Ray-Freya Crossover

ROADWAY CAPACITY JUSTIFICATION REPORT

Submitted to Spokane Regional Transportation Council

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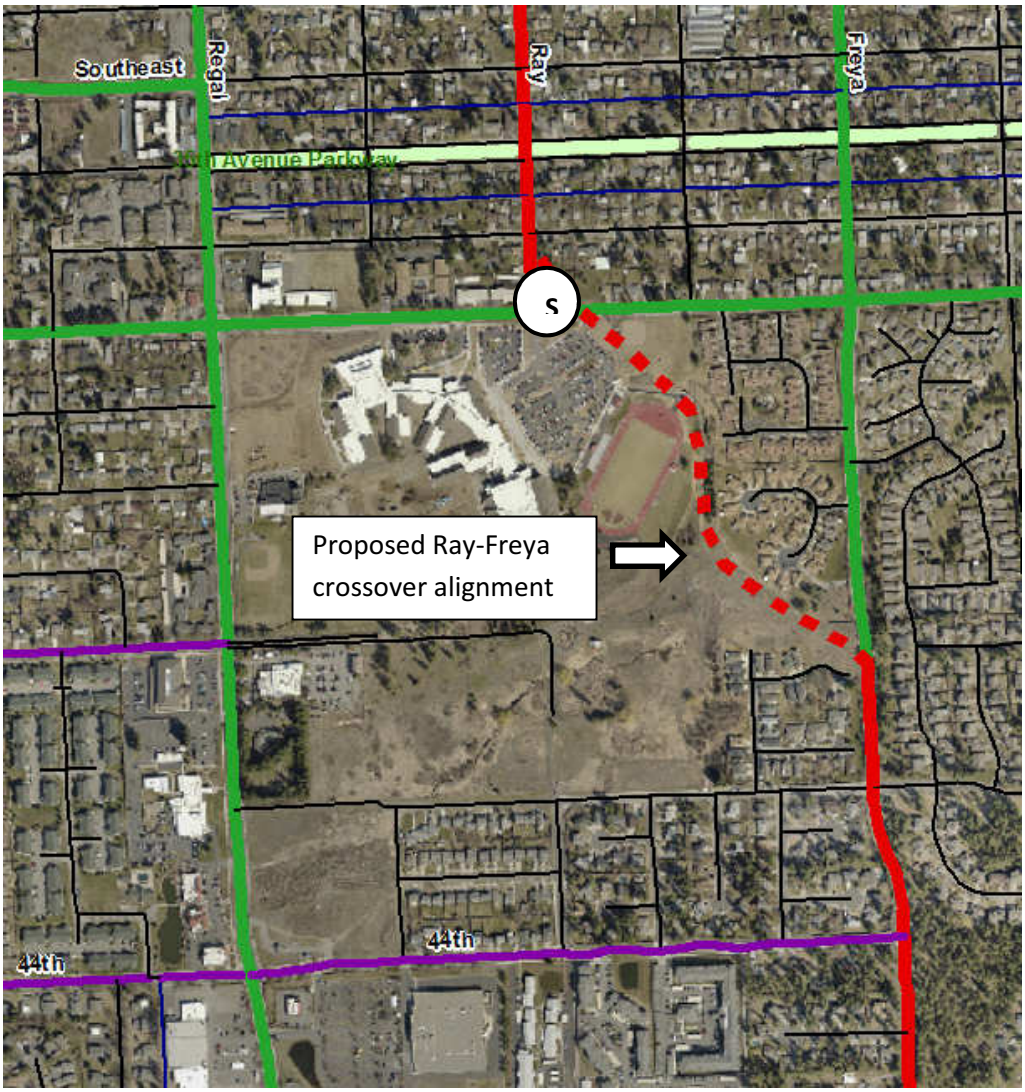
PREPARED BY

City of Spokane

Inga Note, P.E.

Vicinity Map

Spokane, WA



Roadway Capacity Justification Report for Ray-Freya Crossover

Introduction

The Ray-Freya-Greene corridor is one of the primary north-south routes on the east side of Spokane. It connects to I-90 and runs north through Hillyard, connecting into the partially built North Spokane Corridor (NSC). Eventually the NSC will parallel north Freya and provide for even greater movement of traffic north of I-90. South of I-90 the Thor-Freya couplet feeds into Ray Street as it heads up the south hill. Ray Street terminates at 37th Avenue and the traffic splits off west to Regal Street or east to Freya Street. Approximately 35 years ago the City gave up the original southbound ROW alignment of Ray Street and swapped property with District 81 for a new alignment further to the east to better serve District 81's long term plans for the Ferris High school campus. This swap resulted in a chokepoint in the City's arterial system on the south hill.

The Ray-Freya crossover project has been in the City's Comprehensive Plan since its inception in 2001, and is listed on the WSDOT functional classification map as a Proposed Principal Arterial. It was evaluated as part of the regional Southside Transportation Study in 2004, and recommended as a potential future project as development increased. It was included in the City's 6-yr Transportation Program in 2006 but later removed in 2011 due to the impacts of the recession, and the area has been monitored since to better identify the timing of when this project would be needed. It was also included in the 2011-2035 Metropolitan Transportation Plan. As of the writing of this report, the project is being considered for addition to the City's Traffic Impact Fee project list with the 2017 update. It appears that the city already owns all the right-of-way needed for the project, although some District 81 facilities are currently occupying the right-of-way. The City also owns several homes at the corner of Ray Street/37th Avenue that were purchased years ago for this project. SRTC is in the process of updating the Regionally Significant Projects in their Metropolitan Transportation Plan. Because this project makes a new connection between two Principal Arterials, SRTC has requested a Roadway Capacity Justification Report for this project to do the following:

- Demonstrate that travel demand reduction and operational management strategies cannot fully satisfy the need for additional capacity and additional SOV capacity is warranted.
- Identify all reasonable strategies to manage the SOV facility safely and effectively into the future.

Need for Additional Capacity

Traffic volumes on South Regal Street have increased steadily over the years with development of the apartments and commercial properties in the area. One of the main issues with this part of Regal is the lack of redundancy in the transportation system. There is no other continuous parallel route from 57th to downtown or I-90 that is set up to carry significant traffic volume.

Table 1. Historic volumes on Regal Street

Regal Street	1997-1998	2003-2004	2009-2010	2015
SE Blvd to 37th (3500s)	16,000	19,000	17,400	20,100
37th to 44th (4300s)	18,900	20,300	20,000	20,800
44th to Palouse Hwy (4500s)	16,900	19,400	18,600	19,300
Palouse Hwy to 57th (4800s)	11,700	13,400	15,400	15,900

Widening Regal Street is not an option without purchasing additional right-of-way. South of 44th Avenue the city's right-of-way follows the back of the sidewalk on Regal. In the area between 44th and 46th Avenues a right-of-way purchase would mainly impact the adjacent parking lots or landscaping. But south of 46th Avenue any widening would require taking property from the Southeast Sports Complex. The businesses on the east side of Regal are built with smaller parking lots and the buildings are closer to the street. Property acquisition would be considerably more difficult and expensive in this area.

ADT Forecast Analysis

At the time this report was prepared SRTC was finalizing the newest release of the regional travel demand model. SRTC provided city staff with draft volume forecasts for use in this analysis. City staff used the growth rates in the model along with recent ground counts in order to develop 2040 forecast volumes for the area. Table 2 shows the existing ADT along with 2040 forecast volumes both with and without the Ray-Freya Crossover.

The primary chokepoint on this corridor is the 3-lane section of Regal between 44th and Palouse Highway. There is no defined capacity for a 3-lane section as it can depend heavily on signalization, peak vs. daily volume, and presence of parking or transit. The City of Seattle uses 25,000 as the upper limit, but conducts a synchro analysis of any corridor with volumes between 16,000 and 25,000 to determine if an acceptable LOS and travel time can still be maintained[1]. For purposes of this analysis the threshold for needing to widen from *3 lanes to 5 lanes is assumed to be 20,000 ADT*. This is the upper end of volumes that have been observed on 3-lane arterials in the Spokane region.

Table 2. ADT Forecasts

	# of Lanes	Existing ADT	2040 ADT Forecast	2040 ADT w/ Crossover	Comments
Regal Street					
SE Blvd to 37th	4+TWLTL	20,100	21,700	22,000	
37th to 44th	4+TWLTL	20,800	23,600	16,400	
44th to Palouse Hwy	2+TWLTL	19,300	**22,300***	16,000	**Exceeds capacity**
Palouse Hwy to 57th	2+TWLTL	16,600	17,500	16,300	
Ray Street					
27th to 29th	5	19,100	22,600	26,000	
29th to 37th	2-5	9,300	13,500	24,100	
Crossover	2	-	-	14,200	
Freya Street					
27th to 29th	2	11,200	11,700	9,400	
29th to 37th	2	9,400	10,000	6,600	
37th to 41st	2	9,700	11,500	4,200	
41st to 44th	2	9,700	11,200	19,100	
44th to Palouse Hwy	2	8,200	9,300	16,700	
Palouse Hwy to 57th	2	3,000	3,200	4,100	
Palouse Highway					
Freya to 57th	2	4,400	5,400	6,400	

[1] Road Diet Informational Guide. FHWA-SA-14-028. Published by FHWA. November 2014.

29th Avenue					
Regal to Ray	4	17,800	20,400	20,700	
Ray to Freya	2-4	7,500	10,100	10,600	

For purposes of this analysis the threshold for needing to widen from 3 lanes to 5 lanes is assumed to be 20,000 ADT. This is the upper end of volumes that have been observed on 3-lane arterials in the Spokane region.

The forecast in Table 2 shows that the section of Regal between 44th and Palouse Highway will exceed the generally recommended daily volume for a 3-lane section. The construction of the Ray-Freya crossover would shift about 6,000 vehicles per day from Regal to Freya, thus allowing for less congested operations on Regal.

Intersection Analysis

Table 3 shows the results of the PM peak intersection analysis for all intersections in the study area. With current traffic volumes they all operate at or above the minimum level-of-service.

City staff also prepared estimates of 2040 PM peak hour intersection volumes both with and without the crossover. The LOS analysis is shown in Table 3. Several intersections are expected to operate with poor level of service and also long queues. The table shows that the level-of-service on Regal Street generally improves in the scenario with the Ray-Freya Crossover. The table also shows some mitigation options to correct 29th/Freya and Palouse Highway/Freya which will operate below the acceptable LOS with or without the crossover.

Table 3. Intersection Analysis

Intersection	Ctrl	2016 PM Peak	2040 PM Peak	2040 PM Peak w/ Crossover	Notes
29th/Regal	S	C (29.0)	D (43.0)	D (51.3)	
37th/Regal	S	C (28.0)	**E (65.6)***	D (38.5)	
44th/Regal	S	B (17.2)	D (36.5)	C (28.1)	
Palouse/Regal	S	B (15.2)	D (52.9)	C (30.1)	
57th/Regal (county)	S	C (25.3)	**E (56.9)***	D (47.8)	
29th/Ray	S	C (28.2)	D (38.6)	D (54.2)	
37th/Ray	U/S	D (32.7)	**F (63.8)**	C (20.0) -*sig*	Signal built with crossover
29th/Freya	U		**F (68.6)**	**F (60.3)**	
Add EBL, WBL	*U*	-	-	*E (43.5)*	
37th/Freya	U	C (24.3)	E (44.3)	C (23.3)	Includes new EBR and NBL from 37th Ave project
44th/Freya	U	n/a	n/a	n/a	No counts available
Palouse/Freya	U	C (18.7)	E (40.4)	E (42.4)	
Add SBL, WBR	U	-	-	*D (34.6)*	

**Some individual movements are at LOS F with long queues. There may be cycle failures on these movements.*

Commercial Driveways and Minor Streets along Regal

The city's level-of-service standard focuses on the intersections of arterial streets. The operations of commercial driveways and local streets are generally not reviewed unless they are carrying enough volume to warrant a traffic signal or upgrade in classification to an arterial. However, in the case of Regal Street it is worth discussing the commercial driveways and apartment complexes since very few locations have a parallel local street grid to provide secondary access.

The analysis shows that many of these driveways will be operating at LOS F during the PM peak hour. This generally only applies to vehicles turning left onto Regal from the side streets or driveways. These vehicles will find it difficult to find a safe and adequate gap in Regal traffic in order to complete their turning maneuver. More assertive drivers will end up accepting a smaller gap. Others may take a right-turn instead then make a u-turn somewhere up the road.

The construction of the Ray-Freya Crossover is expected to reduce the through traffic on several sections of Regal Street. This will increase the number of available gaps in traffic and make it easier for residents and business patrons to make left turns onto Regal.

Travel Demand and Operation Management Strategies

The focus of the TDM and Operational Management discussion is on the section of Regal Street between 44th and 57th Avenues. Staff believes that transit, bicycle and pedestrian facilities can make a significant contribution to reducing commuter and local trips, as discussed below. However, one of the primary trip generators for this area is traffic coming up Hatch Road from 195. These trips will be more difficult to transfer to non-SOV travel patterns.

Transit

Transportation System Management (TSM) was one of the alternatives to expanding roadway capacity. STA currently operates route 45 along Regal Street. The route runs on 30 minute intervals during the weekday. It also operates in the evenings and on weekends. The closest formal Park and Ride lot is at SE Blvd/30th Avenue.

The South Regal Corridor is part of the planned Monroe-Regal High Performance Transit Line for which improvements are included in the funded 10-year *STA Moving Forward* plan. The Monroe-Regal HPT line will run from the existing Five-Mile Park and Ride through Downtown to a new Moran Prairie Park and Ride to be built in the vicinity of 57th Ave and the South Palouse Highway. The route will be served by 15 minute weekday frequencies and 30 minute weekend frequencies. The increased frequency will be accompanied by capital improvements including raised loading platforms, real-time departure signage, ticket vending machines, lighting, shelters, benches, bike racks, sidewalk improvements and transit signal priority upgrades. This should increase the transit ridership on the corridor and reduce the number of new SOV trips.

Pedestrian

Pedestrian facilities are relatively complete on the arterials in the area, but few of the local streets have continuous sidewalk. The Target shopping center and other businesses along the Regal corridor are located near high density apartment complexes. Local trips can be easily made on foot between these facilities. The new KXLY development planned for the west side of Regal is intended to be more pedestrian oriented as well, and should be attractive for pedestrian trips from the neighborhoods west of the sports complex as well as the apartments to the south. Regal only has controlled pedestrian crossings at Palouse Highway and 57th Avenue. It may be beneficial to explore a signal, rapid flash or

HAWK system in the future to support pedestrian crossing movements in the vicinity of 53rd. Improved crossing locations would also aid riders of STA's route 45.

Bicycle

The Southgate neighborhood has worked hard to include more bicycle infrastructure in their community. This effort resulted in the construction of the shared-use pathway that runs along the south side of Palouse Highway from Regal Street to just east of Target. This path has become popular with pedestrians and cyclists travelling between the Target shopping center and the apartments and senior living facility along Palouse Highway.

The City's Draft Bicycle Plan is shown in Appendix C. We expect this plan to be adopted into the Comprehensive Plan. The plan calls for extending the Palouse Highway pathway westward across Regal, so that it continues through the Southeast Sports Complex to the neighborhoods on the west side. The pathway will also tie into the new KXLY shopping center and should make bicycle trips easier on the west side of Regal.

Further to the north the Draft Bicycle Plan shows a continuation of the path network up to 44th Avenue, where a neighborhood shared-use path was constructed in 2015. Some local streets have also been identified as bicycle friendly routes for riders who want to stay off the arterial system.

Strategies for Management of Facility

Facility management strategies on Regal are limited to traffic signal adjustments. The traffic signals at 44th/ Regal and Palouse Highway/Regal currently run coordination plans during the peak hours, but long queues are still the norm at certain times of day. The City is proposing a minor intersection improvement at 44th/Regal which should improve the northbound capacity and aid the AM peak operations. This project will be on the traffic impact fee list. But the City has no plans for other ITS equipment or management in the corridor.

Conclusions and Recommendations

Conclusions are as follows:

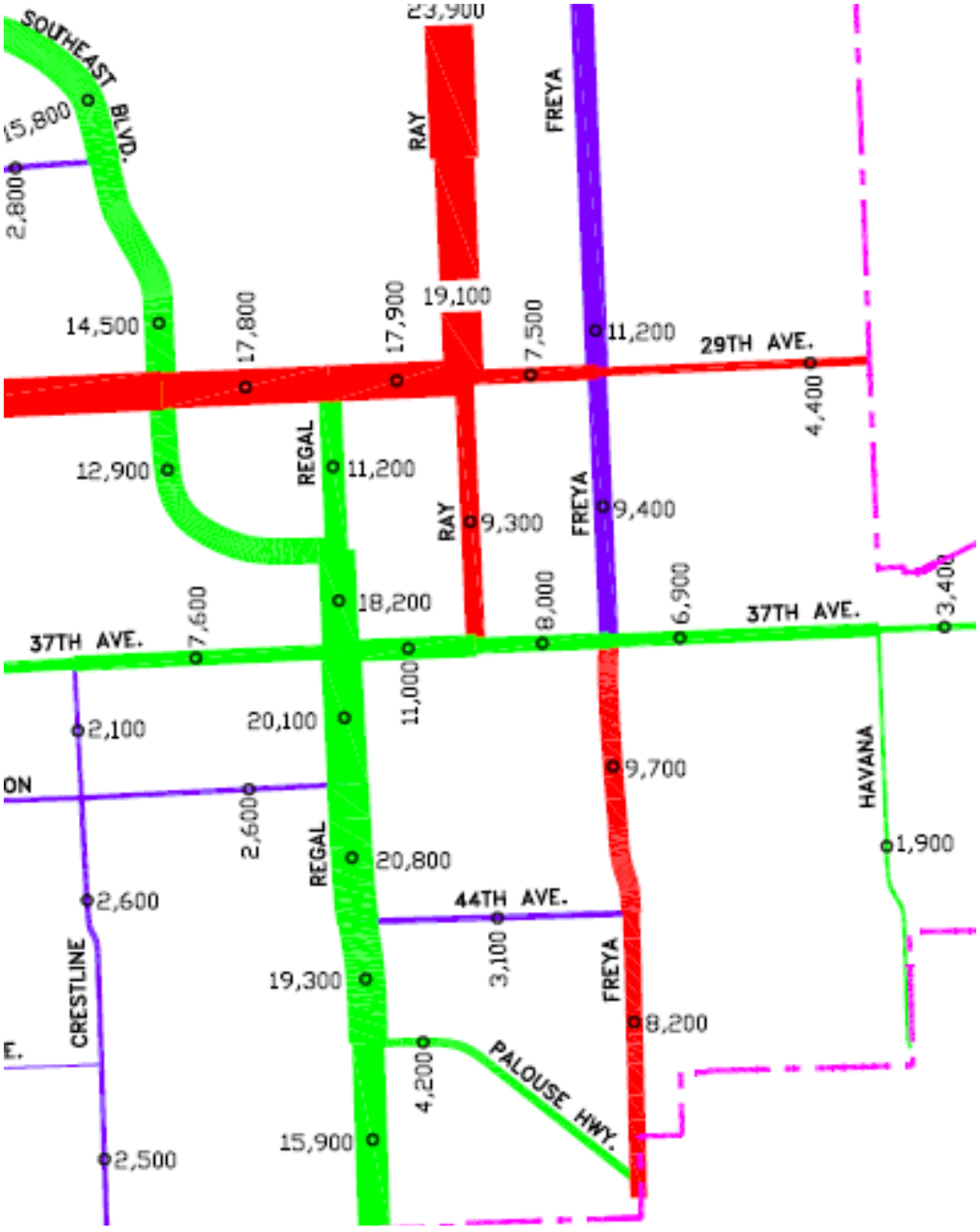
- The Ray-Freya Crossover would negatively impact the environment at Ferris High School by putting an arterial closer to the school facilities. But this version is far less impactful to Ferris than if the City had maintained its original alignment heading due south from 37th/Ray. The curvy alignment between Ray and Freya was a compromise between school needs and the City's need to have a healthy arterial system.
- The crossover would shift some future traffic volume from Regal Street to Freya Street thus keeping Regal Street operating below capacity.
- The crossover would provide redundancy in the arterial system in case of construction or other impact to the corridor.
- Local trips in the area can be encouraged to shift from SOV to bicycle and pedestrian use through the build-out of the draft bicycle plan and further attention to pedestrian infrastructure.
- STA's high performance transit network on Regal Street will likely reduce the SOV trips, especially during the commute hours. But until this is implemented the reduction in peak hour trips is difficult to estimate.

- Some regional traffic drawn to the study area won't be easily shifted to transit or bike/ped uses. The trips that travel between the 195 corridor and south Regal will likely continue as SOV trips due to the terrain, travel distance, and lack of transit service.
- The intersection of Palouse/Freya will require improvements with or without the crossover project. One option would be to keep the 4-way stop and add auxiliary lanes. A second option would involve a roundabout. This is on the traffic impact fee project list.
- The intersection of 29th/Freya will require striping improvements in the near future. The intersection could see an increase in level-of-service by simply restriping the east and west legs to add left turn pockets. This will require some parking restrictions but no changes to the curb line. This is on the traffic impact fee project list.

Recommendations are as follows:

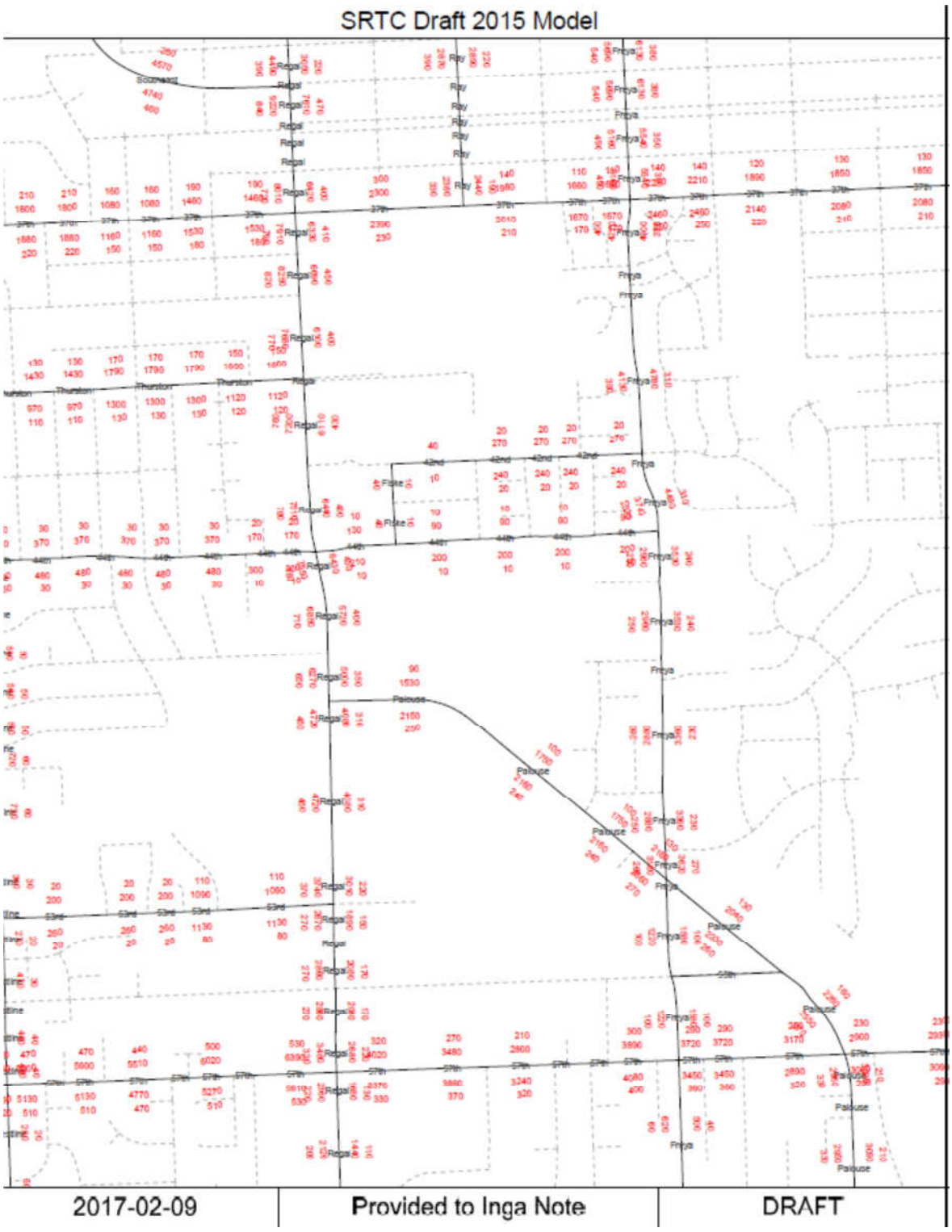
- This memorandum is based on preliminary 2040 model results from SRTC (prior to QA/QC). Once the final model results are released in spring 2017, city staff should review and compare those results to the numbers used in this study. Then this analysis should be updated if warranted.
- The Ray-Freya Crossover project should be included in the Horizon 2040 plan. The timing of construction will be tied to the future development need and availability of funding for design and construction.
- The footprint of the crossover should be minimized near Ferris High School in order to lessen the impact on the school and to keep speeds relatively low.
- Bicycle and pedestrian facilities should be incorporated into the crossover. One concept includes an adjacent asphalt pathway on the west side of the crossover. This could tie into the existing pathway at 44th Avenue, and would provide a larger buffer between the school facilities and moving traffic. A second option would be bicycle lanes and sidewalks.
- Ray Street between 29th and 37th should be restriped to maximize the throughput of traffic at the signals. This can be analyzed at a later date, but may involve lengthening the SB lane drop zone south of 29th.

Appendix A – Current Daily Traffic Volumes

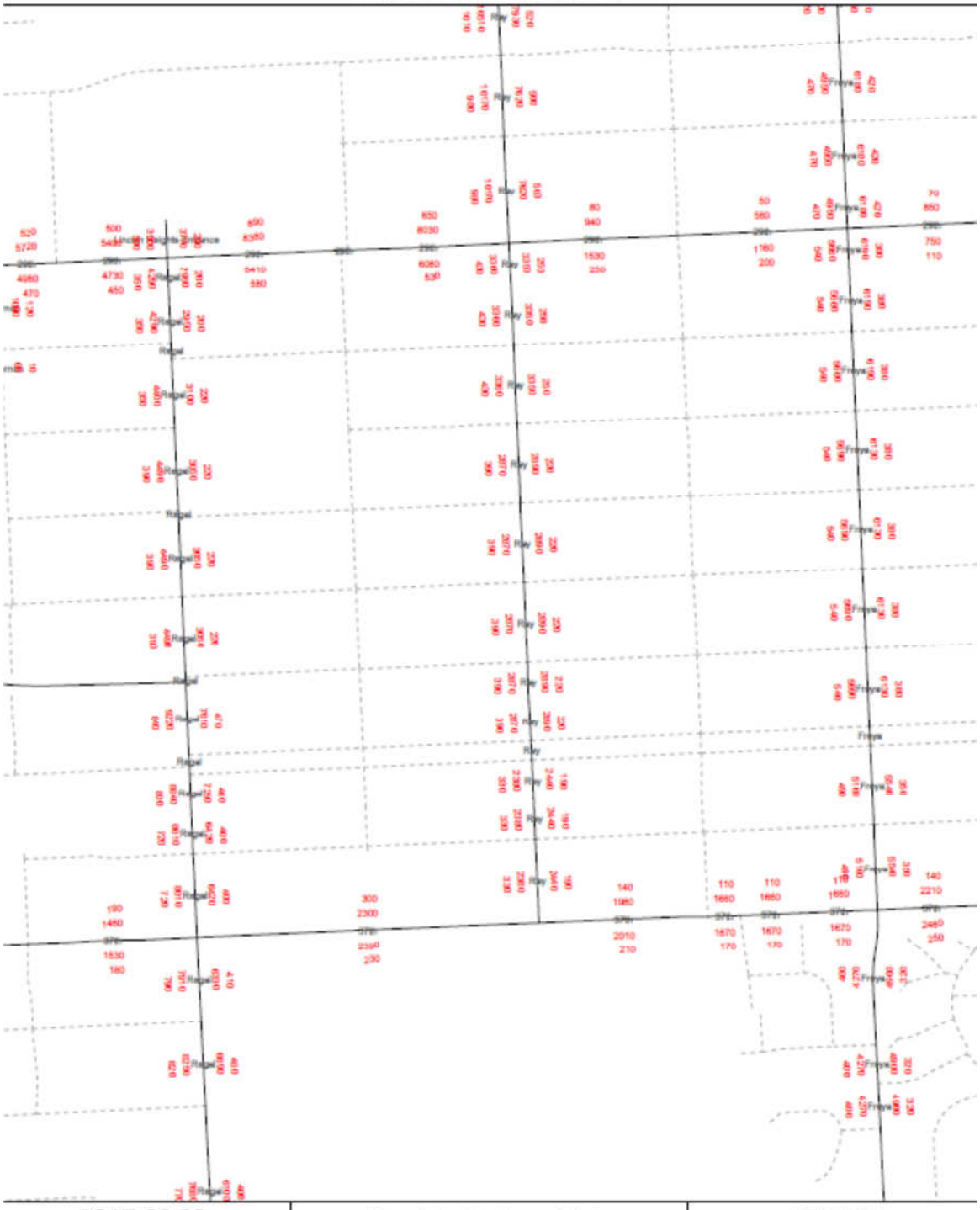


Appendix B – Model Forecasts

2015 VISUM Network – ADT and PM volumes



SRTC Draft 2015 Model



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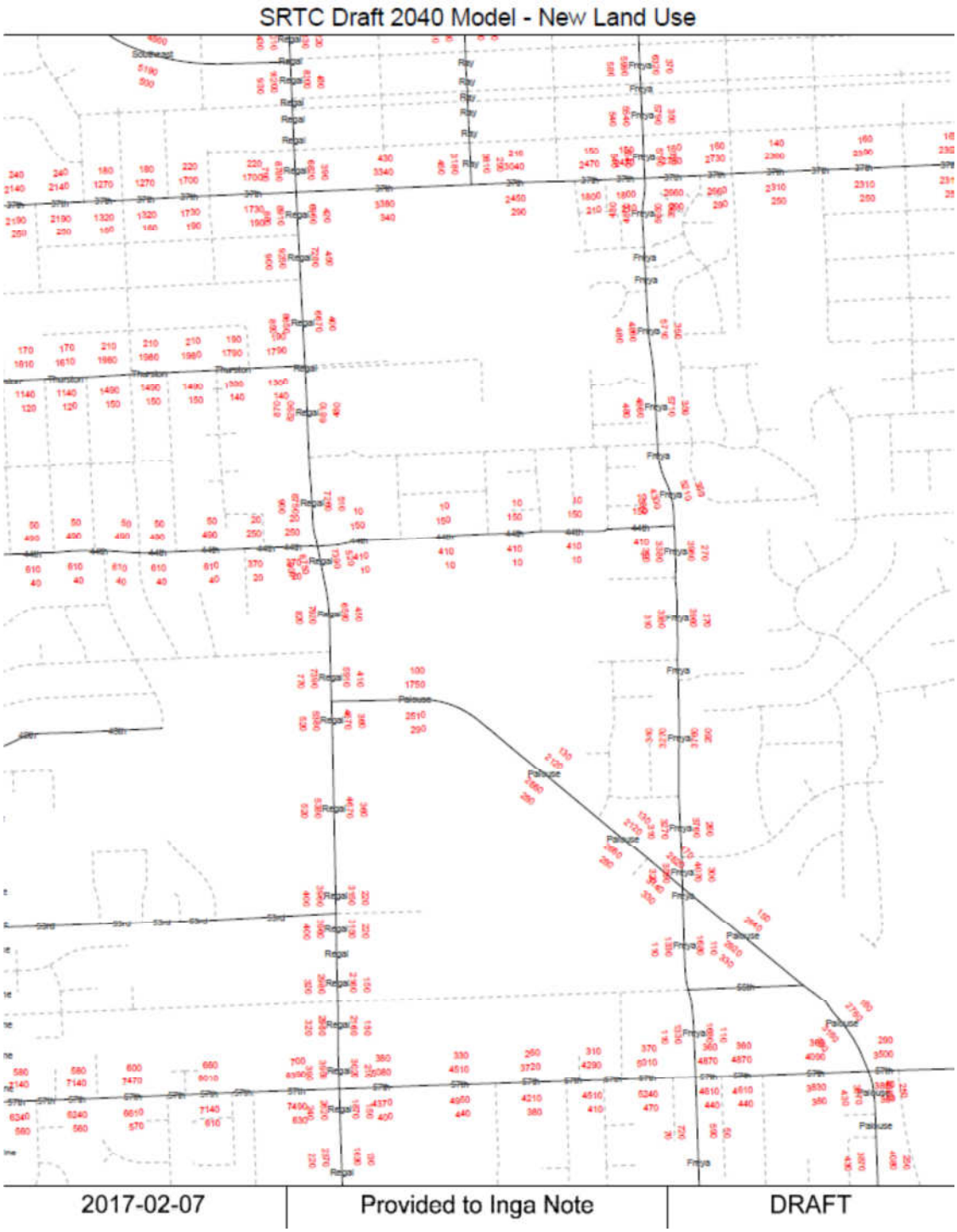
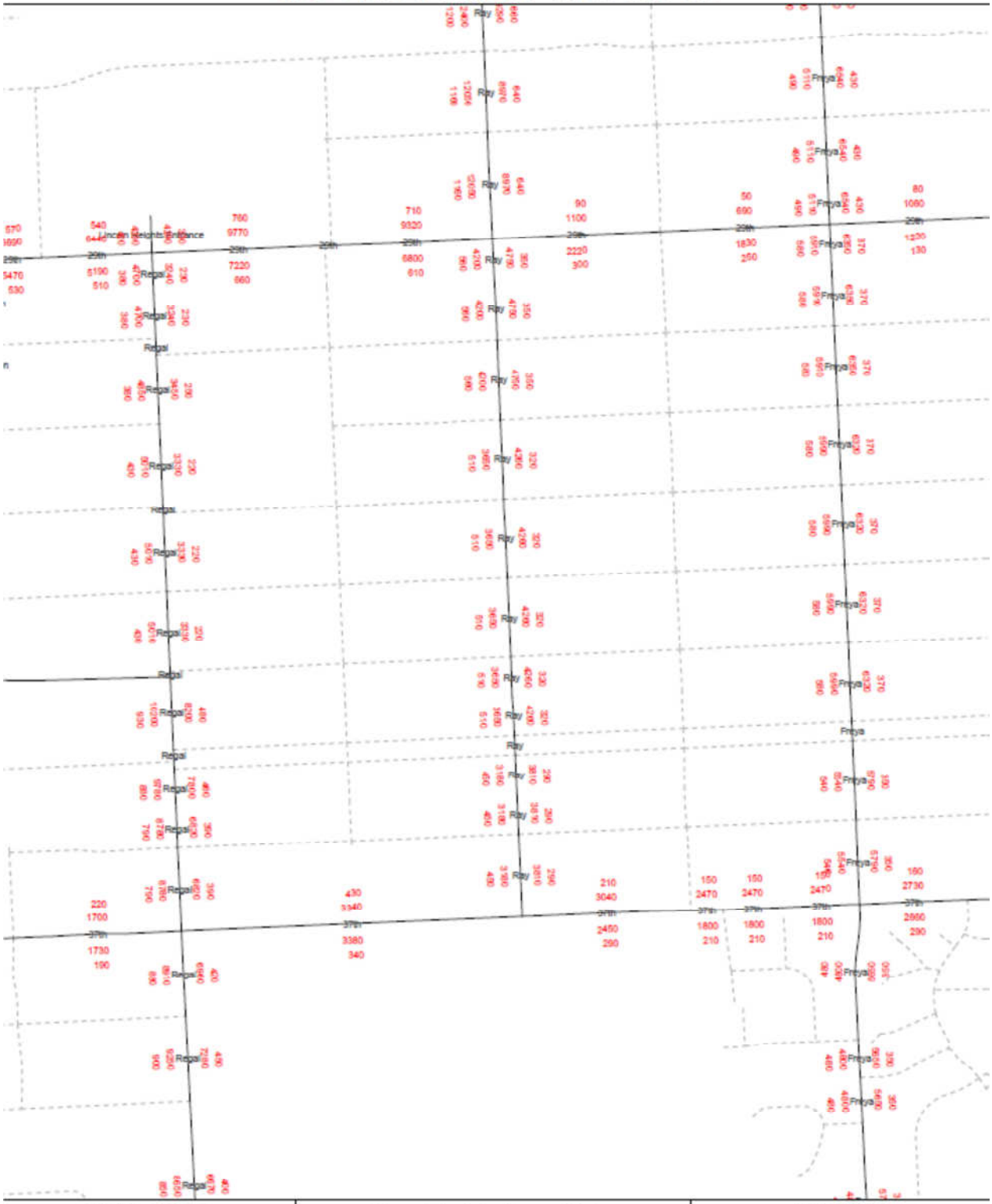
2040 VISUM Network without crossover – ADT and PM volumes
(*Note – includes the North Spokane Corridor.)*



SRTC Draft 2040 Model - New Land Use



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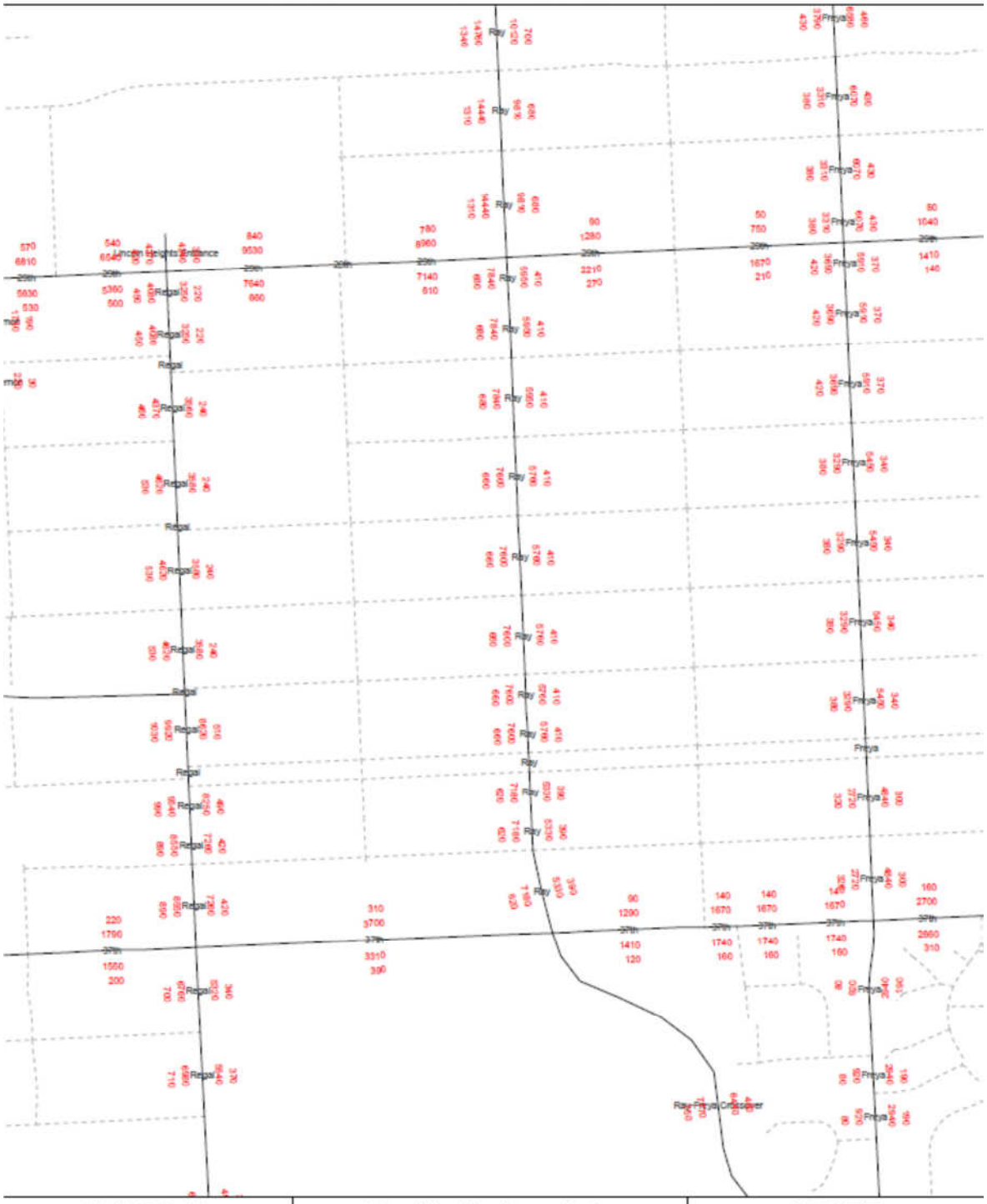
2040 VISUM Network with Crossover – ADT and PM volumes
(*Note – includes the North Spokane Corridor.)*

SRTC Draft 2040 Model - New Land Use



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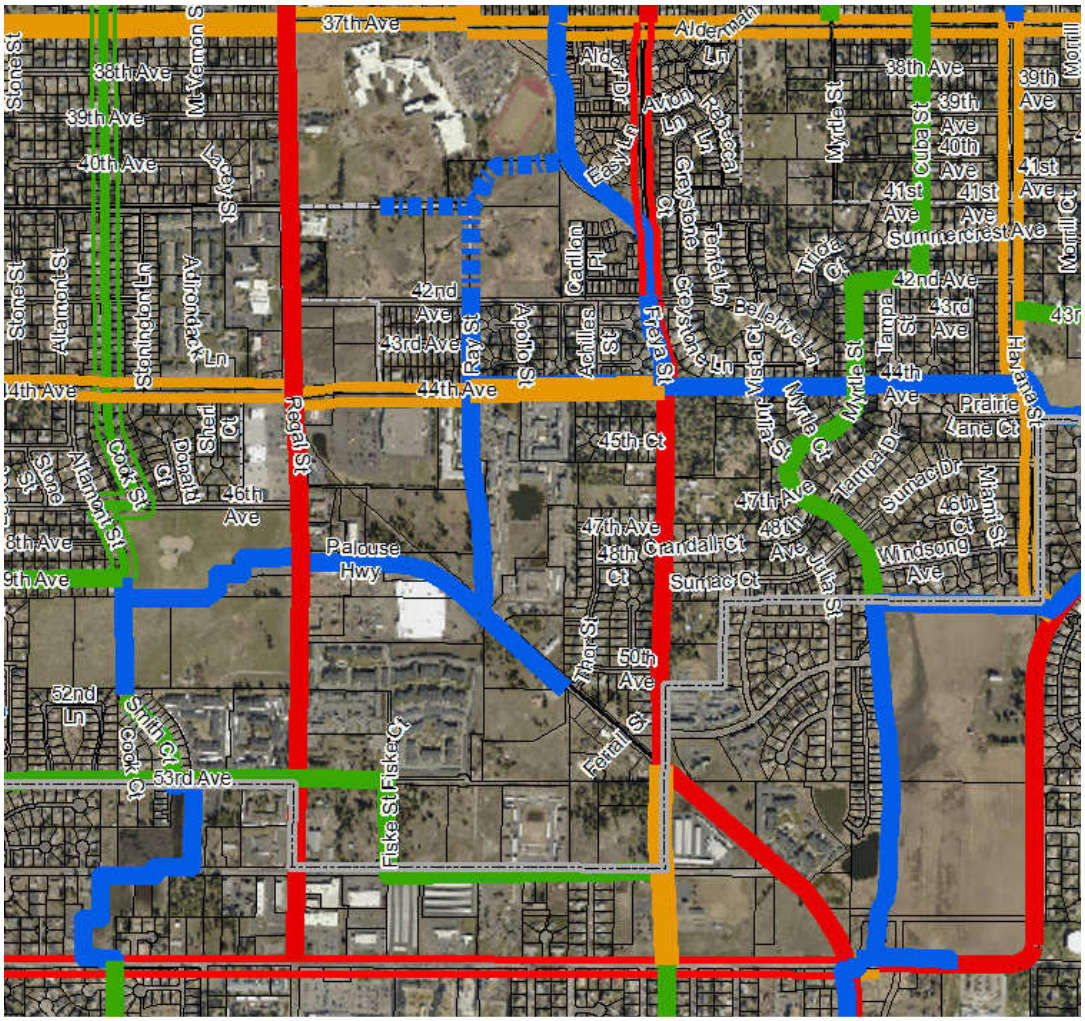
Appendix C – Bicycle Network

Draft Future Bicycle Network for Southgate area



- High Traffic (Bike Lane)
- High Traffic (Shared)
- Moderate Traffic (Bike Lane)
- Moderate Traffic (Shared)
- Bike Friendly Route
- Neighborhood Greenway
- Shared Use Path
- Soft Surface Path