Memo

Date	September 11, 2020
Memo to	Scott Adams, P.Eng., Manager of Public Works, City of Charlottetown
Project name	Transportation Planning for SDU & Adjacent Lands
Subject	Traffic Implications of a New North-South Street
From	Emanuel Nicolescu, CBCL
Copies to	Mark MacDonald, CBCL

Introduction & Background

CBCL Limited was engaged by the City of Charlottetown to provide an opinion on the traffic implications of a new north-south street between Towers Road and the future extension of Spencer Drive to Mt. Edward Road. It is understood that the proposed site driveways for a development proposed by APM MacLean (shown crossed out in red in Figure 1 below) would not be constructed, and that a proposed north-south street would be constructed instead.

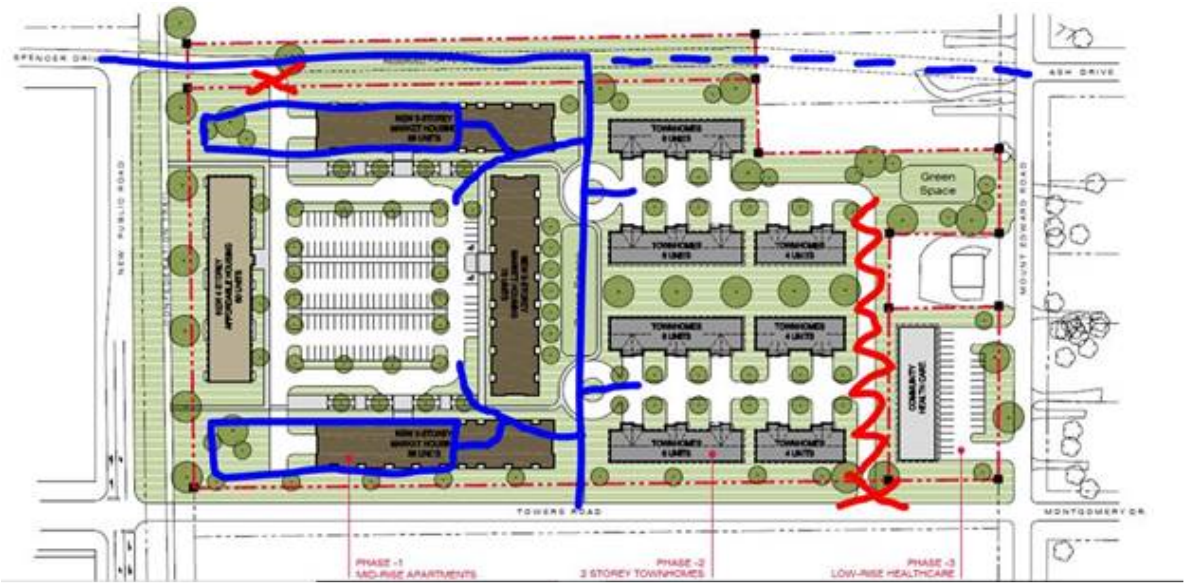

Figure 1: Proposed APM MacLean development with proposed N-S street (in blue)

We proposed to estimate future traffic conditions with this road arrangement, based on a modification of the 2025 Future Conditions as presented by exp. in their March, 2020 *Traffic Impact Study* submitted with the development application.

Given the requirements of this task, we undertook the following steps:

1. Re-assigned all trips associated with the proposed development to new driveways on the proposed north-south road
2. Updated intersection capacity analysis with 2025 future background conditions as estimated by exp. for the weekday AM and PM, and the Saturday PM peak hours;
3. Updated new site trip distribution and assignment to consider the extension of Spencer Drive to Mount Edward Road, assuming 60% traffic loading on Spencer Drive and 40% on Towers Road;
4. Conducted sensitivity analysis with vehicular volumes increasing on Spencer Drive and on Towers Road
5. Identified any intersection capacity deficiencies at selected intersections.

In support of this exercise, we received the following information:

- Report "Towers Road–TIS–Draft–Final-Report-with-Appendices", dated March 2020
- 2025 Future conditions as presented by exp. in their March 2020 Traffic Impact Study

This memorandum outlines the findings of our analysis and presents our opinion on the proposed road arrangement.

Existing Conditions

While the Exp. study did not include the Saturday PM peak hour in their analysis, we considered this time period to be critical, considering the high number of trips generated by the adjacent Charlottetown Mall shopping area. CBCL therefore supplemented the analysis with turning movement counts on a Saturday in June at the following intersections:

- University Avenue/Malpeque Road and Capital Drive/ Spencer Drive
- Spencer Drive and Babineau Avenue
- Towers Road and Mount Edward Road

Balanced existing hourly volumes for the weekday AM, PM and Saturday peak hour are illustrated diagrammatically in Figures 2 - 4. We noted that the Saturday peak hour does indeed experience the highest volumes through the study area and is therefore the critical design hour.

Traffic Analysis (Existing Conditions)

Intersection capacity analysis was undertaken at all intersections in the study area for each peak hour. The Synchro files developed by exp. were reviewed and used for this exercise. Detailed Synchro analysis reports are provided in Appendix A, and the results are summarized in Table 1.

The intersection capacity analysis demonstrates that, under existing conditions, the study area intersections generally operate well, with good levels of service for most movements during all peak hours. An exception is observed at the intersection of Spencer Drive with University Avenue / Malpeque Road.

During the PM peak hour, the northbound-left movement at the signalised intersection of University Ave/Malpeque Rd & Spencer Dr may experience queues occasionally extending beyond 100m, equivalent to approximately 15 vehicles. The queues remain within available storage capacity.

At the same time, the southbound-through movement is approaching its theoretical capacity and experiences average delays of approximately 56 seconds. The corresponding level of service (LOS) E is indicative of limited residual capacity on the movement. The same approach may also experience queues of 100m or more, approximately 15 vehicles, during all peak hours.

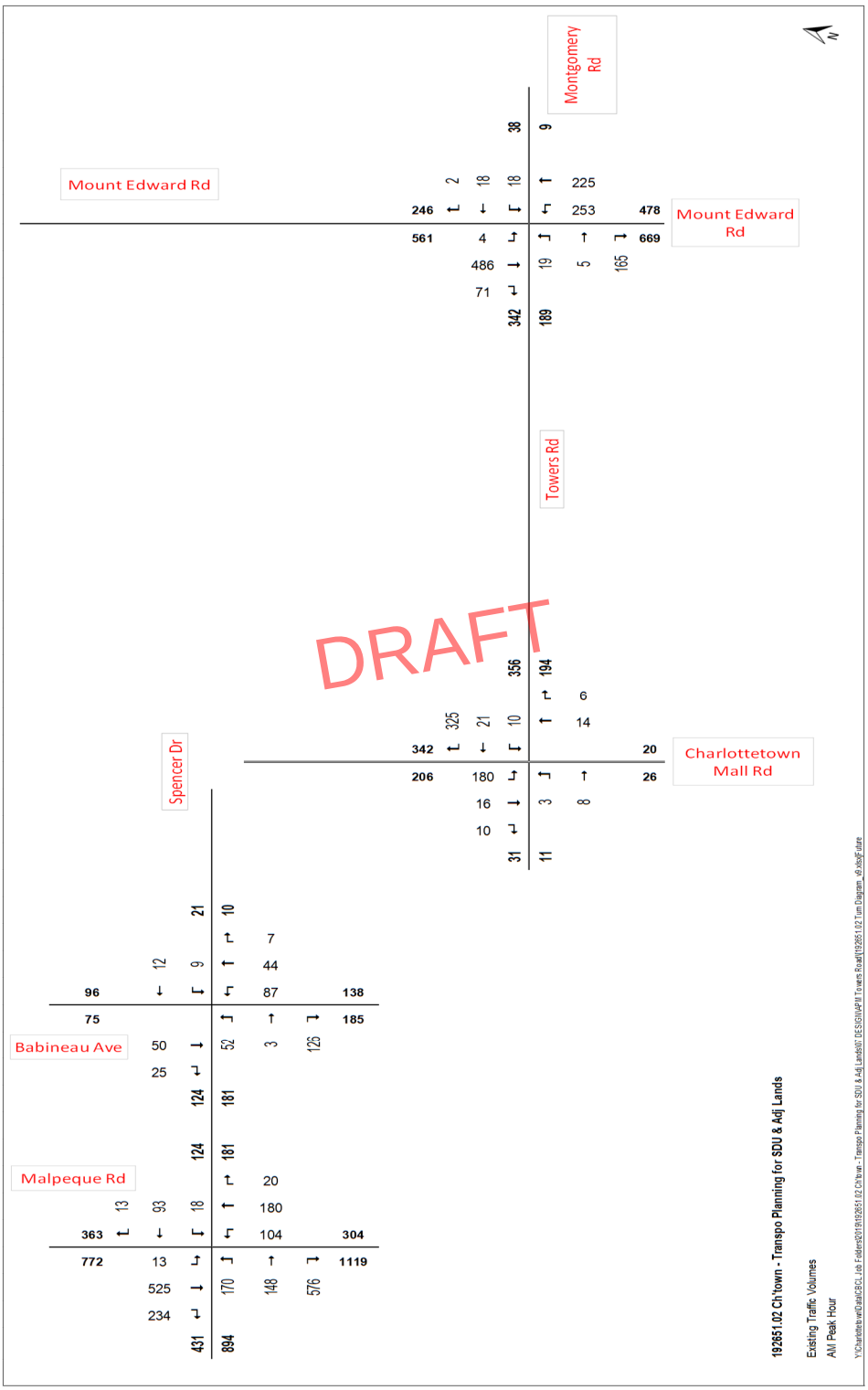

Figure 2: Existing Traffic Volumes (AM Peak Hour)

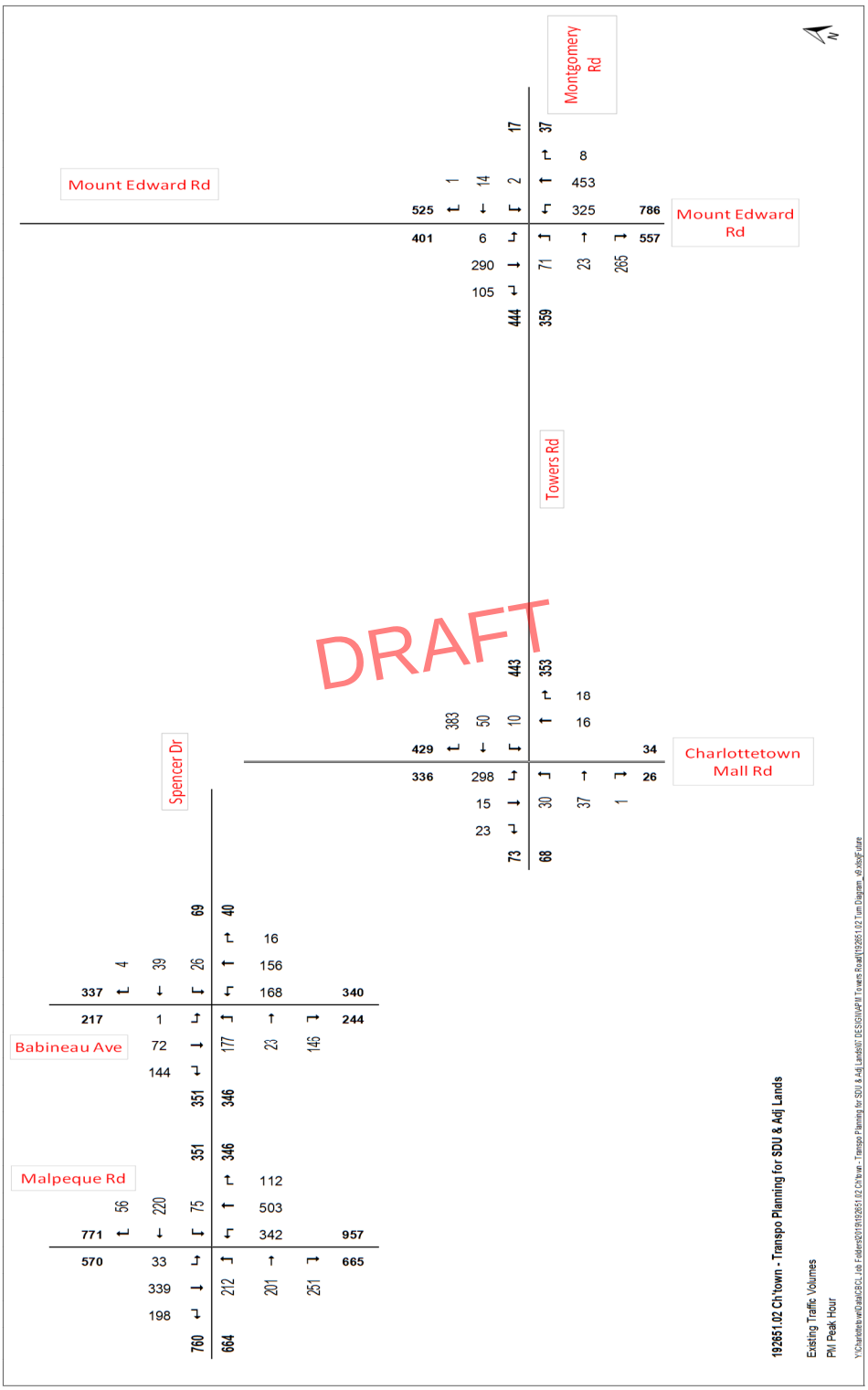

Figure 3: Existing Traffic Volumes (PM Peak Hour)

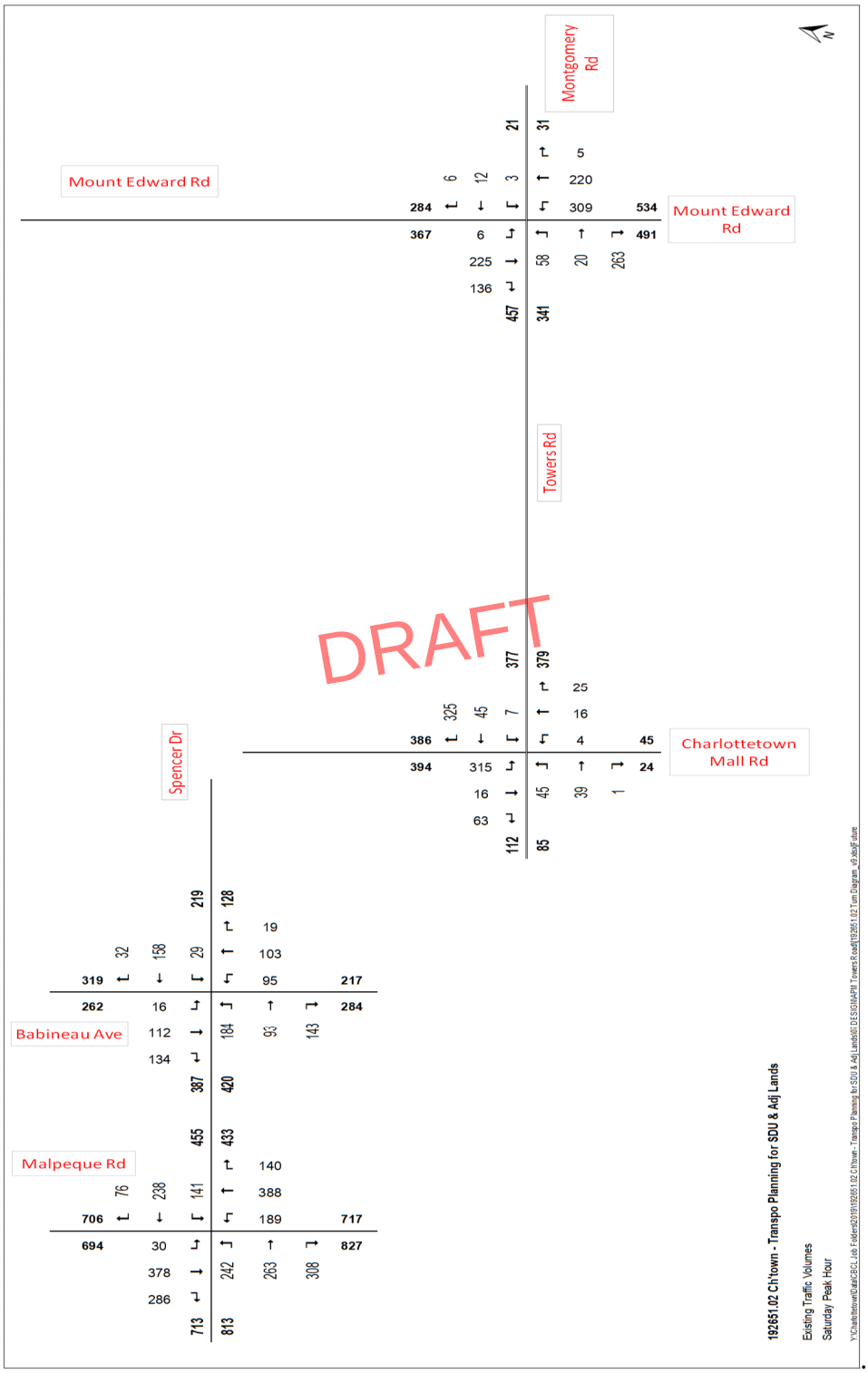

Figure 4: Existing Traffic Volumes (Saturday Peak Hour)

Table 1: Synchro Analysis Results (Existing Conditions)

Intersection	Lane / Movement	AM Peak Hour						PM Peak Hour						Sat Peak Hour					
		Flow Rate (vph)	Capacity (vph)	Average Delay[3] (s)	95th % Q[1] (m)	V/C Ratio[2]	LOS[4]	Flow Rate (vph)	Capacity (vph)	Average Delay[3] (s)	95th % Q[1] (m)	V/C Ratio[2]	LOS[4]	Flow Rate (vph)	Capacity (vph)	Average Delay[3] (s)	95th % Q[1] (m)	V/C Ratio[2]	LOS[4]
101: University Ave/Malpeque Rd & Spencer Dr	EBL	170	406	25.3	35	0.56	C	212	318	49.0	54	0.84	D	242	333	40.9	71	0.89	C
	EBT	148	351	28.2	37	0.46	C	201	349	35.7	55	0.53	D	263	370	37.6	73	0.79	D
	EBR	576	298	1.0	0	0.43	A	251	297	0.3	0	0.19	A	308	315	0.0	0	-	A
	WBL	18	305	17.1	5	0.08	B	75	329	21.5	18	0.26	C	141	312	24.7	32	0.50	C
	WBT	93	225	30.4	26	0.36	C	220	327	42.9	61	0.70	D	238	365	34.4	66	0.72	C
	WBR	13	192	0.2	0	0.04	A	56	278	3.3	0	0.20	A	76	310	0.0	6	-	A
	NBL	104	256	34.2	32	0.42	C	342	478	46.0	109	0.81	D	189	429	27.4	52	0.49	C
	NBTR	200	527	30.1	28	0.48	C	615	971	39.3	93	0.85	D	528	861	31.4	68	0.68	C
	SBL	13	618	20.2	6	0.03	C	33	431	27.2	12	0.08	C	30	442	23.5	12	0.08	C
	SBT	525	649	43.6	167	0.89	D	339	453	55.6	110	0.89	E	378	462	50.5	129	0.91	D
	SBR	234	552	4.9	16	0.4	A	198	385	6.7	17	0.39	A	286	394	40.2	20	0.81	D
102: Charlottetown Mall Rd/Babineau Ave & Spencer Dr	EBLTR	181	843	9.1	8	0.29	A	346	600	21.2	36	0.68	C	420	574	31.9	56	0.81	D
	WBLTR	21	723	8.2	1	0.05	A	69	509	11.6	5	0.18	B	219	523	15.8	16	0.47	C
	NBLTR	138	750	9.2	6	0.23	A	340	582	20.3	32	0.65	C	217	504	16.6	17	0.48	C
	SBLTR	75	780	8.3	3	0.12	A	217	603	14.4	17	0.48	B	262	539	17.4	21	0.54	C
104: Charlottetown Mall Rd/New Public Rd & Towers Road	EBLTR	11	661	8.6	1	0.02	A	68	569	10.7	4	0.18	B	85	486	10.5	1	0.19	B
	WBLTR	356	844	12.4	23	0.55	B	443	719	20.4	43	0.73	C	377	607	20.9	36	0.69	C
	NBL	0	0	-	0	-	A	0	0	9.6	0	0.00	A	4	447	10.8	0	0.01	B
	NBTR	20	615	8.9	1	0.05	A	34	537	10.0	2	0.08	A	41	507	10.5	2	0.09	B
	SBL	180	582	12.4	11	0.36	B	298	532	20.8	30	0.64	C	315	522	22.7	33	0.67	C
	SBTR	26	664	8.5	1	0.07	A	38	612	9.3	2	0.11	A	79	612	9.6	3	0.14	A
106: Mt Edward Rd & Towers Road /Montgomery Dr	EBL	19	424	18.6	5	0.11	B	71	390	20.3	14	0.33	C	58	428	14.3	13	0.15	B
	EBTR	170	342	8.0	0	0.49	A	288	451	8.4	3	0.58	A	283	438	18.8	17	0.72	B
	WBLTR	38	294	18.5	11	0.24	B	17	571	15.9	4	0.12	B	21	530	13.2	6	0.04	B
	NBL	253	447	22.4	29	0.64	C	325	494	11.7	35	0.63	B	309	537	11.6	27	0.64	B
	NBTR	225	972	6.3	24	0.61	A	461	872	9.2	65	0.45	A	225	861	8.4	29	0.29	A
	SBL	4	618	3.5	1	0.55	A	6	416	5.0	1	0.02	A	6	514	11.4	1	0.01	B
	SBTR	557	759	20.0	93	0.43	B	395	584	22.4	62	0.75	C	361	546	18.0	52	0.73	B

Notes:
Analysis by CBCL Limited using Synchro 10.0
1. 95% Queue - 95th percentile queue [highlighted if >100m or if available storage is exceeded]
2. V/C Ratio - Volume-to-Capacity ratio [highlighted if >0.90]
3. Average Delay - average total delay per vehicle [highlighted for LOS E or F]
4. LOS - Level of Service [highlighted for LOS E or F]

2025 No-Build Conditions

The projected background traffic volumes in 2025 without the development have been calculated assuming an annual 1% background traffic growth. The trips have been redistributed through the study area to consider connecting Spencer Drive to Towers Road through "New Public Road" and the extension of Spencer Drive to Mount Edward Road. The trip redistribution is based on the following assumptions:

- All trips between the Mall and Towers Road would no longer traverse the parking lot adjacent the Cineplex Cinema, but would instead route via Spencer Road;
- 60% of trips crossing the Confederation Trail would route via the Spencer Drive extension to Mt. Edward Road, and 40% would route via Towers Road.

Initial analysis indicated that the intersection of Spencer Drive with Mt. Edward Road would need to be signalized to accommodate any significant traffic volume, as shown in Figure 5. The northbound approach would also require a left-turn lane to keep the relatively-significant left turning volume separate from the through movement. This assumption was carried throughout all future 2025 analysis.

Based on these assumptions, the weekday AM, PM and Saturday peak hour volumes under future no-build conditions are illustrated in Figures 6, 7 and 8, respectively.

Traffic Analysis (2025 No-Build Conditions)

The estimated future no-build traffic volumes were analysed to assess the impact of these volumes on the intersections and traffic movements within the study area as shown in Table 2. The corresponding Synchro reports are provided for reference in Appendix A.

Under the future No-Build scenario, the movements currently experiencing some capacity constraint are anticipated to experience deteriorated levels of service as more vehicles route through Spencer Drive.

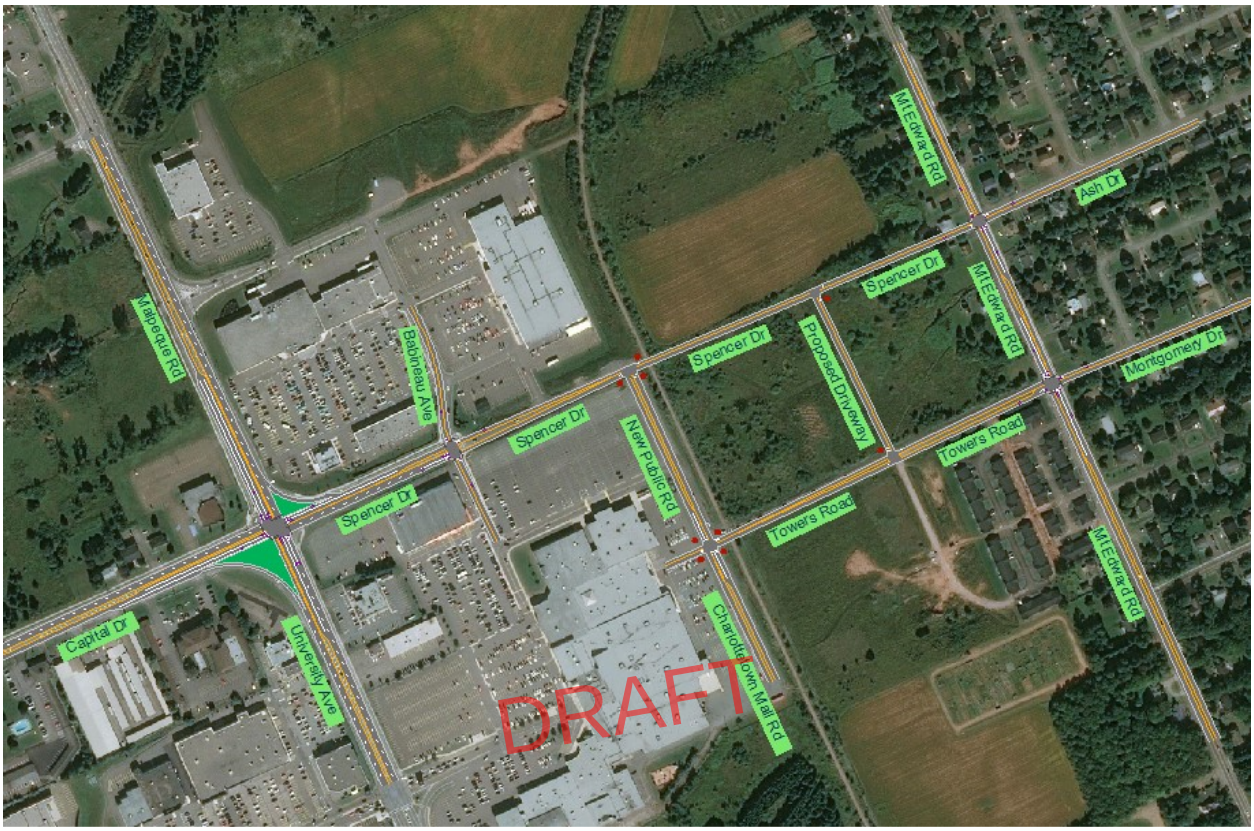

Figure 5: Synchro Model

During the weekday AM peak hour, the southbound-through movement at the University Ave/Malpeque Rd & Spencer Dr intersection is expected to reach its theoretical capacity. Delays will approach a minute and queues may occasionally extend beyond the turn's storage capacity. Some degradation would also be observed at the Towers Rd and Mt. Edward Rd intersection on both the northbound-through-right and the southbound-through-right movements, although these movements will still operate with good levels of service.

During the weekday PM peak hour, significant degradation in levels of service would be expected on the northbound approaches to the University Ave/Malpeque Rd & Spencer Dr. intersection. Delays would be expected to extend beyond a minute as both the northbound-left turn and the shared northbound-through-right movements would approach capacity. Additionally, the Charlottetown Mall Rd/Spencer Dr & Babineau Ave intersection would experience significant capacity constraint on both the eastbound and

westbound approaches, as these movements would reach capacity. Under such conditions, delays may extend up to 2 minutes.

Similar conditions would also persist at the Charlottetown Mall Rd/Spencer Dr & Babineau Ave intersection during the Saturday peak hour.

Table 2: Synchro Analysis Results (2025 No-Build Conditions)

Intersection	Lane / Movement	AM Peak Hour						PM Peak Hour						Sat Peak Hour					
		Flow Rate (vph)	Capacity (vph)	Average Delay[3] (s)	95th % Q[1] (m)	V/C Ratio[2]	LOS[4]	Flow Rate (vph)	Capacity (vph)	Average Delay[3] (s)	95th % Q[1] (m)	V/C Ratio[2]	LOS[4]	Flow Rate (vph)	Capacity (vph)	Average Delay[3] (s)	95th % Q[1] (m)	V/C Ratio[2]	LOS[4]
101: University Ave/Malpeque Rd & Spencer Dr	EBL	179	361	22.1	38	0.55	C	223	296	46.3	66	0.84	D	254	335	46.5	65	0.84	D
	EBT	222	425	26.2	58	0.58	C	292	408	39.8	87	0.80	D	342	426	52.5	111	0.89	D
	WBL	44	346	21.0	12	0.14	C	102	297	24.3	24	0.38	C	155	273	29.3	38	0.63	C
	WBT	228	348	30.6	60	0.73	C	298	396	43.4	90	0.84	D	263	426	35.3	73	0.69	D
	NBL	109	241	30.7	34	0.50	C	359	414	62.0	128	0.96	E	199	390	32.5	57	0.57	C
	NBTR	219	495	30.6	31	0.49	C	693	836	61.9	121	0.92	E	590	777	49.1	89	0.84	D
	SBL	20	577	16.7	8	0.04	B	49	452	24.5	16	0.12	C	40	466	24.7	14	0.09	C
	SBT	532	606	54.4	176	0.98	D	356	474	40.7	108	>1.00	D	397	489	50.6	126	0.90	D
	SBR	246	515	21.0	17	0.53	C	208	403	29.3	16	0.57	C	301	416	40.9	19	0.80	D
102: Charlottetown Mall Rd/Babineau Ave & Spencer Dr (AWSC)	EBLTR	272	722	11.6	14	0.42	B	505	466	>120	139	>1.00	F	564	495	>120	162	>1.00	F
	WBLTR	360	744	13.5	22	0.54	B	452	462	82.0	98	>1.00	F	478	483	78.0	98	>1.00	F
	NBLTR	78	601	10.0	3	0.14	A	190	378	22.4	19	0.56	C	121	374	17.4	9	0.36	C
	SBLTR	110	620	10.3	5	0.20	B	284	417	30.1	36	0.76	D	301	438	29.2	37	0.76	D
103: New Public Rd & Spencer Dr	EBTR	217	823	9.1	8	0.29	A	359	465	12.4	19	0.51	B	414	752	14.9	27	0.60	B
	WBLT	205	773	9.5	8	0.29	A	242	632	11.9	11	0.36	B	248	677	11.8	13	0.40	B
	NBLR	155	696	9.8	6	0.24	A	210	705	11.2	12	0.37	B	230	610	13.0	13	0.41	B
104: Charlottetown Mall Rd/New Public Rd & Towers Road	EBLTR	11	792	7.6	0	0.02	A	73	730	8.6	3	0.11	A	89	703	9.0	3	0.14	A
	WBLTR	170	939	7.8	3	0.20	A	225	850	9.0	8	0.29	A	232	817	9.4	9	0.32	A
	NBL	0	0	7.8	0	-	A	0	0	8.3	0	-	A	4	578	9.0	0	0.01	A
	NBTR	21	738	7.7	1	0.03	A	36	596	8.2	1	0.07	A	43	681	8.4	1	0.07	A
	SBL	76	658	9.0	3	0.13	A	128	617	10.3	6	0.23	B	132	604	10.6	6	0.24	B
	SBTR	28	765	7.6	1	0.04	A	40	731	7.9	1	0.06	A	83	735	8.3	3	0.13	A
105: Mt Edward Rd & Spencer Dr/Ash Dr (Signalized + NBL)	EBLTR	113	182	25.0	17	0.67	C	191	281	30.7	38	0.74	C	199	334	42.5	42	0.65	D
	WBLTR	82	131	27.7	24	0.68	C	36	70	38.8	14	0.56	D	44	353	30.4	14	0.14	C
	NBL	138	531	7.2	27	0.28	A	184	602	9.5	37	0.33	A	177	401	26.5	47	0.48	C
	NBLTR	287	999	6.4	41	0.31	A	544	1104	10.0	94	0.54	B	297	833	17.8	56	0.39	B
	SBLTR	574	1063	8.4	97	0.59	A	470	1140	9.0	77	0.45	A	431	857	20.8	86	0.55	C
106: Mt Edward Rd & Towers Road /Montgomery Dr	EBL	9	408	15.5	10	0.02	B	37	408	15.5	10	0.10	B	34	432	14.7	9	0.09	B
	EBTR	81	278	18.8	13	0.32	B	150	278	18.8	13	0.60	B	165	302	18.0	14	0.61	B
	WBLTR	41	380	15.2	5	0.12	B	18	380	15.2	5	0.05	B	22	402	14.5	5	0.06	B
	NBL	111	484	7.1	9	0.25	A	137	484	7.1	9	0.31	A	130	491	7.1	9	0.29	A
	NBTR	402	962	13.0	121	0.46	A	689	963	13.0	121	0.79	B	431	926	7.8	52	0.52	A
	SBL	7	333	7.9	2	0.02	A	18	333	7.9	2	0.06	A	18	505	6.8	2	0.04	A
	SBTR	661	808	12.1	67	0.91	B	528	808	12.1	67	0.73	B	487	770	11.7	60	0.70	B
107: Spencer Dr & Proposed	WBLT	205	1464	0.0	0	-	A	242	1363	0.0	0	-	A	248	1354	0.0	0	-	A
108: Towers Dr & Proposed	EBLT	90	1390	0.0	0	-	A	187	1321	0.0	0	-	A	199	1313	0.0	0	-	A

Notes:
Analysis by CBCL Limited using Synchro 10.0
1. 95% Queue - 95th percentile queue [highlighted if >100m or if available storage is exceeded]
2. V/C Ratio - Volume-to-Capacity ratio [highlighted if >0.90]
3. Average Delay - average total delay per vehicle [highlighted for LOS E or F]
4. LOS - Level of Service [highlighted for LOS E or F]

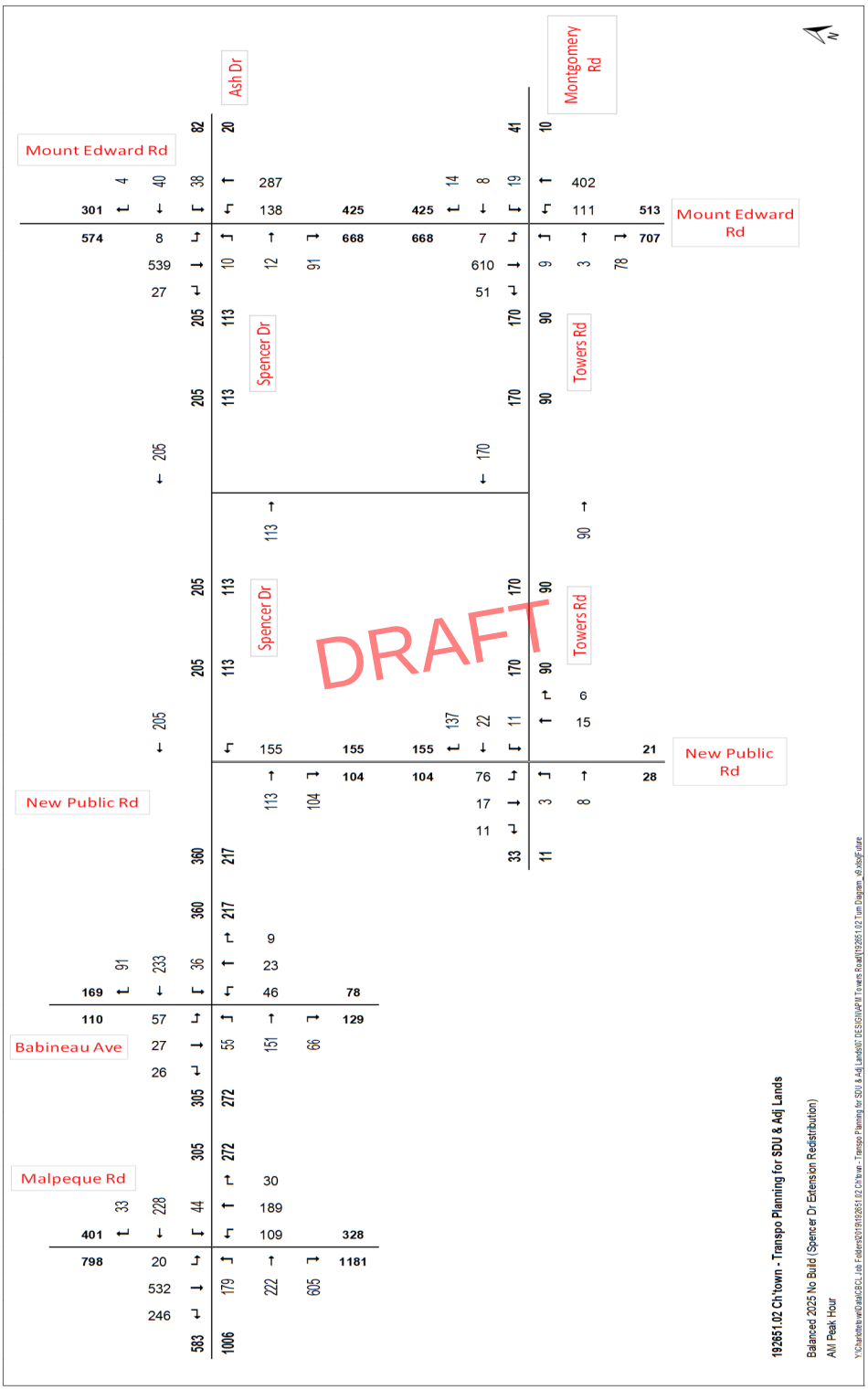

Figure 6: 2025 No-Build Traffic Volumes (AM Peak Hour)

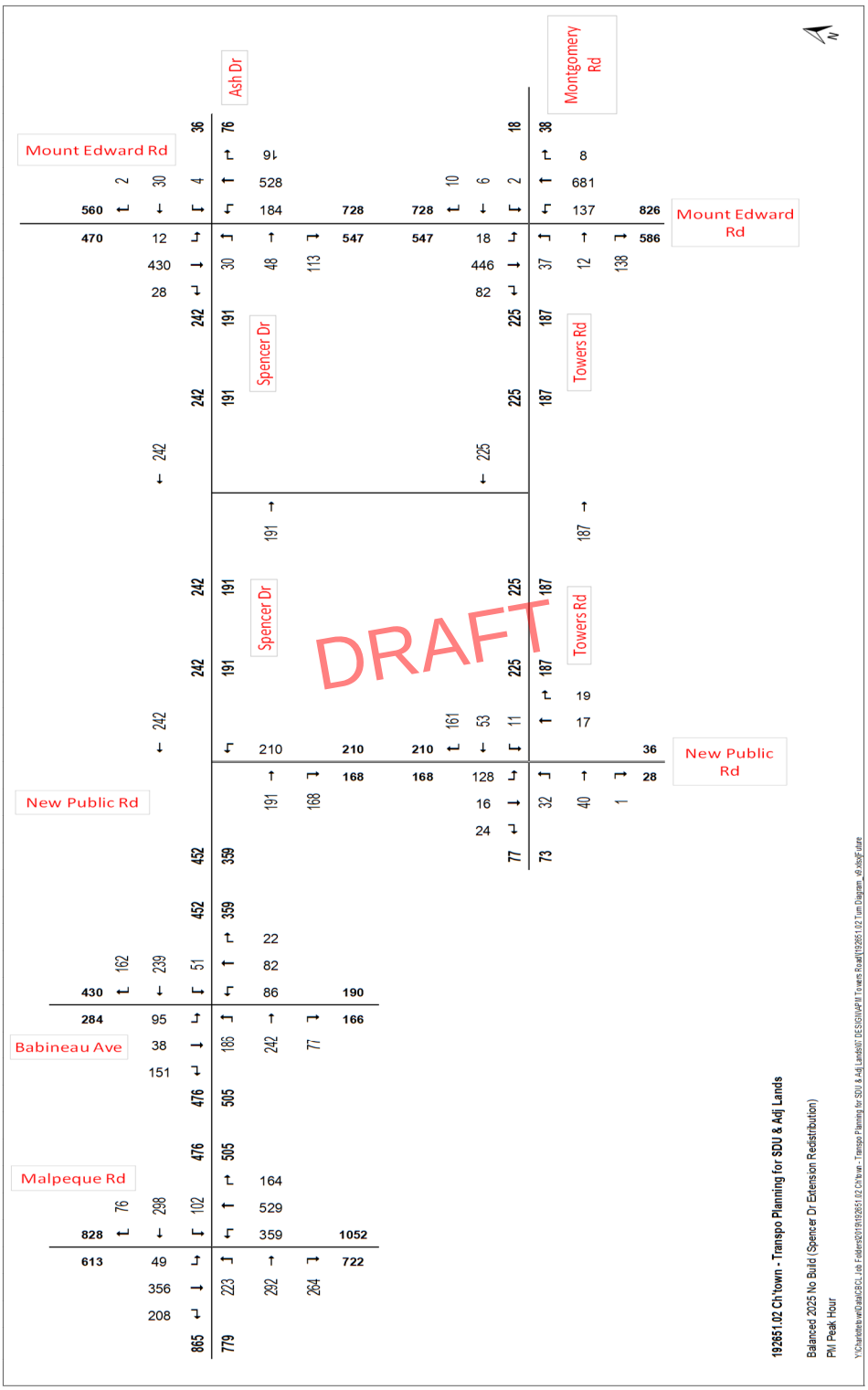

Figure 7: 2025 No-Build Traffic Volumes (PM Peak Hour)

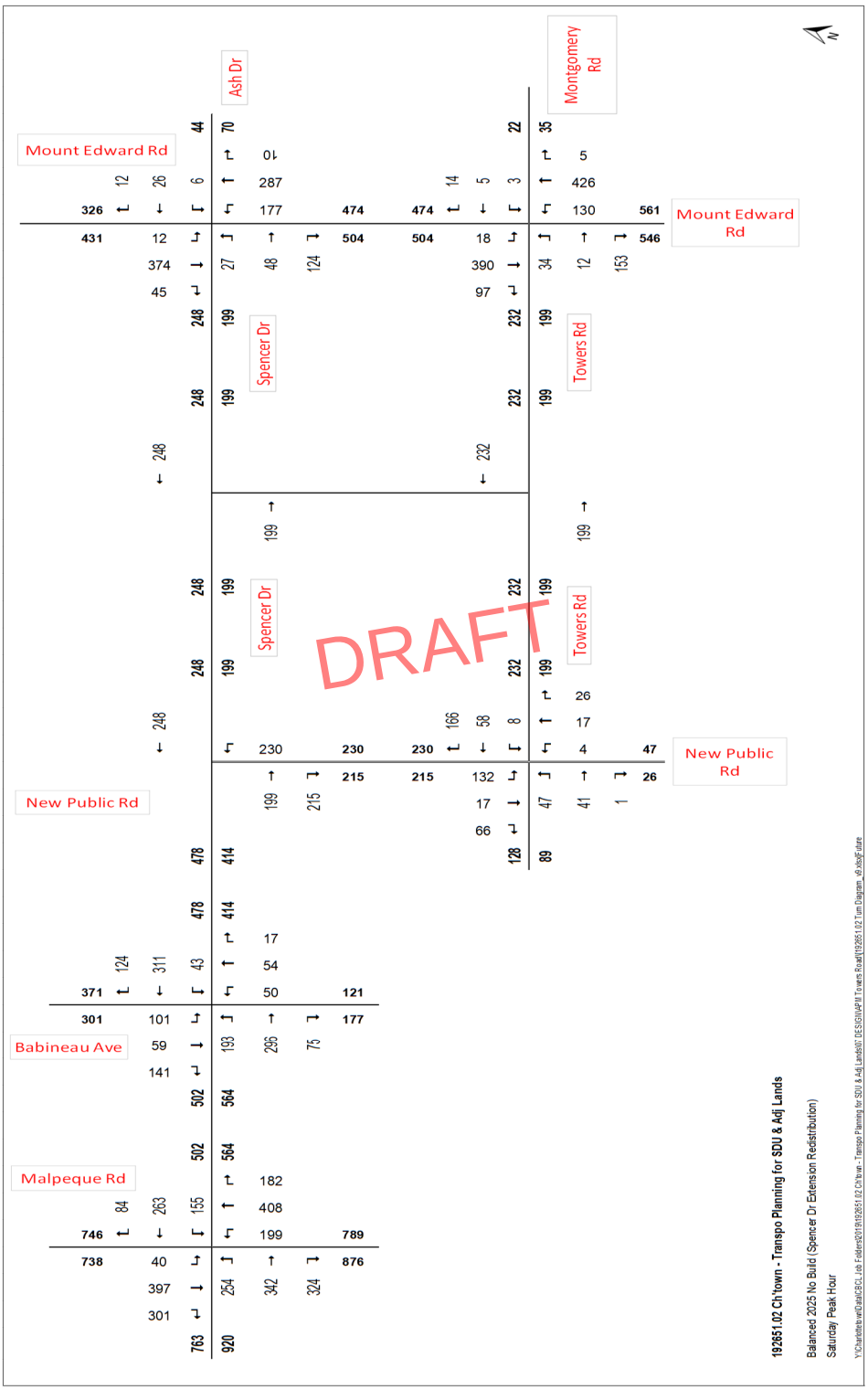

Figure 8: 2025 No-Build Traffic Volumes (Saturday Peak Hour)

▶ 2025 Total Conditions

The future total analysis under full buildout conditions carried out by exp. was updated to reflect the new distribution assumptions with the extension of Spencer Drive to Mt. Edward Road. The analysis was complemented with the Saturday peak hour, and site trip generation was estimated using the trip generation rates published in the 10th edition of the (ITE) Trip Generation Manual.

Trip assignment for the weekday AM and PM peak hours followed the exp. trip distribution. with an adjustment to consider the extension of Spencer Road to Mount Edward Road. The Saturday peak hour trips were assigned according to the existing traffic pattern for the same time and with the same adjustment applied on the AM and PM peak hour volumes.

Figures 9, 10 and 11 illustrate the percentages of traffic distribution of the peak hours. The resulting assignment of the new trips associated with the proposed development are shown in figures 12, 13 and 14. Figures 15 to 17 illustrate the traffic volumes under the future total conditions.

Traffic Analysis (2025 Total Conditions)

The intersection capacity analysis of future total conditions suggests that, while the trips associated with the proposed development will not cause any issues on their own, they may exacerbate conditions on some movements where residual capacity is limited, particularly at the University Ave/Malpeque Rd & Spencer Dr intersection, and at the Spencer Dr & Babineau Avenue intersection. As sumamrized in Table 3, these conditions are expected to be particularly acute during the weekday PM and the Saturday peak hours, when northbound and east-west movements, respectively, would already be approaching capacity.

The analysis does demonstrate that under future total conditions, the site intersections on Towers Road and on Spencer Drive would operate with very good levels of service, with no significant delays or queuing. This is due to the overall good levels of service observed on both Mt. Edward Road and on the new public road on the west side of the confederation trail. As no capacity issues would be expected at these intersections, there should be no incentive for significant cut-through traffic through the proposed development.

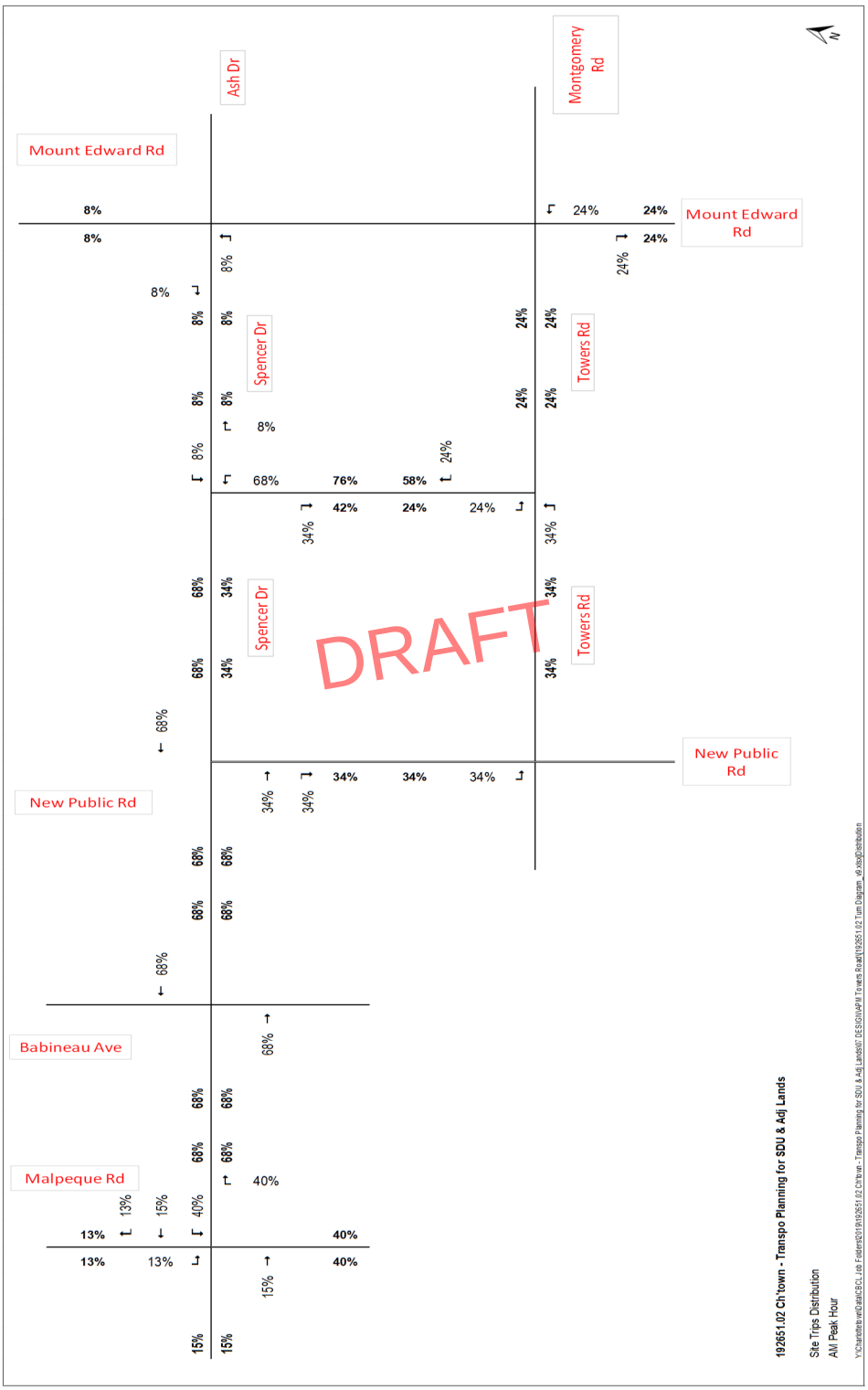

Figure 9: Site Trips Distribution (AM Peak Hour)

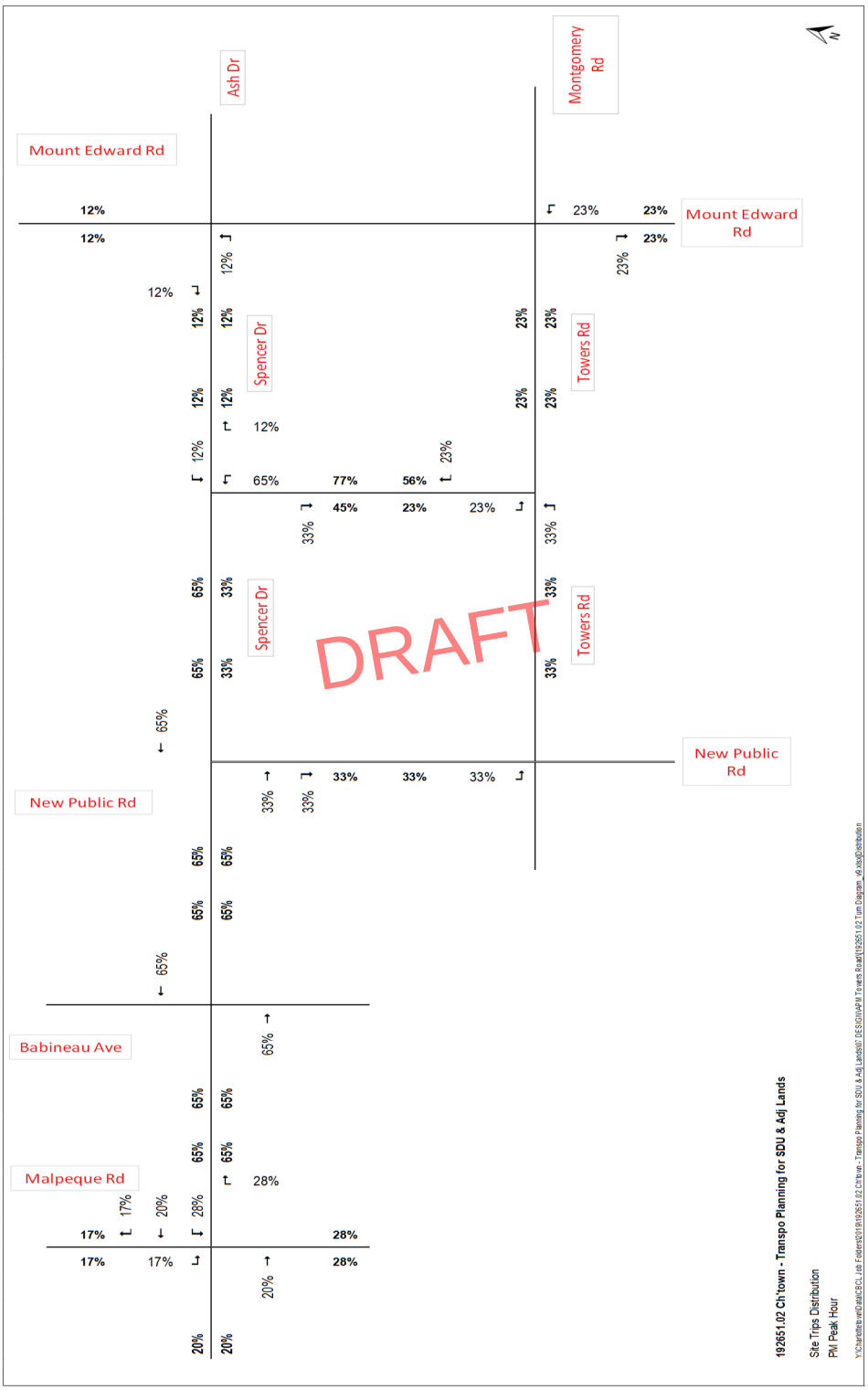

Figure 10: Site Trips Distribution (PM Peak Hour)

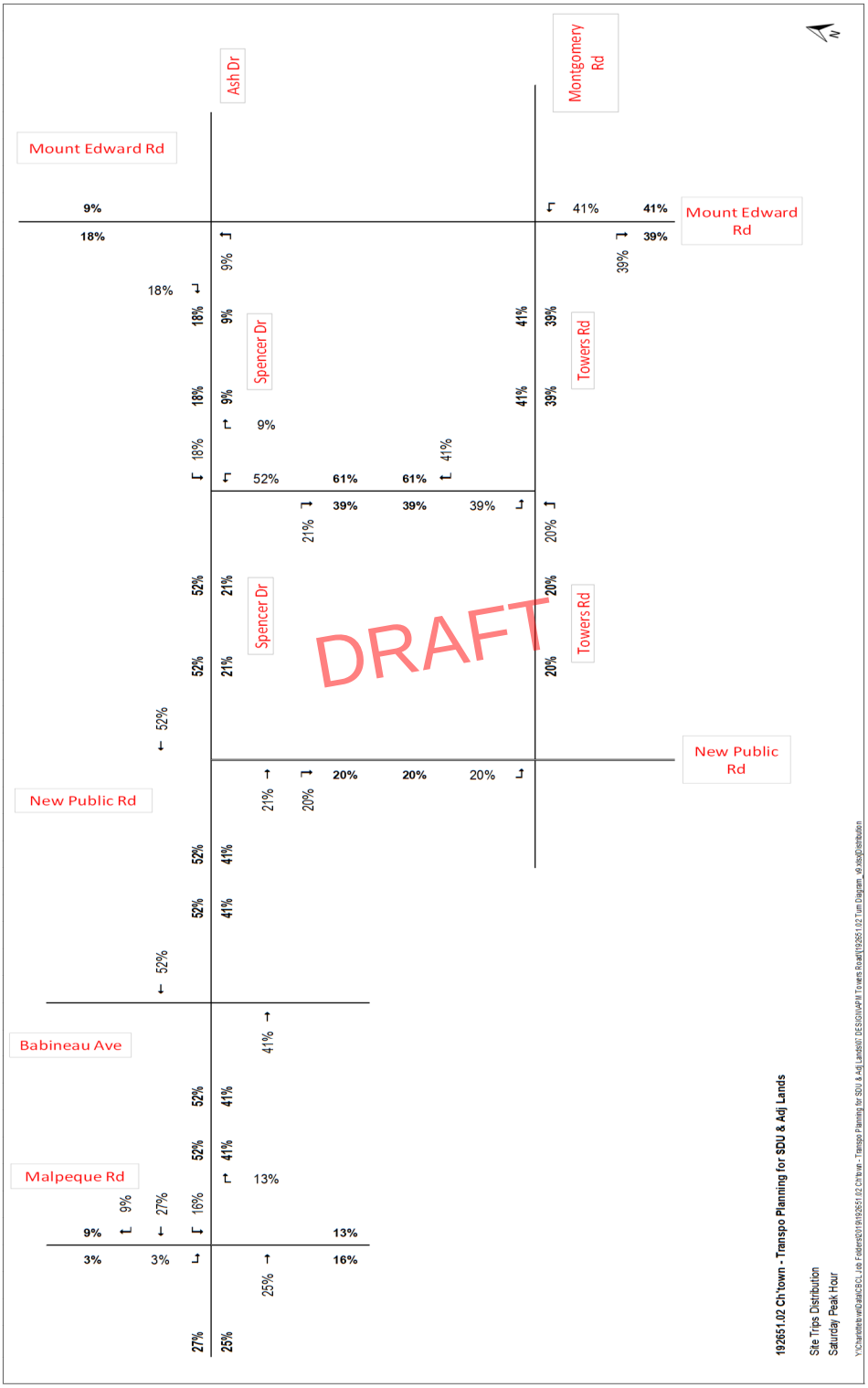

Figure 11: Site Trips Distribution (Saturday Peak Hour)

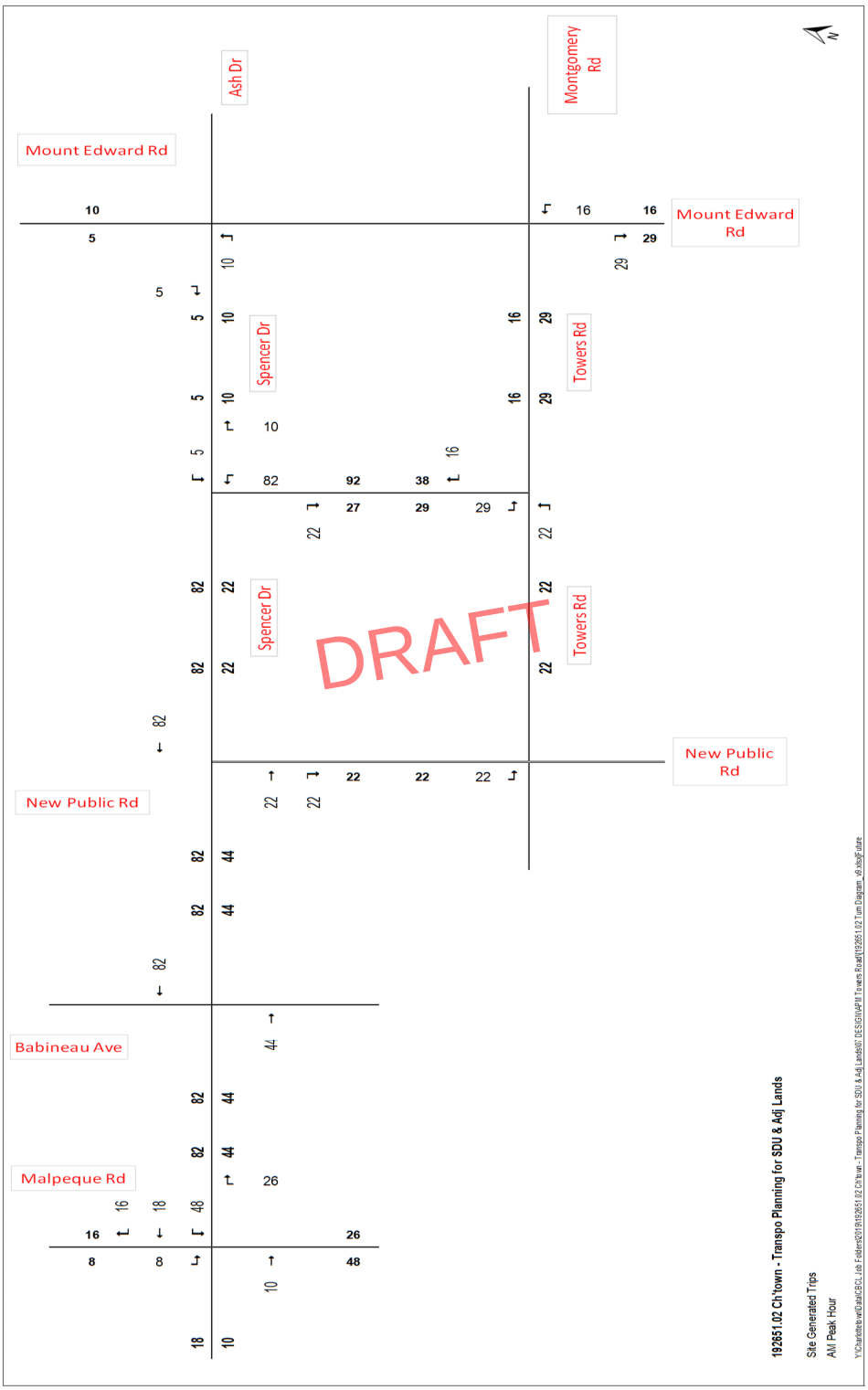

Figure 12: Site Generated Trips (AM Peak Hour)

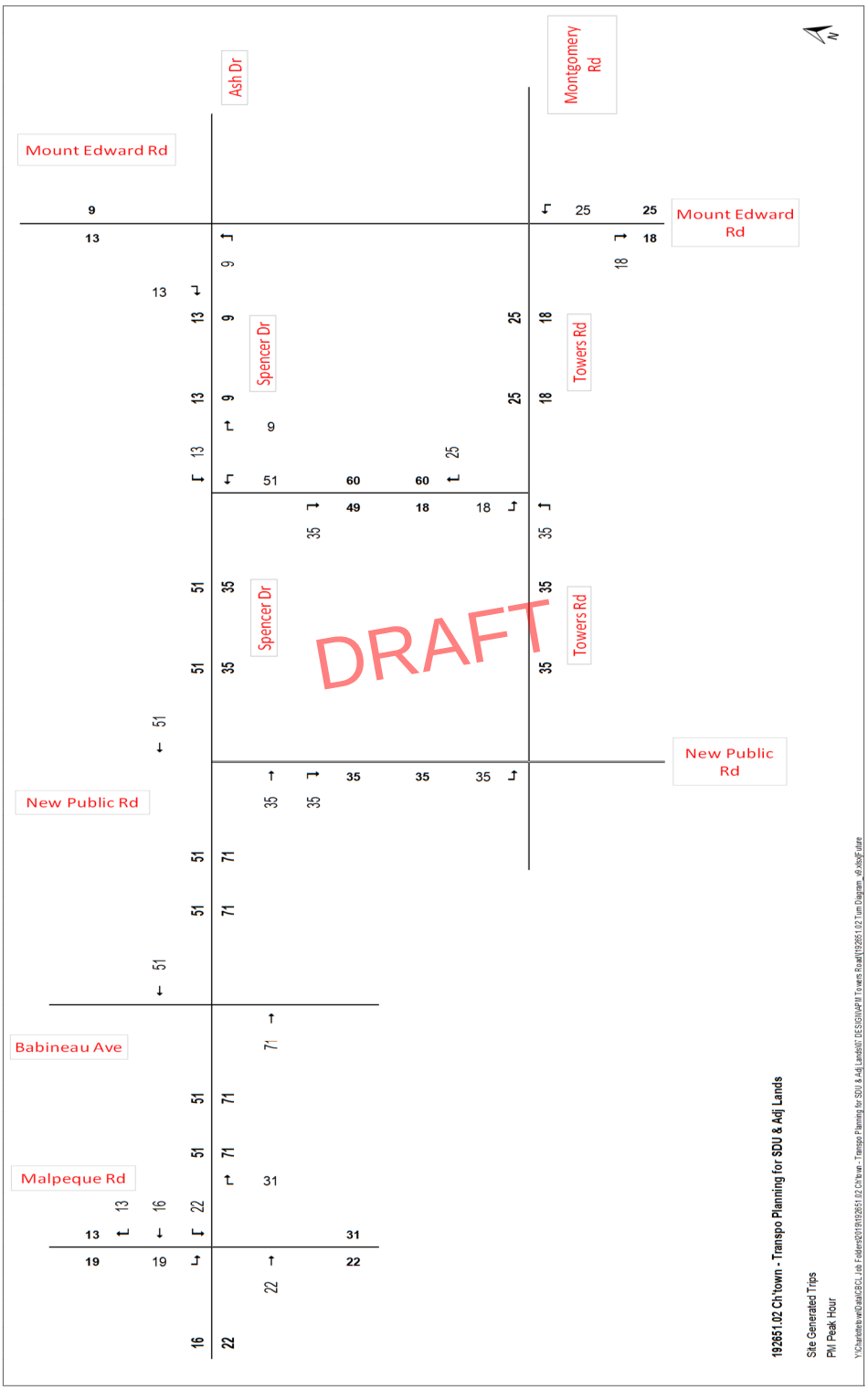

Figure 13: Site Generated Trips (PM Peak Hour)

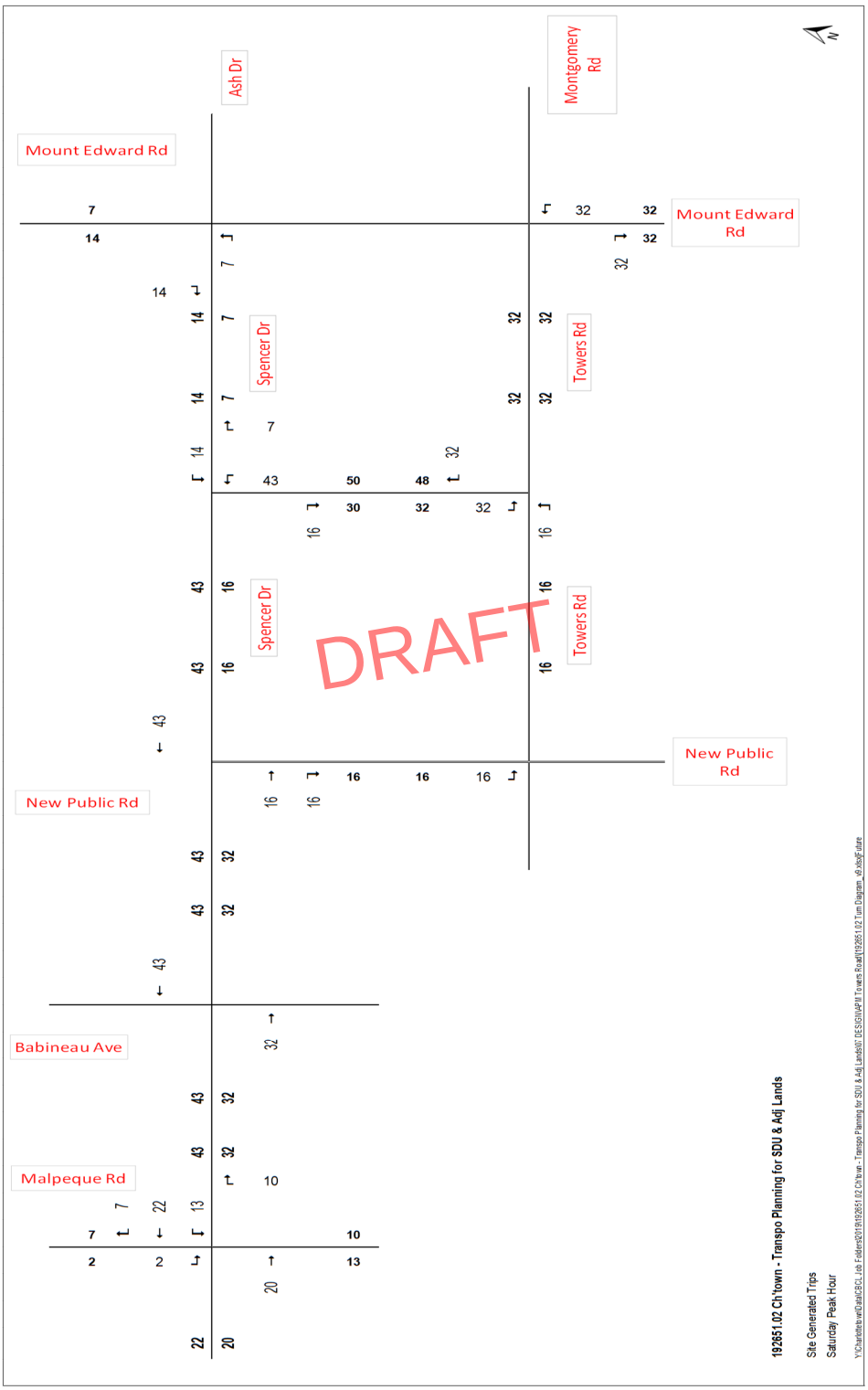

Figure 14: Site Generated Trips (Saturday Peak Hour)

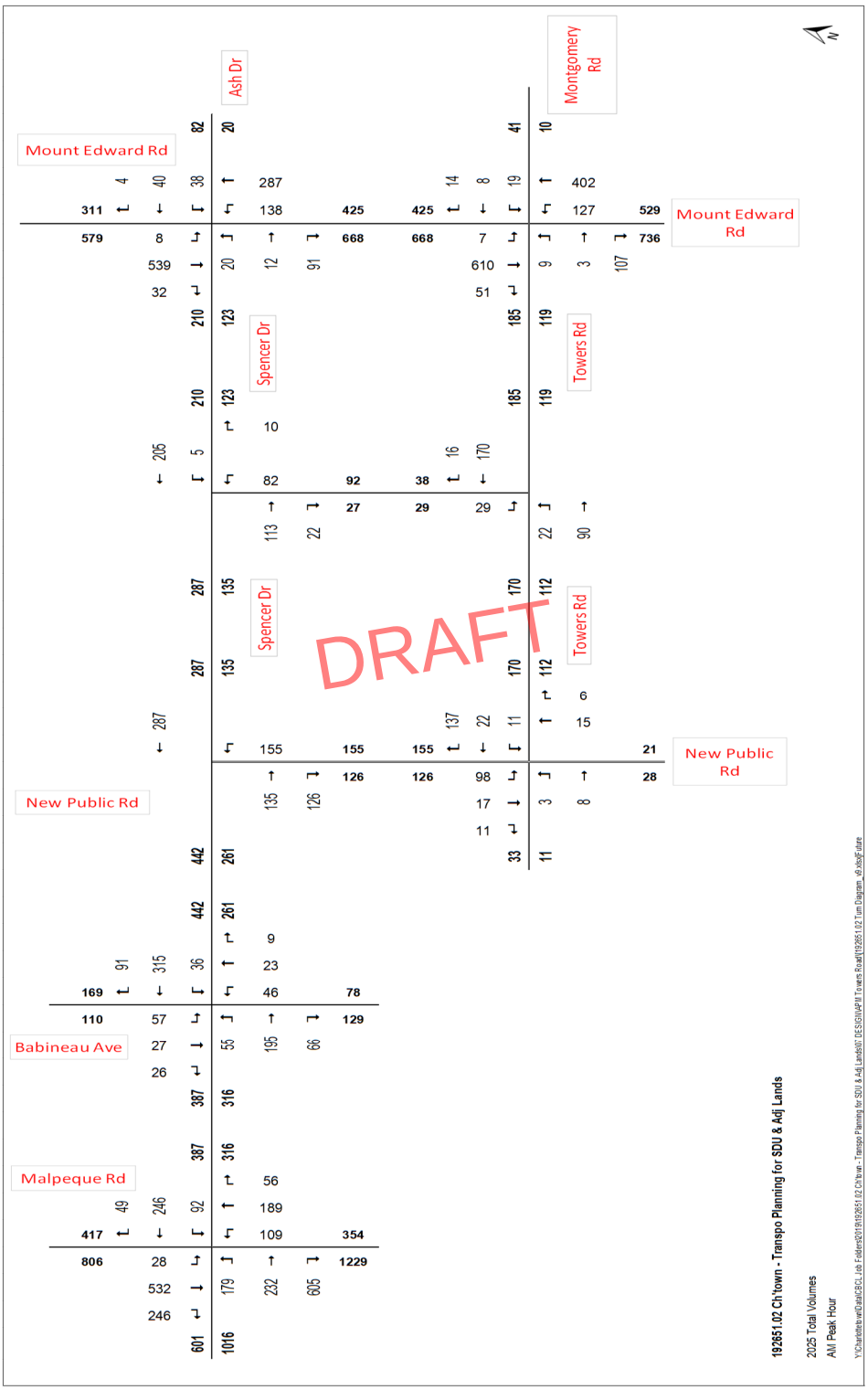

Figure 15: 2025 Total Traffic Volumes (AM Peak Hour)

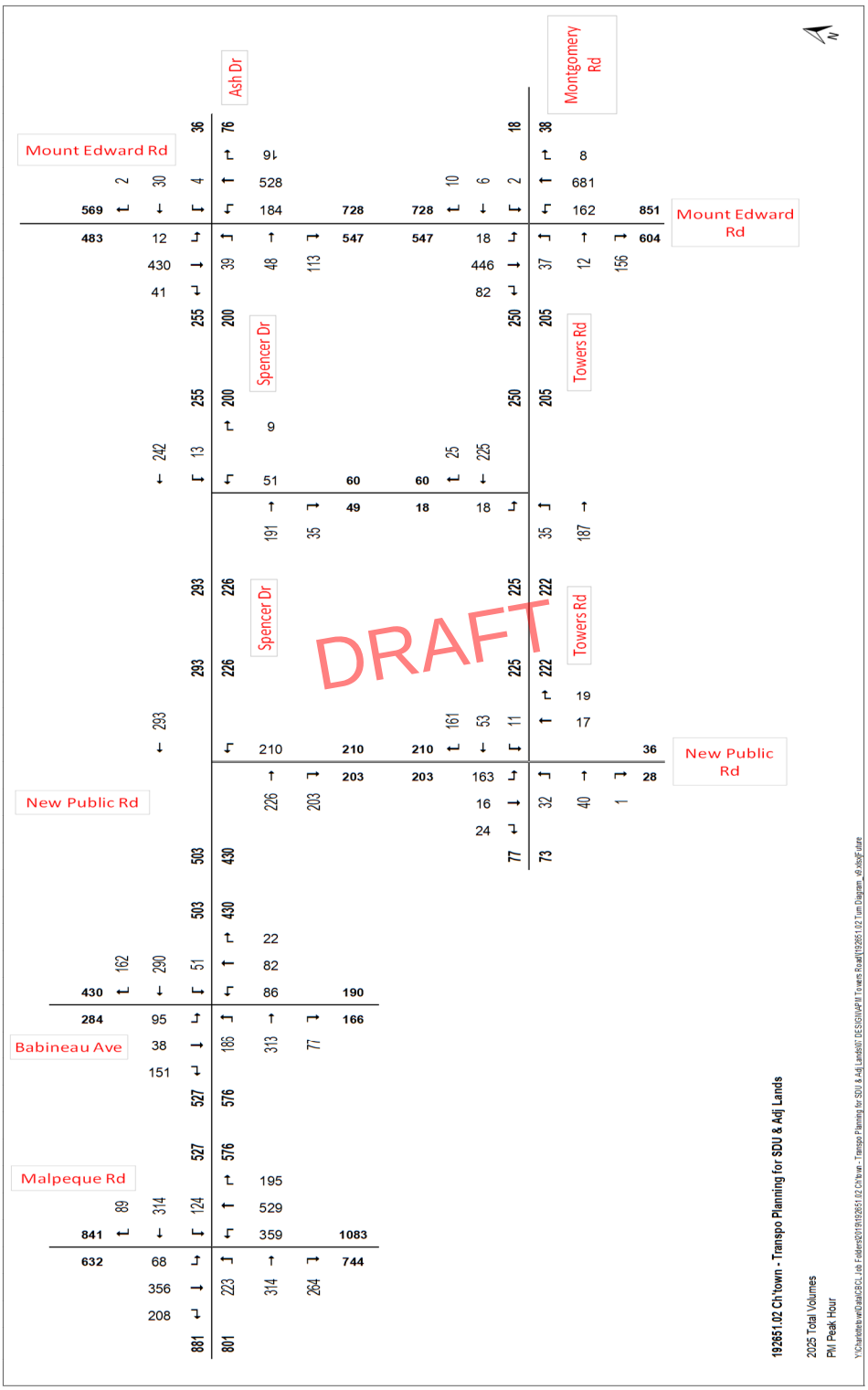

Figure 16: 2025 Total Traffic Volumes (PM Peak Hour)

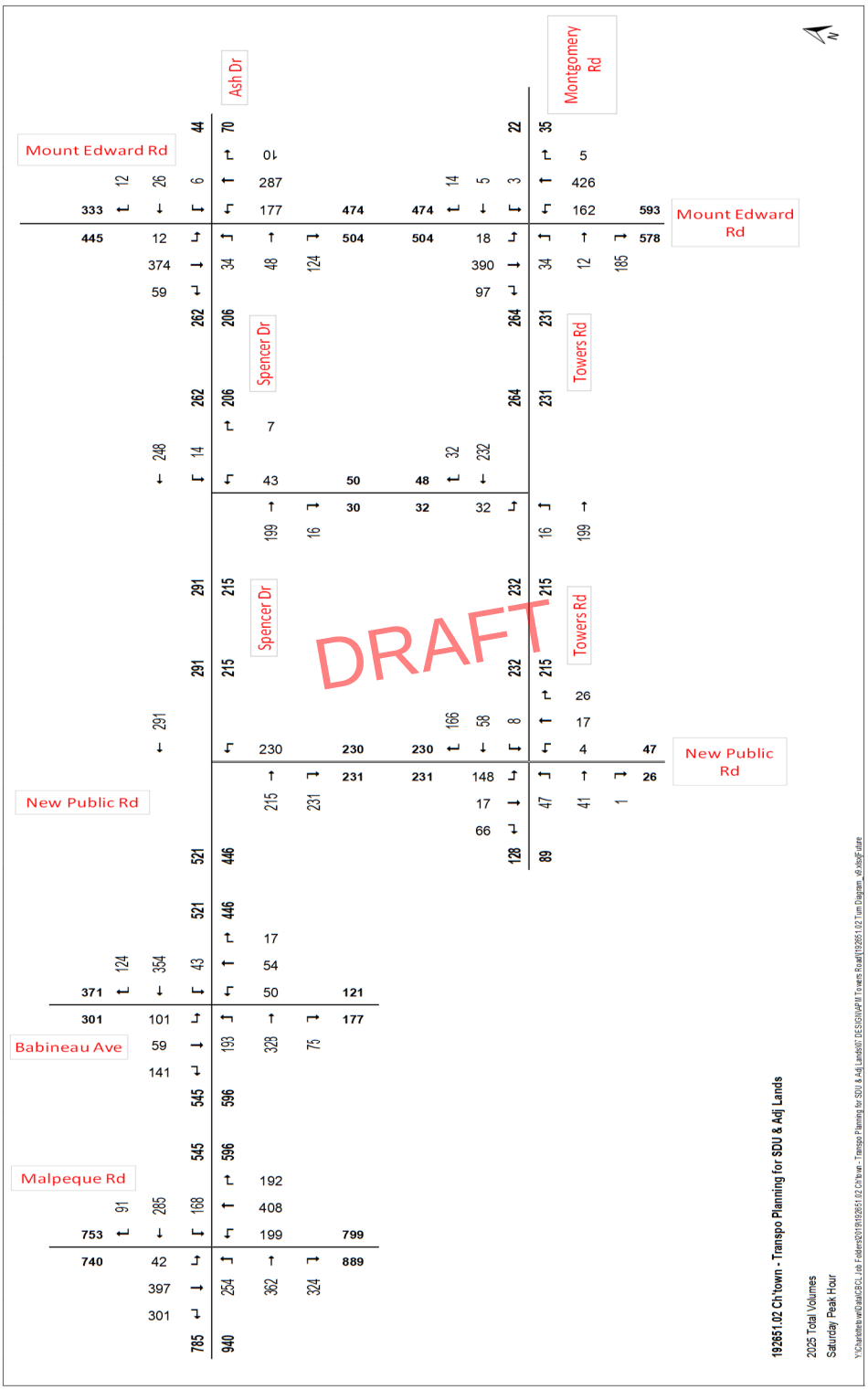

Figure 17: 2025 Total Traffic Volumes (Saturday Peak Hour)

Table 3: Synchro Analysis Results (2025 Total Conditions)

Intersection	Lane / Movement	AM Peak Hour						PM Peak Hour						Sat Peak Hour					
		Flow Rate (vph)	Capacity (vph)	Average Delay[3] (s)	95th % Q[1] (m)	V/C Ratio[2]	LOS[4]	Flow Rate (vph)	Capacity (vph)	Average Delay[3] (s)	95th % Q[1] (m)	V/C Ratio[2]	LOS[4]	Flow Rate (vph)	Capacity (vph)	Average Delay[3] (s)	95th % Q[1] (m)	V/C Ratio[2]	LOS[4]
101: University Ave/Malpeque Rd & Spencer Dr	EBL	179	350	23.4	38	0.57	C	223	289	49.5	70	0.86	D	254	322	52.4	71	0.88	D
	EBT	232	389	29.0	61	0.66	C	314	415	44.5	98	0.84	D	362	436	58.0	120	0.92	E
	WBL	92	355	20.9	21	0.29	C	124	287	25.1	29	0.48	C	168	263	33.8	46	0.71	C
	WBT	246	365	31.8	64	0.75	C	314	409	45.9	98	0.85	D	285	436	37.4	84	0.73	D
	NBL	109	258	30.5	34	0.47	C	359	410	70.2	128	0.97	E	199	389	32.9	57	0.57	C
	NBTR	245	523	31.2	32	0.52	C	727	822	73.3	128	0.98	E	600	773	52.3	91	0.86	D
	SBL	28	562	17.8	10	0.06	B	68	450	25.2	21	0.17	C	42	463	25.1	14	0.10	C
	SBT	532	590	63.1	176	1.00	F	356	472	41.6	108	0.84	D	397	486	52.4	126	0.91	D
	SBR	246	501	22.3	17	0.5	C	208	402	29.7	16	0.58	C	301	413	42.0	19	0.81	D
102: Charlottetown Mall Rd/Babineau Ave & Spencer Dr (AWSC)	EBLTR	316	695	13.5	19	0.51	B	576	454	>120	187	>1.00	F	596	490	>120	186	>1.00	F
	WBLTR	442	722	18.1	36	0.68	C	503	447	>120	126	>1.00	F	521	480	110.9	125	>1.00	F
	NBLTR	78	562	10.6	3	0.16	B	190	355	23.9	19	0.59	C	121	359	17.9	9	0.37	C
	SBLTR	110	578	10.9	5	0.21	B	284	391	32.2	36	0.81	D	301	425	29.9	36	0.79	D
103: New Public Rd & Spencer Dr	EBTR	261	800	10.0	11	0.36	A	429	746	15.7	29	0.63	C	446	737	17.0	34	0.66	C
	WBLT	287	758	11.0	13	0.41	B	293	682	12.9	17	0.47	B	291	667	13.2	17	0.47	B
	NBLR	155	654	10.4	7	0.26	B	210	596	12.8	12	0.38	B	230	590	13.6	14	0.42	B
104: Charlottetown Mall Rd/New Public Rd & Towers Road	EBLTR	11	779	7.7	0	0.02	A	73	711	8.7	3	0.11	A	89	695	9.0	3	0.14	A
	WBLTR	170	922	7.9	5	0.21	A	225	825	9.3	9	0.30	A	232	807	9.5	9	0.32	A
	NBL	0	0	-	0	-	A	0	0	-	0	-	A	4	575	9.0	0	0.01	A
	NBTR	21	733	7.8	1	0.03	A	36	686	8.3	1	0.06	A	43	677	8.4	1	0.07	A
	SBL	98	657	9.3	4	0.17	A	163	616	11.0	8	0.29	B	148	604	10.9	7	0.27	B
	SBTR	28	764	7.6	1	0.04	A	40	728	8.0	1	0.06	A	83	733	8.3	3	0.13	A
105: Mt Edward Rd & Spencer Dr/Ash Dr (Signalized + NBL)	EBLTR	123	190	33.0	19	0.70	C	200	290	30.7	41	0.75	C	206	297	31.2	40	0.75	C
	WBLTR	82	129	36.4	24	0.69	D	36	70	39.0	14	0.56	D	44	77	40.5	15	0.62	D
	NBL	138	537	8.5	27	0.28	A	184	584	10.0	38	0.34	B	177	601	9.8	36	0.32	A
	NBTR	287	1136	6.7	42	0.27	A	544	1097	10.3	96	0.54	B	297	1080	8.0	46	0.30	A
	SBLTR	579	1176	9.4	100	0.54	A	483	1128	9.4	82	0.47	A	445	1108	9.4	74	0.44	A
106: Mt Edward Rd & Towers Road /Montgomery Dr	EBL	9	398	16.6	4	0.03	B	37	424	15.4	10	0.10	B	34	461	14.3	9	0.08	B
	EBTR	110	247	19.4	11	0.49	B	168	301	19.0	14	0.62	B	197	343	18.1	15	0.64	B
	WBLTR	41	318	17.2	9	0.14	B	18	402	15.2	5	0.05	B	22	442	14.2	5	0.06	B
	NBL	127	417	8.4	8	0.34	A	162	473	7.9	11	0.38	A	162	469	8.2	11	0.38	A
	NBTR	402	1051	6.1	45	0.42	A	689	952	14.0	122	0.80	B	431	900	8.6	53	0.53	A
	SBL	7	575	6.0	1	0.01	A	18	321	8.4	2	0.06	A	18	481	7.6	2	0.04	A
	SBTR	661	890	16.0	110	0.83	B	528	794	13.1	68	0.74	B	487	738	13.7	64	0.73	B
107: Spencer Dr & Proposed Driveway	WBLT	210	1435	7.5	0	0.00	A	255	1320	7.8	0	0.01	A	262	1335	7.7	0	0.01	A
	NBLR	92	651	0.2	3	0.15	B	57	533	12.6	3	0.12	B	50	534	12.5	2	0.10	B
108: Towers Dr & Proposed Driveway	EBLT	112	1370	7.7	1	0.02	A	222	1291	7.9	1	0.03	A	215	1275	7.9	0	0.01	A
	SBLR	29	644	10.9	1	0.05	B	18	487	12.7	1	0.04	B	32	508	12.6	1	0.07	B

Notes:
Analysis by CBCL Limited using Synchro 10.0
1. 95% Queue - 95th percentile queue [highlighted if >100m or if available storage is exceeded]
2. V/C Ratio - Volume-to-Capacity ratio [highlighted if >0.90]
3. Average Delay - average total delay per vehicle [highlighted for LOS E or F]
4. LOS - Level of Service [highlighted for LOS E or F]

Traffic Analysis (2025 Total Conditions + 10% E-W Growth)

Our initial scope of work included a sensitivity analysis to assess the implications on the study area road network of additional traffic routing via Spencer Drive to cross the confederation trail. While we initially investigated up to a 50% growth in such traffic, it was observed that this flow is already severely constrained by conditions at the University Ave / Malpeque Rd & Spencer Drive intersection, where both the northbound and southbound approaches are already operating close to or at capacity. The sensitivity analyses were therefore limited to a more modest 10% growth in east-west volumes, considering that no additional growth would be realized beyond that threshold, and that other trips currently routing around the study area would continue doing so.

As expected, the intersection capacity analysis, summarized in Table 4, demonstrates that all movements currently experiencing capacity constraint would deteriorate significantly. Additionally, the analysis indicates that during the Saturday peak hour, the eastbound movements at the Malpeque Road & Spencer Drive intersection would approach capacity and begin experiencing significant delays.

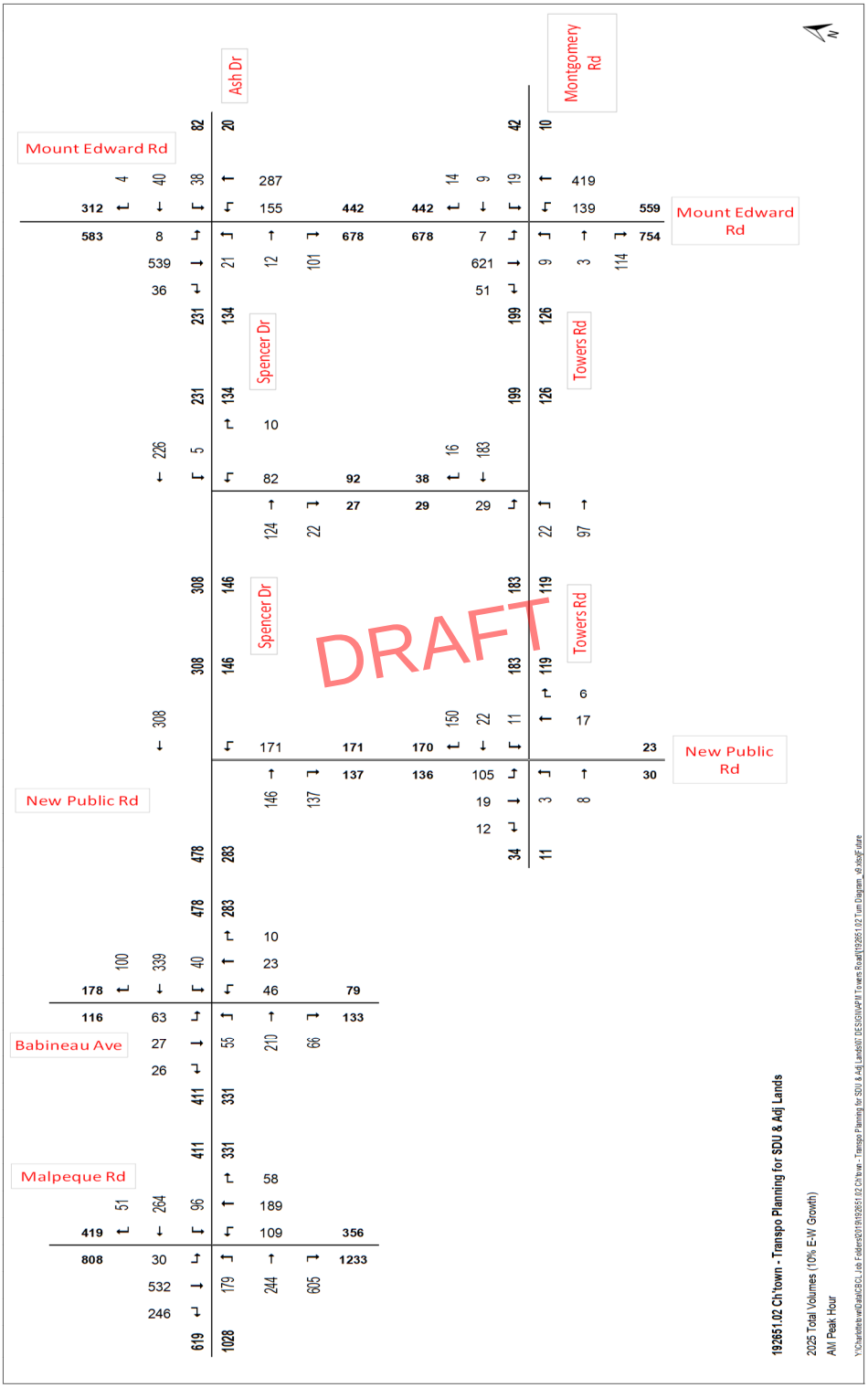

Figure 18: 2025 Total Traffic Volumes + 10% E-W Traffic Growth (AM Peak Hour)

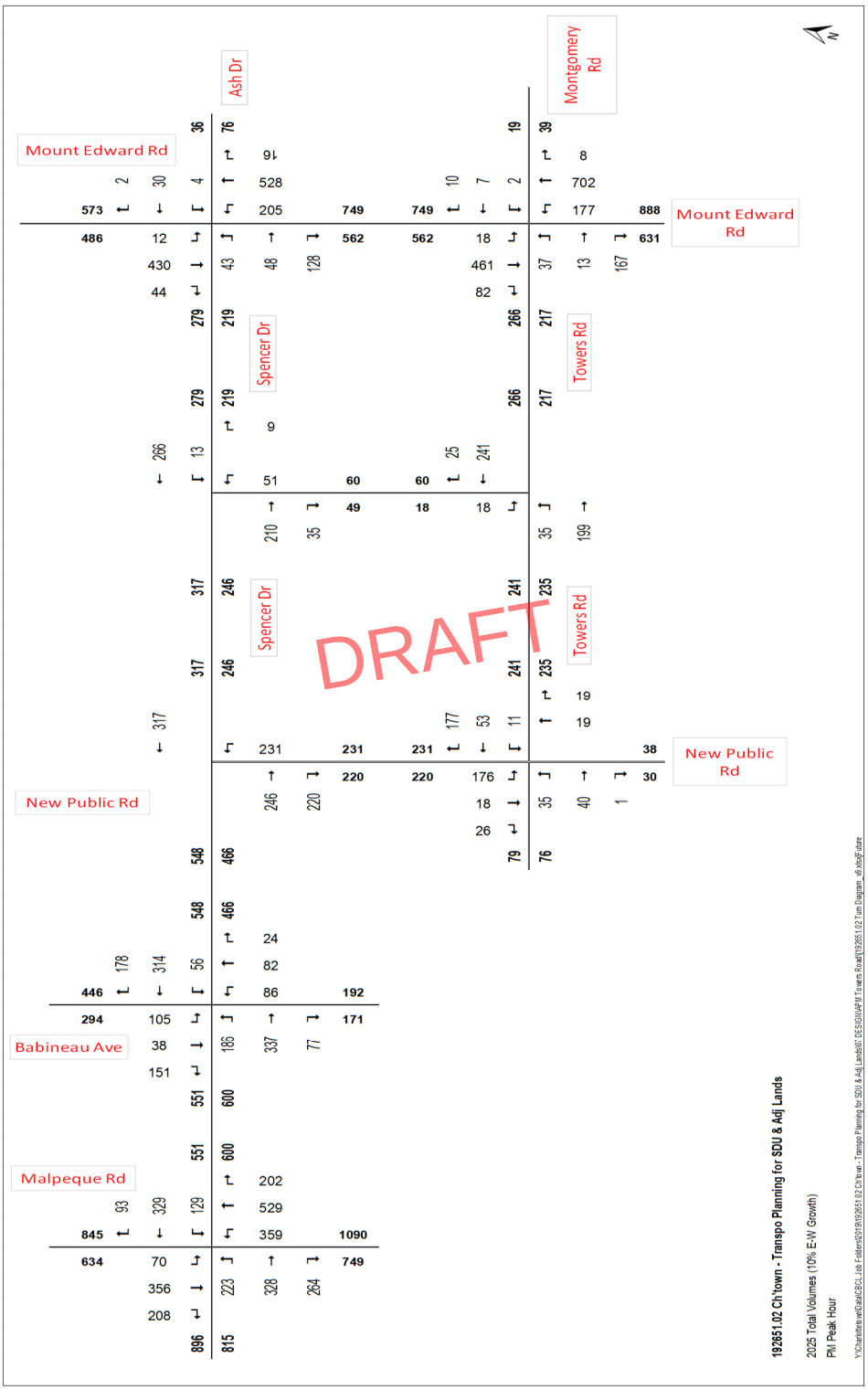

Figure 19: 2025 Total Traffic Volumes + 10% E-W Traffic Growth (PM Peak Hour)

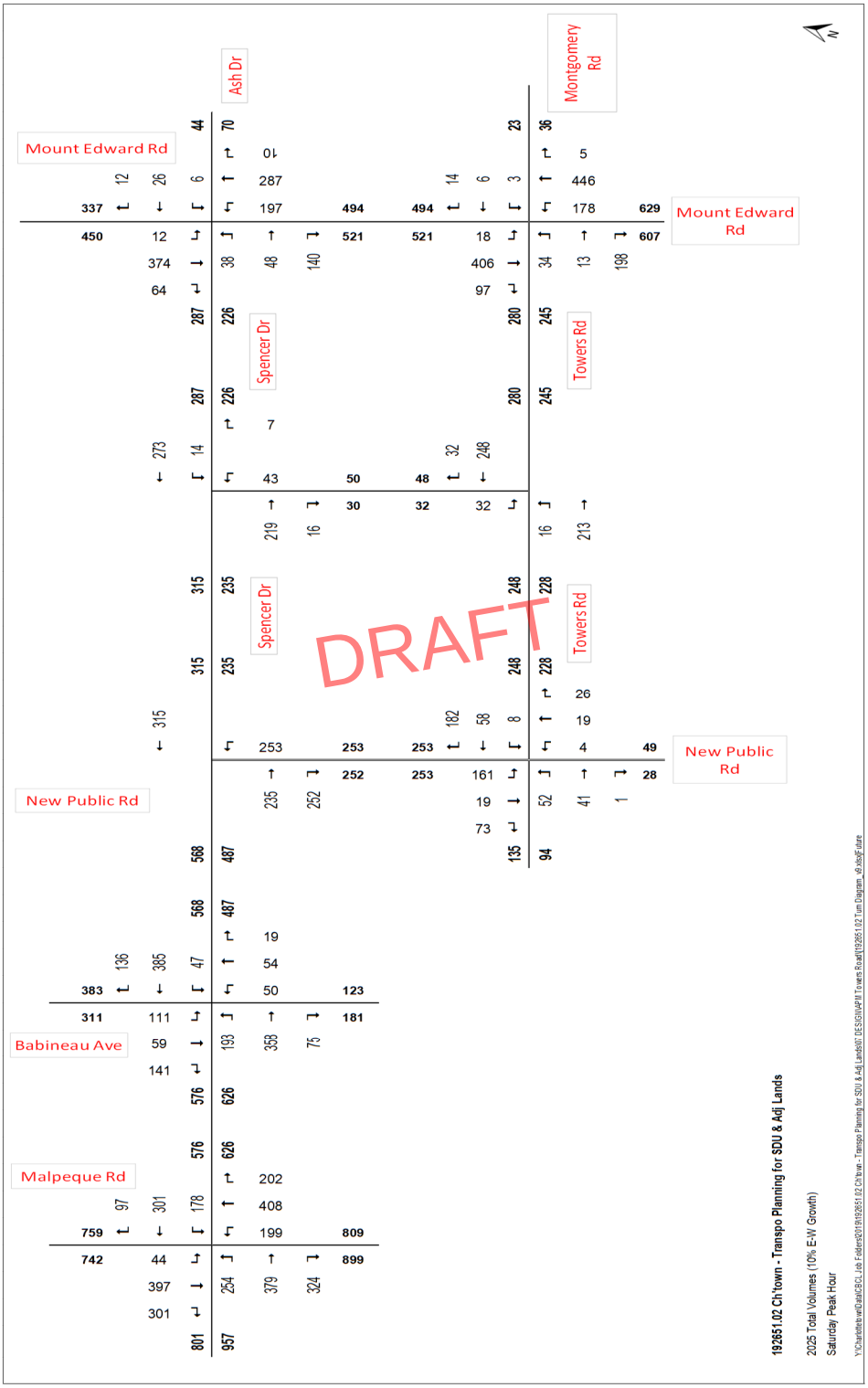

Figure 20: 2025 Total Traffic Volumes + 10% E-W Traffic Growth (Saturday Peak Hour)

Table 4: Synchro Analysis Results (2025 Total Conditions + 10% E-W Growth)

Intersection	Lane / Movement	AM Peak Hour						PM Peak Hour						Sat Peak Hour					
		Flow Rate (vph)	Capacity (vph)	Average Delay[3] (s)	95th % Q[1] (m)	V/C Ratio[2]	LOS[4]	Flow Rate (vph)	Capacity (vph)	Average Delay[3] (s)	95th % Q[1] (m)	V/C Ratio[2]	LOS[4]	Flow Rate (vph)	Capacity (vph)	Average Delay[3] (s)	95th % Q[1] (m)	V/C Ratio[2]	LOS[4]
101: University Ave/Malpeque Rd & Spencer Dr	EBL	179	344	23.6	39	0.58	C	223	282	53.3	71	0.88	D	254	310	59.3	75	0.91	E
	EBT	244	403	29.5	64	0.67	C	328	425	46.7	104	0.86	D	379	437	67.2	128	0.96	E
	WBL	96	355	20.8	22	0.30	C	129	282	25.4	30	0.51	C	178	250	41.2	52	0.79	D
	WBT	264	382	33.1	70	0.77	C	329	419	48.7	105	0.87	D	301	437	39.7	92	0.77	D
	NBL	109	258	30.9	34	0.47	C	359	406	73.0	128	0.98	E	199	390	33.0	57	0.57	C
	NBTR	247	521	31,7	32	0.53	C	731	814	76.1	129	1.00	E	610	774	54.5	92	0.88	D
	SBL	30	554	18.3	11	0.06	B	70	448	25.6	21	0.17	C	44	462	25.3	15	0.11	C
	SBT	532	582	67.4	176	>1.00	F	356	470	42.4	108	0.84	D	397	485	52.8	126	0.91	D
	SBR	246	494	22.9	17	0.55	C	208	400	30.1	16	0.58	C	301	412	42.3	19	0.81	D
102: Charlottetown Mall Rd/Babineau Ave & Spencer Dr (AWSC)	EBLTR	331	677	14.5	97	0.54	B	600	440	>120	205	>1.00	F	626	473	>120	209	>1.00	F
	WBLTR	479	713	21.8	146	0.75	C	548	432	>120	157	>1.00	F	568	467	>120	158	>1.00	F
	NBLTR	79	544	10.9	73	0.16	B	192	337	25.3	19	0.63	D	123	342	18.9	9	0.40	C
	SBLTR	116	561	11.3	76	0.23	B	294	376	36.1	39	0.87	E	311	408	33.1	39	0.85	D
103: New Public Rd & Spencer Dr	EBTR	283	781	10.6	13	0.39	B	466	724	19.0	39	0.70	C	487	709	21.6	46	0.75	C
	WBLT	308	743	11.8	15	0.45	B	317	658	14.4	20	0.52	B	315	640	14.9	21	0.53	B
	NBLR	171	639	10.9	8	0.29	B	231	578	14.0	15	0.43	B	253	569	15.1	17	0.48	C
104: Charlottetown Mall Rd/New Public Rd & Towers Road	EBLTR	11	769	7.8	0	0.02	A	76	697	8.9	3	0.12	A	94	680	9.3	3	0.15	A
	WBLTR	183	915	8.1	6	0.22	A	241	814	9.6	9	0.33	A	248	794	9.9	10	0.35	A
	NBL	0	0	-	0	-	A	0	0	-	0	-	A	4	564	9.1	0	0.01	A
	NBTR	23	723	7.9	1	0.04	A	38	670	8.4	1	0.06	A	45	660	8.6	1	0.08	A
	SBL	105	652	9.4	4	0.18	A	176	608	11.4	9	0.32	B	161	596	11.3	8	0.30	B
	SBTR	31	758	7.7	1	0.05	A	44	717	8.1	1	0.07	A	92	722	8.5	3	0.14	A
105: Mt Edward Rd & Spencer Dr/Ash Dr (Signalized + NBL)	EBLTR	134	205	32.8	20	0.71	C	219	310	32.3	44	0.77	C	226	318	32.2	44	0.77	C
	WBLTR	82	128	36.8	25	0.70	D	36	70	39.7	14	0.56	D	44	77	40.9	15	0.62	D
	NBL	155	523	9.7	32	0.32	A	205	568	11.6	44	0.39	B	197	580	11.4	42	0.37	B
	NBTR	287	1122	7.0	42	0.28	A	544	1080	10.9	96	0.55	B	297	1059	8.5	46	0.30	A
	SBLTR	583	1161	9.9	103	0.55	A	486	1110	10.0	83	0.48	A	450	1085	10.1	76	0.45	B
106: Mt Edward Rd & Towers Road /Montgomery Dr	EBL	9	399	16.8	4	0.03	B	37	435	15.3	9	0.09	B	34	467	14.5	9	0.08	B
	EBTR	117	248	19.9	11	0.52	B	180	317	19.0	14	0.63	B	211	357	18.6	15	0.66	B
	WBLTR	42	311	17.4	9	0.15	B	19	420	15.1	5	0.05	B	23	454	14.4	6	0.06	B
	NBL	139	411	8.9	8	0.38	A	177	453	8.6	12	0.43	A	178	452	8.9	13	0.44	A
	NBTR	419	1055	6.2	48	0.44	A	710	942	16.3	129	0.84	B	451	903	9.1	59	0.55	A
	SBL	7	562	6.1	1	0.01	A	18	297	9.0	2	0.07	A	18	460	7.9	2	0.04	A
	SBTR	672	890	17.0	113	0.84	B	543	783	14.8	79	0.77	B	503	741	14.9	70	0.75	B
107: Spencer Dr & Proposed Driveway	WBLT	231	1420	7.5	0	0.00	A	279	1298	7.8	0	0.01	A	287	1310	7.8	0	0.01	A
	NBLR	92	624	11.9	4	0.16	B	60	511	13.1	3	0.13	B	50	501	13.1	3	0.11	B
108: Towers Dr & Proposed Driveway	EBLT	119	1354	7.7	1	0.02	A	234	1273	7.9	1	0.03	A	229	1256	7.9	0	0.01	A
	SBLR	29	626	11.1	1	0.05	B	18	468	13.0	1	0.04	B	32	485	13.0	1	0.07	B

Notes:
Analysis by CBCL Limited using Synchro 10.0
1. 95% Queue - 95th percentile queue [highlighted if >100m or if available storage is exceeded]
2. V/C Ratio - Volume-to-Capacity ratio [highlighted if >0.90]
3. Average Delay - average total delay per vehicle [highlighted for LOS E or F]
4. LOS - Level of Service [highlighted for LOS E or F]

Conclusion

As requested, we have undertaken a traffic analysis exercise considering a new internal road arrangement for the proposed Towers Road development. Applying more conservative estimates of traffic routing across the Towers Road and Spencer Drive connections, our analysis suggests that, while the proposed new road arrangement could function very well, the intersections controlling access to the Charlottetown Mall and to Spencer Drive operate with relatively poor levels of service and have limited residual capacity in their current configuration to handle a significant increase in vehicular volumes.

Our analysis suggests that, while the new Spencer Drive and Mt. Edward intersection could work well, despite increased vehicular demand, the intersection would require a dedicated north-bound-left turn lane, and would have to be signalized, similar to the current geometry of Towers Road.

Considering the limiting factor of the Babineau Avenue and Spencer Drive intersection, we have reviewed the potential of addressing capacity constraints at this intersection through signalisation. Analysis suggests that traffic signals with a 60s cycle and an eastbound-left turning lane, this intersection would comfortably accommodate a much higher volume. As summarized in Table 5 below, under the 2025 future total scenario with 10% traffic growth, all movement at this intersection would operate with very good levels of service and minimal queueing.

The Malpeque Road & Spencer Drive intersection would remain the most significant bottleneck in the area, with the northbound approach, in particular, experiencing significant delays during the weekday PM peak hour. Preliminary investigation suggests that the introduction of a small right-turn channel on the northbound approach would improve conditions noticeably, as the strong right-turning volume is taken out of the shared lane. This preliminary analysis also suggests that the study area could accommodate up to 25% more vehicular traffic crossing the confederation trail without adverse effects on the study area intersections and without a negative impact on the proposed development's driveways.

Intersection	Lane / Movement	AM Peak Hour						PM Peak Hour						Sat Peak Hour					
		Flow Rate (vph)	Capacity (vph)	Average Delay[3] (s)	95th % Q[1] (m)	V/C Ratio[2]	LOS[4]	Flow Rate (vph)	Capacity (vph)	Average Delay[3] (s)	95th % Q[1] (m)	V/C Ratio[2]	LOS[4]	Flow Rate (vph)	Capacity (vph)	Average Delay[3] (s)	95th % Q[1] (m)	V/C Ratio[2]	LOS[4]
101: University Ave/Malpeque Rd & Spencer Dr	EBL	179	344	23.6	39	0.58	C	223	282	53.3	71	0.88	D	254	310	59.3	75	0.91	E
	EBT	244	403	29.5	64	0.67	C	328	425	46.7	104	0.86	D	379	437	67.2	128	0.96	E
	WBL	96	355	20.8	22	0.30	C	129	282	25.4	30	0.51	C	178	250	41.2	52	0.79	D
	WBT	264	382	33.1	70	0.77	C	329	419	48.7	105	0.87	D	301	437	39.7	92	0.77	D
	NBL	109	258	30.9	34	0.47	C	359	406	73.0	128	0.98	E	199	390	33.0	57	0.57	C
	NBTR	247	521	31,7	32	0.53	C	731	814	76.1	129	1.00	E	610	774	54.5	92	0.88	D
	SBL	30	554	18.3	11	0.06	B	70	448	25.6	21	0.17	C	44	462	25.3	15	0.11	C
	SBT	532	582	67.4	176	>1.00	F	356	470	42.4	108	0.84	D	397	485	52.8	126	0.91	D
	SBR	246	494	22.9	17	0.55	C	208	400	30.1	16	0.58	C	301	412	42.3	19	0.81	D
102: Charlottetown Mall Rd/Babineau Ave & Spencer Dr (Siganlized + EBL)	EBL	55	758	3.6	6	0.08	A	186	530	8.7	32	0.39	A	193	498	9.9	36	0.43	A
	EBTR	276	975	4.2	21	0.31	A	414	918	7.8	49	0.50	A	433	913	8.4	52	0.53	A
	WBLTR	479	1074	5.1	44	0.50	A	548	935	9.3	76	0.65	A	568	945	10.1	81	0.67	B
	NBLTR	79	460	11.7	13	0.19	B	192	576	13.3	33	0.37	B	123	583	12.6	20	0.23	B
	SBLTR	116	449	12.2	17	0.29	B	294	571	15.0	42	0.57	B	311	578	15.6	48	0.60	B
103: New Public Rd & Spencer Dr	EBTR	283	781	10.6	13	0.39	B	466	724	19.0	39	0.70	C	487	709	21.6	46	0.75	C
	WBLT	308	743	11.8	15	0.45	B	317	658	14.4	20	0.52	B	315	640	14.9	21	0.53	B
	NBLR	171	639	10.9	8	0.29	B	231	578	14.0	15	0.43	B	253	569	15.1	17	0.48	C
104: Charlottetown Mall Rd/New Public Rd & Towers Road	EBLTR	11	769	7.8	0	0.02	A	76	697	8.9	3	0.12	A	94	680	9.3	3	0.15	A
	WBLTR	183	915	8.1	6	0.22	A	241	814	9.6	9	0.33	A	248	794	9.9	10	0.35	A
	NBL	0	0	-	0	-	A	0	0	-	0	-	A	4	564	9.1	0	0.01	A
	NBTR	23	723	7.9	1	0.04	A	38	670	8.4	1	0.06	A	45	660	8.6	1	0.08	A
	SBL	105	652	9.4	4	0.18	A	176	608	11.4	9	0.32	B	161	596	11.3	8	0.30	B
	SBTR	31	758	7.7	1	0.05	A	44	717	8.1	1	0.07	A	92	722	8.5	3	0.14	A
105: Mt Edward Rd & Spencer Dr/Ash Dr (Signalized + NBL)	EBLTR	134	205	32.8	20	0.71	C	219	310	32.3	44	0.77	C	226	318	32.2	44	0.77	C
	WBLTR	82	128	36.8	25	0.70	D	36	70	39.7	14	0.56	D	44	77	40.9	15	0.62	D
	NBL	155	523	9.7	32	0.32	A	205	568	11.6	44	0.39	B	197	580	11.4	42	0.37	B
	NBTR	287	1122	7.0	42	0.28	A	544	1080	10.9	96	0.55	B	297	1059	8.5	46	0.30	A
	SBLTR	583	1161	9.9	103	0.55	A	486	1110	10.0	83	0.48	A	450	1085	10.1	76	0.45	B
106: Mt Edward Rd & Towers Road /Montgomery Dr	EBL	9	399	16.8	4	0.03	B	37	435	15.3	9	0.09	B	34	467	14.5	9	0.08	B
	EBTR	117	248	19.9	11	0.52	B	180	317	19.0	14	0.63	B	211	357	18.6	15	0.66	B
	WBLTR	42	311	17.4	9	0.15	B	19	420	15.1	5	0.05	B	23	454	14.4	6	0.06	B
	NBL	139	411	8.9	8	0.38	A	177	453	8.6	12	0.43	A	178	452	8.9	13	0.44	A
	NBTR	419	1055	6.2	48	0.44	A	710	942	16.3	129	0.84	B	451	903	9.1	59	0.55	A
	SBL	7	562	6.1	1	0.01	A	18	297	9.0	2	0.07	A	18	460	7.9	2	0.04	A
	SBTR	672	890	17.0	113	0.84	B	543	783	14.8	79	0.77	B	503	741	14.9	70	0.75	B
107: Spencer Dr & Proposed Driveway	WBLT	231	1420	7.5	0	0.00	A	279	1298	7.8	0	0.01	A	287	1310	7.8	0	0.01	A
	NBLR	92	624	11.9	4	0.16	B	60	511	13.1	3	0.13	B	50	501	13.1	3	0.11	B
108: Towers Dr & Proposed Driveway	EBLT	119	1354	7.7	1	0.02	A	234	1273	7.9	1	0.03	A	229	1256	7.9	0	0.01	A
	SBLR	29	626	11.1	1	0.05	B	18	468	13.0	1	0.04	B	32	485	13.0	1	0.07	B

Notes:
Analysis by CBCL Limited using Synchro 10.0
1. 95% Queue - 95th percentile queue [highlighted if >100m or if available storage is exceeded]
2. V/C Ratio - Volume-to-Capacity ratio [highlighted if >0.90]
3. Average Delay - average total delay per vehicle [highlighted for LOS E or F]
4. LOS - Level of Service [highlighted for LOS E or F]