Lincoln Ranch Golf Course Development Traffic Impact Assessment

Lacombe County, Alberta

Prepared for:
GS Communities

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August 26, 2016
Project No. 116239369

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Sign-off Sheet

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APEGA Permit to Practice P0258

1.0 Introduction

1.1 BACKGROUND

GS Communities Ltd. (Client) is currently seeking approval of the proposed Lincoln Ranch Golf Course development. The proposed development is located approximately 2 km south of the intersection of Township Road 414 and Range Road 282 in the County of Lacombe, and is shown on **Figure 1.1**.

As part of the process for the projects review and approval, Stantec Consulting Ltd. (Stantec) has been retained to complete a Traffic Impact Assessment (TIA) in order to evaluate the potential impacts to the surrounding transportation network within the study area.

1.2 OBJECTIVES

The objectives of this TIA are to:

- Establish existing and future traffic conditions at the intersections of Highway 792 / Township Road 412 and Highway 792 / Township Road 414;
- Complete analysis at the following horizon years 2018 (full build out) and 2038 (20-year horizon) for the background and total traffic scenarios; and
- Recommend appropriate improvements, if necessary, to the intersections of Highway 792 / Township Road 412 and Highway 792 / Township Road 414 in order to mitigate any impact due to the construction of the proposed development.

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Lincoln Ranch Golf Course Development - TIA
Figure 1.1 – Site Location

Study Intersection

2.0 Site Context

2.1 STUDY AREA

The proposed development is located approximately 2 km south of the intersection of Township Road 414 / Range Road 282, east of Gull Lake within Lacombe County, as shown on **Figure 1.1**. The concept plan for the development is shown in **Figure 2.1**.

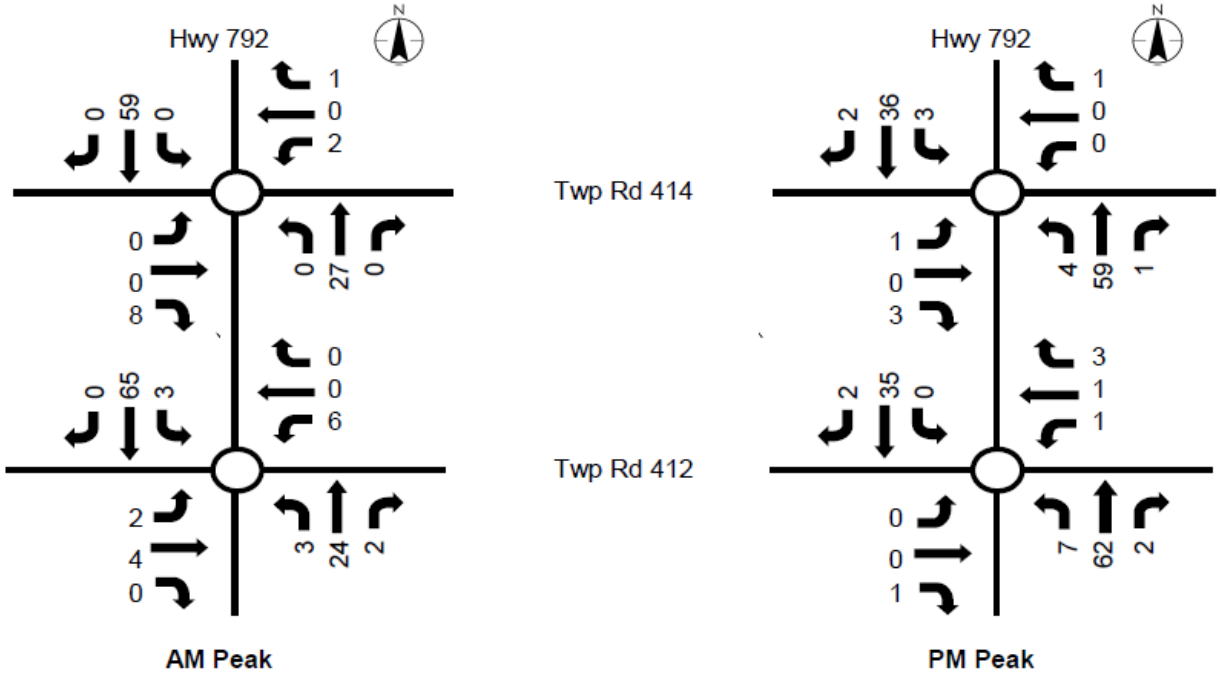
2.2 EXISTING ROAD NETWORK & INTERSECTIONS

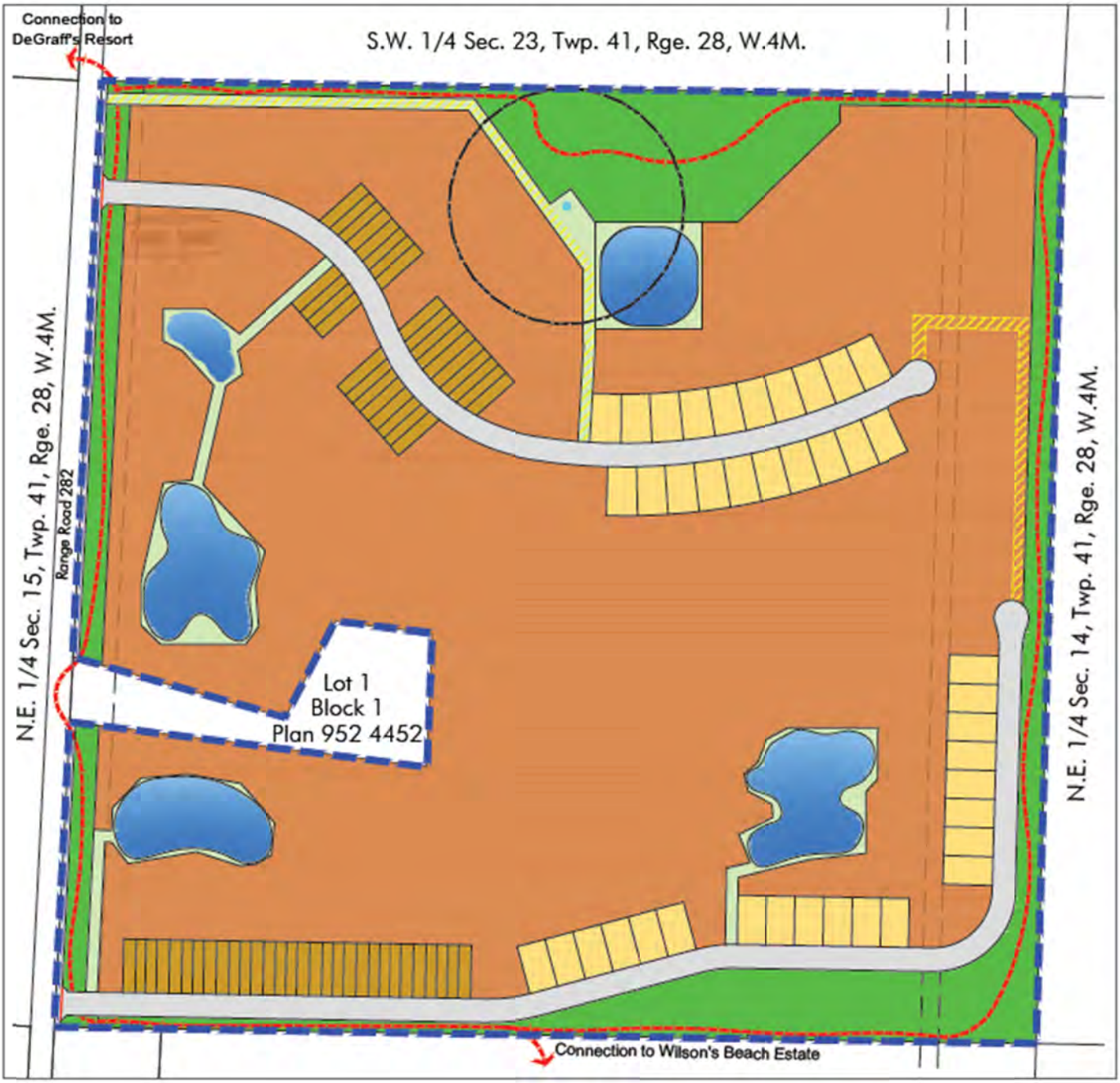
Township Road 414 is a two-lane undivided gravel roadway running in an east-west orientation approximately 2 km north of the development. Township Road 412 is a two-lane paved roadway running in an east-west orientation approximately 1 km south of the development. Highway 792 is a two-lane, undivided roadway that runs in a north-south orientation approximately 1 km east of the development with a posted speed of 100 km/h.

2.3 BACKGROUND TRAFFIC VOLUMES

Traffic counts were conducted at the two study intersections on Thursday April 3, 2014, for both the AM and PM peak hours. The results of these counts are shown in **Figure 2.2**, and the raw data can be found in **Appendix A**.

Figure 2.2: Existing Traffic Volumes




Connection to DeGraff's Resort
S.W. 1/4 Sec. 23, Twp. 41, Rge. 28, W.4M.
N.E. 1/4 Sec. 15, Twp. 41, Rge. 28, W.4M.
Range Road 282
N.E. 1/4 Sec. 14, Twp. 41, Rge. 28, W.4M.
Lot 1
Block 1
Plan 952 4452
Connection to Wilson's Beach Estate
LEGEND
R-RCC Residential Conservation Cluster
R-HDLR Higher Density Lakeshore Residential
P-R Recreation District
Municipal Reserve
Stormwater Management Facility
Wastewater Treatment Plant (WWTP) and 100m Setback
Public Utility Lot
Emergency Access
Multi-Purpose Trail
Outline Plan Boundary

2.3.1 Growth Trends

Historical traffic volume data was supplied by Alberta Transportation (AT) for Highway 792, 6.4 km south of the intersection with Highway 792 / Township Road 412 in the vicinity of the proposed development. This data can be found in **Appendix A** and shows the historical growth rates along Highway 792 to be:

- 5-year average annual growth rate of -0.1%; and
- 10-year average annual growth rate of 1.7%.

For the purpose of this report, AT's typical rate of 2.5% annual, uncompounded background growth up to the 20 year horizon has been conservatively used.

2.3.2 Seasonal Trends

The proposed development is near Gull Lake, campgrounds, and other traffic generators that produce higher volumes of traffic in the summer months. Based on the seasonality of the surroundings, the average summer daily traffic (ASDT) and the annual daily traffic (AADT) were compared to determine the variation in traffic.

Historical ASDT and AADT volumes were supplied by AT for Highway 792, 6.4 km south of the intersection with Highway 792 and Township Road 412 in the vicinity of the proposed development. This data can be found in **Appendix A** and shows the 5-year average increase from the AADT to the ASDT to be 24.8%.

2.3.3 Future Background Traffic

The horizons that have been analyzed in this TIA include the following:

- 2018 (full build out); and
- 2038 (20 year horizon).

The existing traffic volumes were increased by 24.8% to account for seasonal traffic trends and by 2.5% per year to account for annual growth. The resulting background traffic volumes for the 2018 and 2038 horizons are shown in **Figures 2.3 and 2.4** respectively.

Figure 2.3: 2018 Background Traffic Volumes

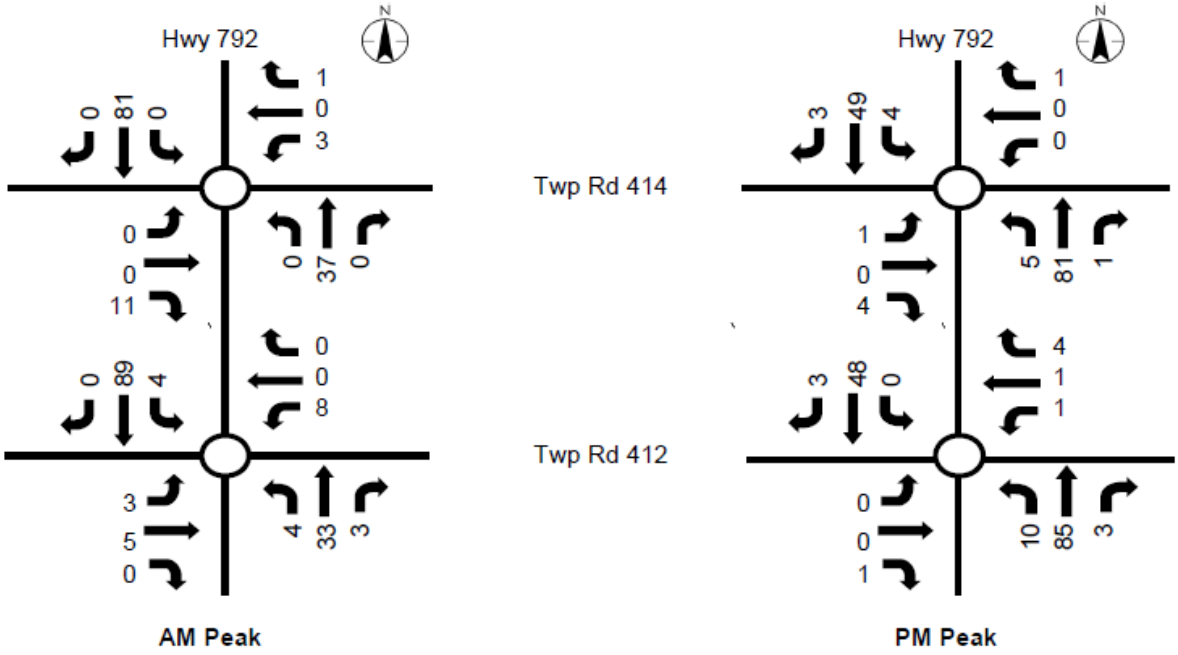
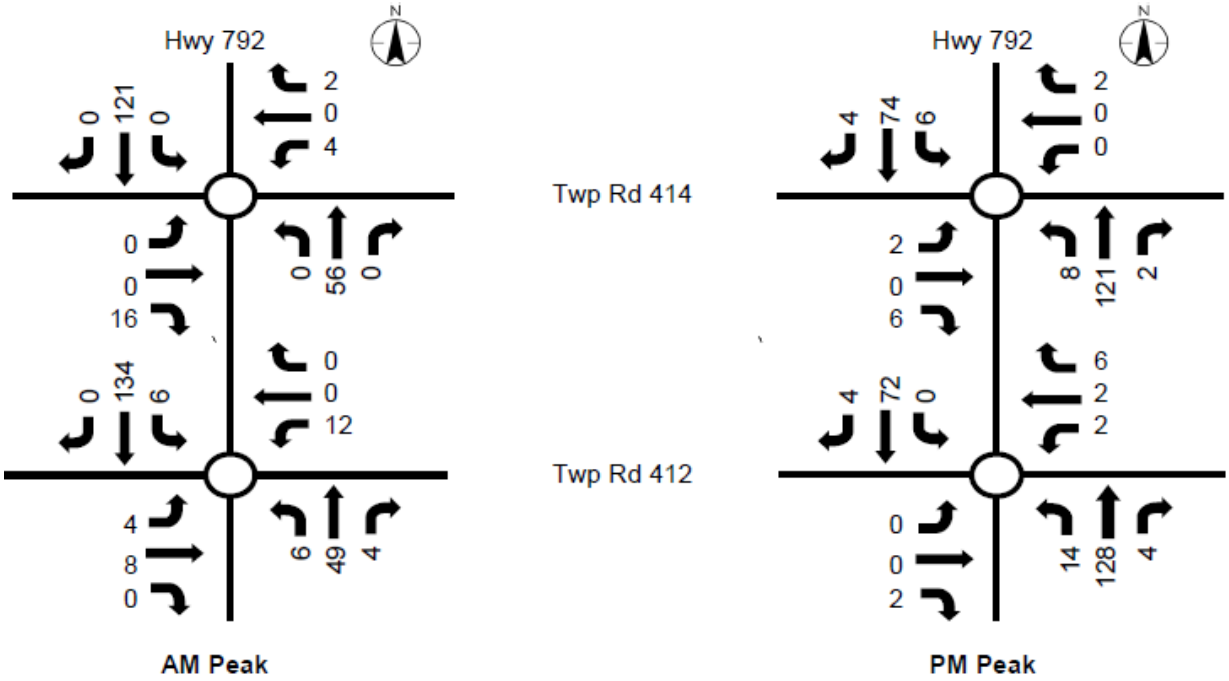


Figure 2.4: 2038 Background Traffic Volumes



3.0 Proposed Development and Trip Characteristics

3.1 PROPOSED DEVELOPMENT

The proposed Lincoln Ranch Golf Course development consists of a 9-hole golf course, 40 single family detached residential units and 60 row house units as shown in the concept plan in **Figure 2.1**.

3.1.1 Development Staging

For the purpose of this TIA, the following phasing assumptions have been made:

- 2018 (full build out) horizon includes a 9 hole golf course, 40 single family detached residential units and 60 row houses; and
- The 2038 (20-year) horizon includes the above plus additional background growth.

3.2 TRIP GENERATION

The Institute of Transportation Engineers (ITE) Trip Generation Manual, 9th Edition, has been used to calculate the number of trips that will be generated by the proposed development. The ITE Land Uses 210 – Single Family Detached Housing, 230 – Residential Condominium / Townhouse and 430 – Golf Course have been used. The fitted curve equations were used for the trip generation calculations where applicable, otherwise the average rate was used.

Table 3.1 shows the trip generation rates for the proposed development at full build out.

Table 3.1: Trip Generation

Land Use	Trip Generation Rate			AM peak		PM peak		Daily	
	AM	PM	Daily	IN	OUT	IN	OUT	IN	OUT
Single Family Residential (#210) [40 Dwelling Units]	T= 0.70(X) +9.74	Ln(T)= 0.90* Ln(X)+ 0.51	9.52 Trips / Unit	25%	75%	63%	37%	50%	50%
				9	28	29	17	190	190
Row House (#230) [60 Dwelling Units]	Ln(T)= 0.80Ln(X) +0.26	Ln(T)= 0.82Ln(X) +0.32	5.81 Trips / Unit	17%	83%	67%	33%	50%	50%
				6	28	26	13	174	174
Golf Course (#430) [9 Holes]	2.06 Trips / Hole	2.92 Trips / Hole	35.74 Trips / Hole	79%	21%	51%	49%	50%	50%
				15	4	13	13	161	161
Total Trip Generation				**30**	**60**	**68**	**43**	**525**	**525**

3.3 TRIP DISTRUBTION AND ASSIGNMENT

Taking into consideration the development's proximity to the City of Lacombe and the City of Red Deer, as well as the existing road network, it is anticipated that the majority of the external trips to/from the development will be generated by areas south of the development and that a smaller portion may be generated from areas east and north of the development. The following trip distribution assumptions have been used for this TIA, and are shown on **Figure 3.1**:

- 70% of the trips to/from the south on Highway 792;
- 20% of the trips to/from the east on Township Road 412; and
- 10% of the trips to/from the north on Highway 792.

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Lincoln Ranch Golf Course Development - TIA

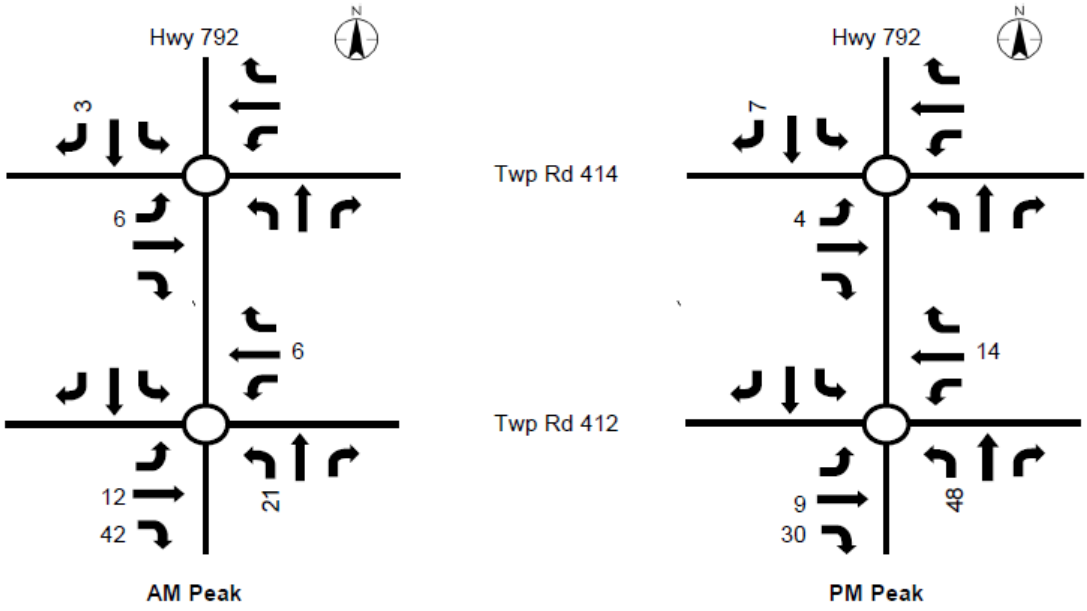
Figure 3.1 – Trip Assignment

Study Intersection

Trip Assignment Percentage

Based on the trip generation calculations outlined in **Table 3.1** and the trip distribution patterns described here, the site generated traffic was manually assigned to the Township Road 414 / Highway 792 and Township Road 412 / Highway 792 intersections, resulting in the site generated traffic volumes shown on **Figure 3.2**.

Figure 3.2: Site-Generated Traffic Volumes



3.4 DESIGN VOLUMES

The horizons that have been analyzed in this TIA include the following:

- 2018 (full build out); and
- 2038 (20 year horizon).

Site generated traffic volumes for the development were added to the background volumes outlined in Section 2.3 to determine the total traffic volumes. The resulting total design traffic volumes for the 2018 and 2038 full build out horizons are shown on **Figures 3.4 and 3.5** respectively.

Figure 3.4: 2018 Total Traffic Volumes

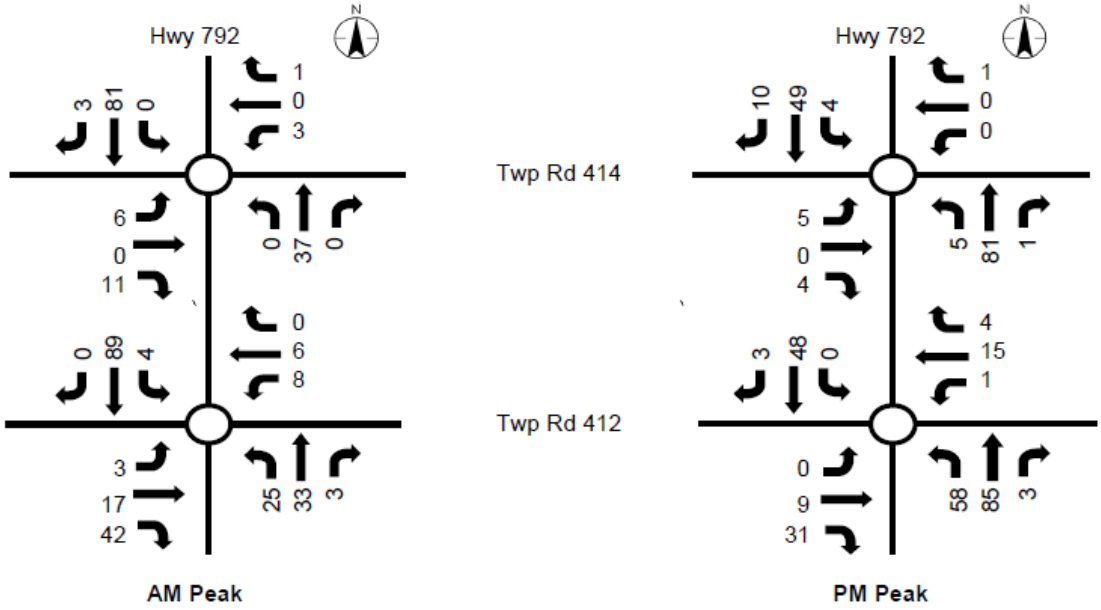
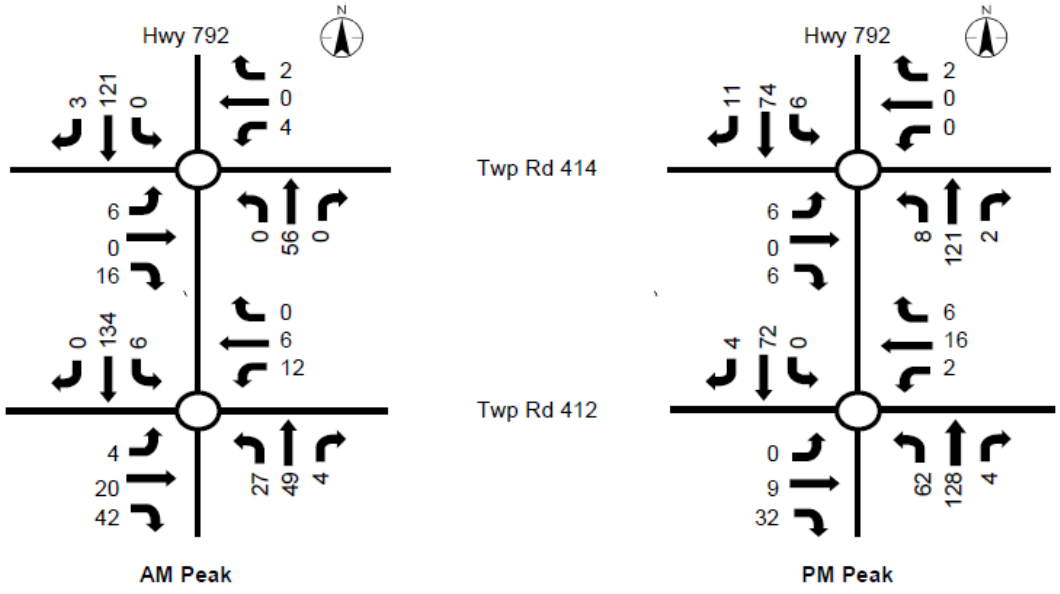


Figure 3.6: 2038 Total Traffic Volumes



4.0 Transportation Assessment

The assessment of the intersections of Highway 792 / Township Road 414 and Highway 792 / Township Road 412 consists of three parts:

- Intersection Treatment Analysis (ITA);
- Illumination Warrant Analysis; and
- Intersection Capacity Analysis (ICA).

The ITA will determine what intersection upgrades, if any, are required for each design volume scenario. The IWA will determine whether traffic signals and/or intersection illumination is warranted. The ICA will confirm that the intersection, when upgraded, can be expected to perform satisfactorily when subjected to the design volumes and will also determine what additional upgrades are required, if any.

4.1 INTERSECTION TREATMENT ANALYSIS

The calculations for the ITA are based on daily volumes as well as peak hour volumes. Thus, it is necessary to convert the peak hour volumes into daily volumes. As per AT's Highway Geometric Design Guide (HGDG):

- DHV = k (AADT), where DHV is the design hourly volume, AADT is the average annual daily traffic and k is a factor equivalent to 0.12.

As the highest volumes are expected during the PM peak they have been used as the design hour volumes. The resulting daily traffic volumes for the four horizons are illustrated in **Figures 4.1 and 4.2**.

Figure 4.1 – 2018 AADT Traffic Volumes

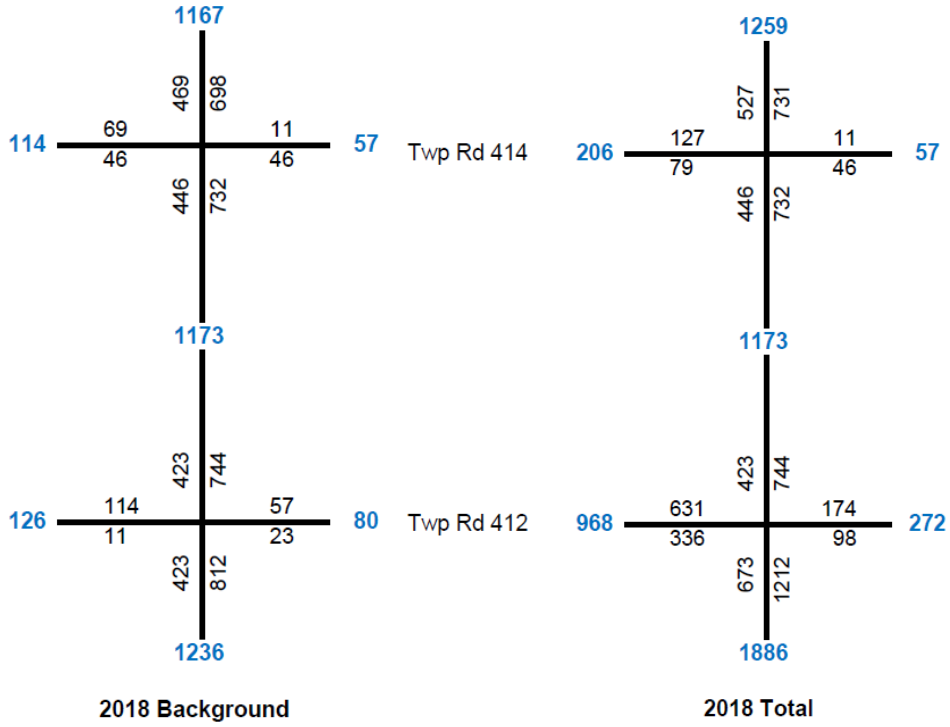
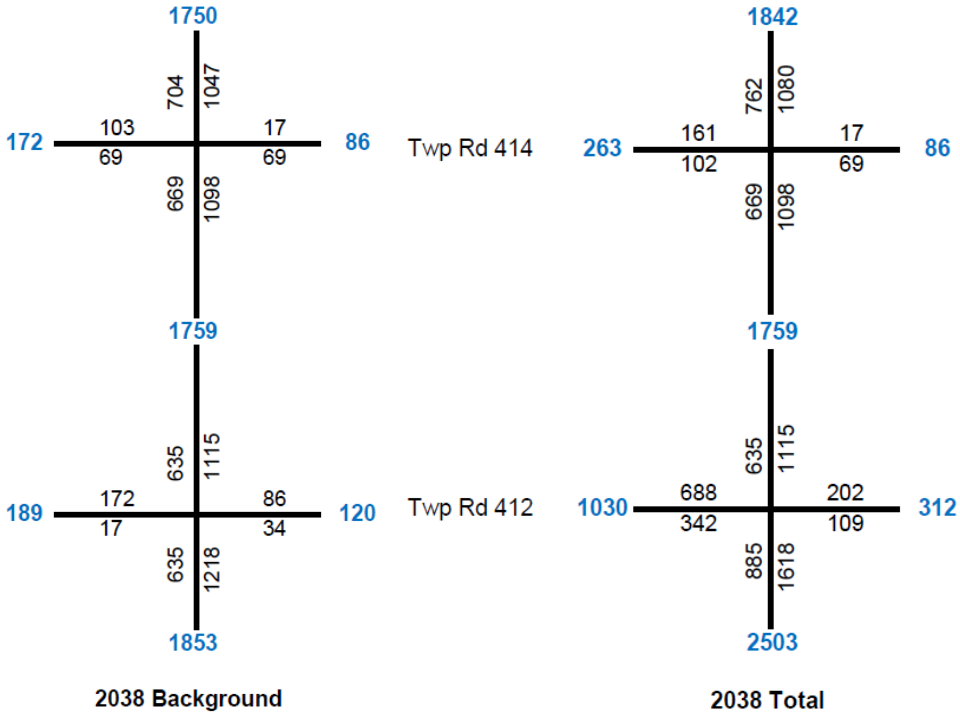


Figure 4.2 – 2038 AADT Traffic Volumes



Intersections involving provincial highways must meet minimum requirements as defined by AT's HGDG. The ITA for this report was completed utilizing section D7.4 and, where required, warrant analysis for dedicated left and right turn lanes were completed as per section D.7.6 and D.7.7 of the HGDG for the intersections of Highway 792 / Township Road 414 and Highway 792 / Township Road 412.

4.1.1 Preliminary Assessment

Figure D-7.4 of the HGDG was used to conduct a preliminary assessment of intersection treatment requirements based on AADT. **Table 4.1** outlines the results of this analysis. The warrant worksheets are included in **Appendix B**.

Table 4.1 – ITA Results: Preliminary Assessment

Horizon Year	Intersection Requirements	
	Hwy 792 / Twp Rd 414	Hwy 792 / Twp Rd 412
2018 (Background Traffic)	Type II-b	Type II-b
2018 (Full Buildout)	Type II-b	Type III-c
2038 (Background Traffic)	Type II-b	Detailed Analysis Required
2038 (20 Year Horizon)	Detailed Analysis Required	Detailed Analysis Required

4.1.2 Left Turn Lane Warrant

For the intersections labelled as "Detailed Analysis Required" above, a left turn warrant analysis was conducted as per Section D.7.6 of the HGDG. **Table 4.2** outlines the results of this analysis.

Table 4.2 – ITA Results: Left Turn Lane Warrant

Intersection and Horizon	NB Direction		SB Direction	
	AM	PM	AM	PM
Twp Rd 412, 2038 Background Traffic	Type II-b	n/a	n/a	n/a
Twp Rd 412, 2038 Full Buildout	Type II-c	n/a	n/a	n/a
Twp Rd 414, 2038 Full Buildout	n/a	n/a	n/a	Type II-b

4.1.3 Right Turn Lane Warrant

Section D.7.7 of the HGDG outlines the conditions that warrant an exclusive right turn lane as:

- Main road AADT > 1800;
- Intersecting road AADT > 900; and
- Right turn volume > 360 (vpd).

Based on these parameters, a right turn lane is not required at either intersection at any study horizon based on the projected right turning volumes.

4.1.4 Intersection Treatment Analysis Summary

Based on the preceding analysis, the following intersection treatments are required for the study intersections:

Hwy 792 / Twp Rd 414:

- Intersection type II-b (tapered intersection) will be sufficient for all study horizons

Hwy 792 / Twp Rd 412:

- Intersection type II-b (tapered intersection) required at 2018 and 2038 background horizons
- Intersection type III-c (flared intersection) required at 2018 full buildout horizon
- Intersection type II-c (tapered intersection) required at 2038 full buildout horizon

The higher level intersection treatment is required at the 2018 horizon because that analysis is based on daily traffic volumes, vs. the 2038 horizon which was based on peak hour volumes. Based on the peak hour analysis, it is expected that a type II-c treatment will be sufficient for all study horizons.

4.2 INTERSECTION ILLUMINATION WARRANT

Intersection illumination warrants for this TIA were completed utilizing TAC's *Illumination of Isolated Rural Intersections*, which rates intersections for illumination based on a number of parameters. An intersection must score 120 points or greater to warrant illumination. The results of the intersection illumination warrant results are as follows, and the worksheets are included in **Appendix B**.

- **Highway 792 / Township Road 414** – warrant totals 56 points at the 2038 (20 year) horizon for the total traffic scenario and therefore intersection illumination is not required.

- **Highway 792 / Township Road 412** – warrant totals 106 points at the 2038 (20 year) horizon for the total traffic scenario and therefore intersection illumination is not required.

4.3 INTERSECTION CAPACITY ANALYSIS

The ICA was completed in order to determine whether the Level of Service (LOS) and the delay of the studied intersections remains at an acceptable level once they are subjected to the design volumes. The traffic modeling software package of Synchro Studio 9 has been used to complete intersection capacity analysis for different scenarios. The LOS for the intersection is based on the computed delays on each of the traffic movements. LOS 'A' represents minimal delays and LOS 'F' represents a scenario with significant vehicular delays. **Table 4.3** shows LOS criteria for unsignalized intersections as summarized in the Highway Capacity Manual.

Table 4.3: Level of Service Criteria

Level of Service (LOS)	Control Delay per Vehicle (s)
A	≤10
B	> 10 and ≤ 15
C	> 15 and ≤ 25
D	> 25 and ≤ 35
E	> 35 and ≤ 50
F	> 50

Generally, a LOS-D is the lowest acceptable LOS for a given turning movement on the highway. Movements experiencing LOS-E or LOS-F, typically require upgrading in order to increase performance of the failing traffic movements. An exception to this guideline is in situations where the affected traffic movement has a relatively small volume compared to other movements within the same intersection.

The volume to capacity (V/C) Ratio indicates the level of congestion for a lane. A V/C ratio equal to or greater than 1.00 indicates that the lane is operating at or above capacity. It is generally accepted in the short-term and long-term planning horizons that lanes operating with V/C ratios equal to or less than 0.85 and 0.90, respectively, have acceptable levels of congestion.

4.3.1 2018 Horizon

The intersections of Highway 792 / Township Road 414 and Highway 792 / Township Road 412 are currently Type I two way stop controlled (TWSC) intersection with free movements on Highway 792. For the 2018 Background and Full Build Out horizons, these intersections were modeled with their existing geometry. The results of this analysis are summarized in **Tables 4.4 and 4.5**. The Synchro and SimTraffic output reports are included in **Appendix C**.

Table 4.4: ICA Results - 2018 - Highway 792 & Township Road 414

Description	Intersection Movements												Overall Intersection
	EB			WB			NB			SB			
	L	T	R	L	T	R	L	T	R	L	T	R	
AM Peak Background Traffic													
Intersection / Lane Characteristics	SH	1	SH	SH	1	SH	SH	1	SH	SH	1	SH	
Volumes(veh/h)	0	0	11	3	0	1	0	37	0	0	81	0	ICU = 14.3%
Volume/Capacity Ratio (V/C)	-	0.01	-	-	0.00	-	-	0.00	-	-	0.00	-	
Level of Service (LOS)	-	A	-	-	A	-	-	-	-	-	-	-	LOS A
Queue Length 95th (m) - Sim Traffic	-	7.8	-	-	3.7	-	-	-	-	-	-	-	
PM Peak Background Traffic													
Intersection / Lane Characteristics	SH	1	SH	SH	1	SH	SH	1	SH	SH	1	SH	
Volumes(veh/h)	1	0	4	0	0	1	5	81	1	4	49	3	ICU = 15.7%
Volume/Capacity Ratio (V/C)	-	0.01	-	-	0.00	-	-	0.00	-	-	0.00	-	
Level of Service (LOS)	-	A	-	-	A	-	-	A	-	-	A	-	LOS A
Queue Length 95th (m) - Sim Traffic	-	5.4	-	-	2.6	-	-	0.0	-	-	1.8	-	
AM Peak Total Traffic													
Intersection / Lane Characteristics	SH	1	SH	SH	1	SH	SH	1	SH	SH	1	SH	
Volumes(veh/h)	6	0	11	3	0	1	0	37	0	0	81	3	ICU = 14.4%
Volume/Capacity Ratio (V/C)	-	0.02	-	-	0.00	-	-	0.00	-	-	0	-	
Level of Service (LOS)	-	A	-	-	A	-	-	-	-	-	-	-	LOS A
Queue Length 95th (m) - Sim Traffic	-	10.2	-	-	3.7	-	-	-	-	-	-	-	
PM Peak Total Traffic													
Intersection / Lane Characteristics	SH	1	SH	SH	1	SH	SH	1	SH	SH	1	SH	
Volumes(veh/h)	5	0	4	0	0	1	5	81	1	4	49	10	ICU = 17.5%
Volume/Capacity Ratio (V/C)	-	0.01	-	-	0.00	-	-	0.00	-	-	0	-	
Level of Service (LOS)	-	A	-	-	A	-	-	A	-	-	A	-	LOS A
Queue Length 95th (m) - Sim Traffic	-	12.6	-	-	11.0	-	-	5.0	-	-	0	-	

Table 4.5: ICA Results - 2018 - Highway 792 & Township Road 412

Description	Intersection Movements												Overall Intersection
	EB			WB			NB			SB			
	L	T	R	L	T	R	L	T	R	L	T	R	
AM Peak Background Traffic													
Intersection / Lane Characteristics	SH	1	SH	SH	1	SH	SH	1	SH	SH	1	SH	
Volumes(veh/h)	3	5	0	8	0	0	4	33	3	4	89	0	ICU = 15.5%
Volume/Capacity Ratio (V/C)	-	0.01	-	-	0.01	-	-	0.00	-	-	0	-	
Level of Service (LOS)	-	A	-	-	A	-	-	A	-	-	A	-	LOS A
Queue Length 95th (m) - Sim Traffic	-	6.9	-	-	7.1	-	-	1.0	-	-	0	-	
PM Peak Background Traffic													
Intersection / Lane Characteristics	SH	1	SH	SH	1	SH	SH	1	SH	SH	1	SH	
Volumes(veh/h)	0	0	1	1	1	4	10	85	3	0	48	3	ICU = 21.9%
Volume/Capacity Ratio (V/C)	-	0.00	-	-	0.01	-	-	0.01	-	-	0	-	
Level of Service (LOS)	-	A	-	-	A	-	-	A	-	-	-	-	LOS A
Queue Length 95th (m) - Sim Traffic	-	1.9	-	-	6.1	-	-	-	-	-	-	-	
AM Peak Total Traffic													
Intersection / Lane Characteristics	SH	1	SH	SH	1	SH	SH	1	SH	SH	1	SH	
Volumes(veh/h)	3	17	42	8	6	0	25	33	3	4	89	0	ICU = 20.7%
Volume/Capacity Ratio (V/C)	-	0.08	-	-	0.02	-	-	0.02	-	-	0	-	
Level of Service (LOS)	-	A	-	-	B	-	-	A	-	-	A	-	LOS A
Queue Length 95th (m) - Sim Traffic	-	13.0	-	-	9.2	-	-	2.1	-	-	0	-	
PM Peak Total Traffic													
Intersection / Lane Characteristics	SH	1	SH	SH	1	SH	SH	1	SH	SH	1	SH	
Volumes(veh/h)	0	9	31	1	15	4	58	85	3	0	48	3	ICU = 24.5%
Volume/Capacity Ratio (V/C)	-	0.05	-	-	0.03	-	-	0.04	-	-	0	-	
Level of Service (LOS)	-	A	-	-	B	-	-	A	-	-	-	-	LOS A
Queue Length 95th (m) - Sim Traffic	-	12.6	-	-	11.0	-	-	5.0	-	-	-	-	

At the intersection of Highway 792 / Township Road 414, all movements are expected to operate at LOS A with no V/C greater than 0.02. At the intersection of Highway 792 / Township Road 412, all movements are expected to operate at LOS B or better with no V/C greater than 0.08.

This analysis suggests that the total traffic volumes warrant no improvements upon existing conditions at the 2018 horizon.

4.3.2 2038 (20 Year) Horizon

Based on the results of the Intersection Treatment Analysis, the intersection of Highway 792 / Township Road 414 was modelled as a type II-b (tapered) intersection, which is represented in Synchro with a short right turn lane in the northbound and southbound directions. The intersection of Highway 792 / Township Road 412 was modelled as a type II-c (tapered) intersection, also represented with a short right turn lane in the northbound and southbound directions.

The results of this analysis are summarized in **Tables 4.6 and 4.7**. The Synchro and SimTraffic output reports are included in **Appendix C**

Table 4.6: ICA Results - 2038 - Highway 792 & Township Road 414

Description	Intersection Movements												Overall Intersection
	EB			WB			NB			SB			
	L	T	R	L	T	R	L	T	R	L	T	R	
AM Peak Background Traffic													
Intersection / Lane Characteristics	SH	1	SH	SH	1	SH	SH	1	1	SH	1	1	
Volumes(veh/h)	0	0	16	4	0	2	0	56	0	0	121	0	ICU = 16.9%
Volume/Capacity Ratio (V/C)	-	0.02	-	-	0.01	-	-	0.00	0.00	-	0.00	0.00	
Level of Service (LOS)	-	A	-	-	A	-	-	-	-	-	-	-	LOS A
Queue Length 95th (m) - Sim Traffic	-	5.5	-	-	3.5	-	-	-	-	-	-	-	
PM Peak Background Traffic													
Intersection / Lane Characteristics	SH	1	SH	SH	1	SH	SH	1	1	SH	1	1	
Volumes(veh/h)	2	0	6	0	0	2	8	121	2	6	74	4	ICU = 23.5%
Volume/Capacity Ratio (V/C)	-	0.01	-	-	0.00	-	-	0.01	0.00	-	0.00	0.00	
Level of Service (LOS)	-	A	-	-	A	-	-	A	-	-	A	-	LOS A
Queue Length 95th (m) - Sim Traffic	-	4.3	-	-	2.1	-	-	1.0	-	-	1.5	-	
AM Peak Total Traffic													
Intersection / Lane Characteristics	SH	1	SH	SH	1	SH	SH	1	1	SH	1	1	
Volumes(veh/h)	6	0	16	4	0	2	0	56	0	0	121	3	ICU = 20.0%
Volume/Capacity Ratio (V/C)	-	0.03	-	-	0.01	-	-	0.00	0.00	-	0.00	0.00	
Level of Service (LOS)	-	A	-	-	A	-	-	-	-	-	-	-	LOS A
Queue Length 95th (m) - Sim Traffic	-	6.5	-	-	3.0	-	-	-	-	-	-	-	
PM Peak Total Traffic													
Intersection / Lane Characteristics	SH	1	SH	SH	1	SH	SH	1	1	SH	1	1	
Volumes(veh/h)	6	0	6	0	0	2	8	121	2	6	74	11	ICU = 25.7%
Volume/Capacity Ratio (V/C)	-	0.02	-	-	0.00	-	-	0.01	0.00	-	0.00	0.01	
Level of Service (LOS)	-	A	-	-	A	-	-	A	-	-	A	-	LOS A
Queue Length 95th (m) - Sim Traffic	-	5.4	-	-	2.2	-	-	2.4	-	-	1.8	-	

Table 4.7: ICA Results - 2038 - Highway 792 & Township Road 412

Description	Intersection Movements												Overall Intersection
	EB			WB			NB			SB			
	L	T	R	L	T	R	L	T	R	L	T	R	
AM Peak Background Traffic													
Intersection / Lane Characteristics	SH	1	SH	SH	1	SH	SH	1	1	SH	1	1	
Volumes(veh/h)	4	8	0	12	0	0	6	49	4	6	134	0	ICU = 24.1%
Volume/Capacity Ratio (V/C)	-	0.02	-	-	0.02	-	-	0.00	0.00	-	0.00	0.00	
Level of Service (LOS)	-	B	-	-	B	-	-	A	-	-	A	-	LOS A
Queue Length 95th (m) - Sim Traffic	-	5.7	-	-	5.2	-	-	1.0	-	-	-	-	
PM Peak Background Traffic													
Intersection / Lane Characteristics	SH	1	SH	SH	1	SH	SH	1	1	SH	1	1	
Volumes(veh/h)	0	0	2	2	2	6	14	128	4	0	72	4	ICU = 24.2%
Volume/Capacity Ratio (V/C)	-	0.00	-	-	0.01	-	-	0.01	0.00	-	0.00	0.00	
Level of Service (LOS)	-	A	-	-	A	-	-	A	-	-	-	-	LOS A
Queue Length 95th (m) - Sim Traffic	-	2.4	-	-	4.8	-	-	1.8	-	-	-	-	
AM Peak Total Traffic													
Intersection / Lane Characteristics	SH	1	SH	SH	1	SH	SH	1	1	SH	1	1	
Volumes(veh/h)	4	20	42	12	6	0	27	49	4	6	134	0	ICU = 26.8%
Volume/Capacity Ratio (V/C)	-	0.09	-	-	0.03	-	-	0.02	0.00	-	0.00	0.00	
Level of Service (LOS)	-	B	-	-	B	-	-	A	-	-	A	-	LOS A
Queue Length 95th (m) - Sim Traffic	-	10.6	-	-	6.5	-	-	3.9	-	-	-	-	
PM Peak Total Traffic													
Intersection / Lane Characteristics	SH	1	SH	SH	1	SH	SH	1	1	SH	1	1	
Volumes(veh/h)	0	9	32	2	16	6	62	128	4	0	72	4	ICU = 26.8%
Volume/Capacity Ratio (V/C)	-	0.05	-	-	0.04	-	-	0.04	0.00	-	0.00	0.00	
Level of Service (LOS)	-	A	-	-	B	-	-	A	-	-	-	-	LOS A
Queue Length 95th (m) - Sim Traffic	-	8.4	-	-	7.5	-	-	5.1	-	-	-	-	

At the intersection of Highway 792 / Township Road 414, all movements are expected to operate at LOS A with no V/C greater than 0.03. At the intersection of Highway 792 / Township Road 412, all movements are expected to operate at LOS B or better with no V/C greater than 0.09.

This analysis suggests that the total traffic volumes warrant no improvements upon the required treatments determined in the previous analysis at the 2038 horizon.

5.0 Conclusions

Based on the analysis contained within this TIA, the following conclusions can be made:

- It is expected that the intersections of Highway 792 / Township Road 414 and Highway 792 / Township Road 412 will continue to function acceptably as a Type I-b, two-way stop controlled intersection up to the 2018 full build out scenario. All movements experience LOS-B or better and V/C Ratios well below 0.85.
- The 2018 full build out horizon warrants upgrading to a Type II-b (tapered) intersection at Township Road 414 and a Type II-c (tapered) intersection at Township Road 412.
- The 2038 (20 year) total traffic scenario will continue to operate acceptably with a Type II-b intersection at the junction of Highway 792 and Township Road 414. All movements experience LOS-A and V/C Ratios well below 0.85.
- The 2038 (20 year) total traffic scenario will continue to operate acceptably with a Type II-c intersection at the junction of Highway 792 and Township Road 412. All movements experience LOS-B or better and V/C Ratios well below 0.85.
- Illumination is not warranted for the intersections of Highway 792 / Township Road 414 or Highway 792 / Township Road 412 at all analyzed horizons.

Due to other developments in the area, it is understood that the following improvements are planned for 2017/2018:

- Upgrade the Highway 792 / Township Road 414 intersection to a Type IV-c design
- Upgrade Township Road 414 to a main access road standard from Highway 792 west to Range Road 282
- Upgrade Range Road 282 from Township Road 414 south to the Degraff's Resort access
- Upgrade the Range Road 282/Township Road 414 intersection to a Type II design

The planned upgrades for the Highway 792 / Township Road 414 intersection are of a higher level than those recommended for the Lincoln Ranch development, and therefore outweigh the recommendations made in this study. The recommendations for the Highway 792 / Township Road 412 intersection should still be considered.

6.0 Appendix A – Traffic Data

Location Highway 792 and Township Road 41-4

Project **116239369 - Lincoln Ranch Golf Course Development TIA**

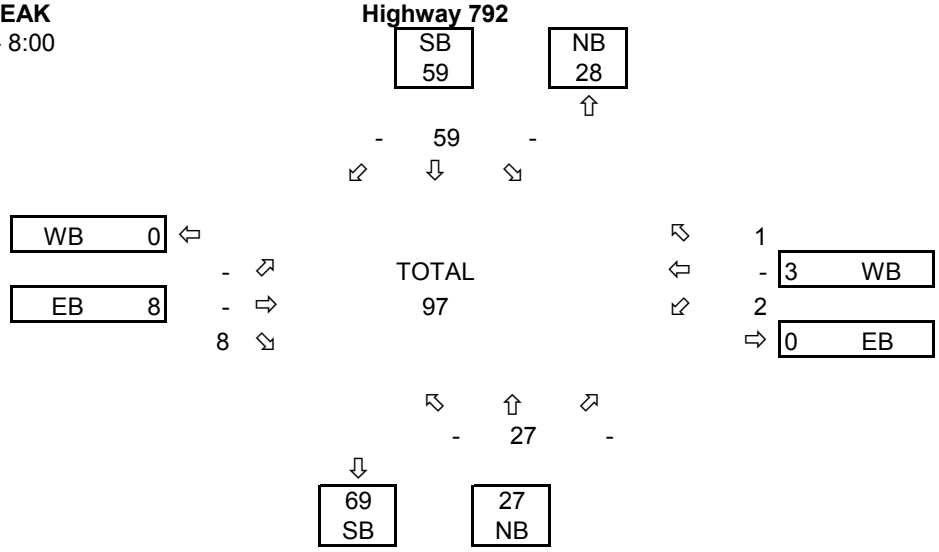
	North/South Street		East/West Street
LOCATION:	**Highway 792**	**and**	**Township Road 41-4**
DATE:	**3-Apr-14**		

TURNING MOVEMENT SUMMARY

TIME	NORTHBOUND									SOUTHBOUND									EASTBOUND									WESTBOUND									TOTAL	HOURLY
	LEFT			THROUGH			RIGHT			LEFT			THROUGH			RIGHT			LEFT			THROUGH			RIGHT			LEFT			THROUGH			RIGHT				
BEGINNING	P	T	B	P	T	B	P	T	B	P	T	B	P	T	B	P	T	B	P	T	B	P	T	B	P	T	B	P	T	B	P	T	B	P	T	B		TOTALS
6:30				9									12												1													22	
6:45				5	1								6	1																								13	
7:00				4	1								12															1		1								19	
7:15				5									13												5													23	77
7:30				6									19	2											3									1				31	86
7:45				10	1								10	3																								24	97
8:00	1			5									8												1													15	93
8:15	1			4	1								10	2											2													20	90
8:30				6	2								6						1						1			2										18	77
8:45	2			1	2								6			1									1													13	66
9:00				5									6																									11	62
9:15				5	1								5	1																								12	54
9:30																																						-	36
9:45																																						-	23
10:00																																						-	12
10:15																																						-	-
Total	*4*	-	-	*65*	*9*	-	-	-	-	-	-	-	*113*	*9*	-	*1*	-	-	*1*	-	-	-	-	-	*14*	-	-	*3*	-	*1*	-	-	-	*1*	-	-	*221*	
14:00																																						-	
14:15																																						-	
14:30																																						-	
14:45																																						-	-
15:00																																						-	-
15:15																																						-	-
15:30				7	1								5																									13	13
15:45	2			5	1								4																			1					13	26
16:00	1			7									4												2	1								1			16	42
16:15				3		1							6	1											1			1									13	55
16:30				10						1			9	3		1									1													25	67
16:45				14									7	1					1						1									1				25	79
17:00				18						2			9			1																					30	93
17:15	4			17			1						7			1									1													30	110
17:30				12									6						2						1													21	106
17:45				8									6						1				1											1				17	98
18:00		1		8	1								3	2											1													16	84
18:15				8	1								5	1																								15	69
18:30																																						-	48
18:45																																						-	31
TOTAL																																						*234*	
AM PEAK	-	-	-	25	2	-	-	-	-	-	-	-	54	5	-	-	-	-	-	-	-	-	-	-	8	-	-	1	-	1	-	-	-	1	-	-	97	
NOON PEAK																																						-	
PM PEAK	4	-	-	59	-	-	1	-	-	3	-	-	32	4	-	2	-	-	1	-	-	-	-	-	3	-	-	-	-	-	-	-	-	1	-	-	110	

AM PEAK
7:00 - 8:00

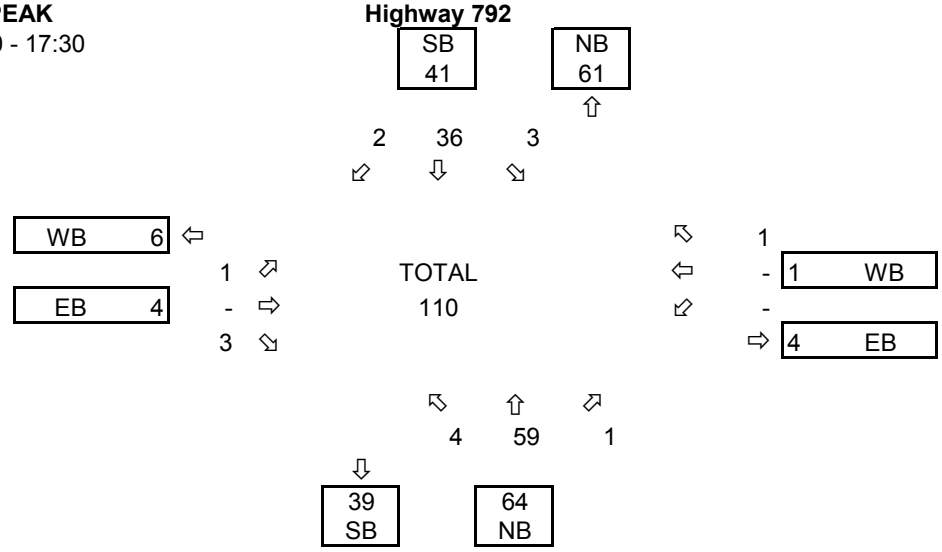
Highway 792



Township Road 41-4

PM PEAK
16:30 - 17:30

Highway 792



Township Road 41-4

Location Highway 792 and Township Road 41-4

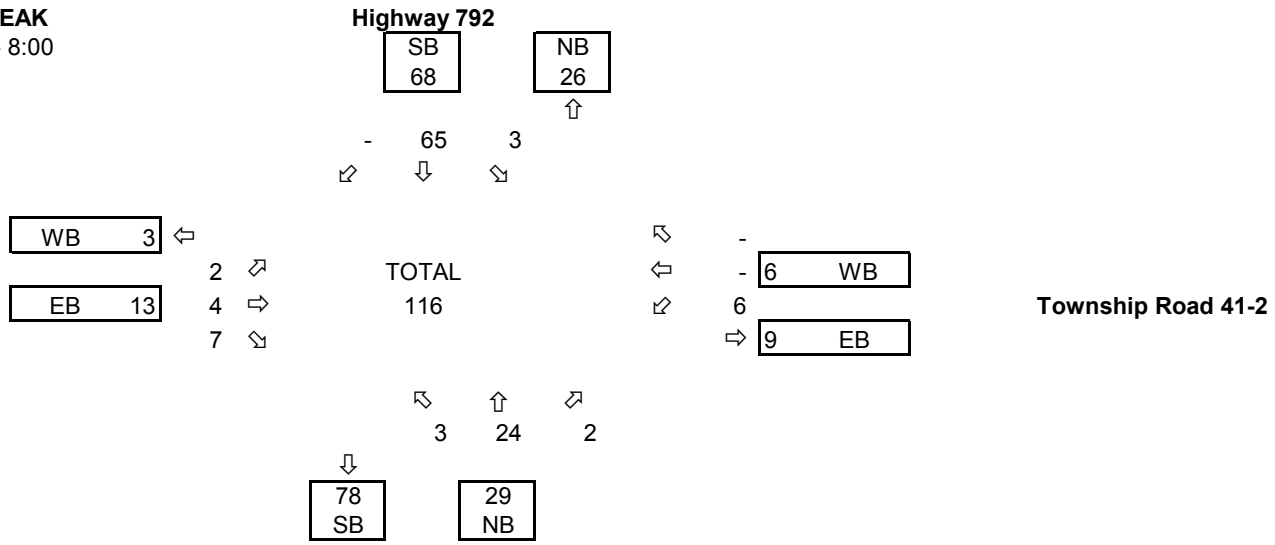
Project **116239369 - Lincoln Ranch Golf Course Development TIA**

	North/South Street		East/West Street
LOCATION:	**Highway 792**	**and**	**Township Road 41-2**
DATE:	**3-Apr-14**		

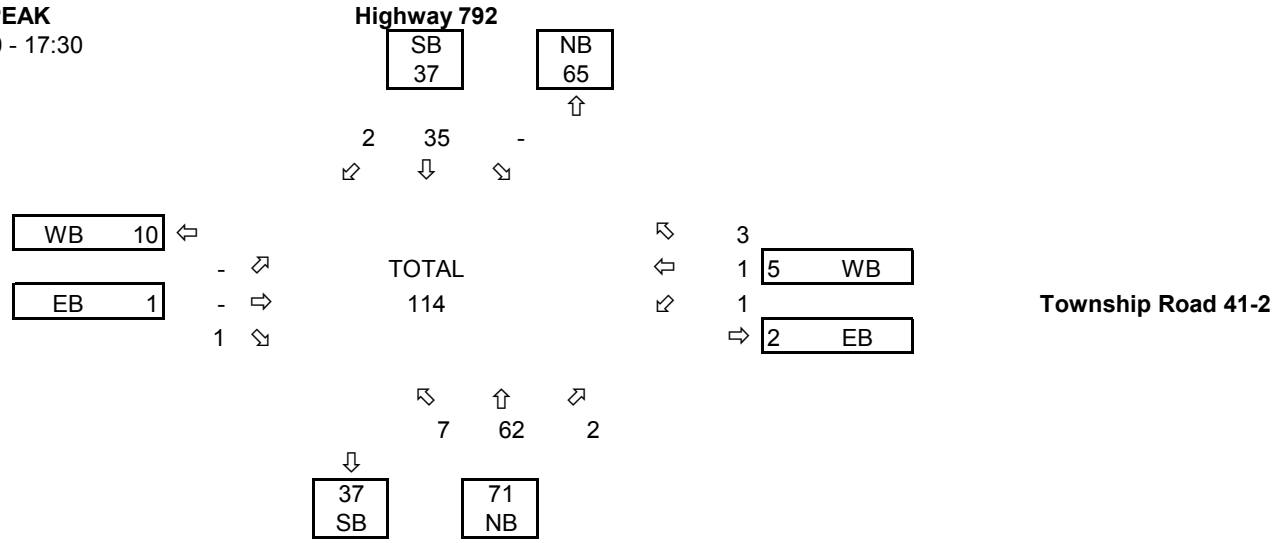
TURNING MOVEMENT SUMMARY

TIME	NORTHBOUND									SOUTHBOUND									EASTBOUND									WESTBOUND									TOTAL	HOURLY
	LEFT			THROUGH			RIGHT			LEFT			THROUGH			RIGHT			LEFT			THROUGH			RIGHT			LEFT			THROUGH			RIGHT				
BEGINNING	P	T	B	P	T	B	P	T	B	P	T	B	P	T	B	P	T	B	P	T	B	P	T	B	P	T	B	P	T	B	P	T	B	P	T	B		TOTALS
6:30				5									10			2									2									2			21	
6:45				4	1					3			5	1		1									3												18	
7:00	2			3	1								11						1			4						1									23	
7:15				5						1			22												4			1									33	95
7:30	1			6				1			1		20												2			2									33	107
7:45				8	1				1	1			11	1					1						1			2									27	116
8:00				4			1			1			11	1											1									2			21	114
8:15				3	2		1			1	1		5			1									1						1	1		1			18	99
8:30				5	3		1			2	1		9	1								1			1							1					25	91
8:45	1			5						1			7															3						1	1		19	83
9:00				1									5																						1		7	69
9:15		1		5	1								5												1												13	64
9:30																																					-	39
9:45																																					-	20
10:00																																					-	13
10:15																																					-	-
Total	*4*	*1*	*-*	*45*	*8*	*-*	*3*	*1*	*1*	*10*	*3*	*-*	*121*	*4*	*-*	*4*	*-*	*-*	*2*	*-*	*-*	*5*	*-*	*-*	*16*	*-*	*-*	*9*	*-*	*-*	*1*	*2*	*-*	*6*	*2*	*-*	*258*	
14:00																																					-	
14:15																																					-	
14:30																																					-	
14:45																																					-	-
15:00																																					-	-
15:15																																					-	-
15:30	2			7	1								7												1												18	18
15:45	2			8	1		1						3	1																							16	34
16:00	3			8	1	1		1					3	1						1	1																20	54
16:15	1			4			1						8	1																1					1		17	71
16:30	1			10									9	3		1									1			1						2			28	81
16:45	3			14			1						8	1																							27	92
17:00	2			16									8																	1							27	99
17:15	1			22			1						6			1																		1			32	114
17:30				12									6						1						1									1			21	107
17:45	1			8	1		1						6							1		1			1									1			21	101
18:00				8	2					1			5	2																							18	92
18:15				6	1								5	1																				2			15	75
18:30																																					-	54
18:45																																					-	33
TOTAL																																					*260*	
AM PEAK	3	-	-	22	2	-	-	1	1	2	1	-	64	1	-	-	-	-	2	-	-	4	-	-	7	-	-	6	-	-	-	-	-	-	-	-	116	
NOON PEAK																																					-	
PM PEAK	7	-	-	62	-	-	2	-	-	-	-	-	31	4	-	2	-	-	-	-	-	-	-	-	1	-	-	1	-	-	1	-	-	3	-	-	114	

AM PEAK
7:00 - 8:00



PM PEAK
16:30 - 17:30



Background Traffic Data

from north of Hwy 12 east of Gull Lake

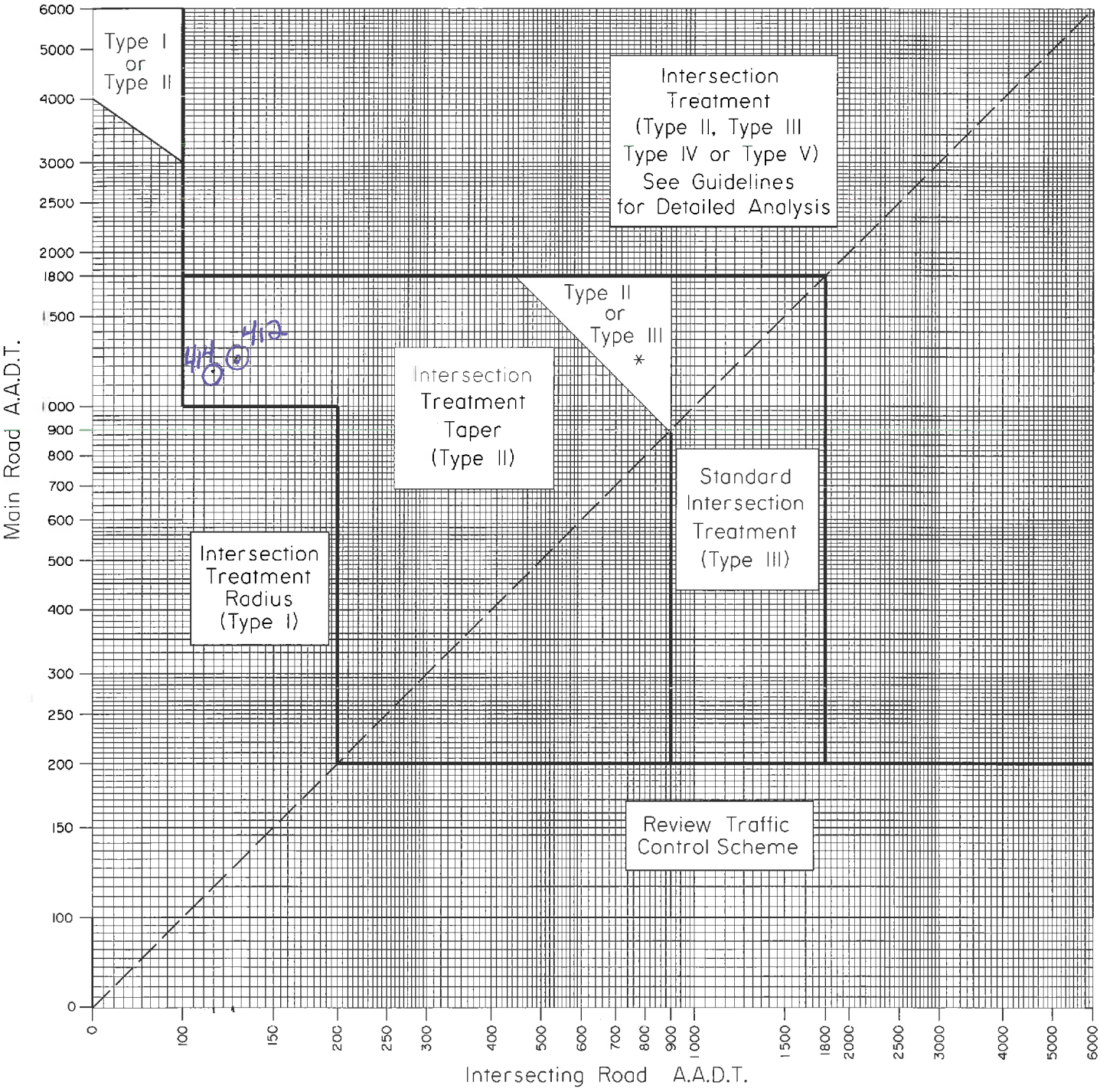
Highway 792 AADT Growth: 5-Year		
YEAR	**AADT**	**GROWTH**
2007	1300	
2008	1340	3.1%
2009	1260	-6.0%
2010	1260	0.0%
2011	1260	0.0%
2012	1290	2.4%
5-yr avg		**-0.1%**

Highway 792 AADT Growth: 10-Year		
YEAR	**AADT**	**GROWTH**
2002	1100	
2003	1190	8.2%
2004	1190	0.0%
2005	1190	0.0%
2006	1210	1.7%
2007	1300	7.4%
2008	1340	3.1%
2009	1260	-6.0%
2010	1260	0.0%
2011	1260	0.0%
2012	1290	2.4%
10-yr avg		**1.7%**

Highway 792 AADT Compared to ASDT			
Year	**AADT**	**ASDT**	**Percent Increase**
2008	1340	1660	23.9%
2009	1260	1550	23.0%
2010	1260	1560	23.8%
2011	1260	1610	27.8%
2012	1290	1620	25.6%
5-yr avg		**Average =**	**24.8%**

7.0 Appendix B – Warrant Worksheets

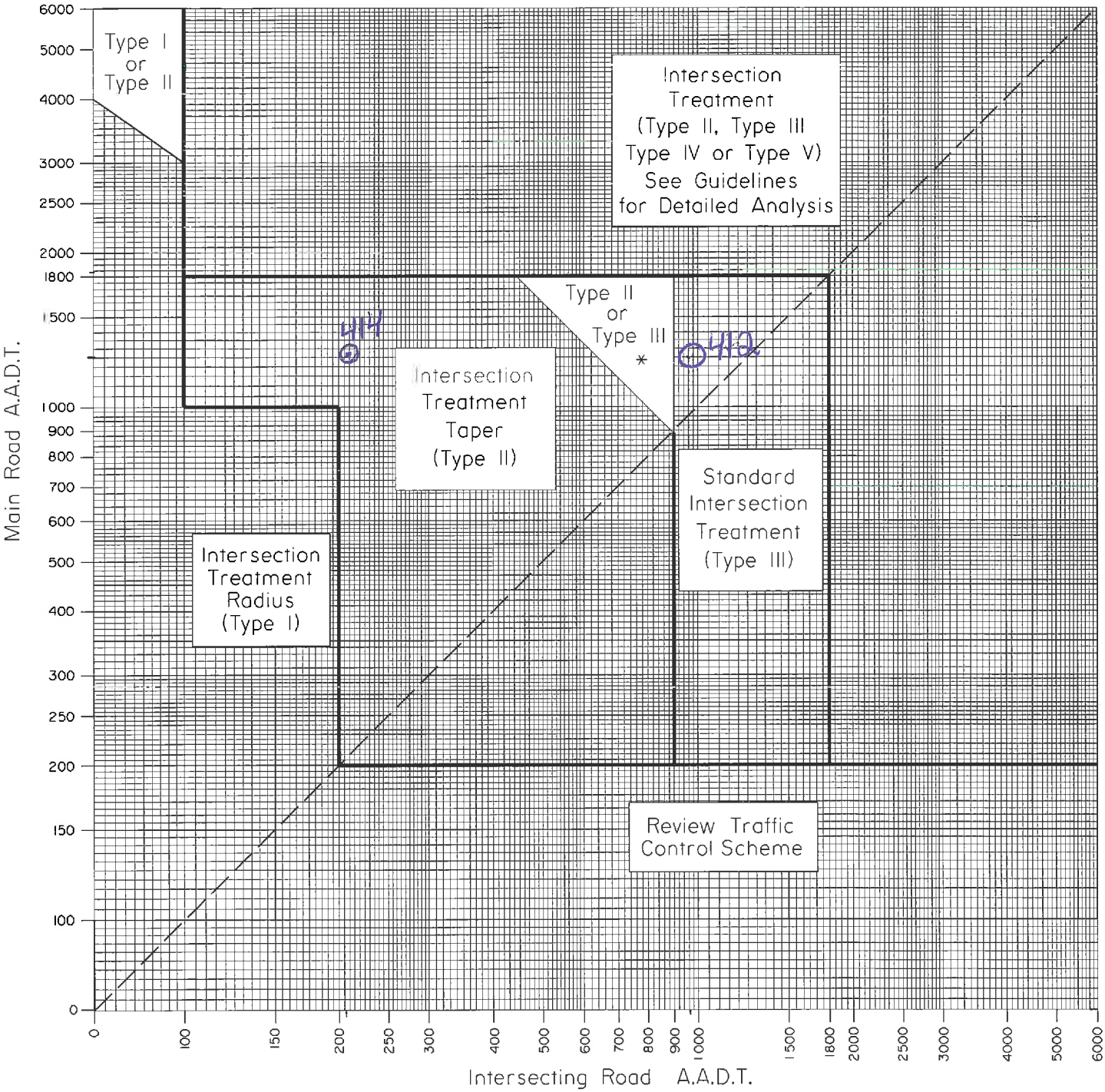
FIGURE D-7.4 TRAFFIC VOLUME WARRANT CHART FOR AT-GRADE INTERSECTION TREATMENT ON TWO-LANE RURAL HIGHWAYS (DESIGN SPEEDS 100, 110, 120 km/h)



Notes:

1. If main road, or intersecting road, is <100 AADT provide Type I Intersection Treatment (15m radius), except as shown for the higher volume main roads on this chart (Type I or II zone) where engineering judgement may be used to select the appropriate treatment.
2. If main road is >4000 AADT Review Access Management
   - — — If Intersecting Road AADT is > Main Road AADT: Review Traffic Control Scheme
3. Use projected traffic volumes for design
   Sloping line is defined by Main Road AADT x Intersecting Road AADT = 800,000

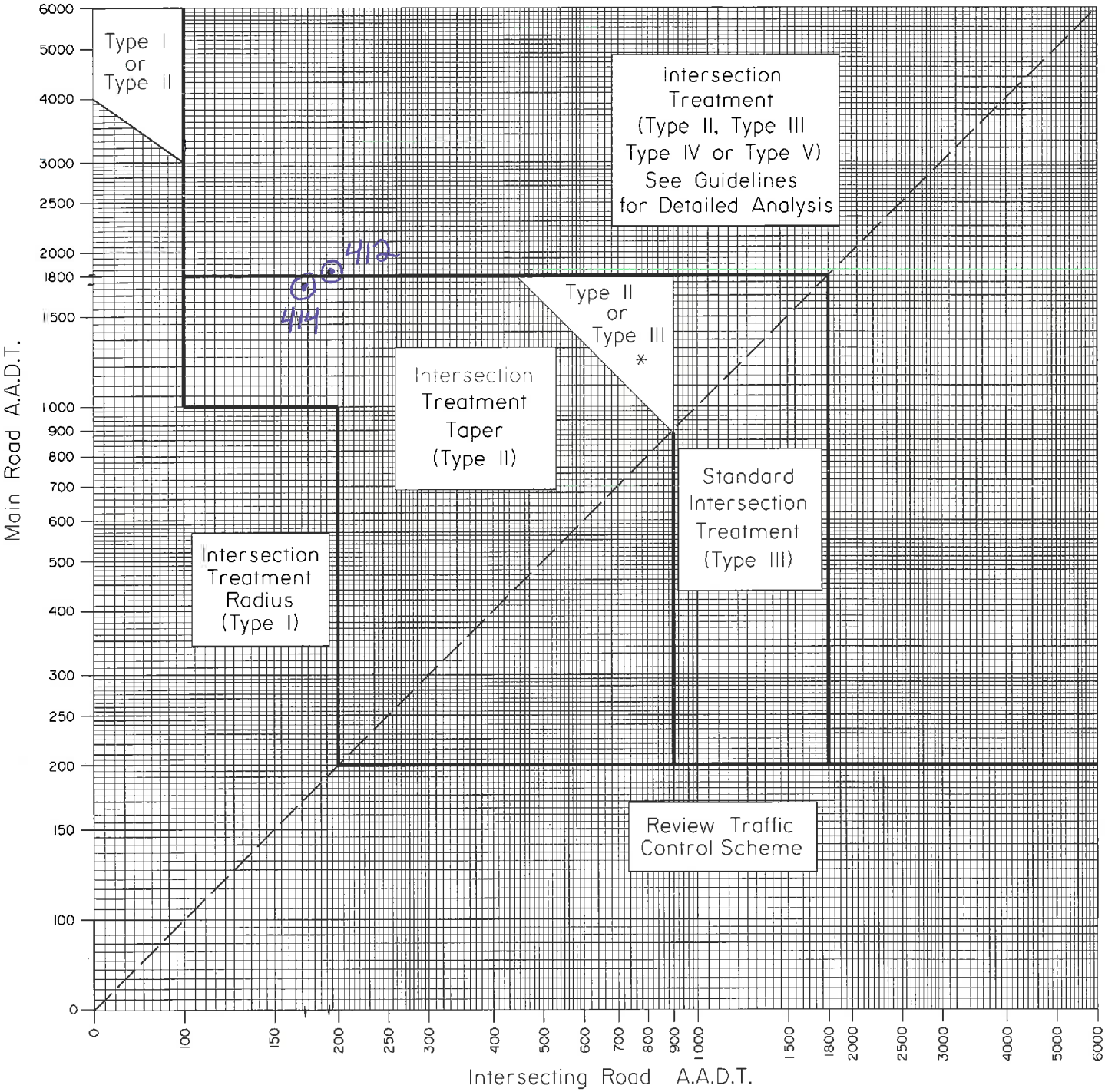
FIGURE D-7.4 TRAFFIC VOLUME WARRANT CHART FOR AT-GRADE INTERSECTION TREATMENT ON TWO-LANE RURAL HIGHWAYS (DESIGN SPEEDS 100, 110, 120 km/h)



Notes:

1. If main road, or intersecting road, is <100 AADT provide Type I intersection Treatment (15m radius), except as shown for the higher volume main roads on this chart (Type I or II zone) where engineering judgement may be used to select the appropriate treatment.
2. If main road is >4000 AADT Review Access Management
   - — — If Intersecting Road AADT is > Main Road AADT: Review Traffic Control Scheme
3. Use projected traffic volumes for design
   Sloping line is defined by Main Road AADT x Intersecting Road AADT = 800,000

FIGURE D-7.4 TRAFFIC VOLUME WARRANT CHART FOR AT-GRADE INTERSECTION TREATMENT ON TWO-LANE RURAL HIGHWAYS (DESIGN SPEEDS 100, 110, 120 km/h)



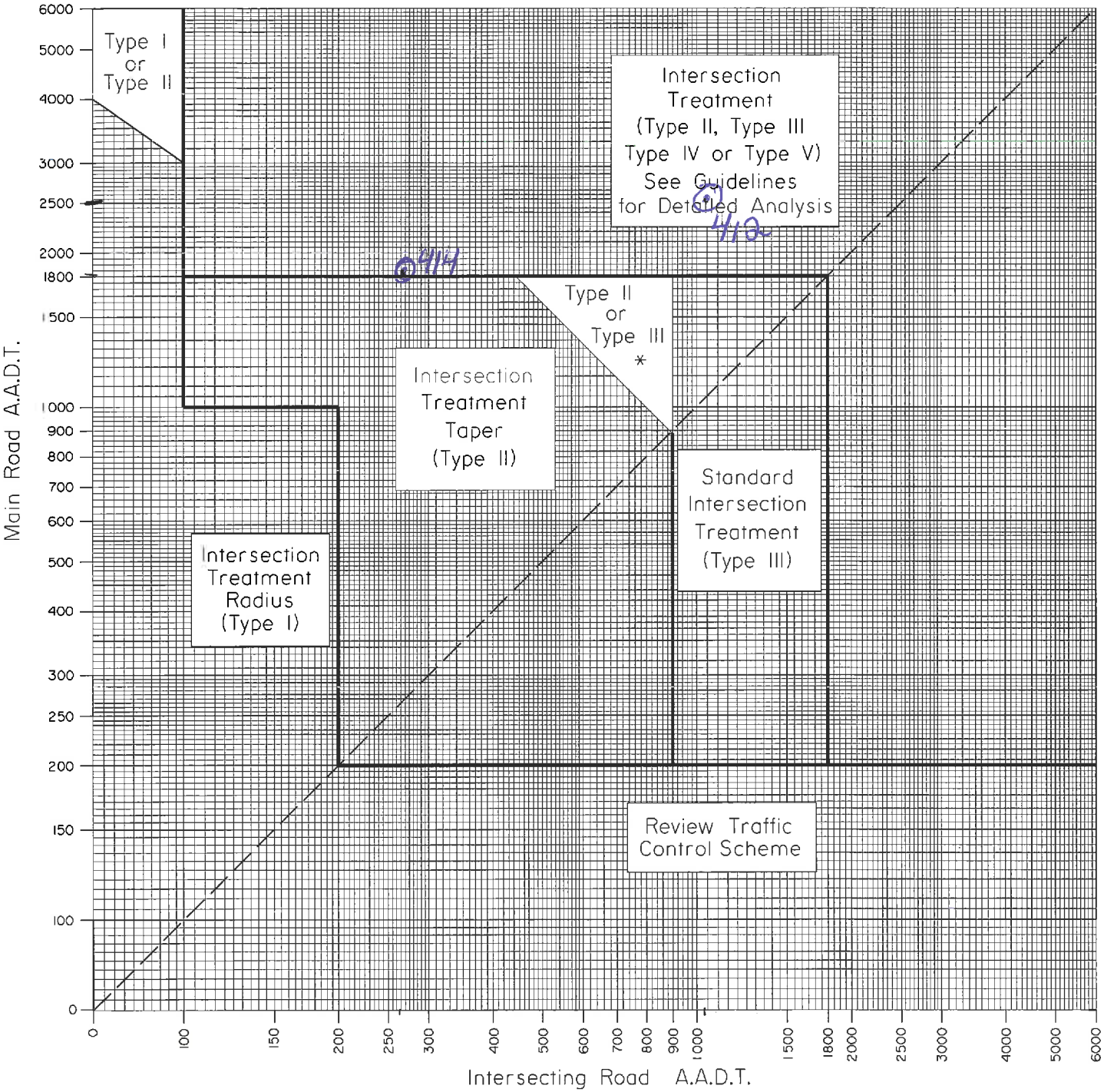
Notes:

1. If main road, or intersecting road, is <100 AADT provide Type I Intersection Treatment (15m radius), except as shown for the higher volume main roads on this chart (Type I or II zone) where engineering judgement may be used to select the appropriate treatment.
2. If main road is >4000 AADT Review Access Management
   - — — If Intersecting Road AADT is > Main Road AADT: Review Traffic Control Scheme
3. Use projected traffic volumes for design
   Sloping line is defined by Main Road AADT x Intersecting Road AADT = 800,000

2038 Total

412: see ITA worksheet
414: see ITA worksheet

FIGURE D-7.4 TRAFFIC VOLUME WARRANT CHART FOR AT-GRADE INTERSECTION TREATMENT ON TWO-LANE RURAL HIGHWAYS (DESIGN SPEEDS 100, 110, 120 km/h)



Notes:

1. If main road, or intersecting road, is <100 AADT provide Type I Intersection Treatment (15m radius), except as shown for the higher volume main roads on this chart (Type I or II zone) where engineering judgement may be used to select the appropriate treatment.
2. If main road is >4000 AADT Review Access Management
   - — — If Intersecting Road AADT is > Main Road AADT: Review Traffic Control Scheme
3. Use projected traffic volumes for design
   Sloping line is defined by Main Road AADT x Intersecting Road AADT = 800,000

Stantec INTERSECTION TREATMENT ANALYSIS WORKSHEET

Project: Lincoln Ranch TIA
Date: 24-Aug-16
Sheet: 1 of 1

Main Road: Highway 792 | Design Speed: 110 km/h
Design Volume: 2038 Background Traffic | Side Road: Township Road 41-2 | Existing Treatment: Type I b

ADT | ADT_{main}= 1853 | ADT_{side}= 189 | Treatment Required (as per D7.4): | Right Turn Warrant: Right Turn Not Required

		V_L=	V_A=	L%=	V_O=	Treatment Required:
AM	Northbound	6	60	10%	140	Type II - b
	Southbound	6	140	4%	60	n/a
PM	Northbound	14	146	10%	76	n/a
	Southbound	0	76	0%	146	n/a

Main Road: Highway 792 | Design Speed: 110 km/h
Design Volume: 2038 Total Traffic | Side Road: Township Road 41-2 | Existing Treatment: Type I b

ADT | ADT_{main}= 2503 | ADT_{side}= 1030 | Treatment Required (as per D7.4): | Right Turn Warrant: Right Turn Not Required

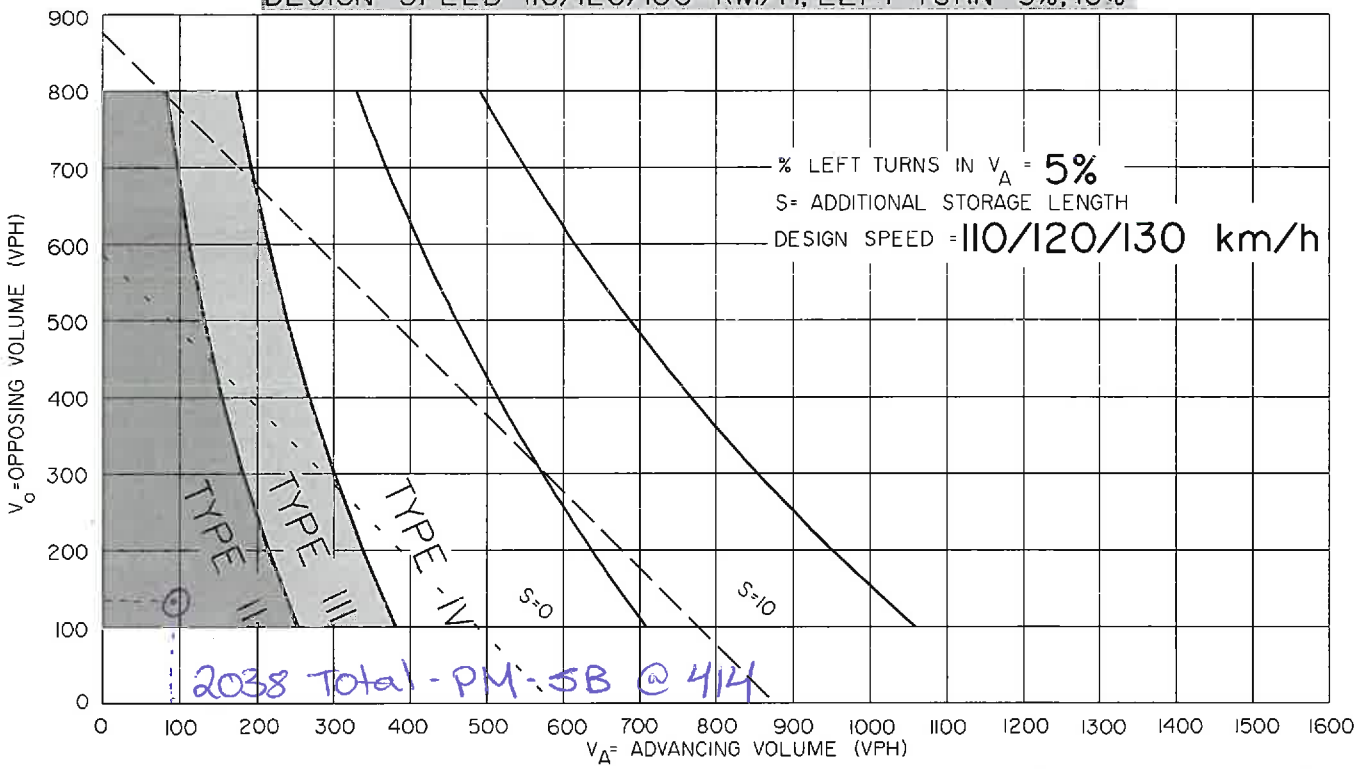
		V_L=	V_A=	L%=	V_O=	Treatment Required:
AM	Northbound	27	81	33%	140	Type II - c
	Southbound	6	140	4%	81	n/a
PM	Northbound	62	194	32%	76	n/a
	Southbound	0	76	0%	194	n/a

Main Road: Highway 792 | Design Speed: 110 km/h
Design Volume: 2038 Total Traffic | Side Road: Township Road 41-4 | Existing Treatment: Type I b

ADT | ADT_{main}= 1842 | ADT_{side}= 263 | Treatment Required (as per D7.4): | Right Turn Warrant: Right Turn Not Required

		V_L=	V_A=	L%=	V_O=	Treatment Required:
AM	Northbound	0	56	0%	124	n/a
	Southbound	0	124	0%	56	n/a
PM	Northbound	8	131	6%	91	n/a
	Southbound	6	91	7%	131	Type II - b

FIGURE D-7.6-7a WARRANTS FOR LEFT TURN LANES AND STORAGE REQUIREMENTS FOR TWO-LANE HIGHWAYS DESIGN SPEED 110/120/130 KM/H, LEFT TURN 5%, 10%



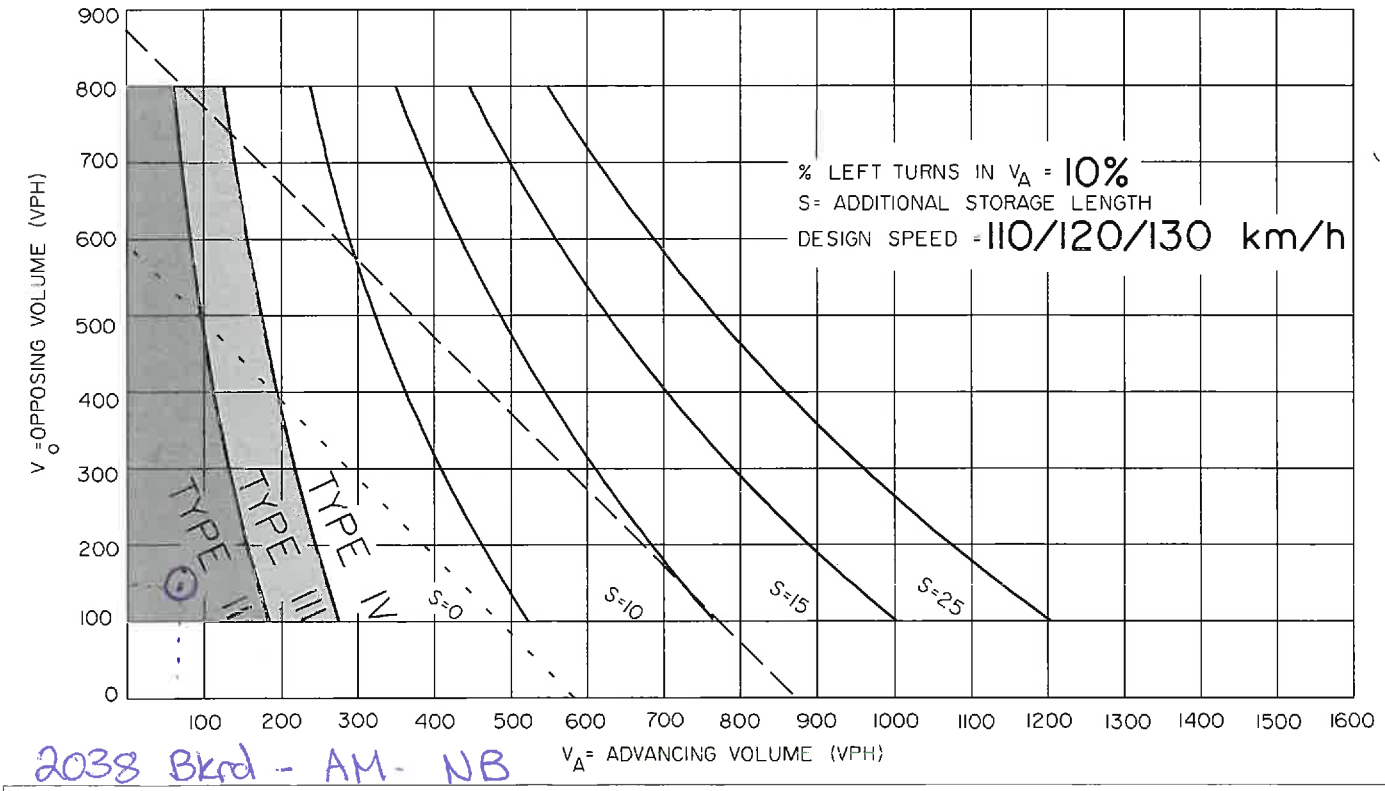
S = Additional storage length required, that is, in addition to what is shown on the appropriate Type IV standard drawing. Designers should check additional storage requirements for trucks, also see Table D.7.6a.

- - - - Traffic signals may be warranted in rural areas, or urban areas, with restricted flow.

— — — Traffic signals may be warranted in "free flow" urban areas.

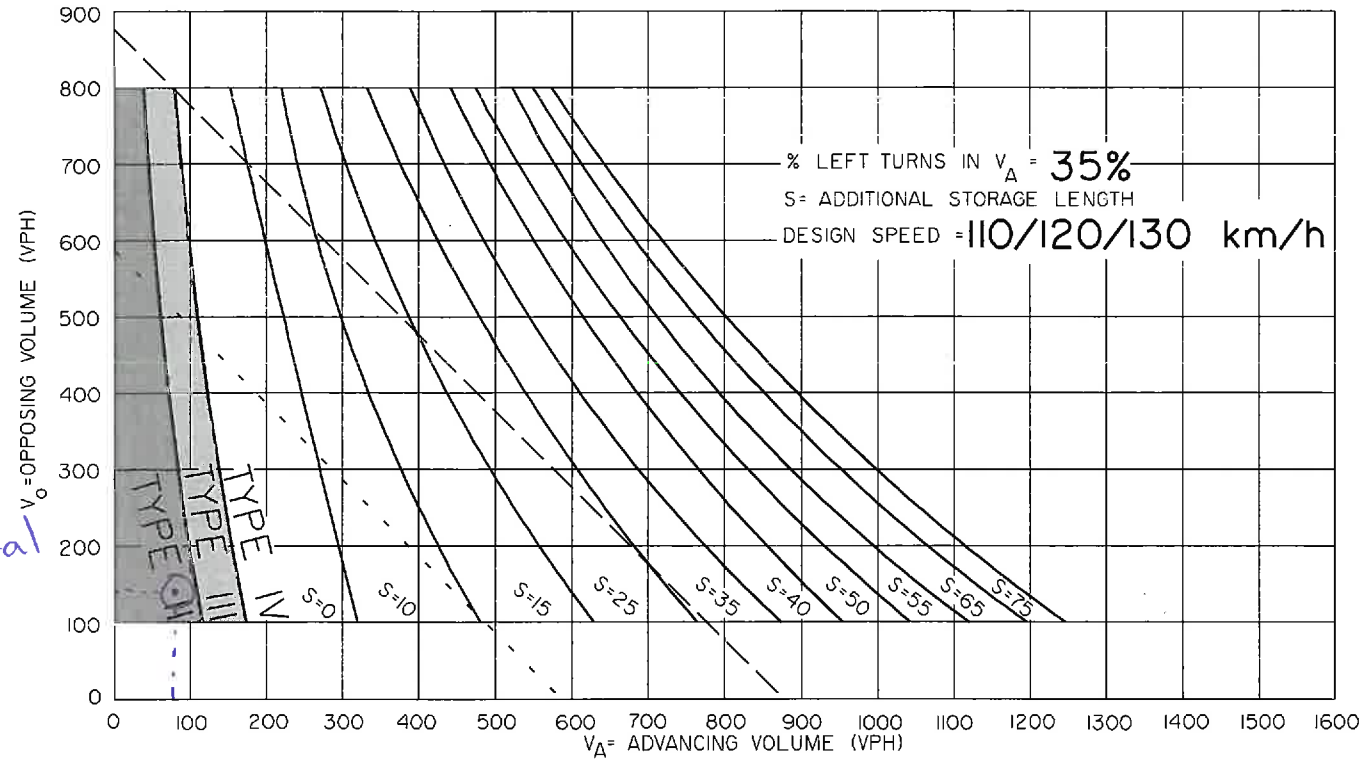
Notes:

1. The traffic signal warrant lines are provided for reference only. For detailed analysis of the requirements for signals, contact Roadway Engineering Branch.
2. Warrant for Type I treatment is shown in Figure D-7.4.



2038 Bkgd - AM - NB @ 4/2

FIGURE D-7.6-7d WARRANTS FOR LEFT TURN LANES AND STORAGE REQUIREMENTS FOR TWO-LANE HIGHWAYS DESIGN SPEED 110/120/130 KM/H, LEFT TURN 35%, 40%



2038 Total
AM-NB
@412

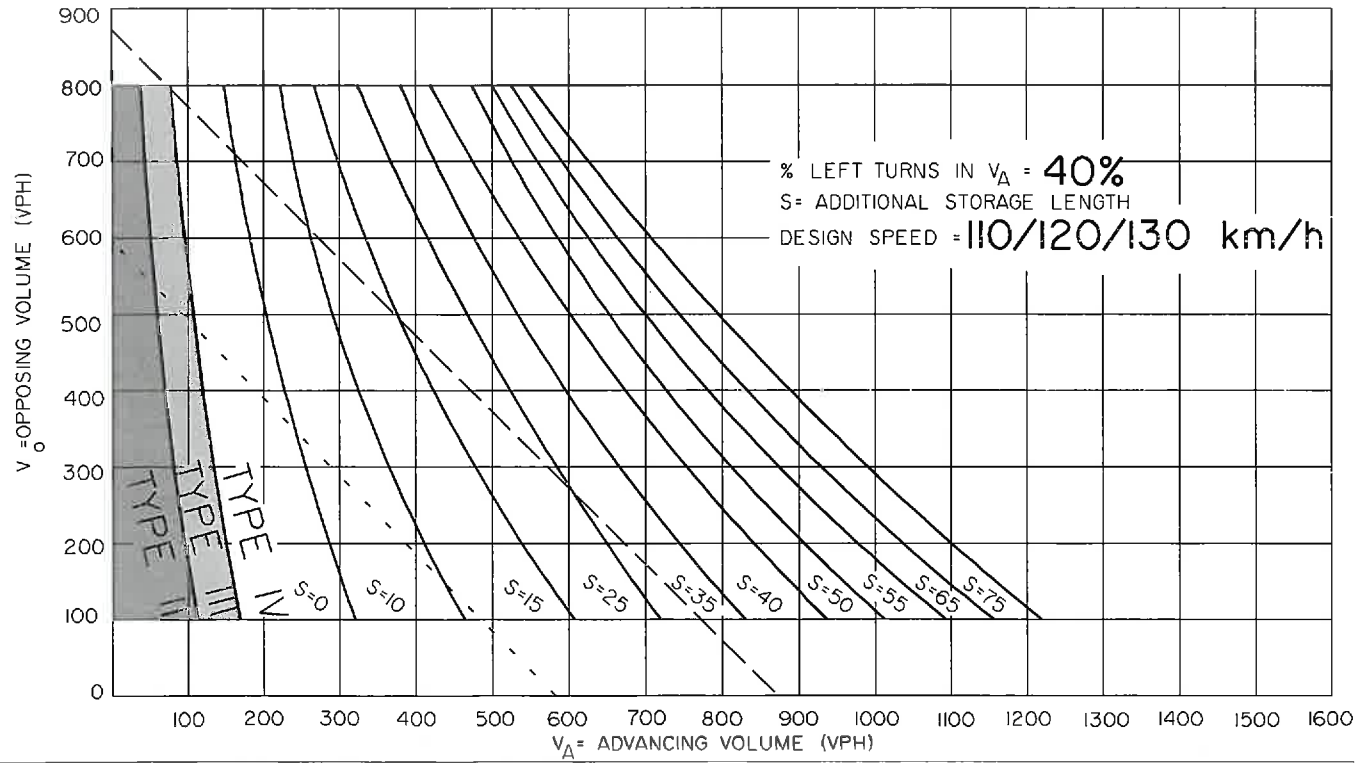
S = Additional storage length required, that is, in addition to what is shown on the appropriate Type IV standard drawing. Designers should check additional storage requirements for trucks, also see Table D.7.6a.

- - - - Traffic signals may be warranted in rural areas, or urban areas, with restricted flow.

— — — Traffic signals may be warranted in "free flow" urban areas.

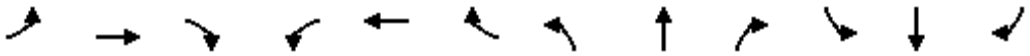
Notes:

1. The traffic signal warrant lines are provided for reference only. For detailed analysis of the requirements for signals, contact Roadway Engineering Branch.
2. Warrant for Type I treatment is shown in Figure D-7.4.



GRAPHICS FILE: debd767a.man

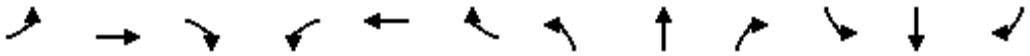
8.0 Appendix C – Synchro Output Reports



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	11	3	0	1	0	37	0	0	81	0
Future Volume (Veh/h)	0	0	11	3	0	1	0	37	0	0	81	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	12	3	0	1	0	40	0	0	88	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	129	128	88	140	128	40	88			40		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	129	128	88	140	128	40	88			40		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	99	100	100	100	100			100		
cM capacity (veh/h)	843	763	970	820	763	1031	1489			1550		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	12	4	40	88
Volume Left	0	3	0	0
Volume Right	12	1	0	0
cSH	970	864	1489	1550
Volume to Capacity	0.01	0.00	0.00	0.00
Queue Length 95th (m)	0.3	0.1	0.0	0.0
Control Delay (s)	8.8	9.2	0.0	0.0
Lane LOS	A	A		
Approach Delay (s)	8.8	9.2	0.0	0.0
Approach LOS	A	A		

Intersection Summary				
Average Delay	1.0			
Intersection Capacity Utilization	14.3%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	5	0	8	0	0	4	33	3	4	89	0
Future Volume (Veh/h)	3	5	0	8	0	0	4	33	3	4	89	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	5	0	9	0	0	4	36	3	4	97	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	150	152	97	153	150	38	97			39		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	150	152	97	153	150	38	97			39		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	99	100	99	100	100	100			100		
cM capacity (veh/h)	814	736	959	807	737	1035	1478			1552		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	8	9	43	101
Volume Left	3	9	4	4
Volume Right	0	0	3	0
cSH	763	807	1478	1552
Volume to Capacity	0.01	0.01	0.00	0.00
Queue Length 95th (m)	0.2	0.3	0.1	0.1
Control Delay (s)	9.8	9.5	0.7	0.3
Lane LOS	A	A	A	A
Approach Delay (s)	9.8	9.5	0.7	0.3
Approach LOS	A	A		

Intersection Summary				
Average Delay	1.4			
Intersection Capacity Utilization	15.5%	ICU Level of Service	A	
Analysis Period (min)	15			

Intersection: 1: Hwy 792 & Twp Rd 414

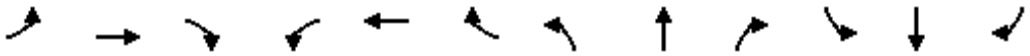
Movement	EB	WB
Directions Served	LTR	LTR
Maximum Queue (m)	8.1	7.3
Average Queue (m)	2.2	0.6
95th Queue (m)	7.8	3.7
Link Distance (m)	200.1	197.5
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 2: Hwy 792 & Twp Rd 412

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	8.6	7.9	1.4	1.4
Average Queue (m)	1.6	1.8	0.1	0.0
95th Queue (m)	6.9	7.1	1.0	0.0
Link Distance (m)	191.9	207.9	264.8	278.6
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

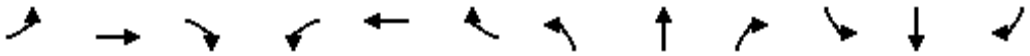
Network wide Queuing Penalty: 0



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	0	4	0	0	1	5	81	1	4	49	3
Future Volume (Veh/h)	1	0	4	0	0	1	5	81	1	4	49	3
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	0	4	0	0	1	5	88	1	4	53	3
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	162	162	54	165	162	88	56			89		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	162	162	54	165	162	88	56			89		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	100	100			100		
cM capacity (veh/h)	799	726	1012	793	726	970	1530			1488		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	5	1	94	60
Volume Left	1	0	5	4
Volume Right	4	1	1	3
cSH	961	970	1530	1488
Volume to Capacity	0.01	0.00	0.00	0.00
Queue Length 95th (m)	0.1	0.0	0.1	0.1
Control Delay (s)	8.8	8.7	0.4	0.5
Lane LOS	A	A	A	A
Approach Delay (s)	8.8	8.7	0.4	0.5
Approach LOS	A	A		

Intersection Summary				
Average Delay	0.8			
Intersection Capacity Utilization	15.7%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	1	1	1	4	10	85	3	0	48	3
Future Volume (Veh/h)	0	0	1	1	1	4	10	85	3	0	48	3
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	1	1	1	4	11	92	3	0	52	3
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	174	170	54	170	170	94	55			95		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	174	170	54	170	170	94	55			95		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	100	99			100		
cM capacity (veh/h)	781	717	1014	788	717	963	1531			1480		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	1	6	106	55
Volume Left	0	1	11	0
Volume Right	1	4	3	3
cSH	1014	881	1531	1480
Volume to Capacity	0.00	0.01	0.01	0.00
Queue Length 95th (m)	0.0	0.2	0.2	0.0
Control Delay (s)	8.6	9.1	0.8	0.0
Lane LOS	A	A	A	
Approach Delay (s)	8.6	9.1	0.8	0.0
Approach LOS	A	A		

Intersection Summary				
Average Delay	0.9			
Intersection Capacity Utilization	21.9%	ICU Level of Service	A	
Analysis Period (min)	15			

Intersection: 1: Hwy 792 & Twp Rd 414

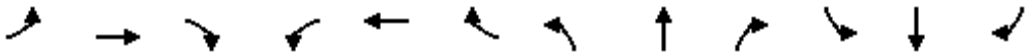
Movement	EB	WB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (m)	7.6	5.6	2.8
Average Queue (m)	1.1	0.3	0.1
95th Queue (m)	5.4	2.6	1.8
Link Distance (m)	200.1	197.5	269.7
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 2: Hwy 792 & Twp Rd 412

Movement	EB	WB
Directions Served	LTR	LTR
Maximum Queue (m)	4.3	7.9
Average Queue (m)	0.2	1.4
95th Queue (m)	1.9	6.1
Link Distance (m)	191.9	207.9
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

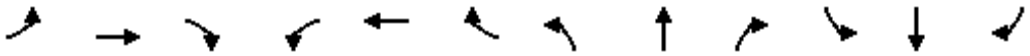
Network wide Queuing Penalty: 0



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	0	11	3	0	1	0	37	0	0	81	3
Future Volume (Veh/h)	6	0	11	3	0	1	0	37	0	0	81	3
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	0	12	3	0	1	0	40	0	0	88	3
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	130	130	90	142	131	40	91			40		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	130	130	90	142	131	40	91			40		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	100	99	100	100	100	100			100		
cM capacity (veh/h)	841	761	968	818	760	1031	1485			1550		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	19	4	40	91
Volume Left	7	3	0	0
Volume Right	12	1	0	3
cSH	917	863	1485	1550
Volume to Capacity	0.02	0.00	0.00	0.00
Queue Length 95th (m)	0.5	0.1	0.0	0.0
Control Delay (s)	9.0	9.2	0.0	0.0
Lane LOS	A	A		
Approach Delay (s)	9.0	9.2	0.0	0.0
Approach LOS	A	A		

Intersection Summary				
Average Delay	1.4			
Intersection Capacity Utilization	14.4%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	17	42	8	6	0	25	33	3	4	89	0
Future Volume (Veh/h)	3	17	42	8	6	0	25	33	3	4	89	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	18	46	9	7	0	27	36	3	4	97	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	200	198	97	252	196	38	97			39		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	200	198	97	252	196	38	97			39		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	97	95	99	99	100	98			100		
cM capacity (veh/h)	741	683	959	644	684	1035	1478			1552		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	67	16	66	101
Volume Left	3	9	27	4
Volume Right	46	0	3	0
cSH	855	661	1478	1552
Volume to Capacity	0.08	0.02	0.02	0.00
Queue Length 95th (m)	1.9	0.6	0.4	0.1
Control Delay (s)	9.6	10.6	3.1	0.3
Lane LOS	A	B	A	A
Approach Delay (s)	9.6	10.6	3.1	0.3
Approach LOS	A	B		

Intersection Summary				
Average Delay	4.2			
Intersection Capacity Utilization	20.7%	ICU Level of Service	A	
Analysis Period (min)	15			

Intersection: 1: Hwy 792 & Twp Rd 414

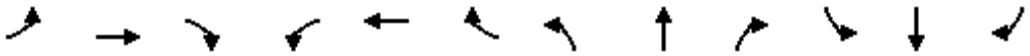
Movement	EB	WB
Directions Served	LTR	LTR
Maximum Queue (m)	8.8	7.7
Average Queue (m)	4.0	0.5
95th Queue (m)	10.2	3.7
Link Distance (m)	200.1	197.5
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 2: Hwy 792 & Twp Rd 412

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	15.6	10.3	4.2	1.4
Average Queue (m)	7.5	2.7	0.2	0.0
95th Queue (m)	13.0	9.2	2.1	0.0
Link Distance (m)	191.9	207.9	264.8	278.6
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

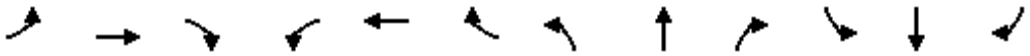
Network wide Queuing Penalty: 0



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	0	4	0	0	1	5	81	1	4	49	10
Future Volume (Veh/h)	5	0	4	0	0	1	5	81	1	4	49	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	0	4	0	0	1	5	88	1	4	53	11
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	166	166	58	169	170	88	64			89		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	166	166	58	169	170	88	64			89		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	100	100	100	100	100	100			100		
cM capacity (veh/h)	794	723	1007	788	718	970	1519			1488		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	9	1	94	68
Volume Left	5	0	5	4
Volume Right	4	1	1	11
cSH	876	970	1519	1488
Volume to Capacity	0.01	0.00	0.00	0.00
Queue Length 95th (m)	0.2	0.0	0.1	0.1
Control Delay (s)	9.2	8.7	0.4	0.5
Lane LOS	A	A	A	A
Approach Delay (s)	9.2	8.7	0.4	0.5
Approach LOS	A	A		

Intersection Summary				
Average Delay	0.9			
Intersection Capacity Utilization	17.5%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	9	31	1	15	4	58	85	3	0	48	3
Future Volume (Veh/h)	0	9	31	1	15	4	58	85	3	0	48	3
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	10	34	1	16	4	63	92	3	0	52	3
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	285	274	54	312	274	94	55			95		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	285	274	54	312	274	94	55			95		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	98	97	100	97	100	96			100		
cM capacity (veh/h)	631	607	1014	592	607	963	1531			1480		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	44	21	158	55
Volume Left	0	1	63	0
Volume Right	34	4	3	3
cSH	880	652	1531	1480
Volume to Capacity	0.05	0.03	0.04	0.00
Queue Length 95th (m)	1.2	0.8	1.0	0.0
Control Delay (s)	9.3	10.7	3.2	0.0
Lane LOS	A	B	A	
Approach Delay (s)	9.3	10.7	3.2	0.0
Approach LOS	A	B		

Intersection Summary				
Average Delay	4.1			
Intersection Capacity Utilization	24.5%	ICU Level of Service	A	
Analysis Period (min)	15			

Intersection: 1: Hwy 792 & Twp Rd 414

Movement	EB	WB
Directions Served	LTR	LTR
Maximum Queue (m)	8.3	4.3
Average Queue (m)	1.7	0.2
95th Queue (m)	6.9	2.2
Link Distance (m)	200.1	197.5
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 2: Hwy 792 & Twp Rd 412

Movement	EB	WB	NB
Directions Served	LTR	LTR	LTR
Maximum Queue (m)	14.2	10.2	8.8
Average Queue (m)	5.9	4.2	0.9
95th Queue (m)	12.6	11.0	5.0
Link Distance (m)	191.9	207.9	264.8
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

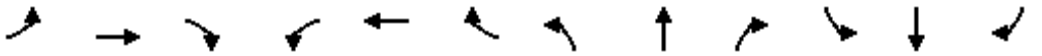
Network Summary

Network wide Queuing Penalty: 0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	16	4	0	2	0	56	0	0	121	0
Future Volume (Veh/h)	0	0	16	4	0	2	0	56	0	0	121	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	17	4	0	2	0	61	0	0	132	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	195	193	132	210	193	61	132			61		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	195	193	132	210	193	61	132			61		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	98	99	100	100	100			100		
cM capacity (veh/h)	763	702	917	733	702	1004	1435			1523		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	17	6	61	0	132	0
Volume Left	0	4	0	0	0	0
Volume Right	17	2	0	0	0	0
cSH	917	806	1435	1700	1523	1700
Volume to Capacity	0.02	0.01	0.00	0.00	0.00	0.00
Queue Length 95th (m)	0.4	0.2	0.0	0.0	0.0	0.0
Control Delay (s)	9.0	9.5	0.0	0.0	0.0	0.0
Lane LOS	A	A				
Approach Delay (s)	9.0	9.5	0.0		0.0	
Approach LOS	A	A				

Intersection Summary				
Average Delay	1.0			
Intersection Capacity Utilization	16.9%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	8	0	12	0	0	6	49	4	6	134	0
Future Volume (Veh/h)	4	8	0	12	0	0	6	49	4	6	134	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	9	0	13	0	0	7	53	4	7	146	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	227	231	146	232	227	53	146			57		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	227	231	146	232	227	53	146			57		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	99	100	98	100	100	100			100		
cM capacity (veh/h)	723	663	901	711	666	1014	1418			1528		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	13	13	60	4	153	0
Volume Left	4	13	7	0	7	0
Volume Right	0	0	0	4	0	0
cSH	680	711	1418	1700	1528	1700
Volume to Capacity	0.02	0.02	0.00	0.00	0.00	0.00
Queue Length 95th (m)	0.4	0.4	0.1	0.0	0.1	0.0
Control Delay (s)	10.4	10.2	0.9	0.0	0.4	0.0
Lane LOS	B	B	A		A	
Approach Delay (s)	10.4	10.2	0.9		0.4	
Approach LOS	B	B				

Intersection Summary				
Average Delay	1.6			
Intersection Capacity Utilization	24.1%	ICU Level of Service		A
Analysis Period (min)	15			

Intersection: 1: Hwy 792 & Twp Rd 414

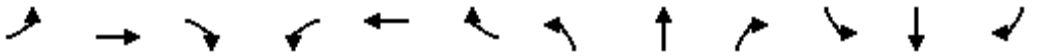
Movement	EB	WB
Directions Served	LTR	LTR
Maximum Queue (m)	5.9	4.9
Average Queue (m)	1.8	0.7
95th Queue (m)	5.5	3.5
Link Distance (m)	196.2	193.6
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 2: Hwy 792 & Twp Rd 412

Movement	EB	WB	NB
Directions Served	LTR	LTR	LT
Maximum Queue (m)	6.2	5.6	1.4
Average Queue (m)	1.6	1.5	0.0
95th Queue (m)	5.7	5.2	1.0
Link Distance (m)	188.0	204.0	264.8
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 0



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	0	6	0	0	2	8	121	2	6	74	4
Future Volume (Veh/h)	2	0	6	0	0	2	8	121	2	6	74	4
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	0	7	0	0	2	9	132	2	7	80	4
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	246	246	80	251	248	132	84			134		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	246	246	80	251	248	132	84			134		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	99	100	100	100	99			100		
cM capacity (veh/h)	700	649	980	692	647	917	1494			1432		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	9	2	141	2	87	4
Volume Left	2	0	9	0	7	0
Volume Right	7	2	0	2	0	4
cSH	900	917	1494	1700	1432	1700
Volume to Capacity	0.01	0.00	0.01	0.00	0.00	0.00
Queue Length 95th (m)	0.2	0.0	0.1	0.0	0.1	0.0
Control Delay (s)	9.0	8.9	0.5	0.0	0.6	0.0
Lane LOS	A	A	A		A	
Approach Delay (s)	9.0	8.9	0.5		0.6	
Approach LOS	A	A				

Intersection Summary				
Average Delay	0.9			
Intersection Capacity Utilization	23.5%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	2	2	2	6	14	128	4	0	72	4
Future Volume (Veh/h)	0	0	2	2	2	6	14	128	4	0	72	4
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	2	2	2	7	15	139	4	0	78	4
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	255	251	78	249	251	139	82			143		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	255	251	78	249	251	139	82			143		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	99	99			100		
cM capacity (veh/h)	686	646	983	698	646	909	1497			1421		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	2	11	154	4	78	4
Volume Left	0	2	15	0	0	0
Volume Right	2	7	0	4	0	4
cSH	983	805	1497	1700	1421	1700
Volume to Capacity	0.00	0.01	0.01	0.00	0.00	0.00
Queue Length 95th (m)	0.0	0.3	0.2	0.0	0.0	0.0
Control Delay (s)	8.7	9.5	0.8	0.0	0.0	0.0
Lane LOS	A	A	A			
Approach Delay (s)	8.7	9.5	0.8		0.0	
Approach LOS	A	A				

Intersection Summary				
Average Delay	1.0			
Intersection Capacity Utilization	24.2%	ICU Level of Service		A
Analysis Period (min)	15			

Intersection: 1: Hwy 792 & Twp Rd 414

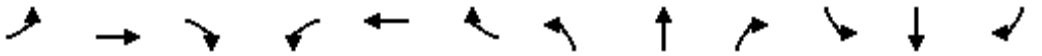
Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LT	LT
Maximum Queue (m)	4.7	4.5	1.4	2.9
Average Queue (m)	1.2	0.3	0.1	0.1
95th Queue (m)	4.3	2.1	1.0	1.5
Link Distance (m)	196.2	193.6	292.7	269.7
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)			0	0
Queuing Penalty (veh)			0	0

Intersection: 2: Hwy 792 & Twp Rd 412

Movement	EB	WB	NB
Directions Served	LTR	LTR	LT
Maximum Queue (m)	4.9	5.9	2.8
Average Queue (m)	0.4	1.3	0.1
95th Queue (m)	2.4	4.8	1.8
Link Distance (m)	188.0	204.0	264.8
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			0
Queuing Penalty (veh)			0

Network Summary

Network wide Queuing Penalty: 0



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	0	16	4	0	2	0	56	0	0	121	3
Future Volume (Veh/h)	6	0	16	4	0	2	0	56	0	0	121	3
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	0	17	4	0	2	0	61	0	0	132	3
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	195	193	132	210	196	61	135			61		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	195	193	132	210	196	61	135			61		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	100	98	99	100	100	100			100		
cM capacity (veh/h)	763	702	917	733	699	1004	1431			1523		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	24	6	61	0	132	3
Volume Left	7	4	0	0	0	0
Volume Right	17	2	0	0	0	3
cSH	866	806	1431	1700	1523	1700
Volume to Capacity	0.03	0.01	0.00	0.00	0.00	0.00
Queue Length 95th (m)	0.6	0.2	0.0	0.0	0.0	0.0
Control Delay (s)	9.3	9.5	0.0	0.0	0.0	0.0
Lane LOS	A	A				
Approach Delay (s)	9.3	9.5	0.0		0.0	
Approach LOS	A	A				

Intersection Summary				
Average Delay	1.2			
Intersection Capacity Utilization	20.0%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	20	42	12	6	0	27	49	4	6	134	0
Future Volume (Veh/h)	4	20	42	12	6	0	27	49	4	6	134	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	22	46	13	7	0	29	53	4	7	146	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	274	275	146	328	271	53	146			57		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	274	275	146	328	271	53	146			57		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	96	95	98	99	100	98			100		
cM capacity (veh/h)	659	617	901	566	620	1014	1418			1528		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	72	20	82	4	153	0
Volume Left	4	13	29	0	7	0
Volume Right	46	0	0	4	0	0
cSH	776	584	1418	1700	1528	1700
Volume to Capacity	0.09	0.03	0.02	0.00	0.00	0.00
Queue Length 95th (m)	2.3	0.8	0.5	0.0	0.1	0.0
Control Delay (s)	10.1	11.4	2.8	0.0	0.4	0.0
Lane LOS	B	B	A		A	
Approach Delay (s)	10.1	11.4	2.7		0.4	
Approach LOS	B	B				

Intersection Summary				
Average Delay	3.8			
Intersection Capacity Utilization	26.8%	ICU Level of Service		A
Analysis Period (min)	15			

Intersection: 1: Hwy 792 & Twp Rd 414

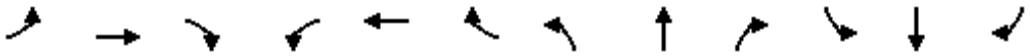
Movement	EB	WB
Directions Served	LTR	LTR
Maximum Queue (m)	7.4	4.8
Average Queue (m)	2.4	0.5
95th Queue (m)	6.5	3.0
Link Distance (m)	196.2	193.6
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 2: Hwy 792 & Twp Rd 412

Movement	EB	WB	NB
Directions Served	LTR	LTR	LT
Maximum Queue (m)	14.8	7.6	7.4
Average Queue (m)	5.5	2.2	0.6
95th Queue (m)	10.6	6.5	3.9
Link Distance (m)	188.0	204.0	264.8
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			0
Queuing Penalty (veh)			0

Network Summary

Network wide Queuing Penalty: 0



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	0	6	0	0	2	8	121	2	6	74	11
Future Volume (Veh/h)	6	0	6	0	0	2	8	121	2	6	74	11
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	0	7	0	0	2	9	132	2	7	80	12
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	246	246	80	251	256	132	92			134		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	246	246	80	251	256	132	92			134		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	100	99	100	100	100	99			100		
cM capacity (veh/h)	700	649	980	692	641	917	1484			1432		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	14	2	141	2	87	12
Volume Left	7	0	9	0	7	0
Volume Right	7	2	0	2	0	12
cSH	817	917	1484	1700	1432	1700
Volume to Capacity	0.02	0.00	0.01	0.00	0.00	0.01
Queue Length 95th (m)	0.4	0.0	0.1	0.0	0.1	0.0
Control Delay (s)	9.5	8.9	0.5	0.0	0.6	0.0
Lane LOS	A	A	A		A	
Approach Delay (s)	9.5	8.9	0.5		0.6	
Approach LOS	A	A				

Intersection Summary				
Average Delay	1.1			
Intersection Capacity Utilization	25.7%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	9	32	2	16	6	62	128	4	0	72	4
Future Volume (Veh/h)	0	9	32	2	16	6	62	128	4	0	72	4
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	10	35	2	17	7	67	139	4	0	78	4
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	366	355	78	391	355	139	82			143		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	366	355	78	391	355	139	82			143		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	98	96	100	97	99	96			100		
cM capacity (veh/h)	552	545	983	522	545	909	1497			1421		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	45	26	206	4	78	4
Volume Left	0	2	67	0	0	0
Volume Right	35	7	0	4	0	4
cSH	834	609	1497	1700	1421	1700
Volume to Capacity	0.05	0.04	0.04	0.00	0.00	0.00
Queue Length 95th (m)	1.3	1.0	1.1	0.0	0.0	0.0
Control Delay (s)	9.6	11.2	2.7	0.0	0.0	0.0
Lane LOS	A	B	A			
Approach Delay (s)	9.6	11.2	2.6		0.0	
Approach LOS	A	B				

Intersection Summary				
Average Delay	3.5			
Intersection Capacity Utilization	26.8%	ICU Level of Service		A
Analysis Period (min)	15			

Intersection: 1: Hwy 792 & Twp Rd 414

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LT	LT
Maximum Queue (m)	5.8	4.4	2.8	2.8
Average Queue (m)	1.7	0.3	0.2	0.1
95th Queue (m)	5.4	2.2	2.4	1.8
Link Distance (m)	196.2	193.6	292.7	269.7
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)			0	0
Queuing Penalty (veh)			0	0

Intersection: 2: Hwy 792 & Twp Rd 412

Movement	EB	WB	NB
Directions Served	LTR	LTR	LT
Maximum Queue (m)	12.7	6.4	12.1
Average Queue (m)	4.3	3.1	0.9
95th Queue (m)	8.4	7.5	5.1
Link Distance (m)	188.0	204.0	264.8
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			0
Queuing Penalty (veh)			0

Network Summary

Network wide Queuing Penalty: 0