

Calgary



Glenmore Trail East Interchanges Functional Planning Study

Appendix E - Traffic Analysis and Future Conditions

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Appendix E – Future Traffic Conditions

1.1 Land Uses

1.1.1 LAND USES NORTH OF GLENMORE TRAIL

The lands north of Glenmore Trail fall within TZ 1659, 1660, 3519, 3552, and 3553 included in the City’s forecast. The land use assumptions of these TZs are based on the Emcor Business Park TIA (Emcor TIA) and the Janet ASP.

TZ 3553

Traffic in TZ 3553 is generated from the Emcor TIA and Janet ASP.

Per the Emcor TIA, the site will be fully developed by 2035. The proposed land of the Emcor site is 237 acres, approximately 75% of total site area of 315 acres. The proposed developable land consists of light industrial, commercial, and a rail yard. The trip generation of the commercial component is based on the floor area of the commercial building. As the commercial building size is not stated in the Emcor TIA, the typical floor-area-ratio (FAR) of 0.25 was assumed.

The remaining land uses in TZ 3553 is derived from the Janet ASP where primarily light industrial land uses are proposed. It is noted that the existing country residential in TZ 3553 is proposed to be transformed to light industrial in the future.

The proposed land uses for TZ 3553 are summarized in Table 2.1.

Table 2.1 Proposed Land Uses – TZ 3553

TRANSPORTATION ZONE (TZ)	SOURCE	LAND USE	LAND AREA (ACRES)	NET DEVELOPABLE AREA (ACRES)	FAR	GROSS BUILDING AREA (FT ²)
TZ 3553	Emcor TIA	Light Industrial	315	169.53	-	332,472
		Commercial		30.53	0.25	
		Rail Yard Access		37.1	-	
TZ 3553	Janet ASP	Light Industrial	722	541		

TZ 1659 & TZ 1660

The majority of TZ 1659 and TZ 1660 are currently built-out with light industrial uses. The only exception is the lands south of the Western Headworks Canal on TZ 1660, where the lands are currently undeveloped. From the Janet ASP, the lands south of the Western Headworks Canal on TZ 1660 will be developed as commercial use. Similar to the Emcor TIA, a 75% net developable area and FAR of 0.25 was assumed to the undeveloped commercial lands to estimate the size of the commercial building.

The proposed land uses for TZ 1659 and TZ 1660 are summarized in Table 2.2.

Table 2.2 Proposed Land Uses - TZ 1659 and TZ 1660

TRANSPORTATION ZONE (TZ)	SOURCE	LAND USE	LAND AREA (ACRES)	NET DEVELOPABLE AREA (ACRES)	FAR	GROSS BUILDING AREA (FT ²)
TZ 1659 & 1660	Janet ASP	Light Industrial	530	Existing To Be Maintained		
		Commercial	96	72	0.25	787,110

TZ 3552 & 3519

Per the Janet ASP, the Heather Glen Golf Course within TZ 3552 is expected to be converted to commercial or industrial uses in the long term. The existing Prairie Schooner Estates is expected to remain as a permanent country residential area. All of the land west of Range Road 282 and south of the Western Headworks Canal, with the exception of the Prairie Schooner Estates subdivision, is classified as the Long-Term Development Regional Business Centre with a mix of commercial and industrial uses.

Given the large amount of wetlands within the Long-Term Development area, it was assumed that 70% of the total site area within TZ 3552 and 3519 will be developable. Of this developable land, it was assumed 10% of the land is commercial, 60% is light industrial, and the remaining 30% is heavy industrial. Due to the large scale of the Long-Term Development area, a slightly lower FAR of 0.20 for commercial was applied.

The proposed land uses for TZ 3552 and TZ 3519 are summarized in Table 2.3.

Table 2.3 Proposed Land Uses - TZ 3552 and TZ 3519

TRANSPORTATION ZONE (TZ)	SOURCE	LAND USE	LAND AREA (ACRES)	NET DEVELOPABLE AREA (ACRES)	FAR	GROSS BUILDING AREA (FT ²)
TZ 3552	Janet ASP	Country Res	110	Existing to Be Maintained		
		Commercial	22	15	0.20	132,611
		Light Industrial	130	91	-	-
		Heavy Industrial	65	46	-	-
TZ 3519	Janet ASP	Commercial	226	158	0.20	1,378,855
		Light Industrial	1,357	950	-	-
		Heavy Industrial	678	475	-	-

Remaining TZ 3519

The remaining lands east of the Janet ASP boundary in TZ3519 was assumed to remain as agricultural and country residential.

1.1.2 LAND USES SOUTH OF GLENMORE TRAIL

The lands south of Glenmore Trail is within TZ 3518, 3549, 3550, and 3551 in the City's forecast. The land use assumptions of these TZs are based on the Glenmore Business Park TIA and the Shepard Industrial Park TIA.

TZ 3518 & 3551 (Glenmore Business Park)

Ronmor’s Glenmore Business Park is located south of Glenmore Trail between 116 Street SE and the Western Headworks Canal. The proposed development is expected to consist of warehousing, office and commercial uses and are located within TZ 3518 and 3551. Per the Glenmore Business Park TIA, the following are the expected FAR of each land uses: 0.25 for commercial, 0.40 for general industrial, and 0.40 for business industrial.

The proposed land uses for Glenmore Business Park within TZ 3518 and TZ 3551 are summarized in Table 2.4.

Table 2.4 Proposed Land Uses – Glenmore Business Park within TZ 3518 and TZ 3551

Transportation Zone (TZ)	Source	Land Use	Net Developable Area (Acres)	FAR	Gross Building Area (ft ²)
TZ 3518 & 3551	Glenmore Business Park TIA	Commercial	50	0.25	544,500
		Industrial General / Warehouse	281	0.40	4,896,144
		Industrial Business	15	0.40	261,360

TZ 3518 & TZ 3550 (Walton Industrial)

The existing Walton Industrial is located south of Glenmore Business Park and is located within TZ 3518 and 3550. Uses are primarily industrial and this area is fully built-out.

Table 2.5 Proposed Land Uses – Walton Industrial within TZ 3518 and TZ 3550

TRANSPORTATION ZONE (TZ)	SOURCE	LAND USE	NET DEVELOPABLE AREA (ACRES)	FAR	GROSS BUILDING AREA (FT ²)
TZ 3518	Shepard TIA	Un-Serviced Industrial	206.51	Existing to be Maintained	
TZ 3550			120.65		

TZ 3549, 3550 & 3551 (Shepard Industrial Park)

The Shepard Industrial Park is located to the south of the Glenmore Business Park between 84 Street and 116 Street SE. The site is located within TZ 3549, 3550, and 3551. Per the Shepard TIA, the proposed development consists of industrial general uses (I-G), industrial commercial use (I-C), commercial uses (C-COR3,) and power generation facility (DC). The DC site is the only parcel that is currently built. With no available FAR in the Shepard TIA, the typical FAR of 0.25 for commercial was applied. The proposed land uses for Shepard Industrial Park within TZ 3549, TZ 3550 and TZ 3551 are summarized in Table 2.6.

Table 2.6 Proposed Land Uses – Shepard Industrial Park within TZ 3549, TZ 3550 and TZ 3551

TRANSPORTATION ZONE (TZ)	SOURCE	LAND USE	NET DEVELOPABLE AREA (ACRES)	FAR	GROSS BUILDING AREA (FT ²)
TZ 3549 & 3551	Shepard TIA	Commercial	11	0.25	119,790
		Industrial Park	39	-	-

		Direct Control Site	60 (20 Employee)	Existing to be Maintained	
		Light Industrial	382.45	-	-
TZ 3550		Light Industrial	191.23		

TZ 3549 (Reid Industrial)

The existing Reid Industrial is located south of the Shepard Business Park and is within TZ 3549 and is fully built-out. The Reid Industrial development area is based on the Shepard TIA and is summarized in Table 2.7.

TABLE 2.7 PROPOSED LAND USES – REID INDUSTRIAL WITHIN TZ 3549

TRANSPORTATION ZONE (TZ)	SOURCE	LAND USE	NET DEVELOPABLE AREA (ACRES)	FAR	GROSS BUILDING AREA (FT ²)
TZ 3549	Shepard TIA	Light Industrial	39.62	Existing To Be Maintained	

TZ 3547

TZ3547 was assumed to remain as country residential.

1.1.3 LAND USE SUMMARY

The above land use assumptions are summarized in Table 2.8 and Table 2.9 below.

Table 2.8 Land Use Assumption for Developments North of Glenmore Trail

TRANSPORTATION ZONE (TZ)	SOURCE	LAND USE	LAND AREA (ACRES)	NET DEVELOPABLE AREA (ACRES)	FAR	GROSS BUILDING AREA (FT ²)
TZ 3553	Emcor TIA	Light Industrial	315	169.53	-	
		Commercial		30.53	0.25	332,472
		Rail Yard Access		37.1	-	
TZ 3553	Janet ASP	Light Industrial	722	541	-	
TZ 1659 & 1660	Janet ASP	Light Industrial	530	Existing to be Maintained		
		Commercial	96	72	0.25	787,110
TZ 3552	Janet ASP	Country Res	110	Existing to be Maintained		
		Commercial	22	15	0.20	132,611
		Light Industrial	130	91	-	
		Heavy Industrial	65	46	-	
TZ 3519	Janet ASP	Commercial	226	158	0.20	1,378,855
		Light Industrial	1,357	950	-	
		Heavy Industrial	678	475	-	

TZ 3519 East of Janet ASP	-	Country Res	2,500	Existing to be Maintained
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Table 2.9 Land Use Assumption for Developments South of Glenmore Trail

TRANSPORTATION ZONE (TZ)	SOURCE	LAND USE	NET DEVELOPABLE AREA (ACRES)	FAR	GROSS BUILDING AREA (FT ²)
TZ 3518 & 3551	Glenmore Business Park TIA	Commercial	50	0.25	544,500
		Industrial General / Warehouse	281	0.40	4,896,144
		Industrial Business	15	0.40	261,360
TZ 3549 & 3551	Shepard TIA	Commercial	11	0.25	119,790
		Industrial Park	39		
		Direct Control Site	60 (20 Employee)		
		Light Industrial	382.45		
		TZ 3550	Light Industrial		
TZ 3549	Shepard TIA (Reid Industrial)	Light Industrial	39.62		
TZ 3518	Shepard TIA (Walton Industrial)	Un-Serviced Industrial	206.51		
TZ 3550			120.65		
TZ 3547	-	Country Res	Existing to be Maintained		

1.1.4 TRIP GENERATION

Comparison and Adjustments to City Forecasting

The 2039 traffic forecast was provided by the City of Calgary Forecasting division and is based on the 2039 Land Use and Network (LUN) model run. The model run includes a system interchange at Glenmore Trail / Stoney Trail and full interchange at Glenmore Trail / 100 Street, Glenmore Trail / 116 Street SE, and Glenmore Trail / Rainbow Road. The LUN model run is a more conservative model as compared to the City’s other model, the TARGET model run. The LUN model does not take into consideration auto cost or walking / cycling / transit behavior change over time, thus resulting in a lower transit ridership and higher volumes of traffic as compared to the TARGET model run.

The anticipated land uses, population and employment from the referenced reports were compared to the respective TZs in the 2039 horizon model run. The following summarizes the adjustments made for each TZ:

North of Glenmore Trail

- TZ 1660 / 1659: The traffic assumptions of the forecast were maintained and assumed to be the trips of the existing light industrial uses. Additional trips of the proposed commercial uses (per the Janet ASP) south of the canal will be generated and added to the 2039 network (refer to Section 3.2.)

- TZ 3552: The traffic assumptions of the forecast were maintained and assumed to be the trips of the existing Prairie Schooner Estates. Additional trips of the proposed commercial and industrial uses (per the Janet ASP) will be generated and added to the 2039 network (refer to Section 3.2.)
- TZ 3553: The traffic assumptions of the forecast do not correspond to the proposed land uses of the Emcor TIA and Janet ASP. The forecast trips were backed out and actual uses (per the Emcor TIA and Janet ASP) will be generated and added to the 2039 network (refer to Section 3.2.)
- TZ 3519: The traffic assumptions of the forecast were maintained and assumed to be the trips of the existing country residential. Additional trips of the proposed commercial and industrial uses (per the Janet ASP) will be generated and added to the 2039 network (refer to Section 3.2.)

South of Glenmore Trail

- TZ 3518 / 3549 / 3550 / 3551: The traffic assumptions of the forecast do not correspond to the proposed land uses of the Glenmore Business Park TIA and Shepard TIA. The forecast trips were backed out and actual uses (per the Glenmore Business Park TIA and Shepard TIA) will be generated and added to the 2039 network (refer to Section 3.2.)
- TZ 3547: The traffic assumptions of the forecast were maintained and assumed to be the trips of the existing country residential.
- TZ 3518 / 3549 / 3550 / 3551: The traffic assumptions of the forecast do not correspond to the proposed land uses of the Glenmore Business Park TIA and Shepard TIA. The forecast trips were backed out and actual uses (per the Glenmore Business Park TIA and Shepard TIA) will be generated and added to the 2039 network (refer to Section 3.2.)
- TZ 3547: The traffic assumptions of the forecast were maintained and assumed to be the trips of the existing country residential.

1.1.5 TRIP GENERATION

The trip generations of the additional trips to be added to the 2039 network were based on the following: City of Calgary rates, ITE Trip Generation Manual, 9th Edition, and trip generation studies as undertaken in the Shepard TIA and Emcor TIA:

- Commercial (ITE 820)1:
 - Large Commercial Sites AM: $\text{Ln}(T) = 0.61 \text{Ln}(X) + 2.24$ (62% In / 38% Out)
 - Large Commercial Sites PM: $\text{Ln}(T) = 0.67 \text{Ln}(X) + 3.31$ (48% In / 52% Out)
 - Small / Medium Sites AM: 0.96 trips / 1,000 sq ft (62% In / 38% Out)
 - Small / Medium Sites PM: 3.71 trips / 1,000 sq ft (48% In / 52% Out)
- Light Industrial (ITE 110)2:
 - Equation, AM $3.68 (X) + 116.82$ (83% In / 17% Out), PM $3.68 (X) + 116.82$ (22% In / 78% Out)
- Heavy Industrial (ITE 120):
 - AM 1.98 trips / acre (83% In / 17% Out)
 - PM 2.16 trips / acre (22% In / 78% Out)
- Industrial General (City of Calgary rate):
 - AM 0.47 trips / 1,000 sq ft (88% In / 12% Out)
 - PM 0.49 trips / 1,000 sq ft (17% In / 83% Out)
- Industrial Park (ITE 130):
 - AM 8.55 trips / acre (83% In / 17% Out)
 - PM 8.84 trips / acre (21% In / 79% Out)
- Un-serviced Industrial (per trip generation study as undertaken in the Shepard TIA):
 - AM 1.41 trips / acre (77% In / 23% Out)
 - PM 1.32 trips / acre (20% In / 80% Out)
- Rail Yard (per trip generation study as undertaken in the Emcor TIA)3:

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- AM 1.89 trips / acre (40% In / 60% Out)
- PM 1.89 trips / acre (60% In / 40% Out)
- Industrial Business (City):
 - AM 1.55 trips / 1000 sq ft (88% In / 12% Out)
 - PM 1.49 trips / 1000 sq ft (17% In / 83% Out)
- Direct Control Facility (Shepard TIA):
 - AM 0.44 trips / employee (83% In / 17% Out)
 - PM 0.42 trips / employee (21% In / 79% Out)
- All Land Uses:
 - 10% internal trip was assumed for all land uses
- Commercial:
 - 25% pass-by was assumed for the commercial uses

Using the above rates, the traffic generation for the additional trips to be added to the 2039 network area land use is summarized in Table 3.1 and Table 3.2.

¹The commercial and light industrial regression equations from the ITE trip Generation Manual, 9th Edition, were applied to the larger sites in TZ 1660, TZ 3518, TZ 3519 and TZ 3551.

²There is no equation available for light industrial land use in the AM peak; to be conservative, the PM peak equation was applied for the AM peak.

³Trip generations for Rail Yard was based on the trip generation study as undertaken in the Emcor TIA. In the Emcor TIA, only a PM rate was available. To be conservative, the PM peak trip rate was also applied for the AM peak. In addition, the PM peak in / out split was reversed for the AM peak.

Table 3.1: Land Use Assumption for Development North of Glenmore Trail

TZ	SOURCE	LAND USE	NET DEV AREA (ACRES)	TRIP GENERATION RATE	AM PEAK HOUR TRIPS			PM PEAK HOUR TRIPS		
					IN	OUT	TOTAL	IN	OUT	TOTAL
TZ 3553	Emcor TIA	Light Industrial	169.53	ITE Equation	712	146	858	189	669	858
		Comm	30.53	ITE Rate	198	121	319	592	641	1,233
		Rail Yard Access	37.1	Emcor TIA Trip Gen Study	28	42	70	42	28	70
TZ 3553	Janet ASP	Light Industrial	541	ITE Equation	1,750	358	2,108	464	1,644	2108
Sub-Total:					2,688	667	3355	1,287	2,982	4,269
TZ 1660	Janet ASP	Comm	72	ITE Equation	340	209	549	1,146	1,241	2,387
Sub-Total:					340	209	549	1,146	1,241	2,387
TZ 3552	Janet ASP	Comm	15	ITE Rate	79	48	127	236	256	492
		Light Industrial	91	ITE Equation	376	77	453	100	353	453

TZ	SOURCE	LAND USE	NET DEV AREA (ACRES)	TRIP GENERATION RATE	AM PEAK HOUR TRIPS			PM PEAK HOUR TRIPS		
					IN	OUT	TOTAL	IN	OUT	TOTAL
		Heavy Industrial	46	ITE Rate	75	15	90	22	77	99
Sub-Total:					530	140	670	358	686	1044
TZ 3519	Janet ASP	Comm	158	ITE Equation	479	294	773	1,668	1,807	3,475
		Light Industrial	950	ITE Equation	2,997	614	3,611	795	2,817	3,611
		Heavy Industrial	475	ITE Rate	780	160	940	226	800	1,026
Sub-Total:					4,256	1068	5,324	2,689	5,424	8,112
Total Trips:					7,814	2,084	9,898	5,480	10,333	15,812
Total Internal Trips (10%):					781	208	990	548	1,033	1,581
Total Trips (with Internal Trips):					7,033	1,876	8,908	4,932	9,300	14,231
Total Non Pass-by Trips (75%):					6,785	1,725	8,510	4,113	8,412	12,523
Total Pass-By Trips (25%):					248	151	398	819	888	1,708

From Table 3.1, 8,510 non pass-by trips and 398 pass-by trips are generated in the AM peak; in the PM peak, 12,523 non pass-by trips and 1,708 pass-by trips are generated.

Table 3.2: Land Use Assumption for Development South of Glenmore Trail

TZ	SOURCE	LAND USE	NET DEV AREA (ACRES)	TRIP GENERATION RATE	AM PEAK HOUR TRIPS			PM PEAK HOUR TRIPS		
					IN	OUT	TOTAL	IN	OUT	TOTAL
TZ 3518 & 3551	Glenmore Bus Park	Comm	50	ITE Equation	272	167	438	895	970	1,865
		Industrial General / Warehouse	281	City Rate	2,025	276	2,301	408	1,991	2,399
		Industrial Business	15	City Rate	356	49	405	66	323	389
Sub-Total:					2,653	492	3,144	1,369	3,284	4,653
TZ 3549 & 3551	Shepard TIA	Comm	11	ITE Rate	71	44	115	214	232	447
		Industrial Park	39	ITE Rate	273	56	329	71	269	340
		Direct Control	60 Acres / 20 Emp	Shepard TIA Trip Gen Study	7	1	9	2	7	9

		Light Industrial	382.45	ITE Equation	1,265	259	1,524	335	1,189	1,524
TZ 3550		Light Industrial	191.23	ITE Equation	681	139	821	181	640	821
Sub-Total:					2,297	499	2,798	803	2,337	3,141
TZ 3549	Shepard TIA (Reid Ind)	Light Industrial	39.62	ITE Equation	218	45	263	58	205	263
Sub-Total:					218	45	263	58	205	263
TZ 3518	Shepard TIA (Walton Ind)	Un-Serviced Industrial	206.51	Shepard TIA Trip Gen Study	224	67	291	55	218	273
TZ 3550			120.65		131	39	170	32	127	159
Sub-Total:					355	106	461	87	345	432
Total Trips:					5,523	1,142	6,666	2,317	6,171	8,489
Total Internal Trip (10%):					552	114	667	232	617	849
Total Trips (with Internal Trips):					4,971	1,028	5,999	2,085	5,554	7,640
Total Non Pass-by Trip:					4,894	981	5,874	1,836	5,284	7,120
Total Pass-By Trip (25%):					77	47	125	249	270	520

From Table 3.2, 5,874 non pass-by trips and 125 pass-by trips are generated in the AM peak; in the PM peak, 7,120 non pass-by trips and 520 pass-by trips are generated.

1.1.6 DESIGN TRAFFIC DERIVATION

To estimate the build-out design traffic volumes for the subjected land uses north and south of Glenmore Trail, the following steps are undertaken and summarized on Exhibits 1.0 and 2.0:

- The interchange volumes from the 2039 LUN model as provided by Forecasting were used as the base volumes.
- Per the land use comparison of the referenced studies and the City's model assumptions in Section 3.1, the following adjustments are made:
 - The City's model land use assumption of TZ 3518, 3549, 3550, 3551, and 3553 do not correspond to the land uses in the reference studies.
 - Additional traffic is required to be added in TZ 1660, 3518, 3519, 3549, 3550, 3351, 3552, and 3553
- Remove the traffic of TZ 3518, 3549, 3550, 3551, and 3553 from the base volumes by referencing to each TZ's respective Select Zone Analysis (refer to Appendix A) and subtracting the zonal traffic from the base volumes.
- Generate the traffic to be added in TZ 1660, 3518, 3519, 3549, 3550, 3351, 3552, and 3553 (refer to Section 3.2 and Tables 3.1 and 3.2)
- Apply 10% internal trip reduction to the generated traffic of all land uses (refer to Section 3.2 and Tables 3.1 and 3.2)
- Apply 25% pass-by rates to the commercial generated traffic (refer to Section 3.2 and Tables 3.1 and 3.2)
- Distribute the generated trips onto the 100 Street, 116 Street SE, and Rainbow Road interchange based on the trip distribution (refer to Appendix B) of each TZ.

- North of Glenmore Trail:
 - TZ 1660 / 1659: Additional trips of the proposed commercial uses south of the canal were distributed onto Glenmore Trail through Glenmore Trail / 100 Street interchange
 - TZ 3552: Additional trips of the proposed commercial and industrial were equally distributed onto Glenmore Trail through both Glenmore Trail / 100 Street interchange and Glenmore Trail / 116 Street SE interchange
 - TZ 3553: The actual generated trips were equally distributed onto Glenmore Trail through both Glenmore Trail / 100 Street interchange and Glenmore Trail / 116 Street SE interchange
 - TZ 3519: It is assumed that there will be one additional access from TZ 3519 onto Glenmore Trail between Rainbow Road and Highway 791 in order to support the development of TZ 3519. The additional trips of the proposed commercial and industrial uses were distributed onto Glenmore Trail through 116 Street SE, Rainbow Road interchange and the assumed access between Rainbow Road and Highway 791. The percentage split between these accesses are 25% thru Glenmore Trail / 116 Street SE interchange, 50% thru Glenmore Trail / Rainbow Road interchange and 25% thru the assumed access.
- South of Glenmore Trail:
 - TZ 3518 / 3549 / 3551: The actual generated trips were equally distributed onto Glenmore Trail through both Glenmore Trail / 100 Street interchange and Glenmore Trail / 116 Street SE interchange
 - TZ 3550: The actual generated trips were distributed onto Glenmore Trail through both Glenmore Trail / 100 Street interchange
 - TZ 3547: The forecasted trip distribution was maintained and assumed trips were distributed onto Glenmore Trail through Range Road 282

Distribute the generated trips onto Glenmore Trail / Stoney Trail interchange based on the existing travel pattern of the interchange (refer to Appendix C). Note: upon further review of the trip distributions at Glenmore Trail / Stoney Trail, the model shows minimal traffic accessing northbound and southbound Stoney Trail. It was assumed that there would be more traffic utilizing northbound and southbound Stoney Trail as the main north and south connection, similar to existing travel pattern of the interchange. As a result, the trip distributions at Glenmore Trail / Stoney Trail interchange from the 2039 model was not used and was adjusted to follow the existing traffic pattern of the interchange.

The following truck percentages will be applied for the traffic analysis. Note: upon further review of the truck percentage from the City's forecast, the model shows minimal truck traffic at Glenmore Trail / 100 Street, Glenmore Trail / 116 Street SE and Glenmore Trail / Rainbow Road (Table 4.2). It was assumed that there would be more truck movement to/from north and south of Glenmore Trail based on the land use assumptions discussed in Section 2.1. As a result, the truck percentages at these three interchanges of the 2039 model were not used and were adjusted to the following:

TABLE 4.1: ASSUMED TRUCK PERCENTAGE

ASSUMED TRUCK %		NBL	NBT	NBR	WBL	WBT	WBR	SBL	SBT	SBR	EBL	EBT	EBR
AM / PM	Glenmore Tr / 100 St	30%	15%	6%	6%	6%	6%	6%	15%	30%	30%	15%	30%
	Glenmore Tr / Conrich Rd												
	Glenmore Tr / Rainbow Rd												

TABLE 4.2: CITY'S 2039 MODEL FORECASTED TRUCK %

CITY'S FORECAST TRUCK %		NBL	NBT	NBR	WBL	WBT	WBR	SBL	SBT	SBR	EBL	EBT	EBR
AM	Glenmore Tr / 100 St	28%			2%			4%			9%		
	Glenmore Tr / Conrich Rd	11%			2%			1%			10%		
	Glenmore Tr / Rainbow Rd	7%			2%			0%			11%		

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CITY'S FORECAST TRUCK %		NBL	NBT	NBR	WBL	WBT	WBR	SBL	SBT	SBR	EBL	EBT	EBR
PM	Glenmore Tr / 100 St	7%			6%			6%			2%		
	Glenmore Tr / Conrich Rd	4%			6%			3%			1%		
	Glenmore Tr / Rainbow Rd	6%			7%			2%			1%		

Using the above steps, the design volumes were developed for the Full interchange at 100 St, 116 St, and Rainbow Road (refer to Exhibit 3.0 for AM traffic volumes and Exhibit 4.0 for PM traffic volumes).

AM PEAK 2039 LUN Traffic Volumes

Stoney TR SE		100 ST SE		Range RD 284		Range RD 283																			
Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks																		
SBI 3,990	SBR 1,190	SBT 2,580	SBL 220	NBO 4,370	SBI 240	SBR 180	SBT 50	SBL 10	NBO 160	SBI 200	SBR 170	SBT 20	SBL 10	NBO 90	SBI 660	SBR 640	SBT 10	SBL 10	NBO 150						
WBO 4,590	EBL 170	EBT 460	EBR 60	EBI 690	WBO 3,090	EBL 120	EBT 430	EBR 310	EBI 860	WBO 2,830	EBL 60	EBT 380	EBR 10	EBI 450	WBO 2,660	EBL 110	EBT 280	EBR 10	EBI 400	WBO 2,040	EBL 20	EBT 2,010	EBR 10	EBI 300	
Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks
2,720	430	4,160	180	4,770	430	180	10	10	200	40	30	10	10	50	30	10	20	10	40	30	10	20	10	40	
SBO	NBL	NBT	NBR	NBI	SBO	NBL	NBT	NBR	NBI	SBO	NBL	NBT	NBR	NBI	SBO	NBL	NBT	NBR	NBI	SBO	NBL	NBT	NBR	NBI	

Total Traffic Volume being Zero Out

Stoney TR SE		100 ST SE		Range RD 284		Range RD 283																			
Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks																		
SBI 37	SBR 0	SBT -49	SBL 85	NBO 2	SBI 13	SBR 0	SBT 13	SBL 0	NBO 5	SBI -18	SBR -12	SBT -7	SBL 0	NBO -34	SBI 0	SBR 0	SBT 0	SBL 0	NBO 0						
WBO 12	EBL 0	EBT 48	EBR 0	EBI 48	WBO 20	EBL 0	EBT -31	EBR 148	EBI 116	WBO 8	EBL -31	EBT 3	EBR 0	EBI -28	WBO 3	EBL 0	EBT 0	EBR 0	EBI 0						
Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks
-49	0	-7	-17	-23	180	32	5	3	40	-14	0	0	-2	-2	0	0	0	0	0						
SBO	NBL	NBT	NBR	NBI	SBO	NBL	NBT	NBR	NBI	SBO	NBL	NBT	NBR	NBI	SBO	NBL	NBT	NBR	NBI	SBO	NBL	NBT	NBR	NBI	

2039 LUN - Zero Out Traffic Volume from TZ

Stoney TR SE		100 ST SE		Range RD 284		Range RD 283																			
Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks																		
SBI 3,791	SBR 1,190	SBT 2,531	SBL 70	NBO 4,348	SBI 212	SBR 180	SBT 22	SBL 10	NBO 155	SBI 182	SBR 159	SBT 13	SBL 10	NBO 56	SBI 660	SBR 640	SBT 10	SBL 10	NBO 150						
WBO 4,490	EBL 170	EBT 326	EBR 60	EBI 556	WBO 2,974	EBL 120	EBT 399	EBR 41	EBI 560	WBO 2,779	EBL 29	EBT 374	EBR 10	EBI 412	WBO 2,611	EBL 110	EBT 275	EBR 10	EBI 395	WBO 2,006	EBL 20	EBT 1,976	EBR 10	EBI 295	
Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks
2,671	430	4,153	163	4,747	94	75	5	4	84	26	30	10	8	48	30	10	20	10	40						
SBO	NBL	NBT	NBR	NBI	SBO	NBL	NBT	NBR	NBI	SBO	NBL	NBT	NBR	NBI	SBO	NBL	NBT	NBR	NBI	SBO	NBL	NBT	NBR	NBI	

Development Traffic Only (North of Glenmore)

Stoney TR SE		100 ST SE		Range RD 284		Range RD 283																			
Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks																		
SBI 843	SBR 0	SBT 29	SBL 814	NBO 100	SBI 251	SBR 229	SBT 11	SBL 11	NBO 880	SBI 270	SBR 261	SBT 9	SBL 0	NBO 1,194	SBI 293	SBR 293	SBT 0	SBL 0	NBO 1,130						
WBO 703	EBL 0	EBT 1,694	EBR 0	EBI 1,694	WBO 913	EBL 774	EBT 2,489	EBR -6	EBI 3,257	WBO 778	EBL 1,071	EBT 1,430	EBR -1	EBI 2,500	WBO 627	EBL 1,034	EBT 397	EBR -1	EBI 1,430	WBO 430	EBL 96	EBT 334	EBR 0	EBI 397	
Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks
138	0	0	749	749	4	0	12	0	12	8	0	12	0	12	-1	0	0	0	0						
SBO	NBL	NBT	NBR	NBI	SBO	NBL	NBT	NBR	NBI	SBO	NBL	NBT	NBR	NBI	SBO	NBL	NBT	NBR	NBI	SBO	NBL	NBT	NBR	NBI	

Development Traffic Only (South of Glenmore)

Stoney TR SE		100 ST SE		Range RD 284		Range RD 283																			
Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks																		
SBI 654	SBR 0	SBT 175	SBL 479	NBO 82	SBI 113	SBR 0	SBT 113	SBL 0	NBO 12	SBI 83	SBR 0	SBT 83	SBL 0	NBO 15	SBI 0	SBR 0	SBT 0	SBL 0	NBO 0						
WBO 419	EBL 0	EBT 996	EBR 0	EBI 996	WBO 544	EBL -4	EBT 944	EBR 975	EBI 1,915	WBO 402	EBL -1	EBT -8	EBR 975	EBI 966	WBO 286	EBL 9	EBT 0	EBR 0	EBI 9	WBO 286	EBL 0	EBT 286	EBR 0	EBI 9	
Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks	Trucks
241	0	23	441	463	1,252	305	16	22	344	1,186	243	16	17	276	0	0	0	0	0						
SBO	NBL	NBT	NBR	NBI	SBO	NBL	NBT	NBR	NBI	SBO	NBL	NBT	NBR	NBI	SBO	NBL	NBT	NBR	NBI	SBO	NBL	NBT	NBR	NBI	

RM PEAK		2039 LUN Traffic Volumes																									
		Stoney TR SE					100 ST SE					Range RD 284					Range RD 283										
		Trucks	SBI	SBR	SBT	SBL	NBO	Trucks	SBI	SBR	SBT	SBL	NBO	Trucks	SBI	SBR	SBT	SBL	NBO	Trucks	SBI	SBR	SBT	SBL	NBO		
		5,510	640	4,760	110	3,950	1,090	130	90	20	20	280	680	80	50	10	20	140	750	640	200	180	10	10	750		
		Trucks	Freelflow					Trucks	Signal					Trucks	Signal					Trucks	Signal						
		WBO	1,550					WBO	1,090					WBO	680					WBO	640						
		EBL	1,040					EBL	230					EBL	90					EBL	710						
		EBT	2,950					EBT	2,990					EBT	2,960					EBT	2,280						
		EBR	1,030					EBR	110					EBR	10					EBR	10						
		EBI	5,020					EBI	3,330					EBI	3,060					EBI	3,000						
		Trucks	5,860					Trucks	150					Trucks	30					Trucks	30						
		SBO	NBL	NBT	NBR	NBI	SBO	NBL	NBT	NBR	NBI	SBO	NBL	NBT	NBR	NBI	SBO	NBL	NBT	NBR	NBI	SBO	NBL	NBT	NBR	NBI	
		100	2,700	270	3,070	350	40	50	440	10	20	70	10	20	40	10	20	10	40	10	20	10	10	40	10	40	
		Glenmore TR SE	Glenmore Timore TR SE					Glenmore Timore TR SE					Glenmore Timore TR SE					Glenmore Timore TR SE					Glenmore Timore TR SE				

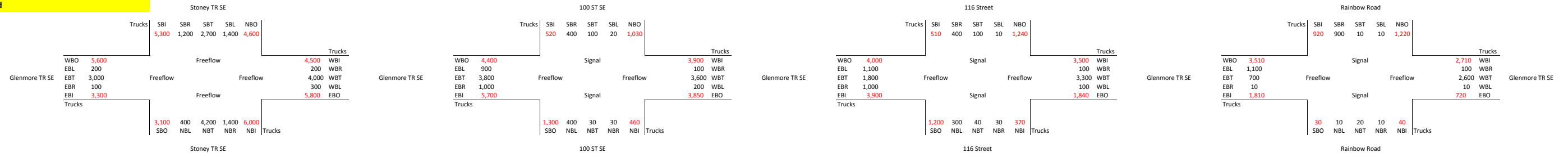
Total Traffic Volume being Zero Out		Stoney TR SE										100 ST SE					Range RD 284					Range RD 283					
		Trucks	SBI	SBR	SBT	SBL	NBO	Trucks	SBI	SBR	SBT	SBL	NBO	Trucks	SBI	SBR	SBT	SBL	NBO	Trucks	SBI	SBR	SBT	SBL	NBO		
		16	0	-7	23	41	3	0	3	0	11	-28	-20	-2	-5	-21	0	0	0	0	0	0	0	0	0		
		Trucks	Freelflow					Trucks	Signal					Trucks	Signal					Trucks	Signal						
		WBO	18					WBO	109					WBO	-14					WBO	4						
		EBL	0					EBL	0					EBL	-21					EBL	0						
		EBT	21					EBT	-21					EBT	15					EBT	2						
		EBR	0					EBR	59					EBR	0					EBR	0						
		EBI	21					EBI	38					EBI	-5					EBI	2						
		Trucks	-7					Trucks	67					Trucks	-3					Trucks	0						
		SBO	NBL	NBT	NBR	NBI	SBO	NBL	NBT	NBR	NBI	SBO	NBL	NBT	NBR	NBI	SBO	NBL	NBT	NBR	NBI	SBO	NBL	NBT	NBR	NBI	
		0	-51	-6	-57	130	11	15	157	0	0	-8	-8	0	0	0	0	0	0	0	0	0	0	0	0		
		Glenmore TR SE	Glenmore Timore TR SE					Glenmore Timore TR SE					Glenmore Timore TR SE					Glenmore Timore TR SE					Glenmore Timore TR SE				

2039 LUN - Zero Out Traffic Volume from TZ		Stoney TR SE										100 ST SE					Range RD 284					Range RD 283					
		Trucks	SBI	SBR	SBT	SBL	NBO	Trucks	SBI	SBR	SBT	SBL	NBO	Trucks	SBI	SBR	SBT	SBL	NBO	Trucks	SBI	SBR	SBT	SBL	NBO		
		5,468	640	4,753	75	3,742	743	120	90	10	20	250	651	52	30	8	15	88	750	634	200	180	10	10	750		
		Trucks	Freelflow					Trucks	Signal					Trucks	Signal					Trucks	Signal						
		WBO	1,360					WBO	743					WBO	653					WBO	634						
		EBL	1,040					EBL	230					EBL	69					EBL	710						
		EBT	2,867					EBT	2,969					EBT	2,924					EBT	2,230						
		EBR	1,030					EBR	6					EBR	10					EBR	10						
		EBI	4,937					EBI	3,205					EBI	3,003					EBI	2,950						
		Trucks	5,853					Trucks	28					Trucks	27					Trucks	30						
		SBO	NBL	NBT	NBR	NBI	SBO	NBL	NBT	NBR	NBI	SBO	NBL	NBT	NBR	NBI	SBO	NBL	NBT	NBR	NBI	SBO	NBL	NBT	NBR	NBI	
		100	2,649	264	3,013	10	14	46	12	12	31	10	9	12	31	10	9	12	31	10	9	12	31	10	9	12	31
		Glenmore TR SE	Glenmore Timore TR SE					Glenmore Timore TR SE					Glenmore Timore TR SE					Glenmore Timore TR SE					Glenmore Timore TR SE				

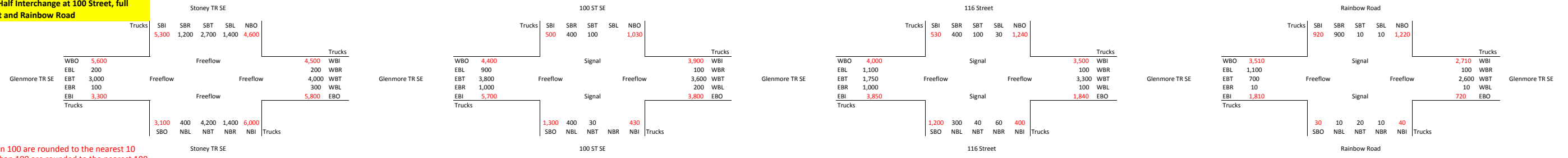
Development Traffic Only (North of Glenmore)		Stoney TR SE										100 ST SE					Range RD 284					Range RD 283					
		Trucks	SBI	SBR	SBT	SBL	NBO	Trucks	SBI	SBR	SBT	SBL	NBO	Trucks	SBI	SBR	SBT	SBL	NBO	Trucks	SBI	SBR	SBT	SBL	NBO		
		526	0	305	221	1,139	4,219	1,400	1,240	24	136	1,018	3,082	1,227	1,072	13	142	745	919	2,033	1,440	1,294	0	146	919		
		Trucks	Freelflow					Trucks	Signal					Trucks	Signal					Trucks	Signal						
		WBO	1,730					WBO	4,219					WBO	3,082					WBO	2,033						
		EBL	0					EBL	907					EBL	715					EBL	895						
		EBT	1,963					EBT	1,548					EBT	970					EBT	217						
		EBR	0					EBR	0					EBR	0					EBR	-1						
		EBI	1,963					EBI	2,455					EBI	1,684					EBI	1,112						
		Trucks	1,655					Trucks	23					Trucks	12					Trucks	-1						
		SBO	NBL	NBT	NBR	NBI	SBO	NBL	NBT	NBR	NBI	SBO	NBL	NBT	NBR	NBI	SBO	NBL	NBT	NBR	NBI	SBO	NBL	NBT	NBR	NBI	
		0	0	0	270	270	0	8	0	8	8	0	8	0	8	8	0	8	0	8	0	0	0	0	0	0	
		Glenmore TR SE	Glenmore Timore TR SE					Glenmore Timore TR SE					Glenmore Timore TR SE					Glenmore Timore TR SE					Glenmore Timore TR SE				

Development Traffic Only (South of Glenmore)		Stoney TR SE										100 ST SE					Range RD 284					Range RD 283					
		Trucks	SBI	SBR	SBT	SBL	NBO	Trucks	SBI	SBR	SBT	SBL	NBO	Trucks	SBI	SBR	SBT	SBL	NBO	Trucks	SBI	SBR	SBT	SBL	NBO		
		130	0	21	109	666	1,851	55	0	55	0	71	936	50	0	50	0	74	105	105	0	0	0	0	0		
		Trucks	Freelflow					Trucks	Signal					Trucks	Signal					Trucks	Signal						
		WBO	759					WBO	1,851					WBO	936					WBO	105						
		EBL	0					EBL	-4					EBL	-1					EBL	0						
		EBT	972					EBT	551					EBT	19					EBT	119						
		EBR	0					EBR	669					EBR	669					EBR	0						
		EBI	972					EBI	1,215					EBI	686					EBI	119						
		Trucks	613					Trucks	784					Trucks	773					Trucks	0						
		SBO	NBL	NBT	NBR	NBI	SBO	NBL	NBT	NBR	NBI	SBO	NBL	NBT	NBR	NBI	SBO	NBL	NBT	NBR	NBI	SBO	NBL	NBT	NBR	NBI	
		0	166	134	299	975	75	135	1,186	886	75	101	1,061	0	0	0	0	0	0	0	0	0	0	0	0		
		Glenmore TR SE	Glenmore Timore TR SE					Glenmore Timore TR SE					Glenmore Timore TR SE					Glenmore Timore TR SE					Glenmore Timore TR SE				

Interchange Option #1 - Full Interchange at 100 Street, 116 Street and Rainbow Road

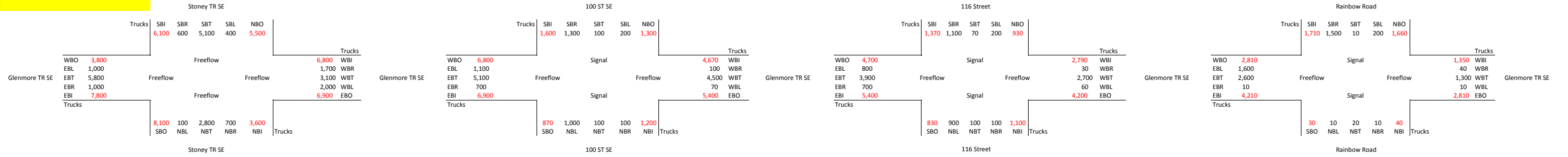


Interchange Option #2 - Half Interchange at 100 Street, full interchange at 116 Street and Rainbow Road

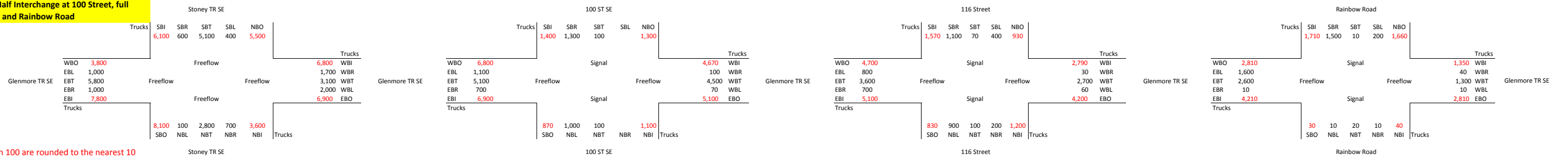


NOTE
* Traffic Volumes less than 100 are rounded to the nearest 10
* Traffic Volumes larger than 100 are rounded to the nearest 100

Interchange Option #1 - Full Interchange at 100 Street, 116 Street and Rainbow Road



Interchange Option #2 - Half Interchange at 100 Street, full interchange at 116 Street and Rainbow Road



NOTE
* Traffic Volumes less than 100 are rounded to the nearest 10
* Traffic Volumes larger than 100 are rounded to the nearest 100