

# Residential Development 1335 and 1339 Bank St

## TIA Strategy Report

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## Document Control Page

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## **TIA Plan Reports**

On 14 June 2017, the Council of the City of Ottawa adopted new Transportation Impact Assessment (TIA) Guidelines. In adopting the guidelines, Council established a requirement for those preparing and delivering transportation impact assessments and reports to sign a letter of certification.

Individuals submitting TIA reports will be responsible for all aspects of development-related transportation assessment and reporting, and undertaking such work, in accordance and compliance with the City of Ottawa's Official Plan, the Transportation Master Plan and the Transportation Impact Assessment (2017) Guidelines.

By submitting the attached TIA report (and any associated documents) and signing this document, the individual acknowledges that s/he meets the four criteria listed below.

### **CERTIFICATION**

1. I have reviewed and have a sound understanding of the objectives, needs and requirements of the City of Ottawa's Official Plan, Transportation Master Plan and the Transportation Impact Assessment (2017) Guidelines;
2. I have a sound knowledge of industry standard practice with respect to the preparation of transportation impact assessment reports, including multi modal level of service review;
3. I have substantial experience (more than 5 years) in undertaking and delivering transportation impact studies (analysis, reporting and geometric design) with strong background knowledge in transportation planning, engineering or traffic operations; and
4. I am either a licensed<sup>1</sup> or registered<sup>2</sup> professional in good standing, whose field of expertise [check ☒ appropriate field(s)] is either transportation engineering ☐ or transportation planning ☐.

**1,2 License of registration body that oversees the profession is required to have a code of conduct and ethics guidelines that will ensure appropriate conduct and representation for transportation planning and/or transportation engineering works.**

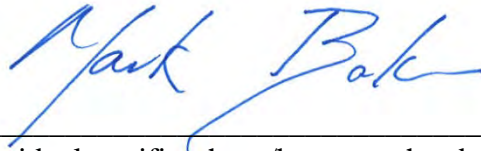
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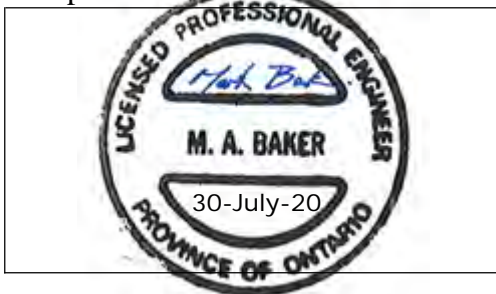
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## Strategy Report

Parsons has been retained by Lofty Riverside GP Inc. to prepare a TIA in support of an Official Plan Amendment (OPA)/Zoning By-Law Amendment (ZBLA) for a residential development located at 1335 & 1339 Bank Street. This document follows the new TIA process, as outlined in the City Transportation Impact Assessment (TIA) Guidelines (2017). The following report represents Step 4 – Strategy Report.

## 1. Screening Form

The screening form confirmed the need for a TIA Report based on the Trip Generation trigger, given that the proposed development consists of a 26-storey apartment building with approximately 391 residential units; The Location trigger, given that the development is located within a Design Priority Area (DPA) and within 600 meters of the existing Billings Bridge Rapid Transit Station; and the Safety trigger, given that a driveway access will connect to a road with horizontal curvature, the proposed driveway is in the influence area of an adjacent traffic signal and there is documented safety concerns on boundary streets within 500 meters of the development. The Screening Form has been provided in Appendix A.

## 2. Scoping Report

### 2.1. Existing and Planned Conditions

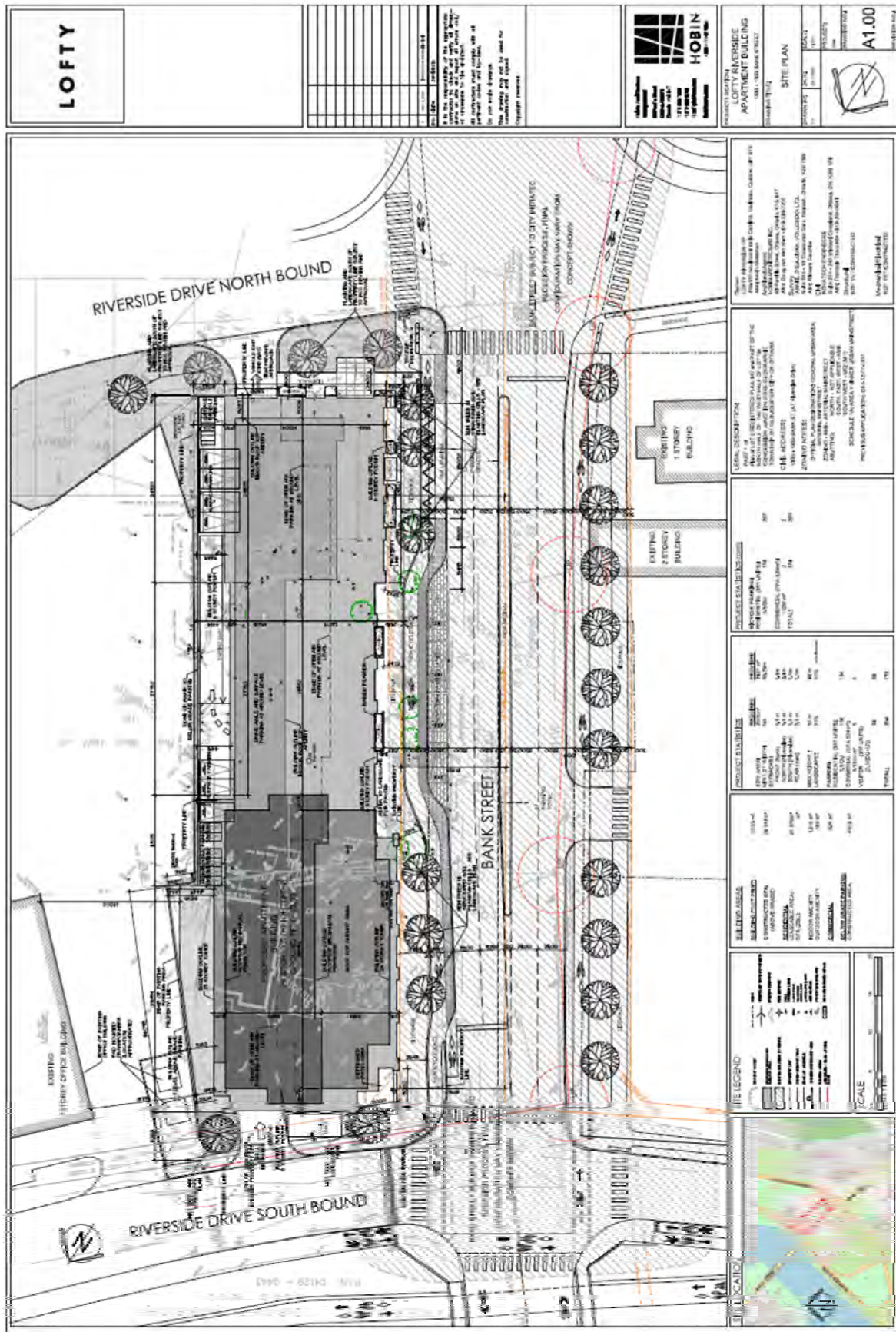
#### 2.1.1. PROPOSED DEVELOPMENT

The proposed site is located at the combined addresses of 1335 & 1339 Bank Street and will be composed of a 26-storey apartment building consisting of approximately 391 residential units and 525m<sup>2</sup> of ground floor commercial space (Café/Bar, Fitness, etc.), which will be constructed in a single phase by horizon year 2022. It is noted that approximately 50 of the residential units may be reassigned as short-term stay/hotel rooms (that is, a total 341 apartment units and 50 hotel units). The site is currently occupied by an automobile service building/used car lot and a Harvey's Restaurant. The proposed site will be located in-between the westbound and eastbound travel lanes for Riverside Drive (Referred to as Riverside Drive WB and Riverside Drive EB herein respectively). The site proposes a one-way driveway access connection linking Riverside Drive WB and Riverside Drive EB. Additionally, the total number of parking spaces proposed are approximately 170 vehicle parking spaces and 270 bicycle parking spaces. The two properties are currently zoned as AM8 (Arterial Mainstreet), Bank Street Subzone. The local context of the site is displayed in Figure 1 and the proposed Concept Plan shown in Figure 2.

Figure 1: Local Context



### Figure 2: Concept Plan





## 2.1.2. EXISTING CONDITIONS

### Area Road Network

**Bank Street** is a north-south municipal arterial roadway within the City of Ottawa, that extends from Wellington Street in the north, to past the City's limits at Belmeade Road in the south. Within the study area, Bank Street has a four-lane cross-section. The posted speed limit is 40 km/h north of Riverdale Avenue, and 50 km/h south of Riverdale Avenue. Immediately adjacent to, and south of the site, Bank Street is designated as an Arterial Mainstreet, while the designation changes to Traditional Mainstreet north of Riverside Drive (at the Rideau River).

**Riverside Drive** is a municipal arterial roadway in Ottawa, that extends from its north terminus at Tremblay Road and the Hwy 417 EB Off Ramps, to its south terminus at Limebank Road, where it continues as River Road until the City's limits. Within the study area and east of Data Centre Road, the Riverside Drive eastbound and Riverside Drive westbound travel lanes diverge from one another to form two separate intersections at Bank Street, with the development site located between the two roadways. Three ramps on the east and west sides of Bank Street connect the two Riverside Drive roadways. The two roadways converge again at their intersection with Neil Way, approximately 385 m east of Bank Street. Riverside Drive provides a four-lane cross-section, with auxiliary turn lanes at major intersections. The posted speed limit is 60 km/h.

**Riverdale Avenue** is a municipal collector roadway in Ottawa, that runs from Bank Street in the west to Main Street in the east. The roadway provides a two-lane cross-section, with space for on-street parking. The posted speed limit is 40 km/h.

**Billings Transit** is an east-west local municipal roadway in Ottawa that is restricted to buses only. The roadway extends from Bank Street in the east to the Data Centre Road in the west and connects buses to the Transitway.

**Data Centre Road** is a north-south arterial municipal roadway that connects Riverside Drive in the north to Heron Road in the south. The roadway provides a two-lane cross-section and auxiliary turn lanes at major intersections. The posted speed limit is 50 km/h.

**Pleasant Park Rd** is a collector municipal roadway that extends from Riverside Dr in the west to St Laurent Blvd in the east. The roadway provides a two-lane cross-section and a posted speed limit of 50km/h.

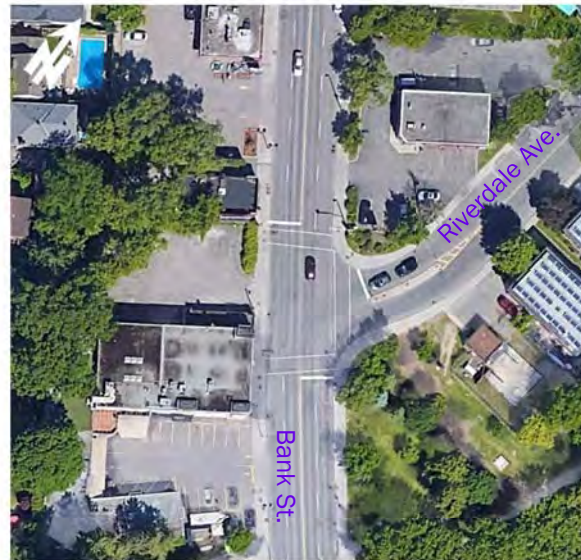
Three **ramps** (identified as R1, R2 and R3 in Figure 1) provide connections between the separated, unidirectional roadways Riverside Dr WB and Riverside Dr EB.

- Ramp 1 is located on Riverside Drive approximately 110m west of Bank St, which provides a connection for westbound traffic access to Billings Bridge Mall and allows traffic to change its heading to eastbound on Riverside Drive.
- Ramp 2 is located on Riverside Drive approximately 130m east of Bank St and provides a connection that allows eastbound traffic to change it heading to westbound on Riverside Drive.
- Ramps 3 is approximately 265m west of Bank St and permits Billings Bridge northbound traffic to head westbound on Riverside Drive

## Existing Study Area Intersections

### Bank/Riverdale

The Bank/Riverdale intersection provides signal control for its north, south and east legs of the intersection and no control for the access on the west leg of the intersection. The north and south legs of the intersection consist of one shared through/right-turn lane and one shared through/left-turn lane. The east and west legs of the intersection consist of a single all-movement lane. There are no restricted movements at this intersection.



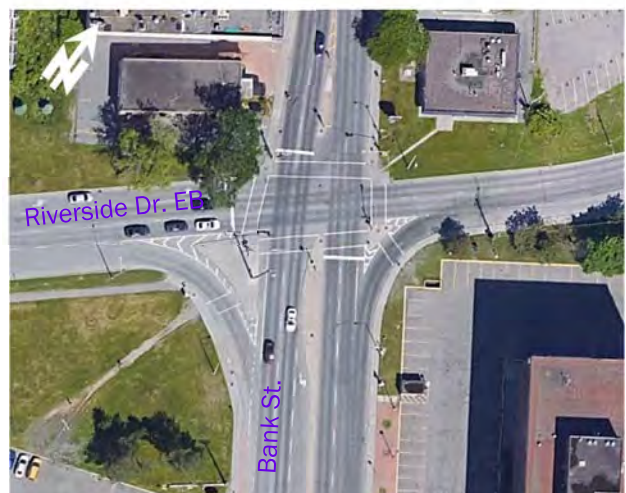
### Bank/Riverside Westbound

The Bank/Riverside WB intersection is a signalized intersection consisting of northbound, southbound and westbound movements. The north leg of the intersection provides a through lane and a shared through/right-turn lane. The south leg provides two through lanes. The east leg provides one shared through/right-turn lane, one through lane and an auxiliary left-turn lane. With regards to restricted movements, there are no eastbound movements at this intersection, the NBL movement is prohibited and the SBR is prohibited on a red light.



### Bank/Riverside Eastbound

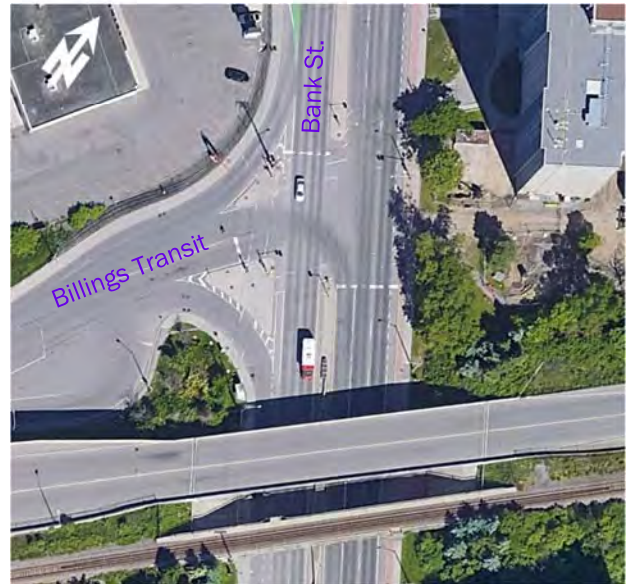
The Bank/Riverside EB intersection is a signalized intersection consisting of northbound, southbound and eastbound movements. The north leg of the intersection provides two through lanes. The south leg provides two through lanes and a channelized right-turn lane. The west leg provides two through lanes, a channelized right-turn lane and an auxiliary left-turn lane. With regards to restricted movements, there are no westbound movements at this intersection and the SBL is prohibited.





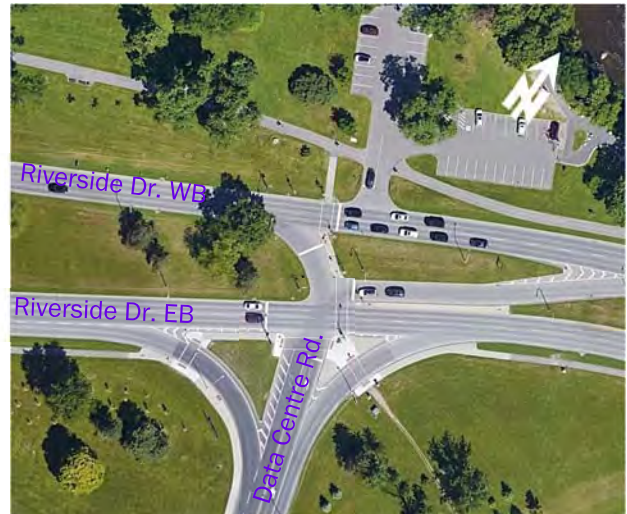
### Bank/Billings Transit

The Bank/Billings Transit intersection is a signalized 3-legged intersection providing northbound, southbound and eastbound movements. However, movements to/from the west leg are restricted to buses only. The south leg consists of two through lanes and one auxiliary left-turn lane, the north leg consists of two through lanes and a channelized right-turn lane. The west leg consists of a single all-movement lane. U-turns are prohibited from the southbound (north leg) approach.



### Data Centre/Riverside

The Data Centre/Riverside intersection is a signalized 3-legged intersection, consisting of south, east and west legs. The south leg consists of an auxiliary left-turn lane and a channelized right-turn lane. The east leg consists of two through lanes and an auxiliary left-turn lane. The west leg consists of two through lanes and a channelized auxiliary right-turn lane. U-turns are prohibited from the west leg of the intersection. Note that a second traffic signal control is provided for the NBLT movement, to halt any vehicles that do not manage to clear the intersection prior to the westbound through movement activating.



### Pleasant Park/Riverside

The Pleasant Park/Riverside intersection is a signalized 3-legged intersection, consisting of south, east and west legs. The south leg consists of an left-turn lane and a channelized right-turn lane. The east leg consists of two through lanes and an auxiliary left-turn lane. The west leg consists of one through lane and a share through/right-turn lane. On the north leg of the intersection, a southbound signal is dedicated to bicycles coming from the pathway. There are no restricted movements at this intersection.



### Existing Driveways to Adjacent Developments

As shown highlighted red in Figure 3, there are several adjacent driveways within 200m of the proposed sites driveways.

Figure 3: Adjacent Driveways



- Bank Street
  - East Side: There are currently 6 driveways on the east side of Bank Street. Three are located within the site boundaries, servicing the auto lot and Harvey's Restaurant, which will be removed once the site is redeveloped. The remaining 3 driveways are located to the south of Riverside Drive EB.
  - West Side: There are currently 4 driveways on the west side of Bank Street. Three are located adjacent to the site, servicing a low-rise commercial building and restaurants, which is anticipated to be replaced by a single driveway once the site is redeveloped by nearby 1346 Bank Street Development. The fourth driveway is located south of Riverside Drive EB, providing access to Billings Bridge Shopping Center.
- Riverside Drive WB
  - South Side: There are 3 driveways on the south side of Riverside Drive WB. One of the driveways provides access to the auto lot within site boundaries. This access is proposed to be extended south to Riverside Drive EB to provide a one-way access road, similar to the driveway located just east of the site, which provides one-way access to 'The Registry' parking lot. The final driveway is located to the west side of Bank Street and is anticipated to be relocated once the site is redeveloped by nearby 1346 Bank Street Development.
- Riverside Drive EB
  - North Side: There is a single driveway located approximately 40 meters east of the proposed site which provides a one-way exit only for 'The Registry' parking lot on to Riverside Drive EB.
  - South Side: There are 4 driveways on the south side of Riverside Drive EB. East of Bank Street, there are 2 driveways, with one located opposite to the one-way egress for 'The Registry' and the other



located approximately 100 meters east of site. West of Bank Street, there are 2 driveways which provide access to Billings Bridge Shopping Center.

### Existing Area Traffic Management Measures

Below are the existing area traffic management measures within the study area:

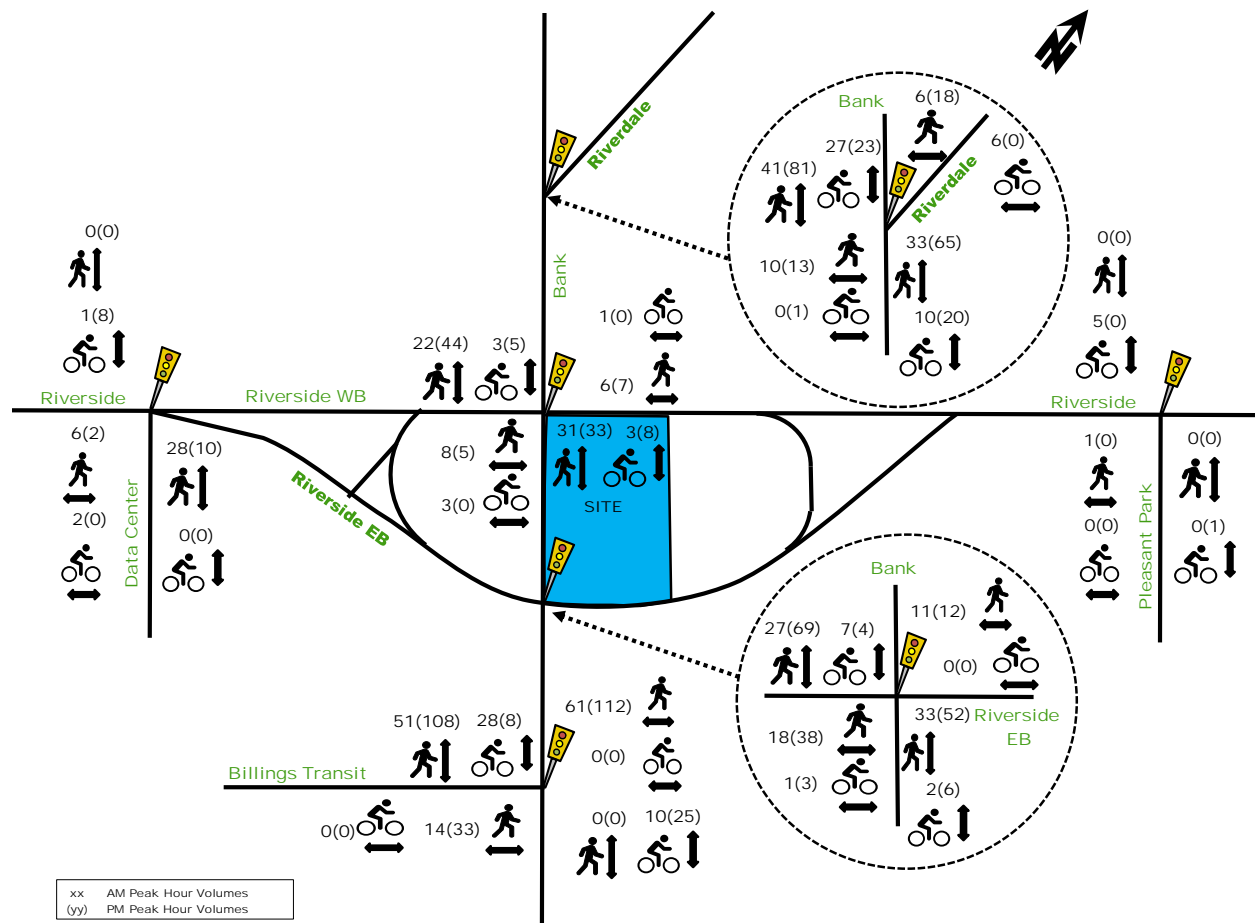
- Channelized right-turns at Bank/Riverside EB, Riverside/Data Centre and Bank/Billings Transit.

### Pedestrian/Cycling Network

Pedestrian sidewalk facilities are provided throughout the study area, including on the south side of Riverside Drive EB, along both sides of Bank Street, on the west side of Data Centre Road, on both sides of Billings Transit roadway, on both sides of Riverdale Avenue, on the west side of Pleasant Park Rd, on the west side of Ramp 1 and on the east side of Ramp 2.

With regards to cycling, bike lanes exist along the east and west sides of Bank Street, south of the Bank/Riverside EB intersection. A multi-use pathway (Rideau River Eastern Pathway) runs along the north side of Riverside Drive WB, which can be used by cyclists and pedestrians. Note that in July 2019, a 3m wide grade-separated pathway project was completed that removed the need to cross Bank Street at-grade for users of the Eastern Pathway. GeoOttawa shows suggested cycling routes along Data Centre Road and parts of Riverdale Avenue and Bank Street (north of the Bank/Riverdale intersection). Figure 4 below shows the existing active transportation volumes at study area intersections, although it is noted that the counts at Riverside Drive date back to 2014/2015.

Figure 4: Existing Active Transportation



## Transit Network

The following OC Transpo routes currently operate along Bank Street, at the frontage of the site:

- **Route #5 (Rideau <-> Billings Bridge):** identified by OC Transpo as a “Local Route”, this route operates on customized routing and schedules, to serve local destinations. Route #5 operates at an average rate of every 15-to-30 minutes during weekdays. Bus stops for this route are available on both sides of Bank Street, at the frontage of the site.
- **Route #6 (Rockcliffe <-> Greenboro):** identified by OC Transpo as a “Frequent Route”, this route operates at a high frequency along major roads. Route #6 operates 7 days a week, at an average rate of every 15 minutes or less during weekday peak hours. Bus stops for this route are available on both sides of Bank Street, at the frontage of the site.

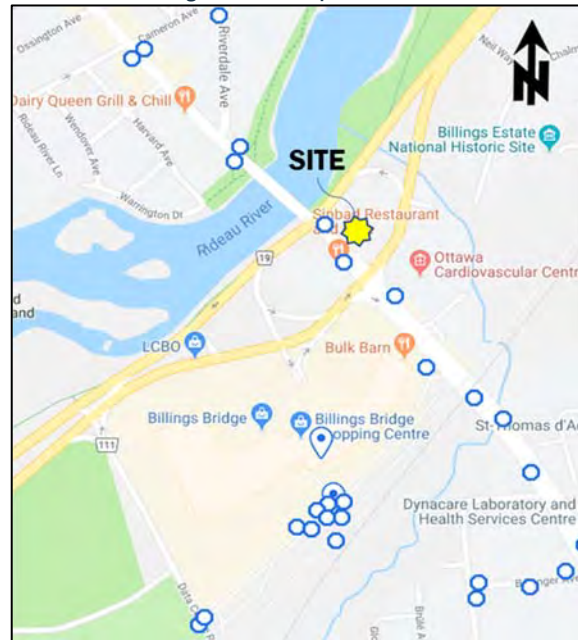
In addition to the above mentioned bus routes, the transitway operates directly south of the Billings Bridge Shopping Centre and intersects with Pleasant Park Rd, providing bus stops for the following routes: #5, #6, #40, #48, #87, #88, #92, #96, #97, #98, #99, #104, #112, #199, #290, #293, #294, #299 and #304.

OC Transpo route maps for routes #5 and #6 have been provided in Appendix B. Figure 5 below illustrates the area transit network surrounding the subject site, while Figure 6 provides the nearest bus stop locations to the development site in the form of blue dots.

Figure 5: Area Transit Network



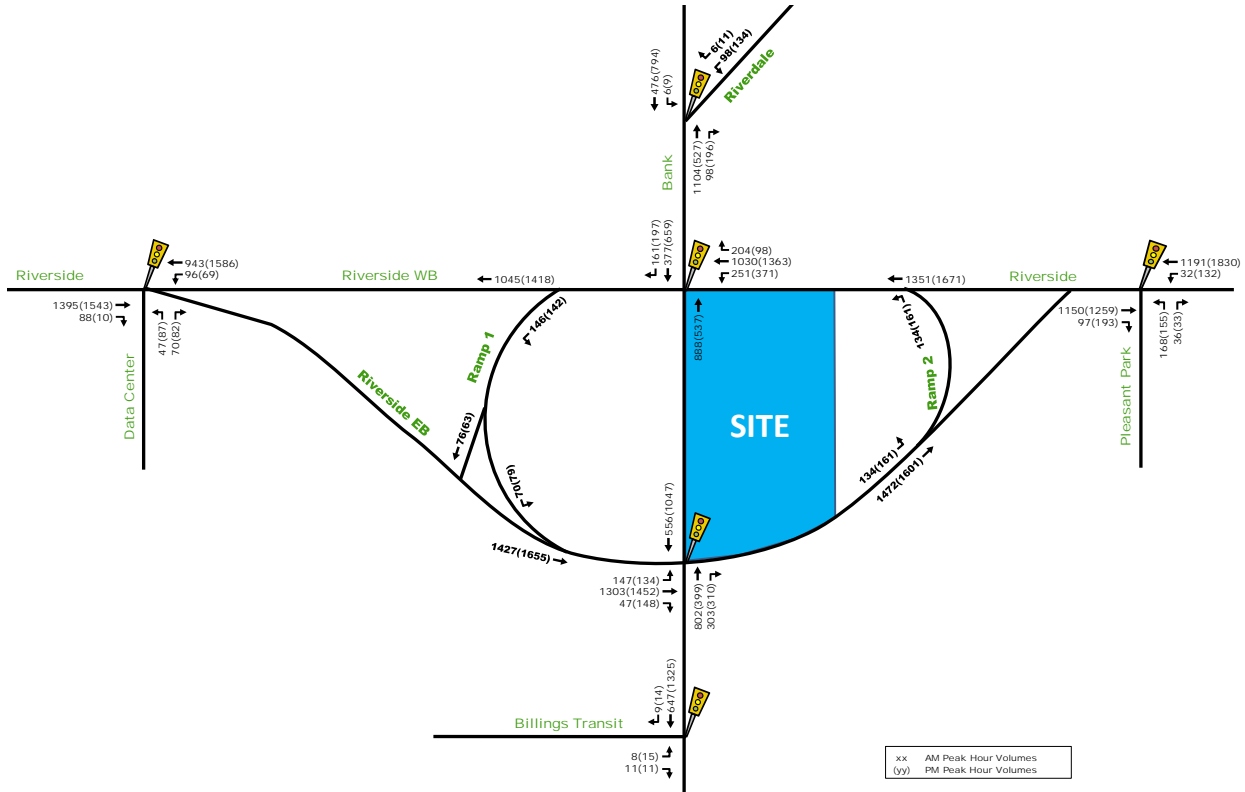
Figure 6: Bus Stop Locations



## Peak Hour Travel Demands

The existing peak hour traffic volumes within the study area, as illustrated in Figure 7, were obtained from the City of Ottawa or conducted recently by Parsons. The peak hour traffic volume count data has been provided in Appendix C.

Figure 7: Existing Peak Hour Traffic Volumes



### Existing Road Safety Conditions

A five-year collision history data (2014-2018, inclusive) was requested and obtained from the City of Ottawa for all intersections and road segments within the study area. Upon analyzing the collision data, the total number of collisions observed within the study area was determined to be 337 collisions within the past five-years. The majority of the collisions (79%) resulted in property damage only, while the remaining collisions resulted in a non-fatal injury. Furthermore, the type of impacts that resulted in 337 collisions were broken down into the following: 115 (34%) rear end, 103 (31%) angled, 80 (24%) sideswipes, 32 (10%) turning movement, 2 (<1%) approaching and 5 (1%) other.

A standard unit of measure for assessing collisions at an intersection is based on the number of collisions per million entering vehicles (MEV). At signalized intersections within the study area, reported collisions have historically taken place at a rate of:

- 0.11 Collisions/MEV at the intersection of Bank/Billings Transit (total of 5 collisions with no particular collision patterns observed)
- 0.39 Collisions/MEV at the intersection of Bank/Riverdale (total of 14 collisions with no particular collision patterns observed)
- 1.33 Collisions/MEV at the intersection of Bank/Riverside WB. A total of 97 collisions took place at this intersection within the past five years. Low visibility and narrow lanes at this intersection are the main contributing factors to the collisions.
- 0.91 Collisions/MEV at the intersection of Bank/Riverside EB. A total of 73 collisions took place at this intersection, the majority of which 35 (48%) were rear end accidents, with 18 (25%) occurring in the EB approach alone.
- 0.40 Collisions/MEV at the intersection of Data Centre/Riverside. A total of 23 collisions took place at this intersection, 18 (78%) of which were recorded as rear end (10 (43%) in the NB approach and 8 (35%) in the EB approach).

Other collisions within the study area include:

- 12 collisions between along Bank Street, between Riverside Dr EB and WB, of which 3 occurred in the NB near the proposed lay-by parking area as a result of 2 rear end collisions and 1 sideswipe.
- 12 sideswipe collisions along Riverside Dr EB, between Bank St and Ramp 2.
- 10 angled collisions at the Ramp 3 and Riverside Dr EB intersection.
- 8 angled collisions at the Ramp 3 and Riverside Dr WB intersection.
- 10 angled collisions at the Ramp 1 and Riverside Dr EB intersection.
- 6 turning movement and 7 angle collisions along Bank Street, between Riverside Drive and Billings Transit.

The source collision data as provided by the City of Ottawa and related analysis is provided as Appendix D.

### 2.1.3. PLANNED CONDITIONS

#### Planned Study Area Transportation Network Changes

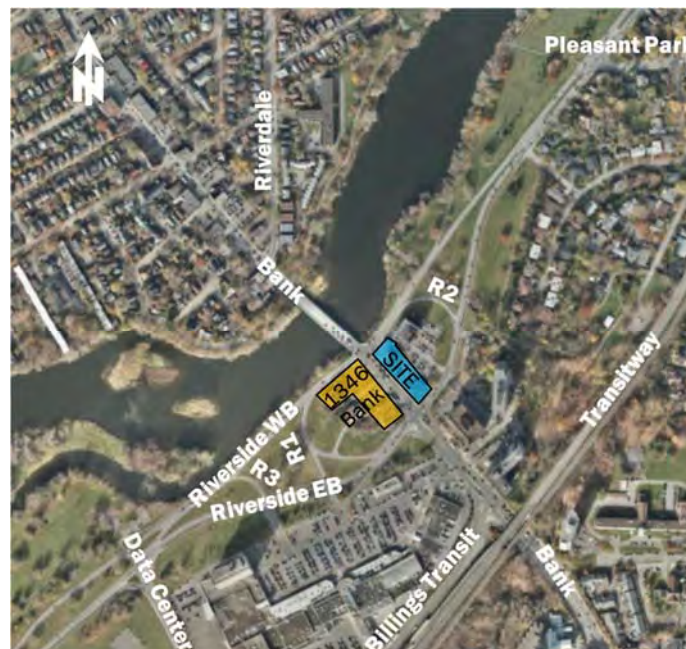
Based on the City of Ottawa's TMP, the 2031 Affordable Network for Rapid Transit and Transit Priority illustrates Bank Street as a Transit Priority Corridor (Isolated Measures) at the frontage of the site.

Furthermore, a Bank Street Renewal Project (Riverside to Ledbury) is currently underway by the City of Ottawa, with detailed design expected to begin in Spring/Summer 2020. The timing of construction is yet to be determined and is subject to funding availability. The street design identified by the Bank Street Renewal Project will influence various aspects of the ultimate Site Plan for the subject development, including available right-of-way, pedestrian/cycling facilities, driveway access, landscaping, etc. The Functional Design plan for Bank Street (Fall 2019), provided in Appendix E, shows that Ramp 1 will be modified by removing the Riverside Dr EB on ramp and widening the ramp's SBT lane to include a left-turn auxiliary lane.

#### Other Area Developments

The following section outlines adjacent developments in the general area that were considered in the TIA. Figure 8 illustrates the site context for other area developments nearby.

Figure 8: Other Nearby Developments





### 1346 Bank Street

Cushman & Wakefield is proposing to construct a residential development consisting of a 30-storey and a 33-storey high-rise buildings and approximately 600 apartment units. The development is anticipated to be constructed in two phases, with Phase 1 constructed by 2023 and Phase 2 constructed by 2026. The anticipated two-way vehicle trips are approximately 43 and 45 veh/h during the AM and PM peak hours respectively.

## 2.2. Study Area and Time Periods

The proposed site is a residential development that is planned to be constructed in 2022. As such, the horizon years being analyzed in this report are the 2022 and 2027 (five-years after full buildout) horizon years, using the weekday morning and afternoon peak hour time periods. Proposed study area intersections and boundary roads are outlined below and highlighted in Figure 9.

- Bank/Riverdale intersection;
- Bank/Riverside WB intersection;
- Bank/Riverside EB intersection;
- Bank/Billings Transit intersection;
- Pleasant Park/Riverside intersection;
- Riverside WB/Site Access intersection;
- Riverside EB/Site Access intersection;
- Data Center/Riverside intersection;
- Riverside EB/Ramp 1;
- Riverside WB/Ramp 2;
- Along Bank Street adjacent to the site;
- Along Riverside Drive EB adjacent to the site; and,
- Along Riverside Drive WB adjacent to the site.

Figure 9: Study Area



## 2.3. Exemption Review

The following modules/elements of the TIA process recommended to be exempt in the subsequent steps of the TIA process, based on the City's TIA guidelines and the subject site:

Table 1: Exemptions Review Summary

Module	Element	Exemption Consideration
4.1 Development Design	4.1.2 New Streets Network	Not required for applications involving site plans.
4.2 Parking	4.2.2 Spillover Parking	The parking is expected to meet By-Law requirements.
4.6 Neighborhood Traffic Management	4.6.1 Adjacent Neighborhoods	The development relies on arterial roads for access.
4.8 Review of Network Concept	All elements	The site is not expected to generate 200 trips more than the established zoning.

## 3. Forecasting

### 3.1. Development Generated Travel Demand

#### 3.1.1. TRIP GENERATION AND MODE SHARES

The proposed development will consist of a 26-storey high-rise apartment building, containing 391 residential units and approximately 524m<sup>2</sup> (5,640ft<sup>2</sup>) commercial space consisting of a café/bar space and fitness area. For the purposes of trip generation, we have assumed only a portion of the commercial space – that is occupied by the café/bar - would generate trips by non-residents.

As previously mentioned, the site is currently occupied by some existing developments. As such, the number of trips generated will be the net difference between the projected future trips and the existing trips.

The appropriate trip generation rates for the apartment land use of the proposed development were obtained from the 2009 TRANS Trip Generation Residential Trip Rates Report (Table 6.3). While trip rates for the café/bar land use were obtained from the ITE Trip Generation Manual (10<sup>th</sup> edition). The trip rates are summarized in Table 2 below.

Table 2: Trip Generation Trip Rates

Land Use	Data Source	Trip Rates	
		AM Peak	PM Peak
High-Rise Apartments (10+ floors)	TRANS	T = 0.24(du);	T = 0.27(du);
First Floor Café/Bar	ITE 925	N/A	T = 11.36(x);
Hotel Rooms	ITE 310	T = 0.50(du) + 5.34;	T = 0.75(du) – 26.02;
Notes: T = Average Vehicle Trip Ends du = Dwelling unit x = Gross Floor Area (GFA) (1000 ft <sup>2</sup> )			

The trip rates shown in Table 2 represent the vehicle trips/hour for the residential land use and person trips/hour for the café/bar and hotel rooms. Note that during the morning peak hour, the café/bar is expected to generate internal trips only. As such, only an afternoon peak hour trip rate has been provided. With regards to the residential land use, the number of vehicles per hour were determined as shown in Table 3 below.

Table 3: Apartment Units Vehicle Trip Generation

Land Use	Dwelling Units	AM Peak (Vehicles/h)			PM Peak (Vehicles/h)		
		In (24%)	Out (76%)	Total	In (62%)	Out (38%)	Total
High-Rise Apartments (10+ floors)	391	22	72	94	65	41	106

The 2009 TRANS Trip Generation Report was then used to convert the total vehicle trips of the residential land use to total person trips, based on the mode share percentages of each respective travel mode. The total trips were also divided into inbound and outbound trips. Table 4 below provides the detailed mode share breakdowns for the residential land use of the proposed development.

Table 4: Mode Shares Breakdown (2009 TRANS Report)

Travel Mode	Mode Share	AM Peak (Person Trips/h)			Mode Share	PM Peak (Person Trips/h)		
		In (24%)	Out (76%)	Total		In (62%)	Out (38%)	Total
Auto Driver	37%	22	72	94	40%	65	41	106
Auto Passenger	8%	5	16	21	9%	15	9	24
Transit	41%	24	80	104	37%	61	37	98
Non-motorized	14%	8	27	35	14%	23	14	37
<b>Total Person Trips</b>	<b>100%</b>	<b>59</b>	<b>195</b>	<b>254</b>	<b>100%</b>	<b>164</b>	<b>101</b>	<b>265</b>

As shown in Table 4, the total number of person trips anticipated to be generated by the proposed development is 254 and 265 person trips/h during the morning and afternoon peak hour periods, respectively.

With regards to the café/bar space, the person trips/hour are calculated directly using the trip rates shown in Table 2 and multiplied by a factor of 1.28, as per TIA standards, to account for typical North American auto occupancy values of approximately 1.15 and combined transit and non-motorized modal shares of less than 10%. The resulting total person trips/hour for the café/bar land use of the proposed development are summarized in Table 5.

Table 5: Café/Bar Person Trips

Land Use	Area (ft²)	PM Peak (Person Trips/h)		
		In (66%)	Out (34%)	Total
First Floor Café/Bar	2,142	20	11	31

The total person trips of the residential land use can now be combined with the total person trips of the café/bar land use. Traditionally, the total person trips are distributed by forecasted mode share percentages that are obtained from 2011 NCR Household Origin-Destination Survey. These mode shares, which represent the broader Alta Vista District in Ottawa, are provided in Table 6. However, based on information provided by City's Transportation Planning Staff, transit modal percentages in the vicinity of Billings Bridge Plaza / Billings Station range between 50% and 60% based on 2016 Census data. As such, the forecasted mode shares were adjusted to the percentages as shown in Table 7.

Table 6: 2011 NCR Mode Share Percentages (Alta Vista District)

Travel Mode	Mode Share
Auto Driver	55%
Auto Passenger	15%
Transit	20%
Walk	5%
Bike	5%
<b>Total</b>	<b>100%</b>

Table 7: Modified Mode Share Percentages (2016 Census)

Travel Mode	Mode Share
Auto Driver	25%
Auto Passenger	10%
Transit	55%
Walk	5%
Bike	5%
<b>Total</b>	<b>100%</b>

The person trips of the residential apartment land use and the café/bar were combined and distributed using the revised mode share assumptions. The total person trips anticipated to be generated by the proposed development based on the travel modes are provided in Table 8.

Table 8: OD Survey Mode Shares Breakdown, Alta Vista District

Travel Mode	Mode Share	AM Peak (Person Trips/h)			PM Peak (Person Trips/h)		
		In	Out	Total	In	Out	Total
Auto Driver	25%	15	48	63	45	29	74
Auto Passenger	10%	6	19	25	18	11	29
Transit	55%	33	107	140	101	62	163
Walk	5%	3	10	13	9	6	15
Bike	5%	3	10	13	9	6	15
Total Person Trips	100%	60	194	254	182	114	296
Total Auto Trips		15	48	63	45	29	74

As such, the anticipated number of total auto trips generated by proposed development is approximately 63 and 66 vehicle trips/h during the morning and afternoon peak hour, respectively.

Since this proposed development does not satisfy the permitted zoning, with respect to height. The following assumptions were used to estimate the number of site generated person trips greater than the established zoning:

- The site current zoned as AM8, which permits buildings up to 50m in height (approximately 11 storeys assuming 4.3m average storey height);
- The proposed building is 26 storeys;

Using the assumptions stated above, the number of residential units per floor template within the proposed building are as follows:

Ground floor to top of podium (6<sup>th</sup> floor)

- 175 residential units

Bottom of tower (7<sup>th</sup> floor) to 11<sup>th</sup> floor

- 48 residential units
- total of 223 residential units within the first 50m of building height

12<sup>th</sup> floor to 26<sup>th</sup> floor

- 168 residential units

Using the above values, a ratio can be obtained that will be used to apply to the total number of anticipated generated person trips during the morning and afternoon peak hours.

Person trip ratio =  $168 / (223 + 168) \sim 0.43$  (43%)

Total estimated trips greater than the established zoning during the peak periods using the above ratio are (residential person trips from Table 4):

AM peak

254 person trips/h \* 0.43 = 110 person trips/h over the current zoning (using the assumptions stated above)

PM peak

265 person trips/h \* 0.43 = 114 person trips/h over the current zoning (using the assumptions stated above)

Therefore, the development is not anticipated generate 200 trips more than the established zoning during both the morning and afternoon peak hours, and module 4.8 Review of Network Concept is exempted from this report.

### **Estimated Net Difference in Trips Generated**

With regards to the existing developments at the site, the number of trips generated in existing conditions were estimated using the ITE Trip Generation Manual (10<sup>th</sup> edition). As the proposed development is planned to replace the existing developments at 1335 and 1339 Bank St, which consist of a fast-food restaurant and a car service shop, Table 9 provides the estimated peak hour vehicle volumes of the existing developments. Note that the mode shares in Table 7 were used to determine the vehicle trips of the existing developments.



Table 9: Existing Vehicle Trips at 1335 and 1339 Bank St

Land Use	Data Source	GFA (ft <sup>2</sup> )	AM Peak (Vehicles/h)			PM Peak (Vehicles/h)		
			In	Out	Total	In	Out	Total
Harvey's Fast-Food Restaurant	ITE 934	3,300	0	0	0	18	17	35
Reliable Auto Car Service	ITE 943	1,600	1	1	2	1	1	2
<b>Total</b>		<b>4,900</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>19</b>	<b>18</b>	<b>37</b>

Since the Harvey's restaurant does not open until (10:30 AM) and is not operating throughout the morning peak hour, vehicle trips are anticipated to be very low (zero) during the AM peak hour. As for the Reliable Auto car service shop, it is anticipated that low volume of vehicles will be experienced due size of the building and the usage of the site. The anticipated net difference between the proposed development's vehicle trips (Table 8) and the existing site's vehicle trips (Table 9) is summarized in Table 10.

Table 10: Anticipated 'New' Vehicle Trips

Land Use	AM Peak (Vehicles/h)			PM Peak (Vehicles/h)		
	In	Out	Total	In	Out	Total
Proposed Residential Building	14	47	61	26	11	37

As shown in Table 10 above, the anticipated 'new' vehicle trips of the proposed development are 61 and 37 vehicle trips/hour during the morning and afternoon peak hours, respectively.

### Potential Reassigned Apartment Unit Trip Generation

As mentioned, 50 apartment units may potentially be reassigned to short-term/hotel units and since this change has not been confirmed, this section compares the number of trips generated by 50 apartment units and the equivalent trips that would be generated by the short-term/hotel units.

Table 11 below provides the person trips mode share breakdown anticipated to be generated by 50 apartment units, while Table 12 provides the equivalent person trips expected to be generated by reassigned hotel rooms. The mode share percentages are based on Table 7.

Table 11: OD Survey Mode Shares Breakdown, Alta Vista District – Apartment Person Trips

Travel Mode	Mode Share	AM Peak (Person Trips/h)			PM Peak (Person Trips/h)		
		In	Out	Total	In	Out	Total
Auto Driver	25%	1	7	8	4	4	8
Auto Passenger	10%	1	2	3	1	2	3
Transit	55%	4	13	17	12	8	20
Walk	5%	0	2	2	1	1	2
Bike	5%	0	2	2	1	1	2
Total Person Trips	100%	6	26	32	19	16	35
<b>Total Auto Trips</b>		<b>1</b>	<b>7</b>	<b>8</b>	<b>4</b>	<b>4</b>	<b>8</b>

Table 12: OD Survey Mode Shares Breakdown, Alta Vista District – Reassigned Hotel Person Trips

Travel Mode	Mode Share	AM Peak (Person Trips/h)			PM Peak (Person Trips/h)		
		In	Out	Total	In	Out	Total
Auto Driver	25%	6	4	10	2	3	5
Auto Passenger	10%	3	2	5	1	1	2
Transit	55%	12	9	21	3	5	8
Walk	5%	1	1	2	0	0	0
Bike	5%	1	0	1	0	0	0
Total Person Trips	100%	23	16	39	6	9	15
<b>Total Auto Trips</b>		<b>6</b>	<b>4</b>	<b>10</b>	<b>2</b>	<b>3</b>	<b>5</b>

As displayed in Table 11, the anticipated vehicle trips generated by 50 apartment units are 8 veh/h during both the morning and afternoon peak hours. While in Table 12, the anticipated vehicle trips generated by 50 hotel rooms are 10 veh/h and 5 veh/h during both the morning and afternoon peak hours, respectively.



## 3.2. Background Network Traffic

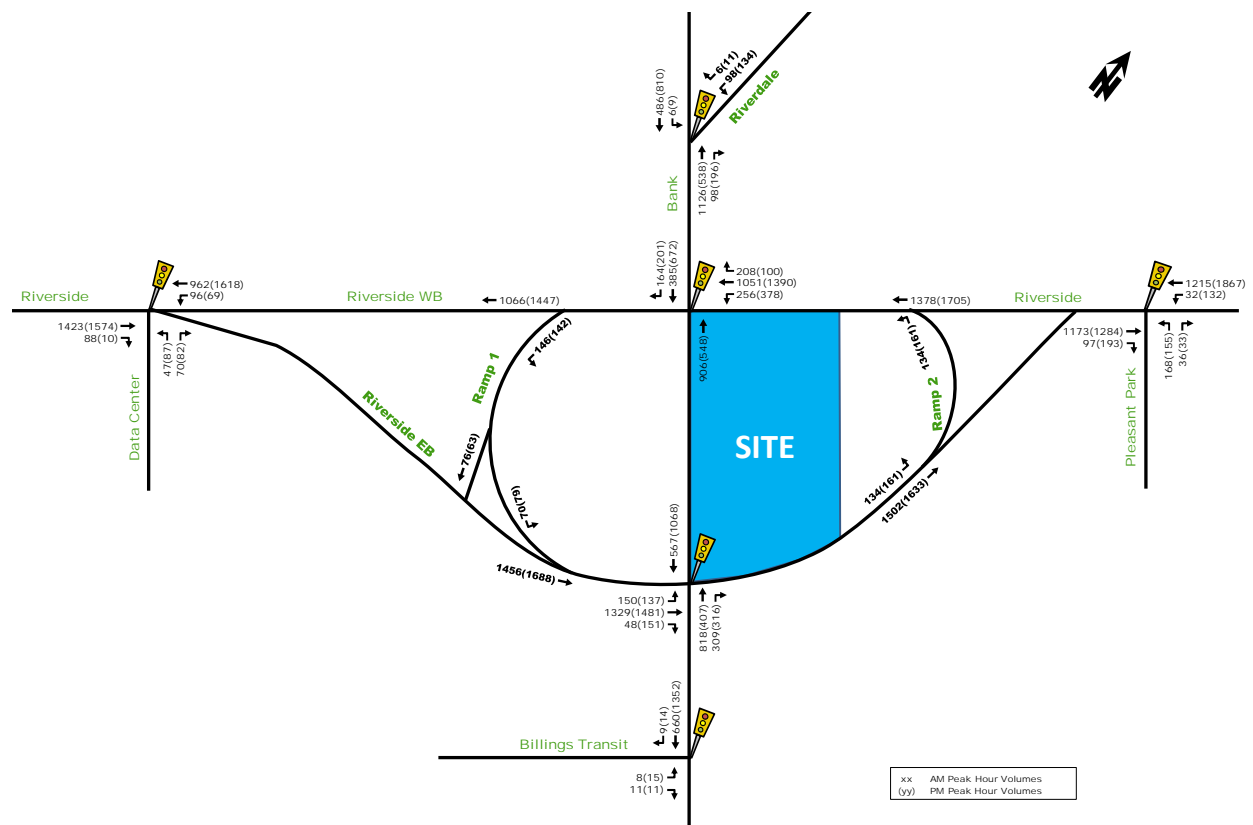
### 3.2.1. TRANSPORTATION NETWORK PLANS

Refer to Section 2.1.3: Planned Study Area Transportation Network Changes.

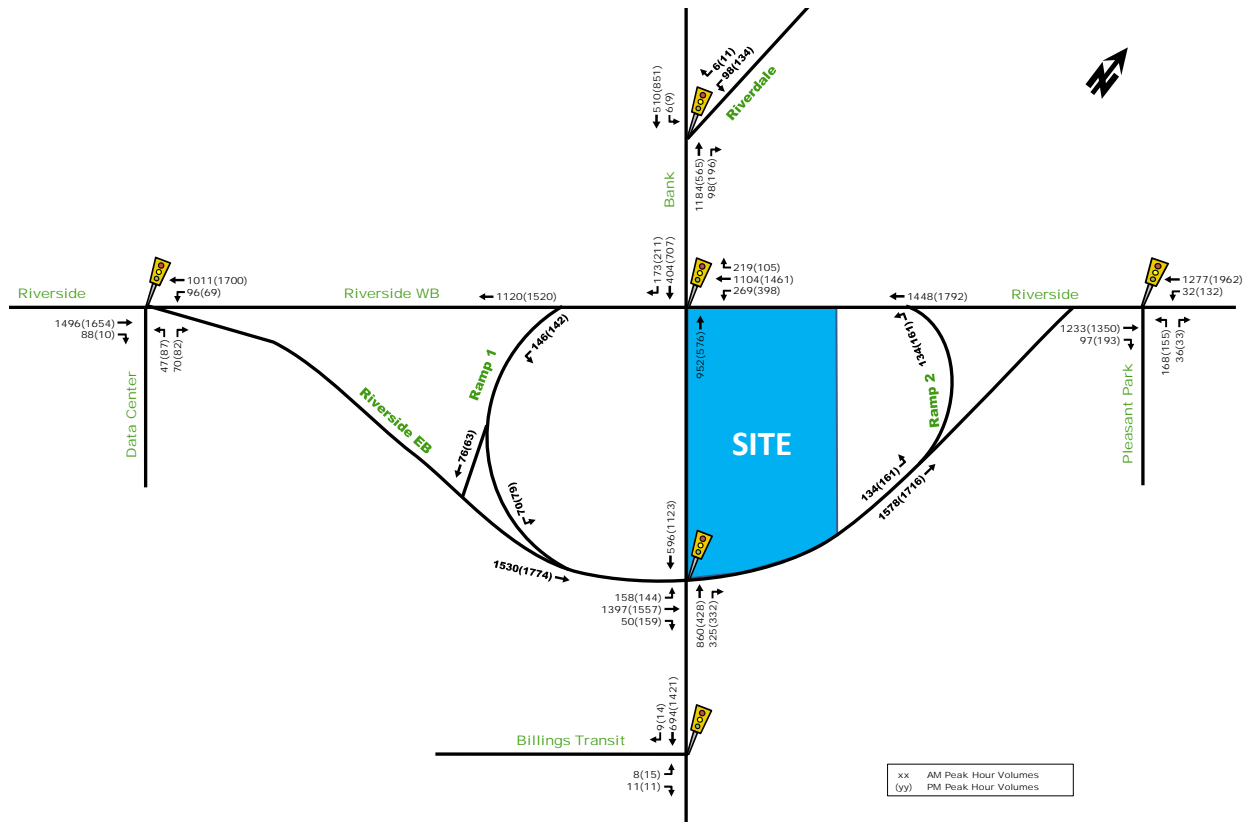
### 3.2.2. BACKGROUND GROWTH

Since the lands surrounding the study area are well developed, with not many major other area developments planned near the subject site, traffic within the study area is not anticipated to increase significantly in the next few years. As a conservative estimate, traffic growth is assumed to be 1% per year along both Bank St and Riverside Dr for the future horizon years 2022 and 2027. Along Billings Transit, Riverdale Ave and Data Centre Rd, the traffic growth was assumed to be negligible. Traffic volumes anticipated for the future background horizon years are illustrated in Figure 11 and Figure 12.

Figure 11: Future Background 2022 Traffic Volumes



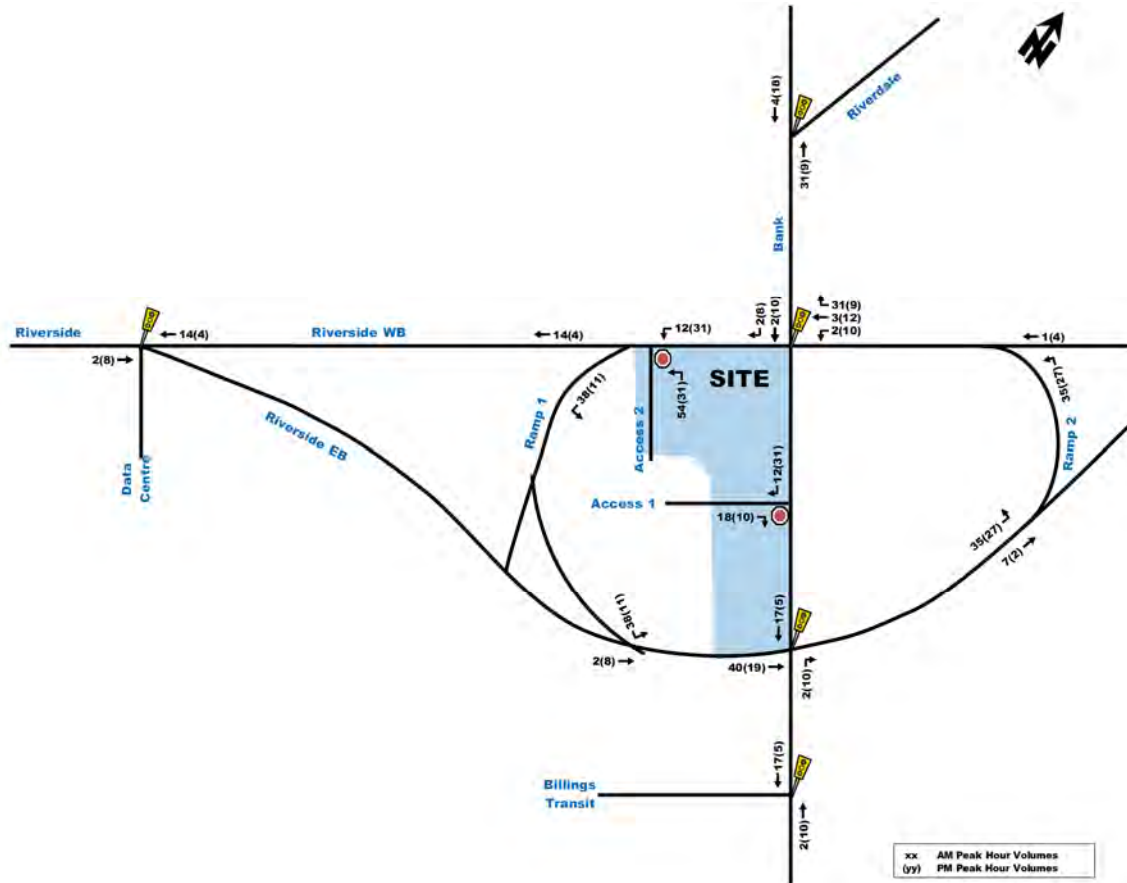
**Figure 12: Future Background 2027 Traffic Volumes**



### 3.2.3. OTHER DEVELOPMENTS

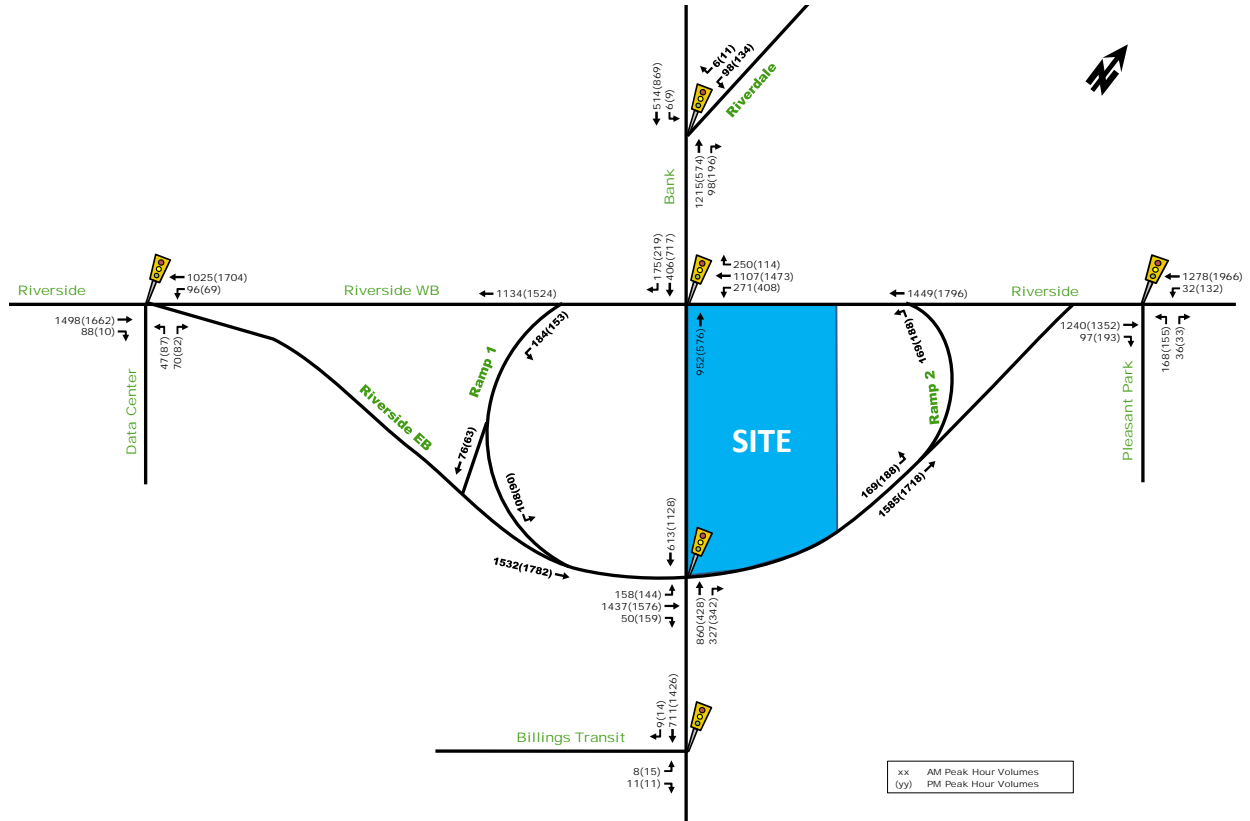
Description of other area developments taking place within the study area was provided in Section 2.1.3 - Other Area Developments. Traffic volumes anticipated to be generated by the future adjacent development at 1346 Bank St are illustrated in Figure 13.

Figure 13: 1346 Bank St Anticipated Site-Generated Traffic



Since the adjacent future development at 1346 Bank St is anticipated to be constructed in two phases, with both phases taking place after the full buildout of the subject development at 1335 & 1339 Bank St (2022), the traffic volumes in Figure 13 are added only to the future background 2027 traffic volumes in Figure 12. The resulting total future background 2027 traffic volumes are illustrated in Figure 14.

**Figure 14: Total Future Background 2027 Traffic Volumes**



### 3.3. Demand Rationalization

Total projected traffic volumes for horizon years 2022 and 2027 were determined by superimposing the site-generated traffic volumes in Figure 10, onto the future background 2022 and 2027 traffic volumes in Figure 11 and Figure 14. The resulting total projected 2022 and 2027 traffic volumes are illustrated in Figure 15 and Figure 16, respectively.

Figure 15: Total Projected 2022 Traffic Volumes

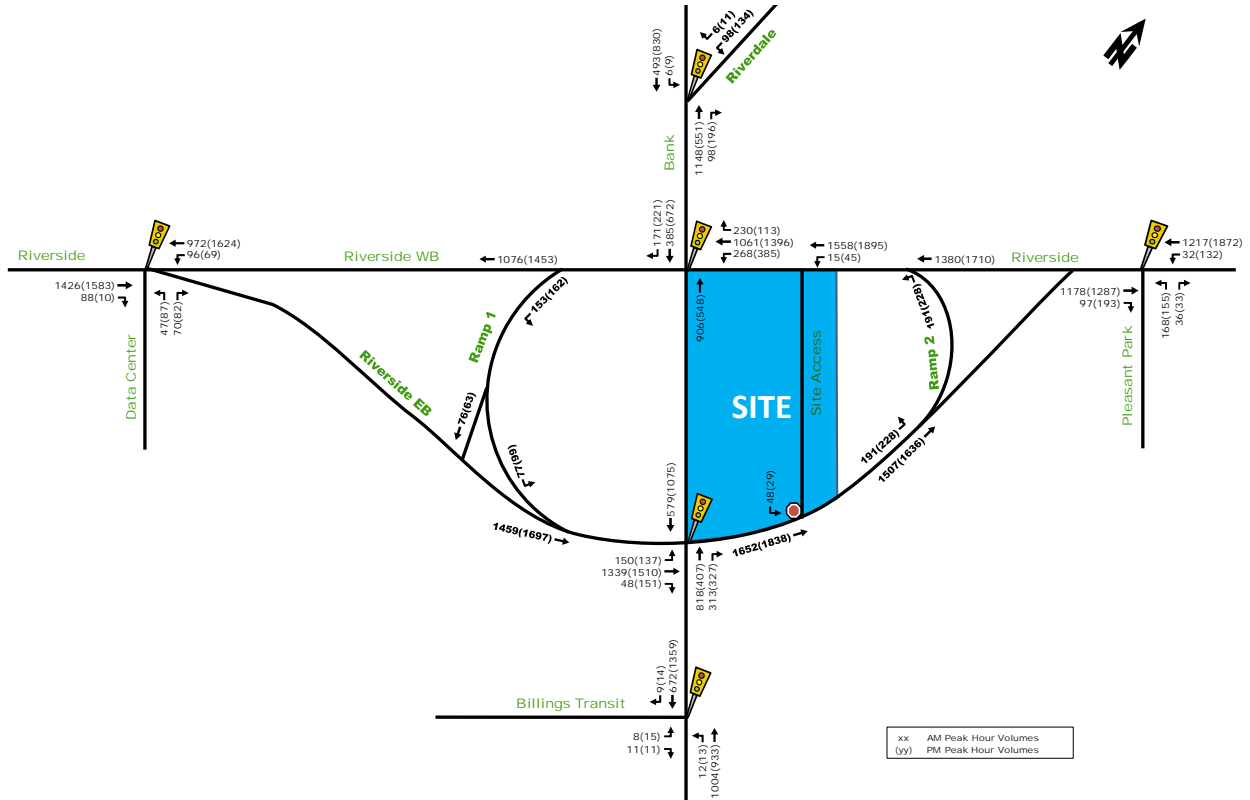
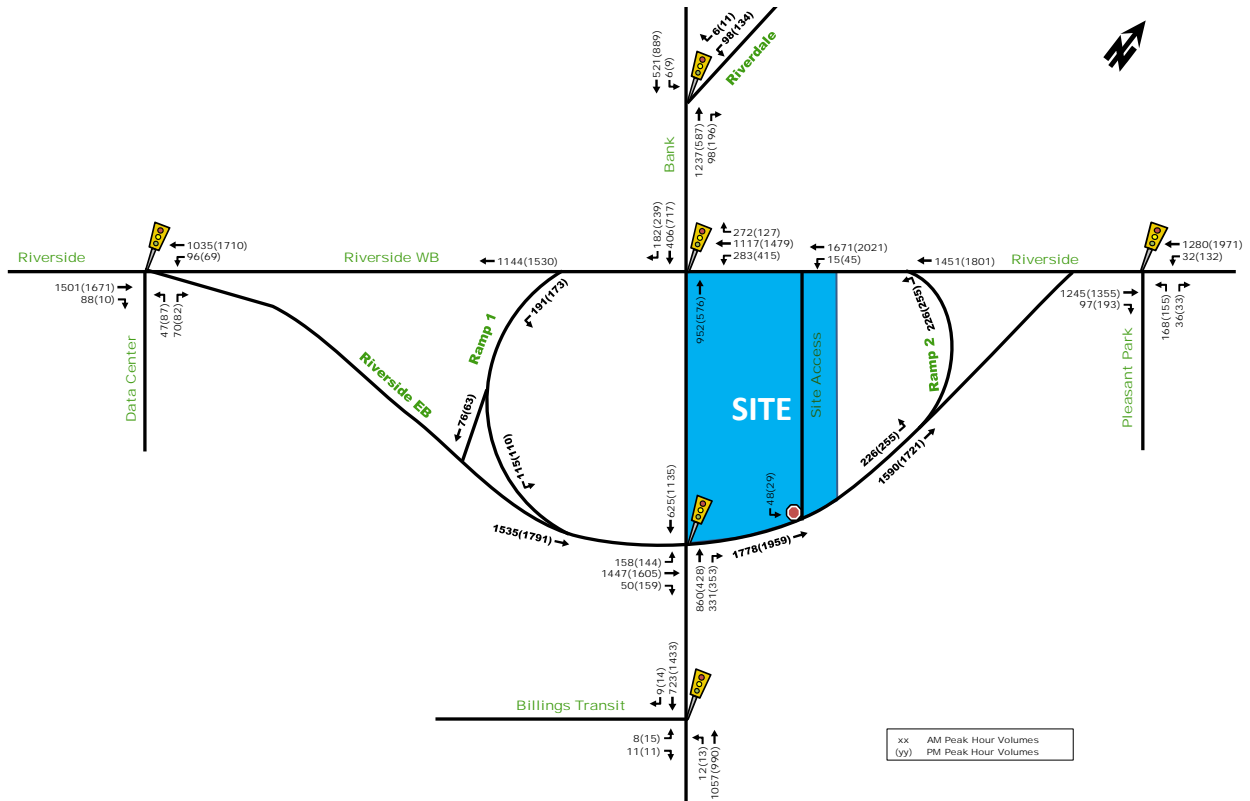


Figure 16: Total Projected 2027 Traffic Volumes



The total projected 2027 traffic volumes in Figure 16 illustrates a maximum through volume in the order of 1,150 veh/2-lane/h (575 per lane) in the peak direction of Bank St, at the Bank/Riverside intersections. Similarly, the maximum peak direction through traffic volume along Riverside Dr, at the Bank/Riverside intersections is in the order of 1,600 veh/2-lane/h (800 per lane). As the maximum ideal saturation flow rate of a single lane is 1,800 veh/h, the maximum anticipated traffic volumes of Bank St and Riverside Dr at the two Bank/Riverside intersections are well within the capacity limitations.

Furthermore, as mentioned in Section 2.1.3: Planned Study Area Transportation Network Changes, a Bank St renewal project is currently underway. The project entails the rehabilitation of the underground structures of Bank St, as well as cater to new surface elements such as sidewalks, bike lanes and transit facilities. This is anticipated to increase transit and active mode shares.

A detailed capacity analysis of study area intersections in existing and future conditions is provided in Section 4.9.2, as per the TIA Guidelines. This analysis will confirm any present or anticipated capacity issues within the study area.

## 4. Analysis

### 4.1. Development Design

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Design related elements will be provided in more detail in the future Site Plan Application submission of the proposed development. The City of Ottawa's TDM-supportive Development Design and Infrastructure will also be provided in the future submission.

Car parking spaces are proposed in the form of a two-level underground parking garage and surface parking spaces located along the internal driveway of the site (see Figure 2). Similarly, bicycle parking spaces are provided on a mezzanine level and within the two-level underground parking garage.

Transit amenities will continue to be provided along Bank St as described in Section 2.1.2: Transit Network. However, it is understood that OC Transpo intends to make some refinements to the bus stop locations in the area in concert with the Bank Street Renewal Project, including a relocation of the existing northbound stop on Bank St (currently near side Riverside WB) southerly towards Riverside EB. This move is reflected in the Concept Plan (see Figure 2).

### 4.2. Parking

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A total of approximately 170 vehicle parking spaces are proposed to be provided for the development, the majority of which are situated in two levels of underground parking, and the balance as surface parking spaces along the site's internal driveway (35 spaces, plus 6 motorcycle parking spaces). Four parallel parking spaces are also proposed in a lay-by area along Bank St, at the frontage of the site (see Section 4.3.1).

A total of approximately 270 bicycle parking spaces are proposed to be provided, the majority of which are situated on the mezzanine level of the building and the balance on the surface and/or the underground parking garage.

Based on the City of Ottawa's Parking Provisions and the location of the proposed development, a rate of 0.5 parking spaces per dwelling unit applies (row R12), which equates to 196 parking spaces. For visitor parking spaces, a rate of 0.1 per dwelling unit is required, which equates to 38 parking spaces. Furthermore, the minimum number of spaces required for bicycles is 0.5 per dwelling unit, which equates to approximately 196 parking spaces. As such, the number of proposed bicycle parking spaces meet the Parking Provisions requirements.



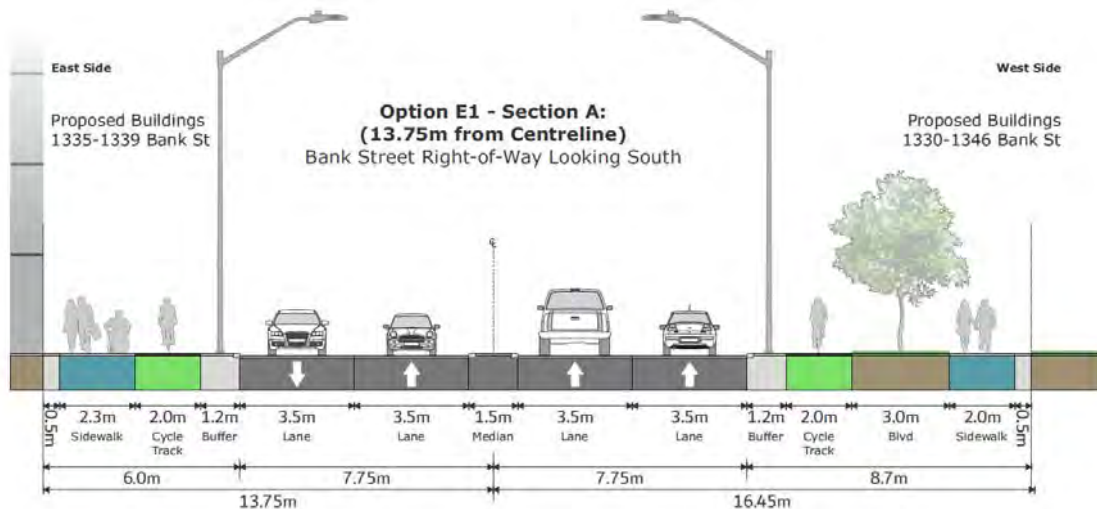
### 4.3. Boundary Street Design

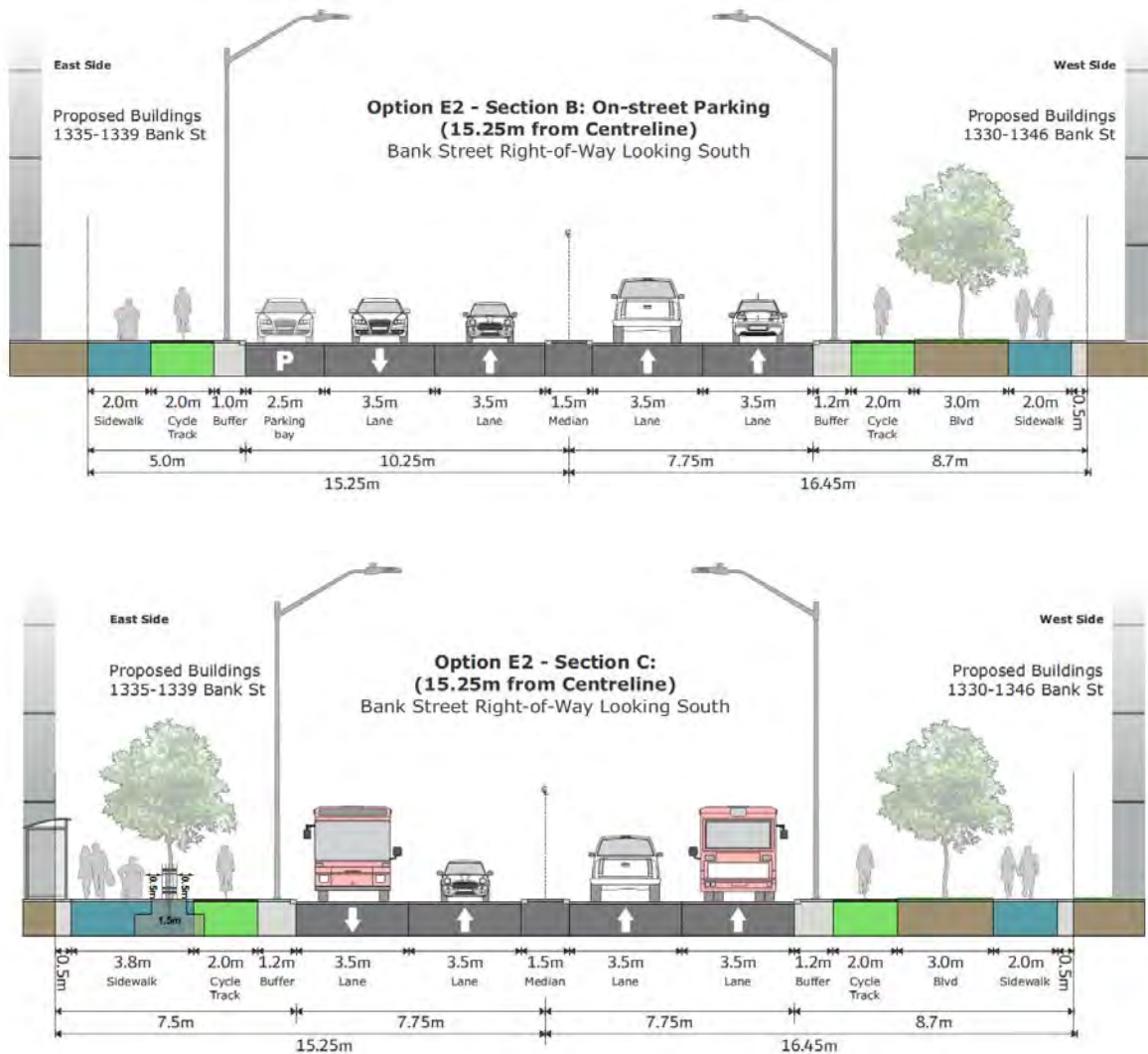
The detailed Multi-Modal Level of Service (MMLOS) analysis for boundary streets and intersections will be provided in the future Site Plan Application.

Preliminary discussions have taken place with the City regarding the right-of-way requirements for this section of Bank St related to both the subject development on the east side (1335 to 1339 Bank), as well as the adjacent development in the west side (1330 to 1346 Bank). The City has confirmed the need for a 1.5m centre median along the Bank St frontage on the basis that it maximizes safety, reduces vehicle speeds, provides space for additional roadway lighting, as well as supplemental signage and signal plant as required. Based on this direction, candidate cross-sections were created to help guide the discussion of the right-of-way (ROW) requirements for Bank St (see complete package as Appendix F).

There has been no resolution on the City's preferred cross-section for the east side of Bank St, along the site's frontage. Street cross-sections were developed at three locations, namely Section A at the north end, Section B in the middle, and Section C at the south end. Distances from centreline of 13.75m (E1) and 15.25m (E2) were proposed. The various cross-sections are intended to demonstrate how the resulting sidewalk and landscaping space between the edge of the cycle track and building face could be programmed. The wider 15.25m option provides the opportunity for enhanced landscaping treatments throughout, superior transit amenities, and a short on-street parking lane (2.5m) area mid-block (Section B). As shown in in Figure 17 below, the Proponent is proposing 13.75m from centerline in the northern portion of the site, and widening to 15.25m in the southern portion of the site. The cross-section for the west side of Bank St, along the frontage of the proposed development at 1330-1346 Bank St is still being determined.

Figure 17: Preferred Bank St Cross-Sections along Site Frontage (13.75m to 15.25m east of centreline)





Note that the above cross-section includes 2.0m cycle tracks and 2.0m sidewalk facilities that are considered consistent with the design guidelines established by the City for the Bank St Renewal Project (refer to the Functional Design plan in Appendix E). The Concept Plan in Figure 2 also illustrates the cycle track and sidewalk along the Bank St frontage of the site. On the north side of Riverside Dr EB, a new sidewalk is proposed within the site between that would link Bank Street and the site exit driveway to Riverside Dr EB (building exit and bike rooms provided on the south side of the building).

#### 4.3.1. STREET LAY-BY

The Concept Plan (see Figure 2) proposes an on-street lay-by within the site's Bank Street frontage. Such a feature is considered uncommon within an Arterial Mainstreet environment, rather more commonly found within a Traditional Mainstreet where the user experience along the corridor (including motorists) is one where one would expect curb side activity, such as on-street parking, loading, police services zones, taxi stands, street spots, etc. Although the formal Traditional Mainstreet designation for Bank St begins less than 100m away to the north at the Rideau River, it is understood that the vision of the Proponent is to convey this subject section of Bank St as a Traditional Mainstreet feel. The redevelopment of both sites, immediately south of the River, represents a significant (if not only) opportunity to create an appropriate transition before the bridge.

The following is a summary of the opportunities and constraints associated with the proposed lay-by for consideration.

Constraints	Opportunities
<ul style="list-style-type: none"> <li>The lay-by results in an expansion of overall road pavement width.</li> </ul>	<ul style="list-style-type: none"> <li>The length of the 2.5m wide lay-by is limited to 35m of the available 100m of Bank St frontage</li> </ul>
<ul style="list-style-type: none"> <li>The lay-by uses valuable space in the ROW that could otherwise be used for active modes, landscaping, etc.</li> </ul>	<ul style="list-style-type: none"> <li>A 2.0m wide cycle track and minimum 2.3m wide sidewalk is provided adjacent to the lay-by, in addition to planting boxes along the building face in this area.</li> </ul>
<ul style="list-style-type: none"> <li>The concept with the lay-by as depicted that assumes a 27.5m ROW line, would push the sidewalk onto private property – requiring a pedestrian easement. It is much preferred by the City to keep the sidewalk on public property whenever possible.</li> </ul>	<ul style="list-style-type: none"> <li>The proposed ROW in Bank St adjacent to the lay-by is 15.25m from centerline.</li> <li>A small easement would be required to achieve the full sidewalk width to be contained within the City ROW as noted above. Any easement could be minimized by eliminating the proposed centre median.</li> </ul>
<ul style="list-style-type: none"> <li>The lay-by is in a very congested area, and any parking maneuvers may potentially add to the congested environment, result in collisions (sideswipes, rear-ends) and delay transit vehicles.</li> </ul>	<ul style="list-style-type: none"> <li>The three existing driveways on the east side of Bank St within this section will be removed as a result of this development, while the three existing driveways on the west side serving 1330-1346 Bank St will be consolidated to a single driveway limited to right-in/right-out operation as a result of the proposed 1.5m wide centre median. As such turning movement conflicts in this segment will be minimized resulting in less mid-block congestion than today.</li> <li>Also note that there are no turning movements available for northbound vehicles on Bank St at Riverside WB leaving the lay-by, thereby minimizing the need for any aggressive lane changes immediately downstream.</li> <li>Parking maneuvers would be the only source of vehicle friction within this section, other than the when a bus is present at the stop. This may be desirable to reduce vehicle speeds in this section of Bank St.</li> <li>Should the lay-by not be provided, the Proponent has advised that it may be necessary to introduce a driveway connection to Bank St. This would adversely impact the Bank St frontage, introduce increased conflict with pedestrian and cyclists (where the driveway crosses the sidewalk and cycle track) and generate turning movement conflicts for vehicles. This alternative is considered to be less desirable from an active transportation perspective.</li> <li>Should the lay-by not be provided, it is envisioned that the same drop-off/pick-up behavior will occur in the curb lane, which is considered a less safe situation.</li> </ul>
<ul style="list-style-type: none"> <li>Although the intention is for the lay-by be restricted to short term parking or loading only, the fact the lay-by is located within City ROW means the area could be used as short term or longer-term hourly parking for visitors to all surrounding land uses. This would negate the intended benefit of providing an area for short-term pick-up and drop-off for tenants/deliveries.</li> </ul>	<ul style="list-style-type: none"> <li>The Proponent would be seeking support from the City given a relatively low parking supply rate is proposed for such a large scale building. Providing opportunities to eliminate the need for car ownership, such as a dedicated and convenient facility for pick-up and drop-off by car sharing/taxi, would be encouraged.</li> </ul>
<ul style="list-style-type: none"> <li>Section 3.15 of the City's Urban Design Guidelines for High-Rise Buildings outlines: <i>"Locate drop-off and pick up areas on private lands and where possible, at the rear of the property."</i></li> </ul>	<ul style="list-style-type: none"> <li>The narrow depth of the property limits the ability to provide a high-quality drop-off and pick-up area at the rear of the building.</li> <li>The Proponent has expressed a desire to identify a statement feature at the main Bank St entrance</li> </ul>

#### 4.4. Access Intersection Design

Access to the development is proposed through a one-way driveway that allows inbound only traffic at Riverside Dr WB and outbound only traffic at Riverside Dr EB. The driveways will be located approximately 20 to 25m east of Bank St.

Access design will be further explored in the future Site Plan Application; however, a summary of general features is provided below:

- The inbound driveway connection to Riverside Dr WB is situated near the eastern extent of the property to maximize the distance from the signalized Bank/Riverside WB intersection. There is a driveway 7m

upstream serving The Registry Building. The left-turn vehicle movements into the site driveway from Riverside Dr WB will occur from within the existing auxiliary turn lane serving the Bank St intersection.

- The outbound driveway connection to Riverside Dr EB is situated near the eastern extent of the property to maximize the distance from the signalized Bank/Riverside EB intersection. There is a driveway 35m downstream serving The Registry Building. The left-turn vehicle movements from the site driveway onto Riverside Dr EB will be into the median lane. From this point, vehicle can choose to travel eastbound on Riverside Dr or use Ramp x to access Riverside Dr WB and subsequently either direction on Bank St.
- Alternative driveway locations were also investigated as part of earlier iterations of the Concept, including a right-in/right-out connection to Bank St.

#### **4.5. Transportation Demand Management**

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The TDM Measures Checklist has been provided in Appendix G.

#### **4.6. Neighbourhood Traffic Management**

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Exempt – see Table 1.

#### **4.7. Transit**

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In the City of Ottawa TMP, Bank St is illustrated as a Transit Priority Corridor (Isolated Measures) at the frontage of the site. With regards to transit routes within the study area, the transit network is expected to remain as described in Section 2.1.2: Transit Network.

#### **4.8. Review of Network Concept**

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Exempt – see Table 1 and Section 3.1.1.

#### **4.9. Intersection Design**

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##### **4.9.1. INTERSECTION CONTROL**

The proposed development driveway is anticipated to use STOP Control at the outbound only access on Riverside Dr EB.

##### **4.9.2. INTERSECTION DESIGN**

Synchro 10 Trafficware was used to analyze intersection performance of intersections within the study area. Critical movements at each of the intersections were assessed based on either the movement with the highest volume-to-capacity ratio (for signalized intersections), or the movement experiencing the highest average delay (for unsignalized intersections). It should be noted that, as per the TIA Guidelines, the Peak Hour Factor (PHF) used for analysis was 0.9 in existing conditions and 1.0 in all future scenario conditions. All Synchro report outputs for existing and future conditions have been provided in Appendix H.

##### **Existing Conditions**

Table 14 below summarizes the intersection performance of study area intersections, based on existing conditions traffic volumes illustrated in Figure 7.

Table 14: Existing Conditions Intersection Performance

Intersection	Weekday AM Peak (PM Peak)					
	Critical Movement			Intersection 'As a Whole'		
	LOS	max. v/c or avg. delay (s)	Movement	Delay (s)	LOS	v/c
Bank St/Riverdale Ave (S)	A(B)	0.54(0.65)	NBT(WBL)	7.6(7.6)	A(A)	0.45(0.43)
Bank St/Riverside Dr WB (S)	D(E)	0.83(0.93)	WBT(WBT)	13.7(16.9)	C(D)	0.80(0.88)
Bank St/Riverside Dr EB (S)	D(E)	0.84(1.00)	EBT(EBT)	24.1(29.1)	C(E)	0.80(0.95)
Bank St/Billings Transit (S)	A(A)	0.35(0.49)	NBT(SBT)	1.9(3.8)	A(A)	0.35(0.48)
Data Centre Rd/Riverside Dr (S)	B(D)	0.69(0.81)	EBT(EBT)	12.0(17.6)	B(C)	0.67(0.78)
Pleasant Park Rd/Riverside Dr (S)	F(F)	1.05(1.38)	EBT(EBT)	42.8(154.5)	E(F)	0.94(1.23)
Note: Analysis of signalized intersections assumes a PHF of 0.9 and a saturation flow rate of 1800 veh/h/lane. (S) – Signalized intersection.						

As shown in Table 14, the critical movement at the intersection of Bank St//Riverside Dr WB operates near capacity during the afternoon peak hour. Similarly, the critical movement at Bank St/Riverside Dr EB, as well as the intersection 'as a whole' operate near capacity during the afternoon peak hour.

Critical movements at the intersection of Pleasant Park Rd/Riverside Dr operate at capacity during both peak hours the intersection 'as a whole' operates near capacity during the morning peak hour and at capacity during the afternoon peak hour.

### Future Background 2022

Table 15 below summarizes the Synchro traffic operations at study area intersections, based on future background 2022 conditions in Figure 11.

Table 15: Future Background 2022 Intersection Performance

Intersection	Weekday AM Peak (PM Peak)					
	Critical Movement			Intersection 'As a Whole'		
	LOS	max. v/c or avg. delay (s)	Movement	Delay (s)	LOS	v/c
Bank St/Riverdale Ave (S)	A(B)	0.49(0.62)	NBT(WBL)	7.0(7.1)	A(A)	0.41(0.39)
Bank St/Riverside Dr WB (S)	C(D)	0.76(0.86)	WBT(WBT)	12.5(12.2)	C(D)	0.73(0.81)
Bank St/Riverside Dr EB (S)	C(E)	0.77(0.92)	EBT(EBT)	23.0(21.5)	C(D)	0.73(0.87)
Bank St/Billings Transit (S)	A(A)	0.32(0.45)	NBT(SBT)	1.8(3.0)	A(A)	0.32(0.44)
Data Centre Rd/Riverside Dr (S)	B(B)	0.62(0.70)	EBT(EBT)	10.9(15.1)	A(B)	0.60(0.68)
Pleasant Park Rd/Riverside Dr (S)	E(F)	0.96(1.27)	EBT(EBT)	31.4(111.8)	D(F)	0.86(1.13)
Note: Analysis of signalized intersections assumes a PHF of 1.0 and a saturation flow rate of 1800 veh/h/lane. (S) – Signalized intersection.						

As shown in Table 15, study area intersections are projected to operate better than existing conditions due to increasing the PHF to 1.0. The intersection of Pleasant Park Rd/Riverside Dr still operate at capacity during the afternoon peak hour.

### Total Future Background 2027

Table 16 below summarizes the Synchro traffic operations at study area intersections, based on total future background traffic volumes in Figure 14.

Table 16: Total Future Background 2027 Intersection Performance

Intersection	Weekday AM Peak (PM Peak)					
	Critical Movement			Intersection 'As a Whole'		
	LOS	max. v/c or avg. delay (s)	Movement	Delay (s)	LOS	v/c
Bank St/Riverdale Ave (S)	A(B)	0.53(0.62)	NBT(WBL)	7.2(7.1)	A(A)	0.44(0.41)
Bank St/Riverside Dr WB (S)	D(E)	0.82(0.91)	WBT(WBT)	13.5(13.7)	C(D)	0.78(0.87)
Bank St/Riverside Dr EB (S)	D(E)	0.83(0.98)	EBT(EBT)	24.1(26.0)	C(E)	0.78(0.92)
Bank St/Billings Transit (S)	A(A)	0.34(0.48)	NBT(SBT)	1.8(3.4)	A(A)	0.34(0.47)
Data Centre Rd/Riverside Dr (S)	B(C)	0.66(0.73)	EBT(EBT)	11.1(15.7)	B(C)	0.64(0.71)
Pleasant Park Rd/Riverside Dr (S)	F(F)	1.02(1.32)	EBT(EBT)	36.8(135.1)	E(F)	0.92(1.18)
Note: Analysis of signalized intersections assumes a PHF of 1.0 and a saturation flow rate of 1800 veh/h/lane. (S) – Signalized intersection.						

With regards to critical movements, the intersection of Bank St/Riverside Dr EB operates near capacity during the afternoon peak hour. The intersection of Pleasant Park Rd/Riverside Dr operates at capacity during both peak hours.

With regards to the intersections 'as a whole', the intersection of Pleasant Park Rd/Riverside Dr operates at capacity during the afternoon peak hour.

### Total Projected 2022

Based on total projected 2022 traffic volumes in Figure 15, study area intersections were analyzed using Synchro, with results summarized in Table 17 below.

Table 17: Total Projected 2022 Intersection Performance

Intersection	Weekday AM Peak (PM Peak)					
	Critical Movement			Intersection 'As a Whole'		
	LOS	max. v/c or avg. delay (s)	Movement	Delay (s)	LOS	v/c
Bank St/Riverdale Ave (S)	A(B)	0.50(0.62)	NBT(WBL)	7.0(7.1)	A(A)	0.42(0.40)
Bank St/Riverside Dr WB (S)	C(D)	0.78(0.87)	WBT(WBT)	13.0(12.6)	C(D)	0.74(0.83)
Bank St/Riverside Dr EB (S)	C(E)	0.77(0.93)	EBT(EBT)	23.1(22.6)	C(D)	0.73(0.88)
Bank St/Billings Transit (S)	A(A)	0.32(0.45)	NBT(SBT)	1.8(3.1)	A(A)	0.32(0.44)
Data Centre Rd/Riverside Dr (S)	B(B)	0.62(0.70)	EBT(EBT)	10.9(15.1)	A(B)	0.60(0.68)
Pleasant Park Rd/Riverside Dr (S)	E(F)	0.97(1.27)	EBT(EBT)	32.0(112.9)	D(F)	0.87(1.13)
Riverside Dr EB/Site Access (U)	B(B)	10.6(11.4)	SB(SB)	0.3(0.2)	-	-
Note: Analysis of signalized intersections assumes a PHF of 1.0 and a saturation flow rate of 1800 veh/h/lane. (S) – Signalized intersection. (U) – Unsignalized Intersection						

As shown in Table 17, study area intersections in total projected 2022 conditions are projected to operate similar to future background 2022 conditions, with slightly higher v/c ratios and delays. The SB movement of the proposed site access along Riverside Dr EB operates at LOS 'B' during both peak hours.

### Total Projected 2027

Based on total projected 2027 traffic volumes in Figure 16, study area intersections were analyzed using Synchro, with results summarized in Table 18 below.



Table 18: Total Projected 2027 Intersection Performance

Intersection	Weekday AM Peak (PM Peak)					
	Critical Movement			Intersection 'As a Whole'		
	LOS	max. v/c or avg. delay (s)	Movement	Delay (s)	LOS	v/c
Bank St/Riverdale Ave (S)	A(B)	0.53(0.62)	NBT(WBL)	7.2(7.1)	A(A)	0.44(0.41)
Bank St/Riverside Dr WB (S)	D(E)	0.84(0.92)	WBT(WBT)	14.0(14.6)	C(D)	0.80(0.88)
Bank St/Riverside Dr EB (S)	C(E)	0.80(0.95)	EBT(EBT)	24.2(26.4)	C(E)	0.78(0.93)
Bank St/Billings Transit (S)	A(A)	0.34(0.48)	NBT(SBT)	1.7(3.7)	A(A)	0.34(0.47)
Data Centre Rd/Riverside Dr (S)	B(C)	0.66(0.74)	EBT(EBT)	11.1(15.6)	B(C)	0.64(0.71)
Pleasant Park Rd/Riverside Dr (S)	F(F)	1.02(1.33)	EBT(EBT)	38.7(136.8)	E(F)	0.92(1.19)
Riverside Dr EB/Site Access (U)	B(B)	10.9(11.8)	SB(SB)	0.3(0.2)	-	-
Note: Analysis of signalized intersections assumes a PHF of 1.0 and a saturation flow rate of 1800 veh/h/lane. (S) – Signalized intersection. (U) – Unsignalized Intersection						

As shown in Table 18, study area intersections in total projected 2027 conditions are anticipated to operate similar to total future background 2027 conditions, with slightly higher v/c ratios and delays. With regards to critical movements, the intersection of Pleasant Park Rd/Riverside Dr continues to operate at capacity during both peak hours.

Note that the intersection of Bank St/Riverside Dr EB has been optimized in Synchro with regards to phase times, in order to reduce critical movement LOS to below capacity during the afternoon peak hour.

The proposed site access SB movement along Riverside Dr EB continues to operate at a LOS 'B' during both peak hours.

## 5. Findings, Conclusions and Recommendations

Based on the results summarized herein, the following transportation related conclusions are offered:

### Proposed Development

- The proposed development will consist of a high-rise residential building, which will be constructed in a single phase.
- The existing car service shop/dealership and fast-food restaurant at 1335 and 1339 Bank St will be replaced by the proposed developments.
- The proposed building will consist of approximately 391 residential apartment units with 525m<sup>2</sup> of ground floor commercial space (Café/Bar, Fitness, etc.). Additionally, there is potential for 50 of the units to be designated as hotel rooms. (However, the change in units result in a negligible difference in vehicle trips.)
- A one-way driveway permitting inbound traffic along Riverside Dr WB and outbound traffic along Riverside Dr EB is proposed to serve the development.
- A total of 170 vehicle parking spaces are proposed to be provided, with 137 located within a two-level underground parking garage and 35 as surface parking spaces. A total of 270 bicycle parking spaces are also proposed, with 73 located in the underground parking garage and 196 on the ground floor of the proposed building.
- The number of vehicle trips anticipated to be generated by the proposed development is 61 and 37 veh/h during the morning and afternoon peak hours, respectively.

### Existing and Background Conditions

- In existing conditions, notable traffic operations include the following:
  - Critical movements at Pleasant Park Rd/Riverside Dr operate at capacity during both peak hours. The intersection 'as a whole' operates near capacity during the morning peak hour and at capacity during the afternoon peak hour.
  - Critical movements at the two Bank/Riverside intersections operate near capacity during the afternoon peak hour. The Bank St/Riverside Dr EB intersection 'as a whole' operates near capacity during the afternoon peak hour.
- A background growth rate of 1% per year was applied along Bank St and Riverside Dr between existing conditions and future horizon years 2022 and 2027.
- In future background 2022 conditions, study area intersections operate slightly better than existing conditions due to increasing the PHF to 1.0, as per TIA requirements.
- With regards to total future background 2027 conditions, Synchro indicates slightly higher v/c ratios and delays compared to existing conditions, with the critical movement at the intersection of Bank St/Riverside Dr EB operating at capacity during the afternoon peak hour.

### Projected Conditions

- Total projected 2022 traffic operations are similar to future background 2022 operations, where intersections are projected to operate better than existing conditions.
- In total projected 2027 conditions, the following traffic operations are noted:
  - Similar to existing conditions, critical movements at Pleasant Park Rd/Riverside Dr operate at capacity during both peak hours. The intersection 'as a whole' operates near capacity during the morning peak hour and at capacity during the afternoon peak hour.
  - The intersection of Bank St/Riverside Dr EB was optimized to reduce critical movement LOS to below capacity during the afternoon peak hour.
  - Critical movements at the Bank St/Riverside Dr WB intersection are projected to operate near capacity during both peak hours.
- With regards to the proposed site access, the outbound movement along Riverside Dr EB was analyzed with STOP Control and was projected to operate at a LOS 'B' during both the morning and afternoon peak hours of horizon years 2022 and 2027.
- Resolution on the proposed ROW for Bank St, as well as the proposed lay-by along a portion on the Bank St frontage, will be required before advancing to Site Plan Application.
- MMLOS analysis for signalized intersections and boundary streets within the study area will be provided in the future Site Plan Application.

In summary, the subject development is located in close proximity to existing rapid transit and active transportation networks, and although situated within the middle of the unusual configuration of the Bank/Riverside intersection, the vehicle access is well integrated and the development is forecasted to generate traffic volumes that do not adversely impact the performance of the nearby study area intersections. The development is recommended from a transportation perspective.

Prepared By:

Reviewed By:



Basel Ansari, EIT.  
Transportation Planner



Mark Baker, P.Eng.  
Senior Transportation Engineer



# Appendix A

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SCREENING FORM AND COMMENT RESPONSES

City of Ottawa 2017 TIA Guidelines

## TIA Screening Form

Date

11-Feb-20

Project

1335 Bank Street

Project Number

908489 - 50073

Results of Screening	Yes/No
Development Satisfies the Trip Generation Trigger	Yes
Development Satisfies the Location Trigger	Yes
Development Satisfies the Safety Trigger	Yes

Module 1.1 - Description of Proposed Development	
Municipal Address	1335 Bank Street
Description of location	East side of Bank Street, between Riverside Dr east and west
Land Use	Mixed-use (residential and first floor commercial space)
Development Size	405 residential apartment units and 594 m <sup>2</sup> commercial
Number of Accesses and Locations	2 accesses, one on Riverside east and one on Riverside west
Development Phasing	single phase
Buildout Year	2022
Sketch Plan / Site Plan	See attached

Module 1.2 - Trip Generation Trigger		
Land Use Type	Townhomes or Apartments	
Development Size	405	Units
Trip Generation Trigger Met?	Yes	

Module 1.3 - Location Triggers	
Development Proposes a new driveway to a boundary street that is designated as part of the City's Transit Priority, Rapid Transit, or Spine Bicycle Networks (See Sheet 3)	Yes
Development is in a Design Priority Area (DPA) or Transit-oriented Development (TOD) zone. (See Sheet 3)	Yes
Location Trigger Met?	Yes

Module 1.4 - Safety Triggers		
Posted Speed Limit on any boundary road	<80	km/h
Horizontal / Vertical Curvature on a boundary street limits sight lines at a proposed driveway	Yes	
A proposed driveway is within the area of influence of an adjacent traffic signal or roundabout (i.e. within 300 m of intersection in rural conditions, or within 150 m of intersection in urban/ suburban conditions) or within auxiliary lanes of an intersection;	Yes	
A proposed driveway makes use of an existing median break that serves an existing site	No	
There is a documented history of traffic operations or safety concerns on the boundary streets within 500 m of the development	Yes	
The development includes a drive-thru facility	No	
Safety Trigger Met?	Yes	

Responses can be found in green following the comments below.

Please review the following comments;

Project No.: 477450 - 01000	Project Address: 1335 & 1339 Bank Street
Applicant/Consultants/Developer: Parsons	Ward/Councillor: 17/Shawn Manard

This comment response sheet is to address the Forecasting Report comments received on April 23<sup>rd</sup>, 2020.

Comments:

#### **Transportation Engineering Services:**

- Recent studies completed by the City of Ottawa using 2016 census data show that the current transit and active mode shares for the Billings Bridge area are much higher than indicated in the 2011 OD survey for the Alta Vista district. Contact Jennifer Armstrong (613-580-2424 Ext 22899) for data. The proximity of quality transit, existing cycling links and the future revitalization of Bank Street should further increase the transit and active mode shares in the Billings Bridge area. The data from the 2016 census indicates that the area is currently experiencing 51-60% transit mode share. Ensure that the development provides supportive design and infrastructure to promote walking, cycling and transit use with an aim to exceed this value. Note that the pedestrian and cycling mode shares should also be separated and reflect the 2016 census data.

Noted. Transit mode share was increased to 55%, while the auto mode share was decreased to 25%. Cycling and pedestrian mode shares were separated. Sidewalk, bike lane and transit facilities are anticipated to be provided along Bank St and throughout the development site.

- Include the ramp connections as study area intersections.

The volume figures in the report have been adjusted to include the traffic volumes at the ramp connections.

- Combine the development-related trips to the background demand as part of the demand rationalization module. There are existing capacity concerns at both Riverside Drive and Bank Street intersections, therefore this module should not be omitted.

The Demand Rationalization section has been expanded upon in the report. As per the TIA Guidelines, a full analysis review is provided in Section 4.9.2 in the report.

#### **Traffic Signal Operations:**

- No comment.

Noted.

## Development Review – Transportation:

- The TIA forecasting does not appear to account for the proposed retail/café use on the main level that was mentioned at the pre-consult meeting. If the commercial component is proposed to be open to the public, this should be included within the analysis.

The trip generated has been revised to account for the Café/Bar space shown on the site's Concept Plan for the first floor of the building.

- Correct 'Existing Area Traffic Management Measures', as sidewalks and cycling facilities are not traffic management features.

The 'Existing Area Traffic Management Measures' section has been corrected.

- Providing at least the minimum amount of bicycle parking (0.5 per unit) is strongly recommended in this area. If the minimum is not met, then the applicant will need to either request for site specific relaxations as part of the ZBLA, or request a variance through the Committee of Adjustment as part of the Site Plan Application.

A total of 269 bicycle parking spaces are proposed, which meets the minimum requirement of 198 spaces.

# Appendix B

TRANSIT ROUTE MAPS

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# 5

## BILLINGS BRIDGE RIDEAU

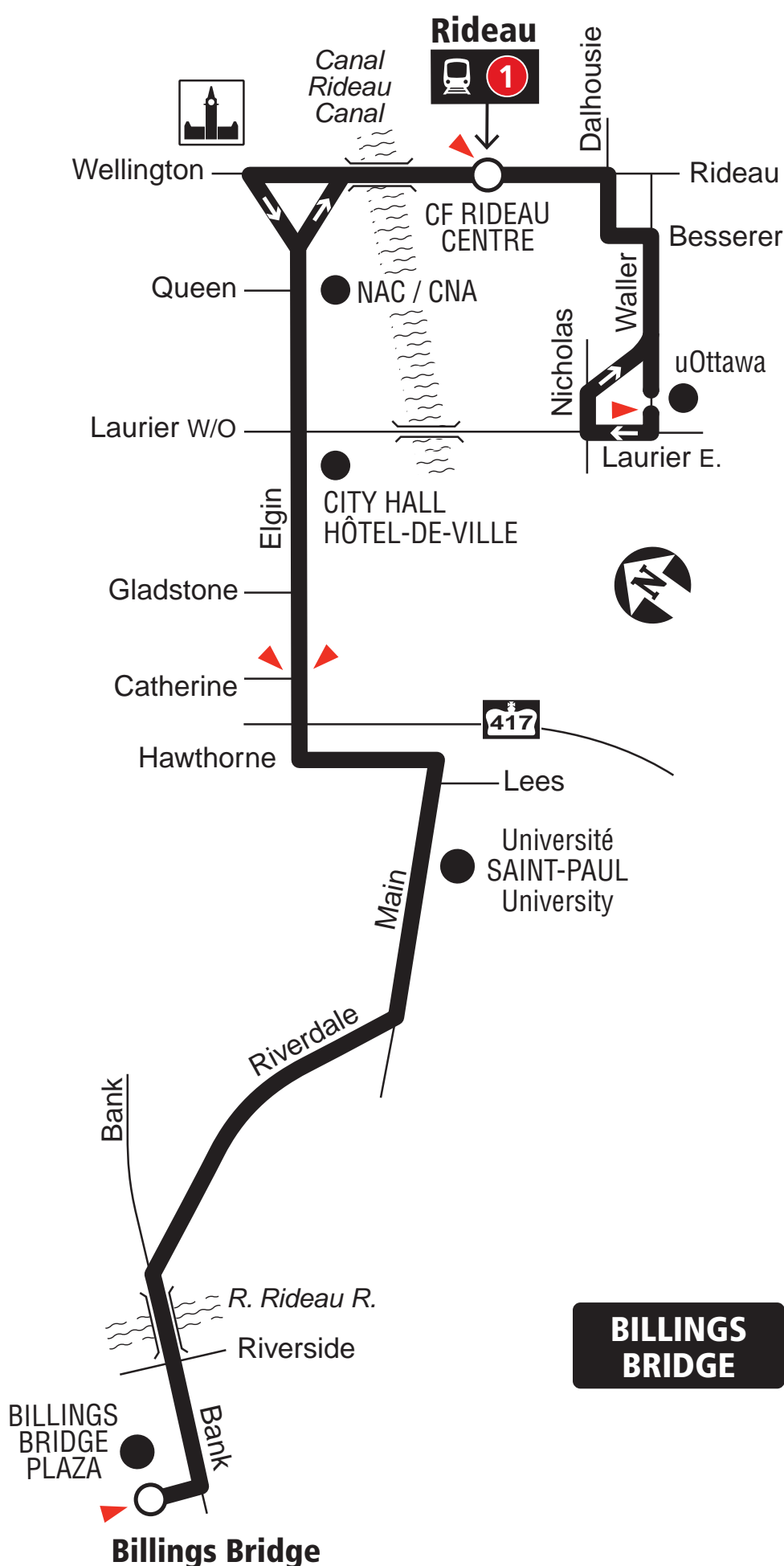
### Local

**7 days a week / 7 jours par semaine**

All day service

Service toute la journée

**RIDEAU**



**BILLINGS  
BRIDGE**



Station



Timepoint / Heures de passage

2019.07



# 1



**Future route after O-Train Line 1 is open**  
**Trajet du circuit après l'ouverture**  
**de la Ligne 1 de l'O-Train**

Lost and Found / Objets perdus..... **613-563-4011**

Security / Sécurité..... **613-741-2478**

**OC Transpo**

**INFO 613-741-4390**  
**octranspo.com**



6

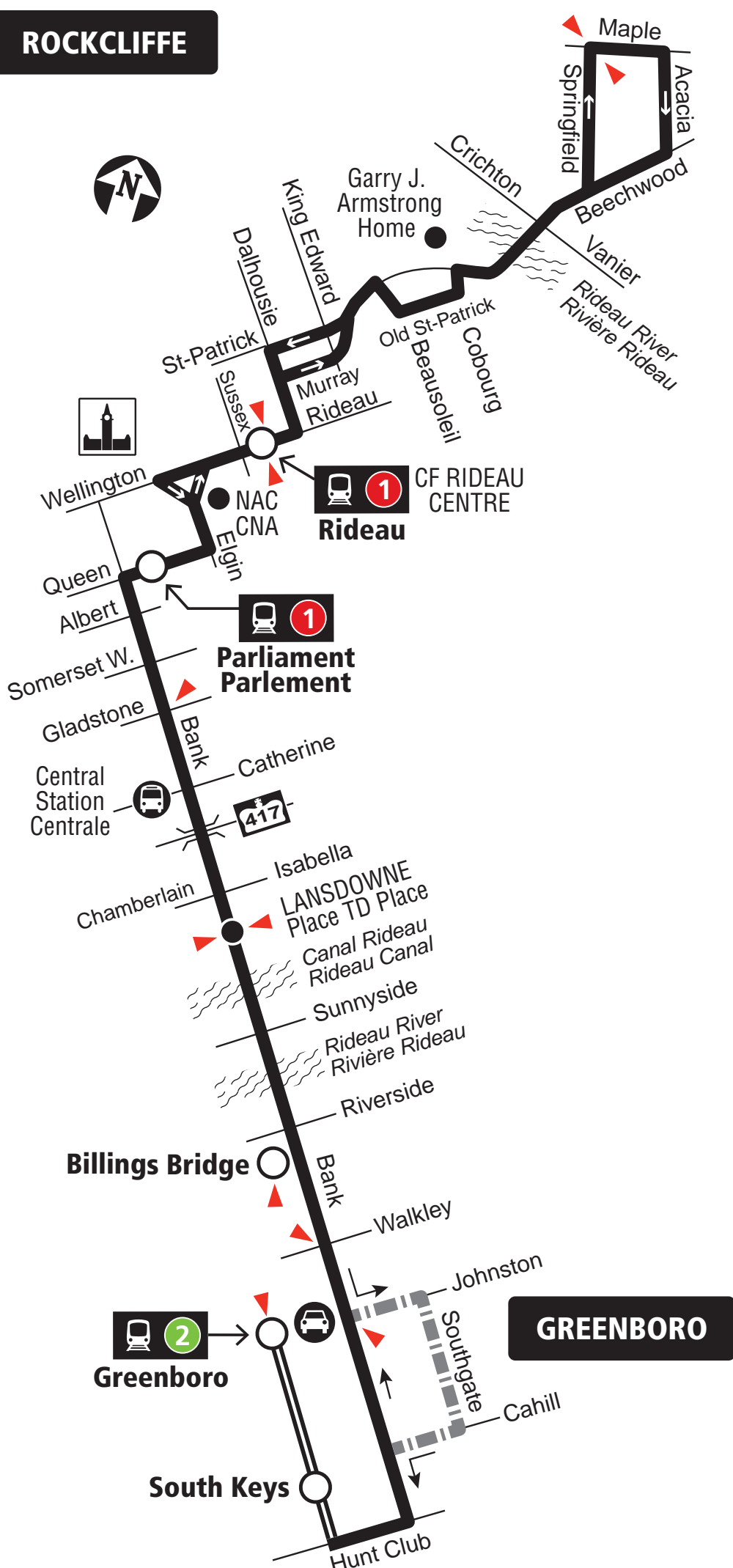
# ROCKCLIFFE GREENBORO

## Fréquent

### 7 days a week / 7 jours par semaine

#### All day service

#### Service toute la journée

**ROCKCLIFFE**
**GREENBORO**


Transitway &amp; Station

No early morning service /  
Aucun service matinal

Park &amp; Ride / Parc-o-Bus



Timepoint / Heures de passage

2019.06


**Schedule / Horaire.....613-560-1000**
**Text / Texto .....560560**
*plus your four digit bus stop number / plus votre numéro d'arrêt à quatre chiffres*
**Customer Service**
**Service à la clientèle ..... 613-741-4390**
**Lost and Found / Objets perdus..... 613-563-4011**
**Security / Sécurité ..... 613-741-2478**
**Effective September 2, 2018**
**En vigueur 2 septembre 2018**

**INFO 613-741-4390**  
**octranspo.com**



# Appendix C

TRAFFIC DATA

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# Transportation Services - Traffic Services

## Turning Movement Count - Full Study Peak Hour Diagram

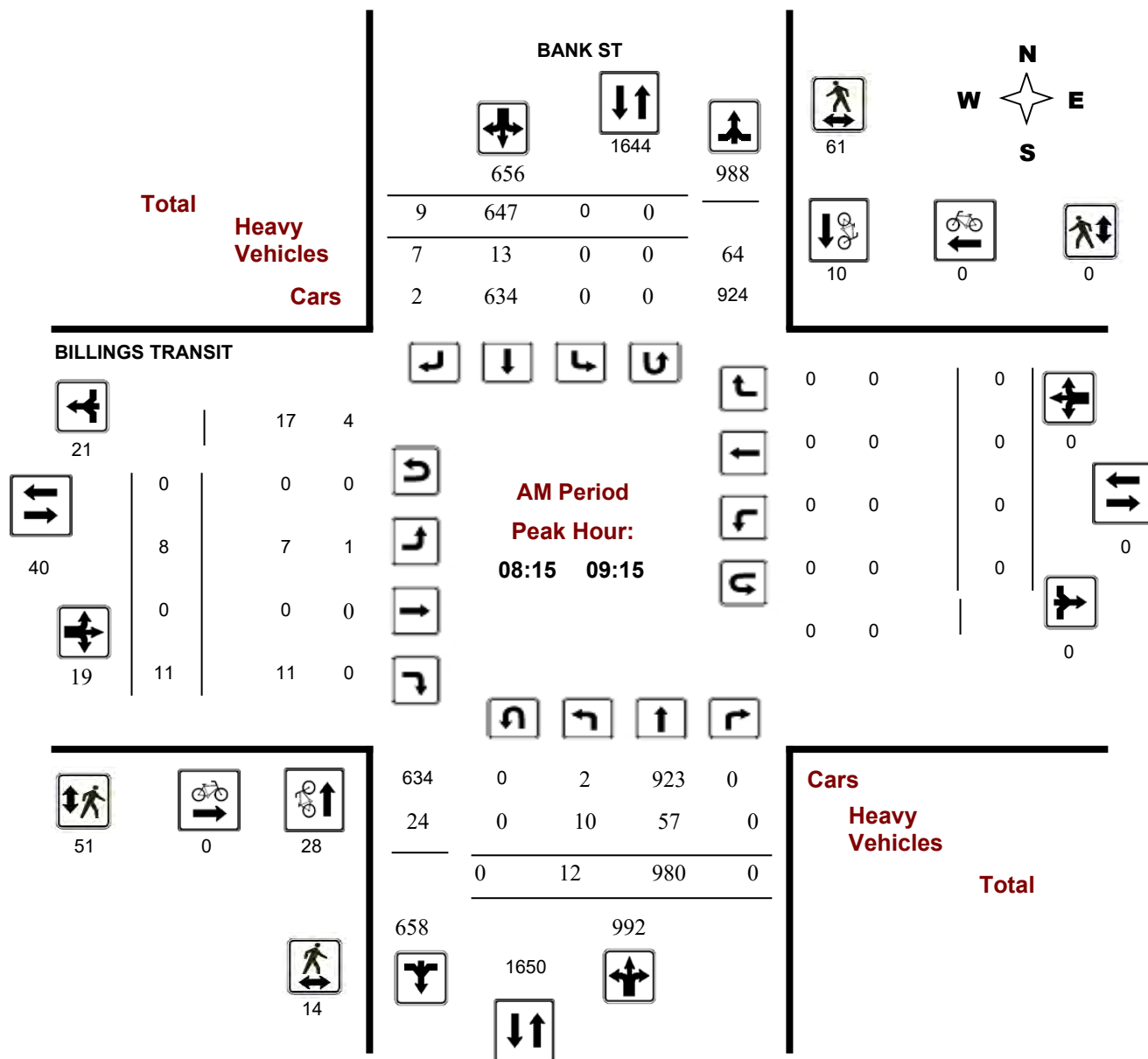
### BANK ST @ BILLINGS TRANSIT

**Survey Date:** Thursday, August 06, 2015

**Start Time:** 07:00

**WO No:** 35210

**Device:** Miovision





# Transportation Services - Traffic Services

## Turning Movement Count - Full Study Peak Hour Diagram

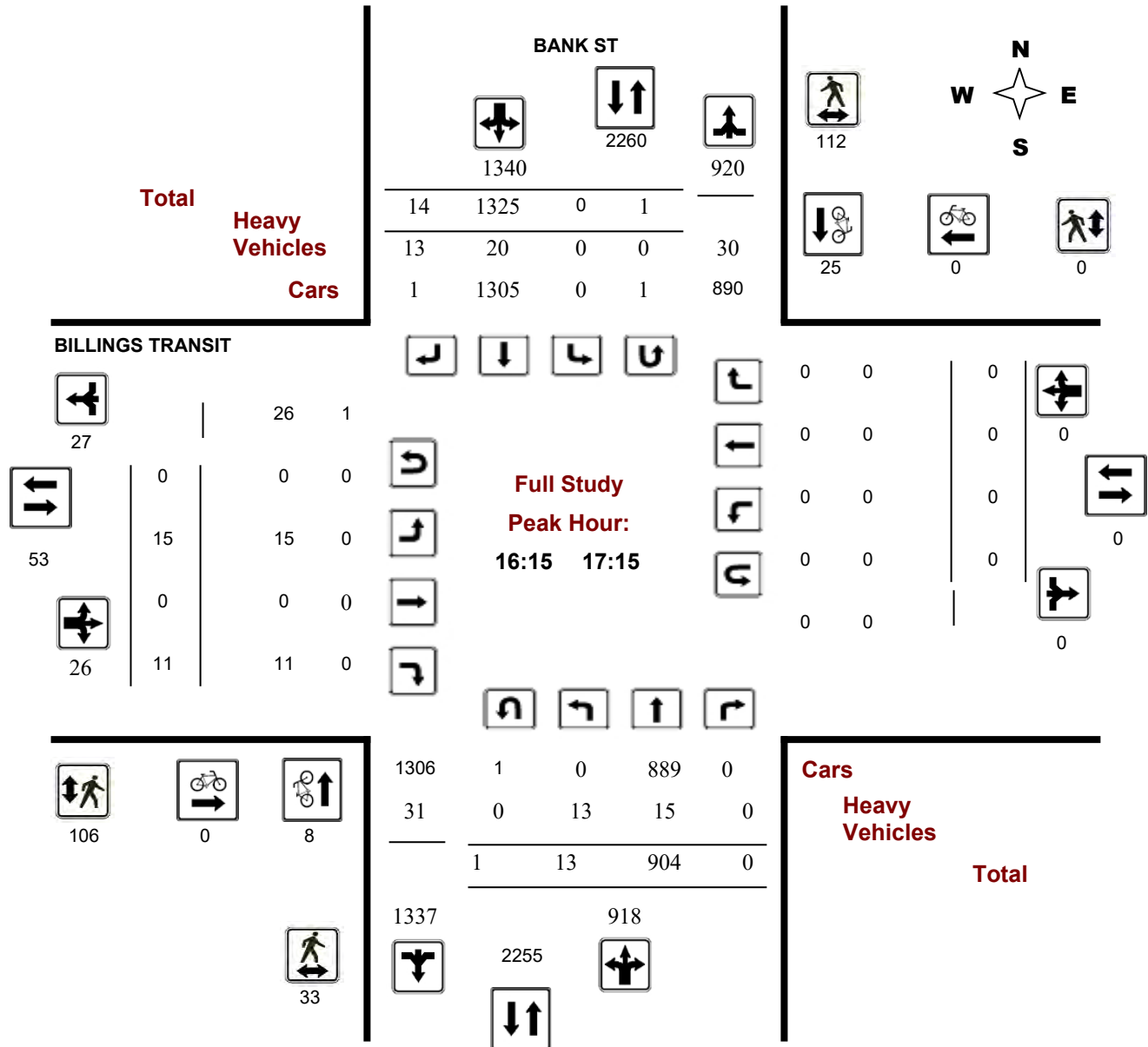
### BANK ST @ BILLINGS TRANSIT

**Survey Date:** Thursday, August 06, 2015

**Start Time:** 07:00

**WO No:** 35210

**Device:** Miovision





# Transportation Services - Traffic Services

## Turning Movement Count - Full Study Peak Hour Diagram

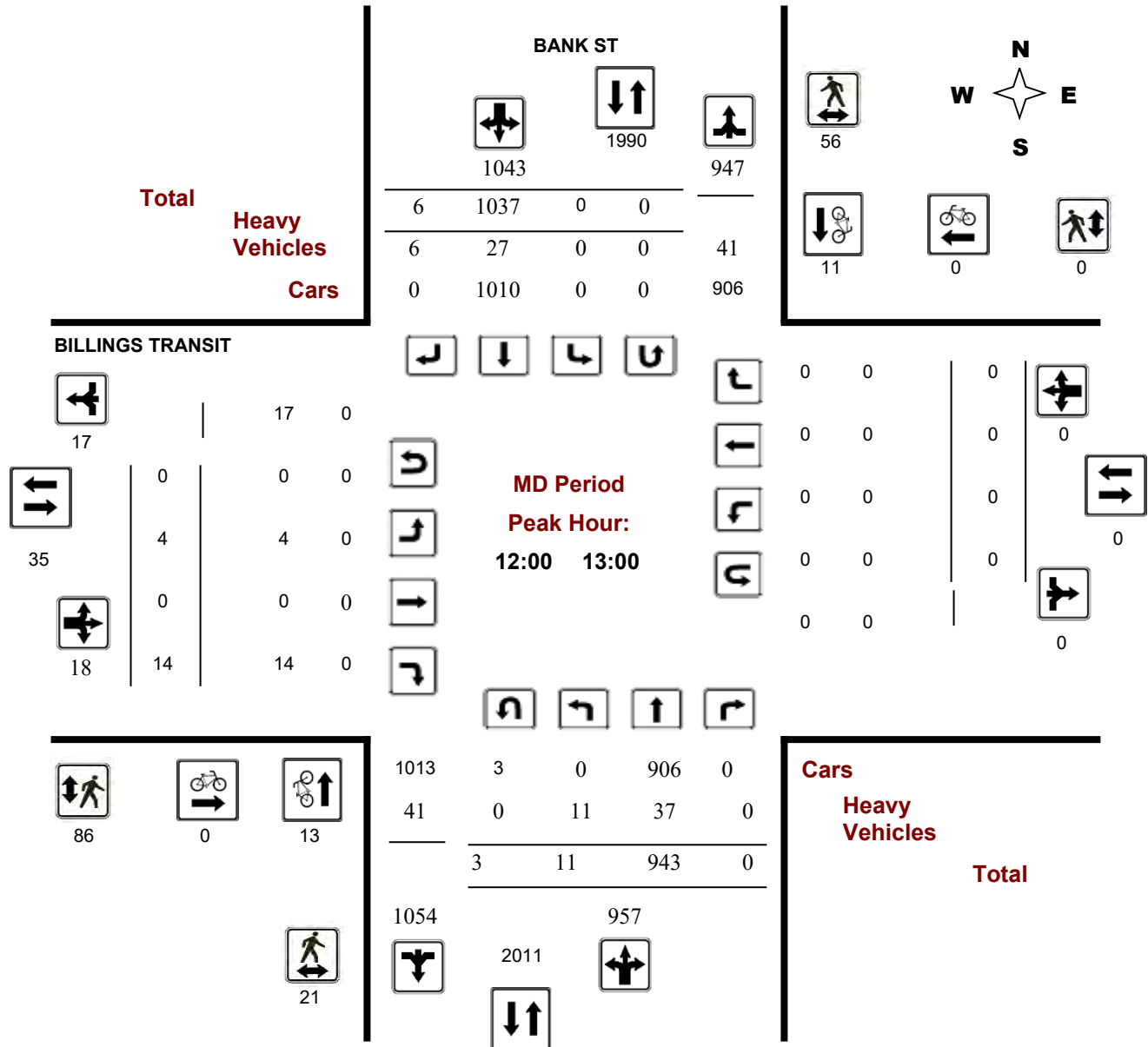
### BANK ST @ BILLINGS TRANSIT

**Survey Date:** Thursday, August 06, 2015

**Start Time:** 07:00

**WO No:** 35210

**Device:** Miovision



## Transportation Services - Traffic Services

### Turning Movement Count - Full Study Peak Hour Diagram

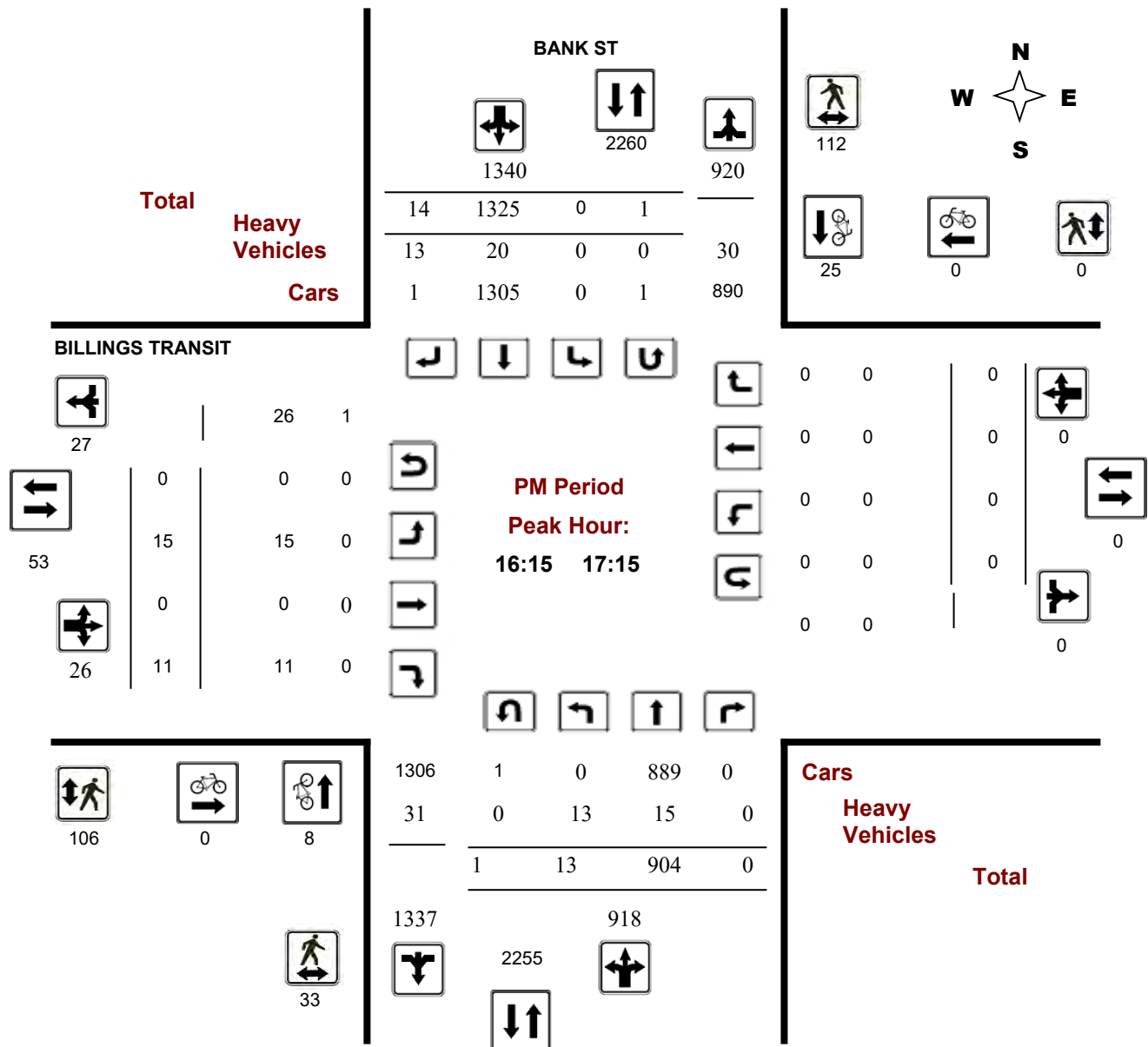
## BANK ST @ BILLINGS TRANSIT

**Survey Date:** Thursday, August 06, 2015

**Start Time:** 07:00

**WO No:** 35210

**Device:** Miovision



## Comments



# Transportation Services - Traffic Services

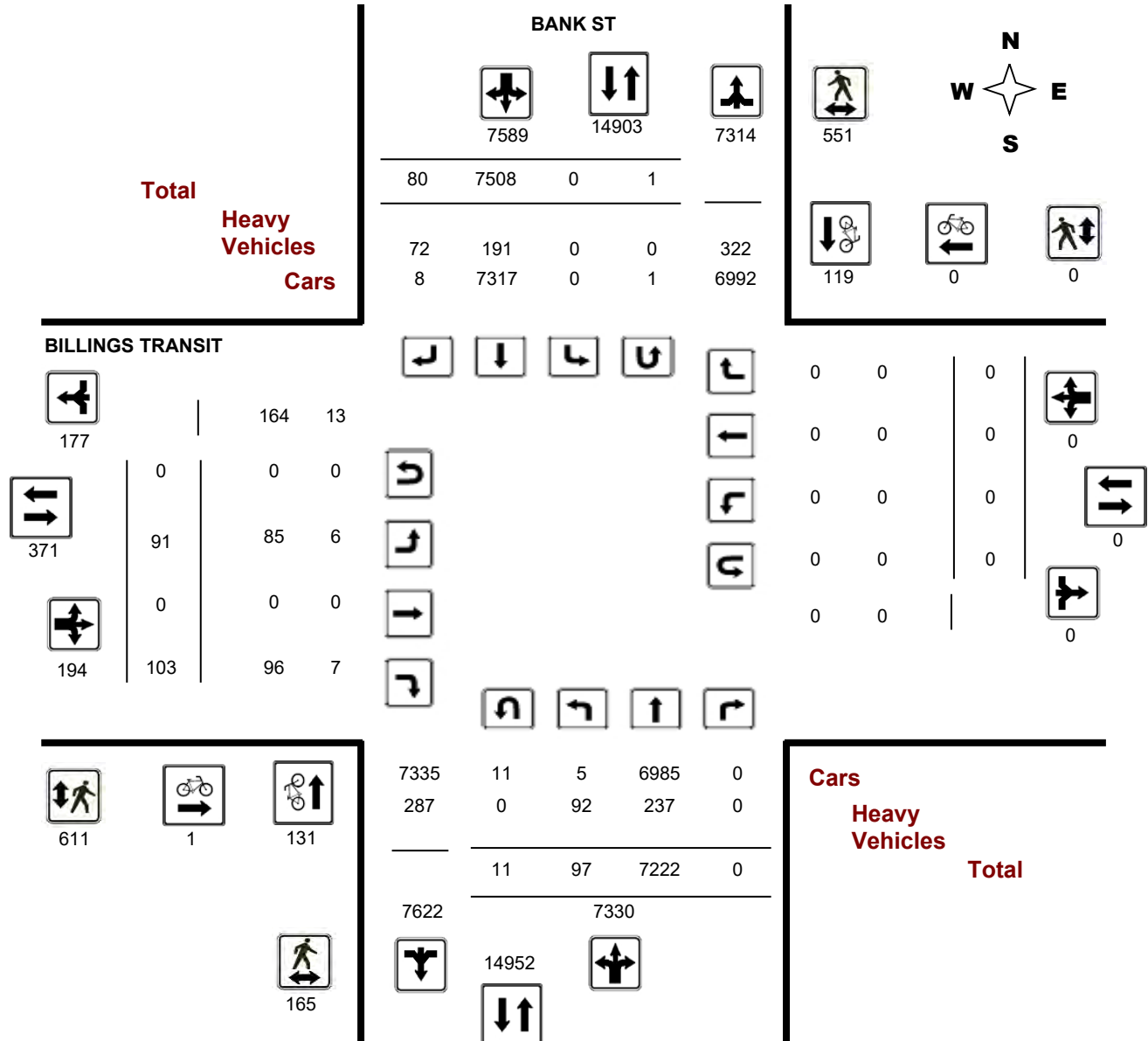
## Turning Movement Count - Full Study Diagram

### BANK ST @ BILLINGS TRANSIT

**Survey Date:** Thursday, August 06, 2015

**WO#:** 35210

**Device:** Miovision





## Turning Movement Count - Full Study Summary Report

### BANK ST @ BILLINGS TRANSIT

**Survey Date:** Thursday, August 06, 2015

**Total Observed U-Turns**

Northbound: 11 Southbound: 1  
Eastbound: 0 Westbound: 0

**AADT Factor**

.90

**Full Study**
**BANK ST**
**BILLINGS TRANSIT**

		Northbound				Southbound				Eastbound				Westbound				STR TOT	Grand Total	
		LT	ST	RT	NB TOT	LT	ST	RT	SB TOT	STR TOT	LT	ST	RT	EB TOT	LT	ST	RT			WB TOT
07:00	08:00	13	813	0	826	0	401	8	409	1235	16	0	13	29	0	0	0	0	29	1264
08:00	09:00	11	1012	0	1023	0	589	13	602	1625	11	0	10	21	0	0	0	0	21	1646
09:00	10:00	13	868	0	881	0	753	8	761	1642	8	0	14	22	0	0	0	0	22	1664
11:30	12:30	13	958	0	971	0	974	8	982	1953	5	0	13	18	0	0	0	0	18	1971
12:30	13:30	9	885	0	894	0	1073	6	1079	1973	9	0	14	23	0	0	0	0	23	1996
15:00	16:00	11	884	0	895	0	1219	10	1229	2124	12	0	12	24	0	0	0	0	24	2148
16:00	17:00	15	929	0	944	0	1295	15	1310	2254	15	0	13	28	0	0	0	0	28	2282
17:00	18:00	12	873	0	885	0	1204	12	1216	2101	15	0	14	29	0	0	0	0	29	2130
Sub Total		97	7222	0	7319	0	7508	80	7588	14907	91	0	103	194	0	0	0	0	194	15101
U Turns		11				1				12	0				0				0	12
Total		97	7222	0	7330	0	7508	80	7589	14919	91	0	103	194	0	0	0	0	194	15113
EQ 12Hr		135	10039	0	10189	0	10436	111	10549	20738	126	0	143	270	0	0	0	0	270	21008
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.														1.39						
AVG 12Hr		121	9035	0	9170	0	9393	100	9494	18664	114	0	129	243	0	0	0	0	243	18907
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.														.90						
AVG 24Hr		159	11835	0	12012	0	12304	131	12437	24449	149	0	169	318	0	0	0	0	318	24767
Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor.														1.31						

**Comments:**

Note: U-Turns provided for approach totals. Refer to 'U-Turn' Report for specific breakdown.





## Turning Movement Count - 15 Minute Summary Report

### BANK ST @ BILLINGS TRANSIT

**Survey Date:** Thursday, August 06, 2015

**Total Observed U-Turns**

Northbound: 11 Southbound: 1  
Eastbound: 0 Westbound: 0

BANK ST										BILLINGS TRANSIT										Grand Total
Northbound					Southbound					Eastbound					Westbound					
Time Period	LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT		
07:00 07:15	2	168	0	170	0	93	2	95	265	4	0	4	8	0	0	0	0	8	273	
07:15 07:30	3	189	0	192	0	77	1	78	270	4	0	3	7	0	0	0	0	7	277	
07:30 07:45	4	215	0	219	0	117	2	119	338	3	0	2	5	0	0	0	0	5	343	
07:45 08:00	4	241	0	246	0	114	3	117	363	5	0	4	9	0	0	0	0	9	372	
08:00 08:15	3	253	0	256	0	125	5	130	386	4	0	3	7	0	0	0	0	7	393	
08:15 08:30	4	247	0	251	0	126	3	129	380	2	0	2	4	0	0	0	0	4	384	
08:30 08:45	1	259	0	260	0	179	3	182	442	3	0	2	5	0	0	0	0	5	447	
08:45 09:00	3	253	0	256	0	159	2	161	417	2	0	3	5	0	0	0	0	5	422	
09:00 09:15	4	221	0	225	0	183	1	184	409	1	0	4	5	0	0	0	0	5	414	
09:15 09:30	4	192	0	197	0	163	2	165	362	1	0	3	4	0	0	0	0	4	366	
09:30 09:45	1	228	0	229	0	211	5	216	445	3	0	4	7	0	0	0	0	7	452	
09:45 10:00	4	227	0	231	0	196	0	196	427	3	0	3	6	0	0	0	0	6	433	
11:30 11:45	3	247	0	251	0	249	2	251	502	1	0	1	2	0	0	0	0	2	504	
11:45 12:00	3	206	0	210	0	242	2	244	454	3	0	4	7	0	0	0	0	7	461	
12:00 12:15	1	257	0	258	0	243	3	246	504	1	0	4	5	0	0	0	0	5	509	
12:15 12:30	6	248	0	254	0	240	1	241	495	0	0	4	4	0	0	0	0	4	499	
12:30 12:45	0	200	0	200	0	280	1	281	481	1	0	3	4	0	0	0	0	4	485	
12:45 13:00	4	238	0	245	0	274	1	275	520	2	0	3	5	0	0	0	0	5	525	
13:00 13:15	3	207	0	210	0	256	2	258	468	2	0	4	6	0	0	0	0	6	474	
13:15 13:30	2	240	0	242	0	263	2	265	507	4	0	4	8	0	0	0	0	8	515	
15:00 15:15	3	219	0	222	0	299	3	302	524	4	0	2	6	0	0	0	0	6	530	
15:15 15:30	4	224	0	230	0	293	1	294	524	2	0	4	6	0	0	0	0	6	530	
15:30 15:45	2	223	0	225	0	312	2	314	539	2	0	2	4	0	0	0	0	4	543	
15:45 16:00	2	218	0	220	0	315	4	319	539	4	0	4	8	0	0	0	0	8	547	
16:00 16:15	3	224	0	227	0	312	4	316	543	4	0	5	9	0	0	0	0	9	552	
16:15 16:30	6	236	0	242	0	312	3	315	557	5	0	3	8	0	0	0	0	8	565	
16:30 16:45	3	253	0	256	0	324	4	328	584	3	0	3	6	0	0	0	0	6	590	
16:45 17:00	3	216	0	219	0	347	4	351	570	3	0	2	5	0	0	0	0	5	575	
17:00 17:15	1	199	0	201	0	342	3	346	547	4	0	3	7	0	0	0	0	7	554	
17:15 17:30	3	231	0	235	0	306	1	307	542	5	0	3	8	0	0	0	0	8	550	
17:30 17:45	4	207	0	211	0	259	4	263	474	3	0	5	8	0	0	0	0	8	482	
17:45 18:00	4	236	0	240	0	297	4	301	541	3	0	3	6	0	0	0	0	6	547	
TOTAL:	97	7222	0	7330	0	7508	80	7589	14919	91	0	103	194	0	0	0	0	194	15113	

Note: U-Turns are included in Totals.

**Comment:**



# Transportation Services - Traffic Services

## Turning Movement Count - Cyclist Volume Report

Work Order  
35210

### BANK ST @ BILLINGS TRANSIT

**Count Date:** Thursday, August 06, 2015

**Start Time:** 07:00

Time Period	BANK ST			BILLINGS TRANSIT			Grand Total
	Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	
07:00 08:00	31	3	34	0	0	0	34
08:00 09:00	36	9	45	0	0	0	45
09:00 10:00	15	4	19	0	0	0	19
11:30 12:30	12	18	30	0	0	0	30
12:30 13:30	18	9	27	0	0	0	27
15:00 16:00	7	24	31	1	0	1	32
16:00 17:00	6	26	32	0	0	0	32
17:00 18:00	6	26	32	0	0	0	32
Total .....	131	119	250	1	0	1	251

**Comment:**

Note: These volumes consists of bicycles only (no mopeds or motorcycles) and ARE NOT included in the Turning Movement Count Summary.



# Transportation Services - Traffic Services

W.O.  
35210

## Turning Movement Count - Heavy Vehicle Report

### BANK ST @ BILLINGS TRANSIT

**Survey Date:** Thursday, August 06, 2015

BANK ST										BILLINGS TRANSIT										
Time Period		Northbound			Southbound			S TOTSTR TOT			Eastbound			Westbound			W TOTSTR TOT			Grand Total
		LT	ST	RT	N TOT	LT	ST				RT	LT	ST	RT	E TOT	LT				
07:00	08:00	12	31	0	43	0	21	7	28	71	16	0	12	28	0	0	0	0	28	99
08:00	09:00	11	62	0	73	0	12	9	21	94	9	0	10	19	0	0	0	0	19	113
09:00	10:00	11	33	0	44	0	31	7	38	82	6	0	13	19	0	0	0	0	19	101
11:30	12:30	13	35	0	48	0	20	7	27	75	5	0	12	17	0	0	0	0	17	92
12:30	13:30	9	33	0	42	0	35	6	41	83	9	0	12	21	0	0	0	0	21	104
15:00	16:00	10	13	0	23	0	38	10	48	71	12	0	11	23	0	0	0	0	23	94
16:00	17:00	15	20	0	35	0	16	14	30	65	14	0	13	27	0	0	0	0	27	92
17:00	18:00	11	10	0	21	0	18	12	30	51	14	0	13	27	0	0	0	0	27	78
Sub Total		92	237	0	329	0	191	72	263	592	85	0	96	181	0	0	0	0	181	773
U-Turns (Heavy Vehicles)					0				0	0				0				0	0	0
Total		92	237	0	0	0	191	72	263	592	85	0	96	181	0	0	0	0	181	773

Heavy Vehicles include Buses, Single-Unit Trucks and Articulated Trucks. Further, they ARE included in the Turning Movement Count Summary.



# Transportation Services - Traffic Services

Work Order

35210

## Turning Movement Count - Pedestrian Volume Report

### BANK ST @ BILLINGS TRANSIT

**Count Date:** Thursday, August 06, 2015

**Start Time:** 07:00

Time Period	NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	Total	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	Total	Grand Total
07:00 07:15	0	6	6	6	0	6	12
07:15 07:30	2	12	14	11	0	11	25
07:30 07:45	0	9	9	11	0	11	20
07:45 08:00	5	19	24	21	0	21	45
07:00 08:00	7	46	53	49	0	49	102
08:00 08:15	5	8	13	18	0	18	31
08:15 08:30	3	19	22	11	0	11	33
08:30 08:45	5	16	21	16	0	16	37
08:45 09:00	2	14	16	11	0	11	27
08:00 09:00	15	57	72	56	0	56	128
09:00 09:15	4	12	16	13	0	13	29
09:15 09:30	5	14	19	12	0	12	31
09:30 09:45	3	13	16	16	0	16	32
09:45 10:00	9	16	25	19	0	19	44
09:00 10:00	21	55	76	60	0	60	136
11:30 11:45	4	26	30	18	0	18	48
11:45 12:00	10	17	27	11	0	11	38
12:00 12:15	9	15	24	24	0	24	48
12:15 12:30	3	14	17	17	0	17	34
11:30 12:30	26	72	98	70	0	70	168
12:30 12:45	4	9	13	21	0	21	34
12:45 13:00	5	18	23	24	0	24	47
13:00 13:15	5	24	29	19	0	19	48
13:15 13:30	3	17	20	15	0	15	35
12:30 13:30	17	68	85	79	0	79	164
15:00 15:15	5	13	18	23	0	23	41
15:15 15:30	5	17	22	25	0	25	47
15:30 15:45	3	15	18	25	0	25	43
15:45 16:00	0	15	15	27	0	27	42
15:00 16:00	13	60	73	100	0	100	173
16:00 16:15	4	18	22	20	0	20	42
16:15 16:30	3	27	30	23	0	23	53
16:30 16:45	14	27	41	35	0	35	76
16:45 17:00	11	26	37	25	0	25	62
16:00 17:00	32	98	130	103	0	103	233
17:00 17:15	5	32	37	23	0	23	60
17:15 17:30	11	21	32	29	0	29	61
17:30 17:45	8	26	34	21	0	21	55
17:45 18:00	10	16	26	21	0	21	47
17:00 18:00	34	95	129	94	0	94	223
Total .....	165	551	716	611	0	611	1327

**Comment:**

## Turning Movement Count - 15 Min U-Turn Total Report

### BANK ST @ BILLINGS TRANSIT

**Survey Date:** Thursday, August 06, 2015

Time Period		Northbound U-Turn Total	Southbound U-Turn Total	Eastbound U-Turn Total	Westbound U-Turn Total	Total
07:00	07:15	0	0	0	0	0
07:15	07:30	0	0	0	0	0
07:30	07:45	0	0	0	0	0
07:45	08:00	1	0	0	0	1
08:00	08:15	0	0	0	0	0
08:15	08:30	0	0	0	0	0
08:30	08:45	0	0	0	0	0
08:45	09:00	0	0	0	0	0
09:00	09:15	0	0	0	0	0
09:15	09:30	1	0	0	0	1
09:30	09:45	0	0	0	0	0
09:45	10:00	0	0	0	0	0
11:30	11:45	1	0	0	0	1
11:45	12:00	1	0	0	0	1
12:00	12:15	0	0	0	0	0
12:15	12:30	0	0	0	0	0
12:30	12:45	0	0	0	0	0
12:45	13:00	3	0	0	0	3
13:00	13:15	0	0	0	0	0
13:15	13:30	0	0	0	0	0
15:00	15:15	0	0	0	0	0
15:15	15:30	2	0	0	0	2
15:30	15:45	0	0	0	0	0
15:45	16:00	0	0	0	0	0
16:00	16:15	0	0	0	0	0
16:15	16:30	0	0	0	0	0
16:30	16:45	0	0	0	0	0
16:45	17:00	0	0	0	0	0
17:00	17:15	1	1	0	0	2
17:15	17:30	1	0	0	0	1
17:30	17:45	0	0	0	0	0
17:45	18:00	0	0	0	0	0
Total		11	1	0	0	12



## Transportation Services - Traffic Services

### Turning Movement Count - Full Study Peak Hour Diagram

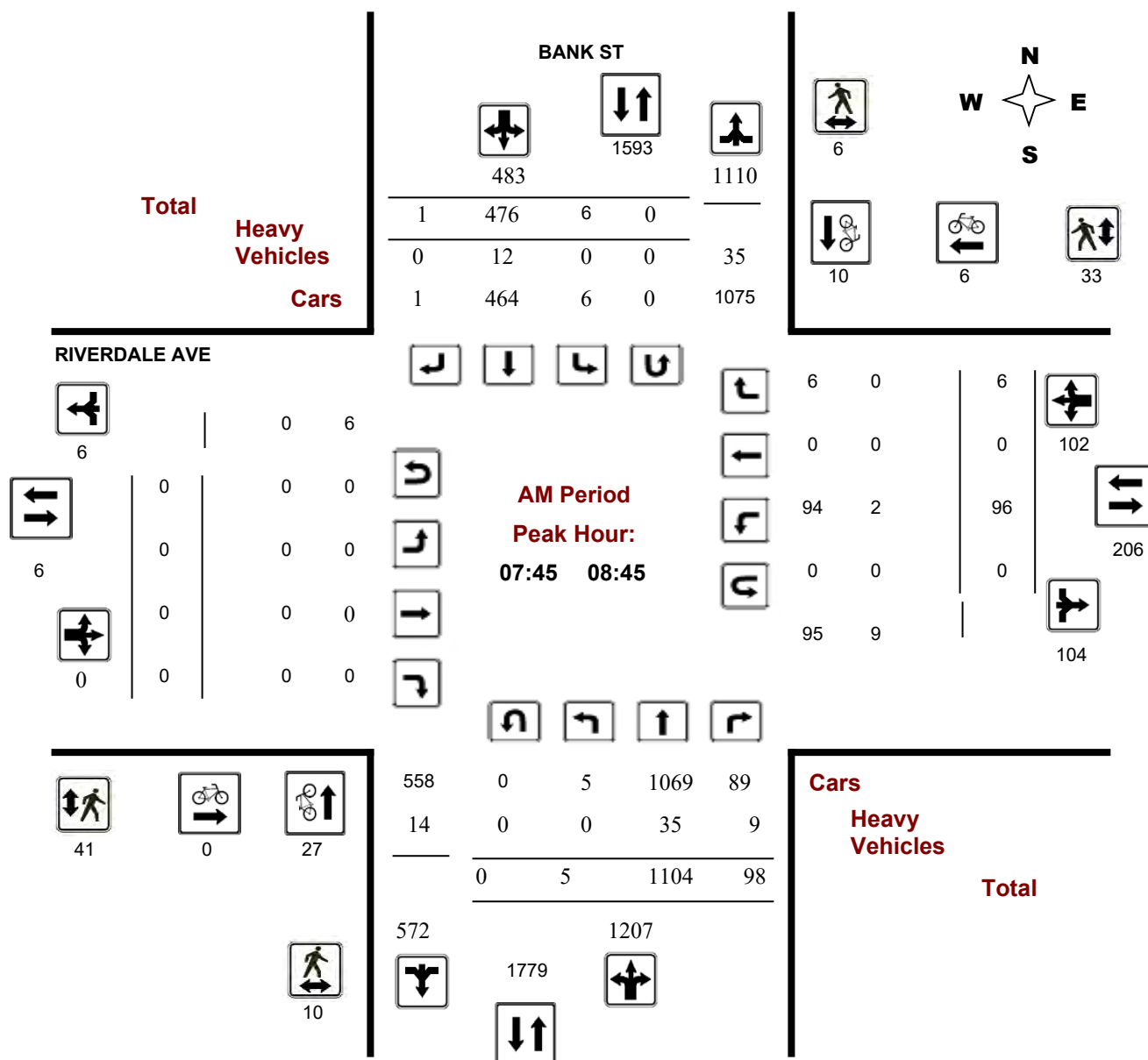
**BANK ST @ RIVERDALE AVE**

**Survey Date:** Tuesday, April 16, 2019

**Start Time:** 07:00

**WO No:** 38542

**Device:** Miovision



## Comments

## Transportation Services - Traffic Services

## Turning Movement Count - Full Study Peak Hour Diagram

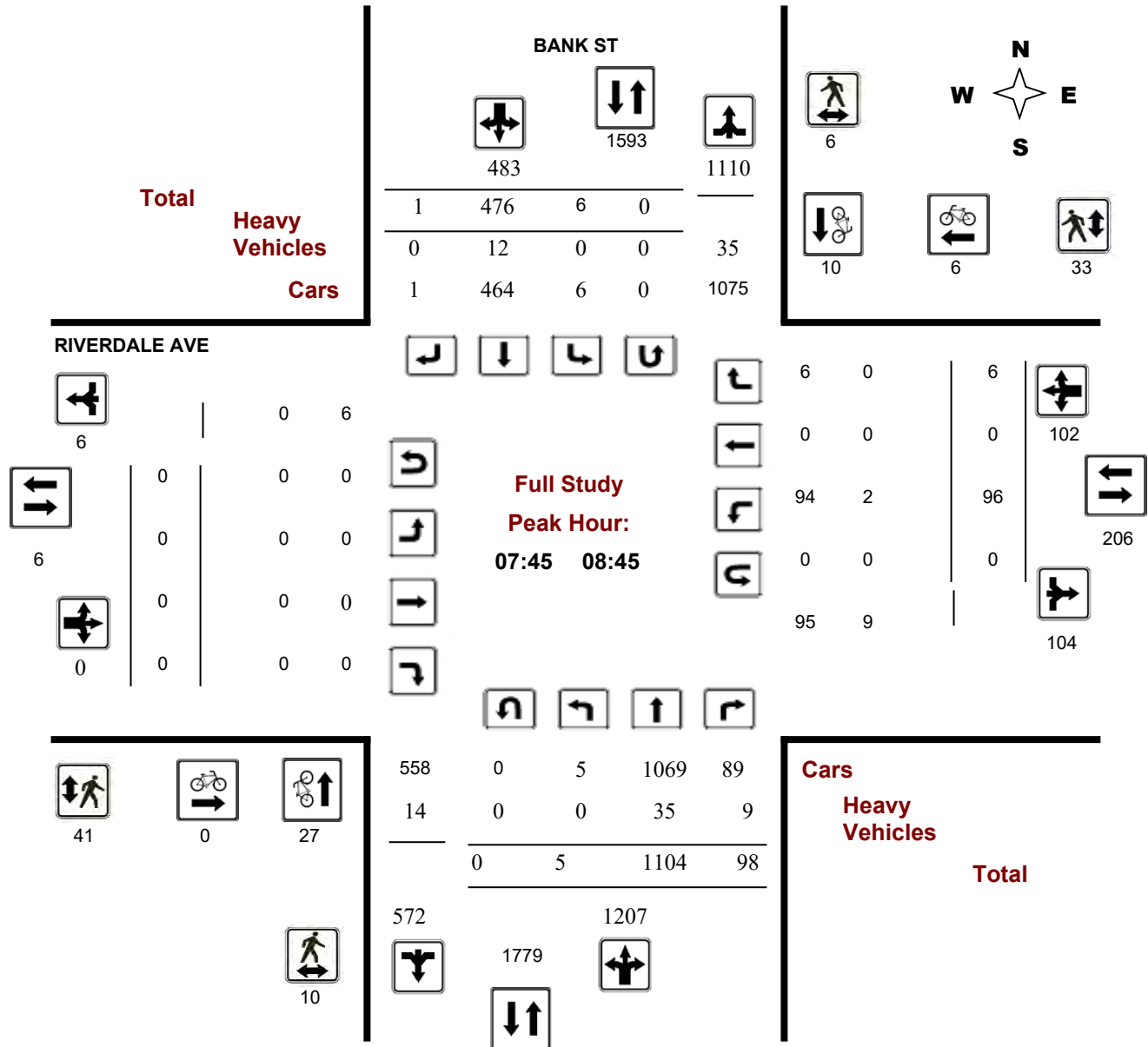
**BANK ST @ RIVERDALE AVE**

**Survey Date:** Tuesday, April 16, 2019

**Start Time:** 07:00

**WO No:** 38542

**Device:** Miovision



## Comments



# Transportation Services - Traffic Services

## Turning Movement Count - Full Study Peak Hour Diagram

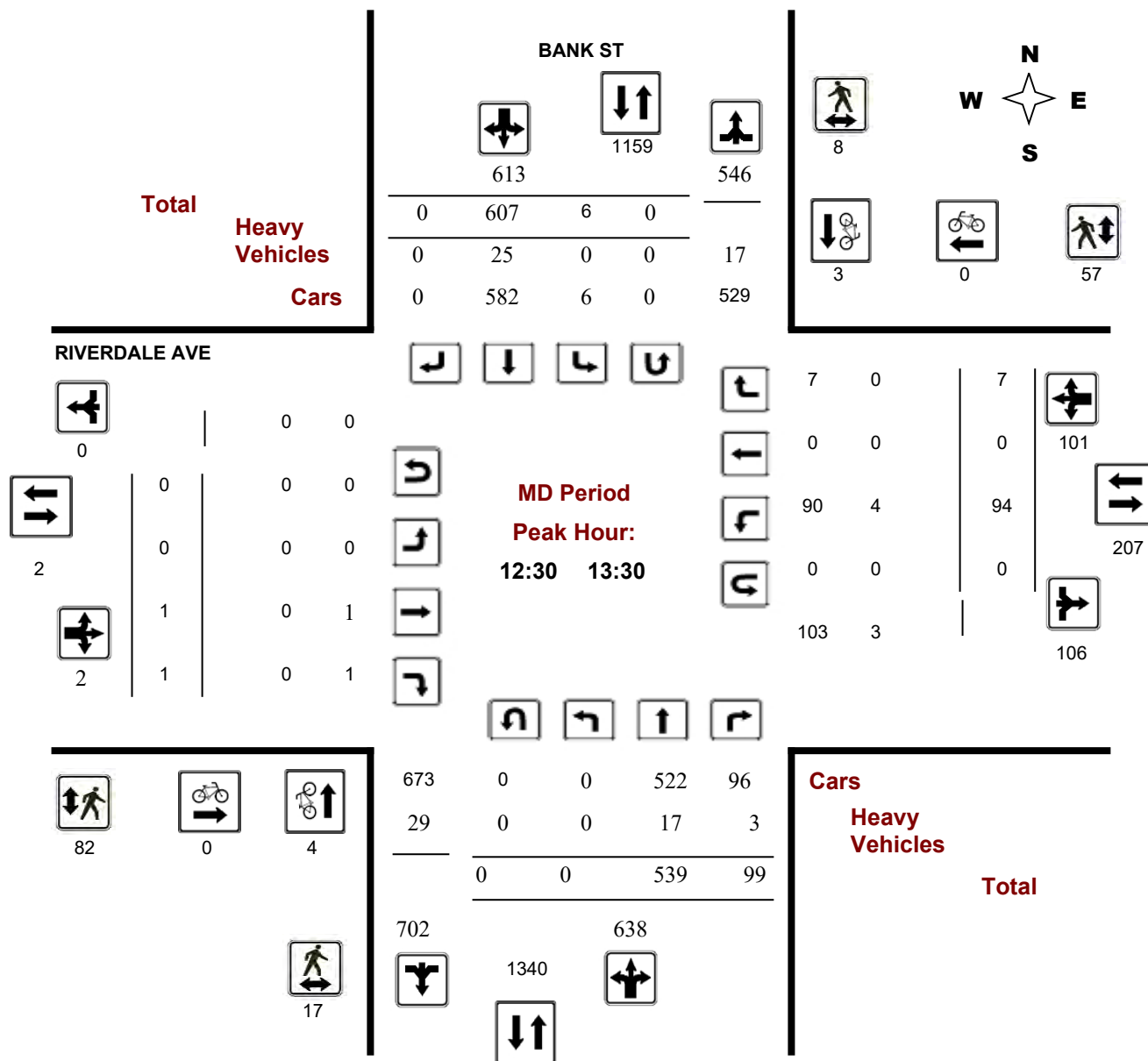
### BANK ST @ RIVERDALE AVE

**Survey Date:** Tuesday, April 16, 2019

**Start Time:** 07:00

**WO No:** 38542

**Device:** Miovision





# Transportation Services - Traffic Services

## Turning Movement Count - Full Study Peak Hour Diagram

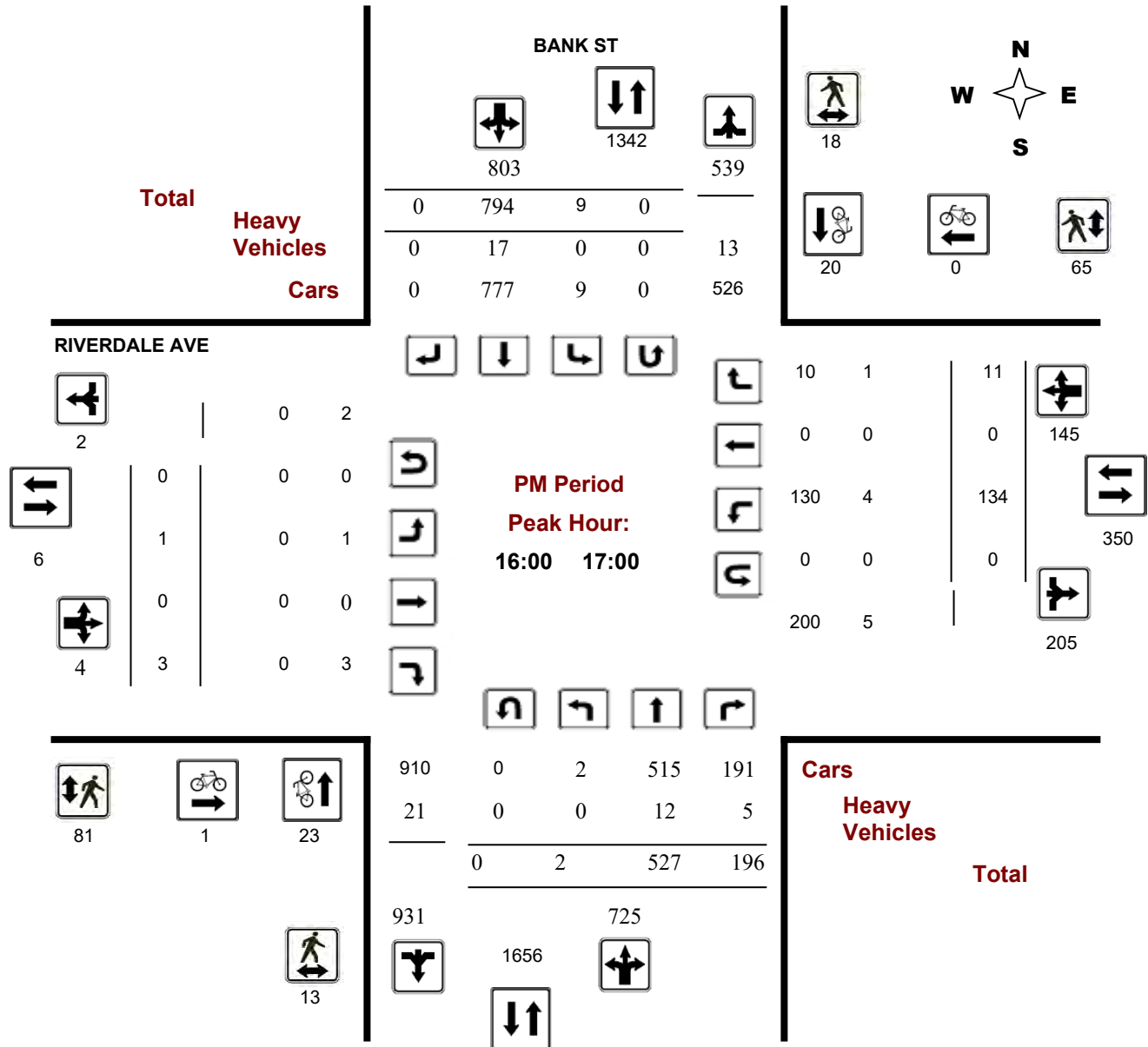
### BANK ST @ RIVERDALE AVE

**Survey Date:** Tuesday, April 16, 2019

**Start Time:** 07:00

**WO No:** 38542

**Device:** Miovision





# Transportation Services - Traffic Services

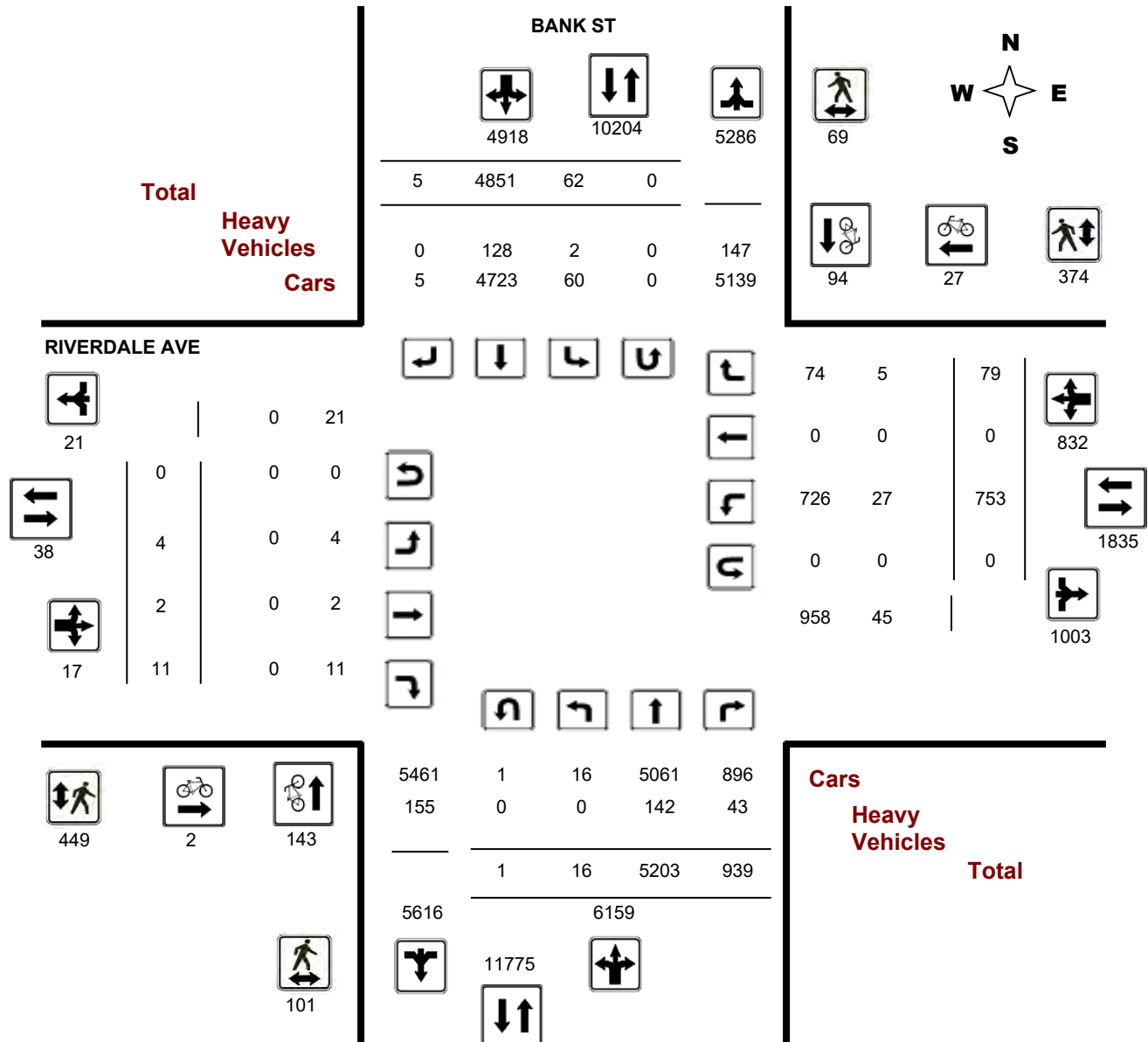
## Turning Movement Count - Full Study Diagram

### BANK ST @ RIVERDALE AVE

**Survey Date:** Tuesday, April 16, 2019

**WO#:** 38542

**Device:** Miovision







## Turning Movement Count - Full Study Summary Report

### BANK ST @ RIVERDALE AVE

**Survey Date:** Tuesday, April 16, 2019

**Total Observed U-Turns**

Northbound: 1      Southbound: 0  
Eastbound: 0      Westbound: 0

**AADT Factor**

.90

**Full Study**
**BANK ST**
**RIVERDALE AVE**

		Northbound				Southbound				Eastbound				Westbound										
Period		LT	ST	RT	NB TOT	LT	ST	RT	SB TOT	STR TOT	LT	ST	RT	EB TOT	LT	ST	RT	WB TOT	STR TOT	Grand Total				
07:00	08:00	2	831	76	909	1	389	1	391	1300	0	0	0	0	58	0	4	62	62	1362				
08:00	09:00	6	1046	106	1158	9	504	0	513	1671	0	0	0	0	98	0	7	105	105	1776				
09:00	10:00	4	569	79	652	6	505	1	512	1164	0	0	0	0	79	0	14	93	93	1257				
11:30	12:30	0	590	97	687	10	551	1	562	1249	0	0	0	0	83	0	17	100	100	1349				
12:30	13:30	0	539	99	638	6	607	0	613	1251	0	1	1	2	94	0	7	101	103	1354				
15:00	16:00	0	547	147	694	9	706	0	715	1409	0	0	1	1	111	0	12	123	124	1533				
16:00	17:00	2	527	196	725	9	794	0	803	1528	1	0	3	4	134	0	11	145	149	1677				
17:00	18:00	2	554	139	695	12	795	2	809	1504	3	1	6	10	96	0	7	103	113	1617				
Sub Total		16	5203	939	6158	62	4851	5	4918	11076	4	2	11	17	753	0	79	832	849	11925				
U Turns		1				0				1				0				0				0		1
Total		16	5203	939	6159	62	4851	5	4918	11077	4	2	11	17	753	0	79	832	849	11926				
EQ 12Hr		22	7232	1305	8561	86	6743	7	6836	15397	6	3	15	24	1047	0	110	1156	1180	16577				
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.														1.39										
AVG 12Hr		20	6509	1175	7705	78	6069	6	6152	13857	5	3	14	21	942	0	99	1041	1062	14919				
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.														.90										
AVG 24Hr		26	8527	1539	10093	102	7950	8	8060	18153	7	3	18	28	1234	0	129	1363	1391	19544				
Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor.														1.31										

**Comments:**

Note: U-Turns provided for approach totals. Refer to 'U-Turn' Report for specific breakdown.



## Turning Movement Count - 15 Minute Summary Report

### BANK ST @ RIVERDALE AVE

**Survey Date:** Tuesday, April 16, 2019

#### Total Observed U-Turns

Northbound: 1 Southbound: 0  
Eastbound: 0 Westbound: 0

		BANK ST									RIVERDALE AVE										
		Northbound			Southbound						Eastbound			Westbound							
Time Period		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total	
07:00	07:15	0	158	20	178	1	81	0	82	260	0	0	0	0	14	0	1	15	15	275	
07:15	07:30	0	179	16	195	0	96	0	96	291	0	0	0	0	9	0	2	11	11	302	
07:30	07:45	0	219	17	236	0	98	0	98	334	0	0	0	0	10	0	1	11	11	345	
07:45	08:00	2	275	23	300	0	114	1	115	415	0	0	0	0	25	0	0	25	25	440	
08:00	08:15	0	270	30	300	1	113	0	114	414	0	0	0	0	26	0	2	28	28	442	
08:15	08:30	2	297	20	319	2	120	0	122	441	0	0	0	0	22	0	1	23	23	464	
08:30	08:45	1	262	25	288	3	129	0	132	420	0	0	0	0	23	0	3	26	26	446	
08:45	09:00	3	217	31	251	3	142	0	145	396	0	0	0	0	27	0	1	28	28	424	
09:00	09:15	0	154	18	172	1	127	1	129	301	0	0	0	0	19	0	2	21	21	322	
09:15	09:30	1	156	19	176	2	118	0	120	296	0	0	0	0	20	0	3	23	23	319	
09:30	09:45	0	135	22	157	1	137	0	138	295	0	0	0	0	25	0	7	32	32	327	
09:45	10:00	3	124	20	148	2	123	0	125	273	0	0	0	0	15	0	2	17	17	290	
11:30	11:45	0	154	26	180	3	135	0	138	318	0	0	0	0	19	0	3	22	22	340	
11:45	12:00	0	157	23	180	2	145	0	147	327	0	0	0	0	23	0	4	27	27	354	
12:00	12:15	0	139	30	169	2	131	1	134	303	0	0	0	0	21	0	6	27	27	330	
12:15	12:30	0	140	18	158	3	140	0	143	301	0	0	0	0	20	0	4	24	24	325	
12:30	12:45	0	129	23	152	1	139	0	140	292	0	0	0	0	25	0	3	28	28	320	
12:45	13:00	0	154	30	184	1	166	0	167	351	0	0	0	0	19	0	1	20	20	371	
13:00	13:15	0	134	17	151	2	141	0	143	294	0	0	1	1	19	0	2	21	22	316	
13:15	13:30	0	122	29	151	2	161	0	163	314	0	1	0	1	31	0	1	32	33	347	
15:00	15:15	0	134	39	173	0	173	0	173	346	0	0	1	1	31	0	4	35	36	382	
15:15	15:30	0	146	32	178	2	180	0	182	360	0	0	0	0	28	0	2	30	30	390	
15:30	15:45	0	154	26	180	4	177	0	181	361	0	0	0	0	26	0	1	27	27	388	
15:45	16:00	0	113	50	163	3	176	0	179	342	0	0	0	0	26	0	5	31	31	373	
16:00	16:15	2	115	73	190	2	201	0	203	393	0	0	0	0	41	0	4	45	45	438	
16:15	16:30	0	151	41	192	3	204	0	207	399	0	0	0	0	30	0	0	30	30	429	
16:30	16:45	0	133	46	179	1	200	0	201	380	1	0	3	4	33	0	4	37	41	421	
16:45	17:00	0	128	36	164	3	189	0	192	356	0	0	0	0	30	0	3	33	33	389	
17:00	17:15	1	121	43	165	5	224	1	230	395	3	1	3	7	26	0	1	27	34	429	
17:15	17:30	0	129	33	162	2	189	0	191	353	0	0	1	1	33	0	2	35	36	389	
17:30	17:45	0	143	26	169	1	200	0	201	370	0	0	1	1	16	0	2	18	19	389	
17:45	18:00	1	161	37	199	4	182	1	187	386	0	0	1	1	21	0	2	23	24	410	
TOTAL:		16	5203	939	6159	62	4851	5	4918	11077	4	2	11	17	753	0	79	832	849	11926	

Note: U-Turns are included in Totals.

Comment:



# Transportation Services - Traffic Services

## Turning Movement Count - Cyclist Volume Report

Work Order  
38542

### BANK ST @ RIVERDALE AVE

**Count Date:** Tuesday, April 16, 2019

**Start Time:** 07:00

Time Period	BANK ST			RIVERDALE AVE			Grand Total
	Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	
07:00 08:00	24	6	30	0	5	5	35
08:00 09:00	30	12	42	0	5	5	47
09:00 10:00	9	5	14	0	1	1	15
11:30 12:30	10	5	15	0	3	3	18
12:30 13:30	4	3	7	0	0	0	7
15:00 16:00	19	19	38	0	4	4	42
16:00 17:00	23	20	43	1	0	1	44
17:00 18:00	24	24	48	1	9	10	58
Total .....	143	94	237	2	27	29	266

**Comment:**

Note: These volumes consists of bicycles only (no mopeds or motorcycles) and ARE NOT included in the Turning Movement Count Summary.



# Transportation Services - Traffic Services

W.O.

38542

## Turning Movement Count - Heavy Vehicle Report

### BANK ST @ RIVERDALE AVE

**Survey Date:** Tuesday, April 16, 2019

BANK ST											RIVERDALE AVE									
Time Period		Northbound			Southbound			Eastbound			Westbound									Grand Total
		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	
07:00	08:00	0	27	5	32	0	11	0	11	43	0	0	0	0	2	0	0	2	2	45
08:00	09:00	0	30	9	39	0	16	0	16	55	0	0	0	0	4	0	0	4	4	59
09:00	10:00	0	14	6	20	0	18	0	18	38	0	0	0	0	4	0	1	5	5	43
11:30	12:30	0	16	4	20	2	12	0	14	34	0	0	0	0	2	0	3	5	5	39
12:30	13:30	0	17	3	20	0	25	0	25	45	0	0	0	0	4	0	0	4	4	49
15:00	16:00	0	14	6	20	0	13	0	13	33	0	0	0	0	5	0	0	5	5	38
16:00	17:00	0	12	5	17	0	17	0	17	34	0	0	0	0	4	0	1	5	5	39
17:00	18:00	0	12	5	17	0	16	0	16	33	0	0	0	0	2	0	0	2	2	35
<b>Sub Total</b>		0	142	43	185	2	128	0	130	315	0	0	0	0	27	0	5	32	32	347
<b>U-Turns (Heavy Vehicles)</b>					0				0	0				0				0	0	0
<b>Total</b>		0	142	43	0	2	128	0	130	315	0	0	0	0	27	0	5	32	32	347

Heavy Vehicles include Buses, Single-Unit Trucks and Articulated Trucks. Further, they ARE included in the Turning Movement Count Summary.



# Transportation Services - Traffic Services

Work Order

38542

## Turning Movement Count - Pedestrian Volume Report

### BANK ST @ RIVERDALE AVE

Count Date: Tuesday, April 16, 2019

Start Time: 07:00

Time Period	NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	Total	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	Total	Grand Total
07:00 07:15	0	0	0	2	3	5	5
07:15 07:30	2	2	4	1	10	11	15
07:30 07:45	2	0	2	4	9	13	15
07:45 08:00	2	4	6	9	6	15	21
07:00 08:00	6	6	12	16	28	44	56
08:00 08:15	6	0	6	7	1	8	14
08:15 08:30	0	2	2	16	15	31	33
08:30 08:45	2	0	2	9	11	20	22
08:45 09:00	1	2	3	4	5	9	12
08:00 09:00	9	4	13	36	32	68	81
09:00 09:15	2	1	3	13	5	18	21
09:15 09:30	0	1	1	6	8	14	15
09:30 09:45	1	0	1	5	6	11	12
09:45 10:00	4	1	5	10	10	20	25
09:00 10:00	7	3	10	34	29	63	73
11:30 11:45	5	3	8	9	8	17	25
11:45 12:00	3	0	3	13	8	21	24
12:00 12:15	4	3	7	9	3	12	19
12:15 12:30	3	3	6	19	13	32	38
11:30 12:30	15	9	24	50	32	82	106
12:30 12:45	5	4	9	20	7	27	36
12:45 13:00	6	2	8	21	18	39	47
13:00 13:15	5	1	6	30	18	48	54
13:15 13:30	1	1	2	11	14	25	27
12:30 13:30	17	8	25	82	57	139	164
15:00 15:15	5	0	5	6	13	19	24
15:15 15:30	6	1	7	16	18	34	41
15:30 15:45	4	2	6	17	14	31	37
15:45 16:00	4	2	6	16	10	26	32
15:00 16:00	19	5	24	55	55	110	134
16:00 16:15	3	3	6	18	14	32	38
16:15 16:30	1	1	2	21	8	29	31
16:30 16:45	6	3	9	20	23	43	52
16:45 17:00	3	11	14	22	20	42	56
16:00 17:00	13	18	31	81	65	146	177
17:00 17:15	3	2	5	30	18	48	53
17:15 17:30	3	5	8	20	23	43	51
17:30 17:45	5	5	10	25	24	49	59
17:45 18:00	4	4	8	20	11	31	39
17:00 18:00	15	16	31	95	76	171	202
Total .....	101	69	170	449	374	823	993

Comment:

## Turning Movement Count - 15 Min U-Turn Total Report

### BANK ST @ RIVERDALE AVE

**Survey Date:** Tuesday, April 16, 2019

Time Period		Northbound U-Turn Total	Southbound U-Turn Total	Eastbound U-Turn Total	Westbound U-Turn Total	Total
07:00	07:15	0	0	0	0	0
07:15	07:30	0	0	0	0	0
07:30	07:45	0	0	0	0	0
07:45	08:00	0	0	0	0	0
08:00	08:15	0	0	0	0	0
08:15	08:30	0	0	0	0	0
08:30	08:45	0	0	0	0	0
08:45	09:00	0	0	0	0	0
09:00	09:15	0	0	0	0	0
09:15	09:30	0	0	0	0	0
09:30	09:45	0	0	0	0	0
09:45	10:00	1	0	0	0	1
11:30	11:45	0	0	0	0	0
11:45	12:00	0	0	0	0	0
12:00	12:15	0	0	0	0	0
12:15	12:30	0	0	0	0	0
12:30	12:45	0	0	0	0	0
12:45	13:00	0	0	0	0	0
13:00	13:15	0	0	0	0	0
13:15	13:30	0	0	0	0	0
15:00	15:15	0	0	0	0	0
15:15	15:30	0	0	0	0	0
15:30	15:45	0	0	0	0	0
15:45	16:00	0	0	0	0	0
16:00	16:15	0	0	0	0	0
16:15	16:30	0	0	0	0	0
16:30	16:45	0	0	0	0	0
16:45	17:00	0	0	0	0	0
17:00	17:15	0	0	0	0	0
17:15	17:30	0	0	0	0	0
17:30	17:45	0	0	0	0	0
17:45	18:00	0	0	0	0	0
Total		1	0	0	0	1



# Transportation Services - Traffic Services

## Turning Movement Count - Full Study Peak Hour Diagram

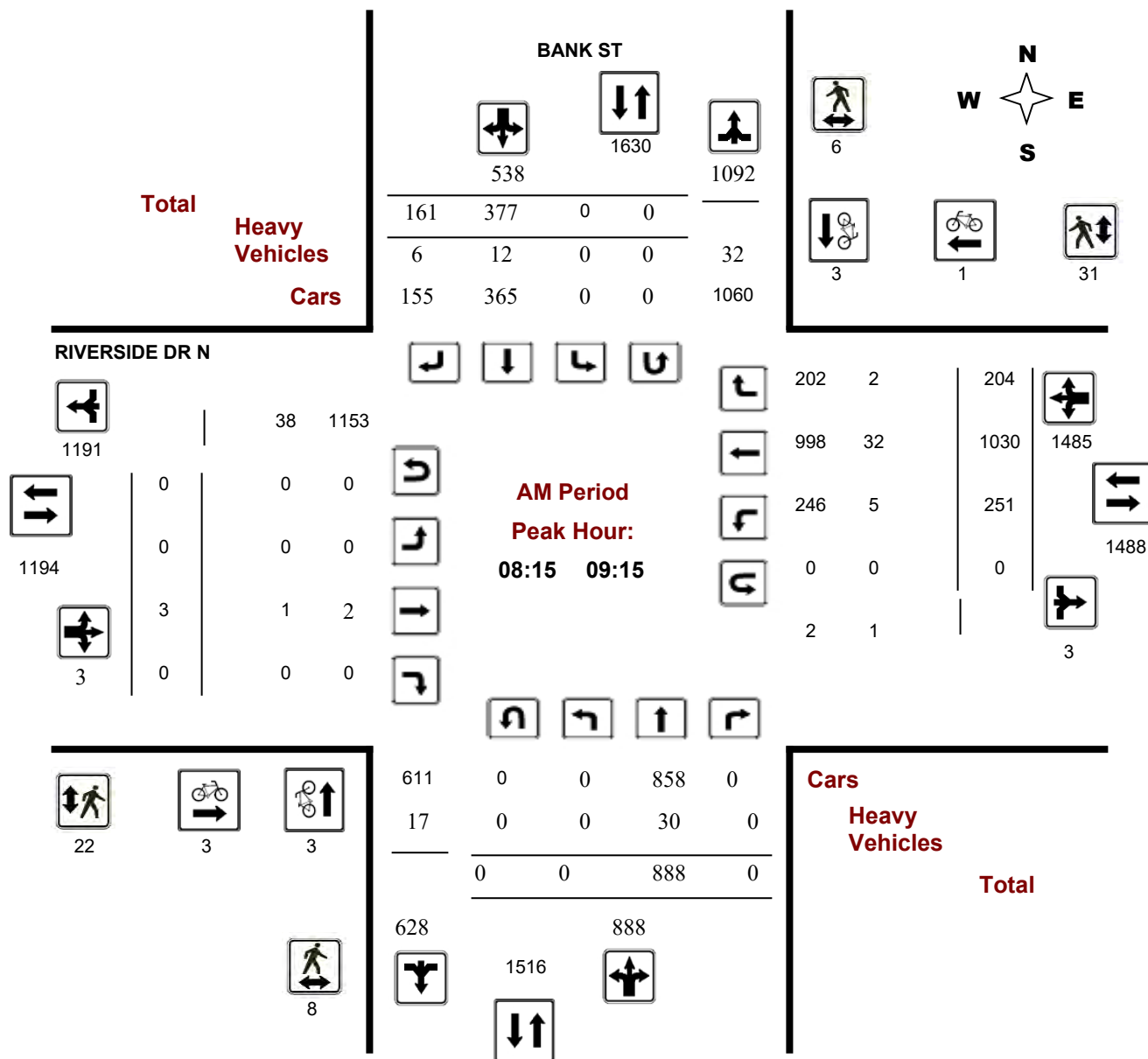
### BANK ST @ RIVERSIDE DR N

**Survey Date:** Tuesday, November 20, 2018

**Start Time:** 07:00

**WO No:** 38131

**Device:** Miovision







# Transportation Services - Traffic Services

## Turning Movement Count - Full Study Peak Hour Diagram

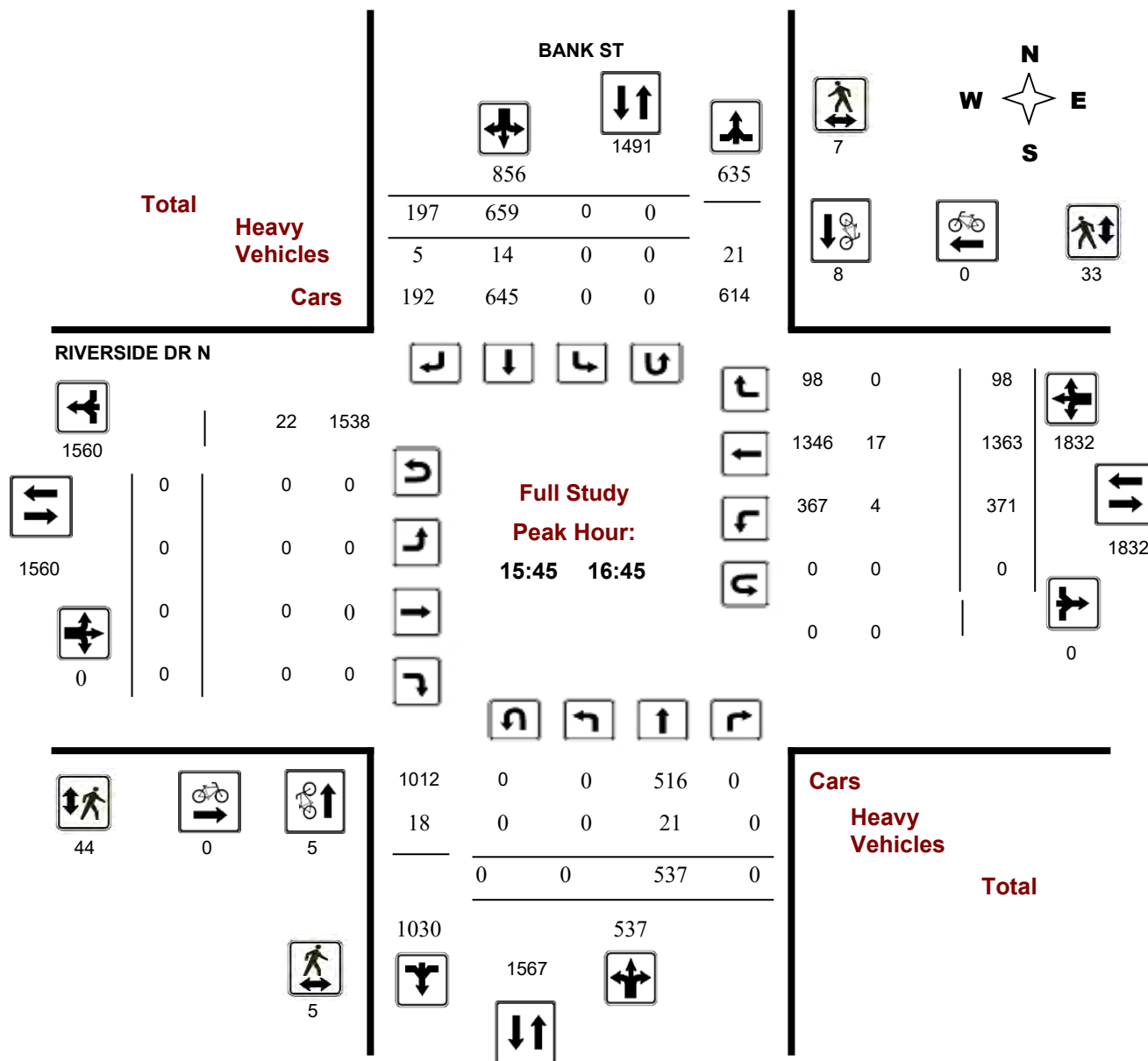
### BANK ST @ RIVERSIDE DR N

**Survey Date:** Tuesday, November 20, 2018

**Start Time:** 07:00

**WO No:** 38131

**Device:** Miovision





# Transportation Services - Traffic Services

## Turning Movement Count - Full Study Peak Hour Diagram

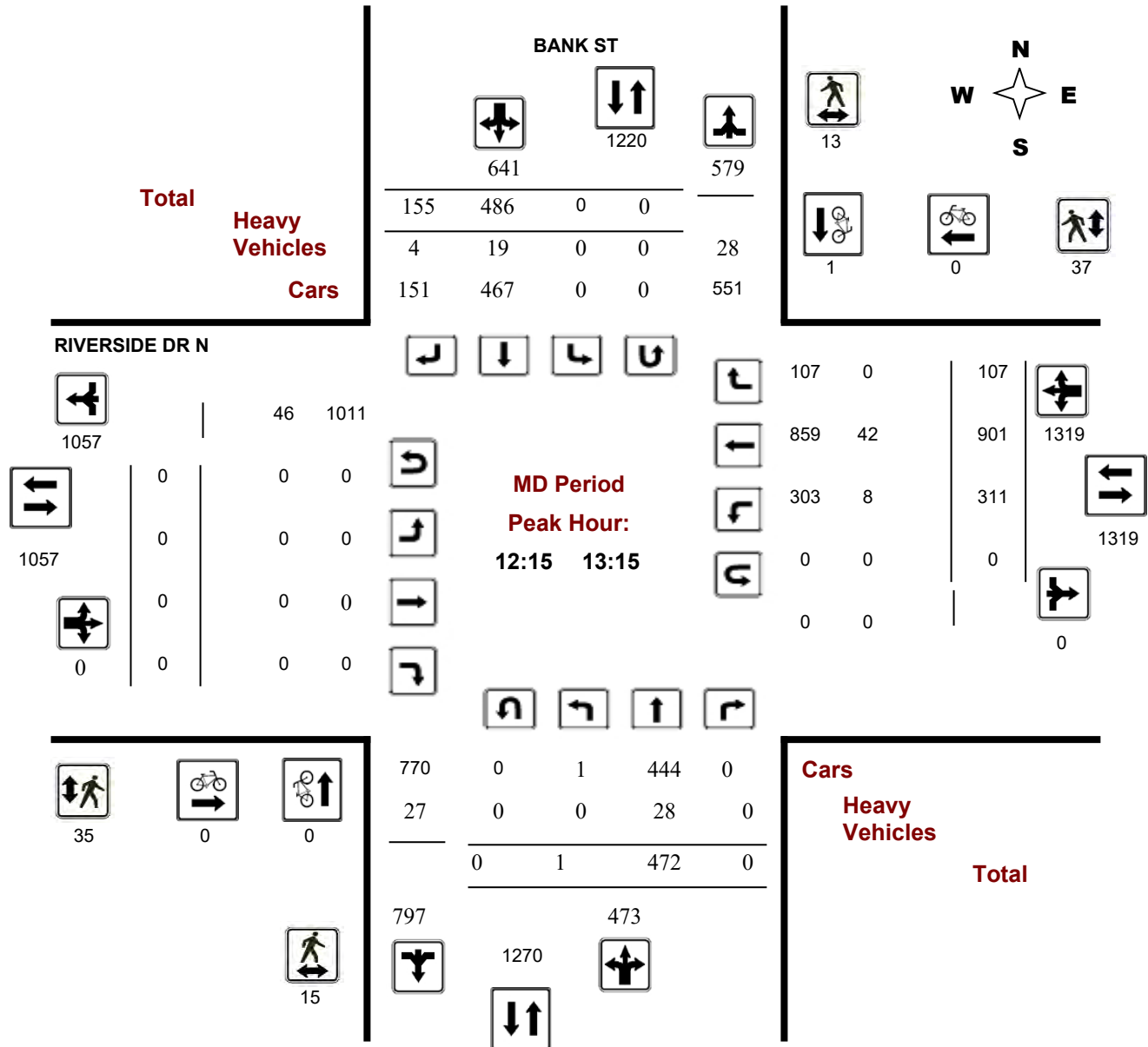
### BANK ST @ RIVERSIDE DR N

**Survey Date:** Tuesday, November 20, 2018

**Start Time:** 07:00

**WO No:** 38131

**Device:** Miovision





# Transportation Services - Traffic Services

## Turning Movement Count - Full Study Peak Hour Diagram

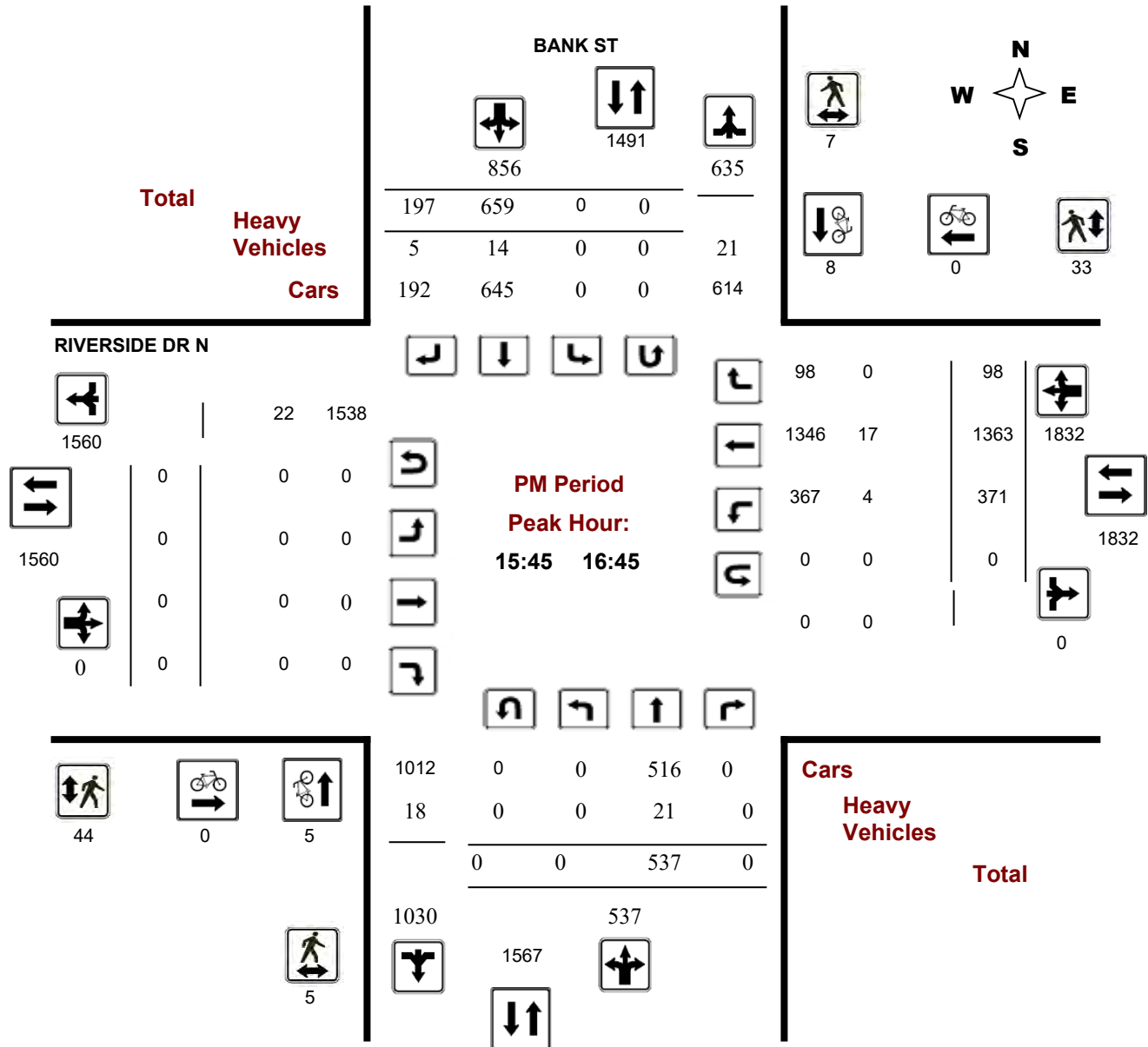
### BANK ST @ RIVERSIDE DR N

**Survey Date:** Tuesday, November 20, 2018

**Start Time:** 07:00

**WO No:** 38131

**Device:** Miovision





# Transportation Services - Traffic Services

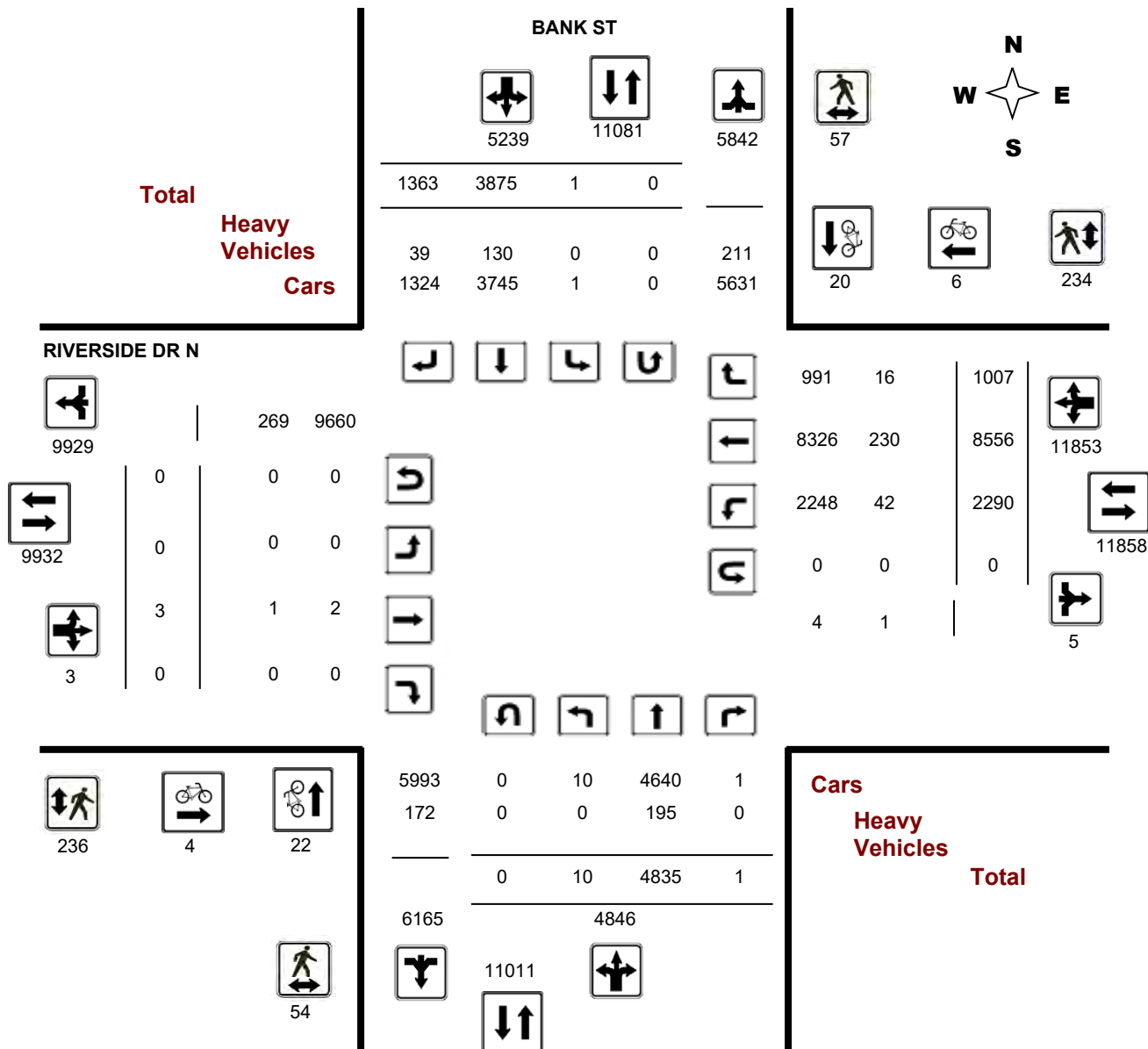
## Turning Movement Count - Full Study Diagram

### BANK ST @ RIVERSIDE DR N

**Survey Date:** Tuesday, November 20, 2018

**WO#:** 38131

**Device:** Miovision



## Turning Movement Count - Full Study Summary Report

### BANK ST @ RIVERSIDE DR N

**Survey Date:** Tuesday, November 20, 2018

**Total Observed U-Turns**

Northbound: 0 Southbound: 0  
Eastbound: 0 Westbound: 0

**AADT Factor**

1.00

**Full Study**
**BANK ST**
**RIVERSIDE DR N**

Period	Northbound				Southbound				STR TOT	Eastbound				Westbound				STR TOT	Grand Total
	LT	ST	RT	NB TOT	LT	ST	RT	SB TOT		LT	ST	RT	EB TOT	LT	ST	RT	WB TOT		
07:00 08:00	0	757	1	758	0	289	142	431	1189	0	0	0	0	161	983	113	1257	1257	2446
08:00 09:00	0	939	0	939	0	348	165	513	1452	0	3	0	3	239	992	208	1439	1442	2894
09:00 10:00	2	649	0	651	0	385	147	532	1183	0	0	0	0	276	978	149	1403	1403	2586
11:30 12:30	3	487	0	490	0	441	174	615	1105	0	0	0	0	316	857	104	1277	1277	2382
12:30 13:30	0	476	0	476	0	509	158	667	1143	0	0	0	0	318	852	89	1259	1259	2402
15:00 16:00	4	488	0	492	0	578	175	753	1245	0	0	0	0	314	1399	102	1815	1815	3060
16:00 17:00	0	534	0	534	0	703	201	904	1438	0	0	0	0	355	1304	106	1765	1765	3203
17:00 18:00	1	505	0	506	1	622	201	824	1330	0	0	0	0	311	1191	136	1638	1638	2968
<b>Sub Total</b>	10	4835	1	4846	1	3875	1363	5239	10085	0	3	0	3	2290	8556	1007	11853	11856	21941
<b>U Turns</b>				0				0	0				0				0	0	0
<b>Total</b>	10	4835	1	4846	1	3875	1363	5239	10085	0	3	0	3	2290	8556	1007	11853	11856	21941
<b>EQ 12Hr</b>	14	6721	1	6736	1	5386	1895	7282	14018	0	4	0	4	3183	11893	1400	16476	16480	30498
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.													<b>1.39</b>						
<b>AVG 12Hr</b>	14	6721	1	6736	1	5386	1895	7282	14018	0	4	0	4	3183	11893	1400	16476	16480	30498
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.													<b>1.00</b>						
<b>AVG 24Hr</b>	18	8804	2	8824	2	7056	2482	9540	18364	0	5	0	5	4170	15580	1834	21583	21588	39952
Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor.													<b>1.31</b>						

**Comments:**

Note: U-Turns provided for approach totals. Refer to 'U-Turn' Report for specific breakdown.



## Turning Movement Count - 15 Minute Summary Report

### BANK ST @ RIVERSIDE DR N

**Survey Date:** Tuesday, November 20, 2018

**Total Observed U-Turns**

Northbound: 0 Southbound: 0

Eastbound: 0 Westbound: 0

BANK ST										RIVERSIDE DR N										Grand Total
Northbound					Southbound					Eastbound					Westbound					
Time Period	LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT		
07:00 07:15	0	150	1	151	0	56	33	89	240	0	0	0	0	30	193	15	238	238	478	
07:15 07:30	0	176	0	176	0	73	39	112	288	0	0	0	0	36	245	28	309	309	597	
07:30 07:45	0	207	0	207	0	73	36	109	316	0	0	0	0	43	272	30	345	345	661	
07:45 08:00	0	224	0	224	0	87	34	121	345	0	0	0	0	52	273	40	365	365	710	
08:00 08:15	0	241	0	241	0	73	40	113	354	0	0	0	0	49	227	50	326	326	680	
08:15 08:30	0	241	0	241	0	92	36	128	369	0	0	0	0	45	235	49	329	329	698	
08:30 08:45	0	238	0	238	0	93	37	130	368	0	0	0	0	75	278	54	407	407	775	
08:45 09:00	0	219	0	219	0	90	52	142	361	0	3	0	3	70	252	55	377	380	741	
09:00 09:15	0	190	0	190	0	102	36	138	328	0	0	0	0	61	265	46	372	372	700	
09:15 09:30	1	175	0	176	0	95	32	127	303	0	0	0	0	65	257	34	356	356	659	
09:30 09:45	0	149	0	149	0	96	35	131	280	0	0	0	0	68	250	34	352	352	632	
09:45 10:00	1	135	0	136	0	92	44	136	272	0	0	0	0	82	206	35	323	323	595	
11:30 11:45	1	119	0	120	0	111	40	151	271	0	0	0	0	66	166	30	262	262	533	
11:45 12:00	1	135	0	136	0	109	42	151	287	0	0	0	0	80	242	21	343	343	630	
12:00 12:15	0	121	0	121	0	110	48	158	279	0	0	0	0	96	199	18	313	313	592	
12:15 12:30	1	112	0	113	0	111	44	155	268	0	0	0	0	74	250	35	359	359	627	
12:30 12:45	0	127	0	127	0	128	27	155	282	0	0	0	0	74	184	28	286	286	568	
12:45 13:00	0	129	0	129	0	118	38	156	285	0	0	0	0	80	243	22	345	345	630	
13:00 13:15	0	104	0	104	0	129	46	175	279	0	0	0	0	83	224	22	329	329	608	
13:15 13:30	0	116	0	116	0	134	47	181	297	0	0	0	0	81	201	17	299	299	596	
15:00 15:15	2	124	0	126	0	139	43	182	308	0	0	0	0	66	348	19	433	433	741	
15:15 15:30	0	120	0	120	0	153	50	203	323	0	0	0	0	70	348	28	446	446	769	
15:30 15:45	2	112	0	114	0	153	45	198	312	0	0	0	0	79	345	29	453	453	765	
15:45 16:00	0	132	0	132	0	133	37	170	302	0	0	0	0	99	358	26	483	483	785	
16:00 16:15	0	159	0	159	0	173	49	222	381	0	0	0	0	87	360	22	469	469	850	
16:15 16:30	0	124	0	124	0	172	60	232	356	0	0	0	0	94	320	23	437	437	793	
16:30 16:45	0	122	0	122	0	181	51	232	354	0	0	0	0	91	325	27	443	443	797	
16:45 17:00	0	129	0	129	0	177	41	218	347	0	0	0	0	83	299	34	416	416	763	
17:00 17:15	0	124	0	124	1	177	57	235	359	0	0	0	0	79	303	25	407	407	766	
17:15 17:30	0	108	0	108	0	159	54	213	321	0	0	0	0	82	314	41	437	437	758	
17:30 17:45	0	144	0	144	0	158	55	213	357	0	0	0	0	77	295	45	417	417	774	
17:45 18:00	1	129	0	130	0	128	35	163	293	0	0	0	0	73	279	25	377	377	670	
TOTAL:	10	4835	1	4846	1	3875	1363	5239	10085	0	3	0	3	2290	8556	1007	11853	11856	21941	

Note: U-Turns are included in Totals.

**Comment:**



# Transportation Services - Traffic Services

## Turning Movement Count - Cyclist Volume Report

Work Order  
38131

### BANK ST @ RIVERSIDE DR N

**Count Date:** Tuesday, November 20, 2018

**Start Time:** 07:00

Time Period	BANK ST			RIVERSIDE DR N			Grand Total
	Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	
07:00 08:00	6	2	8	1	1	2	10
08:00 09:00	3	2	5	1	1	2	7
09:00 10:00	2	2	4	2	0	2	6
11:30 12:30	2	1	3	0	0	0	3
12:30 13:30	0	2	2	0	0	0	2
15:00 16:00	8	4	12	0	1	1	13
16:00 17:00	1	7	8	0	0	0	8
17:00 18:00	0	0	0	0	3	3	3
Total .....	22	20	42	4	6	10	52

**Comment:**

Note: These volumes consists of bicycles only (no mopeds or motorcycles) and ARE NOT included in the Turning Movement Count Summary.





# Transportation Services - Traffic Services

W.O.  
38131

## Turning Movement Count - Heavy Vehicle Report

### BANK ST @ RIVERSIDE DR N

**Survey Date:** Tuesday, November 20, 2018

BANK ST										RIVERSIDE DR N										Grand Total
Time Period	Northbound			Southbound			S TOT	STR TOT	Eastbound			Westbound			W TOT	STR TOT				
	LT	ST	RT	N TOT	LT	ST			RT	LT	ST	RT	E TOT	LT			ST	RT		
07:00	08:00	0	32	0	32	0	13	6	19	51	0	0	0	0	8	32	3	43	43	94
08:00	09:00	0	35	0	35	0	10	5	15	50	0	1	0	1	6	27	3	36	37	87
09:00	10:00	0	29	0	29	0	17	4	21	50	0	0	0	0	6	31	3	40	40	90
11:30	12:30	0	18	0	18	0	19	10	29	47	0	0	0	0	3	42	3	48	48	95
12:30	13:30	0	25	0	25	0	23	6	29	54	0	0	0	0	9	36	0	45	45	99
15:00	16:00	0	19	0	19	0	12	1	13	32	0	0	0	0	6	28	1	35	35	67
16:00	17:00	0	20	0	20	0	18	5	23	43	0	0	0	0	4	18	0	22	22	65
17:00	18:00	0	17	0	17	0	18	2	20	37	0	0	0	0	0	16	3	19	19	56
Sub Total		0	195	0	195	0	130	39	169	364	0	1	0	1	42	230	16	288	289	653
U-Turns (Heavy Vehicles)					0				0	0				0				0	0	0
Total		0	195	0	0	0	130	39	169	364	0	1	0	1	42	230	16	288	289	653

Heavy Vehicles include Buses, Single-Unit Trucks and Articulated Trucks. Further, they ARE included in the Turning Movement Count Summary.



# Transportation Services - Traffic Services

Work Order

38131

## Turning Movement Count - Pedestrian Volume Report

### BANK ST @ RIVERSIDE DR N

Count Date: Tuesday, November 20, 2018

Start Time: 07:00

Time Period	NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	Total	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	Total	Grand Total
07:00 07:15	1	0	1	5	4	9	10
07:15 07:30	0	0	0	3	5	8	8
07:30 07:45	1	0	1	9	4	13	14
07:45 08:00	2	3	5	6	5	11	16
07:00 08:00	4	3	7	23	18	41	48
08:00 08:15	0	5	5	3	1	4	9
08:15 08:30	0	0	0	4	6	10	10
08:30 08:45	2	1	3	6	4	10	13
08:45 09:00	5	4	9	6	12	18	27
08:00 09:00	7	10	17	19	23	42	59
09:00 09:15	1	1	2	6	9	15	17
09:15 09:30	3	0	3	9	3	12	15
09:30 09:45	6	0	6	7	3	10	16
09:45 10:00	1	0	1	4	3	7	8
09:00 10:00	11	1	12	26	18	44	56
11:30 11:45	4	2	6	1	5	6	12
11:45 12:00	4	4	8	4	10	14	22
12:00 12:15	0	1	1	5	9	14	15
12:15 12:30	1	4	5	5	8	13	18
11:30 12:30	9	11	20	15	32	47	67
12:30 12:45	2	1	3	8	14	22	25
12:45 13:00	7	3	10	7	4	11	21
13:00 13:15	5	5	10	15	11	26	36
13:15 13:30	1	0	1	5	7	12	13
12:30 13:30	15	9	24	35	36	71	95
15:00 15:15	0	1	1	8	4	12	13
15:15 15:30	1	3	4	9	9	18	22
15:30 15:45	0	1	1	12	7	19	20
15:45 16:00	0	2	2	14	8	22	24
15:00 16:00	1	7	8	43	28	71	79
16:00 16:15	0	0	0	8	9	17	17
16:15 16:30	3	3	6	12	14	26	32
16:30 16:45	2	2	4	10	2	12	16
16:45 17:00	2	3	5	10	16	26	31
16:00 17:00	7	8	15	40	41	81	96
17:00 17:15	0	2	2	3	11	14	16
17:15 17:30	0	1	1	12	12	24	25
17:30 17:45	0	2	2	10	8	18	20
17:45 18:00	0	3	3	10	7	17	20
17:00 18:00	0	8	8	35	38	73	81
Total .....	54	57	111	236	234	470	581

Comment:

## Turning Movement Count - 15 Min U-Turn Total Report

### BANK ST @ RIVERSIDE DR N

**Survey Date:** Tuesday, November 20, 2018

Time Period		Northbound U-Turn Total	Southbound U-Turn Total	Eastbound U-Turn Total	Westbound U-Turn Total	Total
07:00	07:15	0	0	0	0	0
07:15	07:30	0	0	0	0	0
07:30	07:45	0	0	0	0	0
07:45	08:00	0	0	0	0	0
08:00	08:15	0	0	0	0	0
08:15	08:30	0	0	0	0	0
08:30	08:45	0	0	0	0	0
08:45	09:00	0	0	0	0	0
09:00	09:15	0	0	0	0	0
09:15	09:30	0	0	0	0	0
09:30	09:45	0	0	0	0	0
09:45	10:00	0	0	0	0	0
11:30	11:45	0	0	0	0	0
11:45	12:00	0	0	0	0	0
12:00	12:15	0	0	0	0	0
12:15	12:30	0	0	0	0	0
12:30	12:45	0	0	0	0	0
12:45	13:00	0	0	0	0	0
13:00	13:15	0	0	0	0	0
13:15	13:30	0	0	0	0	0
15:00	15:15	0	0	0	0	0
15:15	15:30	0	0	0	0	0
15:30	15:45	0	0	0	0	0
15:45	16:00	0	0	0	0	0
16:00	16:15	0	0	0	0	0
16:15	16:30	0	0	0	0	0
16:30	16:45	0	0	0	0	0
16:45	17:00	0	0	0	0	0
17:00	17:15	0	0	0	0	0
17:15	17:30	0	0	0	0	0
17:30	17:45	0	0	0	0	0
17:45	18:00	0	0	0	0	0
Total		0	0	0	0	0



# Transportation Services - Traffic Services

## Turning Movement Count - Full Study Peak Hour Diagram

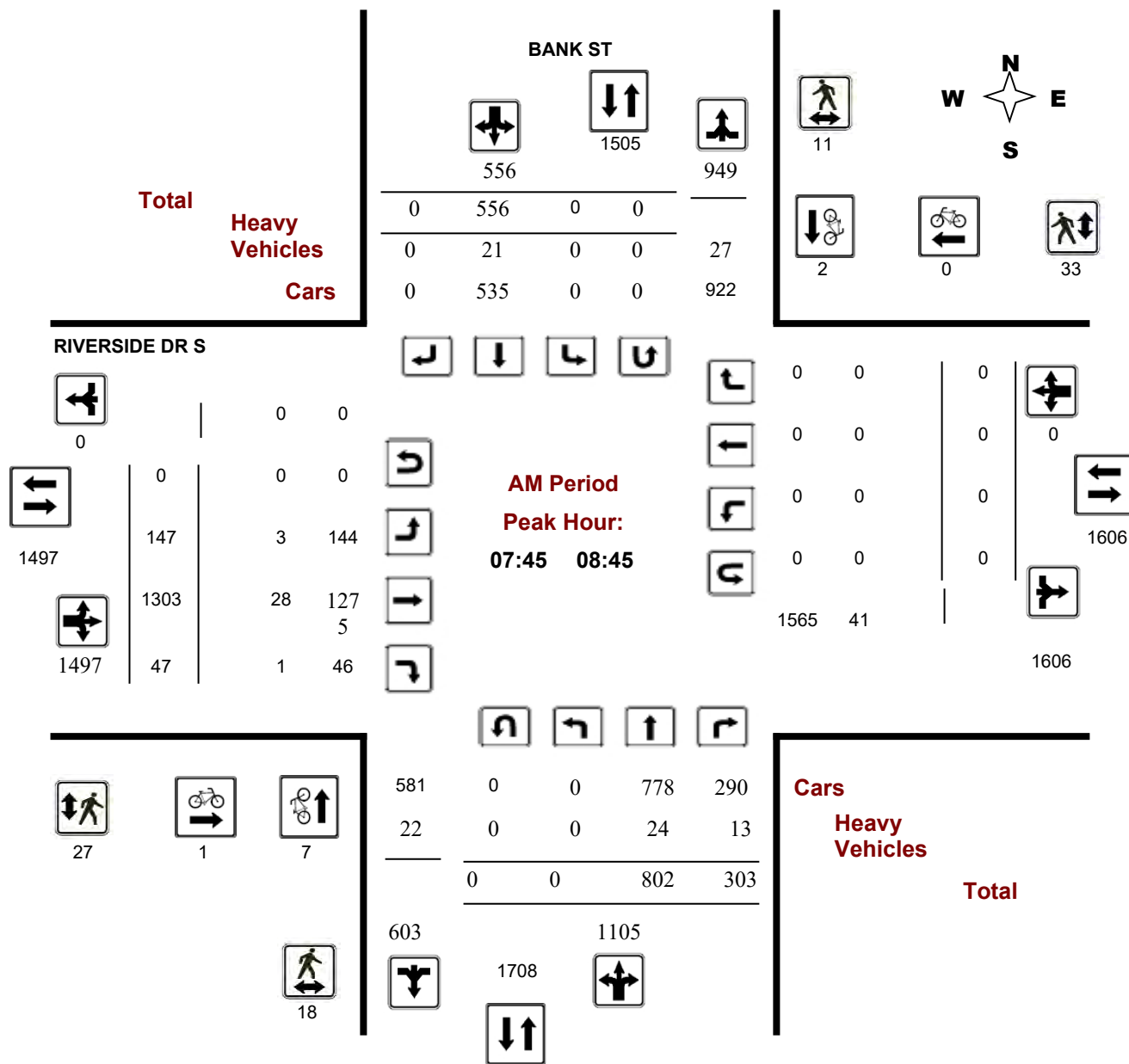
### BANK ST @ RIVERSIDE DR S

**Survey Date:** Tuesday, November 20, 2018

**Start Time:** 07:00

**WO No:** 38130

**Device:** Miovision





# Transportation Services - Traffic Services

## Turning Movement Count - Full Study Peak Hour Diagram

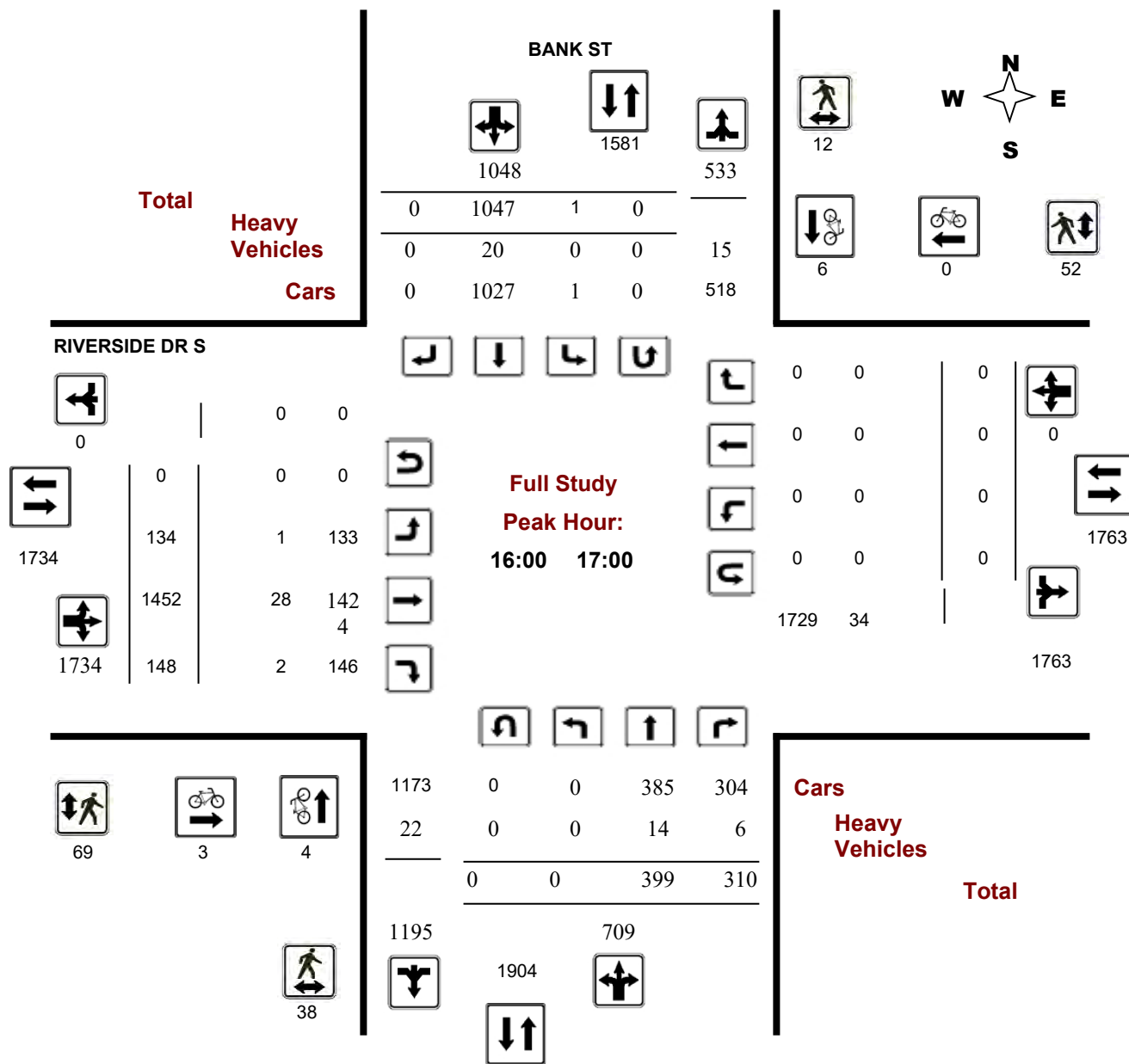
### BANK ST @ RIVERSIDE DR S

**Survey Date:** Tuesday, November 20, 2018

**Start Time:** 07:00

**WO No:** 38130

**Device:** Miovision





# Transportation Services - Traffic Services

## Turning Movement Count - Full Study Peak Hour Diagram

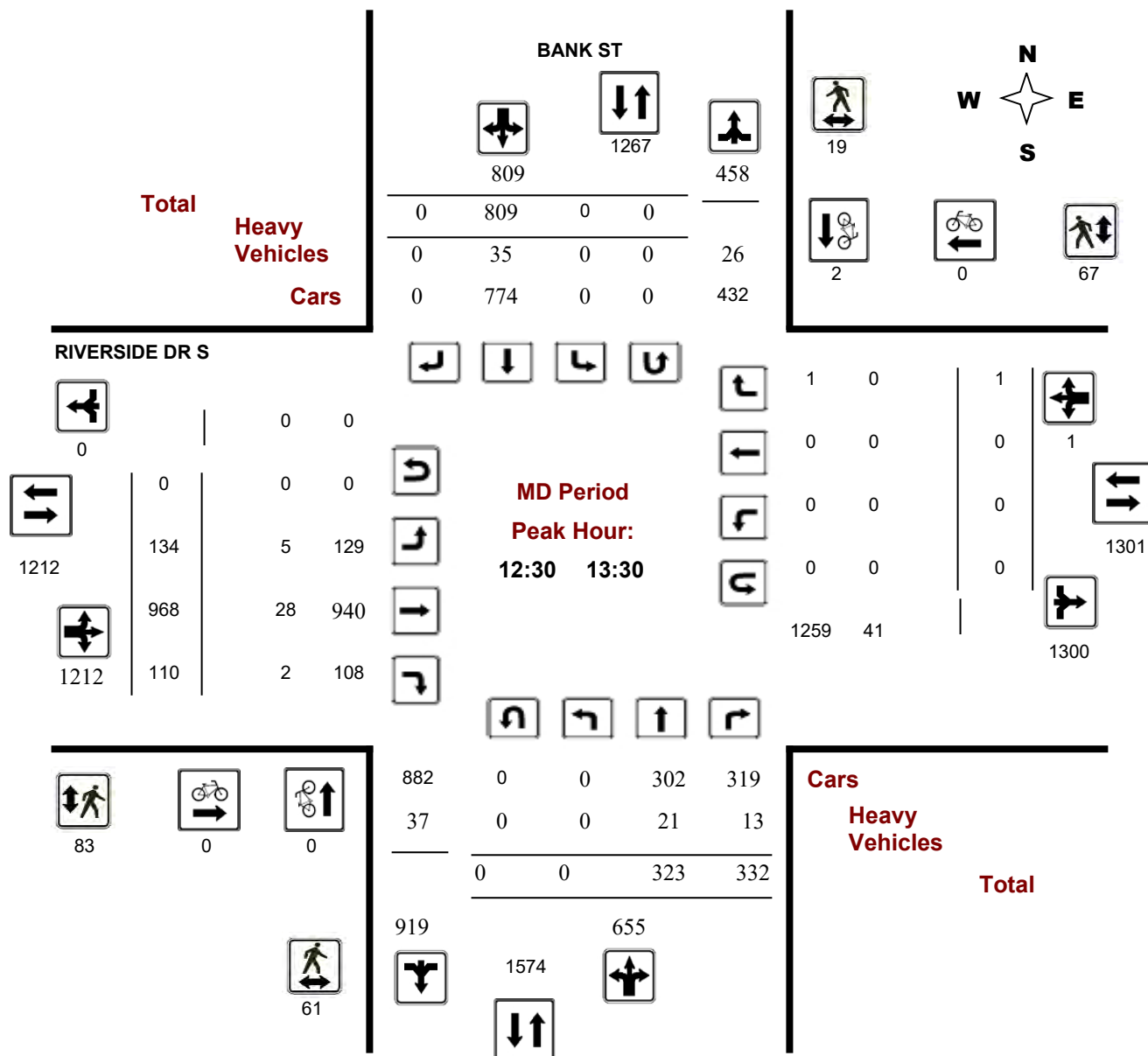
### BANK ST @ RIVERSIDE DR S

**Survey Date:** Tuesday, November 20, 2018

**Start Time:** 07:00

**WO No:** 38130

**Device:** Miovision





# Transportation Services - Traffic Services

## Turning Movement Count - Full Study Peak Hour Diagram

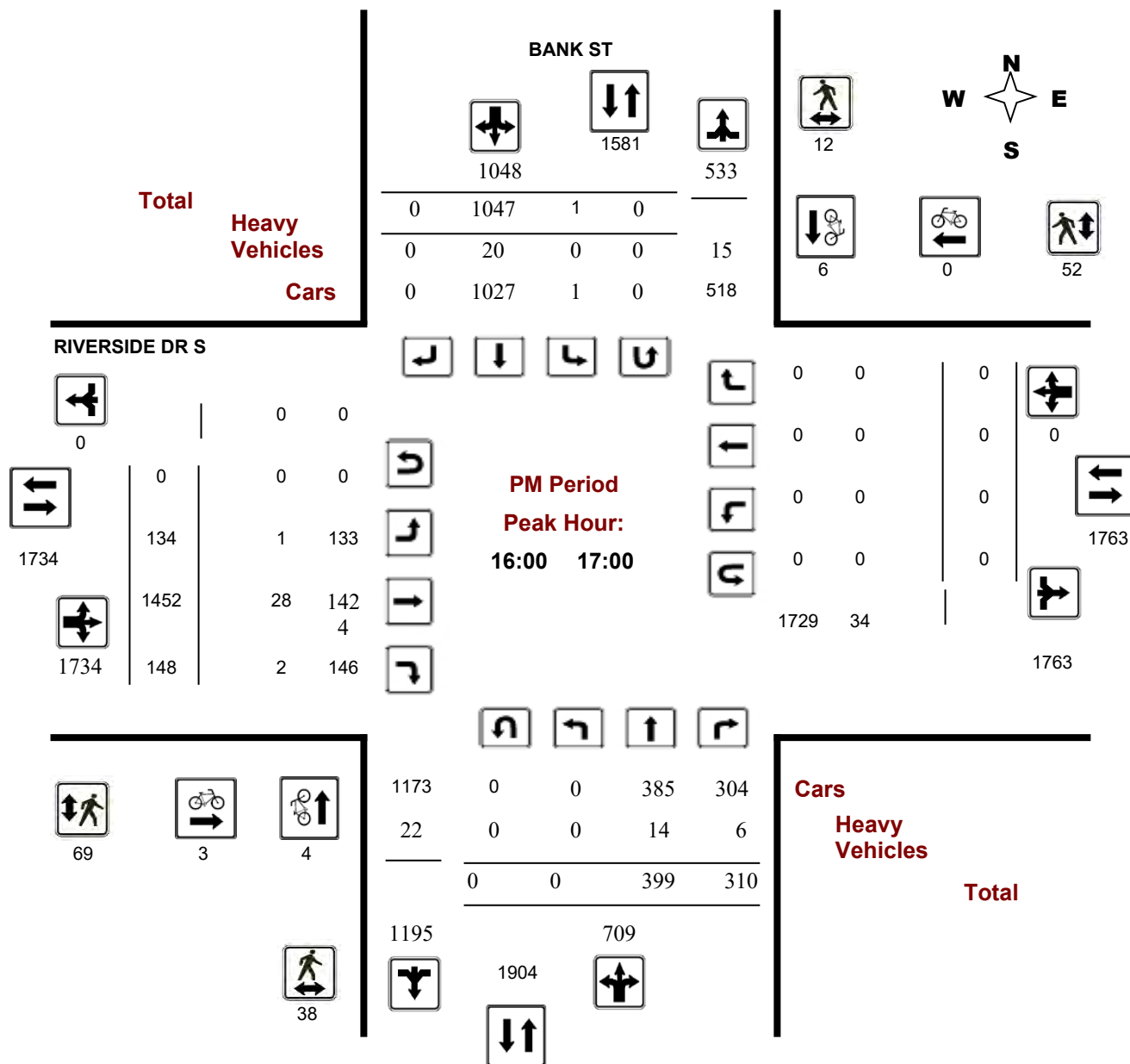
### BANK ST @ RIVERSIDE DR S

**Survey Date:** Tuesday, November 20, 2018

**Start Time:** 07:00

**WO No:** 38130

**Device:** Miovision







# Transportation Services - Traffic Services

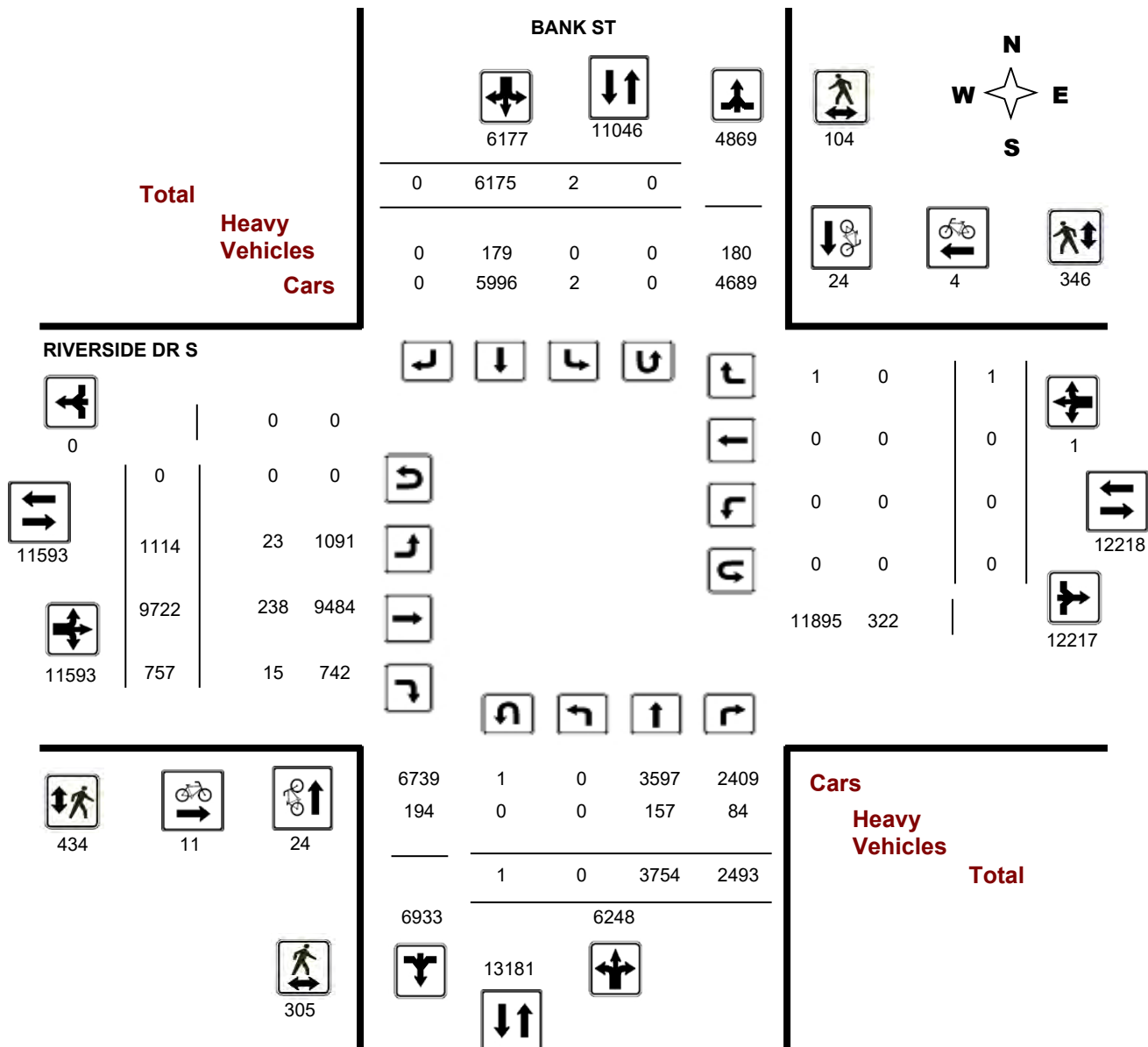
## Turning Movement Count - Full Study Diagram

### BANK ST @ RIVERSIDE DR S

**Survey Date:** Tuesday, November 20, 2018

**WO#:** 38130

**Device:** Miovision





## Turning Movement Count - Full Study Summary Report

### BANK ST @ RIVERSIDE DR S

**Survey Date:** Tuesday, November 20, 2018

**Total Observed U-Turns**

Northbound: 1      Southbound: 0  
Eastbound: 0      Westbound: 0

**AADT Factor**

1.00

**Full Study**
**BANK ST**
**RIVERSIDE DR S**

		Northbound				Southbound				Eastbound				Westbound						
Period		LT	ST	RT	NB TOT	LT	ST	RT	SB TOT	STR TOT	LT	ST	RT	EB TOT	LT	ST	RT	WB TOT	STR TOT	Grand Total
07:00	08:00	0	634	332	966	0	421	0	421	1387	91	1316	24	1431	0	0	0	0	1431	2818
08:00	09:00	0	784	289	1073	0	585	0	585	1658	162	1189	56	1407	0	0	0	0	1407	3065
09:00	10:00	0	517	311	828	0	665	0	665	1493	158	1251	74	1483	0	0	0	0	1483	2976
11:30	12:30	0	351	294	645	0	753	0	753	1398	156	983	109	1248	0	0	0	0	1248	2646
12:30	13:30	0	323	332	655	0	809	0	809	1464	134	968	110	1212	0	0	1	1	1213	2677
15:00	16:00	0	375	312	687	1	905	0	906	1593	128	1241	112	1481	0	0	0	0	1481	3074
16:00	17:00	0	399	310	709	1	1047	0	1048	1757	134	1452	148	1734	0	0	0	0	1734	3491
17:00	18:00	0	371	313	684	0	990	0	990	1674	151	1322	124	1597	0	0	0	0	1597	3271
Sub Total		0	3754	2493	6247	2	6175	0	6177	12424	1114	9722	757	11593	0	0	1	1	11594	24018
U Turns					1				0	1				0				0	0	1
Total		0	3754	2493	6248	2	6175	0	6177	12425	1114	9722	757	11593	0	0	1	1	11594	24019
EQ 12Hr		0	5218	3465	8685	3	8583	0	8586	17271	1548	13514	1052	16114	0	0	1	1	16115	33386
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.														1.39						
AVG 12Hr		0	5218	3465	8685	3	8583	0	8586	17271	1548	13514	1052	16114	0	0	1	1	16115	33386
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.														1.00						
AVG 24Hr		0	6836	4540	11377	4	11244	0	11248	22625	2028	17703	1378	21110	0	0	2	2	21112	43737
Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor.														1.31						

**Comments:**

Note: U-Turns provided for approach totals. Refer to 'U-Turn' Report for specific breakdown.



## Turning Movement Count - 15 Minute Summary Report

### BANK ST @ RIVERSIDE DR S

**Survey Date:** Tuesday, November 20, 2018

#### Total Observed U-Turns

Northbound: 1      Southbound: 0  
Eastbound: 0      Westbound: 0

BANK ST										RIVERSIDE DR S											
Northbound					Southbound					Eastbound					Westbound						
Time Period	LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total		
07:00 07:15	0	115	62	177	0	78	0	78	255	18	272	2	292	0	0	0	0	292	547		
07:15 07:30	0	142	69	211	0	107	0	107	318	27	320	9	356	0	0	0	0	356	674		
07:30 07:45	0	183	95	278	0	108	0	108	386	16	344	9	369	0	0	0	0	369	755		
07:45 08:00	0	194	106	300	0	128	0	128	428	30	380	4	414	0	0	0	0	414	842		
08:00 08:15	0	209	66	275	0	137	0	137	412	33	337	16	386	0	0	0	0	386	798		
08:15 08:30	0	199	63	262	0	140	0	140	402	33	316	11	360	0	0	0	0	360	762		
08:30 08:45	0	200	68	268	0	151	0	151	419	51	270	16	337	0	0	0	0	337	756		
08:45 09:00	0	176	92	268	0	157	0	157	425	45	266	13	324	0	0	0	0	324	749		
09:00 09:15	0	144	74	218	0	168	0	168	386	43	270	20	333	0	0	0	0	333	719		
09:15 09:30	0	154	75	229	0	162	0	162	391	36	278	17	331	0	0	0	0	331	722		
09:30 09:45	0	108	69	177	0	160	0	160	337	44	347	15	406	0	0	0	0	406	743		
09:45 10:00	0	111	93	204	0	175	0	175	379	35	356	22	413	0	0	0	0	413	792		
11:30 11:45	0	82	80	162	0	176	0	176	338	38	267	25	330	0	0	0	0	330	668		
11:45 12:00	0	86	73	159	0	190	0	190	349	45	244	23	312	0	0	0	0	312	661		
12:00 12:15	0	86	73	159	0	193	0	193	352	39	241	25	305	0	0	0	0	305	657		
12:15 12:30	0	97	68	165	0	194	0	194	359	34	231	36	301	0	0	0	0	301	660		
12:30 12:45	0	98	82	180	0	176	0	176	356	28	234	26	288	0	0	0	0	288	644		
12:45 13:00	0	77	72	149	0	210	0	210	359	46	279	22	347	0	0	0	0	347	706		
13:00 13:15	0	78	95	173	0	213	0	213	386	30	221	29	280	0	0	1	1	281	667		
13:15 13:30	0	70	83	153	0	210	0	210	363	30	234	33	297	0	0	0	0	297	660		
15:00 15:15	0	83	78	162	1	205	0	206	368	38	298	25	361	0	0	0	0	361	729		
15:15 15:30	0	101	80	181	0	223	0	223	404	29	318	30	377	0	0	0	0	377	781		
15:30 15:45	0	91	71	162	0	215	0	215	377	26	307	31	364	0	0	0	0	364	741		
15:45 16:00	0	100	83	183	0	262	0	262	445	35	318	26	379	0	0	0	0	379	824		
16:00 16:15	0	111	93	204	0	247	0	247	451	37	369	43	449	0	0	0	0	449	900		
16:15 16:30	0	97	70	167	0	279	0	279	446	38	373	23	434	0	0	0	0	434	880		
16:30 16:45	0	99	74	173	0	260	0	260	433	31	339	36	406	0	0	0	0	406	839		
16:45 17:00	0	92	73	165	1	261	0	262	427	28	371	46	445	0	0	0	0	445	872		
17:00 17:15	0	91	67	158	0	254	0	254	412	44	365	31	440	0	0	0	0	440	852		
17:15 17:30	0	82	83	165	0	248	0	248	413	29	342	33	404	0	0	0	0	404	817		
17:30 17:45	0	85	85	170	0	254	0	254	424	45	330	32	407	0	0	0	0	407	831		
17:45 18:00	0	113	78	191	0	234	0	234	425	33	285	28	346	0	0	0	0	346	771		
TOTAL:	0	3754	2493	6248	2	6175	0	6177	12425	1114	9722	757	11593	0	0	1	1	11594	24019		

Note: U-Turns are included in Totals.

Comment:



# Transportation Services - Traffic Services

## Turning Movement Count - Cyclist Volume Report

Work Order  
38130

### BANK ST @ RIVERSIDE DR S

Count Date: Tuesday, November 20, 2018

Start Time: 07:00

Time Period	BANK ST			RIVERSIDE DR S			Grand Total
	Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	
07:00 08:00	7	8	15	3	3	6	21
08:00 09:00	6	2	8	1	0	1	9
09:00 10:00	2	1	3	1	0	1	4
11:30 12:30	2	1	3	1	1	2	5
12:30 13:30	0	2	2	0	0	0	2
15:00 16:00	3	4	7	1	0	1	8
16:00 17:00	4	6	10	3	0	3	13
17:00 18:00	0	0	0	1	0	1	1
Total .....	24	24	48	11	4	15	63

Comment:

Note: These volumes consists of bicycles only (no mopeds or motorcycles) and ARE NOT included in the Turning Movement Count Summary.



# Transportation Services - Traffic Services

W.O.  
38130

## Turning Movement Count - Heavy Vehicle Report

### BANK ST @ RIVERSIDE DR S

**Survey Date:** Tuesday, November 20, 2018

BANK ST											RIVERSIDE DR S									
Time Period		Northbound			Southbound			Eastbound			Westbound									Grand Total
		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	
07:00	08:00	0	30	13	43	0	18	0	18	61	4	23	0	27	0	0	0	0	27	88
08:00	09:00	0	26	11	37	0	19	0	19	56	3	29	1	33	0	0	0	0	33	89
09:00	10:00	0	23	17	40	0	23	0	23	63	4	38	3	45	0	0	0	0	45	108
11:30	12:30	0	14	10	24	0	23	0	23	47	2	52	6	60	0	0	0	0	60	107
12:30	13:30	0	21	13	34	0	35	0	35	69	5	28	2	35	0	0	0	0	35	104
15:00	16:00	0	18	14	32	0	21	0	21	53	0	22	1	23	0	0	0	0	23	76
16:00	17:00	0	14	6	20	0	20	0	20	40	1	28	2	31	0	0	0	0	31	71
17:00	18:00	0	11	0	11	0	20	0	20	31	4	18	0	22	0	0	0	0	22	53
<b>Sub Total</b>		0	157	84	241	0	179	0	179	420	23	238	15	276	0	0	0	0	276	696
<b>U-Turns (Heavy Vehicles)</b>					0				0	0				0				0	0	0
<b>Total</b>		0	157	84	0	0	179	0	179	420	23	238	15	276	0	0	0	0	276	696

Heavy Vehicles include Buses, Single-Unit Trucks and Articulated Trucks. Further, they ARE included in the Turning Movement Count Summary.



# Transportation Services - Traffic Services

Work Order

38130

## Turning Movement Count - Pedestrian Volume Report

### BANK ST @ RIVERSIDE DR S

Count Date: Tuesday, November 20, 2018

Start Time: 07:00

Time Period	NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	Total	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	Total	Grand Total
07:00 07:15	2	0	2	4	3	7	9
07:15 07:30	3	2	5	5	4	9	14
07:30 07:45	5	0	5	5	3	8	13
07:45 08:00	1	2	3	9	6	15	18
07:00 08:00	11	4	15	23	16	39	54
08:00 08:15	7	1	8	6	6	12	20
08:15 08:30	6	6	12	4	11	15	27
08:30 08:45	4	2	6	8	10	18	24
08:45 09:00	10	2	12	7	12	19	31
08:00 09:00	27	11	38	25	39	64	102
09:00 09:15	8	4	12	15	10	25	37
09:15 09:30	9	2	11	16	11	27	38
09:30 09:45	5	1	6	15	4	19	25
09:45 10:00	6	0	6	9	7	16	22
09:00 10:00	28	7	35	55	32	87	122
11:30 11:45	6	1	7	7	6	13	20
11:45 12:00	16	5	21	12	9	21	42
12:00 12:15	15	8	23	17	14	31	54
12:15 12:30	4	10	14	14	7	21	35
11:30 12:30	41	24	65	50	36	86	151
12:30 12:45	17	4	21	23	18	41	62
12:45 13:00	18	6	24	22	17	39	63
13:00 13:15	11	3	14	21	17	38	52
13:15 13:30	15	6	21	17	15	32	53
12:30 13:30	61	19	80	83	67	150	230
15:00 15:15	18	6	24	18	12	30	54
15:15 15:30	10	1	11	13	6	19	30
15:30 15:45	12	1	13	16	11	27	40
15:45 16:00	12	4	16	17	15	32	48
15:00 16:00	52	12	64	64	44	108	172
16:00 16:15	6	5	11	15	8	23	34
16:15 16:30	17	2	19	15	18	33	52
16:30 16:45	7	5	12	20	8	28	40
16:45 17:00	8	0	8	19	18	37	45
16:00 17:00	38	12	50	69	52	121	171
17:00 17:15	17	4	21	13	14	27	48
17:15 17:30	12	2	14	22	16	38	52
17:30 17:45	9	1	10	16	12	28	38
17:45 18:00	9	8	17	14	18	32	49
17:00 18:00	47	15	62	65	60	125	187
Total .....	305	104	409	434	346	780	1189

Comment:

## Turning Movement Count - 15 Min U-Turn Total Report

### BANK ST @ RIVERSIDE DR S

**Survey Date:** Tuesday, November 20, 2018

Time Period		Northbound U-Turn Total	Southbound U-Turn Total	Eastbound U-Turn Total	Westbound U-Turn Total	Total
07:00	07:15	0	0	0	0	0
07:15	07:30	0	0	0	0	0
07:30	07:45	0	0	0	0	0
07:45	08:00	0	0	0	0	0
08:00	08:15	0	0	0	0	0
08:15	08:30	0	0	0	0	0
08:30	08:45	0	0	0	0	0
08:45	09:00	0	0	0	0	0
09:00	09:15	0	0	0	0	0
09:15	09:30	0	0	0	0	0
09:30	09:45	0	0	0	0	0
09:45	10:00	0	0	0	0	0
11:30	11:45	0	0	0	0	0
11:45	12:00	0	0	0	0	0
12:00	12:15	0	0	0	0	0
12:15	12:30	0	0	0	0	0
12:30	12:45	0	0	0	0	0
12:45	13:00	0	0	0	0	0
13:00	13:15	0	0	0	0	0
13:15	13:30	0	0	0	0	0
15:00	15:15	1	0	0	0	1
15:15	15:30	0	0	0	0	0
15:30	15:45	0	0	0	0	0
15:45	16:00	0	0	0	0	0
16:00	16:15	0	0	0	0	0
16:15	16:30	0	0	0	0	0
16:30	16:45	0	0	0	0	0
16:45	17:00	0	0	0	0	0
17:00	17:15	0	0	0	0	0
17:15	17:30	0	0	0	0	0
17:30	17:45	0	0	0	0	0
17:45	18:00	0	0	0	0	0
Total		1	0	0	0	1





# Transportation Services - Traffic Services

## Turning Movement Count - Full Study Peak Hour Diagram

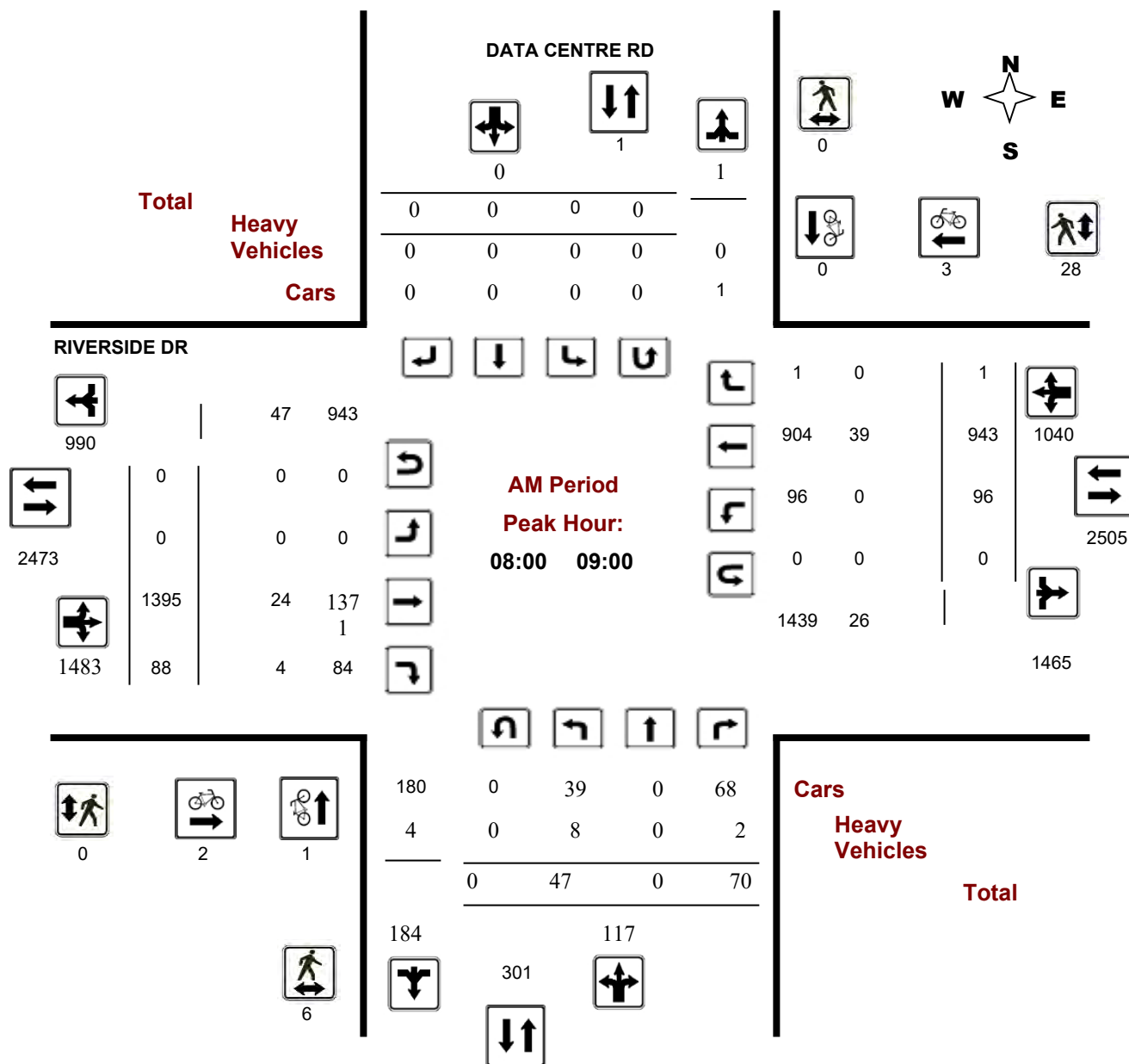
### DATA CENTRE RD @ RIVERSIDE DR

**Survey Date:** Friday, July 17, 2015

**Start Time:** 07:00

**WO No:** 34957

**Device:** Jamar Technologies, Inc





# Transportation Services - Traffic Services

## Turning Movement Count - Full Study Peak Hour Diagram

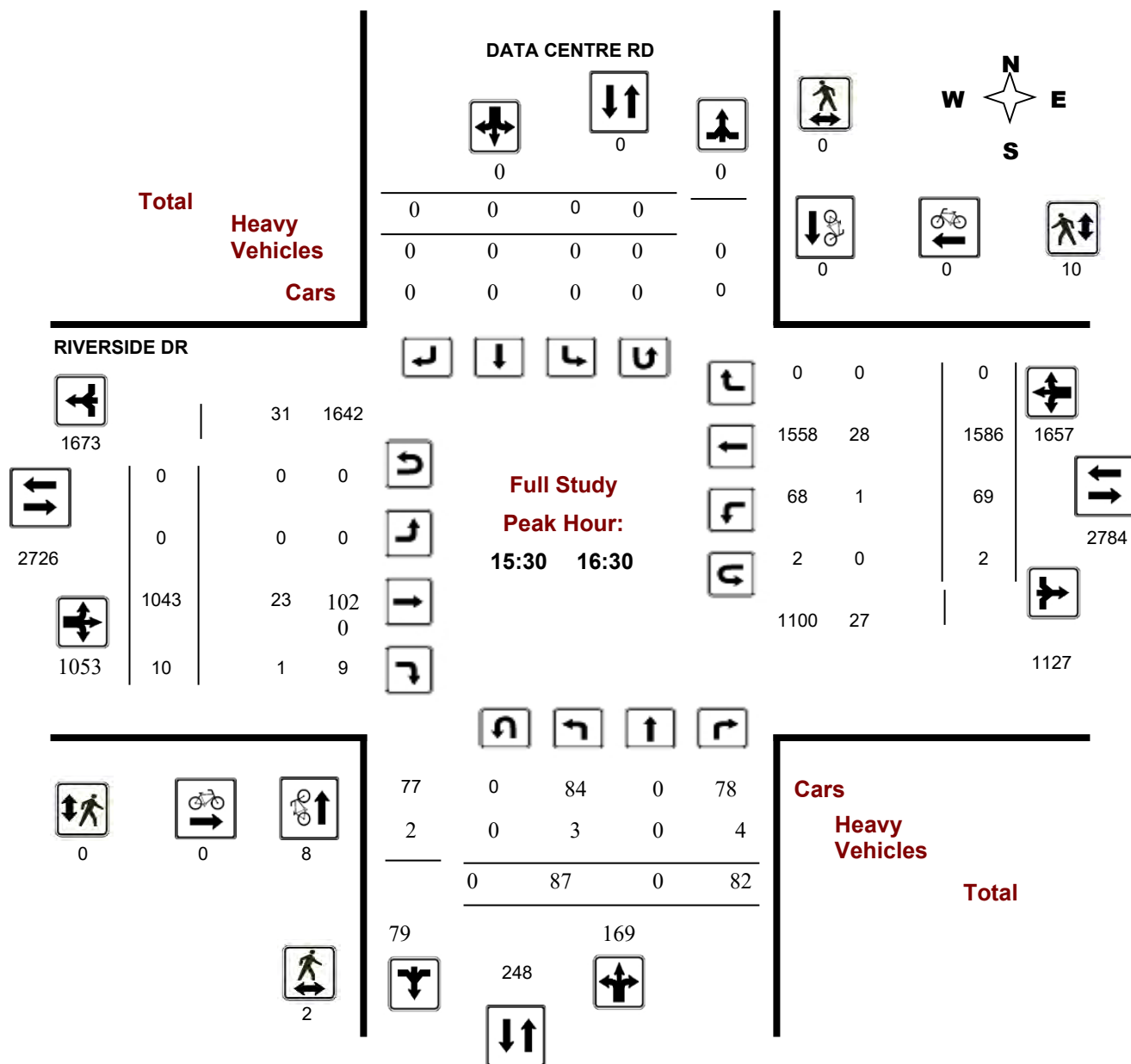
### DATA CENTRE RD @ RIVERSIDE DR

**Survey Date:** Friday, July 17, 2015

**Start Time:** 07:00

**WO No:** 34957

**Device:** Jamar Technologies, Inc





# Transportation Services - Traffic Services

## Turning Movement Count - Full Study Peak Hour Diagram

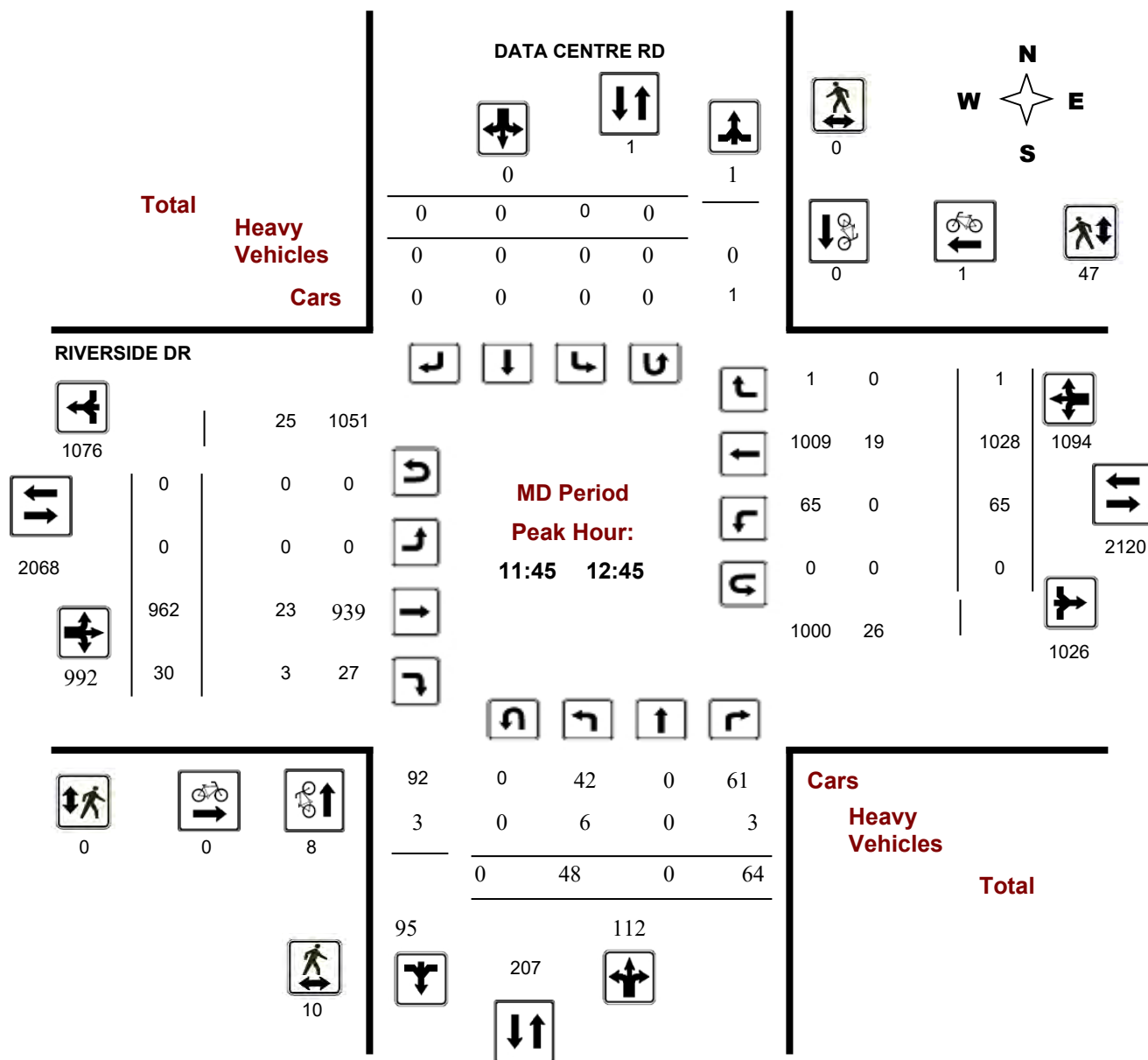
### DATA CENTRE RD @ RIVERSIDE DR

**Survey Date:** Friday, July 17, 2015

**Start Time:** 07:00

**WO No:** 34957

**Device:** Jamar Technologies, Inc





# Transportation Services - Traffic Services

## Turning Movement Count - Full Study Peak Hour Diagram

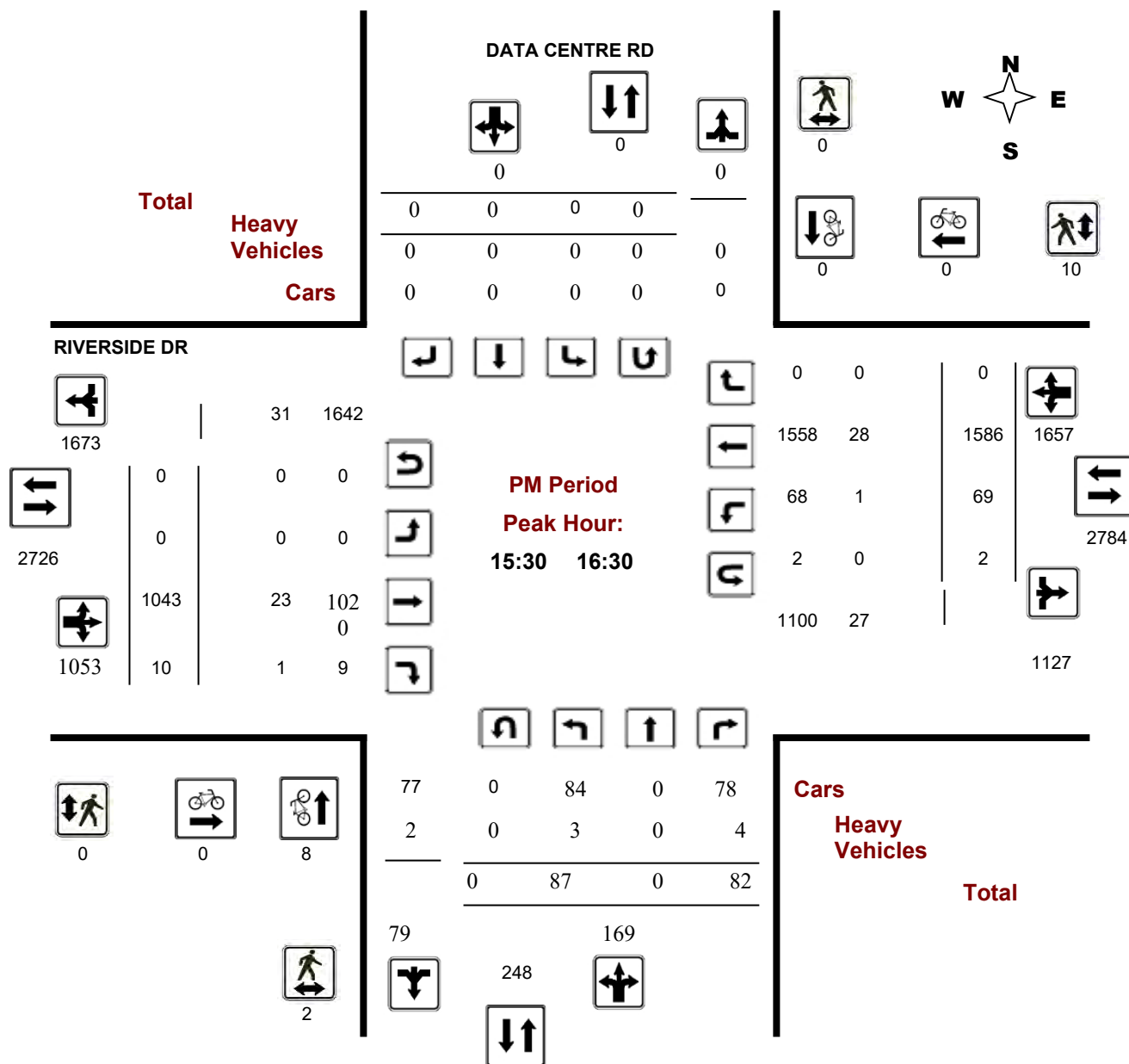
### DATA CENTRE RD @ RIVERSIDE DR

**Survey Date:** Friday, July 17, 2015

**Start Time:** 07:00

**WO No:** 34957

**Device:** Jamar Technologies, Inc



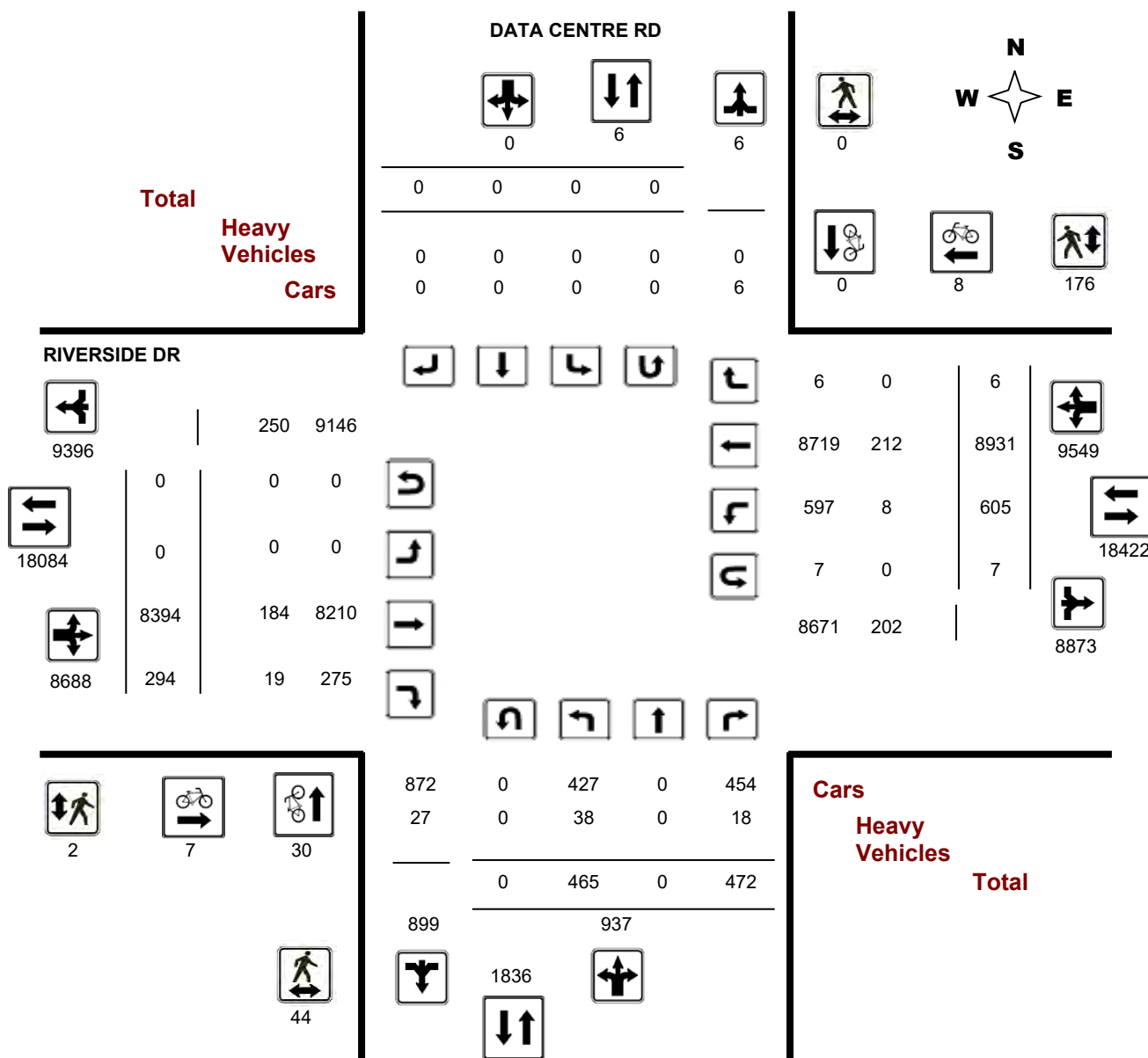
## Transportation Services - Traffic Services

### Turning Movement Count - Full Study Diagram

## DATA CENTRE RD @ RIVERSIDE DR

**Survey Date:** Friday, July 17, 2015

**WO#:** 34957  
**Device:** Jamar Technologies, Inc



## Comments



## Turning Movement Count - Full Study Summary Report

### DATA CENTRE RD @ RIVERSIDE DR

**Survey Date:** Friday, July 17, 2015

**Total Observed U-Turns**

Northbound: 0      Southbound: 0  
Eastbound: 0      Westbound: 7

**AADT Factor**

.90

#### Full Study

DATA CENTRE RD										RIVERSIDE DR										STR TOT	Grand Total
Period	Northbound				Southbound				STR TOT	Eastbound				Westbound							
	LT	ST	RT	NB TOT	LT	ST	RT	SB TOT		LT	ST	RT	EB TOT	LT	ST	RT	WB TOT				
07:00	08:00	23	0	43	66	0	0	0	0	66	0	1190	57	1247	128	865	1	994	2241	2307	
08:00	09:00	47	0	70	117	0	0	0	0	117	0	1395	88	1483	96	943	1	1040	2523	2640	
09:00	10:00	24	0	42	66	0	0	0	0	66	0	1043	46	1089	74	858	0	932	2021	2087	
11:30	12:30	50	0	64	114	0	0	0	0	114	0	946	27	973	59	1009	4	1072	2045	2159	
12:30	13:30	62	0	53	115	0	0	0	0	115	0	919	22	941	54	937	0	991	1932	2047	
15:00	16:00	77	0	87	164	0	0	0	0	164	0	983	14	997	57	1411	0	1468	2465	2629	
16:00	17:00	106	0	84	190	0	0	0	0	190	0	999	22	1021	89	1515	0	1604	2625	2815	
17:00	18:00	76	0	29	105	0	0	0	0	105	0	919	18	937	48	1393	0	1441	2378	2483	
Sub Total		465	0	472	937	0	0	0	0	937	0	8394	294	8688	605	8931	6	9542	18230	19167	
U Turns					0				0	0				0				7	7	7	
Total		465	0	472	937	0	0	0	0	937	0	8394	294	8688	605	8931	6	9549	18237	19174	
EQ 12Hr		646	0	656	1302	0	0	0	0	1302	0	11668	409	12076	841	12414	8	13273	25349	26651	
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.														1.39							
AVG 12Hr		582	0	590	1172	0	0	0	0	1172	0	10501	368	10869	757	11173	8	11946	22815	23987	
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.														.90							
AVG 24Hr		762	0	774	1536	0	0	0	0	1536	0	13756	482	14238	991	14636	10	15649	29887	31423	
Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor.														1.31							

**Comments:**

Note: U-Turns provided for approach totals. Refer to 'U-Turn' Report for specific breakdown.



## Turning Movement Count - 15 Minute Summary Report

### DATA CENTRE RD @ RIVERSIDE DR

**Survey Date:** Friday, July 17, 2015

#### Total Observed U-Turns

Northbound: 0 Southbound: 0  
Eastbound: 0 Westbound: 7

DATA CENTRE RD											RIVERSIDE DR									
Northbound					Southbound					Eastbound					Westbound					Grand Total
Time Period	LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT		
07:00	07:15	4	0	12	16	0	0	0	0	16	0	264	12	276	31	160	1	192	468	484
07:15	07:30	5	0	8	13	0	0	0	0	13	0	294	16	310	29	207	0	236	546	559
07:30	07:45	4	0	10	14	0	0	0	0	14	0	368	19	387	33	239	0	272	659	673
07:45	08:00	10	0	13	23	0	0	0	0	23	0	264	10	274	35	259	0	294	568	591
08:00	08:15	22	0	21	43	0	0	0	0	43	0	300	22	322	25	232	1	258	580	623
08:15	08:30	6	0	12	18	0	0	0	0	18	0	311	16	327	30	232	0	262	589	607
08:30	08:45	10	0	19	29	0	0	0	0	29	0	347	28	375	15	243	0	258	633	662
08:45	09:00	9	0	18	27	0	0	0	0	27	0	437	22	459	26	236	0	262	721	748
09:00	09:15	12	0	15	27	0	0	0	0	27	0	318	9	327	31	222	0	253	580	607
09:15	09:30	3	0	7	10	0	0	0	0	10	0	243	15	258	13	190	0	203	461	471
09:30	09:45	6	0	7	13	0	0	0	0	13	0	261	14	275	13	240	0	253	528	541
09:45	10:00	3	0	13	16	0	0	0	0	16	0	221	8	229	17	206	0	223	452	468
11:30	11:45	14	0	11	25	0	0	0	0	25	0	204	4	208	9	229	3	241	449	474
11:45	12:00	10	0	20	30	0	0	0	0	30	0	223	13	236	14	254	0	268	504	534
12:00	12:15	17	0	17	34	0	0	0	0	34	0	235	1	236	19	262	0	281	517	551
12:15	12:30	9	0	16	25	0	0	0	0	25	0	284	9	293	17	264	1	282	575	600
12:30	12:45	12	0	11	23	0	0	0	0	23	0	220	7	227	15	248	0	263	490	513
12:45	13:00	13	0	16	29	0	0	0	0	29	0	217	2	219	18	250	0	269	488	517
13:00	13:15	19	0	8	27	0	0	0	0	27	0	255	9	264	13	215	0	228	492	519
13:15	13:30	18	0	18	36	0	0	0	0	36	0	227	4	231	8	224	0	232	463	499
15:00	15:15	27	0	36	63	0	0	0	0	63	0	227	6	233	14	289	0	303	536	599
15:15	15:30	14	0	19	33	0	0	0	0	33	0	203	3	206	13	329	0	343	549	582
15:30	15:45	18	0	15	33	0	0	0	0	33	0	319	3	322	13	386	0	401	723	756
15:45	16:00	18	0	17	35	0	0	0	0	35	0	234	2	236	17	407	0	424	660	695
16:00	16:15	24	0	25	49	0	0	0	0	49	0	278	2	280	18	384	0	402	682	731
16:15	16:30	27	0	25	52	0	0	0	0	52	0	212	3	215	21	409	0	430	645	697
16:30	16:45	29	0	22	51	0	0	0	0	51	0	239	7	246	26	380	0	406	652	703
16:45	17:00	26	0	12	38	0	0	0	0	38	0	270	10	280	24	342	0	366	646	684
17:00	17:15	19	0	8	27	0	0	0	0	27	0	258	5	263	24	361	0	386	649	676
17:15	17:30	28	0	15	43	0	0	0	0	43	0	309	9	318	8	360	0	370	688	731
17:30	17:45	18	0	2	20	0	0	0	0	20	0	135	3	138	5	350	0	355	493	513
17:45	18:00	11	0	4	15	0	0	0	0	15	0	217	1	218	11	322	0	333	551	566
TOTAL:		465	0	472	937	0	0	0	0	937	0	8394	294	8688	605	8931	6	9549	18237	19174

Note: U-Turns are included in Totals.

Comment:



# Transportation Services - Traffic Services

## Turning Movement Count - Cyclist Volume Report

Work Order  
34957

### DATA CENTRE RD @ RIVERSIDE DR

Count Date: Friday, July 17, 2015

Start Time: 07:00

Time Period	DATA CENTRE RD			RIVERSIDE DR			Grand Total
	Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	
07:00 08:00	1	0	1	2	2	4	5
08:00 09:00	1	0	1	2	3	5	6
09:00 10:00	2	0	2	1	1	2	4
11:30 12:30	8	0	8	0	1	1	9
12:30 13:30	1	0	1	0	0	0	1
15:00 16:00	6	0	6	0	1	1	7
16:00 17:00	7	0	7	0	0	0	7
17:00 18:00	4	0	4	2	0	2	6
Total .....	30	0	30	7	8	15	45

Comment:

Note: These volumes consists of bicycles only (no mopeds or motorcycles) and ARE NOT included in the Turning Movement Count Summary.





# Transportation Services - Traffic Services

W.O.  
34957

## Turning Movement Count - Heavy Vehicle Report

### DATA CENTRE RD @ RIVERSIDE DR

**Survey Date:** Friday, July 17, 2015

DATA CENTRE RD											RIVERSIDE DR									
Time Period		Northbound			Southbound			Eastbound			Westbound									Grand Total
		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	
07:00	08:00	3	0	0	3	0	0	0	0	3	0	32	1	33	2	28	0	30	63	66
08:00	09:00	8	0	2	10	0	0	0	0	10	0	24	4	28	0	39	0	39	67	77
09:00	10:00	4	0	2	6	0	0	0	0	6	0	42	4	46	3	26	0	29	75	81
11:30	12:30	5	0	3	8	0	0	0	0	8	0	20	3	23	0	22	0	22	45	53
12:30	13:30	6	0	6	12	0	0	0	0	12	0	20	1	21	1	20	0	21	42	54
15:00	16:00	5	0	2	7	0	0	0	0	7	0	18	3	21	1	28	0	29	50	57
16:00	17:00	3	0	3	6	0	0	0	0	6	0	18	1	19	0	30	0	30	49	55
17:00	18:00	4	0	0	4	0	0	0	0	4	0	10	2	12	1	19	0	20	32	36
<b>Sub Total</b>		<b>38</b>	<b>0</b>	<b>18</b>	<b>56</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>56</b>	<b>0</b>	<b>184</b>	<b>19</b>	<b>203</b>	<b>8</b>	<b>212</b>	<b>0</b>	<b>220</b>	<b>423</b>	<b>479</b>
<b>U-Turns (Heavy Vehicles)</b>					<b>0</b>				<b>0</b>	<b>0</b>				<b>0</b>				<b>0</b>	<b>0</b>	<b>0</b>
<b>Total</b>		<b>38</b>	<b>0</b>	<b>18</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>56</b>	<b>0</b>	<b>184</b>	<b>19</b>	<b>203</b>	<b>8</b>	<b>212</b>	<b>0</b>	<b>220</b>	<b>423</b>	<b>479</b>

Heavy Vehicles include Buses, Single-Unit Trucks and Articulated Trucks. Further, they ARE included in the Turning Movement Count Summary.



# Transportation Services - Traffic Services

Work Order

34957

## Turning Movement Count - Pedestrian Volume Report

### DATA CENTRE RD @ RIVERSIDE DR

Count Date: Friday, July 17, 2015

Start Time: 07:00

Time Period	NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	Total	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	Total	Grand Total
07:00 07:15	0	0	0	0	5	5	5
07:15 07:30	0	0	0	0	2	2	2
07:30 07:45	0	0	0	0	4	4	4
07:45 08:00	0	0	0	0	4	4	4
07:00 08:00	0	0	0	0	15	15	15
08:00 08:15	1	0	1	0	8	8	9
08:15 08:30	1	0	1	0	5	5	6
08:30 08:45	1	0	1	0	7	7	8
08:45 09:00	3	0	3	0	8	8	11
08:00 09:00	6	0	6	0	28	28	34
09:00 09:15	0	0	0	0	2	2	2
09:15 09:30	0	0	0	1	3	4	4
09:30 09:45	0	0	0	1	1	2	2
09:45 10:00	0	0	0	0	1	1	1
09:00 10:00	0	0	0	2	7	9	9
11:30 11:45	2	0	2	0	1	1	3
11:45 12:00	0	0	0	0	5	5	5
12:00 12:15	5	0	5	0	20	20	25
12:15 12:30	3	0	3	0	7	7	10
11:30 12:30	10	0	10	0	33	33	43
12:30 12:45	2	0	2	0	15	15	17
12:45 13:00	4	0	4	0	14	14	18
13:00 13:15	6	0	6	0	41	41	47
13:15 13:30	1	0	1	0	0	0	1
12:30 13:30	13	0	13	0	70	70	83
15:00 15:15	1	0	1	0	1	1	2
15:15 15:30	0	0	0	0	6	6	6
15:30 15:45	0	0	0	0	3	3	3
15:45 16:00	0	0	0	0	4	4	4
15:00 16:00	1	0	1	0	14	14	15
16:00 16:15	2	0	2	0	1	1	3
16:15 16:30	0	0	0	0	2	2	2
16:30 16:45	2	0	2	0	1	1	3
16:45 17:00	5	0	5	0	2	2	7
16:00 17:00	9	0	9	0	6	6	15
17:00 17:15	3	0	3	0	0	0	3
17:15 17:30	2	0	2	0	2	2	4
17:30 17:45	0	0	0	0	1	1	1
17:45 18:00	0	0	0	0	0	0	0
17:00 18:00	5	0	5	0	3	3	8
Total .....	44	0	44	2	176	178	222

Comment:

## Turning Movement Count - 15 Min U-Turn Total Report

### DATA CENTRE RD @ RIVERSIDE DR

**Survey Date:** Friday, July 17, 2015

Time Period		Northbound U-Turn Total	Southbound U-Turn Total	Eastbound U-Turn Total	Westbound U-Turn Total	Total
07:00	07:15	0	0	0	0	0
07:15	07:30	0	0	0	0	0
07:30	07:45	0	0	0	0	0
07:45	08:00	0	0	0	0	0
08:00	08:15	0	0	0	0	0
08:15	08:30	0	0	0	0	0
08:30	08:45	0	0	0	0	0
08:45	09:00	0	0	0	0	0
09:00	09:15	0	0	0	0	0
09:15	09:30	0	0	0	0	0
09:30	09:45	0	0	0	0	0
09:45	10:00	0	0	0	0	0
11:30	11:45	0	0	0	0	0
11:45	12:00	0	0	0	0	0
12:00	12:15	0	0	0	0	0
12:15	12:30	0	0	0	0	0
12:30	12:45	0	0	0	0	0
12:45	13:00	0	0	0	1	1
13:00	13:15	0	0	0	0	0
13:15	13:30	0	0	0	0	0
15:00	15:15	0	0	0	0	0
15:15	15:30	0	0	0	1	1
15:30	15:45	0	0	0	2	2
15:45	16:00	0	0	0	0	0
16:00	16:15	0	0	0	0	0
16:15	16:30	0	0	0	0	0
16:30	16:45	0	0	0	0	0
16:45	17:00	0	0	0	0	0
17:00	17:15	0	0	0	1	1
17:15	17:30	0	0	0	2	2
17:30	17:45	0	0	0	0	0
17:45	18:00	0	0	0	0	0
Total		0	0	0	7	7



# Transportation Services - Traffic Services

## Turning Movement Count - Study Results

### RIVERSIDE DR @ PLEASANT PARK RD

**Survey Date:** Friday, July 24, 2015

**Start Time:** 07:00

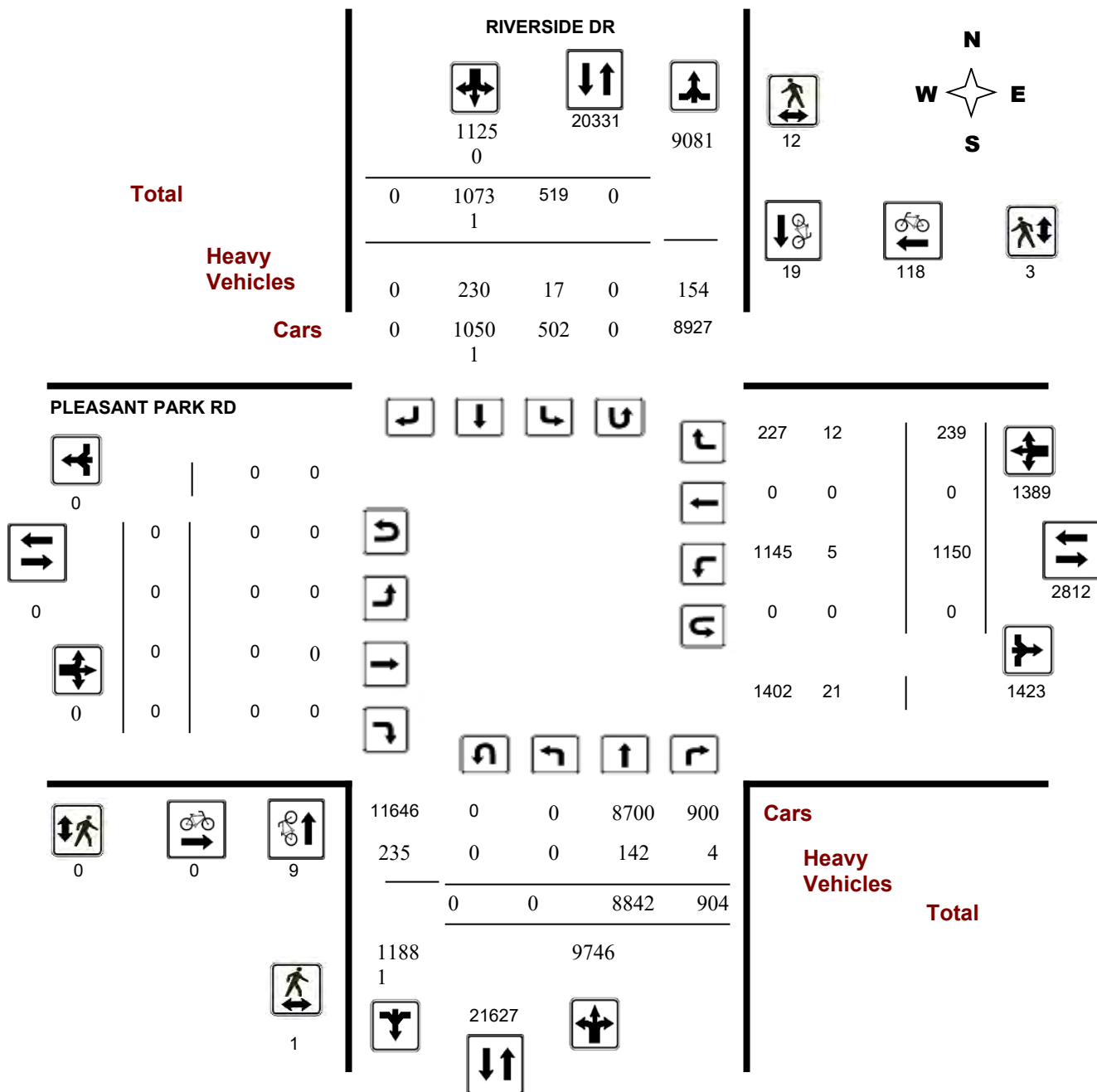
**WO No:**

35006

**Device:**

Jamar Technologies, Inc

### Full Study Diagram



**Survey Date:** Friday, July 24, 2015

**WO No:**

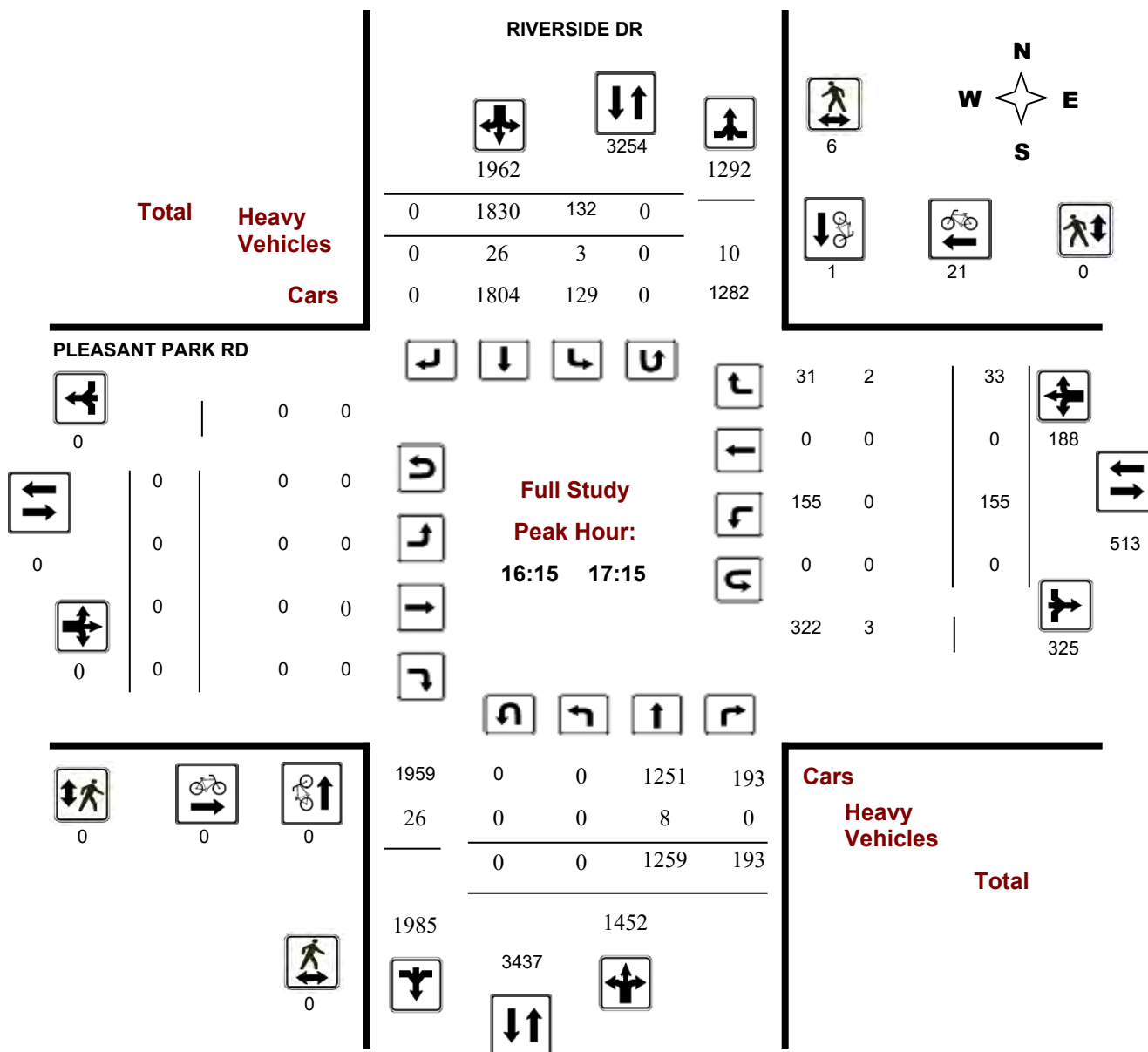
35006

**Start Time:** 07:00

**Device:**

Jamar Technologies, Inc

### Full Study Peak Hour Diagram





# Transportation Services - Traffic Services

## Turning Movement Count - Study Results

### RIVERSIDE DR @ PLEASANT PARK RD

**Survey Date:** Friday, July 24, 2015

**WO No:** 35006

**Start Time:** 07:00

**Device:** Jamar Technologies, Inc

### Full Study Summary (8 HR Standard)

**Survey Date:** Friday, July 24, 2015

#### Total Observed U-Turns

Northbound: 0 Southbound: 0  
Eastbound: 0 Westbound: 0

#### AADT Factor

.90

#### RIVERSIDE DR

#### PLEASANT PARK RD

Period	Northbound				Southbound				STR TOT	Eastbound				Westbound				STR TOT	Grand Total
	LT	ST	RT	NB TOT	LT	ST	RT	SB TOT		LT	ST	RT	EB TOT	LT	ST	RT	WB TOT		
07:00 08:00	0	922	91	1013	29	1063	0	1092	2105	0	0	0	0	94	0	22	116	116	2221
08:00 09:00	0	1072	77	1149	33	1179	0	1212	2361	0	0	0	0	212	0	38	250	250	2611
09:00 10:00	0	1150	94	1244	44	1002	0	1046	2290	0	0	0	0	136	0	26	162	162	2452
11:30 12:30	0	1033	89	1122	53	1202	0	1255	2377	0	0	0	0	131	0	28	159	159	2536
12:30 13:30	0	1156	89	1245	59	1209	0	1268	2513	0	0	0	0	102	0	33	135	135	2648
15:00 16:00	0	1083	139	1222	74	1651	0	1725	2947	0	0	0	0	179	0	24	203	203	3150
16:00 17:00	0	1173	169	1342	139	1881	0	2020	3362	0	0	0	0	157	0	37	194	194	3556
17:00 18:00	0	1253	156	1409	88	1544	0	1632	3041	0	0	0	0	139	0	31	170	170	3211
<b>Sub Total</b>	0	8842	904	9746	519	10731	0	11250	20996	0	0	0	0	1150	0	239	1389	1389	22385
<b>U Turns</b>				0				0	0				0				0	0	0
<b>Total</b>	0	8842	904	9746	519	10731	0	11250	20996	0	0	0	0	1150	0	239	1389	1389	22385
<b>EQ 12Hr</b>	0	12290	1257	13547	721	14916	0	15637	29184	0	0	0	0	1598	0	332	1931	1931	31115
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.													<b>1.39</b>						
<b>AVG 12Hr</b>	0	10425	1066	11491	612	12652	0	13264	26266	0	0	0	0	1356	0	282	1638	1738	28004
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.													<b>0.9</b>						
<b>AVG 24Hr</b>	0	13656	1396	15053	802	16574	0	17376	32429	0	0	0	0	1776	0	369	2145	2145	34574

Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor.

**1.31**

Note: U-Turns provided for approach totals. Refer to 'U-Turn' Report for specific breakdown.



# Transportation Services - Traffic Services

## Turning Movement Count - Peak Hour Diagram

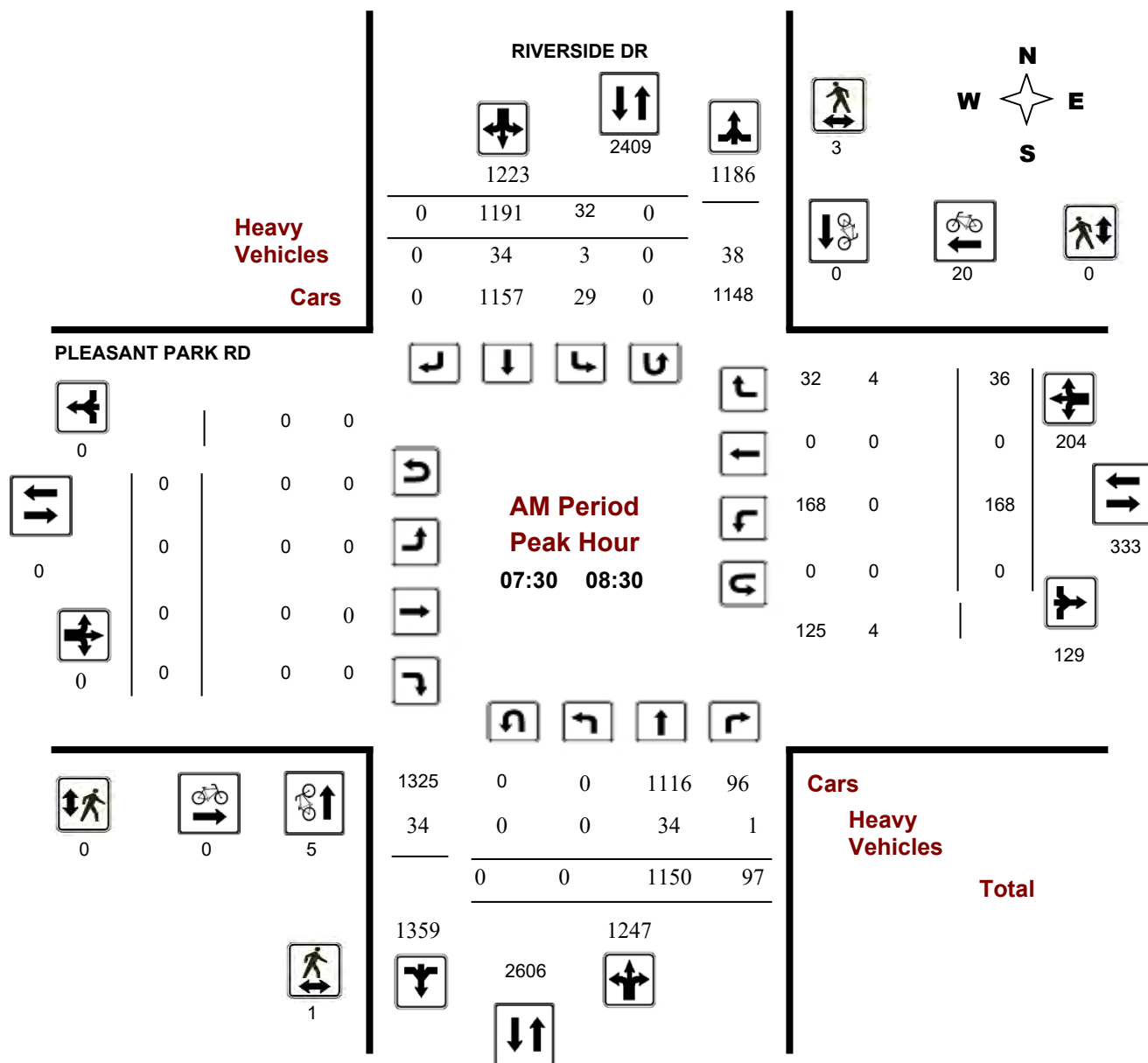
### RIVERSIDE DR @ PLEASANT PARK RD

**Survey Date:** Friday, July 24, 2015

**Start Time:** 07:00

**WO No:** 35006

**Device:** Jamar Technologies, Inc





# Transportation Services - Traffic Services

## Turning Movement Count - Peak Hour Diagram

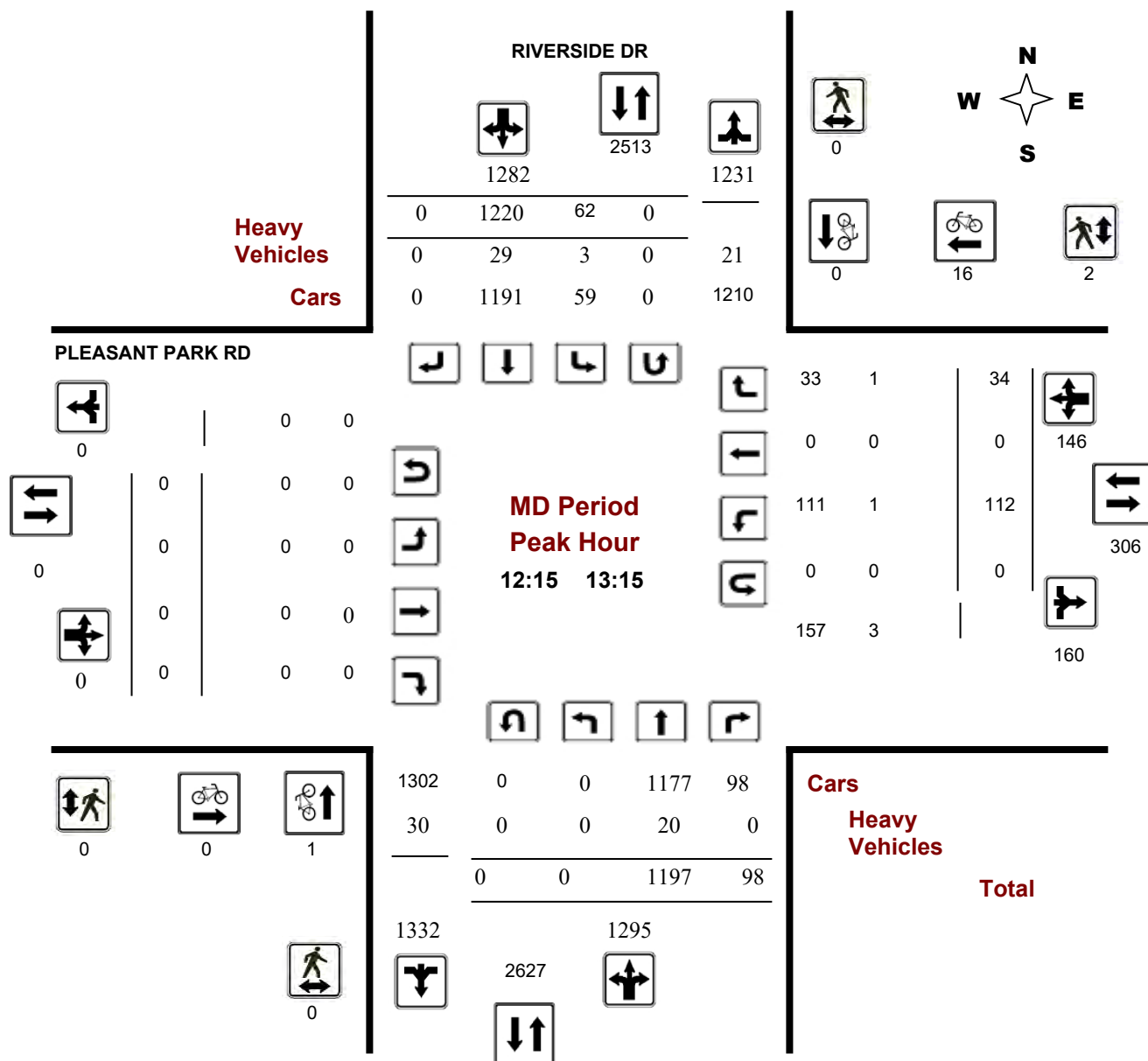
### RIVERSIDE DR @ PLEASANT PARK RD

**Survey Date:** Friday, July 24, 2015

**Start Time:** 07:00

**WO No:** 35006

**Device:** Jamar Technologies, Inc







# Transportation Services - Traffic Services

## Turning Movement Count - Peak Hour Diagram

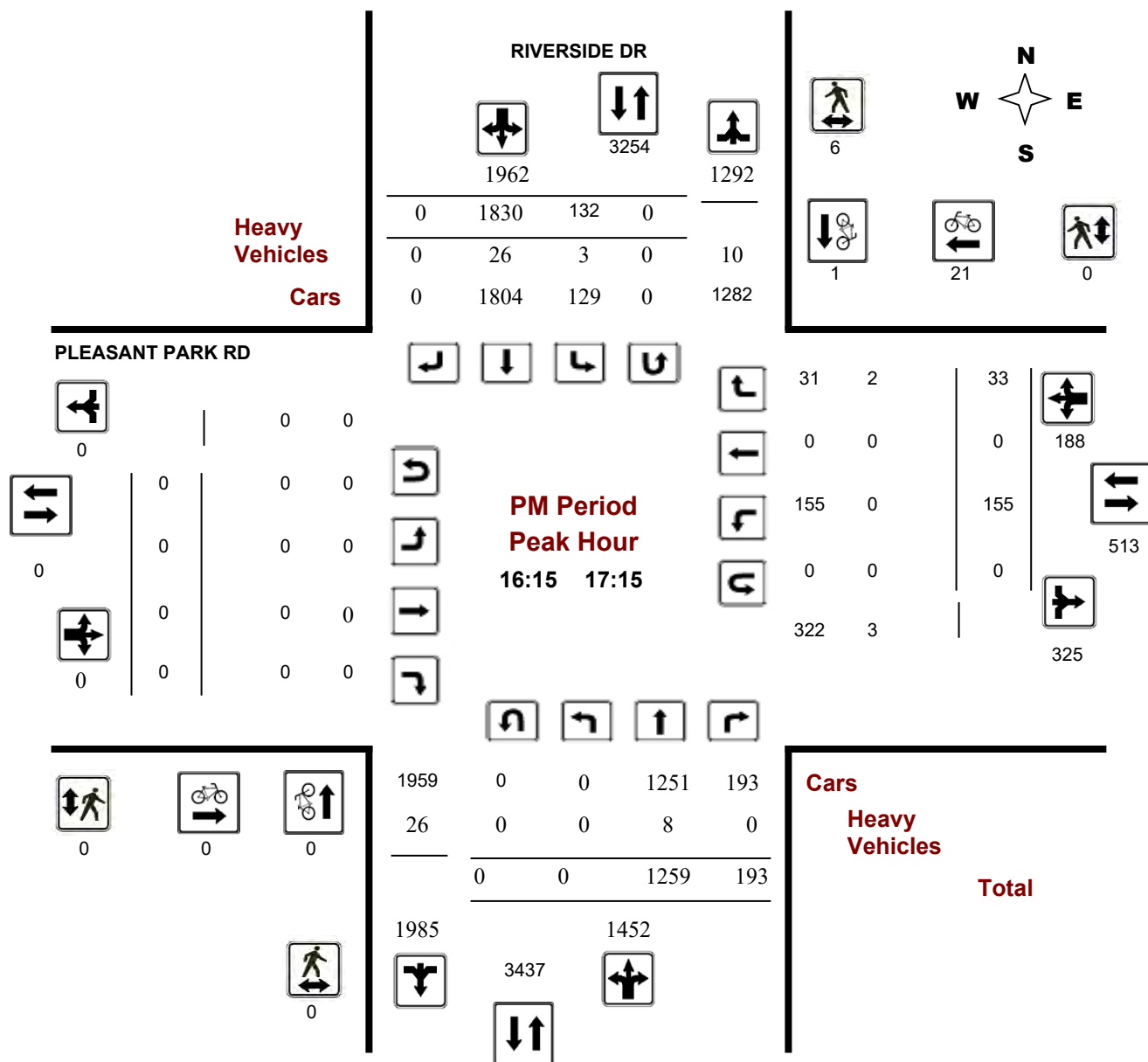
### RIVERSIDE DR @ PLEASANT PARK RD

**Survey Date:** Friday, July 24, 2015

**Start Time:** 07:00

**WO No:** 35006

**Device:** Jamar Technologies, Inc





# Transportation Services - Traffic Services

## Turning Movement Count - Study Results

### RIVERSIDE DR @ PLEASANT PARK RD

**Survey Date:** Friday, July 24, 2015

**WO No:**

35006

**Start Time:** 07:00

**Device:**

Jamar Technologies, Inc

## Full Study 15 Minute Increments

### RIVERSIDE DR

### PLEASANT PARK RD

Northbound

Southbound

Eastbound

Westbound

Time Period	LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:45 08:00	0	298	27	325	10	323	0	333	23	0	0	0	0	39	0	9	48	23	706
08:00 08:15	0	282	25	307	7	285	0	292	16	0	0	0	0	49	0	6	55	16	654
08:15 08:30	0	270	21	291	6	298	0	304	22	0	0	0	0	60	0	17	77	22	672
08:30 08:45	0	283	16	299	9	271	0	280	7	0	0	0	0	43	0	7	50	7	629
08:45 09:00	0	237	15	252	11	325	0	336	19	0	0	0	0	60	0	8	68	19	656
09:00 09:15	0	250	19	269	9	237	0	246	16	0	0	0	0	37	0	6	43	16	558
09:15 09:30	0	336	32	368	8	259	0	267	16	0	0	0	0	29	0	6	35	16	670
09:30 09:45	0	301	25	326	14	255	0	269	20	0	0	0	0	27	0	8	35	20	630
09:45 10:00	0	263	18	281	13	251	0	264	17	0	0	0	0	43	0	6	49	17	594
11:30 11:45	0	225	20	245	6	288	0	294	10	0	0	0	0	44	0	6	50	10	589
11:45 12:00	0	248	16	264	16	300	0	316	17	0	0	0	0	30	0	7	37	17	617
12:00 12:15	0	279	22	301	16	326	0	342	14	0	0	0	0	24	0	11	35	14	678
12:15 12:30	0	281	31	312	15	288	0	303	10	0	0	0	0	33	0	4	37	10	652
12:30 12:45	0	323	19	342	11	309	0	320	11	0	0	0	0	28	0	11	39	11	701
12:45 13:00	0	272	30	302	29	321	0	350	19	0	0	0	0	28	0	9	37	19	689
13:00 13:15	0	321	18	339	7	302	0	309	12	0	0	0	0	23	0	10	33	12	681
13:15 13:30	0	240	22	262	12	277	0	289	14	0	0	0	0	23	0	3	26	14	577
15:00 15:15	0	249	32	281	21	374	0	395	11	0	0	0	0	37	0	6	43	11	719
15:15 15:30	0	266	31	297	25	403	0	428	8	0	0	0	0	50	0	4	54	8	779
15:30 15:45	0	288	37	325	16	405	0	421	9	0	0	0	0	44	0	9	53	9	799
15:45 16:00	0	280	39	319	12	469	0	481	19	0	0	0	0	48	0	5	53	19	853
16:00 16:15	0	295	42	337	37	461	0	498	12	0	0	0	0	38	0	11	49	12	884
16:15 16:30	0	292	40	332	42	520	0	562	9	0	0	0	0	35	0	8	43	9	937
16:30 16:45	0	296	38	334	31	404	0	435	9	0	0	0	0	36	0	7	43	9	812
16:45 17:00	0	290	49	339	29	496	0	525	11	0	0	0	0	48	0	11	59	11	923
17:00 17:15	0	381	66	447	30	410	0	440	8	0	0	0	0	36	0	7	43	8	930
17:15 17:30	0	311	41	352	22	417	0	439	4	0	0	0	0	43	0	8	51	4	842
17:30 17:45	0	273	28	301	25	384	0	409	6	0	0	0	0	38	0	6	44	6	754
17:45 18:00	0	288	21	309	11	333	0	344	7	0	0	0	0	22	0	10	32	7	685
07:30 07:45	0	300	24	324	9	285	0	294	11	0	0	0	0	20	0	4	24	11	642
07:00 07:15	0	30	20	50	5	215	0	220	2	0	0	0	0	18	0	5	23	2	293
07:15 07:30	0	294	20	314	5	240	0	245	4	0	0	0	0	17	0	4	21	4	580
Total:	0	8842	904	9746	519	10731	0	11250	393	0	0	0	0	1150	0	239	1389	393	22,385

Note: U-Turns are included in Totals.



# Transportation Services - Traffic Services

## Turning Movement Count - Study Results

### RIVERSIDE DR @ PLEASANT PARK RD

**Survey Date:** Friday, July 24, 2015

**WO No:** 35006

**Start Time:** 07:00

**Device:** Jamar Technologies, Inc

## Full Study Cyclist Volume

		RIVERSIDE DR			PLEASANT PARK RD			Grand Total
Time Period		Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	
07:45	08:00	0	0	0	0	4	4	4
08:00	08:15	3	0	3	0	8	8	11
08:15	08:30	1	0	1	0	4	4	5
08:30	08:45	1	0	1	0	1	1	2
08:45	09:00	0	1	1	0	0	0	1
09:00	09:15	0	0	0	0	5	5	5
09:15	09:30	1	0	1	0	2	2	3
09:30	09:45	0	0	0	0	2	2	2
09:45	10:00	0	0	0	0	7	7	7
11:30	11:45	0	0	0	0	4	4	4
11:45	12:00	0	0	0	0	5	5	5
12:00	12:15	0	0	0	0	0	0	0
12:15	12:30	0	0	0	0	5	5	5
12:30	12:45	0	0	0	0	3	3	3
12:45	13:00	0	0	0	0	5	5	5
13:00	13:15	1	0	1	0	3	3	4
13:15	13:30	0	0	0	0	0	0	0
15:00	15:15	0	2	2	0	1	1	3
15:15	15:30	0	0	0	0	8	8	8
15:30	15:45	1	0	1	0	1	1	2
15:45	16:00	0	0	0	0	6	6	6
16:00	16:15	0	0	0	0	6	6	6
16:15	16:30	0	0	0	0	5	5	5
16:30	16:45	0	1	1	0	3	3	4
16:45	17:00	0	0	0	0	6	6	6
17:00	17:15	0	0	0	0	7	7	7
17:15	17:30	0	0	0	0	6	6	6
17:30	17:45	0	0	0	0	3	3	3
17:45	18:00	0	0	0	0	4	4	4
07:30	07:45	1	0	1	0	4	4	5
07:00	07:15	0	6	6	0	0	0	6
07:15	07:30	0	9	9	0	0	0	9
Total		9	19	28	0	118	118	146



# Transportation Services - Traffic Services

## Turning Movement Count - Study Results

### RIVERSIDE DR @ PLEASANT PARK RD

**Survey Date:** Friday, July 24, 2015

**WO No:** 35006

**Start Time:** 07:00

**Device:** Jamar Technologies, Inc

### Full Study Pedestrian Volume

#### RIVERSIDE DR

#### PLEASANT PARK RD

Time Period	NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	Total	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	Total	Grand Total
07:45 08:00	0	2	2	0	0	0	2
08:00 08:15	0	1	1	0	0	0	1
08:15 08:30	0	0	0	0	0	0	0
08:30 08:45	0	0	0	0	0	0	0
08:45 09:00	0	0	0	0	0	0	0
09:00 09:15	0	0	0	0	0	0	0
09:15 09:30	0	0	0	0	0	0	0
09:30 09:45	0	0	0	0	0	0	0
09:45 10:00	0	0	0	0	0	0	0
11:30 11:45	0	0	0	0	0	0	0
11:45 12:00	0	0	0	0	0	0	0
12:00 12:15	0	0	0	0	0	0	0
12:15 12:30	0	0	0	0	0	0	0
12:30 12:45	0	0	0	0	0	0	0
12:45 13:00	0	0	0	0	2	2	2
13:00 13:15	0	0	0	0	0	0	0
13:15 13:30	0	0	0	0	0	0	0
15:00 15:15	0	0	0	0	0	0	0
15:15 15:30	0	2	2	0	0	0	2
15:30 15:45	0	0	0	0	0	0	0
15:45 16:00	0	0	0	0	1	1	1
16:00 16:15	0	0	0	0	0	0	0
16:15 16:30	0	0	0	0	0	0	0
16:30 16:45	0	4	4	0	0	0	4
16:45 17:00	0	2	2	0	0	0	2
17:00 17:15	0	0	0	0	0	0	0
17:15 17:30	0	0	0	0	0	0	0
17:30 17:45	0	0	0	0	0	0	0
17:45 18:00	0	0	0	0	0	0	0
07:30 07:45	1	0	1	0	0	0	1
07:00 07:15	0	0	0	0	0	0	0
07:15 07:30	0	1	1	0	0	0	1
<b>Total .....</b>	<b>1</b>	<b>12</b>	<b>13</b>	<b>0</b>	<b>3</b>	<b>3</b>	<b>16</b>



# Transportation Services - Traffic Services

## Turning Movement Count - Study Results

### RIVERSIDE DR @ PLEASANT PARK RD

**Survey Date:** Friday, July 24, 2015

**WO No:**

35006

**Start Time:** 07:00

**Device:**

Jamar Technologies, Inc

## Full Study Heavy Vehicles

### RIVERSIDE DR

### PLEASANT PARK RD

Northbound

Southbound

Eastbound

Westbound

Time Period	LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:45 08:00	0	12	0	12	1	10	0	11	23	0	0	0	0	0	0	1	1	1	24
08:00 08:15	0	6	1	7	0	9	0	9	16	0	0	0	0	0	0	1	1	1	17
08:15 08:30	0	10	0	10	1	11	0	12	22	0	0	0	0	0	0	1	1	1	23
08:30 08:45	0	2	0	2	0	5	0	5	7	0	0	0	0	0	0	0	0	0	7
08:45 09:00	0	5	1	6	0	13	0	13	19	0	0	0	0	0	0	0	0	0	19
09:00 09:15	0	6	0	6	0	10	0	10	16	0	0	0	0	0	0	1	1	1	17
09:15 09:30	0	0	1	1	1	14	0	15	16	0	0	0	0	2	0	0	2	2	18
09:30 09:45	0	5	1	6	0	14	0	14	20	0	0	0	0	0	0	0	0	0	20
09:45 10:00	0	6	0	6	0	11	0	11	17	0	0	0	0	1	0	0	1	1	18
11:30 11:45	0	3	0	3	0	7	0	7	10	0	0	0	0	0	0	0	0	0	10
11:45 12:00	0	6	0	6	0	11	0	11	17	0	0	0	0	0	0	0	0	0	17
12:00 12:15	0	4	0	4	0	10	0	10	14	0	0	0	0	0	0	0	0	0	14
12:15 12:30	0	3	0	3	1	6	0	7	10	0	0	0	0	0	0	0	0	0	10
12:30 12:45	0	3	0	3	0	8	0	8	11	0	0	0	0	1	0	0	1	1	12
12:45 13:00	0	9	0	9	2	8	0	10	19	0	0	0	0	0	0	1	1	1	20
13:00 13:15	0	5	0	5	0	7	0	7	12	0	0	0	0	0	0	0	0	0	12
13:15 13:30	0	5	0	5	0	9	0	9	14	0	0	0	0	0	0	0	0	0	14
15:00 15:15	0	5	0	5	0	6	0	6	11	0	0	0	0	0	0	1	1	1	12
15:15 15:30	0	3	0	3	2	3	0	5	8	0	0	0	0	1	0	0	1	1	9
15:30 15:45	0	4	0	4	1	4	0	5	9	0	0	0	0	0	0	0	0	0	9
15:45 16:00	0	7	0	7	2	10	0	12	19	0	0	0	0	0	0	1	1	1	20
16:00 16:15	0	5	0	5	1	6	0	7	12	0	0	0	0	0	0	1	1	1	13
16:15 16:30	0	1	0	1	1	7	0	8	9	0	0	0	0	0	0	0	0	0	9
16:30 16:45	0	3	0	3	0	6	0	6	9	0	0	0	0	0	0	1	1	1	10
16:45 17:00	0	3	0	3	1	7	0	8	11	0	0	0	0	0	0	0	0	0	11
17:00 17:15	0	1	0	1	1	6	0	7	8	0	0	0	0	0	0	1	1	1	9
17:15 17:30	0	0	0	0	1	3	0	4	4	0	0	0	0	0	0	0	0	0	4
17:30 17:45	0	3	0	3	0	3	0	3	6	0	0	0	0	0	0	1	1	1	7
17:45 18:00	0	5	0	5	0	2	0	2	7	0	0	0	0	0	0	0	0	0	7
07:30 07:45	0	6	0	6	1	4	0	5	11	0	0	0	0	0	0	1	1	1	12
07:00 07:15	0	2	0	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2
07:15 07:30	0	4	0	4	0	0	0	0	4	0	0	0	0	0	0	0	0	0	4
Total: None	0	142	4	146	17	230	0	247	393	0	0	0	0	5	0	12	17	17	410



# Transportation Services - Traffic Services

## Turning Movement Count - Study Results

### RIVERSIDE DR @ PLEASANT PARK RD

**Survey Date:** Friday, July 24, 2015

**WO No:** 35006

**Start Time:** 07:00

**Device:** Jamar Technologies, Inc

### Full Study 15 Minute U-Turn Total

#### RIVERSIDE DR

#### PLEASANT PARK RD

Time Period		Northbound U-Turn Total	Southbound U-Turn Total	Eastbound U-Turn Total	Westbound U-Turn Total	Total
07:45	08:00	0	0	0	0	0
08:00	08:15	0	0	0	0	0
08:15	08:30	0	0	0	0	0
08:30	08:45	0	0	0	0	0
08:45	09:00	0	0	0	0	0
09:00	09:15	0	0	0	0	0
09:15	09:30	0	0	0	0	0
09:30	09:45	0	0	0	0	0
09:45	10:00	0	0	0	0	0
11:30	11:45	0	0	0	0	0
11:45	12:00	0	0	0	0	0
12:00	12:15	0	0	0	0	0
12:15	12:30	0	0	0	0	0
12:30	12:45	0	0	0	0	0
12:45	13:00	0	0	0	0	0
13:00	13:15	0	0	0	0	0
13:15	13:30	0	0	0	0	0
15:00	15:15	0	0	0	0	0
15:15	15:30	0	0	0	0	0
15:30	15:45	0	0	0	0	0
15:45	16:00	0	0	0	0	0
16:00	16:15	0	0	0	0	0
16:15	16:30	0	0	0	0	0
16:30	16:45	0	0	0	0	0
16:45	17:00	0	0	0	0	0
17:00	17:15	0	0	0	0	0
17:15	17:30	0	0	0	0	0
17:30	17:45	0	0	0	0	0
17:45	18:00	0	0	0	0	0
07:30	07:45	0	0	0	0	0
07:00	07:15	0	0	0	0	0
07:15	07:30	0	0	0	0	0
Total		0	0	0	0	0

# Appendix D

COLLISION DATA

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**Total Area**

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total
P.D. only	87	23	74	76	2	0	0	5	267
Non-fatal injury	28	9	6	27	0	0	0	0	70
Non reportable	0	0	0	0	0	0	0	0	0
Total	115	32	80	103	2	0	0	5	337
	#1 or 34%	#4 or 10%	#3 or 24%	#2 or 31%	#6 or 1%	#7 or 0%	#7 or 0%	#5 or 1%	

79%  
21%  
0%  
100%

**BANK ST/BILLINGS TRANSIT**

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2014-2018	5	24,767	1825	0.11

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total
P.D. only	2	0	0	1	0	0	0	0	3
Non-fatal injury	2	0	0	0	0	0	0	0	2
Non reportable	0	0	0	0	0	0	0	0	0
Total	4	0	0	1	0	0	0	0	5
	80%	0%	0%	20%	0%	0%	0%	0%	

60%  
40%  
0%  
100%

**BANK ST/RIVERDALE AVE**

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2014-2018	14	19,544	1825	0.39

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total
P.D. only	4	1	3	1	2	0	0	0	11
Non-fatal injury	1	1	1	0	0	0	0	0	3
Non reportable	0	0	0	0	0	0	0	0	0
Total	5	2	4	1	2	0	0	0	14
	36%	14%	29%	7%	14%	0%	0%	0%	

79%  
21%  
0%  
100%

**BANK ST/RIVERSIDE DR N**

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2014-2018	97	39,952	1825	1.33

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total
P.D. only	23	4	20	26	0	0	0	0	73
Non-fatal injury	4	4	1	15	0	0	0	0	24
Non reportable	0	0	0	0	0	0	0	0	0
Total	27	8	21	41	0	0	0	0	97
	28%	8%	22%	42%	0%	0%	0%	0%	

75%  
25%  
0%  
100%

**BANK ST/RIVERSIDE DR S**

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2014-2018	73	43,737	1825	0.91

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total
P.D. only	27	4	14	16	0	0	0	1	62
Non-fatal injury	8	1	0	2	0	0	0	0	11
Non reportable	0	0	0	0	0	0	0	0	0
Total	35	5	14	18	0	0	0	1	73
	48%	7%	19%	25%	0%	0%	0%	1%	

85%  
15%  
0%  
100%

**BANK ST, RIVERDALE AVE to RIVERSIDE DR**

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2014-2018	5	n/a	1825	n/a

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total
P.D. only	0	0	4	0	0	0	0	0	4
Non-fatal injury	1	0	0	0	0	0	0	0	1
Non reportable	0	0	0	0	0	0	0	0	0
Total	1	0	4	0	0	0	0	0	5
	20%	0%	80%	0%	0%	0%	0%	0%	

80%  
20%  
0%  
100%



**BANK ST, RIVERSIDE DR to BILLINGS TRANSIT**

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2014-2018	18	n/a	1825	n/a

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total
P.D. only	0	3	2	6	0	0	0	1	12
Non-fatal injury	1	3	1	1	0	0	0	0	6
Non reportable	0	0	0	0	0	0	0	0	0
Total	1	6	3	7	0	0	0	1	18
	6%	33%	17%	39%	0%	0%	0%	6%	

67%  
33%  
0%  
100%

**BANK ST, RIVERSIDE DR to RIVERSIDE DR**

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2014-2018	12	n/a	1825	n/a

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total
P.D. only	3	5	2	0	0	0	0	1	11
Non-fatal injury	0	0	0	1	0	0	0	0	1
Non reportable	0	0	0	0	0	0	0	0	0
Total	3	5	2	1	0	0	0	1	12
	25%	42%	17%	8%	0%	0%	0%	8%	

92%  
8%  
0%  
100%

**BILLINGS BRIDGE NB/RIVERSIDE DR EB**

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2014-2018	2	n/a	1825	n/a

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total
P.D. only	0	0	2	0	0	0	0	0	2
Non-fatal injury	0	0	0	0	0	0	0	0	0
Non reportable	0	0	0	0	0	0	0	0	0
Total	0	0	2	0	0	0	0	0	2
	0%	0%	100%	0%	0%	0%	0%	0%	

100%  
0%  
0%  
100%

**BILLINGS BRIDGES RAMP NB/RIVERSIDE DR EB**

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2014-2018	10	n/a	1825	n/a

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total
P.D. only	0	0	0	6	0	0	0	0	6
Non-fatal injury	0	0	0	4	0	0	0	0	4
Non reportable	0	0	0	0	0	0	0	0	0
Total	0	0	0	10	0	0	0	0	10
	0%	0%	0%	100%	0%	0%	0%	0%	

60%  
40%  
0%  
100%

**BILLINGS BRIDGES RAMP NB/RIVERSIDE DR WB**

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2014-2018	8	n/a	1825	n/a

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total
P.D. only	0	0	0	7	0	0	0	0	7
Non-fatal injury	0	0	0	1	0	0	0	0	1
Non reportable	0	0	0	0	0	0	0	0	0
Total	0	0	0	8	0	0	0	0	8
	0%	0%	0%	100%	0%	0%	0%	0%	

88%  
13%  
0%  
100%

**BILLINGS BRIDGES RAMP SB/RIVERSIDE DR EB**

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2014-2018	10	n/a	1825	n/a

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total
P.D. only	0	0	0	9	0	0	0	0	9
Non-fatal injury	0	0	0	1	0	0	0	0	1
Non reportable	0	0	0	0	0	0	0	0	0
Total	0	0	0	10	0	0	0	0	10
	0%	0%	0%	100%	0%	0%	0%	0%	

90%  
10%  
0%  
100%

**BILLINGS BRIDGESC RAMP SB/RIVERSIDE DR SB**

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2014-2018	1	n/a	1825	n/a

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total
P.D. only	1	0	0	0	0	0	0	0	1
Non-fatal injury	0	0	0	0	0	0	0	0	0
Non reportable	0	0	0	0	0	0	0	0	0
Total	1	0	0	0	0	0	0	0	1
	100%	0%	0%	0%	0%	0%	0%	0%	

100%  
0%  
0%  
100%

**DATA CENTRE RD/RIVERSIDE DR**

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2014-2018	23	31,423	1825	0.40

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total
P.D. only	14	1	1	3	0	0	0	0	19
Non-fatal injury	4	0	0	0	0	0	0	0	4
Non reportable	0	0	0	0	0	0	0	0	0
Total	18	1	1	3	0	0	0	0	23
	78%	4%	4%	13%	0%	0%	0%	0%	

83%  
17%  
0%  
100%

**RIVERSIDE DR EB/BILLINGS BRIDGE SC SE**

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2014-2018	2	n/a	1825	n/a

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total
P.D. only	0	0	0	0	0	0	0	1	1
Non-fatal injury	1	0	0	0	0	0	0	0	1
Non reportable	0	0	0	0	0	0	0	0	0
Total	1	0	0	0	0	0	0	1	2
	50%	0%	0%	0%	0%	0%	0%	50%	

50%  
50%  
0%  
100%

**RIVERSIDE DR NB, BANK ST to RIVERSIDE DR NB RAMP FROM EB TO WB**

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2014-2018	22	n/a	1825	n/a

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total
P.D. only	2	4	10	1	0	0	0	0	17
Non-fatal injury	3	0	2	0	0	0	0	0	5
Non reportable	0	0	0	0	0	0	0	0	0
Total	5	4	12	1	0	0	0	0	22
	23%	18%	55%	5%	0%	0%	0%	0%	

77%  
23%  
0%  
100%

**RIVERSIDE DR NB, BILLINGS BRIDGE SC RAMP NB to BILLINGS BRIDGE SC R**

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2014-2018	1	n/a	1825	n/a

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total
P.D. only	0	0	0	0	0	0	0	0	0
Non-fatal injury	1	0	0	0	0	0	0	0	1
Non reportable	0	0	0	0	0	0	0	0	0
Total	1	0	0	0	0	0	0	0	1
	100%	0%	0%	0%	0%	0%	0%	0%	

0%  
100%  
0%  
100%

**RIVERSIDE DR NB, BILLINGS BRIDGE SC RAMP SB to BANK ST**

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2014-2018	4	n/a	1825	n/a

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total
P.D. only	2	0	2	0	0	0	0	0	4
Non-fatal injury	0	0	0	0	0	0	0	0	0
Non reportable	0	0	0	0	0	0	0	0	0
Total	2	0	2	0	0	0	0	0	4

100%  
0%  
0%  
100%

50% 0% 50% 0% 0% 0% 0% 0% 0%

#### RIVERSIDE DR NB, BILLINGS BRIDGE SC RAMP SB to BILLINGS BRIDGE SC R

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2014-2018	5	n/a	1825	n/a

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total
P.D. only	0	0	5	0	0	0	0	0	5
Non-fatal injury	0	0	0	0	0	0	0	0	0
Non reportable	0	0	0	0	0	0	0	0	0
Total	0	0	5	0	0	0	0	0	5
	0%	0%	100%	0%	0%	0%	0%	0%	

100%  
0%  
0%  
100%

#### RIVERSIDE DR NB, DATA CENTRE RD to BILLINGS BRIDGES RAMP NB

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2014-2018	2	n/a	1825	n/a

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total
P.D. only	1	0	0	0	0	0	0	0	1
Non-fatal injury	0	0	0	1	0	0	0	0	1
Non reportable	0	0	0	0	0	0	0	0	0
Total	1	0	0	1	0	0	0	0	2
	50%	0%	0%	50%	0%	0%	0%	0%	

50%  
50%  
0%  
100%

#### RIVERSIDE DR NB, RIVERSIDE DR NB RAMP FROM EB TO WB to NEIL WAY

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2014-2018	3	n/a	1825	n/a

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total
P.D. only	2	0	1	0	0	0	0	0	3
Non-fatal injury	0	0	0	0	0	0	0	0	0
Non reportable	0	0	0	0	0	0	0	0	0
Total	2	0	1	0	0	0	0	0	3
	67%	0%	33%	0%	0%	0%	0%	0%	

100%  
0%  
0%  
100%

#### RIVERSIDE DR SB, BANK ST to BILLINGS BRIDGE NB RAMP

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2014-2018	6	n/a	1825	n/a

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total
P.D. only	0	1	3	0	0	0	0	1	5
Non-fatal injury	0	0	0	1	0	0	0	0	1
Non reportable	0	0	0	0	0	0	0	0	0
Total	0	1	3	1	0	0	0	1	6
	0%	17%	50%	17%	0%	0%	0%	17%	

83%  
17%  
0%  
100%

#### RIVERSIDE DR SB, BILLINGS BRIDGE NB RAMP to NEIL WAY

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2014-2018	2	n/a	1825	n/a

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total
P.D. only	0	0	0	0	0	0	0	0	0
Non-fatal injury	1	0	1	0	0	0	0	0	2
Non reportable	0	0	0	0	0	0	0	0	0
Total	1	0	1	0	0	0	0	0	2
	50%	0%	50%	0%	0%	0%	0%	0%	

0%  
100%  
0%  
100%

#### RIVERSIDE DR SB, BILLINGS BRIDGE SC RAMP SB to BANK ST

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2014-2018	8	n/a	1825	n/a

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total
P.D. only	4	0	3	0	0	0	0	0	7
Non-fatal injury	1	0	0	0	0	0	0	0	1
Non reportable	0	0	0	0	0	0	0	0	0
Total	5	0	3	0	0	0	0	0	8

88%  
13%  
0%  
100%

63%      0%      38%      0%      0%      0%      0%      0%

**RIVERSIDE DR SB, BILLINGS BRIDGES RAMP NB to DATA CENTRE RD**

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2014-2018	2	n/a	1825	n/a

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total
P.D. only	1	0	1	0	0	0	0	0	2
Non-fatal injury	0	0	0	0	0	0	0	0	0
Non reportable	0	0	0	0	0	0	0	0	0
Total	1	0	1	0	0	0	0	0	2
	50%	0%	50%	0%	0%	0%	0%	0%	

100%  
0%  
0%  
100%

**RIVERSIDE DR SB, BILLINGS BRIDGES RAMP SB to BILLINGS BRIDGE SC RA**

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2014-2018	2	n/a	1825	n/a

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total
P.D. only	1	0	1	0	0	0	0	0	2
Non-fatal injury	0	0	0	0	0	0	0	0	0
Non reportable	0	0	0	0	0	0	0	0	0
Total	1	0	1	0	0	0	0	0	2
	50%	0%	50%	0%	0%	0%	0%	0%	

100%  
0%  
0%  
100%



# City Operations - Transportation Services

## Collision Details Report - Public Version

**From:** January 1, 2014 **To:** December 31, 2018

**Location:** BANK ST @ BILLINGS TRANSIT

**Traffic Control:** Traffic signal

**Total Collisions:** 6

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuvre	Vehicle type	First Event	No. Ped
2014-Feb-14, Fri,18:31	Snow	Angle	P.D. only	Slush	North	Going ahead	Automobile, station wagon	Other motor vehicle	
					East	Turning left	Municipal transit bus	Other motor vehicle	
2014-Apr-13, Sun,15:17	Clear	Rear end	P.D. only	Dry	North	Slowing or stopping	Pick-up truck	Other motor vehicle	
					North	Stopped	Automobile, station wagon	Other motor vehicle	
2014-Jul-22, Tue,10:48	Clear	Rear end	Non-fatal injury	Dry	South	Slowing or stopping	Delivery van	Other motor vehicle	
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2016-Jan-14, Thu,08:15	Snow	Rear end	P.D. only	Loose snow	North	Going ahead	Automobile, station wagon	Other motor vehicle	
					North	Stopped	Pick-up truck	Other motor vehicle	
2017-Jan-04, Wed,21:00	Snow	Rear end	Non-fatal injury	Ice	North	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
					North	Stopped	Automobile, station wagon	Other motor vehicle	

2018-Mar-14, Wed,16:55	Clear	SMV other	Non-fatal injury	Dry	East	Turning left	Municipal transit bus	Pedestrian	1
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**Location:** BANK ST @ RIVERDALE AVE

**Traffic Control:** Traffic signal

**Total Collisions:** 16

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2014-Jun-17, Tue,08:00	Clear	Sideswipe	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Cyclist	
					South	Going ahead	Bicycle	Other motor vehicle	
2014-Aug-19, Tue,09:06	Clear	Rear end	P.D. only	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle	
					North	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
2014-Nov-20, Thu,19:00	Clear	Rear end	P.D. only	Wet	South	Going ahead	Passenger van	Other motor vehicle	
					South	Stopped	Automobile, station wagon	Other motor vehicle	
2014-Nov-21, Fri,15:38	Clear	SMV other	Non-fatal injury	Dry	West	Turning left	Automobile, station wagon	Pedestrian	1
2015-Jun-17, Wed,13:01	Clear	SMV other	Non-fatal injury	Dry	North	Going ahead	Automobile, station wagon	Pedestrian	1
2016-Feb-17, Wed,16:48	Clear	Rear end	P.D. only	Slush	South	Slowing or stopping	Passenger van	Other motor vehicle	
					South	Stopped	Automobile, station wagon	Other motor vehicle	
2016-Aug-12, Fri,13:51	Rain	Turning movement	P.D. only	Wet	South	Turning left	Construction equipment	Other motor vehicle	

					South	Going ahead	Automobile, station wagon	Other motor vehicle
2016-Jun-11, Sat,06:38	Clear	Turning movement	Non-fatal injury	Dry	South	Turning left	Passenger van	Other motor vehicle
					North	Going ahead	Motorcycle	Other motor vehicle
2016-Jun-09, Thu,09:08	Clear	Rear end	Non-fatal injury	Dry	North	Going ahead	Passenger van	Other motor vehicle
					North	Stopped	Pick-up truck	Other motor vehicle
2017-Jan-28, Sat,10:21	Snow	Sideswipe	Non-fatal injury	Wet	North	Changing lanes	Automobile, station wagon	Other motor vehicle
					North	Going ahead	Automobile, station wagon	Other motor vehicle
2016-Dec-08, Thu,19:15	Snow	Approaching	P.D. only	Ice	North	Slowing or stopping	Automobile, station wagon	Other motor vehicle
					South	Going ahead	Automobile, station wagon	Other motor vehicle
2017-Dec-22, Fri,19:48	Snow	Angle	P.D. only	Loose snow	West	Turning left	Passenger van	Other motor vehicle
					South	Going ahead	Automobile, station wagon	Other motor vehicle
2018-Feb-03, Sat,22:15	Snow	Approaching	P.D. only	Loose snow	North	Slowing or stopping	Automobile, station wagon	Skidding/sliding
					South	Going ahead	Automobile, station wagon	Other motor vehicle
2018-Jul-17, Tue,15:55	Clear	Sideswipe	P.D. only	Dry	South	Changing lanes	Automobile, station wagon	Other motor vehicle
					South	Going ahead	Automobile, station wagon	Other motor vehicle

2018-Oct-15, Mon,01:21	Clear	Rear end	P.D. only	Dry	North	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
					North	Stopped	Automobile, station wagon	Other motor vehicle	
2018-Nov-22, Thu,18:30	Clear	Sideswipe	P.D. only	Dry	South	Changing lanes	Intercity bus	Other motor vehicle	
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
<b>Location:</b> BANK ST @ RIVERSIDE DR N									
<b>Traffic Control:</b> Traffic signal							<b>Total Collisions:</b> 102		
Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2014-Jan-03, Fri,12:24	Clear	Angle	P.D. only	Ice	North	Going ahead	Automobile, station wagon	Other motor vehicle	
					West	Going ahead	Delivery van	Other motor vehicle	
2014-Jan-29, Wed,08:24	Clear	Rear end	P.D. only	Wet	West	Turning left	Pick-up truck	Other motor vehicle	
					West	Turning left	Pick-up truck	Other motor vehicle	
					West	Turning left	Automobile, station wagon	Other motor vehicle	
2014-Mar-02, Sun,09:35	Clear	Angle	P.D. only	Wet	North	Going ahead	Truck - closed	Other motor vehicle	
					West	Going ahead	Pick-up truck	Other motor vehicle	
2014-Mar-08, Sat,19:48	Clear	SMV other	P.D. only	Dry	West	Turning left	Automobile, station wagon	Pedestrian	1



2014-Mar-13, Thu,10:37	Clear	Angle	P.D. only	Wet	North	Slowing or stopping	Truck and trailer	Other motor vehicle
					West	Going ahead	Automobile, station wagon	Other motor vehicle
2014-Mar-07, Fri,12:33	Clear	Angle	P.D. only	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle
					West	Going ahead	Passenger van	Other motor vehicle
2014-Apr-19, Sat,12:23	Clear	Angle	Non-fatal injury	Dry	West	Going ahead	Automobile, station wagon	Other motor vehicle
					North	Going ahead	Automobile, station wagon	Other motor vehicle
2014-May-20, Tue,17:31	Clear	Rear end	Non-fatal injury	Dry	West	Going ahead	Automobile, station wagon	Other motor vehicle
					West	Stopped	Automobile, station wagon	Other motor vehicle
2014-Apr-15, Tue,16:22	Snow	Angle	P.D. only	Ice	South	Going ahead	Automobile, station wagon	Other motor vehicle
					West	Going ahead	Automobile, station wagon	Other motor vehicle
2014-Jul-01, Tue,15:42	Clear	Angle	Non-fatal injury	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle
					West	Going ahead	Passenger van	Other motor vehicle
2014-Jul-07, Mon,12:30	Clear	Angle	Non-fatal injury	Dry	North	Going ahead	Pick-up truck	Other motor vehicle
					West	Going ahead	Automobile, station wagon	Other motor vehicle
					South	Stopped	Automobile, station wagon	Other motor vehicle

2014-Aug-01, Fri,12:58	Clear	Angle	P.D. only	Dry	South	Going ahead	Pick-up truck	Other motor vehicle
					West	Turning left	Automobile, station wagon	Other motor vehicle
2014-Jul-30, Wed,13:50	Clear	Angle	P.D. only	Dry	South	Going ahead	Pick-up truck	Other motor vehicle
					West	Going ahead	Automobile, station wagon	Other motor vehicle
2014-Jul-19, Sat,16:31	Clear	Angle	Non-fatal injury	Dry	South	Turning right	Pick-up truck	Cyclist
					East	Going ahead	Bicycle	Other motor vehicle
2014-Dec-06, Sat,22:16	Clear	Turning movement	P.D. only	Wet	North	Turning left	Automobile, station wagon	Other motor vehicle
					South	Going ahead	Automobile, station wagon	Other motor vehicle
2015-Jan-25, Sun,15:34	Clear	Rear end	P.D. only	Dry	West	Going ahead	Automobile, station wagon	Other motor vehicle
					West	Turning right	Automobile, station wagon	Other motor vehicle
2015-Jan-26, Mon,10:41	Clear	Rear end	P.D. only	Ice	North	Going ahead	Automobile, station wagon	Other motor vehicle
					North	Stopped	Passenger van	Other motor vehicle
2015-May-04, Mon,07:47	Clear	Angle	Non-fatal injury	Dry	South	Going ahead	Pick-up truck	Other motor vehicle
					West	Going ahead	Automobile, station wagon	Other motor vehicle
2015-Apr-23, Thu,09:41	Clear	Sideswipe	P.D. only	Dry	West	Turning left	Truck and trailer	Other motor vehicle

					West	Turning left	Automobile, station wagon	Other motor vehicle
2015-Feb-13, Fri,17:35	Clear	Sideswipe	P.D. only	Dry	West	Changing lanes	Automobile, station wagon	Other motor vehicle
					West	Going ahead	Passenger van	Other motor vehicle
2015-Jan-23, Fri,16:06	Clear	Angle	P.D. only	Dry	North	Stopped	Passenger van	Other motor vehicle
					East	Going ahead	Automobile, station wagon	Other motor vehicle
2015-Feb-15, Sun,11:37	Clear	Angle	P.D. only	Wet	North	Going ahead	Automobile, station wagon	Other motor vehicle
					West	Going ahead	Automobile, station wagon	Other motor vehicle
2015-Feb-01, Sun,09:06	Clear	Angle	Non-fatal injury	Wet	North	Going ahead	Passenger van	Other motor vehicle
					West	Going ahead	Automobile, station wagon	Other motor vehicle
2015-Jan-20, Tue,08:49	Clear	Angle	Non-fatal injury	Wet	South	Going ahead	Automobile, station wagon	Other motor vehicle
					West	Going ahead	Passenger van	Other motor vehicle
2015-Jan-29, Thu,17:48	Snow	Angle	P.D. only	Loose snow	South	Slowing or stopping	Pick-up truck	Other motor vehicle
					West	Going ahead	Pick-up truck	Other motor vehicle
2014-Dec-19, Fri,13:35	Clear	Angle	P.D. only	Dry	North	Going ahead	Pick-up truck	Other motor vehicle
					West	Going ahead	Pick-up truck	Other motor vehicle

2014-Dec-25, Thu,11:16	Clear	Angle	P.D. only	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle
					West	Going ahead	Automobile, station wagon	Other motor vehicle
2015-Jul-20, Mon,16:35	Clear	Rear end	P.D. only	Dry	West	Changing lanes	Pick-up truck	Other motor vehicle
					West	Stopped	Automobile, station wagon	Other motor vehicle
2015-Mar-03, Tue,12:07	Clear	Angle	P.D. only	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle
					West	Unknown	Unknown	Other motor vehicle
2015-Sep-02, Wed,06:28	Clear	Angle	Non-fatal injury	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle
					West	Going ahead	Automobile, station wagon	Other motor vehicle
2015-Aug-15, Sat,14:00	Clear	Angle	P.D. only	Dry	West	Going ahead	Pick-up truck	Other motor vehicle
					South	Going ahead	Automobile, station wagon	Other motor vehicle
2015-Aug-11, Tue,12:34	Clear	Sideswipe	P.D. only	Dry	South	Changing lanes	Pick-up truck	Other motor vehicle
					South	Going ahead	Passenger van	Other motor vehicle
2015-Jun-04, Thu,18:06	Clear	Rear end	P.D. only	Dry	West	Slowing or stopping	Pick-up truck	Other motor vehicle
					West	Stopped	Pick-up truck	Other motor vehicle

2015-Jul-07, Tue,11:30	Clear	Angle	P.D. only	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle
					West	Going ahead	Automobile, station wagon	Other motor vehicle
					West	Going ahead	Pick-up truck	Other motor vehicle
2015-Jul-17, Fri,23:51	Rain	Rear end	P.D. only	Wet	North	Going ahead	Automobile, station wagon	Other motor vehicle
					North	Going ahead	Automobile, station wagon	Other motor vehicle
					North	Going ahead	Automobile, station wagon	Other motor vehicle
2015-May-12, Tue,09:41	Clear	Sideswipe	P.D. only	Dry	West	Going ahead	Delivery van	Other motor vehicle
					West	Going ahead	Automobile, station wagon	Other motor vehicle
2015-May-20, Wed,15:34	Clear	Rear end	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle
					South	Stopped	Pick-up truck	Other motor vehicle
2015-Sep-15, Tue,17:32	Clear	Sideswipe	Non-fatal injury	Dry	West	Changing lanes	Motorcycle	Other motor vehicle
					West	Going ahead	Automobile, station wagon	Other motor vehicle
2015-Sep-23, Wed,13:19	Clear	Sideswipe	P.D. only	Dry	South	Changing lanes	Automobile, station wagon	Other motor vehicle
					South	Going ahead	Passenger van	Other motor vehicle
2016-Mar-06, Sun,08:55	Clear	Angle	P.D. only	Dry	North	Going ahead	Pick-up truck	Other motor vehicle

					West	Going ahead	Automobile, station wagon	Other motor vehicle
2016-Feb-26, Fri,14:06	Clear	Sideswipe	P.D. only	Dry	West	Turning left	Truck and trailer	Other motor vehicle
					West	Turning left	Automobile, station wagon	Other motor vehicle
2016-Sep-01, Thu,11:06	Clear	Sideswipe	P.D. only	Dry	North	Turning left	Pick-up truck	Other motor vehicle
					North	Turning left	Automobile, station wagon	Other motor vehicle
2016-Sep-20, Tue,17:27	Clear	Rear end	P.D. only	Dry	West	Slowing or stopping	Automobile, station wagon	Other motor vehicle
					West	Stopped	Automobile, station wagon	Other motor vehicle
2015-May-07, Thu,11:36	Clear	Angle	Non-fatal injury	Dry	South	Going ahead	Passenger van	Other motor vehicle
					West	Going ahead	Automobile, station wagon	Other motor vehicle
					West	Going ahead	Automobile, station wagon	Other motor vehicle
2015-Nov-18, Wed,21:30	Clear	Sideswipe	P.D. only	Dry	South	Changing lanes	Automobile, station wagon	Other motor vehicle
					South	Stopped	Automobile, station wagon	Other motor vehicle
2015-Dec-15, Tue,14:07	Rain	Rear end	P.D. only	Wet	West	Slowing or stopping	Automobile, station wagon	Other motor vehicle
					West	Stopped	Pick-up truck	Other motor vehicle
2015-Sep-04, Fri,13:30	Clear	Angle	Non-fatal injury	Dry	North	Going ahead	Passenger van	Other motor vehicle

					West	Going ahead	Motorcycle	Other motor vehicle	
2015-Dec-04, Fri,09:42	Clear	Rear end	P.D. only	Wet	South	Slowing or stopping	Pick-up truck	Other motor vehicle	
					South	Stopped	Pick-up truck	Other motor vehicle	
2016-Apr-23, Sat,07:55	Clear	Angle	P.D. only	Dry	South	Going ahead	Pick-up truck	Other motor vehicle	
					West	Going ahead	Pick-up truck	Other motor vehicle	
2016-Mar-16, Wed,12:10	Clear	Angle	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	
					West	Going ahead	Automobile, station wagon	Other motor vehicle	
2016-Sep-13, Tue,14:28	Clear	SMV other	Non-fatal injury	Dry	West	Turning left	Pick-up truck	Pedestrian	1
2016-Apr-04, Mon,12:58	Clear	Rear end	Non-fatal injury	Dry	West	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
					West	Turning left	Automobile, station wagon	Other motor vehicle	
2016-Mar-28, Mon,11:25	Rain	Angle	Non-fatal injury	Wet	North	Going ahead	Automobile, station wagon	Other motor vehicle	
					West	Going ahead	Pick-up truck	Other motor vehicle	
2016-Jun-09, Thu,16:15	Clear	Turning movement	Non-fatal injury	Dry	South	Turning right	Unknown	Cyclist	
					South	Going ahead	Bicycle	Other motor vehicle	

2016-Jul-29, Fri,10:11	Clear	Angle	Non-fatal injury	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle
					West	Going ahead	Automobile, station wagon	Other motor vehicle
					West	Going ahead	Automobile, station wagon	Other motor vehicle
2016-Aug-25, Thu,10:25	Clear	Sideswipe	P.D. only	Dry	South	Going ahead	Pick-up truck	Other motor vehicle
					South	Going ahead	Pick-up truck	Other motor vehicle
2016-Nov-23, Wed,18:12	Clear	Sideswipe	P.D. only	Dry	West	Changing lanes	Automobile, station wagon	Other motor vehicle
					West	Going ahead	Automobile, station wagon	Other motor vehicle
2016-Oct-04, Tue,09:10	Clear	Sideswipe	P.D. only	Dry	South	Changing lanes	Automobile, station wagon	Other motor vehicle
					South	Stopped	Pick-up truck	Other motor vehicle
					South	Going ahead	Automobile, station wagon	Other motor vehicle
2017-Jan-05, Thu,09:05	Clear	Angle	P.D. only	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Passenger van	Other motor vehicle
2017-Jan-09, Mon,11:59	Clear	Sideswipe	P.D. only	Dry	South	Changing lanes	Automobile, station wagon	Other motor vehicle
					South	Going ahead	Automobile, station wagon	Other motor vehicle
2017-Nov-02, Thu,23:15	Rain	Angle	P.D. only	Wet	South	Slowing or stopping	Automobile, station wagon	Other motor vehicle



					West	Going ahead	Automobile, station wagon	Other motor vehicle
2017-Oct-12, Thu,00:00	Clear	Sideswipe	P.D. only	Dry	West	Changing lanes	Unknown	Other motor vehicle
					West	Going ahead	Automobile, station wagon	Other motor vehicle
2017-Aug-31, Thu,15:55	Clear	Rear end	P.D. only	Dry	East	Slowing or stopping	Automobile, station wagon	Other motor vehicle
					East	Stopped	Automobile, station wagon	Other motor vehicle
2017-Aug-30, Wed,11:35	Clear	Angle	Non-fatal injury	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle
					West	Going ahead	Motorcycle	Other motor vehicle
2017-Feb-15, Wed,17:57	Snow	Rear end	P.D. only	Loose snow	South	Slowing or stopping	Automobile, station wagon	Other motor vehicle
					South	Stopped	Pick-up truck	Other motor vehicle
2017-Jan-19, Thu,11:17	Clear	Rear end	P.D. only	Dry	North	Going ahead	Pick-up truck	Other motor vehicle
					North	Changing lanes	Automobile, station wagon	Other motor vehicle
2017-Jan-20, Fri,06:35	Clear	Angle	P.D. only	Dry	West	Going ahead	Automobile, station wagon	Other motor vehicle
					South	Going ahead	Automobile, station wagon	Other motor vehicle
2017-Feb-28, Tue,21:04	Clear	Turning movement	P.D. only	Dry	North	Turning left	Automobile, station wagon	Other motor vehicle
					South	Going ahead	Automobile, station wagon	Other motor vehicle

2016-Nov-20, Sun,23:44	Snow	Rear end	P.D. only	Loose snow	North	Going ahead	Automobile, station wagon	Other motor vehicle
					North	Stopped	Automobile, station wagon	Other motor vehicle
2016-Dec-08, Thu,19:45	Drifting Snow	Rear end	P.D. only	Ice	South	Slowing or stopping	Pick-up truck	Other motor vehicle
					South	Stopped	Automobile, station wagon	Other motor vehicle
2017-May-25, Thu,13:27	Clear	Sideswipe	P.D. only	Dry	West	Changing lanes	Automobile, station wagon	Other motor vehicle
					West	Going ahead	Passenger van	Other motor vehicle
2017-May-26, Fri,13:17	Rain	Turning movement	P.D. only	Wet	West	Turning left	Automobile, station wagon	Other motor vehicle
					West	Going ahead	Pick-up truck	Other motor vehicle
2017-Jul-09, Sun,15:09	Clear	Angle	P.D. only	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle
					West	Turning left	Automobile, station wagon	Other motor vehicle
2017-Dec-03, Sun,08:27	Clear	Angle	Non-fatal injury	Dry	West	Going ahead	Passenger van	Other motor vehicle
					South	Going ahead	Automobile, station wagon	Other motor vehicle
2017-Sep-19, Tue,10:08	Clear	Angle	P.D. only	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle
					West	Going ahead	Automobile, station wagon	Other motor vehicle

2017-Aug-09, Wed,07:59	Clear	Sideswipe	P.D. only	Dry	West	Changing lanes	Automobile, station wagon	Other motor vehicle	
					West	Going ahead	Automobile, station wagon	Other motor vehicle	
2017-Nov-26, Sun,01:40	Rain	Angle	P.D. only	Wet	North	Going ahead	Automobile, station wagon	Other motor vehicle	
					West	Going ahead	Automobile, station wagon	Other motor vehicle	
2018-Jan-06, Sat,10:00	Clear	Rear end	P.D. only	Loose snow	West	Turning right	Automobile, station wagon	Other motor vehicle	
					West	Turning right	Automobile, station wagon	Other motor vehicle	
2017-Sep-11, Mon,12:02	Clear	Rear end	P.D. only	Dry	North	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
					North	Turning right	Automobile, station wagon	Other motor vehicle	
2017-Dec-07, Thu,15:40	Clear	Rear end	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	
					South	Stopped	Automobile, station wagon	Other motor vehicle	
2017-Dec-28, Thu,23:27	Snow	Rear end	P.D. only	Ice	South	Going ahead	Automobile, station wagon	Other motor vehicle	
					South	Stopped	Automobile, station wagon	Other motor vehicle	
2017-Dec-24, Sun,13:58	Clear	SMV other	Non-fatal injury	Dry	West	Turning right	Pick-up truck	Pedestrian	1
2018-Mar-09, Fri,16:49	Clear	Rear end	P.D. only	Wet	West	Going ahead	Automobile, station wagon	Other motor vehicle	
					West	Going ahead	Automobile, station wagon	Other motor vehicle	

					West	Going ahead	Automobile, station wagon	Other motor vehicle
2018-Mar-16, Fri,09:17	Clear	SMV other	Non-fatal injury	Dry	North	Going ahead	Municipal transit bus	Steel guide rail
2018-Mar-08, Thu,16:47	Clear	Turning movement	P.D. only	Wet	West	Turning left	Automobile, station wagon	Other motor vehicle
					West	Turning left	Automobile, station wagon	Other motor vehicle
2018-Mar-23, Fri,16:45	Clear	Rear end	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle
					South	Slowing or stopping	Automobile, station wagon	Other motor vehicle
2018-May-04, Fri,13:35	Clear	Rear end	P.D. only	Dry	South	Slowing or stopping	Passenger van	Other motor vehicle
					South	Stopped	Truck - open	Other motor vehicle
2018-Apr-25, Wed,11:12	Rain	Sideswipe	P.D. only	Wet	South	Changing lanes	Automobile, station wagon	Other motor vehicle
					South	Going ahead	Automobile, station wagon	Other motor vehicle
2018-May-29, Tue,09:03	Clear	Rear end	Non-fatal injury	Dry	West	Going ahead	Truck - tank	Other motor vehicle
					West	Turning right	Automobile, station wagon	Other motor vehicle
2018-Jun-01, Fri,12:39	Clear	Rear end	P.D. only	Dry	West	Slowing or stopping	Automobile, station wagon	Other motor vehicle
					West	Slowing or stopping	Automobile, station wagon	Other motor vehicle

2018-Oct-12, Fri,14:00	Clear	Sideswipe	P.D. only	Dry	South	Changing lanes	Automobile, station wagon	Other motor vehicle	
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2018-Sep-15, Sat,00:35	Clear	Sideswipe	P.D. only	Dry	West	Turning left	Unknown	Other motor vehicle	
					West	Turning left	Automobile, station wagon	Other motor vehicle	
2018-Sep-09, Sun,12:09	Clear	Rear end	Non-fatal injury	Dry	West	Turning left	Pick-up truck	Other motor vehicle	
					West	Turning left	Automobile, station wagon	Other motor vehicle	
2018-Jul-24, Tue,13:10	Clear	Sideswipe	P.D. only	Dry	West	Changing lanes	Automobile, station wagon	Other motor vehicle	
					West	Going ahead	Automobile, station wagon	Other motor vehicle	
2018-Sep-07, Fri,17:13	Clear	Turning movement	Non-fatal injury	Dry	South	Turning right	Pick-up truck	Cyclist	
					South	Going ahead	Bicycle	Other motor vehicle	
2018-Aug-19, Sun,16:18	Clear	Angle	P.D. only	Dry	South	Turning right	Automobile, station wagon	Other motor vehicle	
					West	Going ahead	Automobile, station wagon	Other motor vehicle	
2018-Aug-02, Thu,17:38	Clear	SMV other	Non-fatal injury	Dry	West	Pulling onto shoulder or toward curb	Automobile, station wagon	Pedestrian	2
2018-Aug-01, Wed,09:00	Clear	Turning movement	Non-fatal injury	Dry	South	Turning right	Automobile, station wagon	Cyclist	

					South	Going ahead	Bicycle	Other motor vehicle
2018-Jul-17, Tue,15:07	Clear	Angle	Non-fatal injury	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle
					West	Turning left	Automobile, station wagon	Other motor vehicle
2018-Dec-28, Fri,23:37	Clear	Sideswipe	P.D. only	Dry	West	Turning left	Truck and trailer	Other motor vehicle
					West	Turning left	Automobile, station wagon	Other motor vehicle
2018-Oct-17, Wed,10:40	Clear	Turning movement	Non-fatal injury	Dry	South	Turning right	Unknown	Cyclist
					South	Going ahead	Bicycle	Other motor vehicle
2018-Nov-21, Wed,10:39	Clear	Angle	P.D. only	Wet	West	Going ahead	Automobile, station wagon	Other motor vehicle
					North	Going ahead	Automobile, station wagon	Other motor vehicle

**Location:** BANK ST @ RIVERSIDE DR S

**Traffic Control:** Traffic signal

**Total Collisions:** 78

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2014-Feb-11, Tue,16:33	Clear	Angle	P.D. only	Wet	East	Going ahead	Truck - tractor	Other motor vehicle	
					North	Turning right	Pick-up truck	Other motor vehicle	
2014-Feb-14, Fri,18:30	Clear	Sideswipe	P.D. only	Dry	East	Changing lanes	Automobile, station wagon	Other motor vehicle	
					East	Going ahead	Pick-up truck	Other motor vehicle	

2014-Feb-12, Wed,07:50	Clear	Rear end	Non-fatal injury	Dry	East	Going ahead	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Automobile, station wagon	Other motor vehicle
2014-May-03, Sat,15:03	Clear	Rear end	P.D. only	Dry	South	Going ahead	Pick-up truck	Other motor vehicle
					South	Stopped	Automobile, station wagon	Other motor vehicle
					South	Stopped	Automobile, station wagon	Other motor vehicle
2014-Jun-19, Thu,13:25	Clear	Rear end	P.D. only	Dry	South	Slowing or stopping	Delivery van	Other motor vehicle
					South	Stopped	Automobile, station wagon	Other motor vehicle
2014-Jun-24, Tue,23:16	Rain	Angle	Non-fatal injury	Wet	North	Going ahead	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Automobile, station wagon	Other motor vehicle
2014-Sep-04, Thu,18:06	Clear	Rear end	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle
					South	Slowing or stopping	Automobile, station wagon	Other motor vehicle
					South	Going ahead	Automobile, station wagon	Other motor vehicle
2014-Nov-13, Thu,15:20	Clear	Rear end	P.D. only	Dry	East	Going ahead	Pick-up truck	Other motor vehicle
					East	Stopped	Pick-up truck	Other motor vehicle
2014-Nov-06, Thu,06:27	Clear	Angle	P.D. only	Dry	North	Turning right	Unknown	Other motor vehicle

					East	Going ahead	Passenger van	Other motor vehicle
2014-Sep-17, Wed,16:30	Clear	Rear end	P.D. only	Dry	East	Slowing or stopping	Automobile, station wagon	Other motor vehicle
					East	Stopped	Automobile, station wagon	Other motor vehicle
2014-Sep-05, Fri,15:15	Clear	Other	P.D. only	Dry	North	Reversing	Pick-up truck	Other motor vehicle
					South	Stopped	Automobile, station wagon	Other motor vehicle
2014-Oct-25, Sat,10:44	Clear	Sideswipe	P.D. only	Dry	South	Changing lanes	Automobile, station wagon	Other motor vehicle
					South	Going ahead	Automobile, station wagon	Other motor vehicle
2015-Aug-06, Thu,20:07	Clear	Rear end	Non-fatal injury	Dry	South	Going ahead	Passenger van	Other motor vehicle
					South	Stopped	Automobile, station wagon	Other motor vehicle
					South	Stopped	Automobile, station wagon	Other motor vehicle
2015-Apr-22, Wed,15:50	Clear	Rear end	P.D. only	Dry	East	Going ahead	Passenger van	Other motor vehicle
					East	Stopped	Automobile, station wagon	Other motor vehicle
2014-Oct-03, Fri,22:47	Clear	Turning movement	P.D. only	Dry	South	Turning left	Automobile, station wagon	Other motor vehicle
					North	Going ahead	Automobile, station wagon	Other motor vehicle
2015-Feb-02, Mon,13:00	Snow	Sideswipe	P.D. only	Loose snow	East	Turning left	Passenger van	Other motor vehicle



					East	Going ahead	Automobile, station wagon	Other motor vehicle
2015-Apr-29, Wed,14:42	Clear	Rear end	P.D. only	Dry	East	Slowing or stopping	Automobile, station wagon	Other motor vehicle
					East	Stopped	Pick-up truck	Other motor vehicle
2015-Jun-12, Fri,17:36	Rain	Rear end	P.D. only	Wet	East	Going ahead	Automobile, station wagon	Other motor vehicle
					East	Stopped	Pick-up truck	Other motor vehicle
					East	Stopped	Automobile, station wagon	Other motor vehicle
2015-Apr-20, Mon,20:05	Rain	Turning movement	P.D. only	Wet	East	Turning left	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Automobile, station wagon	Other motor vehicle
2014-Oct-21, Tue,14:21	Clear	Sideswipe	P.D. only	Dry	South	Changing lanes	Automobile, station wagon	Other motor vehicle
					South	Going ahead	Truck - dump	Other motor vehicle
2015-Jan-08, Thu,15:07	Clear	Rear end	P.D. only	Slush	North	Turning right	School bus	Other motor vehicle
					North	Turning right	Automobile, station wagon	Other motor vehicle
2014-Sep-28, Sun,16:47	Clear	Sideswipe	P.D. only	Dry	East	Changing lanes	Pick-up truck	Other motor vehicle
					East	Turning left	Automobile, station wagon	Other motor vehicle
2015-Mar-02, Mon,18:27	Clear	Angle	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle

					East	Going ahead	Automobile, station wagon	Other motor vehicle
2015-Mar-17, Tue,10:15	Clear	Rear end	P.D. only	Dry	East	Turning left	Automobile, station wagon	Other motor vehicle
					East	Turning left	Automobile, station wagon	Other motor vehicle
2015-Feb-20, Fri,18:52	Clear	Rear end	P.D. only	Dry	North	Slowing or stopping	Ambulance	Other motor vehicle
					North	Stopped	Passenger van	Other motor vehicle
2015-Jul-07, Tue,14:45	Clear	Rear end	Non-fatal injury	Dry	East	Going ahead	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Automobile, station wagon	Other motor vehicle
2015-Aug-03, Mon,10:21	Clear	Angle	P.D. only	Dry	North	Going ahead	Pick-up truck	Other motor vehicle
					East	Going ahead	Automobile, station wagon	Other motor vehicle
2015-Sep-28, Mon,10:35	Clear	Rear end	P.D. only	Dry	North	Turning right	Unknown	Other motor vehicle
					North	Turning right	Pick-up truck	Other motor vehicle
2015-Sep-28, Mon,10:55	Clear	Sideswipe	P.D. only	Dry	East	Changing lanes	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Truck - open	Other motor vehicle
2015-Jun-23, Tue,21:34	Clear	Rear end	P.D. only	Dry	East	Slowing or stopping	Automobile, station wagon	Other motor vehicle

					East	Stopped	Automobile, station wagon	Other motor vehicle
2016-Aug-30, Tue,17:06	Clear	Rear end	P.D. only	Dry	East	Turning right	Pick-up truck	Other motor vehicle
					East	Turning right	Automobile, station wagon	Other motor vehicle
2016-Feb-09, Tue,15:15	Clear	Sideswipe	P.D. only	Wet	East	Turning left	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Pick-up truck	Other motor vehicle
2016-Jan-20, Wed,15:28	Clear	Rear end	P.D. only	Dry	East	Going ahead	Passenger van	Other motor vehicle
					East	Stopped	Automobile, station wagon	Other motor vehicle
2016-Jan-20, Wed,10:02	Clear	Angle	Non-fatal injury	Wet	South	Going ahead	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Automobile, station wagon	Other motor vehicle
2016-Oct-27, Thu,13:32	Clear	Angle	P.D. only	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Automobile, station wagon	Other motor vehicle
2016-Nov-02, Wed,11:27	Clear	Rear end	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle
					South	Stopped	Pick-up truck	Other motor vehicle
2015-Aug-30, Sun,01:20	Clear	SMV other	P.D. only	Wet	East	Going ahead	Automobile, station wagon	Curb

2015-Jul-03, Fri,15:23	Clear	Sideswipe	P.D. only	Dry	East	Changing lanes	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Automobile, station wagon	Other motor vehicle
2015-Jul-04, Sat,14:28	Clear	Turning movement	P.D. only	Dry	East	Turning left	Passenger van	Other motor vehicle
					East	Going ahead	Automobile, station wagon	Other motor vehicle
2015-Dec-07, Mon,20:11	Clear	Sideswipe	P.D. only	Dry	North	Changing lanes	Automobile, station wagon	Other motor vehicle
					North	Going ahead	Pick-up truck	Other motor vehicle
2016-Jan-21, Thu,13:34	Clear	Angle	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Automobile, station wagon	Other motor vehicle
2016-Jan-20, Wed,13:55	Clear	Rear end	P.D. only	Wet	East	Turning right	Passenger van	Other motor vehicle
					East	Turning right	Pick-up truck	Other motor vehicle
2016-Jan-01, Fri,03:21	Snow	Angle	P.D. only	Loose snow	East	Going ahead	Other emergency vehicle	Other motor vehicle
					North	Going ahead	Automobile, station wagon	Other motor vehicle
2016-Jul-08, Fri,12:30	Clear	Rear end	P.D. only	Dry	East	Going ahead	Automobile, station wagon	Other motor vehicle
					East	Slowing or stopping	Motorcycle	Other motor vehicle

2016-Jun-29, Wed,23:14	Clear	Angle	P.D. only	Dry	East	Turning right	Automobile, station wagon	Other motor vehicle
					South	Going ahead	Automobile, station wagon	Other motor vehicle
2016-Sep-24, Sat,15:44	Clear	Sideswipe	P.D. only	Dry	East	Changing lanes	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Automobile, station wagon	Other motor vehicle
2016-Dec-30, Fri,15:47	Clear	Rear end	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle
					South	Unknown	Automobile, station wagon	Other motor vehicle
2017-Aug-26, Sat,15:16	Clear	Rear end	P.D. only	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle
					North	Stopped	Automobile, station wagon	Other motor vehicle
					North	Stopped	Automobile, station wagon	Other motor vehicle
2016-Dec-10, Sat,14:26	Clear	Rear end	P.D. only	Ice	East	Turning right	Automobile, station wagon	Other motor vehicle
					East	Turning right	Pick-up truck	Other motor vehicle
2016-Dec-30, Fri,13:43	Clear	Sideswipe	P.D. only	Dry	South	Changing lanes	Automobile, station wagon	Other motor vehicle
					South	Going ahead	Pick-up truck	Other motor vehicle
2017-Apr-15, Sat,18:28	Rain	SMV other	P.D. only	Wet	North	Going ahead	Pick-up truck	Pole (utility, power)
2017-Mar-25, Sat,09:09	Clear	Angle	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle

					East	Going ahead	Automobile, station wagon	Other motor vehicle
2017-Jan-04, Wed,18:09	Snow	SMV other	P.D. only	Ice	North	Slowing or stopping	Pick-up truck	Skidding/sliding
2017-Jun-24, Sat,14:28	Clear	Rear end	P.D. only	Dry	North	Turning right	Pick-up truck	Other motor vehicle
					North	Turning right	Automobile, station wagon	Other motor vehicle
2017-Dec-14, Thu,14:26	Clear	Sideswipe	P.D. only	Dry	East	Changing lanes	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Truck - open	Other motor vehicle
2017-Sep-26, Tue,21:27	Clear	Angle	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Automobile, station wagon	Other motor vehicle
2018-Feb-01, Thu,19:09	Snow	Rear end	Non-fatal injury	Wet	East	Turning right	Automobile, station wagon	Other motor vehicle
					East	Turning right	Automobile, station wagon	Other motor vehicle
2018-Mar-15, Thu,09:38	Clear	Angle	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle
					East	Turning left	Truck - closed	Other motor vehicle
2018-Mar-27, Tue,05:11	Clear	Angle	P.D. only	Dry	East	Going ahead	Passenger van	Other motor vehicle
					North	Going ahead	Automobile, station wagon	Other motor vehicle

2018-Feb-20, Tue,23:48	Rain	Turning movement	P.D. only	Wet	North	Turning left	Automobile, station wagon	Other motor vehicle
					North	Going ahead	Delivery van	Other motor vehicle
2018-Mar-20, Tue,08:35	Clear	Rear end	P.D. only	Dry	North	Slowing or stopping	Pick-up truck	Other motor vehicle
					North	Stopped	Automobile, station wagon	Other motor vehicle
2017-Sep-12, Tue,03:41	Clear	SMV other	Non-fatal injury	Dry	East	Going ahead	Automobile, station wagon	Curb
2018-Jan-21, Sun,01:16	Clear	Angle	P.D. only	Wet	South	Going ahead	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Automobile, station wagon	Other motor vehicle
2018-Mar-19, Mon,14:30	Clear	Angle	P.D. only	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle
					West	Going ahead	Automobile, station wagon	Other motor vehicle
2018-Apr-16, Mon,06:04	Freezing Rain	Angle	P.D. only	Ice	East	Going ahead	Pick-up truck	Skidding/sliding
					North	Going ahead	Automobile, station wagon	Other motor vehicle
2018-May-24, Thu,09:36	Clear	Rear end	P.D. only	Dry	North	Changing lanes	Truck - open	Other motor vehicle
					North	Going ahead	Automobile, station wagon	Other motor vehicle
2018-May-28, Mon,17:55	Clear	SMV other	Non-fatal injury	Dry	East	Going ahead	Motorcycle	Curb

2018-Jul-04, Wed,15:05	Clear	Rear end	P.D. only	Dry	East	Turning right	Automobile, station wagon	Other motor vehicle
					East	Turning right	Automobile, station wagon	Other motor vehicle
2018-Jul-05, Thu,15:14	Clear	Rear end	Non-fatal injury	Dry	East	Going ahead	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Pick-up truck	Other motor vehicle
2018-Jul-02, Mon,09:05	Clear	Rear end	Non-fatal injury	Dry	North	Turning right	Unknown	Other motor vehicle
					North	Turning right	Passenger van	Other motor vehicle
2018-Jun-26, Tue,13:08	Clear	Sideswipe	P.D. only	Dry	East	Changing lanes	Truck - closed	Other motor vehicle
					East	Turning left	Automobile, station wagon	Other motor vehicle
2018-Oct-23, Tue,08:15	Clear	Rear end	P.D. only	Dry	North	Slowing or stopping	Automobile, station wagon	Other motor vehicle
					North	Stopped	Automobile, station wagon	Other motor vehicle
2018-Nov-25, Sun,12:39	Fog, mist, smoke, dust	Rear end	Non-fatal injury	Wet	South	Going ahead	Pick-up truck	Other motor vehicle
					South	Stopped	Automobile, station wagon	Other motor vehicle
2018-Aug-26, Sun,20:13	Clear	Rear end	Non-fatal injury	Dry	North	Turning right	Automobile, station wagon	Other motor vehicle



					North	Turning right	Automobile, station wagon	Other motor vehicle
2018-Aug-31, Fri,15:18	Clear	Turning movement	Non-fatal injury	Dry	South	Turning left	Automobile, station wagon	Other motor vehicle
					North	Going ahead	Automobile, station wagon	Other motor vehicle
2018-Aug-02, Thu,21:25	Clear	Angle	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle
					East	Turning left	Automobile, station wagon	Other motor vehicle
2018-Nov-15, Thu,14:30	Clear	Sideswipe	P.D. only	Dry	South	Changing lanes	Automobile, station wagon	Other motor vehicle
					South	Going ahead	Automobile, station wagon	Other motor vehicle
2018-Nov-12, Mon,05:58	Snow	Rear end	P.D. only	Wet	East	Going ahead	Pick-up truck	Other motor vehicle
					East	Stopped	Automobile, station wagon	Other motor vehicle

**Location:** BANK ST btwn RIVERDALE AVE & RIVERSIDE DR

**Traffic Control:** No control

**Total Collisions:** 5

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2014-Mar-25, Tue,18:30	Clear	Sideswipe	P.D. only	Dry	South	Pulling away from shoulder or curb	Pick-up truck	Other motor vehicle	
					South	Going ahead	Pick-up truck	Other motor vehicle	
2016-Oct-07, Fri,13:03	Clear	Sideswipe	P.D. only	Dry	South	Changing lanes	Truck - closed	Other motor vehicle	
					South	Going ahead	Automobile, station wagon	Other motor vehicle	

2015-Nov-26, Thu,17:43	Clear	Sideswipe	P.D. only	Wet	North	Changing lanes	Automobile, station wagon	Other motor vehicle
					North	Going ahead	Automobile, station wagon	Other motor vehicle
2016-Oct-04, Tue,12:10	Clear	Rear end	Non-fatal injury	Dry	West	Going ahead	Automobile, station wagon	Other motor vehicle
					West	Stopped	Automobile, station wagon	Other motor vehicle
2017-May-25, Thu,09:50	Clear	Sideswipe	P.D. only	Dry	North	Unknown	Unknown	Other motor vehicle
					North	Going ahead	Automobile, station wagon	Other motor vehicle

**Location:** BANK ST btwn RIVERSIDE DR & BILLINGS TRANSIT

**Traffic Control:** No control

**Total Collisions:** 19

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2014-Jan-15, Wed,10:58	Clear	Turning movement	P.D. only	Dry	North	Turning left	Automobile, station wagon	Other motor vehicle	
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2014-Feb-15, Sat,14:13	Clear	Angle	P.D. only	Wet	West	Turning left	Passenger van	Other motor vehicle	
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2014-Jun-25, Wed,14:58	Clear	Angle	P.D. only	Dry	East	Turning right	Automobile, station wagon	Other motor vehicle	
					South	Stopped	Pick-up truck	Other motor vehicle	
					South	Stopped	Pick-up truck	Other motor vehicle	

2014-Aug-04, Mon,19:39	Clear	Angle	Non-fatal injury	Dry	West	Going ahead	Automobile, station wagon	Other motor vehicle	
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2014-Aug-07, Thu,15:59	Clear	Angle	P.D. only	Dry	East	Turning right	Automobile, station wagon	Other motor vehicle	
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2014-Nov-06, Thu,10:25	Clear	Angle	P.D. only	Dry	West	Going ahead	Automobile, station wagon	Other motor vehicle	
					South	Going ahead	Pick-up truck	Other motor vehicle	
2014-Aug-06, Wed,08:44	Clear	Turning movement	Non-fatal injury	Dry	North	Turning right	Automobile, station wagon	Cyclist	
					North	Going ahead	Bicycle	Other motor vehicle	
2015-Oct-20, Tue,10:55	Clear	Sideswipe	P.D. only	Dry	North	Changing lanes	Pick-up truck	Other motor vehicle	
					North	Going ahead	Delivery van	Other motor vehicle	
2015-Feb-04, Wed,11:47	Snow	Sideswipe	P.D. only	Loose snow	North	Turning left	Automobile, station wagon	Other motor vehicle	
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2015-Aug-21, Fri,13:59	Clear	Turning movement	P.D. only	Dry	North	Turning left	Automobile, station wagon	Other motor vehicle	
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2016-Oct-18, Tue,23:49	Clear	SMV other	Non-fatal injury	Dry	North	Going ahead	Automobile, station wagon	Pedestrian	1

2017-Aug-08, Tue,19:44	Clear	Turning movement	Non-fatal injury	Dry	North	Turning right	Automobile, station wagon	Cyclist
					North	Going ahead	Bicycle	Other motor vehicle
2017-Oct-02, Mon,15:06	Clear	Sideswipe	Non-fatal injury	Dry	South	Changing lanes	Automobile, station wagon	Other motor vehicle
					South	Going ahead	Automobile, station wagon	Other motor vehicle
2017-Aug-12, Sat,08:38	Clear	Angle	P.D. only	Dry	North	Making "U" turn	Automobile, station wagon	Other motor vehicle
					East	Turning right	Automobile, station wagon	Other motor vehicle
2017-Jan-27, Fri,13:18	Clear	Angle	P.D. only	Dry	East	Turning left	Automobile, station wagon	Other motor vehicle
					North	Going ahead	Passenger van	Other motor vehicle
2017-Apr-20, Thu,06:00	Clear	Other	P.D. only	Wet	North	Going ahead	Automobile, station wagon	Debris falling off vehicle
					North	Going ahead	Unknown	Other
2017-Aug-01, Tue,17:22	Clear	Turning movement	Non-fatal injury	Dry	North	Turning right	Automobile, station wagon	Cyclist
					North	Going ahead	Bicycle	Other motor vehicle
2018-Apr-06, Fri,11:38	Clear	Rear end	Non-fatal injury	Dry	East	Turning right	Automobile, station wagon	Other motor vehicle
					East	Turning right	Automobile, station wagon	Other motor vehicle

2018-Jun-09, Sat,13:08	Clear	Turning movement	P.D. only	Dry	North	Turning left	Automobile, station wagon	Other motor vehicle
					South	Going ahead	Automobile, station wagon	Other motor vehicle

**Location:** BANK ST btwn RIVERSIDE DR & RIVERSIDE DR

**Traffic Control:** No control

**Total Collisions:** 12

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2014-May-01, Thu,12:15	Clear	Sideswipe	P.D. only	Dry	North	Going ahead	Passenger van	Other motor vehicle	
					North	Going ahead	Passenger van	Other motor vehicle	
2014-Aug-31, Sun,14:01	Clear	Turning movement	P.D. only	Dry	North	Turning left	Automobile, station wagon	Other motor vehicle	
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2014-Oct-24, Fri,11:24	Clear	Rear end	P.D. only	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle	
					North	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
					North	Turning left	Automobile, station wagon	Other motor vehicle	
2014-Jun-27, Fri,17:43	Clear	Turning movement	P.D. only	Dry	South	Turning left	Automobile, station wagon	Other motor vehicle	
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2015-Apr-27, Mon,12:22	Clear	Rear end	P.D. only	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle	
					North	Stopped	Bus (other)	Other motor vehicle	

2015-Jul-31, Fri,16:33	Clear	Turning movement	P.D. only	Dry	North	Turning left	Automobile, station wagon	Other motor vehicle
					South	Going ahead	Automobile, station wagon	Other motor vehicle
2016-Aug-03, Wed,13:16	Clear	Turning movement	P.D. only	Dry	North	Turning left	Passenger van	Other motor vehicle
					North	Going ahead	Pick-up truck	Other motor vehicle
2016-Jan-22, Fri,07:35	Clear	Sideswipe	P.D. only	Dry	South	Changing lanes	Pick-up truck	Other motor vehicle
					South	Going ahead	Pick-up truck	Other motor vehicle
2016-Aug-24, Wed,15:23	Clear	Other	P.D. only	Dry	North	Going ahead	Passenger van	Pole (sign, parking meter)
					South	Stopped	Pick-up truck	Other motor vehicle
2015-Oct-19, Mon,16:12	Rain	Angle	Non-fatal injury	Wet	East	Turning left	Automobile, station wagon	Other motor vehicle
					North	Going ahead	Automobile, station wagon	Other motor vehicle
2017-Nov-07, Tue,20:20	Clear	Turning movement	P.D. only	Dry	North	Turning left	Passenger van	Other motor vehicle
					South	Going ahead	Automobile, station wagon	Other motor vehicle
2018-Dec-08, Sat,13:23	Clear	Rear end	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle
					South	Stopped	Automobile, station wagon	Other motor vehicle
					South	Stopped	Automobile, station wagon	Other motor vehicle

**Location:** BILLINGS BRIDGE NB RAMP @ RIVERSIDE DR EB

**Traffic Control:** No control

**Total Collisions:** 2

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2016-May-03, Tue,13:15	Clear	Sideswipe	P.D. only	Dry	East	Changing lanes	Automobile, station wagon	Other motor vehicle	
					East	Going ahead	Delivery van	Other motor vehicle	
2018-Nov-27, Tue,20:09	Snow	Sideswipe	P.D. only	Wet	North	Turning left	Unknown	Other motor vehicle	
					North	Going ahead	Automobile, station wagon	Other motor vehicle	

**Location:** BILLINGS BRIDGES RAMP NB @ RIVERSIDE DR EB

**Traffic Control:** Stop sign

**Total Collisions:** 11

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2014-Jan-31, Fri,15:38	Clear	Angle	P.D. only	Wet	West	Going ahead	Automobile, station wagon	Other motor vehicle	
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2014-Aug-01, Fri,15:45	Clear	Angle	Non-fatal injury	Dry	West	Going ahead	Automobile, station wagon	Other motor vehicle	
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2014-Nov-02, Sun,18:26	Clear	Angle	Non-fatal injury	Dry	West	Turning left	Pick-up truck	Cyclist	
					North	Going ahead	Bicycle	Other motor vehicle	
2015-Feb-11, Wed,22:53	Snow	SMV other	P.D. only	Ice	East	Changing lanes	Automobile, station wagon	Skidding/sliding	

2015-Feb-17, Tue,17:44	Clear	Angle	P.D. only	Ice	North	Going ahead	Pick-up truck	Other motor vehicle
					East	Going ahead	Automobile, station wagon	Other motor vehicle
2015-Feb-25, Wed,14:51	Clear	Angle	Non-fatal injury	Wet	West	Going ahead	Automobile, station wagon	Other motor vehicle
					North	Going ahead	Automobile, station wagon	Other motor vehicle
2016-Jan-22, Fri,16:16	Clear	Angle	P.D. only	Loose snow	North	Going ahead	Pick-up truck	Other motor vehicle
					East	Going ahead	Automobile, station wagon	Other motor vehicle
2016-Mar-10, Thu,12:22	Clear	Angle	Non-fatal injury	Wet	North	Going ahead	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Automobile, station wagon	Other motor vehicle
2017-Feb-28, Tue,18:00	Clear	Angle	P.D. only	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Unknown	Other motor vehicle
2017-Feb-28, Tue,18:15	Clear	Angle	P.D. only	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Automobile, station wagon	Other motor vehicle
2018-Dec-23, Sun,12:00	Clear	Angle	P.D. only	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Automobile, station wagon	Other motor vehicle



**Location:** BILLINGS BRIDGES RAMP NB @ RIVERSIDE DR WB

**Traffic Control:** Yield sign

**Total Collisions:** 8

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2014-Sep-16, Tue,15:28	Clear	Angle	P.D. only	Dry	North	Turning left	Pick-up truck	Other motor vehicle	
					West	Going ahead	Pick-up truck	Other motor vehicle	
2015-Jan-26, Mon,17:15	Clear	Angle	P.D. only	Dry	West	Turning left	Automobile, station wagon	Other motor vehicle	
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2014-Aug-23, Sat,14:50	Clear	Angle	P.D. only	Dry	West	Turning left	Pick-up truck	Other motor vehicle	
					South	Going ahead	Pick-up truck	Other motor vehicle	
2015-Jan-29, Thu,10:20	Clear	Angle	P.D. only	Dry	North	Turning left	Pick-up truck	Other motor vehicle	
					West	Going ahead	Automobile, station wagon	Other motor vehicle	
2015-Jul-25, Sat,12:29	Clear	Angle	P.D. only	Dry	North	Turning left	Pick-up truck	Other motor vehicle	
					West	Going ahead	Pick-up truck	Other motor vehicle	
2016-Jan-11, Mon,11:54	Clear	Angle	Non-fatal injury	Dry	West	Turning left	Automobile, station wagon	Other motor vehicle	
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2016-Mar-10, Thu,14:09	Clear	Angle	P.D. only	Wet	West	Turning left	Automobile, station wagon	Other motor vehicle	

					South	Going ahead	Passenger van	Other motor vehicle
2016-Nov-10, Thu,14:25	Clear	Angle	P.D. only	Dry	North	Merging	Automobile, station wagon	Other motor vehicle
					West	Going ahead	Pick-up truck	Other motor vehicle

**Location:** BILLINGS BRIDGES RAMP SB @ RIVERSIDE DR EB

**Traffic Control:** Stop sign

**Total Collisions:** 10

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2014-Jan-17, Fri,16:15	Snow	Angle	P.D. only	Wet	South	Going ahead	Automobile, station wagon	Other motor vehicle	
					East	Going ahead	Automobile, station wagon	Other motor vehicle	
2014-Mar-10, Mon,16:02	Clear	Angle	P.D. only	Dry	East	Going ahead	Automobile, station wagon	Other motor vehicle	
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2015-Mar-08, Sun,16:10	Clear	Angle	P.D. only	Dry	East	Going ahead	Automobile, station wagon	Other motor vehicle	
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2015-Oct-11, Sun,10:01	Clear	Angle	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	
					East	Going ahead	Automobile, station wagon	Other motor vehicle	
2015-Mar-25, Wed,08:09	Clear	Angle	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	
					East	Going ahead	Automobile, station wagon	Other motor vehicle	

2015-Dec-30, Wed,14:31	Clear	Angle	Non-fatal injury	Slush	South	Going ahead	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Pick-up truck	Other motor vehicle
2017-Jun-29, Thu,17:36	Rain	Angle	P.D. only	Wet	South	Going ahead	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Automobile, station wagon	Other motor vehicle
2017-Dec-21, Thu,08:49	Clear	Angle	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Passenger van	Other motor vehicle
2018-Oct-19, Fri,16:39	Clear	Angle	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Automobile, station wagon	Other motor vehicle
2018-Sep-24, Mon,10:38	Clear	Angle	P.D. only	Dry	South	Going ahead	Passenger van	Other motor vehicle
					East	Going ahead	Automobile, station wagon	Other motor vehicle

**Location:** BILLINGS BRIDGES RAMP SB @ RIVERSIDE DR SB

**Traffic Control:** No control

**Total Collisions:** 1

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2015-Feb-13, Fri,15:30	Clear	Rear end	P.D. only	Dry	South	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
					South	Stopped	Pick-up truck	Other motor vehicle	

**Location:** DATA CENTRE RD @ RIVERSIDE DR

**Traffic Control:** Traffic signal

**Total Collisions:** 26

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuvre	Vehicle type	First Event	No. Ped
2014-Jan-28, Tue,06:46	Clear	Rear end	P.D. only	Ice	East	Going ahead	Automobile, station wagon	Other motor vehicle	
					East	Going ahead	Automobile, station wagon	Other motor vehicle	
2014-Aug-18, Mon,15:47	Clear	SMV other	Non-fatal injury	Dry	West	Turning left	Automobile, station wagon	Ran off road	1
2014-Sep-16, Tue,19:00	Clear	Rear end	P.D. only	Dry	East	Turning right	Automobile, station wagon	Other motor vehicle	
					East	Turning right	Automobile, station wagon	Other motor vehicle	
2014-Sep-30, Tue,18:30	Clear	Rear end	P.D. only	Dry	East	Turning right	Automobile, station wagon	Other motor vehicle	
					East	Turning right	Automobile, station wagon	Other motor vehicle	
2014-Sep-30, Tue,08:31	Clear	SMV other	Non-fatal injury	Dry	North	Going ahead	Motorcycle	Skidding/sliding	
2014-Oct-06, Mon,18:02	Clear	Rear end	P.D. only	Dry	North	Turning right	Automobile, station wagon	Other motor vehicle	
					North	Turning right	Automobile, station wagon	Other motor vehicle	
2014-Oct-31, Fri,11:09	Clear	Rear end	P.D. only	Dry	North	Turning right	Automobile, station wagon	Other motor vehicle	
					North	Turning right	Automobile, station wagon	Other motor vehicle	
2015-Feb-19, Thu,20:28	Clear	Angle	P.D. only	Dry	North	Turning left	Automobile, station wagon	Other motor vehicle	

					West	Going ahead	Automobile, station wagon	Other motor vehicle
2015-Jun-24, Wed,21:00	Clear	Rear end	P.D. only	Dry	North	Turning right	Automobile, station wagon	Other motor vehicle
					North	Turning right	Pick-up truck	Other motor vehicle
2015-May-20, Wed,15:36	Clear	Rear end	Non-fatal injury	Dry	East	Going ahead	Automobile, station wagon	Other motor vehicle
					East	Slowing or stopping	Automobile, station wagon	Other motor vehicle
					East	Slowing or stopping	Automobile, station wagon	Other motor vehicle
					East	Slowing or stopping	Pick-up truck	Other motor vehicle
2016-Mar-19, Sat,18:11	Clear	Rear end	P.D. only	Dry	North	Turning right	Passenger van	Other motor vehicle
					North	Turning right	Automobile, station wagon	Other motor vehicle
2016-May-21, Sat,14:58	Clear	Angle	P.D. only	Dry	North	Turning left	Automobile, station wagon	Other motor vehicle
					West	Going ahead	Automobile, station wagon	Other motor vehicle
2016-Feb-01, Mon,11:32	Clear	Rear end	P.D. only	Dry	North	Turning right	Automobile, station wagon	Other motor vehicle
					North	Turning left	Pick-up truck	Other motor vehicle
2016-Nov-16, Wed,18:30	Clear	Rear end	Non-fatal injury	Dry	North	Turning right	Passenger van	Other motor vehicle
					North	Turning right	Pick-up truck	Other motor vehicle

2016-Apr-06, Wed,18:20	Snow	Sideswipe	P.D. only	Slush	North	Changing lanes	Automobile, station wagon	Other motor vehicle
					North	Going ahead	Automobile, station wagon	Other motor vehicle
2017-Jan-28, Sat,14:13	Clear	Rear end	P.D. only	Wet	North	Turning right	Automobile, station wagon	Other motor vehicle
					North	Turning right	Automobile, station wagon	Other motor vehicle
2016-Nov-30, Wed,18:24	Rain	SMV other	P.D. only	Wet	East	Changing lanes	Automobile, station wagon	Curb
2017-Mar-14, Tue,16:10	Snow	Rear end	P.D. only	Loose snow	North	Turning right	Automobile, station wagon	Other motor vehicle
					North	Turning right	Automobile, station wagon	Other motor vehicle
2017-Feb-18, Sat,08:43	Clear	Rear end	Non-fatal injury	Dry	North	Going ahead	Pick-up truck	Other motor vehicle
					North	Slowing or stopping	Pick-up truck	Other motor vehicle
2017-Aug-31, Thu,13:59	Clear	Rear end	Non-fatal injury	Dry	East	Slowing or stopping	Motorcycle	Other motor vehicle
					East	Slowing or stopping	Automobile, station wagon	Other motor vehicle
2017-Nov-07, Tue,17:22	Clear	Rear end	P.D. only	Dry	North	Going ahead	Pick-up truck	Other motor vehicle
					North	Stopped	Automobile, station wagon	Other motor vehicle
2018-Mar-13, Tue,15:31	Snow	Rear end	P.D. only	Wet	East	Slowing or stopping	Pick-up truck	Other motor vehicle
					East	Slowing or stopping	Automobile, station wagon	Other motor vehicle

					East	Slowing or stopping	Automobile, station wagon	Other motor vehicle
2018-Feb-14, Wed,15:39	Clear	Rear end	P.D. only	Wet	East	Going ahead	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Automobile, station wagon	Other motor vehicle
2018-Feb-20, Tue,18:53	Rain	Turning movement	P.D. only	Wet	North	Turning left	Automobile, station wagon	Other motor vehicle
					South	Going ahead	Automobile, station wagon	Other motor vehicle
2018-May-25, Fri,16:02	Clear	Rear end	P.D. only	Dry	East	Unknown	Automobile, station wagon	Other motor vehicle
					East	Stopped	Automobile, station wagon	Other motor vehicle
2018-Sep-21, Fri,20:20	Rain	Angle	P.D. only	Wet	East	Going ahead	Passenger van	Other motor vehicle
					North	Going ahead	Automobile, station wagon	Other motor vehicle

**Location:** RIVERSIDE DR EB @ BILLINGS BRIDGE SC SE

**Traffic Control:** Yield sign

**Total Collisions:** 2

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2014-Feb-20, Thu,12:20	Clear	Rear end	Non-fatal injury	Dry	East	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
					East	Stopped	Automobile, station wagon	Other motor vehicle	
2014-Aug-06, Wed,09:31	Clear	Other	P.D. only	Dry	West	Reversing	Truck and trailer	Other motor vehicle	

East

Stopped

Automobile,  
station wagonOther motor  
vehicle**Location:** RIVERSIDE DR NB btwn BANK ST & RIVERSIDE DR NB RAMP FROM EB TO WB**Traffic Control:** No control**Total Collisions:** 23

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuvre	Vehicle type	First Event	No. Ped
2014-Jan-02, Thu,10:00	Clear	Angle	P.D. only	Packed snow	North	Turning right	Automobile, station wagon	Other motor vehicle	
					East	Going ahead	Automobile, station wagon	Other motor vehicle	
2014-Jan-07, Tue,03:29	Clear	Sideswipe	P.D. only	Dry	East	Changing lanes	Construction equipment	Other motor vehicle	
					East	Going ahead	Automobile, station wagon	Other motor vehicle	
2014-Mar-08, Sat,18:25	Clear	Sideswipe	Non-fatal injury	Dry	East	Changing lanes	Automobile, station wagon	Other motor vehicle	
					East	Going ahead	Automobile, station wagon	Other motor vehicle	
2014-Feb-20, Thu,08:23	Clear	Sideswipe	P.D. only	Wet	North	Changing lanes	Automobile, station wagon	Other motor vehicle	
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2014-Mar-05, Wed,18:22	Clear	Rear end	Non-fatal injury	Wet	North	Going ahead	Automobile, station wagon	Other motor vehicle	
					North	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
					North	Turning left	Automobile, station wagon	Other motor vehicle	
2014-May-29, Thu,10:25	Clear	Turning movement	P.D. only	Dry	North	Turning left	Automobile, station wagon	Other motor vehicle	



					North	Going ahead	Automobile, station wagon	Other motor vehicle
2014-Jun-04, Wed,21:39	Clear	Turning movement	P.D. only	Dry	North	Overtaking	Automobile, station wagon	Other motor vehicle
					North	Turning left	Automobile, station wagon	Other motor vehicle
2014-Jun-12, Thu,14:40	Rain	Rear end	P.D. only	Wet	North	Slowing or stopping	Automobile, station wagon	Other motor vehicle
					North	Stopped	Pick-up truck	Other motor vehicle
2014-Oct-09, Thu,16:30	Rain	Sideswipe	P.D. only	Wet	North	Changing lanes	Automobile, station wagon	Other motor vehicle
					North	Going ahead	Automobile, station wagon	Other motor vehicle
2014-Jun-18, Wed,12:07	Clear	Rear end	Non-fatal injury	Dry	North	Going ahead	Police vehicle	Other motor vehicle
					North	Slowing or stopping	Police vehicle	Other motor vehicle
2015-Sep-02, Wed,23:04	Clear	Sideswipe	P.D. only	Wet	East	Changing lanes	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Automobile, station wagon	Other motor vehicle
2015-Jan-29, Thu,08:26	Clear	Rear end	Non-fatal injury	Dry	North	Going ahead	Delivery van	Other motor vehicle
					North	Stopped	Automobile, station wagon	Other motor vehicle
2015-Jan-27, Tue,18:50	Clear	SMV other	P.D. only	Dry	North	Going ahead	Automobile, station wagon	Skidding/sliding

2014-Dec-23, Tue, 11:30	Rain	Sideswipe	P.D. only	Wet	North	Changing lanes	Truck - closed	Other motor vehicle
					North	Going ahead	Automobile, station wagon	Other motor vehicle
2015-Feb-11, Wed, 13:43	Snow	Turning movement	P.D. only	Slush	North	Turning right	Automobile, station wagon	Other motor vehicle
					North	Going ahead	Automobile, station wagon	Other motor vehicle
2014-Dec-30, Tue, 13:36	Clear	Rear end	P.D. only	Dry	North	Going ahead	Passenger van	Other motor vehicle
					North	Stopped	Automobile, station wagon	Other motor vehicle
2015-Feb-18, Wed, 09:00	Clear	Turning movement	P.D. only	Wet	North	Turning left	Automobile, station wagon	Other motor vehicle
					North	Going ahead	Passenger van	Other motor vehicle
2015-Jul-14, Tue, 20:47	Clear	Sideswipe	P.D. only	Dry	East	Changing lanes	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Pick-up truck	Other motor vehicle
2015-Dec-30, Wed, 17:18	Snow	Sideswipe	Non-fatal injury	Wet	North	Going ahead	Automobile, station wagon	Other motor vehicle
					North	Going ahead	Automobile, station wagon	Other motor vehicle
2016-May-24, Tue, 20:54	Clear	Sideswipe	P.D. only	Dry	East	Changing lanes	Pick-up truck	Other motor vehicle
					East	Going ahead	Automobile, station wagon	Other motor vehicle
2016-Mar-17, Thu, 14:18	Rain	Sideswipe	P.D. only	Wet	North	Changing lanes	Automobile, station wagon	Other motor vehicle

					North	Going ahead	Automobile, station wagon	Other motor vehicle
2018-Apr-10, Tue,18:00	Clear	Sideswipe	P.D. only	Dry	East	Changing lanes	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Automobile, station wagon	Other motor vehicle
2018-Aug-12, Sun,11:43	Clear	Sideswipe	P.D. only	Dry	East	Changing lanes	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Automobile, station wagon	Other motor vehicle

**Location:** RIVERSIDE DR NB btwn BILLINGS BRIDGE SC RAMP NB & BILLINGS BRIDGE SC R

**Traffic Control:** No control

**Total Collisions:** 2

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2015-Jan-10, Sat,22:58	Clear	SMV other	P.D. only	Other	North	Going ahead	Automobile, station wagon	Skidding/sliding	
2016-Jun-07, Tue,14:34	Clear	Rear end	Non-fatal injury	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle	
					North	Going ahead	Pick-up truck	Other motor vehicle	

**Location:** RIVERSIDE DR NB btwn BILLINGS BRIDGE SC RAMP SB & BANK ST

**Traffic Control:** No control

**Total Collisions:** 5

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2014-Oct-17, Fri,05:30	Rain	SMV other	P.D. only	Wet	North	Going ahead	Passenger van	Curb	
2015-Feb-08, Sun,11:30	Snow	Rear end	P.D. only	Packed snow	North	Changing lanes	Automobile, station wagon	Other motor vehicle	
					North	Going ahead	Pick-up truck	Other motor vehicle	

2016-Jan-06, Wed,14:39	Clear	Sideswipe	P.D. only	Wet	West	Changing lanes	Automobile, station wagon	Other motor vehicle
					West	Going ahead	Automobile, station wagon	Other motor vehicle
2017-Jun-22, Thu,22:30	Clear	Rear end	P.D. only	Dry	North	Slowing or stopping	Automobile, station wagon	Other motor vehicle
					North	Going ahead	Automobile, station wagon	Other motor vehicle
2018-Aug-18, Sat,22:29	Clear	Sideswipe	P.D. only	Dry	East	Changing lanes	Unknown	Other motor vehicle
					East	Going ahead	Automobile, station wagon	Other motor vehicle

**Location:** RIVERSIDE DR NB btwn BILLINGS BRIDGE SC RAMP SB & BILLINGS BRIDGE SC R

**Traffic Control:** No control

**Total Collisions:** 5

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuvre	Vehicle type	First Event	No. Ped
2016-Feb-02, Tue,14:27	Clear	Sideswipe	P.D. only	Dry	East	Changing lanes	Pick-up truck	Other motor vehicle	
					East	Going ahead	Tow truck	Other motor vehicle	
2015-Dec-10, Thu,18:47	Clear	Sideswipe	P.D. only	Dry	North	Unknown	Unknown	Other motor vehicle	
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2018-Feb-15, Thu,08:51	Freezing Rain	Sideswipe	P.D. only	Ice	North	Slowing or stopping	Automobile, station wagon	Skidding/sliding	
					North	Stopped	Automobile, station wagon	Other motor vehicle	
2018-Jun-05, Tue,16:19	Rain	Sideswipe	P.D. only	Wet	North	Changing lanes	Passenger van	Other motor vehicle	

					North	Going ahead	Automobile, station wagon	Other motor vehicle
2018-Oct-07, Sun,13:47	Clear	Sideswipe	P.D. only	Dry	North	Changing lanes	Automobile, station wagon	Other motor vehicle
					North	Going ahead	Automobile, station wagon	Other motor vehicle

**Location:** RIVERSIDE DR NB btwn DATA CENTRE RD & BILLINGS BRIDGES RAMP NB

**Traffic Control:** No control

**Total Collisions:** 4

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuvre	Vehicle type	First Event	No. Ped
2014-Apr-01, Tue,08:15	Clear	SMV other	P.D. only	Dry	East	Going ahead	Automobile, station wagon	Curb	
2014-Jul-13, Sun,21:57	Clear	SMV other	P.D. only	Dry	North	Going ahead	Automobile, station wagon	Curb	
2016-Mar-23, Wed,11:19	Clear	Rear end	P.D. only	Dry	East	Going ahead	Passenger van	Other motor vehicle	
					East	Stopped	Pick-up truck	Other motor vehicle	
					East	Going ahead	Pick-up truck	Other motor vehicle	
					West	Going ahead	Automobile, station wagon	Other	
2018-Jul-24, Tue,16:05	Rain	Angle	Non-fatal injury	Wet	North	Turning left	Automobile, station wagon	Other motor vehicle	
					East	Going ahead	Automobile, station wagon	Other motor vehicle	

**Location:** RIVERSIDE DR NB btwn RIVERSIDE DR NB RAMP FROM EB TO WB & NEIL WAY

**Traffic Control:** No control

**Total Collisions:** 3

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuvre	Vehicle type	First Event	No. Ped
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2014-Feb-11, Tue,13:00	Clear	Sideswipe	P.D. only	Ice	North	Going ahead	Pick-up truck	Skidding/sliding
					North	Going ahead	Truck - closed	Other motor vehicle
					North	Going ahead	Automobile, station wagon	Skidding/sliding

2015-Aug-18, Tue,16:23	Clear	Rear end	P.D. only	Dry	North	Going ahead	Pick-up truck	Other motor vehicle
					North	Slowing or stopping	Automobile, station wagon	Other motor vehicle

2017-Dec-09, Sat,16:57	Snow	Rear end	P.D. only	Wet	North	Slowing or stopping	Automobile, station wagon	Other motor vehicle
					North	Slowing or stopping	Automobile, station wagon	Other motor vehicle
					North	Slowing or stopping	Automobile, station wagon	Other motor vehicle
					North	Slowing or stopping	Automobile, station wagon	Other motor vehicle

**Location:** RIVERSIDE DR SB btwn BANK ST & BILLINGS BRIDGE NB RAMP

**Traffic Control:** No control

**Total Collisions:** 6

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2015-Mar-11, Wed,10:30	Clear	Sideswipe	P.D. only	Dry	South	Changing lanes	Automobile, station wagon	Other motor vehicle	
					South	Going ahead	Pick-up truck	Other motor vehicle	
2014-Oct-16, Thu,18:19	Rain	Angle	Non-fatal injury	Wet	West	Turning left	Passenger van	Other motor vehicle	
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2015-Jan-21, Wed,10:33	Clear	Other	P.D. only	Dry	West	Turning left	Truck - closed	Pole (utility, power)	

					South	Going ahead	Passenger van	Other
2015-Apr-26, Sun,13:41	Clear	Sideswipe	P.D. only	Dry	South	Changing lanes	Pick-up truck	Other motor vehicle
					South	Going ahead	Automobile, station wagon	Other motor vehicle
2016-Jan-25, Mon,10:53	Clear	Turning movement	P.D. only	Wet	East	Turning left	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Automobile, station wagon	Other motor vehicle
2016-Jun-26, Sun,09:55	Clear	Sideswipe	P.D. only	Dry	West	Changing lanes	Pick-up truck	Other motor vehicle
					West	Going ahead	Pick-up truck	Other motor vehicle

**Location:** RIVERSIDE DR SB btwn BILLINGS BRIDGE NB RAMP & NEIL WAY

**Traffic Control:** No control

**Total Collisions:** 2

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2016-Jun-21, Tue,11:44	Clear	Rear end	Non-fatal injury	Dry	West	Going ahead	Pick-up truck	Other motor vehicle	
					West	Stopped	Pick-up truck	Other motor vehicle	
					West	Stopped	Automobile, station wagon	Other motor vehicle	
2018-Mar-14, Wed,12:22	Snow	Sideswipe	Non-fatal injury	Wet	South	Changing lanes	Automobile, station wagon	Other motor vehicle	
					South	Going ahead	Automobile, station wagon	Other motor vehicle	

**Location:** RIVERSIDE DR SB btwn BILLINGS BRIDGE SC RAMP SB & BANK ST

**Traffic Control:** No control

**Total Collisions:** 9

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuvre	Vehicle type	First Event	No. Ped
2014-Feb-03, Mon,13:03	Clear	Rear end	Non-fatal injury	Wet	West	Going ahead	Automobile, station wagon	Other motor vehicle	
					West	Stopped	Pick-up truck	Other motor vehicle	
					West	Stopped	Pick-up truck	Other motor vehicle	
2014-May-27, Tue,14:35	Clear	Rear end	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	
					South	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
2014-Jul-02, Wed,17:28	Clear	Rear end	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	
					South	Stopped	Pick-up truck	Other motor vehicle	
2014-Dec-10, Wed,22:01	Snow	SMV other	P.D. only	Loose snow	South	Going ahead	Automobile, station wagon	Curb	
2015-Mar-09, Mon,11:35	Clear	Rear end	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	
					South	Slowing or stopping	Pick-up truck	Other motor vehicle	
2015-Aug-14, Fri,12:57	Clear	Rear end	P.D. only	Wet	South	Going ahead	Passenger van	Other motor vehicle	
					South	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
					South	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
					South	Slowing or stopping	Automobile, station wagon	Other motor vehicle	



2017-Oct-12, Thu,07:11	Clear	Sideswipe	P.D. only	Dry	South	Changing lanes	Automobile, station wagon	Other motor vehicle
					South	Going ahead	Automobile, station wagon	Curb
2018-Apr-30, Mon,12:30	Clear	Sideswipe	P.D. only	Dry	East	Changing lanes	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Automobile, station wagon	Other motor vehicle
2018-Aug-02, Thu,17:19	Clear	Sideswipe	P.D. only	Dry	West	Going ahead	Automobile, station wagon	Other motor vehicle
					West	Going ahead	Truck - tractor	Other motor vehicle

**Location:** RIVERSIDE DR SB btwn BILLINGS BRIDGES RAMP NB & DATA CENTRE RD

**Traffic Control:** No control

**Total Collisions:** 3

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2014-Aug-31, Sun,05:51	Clear	SMV other	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Curb	
2015-May-06, Wed,15:29	Clear	Sideswipe	P.D. only	Dry	South	Changing lanes	Pick-up truck	Other motor vehicle	
					South	Going ahead	Pick-up truck	Other motor vehicle	
2015-Sep-26, Sat,18:21	Clear	Rear end	P.D. only	Dry	South	Going ahead	Pick-up truck	Other motor vehicle	
					South	Stopped	Automobile, station wagon	Other motor vehicle	

**Location:** RIVERSIDE DR SB btwn BILLINGS BRIDGES RAMP SB & BILLINGS BRIDGE SC RA

**Traffic Control:** No control

**Total Collisions:** 2

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
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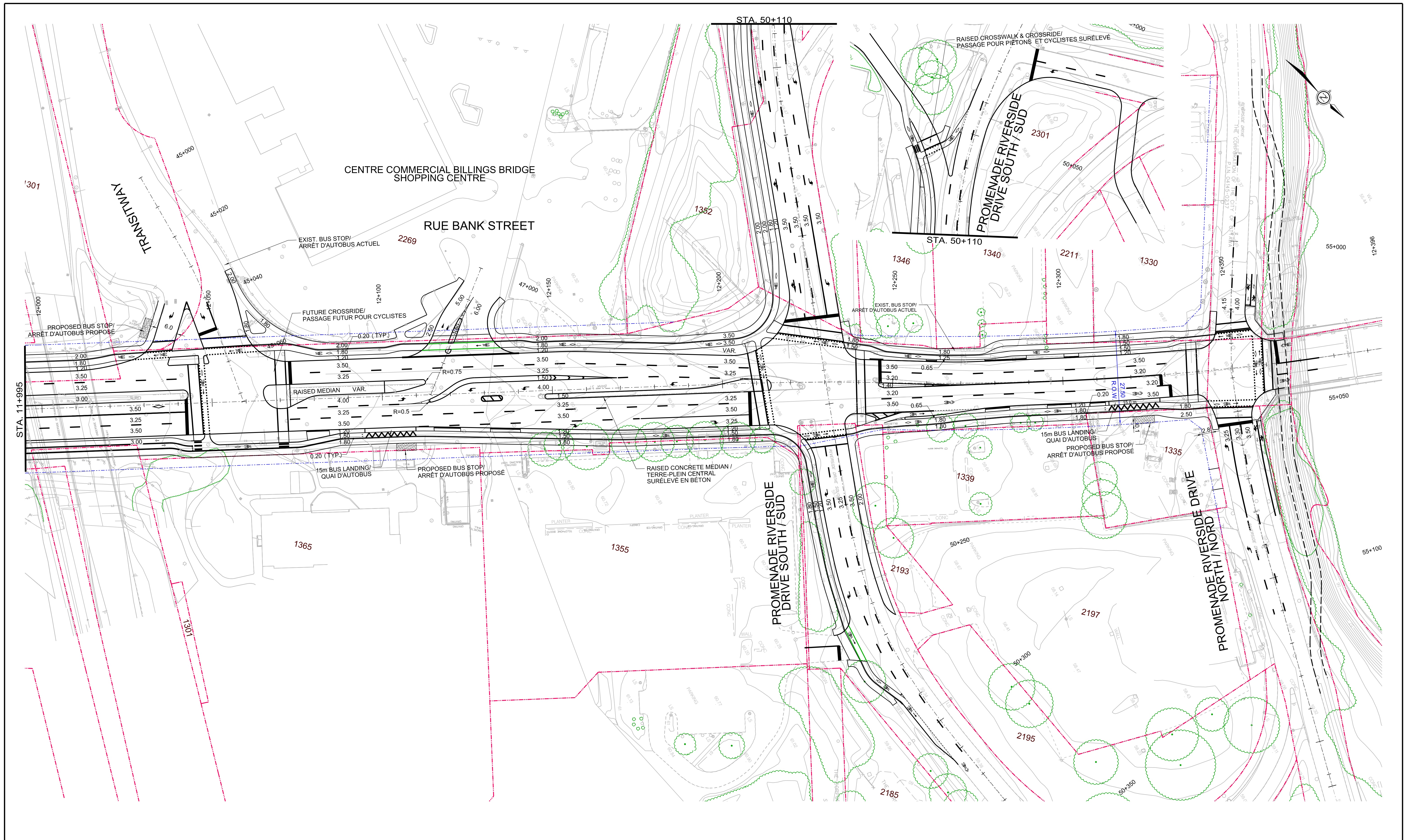
2015-Nov-03, Tue,11:40	Clear	Sideswipe	P.D. only	Dry	South	Changing lanes	Automobile, station wagon	Other motor vehicle
					South	Going ahead	Passenger van	Other motor vehicle
2018-May-22, Tue,18:46	Rain	Rear end	P.D. only	Wet	South	Going ahead	Automobile, station wagon	Other motor vehicle
					South	Stopped	Automobile, station wagon	Other motor vehicle

# Appendix E

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BANK STREET RENEWAL FUNCTIONAL DESIGN PLAN





**BANK STREET RENEWAL / RÉFECTION DE LA RUE BANK**  
**BILLINGS BRIDGE SHOPPING CENTRE TO RIVERSIDE DRIVE NORTH / CENTRE COMMERCIAL BILLINGS BRIDGE À PROMENADE RIVERSIDE NORD**

Scale / Échelle:	1:1000
Date:	April-18-17
Sheet No / No Feuille:	009A



# Appendix F

BANK STREET CROSS-SECTION OPTIONS

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# Memorandum

To: Christine McCuaig, RPP MCIP M.PI (Lloyd Phillips)

Date: 29 May 2020

From: Mark Baker, P.Eng. (Parsons)

Project: 477450

Subject: Bank Street (Riverside) Cross-Sections

As part of on-going work for two adjacent development sites near Riverside Drive, namely 1335-1339 Bank on the EAST and 1330-1346 Bank on the WEST, street cross-sections were developed by Parsons illustrating the various components within the existing and proposed right-of-way (ROW). It is noted that:

- the existing ROW within this segment of Bank Street ranges between 20 and 30m, whereas the protected ROW is 37.5m;
- there are unique constraints for both development parcels that limit the ability to fully grant the City's requested width from centreline (18.75m); and
- there is an on-going detailed design assignment by the City referred to as the Bank Street Renewal Project. <https://ottawa.ca/en/city-hall/public-engagement/projects/bank-street-renewal-riverside-drive-north-ledbury-avenue> [ottawa.ca]

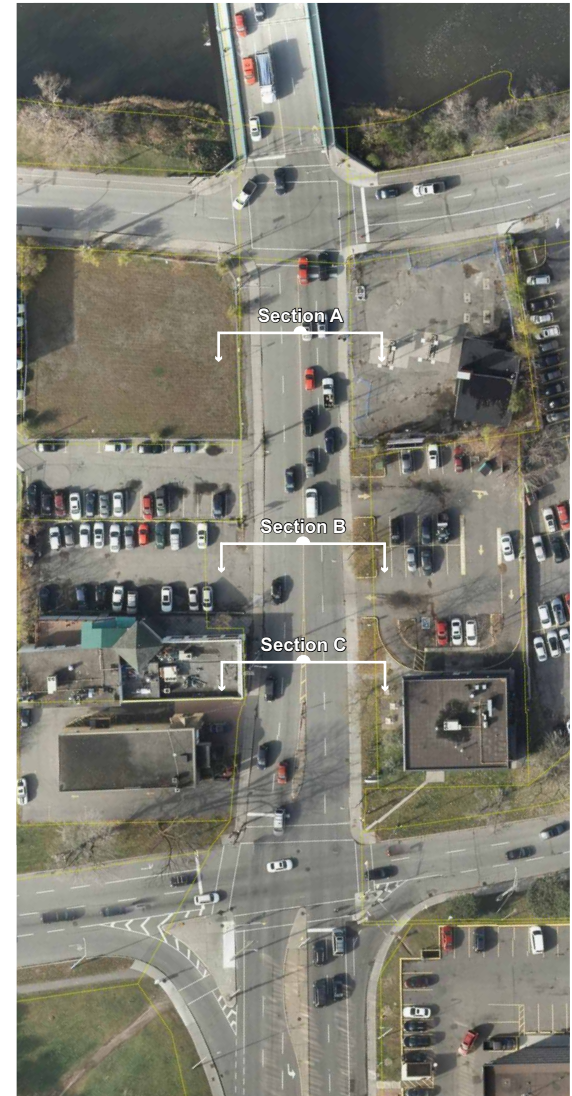
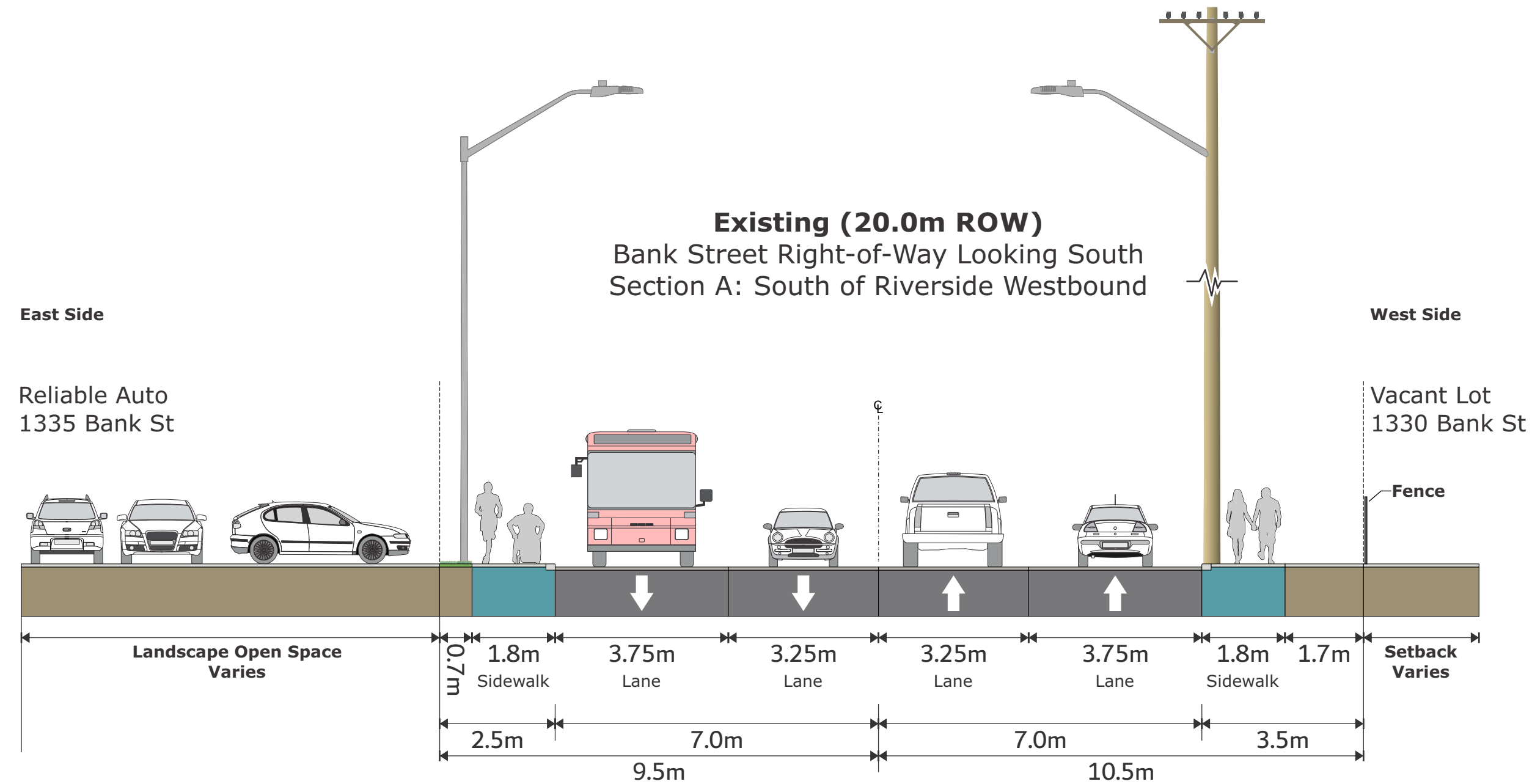
For the dimensions indicated for the proposed cross-section elements (i.e., widths of vehicle lanes, cycle track, sidewalks, etc.), the starting point for reference was the recent update to the arterial road design guidelines: <https://ottawa.ca/en/regional-road-corridor-design-guidelines-and-arterial-road-cross-sections> [ottawa.ca]. Some of these elements, including the width of the buffer, cycle track and boulevard, were refined based on a meeting with City technical staff dated 26 February 2020, including the PM for the aforementioned Bank Street Renewal Project, that focussed on 1330-1346 Bank on the WEST. The key elements agreed to by City staff at the time were as follows:

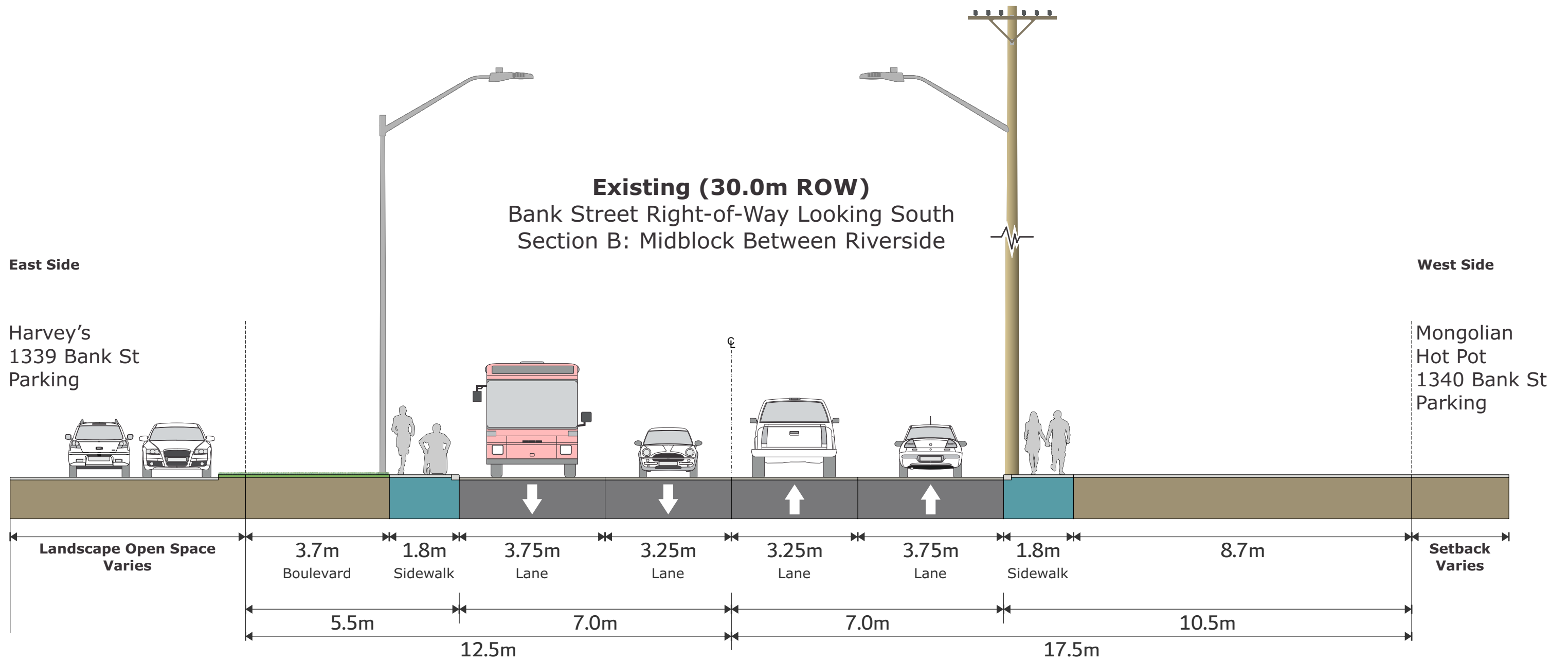
- 0.75m (from centreline) for median
- 3.5m inner lane
- 3.5m curb lane
- 1.2m buffer
- 2.0m cycle track
- 3.0m landscaped boulevard
- minimum of 2.0m sidewalk (min 2.5m to building face)
- 0.5m transition space (to be added to the sidewalk)

Note that the City of Ottawa have indicated that a centre median is required for this segment of Bank Street. The rationale for the centre median: it provides the most effective means to physically restrict the left-turn movements to/from the proposed site driveway on the WEST side; contributes to reduced vehicle speeds; provides space for additional roadway lighting, as well as space for supplemental signage and traffic signal poles for driver guidance.

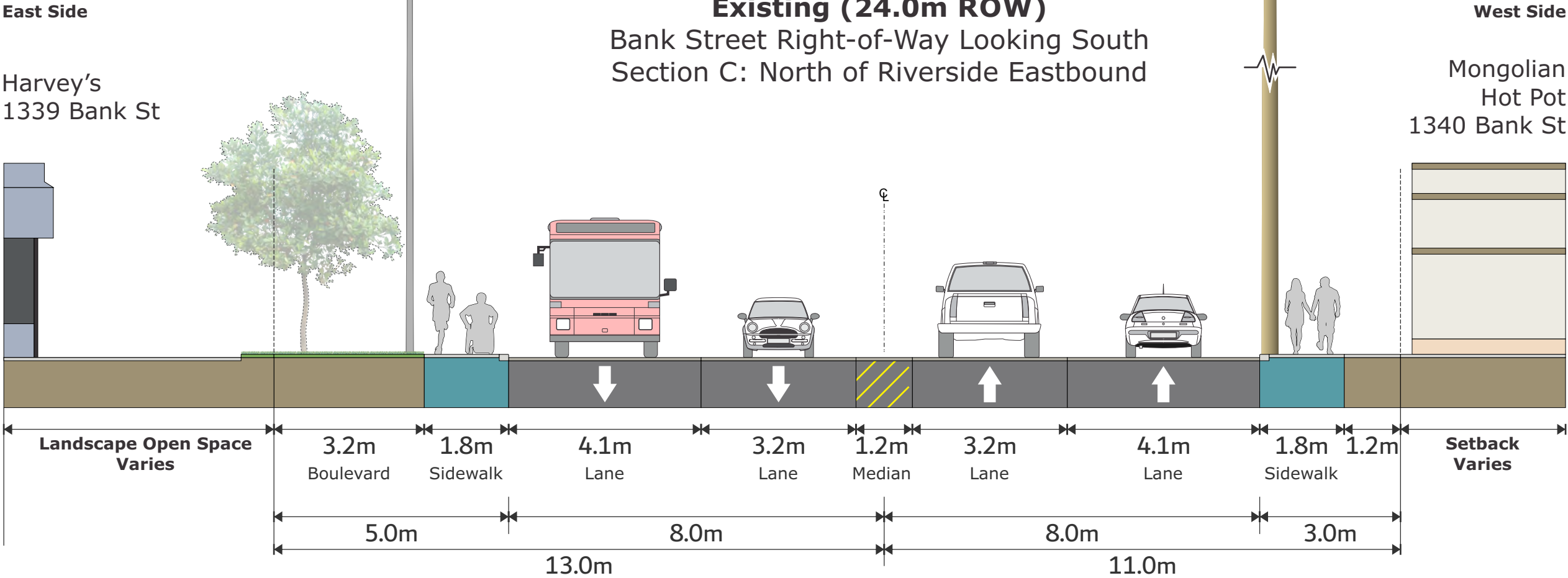
Regarding 1335-1339 Bank on the EAST, these same City-endorsed elements were used to develop candidate cross-sections in support of this development site. Street cross-sections were developed at three locations, namely Section A at the north end, Section B in the middle, and Section 3 at the south end. Distances from centreline of 13.75m (E1) and 15.25m (E2) were proposed. The various cross-sections are intended to demonstrate how the resulting sidewalk and landscaping space between the edge of the cycle track and building face could be programmed. The wider 15.25m option provides the opportunity for enhanced landscaping treatments throughout, superior transit amenities, and short on-street parking lane (2.5m) area mid-block (Section B). Note that preliminary discussions with OC Transpo support the movement of the existing northbound bus stop southerly to within Section C.

The package of existing and candidate street cross-sections is attached.









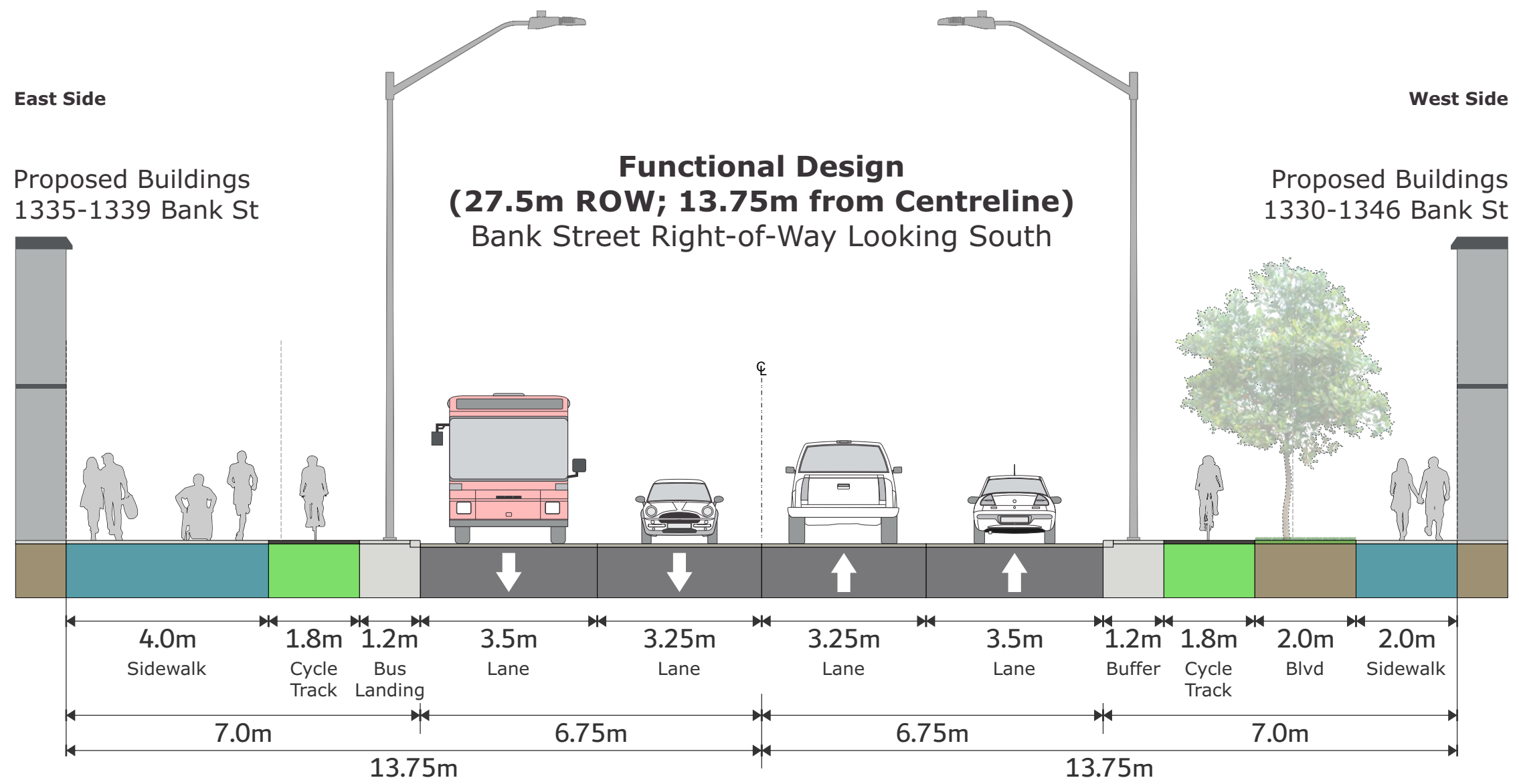
East Side

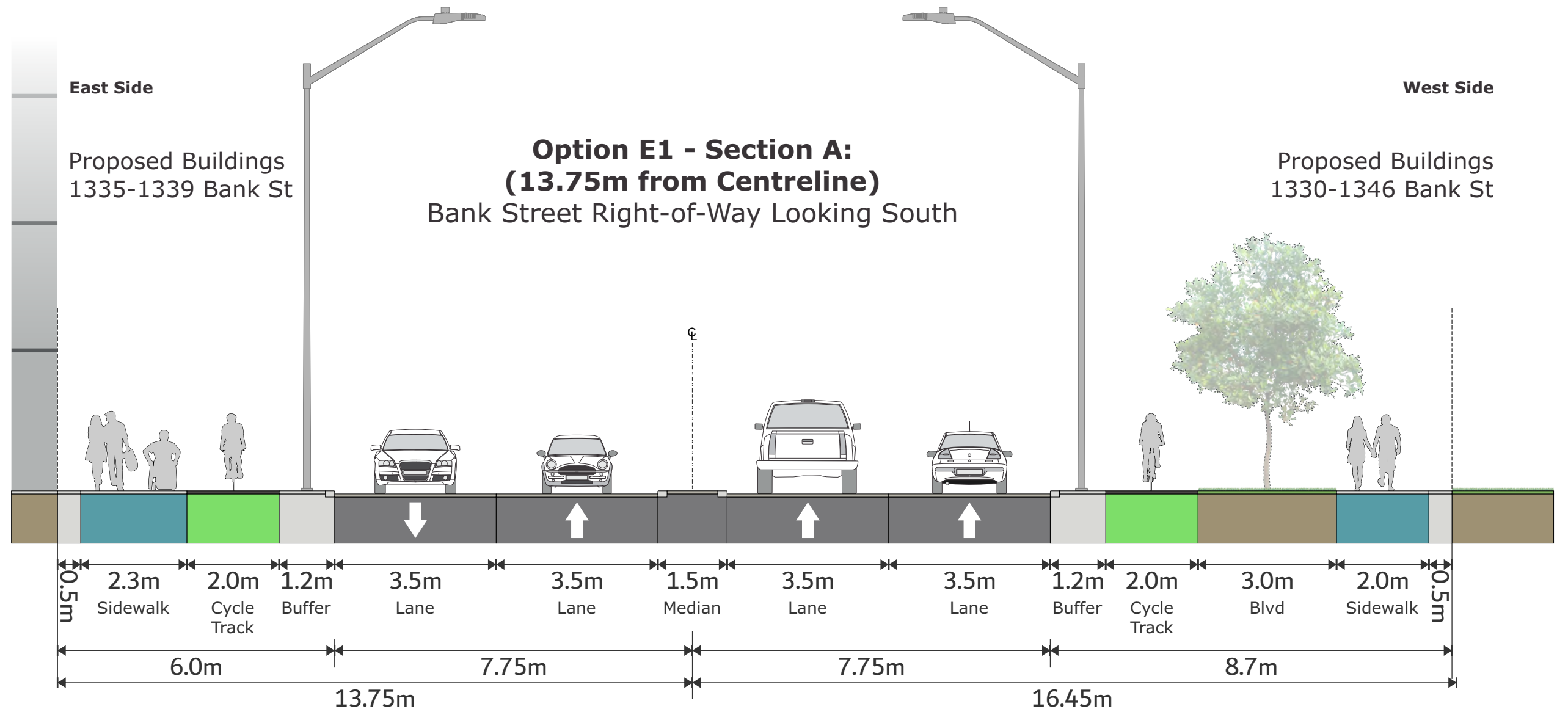
West Side

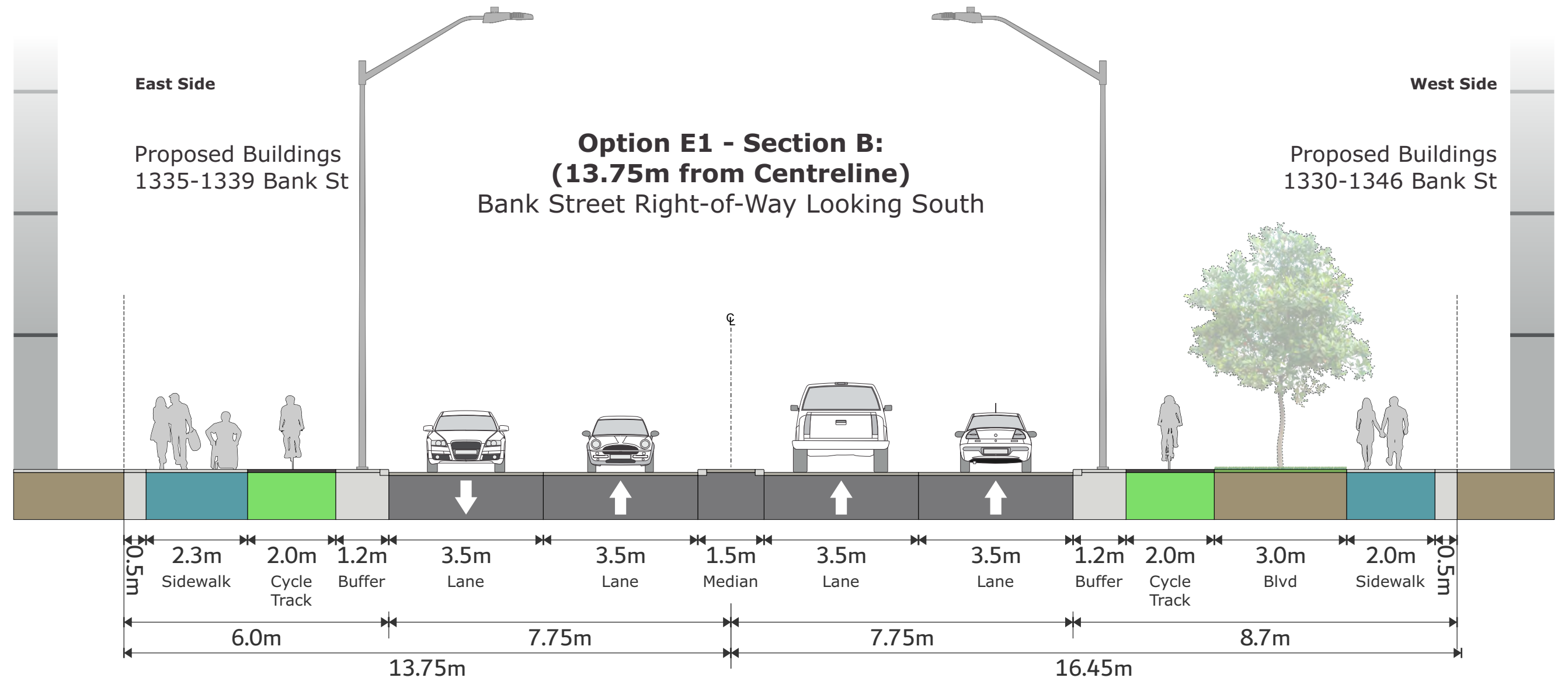
Proposed Buildings  
1335-1339 Bank St

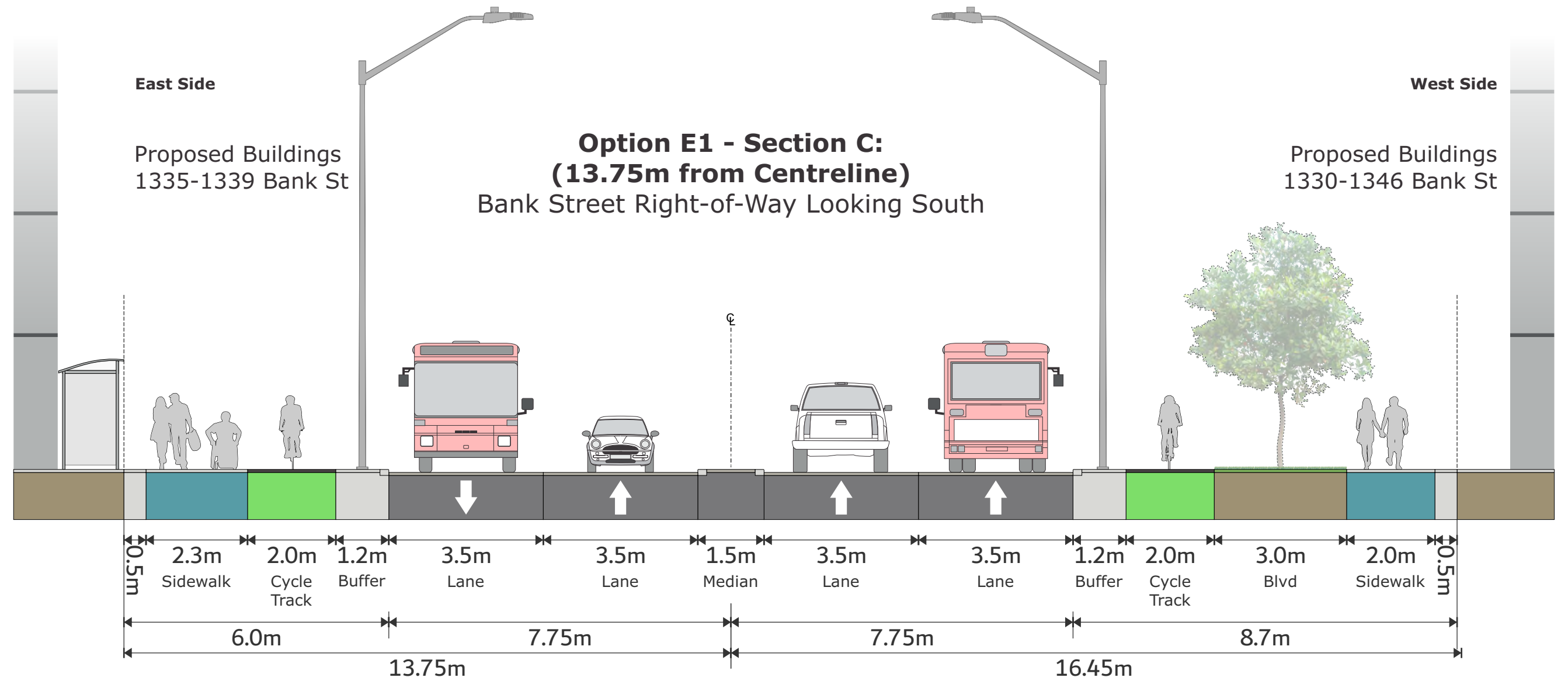
Proposed Buildings  
1330-1346 Bank St

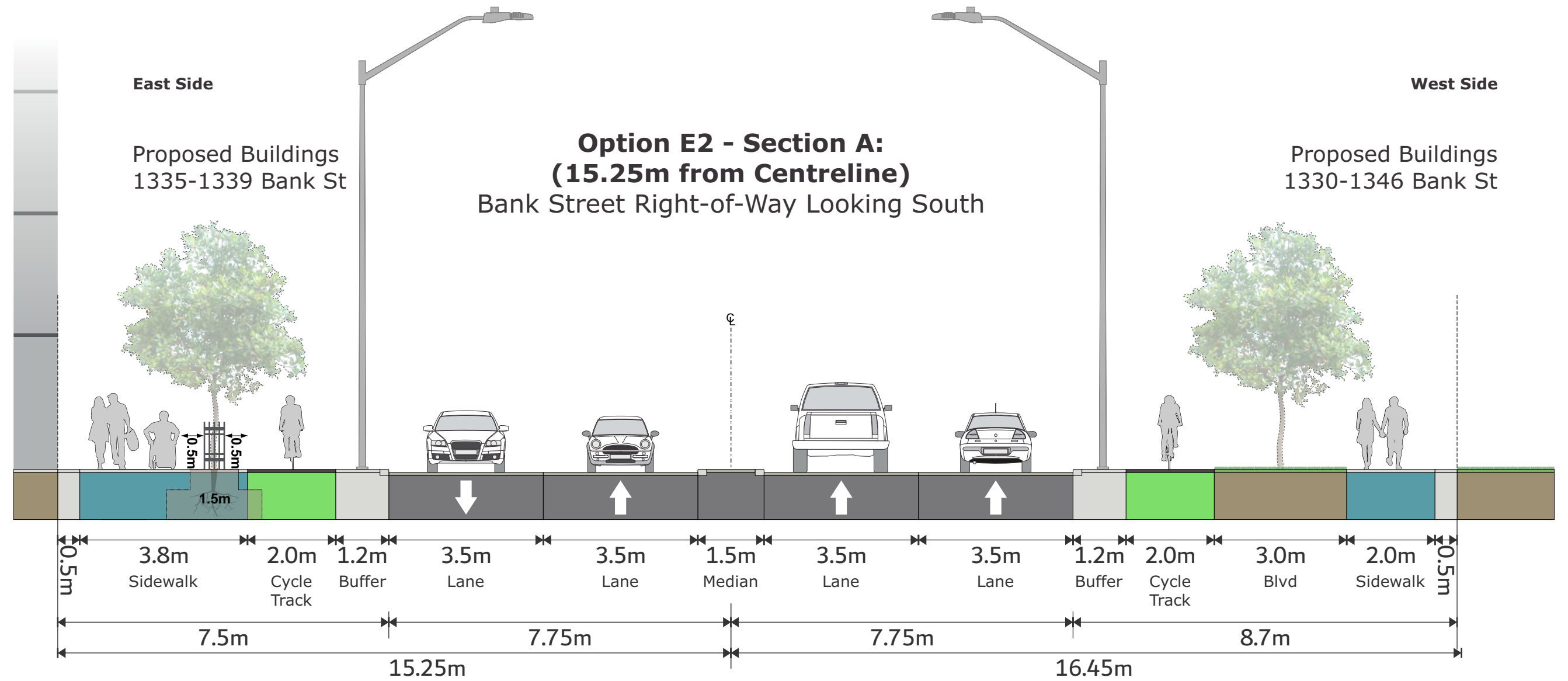
**Functional Design**  
**(27.5m ROW; 13.75m from Centreline)**  
Bank Street Right-of-Way Looking South

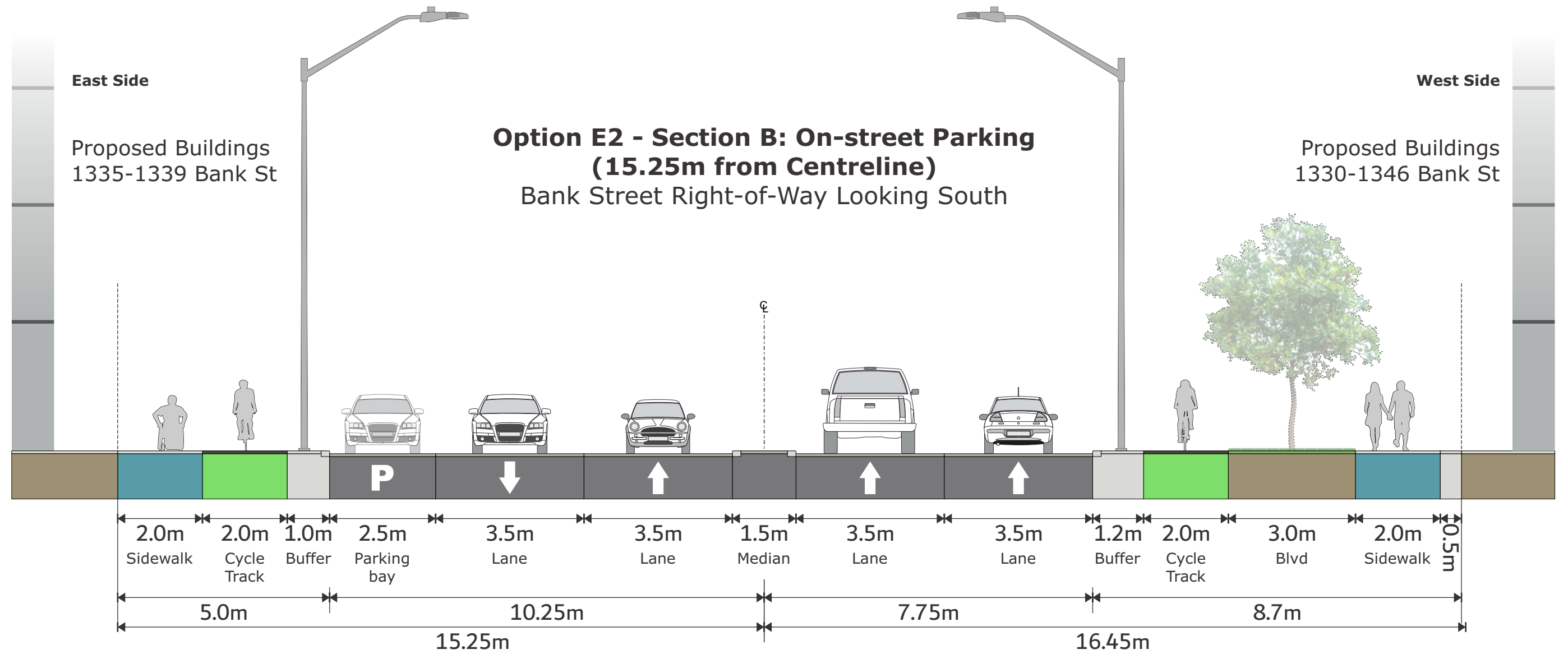


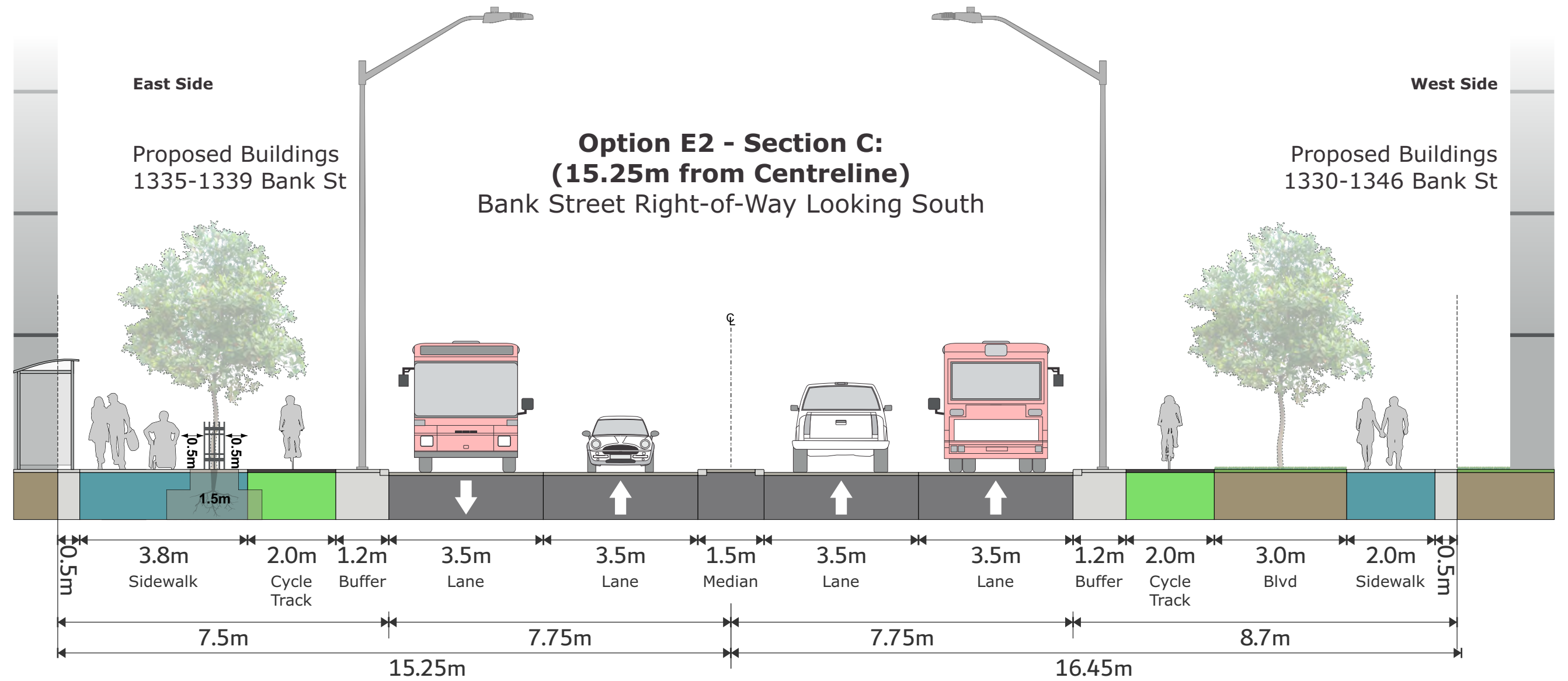














# Appendix G

TDM MEASURES CHECKLIST

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**TDM Measures Checklist:**  
*Residential Developments (multi-family, condominium or subdivision)*

<b>Legend</b>	
<b>BASIC</b>	The measure is generally feasible and effective, and in most cases would benefit the development and its users
<b>BETTER</b>	The measure could maximize support for users of sustainable modes, and optimize development performance
<b>★</b>	The measure is one of the most dependably effective tools to encourage the use of sustainable modes

<b>TDM measures: <i>Residential developments</i></b>		<b>Check if proposed &amp; add descriptions</b>
<b>1. TDM PROGRAM MANAGEMENT</b>		
<b>1.1 Program coordinator</b>		
<b>BASIC</b>	<b>★</b> 1.1.1 Designate an internal coordinator, or contract with an external coordinator	<input type="checkbox"/>
<b>1.2 Travel surveys</b>		
<b>BETTER</b>	1.2.1 Conduct periodic surveys to identify travel-related behaviours, attitudes, challenges and solutions, and to track progress	<input type="checkbox"/>
<b>2. WALKING AND CYCLING</b>		
<b>2.1 Information on walking/cycling routes &amp; destinations</b>		
<b>BASIC</b>	2.1.1 Display local area maps with walking/cycling access routes and key destinations at major entrances ( <i>multi-family, condominium</i> )	<input type="checkbox"/>
<b>2.2 Bicycle skills training</b>		
<b>BETTER</b>	2.2.1 Offer on-site cycling courses for residents, or subsidize off-site courses	<input type="checkbox"/>

TDM measures: <i>Residential developments</i>		Check if proposed & add descriptions
<b>3. TRANSIT</b>		
<b>3.1 Transit information</b>		
BASIC	3.1.1 Display relevant transit schedules and route maps at entrances ( <i>multi-family, condominium</i> )	<input type="checkbox"/>
BETTER	3.1.2 Provide real-time arrival information display at entrances ( <i>multi-family, condominium</i> )	<input type="checkbox"/>
<b>3.2 Transit fare incentives</b>		
BASIC ★	3.2.1 Offer PRESTO cards preloaded with one monthly transit pass on residence purchase/move-in, to encourage residents to use transit	<input type="checkbox"/>
BETTER	3.2.2 Offer at least one year of free monthly transit passes on residence purchase/move-in	<input type="checkbox"/>
<b>3.3 Enhanced public transit service</b>		
BETTER ★	3.3.1 Contract with OC Transpo to provide early transit services until regular services are warranted by occupancy levels ( <i>subdivision</i> )	<input type="checkbox"/>
<b>3.4 Private transit service</b>		
BETTER	3.4.1 Provide shuttle service for seniors homes or lifestyle communities (e.g. scheduled mall or supermarket runs)	<input type="checkbox"/>
<b>4. CARSHARING &amp; BIKESHARING</b>		
<b>4.1 Bikeshare stations &amp; memberships</b>		
BETTER	4.1.1 Contract with provider to install on-site bikeshare station ( <i>multi-family</i> )	<input type="checkbox"/>
BETTER	4.1.2 Provide residents with bikeshare memberships, either free or subsidized ( <i>multi-family</i> )	<input type="checkbox"/>
<b>4.2 Carshare vehicles &amp; memberships</b>		
BETTER	4.2.1 Contract with provider to install on-site carshare vehicles and promote their use by residents	<input type="checkbox"/>
BETTER	4.2.2 Provide residents with carshare memberships, either free or subsidized	<input type="checkbox"/>
<b>5. PARKING</b>		
<b>5.1 Priced parking</b>		
BASIC ★	5.1.1 Unbundle parking cost from purchase price ( <i>condominium</i> )	<input type="checkbox"/>
BASIC ★	5.1.2 Unbundle parking cost from monthly rent ( <i>multi-family</i> )	<input type="checkbox"/>

TDM measures: <i>Residential developments</i>		Check if proposed & add descriptions
<b>6. TDM MARKETING &amp; COMMUNICATIONS</b>		
<b>6.1 Multimodal travel information</b>		
<b>BASIC</b>	★ 6.1.1 Provide a multimodal travel option information package to new residents	<input type="checkbox"/>
<b>6.2 Personalized trip planning</b>		
<b>BETTER</b>	★ 6.2.1 Offer personalized trip planning to new residents	<input type="checkbox"/>

# Appendix H










SYNCHRO ANALYSIS RESULTS

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## **Existing Conditions**

Lanes, Volumes, Timings  
1: Bank St & Riverdale Ave

Existing AM  
07/24/2020

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	98	6	1104	98	6	476
Future Volume (vph)	98	6	1104	98	6	476
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Right Turn on Red		Yes		Yes		
Link Speed (k/h)	40		50			50
Link Distance (m)	227.4		190.3			201.0
Travel Time (s)	20.5		13.7			14.5
Lane Group Flow (vph)	116	0	1336	0	0	536
Turn Type	Prot		NA		Perm	NA
Protected Phases	8		2			6
Permitted Phases					6	
Detector Phase	8		2		6	6
Switch Phase						
Minimum Initial (s)	5.0		10.0		10.0	10.0
Minimum Split (s)	22.0		22.5		22.5	22.5
Total Split (s)	22.0		48.0		48.0	48.0
Total Split (%)	31.4%		68.6%		68.6%	68.6%
Yellow Time (s)	3.0		3.3		3.3	3.3
All-Red Time (s)	3.2		2.6		2.6	2.6
Lost Time Adjust (s)	0.0		0.0			0.0
Total Lost Time (s)	6.2		5.9			5.9
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None		C-Max		C-Max	C-Max
Act Effect Green (s)	9.9		51.6			51.6
Actuated g/C Ratio	0.14		0.74			0.74
v/c Ratio	0.48		0.54			0.23
Control Delay	32.5		6.7			4.6
Queue Delay	0.0		0.0			0.0
Total Delay	32.5		6.7			4.6
LOS	C		A			A
Approach Delay	32.5		6.7			4.6
Approach LOS	C		A			A
Queue Length 50th (m)	13.7		38.6			11.4
Queue Length 95th (m)	26.1		66.0			21.0
Internal Link Dist (m)	203.4		166.3			177.0
Turn Bay Length (m)						
Base Capacity (vph)	384		2474			2341
Starvation Cap Reductn	0		0			0
Spillback Cap Reductn	0		0			0
Storage Cap Reductn	0		0			0
Reduced v/c Ratio	0.30		0.54			0.23
<b>Intersection Summary</b>						
Area Type:	Other					
Cycle Length: 70						
Actuated Cycle Length: 70						
Offset: 17 (24%), Referenced to phase 2:NBT and 6:SBTL, Start of Green						

Lanes, Volumes, Timings  
1: Bank St & Riverdale Ave

Existing AM  
07/24/2020

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.54

Intersection Signal Delay: 7.6

Intersection LOS: A

Intersection Capacity Utilization 51.7%

ICU Level of Service A

Analysis Period (min) 15

















Splits and Phases: 1: Bank St & Riverdale Ave





Lanes, Volumes, Timings  
2: Bank St & Riverside Dr WB

Existing AM  
07/24/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	251	1030	204	0	888	0	0	377	161
Future Volume (vph)	0	0	0	251	1030	204	0	888	0	0	377	161
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	75.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Right Turn on Red			Yes			Yes			Yes			No
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		344.9			312.6			124.8			190.3	
Travel Time (s)		20.7			18.8			9.0			13.7	
Lane Group Flow (vph)	0	0	0	279	1371	0	0	987	0	0	598	0
Turn Type				Perm	NA			NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8								
Minimum Split (s)				28.5	28.5			30.2			30.2	
Total Split (s)				50.0	50.0			40.0			40.0	
Total Split (%)				55.6%	55.6%			44.4%			44.4%	
Yellow Time (s)				3.7	3.7			3.3			3.3	
All-Red Time (s)				1.8	1.8			1.9			1.9	
Lost Time Adjust (s)				0.0	0.0			0.0			0.0	
Total Lost Time (s)				5.5	5.5			5.2			5.2	
Lead/Lag												
Lead-Lag Optimize?												
Act Effct Green (s)				44.5	44.5			34.8			34.8	
Actuated g/C Ratio				0.49	0.49			0.39			0.39	
v/c Ratio				0.33	0.83			0.75			0.48	
Control Delay				5.4	13.6			10.7			22.3	
Queue Delay				0.0	0.0			0.1			0.0	
Total Delay				5.4	13.6			10.8			22.3	
LOS				A	B			B			C	
Approach Delay					12.2			10.8			22.3	
Approach LOS					B			B			C	
Queue Length 50th (m)				10.7	114.6			16.8			40.1	
Queue Length 95th (m)				m15.1	149.1			20.2			54.9	
Internal Link Dist (m)		320.9			288.6			100.8			166.3	
Turn Bay Length (m)				75.0								
Base Capacity (vph)				838	1651			1310			1252	
Starvation Cap Reductn				0	0			18			0	
Spillback Cap Reductn				0	0			0			0	
Storage Cap Reductn				0	0			0			0	
Reduced v/c Ratio				0.33	0.83			0.76			0.48	
Intersection Summary												
Area Type:	Other											
Cycle Length: 90												
Actuated Cycle Length: 90												
Offset: 41 (46%), Referenced to phase 2:NBT and 6:SBT, Start of Green												
Natural Cycle: 65												

Lanes, Volumes, Timings  
2: Bank St & Riverside Dr WB

Existing AM  
07/24/2020

Control Type: Pretimed

Maximum v/c Ratio: 0.83

Intersection Signal Delay: 13.7

Intersection LOS: B

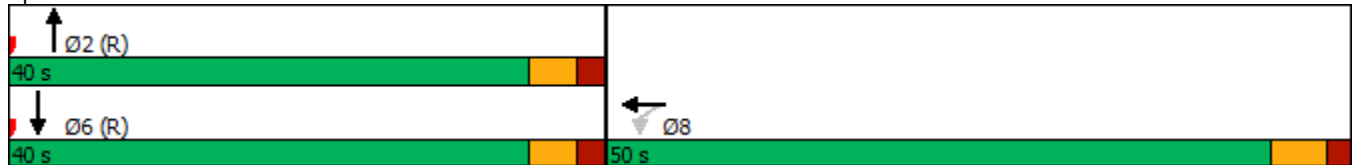
Intersection Capacity Utilization 71.7%

ICU Level of Service C

Analysis Period (min) 15



















m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Bank St & Riverside Dr WB



Lanes, Volumes, Timings  
3: Bank St & Riverside Dr EB

Existing AM  
07/24/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	147	1303	47	0	0	0	0	802	303	0	556	0
Future Volume (vph)	147	1303	47	0	0	0	0	802	303	0	556	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0		45.0	0.0		0.0	0.0		60.0	0.0		0.0
Storage Lanes	1		1	0		0	0		1	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		353.9			357.9			168.7			124.8	
Travel Time (s)		21.2			21.5			12.1			9.0	
Lane Group Flow (vph)	163	1448	52	0	0	0	0	891	337	0	618	0
Turn Type	Perm	NA	Perm					NA	Perm		NA	
Protected Phases		4						2			6	
Permitted Phases	4		4						2			
Minimum Split (s)	29.1	29.1	29.1					25.5	25.5		25.5	
Total Split (s)	52.0	52.0	52.0					38.0	38.0		38.0	
Total Split (%)	57.8%	57.8%	57.8%					42.2%	42.2%		42.2%	
Yellow Time (s)	3.7	3.7	3.7					3.3	3.3		3.3	
All-Red Time (s)	2.4	2.4	2.4					2.2	2.2		2.2	
Lost Time Adjust (s)	0.0	0.0	0.0					0.0	0.0		0.0	
Total Lost Time (s)	6.1	6.1	6.1					5.5	5.5		5.5	
Lead/Lag												
Lead-Lag Optimize?												
Act Effct Green (s)	45.9	45.9	45.9					32.5	32.5		32.5	
Actuated g/C Ratio	0.51	0.51	0.51					0.36	0.36		0.36	
v/c Ratio	0.19	0.84	0.07					0.73	0.59		0.50	
Control Delay	11.0	26.8	5.5					27.6	23.9		18.0	
Queue Delay	0.0	0.0	0.0					0.0	0.0		0.0	
Total Delay	11.0	26.8	5.5					27.6	23.9		18.0	
LOS	B	C	A					C	C		B	
Approach Delay		24.6						26.6			18.0	
Approach LOS		C						C			B	
Queue Length 50th (m)	21.7	143.3	3.6					69.2	41.2		29.8	
Queue Length 95th (m)	m20.6	165.2	m3.8					90.9	68.6		39.1	
Internal Link Dist (m)		329.9			333.9			144.7			100.8	
Turn Bay Length (m)	60.0		45.0						60.0			
Base Capacity (vph)	864	1728	792					1224	572		1224	
Starvation Cap Reductn	0	0	0					0	0		0	
Spillback Cap Reductn	0	0	0					0	0		0	
Storage Cap Reductn	0	0	0					0	0		0	
Reduced v/c Ratio	0.19	0.84	0.07					0.73	0.59		0.50	
Intersection Summary												
Area Type:	Other											
Cycle Length: 90												
Actuated Cycle Length: 90												
Offset: 36 (40%), Referenced to phase 2:NBT and 6:SBT, Start of Green												
Natural Cycle: 60												

Lanes, Volumes, Timings  
3: Bank St & Riverside Dr EB

Existing AM  
07/24/2020

Control Type: Pretimed

Maximum v/c Ratio: 0.84

Intersection Signal Delay: 24.1

Intersection LOS: C

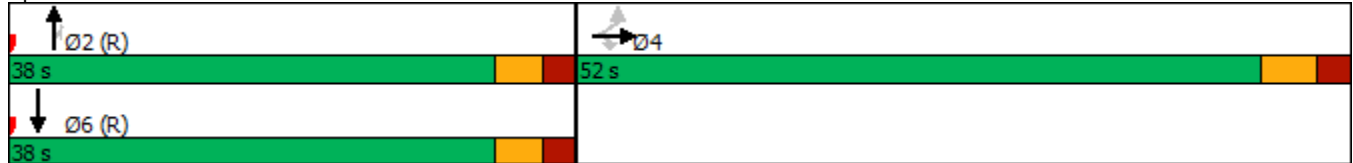
Intersection Capacity Utilization 71.7%

ICU Level of Service C

Analysis Period (min) 15













m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Bank St & Riverside Dr EB



Lanes, Volumes, Timings  
4: Bank St & Billings Transit

Existing AM  
07/24/2020

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	8	11	12	980	647	9
Future Volume (vph)	8	11	12	980	647	9
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	0.0	65.0			15.0
Storage Lanes	1	1	1			1
Taper Length (m)	7.5		7.5			
Right Turn on Red		Yes				Yes
Link Speed (k/h)	50			50	50	
Link Distance (m)	251.4			166.8	168.7	
Travel Time (s)	18.1			12.0	12.1	
Lane Group Flow (vph)	9	12	13	1089	719	10
Turn Type	Perm	Perm	pm+pt	NA	NA	Perm
Protected Phases			5	2	6	
Permitted Phases	4	4	2			6
Detector Phase	4	4	5	2	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	10.0	10.0	10.0
Minimum Split (s)	38.6	38.6	10.7	28.7	28.7	28.7
Total Split (s)	39.0	39.0	11.0	51.0	40.0	40.0
Total Split (%)	43.3%	43.3%	12.2%	56.7%	44.4%	44.4%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.3	2.3	2.4	2.4	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.6	5.6	5.7	5.7	5.7	5.7
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	None	None	None	C-Max	C-Max	C-Max
Act Effect Green (s)	6.7	6.7	78.8	82.2	79.8	79.8
Actuated g/C Ratio	0.07	0.07	0.88	0.91	0.89	0.89
v/c Ratio	0.14	0.18	0.04	0.35	0.24	0.01
Control Delay	43.0	25.6	2.1	1.9	0.9	0.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.0	25.6	2.1	1.9	0.9	0.8
LOS	D	C	A	A	A	A
Approach Delay	33.1			1.9	0.9	
Approach LOS	C			A	A	
Queue Length 50th (m)	1.5	0.0	0.2	0.0	0.2	0.0
Queue Length 95th (m)	6.0	5.1	1.5	32.5	7.9	m0.1
Internal Link Dist (m)	227.4			142.8	144.7	
Turn Bay Length (m)			65.0			15.0
Base Capacity (vph)	320	294	313	3097	3006	687
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.04	0.04	0.35	0.24	0.01
Intersection Summary						
Area Type:	Other					

# Lanes, Volumes, Timings

## 4: Bank St & Billings Transit

Existing AM  
07/24/2020

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 50 (56%), Referenced to phase 2:NBTL and 6:SBT, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.35

Intersection Signal Delay: 1.9

Intersection LOS: A

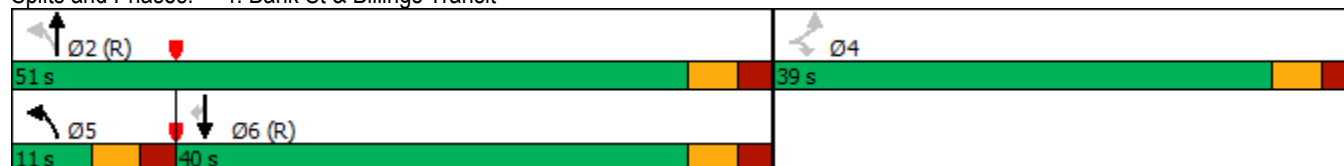
Intersection Capacity Utilization 42.2%

ICU Level of Service A

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: Bank St & Billings Transit



Lanes, Volumes, Timings  
5: Data Centre Rd & Riverside Dr

Existing AM  
07/24/2020

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↘	↑↑	↘	↑
Traffic Volume (vph)	1395	88	96	943	47	70
Future Volume (vph)	1395	88	96	943	47	70
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)		40.0	75.0		85.0	0.0
Storage Lanes		1	1		1	1
Taper Length (m)			7.5		7.5	
Right Turn on Red		Yes				Yes
Link Speed (k/h)	60			60	50	
Link Distance (m)	262.9			119.4	217.7	
Travel Time (s)	15.8			7.2	15.7	
Lane Group Flow (vph)	1550	98	107	1048	52	78
Turn Type	NA	Perm	Prot	NA	Prot	Perm
Protected Phases	4		3	8	2	
Permitted Phases		4				2
Detector Phase	4	4	3	8	2	2
Switch Phase						
Minimum Initial (s)	10.0	10.0	5.0	10.0	5.0	5.0
Minimum Split (s)	23.4	23.4	11.1	23.4	23.1	23.1
Total Split (s)	39.0	39.0	25.0	64.0	26.0	26.0
Total Split (%)	43.3%	43.3%	27.8%	71.1%	28.9%	28.9%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.3	3.3
All-Red Time (s)	1.7	1.7	2.4	1.7	1.8	1.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.4	5.4	6.1	5.4	5.1	5.1
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	C-Max	C-Max	None	C-Max	None	None
Act Effect Green (s)	60.0	60.0	11.0	74.5	8.2	8.2
Actuated g/C Ratio	0.67	0.67	0.12	0.83	0.09	0.09
v/c Ratio	0.69	0.10	0.52	0.37	0.34	0.37
Control Delay	15.4	5.6	54.5	1.5	43.5	14.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.4	5.6	54.5	1.5	43.5	14.5
LOS	B	A	D	A	D	B
Approach Delay	14.9			6.4	26.1	
Approach LOS	B			A	C	
Queue Length 50th (m)	94.3	3.3	19.9	10.3	8.6	0.0
Queue Length 95th (m)	151.4	11.4	m25.6	13.4	18.8	12.2
Internal Link Dist (m)	238.9			95.4	193.7	
Turn Bay Length (m)		40.0	75.0		85.0	
Base Capacity (vph)	2259	1027	355	2806	393	412
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.69	0.10	0.30	0.37	0.13	0.19
Intersection Summary						
Area Type:	Other					

# Lanes, Volumes, Timings 5: Data Centre Rd & Riverside Dr

Existing AM  
07/24/2020

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 37 (41%), Referenced to phase 4:EBT and 8:WBT, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.69

Intersection Signal Delay: 12.0

Intersection LOS: B

Intersection Capacity Utilization 64.3%

ICU Level of Service C

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Data Centre Rd & Riverside Dr





Lanes, Volumes, Timings  
6: Pleasant Park Rd & Riverside Dr

Existing AM  
07/24/2020

	→	↘	↙	←	↖	↗	
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø9
Lane Configurations	↑↑		↘	↑↑	↘	↗	
Traffic Volume (vph)	1150	97	32	1191	168	36	
Future Volume (vph)	1150	97	32	1191	168	36	
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	
Storage Length (m)		0.0	30.0		0.0	40.0	
Storage Lanes		0	1		1	1	
Taper Length (m)			7.5		7.5		
Right Turn on Red		Yes				Yes	
Link Speed (k/h)	60			60	50		
Link Distance (m)	242.5			151.7	243.4		
Travel Time (s)	14.6			9.1	17.5		
Lane Group Flow (vph)	1386	0	36	1323	187	40	
Turn Type	NA		pm+pt	NA	Perm	Perm	
Protected Phases	4		3	8			9
Permitted Phases			8		2	2	
Detector Phase	4		3	8	2	2	
Switch Phase							
Minimum Initial (s)	10.0		5.0	10.0	5.0	5.0	5.0
Minimum Split (s)	28.8		10.0	28.8	25.0	25.0	12.0
Total Split (s)	37.0		10.0	37.0	28.0	28.0	15.0
Total Split (%)	41.1%		11.1%	41.1%	31.1%	31.1%	17%
Yellow Time (s)	3.7		3.3	3.7	3.3	3.3	3.0
All-Red Time (s)	2.1		1.7	2.1	2.7	2.7	4.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.8		5.0	5.8	6.0	6.0	
Lead/Lag	Lag		Lead				
Lead-Lag Optimize?	Yes		Yes				
Recall Mode	C-Max		None	C-Max	Max	Max	None
Act Effect Green (s)	35.2		42.0	41.2	37.0	37.0	
Actuated g/C Ratio	0.39		0.47	0.46	0.41	0.41	
v/c Ratio	1.05		0.21	0.85	0.27	0.06	
Control Delay	61.4		16.1	28.5	18.9	5.7	
Queue Delay	0.0		0.0	0.0	0.0	0.0	
Total Delay	61.4		16.1	28.5	18.9	5.7	
LOS	E		B	C	B	A	
Approach Delay	61.4			28.2	16.6		
Approach LOS	E			C	B		
Queue Length 50th (m)	~154.5		3.3	103.2	20.9	0.0	
Queue Length 95th (m)	#197.6		8.3	132.7	35.7	5.7	
Internal Link Dist (m)	218.5			127.7	219.4		
Turn Bay Length (m)			30.0			40.0	
Base Capacity (vph)	1316		171	1551	696	647	
Starvation Cap Reductn	0		0	0	0	0	
Spillback Cap Reductn	0		0	0	0	0	
Storage Cap Reductn	0		0	0	0	0	
Reduced v/c Ratio	1.05		0.21	0.85	0.27	0.06	
Intersection Summary							
Area Type:	Other						

# Lanes, Volumes, Timings

## 6: Pleasant Park Rd & Riverside Dr

Existing AM  
07/24/2020

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 50 (56%), Referenced to phase 4:EBT and 8:WBTL, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.05

Intersection Signal Delay: 42.8

Intersection LOS: D

Intersection Capacity Utilization 56.5%

ICU Level of Service B

Analysis Period (min) 15

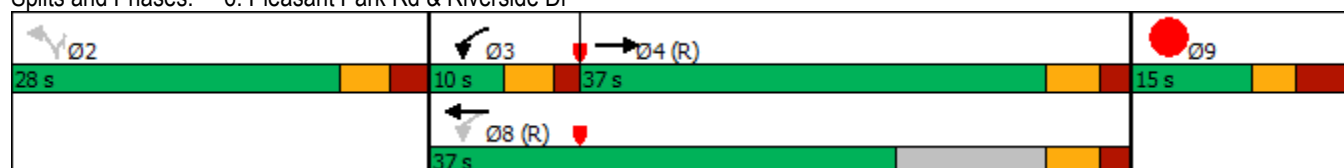
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.










Queue shown is maximum after two cycles.

Splits and Phases: 6: Pleasant Park Rd & Riverside Dr



Lanes, Volumes, Timings  
1: Bank St & Riverdale Ave

Existing PM  
07/24/2020

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	134	11	527	196	9	794
Future Volume (vph)	134	11	527	196	9	794
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Right Turn on Red		Yes		Yes		
Link Speed (k/h)	40		50			50
Link Distance (m)	227.4		190.3			201.0
Travel Time (s)	20.5		13.7			14.5
Lane Group Flow (vph)	161	0	804	0	0	892
Turn Type	Prot		NA		Perm	NA
Protected Phases	8		2			6
Permitted Phases					6	
Detector Phase	8		2		6	6
Switch Phase						
Minimum Initial (s)	5.0		10.0		10.0	10.0
Minimum Split (s)	22.0		22.5		22.5	22.5
Total Split (s)	22.0		68.0		68.0	68.0
Total Split (%)	24.4%		75.6%		75.6%	75.6%
Yellow Time (s)	3.0		3.3		3.3	3.3
All-Red Time (s)	3.2		2.6		2.6	2.6
Lost Time Adjust (s)	0.0		0.0			0.0
Total Lost Time (s)	6.2		5.9			5.9
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None		C-Max		C-Max	C-Max
Act Effect Green (s)	12.9		65.0			65.0
Actuated g/C Ratio	0.14		0.72			0.72
v/c Ratio	0.65		0.34			0.39
Control Delay	48.0		1.5			5.7
Queue Delay	0.0		0.0			0.0
Total Delay	48.0		1.5			5.7
LOS	D		A			A
Approach Delay	48.0		1.5			5.7
Approach LOS	D		A			A
Queue Length 50th (m)	25.8		4.3			27.1
Queue Length 95th (m)	44.3		m6.1			39.7
Internal Link Dist (m)	203.4		166.3			177.0
Turn Bay Length (m)						
Base Capacity (vph)	299		2384			2312
Starvation Cap Reductn	0		0			0
Spillback Cap Reductn	0		0			0
Storage Cap Reductn	0		0			0
Reduced v/c Ratio	0.54		0.34			0.39
<b>Intersection Summary</b>						
Area Type:	Other					
Cycle Length: 90						
Actuated Cycle Length: 90						
Offset: 57 (63%), Referenced to phase 2:NBT and 6:SBTL, Start of Green						

Lanes, Volumes, Timings  
1: Bank St & Riverdale Ave

Existing PM  
07/24/2020

Natural Cycle: 45

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.65

Intersection Signal Delay: 7.6

Intersection LOS: A

Intersection Capacity Utilization 48.5%

ICU Level of Service A

Analysis Period (min) 15






m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Bank St & Riverdale Ave



Lanes, Volumes, Timings  
2: Bank St & Riverside Dr WB

Existing PM  
07/24/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	371	1363	98	0	537	0	0	659	197
Future Volume (vph)	0	0	0	371	1363	98	0	537	0	0	659	197
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	75.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Right Turn on Red			Yes			Yes			Yes			No
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		344.9			312.6			124.8			190.3	
Travel Time (s)		20.7			18.8			9.0			13.7	
Lane Group Flow (vph)	0	0	0	412	1623	0	0	597	0	0	951	0
Turn Type				Perm	NA			NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8								
Minimum Split (s)				28.5	28.5			30.2			30.2	
Total Split (s)				52.0	52.0			38.0			38.0	
Total Split (%)				57.8%	57.8%			42.2%			42.2%	
Yellow Time (s)				3.7	3.7			3.3			3.3	
All-Red Time (s)				1.8	1.8			1.9			1.9	
Lost Time Adjust (s)				0.0	0.0			0.0			0.0	
Total Lost Time (s)				5.5	5.5			5.2			5.2	
Lead/Lag												
Lead-Lag Optimize?												
Act Effect Green (s)				46.5	46.5			32.8			32.8	
Actuated g/C Ratio				0.52	0.52			0.36			0.36	
v/c Ratio				0.47	0.93			0.48			0.80	
Control Delay				5.5	15.0			12.9			26.7	
Queue Delay				0.0	0.0			0.0			0.9	
Total Delay				5.5	15.0			12.9			27.6	
LOS				A	B			B			C	
Approach Delay					13.1			12.9			27.6	
Approach LOS					B			B			C	
Queue Length 50th (m)				15.7	116.7			19.2			79.7	
Queue Length 95th (m)				m15.1	m67.5			24.9			103.1	
Internal Link Dist (m)		320.9			288.6			100.8			166.3	
Turn Bay Length (m)				75.0								
Base Capacity (vph)				875	1739			1235			1192	
Starvation Cap Reductn				0	0			0			0	
Spillback Cap Reductn				0	0			0			77	
Storage Cap Reductn				0	0			0			0	
Reduced v/c Ratio				0.47	0.93			0.48			0.85	
<b>Intersection Summary</b>												
Area Type:	Other											
Cycle Length: 90												
Actuated Cycle Length: 90												
Offset: 64 (71%), Referenced to phase 2:NBT and 6:SBT, Start of Green												
Natural Cycle: 80												

Lanes, Volumes, Timings  
2: Bank St & Riverside Dr WB

Existing PM  
07/24/2020

Control Type: Pretimed

Maximum v/c Ratio: 0.93

Intersection Signal Delay: 16.9

Intersection LOS: B

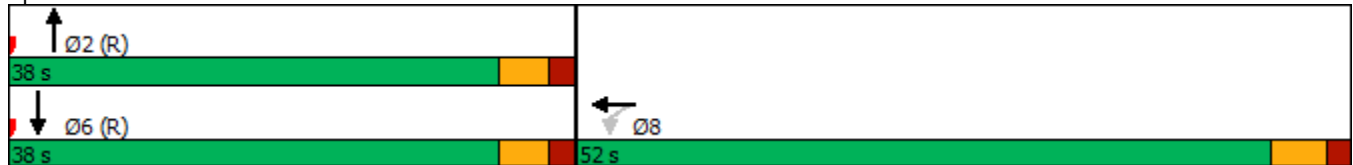
Intersection Capacity Utilization 82.6%

ICU Level of Service E

Analysis Period (min) 15






















m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Bank St & Riverside Dr WB



Lanes, Volumes, Timings  
3: Bank St & Riverside Dr EB

Existing PM  
07/24/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 						 			 	
Traffic Volume (vph)	134	1452	148	0	0	0	0	399	310	0	1047	0
Future Volume (vph)	134	1452	148	0	0	0	0	399	310	0	1047	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0		45.0	0.0		0.0	0.0		60.0	0.0		0.0
Storage Lanes	1		1	0		0	0		1	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		353.9			357.9			168.7			124.8	
Travel Time (s)		21.2			21.5			12.1			9.0	
Lane Group Flow (vph)	149	1613	164	0	0	0	0	443	344	0	1163	0
Turn Type	Perm	NA	Perm					NA	Perm		NA	
Protected Phases		4						2			6	
Permitted Phases	4		4						2			
Minimum Split (s)	29.1	29.1	29.1					25.5	25.5		25.5	
Total Split (s)	49.0	49.0	49.0					41.0	41.0		41.0	
Total Split (%)	54.4%	54.4%	54.4%					45.6%	45.6%		45.6%	
Yellow Time (s)	3.7	3.7	3.7					3.3	3.3		3.3	
All-Red Time (s)	2.4	2.4	2.4					2.2	2.2		2.2	
Lost Time Adjust (s)	0.0	0.0	0.0					0.0	0.0		0.0	
Total Lost Time (s)	6.1	6.1	6.1					5.5	5.5		5.5	
Lead/Lag												
Lead-Lag Optimize?												
Act Effct Green (s)	42.9	42.9	42.9					35.5	35.5		35.5	
Actuated g/C Ratio	0.48	0.48	0.48					0.39	0.39		0.39	
v/c Ratio	0.18	1.00	0.22					0.33	0.55		0.87	
Control Delay	14.7	38.9	12.3					18.2	20.9		24.4	
Queue Delay	0.0	0.0	0.0					0.0	0.0		1.9	
Total Delay	14.7	38.9	12.3					18.2	20.9		26.3	
LOS	B	D	B					B	C		C	
Approach Delay		34.8						19.4			26.3	
Approach LOS		C						B			C	
Queue Length 50th (m)	9.1	56.1	6.2					27.8	40.4		49.9	
Queue Length 95th (m)	m17.9	#190.0	m16.5					39.4	66.7		#100.8	
Internal Link Dist (m)		329.9			333.9			144.7			100.8	
Turn Bay Length (m)	60.0		45.0						60.0			
Base Capacity (vph)	807	1615	738					1337	621		1337	
Starvation Cap Reductn	0	0	0					0	0		76	
Spillback Cap Reductn	0	0	0					0	0		0	
Storage Cap Reductn	0	0	0					0	0		0	
Reduced v/c Ratio	0.18	1.00	0.22					0.33	0.55		0.92	
<b>Intersection Summary</b>												
Area Type:	Other											
Cycle Length: 90												
Actuated Cycle Length: 90												
Offset: 61 (68%), Referenced to phase 2:NBT and 6:SBT, Start of Green												
Natural Cycle: 90												

Lanes, Volumes, Timings  
3: Bank St & Riverside Dr EB

Existing PM  
07/24/2020

Control Type: Pretimed

Maximum v/c Ratio: 1.00

Intersection Signal Delay: 29.1

Intersection LOS: C

Intersection Capacity Utilization 82.6%

ICU Level of Service E




Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.













Splits and Phases: 3: Bank St & Riverside Dr EB

 Ø2 (R)	 Ø4
41 s	49 s
 Ø6 (R)	
41 s	



Lanes, Volumes, Timings  
4: Bank St & Billings Transit

Existing PM  
07/24/2020

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	15	11	13	904	1325	14
Future Volume (vph)	15	11	13	904	1325	14
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	0.0	65.0			15.0
Storage Lanes	1	1	1			1
Taper Length (m)	7.5		7.5			
Right Turn on Red		Yes				Yes
Link Speed (k/h)	50			50	50	
Link Distance (m)	251.4			166.8	168.7	
Travel Time (s)	18.1			12.0	12.1	
Lane Group Flow (vph)	17	12	14	1004	1472	16
Turn Type	Perm	Perm	pm+pt	NA	NA	Perm
Protected Phases			5	2	6	
Permitted Phases	4	4	2			6
Detector Phase	4	4	5	2	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	10.0	10.0	10.0
Minimum Split (s)	38.6	38.6	10.7	28.7	28.7	28.7
Total Split (s)	39.0	39.0	11.0	51.0	40.0	40.0
Total Split (%)	43.3%	43.3%	12.2%	56.7%	44.4%	44.4%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.3	2.3	2.4	2.4	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.6	5.6	5.7	5.7	5.7	5.7
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	None	None	None	C-Max	C-Max	C-Max
Act Effect Green (s)	7.5	7.5	78.2	81.6	79.2	79.2
Actuated g/C Ratio	0.08	0.08	0.87	0.91	0.88	0.88
v/c Ratio	0.24	0.16	0.09	0.33	0.49	0.02
Control Delay	45.4	23.8	3.2	2.1	4.3	3.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	45.4	23.8	3.2	2.1	4.3	3.6
LOS	D	C	A	A	A	A
Approach Delay	36.5			2.1	4.3	
Approach LOS	D			A	A	
Queue Length 50th (m)	2.8	0.0	0.2	0.0	1.9	0.0
Queue Length 95th (m)	8.9	5.0	1.7	33.0	49.5	m0.1
Internal Link Dist (m)	227.4			142.8	144.7	
Turn Bay Length (m)			65.0			15.0
Base Capacity (vph)	320	294	157	3075	2982	681
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.04	0.09	0.33	0.49	0.02
Intersection Summary						
Area Type:	Other					

Lanes, Volumes, Timings  
4: Bank St & Billings Transit

Existing PM  
07/24/2020

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 68 (76%), Referenced to phase 2:NBTL and 6:SBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.49

Intersection Signal Delay: 3.8

Intersection LOS: A

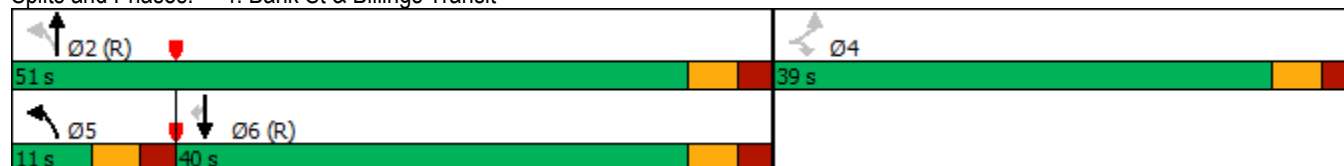
Intersection Capacity Utilization 52.2%

ICU Level of Service A

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: Bank St & Billings Transit



Lanes, Volumes, Timings  
5: Data Centre Rd & Riverside Dr

Existing PM  
07/24/2020

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↘	↑↑	↘	↑
Traffic Volume (vph)	1543	10	69	1586	87	82
Future Volume (vph)	1543	10	69	1586	87	82
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)		40.0	75.0		85.0	0.0
Storage Lanes		1	1		1	1
Taper Length (m)			7.5		7.5	
Right Turn on Red		Yes				Yes
Link Speed (k/h)	60			60	50	
Link Distance (m)	262.9			119.4	217.7	
Travel Time (s)	15.8			7.2	15.7	
Lane Group Flow (vph)	1714	11	77	1762	97	91
Turn Type	NA	Perm	Prot	NA	Prot	Perm
Protected Phases	4		3	8	2	
Permitted Phases		4				2
Detector Phase	4	4	3	8	2	2
Switch Phase						
Minimum Initial (s)	10.0	10.0	5.0	10.0	5.0	5.0
Minimum Split (s)	23.4	23.4	11.1	23.4	23.1	23.1
Total Split (s)	47.0	47.0	17.0	64.0	26.0	26.0
Total Split (%)	52.2%	52.2%	18.9%	71.1%	28.9%	28.9%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.3	3.3
All-Red Time (s)	1.7	1.7	2.4	1.7	1.8	1.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.4	5.4	6.1	5.4	5.1	5.1
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	C-Max	C-Max	None	C-Max	None	None
Act Effect Green (s)	55.9	55.9	9.4	69.0	10.5	10.5
Actuated g/C Ratio	0.62	0.62	0.10	0.77	0.12	0.12
v/c Ratio	0.81	0.01	0.44	0.68	0.49	0.35
Control Delay	20.0	7.5	33.0	13.4	45.0	11.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.0	7.5	33.0	13.4	45.0	11.9
LOS	C	A	C	B	D	B
Approach Delay	19.9			14.2	29.0	
Approach LOS	B			B	C	
Queue Length 50th (m)	117.5	0.3	11.5	117.3	16.0	0.0
Queue Length 95th (m)	#204.3	2.9	m14.8	m141.0	29.3	12.4
Internal Link Dist (m)	238.9			95.4	193.7	
Turn Bay Length (m)		40.0	75.0		85.0	
Base Capacity (vph)	2105	944	213	2599	393	422
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.81	0.01	0.36	0.68	0.25	0.22
Intersection Summary						
Area Type:	Other					

# Lanes, Volumes, Timings

## 5: Data Centre Rd & Riverside Dr

Existing PM  
07/24/2020

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 6 (7%), Referenced to phase 4:EBT and 8:WBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.81

Intersection Signal Delay: 17.6

Intersection LOS: B

Intersection Capacity Utilization 68.1%

ICU Level of Service C

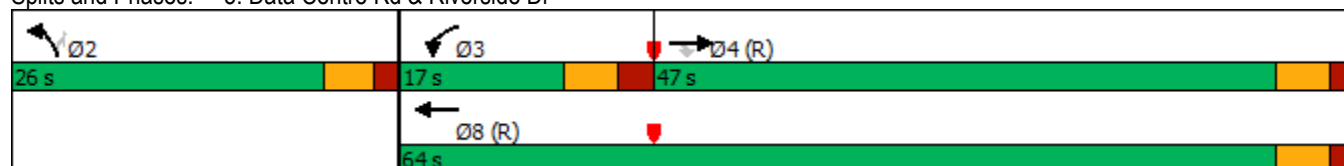
Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Data Centre Rd & Riverside Dr



Lanes, Volumes, Timings  
6: Pleasant Park Rd & Riverside Dr

Existing PM  
07/24/2020

	→	↘	↙	←	↖	↗	
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø9
Lane Configurations	↑↑		↘	↑↑	↘	↗	
Traffic Volume (vph)	1259	193	132	1830	155	33	
Future Volume (vph)	1259	193	132	1830	155	33	
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	
Storage Length (m)		0.0	30.0		0.0	40.0	
Storage Lanes		0	1		1	1	
Taper Length (m)			7.5		7.5		
Right Turn on Red		Yes				Yes	
Link Speed (k/h)	60			60	50		
Link Distance (m)	242.5			151.7	243.4		
Travel Time (s)	14.6			9.1	17.5		
Lane Group Flow (vph)	1613	0	147	2033	172	37	
Turn Type	NA		pm+pt	NA	Perm	Perm	
Protected Phases	4		3	8			9
Permitted Phases			8		2	2	
Detector Phase	4		3	8	2	2	
Switch Phase							
Minimum Initial (s)	10.0		5.0	10.0	5.0	5.0	5.0
Minimum Split (s)	28.8		10.0	28.8	25.0	25.0	12.0
Total Split (s)	37.0		12.0	37.0	26.0	26.0	15.0
Total Split (%)	41.1%		13.3%	41.1%	28.9%	28.9%	17%
Yellow Time (s)	3.7		3.3	3.7	3.3	3.3	3.0
All-Red Time (s)	2.1		1.7	2.1	2.7	2.7	4.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.8		5.0	5.8	6.0	6.0	
Lead/Lag	Lag		Lead				
Lead-Lag Optimize?	Yes		Yes				
Recall Mode	C-Max		None	C-Max	Max	Max	None
Act Effect Green (s)	31.2		44.0	43.2	35.0	35.0	
Actuated g/C Ratio	0.35		0.49	0.48	0.39	0.39	
v/c Ratio	1.38		0.69	1.25	0.26	0.06	
Control Delay	198.9		32.8	142.1	20.1	6.2	
Queue Delay	0.0		0.0	0.0	0.0	0.0	
Total Delay	198.9		32.8	142.1	20.1	6.2	
LOS	F		C	F	C	A	
Approach Delay	198.9			134.8	17.6		
Approach LOS	F			F	B		
Queue Length 50th (m)	~199.3		13.6	~233.1	19.8	0.0	
Queue Length 95th (m)	m#208.8		#35.8	#275.0	34.2	5.7	
Internal Link Dist (m)	218.5			127.7	219.4		
Turn Bay Length (m)			30.0			40.0	
Base Capacity (vph)	1165		212	1627	659	612	
Starvation Cap Reductn	0		0	0	0	0	
Spillback Cap Reductn	0		0	0	0	0	
Storage Cap Reductn	0		0	0	0	0	
Reduced v/c Ratio	1.38		0.69	1.25	0.26	0.06	
Intersection Summary							
Area Type:	Other						

# Lanes, Volumes, Timings

## 6: Pleasant Park Rd & Riverside Dr

Existing PM  
07/24/2020

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 75 (83%), Referenced to phase 4:EBT and 8:WBTL, Start of Green

Natural Cycle: 100

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.38

Intersection Signal Delay: 154.5

Intersection LOS: F

Intersection Capacity Utilization 74.0%

ICU Level of Service D

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

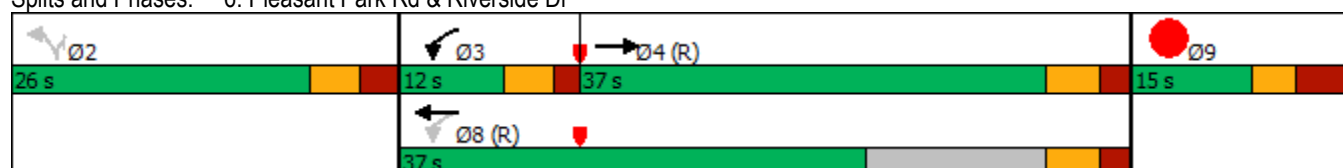
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: Pleasant Park Rd & Riverside Dr













## **Future Background 2022**

Lanes, Volumes, Timings  
1: Bank St & Riverdale Ave

Future Background 2022 AM

07/24/2020

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	98	6	1126	98	6	486
Future Volume (vph)	98	6	1126	98	6	486
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Right Turn on Red		Yes		Yes		
Link Speed (k/h)	40		50			50
Link Distance (m)	227.4		190.3			201.0
Travel Time (s)	20.5		13.7			14.5
Lane Group Flow (vph)	104	0	1224	0	0	492
Turn Type	Prot		NA		Perm	NA
Protected Phases	8		2			6
Permitted Phases					6	
Detector Phase	8		2		6	6
Switch Phase						
Minimum Initial (s)	5.0		10.0		10.0	10.0
Minimum Split (s)	22.0		22.5		22.5	22.5
Total Split (s)	22.0		48.0		48.0	48.0
Total Split (%)	31.4%		68.6%		68.6%	68.6%
Yellow Time (s)	3.0		3.3		3.3	3.3
All-Red Time (s)	3.2		2.6		2.6	2.6
Lost Time Adjust (s)	0.0		0.0			0.0
Total Lost Time (s)	6.2		5.9			5.9
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None		C-Max		C-Max	C-Max
Act Effect Green (s)	9.5		52.0			52.0
Actuated g/C Ratio	0.14		0.74			0.74
v/c Ratio	0.45		0.49			0.21
Control Delay	32.2		5.9			4.3
Queue Delay	0.0		0.0			0.0
Total Delay	32.2		5.9			4.3
LOS	C		A			A
Approach Delay	32.2		5.9			4.3
Approach LOS	C		A			A
Queue Length 50th (m)	12.2		32.6			10.1
Queue Length 95th (m)	24.1		55.2			18.5
Internal Link Dist (m)	203.4		166.3			177.0
Turn Bay Length (m)						
Base Capacity (vph)	384		2494			2369
Starvation Cap Reductn	0		0			0
Spillback Cap Reductn	0		0			0
Storage Cap Reductn	0		0			0
Reduced v/c Ratio	0.27		0.49			0.21
<b>Intersection Summary</b>						
Area Type:	Other					
Cycle Length: 70						
Actuated Cycle Length: 70						
Offset: 17 (24%), Referenced to phase 2:NBT and 6:SBTL, Start of Green						



Lanes, Volumes, Timings  
1: Bank St & Riverdale Ave

Future Background 2022 AM  
07/24/2020

Natural Cycle: 55

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.49

Intersection Signal Delay: 7.0

Intersection LOS: A

Intersection Capacity Utilization 52.3%

ICU Level of Service A

Analysis Period (min) 15


















Splits and Phases: 1: Bank St & Riverdale Ave



Lanes, Volumes, Timings  
2: Bank St & Riverside Dr WB

Future Background 2022 AM

07/24/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	256	1051	208	0	906	0	0	385	164
Future Volume (vph)	0	0	0	256	1051	208	0	906	0	0	385	164
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	75.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Right Turn on Red			Yes			Yes			Yes			No
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		344.9			312.6			124.8			190.3	
Travel Time (s)		20.7			18.8			9.0			13.7	
Lane Group Flow (vph)	0	0	0	256	1259	0	0	906	0	0	549	0
Turn Type				Perm	NA			NA			NA	
Protected Phases					8			2				6
Permitted Phases				8								
Minimum Split (s)				28.5	28.5			30.2			30.2	
Total Split (s)				50.0	50.0			40.0			40.0	
Total Split (%)				55.6%	55.6%			44.4%			44.4%	
Yellow Time (s)				3.7	3.7			3.3			3.3	
All-Red Time (s)				1.8	1.8			1.9			1.9	
Lost Time Adjust (s)				0.0	0.0			0.0			0.0	
Total Lost Time (s)				5.5	5.5			5.2			5.2	
Lead/Lag												
Lead-Lag Optimize?												
Act Effect Green (s)				44.5	44.5			34.8			34.8	
Actuated g/C Ratio				0.49	0.49			0.39			0.39	
v/c Ratio				0.31	0.76			0.69			0.44	
Control Delay				5.2	11.7			10.0			21.8	
Queue Delay				0.0	0.0			0.1			0.0	
Total Delay				5.2	11.7			10.1			21.8	
LOS				A	B			B			C	
Approach Delay					10.6			10.1			21.8	
Approach LOS					B			B			C	
Queue Length 50th (m)				9.4	99.2			15.5			36.1	
Queue Length 95th (m)				m14.7	122.1			18.7			50.1	
Internal Link Dist (m)		320.9			288.6			100.8			166.3	
Turn Bay Length (m)				75.0								
Base Capacity (vph)				838	1652			1310			1252	
Starvation Cap Reductn				0	0			19			0	
Spillback Cap Reductn				0	0			0			0	
Storage Cap Reductn				0	0			0			0	
Reduced v/c Ratio				0.31	0.76			0.70			0.44	
Intersection Summary												
Area Type:	Other											
Cycle Length: 90												
Actuated Cycle Length: 90												
Offset: 41 (46%), Referenced to phase 2:NBT and 6:SBT, Start of Green												
Natural Cycle: 60												

Lanes, Volumes, Timings  
2: Bank St & Riverside Dr WB

Future Background 2022 AM

07/24/2020

Control Type: Pretimed

Maximum v/c Ratio: 0.76

Intersection Signal Delay: 12.5

Intersection LOS: B

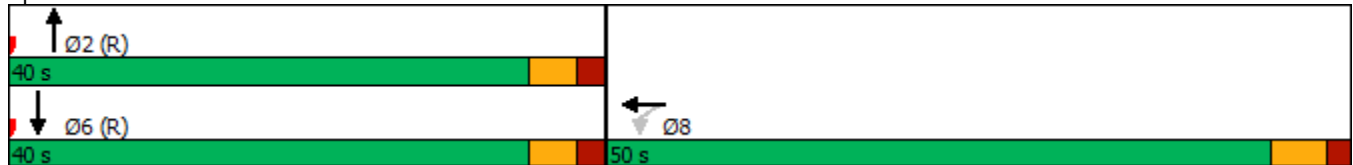
Intersection Capacity Utilization 73.0%

ICU Level of Service D

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.






















Splits and Phases: 2: Bank St & Riverside Dr WB



Lanes, Volumes, Timings  
3: Bank St & Riverside Dr EB

Future Background 2022 AM

07/24/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 						 			 	
Traffic Volume (vph)	150	1329	48	0	0	0	0	818	309	0	567	0
Future Volume (vph)	150	1329	48	0	0	0	0	818	309	0	567	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0		45.0	0.0		0.0	0.0		60.0	0.0		0.0
Storage Lanes	1		1	0		0	0		1	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		353.9			357.9			168.7			124.8	
Travel Time (s)		21.2			21.5			12.1			9.0	
Lane Group Flow (vph)	150	1329	48	0	0	0	0	818	309	0	567	0
Turn Type	Perm	NA	Perm					NA	Perm		NA	
Protected Phases		4						2			6	
Permitted Phases	4		4						2			
Minimum Split (s)	29.1	29.1	29.1					25.5	25.5		25.5	
Total Split (s)	52.0	52.0	52.0					38.0	38.0		38.0	
Total Split (%)	57.8%	57.8%	57.8%					42.2%	42.2%		42.2%	
Yellow Time (s)	3.7	3.7	3.7					3.3	3.3		3.3	
All-Red Time (s)	2.4	2.4	2.4					2.2	2.2		2.2	
Lost Time Adjust (s)	0.0	0.0	0.0					0.0	0.0		0.0	
Total Lost Time (s)	6.1	6.1	6.1					5.5	5.5		5.5	
Lead/Lag												
Lead-Lag Optimize?												
Act Effct Green (s)	45.9	45.9	45.9					32.5	32.5		32.5	
Actuated g/C Ratio	0.51	0.51	0.51					0.36	0.36		0.36	
v/c Ratio	0.17	0.77	0.06					0.67	0.54		0.46	
Control Delay	11.8	25.3	6.1					26.1	22.5		17.9	
Queue Delay	0.0	0.0	0.0					0.0	0.0		0.0	
Total Delay	11.8	25.3	6.1					26.1	22.5		17.9	
LOS	B	C	A					C	C		B	
Approach Delay		23.4						25.1			17.9	
Approach LOS		C						C			B	
Queue Length 50th (m)	20.0	131.3	3.8					61.6	36.4		27.2	
Queue Length 95th (m)	m23.0	152.5	m4.2					81.7	61.6		36.1	
Internal Link Dist (m)		329.9			333.9			144.7			100.8	
Turn Bay Length (m)	60.0		45.0						60.0			
Base Capacity (vph)	864	1728	792					1224	572		1224	
Starvation Cap Reductn	0	0	0					0	0		0	
Spillback Cap Reductn	0	0	0					0	0		0	
Storage Cap Reductn	0	0	0					0	0		0	
Reduced v/c Ratio	0.17	0.77	0.06					0.67	0.54		0.46	
<b>Intersection Summary</b>												
Area Type:	Other											
Cycle Length: 90												
Actuated Cycle Length: 90												
Offset: 36 (40%), Referenced to phase 2:NBT and 6:SBT, Start of Green												
Natural Cycle: 60												

Lanes, Volumes, Timings  
3: Bank St & Riverside Dr EB

Future Background 2022 AM  
07/24/2020

Control Type: Pretimed

Maximum v/c Ratio: 0.77

Intersection Signal Delay: 23.0

Intersection LOS: C

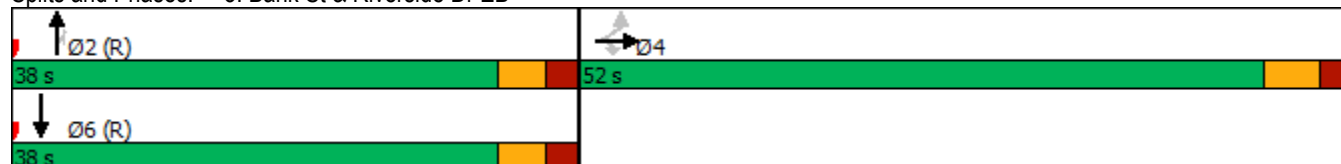
Intersection Capacity Utilization 73.0%

ICU Level of Service D

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.













Splits and Phases: 3: Bank St & Riverside Dr EB



Lanes, Volumes, Timings  
4: Bank St & Billings Transit

Future Background 2022 AM

07/24/2020

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	8	11	12	1000	660	9
Future Volume (vph)	8	11	12	1000	660	9
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	0.0	65.0			15.0
Storage Lanes	1	1	1			1
Taper Length (m)	7.5		7.5			
Right Turn on Red		Yes				Yes
Link Speed (k/h)	50			50	50	
Link Distance (m)	251.4			166.8	168.7	
Travel Time (s)	18.1			12.0	12.1	
Lane Group Flow (vph)	8	11	12	1000	660	9
Turn Type	Perm	Perm	pm+pt	NA	NA	Perm
Protected Phases			5	2	6	
Permitted Phases	4	4	2			6
Detector Phase	4	4	5	2	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	10.0	10.0	10.0
Minimum Split (s)	38.6	38.6	10.7	28.7	28.7	28.7
Total Split (s)	39.0	39.0	11.0	51.0	40.0	40.0
Total Split (%)	43.3%	43.3%	12.2%	56.7%	44.4%	44.4%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.3	2.3	2.4	2.4	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.6	5.6	5.7	5.7	5.7	5.7
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	None	None	None	C-Max	C-Max	C-Max
Act Effect Green (s)	6.6	6.6	78.9	82.3	79.9	79.9
Actuated g/C Ratio	0.07	0.07	0.88	0.91	0.89	0.89
v/c Ratio	0.13	0.16	0.04	0.32	0.22	0.01
Control Delay	42.6	25.7	2.1	1.8	0.9	0.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.6	25.7	2.1	1.8	0.9	0.8
LOS	D	C	A	A	A	A
Approach Delay	32.8			1.8	0.9	
Approach LOS	C			A	A	
Queue Length 50th (m)	1.3	0.0	0.1	0.0	0.2	0.0
Queue Length 95th (m)	5.5	5.0	1.3	28.6	7.3	m0.1
Internal Link Dist (m)	227.4			142.8	144.7	
Turn Bay Length (m)			65.0			15.0
Base Capacity (vph)	320	294	328	3101	3009	687
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.04	0.04	0.32	0.22	0.01
<b>Intersection Summary</b>						
Area Type:	Other					

Lanes, Volumes, Timings  
4: Bank St & Billings Transit

Future Background 2022 AM

07/24/2020

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 50 (56%), Referenced to phase 2:NBTL and 6:SBT, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.32

Intersection Signal Delay: 1.8

Intersection LOS: A

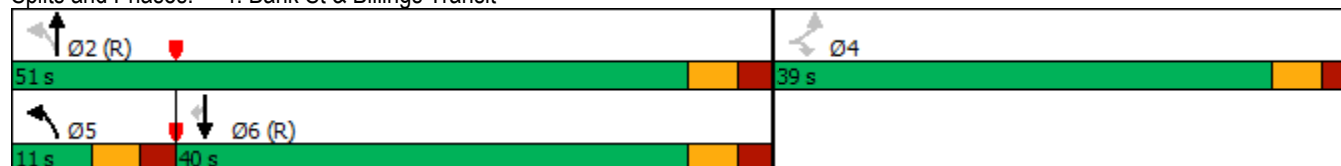
Intersection Capacity Utilization 42.8%

ICU Level of Service A

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.







Splits and Phases: 4: Bank St & Billings Transit



Lanes, Volumes, Timings  
5: Data Centre Rd & Riverside Dr

Future Background 2022 AM

07/24/2020

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↵	↑↑	↵	↑
Traffic Volume (vph)	1423	88	96	962	47	70
Future Volume (vph)	1423	88	96	962	47	70
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)		40.0	75.0		85.0	0.0
Storage Lanes		1	1		1	1
Taper Length (m)			7.5		7.5	
Right Turn on Red		Yes				Yes
Link Speed (k/h)	60			60	50	
Link Distance (m)	262.9			119.4	217.7	
Travel Time (s)	15.8			7.2	15.7	
Lane Group Flow (vph)	1423	88	96	962	47	70
Turn Type	NA	Perm	Prot	NA	Prot	Perm
Protected Phases	4		3	8	2	
Permitted Phases		4				2
Detector Phase	4	4	3	8	2	2
Switch Phase						
Minimum Initial (s)	10.0	10.0	5.0	10.0	5.0	5.0
Minimum Split (s)	23.4	23.4	11.1	23.4	23.1	23.1
Total Split (s)	39.0	39.0	25.0	64.0	26.0	26.0
Total Split (%)	43.3%	43.3%	27.8%	71.1%	28.9%	28.9%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.3	3.3
All-Red Time (s)	1.7	1.7	2.4	1.7	1.8	1.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.4	5.4	6.1	5.4	5.1	5.1
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	C-Max	C-Max	None	C-Max	None	None
Act Effect Green (s)	60.7	60.7	10.4	74.7	8.0	8.0
Actuated g/C Ratio	0.67	0.67	0.12	0.83	0.09	0.09
v/c Ratio	0.62	0.08	0.49	0.34	0.31	0.35
Control Delay	13.3	5.1	55.8	1.5	43.1	14.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.3	5.1	55.8	1.5	43.1	14.9
LOS	B	A	E	A	D	B
Approach Delay	12.8			6.4	26.3	
Approach LOS	B			A	C	
Queue Length 50th (m)	78.8	2.6	17.8	9.3	7.8	0.0
Queue Length 95th (m)	125.8	9.9	m24.8	12.2	17.5	11.5
Internal Link Dist (m)	238.9			95.4	193.7	
Turn Bay Length (m)		40.0	75.0		85.0	
Base Capacity (vph)	2285	1038	355	2813	393	406
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.62	0.08	0.27	0.34	0.12	0.17
<b>Intersection Summary</b>						
Area Type:	Other					



# Lanes, Volumes, Timings

## 5: Data Centre Rd & Riverside Dr

Future Background 2022 AM

07/24/2020

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 37 (41%), Referenced to phase 4:EBT and 8:WBT, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.62

Intersection Signal Delay: 10.9

Intersection LOS: B

Intersection Capacity Utilization 65.1%

ICU Level of Service C

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Data Centre Rd & Riverside Dr



Lanes, Volumes, Timings  
6: Pleasant Park Rd & Riverside Dr

Future Background 2022 AM

07/24/2020

	→	↘	↙	←	↖	↗	
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø9
Lane Configurations	↑↑		↘	↑↑	↘	↗	
Traffic Volume (vph)	1173	97	32	1215	168	36	
Future Volume (vph)	1173	97	32	1215	168	36	
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	
Storage Length (m)		0.0	30.0		0.0	40.0	
Storage Lanes		0	1		1	1	
Taper Length (m)			7.5		7.5		
Right Turn on Red		Yes				Yes	
Link Speed (k/h)	60			60	50		
Link Distance (m)	242.5			151.7	243.4		
Travel Time (s)	14.6			9.1	17.5		
Lane Group Flow (vph)	1270	0	32	1215	168	36	
Turn Type	NA		pm+pt	NA	Prot	Perm	
Protected Phases	4		3	8	2		9
Permitted Phases			8			2	
Detector Phase	4		3	8	2	2	
Switch Phase							
Minimum Initial (s)	10.0		5.0	10.0	5.0	5.0	5.0
Minimum Split (s)	28.8		10.0	28.8	25.0	25.0	12.0
Total Split (s)	37.0		10.0	37.0	28.0	28.0	15.0
Total Split (%)	41.1%		11.1%	41.1%	31.1%	31.1%	17%
Yellow Time (s)	3.7		3.3	3.7	3.3	3.3	3.0
All-Red Time (s)	2.1		1.7	2.1	2.7	2.7	4.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.8		5.0	5.8	6.0	6.0	
Lead/Lag	Lag		Lead				
Lead-Lag Optimize?	Yes		Yes				
Recall Mode	C-Max		None	C-Max	Max	Max	None
Act Effect Green (s)	35.2		42.0	41.2	37.0	37.0	
Actuated g/C Ratio	0.39		0.47	0.46	0.41	0.41	
v/c Ratio	0.96		0.19	0.78	0.24	0.06	
Control Delay	40.3		15.6	25.1	18.5	5.9	
Queue Delay	0.0		0.0	0.0	0.0	0.0	
Total Delay	40.3		15.6	25.1	18.5	5.9	
LOS	D		B	C	B	A	
Approach Delay	40.3			24.9	16.3		
Approach LOS	D			C	B		
Queue Length 50th (m)	~131.5		2.9	90.1	18.5	0.0	
Queue Length 95th (m)	#173.8		7.6	116.2	32.3	5.3	
Internal Link Dist (m)	218.5			127.7	219.4		
Turn Bay Length (m)			30.0			40.0	
Base Capacity (vph)	1317		171	1551	696	644	
Starvation Cap Reductn	0		0	0	0	0	
Spillback Cap Reductn	0		0	0	0	0	
Storage Cap Reductn	0		0	0	0	0	
Reduced v/c Ratio	0.96		0.19	0.78	0.24	0.06	
Intersection Summary							
Area Type:	Other						

# Lanes, Volumes, Timings

## 6: Pleasant Park Rd & Riverside Dr

Future Background 2022 AM

07/24/2020

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 50 (56%), Referenced to phase 4:EBT and 8:WBTL, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.96

Intersection Signal Delay: 31.4

Intersection LOS: C

Intersection Capacity Utilization 57.1%

ICU Level of Service B

Analysis Period (min) 15

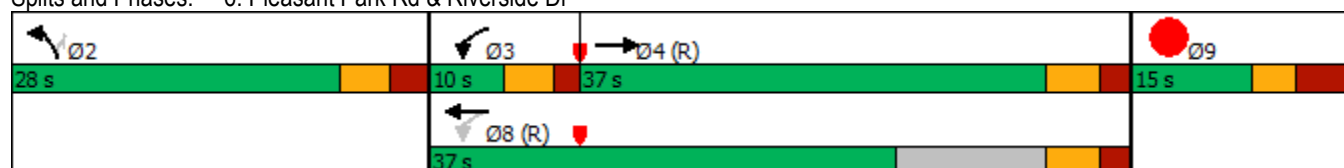
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.










Splits and Phases: 6: Pleasant Park Rd & Riverside Dr



Lanes, Volumes, Timings  
1: Bank St & Riverdale Ave

Future Background 2022 PM

07/24/2020

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	134	11	538	196	9	810
Future Volume (vph)	134	11	538	196	9	810
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Right Turn on Red		Yes		Yes		
Link Speed (k/h)	40		50			50
Link Distance (m)	227.4		190.3			201.0
Travel Time (s)	20.5		13.7			14.5
Lane Group Flow (vph)	145	0	734	0	0	819
Turn Type	Prot		NA		Perm	NA
Protected Phases	8		2			6
Permitted Phases					6	
Detector Phase	8		2		6	6
Switch Phase						
Minimum Initial (s)	5.0		10.0		10.0	10.0
Minimum Split (s)	22.0		22.5		22.5	22.5
Total Split (s)	22.0		68.0		68.0	68.0
Total Split (%)	24.4%		75.6%		75.6%	75.6%
Yellow Time (s)	3.0		3.3		3.3	3.3
All-Red Time (s)	3.2		2.6		2.6	2.6
Lost Time Adjust (s)	0.0		0.0			0.0
Total Lost Time (s)	6.2		5.9			5.9
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None		C-Max		C-Max	C-Max
Act Effect Green (s)	12.4		65.5			65.5
Actuated g/C Ratio	0.14		0.73			0.73
v/c Ratio	0.62		0.31			0.35
Control Delay	46.6		1.4			5.3
Queue Delay	0.0		0.0			0.0
Total Delay	46.6		1.4			5.3
LOS	D		A			A
Approach Delay	46.6		1.4			5.3
Approach LOS	D		A			A
Queue Length 50th (m)	23.1		4.0			23.1
Queue Length 95th (m)	40.1		m5.5			35.6
Internal Link Dist (m)	203.4		166.3			177.0
Turn Bay Length (m)						
Base Capacity (vph)	299		2406			2338
Starvation Cap Reductn	0		0			0
Spillback Cap Reductn	0		0			0
Storage Cap Reductn	0		0			0
Reduced v/c Ratio	0.48		0.31			0.35
<b>Intersection Summary</b>						
Area Type:	Other					
Cycle Length: 90						
Actuated Cycle Length: 90						
Offset: 57 (63%), Referenced to phase 2:NBT and 6:SBTL, Start of Green						

Lanes, Volumes, Timings  
1: Bank St & Riverdale Ave

Future Background 2022 PM

07/24/2020

Natural Cycle: 45

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.62

Intersection Signal Delay: 7.1

Intersection LOS: A

Intersection Capacity Utilization 48.9%

ICU Level of Service A

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

















Splits and Phases: 1: Bank St & Riverdale Ave



Lanes, Volumes, Timings  
2: Bank St & Riverside Dr WB

Future Background 2022 PM

07/24/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	378	1390	100	0	548	0	0	672	201
Future Volume (vph)	0	0	0	378	1390	100	0	548	0	0	672	201
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	75.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Right Turn on Red			Yes			Yes			Yes			No
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		344.9			312.6			124.8			190.3	
Travel Time (s)		20.7			18.8			9.0			13.7	
Lane Group Flow (vph)	0	0	0	378	1490	0	0	548	0	0	873	0
Turn Type				Perm	NA			NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8								
Minimum Split (s)				28.5	28.5			30.2			30.2	
Total Split (s)				52.0	52.0			38.0			38.0	
Total Split (%)				57.8%	57.8%			42.2%			42.2%	
Yellow Time (s)				3.7	3.7			3.3			3.3	
All-Red Time (s)				1.8	1.8			1.9			1.9	
Lost Time Adjust (s)				0.0	0.0			0.0			0.0	
Total Lost Time (s)				5.5	5.5			5.2			5.2	
Lead/Lag												
Lead-Lag Optimize?												
Act Effct Green (s)				46.5	46.5			32.8			32.8	
Actuated g/C Ratio				0.52	0.52			0.36			0.36	
v/c Ratio				0.43	0.86			0.44			0.73	
Control Delay				2.8	7.0			12.5			24.6	
Queue Delay				0.0	0.0			0.0			0.2	
Total Delay				2.8	7.0			12.5			24.8	
LOS				A	A			B			C	
Approach Delay					6.2			12.5			24.8	
Approach LOS					A			B			C	
Queue Length 50th (m)				5.0	37.9			17.6			71.2	
Queue Length 95th (m)				m5.7	m26.8			23.2			83.7	
Internal Link Dist (m)		320.9			288.6			100.8			166.3	
Turn Bay Length (m)				75.0								
Base Capacity (vph)				875	1739			1235			1192	
Starvation Cap Reductn				0	0			0			0	
Spillback Cap Reductn				0	0			0			33	
Storage Cap Reductn				0	0			0			0	
Reduced v/c Ratio				0.43	0.86			0.44			0.75	
Intersection Summary												
Area Type:	Other											
Cycle Length: 90												
Actuated Cycle Length: 90												
Offset: 64 (71%), Referenced to phase 2:NBT and 6:SBT, Start of Green												
Natural Cycle: 70												

Lanes, Volumes, Timings  
2: Bank St & Riverside Dr WB

Future Background 2022 PM

07/24/2020

Control Type: Pretimed

Maximum v/c Ratio: 0.86

Intersection Signal Delay: 12.2

Intersection LOS: B

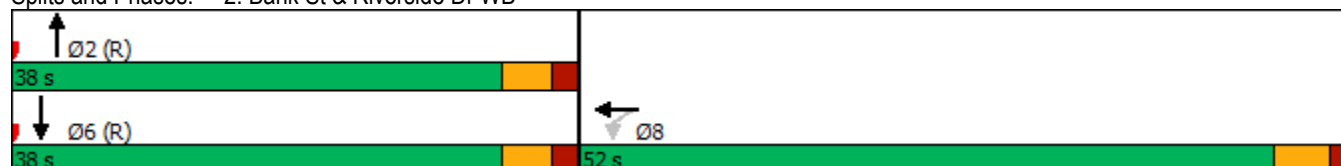
Intersection Capacity Utilization 84.0%

ICU Level of Service E

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.



















Splits and Phases: 2: Bank St & Riverside Dr WB



Lanes, Volumes, Timings  
3: Bank St & Riverside Dr EB

Future Background 2022 PM

07/24/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	137	1481	151	0	0	0	0	407	316	0	1068	0
Future Volume (vph)	137	1481	151	0	0	0	0	407	316	0	1068	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0		45.0	0.0		0.0	0.0		60.0	0.0		0.0
Storage Lanes	1		1	0		0	0		1	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		353.9			357.9			168.7			124.8	
Travel Time (s)		21.2			21.5			12.1			9.0	
Lane Group Flow (vph)	137	1481	151	0	0	0	0	407	316	0	1068	0
Turn Type	Perm	NA	Perm					NA	Perm		NA	
Protected Phases		4						2			6	
Permitted Phases	4		4						2			
Minimum Split (s)	29.1	29.1	29.1					25.5	25.5		25.5	
Total Split (s)	49.0	49.0	49.0					41.0	41.0		41.0	
Total Split (%)	54.4%	54.4%	54.4%					45.6%	45.6%		45.6%	
Yellow Time (s)	3.7	3.7	3.7					3.3	3.3		3.3	
All-Red Time (s)	2.4	2.4	2.4					2.2	2.2		2.2	
Lost Time Adjust (s)	0.0	0.0	0.0					0.0	0.0		0.0	
Total Lost Time (s)	6.1	6.1	6.1					5.5	5.5		5.5	
Lead/Lag												
Lead-Lag Optimize?												
Act Effct Green (s)	42.9	42.9	42.9					35.5	35.5		35.5	
Actuated g/C Ratio	0.48	0.48	0.48					0.39	0.39		0.39	
v/c Ratio	0.17	0.92	0.20					0.30	0.51		0.80	
Control Delay	13.7	25.1	11.1					18.0	19.8		20.1	
Queue Delay	0.0	0.0	0.0					0.0	0.0		0.7	
Total Delay	13.7	25.1	11.1					18.0	19.8		20.8	
LOS	B	C	B					B	B		C	
Approach Delay		23.0						18.8			20.8	
Approach LOS		C						B			C	
Queue Length 50th (m)	6.9	41.2	4.2					25.1	35.8		44.7	
Queue Length 95th (m)	m17.8	#163.9	m15.2					36.2	60.0		64.8	
Internal Link Dist (m)		329.9			333.9			144.7			100.8	
Turn Bay Length (m)	60.0		45.0						60.0			
Base Capacity (vph)	807	1615	738					1337	621		1337	
Starvation Cap Reductn	0	0	0					0	0		76	
Spillback Cap Reductn	0	0	0					0	0		0	
Storage Cap Reductn	0	0	0					0	0		0	
Reduced v/c Ratio	0.17	0.92	0.20					0.30	0.51		0.85	
Intersection Summary												
Area Type:	Other											
Cycle Length: 90												
Actuated Cycle Length: 90												
Offset: 61 (68%), Referenced to phase 2:NBT and 6:SBT, Start of Green												
Natural Cycle: 75												



# Lanes, Volumes, Timings

## 3: Bank St & Riverside Dr EB

Future Background 2022 PM

07/24/2020

Control Type: Pretimed

Maximum v/c Ratio: 0.92

Intersection Signal Delay: 21.5

Intersection LOS: C

Intersection Capacity Utilization 84.0%

ICU Level of Service E




Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.













Splits and Phases: 3: Bank St & Riverside Dr EB

 Ø2 (R)	 Ø4
41 s	49 s
 Ø6 (R)	
41 s	

Lanes, Volumes, Timings  
4: Bank St & Billings Transit

Future Background 2022 PM

07/24/2020

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	15	11	13	922	1352	14
Future Volume (vph)	15	11	13	922	1352	14
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	0.0	65.0			15.0
Storage Lanes	1	1	1			1
Taper Length (m)	7.5		7.5			
Right Turn on Red		Yes				Yes
Link Speed (k/h)	50			50	50	
Link Distance (m)	251.4			166.8	168.7	
Travel Time (s)	18.1			12.0	12.1	
Lane Group Flow (vph)	15	11	13	922	1352	14
Turn Type	Perm	Perm	pm+pt	NA	NA	Perm
Protected Phases			5	2	6	
Permitted Phases	4	4	2			6
Detector Phase	4	4	5	2	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	10.0	10.0	10.0
Minimum Split (s)	38.6	38.6	10.7	28.7	28.7	28.7
Total Split (s)	39.0	39.0	11.0	51.0	40.0	40.0
Total Split (%)	43.3%	43.3%	12.2%	56.7%	44.4%	44.4%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.3	2.3	2.4	2.4	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.6	5.6	5.7	5.7	5.7	5.7
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	None	None	None	C-Max	C-Max	C-Max
Act Effect Green (s)	7.3	7.3	78.4	81.8	79.3	79.3
Actuated g/C Ratio	0.08	0.08	0.87	0.91	0.88	0.88
v/c Ratio	0.21	0.15	0.07	0.30	0.45	0.02
Control Delay	44.9	24.1	2.9	1.9	3.2	3.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.9	24.1	2.9	1.9	3.2	3.5
LOS	D	C	A	A	A	A
Approach Delay	36.1			1.9	3.2	
Approach LOS	D			A	A	
Queue Length 50th (m)	2.5	0.0	0.2	0.0	1.0	0.0
Queue Length 95th (m)	8.3	4.9	1.6	28.6	39.3	m0.0
Internal Link Dist (m)	227.4			142.8	144.7	
Turn Bay Length (m)			65.0			15.0
Base Capacity (vph)	320	294	174	3080	2988	683
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.04	0.07	0.30	0.45	0.02
Intersection Summary						
Area Type:	Other					

Lanes, Volumes, Timings  
4: Bank St & Billings Transit

Future Background 2022 PM

07/24/2020

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 68 (76%), Referenced to phase 2:NBTL and 6:SBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.45

Intersection Signal Delay: 3.0

Intersection LOS: A

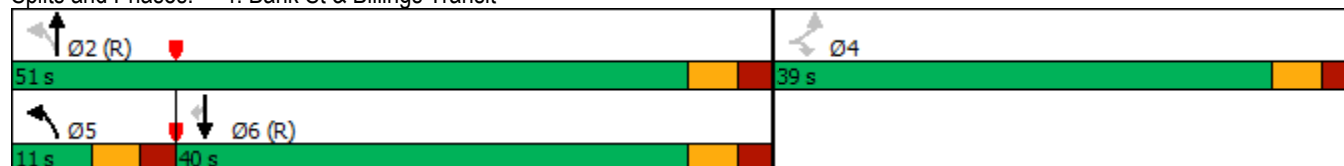
Intersection Capacity Utilization 53.0%

ICU Level of Service A

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.







Splits and Phases: 4: Bank St & Billings Transit



Lanes, Volumes, Timings  
5: Data Centre Rd & Riverside Dr

Future Background 2022 PM

07/24/2020

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↵	↑↑	↵	↑
Traffic Volume (vph)	1574	10	69	1618	87	82
Future Volume (vph)	1574	10	69	1618	87	82
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)		40.0	75.0		85.0	0.0
Storage Lanes		1	1		1	1
Taper Length (m)			7.5		7.5	
Right Turn on Red		Yes				Yes
Link Speed (k/h)	60			60	50	
Link Distance (m)	262.9			119.4	217.7	
Travel Time (s)	15.8			7.2	15.7	
Lane Group Flow (vph)	1574	10	69	1618	87	82
Turn Type	NA	Perm	Prot	NA	Prot	Perm
Protected Phases	4		3	8	2	
Permitted Phases		4				2
Detector Phase	4	4	3	8	2	2
Switch Phase						
Minimum Initial (s)	10.0	10.0	5.0	10.0	5.0	5.0
Minimum Split (s)	23.4	23.4	11.1	23.4	23.1	23.1
Total Split (s)	47.0	47.0	17.0	64.0	26.0	26.0
Total Split (%)	52.2%	52.2%	18.9%	71.1%	28.9%	28.9%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.3	3.3
All-Red Time (s)	1.7	1.7	2.4	1.7	1.8	1.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.4	5.4	6.1	5.4	5.1	5.1
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	C-Max	C-Max	None	C-Max	None	None
Act Effect Green (s)	60.1	60.1	9.0	72.8	10.0	10.0
Actuated g/C Ratio	0.67	0.67	0.10	0.81	0.11	0.11
v/c Ratio	0.70	0.01	0.41	0.59	0.47	0.34
Control Delay	15.7	6.9	27.6	12.6	44.8	12.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.7	6.9	27.6	12.6	44.8	12.4
LOS	B	A	C	B	D	B
Approach Delay	15.6			13.2	29.1	
Approach LOS	B			B	C	
Queue Length 50th (m)	96.7	0.3	9.6	111.6	14.3	0.0
Queue Length 95th (m)	#157.8	2.6	m11.6	140.2	27.3	11.9
Internal Link Dist (m)	238.9			95.4	193.7	
Turn Bay Length (m)		40.0	75.0		85.0	
Base Capacity (vph)	2263	1014	211	2743	393	415
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.70	0.01	0.33	0.59	0.22	0.20
<b>Intersection Summary</b>						
Area Type:	Other					

# Lanes, Volumes, Timings

## 5: Data Centre Rd & Riverside Dr

Future Background 2022 PM

07/24/2020

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 6 (7%), Referenced to phase 4:EBT and 8:WBT, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.70

Intersection Signal Delay: 15.1

Intersection LOS: B

Intersection Capacity Utilization 69.0%

ICU Level of Service C

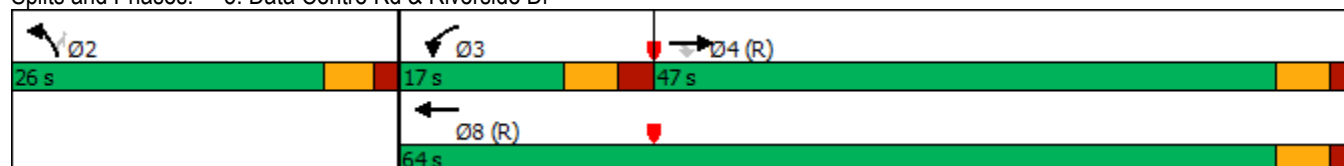
Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Data Centre Rd & Riverside Dr



Lanes, Volumes, Timings  
6: Pleasant Park Rd & Riverside Dr

Future Background 2022 PM

07/24/2020

	→	↘	↙	←	↖	↗	
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø9
Lane Configurations	↑↑		↘	↑↑	↘	↗	
Traffic Volume (vph)	1284	193	132	1867	155	33	
Future Volume (vph)	1284	193	132	1867	155	33	
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	
Storage Length (m)		0.0	30.0		0.0	40.0	
Storage Lanes		0	1		1	1	
Taper Length (m)			7.5		7.5		
Right Turn on Red		Yes				Yes	
Link Speed (k/h)	60			60	50		
Link Distance (m)	242.5			151.7	243.4		
Travel Time (s)	14.6			9.1	17.5		
Lane Group Flow (vph)	1477	0	132	1867	155	33	
Turn Type	NA		pm+pt	NA	Prot	Perm	
Protected Phases	4		3	8	2		9
Permitted Phases			8			2	
Detector Phase	4		3	8	2	2	
Switch Phase							
Minimum Initial (s)	10.0		5.0	10.0	5.0	5.0	5.0
Minimum Split (s)	28.8		10.0	28.8	25.0	25.0	12.0
Total Split (s)	37.0		12.0	37.0	26.0	26.0	15.0
Total Split (%)	41.1%		13.3%	41.1%	28.9%	28.9%	17%
Yellow Time (s)	3.7		3.3	3.7	3.3	3.3	3.0
All-Red Time (s)	2.1		1.7	2.1	2.7	2.7	4.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.8		5.0	5.8	6.0	6.0	
Lead/Lag	Lag		Lead				
Lead-Lag Optimize?	Yes		Yes				
Recall Mode	C-Max		None	C-Max	Max	Max	None
Act Effect Green (s)	31.3		44.0	43.2	35.0	35.0	
Actuated g/C Ratio	0.35		0.49	0.48	0.39	0.39	
v/c Ratio	1.27		0.63	1.15	0.24	0.05	
Control Delay	147.9		27.8	98.7	19.7	6.5	
Queue Delay	0.0		0.0	0.0	0.0	0.0	
Total Delay	147.9		27.8	98.7	19.7	6.5	
LOS	F		C	F	B	A	
Approach Delay	147.9			94.1	17.4		
Approach LOS	F			F	B		
Queue Length 50th (m)	~172.3		12.1	~201.4	17.7	0.0	
Queue Length 95th (m)	m#203.3		#28.7	#243.1	31.3	5.5	
Internal Link Dist (m)	218.5			127.7	219.4		
Turn Bay Length (m)			30.0			40.0	
Base Capacity (vph)	1166		212	1627	659	610	
Starvation Cap Reductn	0		0	0	0	0	
Spillback Cap Reductn	0		0	0	0	0	
Storage Cap Reductn	0		0	0	0	0	
Reduced v/c Ratio	1.27		0.62	1.15	0.24	0.05	
Intersection Summary							
Area Type:	Other						

# Lanes, Volumes, Timings

## 6: Pleasant Park Rd & Riverside Dr

Future Background 2022 PM

07/24/2020

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 75 (83%), Referenced to phase 4:EBT and 8:WBTL, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.27

Intersection Signal Delay: 111.8

Intersection LOS: F

Intersection Capacity Utilization 74.7%

ICU Level of Service D

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

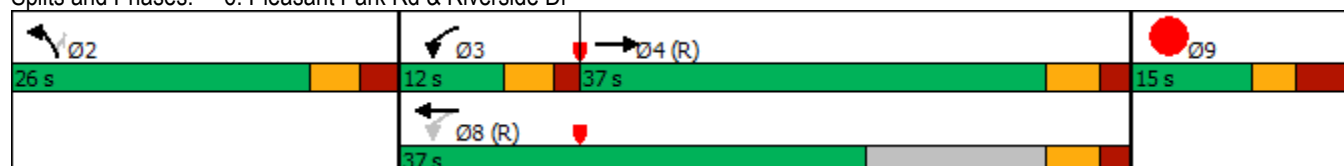
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: Pleasant Park Rd & Riverside Dr












## **Future Background 2027**



Lanes, Volumes, Timings  
1: Bank St & Riverdale Ave

Total Future Background 2027 AM

06/01/2020

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	98	6	1215	98	6	514
Future Volume (vph)	98	6	1215	98	6	514
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Right Turn on Red		Yes		Yes		
Link Speed (k/h)	40		50			50
Link Distance (m)	227.4		190.3			201.0
Travel Time (s)	20.5		13.7			14.5
Lane Group Flow (vph)	104	0	1313	0	0	520
Turn Type	Prot		NA		Perm	NA
Protected Phases	8		2			6
Permitted Phases					6	
Detector Phase	8		2		6	6
Switch Phase						
Minimum Initial (s)	5.0		10.0		10.0	10.0
Minimum Split (s)	22.0		22.5		22.5	22.5
Total Split (s)	22.0		48.0		48.0	48.0
Total Split (%)	31.4%		68.6%		68.6%	68.6%
Yellow Time (s)	3.0		3.3		3.3	3.3
All-Red Time (s)	3.2		2.6		2.6	2.6
Lost Time Adjust (s)	0.0		0.0			0.0
Total Lost Time (s)	6.2		5.9			5.9
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None		C-Max		C-Max	C-Max
Act Effect Green (s)	9.5		52.0			52.0
Actuated g/C Ratio	0.14		0.74			0.74
v/c Ratio	0.45		0.53			0.22
Control Delay	32.2		6.3			4.3
Queue Delay	0.0		0.0			0.0
Total Delay	32.2		6.3			4.3
LOS	C		A			A
Approach Delay	32.2		6.3			4.3
Approach LOS	C		A			A
Queue Length 50th (m)	12.2		36.6			10.7
Queue Length 95th (m)	24.1		61.9			19.6
Internal Link Dist (m)	203.4		166.3			177.0
Turn Bay Length (m)						
Base Capacity (vph)	384		2496			2369
Starvation Cap Reductn	0		0			0
Spillback Cap Reductn	0		0			0
Storage Cap Reductn	0		0			0
Reduced v/c Ratio	0.27		0.53			0.22
Intersection Summary						
Area Type:	Other					
Cycle Length: 70						
Actuated Cycle Length: 70						
Offset: 17 (24%), Referenced to phase 2:NBT and 6:SBTL, Start of Green						

Lanes, Volumes, Timings  
1: Bank St & Riverdale Ave

Total Future Background 2027 AM

06/01/2020

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.53

Intersection Signal Delay: 7.2

Intersection LOS: A

Intersection Capacity Utilization 54.9%

ICU Level of Service A

Analysis Period (min) 15

















Splits and Phases: 1: Bank St & Riverdale Ave



Lanes, Volumes, Timings  
2: Bank St & Riverside Dr WB

Total Future Background 2027 AM

06/01/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	271	1107	250	0	952	0	0	406	175
Future Volume (vph)	0	0	0	271	1107	250	0	952	0	0	406	175
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	75.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (m)	0.0			7.5			0.0			0.0		
Right Turn on Red			Yes			Yes			Yes			No
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		344.9			312.6			124.8			190.3	
Travel Time (s)		20.7			18.8			9.0			13.7	
Lane Group Flow (vph)	0	0	0	271	1357	0	0	952	0	0	581	0
Turn Type				Perm	NA			NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8								
Minimum Split (s)				28.5	28.5			30.2			30.2	
Total Split (s)				50.0	50.0			40.0			40.0	
Total Split (%)				55.6%	55.6%			44.4%			44.4%	
Yellow Time (s)				3.7	3.7			3.3			3.3	
All-Red Time (s)				1.8	1.8			1.9			1.9	
Lost Time Adjust (s)				0.0	0.0			0.0			0.0	
Total Lost Time (s)				5.5	5.5			5.2			5.2	
Lead/Lag												
Lead-Lag Optimize?												
Act Effct Green (s)				44.5	44.5			34.8			34.8	
Actuated g/C Ratio				0.49	0.49			0.39			0.39	
v/c Ratio				0.32	0.82			0.73			0.46	
Control Delay				5.4	13.6			10.4			22.1	
Queue Delay				0.0	0.0			0.1			0.0	
Total Delay				5.4	13.6			10.5			22.1	
LOS				A	B			B			C	
Approach Delay					12.2			10.5			22.1	
Approach LOS					B			B			C	
Queue Length 50th (m)				10.4	111.5			16.3			38.6	
Queue Length 95th (m)				m15.2	146.9			19.6			53.3	
Internal Link Dist (m)		320.9			288.6			100.8			166.3	
Turn Bay Length (m)				75.0								
Base Capacity (vph)				838	1649			1310			1252	
Starvation Cap Reductn				0	0			19			0	
Spillback Cap Reductn				0	0			0			0	
Storage Cap Reductn				0	0			0			0	
Reduced v/c Ratio				0.32	0.82			0.74			0.46	
Intersection Summary												
Area Type:	Other											
Cycle Length: 90												
Actuated Cycle Length: 90												
Offset: 41 (46%), Referenced to phase 2:NBT and 6:SBT, Start of Green												
Natural Cycle: 65												

Lanes, Volumes, Timings  
2: Bank St & Riverside Dr WB

Total Future Background 2027 AM

06/01/2020

Control Type: Pretimed

Maximum v/c Ratio: 0.82

Intersection Signal Delay: 13.5

Intersection LOS: B

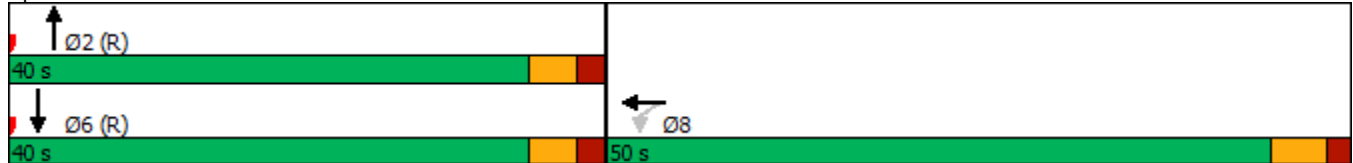
Intersection Capacity Utilization 77.4%

ICU Level of Service D

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.



















Splits and Phases: 2: Bank St & Riverside Dr WB



Lanes, Volumes, Timings  
3: Bank St & Riverside Dr EB

Total Future Background 2027 AM

06/01/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	158	1437	50	0	0	0	0	860	327	0	613	0
Future Volume (vph)	158	1437	50	0	0	0	0	860	327	0	613	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0		45.0	0.0		0.0	0.0		60.0	0.0		0.0
Storage Lanes	1		1	0		0	0		1	0		0
Taper Length (m)	7.5			0.0			0.0			0.0		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		353.9			357.9			168.7			124.8	
Travel Time (s)		21.2			21.5			12.1			9.0	
Lane Group Flow (vph)	158	1437	50	0	0	0	0	860	327	0	613	0
Turn Type	Perm	NA	Perm					NA	Perm		NA	
Protected Phases		4						2			6	
Permitted Phases	4		4						2			
Minimum Split (s)	29.1	29.1	29.1					25.5	25.5		25.5	
Total Split (s)	52.0	52.0	52.0					38.0	38.0		38.0	
Total Split (%)	57.8%	57.8%	57.8%					42.2%	42.2%		42.2%	
Yellow Time (s)	3.7	3.7	3.7					3.3	3.3		3.3	
All-Red Time (s)	2.4	2.4	2.4					2.2	2.2		2.2	
Lost Time Adjust (s)	0.0	0.0	0.0					0.0	0.0		0.0	
Total Lost Time (s)	6.1	6.1	6.1					5.5	5.5		5.5	
Lead/Lag												
Lead-Lag Optimize?												
Act Effct Green (s)	45.9	45.9	45.9					32.5	32.5		32.5	
Actuated g/C Ratio	0.51	0.51	0.51					0.36	0.36		0.36	
v/c Ratio	0.18	0.83	0.06					0.70	0.57		0.50	
Control Delay	11.6	27.2	5.9					26.9	23.4		18.1	
Queue Delay	0.0	0.0	0.0					0.0	0.0		0.0	
Total Delay	11.6	27.2	5.9					26.9	23.4		18.1	
LOS	B	C	A					C	C		B	
Approach Delay		25.1						25.9			18.1	
Approach LOS		C						C			B	
Queue Length 50th (m)	21.0	141.6	3.7					66.0	39.5		29.6	
Queue Length 95th (m)	m21.8	163.7	m4.0					86.8	66.0		38.8	
Internal Link Dist (m)		329.9			333.9			144.7			100.8	
Turn Bay Length (m)	60.0		45.0						60.0			
Base Capacity (vph)	864	1728	791					1224	572		1224	
Starvation Cap Reductn	0	0	0					0	0		0	
Spillback Cap Reductn	0	0	0					0	0		0	
Storage Cap Reductn	0	0	0					0	0		0	
Reduced v/c Ratio	0.18	0.83	0.06					0.70	0.57		0.50	
Intersection Summary												
Area Type:	Other											
Cycle Length: 90												
Actuated Cycle Length: 90												
Offset: 36 (40%), Referenced to phase 2:NBT and 6:SBT, Start of Green												
Natural Cycle: 60												

Lanes, Volumes, Timings  
3: Bank St & Riverside Dr EB

Total Future Background 2027 AM

06/01/2020

Control Type: Pretimed

Maximum v/c Ratio: 0.83

Intersection Signal Delay: 24.1

Intersection LOS: C

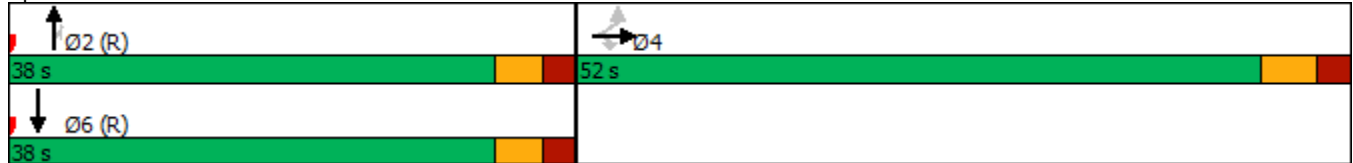
Intersection Capacity Utilization 77.4%

ICU Level of Service D

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.













Splits and Phases: 3: Bank St & Riverside Dr EB



Lanes, Volumes, Timings  
4: Bank St & Billings Transit

Total Future Background 2027 AM

06/01/2020

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	8	11	12	1053	711	9
Future Volume (vph)	8	11	12	1053	711	9
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	0.0	65.0			15.0
Storage Lanes	1	1	1			1
Taper Length (m)	0.0		7.5			
Right Turn on Red		Yes				Yes
Link Speed (k/h)	50			50	50	
Link Distance (m)	251.4			166.8	168.7	
Travel Time (s)	18.1			12.0	12.1	
Lane Group Flow (vph)	8	11	12	1053	711	9
Turn Type	Perm	Perm	pm+pt	NA	NA	Perm
Protected Phases			5	2	6	
Permitted Phases	4	4	2			6
Detector Phase	4	4	5	2	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	10.0	10.0	10.0
Minimum Split (s)	38.6	38.6	10.7	28.7	28.7	28.7
Total Split (s)	39.0	39.0	11.0	51.0	40.0	40.0
Total Split (%)	43.3%	43.3%	12.2%	56.7%	44.4%	44.4%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.3	2.3	2.4	2.4	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.6	5.6	5.7	5.7	5.7	5.7
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	None	None	None	C-Max	C-Max	C-Max
Act Effect Green (s)	6.6	6.6	78.9	82.3	79.9	79.9
Actuated g/C Ratio	0.07	0.07	0.88	0.91	0.89	0.89
v/c Ratio	0.13	0.16	0.04	0.34	0.24	0.01
Control Delay	42.6	25.7	2.1	1.8	0.9	0.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.6	25.7	2.1	1.8	0.9	0.7
LOS	D	C	A	A	A	A
Approach Delay	32.8			1.8	0.9	
Approach LOS	C			A	A	
Queue Length 50th (m)	1.3	0.0	0.1	0.0	0.0	0.0
Queue Length 95th (m)	5.5	5.0	1.3	30.6	7.5	m0.1
Internal Link Dist (m)	227.4			142.8	144.7	
Turn Bay Length (m)			65.0			15.0
Base Capacity (vph)	320	294	315	3101	3009	687
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.04	0.04	0.34	0.24	0.01
Intersection Summary						
Area Type:	Other					

Lanes, Volumes, Timings  
4: Bank St & Billings Transit

Total Future Background 2027 AM

06/01/2020

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 50 (56%), Referenced to phase 2:NBTL and 6:SBT, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.34

Intersection Signal Delay: 1.8

Intersection LOS: A

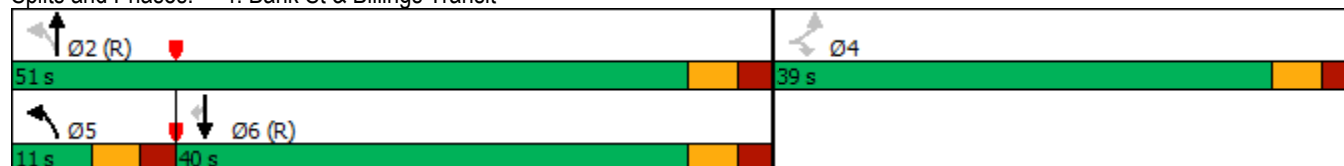
Intersection Capacity Utilization 44.3%

ICU Level of Service A

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: Bank St & Billings Transit





Lanes, Volumes, Timings  
5: Data Centre Rd & Riverside Dr

Total Future Background 2027 AM

06/01/2020

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↘	↑↑	↘	↑
Traffic Volume (vph)	1498	88	96	1025	47	70
Future Volume (vph)	1498	88	96	1025	47	70
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)		40.0	75.0		85.0	0.0
Storage Lanes		1	1		1	1
Taper Length (m)			7.5		7.5	
Right Turn on Red		Yes				Yes
Link Speed (k/h)	60			60	50	
Link Distance (m)	262.9			119.4	217.7	
Travel Time (s)	15.8			7.2	15.7	
Lane Group Flow (vph)	1498	88	96	1025	47	70
Turn Type	NA	Perm	Prot	NA	Prot	Perm
Protected Phases	4		3	8	2	
Permitted Phases		4				2
Detector Phase	4	4	3	8	2	2
Switch Phase						
Minimum Initial (s)	10.0	10.0	5.0	10.0	5.0	5.0
Minimum Split (s)	23.4	23.4	11.1	23.4	23.1	23.1
Total Split (s)	39.0	39.0	25.0	64.0	26.0	26.0
Total Split (%)	43.3%	43.3%	27.8%	71.1%	28.9%	28.9%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.3	3.3
All-Red Time (s)	1.7	1.7	2.4	1.7	1.8	1.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.4	5.4	6.1	5.4	5.1	5.1
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	C-Max	C-Max	None	C-Max	None	None
Act Effect Green (s)	60.7	60.7	10.4	74.7	8.0	8.0
Actuated g/C Ratio	0.67	0.67	0.12	0.83	0.09	0.09
v/c Ratio	0.66	0.08	0.49	0.36	0.31	0.35
Control Delay	14.0	5.3	53.9	1.5	43.1	14.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.0	5.3	53.9	1.5	43.1	14.9
LOS	B	A	D	A	D	B
Approach Delay	13.5			6.0	26.3	
Approach LOS	B			A	C	
Queue Length 50th (m)	86.3	2.7	17.8	10.1	7.8	0.0
Queue Length 95th (m)	137.7	10.1	m23.3	13.2	17.5	11.5
Internal Link Dist (m)	238.9			95.4	193.7	
Turn Bay Length (m)		40.0	75.0		85.0	
Base Capacity (vph)	2285	1037	355	2813	393	406
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.66	0.08	0.27	0.36	0.12	0.17
Intersection Summary						
Area Type:	Other					

# Lanes, Volumes, Timings 5: Data Centre Rd & Riverside Dr

Total Future Background 2027 AM  
06/01/2020

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 37 (41%), Referenced to phase 4:EBT and 8:WBT, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.66

Intersection Signal Delay: 11.1

Intersection LOS: B

Intersection Capacity Utilization 67.3%

ICU Level of Service C

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Data Centre Rd & Riverside Dr



Lanes, Volumes, Timings  
6: Pleasant Park Rd & Riverside Dr

Total Future Background 2027 AM

06/01/2020

	→	↘	↙	←	↖	↗	
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø9
Lane Configurations	↑↑		↘	↑↑	↘	↗	
Traffic Volume (vph)	1240	97	32	1278	168	36	
Future Volume (vph)	1240	97	32	1278	168	36	
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	
Storage Length (m)		0.0	30.0		0.0	40.0	
Storage Lanes		0	1		1	1	
Taper Length (m)			7.5		0.0		
Right Turn on Red		Yes				Yes	
Link Speed (k/h)	60			60	50		
Link Distance (m)	242.5			151.7	243.4		
Travel Time (s)	14.6			9.1	17.5		
Lane Group Flow (vph)	1337	0	32	1278	168	36	
Turn Type	NA		pm+pt	NA	Prot	Perm	
Protected Phases	4		3	8	2		9
Permitted Phases			8			2	
Detector Phase	4		3	8	2	2	
Switch Phase							
Minimum Initial (s)	10.0		5.0	10.0	5.0	5.0	5.0
Minimum Split (s)	28.8		10.0	28.8	25.0	25.0	12.0
Total Split (s)	37.0		10.0	37.0	28.0	28.0	15.0
Total Split (%)	41.1%		11.1%	41.1%	31.1%	31.1%	17%
Yellow Time (s)	3.7		3.3	3.7	3.3	3.3	3.0
All-Red Time (s)	2.1		1.7	2.1	2.7	2.7	4.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.8		5.0	5.8	6.0	6.0	
Lead/Lag	Lag		Lead				
Lead-Lag Optimize?	Yes		Yes				
Recall Mode	C-Max		None	C-Max	Max	Max	None
Act Effect Green (s)	35.2		42.0	41.2	37.0	37.0	
Actuated g/C Ratio	0.39		0.47	0.46	0.41	0.41	
v/c Ratio	1.02		0.19	0.82	0.24	0.06	
Control Delay	49.9		15.6	26.9	18.5	5.9	
Queue Delay	0.0		0.0	0.0	0.0	0.0	
Total Delay	49.9		15.6	26.9	18.5	5.9	
LOS	D		B	C	B	A	
Approach Delay	49.9			26.6	16.3		
Approach LOS	D			C	B		
Queue Length 50th (m)	~144.8		2.9	97.6	18.5	0.0	
Queue Length 95th (m)	#187.5		7.6	125.6	32.3	5.3	
Internal Link Dist (m)	218.5			127.7	219.4		
Turn Bay Length (m)			30.0			40.0	
Base Capacity (vph)	1317		171	1551	696	644	
Starvation Cap Reductn	0		0	0	0	0	
Spillback Cap Reductn	0		0	0	0	0	
Storage Cap Reductn	0		0	0	0	0	
Reduced v/c Ratio	1.02		0.19	0.82	0.24	0.06	
Intersection Summary							
Area Type:	Other						

# Lanes, Volumes, Timings

## 6: Pleasant Park Rd & Riverside Dr

Total Future Background 2027 AM

06/01/2020

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 50 (56%), Referenced to phase 4:EBT and 8:WBTL, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.02

Intersection Signal Delay: 36.8

Intersection LOS: D

Intersection Capacity Utilization 59.1%

ICU Level of Service B

Analysis Period (min) 15

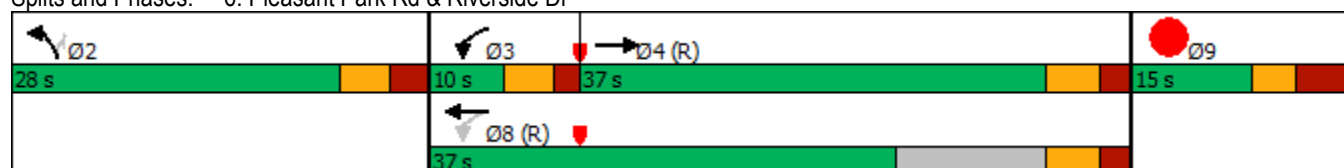
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.










Splits and Phases: 6: Pleasant Park Rd & Riverside Dr



Lanes, Volumes, Timings  
1: Bank St & Riverdale Ave

Total Future Background 2027 PM

06/01/2020

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	134	11	574	196	9	869
Future Volume (vph)	134	11	574	196	9	869
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Right Turn on Red		Yes		Yes		
Link Speed (k/h)	40		50			50
Link Distance (m)	227.4		190.3			201.0
Travel Time (s)	20.5		13.7			14.5
Lane Group Flow (vph)	145	0	770	0	0	878
Turn Type	Prot		NA		Perm	NA
Protected Phases	8		2			6
Permitted Phases					6	
Detector Phase	8		2		6	6
Switch Phase						
Minimum Initial (s)	5.0		10.0		10.0	10.0
Minimum Split (s)	22.0		22.5		22.5	22.5
Total Split (s)	22.0		68.0		68.0	68.0
Total Split (%)	24.4%		75.6%		75.6%	75.6%
Yellow Time (s)	3.0		3.3		3.3	3.3
All-Red Time (s)	3.2		2.6		2.6	2.6
Lost Time Adjust (s)	0.0		0.0			0.0
Total Lost Time (s)	6.2		5.9			5.9
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None		C-Max		C-Max	C-Max
Act Effect Green (s)	12.4		65.5			65.5
Actuated g/C Ratio	0.14		0.73			0.73
v/c Ratio	0.62		0.32			0.38
Control Delay	46.6		1.5			5.5
Queue Delay	0.0		0.0			0.0
Total Delay	46.6		1.5			5.5
LOS	D		A			A
Approach Delay	46.6		1.5			5.5
Approach LOS	D		A			A
Queue Length 50th (m)	23.1		4.4			25.4
Queue Length 95th (m)	40.1		6.4			38.9
Internal Link Dist (m)	203.4		166.3			177.0
Turn Bay Length (m)						
Base Capacity (vph)	299		2407			2338
Starvation Cap Reductn	0		0			0
Spillback Cap Reductn	0		0			0
Storage Cap Reductn	0		0			0
Reduced v/c Ratio	0.48		0.32			0.38
Intersection Summary						
Area Type:	Other					
Cycle Length: 90						
Actuated Cycle Length: 90						
Offset: 57 (63%), Referenced to phase 2:NBT and 6:SBTL, Start of Green						

Lanes, Volumes, Timings  
1: Bank St & Riverdale Ave

Total Future Background 2027 PM

06/01/2020

Natural Cycle: 45

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.62

Intersection Signal Delay: 7.1

Intersection LOS: A

Intersection Capacity Utilization 50.7%

ICU Level of Service A

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

















Splits and Phases: 1: Bank St & Riverdale Ave



Lanes, Volumes, Timings  
2: Bank St & Riverside Dr WB

Total Future Background 2027 PM

06/01/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	408	1473	114	0	576	0	0	717	219
Future Volume (vph)	0	0	0	408	1473	114	0	576	0	0	717	219
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	75.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (m)	0.0			7.5			0.0			0.0		
Right Turn on Red			Yes			Yes			Yes			No
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		344.9			312.6			124.8			190.3	
Travel Time (s)		20.7			18.8			9.0			13.7	
Lane Group Flow (vph)	0	0	0	408	1587	0	0	576	0	0	936	0
Turn Type				Perm	NA			NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8								
Minimum Split (s)				28.5	28.5			30.2			30.2	
Total Split (s)				52.0	52.0			38.0			38.0	
Total Split (%)				57.8%	57.8%			42.2%			42.2%	
Yellow Time (s)				3.7	3.7			3.3			3.3	
All-Red Time (s)				1.8	1.8			1.9			1.9	
Lost Time Adjust (s)				0.0	0.0			0.0			0.0	
Total Lost Time (s)				5.5	5.5			5.2			5.2	
Lead/Lag												
Lead-Lag Optimize?												
Act Effect Green (s)				46.5	46.5			32.8			32.8	
Actuated g/C Ratio				0.52	0.52			0.36			0.36	
v/c Ratio				0.47	0.91			0.47			0.79	
Control Delay				3.0	8.9			12.6			26.4	
Queue Delay				0.0	0.0			0.0			0.6	
Total Delay				3.0	8.9			12.6			27.0	
LOS				A	A			B			C	
Approach Delay					7.7			12.6			27.0	
Approach LOS					A			B			C	
Queue Length 50th (m)				6.4	70.3			18.4			77.8	
Queue Length 95th (m)				m6.4	m31.1			24.2			101.1	
Internal Link Dist (m)		320.9			288.6			100.8			166.3	
Turn Bay Length (m)				75.0								
Base Capacity (vph)				875	1738			1235			1192	
Starvation Cap Reductn				0	0			0			0	
Spillback Cap Reductn				0	0			0			64	
Storage Cap Reductn				0	0			0			0	
Reduced v/c Ratio				0.47	0.91			0.47			0.83	
Intersection Summary												
Area Type:	Other											
Cycle Length: 90												
Actuated Cycle Length: 90												
Offset: 64 (71%), Referenced to phase 2:NBT and 6:SBT, Start of Green												
Natural Cycle: 75												

Lanes, Volumes, Timings  
2: Bank St & Riverside Dr WB

Total Future Background 2027 PM

06/01/2020

Control Type: Pretimed

Maximum v/c Ratio: 0.91

Intersection Signal Delay: 13.7

Intersection LOS: B

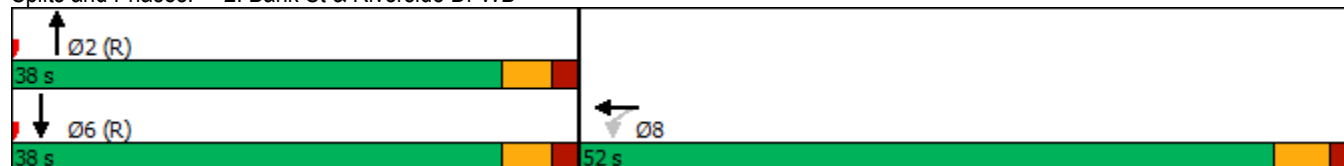
Intersection Capacity Utilization 88.6%

ICU Level of Service E

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Bank St & Riverside Dr WB























Lanes, Volumes, Timings  
3: Bank St & Riverside Dr EB

Total Future Background 2027 PM

06/01/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	144	1576	159	0	0	0	0	428	342	0	1128	0
Future Volume (vph)	144	1576	159	0	0	0	0	428	342	0	1128	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0		45.0	0.0		0.0	0.0		60.0	0.0		0.0
Storage Lanes	1		1	0		0	0		1	0		0
Taper Length (m)	7.5			0.0			0.0			0.0		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		353.9			357.9			168.7			124.8	
Travel Time (s)		21.2			21.5			12.1			9.0	
Lane Group Flow (vph)	144	1576	159	0	0	0	0	428	342	0	1128	0
Turn Type	Perm	NA	Perm					NA	Perm		NA	
Protected Phases		4						2			6	
Permitted Phases	4		4						2			
Minimum Split (s)	29.1	29.1	29.1					25.5	25.5		25.5	
Total Split (s)	49.0	49.0	49.0					41.0	41.0		41.0	
Total Split (%)	54.4%	54.4%	54.4%					45.6%	45.6%		45.6%	
Yellow Time (s)	3.7	3.7	3.7					3.3	3.3		3.3	
All-Red Time (s)	2.4	2.4	2.4					2.2	2.2		2.2	
Lost Time Adjust (s)	0.0	0.0	0.0					0.0	0.0		0.0	
Total Lost Time (s)	6.1	6.1	6.1					5.5	5.5		5.5	
Lead/Lag												
Lead-Lag Optimize?												
Act Effct Green (s)	42.9	42.9	42.9					35.5	35.5		35.5	
Actuated g/C Ratio	0.48	0.48	0.48					0.39	0.39		0.39	
v/c Ratio	0.18	0.98	0.22					0.32	0.55		0.84	
Control Delay	14.0	33.3	11.7					18.1	20.9		22.6	
Queue Delay	0.0	0.0	0.0					0.0	0.0		1.3	
Total Delay	14.0	33.3	11.7					18.1	20.9		24.0	
LOS	B	C	B					B	C		C	
Approach Delay		30.0						19.4			24.0	
Approach LOS		C						B			C	
Queue Length 50th (m)	7.4	44.8	4.8					26.7	40.1		47.4	
Queue Length 95th (m)	m17.7	#182.5	m15.5					38.0	66.3		81.7	
Internal Link Dist (m)		329.9			333.9			144.7			100.8	
Turn Bay Length (m)	60.0		45.0						60.0			
Base Capacity (vph)	807	1615	738					1337	621		1337	
Starvation Cap Reductn	0	0	0					0	0		78	
Spillback Cap Reductn	0	0	0					0	0		0	
Storage Cap Reductn	0	0	0					0	0		0	
Reduced v/c Ratio	0.18	0.98	0.22					0.32	0.55		0.90	
Intersection Summary												
Area Type:	Other											
Cycle Length: 90												
Actuated Cycle Length: 90												
Offset: 61 (68%), Referenced to phase 2:NBT and 6:SBT, Start of Green												
Natural Cycle: 80												

Lanes, Volumes, Timings  
3: Bank St & Riverside Dr EB

Total Future Background 2027 PM  
06/01/2020

Control Type: Pretimed

Maximum v/c Ratio: 0.98

Intersection Signal Delay: 26.0

Intersection LOS: C

Intersection Capacity Utilization 88.6%

ICU Level of Service E




Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.













Splits and Phases: 3: Bank St & Riverside Dr EB

 Ø2 (R)	 Ø4
41 s	49 s
 Ø6 (R)	
41 s	

Lanes, Volumes, Timings  
4: Bank St & Billings Transit

Total Future Background 2027 PM

06/01/2020

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	15	11	13	979	1426	14
Future Volume (vph)	15	11	13	979	1426	14
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	0.0	65.0			15.0
Storage Lanes	1	1	1			1
Taper Length (m)	0.0		7.5			
Right Turn on Red		Yes				Yes
Link Speed (k/h)	50			50	50	
Link Distance (m)	251.4			166.8	168.7	
Travel Time (s)	18.1			12.0	12.1	
Lane Group Flow (vph)	15	11	13	979	1426	14
Turn Type	Perm	Perm	pm+pt	NA	NA	Perm
Protected Phases			5	2	6	
Permitted Phases	4	4	2			6
Detector Phase	4	4	5	2	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	10.0	10.0	10.0
Minimum Split (s)	38.6	38.6	10.7	28.7	28.7	28.7
Total Split (s)	39.0	39.0	11.0	51.0	40.0	40.0
Total Split (%)	43.3%	43.3%	12.2%	56.7%	44.4%	44.4%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.3	2.3	2.4	2.4	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.6	5.6	5.7	5.7	5.7	5.7
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	None	None	None	C-Max	C-Max	C-Max
Act Effect Green (s)	7.3	7.3	78.4	81.8	79.3	79.3
Actuated g/C Ratio	0.08	0.08	0.87	0.91	0.88	0.88
v/c Ratio	0.21	0.15	0.08	0.32	0.48	0.02
Control Delay	44.9	24.1	3.1	2.0	3.7	3.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.9	24.1	3.1	2.0	3.7	3.5
LOS	D	C	A	A	A	A
Approach Delay	36.1			2.0	3.7	
Approach LOS	D			A	A	
Queue Length 50th (m)	2.5	0.0	0.2	0.0	1.4	0.0
Queue Length 95th (m)	8.3	4.9	1.6	31.1	43.9	m0.1
Internal Link Dist (m)	227.4			142.8	144.7	
Turn Bay Length (m)			65.0			15.0
Base Capacity (vph)	320	294	163	3080	2988	683
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.04	0.08	0.32	0.48	0.02
Intersection Summary						
Area Type:	Other					

Lanes, Volumes, Timings  
4: Bank St & Billings Transit

Total Future Background 2027 PM

06/01/2020

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 68 (76%), Referenced to phase 2:NBTL and 6:SBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.48

Intersection Signal Delay: 3.4

Intersection LOS: A

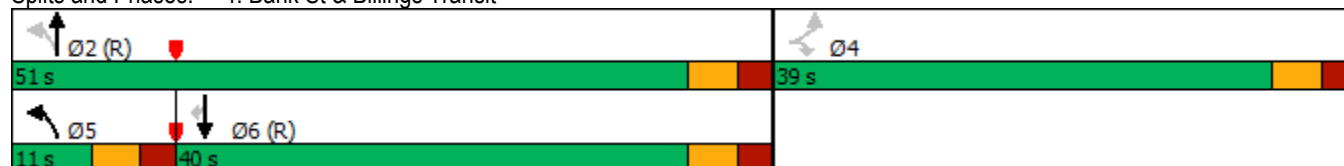
Intersection Capacity Utilization 55.2%

ICU Level of Service B

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.







Splits and Phases: 4: Bank St & Billings Transit



Lanes, Volumes, Timings  
5: Data Centre Rd & Riverside Dr

Total Future Background 2027 PM

06/01/2020

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↵	↑↑	↵	↑
Traffic Volume (vph)	1662	10	69	1704	87	82
Future Volume (vph)	1662	10	69	1704	87	82
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)		40.0	75.0		85.0	0.0
Storage Lanes		1	1		1	1
Taper Length (m)			7.5		7.5	
Right Turn on Red		Yes				Yes
Link Speed (k/h)	60			60	50	
Link Distance (m)	262.9			119.4	217.7	
Travel Time (s)	15.8			7.2	15.7	
Lane Group Flow (vph)	1662	10	69	1704	87	82
Turn Type	NA	Perm	Prot	NA	Prot	Perm
Protected Phases	4		3	8	2	
Permitted Phases		4				2
Detector Phase	4	4	3	8	2	2
Switch Phase						
Minimum Initial (s)	10.0	10.0	5.0	10.0	5.0	5.0
Minimum Split (s)	23.4	23.4	11.1	23.4	23.1	23.1
Total Split (s)	47.0	47.0	17.0	64.0	26.0	26.0
Total Split (%)	52.2%	52.2%	18.9%	71.1%	28.9%	28.9%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.3	3.3
All-Red Time (s)	1.7	1.7	2.4	1.7	1.8	1.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.4	5.4	6.1	5.4	5.1	5.1
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	C-Max	C-Max	None	C-Max	None	None
Act Effect Green (s)	60.1	60.1	9.0	72.8	10.0	10.0
Actuated g/C Ratio	0.67	0.67	0.10	0.81	0.11	0.11
v/c Ratio	0.73	0.01	0.41	0.62	0.47	0.34
Control Delay	16.8	7.3	28.5	12.8	44.8	12.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.8	7.3	28.5	12.8	44.8	12.4
LOS	B	A	C	B	D	B
Approach Delay	16.8			13.5	29.1	
Approach LOS	B			B	C	
Queue Length 50th (m)	107.3	0.3	9.9	121.0	14.3	0.0
Queue Length 95th (m)	#189.3	2.7	m11.1	m143.7	27.3	11.9
Internal Link Dist (m)	238.9			95.4	193.7	
Turn Bay Length (m)		40.0	75.0		85.0	
Base Capacity (vph)	2263	1014	211	2743	393	415
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.73	0.01	0.33	0.62	0.22	0.20
<b>Intersection Summary</b>						
Area Type:	Other					

# Lanes, Volumes, Timings

## 5: Data Centre Rd & Riverside Dr

Total Future Background 2027 PM

06/01/2020

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 6 (7%), Referenced to phase 4:EBT and 8:WBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.73

Intersection Signal Delay: 15.7

Intersection LOS: B

Intersection Capacity Utilization 71.6%

ICU Level of Service C

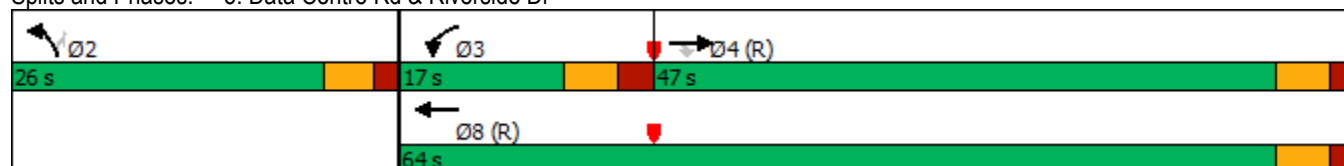
Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Data Centre Rd & Riverside Dr



Lanes, Volumes, Timings  
6: Pleasant Park Rd & Riverside Dr

Total Future Background 2027 PM

06/01/2020

	→	↘	↙	←	↖	↗	
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø9
Lane Configurations	↑↑		↘	↑↑	↘	↗	
Traffic Volume (vph)	1352	193	132	1966	155	33	
Future Volume (vph)	1352	193	132	1966	155	33	
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	
Storage Length (m)		0.0	30.0		0.0	40.0	
Storage Lanes		0	1		1	1	
Taper Length (m)			7.5		0.0		
Right Turn on Red		Yes				Yes	
Link Speed (k/h)	60			60	50		
Link Distance (m)	242.5			151.7	243.4		
Travel Time (s)	14.6			9.1	17.5		
Lane Group Flow (vph)	1545	0	132	1966	155	33	
Turn Type	NA		pm+pt	NA	Prot	Perm	
Protected Phases	4		3	8	2		9
Permitted Phases			8			2	
Detector Phase	4		3	8	2	2	
Switch Phase							
Minimum Initial (s)	10.0		5.0	10.0	5.0	5.0	5.0
Minimum Split (s)	28.8		10.0	28.8	25.0	25.0	12.0
Total Split (s)	37.0		12.0	37.0	26.0	26.0	15.0
Total Split (%)	41.1%		13.3%	41.1%	28.9%	28.9%	17%
Yellow Time (s)	3.7		3.3	3.7	3.3	3.3	3.0
All-Red Time (s)	2.1		1.7	2.1	2.7	2.7	4.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.8		5.0	5.8	6.0	6.0	
Lead/Lag	Lag		Lead				
Lead-Lag Optimize?	Yes		Yes				
Recall Mode	C-Max		None	C-Max	Max	Max	None
Act Effect Green (s)	31.3		44.0	43.2	35.0	35.0	
Actuated g/C Ratio	0.35		0.49	0.48	0.39	0.39	
v/c Ratio	1.32		0.63	1.21	0.24	0.05	
Control Delay	172.3		27.8	124.4	19.7	6.5	
Queue Delay	0.0		0.0	0.0	0.0	0.0	
Total Delay	172.3		27.8	124.4	19.7	6.5	
LOS	F		C	F	B	A	
Approach Delay	172.3			118.3	17.4		
Approach LOS	F			F	B		
Queue Length 50th (m)	~186.1		12.1	~220.3	17.7	0.0	
Queue Length 95th (m)	m#201.6		#28.7	#262.0	31.3	5.5	
Internal Link Dist (m)	218.5			127.7	219.4		
Turn Bay Length (m)			30.0			40.0	
Base Capacity (vph)	1167		212	1627	659	610	
Starvation Cap Reductn	0		0	0	0	0	
Spillback Cap Reductn	0		0	0	0	0	
Storage Cap Reductn	0		0	0	0	0	
Reduced v/c Ratio	1.32		0.62	1.21	0.24	0.05	
Intersection Summary							
Area Type:	Other						

# Lanes, Volumes, Timings

## 6: Pleasant Park Rd & Riverside Dr

Total Future Background 2027 PM

06/01/2020

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 75 (83%), Referenced to phase 4:EBT and 8:WBTL, Start of Green

Natural Cycle: 100

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.32

Intersection Signal Delay: 135.1

Intersection LOS: F

Intersection Capacity Utilization 76.7%

ICU Level of Service D

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

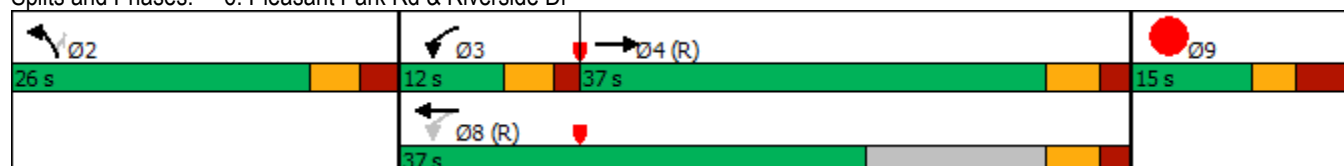
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: Pleasant Park Rd & Riverside Dr
















**Total Projected 2022**

Lanes, Volumes, Timings  
1: Bank St & Riverdale Ave

Total Projected 2022 AM  
06/01/2020

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			 			 
Traffic Volume (vph)	98	6	1148	98	6	493
Future Volume (vph)	98	6	1148	98	6	493
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Right Turn on Red		Yes		Yes		
Link Speed (k/h)	40		50			50
Link Distance (m)	227.4		190.3			201.0
Travel Time (s)	20.5		13.7			14.5
Lane Group Flow (vph)	104	0	1246	0	0	499
Turn Type	Prot		NA		Perm	NA
Protected Phases	8		2			6
Permitted Phases					6	
Detector Phase	8		2		6	6
Switch Phase						
Minimum Initial (s)	5.0		10.0		10.0	10.0
Minimum Split (s)	22.0		22.5		22.5	22.5
Total Split (s)	22.0		48.0		48.0	48.0
Total Split (%)	31.4%		68.6%		68.6%	68.6%
Yellow Time (s)	3.0		3.3		3.3	3.3
All-Red Time (s)	3.2		2.6		2.6	2.6
Lost Time Adjust (s)	0.0		0.0			0.0
Total Lost Time (s)	6.2		5.9			5.9
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None		C-Max		C-Max	C-Max
Act Effect Green (s)	9.5		52.0			52.0
Actuated g/C Ratio	0.14		0.74			0.74
v/c Ratio	0.45		0.50			0.21
Control Delay	32.2		6.0			4.3
Queue Delay	0.0		0.0			0.0
Total Delay	32.2		6.0			4.3
LOS	C		A			A
Approach Delay	32.2		6.0			4.3
Approach LOS	C		A			A
Queue Length 50th (m)	12.2		33.5			10.3
Queue Length 95th (m)	24.1		56.9			18.8
Internal Link Dist (m)	203.4		166.3			177.0
Turn Bay Length (m)						
Base Capacity (vph)	384		2494			2369
Starvation Cap Reductn	0		0			0
Spillback Cap Reductn	0		0			0
Storage Cap Reductn	0		0			0
Reduced v/c Ratio	0.27		0.50			0.21
<b>Intersection Summary</b>						
Area Type:	Other					
Cycle Length: 70						
Actuated Cycle Length: 70						
Offset: 17 (24%), Referenced to phase 2:NBT and 6:SBTL, Start of Green						

Lanes, Volumes, Timings  
1: Bank St & Riverdale Ave

Total Projected 2022 AM

06/01/2020

Natural Cycle: 55

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.50

Intersection Signal Delay: 7.0

Intersection LOS: A

Intersection Capacity Utilization 53.0%

ICU Level of Service A

Analysis Period (min) 15

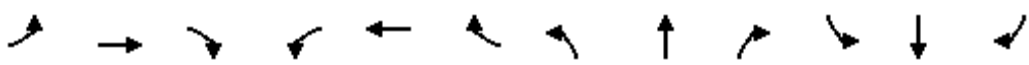




Splits and Phases: 1: Bank St & Riverdale Ave



Lanes, Volumes, Timings  
2: Bank St & Riverside Dr WB

Total Projected 2022 AM

06/01/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	268	1061	230	0	906	0	0	385	171
Future Volume (vph)	0	0	0	268	1061	230	0	906	0	0	385	171
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	75.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (m)	0.0			7.5			0.0			0.0		
Right Turn on Red			Yes			Yes			Yes			No
Link Speed (k/h)		60			60			50				50
Link Distance (m)		344.9			35.3			124.8				190.3
Travel Time (s)		20.7			2.1			9.0				13.7
Lane Group Flow (vph)	0	0	0	268	1291	0	0	906	0	0	556	0
Turn Type				Perm	NA			NA				NA
Protected Phases					8			2				6
Permitted Phases				8								
Minimum Split (s)				28.5	28.5			30.2				30.2
Total Split (s)				50.0	50.0			40.0				40.0
Total Split (%)				55.6%	55.6%			44.4%				44.4%
Yellow Time (s)				3.7	3.7			3.3				3.3
All-Red Time (s)				1.8	1.8			1.9				1.9
Lost Time Adjust (s)				0.0	0.0			0.0				0.0
Total Lost Time (s)				5.5	5.5			5.2				5.2
Lead/Lag												
Lead-Lag Optimize?												
Act Effect Green (s)				44.5	44.5			34.8				34.8
Actuated g/C Ratio				0.49	0.49			0.39				0.39
v/c Ratio				0.32	0.78			0.69				0.44
Control Delay				5.7	12.7			10.0				21.9
Queue Delay				0.0	0.0			0.1				0.0
Total Delay				5.7	12.7			10.1				21.9
LOS				A	B			B				C
Approach Delay					11.5			10.1				21.9
Approach LOS					B			B				C
Queue Length 50th (m)				11.1	102.3			15.5				36.7
Queue Length 95th (m)				16.9	136.5			18.7				50.7
Internal Link Dist (m)		320.9			11.3			100.8				166.3
Turn Bay Length (m)				75.0								
Base Capacity (vph)				838	1651			1310				1250
Starvation Cap Reductn				0	0			19				0
Spillback Cap Reductn				0	0			0				0
Storage Cap Reductn				0	0			0				0
Reduced v/c Ratio				0.32	0.78			0.70				0.44
Intersection Summary												
Area Type:	Other											
Cycle Length: 90												
Actuated Cycle Length: 90												
Offset: 41 (46%), Referenced to phase 2:NBT and 6:SBT, Start of Green												
Natural Cycle: 60												

Lanes, Volumes, Timings  
2: Bank St & Riverside Dr WB

Total Projected 2022 AM  
06/01/2020

Control Type: Pretimed

Maximum v/c Ratio: 0.78

Intersection Signal Delay: 13.0

Intersection LOS: B

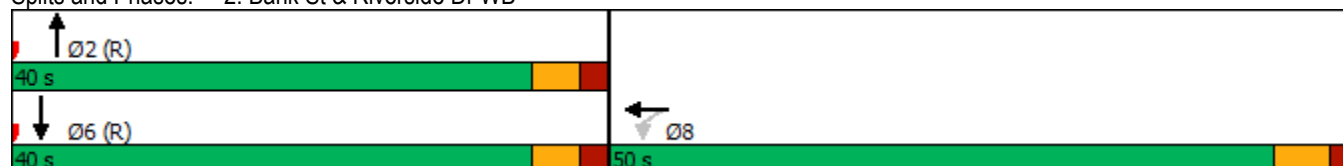
Intersection Capacity Utilization 74.1%

ICU Level of Service D

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.



















Splits and Phases: 2: Bank St & Riverside Dr WB



Lanes, Volumes, Timings  
3: Bank St & Riverside Dr EB

Total Projected 2022 AM

06/01/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	150	1339	48	0	0	0	0	818	313	0	579	0
Future Volume (vph)	150	1339	48	0	0	0	0	818	313	0	579	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0		45.0	0.0		0.0	0.0		60.0	0.0		0.0
Storage Lanes	1		1	0		0	0		1	0		0
Taper Length (m)	7.5			0.0			0.0			0.0		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		353.9			34.1			168.7			124.8	
Travel Time (s)		21.2			2.0			12.1			9.0	
Lane Group Flow (vph)	150	1339	48	0	0	0	0	818	313	0	579	0
Turn Type	Perm	NA	Perm					NA	Perm		NA	
Protected Phases		4						2			6	
Permitted Phases	4		4						2			
Minimum Split (s)	29.1	29.1	29.1					25.5	25.5		25.5	
Total Split (s)	52.0	52.0	52.0					38.0	38.0		38.0	
Total Split (%)	57.8%	57.8%	57.8%					42.2%	42.2%		42.2%	
Yellow Time (s)	3.7	3.7	3.7					3.3	3.3		3.3	
All-Red Time (s)	2.4	2.4	2.4					2.2	2.2		2.2	
Lost Time Adjust (s)	0.0	0.0	0.0					0.0	0.0		0.0	
Total Lost Time (s)	6.1	6.1	6.1					5.5	5.5		5.5	
Lead/Lag												
Lead-Lag Optimize?												
Act Effct Green (s)	45.9	45.9	45.9					32.5	32.5		32.5	
Actuated g/C Ratio	0.51	0.51	0.51					0.36	0.36		0.36	
v/c Ratio	0.17	0.77	0.06					0.67	0.55		0.47	
Control Delay	11.8	25.5	6.1					26.1	22.7		18.2	
Queue Delay	0.0	0.0	0.0					0.0	0.0		0.0	
Total Delay	11.8	25.5	6.1					26.1	22.7		18.2	
LOS	B	C	A					C	C		B	
Approach Delay		23.5						25.1			18.2	
Approach LOS		C						C			B	
Queue Length 50th (m)	20.0	132.1	3.8					61.6	37.1		28.3	
Queue Length 95th (m)	m22.9	153.5	m4.3					81.7	62.4		37.4	
Internal Link Dist (m)		329.9			10.1			144.7			100.8	
Turn Bay Length (m)	60.0		45.0						60.0			
Base Capacity (vph)	864	1728	792					1224	572		1224	
Starvation Cap Reductn	0	0	0					0	0		0	
Spillback Cap Reductn	0	0	0					0	0		0	
Storage Cap Reductn	0	0	0					0	0		0	
Reduced v/c Ratio	0.17	0.77	0.06					0.67	0.55		0.47	
Intersection Summary												
Area Type:	Other											
Cycle Length: 90												
Actuated Cycle Length: 90												
Offset: 36 (40%), Referenced to phase 2:NBT and 6:SBT, Start of Green												
Natural Cycle: 60												

Lanes, Volumes, Timings  
3: Bank St & Riverside Dr EB

Total Projected 2022 AM

06/01/2020

Control Type: Pretimed

Maximum v/c Ratio: 0.77

Intersection Signal Delay: 23.1

Intersection LOS: C

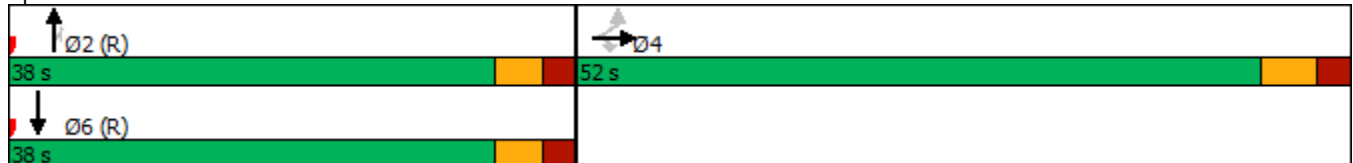
Intersection Capacity Utilization 74.1%

ICU Level of Service D

Analysis Period (min) 15













m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Bank St & Riverside Dr EB



Lanes, Volumes, Timings  
4: Bank St & Billings Transit

Total Projected 2022 AM  
06/01/2020

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	8	11	12	1004	672	9
Future Volume (vph)	8	11	12	1004	672	9
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	0.0	65.0			15.0
Storage Lanes	1	1	1			1
Taper Length (m)	0.0		7.5			
Right Turn on Red		Yes				Yes
Link Speed (k/h)	50			50	50	
Link Distance (m)	251.4			166.8	168.7	
Travel Time (s)	18.1			12.0	12.1	
Lane Group Flow (vph)	8	11	12	1004	672	9
Turn Type	Perm	Perm	pm+pt	NA	NA	Perm
Protected Phases			5	2	6	
Permitted Phases	4	4	2			6
Detector Phase	4	4	5	2	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	10.0	10.0	10.0
Minimum Split (s)	38.6	38.6	10.7	28.7	28.7	28.7
Total Split (s)	39.0	39.0	11.0	51.0	40.0	40.0
Total Split (%)	43.3%	43.3%	12.2%	56.7%	44.4%	44.4%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.3	2.3	2.4	2.4	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.6	5.6	5.7	5.7	5.7	5.7
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	None	None	None	C-Max	C-Max	C-Max
Act Effect Green (s)	6.6	6.6	78.9	82.3	79.9	79.9
Actuated g/C Ratio	0.07	0.07	0.88	0.91	0.89	0.89
v/c Ratio	0.13	0.16	0.04	0.32	0.22	0.01
Control Delay	42.6	25.7	2.1	1.8	0.9	0.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.6	25.7	2.1	1.8	0.9	0.8
LOS	D	C	A	A	A	A
Approach Delay	32.8			1.8	0.9	
Approach LOS	C			A	A	
Queue Length 50th (m)	1.3	0.0	0.1	0.0	0.1	0.0
Queue Length 95th (m)	5.5	5.0	1.3	28.8	7.3	m0.1
Internal Link Dist (m)	227.4			142.8	144.7	
Turn Bay Length (m)			65.0			15.0
Base Capacity (vph)	320	294	326	3101	3009	687
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.04	0.04	0.32	0.22	0.01
Intersection Summary						
Area Type:	Other					



Lanes, Volumes, Timings  
4: Bank St & Billings Transit

Total Projected 2022 AM  
06/01/2020

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 50 (56%), Referenced to phase 2:NBTL and 6:SBT, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.32

Intersection Signal Delay: 1.8

Intersection LOS: A

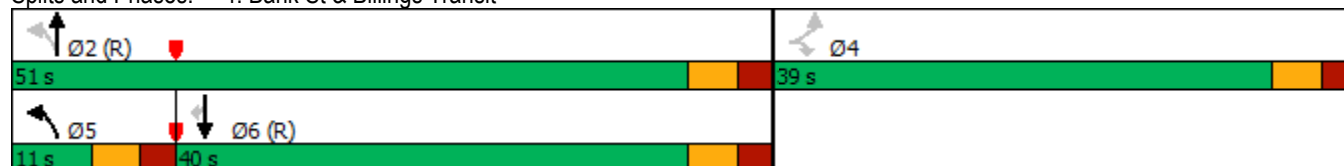
Intersection Capacity Utilization 42.9%

ICU Level of Service A

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: Bank St & Billings Transit



Lanes, Volumes, Timings  
5: Data Centre Rd & Riverside Dr

Total Projected 2022 AM

06/01/2020

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↘	↑↑	↘	↑
Traffic Volume (vph)	1426	88	96	972	47	70
Future Volume (vph)	1426	88	96	972	47	70
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)		40.0	75.0		85.0	0.0
Storage Lanes		1	1		1	1
Taper Length (m)			7.5		7.5	
Right Turn on Red		Yes				Yes
Link Speed (k/h)	60			60	50	
Link Distance (m)	262.9			119.4	217.7	
Travel Time (s)	15.8			7.2	15.7	
Lane Group Flow (vph)	1426	88	96	972	47	70
Turn Type	NA	Perm	Prot	NA	Prot	Perm
Protected Phases	4		3	8	2	
Permitted Phases		4				2
Detector Phase	4	4	3	8	2	2
Switch Phase						
Minimum Initial (s)	10.0	10.0	5.0	10.0	5.0	5.0
Minimum Split (s)	23.4	23.4	11.1	23.4	23.1	23.1
Total Split (s)	39.0	39.0	25.0	64.0	26.0	26.0
Total Split (%)	43.3%	43.3%	27.8%	71.1%	28.9%	28.9%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.3	3.3
All-Red Time (s)	1.7	1.7	2.4	1.7	1.8	1.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.4	5.4	6.1	5.4	5.1	5.1
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	C-Max	C-Max	None	C-Max	None	None
Act Effect Green (s)	60.7	60.7	10.4	74.7	8.0	8.0
Actuated g/C Ratio	0.67	0.67	0.12	0.83	0.09	0.09
v/c Ratio	0.62	0.08	0.49	0.35	0.31	0.35
Control Delay	13.3	5.1	55.2	1.5	43.1	14.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.3	5.1	55.2	1.5	43.1	14.9
LOS	B	A	E	A	D	B
Approach Delay	12.9			6.3	26.3	
Approach LOS	B			A	C	
Queue Length 50th (m)	79.1	2.6	17.9	9.7	7.8	0.0
Queue Length 95th (m)	126.5	9.9	m24.4	12.8	17.5	11.5
Internal Link Dist (m)	238.9			95.4	193.7	
Turn Bay Length (m)		40.0	75.0		85.0	
Base Capacity (vph)	2285	1038	355	2813	393	406
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.62	0.08	0.27	0.35	0.12	0.17
Intersection Summary						
Area Type:	Other					

# Lanes, Volumes, Timings 5: Data Centre Rd & Riverside Dr

Total Projected 2022 AM  
06/01/2020

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 37 (41%), Referenced to phase 4:EBT and 8:WBT, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.62

Intersection Signal Delay: 10.9

Intersection LOS: B

Intersection Capacity Utilization 65.2%

ICU Level of Service C

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Data Centre Rd & Riverside Dr



Lanes, Volumes, Timings  
6: Pleasant Park Rd & Riverside Dr

Total Projected 2022 AM

06/01/2020

	→	↘	↙	←	↖	↗	
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø9
Lane Configurations	↑↑		↘	↑↑	↘	↗	
Traffic Volume (vph)	1178	97	32	1217	168	36	
Future Volume (vph)	1178	97	32	1217	168	36	
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	
Storage Length (m)		0.0	30.0		0.0	40.0	
Storage Lanes		0	1		1	1	
Taper Length (m)			7.5		0.0		
Right Turn on Red		Yes				Yes	
Link Speed (k/h)	60			60	50		
Link Distance (m)	242.5			151.7	243.4		
Travel Time (s)	14.6			9.1	17.5		
Lane Group Flow (vph)	1275	0	32	1217	168	36	
Turn Type	NA		pm+pt	NA	Prot	Perm	
Protected Phases	4		3	8	2		9
Permitted Phases			8			2	
Detector Phase	4		3	8	2	2	
Switch Phase							
Minimum Initial (s)	10.0		5.0	10.0	5.0	5.0	5.0
Minimum Split (s)	28.8		10.0	28.8	25.0	25.0	12.0
Total Split (s)	37.0		10.0	37.0	28.0	28.0	15.0
Total Split (%)	41.1%		11.1%	41.1%	31.1%	31.1%	17%
Yellow Time (s)	3.7		3.3	3.7	3.3	3.3	3.0
All-Red Time (s)	2.1		1.7	2.1	2.7	2.7	4.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.8		5.0	5.8	6.0	6.0	
Lead/Lag	Lag		Lead				
Lead-Lag Optimize?	Yes		Yes				
Recall Mode	C-Max		None	C-Max	Max	Max	None
Act Effect Green (s)	35.2		42.0	41.2	37.0	37.0	
Actuated g/C Ratio	0.39		0.47	0.46	0.41	0.41	
v/c Ratio	0.97		0.19	0.78	0.24	0.06	
Control Delay	41.4		15.6	25.2	18.5	5.9	
Queue Delay	0.0		0.0	0.0	0.0	0.0	
Total Delay	41.4		15.6	25.2	18.5	5.9	
LOS	D		B	C	B	A	
Approach Delay	41.4			24.9	16.3		
Approach LOS	D			C	B		
Queue Length 50th (m)	~132.4		2.9	90.4	18.5	0.0	
Queue Length 95th (m)	#174.7		7.6	116.5	32.3	5.3	
Internal Link Dist (m)	218.5			127.7	219.4		
Turn Bay Length (m)			30.0			40.0	
Base Capacity (vph)	1317		171	1551	696	644	
Starvation Cap Reductn	0		0	0	0	0	
Spillback Cap Reductn	0		0	0	0	0	
Storage Cap Reductn	0		0	0	0	0	
Reduced v/c Ratio	0.97		0.19	0.78	0.24	0.06	
Intersection Summary							
Area Type:	Other						

# Lanes, Volumes, Timings 6: Pleasant Park Rd & Riverside Dr

Total Projected 2022 AM  
06/01/2020

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 50 (56%), Referenced to phase 4:EBT and 8:WBTL, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.97

Intersection Signal Delay: 32.0

Intersection LOS: C

Intersection Capacity Utilization 57.3%

ICU Level of Service B

Analysis Period (min) 15

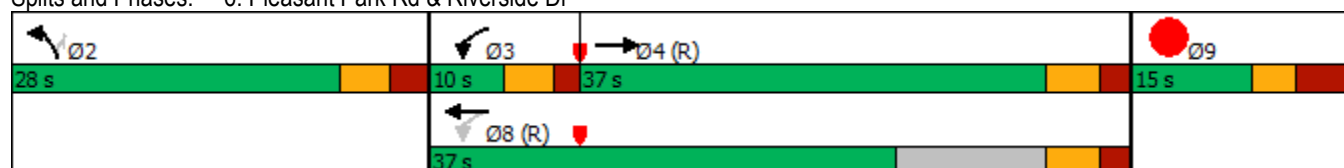
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 6: Pleasant Park Rd & Riverside Dr



Lanes, Volumes, Timings  
7: Site Access & Riverside Dr WB

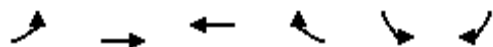
Total Projected 2022 AM  
06/01/2020

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations				↕↕		
Traffic Volume (vph)	0	0	15	1558	0	0
Future Volume (vph)	0	0	15	1558	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Link Speed (k/h)	60			60	40	
Link Distance (m)	35.3			277.3	43.7	
Travel Time (s)	2.1			16.6	3.9	
Lane Group Flow (vph)	0	0	0	1573	0	0
Sign Control	Free			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	49.3%			ICU Level of Service A		
Analysis Period (min)	15					

Intersection Sign configuration not allowed in HCM analysis.

Lanes, Volumes, Timings  
8: Riverside Dr EB & Site Access

Total Projected 2022 AM  
06/01/2020



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑			↙	
Traffic Volume (vph)	0	1652	0	0	48	0
Future Volume (vph)	0	1652	0	0	48	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Link Speed (k/h)		60	60		40	
Link Distance (m)		34.1	317.4		44.6	
Travel Time (s)		2.0	19.0		4.0	
Lane Group Flow (vph)	0	1652	0	0	48	0
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 58.2% ICU Level of Service B

Analysis Period (min) 15

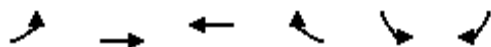


# HCM Unsignalized Intersection Capacity Analysis

## 8: Riverside Dr EB & Site Access

Total Projected 2022 AM










06/01/2020



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑			↘	
Traffic Volume (veh/h)	0	1652	0	0	48	0
Future Volume (Veh/h)	0	1652	0	0	48	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	1652	0	0	48	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)		34				
pX, platoon unblocked					0.68	
vC, conflicting volume	0				826	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0				0	0
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				93	100
cM capacity (veh/h)	1622				693	1084
Direction, Lane #	EB 1	EB 2	SB 1			
Volume Total	826	826	48			
Volume Left	0	0	48			
Volume Right	0	0	0			
cSH	1700	1700	693			
Volume to Capacity	0.49	0.49	0.07			
Queue Length 95th (m)	0.0	0.0	1.7			
Control Delay (s)	0.0	0.0	10.6			
Lane LOS			B			
Approach Delay (s)	0.0		10.6			
Approach LOS			B			
Intersection Summary						
Average Delay			0.3			
Intersection Capacity Utilization			58.2%	ICU Level of Service		B
Analysis Period (min)			15			

Lanes, Volumes, Timings  
1: Bank St & Riverdale Ave

Total Projected 2022 PM  
06/01/2020

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	134	11	551	196	9	830
Future Volume (vph)	134	11	551	196	9	830
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Right Turn on Red		Yes		Yes		
Link Speed (k/h)	40		50			50
Link Distance (m)	227.4		190.3			201.0
Travel Time (s)	20.5		13.7			14.5
Lane Group Flow (vph)	145	0	747	0	0	839
Turn Type	Prot		NA		Perm	NA
Protected Phases	8		2			6
Permitted Phases					6	
Detector Phase	8		2		6	6
Switch Phase						
Minimum Initial (s)	5.0		10.0		10.0	10.0
Minimum Split (s)	22.0		22.5		22.5	22.5
Total Split (s)	22.0		68.0		68.0	68.0
Total Split (%)	24.4%		75.6%		75.6%	75.6%
Yellow Time (s)	3.0		3.3		3.3	3.3
All-Red Time (s)	3.2		2.6		2.6	2.6
Lost Time Adjust (s)	0.0		0.0			0.0
Total Lost Time (s)	6.2		5.9			5.9
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None		C-Max		C-Max	C-Max
Act Effect Green (s)	12.4		65.5			65.5
Actuated g/C Ratio	0.14		0.73			0.73
v/c Ratio	0.62		0.31			0.36
Control Delay	46.6		1.5			5.3
Queue Delay	0.0		0.0			0.0
Total Delay	46.6		1.5			5.3
LOS	D		A			A
Approach Delay	46.6		1.5			5.3
Approach LOS	D		A			A
Queue Length 50th (m)	23.1		4.6			23.8
Queue Length 95th (m)	40.1		6.4			36.7
Internal Link Dist (m)	203.4		166.3			177.0
Turn Bay Length (m)						
Base Capacity (vph)	299		2407			2338
Starvation Cap Reductn	0		0			0
Spillback Cap Reductn	0		0			0
Storage Cap Reductn	0		0			0
Reduced v/c Ratio	0.48		0.31			0.36
Intersection Summary						
Area Type:	Other					
Cycle Length: 90						
Actuated Cycle Length: 90						
Offset: 57 (63%), Referenced to phase 2:NBT and 6:SBTL, Start of Green						

Lanes, Volumes, Timings  
1: Bank St & Riverdale Ave

Total Projected 2022 PM

06/01/2020

Natural Cycle: 45

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.62

Intersection Signal Delay: 7.1

Intersection LOS: A

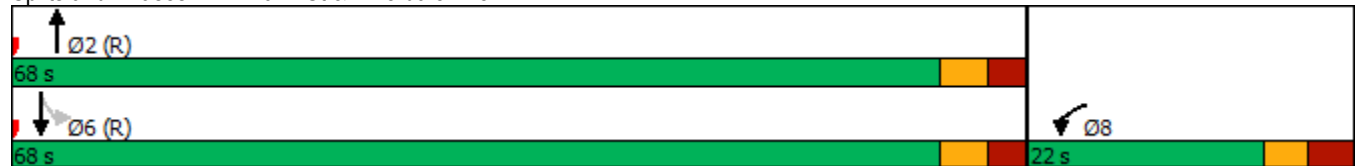
Intersection Capacity Utilization 49.5%

ICU Level of Service A

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

















Splits and Phases: 1: Bank St & Riverdale Ave



Lanes, Volumes, Timings  
2: Bank St & Riverside Dr WB

Total Projected 2022 PM

06/01/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	385	1396	113	0	548	0	0	672	221
Future Volume (vph)	0	0	0	385	1396	113	0	548	0	0	672	221
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	75.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (m)	0.0			7.5			0.0			0.0		
Right Turn on Red			Yes			Yes			Yes			No
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		344.9			35.0			124.8			190.3	
Travel Time (s)		20.7			2.1			9.0			13.7	
Lane Group Flow (vph)	0	0	0	385	1509	0	0	548	0	0	893	0
Turn Type				Perm	NA			NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8								
Minimum Split (s)				28.5	28.5			30.2			30.2	
Total Split (s)				52.0	52.0			38.0			38.0	
Total Split (%)				57.8%	57.8%			42.2%			42.2%	
Yellow Time (s)				3.7	3.7			3.3			3.3	
All-Red Time (s)				1.8	1.8			1.9			1.9	
Lost Time Adjust (s)				0.0	0.0			0.0			0.0	
Total Lost Time (s)				5.5	5.5			5.2			5.2	
Lead/Lag												
Lead-Lag Optimize?												
Act Effect Green (s)				46.5	46.5			32.8			32.8	
Actuated g/C Ratio				0.52	0.52			0.36			0.36	
v/c Ratio				0.44	0.87			0.44			0.75	
Control Delay				3.0	7.6			12.5			25.2	
Queue Delay				0.0	0.0			0.0			0.2	
Total Delay				3.0	7.6			12.5			25.4	
LOS				A	A			B			C	
Approach Delay					6.6			12.5			25.4	
Approach LOS					A			B			C	
Queue Length 50th (m)				6.1	45.7			17.6			73.4	
Queue Length 95th (m)				m6.5	m31.2			23.2			91.4	
Internal Link Dist (m)		320.9			11.0			100.8			166.3	
Turn Bay Length (m)				75.0								
Base Capacity (vph)				875	1739			1235			1189	
Starvation Cap Reductn				0	0			0			0	
Spillback Cap Reductn				0	0			0			38	
Storage Cap Reductn				0	0			0			0	
Reduced v/c Ratio				0.44	0.87			0.44			0.78	
Intersection Summary												
Area Type:	Other											
Cycle Length: 90												
Actuated Cycle Length: 90												
Offset: 64 (71%), Referenced to phase 2:NBT and 6:SBT, Start of Green												
Natural Cycle: 70												

Lanes, Volumes, Timings  
2: Bank St & Riverside Dr WB

Total Projected 2022 PM  
06/01/2020

Control Type: Pretimed

Maximum v/c Ratio: 0.87

Intersection Signal Delay: 12.6

Intersection LOS: B

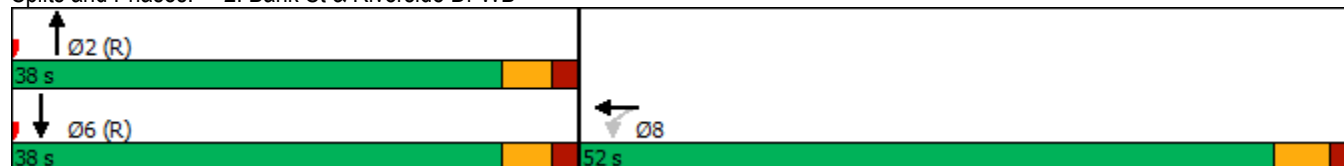
Intersection Capacity Utilization 85.1%

ICU Level of Service E

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.



















Splits and Phases: 2: Bank St & Riverside Dr WB



Lanes, Volumes, Timings  
3: Bank St & Riverside Dr EB

Total Projected 2022 PM

06/01/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	137	1510	151	0	0	0	0	407	327	0	1075	0
Future Volume (vph)	137	1510	151	0	0	0	0	407	327	0	1075	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0		45.0	0.0		0.0	0.0		60.0	0.0		0.0
Storage Lanes	1		1	0		0	0		1	0		0
Taper Length (m)	7.5			0.0			0.0			0.0		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		353.9			37.2			168.7			124.8	
Travel Time (s)		21.2			2.2			12.1			9.0	
Lane Group Flow (vph)	137	1510	151	0	0	0	0	407	327	0	1075	0
Turn Type	Perm	NA	Perm					NA	Perm		NA	
Protected Phases		4						2			6	
Permitted Phases	4		4						2			
Minimum Split (s)	29.1	29.1	29.1					25.5	25.5		25.5	
Total Split (s)	49.0	49.0	49.0					41.0	41.0		41.0	
Total Split (%)	54.4%	54.4%	54.4%					45.6%	45.6%		45.6%	
Yellow Time (s)	3.7	3.7	3.7					3.3	3.3		3.3	
All-Red Time (s)	2.4	2.4	2.4					2.2	2.2		2.2	
Lost Time Adjust (s)	0.0	0.0	0.0					0.0	0.0		0.0	
Total Lost Time (s)	6.1	6.1	6.1					5.5	5.5		5.5	
Lead/Lag												
Lead-Lag Optimize?												
Act Effct Green (s)	42.9	42.9	42.9					35.5	35.5		35.5	
Actuated g/C Ratio	0.48	0.48	0.48					0.39	0.39		0.39	
v/c Ratio	0.17	0.93	0.20					0.30	0.53		0.80	
Control Delay	13.7	27.0	11.2					18.0	20.3		20.8	
Queue Delay	0.0	0.0	0.0					0.0	0.0		0.8	
Total Delay	13.7	27.0	11.2					18.0	20.3		21.6	
LOS	B	C	B					B	C		C	
Approach Delay		24.6						19.0			21.6	
Approach LOS		C						B			C	
Queue Length 50th (m)	6.8	41.8	4.3					25.2	37.6		45.6	
Queue Length 95th (m)	m17.8	#169.6	m15.1					36.1	62.6		66.9	
Internal Link Dist (m)		329.9			13.2			144.7			100.8	
Turn Bay Length (m)	60.0		45.0						60.0			
Base Capacity (vph)	807	1615	738					1337	621		1337	
Starvation Cap Reductn	0	0	0					0	0		81	
Spillback Cap Reductn	0	0	0					0	0		0	
Storage Cap Reductn	0	0	0					0	0		0	
Reduced v/c Ratio	0.17	0.93	0.20					0.30	0.53		0.86	
Intersection Summary												
Area Type:	Other											
Cycle Length: 90												
Actuated Cycle Length: 90												
Offset: 61 (68%), Referenced to phase 2:NBT and 6:SBT, Start of Green												
Natural Cycle: 75												

Lanes, Volumes, Timings  
 3: Bank St & Riverside Dr EB

Total Projected 2022 PM

06/01/2020

Control Type: Pretimed

Maximum v/c Ratio: 0.93

Intersection Signal Delay: 22.6

Intersection LOS: C

Intersection Capacity Utilization 85.1%

ICU Level of Service E

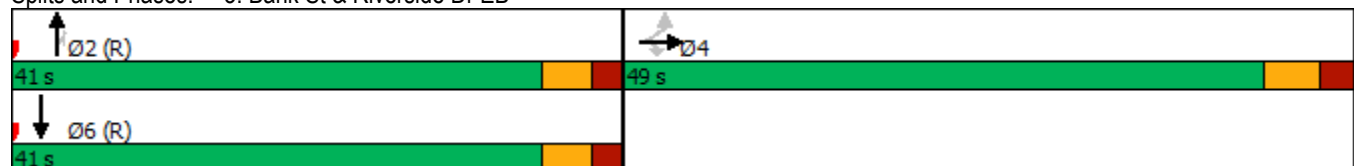
Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.













Splits and Phases: 3: Bank St & Riverside Dr EB



Lanes, Volumes, Timings  
4: Bank St & Billings Transit

Total Projected 2022 PM

06/01/2020

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	15	11	13	933	1359	14
Future Volume (vph)	15	11	13	933	1359	14
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	0.0	65.0			15.0
Storage Lanes	1	1	1			1
Taper Length (m)	0.0		7.5			
Right Turn on Red		Yes				Yes
Link Speed (k/h)	50			50	50	
Link Distance (m)	251.4			166.8	168.7	
Travel Time (s)	18.1			12.0	12.1	
Lane Group Flow (vph)	15	11	13	933	1359	14
Turn Type	Perm	Perm	pm+pt	NA	NA	Perm
Protected Phases			5	2	6	
Permitted Phases	4	4	2			6
Detector Phase	4	4	5	2	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	10.0	10.0	10.0
Minimum Split (s)	38.6	38.6	10.7	28.7	28.7	28.7
Total Split (s)	39.0	39.0	11.0	51.0	40.0	40.0
Total Split (%)	43.3%	43.3%	12.2%	56.7%	44.4%	44.4%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.3	2.3	2.4	2.4	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.6	5.6	5.7	5.7	5.7	5.7
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	None	None	None	C-Max	C-Max	C-Max
Act Effect Green (s)	7.3	7.3	78.4	81.8	79.3	79.3
Actuated g/C Ratio	0.08	0.08	0.87	0.91	0.88	0.88
v/c Ratio	0.21	0.15	0.07	0.30	0.45	0.02
Control Delay	44.9	24.1	2.9	1.9	3.2	3.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.9	24.1	2.9	1.9	3.2	3.5
LOS	D	C	A	A	A	A
Approach Delay	36.1			1.9	3.2	
Approach LOS	D			A	A	
Queue Length 50th (m)	2.5	0.0	0.2	0.0	1.1	0.0
Queue Length 95th (m)	8.3	4.9	1.6	29.1	39.7	m0.1
Internal Link Dist (m)	227.4			142.8	144.7	
Turn Bay Length (m)			65.0			15.0
Base Capacity (vph)	320	294	174	3080	2988	683
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.04	0.07	0.30	0.45	0.02
Intersection Summary						
Area Type:	Other					



Lanes, Volumes, Timings  
4: Bank St & Billings Transit

Total Projected 2022 PM  
06/01/2020

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 68 (76%), Referenced to phase 2:NBTL and 6:SBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.45

Intersection Signal Delay: 3.1

Intersection LOS: A

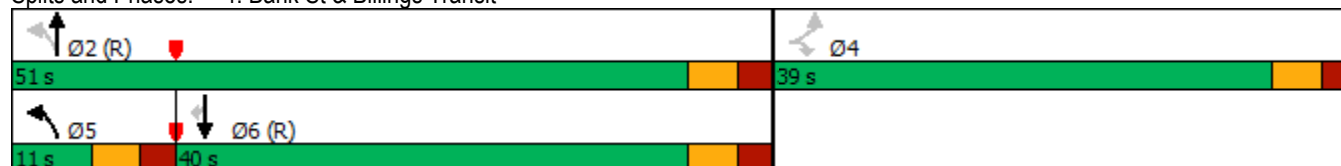
Intersection Capacity Utilization 53.2%

ICU Level of Service A

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.







Splits and Phases: 4: Bank St & Billings Transit



Lanes, Volumes, Timings  
5: Data Centre Rd & Riverside Dr

Total Projected 2022 PM

06/01/2020

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↓	↑↑	↓	↑
Traffic Volume (vph)	1583	10	69	1624	87	82
Future Volume (vph)	1583	10	69	1624	87	82
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)		40.0	75.0		85.0	0.0
Storage Lanes		1	1		1	1
Taper Length (m)			7.5		7.5	
Right Turn on Red		Yes				Yes
Link Speed (k/h)	60			60	50	
Link Distance (m)	262.9			119.4	217.7	
Travel Time (s)	15.8			7.2	15.7	
Lane Group Flow (vph)	1583	10	69	1624	87	82
Turn Type	NA	Perm	Prot	NA	Prot	Perm
Protected Phases	4		3	8	2	
Permitted Phases		4				2
Detector Phase	4	4	3	8	2	2
Switch Phase						
Minimum Initial (s)	10.0	10.0	5.0	10.0	5.0	5.0
Minimum Split (s)	23.4	23.4	11.1	23.4	23.1	23.1
Total Split (s)	47.0	47.0	17.0	64.0	26.0	26.0
Total Split (%)	52.2%	52.2%	18.9%	71.1%	28.9%	28.9%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.3	3.3
All-Red Time (s)	1.7	1.7	2.4	1.7	1.8	1.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.4	5.4	6.1	5.4	5.1	5.1
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	C-Max	C-Max	None	C-Max	None	None
Act Effect Green (s)	60.1	60.1	9.0	72.8	10.0	10.0
Actuated g/C Ratio	0.67	0.67	0.10	0.81	0.11	0.11
v/c Ratio	0.70	0.01	0.41	0.59	0.47	0.34
Control Delay	15.8	6.9	27.8	12.5	44.8	12.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.8	6.9	27.8	12.5	44.8	12.4
LOS	B	A	C	B	D	B
Approach Delay	15.7			13.1	29.1	
Approach LOS	B			B	C	
Queue Length 50th (m)	97.6	0.3	9.8	111.5	14.3	0.0
Queue Length 95th (m)	#161.2	2.6	m11.7	140.0	27.3	11.9
Internal Link Dist (m)	238.9			95.4	193.7	
Turn Bay Length (m)		40.0	75.0		85.0	
Base Capacity (vph)	2263	1014	211	2743	393	415
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.70	0.01	0.33	0.59	0.22	0.20
Intersection Summary						
Area Type:	Other					

# Lanes, Volumes, Timings

## 5: Data Centre Rd & Riverside Dr

Total Projected 2022 PM

06/01/2020

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 6 (7%), Referenced to phase 4:EBT and 8:WBT, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.70

Intersection Signal Delay: 15.1

Intersection LOS: B

Intersection Capacity Utilization 69.3%

ICU Level of Service C

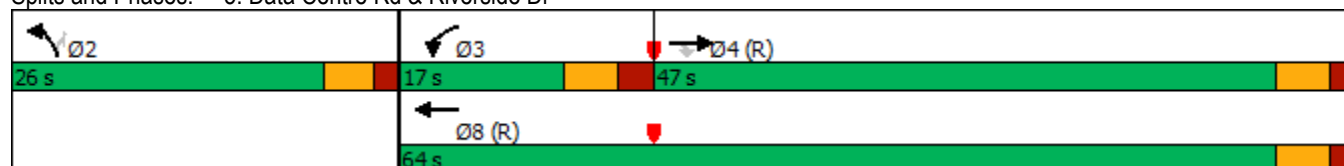
Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Data Centre Rd & Riverside Dr



Lanes, Volumes, Timings  
6: Pleasant Park Rd & Riverside Dr

Total Projected 2022 PM

06/01/2020

	→	↘	↙	←	↖	↗	
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø9
Lane Configurations	↑↑		↘	↑↑	↘	↗	
Traffic Volume (vph)	1287	193	132	1872	155	33	
Future Volume (vph)	1287	193	132	1872	155	33	
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	
Storage Length (m)		0.0	30.0		0.0	40.0	
Storage Lanes		0	1		1	1	
Taper Length (m)			7.5		0.0		
Right Turn on Red		Yes				Yes	
Link Speed (k/h)	60			60	50		
Link Distance (m)	242.5			151.7	243.4		
Travel Time (s)	14.6			9.1	17.5		
Lane Group Flow (vph)	1480	0	132	1872	155	33	
Turn Type	NA		pm+pt	NA	Prot	Perm	
Protected Phases	4		3	8	2		9
Permitted Phases			8			2	
Detector Phase	4		3	8	2	2	
Switch Phase							
Minimum Initial (s)	10.0		5.0	10.0	5.0	5.0	5.0
Minimum Split (s)	28.8		10.0	28.8	25.0	25.0	12.0
Total Split (s)	37.0		12.0	37.0	26.0	26.0	15.0
Total Split (%)	41.1%		13.3%	41.1%	28.9%	28.9%	17%
Yellow Time (s)	3.7		3.3	3.7	3.3	3.3	3.0
All-Red Time (s)	2.1		1.7	2.1	2.7	2.7	4.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.8		5.0	5.8	6.0	6.0	
Lead/Lag	Lag		Lead				
Lead-Lag Optimize?	Yes		Yes				
Recall Mode	C-Max		None	C-Max	Max	Max	None
Act Effect Green (s)	31.3		44.0	43.2	35.0	35.0	
Actuated g/C Ratio	0.35		0.49	0.48	0.39	0.39	
v/c Ratio	1.27		0.63	1.15	0.24	0.05	
Control Delay	148.9		27.8	100.0	19.7	6.5	
Queue Delay	0.0		0.0	0.0	0.0	0.0	
Total Delay	148.9		27.8	100.0	19.7	6.5	
LOS	F		C	F	B	A	
Approach Delay	148.9			95.3	17.4		
Approach LOS	F			F	B		
Queue Length 50th (m)	~173.0		12.1	~202.3	17.7	0.0	
Queue Length 95th (m)	m#199.2		#28.7	#244.1	31.3	5.5	
Internal Link Dist (m)	218.5			127.7	219.4		
Turn Bay Length (m)			30.0			40.0	
Base Capacity (vph)	1166		212	1627	659	610	
Starvation Cap Reductn	0		0	0	0	0	
Spillback Cap Reductn	0		0	0	0	0	
Storage Cap Reductn	0		0	0	0	0	
Reduced v/c Ratio	1.27		0.62	1.15	0.24	0.05	
Intersection Summary							
Area Type:	Other						

# Lanes, Volumes, Timings

## 6: Pleasant Park Rd & Riverside Dr

Total Projected 2022 PM

06/01/2020

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 75 (83%), Referenced to phase 4:EBT and 8:WBTL, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.27

Intersection Signal Delay: 112.9

Intersection LOS: F

Intersection Capacity Utilization 74.8%

ICU Level of Service D

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

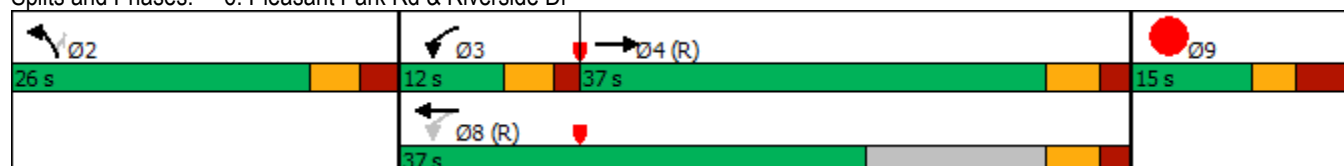
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: Pleasant Park Rd & Riverside Dr



Lanes, Volumes, Timings  
7: Site Access & Riverside Dr WB

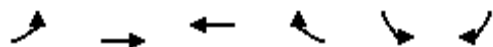
Total Projected 2022 PM  
06/01/2020

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations				↕↕		
Traffic Volume (vph)	0	0	45	1895	0	0
Future Volume (vph)	0	0	45	1895	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Link Speed (k/h)	60			60	40	
Link Distance (m)	35.0			277.6	39.5	
Travel Time (s)	2.1			16.7	3.6	
Lane Group Flow (vph)	0	0	0	1940	0	0
Sign Control	Free			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	60.0%			ICU Level of Service B		
Analysis Period (min)	15					

Intersection Sign configuration not allowed in HCM analysis.

Lanes, Volumes, Timings  
8: Riverside Dr EB & Site Access

Total Projected 2022 PM  
06/01/2020



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑			↘	
Traffic Volume (vph)	0	1838	0	0	29	0
Future Volume (vph)	0	1838	0	0	29	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Link Speed (k/h)		60	60		40	
Link Distance (m)		37.2	314.3		40.9	
Travel Time (s)		2.2	18.9		3.7	
Lane Group Flow (vph)	0	1838	0	0	29	0
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 63.6% ICU Level of Service B

Analysis Period (min) 15

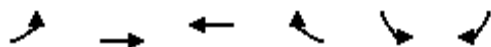


# HCM Unsignalized Intersection Capacity Analysis

## 8: Riverside Dr EB & Site Access

Total Projected 2022 PM

06/01/2020













Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑			↘	
Traffic Volume (veh/h)	0	1838	0	0	29	0
Future Volume (Veh/h)	0	1838	0	0	29	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	1838	0	0	29	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)		37				
pX, platoon unblocked					0.57	
vC, conflicting volume	0				919	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0				0	0
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				95	100
cM capacity (veh/h)	1622				588	1084
Direction, Lane #	EB 1	EB 2	SB 1			
Volume Total	919	919	29			
Volume Left	0	0	29			
Volume Right	0	0	0			
cSH	1700	1700	588			
Volume to Capacity	0.54	0.54	0.05			
Queue Length 95th (m)	0.0	0.0	1.2			
Control Delay (s)	0.0	0.0	11.4			
Lane LOS			B			
Approach Delay (s)	0.0		11.4			
Approach LOS			B			
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			63.6%	ICU Level of Service		B
Analysis Period (min)			15			

**Total Projected 2027**

Lanes, Volumes, Timings  
1: Bank St & Riverdale Ave

Total Projected 2027 AM  
06/01/2020

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	98	6	1237	98	6	521
Future Volume (vph)	98	6	1237	98	6	521
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Right Turn on Red		Yes		Yes		
Link Speed (k/h)	40		50			50
Link Distance (m)	227.4		190.3			201.0
Travel Time (s)	20.5		13.7			14.5
Lane Group Flow (vph)	104	0	1335	0	0	527
Turn Type	Prot		NA		Perm	NA
Protected Phases	8		2			6
Permitted Phases					6	
Detector Phase	8		2		6	6
Switch Phase						
Minimum Initial (s)	5.0		10.0		10.0	10.0
Minimum Split (s)	22.0		22.5		22.5	22.5
Total Split (s)	22.0		48.0		48.0	48.0
Total Split (%)	31.4%		68.6%		68.6%	68.6%
Yellow Time (s)	3.0		3.3		3.3	3.3
All-Red Time (s)	3.2		2.6		2.6	2.6
Lost Time Adjust (s)	0.0		0.0			0.0
Total Lost Time (s)	6.2		5.9			5.9
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None		C-Max		C-Max	C-Max
Act Effect Green (s)	9.5		52.0			52.0
Actuated g/C Ratio	0.14		0.74			0.74
v/c Ratio	0.45		0.53			0.22
Control Delay	32.2		6.4			4.3
Queue Delay	0.0		0.0			0.0
Total Delay	32.2		6.4			4.3
LOS	C		A			A
Approach Delay	32.2		6.4			4.3
Approach LOS	C		A			A
Queue Length 50th (m)	12.2		37.6			10.9
Queue Length 95th (m)	24.1		63.5			19.8
Internal Link Dist (m)	203.4		166.3			177.0
Turn Bay Length (m)						
Base Capacity (vph)	384		2496			2367
Starvation Cap Reductn	0		0			0
Spillback Cap Reductn	0		0			0
Storage Cap Reductn	0		0			0
Reduced v/c Ratio	0.27		0.53			0.22
<b>Intersection Summary</b>						
Area Type:	Other					
Cycle Length: 70						
Actuated Cycle Length: 70						
Offset: 17 (24%), Referenced to phase 2:NBT and 6:SBTL, Start of Green						

Lanes, Volumes, Timings  
1: Bank St & Riverdale Ave

Total Projected 2027 AM  
06/01/2020

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.53

Intersection Signal Delay: 7.2

Intersection LOS: A

Intersection Capacity Utilization 55.6%

ICU Level of Service B

Analysis Period (min) 15

















Splits and Phases: 1: Bank St & Riverdale Ave



Lanes, Volumes, Timings  
2: Bank St & Riverside Dr WB

Total Projected 2027 AM

06/01/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	283	1117	272	0	952	0	0	406	182
Future Volume (vph)	0	0	0	283	1117	272	0	952	0	0	406	182
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	75.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (m)	0.0			7.5			0.0			0.0		
Right Turn on Red			Yes			Yes			Yes			No
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		344.9			35.3			124.8			190.3	
Travel Time (s)		20.7			2.1			9.0			13.7	
Lane Group Flow (vph)	0	0	0	283	1389	0	0	952	0	0	588	0
Turn Type				Perm	NA			NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8								
Minimum Split (s)				28.5	28.5			30.2			30.2	
Total Split (s)				50.0	50.0			40.0			40.0	
Total Split (%)				55.6%	55.6%			44.4%			44.4%	
Yellow Time (s)				3.7	3.7			3.3			3.3	
All-Red Time (s)				1.8	1.8			1.9			1.9	
Lost Time Adjust (s)				0.0	0.0			0.0			0.0	
Total Lost Time (s)				5.5	5.5			5.2			5.2	
Lead/Lag												
Lead-Lag Optimize?												
Act Effect Green (s)				44.5	44.5			34.8			34.8	
Actuated g/C Ratio				0.49	0.49			0.39			0.39	
v/c Ratio				0.34	0.84			0.73			0.47	
Control Delay				5.9	15.1			9.4			22.2	
Queue Delay				0.0	0.0			0.1			0.0	
Total Delay				5.9	15.1			9.5			22.2	
LOS				A	B			A			C	
Approach Delay					13.5			9.5			22.2	
Approach LOS					B			A			C	
Queue Length 50th (m)				11.9	115.5			14.8			39.3	
Queue Length 95th (m)				17.5	149.6			17.8			54.0	
Internal Link Dist (m)		320.9			11.3			100.8			166.3	
Turn Bay Length (m)				75.0								
Base Capacity (vph)				838	1647			1310			1250	
Starvation Cap Reductn				0	0			29			0	
Spillback Cap Reductn				0	0			0			0	
Storage Cap Reductn				0	0			0			0	
Reduced v/c Ratio				0.34	0.84			0.74			0.47	
Intersection Summary												
Area Type:	Other											
Cycle Length: 90												
Actuated Cycle Length: 90												
Offset: 41 (46%), Referenced to phase 2:NBT and 6:SBT, Start of Green												
Natural Cycle: 65												

Lanes, Volumes, Timings  
2: Bank St & Riverside Dr WB

Total Projected 2027 AM

06/01/2020

Control Type: Pretimed

Maximum v/c Ratio: 0.84

Intersection Signal Delay: 13.9

Intersection LOS: B

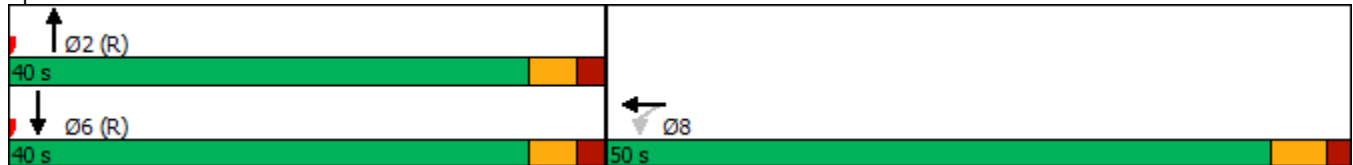
Intersection Capacity Utilization 78.4%

ICU Level of Service D

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.






















Splits and Phases: 2: Bank St & Riverside Dr WB



Lanes, Volumes, Timings  
3: Bank St & Riverside Dr EB

Total Projected 2027 AM

06/01/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 						 			 	
Traffic Volume (vph)	158	1447	50	0	0	0	0	860	331	0	625	0
Future Volume (vph)	158	1447	50	0	0	0	0	860	331	0	625	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0		45.0	0.0		0.0	0.0		60.0	0.0		0.0
Storage Lanes	1		1	0		0	0		1	0		0
Taper Length (m)	7.5			0.0			0.0			0.0		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		353.9			34.1			168.7			124.8	
Travel Time (s)		21.2			2.0			12.1			9.0	
Lane Group Flow (vph)	158	1447	50	0	0	0	0	860	331	0	625	0
Turn Type	Perm	NA	Perm					NA	Perm		NA	
Protected Phases		4						2			6	
Permitted Phases	4		4						2			
Minimum Split (s)	29.1	29.1	29.1					25.5	25.5		25.5	
Total Split (s)	54.0	54.0	54.0					36.0	36.0		36.0	
Total Split (%)	60.0%	60.0%	60.0%					40.0%	40.0%		40.0%	
Yellow Time (s)	3.7	3.7	3.7					3.3	3.3		3.3	
All-Red Time (s)	2.4	2.4	2.4					2.2	2.2		2.2	
Lost Time Adjust (s)	0.0	0.0	0.0					0.0	0.0		0.0	
Total Lost Time (s)	6.1	6.1	6.1					5.5	5.5		5.5	
Lead/Lag												
Lead-Lag Optimize?												
Act Effct Green (s)	47.9	47.9	47.9					30.5	30.5		30.5	
Actuated g/C Ratio	0.53	0.53	0.53					0.34	0.34		0.34	
v/c Ratio	0.18	0.80	0.06					0.75	0.61		0.54	
Control Delay	10.2	24.5	4.8					29.8	26.0		20.0	
Queue Delay	0.0	0.0	0.0					0.0	0.0		0.0	
Total Delay	10.2	24.5	4.8					29.8	26.0		20.0	
LOS	B	C	A					C	C		C	
Approach Delay		22.6						28.7			20.0	
Approach LOS		C						C			C	
Queue Length 50th (m)	19.9	141.1	3.2					68.5	41.7		31.4	
Queue Length 95th (m)	m19.6	163.5	m3.6					90.4	69.7		43.3	
Internal Link Dist (m)		329.9			10.1			144.7			100.8	
Turn Bay Length (m)	60.0		45.0						60.0			
Base Capacity (vph)	902	1804	825					1148	539		1148	
Starvation Cap Reductn	0	0	0					0	0		0	
Spillback Cap Reductn	0	0	0					0	0		0	
Storage Cap Reductn	0	0	0					0	0		0	
Reduced v/c Ratio	0.18	0.80	0.06					0.75	0.61		0.54	
Intersection Summary												
Area Type:	Other											
Cycle Length: 90												
Actuated Cycle Length: 90												
Offset: 36 (40%), Referenced to phase 2:NBT and 6:SBT, Start of Green												
Natural Cycle: 60												

Lanes, Volumes, Timings  
3: Bank St & Riverside Dr EB

Total Projected 2027 AM

06/01/2020

Control Type: Pretimed

Maximum v/c Ratio: 0.80

Intersection Signal Delay: 24.2

Intersection LOS: C

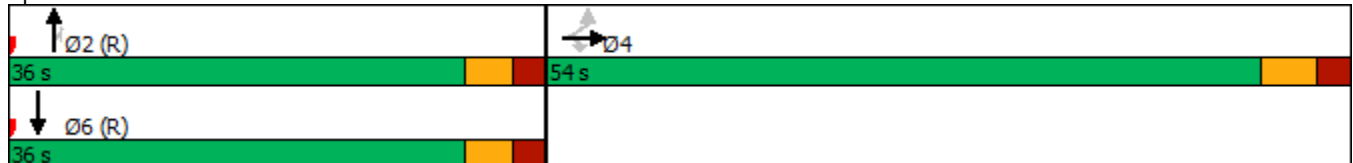
Intersection Capacity Utilization 78.4%

ICU Level of Service D

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Bank St & Riverside Dr EB

















Lanes, Volumes, Timings  
4: Bank St & Billings Transit

Total Projected 2027 AM

06/01/2020

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	8	11	12	1057	723	9
Future Volume (vph)	8	11	12	1057	723	9
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	0.0	65.0			15.0
Storage Lanes	1	1	1			1
Taper Length (m)	0.0		7.5			
Right Turn on Red		Yes				Yes
Link Speed (k/h)	50			50	50	
Link Distance (m)	251.4			166.8	168.7	
Travel Time (s)	18.1			12.0	12.1	
Lane Group Flow (vph)	8	11	12	1057	723	9
Turn Type	Perm	Perm	pm+pt	NA	NA	Perm
Protected Phases			5	2	6	
Permitted Phases	4	4	2			6
Detector Phase	4	4	5	2	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	10.0	10.0	10.0
Minimum Split (s)	38.6	38.6	10.7	28.7	28.7	28.7
Total Split (s)	39.0	39.0	11.0	51.0	40.0	40.0
Total Split (%)	43.3%	43.3%	12.2%	56.7%	44.4%	44.4%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.3	2.3	2.4	2.4	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.6	5.6	5.7	5.7	5.7	5.7
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	None	None	None	C-Max	C-Max	C-Max
Act Effect Green (s)	6.6	6.6	78.9	82.3	79.9	79.9
Actuated g/C Ratio	0.07	0.07	0.88	0.91	0.89	0.89
v/c Ratio	0.13	0.16	0.04	0.34	0.24	0.01
Control Delay	42.6	25.7	2.1	1.8	0.8	0.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.6	25.7	2.1	1.8	0.8	0.7
LOS	D	C	A	A	A	A
Approach Delay	32.8			1.8	0.8	
Approach LOS	C			A	A	
Queue Length 50th (m)	1.3	0.0	0.1	0.0	0.0	0.0
Queue Length 95th (m)	5.5	5.0	1.3	30.9	7.2	m0.1
Internal Link Dist (m)	227.4			142.8	144.7	
Turn Bay Length (m)			65.0			15.0
Base Capacity (vph)	320	294	313	3101	3009	687
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.04	0.04	0.34	0.24	0.01
Intersection Summary						
Area Type:	Other					

Lanes, Volumes, Timings  
4: Bank St & Billings Transit

Total Projected 2027 AM  
06/01/2020

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 50 (56%), Referenced to phase 2:NBTL and 6:SBT, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.34

Intersection Signal Delay: 1.8

Intersection LOS: A

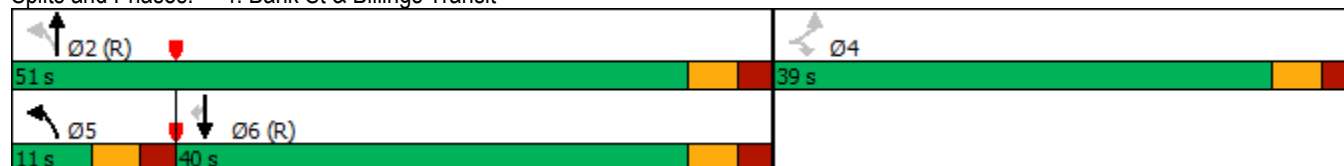
Intersection Capacity Utilization 44.4%

ICU Level of Service A

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: Bank St & Billings Transit



Lanes, Volumes, Timings  
5: Data Centre Rd & Riverside Dr

Total Projected 2027 AM  
06/01/2020

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↘	↑↑	↘	↑
Traffic Volume (vph)	1501	88	96	1035	47	70
Future Volume (vph)	1501	88	96	1035	47	70
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)		40.0	75.0		85.0	0.0
Storage Lanes		1	1		1	1
Taper Length (m)			7.5		7.5	
Right Turn on Red		Yes				Yes
Link Speed (k/h)	60			60	50	
Link Distance (m)	262.9			119.4	217.7	
Travel Time (s)	15.8			7.2	15.7	
Lane Group Flow (vph)	1501	88	96	1035	47	70
Turn Type	NA	Perm	Prot	NA	Prot	Perm
Protected Phases	4		3	8	2	
Permitted Phases		4				2
Detector Phase	4	4	3	8	2	2
Switch Phase						
Minimum Initial (s)	10.0	10.0	5.0	10.0	5.0	5.0
Minimum Split (s)	23.4	23.4	11.1	23.4	23.1	23.1
Total Split (s)	39.0	39.0	25.0	64.0	26.0	26.0
Total Split (%)	43.3%	43.3%	27.8%	71.1%	28.9%	28.9%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.3	3.3
All-Red Time (s)	1.7	1.7	2.4	1.7	1.8	1.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.4	5.4	6.1	5.4	5.1	5.1
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	C-Max	C-Max	None	C-Max	None	None
Act Effect Green (s)	60.7	60.7	10.4	74.7	8.0	8.0
Actuated g/C Ratio	0.67	0.67	0.12	0.83	0.09	0.09
v/c Ratio	0.66	0.08	0.49	0.37	0.31	0.35
Control Delay	14.1	5.3	53.5	1.5	43.1	14.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.1	5.3	53.5	1.5	43.1	14.9
LOS	B	A	D	A	D	B
Approach Delay	13.6			5.9	26.3	
Approach LOS	B			A	C	
Queue Length 50th (m)	86.6	2.7	17.8	10.5	7.8	0.0
Queue Length 95th (m)	138.3	10.1	m22.9	m13.7	17.5	11.5
Internal Link Dist (m)	238.9			95.4	193.7	
Turn Bay Length (m)		40.0	75.0		85.0	
Base Capacity (vph)	2285	1037	355	2813	393	406
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.66	0.08	0.27	0.37	0.12	0.17
Intersection Summary						
Area Type:	Other					

# Lanes, Volumes, Timings 5: Data Centre Rd & Riverside Dr

Total Projected 2027 AM  
06/01/2020

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 37 (41%), Referenced to phase 4:EBT and 8:WBT, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.66

Intersection Signal Delay: 11.1

Intersection LOS: B

Intersection Capacity Utilization 67.4%

ICU Level of Service C

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Data Centre Rd & Riverside Dr



Lanes, Volumes, Timings  
6: Pleasant Park Rd & Riverside Dr

Total Projected 2027 AM

06/01/2020

	→	↘	↙	←	↖	↗	
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø9
Lane Configurations	↑↑		↘	↑↑	↘	↗	
Traffic Volume (vph)	1245	97	32	1280	168	36	
Future Volume (vph)	1245	97	32	1280	168	36	
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	
Storage Length (m)		0.0	30.0		0.0	40.0	
Storage Lanes		0	1		1	1	
Taper Length (m)			7.5		0.0		
Right Turn on Red		Yes				Yes	
Link Speed (k/h)	60			60	50		
Link Distance (m)	242.5			151.7	243.4		
Travel Time (s)	14.6			9.1	17.5		
Lane Group Flow (vph)	1342	0	32	1280	168	36	
Turn Type	NA		pm+pt	NA	Prot	Perm	
Protected Phases	4		3	8	2		9
Permitted Phases			8			2	
Detector Phase	4		3	8	2	2	
Switch Phase							
Minimum Initial (s)	10.0		5.0	10.0	5.0	5.0	5.0
Minimum Split (s)	28.8		10.0	28.8	25.0	25.0	12.0
Total Split (s)	37.0		10.0	37.0	28.0	28.0	15.0
Total Split (%)	41.1%		11.1%	41.1%	31.1%	31.1%	17%
Yellow Time (s)	3.7		3.3	3.7	3.3	3.3	3.0
All-Red Time (s)	2.1		1.7	2.1	2.7	2.7	4.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.8		5.0	5.8	6.0	6.0	
Lead/Lag	Lag		Lead				
Lead-Lag Optimize?	Yes		Yes				
Recall Mode	C-Max		None	C-Max	Max	Max	None
Act Effect Green (s)	35.2		42.0	41.2	37.0	37.0	
Actuated g/C Ratio	0.39		0.47	0.46	0.41	0.41	
v/c Ratio	1.02		0.19	0.83	0.24	0.06	
Control Delay	53.1		15.6	26.9	18.5	5.9	
Queue Delay	0.0		0.0	0.0	0.0	0.0	
Total Delay	53.1		15.6	26.9	18.5	5.9	
LOS	D		B	C	B	A	
Approach Delay	53.1			26.7	16.3		
Approach LOS	D			C	B		
Queue Length 50th (m)	~145.9		2.9	97.9	18.5	0.0	
Queue Length 95th (m)	#188.6		7.6	126.0	32.3	5.3	
Internal Link Dist (m)	218.5			127.7	219.4		
Turn Bay Length (m)			30.0			40.0	
Base Capacity (vph)	1317		171	1551	696	644	
Starvation Cap Reductn	0		0	0	0	0	
Spillback Cap Reductn	0		0	0	0	0	
Storage Cap Reductn	0		0	0	0	0	
Reduced v/c Ratio	1.02		0.19	0.83	0.24	0.06	
Intersection Summary							
Area Type:	Other						

# Lanes, Volumes, Timings

## 6: Pleasant Park Rd & Riverside Dr

Total Projected 2027 AM

06/01/2020

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 50 (56%), Referenced to phase 4:EBT and 8:WBTL, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.02

Intersection Signal Delay: 38.3

Intersection LOS: D

Intersection Capacity Utilization 59.2%

ICU Level of Service B

Analysis Period (min) 15

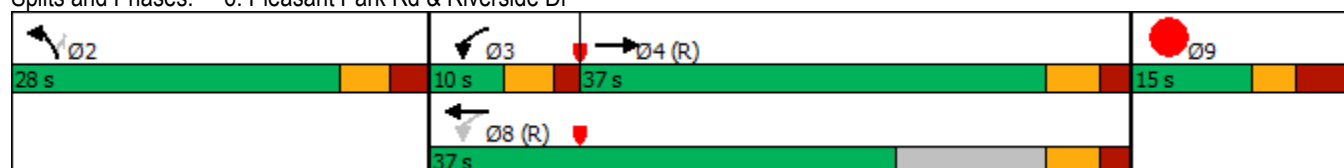
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 6: Pleasant Park Rd & Riverside Dr



Lanes, Volumes, Timings  
7: Site Access & Riverside Dr WB

Total Projected 2027 AM  
06/01/2020

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations				↕↕		
Traffic Volume (vph)	0	0	15	1671	0	0
Future Volume (vph)	0	0	15	1671	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Link Speed (k/h)	60			60	40	
Link Distance (m)	35.3			277.3	43.7	
Travel Time (s)	2.1			16.6	3.9	
Lane Group Flow (vph)	0	0	0	1686	0	0
Sign Control	Free			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	52.5%			ICU Level of Service A		
Analysis Period (min)	15					

Intersection Sign configuration not allowed in HCM analysis.



Lanes, Volumes, Timings  
8: Riverside Dr EB & Site Access

Total Projected 2027 AM  
06/01/2020



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑			↵	
Traffic Volume (vph)	0	1778	0	0	48	0
Future Volume (vph)	0	1778	0	0	48	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Link Speed (k/h)		60	60		40	
Link Distance (m)		34.1	317.4		44.6	
Travel Time (s)		2.0	19.0		4.0	
Lane Group Flow (vph)	0	1778	0	0	48	0
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 61.9% ICU Level of Service B

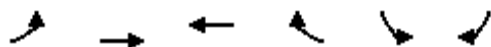
Analysis Period (min) 15

# HCM Unsignalized Intersection Capacity Analysis

## 8: Riverside Dr EB & Site Access

Total Projected 2027 AM










06/01/2020



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑			↘	
Traffic Volume (veh/h)	0	1778	0	0	48	0
Future Volume (Veh/h)	0	1778	0	0	48	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	1778	0	0	48	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)		34				
pX, platoon unblocked					0.65	
vC, conflicting volume	0				889	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0				0	0
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				93	100
cM capacity (veh/h)	1622				663	1084
Direction, Lane #	EB 1	EB 2	SB 1			
Volume Total	889	889	48			
Volume Left	0	0	48			
Volume Right	0	0	0			
cSH	1700	1700	663			
Volume to Capacity	0.52	0.52	0.07			
Queue Length 95th (m)	0.0	0.0	1.8			
Control Delay (s)	0.0	0.0	10.9			
Lane LOS			B			
Approach Delay (s)	0.0		10.9			
Approach LOS			B			
Intersection Summary						
Average Delay			0.3			
Intersection Capacity Utilization			61.9%	ICU Level of Service		B
Analysis Period (min)			15			

Lanes, Volumes, Timings  
1: Bank St & Riverdale Ave

Total Projected 2027 PM  
06/01/2020

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	134	11	587	196	9	889
Future Volume (vph)	134	11	587	196	9	889
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Right Turn on Red		Yes		Yes		
Link Speed (k/h)	40		50			50
Link Distance (m)	227.4		190.3			201.0
Travel Time (s)	20.5		13.7			14.5
Lane Group Flow (vph)	145	0	783	0	0	898
Turn Type	Prot		NA		Perm	NA
Protected Phases	8		2			6
Permitted Phases					6	
Detector Phase	8		2		6	6
Switch Phase						
Minimum Initial (s)	5.0		10.0		10.0	10.0
Minimum Split (s)	22.0		22.5		22.5	22.5
Total Split (s)	22.0		68.0		68.0	68.0
Total Split (%)	24.4%		75.6%		75.6%	75.6%
Yellow Time (s)	3.0		3.3		3.3	3.3
All-Red Time (s)	3.2		2.6		2.6	2.6
Lost Time Adjust (s)	0.0		0.0			0.0
Total Lost Time (s)	6.2		5.9			5.9
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None		C-Max		C-Max	C-Max
Act Effect Green (s)	12.4		65.5			65.5
Actuated g/C Ratio	0.14		0.73			0.73
v/c Ratio	0.62		0.33			0.38
Control Delay	46.6		1.6			5.5
Queue Delay	0.0		0.0			0.0
Total Delay	46.6		1.6			5.5
LOS	D		A			A
Approach Delay	46.6		1.6			5.5
Approach LOS	D		A			A
Queue Length 50th (m)	23.1		5.1			26.2
Queue Length 95th (m)	40.1		m7.3			40.2
Internal Link Dist (m)	203.4		166.3			177.0
Turn Bay Length (m)						
Base Capacity (vph)	299		2406			2338
Starvation Cap Reductn	0		0			0
Spillback Cap Reductn	0		0			0
Storage Cap Reductn	0		0			0
Reduced v/c Ratio	0.48		0.33			0.38
Intersection Summary						
Area Type:	Other					
Cycle Length: 90						
Actuated Cycle Length: 90						
Offset: 57 (63%), Referenced to phase 2:NBT and 6:SBTL, Start of Green						

Lanes, Volumes, Timings  
1: Bank St & Riverdale Ave

Total Projected 2027 PM  
06/01/2020

Natural Cycle: 45

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.62

Intersection Signal Delay: 7.1

Intersection LOS: A

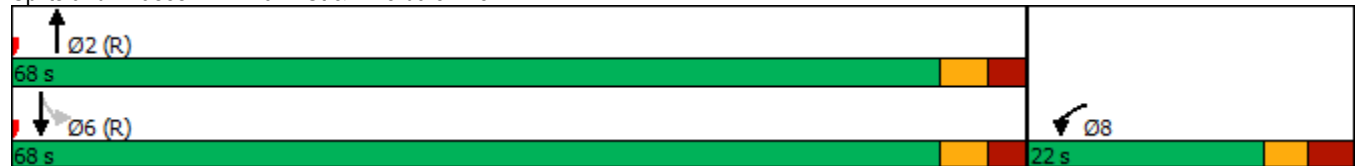
Intersection Capacity Utilization 51.2%

ICU Level of Service A

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

















Splits and Phases: 1: Bank St & Riverdale Ave



Lanes, Volumes, Timings  
2: Bank St & Riverside Dr WB

Total Projected 2027 PM

06/01/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	415	1479	127	0	576	0	0	717	239
Future Volume (vph)	0	0	0	415	1479	127	0	576	0	0	717	239
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	75.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (m)	0.0			7.5			0.0			0.0		
Right Turn on Red			Yes			Yes			Yes			No
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		344.9			35.0			124.8			190.3	
Travel Time (s)		20.7			2.1			9.0			13.7	
Lane Group Flow (vph)	0	0	0	415	1606	0	0	576	0	0	956	0
Turn Type				Perm	NA			NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8								
Minimum Split (s)				28.5	28.5			30.2			30.2	
Total Split (s)				52.0	52.0			38.0			38.0	
Total Split (%)				57.8%	57.8%			42.2%			42.2%	
Yellow Time (s)				3.7	3.7			3.3			3.3	
All-Red Time (s)				1.8	1.8			1.9			1.9	
Lost Time Adjust (s)				0.0	0.0			0.0			0.0	
Total Lost Time (s)				5.5	5.5			5.2			5.2	
Lead/Lag												
Lead-Lag Optimize?												
Act Effect Green (s)				46.5	46.5			32.8			32.8	
Actuated g/C Ratio				0.52	0.52			0.36			0.36	
v/c Ratio				0.47	0.92			0.47			0.80	
Control Delay				3.7	10.1			11.9			27.3	
Queue Delay				0.0	0.0			0.0			1.4	
Total Delay				3.7	10.1			11.9			28.6	
LOS				A	B			B			C	
Approach Delay					8.8			11.9			28.6	
Approach LOS					A			B			C	
Queue Length 50th (m)				9.7	92.7			17.4			80.1	
Queue Length 95th (m)				m9.3	m45.0			23.0			103.8	
Internal Link Dist (m)		320.9			11.0			100.8			166.3	
Turn Bay Length (m)				75.0								
Base Capacity (vph)				875	1738			1235			1188	
Starvation Cap Reductn				0	0			0			0	
Spillback Cap Reductn				0	0			0			92	
Storage Cap Reductn				0	0			0			0	
Reduced v/c Ratio				0.47	0.92			0.47			0.87	
Intersection Summary												
Area Type:	Other											
Cycle Length: 90												
Actuated Cycle Length: 90												
Offset: 64 (71%), Referenced to phase 2:NBT and 6:SBT, Start of Green												
Natural Cycle: 75												

Lanes, Volumes, Timings  
2: Bank St & Riverside Dr WB

Total Projected 2027 PM  
06/01/2020

Control Type: Pretimed

Maximum v/c Ratio: 0.92

Intersection Signal Delay: 14.6

Intersection LOS: B

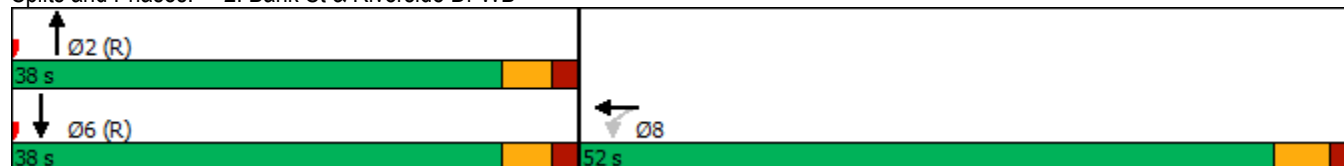
Intersection Capacity Utilization 89.6%

ICU Level of Service E

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.



















Splits and Phases: 2: Bank St & Riverside Dr WB



Lanes, Volumes, Timings  
3: Bank St & Riverside Dr EB

Total Projected 2027 PM

06/01/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	144	1605	159	0	0	0	0	428	353	0	1135	0
Future Volume (vph)	144	1605	159	0	0	0	0	428	353	0	1135	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0		45.0	0.0		0.0	0.0		60.0	0.0		0.0
Storage Lanes	1		1	0		0	0		1	0		0
Taper Length (m)	7.5			0.0			0.0			0.0		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		353.9			37.2			168.7			124.8	
Travel Time (s)		21.2			2.2			12.1			9.0	
Lane Group Flow (vph)	144	1605	159	0	0	0	0	428	353	0	1135	0
Turn Type	Perm	NA	Perm					NA	Perm		NA	
Protected Phases		4						2			6	
Permitted Phases	4		4						2			
Minimum Split (s)	29.1	29.1	29.1					25.5	25.5		25.5	
Total Split (s)	51.0	51.0	51.0					39.0	39.0		39.0	
Total Split (%)	56.7%	56.7%	56.7%					43.3%	43.3%		43.3%	
Yellow Time (s)	3.7	3.7	3.7					3.3	3.3		3.3	
All-Red Time (s)	2.4	2.4	2.4					2.2	2.2		2.2	
Lost Time Adjust (s)	0.0	0.0	0.0					0.0	0.0		0.0	
Total Lost Time (s)	6.1	6.1	6.1					5.5	5.5		5.5	
Lead/Lag												
Lead-Lag Optimize?												
Act Effct Green (s)	44.9	44.9	44.9					33.5	33.5		33.5	
Actuated g/C Ratio	0.50	0.50	0.50					0.37	0.37		0.37	
v/c Ratio	0.17	0.95	0.21					0.34	0.60		0.90	
Control Delay	13.3	27.6	11.1					19.6	23.6		29.0	
Queue Delay	0.0	0.0	0.0					0.0	0.0		2.8	
Total Delay	13.3	27.6	11.1					19.6	23.6		31.8	
LOS	B	C	B					B	C		C	
Approach Delay		25.2						21.4			31.8	
Approach LOS		C						C			C	
Queue Length 50th (m)	7.5	46.4	4.9					27.8	43.6		54.9	
Queue Length 95th (m)	m17.7	#180.7	m15.2					39.4	71.5		#131.0	
Internal Link Dist (m)		329.9			13.2			144.7			100.8	
Turn Bay Length (m)	60.0		45.0						60.0			
Base Capacity (vph)	845	1691	771					1261	588		1261	
Starvation Cap Reductn	0	0	0					0	0		63	
Spillback Cap Reductn	0	0	0					0	0		0	
Storage Cap Reductn	0	0	0					0	0		0	
Reduced v/c Ratio	0.17	0.95	0.21					0.34	0.60		0.95	
Intersection Summary												
Area Type:	Other											
Cycle Length: 90												
Actuated Cycle Length: 90												
Offset: 61 (68%), Referenced to phase 2:NBT and 6:SBT, Start of Green												
Natural Cycle: 90												

# Lanes, Volumes, Timings

## 3: Bank St & Riverside Dr EB

Total Projected 2027 PM

06/01/2020

Control Type: Pretimed

Maximum v/c Ratio: 0.95

Intersection Signal Delay: 26.4

Intersection LOS: C

Intersection Capacity Utilization 89.6%

ICU Level of Service E

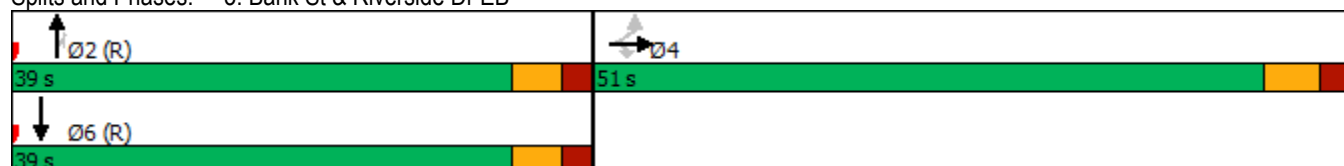
Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Bank St & Riverside Dr EB

















Lanes, Volumes, Timings  
4: Bank St & Billings Transit

Total Projected 2027 PM

06/01/2020

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	15	11	13	990	1433	14
Future Volume (vph)	15	11	13	990	1433	14
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	0.0	65.0			15.0
Storage Lanes	1	1	1			1
Taper Length (m)	0.0		7.5			
Right Turn on Red		Yes				Yes
Link Speed (k/h)	50			50	50	
Link Distance (m)	251.4			166.8	168.7	
Travel Time (s)	18.1			12.0	12.1	
Lane Group Flow (vph)	15	11	13	990	1433	14
Turn Type	Perm	Perm	pm+pt	NA	NA	Perm
Protected Phases			5	2	6	
Permitted Phases	4	4	2			6
Detector Phase	4	4	5	2	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	10.0	10.0	10.0
Minimum Split (s)	38.6	38.6	10.7	28.7	28.7	28.7
Total Split (s)	39.0	39.0	11.0	51.0	40.0	40.0
Total Split (%)	43.3%	43.3%	12.2%	56.7%	44.4%	44.4%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.3	2.3	2.4	2.4	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.6	5.6	5.7	5.7	5.7	5.7
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	None	None	None	C-Max	C-Max	C-Max
Act Effect Green (s)	7.3	7.3	78.4	81.8	79.3	79.3
Actuated g/C Ratio	0.08	0.08	0.87	0.91	0.88	0.88
v/c Ratio	0.21	0.15	0.08	0.32	0.48	0.02
Control Delay	44.9	24.1	3.1	2.0	4.1	3.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.9	24.1	3.1	2.0	4.1	3.0
LOS	D	C	A	A	A	A
Approach Delay	36.1			2.0	4.1	
Approach LOS	D			A	A	
Queue Length 50th (m)	2.5	0.0	0.2	0.0	2.6	0.0
Queue Length 95th (m)	8.3	4.9	1.6	31.4	m40.5	m0.0
Internal Link Dist (m)	227.4			142.8	144.7	
Turn Bay Length (m)			65.0			15.0
Base Capacity (vph)	320	294	163	3080	2988	683
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.04	0.08	0.32	0.48	0.02
Intersection Summary						
Area Type:	Other					

Lanes, Volumes, Timings  
4: Bank St & Billings Transit

Total Projected 2027 PM  
06/01/2020

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 68 (76%), Referenced to phase 2:NBTL and 6:SBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.48

Intersection Signal Delay: 3.6

Intersection LOS: A

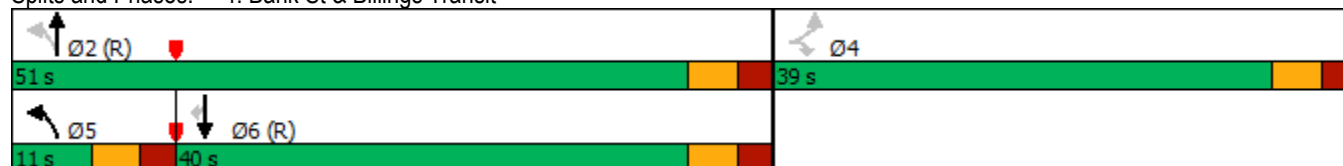
Intersection Capacity Utilization 55.4%

ICU Level of Service B

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.







Splits and Phases: 4: Bank St & Billings Transit



Lanes, Volumes, Timings  
5: Data Centre Rd & Riverside Dr

Total Projected 2027 PM

06/01/2020

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↓	↑↑	↓	↑
Traffic Volume (vph)	1671	10	69	1710	87	82
Future Volume (vph)	1671	10	69	1710	87	82
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)		40.0	75.0		85.0	0.0
Storage Lanes		1	1		1	1
Taper Length (m)			7.5		7.5	
Right Turn on Red		Yes				Yes
Link Speed (k/h)	60			60	50	
Link Distance (m)	262.9			119.4	217.7	
Travel Time (s)	15.8			7.2	15.7	
Lane Group Flow (vph)	1671	10	69	1710	87	82
Turn Type	NA	Perm	Prot	NA	Prot	Perm
Protected Phases	4		3	8	2	
Permitted Phases		4				2
Detector Phase	4	4	3	8	2	2
Switch Phase						
Minimum Initial (s)	10.0	10.0	5.0	10.0	5.0	5.0
Minimum Split (s)	23.4	23.4	11.1	23.4	23.1	23.1
Total Split (s)	47.0	47.0	17.0	64.0	26.0	26.0
Total Split (%)	52.2%	52.2%	18.9%	71.1%	28.9%	28.9%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.3	3.3
All-Red Time (s)	1.7	1.7	2.4	1.7	1.8	1.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.4	5.4	6.1	5.4	5.1	5.1
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	C-Max	C-Max	None	C-Max	None	None
Act Effect Green (s)	60.1	60.1	9.0	72.8	10.0	10.0
Actuated g/C Ratio	0.67	0.67	0.10	0.81	0.11	0.11
v/c Ratio	0.74	0.01	0.41	0.62	0.47	0.34
Control Delay	17.0	7.3	29.8	12.4	44.8	12.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.0	7.3	29.8	12.4	44.8	12.4
LOS	B	A	C	B	D	B
Approach Delay	16.9			13.1	29.1	
Approach LOS	B			B	C	
Queue Length 50th (m)	108.5	0.3	10.1	119.0	14.3	0.0
Queue Length 95th (m)	#191.0	2.7	m11.4	m140.4	27.3	11.9
Internal Link Dist (m)	238.9			95.4	193.7	
Turn Bay Length (m)		40.0	75.0		85.0	
Base Capacity (vph)	2263	1014	211	2743	393	415
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.74	0.01	0.33	0.62	0.22	0.20
<b>Intersection Summary</b>						
Area Type:	Other					

# Lanes, Volumes, Timings 5: Data Centre Rd & Riverside Dr

Total Projected 2027 PM  
06/01/2020

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 6 (7%), Referenced to phase 4:EBT and 8:WBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.74

Intersection Signal Delay: 15.6

Intersection LOS: B

Intersection Capacity Utilization 71.8%

ICU Level of Service C

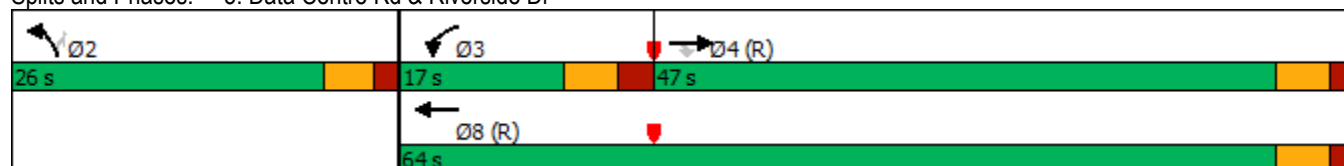
Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Data Centre Rd & Riverside Dr



Lanes, Volumes, Timings  
6: Pleasant Park Rd & Riverside Dr

Total Projected 2027 PM

06/01/2020

	→	↘	↙	←	↖	↗	
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø9
Lane Configurations	↑↑		↘	↑↑	↘	↗	
Traffic Volume (vph)	1355	193	132	1971	155	33	
Future Volume (vph)	1355	193	132	1971	155	33	
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	
Storage Length (m)		0.0	30.0		0.0	40.0	
Storage Lanes		0	1		1	1	
Taper Length (m)			7.5		0.0		
Right Turn on Red		Yes				Yes	
Link Speed (k/h)	60			60	50		
Link Distance (m)	242.5			151.7	243.4		
Travel Time (s)	14.6			9.1	17.5		
Lane Group Flow (vph)	1548	0	132	1971	155	33	
Turn Type	NA		pm+pt	NA	Prot	Perm	
Protected Phases	4		3	8	2		9
Permitted Phases			8			2	
Detector Phase	4		3	8	2	2	
Switch Phase							
Minimum Initial (s)	10.0		5.0	10.0	5.0	5.0	5.0
Minimum Split (s)	28.8		10.0	28.8	25.0	25.0	12.0
Total Split (s)	37.0		12.0	37.0	26.0	26.0	15.0
Total Split (%)	41.1%		13.3%	41.1%	28.9%	28.9%	17%
Yellow Time (s)	3.7		3.3	3.7	3.3	3.3	3.0
All-Red Time (s)	2.1		1.7	2.1	2.7	2.7	4.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.8		5.0	5.8	6.0	6.0	
Lead/Lag	Lag		Lead				
Lead-Lag Optimize?	Yes		Yes				
Recall Mode	C-Max		None	C-Max	Max	Max	None
Act Effect Green (s)	31.3		44.0	43.2	35.0	35.0	
Actuated g/C Ratio	0.35		0.49	0.48	0.39	0.39	
v/c Ratio	1.33		0.63	1.21	0.24	0.05	
Control Delay	174.5		27.8	125.7	19.7	6.5	
Queue Delay	0.0		0.0	0.0	0.0	0.0	
Total Delay	174.5		27.8	125.7	19.7	6.5	
LOS	F		C	F	B	A	
Approach Delay	174.5			119.6	17.4		
Approach LOS	F			F	B		
Queue Length 50th (m)	~186.5		12.1	~221.3	17.7	0.0	
Queue Length 95th (m)	m#209.7		#28.7	#263.2	31.3	5.5	
Internal Link Dist (m)	218.5			127.7	219.4		
Turn Bay Length (m)			30.0			40.0	
Base Capacity (vph)	1167		212	1627	659	610	
Starvation Cap Reductn	0		0	0	0	0	
Spillback Cap Reductn	0		0	0	0	0	
Storage Cap Reductn	0		0	0	0	0	
Reduced v/c Ratio	1.33		0.62	1.21	0.24	0.05	
Intersection Summary							
Area Type:	Other						

# Lanes, Volumes, Timings

## 6: Pleasant Park Rd & Riverside Dr

Total Projected 2027 PM

06/01/2020

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 75 (83%), Referenced to phase 4:EBT and 8:WBTL, Start of Green

Natural Cycle: 100

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.33

Intersection Signal Delay: 136.7

Intersection LOS: F

Intersection Capacity Utilization 76.8%

ICU Level of Service D

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

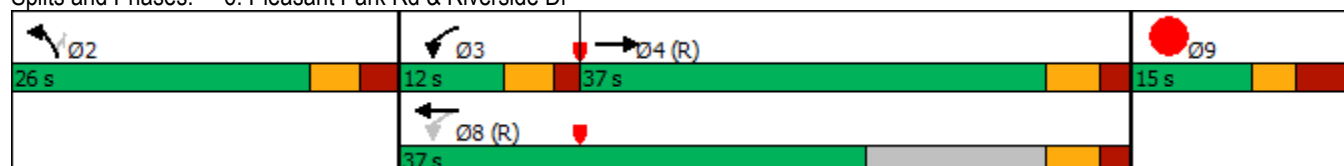
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: Pleasant Park Rd & Riverside Dr



Lanes, Volumes, Timings  
7: Site Access & Riverside Dr WB

Total Projected 2027 PM  
06/01/2020

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations				↕↕		
Traffic Volume (vph)	0	0	45	2021	0	0
Future Volume (vph)	0	0	45	2021	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Link Speed (k/h)	60			60	40	
Link Distance (m)	35.0			277.6	39.5	
Travel Time (s)	2.1			16.7	3.6	
Lane Group Flow (vph)	0	0	0	2066	0	0
Sign Control	Free			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	63.7%			ICU Level of Service B		
Analysis Period (min)	15					

Intersection Sign configuration not allowed in HCM analysis.



Lanes, Volumes, Timings  
8: Riverside Dr EB & Site Access

Total Projected 2027 PM  
06/01/2020



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑			↘	
Traffic Volume (vph)	0	1959	0	0	29	0
Future Volume (vph)	0	1959	0	0	29	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Link Speed (k/h)		60	60		40	
Link Distance (m)		37.2	314.3		40.9	
Travel Time (s)		2.2	18.9		3.7	
Lane Group Flow (vph)	0	1959	0	0	29	0
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 67.2% ICU Level of Service C

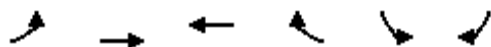
Analysis Period (min) 15

# HCM Unsignalized Intersection Capacity Analysis

## 8: Riverside Dr EB & Site Access

Total Projected 2027 PM

06/01/2020



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑			↘	
Traffic Volume (veh/h)	0	1959	0	0	29	0
Future Volume (Veh/h)	0	1959	0	0	29	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	1959	0	0	29	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)		37				
pX, platoon unblocked					0.54	
vC, conflicting volume	0				980	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0				0	0
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				95	100
cM capacity (veh/h)	1622				555	1084
Direction, Lane #	EB 1	EB 2	SB 1			
Volume Total	980	980	29			
Volume Left	0	0	29			
Volume Right	0	0	0			
cSH	1700	1700	555			
Volume to Capacity	0.58	0.58	0.05			
Queue Length 95th (m)	0.0	0.0	1.3			
Control Delay (s)	0.0	0.0	11.8			
Lane LOS			B			
Approach Delay (s)	0.0		11.8			
Approach LOS			B			
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			67.2%	ICU Level of Service		C
Analysis Period (min)			15			