

APPENDIX B

Horizon 2040 Land Use Documentation and Planning Assumptions

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The model set used for the Horizon 2040 Metropolitan Transportation Plan (MTP) includes a base year of 2010 and a forecast year of 2040. Interim year models of 2020 and 2030 are used as well; they are required for SRTC’s transportation air quality conformity determination.

Federal transportation planning regulations require documentation of the input assumptions and methods used for developing forecasts. This documentation includes an inventory of the current state of transportation in the planning area, key planning assumptions used in developing forecasts, and descriptions of the methods used to develop forecasts of future travel demand.

INVENTORY OF CURRENT CONDITIONS

The foundation for any travel forecast is a comprehensive inventory of current conditions of transportation supply and demand. The current transportation network (including roadways, transit, nonmotorized and freight) and conditions (including Vehicle Miles Traveled, congestion, land use) are documented in Chapter 2 - Where We’re At.

PLANNING ASSUMPTIONS

The principal determinants of any long-range travel demand forecast are the planning assumptions about the growth and distribution of population, developed land, and individual travel preferences.

LAND USE

A key aspect of SRTC’s travel demand model is land use. For SRTC’s purposes, land use consists of housing units, employees, hotel rooms, and higher education commuter students (see illustration in Figure B.1). These land uses play an important role in development of the model as they are key inputs for the generation and distribution of trips.

Figure B.1 Generalized Land Use in the Travel Demand Model



Land Use Categories

For modeling purposes, these land uses are broken down into 12 detailed categories, which are associated with different travel behaviors. For example, a commercial establishment such as a fast food restaurant is likely to generate more traffic than an office. The type of trips and time of day they are taken differ as well. **Table B.1** lists the land use categories used in the SRTC model.

Table B.1 SRTC Land Use Categories

Land Use Type	Description	Unit Measurement
1	Single Family Residential	# of units/zone
2	Multi-Family Residential	# of units/zone
3	Hotel/Motel	# of rooms or camp spaces/zone
4	Agriculture, Forestry, Mining, Industrial, Manufacturing, and Wholesale	# of employees/zone
5	Retail Trade (Non-Central Business District)	# of employees/zone
6	Services and Offices	# of employees/zone
7	Finance, Insurance, and Real Estate Services (FIRES)	# of employees/zone
8	Medical	# of employees/zone
9	Retail Trade (CBD)	# of employees/zone
10	Higher Education Commuter Students	# of higher education commuter students/zone
11	Education Employees	# of employees/zone
12	University Employees	# of employees/zone

Traditionally, SRTC has used Standard Industrial Classification Codes (SIC) to determine the appropriate land use category for any given employer/establishment. SIC are four digit codes created by the federal government. SIC is being replaced by the more modern, six digit, North American Industry Classification System (NAICS) codes. SRTC’s land use categories are SIC based. Staff devised a method to use the modern NAICS codes in SRTC’s SIC based land use categories and outlined a process to convert all employer data from NAICS to SIC. This allows for the assignment of NAICS based employers into SRTC’s SIC based land use categories.

Transportation Analysis Zones

Each land use has a value for the number of housing units, employees, hotel/motel rooms, or higher education commuter students. Whatever the data source, all land uses are geocoded by SRTC staff. Geocoding assigns a point location to all data, based on tabular information such as an address. Using Geographic Information Systems (GIS), the land use totals are aggregated by Transportation Analysis Zone (TAZ), which are the primary units of analysis in the SRTC travel demand model.

The final product that is supplied to SRTC modeling staff is a table containing the total of each type of land use, for each TAZ (see **Table B.2** for example).

Figure B.1 Generalized Land Use in the Travel Demand Model

TAZ_Number	SingleFamilyHousing	MultiFamilyHousing	HotelsMotels	IndustrialEmployees	RetailEmployees
246	0	0	0	142	2
247	0	0	0	257	9
248	12	22	78	29	42
249	15	6	0	60	11
250	0	2	0	6	94
251	122	16	20	0	21
252	134	10	0	0	5
253	201	8	0	2	0
254	7	120	0	0	0
255	61	88	0	0	7

In the spring of 2011, SRTC staff delineated a new TAZ structure through a planned 10 year update process directed by the U.S. Census Bureau with assistance from other federal agencies. The primary goal in the TAZ delineation process was to further refine the TAZ structure for modeling purposes while maintaining reasonable TAZ sizes for statistical data purposes. SRTC based the new TAZ structure on the previous structure, but increased the number of TAZs from 454 to 519 TAZs in Spokane County. In addition to being used for travel modeling, TAZs are also the geographic units for which specialized data products are published, such as Census Transportation Planning Products (CTPP).

2010 LAND USE DEVELOPMENT

SRTC staff used a number of data sources to establish the land use values for the 2010 base year model (**Table B.3**). A number of steps are taken to ensure the accuracy of the base land use data.

Housing Units

For travel demand modeling, the SRTC model uses single-family and multi-family housing units to represent where people live as part of the trip generation process. For Housing Unit (Single Family and Multi Family) categories, staff used the housing unit counts directly from the 2010 Decennial Census.

Vacancy Rates

In previous modeling work done at SRTC a uniform vacancy rate was applied within the travel demand model. For the most recent model update, SRTC staff applied the vacancy rate to each TAZ within the model. Occupied, vacant, and total housing unit counts are available in the 2010 decennial Census. SRTC staff used this data to calculate a vacancy rate for each TAZ in Spokane County. The rate was applied to the Single Family (SF) and Multi-Family (MF) housing units in each TAZ. This method allows the model to reflect the spatial differences in vacancy rates through Spokane County and the SRTC TAZ structure.

Employment

The primary source for employment data is Washington State's Employment Security Department (ESD). This dataset contains the majority of the employers and establishments in Spokane County. This includes their location, number of employees, and industrial classifications, among other attributes. Staff takes measures to ensure the confidentiality of individual establishments is

maintained, per agreement with ESD. Staff research supplements the ESD data in cases where clarification or further detail is needed. For example, many employers report their information to ESD at a single location such as a headquarters, instead of the multiple office locations their employees report to. In these cases staff refines the ESD data to account for the number of employees at each location.

Hotel and Motel Rooms

For Hotel and Motel rooms SRTC uses data from the Washington State Department of Health (DOH) on transient accommodations. This data includes employee counts and number of rooms; staff research supplements the data provided by DOH in cases of absent or unclear information.

Higher Education Commuter Students

SRTC staff generates the higher education commuter students category by contacting the higher education institutions throughout Spokane County. Generally, higher education establishments provide SRTC with their total enrollment, and their total resident student population. The resident student population is subtracted from total enrollment to determine the commuter student population. When available, other non-commuting populations such as online only students are removed from the commuter student population as well.

Table B.3 Base (2010) Land Use Values

	2010 Base
Population	471,221
Employment	194,546
Hotel Rooms	6,732
Higher Education Commuter Students	25,405

2040 LAND USE DEVELOPMENT

The first step in producing land use for 2040 was determining an appropriate forecast of population and employment.

Population

SRTC staff started the population forecasting process by reviewing numerous current and historical forecasts. Washington State's Office of Financial Management (OFM) Forecasting Division released its 2011 state population forecast in November of 2011. In the spring of 2012 OFM released their 2012 county forecast series for Growth Management. This series is released by OFM every five years to allow counties to perform required planning under Washington State's Growth Management Act. SRTC consulted with a number of Metropolitan Planning Organizations (MPOs) in the state regarding their efforts to forecast for local planning. Also consulted were economists from Avista Utilities. Avista maintains forecasts on a regular basis for their service areas, in order to plan for future utility usages. During the forecast review and development process, staff consulted with local planners and experts from other jurisdictions and agencies as well. The ad-hoc group of local planners was consulted and met in April of 2012 to discuss the upcoming processes of forecasting and allocating the future growth to each jurisdiction. SRTC staff reviewed historical growth trends in Spokane County. Census data and estimates from OFM were reviewed. SRTC staff's intention was to use all the tools available to formulate a forecast recommendation, and to provide the SRTC Policy Board all the applicable information to allow them to make an informed decision.

Employment

For forecasting employment, staff reviewed current and historical ratios in Spokane County between population and employment.

Despite small fluctuations in this ratio, and changes in population and employment over time, this ratio did not fluctuate significantly over time. Because of this, staff felt it appropriate to first forecast population, and then forecast employment based on the population forecast. Staff maintained the current ratio between employment and population and applied it to the 2040 population forecast to arrive at the 2040 employment forecast. Population and employment forecasts established separately could potentially produce diverging forecasts and a less logical relationship between population and employment through the forecast period.

SRTC Board and Committee Review

Staff briefed the SRTC Policy Board and Transportation Technical Committee (TTC) in 2012 on historical trends in population and employment growth, how other MPOs were forecasting, current and recent forecasts from various agencies, recent trends in forecasting, and expert opinions from local experts and jurisdictional planning staffs. Starting in February 2012, SRTC staff presented and asked for feedback on the land use process to the SRTC Policy Board and the TTC. Staff also briefed the Transportation Advisory Committee (TAC), and consulted with an ad-hoc group of local land use planners throughout the process. Included in these activities were discussions on forecasting and methods of allocating those forecasts to the jurisdictional level.

In June of 2012 the SRTC Policy Board adopted the following forecast (**Table B.4**).

Table B.4 Adopted 2040 Land Use Forecast

	2040 Forecast	2010-2040 Growth
Population	636,000	164,779
Employment	262,576	68,030
Hotel Rooms	9,086	2,354
Higher-Education Commuter Students	34,289	8,884

The 2040 population forecast adopted by the SRTC Policy Board is approximately 7% higher than OFM’s 2012 medium forecast for Spokane County’s 2040 population (592,969).

Sub-County Allocations

In addition to adopting a 2040 population and employment forecast, the SRTC Policy Board also adopted growth allocations for each jurisdiction in Spokane County. This process of allocating the future growth is equally as important as the forecast itself. Where growth occurs plays a major role in how the travel demand model shows future travel patterns and demand.

Allocation Assumptions

Staff prepared a recommendation on the percentage of the growth that should be allocated to each municipality and unincorporated Spokane County. Separate recommendations were made for housing units, employees, hotel/motel rooms, and higher education commuter students. SRTC staff produced research and analysis in conjunction with many local experts and planners. Historical growth trends in both population and employment were reviewed. A series of SRTC model land use datasets were applied to a historical TAZ structure and compared over time. The section below outlines generalized assumptions made regarding the allocation of future land use to the jurisdiction level.

Population

SRTC decided to take advantage of the Regional Land Quantity Analysis (LQA), as one of the tools in determining where to locate future population growth. In 2010, the Planning Technical Advisory Committee (PTAC) published their Land Quantity Analysis Report. This report was amended in May of 2011.¹ The LQA is a GIS based tool that identifies vacant residential lands on a parcel by parcel basis. It accounts for numerous factors such as lands needing to be set aside for infrastructure, and a market factor that assumes only a certain percentage of land owners will be willing to sell or develop their land in the 20 year time frame. Certain lands deemed ‘undevelopable’ are removed, such as excessively steep slopes or wetlands. Each jurisdiction completes their own LQA based on a set of methods outlined in the county-wide planning policies (CWPP). Each LQA was compiled into the 2010 LQA report and updated May 2011 report. The City of Medical Lake had an updated LQA performed by Spokane County staff in 2012. The LQA represents a regionally adopted process for analyzing residential land capacity. A considerable amount of time and effort went into the LQA analysis. Additionally, the LQA coincides with the 2010 base year and 2010 Decennial Census counts. Therefore, it was seen as a valuable tool to assist in the allocation process.

For future population allocation, a certain percentage of the population growth is allocated to the rural portion of unincorporated Spokane County. For LQA purposes this has been 20%. This amount was based on analysis of building permits done by Spokane County; the analysis has been used in regional planning efforts. After consultation and feedback from local land use planners, there was concern that may be too high of a growth factor in rural

¹ <http://www.spokanecounty.org/data/buildingandplanning/lrp/documents/PTC%20LQA%20report%202010.pdf>

Spokane County. It was felt that much of the growth seen in rural areas was less rural in nature. Pre Growth Management Act plats and developments that were already vested were likely inflating the amount of rural growth. As these vested developments are built over time, it was expected that rural growth would slow. Further discussion on rural growth, and research into these vested developments solidified the assumption that rural growth would slow. In the SRTC forecast and allocation 20% of the population growth from 2010-2020 is allocated to rural Spokane County. That factor is decreased to 10% after 2020.

The LQA does not account for infill/increased density developments, the City of Spokane being the only exception. There is an assumption of increased density and infill in the Downtown and U-District areas due to approved plans there. This accounts for a capacity for approximately 6,000 additional residents in those areas.

Employment

In order to effectively allocate future employment growth SRTC staff felt a good understanding of historical employment growth trends was necessary. Unlike population, there is no comprehensive analysis on employment (commercial, industrial, etc.) capacity. The PTAC did complete an industrial and commercial LQA, to a degree of less detail than in the residential LQA report. Staff has consulted both the commercial and industrial LQA in this process. Essentially, there is excess capacity throughout Spokane County for both commercial and industrial acreage. There is difficulty in determining the exact capacity of employment as there are so many variables depending on the type of business or agency occupying a particular location. There is capacity for all of the forecasted employment growth in any number of areas.

As a tool in determining where to allocate future employment, SRTC

compiled a set of historical land use data used for agency modeling purposes. After review, the best quality datasets were from the years 1995 and 2000. Both of these sets of land use data used a TAZ structure known as TAZ428. They were added using GIS overlay to the TAZ428 GIS based features so they could be compared. The 2010 employment based land use was also added to the TAZ428 structure. The end result was a TAZ structure that had three different time periods of land use for comparison. Certain land uses that did not exist in the older historical data were removed in order to compare the same datasets over time. Calculations were then made comparing the employment based land use from each time period to each other. The result was a TAZ structure where the historical land use could be compared: 1995, 2000, and 2010.

An approximation of jurisdictional growth during the same 1995, 2000, 2010 periods was made using the TAZ428 analysis as well. TAZs that most closely reflected 2010 municipal boundaries have historical growth trends generated from the TAZ428 analysis.

The US Census Bureau program Local Employment Dynamics (LED) uses state employment agency data to share and analyze employment related data. For Washington State, the LED program partners with Washington's Employment Security Department. SRTC used data from this program to track jurisdictional employment over time. Using SRTC's trends analysis as well as data from the Census Bureau's LED program allowed for comparison of employment trends. In general the two data sources were consistent in reflecting the same employment trends by jurisdiction over time.

Due to the recent economic recession, most jurisdictions as well as the county as a whole have recently experienced a decrease in total employment. These decreases are seen as temporary and should generally not be viewed as long term trends. In nearly all cases the

economic effects of the recession can be sorted through, and the long term trends can still be interpreted.

The employment allocations used in the SRTC forecast model are based on current (2012) municipal boundaries. Jurisdictional planning staffs in coordination with SRTC staff distributed their land use allocations based on 2012 jurisdictional boundaries without assumption or speculation as to future municipal boundaries and annexations.

Analysis for Jurisdictional Employment Allocations

The following section outlines the general employment trends by jurisdiction from the two separate data sources listed above. A generalization of the recent trends and development in employment using these two sources is summarized in the comments for each jurisdiction. As SRTC and agency staff determined the most appropriate employment forecast for each jurisdiction, both sources of historical employment trends (Census LED, SRTC Trends Analysis) were a valuable supplement used in determining future growth. Tables of these employment trends are included for each jurisdiction.

Airway Heights:

SRTC trends analysis for the City of Airway Heights shows very strong employment growth, as well as an increasing share of total employment in Spokane County. LED data show the same trend from 2002-2010 (see **Table B.5**). The West Plains has seen significant development in recent history and this trend is expected to continue. The potential for continued development along Highway 2, industrial and aerospace development, and tribal trust lands development suggest the City of Airway Heights will continue to grow and have a larger share of total employment in 2040 than it does now. The City also has a significant population capacity

of 3,944 listed in the May 2011 LQA report. It is also expected that some non-residential development in the area will occur to support the local population growth. The City of Airway Heights has considerable acreage of undeveloped land to support its continued growth. SRTC assumes a share of total employment at three percent of countywide total in 2040.

Table B.5 Airways Heights Employment Growth Trends

	2010	2009	2008	2007	2006	2005	2004	2003	2002
Total Employment	3,700	3,700	3,230	2,798	2,576	2,425	1,933	1,666	1,547
Share of County Total	1.75%	1.77%	1.50%	1.30%	1.23%	1.20%	0.98%	0.87%	0.81%

Source: Census LED

	2010	2000	1995
Total Employment	3,932	2,212	981
Share of County Total	2.22%	1.24%	0.67%

Source: SRTC Trends Analysis

Cheney:

Based on LED data, Cheney is slowly increasing its total share of employment in Spokane County. SRTC trends analysis suggests this as well (**Table B.6**). Cheney has seen healthy employment growth over the last ten to fifteen years. Cheney is unique in that a major portion of its employment and residences are due to Eastern Washington University (EWU). Cheney has capacity for over 3,300 persons according to the May 2011 LQA report. Growth of EWU, the general population, and a continued healthy employment base in the area are expected. Cheney has a larger portion of non-working population since there are several thousand resident university students. The employment growth in Cheney has not been as rapid as Airway Heights or Liberty Lake; however it is expected that

Cheney’s share of total county employment will increase to 2.5 to 3 percent of the countywide total.

Table B.6 Cheney Employment Growth Trends

	2010	2009	2008	2007	2006	2005	2004	2003	2002
Total Employment	3,938	3,848	3,813	3,675	3,661	3,497	3,393	3,265	3,218
Share of County Total	1.87%	1.84%	1.77%	1.71%	1.75%	1.72%	1.72%	1.70%	1.69%

Source: Census LED

	2010	2000	1995
Total Employment	1,684	1,695	595
Share of County Total	0.95%	0.95%	0.40%

Source: SRTC Trends Analysis

Deer Park:

Both LED data and SRTC trends show a small but steady increase in the City of Deer Park’s share of total employment in Spokane County (**Table B.7**). There is population capacity of 2,405 according to the May 2011 LQA report. SRTC expects continued moderate but steady employment growth in Deer Park to support its growing residential population. In SRTC’s allocations the current ratio between population and employment is forecasted to remain the same over the forecast period.

Table B.7 Deer Park Employment Growth Trends

	2010	2009	2008	2007	2006	2005	2004	2003	2002
Total Employment	1,592	1,539	1,564	1,544	1,485	1,373	1,358	1,302	1,306
Share of County Total	0.75%	0.74%	0.72%	0.72%	0.71%	0.68%	0.69%	0.68%	0.68%

Source: Census LED

	2010	2000	1995
Total Employment	1,105	986	483
Share of County Total	0.63%	0.55%	0.33%

Source: SRTC Trends Analysis

Liberty Lake:

Liberty Lake has had major growth in employment according to the SRTC trends analysis. LED data also suggests significant growth; however total employment is somewhat erratic (**see Table B.8**). There is much evidence of employment growth in Liberty Lake from other sources. Large increases in population over the last ten years have also been measured. Based on the May 2011 LQA report, Liberty Lake has population capacity for 8,460. With the potential for large population growth, and major undeveloped acreage for all types of development, Liberty Lake is expected to see continued significant employment growth. While SRTC expects significant growth in both population and employment, population growth is expected to outpace employment growth slightly, therefore the number of employees per residents will see a decrease over the forecast period.

Table B.8 Liberty Lake Employment Growth Trends

	2010	2009	2008	2007	2006	2005	2004	2003	2002
Total Employment	6,895	7,016	8,287	8,396	7,653	7,238	6,185	6,523	6,673
Share of County Total	3.27%	3.35%	3.84%	3.90%	3.65%	3.57%	3.14%	3.39%	3.49%

Source: Census LED

	2010	2000	1995
Total Employment	4,625	4,182	2,177
Share of County Total	2.62%	2.35%	1.48%

Source: SRTC Trends Analysis

Medical Lake:

SRTC trends analysis show the City of Medical Lake has a continual decrease in its share of total employment in Spokane County. LED data shows the same, with a large spike in total employment for 2010 (**Table B.9**). Other than this anomaly, the trend of very limited employment growth and/or decline is quite clear. The spike in 2010 may be due to the way ESD reports state employees in the medical profession in the city. The SRTC employment count for Medical Lake in 2010 is 1,959. Medical Lake is primarily a bedroom community, with a limited amount of services that support the local population; the exception being a major share of employment in the health sector with Eastern State Hospital and other medical facilities. SRTC expects very limited employment growth in Medical Lake to 2040. The population capacity for Medical Lake is 1,261 persons, based on a recently completed update of Medical Lake’s LQA by Spokane County staff. With the potential for that population growth, SRTC expects smaller employment gains in support of the local population. This limited growth produces a small decrease in the total share of county employment the City of Medical Lake would have in 2040.

Table B.9 Medical Lake Employment Growth Trends

	2010	2009	2008	2007	2006	2005	2004	2003	2002
Total Employment	1,869	475	469	466	495	488	509	553	533
Share of County Total	0.89%	0.23%	0.22%	0.22%	0.24%	0.24%	0.26%	0.29%	0.28%

Source: Census LED

	2010	2000	1995
Total Employment	1,652	1,901	2,700
Share of County Total	0.93%	1.07%	1.84%

Source: SRTC Trends Analysis

Millwood:

The Town of Millwood is a relatively small municipality with a 2010 Census population of 1,786. Both SRTC trends analysis and LED data show employment in the Town of Millwood relatively stable over time (**Table B.10**). The town is more or less built out as there is almost no vacant land available. SRTC expects slight growth as continued growth in surrounding areas will place more demand on services in Millwood. There is no expectation the Town of Millwood will increase its share of total employment in Spokane County. According to the May 2011 LQA report, Millwood has capacity for 258 persons. A small degree of employment growth in Millwood is likely to occur in support of area populations. Established businesses and a limited amount of available lands can also contribute to the slight employment growth expected in Millwood to 2040.

Table B.10 Millwood Employment Growth Trends

	2010	2009	2008	2007	2006	2005	2004	2003	2002
Total Employment	933	960	1,033	1,040	1,043	1,016	1,091	993	906
Share of County Total	0.44%	0.46%	0.48%	0.48%	0.50%	0.50%	0.55%	0.52%	0.47%

Source: Census LED

	2010	2000	1995
Total Employment	835	979	398
Share of County Total	0.47%	0.55%	0.27%

Source: SRTC Trends Analysis

Spokane:

Both LED and SRTC trends analysis suggest slow and steady growth over time in the City of Spokane (see **Table B.11**). They both also show a decreasing share of total employment, as areas outside of Spokane are growing faster. The majority of employment in Spokane

County is within the City of Spokane. Spokane’s population capacity based on the May 2011 LQA report is just over 38,000. SRTC expects continued growth in the City of Spokane; but a continued slight decrease in the total overall share of countywide employment. There are less available lands in Spokane than elsewhere in the County, and the data shows that growth outside the city has clearly outpaced growth inside the city. Developments in already established areas, as well as development in the West Plains and along the North-South Corridor are likely to continue Spokane’s steady growth over time. Spokane has the majority of employment in 2010 and is expected to have the most employment of any jurisdiction into the year 2040. SRTC’s allocation of employment to Spokane essentially maintains the ratio between population and employment through the 2040 forecast period.

Table B.11 Spokane Employment Growth Trends

	2010	2009	2008	2007	2006	2005	2004	2003	2002
Total Employment	117,735	117,995	119,479	118,029	117,001	113,364	112,086	110,016	109,996
Share of County Total	55.83%	56.40%	55.31%	54.81%	55.78%	55.88%	56.91%	57.15%	57.60%

Source: Census LED

	2010	2000	1995
Total Employment	98,182	105,691	94,034
Share of County Total	55.54%	59.46%	63.95%

Source: SRTC Trends Analysis

Spokane Valley:

Based on SRTC trends analysis, no jurisdiction has had greater total employment growth than the City of Spokane Valley. Other cities have had greater percentage increases, but Spokane Valley has had

the greatest total growth. According to SRTC trends analysis, much of this growth was during the 1990’s. LED data suggests that this strong growth has continued through the last decade (**Table B.12**). Most jurisdictions have the capacity for significant employment growth, and Spokane Valley is included as it has a large amount of vacant and undeveloped land and has shown steady employment growth throughout the analyses periods. There is population capacity for 16,493 in Spokane Valley according to the May 2011 LQA report. SRTC expects continued strong employment growth in Spokane Valley. The rate of employment growth is expected to outpace that of population. Accordingly the number of employees per residents will increase a small degree over time.

Table B.12 Spokane Valley Employment Growth Trends

	2010	2009	2008	2007	2006	2005	2004	2003	2002
Total Employment	48,665	46,877	49,873	51,738	49,427	48,208	46,286	44,361	43,447
Share of County Total	23.08%	22.41%	23.09%	24.03%	23.56%	23.76%	23.50%	23.05%	22.75%

Source: Census LED

	2010	2000	1995
Total Employment	40,922	39,302	25,616
Share of County Total	23.15%	22.11%	17.42%

Source: SRTC Trends Analysis

Unincorporated Spokane County:

Rural Spokane County has seen very limited growth over the analyses periods, while urban Spokane County as seen moderate growth. Municipalities have annexed areas from the unincorporated county that will limit the county’s potential for employment growth; most notably the West Plains annexation earlier this year. Compared to

municipalities in the region, there is a very low ratio of employees per residents in the unincorporated county. This is no surprise as there are far more residents than jobs, especially in the rural areas. There is considerable population capacity in the unincorporated county, with an urban capacity of 43,023 persons. SRTC expects employment growth in the denser areas where significant population growth is possible. Very limited employment growth is expected in the rural areas (see **Table B.13** for historic trends). SRTC expects the ratio of employment to residents to decrease slightly as more employment growth will occur in denser areas and less land is available for county growth due to annexation.

Table B.13 Unincorporated Spokane County* Employment Growth Trends

	2010	2009	2008	2007	2006	2005	2004	2003	2002
Total Employment	25,545	26,806	28,274	27,659	26,431	25,249	24,121	23,811	23,338
Share of County Total	12.11%	12.81%	13.09%	12.84%	12.60%	12.45%	12.25%	12.37%	12.22%

Source: Census LED *Approximation of Unincorporated boundary

County Urban	2010	2000	1995
Total Employment	18,420	15,819	9,993
Share of County Total	10.42%	8.90%	6.80%

Source: SRTC Trends Analysis

County Rural	2010	2000	1995
Total Employment	5,423	4,981	10,057
Share of County Total	3.07%	2.80%	6.84%

Source: SRTC Trends Ana

County Unincorporated	2010	2000	1995
Total Employment	23,842	20,800	20,050
Share of County Total	13.49%	11.70%	13.64%

Source: SRTC Trends Analysis

The Five Palouse Towns (Waverly, Spangle, Latah, Rockford, and Fairfield):

The towns of Waverly, Spangle, Latah, Rockford, and Fairfield are often referred to as the Five Palouse towns. They are smaller municipalities located in Southeast Spokane County. These five places are unique in that there are multiples towns within single TAZs. As they are such small areas in both size and population, getting useful employment or other statistics for them can be challenging. They do vary in population and employment, and SRTC expects the potential for limited growth in both categories for each of them. Their individual population capacities can be found in the LQA report; they range from 67 persons in Latah to 350 in Spangle. They have been given a growth factor in magnitude reflective of their base year population and employment; the total employment and population allocations for each are comparatively quite small, and will be aggregated into the surrounding larger TAZ structure.

Jurisdiction Allocations

In the following tables are SRTC’s allocations of population (**Table B.14**) and employment (**Table B.15**) growth, which were adopted by the SRTC Policy Board in June of 2012. These figures for the allocations below are based on the 2040 population forecast of 636,000.

Table B.14 SRTC Policy Board Adopted Population Allocation

Jurisdiction	2010 Population	Percent Growth Allocated	Total Population Growth	2040 Population
Airway Heights	6,114	2.88%	4,752	10,866
Cheney	10,590	2.46%	4,055	14,645
Deer Park	3,652	1.76%	2,897	6,549
Fairfield	612	0.19%	318	930
Latah	183	0.08%	130	313
Liberty Lake	7,591	6.19%	10,192	17,783

Jurisdiction	2010 Population	Percent Growth Allocated	Total Population Growth	2040 Population
Medical Lake	5,060	0.92%	1,519	6,579
Millwood	1,786	0.19%	311	2,097
Rockford	470	0.20%	328	798
Spangle	278	0.26%	422	700
Spokane	208,916	27.80%	45,814	254,730
Spokane County	136,108	44.96%	74,089	210,197
Spokane Valley	89,755	12.06%	19,871	109,626
Waverly	106	0.05%	81	187

Table B.15 SRTC Policy Board Adopted Employment Allocation

Jurisdiction	2010 Employment	Percent Growth Allocated	Total Employment Growth	2040 Employment
Airway Heights	4,707	4.50%	3,061	7,768
Cheney	3,880	4.50%	3,061	6,941
Deer Park	1,381	2.00%	1,361	2,742
Fairfield	123	0.08%	54	178
Latah	11	0.02%	14	24
Liberty Lake	4,460	8.00%	5,442	9,903
Medical Lake	1,959	0.75%	510	2,470
Millwood	467	0.40%	272	739
Rockford	121	0.08%	54	176
Spangle	58	0.05%	34	92
Spokane	111,044	36.60%	24,899	135,943
Spokane Valley	45,102	27.00%	18,368	63,470
Waverly	15	0.02%	14	28
Spokane County	19,054	16.00%	10,885	29,939

Hotel and Motel Accommodations

The land use for hotels, motels, and other transient accommodations is based on the number of rooms and not employees. Not all jurisdictions in Spokane County have hotel/motel land use. Staff

evaluated applying a flat rate of growth to this land use, while maintaining the category only in jurisdictions where it already existed. After further consideration staff decided to make the adjustments seen in the **Table B.16**. These adjustments account for the faster rate of growth expected in some of the peripheral jurisdictions in employment and population. This method allocates this land use at a higher rate of growth for Cheney, Airway Heights, Liberty Lake, and the unincorporated Spokane County. The Cities of Spokane and Spokane Valley still share the super majority of this land use in 2040. The allocation does not speculate regarding new hotels/motels in jurisdictions currently without that land use category.

Table B.16 SRTC Policy Board Adopted LU3 Allocation

Jurisdiction	2010 Hotel & Motel Rooms	Percent Growth Allocated	Total Hotel & Motel Room Growth	2040 Hotel & Motel Rooms
Airway Heights	154	7.30%	172	326
Cheney	54	7.30%	172	226
Deer Park	0	0.00%	0	0
Fairfield	0	0.00%	0	0
Latah	0	0.00%	0	0
Liberty Lake	146	9.75%	230	376
Medical Lake	0	0.00%	0	0
Millwood	0	0.00%	0	0
Rockford	0	0.00%	0	0
Spangle	0	0.00%	0	0
Spokane	4,382	43.80%	1,031	5,413
Spokane Valley	1,465	19.69%	464	1,929
Waverly	0	0.00%	0	0
Spokane County	531	12.15%	286	817

Higher Education Commuter Students

Similar to hotel/motel rooms, the higher education commuter students land use is allocated separately from employees. Growth in higher education commuter students was applied uniformly across jurisdictions that had these students already in the 2010 base year. Staff expects continued university and higher education growth in the cities of Cheney and Spokane. Eastern Washington University has seen continued healthy growth over time as have the higher education institutions in Spokane. Continued development and expansion of the U-District area in Spokane is expected. The allocations of higher education commuter students can be seen in **Table B.17**.

Table B.17 SRTC Policy Board Adopted Higher Education Commuter Student Allocation

Jurisdiction	2010 Higher Education Commuter Students	Percent Growth Allocated	Total Higher Education Commuter Students Growth	2040 Higher Education Commuter Students
Airway Heights	0	0.00%	0	0
Cheney	8,071	32.00%	2,843	10,914
Deer Park	0	0.00%	0	0
Fairfield	0	0.00%	0	0
Latah	0	0.00%	0	0
Liberty Lake	0	0.00%	0	0
Medical Lake	0	0.00%	0	0
Millwood	0	0.00%	0	0
Rockford	0	0.00%	0	0
Spangle	0	0.00%	0	0
Spokane	15,592	61.83%	5,493	21,085
Spokane Valley	120	0.48%	42	162
Waverly	0	0.00%	0	0
Spokane County	1,436	5.69%	506	1,942

Fairchild Air Force Base

Fairchild Air Force Base (FAFB) plays an important role in Spokane County. It is a major regional employer and accounts for numerous residents in the area, both civilian and military. Regarding future land use, SRTC is carrying out the same process that was done in 2008. There is no distinctly clear expectation for the future of the base, as military missions can change over time. These changes are often based on factors outside of those occurring locally. The possibility for both increased or decreased land uses exist. Therefore, in consultation with FAFB planners and local jurisdictions, SRTC is not making any future year adjustments to the base year land use for TAZ 549 which encompasses FAFB. Opportunities for scenario planning in regards to FAFB will allow SRTC to analyze potential future missions and base activities.

Tribal Land Uses

Within Spokane County are both Kalispel Tribe of Indians and Spokane Tribe of Indians Trust Lands. These lands are located on the west plains near the City of Airway Heights. For future land uses, SRTC referred to data from the West Plains-Spokane International Airport (WP-SIA) Transportation Study. This study was adopted by the SRTC Policy Board in 2011. The WP-SIA study began in 2008; both the Spokane and Kalispel Tribe had representatives on the WP-SIA Stakeholder Technical Committee. **Table B.18** illustrates the future/additional land use placed in 2040 for Tribal developments, based on the WP-SIA study.

Table B.18 Tribal Trust Lands 2040 Land Use (this is growth not 2040 numbers)

Spokane Tribe Trust Lands	Kalispel Tribe Trust Lands
TAZ 463	TAZ 461 & 462
1080 Commercial Employees	679 Commercial Employees
37 Office Employees	338 Office Employees
0 Industrial Employees	226 Industrial Employees
286 Hotel Rooms	100 Hotel Rooms

TAZ Allocation

After the process of forecasting and allocating growth to the jurisdictional level was complete, the final step was to distribute the allocated growth to the TAZ level. SRTC staff worked with local jurisdictions and provided research and materials to assist in the process of distributing the future growth to the TAZ level.

Available lands for continued development were reviewed to ensure the capacity for prospective growth. Many jurisdictions used their recently completed land quantity analyses (LQA) to assist in distributing their population growth and housing units. Jurisdictions were encouraged to incorporate local and regional plans as they located future growth. SRTC staff held numerous meetings with local agencies as they went about this process. The result was future land use growth determined for 2020, 2030, and 2040 for all TAZs in Spokane County.

Application of Vacancy Rates

When the collaborative process of placing future growth was completed, SRTC staff made adjustments to account for vacant housing units in the new housing unit growth. All new housing units were adjusted by TAZ for vacant units by applying the occupancy rate from the 2010 Census for Spokane County to all new housing units by TAZ. This reflected standardized vacancy rates across

Spokane County for all new units, while maintaining the spatial distribution of vacancy rates in the 2010 base year housing units.

DEMOGRAPHIC AND TRAVEL BEHAVIOR CHANGES

The Horizon 2040 models are based on the demographic characteristics and travel behaviors identified by the 2005 Spokane and Kootenai County Regional Travel Survey. The results of the survey can be found on SRTC’s website.

Demographics currently utilized in the model include household income, household size (in persons), and number of workers per household. As described in Chapter 2 - Where We’re At, demographic trends have fluctuated significantly in recent decades. However, for modeling purposes, the demographic characteristics included in the model are presumed to remain stable through the planning horizon. With the completion of a new regional household travel survey, it may be possible to analyze historical trends in demography and make reasonable assumptions about demographic changes for future horizon year models.

Travel behaviors are also discerned from the travel survey. Behaviors such as mode preference, number of trips per household per day, fluctuations in parking prices and/or gas prices, may be revealed with additional travel surveys over time. However, the current model sets do not presume any fundamental changes in household travel behaviors between the 2010 and 2040 models.

FORECASTING METHODS

The complexity of an MPO’s forecasting methods can vary considerably, depending on current transportation conditions, and on the future transportation investments and policies being

evaluated. Current forecasting methods and model details are described below.

LATEST MODEL REVISION

The Horizon 2040 model set was developed using a 2010 model that was significantly restructured in 2012. The model was updated with major reconstruction of the trip generation, trip distribution and mode choice components of the model. The update also introduced a walk/bike mode choice to the modeling process and enabled vehicular access on the road to access transit park and rides. The resulting 2010 model is a fully calibrated and validated 2010 model.

NETWORK CHARACTERISTICS

Network characteristics vary slightly for each model in the Horizon 2040 model set. This is due to different projects and associated network changes that are present in each model. The network characteristics provided below are for the 2010 model.

The model includes 565 Transportation Analysis Zones (TAZs). Of the total, 12 are park and ride locations, 34 are external zones, and the remaining 519 are standard TAZs.

There are 17,798 active links, or roadway segments, in the model (65,956 total). Active links include all roadways classified as collector or higher. In addition, a number of local roads are also activated for travel to better reflect local travel patterns. There are many inactive links that are included in the model for illustrative purposes; they are not utilized in the modeling process.

There are 8,519 active nodes in the model (24,130 total). Nodes represent intersections and may be classified as signalized, stop

controlled, roundabouts, or uncontrolled.

The model uses zone connectors to emulate traffic generated on local roads. There are 5,304 connectors in the model; 112 of these connectors connect external zones or park and rides to the active links in the model network.

MODEL SPECIFICATION

SRTC utilizes VISUM - Version 12 to run a standard four-step gravity model for travel forecasting. The four steps of the modeling process are trip generation, trip distribution, mode choice and network assignment.

Trip Generation

The model utilizes household characteristics and land use data to generate the demand for trips by trip purpose. Table B.19 lists the total households, employment and other trip generator totals for the region in the 2010 and 2040 model.

Table B.19 Trip Generator Regional Totals

Zonal Attribute	2010	2040
Households, 0 Students	115,378	159,257
Households, 1 Student	33,186	45,933
Households, 2 Students	24,510	33,716
Households, 3+ Students	14,110	19,387
Households, 1 Person, 0 Workers	23,207	31,182
Households, 1 Person, 1 Worker	22,525	30,266
(Households, 1 Person, 2 Workers)	0	0
Households, 2 Persons, 0 Workers	17,918	25,212
Households, 2 Persons, 1 Worker	20,224	28,457
Households, 2 Persons, 2 Workers	28,710	40,398

Zonal Attribute	2010	2040
Households, 3 Persons, 0 Workers	3,156	4,375
Households, 3 Persons, 1 Worker	10,755	14,912
Households, 3 Persons, 2+ Workers	16,418	22,764
Households, 4+ Persons, 0 Workers	2,549	3,496
Households, 4+ Persons, 1 Worker	15,956	21,880
Households, 4+ Persons, 2+ Workers	25,747	35,306
Occupied Single-Family Dwelling Units	147,492	193,917
Occupied Multi-Family Dwelling Units	39,676	64,339
Hotel Rooms	7,597	9,952
Industrial Employees	42,948	60,276
Non-CBD Retail Employees	51,314	71,214
Office Employees	38,766	50,283
FIRES Employees	11,697	15,607
Medical Employees	26,902	34,504
CBD Retail Employees	7,266	8,941
Education Employees	11,480	16,017
University Students	25,219	34,090
University Employees	6,544	8,094
XI Productions	57,214	77,119
IX Attractions	38,134	51,391
XI Comm. Veh. Productions	6,780	9,129
IX Comm. Veh. Productions	6,780	9,129
Total Households (all pers, wkrs)	187,165	258,256
Total Employees	196,917	264,936

Trip Distribution

Trip demand that is generated in the trip generation step are distributed geographically throughout the region based on gravity

model functions for the following trip purposes: home-based work/school (HBW), home-based retail (HBR), home-based other (HBO), non-home based (NHB), and commercial (COM). The trip distribution model is a combined gravity formulation. The basic equation is:

$$f(U) = aU^b e^{cU}$$

where (U) is the utility function, which includes composite impedance for drive alone trips and shared ride trips along with terminal time. U is defined by:

$$1 + \text{terminal time} + .85 * \text{Impedance}(\text{drive alone}) + .15 * \text{impedance}(\text{shared ride})$$

The value of the coefficient for each trip purpose is shown below (**Table B.20**).

Table B.20 Trip Distribution Parameters

Trip Purpose	Distribution Parameters		
	a	b	c
Work	1	-0.02	-.123
College	1	-1.75	-0.14
School	1	-2.8	-0.4
Retail	1	-1.7	-0.17
Other	1	-1.8	-0.07
Non-Home	1	-1.7	-0.06
Commercial	1	-0.3	-0.09

The trip distribution was calibrated against the travel survey data. The resulting total person trip demand by trip purpose for the 2010 model is provided in **Table B.21**.

Table B.21 Total Person Trips by Trip Purpose

Trip Purpose	Total Person Trips	%
Work	339,390	15.2%
School	99,304	4.4%
Retail	374,732	16.7%
Other	623,451	27.8%
College	16,744	0.7%
Non-Home	629,491	28.1%
Commercial	156,296	7.0%

Mode Choice

The mode choice model formulation uses a nested Logit structure. This structure takes into account that mode choice requires more than one decision point. Trip makers must first choose between auto, transit (or walking/biking), and then they choose between drive alone or carpool (auto) or to walk or drive to transit (transit). The utility of a mode varies by household characteristics and trip purpose, and includes variables such as travel time, distance, and parking costs (auto); perceived journey time (transit), and fares (transit). The Logit function for mode choice is:

$$f(U) = e^{(cU)}$$

where U is utility and c is 1. The basic utility functions are identical for all trip purposes. The only differences in the utility functions are the coefficients and constants. The basic utility functions from the mode choice model for HBW trips are shown below.

$$U(\text{drive alone}) = -0.03571 * \text{Drive time} + -0.07497 * \text{Distance} + -0.00225 * \text{Daily Parking Cost} + 1$$

$$U(\text{shared ride}) = -0.03571 * \text{Drive time} + -0.03455 * \text{Distance} + -0.00104 * \text{Daily Parking Cost} + -2.25$$

$$U(\text{walk to bus}) = -0.11905 * \text{Perceived Journey Time} + -0.015 * \text{Transit Fare}(\text{origin}) + 0.35 * \text{CBD}$$

$$U(\text{drive to bus}) = -0.11905 * \text{Perceived Journey Time} + -0.015 * \text{Transit Fare}(\text{origin}) + 0.35 * \text{CBD}$$

$$U(\text{walk/bike}) = -1.25 * \text{Travel time} + -0.35$$

The mode share by trip purpose in the 2010 model is shown in **Table B.22**.

Table B.22 Mode Share by Trip Purpose

Mode		Trip Purpose						
		Work	School	Retail	Other	College	Non Home Based	Total
Auto	Drive Alone	83.8%	11.0%	55.1%	35.6%	55.0%	54.3%	51.6%
	Shared Ride	10.5%	41.0%	37.3%	53.6%	12.4%	40.8%	38.8%
Transit	Walk to bus	1.8%	1.0%	1.4%	0.6%	12.4%	0.6%	1.1%
	Drive to bus	0.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%
Walk/Bike		3.1%	47.0%	6.2%	10.3%	20.2%	4.3%	8.3%

The mode choice results from the 2010 model were calibrated against the 2005 Spokane County Household Travel Survey (**Table B.23**).

Table B.23 Mode Share by Trip Purpose, 2010 Model vs. 2005 Survey

	Work		Retail		Other		Non Home Based	
	Model	Survey	Model	Survey	Model	Survey	Model	Survey
Single Occupancy Vehicle	83.8%	84.0%	55.1%	56.5%	35.6%	35.2%	54.3%	54.4%
High Occupancy Vehicle	10.5%	9.5%	37.3%	37.4%	53.6%	56.7%	40.8%	40.4%
Transit	2.6%	3.1%	1.4%	1.4%	0.6%	0.8%	0.6%	0.9%
Walk-Bike	3.1%	3.3%	6.2%	4.7%	10.3%	10.4%	4.3%	4.8%

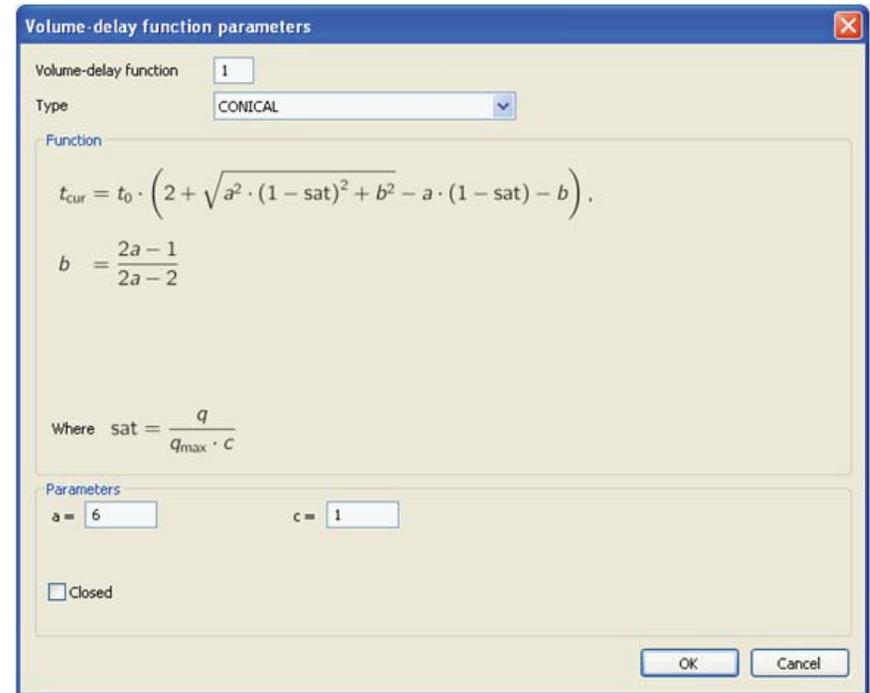
Highway and Transit Assignment

The current model is run for all time periods, however, the model is primarily validated for the PM peak hour and the daily total.

VOLUME DELAY FUNCTIONS

The model utilizes a conical function to calculate volume delay on links. There are currently six variations of the volume delay function used in the SRTC model. The basic structure is identical for all link types; however the parameters vary by link type. The basic formula for the TModel Link volume delay function is shown in **Figure B.2**.

Figure B.2 Conical Volume Delay Function



Facility types represented	a
Freeways, ramps, rural highways	6
Principal urban arterials	5
Minor arterials	4
Collectors (most)	3.5
Rural minor collectors	3
Local, neighborhood, miscellaneous	3

There are also nine node delay functions (five are active) in the model. All of the node volume delay functions are of the TModel type. The basic formulation of the TModel node volume delay function is illustrated below (**Figure B.3**).

Figure B.3 TModel Node Volume Delay Function

The TModel Node function is designed to simulate travel delay that occurs at intersections. The incoming capacity of all links is factored to simulate the capacity of the intersection. The parameters used to calculate node delay is detailed in **Table B.24**

Table B.24 TModel Node Volume Delay Function Parameters

VDF	Sat Crit	Below Critical Saturation Flow Rate					VDF	Sat Crit	Above Critical Saturation Flow Rate				
		a	b	c	d	f			a	b	c	d	f
1	0.00	0.00	0.01	1	0.00	0.00	1	0.00	0.00	1	0.00	0.00	
3	0.90	2.00	3.80	1	30.00	0.10	3	0.90	4.00	6.00	1	30.00	0.10
6	0.90	2.00	3.60	1	30.00	0.10	6	0.90	4.00	4.60	1	30.00	0.10
8	0.85	0.00	4.00	1	30.00	0.15	8	0.85	0.60	6.00	1	30.00	0.15
9	0.95	0.00	4.00	1	25.00	0.05	9	0.95	0.00	4.00	1	25.00	0.05

Node types and corresponding volume delay functions are listed in **Table B.25**

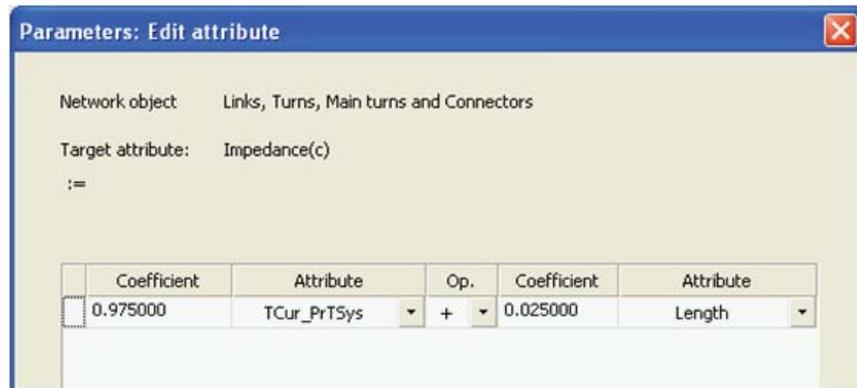
Table B.25 Volume Delay Functions by Node Type

Number	VDF	Intersection Control
1	1	Uncontrolled
2	6	Two-Way Stop
3	3	Signalized
4	6	All-Way Stop
5	1	Diverge
6	6	Emergency Signal
7	9	Merge Point
8	8	Flashing Signal
10	9	Roundabout
11	9	Railroad Crossing Low Use

Impedance Calculation

The impedance function for the base model combines both the link distance as well as travel time. The same impedance function is used for lov, hov and trucks in the model. The weights applied to the travel time and length can be seen in **Figure B.4**.

Figure B.4 Impedance Function



Assignment Validation

The 2010 model weekday assignment results were validated against recent traffic counts in a corridor screenline analysis. Transit assignment is calibrated to 2010 ridership and park & ride usage data. The results of the validation analysis can be found on SRTC’s modeling website, www.srtc.org/model_resource.html.

Model Calibration

The 2010 model was calibrated in 2012 using the 2005 Spokane and Kootenai County Travel Survey. The original survey results were recomputed and refined in 2012.

Calibration of the 2010 model is described in detail throughout Model Specification section, above.

Model Validation

The 2010 model was validated against traffic counts using a screenline analysis. The screenline analysis includes count data from approximately 180 locations across the Spokane region, and was completed in accordance to TMIP protocol and acceptable

deviations. The screenline results are included in the Model Specification section, above.

Traffic count data for screenline count locations are collected by SRTC on an annual basis.

ASSUMPTIONS FOR TRANSPORTATION CONFORMITY (AIR QUALITY) ANALYSIS

Transportation Networks

The transportation networks for the conformity modeling include the existing transportation network and projects from Horizon 2040. The analysis years are 2010, 2020, 2030, and 2040.

Selecting Projects to be Modeled

Projects meeting SRTC’s definition of regional significance are included in the transportation demand model and therefore included in the air quality conformity analysis.

SRTC classifies a transportation project as regionally significant if the project:

1. Cannot be grouped in the TIP and/or State TIP (STIP), and/or it is not listed as an exempt project type in the Environmental Protection Agency’s (EPA’s) regional transportation conformity regulation (40 C.F.R. part 93); and
2. Is on a facility which serves regional transportation needs(federally classified as a principal arterial or higher) and alters the number of through-lanes for motor vehicles, or impacts a freeway or freeway interchange (other than maintenance projects); or

3. Is a new or extended fixed guideway transit service (dedicated bus lanes, vehicle track or wires) or capital expenditures related to a new fixed-route transit service on a facility which serves regional transportation needs (federally classified as principal arterial or higher); or
4. Is determined by the SRTC Policy Board in consultation with the Interagency Consultation Group to be regionally significant or have the potential for adverse emissions impacts for any reason.

Emissions Modeling

For the CO air quality conformity analysis, EPA's MOVES model at the County-level in the emissions inventory mode was used. Many input files were provided by the Washington State Department of Ecology. Some of these files required additional post-processing by SRTC staff, and others were developed by SRTC staff. The key assumptions used in these input files are as follows:

- **Source Type (vehicle) & Age Distribution data** – was provided by the Washington State Department of Ecology
 - o 2011 Vehicle registrations data was provided by the Department of Licensing.
 - o The vehicle population was assumed to increase at the same rate as the modeled VMT (output from SRTC's travel demand models) increased.
 - o The vehicle age distribution was assumed to remain constant in the future years, i.e., the same fraction of age 1, age 2, etc.

- **Vehicle Type VMT**
 - o VMT from SRTC's regional travel demand models was used for the VMT input files. Since MOVES requires VMT by source type and that level of detail is not included in SRTC's model, the MOVES default source type fractions for Spokane County was used.
 - o MOVES default month, day, and hour VMT fractions for Spokane County were used.
- **Fuel data** – was provided to SRTC by the Washington State Department of Ecology
 - o 10% ethanol was used for the current and future year runs.
 - o Gasoline RVP was held constant for all years, and is based on recent estimates provided by Ecology.
 - o Fuel sulfur content is consistent with current fuel regulations.
- **Meteorology Data** – was provided to SRTC by the Washington State Department of Ecology based on a combination of MOVES default data for Spokane County and actual temperature and humidity data.
- **Ramp Fraction**
 - o MOVES default ramp fraction of 8% was used.
- **Road Type Distribution** – was provided by the Department of Ecology; MOVES default data for Spokane County was used. SRTC's travel demand model does not include the required level of detail on source types for this input.
- **Average Speed Distribution** – MOVES default was used.

- **I/M Program** – was provided by the Washington State Department of Ecology; since the program will terminate in 2019 all runs after 2020 did not include the I/M program.
- **California Low-Emission Vehicle (LEV II) Standards**–Washington State adopted the California LEV II standards beginning with 2009 model year vehicle. Since the MOVES model uses federal emissions standards by default, an additional input database (mylevs) is required to inform the MOVES model of these lower standards.
- Market forces that impact improvements in fuels and vehicle technologies; and,
- Travel behavioral changes resulting in less fuel use.

Consistency with Motor Vehicle Emissions Budget

The 2002 motor vehicle emissions budget (MVEB) for the Spokane CO maintenance area is 279 tons per winter day, effective February 14, 2005. (Federal Register: January 28, 2005 (Volume 70, Number 18)).

More information on the air quality conformity determination and the results of the analysis are detailed in **Chapter 4, pages 4-34 through 4-36**.

Future Issues

While there is a large degree of uncertainty in projecting future transportation impacts to air quality in the region, SRTC will continue to track several issues including:

- Reductions in petroleum usage and greenhouse gases due to increased fuel economy as a result of CAFE and RFS2 standards;
- Enactment of strong public policies for requiring greater energy efficiency;