December 8, 2015

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SUBJECT: LAND USE FORECAST TECHNICAL MEMORANDUM

Ms. Bradley-Lowell:

The purpose of this memo is to summarize the existing and forecasted land use data which were used to develop the Mount Vernon citywide transportation planning model.

Introduction

The accuracy of a transportation planning model depends largely on the quality of the land use data used in the model. The location, quantity, and type of land use, both now and in the future, form the backbone of the citywide planning model which is used for the City's Transportation Element update.

As a component of the City's Comprehensive Plan, the Transportation Element is required to be internally consistent with the requirements and assumptions used throughout the Comprehensive Plan. Most important is the use of consistent future land use assumptions. The land use data described here provides that consistency: it is based on the City's 2036 growth targets for population and employment which were developed by Skagit Council of Governments (SCOG), BERK Consulting, and the City of Mount Vernon.

Existing Land Use

For the purposes of transportation planning, land use can be stratified into two general categories: households and employment. Residential land use forecasts are often expressed in terms of population, however for travel demand modeling it is helpful to convert population into trip-generating households.

Current population and household estimates are summarized in **Table 1.** Population represents the current SCOG estimate while average household size was provided by the City and is based on 2010 Census data.

Table 1. Existing Population Estimate

Jurisdiction	2015 Population	Average Household Size (persons / HH)	2015 Households
Mount Vernon UGA	34,969	2.74	12,762

Source: SCOG 2014, BERK Consulting 2014

Existing employment estimates were provided by the City and based on data provided by the Washington State Employment Security Division (ESD). Employment estimates were gathered for employment type and number of employees. Modeled employment type was stratified into eight different employment categories, which are consistent with the categories used in the SCOG regional transportation model. **Table 2** summarizes the

employment categories, including their corresponding North American Industry Classification System (NAICS) code(s), number of employees, and share of total citywide employment.

Table 2. Existing Employment Estimates

NAICS Code	Employment Sector	Employees	Percent
44, 45	Retail	3,418	20.7%
51-56, 61, 71, 72, 81	Finance, Insurance, Real Estate, and Services	2,758	16.7%
Public sector, excluding education	Government	1,265	7.7%
61	Education	1,995	12.1%
22, 42, 48, 49	Wholesale Trade, Transportation, and Utilities	940	5.7%
31-33	Manufacturing	890	5.4%
11, 21, 23	Construction and Resources	1,144	6.9%
62	Health	4,093	2.5%
	Total	16,503	100.0%

Source: ESD 2015, City of Mount Vernon 2015

Land Use Growth Forecast

To ensure internal consistency with the other elements of the Comprehensive Plan Update, the citywide planning model used land use forecasts which are consistent with SCOG growth allocations. These forecasts include total population growth of 12,434 and employment growth of 4,785. **Tables 3** and **4** summarize SCOG population growth allocations and estimated household growth using average household size.

Table 3. Mount Vernon 2015-2036 Population Allocation

Jurisdiction	2015 Population	Population Allocation	2036 Population	Compound Annual Growth Rate
Mount Vernon UGA	34,969	12,434	47,403	1.46%

Source: SCOG 2014, BERK Consulting 2014

Table 4. Mount Vernon 2015-2036 Household Growth

Jurisdiction	Population Allocation	Average Household Size (persons / HH)	Household Growth
Mount Vernon UGA	12,434	2.74	4,537

Source: SCOG 2014, BERK Consulting 2014

Citywide SCOG employment growth allocations are summarized in **Table 5**. The SCOG employment forecast describes growth in a total of five employment categories. For demand modeling purposes, growth allocations were disaggregated to the eight categories described in Table 2 using NAICS code associations and distributing proportionately to the existing employment within each category.

Table 5. Mount Vernon 2036 Employment Growth Forecast

NAICS Code	Employment Sector	Net Growth, 2015-2036
44, 45, 72	Retail	201
51-56, 62, 71, 81	Services	1,936
61, 92	Government/Education	1,774
22, 23, 31-33, 42, 48, 49	Industrial	874
11, 21	Resources	0
	Total	4,785

Source: SCOG 2014, BERK Consulting 2014

Land Use Growth Location

The geographic units or Transportation Analysis Zones (TAZs) used to geographically assign land use in and around Mount Vernon are consistent with the structure developed by SCOG for the regional planning model. A total of 91 internal TAZs were used to represent the City and UGA. Residential land use is represented in the traffic model in terms of households while employment is modeled using the categories defined in Table 2. The existing household and employment totals described above were checked against TAZ-based GIS data provided by SCOG and minor revisions were made to reconcile the latest land use estimates with SCOG geospatial data.

City staff distributed citywide population and employment growth forecasts to the modeled TAZs based on an internal buildable lands analysis and through collaboration with TSI. Each TAZ was assigned an estimated 20-year growth capacity, expressed in (total) households and employment (by type).

The transportation model uses a household cross-classification scheme which represents households by number of occupants and number of vehicles, based on SCOG's analysis of 2010 census data. To prepare the total household growth forecast for input to the model, TAZ-based household growth was cross-classified using the existing (SCOG) cross-classification shares. The citywide traffic forecasting model will be described in greater detail in a subsequent memo.

Conclusion

The land use data described in this memo is consistent with the latest available residential and employment data as well as the most recent SCOG growth forecasts which will be incorporated to the City's Comprehensive Plan update.

I trust this provides you with an understanding of the existing and future land use information which forms the backbone of the travel demand component of the Mount Vernon citywide planning model. If you have any questions or need clarification related to the approach described here, please contact me at your convenience.

Regards,

Transportation Solutions, Inc.

Andrew L. Bratlien, PE
Senior Transportation Engineer

December 14, 2015

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SUBJECT: TRAFFIC FORECASTING TECHNICAL MEMORANDUM

Introduction

The purpose of this memo is to summarize the Mount Vernon citywide travel demand model (Model), which was developed by TSI with support from Skagit Council of Governments (SCOG) and the City of Mount Vernon.

This memo describes the major components of the Mount Vernon TDM, including street network development, trip generation, trip distribution, and traffic assignment. It also summarizes model calibration and the process by which the calibrated model forecasts future travel demand.

Background

The Mount Vernon TDM was developed in PTV Visum 14.00-17 software and is based on SCOG's regional travel demand model. Travel demand is represented in terms of PM peak hour vehicle trips. The base year model has been calibrated to match intersection turning movement counts collected at 101 locations throughout the city in November of 2013.

The accuracy of a travel demand model depends on the underlying land use data, i.e. the location, quantity, and nature of housing and employment. The development of the existing and forecasted land use data which are used in the citywide TDM are described in the Land Use Forecast Technical Memo dated December 8, 2015.

Network Development

Existing transportation facilities were inventoried as described in the Existing Level of Service Technical Memo dated December 8, 2015. The network inventory was used to verify and expand the SCOG regional model street network in order to ensure that the citywide model accurately represented (1) the City's arterial street system, (2) local streets which are outside the scope of the regional model, and (3) regionally significant routes including state highways and I-5.

Link and node capacities and volume-delay functions were kept consistent with the SCOG regional model.

Traffic Analysis Zone Structure

The function of a Traffic Analysis Zone (TAZ) in a travel demand model is to generate vehicle trips to and from the roadway network. In general internal TAZs are specific geographic areas that are associated with specific land use data. The land use data associated with a TAZ determines the number of trips that the TAZ produces to or attracts from the other TAZs in the model. This model's traffic analysis zone (TAZ) structure consists of 98 zones, of which 91 are internal to the Mount Vernon area.

There are 7 external zones surrounding the modeled study area. These zones are designed to incorporate trips that are generated to and/or from points outside the network. Although these are labeled zones, they actually represent links to regions outside the model and do not represent a defined area. These zones do not reflect any land use assumptions; only vehicle trips. Trips to and from each external zone are determined from actual traffic counts and future trips are based on historical growth records. These external zones play a two-part role in the model: (1) only a certain portion of the trips in an external zone interact with TAZ's within the model, and (2) the remained of the trips in any external zone interact with other external zones outlying the study area. These trips are called through trips since they have neither an origin nor destination within the study area yet they pass through the study area, impacting the network.

Trip Generation

Trips are generated by land uses and are assigned a trip type. In general, three basic trip types are represented in the travel demand model:

- Home-Based Work (HBW): Trips with one end at the traveler's home and the other end at the traveler's place of employment
- Home-Based Other (HBO): Trips with one end at the traveler's home and the other end at somewhere other than the traveler's place of employment, e.g. shopping trips
- Non-Home-Based (NHB): Trips without an end at the traveler's home

Trip generation rates used in the Mount Vernon model are based on SCOG and ITE trip generation rates and are representative of PM peak hour vehicle trips. **Table 1** displays the trip generation rates used in the model.

Residential land use is quantified in households and cross-classified for trip generation purposes. The household cross-classification scheme follows the format HH(a)_(b), where (a) represents the number of people in the household and (b) represents the number of workers in the household. Employment land uses are defined in the Land Use Forecast Technical Memo.

Trip generation for external TAZs is based on current and historical traffic volumes which were provided by SCOG or WSDOT.

Table 1. Trip Generation Rates

Land Use Code	Units	Total	Origins			Destinations		
			HBW	HBO	NHB	HBW	HBO	NHB
HH1_0	Households	0.24	0	0.0870	0.0242	0	0.1063	0.0242
HH1_1	Households	0.32	0.0268	0.0502	0.0367	0.1072	0.0614	0.0367
HH2_0	Households	0.37	0	0.1340	0.0372	0	0.1637	0.0372
HH2_1	Households	0.49	0.0248	0.1271	0.0528	0.0990	0.1554	0.0528
HH2_2	Households	0.75	0.0632	0.1184	0.0865	0.2526	0.1447	0.0865
HH3_0	Households	0.51	0	0.1826	0.0507	0	0.2231	0.0507
HH3_1	Households	0.67	0.0225	0.1868	0.0710	0.0900	0.2283	0.0710
HH3_2	Households	1.02	0.0668	0.2028	0.1147	0.2754	0.2479	0.1147
HH3_3	Households	1.44	0.1210	0.2268	0.1656	0.4838	0.2772	0.1656
HH4_0	Households	0.78	0	0.2805	0.0779	0	0.3428	0.0779
HH4_1	Households	1.03	0.0259	0.3078	0.1075	0.1037	0.3761	0.1075
HH4_2	Households	1.57	0.0793	0.3753	0.1716	0.3173	0.4588	0.1716
HH4_3	Households	2.21	0.1673	0.3933	0.2511	0.6690	0.4807	0.2511
RETAIL	Employees	1.80	0.2304	0.4158	0.3780	0.0576	0.3402	0.3780
FIRES	Employees	0.70	0.1680	0.1579	0.1015	0.0420	0.1292	0.1015
GOV	Employees	0.70	0.2352	0.1386	0.0770	0.0588	0.1134	0.0770
EDU	Employees	1.56	0.6240	0.4118	0.0156	0.1560	0.3370	0.0156
WTCU	Employees	0.59	0.3634	0.0097	0.0590	0.0909	0.0080	0.0590
MANU	Employees	0.37	0.1243	0.0122	0.0962	0.0311	0.0100	0.0962
RESOURCE	Employees	0.35	0.2240	0	0.0350	0.0560	0	0.0350
HEALTH	Employees	1.06	0.2544	0.2390	0.1537	0.0636	0.1956	0.1537

Source: SCOG 2015

Trip Distribution

Trips are distributed between TAZs using a gravity model, which is based on the theory that the attraction between two bodies is directly proportional to the bodies' masses and inversely proportional to the distance between the bodies. For the purposes of transportation modeling, a TAZ's "mass" is represented by the number of trips generated (produced by or attracted to) the TAZ while the distance factor is represented by route travel time.

The gravity model calculates the attractiveness between any two TAZs using the following utility function:

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

In the utility function, U is defined as travel time between zones. The parameters a, b, and c are calibration factors which influence the weight of travel time in the gravity model. The gravity parameters used in the Mount Vernon model are shown in **Table 2** and are based on the values used in the SCOG regional model as well as guidance from *NCHRP Report 716* (TRB 2012).

Table 2. Trip Distribution Gravity Model Parameters

Trip Purpose	Model Parameter		
	a	b	c
Home-Based Work (HBW)	100	-0.02	-0.125
Home-Based Other (HBO)	100	-0.90	-0.10
Non-Home Based (NHB)	100	-0.30	-0.10

Traffic Assignment

Trips are assigned to the street network uses an equilibrium assignment process which assigns vehicle trips from origin to destination along the calculated shortest travel time route, iteratively updating travel time as vehicle demand induces congestion throughout the network. As travel time is updated, shortest paths are recalculated and traffic re-assigned. The process continues until the model finds an equilibrium condition.

Calibration

The base year model was calibrated based on guidance from FHWA's *Travel Model Validation and Reasonableness Checking Manual Second Edition* (FHWA 2010). Assigned link volume was measured against link volume counts which were derived from the 2013 PM peak hour intersection turning movement counts. Calibration statistics and a scatterplot of assigned vs. counted volume are provided in Appendix B.

Forecasting Future Travel Demand

For the 20-year planning horizon (2035), the travel demand model assumes that the land use forecast developed by SCOG and the City are consistent with the City's updated Land Use Element and that growth rates are primarily based on historical trends for all roadways that function as connections between Mount Vernon and the surrounding region.

An initial traffic forecast scenario assumed that the existing street network will be maintained with no improvements in the next 20 years. This "no build" condition is used to identify locations where improvements will be necessary to maintain minimum LOS standards. A proposed street network improvement list was then developed and each project tested in the model to identify growth-driven improvement projects. The forecasted failures and identified improvement projects will be outlined in a subsequent memo.

The forecasting model can be updated and refined in the future to maintain consistency with any revisions to the City's land use forecast or transportation improvement project list, or to accommodate other feedback from the City.

Conclusion

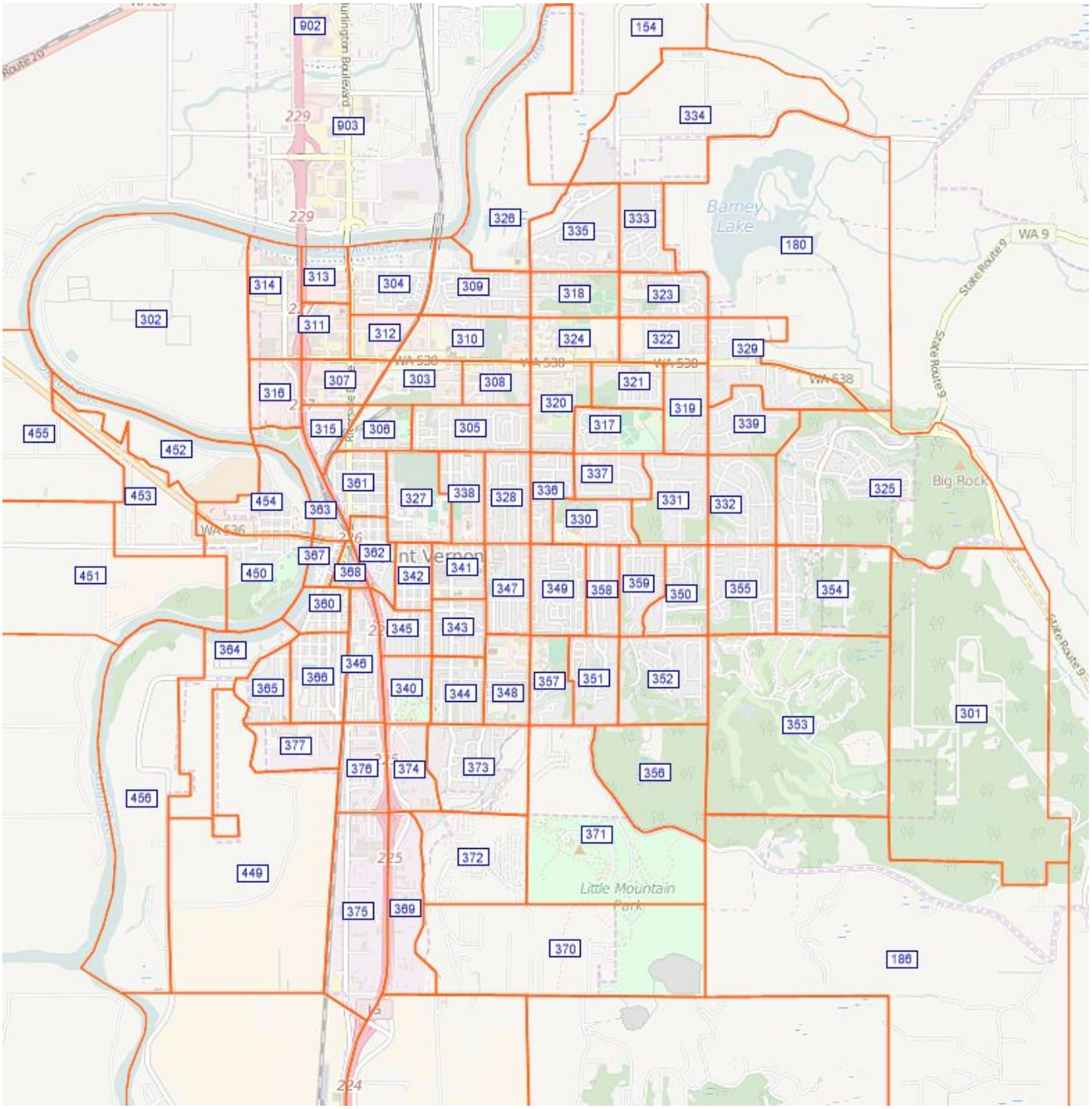
I trust this provides you with an understanding of the development of the Mount Vernon traffic forecasting model. If you have any questions or need clarification related to any part of the methodology described above, please contact me at your convenience.

Regards,

Transportation Solutions, Inc.

Andrew L. Bratlien, PE
Senior Transportation Engineer

APPENDIX A. TRAFFIC ANALYSIS ZONE STRUCTURE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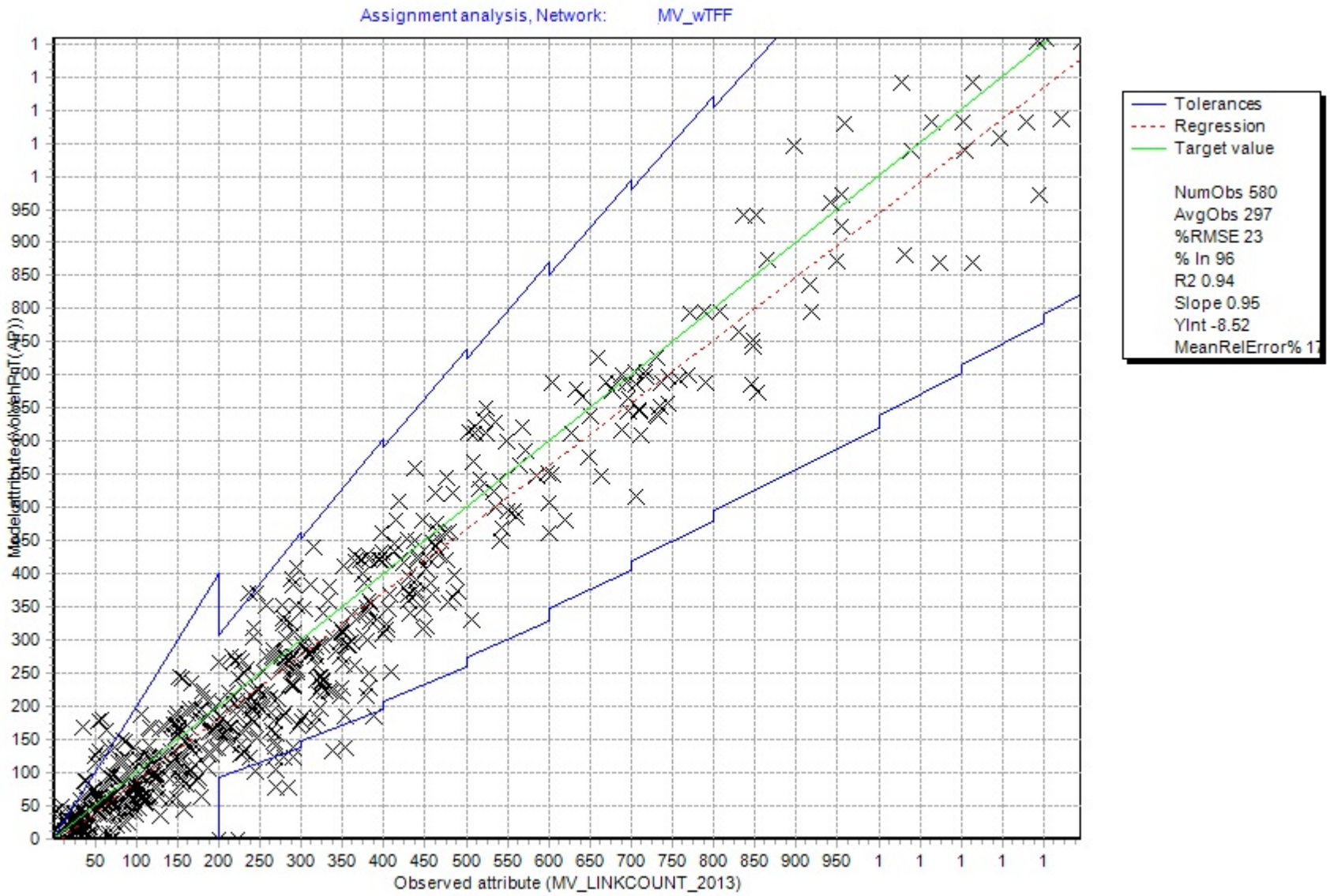
APPENDIX B. MODEL CALIBRATION PLOT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Tolerances
Regression
Target value
NumObs 580
AvgObs 297
%RMSE 23
% In 96
R2 0.94
Slope 0.95
YInt -8.52
MeanRelError% 17
Observed attribute (MV_LINKCOUNT_2013)

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June 13, 2016

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SUBJECT: TRAFFIC FORECAST AND 20-YEAR NEEDS UPDATE

Introduction

TSI has updated the citywide traffic forecasting model to address comments from Skagit Council of Governements (SCOG) staff during the Comprehensive Plan review process. The purpose of this memo is to document the changes to the citywide traffic forecast and to identify the effects of those changes in terms of Level of Service (LOS) failures and necessary improvement projects in the 20-year planning horizon

Traffic Forecasting Model Update and Regional Model Coordination

SCOG staff identified a desire for closer coordination between the Mount Vernon citywide planning model and the SCOG regional planning model, specifically with regard to trips entering and exiting the study area. The Mount Vernon citywide planning model includes seven external zones which represent travel demand at major access routes to and from the City and UGA. These include:

- I-5 at Skagit River Bridge
- I-5 at SR 534
- Riverside Drive (Old Highway 99) at Skagit River
- SR 9 northeast of Mount Vernon
- SR 9 southeast of Mount Vernon
- SR 536 east of Avon Allen Road
- McLean Road east of Avon Allen Road

To improve consistency between the regional and citywide travel demand forecasts, TSI reviewed the latest regional planning model provided by SCOG and identified forecasted 2040 traffic volumes at the links which represent the citywide model external TAZ loading points. The citywide model external trip generation calculations were updated to reflect these updated regional volume forecasts.

The updated regional volume forecasts were generally slightly higher than the initial citywide external trip forecasts. A significant portion of the increased travel demand represent “through” (external-to-external) trips, particularly on the I-5 corridor, which will not have a significant impact on the Mount Vernon street network. This memo will focus primarily on the operational impacts of the external trips

which impact the local street network, most of which have at least one trip end in the Mount Vernon study area.

Forecasted Level of Service Deficiencies

The citywide operational model was updated with the volume forecasts generated by the updated citywide planning model. The updated operational model was used to identify forecasted LOS deficiencies. A total of 16 intersections and 12 segments in the study area are forecasted to fail by 2035 assuming no network improvements, as shown in Table 1 and Table 2.

The updated travel demand forecast results in several new intersection and segment LOS failures which are identified as highlighted facilities in Tables 1 and 2.

Table 1. 2035 Intersection Level of Service Deficiencies - Without Improvement

Node ID	Intersection	Existing Intersection Control[1]	LOS Standard	2035 Delay (s/veh)	2035 LOS
723	Continental Pl & Hoag Rd	TWSC	D	57.0	F
724	N Laventure Rd & Hoag Rd	AWSC	D	56.1	F
789	S 1st St/Freeway Dr & W Division St	Signal	D	140.4	F
801	Waugh Rd & E Division St	AWSC	D	49.2	E
828	S 13th St & Broad St	TWSC	D	50.4	F
833	S Laventure Rd & E Section St	AWSC	D	45.0	E
871	I-5 SB Ramp & Anderson Rd	TWSC	D	49.4	E
1058	Blodgett Rd & Broad St	TWSC	D	135.1	F
1072	S 18th St & E Broadway	TWSC	C	44.0	E
1085	S 1st St & W Montgomery St	TWSC	C	36.3	E
1100	30th St & E College Way	TWSC	D	999[2]	F
1101	N 30th St & E Fir St	TWSC	D	86.7	F
1346	S Waugh Rd & E Broadway	TWSC	D	48.6	E
1715	S 15th St & E Broadway	TWSC	C	26.8	D
1895	S 2nd St & Broadway	TWSC	D	71.8	F
6614	Laventure Rd & Blackburn Rd	AWSC	D	36.3	E

[1]TWSC = Two-Way Stop Control; AWSC = All-Way Stop Control; RAB = Roundabout; Signal = Signalized
[2]Delay exceeds limits of HCM methodology
Note: Deficiencies which have been newly identified using the updated traffic forecast are highlighted

Table 2. 2035 Segment Level of Service Deficiencies - Without Improvement

Segment ID	Name	Cross Street A	Cross Street B	Functional Classification	V/C	LOS
1002	I-5 NB	Mt Vernon Rd	Anderson Rd	Freeway	0.90	E
1003	I-5 NB	Anderson Rd	Kincaid St	Freeway	0.90	D
1004	I-5 NB	Kincaid St	College Way	Freeway	0.91	E
1005	I-5 NB	College Way	George Hopper	Freeway	0.98	E
1006	I-5 SB	George Hopper	College Way	Freeway	0.88	D
2001	Division St	Freeway Dr	Ball St	Principal Arterial	1.04	F
3022	College Way	I-5 SB ramps	I-5 NB ramps	Principal Arterial	0.91	E
3044	Anderson Rd	I-5 NB ramps	Cedardale Rd	Principal Arterial	0.93	E
4009	Hoag Rd	Urban Ave	Continental Pl	Minor Arterial	1.03	F
4059	Broad St	Blodgett	9th St	Minor Arterial	1.06	F
5044	18th St	Fir St	Roosevelt Ave	Urban Collector	1.04	F
5053	Francis Rd	30th St	Swan Rd	Urban Collector	0.83	D

Note: Deficiencies which have been newly identified using the updated traffic forecast are highlighted

Recommended Transportation Network Improvements

The projects identified in Table 3 are necessary to maintain acceptable LOS in 2035 with forecasted traffic growth. Project numbers are included for projects which are included in the transportation component of the City's draft Comprehensive Plan and the 2016-2021 Capital Improvement Plan (CIP).

The model update adds six projects to the recommended improvement list. Four of these projects were previously identified in the Mount Vernon CIP and Comprehensive Plan update. Two additional projects have been identified on 18th Street, including a nonmotorized completion project north of Fir Street and an intersection improvement project at Broadway.

Table 3. Projects Necessary to Mitigate Growth-Related LOS Deficiencies

Comp. Plan #	CIP #	Project Name	From/To	Est.Cost ($$$)	Description
T-150	T-94-14	Fir St Widening	Laventure / Waugh	1,200	Widen to 3 lanes
T-240	T-06-04	15th St Improvements	Broad / Division	1,500	Widen to 3 lanes
T-040	T-06-05	Hoag/Laventure Intersection Improvements		700	Capacity improvements
T-070	T-06-10	College Way @ I-5 Improvements	I-5 NB / I-5 SB	6,233	Add 2 lanes and rechannelize
T-090	T-07-04	College Way / 30th Intersection Improvements		700	Capacity improvements
T-210	T-07-05	Division / Waugh Intersection Improvements		600	Capacity improvements
T-310	T-07-07	Laventure / Section Intersection Improvements		339	Capacity improvements
T-200	T-09-01	First St / Division Intersection Realignment		3,000	Capacity improvements
T-370	T-13-01	Laventure / Blackburn Intersection Improvements		700	Capacity improvements
T-420	n/a	Anderson Rd	Henson / Cedardale	TBD	Complete sidewalks
T-020	n/a	Hoag Rd	Urban / Laventure	TBD	Widen to 3 lanes
T-290	n/a	Broad St	Blodgett / 13th St	TBD	Access management / RIRO

Comp. Plan #	CIP #	Project Name	From/To	Est.Cost ($$$)	Description
T-010	n/a	Francis Rd	30th St / Swan Rd	TBD	Complete sidewalks
n/a	n/a	18th St	Fir St / Roosevelt Ave	TBD	Complete sidewalk/bike ln
T-330	n/a	Waugh/Broadway Intersection Improvements		TBD	New roundabout
T-260	n/a	Broadway/2nd St Intersection Improvements		TBD	New all-way stop
T-230	n/a	S 1st St/Montgomery Intersection Improvements		TBD	New all-way stop
n/a	n/a	Broadway / 18th St Intersection Improvements		TBD	Left-turn bays on Broadway

Note: Deficiencies which have been newly identified using the updated traffic forecast are highlighted

Tables 4 and 5 identify all of the facilities that are deficient in the 2035 no action scenario and describe how they meet standards after the recommended improvements. The Division St (SR 536) Skagit River Bridge is forecasted to operate at LOS F by 2035 but is exempt from LOS standards per MVMC 14.10.060(C).

Table 4. 2035 Intersection Level of Service Deficiencies - With Improvement

Node ID	Intersection	Proposed Intersection Control[1]	2035 No Improvement		2035 With Improvement		Improvement Description
			Delay (s/veh)	LOS	Delay (s/veh)	LOS	
723	Continental Pl & Hoag Rd	TWSC	57.0	F	19.2	C	Add TWLTL
724	N Laventure Rd & Hoag Rd	Signal	56.1	F	27.6	C	Signalize
789	S 1st St/Freeway Dr & W Division St	Signal	140.4	F	27.7	C	Improve left-turn phasing
801	Waugh Rd & E Division St	RAB	49.2	E	15.3	B	New roundabout
828	S 13th St & Broad St	TWSC	50.4	F	16.9	C	Right-in right-out
833	S Laventure Rd & E Section St	Signal	45.0	E	21.3	C	Signalize
871	I-5 SB Ramp & Anderson Rd	RAB	49.4	E	7.1	A	New roundabout
1058	Blodgett Rd & Broad St	TWSC	135.1	F	15.7	C	Right-in right-out
1072	S 18th St & E Broadway	TWSC	44.0	E	22.0	C	EB/WB left-turn lanes
1085	S 1st St & W Montgomery St	AWSC	36.3	E	20.1	C	New all-way stop
1100	30th St & E College Way	Signal	999.0	F	23.0	C	Signalize
1101	N 30th St & E Fir St	TWSC	86.7	F	32.0	D	Add TWLTL
1346	S Waugh Rd & E Broadway	RAB	48.6	E	7.2	A	New roundabout
1715	S 15th St & E Broadway	TWSC	26.8	D	23.2	C	Widen Broadway to 3-lane section
1895	S 2nd St & Broadway	AWSC	71.8	F	19.9	C	New all-way stop
6614	Laventure Rd & Blackburn Rd	Signal	36.3	E	21.6	C	Signalize

[1]TWSC = Two-Way Stop Control; AWSC = All-Way Stop Control; RAB = Roundabout; Signal = Signalized

Table 5. 2035 Segment Level of Service Deficiencies - With Improvement

Segment ID	Name	From/To	Functional Classification	No Improvement		With Improvement		Improvement Description
				V/C	LOS	V/C	LOS	
2001	Division St	Freeway / Ball	Principal Arterial	0.90	E	1.04	F	LOS exempt per MVMC 14.10.060
2002	Division St	Ball / Wall	Principal Arterial	0.90	D	0.91	E	LOS exempt per MVMC 14.10.060
3022	College Way	I-5 SB ramp / I-5 NB ramp	Principal Arterial	0.91	E	0.58	A	Add lanes and rechannelize
3044	Anderson Rd	I-5 NB ramp / Cedardale	Principal Arterial	0.98	E	0.83	D	Complete sidewalks
4009	Hoag Rd	Urban / Continental	Minor Arterial	0.88	D	0.74	C	Widen to 3 lanes
4059	Broad St	Blodgett / 9th	Minor Arterial	1.04	F	0.75	C	Right-in right-out channelization
5044	18th St	Fir / Roosevelt	Urban Collector	0.91	E	0.76	C	Complete bike lane
5053	Francis Rd	30th / Swan	Urban Collector	0.93	E	0.76	C	Complete sidewalks

Future Improvements Identified in TIP

A complete list of projects contained in the City's 2016-2021 TIP is provided in Table 6. Projects which are necessary to maintain LOS concurrency standards for the next 20 years are highlighted. While the highlighted projects will be necessary to maintain concurrency standards, the other projects in Table 6 may serve other transportation needs (e.g. transportation network completion, expanding non-motorized access) identified by the City.

Table 6. City of Mount Vernon TIP 2016 – 2021

ID	CIP #	Project Name	From/To	Est.Cost ($$$)	Description
1	T-94-14	Fir St Widening	Laventure / Waugh	1,200	Widen to 3 lanes
2	T-94-19	Blackburn Rd Widening	Cedar Hills Dr / Little Mtn Rd	1,700	Widen to current street standards
3	T-94-21	Blackburn Rd Extension	Little Mtn Rd / Eaglemont	2,400	Widen to current street standards
4	T-97-07	Freeway Dr Widening	Cameron / College	3,000	Widen to 3 lanes & add sidewalks
5	T-00-02	Local Improvements	Various	3,000	Maintain existing street network
6	T-02-04	Roosevelt Ave Extension	Urban / Cameron	11,100	Extend Roosevelt Ave
7	T-02-06	30th St Extension	Blackburn / Section	1,300	Extend 30th Street
8	T-02-10	Fowler Trail Conection	Laventure / 30th St	200	Connect pedestrian path from Laventure to 30th St along the extension of Fowler St
9	T-02-13	30th St Pathway	Blackburn / Fowler	150	Pathway parallel to 30th St
10	T-02-17	River Dike Trails	Various	500	Utilize existing dike top as ped pathways
11	T-02-24	30th St Improvements	Fir St / Manito Dr	900	Street widening, complete sidewalks
12	T-03-02	Broad St Improvement	Blodgett / 12th St	2,550	Pedestrian safety improvements
13	T-05-02	Martin Rd Improvements	Trumpeter / McLaughlin	2,000	Realignment & reconstruction
14	T-05-09	Hickox Rd / I-5 interchange	Hickox Rd / I-5	5,000	Interchange completion
15	T-06-04	15th St Improvements	Broad / Division	1,500	Widen to 3 lanes
16	T-06-05	Hoag/Laventure Intersection Improvements		700	Capacity improvements
17	T-06-06	Broadway Extension	Dallas / Burlingame	1,157	Extend Broadway
18	T-06-07	Laventure Rd Impr.	Hoag / south of Hoag	550	Widen to current street standards
19	T-06-10	College Way @ I-5 Improvements	I-5 NB ramp / I-5 SB ramp	6,233	Add 2 lanes and rechannelize
20	T-06-11	I-5/SR 536 interchange	SW of existing I-5 interchange @ Kincaid	20,000	Construct new frontage rd, new SB on-ramp at Section, and new park & ride facility.
21	T-07-02	Signal maintenance	Various	270	Signal controller replacement
22	T-07-03	Truck rt improvement	Main St / Cleveland	50	Raise road grade along Milwaukee

ID	CIP #	Project Name	From/To	Est.Cost ($$$)	Description
23	T-07-04	College Way / 30th Intersection Improvements		700	Capacity improvements
24	T-07-05	Division / Waugh Intersection Improvements		600	Capacity improvements
25	T-07-06	18th / Blackburn Intersection Improvements		700	Capacity improvements
26	T-07-07	Laventure / Section Intersection Improvements		339	Capacity improvements
27	T-08-01	Sidewalk Gap Prgrm	Various	50	Construct new sidewalks
28	T-09-01	First St / Division Intersection Realignment		3,000	Capacity improvements
29	T-13-01	Laventure / Blackburn Intersection Improvements		700	Capacity improvements
30	T-15-01	LED Street Lights	Various	544	Street lighting improvements
31	T-16-01	ADA Sidewalk Transition Program	Various	120	Sidewalk improvements
Total Estimated Cost, 2016-2021				72,213	

Note: Projects necessary to maintain LOS concurrency standards are highlighted

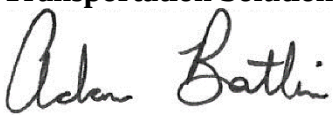
Conclusion

This memo describes the results of the Mount Vernon citywide planning and operational model updates, level of service forecasts, and recommended transportation improvement projects. This information will update the technical component of the Transportation Element of the 2016 Comprehensive Plan update.

If you have any questions or need clarification related to any of the existing conditions described above, please contact me at your convenience.

Regards,

Transportation Solutions, Inc.



Andrew L. Bratlien, PE
Senior Transportation Engineer

City of MOUNT VERNON
COMMUNITY & ECONOMIC DEVELOPMENT

MEMO

DATE: June 20, 2016

TO: Brad Johnson, City of Burlington

FROM: Rebecca Lowell, CEDD

RE: Transportation System Impacts to the City of Burlington [RCW 36.70A.070(6)(a)(v)]

To ensure coordination between the Mount Vernon citywide traffic planning model and the Skagit Council of Governments (SCOG) regional planning model, specifically with regard to trips entering and exiting Mount Vernon, the attached updated forecast was completed and is being forwarded to you.

This is being sent to you as the City's assessment of impacts to the City of Burlington's transportation systems from Mount Vernon's forecasted growth and traffic. As you are aware, this assessment is required per RCW 36.70A.070(6)(a)(v).

ATTACHED:
Traffic Forecast & 20-Year Needs Update, June 13, 2016, prepared by Transportation Solutions, Inc.