The City of Barrie

TRANSPORTATION MASTER PLAN

Appendix E – Emme Macro Modelling and Improvements Rationale Technical Memorandum

June 2019

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EMME MACRO MODELLING & IMPROVEMENTS RATIONALE

CITY OF BARRIE

TECHNICAL MEMORANDUM

PROJECT NO.: 171-08853-00
DATE: JUNE 12, 2019

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June 12, 2019

CITY OF BARRIE
City Hall, 70 Collier Street
City of Barrie
P.O. Box 400
Barrie, ON
L4M 4T5

Attention: Mr. Tom Reeve, P.Eng

Dear Mr. Reeve:

Subject: Transportation Master Plan, Emme Macro Modelling & Improvements Rationale

Attached is the Emme Macro Modelling plus Improvements Rationale Technical Memorandum - Final to support the development of the City of Barrie Transportation Master Plan. The Memorandum documents:

- development, calibration and validation of the base 2016 Emme model;
- Emme macro modelling assessment of the future 2041 road network;
- rationale analyses for the proposed road improvements by 2041;
- Emme macro modelling assessment of the future 2031 road network;
- rationale analyses for the proposed road improvements by 2031; and
- prioritization and timings of the proposed 2031 road improvements

Yours sincerely,

Thomas You, M.A.Sc., P.Eng
Project Manager

TY/BC
Encl.

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1 INTRODUCTION

The City of Barrie, located within Simcoe County along the Western Shores of Lake Simcoe, has been one of the fastest-growing communities in all of Canada. The provincial government designated the City of Barrie as an Urban Growth Centre (UGC) within the Simcoe Area. Urban Growth Centres are areas that will be focal points for investment in institutional and region wide public services, as well as commercial, recreational, cultural and entertainment uses. In addition, they will serve as major employment centres, and will be planned to support major transit infrastructure and accommodate a significant share of population and employment growth.

With the addition of the Hewitt's and Salem Secondary Plan areas forming the southern portion of the City, the population is expected to grow from approximately 145,800 to 253,000 persons; employment to grow from approximately 73,800 to 129,000 jobs by 2041. The Secondary Plan areas currently consist of primarily agricultural land uses and are to be urbanized into future residential and employment uses over the next 20 to 25 years.

The City's first Multi-Modal Active Transportation Master Plan (MMATMP) was developed in 2014 to address the planned growth in the City. The 2014 MMATMP planned for significant growth in Barrie's population and employment, estimating 210,000 residents and 100,000 jobs by 2031. The major projected population growth was expected within the secondary plan areas and greenfield areas, as specified by the 2006 Growth Plan for the Greater Golden Horseshoe and Simcoe Area.

However, the 2017 Provincial Growth Plan identified the following changes in density and growth locations:

- A minimum density target of 80 residents and jobs combined per hectare (an increase from 50 residents and jobs combined per hectare) was identified for Greenfield Areas.
- The growth allocation was changed from the 2006 allocation of 60 percent in the Greenfield Area and 40 percent in the Intensification Area to 40 percent in the Greenfield Area and 60 percent in the Intensification area.

As a result, the City of Barrie initiated an update to the 2014 MMATMP. This update also required the City's demand forecasting Emme Model be updated to reflect the change in growth.

1.1 TRAVEL DEMAND MODEL 2014

The 2014 MMATMP assessed and recommended improvements to active transportation, transit, and roadways to allow the future transportation network to meet the projected travel demand and accommodate development outside the existing built boundary and intensification within the built boundary of the City by 2031.

An Emme 4 macro-level demand forecasting model was developed as part of the MMATMP by WSP (formerly GENIVAR). The MMATMP Macro Model Memorandum, dated January 2014, thoroughly documented the development of the City's existing macro model (herein referred to as the 2014 Emme Model). The model simulated the travel demand in the mid-week AM and PM peak hour and Friday PM peak hours for the future horizon year 2031. A limited Saturday model was also developed at aggregated screenline levels.

The 2014 Emme Model was calibrated and developed from the 2006 Transportation Tomorrow Survey (TTS) data and validated against the 2011 adjusted spring/fall counts. Overall, the model validation showed good correlation between modelled volumes and observed counts. The travel demand forecasts and road network assessment were completed for horizon years 2016, 2021, 2026 and 2031. During the model development, Systems Analysis and Forecasting Office (SAFO) staff of the Ministry of Transportation of Ontario (MTO) was also consulted.

The model area included Wasaga Beach to the northwest, the City of Orillia to the northeast, the towns of Innisfil and Keswick to the east, and the town of Bradford West Gwillimbury. It also covered the northwest portion of York Region, including the towns of Newmarket and Aurora, thus allowing for the analysis of commuter traffic travelling to and from the region. Furthermore, the model area accounted for adjacent areas, including the Greater Toronto Area (GTA) to the south, the counties of Dufferin and Grey to the west, Muskoka and Haliburton to the north, and Kawartha Lakes to the east. These adjacent areas were represented as external gateways to the City of Barrie.

1.2 PURPOSE

This memorandum describes the recalibration, validation, enhancement completed to update the City of Barrie's 2014 Emme Model, as well as documents the rationale analyses for the proposed improvements in the TMP. The primary purpose for updating the model is to ensure that the model reflects the projected population and employment forecasts identified in **Schedule 7 of the 2017 Provincial Growth Plan** for the City of Barrie. The previous model forecasted the planned growth up to the year 2031. The updated model (herein referred to as the 2019 Emme Model) is extended to forecast horizon years 2041 to address the policies of the Growth Plan.

The 2014 Emme Model was redeveloped and updated based on the most current travel data captured in the 2016 TTS. The model was then re-calibrated and validated against the 2016/2017 traffic counts and updated based on new population and employment forecasts. The updated model simulates travel demand for the mid-week (Tuesday, Wednesday, and Thursday) AM and PM peak hours for base year 2016 and horizon years 2031 and 2041.

1.3 MODEL PROCESS AND METHODOLOGY

The model development consists of the following major tasks: data collection, model redevelopment, calibration, analysis, and forecasting. This memorandum discusses key development stages of the model, namely data collection, model redevelopment, calibration and validation.

The model development applies the sequential four-step transportation planning methodology, which include:

- **Trip generation** determines the total of origin and destination trips in each zone by relating the influencing factors such as land uses, household demographics, and other social-economic factors. The zonal population and employment data are the two major factors.
- **Trip distribution** matches origin trips with destination trips to generate an origin-destination travel demand matrix. Trip distribution can be done by methodologies such as the Gravity model and the Fratar model. The methodology of the Fratar model was applied.
- **Mode choice** determines the proportion of trips by a mode of travel such as auto and transit. The 2019 Emme Model only generates and simulates auto travel demand. For the future horizons, auto travel demand was adjusted based on the defined modal share targets to reflect the modal shifts to other modes such as transit. The 2019 Emme Model applies an aggregation and disaggregation analysis approach to avoid the limitations of the Fratar growth model, such as zero cells in the base year.
- **Trip assignment** allocates trips by a mode of travel (auto in the case of the 2019 Emme Model) to a route on a road network to determine the traffic volumes.

1.4 MODEL UPDATE

The 2019 Emme Model includes the following major updates:

- **Trip Generation:**
  - **a)** The 2014 Model used one aggregate trip rate for the City of Barrie. The 2019 Model applied different trip rates to account for significantly different travel demand generated by large traffic generators such as Georgian Campus, Victoria Royal Hospital, and Park Place properties adjacent to Highway 400 and Mapleview Drive.
  - **b)** Different trip rates were also estimated based on the land use planning areas defined in the City's Official Plan.
  - **c)** Trip rates were estimated with the advanced statistics regression analyses to relate major factors: either population or employment or both.
- **Base and Future Year Road Network Update:** The 2016 base year network was updated and coded for relevant attributes such as road classification, posted speed limits, capacity, etc. Future road networks were developed for horizon years 2031 and 2041.

- **Model Validation:** The 2016 base year model was validated against traffic counts aggregated along screenlines across the major roads within the City boundaries. The model fit was validated for accuracy. In addition to the typical screenline-level validation, the 2019 Emme Model was validated at the intersection level for the city-wide major intersections, as well as on the Highway 400 mainline and interchange ramps within Barrie.

2 ZONE SYSTEM

The traffic zone system developed is compatible with the GTA 2001 zone system and the system in the MTO's GGH model. Table 2-1 summarizes the total 290 traffic analysis zones (TAZs) in the model.

The model covers the urban area of the City of Barrie, the disaggregated Secondary Plan areas, parts of the County of Simcoe, and other areas outside the City of Barrie. The areas outside the City of Barrie and the County of Simcoe, such as the GTA and north of the County of Simcoe, are represented as 10 external zones to capture inter-regional travel through Barrie, particularly on Highway 400.

Table 2-1 Zone System

Level	Geographic Area	GTA 2001 Zones		Barrie Model Zones	
		ID	# of Zones	ID	# of Zones
1	**The City of Barrie**				
	2006 urban boundary	3801 to 3832	32	1 to 155	155
	Hewitt's and Salem Secondary Plan areas	Disaggregated zones of the GTA 2001 Zones 3755 & 3766;	n/a	201 to 216	16
	Subtotal				***171***
2	**Region**				
	Orillia	3731 to 3735	5	3731 to 3735	5
	County of Simcoe (Part)	3741 to 3789	31	3741 to 3789	31
	York Region (Aurora, Bradford, Newmarket)	1230 to 1281, 1308 to 1349	71	1230 to 1281, 1308 to 1349	71
	Subtotal				***107***
3	**Gateways**				
	Other areas outside City of Barrie and County of Simcoe, e.g. Greater Toronto Area, north of County of Simcoe, etc.	n/a	n/a	901 to 910 (external gateways)	**10**
4	**GO Stations (dummy zones)**	n/a	n/a	9001, 9002	**2**
	Total				***290***

Figure 2-1 and Figure 2-2 provide a graphical representation of the entire model zoning system and zoomed-in details for the City of Barrie, respectively.

2.1 HEWITT'S AND SALEM SECONDARY PLAN AREAS

The Hewitt's and Salem Secondary Plan areas are in Zones 3755 and 3766 of the GTA 2001 zoning system. These areas were disaggregated into 16 new zones (numbering from 201 to 216) to reflect the high growth area with different land uses and development phasing. The remaining areas are numbered as Zones 355 and 366.

2.2 GO STATIONS

Two dummy zones (9001 and 9002) represent the two GO stations (Barrie South GO Station and Allandale Waterfront GO Station), which facilitate the simulation of auto travel demand on the City of Barrie road network, resulting from access to GO Rail transit at the stations via kiss-and-ride and park-and-ride travel modes.

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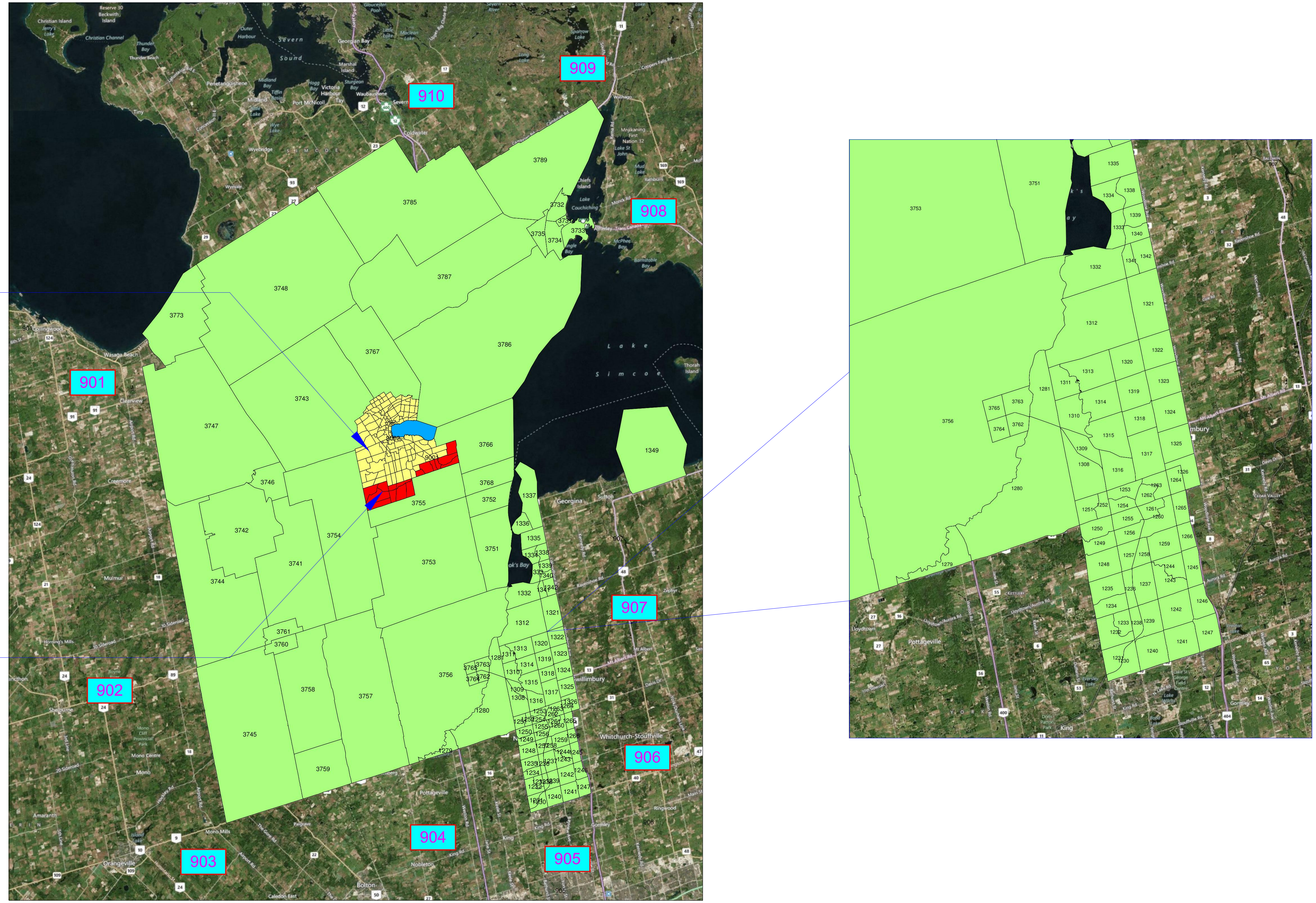
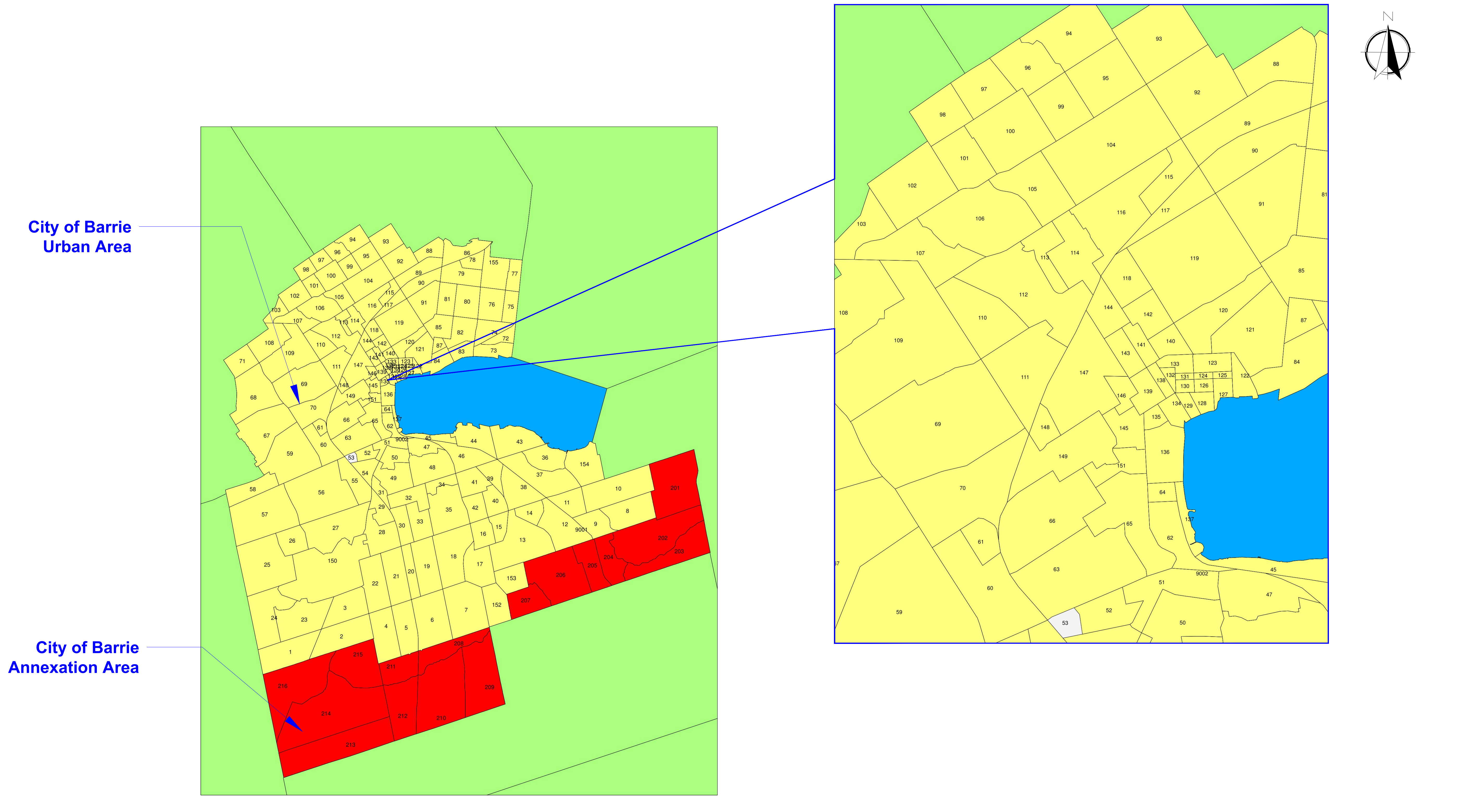


Source: Background image from Bing Map and shapefile in the Emme model.

Scale: N.T.S.

Figure 2-1
Model Zone System, Full Extent
Transportation Master Plan - Emme Macro Modelling and Improvements Rationale



Source: Shapefile in the Emme model.

Scale: N.T.S.

Figure 2-2
Model Zone System, City of Barrie
Transportation Master Plan - Emme Macro Modelling and Improvements Rationale

3 MODEL PARAMETER INPUTS

The road network in the model is represented by roads of different classifications, including Highway 400, other provincial highways, arterial, collector and local roads. These roads, in the form of links and zone connectors in the model, have attributes such as link length, free-flow speed, capacity, number of lanes and volume-delay functions.

Table 3-1 summarizes the road classification system and link attributes as represented in the model after calibration. Note that the existing and proposed road classification systems include only one class for arterial roads. However, for the Emme modelling, they are identified as major arterials and minor arterials to differentiate the lane capacity.

Table 3-1 Model Road Classification and Associated Parameters

Classification		Free-Flow Speed [a] ul2 (km/h)	Lane Auto Capacity ul3 (vph)	Volume Delay Function vdf
Highway 400		110	1,800	11
	HOV	110	1,600	11
	average per lane of (4 GPL+1 HOV)	110	1,760	11
Highway Ramps		40 (inner loop) 60	1,400	13
Highway 11		110	1,800	20
Highway 26/27		70-90	1,000	20
Major Rural Arterial (Out of Barrie)		70-90	850	30
Minor Rural Arterial (Out of Barrie)		70-90	750	50
City's Roads				
Mapleview Drive (Future) (from Bryne to Bayview) (Diverging Diamond Interchange)		70	1,000	40
ARTERIAL [b]	Major Arterial [c] (2,4,6 lanes)	50-80	750	40
	Major Arterial (3,5,7 lanes)	50-80	850	40
	Minor Arterial [c] (2,4,6 lanes)	50-80	650	40
	Minor Arterial (3,5,7 lanes)	50-80	750	40
COLLECTOR [b]	Major Collector (2,4 lanes)	40-50	500	50
	Major Collector (3,5 lanes)	40-50	550	50
	Minor Collector (2 lanes)	40-50	400	50
	Minor Collector (3 lanes)	40-50	500	50
Local		40	400	50
Centroid Connector		40	9,999	90

Notes: a. The free-flow speed is determined by the posted speed limit plus 10km/h, except for local roads.
b. The lane capacity for arterials and collectors was approved by the City on March 15, 2012.
"vph" represents vehicles per hour.
c. Note that the existing and proposed road classification systems include one class for arterial roads. For the Emme modelling purpose, they are identified as major arterials and minor arterials to differentiate the lane capacity.

Major link parameters are discussed in detail in the following sections.

3.1 FREE-FLOW SPEED

For the Emme modelling, free-flow speed is used to represent the roadway speed when traffic density and flow are very low or zero. Free-flow speed in the City of Barrie Model is determined by the roadway posted speed limit plus 10 km/h, except for local roads. Local roads typically have a free-flow speed of 40 km/h, same as the posted speed. This approach would reduce the traffic infiltration in the residential neighbourhoods.

3.2 LANE CAPACITY

The City's Emme Model does not simulate commercial traffic and generates auto traffic demand only. The approach to reducing lane capacity to account for auto traffic only and thus reserve capacity for commercial traffic is applied. The post-modelling adjustment is applied to estimate the total traffic volumes (including commercial traffic) based on the typical truck percentage on the City's roads and Highway 400. Note that commercial traffic is simulated in the City of Barrie Aimsun Microsimulation Model.

3.2.1 GENERAL-PURPOSE LANES

Lane capacity is typically measured as passenger car units (PCU) that traverse a point or a uniform segment of a roadway lane per hour under prevailing roadway, traffic and control conditions. Considering a typical commercial truck percentage, lane capacity is reduced to account for capacity being used by trucks in real traffic conditions, that is, lane auto capacity measured in auto vehicles per hour (vph). For example, Highway 400 would have a typical lane capacity of 2,300 PCU per hour while the Emme Model uses a lane auto capacity of 1,800 auto vehicles per hour based on the SAFO standard. This reduction accounts for a typical truck percentage of 12% and two PCU per truck.

— **Highway 400 and ramps:** The lane capacity was confirmed with the SAFO. Highway 400 and Highway 11 have a lane auto capacity of 1,800 vph for a general–purpose lane (GPL) and 1,600 vph on a high-occupancy-vehicle (HOV) lane. One single-lane ramp has a lane auto capacity of 1,400 vph.

— **City's roads**: The City's road network includes arterial, collector and local roads. Arterial and collector roads are further classified.
  - — arterial roads: major arterials and minor arterials
  - — collectors: major collectors and minor collectors

In the development of the 2014 Emme Model, a detailed review of lane auto capacity applied by other jurisdictions such as the Greater Toronto Area, York Region and Halton Region was conducted in consultation with City staff. The City approved the model input of lane auto capacity for City roads, as listed in Table 3-1. The input is consistent with the current industry modelling practices. Capacities are differentiated for roads with and without a centre two-way left-turn lane (TWLTL).

3.2.2 DIVERGING DIAMOND INTERCHANGE AT MAPLEVIEW

A lane auto capacity of 1,000 vph, increased from the City's standard of 850 vph for an arterial road, was applied to the future Mapleview Drive from Bryne Drive to Bayview Drive to account for the anticipated capacity increases created from the planned diverging diamond interchange (DDI) improvements. This number was selected because a DDI will eliminate the current high-volume left-turn movements and provide free-flow movements at on- and off-ramps, which would improve traffic operations on Mapleview Drive adjacent to the interchange. The lane auto capacity of 1,000 vph is similar to the capacity for a high-capacity urban arterial road. The approach of increasing capacity would not only reflect the improvements on the Mapleview Interchange but also justify whether additional interchanges would be required in future horizons.

3.2.3 HOV LANES

Auto demand with two or more passengers is not explicitly forecasted but included in the overall auto demand in the City's Emme Model. HOV lanes on the City's roads are not coded. In the case of the future network with the proposed HOV lanes, the approach was taken to apply an increase to the capacity on the coded general-purpose (GP) lanes to reflect traffic demand of vehicles with two or more passengers in HOV lanes. Therefore, an average lane auto capacity that represents the total auto capacity divided by the number of coded lanes was used as an input. For example, six lanes that include four GP lanes and two HOV lanes would have a lane auto capacity of 900 vph on average. Note that the average lane capacity is not the lane capacity on a HOV lane, as shown in Table 3-2.

Table 3-2 lists the inputs of the average lane auto capacity on roadways where HOV lanes are proposed but not coded in the Emme Model.

Table 3-2 Average Lane Auto Capacity on General-Purpose Lanes where HOV Lanes Not Coded

Road Classification & Total Lanes	No HOV	With HOV
Major Arterial (2,4,6 lanes)	750	900
Major Arterial (3,5,7 lanes)	850	1,000
Major Arterial (Mapleview DDI)	1,000	1,150
Minor Arterial (2,4,6 lanes)	650	800
Minor Arterial (3,5,7 lanes)	750	900
Major Collector (2,4 lanes)	500	600

Notes:
1. HOV lanes are not coded in the Emme Model. An approach is applied to increase the lane auto capacity on general-purpose lanes to reflect traffic demand of vehicles with two or more passengers on HOV lanes.
2. The average lane capacity is not the lane capacity on a HOV lane.

3.3 VOLUME-DELAY FUNCTIONS

The volume-delay functions that describe the relationship between travel time, traffic volume, and the level of congestion applied the Bureau of Public Roads (BPR) function for road links with the ratio of volume to capacity (V/C) less than 1.0. For road links with a V/C ratio greater than 1.0, the BPR function overestimated delay for Ontario conditions, according to the research at the Joint Program in Transportation. The tangent volume-delay functions, which have been successfully implemented for the Greater Toronto Area Modelling System and are currently used in the GGH model, were applied in the City's Emme Model.

The volume-delay functions are given as follows:

$$TT = \left(\frac{L}{S}\right) * \left[1 + \alpha\left(\frac{v}{c}\right)^{\beta}\right], \text{ if (v/c)<1}$$

$$TT = \left(\frac{L}{S}\right) * \left[(1 + \alpha - \alpha\beta) + \alpha\beta\left(\frac{v}{c}\right)\right], \text{ if (v/c)>1}$$

Where:

TT = travel time in minutes

L = length in km

S = free flow speed in km/h

v/c = volume to capacity ratio

α, β = parameter

The parameters α and β for each road classification that were applied in the City's Emme Model are provided in Table 3-3. The volume-delay functions were inherited from the GGH Model and have the same function definitions and IDs as those in the GGH Model, which reflect the characteristics of Ontario Roads.

Table 3-3 Volume-Delay Functions for Road Classification

<table>
<tr><th>Type of Road</th><th>VDF Code</th><th>Alpha (α)</th><th>Beta (β)</th></tr>
<tr><td>Highway 400</td><td>11</td><td>1.45</td><td>7</td></tr>
<tr><td>Highway Ramps</td><td>13</td><td>1.45</td><td>7</td></tr>
<tr><td>Other Provincial Highways</td><td>20</td><td>1.25</td><td>5</td></tr>
<tr><td>Major Rural Arterial (Out of Barrie)</td><td>30</td><td>1.3</td><td>5</td></tr>
<tr><td>Barrie Arterial</td><td>40</td><td>1.70</td><td>5</td></tr>
<tr><td>Minor Rural Arterial (Out of Barrie)</td><td rowspan="3">50</td><td rowspan="3">2.00</td><td rowspan="3">5</td></tr>
<tr><td>Collector Road</td></tr>
<tr><td>Local</td></tr>
</table>

Note: VDF – Volume-Delay Function.

4 TRAVEL DEMAND

4.1 LAND USES

The City's Emme Model covers three major areas:

- the City of Barrie
- part of County of Simcoe (e.g., Town of Innisfil) and York Region that are represented in detail in the City's Emme Model, referred to as the modelled region
- other areas including the rest of the County of Simcoe and part of York Region, represented as external gateways

The following section discusses the data sources and a summary of the land use inputs for the model.

4.1.1 DATA SOURCES

The land use inputs for the model was collected from various data sources, as summarized in Table 4-1.

Table 4-1 Category and Source of Population and Employment Forecast Inputs

No	Category	Source
1	**City of Barrie**	2016, 2031, and 2041 population and employment forecasts were provided by City of Barrie / Watson & Associates Economists Ltd. on November 30, 2017. Adjusted employment forecasts were provided on August 21, 2018 to correct the forecasts for Park Place.
2	**Modelled Region**	
	Town of Innisfil	2021, 2031 and 2041 population and employment forecasts were obtained from Innisfil 2017 TMP Update. The forecasts also included intensification on Innisfil Beach Road and new developments in Friday Harbour.
	Part of Simcoe County (Zone 3731 - 3749)	2016 population and employment data were obtained from SAFO / GGH Model input, dated May 15, 2018. 2031 population and employment forecasts were obtained from 2014 County TMP.
	Part of York Region (Zone 1230 - 1349)	2016, 2031 and 2041 population and employment forecasts were obtained from SAFO / GGH Model input, dated May 15, 2018.
3	**Gateways**	2016, 2031 and 2041 aggregated population and employment forecasts were provided by SAFO per its GGH Model input, dated May 15, 2018. The aggregated forecasts were per the aggregated zones for the gateways of the City's Model.

4.1.2 EXISTING AND FUTURE LAND USES

The population and employment inputs were updated accordingly to reflect the most-current forecasts as follows:

CITY OF BARRIE

The land use forecasts reflect growth assumptions defined in the 2017 Provincial Growth Plan provided by the City of Barrie.

A summary of the population and employment forecasts for the City is provided in Table 4-2. The detailed population and employment estimates for each zone are provided in Appendix E-1 - Population and Employment Forecasts.

Table 4-2 Population and Employment Forecasts to 2041 for the City of Barrie

Horizon	Population	Employment
2016	145,800	73,800
2021	167,600	83,400
2026	189,200	93,300
2031	210,000	101,000
2036	229,700	113,300
2041	253,000	129,000
Annual Compound Growth Rate	**2%**	**2%**
Accumulated Growth 2016 to 2041	**74%**	**75%**

Source: The forecasts were provided by the City of Barrie on August 21, 2018.
Notes: 1. Population forecasts account for the Census undercount.
2. Employment forecasts include no fixed-place of work (NFPOW) and work at home (WAH).

The inputs of the population and employment forecasts are defined as follows:

— Population input includes the Census undercount.
— Employment (number of jobs) forecasts typically include the number jobs for Work at Home (WAH) and No Fixed Place of Work (NFPOW). As the jobs for WAH do not generate any traffic on a road network, they are not accounted for in the Emme Model and the employment input excludes the number of jobs for WAH. The NFPOW trips were assumed to have the same travel patterns as those having a fixed destination in a traffic zone.

COUNTY OF SIMCOE

County staff was consulted in February and March 2017 to confirm the future population and employment forecasts. The future 2031 forecasts used for the 2014 County TMP Study were applied, which have also been shared with the SAFO. Based on consultation with SAFO staff, the future forecasts for horizon year 2041 were estimated based on the same growth rates reflected in the MTO GGH Model inputs for the County.

TOWN OF INNISFIL

The land use forecasts for horizon years 2031 and 2041 for the Town of Innisfil were obtained from the Innisfil 2017 TMP updates. Note the forecasts included intensifications on Innisfil Beach Road and new development in Friday Harbour.

EXTERNAL GATEWAYS

The land use forecasts at external gateways for horizon years 2016, 2031, and 2041 were obtained from the GGH model and provided by the SAFO on May 18, 2018.

Note that these land use forecasts were not used as the City Emme Model inputs. Instead, external gateway growth factors were derived from the population forecasts and applied to the base year (2016) demand at external gateways to estimate the future demand for future horizons. Refer to Section 4.2.4 for more details.

4.2 TRIP GENERATION

Trip generation estimates the number of auto driver trips produced in and attracted to each zone by trip purpose and time of the day. In the 2019 Emme Model update, the trip rates of auto driver trips were estimated from the 2016 TTS data and were applied to generate the origin trips and destination trips for the future horizon years. For some location within a confined area, such as Georgian College, Victoria Royal Hospital, and Park Place properties, 2016/2017 turning movement counts at driveways were analyzed to derive overall trip rates.

It should be noted that the origin and destination trips refer to the trip ends in the origin-destination (O-D) matrices of the Emme Model and that origin trips (O) are production trips and destination trips (D) are attraction trips in this Technical Memorandum.

4.2.1 TRIP PURPOSE AND TRIP RATES

The model estimates travel demand originated in and destined to the City of Barrie and the region (the County of Simcoe) in the AM three-hour peak period (6:00 a.m. to 9:00 a.m.) and PM two-hour peak period (4:00 p.m. to 6:00 p.m.) for the following four trip purposes:

— home-based work (HBW)

— home-based school (HBS)

— home-based discretionary (HBD)

— non-home based (NHB)

In the previous 2014 Emme Model, trip rates were classified into three areas: North Barrie, South Barrie and Non-Barrie (Region). The 2019 Updated Model applied a more disaggregate approach by classifying trip rates by land use types and planning areas within the City of Barrie as shown in Table 4-3.

Table 4-3 Location Classification of Trip Rates

Model Area	Planning Area	Locations
City of Barrie	Commercial	Downtown Core and Lakeshore
		Bayfield Corridor
	Industrial	Barrie North & South
	Barrie - Residential	Barrie North & South
	Special Areas	Royal Victoria Hospital
		Georgian College
		Park Place
Modelled Region		Part of Simcoe County and Orillia
		Part of York Region

Note that Georgian Campus (i.e. Georgian College and Royal Victoria Hospital) and Park Place are major trip generators. Therefore, to improve the accuracy of the model, separate trip rates were calculated for these special zones.

4.2.2 MID-WEEK AM PEAK

Trip rates for auto driver trips in the AM three-hour peak period are provided in Table 4-4. These rates were initially estimated from 2016 TTS data and adjusted based on the calibrated origin-destination (OD) demand.

For Georgian Campus and Park Place, significant differences were observed in the trip rates calculated from the 2016 TTS data and the 2016/2017 turning movement counts. Therefore, the trip rates for these locations were calibrated to the turning movement counts, as discussed in the next sub-sections.

Table 4-4 Mid-Week AM Peak Period (Three-Hour) Auto Driver Trip Rates

Category ID	Planning Area	Location	Origin Trips Equation	Destination Trips Equation
Home-Based Work (HBW)				
11	Barrie - Commercial	Downtown Core and Lakeshore	O = 0.191 * Pop	D = 0.339 * Pop + 0.095 * Emp
12		Bayfield Corridor	O = 0.027 * Emp	D = 0.233 * Emp
21, 22	Barrie - Industrial	Industrial	O = 0.105 * Emp	D = 0.591 * Emp
31, 32	Barrie - Residential	Barrie North & South	O = 77.646 + 0.168 * Pop	D = 0.47 * Emp
51	Modelled Region	Part of Simcoe County and Orillia	O = 0.169 * Pop	D = 0.053 * Pop + 0.173 * Emp
61		Part of York Region	O = 0.199 * Pop	D = 0.42 * Emp
Home-Based School (HBS)				
11	Barrie - Commercial	Downtown Core and Lakeshore	O = 0.01 * Pop	D = 0 (zero)
12		Bayfield Corridor	O = 0.014 * Pop	D = 0.126 * Pop
21, 22	Barrie - Industrial	Industrial	O = 0.085 * Pop	D = 0.082 * Pop
31, 32	Barrie - Residential	Barrie North & South	O = 0.009 * Pop	D = 0.004 * Pop
51	Modelled Region	Part of Simcoe County and Orillia	O = 0.008 * Pop	D = 0.004 * Pop
61		Part of York Region	O = 0.008 * Pop	D = 0.003 * Pop
Home-Based Discretionary (HBD)				
11	Barrie - Commercial	Downtown Core and Lakeshore	O = 0.163 * Pop	D = 0.059 * Pop + 0.014 * Emp
12		Bayfield Corridor	O = 0.038 * Emp	D = 0.089 * Emp
21, 22	Barrie - Industrial	Industrial	O = 0.103 * Emp	D = 0.102 * Emp
31, 32	Barrie - Residential	Barrie North & South	O = 0.046 * Pop + 0.133 * Emp	D = 0.034 * Pop + 0.21 * Emp
51	Modelled Region	Part of Simcoe County and Orillia	O = 0.047 * Pop	D = 0.032 * Pop + 0.037 * Emp
61		Part of York Region	O = 0.07 * Pop + 0.028 * Emp	D = 0.051 * Pop + 0.087 * Emp

Table 4-4 Mid-Week AM Peak Period (Three-Hour) Auto Driver Trip Rates (*Continued*)

Category ID	Planning Area	Location	Origin Trips Equation	Destination Trips Equation
Non-Home-Based (NHB)				
11	Barrie - Commercial	Downtown Core and Lakeshore	O = 0.069 * Pop + 0.022 * Emp	D = 0.063 * Pop + 0.018 * Emp
12		Bayfield Corridor	O = 43.723 + 0.034 * Emp	D = 0.027 * Emp
21, 22	Barrie - Industrial	Industrial	O = 0.098 * Emp	D = 0.063 * Emp
31, 32	Barrie - Residential	Barrie North & South	O = 0.017 * Pop + 0.046 * Emp	D = 0.095 * Emp
51	Modelled Region	Part of Simcoe County and Orillia	O = 0.014 * Pop + 0.011 * Emp	D = 0.01 * Pop + 0.023 * Emp
61		Part of York Region	O = 0.019 * Pop + 0.037 * Emp	D = 0.065 * Emp
41	**Zone 78**	**Royal Victoria Hospital**	Trip rate by employment	Trip rate by employment
		Home-Based Work (HBW)	O = 0.054 * Emp	D = 0.305 * Emp
		Home-Based School (HBS)	O = 0 (zero)	D = 0 (zero)
		Home-Based Discretionary (HBD)	O = 0.029 * Emp	D = 0.09 * Emp
		Non-Home-Based (NHB)	O = 0.014 * Emp	D = 0.033 * Emp
41	**Zone 79**	**Georgian College**	Trip rate by employment	Trip rate by employment
		Home-Based Work (HBW)	O = 0.15 * Emp	D = 0.23 * Emp
		Home-Based School (HBS)	O = 0 (zero)	D = 0.407 * Emp
		Home-Based Discretionary (HBD)	O = 0.076 * Emp	D = 0.068 * Emp
		Non-Home-Based (NHB)	O = 0.039 * Emp	D = 0.026 * Emp
19	**Zone 19 & 20**	**Park Place**	Trip rate by employment	Trip rate by employment
		Home-Based Work (HBW)	O = 0.12 * Emp	D = 0.437 * Emp
		Home-Based School (HBS)	O = 0.02 * Emp	D = 0 (zero)
		Home-Based Discretionary (HBD)	O = 0.079 * Emp	D = 0.054 * Emp
		Non-Home-Based (NHB)	O = 0.126 * Emp	D = 0.045 * Emp

GEORGIAN CAMPUS AM PEAK HOUR TRIP RATES

A comparison of the total AM peak hour origin (outbound) and destination (inbound) trips derived from the 2016 TTS data and the 2016/2017AM peak hour traffic counts at driveways for Georgian Campus was conducted and is provided in Table 4-5.

As well, Table 4-5 presents the trip rates for the total origin and destination trips derived from TTS data and traffic counts. The trip rates from the Institute of Transportation Engineers (ITE) Trip Generation Manual 9th Edition for comparison are also provided in Table 4-5 for comparison. As indicated, the 2016 TTS underreported trips at Royal Victoria Hospital, based on the traffic count data at the driveways. The total trip rates are relatively close between TTS, traffic counts and ITE for Georgian College.

Given the fact that the traffic counts are more reliable as they were collected from the local areas, the Emme model trip rates applied the total trip rates derived from the traffic counts. The trip rates by trip purpose were obtained by adjusting the original TTS trip rates to match the total trip rates.

Table 4-5 Comparison of Georgian Campus AM Peak Hour Trip Rates

Location	2016 TTS			Traffic Counts			ITE	Emme Model
	O	D	Trip Rate (O + D)	O	D	Trip Rate (O + D)	Trip Rate (Out + In)	Trip Rate (O + D)
Royal Victoria Hospital	108	265	0.14	138	608	0.28	0.31	0.28
Georgian College	284	1507	0.68	371	1025	0.53	0.75	0.53

PARK PLACE AM PEAK HOUR TRIP RATES

A comparison of the AM peak hour origin (outbound) and destination (inbound) trips derived from the 2016 original TTS data and the 2016/2017AM peak hour adjusted traffic counts at driveways for Park Place is provided in Table 4-6. It is indicated in Table 4-6 that the 2016 TTS data slightly underreport trips to and from Park Place by 4% for the AM peak hour.

Combined trip rates were calculated from the ITE 9th Edition for comparison. The ITE trip rates of the various land uses at the Park Place properties were used to estimate the total number of trips entering and exiting Park Place. An overall combined trip rate was estimated by dividing the total number of trips by the total employment at Park Place. As shown in Table 4-6, the estimated ITE combined trip rate seems significantly higher than the trip rates derived from the 2016 TTS and the traffic counts. However, it should be noted that the estimation was conducted with some key assumptions and thus may have underestimated the inter-captured trips between different land uses within Park Place.

Similarly, given the fact that the traffic counts are more reliable as they were collected from the local areas, the Emme model trip rates applied the total trip rates derived from the traffic counts.

Table 4-6 Comparison of Park Place AM Peak Hour Trip Rates

Location	2016 TTS			Traffic Counts			ITE	Emme Model
	O	D	Trip Rate (O + D)	O	D	Trip Rate (O + D)	Estimated Combined Rate (Out + In)	Trip Rate (O + D)
Park Place	96	441	0.37	233	362	0.41	0.96	0.41

4.2.3 MID-WEEK PM PEAK

Trip rates for auto driver trips in the PM two-hour peak period are provided in Table 4-7. A similar comparison of trip rates for Georgian Campus and Park Place was conducted and is discussed in the following sub-sections.

Table 4-7 Mid-Week PM Peak Period (Two-Hour) Auto Driver Trip Rates

Category ID	Planning Area	Location	Origin Trips Equation	Destination Trips Equation
Home-Based Work (HBW)				
11	Barrie - Commercial	Downtown Core and Lakeshore	O = 0.339 * Pop + 0.099 * Emp	D = 0.071 * Pop
12		Bayfield Corridor	O = 95.553 + 0.065 * Emp	D = 0.04 * Emp
21, 22	Barrie - Industrial	Industrial	O = 0.436 * Emp	D = 0.07 * Emp
31, 32	Barrie - Residential	Barrie North & South	O = 0.317 * Emp	D = 0.107 * Pop + 0.107 * Emp
51	Modelled Region	Part of Simcoe County and Orillia	O = 0.036 * Pop + 0.157 * Emp	D = 0.13 * Pop
61		Part of York Region	O = 0.275 * Emp	D = 0.132 * Pop
Home-Based School (HBS)				
11	Barrie - Commercial	Downtown Core and Lakeshore	O = 0 * Pop	D = 0 * Pop
12		Bayfield Corridor	O = 0 * Pop	D = 0.054 * Pop
21, 22	Barrie - Industrial	Industrial	O = 0.013 * Pop	D = 0.003 * Pop
31, 32	Barrie - Residential	Barrie North & South	O = 0 * Pop	D = 0.004 * Pop
51	Modelled Region	Part of Simcoe County and Orillia	O = 0.003 * Pop	D = 0.006 * Pop
61		Part of York Region	O = 0 * Pop	D = 0.003 * Pop
Home-Based Discretionary (HBD)				
11	Barrie - Commercial	Downtown Core and Lakeshore	O = 0.152 * Pop	D = 0.17 * Pop + 0.051 * Emp
12		Bayfield Corridor	O = 173.366 + 0.175 * Emp	D = 141.048 + 0.074 * Emp
21, 22	Barrie - Industrial	Industrial	O = 0.194 * Emp	D = 0.204 * Emp
31, 32	Barrie - Residential	Barrie North & South	O = 0.063 * Pop + 0.162 * Emp	D = 0.061 * Pop + 0.106 * Emp
51	Modelled Region	Part of Simcoe County and Orillia	O = 0.056 * Pop + 0.051 * Emp	D = 0.068 * Pop + 0.039 * Emp
61		Part of York Region	O = 0.046 * Pop + 0.148 * Emp	D = 0.069 * Pop + 0.075 * Emp

Table 4-7 Mid-Week PM Peak Period (Two-Hour) Auto Driver Trip Rates

Category ID	Planning Area	Location	Origin Trips Equation	Destination Trips Equation
Non-Home-Based (NHB)				
11	Barrie - Commercial	Downtown Core and Lakeshore	O = 0.228 * Pop + 0.059 * Emp	D = 0.165 * Pop
12		Bayfield Corridor	O = 0.149 * Emp	D = 292.172 + 0.179 * Emp
21, 22	Barrie - Industrial	Industrial	O = 0.144 * Emp	D = 0.19 * Emp
31, 32	Barrie - Residential	Barrie North & South	O = 0.175 * Emp	D = 0.19 * Emp
51	Modelled Region	Part of Simcoe County and Orillia	O = 0.015 * Pop + 0.054 * Emp	D = 0.023 * Pop + 0.034 * Emp
61		Part of York Region	O = 0.112 * Emp	D = 0.126 * Emp
41	**Zone 78**	**Royal Victoria Hospital**	Trip rate by employment	Trip rate by employment
		Home-Based Work (HBW)	O = 0.185 * Emp	D = 0.058 * Emp
		Home-Based School (HBS)	O = 0 * Emp	D = 0 * Emp
		Home-Based Discretionary (HBD)	O = 0.079 * Emp	D = 0.043 * Emp
		Non-Home-Based (NHB)	O = 0.095 * Emp	D = 0.015 * Emp
41	**Zone 79**	**Georgian College**	Trip rate by employment	Trip rate by employment
		Home-Based Work (HBW)	O = 0.136 * Emp	D = 0.091 * Emp
		Home-Based School (HBS)	O = 0.298 * Emp	D = 0.01 * Emp
		Home-Based Discretionary (HBD)	O = 0.06 * Emp	D = 0.068 * Emp
		Non-Home-Based (NHB)	O = 0.07 * Emp	D = 0.024 * Emp
19	**Zone 19 & 20**	**Park Place**	Trip rate by employment	Trip rate by employment
		Home-Based Work (HBW)	O = 0.607 * Emp	D = 0.137 * Emp
		Home-Based School (HBS)	O = 0 * Emp	D = 0 * Emp
		Home-Based Discretionary (HBD)	O = 0.269 * Emp	D = 0.49 * Emp
		Non-Home-Based (NHB)	O = 0.189 * Emp	D = 0.46 * Emp

GEORGIAN CAMPUS PM PEAK HOUR TRIP RATES

A comparison of the total PM peak hour origin (outbound) and destination (inbound) trips derived from the 2016 original TTS data and the 2016/2017 PM peak hour traffic counts at driveways for Georgian Campus is provided in Table 4-8. It is evident that the 2016 TTS underreported trips at Royal Victoria Hospital, based on the driveway counts.

Trip rates were obtained from the ITE 9th Edition for comparison. The comparison shows that the PM rates have similar findings as the AM rates. The ITE rate is close to the traffic counts for Royal Victoria Hospital while it is higher than the rate of traffic counts. The Emme model trip rates applied the total trip rates derived from the traffic counts, given the reliable traffic counts collected from the local areas.

Table 4-8 Comparison of Georgian Campus PM Peak Hour Trip Rates

Location	2016 TTS			Traffic Counts			ITE	Emme Model
	O	D	Trip Rate (O + D)	O	D	Trip Rate (O + D)	Trip Rate (Out + In)	Trip Rate (O + D)
Royal Victoria Hospital	200	84	0.11	548	178	0.27	0.29	0.27
Georgian College	1070	235	0.49	850	291	0.43	0.79	0.43

PARK PLACE PM PEAK HOUR TRIP RATES

A comparison of the total PM peak hour origin and destination trips derived from the 2016 TTS data and the 2016/2017 PM peak hour adjusted traffic counts at driveways for Park Place is provided in Table 4-9. The 2016 TTS appeared to underreport trips to and from Park Place by 80%.

A combined trip rate was estimated from the ITE 9th Edition for comparison using the same approach as AM discussed above. As shown in Table 4-9, the estimated ITE combined rate for the PM peak hour is relative closer to the derived trip rate from the traffic counts, compared to the rate from TTS data.

The Emme model trip rates applied the total trip rates derived from the traffic counts. The trip rates by trip purpose were obtained by adjusting the original TTS trip rates to match the total trip rates.

Table 4-9 Comparison of Park Place PM Peak Hour Trip Rates

Location	2016 TTS			Traffic Counts			ITE	Emme Model
	O	D	Trip Rate (O + D)	O	D	Trip Rate (O + D)	Estimated Combined Rate (Out + In)	Trip Rate (O + D)
Park Place	490	164	0.45	907	926	1.25	1.02	1.25

4.2.4 EXTERNAL ZONE TRIPS

External zones represent areas outside the traffic zone system defined for the Barrie model, which are areas outside the City of Barrie and the County of Simcoe, such as the GTA. The external zones connect to key access roads near those zones using a "gateway" approach. The model includes 10 external zones, labelled as zones 901 through 910, to capture the inter-regional trips, which have an origin, destination or both located outside the study area boundary.

Trip generation for external zones applies an approach different from the areas within the City of Barrie and the County of Simcoe. For the base year 2016, the trips for four trip purposes at the gateways represent traversal OD demand relative to the City of Barrie Emme Model areas. The traversal OD matrices of the 2016 observed data were extracted from the GGH Model, then aggregated to each external zone. The overall trips at the gateway zones were further adjusted with the calibrated OD demand matrices that were validated against the 2016 adjusted traffic counts. For the future horizon years, traffic at the gateways was estimated by applying a growth factor that was derived from the population growth in the represented area. Table 4-10 shows the external zone growth factors, which were derived from the population forecasts applied in the GGH model.

Table 4-10 Growth Factors at Model Gateways from 2016

Gateway	2016 to 2031 Factor	2016 to 2041 Factor
901	1.43	1.78
902	1.36	1.60
903	1.35	1.60
904	1.23	1.36
905	1.32	1.46
906	1.49	1.86
907	1.41	1.70
908	1.41	1.67
909	1.33	1.45
910	1.28	1.51

4.3 TRIP DISTRIBUTION

4.3.1 FRATAR TRIP DISTRIBUTION MODEL

Trip distribution estimates the origin-destination (O-D) trip matrices from the generated trip ends. The updated Emme Model applied the Fratar trip distribution model, which is based on doubly-constrained growth factors. The Fratar model relies on the strength of the base year observed O-D trip matrices and is described as the following formula:

$$T_{ij} = t_{ij} * a_i * b_j$$

Subject to:

$$\sum_j T_{ij} = O_i$$

$$\sum_i T_{ij} = D_j$$

Where:

T_{ij} = the forecasted future O-D trip flows between zone i and zone j

t_{ij} = the base year O-D trip flows between zone i and zone j

a_i = the balancing factor for row i

b_j = the balancing factor for column j

O_i = the number trips originated by zone i

D_j = the number trips destined to zone j

4.3.2 AGGREGATION AND DISAGGREGATION ANALYSIS

Considering the limitation of the Fratar trip distribution model that relies strongly on the base year O-D matrix and few trips in the Hewitt's and Salem Secondary Plan areas in the base year 2016, an aggregation and disaggregation analysis is applied, as described in the following steps, to enhance the Fratar trip distribution model:

— Based on the proposed land uses in the disaggregated zones of the Hewitt's and Salem Secondary Plan areas, the disaggregated zones are aggregated with the existing TAZs with similar land uses. Specifically, the base year 2016 adjusted all-trip-purpose O-D full matrix and the future origin and destination trip end matrices are aggregated into the aggregated zone system.
— The Fratar balancing is applied to the aggregated matrices in the aggregation zone system to obtain the future all-trip-purpose O-D matrices.
— Disaggregation factors of the future origins and destinations for each disaggregated TAZ are estimated based on the ratio of the future disaggregated zonal origin/destination total to the future aggregated zonal origin/destination total.
— The future all-trip-purpose O-D matrices in the aggregated zone system are disaggregated back into the disaggregated zone system (i.e. the model zone system) based on the disaggregation factors.

4.4 GO STATION AUTO TRAVEL DEMAND

Considering the recent and future extension of GO Train services within the City of Barrie, the model has been updated to account for travel impact on the future road network due to the park-and-ride facilities at the GO Train stations. GO Train auto travel demand refers to auto trips resulting from the park-and-ride and kiss-and-ride activities at GO stations.

The following subsections summarize the existing and future GO Train services, as well as the existing travel demand and future forecasts by GO transit, which were obtained from Metrolinx for GO Rail Station planning studies.

4.4.1 EXISTING GO TRAIN TRAVEL DEMAND

Barrie is currently served by two GO Rail stations along the Barrie Line (GO Newmarket Subdivision). The first station, Barrie South GO, is located at the southern limit of the City, in the northeast corner of Mapleview Drive East and Yonge Street. This station is well served by Barrie Transit that provides three local routes. This station has five bus bays available to accommodate these services.

The second station in Barrie, Allandale Waterfront GO, acts as the terminus for the Barrie Line and is located in the center of Barrie and in the southeast corner of Lakeshore Drive and Bradford Street. This station is served by five Barrie Transit routes with six bus bays.

GO SCHEDULE

Currently, GO Transit provides seven train services in both the AM and PM peak periods, as per its timetable schedule dated September 1st, 2018. As shown in Table 4-11, the existing GO Trains have headways of approximately 20 minutes and 30 minutes in the AM and PM peak periods respectively.

Table 4-11 Existing GO Train Schedule

A. Direction: Southbound (7 Trains in the AM)

Train Number	Arrival Time at Union	Allandale Waterfront Station Departure Time	Barrie South GO Departure Time
782	07:03	05:18	05:26
784	07:33	05:48	05:56
786	07:47	06:03	06:11
788	08:03	06:18	06:26
790	08:19	06:33	06:41
792	08:33	06:48	06:56
794	09:03	07:18	07:26

Source: GO Transit Timetable provided by Metrolinx, effective on September 1, 2018.

B. Direction: Northbound (7 Trains in the PM)

Train Number	Departure Time from Union	Allandale Waterfront Station Arrival Time	Barrie South GO Arrival Time
793	15:40	17:26	17:16
795	16:10	17:56	17:46
797	16:40	18:26	18:16
799	17:05	18:51	18:41
801	17:35	19:21	19:11
803	18:05	19:51	19:41
805	18:35	20:21	20:11

Source: GO Transit Timetable provided by Metrolinx, effective on September 1, 2018.

GO RIDERSHIP

The existing ridership and its distribution at the GO stations during the AM peak period was obtained from results of a ridership survey provided by Metrolinx. The total daily ridership for 2016 is summarized in Table 4-12.

Table 4-12 Existing 2016 GO Ridership

GO Station	Existing 2016 Ridership
Allandale Waterfront	478
Barrie South	567
Total	**1045**

Source: The 2016 counts were obtained from Exhibit 11 provided by Metrolinx.
Note: The counts were slightly different from the numbers shown on the distribution maps.

GO ACCESS MODE SHARE

The existing access mode shares were taken from the 2016 *Metrolinx GO Rail Station Access Plan*, as shown in Table 4-13. The passenger drop-off trips (i.e. kiss-and-ride) were assumed to have the same origin and destination locations.

Table 4-13 Existing 2016 GO Rail Access Mode Share

Access Mode	Allandale Waterfront GO Station	Barrie South GO Station
Walking	9%	4%
Cycling	0%	1%
Local transit	7%	1%
Park & ride	64%	81%
Pick-up / drop-off	20%	12%
Carpool passengers	0%	1%
Total	**100%**	**100%**

Source: Metrolinx GO Rail Station Access Plan, Final Report, December 12, 2016.

GO PEAK HOUR FACTOR

As there was no breakdown of the existing ridership counts by time, peak hour factors (PHF) of the peak period travel demand from the 2014 Emme model which was derived from the 2010 ridership counts. The PHF for the AM and PM peak hours were 0.51 and 0.65 respectively. This indicates that the GO Train travel peaked evenly in the AM peak hour and peaked more sharply in the PM peak hour. It was assumed that the peak hour of GO Train travel demand would be the same as the peak hour of roadway traffic, as a worst-case scenario.

4.4.2 FUTURE GO TRAIN TRAVEL DEMAND

FUTURE GO TRAIN SERVICES

Under GO Transit's Regional Express Rail program, rail service along the Barrie line will be upgraded to be a two-way, all-day rail service. According to the Metrolinx Regional Transportation Plan 2041, this service will operate along the entire length of the Barrie line from Toronto Union Station to Allandale Waterfront GO Station. Service will operate at a minimum frequency of 15 minutes per train in either direction between Toronto Union and Aurora GO Station, and a frequency of 30 minutes between Aurora GO and Allandale Waterfront Stations. Construction is underway to improve the infrastructure on the line to facilitate these operations.

FUTURE GO ACCESS MODE SHARE

As shown in Table 4-14, *Metrolinx GO Rail Station Access Plan* has set out access mode share targets for Allandale Waterfront GO Station and Barrie South GO Station for horizon year 2031. Compared to the existing mode shares in Table 4-13, there would be a decrease of travel by park-and-ride and an increase by all other access modes.

Table 4-14 2031 Future GO Access Mode Share Targets

Access Mode	Allandale Waterfront GO Station	Barrie South GO Station
Walking	14% - 16%	8% - 10%
Cycling	3% - 5%	3% - 5%
Local transit	28% - 30%	14% - 16%
Park & ride	26% - 28%	50% - 52%
Pick-up / drop-off	26% - 28%	20% - 22%
Carpool passengers	3% - 5%	5% - 7%

Source: Metrolinx GO Rail Station Access Plan, Final Report, December 12, 2016.

Based on the existing mode shares and the future 2031 mode share targets, the assumed mode shares by the model for the future horizon years are provided in Table 4-15. The mode shares beyond 2031 were assumed to have a slight increase for all non-auto modes.

Table 4-15 Estimated Future GO Access Mode Shares

Access Mode	Allandale Waterfront GO Station						Barrie South GO Station					
	2016 [a]	2021	2026	2031 [a]	2036	2041	**2016 [a]**	2021	2026	2031 [a]	2036	2041
Walking	**9%**	11%	12%	14%	15%	15%	**4%**	5%	7%	8%	9%	10%
Cycling	**0%**	1%	2%	3%	3%	4%	**1%**	2%	2%	3%	4%	4%
Local transit	**7%**	14%	21%	28%	29%	30%	**1%**	5%	10%	14%	16%	18%
Park & ride	***64%***	*51%*	*39%*	*26%*	*23%*	*20%*	***81%***	*71%*	*60%*	*50%*	*44%*	*39%*
Pick-up / drop-off	***20%***	*22%*	*24%*	*26%*	*26%*	*27%*	***12%***	*15%*	*17%*	*20%*	*21%*	*22%*
Carpool passengers	**0%**	1%	2%	3%	4%	4%	**1%**	2%	4%	5%	6%	7%

Source: [a]. The mode shares in Blue are obtained from Metrolinx GO Rail Station Access Plan, Final Report, December 12, 2016.

FUTURE GO RIDERSHIP FORECAST

Metrolinx GO Rail Station Access Plan estimates that the future total ridership at the Allandale Waterfront and Barrie South GO Stations would increase to approximately 1,000 to 2,000 daily riders respectively by 2031. This results in a minimum of 2,000 riders at the two stations. Using Metrolinx' 2031 ridership forecasts and assuming a linear growth in ridership, the assumed future travel demand for GO Train service is provided in Table 4-16.

Table 4-16 Future GO Ridership Forecast Assumptions

GO Station	2016	2021	2026	2031	2036	2041
Allandale Waterfront	**478**	624	769	915	1,060	1,206
Barrie South	**567**	740	912	1,085	1,258	1,431
Total	**1,045**	1,363	1,682	**2,000**	2,318	**2,637**

Source: The 2016 counts were obtained from Exhibit 11 provided by Metrolinx.
Note: The counts were slightly different from the numbers shown on the distribution maps. The 2031 estimated total ridership was obtained from the Metrolinx GO Rail Station Access Plan, Final Report, December 12, 2016.

The following assumptions were made to account for the auto travel demand resulting from the park-and-ride facilities at the GO Train stations:

- GO Train stations are represented as dummy zones in the City's demand forecasting model.
- The GO Train travel forecasts were obtained from other sources. The model does not simulate the competition between the auto travel mode and other modes (including GO Train with auto access, e.g., park/kiss-and-ride) The auto travel demand destined to the GO Train stations by park-and-ride and kiss-and-ride was accounted for by the City's Emme Model and assigned to the roadway networks.
- The overall AM peak period travel demand by GO Train was disaggregated based on the current trip distribution and future population growth.
- The GO Train travel demand in the PM peak period was the reverse of travel demand in the AM peak period.
- A peak hour factor of 0.51 and 0.65 was applied to obtain the overall O-D travel demand by GO Train in the AM and PM peak hours, respectively.
- The future access mode shares for park-and-ride and kiss-and-ride were applied to the future GO Train travel demand to obtain the auto driver O-D travel demand related to the GO stations.

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5 MODEL VALIDATION

Validation is the process of comparing modelled traffic volumes with observed traffic volumes to assess how well the demand forecasting model fits. Validation was completed for year 2016 for the screenline locations, as well as segments on the Highway 400 mainline and interchange ramps in the City of Barrie.

5.1 BASE YEAR (2016) ROAD NETWORK

The base year (2016) road network was developed from the 2016 base network in the prior 2014 City Model, input from City staff, and site visits. The road improvements identified in the prior 2014 Model for base year 2016 were verified to ensure that the road improvements were completed before 2016 and before the traffic counts conducted that were used for model validation. The review of the completed infrastructure improvements between 2011 and 2017 are described in Table 5-1.

Table 5-1 Completed Transportation Infrastructure Improvements

Roadway	From	To	Completed Road Improvements
Mapleview Drive	Welham Road	Huronia Road	Widened to 7 lanes
	Huronia Road	Country Lane	Widened to 5 lanes
Ferndale Drive	Dunlop Street	Tiffin Street	Widened to 4 lanes
Cundles Road	Livingston Street	J. C. Massie Way	Widened to 5 lanes, including bicycle and exclusive left-turn lanes
Duckworth Street	J. C. Massie Way	Bell Farm Road	Widened to 7 lanes, including bicycle lanes and exclusive left-turn lanes
	Bell Farm Road	Rose Street	Widened to 5 lanes, including bicycle and exclusive left-turn lanes
Duckworth Street Interchange			Re-configuration and improvements
Essa Road	Coughlin Road	Ferndale Drive	Widened to 5 lanes plus multi-use path

5.2 DATA COLLECTION

Extensive traffic data was provided by the City and MTO for calibration purposes. Traffic count data (including ATR and TMC) and their respective sources are provided in Appendix E-2 - Summary of Traffic Counts.

5.3 VALIDATION SCREENLINES

Eight screenlines, as shown in Figure 5-1, were defined for the City's Emme Model for validation. The screenlines include four at the boundaries of the City to capture the traffic entering and exiting the City of Barrie:

- south of Barrie
- southwest of Barrie
- northwest of Barrie
- northeast of Barrie

The four internal screenlines cross the City along:

- Essa Road
- Tiffin Street
- Sunnidale Road
- Highway 400 Crossing

Source: Background image from Google Earth.

Scale: N.T.S.

Figure 5-1
Model Validation Screenlines
Transportation Master Plan - Emme Macro Modelling and Improvements Rationale

5.4 TRAFFIC COUNTS TO VALIDATE

As mentioned, the most current traffic counts that were provided by the City and the MTO for validation varied in terms of date, season, day of the week and peak hours of the counts. It is important to select the appropriate traffic counts that the modelled volumes are validated against, particularly traffic counts on Highway 400, since it had traffic counts in different seasons (e.g., summer, spring and fall). The rule of thumb for validation is to select traffic counts whose conditions match the conditions that are simulated in the model as closely as possible, such as year, season and type of trips. The following sections describe the approaches, assumptions or methodologies that were applied.

5.4.1 CITY ROADS

Most roads under the jurisdiction of the City of Barrie had an excellent collection of ATR counts and turning movement counts (TMC) for AM and PM peak hours on a typical mid-week day. Most of these counts were collected in 2016 or 2017. Approximately 49 road link locations had ATR counts and 106 major signalized intersections had TMC counts. These traffic counts were selected for validation. For some locations where the year of counts was not 2016, the traffic counts were factored up to the target year 2016. An annual growth rate of 1% was assumed for urban roadways and an annual growth rate of 2% was assumed for freeway and ramp locations.

5.4.2 HIGHWAY 400

SEASONAL VARIATION

As mentioned, Highway 400 had traffic counts observed in the spring, summer and fall. Comparison of the most current observed AM and PM peak hour traffic volumes on Highway 400 in the summer with those in the spring or fall, as shown in Table 5-2, found that:

— Overall, the traffic counts for both peak periods and directions were higher in the fall than the spring. The peak direction traffic counts during the fall were on average 24% to 59% higher than those during the spring, except for the mid-week AM peak period where traffic counts were on average 9% higher.
— Overall, the mid-week AM traffic counts for the peak direction (SB) during the summer were 11% lower than the fall traffic counts. However, the mid-week PM and Friday PM traffic counts for the peak direction (NB) were generally slightly higher in the summer, except for a few individual locations.
— The peak direction traffic counts in the Saturday and Sunday peak hour during the summer were on average 26% and 13% higher than those in the fall, respectively. Summer traffic counts at Highway 400 north of Mapleview Drive in both directions were exceptionally higher than the fall traffic counts.

Table 5-2 Seasonal Factors during a Typical Week, Highway 400 Mainline in the City of Barrie

Location	Fall/Spring											Summer/Fall										
	Year	Mid-Week AM Peak		Mid-Week PM Peak		Friday PM Peak		Saturday Peak		Sunday Peak		Year	Mid-Week AM Peak		Mid-Week PM Peak		Friday PM Peak		Saturday Peak		Sunday Peak	
		NB	SB	NB	SB	NB	SB	NB	SB	NB	SB		NB	SB	NB	SB	NB	SB	NB	SB	NB	SB
Highway 400 NO Duckworth St.	2014	1.12	1.09	1.18	1.31	1.44	1.24	1.67	1.35	1.16	1.89	2014	1.03	0.94	1.04	1.01	1.07	1.09	**1.41**	**1.31**	**1.33**	1.06
Highway 400 NO Bayfield St.	2015	1.12	1.25	1.03	1.01	1.22	1.04	0.95	0.93	0.75	0.92	2015	1.09	0.76	1.11	0.90	1.15	0.81	**1.91**	1.06	**1.78**	**1.55**
Highway 400 NO Dunlop St.	2014	1.09	1.21	1.12	1.15	1.23	1.12	1.45	1.12	1.09	1.39	2014	0.74	0.88	0.82	1.02	0.88	0.97	0.97	1.25	1.17	1.07
Highway 400 WO Essa Rd.	2013	0.99	1.00	1.02	1.06	1.06	1.04	1.21	0.92	1.00	1.04	2013	0.92	0.79	1.03	0.83	1.02	0.77	0.95	0.99	1.02	0.93
Highway 400 NO Mapleview Dr. E.	2014	2.03	1.12	1.74	1.16	1.79	1.10	2.59	1.09	1.66	1.56	2014	1.12	0.89	1.05	1.10	1.01	1.06	1.06	1.28	**1.53**	1.05
Highway 400 NO Innisfil Beach Rd.	2013	1.34	0.89	1.33	1.13	1.32	1.10	1.69	1.01	1.35	1.10	2013	1.01	1.04	1.03	1.19	0.87	1.18	1.25	**1.32**	**1.66**	1.13
Average			**1.09**	**1.24**		**1.34**		**1.59**			**1.32**			**0.89**	**1.01**		**1.00**		**1.26**			**1.13**
Seasonal Characteristics	1. The traffic counts (about 86%) in **both directions** during the fall were **overall higher** than those during the spring. 2. The **peak direction** traffic counts during the fall were significantly higher than those during the spring. Except the mid-week AM peak hour (approximately 9%), the peak direction traffic counts during the fall were on an average **24% to 59%** higher than those during the spring during the mid-peak **PM, Friday PM, Saturday**, and **Sunday** peak hours.											1. The peak direction (SB) traffic counts in the mid-week AM peak hour during the summer were not higher than those during the fall. 2. The peak direction (NB) traffic counts in the mid-week PM and Friday PM peak hours during the summer were generally higher than those during the fall, except some individual locations. 3. The **peak direction (NB)** traffic counts in the **Saturday peak** hour during the summer were on average **26%** higher than those during the fall. Traffic counts in both directions on Highway 400 north of Mapleview Drive were extremely higher during the summer, as opposed to the fall. 4. The **peak direction (SB)** traffic counts in the **Sunday peak** hour during the summer were on average **13%** higher than those during the fall. Traffic counts in both directions on Highway 400 north of Mapleview Drive were extremely higher during the summer, as opposed to the fall.										

Note:

1. NO = north of; NB = northbound; SB = southbound

2. The analysis of seasonal characteristics was based on raw traffic counts obtained on the same survey year.

3. The light blue-shaded columns indicate the peak direction on the Highway 400 mainline.

4. The blue figures indicate the ratios less than 1.00.

WEEKDAY VARIATION

An analysis of the peak hours of cross-section traffic (total traffic in two travel directions), including northbound and southbound traffic during the AM and PM peak period respectively, is summarized in Table 5-3. The mid-week and Saturday peak periods are very similar across the summer and fall / spring seasons. However, the Friday PM peak period typically experiences an earlier traffic peak in the summer relative to the fall / spring seasons. Sunday also experiences an earlier traffic peak in the summer.

Table 5-3 Seasonal Variation in Traffic Volumes, Highway 400 Mainline, Barrie

Season	Mid-Week AM Peak	Mid-Week PM Peak	Friday PM Peak	Saturday Peak	Sunday Peak
	NB+SB	NB+SB	NB+SB	NB+SB	NB+SB
Fall or Spring	7:00 - 9:00 **(typical peak hour: 8:00 - 9:00)**	16:00 - 18:00 **(typical peak hour: 16:00 - 17:00)**	16:00 - 18:00 **(typical peak hour: 16:00 - 17:00)**	11:00 - 13:00 **(typical peak hour: 12:00 - 13:00)**	12:00 - 17:00 **(typical peak hour: various)**
Summer	7:00 - 9:00 **(typical peak hour: 8:00 - 9:00)**	16:00 - 18:00 **(typical peak hour: 16:00 - 17:00)**	14:00 - 18:00 **(typical peak hour: 14:00 - 15:00)**	11:00 - 14:00 **(typical peak hour: 12:00 - 13:00)**	11:00 - 16:00 **(typical peak hour: various)**
Traffic Peak Period Characteristics	Peak period during summer is similar to that during fall or spring.	Peak period during summer is similar to that during fall or spring.	Traffic **peaks earlier** during summer in the **Friday PM** period.	Peak period during summer is similar to that during fall or spring.	Traffic **peaks earlier** during summer on **Sunday.**

Note: NB – northbound, SB – southbound.

The weekly variations of the non-summer (i.e. fall and spring) and summer traffic counts along the Highway 400 were compared and plotted as shown in Figure 5-2 and Figure 5-3, respectively. For both summer and non-summer seasons, the traffic counts in the peak direction (NB) in the Friday PM peak hour were on average 23-24% higher than those in the mid-week PM peak hour. Traffic counts in the peak direction (NB) in the Saturday peak hour were on average 20% lower than those in the Friday PM peak hour during the non-summer season.

During the summer season, traffic counts in the peak direction (NB) in the Saturday peak hour were on average 4% lower than those in the Friday PM peak hour while traffic counts in the non-peak direction (SB) were on average 4% higher. Excluding one section north of Bayfield Street that had unreasonably low counts, traffic counts in the peak direction in the Sunday peak hour (SB) were generally close to or 4% higher than traffic counts in the peak NB direction in the Friday PM peak hour during the non-summer and summer seasons respectively.

Based on the data reviewed, traffic volumes in the Friday PM peak hour and Sunday mid-day peak hour represent the worst-case traffic scenarios during either the summer or non-summer season in the City of Barrie.

Figure 5-2 **Variations of (Fall / Spring) Traffic Counts along Highway 400 Mainline, City of Barrie**

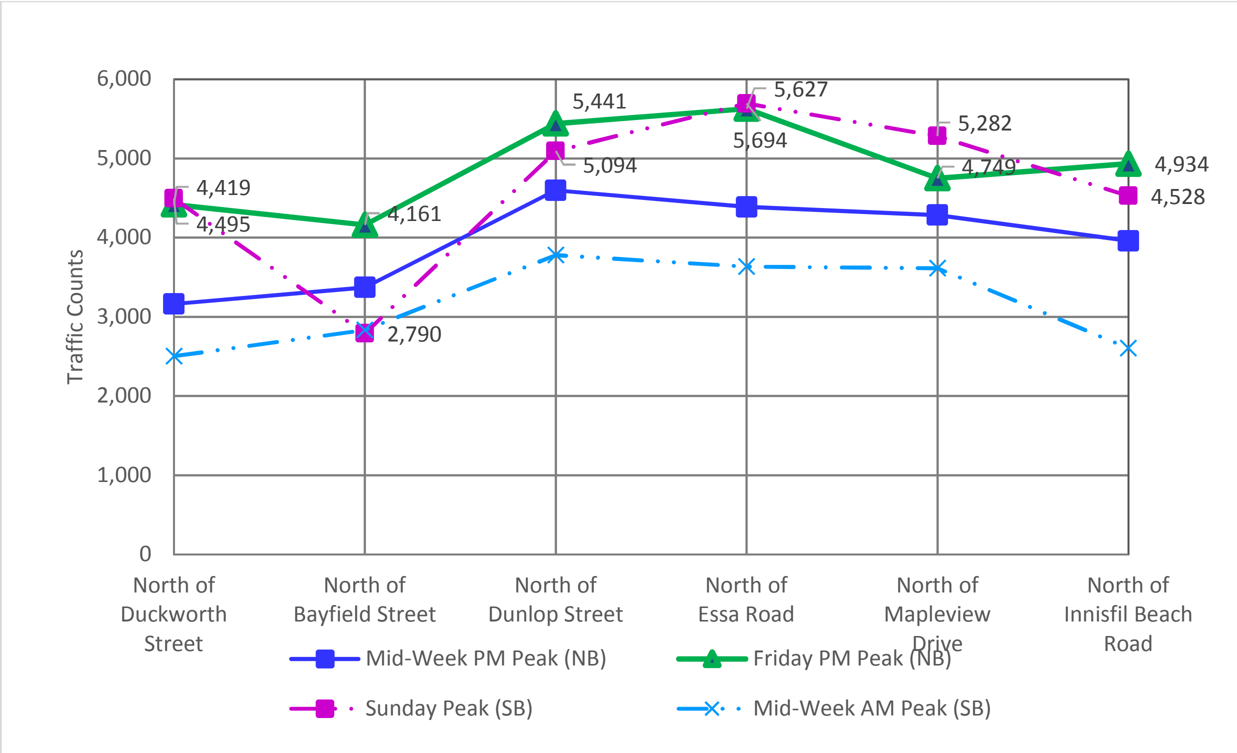
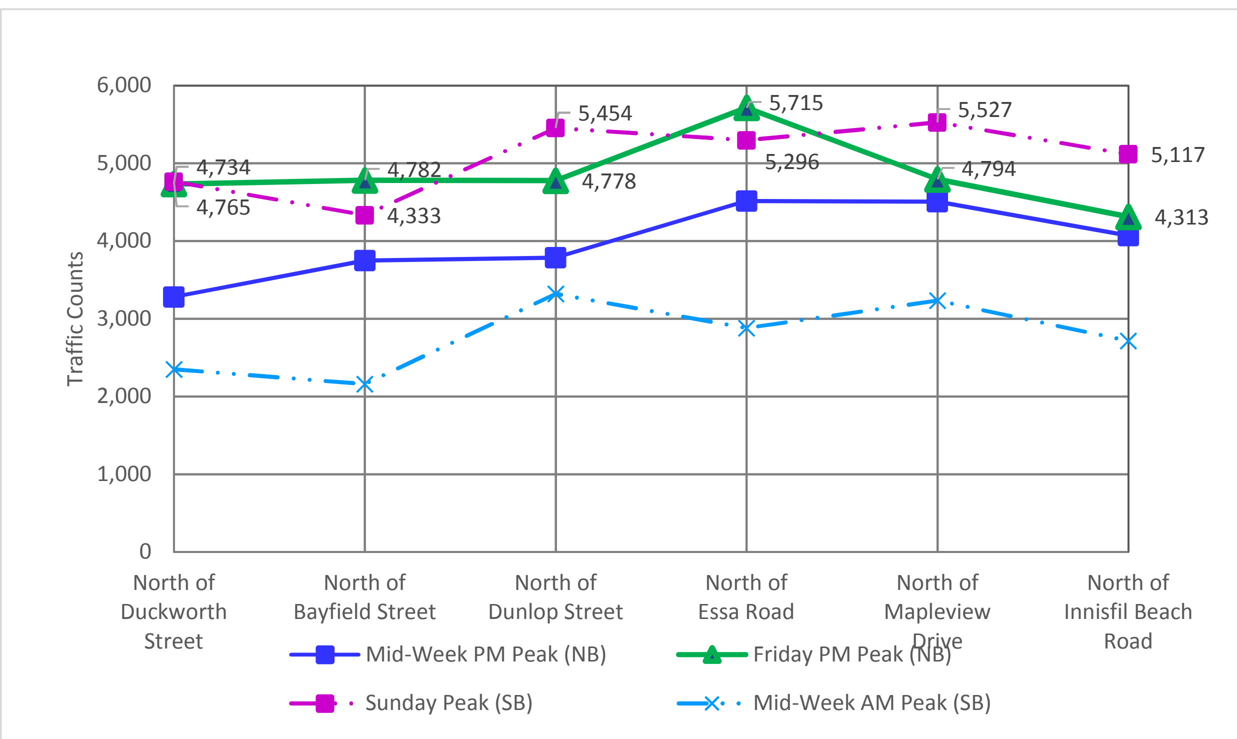


Figure 5-3 **Variations of (Summer) Traffic Counts along Highway 400 Mainline, City of Barrie**



COUNTS FOR VALIDATION

As discussed above, traffic counts on the Highway 400 mainline vary during seasons and day of the week. The City Emme Model was developed from the travel data (TTS) that was obtained during the fall/spring. The Model simulates auto travel demand during a typical mid-week AM and PM peak period. The auto demand during fall/spring represents the typical traffic demand on the City's road network.

Therefore, the observed fall mid-week traffic volumes on Highway 400 were selected for validation. Traffic counts for validation were obtained by taking an average of counts on three typical mid-week days or more during fall that had higher traffic counts than the spring. Traffic counts obtained from a different year were adjusted based on an annual compound growth rate of 2% to obtain the same validation year of 2016. Furthermore, the on-ramp, off-ramp and segment counts along the mainline were balanced accordingly.

5.5 TRAVEL DEMAND ADJUSTMENT

5.5.1 GOODNESS OF FIT CRITERIA

The validation of the City of Barrie Emme Model applied the typical criterion at the screenline level for an Emme demand forecasting model, which is:

The modelled traffic volumes at the screenline level are within a reasonable range of model errors of 15% compared to the observed traffic counts.

However, this criterion would not be sufficient to provide inputs to the TMP study that identified the required roadway improvements based on the future forecasted volumes, V/C ratios, and average daily traffic (ADT) volumes on roadway links, as well as provide inputs to traffic operations assessment (Synchro or Aimsun) for signalized intersections and ramp terminals. In addition, this criterion would not be sufficient for the future need and justification studies for improvements to the Highway 400 facilities.

Therefore, in addition to the typical screenline-level validation, the 2019 Emme Model was validated at the intersection level for the city-wide major intersections, as well as on the Highway 400 mainline and interchange ramps within Barrie. The validation was checked graphically for goodness-of-fit on the scatterplots of modelled volumes against observed traffic counts. The goodness-of-fit criteria to check include:

- **a slope of the fit line closes to 45 degrees (B value closes to 1.0) with a small value of intercept (A value)**
- **R-square value above 80%, as a minimum (the percentage of road links or intersections well explained by the model)**

5.5.2 ADJUSTMENT MOTIVATIONS

Before travel demand adjustment, thorough network validation and calibration was completed to make sure that the model errors of the modelled volumes were not a result of the coding errors in the network and inappropriate input parameters.

After substantial network calibration, the initial O-D demand matrices derived from the TTS data were assigned to the 2016 base network. The initial validation results for mid-week AM and PM peak hours of 2016 at screenline locations and on Highway 400 and interchange ramps were obtained and reviewed.

5.5.2.1 INITIAL VALIDATION RESULTS

Figure 5-4 and Figure 5-5 provide the scatterplots of the modelled volumes and the observed counts at the screenline links and major intersections based on the initial TTS O-D data. The scatterplots indicate that:

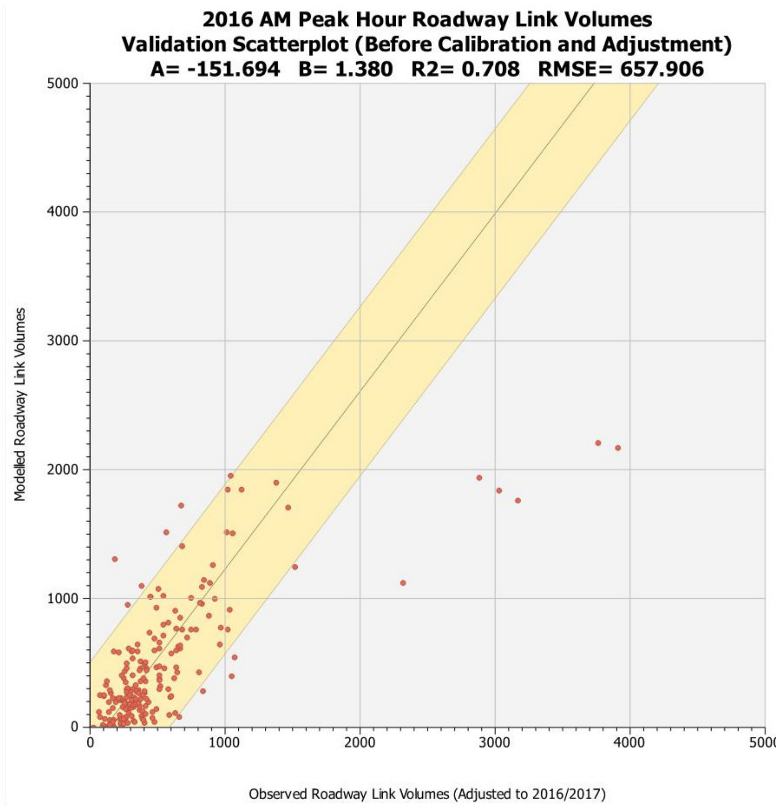
- At the screenline location, the AM and PM peak models had a bad correlation between the modelled volumes and the observed counts. The slope (B value) was far from 1.0. The R square values of 0.71 to 0.76 indicated that the fit explained 98% of link locations. The intercept had a large constant value.

- At intersections, the AM and PM peak models also had a bad correlation between the modelled volumes and the observed counts. The locations with differences between the modelled volumes and the observed counts were scattered in the whole plots.

Therefore, the initial results indicated a poor fit between the model volumes and the observed traffic counts, which required adjustment to the initial O-D travel demand.

Figure 5-4 Goodness-of-Fit of Mid-Week Model Validation (before Demand Adjustment – TTS OD), All Link Roadway Volumes

A) AM Peak Hour



B) PM Peak Hour

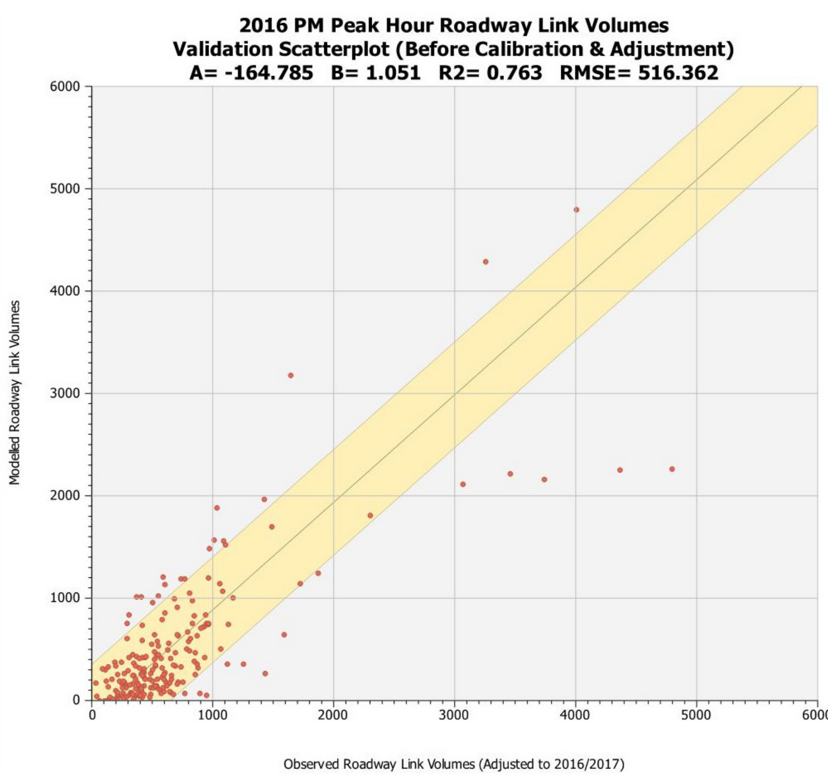
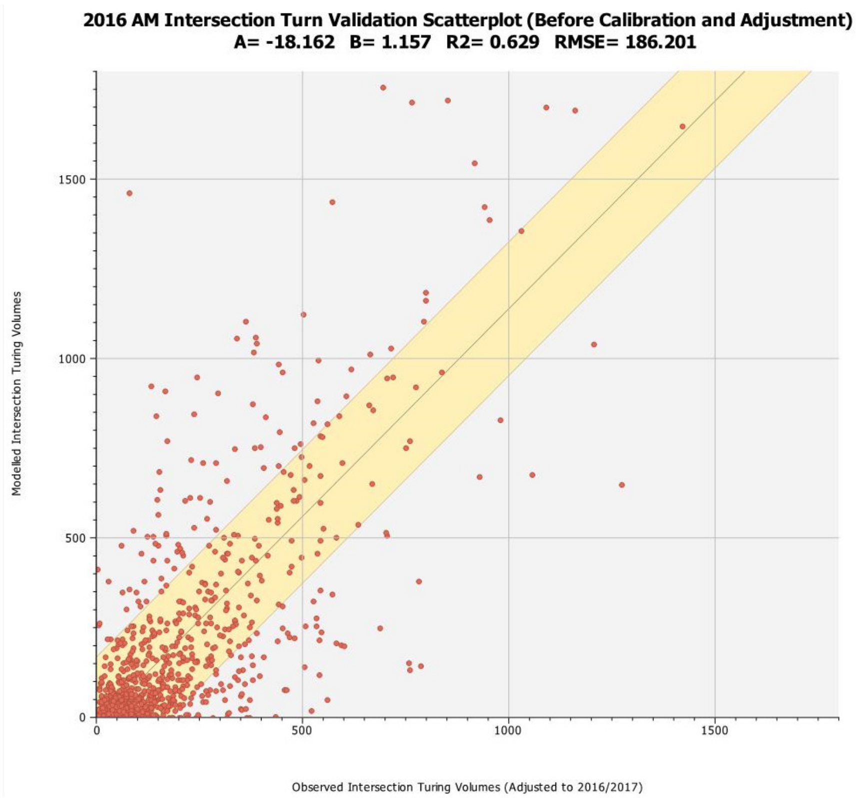
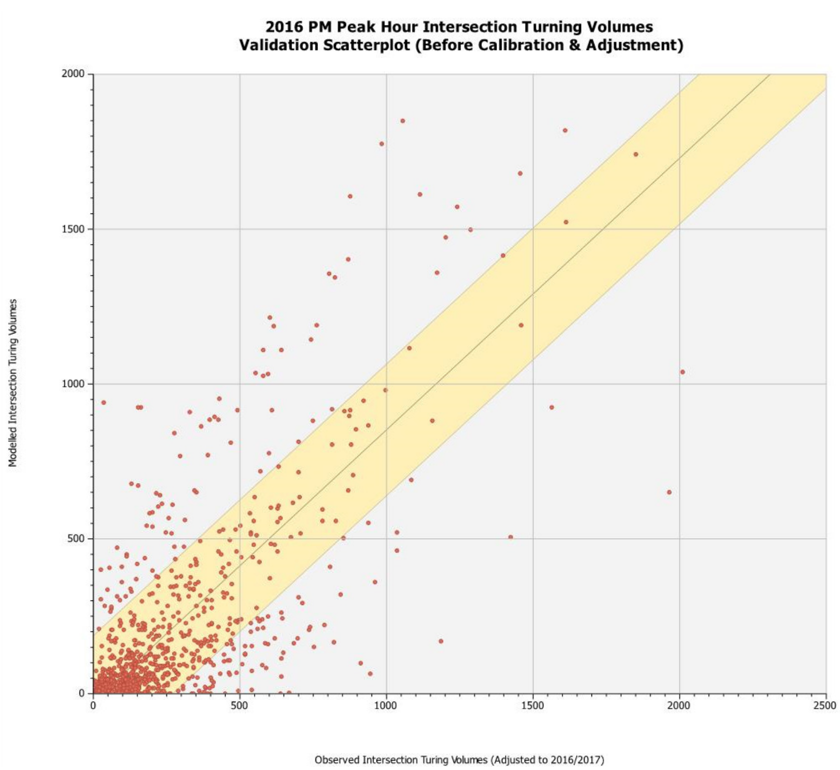


Figure 5-5 Goodness-of-Fit of Mid-Week Model Validation (before Demand Adjustment – TTS OD), Intersection Turning Volumes

A) AM Peak Hour



B) PM Peak Hour



5.5.3 DEMAND ADJUSTMENT MACRO AND PARAMETERS

The demand adjustment macro supplied with the Emme 4 package was used to adjust the O-D demand matrix to better fit with the observed traffic counts. The algorithm for the demand adjustment is the gradient method or the method of steepest descent. Before demand adjustment was applied, the following tasks were completed:

1. The model had been substantially calibrated to ensure that all potential errors had been eliminated or reduced to the minimum level.
2. As discussed in Section 5.4 - Traffic Counts to Validate, all traffic counts had been reviewed and adjusted to ensure that all the counts were reliable.

The O-D demand matrices for year 2016 were adjusted using the traffic demand adjustment tool. All link and intersection counts were applied.

5.6 VALIDATION RESULTS

Table 5-4 and Table 5-5 present the mid-week AM and PM peak hour model validation results after demand adjustment for year 2016 as described in Section 5.5.3. The tables tabulate the modelled volumes (automobile plus truck) versus the observed counts in each travel direction and the total in both directions at eight defined screenlines and on Highway 400. Statistics and visual presentation of goodness-of-fit of the modelled volumes to the observed counts for AM and PM peak hours are shown in A) and B) of Figure 5-6, Figure 5-7 and Figure 5-8 respectively.

Findings for the mid-week AM and PM peak hour model validation results are discussed in the subsequent sections.

Table 5-4 2016/2017 Mid-Week AM Peak Model Validation Results at Screenline Locations

Screenline	Code	Location	Observed counts (AM Peak Hour)			Modelled Volumes (AM Peak Hour)			Modelled / Observed (AM Peak Hour)		
			NB/ EB	SB/ WB	Total	NB/ EB	SB/ WB	Total	NB/ EB	SB/ WB	Total
North East of Barrie	101	Highway 400 NO Duckworth St.	2,317	3,114	5,431	2,189	3,057	5,246	0.94	0.98	0.97
	102	Penetanguishene Rd. NO Georgian Dr.	334	342	676	334	331	665	1.00	0.97	0.98
	103	Georgian Dr. EO Penetanguishene Rd.	17	85	102	28	24	52	1.65	0.28	0.51
	104	Shanty Bay Rd. EO Crestwood Dr.	91	227	318	42	89	131	0.46	0.39	0.41
		Subtotal	**2,759**	**3,768**	**6,527**	**2,593**	**3,501**	**6,094**	**0.94**	**0.93**	**0.93**
South of Tiffin Street	201	Ferndale Rd. SO Tiffin St.	575	403	978	686	410	1,096	1.19	1.02	1.12
	202	Patterson Rd. SO Tiffin St.	302	261	563	355	200	555	1.18	0.77	0.99
	203	Hwy. 400 SO Tiffin St.	3,904	4,320	8,224	4,028	4,377	8,405	1.03	1.01	1.02
	204	Anne St. SO Tiffin St.	370	352	722	410	419	829	1.11	1.19	1.15
	205	Innisfil St. SO Tiffin St.	232	213	445	145	121	266	0.63	0.57	0.60
	206	Essa Rd. SO Tiffin St.	511	471	982	643	561	1,204	1.26	1.19	1.23
	207	Lakeshore Blvd. SO Tiffin St.	1,005	678	1,683	878	574	1,452	0.87	0.85	0.86
		Subtotal	**6,899**	**6,698**	**13,597**	**7,145**	**6,662**	**13,807**	**1.04**	**0.99**	**1.02**
South of Sunnidale Road	301	Ferndale Rd. SO Sunnidale Rd.	272	368	640	313	479	792	1.15	1.30	1.24
	302	Livingstone St. SO Sunnidale Rd.	285	146	431	271	121	392	0.95	0.83	0.91
	303	Anne St. SO Sunnidale Rd.	261	408	669	201	410	611	0.77	1.00	0.91
	304	Cundles Rd. WO Sunnidale Rd.	339	218	557	436	217	653	1.29	1.00	1.17
	305	Highway 400 SO Sunnidale Rd.	3,759	3,931	7,690	3,796	4,014	7,810	1.01	1.02	1.02
	306	Wellington St. WO Sunnidale Rd.	414	435	849	504	405	909	1.22	0.93	1.07
	307	Toronto St. SO Ross St.	301	255	556	325	198	523	1.08	0.78	0.94
	308	Dunlop St. EO Bayfield St.	286	276	562	422	343	765	1.48	1.24	1.36
	310	Simcoe St WO Bayfield St.	665	560	1,225	644	490	1,134	0.97	0.88	0.93
		Subtotal	**6,582**	**6,597**	**13,179**	**6,912**	**6,677**	**13,589**	**1.05**	**1.01**	**1.03**
West of Essa Road	401	Mapleview Dr. WO Essa Rd.	923	370	1,293	1,019	386	1,405	1.10	1.04	1.09
	402	Mapleton Ave. WO Essa Rd.	408	267	675	336	309	645	0.82	1.16	0.96
	404	Ferndale Dr. NO Essa Rd.	540	298	838	592	399	991	1.10	1.34	1.18
	405	Ardagh Rd. NO Essa Rd.	660	508	1,168	680	473	1,153	1.03	0.93	0.99
	406	Highway 400 WO Essa Rd.	4,320	3,904	8,224	4,377	4,028	8,405	1.01	1.03	1.02
	407	Anne St. NO Essa Rd.	412	337	749	315	310	625	0.76	0.92	0.83
	408	Innisfil St. NO Essa Rd.	248	243	491	190	276	466	0.77	1.14	0.95
	409	Tiffin St. WO Essa Rd.	413	311	724	404	415	819	0.98	1.33	1.13
	410	Bradford St. NO Essa Rd.	350	511	861	456	507	963	1.30	0.99	1.12
	411	Lakeshore NO Tiffin St.	504	822	1,326	433	671	1,104	0.86	0.82	0.83
		Subtotal	**8,778**	**7,571**	**16,349**	**8,802**	**7,774**	**16,576**	**1.00**	**1.03**	**1.01**

Note:

1. NO = north of; SO = south of; EO = east of; WO = east of.

2. The green-shaded rows indicate the major screenlines within the City.

Table 5-4 2016/2017 Mid-Week AM Peak Model Validation Results at Screenline Locations

Screenline	Code	Location	Observed counts (AM Peak Hour)			Modelled Volumes (AM Peak Hour)			Modelled / Observed (AM Peak Hour)		
			NB/ EB	SB/ WB	Total	NB/ EB	SB/ WB	Total	NB/ EB	SB/ WB	Total
South of Barrie	500	CR-27 SO Mapleview Dr. (NEW)	164	209	373	139	256	395	0.85	1.22	1.06
	501	Essa Rd. SO Mapleview Dr.	321	266	587	260	287	547	0.81	1.08	0.93
	502	Veterans Dr. SO Mapleview Dr.	257	624	881	219	674	893	0.85	1.08	1.01
	503	Bryne Dr. SO Mapleview Dr.	279	637	916	269	584	853	0.96	0.92	0.93
	504	Hwy. 400 SO Mapleview Dr.	2,877	3,087	5,964	2,800	3,015	5,815	0.97	0.98	0.98
	505	Bayview Dr. SO Mapleview Dr.	458	663	1,121	422	628	1,050	0.92	0.95	0.94
	506	Welham Rd. SO Mapleview Dr.	317	509	826	266	459	725	0.84	0.90	0.88
	507	Huronia Rd. SO Mapleview Dr.	294	337	632	477	516	993	1.62	1.53	1.57
	508	Yonge St. SO Mapleview Dr.	172	179	351	247	260	507	1.44	1.45	1.44
		Subtotal	**5,139**	**6,511**	**11,650**	**5,099**	**6,679**	**11,778**	**0.99**	**1.03**	**1.01**
South West of Barrie	601	Mapleview Dr. EO CR-27	399	357	756	392	305	697	0.98	0.85	0.92
	602	Ardagh Rd. EO CR-27	318	360	678	272	356	628	0.86	0.99	0.93
	603	Dunlop St. (CR-90) EO CR-27	838	598	1,436	796	687	1,483	0.95	1.15	1.03
		Subtotal	**1,555**	**1,315**	**2,870**	**1,460**	**1,348**	**2,808**	**0.94**	**1.03**	**0.98**
North West of Barrie	701	Ferndale Rd. NO Livingstone St.	272	368	640	313	479	792	1.15	1.30	1.24
	702	Sunnidale Rd. NO Livingstone St.	280	195	475	303	263	566	1.08	1.35	1.19
	703	Anne St. NO Neelands St.	106	136	242	131	106	237	1.24	0.78	0.98
	704	Bayfield St. NO Hanmer St.	1,047	825	1,872	1,087	868	1,955	1.04	1.05	1.04
	705	St. Vincent St. NO Hanmer St.	228	150	378	228	188	416	1.00	1.25	1.10
		Subtotal	**1,933**	**1,674**	**3,607**	**2,062**	**1,904**	**3,966**	**1.07**	**1.14**	**1.10**
Highway 400 Crossings	801	Duckworth St. at Hwy. 400	1,034	783	1,817	1,085	817	1,902	1.05	1.04	1.05
	802	St. Vincent St. at Hwy. 400	643	680	1,323	658	624	1,282	1.02	0.92	0.97
	803	Bayfield St. at Hwy. 400	1,437	949	2,386	1,424	1,047	2,471	0.99	1.10	1.04
	804	Sunnidale Rd. at Hwy. 400	239	391	630	255	419	674	1.07	1.07	1.07
	805	Anne St. at Hwy. 400	488	759	1,247	564	875	1,439	1.16	1.15	1.15
	806	Dunlop St. at Hwy. 400	874	956	1,830	810	906	1,716	0.93	0.95	0.94
	807	Tiffin St. at Hwy. 400	802	511	1,313	798	480	1,278	1.00	0.94	0.97
	808	Essa Rd. at Hwy. 400	1,787	836	2,623	1,837	832	2,669	1.03	1.00	1.02
	810	Mapleview Dr. at Hwy. 400	1,778	1,360	3,138	1,817	1,444	3,261	1.02	1.06	1.04
	812	McKay Road at Hwy. 400	141	229	370	294	338	632	2.08	1.48	1.71
		Subtotal	**9,223**	**7,454**	**16,677**	**9,542**	**7,782**	**17,324**	**1.03**	**1.04**	**1.04**
Subtotal for Major Screenlines within City			***31,482***	***28,319***	***59,801***	***32,401***	***28,895***	***61,296***	***1.03***	***1.02***	***1.02***
Total for Eight Screenlines			***42,868***	***41,587***	***84,455***	***43,615***	***42,327***	***85,942***	***1.02***	***1.02***	***1.02***

Note:

1. NO = north of; SO = south of; EO = east of; WO = east of.

2. The green-shaded rows indicate the major screenlines within the City.

Table 5-5 2016/2017 Mid-Week PM Peak Model Validation Results at Screenline Locations

Screenline	Code	Location	Observed counts (PM Peak Hour)			Modelled Volumes (PM Peak Hour)			Modelled / Observed (PM Peak Hour)		
			NB/ EB	SB/ WB	Total	NB/ EB	SB/ WB	Total	NB/ EB	SB/ WB	Total
North East of Barrie	101	Highway 400 NO Duckworth St.	3,251	2,300	5,551	3,327	2,733	6,060	1.02	1.19	1.09
	102	Penetanguishene Rd. NO Georgian Dr.	415	280	695	362	222	584	0.87	0.79	0.84
	103	Georgian Dr. EO Penetanguishene Rd.	62	58	120	10	4	14	0.16	0.07	0.12
	104	Shanty Bay Rd. EO Crestwood Dr.	207	125	332	110	86	196	0.53	0.69	0.59
		Subtotal	**3,935**	**2,763**	**6,698**	**3,809**	**3,045**	**6,854**	**0.97**	**1.10**	**1.02**
South of Tiffin Street	201	Ferndale Rd. SO Tiffin St.	700	732	1,432	836	777	1,613	1.19	1.06	1.13
	202	Patterson Rd. SO Tiffin St.	487	264	751	399	238	637	0.82	0.90	0.85
	203	Hwy. 400 SO Tiffin St.	5,241	4,796	10,037	5,117	4,772	9,889	0.98	0.99	0.99
	204	Anne St. SO Tiffin St.	531	617	1,148	638	675	1,313	1.20	1.09	1.14
	205	Innisfil St. SO Tiffin St.	334	302	636	282	249	531	0.84	0.82	0.83
	206	Essa Rd. SO Tiffin St.	828	685	1,513	1,065	1,103	2,168	1.29	1.61	1.43
	207	Lakeshore Blvd. SO Tiffin St.	962	1,007	1,969	685	714	1,399	0.71	0.71	0.71
		Subtotal	**9,083**	**8,403**	**17,486**	**9,022**	**8,528**	**17,550**	**0.99**	**1.01**	**1.00**
South of Sunnidale Road	301	Ferndale Rd. SO Sunnidale Rd.	478	380	858	512	456	968	1.07	1.20	1.13
	302	Livingstone St. SO Sunnidale Rd.	318	337	655	243	292	535	0.76	0.87	0.82
	303	Anne St. SO Sunnidale Rd.	528	375	903	543	270	813	1.03	0.72	0.90
	304	Cundles Rd. WO Sunnidale Rd.	481	427	908	521	544	1,065	1.08	1.27	1.17
	305	Highway 400 SO Sunnidale Rd.	5,010	4,363	9,373	4,918	4,388	9,306	0.98	1.01	0.99
	306	Wellington St. WO Sunnidale Rd.	791	515	1,306	658	459	1,117	0.83	0.89	0.86
	307	Toronto St. SO Ross St.	405	409	814	441	256	697	1.09	0.63	0.86
	308	Dunlop St. EO Bayfield St.	417	331	748	507	457	964	1.22	1.38	1.29
	310	Simcoe St WO Bayfield St.	938	767	1,705	884	657	1,541	0.94	0.86	0.90
		Subtotal	**9,366**	**7,904**	**17,270**	**9,227**	**7,779**	**17,006**	**0.99**	**0.98**	**0.98**
West of Essa Road	401	Mapleview Dr. WO Essa Rd.	601	1,077	1,678	692	1,004	1,696	1.15	0.93	1.01
	402	Mapleton Ave. WO Essa Rd.	405	601	1,006	318	506	824	0.79	0.84	0.82
	404	Ferndale Dr. NO Essa Rd.	570	848	1,418	585	905	1,490	1.03	1.07	1.05
	405	Ardagh Rd. NO Essa Rd.	515	811	1,326	598	710	1,308	1.16	0.88	0.99
	406	Highway 400 WO Essa Rd.	4,796	5,241	10,037	4,772	5,117	9,889	0.99	0.98	0.99
	407	Anne St. NO Essa Rd.	509	513	1,022	535	533	1,068	1.05	1.04	1.05
	408	Innisfil St. NO Essa Rd.	425	399	824	380	382	762	0.89	0.96	0.92
	409	Tiffin St. WO Essa Rd.	444	392	836	476	378	854	1.07	0.96	1.02
	410	Bradford St. NO Essa Rd.	648	634	1,282	831	934	1,765	1.28	1.47	1.38
	411	Lakeshore NO Tiffin St.	733	831	1,564	596	578	1,174	0.81	0.70	0.75
		Subtotal	**9,646**	**11,347**	**20,993**	**9,783**	**11,047**	**20,830**	**1.01**	**0.97**	**0.99**

Note:

1. NO = north of; SO = south of; EO = east of; WO = east of.

2. The green-shaded rows indicate the major screenlines within the City.

Table 5-5 2016/2017 Mid-Week PM Peak Model Validation Results at Screenline Locations

Screenline	Code	Location	Observed counts (PM Peak Hour)			Modelled Volumes (PM Peak Hour)			Modelled / Observed (PM Peak Hour)		
			NB/ EB	SB/ WB	Total	NB/ EB	SB/ WB	Total	NB/ EB	SB/ WB	Total
South of Barrie	500	CR-27 SO Mapleview Dr. (NEW)	288	114	402	368	121	489	1.28	1.06	1.22
	501	Essa Rd. SO Mapleview Dr.	390	344	734	388	433	821	0.99	1.26	1.12
	502	Veterans Dr. SO Mapleview Dr.	752	568	1,320	658	420	1,078	0.88	0.74	0.82
	503	Bryne Dr. SO Mapleview Dr.	869	655	1,524	537	415	952	0.62	0.63	0.62
	504	Hwy. 400 SO Mapleview Dr.	4,106	3,066	7,172	4,001	3,113	7,114	0.97	1.02	0.99
	505	Bayview Dr. SO Mapleview Dr.	777	642	1,419	426	641	1,067	0.55	1.00	0.75
	506	Welham Rd. SO Mapleview Dr.	579	317	896	364	204	568	0.63	0.64	0.63
	507	Huronia Rd. SO Mapleview Dr.	407	347	754	446	523	969	1.10	1.51	1.29
	508	Yonge St. SO Mapleview Dr.	305	290	595	309	486	795	1.01	1.68	1.34
		Subtotal	**8,473**	**6,343**	**14,816**	**7,497**	**6,356**	**13,853**	**0.88**	**1.00**	**0.94**
South West of Barrie	601	Mapleview Dr. EO CR-27	474	549	1,023	409	426	835	0.86	0.78	0.82
	602	Ardagh Rd. EO CR-27	281	244	525	244	320	564	0.87	1.31	1.07
	603	Dunlop St. (CR-90) EO CR-27	943	844	1,787	792	923	1,715	0.84	1.09	0.96
		Subtotal	**1,698**	**1,637**	**3,335**	**1,445**	**1,669**	**3,114**	**0.85**	**1.02**	**0.93**
North West of Barrie	701	Ferndale Rd. NO Livingstone St.	478	380	858	512	456	968	1.07	1.20	1.13
	702	Sunnidale Rd. NO Livingstone St.	439	360	799	342	347	689	0.78	0.96	0.86
	703	Anne St. NO Neelands St.	197	146	343	289	211	500	1.47	1.45	1.46
	704	Bayfield St. NO Hanmer St.	972	1,116	2,088	988	1,070	2,058	1.02	0.96	0.99
	705	St. Vincent St. NO Hanmer St.	187	277	464	406	339	745	2.17	1.22	1.61
		Subtotal	**2,273**	**2,279**	**4,552**	**2,537**	**2,423**	**4,960**	**1.12**	**1.06**	**1.09**
Highway 400 Crossings	801	Duckworth St. at Hwy. 400	1,590	875	2,465	1,759	724	2,483	1.11	0.83	1.01
	802	St. Vincent St. at Hwy. 400	917	808	1,725	798	736	1,534	0.87	0.91	0.89
	803	Bayfield St. at Hwy. 400	2,032	1,044	3,076	2,007	1,123	3,130	0.99	1.08	1.02
	804	Sunnidale Rd. at Hwy. 400	590	313	903	450	325	775	0.76	1.04	0.86
	805	Anne St. at Hwy. 400	1,204	706	1,910	1,250	682	1,932	1.04	0.97	1.01
	806	Dunlop St. at Hwy. 400	933	1,124	2,057	805	983	1,788	0.86	0.87	0.87
	807	Tiffin St. at Hwy. 400	869	845	1,714	893	802	1,695	1.03	0.95	0.99
	808	Essa Rd. at Hwy. 400	1,843	1,391	3,234	1,871	1,308	3,179	1.02	0.94	0.98
	810	Mapleview Dr. at Hwy. 400	2,744	1,955	4,699	2,808	2,109	4,917	1.02	1.08	1.05
	812	McKay Road at Hwy. 400	295	241	536	461	411	872	1.56	1.71	1.63
		Subtotal	**13,017**	**9,302**	**22,319**	**13,102**	**9,203**	**22,305**	**1.01**	**0.99**	**1.00**
Subtotal for Internal Screenlines Crossing City			***41,112***	***36,956***	***78,068***	***41,134***	***36,557***	***77,691***	***1.00***	***0.99***	***1.00***
Total for Eight Screenlines			***57,490***	***49,978***	***107,468***	***56,422***	***50,050***	***106,472***	***0.98***	***1.00***	***0.99***

Note:

1. NO = north of; SO = south of; EO = east of; WO = east of.

2. The green-shaded rows indicate the major screenlines within the City.

5.6.1 MAJOR SCREENLINES WITHIN THE CITY

Overall, the mid-week AM and PM peak hour modelled traffic volumes at the screenline level accuracy were within a reasonable range of model errors of 15% compared to the observed traffic counts for the defined four internal screenlines, which include south of Tiffin Street, south of Sundial Road, west of Essa Road, South of Barrie, and the Highway 400 Crossing. The model errors for all major screenlines were within 5% except for the South of Barrie screenline that had a model error of minus 12% in the AM peak hour. Although, there were several individual roads that had modelled volumes deviating more than 15% from the counts. These locations had relatively low counts, and would have no material impacts on the overall network.

5.6.2 EXTERNAL SCREENLINES AT CITY BOUNDARIES

The model was validated against four external screenlines which include south of Barrie, southwest of Barrie, northwest of Barrie and northeast of Barrie. Overall, the mid-week AM and PM peak hour modelled traffic volumes at the screenline level accuracy were within a reasonable range of model errors of 15% compared to the observed traffic counts for the defined four external screenlines. Although, there were several individual roads with modelled volumes deviating more than 15% from the counts. These locations had relatively low counts, and thus were difficult to calibrate.

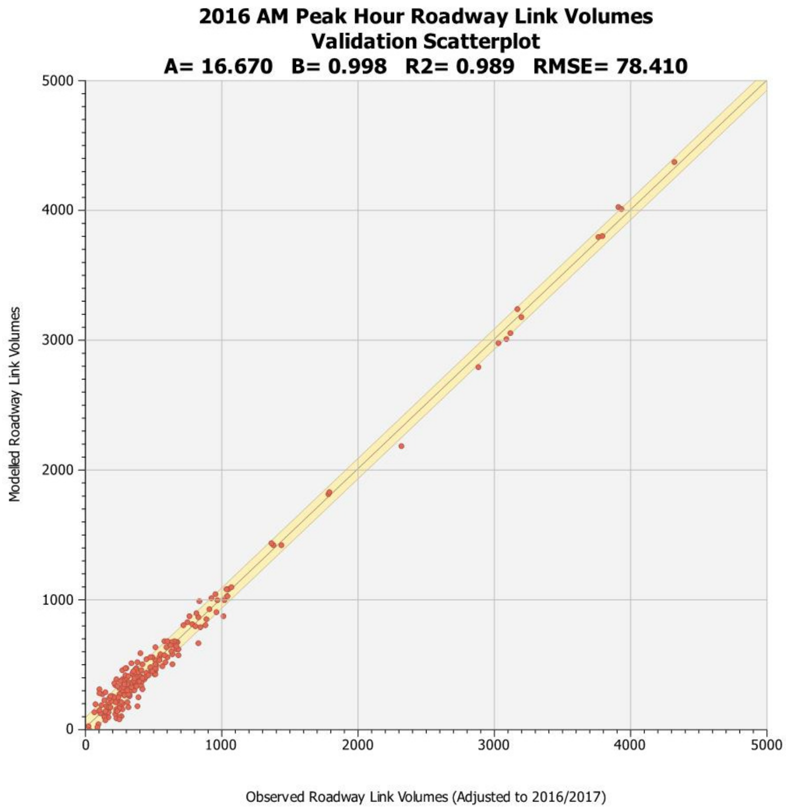
5.6.3 GOODNESS-OF-FIT

As shown in Figure 5-6 and Figure 5-7 the AM and PM peak models have a good correlation between the modelled volumes and the observed counts at all validated links and Highway 400 mainline and ramps respectively. The slope (B value) in the scatterplots of modelled volumes versus observed counts are close to 1.0, the R square values 98% or greater, and the intercept has a small constant value. The high R-squared values of greater than 98% indicate that the fit explain 98% of link locations.

Figure 5-8 presents the scatterplots of the modelled intersection turning volumes and the observed TMC counts at the intersection level. The scatterplots also show a better goodness-of-fit with a B-value close to 1.0, a smaller constant, and a R-squared value of 0.9, indicating 90% of validated intersection volumes were explained.

Figure 5-6 Goodness-of-Fit of Mid-Week Model Validation (after Demand Adjustment), All Link Roadway Volumes

A) AM Peak Hour



B) PM Peak Hour

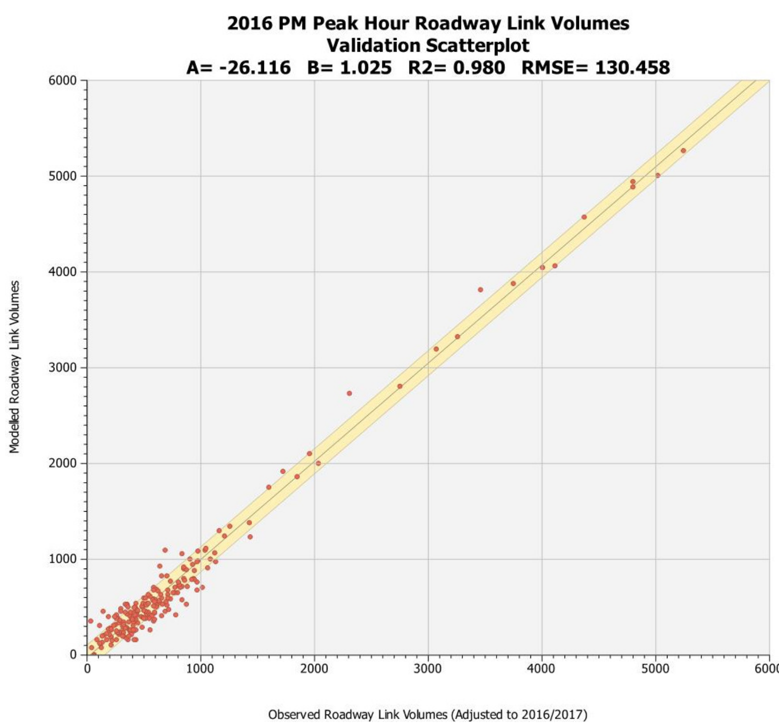
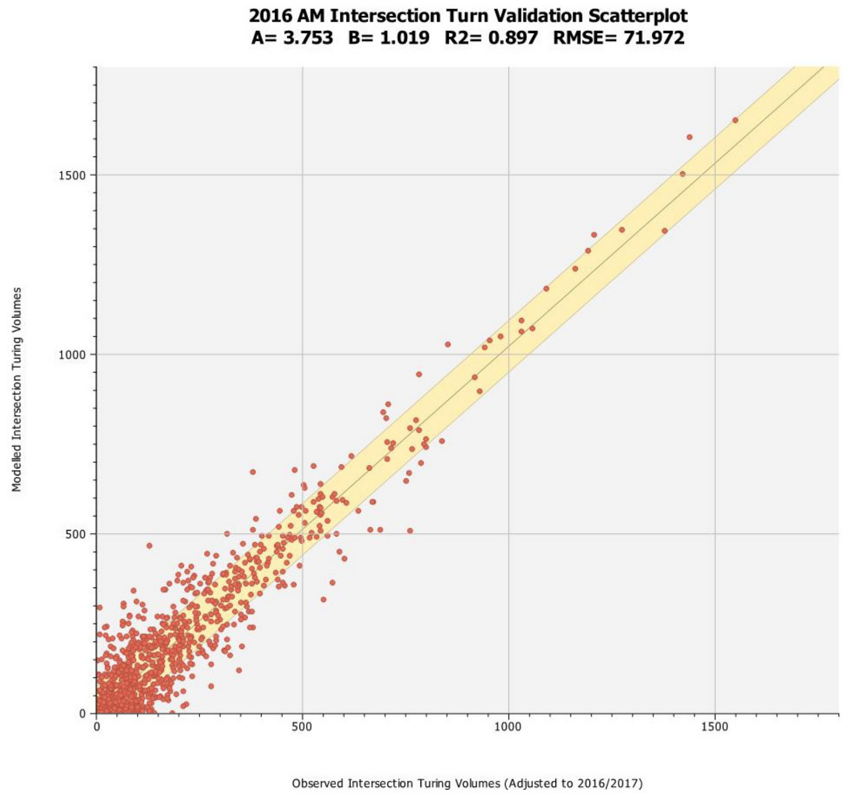


Figure 5-7 Goodness-of-Fit of Mid-Week Model Validation (after Demand Adjustment), Intersection Turning Volumes

A) AM Peak Hour



B) PM Peak Hour

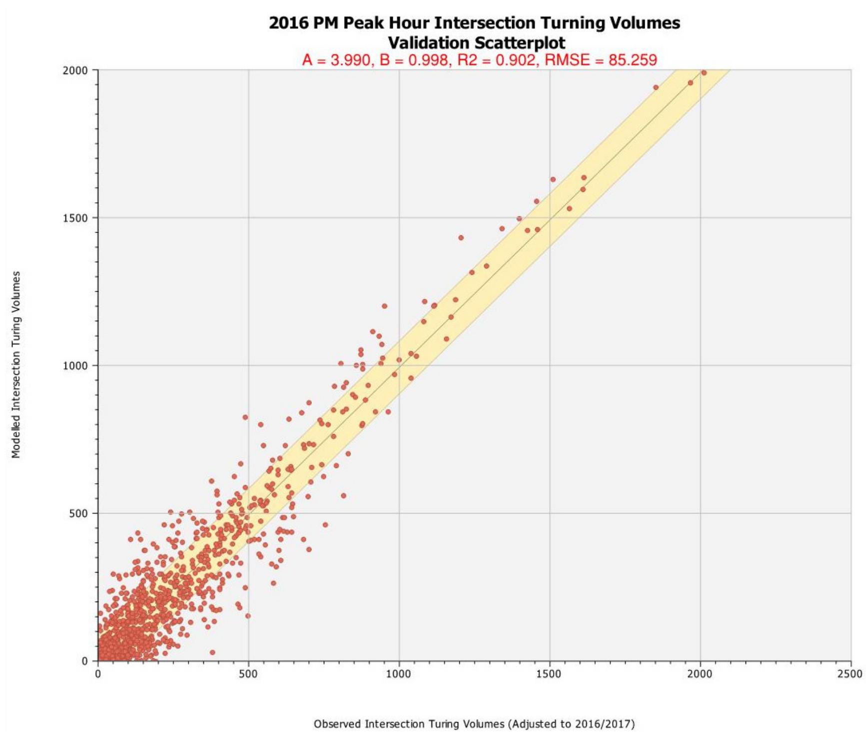
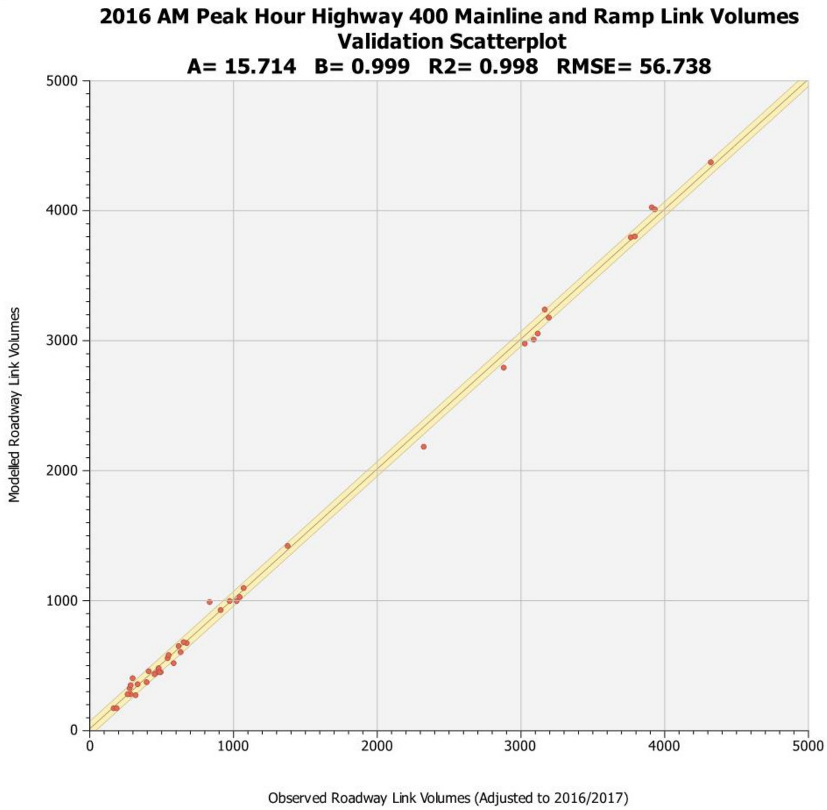
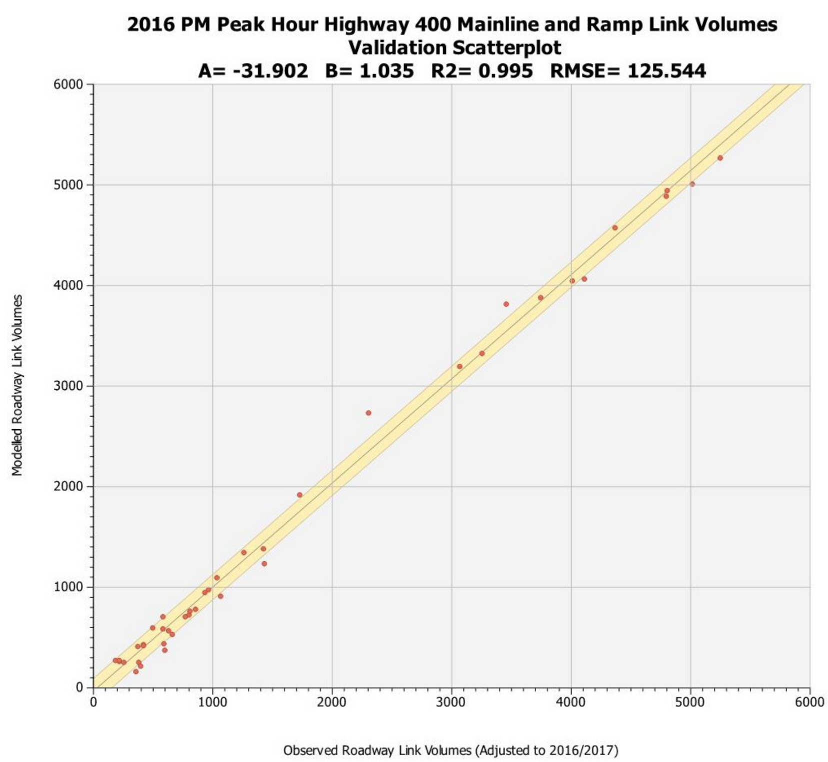


Figure 5-8 Goodness-of-Fit of Mid-Week Model Validation (after Demand Adjustment), Intersection Turning Volumes

A) AM Peak Hour



B) PM Peak Hour



5.6.4 HIGHWAY 400 VALIDATION

As shown in Table 5-6 and Table 5-7, the AM and PM models have the total modelled volumes within a range of 5% error for all Highway 400 sections (six interchange locations within the City) compared to the observed total traffic counts.

The modelled directional volumes for the AM and PM peak hour volumes at most individual interchange locations are within a range of 10% of the observed traffic counts. The southbound / westbound direction at Highway 400 and Duckworth Street have modelled volumes to observed counts of 1.19 in the PM peak hour. Note that this location is close to the City boundary.

Table 5-8 and Table 5-9 presents the mid-week AM and PM peak hour validations results for the Highway 400 interchange ramp locations. Overall, the total modelled volumes at each interchange are within 10% of the observed traffic counts. The modelled directional volumes for the AM and PM peak hour at most individual ramps are within 15% of the observed traffic counts. The deviations in modelled volumes and observed counts larger than 15% at these ramps were mainly attributed to the relatively low traffic volumes observed at the locations, making it difficult to calibrate, however, the impact on the overall network is negligible.

Table 5-6 2016/2017 Mid-Week AM Peak Model Validation Results at Highway 400 Mainline

Code	Highway 400 Mainline Segment	Observed counts (AM Peak Hour)			Modelled Volumes (AM Peak Hour)			Modelled / Observed (AM Peak Hour)		
		NB/EB	SB/WB	Total	NB/EB	SB/WB	Total	NB/EB	SB/WB	Total
4001	Highway 400 NO Duckworth St.	2,317	3,114	5,431	2,189	3,057	5,246	0.94	0.98	0.97
4002	Highway 400 NO Bayfield St.	3,024	3,191	6,215	2,982	3,186	6,168	0.99	1.00	0.99
4003	Highway 400 NO Dunlop St.	3,759	3,931	7,690	3,796	4,014	7,810	1.01	1.02	1.02
4004	Highway 400 WO Essa Rd.	3,904	4,320	8,224	4,028	4,377	8,405	1.03	1.01	1.02
4006	Highway 400 NO Mapleview Dr. E.	3,162	3,791	6,953	3,246	3,803	7,049	1.03	1.00	1.01
4008	Highway 400 NO Innisfil Beach Rd.	2,877	3,087	5,964	2,800	3,015	5,815	0.97	0.98	0.98
Subtotal for Highway 400 Mainline Segments in Barrie		**19,043**	**21,433**	**40,476**	**19,041**	**21,452**	**40,493**	**1.00**	**1.00**	**1.00**

Note: NO = north of; SO = south of; EO = east of; WO = east of.

Table 5-7 2016/2017 Mid-Week PM Peak Model Validation Results at Highway 400 Mainline

Code	Highway 400 Mainline Segment	Observed counts (PM Peak Hour)			Modelled Volumes (PM Peak Hour)			Modelled / Observed (PM Peak Hour)		
		NB/EB	SB/WB	Total	NB/EB	SB/WB	Total	NB/EB	SB/WB	Total
4001	Highway 400 NO Duckworth St.	3,251	2,300	5,551	3,327	2,733	6,060	1.02	1.19	1.09
4002	Highway 400 NO Bayfield St.	4,004	3,452	7,456	4,011	3,680	7,691	1.00	1.07	1.03
4003	Highway 400 NO Dunlop St.	5,010	4,363	9,373	4,918	4,388	9,306	0.98	1.01	0.99
4004	Highway 400 WO Essa Rd.	5,241	4,796	10,037	5,117	4,772	9,889	0.98	0.99	0.99
4006	Highway 400 NO Mapleview Dr. E.	4,793	3,740	8,533	4,732	3,774	8,506	0.99	1.01	1.00
4008	Highway 400 NO Innisfil Beach Rd.	4,106	3,066	7,172	4,001	3,113	7,114	0.97	1.02	0.99
Subtotal for Highway 400 Mainline Segments in Barrie		**26,404**	**21,717**	**48,121**	**26,106**	**22,460**	**48,566**	**0.99**	**1.03**	**1.01**

Note: NO = north of; SO = south of; EO = east of; WO = east of.

Table 5-8 2016/2017 Mid-Week AM Peak Model Validation Results at Highway 400 Mainline

Code	Highway 400 Interchange	Observed Volumes (AM Peak Hour)	Modelled Volumes (AM Peak Hour)	Modelled / Observed (AM Peak Hour)
		Ramp	Ramp	Ramp
1	***Duckworth Interchange***			
913	NB Off-Ramp (S-E/W)	967	1,003	1.04
911	SB Off-Ramp (N-E/W)	627	612	0.98
912	SB On-Ramp (E-S)	541	560	1.04
916	SB On-Ramp (W-S)	163	174	1.07
914	NB On-Ramp (E/W-N)	259	286	1.10
	Subtotal	**2,557**	**2,635**	**1.03**
2	***Bayfield Interchange***			
921	SB Off-Ramp (N-E/W)	446	439	0.98
923	NB Off-Ramp (S-E/W)	1,067	1,100	1.03
922	SB On-Ramp (E-S)	279	288	1.03
926	SB On-Ramp (W-S)	907	936	1.03
924	NB On-Ramp (E/W-N)	332	363	1.09
	Subtotal	**3,031**	**3,126**	**1.03**
3	***Dunlop Interchange***			
931	SB Off-Ramp (N-E/W)	650	685	1.05
932	NB Off-Ramp (S-W)	471	453	0.96
933	NB Off-Ramp (S-E)	291	409	1.41
936	SB On-Ramp (E/W-S)	1,039	1,030	0.99
934	NB On-Ramp (E/W-N)	617	653	1.06
	Subtotal	**3,068**	**3,230**	**1.05**
4	***Essa Interchange***			
941	SB Off-Ramp (N-E/W)	1,019	999	0.98
943	NB Off-Ramp (S-E/W)	314	279	0.89
942	SB On-Ramp (E/W-S)	490	455	0.93
948	NB On-Ramp (W-N)	476	489	1.03
946	NB On-Ramp (E-N)	580	526	0.91
	Subtotal	**2,878**	**2,748**	**0.95**
6	***Mapleview Interchange***			
961	SB Off-Ramp	1,373	1,426	1.04
963	NB Off-Ramp	545	586	1.08
962	SB On-Ramp	669	679	1.01
964	NB On-Ramp	830	990	1.19
	Subtotal	**3,417**	**3,681**	**1.08**
8	***Innisfil Beach Interchange***			
981	SB Off-Ramp (N-E/W)	485	457	0.94
983	NB Off-Ramp (S-E/W)	274	331	1.21
984	SB On-Ramp (E-S)	405	460	1.14
982	SB On-Ramp (W-S)	281	356	1.27
988	NB On-Ramp (E-N)	390	379	0.97
986	NB On-Ramp (W-N)	182	178	0.98
	Subtotal	**2,016**	**2,161**	**1.07**
Subtotal for All Ramps		**31,918**	**33,001**	**1.03**

Table 5-9 2016/2017 Mid-Week PM Peak Model Validation Results at Highway 400 Ramps

Code	Highway 400 Interchange	Observed Volumes (PM Peak Hour)	Modelled Volumes (PM Peak Hour)	Modelled / Observed (PM Peak Hour)
		Ramp	Ramp	Ramp
1	***Duckworth Interchange***			
913	NB Off-Ramp (S-E/W)	963	982	1.02
911	SB Off-Ramp (N-E/W)	414	437	1.06
912	SB On-Ramp (E-S)	798	733	0.92
916	SB On-Ramp (W-S)	768	711	0.93
914	NB On-Ramp (E/W-N)	210	267	1.27
	Subtotal	**3,153**	**3,130**	**0.99**
2	***Bayfield Interchange***			
921	SB Off-Ramp (N-E/W)	370	411	1.11
923	NB Off-Ramp (S-E/W)	1,420	1,385	0.98
922	SB On-Ramp (E-S)	354	165	0.47
926	SB On-Ramp (W-S)	927	951	1.03
924	NB On-Ramp (E/W-N)	414	429	1.04
	Subtotal	**3,485**	**3,341**	**0.96**
3	***Dunlop Interchange***			
931	SB Off-Ramp (N-E/W)	627	573	0.91
932	NB Off-Ramp (S-W)	587	441	0.75
933	NB Off-Ramp (S-E)	496	598	1.21
936	SB On-Ramp (E/W-S)	1,060	916	0.86
934	NB On-Ramp (E/W-N)	852	785	0.92
	Subtotal	**3,622**	**3,313**	**0.91**
4	***Essa Interchange***			
941	SB Off-Ramp (N-E/W)	1,428	1,243	0.87
943	NB Off-Ramp (S-E/W)	579	589	1.02
942	SB On-Ramp (E/W-S)	372	255	0.69
948	NB On-Ramp (W-N)	369	414	1.12
946	NB On-Ramp (E-N)	658	534	0.81
	Subtotal	**3,406**	**3,035**	**0.89**
6	***Mapleview Interchange***			
961	SB Off-Ramp	1,253	1,346	1.07
963	NB Off-Ramp	1,033	1,098	1.06
962	SB On-Ramp	579	713	1.23
964	NB On-Ramp	1,720	1,921	1.12
	Subtotal	**4,585**	**5,078**	**1.11**
8	***Innisfil Beach Interchange***			
981	SB Off-Ramp (N-E/W)	592	379	0.64
983	NB Off-Ramp (S-E/W)	801	767	0.96
984	SB On-Ramp (E-S)	253	255	1.01
982	SB On-Ramp (W-S)	209	274	1.31
988	NB On-Ramp (E-N)	390	224	0.57
986	NB On-Ramp (W-N)	182	273	1.50
	Subtotal	**2,427**	**2,172**	**0.90**
Subtotal for All Ramps		**38,928**	**37,966**	**0.98**

5.7 CONCLUSIONS

The following conclusions are made:

- The mid-week AM and PM peak hour modelled traffic volumes at the screenline level accuracy are within a reasonable range of model errors of 15% compared to the traffic counts for all four internal screenlines and most external screenlines.
- The scatterplots of modelled volumes versus traffic counts present a statistically sound goodness-of-fit.

Therefore, validation results for the mid-week AM and PM peak hours indicate that the two models have been substantially calibrated, are accurate and are ready for future forecasting.

6 FUTURE 2041 ROAD NETWORK ASSESSMENT

6.1 PLANNED IMPROVEMENTS

The planned improvements include those identified in the City of Barrie Capital Plan, Simcoe County 2014 TMP and MTO 2017 Transportation Environmental Study Report (TESR) Update. Depending on the implementation timings of these improvements, they are included in the future base network, that is, an alternative of do-nothing to the City road network, for a specific future horizon.

6.1.1 CITY OF BARRIE

6.1.1.1 CAPITAL PLAN

The 2014 MMATMP recommended several strategic infrastructure improvements by 2031 to support future planned growth. Some of the improvements have been prioritized and programmed in the City's 2019 Capital Plan to address current and future capacity deficiencies. The major roadway improvements listed in the City's 2019 Capital Plan from 2019 to 2028 are summarized in Table 6-1.

6.1.1.2 HARIVE ROAD / BIG BAY POINT ROAD CROSSING AND INTERCHANGE

After the 2014 MMATMP Study, an EA study was conducted in 2015. However, the File of Completion was not completed for the proposed partial interchange at Harvie Road / Big Bay Point Road (the File of Completion was complete for the crossing). Therefore, the new partial interchange recommended in the 2014 MMATMP will not be carried forward. However, there are additional planned improvements that would help to improve the future traffic conditions at Mapleview Drive:

- Improvements to current Diamond Interchange at Mapleview Drive: The future DDI will mitigate current capacity issues and increase capacity at ramp terminals.
- Improvement to Mapleview Drive between just west of Bryne Drive and Bayview Drive: The auxiliary right-turn lanes will be reduced to provide an extra eastbound through lane (shared with right turns), thus increasing capacity.

A new five-lane crossing with in-boulevard trails was planned by the City. The bridge structure was designed to protect for the future widening to seven lanes or the potential interchange beyond 2041.

6.1.1.3 NEW MCKAY ROAD INTERCHANGE

After the 2014 MMATMP Study, an EA study was conducted in 2017. The 2017 EA Environmental Study Report (ESR) recommended a Parclo-A3 interchange to reduce the impacts to the adjacent significant archeological site. The new Parclo-A3 interchange included two lanes on both the N-E/W Southbound Off-Ramp and the S-E/W Northbound Off-Ramp.

Table 6-1 Planned Road Improvements from 2019 to 2028, City of Barrie 2019 Capital Plan

Description			Existing 2018	Planned Road Widening Project	
Road Name	From	To		Timing	Details
Anne Street	Edgehill Drive	Donald Street / Wellington Street	4 lanes	2023	+ 1 lane (intersection improvements at two ends of the section)
Bell Farm Road	St. Vincent Street	Duckworth Street	2 lanes	2021	+ 1 lane
Big Bay Point Road	Fairview Road	Huronia Road	2 lanes	2022	+ 3 lanes
Big Bay Point Road	Prince William Way	Collector 11	2 lanes	2020	+ 3 lanes
Bryne Drive Extension	South of Essa Road	North of Caplan Avenue	Not existing	2022	+ 5 lanes
Dunlop Street	Sarjeant Drive	Cedar Pointe Drive	4 lanes	2021	+ 1 lane
Dunlop Street	Cedar Pointe Drive	Hart Drive	2 lanes	2021	+ 3 lanes
Dunlop Street	Hart Drive	Anne Street	4 lanes	2021	+ 1 lane
Essa Road	Bryne Drive	West Ramp Terminal	5 lanes	2021	+ 2 lanes
Essa Road	West Ramp Terminal	Fairview Road	4 lanes	2021	+ 3 lanes
Essa Road	Mapleview Drive	Athabaska Road	2 lanes	2023	+ 1 lane
Essa Road	Athabaska Road	South of Salem Road	2 lanes	2023	+ 1 lane
Harvie Road	Essa Road	Veterans Drive	2 lanes	2020	+ 1 lane
Huronia Road	Yonge Street	Herrel Avenue	2 lanes	2026	Rebuild to urban standards
Huronia Road	Lockhart Road	McKay Road	2 lanes	2021	+ 1 lane
Lockhart Road New Crossing	Highway 400 Overpass (Structure)		Not existing	2025	+ 5 lanes new crossing
Lockhart Road	Highway 400	Bayview Drive	2 lanes	2025	+ 3 lanes
Lockhart Road	Bayview Drive	Huronia Road	2 lanes	2024	+ 3 lanes
Mapleview Drive	Country Lane	Yonge Street	2 lanes	2020	+ 3 lanes
Mapleview Drive	Yonge Street	Prince William Way	2 lanes	2023	+ 3 lanes
Mapleview Drive	Prince William Way	east of Collector 11	2 lanes	2023	+ 1 lane
McKay Road	County Road 27	Reid Drive	2 lanes	2027	+ 1 lane
McKay Road	Reid Drive	Highway 400	2 lanes	2027	+ 3 lanes
McKay Road	Highway 400 Overpass (Structure)		2 lanes	2023	+ 3 lanes
McKay Road	Highway 400	Huronia Road	2 lanes	2021	+ 3 lanes
McKay Road New Interchange			Not existing	2023	New interchange
Salem Road	County Road 27	Veterans Drive	2 lanes	2025	+ 1 lane
Salem Road	Veterans Drive	Highway 400	2 lanes	2025	+ 3 lanes
Veterans Drive	Salem Road	McKay Road	2 lanes	2021	+ 3 lanes
Veterans Drive	McKay Road	City South Limits	2 lanes	2021	+ 3 lanes
Yonge Street	Mapleview Drive	Lockhart Road	2 lanes	2025	+ 3 lanes

Source: The City of Barrie 2019 Capital Plan.

6.1.2 SIMCOE COUNTY

6.1.2.1 2014 TRANSPORTER MASTER PLAN

The 2014 update of Simcoe County Transportation Master Plan (TMP) provided the County with long-term transportation strategies, policies and tools to support existing and future travel demand. The TMP included recommendations for road widening improvements by 2041, which are summarized Table 6-2.

6.1.3 MTO

6.1.3.1 HIGHWAY 400 CORRIDOR AND INTERCHANGES

The MTO TESR Update, which was completed in November 2017, examined the nature of improvements required to address traffic operations, capacity, and safety needs along a 30-km section of Highway 400 from 1 km south of Highway 89 to the junction at Highway 11, and recommended a preferred alternative and a recommended plan for the Highway 400 corridor.

This update included several improvements to the Highway 400 corridor within various timeframes, which are summarized in Table 6-3.

The recommendation was to widen Highway 400 to 10 lanes (four general purpose lanes and one High Occupancy Vehicle (HOV) lane in each direction), transitioning to eight general purpose lanes at the junction of Highway 11 by 2031. Additionally, improvements will be required at the current interchanges to accommodate the proposed widening and provide adequate traffic operations. The following interchanges within the City of Barrie boundaries and adjacent were recommended for improvements:

- Bayfield Street
- Dunlop Street
- Essa Road
- Mapleview Drive (conversion to a Divergent Diamond Interchange)
- Innisfil Beach Road

6.1.3.2 NEW BARRIE BYPASS

Based on the Simcoe Area Multi-Modal Transportation Strategy Needs Assessment that was commissioned by MTO, dated March 2014, a new Barrie Bypass connecting Highway 11 to the proposed Highway 427 extension was examined as an alternative to address congestion issues on Highway 400 within Barrie. Based on this study, the new Barrie Bypass would divert trips away from Barrie and provide relief along the congested Highway 400 corridor in Barrie. However, there is no status or update for this improvement. Therefore, it was not assumed in the City TMP analyses.

Table 6-2 Road Improvements Recommended in Simcoe County 2014 TMP

Description			Existing	Planned Road Widening Improvements	
Road Name	From	To	2016	Timing	Details
CR-88, Bradford West Gwillimbury	Highway 400	Bradford Limit / Professor Day Drive	4 Lanes	Completed	
CR-4, Bradford West Gwillimbury/Innisfil	8th Line (Bradford West Gwillimbury)	CR-89	2 lanes	short-term	+2 lanes
CR-10, Clearview	CR-90	CR-9	2 lanes	short-term	+2 lanes
CR-10, Clearview	CR-9	Highway 26	2 lanes	short-term	+2 lanes
CR-10, New Tecumseth	CR-14	Highway 89	2 lanes	short-term	+2 lanes
CR-21 / Innisfil Beach Road	CR-27	20th Sideroad / CR-39	2 lanes	short-term	+2 lanes
CR-27, Innisfil	CR-21	CR-90 / Dunlop Street	2 lanes	short-term	+2 lanes
CR-43 / Snow Valley Road, Springwater	CR-28 / George Johnston Road	Highway 26	2 lanes	short-term	+2 lanes
CR-44	Concession Rd. 12	Casino Rama (Benson Rd.)	2 lanes	short-term	+2 lanes
CR-53 / 5 Sideroad, Innisfil	CR-21	Barrie South Limits	2 lanes	short-term	+2 lanes
CR-4 / Yonge Street	CR-89	Barrie South Limits	2 lanes	by 2031	+2 lanes
CR-10, Clearview	Highway 26	27/28 Sideroad / 12 Concession	2 lanes	by 2031	+2 lanes
CR-53 / Wilson Drive	Ferndale Drive	Highway 26	2 lanes	by 2031	+2 lanes
CR-93	Highway 12	CR-25	2 lanes	by 2031	+2 lanes
CR-93 / Penetanguishene Road, Oro-Medonte	CR-11 / Old Barrie Road	Barrie Northeast Limits	2 lanes	by 2031	+2 lanes
CR-10, New Tecumseth	Highway 9	Tottenham boundary	2 lanes	Post 2031	+2 lanes
CR-10 - Tottenham By-Pass New Tecumseth	3rd Line	North of 5th Line	Not existing	Post 2031	New 4 lanes
CR-27, Springwater	Highway 26	CR-22	2 lanes	Post 2031	+2 lanes
CR-27 Bond Head By-Pass	6th Line	CR-1	Not existing	Post 2031	New 4 lanes
CR-27	Highway 9	6th Line	2 lanes	Post 2031	+2 lanes
CR-40 / Sunnidale Road	Dobson Rd.	Barrie North Limits	2 lanes	Post 2031	+2 lanes
CR-54 / 10 Sideroad	CR-21	Barrie South Limits	2 lanes	Post 2031	+2 lanes
CR-88 Bradford West Gwillimbury	Highway 400	Bond Head By-Pass	2 lanes	Post 2031	+2 lanes
CR-89 / Highway 89	CR-53 / 5 Sideroad	20th Sideroad / CR-39	2 lanes	Post 2031	+2 lanes

Source: Simcoe County 2014 TMP Update.

Note: Simcoe County road improvements were as of 2016.

Table 6-3 Road Capacity and Network Improvements on Highway 400 Corridor and Interchanges, Recommended in MTO 2017 TESR Update

Location	Improvements
Highway 400 Mainline	Widen to 10 lanes with HOV, from Highway 89 to Duckworth Street; Widen to 8 lanes, from Duckworth Street to Highway 11
Duckworth Interchange	No additional improvements
Bayfield Interchange	(1) A modified Parclo A / Diamond with geometric improvements
	(2) Eliminate connection from Rose Street to the NB On-Ramp and Bayfield Street
	(3) Widen Bayfield Street to 6 lanes
Dunlop Interchange	(1) Relocate E/W-N On-Ramp to the Hart Drive intersection
	(2) Provide an exclusive WB left-turn lane, an exclusive EB left-turn lane and an exclusive right-turn lane at the east ramp terminal
	(3) Geometric improvements to the S-W Off-Ramp
	(4) Widen to a 2-lane exit at the N-E/W Off-Ramp
	(5) Relocate the west ramp terminal and provide a 3-lane approach on the N-E/W Off-Ramp
	(6) Provide an exclusive EB right-turn lane, dual WB left-turn lanes, dual EB left-turn lanes, an exclusive SB right-turn lane and dual NB left-turn lanes at the west ramp terminal
	(7) Widen Dunlop Street to 4 lanes plus 2 speed change lanes at crossing
Essa Interchange	Provide an exclusive EB right-turn lane at the Essa Road / Fairview Road intersection
	(1) Reconfigure the current interchange with geometric improvements to existing ramps
	(2) Propose a separate W-S On-Ramp
	(3) Widen to two lanes at the NB and SB Off-Ramps
	(4) Provide three lanes at the approach of the NB Off-Ramp
	(5) Widen Essa Road to six lanes
Mapleview Interchange	Reconfigure to a Diverging Diamond interchange configuration
Innisfil Beach Interchange	(1) Widen to a 2-lane exit at both the N-E/W and S-E/W Off-Ramps (2) Geometric improvements to all ramps
	Widen Innisfil Beach Road to four lanes

6.2 ROAD NETWORK ALTERNATIVES

The 2014 MMATMP evaluated a total of four transportation alternatives in the development of City-wide TMP:

- **Alternative 1**: Do Nothing
- **Alternative 2**: Low/Existing Modal Share
- **Alternative 3**: Medium Modal Share – increased emphasis on non-auto modes
- **Alternative 4**: High Modal Share – strong emphasis on non-auto modes

The **Transportation Alternative 3 - Medium Modal Share** was recommended as the preferred transportation alternative for all modes. The medium modal share targets by 2031 were identified:

- Transit: **7%**
- Active transportation (AT): **12%**

In consultation with City staff, the above modal share targets would not be achievable, considering the current 2016 modal shares and investment in transit and active transportation (AT) infrastructure; however, these would be the targets for the planning horizon 2041.

The future road network alternatives for 2041 were developed and assessed under the future conditions of Medium Modal Share (7% of transit and 12% of AT).

6.2.1 CREATION OF ROAD NETWORK ALTERNATIVES

One of the objectives of this TMP is to confirm the previously recommended road network improvements by 2031 and identify any additional improvements, if required, to accommodate the future growth to 2041. Three series of future road network alternatives were developed to test and assess the needs for road network improvements and are discussed briefly below:

Alternative 1A – Future 2041 Base Network No.1(Do-nothing) (Ref. Emme Scenarios 20417 and 20418):

This network scenario includes a) existing road network, b) programmed improvements in City's Capital Plan, and c) recommended improvements on County Roads. It represents do-nothing to City's Roads and Highway 400 mainline, crossings and interchanges.

Alternative 1B – Future 2041 Base Network No.2 (Only MTO improvements) (Ref. Emme Scenarios 21417 and 21418):

This network scenario includes a) existing road network, b) programmed improvements in City's Capital Plan, c) recommended improvements on County Roads, plus d) MTO TESR Update recommended improvements. It represents the future 2041 do-nothing network scenario or the MTO TESR network scenario.

Note that the new Harvie Road / Big Bay Point Road Crossing and the new McKay Road Interchange are included in the above two base network scenarios, as they are programmed in the City's Capital Plan and are scheduled to be completed by 2021 and 2023, respectively.

Alternative 2 – Future 2031 Recommended Network (2014 MMATMP) without Harvie / Big Bay Point Interchange (Ref. Emme Scenarios 26414 and 26415):

This network scenario includes the future 2041 base network No.2 (Alt.1B) plus the 2014 MMATMP recommended improvements, excluding the new Harvie Road / Big Bay Point Road Interchange. This alternative is to justify the extra improvements and the changes to the previous TMP recommendations.

Alternative 3 – Future 2041 Draft Preferred Network without Harvie / Big Bay Point Interchange (Updated 2014 MMATMP plus enhancements) (Ref. Emme Scenarios 32414 and 32415):

This alternative represents the **future 2041 draft preferred network**. Additional improvements or changes to the previous 2014 MMATMP network are included.

Table 6-4 summarizes the descriptions of the above alternatives along with detailed network assumptions for the Highway 400 corridor, City-wide network, and County's roads.

Table 6-4 Alternatives and Network Assumptions for Developing TMP Road Network by 2041 *(Page 1/2)*

		Network Alternative Description			
		TMP Alt. 1A	TMP Alt. 1B	TMP Alt. 2	TMP Alt. 3
Location	**Existing 2016 Road Conditions**	**Future 2041 Base Network No.1** - Existing + Planned Network	**Future 2041 Base Network No.2** - Existing + Planned Network + **TESR Recommended Improvements**	**Future 2031 Recommended Network (2014 MMATMP) without Harvie / Big Bay Point Interchange** - Existing + Planned Network + TESR Recommended Improvements + **2014 MMATMP Recommended Improvements**	**Future 2041 Draft Preferred Network without Harvie / Big Bay Point Parclo A4 Interchange** - Existing + Planned Network + TESR Recommended Improvements + 2014 MMATMP Recommended Improvements + **Additional Improvements**
	Emme Scenario ID	**Emme Scen. 20417 (AM)** **Emme Scen. 20418 (PM)**	**Emme Scen. 21417 (AM)** **Emme Scen. 21418 (PM)**	**Emme Scen. 26414 (AM)** **Emme Scen. 26415 (PM)**	**Emme Scen. 32414 (AM)** **Emme Scen. 32415 (PM)**
	Comments	This base network represents the do-nothing (including Capital Plan) to City roads and Highway 400 crossings and interchanges.	This base network represents the future 2041 do-nothing network scenario.	This alternative represents the previous 2014 MMATMP-recommended future 2031 network scenario (excluding Harvie / Big Bay Point Interchange) plus the 2017 updated TESR recommended network. This alternative is to justify the extra improvements (the changes) to the previous TMP recommendations.	This alternative represents the previous 2014 MMATMP-recommended future 2031 network scenario (excluding Harvie / Big Bay Point Interchange) plus the 2017 updated TESR recommended network. This alternative represents the future 2041 draft preferred network.
Highway 400 Corridor (with the City of Barrie Boundaries)					
Duckworth Interchange	6 lanes at Duckworth Street	6 lanes at Duckworth Street	6 lanes at Duckworth Street	6 lanes at Duckworth Street	6 lanes at Duckworth Street
	Interchange re-configuration and improvements completed in 2016	Existing interchange configuration	Existing interchange configuration	Existing interchange configuration	Existing interchange configuration
St. Vincent Crossing	2 lanes	2 lanes	2 lanes	**4 lanes**	**4 lanes**
Bayfield Interchange	4 lanes at Bayfield Street	4 lanes at Bayfield Street	**6 lanes** at Bayfield Street	**6 lanes** at Bayfield Street	**6 lanes** at Bayfield Street
	Parclo A / Diamond interchange configuration	Parclo A / Diamond interchange configuration	**2017 TESR-recommended improvements**	**2017 TESR-recommended improvements**	**2017 TESR-recommended improvements**
Sunnidale Crossing	2 lanes	2 lanes	2 lanes	2 lanes	2 lanes
Anne Crossing	4 lanes	4 lanes	4 lanes	4 lanes	4 lanes
Dunlop Interchange	2 lanes at Dunlop Street	2 lanes at Dunlop Street	**4 lanes** at Dunlop Street (MTO supported 4 lanes only)	**6 lanes** at Dunlop Street	**6 lanes** at Dunlop Street
	Parclo B3 interchange configuration	Parclo B3 interchange configuration	**2017 TESR-recommended improvements**	**2017 TESR-recommended improvements**	**2017 TESR-recommended improvements**
Tiffin Crossing	2 lanes	2 lanes	2 lanes	**4 lanes**	**4 lanes**
Essa Interchange	4 lanes at Essa Road	4 lanes at Essa Road	**4 lanes** at Essa Road (MTO supported 4 lanes only)	**6 lanes** at Essa Road	**6 lanes** at Essa Road
	Parclo A3 interchange configuration	Parclo A3 interchange configuration	**2017 TESR-recommended improvements**	**2017 TESR-recommended improvements**	**2017 TESR-recommended improvements**
Harvie / Big Bay Point Crossing / Interchange	No crossing	**4 lanes** at Harvie Road / Big Bay Point Road [1]	**4 lanes** at Harvie Road / Big Bay Point Road [1]	**4 lanes** at Harvie Road / Big Bay Point Road	**6 lanes** at Harvie Road / Big Bay Point Road (**4 lanes** at Fairview Road)
	No interchange	No interchange	No new interchange	No new interchange	No new interchange
Mapleview Interchange	6 lanes at Mapleview Drive	6 lanes at Mapleview Drive	6 lanes at Mapleview Drive	6 lanes at Mapleview Drive	6 lanes at Mapleview Drive
	Diamond interchange configuration	Diamond interchange configuration	**2017 TESR-recommended improvements (Reconfigure to a DDI)**	**2017 TESR-recommended improvements (Reconfigure to a DDI)**	**2017 TESR-recommended improvements (Reconfigure to a DDI)**
Salem / Lockhart Crossing	No crossing	**4 lanes**	**4 lanes**	**4 lanes**	**4 lanes**

Table 6-4 Alternatives and Network Assumptions for Developing TMP Road Network by 2041 *(Page 2/2)*

Location	Existing 2016 Road Conditions	Network Alternative Description: TMP Alt. 1A	TMP Alt. 1B	TMP Alt. 2	TMP Alt. 3
		Future 2041 Base Network No.1 - Existing + Planned Network	**Future 2041 Base Network No.2** - Existing + Planned Network + **TESR Recommended Improvements**	**Future 2031 Recommended Network (2014 MMATMP) without Harvie / Big Bay Point Interchange** - Existing + Planned Network + TESR Recommended Improvements + **2014 MMATMP Recommended Improvements**	**Future 2041 Draft Preferred Network without Harvie / Big Bay Point Parclo A4 Interchange** - Existing + Planned Network + TESR Recommended Improvements + 2014 MMATMP Recommended Improvements + **Additional Improvements**
McKay Crossing / Interchange	2 lanes at McKay Road	**4 lanes** at McKay Road [1]	**4 lanes** at McKay Road [1]	**4 lanes** at McKay Road	**4 lanes** at McKay Road
	No interchange	**New Parclo A3 interchange** (2-lane Off-Ramps) [1]	**New Parclo A3 interchange** (2-lane Off-Ramps) [1]	**New Parclo A3 interchange** (2-lane Off-Ramps)	**New Parclo A3 interchange** (2-lane Off-Ramps)
Highway 400 Corridor (beyond the City of Barrie Boundaries)					
Innisfil Beach Interchange	2 lanes at Innisfil Beach Road	**4 lanes** at Innisfil Beach Road	**4 lanes** at Innisfil Beach Road	**4 lanes** at Innisfil Beach Road	**4 lanes** at Innisfil Beach Road
	Parclo A4 interchange configuration	Parclo A4 interchange configuration	**2017 TESR-recommended improvements**	**2017 TESR-recommended improvements**	**2017 TESR-recommended improvements**
Sixth Line Crossing / Interchange	2 lanes at Sixth Line	2 lanes at Sixth Line	2 lanes at Sixth Line	2 lanes at Sixth Line	2 lanes at Sixth Line
	No interchange	No interchange	No new interchange	No new interchange	No new interchange
Highway 89 Interchange	2 lanes at Highway 89	2 lanes at Highway 89	**4 lanes at Highway 89**	**4 lanes at Highway 89**	**4 lanes at Highway 89**
	Parclo A3 interchange configuration	Parclo A3 interchange configuration	**2017 TESR-recommended improvements**	**2017 TESR-recommended improvements**	**2017 TESR-recommended improvements**
Highway 400 Mainline	6 lanes	6 lanes	**2017 TESR-recommended improvements:** - Highway 89 to Duckworth Street: **10 lanes, including 8 GPL + 2 HOV** - Duckworth Street to Highway 11: **8 lanes**	**2017 TESR-recommended improvements:** - Highway 89 to Duckworth Street: **10 lanes, including 8 GPL + 2 HOV** - Duckworth Street to Highway 11: **8 lanes**	**2017 TESR-recommended improvements:** - Highway 89 to Duckworth Street: **10 lanes, including 8 GPL + 2 HOV** - Duckworth Street to Highway 11: **8 lanes**
City of Barrie Road Network					
Other City of Barrie Roads		Existing 2016 road network + Capital-Planned Improvements from 2017 to 2021	Existing 2016 road network + Capital-Planned Improvements from 2017 to 2021	City 2014 MMATMP preferred City-wide network, excluding Harvie / Big Bay Point Partial Interchange	City draft preferred City-wide network
Simcoe County Road Network					
County Roads		Existing 2016 road network + County 2014 TMP recommended improvements by **2041**	Existing 2016 road network + County 2014 TMP recommended improvements	Existing 2016 road network + County 2014 TMP recommended improvements	Existing 2016 road network + County 2014 TMP recommended improvements
York Region Road Network					
		Existing 2016 road network + York Region 2016 TMP recommended improvements by **2041**	Existing 2016 road network + York Region 2016 TMP recommended improvements	Existing 2016 road network + York Region 2016 TMP recommended improvements	Existing 2016 road network + York Region 2016 TMP recommended improvements

Notes:1. Improvements are already programmed in the City's Capital Plan. 2. The number of lanes indicate through lanes. Two-way left-turn lanes and exclusive left-turn lanes are not counted.

6.3 EMME MODELLING ANALYSES OF NETWORK ALTERNATIVES

6.3.1 HYPOTHESES

To identify roadway capacity deficiencies and develop each road improvement alternative, several assumptions were developed and used throughout. The hypotheses were based on a review of planned improvements, consultation with the City, consultation with MTO, and professional best practices. The hypotheses include:

1. The 2041 planning horizon was used to explore and compare different road network alternatives. The mid-week AM and PM peak hours were used to determine infrastructure requirements.
2. The population and employment forecasts that have an impact on transportation are used to generate future travel demand. It should be noted that the forecasts used for the Emme demand forecasting model represent those that impact the traffic demand on a road network. Specifically:
   a. The population projections include the Census undercounts.
   b. Employment (number of jobs) forecasts typically include the jobs for Work at Home (WAH) and No Fixed Place of Work. As the jobs for WAH do not generate any traffic on a road network, they are not accounted for in the Emme Model and the employment input excludes the jobs for WAH.
3. The future 2041 road network was developed based on the future modal share targets during the AM and PM peak hours, which were estimated based on the established daily modal share targets in the TMP by 2041: **7% of transit** and **12% of active transportation** out of total person trips. The modal share targets are translated to be approximately 78% for the auto travel mode.

The Emme macro modelling analyses of the above road network alternatives were conducted for the future 2041 AM and PM peak hours to develop the future proposed preferred road network. The Emme model plots, including number of lanes, lane auto capacity, auto V/C ratios, and volume comparison between two subsequent scenarios, are provided in Appendix E-3.

6.3.2 FUTURE "DO-NOTHING" ROAD CONDITIONS

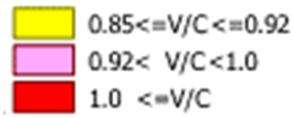
As discussed, the following two alternatives represent two different "do-nothing" network scenarios:

1. **Alternative 1B – Future 2041 Base Network No.2** represents one future 2041 network scenario that would "do-nothing" to the City's road network. It would be a base condition ("do-nothing" scenario #1) prior to the 2014 MMATMP recommended improvements. It was used to confirm the 2014 MMATMP-recommended improvements.

2. **Alternative 2 – Future 2031 Recommended Network (2014 MMATMP) without Harvie / Big Bay Point Interchange** represents the future 2041 network alternative with the previous 2031 network (recommended in 2014 MMATMP), excluding the Harvie / Big Bay Point Interchange. It would be a base condition ("do-nothing" scenario #2) prior to additional road improvements and the changes to the previous TMP recommendations.

FUTURE 2041 ROAD NETWORK CAPACITY DEFICIENCIES, "DO-NOTHING" TO EXISTING CITY'S ROAD NETWORK

Figure 6-1 and Figure 6-2 present the forecasted auto volumes to capacity (V/C) ratios during the AM and PM peak hours for **Alternative 1B**. The yellow, pink, or red links indicate the forecasted road capacity deficiencies.



FUTURE 2041 ROAD NETWORK CAPACITY DEFICIENCIES, "DO-NOTHING" TO 2014 MMATMP-RECOMMENDED 2031 NETWORK

Figure 6-3 and Figure 6-4 present its forecasted V/C ratios during the AM and PM peak hours for **Alternative 2**.

6.3.3 FUTURE PRELIMINARY ROAD NETWORK CONDITIONS

Several Emme test runs were conducted for **Alternative 3 – Future 2041 Draft Preferred Network** to explore additional improvements and changes to the previous 2014 MMATMP-recommended network. The forecasted V/C ratios are provided in Appendix E-3.

Detailed rationale analyses for the required improvements, which are discussed in the following sections, were then conducted to further confirm their needs and identify extra required improvements.

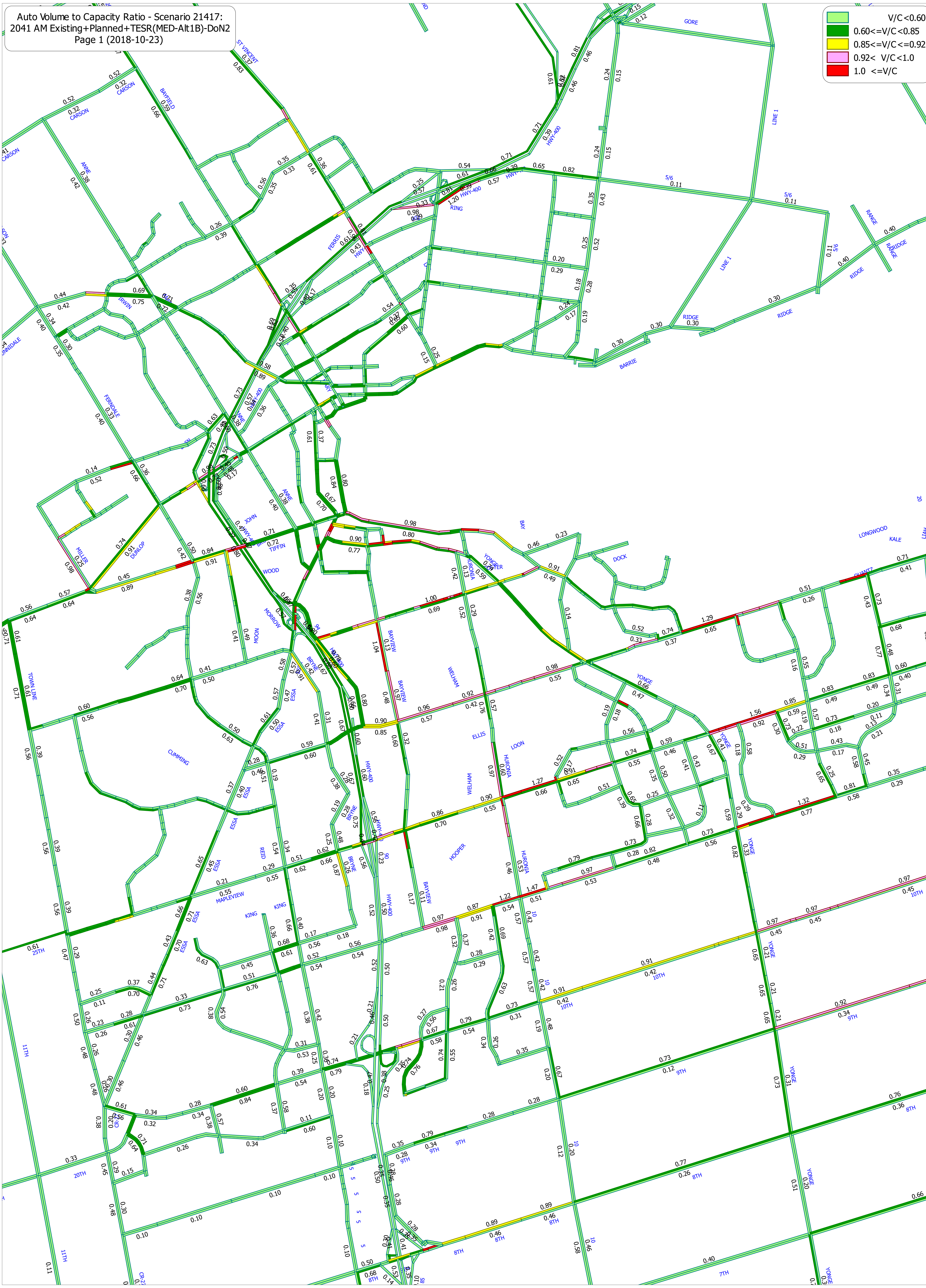


Figure 6-1 Future 2041 AM Peak Forecasted Auto V/C Ratios, "Do-Nothing" Network

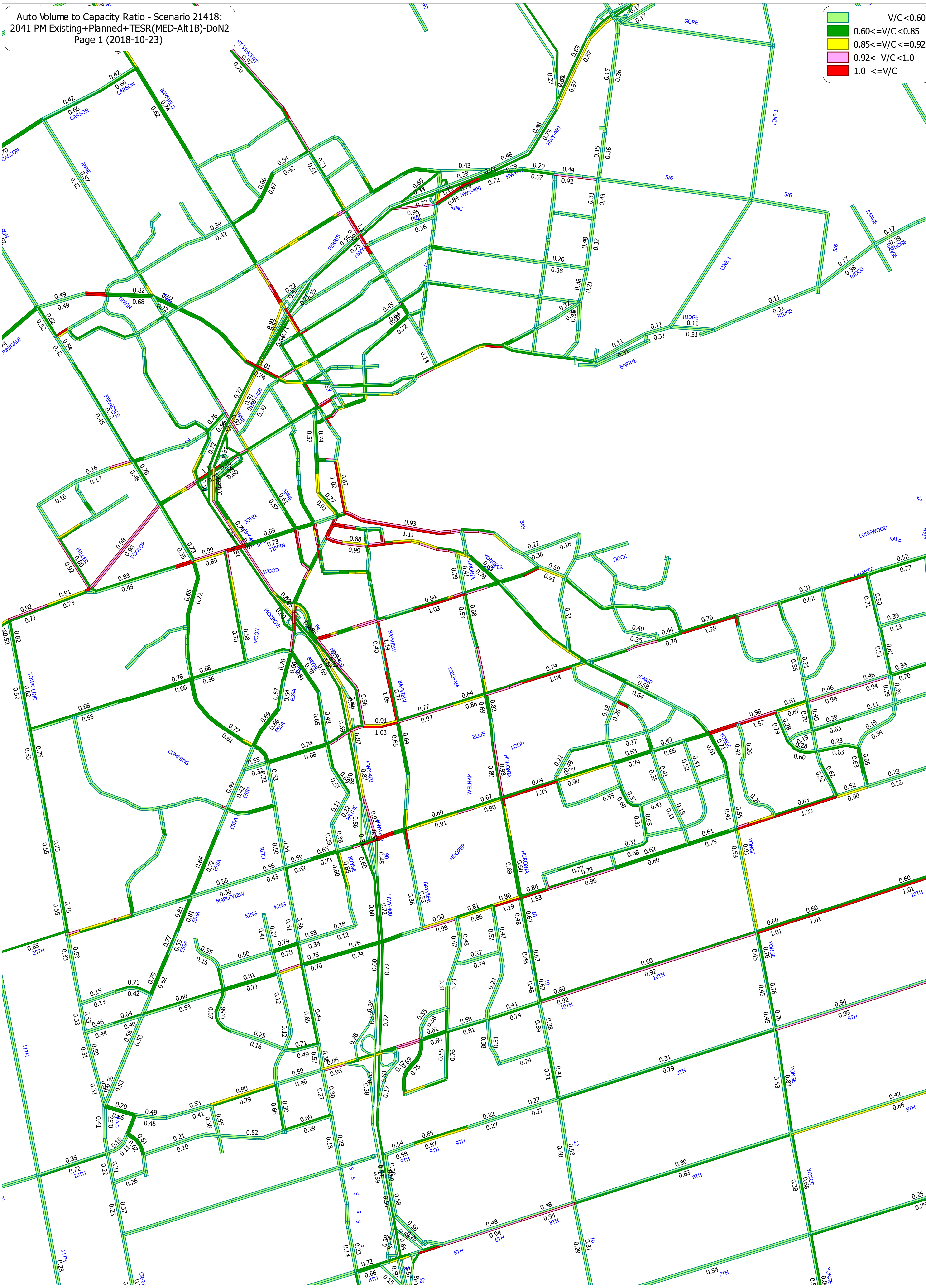


Figure 6-2 Future 2041 PM Peak Forecasted Auto V/C Ratios, "Do-Nothing" Network

Figure 6-3 Future 2041 AM Peak Forecasted Auto V/C Ratios, 2031 Improvements Previously-Recommended in 2014 MMATMP (Alt.2)

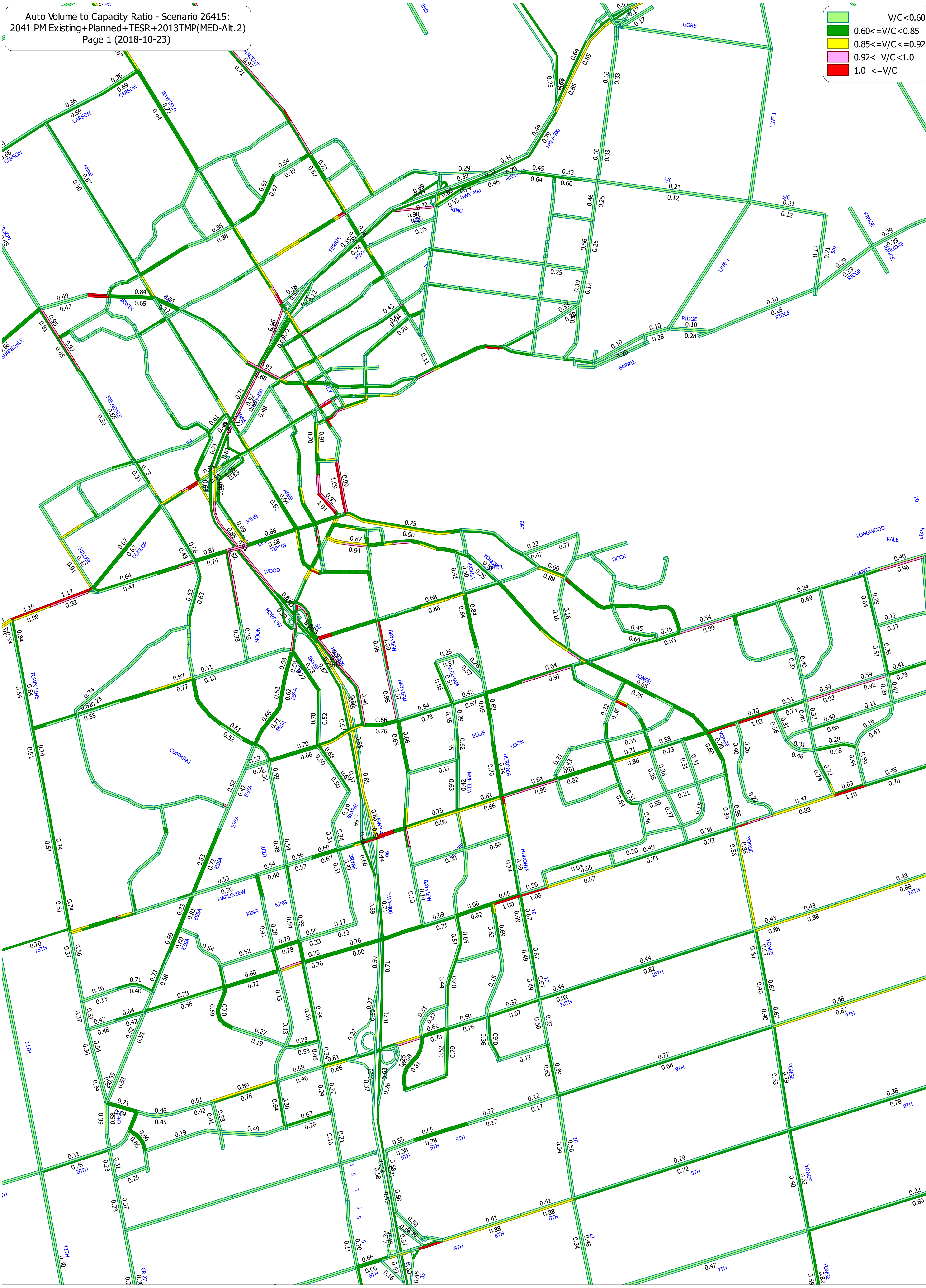


Figure 6-4 Future 2041 PM Peak Forecasted Auto V/C Ratios, 2031 Improvements Previously-Recommended in 2014 MMATMP (Alt.2)

6.4 RATIONALE ANALYSES FOR PROPOSED ROAD IMPROVEMENTS

6.4.1 CRITERIA AND RATIONALE FOR IDENTIFYING ROAD IMPROVEMENTS

Table 6-5 summarizes the major criteria that were applied to the City’s roads and MTO Highway 400 interchange ramps.

Roads with a V/C ratio equal to or greater than 0.85 were identified as candidates for potential improvements as per the travel demand forecasts from the Emme model. Road widening measures were limited to a maximum of seven lanes and network connectivity and grids were also considered.

To identify the need to widen a Highway 400 ramp, the current MTO methodology and guidelines identified in Geometric Design Standards for Ontario Highways (GDSOH) are considered:

- A lower congestion threshold of 0.75 is used.
- A two-lane ramp is required where flows exceed 1,500 passenger cars per hour (pc/h).

Table 6-5 Criteria and Rationale for Identifying Roadway Improvements

Roadway Capacity Threshold of V/C	Rationale
Before making major roadway network improvements, the road or roads in question should be analyzed to determine the appropriate level of service and design standards that match the need and character of the area being served. Level of service (LOS) is a term used to qualitatively describe the operating conditions of a roadway based on factors such as speed, travel time, maneuverability, delay and safety. The level of service of a facility is designated with a letter, A to F, with A representing the best operating conditions (free flow) and F the worst (congestion). Roads with an auto volume-to-capacity ratio (V/C) ratio greater than 0.85 are identified as being deficient as per the travel demand forecasts from the Emme model. The threshold for determining road capacity deficiencies was determined with the City and is defined as streets with traffic volumes over 85% of roadway capacity (this is represented by a volume to capacity ratio of 0.85). This ratio corresponds to a level of service (LOS) of “D”, which denotes that there is some congestion on some movements at intersections and that intersections are generally functional.	
City's Roads	
Target capacity threshold - 0.85 (V/C < 0.85)	Target capacity threshold of V/C of 0.85 is reviewed for links (roads) during the peak weekday hour (AM or PM). This ratio compares capacity with vehicular demand. This represents a use of approximately 85 percent of capacity during the weekday AM and PM peak hours. The capacity is determined based on the number of lanes and roadway classification, while the demand is based on projected traffic volumes. This V/C ratio corresponds to a level of service (LOS) of “D” where there is some congestion on some movements at intersections, but intersections are generally functional. **LOS D is typically the roadway design target.**
V/C between 0.85 and 0.92 (0.85 ≤ V/C < 0.92)	Roads with a V/C between 0.85 and 0.92 are examined individually to examine if significant constraints are present for roadway expansion (built or natural environments).
Maximum capacity threshold - 0.92 (V/C ≥ 0.92)	1) Under urban congestion conditions, a maximum capacity threshold of 0.92 can be tolerated. If significant constaints are present for roadway expansion, roads with a V/C between 0.85 and 0.92 will not be widened in order to maintain the current built or natural environments.
	2) Individual road segments with a V/C greater than 0.92 will be reviewed to examine if there are specific right-of-way constraints that prevent from roadway expansion.
Special Cases	1) Arterial roads are limited to have a maximum capacity of seven through lanes (three lanes per direction).
	2) If existing right-of-way constraints are present to prevent expansion, other alternative transportation modes can be considered.
MTO Highway 400 Interchange Ramps	
V/C ≥ 0.75	For Highway 400 ramps, a lower congestion threshold is used (0.75) in accordance with MTO methodology.
Flow of 1,500 pc/h	Based on MTO Geometric Design Guideline, a two-lane ramp is required where the flow exceeds 1,500 equivalent passenger cars per hour (pc/h).

6.4.2 ROAD GENERALIZED SERVICE VOLUMES

In addition, the analyses with the travel demand forecasting Emme model were complemented by a review of currently observed and future estimated average daily traffic (ADT) volumes against the generalized service volumes corresponding to roadway levels of service (LOS), as listed in Table 6-6, to capture traffic variations during the day. The review further confirms the need for roadway improvements.

Table 6-6 Roadway Levels of Service and Generalized Service Volumes (ADT)

Methodology				
Roads with a volume-to-capacity ratio (V/C) ratio equal to or greater than 0.85 or roads to be considered for road diet are complemented by a review of currently observed and future forecasted average daily traffic (ADT) volumes to capture traffic variations during the time of a day. And the observed ADT volumes were reviewed against the service volumes under the LOS of “D” and "E".				
Road Classification	**Number of Lanes**	**TWLTL or Median**	**LOS D**	**LOS E**
Arterial	2		11,900	**14,900**
Arterial	3*	Including	12,500	15,700
Arterial	4*		26,800	**30,400**
Arterial	5	Including	28,200	**31,900**
Arterial	6*		41,600	**45,800**
Arterial	7	Including	43,700	**48,200**

Source: 2013 Quality / Level of Service Handbook, Florida DOT.

*Notes: * The service volumes for roads with the number of lanes were estimated by the recommended adjustment of 5%.*

1. The service volume thresholds assume more than 2.8 signalized intersections per kilometres and typical exclusive left-turn lanes at intersections. 2. The table does not constitute a standard and should be used only for general planning applications. 3. A two-way left-turn lane or a median is counted as one lane in this TMP.

For the general evaluation of the capacity of an arterial street in an urbanized area, Annual Average Daily Traffic (AADT) volumes (acceptable LOS D threshold) are as follows:

— A typical two-lane arterial road without a TWLTL or median or can carry 11,900 vehicles per day (vpd) with a reasonable level of service (LOS D). When the volume reaches 14,900 vpd some congestion is expected (LOS E).

— A typical four-lane arterial road with a TWLTL or median (referred to as five lanes in the TMP) can carry 28,200 vpd with a reasonable level of service (LOS D). When the volume reaches 31,900 vpd some congestion is expected (LOS E).

— A typical six-lane arterial road with a TWLTL or median (referred to as seven lanes in the TMP) can carry 43,700 vpd with a reasonable level of service (LOS D). Some congestion is expected (LOS E) with the AADT volumes approaching 48,200 vpd.

Beyond LOS E, traffic volumes will deteriorate due to severe congestion (LOS F) during peak hours, resulting in unacceptable travel conditions. LOS D is typically the roadway design target. Therefore, roads with ADT volumes equal to or greater than the volume threshold for LOS E were identified as candidates for potential improvements.

It should be noted that the service volumes in Table 6-6 assume more than 2.8 signalized intersections per kilometre and typical exclusive left-turn lanes at intersections. The increase in the number of driveway accesses or intersections reduce the roadway capacity and service volumes. Without exclusive left-turn lanes, the service volumes will be reduced by approximate 20% to 25%. Adding a two-way left-turn lane or median increases the service volumes of the roadway by 5%, and vice versa.

6.4.3 RATIONALE ANALYSES

Per the criteria and rationale discussed in 6.4.1 and road generalized service volumes discussed in 6.4.2, rationale analyses were conducted to identify road improvements based on the future forecasted V/C ratios and ADT volumes in the Emme model. The analyses included:

1. confirmation of road improvements recommended in 2014 MMATMP (refer to Table 6-7)
2. proposed changes and additional improvements (refer to Table 6-8)
3. proposed interchange ramp options (refer to Table 6-9)
4. proposed widening to City roads at the Highway 400 crossings and interchanges, which are included in Table 6-8 and Table 6-9

Note that, due to roadway right-of-way constraints, some roads, such as Bayfield Street and Mapleview Drive at the Highway crossing, Lakeshore Drive and Bradford Street north Tiffin Street, Bayview Drive from Big Bay Point Road to Little Avenue, etc, would be at or over capacity.

Refer to Table 5-10 the TMP main report for a summary of the proposed improvements and refer to Figure 5-5 for the total of vehicle lanes and Figure 5-6 for changes in vehicle lanes from 2016 for the proposed 2041 road network.

Table 6-7 Rationale for Confirmation of 2014 MMATMP-Recommended Improvements, Horizon 2041 *(Page 1/8)*

Road	From	To	Road Classi-fication	2016 Network	2014 MMATMP Recommended Network	2018 TMP Proposed Network	Changes in Improvements from 2014 MMATMP	Rationale: Existing ADT Counts	Rationale: Existing Year	Peak Hour, Dir.	Alt. 1B - 2041 Do-Nothing: Forecasted Peak Hour Auto V/C Ratio [3]	Alt. 2 - 2041 with 2031 Network [1] (2014 MMATMP): Forecasted Peak Hour Auto V/C Ratio [3]	Alt. 3 - 2041 Proposed Preferred Network (Draft) [2]: Forecasted Peak Hour Auto V/C Ratio [3]	Alt. 3: Forecasted Peak Hour Auto Volume [4]	Alt. 3: Forecasted ADT Volume (Adjusted) [5]	LOS E Service ADT Volume Threshold (Lanes) [6]	Comments (V/C Color Coding: 0.85<=V/C<=0.92; 0.92< V/C<1.0; 1.0 <=V/C)
2014 MMATMP Roadway Network Improvements																	
Anne Street N (Highway 400 Crossing)	Edgehill Drive	Donald Street	Arterial	4 lanes	4 lanes + TWLTL	4 lanes + TWLTL	No change.	19,268	2017	PM, NB	**0.97**	0.79	0.76	1,294	20,874	30,400 (4 ln)	1) The current Highway 400 overpass bridge has a 4- lane cross-section. The current left-turn lanes on Anne Street at Edgehill Drive and Donald Street do not have sufficient storage, creating queue spillback on the bridge. 2) Widen to a 5-lane cross-section to accommodate the improvement of the two left-turn lanes. 3) Widening to 7 lanes at the crossing was explored to examine the alternative of the Dunlop Crossing. The further widening at the Anne Crossing would not relieve the future congestion at the Dunlop Crossing.
Anne Street N	Donald Street	Dunlop Street W	Arterial	4 lanes	4 lanes + TWLTL	4 lanes + TWLTL	No change.	22,074	2006	PM, NB	**0.90**	**0.86**	**0.86**	1,454	33,773	30,400 (4 ln) 45,800 (6 ln)	1) With the do-nothing (existing 4 lanes), the road would have a V/C ratio of 0.90, indicating congestion. 2) The forecasted ADT indicates LOS E or worse. 3) Adding one TWLTL would improve traffic flow from Edgehill to Dunlop. 4) The proposed 5-lane cross-section is consistent with that south of Dunlop Street.
Anne Street S	Tiffin Street	Centre Street / Campbell Avenue	Arterial	2 lanes	2 lanes + TWLTL	2 lanes + TWLTL	No change.	11,390	2017	PM, SB	**1.06**	**0.85**	**0.87**	741	14,632	14,900 (2 ln)	With the proposed 3 lanes, the road would experience congestion, which is acceptable.
Anne Street S	Centre Street / Campbell Avenue	Essa Road	Arterial	2 lanes	4 lanes + TWLTL	4 lanes + TWLTL	No change.	10,975	2003	PM, SB	**0.96**	0.77	0.83	705	17,412	14,900 (2 ln) 30,400 (4 ln)	Propose 5 lanes on this short segment to improve traffic operations at the Anne/Essa intersection.
Anne Street S	Essa Road	Adelaide Street	Major Collector	2 lanes	2 lanes + TWLTL	2 lanes + TWLTL	No change.	3,851	2002	PM, SB	**1.14**	**1.05**	**1.04**	574	9,732		Adding one TWLTL would provide access to adjacent properties and improve traffic flow.
Anne Street S	Adelaide Street	Innisfil Street / Baldwin Lane	Major Collector	Does not exist	2 lanes + TWLTL	2 lanes + TWLTL	No change.	n/a		PM, EB		0.63	0.67	367	7,975	14,900 (2 ln)	Extending Baldwin Lane to connect with Anne Street would improve network connectivity.
Ardagh Road	Essa Road	Patterson Road	Arterial	4 lanes	4 lanes + TWLTL	4 lanes + TWLTL	No change.	8,868	2005	PM, WB	0.69	0.53	0.49	800	11,905	14,900 (2 ln)	1) Adding one TWLTL would provide access to adjacent properties and improve traffic flow and traffic operations at the intersections at Morrow and Essa. 2) The proposed 5-lane cross-section is consistent with that on Bryne south of Essa.
Baldwin Lane	Innisfil Street	Bayview Drive	Major Collector	2 lanes	2 lanes + TWLTL	2 lanes + TWLTL	No change.	3,598	2017	PM, WB	**0.89**	0.79	0.84	459	9,698	14,900 (2 ln)	Adding one TWLTL would provide access to adjacent properties and improve traffic flow.
Bayfield Street	City Boundary	Cundles Road	Arterial	6 lanes + TWLTL	6 lanes (including 2 HOV) + TWLT	6 lanes (including 2 HOV) + TWLTL	No change.	23,229	2010	PM, NB	0.76	**0.87**	0.84	1,651	30,559	30,400 (4 ln) 45,800 (6 ln)	1) With the existing 7 lanes, the road would have a V/C ratio of 0.76. 2) Converting 2 GPL to HOV would slightly increase congestion, but reduce transit travel time. 3) Based on the forecasted ADT of 30,559 vehicles, the road with the reduced 5 lanes would be operating at LOS E.
Bayfield Street	Cundles Road	Highway 400 SB Off-Ramp	Arterial	4 lanes + TWLTL	6 lanes (including 2 HOV) + TWLT	6 lanes (including 2 HOV) + TWLTL	No change.	29,546	2010	PM, NB	**1.22**	**1.09**	**1.12**	2,240	40,635	30,400 (4 ln) 45,800 (6 ln)	1) With the do-nothing (existing 5 lanes), the road would have a V/C ratio of 1.22, indicating capacity deficiencies. 2) The forecasted ADT indicates LOS F and further justifies the need for 6 lanes. 3). Converting 2 the proposed GPL to HOV would increase roadway congestion, but reduce transit travel time.
Bayfield Street (Highway 400 Crossing)	Highway 400 SB Off-Ramp	Highway 400 NB Off-Ramp	Arterial	4 lanes + TWLTL	6 lanes (including 2 HOV) + TWLT	6 lanes (including 2 HOV) + TWLTL	No change.	34,664	2017	PM, NB	**1.09**	**0.91**	**1.26**	2,529	37,871	30,400 (4 ln) 45,800 (6 ln)	1) With the do-nothing (existing 5 lanes), the road would have a V/C ratio of 1.09, indicating capacity deficiencies. 2) Both the current & forecasted ADT indicate LOS F with 4 lanes and further justify the need for 6 lanes. MTO TESR recommends 6 through lanes, too. 3). Converting 2 GPL to HOV would increase roadway congestion, but reduce transit travel time.

Table 6-7 Rationale for Confirmation of 2014 MMATMP-Recommended Improvements, Horizon 2041 *(Page 2/8)*

Road	From	To	Road Classi-fication	2016 Network	2014 MMATMP Recommended Network	2018 TMP Proposed Network	Changes in Improvements from 2014 MMATMP	Rationale: Existing ADT Counts	Existing Year	Peak Hour, Dir.	Alt. 1B - 2041 Do-Nothing: Forecasted Peak Hour Auto V/C Ratio 3	Alt. 2 - 2041 with 2031 Network 1 (2014 MMATMP): Forecasted Peak Hour Auto V/C Ratio 3	Alt. 3 - 2041 Proposed Preferred Network (Draft) 2: Forecasted Peak Hour Auto V/C Ratio 3	Alt. 3: Forecasted Peak Hour Auto Volume 4	Alt. 3: Forecasted ADT Volume (Adjusted) 5	LOS E Service ADT Volume Threshold (Lanes) 6	Comments (V/C Color Coding: 0.85<=V/C<=0.92; 0.92< V/C<1.0; 1.0 <=V/C)
Bayfield Street	Highway 400 NB Off-Ramp	Grove Street W	Arterial	4 lanes	4 lanes + TWLTL	4 lanes + TWLTL	No change.	15,082	2003	PM, NB	**1.12**	**0.91**	0.84	1,436	25,290	30,400 (4 ln)	1) With the do-nothing (existing 4 lanes), the road would have a V/C ratio of 1.12, indicating capacity deficiencies. 2) The forecasted ADT indicates LOS D, which is acceptable. 3). Adding one TWLTL would provide access to adjacent properties and improve traffic flow.
Bayview Drive	Burton Avenue	Little Avenue	Major Collector	2 lanes	2 lanes + TWLTL	2 lanes + TWLTL	No change.	7,994	2017	PM, NB	0.73	0.73	0.75	410	11,383	14,900 (2 ln)	Adding one TWLTL would provide access to adjacent properties and improve traffic flow.
Bell Farm Road	St. Vincent Street	Alliance Boulevard (East End)	Major Collector	2 lanes	2 lanes + TWLTL	2 lanes + TWLTL	No change.	5,659	2017	PM, WB	0.43	0.48	0.47	260	4,329	14,900 (2 ln)	Adding one TWLTL would provide access to adjacent properties in the employment lands.
Big Bay Point Road	Fairview Road	Bayview Drive	Arterial	2 lanes	6 lanes + TWLTL	6 lanes + TWLTL	No change.			PM, EB	**1.02**	0.76	**1.01**	1,717	39,066	30,400 (4 ln) 45,800 (6 ln)	1) The future forecasted V/C and ADT on this section justify the need for 6 lanes. 2) After the implementation of the proposed HOV on Mapleview Drive and Essa Road, there would be some traffic shifted from Mapleview and Essa. 3) The crossing bridge structure is under construction with abutments to accommodate 7 lanes.
Big Bay Point Road	Leggott Avenue	Dean Avenue	Arterial	4 lanes	4 lanes + TWLTL	4 lanes + TWLTL	No change.	18,492	2017	PM, EB	**1.05**	**0.96**	**1.01**	1,509	32,136	30,400 (4 ln) 45,800 (6 ln)	Adding a TWLTL would provide access to adjacent properties and improve traffic flow, thus capacity.
Big Bay Point Road	Prince William Way	Collector 11	Arterial	2 lanes	4 lanes + TWLTL	4 lanes + TWLTL	No change.	5,329	2006	PM, EB	**1.29**	0.71	0.64	1,093	18,053	14,900 (2 ln) 30,400 (4 ln)	1) The forecasted ADT also indicates the need for 4 lanes. 2) A TWLTL would provide access to adjacent properties and improve traffic flow.
Big Bay Point Road	Collector 11	Approx. 280m east of Collector 11	Arterial	2 lanes	2 lanes + TWLTL	2 lanes + TWLTL	No change.	6,634	2017	PM, EB	**0.86**	0.84	0.84	716	13,197	14,900 (2 ln)	Adding a TWLTL would provide access to adjacent properties and improve traffic flow, thus capacity.
Blake Street	Duckworth Street	Johnson Street	Arterial	2 lanes	2 lanes + TWLTL	2 lanes + TWLTL	No change.	13,247	2017	PM, EB	**0.98**	**0.93**	**0.93**	689	14,830	14,900 (2 ln)	1) With the do-nothing (existing 2 lanes) and the 2031 network, the road would have a V/C ratio greater than 0.92, indicating capacity deficiencies and congestion. 2) Adding one TWLTL would provide access to adjacent properties and improve traffic flow. 3) The forecasted ADT indicates LOS E.
Bradford Street	Simcoe Street	Tiffin Street	Arterial	4 lanes	5 lanes (including 2 HOV)	5 lanes (including 2 HOV)	No change.	11,706	2010	PM, SB	**0.90**	**1.04**	**1.04**	783	10,457	14,900 (2 ln) 30,400 (4 ln)	1) Providing HOV lanes at Bradford would reduce transit travel time between the Downtown Bus Terminal and the Waterfront GO Station. 2) Converting 2 GPL to HOV would indicate auto traffic congestion. 3) Note that the implementation of HOV would shift traffic to other roads, resulting in reduction in traffic volumes. 4) A TWLTL would provide access to adjacent properties
Bryne Drive (North)	Approx. 200m south of Essa Road	South end of existing Bryne Drive	Arterial	2 lanes	4 lanes + TWLTL	4 lanes + TWLTL	No change.	8,516	2004	AM, SB	0.80	**0.91**	0.70	1,011	26,546	14,900 (2 ln) 30,400 (4 ln)	1) A 5-lane cross-section is proposed for the Bryne Drive Extension, which is consistent with both ends adjacent to Essa Road and Caplan Avenue. 2) The forecasted ADT further confirms the need for 4 lanes. 3) A TWLTL would provide access to adjacent properties in the employment lands and improve traffic flow.
Bryne Drive (North)	South end of existing Bryne Drive	North end of existing Bryne Drive, north of Mapleview Drive W	Arterial	Does not exist	4 lanes + TWLTL	4 lanes + TWLTL	No change.			PM, NB	0.67	0.68	0.49	830	16,669	14,900 (2 ln) 30,400 (4 ln)	The Bryne Extension would improve network connectivity, providing another road in parallel to Highway 400 and reducing traffic access to Highway 400.

Table 6-7 Rationale for Confirmation of 2014 MMATMP-Recommended Improvements, Horizon 2041 *(Page 3/8)*

Road	From	To	Road Classi-fication	2016 Network	2014 MMATMP Recommended Network	2018 TMP Proposed Network	Changes in Improvements from 2014 MMATMP	Rationale: Existing ADT Counts	Rationale: Existing Year	Peak Hour, Dir.	Alt. 1B - 2041 Do-Nothing: Forecasted Peak Hour Auto V/C Ratio [3]	Alt. 2 - 2041 with 2031 Network [1] (2014 MMATMP): Forecasted Peak Hour Auto V/C Ratio [3]	Alt. 3 - 2041 Proposed Preferred Network (Draft) [2]: Forecasted Peak Hour Auto V/C Ratio [3]	Alt. 3: Forecasted Peak Hour Auto Volume [4]	Alt. 3: Forecasted ADT Volume (Adjusted) [5]	LOS E Service ADT Volume Threshold (Lanes) [6]	Comments
Bryne Drive (South)	North end of existing Bryne Drive, north of Mapleview Drive W	Caplan Avenue	Arterial	2 lanes	4 lanes + TWLTL	4 lanes + TWLTL	No change.			PM, NB	0.26	0.18	0.15	252	-5,115		1) A 5-lane cross-section is proposed for the Bryne Drive Extension, which is consistent with both ends adjacent to Essa Road and Caplan Avenue. 2) The forecasted ADT further confirms the need for 4 lanes. 3) A TWLTL would provide access to adjacent properties in the employment lands and improve traffic flow.
Bryne Drive (South)	Approx. 150m south of Mapleview Drive	Commerce Park Drive (North End)	Major Collector	2 lanes + TWLTL	4 lanes + TWLTL	4 lanes + TWLTL	No change.	17,300	2010	PM, NB	**0.86**	0.46	0.45	500	18,658	14,900 (2 ln) 30,400 (4 ln)	1) With the do-nothing (existing 2 lanes), the road would have a V/C ratio of 0.86, indicating congestion. 2) The forecasted ADT justifies the need for 4 lanes. 3) A TWLTL would provide access to adjacent properties in the employment lands and improve traffic flow.
Burton Avenue	Bayview Drive	Robinson Street	Arterial	2 lanes	4 lanes	4 lanes	No change.	10,066	2001	PM, EB	**1.60**	**0.88**	**0.89**	1,156	22,567	14,900 (2 ln) 30,400 (4 ln)	1) Currently, Burton has 2 lanes between Bayview and Milburn; and 2 lanes in the westbound and 1 lane in the eastbound between Milburn and Robinson. 2) The future traffic would be increased by 51% by 2041. The forecasted ADT justifies 4 lanes. 3) The road with the proposed 4 lanes would still experience congestion. 4) Residents have concerns on the impacts of road widening on the adjacent century-home neighbourhood. But City staff confirmed that the area would be redeveloped. 5) The road section from Essa to Bayview is proposed to protect for 4 lanes at redevelopment. If HOV lanes are provided on Lakeshore, traffic would be shifted from Lakeshore to Burton.
Collier Street	Blake Street	Mulcaster Street	Major Collector	2 lanes	2 lanes + TWLTL	2 lanes + TWLTL	No change.	5,372	2006	PM, EB	0.75	0.78	0.78	432	8,351	14,900 (2 ln)	Adding one TWLTL by lane re-configuration would provide access to adjacent properties and improve traffic flow along the Blake/Collier/Ross corridor.
Dunlop Street W	City boundary	Ferndale Drive N	Arterial	2 lanes	4 lanes + TWLTL	4 lanes + TWLTL	No change.	13,305	2010	PM, WB	**1.00**	0.62	0.70	1,189	30,661	14,900 (2 ln) 30,400 (4 ln)	1) With the do-nothing (existing 2 lanes), the road would have a V/C ratio of 1.00, indicating capacity deficiencies. 2) The forecasted ADT justifies the need for 4 lanes. The road with the proposed 5 lanes would be operating at LOS D. 3) A 5-lane cross-section outside the city boundary has been built by the County.
Dunlop Street W (Highway 400 Crossing)	Cedar Pointe Drive	Highway 400 NB On-Ramp	Arterial	2 lanes	6 lanes + TWLTL	6 lanes + TWLTL	No change.	19,609	2010	PM, WB	**1.17**	**0.89**	**0.95**	2,412	48,264	30,400 (4 ln) 45,800 (6 ln)	1) With the do-nothing (existing 2 lanes), the road would have a V/C ratio of 1.17, indicating capacity deficiencies. 2) The forecasted ADT of 48,264 vehicles would be approaching a service volume of 48,200 vehicles for a 6-lane arterial road under LOS E. That is, the Dunlop Crossing with the future 7 lanes would be operating at LOS F. 3) Due to complexity of turning movements at the interchange, the lane configuration of the recommended 7-lane cross-section will need to be determined with detailed traffic operations assessment at the design stage.
Dunlop Street W	Highway 400 NB On-Ramp	Anne Street N	Arterial	4 lanes	6 lanes + TWLTL	6 lanes + TWLTL	No change.	28,823	2017	PM, WB	**0.93**	0.76	0.76	1,934	46,405	30,400 (4 ln) 45,800 (6 ln)	1) With the do-nothing (existing 4 lanes), the road would have a V/C ratio of 0.93, indicating congestion. 2) The forecasted ADT indicates the need for 6 lanes. 3) This segment currently experience the lane changing issue for traffic coming from the S-E NB Off-Ramp. 4) The current and future intersection of Anne/Dunlop experiences high EB left-turning traffic volumes. 5) Due to complexity of turning movements at the interchange, the lane configuration of the recommended 7-lane cross-section will need to be determined with detailed traffic operations assessment at the design stage.

V/C Color Coding:
- 0.85<=V/C<=0.92
- 0.92< V/C<1.0
- 1.0 <=V/C

Table 6-7 Rationale for Confirmation of 2014 MMATMP-Recommended Improvements, Horizon 2041 *(Page 4/8)*

Road	From	To	Road Classification	2016 Network	2014 MMATMP Recommended Network	2018 TMP Proposed Network	Changes in Improvements from 2014 MMATMP	Rationale: Existing ADT Counts	Existing Year	Peak Hour, Dir.	Alt. 1B - 2041 Do-Nothing: Forecasted Peak Hour Auto V/C Ratio [3]	Alt. 2 - 2041 with 2031 Network [1] (2014 MMATMP): Forecasted Peak Hour Auto V/C Ratio [3]	Alt. 3 - 2041 Proposed Preferred Network (Draft) [2]: Forecasted Peak Hour Auto V/C Ratio [3]	Alt. 3: Forecasted Peak Hour Auto Volume [4]	Alt. 3: Forecasted ADT Volume (Adjusted) [5]	LOS E Service ADT Volume Threshold (Lanes) [6]	Comments (V/C Color Coding: 0.85<=V/C<=0.92; 0.92< V/C<1.0; 1.0 <=V/C)
Essa Road	Tiffin Street	Gowan Street	Arterial	4 lanes	4 lanes + TWLTL	4 lanes + TWLTL	No change.	16,643	2017	PM, SB	**1.05**	**0.89**	**0.90**	1,172	18,911	30,400 (4 ln) 45,800 (6 ln)	1) The section with the proposed 5 lanes would have a V/C ratio of 0.90, less than the maximum threshold of 0.92. 2) The proposed 5 lanes would improve traffic operations between GO Station Driveway and Tiffin Street by incorporating turning movements of transit vehicles. 3) The implementation of HOV lanes would increase congestion on general-purpose lanes.
Essa Road	Anne Street S	Approx. 230m west of Anne Street S	Arterial	4 lanes	4 lanes + TWLTL	4 lanes + TWLTL	No change.	23,842	2010	PM, WB	**0.94**	**0.87**	**0.87**	1,475	34,862	30,400 (4 ln) 45,800 (6 ln)	1) With the existing 4 lanes, the road would have a V/C ratio of 0.94, indicate congestion. 2) The forecasted ADT indicates a LOS F with 4 lanes. 3) Adding one TWLTL would provide access to adjacent properties and improve traffic flow. 4) The segment provides a transition from the 7 lanes adjacent to the interchange to 4 lanes east of Anne Street.
Essa Road	Approx. 230m west of Anne Street S	Fairview Road	Arterial	4 lanes	6 lanes + TWLTL	6 lanes + TWLTL	No change.	23,842	2010	PM, WB	0.79	0.76	0.73	1,860	43,100	30,400 (4 ln) 45,800 (6 ln)	1) The proposed 7 lanes are programmed in the City's Capital Plan. 2) The forecasted ADT also indicates the need for 6/7 lanes. It indicates LOS E with the proposed 7 lanes.
Essa Road (Highway 400 Crossing)	Fairview Road	Highway 400 SB Off-Ramp	Arterial	4 lanes	6 lanes + TWLTL	6 lanes + TWLTL	No change.	33,339	2012	PM, EB	**1.33 - 1.42**	**1.00**	**0.96**	2,445	45,902	30,400 (4 ln) 45,800 (6 ln)	1) With the do-nothing (existing 4 lanes), the road would have a V/C ratio of 1.33-1.42, indicating capacity deficiencies. 2) The forecasted ADT further justifies the need for 6 lanes 3) The forecasted V/C and ADT still indicate congestion with the proposed 7 lanes.
Essa Road	Highway 400 SB Off-Ramp	Ardagh Road	Arterial	4 lanes + TWLTL	6 lanes + TWLTL	6 lanes + TWLTL	No change.	35,085	2017	PM, WB	**0.95**	**0.93**	**0.93**	2,365	47,590	30,400 (4 ln) 45,800 (6 ln)	1) The proposed 7 lanes are programmed in the City's Capital Plan.2) The forecasted ADT also indicates the need for 6/7 lanes. It indicates LOS E with the proposed 7 lanes.
Essa Road	Mapleview Drive	Salem Road	Arterial	2 lanes	2 lanes + TWLTL	2 lanes + TWLTL	No change.	8,073	2017	PM, SB	0.82	0.82	0.81	686	14,655	14,900 (2 ln)	1) Adding one TWLTL would provide access to adjacent properties and improve traffic flow. 2) The forecasted ADT indicate LOS E with 2 lanes.
Essa Road	Salem Road	Approx. 670m south of Salem Road	Arterial	2 lanes	2 lanes + TWLTL	2 lanes + TWLTL	No change.	6,198	2013	PM, SB	0.58	0.52	0.52	455	8,098	14,900 (2 ln)	Adding one TWLTL would provide access to adjacent properties and improve traffic flow.
Fairview Road	Essa Road	Little Avenue	Arterial	4 lanes	4 lanes + TWLTL	4 lanes + TWLTL	No change.	21,276	2007	PM, SB	**0.85**	**0.92**	**0.87**	1,131	27,202	30,400 (4 ln)	Currently, the NB left-turning traffic experiences long queues. Adding one TWLTL would provide access to adjacent properties and improve traffic flow.
Georgian Drive	Gallie Court	Johnson Street	Arterial	4 lanes	4 lanes + TWLTL	4 lanes + TWLTL	No change.	12,309	2017	PM, EB	0.67	0.64	0.65	973	20,874	30,400 (4 ln)	1) Adding one TWLTL would provide access to adjacent properties and improve traffic flow. 2) The cross-section would be consistent with an existing 3-lane cross-section east of Johnson Street.
Hamilton Road	Truman Road	Welham Road	Minor Collector	2 lanes	2 lanes + TWLTL	2 lanes + TWLTL	No change.			PM, EB	0.79	0.57	0.56	278	4,795	14,900 (2 ln)	Adding one TWLTL would provide access to adjacent properties and improve traffic flow.
Harvie Road	Essa Road	Veterans Drive	Arterial	2 lanes	2 lanes + TWLTL	2 lanes + TWLTL	No change.	381	2006	PM, WB	0.44	0.42	0.52	438	8,596	14,900 (2 ln)	Adding a TWLTL would provide access to adjacent properties and improve traffic flow.
Harvie Road	Veterans Drive	Bryne Drive	Arterial	2 lanes	4 lanes + TWLTL	4 lanes + TWLTL	No change.			PM, WB	0.72	0.70	0.66	1,120	23,599	14,900 (2 ln) 30,400 (4 ln)	1) The proposed 5 lanes are programmed in the City's Capital Plan. 2) The forecasted ADT also indicates the need for 4 lanes. 3) A TWLTL would provide access to adjacent properties and improve traffic flow.
Harvie Road	Bryne Drive	Fairview Road	Arterial	Does not exist	6 lanes + TWLTL	6 lanes + TWLTL	No change.			PM, EB	**0.95**	**0.91**	0.84	1,429	29,619	30,400 (4 ln) 45,800 (6 ln)	1) The future forecasted V/C and ADT on this section justify the need for 6 lanes. 2) After the implementation of the proposed HOV on Mapleview Drive and Essa Road, there would be some traffic shifted from Mapleview and Essa. 3) The crossing bridge structure is under construction with abutments to accommodate 7 lanes.

Table 6-7 Rationale for Confirmation of 2014 MMATMP-Recommended Improvements, Horizon 2041 *(Page 5/8)*

Road	From	To	Road Classi-fication	2016 Network	2014 MMATMP Recommended Network	2018 TMP Proposed Network	Changes in Improvements from 2014 MMATMP	Rationale: Existing ADT Counts	Existing Year	Peak Hour, Dir.	Alt. 1B - 2041 Do-Nothing: Forecasted Peak Hour Auto V/C Ratio [3]	Alt. 2 - 2041 with 2031 Network [1] (2014 MMATMP): Forecasted Peak Hour Auto V/C Ratio [3]	Alt. 3 - 2041 Proposed Preferred Network (Draft) [2]: Forecasted Peak Hour Auto V/C Ratio [3]	Alt. 3: Forecasted Peak Hour Auto Volume [4]	Alt. 3: Forecasted ADT Volume (Adjusted) [5]	LOS E Service ADT Volume Threshold (Lanes) [6]	Comments
Huronia Road	Yonge Street	Little Avenue	Arterial	2 lanes	2 lanes + TWLTL	2 lanes + TWLTL	No change.	6,457	2006	PM, NB	0.41	0.50	0.48	358	8,737	14,900 (2 ln)	Adding one TWLTL would provide access to adjacent properties and improve traffic flow.
Huronia Road	Little Avenue	Herrell Avenue	Arterial	2 lanes	2 lanes + TWLTL	2 lanes + TWLTL	No change.	8,287	2006	PM, NB	0.69	0.83	0.77	576	11,638	14,900 (2 ln)	Adding one TWLTL would provide access to adjacent properties and improve traffic flow.
Huronia Road	Herrell Avenue	Big Bay Point Road	Arterial	2 lanes	4 lanes + TWLTL	4 lanes + TWLTL	No change.	8,402	2017	PM, NB	**0.94**	0.52	0.47	807	14,046	14,900 (2 ln)	Adding one TWLTL would provide access to adjacent properties and improve traffic flow.
Hurst Drive	Minet's Point Road	Bay Lane	Arterial	2 lanes	4 lanes	4 lanes	No change.	13,465	2017	AM/PM, NB	**0.93**	0.70	**0.92**	688	18,475	14,900 (2 ln) 30,400 (4 ln)	1) The forecasted V/C ratio and ADT indicate the need for 4 lanes.2) Currently Hurst Drive from Big Bay Point to Bay Lane has been built with road diet to 3 lanes with bike lanes. City staff confirmed that the section can be reversed to have 4 lanes if capacity is required. 3) Hurst Drive is the major corridor for the southeast neighbourhood to access downtown. Therefore, the section is proposed to have 4 lanes.
Hurst Drive	Bay Lane	Little Avenue	Arterial	2 lanes + TWLTL	4 lanes	4 lanes	No change.	9,135	2004	AM/PM, NB	**0.86**	**0.88**	**0.86**	648	17,110	14,900 (2 ln) 30,400 (4 ln)	
Hurst Drive	Little Avenue	Cox Mill Road	Arterial	2 lanes + TWLTL	4 lanes	4 lanes	No change.	12,809	2010	AM/PM, NB	**1.11**	**1.12**	**1.14**	854	22,121	14,900 (2 ln) 30,400 (4 ln)	
Innisfil Street	Tiffin Street	Essa Road	Major Collector	2 lanes	2 lanes + TWLTL	2 lanes + TWLTL	No change.	7,592	2017	PM, SB	**1.25**	**0.95**	**0.92**	506	11,375	14,900 (2 ln)	1) With the proposed 3 lanes, the road would experience congestion. 2) There is a ROW constraint for the road to be further widened on the short segment.
Lakeshore Drive	Tiffin Street	Minet's Point Road	Arterial	2 lanes + TWLTL	4 lanes + TWLTL	4 lanes + TWLTL	No change.	22,380	2013	PM, EB	**1.13**	**0.90**	**0.89**	1,518	40,565	14,900 (2 ln) 30,400 (4 ln)	1) With the existing lanes, the road would have a V/C ratio of 1.13, indicating capacity deficiencies. 2) The road with the proposed 5 lanes would still be experiencing congestion. 3) The future forecasted ADT indicates LOS F with the proposed 5 lanes.
Little Avenue	Fairview Road	Marshall Street	Arterial	2 lanes	4 lanes + TWLTL	4 lanes + TWLTL	No change.	11,298	2017	PM, EB	**1.30**	**1.04**	**1.18**	887	16,618	14,900 (2 ln) 30,400 (4 ln)	1) With the do-nothing (existing 2 lanes) and the proposed 4 lanes, the road would have a V/C ratio greater than 1.0, indicating capacity deficiencies. 2) The forecasted ADT further justifies the need for 4 lanes.
Little Avenue	Marshall Street	Bayview Drive	Arterial	2 lanes	2 lanes + TWLTL	2 lanes + TWLTL	No change.	9,774	2006	PM, EB	**0.91**	0.81	0.82	613	16,423	14,900 (2 ln) 30,400 (4 ln)	1) The forecasted V/C ratio and ADT indicate the capacity deficiencies. 2) Adding one TWLTL by re-configuration would provide access to adjacent properties and improve traffic flow. 3) Further widening roadway would have an impact on the current residential area.
Little Avenue	Bayview Drive	Huronia Road	Arterial	2 lanes	2 lanes + TWLTL	2 lanes + TWLTL	No change.	8,406	2010	PM, EB	**1.17**	**0.90**	**0.93**	696	15,288	14,900 (2 ln) 30,400 (4 ln)	
Little Avenue	Huronia Road	Hurst Drive	Arterial	2 lanes	2 lanes + TWLTL	2 lanes + TWLTL	No change.	2,843	2004	PM, EB	**0.92**	0.73	0.79	592	8,133	14,900 (2 ln)	
Lockhart Road	Salem Road	Huronia Road	Arterial	2 lanes	4 lanes + TWLTL	4 lanes + TWLTL	No change.	4,805	2017	PM, EB	**1.19**	**1.00**	**1.01**	1,723	32,766	30,400 (4 ln) 45,800 (6 ln)	1) The forecasted V/C and ADT indicate the need for 4 lanes. 2) A TWLTL would provide access to adjacent properties and improve traffic flow. 3) The short segment with a capacity deficiency is located close to Huronia Road, which can be improved with additional turn lanes at the intersection.
Lockhart Road	Huronia Road	Yonge Street	Arterial	2 lanes	4 lanes + TWLTL	4 lanes + TWLTL	No change.	3,862	2013	PM, EB	**1.53**	**1.08**	**1.08**	1,830	32,927	30,400 (4 ln) 45,800 (6 ln)	1) The forecasted V/C and ADT indicate the need for 4 lanes. 2) A TWLTL would provide access to adjacent properties and improve traffic flow. 3) The short segment with a capacity deficiency is located close to Huronia Road, which can be improved with additional turn lanes at the intersection.
Lockhart Road	Yonge Street	Prince William Way	Arterial	2 lanes	4 lanes + TWLTL	4 lanes + TWLTL	No change.			AM&PM, EB	**1.59**	**0.99**	**1.00**	1,692	28,710	30,400 (4 ln) 45,800 (6 ln)	1) The forecasted V/C and ADT indicate the need for 4 lanes. 2) A TWLTL would provide access to adjacent properties and improve traffic flow. 3) The short segment with a capacity deficiency is located close to Yonge Street, which can be improved with additional turn lanes at the intersection.
Madelaine Drive	Yonge Street	Mapleview Drive	Major Collector	4 lanes	2 lanes + TWLTL	2 lanes + TWLTL	No change.	3,892	2008	PM, NB	0.45	0.65	0.57	315	7,960	14,900 (2 ln)	1) Road diet to incorporate the proposed bike facility. 2) The forecasted ADT is less than the threshold for LOS E with 2 lanes.

V/C Color Coding:
- 0.85<=V/C<=0.92
- 0.92< V/C<1.0
- 1.0 <=V/C

Table 6-7 Rationale for Confirmation of 2014 MMATMP-Recommended Improvements, Horizon 2041 *(Page 6/8)*

Road	From	To	Road Classification	2016 Network	2014 MMATMP Recommended Network	2018 TMP Proposed Network	Changes in Improvements from 2014 MMATMP	Rationale: Existing ADT Counts	Existing Year	Peak Hour, Dir.	Alt. 1B - 2041 Do-Nothing: Forecasted Peak Hour Auto V/C Ratio [3]	Alt. 2 - 2041 with 2031 Network [1] (2014 MMATMP): Forecasted Peak Hour Auto V/C Ratio [3]	Alt. 3 - 2041 Proposed Preferred Network (Draft) [2]: Forecasted Peak Hour Auto V/C Ratio [3]	Alt. 3: Forecasted Peak Hour Auto Volume [4]	Alt. 3: Forecasted ADT Volume (Adjusted) [5]	LOS E Service ADT Volume Threshold (Lanes) [6]	Comments (V/C Color Coding: 0.85<=V/C<=0.92; 0.92< V/C<1.0; 1.0 <=V/C)
Mapleview Drive	Essa Road	Bryne Drive	Arterial	6 lanes + TWLTL	6 lanes (including 2 HOV) + TWLT	6 lanes (including 2 HOV) + TWLTL	No change.	16,745	2010	PM, EB	0.75	0.67	0.61	1,365	22,116	30,400 (4 ln) 45,800 (6 ln)	1) With the conversion of 2 GPL to HOV, the forecasted V/C ratio would still be acceptable. 2) The forecasted ADT would still be less than the threshold for LOS E with 4 lanes. 3) The impact of implementing HOV would be limited. *(Note that HOV was not coded in Alt. 2 in the Emme Model.)*
Mapleview Drive	Bryne Drive	West Ramp Terminal	Arterial	6 lanes + TWLTL	6 lanes (including 2 HOV) + TWLT	6 lanes (including 2 HOV) + TWLTL	No change.	47,835	2004	PM, EB	**0.97**	**0.91**	**0.99**	2,284	60,698	30,400 (4 ln) 45,800 (6 ln)	1) With the conversion of 2 GPL to HOV, the forecasted V/C ratio would be 0.99, indicating capacity deficiencies.. 2) The forecasted ADT requires the need for 6 GPL lanes. Without the proposed HOV, this section would be operating at LOS F. 3) Implementing HOV would have a greater impact on traffic operations on this segment, but would reduce transit travel time. *(Note that HOV was not coded in Alt. 2 in the Emme Model.)*
Mapleview Drive (Highway 400 Crossing)	West Ramp Terminal	East Ramp Terminal	Arterial	6 lanes + TWLTL	6 lanes (including 2 HOV) + TWLTL	6 lanes (including 2 HOV) + TWLTL	No change.	43,271	2017	PM, EB	**1.21**	**1.13**	**1.24**	2,842	44,049	30,400 (4 ln) 45,800 (6 ln)	1) With or without the conversion of 2 GPL to HOV, the forecasted V/C ratio would be 1.13-1.24, indicating over capacity under the future DDI. 2) The forecasted ADT requires the need for 6 GPL lanes. Without the proposed HOV, this section would be operating at LOS E. 3) Implementing HOV would have a greater impact on traffic operations on this segment, but would reduce transit travel time. *(Note that HOV was not coded in Alt. 2 in the Emme Model.)*
Mapleview Drive	East Ramp Terminal	Bayview Drive	Arterial	6 lanes + TWLTL	6 lanes (including 2 HOV) + TWLTL	6 lanes (including 2 HOV) + TWLTL	No change.	40,792	2004	PM, EB	**1.24**	**1.10**	**1.29**	2,973	62,870	30,400 (4 ln) 45,800 (6 ln)	1) With or without the conversion of 2 GPL to HOV, the forecasted V/C ratio would be 1.10-1.29, indicating over capacity. 2) The forecasted ADT requires the need for 6 GPL lanes. Even without the proposed HOV, this section would be operating at LOS F. 3) Implementing HOV would have a greater impact on traffic operations on this segment, but would reduce transit travel time. *(Note that HOV was not coded in Alt. 2 in the Emme Model.)*
Mapleview Drive	Bayview Drive	Welham Road	Arterial	6 lanes	6 lanes (including 2 HOV) + LTL at some streets	6 lanes (including 2 HOV) + TWLTL	No change.	21,155	2010	PM, EB	**0.91**	**0.85**	**0.86**	1,719	33,064	30,400 (4 ln) 45,800 (6 ln)	1) With or without the conversion of 2 GPL to HOV, the forecasted V/C ratio would be 0.85-0.91, which is acceptable with a high congestion. 2) The forecasted ADT requires the need for 6 GPL lanes. 3) Implementing HOV would have a less impact on traffic operations on this segment. *(Note that HOV was not coded in Alt. 2 in the Emme Model.)*
Mapleview Drive	Welham Road	Huronia Road	Arterial	6 lanes + TWLTL	6 lanes (including 2 HOV) + TWLTL	6 lanes (including 2 HOV) + TWLTL	No change.	19,247	2004	PM, EB	**0.92**	**0.87**	**0.95**	1,908	37,500	30,400 (4 ln) 45,800 (6 ln)	1) With or without the conversion of 2 GPL to HOV, the forecasted V/C ratio would be 0.87-0.95, which is acceptable with a high congestion. 2) The forecasted ADT requires the need for 6 GPL lanes. 3) Implementing HOV would have a less impact on traffic operations on this segment. *(Note that HOV was not coded in Alt. 2 in the Emme Model.)*
Mapleview Drive	Huronia Road	Country Lane	Arterial	4 lanes + TWLTL	6 lanes (including 2 HOV) + TWLTL	6 lanes (including 2 HOV) + TWLTL	No change.	17,300	2010	PM, EB	**1.24**	**0.94**	**1.04**	2,084	47,284	30,400 (4 ln) 45,800 (6 ln)	1) With the new 2 GPL or HOV, the forecasted V/C ratio would be 0.94-1.24, indicating at or over capacity. 2) The forecasted ADT requires the need for 6 GPL lanes. Even without the proposed HOV, this section would be operating at LOS E. 3) Implementing HOV would have a greater impact on traffic operations on this segment, but would reduce transit travel time. *(Note that HOV was not coded in Alt. 2 in the Emme Model.)*

Table 6-7 Rationale for Confirmation of 2014 MMATMP-Recommended Improvements, Horizon 2041 *(Page 7/8)*

Road	From	To	Road Classi-fication	2016 Network	2014 MMATMP Recommended Network	2018 TMP Proposed Network	Changes in Improvements from 2014 MMATMP	Rationale: Existing ADT Counts	Existing Year	Peak Hour, Dir.	Alt. 1B - 2041 Do-Nothing: Forecasted Peak Hour Auto V/C Ratio [3]	Alt. 2 - 2041 with 2031 Network [1] (2014 MMATMP): Forecasted Peak Hour Auto V/C Ratio [3]	Alt. 3 - 2041 Proposed Preferred Network (Draft) [2]: Forecasted Peak Hour Auto V/C Ratio [3]	Alt. 3: Forecasted Peak Hour Auto Volume [4]	Alt. 3: Forecasted ADT Volume (Adjusted) [5]	LOS E Service ADT Volume Threshold (Lanes) [6]	Comments (V/C Color Coding: 0.85<=V/C<=0.92; 0.92< V/C<1.0; 1.0 <=V/C)
Mapleview Drive	Country Lane	Madelaine Drive	Arterial	2 lanes	6 lanes (including 2 HOV) + TWLTL	6 lanes (including 2 HOV) + TWLTL	No change.	10,099	2005	PM, EB	**0.91**	0.82	**0.87**	1,732	39,393	30,400 (4 ln) 45,800 (6 ln)	1) With the new 2 GPL or HOV, the forecasted V/C ratio would be 0.82-0.91, which is acceptable with a high congestion. 2) The forecasted ADT requires the need for 6 GPL lanes. 3) Implementing HOV would have a less impact on traffic operations on this segment. *(Note that HOV was not coded in Alt. 2 in the Emme Model.)*
Mapleview Drive	Collector 8	Prince William Way	Arterial	2 lanes	4 lanes + TWLTL	4 lanes + TWLTL	No change.	6,435	2015	AM&PM, EB	**0.88**	0.73	0.72	1,223	30,277	14,900 (2 ln) 30,400 (4 ln)	1) With the do-nothing 2 lanes, the road would have a V/C ratio of 0.88 that is greater than the typical target of 0.85, indicating the need for 4 lanes. 2) The forecasted ADT volume is greater than the service volume of 14,900 vehicles for a two-lane road, further justifying the need for 4 lanes.
Mapleview Drive	Collector 11	Approx. 428m east of Collector 11	Arterial	2 lanes	2 lanes + TWLTL	2 lanes + TWLTL	No change.	2,351	2017	PM, EB	0.71	0.74	0.81	691	9,824	14,900 (2 ln)	Adding a TWLTL would provide access to adjacent properties and improve traffic flow, thus capacity. The provision of a TWLTL is consistent with other segments.
McKay Road W	Approx. 900m east of city boundary	Reid Drive	Arterial	2 lanes	2 lanes + TWLTL	2 lanes + TWLTL	No change.	1,897	2013	PM, WB	**0.91**	**0.88**	**0.89**	753	12,298	14,900 (2 ln)	1) Adding a TWLTL would provide access to adjacent properties and improve traffic flow, thus capacity. 2) The forecasted ADT indicates no need for 4 lanes.
McKay Road W	Reid Drive	Veterans Drive	Arterial	2 lanes	4 lanes + TWLTL	4 lanes + TWLTL	No change.			PM, WB	0.59	0.57	0.57	976	14,113	14,900 (2 ln) 30,400 (4 ln)	1) The proposed 5 lanes are programmed in the City's Capital Plan. 2) A TWLTL would provide access to adjacent properties and improve traffic flow.
McKay Road W	Welham Road	Huronia Road	Arterial	2 lanes	4 lanes + TWLTL	4 lanes + TWLTL	No change.	4,476	2013	PM, EB	0.81	0.76	0.78	1,323	20,586	14,900 (2 ln) 30,400 (4 ln)	1) The proposed 5 lanes are programmed in the City's Capital Plan. 2) The forecasted V/C and ADT indicate the need for 4 lanes. 3) A TWLTL would provide access to adjacent properties and improve traffic flow.
Minet's Point Road	Lakeshore Drive	Yonge Street	Arterial	4 lanes	4 lanes + TWLTL	4 lanes + TWLTL	No change.	19,861	2017	AM, SB	0.52	0.65	0.67	697	23,759	30,400 (4 ln)	Adding one TWLTL would provide access to adjacent properties in the employment lands and improve traffic flow and traffic operations at intersections.
Salem Road	County Road 27	Essa Road	Arterial	2 lanes	2 lanes + TWLTL	2 lanes + TWLTL	No change.	309	2013	PM, WB	0.68	0.65	0.66	493	8,784	14,900 (2 ln)	Adding a TWLTL would provide access to adjacent properties and improve traffic flow, thus capacity.
Salem Road	Essa Road	Reid Drive	Arterial	2 lanes	2 lanes + TWLTL	2 lanes + TWLTL	No change.	1,500	2013	PM, WB	0.82	0.80	**0.85**	638	11,756	14,900 (2 ln)	Adding a TWLTL would provide access to adjacent properties and improve traffic flow, thus capacity.
Salem Road	Veterans Drive	Approx. 600 m east of Veterans Road	Arterial	4 lanes	4 lanes + TWLTL	4 lanes + TWLTL	No change.	80	2008	PM, EB	0.76	0.80	**0.86**	1,455	32,587	30,400 (4 ln) 45,800 (6 ln)	1) The proposed 5 lanes are programmed in the City's Capital Plan. 2) The forecasted ADT also indicates the need for 4 lanes. 3) A TWLTL would provide access to adjacent properties and improve traffic flow.
Salem Road (Highway 400 Crossing)	Approx. 600 m east of Veterans Road	Lockhart Road	Arterial	Does not exist	4 lanes + TWLTL	4 lanes + TWLTL	No change.			PM, EB	0.75	0.80	**0.86**	1,455	32,493	30,400 (4 ln) 45,800 (6 ln)	1) The proposed 5 lanes are programmed in the City's Capital Plan. 2) The forecasted ADT also indicates the need for 4 lanes. 3) A TWLTL would provide access to adjacent properties and improve traffic flow. 4) The need for the Salem/Lockhart Crossing was already justified in the April 2018 Need and Justification Study Draft Report, prepared by WSP.
Sproule Drive	Sproule Drive east end	Ferndale Drive N	Minor Collector	Does not exist	2 lanes	2 lanes	No change.	N/A	N/A	PM, WB		0.57	0.53	212	4,803	14,900 (2 ln)	Extending Sproule Drive to Ferndale Drive will improve network connectivity.
St. Vincent Street (Highway 400 Crossing)	Sperling Drive	Bell Farm Road	Arterial	2 lanes	4 lanes + TWLTL	4 lanes + TWLTL	No change.	19,736	2017	PM, NB	**1.17**	0.75	0.78	1,321	29,494	14,900 (2 ln) 30,400 (4 ln)	1) With the do-nothing (existing 2 lanes), the road would have a V/C ratio of 1.17, indicating capacity deficiencies. 2) The existing and forecasted ADT further justifies the need for 4 lanes.
Summerset Drive	Summerset Drive west end	Ardagh Road	Minor Collector	Does not exist	2 lanes	2 lanes	No change.			PM, SB		0.34	0.32	127	2,472	14,900 (2 ln)	Extending Summerset Drive to Ardagh Road will improve network connectivity.

Table 6-7 Rationale for Confirmation of 2014 MMATMP-Recommended Improvements, Horizon 2041 *(Page 8/8)*

Road	From	To	Road Classi-fication	2016 Network	2014 MMATMP Recommended Network	2018 TMP Proposed Network	Changes in Improvements from 2014 MMATMP	Rationale: Existing ADT Counts	Rationale: Existing Year	Peak Hour, Dir.	Alt. 1B - 2041 Do-Nothing: Forecasted Peak Hour Auto V/C Ratio [3]	Alt. 2 - 2041 with 2031 Network [1] (2014 MMATMP): Forecasted Peak Hour Auto V/C Ratio [3]	Alt. 3 - 2041 Proposed Preferred Network (Draft) [2]: Forecasted Peak Hour Auto V/C Ratio [3]	Alt. 3: Forecasted Peak Hour Auto Volume [4]	Alt. 3: Forecasted ADT Volume (Adjusted) [5]	LOS E Service ADT Volume Threshold (Lanes) [6]	Comments (V/C Color Coding: 0.85<=V/C<=0.92; 0.92< V/C<1.0; 1.0 <=V/C)
Truman Road	Huronia Road	Hamilton Road	Minor Collector	2 lanes	2 lanes + TWLTL	2 lanes + TWLTL	No change.			PM, EB	0.79	0.57	0.56	278	4,795	14,900 (2 ln)	Adding one TWLTL would provide access to adjacent properties and improve traffic flow.
Veterans Drive	Salem Road	McKay Road W	Arterial	2 lanes	4 lanes + TWLTL	4 lanes + TWLTL	No change.	8,725	2013	PM, SB	0.70	0.69	0.68	1,171	25,544	14,900 (2 ln) 30,400 (4 ln)	1) The proposed 5 lanes are programmed in the City's Capital Plan. 2) The forecasted ADT also indicates the need for 4 lanes.3) A TWLTL would provide access to adjacent properties and improve traffic flow.
Welham Road	Hamilton Road	Big Bay Point Road	Minor Collector	2 lanes	2 lanes + TWLTL	2 lanes + TWLTL	No change.			PM, SB	**0.97**	0.83	**0.85**	423	7,765	14,900 (2 ln)	Adding one TWLTL would provide access to adjacent properties and improve traffic flow.
Welham Road	Big Bay Point Road	Mapleview Drive	Minor Collector	2 lanes	2 lanes + TWLTL	2 lanes + TWLTL	No change.	6,712	2017	PM, NB	**0.90**	0.63	0.60	329	11,972	14,900 (2 ln)	
Welham Road	Mapleview Drive	South of Saunders Road	Minor Collector	2 lanes	2 lanes + TWLTL	2 lanes + TWLTL	No change.	6,712	2017	PM, NB	**0.99**	**0.89**	0.71	388	12,819	14,900 (2 ln)	
Welham Road	South of Saunders Road	Lockhart Road	Minor Collector	Does not exist	2 lanes + TWLTL	2 lanes + TWLTL	No change.			PM, NB		0.44	0.44	28	375	14,900 (2 ln)	Extending Welham Road to Lockhart Road would improve network connectivity. The road connects to McKay Road with a Highway 400 interchange.
Wellington St W	Sunnidale Road	Bayfield Street	Arterial	2 lanes	2 lanes + TWLTL	2 lanes + TWLTL	No change.	10,157	2017	PM, EB	**0.93**	**0.94**	**0.94**	706	14,483	14,900 (2 ln)	1) With the do-nothing (existing 2 lanes) and the recommended 3 lanes, the road would have a V/C ratio of 0.93-0.94, indicating capacity deficiencies and congestion. 2) The forecasted ADT indicates LOS E..3) Adding one TWLTL by lane re-configuration would provide access to adjacent properties and improve traffic flow.

Notes: TWLTL = Two-way left turn lane; LTL = Left turn lane; GPL = General Purpose Lane; HOV = High Occupancy Vehicle; TESR represents MTO's Transportation Environmental Study Report

[1] *The 2031 road network excludes the 2014 MMATMP-recommended new partial interchange at Harvie / Big Bay Point Road.*

[2] *The Alt. 3 network represents the draft preferred network, as of WSP's Skype review meeting with City staff. It does not include all the road improvements proposed in the TMP report. That is, some of the proposed improvements (including new improvements and changes) were not coded in the Emme network scenarios (No. 32414 and 32415) presented in this table. Refer to Emme plots on number of lanes for details.*

[3] *V/C ratio represents the auto volume to auto lane capacity ratio. The V/C ratio represents the highest ratio on a road segment in two travel directions during the AM and PM peak hours.*

[4] *Forecasted volume represents the highest volume on a road segment in two travel directions during the AM and PM peak hours.*

[5] *Forecasted ADT Volume is the forecasted ADT total vehicle volume (including trucks) in two volumes. It has been adjusted based on the existing ADT counts.*

[6] *LOS service ADT volume threshold is based on the reference guidelines,* **2013 Quality / Level of Service Handbook** *by Florida DOT. The threshold represents the minimum service ADT volume for LOS E, which is the maximum service volume for LOS D.*

Emme Scenario IDs: Alt. 1B - 2041 Do-Nothing, Scen.No. 21417 & 21418; Alt. 2 - 2041 with 2031 Network (2014 MMATMP), Scen.No. 26414 & 26415; Alt. 3 - 2041 Proposed Preferred Network (Draft), Scen.No. 32414 & 32415.

Table 6-8 Rationale for Changes and Additional to 2014 MMATMP-Recommended Improvements, Horizon 2041 *(Page 1/5)*

Road	From	To	Road Classi-fication	2016 Network	2014 MMATMP Recommended Network	2018 TMP Proposed Network	Changes in Improvements from 2014 MMATMP	Rationale: Existing ADT Counts	Rationale: Existing Year	Peak Hour, Dir.	Alt. 1B - 2041 Do-Nothing: Forecasted Peak Hour Auto V/C Ratio [3]	Alt. 2 - 2041 with 2031 Network [1] (2014 MMATMP): Forecasted Peak Hour Auto V/C Ratio [3]	Alt. 3 - 2041 Proposed Preferred Network (Draft) [2]: Forecasted Peak Hour Auto V/C Ratio [3]	Alt. 3: Forecasted Peak Hour Auto Volume [4]	Alt. 3: Forecasted ADT Volume (Adjusted) [5]	LOS E Service ADT Volume Threshold (Lanes) [6]	Comments (V/C Color Coding: 0.85<=V/C<=0.92; 0.92< V/C<1.0; 1.0 <=V/C)
Changes to 2014 MMATMP Roadway Network Improvements																	
Ardagh Road	Ferndale Drive N	Patterson Road	Arterial	2 lanes + TWLTL	4 lanes	2 lanes + TWLTL	Remove 1 lane (maintain the currently-built 3 lanes)	9,063	2010	PM, WB	0.58	0.30	0.49	368	7,879	14,900 (2 ln)	1) Road diet has been implemented west of Ferndale Drive. Ardagh Road from CR-27 to Patterson Road currently has 3 lanes (including TWLTL) and two bike lanes. 2) However, the 2014 MMATMP recommended 4 lanes are not consistent with the currently-built conditions and thus would not be reasonable. It is proposed to maintain the current conditions.3) The forecasted V/C and ADT support the current 3 lanes.
Bayfield Street	Grove Street	Sophia Street	Arterial	4 lanes	4 lanes	4 lanes + TWLTL	1 new TWLTL	17,168	2007	PM, NB	0.83	0.77	0.74	1,114	24,671	31,900 (4 ln) 48,200 (6 ln)	1) The existing and future forecasted ADT volumes indicate LOS D with 4 travel lanes. 2) Adding one TWLTL would provide access to adjacent properties and improve traffic flow.
Big Bay Point Road	Bayview Drive	Huronia Road	Arterial	2 lanes	6 lanes + TWLTL	4 lanes + TWLTL	Remove 2 lanes	15,293	2008	PM, EB	**0.97**	0.73	**0.89**	1,509	38,317	30,400 (4 ln) 45,800 (6 ln)	1) The future forecasted V/C and ADT on this section justify the need for 6 lanes. 2) After the implementation of the proposed HOV on Mapleview Drive and Essa Road, there would be some traffic shifted from Mapleview and Essa. 3) The removal of 2 lanes accounts for the concern of the existing rail on the north side.
Big Bay Point Road	Hurst Drive	Prince William Way	Arterial	4 lanes + TWLTL	4 lanes + TWLTL	4 lanes	Remove 1 lane (TWLTL)								29,319	30,400 (4 ln)	1) Reduce from 5 lanes to 4 lanes to accommodate bike lanes due to roadway constraints. 2) With 4 lanes, the future forcasted V/C ratios on the segment between Hurst Drive and Sandringham Drive would be over capacity. Potential intersection improvements would be required on intersections at both ends. 3) The future forcasted ADT indicate that the segment with 4 lanes would have LOS D.
Commerce Park Drive	Veterans Drive	Approx. 180m west of Bryne Drive	Major Collector	4 lanes + TWLTL	4 lanes + TWLTL	4 lanes	Remove 1 lane (TWLTL)								11,608	14,900 (2 ln) 31,900 (4 ln)	1) Reduce from 5 lanes to 4 lanes to accommodate bike lanes given the over-built roadway width. 2) The future forcasted V/C ratios and ADT indicate that 4 lanes would be sufficient.
Commerce Park Drive	Approx. 180m west of Bryne Drive	Bryne Drive	Major Collector	2 lanes	4 lanes + TWLTL	4 lanes	Remove 1 lane (TWLTL)								11,608	14,900 (2 ln) 31,900 (4 ln)	
Cundles Road	St. Vincent Street	Livingston Street	Arterial	4 lanes	4 lanes	4 lanes + TWLTL	1 new TWLTL	15,147	2017	PM, WB	0.49	0.44	0.44	663	14,497	31,900 (4 ln) 48,200 (6 ln)	1) The future forecasted ADT indicates LOS D or better. 2) Adding one TWLTL would provide access to adjacent properties and improve traffic flow. 3) The 5-lane cross-section is consistent with sections on both ends.
Dean Avenue	Big Bay Point Road	Madelaine Drive	Major Collector	4 lanes	2 lanes	2 lanes + TWLTL	1 new TWLTL	3,112	2017	AM, NB	0.58	0.82	**0.85**	461	8,070		1) The current condition has 4 lanes. Two lanes were recommended to be removed in the 2014 MMATMP. 2) Given the employment land on the northeast side, 3 lanes would be more reasonable to provide a TWLTL for property access and accommodate two bike lanes, which are similar to the recommendations on adjacent Madelaine Drive. 3) The forecasted ADT supports road diet.

Table 6-8 Rationale for Changes and Additional to 2014 MMATMP-Recommended Improvements, Horizon 2041 *(Page 2/5)*

Road	From	To	Road Classi-fication	2016 Network	2014 MMATMP Recommended Network	2018 TMP Proposed Network	Changes in Improvements from 2014 MMATMP	Rationale: Existing ADT Counts	Rationale: Existing Year	Rationale: Peak Hour, Dir.	Rationale: Alt. 1B - 2041 Do-Nothing Forecasted Peak Hour Auto V/C Ratio [3]	Rationale: Alt. 2 - 2041 with 2031 Network [1] (2014 MMATMP) Forecasted Peak Hour Auto V/C Ratio [3]	Rationale: Alt. 3 - 2041 Proposed Preferred Network (Draft) [2] Forecasted Peak Hour Auto V/C Ratio [3]	Rationale: Alt. 3 Forecasted Peak Hour Auto Volume [4]	Rationale: Alt. 3 Forecasted ADT Volume (Adjusted) [5]	Rationale: LOS E Service ADT Volume Threshold (Lanes) [6]	Comments (V/C Color Coding: 0.85<=V/C<=0.92; 0.92< V/C<1.0; 1.0 <=V/C)
Essa Road	Coughlin Road	Mapleview Road	Arterial	2 lanes	2 lanes + TWLTL	4 lanes + TWLTL	2 additional lanes	10,292	2010	PM, NB	0.76	0.77	0.47	889	19,755	14,900 (2 ln) 31,900 (4 ln)	1) Based on PIC feedback, 5 lanes were proposed by the adjacent landowner to extend from Coughlin Road to Mapleview Drive to accommodate potential high-density residential developments (OPA 55) on 564 and 622 Essa Road at the northeast corner of Essa Road and Mapleview Drive West intersection. 2) The forecasted ADT volume also justifies the need for 4 lanes. 3) A 5-lane along the short segment is proposed to have a consistent roadway cross-section on Essa Road, north of Mapleview Drive.
Essa Road	Gowan Street	Anne Street	Arterial	4 lanes	4 lanes	4 lanes + TWLTL	1 new TWLTL	16,636	2010	PM, SB	**1.39**	0.71	0.71	923	25,143	31,900 (4 ln) 48,200 (6 ln)	1) The section between Gowan and Burton with the existing 2 travel lanes (plus on-street parking lanes is justified for the need to remove on-street parking. 2) Adding one TWLTL would provide access to adjacent properties and improve traffic flow. 3) The proposed 5-lane cross-section is consistent with sections on both ends. 4) The implementation of HOV lanes would increase congestion on general-purpose lanes.
Ferndale Drive	City North Limits	South of Benson Drive	Arterial	2 lanes + TWLTL	2 lanes + TWLTL	4 lanes	Add 1 lane with removal of bike lanes.	12,364	2017	PM, NB	**0.93**	**0.95**	**0.93**	787	15,276	14,900 (2 ln) 31,900 (4 ln)	1) The forecasted V/C ratio and ADT indicate the need for 4 lanes. 2) CR-53 / Wilson Drive will be widened to 4 lanes north of the City boundary limit. And Ferndale south of Benson Drive currently has 4 lanes. 3) However, this segment currently has 3 traffic lanes and a bike lane on both sides. 4). Due to capacity needs and roadway design consistency, it is proposed to have 4 travel lanes with removal of on-street bike lanes.
Georgian Drive	Duckworth Street	Governors Drive	Arterial	4 lanes	6 lanes + TWLTL	6 lanes	Remove TWLTL	18,942	2017	PM, WB	**1.28**	0.80	0.80	1,790	29,337	31,900 (4 ln) 48,200 (6 ln)	1) With the do-nothing (existing 4 lanes), the road would have a V/C ratio of 1.23, indicating capacity deficiencies. 2) The forecasted ADT would be less than a service volume of 31,900 vehicles for a 4-lane arterial road under LOS E. 3) There will be no property access on both sides of Georgian Drive, justifying no need for TWLTL. 4) Further, two of the 3 westbound through lanes can be transitioned a left-turn lane and a right-turn lane at the intersection of Georgian and Duckworth.
Georgian Drive	Governors Drive	Gallie Court	Arterial	4 lanes	6 lanes + TWLTL	4 lanes + TWLTL	Remove 2 lanes	19,624	2017	PM, WB	**1.04**	0.65	0.65	1,453	27,616	31,900 (4 ln) 48,200 (6 ln)	1) With the do-nothing (existing 4 lanes), the road would have a V/C ratio of 1.04, indicating capacity deficiencies. 2) The forecasted ADT would be greater than a service volume of 31,900 vehicles for a 4-lane arterial road under LOS E, indicating LOS D.
Huronia Road	Big Bay Point Road	Mapleview Drive	Arterial	2 lanes	2 lanes + TWLTL	4 lanes + TWLTL	2 additional lanes	11,030	2017	PM, NB	**0.95**	0.73	0.76	650	12,696	14,900 (2 ln)	1) Some short segments with 2 or 3 lanes have capacity deficiencies. 2) Four lanes were recommended beyond 2031 in the 2014 County TMP Update for CR-54 in the Town of Innisfil. 2) Five lanes are proposed to match the improvements in Innisfil. The Huronia Road corridor would accommodate truck traffic entering and exiting Barrie for goods movements, which was also the rationale for the improvements to CR-54. 3) Adding one TWLTL would provide access to adjacent properties and improve traffic flow. 4). The proposed widening on Huronia Road would also provide an alternative route to address the future capacity needs on Yonge Street where intensification occurs. 5) In
Huronia Road	Mapleview Drive	Lockhart Road	Arterial	2 lanes	2 lanes + TWLTL	4 lanes + TWLTL	2 additional lanes	5,752	2017	PM, NB	**1.08**	**1.04**	**0.99**	844	10,662	14,900 (2 ln)	
Huronia Road	Lockhart Road	McKay Road E	Arterial	2 lanes	2 lanes + TWLTL	4 lanes + TWLTL	2 additional lanes	7,660	2013	PM, NB	0.67	0.66	0.68	582	9,517	14,900 (2 ln)	

Table 6-8 Rationale for Changes and Additional to 2014 MMATMP-Recommended Improvements, Horizon 2041 *(Page 3/5)*

Road	From	To	Road Classi-fication	2016 Network	2014 MMATMP Recommended Network	2018 TMP Proposed Network	Changes in Improvements from 2014 MMATMP	Rationale: Existing ADT Counts	Rationale: Existing Year	Rationale: Peak Hour, Dir.	Rationale: Alt. 1B - 2041 Do-Nothing: Forecasted Peak Hour Auto V/C Ratio [3]	Rationale: Alt. 2 - 2041 with 2031 Network [1] (2014 MMATMP): Forecasted Peak Hour Auto V/C Ratio [3]	Rationale: Alt. 3 - 2041 Proposed Preferred Network (Draft) [2]: Forecasted Peak Hour Auto V/C Ratio [3]	Rationale: Alt. 3: Forecasted Peak Hour Auto Volume [4]	Rationale: Alt. 3: Forecasted ADT Volume (Adjusted) [5]	Rationale: LOS E Service ADT Volume Threshold (Lanes) [6]	Comments (V/C Color Coding: 0.85<=V/C<=0.92; 0.92< V/C<1.0; 1.0 <=V/C)
Huronia Road	McKay Road E	City South Limits	Arterial	2 lanes	2 lanes + TWLTL	4 lanes + TWLTL	2 additional lanes	7,533	2017	PM, SB	0.59	0.51	0.42	361	6,327	14,900 (2 ln)	addition, the proposed widening would accommodate additional future traffic shifted from Yonge Street where HOV is implemented.
Ross Street	Collier Street	Maple Avenue	Major Collector	Does not exist	Realignment with 2 lanes + TWLTL	2 lanes + TWLTL, but without alignment	Remove re-alignment			PM, EB	0.79	0.75	0.76	418	8,669		Currently, Ross Street and Collier Street have an offset at the intersection with Bayfield Street. A roundabout instead of realignment was proposed by an EA study to improve intersection operations.
Veterans Drive / 5 Sideroad	McKay Road	South Limit of Annexed Lands	Arterial	2 lanes	2 lanes + TWLTL	4 lanes + TWLTL	2 additional lanes	8382	2017	PM, NB	0.23	0.25	0.25	433	10,754		1) Five lanes including a TWLTL were proposed at north of McKay and 4 lanes were recommended by the County at south of the City boundary. 2) Five lanes are proposed on this short segment to be consistent with the future north sections and provide a transition to the south section.
2041 Additional Roadway Network Improvements																	
Anne Street	Sunnidale Road	City Northwest Limits	Arterial	2 lanes	2 lanes	2 lanes + TWLTL	1 new TWLTL	n/a		PM, NB	**0.87**	**0.87**	**0.87**	568	10,969	14,900 (2 ln)	1) The future forecasted V/C ratio on the short segment is 0.87, which is greater than 0.85. 2) The forecasted ADT indicates LOS D. 3) Adding one TWLTL would provide access to adjacent properties and improve traffic flow entering and exiting Barrie.
Bayview Drive	Little Avenue	Big Bay Point Road	Arterial	2 lanes	2 lanes + TWLTL	4 lanes + TWLTL	2 additional lanes	11,079	2017	PM, NB	**1.14**	**1.09**	**1.14**	629	12,020	14,900 (2 ln)	1) With the existing 2 lanes and the 2014 MMATMP-proposed 3 lanes, the road would have a V/C ratio greater than 1.0, indicating capacity deficiencies. Four lanes are justified. 2) Adding one TWLTL would provide access to adjacent properties and improve traffic flow. 3) A 5-lane cross-section is consistent with sections south of Big Bay Point Road.
Bayview Drive	Mapleview Drive	Lockhart Road	Arterial	2 lanes	2 lanes + TWLTL	2 lanes + TWLTL	1 new TWLTL	3,923	2010	PM, NB	1.05	**0.94**	0.77	655	8,077	14,900 (2 ln)	Adding one TWLTL would provide access to adjacent properties in the employment lands and improve traffic flow.
Burton Avenue	Essa Road	Bayview Drive	Arterial	2 lanes	2 lanes	2 lanes + TWLTL	1 new TWLTL	11,589	2017	PB, EB	**0.99**	**0.93**	**0.94**	610	23,259	14,900 (2 ln) 31,900 (4 ln)	1) The forecasted V/C ratios with 2 lanes exceed the maximum threshold of 0.92, indicating capacity deficiencies. 2) The future forecasted ADT justifies the need for 3 or 4 lanes. 3) The area with century houses will be re-developed as an Urban Growth Centre. Adding one TWLTL would provide access to adjacent properties and improve traffic flow. 4) The roadway widening can be implemented when redevelopment occurs.
Dunlop Street W	Ferndale Drive N	Cedar Pointe Drive	Arterial	4 lanes + TWLTL	4 lanes + TWLTL	6 lanes + TWLTL	2 additional lanes	22,528	2012	PM, EB	**1.00**	**1.00**	0.80	2,049	44,579	31,900 (4 ln) 48,200 (6 ln)	1) With the do-nothing (existing 5 lanes), the road would have a V/C ratio of 1.10, indicating capacity deficiencies. 2) The forecasted ADT of 44,579 vehicles would be much greater than a service volume of 28,200 and 31,900 vehicles for a 4-lane arterial road under LOS D and LOS E respectively, indicating LOS F at the current 5 lanes. 3) The road with the proposed future 6 lanes would be operating at LOS E, which is lower than the acceptable LOS D. 4) The future traffic growth would be increased by Approx. 71% by 2041.
Essa Road	Approx. 670m south of Salem Road	McKay Road / County Road 27	Arterial	2 lanes	2 lanes	2 lanes + TWLTL	1 new TWLTL	6,198	2013	PM, SB	0.58	0.52	0.52	455	8,098	14,900 (2 ln)	1) The adjacent Secondary Plan will be developed in Phase 3. 2) The 3-lane cross-section on this short segment is consistent with the north section on Essa Road.

Table 6-8 Rationale for Changes and Additional to 2014 MMATMP-Recommended Improvements, Horizon 2041 *(Page 4/5)*

Road	From	To	Road Classi-fication	2016 Network	2014 MMATMP Recommended Network	2018 TMP Proposed Network	Changes in Improvements from 2014 MMATMP	Rationale									
								Existing		Peak Hour, Dir.	Alt. 1B - 2041 Do-Nothing	Alt. 2 - 2041 with 2031 Network [1] (2014 MMATMP)	Alt. 3 - 2041 Proposed Preferred Network (Draft) [2]			LOS E Service ADT Volume Threshold (Lanes) [6]	Comments *V/C Color Coding:* 0.85<=V/C<=0.92 0.92< V/C<1.0 1.0 <=V/C
								ADT Counts	Year		Forecasted Peak Hour Auto V/C Ratio [3]	Forecasted Peak Hour Auto V/C Ratio [3]	Forecasted Peak Hour Auto V/C Ratio [3]	Forecasted Peak Hour Auto Volume [4]	Forecasted ADT Volume (Adjusted) [5]		
Fairview Road	Little Avenue	Big Bay Point Road	Arterial	2 lanes	2 lanes	4 lanes	2 additional lanes	11,451	2013	PM, NB	**0.97**	**0.94**	0.74	965	19,692	14,900 (2 ln) 31,900 (4 ln)	1) There would be capacity deficiencies with the current 2 lanes. Extra capacity is required to accommodate future traffic growth. 2) The proposed 4 lanes would accommodate future potential traffic of Service Centre to be directed to Fairview Road with the alternative of removing current ramp to Service Centre and accommodating the future ramps of the proposed new Big Bay Point Interchange
Innisfil Street	Dunlop Street	Tiffin Street	Major Collector	2 lanes	2 lanes	2 lanes + TWLTL	1 new TWLTL	7,500	2016	PM, NB	0.78	**0.87**	0.83		11,960		1) The future forecasted ADT justifies the section as a major collector. 2) The section with 2 lanes has a forecasted V/C ratio of 0.87 that is greater than 0.85, indicating capacity deficiencies. 3) Adding one TWLTL would provide access to adjacent properties and improve traffic flow, thus increasing capacity.4) Adjacent developments are expected to occur beyond 2031.
Lockhart Road	Prince William Way	Collector 11	Arterial	2 lanes	2 lanes + TWLTL	4 lanes + TWLTL	2 additional lanes			PM, EB	0.80	**1.10**	0.64	1,088	17,314	14,900 (2 ln) 31,900 (4 ln)	1) With the 2014 MMATMP-proposed 3 lanes, the road would have a V/C ratio greater than 1.0, indicating capacity deficiencies. 2) The forecasted ADT would be much greater than a service volume of 14,900 vehicles for a 2-lane arterial road, justifying the need for more than 2 lanes.
Mapleview Drive	Madelaine Drive	Yonge Street	Arterial	2 lanes	4 lanes + TWLTL	6 lanes (including 2 HOV)+ TWLTL	2 new HOV lanes	11,031	2013	PM, EB	0.80	**0.85**	0.73	1,461	33,396	31,900 (4 ln) 48,200 (6 ln)	1) Extend the proposed HOV on Mapleview Drive to Yonge Street in order to provide connection with the Barrie GO Station. 2) With the proposed 4 GPL and 2 HOV, road segment would have a V/C ratio of 0.85, which is acceptable. 3) The future forecasted ADT justifies the need for 4 GPL.
Mapleview Drive	Yonge Street	Collector 8	Arterial	2 lanes	4 lanes + TWLTL	6 lanes + TWLTL	2 additional lanes	10,954	2013	AM&PM, EB	**1.80**	**1.10**	**1.13**	1,850	35,337	31,900 (4 ln) 48,200 (6 ln)	1) With the 2014 MMATMP proposed 5 lanes, the road would have a V/C ratio of 1.13, indicating over capacity. 2) The forecasted ADT justifies the need for 6 lanes.
Mapleview Drive	Prince William Way	Collector 11	Arterial	2 lanes	2 lanes + TWLTL	4 lanes + TWLTL	2 additional lanes	2,147	2008	PM, EB	**0.98**	**0.92**	0.56	956	15,209	14,900 (2 ln) 31,900 (4 ln)	With the 2 or 3 lanes, the segment would have a forecasted V/C ratio beyond the threshold of 0.85.
McKay Road W	Veterans Drive	West Ramp Terminal	Arterial	2 lanes	4 lanes + TWLTL	6 lanes + TWLTL	2 additional lanes	4,476	2013	PM, EB	**0.96**	**0.86**	**0.85**	1,446	27,955	14,900 (2 ln) 31,900 (4 ln)	1) The 2014 MMATMP proposed 5 lanes are programmed in the City's Capital Plan. With 5 lanes, McKay Road from Veterans Drive to Welham Road would have forecasted V/C ratios greater than the maximum capacity threshold of 0.92, justifying the need for 7 lanes. 3) The forecasted ADT on McKay Road from East Ramp Terminal to Welham Road indicates the need for more than 4 lanes. 4) Adding one TWLTL would provide access to adjacent properties, or accommodate turn lanes at adjacent closely-spaced intersections, thus improving traffic flow.
McKay Road W (Highway 400 Crossing)	West Ramp Terminal	East Ramp Terminal	Arterial	2 lanes	4 lanes + TWLTL	4 lanes + TWLTL	2 additional lanes	4,476	2013	PM, EB	**0.88**	0.75	0.78	1,327	24,162	14,900 (2 ln) 31,900 (4 ln)	
McKay Road W	East Ramp Terminal	Welham Road	Arterial	2 lanes	4 lanes + TWLTL	4 lanes + TWLTL	2 additional lanes	4,476	2013	PM, EB	**0.93**	**0.94**	**1.01**	1,714	32,896	14,900 (2 ln) 31,900 (4 ln)	
McKay Road W	City West Boundary Limit (west end of McKay Road W)	Approx. 900m east of city boundary	Arterial	2 lanes	2 lanes	Realign road, 2 lanes + TWLTL	Realign road and add 1 new TWLTL			PM, WB	0.69	0.70	0.70	596	13,348		Realign this segment to constitute a four-legged intersection at Essa Road, County Road 27 and McKay Road so as to improve the existing two offset T intersections.

Table 6-8 Rationale for Changes and Additional to 2014 MMATMP-Recommended Improvements, Horizon 2041 *(Page 5/5)*

Road	From	To	Road Classi-fication	2016 Network	2014 MMATMP Recommended Network	2018 TMP Proposed Network	Changes in Improvements from 2014 MMATMP	Rationale: Existing ADT Counts	Rationale: Existing Year	Rationale: Peak Hour, Dir.	Rationale: Alt. 1B - 2041 Do-Nothing: Forecasted Peak Hour Auto V/C Ratio [3]	Rationale: Alt. 2 - 2041 with 2031 Network [1] (2014 MMATMP): Forecasted Peak Hour Auto V/C Ratio [3]	Rationale: Alt. 3 - 2041 Proposed Preferred Network (Draft) [2]: Forecasted Peak Hour Auto V/C Ratio [3]	Rationale: Alt. 3: Forecasted Peak Hour Auto Volume [4]	Rationale: Alt. 3: Forecasted ADT Volume (Adjusted) [5]	Rationale: LOS E Service ADT Volume Threshold (Lanes) [6]	Comments (V/C Color Coding: 0.85<=V/C<=0.92; 0.92< V/C<1.0; 1.0 <=V/C)
Salem Road	Reid Drive	Veterans Drive	Arterial	2 lanes	2 lanes + TWLTL	4 lanes + TWLTL	2 additional lanes			PM, WB	**0.95**	**0.94**	0.79	947	21,483	14,900 (2 ln) 31,900 (4 ln)	1) With the alternative of 3 lanes, road segment would have a V/C ratio of 0.94, indicating approaching capacity. 2) It is proposed to extend the proposed 5 lanes east of Veterans Drive to Reid Drive to provide additional capacity. The proposed 5 lanes would also accommodate future potential traffic operations needs at the signalized intersection at Veterans Drive
St. Vincent Street	Bell Farm Road	Grove Street	Arterial	4 lanes (2 lanes only north of Ottaway Avenue)	4 lanes	4 lanes + TWLTL	1 new TWLTL	17,446	2016	PM, NB	**1.13**	**0.86**	**0.89**	1,163	28,909	14,900 (2 ln) 31,900 (4 ln)	Note that the V/C ratios shown here are on the short segment north of Ottaway Avenue. All other segments have a V/C ratio less than 0.85. Currently, traffic operations issues are observed on this section without turn lanes. Adding one TWLTL would provide access to adjacent properties and improve traffic flow.
St. Vincent Street	Grove Street	Wellington Street	Arterial	4 lanes	4 lanes	2 lanes + TWLTL	Reconfigure to be 2 lanes with TWLTL	10,890	2017	PM, NB	0.36	0.55	0.57	744	17,473	14,900 (2 ln) 31,900 (4 ln)	1) In the short term, the section from Bell Farm Road to Wellington Street is planned to be re-configured to be 3 lanes, including a TWLTL. 2) The future forecasted ADT is greater than the service volume of 14,900 vehicles for two lanes, justifying the need for 3 or 4 lanes. 3) Adding one TWLTL would provide access to adjacent properties and improve traffic flow, thus capacity. 4) It is proposed that traffic be monitored after the conversion to 3 lanes. Four lanes are suggested to be protected for.
Collector and Local Roads within Secondary Plans	Salem and Hewitt Secondary Plans			Do not exist	Not recommended due to development phasing	Build out the rest of new local and collector roads (Secondary Plan Areas, Phase 3)	Build out the rest of new local and collector roads (Annexed Lands, Phase 3)	n/a									Accommodate the future developments in the Secondary Plan Areas, Phase 3

Notes: TWLTL = Two-way left turn lane; LTL = Left turn lane; GPL = General Purpose Lane; HOV = High Occupancy Vehicle; TESR represents MTO's Transportation Environmental Study Report

1. *The 2031 road network excludes the 2014 MMATMP-recommended new partial interchange at Harvie / Big Bay Point Road.*
2. *The Alt. 3 network represents the draft preferred network, as of WSP's Skype review meeting with City staff. It does not include all the road improvements proposed in the TMP report. That is, some of the proposed improvements (including new improvements and changes) were not coded in the Emme network scenarios (No. 32414 and 32415) presented in this table. Refer to Emme plots on number of lanes for details.*
3. *V/C ratio represents the auto volume to auto lane capacity ratio. The V/C ratio represents the highest ratio on a road segment in two travel directions during the AM and PM peak hours.*
4. *Forecasted volume represents the highest volume on a road segment in two travel directions during the AM and PM peak hours.*
5. *Forecasted ADT Volume is the forecasted ADT total vehicle volume (including trucks) in two volumes. It has been adjusted based on the existing ADT counts.*
6. *LOS service ADT volume threshold is based on the reference guidelines,* ***2013 Quality / Level of Service Handbook*** *by Florida DOT. The threshold represents the minimum service ADT volume for LOS E, which is the maximum service volume for LOS D.*

Emme Scenario IDs: Alt. 1B - 2041 Do-Nothing, Scen.No. 21417 & 21418; Alt. 2 - 2041 with 2031 Network (2014 MMATMP), Scen.No. 26414 & 26415; Alt. 3 - 2041 Proposed Preferred Network (Draft), Scen.No. 32414 & 32415.

Table 6-9 Rationale for Proposed Interchange Ramp Options, Horizon 2041

Highway 400 Corridor	Location	2016 Network	2014 MMATMP Recommended Network	2018 TMP Proposed Network	Changes in Proposed Improvements from 2014 MMATMP	2017 MTO TESR Update Recommendations	Rationale: Existing – Ramp ATR Counts AM Peak	PM Peak	Year	2041 Emme Proposed Preferred Network (Draft) – Forecasted, Adjusted Peak Hour TOTAL Volume [1] AM Peak	PM Peak	Adjusted Peak Hour Auto V/C Ratio AM Peak	PM Peak	Estimated Peak Hour TOTAL Flow (pc/h) [2] AM Peak	PM Peak	Flow Threshold for Two-Lane Ramp (pc/h)	Comments (V/C Color Coding: 0.85<=V/C<=0.92; 0.92< V/C<1.0; 1.0 <=V/C)
Proposed Interchange Ramp Options																	
Dunlop Interchange	E/W-S On-Ramp (SB)	1 lane	2 lanes	2 lanes	No change.	1 lane	1,130	1,054	2016	1,475	1,417	**1.00**	**0.96**	1,549	1,488	1,500	1) The forecasted V/C exceeds the 0.75 threshold under a one-lane entry ramp. 2) The forecasted traffic flow would be over the threshold of 1,500 pc/h for a two-lane ramp. Therefore, a two-lane entry ramp is required, subject to the MTO's approval. 3) The need for a two-lane entry ramp can be confirmed by a Traffic Operatiions analysis based on the Highway Capacity Manual methodology for an on-ramp.
Essa Interchange	E-N On-Ramp (NB)	1 lane	2 lanes	2 lanes	No change.	1 lane	614	726	2016	1,169	1,300	0.79	**0.88**	1,227	1,365	1,500	1) The forecasted V/C exceeds the 0.75 threshold under a one-lane entry ramp. 2) The forecasted traffic flow would be approaching 91% of the threshold of 1,500 pc/h for a two-lane ramp. Therefore, a two-lane entry ramp is potentially required, subject to the MTO's approval. 3) The previously-recommended new interchange at Harvie / Big Bay Point Road is not carried forward. Traffic demand will be directed to this interchange 4) The need for a two-lane entry ramp can be confirmed by a Traffic Operatiions analysis based on the Highway Capacity Manual methodology for an on-ramp.

Notes:

[1] *A truck percentage of 5% is assumed on ramps.*

[2] *A truck is equivalent to 2 passenger car units (PCU).*

6.5 RATIONALE FOR PROPOSED CHANGES TO ROAD CLASSIFICATION

Currently, the City does not have road functional classification criteria for City roads. One of the major objectives of the road functional classification is to design roadways based on required geometric design standards of their defined class and function. Based on its roadway service function, a roadway of a higher class can carry higher traffic volumes, and vice versa.

Therefore, a roadway functional class impacts roadway capacity. The change in a roadway functional class can be considered as another form of “road improvements” – capacity improvements. And a review of the current road classification system was conducted, which is discussed in the following sections.

6.5.1 PROPOSED ROAD CLASSIFICATION CRITERIA

For road network analyses in this TMP study, a set of road classification criteria, as presented in Table 6-10, were proposed based on a review of best practices, and the City’s current road classification system and road characteristics. Note that public lanes are not within the TMP scope and Expressways are under the jurisdiction of MTO. These two classes are not included in the proposed road classification system.

The criteria recommended in the Transportation Association of Canada (TAC) are applied, except for some criteria such as number of vehicle lanes, posted speed, and parking restrictions that reflect the City of Barrie current practices.

The proposed road classification criteria include:

a traffic service function

b land service / access

c desirable connections

d typical daily traffic volume in two directions (veh/day)

e number of vehicle lanes

f flow characteristics

g posted speed

h transit service

i accommodation of cyclists

j accommodation of pedestrians

k parking restrictions

l minimum intersection spacing

The key criteria to determine a roadway classification include traffic service function, land service or access, desirable connections, daily traffic volumes, number of vehicle lanes, and whether to accommodate transit services and cycling facilities.

It should be noted that Parkways are not included in the proposed road functional classification that provides a guidance to identify roadway design criteria. Although Parkways are one type of roads that were originally referred to as landscaped highways and then are referred to as limited-access highways, they are not typically defined within road functional classification systems of TAC, MTO and FHWA geometric design guidelines.

Table 6-10 Proposed Road Classification Criteria

No.	Factor	Locals		Minor Collectors		Major Collectors		Arterials
		Residential	Industrial / Commercial	Residential	Industrial / Commercial	Residential	Industrial / Commercial	
1 *	**Traffic service function**	Traffic movement secondary consideration		Traffic movement and land access of equal importance		Traffic movement and land access of equal importance		Traffic movement primary consideration
2 *	**Land service / access**	Land access primary function		Traffic movement and land access of equal importance		Traffic movement and land access of equal importance		Property access control
3 *	**Desirable connections**	Locals, collectors		Locals, collectors, arterials		Locals, collectors, arterials		Collectors, arterials, expressways
4 *	**Typical daily traffic volume in two directions (veh/day)**	< 1,000	< 3,000	1,000 - 8,000	3,000 - 12,000	< 16,000	< 20,000	10,000 - 30,000
5 *	**Number of vehicle lanes** [a]	One (one-way streets) or two		Two to three		Two to five		Two to seven
6	**Flow characteristics**	Interrupted flow		Interrupted flow		Interrupted flow		Uninterrupted flow except at signals and crosswalks
7	**Posted speed**	20 - 40		40 - 50		40 - 50		50 - 60 (urban) 60 - 80 (rural)
8 *	**Transit service**	Generally not provided		Permitted		Permitted		Preferred
9 *	**Accommodation of cyclists**	No restrictions or special facilities		Special facilities considered		Special facilities considered		Special facilities considered
10 *	**Accommodation of pedestrians**	Sidewalks normally on one or both sides	Sidewalks provided where required	Sidewalks normally on both sides	Sidewalks provided where required	Sidewalks normally on both sides	Sidewalks provided where required	Sidewalks on both sides
11	**Parking (typically)**	No restrictions or restrictions one side only		Few restrictions other than peak hours		Prohibited or peak hour restrictions		Prohibited or peak hour restrictions
12	**Min. intersection spacing (m)**	60		60		60		200 - 400 (between two traffic controls)

Reference source:

1. Table 2.6.5 - Characteristics of Urban Roads, Geometric Design Guide for Canadian Roads, Transportation Association of Canada (TAC), 2017.

2. Road Classification Criteria, adopted by City of Toronto Council on February, March 1&2, 2000.

3. Table 3-3 - Characteristics of Major and Minor Collectors (Urban and Rural, Highway Functional Classification Concepts, Criteria and Procedures, U.S. Federal Highway Administration, 2013.

Notes:

1. The major criteria adopt the criteria recommended in TAC, particularly the daily traffic volumes. Other criteria reflect the City of Barrie current practices, such as the posted speeds and parking strictions,

2. Major collector routes are longer in length; have lower connecting densities; have higher speed limits; have higher daily traffic volumes; and have more travel lanes, compared to minor collector roads (Reference source No.3). Based on the current City's road classification, major collector roads are similar to minor arterial roads defined in the TAC Guide.

3. Public lanes are not within the TMP scope and Expressways are under the jurisdiction of MTO. These two classes are not included in the proposed road classification system.

** Indicates the key criteria for road classification.*

[a]. The number of lanes includes HOV or bus lanes and a centre two-way left-turn lane (TWLTL), excluding bike lanes.

6.5.2 REVIEW OF ROAD CLASSIFICATION SYSTEM

A review of City roads with the current road classification was conducted based on the proposed criteria in Table 6-10, existing and future forecasted ADT volumes, and future proposed transportation infrastructure including active transportation and transit services. The review included those locations with potential changes. Table 6-11 provides the rationale analysis of road classification.

Some changes to current road classification were proposed, which are summarized in Table 6-12. **Refer to Figure 5-4 of the TMP main report for a proposed road classification system**.

The proposed change to a roadway functional class impacts roadway capacity. It should be noted that the proposed road classification system is for the TMP study purpose to support road network analyses and modelling. Where classifications differ from existing classifications, the City can consider changes in consultation with staff and the public. In addition, the proposed changes can be incorporated in the City OP Update.

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Table 6-11 Rationale for Confirmation and Changes of Road Classification *(Page 1/4)*

As of 4/9/2019

Roadway	From	To	Traffic Movement and Land Access	Daily Traffic Volumes			Desirable Network Connections	Future Proposed Number of Vehicle Lanes	Transit Service (Yes/No)	Bike Facilities (Yes/No)	Pedestrian Sidewalks	Current Classification	Proposed Classification	Comments
				Existing Counts	Year	2041 Forecasted [1]								
Barrie View Drive	Mapleview Drive	Caplan Avenue	Equal importance	12,909	2006	16,800	Yes	5 lanes	No	No	Yes, both sides	Local	Major Collector	1) Existing ADT volumes already exceed the defined maximum volume of 3,000 vehicles for a local road and 12,000 vehicles for a minor collector in the industrial / commercial areas. 2) It has five traffic lanes. 3) It is proposed to be upgraded from a local road to a major collector.
Bayview Drive	Burton Avenue	Little Avenue	Equal importance	7,994	2017	12,000	Yes	3 lanes	Yes	Yes	Yes, both sides	Major Collector	(No change)	The existing and future forecasted ADT volumes are within the volume range for a major collector in the residential areas.
Bayview Drive	Little Avenue	Big Bay Point Road	Traffic movement important	11,079	2017	11,700	Yes	5 lanes	Yes	Yes	Yes, both sides	Major Collector	Arterial	1) The future forecasted ADT volumes are within the volume range for a major collector and an arterial. 2) However, the road sections connect to routes along the future new Harvie / Big Bay Point Crossing, the Mapleview Interchange and the future new Salem / Lockhart Crossing. The traffic movement is a primary consideration. Bayview would function as a major N-S road parallel to Highway 400.
Bayview Drive	Big Bay Point Road	Mapleview Drive	Traffic movement important	10,787	2010	17,100	Yes	5 lanes	Yes	Yes	Yes, both sides	Major Collector	Arterial	
Bayview Drive	Mapleview Drive	Lockhart Road	Traffic movement important	12,825	2004	15,000	Yes	3 lanes	Yes	Yes	Yes, both sides	Major Collector	Arterial	
Bryne Drive	Essa Road	Mapleview Drive	Traffic movement important	n/a		22,500	Yes	5 lanes	Yes	Yes	Yes, both sides	Major Collector	Arterial	1) Future forecasted ADT volumes exceed the maximum volume of 20,000 vehicles for a major collector in the industrial / commercial areas. 2) The road sections connect to routes along the Essa Interchange, the future new Harvie / Big Bay Point Crossing, and the Mapleview Interchange. The traffic movement is primary consideration. Bayview would function as a major N-S road parallel to Highway 400
Caplan Avenue	Reid Drive	Veterans Drive	Equal importance	1,760	2014 [2]	5,300	Yes	2 lanes	No	Yes	Yes, only one side (in commercial / industrial areas)	Local	Minor Collector	1) Future forecasted ADT volumes exceed 3,000 vehicles in the industrial / commercial areas, justified as a collector road. 2) Further, bike facilities are proposed. 3) Therefore, it is proposed to be upgraded to a minor collector road.

Table 6-11 Rationale for Confirmation and Changes of Road Classification *(Page 2/4)*

As of 4/9/2019

Roadway	From	To	Traffic Movement and Land Access	Daily Traffic Volumes			Desirable Network Connections	Future Proposed Number of Vehicle Lanes	Transit Service (Yes/No)	Bike Facilities (Yes/No)	Pedestrian Sidewalks	Current Classification	Proposed Classification	Comments
				Existing Counts	Year	2041 Forecasted [1]								
Caplan Avenue	Veterans Drive	Bryne Drive	Equal importance	8,858	2008	8,400	Yes	2 lanes	Yes	Yes	Yes, both sides	Local	Minor Collector	1) Existing and future forecasted ADT volumes exceed 3,000 vehicles in the industrial / commercial areas, justified as a collector road. 2) Further, bike facilities are proposed. 3) Future transit services are proposed on Caplan west of Bryne Drive. 4) Therefore, it is proposed to be upgraded to a minor collector.
Caplan Avenue	Bryne Drive	Barrie View Drive	Equal importance	7,499	2006	11,400	Yes	2 lanes	No	No	Yes, both sides	Local	Minor Collector	
Reid Drive	Caplan Avenue	Mapleview Drive	Equal importance	1,375	2015 [2]	1,600	Yes	2 lanes	No	No	Yes, both sides	Local	Minor Collector	1) The existing and future ADT volumes may not justify for a minor collector road. 2) However, the Caplan segment on the north end would be justified for a minor collector road. 3). Bike facilities are proposed. 4) It is proposed to be upgraded to be a minor collector.
Cheltenham Road	John Street	Penetan-guishene Road	Equal importance	848	2008	1,600	Yes	2 lanes	No	Yes	Yes, both sides	Major Collector	Minor Collector	1) Existing and future forecasted ADT volumes do not exceed 3,000 vehicles, the threshold for a minor collector in the residential areas. 2) Given the bike and pedestrian facilities, the section is proposed to be downgraded to a minor collector road.
Crimson Ridge Road	Golden Meadow Road	Crimson Ridge Road (east dead end)	Land access primary function	n/a		2,600	Yes	2 lanes	No	No	Yes, but only one side	Minor Collector	(No change)	1) Existing and future forecasted ADT volumes are greater than 1,000 vehicles, the maximum volume for a local road in the residential areas. 2) No changes are proposed in spite of its dead end.
Dean Avenue	Big Bay Point Road	Madelaine Drive	Equal importance	n/a		5,000 - 8,000	Yes	3 lanes	Yes	Yes	Yes, both sides	Minor Collector	Minor Collector	1) The future forecasted ADT volumes are less than 12,000 vehicles for a minor collector road in the industrial / commercial areas, justified as a minor collector road. 2) The future section will be reduced from the current 4 lanes to 3 lanes with road diet.
Dean Avenue	Madelaine Drive	Mapleview Drive	Equal importance	n/a		8,000 - 9,000	Yes	2 lanes	Yes	Yes	Yes, both sides	Minor Collector	Minor Collector	1) The future forecasted ADT volumes are around 8,000 vehicles, a little higher than the maximum 8,000 vehicles for a minor collector road in the residential areas. 2) There is a ROW constraint to widen the roadway in the mature residential areas. 3) Given the sections on both ends that are proposed as a minor collector road, the section is proposed as a minor collector, too. 4) In the area, Madelaine Drive is already classified as a major collector.

Table 6-11 Rationale for Confirmation and Changes of Road Classification *(Page 3/4)*

Roadway	From	To	Traffic Movement and Land Access	Daily Traffic Volumes			Desirable Network Connections	Future Proposed Number of Vehicle Lanes	Transit Service (Yes/No)	Bike Facilities (Yes/No)	Pedestrian Sidewalks	Current Classification	Proposed Classification	Comments
				Existing Counts	Year	2041 Forecasted [1]								
Dean Avenue	Mapleview Drive	Lockhart Road	Equal importance	n/a		3,600	Yes	2 lanes	No	Yes	Yes, both sides	Minor Collector	Minor Collector	The future forecasted ADT volumes are less than 12,000 vehicles for a minor collector road in the residential areas, justified as a minor collector road.
Grand Forest Drive	Hurst Drive	Golden Meadow Road	Equal importance	2,484	2015	3,200	Yes	2 lanes	No	No	Yes, both sides	Local	Minor Collector	1) Future forecasted ADT volumes are greater than 1,000 vehicles, the maximum volume for a local road in the residential areas, justified as a minor collector road. 2) The short section between Golden Meadow Road and Big Bay Point Road currently is a minor collector, as well as Golden Meadow Road.
Innisfil Street	Dunlop Street	Tiffin Street	Equal importance	6,500 - 7,500	2015, 2016	10,960 - 11,960	Yes	3 lanes	No	Yes	Yes, both sides	Minor Collector	Major Collector	1) Existing ADT volumes already approach 8,000 vehicles, the maximum volume for a minor collector in the residential area. 2) The future forecasted ADT volumes would exceed the maximum volume of 8,000 vehicle for a minor collector. 3) The corridor has a mix of residential and commercial developments. 4) Innisfil Street is proposed to be a major collector road.
Innisfil Street	Tiffin Street	Essa Road	Equal importance	5,100 - 7,900	2015, 2016	9,000 - 11,800	Yes	3 lanes	No	Yes	Yes, both sides	Minor Collector	Major Collector	
Innisfil Street	Essa Road	Baldwin Lane	Equal importance			4,500	Yes	2 lanes	No	Yes	Yes, both sides	Minor Collector	Major Collector	1) The future forecasted ADT volumes are slightly less than the maximum volume of 8,000 vehicles. 2) However, this short segment is proposed to be a major collector road, which is consistent with other sections north of Essa Road. 3) Further, it connects with a major collector road at Burton Road.
Lakeshore Drive	Simcoe Street	Tiffin Street	Traffic movement important	17,281	2017 [2]	24,500	Yes	2 lanes	Yes	No, within the roadway	Yes, but only one side	Parkway	Arterial	1) Road functional classification provides a guidance to identify roadway design criteria. Although Parkways are one type of roads that were originally referred to as landscaped highways and then are referred to as limited-access highways, they are not typically defined within road functional classification systems of TAC, MTO and FHWA geometric design guidelines. It is proposed to be removed. 2) Traffic movement is a primary consideration. 3) Existing and future ADT volumes are within the volume range of 10,000 to 30,000 vehicles for an arterial road. 4) It is proposed to be an arterial road.

Table 6-11 Rationale for Confirmation and Changes of Road Classification *(Page 4/4)*

As of 4/9/2019

Roadway	From	To	Traffic Movement and Land Access	Daily Traffic Volumes			Desirable Network Connections	Future Proposed Number of Vehicle Lanes	Transit Service (Yes/No)	Bike Facilities (Yes/No)	Pedestrian Sidewalks	Current Classification	Proposed Classification	Comments
				Existing Counts	Year	2041 Forecasted [1]								
Mapleton Avenue	Essa Road	Veterans Drive	Equal importance	3,758	2004	5,400	Yes	2 lanes	No	Yes	Yes, both sides	Local	Major Collector	1) The road section is in the residential areas. The existing and future ADT volumes exceed 1,000 vehicles, the maximum volume for a local road and are less than 8,000 vehicles, the maximum volume for a minor collector, justified as a minor collector. 2) However, this section is proposed to be a major collector, which is also consistent with the class north of Essa Road.
Morrow Road	Patterson Road	Ardagh Road	Equal importance	4,186	2008	4,600	Yes	2 lanes	No	Yes	Yes, but only one side	Local Street	Minor Collector	The existing ADT volumes already exceed 3,000 vehicles, the maximum volume for a local road in the industrial/commercial areas, justified as a minor collector road. It is proposed to be a minor collector.
Patterson Road	Little Avenue	Morrow Road	Equal importance	5,710	2012	8,400	Yes	2 lanes	Yes	Yes	Yes, but only one side	Minor Collector	(No change)	The existing and future ADT volumes are within the range of 3,000 to 12,000 vehicles for a minor collector in the industrial / commercial areas. No changes are proposed.
Patterson Road	Morrow Road	Ardagh Road	Equal importance	5,558	2006	4,600	Yes	2 lanes	Yes	Yes	Yes, but only one side	Minor Collector	(No change)	The existing and future ADT volumes are within the range of 1,000 to 8,000 vehicles for a minor collector. No changes are proposed.
Sunnidale Road	Cundles Road	City Northwest Limit	Equal importance	4,972	2013	7,100	Yes	2 lanes	No	Yes	Yes, but only one side	Minor Collector	Major Collector	1) The existing and future ADT volumes are within the range of 1,000 to 8,000 vehicles for a minor collector in the residential areas. 2) Although the section has a ADT volume less than 8,000 vehicles, it carries longer trips in and out of Barrie. It connects with a County Road CR-40. 3) It functions as a major collector as other sections.
Victoria Street	Ellen Street	Lakeshore Drive	Equal importance	2,904	2014 [2]	6,300	Yes	2 lanes	No	Yes	Yes, both sides	Major Collector	Minor Collector	1) The existing and future ADT volumes are within the range of 1,000 to 8,000 vehicles for a minor collector in the residential areas. 2) Further, the short section west of Bradford Street is defined as a minor collector. 3) For consistency, the short section is proposed to be a minor collector.
Welham Road	Big Bay Point Road	Mapleview Drive	Equal importance	4,773	2006	5,400						Minor Collector	(No change)	The future ADT volumes are within the range of 3,000 to 12,000 vehicles for a minor collector in the industrial / commercial areas. No changes are proposed.
Welham Road	Mapleview Drive	Lockhart Road	Equal importance			6,300						Minor Collector	(No change)	
Welham Road	Lockhart Road	City South Limit	Equal importance			6,700						Minor Collector	(No change)	

Notes: [1]. The future forecasted ADT volumes were obtained from the Emme modelling analysis and further adjusted based on the most current traffic counts where counts were available.

[2]. The existing ADT counts were estimated based on the adjacent intersection turning movement counts.

Table 6-12 Proposed Changes of Road Classification

Roadway	From	To	Current Classification	Proposed Classification
Barrie View Drive	Mapleview Drive	Caplan Avenue	Local	Major Collector
Bayview Drive	Little Avenue	Big Bay Point Road	Major Collector	Arterial
Bayview Drive	Big Bay Point Road	Mapleview Drive	Major Collector	Arterial
Bayview Drive	Mapleview Drive	Lockhart Road	Major Collector	Arterial
Bryne Drive	Essa Road	Mapleview Drive	Major Collector	Arterial
Caplan Avenue	Reid Drive	Veterans Drive	Local	Minor Collector
Caplan Avenue	Veterans Drive	Bryne Drive	Local	Minor Collector
Caplan Avenue	Bryne Drive	Barrie View Drive	Local	Minor Collector
Cheltenham Road	John Street	Penetanguishene Road	Major Collector	Minor Collector
Grand Forest Drive	Hurst Drive	Golden Meadow Road	Local	Minor Collector
Innisfil Street	Dunlop Street	Tiffin Street	Minor Collector	Major Collector
Innisfil Street	Tiffin Street	Essa Road	Minor Collector	Major Collector
Innisfil Street	Essa Road	Baldwin Lane	Minor Collector	Major Collector
Lakshore Drive	Simecoe Street	Tiffin Street	Parkway	Arterial
Mapleton Avenue	Essa Road	Veterans Drive	Local	Major Collector
Morrow Road	Patterson Road	Ardagh Road	Local Street	Minor Collector
Reid Drive	Caplan Avenue	Mapleview Drive	Local	Minor Collector
Sunnidale Road	Cundles Road	City Northwest Limits	Minor Collector	Major Collector
Victoria Street	Ellen Street	Lakeshore Drive	Major Collector	Minor Collector

6.6 RESPONSE TO PIC FEEDBACKS

The recommendations on the preliminary preferred road network were presented in the Public Information Centre (PIC), held on November 13, 2018; the feedbacks received were reviewed thoroughly. Table 6-13 summarizes the responses to the PIC feedbacks. The proposed road network has incorporated the revised recommendations in response to the PIC feedbacks.

Table 6-13 Responses to PIC Feedbacks on Preliminary Preferred Road Network, Horizon 2041

Location No.	Road Name	From	To	Draft Recommendations on Preliminary Preferred Network	PIC Feedbacks	Responses and Proposed Changes
1	**Essa Road**	Coughlin Road	Mapleview Drive West	3 lanes, including 1 TWLTL lane	Recommend 5 lanes to extend from Coughlin Road to Mapleview Drive to accommodate potential high-density residential developments (OPA 55) on 564 and 622 Essa Road at the northeast corner of Essa Road and Mapleview Drive West intersection.	Change to 5 lanes along the short segment to have a consistent roadway cross-section on Essa Road, north of Mapleview Drive.
2	**Burton Avenue**	Bayview Drive	Milburn Street	Widen to 4 lanes	Residents have concerns on the impacts of road widening on the adjacent century-home neighbourhood.	City confirmed that there would be redevelopments along the Burton Avenue corridor. No changes to the preliminary preferred network.
3	**Burton Avenue**	Essa Road	Bayview Drive	No widening	There are two churches, a high school and residential houses adjacent to the roadway stretch. Residents are concerned about the transport trucks that come from Essa Road.	Not within the MMATMP scope. The City to consider changes to truck routes. No changes to the preliminary preferred network.
4	**Patterson Road**	Morrow Road	Ardagh Road	Downgrade from a minor collector to a local road	Residents are concerned about the impacts of downgrading on city services such as snow removal, transit route, etc. It was suggested to implement signage to divert trucks on Patterson Road to Morrow Road (industrial area).	The City to confirm the impacts of servicing operations. The City to consider implementing appropriate truck signage to identify the truck route. No changes to the current minor collector.
5	**Intersections at Sunnidale Road and Anne Street West and at Sunnidale Road and Cundles Road West**			No widening	Residents suggested improving or realigning these two skewed intersections. City staff discussed on the roundabout alternative.	Not within the MMATMP scope. No changes to the preliminary preferred network.
6	**Bradford Street**	Simcoe Street	Essa Road	HOV lanes	Residents commented more HOV to reduce transit travel time. City Transit staff suggested potentially extending HOV lanes on Bradford Street to Essa Road and connecting HOV lanes on Bayfield.	Propose a further HOV study to examine the implementation timing and other HOV routes such as Essa Road. Factors to consider include congestion, transit travel times, and promotion of carpooling. A revised HOV network has been examined and proposed.
7	**Dunlop Interchange**			MTO recommended geometric alignments and reconfigurations at the interchange; MTO recommended widening at the bridge structure	Owners of the adjacent properties are concerned about the implementation schedule of the planned improvements. The uncertainties of the improvement have hold off the adjacent property redevelopment.	The City to confirm the construction timing with MTO. No changes to the preliminary preferred network.
8	**Mapleview Interchange**			MTO recommended Diverging Diamond Interchange (DDI)	Residents identified the improvements to Mapleview Interchange as one top priority.	The City to confirm the construction timing with MTO. No changes to the preliminary preferred network.
9	**Highway 400**	Within the City boundaries		MTO recommended widening to 10 lanes	Residents such as those adjacent to Sunnidale Road and Highway 400 are concerned of the noise on Highway 400, suggesting the implementation of noise barriers.	The City to bring up the noise concerns to MTO. No changes to the preliminary preferred network.
10	**Ardagh Road**	Ferndale Drive	Patterson Road	Widen to 4 lanes	Road diet has been implemented west of Ferndale Drive. There are 3 lanes from CR-27 to Patterson Road. However, the proposed 2041 network and the 2014 MMATMP recommended 2031 network showed 4 lanes.	Maintain the currently-built 3 lanes. (City staff has confirmed this recommendation.)
11	**Dean Avenue**	Big Bay Point Road	Madelaine Drive	Reduce from the current 4 lanes to 2 lanes	The current condition has 4 lanes. Two lanes were recommended to be removed in the 2014 MMATMP. Given the employment land on the northeast side, 3 lanes would be more reasonable.	Road diet and change to 3 lanes to accommodate AT bike lanes, similar to the recommendations on adjacent Madelaine Drive. (Change to 3 lanes with bike lanes. City staff has confirmed this recommendation.)

Notes: TWLTL = Two-way left turn lane; LTL = Left turn lane; GPL = General Purpose Lane; HOV = High Occupancy Vehicle

[1]. TESR represents Transportation Environmental Study Report

6.7 SUMMARY OF PROPOSED 2041 ROAD IMPROVEMENTS

6.7.1 HIGHWAY 400 FACILITIES

Table 6-14 summarizes the proposed improvements to Highway 400 interchange ramps and crossings that are different from the recommendations in the MTO 2017 TESR Update.

Table 6-14 Proposed Improvements to Highway 400 Interchange Ramps and Crossings, Horizon 2041

Highway 400 Interchange / Crossing	Location	2016 Network	MTO 2017 TESR Update	2018 TMP Proposed Network
Proposed Interchange Ramp Options				
Dunlop Street Interchange	E/W-S On-Ramp (SB)	1 lane [a]	1 lane	Widen to 2 lanes
Essa Road Interchange	E-N On-Ramp (NB)	1 lane	1 lane	Widen to 2 lanes
Proposed Improvements to Crossings or New Crossings				
St. Vincent Crossing		2 lanes	2 lanes (no improvements)	Widen to 5 lanes plus bike lanes
Anne Street Crossing		4 lanes	4 lanes (no improvements)	Widen to 5 lanes with cycle tracks
Dunlop Street Interchange	Dunlop Street	2 lanes	Widen to 4 lanes plus 2 speed-change lanes	Widen to 7 lanes
Essa Road Interchange	Essa Road	4 lanes	Widen to 6 lanes	Widen to 7 lanes
Salem Road / Lockhart Road Crossing		Does not exist	No crossing	New 5-lane crossing with cycle tracks
McKay Road Interchange	McKay Road	2 lanes	2 lanes (no improvements)	Widen to 7 lanes with cycle tracks
Proposed HOV at Interchanges				
Bayfield Street Interchange	Bayfield Street	No HOV	No HOV	Convert 2 GPL to HOV
Essa Road Interchange	Essa Road	No HOV	No HOV	Convert 2 GPL to HOV
Mapleview Street Interchange	Mapleview Drive	No HOV	No HOV	Convert 2 GPL to HOV

Notes: TWLTL = Two-way left turn lane; LTL = Left turn lane; GPL = General Purpose Lane; HOV = High Occupancy Vehicle; TESR represents MTO's Transportation Environmental Study Report. [a]. The number of lanes for a ramp indicates the lanes where a ramp merges with or diverges from Highway 400.

Widening at Ramps: It should be noted that the number of lanes for a ramp indicates the lanes where a ramp merges with or diverges from Highway 400. Based on MTO Geometric Design Guideline, a two-lane ramp is required where the flow exceeds 1,500 passenger car units per hour (pc/h). Given that the future forecasted flow at the existing interchange ramps would approach the flow threshold of 1,500 pc/h for a two-lane ramp, the following ramps are proposed to be widened to two lanes:

- **E/W-S On-Ramp (southbound) at the Dunlop Street Interchange**
- **E-N On-Ramp (northbound) at the Essa Road Interchange:** The forecasted traffic flow would be approaching the threshold of 1,500 pc/h for a two-lane ramp. In addition, the need for a 2-lane on-ramp accounts for the following two factors:
  - Fairview Road will be widened to a 5-lane arterial with two northbound through lanes.
  - Given no new interchange at Harvie Road / Big Bay Point Road and the congestion at Mapleview Drive, demand of traffic access to the northbound Highway 400 via the northbound on-ramp at the Essa Road Interchange would be significantly increased.

  The widening to the E-N On-Ramp would have a potential impact to the current outbound access to the northbound Highway 400 at the MTO Park-and-Ride Parking Lot. A separate study is proposed to assess the resulting impacts and examine the alternative solutions if necessary.

Highway 400 Crossings: As summarized in Table 6-14, improvements to City roads are proposed at the following Highway 400 crossings and interchanges. Note that the number of lanes indicate the lane width at the crossing bridge and that the TWLTL or median width can be used to incorporate a left-turn lane at the adjacent intersections at both ends. These improvements are different from the MTO 2017 TESR Update recommendations.

- **St. Vincent Crossing:** Widen to five lanes plus bike lanes.
- **Anne Street Crossing:** Widen to five lanes with cycle tracks.
- **Dunlop Street Interchange:** Widen Dunlop Street to seven lanes. Note that seven lanes indicate the lane width at the crossing bridge. Due to the complexity resulting from the closely-space intersections and turn movements at ramp terminals, the detailed lane configuration on Dunlop Street from west of Cedar Pointe Drive to Anne Street should be confirmed with additional traffic operations analyses during the preliminary design stage.
- **Essa Road Interchange:** Widen Essa Road to seven lanes.
- **Harvie Road / Big Bay Point Road Crossing:** A new five-lane crossing with in-boulevard trails.
- **Salem Road / Lockhart Road Crossing:** A new five-lane crossing with cycle tracks.
- **New McKay Road Interchange:** Widen McKay Street to seven lanes with cycle tracks.

HOV lanes at Interchanges: As discussed in **the TMP main report (Section 5.5.4 and Figure 5-8)**, HOV corridors are proposed on the key road network. The proposed HOV corridors go through the Highway 400 Interchanges at Bayfield Street, Essa Road, and Mapleview Drive. MTO should be consulted prior to HOV implementation at these locations.

MTO has planned future improvements to the existing interchanges and Highway 400 mainline (road capacity and network improvements in Table 6-3), as well as other improvements such as structure replacement (e.g., Sunnidale Road, Anne Street, Tiffin Street, etc). These TMP-proposed improvements should be coordinated with the MTO planned improvements and be prioritized where required.

6.7.2 CITY ROAD IMPROVEMENTS

Table 5-10 of the TMP main report summarizes the proposed changes to the previous recommendations and additional road improvements (highlighted in red texts), as well as the road improvements identified in the 2014 MMATMP that have been confirmed. **Figure 5-6 of the TMP main report** illustrates changes in vehicle lanes from 2016, that is, road improvements, for the proposed 2041 road network.

Details of the proposed improvements and separate studies at some locations are discussed further as below:

- **Bradford Street, from Simcoe Street to Tiffin Street**: Currently, Bradford Street has four lanes and is located with the future Urban Growth Centre. HOV lanes are proposed to connect the Downtown Transit Terminal and the Allandale/Waterfront GO Station. However, a widening to Bradford Street would not be feasible. Traffic would be increased, which would not only result in traffic issues through the downtown, but also aggravate the existing traffic operation issues at the intersection of Tiffin Street and Bradford Street / Essa Road. Currently, Bradford Street has a geometric alignment issue at the intersection. A separate traffic study is proposed to explore and evaluate the improvements on Bradford Street and at the two Tiffin Street intersections at Bradford Street / Essa Road and Lakeshore Drive.

- **Ferndale Drive, from City North Limits to Benson Avenue; Hurst Drive, from Bay Lane to Cox Mill Road**: Road diets on these roadways were completed in recent years to accommodate cycling facilities by reconfiguring the travel lanes from four lanes to two lanes with a TWLTL. However, future roadway volumes indicate four travel lanes will be required. Ferndale Drive will also match the future widening on CR-53 Wilson Drive north of Barrie. Refer to the AT sections for the proposed future cycling facilities.
- **Little Street at Hurst Drive**: Currently, the GO rail has an at-grade crossing with Little Street, which is close to the eastbound approach at the signalized intersection of Little Street and Hurst Drive. The distance between the rail and crosswalk is approximately one passenger vehicle. In addition, the traffic signals and road conditions are confusing to drivers. A separate study is proposed to assess this location based on traffic volumes, connectivity and safety.
- **McKay Road Re-alignment, from City West Boundary Limit to approximately 900m East of City Boundary**: Realignment with an additional TWLTL. This should be reviewed when the area is redeveloped and individual property access is reissued.
- **Rawson Avenue and Collector 16 in the Salem Secondary Plan, Removal of Sections:** The previously-recommended Rawson Avenue segment between Lockhart Road and Collector 16 segment between Welham Road and Rawson Avenue, crossing of the rail, were removed to due to environmental and other constraints. The removal of these two segments are subject to an amendment to the current Secondary Plan and will be reassessed through further studies.
- **Tiffin Street, from Bradford Street / Essa Road to Lakeshore Drive**: The two Tiffin Street intersections at Bradford Street / Essa Road and Lakeshore Drive have approximately a link distance of 100m, measured from approach to approach. A total of seven lanes are proposed, consisting of four through lanes, one exclusive westbound left-turn lane at Bradford Street / Essa Road, one exclusive eastbound left-turn lane at Lakeshore Drive, and one bus-only eastbound right-turn lane at the Allandale GO Station entrance. As mentioned above, a separate traffic study is proposed to explore other alternatives and conduct functional designs to improve the existing and future traffic operations. The levels of service at these two intersections impacts not only transit buses but also passenger vehicles entering and exiting the Allandale GO Station.
- **Traffic Operations Improvements on Mapleview Drive, between Bryne Drive and Bayview Drive:** There are opportunities to improve the traffic operations on Mapleview Drive, such as signal optimization, removal of the exclusive right-turn lanes to convert to a shared through and right-turn lane, etc. Prior to the implementation of the future DDI, a separate study is proposed to explore and evaluate the improvement alternatives to improve traffic operations on Mapleview Drive between Bryne Drive and Bayview Drive.
- **Traffic Operations Improvements in Downtown**: Separate traffic and parking studies are suggested for road sections in downtown, such as Mulcaster Street, Collier Street, Ross Street, Bayfield Street from Ross Street to Simcoe Street, etc, to assess the impacts of on-street parking, explore lane configuration alternatives to improve traffic flow, as well as evaluate parking demand and strategies.

6.8 FUTURE 2041 ROAD NETWORK FORECASTS

As discussed above, the proposed City road improvements in the TMP were identified based on a systematic analysis of road deficiencies for 2041. Road improvements and changes to the current road classification system were proposed based on the defined hypotheses, criteria, and rationale. In addition, HOV corridors are proposed along Bayfield Street, Bradford Street, Essa Road, Burton Avenue, Yonge Street, and Mapleview Drive to reduce transit travel times and promote transit usage. **Refer to Figure 5-5 of the TMP main report for the proposed 2041 road network.** The Emme 2041 model has been finalized to reflect the proposed road network in the TMP.

The following sections summarize and discuss the future 2041 traffic forecasts and network performance in the format of V/C ratios for the preferred network in the long-term horizon 2041.

6.8.1 FUTURE 2041 TRAFFIC FORECASTS

Figure 6-5 presents an overall snapshot of the total number of vehicle lanes modelled in Emme. It should be noted that the proposed HOV lanes on the City's roads (refer to Section 3.2.3). Figure 6-6 provides an overall snapshot of future 2041 forecasted auto traffic volumes during the PM peak hour. Detailed model plots for both the AM and PM peak hours are provided in Appendix E-5.

6.8.2 FUTURE 2041 LEVELS OF SERVICE

Figure 6-7 presents an overall snapshot of future forecasted congestion level in V/C ratios. It should be noted that the roadway LOS is not determined by a V/C ratio. For reference the LOS criteria on arterials corresponding to V/C ratios are provided in Table 6-15. More model plots for both the AM and PM peak hours are provided in Appendix E-5.

Table 6-15 Level of Service on Arterials [a] Corresponding to Volume-to-Capacity Ratios

Level of Service	Description	V/C[b]
A	Free-flow conditions with unimpeded maneuverability. Stopped delay at signalized intersection is minimal.	0.00 to 0.60
B	Reasonably unimpeded operations with slightly restricted maneuverability. Stopped delays are not bothersome.	0.61 to 0.70
C	Stable operations with somewhat more restrictions in making mid-block lane changes than LOS B. Motorists will experience appreciable tension while driving.	0.71 to 0.80
D	Approaching unstable operations where small increases in volume produce substantial increases in delay and decreases in speed.	0.81 to 0.90
E	Operations with significant intersection approach delays and low average speeds.	0.91 to 1.00
F	Operations with extremely low speeds caused by intersection congestion, high delay, and adverse signal progression.	Greater Than 1.00

[a] For arterials that are multilane divided or undivided with some parking, a signalized intersection density of four to eight per mile, and moderate roadside development.
[b] Volume-to-capacity ratio.

≥ greater than or equal to.
< less than.

Source: Transportation Research Board, *Highway Capacity Manual, Special Report 209* (Washington, D.C., 1994).

Figure 6-5 Future 2041 Road Network Modelled in Emme

Figure 6-6 Future 2041 PM Peak Forecasted Auto Traffic Volumes, TMP-Proposed Network

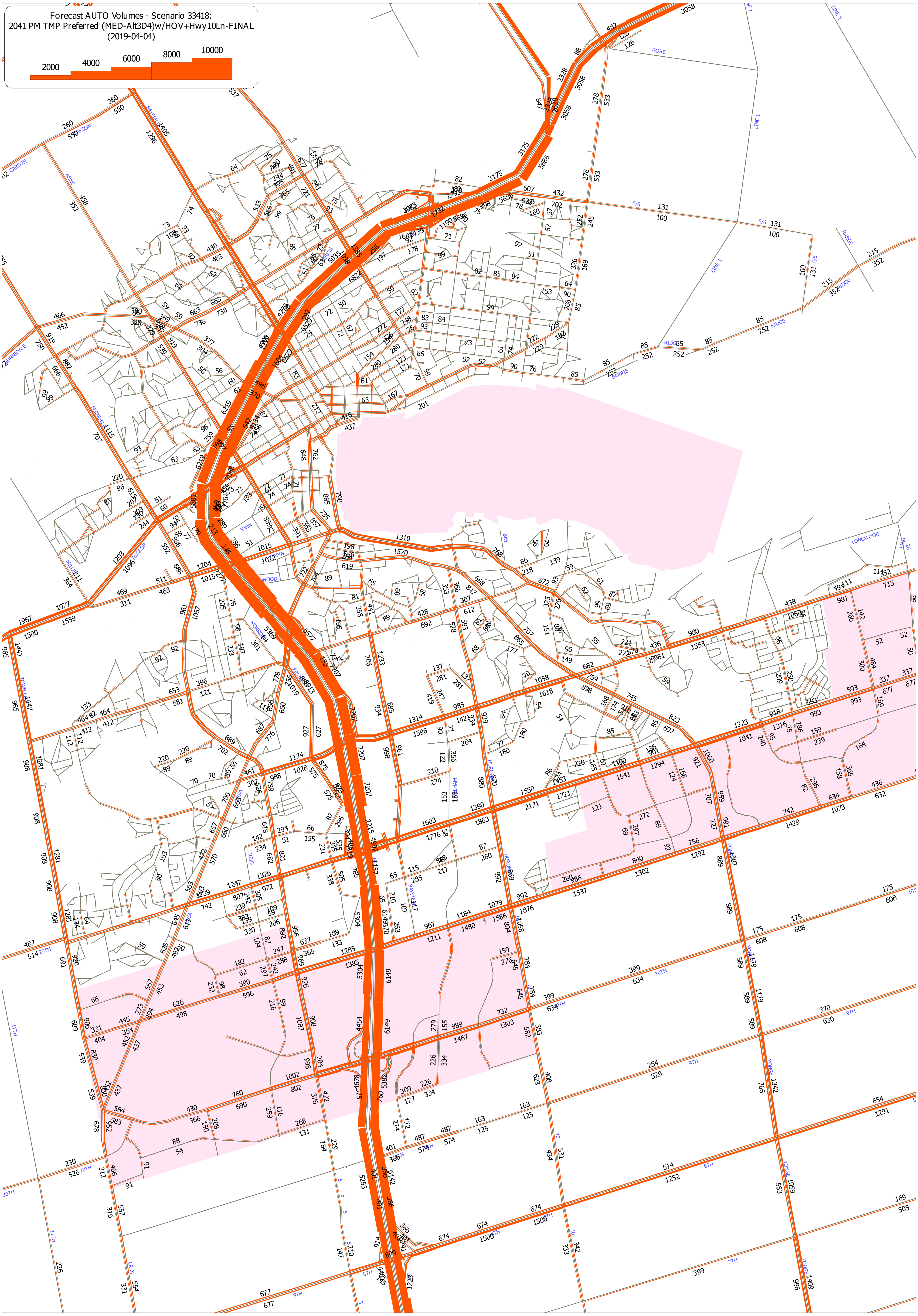

Figure 6-7 Future 2041 PM Peak Forecasted LOS (V/C Ratios) with TMP-Proposed Network

7 FUTURE 2031 ROAD NETWORK ASSESSMENT

The Emme modelling analysis for phasing horizon 2031 was conducted based on the future population and employment forecasts by 2031 to identify the timings of the needs for those improvements that are proposed for the ultimate 2041 conditions. The following modelling assumptions were applied:

1. Road capacity and network improvement projects already programmed in the City's 2019 Capital Plan, as listed in Table 6-1
2. Planned and recommended improvements by the Simcoe County. The improvements prior to 2031 are listed in Table 6-2
3. Planned and recommended improvements by the MTO. Specifically,
   a. MTO planned improvements to the existing Highway 400 Interchanges at Bayfield Street, Dunlop Street, Essa Road, Mapleview Drive, and Innisfil Beach Road, as listed in Table 6-3
   b. No widening to Highway 400. Highway 400 would remain the current six lanes. This is a conservative approach to determining the improvement needs for the City's roads by 2031.

7.1 ROAD NETWORK ALTERNATIVES

Three series of future road network alternatives by 2031 were developed to test and assess the needs for road network improvements and are discussed briefly below:

Alternative 1 – Future 2031 Do-Nothing (Ref. Emme Scenarios 41317 and 41318):

This network scenario includes a) existing road network, b) programmed improvements in City's 2019 Capital Plan, c) recommended improvements on County Roads, plus d) MTO recommended improvements to current interchanges. It represents the future 2031 do-nothing network alterative to the City's roads.

Alternative 2 – Future 2031 Phasing Network without Salem Road / Lockhart Road Crossing (Ref. Emme Scenarios 43317 and 43318):

This network scenario includes the future 2031 proposed improvements without the Salem Road / Lockhart Road Crossing, in addition to Alternative 1. This alternative is to justify the needs for improvements to City's roads by 2031. It also represents the do-nothing to the Salem Road / Lockhart Road Crossing.

Alternative 3 – Future 2031 Phasing Network with Salem Road / Lockhart Road Crossing (Ref. Emme Scenarios 44317 and 44318):

This network scenario includes the future 2031 proposed improvements, including the Salem Road / Lockhart Road Crossing, in addition to Alternative 1. This alternative represents the network effects of the Salem Road / Lockhart Road Crossing, opposed to Alternative 2. It represents the future 2031 proposed network.

7.2 NEED FOR SALEM ROAD / LOCKHART ROAD CROSSING

7.2.1 SCREENLINE ANALYSIS

A screenline analysis was conducted to assess the capacity deficiencies at the following screenlines between Mapleview Drive and McKay Road:

1. screenline at Highway 400 Crossing
2. screenline on West of Highway 400 Interchange Ramp Terminals
3. screenline on East of Highway 400 Interchange Ramp Terminals

Table 7-1 presents the analysis results for horizon year 2031 during the weekday PM peak hour (the worst-case peak period) for the three alternatives. The results indicate the following findings:

- The V/C ratios at the screenlines would be equal to or greater than 0.90 under the Alt. 1 – Future 2031 Do-Nothing, which includes the widening to the Harvie Road / Big Bay Point Road Crossing and the new McKay Road Interchange.
- Under the Alt. 2 network condition that includes the proposed city-wide road improvements, the V/C ratios at the three screenlines would be reduced. The V/C ratio at the Highway 400 Crossing would be reduced from 0.91 to 0.85, which indicates a capacity deficiency.
- There would be a deficiency of at least one lane per direction (a total of two lanes).
- Under the Alt. 3 network condition that includes the new Salem Road / Lockhart Road Crossing with four through lanes, the V/C ratios at the three screenlines would be reduced to a range from 0.73 to 0.76.

7.2.2 NETWORK EFFECTS

Figure 7-1 presents the changes of auto traffic volumes with and without the new Salem Road / Lockhart Road Crossing (Alt. 3 versus Alt. 2) during the future 2031 PM peak hour. The new Salem Road / Lockhart Road Crossing would:

- reduce the auto traffic volumes by approximately 400 vehicles per hour in the peak travel direction
- experience the auto demand of approximately 1,100 per hour in the peak travel direction
- free up some capacity on Mapleview Drive and increase the volumes of auto traffic accessing the Mapleview Drive Interchange

Figure 7-2 presents the changes of auto traffic volumes on Mapleview Drive between the future 2031 network condition without the new Salem Road / Lockhart Road Crossing (Alt. 2) and the existing network condition (no Salem Road / Lockhart Road Crossing) during the PM peak hour. The comparison results indicate:

- The future auto traffic volumes on Mapleview Drive would be increased by approximately 760 vehicles (600 vehicles at the crossing segment) per hour in the peak travel direction
- The future traffic volumes on both the southbound Off-Ramp and the northbound On-ramp would be reduced by approximately 460 vehicles per hour, which is due to the congestion on Mapleview Drive that would impact the access.

Given the current congestion on Mapleview Drive, the future volume increase on Mapleview Drive indicates the need for the new Salem Road / Lockhart Road Crossing, which will provide additional capacity at Highway 400 crossing.

Table 7-2 provides the results of forecasted auto volumes, V/C ratios, system performance, and their changes (i.e. network effects) between two scenarios.

Table 7-1 Screenline Analysis Results for Salem / Lockhart Crossing by 2031

Screenline No.	Screenline and Location	Travel Direction	Horizon 2031 - Alt. 1, Do-Nothing (Emme Scen. 41318) Mid-Week PM Peak Hour						Horizon 2031 - Alt. 2, 2031 Phasing Network without new Salem / Lockhart Crossing (Emme Scen. 43318) Mid-Week PM Peak Hour						Horizon 2031 - Alt. 3, 2031 Phasing Network with new Salem / Lockhart Crossing (Emme Scen. 44318) Mid-Week PM Peak Hour					
			Lanes	Lane Auto Capacity	Total Auto Capacity	Modelled Auto Volumes	V/C	Lane Deficiency	Lanes	Lane Auto Capacity	Total Auto Capacity	Modelled Auto Volumes	V/C	Lane Deficiency	Lanes	Lane Auto Capacity	Total Auto Capacity	Modelled Auto Volumes	V/C	Lane Deficiency
Screenline at Highway 400 Crossing																				
500	**Highway 400**	EB	3.0	1,000	3,000	3,226	1.08	1	3.0	1,000	3,000	3,060	1.02	1	3.0	1,000	3,000	2,776	0.93	1
	Mapleview Drive	WB	3.0	1,000	3,000	2,636	0.88	1	3.0	1,000	3,000	2,604	0.87	1	3.0	1,000	3,000	2,305	0.77	0
	Highway 400	EB	No Crossing						No Crossing						2.0	850	1,700	1,092	0.64	0
	Salem Road / Lockhart Road	WB													2.0	850	1,700	869	0.51	0
	Highway 400	EB	2.0	850	1,700	1,057	0.62	0	2.0	850	1,700	935	0.55	0	2.0	850	1,700	637	0.37	0
	McKay Road	WB	2.0	850	1,700	846	0.50	0	2.0	850	1,700	768	0.45	0	2.0	850	1,700	568	0.33	0
	Subtotal	**EB**			**4,700**	**4,283**	**0.91**				**4,700**	**3,995**	**0.85**				**4,700**	**3,413**	**0.73**	
	Subtotal	**WB**			**4,700**	**3,482**	**0.74**				**4,700**	**3,372**	**0.72**				**4,700**	**2,873**	**0.61**	
Screenlines on Both Sides of Highway 400 Interchange Ramp Terminals																				
501	**W of Highway 400**	EB	3.0	1,000	3,000	2,745	0.92	1	3.0	1,000	3,000	2,633	0.88	1	3.0	1,000	3,000	2,336	0.78	0
	Mapleview Drive	WB	3.0	1,000	3,000	2,385	0.79	0	3.0	1,000	3,000	2,356	0.79	0	3.0	1,000	3,000	2,136	0.71	0
	W of Highway 400	EB	No crossing						No crossing						2.0	850	1,700	1,071	0.63	0
	Salem Road (Lockhart Road)	WB													2.0	850	1,700	865	0.51	0
	W of Highway 400	EB	2.0	850	1,700	1,488	0.88	1	2.0	850	1,700	1,413	0.83	0	2.0	850	1,700	1,183	0.70	0
	MacKay Road	WB	2.0	850	1,700	1,096	0.64	0	2.0	850	1,700	963	0.57	0	2.0	850	1,700	778	0.46	0
	Subtotal	**EB**			**4,700**	**4,233**	**0.90**				**4,700**	**4,046**	**0.86**				**4,700**	**3,519**	**0.75**	
	Subtotal	**WB**			**4,700**	**3,481**	**0.74**				**4,700**	**3,319**	**0.71**				**4,700**	**2,914**	**0.62**	
502	**E of Highway 400**	EB	3.0	1,000	3,000	3,198	1.07	1	3.0	1,000	3,000	3,134	1.04	1	3.0	1,000	3,000	2,711	0.90	1
	Mapleview Drive	WB	3.0	1,000	3,000	3,215	1.07	1	3.0	1,000	3,000	3,059	1.02	1	3.0	1,000	3,000	2,696	0.90	1
	E of Highway 400	EB	No crossing						No crossing						2.0	850	1,700	1,092	0.64	0
	Lockhart Road (Salem Road)	WB													2.0	850	1,700	869	0.51	0
	E of Highway 400	EB	2.0	850	1,700	1,105	0.65	0	2.0	850	1,700	1,132	0.67	0	2.0	850	1,700	880	0.52	0
	MacKay Road	WB	2.0	850	1,700	897	0.53	0	2.0	850	1,700	825	0.49	0	2.0	850	1,700	608	0.36	0
	Subtotal	**EB**			**4,700**	**4,303**	**0.92**				**4,700**	**4,266**	**0.91**				**4,700**	**3,591**	**0.76**	
	Subtotal	**WB**			**4,700**	**4,112**	**0.87**				**4,700**	**3,884**	**0.83**				**4,700**	**3,304**	**0.70**	

wsp

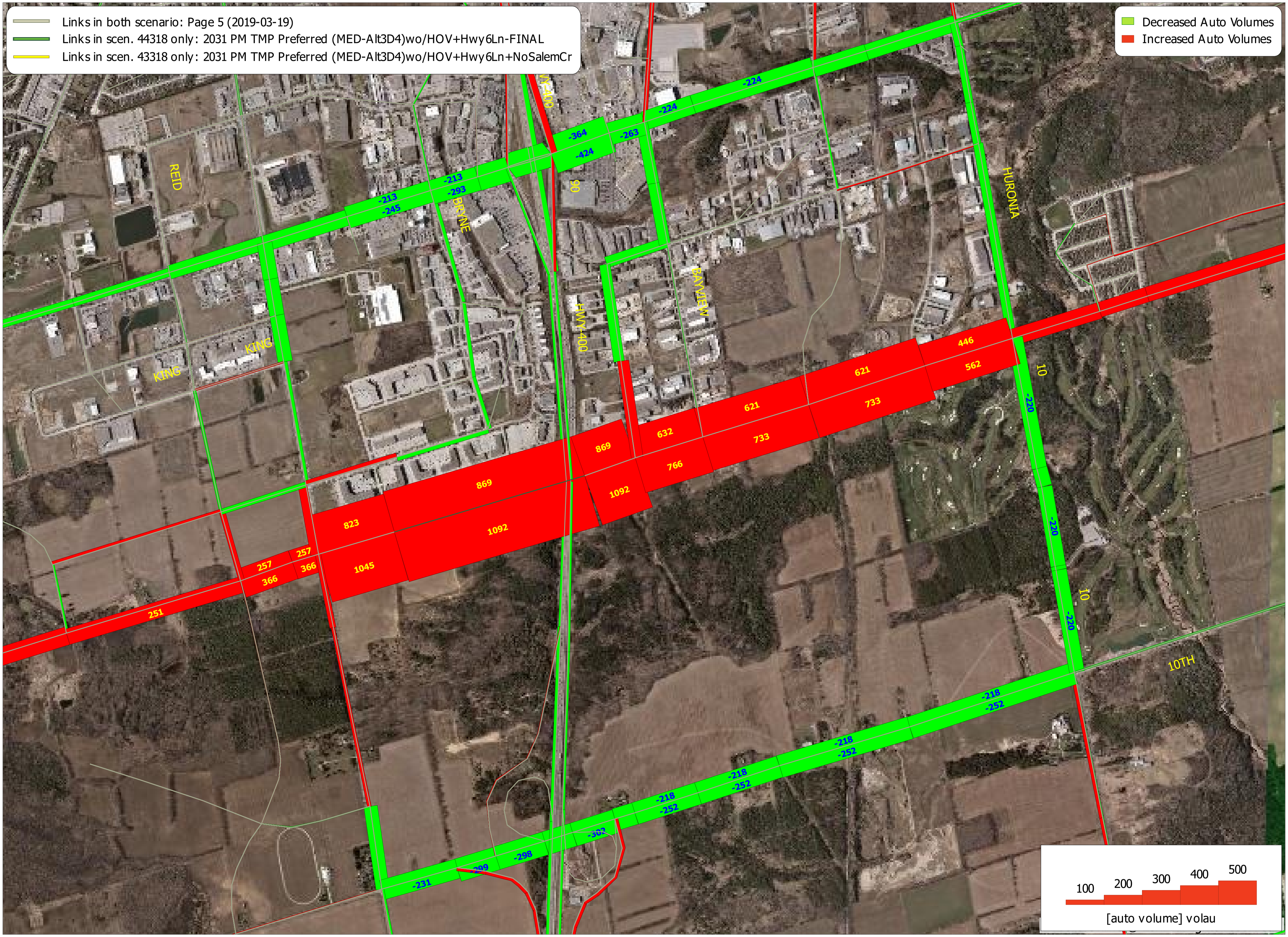

Figure 7-1 **Changes of Auto Traffic Volumes with and without Salem / Lockhart Crossing (Alt. 3 vs. Alt. 2), 2031 PM Peak Hour**

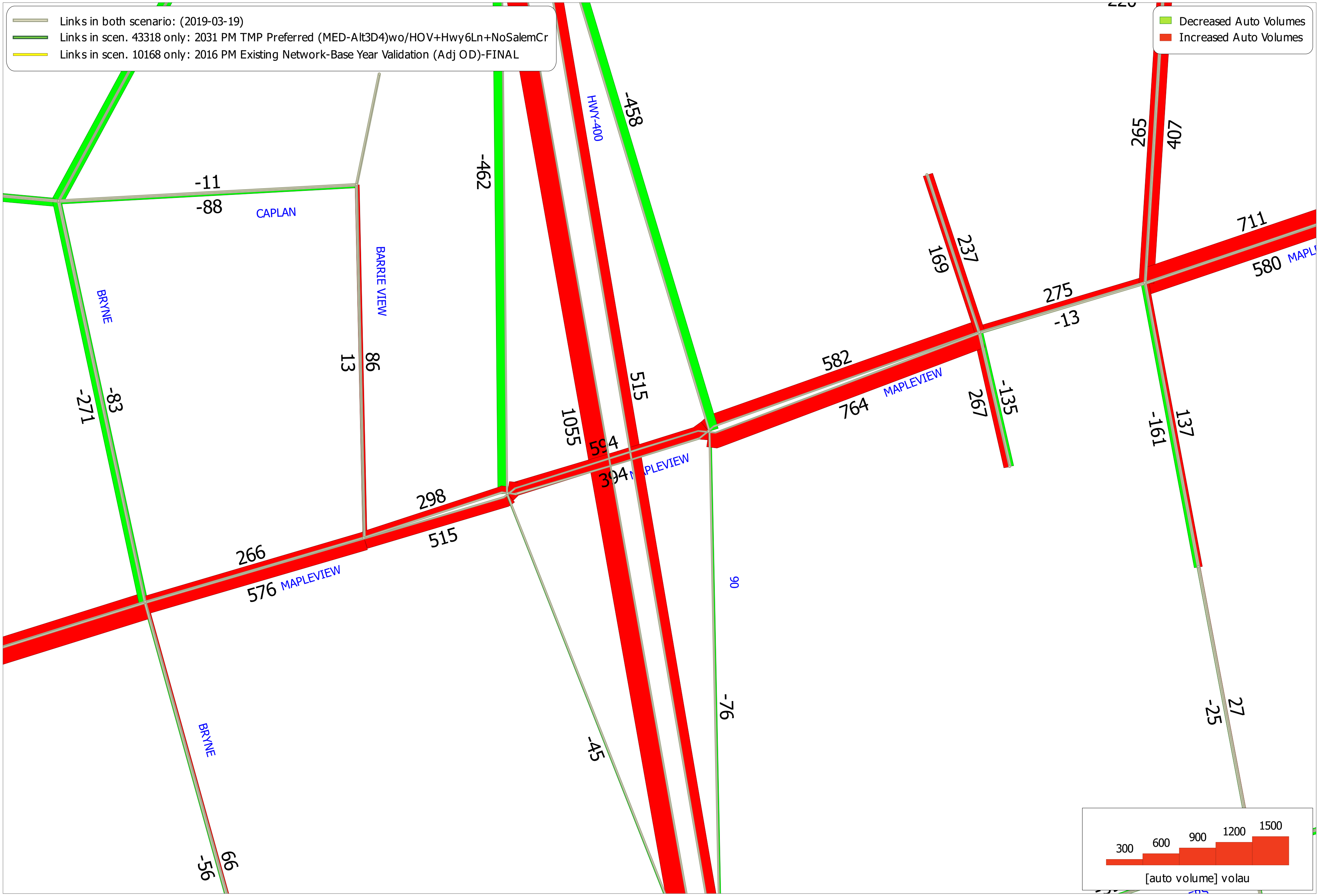

Figure 7-2 Comparison of Auto Traffic Volumes with and without Salem / Lockhart Crossing (2031 vs. Existing) during PM Peak Hour, Mapleview Drive

Table 7-2 Assessment of the Need for Salem / Lockhart Crossing by 2031

Location	Alternative 1, 2031 Do-Nothing (Capital Plan + planned improvements)			Alternative 2, 2031 Phasing Network without new Salem / Lockhart Crossing			Alternative 3, 2031 Phasing Network with new Salem / Lockhart Crossing			Scenario Comparison (Alternative 3 - Alternative 2) (Network effects of Salem / Lockhart Crossing)			Scenario Comparison (Alternative 3 - Alternative 1) (Total network effects of both Salem / Lockhart Crossing and City-wide Improvements)		
	Lanes	Emme Scen. 41318 PM		Lanes	Emme Scen. 43318 PM		Lanes	Emme Scen. 44318 PM		Lane Change	PM		Lane Change	PM	
		Auto Volumes	Auto V/C		Auto Volumes	Auto V/C		Auto Volumes	Auto V/C		Volume Change	V/C Change (%)		Volume Change	V/C Change (%)
Forecast Auto Volumes and V/C Ratios															
Big Bay Point Road Crossing															
EB	2	1,436	0.84	2	1,308	0.77	2	1,191	0.70		-117	-9%		-245	-17%
WB	2	1,153	0.68	2	922	0.54	2	797	0.47		-125	-13%		-356	-31%
Mapleview Drive, West of Interchange															
EB	3	2,745	0.92	3	2,633	0.88	3	2,336	0.78		-297	-11%		-409	-15%
WB	3	2,385	0.79	3	2,356	0.79	3	2,136	0.71		-220	-10%		-249	-10%
Mapleview Interchange															
SB Off-Ramp	2	878	0.31	2	812	0.29	2	852	0.30		40	3%		-26	-3%
NB Off-Ramp	2	1,043	0.37	2	976	0.35	2	1,032	0.37		56	6%		-11	0%
SB On-Ramp	1	649	0.46	1	633	0.45	1	581	0.42		-52	-7%		-68	-9%
NB On-Ramp	2	1,649	0.59	2	1,357	0.48	2	1,489	0.53		132	10%		-160	-10%
Total at All Ramps		***4,219***			***3,778***			***3,954***			***176***			***-265***	
Mapleview Drive Crossing															
EB	3	3,226	1.08	3	3,060	1.02	3	2,776	0.93		-284	-9%		-450	-14%
WB	3	2,636	0.88	3	2,604	0.87	3	2,305	0.77		-299	-11%		-331	-13%
Mapleview Drive, East of Interchange															
EB	3	3,198	1.07	3	3,134	1.04	3	2,711	0.90		-423	-13%		-487	-16%
WB	3	3,215	1.07	3	3,059	1.02	3	2,696	0.90		-363	-12%		-519	-16%
Salem / Lockhart Road Crossing															
EB	Not existing			Not existing			2	1,092	0.64	+2	n.a.	n.a.	+2	n.a.	n.a.
WB	Not existing			Not existing			2	869	0.51	+2	n.a.	n.a.	+2	n.a.	n.a.
McKay Road, West of Interchange															
EB	2	1,488	0.88	2	1,413	0.83	2	1,183	0.70		-230	-16%		-305	-20%
WB	2	1,096	0.64	2	963	0.57	2	778	0.46		-185	-19%		-318	-28%
McKay Interchange															
SB Off-Ramp	2	492	0.18	2	470	0.17	2	485	0.17		15	0%		-7	-6%
NB Off-Ramp	2	199	0.07	2	318	0.11	2	384	0.14		66	27%		185	100%
SB On-Ramp (W-S)	1	557	0.40	1	574	0.41	1	642	0.46		68	12%		85	15%
NB On-Ramp (E-N)	1	71	0.05	1	67	0.05	1	64	0.05		-3	0%		-7	0%
SB On-Ramp (E-S)	1	117	0.08	1	179	0.13	1	179	0.13		0	0%		62	63%
NB On-Ramp (W-N)	1	130	0.09	1	111	0.08	1	116	0.08		5	0%		-14	-11%
Total at All Ramps		***1,566***			***1,719***			***1,870***			***151***			***304***	
McKay Road Crossing															
EB	2	1,057	0.62	2	935	0.55	2	637	0.37		-298	-33%		-420	-40%
WB	2	846	0.50	2	768	0.45	2	568	0.33		-200	-27%		-278	-34%
McKay Road, East of Interchange															
EB	2	1,105	0.65	2	1,132	0.67	2	880	0.52		-252	-22%		-225	-20%
WB	2	897	0.53	2	825	0.49	2	608	0.36		-217	-27%		-289	-32%
Overall System Performance															
Vehicle Kilometres Travelled (VKT)	2,733,817			2,729,197			2,728,389			-808			-5,428		
Vehicle Hours Travelled (VHT)	61,350			60,571			60,436			-135			-914		
Average Road Speed (km/h)	59			59			59			0.06			0.35		
Value of Travel Time Savings Annually ($)[1]										**$1,212,000**			**$8,226,000**		

n.a. = not applicable

[1]. The value of travel time savings annually in dollars were calculated based on the following assumptions:

Number of hours affected in the AM or PM peak period = 2 hours
Value of travel time per person = $15/hr
Vehicle occupancy = 1.2 persons
Number of work days per year = 250

The above assumptions were applied in the Harvie Road / Big Bay Point Road / Highway 400 Class Environmental Assessment Study Draft Report prepared by Morrison Hershfield Limited, dated November 8, 2010.

Notes: 1. The interchange ramps shaded in light red indicate that the volume to capacity (V/C) ratios are greater than 0.75; the City roads shaded in light yellow indicate that the V/C ratios are greater than 0.85.
2. The overall system performance statistics are for the whole network simulated in the Macro Model.

Highlight Legend:

V/C Ratio:

Congestion (V/C > 0.75) on	0.76
Congestion (V/C > 0.85) on City	0.86

Congestion Reduction:

Increased values	1,055
Decreased values	-238

In summary, the network effects of the Salem Road / Lockhart Road Crossing are listed in Table 7-3.

Table 7-3 Network Effects of Salem / Lockhart Crossing by 2031

Category of Effects	Alternative 3 – 2031 Proposed Network with Salem / Lockhart Crossing
	(*Scenario comparison: Alt. 3 minus Alt. 2)*
Reduction of congestion at Mapleview Drive and Crossing	**Reduce** congestion by **11%** at west of the interchange; by **9%** at crossing; by **13%** east of the interchange.
Accessibility at Mapleview DDI	Reduce congestion on Mapleview Drive, thus free up the roadway capacity for traffic accessing the interchange and increase the ramp demand by approximately 175 vehicles.
Reduction of VKT	**Reduce 810** vehicle kilometres, indicating that the new crossing would provide shorter travel distances.
Reduction of VHT	**Reduce 135** vehicle hours, indicating that the new crossing would provide shorter travel distances and reduce the network congestion.
Value of Travel Time Savings Annually	**$1,212,000** (approximately **15%** of the total savings resulting from the proposed 2031 improvements.)

Note: VKT = Vehicle Kilometres Travelled; VHK = Vehicle Hours Travelled.

7.3 RATIONALE FOR PHASING IMPROVEMENTS

The phasing of the road network by 2031 was developed based on the following rationale:

1. the capacity deficiencies resulting from the future forecasted population and employment growth
2. the expected timelines when the adjacent land developments are to be implemented
3. road capacity and network improvement projects already programmed in the City's 2019 Capital Plan
4. the construction phases planned by the City for a road widening project
5. coordination with the required widening at adjacent roadway segments to reduce the costs by phases or ensure roadway consistency in cross-sections

Figure 7-3 presents the forecasted V/C ratios during the PM peak hour by 2031, which indicate road sections experiencing the future capacity deficiencies under the Alt. 1 network condition – 2031 "Do-Nothing" network. More model plots for both the AM and PM peak hours are provided in Appendix E-4.

Table 7-4 summarizes the rationale for road sections that are proposed for improvements by 2031.

Refer to Figure 5-9 of the TMP main report for the proposed 2031 road network.

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Figure 7-3 Future 2031 PM Peak Forecasted Auto V/C Ratios, "Do-Nothing" Network

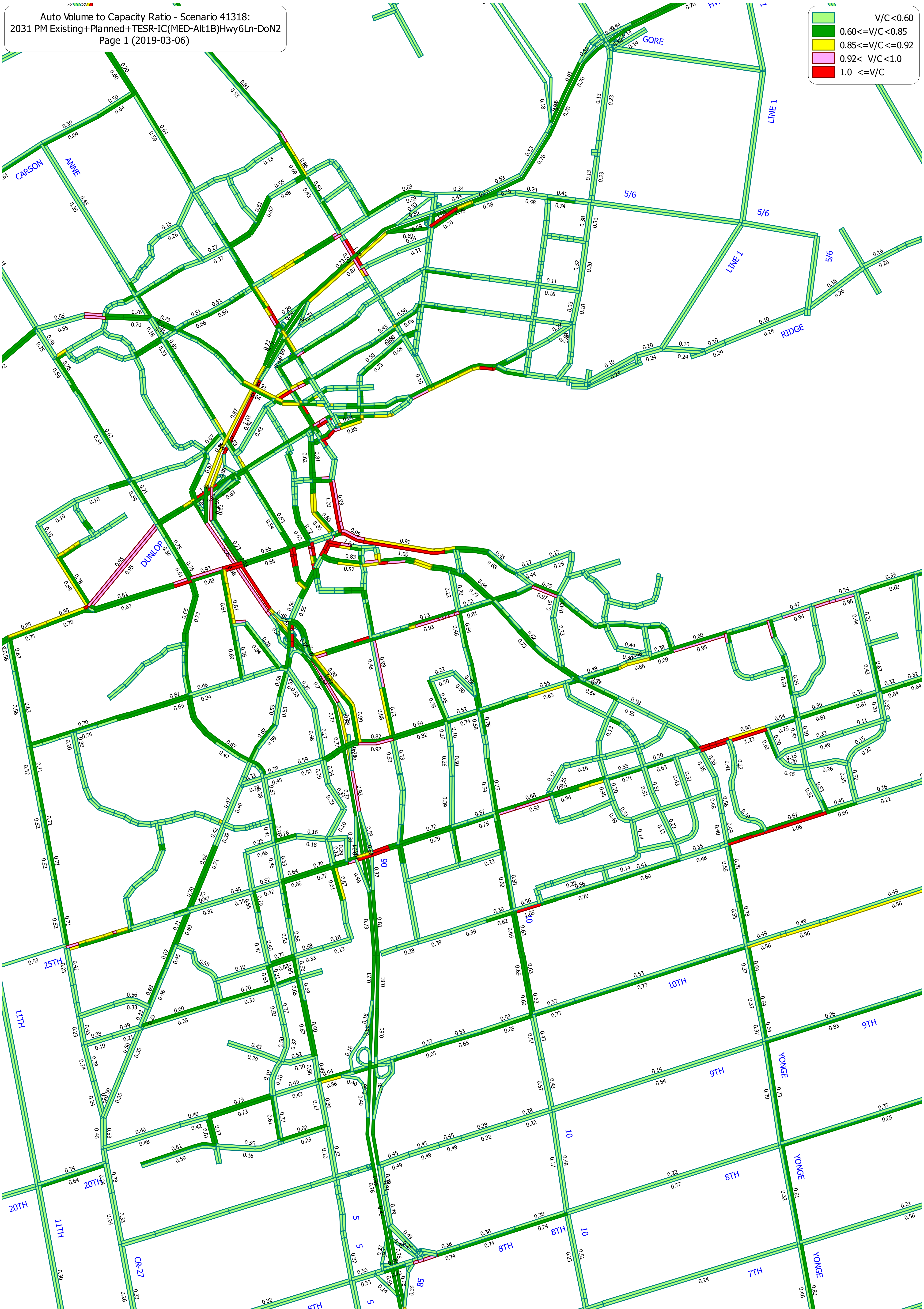


Table 7-4 **Rationale for Phasing Improvements, Horizon 2031** *(Page 1/9)*

Road	From	To	Road Classification	2016 Network	2031 Proposed Network	Rationale for Phasing Improvements by 2031
Anne Street N	Dunlop Street W	Donald Street	Arterial	4 lanes	4 lanes + TWLTL	Capacity needs.
Anne Street N (Highway 400 Crossing)	Donald Street	Edgehill Drive	Arterial	4 lanes	4 lanes + TWLTL	Capacity needs.
Anne Street S	Tiffin Street	Centre Street / Campbell Avenue	Arterial	2 lanes	2 lanes + TWLTL	Capacity needs.
Anne Street S	Centre Street / Campbell Avenue	Essa Road	Arterial	2 lanes	4 lanes + TWLTL	Capacity needs.
Anne Street S	Essa Road	Adelaide Street	Major Collector	2 lanes	2 lanes + TWLTL	Adjacent development would occur. Connect Baldwin to Anne.
Anne Street S	Adelaide Street	Innisfil Street / Baldwin Lane	Major Collector	Does not exist	2 lanes + TWLTL	
Anne Street	Sunnidale Road	City Northwest Limits	Arterial	2 lanes	2 lanes + TWLTL	Widen to provide property access and improve traffic flow.
Ardagh Road	Patterson Road	Essa Road	Arterial	4 lanes	4 lanes + TWLTL	Existing traffic operation issues at Morrow and Essa; Widen to be consistent with the Bryne extension south of Essa.
Baldwin Lane	Innisfil Street	Bayview Drive	Major Collector	2 lanes	2 lanes + TWLTL	Adjacent development would occur.
Bayfield Street	Grove Street W	Highway 400 NB Off-Ramp	Arterial	4 lanes	4 lanes + TWLTL	Capacity needs. Widen when the improvements at the interchange occur.
Bayfield Street	Highway 400 SB Off-Ramp	Cundles Road	Arterial	4 lanes + TWLTL	6 lanes + TWLTL	
Bayfield Street (Highway 400 Crossing)	Highway 400 NB Off-Ramp	Highway 400 SB Off-Ramp	Arterial	4 lanes + TWLTL	6 lanes (including 2 HOV) + TWLTL	Capacity needs. Widen when the improvements at the interchange occur.
Bayview Drive	Burton Avenue	Little Avenue	Major Collector	2 lanes	2 lanes + TWLTL	Reconfigure lanes to provide a TWLTL, improving traffic flow.
Bayview Drive	Little Avenue	Big Bay Point Road	Arterial	2 lanes	4 lanes + TWLTL	Capacity needs.

Table 7-4 Rationale for Phasing Improvements, Horizon 2031 *(Page 2/9)*

Road	From	To	Road Classification	2016 Network	2031 Proposed Network	Rationale for Phasing Improvements by 2031
Bayview Drive	Mapleview Drive	Lockhart Road	Arterial	2 lanes	2 lanes + TWLTL	Widen when construction of the Salem/Lockhart Crossing would occur.
Bell Farm Road	St. Vincent Street	Alliance Boulevard (East End)	Major Collector	2 lanes	2 lanes + TWLTL	Adjacent development would occur.
Big Bay Point Road	Bayview Drive	Huronia Road	Arterial	2 lanes	4 lanes + TWLTL	Improvements were programmed in the City 2019 Capital Plan to increase capacity.
Big Bay Point Road	Fairview Road	Bayview Drive	Arterial	2 lanes	4 lanes [1] + TWLTL	
Big Bay Point Road	Leggott Avenue	Dean Avenue	Arterial	4 lanes	4 lanes + TWLTL	Capacity needs. Widen to provide a TWLTL for property access.
Big Bay Point Road	Prince William Way	Collector 11	Arterial	2 lanes	4 lanes + TWLTL	Capacity needs.
Big Bay Point Road	Collector 11	Approx. 280m east of Collector 11	Arterial	2 lanes	2 lanes + TWLTL	Transition to 3 lanes. Widen when widenings on other sections occur.
Blake Street	Duckworth Street	Johnson Street	Arterial	2 lanes	2 lanes + TWLTL	Capacity needs along the Blake Street corridor.
Bradford Street	Simcoe Street	Tiffin Street	Arterial	4 lanes	4 lanes + TWLTL	Capacity needs. Widen when adjacent development occurs.
Bryne Drive (North)	Approx. 200m south of Essa Road	South end of existing Bryne Drive	Arterial	2 lanes	4 lanes + TWLTL	Improvements were programmed in the City 2019 Capital Plan to increase capacity and network connectivity.
Bryne Drive (North)	South end of existing Bryne Drive	North end of existing Bryne Drive, north of Mapleview Drive W	Arterial	Does not exist	4 lanes + TWLTL	
Bryne Drive (South)	North end of existing Bryne Drive, north of Mapleview Drive W	Caplan Avenue	Arterial	2 lanes	4 lanes + TWLTL	
Bryne Drive (South)	Approx. 150m south of Mapleview Drive	Commerce Park Drive	Major Collector	2 lanes + TWLTL	4 lanes + TWLTL	Capacity needs.

Table 7-4 Rationale for Phasing Improvements, Horizon 2031 *(Page 3/9)*

Road	From	To	Road Classification	2016 Network	2031 Proposed Network	Rationale for Phasing Improvements by 2031
Burton Avenue	Essa Road	Bayview Drive	Arterial	2 lanes	2 lanes + TWLTL	Capacity needs and property access needs. Widen when adjacent development occurs.
Burton Avenue	Bayview Drive	Robinson Street	Arterial	2 lanes	4 lanes	Capacity needs.
Collier Street	Mulcaster Street	Blake Street	Major Collector	2 lanes	2 lanes + TWLTL	Reconfigure lanes to provide a TWLTL, improving traffic flow.
Cundles Road	St. Vincent Street	Livingston Street	Arterial	4 lanes	4 lanes + TWLTL	Widen to provide property access and improve traffic flow. Widen to have a consistent 5-lane cross-section.
Dunlop Street W	City boundary	Ferndale Drive N	Arterial	2 lanes	4 lanes + TWLTL	Capacity needs. The City is planning to build with 5 lanes during the first phase.
Dunlop Street W (Highway 400 Crossing)	Cedar Pointe Drive	Highway 400 NB On-Ramp	Arterial	2 lanes	4 lanes + TWLTL	
Dunlop Street W	Highway 400 NB On-Ramp	Anne Street N	Arterial	4 lanes	4 lanes + TWLTL	
Essa Road	Tiffin Street	Gowan Street	Arterial	4 lanes	4 lanes + TWLTL	Capacity needs.
Essa Road	Gowan Street	Anne Street	Arterial	4 lanes	4 lanes + TWLTL	
Essa Road	Anne Street S	Approx. 230m west of Anne Street S	Arterial	4 lanes	4 lanes + TWLTL	
Essa Road	Approx. 230m west of Anne Street S	Fairview Road	Arterial	4 lanes	6 lanes + TWLTL	
Essa Road (Highway 400 Crossing)	Fairview Road	Highway 400 SB Off-Ramp	Arterial	4 lanes	6 lanes + TWLTL	
Essa Road	Highway 400 SB Off-Ramp	Ardagh Road	Arterial	4 lanes + TWLTL	6 lanes + TWLTL	
Essa Road	Coughlin Road	Mapleview Road	Arterial	2 lanes	4 lanes + TWLTL	Widen when adjacent development occurs. Widen to have a consistent 5-lane cross-section.

Table 7-4 Rationale for Phasing Improvements, Horizon 2031 *(Page 4/9)*

Road	From	To	Road Classification	2016 Network	2031 Proposed Network	Rationale for Phasing Improvements by 2031
Essa Road	Mapleview Drive	Salem Road	Arterial	2 lanes	2 lanes + TWLTL	Widen when adjacent development occurs.
Essa Road	Salem Road	Approx. 670m south of Salem Road	Arterial	2 lanes	2 lanes + TWLTL	
Fairview Road	Essa Road	Little Avenue	Arterial	4 lanes	4 lanes + TWLTL	Widen when the section south of Little is widened. A TWLTL is to provide property access and accommodate left turning traffic queues, improving traffic flow.
Fairview Road	Little Avenue	Big Bay Point	Arterial	2 lanes	4 lanes	Capacity needs.
Ferndale Drive	City North Limit	South of Benson Drive	Arterial	2 lanes + TWLTL	4 lanes	Reconfigure lanes with removal of existing bike lanes when new bike facilities are built.
Georgian Drive	Duckworth Street	Governors Drive	Arterial	4 lanes	6 lanes	Capacity needs.
Georgian Drive	Governors Drive	Gallie Court	Arterial	4 lanes	4 lanes + TWLTL	
Georgian Drive	Gallie Court	Johnson Street	Arterial	4 lanes	4 lanes + TWLTL	Widen to provide property access and improve traffic flow. Widen when the widening at the western section occur.
Hamilton Road	Truman Road	Welham Road	Minor Collector	2 lanes	2 lanes + TWLTL	Widen when adjacent development occurs.

Table 7-4 Rationale for Phasing Improvements, Horizon 2031 *(Page 5/9)*

Road	From	To	Road Classification	2016 Network	2031 Proposed Network	Rationale for Phasing Improvements by 2031
Harvie Road	Essa Road	Veterans Drive	Arterial	2 lanes	2 lanes + TWLTL	Improvements were programmed in the City 2019 Capital Plan to increase capacity and network connectivity. The crossing structure will be built to protect for 7 lanes.
Harvie Road	Veterans Drive	Bryne Drive	Arterial	2 lanes	4 lanes + TWLTL	
Harvie Road	Bryne Drive	Fairview Road	Arterial	Does not exist	4 lanes + TWLTL	
Huronia Road	Yonge Street	Little Avenue	Arterial	2 lanes	2 lanes + TWLTL	Widen when adjacent development occurs.
Huronia Road	Little Avenue	Herrell Avenue	Arterial	2 lanes	2 lanes + TWLTL	
Huronia Road	Herrell Avenue	Big Bay Point Road	Arterial	2 lanes	4 lanes + TWLTL	Widen when adjacent development occurs, or when Big Bay Point Road is widened.
Huronia Road	Big Bay Point Road	Mapleview Drive	Arterial	2 lanes	2 lanes + TWLTL	Widen when adjacent development occurs.
Huronia Road	Mapleview Drive	Lockhart Road	Arterial	2 lanes	2 lanes + TWLTL	Widen when adjacent development occurs.
Huronia Road	Lockhart Road	McKay Road E	Arterial	2 lanes	2 lanes + TWLTL	Widen when adjacent development occurs.
Huronia Road	McKay Road E	City Boundary	Arterial	2 lanes	2 lanes + TWLTL	Widen when adjacent development occurs.
Hurst Drive	Minet's Point Road	Bay Lane	Arterial	2 lanes	4 lanes	Widen when Lakeshore Boulevard is widened.
Hurst Drive	Bay Lane	Little Avenue	Arterial	2 lanes + TWLTL	4 lanes	
Hurst Drive	Little Avenue	Cox Mill Road	Arterial	2 lanes + TWLTL	4 lanes	
Innisfil Street	Tiffin Street	Essa Road	Major Collector	2 lanes	2 lanes + TWLTL	Widen when adjacent redevelopment occur.

Table 7-4 **Rationale for Phasing Improvements, Horizon 2031** *(Page 6/9)*

Road	From	To	Road Classification	2016 Network	2031 Proposed Network	Rationale for Phasing Improvements by 2031
Lakeshore Drive	Tiffin Street	Minet's Point Road	Arterial	2 lanes + Median	4 lanes + Median	Capacity needs.
Little Avenue	Fairview Road	Marshall Street	Arterial	2 lanes	4 lanes + TWLTL	Capacity needs.
Little Avenue	Marshall Street	Bayview Drive	Arterial	2 lanes	2 lanes + TWLTL	
Little Avenue	Bayview Drive	Huronia Road	Arterial	2 lanes	2 lanes + TWLTL	
Little Avenue	Huronia Road	Hurst Drive	Arterial	2 lanes	2 lanes + TWLTL	
Lockhart Road	Salem Road	Huronia Road	Arterial	2 lanes	4 lanes + TWLTL	Timing is driven by the construction of the Salem/Lockhart Crossing.
Lockhart Road	Huronia Road	Yonge Street	Arterial	2 lanes	4 lanes + TWLTL	Capacity needs.
Lockhart Road	Yonge Street	Prince William Way	Arterial	2 lanes	4 lanes + TWLTL	
Lockhart Road	Prince William Way	Collector 11	Arterial	2 lanes	4 lanes + TWLTL	Widen when adjacent development occurs, and build to 5 lanes at one phase.
Lockhart Road	Collector 11	Approx. 150m east of Collector 11	Arterial	2 lanes	2 lanes + TWLTL	Widen when adjacent development occurs.
Madelaine Drive (North of Mapleview)	Yonge Street	Mapleview Drive	Major Collector	4 lanes	2 lanes + TWLTL	Road diet to accommodate AT facilities.
Mapleview Drive	Country Lane	Madelaine Drive	Arterial	2 lanes	4 lanes + TWLTL	Improvements were programmed in the City 2019 Capital Plan to increase capacity.
Mapleview Drive	Madelaine Drive	Yonge Street	Arterial	2 lanes	4 lanes + TWLTL	
Mapleview Drive	Yonge Street	Collector 8	Arterial	2 lanes	4 lanes + TWLTL	
Mapleview Drive	Collector 8	Prince William Way	Arterial	2 lanes	4 lanes + TWLTL	
Mapleview Drive	Prince William Way	Collector 11	Arterial	2 lanes	4 lanes + TWLTL	Widen when adjacent development occurs, and build to 5 lanes at one phase.
Mapleview Drive	Collector 11	Approx. 428m east of Collector 11	Arterial	2 lanes	2 lanes + TWLTL	Widen when adjacent development occurs.

Table 7-4 Rationale for Phasing Improvements, Horizon 2031 *(Page 7/9)*

Road	From	To	Road Classification	2016 Network	2031 Proposed Network	Rationale for Phasing Improvements by 2031
McKay Road	Approx. 900m east of city boundary	Reid Drive	Arterial	2 lanes	2 lanes + TWLTL	Improvements were programmed along with the new interchange in the City 2019 Capital Plan.
McKay Road	Reid Drive	Veterans Drive	Arterial	2 lanes	4 lanes + TWLTL	
McKay Road W	Veterans Drive	West Ramp Terminal	Arterial	2 lanes	4 lanes + TWLTL	
McKay Road W (Highway 400 Crossing)	West Ramp Terminal	East Ramp Terminal	Arterial	2 lanes	4 lanes + TWLTL	
McKay Road W	East Ramp Terminal	Welham Road	Arterial	2 lanes	4 lanes + TWLTL	
McKay Road	Welham Road	Huronia Road	Arterial	2 lanes	4 lanes + TWLTL	
McKay Road	Highway 400			Interchange does not exist	New interchange	Improvements were programmed in the City 2019 Capital Plan.
Minet's Point Road	Lakeshore Drive	Yonge Street	Arterial	4 lanes	4 lanes + TWLTL	Widen when Lakeshore and Hurst are widened. A TWLTL is to provide property access and improve traffic flow.
Salem Road	County Road 27	Essa Road	Arterial	2 lanes	2 lanes + TWLTL	Widen when adjacent development occurs.
Salem Road	Essa Road	Reid Drive	Arterial	2 lanes	2 lanes + TWLTL	Widen when adjacent development occurs.
Salem Road	Veterans Drive	Approx. 600 m east of Veterans Road	Arterial	4 lanes	4 lanes + TWLTL	Widen along with the construction of the new crossing.
Salem Road (Highway 400 Crossing)	Approx. 600 m east of Veterans Road	Lockhart Road	Arterial	Does not exist	4 lanes + TWLTL	The construction of the Salem/Lockhart Crossing would relieve the congestion and capacity deficiencies at Mapleview. It would encourage adjacent development.

Table 7-4 Rationale for Phasing Improvements, Horizon 2031 *(Page 8/9)*

Road	From	To	Road Classification	2016 Network	2031 Proposed Network	Rationale for Phasing Improvements by 2031
Sproule Drive	Sproule Drive east end	Ferndale Drive N	Minor Collector	Does not exist	2 lanes	Extending Sproule Drive to Ferndale Drive will improve network connectivity.
St. Vincent Street (Highway 400 Crossing)	Sperling Drive	Bell Farm Road	Arterial	2 lanes	4 lanes + TWLTL	Capacity needs.
St. Vincent Street	Bell Farm Road	Grove Street	Arterial	4 lanes (2 lanes only north of Ottaway Avenue)	4 lanes + TWLTL	Capacity needs between Bell Farm Road and Ottawa Avenue. Provide a TWLTL to improve traffic flow. Build to the ultimate 5 lanes on this short segment at one phase.
St. Vincent Street	Grove Street	Wellington Street	Arterial	4 lanes	2 lanes + TWLTL	Reconfigure to be 2 lanes with a TWLTL in the short term to improve traffic flow.
Summerset Drive	Summerset Drive west end	Ardagh Road	Minor Collector	Does not exist	2 lanes	Extending Summerset Drive to Ardagh Road will improve network connectivity.
Truman Road	Huronia Road	Hamilton Road	Minor Collector	2 lanes	2 lanes + TWLTL	Widen when adjacent development occurs.
Veterans Drive	Salem Road	McKay Road	Arterial	2 lanes	4 lanes + TWLTL	Improvements were programmed in the City 2019 Capital Plan to increase capacity.

Table 7-4 Rationale for Phasing Improvements, Horizon 2031 *(Page 9/9)*

Road	From	To	Road Classification	2016 Network	2031 Proposed Network	Rationale for Phasing Improvements by 2031
Veterans Drive / 5 Sideroad	McKay Road	South Limit of Annexed Lands	Arterial	2 lanes	4 lanes + TWLTL	Improvements were programmed in the City 2019 Capital Plan to increase capacity. Note that the Plan only included widening to 3 lanes, which is proposed to be revised to 5 lanes in order to the roadway widening recommended by the County south of the City limits.
Welham Road	Hamilton Road	Big Bay Point Road	Minor Collector	2 lanes	2 lanes + TWLTL	Widen when adjacent development occurs.
Welham Road	Big Bay Point Road	Mapleview Drive	Minor Collector	2 lanes	2 lanes + TWLTL	Widen when adjacent development occurs.
Welham Road	Mapleview Drive	South of Saunders Road	Minor Collector	2 lanes	2 lanes + TWLTL	Widen when adjacent development occurs.
Welham Road	South of Saunders Road	Lockhart Road	Minor Collector	Does not exist	2 lanes + TWLTL	Widen when adjacent development occurs.
Wellington St W	Sunnidale Road	Bayfield Street	Arterial	2 lanes	2 lanes + TWLTL	Capacity needs.
Yonge Street	Mapleview Drive	Lockhart Road	Arterial	2 lanes	4 lanes + TWLTL	Programmed in the City 2019 Capital Plan
Collector Roads in Salem and Hewitt Secondary Plans	Salem and Hewitt Secondary Plans		Major and Minor Collectors	Do not exist	Build new local and collector roads	Build when adjacent development occurs to provide the required network.

Note: TWLTL = Two-way left turn lane; GPL = General Purpose Lane; HOV = High Occupancy Vehicle.

[1]. The number of through lanes in red indicates that it is from the total number of through lanes by 2041. The grey-shaded rows indicates the locations of phasing construction by 2031.

7.4 FUTURE 2031 LEVELS OF SERVICE

Figure 7-4 presents an overall snapshot of future forecasted congestion level in V/C ratios. Refer to Table 6-15 the LOS criteria corresponding to V/C ratios. More model plots (forecasted V/C ratios and traffic volumes) for both the AM and PM peak hours are provided in Appendix E-5.

7.5 PRIORITIZATION OF 2031 ROAD IMPROVEMENTS

Similar to the rationale for the phasing of road improvements by 2031, the rationale for prioritization of the proposed 2031 improvements accounts for:

1. road capacity and network improvement projects already programmed in the City's 2019 Capital Plan
2. the expected timelines when the adjacent land developments are to be implemented
3. the expected timelines when adjacent improvements planned by others (MTO and Simcoe County) are to be implemented
4. the severity of the forecasted capacity deficiencies by 2031 – the higher the forecasted V/C ratio, the severer the capacity deficiencies, and thus the earlier the need for improvements.

Refer to Table 5-12 of the TMP main report for prioritization and suggested timings of the proposed 2031 road improvements.

Figure 7-4 Future 2031 PM Peak Forecasted LOS (V/C Ratios), TMP-Proposed Network

8 SUMMARY

EMME MODEL

An updated demand forecasting Emme Model at the macro level has been developed and applied to identify the roadway capacity deficiencies and future required roadway improvements in the City of Barrie 2019 TMP. The model is summarized as follows:

1. The Model was redeveloped and updated based on the most current travel data captured in the 2016 TTS. The model was then re-calibrated and validated against the 2016/2017 traffic counts.
2. The Model reflects the projected population and employment forecasts identified in **Schedule 7 of the 2017 Provincial Growth Plan** for the City of Barrie to address the policies of the Growth Plan.
3. The updated Model reflects the most current land uses for the surrounding regions:
   a. **County of Simcoe**: the most-current forecasts for the Midhurst Secondary Plan, which was obtained from the April 26, 2018 presentation prepared by Ainley & Associates.
   b. **Town of Innisfil**: the forecasts used in the Innisfil 2017 TMP Update. Note that the forecasts included intensifications on Innisfil Beach Road and new developments in Friday Harbour.
   c. **External gateways**: the land use forecasts obtained from the GGH model and provided by the SAFO on May 18, 2018.
4. The trip generation model was updated based on the most current travel data captured in the 2016 TTS.
5. Trip generation model update includes:
   a. Different sets of trip rates were developed to account for significantly different travel demand generated by big traffic generators such as Georgian Campus, Victoria Royal Hospital, and Park Place properties adjacent to Highway 400 and Mapleview Drive.
   b. Different sets of trip rates were estimated based on the land use planning areas defined in the City's Official Plan to reflect different travel demand generated by different land uses.
   c. Trip rates were estimated with the advanced statistics regression analyses to relate major factors: either population or employment or both.
6. Extensive traffic counts, including intersection TMCs at major signalized intersections, were obtained and accounted for in the model validation.
7. The validation results for the mid-week AM and PM peak hours indicate that the two models have been substantially calibrated, are reasonably good and are ready for future forecasting.

EMME MODELLING AND RATIONALE ANALYSES FOR 2041 ROAD IMPROVEMENTS

The City road improvements in the TMP were proposed based on a systematic analysis of road deficiencies for 2041, including the Emme modelling and rationale analyses:

1. Roads with a V/C ratio equal to or greater than 0.85 (the threshold developed in conjunction with City staff) were identified as being candidates for improvements as per the travel demand forecasts from the Emme model.
2. The modelling analyses were complemented by a review of currently observed and future estimated ADT volumes against the roadway generalized service volumes corresponding to a level of service D (LOS D) to capture traffic variations during the day.
3. Individual road segments having a high V/C ratio were reviewed to examine if there are specific right-of-way constraints that prevent roadway expansion.
4. Road widening measures were limited to a maximum of seven lanes, and network connectivity and meshing were also considered.
5. A set of road classification criteria was proposed for the TMP study purpose to support road network analyses and modelling.
6. Some changes to current road classification were proposed based on the established new criteria.

EMME MODELLING AND RATIONALE ANALYSES FOR 2031 ROAD IMPROVEMENTS AND PRIORITIZATION

An Emme modelling analysis for phasing horizon 2031 was conducted based on the future population and employment forecasts by 2031 to identify the timings of the needs for those improvements that are proposed for the ultimate 2041 conditions. Specifically,

1. Three network alternatives were tested and assessed to identify the needs for road network improvements by 2031.
2. Analyses were conducted to assess the need for the new Salem Road / Lockhart Road Crossing by 2031, including:
   a. a screenline analysis
   b. a comparison analysis of network effects – changes in forecasted volumes, V/C ratios, network system performance, etc between three network alternatives
3. A rationale analysis was conducted to justify the needs for improvements by 2031

In addition, the prioritization and timings of the proposed 2031 improvements were suggested.

EMME MODEL SUPPORT DATA AND PLOTS

The appendices include the population and employment inputs, a summary of traffic counts to be validated, and a series of the Emme model plots for the network alternatives and TMP-proposed final road networks. For reference Appendix E-6 provides the Emme model plots of the simulated auto traffic volumes for the base year 2016 road network.

Refer to the appendix outline for all the technical appendices provided.

Appendix E - Emme Macro Modelling & Improvements Rational Technical Memorandum, Sub-Appendices Outline

Appendix No.	Appendix Title	Comments
E-1	**Population and Employment Forecasts**	Emme model input.
E-2	**Summary of Traffic Counts**	2016/2017 traffic counts used to validate the model.
E-3	**Emme Plots - Assessment of 2041 Network Alternatives**	Preliminary assessment results for 2041 alternatives before the proposed 2041 network is finalized.
E-3.1	Alternatives and Emme Scenarios	
E-3.2	Alternative 1A	
E-3.3	Alternative 1B	
E-3.4	Alternative 2	
E-3.5	Alternative 3	
E-4	**Emme Plots - Assessment of 2031 Network Alternatives**	Preliminary assessment results for 2031 alternatives before the proposed 2031 network is determined finalized.
E-4.1	Alternatives and Emme Scenarios	
E-4.2	Alternative 1 - Do Nothing, V/C Ratios	
E-4.3	Alternative 2 - Without Salem/Lockhart Crossing, V/C Ratios	
E-4.4	Alternative 3 - With Salem/ Lockhart Crossing, Volume Comparisons	
E-5	**Emme Plots - Future Traffic Forecasts, Proposed 2041 and 2031 Road Networks**	Assessment results and future forecasted auto traffic volumes for the proposed final 2031 and 2041 networks (Emme plots in zoomed-in views of the road network).
E-5.1	Proposed 2041 Road Network, Auto Traffic Forecasts	
E-5.2	Proposed 2031 Road Network, Auto Traffic Forecasts	
E-6	**Emme Plots, Base Year Traffic Forecasts - Existing 2016 Road Network**	Emme model simulated auto traffic volumes for base year 2016 (Emme plots in zoomed-in views of the road network).
E-6.1	Base Year 2016 Road Network (AM), Auto Traffic Volumes	
E-6.2	Base Year 2016 Road Network (PM), Auto Traffic Volumes	

APPENDIX

E-1 POPULATION AND EMPLOYMENT FORECASTS

APPENDIX

Table 1 - Population and Employment Forecasts by Traffic Zone

Traffic Zone	Population						Employment (excluding Work at Home)					
	2016	2021	2026	2031	2036	2041	2016	2021	2026	2031	2036	2041
1	2,597	2,575	2,582	2,600	2,640	2,717	408	399	399	394	410	435
2	18	18	16	16	18	94	693	1,593	1,941	2,071	2,082	2,142
3	0	0	0	0	376	838	590	899	1,082	1,244	1,348	1,558
4	10	10	10	10	10	10	732	1,367	1,634	1,732	1,752	1,816
5	0	0	0	0	0	0	2,614	2,657	2,633	2,634	2,644	2,691
6	0	0	0	0	0	0	2,146	2,255	2,323	2,348	2,501	2,781
7	10	10	10	10	10	10	1,086	1,382	1,512	1,565	1,726	2,036
8	3,657	3,618	3,598	3,615	3,651	3,711	357	508	557	564	594	610
9	0	390	1,875	2,156	2,965	2,965	0	27	127	142	202	207
10	4,608	4,831	4,884	4,983	5,024	5,114	490	544	578	592	621	652
11	762	758	764	769	776	790	74	72	72	71	73	76
12	1,871	1,895	2,982	3,430	7,744	12,037	300	336	468	567	1,367	2,083
13	5,225	5,209	5,196	5,222	5,286	5,401	527	514	510	503	526	553
14	458	447	443	445	824	1,275	374	365	399	448	581	764
15	660	656	660	679	686	702	61	60	58	59	62	63
16	1,308	1,288	1,277	1,281	1,295	1,319	315	310	312	314	324	335
17	0	0	0	0	0	0	361	692	877	952	1,064	1,247
18	0	0	0	0	0	0	1,338	1,365	1,434	1,463	1,591	1,826
19	5	5	5	5	5	5	948	1,208	1,537	1,842	1,839	1,868
20	0	0	0	0	0	0	521	647	932	1,199	1,228	1,353
21	0	0	0	0	0	0	1,652	1,745	1,882	2,033	2,570	3,092
22	1,402	1,404	1,398	1,410	1,417	1,435	1,095	1,202	1,150	1,171	1,266	1,411
23	5,433	5,469	5,666	5,722	5,792	6,134	586	678	703	703	731	790
24	1,630	1,613	1,606	1,612	1,633	1,666	418	414	412	409	432	450
25	2,481	2,941	3,047	3,142	3,202	3,275	308	334	339	340	353	371
26	1,122	1,110	1,104	1,113	1,122	1,147	89	86	86	84	87	91
27	3,522	3,742	3,801	3,963	4,085	4,223	435	439	442	448	470	511
28	0	459	567	567	1,027	2,388	50	119	364	563	835	1,292
29	0	0	0	0	0	0	563	632	596	602	609	665
30	0	0	0	0	0	0	61	54	182	246	327	439
31	0	0	0	1	8	8	260	257	260	260	272	291
32	793	793	794	815	820	837	478	480	484	491	507	521
33	36	35	35	37	37	38	821	860	883	890	914	968
34	392	401	414	443	455	469	30	30	30	31	33	35
35	0	0	0	0	0	0	853	1,005	1,063	1,054	1,216	1,511
36	1,596	1,626	1,647	1,703	1,720	1,748	189	204	219	231	243	263
37	3,351	3,397	3,411	3,480	3,517	3,591	317	312	312	310	319	331
38	1,231	1,235	1,258	1,361	1,429	1,612	503	511	524	533	593	689
39	710	871	1,233	1,624	1,634	1,675	115	123	148	173	192	208
40	1,293	1,290	1,322	1,373	1,708	2,163	137	132	133	135	175	229
41	1,558	1,545	1,539	1,544	1,559	1,739	144	257	265	263	269	293
42	852	845	836	840	847	859	227	225	224	222	228	234
43	1,076	1,102	1,161	1,307	1,325	1,340	101	101	104	112	115	119
44	861	849	852	861	863	875	288	292	293	293	296	300
45	27	26	26	26	26	27	285	285	286	286	288	290
46	580	613	659	820	996	1,566	583	576	598	630	710	868
47	844	1,260	1,561	1,740	2,127	2,560	207	288	343	393	457	542
48	2,118	2,105	2,108	2,119	2,143	2,186	330	322	323	320	336	363
49	1,813	1,794	1,790	1,966	1,982	2,026	253	284	287	295	309	324
50	860	850	854	946	988	1,035	340	337	340	354	376	397
51	431	442	547	1,574	2,001	2,288	237	236	261	351	459	557
52	349	349	352	358	359	363	40	40	40	40	40	40
53	0	0	0	0	0	0	0	0	0	0	0	0
54	128	135	134	135	1,144	2,392	39	831	920	920	1,010	1,157
55	0	0	0	0	0	0	1,627	1,627	1,637	1,643	1,673	1,741
56	4,899	5,595	5,844	5,907	6,108	6,226	544	589	608	607	648	680
57	1,126	1,307	1,675	1,737	2,728	2,884	178	290	341	346	419	438
58	0	0	0	0	0	76	124	124	124	124	126	142
59	18	18	16	16	551	838	576	663	762	844	1,374	1,822
60	15	15	15	15	15	15	881	878	891	897	931	1,004
61	0	0	0	0	0	0	526	513	526	527	574	663
62	223	218	514	766	972	1,153	65	62	99	147	193	239
63	124	122	124	124	125	126	1,475	1,473	1,487	1,501	1,548	1,639

Table 1 - Population and Employment Forecasts by Traffic Zone

Traffic Zone	Population						Employment (excluding Work at Home)					
	2016	2021	2026	2031	2036	2041	2016	2021	2026	2031	2036	2041
64	239	234	232	773	867	932	126	124	138	189	248	291
65	997	985	994	1,452	1,732	2,032	575	573	579	619	703	783
66	5	5	5	5	27	105	1,732	1,721	1,751	1,763	1,855	2,024
67	3,731	4,398	4,569	4,828	4,956	5,114	322	384	416	444	472	512
68	0	0	0	0	0	0	30	35	39	43	45	48
69	4,819	4,785	4,775	4,820	4,885	4,989	649	636	632	626	647	677
70	608	615	646	661	665	694	1,166	1,174	1,211	1,233	1,304	1,393
71	1,634	1,617	1,628	1,632	1,650	1,679	178	172	171	169	172	179
72	1,012	1,004	1,016	1,060	1,064	1,078	235	231	232	233	235	239
73	441	436	431	437	440	447	40	38	38	38	38	39
74	1,053	1,046	1,044	1,056	1,063	1,079	250	247	246	246	253	260
75	1,245	1,222	1,228	1,241	1,254	1,279	140	136	136	134	138	143
76	1,890	1,865	1,857	1,869	1,891	1,921	255	251	250	246	251	256
77	1,534	1,532	1,519	1,595	1,626	1,723	150	157	168	185	197	223
78	0	0	0	0	0	0	2,681	2,903	3,115	3,122	3,386	3,873
79	0	0	0	0	0	0	2,645	2,865	3,085	3,109	3,374	3,863
80	1,681	1,658	1,655	1,671	1,683	1,709	331	327	324	323	335	349
81	1,218	1,196	1,189	1,198	1,265	1,548	471	464	466	465	492	557
82	1,017	1,006	1,009	1,020	1,030	1,048	101	96	97	97	98	103
83	237	232	232	238	240	241	60	59	59	59	59	59
84	939	920	914	916	926	950	99	94	95	94	98	104
85	1,067	1,045	1,046	1,057	1,061	1,081	114	110	109	109	109	113
86	209	359	756	802	805	806	21	41	81	102	124	142
87	207	208	207	209	216	227	44	44	44	43	44	45
88	199	195	194	196	198	200	26	25	25	25	26	26
89	0	0	0	0	0	0	1,086	1,448	1,549	1,504	1,537	1,560
90	273	267	264	264	266	270	1,307	1,306	1,313	1,315	1,331	1,357
91	1,775	1,747	1,741	1,758	1,778	1,808	489	482	481	479	487	499
92	1,293	1,278	1,276	1,285	1,302	1,327	311	307	307	305	312	323
93	1,615	1,610	1,611	1,627	1,652	1,689	128	125	124	121	126	133
94	1,314	1,309	1,304	1,315	1,332	1,374	150	147	146	146	150	158
95	1,579	1,568	1,557	1,571	1,590	1,630	158	154	151	149	152	159
96	709	704	701	703	709	718	67	66	65	65	65	66
97	0	0	0	0	0	49	754	736	764	784	878	1,032
98	542	683	679	682	686	692	78	102	117	139	166	193
99	816	799	793	794	799	812	134	131	130	129	134	140
100	0	0	0	229	425	750	2,876	2,800	2,887	2,926	3,263	3,835
101	1,265	1,245	1,234	1,240	1,250	1,269	91	86	85	83	85	89
102	1,517	1,505	1,493	1,514	1,534	1,558	210	206	204	202	210	221
103	743	731	734	738	748	760	62	58	58	57	60	63
104	3,081	3,079	3,076	3,094	3,136	3,210	311	303	301	299	306	319
105	381	412	514	528	571	859	951	932	959	958	1,045	1,228
106	2,188	2,160	2,149	2,159	2,183	2,222	356	348	346	344	355	374
107	1,189	1,177	1,174	1,182	1,194	1,216	285	281	281	278	287	297
108	2,372	2,352	2,348	2,371	2,401	2,447	235	231	229	231	243	251
109	3,399	3,371	3,355	3,375	3,412	3,478	404	395	388	384	393	412
110	528	532	531	534	537	547	124	123	123	123	127	133
111	953	1,004	1,091	1,302	1,314	1,332	105	107	112	123	127	130
112	0	0	0	0	0	0	0	0	0	0	0	0
113	897	880	873	873	880	918	79	77	76	74	76	83
114	0	0	0	456	478	566	1,234	1,205	1,237	1,273	1,396	1,608
115	234	241	239	239	240	243	768	824	824	832	833	846
116	1,640	1,651	1,641	1,653	1,671	1,720	196	194	193	188	196	205
117	0	0	0	0	0	0	160	160	171	178	187	197
118	417	410	407	411	416	538	87	85	84	84	89	109
119	2,450	2,453	2,456	2,472	2,504	2,553	399	395	390	387	407	427
120	1,267	1,254	1,257	1,270	1,288	1,315	235	231	236	241	252	271
121	999	998	1,024	1,590	1,741	1,928	118	115	119	156	183	217
122	158	176	454	514	630	746	99	100	142	174	194	237
123	236	231	229	525	610	651	289	305	354	437	766	1,093
124	0	0	0	0	0	0	711	766	898	1,076	1,085	1,101
125	0	0	0	0	0	0	47	46	51	58	65	76
126	84	81	80	212	284	335	459	456	497	558	633	731

Table 1 - Population and Employment Forecasts by Traffic Zone

Traffic Zone	Population						Employment (excluding Work at Home)					
	2016	2021	2026	2031	2036	2041	2016	2021	2026	2031	2036	2041
127	368	360	356	390	494	602	265	263	293	332	424	506
128	26	25	25	25	30	33	142	140	155	174	193	223
129	41	131	313	313	315	316	134	170	217	243	250	283
130	37	36	36	46	60	73	472	462	512	576	637	746
131	0	0	0	0	0	0	140	137	153	172	189	223
132	0	0	0	45	61	71	197	193	215	246	274	323
133	193	189	187	555	740	860	247	249	278	344	438	524
134	403	395	391	391	463	541	296	291	308	330	392	442
135	87	148	308	520	660	766	324	354	429	529	641	769
136	904	1,581	2,583	3,341	3,444	3,511	216	413	576	703	741	793
137	0	0	0	0	0	0	0	0	0	0	0	0
138	62	60	60	152	199	233	157	155	172	203	234	277
139	278	272	351	362	421	489	500	499	565	647	742	878
140	352	349	358	375	382	388	113	113	112	114	118	121
141	130	127	126	450	515	650	381	373	380	402	445	517
142	447	436	435	435	440	444	79	76	76	75	77	82
143	288	280	286	286	286	290	83	82	82	82	82	82
144	209	205	623	1,149	1,577	2,062	103	100	143	197	247	326
145	136	139	177	355	433	485	227	236	274	333	400	477
146	58	57	56	56	56	58	14	13	13	13	13	14
147	1,304	1,274	1,274	1,274	1,287	1,314	1,075	1,070	1,070	1,067	1,097	1,121
148	26	25	25	25	25	26	268	268	268	268	268	268
149	1,082	1,058	1,052	1,056	1,134	1,446	343	335	341	342	376	467
150	7,707	8,057	8,250	8,549	8,654	9,112	1,313	1,313	1,343	1,356	1,453	1,603
151	0	0	100	115	131	156	953	942	1,065	1,250	1,388	1,626
152	952	957	953	959	968	986	80	122	141	145	148	153
153	925	924	919	925	930	957	73	97	122	138	155	169
154	1,322	1,354	1,356	1,360	1,375	1,396	205	204	202	200	207	214
155	2,210	2,187	2,193	2,248	2,270	2,313	658	650	653	656	676	697
Sub-Total for Former Barrie	**145,500**	**150,400**	**158,400**	**169,400**	**184,200**	**202,000**	**69,000**	**75,200**	**80,400**	**84,200**	**92,300**	**103,500**
201	19	2,997	3,907	4,525	5,425	6,258	1	216	329	492	620	715
202	43	3,012	3,935	5,413	5,768	6,709	3	357	466	591	633	713
203	43	42	42	1,009	1,860	2,247	3	3	34	116	254	295
204	-	1,176	1,177	2,123	2,235	2,357	-	81	81	140	153	164
205	47	771	2,809	3,904	4,002	4,342	3	179	819	1,402	1,606	1,687
206	42	3,303	6,486	6,487	6,787	7,142	3	243	524	618	659	701
207	9	9	2,230	2,228	2,230	2,481	1	11	214	263	273	299
208	-	-	-	-	-	-	-	-	-	-	275	546
209	10	10	10	10	10	10	1	1	1	1	697	1,382
210	12	12	12	12	12	12	1	1	1	1	1,416	2,809
211	12	12	12	12	12	12	1	41	111	188	353	515
212	3	3	3	3	3	3	-	373	1,021	1,731	1,731	1,732
213	5	4,509	5,325	6,135	6,637	7,571	-	453	788	978	1,096	1,208
214	29	28	2,326	4,718	5,327	6,010	2	151	557	846	974	1,063
215	-	-	-	-	-	-	-	467	1,264	2,136	2,136	2,136
216	44	1,304	2,518	4,015	5,138	5,849	3	158	275	447	611	695
Sub-Total for Annexed Lands	**300**	**17,200**	**30,800**	**40,600**	**45,400**	**51,000**	**0**	**2,700**	**6,500**	**10,000**	**13,500**	**16,700**
Grand Total for Barrie	**145,800**	**167,600**	**189,200**	**210,000**	**229,600**	**253,000**	**69,000**	**77,900**	**86,900**	**94,200**	**105,800**	**120,200**
901	32,197	36,859	41,520	46,182	51,796	57,410						
902	0	0	0	0	0	0						
903	331,879	370,518	409,157	447,796	488,581	529,367						
904	4,252,924	4,580,600	4,908,277	5,235,953	5,500,530	5,765,106						
905	2,195,298	2,427,907	2,660,516	2,893,125	3,053,133	3,213,141						
906	559,438	649,948	740,459	830,969	936,951	1,042,933						
907	103,950	118,196	132,443	146,690	161,735	176,780						
908	7,342	8,334	9,326	10,318	11,294	12,270						
909	7,485	8,304	9,123	9,942	10,403	10,865						
910	18,552	20,254	21,956	23,658	25,864	28,071						
Grand Total for Gateways	**7,509,064**	**8,220,920**	**8,932,777**	**9,644,633**	**10,240,288**	**10,835,943**						

Table 1 - Population and Employment Forecasts by Traffic Zone

Traffic Zone	Population						Employment (excluding Work at Home)					
	2016	2021	2026	2031	2036	2041	2016	2021	2026	2031	2036	2041
1230	854	1,198	1,543	1,888	1,941	1,993	1,844	1,861	1,877	1,894	1,955	2,016
1231	5,088	5,103	5,119	5,134	5,294	5,453	346	371	396	422	437	453
1232	6,241	6,443	6,645	6,847	6,992	7,137	757	799	841	883	897	911
1233	5,749	6,009	6,269	6,528	6,815	7,101	2,012	2,160	2,308	2,455	2,552	2,650
1234	5,389	5,526	5,662	5,799	5,885	5,970	536	562	588	614	622	631
1235	4,562	4,937	5,313	5,688	5,903	6,118	2,109	2,214	2,318	2,423	2,507	2,591
1236	3,980	4,245	4,510	4,775	4,970	5,164	1,123	1,180	1,238	1,295	1,314	1,333
1237	7,020	7,296	7,573	7,849	8,046	8,243	4,426	4,788	5,150	5,512	5,631	5,750
1238	1,687	1,881	2,076	2,270	2,298	2,327	3,031	3,298	3,566	3,833	4,005	4,178
1239	3,088	3,278	3,469	3,659	3,771	3,884	3,284	3,595	3,905	4,216	4,377	4,537
1240	1,572	1,804	2,035	2,266	2,384	2,503	391	399	406	413	425	436
1241	294	373	451	530	530	530	104	110	116	122	122	122
1242	459	1,048	1,636	2,225	2,763	3,301	879	1,091	1,302	1,514	1,580	1,646
1243	8,175	8,832	9,490	10,147	10,748	11,348	781	977	1,173	1,369	1,427	1,485
1244	750	1,814	2,878	3,942	4,779	5,616	67	158	249	340	421	502
1245	184	439	694	949	1,001	1,053	2,423	3,053	3,684	4,315	4,831	5,347
1246	195	285	376	466	487	509	804	1,298	1,793	2,287	2,848	3,409
1247	157	221	286	350	381	413	2	8	15	22	25	28
1248	5,212	5,649	6,085	6,521	6,764	7,007	871	936	1,001	1,066	1,089	1,113
1249	6,803	7,127	7,451	7,775	8,036	8,298	612	649	686	723	749	774
1250	5,019	5,456	5,892	6,329	6,703	7,077	3,493	3,743	3,993	4,243	4,321	4,399
1251	8,694	9,676	10,659	11,641	12,147	12,652	948	1,090	1,232	1,374	1,423	1,472
1252	436	733	1,031	1,329	1,469	1,609	3,868	3,867	3,865	3,864	3,923	3,982
1253	6,301	6,458	6,615	6,771	6,948	7,124	878	925	971	1,018	1,035	1,052
1254	4,940	5,211	5,482	5,753	6,100	6,447	2,487	2,427	2,367	2,308	2,582	2,856
1255	5,397	5,713	6,030	6,347	6,771	7,196	2,742	2,852	2,962	3,071	3,149	3,226
1256	5,257	5,467	5,678	5,889	6,098	6,307	1,752	1,922	2,093	2,263	2,325	2,386
1257	4,568	4,804	5,040	5,276	5,494	5,711	2,168	2,309	2,450	2,591	2,627	2,664
1258	1,944	2,257	2,571	2,884	2,963	3,042	919	1,085	1,250	1,416	1,460	1,505
1259	8,348	8,394	8,441	8,487	8,562	8,636	2,723	2,947	3,172	3,396	3,441	3,487
1260	8,213	8,414	8,614	8,814	8,912	9,009	2,072	2,178	2,283	2,389	2,399	2,410
1261	2,992	3,274	3,557	3,840	3,924	4,008	3,705	4,036	4,367	4,697	4,796	4,895
1262	3,381	3,579	3,777	3,975	4,052	4,129	1,133	1,184	1,234	1,284	1,292	1,299
1263	5,639	5,861	6,083	6,305	6,454	6,603	546	589	632	675	689	703
1264	35	46	56	67	90	114	5,805	6,405	7,005	7,605	7,804	8,003
1265	25	35	45	55	70	85	4,696	5,308	5,920	6,532	6,843	7,153
1266	1,021	1,497	1,973	2,448	2,867	3,285	14	71	128	185	226	266
1279	200	198	196	194	201	209	70	52	35	17	18	19
1280	1,301	1,312	1,322	1,332	1,352	1,372	581	610	640	669	747	825
1281	35	85	135	185	188	190	2	8	15	21	21	21
1308	1,703	3,498	5,294	7,089	7,511	7,934	804	1,568	2,333	3,097	3,694	4,291
1309	447	1,220	1,993	2,767	2,834	2,901	36	367	698	1,029	1,255	1,481
1310	1,873	2,191	2,508	2,825	3,382	3,939	599	854	1,109	1,364	1,464	1,564
1311	556	686	815	945	998	1,050	5	19	33	47	52	57
1312	69	236	402	569	574	580	3	6	10	13	14	14
1313	154	179	204	228	241	255	0	0	1	1	3	4
1314	745	1,050	1,355	1,660	2,259	2,857	6	37	69	100	158	215
1315	3,722	4,833	5,945	7,056	9,272	11,489	370	468	566	663	910	1,156
1316	944	2,548	4,153	5,757	7,278	8,799	754	1,083	1,412	1,741	2,070	2,398
1317	1,553	3,499	5,445	7,391	14,120	20,849	1,101	1,289	1,477	1,665	2,548	3,431
1318	438	1,317	2,196	3,075	3,159	3,243	12	176	339	502	578	654
1319	1,715	3,944	6,172	8,401	14,104	19,808	42	474	906	1,338	2,084	2,829
1320	148	198	248	298	315	331	0	10	21	31	33	34
1321	18	62	107	151	151	151	1	2	3	5	5	5
1322	310	1,183	2,057	2,930	2,969	3,008	466	870	1,274	1,677	2,294	2,911
1323	1,080	2,572	4,063	5,554	6,657	7,760	1,163	1,779	2,394	3,010	5,929	8,847
1324	1,105	1,994	2,884	3,773	4,501	5,229	600	1,019	1,437	1,855	2,087	2,320
1325	1,371	1,718	2,065	2,412	2,974	3,536	1,284	1,794	2,305	2,815	4,940	7,065
1326	60	191	322	453	462	470	344	417	490	563	598	633
1332	3,708	3,913	4,117	4,322	4,441	4,560	189	212	236	259	270	282
1333	2,235	2,405	2,576	2,746	2,816	2,885	253	283	313	343	350	357
1334	3,361	3,524	3,687	3,849	3,969	4,090	577	639	702	764	776	787
1335	2,400	2,581	2,761	2,941	3,028	3,115	234	243	252	261	270	278

Table 1 - Population and Employment Forecasts by Traffic Zone

Traffic Zone	Population						Employment (excluding Work at Home)					
	2016	2021	2026	2031	2036	2041	2016	2021	2026	2031	2036	2041
1336	343	395	448	500	500	500	2	5	9	12	12	12
1337	1,042	960	879	798	860	922	14	16	17	19	25	31
1338	4,528	4,942	5,357	5,772	6,141	6,509	686	964	1,242	1,521	1,902	2,283
1339	1,993	2,354	2,715	3,077	3,243	3,410	718	942	1,167	1,392	1,622	1,852
1340	5,056	5,475	5,895	6,314	6,507	6,700	1,537	1,964	2,391	2,819	3,072	3,325
1341	2,476	2,981	3,485	3,990	3,990	3,990	233	465	697	929	951	972
1342	977	1,541	2,105	2,668	3,376	4,083	484	961	1,439	1,916	2,177	2,438
1349	1,706	1,989	2,272	2,556	2,662	2,768	158	194	229	264	275	285
Sub-Total for Part of York Region	**189,042**	**218,161**	**247,279**	**276,397**	**306,446**	**336,495**	**79,677**	**92,237**	**104,796**	**117,356**	**131,352**	**145,349**
3731	3,077	3,210	3,349	3,494	3,611	3,732	4,208	4,353	4,504	4,660	4,703	4,745
3732	9,655	10,423	11,251	12,146	13,076	14,076	2,204	2,514	2,867	3,270	3,495	3,736
3733	7,692	8,052	8,429	8,823	10,043	11,432	3,531	3,034	2,607	2,240	2,346	2,457
3734	8,708	8,944	9,186	9,435	10,108	10,828	4,978	5,496	6,068	6,700	7,110	7,545
3735	2,033	3,085	4,681	7,102	7,319	7,542	1,540	2,139	2,972	4,130	4,554	5,021
3741	3,077	3,212	3,353	3,500	3,630	3,765	7,302	3,972	2,160	1,175	1,195	1,215
3742	1,711	1,729	1,747	1,765	1,853	1,946	9	73	620	5,261	5,765	6,316
3743	510	4,596	7,002	7,410	8,187	8,187	2,158	4,011	5,598	5,863	5,863	5,863
3744	5,990	6,384	6,805	7,253	7,843	8,481	276	430	669	1,040	1,233	1,462
3745	4,973	5,559	6,214	6,946	6,991	7,037	1,108	1,092	1,076	1,060	1,075	1,091
3746	10,279	11,160	12,116	13,155	13,757	14,386	178	438	1,080	2,660	3,005	3,395
3747	3,747	4,025	4,325	4,646	4,810	4,981	236	369	576	900	1,014	1,142
3748	8,153	8,838	9,580	10,385	11,964	13,783	1,836	1,798	1,759	1,722	1,857	2,003
3751	5,829	5,962	8,413	10,863	11,021	11,178	430	430	552	673	673	673
3752	9,351	10,904	13,404	15,904	18,065	20,225	893	1,056	906	755	1,140	1,525
3753	2,903	3,399	3,505	3,612	4,103	4,595	2,197	2,572	4,265	5,958	6,558	7,158
3754	6,028	6,099	6,172	6,245	6,463	6,689	315	490	764	1,190	1,369	1,575
3755	2,400	2,400	2,400	2,400	2,527	2,655	2,232	2,607	2,905	3,203	3,203	3,203
3756	16,812	16,518	16,229	15,945	17,981	20,277	7,287	8,402	9,688	11,171	12,785	14,632
3757	3,718	3,819	3,922	4,028	4,477	4,976	922	1,108	1,331	1,600	1,686	1,776
3758	9,308	9,163	9,019	8,878	10,398	12,179	2,875	4,709	7,713	12,634	14,220	16,006
3759	6,500	8,039	9,941	12,294	12,385	12,477	2,000	2,414	2,915	3,519	3,622	3,727
3760	6,239	7,902	10,008	12,675	13,389	14,143	8,870	7,760	6,789	5,940	6,170	6,408
3761	8,476	9,292	10,187	11,167	13,361	15,985	2,331	2,439	2,552	2,670	3,128	3,665
3762	908	1,495	2,460	4,049	4,049	4,049	321	426	565	750	754	759
3763	3,764	4,466	5,300	6,288	6,288	6,288	1,145	1,163	1,181	1,200	1,244	1,290
3764	7,520	8,933	10,611	12,604	13,798	15,105	1,135	1,214	1,299	1,390	1,477	1,569
3765	6,320	7,587	9,107	10,933	12,152	13,506	606	866	1,238	1,770	1,945	2,138
3766	10,084	13,403	14,705	16,006	17,916	19,826	563	665	1,101	1,536	1,536	1,536
3767	3,431	4,796	6,500	10,481	14,981	19,328	726	726	726	726	726	726
3768	9,687	11,520	11,522	11,523	14,609	17,694	1,063	1,226	1,100	974	974	974
3773	13,063	16,028	19,666	24,131	26,192	28,430	3,394	3,115	2,859	2,624	2,765	2,913
3785	5,089	5,628	6,224	6,884	7,002	7,123	100	215	464	1,003	1,058	1,115
3786	8,992	9,417	9,862	10,328	10,785	11,262	884	1,282	1,861	2,700	3,111	3,584
3787	6,956	8,082	9,392	10,913	12,224	13,693	2,849	2,683	2,526	2,378	2,491	2,609
3789	7,179	8,426	9,890	11,609	12,584	13,641	329	681	1,410	2,920	3,421	4,007
Sub-Total for Part of Simcoe County	**230,161**	**262,494**	**296,475**	**335,819**	**369,940**	**405,496**	**73,028**	**77,969**	**89,266**	**109,965**	**119,269**	**129,559**
Grand Total for Modelled Region	**419,200**	**480,700**	**543,800**	**612,200**	**676,400**	**742,000**	**152,700**	**170,200**	**194,100**	**227,300**	**250,600**	**274,900**
Grand Total for Modelled Areas	**565,000**	**648,300**	**733,000**	**822,200**	**906,000**	**995,000**	**221,700**	**248,100**	**281,000**	**321,500**	**356,400**	**395,100**

Source: 1. The forecasts for the City of Barrie (including the Annexed Lands) were provided by the City on November 30, 2017. Adjusted employment forecasts were provided on August 21, 2018 to correct the forecasts for Park Place.

2. The 2031 forecasts for part of Simcoe County are the same as those used for the County 2014 TMP and were confirmed with County staff.

3. The 2016, 2031 and 2041 forecasts for the external gateways and part of York Region were provided by MTO SAFO on May 15, 2018, extracted from the GGH model.

4. The population includes the Census undercounts and the employment includes the employment with no fixed place of work (NFPOW), but excludes the employment for Work at Home.

APPENDIX

E-2 SUMMARY OF TRAFFIC COUNTS

APPENDIX

Table 1 - Weekday Turning Movement Count Locations, City Roads

No	Intersection	Traffic Control	Source / Surveyor	Year	Season	Date
1	Georgian Drive and Penetanguishene Road	Unsignalized	Trans-Plan	2017	Spring	June 1, 2017
2	Georgian Drive and Johnson Street	Signalized	Trans-Plan	2017	Spring	June 1, 2017
3	Georgian Drive and Gallie Court	Signalized	Trans-Plan	2017	Spring	June 1, 2017
4	Georgian Drive and West Parking Entrance	Signalized	Trans-Plan	2017	Spring	June 1, 2017
5	Georgian Drive and East Parking Entrance	Signalized	Trans-Plan	2017	Spring	June 1, 2017
6	Georgian Drive and Governors Drive	Signalized	Trans-Plan	2017	Spring	June 1, 2017
7	Duckworth Street and Georgian Drive / Highway 400 NB Off-Ramp	Signalized	Trans-Plan	2017	Spring	June 6, 2017
8	Duckworth Street and Highway 400 SB Off-Ramp	Signalized	Trans-Plan	2017	Spring	June 6, 2017
9	Cundles Road and J.C. Massie Way	Signalized	Trans-Plan	2017	Spring	June 6, 2017
10	Duckworth Street and Bell Farm Road / Ring Road	Signalized	Trans-Plan	2017	Spring	June 8, 2017
11	Duckworth Street and Grove Street	Signalized	Trans-Plan	2017	Spring	June 8, 2017
12	Shanty Road and Blake Street	Unsignalized	Trans-Plan	2017	Spring	June 15, 2017
13	St. Vincent Street and Bell Farm Road	Signalized	Trans-Plan	2017	Spring	June 6, 2017
14	St. Vincent Street and Grove Street	Signalized	Trans-Plan	2017	Spring	June 8, 2017
15	St. Vincent Street and Duckworth Street	Signalized	Trans-Plan	2017	Spring	June 8, 2017
16	St. Vincent Street and Blake Street	Signalized	Trans-Plan	2017	Spring	June 8, 2017
17	Dunlop Street / Blake Street and Collier Street	Signalized	Trans-Plan	2017	Spring	June 8, 2017
104	Penetanguishine Road and Grove Street	Signalized	Accu-Traffic	2017	Spring	June 8, 2017
18	Bayfield Street and Highway 400 SB Off-Ramp / Coulter Street	Signalized	Trans-Plan	2017	Spring	June 13, 2017
19	Bayfield Street and Highway 400 NB Off-Ramp / Ross Street	Signalized	Trans-Plan	2017	Spring	June 13, 2017
20	Bayfield Street and Grove Street	Signalized	Trans-Plan	2017	Spring	June 13, 2017
21	Bayfield Street and Wellington Street	Signalized	Trans-Plan	2017	Spring	June 13, 2017
22	Bayfield Street and Dunlop Street	Signalized	Trans-Plan	2017	Spring	June 15, 2017
23	Bayfield Street and Simcoe Street / Lakeshore	Signalized	Trans-Plan	2017	Spring	June 15, 2017
24	Toronto Street and Sunnidale Road / Ross Street	Signalized	Trans-Plan	2017	Spring	June 13, 2017
25	Toronto Street and Dunlop Street	Signalized	Trans-Plan	2017	Spring	June 15, 2017
26	Toronto Street and Simcoe Street	Signalized	Trans-Plan	2016	Spring	November 23, 2016
27	Sunnidale Road and Wellington Street	Signalized	Trans-Plan	2017	Spring	June 13, 2017
28	Dunlop Street and Highway SB Off-Ramp / Cedar Pointe Drive	Signalized	Trans-Plan	2017	Spring	November 16, 2017
29	Dunlop Street and Highway NB Off-Ramp	Unsignalized	Trans-Plan	2017	Spring	November 16, 2017
30	Dunlop Street and Hart Drive	Signalized	Trans-Plan	2016	Spring	November 9, 2016
31	Dunlop Street and Anne Street	Signalized	Trans-Plan	2017	Spring	June 15, 2017
32	Dunlop Street and High Street / Bradford Street	Signalized	Trans-Plan	2017	Spring	June 15, 2017
33	Anne Street and John Street	Signalized	Trans-Plan	2017	Spring	April 26, 2017

Table 1 - Weekday Turning Movement Count Locations, City Roads

No	Intersection	Traffic Control	Source / Surveyor	Year	Season	Date
105	Sophia Street and Bayfield Street	Signalized	Accu-Traffic	2017	Spring	June 8, 2017
34	St. Vincent Street and Hanmer Street	Signalized	Trans-Plan	2017	Spring	June 13, 2017
35	St. Vincent Street and Livingstone Street	Signalized	Trans-Plan	2016	Spring	April 21, 2016
36	St. Vincent Street and Cundles Road	Signalized	Trans-Plan	2017	Spring	June 8, 2017
37	Ferndale Drive and Livingstone Street	Signalized	Trans-Plan	2017	Spring	April 5, 2017
38	Sunnidale Road and Livingstone Street	Signalized	Trans-Plan	2017	Spring	June 13, 2017
39	Sunnidale Road and Anne Street	Signalized	Trans-Plan	2017	Spring	June 13, 2017
40	Sunnidale Road and Cundles Road	Signalized	Trans-Plan	2017	Spring	June 13, 2017
41	Bayfield Street and Hanmer Street	Signalized	Trans-Plan	2017	Spring	May 16, 2017
42	Bayfield Street and Livingstone Street	Signalized	Trans-Plan	2017	Spring	April 18, 2017
43	Bayfield Street and Cundles Road	Signalized	Trans-Plan	2017	Spring	May 16, 2017
44	Bayfield Street and Ferris Lane	Signalized	Trans-Plan	2017	Spring	May 16, 2017
45	Anne Street and Edgehill Drive	Signalized	Trans-Plan	2017	Spring	June 15, 2017
46	Anne Street and Donald Street	Signalized	Trans-Plan	2017	Spring	June 15, 2017
47	Ferndale Drive and Edgehill Drive	Signalized	Trans-Plan	2017	Spring	June 13, 2017
48	Dunlop Street and CR-27 / Townline	Signalized	Accu-Traffic	2017	Spring	June 6, 2017
49	Dunlop Street and Tiffin Street / Miller Drive	Signalized	Accu-Traffic	2017	Spring	June 6, 2017
50	Dunlop Street and Ferndale Drive	Signalized	Accu-Traffic	2017	Spring	June 6, 2017
51	Dunlop Street and Sarjeant Drive	Signalized	Accu-Traffic	2017	Spring	June 6, 2017
52	Tiffin Street and Ferndale Drive	Signalized	Accu-Traffic	2017	Spring	June 6, 2017
53	Tiffin Street and Patterson Road	Signalized	Trans-Plan	2017	Spring	May 31, 2017
54	CR-27 / Townline and Ardagh Road	Signalized	Accu-Traffic	2017	Spring	June 6, 2017
55	Ardagh Road and Mapleton Avenue	Signalized	Accu-Traffic	2017	Spring	June 6, 2017
56	Ferndale Drive and Ardagh Road	Signalized	Accu-Traffic	2017	Spring	June 8, 2017
57	Essa Road and Ardagh Road	Signalized	Accu-Traffic	2016	Spring	September 15, 2016
58	Essa Road and Ferndale Drive / Veterans Drive	Signalized	Accu-Traffic	2017	Spring	June 8, 2017
59	Essa Road and Harvie Road	Unsignalized	Trans-Plan	2017	Winter	February 9, 2017
60	Essa Road and Mapleton Avenue	Signalized	Accu-Traffic	2017	Spring	June 15, 2017
61	Veterans Drive and Caplan Avenue	Signalized	Accu-Traffic	2017	Spring	June 16, 2017
102	CR-27 and Essa	Unsignalized	Accu-Traffic	2017	Spring	June 15, 2017
106	Mapleton Avenue and Veterans Drive	Signalized	Accu-Traffic	2017	Spring	June 15, 2017
62	Tiffin Street and Dyment Road	Signalized	Trans-Plan	2016	Fall	November 9, 2016
63	Tiffin Street and Anne Street	Signalized	Trans-Plan	2017	Spring	April 26, 2017
64	Tiffin Street and Innisfil Street	Signalized	Accu-Traffic	2017	Spring	June 8, 2017
65	Tiffin Street and Essa Road / Bradford Street	Signalized	Accu-Traffic	2017	Spring	June 8, 2017
66	Tiffin Street and Lakeshore Drive	Signalized	Accu-Traffic	2017	Spring	June 8, 2017
67	Essa Road and Burton Avenue	Signalized	Accu-Traffic	2017	Spring	June 8, 2017
68	Essa Road and Innisfil Street	Signalized	Accu-Traffic	2017	Spring	June 8, 2017
69	Essa Road and Anne Street	Signalized	Accu-Traffic	2017	Spring	June 13, 2017

Table 1 - Weekday Turning Movement Count Locations, City Roads

No	Intersection	Traffic Control	Source / Surveyor	Year	Season	Date
70	Essa Road and Fairview Road	Signalized	Accu-Traffic	2017	Spring	June 8, 2017
71	Essa Road and Highway 400 NB Off-Ramp / Carpool Parking Lot	Signalized	Accu-Traffic	2016	Spring	September 13, 2016
72	Essa Road and Highway 400 SB Off-Ramp	Signalized	Accu-Traffic	2016	Spring	September 13, 2016
73	Little Avenue and Fairview Road	Signalized	Trans-Plan	2016	Summer	September 14, 2016
74	Little Avenue and Bayview Drive	Signalized	Accu-Traffic	2017	Spring	June 13, 2017
75	Little Avenue and Huronia Road	Signalized	Trans-Plan	2017	Spring	May 24, 2017
76	Little Avenue and Yonge Street	Signalized	Trans-Plan	2017	Spring	May 24, 2017
77	Little Avenue and Hurst Drive	Signalized	Trans-Plan	2017	Spring	May 24, 2017
78	Huronia Road and Yonge Street	Signalized	Trans-Plan	2017	Spring	May 25, 2017
79	Lakeshore Drive / Hurst Drive and Minets Point Road	Signalized	Accu-Traffic	2017	Spring	June 13, 2017
80	Yonge Street and Minets Point Road	Signalized	Trans-Plan	2017	Spring	May 25, 2017
81	Big Bay Point Road and Bayview Drive	Signalized	Accu-Traffic	2017	Spring	June 13, 2017
82	Big Bay Point Road and Huronia Road	Signalized	Trans-Plan	2017	Spring	May 24, 2017
83	Big Bay Point Road and Yonge Street	Signalized	Trans-Plan	2017	Spring	May 11, 2017
84	Big Bay Point Road and Hurst Drive	Signalized	Trans-Plan	2017	Spring	May 24, 2017
85	Big Bay Point Road and Prince William Way	Signalized	Accu-Traffic	2017	Spring	June 15, 2017
86	Mapleview Drive and CR-27 / Townline	Signalized	Accu-Traffic	2017	Spring	June 13, 2017
87	Mapleview Drive and Essa Road	Signalized	Trans-Plan	2017	Spring	May 4, 2017
88	Mapleview Drive and Veterans Drive	Signalized	Accu-Traffic	2017	Spring	June 13, 2017
89	Mapleview Drive and Bryne Drive	Signalized	Accu-Traffic	2017	Spring	June 13, 2017
90	Mapleview Drive and Barrie View Drive	Signalized	Accu-Traffic	2017	Spring	June 13, 2017
91	Mapleview Drive and Highway 400 SB Off-Ramp	Signalized	Accu-Traffic	2017	Spring	June 13, 2017
92	Mapleview Drive and Highway 400 NB Off-Ramp	Signalized	Accu-Traffic	2017	Spring	June 13, 2017
93	Mapleview Drive and Park Place Boulevard / Costco Driveway	Signalized	Accu-Traffic	2017	Spring	June 13, 2017
94	Mapleview Drive and Bayview Drive	Signalized	Accu-Traffic	2017	Spring	June 13, 2017
95	Mapleview Drive and Welham Road	Signalized	Accu-Traffic	2017	Spring	June 13, 2017
96	Mapleview Drive and Huronia Road	Signalized	Accu-Traffic	2015	Fall	October 20, 2015
97	Mapleview Drive and Yonge Street	Signalized	Trans-Plan	2017	Spring	May 9, 2017
98	Mapleview Drive and Prince William Way	Unsignalized	Accu-Traffic	2017	Spring	June 15, 2017
99	Huronia Road and Lockhart Road	Signalized	Accu-Traffic	2017	Spring	June 15, 2017
100	McKay Road and Veterans Drive	Signalized	Accu-Traffic	2015	Spring	April 30, 2015
101	McKay Road and Huronia Road	Signalized	Accu-Traffic	2015	Spring	April 30, 2015
103	Madelaine Drive and Mapleview Drive	Signalized	Accu-Traffic	2017	Spring	June 15, 2017

Table 2 - Weekday ATR Counts, City Roads

No	Location	Source / Surveyor	Year	Season	Date
1	Shanty Bay Road, east of Crestwood Drive (within city boundaries)	Trans-Plan	2017	Spring	June 6, 2017
2	Duckworth Street Highway 400 Crossing	Trans-Plan	2017	Spring	June 8, 2017
3	St. Vincent Street Highway 400 Crossing	Trans-Plan	2017	Spring	June 8, 2017
4	Bayfield Street Highway 400 Crossing	Trans-Plan	2017	Spring	June 13, 2017
5	Sunnidale Road Highway 400 Crossing	Trans-Plan	2017	Spring	June 13, 2017
6	Anne Street Highway 400 Crossing	Trans-Plan	2017	Spring	June 15, 2017
7	Anne Street, north of Neelands Street (within city boundaries)	Trans-Plan	2017	Spring	June 6, 2017
8	Dunlop Street Highway 400 Crossing	Trans-Plan	2017	Spring	June 15, 2017
9	Tiffin Street Highway 400 Crossing	Trans-Plan	2017	Spring	June 8, 2017
10	Essa Road Highway 400 Crossing	Trans-Plan	2017	Spring	June 15, 2017
11	Mapleview Drive Highway 400 Crossing	Trans-Plan	2017	Spring	June 13, 2017
12	McKay Road Highway 400 Crossing		(During construction. Use the 2015 TMC)		
13	Lockhart Road, east of Bayview Drive	Trans-Plan	2017	Spring	June 6, 2017
14	Salem Road, east of Veterans Drive		(Crossing is not existing)		
15	Big Bay Point Road, west of 20th Sideroad	Trans-Plan	2017	Spring	June 6, 2017
16	Mapleview Drive, west of 20th Sideroad	Trans-Plan	2017	Spring	June 6, 2017
17	CR-27 / Townline, south of McKay Road (within city boundaries)	Trans-Plan	2017	Spring	June 6, 2017
18	Veterans Drive, south of McKay Road (within city boundaries)	Trans-Plan	2017	Spring	June 6, 2017
19	Huronia Road, south of McKay Road (within city boundaries)	Trans-Plan	2017	Spring	June 6, 2017
20	Georgian Drive, east of Governors Drive	Trans-Plan	2017	Spring	June 8, 2017
21	Georgian Drive, west of Johnson Street	Trans-Plan	2017	Spring	June 8, 2017
22	Bell Farm Road, east of Alliance Boulevard	Trans-Plan	2017	Spring	June 6, 2017
23	Blake Street, between Puget Street and Johnson Street	Trans-Plan	2017	Spring	June 6, 2017
24	Blake Street, between St. Vincent Square and Rodney Street	Trans-Plan	2017	Spring	June 6, 2017
25	Ross Street, between Parkside Drive and Toronto Street	Trans-Plan	2017	Spring	June 14, 2017
26	Wellington Street, between Sunnidale Road and Toronto Street	Trans-Plan	2017	Spring	June 14, 2017
27	Cundles Road, east of Livingstone Street	Trans-Plan	2017	Spring	June 8, 2017
28	Livingstone Street, between Ford Street and Coles Street	Trans-Plan	2017	Spring	June 1, 2017
29	Cundles Road, Leacock Drive and Anne Street	Trans-Plan	2017	Spring	June 13, 2017

No	Location	Source / Surveyor	Year	Season	Date
30	Ferndale Drive, between Horsfield Drive and Cloughley Drive	Trans-Plan	2017	Spring	June 14, 2017
31	Anne Street, between Caroline Street and Campbell Avenue	Trans-Plan	2017	Spring	June 1, 2017
32	Innisfil Street, between Jacobs Terrace and Caroline Street	Trans-Plan	2017	Spring	June 1, 2017
33	Burton Avenue, between William Street and Bayview Drive	Trans-Plan	2017	Spring	June 1, 2017
34	Baldwin Lane, between Brooks Street and Bayview Drive	Trans-Plan	2017	Spring	June 1, 2017
35	Bayview Drive, south of Glenridge Road	Trans-Plan	2017	Spring	June 1, 2017
36	Bayview Drive, south of Little Avenue	Trans-Plan	2017	Spring	June 15, 2017
37	Minets Point Road, south of Lakeshore Drive	Trans-Plan	2017	Spring	June 15, 2017
38	Huronia Road, north of Truman Road	Trans-Plan	2017	Spring	June 14, 2017
39	Huronia Road, south of Loon Avenue	Trans-Plan	2017	Spring	June 14, 2017
40	Huronia Road, north of Lockhart Road	Trans-Plan	2017	Spring	June 14, 2017
41	Welham Road, south of Big Bay Point Road	Trans-Plan	2017	Spring	June 15, 2017
42	Big Bay Point Road, between Ward Drive and Dean Avenue	Accu-Traffic	2016	Summer	August 6, 2016
43	Little Avenue, between Marshall Street and Chieftian Crescent	Trans-Plan	2017	Spring	June 15, 2017
44	Lakeshore Drive, between Minets Point Road and Wallwins Way	Trans-Plan	2017	Spring	June 15, 2017
45	Hurst Drive, between and Manor Gate and southern Bruce Crescent				
46	Dean Avenue, south of Big Bay Point Road	Accu-Traffic	2015	Spring	April 22, 2016
47	Ardagh Road, between Sedgewood Way and Ferndale Drive	Trans-Plan	2017	Spring	June 15, 2017
48	Essa Road, between Mapleton Avenue and Coughlin Road				
49	Essa Road, between Dunn Street and Mapleview Drive	Trans-Plan	2017	Spring	June 13, 2017

Table 3 - ATR Counts on Highway 400 Mainline

No.	Mainline Section	Source / Surveyor	Year	Season	Date
1	Highway 400, north of Duckworth Street	MTO	2014	Fall	Sept. 17 to Sept. 23
2	Highway 400, north of Bayfield Street	MTO	2015	Fall	Nov. 20 to Nov. 26
3	Highway 400, north of Dunlop Street	MTO	2014	Fall	Sept. 2 to Sept. 8
4	Highway 400, north of Essa Road	MTO	2013	Fall	Sept. 24 to Sept. 30
5	Highway 400, north of Mapleview Drive	MTO	2014	Fall	Sept. 2 to Sept. 8
6	Highway 400, north of Innisfil Beach Road	MTO	2013	Fall	Oct. 1 to Oct. 7

Table 4 Weekday ATR Counts on Highway 400 Interchange Ramps

No	Interchange	Source / Surveyor	Year	Season	Date	Survey Ramp No.
1	***Duckworth Interchange***	Duckworth Street is viewed as an east-west direction.				
	NB Off-Ramp (S-E/W)	MTO	2016	Early summer	Jun. 14 to Jun. 20	24
	SB Off-Ramp (N-E/W)	MTO	2016	Early summer	Jun. 17 to Jun. 23	34
	SB On-Ramp (E-S)	MTO	2016	Early summer	Jun. 14 to Jun. 20	63
	SB On-Ramp (W-S)	MTO	2016	Early summer	Jun. 17 to Jun. 23	53
	NB On-Ramp (E/W-N)	MTO	2016	Early summer	Jun. 15 to Jun. 21	42
2	***Bayfield Interchange***					
	SB Off-Ramp (N-E/W)	MTO	2016	Early summer	Jun. 14 to Jun. 20	34
	NB Off-Ramp (S-E/W)	MTO	2016	Early summer	Jun. 14 to Jun. 20	24
	SB On-Ramp (E-S)	MTO	2016	Early summer	Jun. 17 to Jun. 23	63
	SB On-Ramp (W-S)	MTO	2016	Early summer	Jun. 14 to Jun. 20	53
	NB On-Ramp (E/W-N)	MTO	2016	Early summer	Jun. 14 to Jun. 20	42
3	***Dunlop Interchange***					
	SB Off-Ramp (N-E/W)	MTO	2016	Early summer	Jun. 14 to Jun. 20	34
	NB Off-Ramp (S-W)	MTO	2016	Early summer	Jun. 23 to Jun. 29	26
	NB Off-Ramp (S-E)	MTO	2016	Early summer	Jun. 14 to Jun. 20	25
	SB On-Ramp (E/W-S)	MTO	2016	Early summer	Jun. 23 to Jun. 29	43
	NB On-Ramp (E/W-N)	MTO	2016	Early summer	Jun. 14 to Jun. 20	42
4	***Essa Interchange***	Essa Road is viewed as an east-west direction.				
	SB Off-Ramp (N-E/W)	MTO	2016	Early summer	Jun. 15 to Jun. 21	31
	NB Off-Ramp (S-E/W)	MTO	2016	Early summer	Jun. 14 to Jun. 20	21
	SB On-Ramp (E/W-S)	MTO	2016	Early summer	Jun. 17 to Jun. 23	13
	NB On-Ramp (W-N)	MTO	2016	Early summer	Jun. 17 to Jun. 23	22
	NB On-Ramp (E-N)	MTO	2016	Early summer	Jun. 14 to Jun. 20	42
5	***Mapleview Interchange***					
	SB Off-Ramp	MTO	2016	Early summer	Jun. 14 to Jun. 20	34
	NB Off-Ramp	MTO	2016	Early summer	Jun. 14 to Jun. 20	24
	SB On-Ramp	MTO	2016	Early summer	Jun. 14 to Jun. 20	43
	NB On-Ramp	MTO	2016	Early summer	Jun. 14 to Jun. 20	42
6	***Innisfil Beach Interchange***					
	SB Off-Ramp (N-E/W)	MTO	2016	Early summer	Jun. 12 to Jun. 18	34
	NB Off-Ramp (S-E/W)	MTO	2016	Early summer	Jun. 12 to Jun. 18	24
	SB On-Ramp (E-S)	MTO	2016	Early summer	Jun. 12 to Jun. 18	63
	SB On-Ramp (W-S)	MTO	2016	Early summer	Jun. 22 to Jun. 28	53
	NB On-Ramp (E-N)	MTO	2016	Early summer	Jun. 12 to Jun. 18	62
	NB On-Ramp (W-N)	MTO	2016	Early summer	Jun. 12 to Jun. 18	47

APPENDIX

E-3 EMME PLOTS – ASSESSMENT OF 2041 NETWORK ALTERNATIVES

APPENDIX

APPENDIX

E-3.1 ALTERNATIVES AND EMME SCENARIOS

APPENDIX

Appendix E-3.1

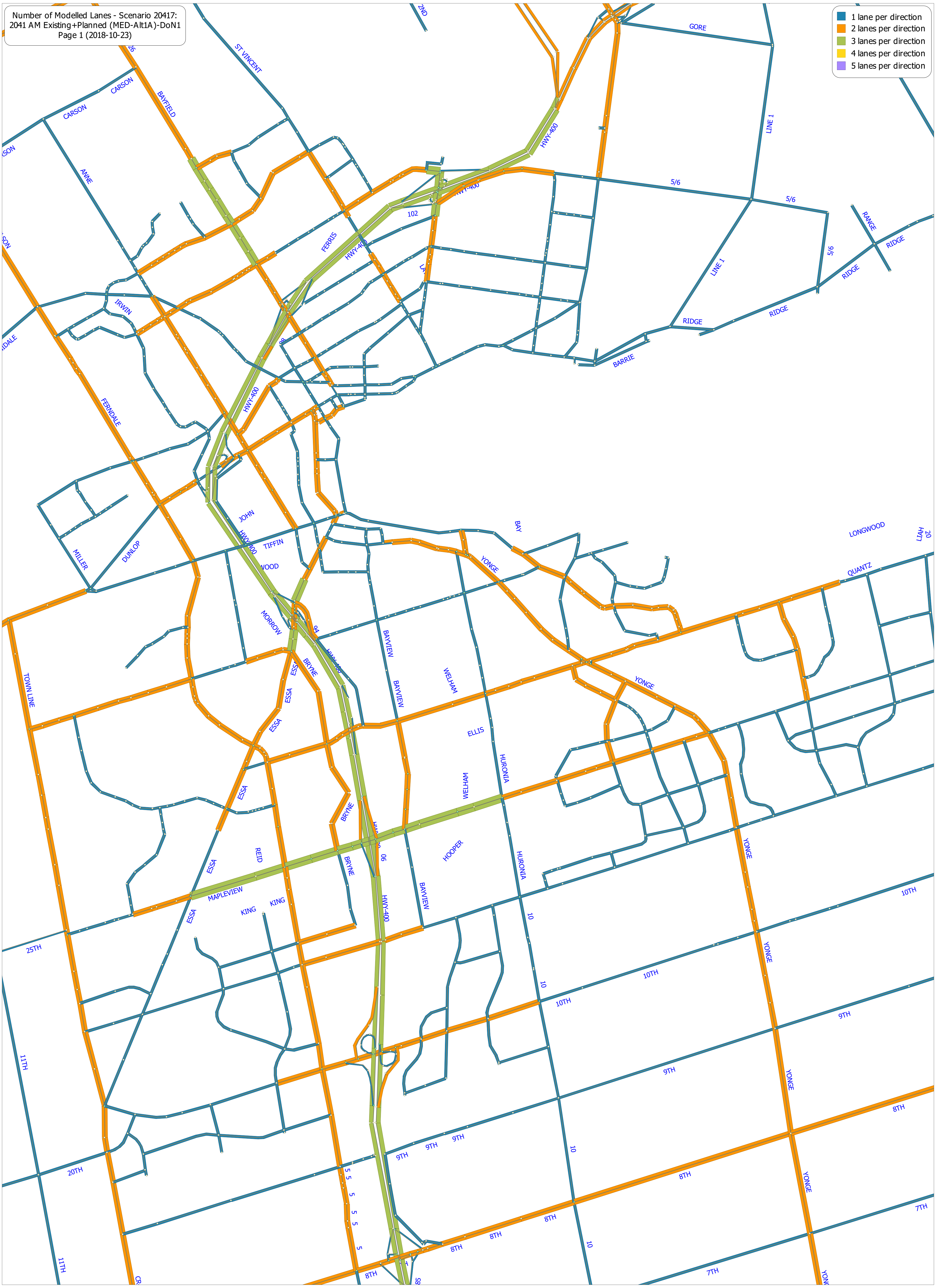
Table 1 Description of Emme Model Scenario Alternatives, 2041

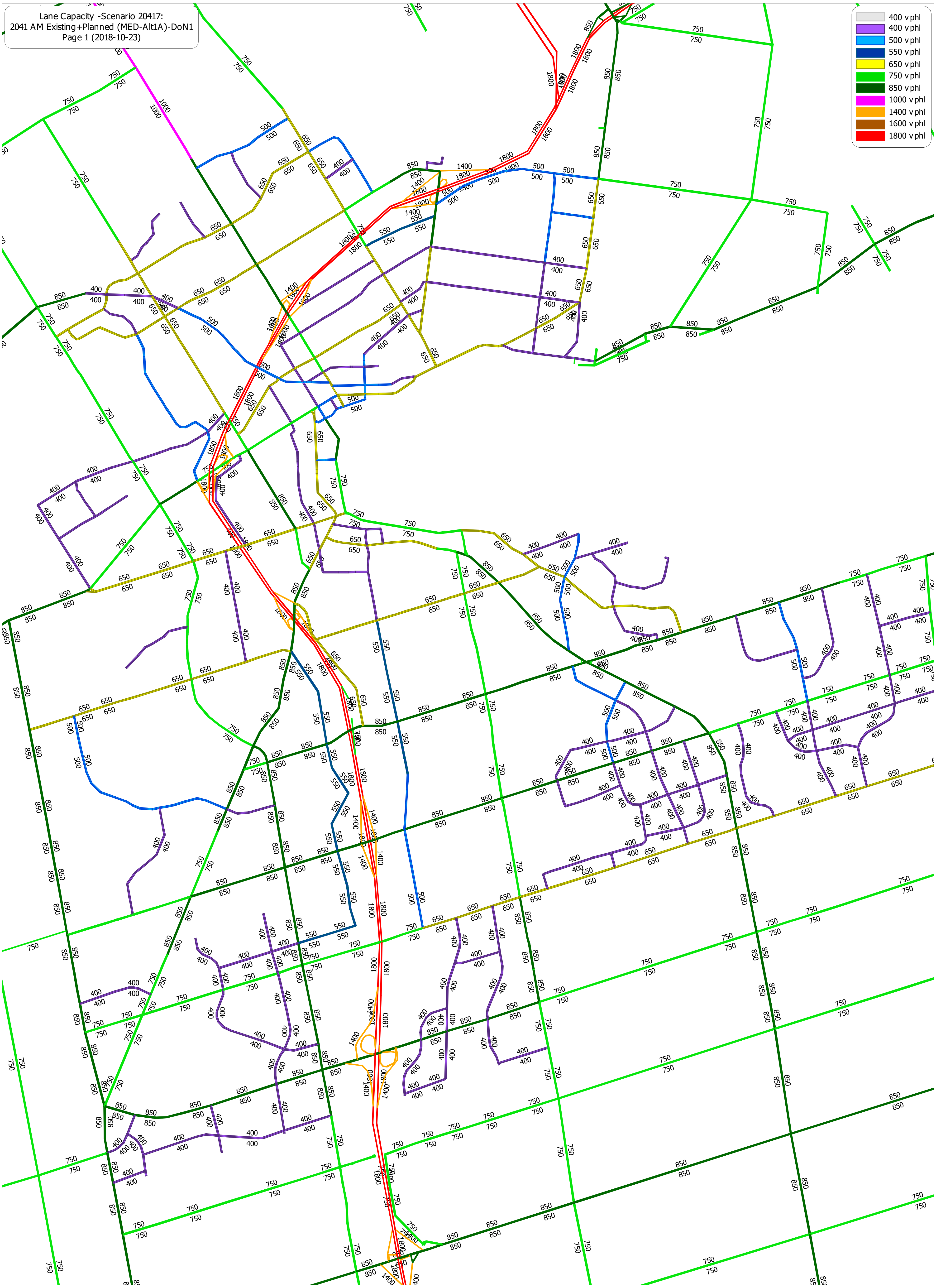
Alt. No.	Network Alternative Description	Comments	Emme Model Scenario No.
1A	**Future 2041 Base Network No.1** - Existing + Planned Network	This base network represents the do-nothing City's roads and Highway 400 crossings and interchanges.	Scen. 20417 (AM) Scen. 20418 (PM)
1B	**Future 2041 Base Network No.2** - Existing + Planned Network + **TESR Recommended Improvements**	This base network represents the future 2041 do-nothing network scenario.	Scen. 21417 (AM) Scen. 21418 (PM)
2	**Future 2031 Recommended Network (2014 MMATMP) without Harvie / Big Bay Point Interchange** **- Existing + Planned Network + TESR Recommended Improvements + 2014 MMATMP Recommended Improvements**	This alternative represents the previous 2014 TMP-recommended future 2031 network scenario (excluding Harvie / Big Bay Point Interchange) plus the 2017 updated TESR recommended network. This alternative is to justify the extra improvements and the changes to the previous TMP recommendations.	Scen. 26414 (AM) Scen. 26415 (PM)
3	**Future 2041 DRAFT Preferred Network without Harvie / Big Bay Point Interchange** **- Existing + Planned Network + TESR Recommended Improvements + 2014 MMATMP Recommended Improvements + Additional Improvements and Changes**	This alternative represents the previous 2014 TMP-recommended future 2031 network scenario (excluding Harvie / Big Bay Point Interchange) plus the 2017 updated TESR recommended network. This alternative is the DRAFT preferred network, as of December 11, 2018 Review Meeting with City staff.	Scen. 32414 (AM) Scen. 32415 (PM) (Revision 3D4)

APPENDIX

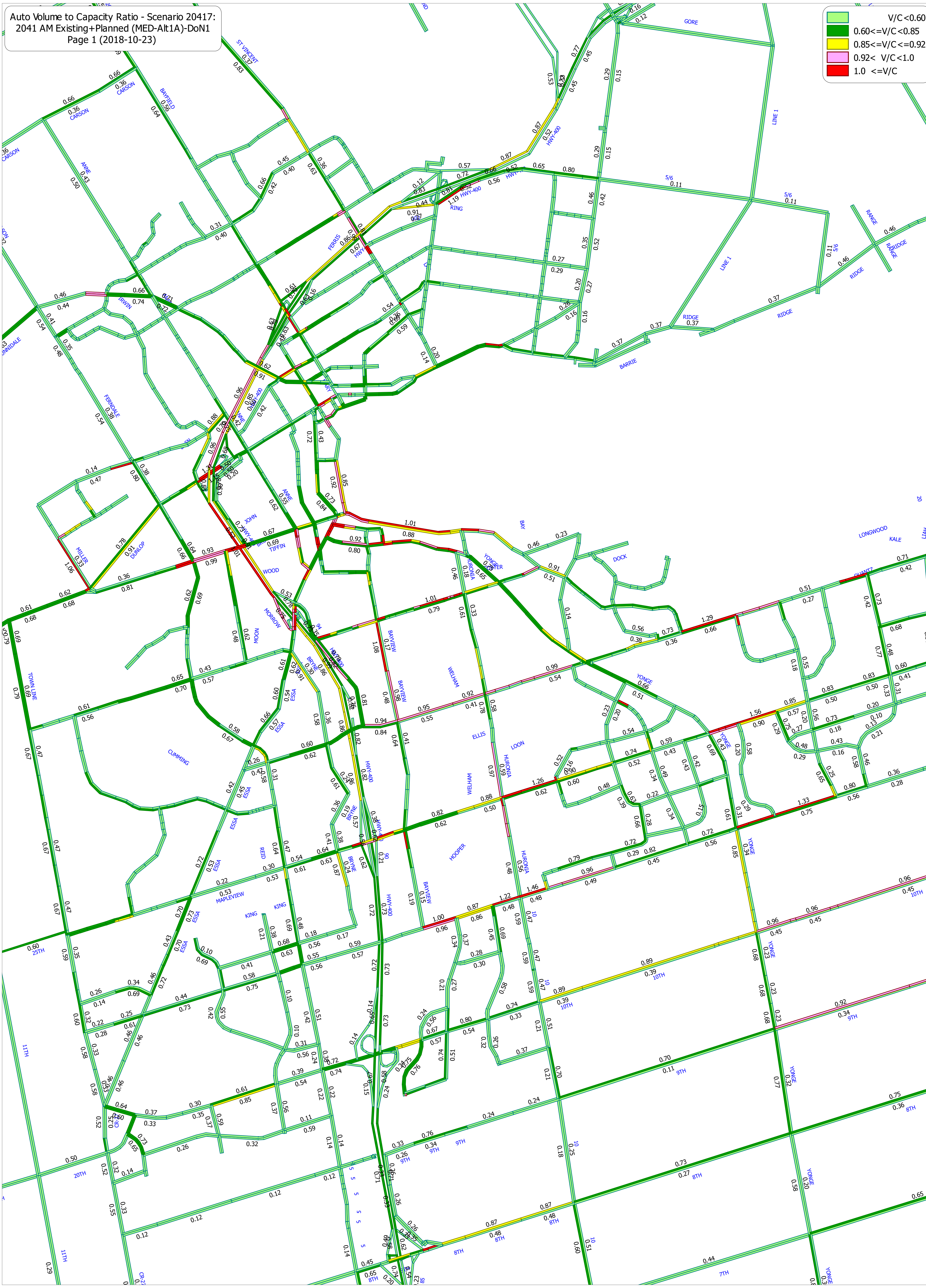
E-3.2 ALTERNATIVE 1A

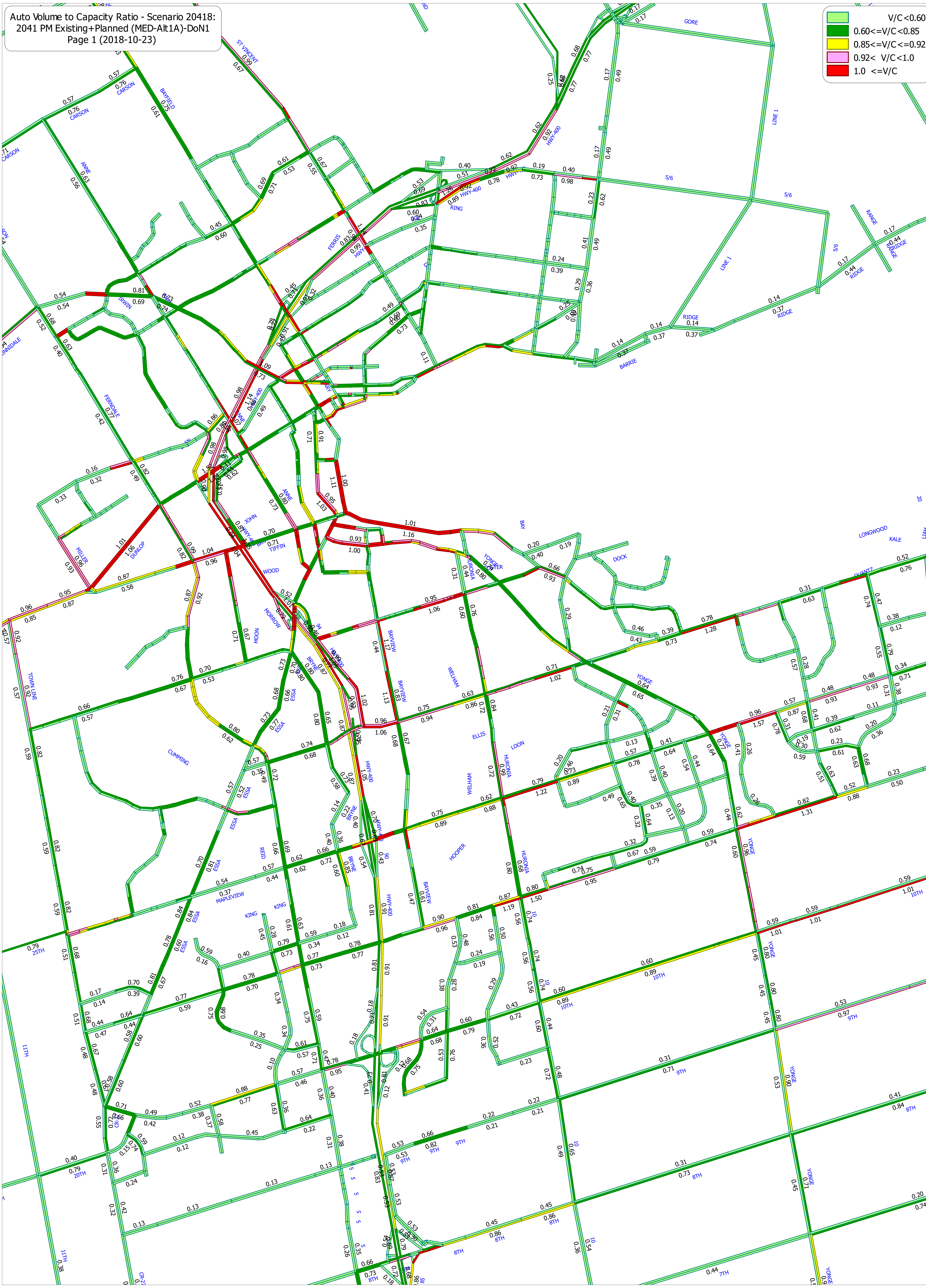
APPENDIX


Number of Modelled Lanes - Scenario 20417:
2041 AM Existing+Planned (MED-Alt1A)-DoN1
Page 1 (2018-10-23)
1 lane per direction
2 lanes per direction
3 lanes per direction
4 lanes per direction
5 lanes per direction
ST VINCENT
GORE
CARSON
BAYFIELD
ANNE
LINE 1
5/6
RANGE
RIDGE
FERRIS
HWY-400
102
IRWIN
BARRIE
FERNDALE
JOHN
TIFFIN
BAY
LONGWOOD
QUANTZ
MILLER
DUNLOP
MORROW
BAYVIEW
WELHAM
YONGE
TOWN LINE
ESSA
BRYNE
ELLIS
HURONIA
REID
HOOPER
MAPLEVIEW
KING
25TH
10TH
10
9TH
8TH
7TH
11TH
20TH


Lane Capacity -Scenario 20417:
2041 AM Existing+Planned (MED-Alt1A)-DoN1
Page 1 (2018-10-23)
400 v phl
400 v phl
500 v phl
550 v phl
650 v phl
750 v phl
850 v phl
1000 v phl
1400 v phl
1600 v phl
1800 v phl

Auto Volume to Capacity Ratio - Scenario 20417:
2041 AM Existing+Planned (MED-Alt1A)-DoN1
Page 1 (2018-10-23)



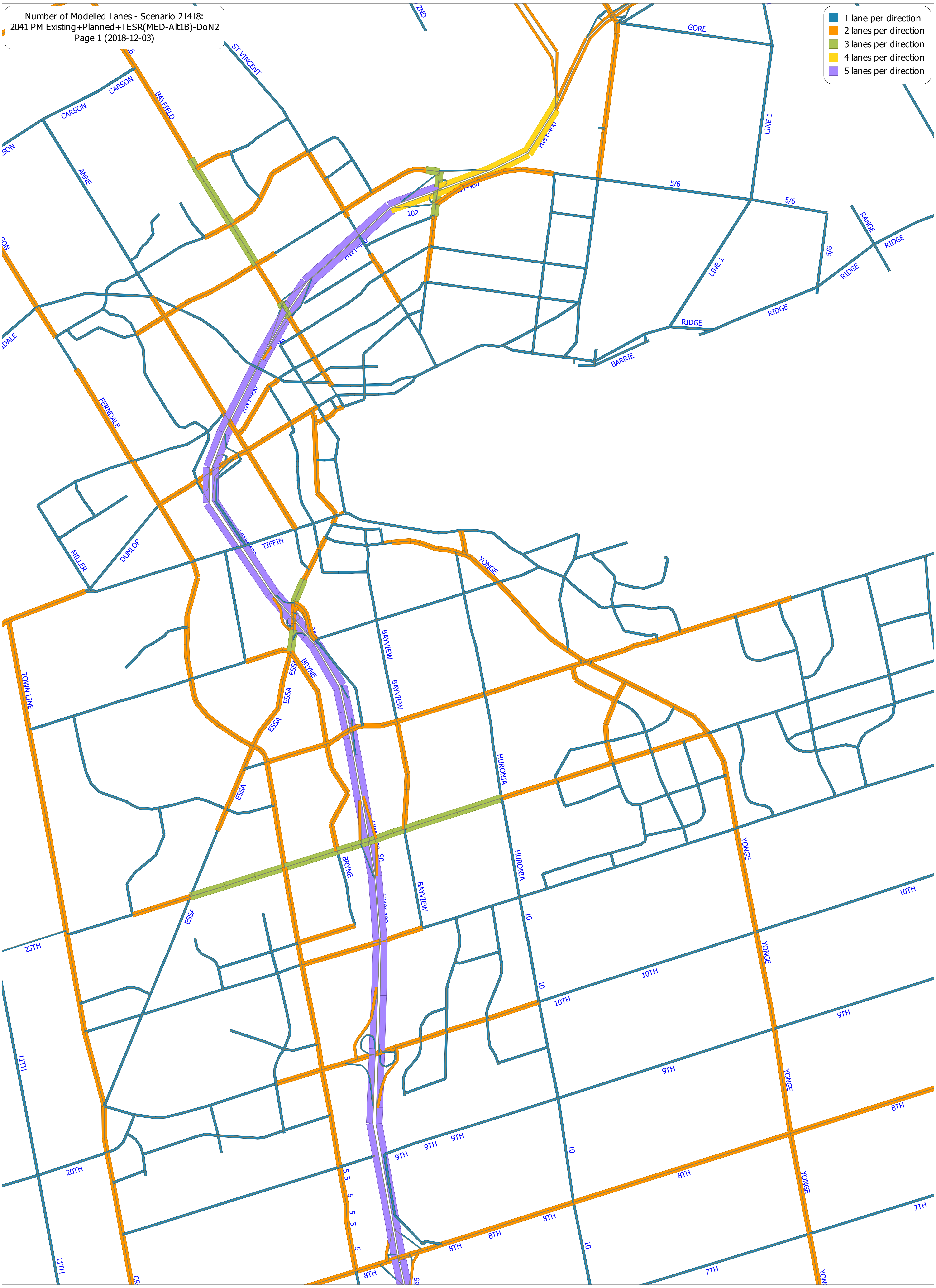

Auto Volume to Capacity Ratio - Scenario 20418:
2041 PM Existing+Planned (MED-Alt1A)-DoN1
Page 1 (2018-10-23)
V/C<0.60
0.60<=V/C<0.85
0.85<=V/C<=0.92
0.92< V/C<1.0
1.0 <=V/C

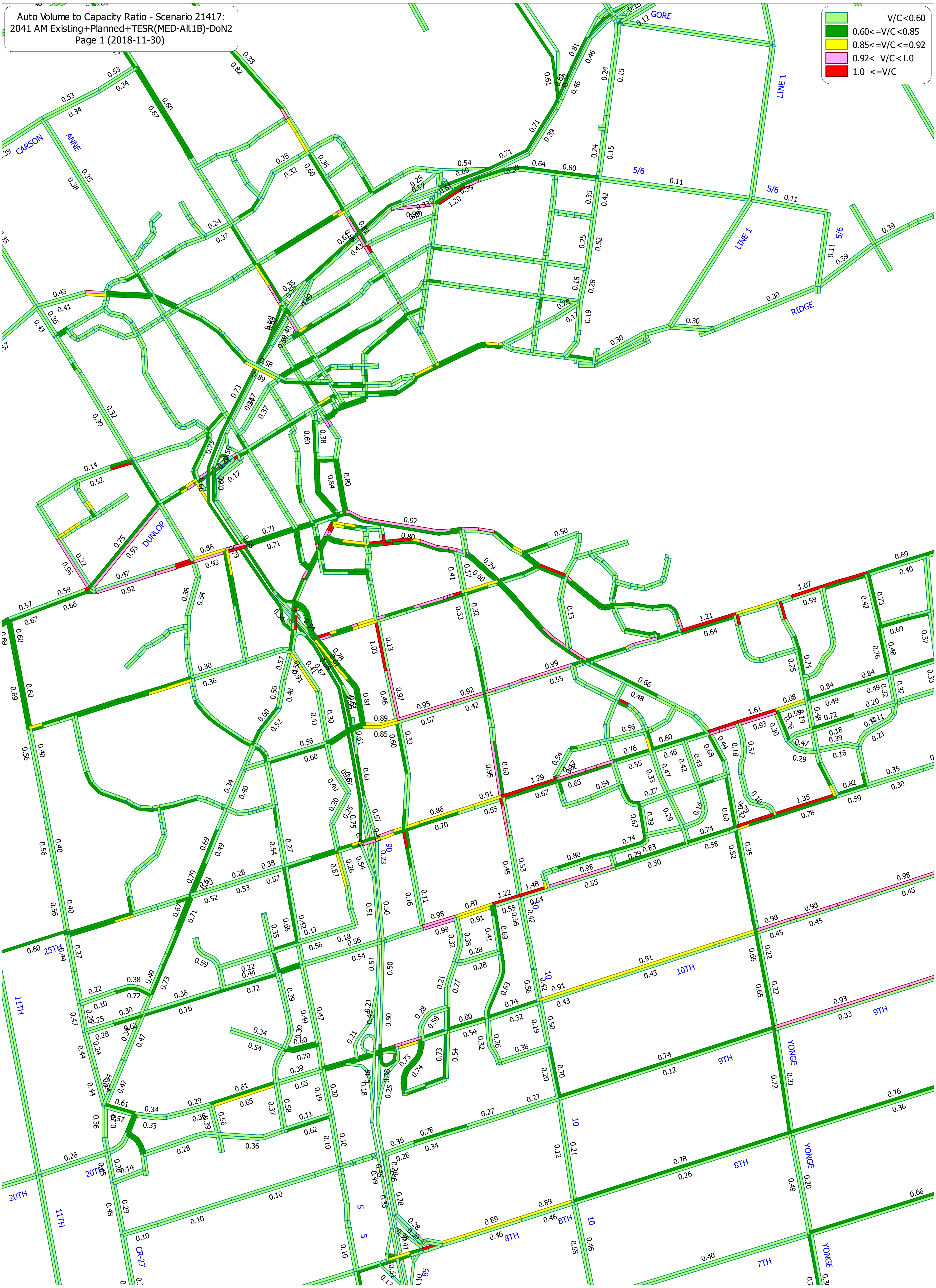
APPENDIX

E-3.3 ALTERNATIVE 1B

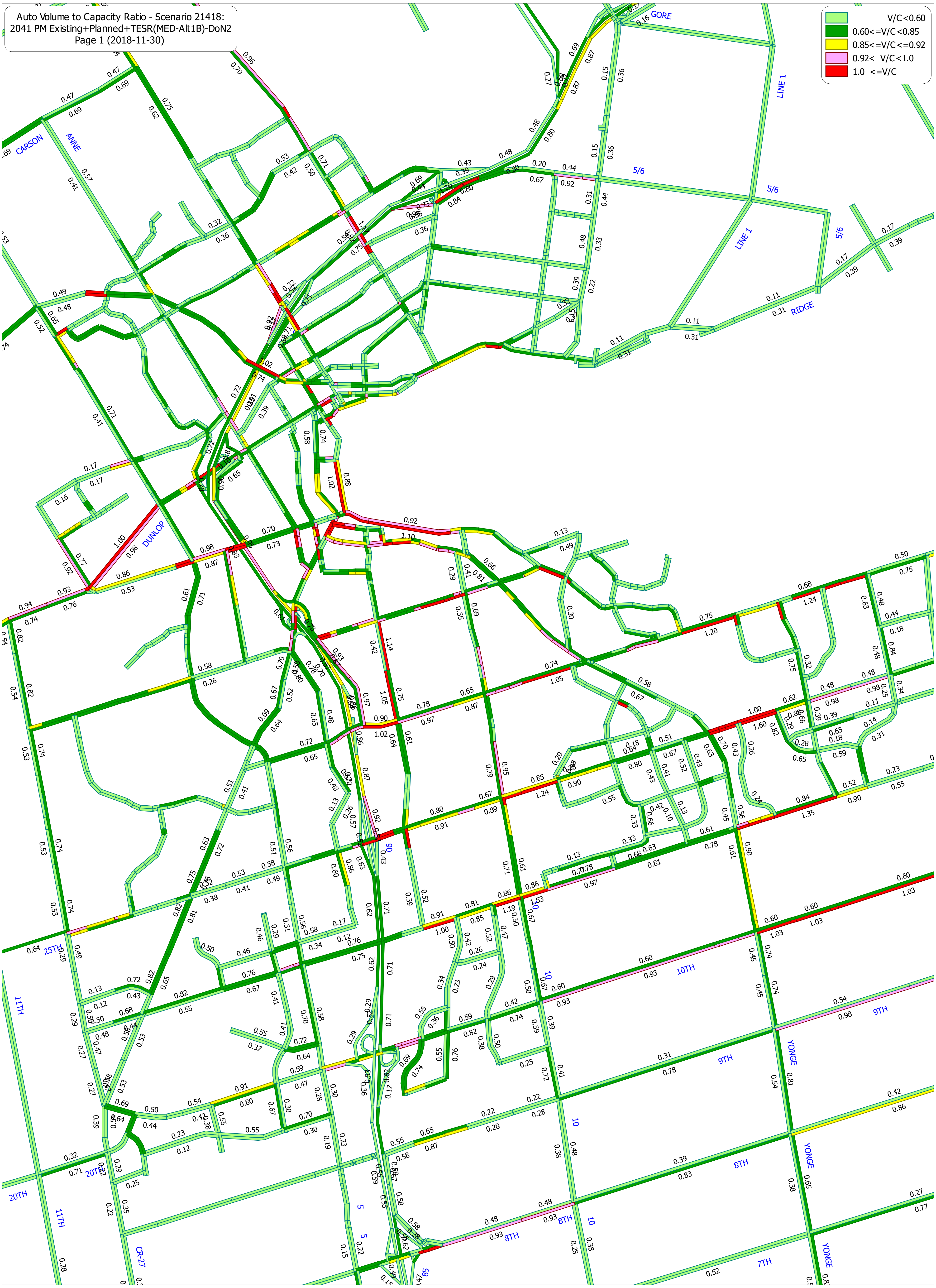
APPENDIX

Number of Modelled Lanes - Scenario 21418:
2041 PM Existing+Planned+TESR(MED-Alt1B)-DoN2
Page 1 (2018-12-03)





Auto Volume to Capacity Ratio - Scenario 21417:
2041 AM Existing+Planned+TESR(MED-Alt1B)-DoN2
Page 1 (2018-11-30)
V/C<0.60
0.60<=V/C<0.85
0.85<=V/C<=0.92
0.92< V/C<1.0
1.0 <=V/C
GORE
LINE 1
CARSON
ANNE
5/6
RIDGE
DUNLOP
25TH
11TH
10TH
9TH
YONGE
8TH
20TH
CR-27
7TH

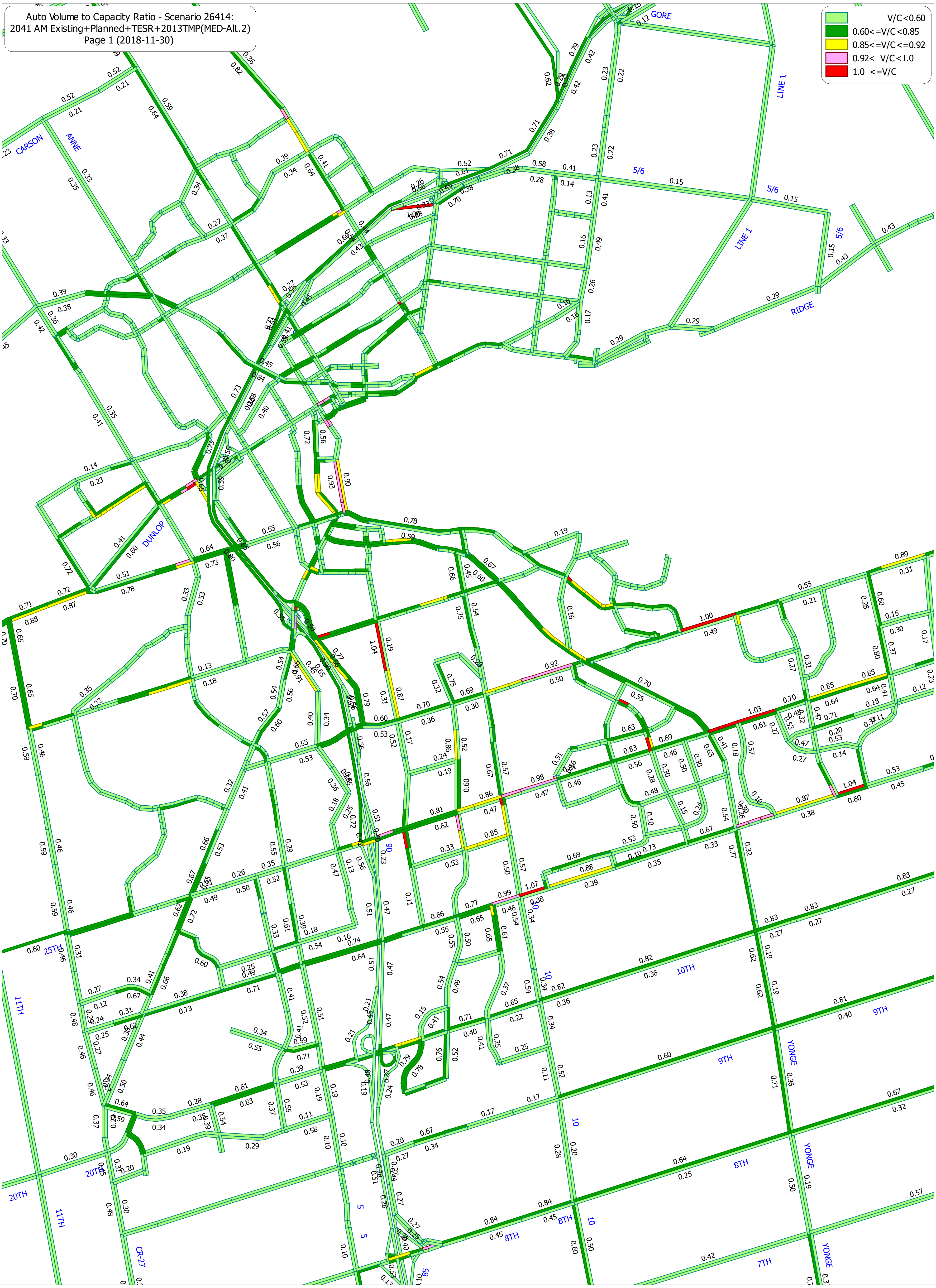

Auto Volume to Capacity Ratio - Scenario 21418:
2041 PM Existing+Planned+TESR(MED-Alt1B)-DoN2
Page 1 (2018-11-30)
V/C<0.60
0.60<=V/C<0.85
0.85<=V/C<=0.92
0.92< V/C<1.0
1.0 <=V/C
GORE
LINE 1
5/6
RIDGE
CARSON
ANNE
DUNLOP
25TH
11TH
20TH
CR-27
10TH
9TH
8TH
7TH
YONGE
10
5
90
85

APPENDIX

E-3.4 ALTERNATIVE 2

APPENDIX

Number of Modelled Lanes - Scenario 26415:
2041 PM Existing+Planned+TESR+2013TMP(MED-Alt.2)
Page 1 (2018-12-03)
1 lane per direction
2 lanes per direction
3 lanes per direction
4 lanes per direction
5 lanes per direction
GORE
LINE 1
5/6
RANGE
RIDGE
BARRIE
HWY 400
102
CARSON
ANNE
BAYFIELD
FERNDALE
MILLER
DUNLOP
TIFFIN
YONGE
BAYVIEW
WELHAM
HURONIA
ESSA
BRYNE
TOWN LINE
25TH
20TH
11TH
10TH
10
9TH
8TH
7TH


Auto Volume to Capacity Ratio - Scenario 26414:
2041 AM Existing+Planned+TESR+2013TMP(MED-Alt.2)
Page 1 (2018-11-30)
V/C<0.60
0.60<=V/C<0.85
0.85<=V/C<=0.92
0.92< V/C<1.0
1.0 <=V/C
GORE
LINE 1
5/6
RIDGE
CARSON
ANNE
DUNLOP
25TH
11TH
20TH
CR-27
10TH
9TH
8TH
7TH
YONGE
10
90
5
85


Auto Volume to Capacity Ratio - Scenario 26415:
2041 PM Existing+Planned+TESR+2013TMP(MED-Alt.2)
Page 1 (2018-11-30)
V/C<0.60
0.60<=V/C<0.85
0.85<=V/C<=0.92
0.92< V/C<1.0
1.0 <=V/C
GORE
LINE 1
CARSON
ANNE
5/6
RIDGE
DUNLOP
25TH
11TH
20TH
CR-27
10TH
9TH
8TH
7TH
YONGE
90
10
5
85

APPENDIX

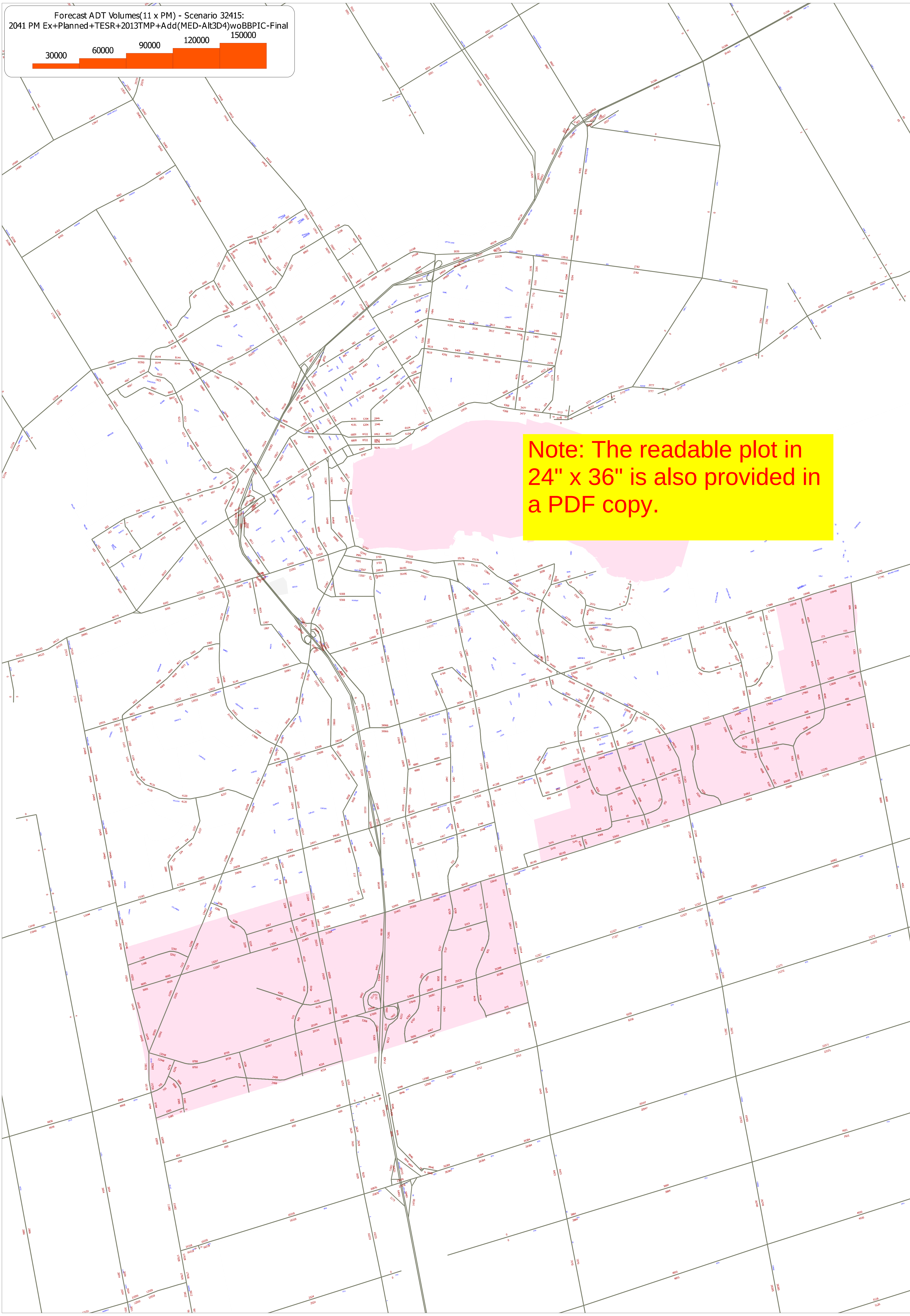
E-3.5 ALTERNATIVE 3

APPENDIX

Number of Modelled Lanes - Scenario 32414:
2041 AM Ex+Planned+TESR+2013TMP+Add(MED-Alt3D4)woBBPIC-Final
Page 1 (2018-12-09)

Auto Volume to Capacity Ratio - Scenario 32414:
2041 AM Ex+Planned+TESR+2013TMP+Add(MED-Alt3D4)woBBPIC-Final
Page 1 (2018-12-09)
V/C<0.60
0.60<=V/C<0.85
0.85<=V/C<=0.92
0.92< V/C<1.0
1.0 <=V/C
HWY-11
LINE 1
LINE 2
GORE
5/6
CARSON
ANNE
WILSON
RIDGE
DUNLOP
11TH
25TH
20TH
CR-27
10TH
9TH
8TH
7TH
YONGE
10
5
90


Auto Volume to Capacity Ratio - Scenario 32415:
2041 PM Ex+Planned+TESR+2013TMP+Add(MED-Alt3D4)woBBPIC-Final
Page 1 (2018-12-09)
V/C<0.60
0.60<=V/C<0.85
0.85<=V/C<=0.92
0.92< V/C<1.0
1.0 <=V/C
HWY-11
LINE 1
LINE 2
GORE
5/6
RIDGE
CARSON
ANNE
WILSON
HWY-400
DUNLOP
11TH
25TH
20TH
CR-27
10TH
9TH
8TH
7TH
YONGE
10
5
90
85


Forecast ADT Volumes(11 x PM) - Scenario 32415:
2041 PM Ex+Planned+TESR+2013TMP+Add(MED-Alt3D4)woBBPIC-Final
30000
60000
90000
120000
150000
Note: The readable plot in 24" x 36" is also provided in a PDF copy.

APPENDIX

E-4 *EMME PLOTS – ASSESSMENT OF 2031 NETWORK ALTERNATIVES*

APPENDIX

APPENDIX

E-4.1 ALTERNATIVES AND EMME SCENARIOS

APPENDIX

Appendix E-4.1
Table 1 Description of Emme Model Scenario Alternatives, 2031

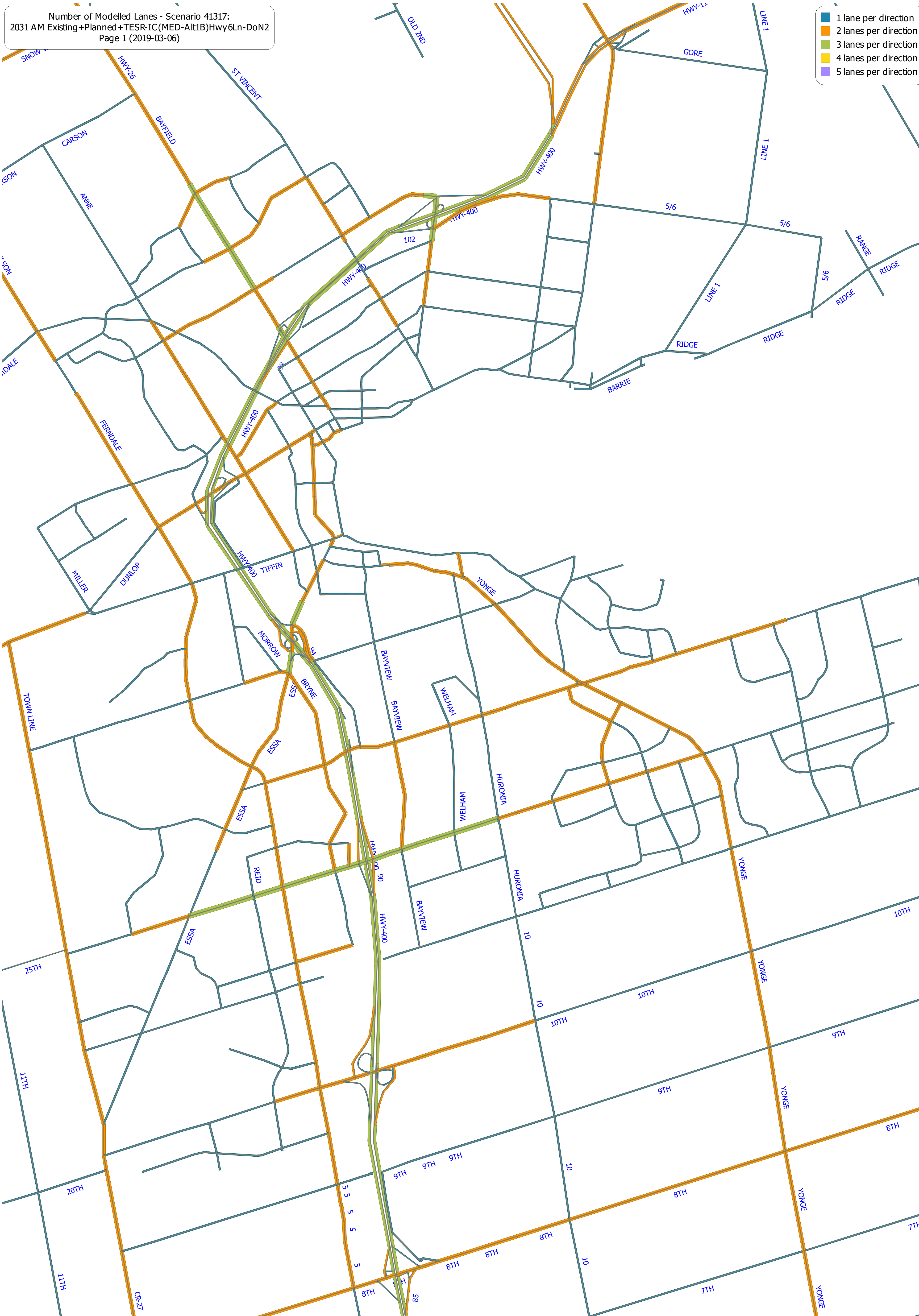
Alt. No.	Network Alternative Description	Comments	Emme Model Scenario No.
1	**Future 2031 Base Network No.1** - Existing + Planned Network + TESR Recommended Improvements	This base network represents the future 2031 do-nothing network scenario. Network excludes the Salem/Lockhart Road widening to 5 lanes and the Salem/Lockhart Crossing.	Scen. 41317 (AM) Scen. 41318 (PM)
2	**Future 2031 Preferred Network with 6 Lanes on Highway 400 (No HOV)** - Existing + Planned Network + TESR Recommended Improvements **+ 2019 TMP Proposed Improvements (excluding Salem Crossing)**	This base network represents the future 2031 preferred network scenario based on the 2019 TMP proposed improvements. Network excludes the Salem/Lockhart Crossing.	Scen. 43317 (AM) Scen. 43318 (PM)
3	**Future 2031 Final Preferred Network with 6 Lanes on Highway 400 (No HOV)** - Existing + Planned Network + TESR Recommended Improvements **+ 2019 TMP Proposed Improvements (including Salem Crossing)**	This base network represents the future 2031 preferred network scenario based on the 2019 TMP proposed improvements. Network includes the Salem/Lockhart Crossing.	Scen. 44317 (AM) Scen. 44318 (PM)

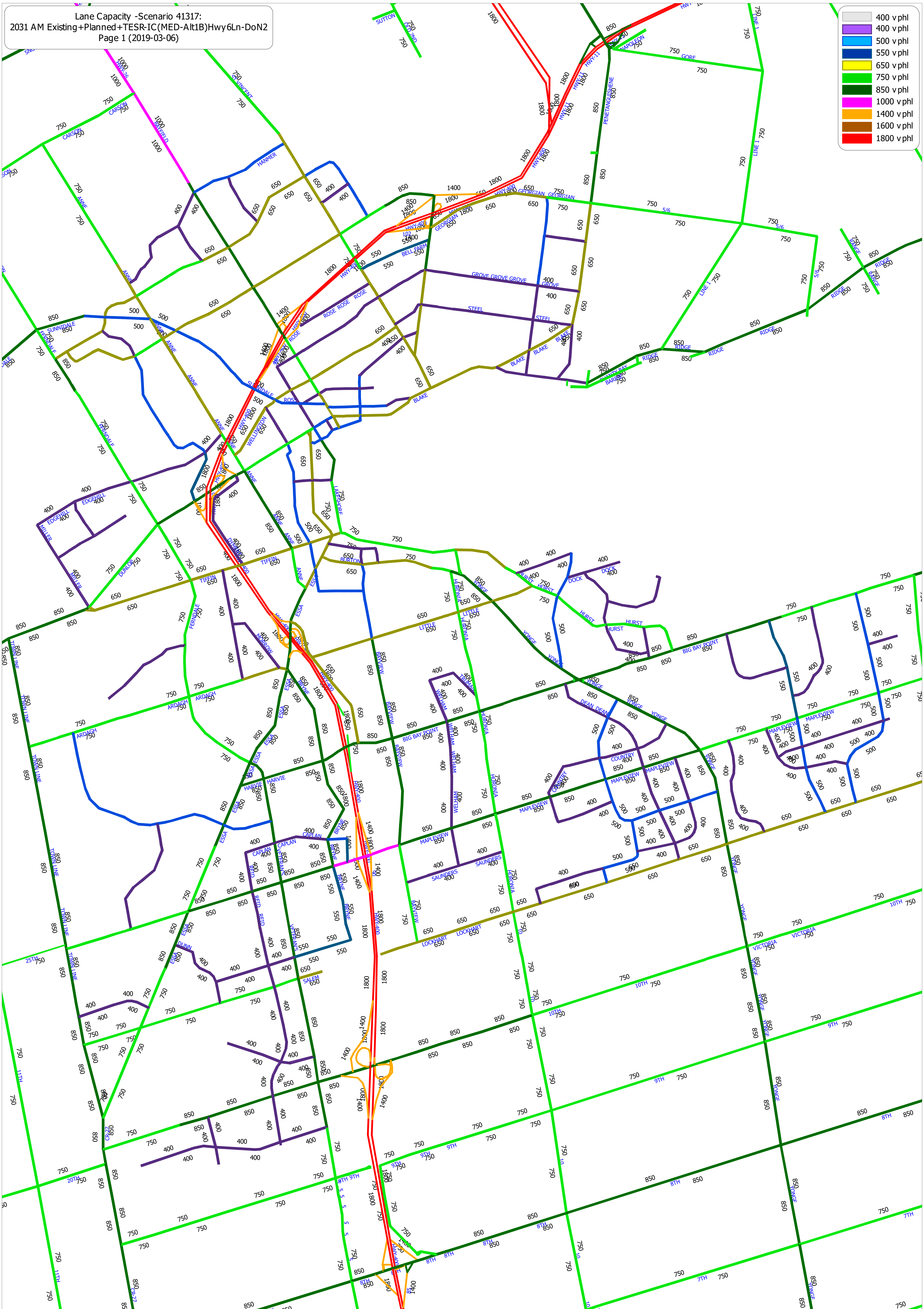
APPENDIX

E-4.2 ALTERNATIVE 1 – DO NOTHING, V/C RATIOS

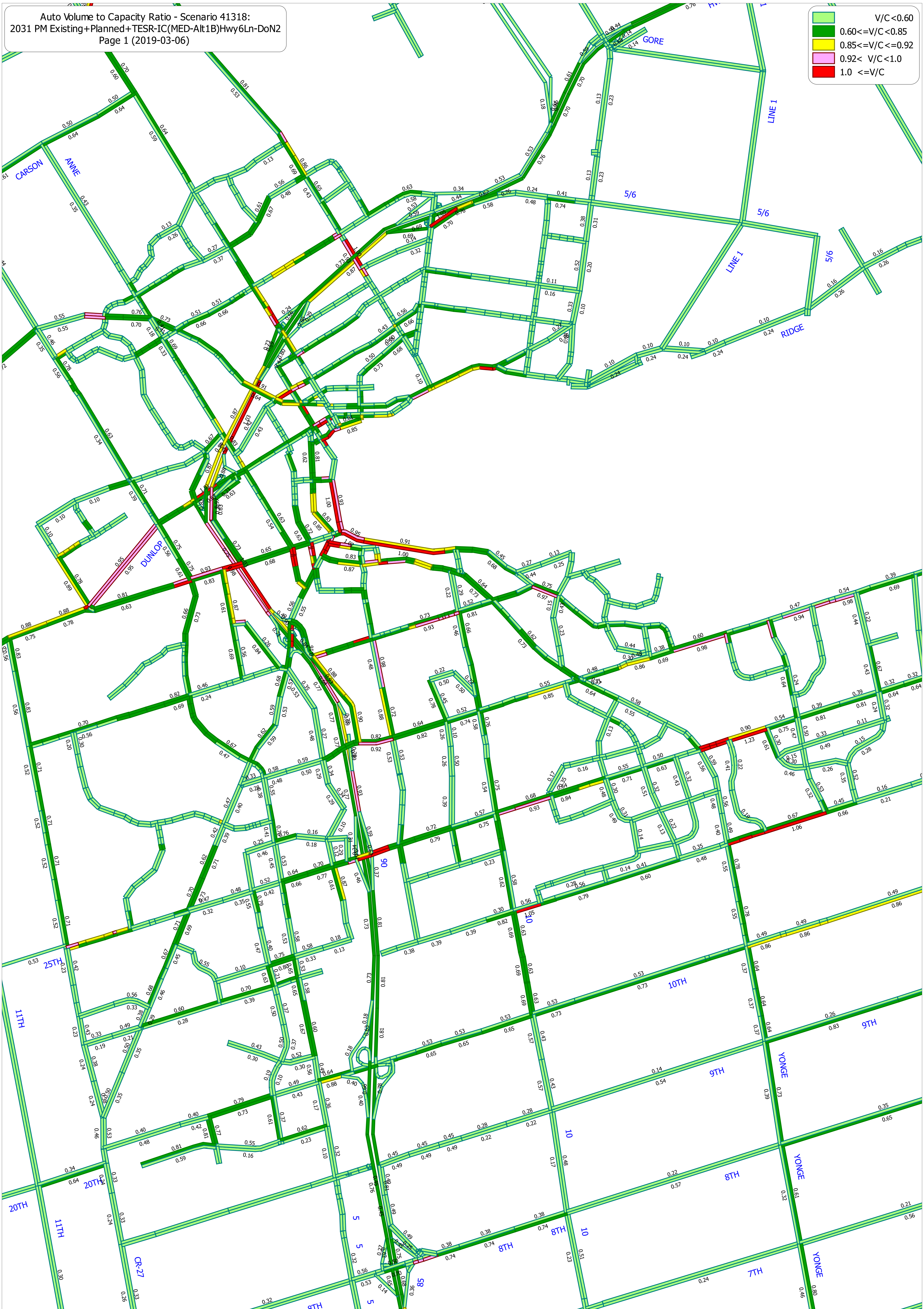
APPENDIX

Number of Modelled Lanes - Scenario 41317:
2031 AM Existing+Planned+TESR-IC(MED-Alt1B)Hwy6Ln-DoN2
Page 1 (2019-03-06)




Lane Capacity -Scenario 41317:
2031 AM Existing+Planned+TESR-IC(MED-Alt1B)Hwy6Ln-DoN2
Page 1 (2019-03-06)
400 v phl
400 v phl
500 v phl
550 v phl
650 v phl
750 v phl
850 v phl
1000 v phl
1400 v phl
1600 v phl
1800 v phl


Auto Volume to Capacity Ratio - Scenario 41317:
2031 AM Existing+Planned+TESR-IC(MED-Alt1B)Hwy6Ln-DoN2
Page 1 (2019-03-06)
V/C<0.60
0.60<=V/C<0.85
0.85<=V/C<=0.92
0.92< V/C<1.0
1.0 <=V/C
CARSON
ANNE
GORE
LINE 1
5/6
RIDGE
DUNLOP
25TH
11TH
10TH
9TH
YONGE
20TH
CR-27
8TH
7TH
10
90
5
85


Auto Volume to Capacity Ratio - Scenario 41318:
2031 PM Existing+Planned+TESR-IC(MED-Alt1B)Hwy6Ln-DoN2
Page 1 (2019-03-06)
V/C<0.60
0.60<=V/C<0.85
0.85<=V/C<=0.92
0.92< V/C<1.0
1.0 <=V/C
CARSON
ANNE
GORE
LINE 1
5/6
RIDGE
DUNLOP
25TH
11TH
20TH
CR-27
10TH
9TH
8TH
7TH
YONGE
90
10
5
85

APPENDIX

E-4.3 ALTERNATIVE 2 – WITHOUT SALEM/LOCKHART CROSSING, V/C RATIOS

APPENDIX

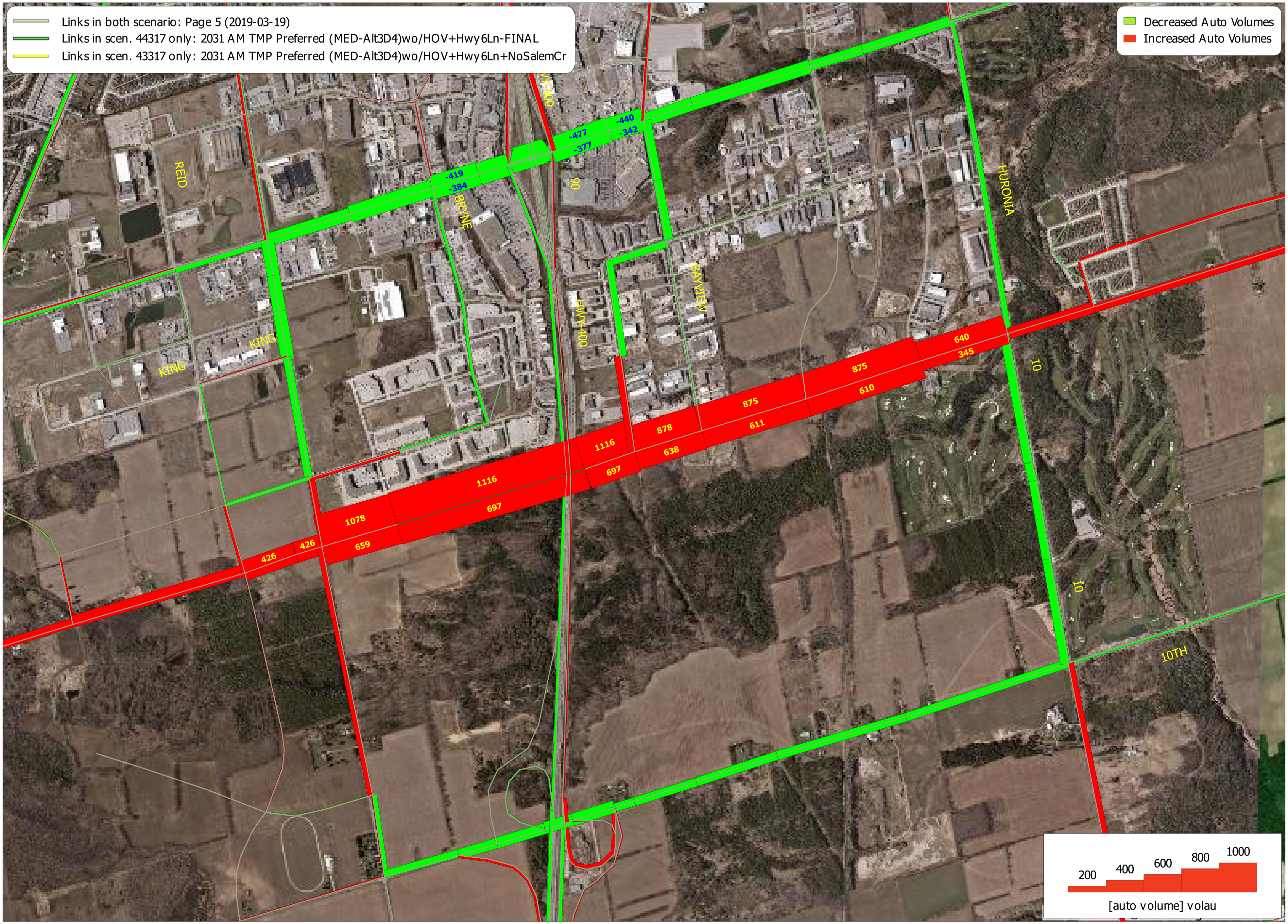
Auto Volume to Capacity Ratio - Scenario 43317:
2031 AM TMP Preferred (MED-Alt3D4)wo/HOV+Hwy6Ln+NoSalemCr
Page 1 (2019-03-19)
V/C<0.60
0.60<=V/C<0.85
0.85<=V/C<=0.92
0.92< V/C<1.0
1.0 <=V/C
MAPLEVIEW
CHURCHILL
CAPLAN
BRYNE
VETERANS
BAYVIEW
WELHAM
HURONIA
SAUNDERS
LOCKHART
SALEM
BARRIE VIEW

Auto Volume to Capacity Ratio - Scenario 43318:
2031 PM TMP Preferred (MED-Alt3D4)wo/HOV+Hwy6Ln+NoSalemCr
Page 1 (2019-03-19)

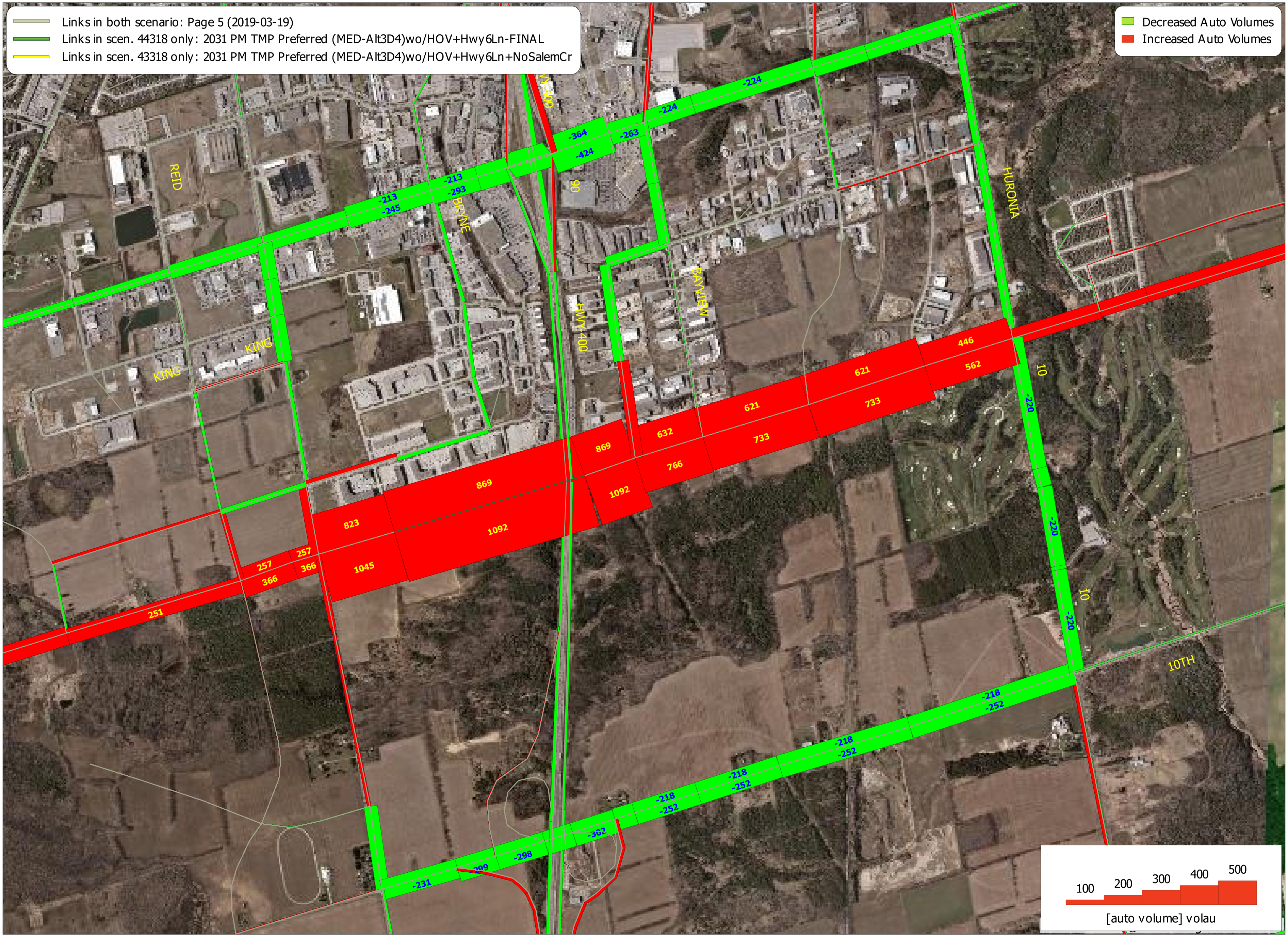
APPENDIX

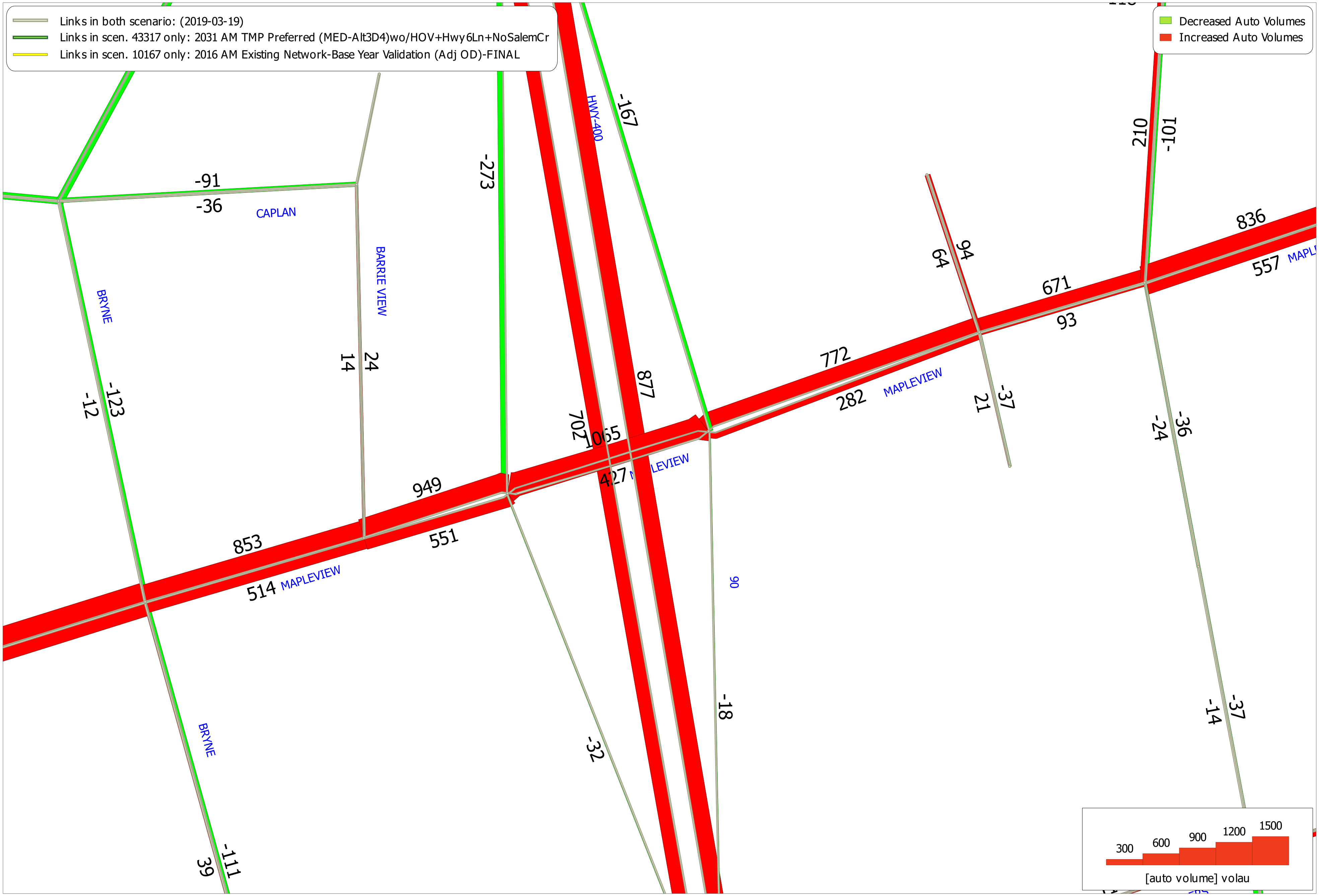
E-4.4 ALTERNATIVE 3 – WITH SALEM/LOCKHART CROSSING, VOLUME COMPARISONS

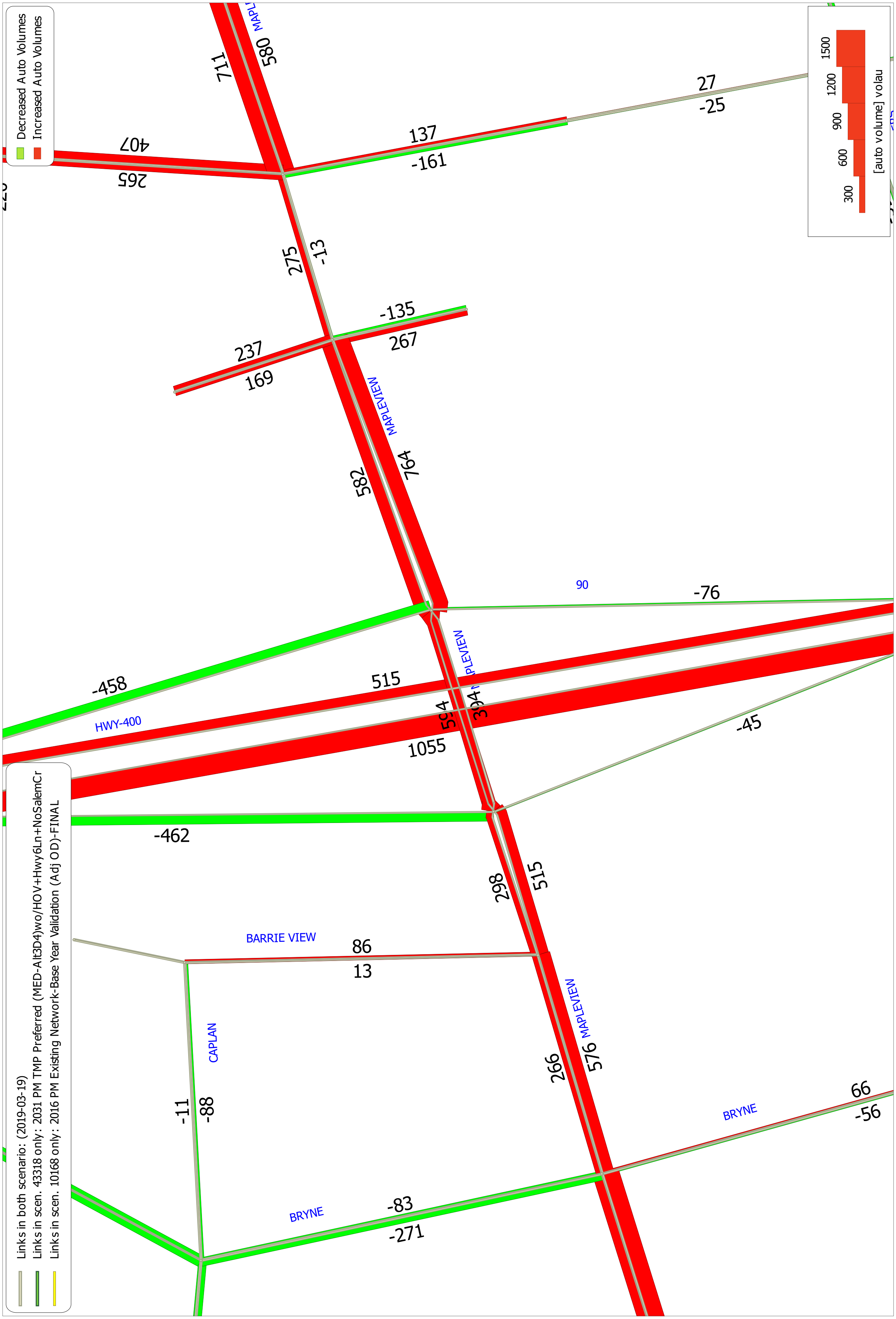
APPENDIX



Links in both scenario: Page 5 (2019-03-19)
Links in scen. 44317 only: 2031 AM TMP Preferred (MED-Alt3D4)wo/HOV+Hwy6Ln-FINAL
Links in scen. 43317 only: 2031 AM TMP Preferred (MED-Alt3D4)wo/HOV+Hwy6Ln+NoSalemCr
Decreased Auto Volumes
Increased Auto Volumes
REID
KING
KING
BRYNE
HWY-400
90
BAYVIEW
HURONIA
10
10
10TH
-419
-384
-477
-377
-440
-342
640
345
875
610
875
611
878
638
1116
697
1116
697
1078
659
426
426
200
400
600
800
1000
[auto volume] volau


Links in both scenario: Page 5 (2019-03-19)
Links in scen. 44318 only: 2031 PM TMP Preferred (MED-Alt3D4)wo/HOV+Hwy6Ln-FINAL
Links in scen. 43318 only: 2031 PM TMP Preferred (MED-Alt3D4)wo/HOV+Hwy6Ln+NoSalemCr
Decreased Auto Volumes
Increased Auto Volumes
REID
KING
KING
BRYNE
90
HWY-400
BAYVIEW
HURONIA
10
10
10TH
-364
-424
-263
-224
-224
-213
-293
-213
-245
446
562
621
733
621
733
632
766
869
1092
869
1092
823
1045
257
366
257
366
251
-220
-220
-220
-218
-252
-218
-252
-218
-252
-218
-252
-302
-298
-299
-231
100
200
300
400
500
[auto volume] volau


Links in both scenario: (2019-03-19)
Links in scen. 43317 only: 2031 AM TMP Preferred (MED-Alt3D4)wo/HOV+Hwy6Ln+NoSalemCr
Links in scen. 10167 only: 2016 AM Existing Network-Base Year Validation (Adj OD)-FINAL
Decreased Auto Volumes
Increased Auto Volumes
300
600
900
1200
1500
[auto volume] volau
HWY-400
MAPLEVIEW
CAPLAN
BARRIE VIEW
BRYNE
90
-167
-273
-91
-36
210
-101
836
557
671
93
94
64
772
282
-37
21
-24
-36
877
702
1065
427
949
551
853
514
24
14
-123
-12
-18
-32
-14
-37
-111
39



Decreased Auto Volumes
Increased Auto Volumes
1500
1200
900
600
300
[auto volume] volau
Links in both scenario: (2019-03-19)
Links in scen. 43318 only: 2031 PM TMP Preferred (MED-Alt3D4)wo/HOV+Hwy6Ln+NoSalemCr
Links in scen. 10168 only: 2016 PM Existing Network-Base Year Validation (Adj OD)-FINAL
MAPLEVIEW
HWY-400
BARRIE VIEW
CAPLAN
BRYNE
90
711
580
407
265
137
-161
27
-25
275
-13
237
169
-135
267
582
764
-76
-458
515
594
394
1055
-45
-462
298
515
86
13
266
576
-11
-88
-83
-271
66
-56

APPENDIX

E-5 *EMME PLOTS – FUTURE TRAFFIC FORECASTS, PROPOSED 2041 AND 2031 ROAD NETWORKS*

APPENDIX

APPENDIX

E-5.1 EMME MODEL FINAL SCENARIOS, 2041 AND 2031

APPENDIX

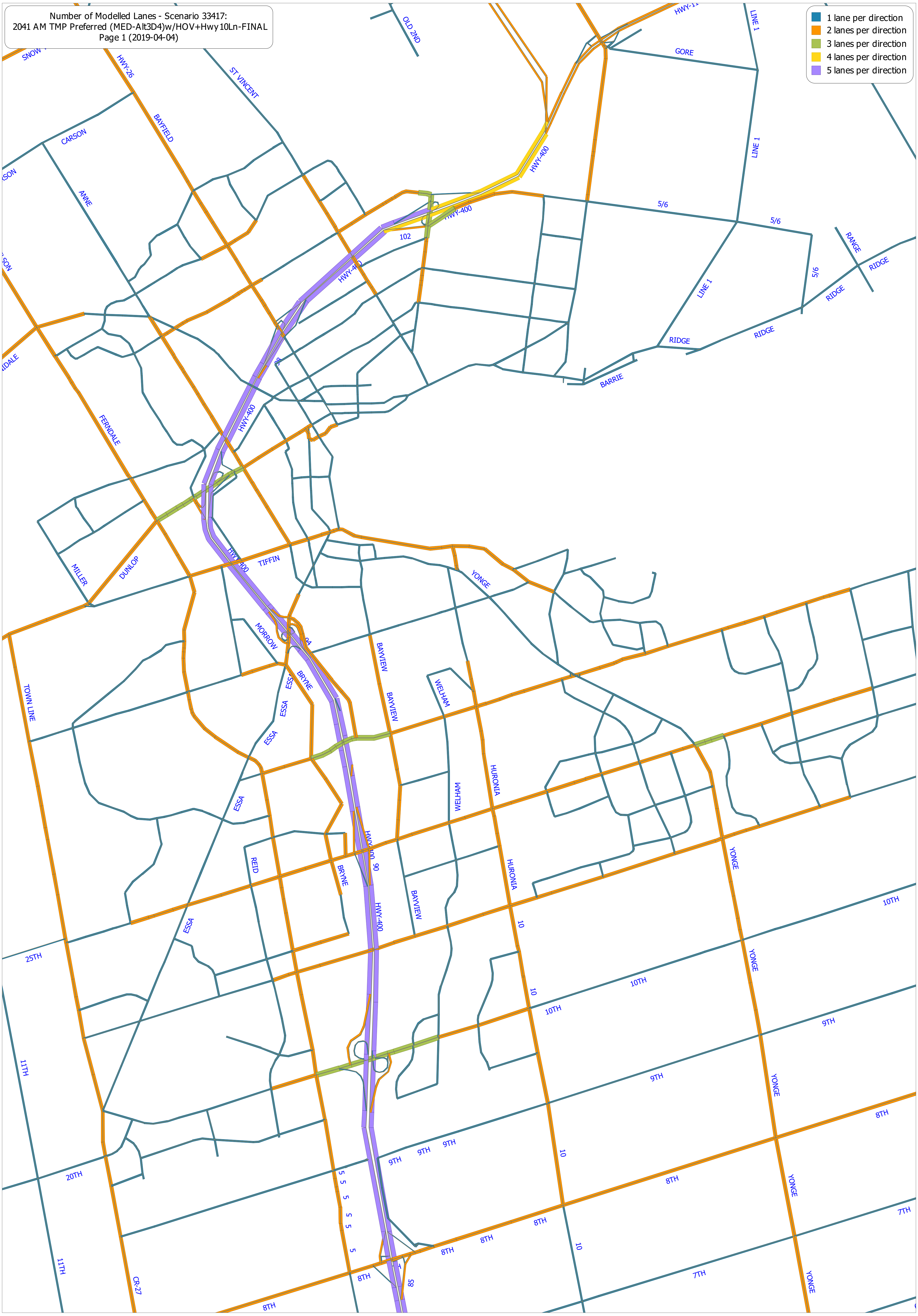
Appendix E-5.1
Table 1 Description of Emme Model Final Scenarios, 2041 and 2031

Scenario	Network Alternative Description	Comments	Emme Model Scenario No.
2041	**Future 2041 Final Preferred Network and with all HOV Lanes** - Existing + Planned Network + TESR Recommended Improvements + 2019 TMP Proposed Improvements (2041 Final Preferred Network **including Proposed HOV**)	This base network represents the future 2041 preferred network scenario based on the the 2019 TMP proposed improvements. Network includes all proposed HOV lanes.	Scen. 33417 (AM) Scen. 33418 (PM)
2031	**Future 2031 Final Preferred Network with 6 Lanes on Highway 400 (No HOV)** - Existing + Planned Network + TESR Recommended Improvements + 2019 TMP Proposed Improvements(2031 Final Preferred Network **including Salem Crossing**)	This base network represents the future 2031 preferred network scenario based on the the 2019 TMP proposed improvements. Network includes the Salem/Lockhart Crossing.	Scen. 44317 (AM) Scen. 44318 (PM)

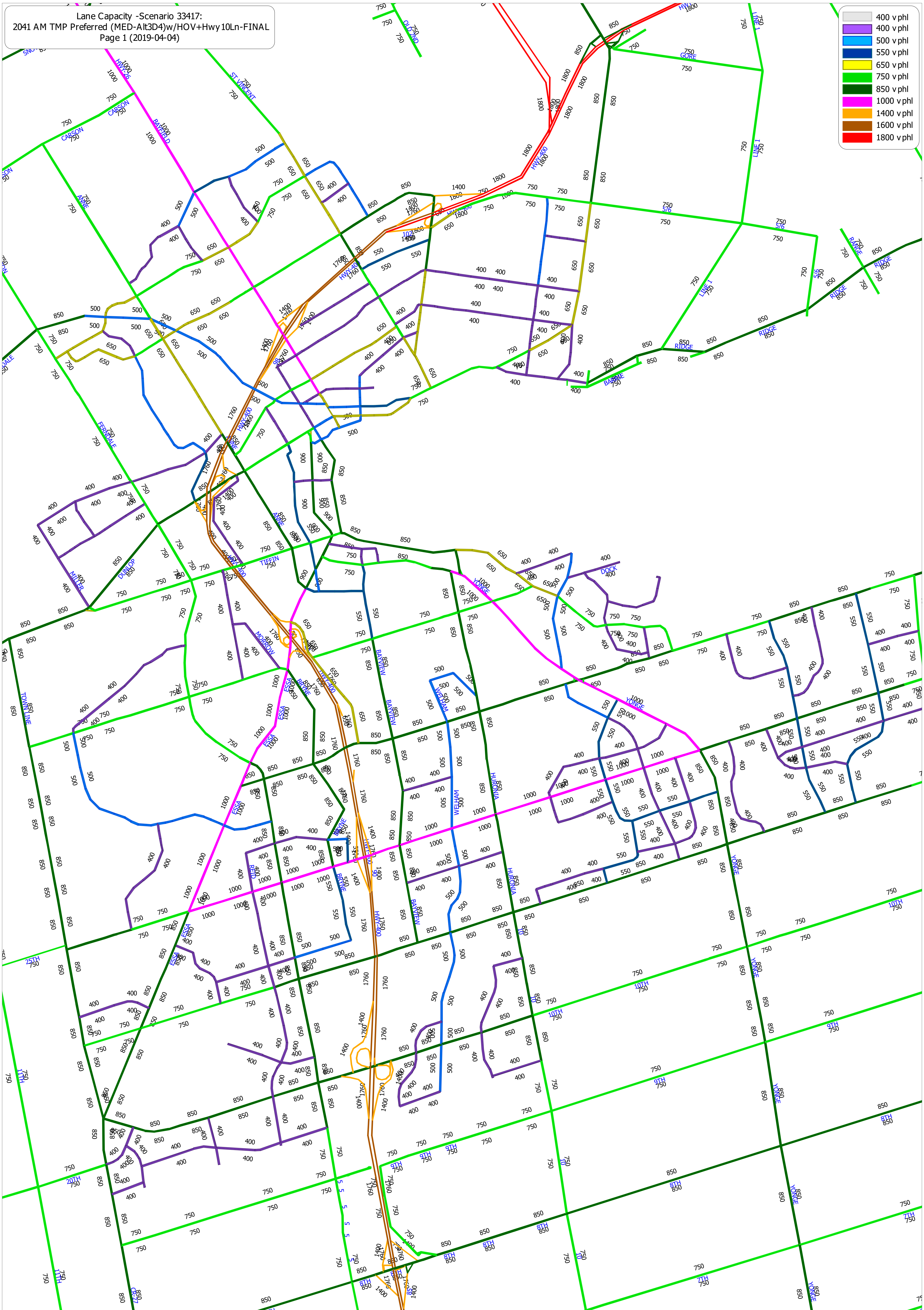
APPENDIX

E-5.2 PROPOSED 2041 ROAD NETWORK, AUTO TRAFFIC FORECASTS

APPENDIX

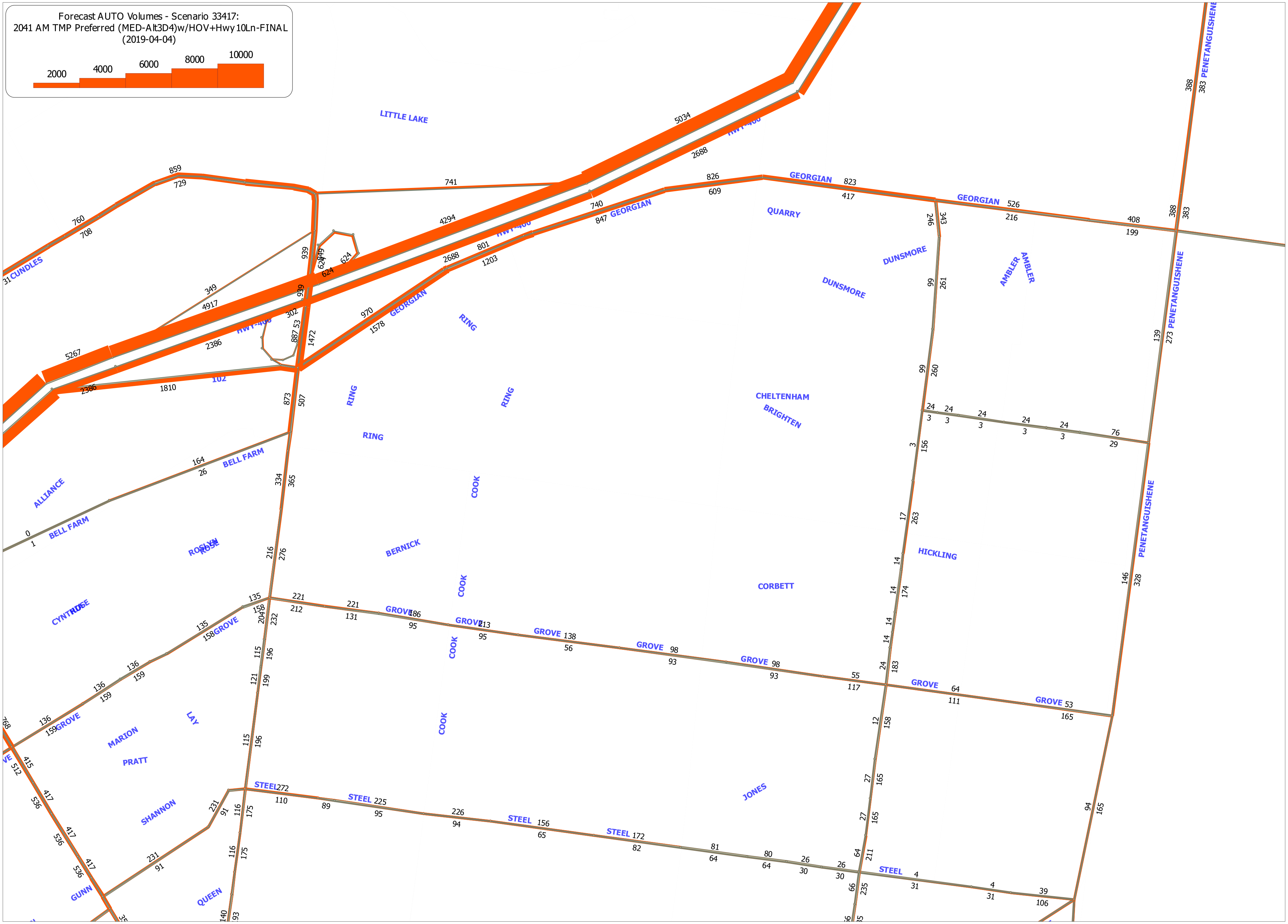

Number of Modelled Lanes - Scenario 33417:
2041 AM TMP Preferred (MED-Alt3D4)w/HOV+Hwy10Ln-FINAL
Page 1 (2019-04-04)
1 lane per direction
2 lanes per direction
3 lanes per direction
4 lanes per direction
5 lanes per direction
OLD 2ND
GORE
LINE 1
HWY-26
BAYFIELD
ST VINCENT
CARSON
ANNE
HWY-400
5/6
RANGE
RIDGE
102
BARRIE
FERNDALE
MILLER
DUNLOP
TIFFIN
YONGE
MORROW
BRYNE
ESSA
BAYVIEW
WELHAM
HURONIA
TOWN LINE
REID
25TH
10TH
9TH
8TH
7TH
11TH
20TH
CR-27
10
90
85
5

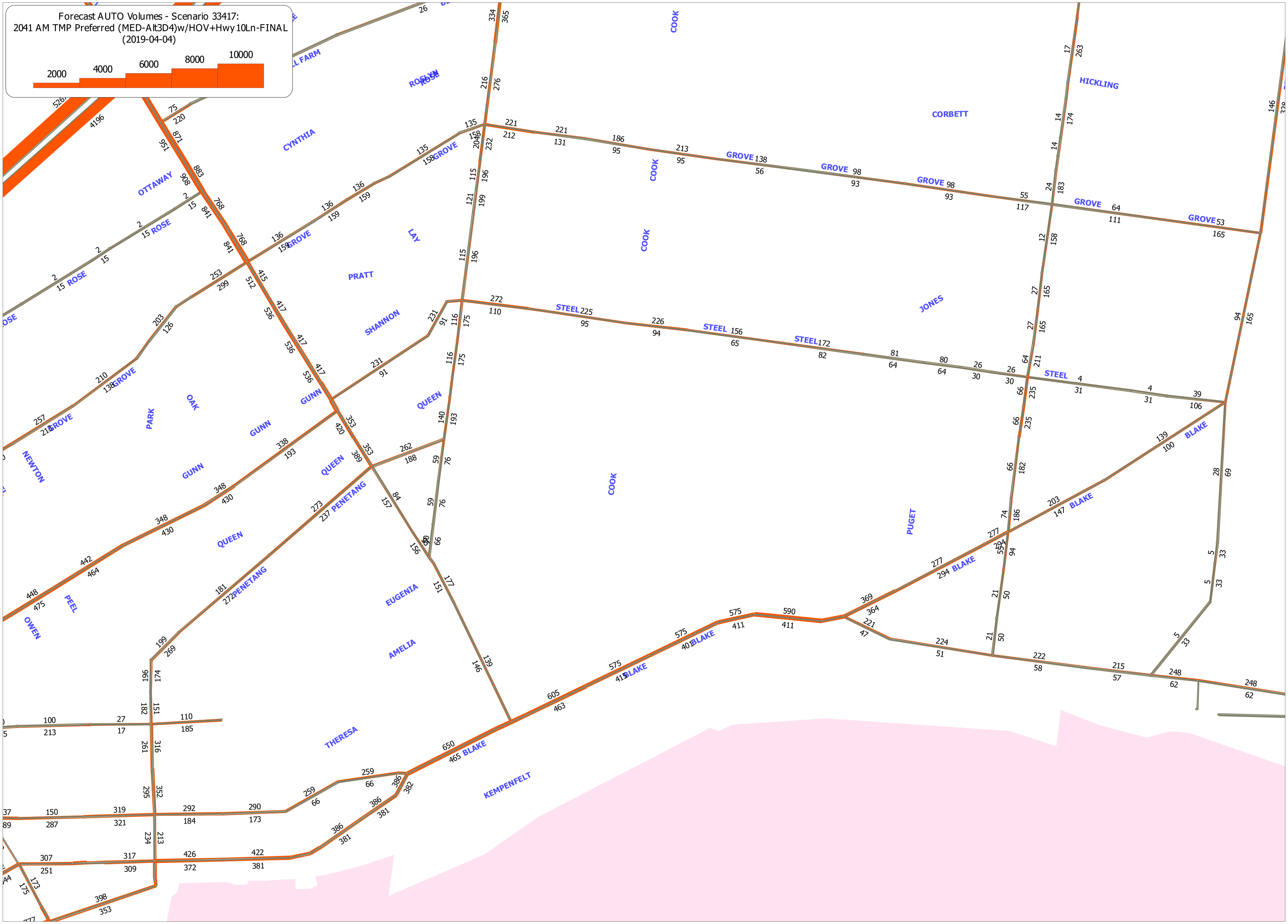
Lane Capacity -Scenario 33417:
2041 AM TMP Preferred (MED-Alt3D4)w/HOV+Hwy10Ln-FINAL
Page 1 (2019-04-04)

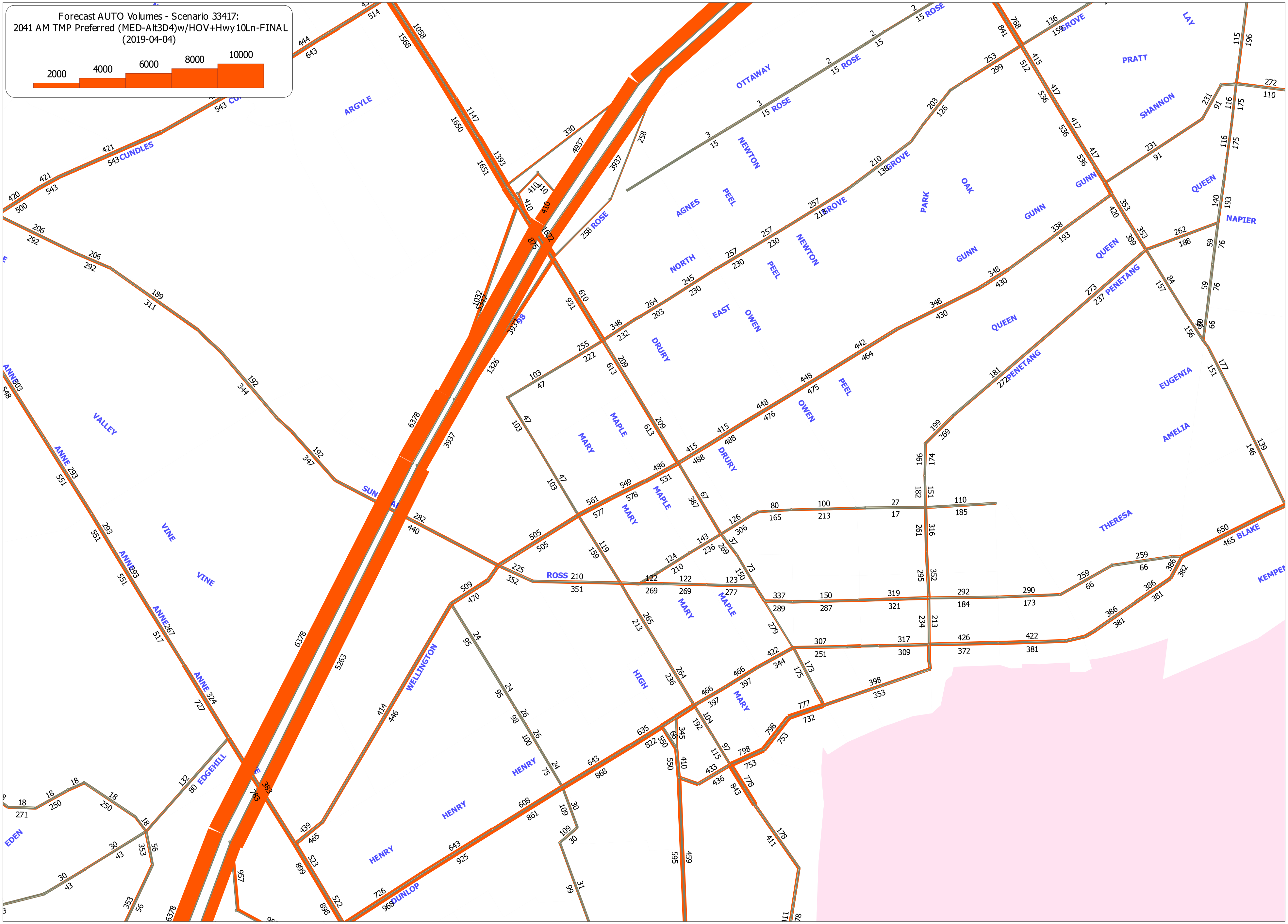



Auto Volume to Capacity Ratio - Scenario 33417:
2041 AM TMP Preferred (MED-Alt3D4)w/HOV+Hwy10Ln-FINAL
Page 1 (2019-04-04)
V/C<0.60
0.60<=V/C<0.85
0.85<=V/C<=0.92
0.92< V/C<1.0
1.0 <=V/C
HWY-26
ST VINCENT
BAYFIELD
CARSON
ANNE
HWY-400
HWY-11
GORE
LINE 1
5/6
RANGE
RIDGE
BARRIE
DOCK
YONGE
TIFFIN
DUNLOP
MILLER
FERNDALE
TOWN LINE
MORROW
BAYVIEW
WELHAM
HURONIA
ESSA
REID
BRYNE
25TH
20TH
11TH
10TH
9TH
8TH
7TH
CR-27
OLD 2ND

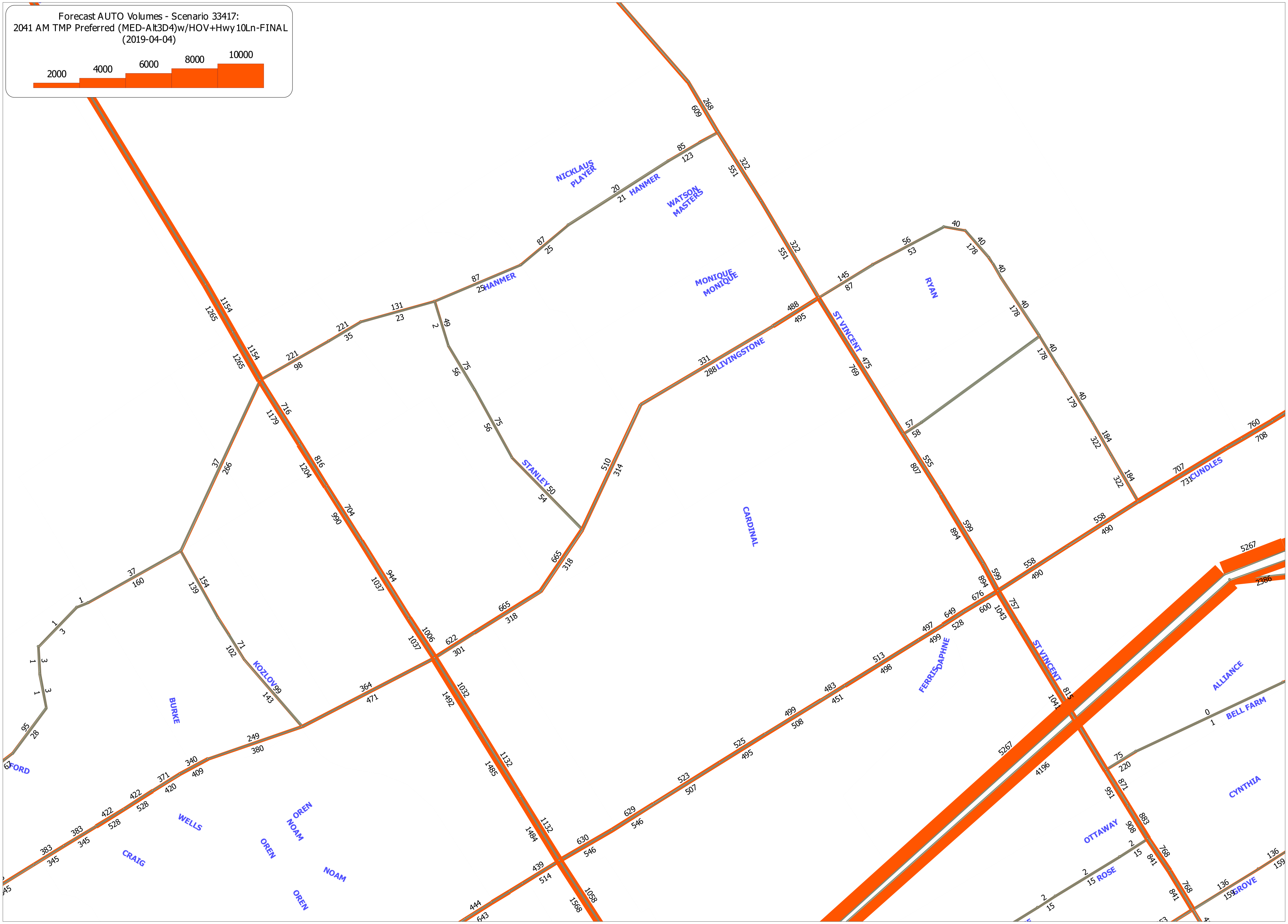
Auto Volume to Capacity Ratio - Scenario 33418:
2041 PM TMP Preferred (MED-Alt3D4)w/HOV+Hwy10Ln-FINAL
Page 1 (2019-04-04)
V/C<0.60
0.60<=V/C<0.85
0.85<=V/C<=0.92
0.92< V/C<1.0
1.0 <=V/C

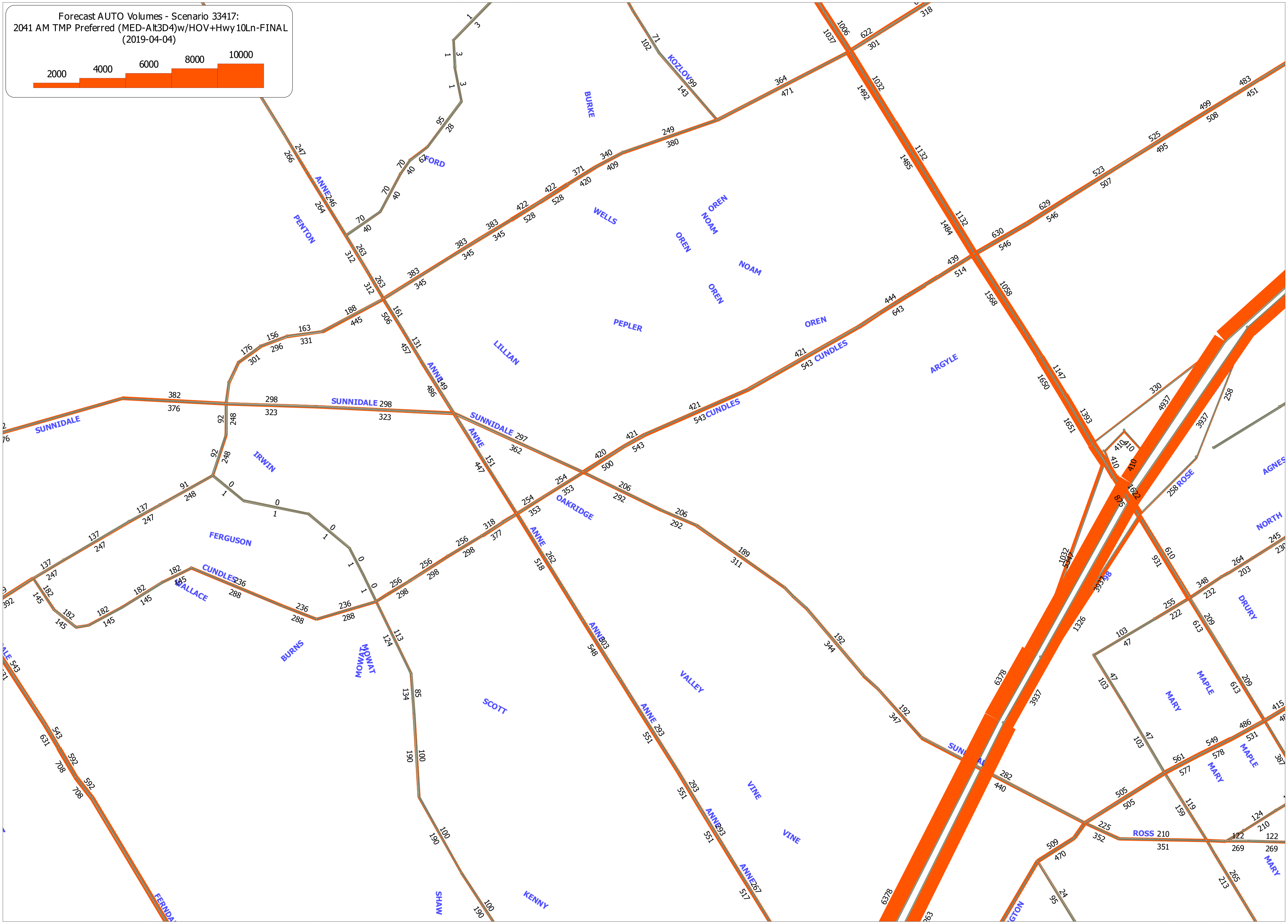

Forecast AUTO Volumes - Scenario 33417:
2041 AM TMP Preferred (MED-Alt3D4)w/HOV+Hwy10Ln-FINAL
(2019-04-04)
2000
4000
6000
8000
10000
LITTLE LAKE
CUNDLES
GEORGIAN
QUARRY
DUNSMORE
AMBLER
PENETANGUISHENE
RING
CHELTENHAM
BRIGHTEN
HICKLING
CORBETT
COOK
BERNICK
BELL FARM
ALLIANCE
GROVE
STEEL
JONES
LAY
MARION
PRATT
SHANNON
GUNN
QUEEN
102

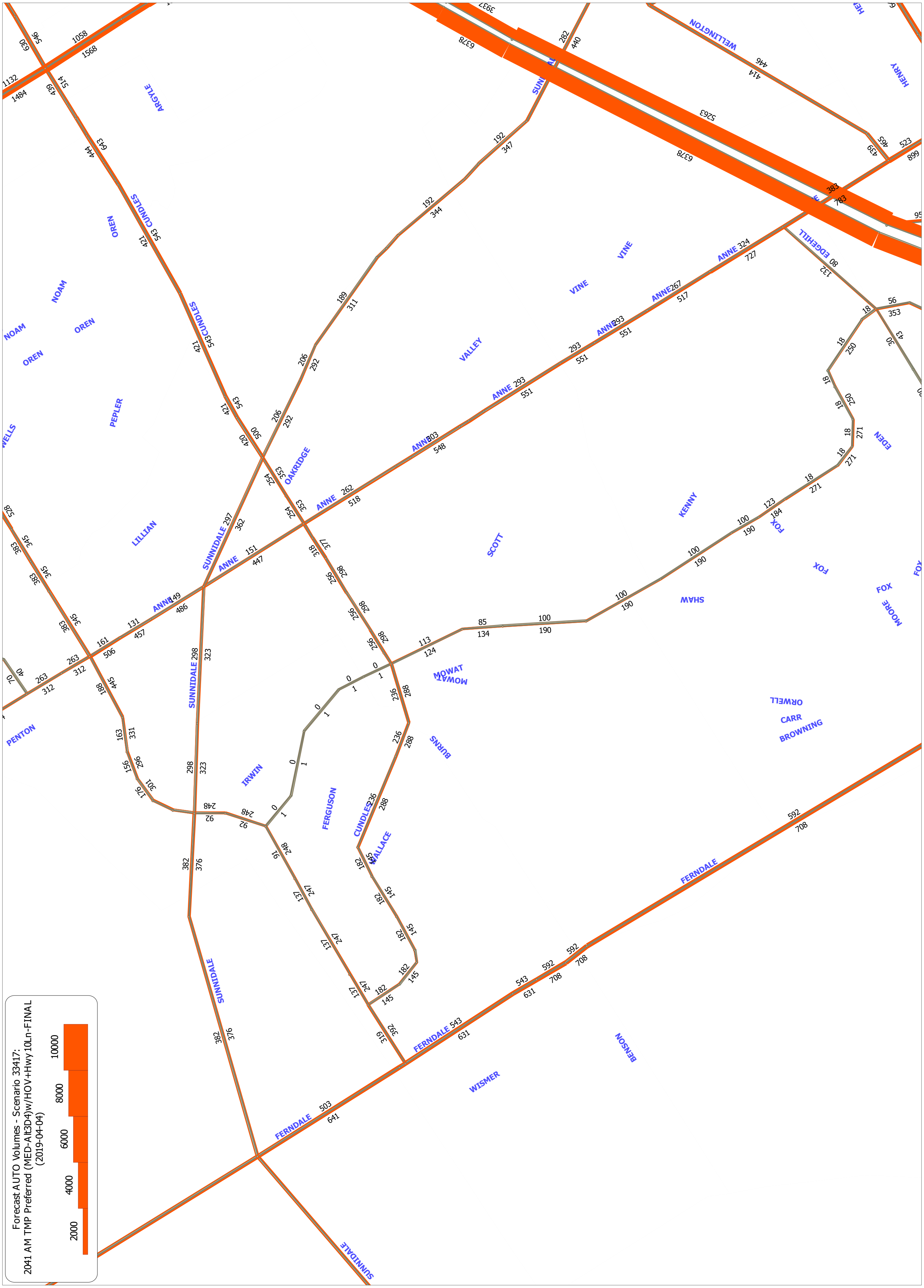

Forecast AUTO Volumes - Scenario 33417:
2041 AM TMP Preferred (MED-Alt3D4)w/HOV+Hwy10Ln-FINAL
(2019-04-04)
2000
4000
6000
8000
10000
CYNTHIA
OTTAWAY
ROSE
GROVE
PRATT
LAY
SHANNON
PARK
OAK
GUNN
QUEEN
NEWTON
PENETANG
PEEL
OWEN
EUGENIA
AMELIA
THERESA
KEMPENFELT
BLAKE
COOK
STEEL
JONES
PUGET
CORBETT
HICKLING

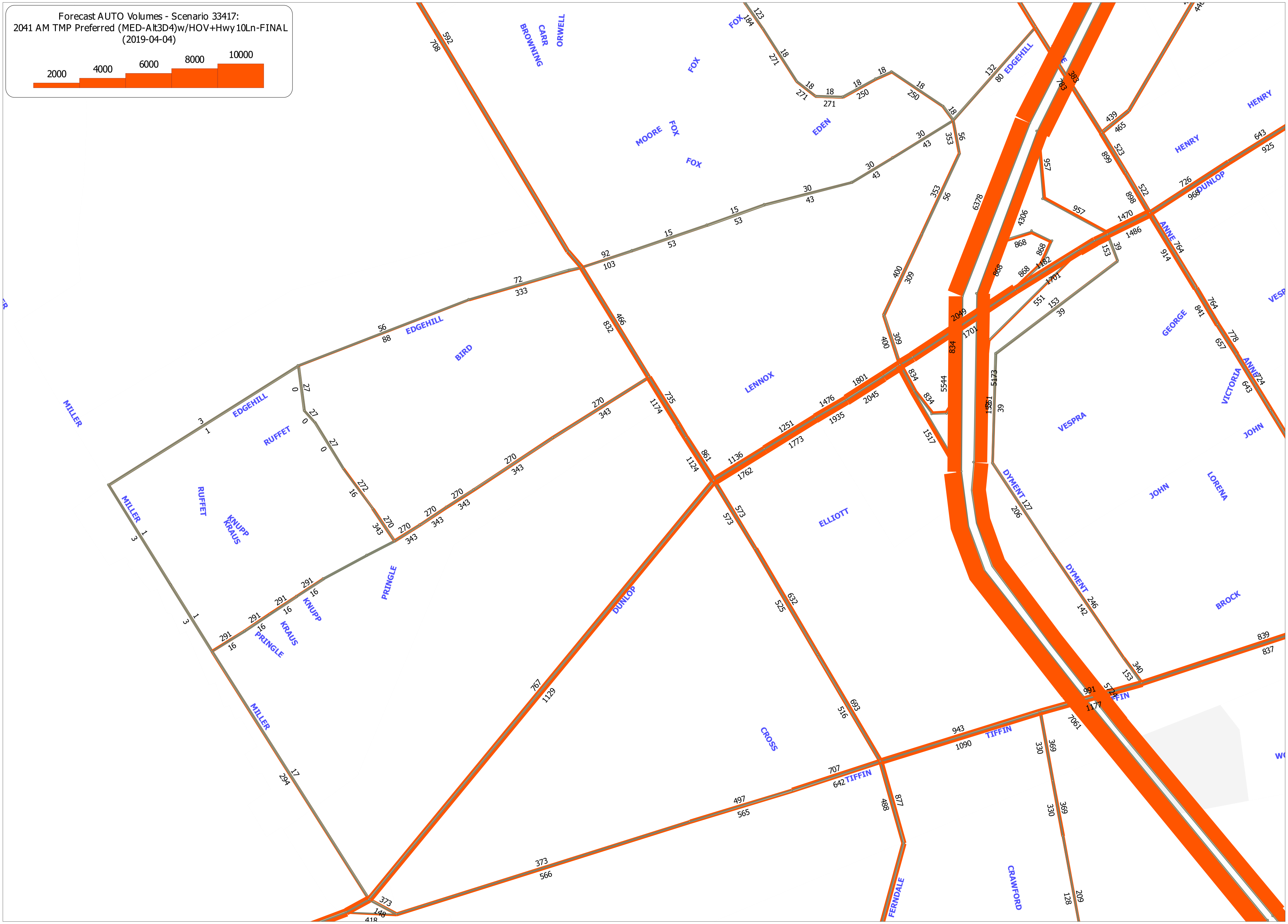

Forecast AUTO Volumes - Scenario 33417:
2041 AM TMP Preferred (MED-Alt3D4)w/HOV+Hwy 10Ln-FINAL
(2019-04-04)
2000
4000
6000
8000
10000

Forecast AUTO Volumes - Scenario 33417:
2041 AM TMP Preferred (MED-Alt3D4)w/HOV+Hwy 10Ln-FINAL
(2019-04-04)
10000
8000
6000
4000
2000
LAKESHORE
BRADFORD
INNISFIL
TIFFIN
JACOBS
CENTRE
ESSA
BURTON
HOLGATE
COWAN
MAPLE
MARY
HIGH
ROSS
HENRY
VESPRA
JOHN
BROCK
ANNE
WELLINGTON
VICTORIA
LORENA
DUNLOP
GEORGE
DYMENT
EDGEHILL
VINE
EDEN
FOX
MOORE
ELLIOTT
LENNOX
CROSS
WOOD

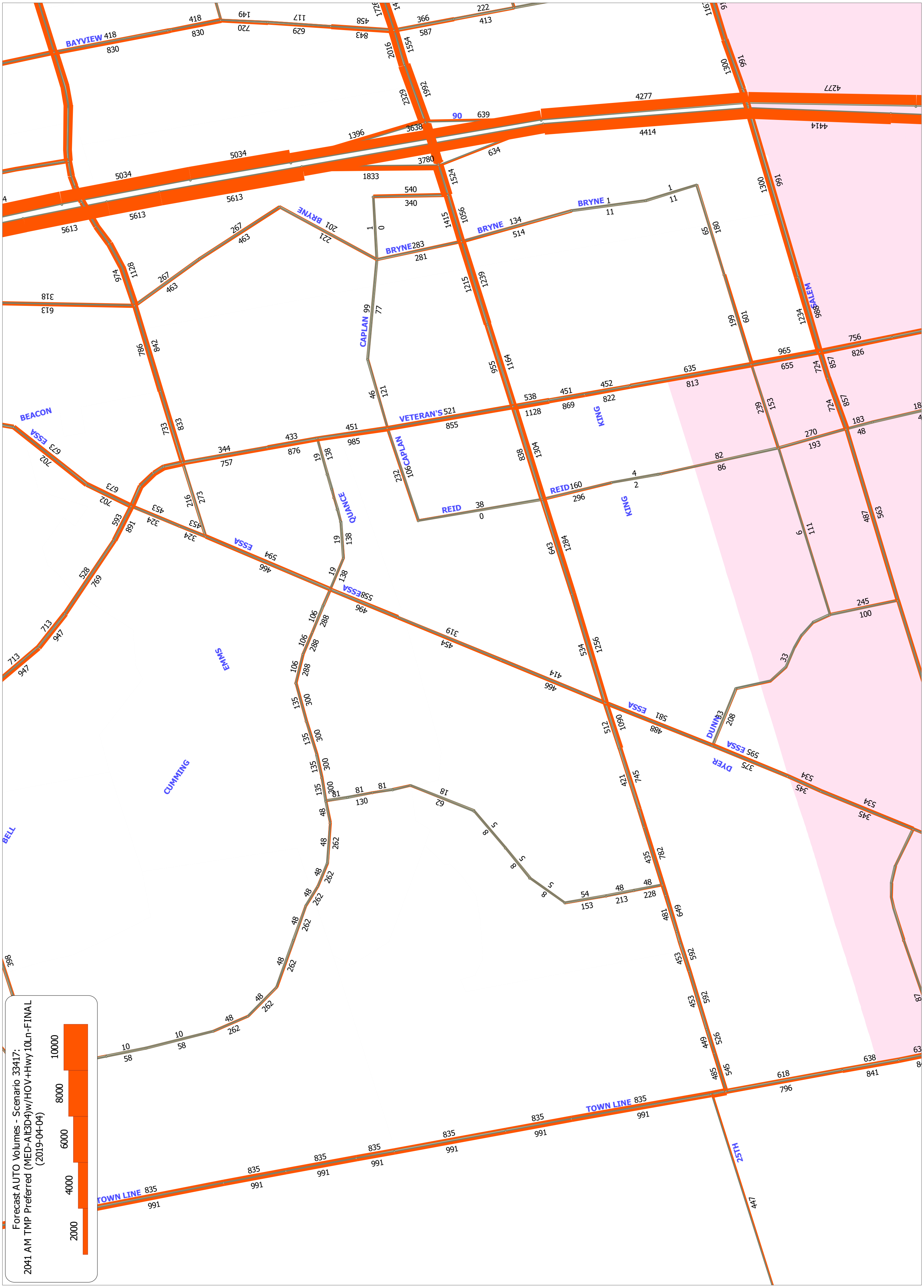

Forecast AUTO Volumes - Scenario 33417:
2041 AM TMP Preferred (MED-Alt3D4)w/HOV+Hwy10Ln-FINAL
(2019-04-04)
2000
4000
6000
8000
10000
NICKLAUS
PLAYER
HANMER
WATSON
MASTERS
MONIQUE
MONIQUE
RYAN
ST VINCENT
LIVINGSTONE
STANLEY
CARDINAL
CUNDLES
KOZLOV
BURKE
FORD
WELLS
CRAIG
OREN
NOAM
FERRIS
DAPHNE
ALLIANCE
BELL FARM
CYNTHIA
OTTAWAY
ROSE
GROVE

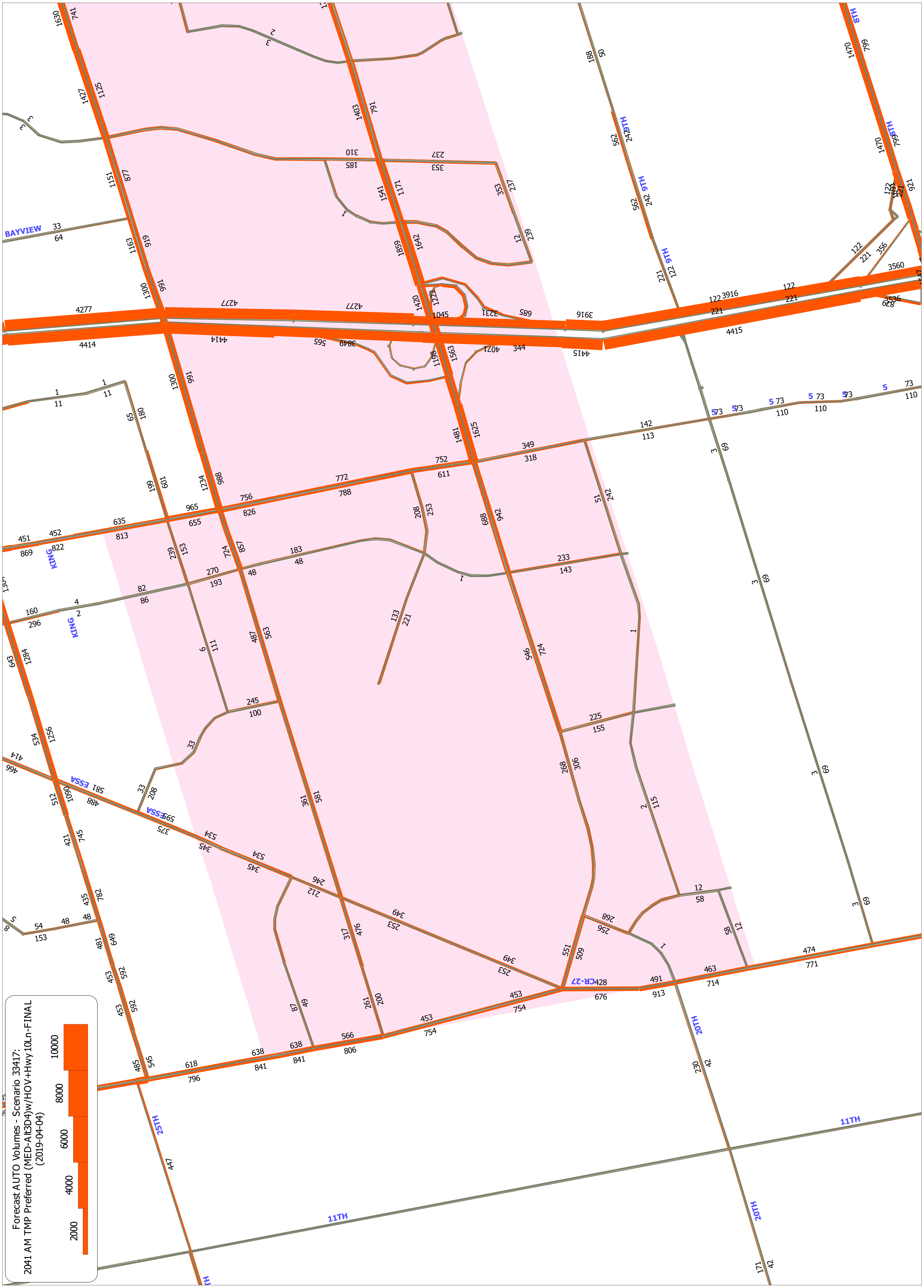

Forecast AUTO Volumes - Scenario 33417:
2041 AM TMP Preferred (MED-Alt3D4)w/HOV+Hwy10Ln-FINAL
(2019-04-04)
2000
4000
6000
8000
10000
BURKE
KOZLOV
FORD
PENTON
ANNE
WELLS
OREN
NOAM
PEPLER
LILLIAN
CUNDLES
ARGYLE
SUNNIDALE
IRWIN
OAKRIDGE
FERGUSON
WALLACE
BURNS
MOWAT
SCOTT
VALLEY
VINE
SHAW
KENNY
FERNDALE
ROSE
AGNES
NORTH
DRURY
MAPLE
MARY
ROSS

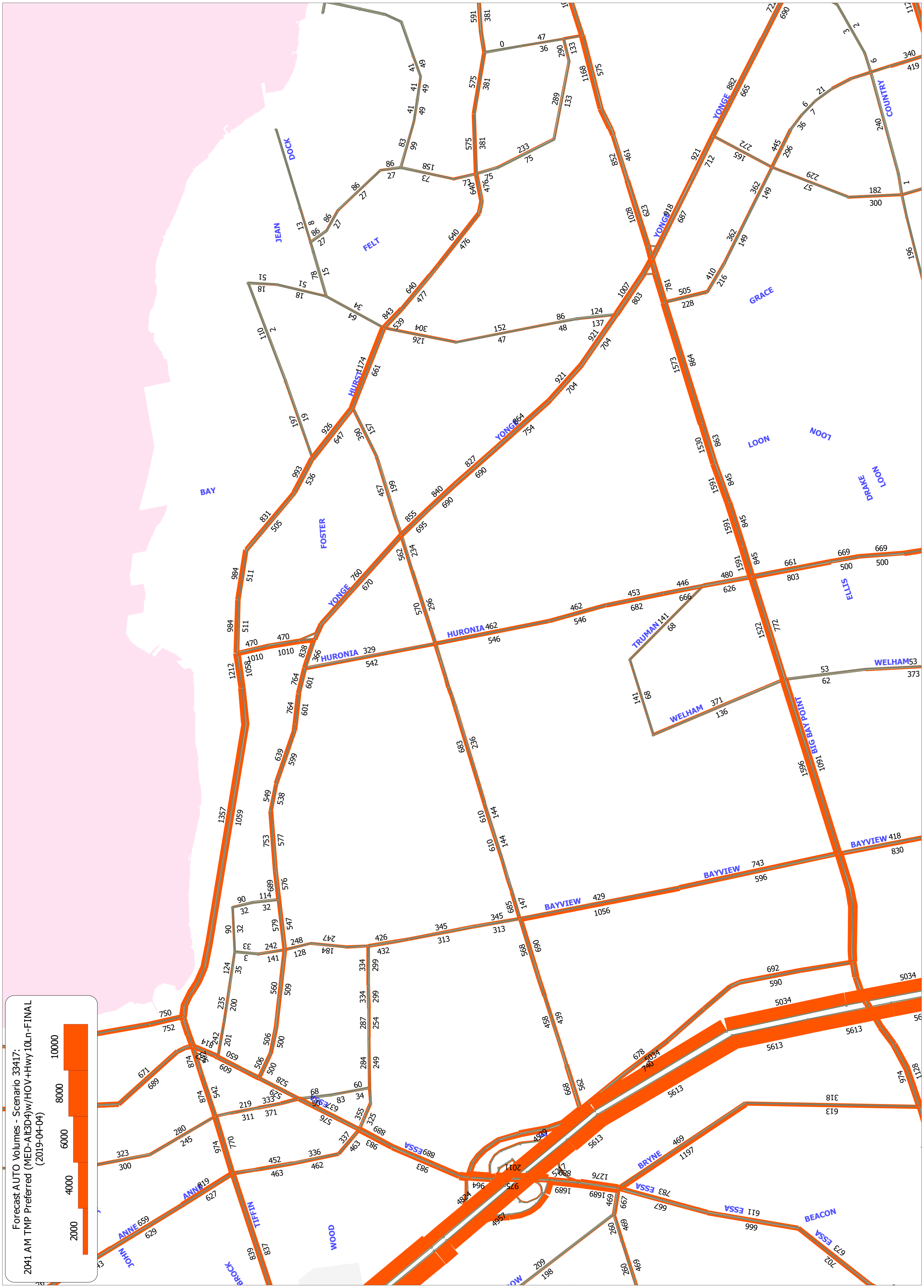

Forecast AUTO Volumes - Scenario 33417:
2041 AM TMP Preferred (MED-Alt3D4)w/HOV+Hwy10Ln-FINAL
(2019-04-04)
2000
4000
6000
8000
10000
ARGYLE
CUNDLES
OREN
NOAM
PEPLER
WELLS
LILLIAN
ANNE
SUNNIDALE
OAKRIDGE
VALLEY
VINE
WELLINGTON
HENRY
EDGEHILL
EDEN
KENNY
SCOTT
FOX
SHAW
MOORE
MOWAT
BURNS
ORWELL
CARR
BROWNING
IRWIN
FERGUSON
WALLACE
PENTON
FERNDALE
WISMER
BENSON


Forecast AUTO Volumes - Scenario 33417:
2041 AM TMP Preferred (MED-Alt3D4)w/HOV+Hwy10Ln-FINAL
(2019-04-04)
2000
4000
6000
8000
10000
ORWELL
CARR
BROWNING
FOX
MOORE
EDEN
EDGEHILL
HENRY
DUNLOP
ANNE
GEORGE
VICTORIA
JOHN
VESPRA
LORENA
BROCK
DYMENT
TIFFIN
CRAWFORD
FERNDALE
ELLIOTT
LENNOX
CROSS
BIRD
RUFFET
KNUPP
KRAUS
PRINGLE
MILLER

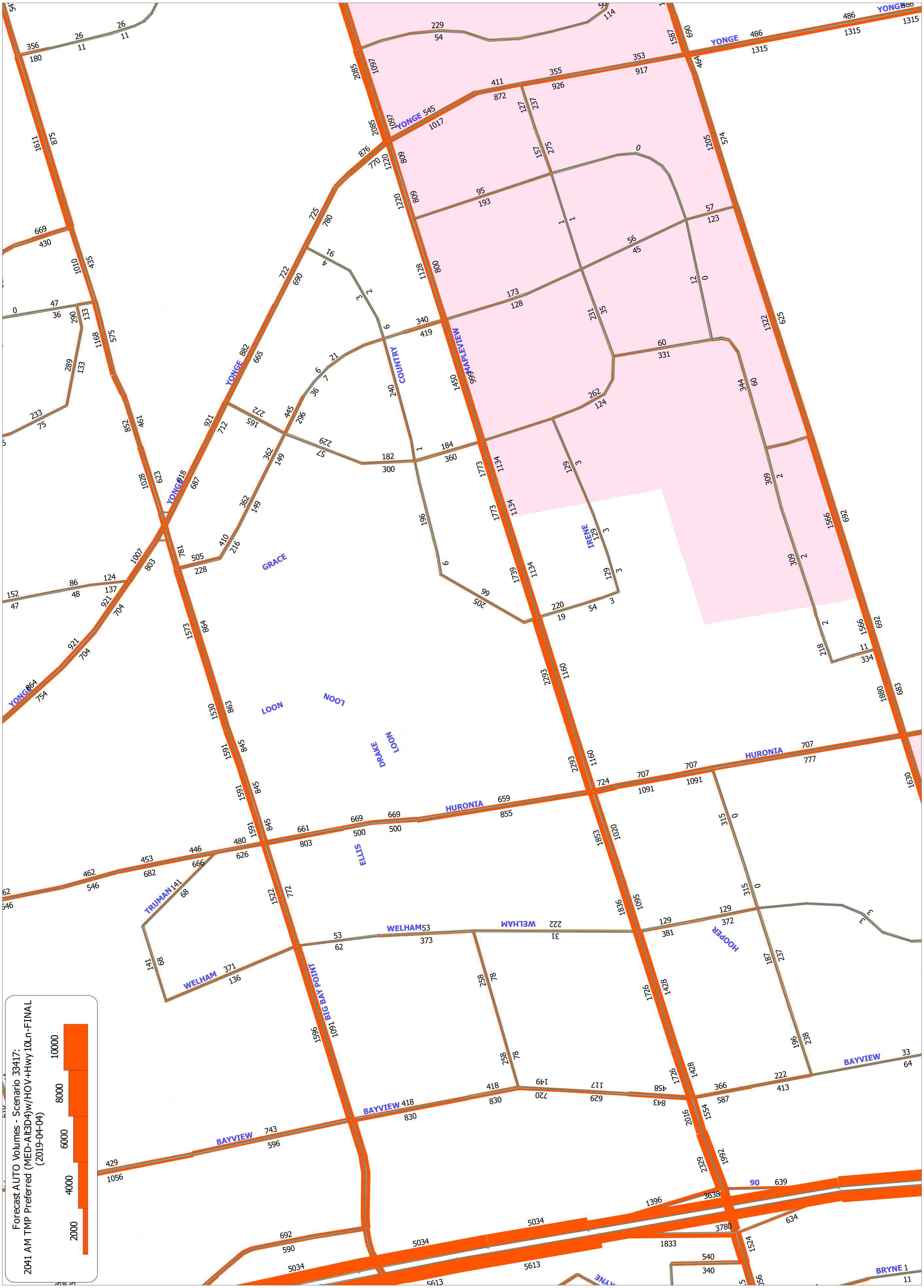
Forecast AUTO Volumes - Scenario 33417:
2041 AM TMP Preferred (MED-Alt3D4)w/HOV+Hwy10Ln-FINAL
(2019-04-04)
2000
4000
6000
8000
10000
BURTON
ESSA
ANNE
TIFFIN
WOOD
BROCK
DYMENT
BRYNE
BEACON
MORROW
MOON
ARDAGH
WILDWOOD
FERNDALE
JAMES
HARVIE
GORE
BELL
CUMMING
DUNLOP
PRINGLE
MILLER
PENVILL
TOWN LINE

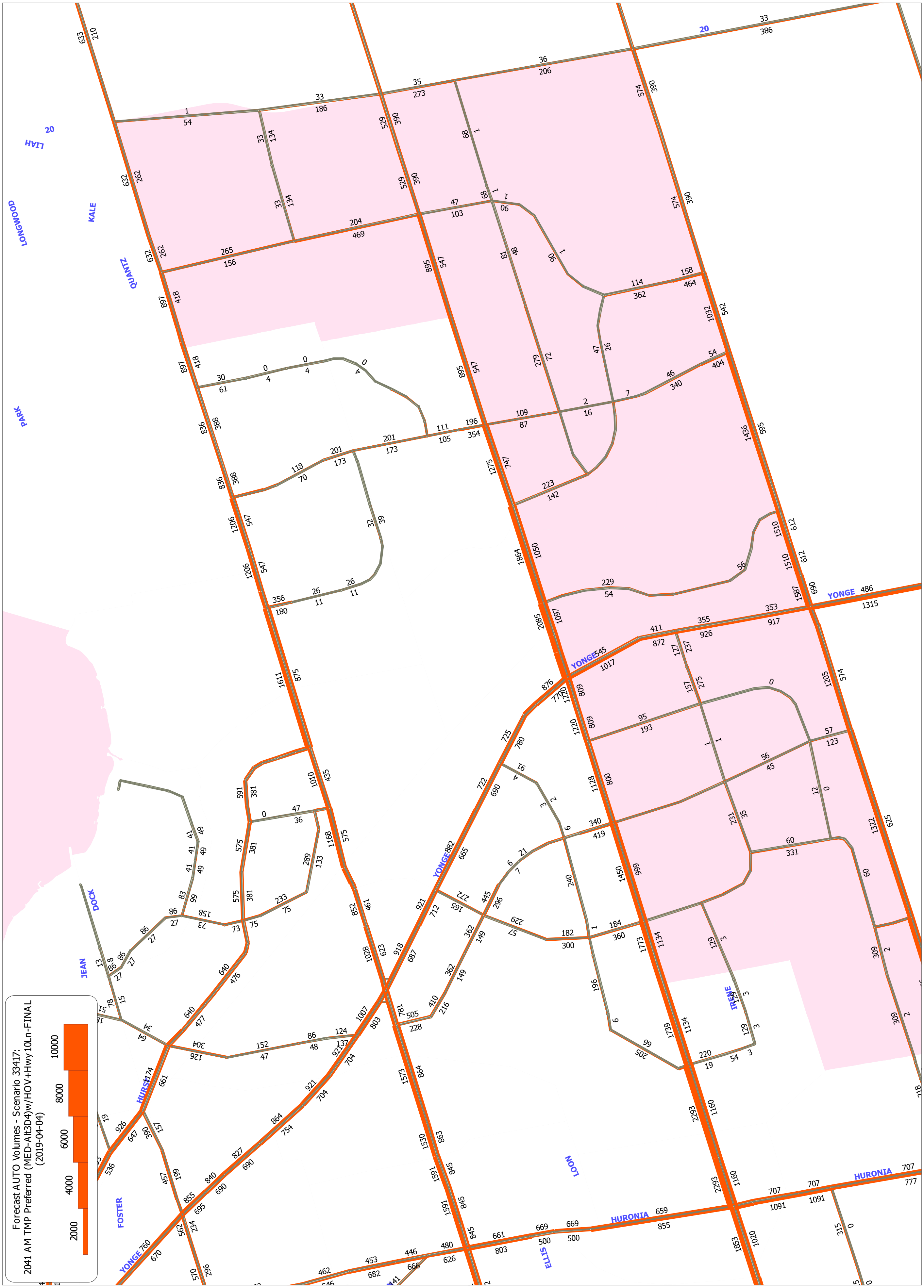

Forecast AUTO Volumes - Scenario 33417:
2041 AM TMP Preferred (MED-Alt3D4)w/HOV+Hwy 10Ln-FINAL
(2019-04-04)
10000
8000
6000
4000
2000
BAYVIEW
90
BRYNE
CAPLAN
VETERAN'S
BEACON
ESSA
QUANCE
REID
KING
SALEM
EMMS
CUMMING
BELL
DUNN
DYER
TOWN LINE
25TH

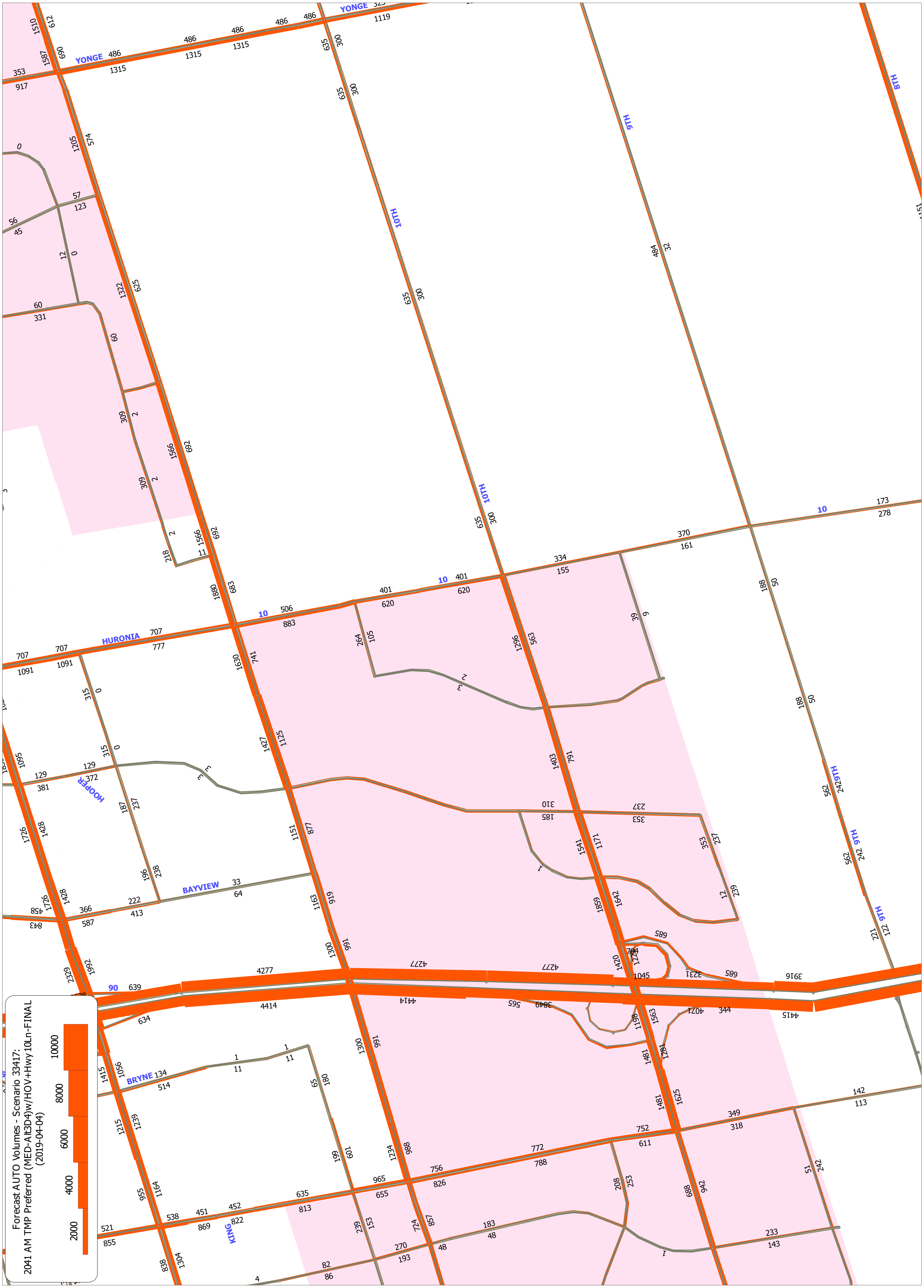

Forecast AUTO Volumes - Scenario 33417:
2041 AM TMP Preferred (MED-Alt3D4)w/HOV+Hwy10Ln-FINAL
(2019-04-04)
2000
4000
6000
8000
10000
BAYVIEW
KING
ESSA
9TH
8TH
5
CR-27
20TH
25TH
11TH



Forecast AUTO Volumes - Scenario 33417:
2041 AM TMP Preferred (MED-Alt3D4)w/HOV+Hwy10Ln-FINAL
(2019-04-04)
10000
8000
6000
4000
2000
DOCK
JEAN
FELT
HURST
BAY
FOSTER
YONGE
HURONIA
GRACE
COUNTRY
LOON
DRAKE
ELLIS
TRUMAN
WELHAM
BIG BAY POINT
BAYVIEW
ESSA
BRYNE
BEACON
ANNE
JOHN
TIFFIN
BROCK
WOOD


Forecast AUTO Volumes - Scenario 33417:
2041 AM TMP Preferred (MED-Alt3D4)w/HOV+Hwy 10Ln-FINAL
(2019-04-04)
2000
4000
6000
8000
10000
YONGE
MAPLEVIEW
COUNTRY
GRACE
IRENE
LOON
DRAKE
HURONIA
ELLIS
TRUMAN
WELHAM
HOOPER
BIG BAY POINT
BAYVIEW
BRYNE
90

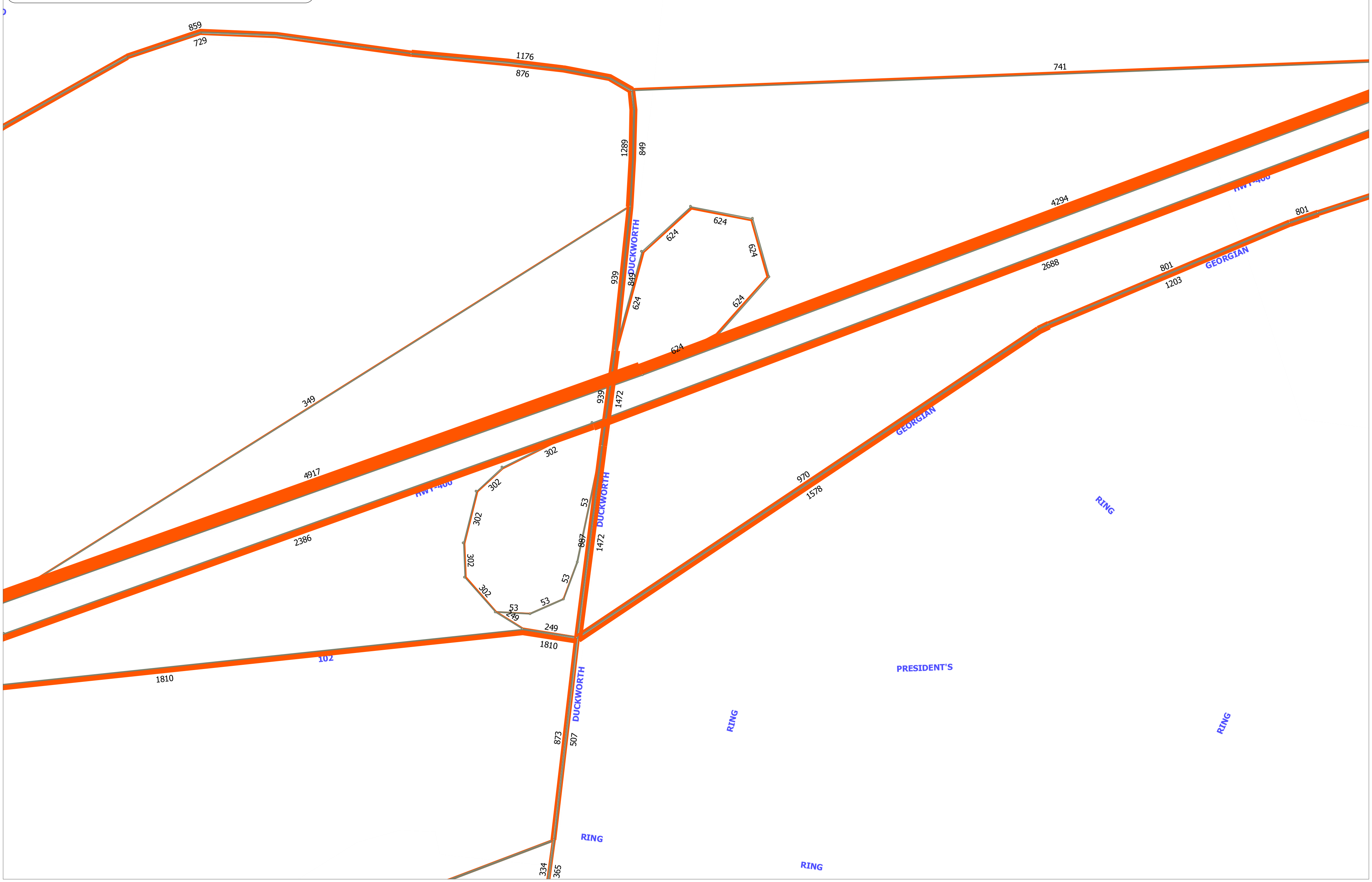

Forecast AUTO Volumes - Scenario 33417:
2041 AM TMP Preferred (MED-Alt3D4)w/HOV+Hwy10Ln-FINAL
(2019-04-04)
10000
8000
6000
4000
2000
20
LITH
LONGWOOD
KALE
QUANTZ
PARK
YONGE
DOCK
JEAN
HURST
FOSTER
IRENE
LOON
ELLIS
HURONIA

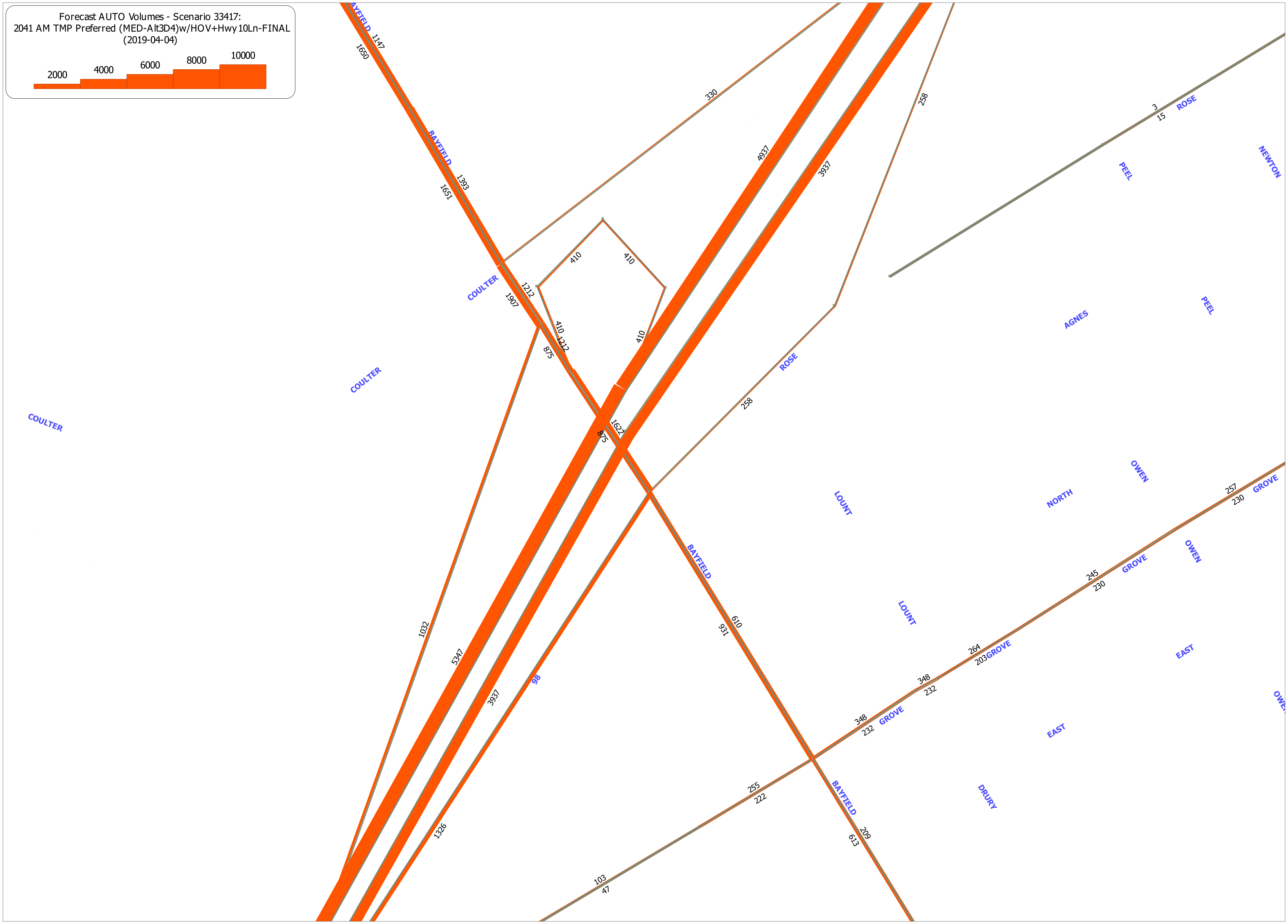


YONGE
10TH
9TH
8TH
10
HURONIA
HOOPER
BAYVIEW
90
BRYNE
KING
Forecast AUTO Volumes - Scenario 33417:
2041 AM TMP Preferred (MED-Alt3D4)w/HOV+Hwy 10Ln-FINAL
(2019-04-04)
10000
8000
6000
4000
2000

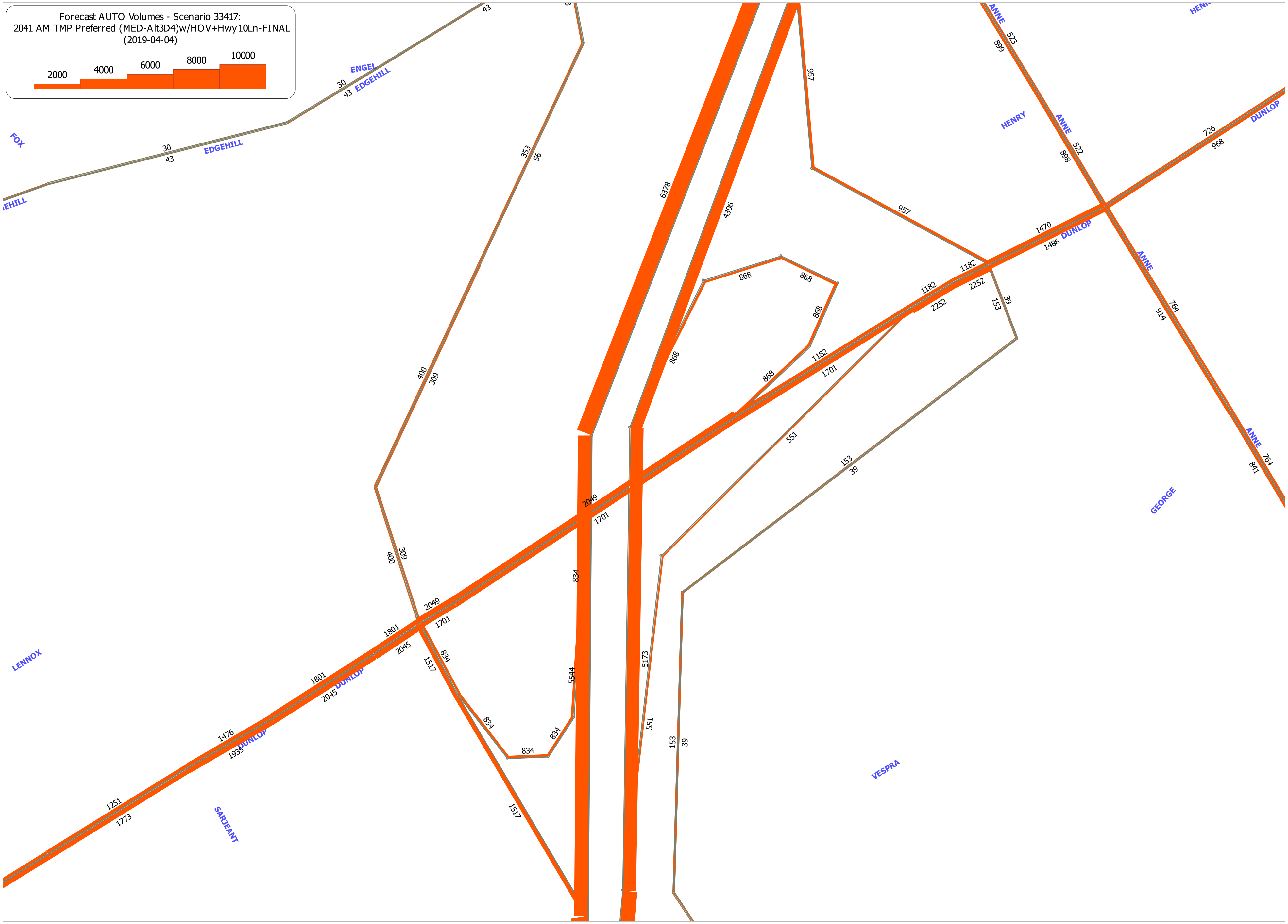
Forecast AUTO Volumes - Scenario 33417:
2041 AM TMP Preferred (MED-Alt3D4)w/HOV+Hwy10Ln-FINAL
(2019-04-04)

2000 4000 6000 8000 10000

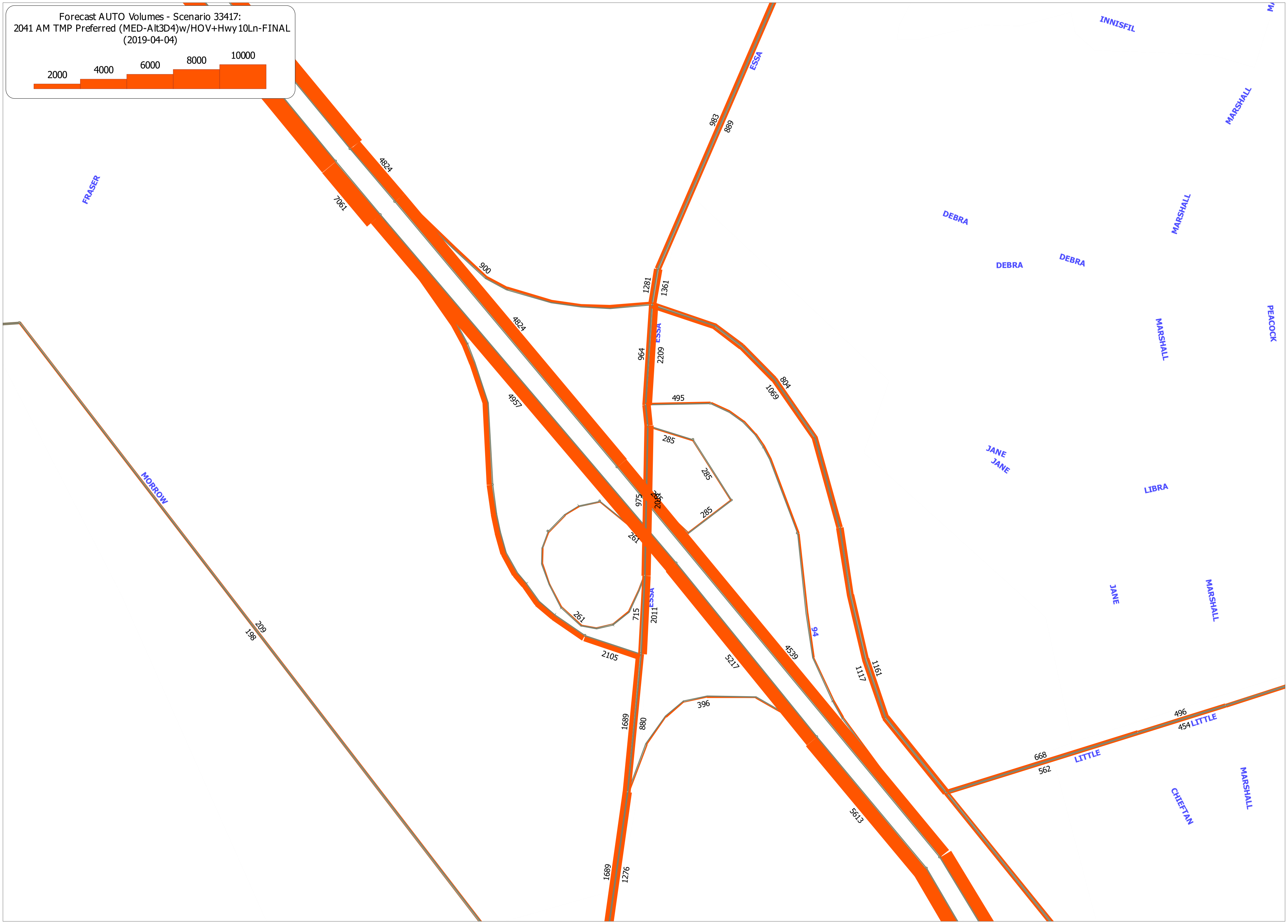


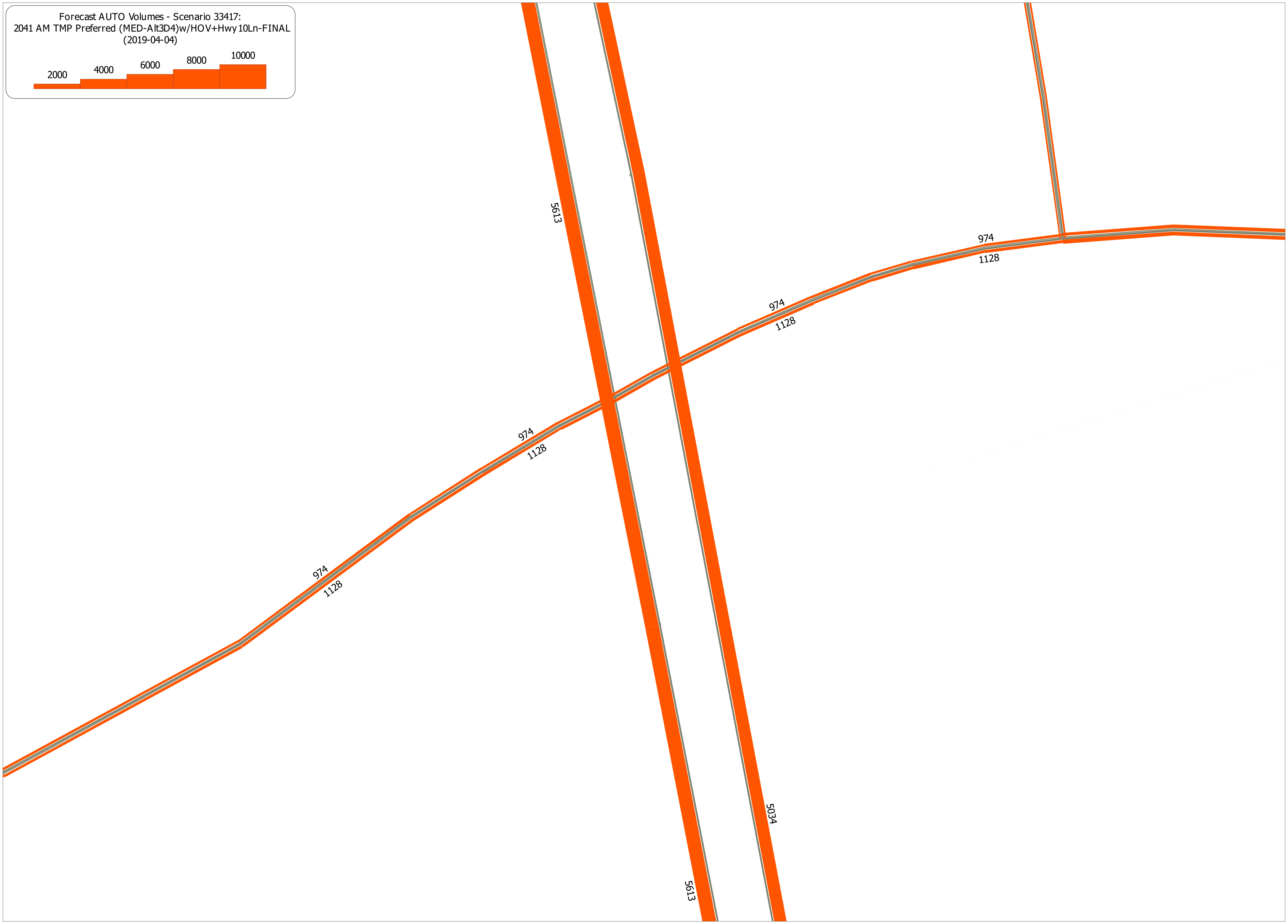


Forecast AUTO Volumes - Scenario 33417:
2041 AM TMP Preferred (MED-Alt3D4)w/HOV+Hwy10Ln-FINAL
(2019-04-04)
2000
4000
6000
8000
10000
BAYFIELD
COULTER
ROSE
NEWTON
PEEL
AGNES
NORTH
OWEN
GROVE
LOUNT
EAST
DRURY
98
1147
1650
1393
1651
330
4937
3937
258
3
15
410
1212
1907
875
1622
1032
5347
1326
610
931
264
203
348
232
255
222
209
613
103
47
245
230
257

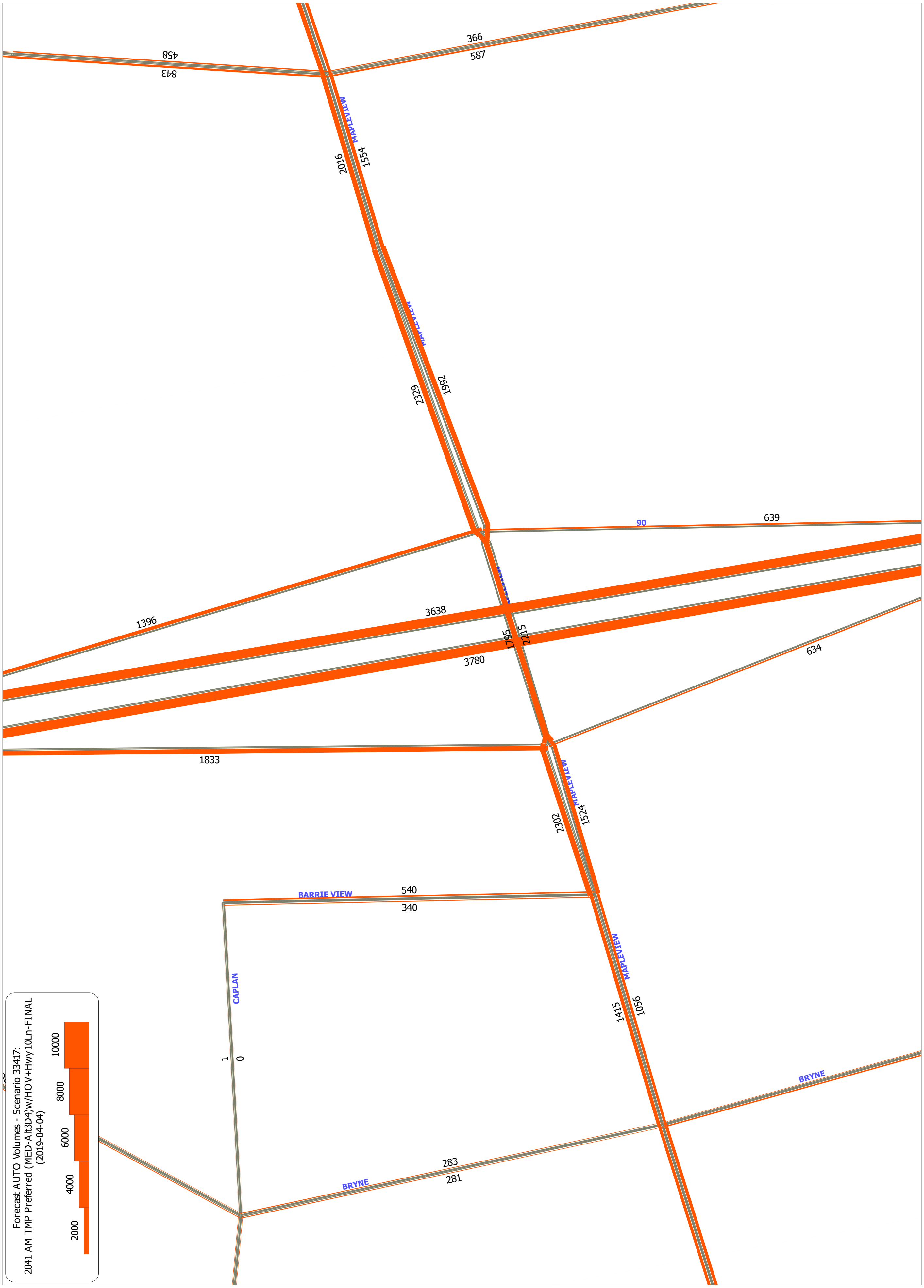


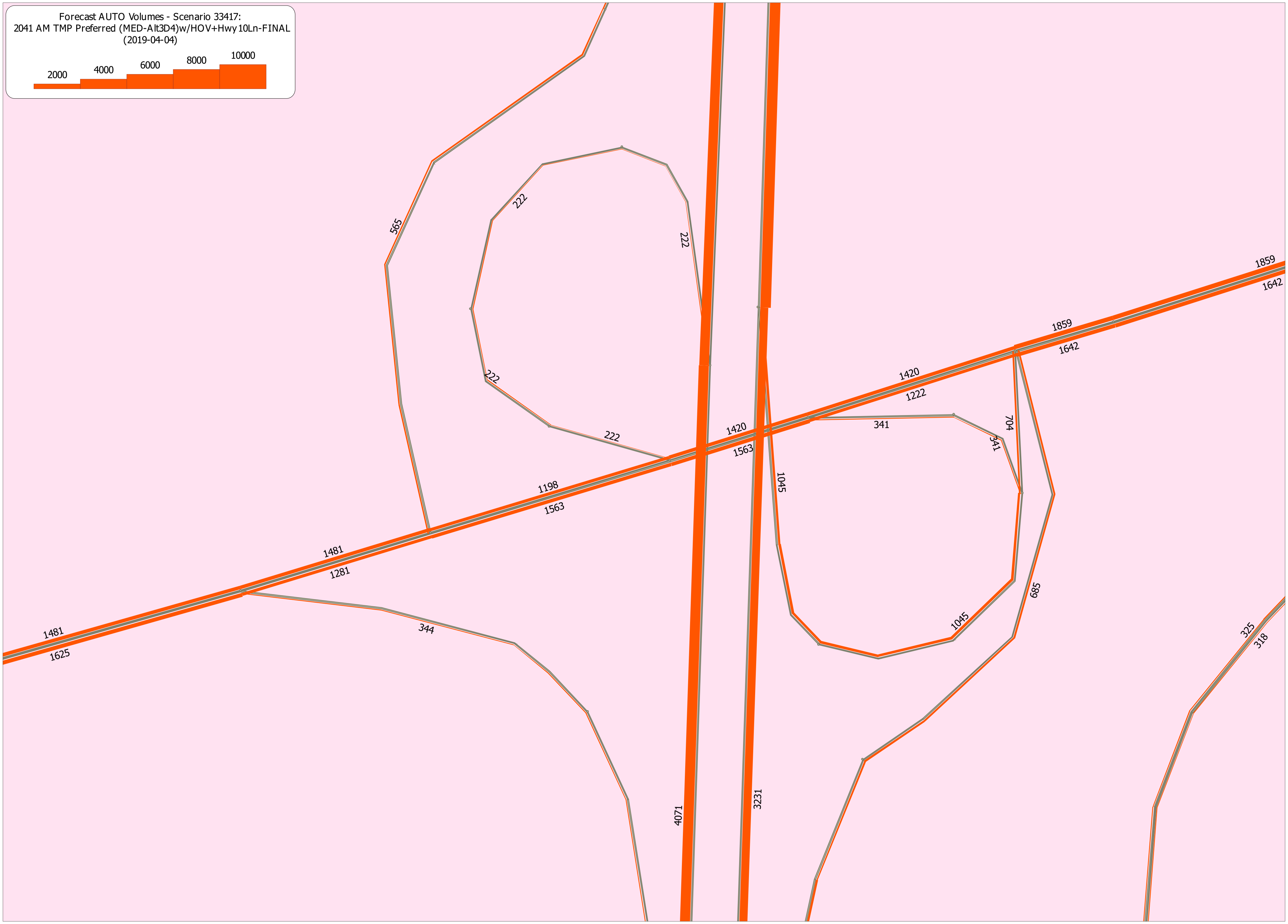
Forecast AUTO Volumes - Scenario 33417:
2041 AM TMP Preferred (MED-Alt3D4)w/HOV+Hwy10Ln-FINAL
(2019-04-04)
2000
4000
6000
8000
10000
ENGEL
EDGEHILL
FOX
HENRY
ANNE
DUNLOP
GEORGE
LENNOX
SARJEANT
VESPRA
6378
4306
957
868
1182
2252
1470
1486
726
968
523
899
522
898
764
914
841
153
39
551
5173
5544
834
1701
2049
1801
2045
1517
1476
1935
1251
1773
400
309
353
56
30
43

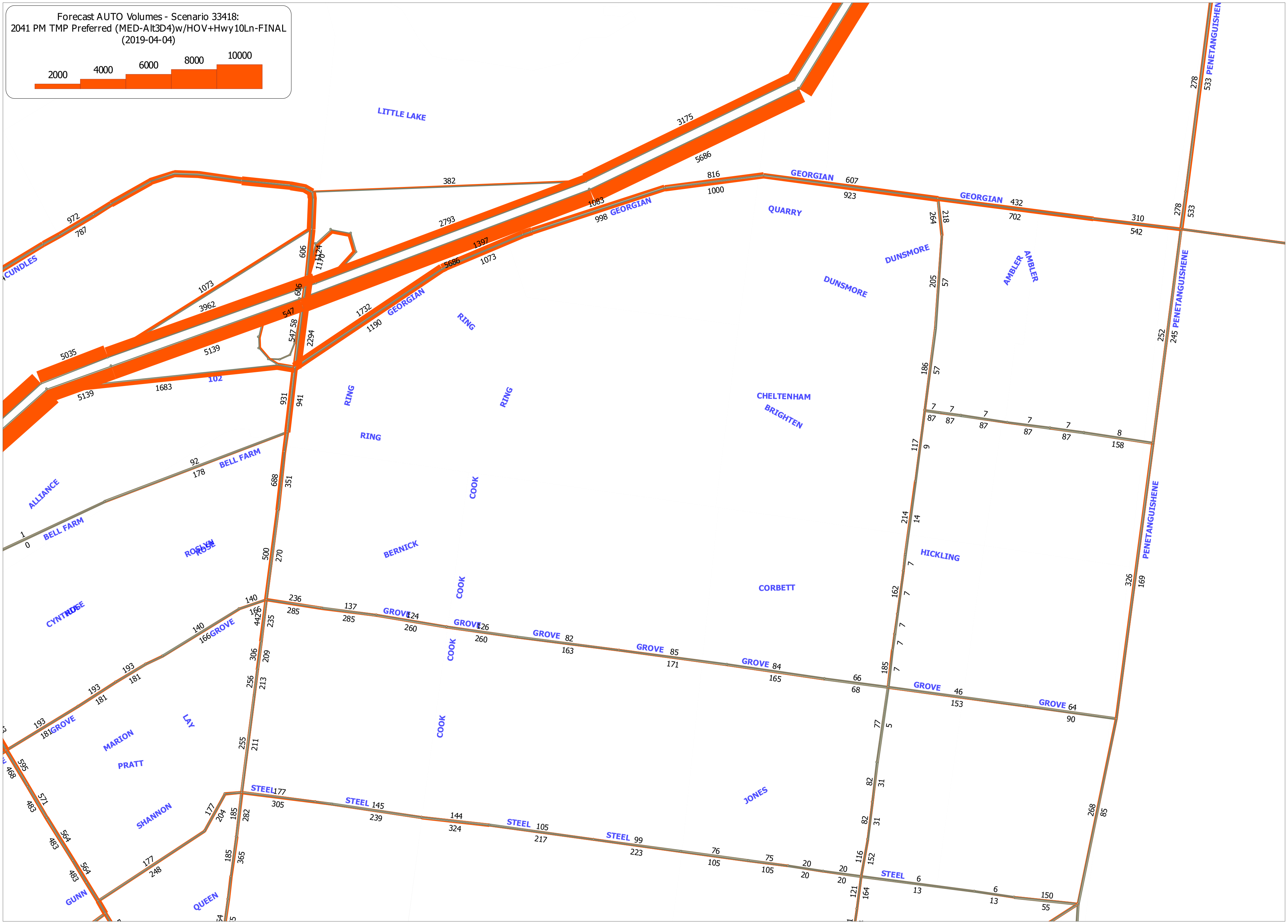

Forecast AUTO Volumes - Scenario 33417:
2041 AM TMP Preferred (MED-Alt3D4)w/HOV+Hwy10Ln-FINAL
(2019-04-04)
2000
4000
6000
8000
10000
FRASER
MORROW
ESSA
ESSA
ESSA
INNISFIL
MARSHALL
MARSHALL
MARSHALL
MARSHALL
MARSHALL
PEACOCK
DEBRA
DEBRA
DEBRA
JANE
JANE
JANE
LIBRA
94
LITTLE
LITTLE
CHIEFTAN
983
889
4824
7061
900
1281
1361
4824
964
2209
804
1069
495
4957
285
285
285
975
261
261
715
2011
2105
4539
5217
1161
1117
396
1689
880
668
562
496
454
5613
1689
1276
209
198

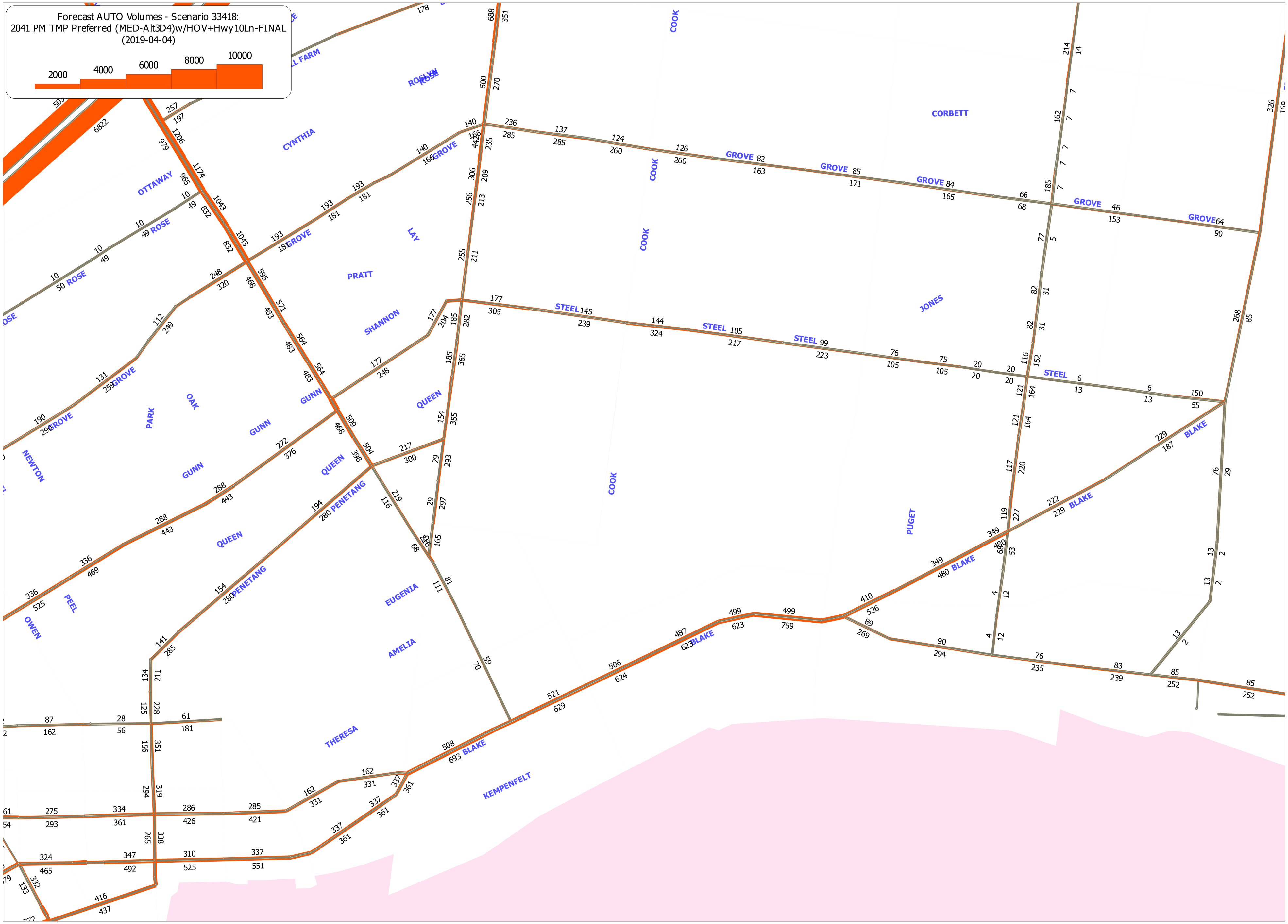


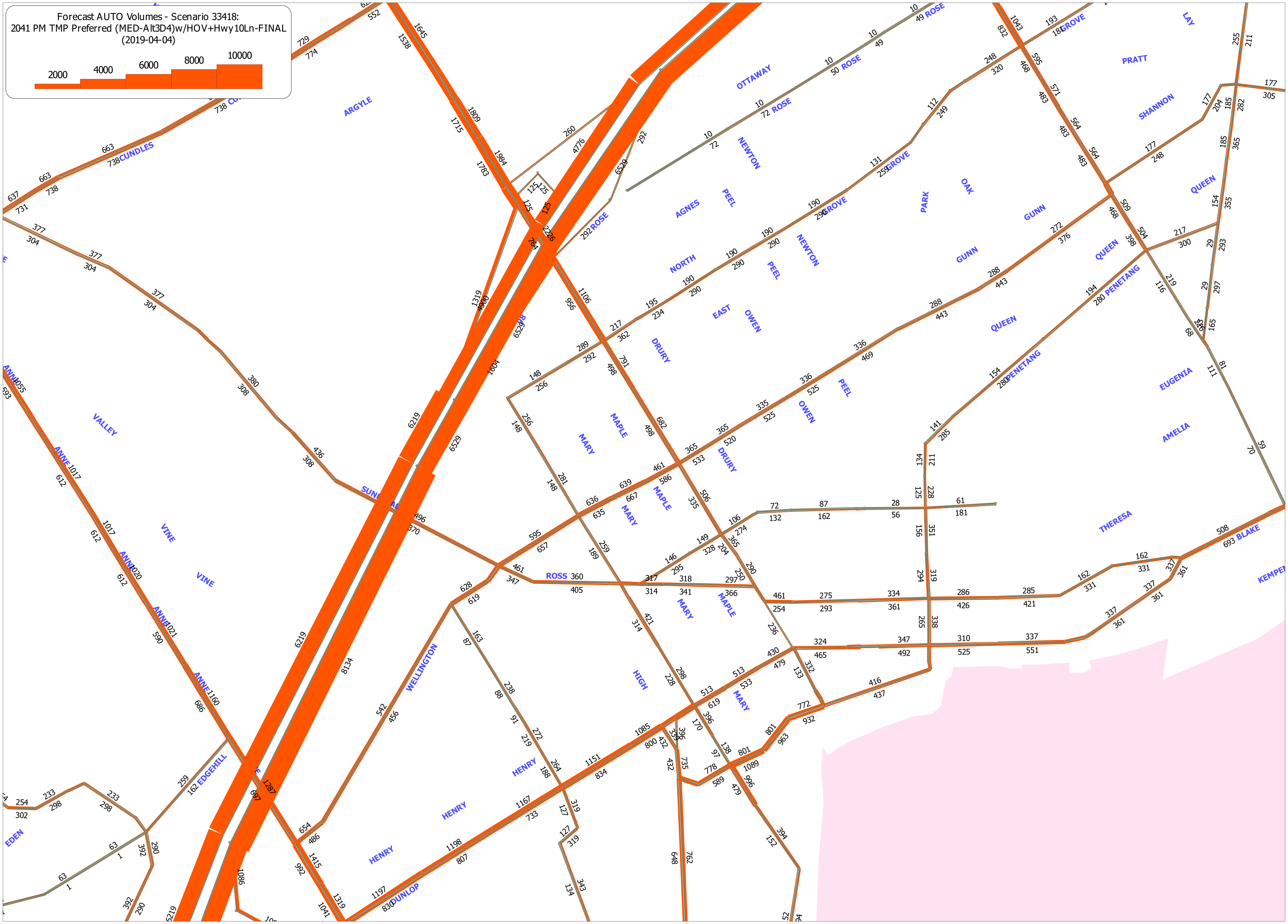
Forecast AUTO Volumes - Scenario 33417:
2041 AM TMP Preferred (MED-Alt3D4)w/HOV+Hwy10Ln-FINAL
(2019-04-04)
2000
4000
6000
8000
10000
5613
974
1128
974
1128
974
1128
974
1128
5034
5613


Forecast AUTO Volumes - Scenario 33417:
2041 AM TMP Preferred (MED-Alt3D4)w/HOV+Hwy10Ln-FINAL
(2019-04-04)
10000
8000
6000
4000
2000
MAPLEVIEW
90
BARRIE VIEW
CAPLAN
BRYNE
458
843
366
587
2016
1554
2329
1992
639
1396
3638
1795
2215
3780
634
1833
2302
1524
540
340
1415
1056
1
0
283
281


Forecast AUTO Volumes - Scenario 33417:
2041 AM TMP Preferred (MED-Alt3D4)w/HOV+Hwy10Ln-FINAL
(2019-04-04)
2000
4000
6000
8000
10000
565
222
222
222
222
1859
1642
1859
1642
1420
1222
1420
1563
341
704
341
1045
1198
1563
1481
1281
685
1045
1481
1625
344
325
318
4071
3231

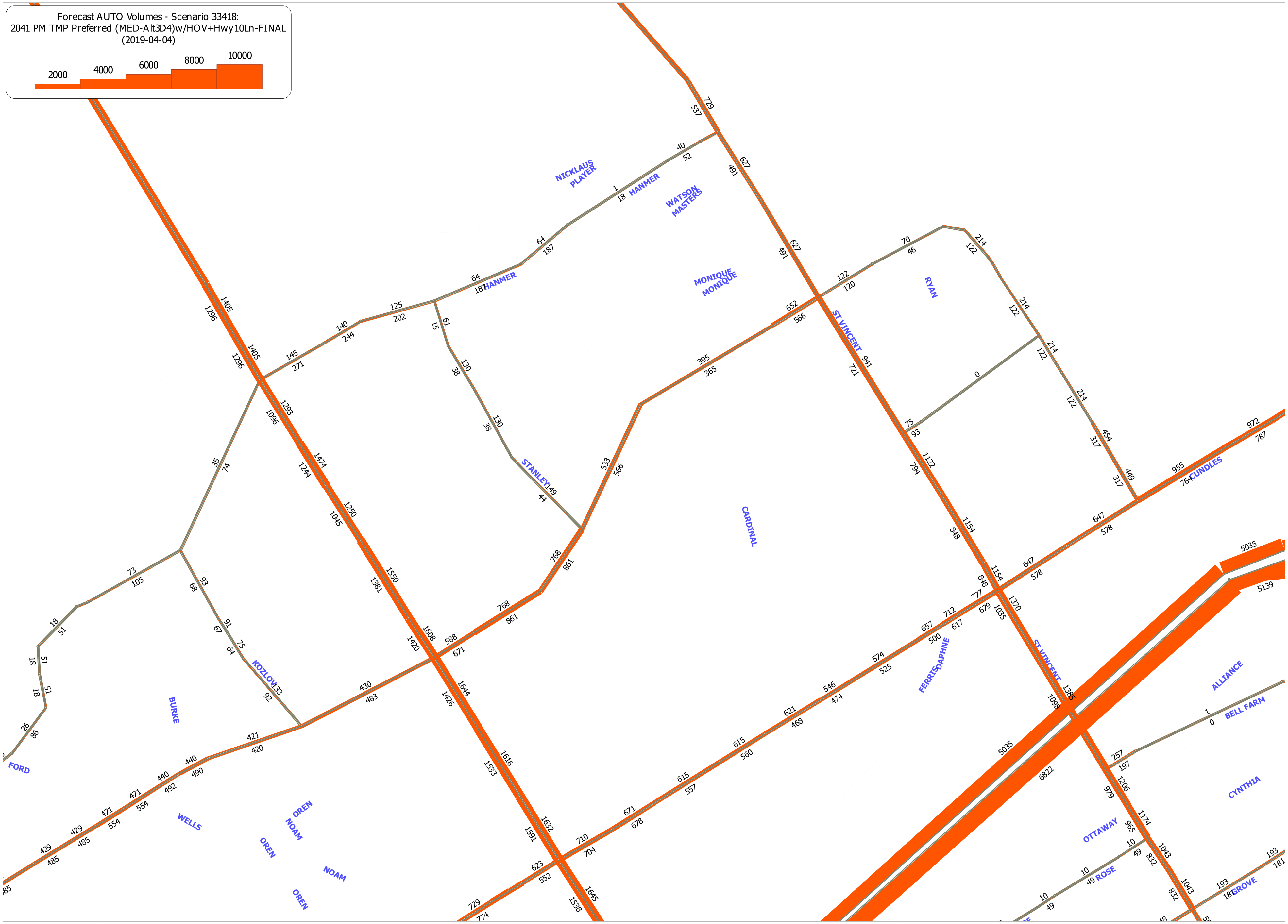

Forecast AUTO Volumes - Scenario 33418:
2041 PM TMP Preferred (MED-Alt3D4)w/HOV+Hwy10Ln-FINAL
(2019-04-04)
2000
4000
6000
8000
10000
LITTLE LAKE
GEORGIAN
PENETANGUISHENE
QUARRY
DUNSMORE
AMBLER
RING
CHELTENHAM
BRIGHTEN
HICKLING
CORBETT
COOK
BERNICK
GROVE
STEEL
JONES
BELL FARM
ALLIANCE
102
CUNDLES
LAY
MARION
PRATT
SHANNON
GUNN
QUEEN

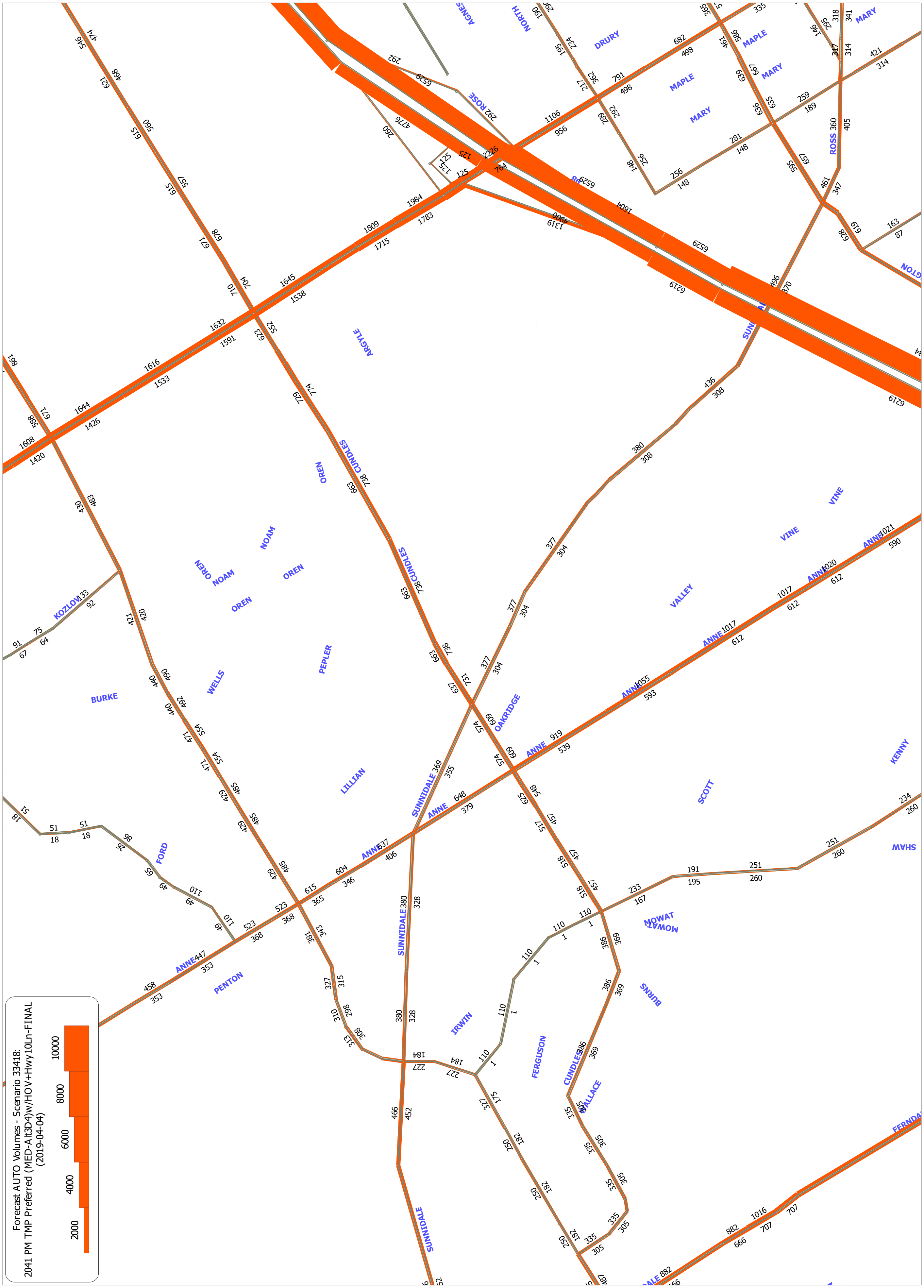

Forecast AUTO Volumes - Scenario 33418:
2041 PM TMP Preferred (MED-Alt3D4)w/HOV+Hwy10Ln-FINAL
(2019-04-04)
2000
4000
6000
8000
10000
CORBETT
GROVE
STEEL
JONES
COOK
PUGET
BLAKE
CYNTHIA
OTTAWAY
ROSE
PRATT
LAY
SHANNON
QUEEN
GUNN
OAK
PARK
NEWTON
PEEL
OWEN
PENETANG
EUGENIA
AMELIA
THERESA
KEMPENFELT



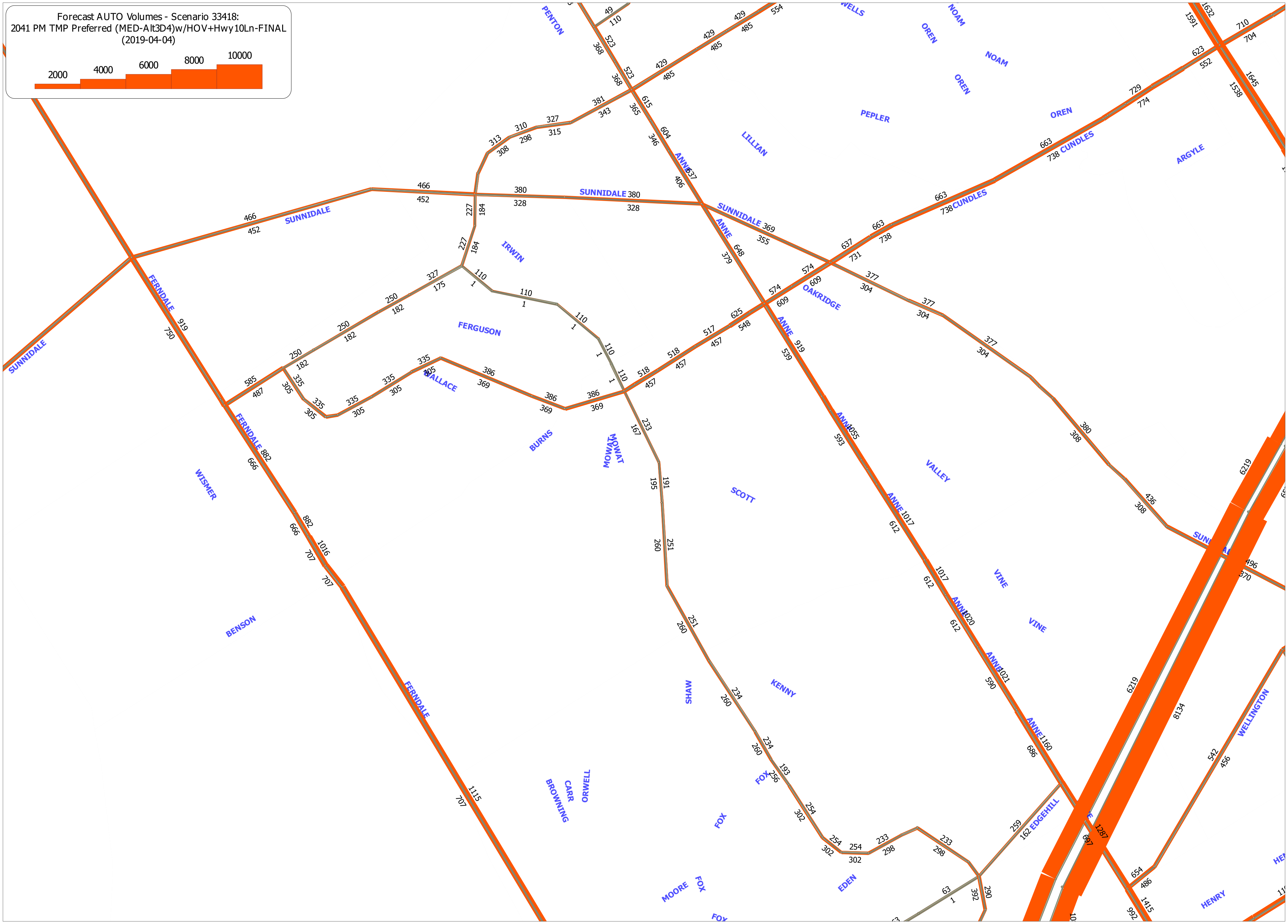
Forecast AUTO Volumes - Scenario 33418:
2041 PM TMP Preferred (MED-Alt3D4)w/HOV+Hwy10Ln-FINAL
(2019-04-04)
2000
4000
6000
8000
10000
ARGYLE
CUNDLES
VALLEY
VINE
ANNE
EDGEHILL
EDEN
SUNNIDALE
WELLINGTON
HENRY
DUNLOP
HIGH
ROSS
MARY
MAPLE
DRURY
OWEN
PEEL
EAST
NORTH
AGNES
NEWTON
ROSE
OTTAWAY
GROVE
PARK
OAK
GUNN
QUEEN
PENETANG
EUGENIA
AMELIA
THERESA
BLAKE
KEMPENFELT
LAY
PRATT
SHANNON

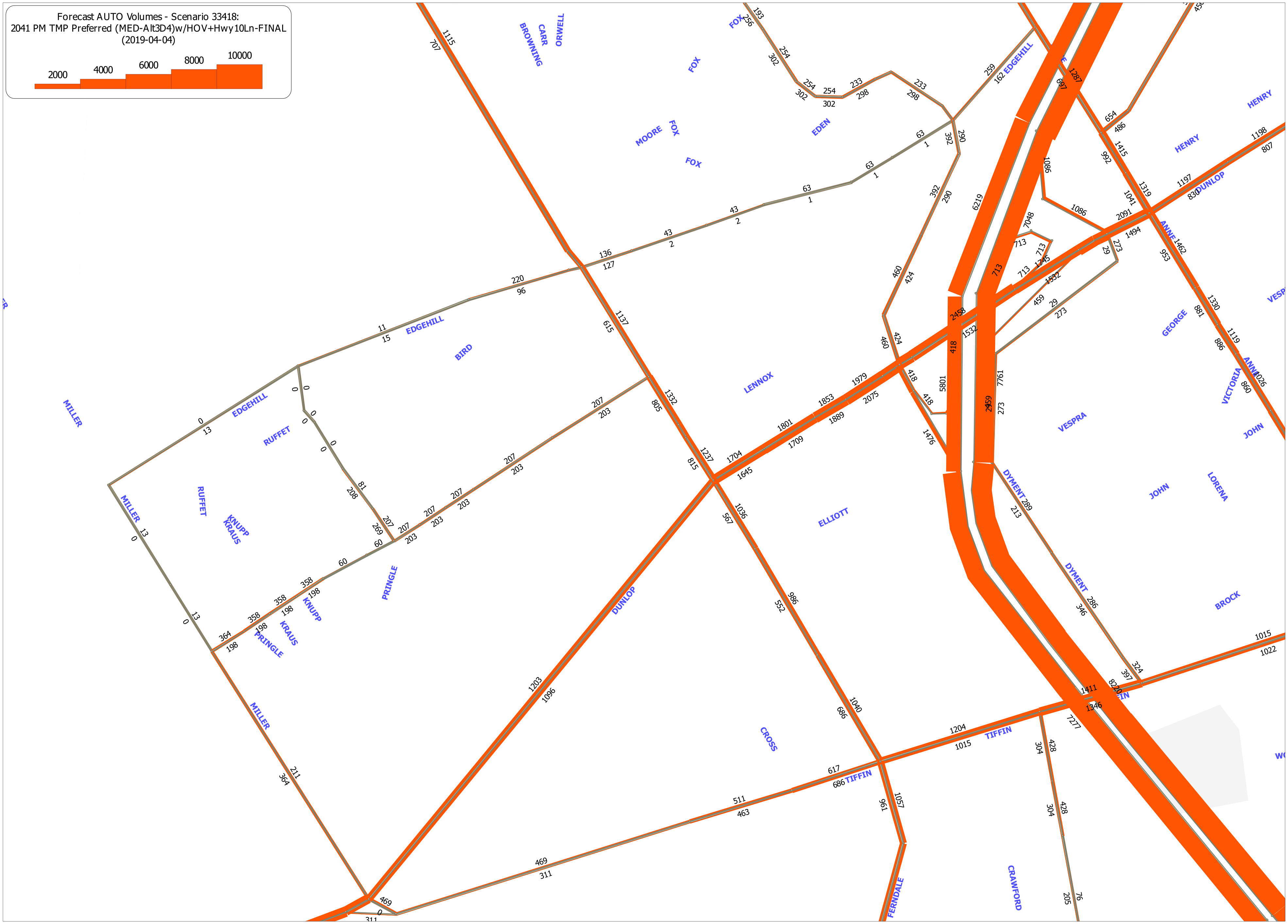

Forecast AUTO Volumes - Scenario 33418:
2041 PM TMP Preferred (MED-Alt3D4)w/HOV+Hwy10Ln-FINAL
(2019-04-04)
10000
8000
6000
4000
2000
LAKESHORE
BRADFORD
INNISFIL
ANNE
TIFFIN
JACOBS
CENTRE
ESSA
BURTON
HOLGATE
COWAN
MAPLE
MARY
HIGH
ROSS
HENRY
VESPRA
JOHN
BROCK
WELLINGTON
DUNLOP
VICTORIA
LORENA
GEORGE
DYMENT
EDGEHILL
VINE
EDEN
FOX
MOORE
LENNOX
ELLIOTT
CROSS
WOOD


Forecast AUTO Volumes - Scenario 33418:
2041 PM TMP Preferred (MED-Alt3D4)w/HOV+Hwy10Ln-FINAL
(2019-04-04)
2000
4000
6000
8000
10000
NICKLAUS
PLAYER
HANMER
WATSON
MASTERS
MONIQUE
MONIQUE
RYAN
ST VINCENT
CUNDLES
CARDINAL
STANLEY
KOZLOV
BURKE
FORD
WELLS
OREN
NOAM
FERRIS
DAPHNE
ALLIANCE
BELL FARM
CYNTHIA
OTTAWAY
ROSE
GROVE

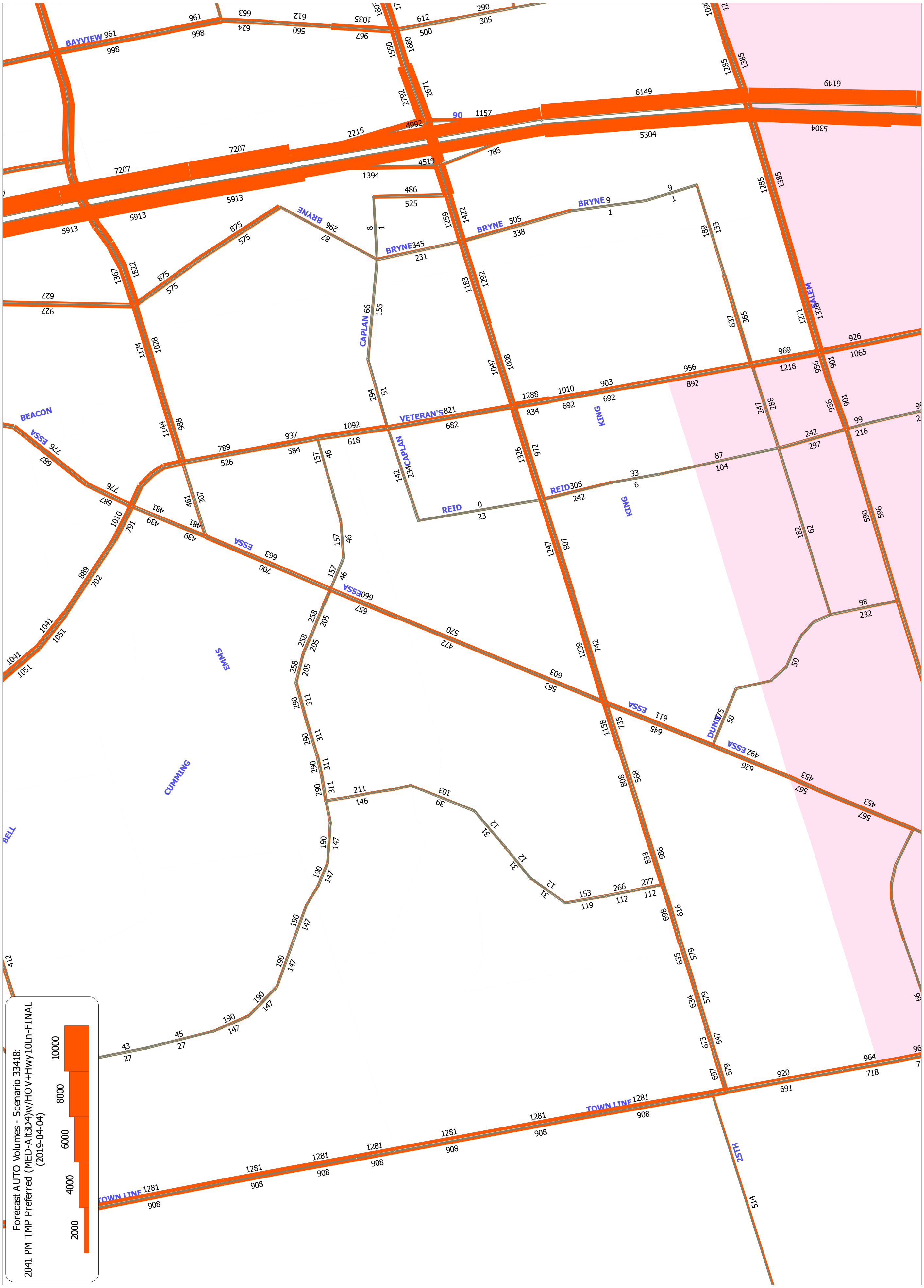


Forecast AUTO Volumes - Scenario 33418:
2041 PM TMP Preferred (MED-Alt3D4)w/HOV+Hwy10Ln-FINAL
(2019-04-04)
2000
4000
6000
8000
10000
AGNES
NORTH
DRURY
MAPLE
MARY
ROSE
ROSS
ARGYLE
CUNDLES
OREN
NOAM
KOZLOV
BURKE
WELLS
PEPLER
VALLEY
VINE
ANNE
OAKRIDGE
LILLIAN
SUNNIDALE
SCOTT
KENNY
SHAW
FORD
PENTON
MOWAT
BURNS
IRWIN
FERGUSON
WALLACE
FERNDALE

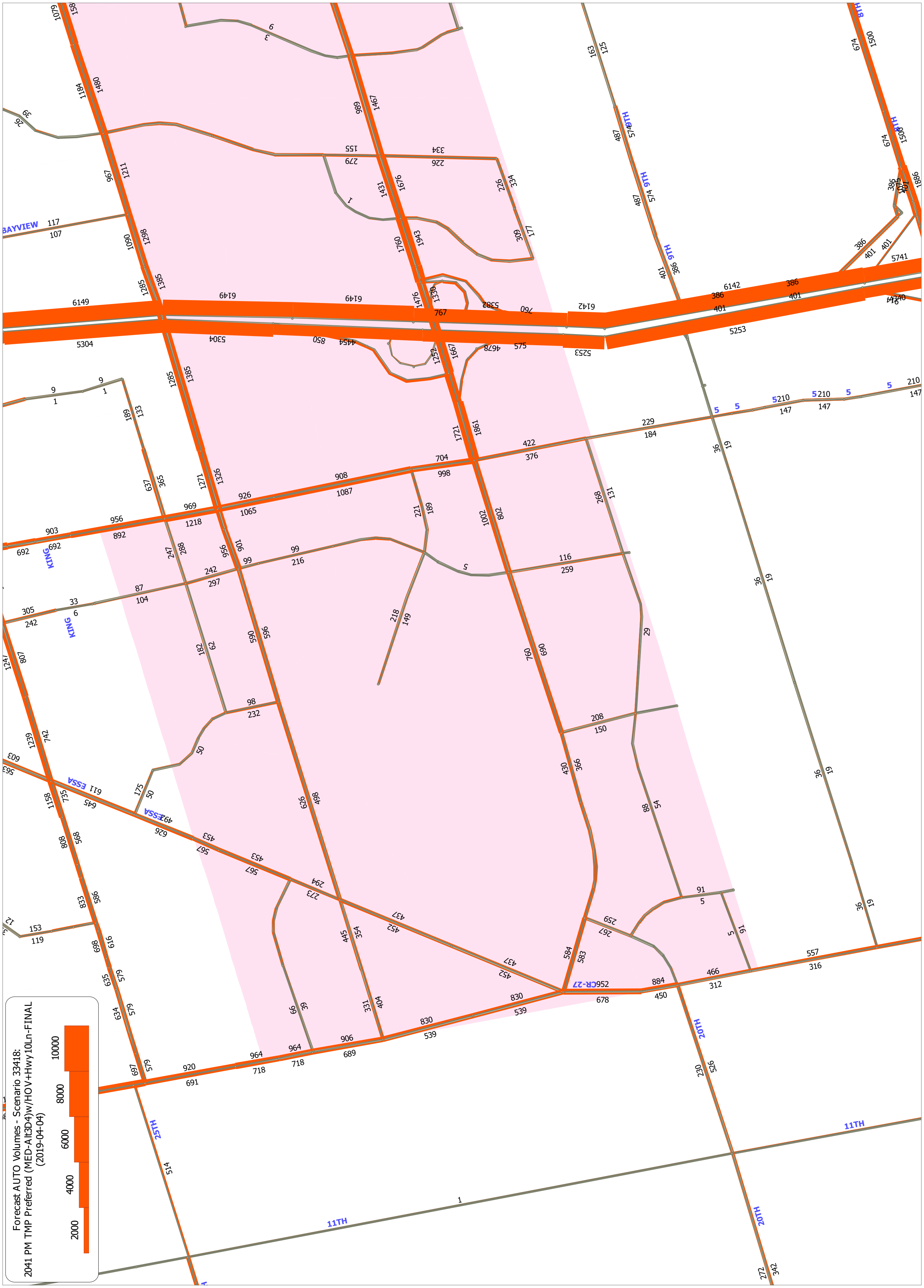

Forecast AUTO Volumes - Scenario 33418:
2041 PM TMP Preferred (MED-Alt3D4)w/HOV+Hwy10Ln-FINAL
(2019-04-04)
2000
4000
6000
8000
10000
SUNNIDALE
ANNE
CUNDLES
FERNDALE
OAKRIDGE
ARGYLE
OREN
NOAM
PEPLER
LILLIAN
WELLS
PENTON
IRWIN
FERGUSON
WALLACE
BURNS
MOWAT
SCOTT
VALLEY
VINE
KENNY
SHAW
FOX
EDEN
MOORE
EDGEHILL
WELLINGTON
HENRY
ORWELL
CARR
BROWNING
BENSON
WISMER


Forecast AUTO Volumes - Scenario 33418:
2041 PM TMP Preferred (MED-Alt3D4)w/HOV+Hwy10Ln-FINAL
(2019-04-04)
2000
4000
6000
8000
10000
DUNLOP
TIFFIN
EDGEHILL
MILLER
CROSS
ELLIOTT
LENNOX
BIRD
RUFFET
KNUPP
KRAUS
PRINGLE
DYMENT
VESPRA
JOHN
LORENA
BROCK
GEORGE
ANNE
VICTORIA
HENRY
EDEN
FOX
MOORE
BROWNING
CARR
ORWELL
CRAWFORD
FERNDALE


Forecast AUTO Volumes - Scenario 33418:
2041 PM TMP Preferred (MED-Alt3D4)w/HOV+Hwy10Ln-FINAL
(2019-04-04)
2000
4000
6000
8000
10000
BURTON
ESSA
BRYNE
BEACON
ANNE
TIFFIN
WOOD
BROCK
MORROW
MOON
DYMENT
FERNDALE
JAMES
ARDAGH
WILDWOOD
HARVIE
CUMMING
BELL
GORE
DUNLOP
PRINGLE
MILLER
TOWN LINE
PENVILL



Forecast AUTO Volumes - Scenario 33418:
2041 PM TMP Preferred (MED-Alt3D4)w/HOV+Hwy10Ln-FINAL
(2019-04-04)
10000
8000
6000
4000
2000
BAYVIEW
90
BRYNE
CAPLAN
SALEM
VETERAN'S
KING
BEACON
ESSA
REID
EMMS
DUNN
CUMMING
BELL
TOWN LINE
25TH


Forecast AUTO Volumes - Scenario 33418:
2041 PM TMP Preferred (MED-Alt3D4)w/HOV+Hwy10Ln-FINAL
(2019-04-04)
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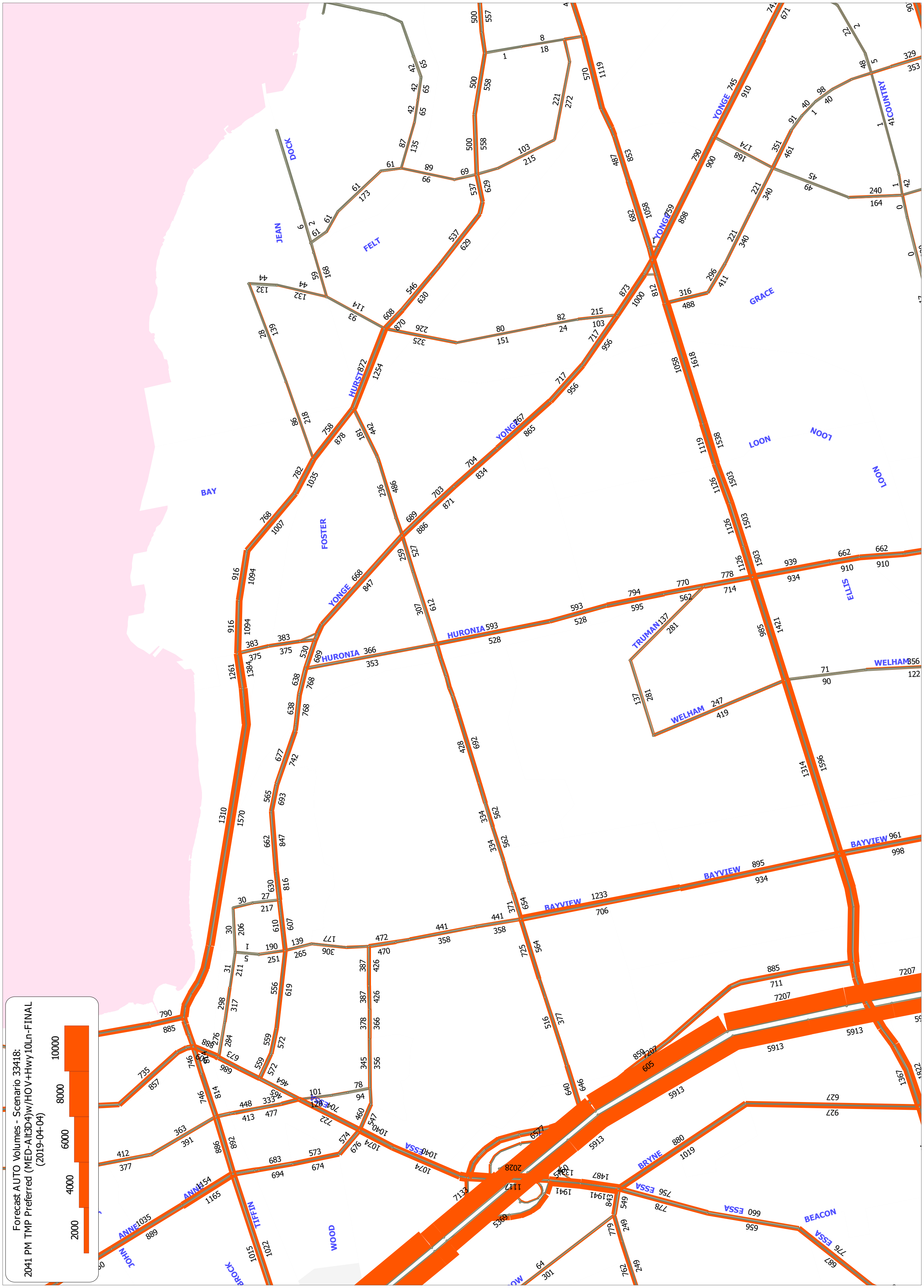
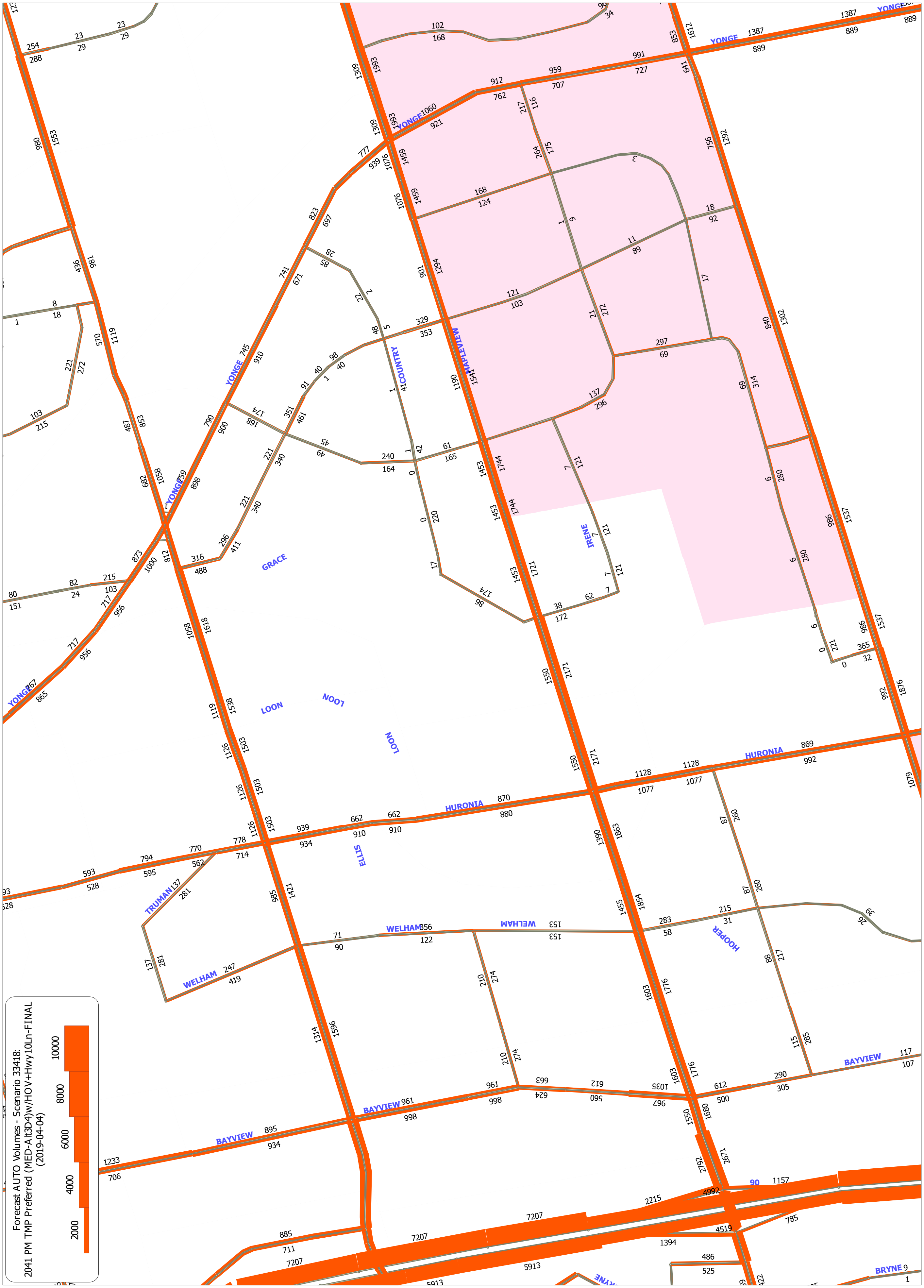
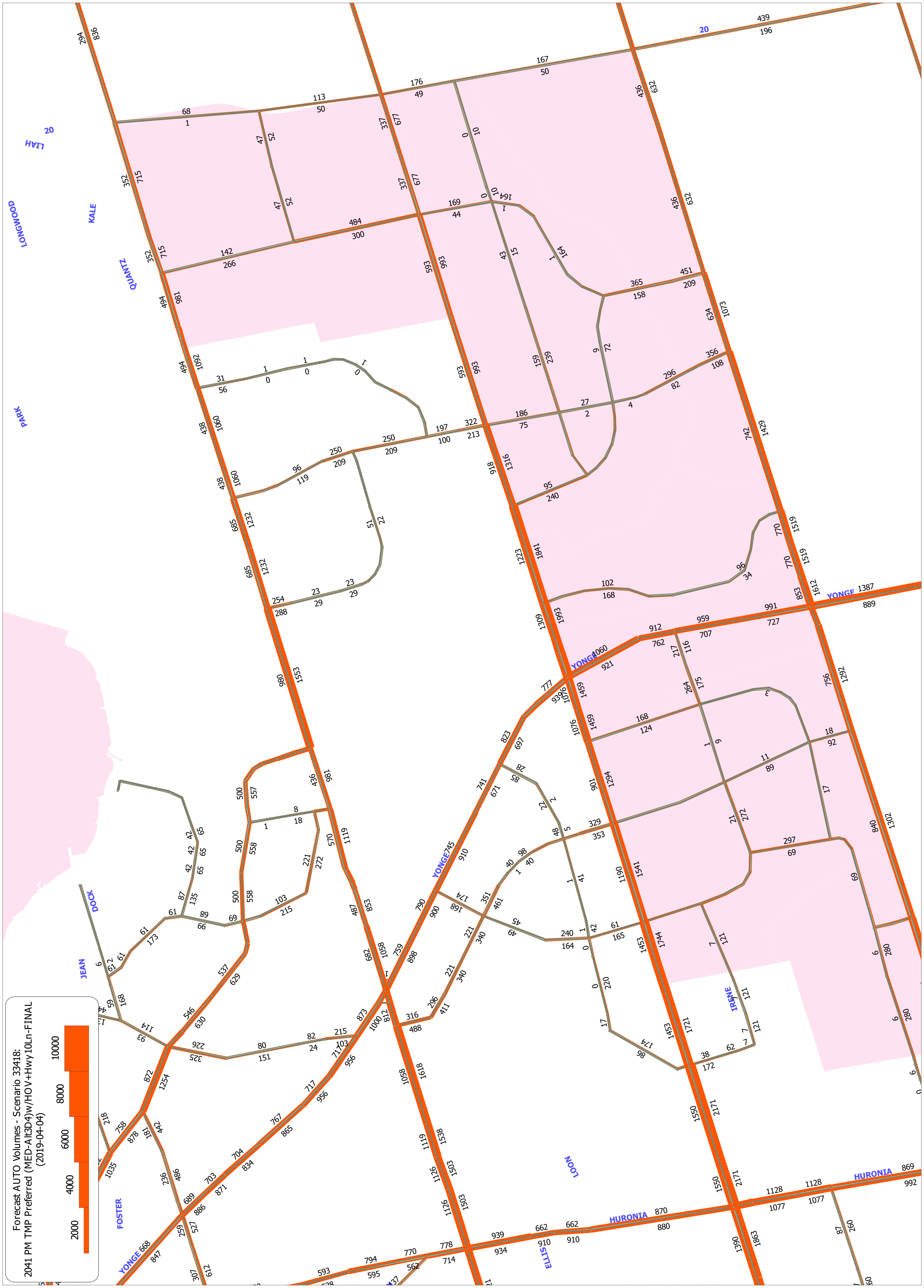
8000
6000
4000
2000
BAYVIEW
KING
ESSA
9TH
8TH
CR-27
20TH
25TH
11TH

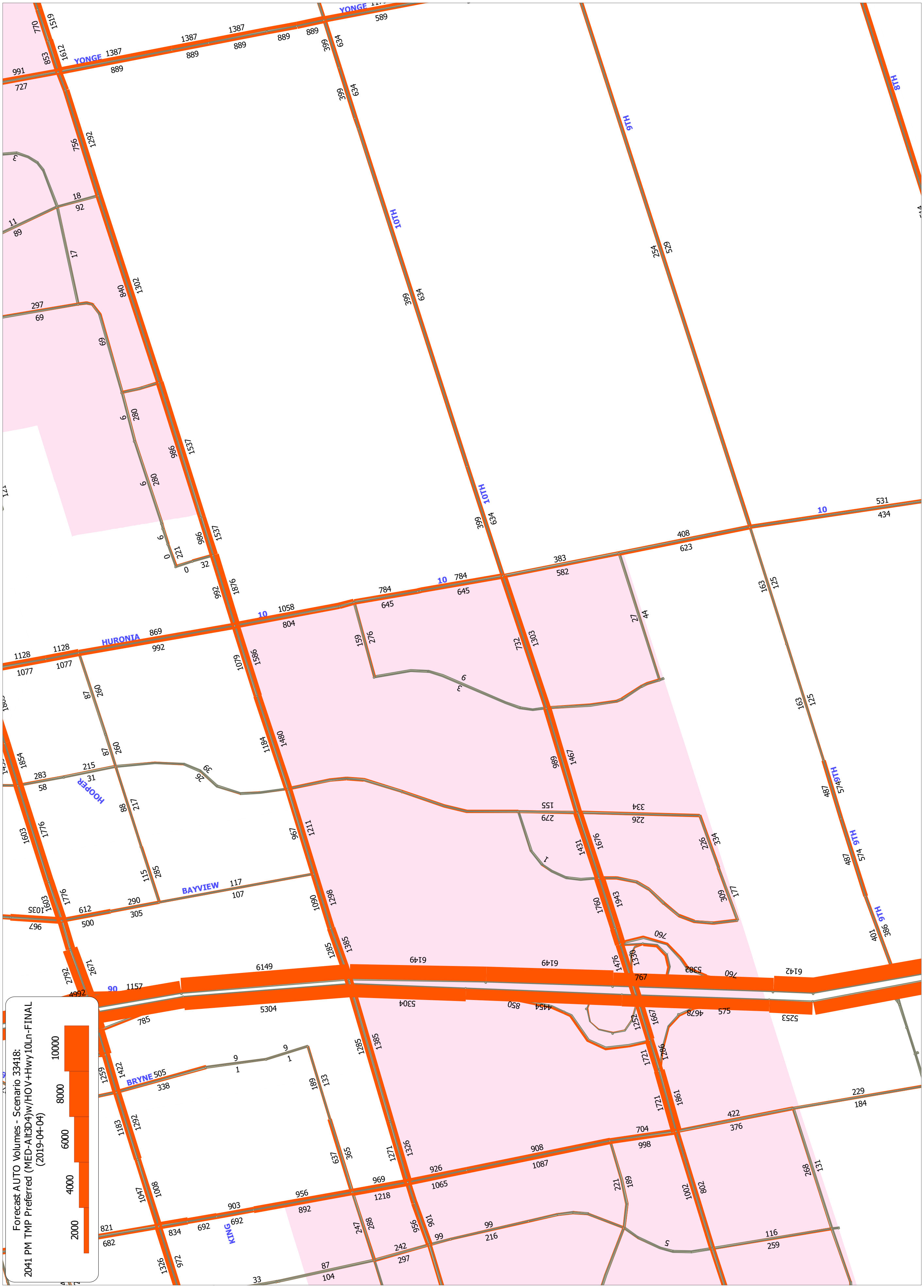


Forecast AUTO Volumes - Scenario 33418:
2041 PM TMP Preferred (MED-Alt3D4)w/HOV+Hwy10Ln-FINAL
(2019-04-04)
10000
8000
6000
4000
2000
BAY
DOCK
JEAN
FELT
HURST
YONGE
FOSTER
HURONIA
GRACE
LOON
ELLIS
TRUMAN
WELHAM
BAYVIEW
COUNTRY
ESSA
BRYNE
BEACON
ANNE
JOHN
TIFFIN
WOOD
BROCK

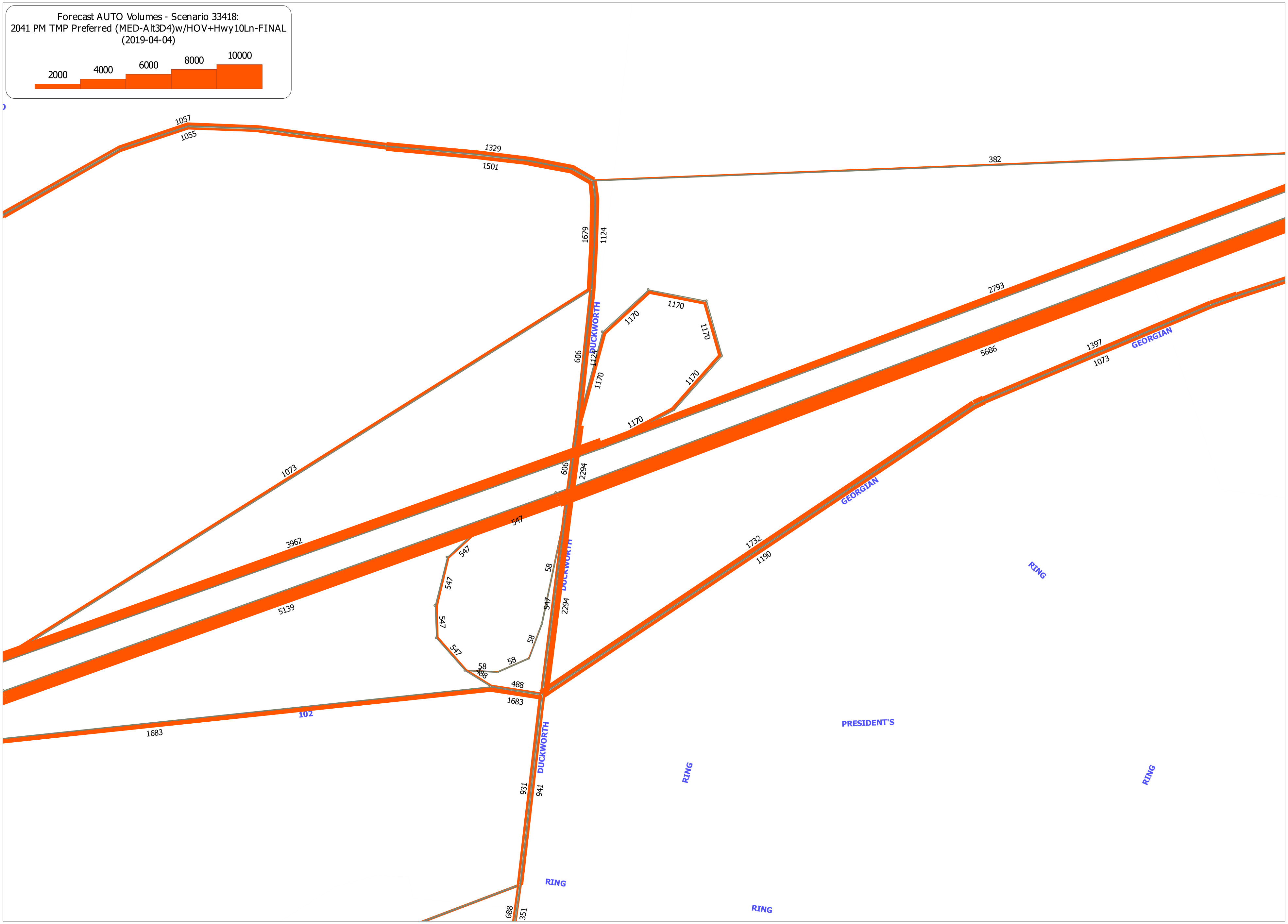

Forecast AUTO Volumes - Scenario 33418:
2041 PM TMP Preferred (MED-Alt3D4)w/HOV+Hwy10Ln-FINAL
(2019-04-04)
10000
8000
6000
4000
2000
YONGE
MAPLEVIEW
COUNTRY
IRENE
GRACE
LOON
HURONIA
ELLIS
TRUMAN
WELHAM
HOOPER
BAYVIEW
BRYNE



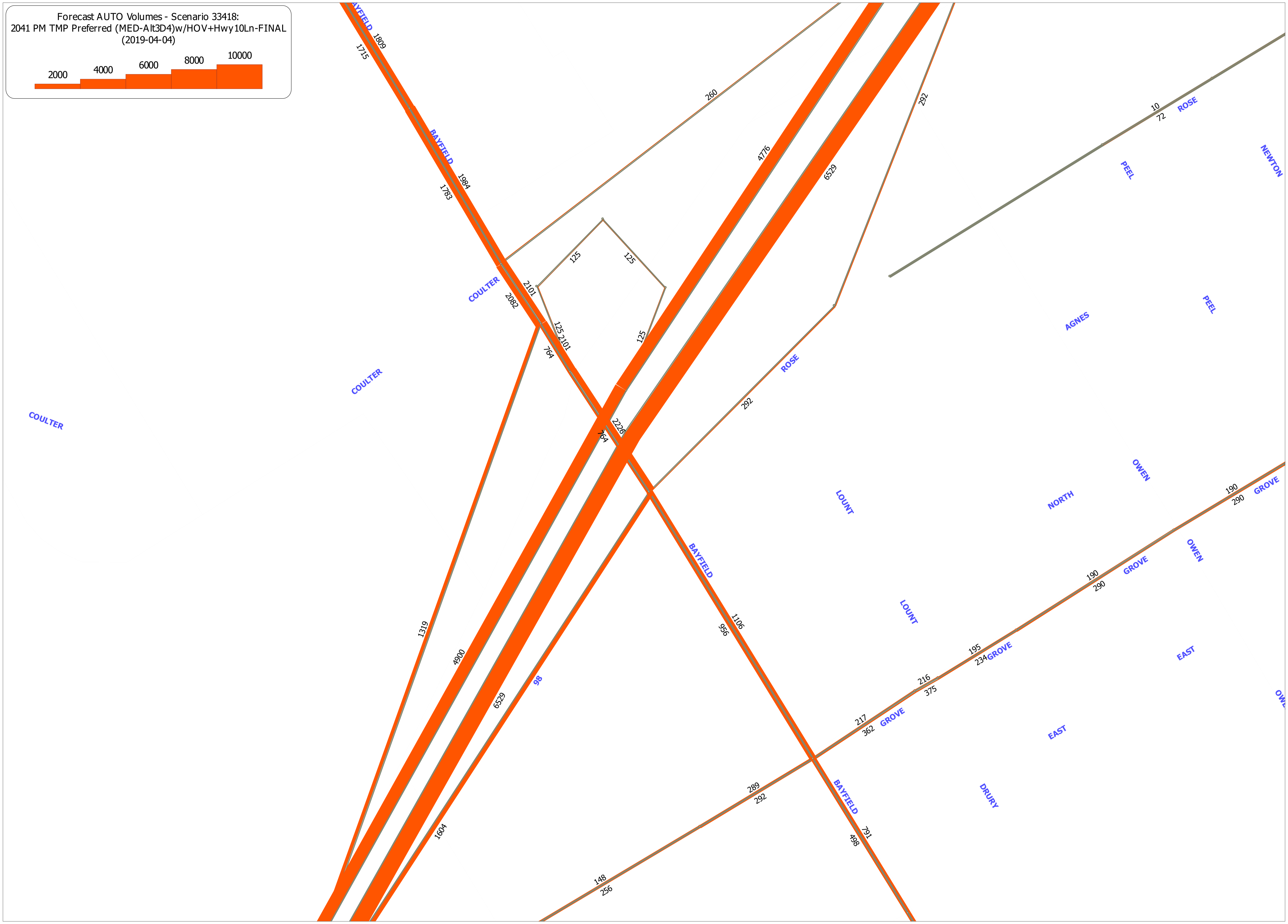
Forecast AUTO Volumes - Scenario 33418:
2041 PM TMP Preferred (MED-Alt3D4)w/HOV+Hwy10Ln-FINAL
(2019-04-04)
10000
8000
6000
4000
2000
LONGWOOD
KALE
QUANTZ
PARK
DOCK
JEAN
FOSTER
YONGE
IRENE
LOON
ELLIS
HURONIA
20



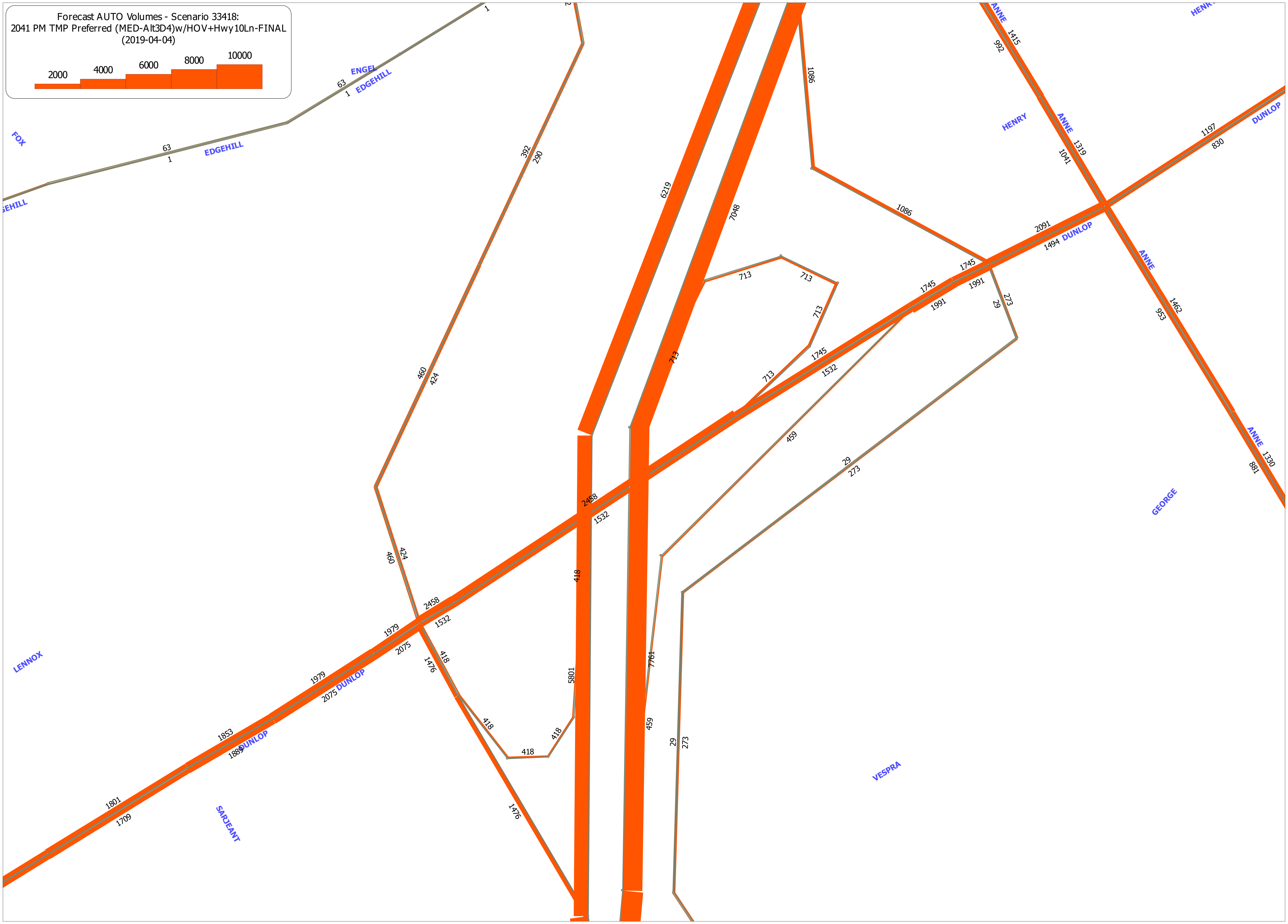
Forecast AUTO Volumes - Scenario 33418:
2041 PM TMP Preferred (MED-Alt3D4)w/HOV+Hwy10Ln-FINAL
(2019-04-04)
10000
8000
6000
4000
2000
YONGE
10TH
9TH
8TH
10
HURONIA
HOOPER
BAYVIEW
90
BRYNE
KING

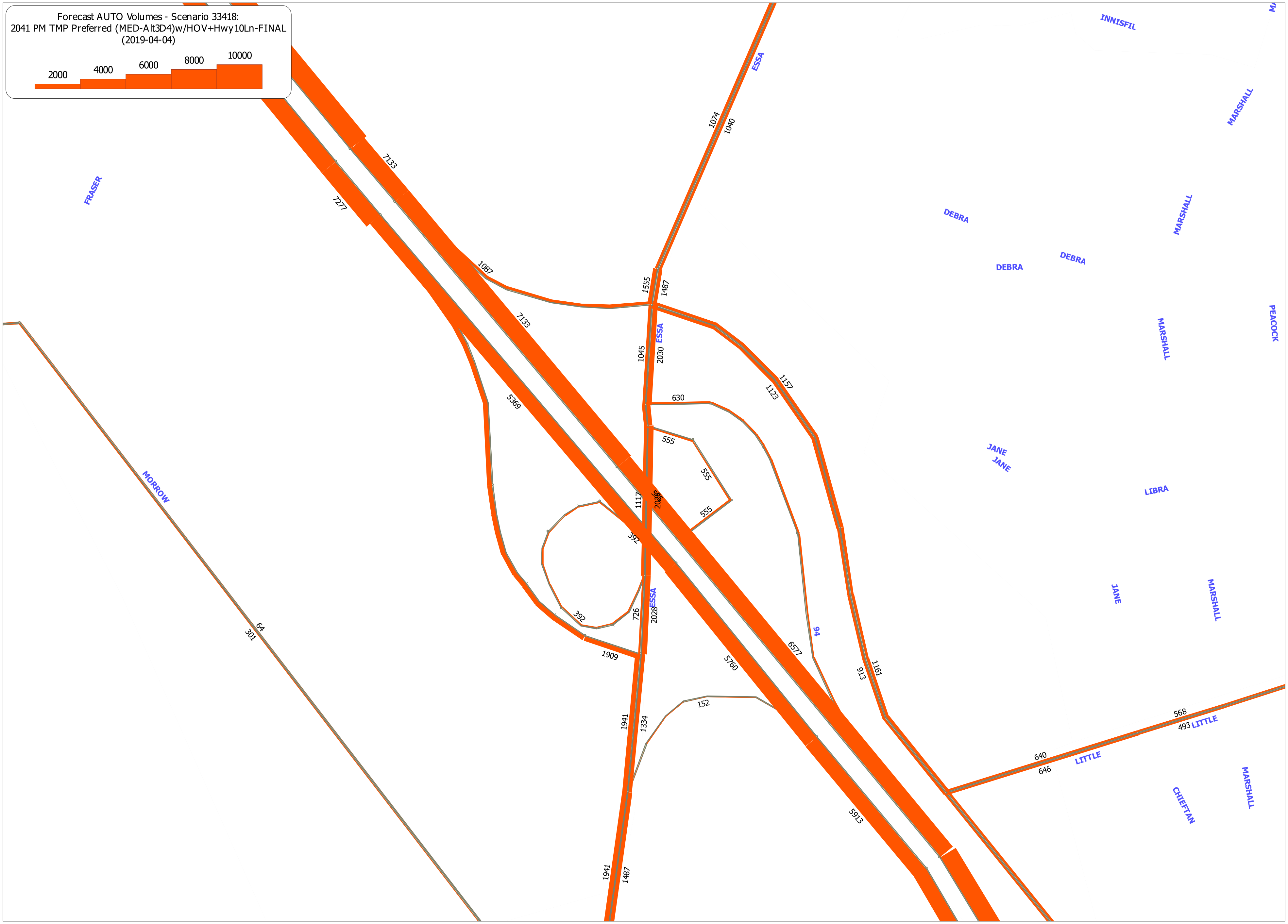


Forecast AUTO Volumes - Scenario 33418:
2041 PM TMP Preferred (MED-Alt3D4)w/HOV+Hwy10Ln-FINAL
(2019-04-04)
2000
4000
6000
8000
10000
DUCKWORTH
GEORGIAN
RING
PRESIDENT'S
102
1057
1055
1329
1501
382
1679
1124
2793
5686
1397
1073
1170
606
2294
1073
3962
5139
547
58
488
1683
1732
1190
931
941
688
351

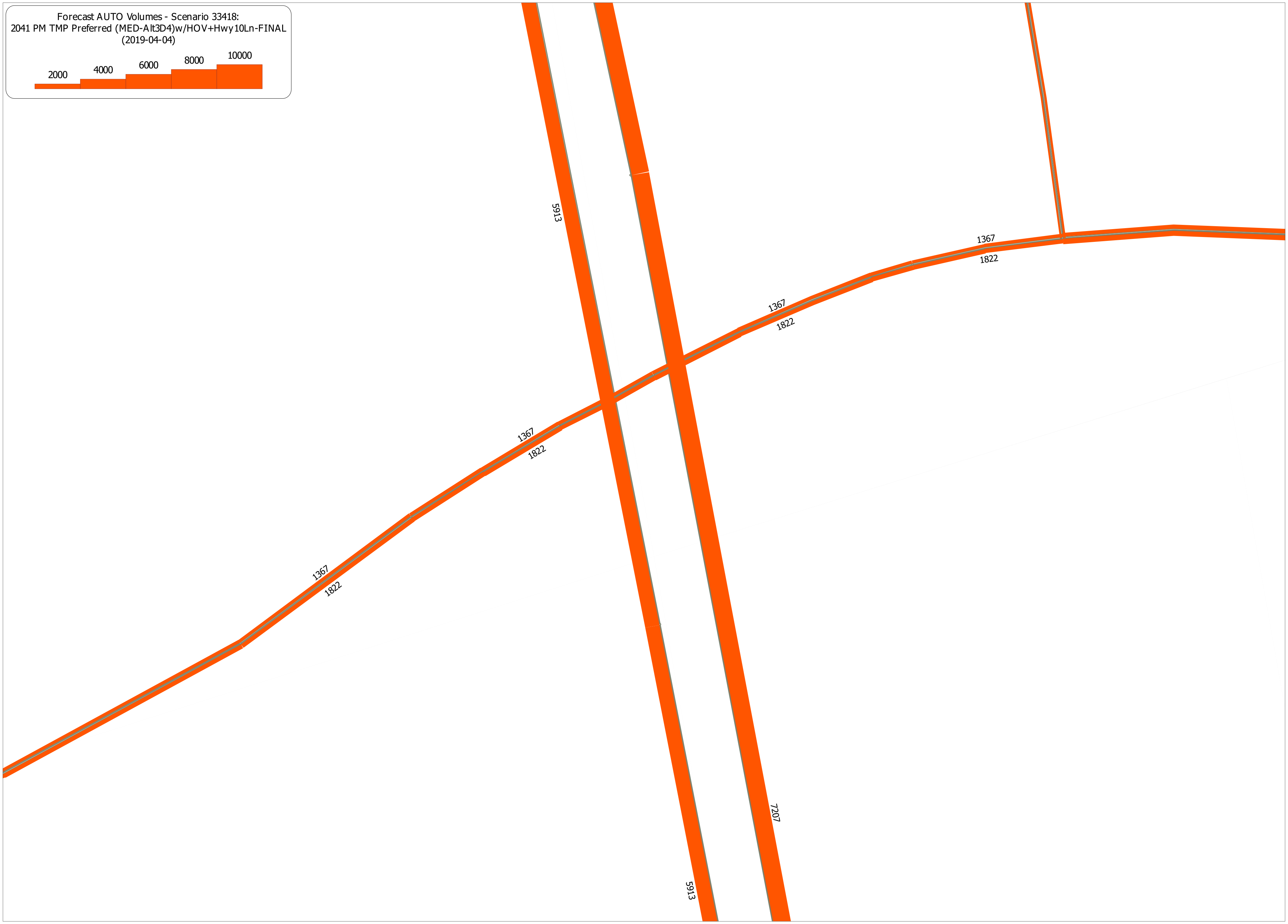


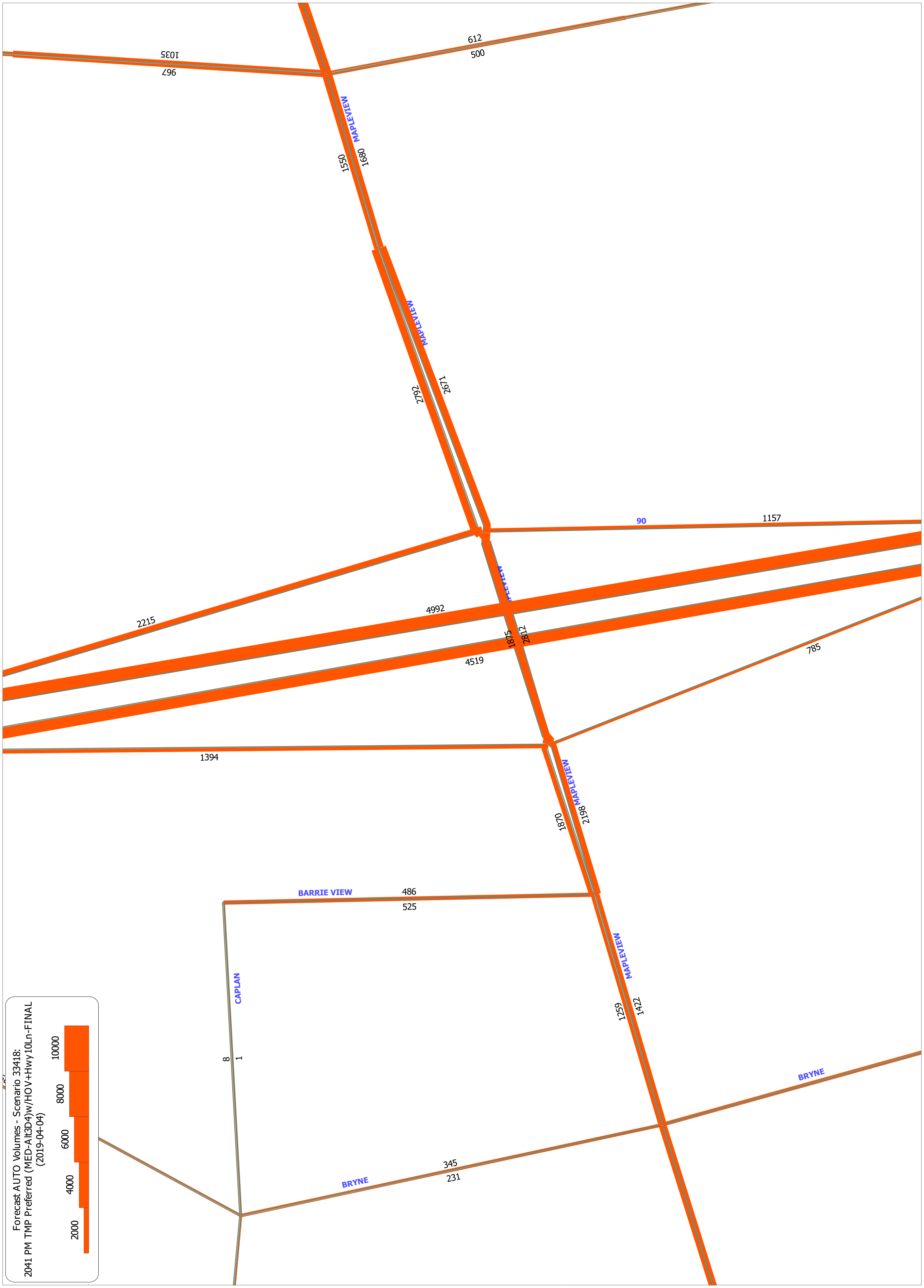
Forecast AUTO Volumes - Scenario 33418:
2041 PM TMP Preferred (MED-Alt3D4)w/HOV+Hwy10Ln-FINAL
(2019-04-04)
2000
4000
6000
8000
10000
BAYFIELD
COULTER
ROSE
PEEL
NEWTON
AGNES
NORTH
OWEN
LOUNT
GROVE
EAST
DRURY
98
1809
1715
1984
1783
260
4776
6529
292
10
72
125
2101
2082
764
2226
1319
4900
1604
1106
956
190
290
195
234
216
375
217
362
289
148
256
791
498


Forecast AUTO Volumes - Scenario 33418:
2041 PM TMP Preferred (MED-Alt3D4)w/HOV+Hwy10Ln-FINAL
(2019-04-04)
2000
4000
6000
8000
10000
FOX
ENGEL
EDGEHILL
LENNOX
SARJEANT
DUNLOP
HENRY
ANNE
GEORGE
VESPRA

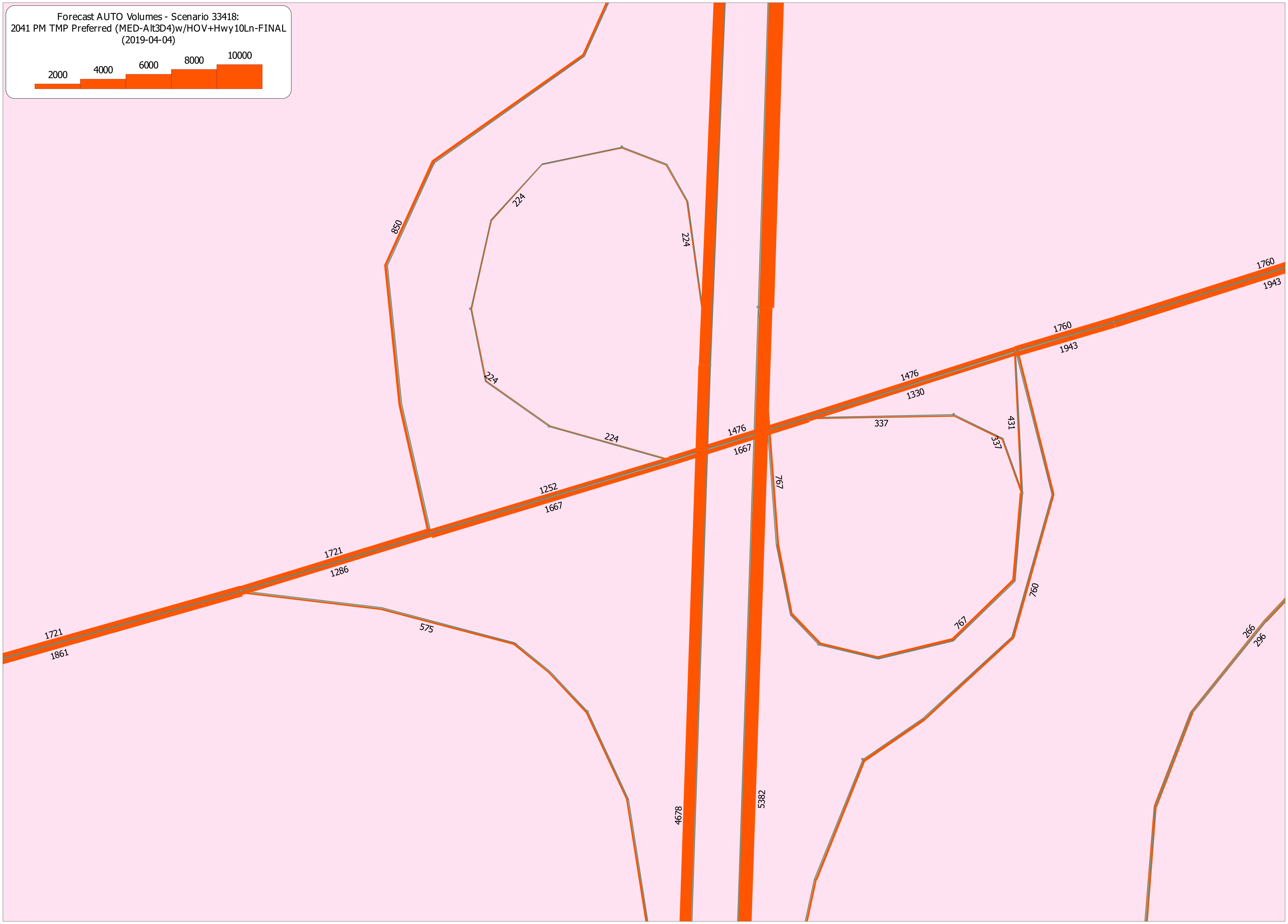


Forecast AUTO Volumes - Scenario 33418:
2041 PM TMP Preferred (MED-Alt3D4)w/HOV+Hwy10Ln-FINAL
(2019-04-04)
2000
4000
6000
8000
10000
ESSA
94
INNISFIL
MARSHALL
PEACOCK
DEBRA
JANE
LIBRA
LITTLE
CHIEFTAN
MORROW
FRASER
7133
7277
1087
5369
1555
1487
1074
1040
1045
2030
630
555
1157
1123
1117
392
726
2028
1909
1941
1334
152
6577
5760
913
1161
5913
640
646
568
493
64
301


Forecast AUTO Volumes - Scenario 33418:
2041 PM TMP Preferred (MED-Alt3D4)w/HOV+Hwy10Ln-FINAL
(2019-04-04)
2000
4000
6000
8000
10000
5913
1367
1822
1367
1822
1367
1822
1367
1822
7207
5913



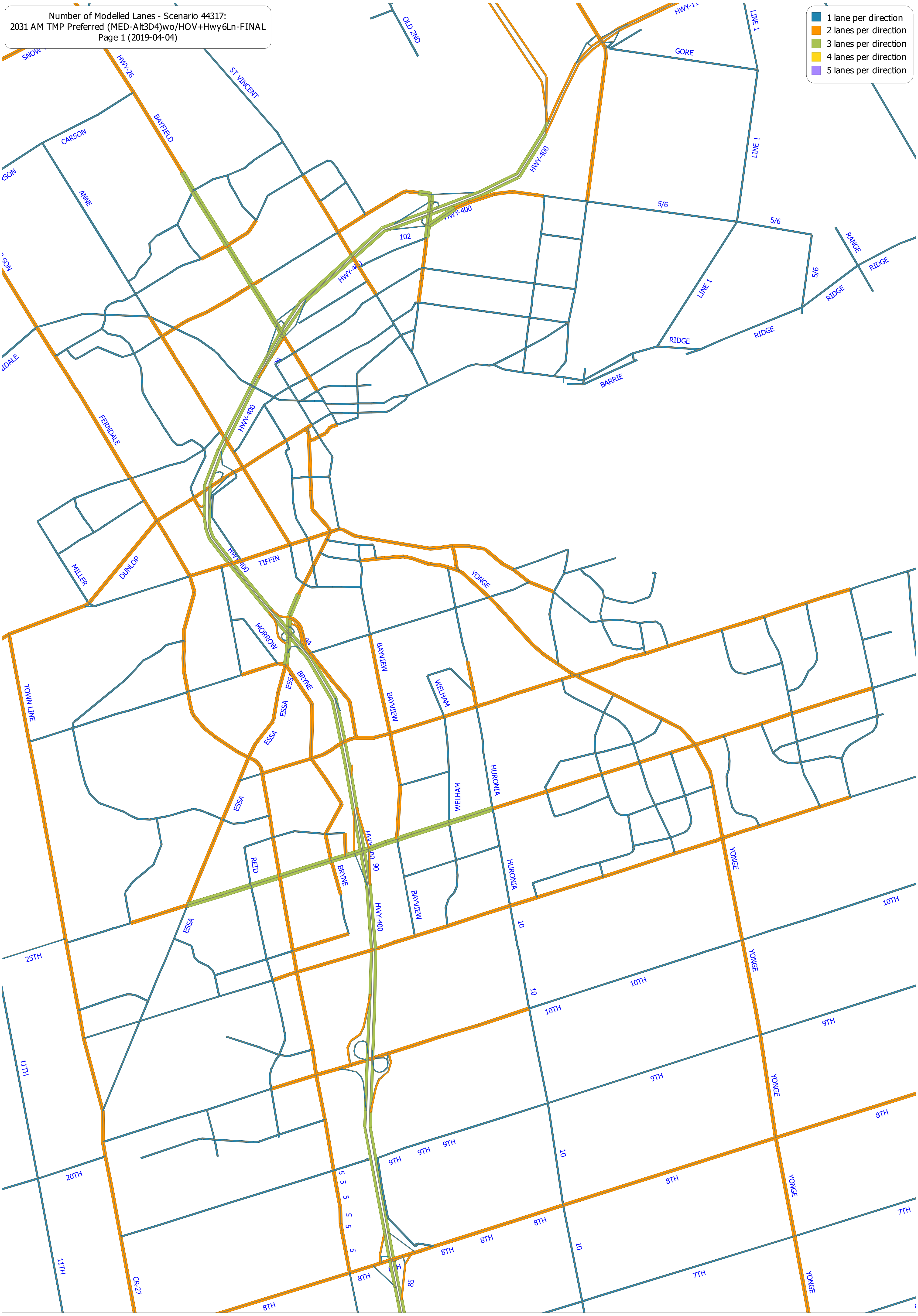
1035
967
612
500
MAPLEVIEW
1550
1680
MAPLEVIEW
2792
2671
90
1157
2215
4992
1875
2812
4519
785
1394
MAPLEVIEW
1870
2198
BARRIE VIEW
486
525
CAPLAN
MAPLEVIEW
1259
1422
8
1
BRYNE
BRYNE
345
231
Forecast AUTO Volumes - Scenario 33418:
2041 PM TMP Preferred (MED-Alt3D4)w/HOV+Hwy10Ln-FINAL
(2019-04-04)
10000
8000
6000
4000
2000

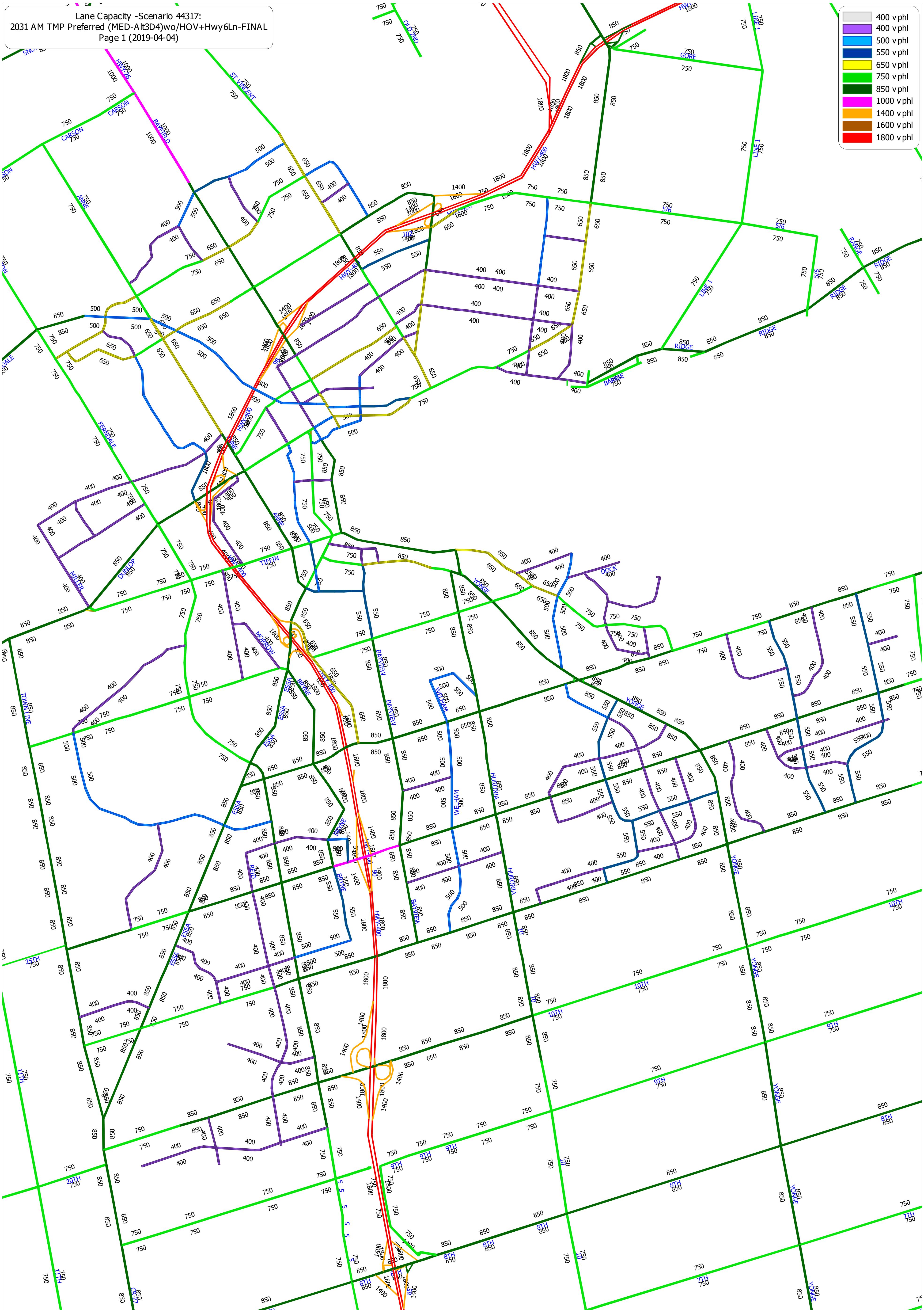

Forecast AUTO Volumes - Scenario 33418:
2041 PM TMP Preferred (MED-Alt3D4)w/HOV+Hwy10Ln-FINAL
(2019-04-04)
2000
4000
6000
8000
10000
850
224
224
224
224
1760
1943
1760
1943
1476
1330
1476
1667
337
431
337
767
1252
1667
1721
1286
1721
1861
575
767
760
266
296
4678
5382

APPENDIX

E-5.3 PROPOSED 2031 ROAD NETWORK, AUTO TRAFFIC FORECASTS

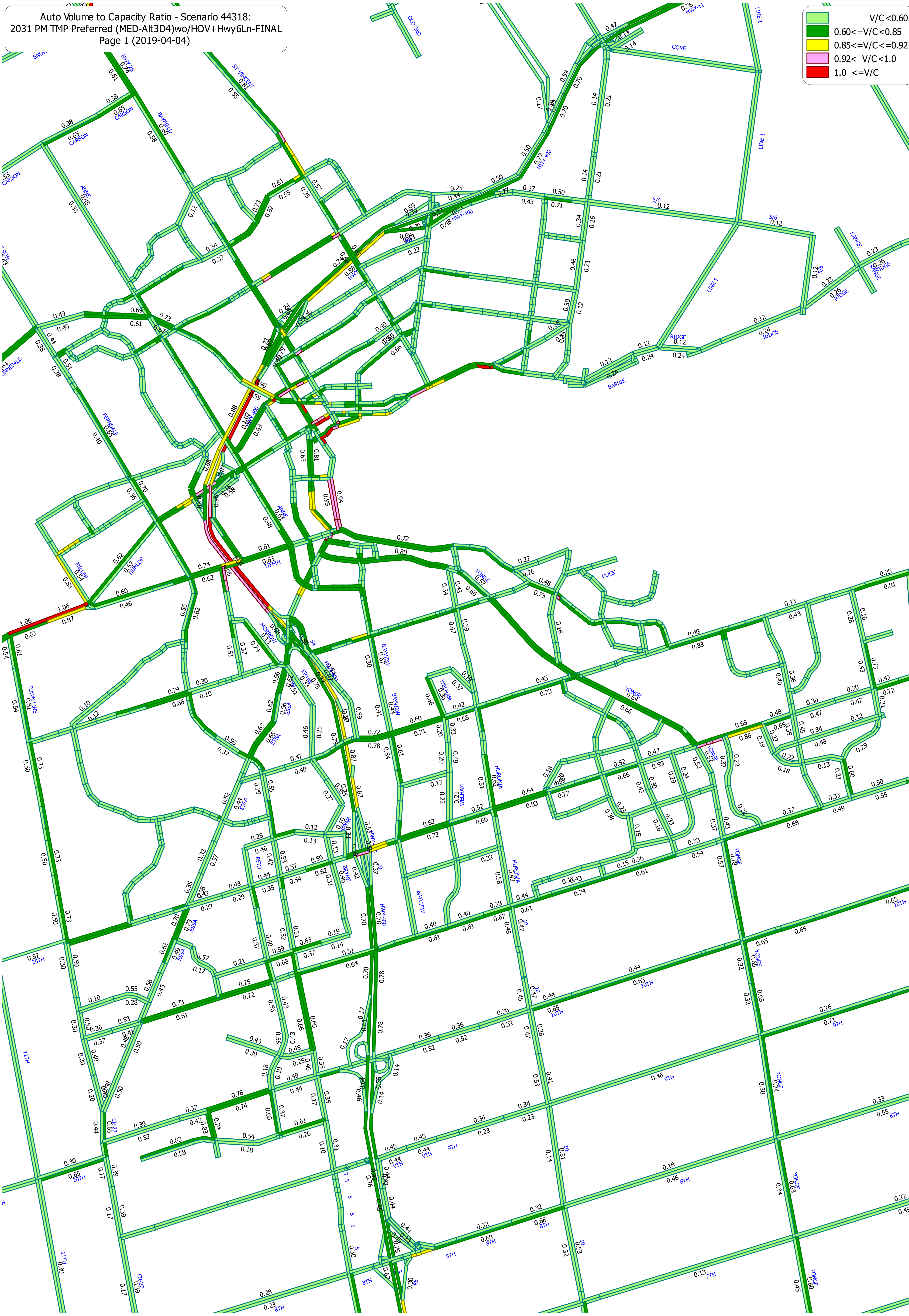
APPENDIX

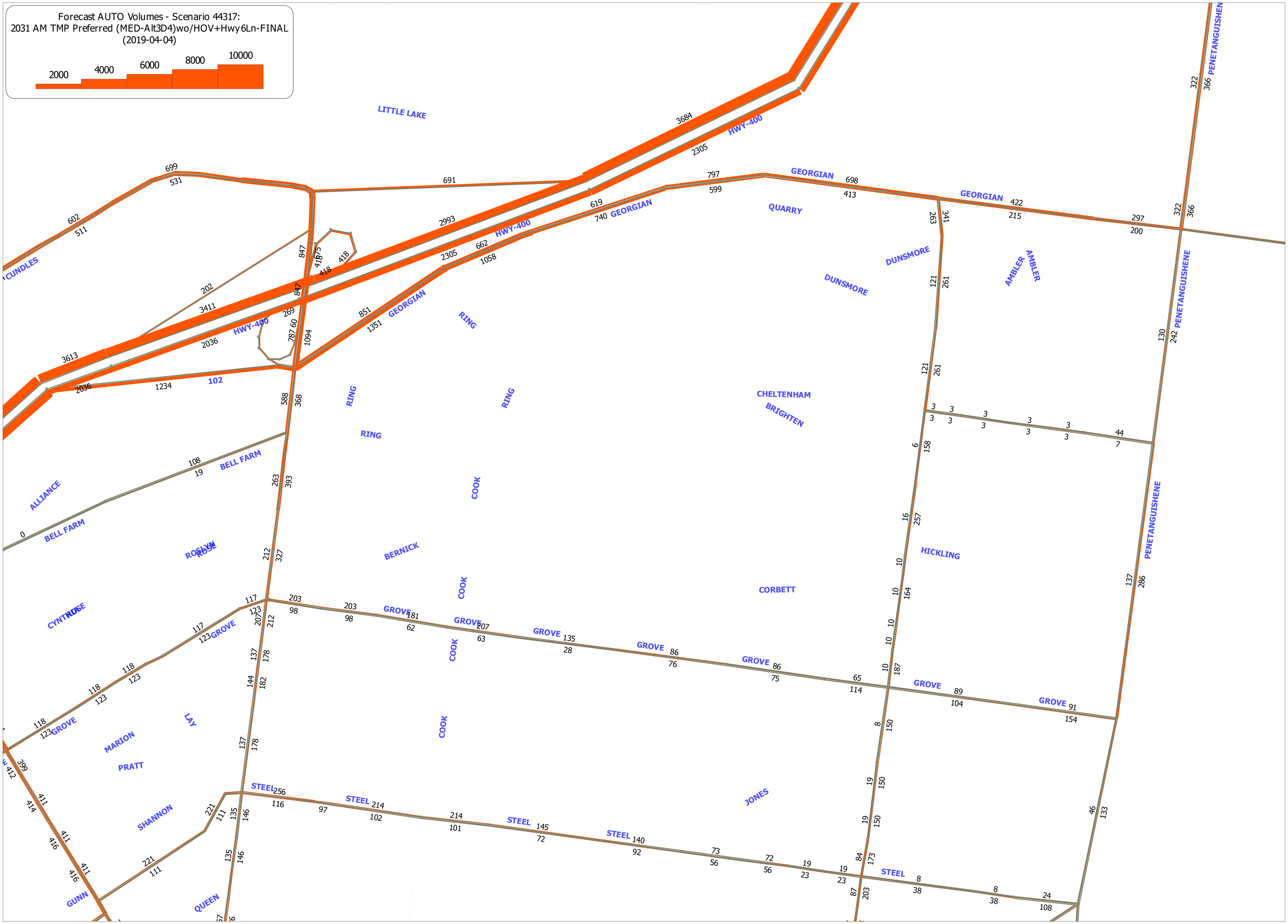

Number of Modelled Lanes - Scenario 44317:
2031 AM TMP Preferred (MED-Alt3D4)wo/HOV+Hwy6Ln-FINAL
Page 1 (2019-04-04)
1 lane per direction
2 lanes per direction
3 lanes per direction
4 lanes per direction
5 lanes per direction
OLD 2ND
LINE 1
GORE
HWY-26
ST VINCENT
BAYFIELD
CARSON
ANNE
HWY-400
5/6
102
RANGE
RIDGE
BARRIE
FERNDALE
MILLER
DUNLOP
TIFFIN
YONGE
MORROW
BRYNE
ESSA
BAYVIEW
WELHAM
HURONIA
TOWN LINE
REID
90
10
10TH
25TH
9TH
11TH
8TH
20TH
7TH
CR-27
85
5

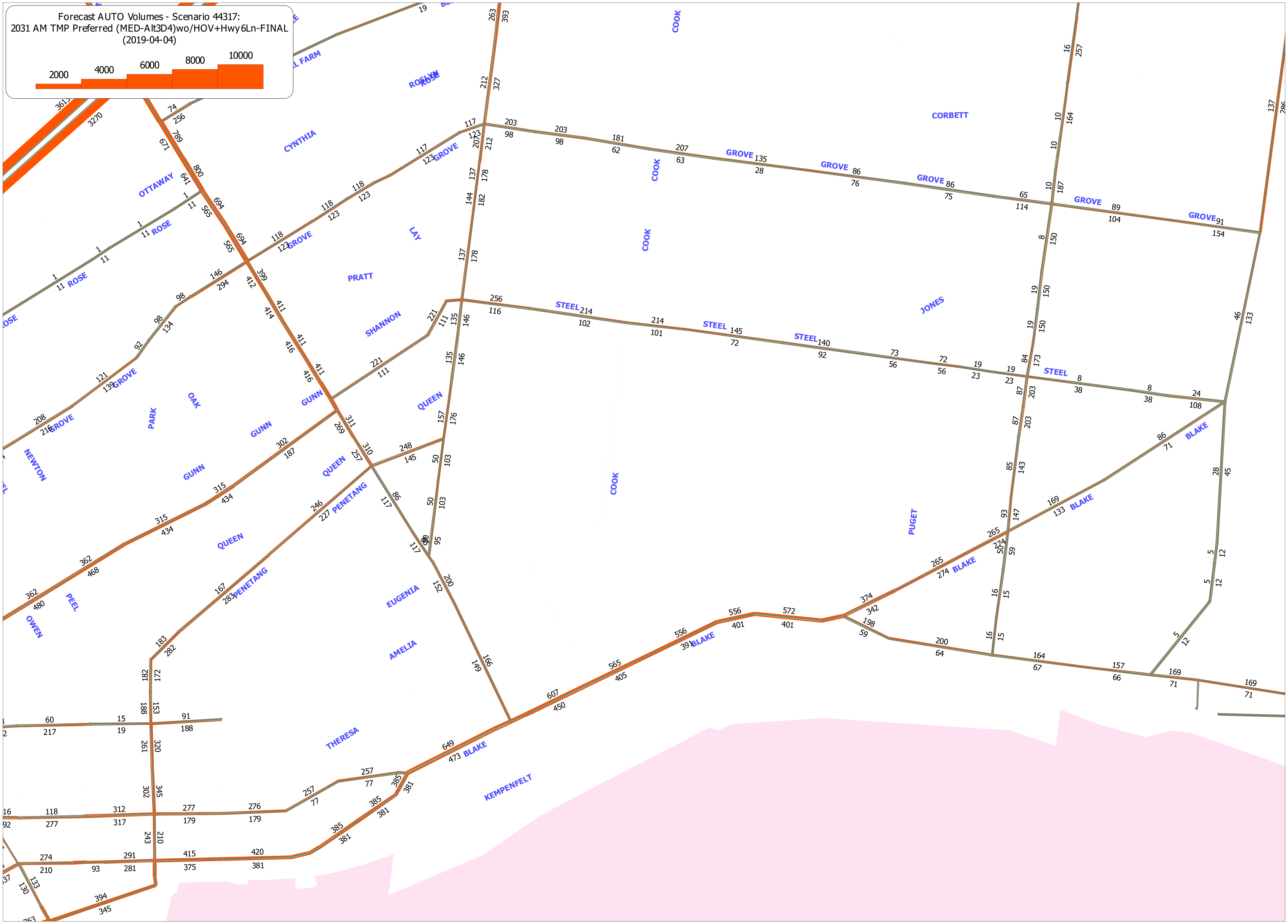

Lane Capacity -Scenario 44317:
2031 AM TMP Preferred (MED-Alt3D4)wo/HOV+Hwy6Ln-FINAL
Page 1 (2019-04-04)
400 v phl
400 v phl
500 v phl
550 v phl
650 v phl
750 v phl
850 v phl
1000 v phl
1400 v phl
1600 v phl
1800 v phl

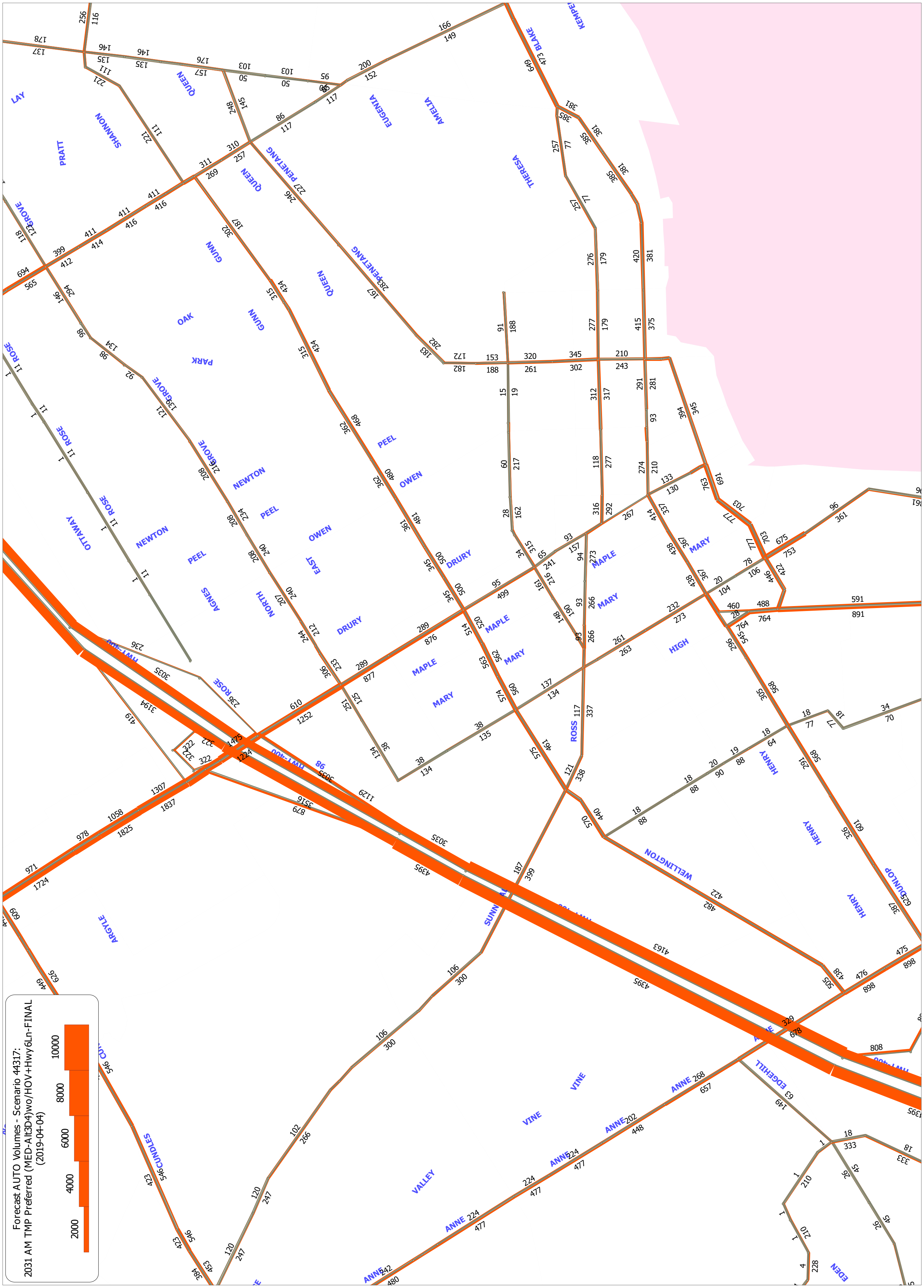
Auto Volume to Capacity Ratio - Scenario 44317:
2031 AM TMP Preferred (MED-Alt3D4)wo/HOV+Hwy6Ln-FINAL
Page 1 (2019-04-04)
V/C<0.60
0.60<=V/C<0.85
0.85<=V/C<=0.92
0.92< V/C<1.0
1.0 <=V/C
HWY-11
GORE
LINE 1
5/6
RANGE
RIDGE
BARRIE
DOCK
YONGE
HWY-400
HWY-26
ST VINCENT
BAYFIELD
CARSON
ANNIE
OLD 2ND
FERNDALE
DUNLOP
MILLER
TIFFIN
TOWN LINE
MORROW
BAYVIEW
WELHAM
HURONIA
ESSA
REID
BRYNE
10TH
9TH
8TH
7TH
11TH
20TH
25TH
CR-27

Auto Volume to Capacity Ratio - Scenario 44318:
2031 PM TMP Preferred (MED-Alt3D4)wo/HOV+Hwy6Ln-FINAL
Page 1 (2019-04-04)




Forecast AUTO Volumes - Scenario 44317:
2031 AM TMP Preferred (MED-Alt3D4)wo/HOV+Hwy6Ln-FINAL
(2019-04-04)
2000
4000
6000
8000
10000
LITTLE LAKE
HWY-400
GEORGIAN
QUARRY
DUNSMORE
AMBLER
PENETANGUISHENE
CUNDLES
RING
102
CHELTENHAM
BRIGHTEN
BELL FARM
ALLIANCE
COOK
BERNICK
HICKLING
CORBETT
GROVE
MARION
PRATT
LAY
SHANNON
STEEL
JONES
GUNN
QUEEN


Forecast AUTO Volumes - Scenario 44317:
2031 AM TMP Preferred (MED-Alt3D4)wo/HOV+Hwy6Ln-FINAL
(2019-04-04)
2000
4000
6000
8000
10000
CORBETT
GROVE
STEEL
BLAKE
JONES
PUGET
COOK
LAY
PRATT
SHANNON
QUEEN
GUNN
PENETANG
EUGENIA
AMELIA
THERESA
KEMPENFELT
CYNTHIA
OTTAWAY
ROSE
OAK
PARK
NEWTON
PEEL
OWEN


Forecast AUTO Volumes - Scenario 44317:
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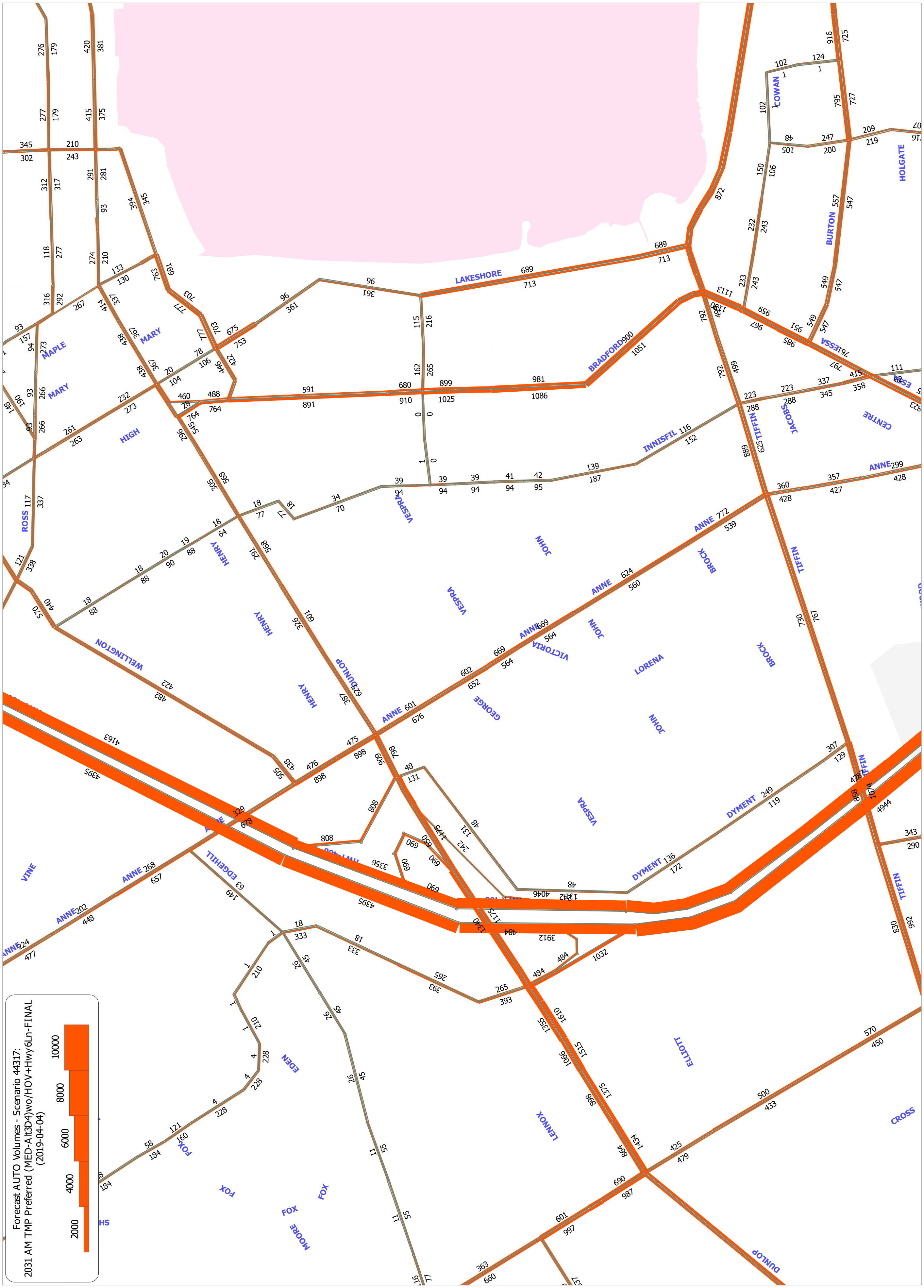
(2019-04-04)
10000
8000
6000
4000
2000


Forecast AUTO Volumes - Scenario 44317:
2031 AM TMP Preferred (MED-Alt3D4)wo/HOV+Hwy6Ln-FINAL
(2019-04-04)
10000
8000
6000
4000
2000
LAKESHORE
BRADFORD
INNISFIL
ANNE
TIFFIN
DUNLOP
WELLINGTON
DYMENT
VESPRA
JOHN
HENRY
BROCK
ELLIOTT
LENNOX
CROSS
ESSA
BURTON
COWAN
HOLGATE
JACOBS
CENTRE
MARY
MAPLE
HIGH
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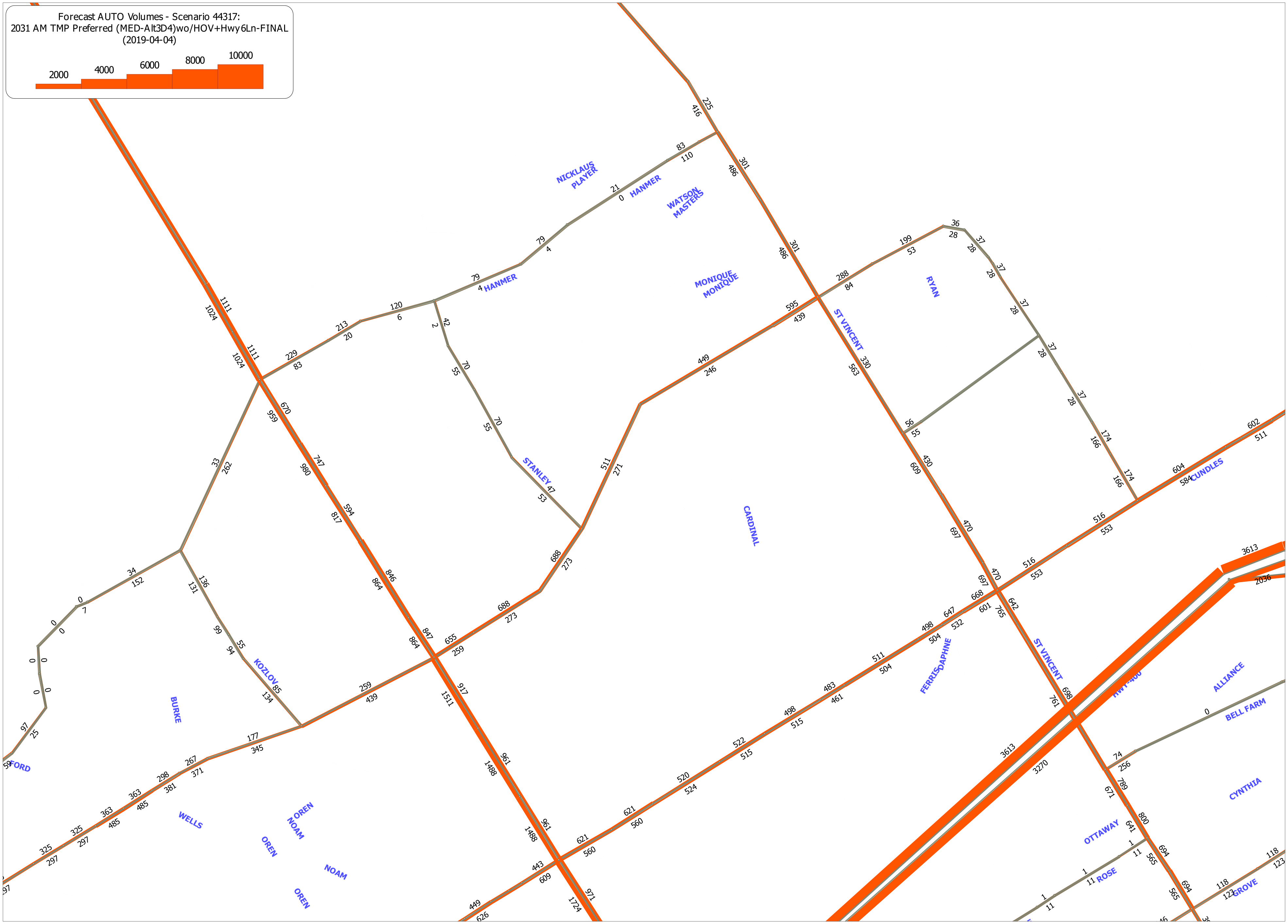
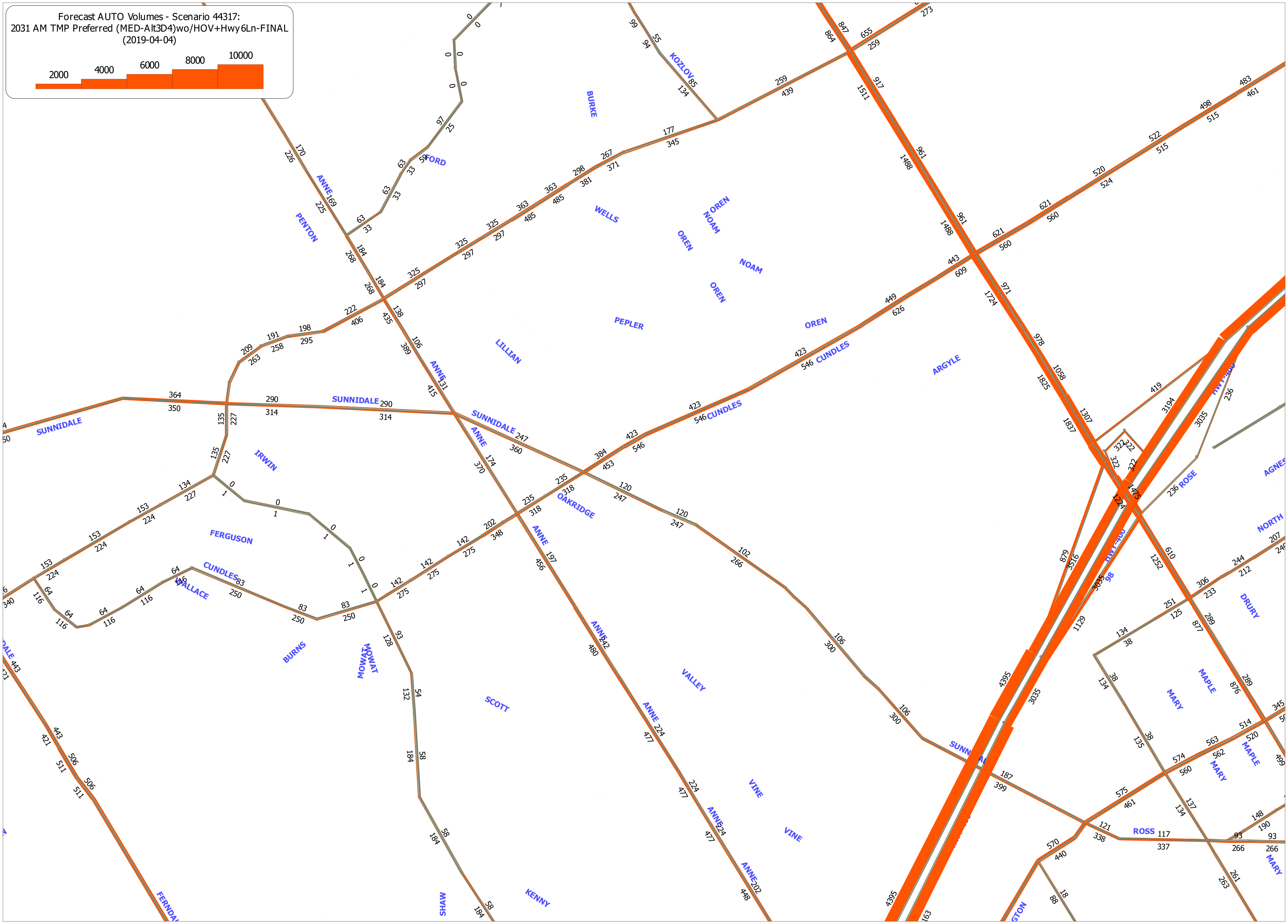
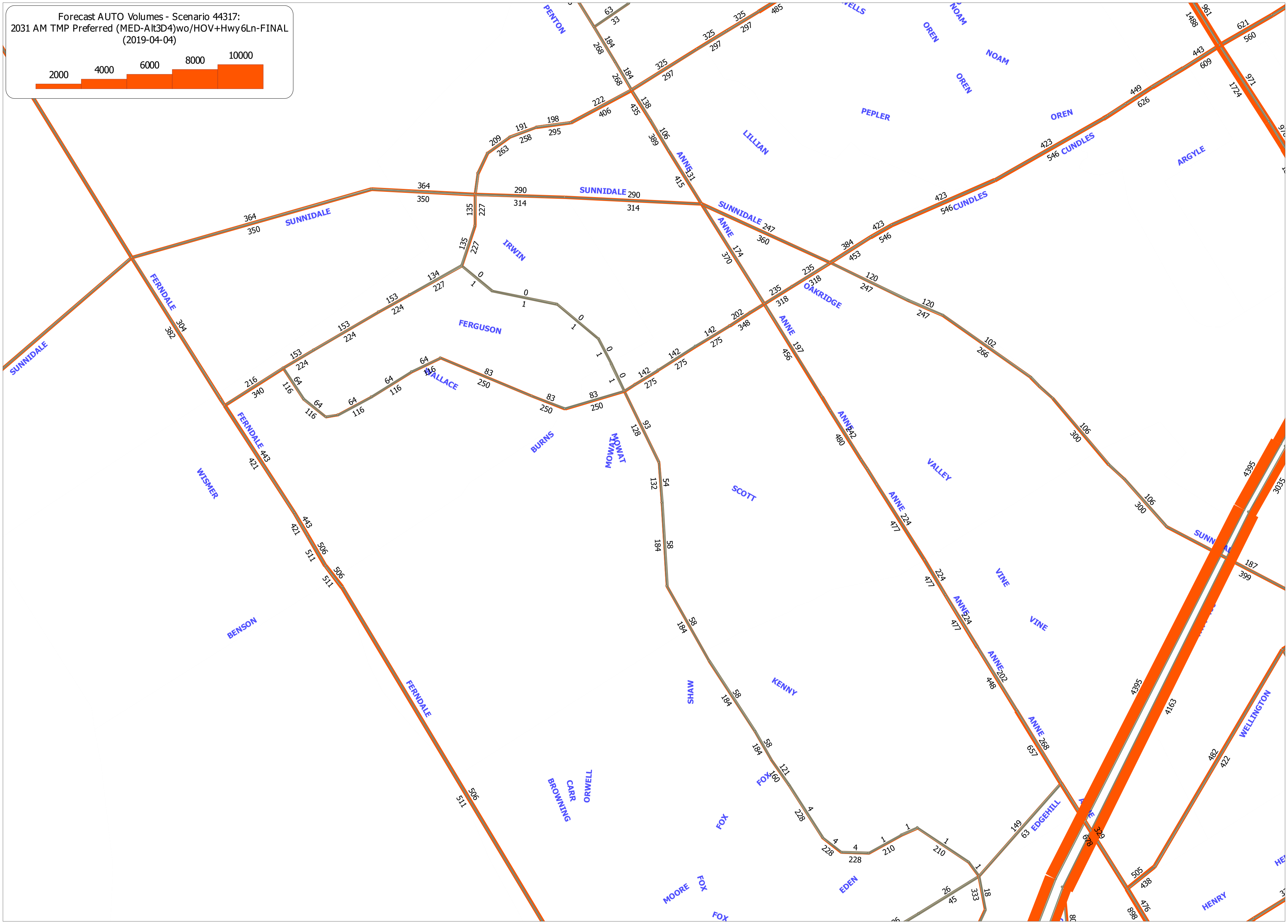
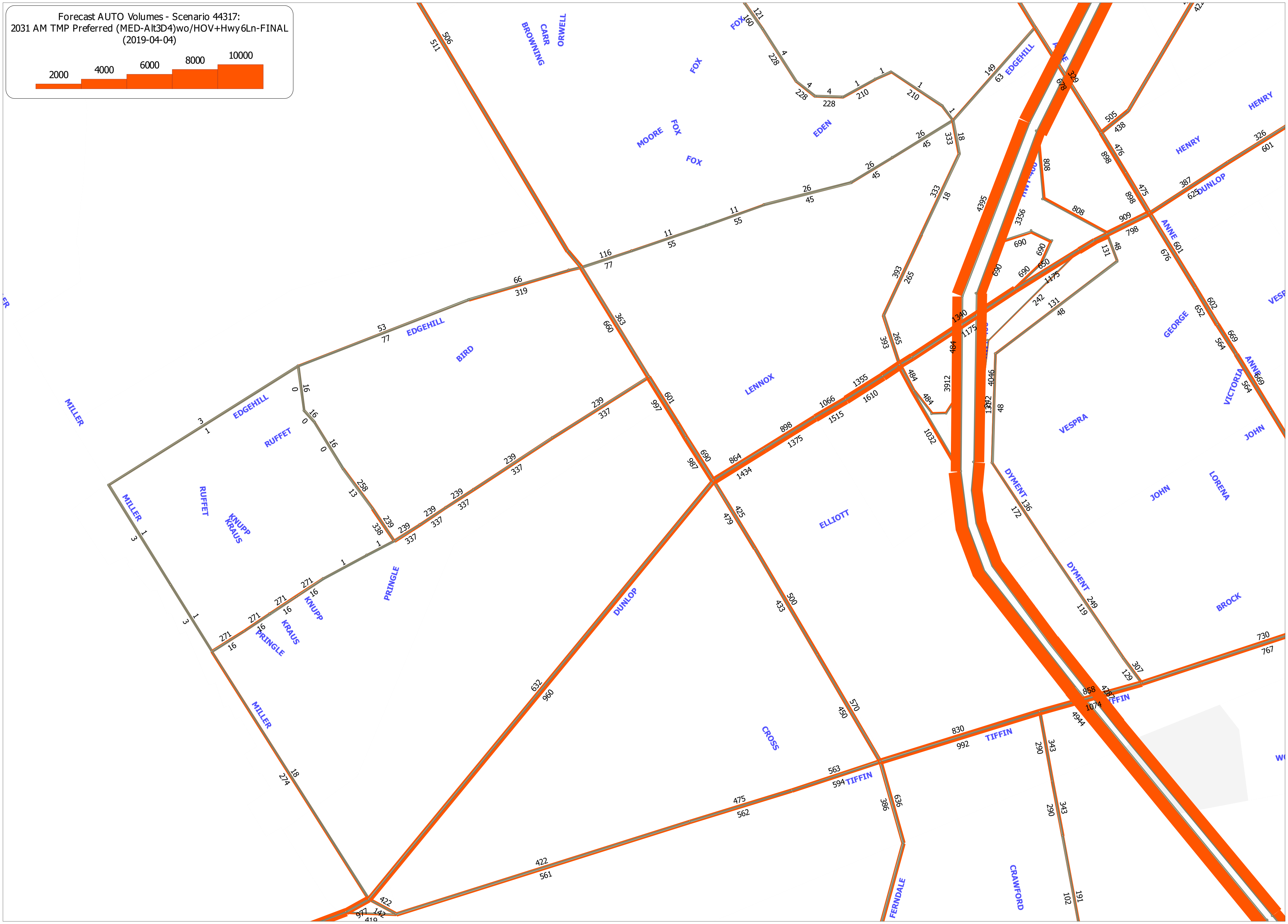
VINE
EDGEHILL
EDEN
FOX
MOORE
GEORGE
VICTORIA
LORENA

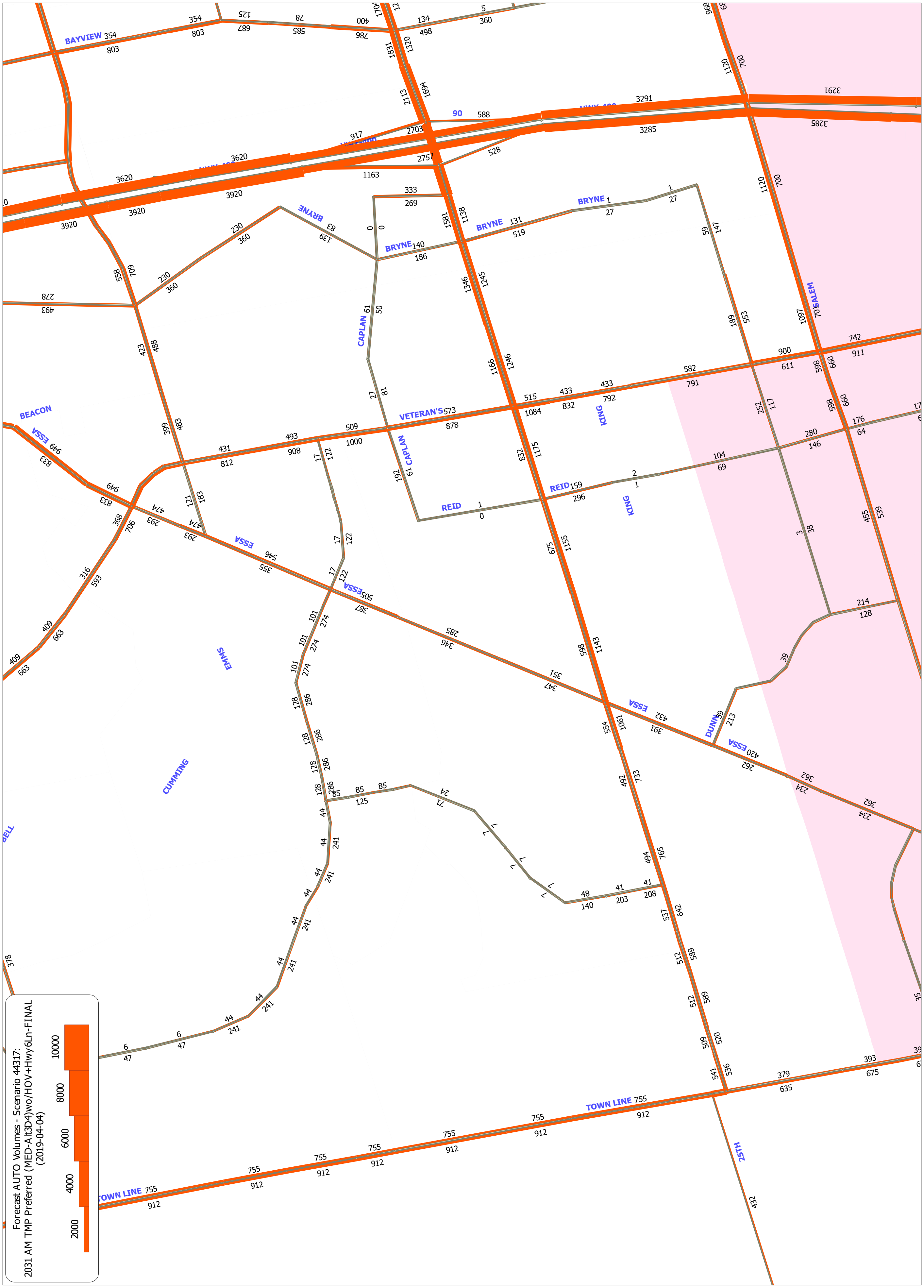

Forecast AUTO Volumes - Scenario 44317:
2031 AM TMP Preferred (MED-Alt3D4)wo/HOV+Hwy6Ln-FINAL
(2019-04-04)
2000
4000
6000
8000
10000
NICKLAUS
PLAYER
HANMER
WATSON
MASTERS
MONIQUE
MONIQUE
RYAN
ST VINCENT
CUNDLES
STANLEY
CARDINAL
KOZLOV
BURKE
FORD
WELLS
OREN
NOAM
FERRIS
DAPHNE
ALLIANCE
BELL FARM
CYNTHIA
OTTAWAY
ROSE
GROVE

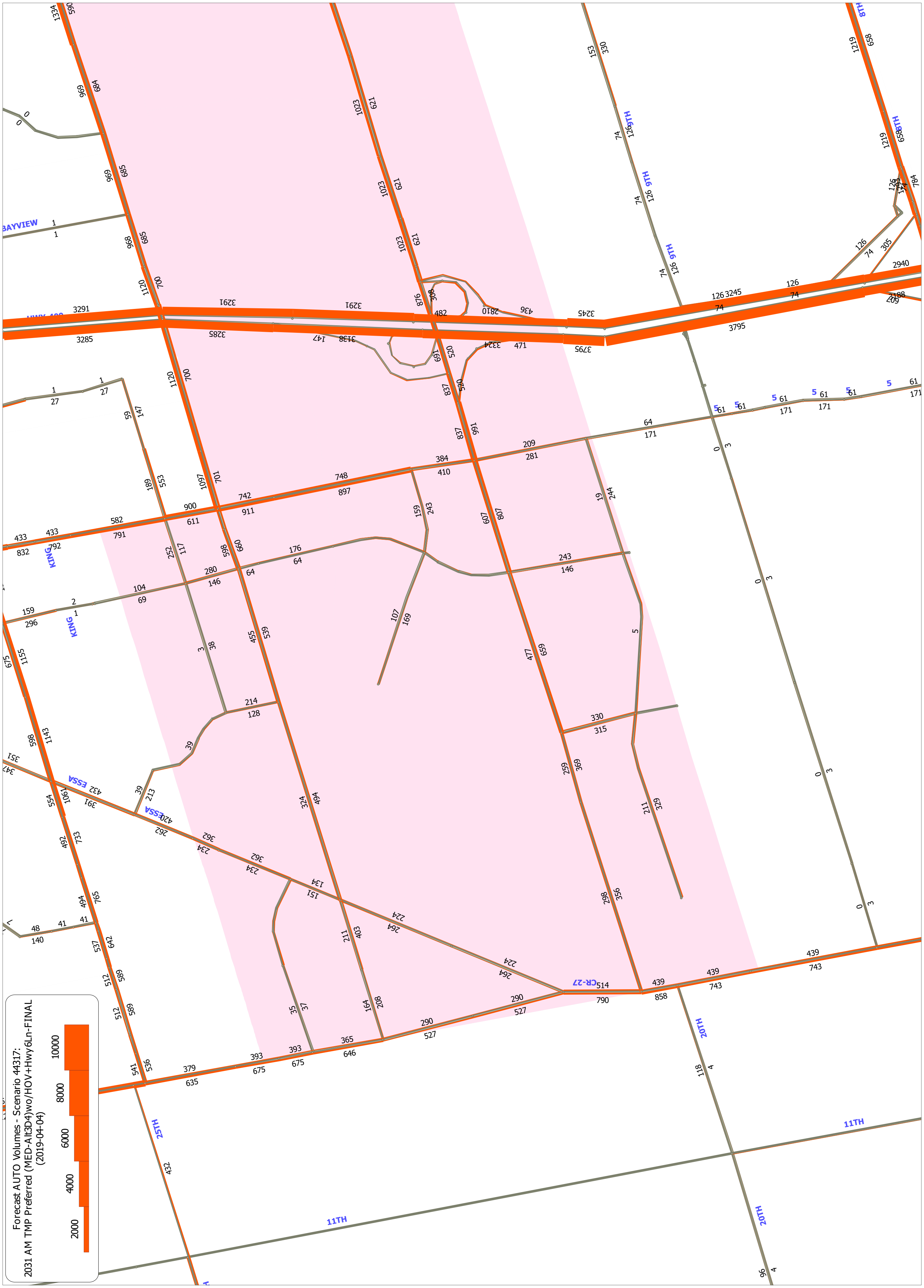

Forecast AUTO Volumes - Scenario 44317:
2031 AM TMP Preferred (MED-Alt3D4)wo/HOV+Hwy6Ln-FINAL
(2019-04-04)
2000
4000
6000
8000
10000
SUNNIDALE
ANNE
CUNDLES
BURKE
KOZLOV
FORD
PENTON
WELLS
OREN
NOAM
PEPLER
LILLIAN
ARGYLE
IRWIN
FERGUSON
WALLACE
OAKRIDGE
BURNS
MOWAT
SCOTT
VALLEY
VINE
KENNY
SHAW
ROSE
AGNES
NORTH
DRURY
MAPLE
MARY
ROSS


Forecast AUTO Volumes - Scenario 44317:
2031 AM TMP Preferred (MED-Alt3D4)wo/HOV+Hwy6Ln-FINAL
(2019-04-04)
2000
4000
6000
8000
10000
SUNNIDALE
FERNDALE
ANNE
CUNDLES
OAKRIDGE
IRWIN
FERGUSON
WALLACE
BURNS
MOWAT
SCOTT
VALLEY
VINE
KENNY
SHAW
FOX
EDEN
MOORE
ORWELL
CARR
BROWNING
EDGEHILL
WELLINGTON
HENRY
BENSON
WISMER
LILLIAN
PEPLER
OREN
NOAM
ARGYLE
PENTON


Forecast AUTO Volumes - Scenario 44317:
2031 AM TMP Preferred (MED-Alt3D4)wo/HOV+Hwy6Ln-FINAL
(2019-04-04)
2000
4000
6000
8000
10000
MILLER
EDGEHILL
RUFFET
KNUPP
KRAUS
PRINGLE
BIRD
DUNLOP
CROSS
TIFFIN
FERNDALE
CRAWFORD
ELLIOTT
LENNOX
MOORE
FOX
EDEN
BROWNING
CARR
ORWELL
DYMENT
VESPRA
JOHN
LORENA
BROCK
GEORGE
ANNE
VICTORIA
HENRY

Forecast AUTO Volumes - Scenario 44317:
2031 AM TMP Preferred (MED-Alt3D4)wo/HOV+Hwy6Ln-FINAL
(2019-04-04)
10000
8000
6000
4000
2000
BURTON
ESSA
ANNE
TIFFIN
WOOD
BROCK
DYMENT
MORROW
MOON
BRYNE
BEACON
HARVIE
ARDAGH
WILDWOOD
FERNDALE
JAMES
GORE
BELL
CUMMING
DUNLOP
PRINGLE
MILLER
PENVILL
TOWN LINE


Forecast AUTO Volumes - Scenario 44317:
2031 AM TMP Preferred (MED-Alt3D4)wo/HOV+Hwy6Ln-FINAL
(2019-04-04)
10000
8000
6000
4000
2000
BAYVIEW
BRYNE
CAPLAN
VETERAN'S
BEACON
ESSA
REID
KING
SALEM
DUNN
EMMS
CUMMING
TOWN LINE
25TH


Forecast AUTO Volumes - Scenario 44317:
2031 AM TMP Preferred (MED-Alt3D4)wo/HOV+Hwy6Ln-FINAL
(2019-04-04)
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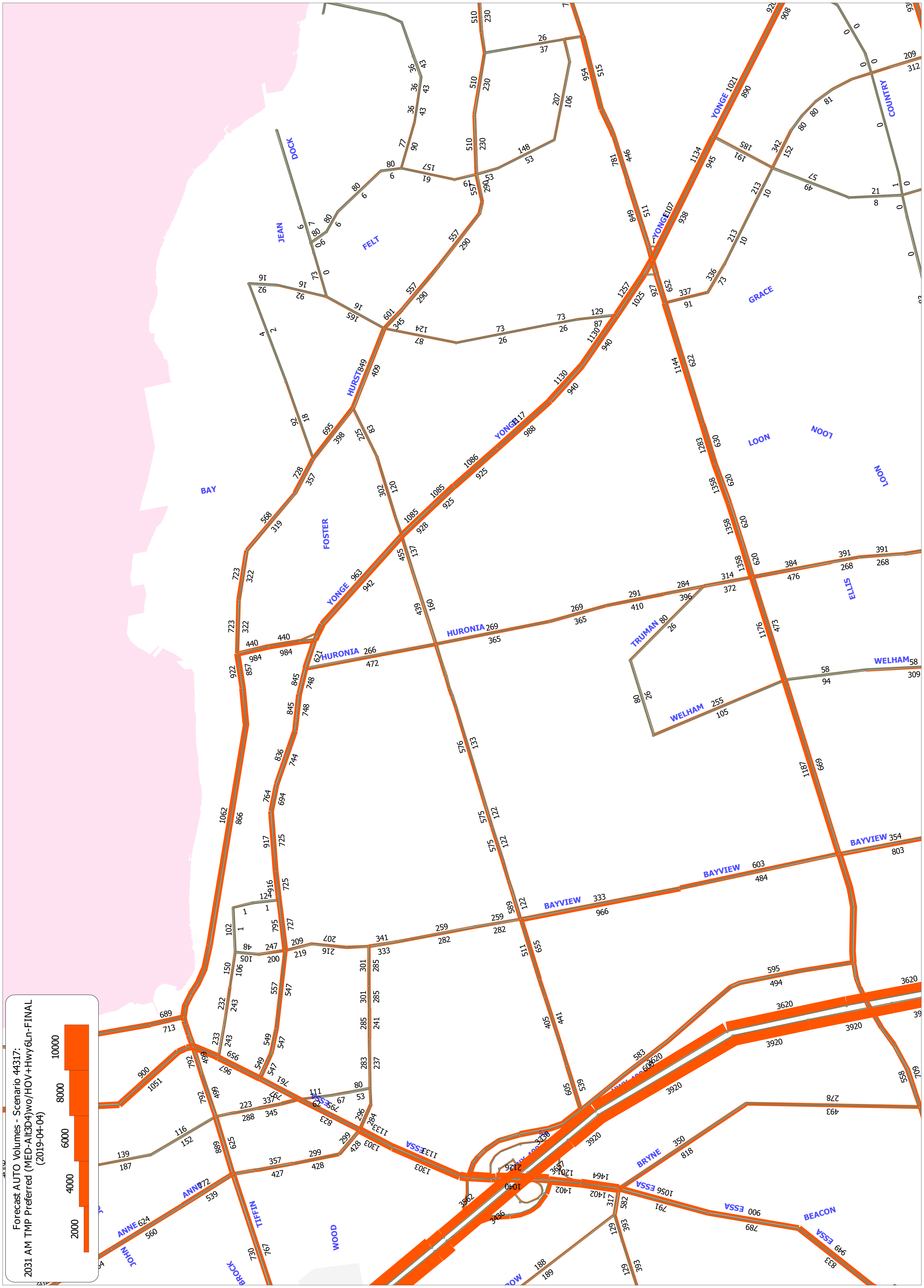
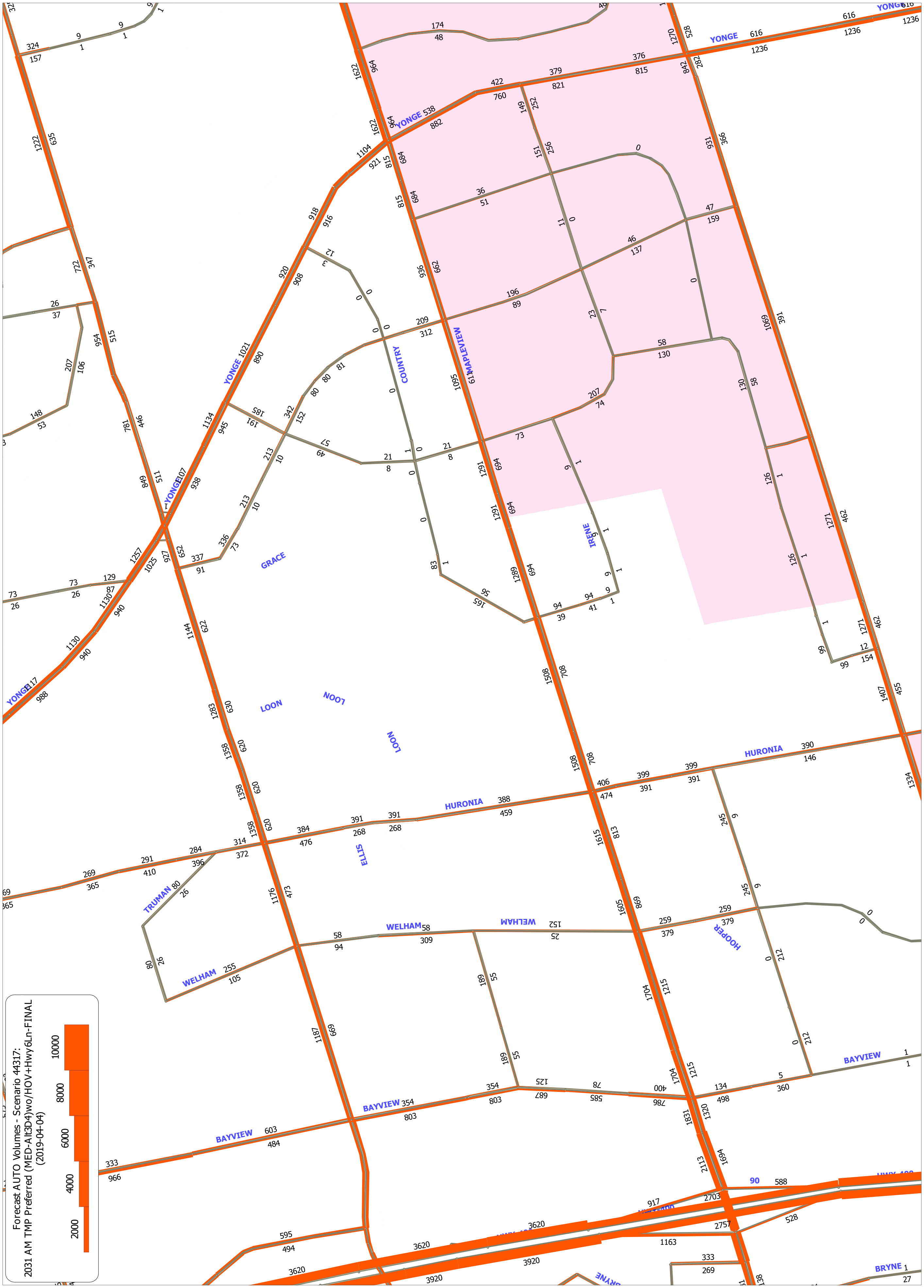
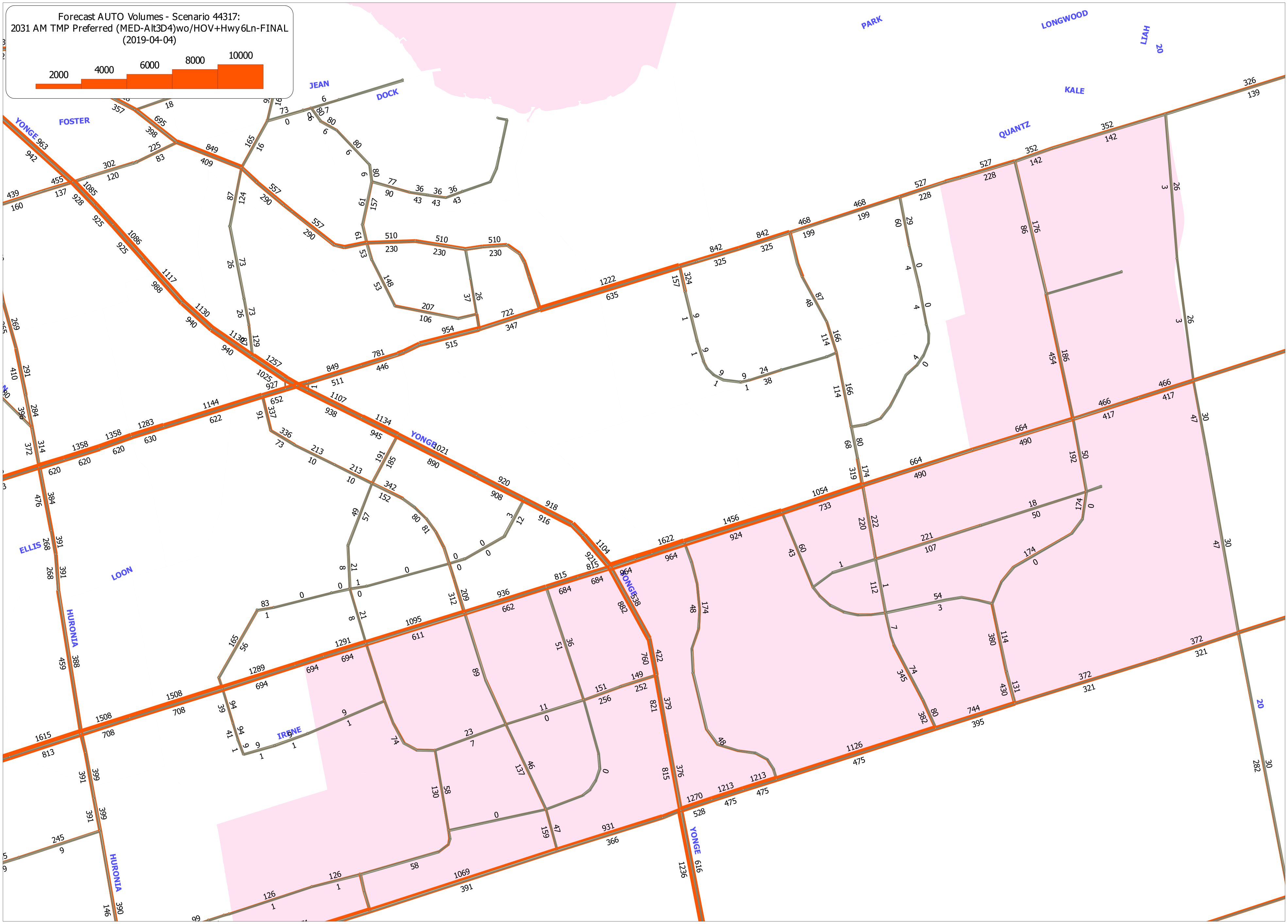
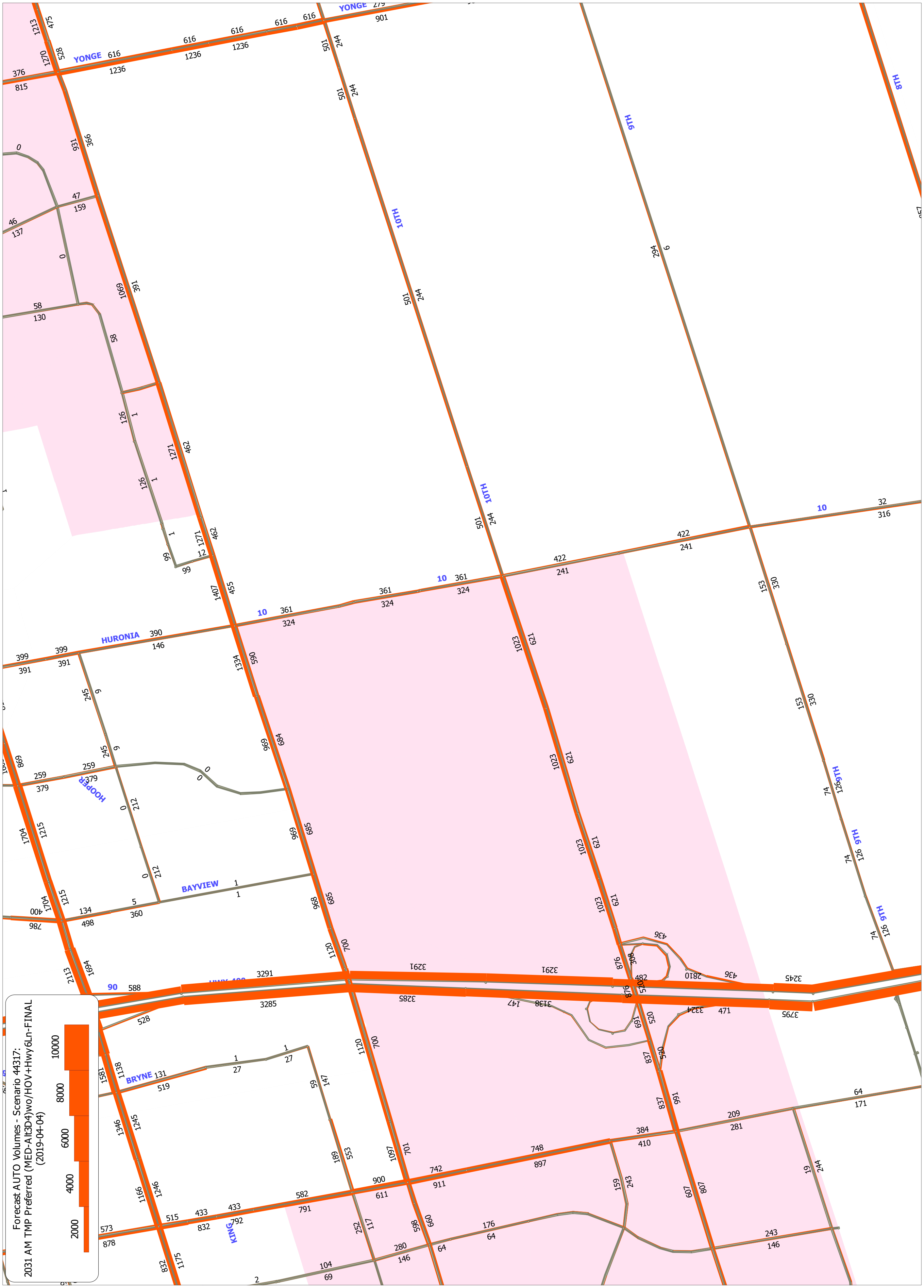
4000
6000
8000
10000
BAYVIEW
KING
ESSA
9TH
8TH
CR-27
20TH
25TH
11TH

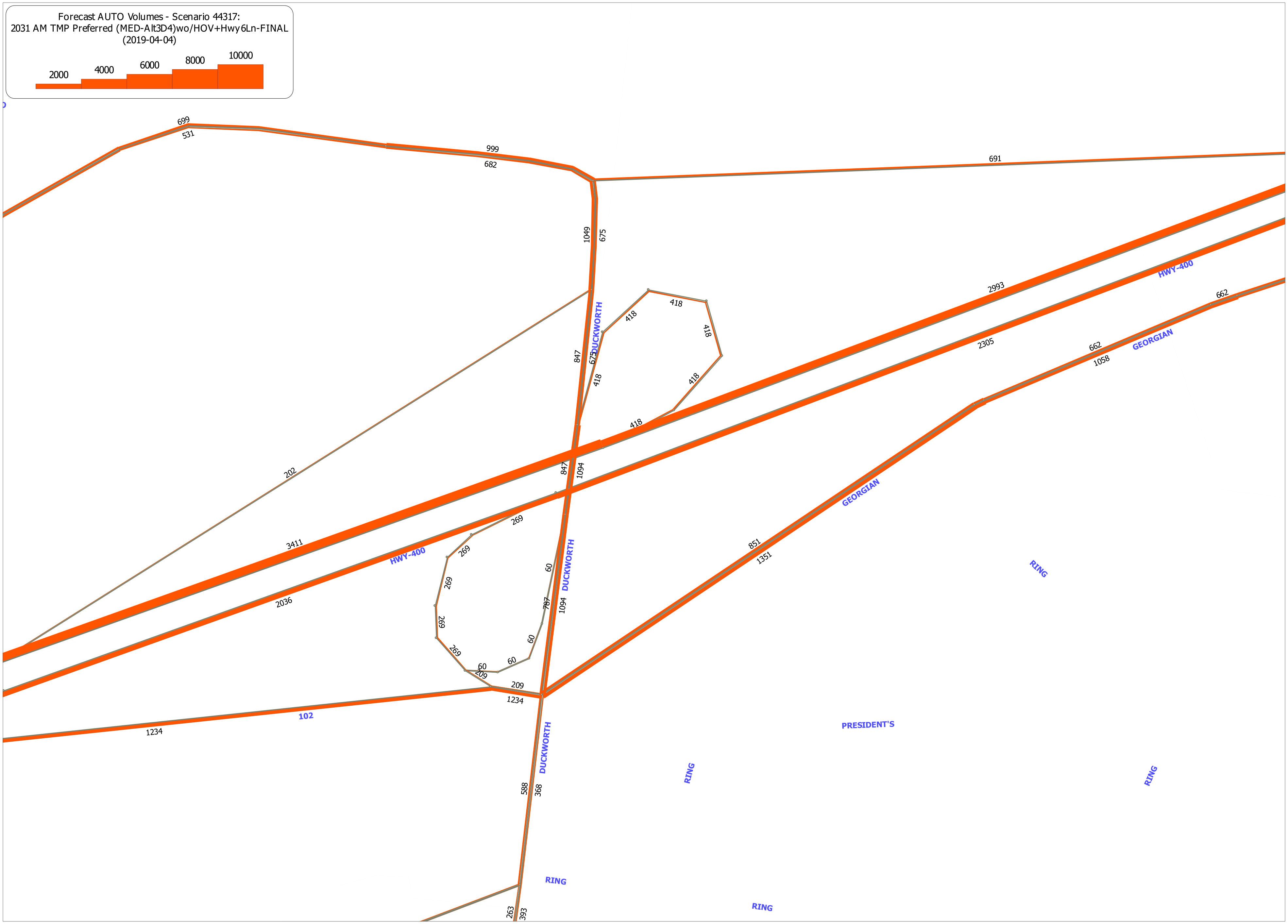


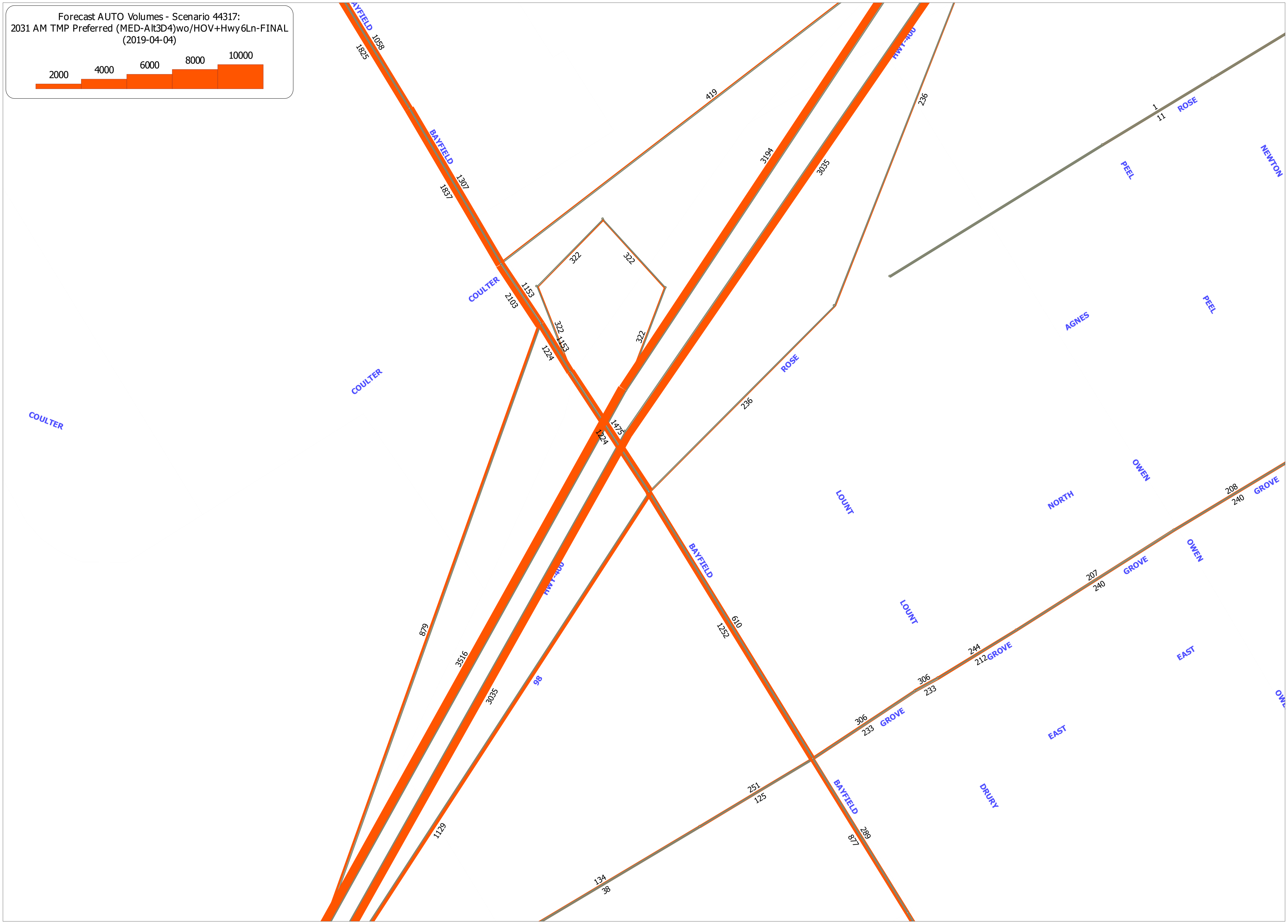
Forecast AUTO Volumes - Scenario 44317:
2031 AM TMP Preferred (MED-Alt3D4)wo/HOV+Hwy6Ln-FINAL
(2019-04-04)
10000
8000
6000
4000
2000
DOCK
JEAN
FELT
HURST
BAY
FOSTER
YONGE
HURONIA
TRUMAN
WELHAM
GRACE
LOON
ELLIS
COUNTRY
BAYVIEW
ESSA
BRYNE
BEACON
ANNE
JOHN
TIFFIN
WOOD
BROCK


Forecast AUTO Volumes - Scenario 44317:
2031 AM TMP Preferred (MED-Alt3D4)wo/HOV+Hwy6Ln-FINAL
(2019-04-04)
10000
8000
6000
4000
2000
YONGE
MAPLEVIEW
COUNTRY
GRACE
IRENE
LOON
HURONIA
ELLIS
TRUMAN
WELHAM
HOOPER
BAYVIEW
BRYNE

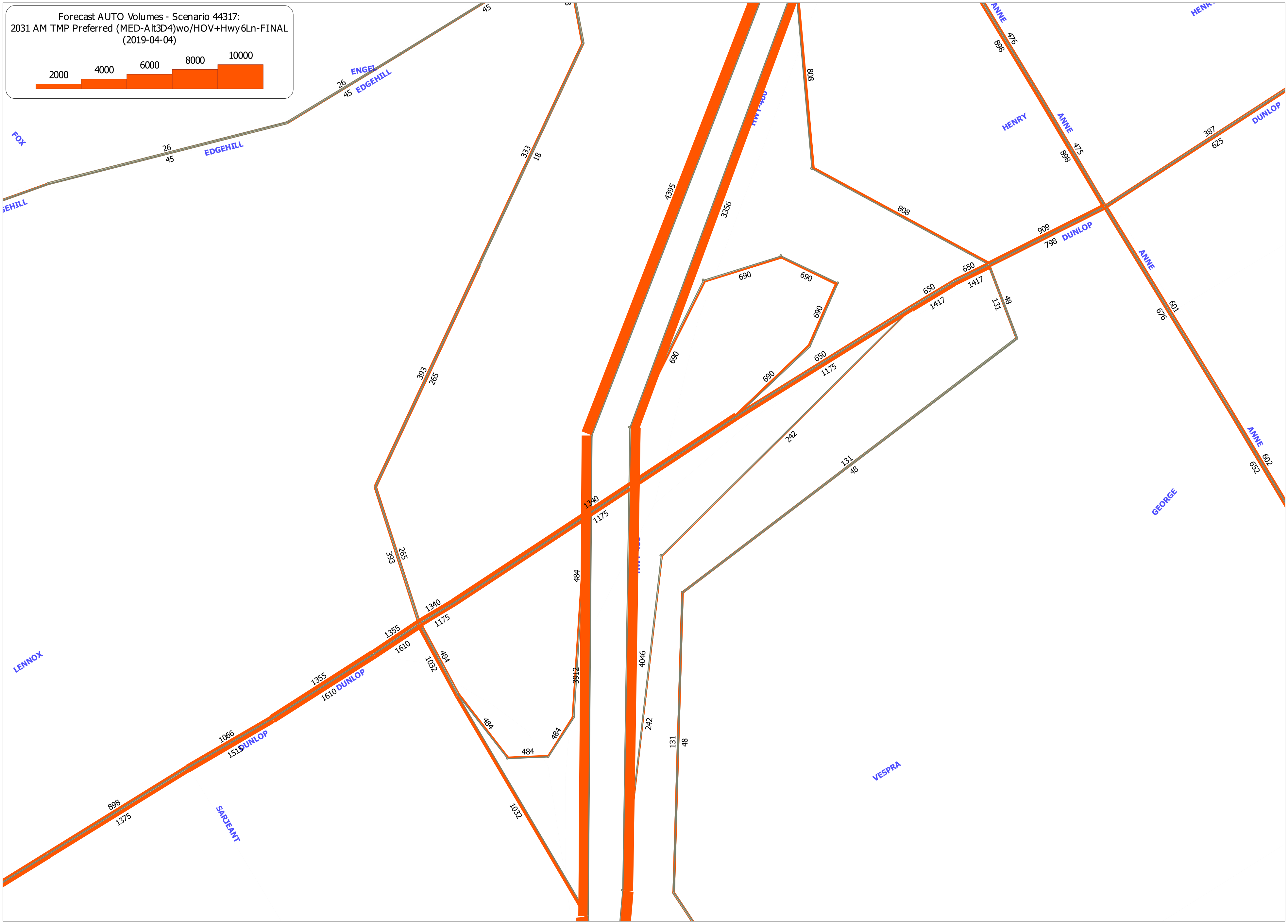

Forecast AUTO Volumes - Scenario 44317:
2031 AM TMP Preferred (MED-Alt3D4)wo/HOV+Hwy6Ln-FINAL
(2019-04-04)
2000
4000
6000
8000
10000
YONGE
FOSTER
JEAN
DOCK
PARK
LONGWOOD
LIAH
20
KALE
QUANTZ
ELLIS
LOON
HURONIA
IRENE

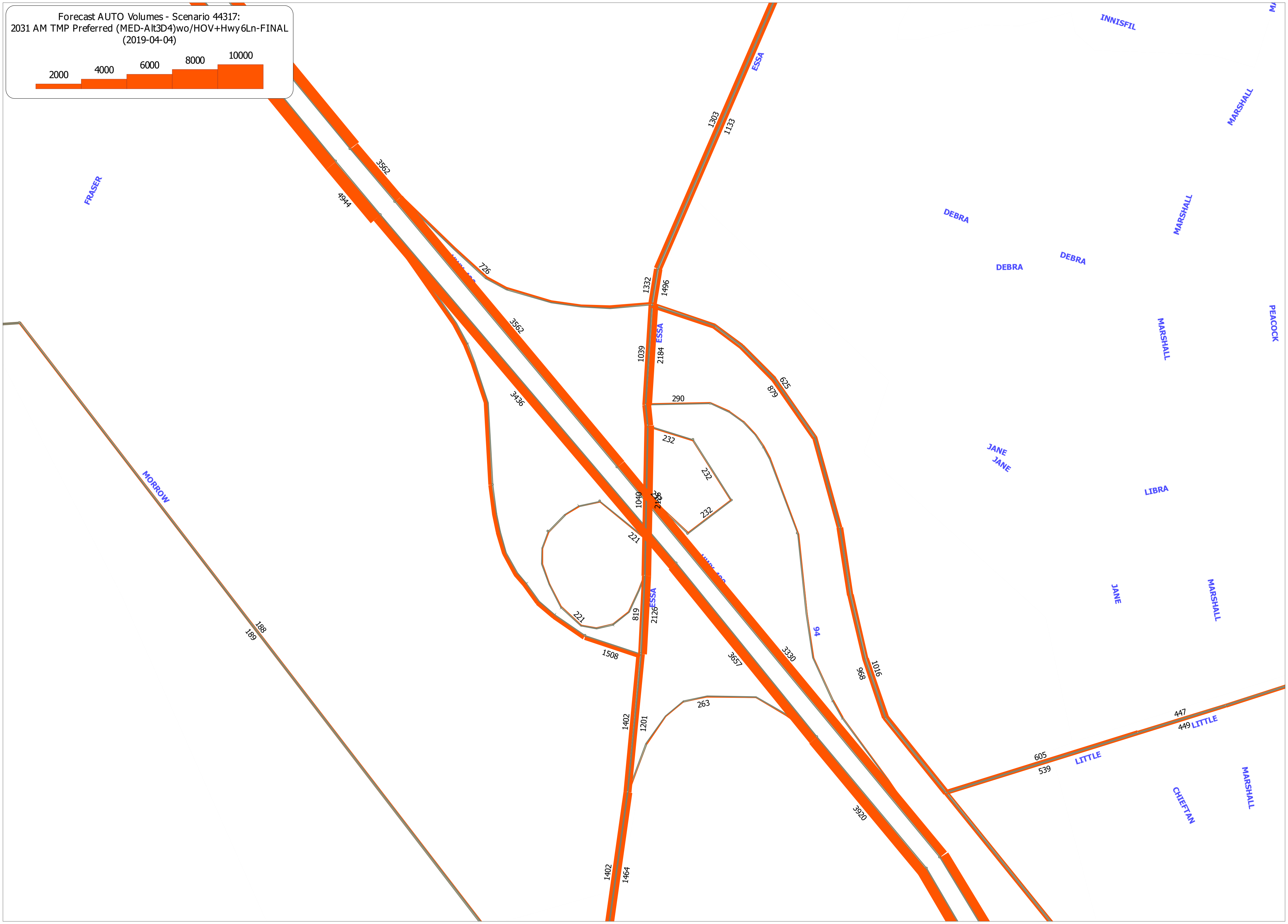

Forecast AUTO Volumes - Scenario 44317:
2031 AM TMP Preferred (MED-Alt3D4)wo/HOV+Hwy6Ln-FINAL
(2019-04-04)
2000
4000
6000
8000
10000
YONGE
10TH
9TH
8TH
10
HURONIA
HOOPER
BAYVIEW
90
BRYNE
KING


Forecast AUTO Volumes - Scenario 44317:
2031 AM TMP Preferred (MED-Alt3D4)wo/HOV+Hwy6Ln-FINAL
(2019-04-04)
2000
4000
6000
8000
10000
HWY-400
GEORGIAN
DUCKWORTH
PRESIDENT'S
RING
102
699
531
999
682
691
1049
675
2993
2305
662
1058
418
847
1094
202
3411
2036
269
60
787
209
1234
851
1351
588
368
263
393



Forecast AUTO Volumes - Scenario 44317:
2031 AM TMP Preferred (MED-Alt3D4)wo/HOV+Hwy6Ln-FINAL
(2019-04-04)
2000
4000
6000
8000
10000
BAYFIELD
COULTER
HWY-400
ROSE
PEEL
NEWTON
AGNES
OWEN
NORTH
LOUNT
GROVE
EAST
DRURY
98
1058
1825
1307
1837
419
3194
3035
236
1
11
322
1153
2103
1224
1475
879
3516
1129
610
1252
208
240
207
244
212
306
233
251
125
289
877
134
38


Forecast AUTO Volumes - Scenario 44317:
2031 AM TMP Preferred (MED-Alt3D4)wo/HOV+Hwy6Ln-FINAL
(2019-04-04)
2000
4000
6000
8000
10000
FOX
ENGEL
EDGEHILL
HENRY
ANNE
DUNLOP
GEORGE
VESPRA
LENNOX
SARJEANT



Forecast AUTO Volumes - Scenario 44317:
2031 AM TMP Preferred (MED-Alt3D4)wo/HOV+Hwy6Ln-FINAL
(2019-04-04)
2000
4000
6000
8000
10000
ESSA
1303
1133
1332
1496
1039
2184
290
625
879
232
232
232
1040
221
221
819
2126
1508
1402
1201
263
1402
1464
3562
4944
726
3562
3436
3330
3657
3920
968
1016
94
605
539
447
449
LITTLE
LITTLE
CHIEFTAN
MARSHALL
MARSHALL
MARSHALL
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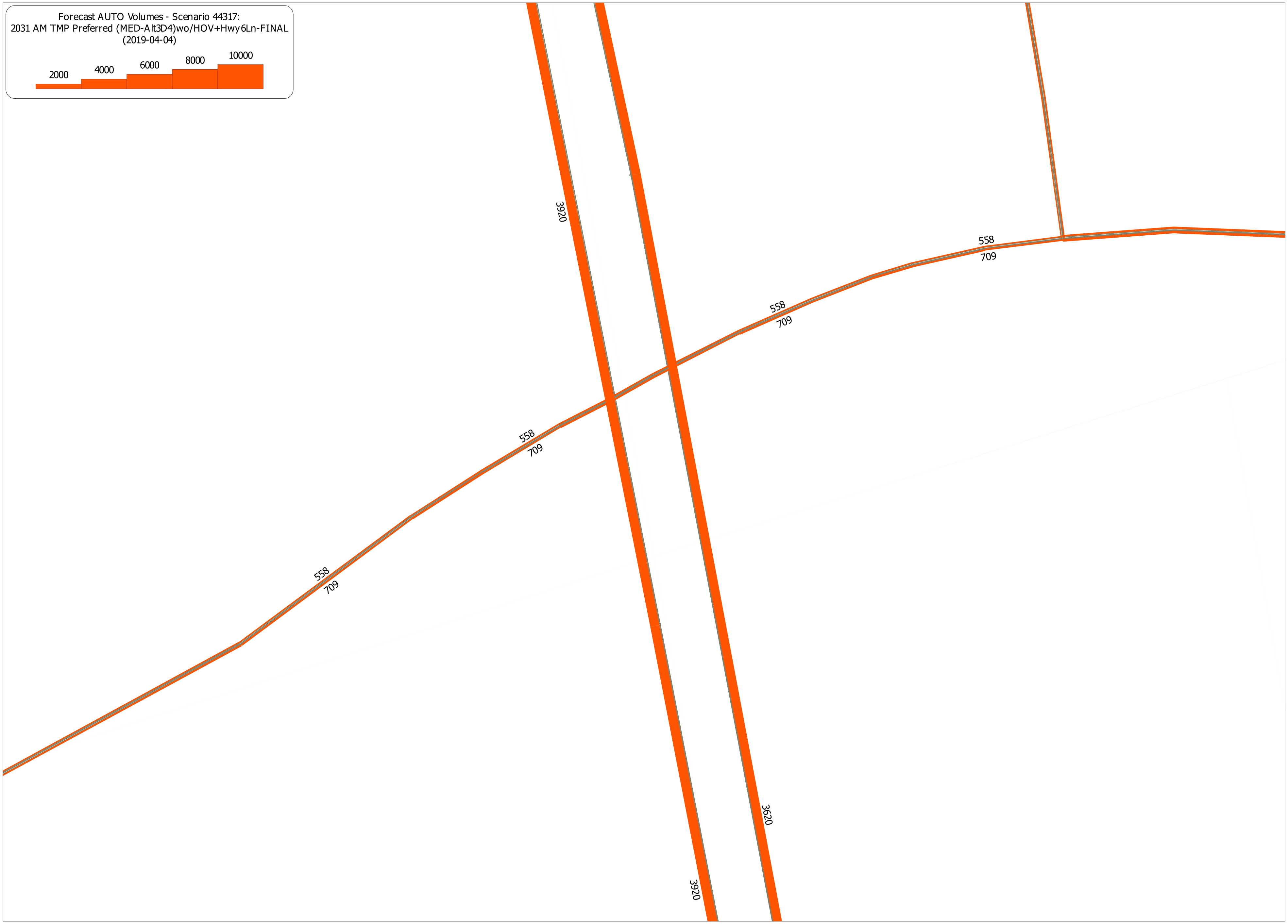
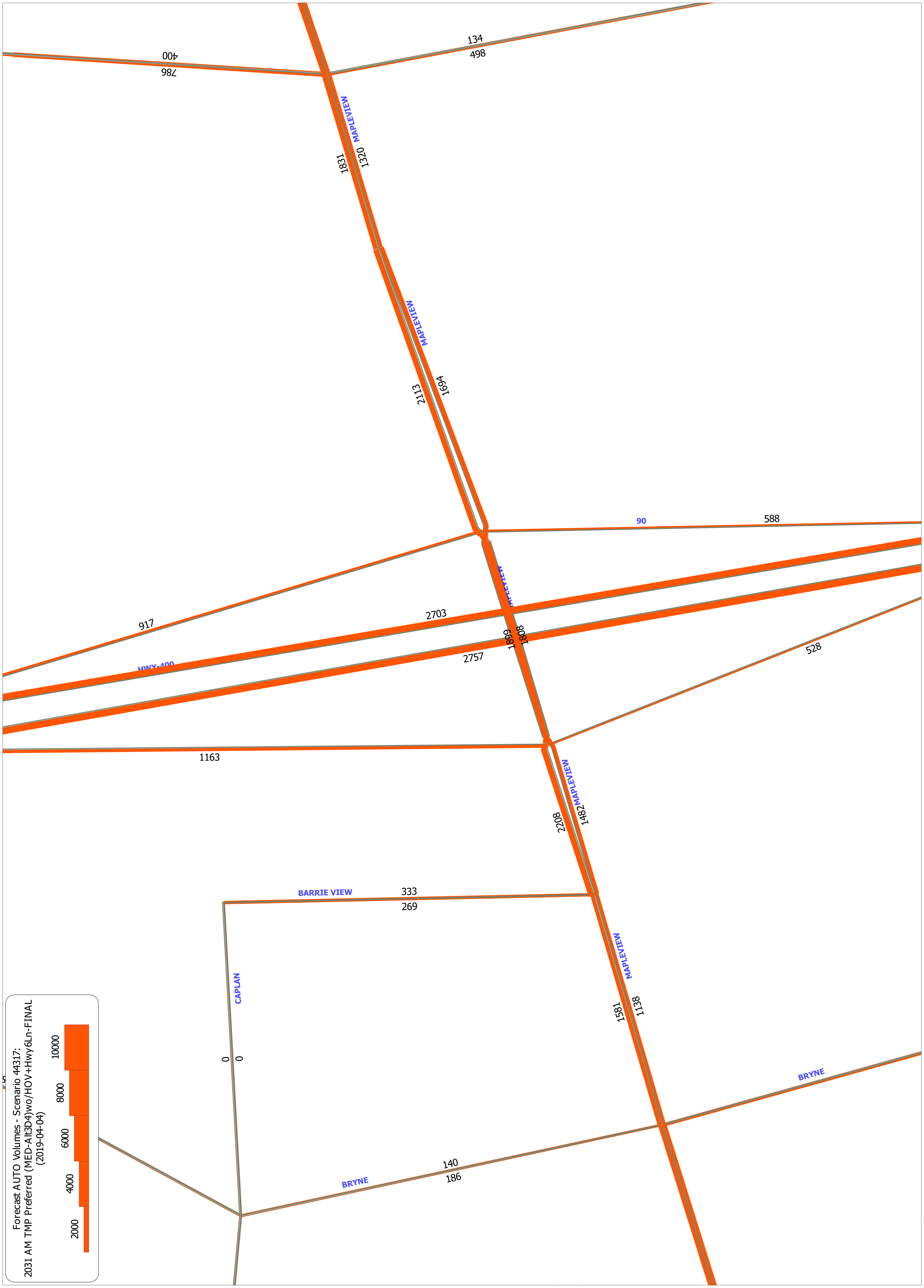
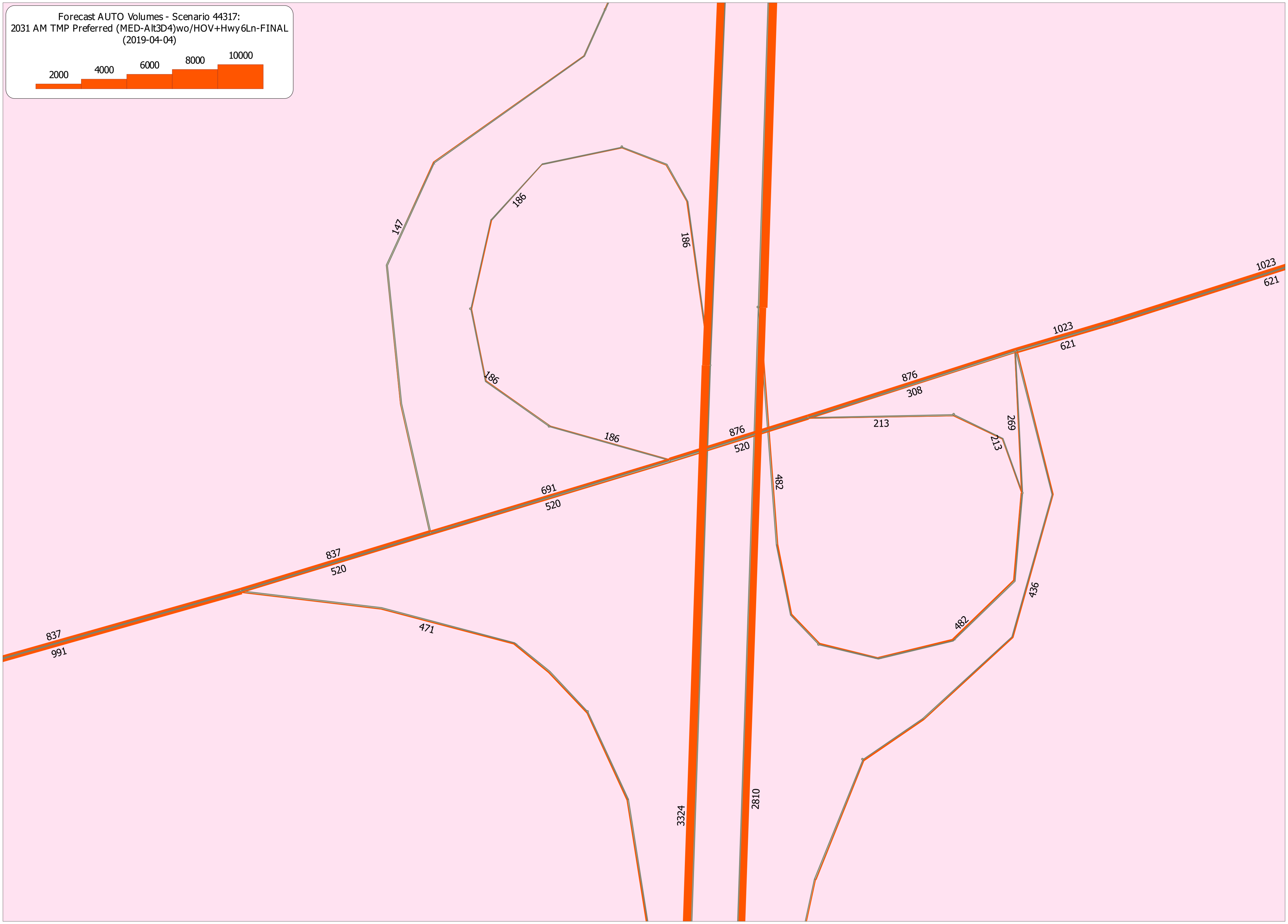
FRASER
MORROW
188
189



Forecast AUTO Volumes - Scenario 44317:
2031 AM TMP Preferred (MED-Alt3D4)wo/HOV+Hwy6Ln-FINAL
(2019-04-04)
2000
4000
6000
8000
10000
3920
3920
3620
558
709
558
709
558
709
558
709


Forecast AUTO Volumes - Scenario 44317:
2031 AM TMP Preferred (MED-Alt3D4)wo/HOV+Hwy6Ln-FINAL
(2019-04-04)
10000
8000
6000
4000
2000
MAPLEVIEW
1831
1320
2113
1694
1899
1808
2208
1482
1581
1138
134
498
400
786
90
588
917
2703
HWY 400
2757
528
1163
BARRIE VIEW
333
269
CAPLAN
0
0
BRYNE
140
186


Forecast AUTO Volumes - Scenario 44317:
2031 AM TMP Preferred (MED-Alt3D4)wo/HOV+Hwy6Ln-FINAL
(2019-04-04)
2000
4000
6000
8000
10000
147
186
186
186
186
1023
621
1023
621
876
308
876
520
213
269
213
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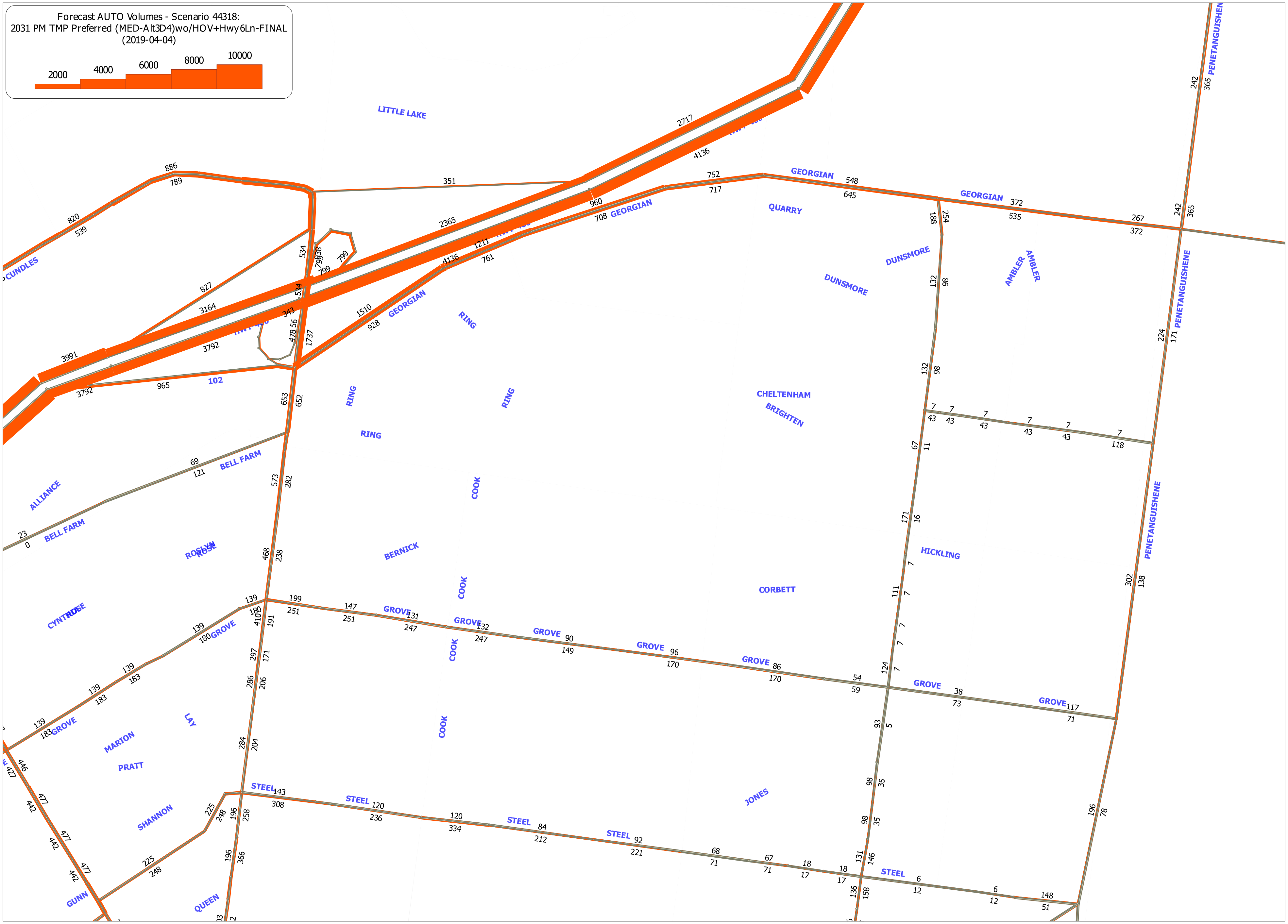
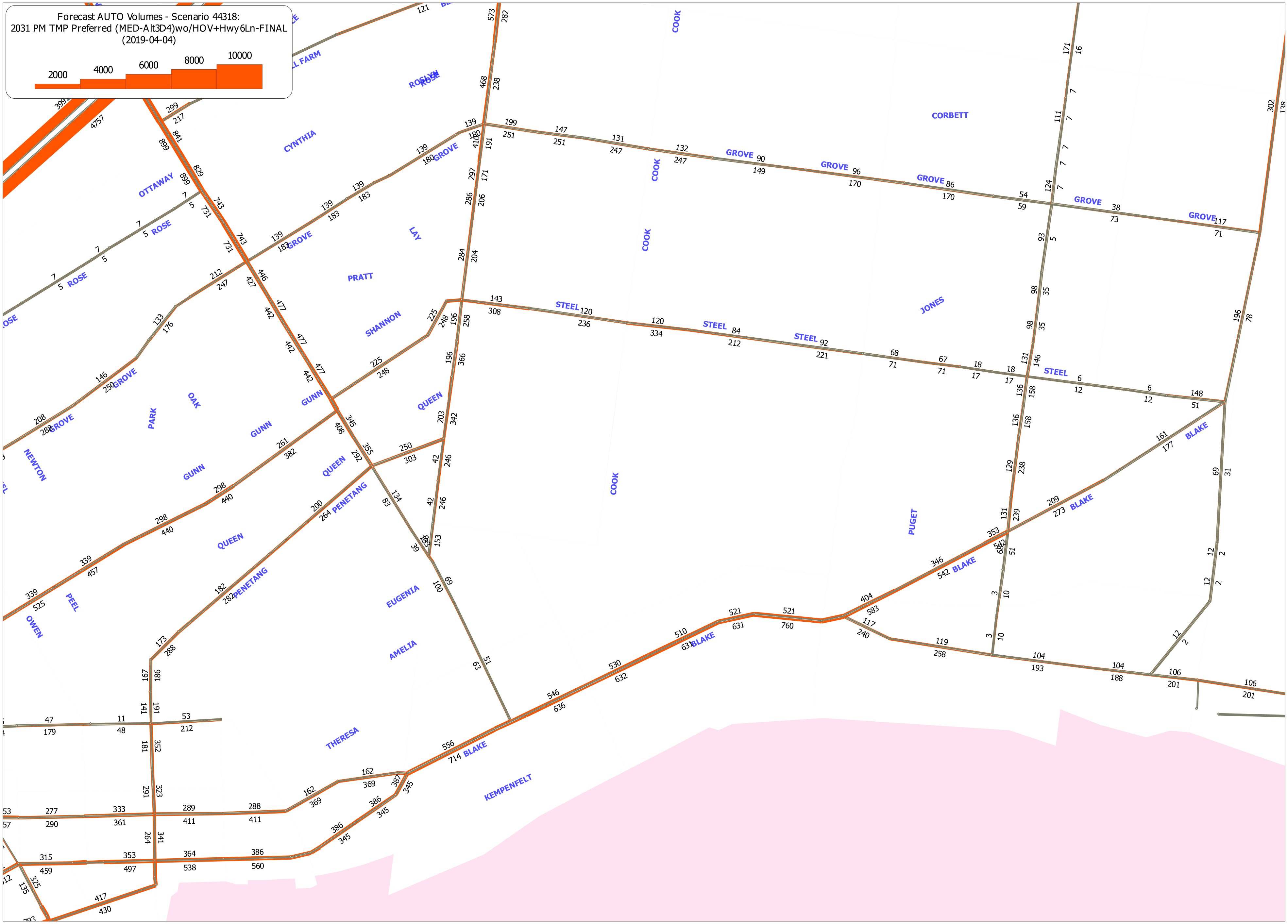
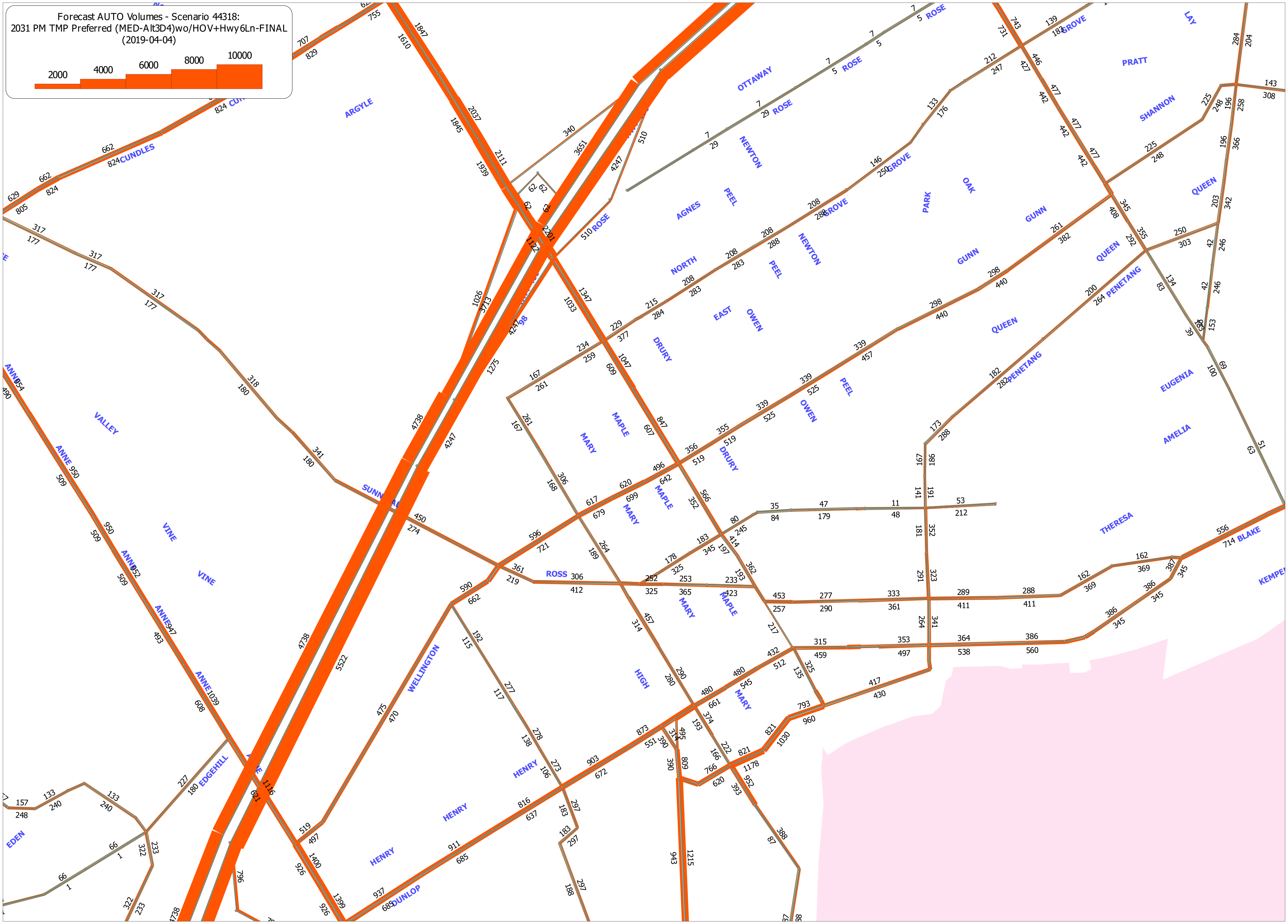
691
520
837
520
837
991
471
482
436
3324
2810

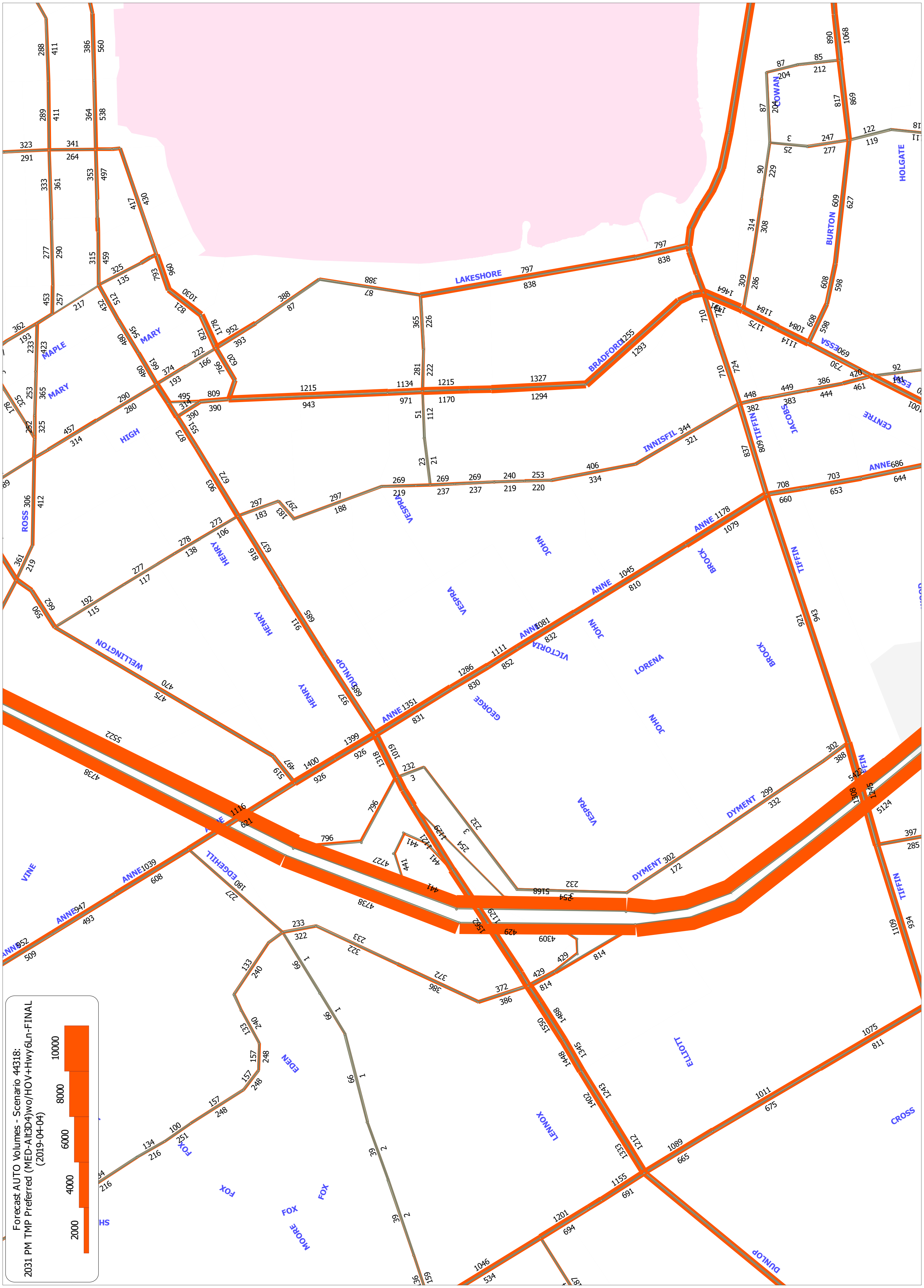


Forecast AUTO Volumes - Scenario 44318:
2031 PM TMP Preferred (MED-Alt3D4)wo/HOV+Hwy6Ln-FINAL
(2019-04-04)
2000
4000
6000
8000
10000
LITTLE LAKE
PENETANGUISHENE
GEORGIAN
QUARRY
DUNSMORE
AMBLER
CHELTENHAM
BRIGHTEN
HICKLING
CORBETT
RING
COOK
BERNICK
GROVE
STEEL
JONES
BELL FARM
ALLIANCE
CUNDLES
102
LAY
MARION
PRATT
SHANNON
GUNN
QUEEN

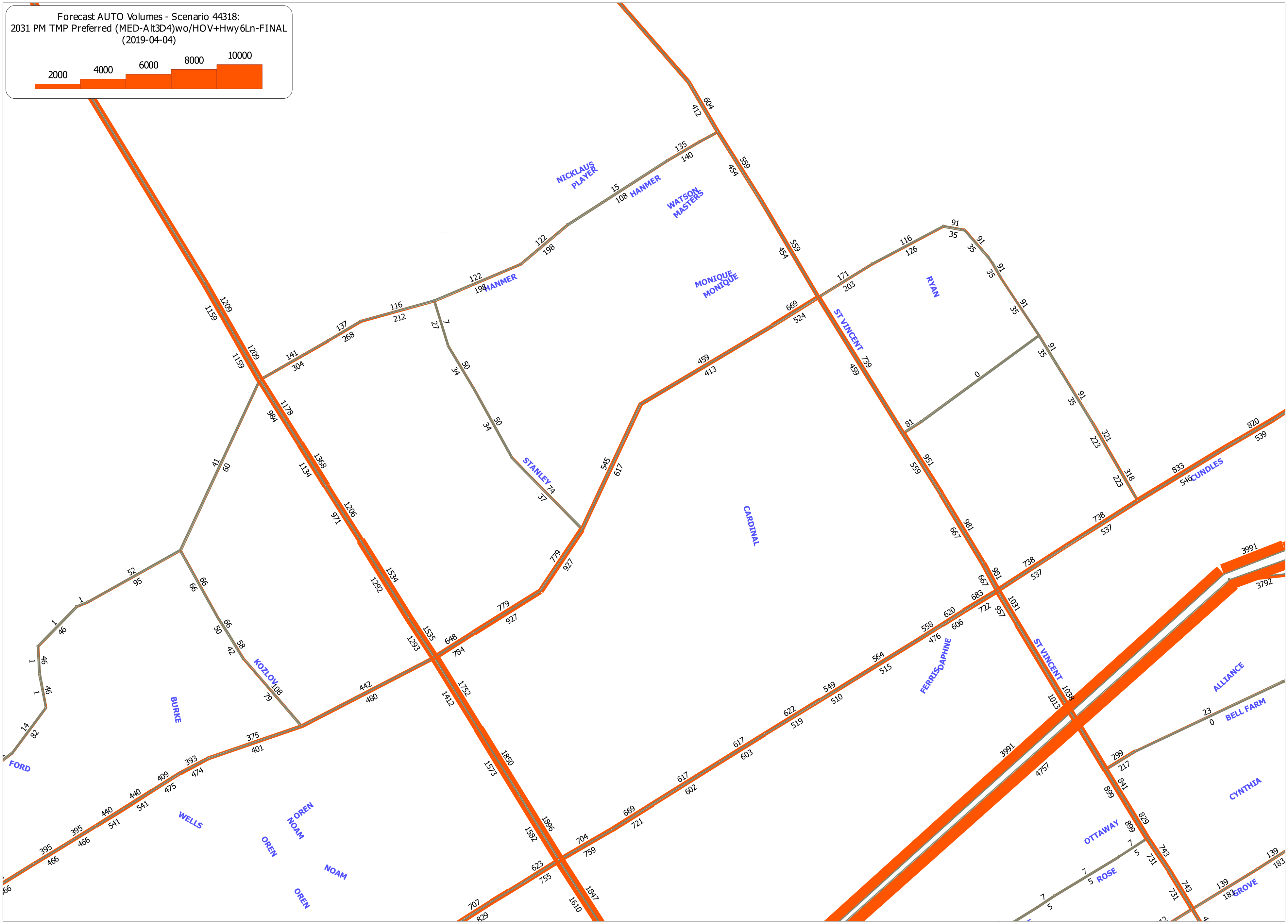

Forecast AUTO Volumes - Scenario 44318:
2031 PM TMP Preferred (MED-Alt3D4)wo/HOV+Hwy6Ln-FINAL
(2019-04-04)
2000
4000
6000
8000
10000
CORBETT
GROVE
STEEL
BLAKE
JONES
PUGET
COOK
LAY
PRATT
SHANNON
QUEEN
GUNN
OAK
PARK
CYNTHIA
OTTAWAY
ROSE
NEWTON
PEEL
OWEN
PENETANG
EUGENIA
AMELIA
THERESA
KEMPENFELT



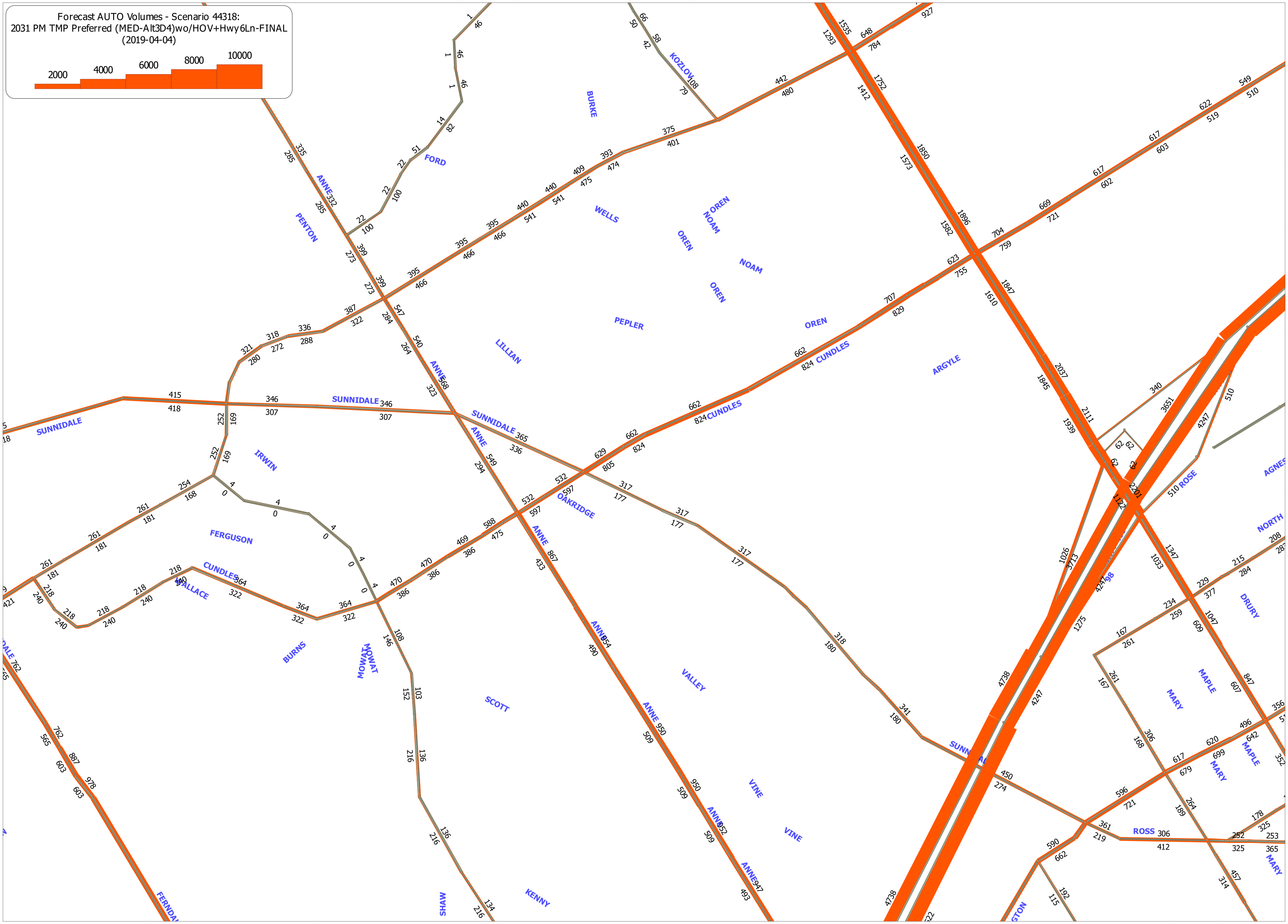
Forecast AUTO Volumes - Scenario 44318:
2031 PM TMP Preferred (MED-Alt3D4)wo/HOV+Hwy6Ln-FINAL
(2019-04-04)
2000
4000
6000
8000
10000
CUNDLES
ARGYLE
OTTAWAY
ROSE
NEWTON
AGNES
PEEL
NORTH
GROVE
PARK
OAK
GUNN
PRATT
LAY
SHANNON
QUEEN
PENETANG
EUGENIA
AMELIA
THERESA
BLAKE
KEMPENFELT
EAST
OWEN
DRURY
MAPLE
MARY
ROSS
HIGH
WELLINGTON
HENRY
DUNLOP
VALLEY
VINE
ANNE
EDGEHILL
EDEN
SUNNIDALE

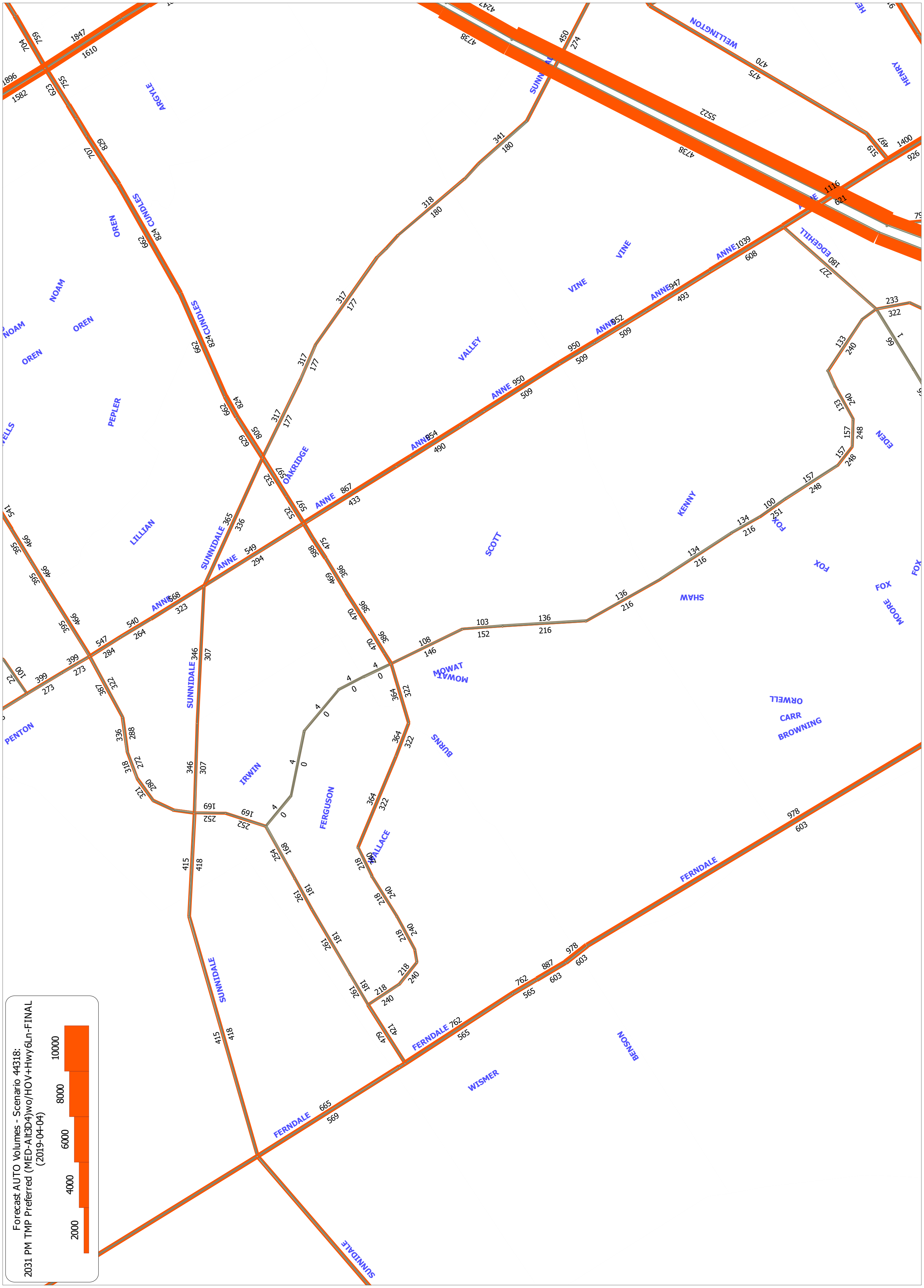


Forecast AUTO Volumes - Scenario 44318:
2031 PM TMP Preferred (MED-Alt3D4)wo/HOV+Hwy6Ln-FINAL
(2019-04-04)
10000
8000
6000
4000
2000
LAKESHORE
BRADFORD
INNISFIL
ANNE
MAPLE
MARY
HIGH
ROSS
HENRY
VESPRA
JOHN
BROCK
TIFFIN
JACOBS
CENTRE
ESSA
BURTON
HOLGATE
COWAN
WELLINGTON
DUNLOP
VICTORIA
LORENA
GEORGE
DYMENT
EDGEHILL
VINE
EDEN
FOX
MOORE
ELLIOTT
LENNOX
CROSS

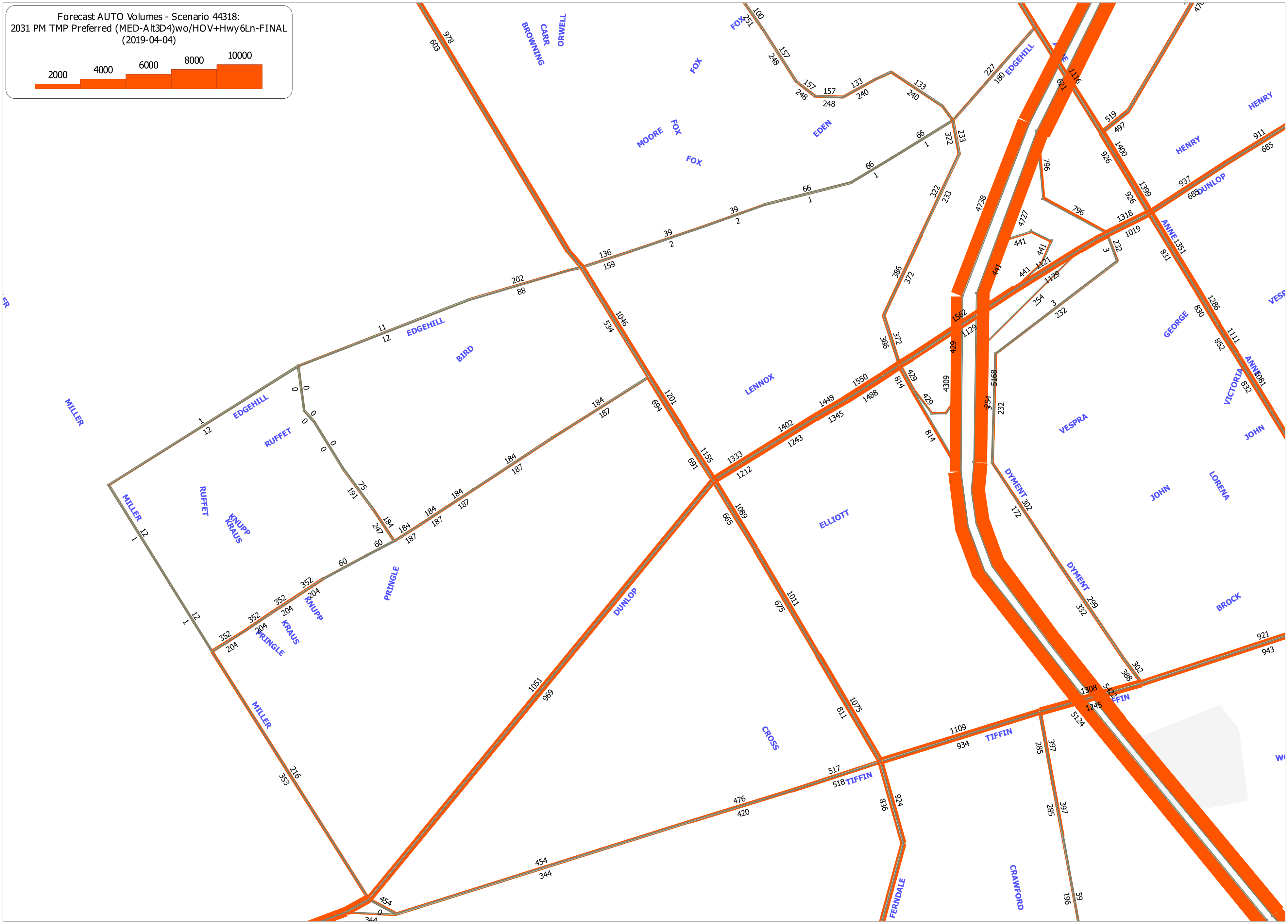


Forecast AUTO Volumes - Scenario 44318:
2031 PM TMP Preferred (MED-Alt3D4)wo/HOV+Hwy6Ln-FINAL
(2019-04-04)
2000
4000
6000
8000
10000
NICKLAUS
PLAYER
HANMER
WATSON
MASTERS
MONIQUE
MONIQUE
RYAN
ST VINCENT
STANLEY
CARDINAL
CUNDLES
FERRIS
DAPHINE
KOZLOV
BURKE
FORD
WELLS
OREN
NOAM
ALLIANCE
BELL FARM
CYNTHIA
OTTAWAY
ROSE
GROVE

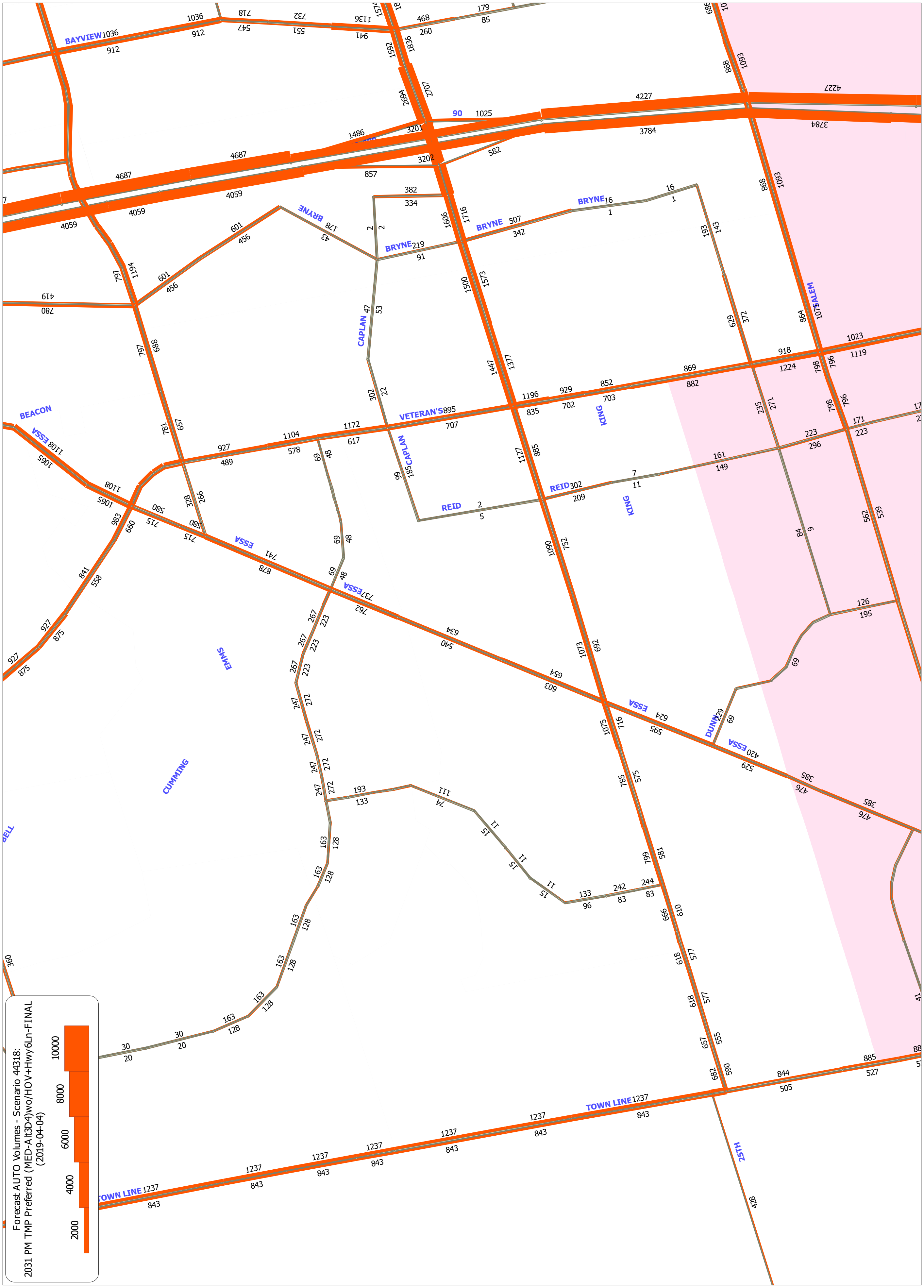

Forecast AUTO Volumes - Scenario 44318:
2031 PM TMP Preferred (MED-Alt3D4)wo/HOV+Hwy6Ln-FINAL
(2019-04-04)
2000
4000
6000
8000
10000
SUNNIDALE
ANNE
CUNDLES
OAKRIDGE
BURKE
FORD
PENTON
WELLS
PEPLER
LILLIAN
IRWIN
FERGUSON
WALLACE
BURNS
MOWAT
SCOTT
VALLEY
VINE
KENNY
SHAW
ARGYLE
OREN
NOAM
KOZLOV
ROSE
NORTH
DRURY
MAPLE
MARY
ROSS
AGNES
FERNDALE

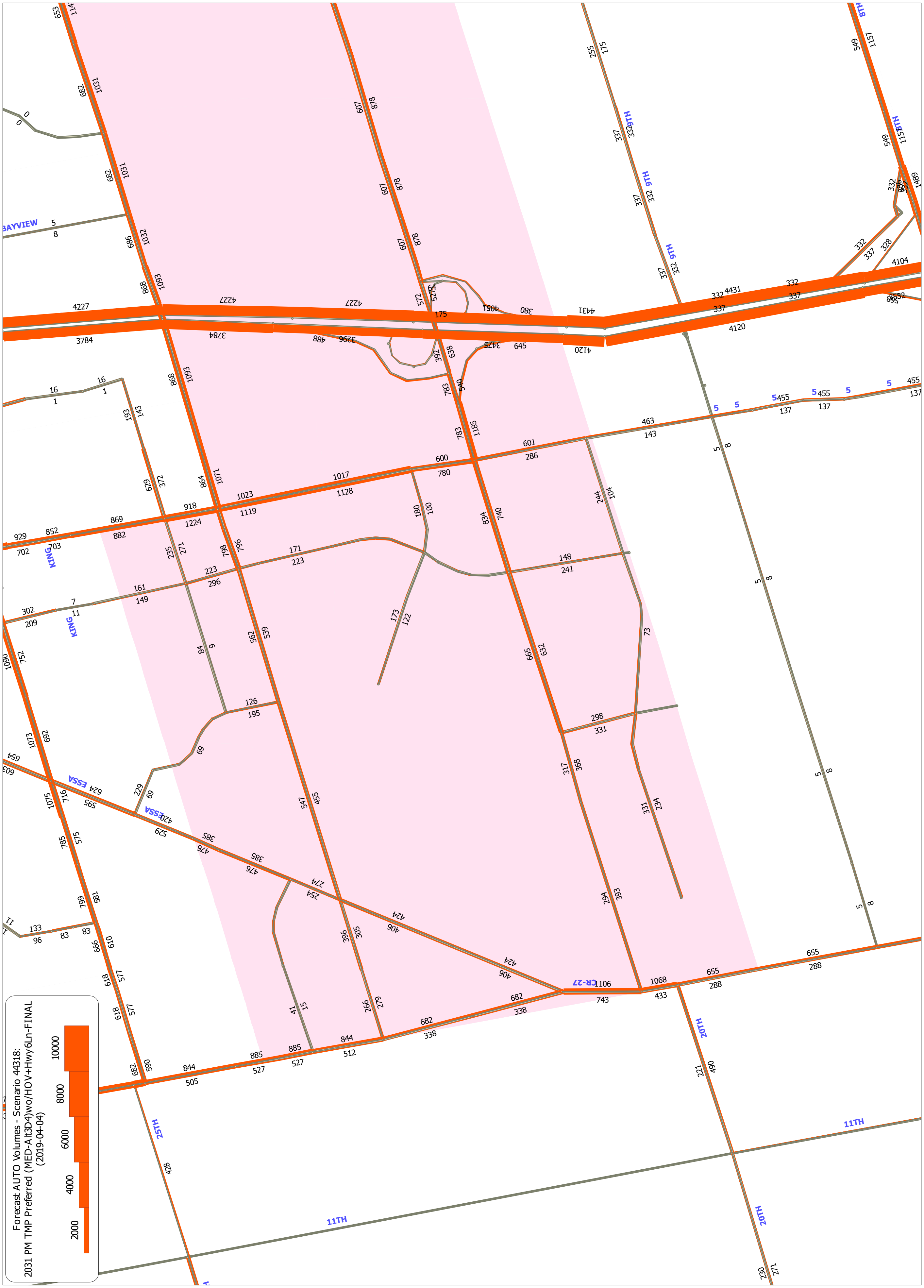


Forecast AUTO Volumes - Scenario 44318:
2031 PM TMP Preferred (MED-Alt3D4)wo/HOV+Hwy6Ln-FINAL
(2019-04-04)
2000
4000
6000
8000
10000
ANNE
SUNNIDALE
FERNDALE
CUNDLES
OAKRIDGE
ARGYLE
OREN
NOAM
PEPLER
LILLIAN
PENTON
VALLEY
VINE
SCOTT
KENNY
SHAW
FOX
EDEN
MOORE
EDGEHILL
WELLINGTON
HENRY
MOWAT
BURNS
IRWIN
FERGUSON
WALLACE
ORWELL
CARR
BROWNING
WISMER
BENSON

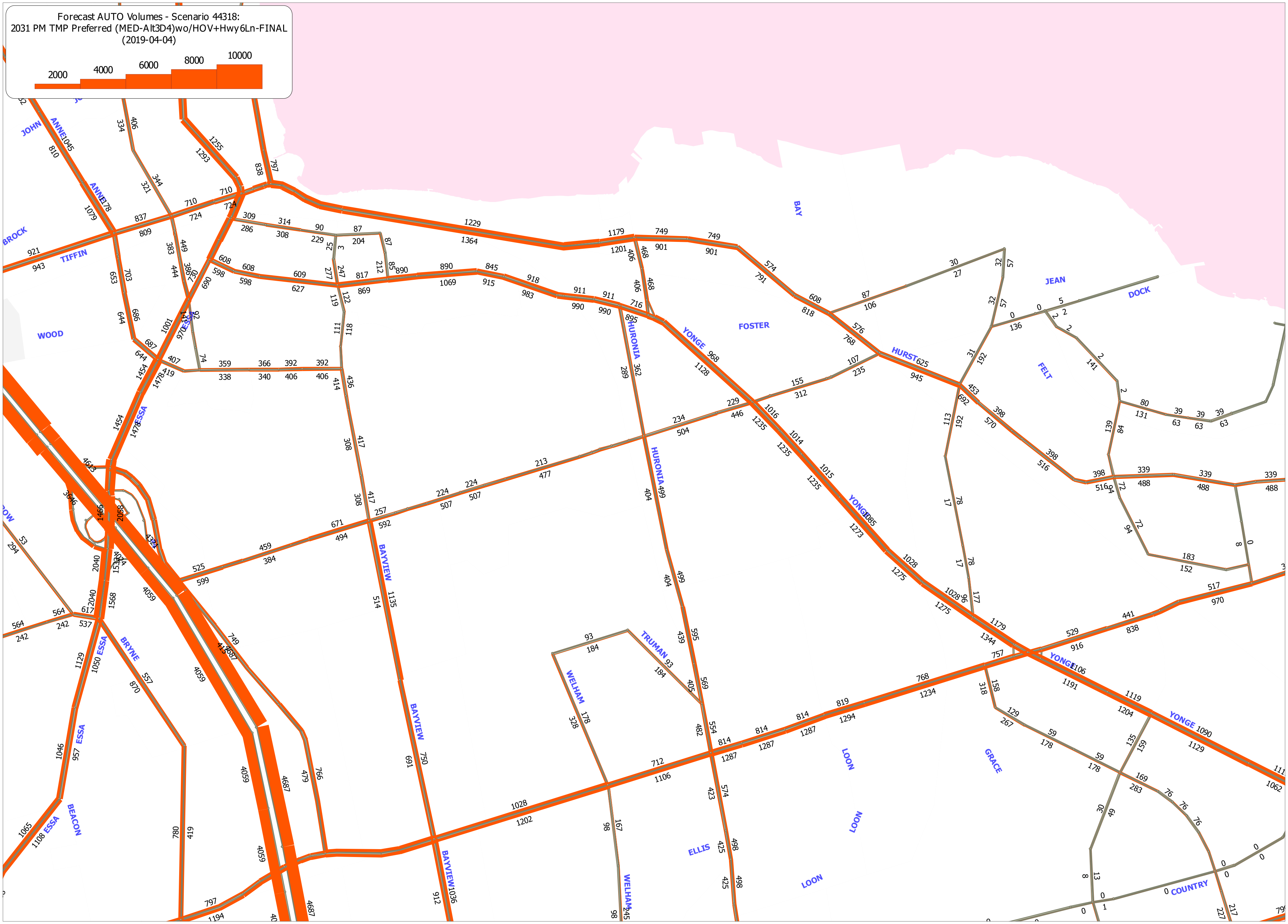

Forecast AUTO Volumes - Scenario 44318:
2031 PM TMP Preferred (MED-Alt3D4)wo/HOV+Hwy6Ln-FINAL
(2019-04-04)
2000
4000
6000
8000
10000
MILLER
EDGEHILL
RUFFET
KNUPP
KRAUS
PRINGLE
BIRD
DUNLOP
LENNOX
ELLIOTT
CROSS
TIFFIN
FERNDALE
CRAWFORD
DYMENT
VESPRA
JOHN
LORENA
BROCK
GEORGE
VICTORIA
ANNE
HENRY
FOX
MOORE
EDEN
CARR
BROWNING
ORWELL

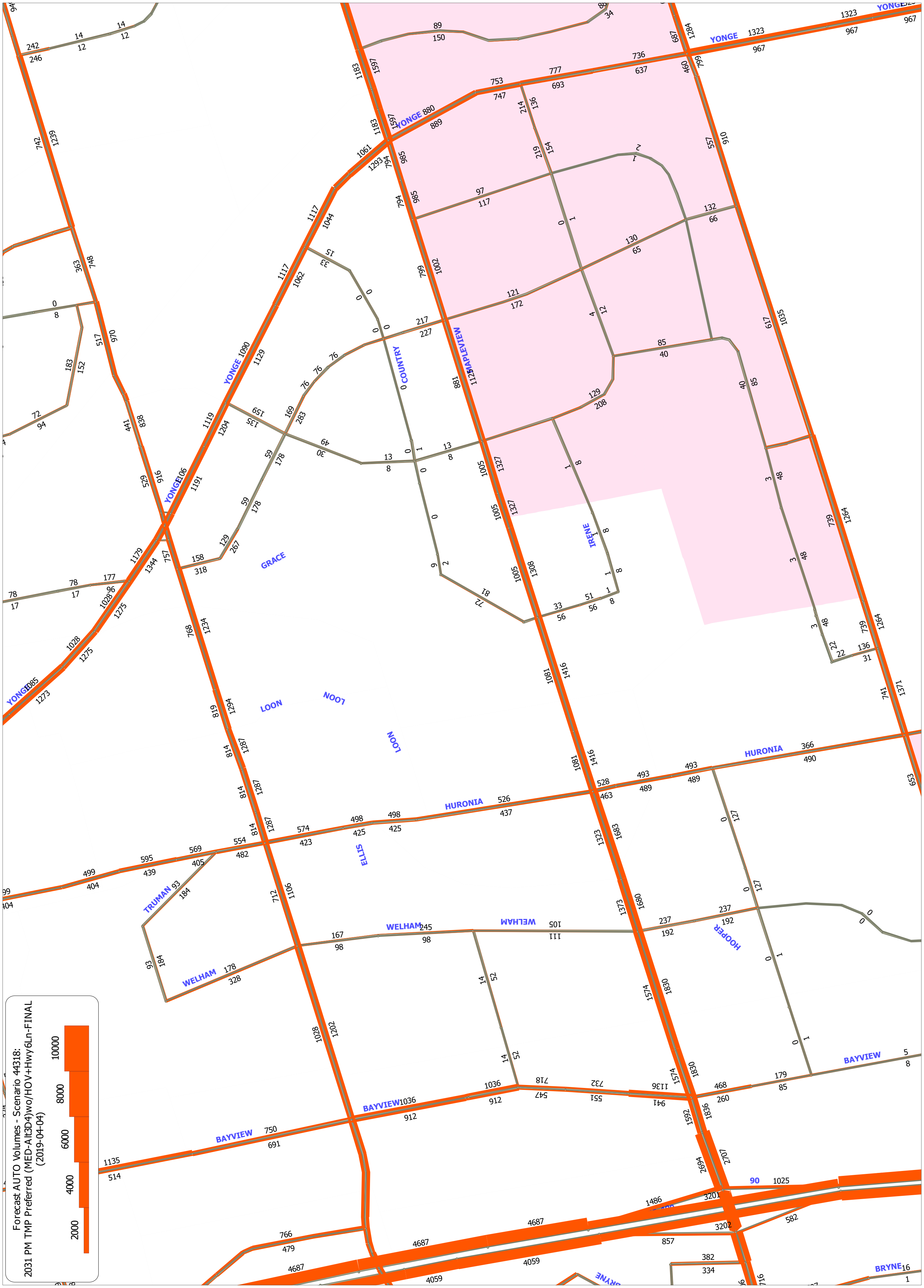

Forecast AUTO Volumes - Scenario 44318:
2031 PM TMP Preferred (MED-Alt3D4)wo/HOV+Hwy6Ln-FINAL
(2019-04-04)
10000
8000
6000
4000
2000
BURTON
ESSA
ANNE
TIFFIN
WOOD
BROCK
DYMENT
MORROW
MOON
BRYNE
BEACON
HARVIE
ARDAGH
WILDWOOD
FERNDALE
JAMES
GORE
BELL
CUMMING
DUNLOP
PRINGLE
MILLER
PENVILL
TOWN LINE

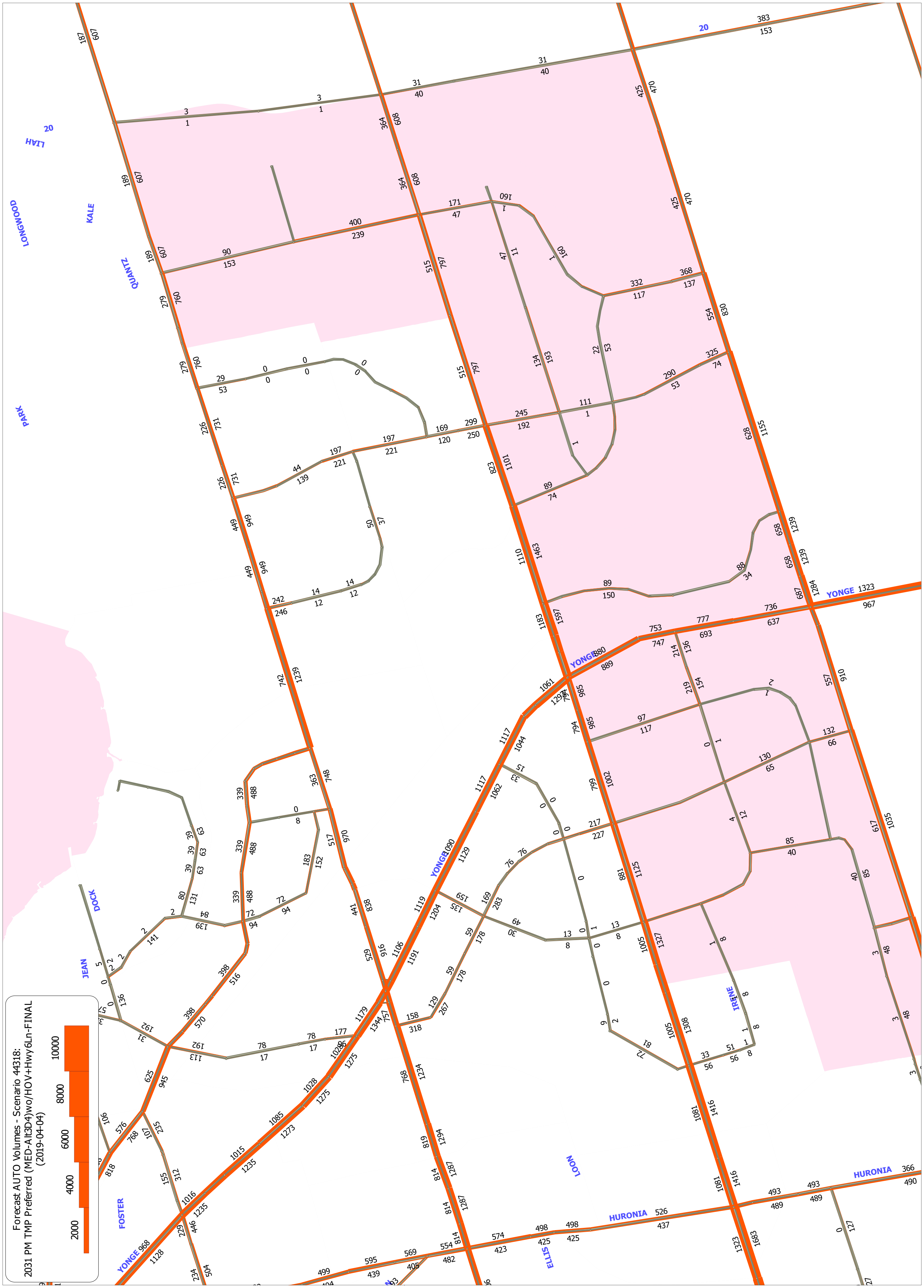

Forecast AUTO Volumes - Scenario 44318:
2031 PM TMP Preferred (MED-Alt3D4)wo/HOV+Hwy6Ln-FINAL
(2019-04-04)
2000
4000
6000
8000
10000
BAYVIEW
90
BRYNE
CAPLAN
SALEM
BEACON
ESSA
VETERAN'S
KING
REID
EMMS
DUNN
CUMMING
TOWN LINE
25TH



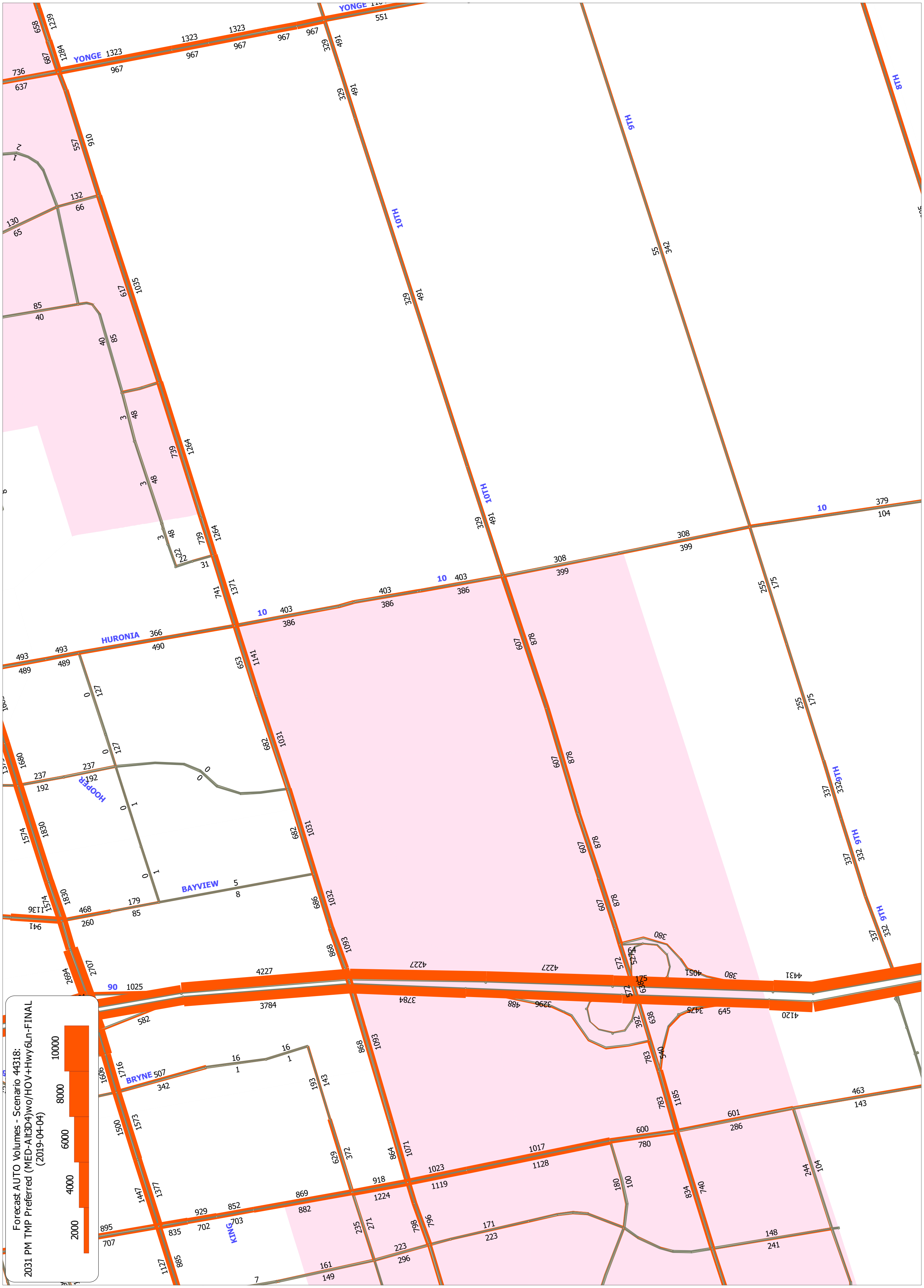
Forecast AUTO Volumes - Scenario 44318:
2031 PM TMP Preferred (MED-Alt3D4)wo/HOV+Hwy6Ln-FINAL
(2019-04-04)
10000
8000
6000
4000
2000
BAYVIEW
KING
ESSA
CR-27
25TH
20TH
11TH
9TH
8TH


Forecast AUTO Volumes - Scenario 44318:
2031 PM TMP Preferred (MED-Alt3D4)wo/HOV+Hwy6Ln-FINAL
(2019-04-04)
2000
4000
6000
8000
10000
BAY
DOCK
JEAN
FELT
HURST
FOSTER
YONGE
HURONIA
TRUMAN
WELHAM
GRACE
LOON
ELLIS
COUNTRY
BAYVIEW
ESSA
BRYNE
BEACON
ANNE
JOHN
TIFFIN
WOOD
BROCK

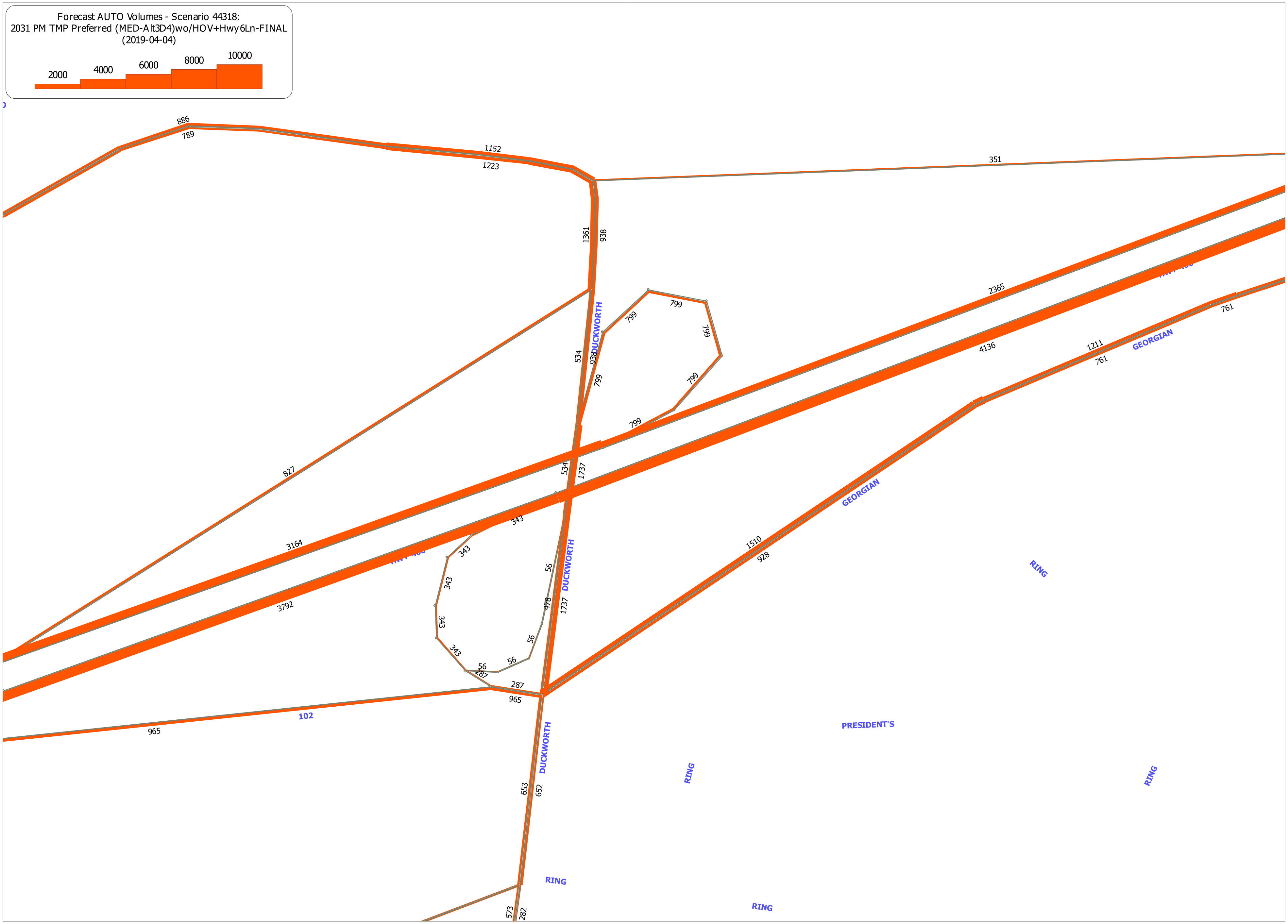

Forecast AUTO Volumes - Scenario 44318:
2031 PM TMP Preferred (MED-Alt3D4)wo/HOV+Hwy6Ln-FINAL
(2019-04-04)
10000
8000
6000
4000
2000
YONGE
MAPLEVIEW
COUNTRY
GRACE
IRENE
LOON
HURONIA
ELLIS
TRUMAN
WELHAM
HOOPER
BAYVIEW
BRYNE
90



Forecast AUTO Volumes - Scenario 44318:
2031 PM TMP Preferred (MED-Alt3D4)wo/HOV+Hwy6Ln-FINAL
(2019-04-04)
10000
8000
6000
4000
2000
LONGWOOD
KALE
QUANTZ
PARK
YONGE
DOCK
JEAN
FOSTER
IRENE
LOON
ELLIS
HURONIA
20

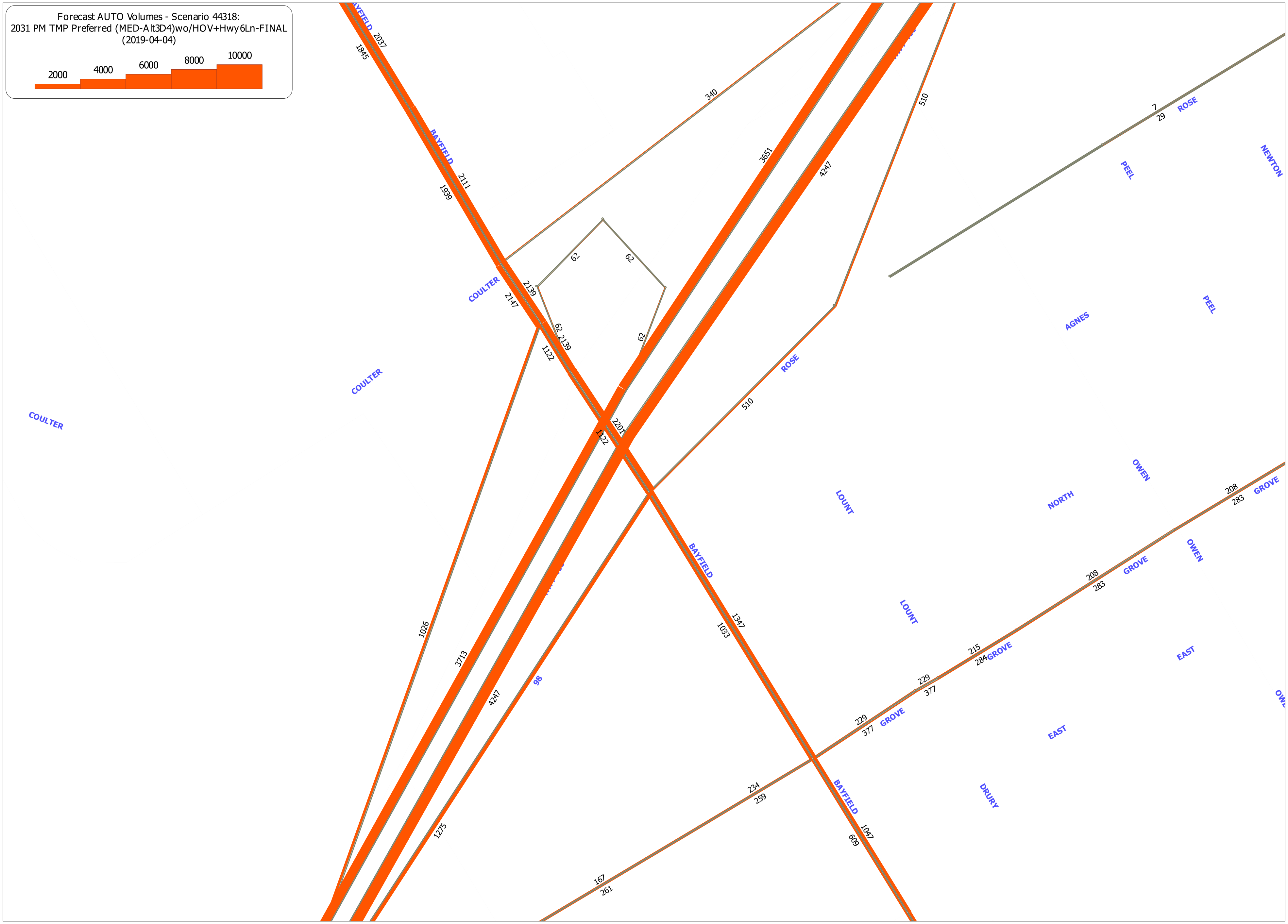


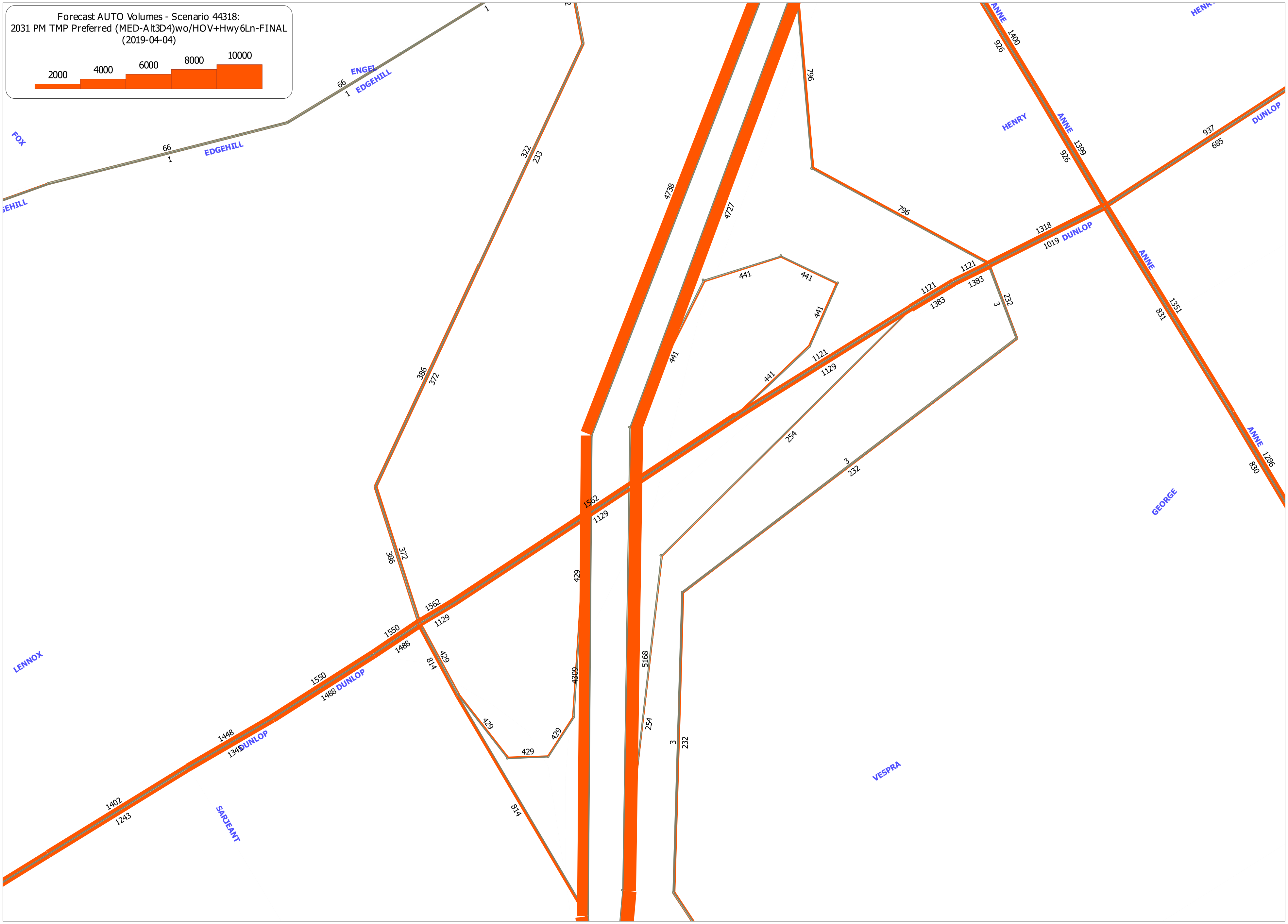
Forecast AUTO Volumes - Scenario 44318:
2031 PM TMP Preferred (MED-Alt3D4)wo/HOV+Hwy6Ln-FINAL
(2019-04-04)
2000
4000
6000
8000
10000
YONGE
HURONIA
10
10TH
9TH
8TH
HOOPER
BAYVIEW
90
BRYNE
KING

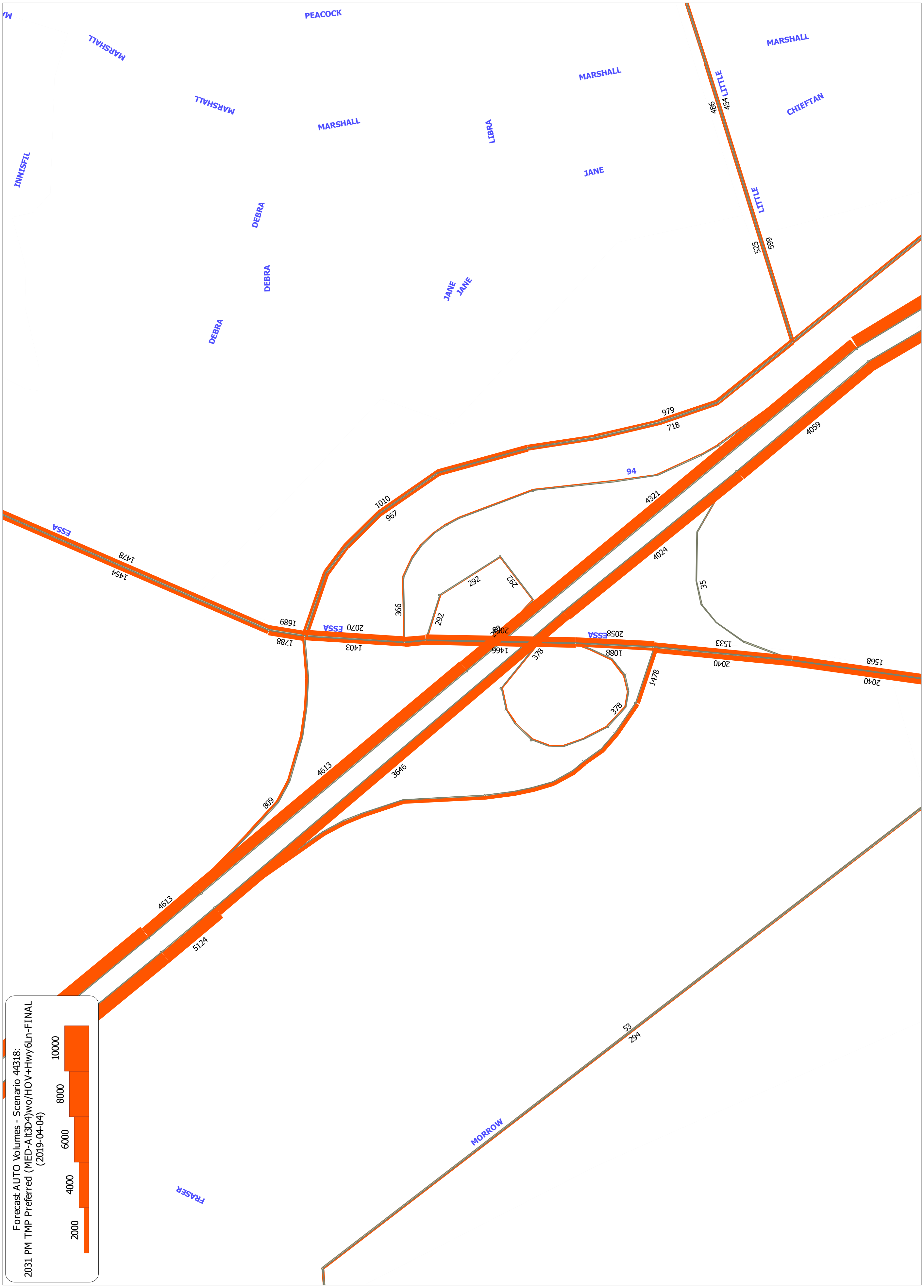


Forecast AUTO Volumes - Scenario 44318:
2031 PM TMP Preferred (MED-Alt3D4)wo/HOV+Hwy6Ln-FINAL
(2019-04-04)
2000
4000
6000
8000
10000
886
789
1152
1223
351
1361
938
DUCKWORTH
534
938
799
2365
4136
1211
761
GEORGIAN
827
1737
534
343
3164
3792
56
478
1737
DUCKWORTH
287
965
102
965
GEORGIAN
1510
928
RING
PRESIDENT'S
DUCKWORTH
653
652
RING
RING
RING
573
282

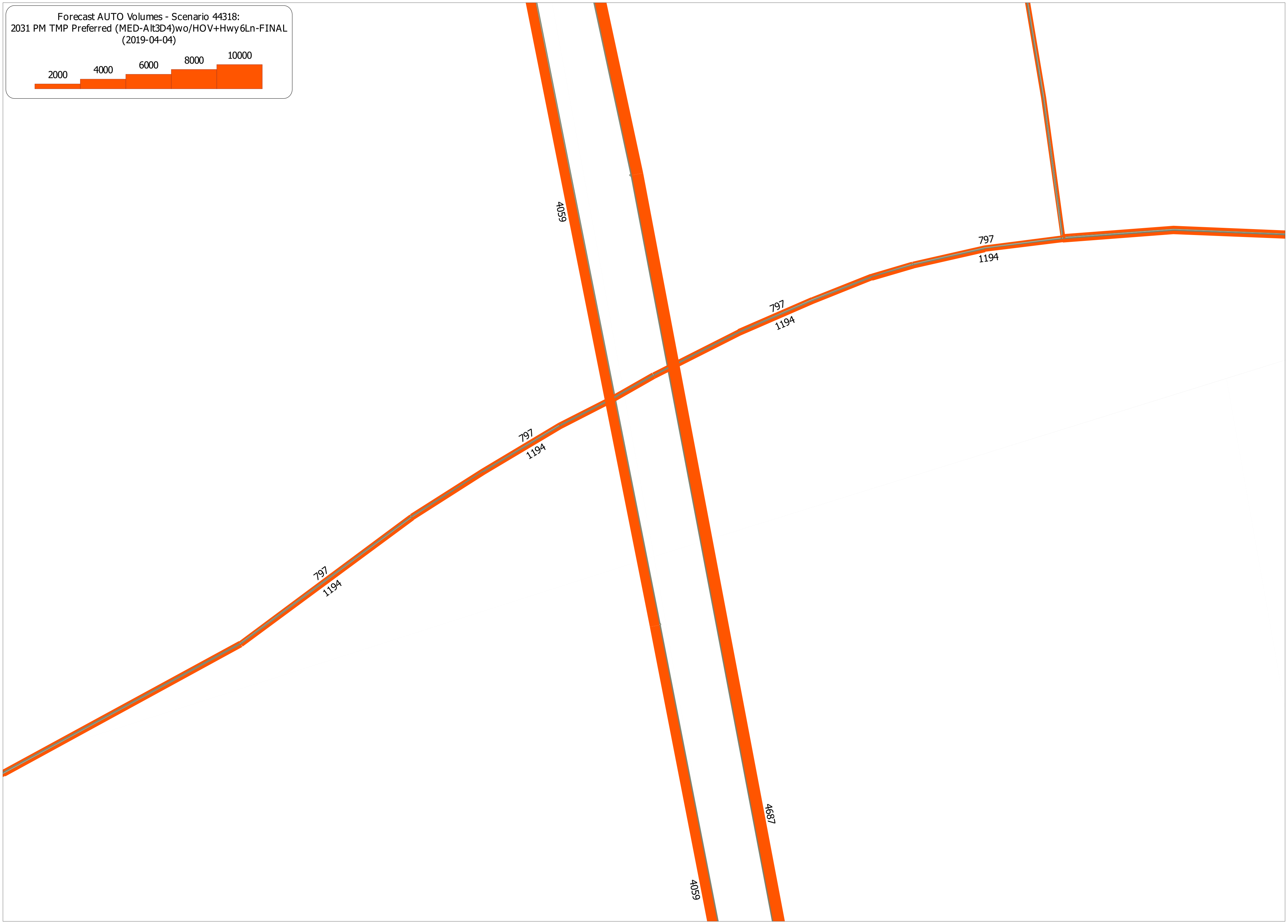
Forecast AUTO Volumes - Scenario 44318:
2031 PM TMP Preferred (MED-Alt3D4)wo/HOV+Hwy6Ln-FINAL
(2019-04-04)



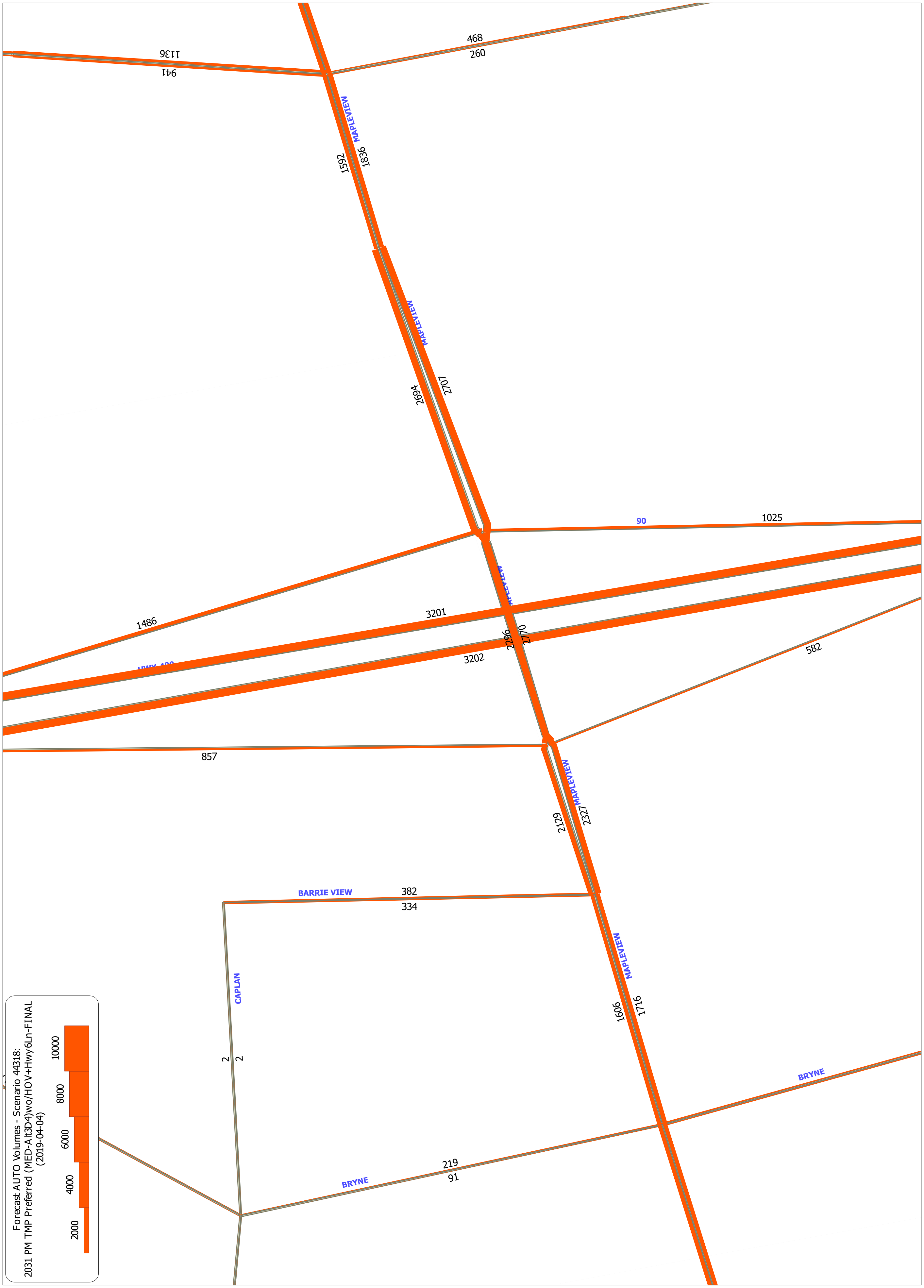

Forecast AUTO Volumes - Scenario 44318:
2031 PM TMP Preferred (MED-Alt3D4)wo/HOV+Hwy6Ln-FINAL
(2019-04-04)
2000
4000
6000
8000
10000
FOX
ENGEL
EDGEHILL
LENNOX
SARJEANT
DUNLOP
VESPRA
GEORGE
HENRY
ANNE
4738
4727
5168
4309
1562
1129
1550
1488
1448
1345
1402
1243
1318
1019
1121
1383
937
685
1400
926
1399
1351
831
1286
830
796
441
429
814
386
372
322
233
254
232
3
66
1

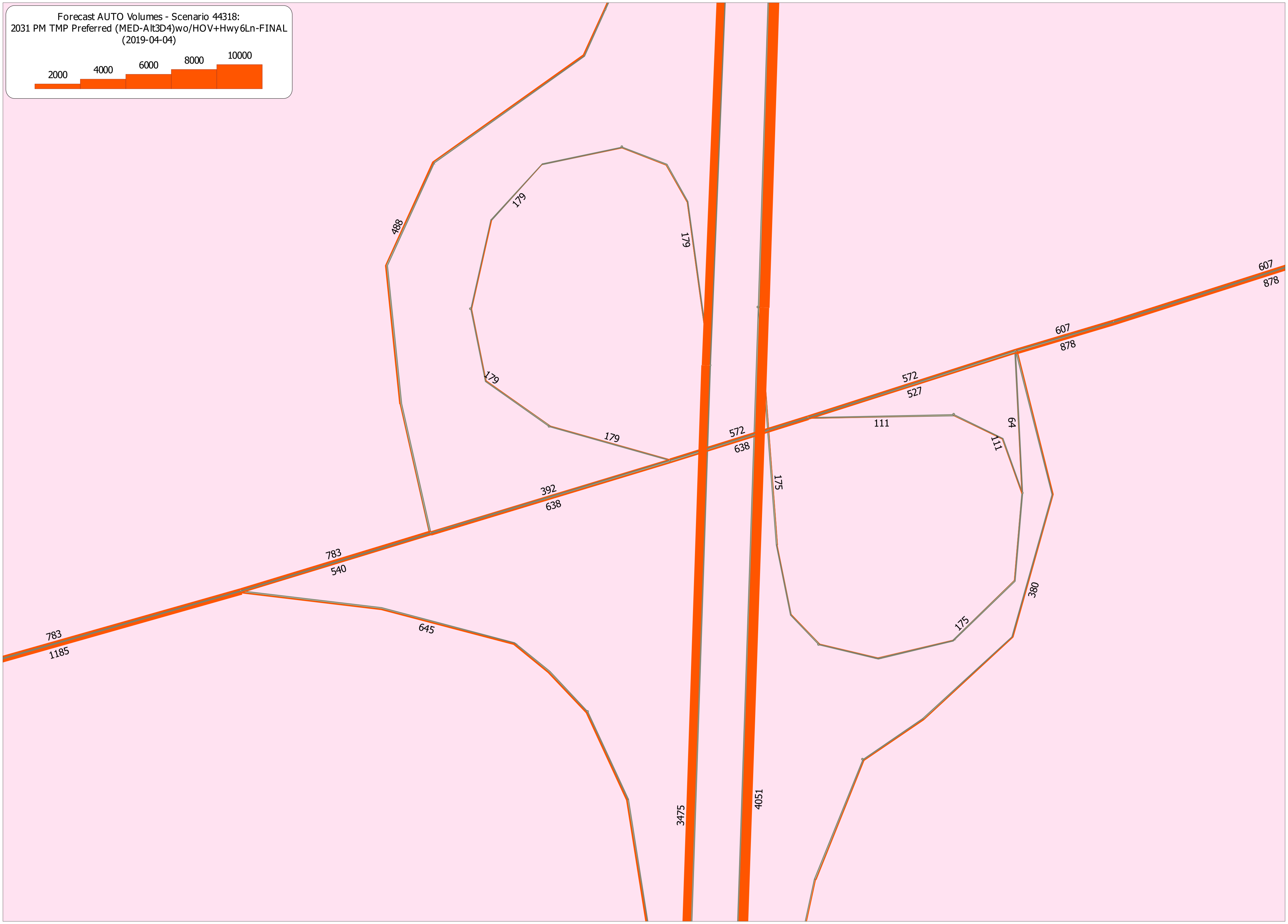


Forecast AUTO Volumes - Scenario 44318:
2031 PM TMP Preferred (MED-Alt3D4)wo/HOV+Hwy6Ln-FINAL
(2019-04-04)
10000
8000
6000
4000
2000
PEACOCK
MARSHALL
MARSHALL
MARSHALL
MARSHALL
MARSHALL
CHIEFTAN
LITTLE
LITTLE
LIBRA
JANE
JANE
JANE
INNISFIL
DEBRA
DEBRA
DEBRA
ESSA
ESSA
ESSA
94
MORROW
FRASER
486
454
525
599
979
718
1010
967
4321
4059
4024
35
1478
1454
1689
1788
2070
1403
366
292
292
292
2058
1466
1088
378
378
1533
2040
1568
2040
1478
809
4613
3646
4613
5124
53
294



Forecast AUTO Volumes - Scenario 44318:
2031 PM TMP Preferred (MED-Alt3D4)wo/HOV+Hwy6Ln-FINAL
(2019-04-04)
2000
4000
6000
8000
10000
4059
797
1194
797
1194
797
1194
797
1194
4687
4059


Forecast AUTO Volumes - Scenario 44318:
2031 PM TMP Preferred (MED-Alt3D4)wo/HOV+Hwy6Ln-FINAL
(2019-04-04)
10000
8000
6000
4000
2000
1136
941
468
260
MAPLEVIEW
1592
1836
MAPLEVIEW
2694
2707
90
1025
1486
3201
MAPLEVIEW
2296
2770
3202
582
857
MAPLEVIEW
2129
2327
BARRIE VIEW
382
334
CAPLAN
MAPLEVIEW
1606
1716
2
2
BRYNE
219
91
BRYNE



Forecast AUTO Volumes - Scenario 44318:
2031 PM TMP Preferred (MED-Alt3D4)wo/HOV+Hwy6Ln-FINAL
(2019-04-04)
2000
4000
6000
8000
10000
488
179
179
179
179
607
878
607
878
572
527
572
638
111
64
111
175
175
380
392
638
783
540
783
1185
645
3475
4051

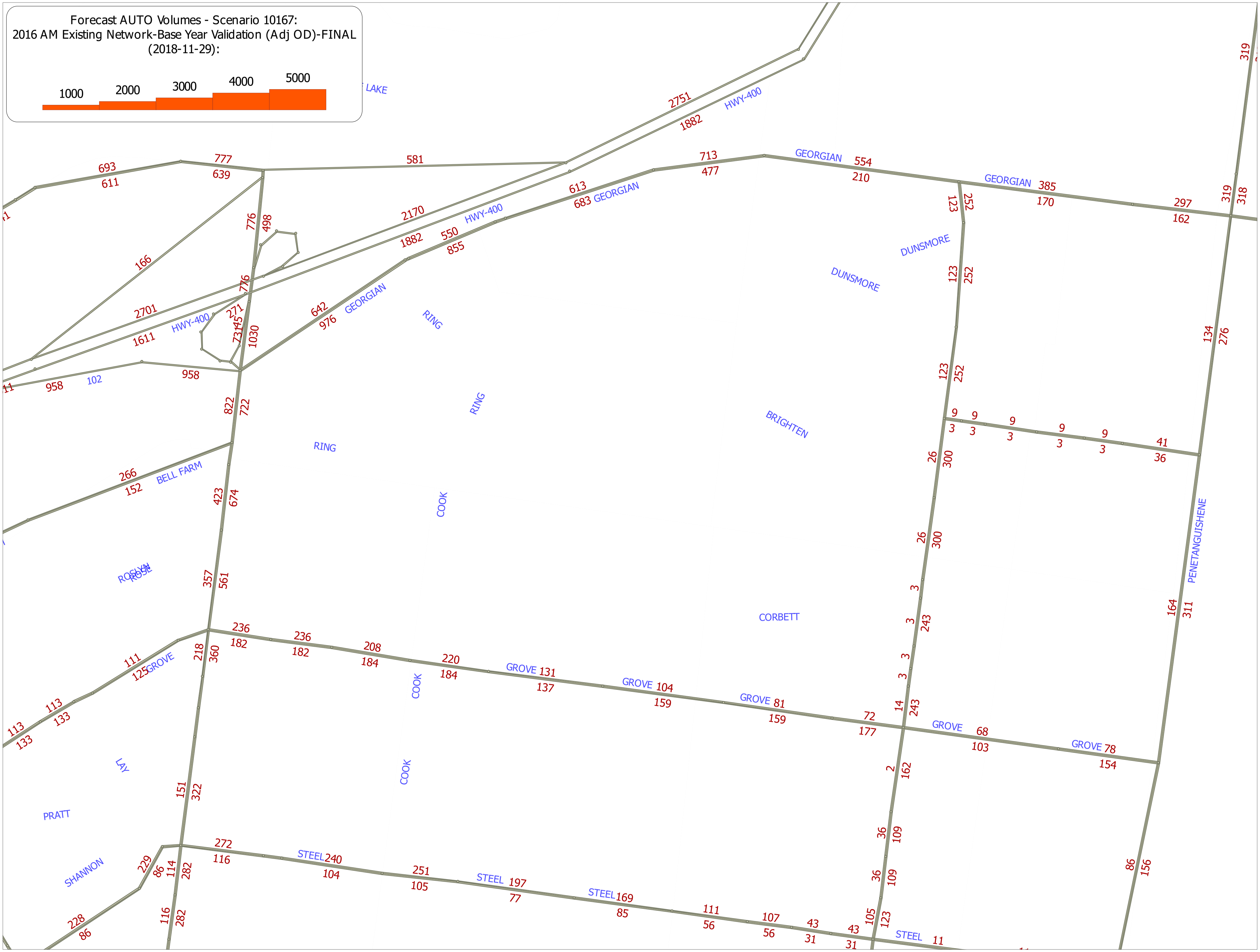
APPENDIX

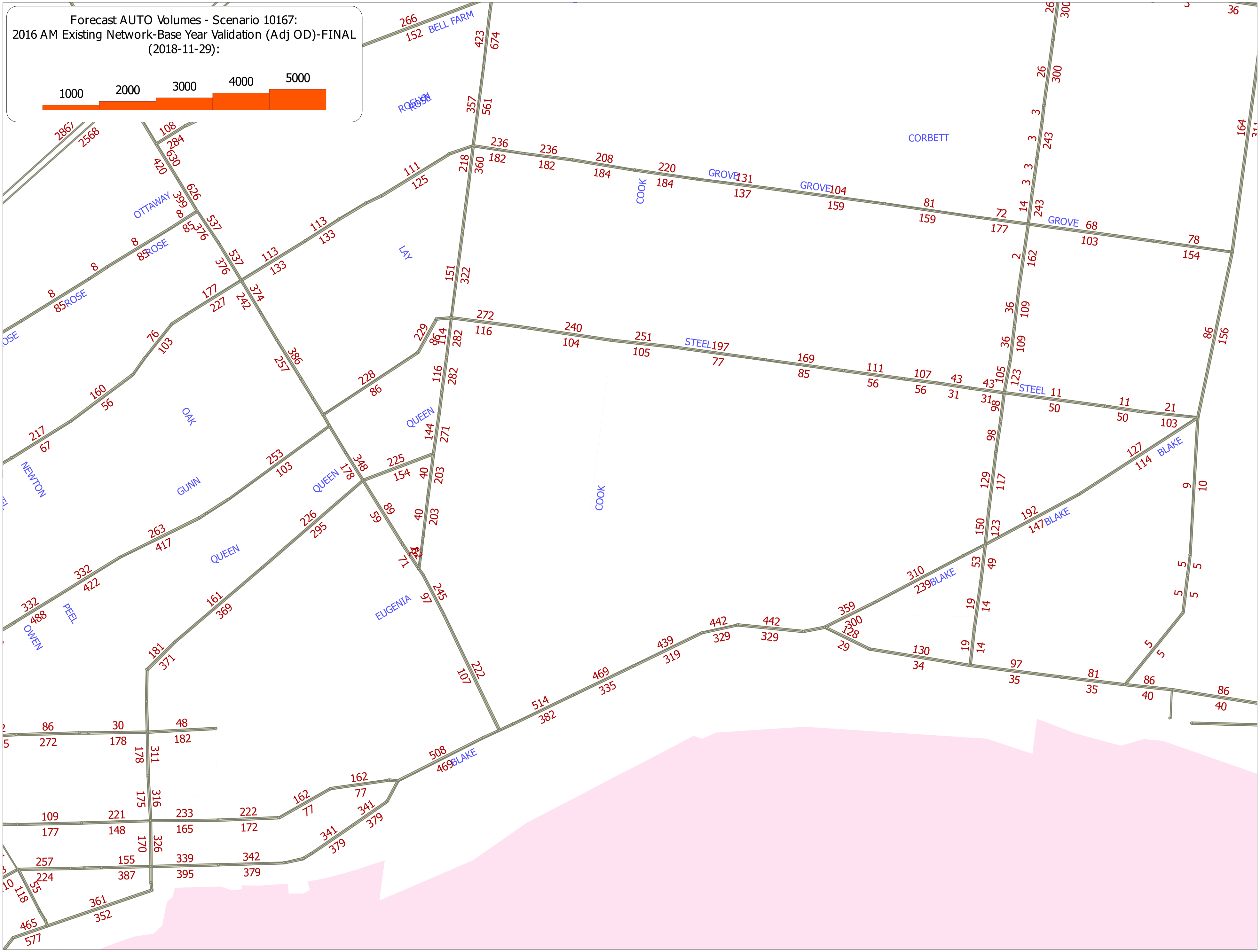
E-6. EMME PLOTS – BASE YEAR TRAFFIC FORECASTS, EXISTING 2016 ROAD NETWORK

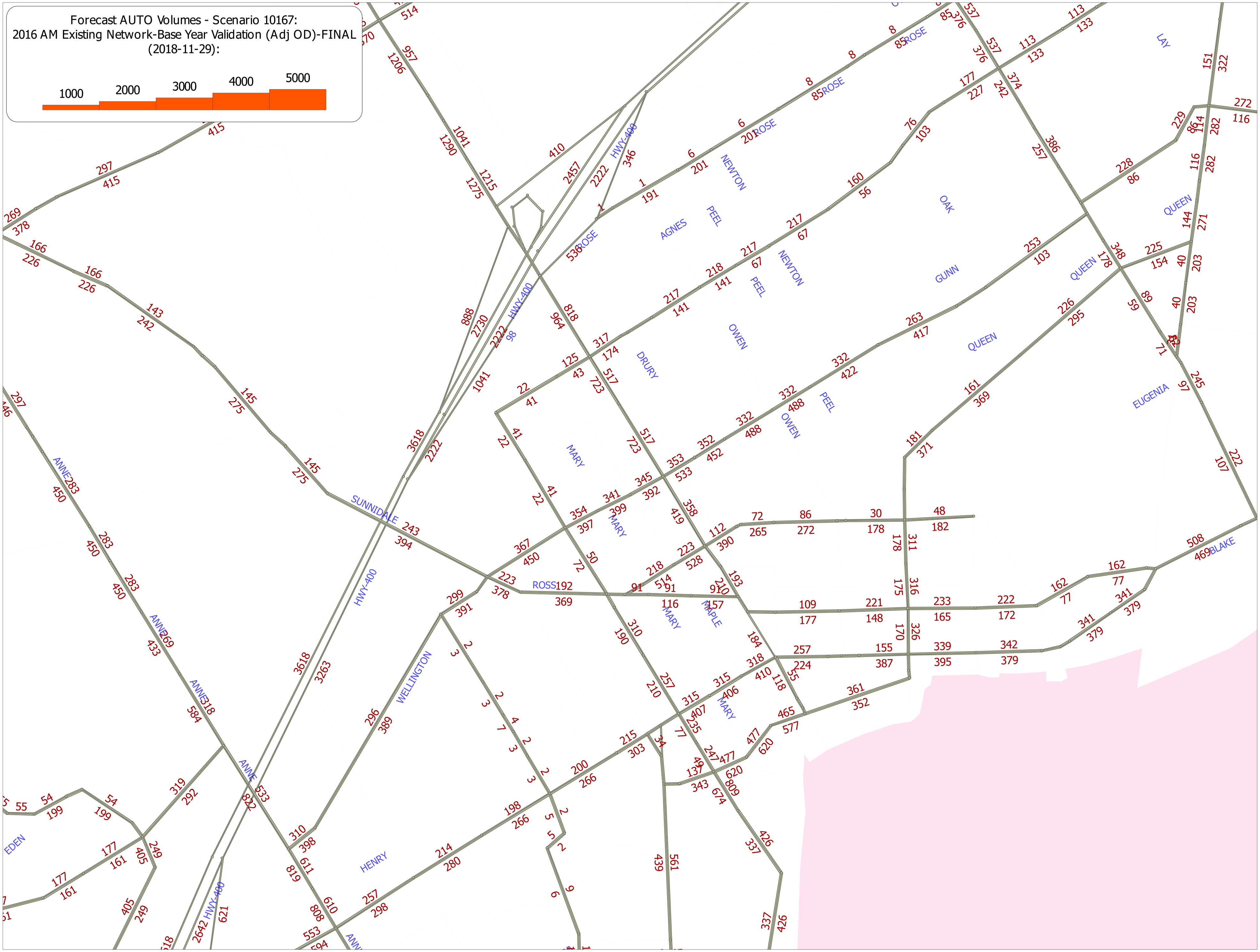

Number of Modelled Lanes - Scenario 10167:
2016 AM Existing Network-Base Year Validation (Adj OD)-FINAL
Page 1 (2018-12-11)
1 lane per direction
2 lanes per direction
3 lanes per direction
4 lanes per direction
5 lanes per direction

APPENDIX

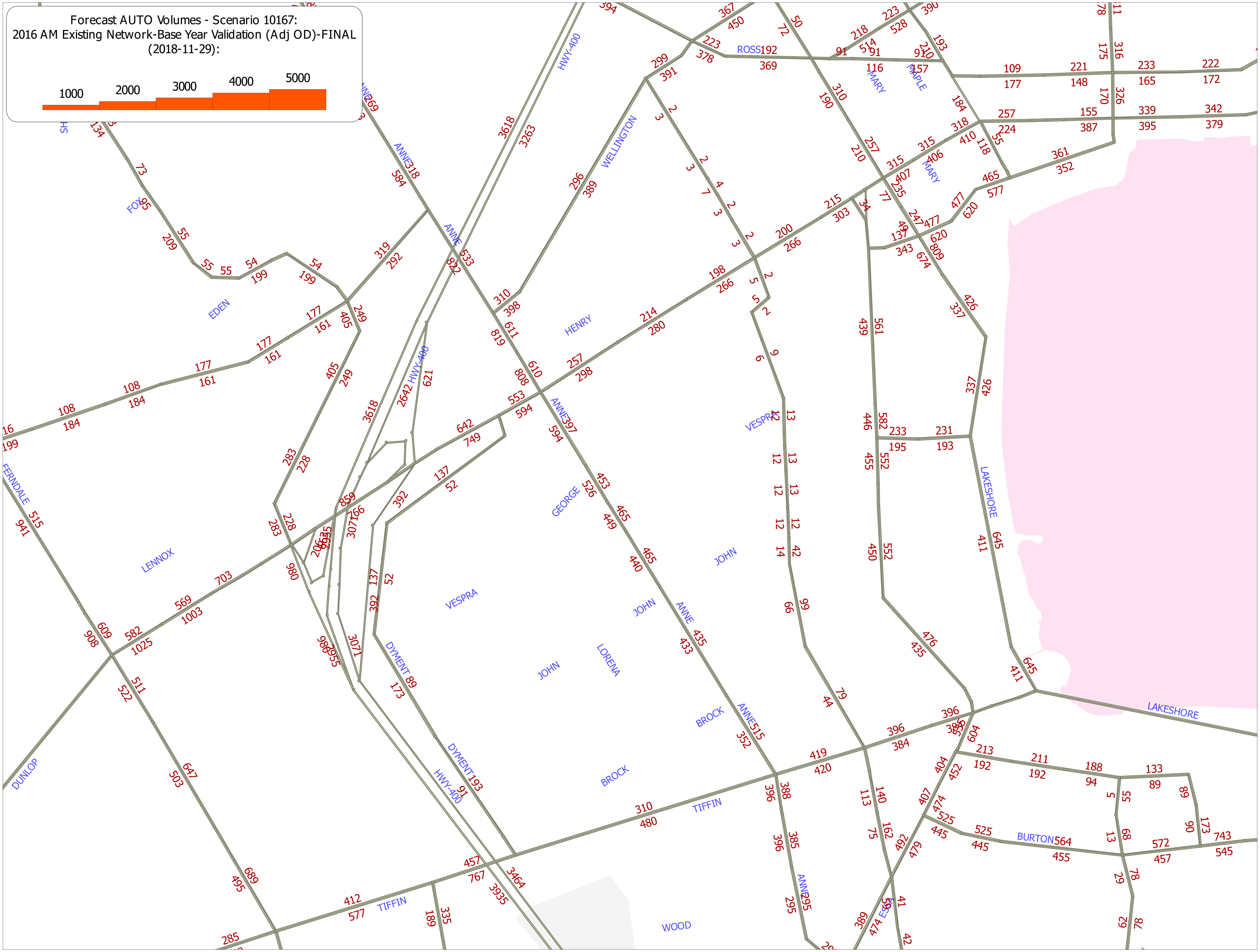
E-6.1 BASE YEAR 2016 ROAD NETWORK (AM), AUTO TRAFFIC VOLUMES


Forecast AUTO Volumes - Scenario 10167:
2016 AM Existing Network-Base Year Validation (Adj OD)-FINAL
(2018-11-29):
1000
2000
3000
4000
5000
LAKE
HWY-400
GEORGIAN
DUNSMORE
RING
BRIGHTEN
COOK
CORBETT
PENETANGUISHENE
BELL FARM
102
ROSE
ROSLYN
GROVE
LAY
PRATT
SHANNON
STEEL


Forecast AUTO Volumes - Scenario 10167:
2016 AM Existing Network-Base Year Validation (Adj OD)-FINAL
(2018-11-29):
1000
2000
3000
4000
5000
BELL FARM
CORBETT
GROVE
STEEL
BLAKE
COOK
LAY
QUEEN
OAK
GUNN
NEWTON
PEEL
OWEN
EUGENIA
OTTAWAY
ROSE

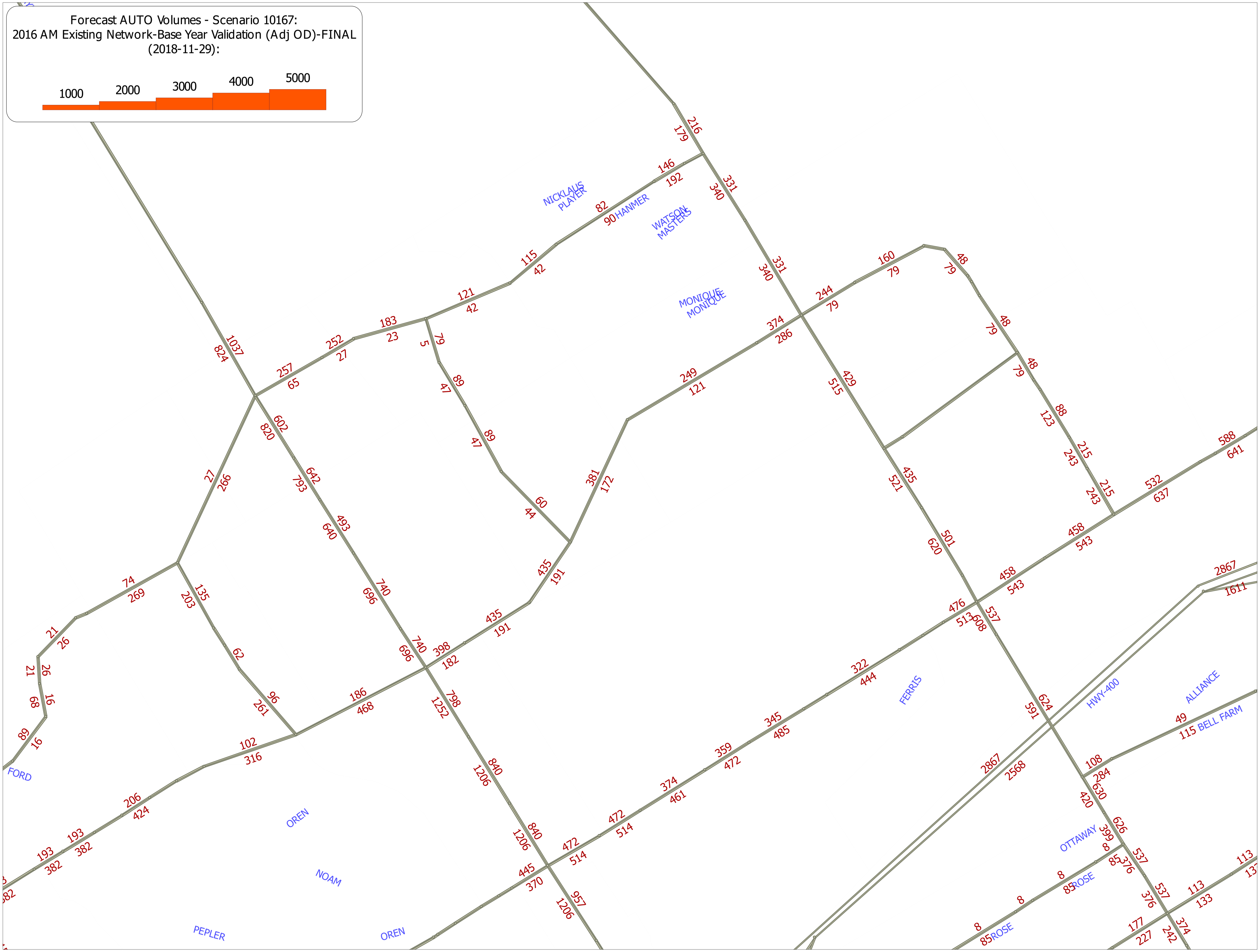


Forecast AUTO Volumes - Scenario 10167:
2016 AM Existing Network-Base Year Validation (Adj OD)-FINAL
(2018-11-29):
1000
2000
3000
4000
5000
LAY
QUEEN
OAK
GUNN
EUGENIA
BLAKE
NEWTON
PEEL
OWEN
ROSE
AGNES
DRURY
MARY
MAPLE
ROSS
SUNNIDALE
WELLINGTON
HENRY
ANNE
EDEN
HWY-400

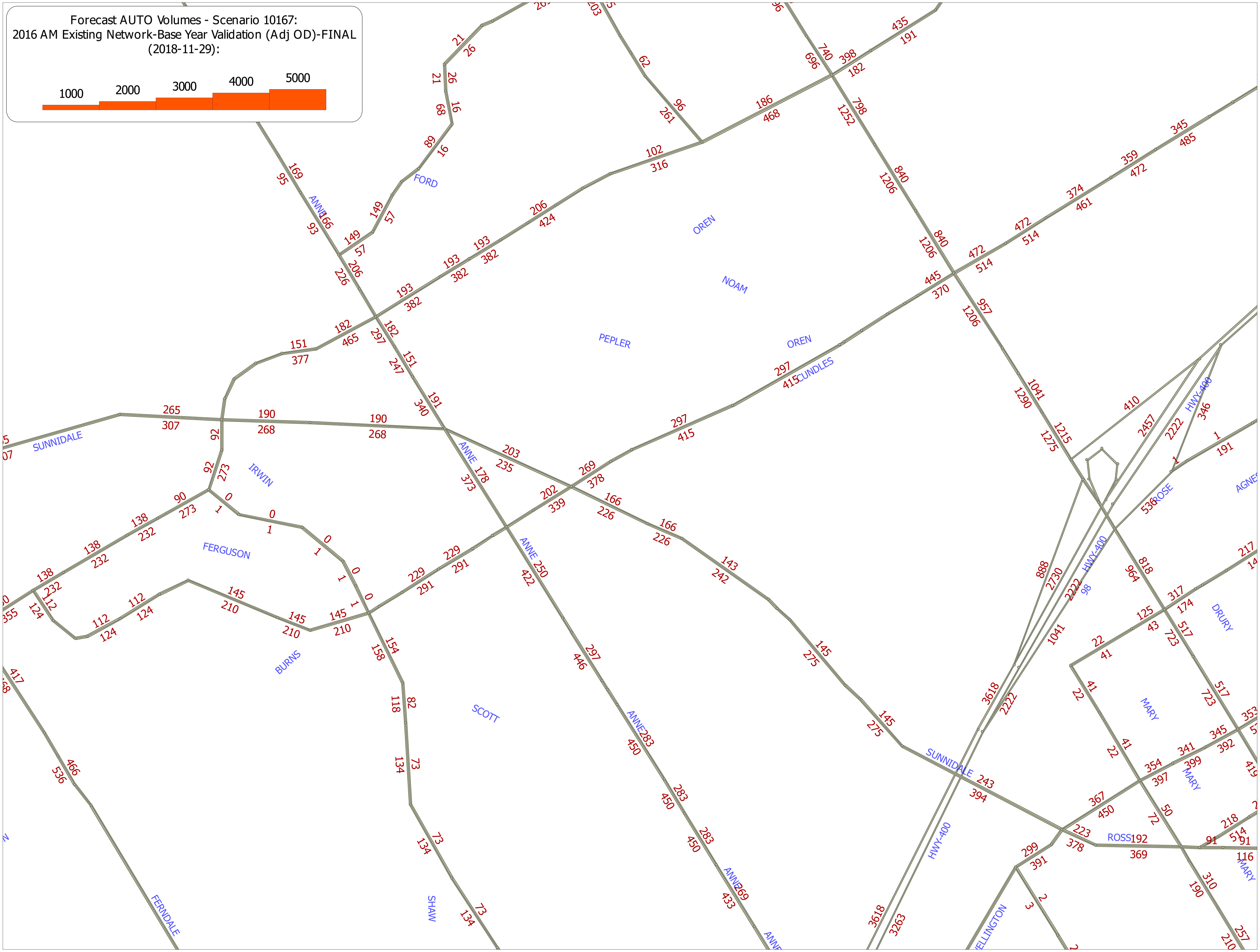

Forecast AUTO Volumes - Scenario 10167:
2016 AM Existing Network-Base Year Validation (Adj OD)-FINAL
(2018-11-29):
1000
2000
3000
4000
5000
LAKESHORE
BURTON
MARY
MAPLE
ROSS
WELLINGTON
HWY-400
ANNE
HENRY
VESPRA
JOHN
BROCK
TIFFIN
WOOD
LORENA
GEORGE
DYMENT
ESSA
EDEN
FOX
LENNOX
DUNLOP
FERNDALE

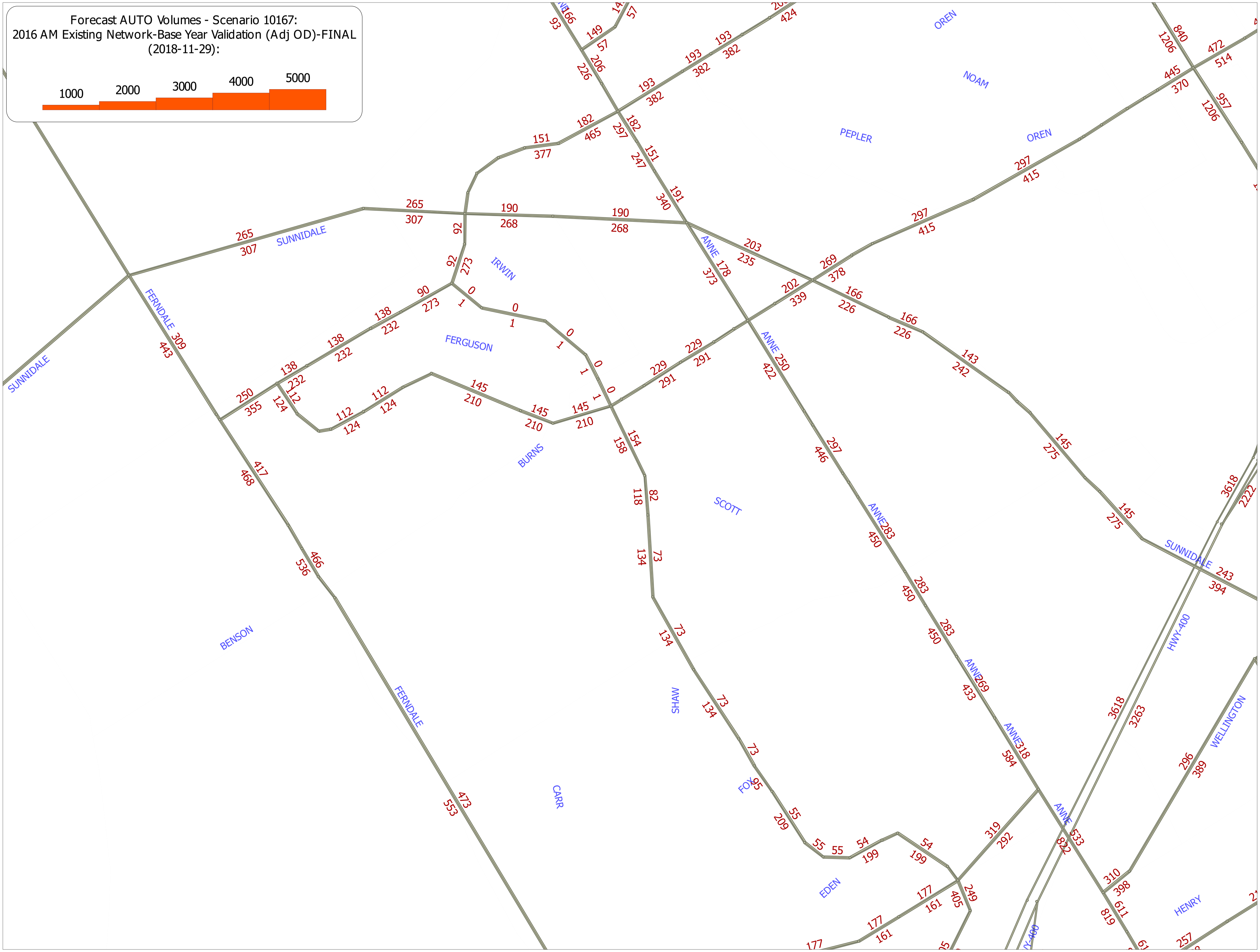
Forecast AUTO Volumes - Scenario 10167:
2016 AM Existing Network-Base Year Validation (Adj OD)-FINAL
(2018-11-29):

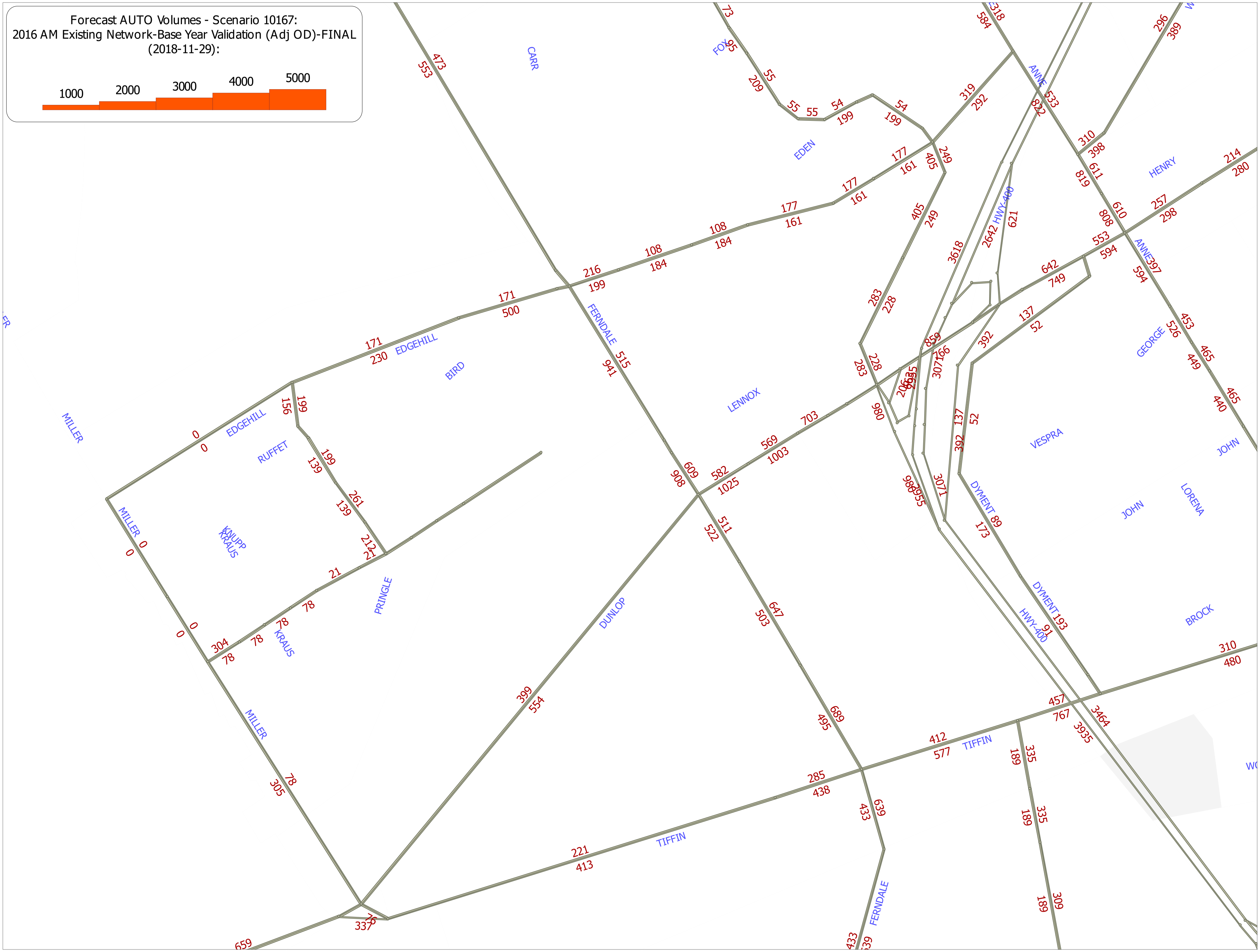
1000 2000 3000 4000 5000



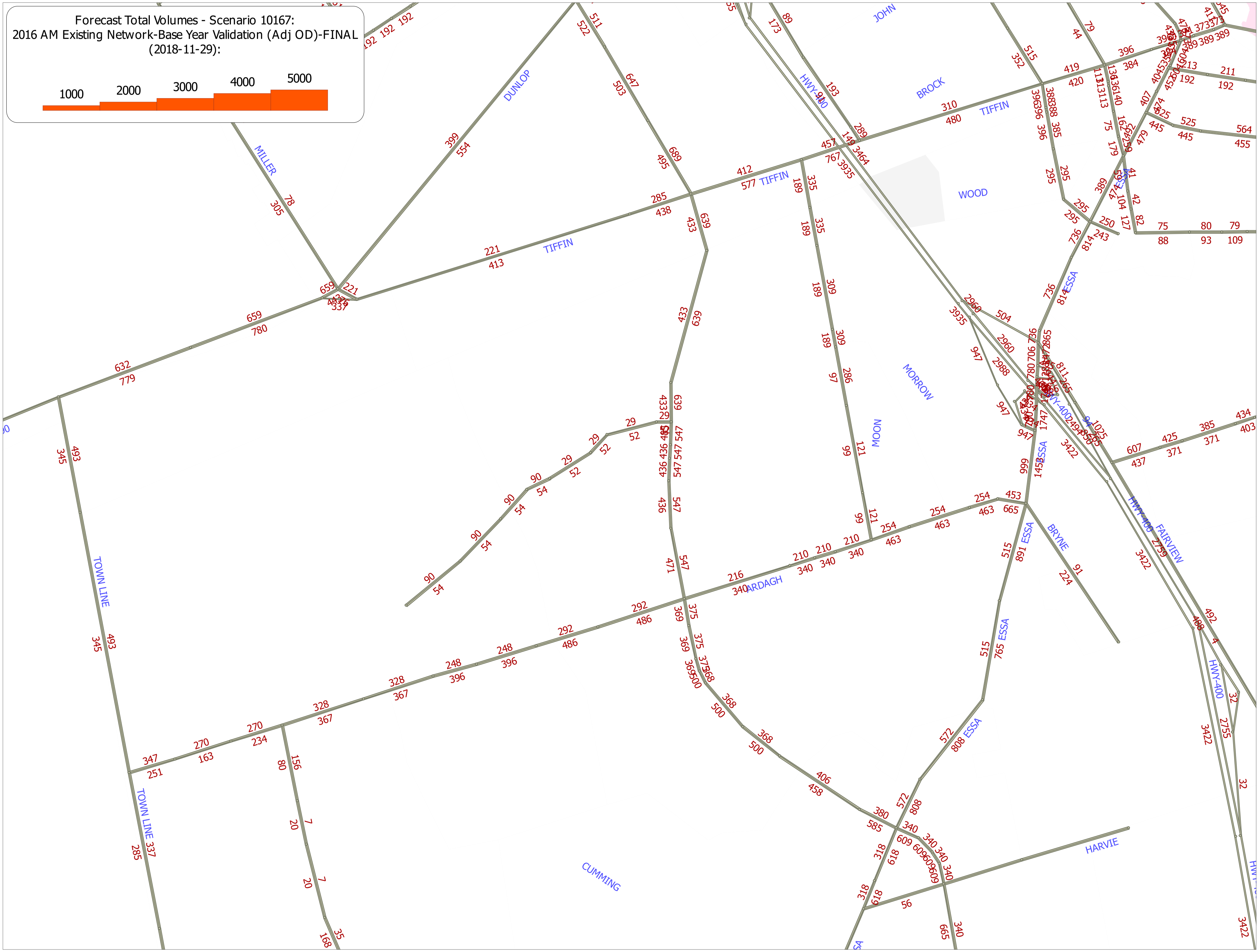
Forecast AUTO Volumes - Scenario 10167:
2016 AM Existing Network-Base Year Validation (Adj OD)-FINAL
(2018-11-29):

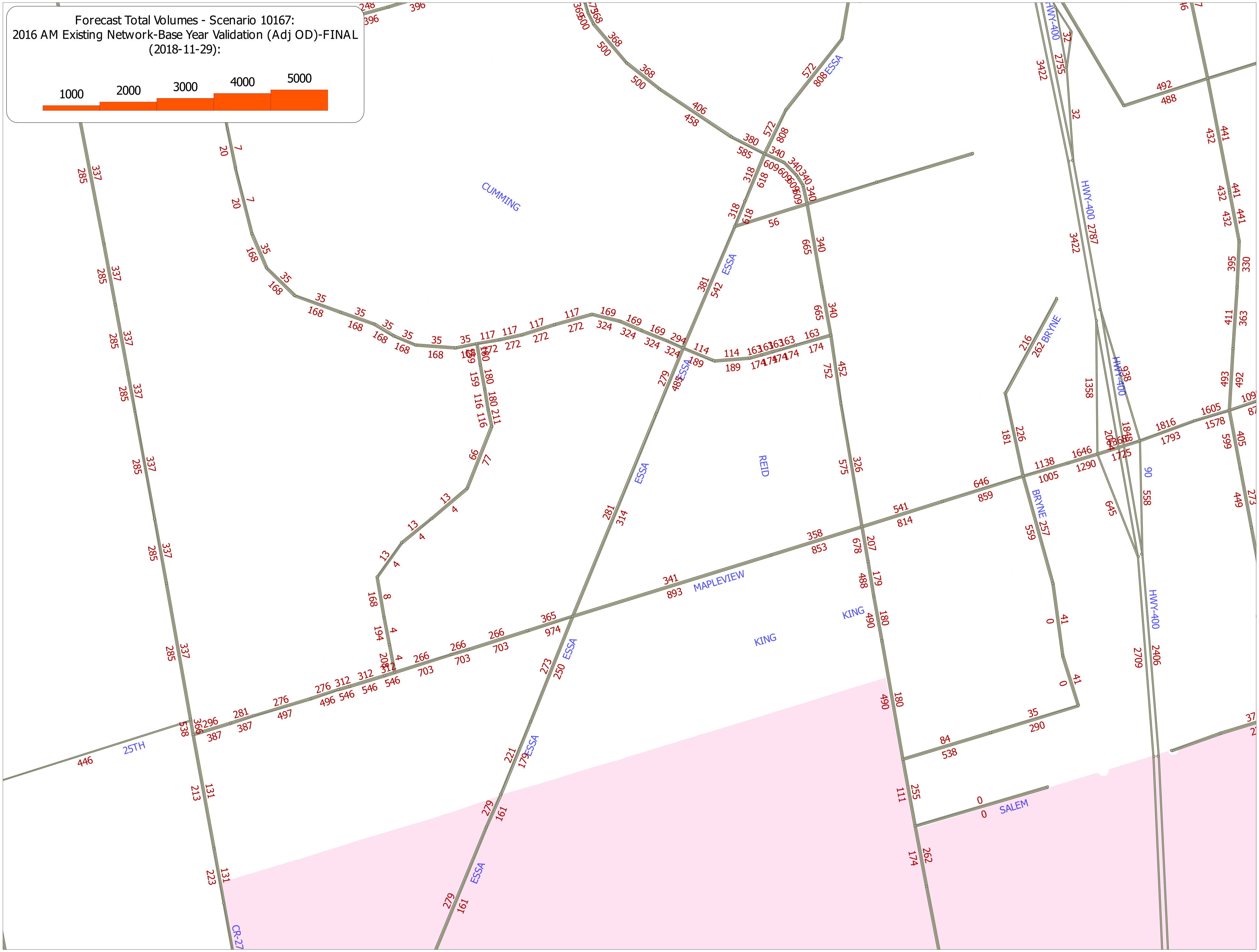


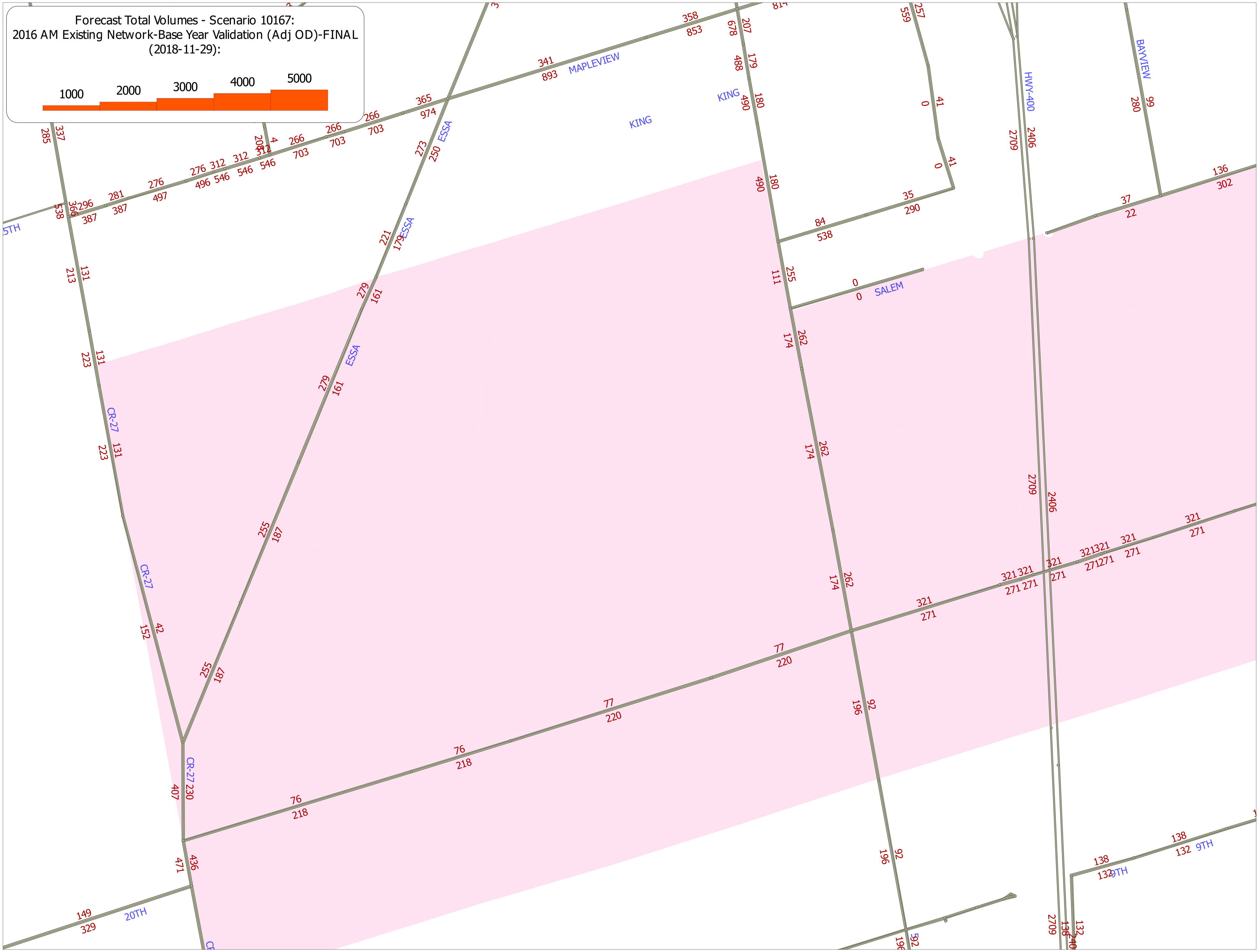

Forecast AUTO Volumes - Scenario 10167:
2016 AM Existing Network-Base Year Validation (Adj OD)-FINAL
(2018-11-29):
1000
2000
3000
4000
5000
SUNNIDALE
FERNDALE
IRWIN
FERGUSON
BURNS
BENSON
SCOTT
SHAW
CARR
FOX
EDEN
ANNE
PEPLER
NOAM
OREN
HWY-400
WELLINGTON
HENRY



Forecast AUTO Volumes - Scenario 10167:
2016 AM Existing Network-Base Year Validation (Adj OD)-FINAL
(2018-11-29):
1000
2000
3000
4000
5000
CARR
FOX
EDEN
HENRY
ANNE
GEORGE
JOHN
LORENA
BROCK
VESPRA
DYMENT
HWY-400
LENNOX
FERNDALE
EDGEHILL
BIRD
RUFFET
KNUPP
KRAUS
PRINGLE
DUNLOP
MILLER
TIFFIN


Forecast Total Volumes - Scenario 10167:
2016 AM Existing Network-Base Year Validation (Adj OD)-FINAL
(2018-11-29):
1000
2000
3000
4000
5000
DUNLOP
MILLER
TIFFIN
JOHN
BROCK
WOOD
HWY-400
MORROW
MOON
ESSA
BRYNE
FAIRVIEW
ARDAGH
TOWN LINE
HARVIE
CUMMING


Forecast Total Volumes - Scenario 10167:
2016 AM Existing Network-Base Year Validation (Adj OD)-FINAL
(2018-11-29):
1000
2000
3000
4000
5000
CUMMING
ESSA
REID
KING
MAPLEVIEW
BRYNE
HWY-400
SALEM
25TH
CR-27



Forecast Total Volumes - Scenario 10167:
2016 AM Existing Network-Base Year Validation (Adj OD)-FINAL
(2018-11-29):
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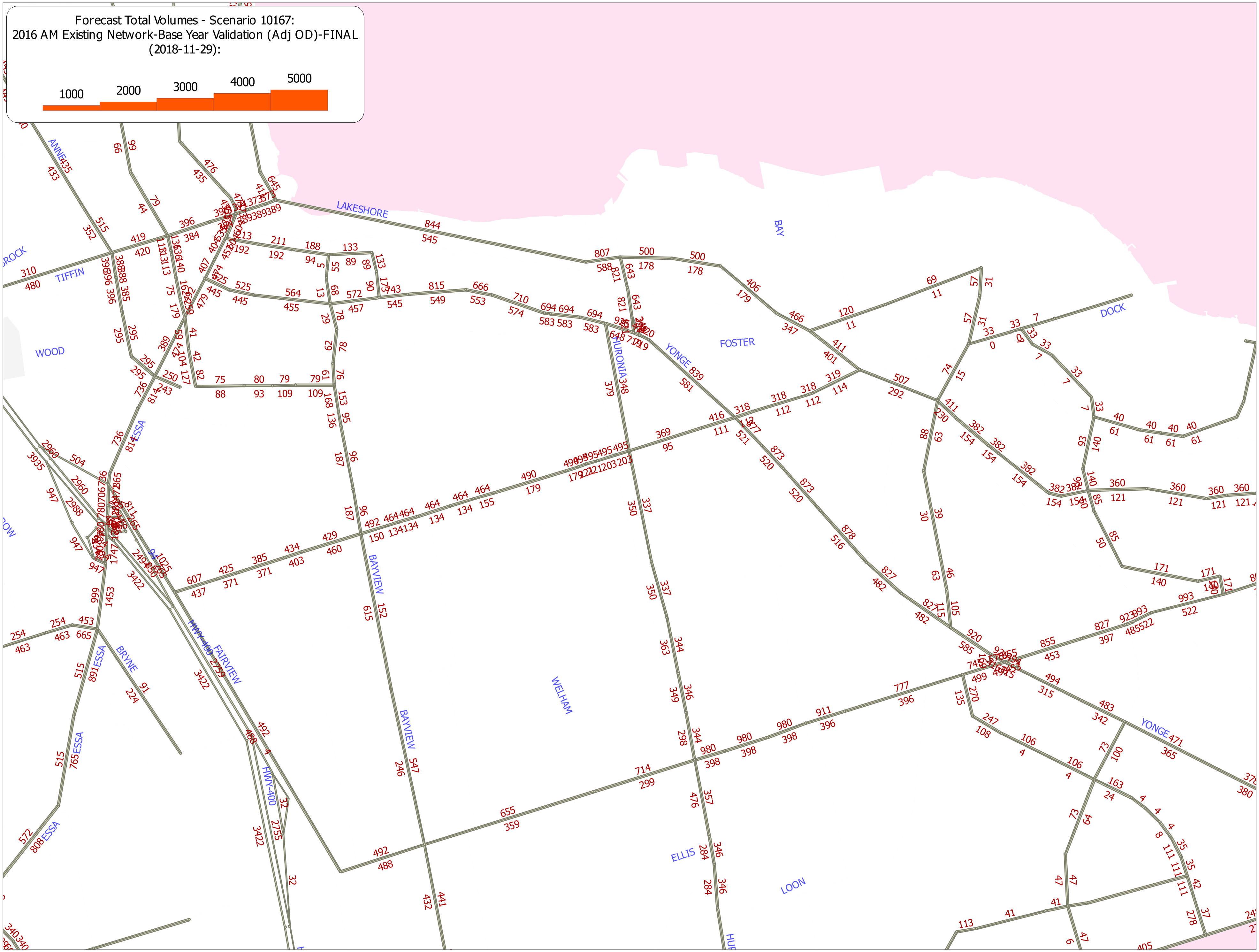
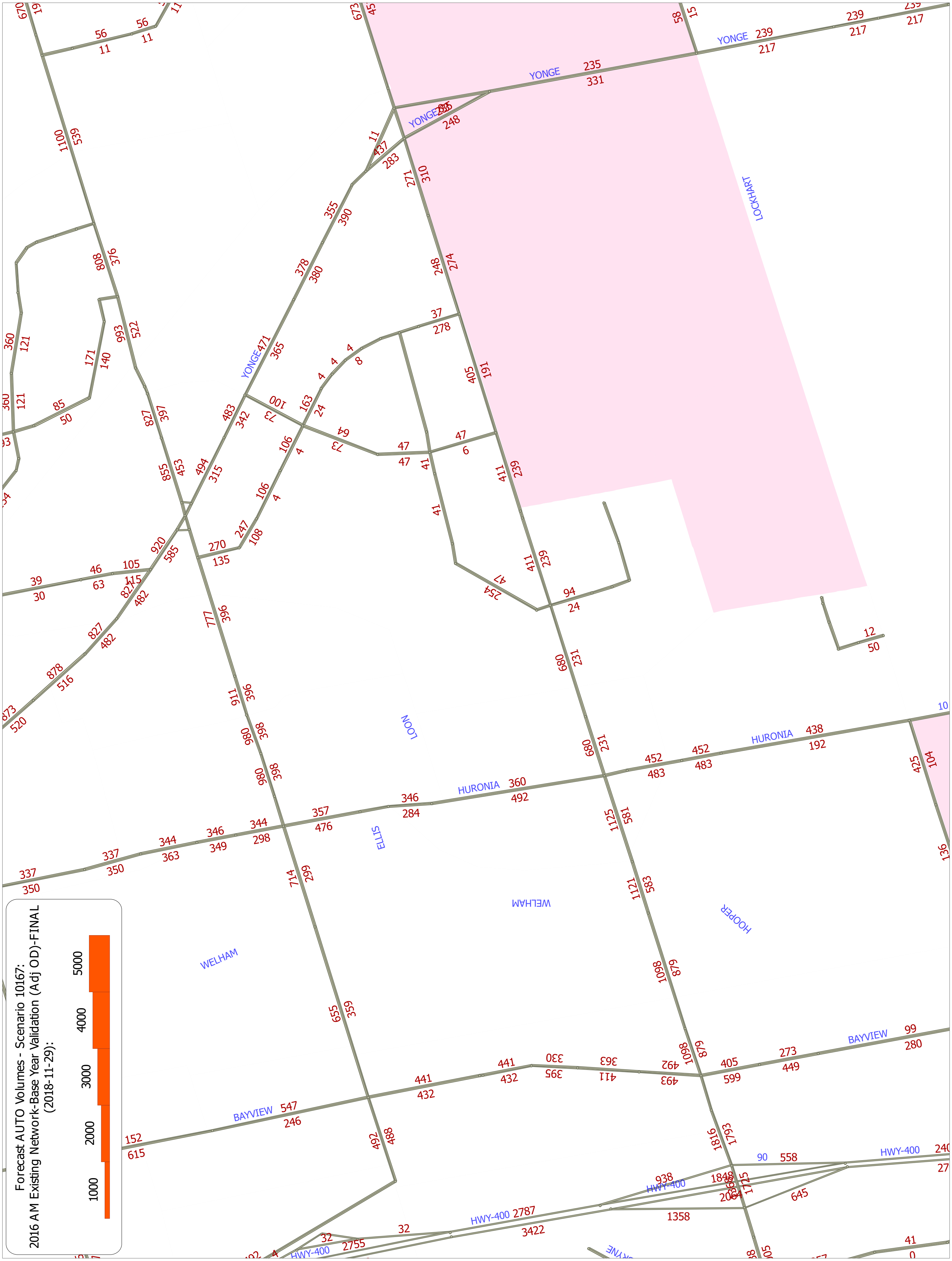
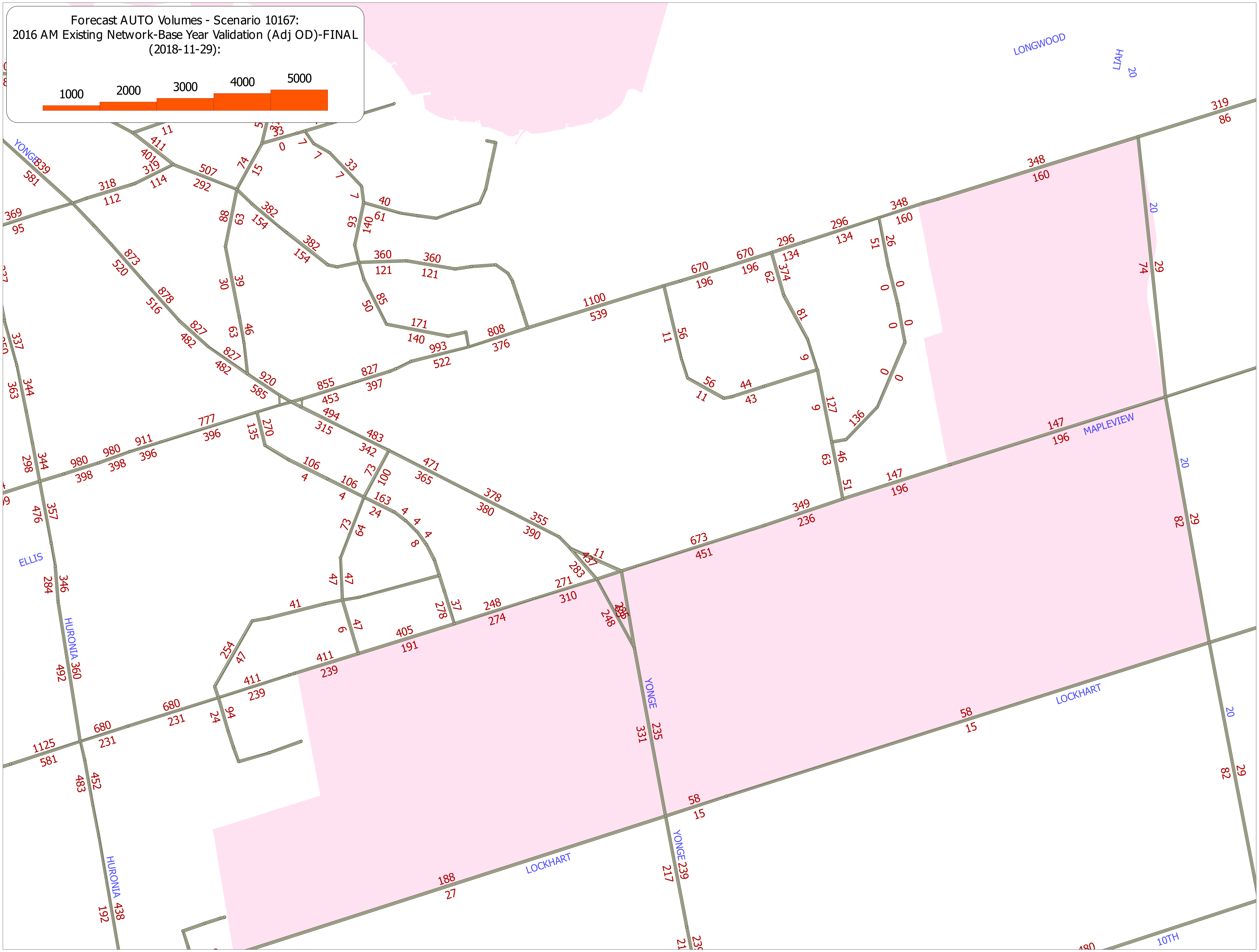
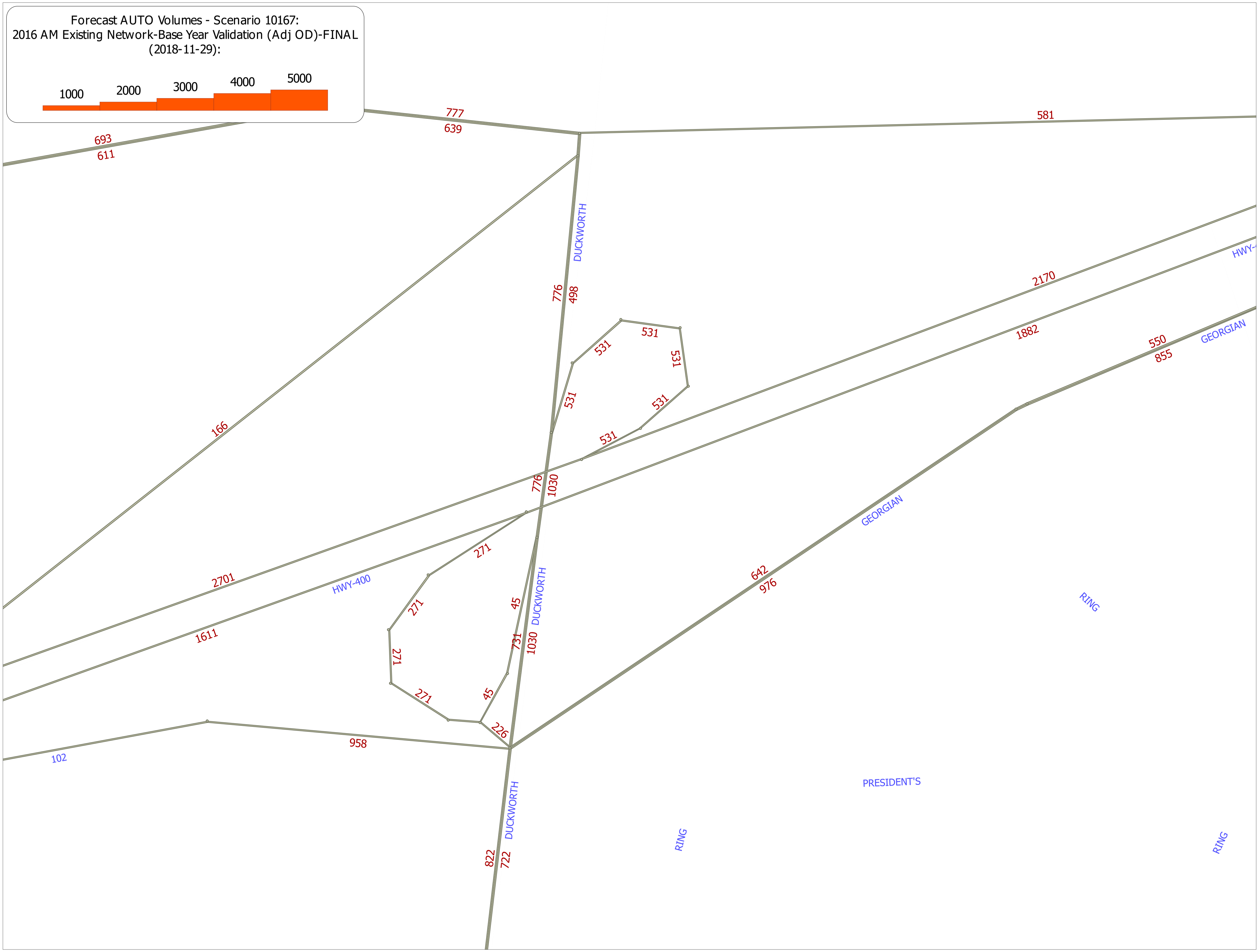
2000
3000
4000
5000
MAPLEVIEW
KING
ESSA
HWY-400
BAYVIEW
SALEM
CR-27
20TH
9TH

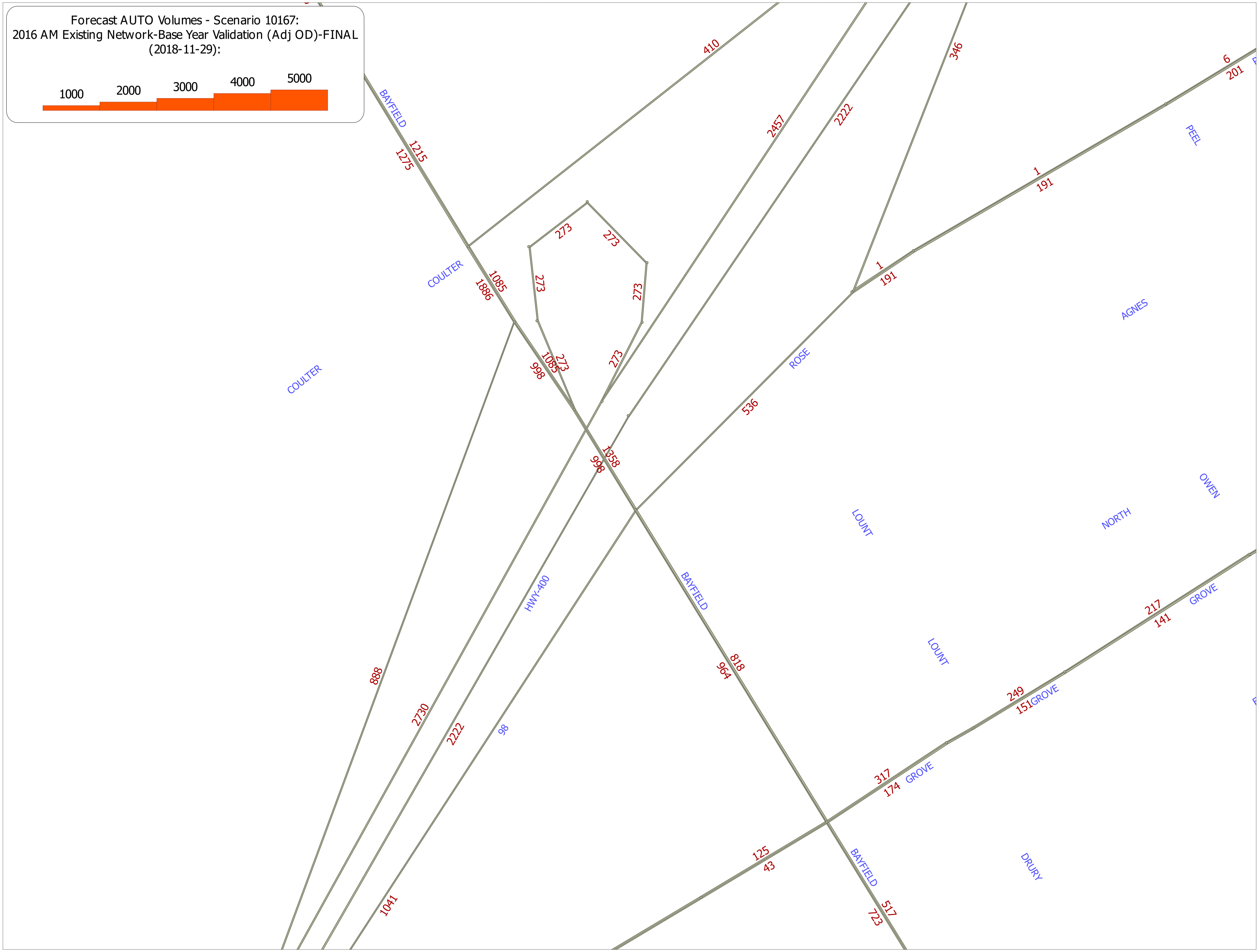

Forecast Total Volumes - Scenario 10167:
2016 AM Existing Network-Base Year Validation (Adj OD)-FINAL
(2018-11-29):
1000
2000
3000
4000
5000
LAKESHORE
BAY
DOCK
FOSTER
YONGE
HURONIA
WOOD
TIFFIN
ANNE
ESSA
BAYVIEW
WELHAM
FAIRVIEW
HWY-400
BRYNE
ELLIS
LOON


Forecast AUTO Volumes - Scenario 10167:
2016 AM Existing Network-Base Year Validation (Adj OD)-FINAL
(2018-11-29):
5000
4000
3000
2000
1000
YONGE
LOCKHART
HURONIA
LOON
ELLIS
WELHAM
HOOPER
BAYVIEW
HWY-400


Forecast AUTO Volumes - Scenario 10167:
2016 AM Existing Network-Base Year Validation (Adj OD)-FINAL
(2018-11-29):
1000
2000
3000
4000
5000
LONGWOOD
LIAH
MAPLEVIEW
LOCKHART
YONGE
HURONIA
ELLIS
10TH


Forecast AUTO Volumes - Scenario 10167:
2016 AM Existing Network-Base Year Validation (Adj OD)-FINAL
(2018-11-29):
5000
4000
3000
2000
1000
YONGE
LOCKHART
10TH
9TH
8TH
HURONIA
10
BAYVIEW
HWY-400
BRYNE
SALEM
KING


Forecast AUTO Volumes - Scenario 10167:
2016 AM Existing Network-Base Year Validation (Adj OD)-FINAL
(2018-11-29):
1000
2000
3000
4000
5000
777
639
581
693
611
DUCKWORTH
776
498
2170
1882
550
855
GEORGIAN
HWY-
531
531
531
531
531
531
166
776
1030
271
2701
HWY-400
GEORGIAN
642
976
RING
45
DUCKWORTH
271
1611
731
1030
271
271
45
226
958
102
PRESIDENT'S
DUCKWORTH
822
722
RING
RING


Forecast AUTO Volumes - Scenario 10167:
2016 AM Existing Network-Base Year Validation (Adj OD)-FINAL
(2018-11-29):
1000
2000
3000
4000
5000
BAYFIELD
COULTER
ROSE
HWY-400
LOUNT
NORTH
OWEN
AGNES
PEEL
GROVE
DRURY
98
410
2457
2222
346
6
201
1
191
1215
1275
1085
1886
273
998
1358
536
888
2730
818
964
317
174
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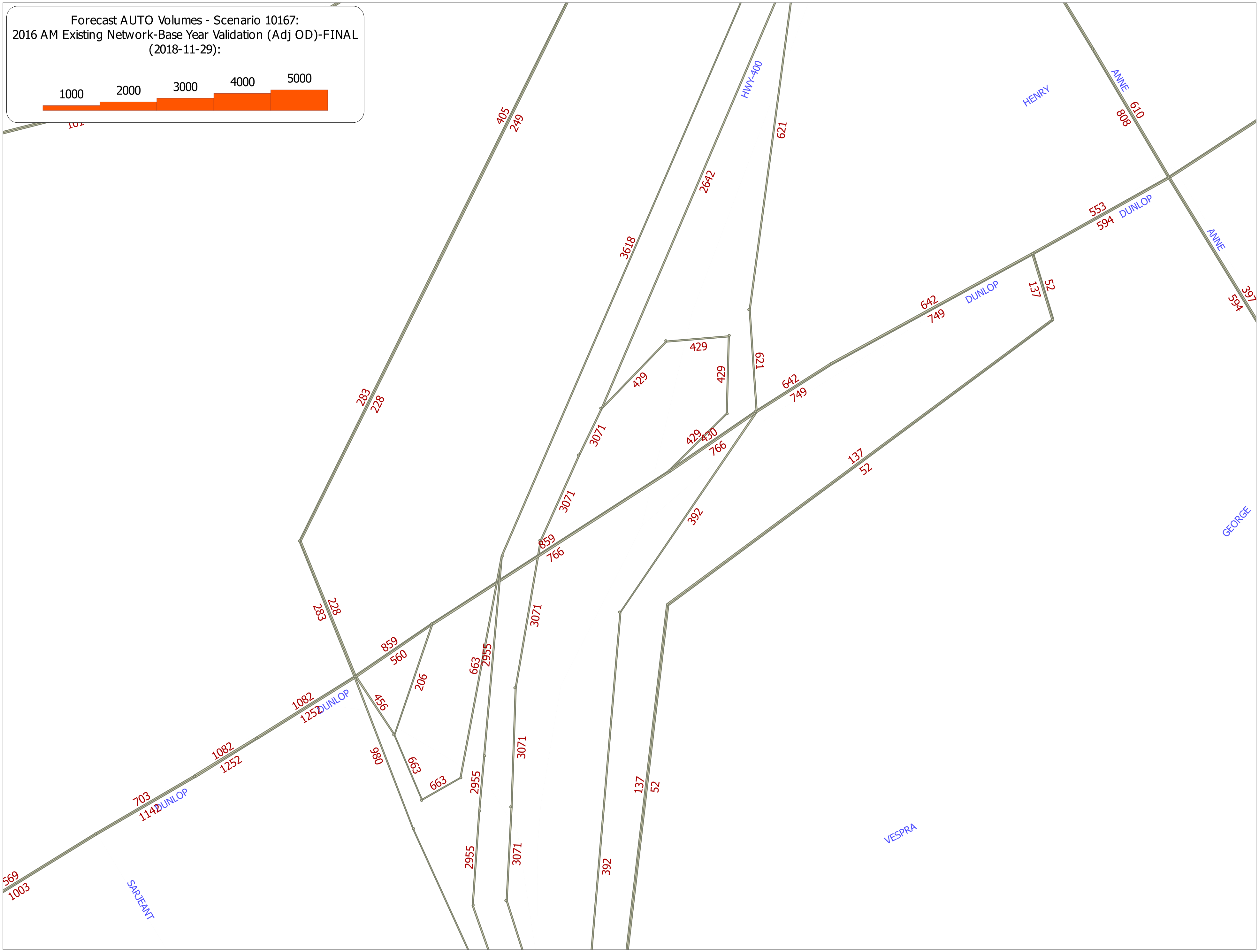
151
217
141
125
43
517
723
1041



Forecast AUTO Volumes - Scenario 10167:
2016 AM Existing Network-Base Year Validation (Adj OD)-FINAL
(2018-11-29):
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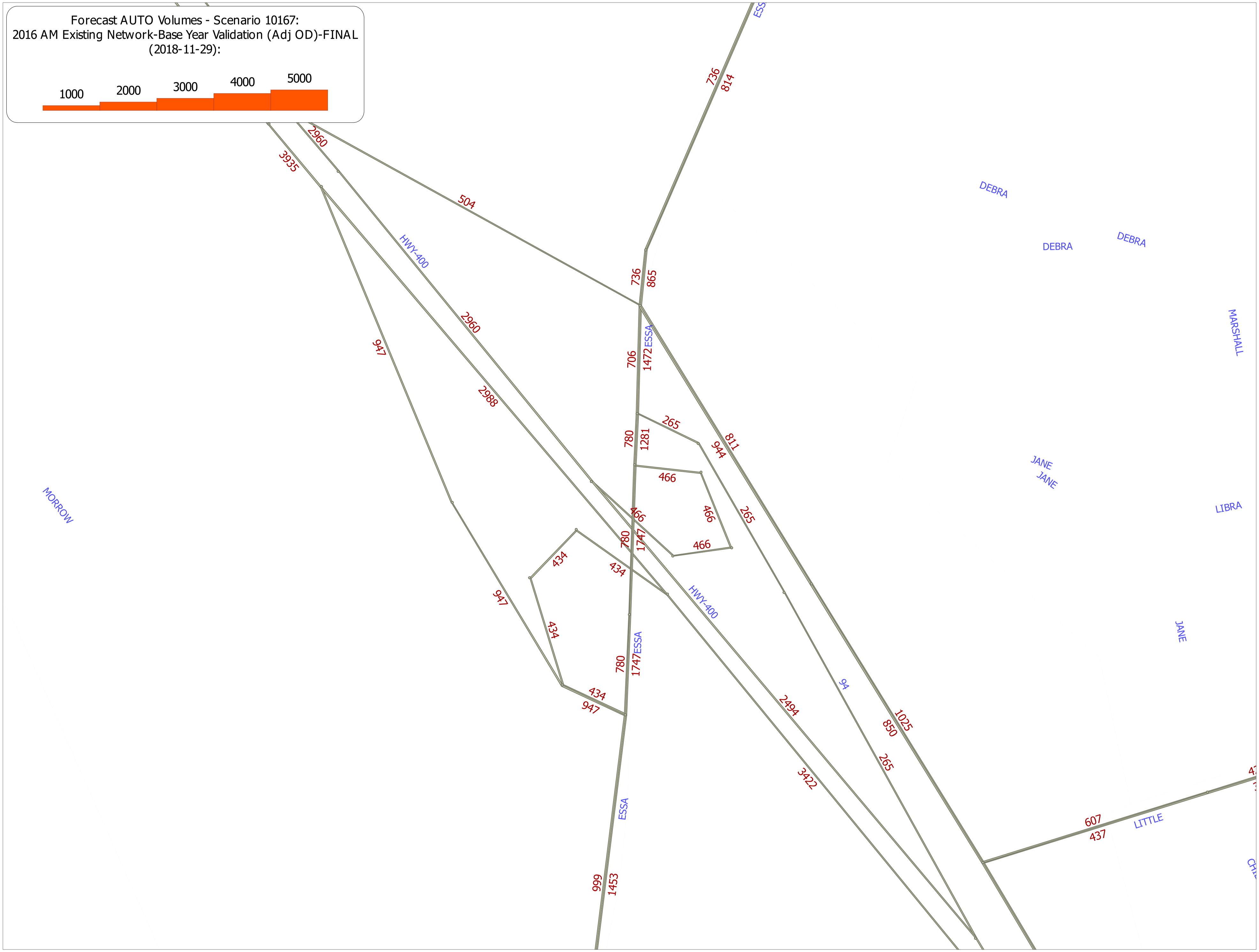
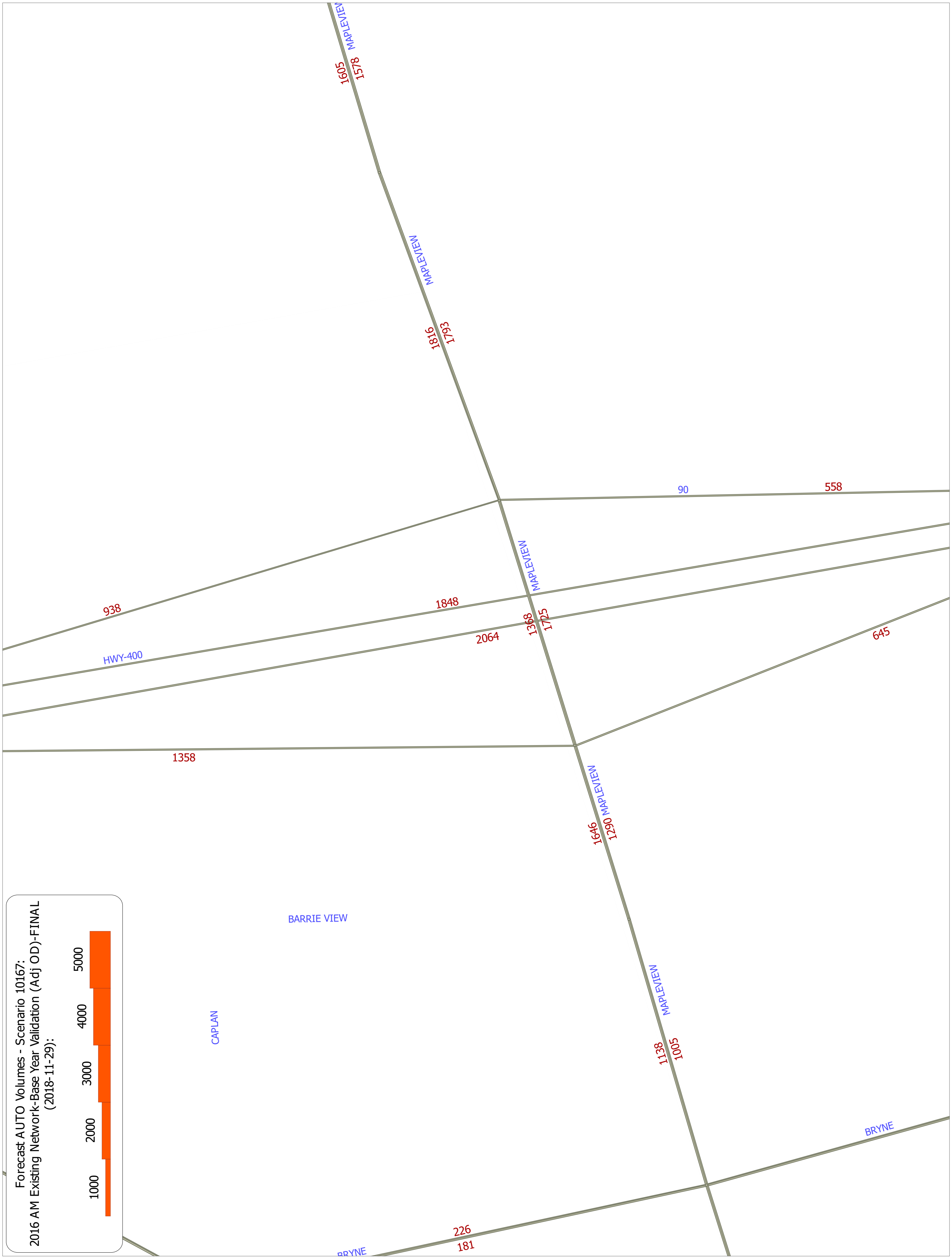
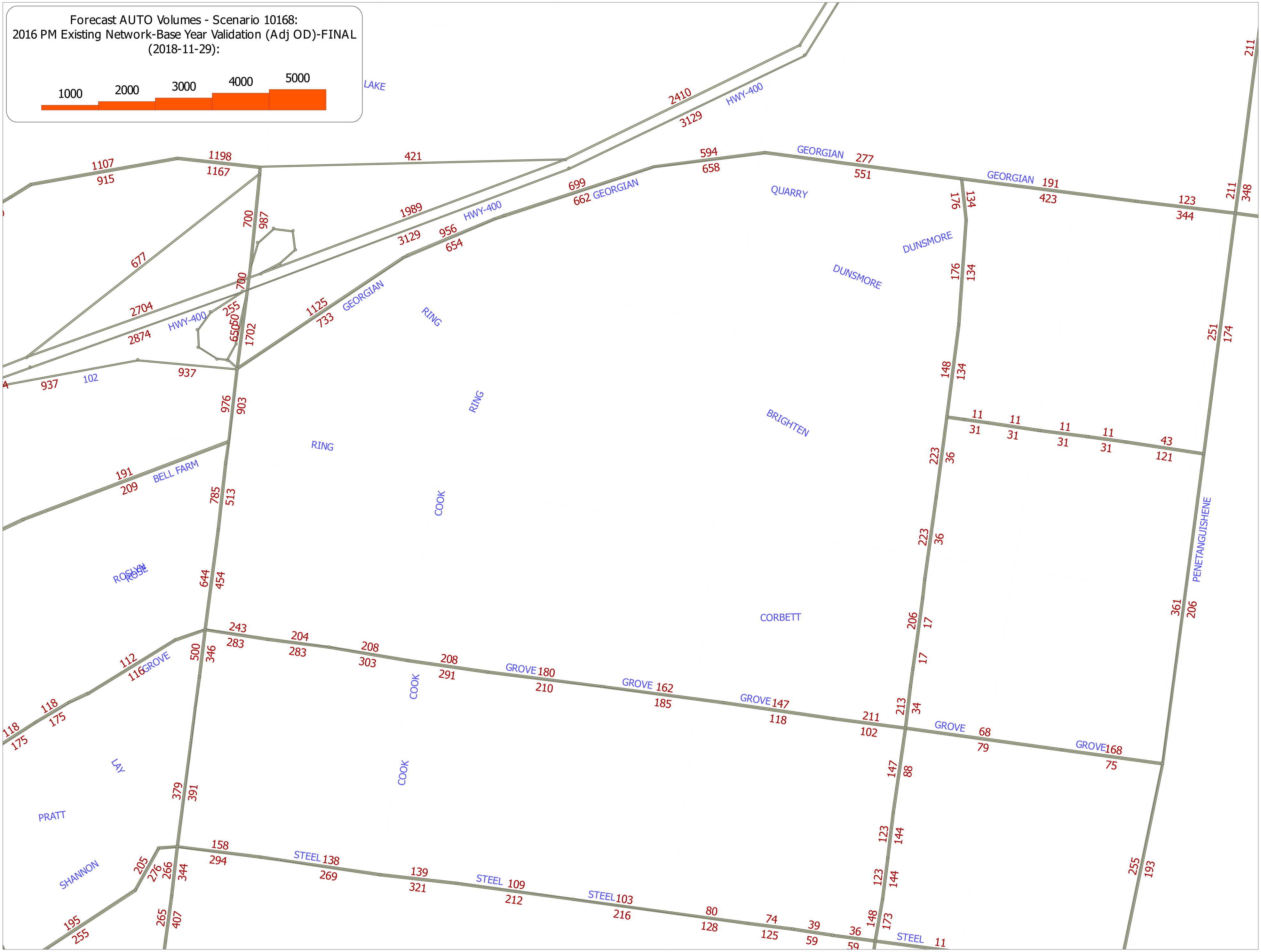
2000
3000
4000
5000
HWY-400
HENRY
ANNE
DUNLOP
GEORGE
VESPRA
SARJEANT


Forecast AUTO Volumes - Scenario 10167:
2016 AM Existing Network-Base Year Validation (Adj OD)-FINAL
(2018-11-29):
1000
2000
3000
4000
5000
ESSA
HWY-400
94
LITTLE
JANE
DEBRA
MARSHALL
LIBRA
MORROW
736
814
865
706
1472
504
2960
3935
947
2988
265
944
811
780
1281
466
1747
434
2494
3422
850
1025
607
437
999
1453


Forecast AUTO Volumes - Scenario 10167:
2016 AM Existing Network-Base Year Validation (Adj OD)-FINAL
(2018-11-29):
5000
4000
3000
2000
1000
MAPLEVIEW
1605
1578
MAPLEVIEW
1816
1793
90
558
MAPLEVIEW
938
1848
HWY-400
2064
1368
1725
645
1358
MAPLEVIEW
1646
1290
BARRIE VIEW
CAPLAN
MAPLEVIEW
1138
1005
BRYNE
226
181
BRYNE

APPENDIX

E-6.2 BASE YEAR 2016 ROAD NETWORK (PM), AUTO TRAFFIC VOLUMES


Forecast AUTO Volumes - Scenario 10168:
2016 PM Existing Network-Base Year Validation (Adj OD)-FINAL
(2018-11-29):
1000
2000
3000
4000
5000
LAKE
HWY-400
GEORGIAN
QUARRY
DUNSMORE
RING
BRIGHTEN
CORBETT
COOK
BELL FARM
GROVE
PENETANGUISHENE
STEEL
LAY
PRATT
SHANNON
102
2410
3129
1107
915
1198
1167
421
594
658
277
551
191
423
123
344
211
348
699
662
1989
956
654
700
987
677
2704
2874
1125
733
255
650
1702
937
976
903
176
134
148
11
31
43
121
251
174
223
36
206
17
213
34
191
209
785
513
644
454
243
283
204
208
303
291
180
210
162
185
147
118
211
102
68
79
168
75
500
346
112
116
118
175
361
88
123
144
379
391
158
294
138
269
139
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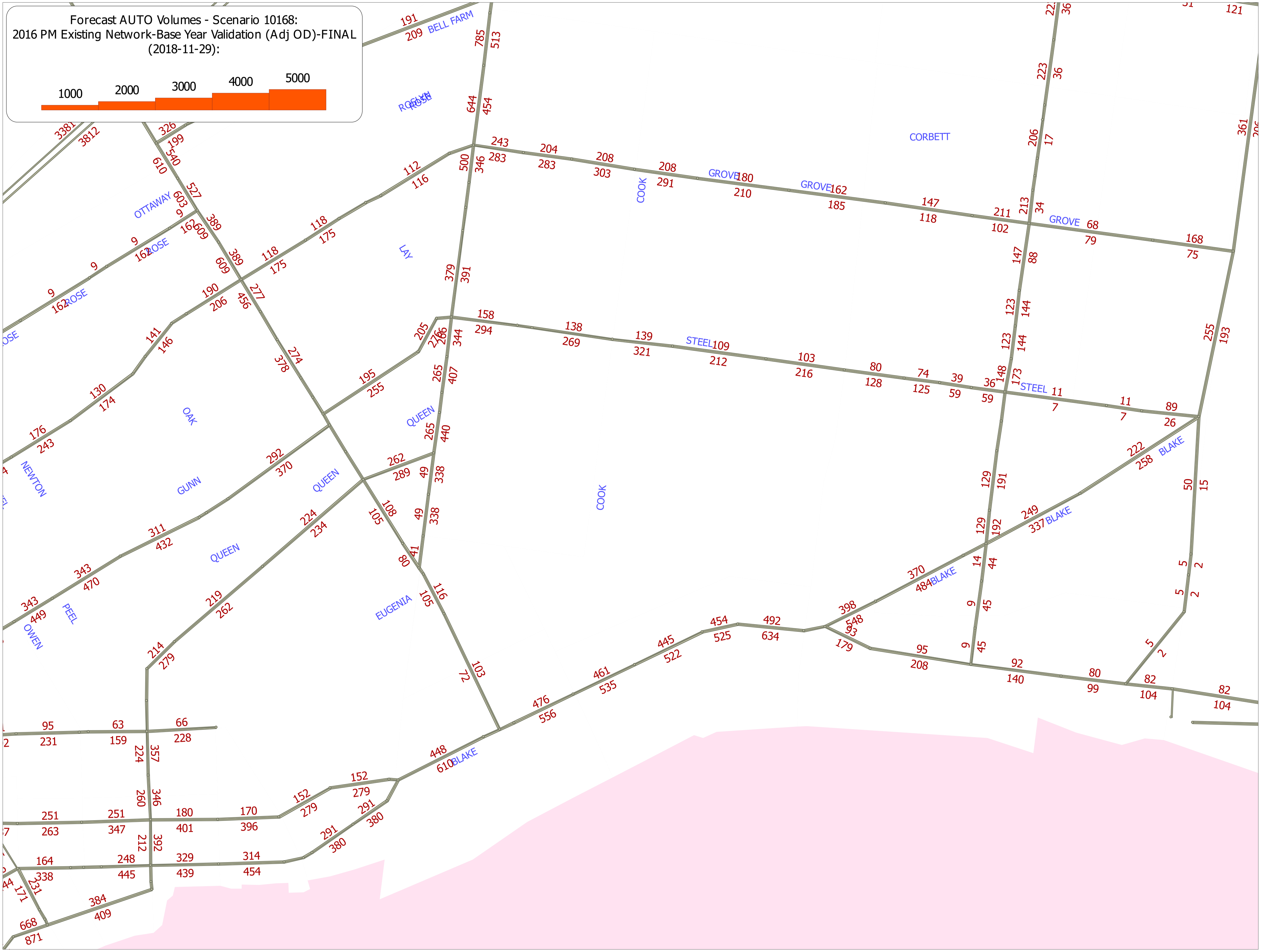
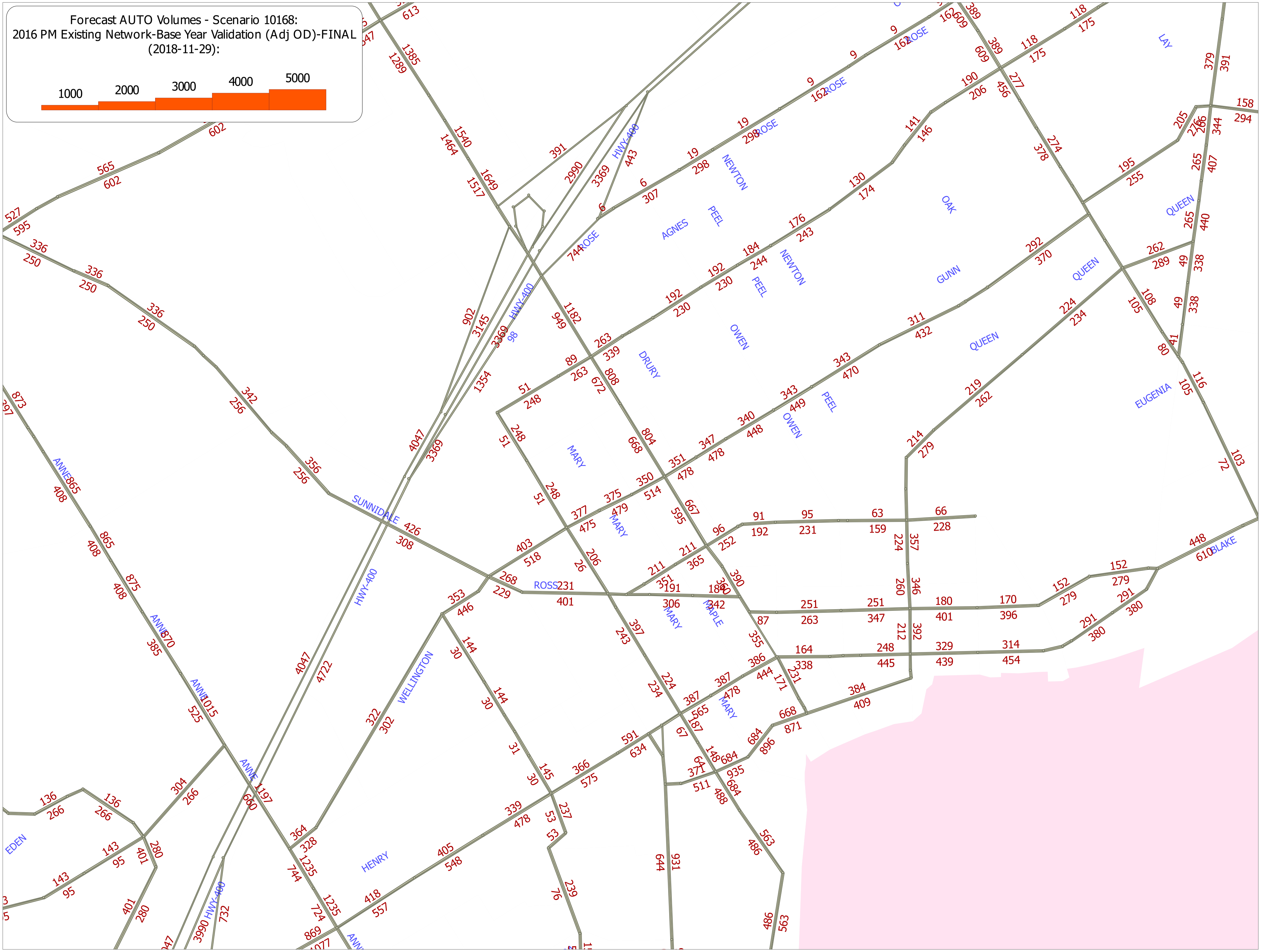
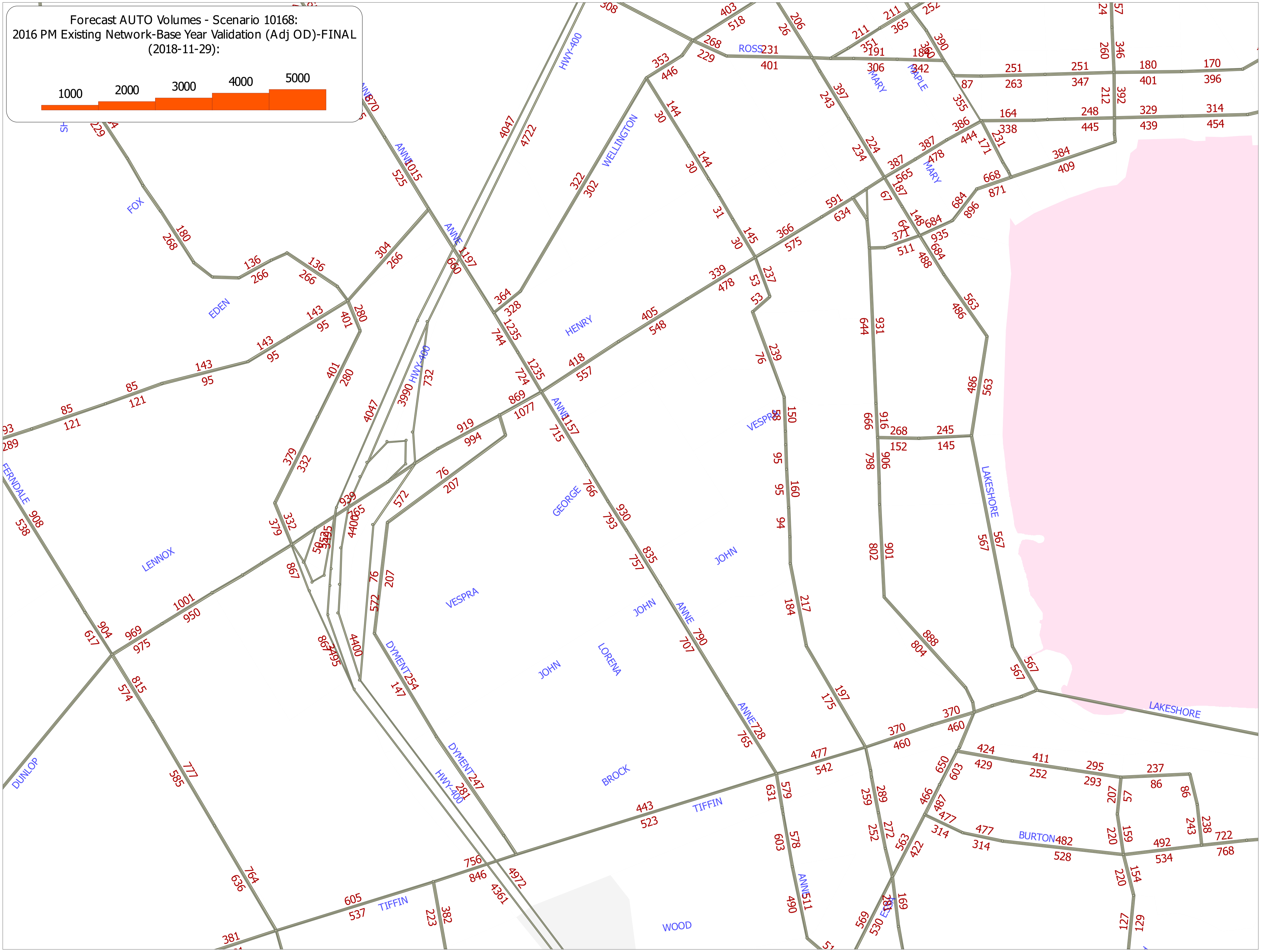
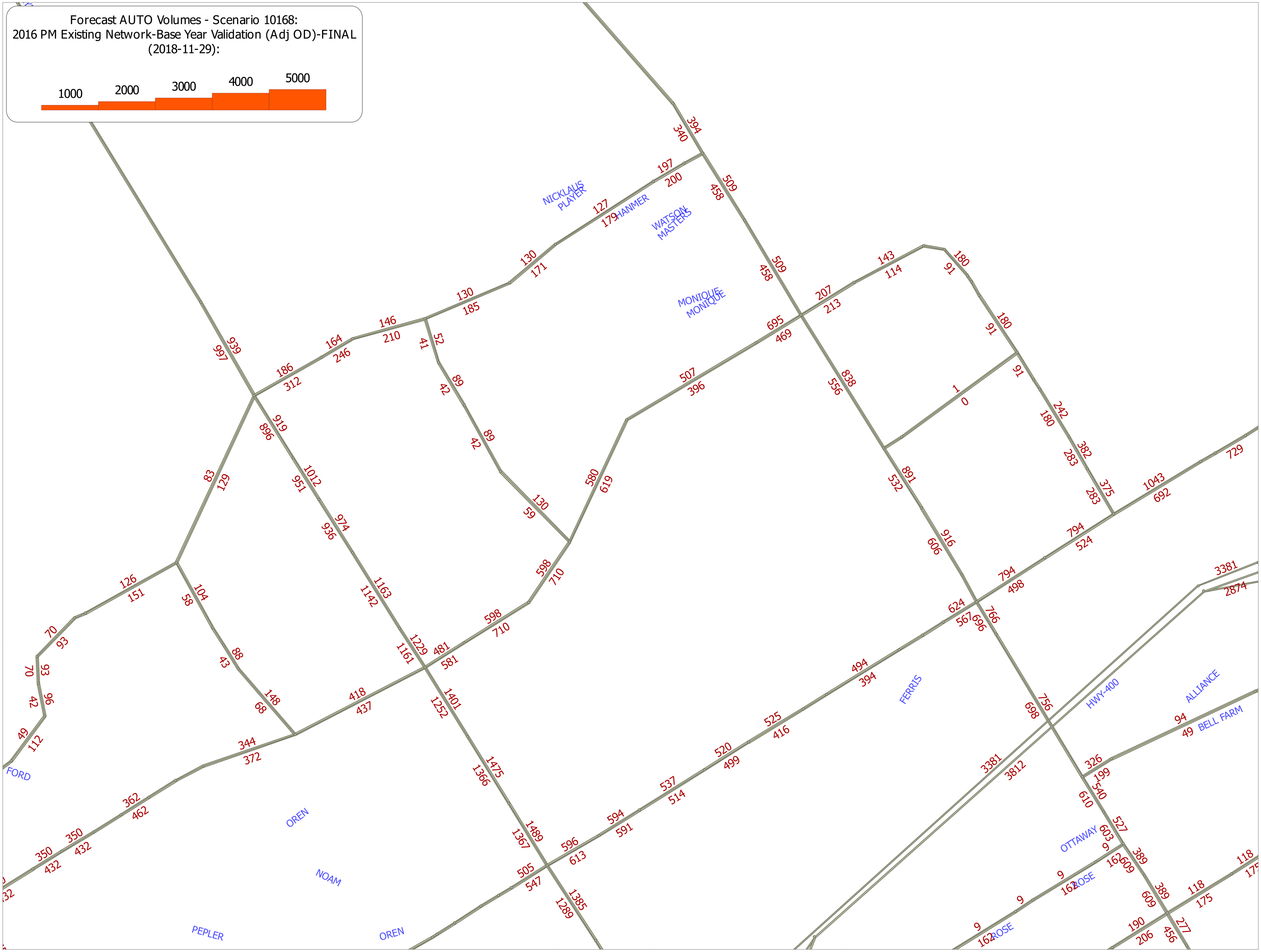
195
255
265
407
193

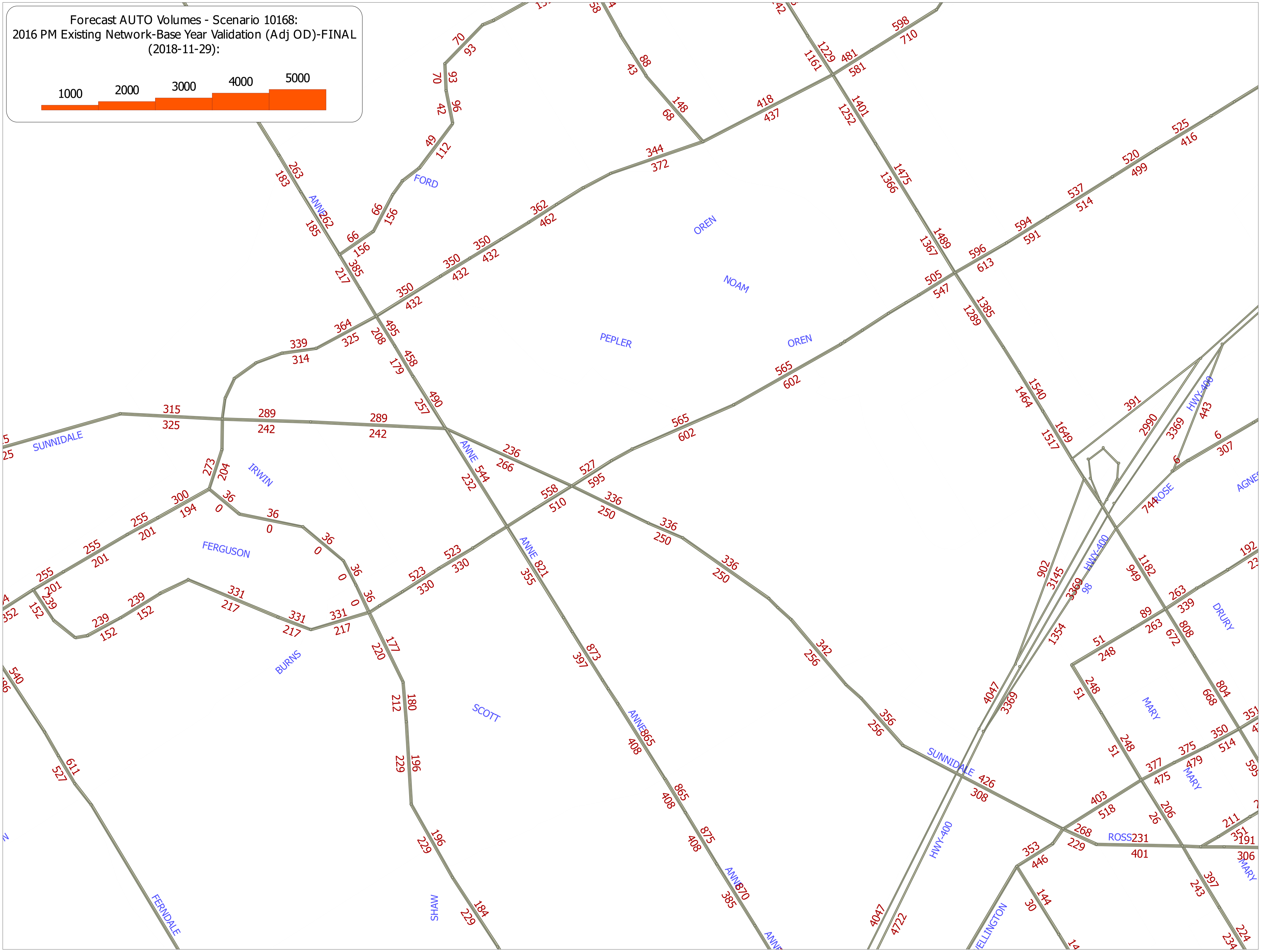


Forecast AUTO Volumes - Scenario 10168:
2016 PM Existing Network-Base Year Validation (Adj OD)-FINAL
(2018-11-29):
1000
2000
3000
4000
5000
BELL FARM
CORBETT
GROVE
COOK
STEEL
BLAKE
LAY
QUEEN
OAK
GUNN
NEWTON
OTTAWAY
ROSE
PEEL
OWEN
EUGENIA

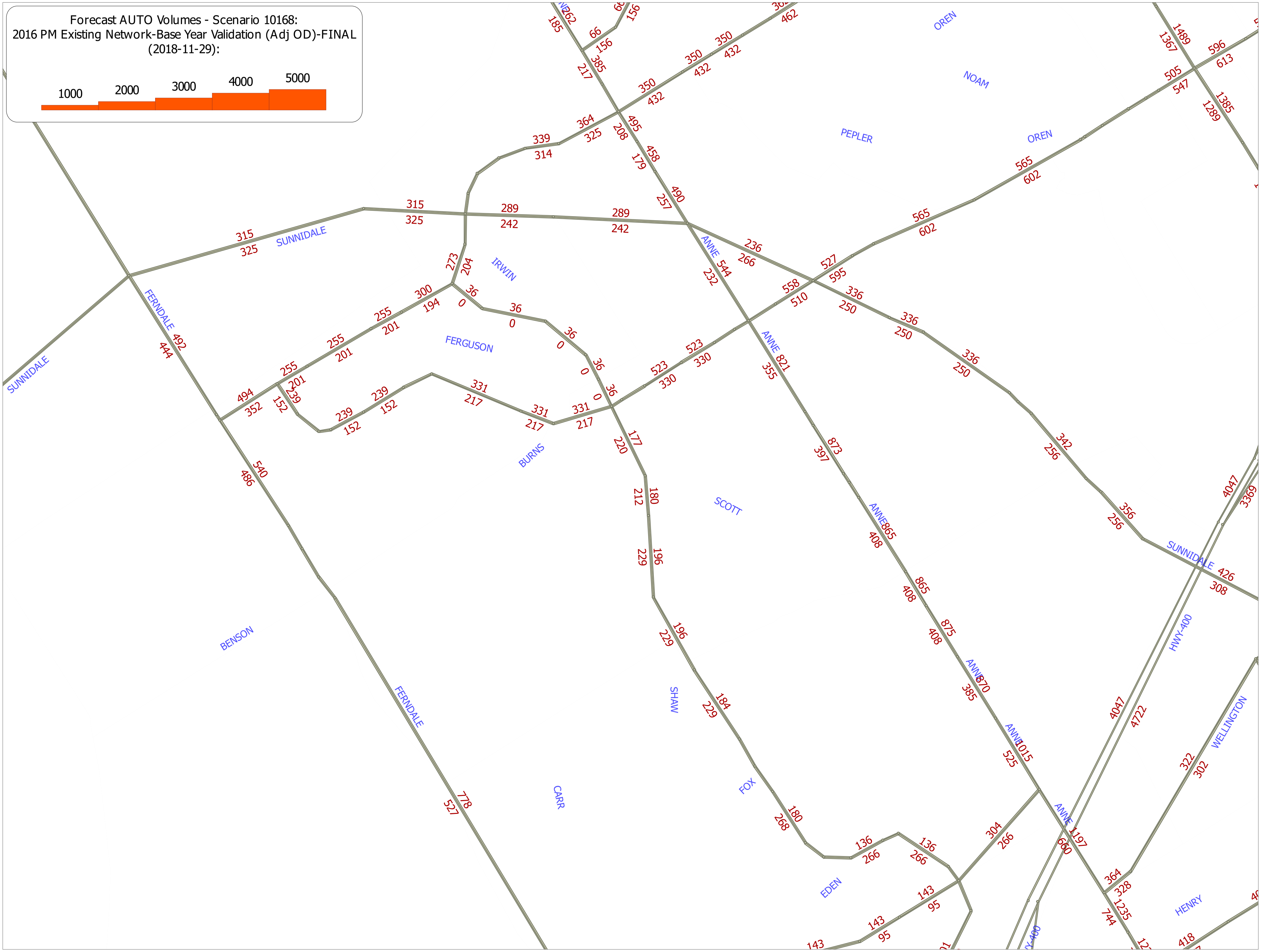

Forecast AUTO Volumes - Scenario 10168:
2016 PM Existing Network-Base Year Validation (Adj OD)-FINAL
(2018-11-29):
1000
2000
3000
4000
5000
LAY
QUEEN
EUGENIA
BLAKE
OAK
GUNN
NEWTON
PEEL
OWEN
ROSE
AGNES
DRURY
MARY
MAPLE
ROSS
SUNNIDALE
HWY-400
WELLINGTON
HENRY
ANNE
EDEN

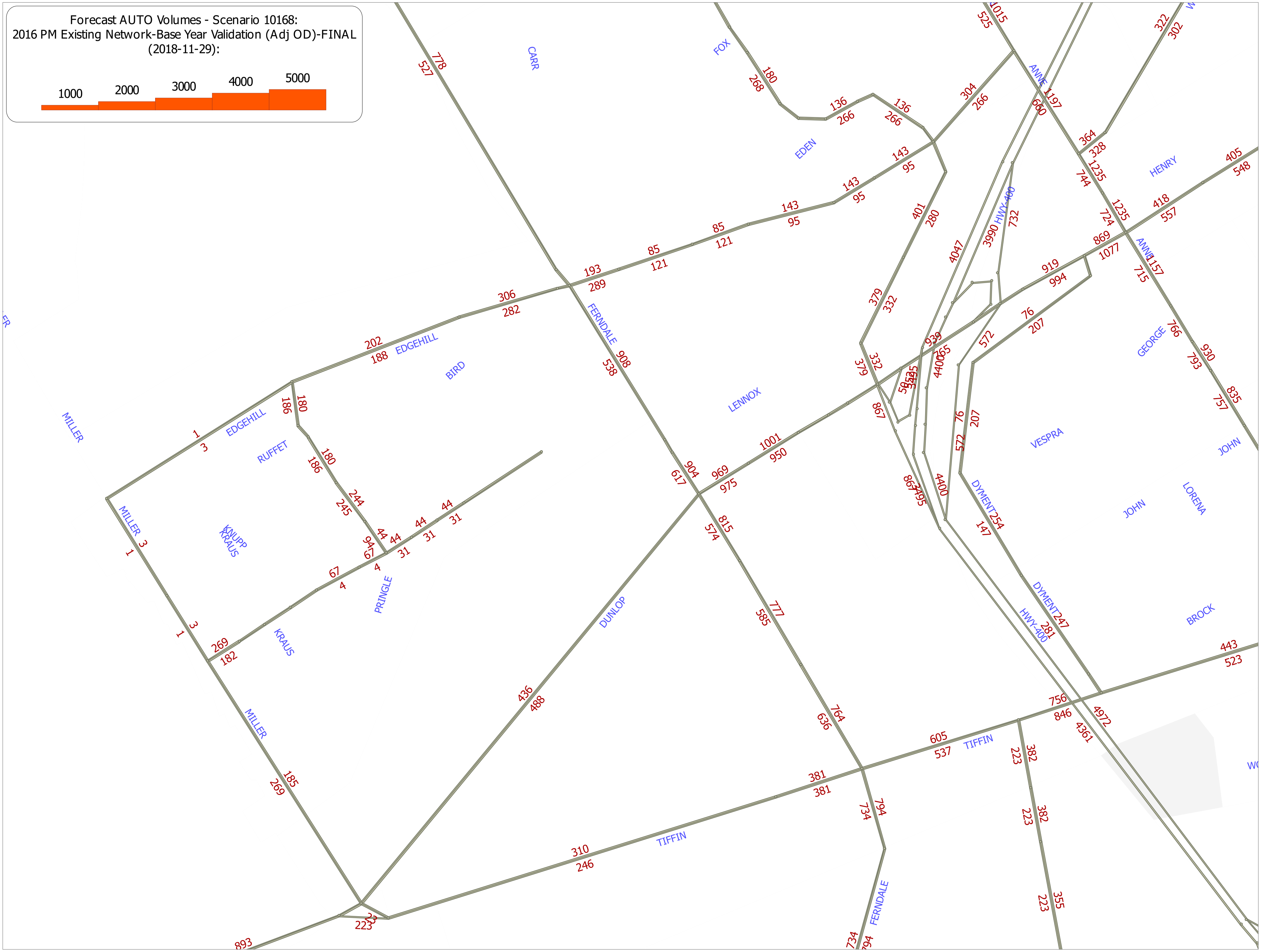

Forecast AUTO Volumes - Scenario 10168:
2016 PM Existing Network-Base Year Validation (Adj OD)-FINAL
(2018-11-29):
1000
2000
3000
4000
5000
LAKESHORE
MARY
MAPLE
ROSS
WELLINGTON
HWY-400
HENRY
VESPRA
JOHN
ANNE
GEORGE
LORENA
BROCK
TIFFIN
WOOD
BURTON
DYMENT
EDEN
FOX
LENNOX
FERNDALE
DUNLOP

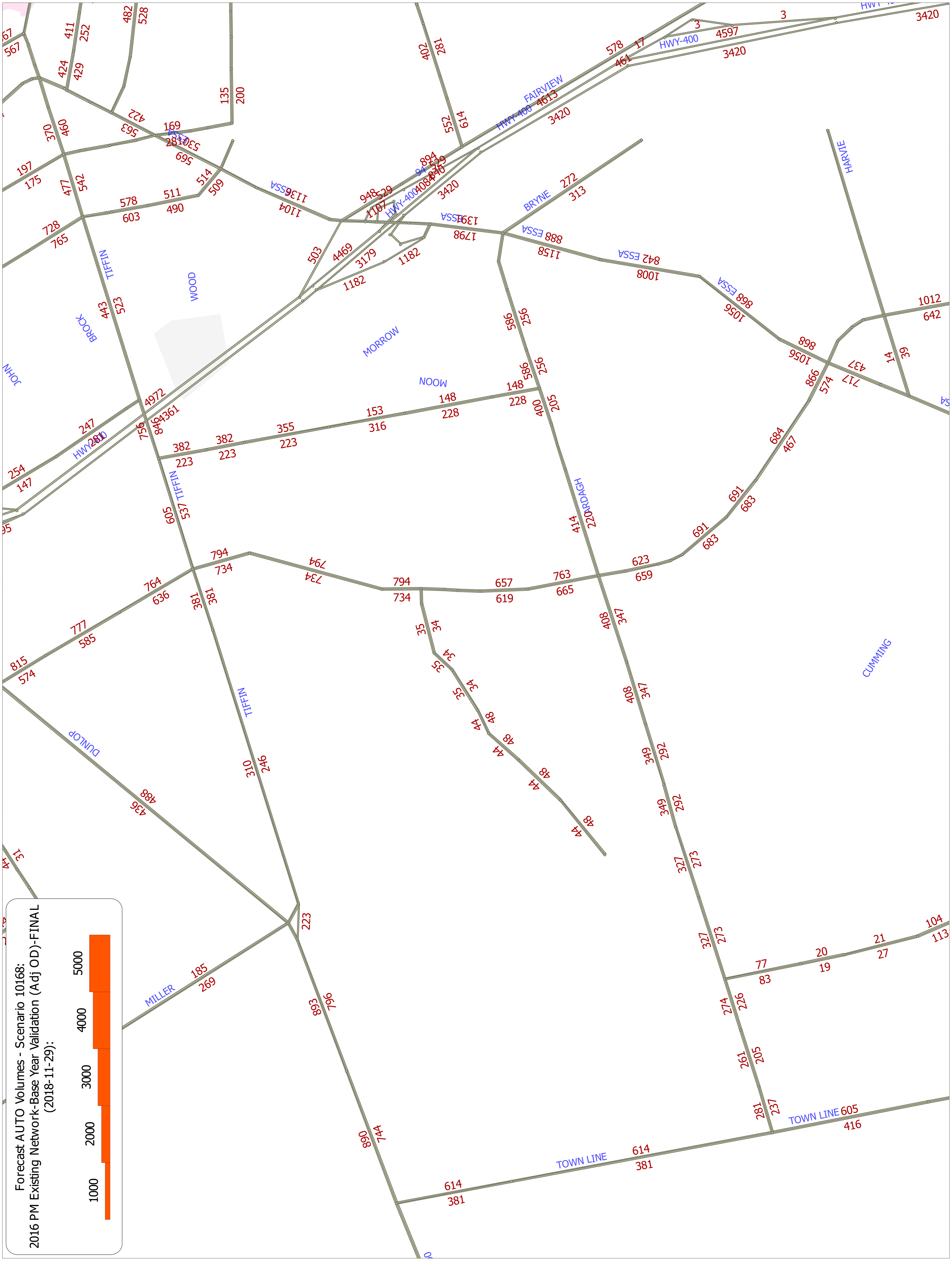

Forecast AUTO Volumes - Scenario 10168:
2016 PM Existing Network-Base Year Validation (Adj OD)-FINAL
(2018-11-29):
1000
2000
3000
4000
5000
NICKLAUS
PLAYER
HANMER
WATSON
MASTERS
MONIQUE
MONIQUE
FERRIS
HWY-400
ALLIANCE
BELL FARM
OTTAWAY
ROSE
ROSE
FORD
OREN
NOAM
PEPLER
OREN



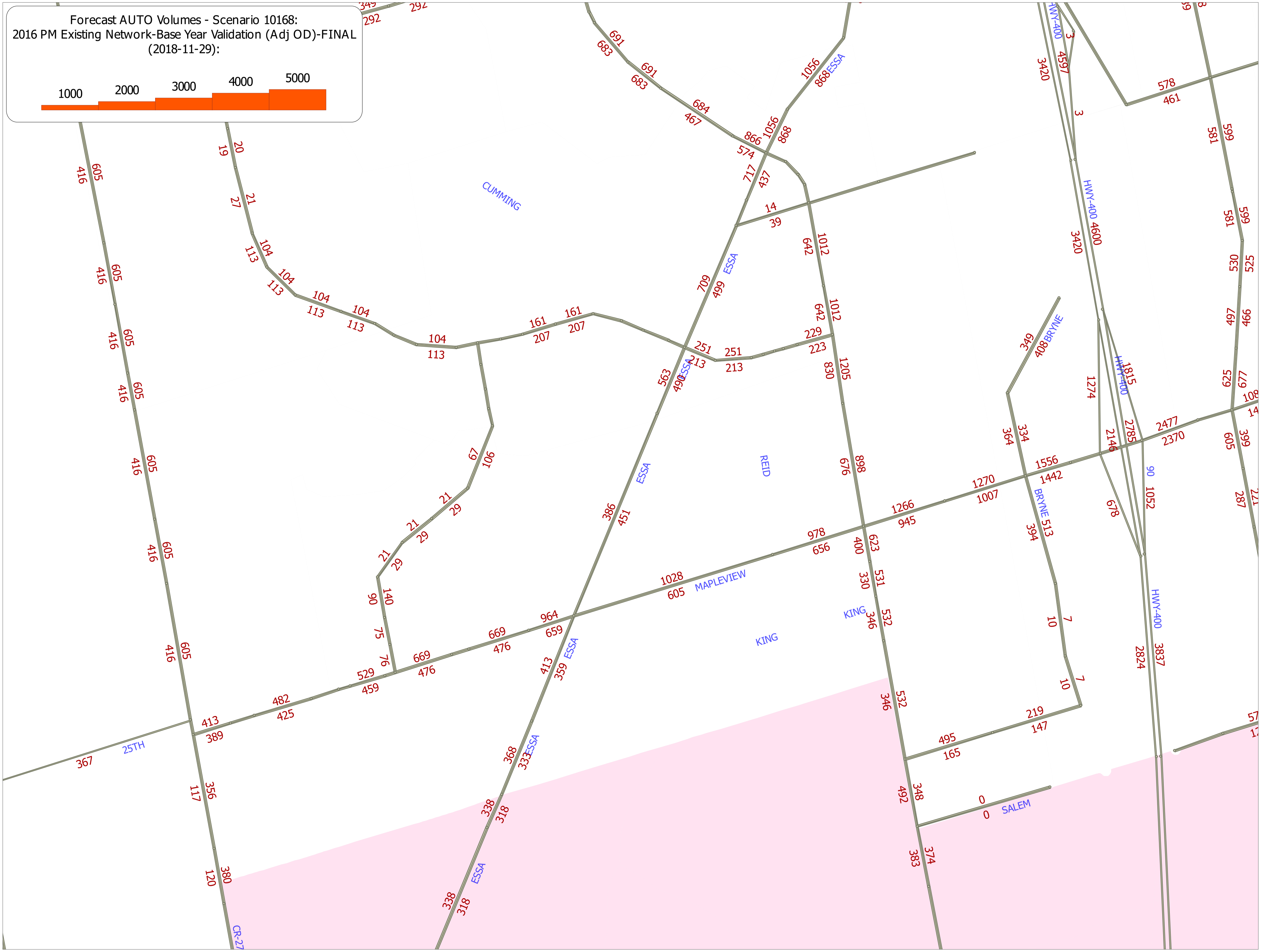
Forecast AUTO Volumes - Scenario 10168:
2016 PM Existing Network-Base Year Validation (Adj OD)-FINAL
(2018-11-29):
1000
2000
3000
4000
5000
SUNNIDALE
ANNE
FORD
IRWIN
FERGUSON
BURNS
SCOTT
SHAW
FERNDALE
PEPLER
OREN
NOAM
HWY-400
ROSE
DRURY
MARY
ROSS
WELLINGTON
98

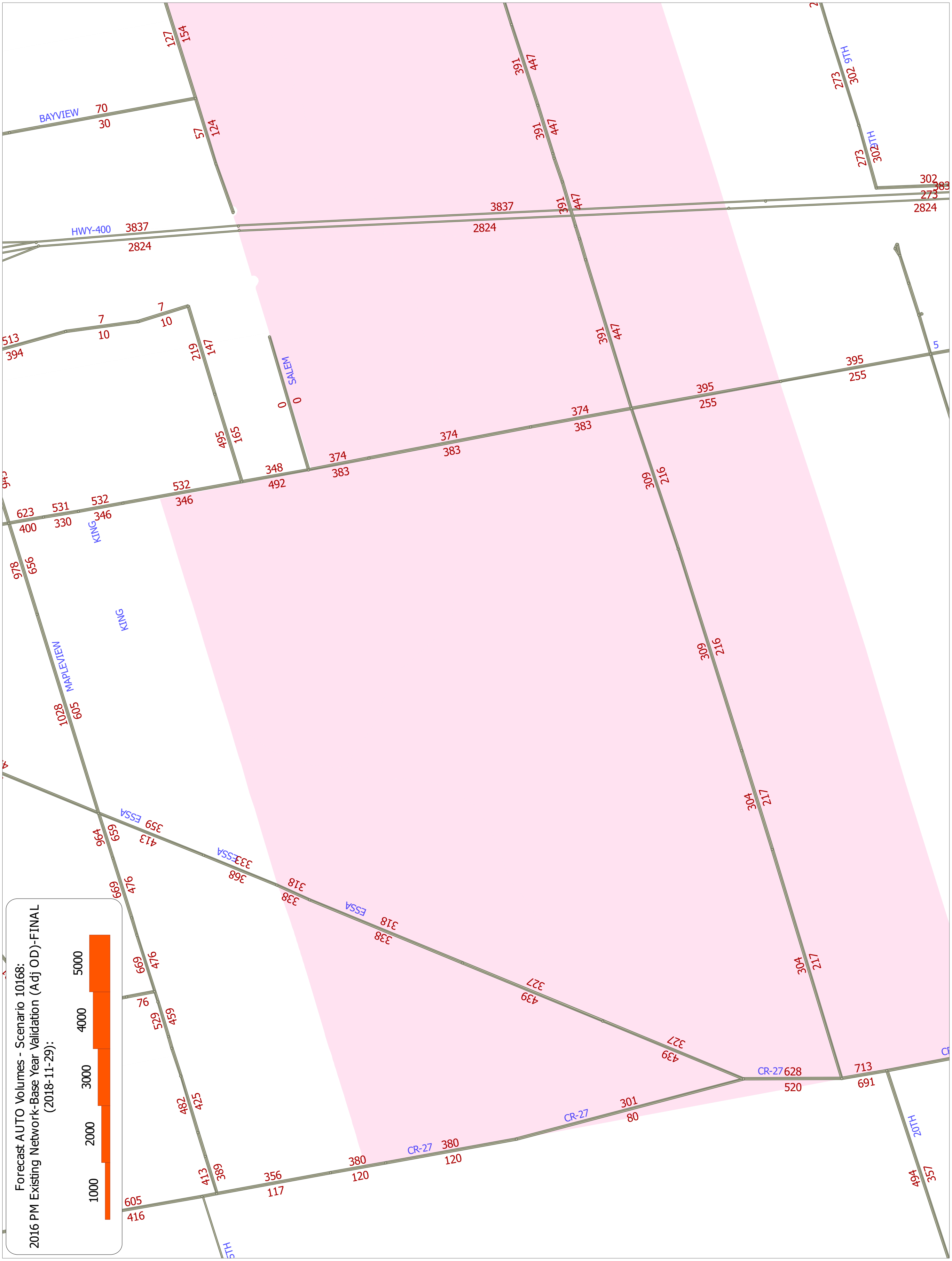

Forecast AUTO Volumes - Scenario 10168:
2016 PM Existing Network-Base Year Validation (Adj OD)-FINAL
(2018-11-29):
1000
2000
3000
4000
5000
OREN
NOAM
PEPLER
SUNNIDALE
IRWIN
FERGUSON
BURNS
ANNE
SCOTT
FERNDALE
BENSON
SHAW
CARR
FOX
EDEN
HENRY
WELLINGTON
HWY-400


Forecast AUTO Volumes - Scenario 10168:
2016 PM Existing Network-Base Year Validation (Adj OD)-FINAL
(2018-11-29):
1000
2000
3000
4000
5000
CARR
FOX
EDEN
ANNE
HENRY
HWY-400
FERNDALE
EDGEHILL
BIRD
LENNOX
GEORGE
VESPRA
JOHN
LORENA
MILLER
RUFFET
KNUPP
KRAUS
PRINGLE
DUNLOP
DYMENT
BROCK
TIFFIN



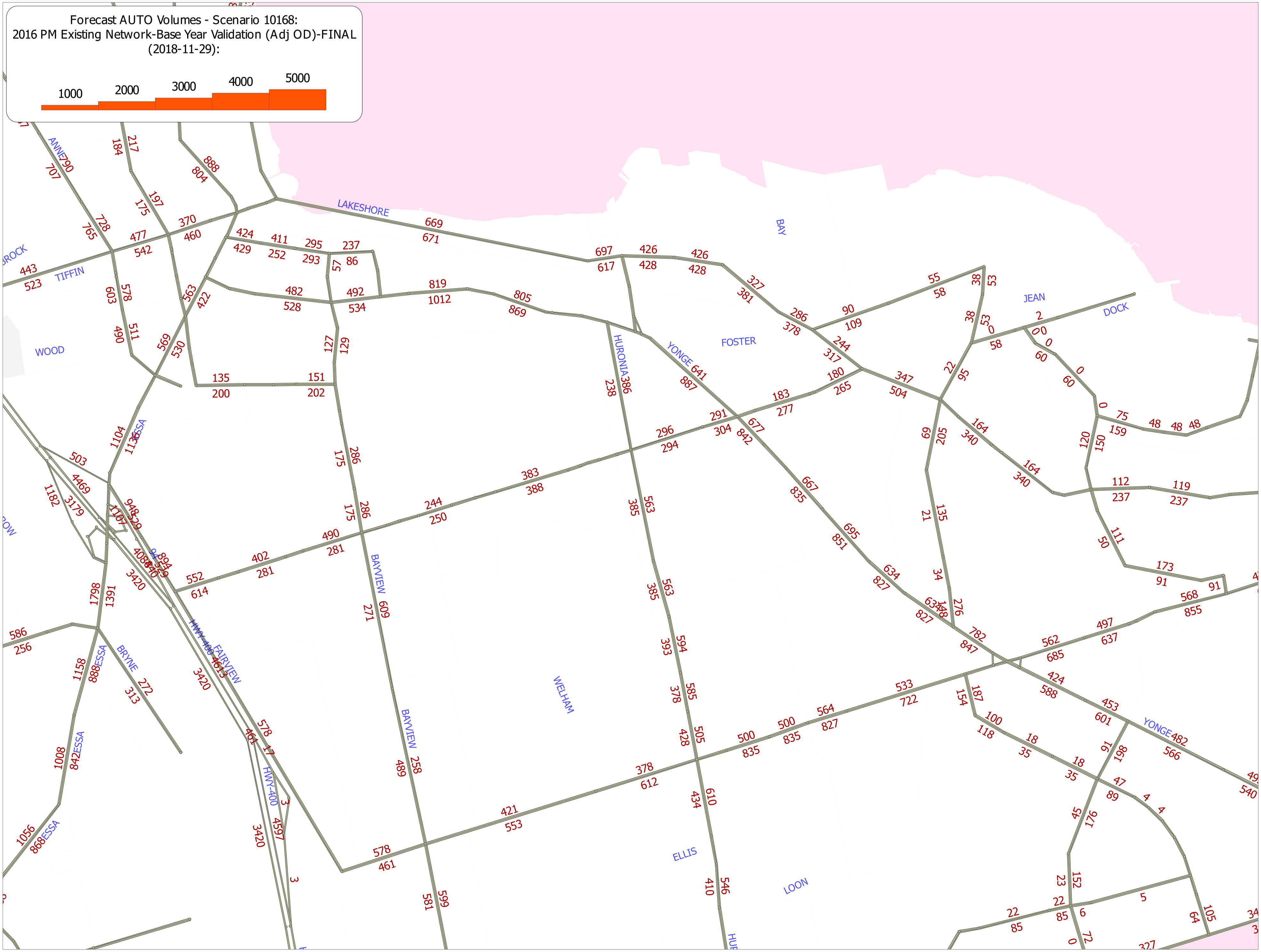
Forecast AUTO Volumes - Scenario 10168:
2016 PM Existing Network-Base Year Validation (Adj OD)-FINAL
(2018-11-29):
5000
4000
3000
2000
1000
HWY-400
FAIRVIEW
ESSA
BRYNE
HARVIE
TIFFIN
WOOD
BROCK
MORROW
JOHN
MOON
ARDAGH
CUMMING
DUNLOP
MILLER
TOWN LINE

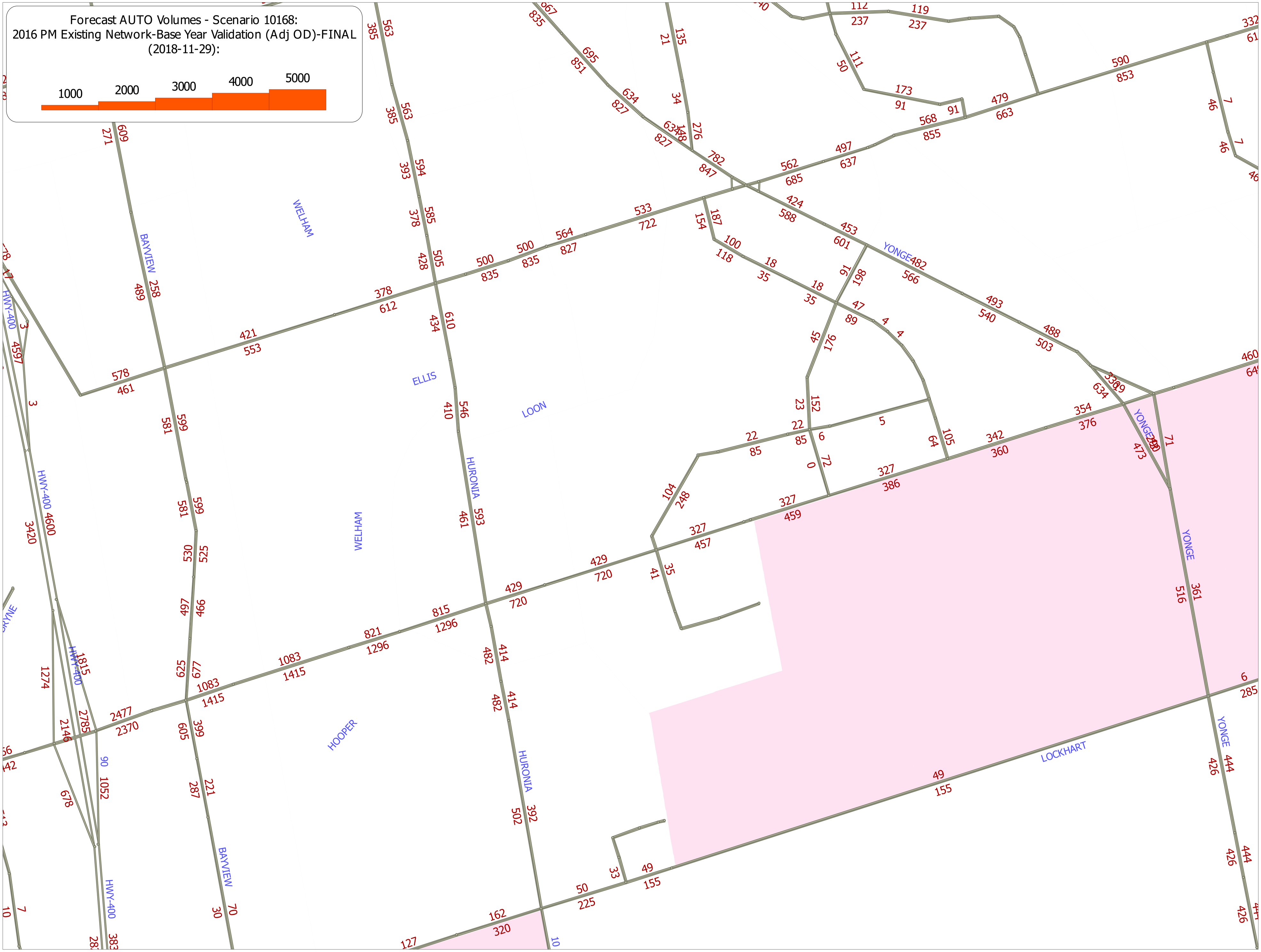

Forecast AUTO Volumes - Scenario 10168:
2016 PM Existing Network-Base Year Validation (Adj OD)-FINAL
(2018-11-29):
1000
2000
3000
4000
5000
CUMMING
ESSA
REID
KING
MAPLEVIEW
BRYNE
HWY-400
SALEM
25TH
CR-27



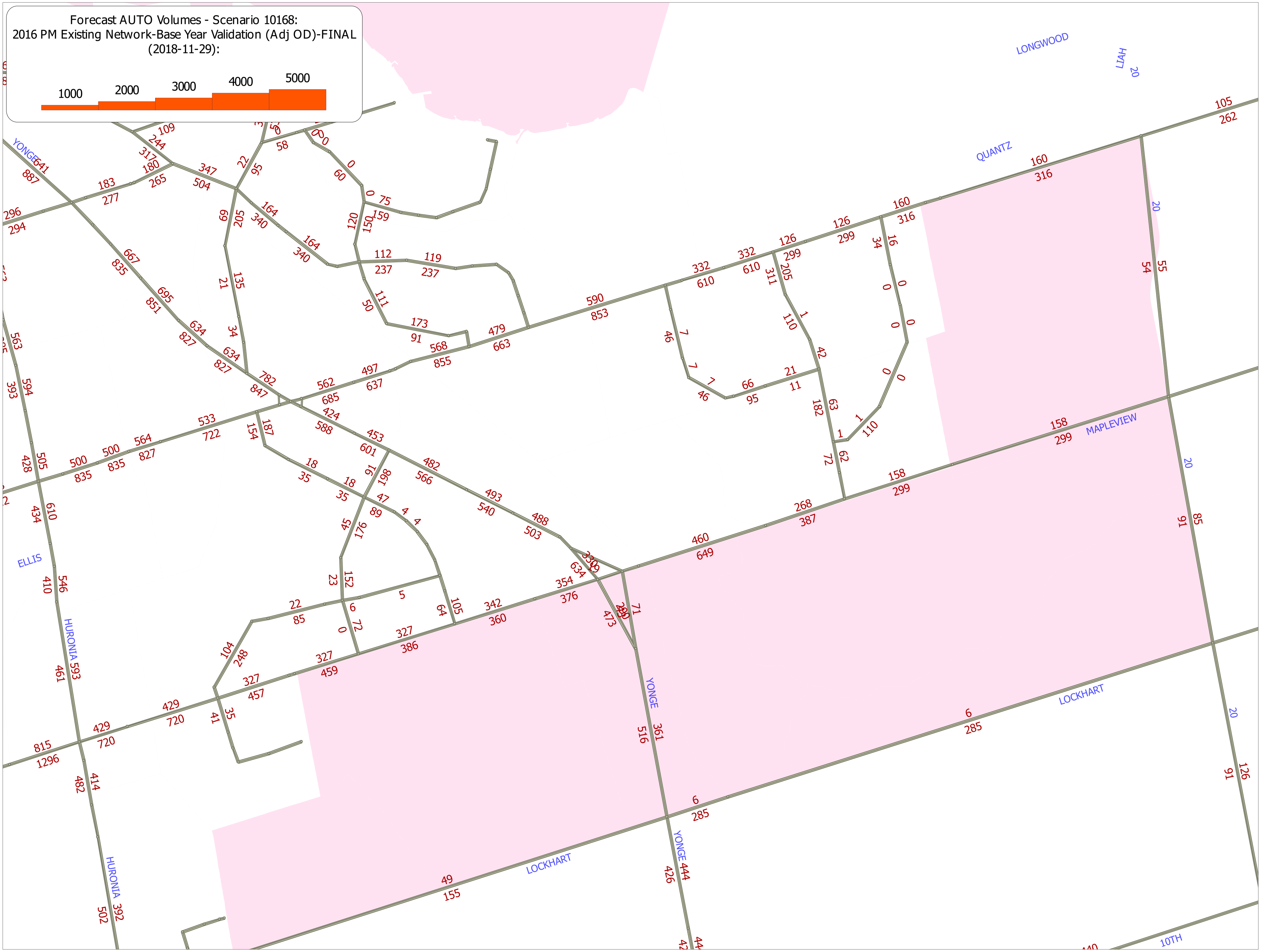
Forecast AUTO Volumes - Scenario 10168:
2016 PM Existing Network-Base Year Validation (Adj OD)-FINAL
(2018-11-29):
5000
4000
3000
2000
1000
BAYVIEW
HWY-400
SALEM
KING
MAPLEVIEW
ESSA
CR-27
9TH
20TH
70
30
127
154
57
124
3837
2824
391
447
273
302
302
273
2824
7
10
513
394
219
147
495
165
0
0
395
255
374
383
348
492
532
346
531
330
623
400
978
656
309
216
1028
605
304
217
359
413
964
659
333
368
318
338
669
476
327
439
529
459
76
628
520
713
691
301
80
482
425
380
120
413
389
356
117
605
416
494
357

Forecast AUTO Volumes - Scenario 10168:
2016 PM Existing Network-Base Year Validation (Adj OD)-FINAL
(2018-11-29):

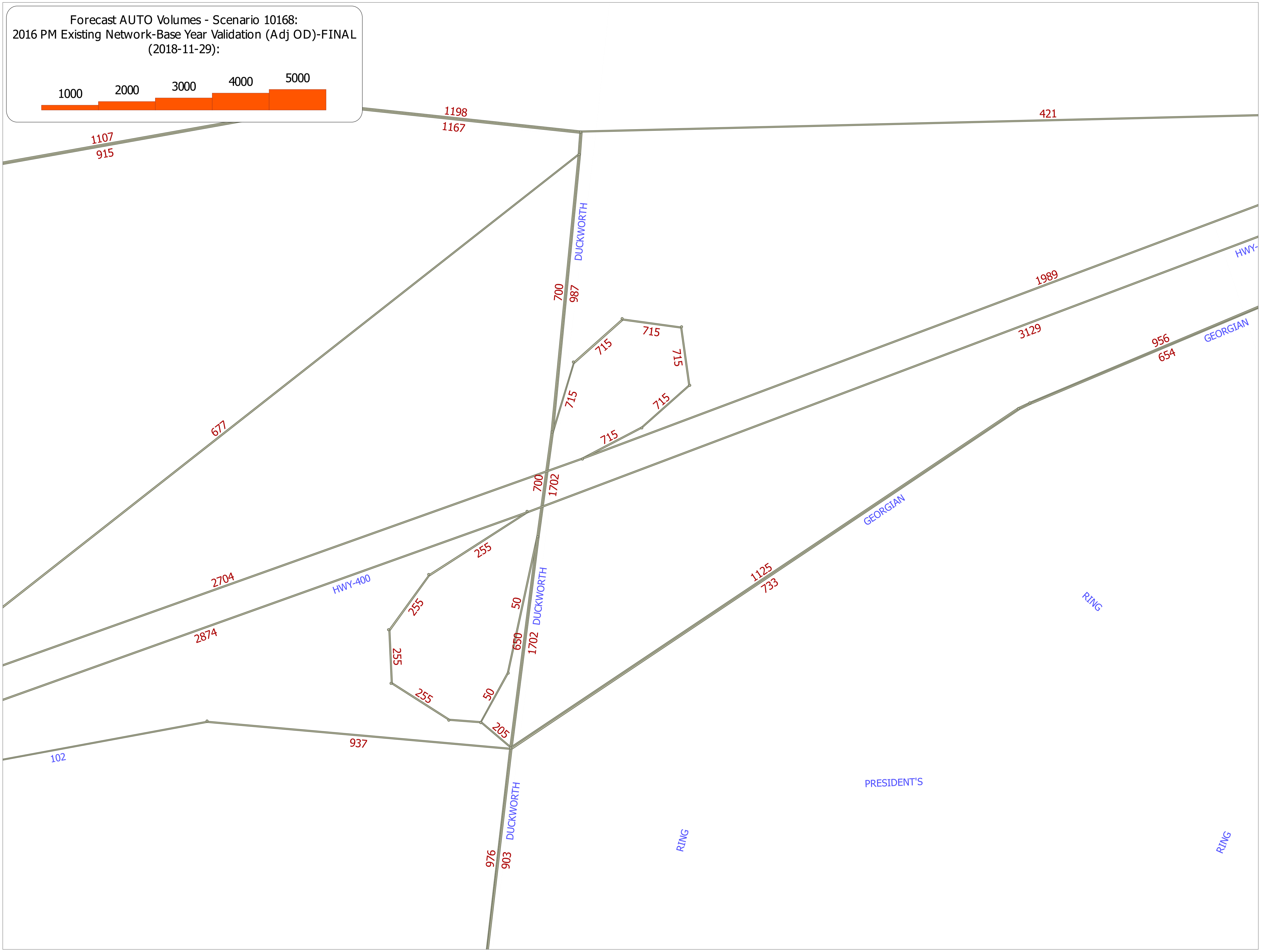




Forecast AUTO Volumes - Scenario 10168:
2016 PM Existing Network-Base Year Validation (Adj OD)-FINAL
(2018-11-29):
1000
2000
3000
4000
5000
YONGE
LOCKHART
HURONIA
LOON
ELLIS
WELHAM
HOOPER
BAYVIEW
HWY-400

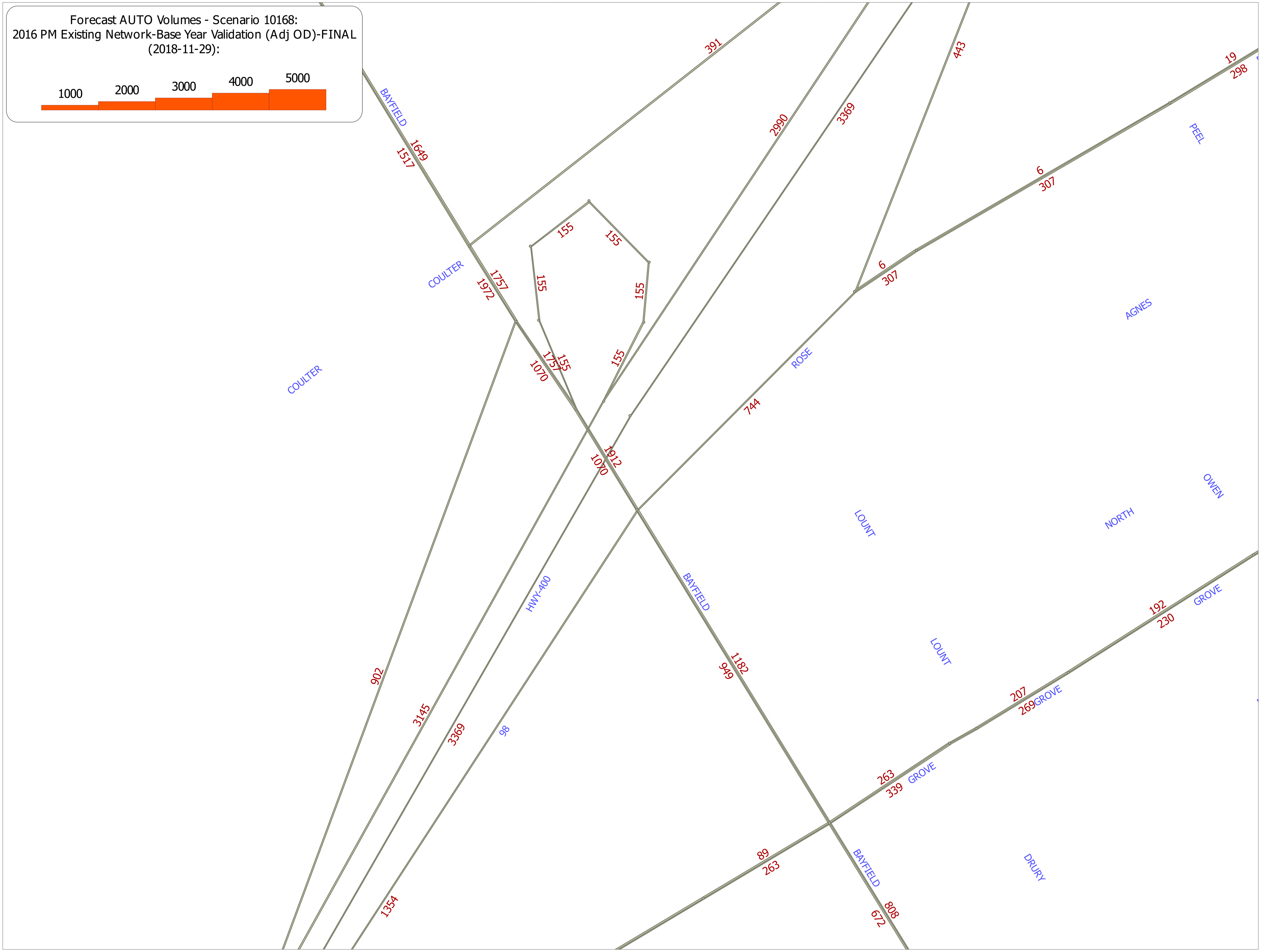

Forecast AUTO Volumes - Scenario 10168:
2016 PM Existing Network-Base Year Validation (Adj OD)-FINAL
(2018-11-29):
1000
2000
3000
4000
5000
LONGWOOD
LIAH
QUANTZ
MAPLEVIEW
LOCKHART
YONGE
ELLIS
HURONIA
10TH

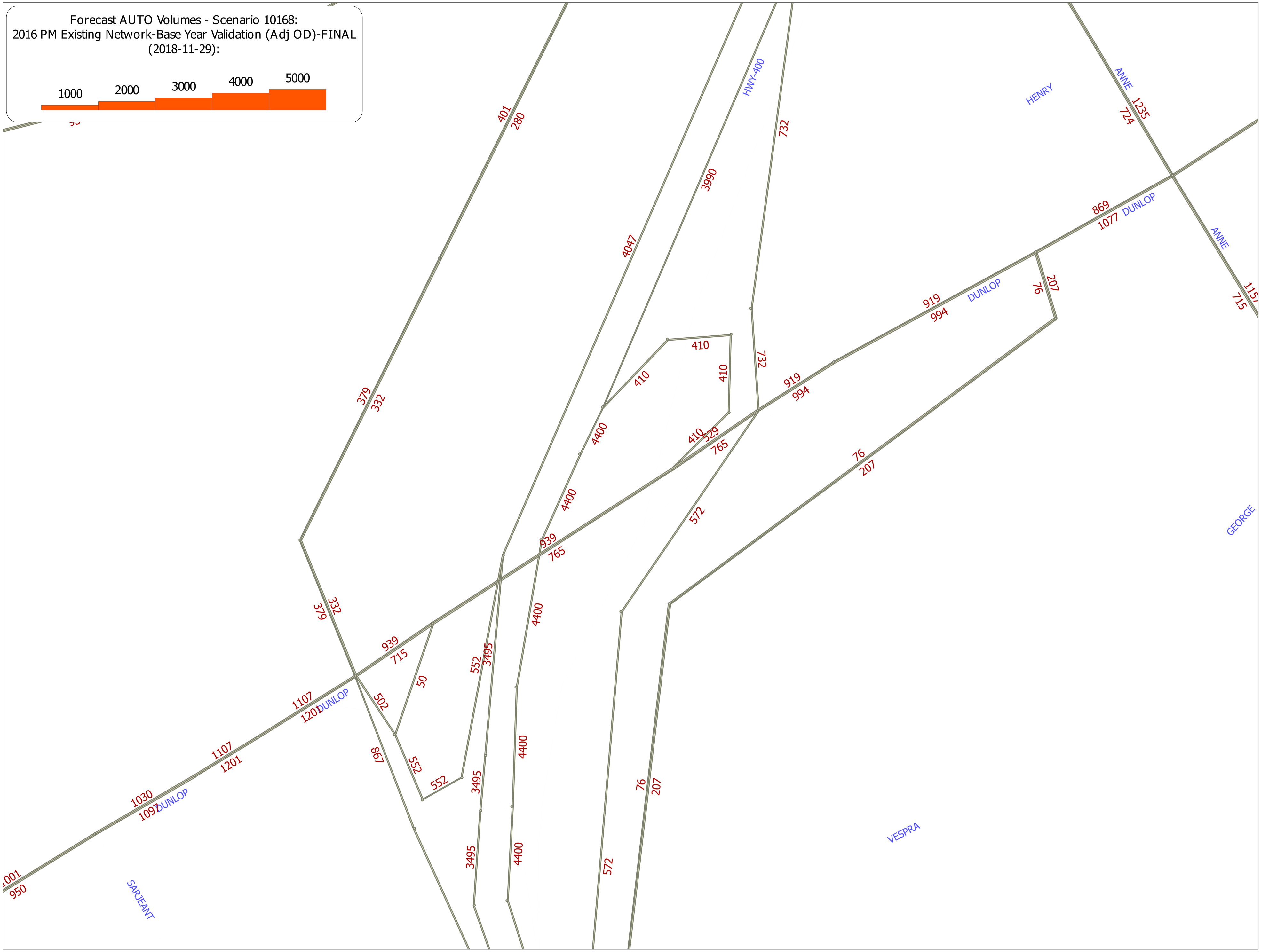

Forecast AUTO Volumes - Scenario 10168:
2016 PM Existing Network-Base Year Validation (Adj OD)-FINAL
(2018-11-29):
5000
4000
3000
2000
1000
YONGE
LOCKHART
10TH
9TH
8TH
HURONIA
BAYVIEW
HWY-400
BRYNE
SALEM
KING

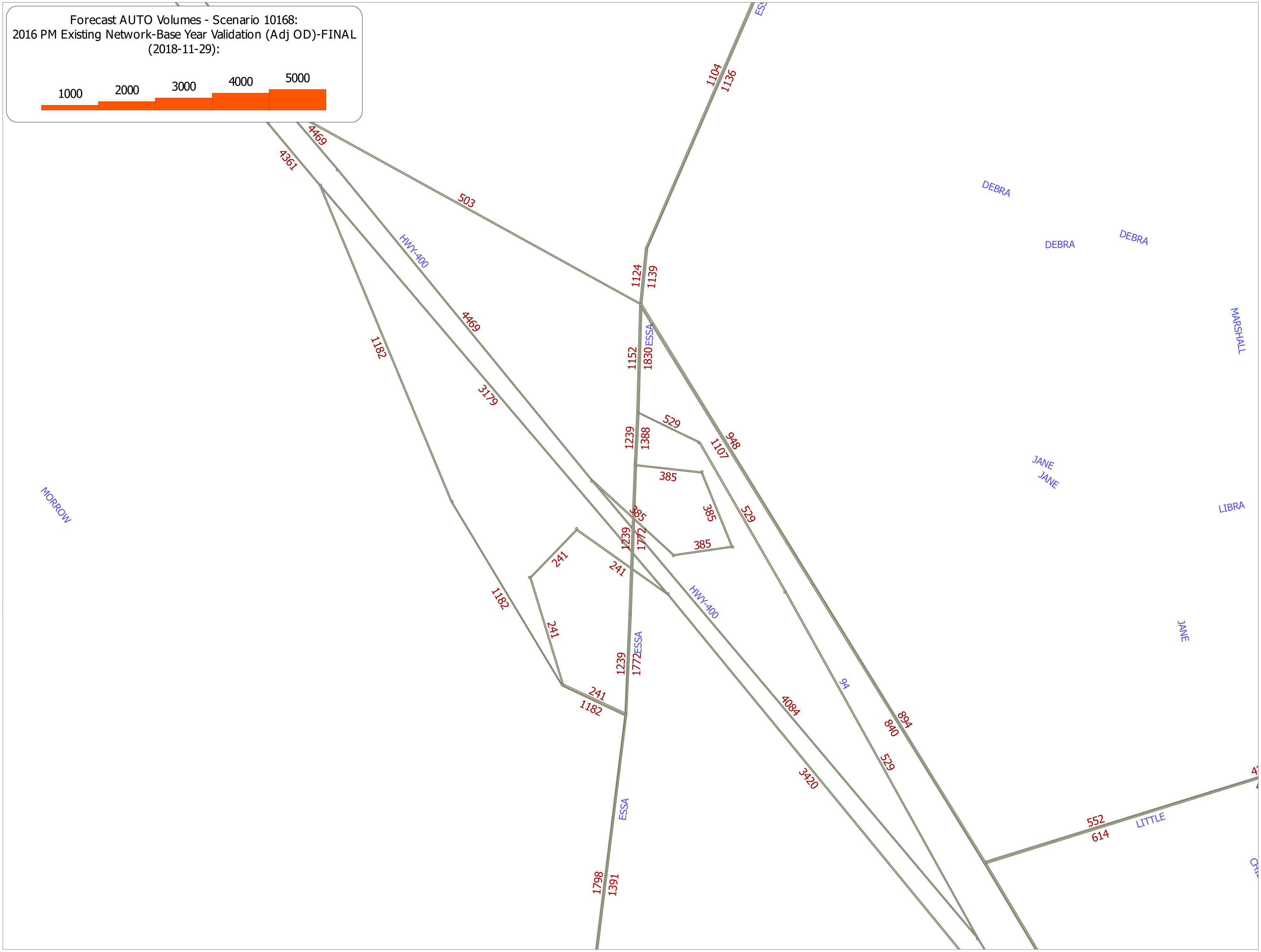


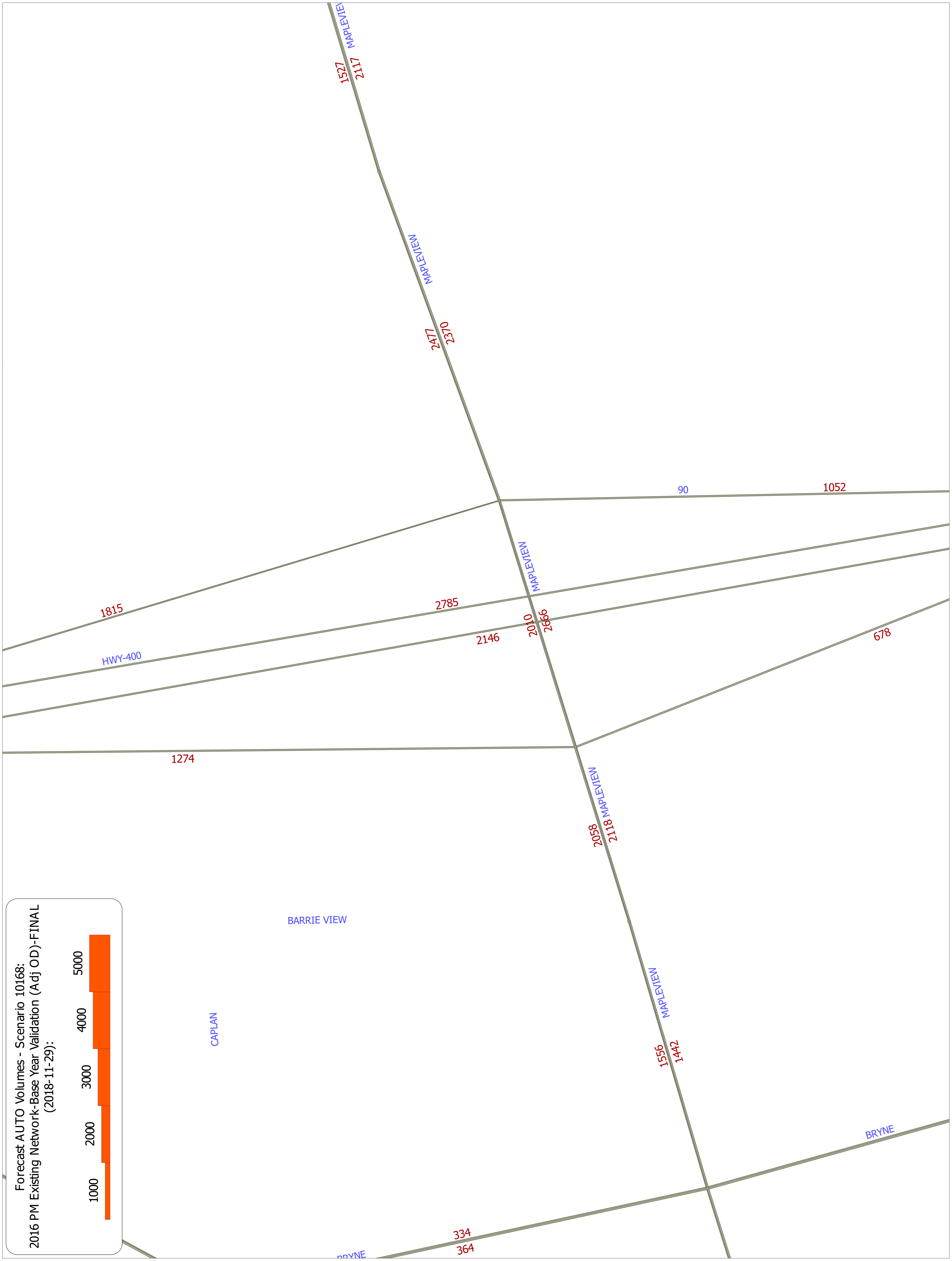
Forecast AUTO Volumes - Scenario 10168:
2016 PM Existing Network-Base Year Validation (Adj OD)-FINAL
(2018-11-29):
1000
2000
3000
4000
5000
1198
1167
421
1107
915
DUCKWORTH
700
987
1989
3129
956
654
GEORGIAN
HWY-
715
715
715
715
715
715
677
700
1702
255
GEORGIAN
2704
HWY-400
1125
733
50
DUCKWORTH
RING
255
2874
650
1702
255
255
50
205
937
102
PRESIDENT'S
DUCKWORTH
RING
RING
976
903

Forecast AUTO Volumes - Scenario 10168:
2016 PM Existing Network-Base Year Validation (Adj OD)-FINAL
(2018-11-29):




Forecast AUTO Volumes - Scenario 10168:
2016 PM Existing Network-Base Year Validation (Adj OD)-FINAL
(2018-11-29):
1000
2000
3000
4000
5000
HWY-400
HENRY
ANNE
DUNLOP
GEORGE
VESPRA
SARJEANT


Forecast AUTO Volumes - Scenario 10168:
2016 PM Existing Network-Base Year Validation (Adj OD)-FINAL
(2018-11-29):
1000
2000
3000
4000
5000
ESSA
1104
1136
4469
4361
503
HWY-400
1124
1139
1182
4469
1152
1830
3179
529
1239
1388
948
1107
385
385
529
385
1239
1772
385
241
241
HWY-400
1182
241
94
1239
1772
241
1182
4084
894
840
529
3420
ESSA
552
614
LITTLE
1798
1391
DEBRA
DEBRA
DEBRA
MARSHALL
JANE
JANE
LIBRA
JANE
MORROW


Forecast AUTO Volumes - Scenario 10168:
2016 PM Existing Network-Base Year Validation (Adj OD)-FINAL
(2018-11-29):
5000
4000
3000
2000
1000
MAPLEVIEW
1527
2117
MAPLEVIEW
2477
2370
90
1052
MAPLEVIEW
1815
2785
HWY-400
2146
2010
2666
678
1274
MAPLEVIEW
2058
2118
BARRIE VIEW
CAPLAN
MAPLEVIEW
1556
1442
BRYNE
334
364
BRYNE