

City of Saskatoon

Caswell Hill Neighbourhood Traffic Review

February 9, 2015

Acknowledgements

The completion of this review would not be possible without the contribution of the following organizations and individuals:

- Caswell Hill residents
- Caswell Hill Community Association
- Saskatoon Police Service
- Saskatoon Light & Power
- Saskatoon Fire Department
- City of Saskatoon Environmental Services
- City of Saskatoon Transit
- City of Saskatoon Transportation
- Great Works Consulting
- Councillor Pat Lorje

Executive Summary

The objective of the Neighbourhood Traffic Management Program is to address traffic concerns within neighbourhoods such as speeding, shortcutting, and pedestrian safety. The program was revised in August 2013 to address traffic concerns on a neighbourhood-wide basis. The revised program involves additional community and stakeholder consultation that provides the environment for neighbourhood residents and City staff to work together in developing solutions that address traffic concerns. The process is outlined in the *Traffic Calming Guidelines and Tools*, City of Saskatoon, 2013.

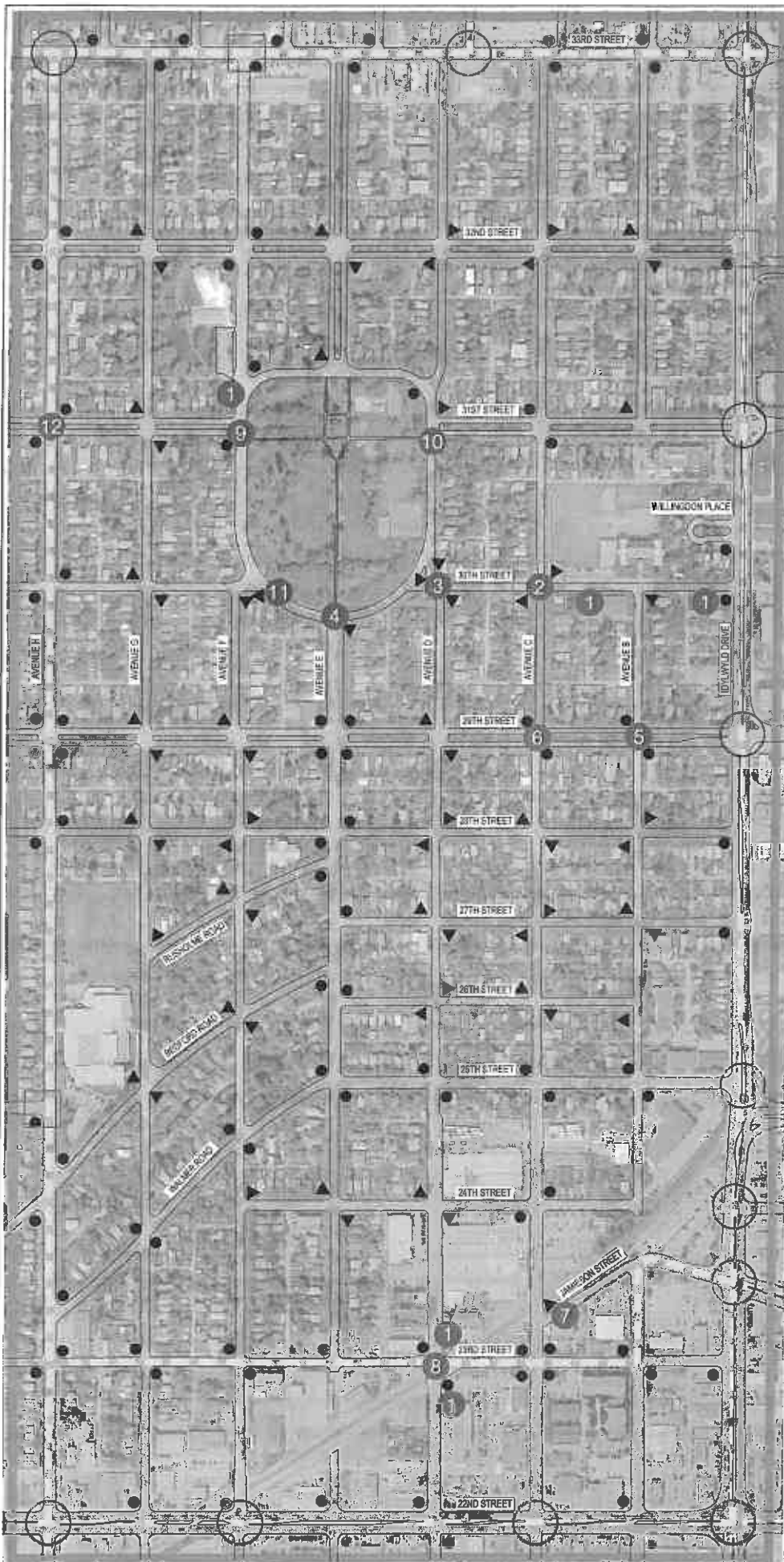
A public meeting was held in April of 2014 to identify traffic concerns and potential solutions within the Caswell Hill neighbourhood. As a result of the meeting a number of traffic assessments were completed to confirm and quantify the concerns raised by the residents. Based on the residents input and the completed traffic assessments, a Traffic Management Plan was developed and presented to the community at a follow-up meeting held in October 2014.

A summary of recommended improvements for the Caswell Hill neighbourhood are included in **Table ES-1**. The summary identifies the locations, the recommended improvement, and a schedule for implementation. The schedule to implement the Traffic Management Plan can vary depending on the complexity of the proposed improvement. According to the *Traffic Calming Guidelines and Tools* document, the time frame may range from short-term (1 to 2 year); medium-term (3 to 5 years) and long-term (5 years plus). Accordingly, the specific time frame to implement the improvements for these neighbourhoods ranges from 1 to 5 years.







The resulting proposed Caswell Hill Traffic Management Plan is illustrated in **Exhibit ES-1**.

Table ES-1: Caswell Hill Neighbourhood Recommended Improvements

Location	Proposed Measure	Time Frame
Avenue B & 27 th Street	Stop signs	1 to 2 years
32 nd Street & Avenue D	Alternate direction of stop signs	
Avenue C & 30 th Street	Change yield signs to stop signs	
Jamieson Street & Avenue C	Change yield sign to stop sign	
Avenue F & 30 th Street	Change yield sign to stop sign; install closer to intersection	
Avenue H & 31 st Street	Zebra crosswalks	
Avenue F - north of 30 th Street (at curve)	30kph advisory speed sign & curve ahead sign	
Avenue D & 30 th Street	"No parking" signs	
29 th Street & Avenue C	Zebra crosswalk	
29 th Street & Avenue B	Pedestrian corridor & zebra crosswalk	
Avenue E & 30 th Street	Raised median islands; accessibility ramps; pathway connection into park; add reflectors to park posts	
Avenue D & 23 rd Street	Directional Closure, signage, & pavement markings to restrict northbound through movement (Subject to CP approval)	
Avenue F & 31 st Street	Curb extensions & raised median island	
Avenue D & 31 st Street	Curb extension	
30th Street between Idylwyld Drive & Avenue C (south side); Avenue F between parking lot south of pool & 31st Street (west side); Avenue D (portions on east side, north & south of 23rd Street to connect to existing); Avenue E between 28th Street & 29th Street (east side)	Sidewalk	5 years plus



LEGEND

-  STOP SIGN
-  YIELD SIGN
-  BUS ROUTE
-  TRAFFIC SIGNAL LOCATION
-  PEDESTRIAN ACTUATED SIGNAL LOCATION
-  ACTIVE PEDESTRIAN CORRIDOR LOCATION

ITEM	LOCATION	PROPOSED MEASURE
1	Avenue B & 27th Street	Stop Sign
2	32nd Street & Avenue D	North-South facing stop signs
3	Avenue C & 30th Street	Change yields sign to stop sign
4	Jamleson St & Avenue C	Change yield sign to stop sign
5	Avenue F & 30th Street	Change yield sign to stop sign; install closer to intersection
6	Avenue H & 31st Street	Zebra crosswalks
7	Avenue F north of 30th St (at curve)	30kph advisory speed sign & curve ahead sign
8	Avenue D & 30th Street	"no parking" signs
9	29th Street & Avenue C	Zebra crosswalk
10	29th Street & Avenue B	Pedestrian corridor & zebra crosswalk
11	Avenue E & 30th Street	Median islands; accessibility ramps; pathway connection into park; add reflectors to park posts
12	Avenue D & 23rd Street	Median island, signage & pavement markings to restrict northbound through movement (subject to CP approval)
13	Avenue F & 31st Street	Curb extensions & median island
14	Avenue D & 31st Street	Curb extension

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1. Introduction

The purpose of this project was to develop a Traffic Management Plan for the Caswell Hill neighbourhood following the implementation procedure outlined in the *City of Saskatoon Traffic Calming Guidelines and Tools* adopted by City Council in August 2013.

The Caswell Hill neighbourhood is located on the west side of the South Saskatchewan River and is bound by 22nd Street to the south, Idwylwyld Drive to the east, 33rd Street to the north, and Avenue H to the west. The area use is mostly residential, with an elementary school on 30th Street (Caswell Hill School) and a high school on Avenue H & Bedford Road (Bedford Road Collegiate), and some commercial land use adjacent to 22nd Street and 33rd Street.

The development and implementation of the traffic management plan includes four stages:

- **Stage 1** - Identify existing problems, concerns and possible solutions through the initial neighbourhood consultation and the Shaping Saskatoon Website.
- **Stage 2** - Develop a draft traffic plan based on resident's input and traffic assessments.
- **Stage 3** - Present the draft traffic plan to the neighbourhood at a follow-up meeting; circulate the plan to other civic divisions for feedback; make adjustments as needed; and present the plan to City Council for approval.
- **Stage 4** - Implement the proposed measures in specific time frame, short-term (1 to 2 years), medium-term (3 to 5 years) or long-term (5 years plus).

2. Identifying Issues, Concerns, & Possible Solutions

A public meeting was held in April of 2014 to identify traffic concerns within the neighbourhood. At the meeting, residents were given the opportunity to express their concerns and suggest possible solutions.

The following pages summarize the concerns and suggested solutions identified during the initial consultation with the neighbourhood residents.

CONCERN 1 – SPEEDING AND SHORTCUTTING

Shortcutting occurs when non-local traffic passes through the neighbourhood on local streets which are designed and intended for low volumes of traffic. In the case of Caswell Hill, the bordering arterial streets (33rd Street, Idylwyld Drive, 22nd Street, and Avenue H) are designated to accommodate larger traffic volumes.

As speeding often accompanies shortcutting, these concerns have been grouped into one category.

Neighbourhood concerns for speeding and shortcutting were at the following locations:

- 30th Street between Avenue E & Avenue F
- 29th Street (including high volumes of heavy trucks)
- Avenue D between 29th Street & 33rd Street
- Avenue I
- 23rd Street near Avenue D
- Avenue B between 31st Street & 33rd Street
- Avenue F near Mayfair Pool, Ashworth Holmes Park, and Walmer Road
- Near Ashworth Holmes Park (Avenue F, Avenue D, 30th Street, & 31st Street)
- Jamieson Street

Proposed solutions identified by residents:

- Install speed humps
- Install raised crosswalks
- Install curb extensions
- Alternate direction of yield or stop signs

CONCERN 2 - PEDESTRIAN SAFETY

A majority of the residents were concerned about pedestrian safety near the Ashworth Holmes Park and the school sites within Caswell Hill (Caswell Hill School on 30th Street; and Bedford Road Collegiate on Avenue H).

Pedestrian crosswalks need to adhere to the City of Saskatoon Council Policy C07-018 *Traffic Control at Pedestrian Crossings*, November 15, 2004 which states the following:

"The installation of appropriate traffic controls at pedestrian crossings shall be based on warrants listed in the document entitled "Traffic Control at Pedestrian Crossings – 2004" approved by City Council in 2004."

Neighbourhood concerns regarding pedestrian safety were at the following locations:

- Ashworth Holmes Park (Avenue F, Avenue D, 30th Street, Avenue E, & 31st Street)
- 29th Street (particularly Avenue B & Avenue C)
- Jamieson Street – pedestrians walking on street; pedestrian safety concerns at Avenue C
- Avenue H – no safe crossings between 29th Street & 33rd Street
- Idylwyld Drive & 32nd Street – pedestrian device takes too long to activate; light turning red when no pedestrians are present
- Idylwyld Drive & 30th Street – install pedestrian-activated signal
- Enforcement for winter maintenance/sidewalk clearing in front of private property
- Missing sidewalks:
 - 30th Street on the south side between Idylwyld Drive & Avenue C
 - Gap on west side of Avenue F just south of pool
 - Avenue E between 25th Street & 29th Street
 - Avenue C between 25th Street & 29th Street
 - Avenue D near 23rd Street

Proposed solutions identified by residents:

- Install pedestrian-activated light
- Install raised median islands or curb extensions
- Install zebra crossing
- Install raised pedestrian crosswalk
- Pedestrian accessibility ramps needed into Ashworth Holmes Park
- Trim hedges around Ashworth Holmes Park to improve visibility of pedestrians

CONCERN 3 - TRAFFIC CONTROL

Traffic control signs are used in order to assign the right-of-way and must meet guidelines in City of Saskatoon Council Policy C07-007 *Traffic Control – Use of Stop and Yield Signs*, April 26, 2009 which states that stop and yield signs are not to be used as speed control devices, to stop priority traffic over minor traffic, on the same approach to an intersection where traffic signals are operational, or as a pedestrian crossing device.

An all-way stop must meet the conditions for traffic volume, collision history, and must have a balanced volume from each leg to operate sufficiently.

Neighbourhood concerns regarding traffic control improvements were are at the following intersections:

- 25th Street & Avenue C – drivers ignoring stop sign
- 29th Street – drivers disobeying 4-way stops at Avenue H and Avenue E
- Jamieson Street & Avenue C – drivers disobeying yield sign
- 23rd Street & Avenue C – 4-way stop isn't working
- Avenue D & 30th Street – right-or-way is confusing
- Avenue B & 27th Street – dangerous
- 25th Street eastbound – difficult to get onto Idylwyld Drive
- Idylwyld Drive & 32nd Street – install motion detector for vehicles waiting on 32nd Street; truck traffic going through intersection; drivers going through on Idylwyld Drive on red

Proposed solutions identified by residents:

- 30th Street & Avenue C – yield signs should be stop signs
- Avenue B & 27th Street – install stop signs

CONCERN 4 – PARKING

Parking is allowed on all city streets unless signage is posted. According to City of Saskatoon Bylaw 7200, *The Traffic Bylaw*, December 16, 2013, vehicles are restricted from parking within 10 metres of an intersection and one metre of a driveway crossing.

Neighbourhood concerns regarding parking were at the following locations:

- 30th Street & Avenue D
- 31st Street & Avenue D
- 29th Street
- Jamieson Street & Avenue C
- Ashworth Holmes Park
- Avenue B & 27th Street
- Trucks parking on Avenue B between 24th Street & 25th Street

Proposed solutions identified by residents:

- Install “no parking” signs to indicate 10 metre distance from intersection.

CONCERN 5 - CYCLING

Cycling is a practical mode of transportation in Caswell Hill, as the neighbourhood is in close proximity to the downtown and other nearby amenities.

The Blairmore Bikeway is a designated pathway connecting the downtown area to the Blairmore Suburban Centre. Jamieson Street and a portion of 23rd Street from Idylwyld Drive to Vancouver Avenue (Circle Drive) were selected as part of the route due to low traffic volumes. A number of traffic calming devices were installed along the route to further decrease traffic volumes and vehicular speeds and increase safety for cyclists. The portion of 23rd Street that intersects the Caswell Hill neighbourhood, from Idylwyld Drive to Avenue H, includes a "pinch point" at between Avenue E and Avenue F, and curb extensions/raised median island at Avenue H.

Neighbourhood concerns regarding cycling were at the following locations:

- Sharrows on Jamieson Street go into parked cars
- 23rd Street & Avenue E pinch point is dangerous and increases frustration; cyclists have no place to go
- Not in favour of the temporary traffic calming used for the cycling route improvements on 23rd Street. The curbing is ugly and collects garbage. Graders frequently hit the curb leaving bolts sticking out.

Proposed solutions identified by residents:

- Remove the bulbing at 23rd Street & Avenue E and paint bike lanes
- Curb extensions force cyclist into the middle of the road. Install path through curb extensions for cyclists to go through
- Prioritize cycling routes in terms of spring maintenance (i.e. potholes, debris, gravel)

3. Assessment

Stage 2 of the plan development included developing a draft traffic management plan. This was completed through the following actions:

- Create a detailed list of all the issues provided by the residents.
- Collect historical traffic data and information the City has on file for the neighbourhood.
- Prepare a data collection program that will provide the appropriate information needed to undertake the assessments.
- Complete the data collection, which may include:
 - Intersection turning moving counts
 - Pedestrian counts
 - Daily and weekly traffic counts
 - Average speed measurements
- Assess the issues by using the information in reference with City policies, bylaws, and guidelines, transportation engineering design guidelines and technical documents, and professional engineering judgement.

The following sections provide details on the data collected for traffic volumes (peak hours, daily, and weekly), travel speed, and pedestrian movements.

1. Traffic Volumes and Travel Speeds

Traffic volumes and travel speeds were measured to assist in determining the need for traffic calming devices. In Saskatoon the neighbourhood streets are classified typically as either local or collector streets. Traffic volumes (referred to as Average Daily Traffic) on these streets should meet the City of Saskatoon guidelines shown in **Table 3-1**.

Table 3-1: City of Saskatoon Street Classifications and Characteristics

Characteristics	Classifications					
	Back Lanes		Locals		Collectors	
	Residential	Commercial	Residential	Commercial	Residential	Commercial
Traffic function	Access function only (traffic movement not a consideration)		Access primary function (traffic movement secondary consideration)		Traffic movement and land access of equal importance	
Average Daily Traffic (vehicles per day)	<500	<1,000	<1,000	<5,000	<5,000	8,000-10,000
Typical Speed Limits (kph)	20		50		50	
Transit Service	Not permitted		Generally avoided		Permitted	
Cyclist	No restrictions or special facilities		No restrictions or special facilities		No restrictions or special facilities	
Pedestrians	Permitted, no special facilities		Sidewalks on one or both sides	Sidewalks provided where required	Typically sidewalks provided both sides	Sidewalks provided where required
Parking	Some restrictions		No restrictions or restriction on one side only		Few restrictions other than peak hour	

Travel speeds were measured to determine the 85th percentile speed, which is the speed at which 85 percent of vehicles are travelling at or below. The speed limit in the Caswell Hill area is 50kph, except for school zones where the speed limit is 30kph from September and June, 8:00am to 5:00pm, excluding weekends.

The speed studies and Average Daily Traffic (ADT) on streets where speeding was identified as an issue are summarized in **Table 3-2**.

Table 3-2: Speed Studies and Average Daily Traffic Counts (2014)

Street	Between	Class	Average Daily Traffic (vpd)	Speed (kph)
25 th Street	Avenue B & Idylwyld Drive	Local	933	N/A
Avenue D	28 th Street & 29 th Street		415	37.8
30 th Street	Avenue E & Avenue F		342	41.3
Avenue D	29 th Street & 30 th Street		228	40.9
Avenue F	31 st Street & 32 nd Street		352	40.9
Avenue F	30 th Street & 31 st Street		977	47.5
Avenue B	31 st Street & 32 nd Street		143	46.5
Avenue B	31 st Street & 32 nd Street		512	39.4
Jamieson Street	Avenue B & Avenue C	Local-Commercial	4,100	N/A
Avenue C	22 nd Street & 23 rd Street		3,603	N/A
29 th Street	Avenue F & Avenue G	Collector	3,400	44.6
29 th Street	Idylwyld Drive & Avenue B		5,345	N/A
29 th Street	Avenue B & Avenue C		4,680	N/A
29 th Street	Idylwyld Drive & Avenue B		4,390	N/A

2. Turning Movement Counts

Turning movement counts were completed to determine the need for an all-way (i.e. three-way or four-way) stop control. All-way stop controls need to meet City of Saskatoon Council Policy C07-007 *Traffic Control – Use of Stop and Yield Signs*, January 26, 2009. Criteria outlined in the policy that may warrant an all-way stop include a peak hour count greater than 600 vehicles or an ADT greater than 6,000 vehicles per day. Further conditions that must be met for an all-way stop to be warranted are:

1. Traffic entering the intersection from the minor street must be at least 35% for a 4-way stop and 25% for a 3-way stop.
2. No other all-way stop or traffic signals within 200m.

Results of the studies are shown in Table 3-3.

Table 3-3: All-Way Stop Assessments

Location	Peak Hour Traffic Count (veh)	Average Daily Traffic (vpd)	% of Traffic from minor street (%)	Traffic signals or all-way stop within 200m	Results
Avenue F & 31 st Street (south)	114	1,230	11	no	All-Way Stop Not Warranted
Avenue F & 31 st Street (north)	122	1,270	20	no	
Avenue C & 29 th Street	617	6,650	21	no	
Avenue H & 28 th Street	572	5,740	3	yes (90m from 4-way stop at 29 th Street)	
Avenue H & 31 st Street	596	5,960	6	No	
Avenue D & 23 rd Street	504	5,360	31	yes (100m from 4-way stop at Avenue C)	

As a result of the assessment there are no all-way stop controls recommended. Details of the all-way stop assessments are provided in **Appendix A**.

3. Pedestrian Assessments

Pedestrian assessments are conducted to determine the need for pedestrian actuated signalized crosswalks which, in adherence to the City of Saskatoon Council Policy C07-018 *Traffic Control at Pedestrian Crossings*, November 15, 2004, are typically active pedestrian corridor (flashing yellow lights) or pedestrian-actuated signals. A warrant system assigns points for a variety of conditions that exist at the crossing location, including:

- The number of traffic lanes to be crossed;
- the presence of a physical median;
- the posted speed limit of the street;
- the distance the crossing point is to the nearest protected crosswalk point; and
- the number of pedestrian and vehicles at the location.

Pedestrian and traffic data is collected during the five peak hours of: 8:00am-9:00am, 11:30am-1:30pm, and 3:00pm-5:00pm.

In addition, if a pedestrian actuated crosswalk is not warranted, a standard marked pedestrian crosswalk, or a zebra crosswalk (i.e. striped) may be considered. A summary of the pedestrian studies are provided in **Table 3-4**.

Table 3-4: Pedestrian Assessment

Location	Number of Pedestrians Crossing	Results
Avenue C & 29 th Street	63	Pedestrian Devices Not Warranted
Avenue H & 28 th Street	14	
31 st Street & Avenue H	27	
Avenue F & 31 st Street (south)	51	
Avenue F & 31 st Street (north)	39	

As a result of the assessment, no pedestrian devices are recommended. Details of the pedestrian device assessments are provided in **Appendix B**.

4. Plan Development

Stage 3 of the review included finalizing the recommended plan. This was achieved by completing the following steps:

- Based on the assessments, prepare a plan that illustrates the appropriate recommended improvement
- Present the draft plan to the residents at a follow-up public meeting
- Circulate the draft plan to the Civic Divisions for comment
- Revise the draft plan based on feedback from the stakeholders
- Prepare a technical document summarizing the recommended plan and project process

The tables in the following sections provide the details of the recommended traffic management plan, including the location, recommended improvement, and the justification of the recommended improvement.

1. Pedestrian Safety

Caswell Hill residents identified pedestrian safety near Caswell Hill School and Ashworth Holmes Park as a concern. The safety of the pedestrian environment near schools is important to encourage people to walk to school, as opposed to being dropped off. Accordingly, the recommended improvements to increase pedestrian safety are detailed in **Table 4-1**.

Table 4-1: Recommended Pedestrian Safety Improvements – School Sites

Location	Recommended Improvement ¹	Purpose
Avenue H & 31 st Street	Zebra crosswalks	Improve pedestrian safety crossing Avenue H (currently no enhanced crossings between 29 th Street & 33 rd Street)
29 th Street & Avenue C	Zebra crosswalk	Improve pedestrian safety on school route
29 th Street & Avenue B	Pedestrian corridor & zebra crosswalk	Improve pedestrian safety on school route
Avenue E & 30 th Street	Raised median islands; accessibility ramps; pathway connection into park; add reflectors to park posts	Reduce speed & improve pedestrian safety near park
Avenue F & 31 st Street	Curb extensions & raised median island	Reduce speed & improve pedestrian safety near park
Avenue D & 31 st Street	Curb extension	Reduce speed & improve pedestrian safety near park
Avenue F - north of 30 th Street (at curve)	30kph advisory speed sign & curve ahead sign	Reduce speed around curve near park
30 th Street between Idylwyld Drive & Avenue C (south side); Avenue F between parking lot south of pool & 31 st Street (west side); Avenue D (portions on east side, north & south of 23 rd Street to connect to existing); Avenue E between 28 th Street & 29 th Street (east side)	Sidewalk	Improve pedestrian safety and connectivity near parks/schools

¹ For details on these devices refer to the *City of Saskatoon Traffic Calming Guidelines and Tools*

2. Traffic Control

The recommended improvements to intersections that will improve the level of safety by clearly identifying the right-of-way through traffic controls are provided in **Table 4-2**.

Table 4-2: Recommended Traffic Control Improvements

Location	Recommended Improvement	Purpose
32 nd Street & Avenue D	Alternate direction of stop signs	As part of the Stop & Yield Retrofit Program, signs are to be installed in an alternating pattern so a thoroughfare isn't created
Avenue C & 30 th Street	Change yield signs to stop signs	Enhance compliance near Caswell School
Jamieson Street & Avenue C	Change yield sign to stop sign	Enhance compliance (Policy C07-007 – warranted based on roadway geometry / alignment)
Avenue F & 30 th Street	Change yield sign to stop sign; install closer to intersection	Enhance compliance near Ashworth Holmes Park (Policy C07-007 – warranted based on roadway geometry / alignment)
32 nd Street & Avenue D	North-south facing stop signs	As part of the Stop & Yield Retrofit Program, signs are to be installed in an alternating pattern so a thoroughfare isn't created
Avenue B & 27 th Street	Stop Signs	Enhance compliance

3. Parking Improvements

The recommended improvements to parking that will improve the level of safety at specific intersections is detailed in **Table 4-3**.

Table 4-3: Recommended Parking Improvements

Location	Recommended Improvement	Purpose
Avenue D & 30th Street	"No parking" signs	Improve sightlines
Avenue D & 30th Street	Add "no parking" signs around island.	Parked cars obstruct sight lines

4. Cycling Improvements

An assessment is currently being conducted for the Blairmore Bikeway (i.e. 23rd Street cycling route). All comments received during the public consultation were forwarded to the project leader for further consideration.

5. 23rd Street & Avenue D

Safety concerns were an identified concern at the intersection of Avenue D & 23rd Street including high traffic volumes and visibility issues.

An all-way stop assessment was conducted and is not warranted due to low traffic volumes and the proximity of the existing all-way stop at Avenue C & 23rd Street.

A review of the most recent 5-year collision data (2009 – 2013) indicated 20 collisions occurred, and 80% of all collisions involved the northbound through movement. A directional closure to restrict the northbound through movement is recommended to reduce the number of collisions and improve overall safety at the intersection. In addition, a yield sign will be added for the northbound right turn and parking restrictions will be installed on 23rd Street on the southeast corner to improve sight lines. Refer to **Exhibit 4-1**.

The peak hour traffic volumes were reviewed to assess the impact of the directional closure. During the morning peak hour (7:45am-8:45am), there were 18 northbound-through vehicles, 10 westbound-right vehicles, and 2 eastbound-left vehicles resulting in a total of 40 vehicles during the afternoon peak hour effected. During the afternoon peak hour (4:30pm-5:30pm), there were 38 northbound-through vehicles, 20 westbound-right vehicles, and 7 eastbound-left vehicles resulting in a total of 65 vehicles during the afternoon peak hour effected. Based on the peak hour assessment the directional closure will have minimal impact on the level of service of the intersection. For full details of the peak hour assessment refer to **Appendix D**.

Follow up Consultation – Presentation of Traffic Management Plan

The initial recommended improvements were presented at a follow-up public meeting in October 2014. Recommended improvements that were not supported by the residents were eliminated or altered accordingly. A decision matrix detailing the list of recommended improvements presented at the follow-up meeting are included in **Appendix E**. A decision matrix for additional comments received after the draft traffic plan is also included in **Appendix E**.

The following table displays a list of the improvements that were adjusted based on the feedback received at the October 2014 follow up meeting.

The recommendations were circulated to all Civic Divisions to gather comments and concerns. General support was received along with the following comments:

- Saskatoon Fire Department requested that emergency vehicles be able to proceed northbound on Avenue D at 23rd Street. They would simply ignore the left/right turn only and go against traffic in the southbound lane.
- Saskatoon Light & Power requested that Transportation Division contact them when the sidewalk location is determined to see if it required relocation of lighting.

5. Recommended Plan and Cost Estimates

Stage 4, the last stage of the process, is to install the recommended improvements for the Caswell Hill neighbourhood within the specified timeframe. The timeframe depends upon the complexity and cost of the solution. A short-term time frame is defined by implementing the improvements within 1 to 2 years; medium-term is 3 to 5 years; and long-term is 5 years plus.

The placement of pedestrian and traffic control signage will be completed short-term (1 to 2 years).

All traffic calming measures will be installed temporarily using rubber curbing until proven effective, and will be implemented short-term (1 to 2 years).

Permanent traffic calming often includes removing the temporary barriers and reconstructing with concrete. The timeline for permanent traffic calming may depend on the complexity of the device and the availability of funding; therefore the timeline is medium-term (3 to 5 years).

Major intersection reviews are based on the number of other locations to be reviewed city-wide and the availability of funding. The timeline for review will be medium-term (3 to 5 years).

The estimated costs of the improvements included in the Neighbourhood Traffic Management Plan are outlined in the following tables:

- Table 5-1: Traffic Calming Cost Estimate
- Table 5-2: Marked Pedestrian Crosswalks Cost Estimate
- Table 5-3: Traffic Control Signage – Stop & Yield Cost Estimate
- Table 5-4: Miscellaneous Signage Cost Estimate
- Table 5-5: Sidewalk & Pedestrian Accessibility Cost Estimate
- Table 5-6: Avenue D & 23rd Street Improvements Cost Estimate
- Table 5-7: Total Cost Estimate

Table 5-1: Traffic Calming Cost Estimate

Location	Device (s)	Cost Estimate		Time Frame
		Temporary	Permanent	
Avenue E & 30 th Street	2 raised median islands	\$1,000	\$12,000	1 to 5 years
Avenue F & 31 st Street	2 curb extensions & 1 raised median island	\$1,500	\$66,000	
Avenue D & 31 st Street	1 curb extension	\$500	\$30,000	
Total		\$3,000	\$108,000	

Temporary traffic calming will be installed in 2015 and will be monitored to determine its effectiveness. If proven effective, the devices will be made permanent. Until they are made permanent, the devices will remain temporary and maintained on a yearly basis. An estimated cost for maintenance is about \$5,000 per year. The maintenance typically involves the replacement of damage curbs as result of snow removal, damage from vehicle impact, etc.

Table 5-2: Marked Pedestrian Crosswalks Cost Estimate

Location	Device (s)	Cost Estimate	Time Frame
Avenue H & 31 st Street	4 signs & zebra markings	\$1,200	1 to 2 years
29 th Street & Avenue C	4 signs & zebra markings	\$1,200	
29 th Street & Avenue B	4 signs & zebra markings	\$1,200	
Avenue E & 30 th Street	Post reflectors	\$100	
29 th Street & Avenue B	Pedestrian corridor	\$30,000	1 to 5 years
Total		\$33,700	

The operating cost on an annual basis to maintain a crosswalk is approximately \$60 each.

Table 5-3: Traffic Control Signage – Stop & Yield Cost Estimate

Location	Device (s)	Number of Signs	Cost Estimate	Time Frame
Avenue B & 27 th Street; Avenue C & 30 th Street; Avenue F & 30 th Street; and Jamieson Street & Avenue C	Stop Sign	6	\$1,500	1 to 2 years
32 nd Street & Avenue D	Alternate stop signs	2	\$0	
Total			\$1,500	

Table 5-4: Miscellaneous Signage Cost Estimate

Location	Device (s)	Cost Estimate	Time Frame
Avenue F - north of 30 th Street (at curve)	30kph speed sign	\$250	1 to 2 years
Avenue D & 30 th Street	"No parking" signs	\$750	
Total		\$1,000	

Table 5-5: Sidewalk & Pedestrian Accessibility Cost Estimate

Location	Device	Distance (m)	Cost Estimate	Time Frame
30 th Street between Idylwyld Drive & Avenue C (south side)	Sidewalk	170	\$74,800	5 years plus
Avenue F between parking lot south of pool & 31 st Street (west side)	Sidewalk	40	\$17,600	
Avenue D (portions on east side, north & south of 23 rd Street to connect to existing)	Sidewalk	55	\$24,200	
Avenue E between 28 th Street & 29 th Street (east side)	Sidewalk	60	\$26,400	
Avenue E & 30 th Street	Asphalt pathway connection	20	\$30,000	
Avenue E & 30 th Street	2 accessibility ramps	NA	\$6,400	
Total			\$179,400	

Table 5-6: Avenue D & 23rd Street Improvements Cost Estimate

Device	Cost Estimate		Time Frame
	Temporary	Permanent	
Pavement markings (lane designation, stop bar)	NA	\$2,000	1 to 2 years
5 Signs (1 yield sign, 1 No Entry, 2 No Right/Left Turns, 1 "No Parking")	NA	\$1,250	
Directional Closure	\$1,000	\$45,000	1 to 5 years
Total	\$1,000	\$48,250	

Table 5-7: Total Cost Estimate

Category	Signage & Temporary Traffic Calming	Permanent
Traffic Calming	\$3,000	\$108,000
Marked Pedestrian Crosswalks	\$3,700	\$30,000
Traffic Control Signage	\$1,500	NA
Miscellaneous Signage	\$1,000	NA
Sidewalks & Pedestrian Accessibility Ramps	NA	\$179,400
Avenue D & 23rd Street Improvements	\$4,250	\$45,000
Total	\$13,450	\$362,400

The total cost estimate for the signage and temporary traffic calming devices to be installed in 2015 is **\$13,450**. The total cost estimate for the installation of future permanent devices, including the pedestrian corridor, sidewalks, pedestrian accessibility ramps, asphalt pathway, and permanent traffic calming is **\$362,400**.







Resulting from the plan development process, the recommended improvements, including the location, type of improvement, and schedule for implementation are summarized in **Exhibit 5-1**. The resulting recommended Caswell Hill neighbourhood Traffic Management Plan is illustrated in **Table 5-8**.

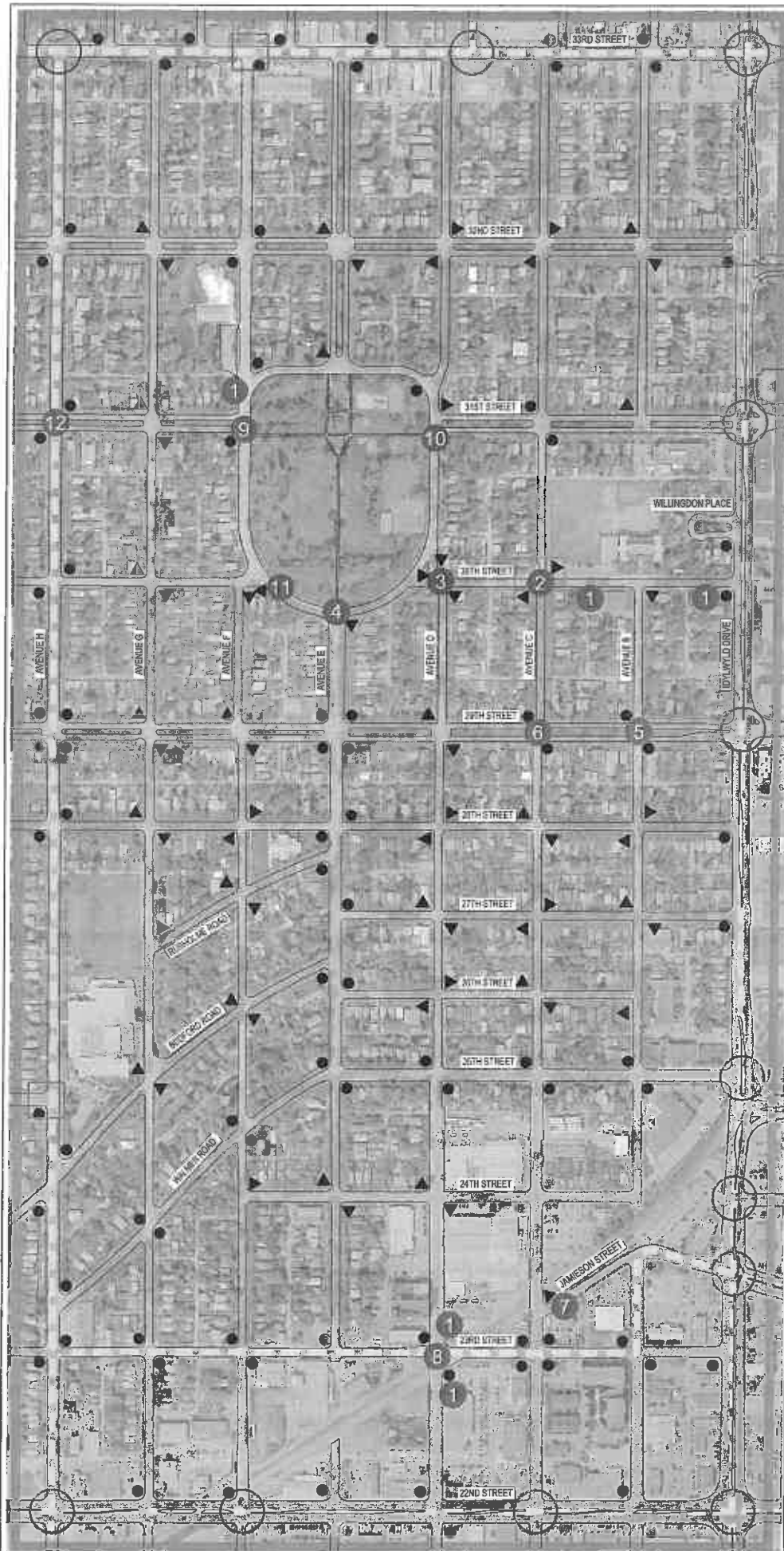
Table 5-8: Caswell Hill Neighbourhood Recommended Improvements

Location	Proposed Measure	Time Frame
Avenue B & 27th Street	Stop signs	1 to 2 years
32nd Street & Avenue D	Alternate direction of stop signs	
Avenue C & 30th Street	Change yield signs to stop signs	
Jamieson Street & Avenue C	Change yield sign to stop sign	
Avenue F & 30th Street	Change yield sign to stop sign; install closer to intersection	
Avenue H & 31st Street	Zebra crosswalks	
Avenue F - north of 30th Street (at curve)	30kph advisory speed sign & curve ahead sign	
Avenue D & 30th Street	"No parking" signs	
29th Street & Avenue C	Zebra crosswalk	
29th Street & Avenue B	Pedestrian corridor & zebra crosswalk	3 to 5 years (traffic calming devices will be installed temporarily until proven effective)
Avenue E & 30th Street	Raised median islands; accessibility ramps; pathway connection into park; add reflectors to park posts	
Avenue D & 23rd Street	Directional Closure, signage, & pavement markings to restrict northbound through movement (Subject to CP approval)	
Avenue F & 31st Street	Curb extensions & raised median island	
Avenue D & 31st Street	Curb extension	
30th Street between Idylwyld Drive & Avenue C (south side); Avenue F between parking lot south of pool & 31st Street (west side); Avenue D (portions on east side, north & south of 23rd Street to connect to existing); Avenue E between 28th Street & 29th Street (east side)	Sidewalk	5 years plus

EXHIBIT 5-1

LEGEND

-  STOP SIGN
-  YIELD SIGN
-  BUS ROUTE
-  TRAFFIC SIGNAL LOCATION
-  PEDESTRIAN ACTUATED SIGNAL LOCATION
-  ACTIVE PEDESTRIAN CORRIDOR LOCATION



ITEM	LOCATION	PROPOSED MEASURE
1	Avenue B & 27th Street	Stop Sign
2	32nd Street & Avenue D	North-South facing stop signs
3	Avenue C & 30th Street	Change yields sign to stop sign
4	Jamieson St & Avenue C	Change yield sign to stop sign
5	Avenue F & 30th Street	Change yield sign to stop sign; install closer to intersection
6	Avenue H & 31st Street	Zebra crosswalks
7	Avenue F north of 30th St (at curve)	30kph advisory speed sign & curve ahead sign
8	Avenue D & 30th Street	"no parking" signs
9	29th Street & Avenue C	Zebra crosswalk
10	29th Street & Avenue B	Pedestrian corridor & zebra crosswalk
11	Avenue E & 30th Street	Median islands; accessibility ramps; pathway connection into park; add reflectors to park posts
12	Avenue D & 23rd Street	Median island, signage & pavement markings to restrict northbound through movement (subject to CP approval)
13	Avenue F & 31st Street	Curb extensions & median island
14	Avenue D & 31st Street	Curb extension

Appendix A

All Way Stop Assessments

All-way Stop Assessment (Policy C07-007 – Traffic Control – Use of Stop & Yield Signs)

The following conditions must be met for all-way stop control to be considered:

i) The combined volume of traffic entering the intersection over the five peak hour periods from the minor street must be at least 25% of the total volume for a three-way stop control, and at least 35% of the total volume for a four-way stop control.

ii) There can be no all-way stop control and traffic signal within 200 metres of the proposed intersection being considered for all-way stop control on either of the intersecting streets.

Location	Condition 1: Combined volume of traffic entering intersection from minor street is at least 25% for 3-way stop or 35% for 4-way stop	Condition 2: There can be no all-way stop or traffic signal within 200m	Results
Avenue F & 31 st Street (south)	11% - Condition NOT met	No all-way stop or traffic signals within 200m – Condition met	Conditions NOT met therefore all-way stop not warranted
Avenue F & 31 st Street (north)	20% - Condition NOT met	No all-way stop or traffic signals within 200m – Condition met	
Avenue C & 29 th Street	21% - Condition NOT met	No all-way stop or traffic signals within 200m – Condition met	
Avenue H & 28 th Street	3% - Condition NOT met	90m from 4-way stop at 29 th Street - condition NOT met	
Avenue H & 31 st Street	6% - Condition NOT met	No all-way stop or traffic signals within 200m – Condition met	
Avenue D & 23 rd Street	31% - Condition NOT met	100m from 4-way stop at Avenue C - condition NOT met	

Provided the above criteria are met, the following conditions, singly or in combination, may warrant the installation of all-way stop signs:

i) When five or more collisions are reported in the last twelve month period and are of a type susceptible to correction by an all-way stop control.

ii) When the total number of vehicles entering the intersection from all approaches averages at least 600 per hour for the peak hour or the total intersection entering volume exceeds 6,000 vehicles per day.

iii) The average delay per vehicle to the minor street traffic must be 30 seconds or greater during the peak hour.

iv) As an interim measure to control traffic while arrangements are being made for the installation of traffic signals.

Appendix B

Pedestrian Device Assessments

Pedestrian device assessment (Traffic Controls at Pedestrian Crossing, 2004)

29th Street & Avenue C:

1. Lanes Priority Points:

$L = 2$ lanes = number of lanes.
 $LANF = 0.0$ points = $(L-2) \times 3.6$ to a max of 15 points, urban x-section only.

2. Median Priority Points:

$MEDF = 6.0$ points = indicating there is no physical median here.

3. Speed Priority Points:

$S = 50$ kph = speed limit or 85th percentile speed.
 $SPDF = 6.7$ points = $(S-30) / 3$ to a maximum of 10 points.

4. Pedestrian Protection Location:

$D = 210$ m = distance from study location to nearest protected crosswalk.
 $LOCF = 0.8$ points = $(D-200) / 13.3$ to a maximum of 15 points.

5. Pedestrian/Vehicle Volume Priority Points:

$H = 5.0$ = (hours) duration of counting period.
 $Ps = 63.0$ = total number of children, teenagers, seniors and/or impaired counted.
 $Pa = 0.0$ = total number of adults counted.
 $Pw = 94.5$ = weighted average of pedestrians crossing the main street.
 $Pcm = 18.9$ = weighted average hourly pedestrian volume crossing the main street.
 $V = 2245.0$ = volume of traffic passing through the crossing(s).
 $Vam = 449.0$ = average hourly volume of traffic passing through the crossing(s).
 $VOLF = 17.0$ points = $Vam \times Pcm / 500$

6. Satisfaction of Installation Criteria:

$SUMF = (LANF + MEDF + SPDF + LOCF + VOLF)$

$SUMF = 30$ points

(P.A. Signal Warrant Points)

The total of the warrant points is less than 100 indicating that a pedestrian actuated signal is NOT warranted.

Avenue H & 28th Street:

1. Lanes Priority Points:

$L = 2$ lanes = number of lanes.
 $LANF = 0.0$ points = $(L-2) \times 3.6$ to a max of 15 points, urban x-section only.

2. Median Priority Points:

$MEDF = 6.0$ points = indicating there is no physical median here.

3. Speed Priority Points:

$S = 50$ kph = speed limit or 85th percentile speed.
 $SPDF = 6.7$ points = $(S-30) / 3$ to a maximum of 10 points.

4. Pedestrian Protection Location:

$D = 95$ m = distance from study location to nearest protected crosswalk.
 $LOCF = 0.0$ points = $(D-200) / 13.3$ to a maximum of 15 points.

5. Pedestrian/Vehicle Volume Priority Points:

$H = 5.0$ = (hours) duration of counting period.
 $Ps = 14.0$ = total number of children, teenagers, seniors and/or impaired counted.
 $Pa = 0.0$ = total number of adults counted.
 $Pw = 21.0$ = weighted average of pedestrians crossing the main street.
 $Pcm = 4.2$ = weighted average hourly pedestrian volume crossing the main street.
 $V = 2263.0$ = volume of traffic passing through the crossing(s).
 $Vam = 452.6$ = average hourly volume of traffic passing through the crossing(s).
 $VOLF = 3.8$ points = $Vam \times Pcm / 500$

6. Satisfaction of Installation Criteria:

$SUMF = (LANF + MEDF + SPDF + LOCF + VOLF)$

$SUMF = 16$ points

(P.A. Signal Warrant Points)

The total of the warrant points is less than 100 indicating that a pedestrian actuated signal is NOT warranted.

Avenue H & 31st Street:

1. Lanes Priority Points:

L = 2 lanes = number of lanes.
LANF = 0.0 points = $(L-2) \times 3.6$ to a max of 15 points, urban x-section only.

2. Median Priority Points:

MEDF = 6.0 points = indicating there is no physical median here.

3. Speed Priority Points:

S = 50 kph = speed limit or 85th percentile speed.
SPDF = 6.7 points = $(S-30) / 3$ to a maximum of 10 points.

4. Pedestrian Protection Location:

D = 400 m = distance from study location to nearest protected crosswalk.
LOCF = 15.0 points = $(D-200) / 13.3$ to a maximum of 15 points.
Actual value = 15.03759 points.

5. Pedestrian/Vehicle Volume Priority Points:

H = 5.0 = (hours) duration of counting period.
Ps = 27.0 = total number of children, teenagers, seniors and/or impaired counted.
Pa = 0.0 = total number of adults counted.
Pw = 40.5 = weighted average of pedestrians crossing the main street.
Pcm = 8.1 = weighted average hourly pedestrian volume crossing the main street.
V = 2008.0 = volume of traffic passing through the crossing(s).
Vam = 401.6 = average hourly volume of traffic passing through the crossing(s).
VOLF = 6.5 points = $Vam \times Pcm / 500$

6. Satisfaction of Installation Criteria:

SUMF = (LANF + MEDF + SPDF + LOCF + VOLF)

SUMF = 34 points

(P.A. Signal Warrant Points)

The total of the warrant points is less than 100 indicating that a pedestrian actuated signal is NOT warranted.

Avenue F & 31st Street (south):

1. Lanes Priority Points:

- L = 2 lanes = number of lanes.
- LANF = 0.0 points = (L-2) x 3.6 to a max of 15 points, urban x-section only.

2. Median Priority Points:

- MEDF = 6.0 points = indicating there is no physical median here.

3. Speed Priority Points:

- S = 50 kph = speed limit or 85th percentile speed.
- SPDF = 6.7 points = (S-30) / 3 to a maximum of 10 points.

4. Pedestrian Protection Location:

- D = 1,000 m = distance from study location to nearest protected crosswalk.
- LOCF = 15.0 points = (D-200) / 13.3 to a maximum of 15 points.
- Actual value = 60.15038 points.

5. Pedestrian/Vehicle Volume Priority Points:

- H = 5.0 = (hours) duration of counting period.
- Ps = 51.0 = total number of children, teenagers, seniors and/or impaired counted.
- Pa = 0.0 = total number of adults counted.
- Pw = 76.5 = weighted average of pedestrians crossing the main street.
- Pcm = 15.3 = weighted average hourly pedestrian volume crossing the main street.
- V = 398.0 = volume of traffic passing through the crossing(s).
- Vam = 79.6 = average hourly volume of traffic passing through the crossing(s).
- VOLF = 2.4 points = Vam x Pcm / 500

6. Satisfaction of Installation Criteria:

SUMF = (LANF + MEDF + SPDF + LOCF + VOLF)

SUMF = 30 points

(P.A. Signal Warrant Points)

The total of the warrant points is less than 100 indicating that a pedestrian actuated signal is NOT warranted.

Avenue F & 31st Street (north):

1. Lanes Priority Points:

L = 2 lanes = number of lanes.
LANF = 0.0 points = (L-2) x 3.6 to a max of 15 points, urban x-section only.

2. Median Priority Points:

MEDF = 6.0 points = indicating there is no physical median here.

3. Speed Priority Points:

S = 50 kph = speed limit or 85th percentile speed.
SPDF = 6.7 points = (S-30) / 3 to a maximum of 10 points.

4. Pedestrian Protection Location:

D = 1,000 m = distance from study location to nearest protected crosswalk.
LOCF = 15.0 points = (D-200) / 13.3 to a maximum of 15 points.
Actual value = 60.15038 points.

5. Pedestrian/Vehicle Volume Priority Points:

H = 5.0 = (hours) duration of counting period.
Ps = 39.0 = total number of children, teenagers, seniors and/or impaired counted.
Pa = 0.0 = total number of adults counted.
Pw = 58.5 = weighted average of pedestrians crossing the main street.
Pcm = 11.7 = weighted average hourly pedestrian volume crossing the main street.
V = 423.0 = volume of traffic passing through the crossing(s).
Vam = 84.6 = average hourly volume of traffic passing through the crossing(s).
VOLF = 2.0 points = Vam x Pcm / 500

6. Satisfaction of Installation Criteria:

SUMF = (LANF + MEDF + SPDF + LOCF + VOLF)

SUMF = 30 points

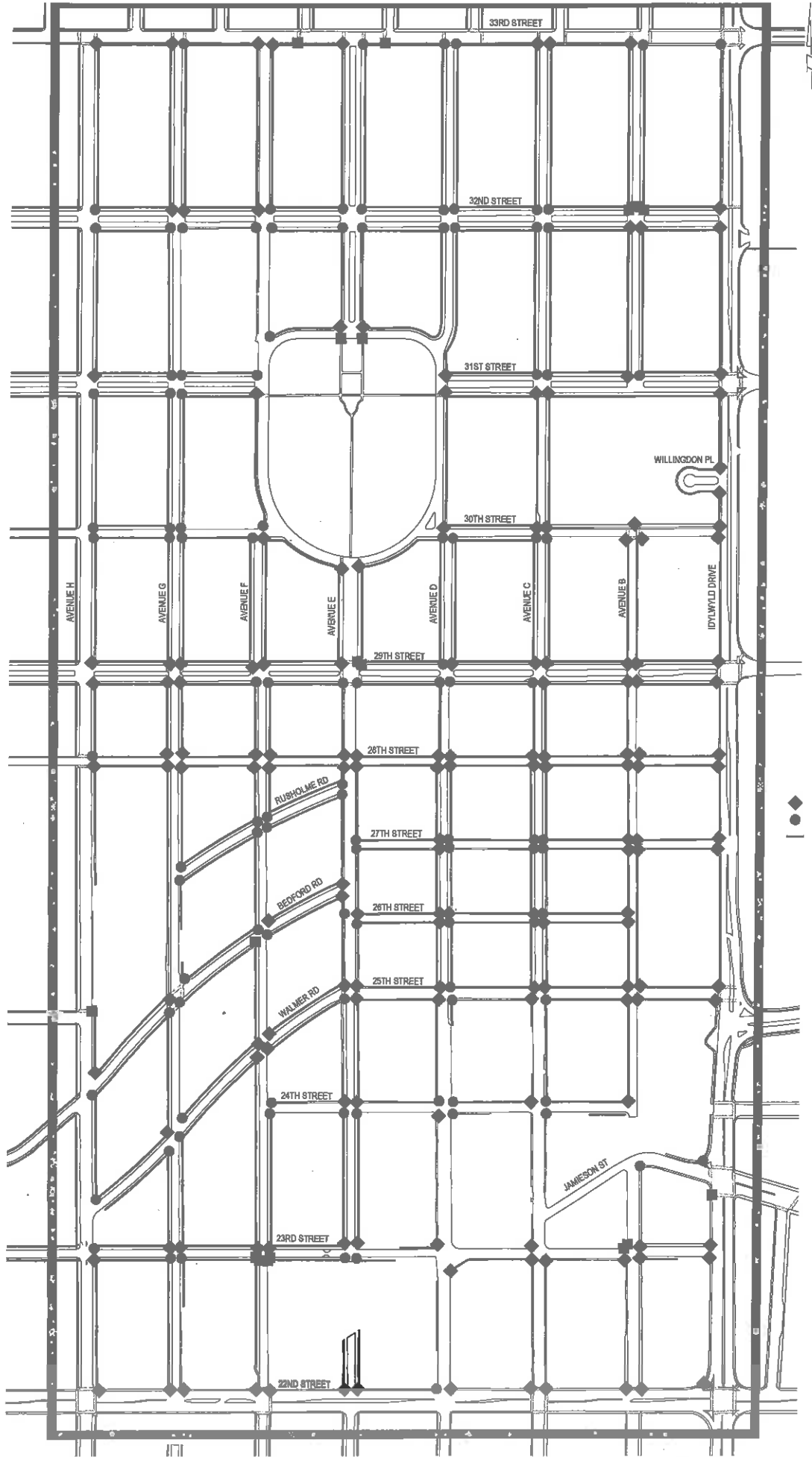
(P.A. Signal Warrant Points)

The total of the warrant points is less than 100 indicating that a pedestrian actuated signal is NOT warranted.

Appendix C

Pedestrian Facilities Map

CASWELL HILL PEDESTRIAN FACILITIES

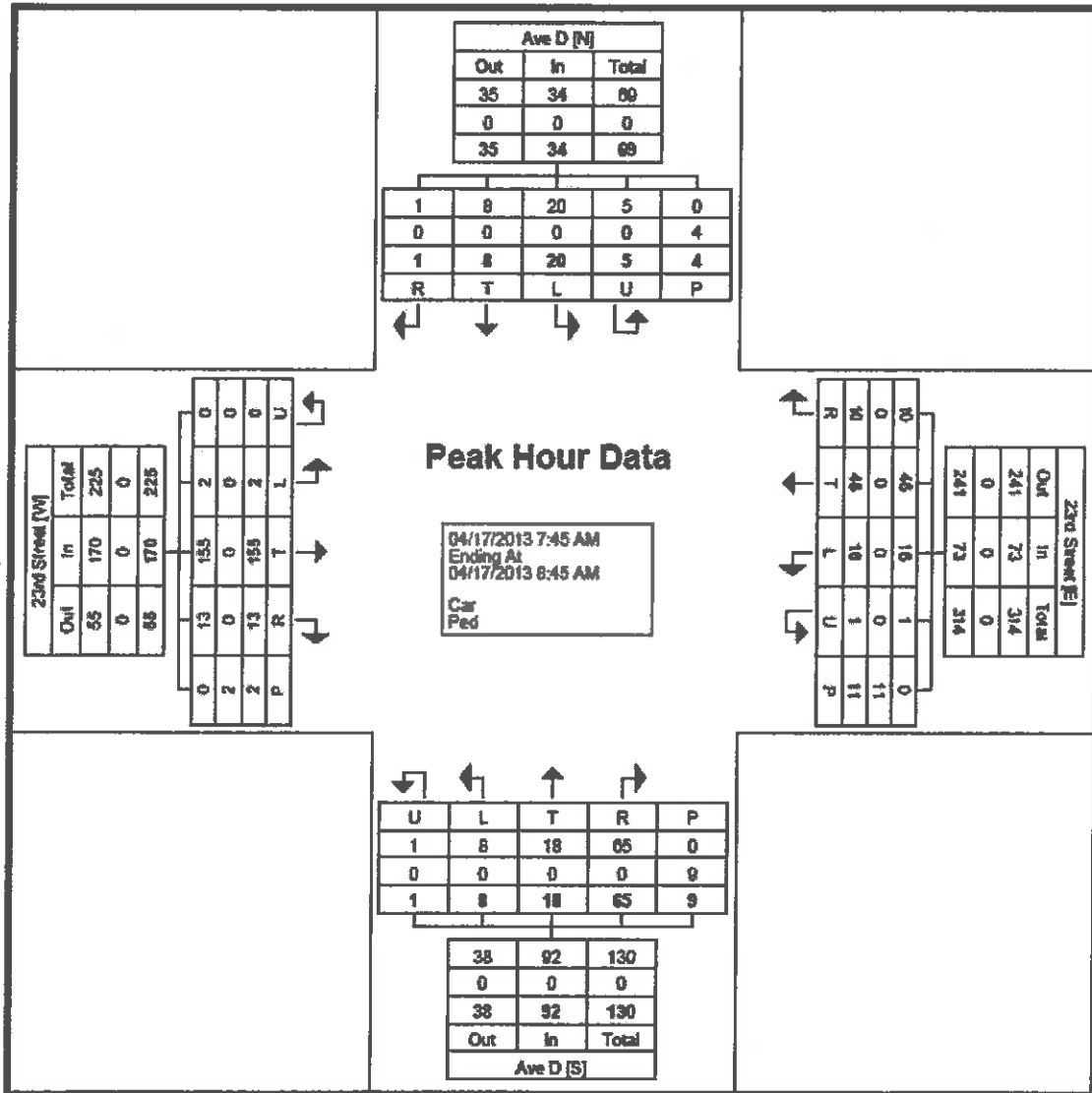


LEGEND

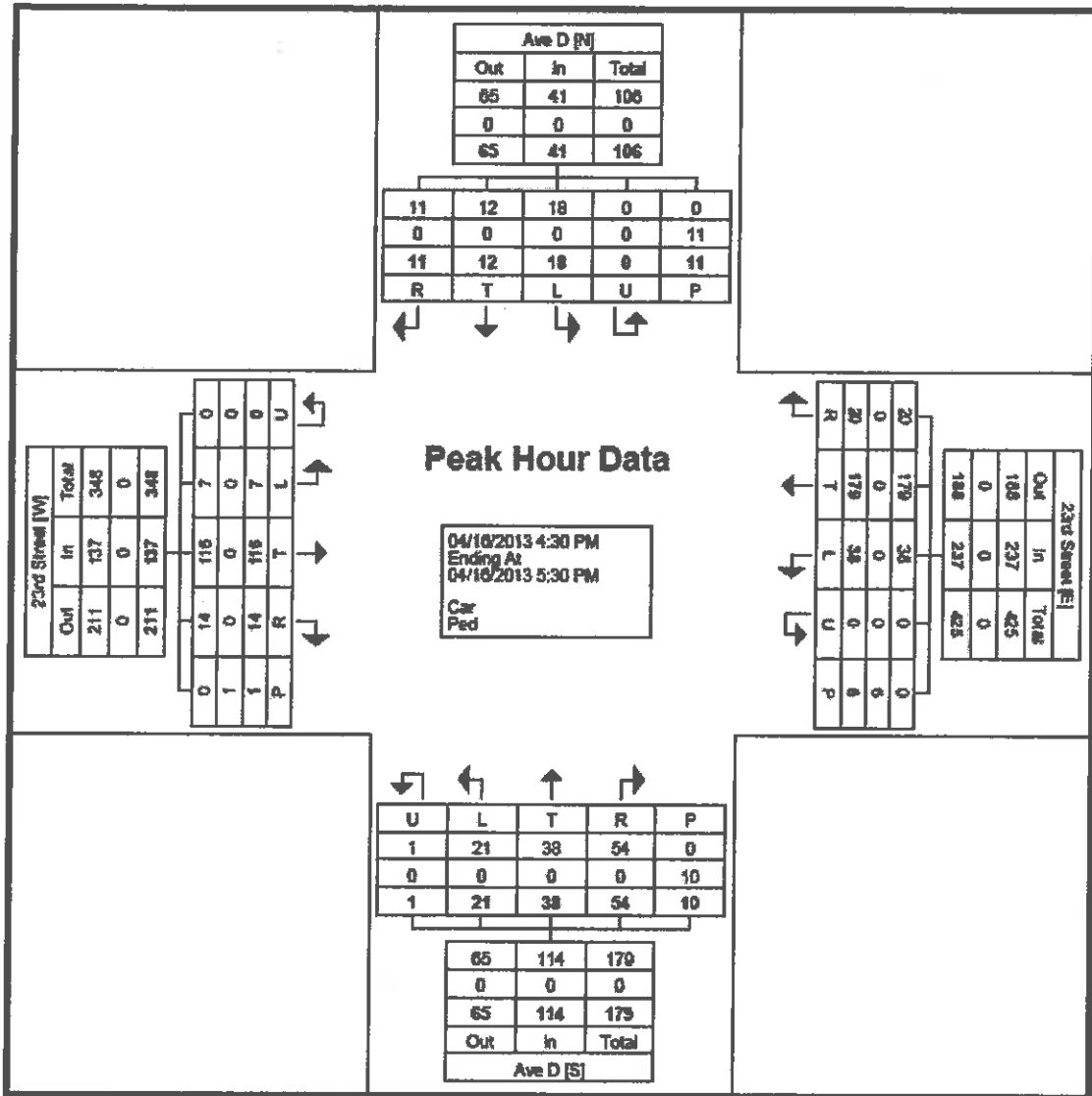
- ◆ EXISTING DISABILITY RAMP
- PROPOSED DISABILITY RAMP
- EXISTING SIDEWALK

Appendix D

Peak Hour Assessment – Avenue D & 23rd Street



Turning Movement Peak Hour Data Plot (7:45 AM)



Turning Movement Peak Hour Data Plot (4:30 PM)

Appendix E

Recommendation Review Matrix

Decision Matrix – Recommendations proposed at initial meeting

Item	Location	Recommendation	Group 1	Group 2	Group 3	Additional Responses	Decision
1	30th St between Idylwyld Dr & Ave C (south side between Idylwyld Dr & Ave C); Ave F between parking lot south of pool & 31st St (west side); Ave D (portions on east side, north & south of 23rd St to connect to existing)	Install Sidewalk		Ave B - 27th St to 29th St; around park		SL&P - has street light poles on the south side of 30 th Street between Avenue B and Avenue C. Please have your engineering team contact SL&P when the sidewalk location is determined to see if it requires the relocation of the lighting.	Carried.
2	Ave C 30th St St	Change yield signs to stop signs	agree, consider 4-way stop				Carried.
3	Ave D & 30th St	Install "no parking" sign on 30th St (southeast corner) 10m		Speeding near Ave D & 30th St; confusion	southeast corner not problem; needed around island/park on west side		Carried. Add "no parking" signs around island.
4a	Ave E & 30th St	Install median islands (west & south legs); install accessibility ramps & pathway connection on north side (Refer to picture #4a)	30kph signs on both sides; visibility is fine	Reflectors on posts into park to restrict vehicle access at path	curb extension pose a safety concern for cyclists; 50/50 support for islands		Carried. Add reflectors to posts. Add "30kph (yellow) & curve ahead" signs at Avenue F & 30th Street.
4b	Ave E & 30th St	Install curb extension on 30th St (southwest corner) & median island on Ave E; install accessibility ramps & pathway connection on north side (Refer to picture #4b)	More in favour of curb extensions; install stop signs instead of yield heading into circle around park		not in agreement		Rejected.
5	29th St & Ave B	Install pedestrian corridor & zebra crosswalk					Carried.
6	29th St & Ave C	Install zebra crosswalk	agree, consider 10m "no parking" signs		consider 4-way stop		Carried. 4-way stop not warranted.
7	Jamieson St & Ave C	Change yield sign to stop sign					Carried.
8	Avenue D & 23rd St	Install median island, signage, & pavement markings to restrict northbound through movement; "no parking" signs 10m (Refer to picture #8) (Subject to CP approval)	agree but see how it works; pedestrian-activated light; roundabout; 4-way stop		consider pedestrians		Carried.
9	Ave F & 31st St	Install curb extensions & median island on Ave F (south side)			visibility is an issue for peds coming out of park; depressed/hedge; curb extension is concern for cyclist, especially younger (pushes cyclist into traffic lane)		Carried.
10	Ave D & 31st St	Install curb extension on Ave D (southeast corner)			No, parking is an issue (visibility) on both park & residential side		Carried.
11	Ave F & 30th St	Change yield sign to stop sign; install closer to intersection					Carried.
12	Ave H & 31st St	Install zebra crosswalks on 31st St (north & south legs)					Carried.

Decision Matrix – Additional comments

Item	Location	Concern	Decision
1	Back lane south of 33rd St facing westbound onto Ave E	Add "Right Turn only" worded tab under existing "Right Turn Only" pictured tab	Rejected. Will be included in 33rd Street Review.
2	Ave E and Ave C between 28th St & 29th St	Sidewalks needed on east side	Site check confirmed existing sidewalk in mentioned locations except Ave E between 28th St & 29th St. Connects to park one block north. Add to recommendations.
3	32nd St & Ave D	Signs not visible; speeding on Ave D between 31st St & 33rd St; switch yield signs	Yield signs were installed throughout Caswell Hill as part of the Stop & Yield Retrofit Program. As such they are to be installed in an alternating pattern so a thoroughfare isn't created. The yields at 32nd St of Ave D and Ave C were installed prior to the retrofit, each facing east-west. To continue in alternating pattern one of these may be switched to face north-south. North-south facing stop signs (to further enhance compliance) will be added to the recommendations.
4	Ashworth Holmes Park	Parking on straight area around park	Parking on east side permitted. Parking restrictions already signed on east side (near crosswalks).
5	Jamieson St	Sharrows go into parked cars	Noted. Forwarded to project manager (Blairmore Bikeway) to follow up.
6	29rd St between Ave E & Ave F	Pinch point increases frustration	Noted. Forwarded to project manager (Blairmore Bikeway) to follow up.
7	Ave B & 27th St	Revisit dangerous "blind corner"; stop signs instead of yields	Carried. Add stop signs to recommendations
8	Unknown	Pedestrian-activated takes too long to activate once pressed	Rejected. Need location.
9	Ashworth Holmes Park	Trim hedge around park; makes it a blind corner	Forwarded to Parks Division for tree trimming.
10	Ave C between 29th St & 31st St	Speeding	Rejected. Speed study indicated 85th percentile speed = 40.9kph. Acceptable range.
11	Ave B & 25th St	Difficult to see cars parked too close	Noted. "No parking" signs in place. Fire hydrant on northeast corner. Follow up with parking enforcement if parking occurs.
12	Ashworth Holmes Park	Accessibility ramps needed at all entries	Site check indicated ramps are in place at all entries except south end. Accessibility ramps have already been proposed in the traffic plan at this location.