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To:	**City of Powell River**	Date:	**October 11, 2022**
Attention:	**Anastasia Lukyanova, M.Eng., CEM & Daniella Fergusson RPP, MCIP**	Project No.:	**33235**
Reference:	**Maple Avenue 100% Preliminary Design Memo**	Design Memo No.:	**2**
From:	**Roy Symons P.Eng. & Scott MacDonald**		

1.0 Executive Summary

The study area includes Sycamore Street and Maple Avenue (approximately 1.6km) within the historic Townsite neighbourhood in the City of Powell River. The land use along the corridor is predominantly residential, but there is a secondary school located at the south end of the corridor and an elementary school a block east close to the south end also. The Townsite core is located near the north end of the corridor and is a popular destination in the community. There are also tennis courts part way along the corridor. There have been requests from residents to calm traffic along the corridor, and furthermore, the corridor is a planned neighbourhood bikeway in the City's cycling plan.

A neighbourhood bikeway is a specially selected local street that utilizes traffic calming techniques to make the corridor comfortable for most people to cycle along while mixing with traffic at slower speeds, typically 30 km/h. Neighbourhood bikeways typically include several elements to reduce motor vehicle volumes such and speeds, wayfinding for people on bicycles, and in some instances placemaking improvements. In the case of Maple Avenue, improvements to the corridor could include pedestrian accessibility upgrades including sidewalks and curb ramps, while curb extensions in addition to calming traffic will provide opportunities for aesthetic enhancements.

Through discussion with City staff and public engagement undertaken by City staff with local residents, the proposed design has been developed to a conceptual level and includes the following key elements:

- **Volume management:** With most of the corridor being an existing bus route, it was not considered desirable to reduce traffic volumes using modal filters/traffic diverters. Speed reduction measures will somewhat discourage the use of this corridor by through traffic.
- **Speed Management:** The corridor will be signed with a 30 km/h posted speed, island curb extensions will be added to narrow the roadway and reduce through and turning speeds while speed cushions will be added between the curb extensions at the south end of the corridor initially, potentially extending north as funding or priorities allow. Speed cushions were selected over speed humps as they allow people on bicycles, as well as transit or emergency vehicles, to pass through without having to negotiate the bump.
- **Passing Comfort:** Drivers passing cyclists closely is an uncomfortable experience. Drivers are often reluctant to cross entirely over the centre line when passing cyclists, thus on neighbourhood bikeways, it is best practice to remove the centre line, unless there are any significant sight line issues. The design removes the centre line along the corridor.
- **Wayfinding:** The design will include sharrow pavement markings along the corridor to confirm the corridors function as a neighbourhood bikeway, increase driver awareness to this function and the expectation that they will encounter people on bicycles on this corridor, and lastly, through correct placement of the markings, encourage people riding bicycles to correctly position themselves on the roadway, i.e., outside of the door zone of any parked vehicles.
- **Aesthetic improvements:** The island curb extensions will provide opportunities for small pockets of landscaping that could improve the aesthetics of the street.

- **Accessibility Improvements:** The design includes curb ramps where they are not currently provided along the corridor, additional marked crosswalks, and a continuous sidewalk across the laneway on Hemlock Street

Further details on the design decisions are provided below.

2.0 Public Engagement

The City undertook public engagement with the local community on Tuesday June 14, 2022 to understand their issues and the type of improvements they would like to see along the corridor. Improvements included:

- Speed humps or cushions
- Traffic diverters/modal filters
- Chicanes
- Curb extensions
- Raised crosswalks/continuous sidewalks
- Intersection controls
- Block closures

From the Parks and Trails Master Plan and Bicycle Network Strategy public engagements, we heard that the community wants to improve street safety on Maple Avenue. These plans also identified Maple Avenue and Sycamore Street as a neighbourhood bikeway. The plans will ultimately link Maple Avenue to the Mid-Level Connector pathway, providing a safe and comfortable connection to Westview.

During public engagement, residents were provided with a range of common neighbourhood bikeway traffic calming elements and asked to select their top 3 elements. Curb extensions were the highest rated with 15 stars, continuous sidewalks were second highest with 12 stars, speed humps/cushions were third highest with 11 stars, block closures and chicanes both received 8 stars, while other elements including modal filters, raised crosswalks, and intersection controls received fewer than 4 stars.

The most predominant traffic calming elements included in the design are curb extensions and speed cushions, continuous sidewalks were included in the initial concept design but removed due to the high cost of construction. Furthermore, the curb extension are also proposed as island curb extensions to reduce the cost of construction, by limiting removals, new curb and gutter and drainage infrastructure. Additional elements of the design include intersection controls favouring the neighbourhood bikeway and accessibility improvements in the form of additional curb ramps and crosswalks.

3.0 Site Visit

ISL undertook desktop reviews and a site visit on Thursday June 16, 2022 to help inform the design and understanding of the existing conditions. The observations are noted below.

3.1 Vehicle Speeds

- There are no posted speed limit signs along most of the corridor, indicating the study corridor has a speed limit of 50 km/h.
- South of Hawthorne Street the posted speed changes to 30 km/h (and includes a school sign).
- The BC Active Transportation Design Guide provides recommendations for vehicle speed and volume thresholds for neighbourhood bikeways that recommend traffic volumes are less than 1,000 vehicles per day and speeds less than 30 km/h. Existing data was not available to inform if speed or volume reduction was

necessary, however, observations would suggest volumes are not very high, and while vehicles observed were not considered to be driving dangerously fast, they were likely travelling more than 30 km/h.

3.2 Roadway Widths

- Lane widths for a neighbourhood bikeway can vary, the BC Active Transportation Design Guide recommends a clear width of between 4.0m and 5.5m between parked vehicles or parked vehicles and a edge of roadway where parking is on one side.
- With a typical parked vehicle (i.e., ford escape) taking up ~1.9m (2.2m including mirrors) a width of 7.7m can accommodate the 5.5m clear width and one parking lane while a width of 9.9m can accommodate two parking lanes. Considering the constrained clear width of 4.0m, two lanes of parking could be accommodated in a space of just 8.4m, however oncoming traffic may have to yield in driveways or at intersections.
- Roadway widths were measured from a topographical survey of curb lines undertaken by ISL. The widths below do into include gutter where present.
    - Sycamore Street, Hwy to Ash ~7.7m
    - Sycamore Street, Ash to Aspen ~10.2m
    - Maple Avenue, Aspen to Birch ~10.4m
    - Maple Avenue, Birch to Chestnut ~10.4m
    - Maple Avenue, Chestnut to Dogwood ~8.7m
    - Maple Avenue, Dogwood to Elm ~9.0m
    - Maple Avenue, Elm to Fir ~8.3m
    - Maple Avenue, Fir to Hawthorne ~8.3m
    - Maple Avenue, Hawthorne to Hazel ~10.1m
    - Maple Avenue, Hazel to Hemlock ~10.1m
- It is possible that even the narrow sections of the corridor (when adding the gutter width) could accommodate two lanes of parking which would narrow the roadway considerably and help manage vehicle speeds, and to some extent, may discourage through traffic.

3.3 Grades

- The land generally slopes from high ground in the east to lower ground in the west.

3.4 Intersections

- All intersections along the corridor are stop controlled, typically two-way stop controls with the stop condition located on the cross-street.
- Exceptions where the study corridor is stop controlled include:
    - Sycamore Street is stop controlled at Highway 101
    - Sycamore Street is stop controlled at Ash Street. This may be reversed as part of the Townsite improvements to reduce people short-cutting the highway via the local streets.
    - Maple Avenue is stop controlled at Fir Street
    - Maple Avenue is stop controlled at Hawthorne Street
    - Maple Avenue is stop controlled at Hemlock Street

3.5 Driveways

- There are some driveways along the corridor, although many properties do not have driveway access from the study corridor.

3.6 On-Street Parking

- On street parking is permitted on both sides north of Chestnut Street and south of Hawthorne Street.
- On-street parking is permitted only on the east side between Chestnut Street and Hawthorne Street.
- Observations noted that even where there is sufficient space to park on the roadway, vehicles parked half in the boulevard, making the adjacent lane wider and more accepting of higher vehicle speeds.
- Opposite the tennis courts, a gravel shoulder is provided for parking.

3.7 Sidewalks and Crosswalks

- Sidewalks are provided on both sides along the corridor, in some locations elevated above the roadway with steps down to the roadway, including to transit stops.
- A zebra crosswalk is provided across Maple Avenue.
- A crosswalk is provided on Aspen Avenue on the east side of Maple Avenue.
- There are several locations where curb ramps are not provided making the sidewalk or ability to cross the road inaccessible to some. This is even an issue at the few marked crosswalks.
- The sidewalks at Sycamore Street and Ash Avenue include street names and dates inset into the concrete which residents would like to retain. Note these are quite difficult to see.

3.8 Transit

- The BC Transit Service 1 (Townsite/Wildwood) operates along the corridor, turning right from Ash Avenue eastbound to Sycamore Street southbound. It then turns left on Hawthorne Street heading towards Timberland Avenue.
- Any traffic calming solutions should consider how transit vehicles navigate them.
- Bus stops are located at several locations along the corridor, in some cases, the waiting area is not paved, nor comfortable or accessible.

3.9 Utilities

- Several manholes were identified in the roadway that must be considered if adding features on the roadway.
- Utilities behind the curb are not considered as improvements are anticipated to be between curbs only. However, they include utility poles, fire hydrants.
- Street lighting is provided on the utility poles

3.10 Street Trees and Landscaping

- A grass boulevard is provided in many places along the corridor, in some locations that includes street trees.

3.11 Drainage

- It appears that storm water typically drains towards the west curb which sits lower than the east curb.
- There are catch basins on both sides and lawn basins in the east boulevard which is steeply sloped in many locations.
- Any curb extensions must consider drainage if tying into existing curbs.

4.0 Design Direction

Several design considerations and decisions were made during the design of the Maple Avenue neighbourhood bikeway. These considerations are noted below.

4.1 Vehicle Speeds

Guidance:

- The BC Active Transportation Design Guide provides recommendations for vehicle speed and volume thresholds for neighbourhood bikeways that recommend traffic volumes are less than 1,000 vehicles per day and speeds less than 30 km/h.
    - Existing data was not available to inform if speed or volume reduction was necessary, however, observations would suggest volumes are not very high, and while vehicles observed were not considered to be driving dangerously fast, they were likely travelling more than 30 km/h.

Concept Design:

- The posted speed limit is reduced from 50 km/h to 30 km/h along Maple Avenue and Sycamore Street, between Arbutus Avenue and Hawthorn Street. The existing posted speed limit of 30 km/h along Maple Avenue between Hawthorn Street and Hemlock Street is retained.
- Roadways are narrowed through the use of cast-in-place concrete curb extension islands inline with formalized parking spaces to remove the current trend of parking partially on the roadway, and thus narrowing the roadway.
- Turning speeds at intersections within the study corridor are reduced through the use of concrete islands, slowing vehicles though their turn and improving general road safety.
- Speed cushions are provided to reduce vehicle speeds along the neighbourhood bikeway. Speed cushions were proposed between concrete islands at all locations at the 50% Concept Design stage, but were removed from the scope except at select locations (adjacent to existing recreational facilities between Chestnut Street and Dogwood Street and near Brooks Secondary School, between Hawthorn Street and Hemlock Street) at the 90% Concept Design stage to reduce project costs for this initial phase. They may be reintroduced in a future phase as funding or priorities dictate.
- Speed humps are provided in the laneway between Maple Avenue and Marine Avenue between Hemlock Street and Hawthorn Street to discourage ‘shortcutting’ and reduce vehicle speeds.
- Sharrows have been provided throughout the design to demarcate this corridor as a neighbourhood bikeway. Sharrows should be installed outside of the door-zone (0.9m offset from parking space to edge of sharrow) of parked vehicles.

4.2 Roadway Widths

Guidance:

- TAC provides lane width recommendations for urban roadways in Table 4.2.3. For urban roadways with a posted speed of 60 km/h or less, the recommended lower limit is 3.0m, however, the practical lower limit is 2.7m.
- Where buses or trucks are expected to regularly use a lane, the minimum width recommended is 3.3m.
- Lane widths are exclusive of gutter widths and where no gutter is present, a minimum offset of 0.25m is recommended.

Concept Design:

- At sections where the island curb extensions are added, the lane width between curb extensions varies between 5.88m and 6.28m. The curb extensions are 2.1m in width and align with the lip of the gutter, thus extending 2.4m from the face of curb, aligning with a typical parking lane width.
- The existing painted yellow centreline is eradicated to encourage sharing of roadway between different sized vehicles and different modes of travel, as well as safer passing of people riding bicycles.

4.3 Intersections

Concept Design:

- New four-way stops are proposed at two existing two-way stop-controlled intersections to promote better safety for all road users. These locations are:
  - Aspen Avenue & Sycamore Street (north) / Maple Avenue (south), and
  - Hemlock Street & Maple Avenue.
- The direction of the stop condition is reversed at the existing two-way stop-controlled intersections of Sycamore Street & Ash Avenue to allow for continuous travel along the Maple Avenue neighbourhood bikeway while also discouraging the use of Ash Avenue as a short-cut to the Highway.
- Existing stop signs at several two-way stop-controlled intersections are relocated to align with new stop bars, which are typically set back 1.0m from proposed pedestrian crossing markings.
- A continuous sidewalk is provided across the Hemlock Street access to the laneway between Maple Avenue and Marine Avenue to discourage ‘shortcutting’ and reduce vehicle speeds. Additional continuous sidewalks were proposed along Maple Avenue in the 50% Concept Design stage but were removed at the 90% Concept Design stage due to project cost constraints.

4.4 Driveways

Concept Design:

- Many properties do not have driveway access from the study corridor; however, proposed works such as concrete islands and speed cushions have been located so as to not to impede access to any existing driveways.

4.5 On-Street Parking

Concept Design:

- Concrete curb extension islands are proposed in line with existing on-street parking at several locations throughout the study corridor (intersections and mid-block). In most locations, the roadway width is sufficient enough to provide a 2.1m wide concrete island which, with the adjacent 0.3m wide gutter pan, will align with vehicles parked next to the islands.
- Existing on-street parking conditions are retained along Sycamore Street between Arbutus Avenue and Aspen Avenue, except for at +/- STA 0+330 where the existing bus stop is relocated approximately 20m further north, extending the no-parking condition required at transit stops.
- Existing informal on-street parking conditions are retained along Maple Avenue between Aspen Avenue and Chestnut Street, except for at +/- STA 0+500, STA 0+550, and STA 0+700 where three existing bus stops are relocated approximately 20m from their existing locations, extending or relocating the no-parking condition required at transit stops.
- Formalized parking is provided between Chestnut Street and Hawthorn Street. The number of parking spaces provided is optimized in several locations by use of ‘small car’ parking spaces.
- Existing informal on-street parking conditions are retained along Maple Avenue between Hawthorn Street and Hemlock Street.

- The total number of existing parking spaces within the study area is estimated to be approximately 285, while the total number of retained or proposed parking spaces is estimated at approximately 248. This represents a 13% overall reduction in on-street parking.
- No-parking signs are provided where appropriate throughout the study corridor to clearly identify parking areas and maintain unimpeded bus access to transit stop locations.

4.6 Sidewalks and Crosswalks

Concept Design:

- New sidewalk and curb & gutter were proposed on the east side of Maple Avenue between Chestnut Street and Elm Street in the 50% Concept Design to connect existing sidewalk to the north and south, respectively. These works were removed from the proposed scope at the 90% Concept Design stage due to project cost constraints.
- New pedestrian curb ramps & crossing markings are provided where appropriate to promote accessibility in areas where no pedestrian letdowns or crossing markings exist.

4.7 Transit

Concept Design:

- Unimpeded swept paths for buses turning at the Maple Avenue & Hemlock Street and Maple Avenue & Hawthorn Street intersections have been confirmed. Standard Nova bus (12.40m length) used as control vehicle.
- Several transit stops have been relocated to provide sufficient space from proposed concrete islands for buses to stop adjacent to the curb and gutter.
- The BC Transit Infrastructure Design Summary was used to identify taper ratios required for transit vehicles to pull-over and pull-out of bus stops, which helped set the location of the curb extension islands. No taper is provided in the design.

4.8 Utilities

Concept Design:

- The proposed design does not impact utilities located behind existing curb and gutter or edge of asphalt.
- Locations of proposed works within the roadway avoid relocates of existing manholes and valves.

4.9 Street Trees and Landscaping

Concept Design:

- Proposed concrete islands are to be landscaped in their centres. Details to be confirmed in detailed design.
- Additional landscaping was proposed in the 50% Concept Design stage at continuous sidewalk locations; however, this landscaping was removed alongside most of the continuous sidewalks in the 90% Concept Design stage due to project cost constraints.

4.10 Drainage

Concept Design:

- Proposed concrete islands will not tie-into existing curb and gutter and their limits will instead be the edge of asphalt so that existing drainage paths can be retained.