

**HINDU TEMPLE  
4835 BANK STREET  
OTTAWA, ONTARIO**

**TRANSPORTATION BRIEF**

Prepared for:

Hindu Temple of Ottawa Carleton Inc.

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**TRANSPORTATION BRIEF**

**1. INTRODUCTION**

The Hindu Temple of Ottawa-Carleton was constructed approximately 30 years ago on a vacant parcel of land on the east side of Bank Street in the south end of the City of Ottawa. The temple provides a place of worship and space for religious and social services. The site has a municipal address of 4835 Bank Street and consists of one building with one access onto Bank Street. The location of the site is shown in Figure 1.1.

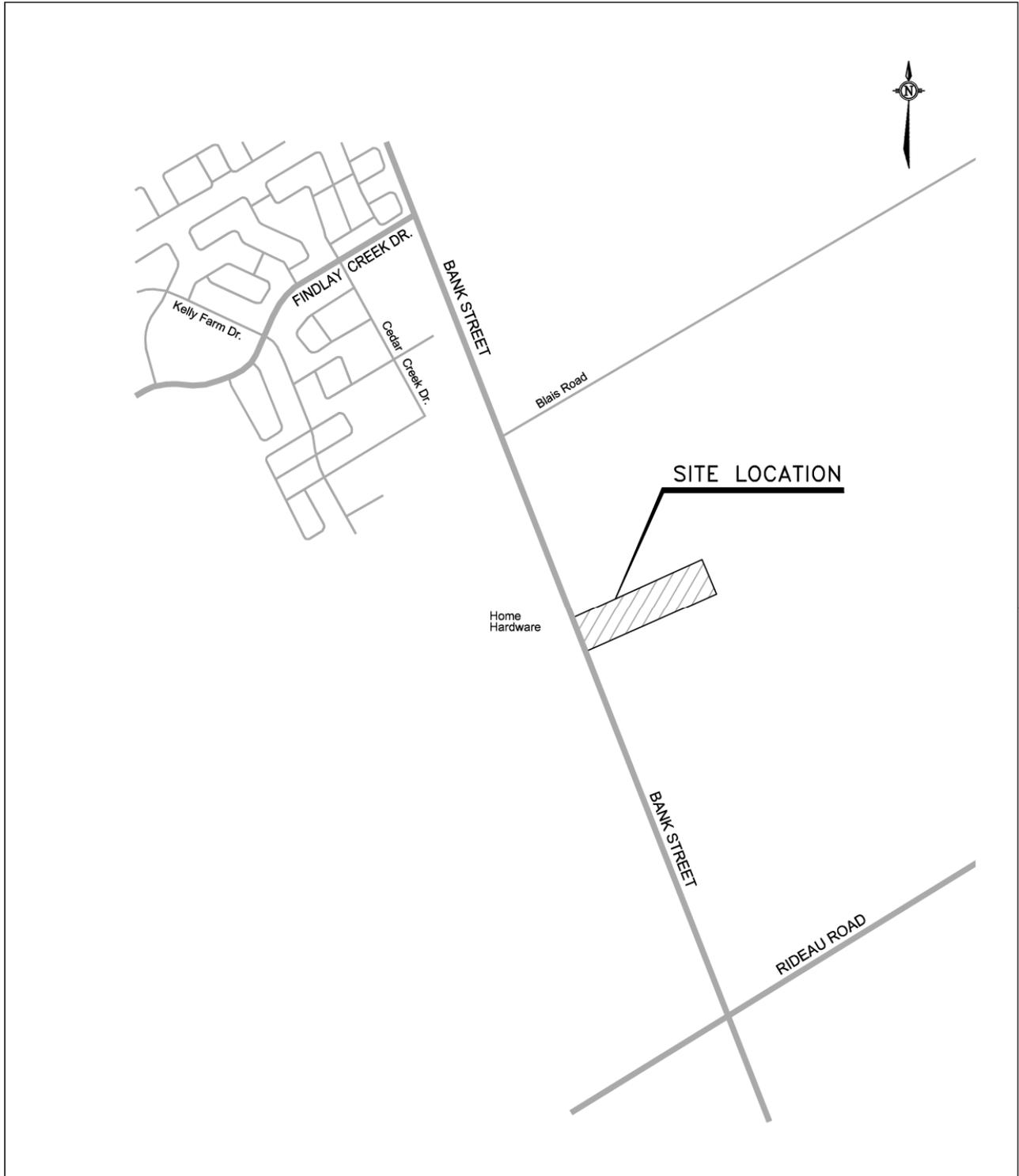
The temple currently provides one Sunday morning service with an average attendance of 125 to 150 parishioners. As the Hindu community grows, there is a need for more space for social activities, religious services, community celebrations and administration offices. A new assembly hall is being proposed for the site which will be a standalone building located behind the temple at the east portion of the site. The assembly hall will not be used as a place of worship.

The current zoning of the lands permits a place of worship, but not an assembly hall. During a pre-consultation meeting with City staff in December 2016, a transportation assessment study was requested as part of the rezoning of the lands to permit the assembly hall. The Hindu Temple of Ottawa-Carleton Inc. has retained the firm of D. J. Halpenny & Associates Ltd. to prepare a transportation assessment study report in support of the rezoning of the land. The study will address the impact of site related trips on the adjacent roads at the completion of the assembly hall. The assembly hall is expected to be constructed by the year 2020.

**1.1 Scope of Work**

The scope of the traffic study is to examine the operation of the existing site access onto Bank Street which will be shared between the temple and assembly hall, and the operation of adjacent municipal intersections. The site is expected to generate a low volume of new trips since the assembly hall will not be used for worship. The number of new trips would not trigger the preparation of a Transportation Impact Study report as documented in the City of Ottawa *Transportation Impact Assessment Guidelines, October 2006*. A Transportation Brief report is being prepared which would examine the impact on the site traffic along Bank Street. The study will examine the existing site access onto Bank Street using the traffic counts taken on July 16, 2017, and for the expected traffic at the completion of the site in 2020 and at five years beyond completion. The time period would be the peak time of services at the temple on a Sunday. The analysis will determine the operation of the intersections for the peak one hour time period for parishioners entering the site (Peak Trips Entering) and for the peak one hour time period of parishioners leaving the site (Peak Trips Exiting). The study will include the expected trips from

**FIGURE 1.1  
SITE LOCATION PLAN**



NOT TO SCALE

the Remer Lands subdivision located north of the site which is expected to have Phase 1 completed by the year 2020, and the widening of Bank Street to a four lane roadway and the construction of a roundabout at the Remer Lands Access (Street 6) to Bank Street.

## **2. ADJACENT ROADWAYS AND INTERSECTIONS**

### **2.1 Existing Roads**

The Hindu Temple is located on the east side of Bank Street. Bank Street is a two lane rural road with gravel shoulders which is designated in the *Ottawa 20/20 – Transportation Master Plan* as an arterial road. The posted speed limit is 80 km./h. along Bank Street past the site. There are no sidewalks or designated cycling lanes within the vicinity of the site.

The access to the temple is a two lane driveway which provides one lane entering, and one lane exiting which has a shared westbound left/right turning movement onto Bank Street. There are no exclusive turn lanes along Bank Street into the site, but there is a 50 m right turn taper along the northbound lane of Bank Street at the site access.

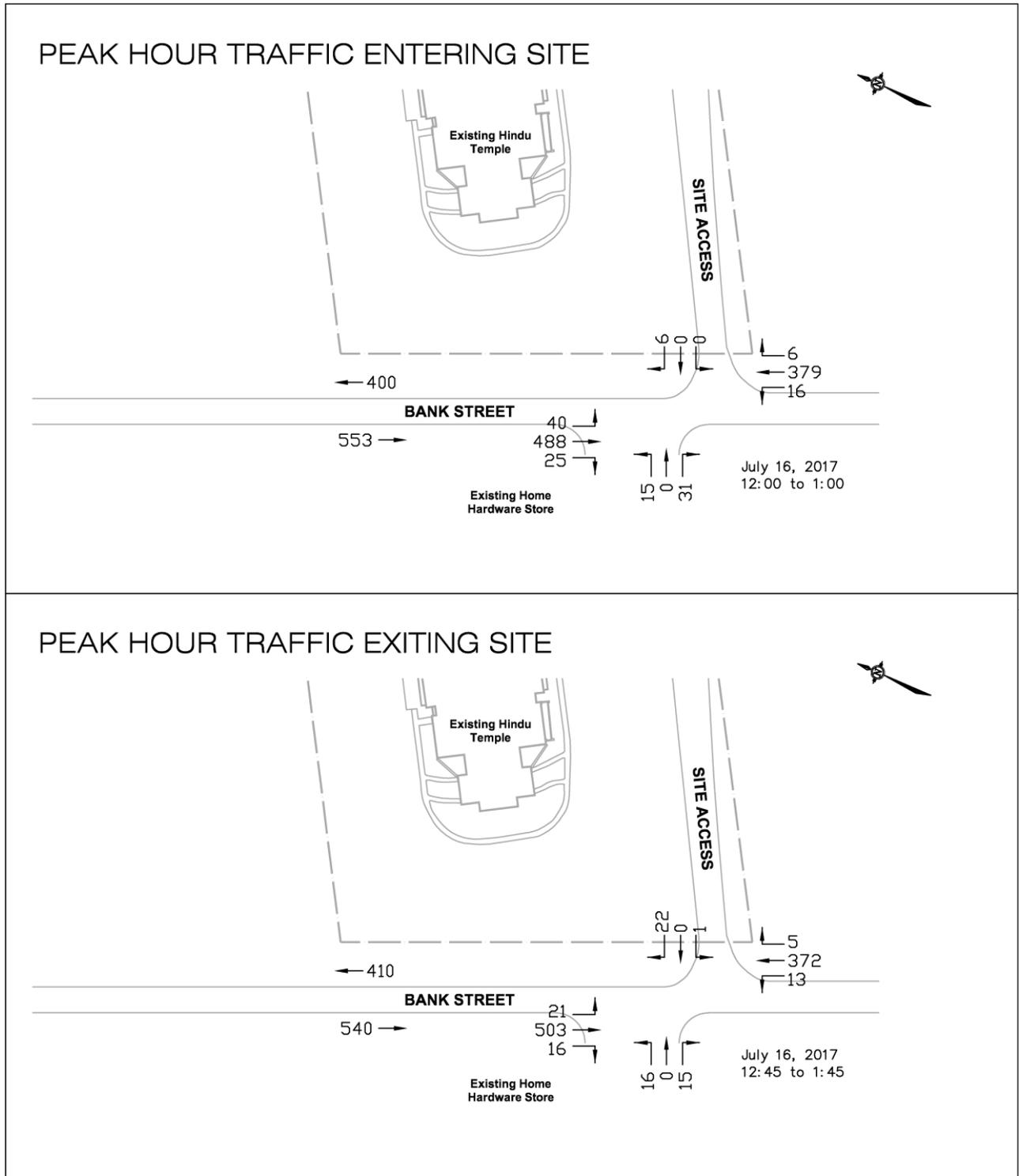
On the west side of Bank Street is a Home Hardware retail store. The store has one access which is offset from the temple's driveway by approximately 20 m (centreline to centreline). There are no exclusive turn lanes at the retail store access. A right turn taper is also provided along the southbound Bank Street lane.

Figure 2.1 shows the Sunday counts of trips entering and exiting the Hindu Temple which were taken by the consultant on July 16, 2017. The counts were taken at the private accesses of the Hindu Temple on the east side of Bank Street and at the Home Hardware store on the west side. The counts determined that the peak hour of trips entering the site occurred between 12:00 PM and 1:00 PM, and peak hour trips exiting between 12:45 PM and 1:45 PM. Exhibit 1 in the Appendix presents the traffic counts.

An OC Transpo bus stop is located at the driveway entrance to the temple. Route 304 provides only Thursday service with routes from Greely/Metcalf to Billings Bridge travelling during the AM, and from Billings Bridge to Greely/ Metcalf in the PM. Route 93 provides Sunday service with one bus from South Keys stopping at the temple at 10:54 AM, and one bus picking up passengers from the temple at 2:32 PM travelling to South Keys. Traffic counts observed 4 passengers using the bus to travel to the temple during the 15 minute period between 10:45 AM and 11:00 AM. No pedestrian travel to/from the temple site was observed during the counts. No cycling trips were observed during the counts.

Collision data was requested from the City of Ottawa which covered the three year time period of January 1, 2013 to January 1, 2016 along Bank Street between Blais Road and Rideau Road. Examination of the collision reports determined that most of the collisions took place during the weekday peak hours and the turning movements would not be consistent with collisions taking place at the existing entrance to the Hindu Temple. The collision reports are provided in the Appendix as Exhibit 2.

**FIGURE 2.1**  
**EXISTING SUNDAY PEAK HOUR TRAFFIC COUNTS (July 16, 2017)**



NOT TO SCALE

## 2.2 Future Roads and Intersections

The City of Ottawa *Transportation Master Plan* has identified the widening of Bank Street from two lanes to four lanes from Leirtrim Road to Rideau Road. Phase 2 of the widening will be from Leirtrim Road to Blais Road and will take place between 2020 and 2025, and Phase 3 will be from Blais Road to Rideau Road which will be completed between 2026 and 2031. The widening will include a roundabout at the intersection of Bank Street and Blais Road, and at the future Bank Street and Street 6 intersection which will provide the south access to the Remer Lands subdivision. Figure 2.2 shows the sketch of the proposed alignment following the widening of Bank Street.

The Remer Lands subdivision plans to have Phase 1 completed by 2020, and full development by 2025. Phase 1 proposes a new street (Street 6) onto Bank Street approximately 135 m north of the temple access. The *Community Transportation Study* for the Remer Lands prepared by the IBI Group states that if Bank Street has not been widened by the 2020 horizon year of Phase 1, one of the measures which may be taken by the developer is construct a single lane roundabout at the Bank/Street 6 intersection which could accommodate widening to a two lane roundabout when Bank Street is widened.

## 3. PROPOSED HINDU TEMPLE ASSEMBLY HALL

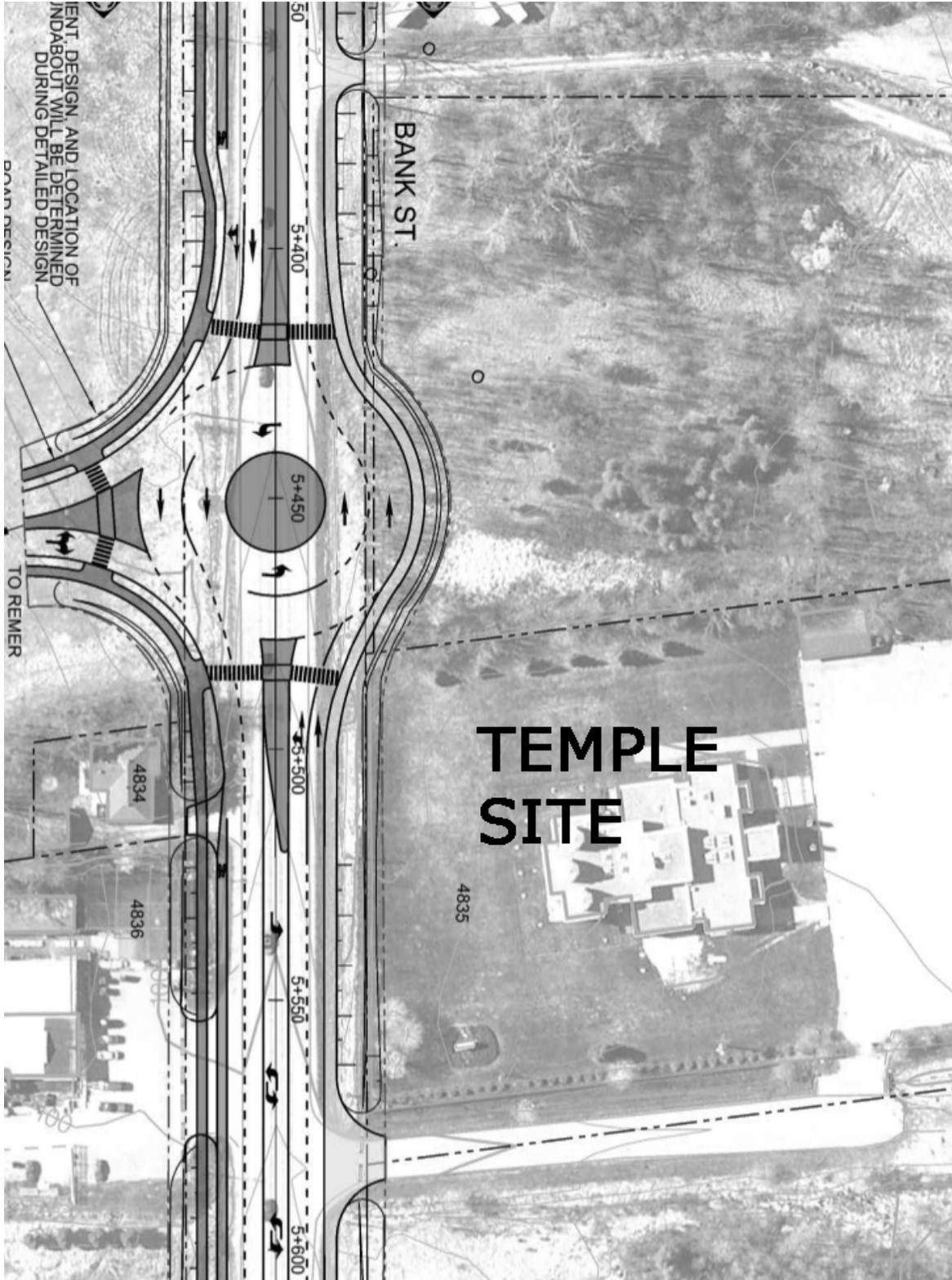
The Hindu Temple of Ottawa-Carleton was constructed approximately 30 years ago along the east side of Bank Street at the south end of the City of Ottawa's Urban Boundary. The site is 4.048 ha in size and currently contains one building with a building footprint of 1,062 m<sup>2</sup>. The existing building provides space for both worship and social gatherings of the parishioners. The site has one access onto Bank Street which is offset by approximately 20 m south of the access to the Home Hardware store which is located across from the temple on the west side of Bank Street. The parking lot is located at the rear of the temple (east side of the site).

The surrounding area consists of commercial development west and north of the site, and vacant lands to the east and south of the site. The Findlay Creek residential community is located approximately 1.3 km. north of the temple site.

The temple provides weekend worship service on Sundays between 10:00 AM and 1:30 PM with a weekend attendance of approximately 125 to 150 parishioners. Parishioners travel to and depart from the temple during the time of worship and do not necessarily stay for the whole service. In addition, the parish provides social activities following the worship service which results in trips entering and exiting the site which are not concentrated at the beginning or end of the worship service. The weekday worship service is provided between 8:30 AM and 10:30 AM and between 5:30 PM and 8:30 PM. Weekday attendance is generally very low with most parishioners arriving at 7:00 PM.

An assembly hall is proposed at the east portion of the site. The hall will have a building footprint of approximately 2,000 m<sup>2</sup>, and will be used for various religious functions and social events. Only the temple will be used as a place of worship. The assembly hall will provide

**FIGURE 2.2  
PROPOSED BANK STREET WIDENING**



additional space, but is not expected to be a generator of new trips to/from the temple. The construction of an assembly hall would require an application for a Zoning By-law Amendment.

The proposed assembly hall will share the same access onto Bank Street as the temple. The existing parking lot will be reconstructed with 173 parking spaces which would include 7 barrier free spaces, 2 accessory residential spaces, and 2 loading spaces. The site will include additional landscaping and a pedestrian pathway linking the assembly hall to the temple.

The assembly hall and modifications to the parking lot are expected to be completed by the year 2020. Figure 3.1 shows a conceptual site plan of the site and proposed assembly hall.

### 3.1 Trip Generation

The traffic analysis has examined the impact of the site related trips for two peak time periods. The first time period would be for the peak hour of trips entering the site before worship service, and the second time period would be the peak hour of trips exiting the site following worship service. With the Sunday worship service scheduled between 10:00 AM and 1:30 PM, the traffic counts taken on July 16, 2017 (Exhibit 1) determined the following as the peak time periods:

	Peak Trips Entering (12:00 PM – 1:00 PM)	Peak Trips Exiting (12:45 PM – 1:45 PM)
Entering	46	26
Exiting	<u>6</u>	<u>23</u>
Total	52 Trips	49 Trips

The trip counts showed that there was no concentrated time period when parishioners would arrive and depart during the worship service. Many parishioners stayed after the service in order to partake in various social activities.

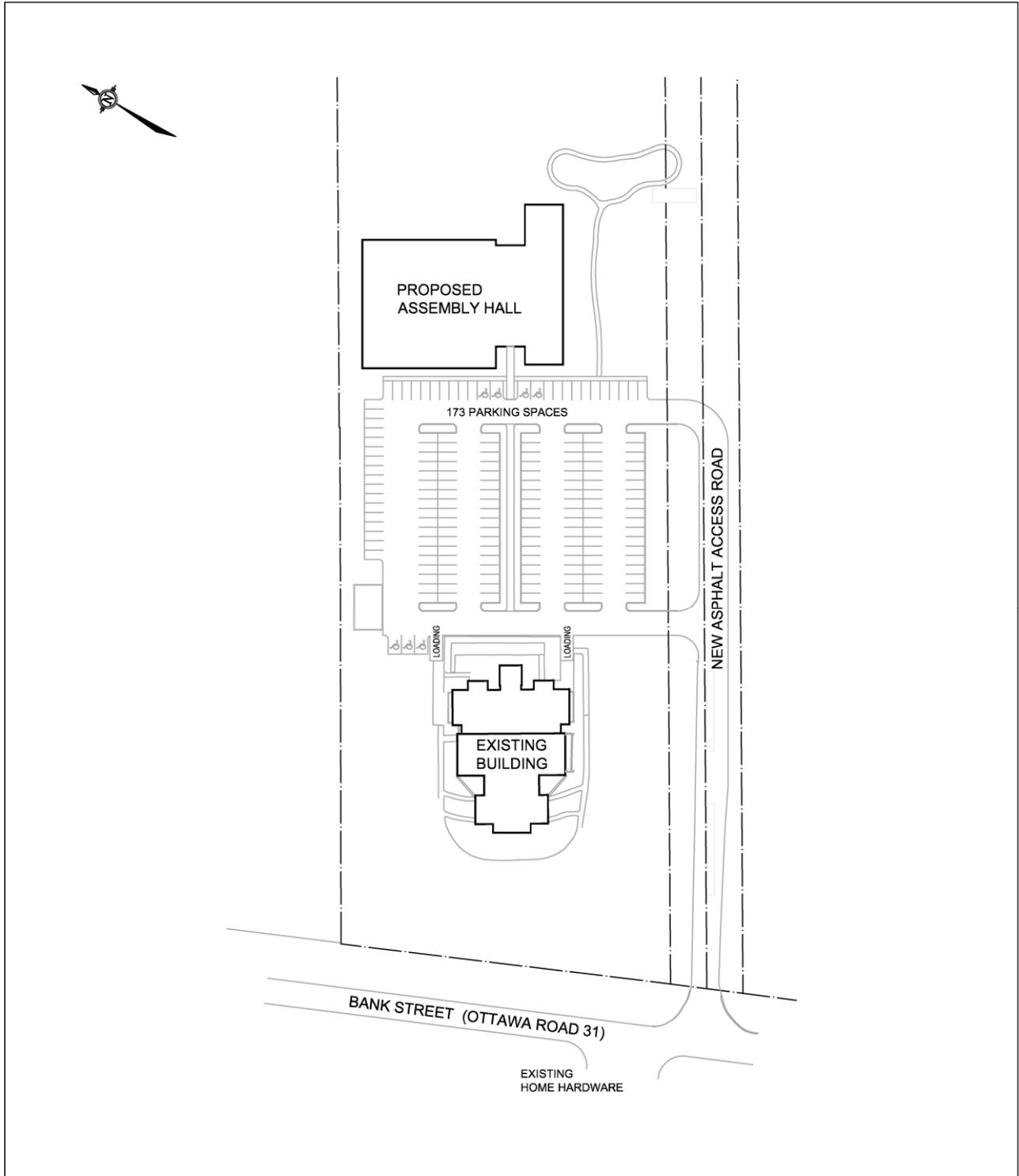
The traffic counts were taken on July 16, 2017 which was Seniors Day which had an attendance of between 275 and 300 parishioners. The trip generation rate was determined for both the trips entering and trips exiting time periods by dividing the total trips counted by 275 parishioners.

$$\text{Trips Entering Time Period} - 52 \text{ Trips}/275 \text{ Parishioners} = 0.19 \text{ Trips/Parishioners}$$

$$\text{Trips Exiting Time Period} - 49 \text{ Trips}/275 \text{ Parishioners} = 0.18 \text{ Trips/Parishioners}$$

Discussions with members of the temple determined that the attendance at the year 2020 would be approximately 300 parishioners and by the year 2025 the attendance would be approximately 350 parishioners. Table 3.1 shows the expected number of site generated trips for an average Sunday service at the years 2020 and 2025. The July 16, 2017 traffic counts were used to proportion trips entering and exiting the site for each time period.

**FIGURE 3.1  
CONCEPTUAL SITE PLAN**



NOT TO SCALE

**TABLE 3.1  
 PEAK HOUR SITE TRIPS GENERATED**

TEMPLE/ASSEMBLY HALL	PEAK TRIPS ENTERING			PEAK TRIPS EXITING		
	TOTAL	ENTER	EXIT	TOTAL	ENTER	EXIT
Year 2020 – Attendance 300	57	50 (88%)	7 (12%)	54	29 (53%)	25 (47%)
Year 2025 – Attendance 350	67	59 (88%)	8 (12%)	63	33 (53%)	30 (47%)

### 3.2 Trip Distribution

The distribution of expected site generated trips entering and exiting the temple site were determined by examining the distribution of existing vehicle trips from traffic counts taken during both the peak trips entering and peak trips exiting time periods. The traffic distribution would represent the trip patterns of parishioners travelling from home to the temple and back home. Since the temple trips are considered a primary trip, the trip distribution was the same for both the trips before worship service and following the service (trips entering and trips exiting time periods).

The following is the proportion of trips along Bank Street and into the proposed access to the Remer Lands (Street 6) for both time periods:

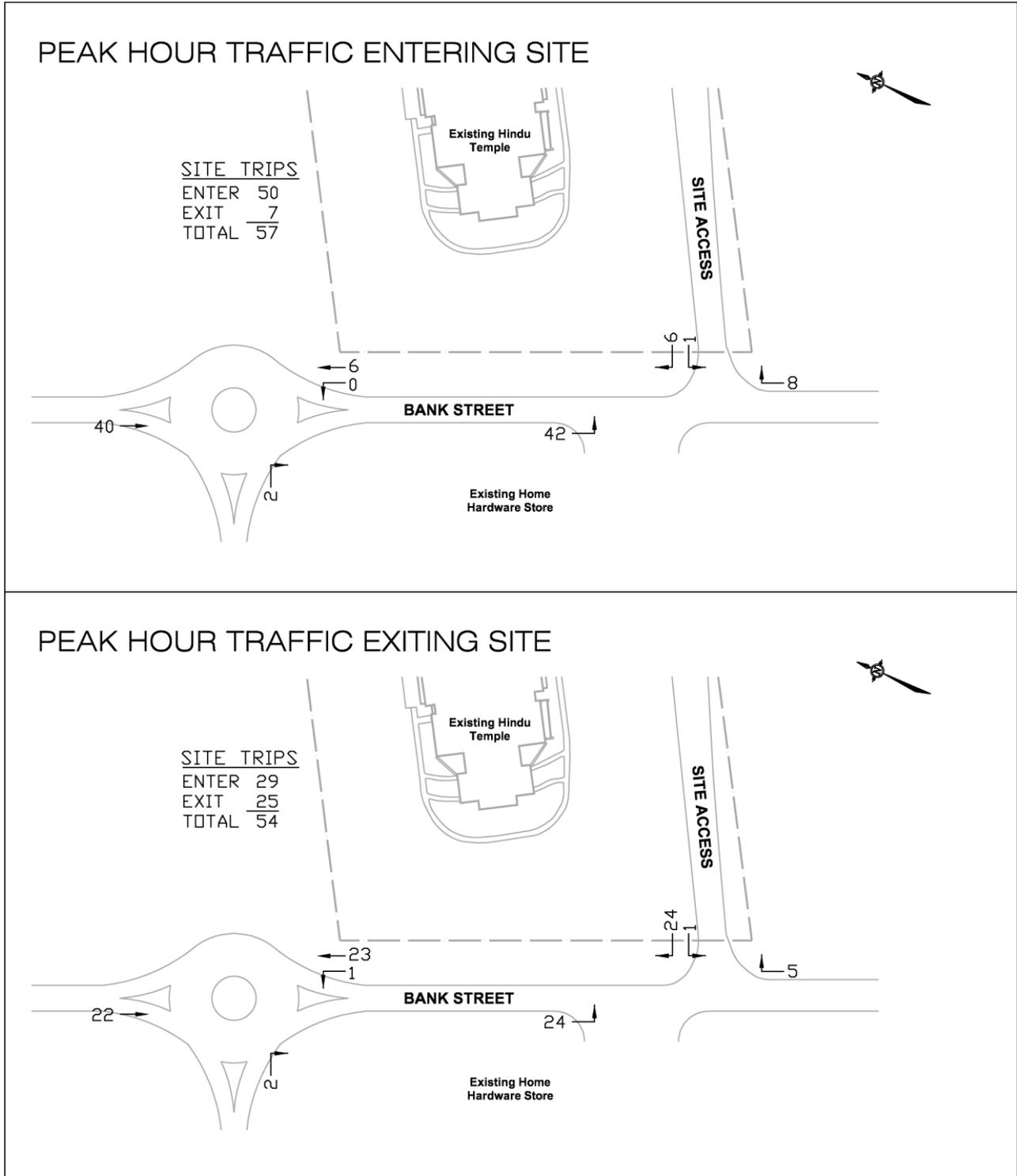
To/From the north along Bank Street	90%
To/From the south along Bank Street	5%
To/From the west along Street 6 (Remer Lands)	5%

Figure 3.2 shows the expected distribution of site trips for the Hindu Temple for both the peak trips entering and peak trips exiting time periods at the year 2020, and Figure 3.3 the expected trips at the year 2025.

## 4. TRANSPORTATION IMPACT

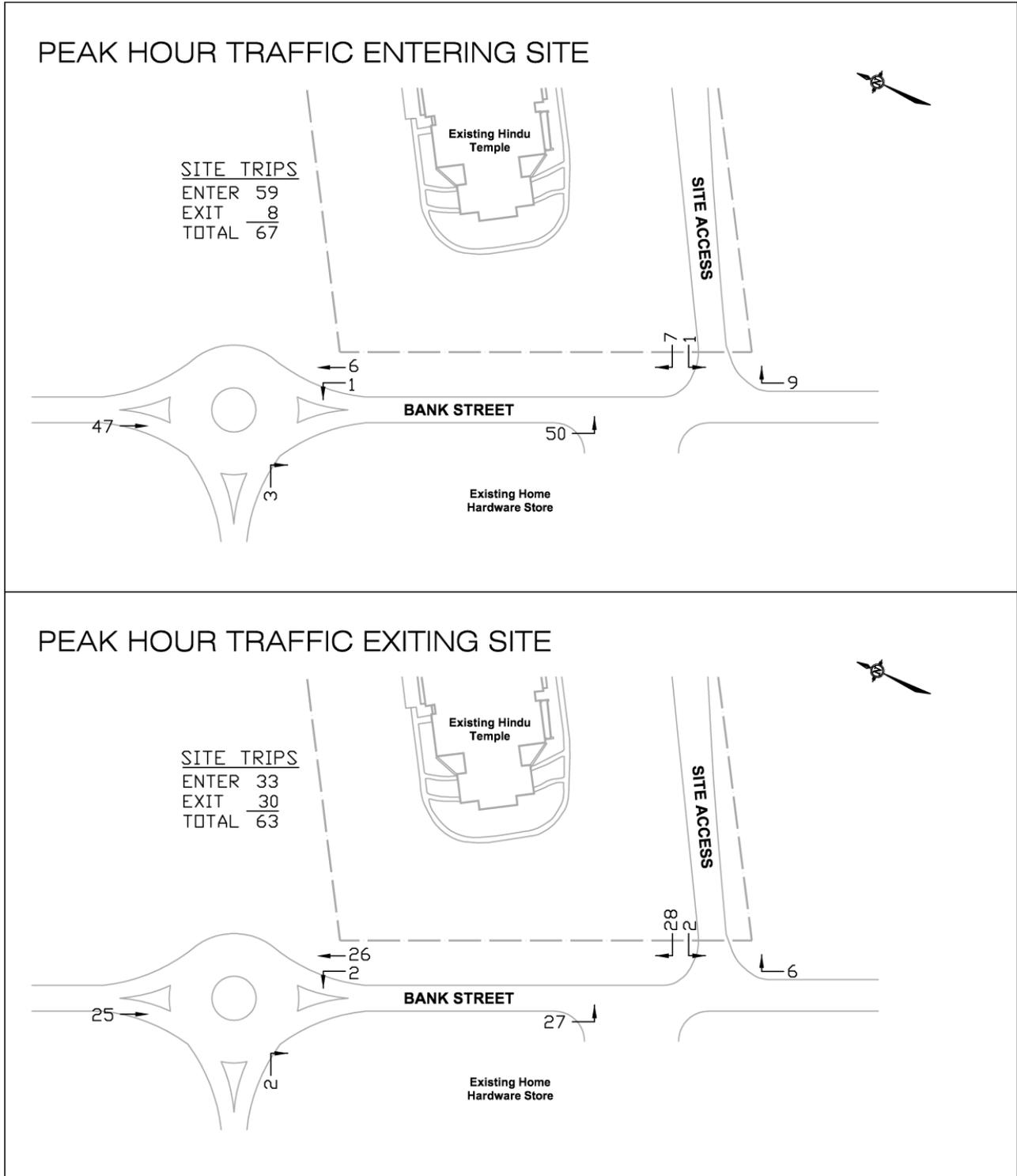
The Transportation Brief will examine the operation of the existing site access using the traffic counts taken on Sunday July 16, 2017. Following the construction of the assembly hall, the study will examine the operation of the site access onto Bank Street for the years 2020 (buildout) and 2025 (5 years beyond buildout). The study will also assume that a roundabout is constructed approximately 135 m north of the temple access to access the proposed Remer Lands subdivision. The roundabout will be part of the Bank Street widening project by the City of Ottawa. The study will assume that by 2020 a single lane roundabout will be constructed to provide access to Street 6 of the Remer Lands subdivision, and by the year 2025 a two lane roundabout along with the widening of Bank Street to four lanes will have been completed. The time period of the study will be the peak hour of worship for the temple which will occur on a Sunday.

**FIGURE 3.2**  
**2020 PEAK HOUR SITE GENERATED TRIPS ENTERING/EXITING**



NOT TO SCALE

**FIGURE 3.3**  
**2025 PEAK HOUR SITE GENERATED TRIPS ENTERING/EXITING**



NOT TO SCALE

The analysis will use the *Highway Capacity Software*, which utilizes the intersection capacity analysis procedure as documented in the *Highway Capacity Manual 2010*. For unsignalized intersections and roundabouts, the level of service of each lane movement and approach is determined as a function of the delay of vehicles at the approach. The following relates the level of service of each lane movement with the expected delay at the approach.

LEVEL OF SERVICE	DELAY	
Level of Service A	0-10 sec./vehicle	Little or No Delay
Level of Service B	>10-15 sec./vehicle	Short Traffic Delays
Level of Service C	>15-25 sec./vehicle	Average Traffic Delays
Level of Service D	>25-35 sec./vehicle	Long Traffic Delays
Level of Service E	>35-50 sec./vehicle	Very Long Traffic Delays
Level of Service F	>50 sec./vehicle	Extreme Delays – Demand Exceeds Capacity

The expected length of queue at the critical lane movements for an unsignalized intersection was determined by the calculation of the 95<sup>th</sup> percentile queue at the lane approach. The 95<sup>th</sup> percentile queue length is the calculated 95<sup>th</sup> greatest queue length out of 100 occurrences at a movement during a 15-minute peak period. The 95<sup>th</sup> percentile queue length is a function of the capacity of a movement and the total expected traffic, with the calculated value determining the magnitude of the queue by representing the queue length as fractions of vehicles.

#### 4.1 Background Traffic Volumes

The background traffic volumes along Bank Street would represent the expected traffic volumes which would not include the expected trips from the temple and proposed assembly hall. The growth in background traffic along Bank Street was determined from the *Community Transportation Study, Remer Lands* dated May 2016 and prepared by the IBI Group. The study compared the growth in traffic along Banks Street from counts obtained from the City of Ottawa between 2007 and 2015. The counts determined that there was a decrease in traffic along Bank Street during the weekday peak hours with the study conservatively applying a 1.0 percent annual growth rate. The Hindu Temple *Transportation Brief* has therefore also applied a 1.0 percent annual compounded growth in the Sunday background traffic. The following growth factors were applied to the through traffic along Bank Street:

Growth Factor (1.0 % Annual Growth)  
 2017 → 2020 = 1.030  
 2017 → 2025 = 1.083

The expected Sunday trips from the Remer Lands subdivision were determined utilizing the weekday peak hour traffic from the May 2016 traffic study. Exhibit 12 in the *Community Transportation Study* showed the 2020 site generated trips for Phase 1, and Exhibit 13 the 2025 full buildout traffic. The weekday peak hour traffic from the subdivision was converted to peak Sunday traffic by multiplying the subdivision trips by the factor of the July 16, 2017 Sunday counts divided by the weekday traffic from the City’s June 5, 2015 counts.

Figure 4.1 shows the expected 2020 Sunday background traffic volumes which include Phase 1 of the Remer Lands and Figure 4.2 the 2025 background traffic which includes the full buildout of the Remer Lands subdivision.

## 4.2 Total Traffic Volumes

The total expected 2020 and 2025 Sunday traffic for the peak time period of trips entering the site and trips exiting the site were determined by the addition of the expected site trips from the proposed development which are shown in Figure 3.2 (2020) and Figure 3.3 (2025), and the 2020 and 2025 background traffic shown in Figures 4.1 and 4.2 respectively. The result is the expected total traffic volumes which will be examined in the study. The 2020 total traffic is shown in Figure 4.3 and the 2025 total traffic in Figure 4.4.

## 4.3 Traffic Analysis

The Transportation Brief will examine the operation of the temple's site access onto Bank Street using the existing traffic counts, and for the site access and the proposed roundabout at the proposed Bank/Street 6 intersection for the expected 2020 and 2025 traffic. The time period of the traffic analysis is for the peak hour for parishioners entering the site prior to worship service and peak hour for parishioners exiting the site on a typical Sunday.

The results of the analysis are discussed in detail in the following sections:

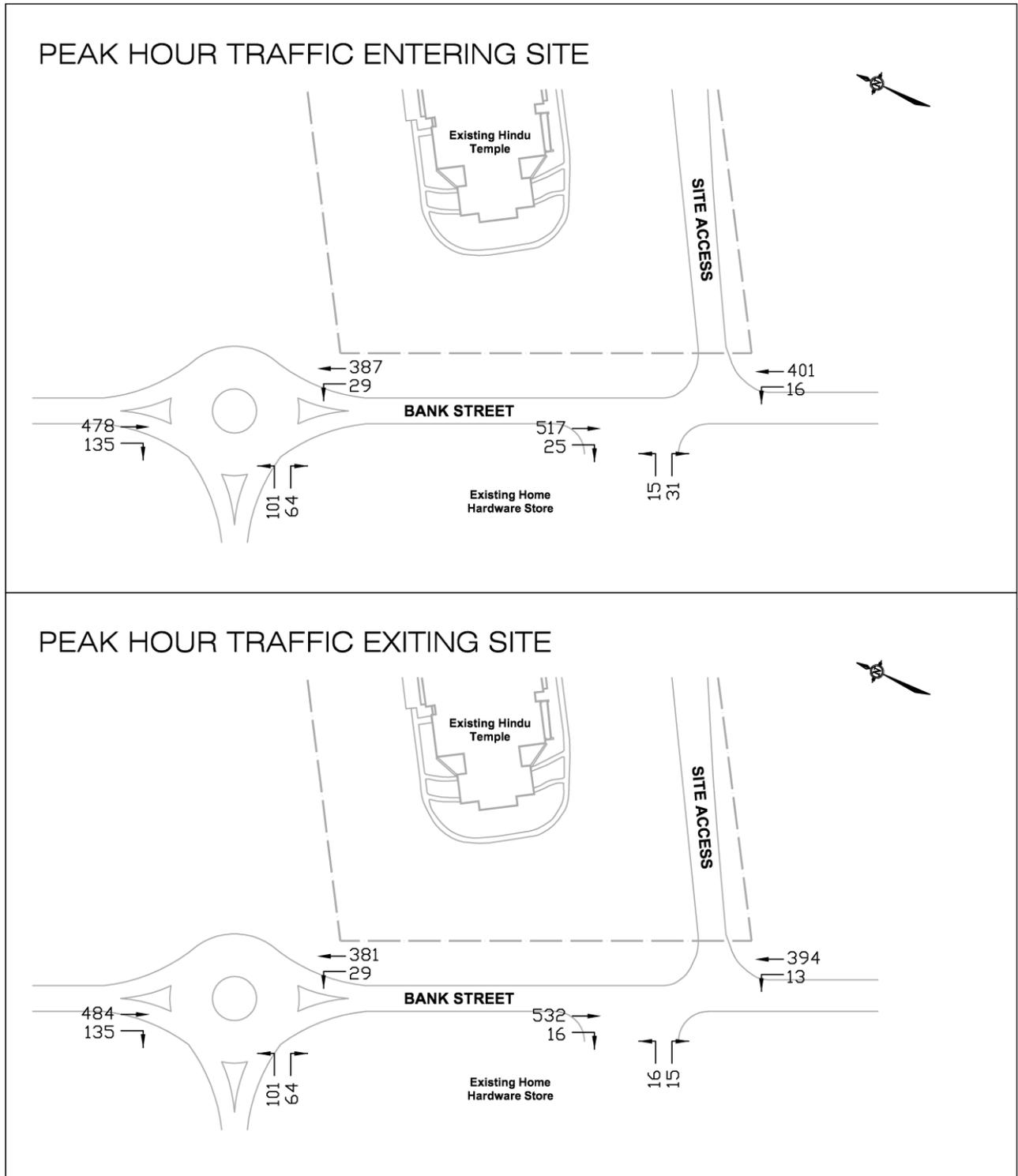
### Site Access and Bank Street Intersection

The existing site access to the temple parking lot is approximately 7.5 m in width and will shared access to the proposed assembly hall. Currently, the intersection geometry provides one westbound shared left/right turn movement exiting the site, one northbound Bank Street shared through/right movement, and one southbound Bank Street shared left/through movement. There is a 50 m taper along the northbound Bank Street approach to the site access which improves turning movements into the site and reduces gravel spillage onto Bank Street from the shoulders. The Home Hardware store across from the site has an entrance which is offset from the temple entrance by 20 m. Traffic counts determined that there were no through movements between sites. For this reason the access to the temple was analyzed independent of the trips to the Home Hardware store.

An operational analysis was conducted using the traffic counts taken by the consultant on Sunday July 16, 2017 (Figure 2.1). The traffic counts determined that the westbound site exit approach would function at a Level of Service (LoS) "B" and the southbound Bank Street left/through movement at a LoS "A" during both the peak hour of trips entering (12:00 to 1:00) and trips exiting (12:45 to 1:45) the site. Table 4.1 summarizes the operation of the site access intersection with the operational analysis sheets provided in the Appendix as Exhibit 3 for trips entering and Exhibit 4 for trips exiting.

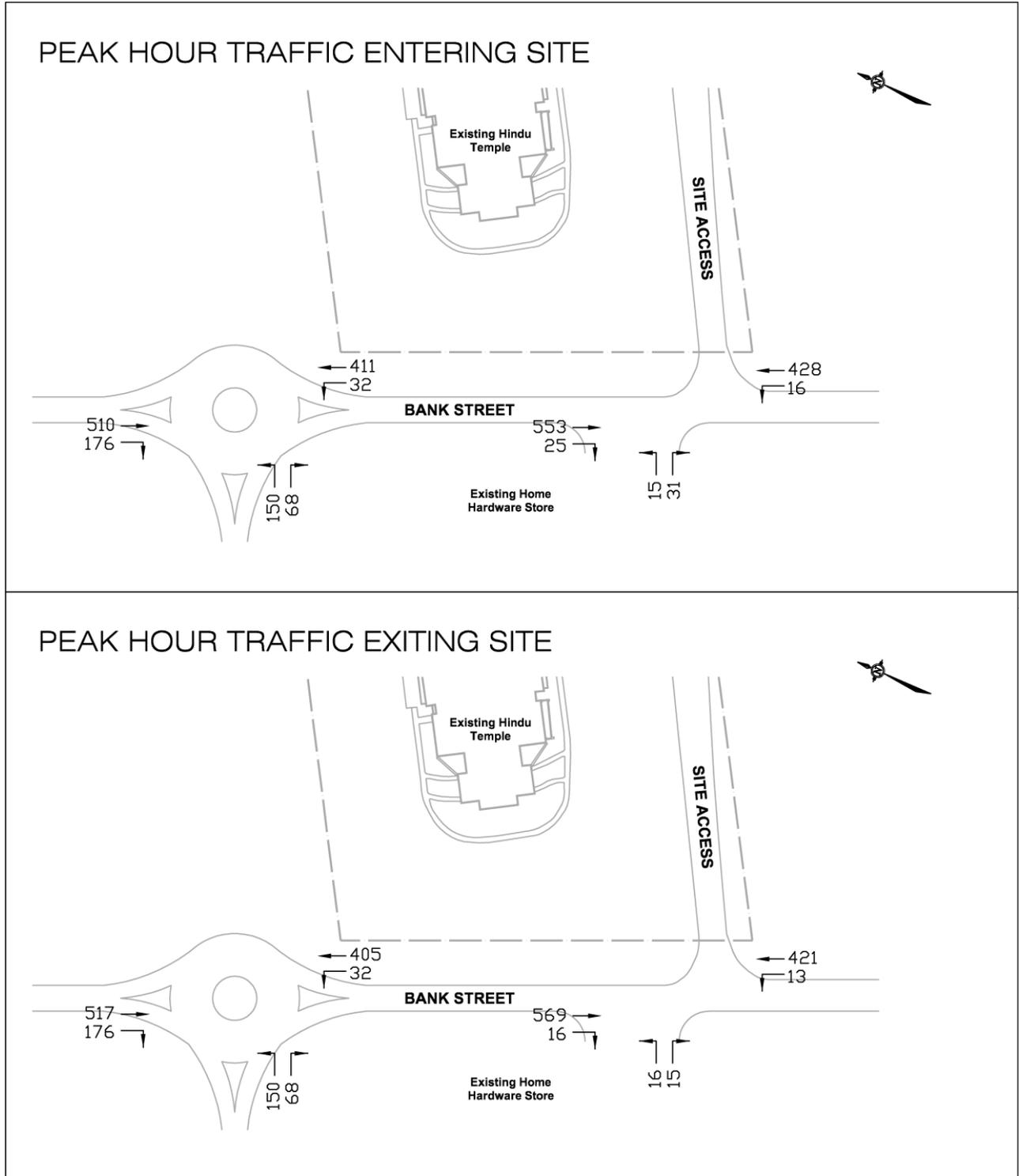
At the year 2020 it has been assumed that Phase 1 of the Remer Lands subdivision has been completed and the roundabout located approximately 135 m north of the site has been constructed to provide access to Street 6. The construction of the roundabout would include a

**FIGURE 4.1**  
**2020 SUNDAY PEAK HOUR BACKGROUND TRAFFIC ENTERING AND EXITING**



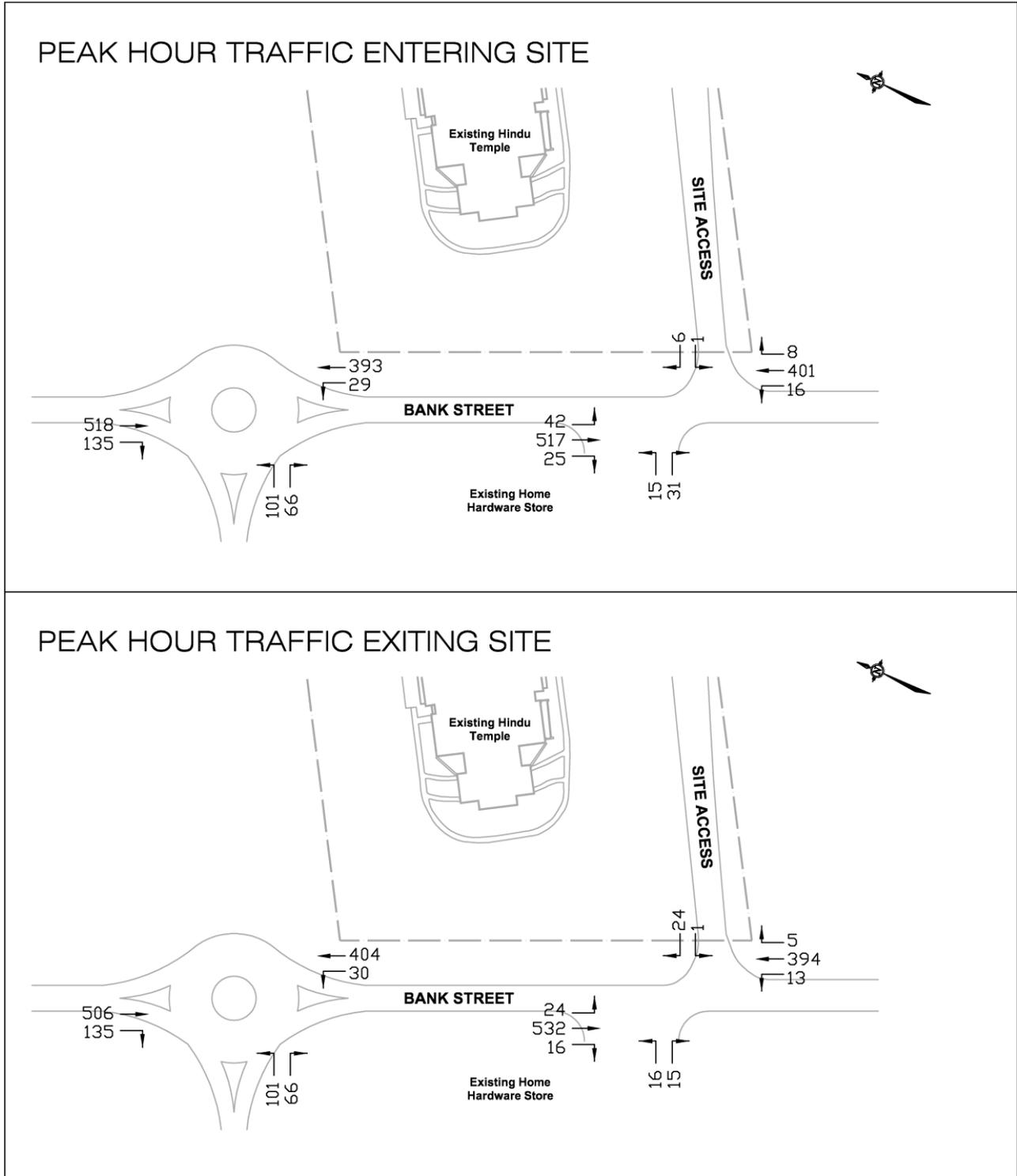
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**FIGURE 4.2**  
**2025 SUNDAY PEAK HOUR BACKGROUND TRAFFIC ENTERING AND EXITING**



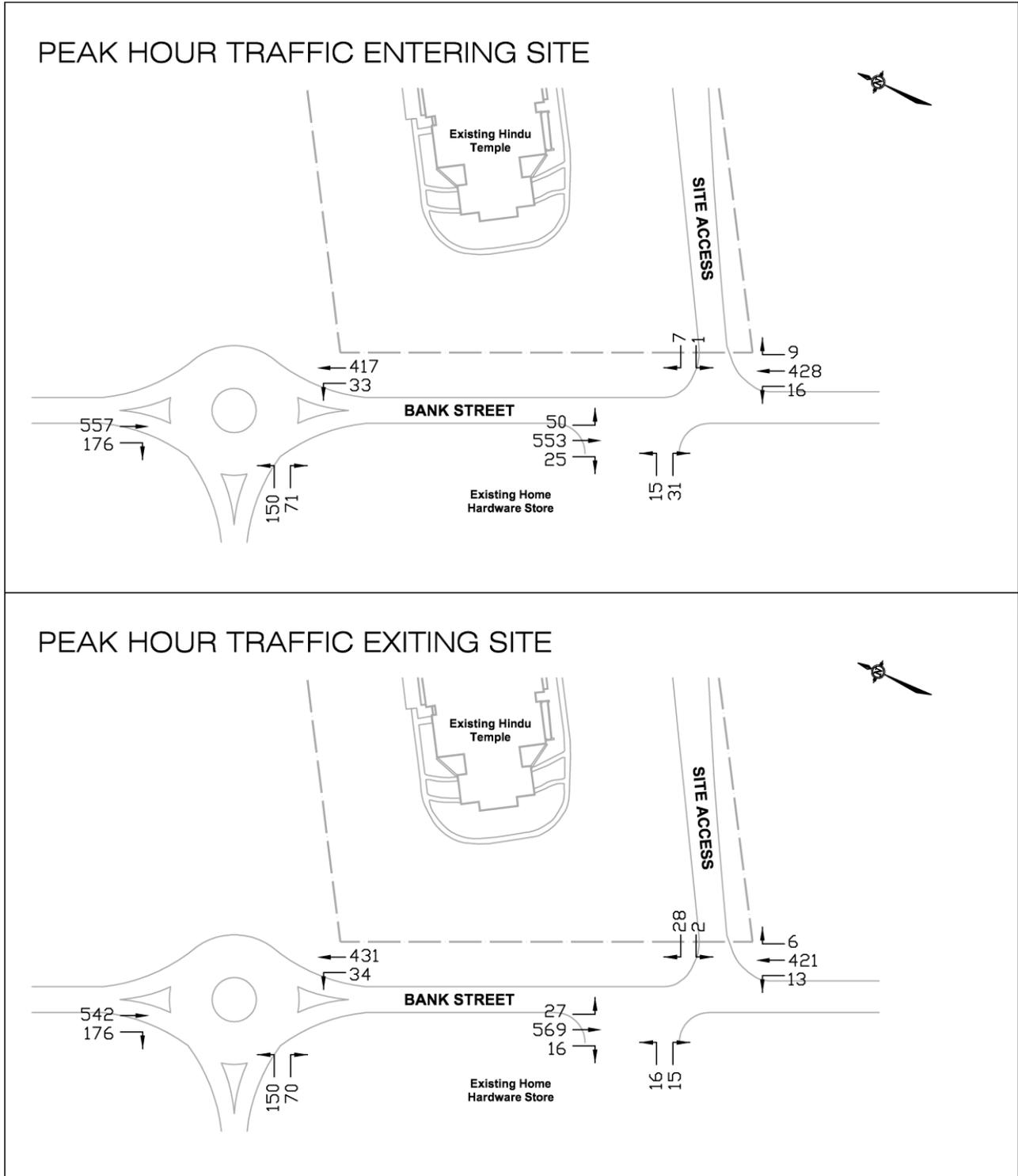
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**FIGURE 4.3**  
**2020 SUNDAY PEAK HOUR TOTAL TRAFFIC ENTERING AND EXITING**



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**FIGURE 4.4**  
**2025 SUNDAY PEAK HOUR TOTAL TRAFFIC ENTERING AND EXITING**



NOT TO SCALE

shared centreline left turn lane into both the temple and Home Hardware sites. Banks Street would remain a two lane road at this time. The 2020 operational analysis determined that the westbound site exit would continue to function at a LoS “B” and the southbound Bank Street exclusive left turn lane at a LoS “A” during both the periods of trips entering and trips exiting the site. Table 4.1 summarizes the 2020 operation of the intersection with the analysis sheets provided as Exhibit 5 and Exhibit 6.

**TABLE 4.1  
SITE ACCESS/BANK STREET INTERSECTION – LoS & Delay**

Intersection Approach	PEAK TRIPS ENTERING YEAR 2017 2020 (2025)		PEAK TRIPS EXITING YEAR 2017 2020 (2025)	
	LoS	Delay (sec.)	LoS	Delay (sec.)
WB Left/Right – Site Access	B B (B)	10.7 12.1 (10.7)	B B (B)	11.1 11.3 (10.3)
SB Left/Through – Bank Street *	A A (A)	8.2 8.3 (8.4)	A A (A)	8.2 8.2 (8.3)

\* The southbound Bank St. left/through lane movement becomes a through lane and exclusive left turn lane following the construction of the roundabout by the year 2020. The widening of Bank St. by the year 2025 would widen Bank St. from 2 lanes to 4 lanes.

At the year 2025 it is assumed that the Remer Lands subdivision has been fully developed and Bank Street has been widened from two lanes to four lanes up to Rideau Road. The site access will still retain the existing geometry of one lane entering, and one lane exiting the site with shared left/right turn movements. Using the expected 2025 traffic, the westbound site exit would function at a LoS “B” and the southbound Bank Street left turn movement at a LoS “A” during both the trips entering and trips exiting peak hour time periods. The 95<sup>th</sup> percentile queue at the southbound Bank Street left turn movement was 0.2 vehicles during the peak hour of trips entering, and 0.1 vehicles at the westbound site exit approach at the peak hour of trips exiting. Table 4.1 summarizes the operation of the intersection with the analysis sheets provided as Exhibit 7 and Exhibit 8.

The proposed assembly hall would not trigger any requirement for roadway or intersection modifications.

#### Bank Street and Remer Lands (Street 6) Roundabout

The City of Ottawa has completed an *Environmental Study Report* (ESR) for the Bank Street widening between Leitrim Road and Rideau Road. Phase 2 of the widening will involve the section of road from Leitrim Road to the Urban Boundary (Blais Road) and will take place between 2020 and 2025. Phase 3 will be from the Urban Boundary to Rideau Road and will take place between 2026 and 2031. The widening project consists of reconstructing Bank Street from a two lane road to a four lane road. The project would also include the construction of a roundabout located approximately 135 m north of the site. The roundabout would provide

access to the southern portion of the Remer Lands subdivision at Street 6. Figure 2.2 shows a sketch of the proposed widening and roundabout in the vicinity of the Hindu Temple.

The *Community Transportation Study* for the Remer Lands subdivision has stated that Phase 1 of the subdivision would be completed by the year 2020. With the widening of Bank Street and construction of the roundabout by the City not scheduled until possibly 2025 or later, interim measures by the subdivision developer may comprise of the construction of a single lane roundabout which could be reconstructed to a double lane roundabout when Bank Street is widened. The single lane roundabout would include a shared centreline left turn lane at the southbound approach which would provide exclusive left turn movements into the Hindu Temple and at the northbound approach to the Home Hardware retail store. For the 2020 traffic analysis, the study has included the Remer Lands Phase 1 traffic and a single lane roundabout at the future Street 6 location as documented in the Remer Lands traffic study. For the expected year 2020 Sunday traffic, which is shown in Figure 4.3, the study determined that the roundabout would operate at a LoS “A” during both the peak hour trips entering and peak hour trips exiting the site. Table 4.2 summarizes the 2020 operation of the roundabout with the analysis sheets provided as Exhibit 9 for the trips entering the site and Exhibit 10 for trips exiting the site.

**TABLE 4.2**  
**BANK STREET/REMER LANDS (STREET 6) ROUNDABOUT – LoS & Delay**

Intersection Approach	PEAK TRIPS ENTERING YEAR 2020 (2025)		PEAK TRIPS EXITING YEAR 2020 (2025)	
	LoS	Delay (sec.)	LoS	Delay (sec.)
EB Approach – Street 6	A (A)	7.3 (7.5)	A (A)	7.2 (7.3)
NB Approach – Bank Street *	A (A)	6.6 (4.9)	A (A)	6.7 (4.9)
SB Approach – Bank Street *	A (A)	8.5 (5.4)	A (A)	8.4 (5.3)
Total Intersection	A (A)	7.7 (5.5)	A (A)	7.6 (5.5)

\* The year 2020 analysis has assumed the roundabout to be a single lane roundabout, and the 2025 analysis a double lane roundabout.

At the year 2025, the study has assumed full development of the Remer Lands subdivision and the widening of Bank Street to a four lane road with a double lane roundabout. Bank Street will retain the shared centreline left turn lane. The operational analysis determined that the roundabout would operate at a LoS “A” during both the 2025 peak trips entering and peak trips exiting time periods. Table 4.2 summarizes the operation of the roundabout with the analysis sheets provided as Exhibit 11 and Exhibit 12.

There would be no requirement for modification to Bank Street or the roundabout due to the construction of the assembly hall.

#### **4.4 Parking and Site Access**

The existing temple site currently provides 176 parking spaces which has been shown at services and events to be adequate and would not result in parishioners parking along Bank Street. The City of Ottawa Parking By-law requires that the proposed site should provide 164 parking spaces (2 of which are “accessory residential” spaces required by the former By-law), 2 barrier free spaces, and 2 loading spaces. The Site Plan proposes that the temple/assembly hall site will provide 162 parking spaces, 2 accessory residential spaces, 7 barrier free spaces, and 2 loading spaces for a total of 173 parking spaces. The proposed parking lot will meet the City By-law and satisfy the needs of the site. With the construction of the assembly hall generating few new trips, the proposed number of parking spaces should be sufficient to accommodate the expected number of parked vehicles.

The driveway for the site is approximately 7.5 m in width. The westbound exit lane comprises of a shared left/right turn lane. The 95<sup>th</sup> percentile queue for both the 2020 and 2025 peak exiting trip periods is 0.1 vehicles (7 m). The clear throat length of the access driveway is approximately 100 m which is of sufficient length to not create conflicts or undesirable queuing within the site or along Bank Street.

The sight distance for turning movements from a stop at the site entrance was determined utilizing the Transportation Association of Canada (TAC) publication, *Geometric Design Guide for Canadian Roads*. The publication determined the sight distance for a passenger vehicle turning left onto a four lane roadway plus median to be 190 m (TAC Figure 2.3.3.4) using a design speed of 90 km./h. (posted speed 80 km./h.). The site entrance currently has a sight distance of approximately 1,000 m in the southbound direction and a greater distance in the northbound direction.

#### **4.5 Transportation Demand Management (TDM)**

The City of Ottawa is implementing Transportation Demand Management (TDM) measures as a plan to reduce peak hour traffic along the City’s transportation network. The nature of the Hindu Temple and assembly hall would not lend itself to the need to reduce vehicle trips by employing other modes of transportation. The times of worship and special activities would not take place during the weekday peak hours of traffic along the adjacent roads. Worship services would take place on Sundays with small services on weekday evenings during off peak traffic periods.

The location of the temple is at a great distance from residential areas and sidewalks are currently not provided along Bank Street in the vicinity of the temple. Promoting pedestrian travel to the site would not be an option since the travel distance of many parishioners is beyond walking distance. In the future when the Remer Lands subdivision is completed and Bank Street widened, a sidewalk or multi use pathway may be provided along Bank Street which could be used by parishioners from the Remer Lands subdivision who decide to walk to the temple.

Although Bank Street is identified as a spine route as part of the cycling network in the *Transportation Master Plan*, no cycling facilities are currently provided along Bank Street in the vicinity of the site. Traffic counts taken on July 16, 2017 determined that no patrons used bicycles to travel to the temple. Bicycle racks may be provided if required.

OC Transpo provides one bus travelling to and one bus travelling from the site on Sundays. Route 93 travels from the South Keys shopping centre and arriving at the temple at 10:54 AM (before service), and one bus picking up passengers from the temple at 2:32 PM (after service) travelling to South Keys. The traffic counts did count 4 passengers arriving by bus. Further use of transit could be achieved by raising awareness of the OC Transpo service to the site.

The main reduction in vehicle travel to and from the site would be achieved by carpooling and ride sharing. Parishioners currently share trips and arrive in one vehicle as a family with a vehicle occupancy rate greater than most land uses.

The Hindu Temple site would conform to the TDM measures which are intended to reduce traffic along the surrounding roadway network.

## **5. FINDINGS AND RECOMMENDATIONS**

The Hindu Temple of Ottawa-Carleton is located on the east side of Bank Street at the south end of the City of Ottawa. The temple was constructed approximately 30 years ago and provides a place of worship and space for religious and social services. A new assembly hall is being proposed which would provide more space for social activities, celebrations and administrative offices. The assembly hall would not be used as a place of worship.

The site currently has one access onto Bank Street. The access is 7.5 m wide with one lane entering and one lane exiting the site. The westbound exiting lane provides shared left/right turning movements.

Bank Street is a two lane rural road. The City of Ottawa plans to widen Bank Street to a four lane road from Leirim Road to Rideau Road. Phase 2 of the widening will be from Leirim Road to Blais Road and will take place between 2020 and 2025, and Phase 3 from Blais Road to Rideau Road between 2026 and 2031. A roundabout approximately 135 m north of the site is planned which would provide access to the proposed Remer Lands subdivision on the west side of Bank Street.

The study has examined the operation of the site access onto Bank Street and the proposed roundabout following the completion of the site's assembly hall. The time period would be for the peak hour of trips entering the temple site for Sunday worship, and the peak hour of trips exiting the site. The analysis would use the 2017 traffic counts, expected traffic at the year 2020 when the assembly hall is completed, and 2025 which represents 5 years beyond completion. The findings and recommendations of the study are summarized in the following:

- 1) Utilizing the trip counts taken on July 16, 2017 and existing lane geometry, the site access intersection operated at an acceptable level of service during both the peak hour of trips entering (prior to service) and trips exiting (following service).
- 2) At the completion of the assembly hall in 2020, it is assumed that Phase 1 of the Remer Lands subdivision is completed and a single lane Bank Street roundabout is constructed at Street 6 to the subdivision with a shared centreline left turn lane at the south approach.

The operational analysis determined that both the site access to Bank Street and the Bank/Street 6 roundabout operated at an acceptable level of service. No roadway or intersection modifications are required due to the addition of the assembly hall.

- 3) At the year 2025 it is assumed that Bank Street has been widened to a four lane road, the Bank/Street 6 roundabout is a two lane roundabout, and the Remer Lands subdivision fully developed. The operational analysis determined that both the site access to Bank Street and the Bank/Street 6 roundabout operated at an acceptable level of service. No roadway or intersection modifications are required due to the addition of the assembly hall.
- 4) The proposed assembly hall will utilize the same existing site access onto Bank Street as the temple. The access provides a sight line which meets and exceeds the guidelines of the Transportation Association of Canada publication, *Geometric Design Guide for Canadian Roads*. Collision reports obtained from the City of Ottawa over the latest three year period does not show a safety problem with respect to the geometry of the site access.
- 5) The number of parking spaces will conform to the City of Ottawa Parking By-law. The number of parking spaces currently is sufficient for the temple facility, and it is expected that the number of parking spaces proposed will be sufficient for the expected number of parked vehicles at the year 2025.
- 6) The Transportation Brief Check List is provided in the Appendix as Exhibit 13.

Prepared by:

*David J. Halpenny*

David J. Halpenny, M. Eng., P. Eng.



## **APPENDIX**

**TRAFFIC COUNTS – Site Access and Bank Street**

**COLLISION REPORTS**

**OPERATIONAL ANALYSIS WORK SHEETS**

**TRANSPORTATION BRIEF – CHECK LIST**



## EXHIBIT 2 COLLISION REPORTS (January 1, 2013 to January 1, 2016)

### Collision Main Detail Summary

OnTRAC Reporting System

FROM: 2013-01-01 TO: 2014-01-01

#### BANK ST, BLAIS RD to RIDEAU RD

Former Municipality: Gloucester

Traffic Control: No control

Number of Collisions: 3

	DATE	DAY	TIME	ENV	LIGHT	IMPACT TYPE	CLASS	DIR	SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	No. PED
1	2013-09-03	Tue	16:26	Clear	Daylight	Rear end	Non-fatal	V1 S	Dry	Going ahead	Pick-up truck	Other motor vehicle	0
								V2 S	Dry	Stopped	Automobile, station wagon	Other motor vehicle	
								V3 S	Dry	Turning left	Automobile, station wagon	Other motor vehicle	
2	2013-12-06	Fri	15:15	Clear	Daylight	Rear end	Non-fatal	V1 S	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	0
								V2 S	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	
3	2013-12-10	Tue	15:24	Clear	Daylight	Single vehicle	P.D. only	V1 N	Wet	Going ahead	Automobile, station wagon	Pole (sign, parking)	0



### City Operations - Transportation Services Collision Details Report - Public Version

From: January 1, 2014 To: January 1, 2016

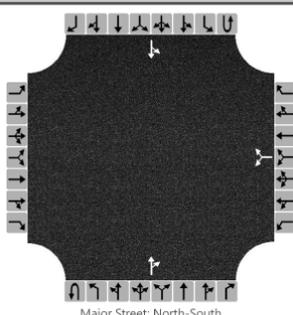
Location: BANK ST btwn BLAIS RD & RIDEAU RD

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-Jan-15, Wed,07:52	Snow	Rear end	Non-fatal injury	Dry	South	Going ahead	Truck and trailer	Other motor vehicle	
					South	Turning left	Automobile, station wagon	Other motor vehicle	
2014-Aug-30, Sat,13:35	Clear	SMV other	P.D. only	Dry	South	Turning right	Pick-up truck	Ran off road	
2014-Aug-13, Wed,14:00	Clear	Turning movement	P.D. only	Dry	North	Pulling away from shoulder or curb	Pick-up truck	Other motor vehicle	
					North	Turning right	Pick-up truck	Other motor vehicle	
2014-Dec-06, Sat,03:01	Clear	SMV other	P.D. only	Ice	South	Going ahead	Pick-up truck	Ran off road	
2015-Jan-15, Thu,08:49	Clear	Rear end	P.D. only	Wet	South	Slowing or stopping	Automobile, station wagon	Skidding/sliding	
					South	Slowing or stopping	School bus	Other motor vehicle	
2015-Jun-18, Thu,17:57	Clear	Rear end	P.D. only	Dry	North	Going ahead	Pick-up truck	Other motor vehicle	
					North	Stopped	Automobile, station wagon	Other motor vehicle	
2015-Jun-17, Wed,16:45	Clear	Angle	P.D. only	Dry	East	Turning left	Pick-up truck	Other motor vehicle	
					South	Turning left	Passenger van	Other motor vehicle	
2015-Oct-04, Sun,12:41	Clear	Rear end	Non-fatal injury	Dry	North	Going ahead	Passenger van	Other motor vehicle	
					North	Stopped	Pick-up truck	Other motor vehicle	
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2015-Oct-05, Mon,16:38	Clear	Angle	P.D. only	Dry	North	Going ahead	Truck - closed	Other motor vehicle	
					East	Going ahead	Pick-up truck	Other motor vehicle	

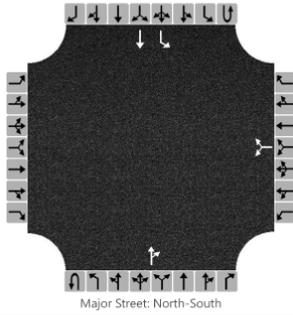
### EXHIBIT 3 EXISTING 2017 PEAK PERIOD PEAK TRIPS ENTERING – Site Access/Bank

HCS7 Two-Way Stop-Control Report																
General Information								Site Information								
Analyst								Intersection	Site Access/Bank							
Agency/Co.								Jurisdiction								
Date Performed	9/20/2017							East/West Street	Site Access							
Analysis Year	2017							North/South Street	Bank Street							
Time Analyzed	Peak Trips Entering							Peak Hour Factor	0.92							
Intersection Orientation	North-South							Analysis Time Period (hrs)	0.25							
Project Description	4835 Bank Street															
Lanes																
 <p style="text-align: center; font-size: small;">Major Street: North-South</p>																
Vehicle Volumes and Adjustments																
Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume, V (veh/h)						0		6			379	6		40	488	
Percent Heavy Vehicles (%)						0		0						0		
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															
Critical and Follow-up Headways																
Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																
Delay, Queue Length, and Level of Service																
Flow Rate, v (veh/h)							7							43		
Capacity, c (veh/h)							641							1151		
v/c Ratio							0.01							0.04		
95% Queue Length, Q <sub>95</sub> (veh)							0.0							0.1		
Control Delay (s/veh)							10.7							8.2		
Level of Service, LOS							B							A		
Approach Delay (s/veh)					10.7								1.0			
Approach LOS					B											

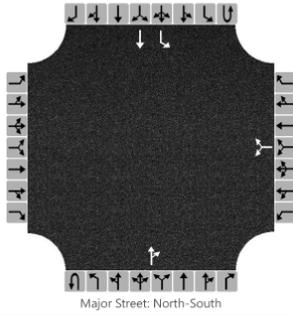
## EXHIBIT 4 EXISTING 2017 PEAK PERIOD PEAK TRIPS EXITING – Site Access/Bank

HCS7 Two-Way Stop-Control Report																
General Information								Site Information								
Analyst								Intersection	Site Access/Bank							
Agency/Co.								Jurisdiction								
Date Performed	9/20/2017							East/West Street	Site Access							
Analysis Year	2017							North/South Street	Bank Street							
Time Analyzed	Peak Trips Exiting							Peak Hour Factor	0.92							
Intersection Orientation	North-South							Analysis Time Period (hrs)	0.25							
Project Description	4835 Bank Street															
Lanes																
<p style="text-align: center; font-size: small;">Major Street: North-South</p>																
Vehicle Volumes and Adjustments																
Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes	0	0	0		0	1	0		0	0	1	0	0	0	1	0
Configuration							LR					TR			LT	
Volume, V (veh/h)						1		22			372	5			21	503
Percent Heavy Vehicles (%)						0		0							0	
Proportion Time Blocked																
Percent Grade (%)					0											
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															
Critical and Follow-up Headways																
Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																
Delay, Queue Length, and Level of Service																
Flow Rate, v (veh/h)							25								23	
Capacity, c (veh/h)							614								1161	
v/c Ratio							0.04								0.02	
95% Queue Length, Q <sub>95</sub> (veh)							0.1								0.1	
Control Delay (s/veh)							11.1								8.2	
Level of Service, LOS							B								A	
Approach Delay (s/veh)					11.1								0.6			
Approach LOS					B											

## EXHIBIT 5 2020 PEAK PERIOD PEAK TRIPS ENTERING – Site Access/Bank

HCS7 Two-Way Stop-Control Report																
General Information								Site Information								
Analyst								Intersection	Site Access/Bank							
Agency/Co.								Jurisdiction								
Date Performed	9/20/2017							East/West Street	Site Access							
Analysis Year	2020							North/South Street	Bank Street							
Time Analyzed	Peak Trips Entering							Peak Hour Factor	0.92							
Intersection Orientation	North-South							Analysis Time Period (hrs)	0.25							
Project Description	4835 Bank Street															
Lanes																
 <p style="text-align: center; font-size: small;">Major Street: North-South</p>																
Vehicle Volumes and Adjustments																
Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0		0	1	0		0	1	0
Configuration							LR					TR		L	T	
Volume, V (veh/h)						1		6			401	8		42	517	
Percent Heavy Vehicles (%)						0		0						0		
Proportion Time Blocked																
Percent Grade (%)					0											
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															
Critical and Follow-up Headways																
Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																
Delay, Queue Length, and Level of Service																
Flow Rate, v (veh/h)							8							46		
Capacity, c (veh/h)							512							1126		
v/c Ratio							0.02							0.04		
95% Queue Length, Q <sub>95</sub> (veh)							0.0							0.1		
Control Delay (s/veh)							12.1							8.3		
Level of Service, LOS							B							A		
Approach Delay (s/veh)					12.1								0.6			
Approach LOS					B											

## EXHIBIT 6 2020 PEAK PERIOD PEAK TRIPS EXITING – Site Access/Bank

HCS7 Two-Way Stop-Control Report																
General Information								Site Information								
Analyst								Intersection	Site Access/Bank							
Agency/Co.								Jurisdiction								
Date Performed	9/20/2017							East/West Street	Site Access							
Analysis Year	2020							North/South Street	Bank Street							
Time Analyzed	Peak Trips Exiting							Peak Hour Factor	0.92							
Intersection Orientation	North-South							Analysis Time Period (hrs)	0.25							
Project Description	4835 Bank Street															
Lanes																
 <p style="text-align: center; font-size: small;">Major Street: North-South</p>																
Vehicle Volumes and Adjustments																
Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0		0	1	0		0	1	0
Configuration							LR					TR		L	T	
Volume, V (veh/h)						1		24			394	5		24	532	
Percent Heavy Vehicles (%)						0		0						0		
Proportion Time Blocked																
Percent Grade (%)					0											
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															
Critical and Follow-up Headways																
Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																
Delay, Queue Length, and Level of Service																
Flow Rate, v (veh/h)							27								26	
Capacity, c (veh/h)							595								1138	
v/c Ratio							0.05								0.02	
95% Queue Length, Q <sub>95</sub> (veh)							0.1								0.1	
Control Delay (s/veh)							11.3								8.2	
Level of Service, LOS							B								A	
Approach Delay (s/veh)					11.3								0.4			
Approach LOS					B											

## EXHIBIT 7 2025 PEAK PERIOD PEAK TRIPS ENTERING – Site Access/Bank

HCS7 Two-Way Stop-Control Report																
General Information								Site Information								
Analyst								Intersection	Site Access/Bank							
Agency/Co.								Jurisdiction								
Date Performed	9/20/2017							East/West Street	Site Access							
Analysis Year	2025							North/South Street	Bank Street							
Time Analyzed	Peak Trips Entering							Peak Hour Factor	0.92							
Intersection Orientation	North-South							Analysis Time Period (hrs)	0.25							
Project Description	4835 Bank Street															
Lanes																
<p style="text-align: center; font-size: small;">Major Street: North-South</p>																
Vehicle Volumes and Adjustments																
Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	2	0	0	1	2	0
Configuration							LR				T	TR		L	T	
Volume, V (veh/h)						1		7			428	9		50	553	
Percent Heavy Vehicles (%)						0		0						0		
Proportion Time Blocked																
Percent Grade (%)					0											
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															
Critical and Follow-up Headways																
Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																
Delay, Queue Length, and Level of Service																
Flow Rate, v (veh/h)							9							54		
Capacity, c (veh/h)							643							1098		
v/c Ratio							0.01							0.05		
95% Queue Length, Q <sub>95</sub> (veh)							0.0							0.2		
Control Delay (s/veh)							10.7							8.4		
Level of Service, LOS							B							A		
Approach Delay (s/veh)					10.7								0.7			
Approach LOS					B											

## EXHIBIT 8 2025 PEAK PERIOD PEAK TRIPS EXITING – Site Access/Bank

HCS7 Two-Way Stop-Control Report																
General Information								Site Information								
Analyst								Intersection	Site Access/Bank							
Agency/Co.								Jurisdiction								
Date Performed	9/20/2017							East/West Street	Site Access							
Analysis Year	2025							North/South Street	Bank Street							
Time Analyzed	Peak Trips Exiting							Peak Hour Factor	0.92							
Intersection Orientation	North-South							Analysis Time Period (hrs)	0.25							
Project Description	4835 Bank Street															
Lanes																
<p style="text-align: center; font-size: small;">Major Street: North-South</p>																
Vehicle Volumes and Adjustments																
Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	2	0	0	1	2	0
Configuration							LR				T	TR		L	T	
Volume, V (veh/h)						2		28			421	6		27	569	
Percent Heavy Vehicles (%)						0		0						0		
Proportion Time Blocked																
Percent Grade (%)					0											
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															
Critical and Follow-up Headways																
Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																
Delay, Queue Length, and Level of Service																
Flow Rate, v (veh/h)							32								29	
Capacity, c (veh/h)							708								1107	
v/c Ratio							0.05								0.03	
95% Queue Length, Q <sub>95</sub> (veh)							0.1								0.1	
Control Delay (s/veh)							10.3								8.3	
Level of Service, LOS							B								A	
Approach Delay (s/veh)					10.3								0.4			
Approach LOS					B											

## EXHIBIT 9 2020 PEAK PERIOD PEAK TRIPS ENTERING – Remer Lands/Bank (Roundabout)

HCS7 Roundabouts Report																	
General Information								Site Information									
Analyst								Intersection	Bank/Remer Access								
Agency or Co.								E/W Street Name	Remer Lands (Street 6)								
Date Performed	9/21/2017							N/S Street Name	Bank Street								
Analysis Year	2020							Analysis Time Period (hrs)	0.25								
Time Analyzed	Peak Hour Trips Entering							Peak Hour Factor	0.92								
Project Description	4835 Bank Street							Jurisdiction									
Volume Adjustments and Site Characteristics																	
Approach	EB				WB				NB				SB				
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R	
Number of Lanes (N)	0	0	1	0	0	0	0	0	0	0	1	0	0	0	1	0	
Lane Assignment	LR								LT				TR				
Volume (V), veh/h	0	101		66					0	29	393		0		518	135	
Percent Heavy Vehicles, %	3	1		1					3	1	1		3		1	1	
Flow Rate (v <sub>PCE</sub> ), pc/h	0	111		72					0	32	431		0		569	148	
Right-Turn Bypass	None				None				None				None				
Conflicting Lanes	1								1				1				
Pedestrians Crossing, p/h	0								0				0				
Critical and Follow-Up Headway Adjustment																	
Approach	EB				WB				NB				SB				
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass		
Critical Headway (s)		4.9763								4.9763				4.9763			
Follow-Up Headway (s)		2.6087								2.6087				2.6087			
Flow Computations, Capacity and v/c Ratios																	
Approach	EB				WB				NB				SB				
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass		
Entry Flow (v <sub>e</sub> ), pc/h		183								463				717			
Entry Volume veh/h		181								458				710			
Circulating Flow (v <sub>c</sub> ), pc/h		569				574				111				32			
Exiting Flow (v <sub>e</sub> ), pc/h		0				180				542				641			
Capacity (c <sub>PCE</sub> ), pc/h		772								1232				1336			
Capacity (c), veh/h		765								1220				1322			
v/c Ratio (x)		0.24								0.38				0.54			
Delay and Level of Service																	
Approach	EB				WB				NB				SB				
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass		
Lane Control Delay (d), s/veh		7.3								6.6				8.5			
Lane LOS		A								A				A			
95% Queue, veh		0.9								1.8				3.3			
Approach Delay, s/veh		7.3								6.6				8.5			
Approach LOS		A								A				A			
Intersection Delay, s/veh   LOS					7.7								A				

## EXHIBIT 10 2020 PEAK PERIOD PEAK TRIPS EXITING – Remer Lands/Bank (Roundabout)

HCS7 Roundabouts Report																
General Information								Site Information								
Analyst								Intersection	Bank/Remer Access							
Agency or Co.								E/W Street Name	Remer Lands (Street 6)							
Date Performed	9/21/2017							N/S Street Name	Bank Street							
Analysis Year	2020							Analysis Time Period (hrs)	0.25							
Time Analyzed	Peak Hour Trips Exiting							Peak Hour Factor	0.92							
Project Description	4835 Bank Street							Jurisdiction								
Volume Adjustments and Site Characteristics																
Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	0	0	0	0	1	0	0	0	1	0
Lane Assignment	LR								LT				TR			
Volume (V), veh/h	0	101		66					0	30	404		0		506	135
Percent Heavy Vehicles, %	3	1		1					3	1	1		3		1	1
Flow Rate (v <sub>PCE</sub> ), pc/h	0	111		72					0	33	444		0		556	148
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1								1				1			
Pedestrians Crossing, p/h	0								0				0			
Critical and Follow-Up Headway Adjustment																
Approach	EB				WB				NB				SB			
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	
Critical Headway (s)		4.9763								4.9763				4.9763		
Follow-Up Headway (s)		2.6087								2.6087				2.6087		
Flow Computations, Capacity and v/c Ratios																
Approach	EB				WB				NB				SB			
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	
Entry Flow (v <sub>e</sub> ), pc/h		183								477				704		
Entry Volume veh/h		181								472				697		
Circulating Flow (v <sub>c</sub> ), pc/h		556			588					111				33		
Exiting Flow (v <sub>e</sub> ), pc/h		0			181					555				628		
Capacity (c <sub>PCE</sub> ), pc/h		783								1232				1334		
Capacity (c), veh/h		775								1220				1321		
v/c Ratio (x)		0.23								0.39				0.53		
Delay and Level of Service																
Approach	EB				WB				NB				SB			
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	
Lane Control Delay (d), s/veh		7.2								6.7				8.4		
Lane LOS		A								A				A		
95% Queue, veh		0.9								1.9				3.2		
Approach Delay, s/veh		7.2								6.7				8.4		
Approach LOS		A								A				A		
Intersection Delay, s/veh   LOS					7.6								A			

## EXHIBIT 11 2025 PEAK PERIOD PEAK TRIPS ENTERING – Remer Lands/Bank (Roundabout)

HCS7 Roundabouts Report																
General Information								Site Information								
Analyst								Intersection	Bank/Remer Access							
Agency or Co.								E/W Street Name	Remer Lands (Street 6)							
Date Performed	9/21/2017							N/S Street Name	Bank Street							
Analysis Year	2025							Analysis Time Period (hrs)	0.25							
Time Analyzed	Peak Hour Trips Entering							Peak Hour Factor	0.92							
Project Description	4835 Bank Street							Jurisdiction								
Volume Adjustments and Site Characteristics																
Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	0	0	0	0	2	0	0	0	2	0
Lane Assignment	LR								LT		T		T		TR	
Volume (V), veh/h	0	150		71					0	33	417		0		557	176
Percent Heavy Vehicles, %	3	1		1					3	1	1		3		1	1
Flow Rate (v <sub>PCE</sub> ), pc/h	0	165		78					0	36	458		0		611	193
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	2								2				2			
Pedestrians Crossing, p/h	0								0				0			
Critical and Follow-Up Headway Adjustment																
Approach	EB				WB				NB				SB			
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	
Critical Headway (s)		4.3276								4.6453	4.3276		4.6453	4.3276		
Follow-Up Headway (s)		2.5352								2.6667	2.5352		2.6667	2.5352		
Flow Computations, Capacity and v/c Ratios																
Approach	EB				WB				NB				SB			
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	
Entry Flow (v <sub>e</sub> ), pc/h		243								232	262		378	426		
Entry Volume veh/h		241								230	259		374	422		
Circulating Flow (v <sub>c</sub> ), pc/h		611			659			165			36			689		
Exiting Flow (v <sub>e</sub> ), pc/h		0			229			623			689					
Capacity (c <sub>PCE</sub> ), pc/h		845						1160	1234		1306	1377				
Capacity (c), veh/h		836						1148	1222		1293	1364				
v/c Ratio (x)		0.29						0.20	0.21		0.29	0.31				
Delay and Level of Service																
Approach	EB				WB				NB				SB			
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	
Lane Control Delay (d), s/veh		7.5								4.9	4.8		5.4	5.4		
Lane LOS		A								A	A		A	A		
95% Queue, veh		1.2								0.7	0.8		1.2	1.3		
Approach Delay, s/veh		7.5						4.9			5.4					
Approach LOS		A						A			A					
Intersection Delay, s/veh   LOS					5.5								A			

## EXHIBIT 12 2025 PEAK PERIOD PEAK TRIPS EXITING – Remer Lands/Bank (Roundabout)

HCS7 Roundabouts Report																
General Information								Site Information								
Analyst								Intersection	Bank/Remer Access							
Agency or Co.								E/W Street Name	Remer Lands (Street 6)							
Date Performed	9/21/2017							N/S Street Name	Bank Street							
Analysis Year	2025							Analysis Time Period (hrs)	0.25							
Time Analyzed	Peak Hour Trips Exiting							Peak Hour Factor	0.92							
Project Description	4835 Bank Street							Jurisdiction								
Volume Adjustments and Site Characteristics																
Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	0	0	0	0	2	0	0	0	2	0
Lane Assignment	LR								LT		T		T		TR	
Volume (V), veh/h	0	150		70					0	34	431		0		542	176
Percent Heavy Vehicles, %	3	1		1					3	1	1		3		1	1
Flow Rate (v <sub>pc</sub> ), pc/h	0	165		77					0	37	473		0		595	193
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	2								2				2			
Pedestrians Crossing, p/h	0								0				0			
Critical and Follow-Up Headway Adjustment																
Approach	EB				WB				NB				SB			
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	
Critical Headway (s)		4.3276					4.6453	4.3276		4.6453	4.3276		4.6453	4.3276		
Follow-Up Headway (s)		2.5352					2.6667	2.5352		2.6667	2.5352		2.6667	2.5352		
Flow Computations, Capacity and v/c Ratios																
Approach	EB				WB				NB				SB			
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	
Entry Flow (v <sub>e</sub> ), pc/h		242					240	270		370	418					
Entry Volume veh/h		240					237	268		367	414					
Circulating Flow (v <sub>c</sub> ), pc/h	595				675				165				37			
Exiting Flow (v <sub>e</sub> ), pc/h	0				230				638				672			
Capacity (c <sub>pc</sub> ), pc/h		856					1160	1234		1305	1376					
Capacity (c), veh/h		848					1148	1222		1292	1362					
v/c Ratio (x)		0.28					0.21	0.22		0.28	0.30					
Delay and Level of Service																
Approach	EB				WB				NB				SB			
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	
Lane Control Delay (d), s/veh		7.3					5.0	4.9		5.3	5.3					
Lane LOS		A					A	A		A	A					
95% Queue, veh		1.2					0.8	0.8		1.2	1.3					
Approach Delay, s/veh	7.3								4.9				5.3			
Approach LOS	A								A				A			
Intersection Delay, s/veh   LOS					5.5								A			

## EXHIBIT 13 TRANSPORTATION BRIEF – CHECK LIST

Address Hindu Temple - 4835 Bank Street  
File # 117-657  
Date September 20, 2017

TIS / **TB** / CTS

### **Check list**

- Municipal address;
- Location relative to major elements of the existing transportation system (eg., the site is location in the southwest quadrant of the intersection of Main Street/ First Street, 600 metres from the Maple Street Rapid Transit Station);
- Existing land uses or permitted use provisions in the Official Plan, Zoning By-law, etc.;
- Proposed land uses and relevant planning regulations to be used in the analysis;
- Proposed development size (building size, number of residential units, etc.) and location on site;
- Estimated date of occupancy;
- Planned phasing of development;
- Proposed number of parking spaces (not relevant for Draft Plans of Subdivision); and
- Proposed access points and type of access (full turns, right-in / right-out, turning restrictions, etc.
- Study area;
- Time periods and phasing; and
- Horizon years (include reference to phased development).

### **Existing Contitions**

- Existing roads and ramps in the study area, including jurisdiction, classification, number of lanes, and posted speed limit;
- Existing intersections, including type of control, lane configurations, turning restrictions, and any other relevant data (eg., extraordinary lane widths, grades, etc.);
- Existing access points to adjacent developments (both sides of all roads bordering the site);
- Existing transit system, including stations and stops;
- Existing on- and off-road bicycle facilities and pedestrian sidewalks and pathway networks;
- Existing system operations (V/C, LOS); and

- Major trip generators / attractors within the Study Area should be indicated.

#### **Demand Forecasting**

- General background growth;
- Other study area developments;
- Changes to the study area road network;
- Future background system operations (V/C, LOS, queue lengths);
- Trip generation rates;
- Trip distribution and assignment;

#### **Impact Analysis**

- Total future system operations (V/C, LOS, queue lengths);
- Signal and auxiliary lane (device) warrants;
- Operational / safety assessment (eg., sight line assessment where grades are an issue);
- Storage analysis for closely spaced intersections;
- Pedestrian and bicycle network connections and continuity;
- On-site circulation and design;
- Potential for neighbourhood impacts; and
- TDM.
- Synchro Files (Highway Capacity Software)

#### **CTS**

##### **Impact Analysis**

- Network Capacity Analysis;
- Non-auto network connections and continuity;
- Potential for community impacts, and
- TDM.
- Synchro Files (Highway Capacity Software)
- Screenline Analysis