

**Item No. 13.1.1**  
**Halifax and West Community Council**  
**April 17, 2018**

**TO:** Chair and Members of Halifax and West Community Council

**SUBMITTED BY:** Original signed  
\_\_\_\_\_  
Bruce Zvaniga, P.Eng., Director, Transportation and Public Works

Original signed  
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Jacques Dubé, Chief Administrative Officer

**DATE:** February 13, 2018

**SUBJECT:** **Implementation of Local Street Bikeways on Vernon-Seymour and Allan-Oak Corridors**

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## **ORIGIN**

- June 25<sup>th</sup>, 2013 Regional Council motion (Item 11.2.1):  
“MOVED by Councillor Watts, seconded by Councillor Mosher that Halifax Regional Council approve the Windsor-Vernon-Seymour bike route option, with the sub-option to [...] as the first of up to three designated north-south, on-road cycling corridors on the peninsula.” MOTION PUT AND PASSED.
- *Integrated Mobility Plan* Section 3.1.5 (b): “Halifax will help to enable year-round bicycling in the ‘all ages and abilities’ bicycle network. This would require additional resources and would be subject to the budgeting process and Council approval.” Action 72: Deliver the Regional Centre all ages and abilities bicycle network by 2022 (Figure 17).

## **LEGISLATIVE AUTHORITY**

*Halifax Regional Municipality Charter*, Section 322(1): The Council may design, lay out, open, expand, construct, maintain, improve, alter, repair, light, water, clean, and clear streets in the Municipality.

*Halifax Regional Municipality Charter*, Section 79(1): Council may expend money required by the Municipality for: (aa) streets, culverts, retaining walls, sidewalks, curbs and gutters.

*Halifax Regional Municipality Charter*, Section 79(1): Council may expend money required by the Municipality for: (ah) playgrounds, trails [...] bicycle paths [...] and other recreational facilities.

*Motor Vehicle Act*, Section 90(3): “The traffic authority may also mark lanes for traffic on street pavements at such places as he may deem advisable, consistent with this Act and may erect traffic signals consistent with this Act to control the use of lanes for traffic.”

## ***RECOMMENDATION ON SECOND PAGE ...***

*Administrative Order 2016-002OP Respecting the Implementation of Local Street Bikeways:*

Section 6: "Council shall consider whether to designate a Local Street Bikeway on its own motion or on the recommendation by a Community Council."

Section 7(1): "Council may designate a Local Street Bikeway if:

- (a) The route is designated as a candidate route in the Active Transportation Priorities Plan or Council otherwise designates the route by resolution; and
- (b) Schedules 1, 2, and 3 have been followed".

## **RECOMMENDATION**

It is recommended that Halifax and West Community Council recommend that Regional Council approve the implementation of Local Street Bikeways on Vernon-Seymour and Allan-Oak Street corridors as described in this report.

## **BACKGROUND**

**Local Street Bikeways:** Local Street Bikeways are designated streets with low motorized traffic volumes and speeds that have been modified to optimize bicycle travel. Local Street Bikeways will help establish critical connections in the bicycle network and create convenient routes for cycling in the Regional Centre. The aim is to create a street environment where bicyclists of all ages and abilities can comfortably share the road with motor vehicles in a shared lane, without the need for painted lanes or separation. However, they may require special treatments at intersections (such as separation, painted lanes, or signal priority measures) to assist cyclists in the crossing of major streets. These facilities are in use in other North America jurisdictions and are credited with helping to build out the bike route network and attracting more residents to bicycling.

**Policy Direction:** The 2014-2019 Active Transportation Priorities Plan (AT Plan) identifies approximately 40 local streets as 'Candidate Local Street Bikeways' including the Vernon-Seymour and Allan-Oak Street corridors. Further, these routes are part of the proposed "All Ages and Abilities Bicycle Network" in the recently approved Integrated Mobility Plan (IMP).

Administrative Order (AO) 2016-002OP 'Respecting the Implementation of Local Street Bikeways' was adopted by Council in November 2016. The AO designates a process for planning, implementing, and monitoring Local Street Bikeways as well as some criteria around their design (Table 1).

Table 1: Criteria from Administrative Order

| <b>Criteria for Consideration of Traffic Diversion and/or Traffic Calming Measures</b> | <b>Traffic Volume*</b>         | <b>Traffic Speed**</b> |
|--|--------------------------------|------------------------|
| Design Intervention <b>Shall Not</b> Be Considered                                     | Under 1,000 vehicles per day   | Under 30 km/h          |
| Design Intervention <b>May</b> Be Considered   | 1,000 – 3,000 vehicles per day | 30 km/h – 45 km/h      |
| Design Intervention <b>Shall</b> Be Considered   | Over 3,000 vehicles per day    | Over 45 km/h           |

\* Based on Average Annual Daily Traffic (AADT) calculations \*\* Based on 85<sup>th</sup> percentile speed calculations

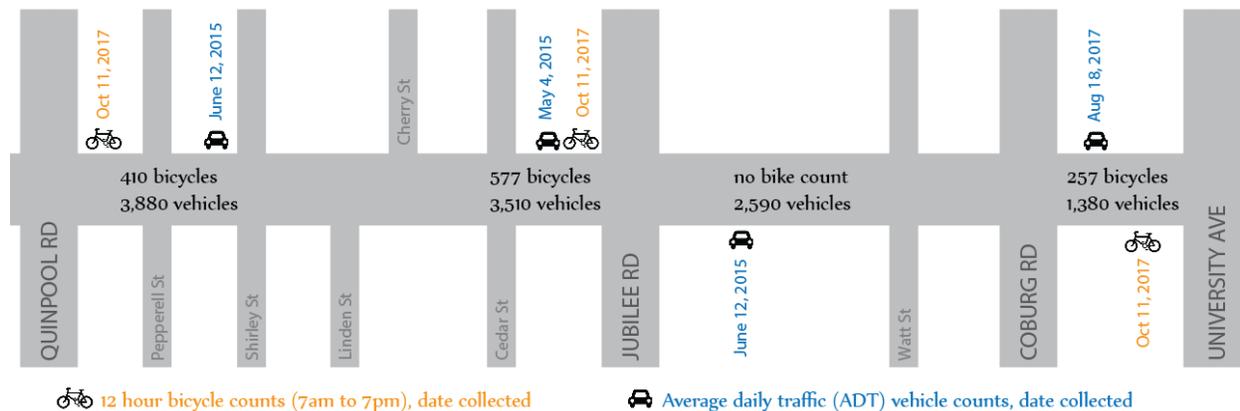
Traffic volume and speed are evaluated separately from each other; each measure requires a different mitigating intervention. Further, a road segment does not need to fall into the top category of both traffic volume and speed to receive a local street bikeway design treatment.

**Context and Existing Condition: Vernon-Seymour Street Corridor:** Vernon-Seymour Street is a 1.08km north-south local street corridor between Quinpool Road and University Avenue. The corridor had a number of bike route signs installed over 5 years ago, but currently has no bicycle facilities. In 2013, the Vernon-Seymour corridor was approved as a proposed Local Street Bikeway as part of the North-South Peninsula Cycling Corridor report. However, an A.O. was required before installation. It is a desirable

corridor for cyclists as it connects the Windsor Street painted bike lanes to Dalhousie University and the University Ave bike lanes via the St Pat's AT Greenway. Bike counts on October 11, 2017 found a weekday two-way cyclist volume of 577 along the peak segment of Jubilee to Cedar, making it one of the most highly traveled corridors in Halifax by bicycle. Traffic counts taken on June 12, 2015 indicate a weekday two-way traffic volume of approximately 3,510 vehicles per day in the same area (see Figure 1). The 85<sup>th</sup> percentile speed was measured as 41 km/h between Cedar Street and Quinpool Road.

Some segments of the sidewalks, asphalt and curbs on Vernon Street are scheduled for a rehabilitation project in 2018 which is an opportunity to implement the Local Street Bikeway.

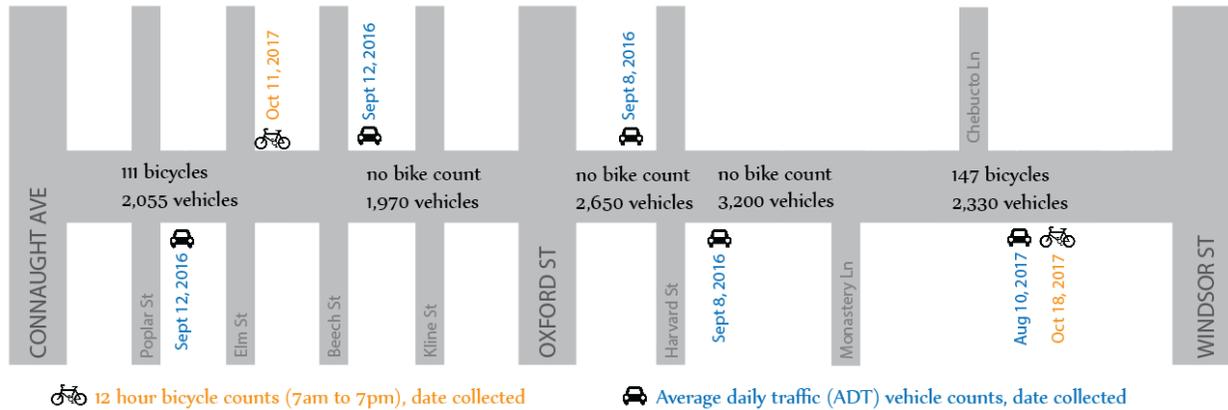
Figure 1: Data Collection on Vernon-Seymour Street Corridor



**Context and Existing Condition: Allan-Oak Street Corridor:** Allan-Oak is a 1.06km east-west corridor spanning between Windsor Street and Connaught Avenue. The corridor runs parallel to Quinpool Road and Chebucto Road, serving as an alternative route to cycling on these busy arterial roads. This corridor provides a critical connection between the residential West End, the Windsor Street bike lane and future connections into the Common and through to downtown. This will create a more comfortable and convenient ride for existing cyclists, and appeal to new riders. Bike counts on October 18, 2017 found a weekday two-way cyclist volume of 147 along the peak segment of Windsor to Monastery. Traffic counts recorded on August 10, 2017 indicate a weekday two-way traffic volume of approx. 2,330 vehicles per day in the same area (see Figure 2). As a note the highest traffic count of approx. 3,200 vehicles per day was documented on September 8, 2016 between Harvard and Monastery; however, bicycle counts were not recorded within that segment. The 85<sup>th</sup> percentile speed was measured as 45 km/h between Windsor Street and Monastery Lane.

Some segments of the sidewalks, asphalt and curbs on Allan Street are scheduled for a rehabilitation project in 2018 which is an opportunity to implement the Local Street Bikeway.

Figure 2: Data Collection on Allan-Oak Street Corridor



**Project Objectives and Scope:** WSP was hired to assist HRM Staff with the planning and design of these two Local Street Bikeway routes.

Some key project objectives include:

1. Engaging with HRM staff, external stakeholders, neighbourhood residents, and the general public to obtain feedback on design options towards selecting a preferred design;
2. Preparing a final report that summarizes the findings and provides 60% design drawings with 'Class C' cost estimates phasing recommendations for each Local Street Bikeway corridor.

## DISCUSSION

**Baseline Conditions and Design Options:** A detailed investigation of existing conditions concluded that the volume and speed of motor vehicles on some segments of the Vernon-Seymour and Allan-Oak corridors exceeds the 3,000 vehicles per day and 45 km/hr thresholds as outlined in the AO. In addition, the crossing of three major streets -- Jubilee Road, Coburg Road and Oxford Street -- were identified as busier streets requiring accommodation for bicyclists. Therefore, the majority of road segments have been approached as "Design Intervention Shall Be Considered" pursuant to the AO. The Local Street Bikeway design options considered volume reduction (traffic diversion), speed reduction (traffic calming) and safer crossings for cyclists (intersection treatments). Where road segments fall into the "Design Intervention May Be Considered" category, treatments may still be recommended for purposes such as speed management, eliminating vehicle-cyclist conflict points, and facilitating pedestrian crossings to schools.

**Evaluation of Design Options:** The proposed design options were evaluated and preferred treatment was selected using four criteria:

1. Professional guidelines (Transportation Association of Canada, National Association of City Transportation Officials, etc.);
2. Consultant and staff review;
3. Public and stakeholder feedback; and
4. Case studies from other jurisdictions.

Examples of the measures considered as part of this planning study include:

- Turn restriction for motor vehicles only;
- Raised intersection medians;
- Diagonal diverters;
- Pedestrian and cyclist-actuated half signals;
- Full intersection signalization with pedestrian and bicycle sensing;
- Raised crosswalks / speed tables;

- Curb extensions/ bump outs; and/or
- Any combination of the above.

The design options proposed do not change the current on street parking inventory or regulations (signage).

Approximately 575 people were engaged in the form of three stakeholder meetings, two open house sessions, and an online survey. Additionally, the concepts were discussed and comments provided by members of the Halifax Active Transportation Advisory Committee (ATAC). Public response was generally positive and in support of establishing these two Local Street Bikeway routes, with suggestion of even greater protection for cyclists. Some concerns were around safety, neighbourhood traffic circulation and overall need for the facilities. A summary of feedback is available in the Community Engagement Section below and Appendix C.

**Preferred Design: Vernon-Seymour Street Corridor:** The following design treatments are recommended to establish the conditions for a Local Street Bikeway along the Vernon-Seymour Street corridor:

1. Maintain Existing Restriction of Through Movements for Vehicles at Intersection of Vernon and Quinpool;
2. Painted Bicycle Lane at Approach to Quinpool Intersection;
3. Narrowed, Shared Lane Approach with Sharrows and Signage from Pepperell to Quinpool;
4. Curb Extensions (Sidewalk Bump-Outs) at Intersection of Vernon and Pepperell;
5. Restriction of Through Movements for Vehicles at Vernon and Jubilee 4-Way Stop;
6. Narrowed, Shared Lane Approach with Sharrows and Signage at Jubilee;
7. Curb Extensions (Sidewalk Bump-Outs) at Intersection of Vernon and Jubilee;
8. Curb Extensions (Sidewalk Bump-Outs) at Intersection of Vernon and Watt
9. Restriction of Left-turn and Through Movements for Vehicles at Intersection of Vernon/Seymour and Coburg;
10. Addition of Half-Signals at Intersection of Vernon/Seymour and Coburg;
11. Painted Bicycle Lane Approach to Coburg Intersection.

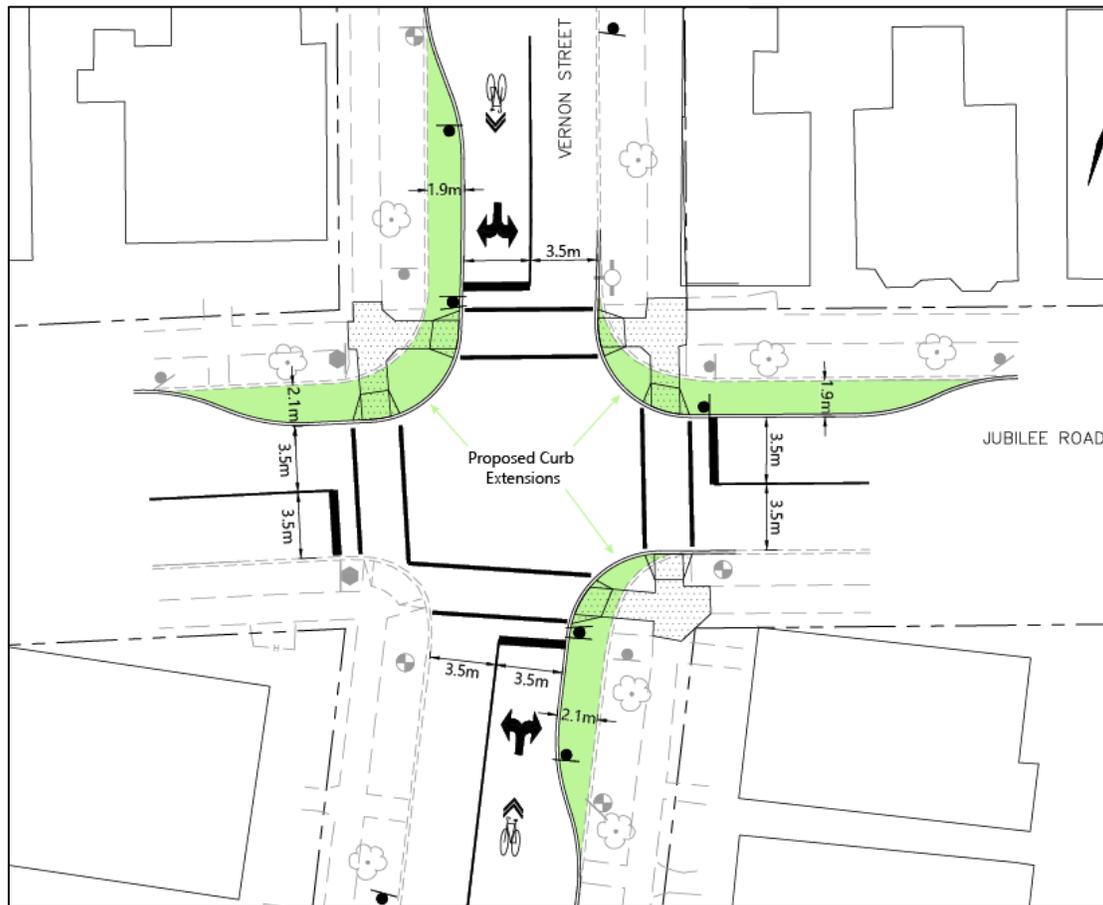


Figure 3: Proposed Curb Extensions and Single-File Approach at Vernon-Jubilee Intersection

In addition to the design treatments described above, the Vernon-Seymour Local Street Bikeway corridor will receive route identification signage, appropriate pavement markings and streetscape improvements.

**Preferred Design: Allan-Oak Street Corridor:** The following design treatments are recommended to establish a Local Street Bikeway along the Allan-Oak Street corridor:

1. Curb extensions and possible signals at Intersection at Allan/Oak and Oxford;
2. Restriction of Left-turn and Through Movements for Vehicles at Intersection of Oak and Oxford (east bound);
3. Painted Bicycle Lane Approach on Oak at Oxford;
4. Shared Lane Approach on Allan at Oxford without Turn Restrictions;
5. Diagonal Diverter at Intersection of Allan and Harvard;
6. Traffic Calming on Allan between Monastery and Windsor Street.

In addition to the design treatments described above, the Allan-Oak Local Street Bikeway corridor will receive route identification signage, appropriate pavement markings and streetscape improvements.

Diagonal diverters are a new bikeway treatment for Halifax that involve full street closure for motor vehicles using a raised median placed diagonally across the intersection. Bicycles can proceed in any direction through the intersection using designated pathways through the diverter (see Figure 4 and Figure 5 below). Pedestrians can proceed as usual crossing at each of the four legs of the intersection. Diagonal diverters are recognized by TAC and NACTO for traffic diversion purposes in the creation of local street bikeways.



Figure 4: Plan View of Diagonal Diverter



Figure 5: Photo of Diagonal Diverter in Victoria BC

**Traffic Management Considerations:** This project features a number of new traffic and street design treatments for Halifax (e.g. diagonal diverter), and is part of the broader integration of new design guidelines to Halifax. These measures are aimed at increasing safety for vulnerable road users. Traffic Management staff have been consulted in preliminary design will continue to be involved in detailed design and review of the final plans.

**Operations and Maintenance Considerations:** When consulted, Staff in Operations and Maintenance were supportive of the project. The majority of the proposed design treatments do not require special equipment or additional cost. The diagonal diverter at Allan and Harvard will require use of sidewalk clearing equipment.

**Emergency Access Considerations:** Staff in Halifax Regional Fire and Emergency (HRFE) were supportive of the project. As long as HRFE is informed where the impasses will be, they can plan their route to go around them without issue. Dialogue between HRFE and the design team will continue during detailed design and project implementation to ensure lane widths and turning radii are suitable to accommodate access by fire apparatus.

**Civic Addressing Considerations:** Staff in Civic Addressing have reviewed the proposed street closure and diagonal diverter for Allan St/Harvard St and have confirmed that the proposed new street configuration will require street name changes and subsequently mailing address changes for the affected residences. If the proposed diagonal diverter is approved, staff will recommend that the block of Allan Street between Oxford Street and Harvard Street be renamed Oak Street, and the portion of Harvard that has the least number of residences be renamed. The affected Harvard Street residents will have an opportunity to participate in choosing their new street name. This is in accordance with Administrative Order #29, Respecting Civic Addressing Policies.

**Permanent vs. Trial Implementation:** The Local Street Bikeway AO dictates that the project be recommended for either permanent or trial implementation. The following criteria are used to guide staff's recommendation:

Trial recommendation may be recommended when:

- analysis of proposed traffic calming and traffic diversion measures predicts the route elements may have **significant impact** on access by motor vehicles for people living along the Local Street Bikeway or adjacent streets, and/or significant impact on motor vehicle volumes on adjacent local streets;
- community engagement demonstrated significant uncertainty or opposition to traffic diversion or traffic calming, particularly by residents of the area; and/or
- the analysis about the possible impact is inconclusive and further analysis through trial implementation would provide the required information.

Based on the planning and analysis for these two projects, permanent implementation with ongoing monitoring is recommended. This is because:

- While there will be some changes to vehicular access and egress, public feedback demonstrated that this does not appear to be a significant issue for residents;
- Community engagement did not demonstrate uncertainty or opposition to the project. There are at least 350 dwelling units combined along the Vernon-Seymour and Allan-Oak proposed bikeway corridors, all of which received notification of the project. A total of 76 abutting residents (representing about 22% of the dwelling units) chose to participate in the open house and online survey (39 and 37 participants respectively). The abutters who chose to participate provided their views on the design options for the five key intersections (i.e., Quinpool, Jubilee, Coburg, Harvard, Oxford). Support for the proposed design treatments ranged from 58-81%, depending on the intersection. A total of 17-25% of participating abutters expressed significant concerns (depending on the intersection) related to vehicular access and potential traffic impact on adjacent streets; and,
- The analysis on possible impact is conclusive that vehicle speed and volume will decrease and that safety and comfort for pedestrians and bicyclists will increase. It is difficult to accurately predict the routes that diverted traffic would use. However, the parallel corridors that offer similar connectivity to Vernon and Allan are all arterials or collectors, so it is anticipated that traffic would be diverted to those streets. Furthermore, we will monitor adjacent streets (e.g. Henry Street, Preston Street, Lawrence Street) for changes and work to address any issues that may materialize.

Another rationale for permanent implementation is that there is an opportunity to integrate the installation of these Local Street Bikeway features with the larger rehabilitation of Vernon and Allan Streets. Any trial implementation would mean temporary measures (e.g. bollards, concrete barriers, paint) and would need to be installed and permanently reinstated at a later date, incurring an additional cost. Further, some of the proposed measures cannot be feasibly installed on a temporary basis.

The facilities will be monitored to assess whether objectives such as increased bicycling, reduced vehicle speed and volume, and co-benefits such as pedestrian safety gains are realized. Should modifications be required, they will be designed and implemented in future years. As an example, full signalization of the intersection of Oxford and Allan/Oak Streets was considered, however, it is not yet clear that this will be necessary to attain the gaps required to safely cross the street. Therefore, the approach will be to install curb extensions that narrow the crossing distances as part of this project and to install conduit that will enable the future installation of signals, if necessary.

There will be public education in conjunction with implementation to communicate the changes to these corridors. If either of the Local Street Bikeways are not meeting objectives, additional modifications would be considered for future years.

## **FINANCIAL IMPLICATIONS**

The estimated cost of implementing these two Local Street Bikeways is approximately \$1,102,303 (net HST included) which includes a 25% contingency (Class C). This breaks down to \$560,016 (net HST included) and \$542,288 (net HST included) for the Vernon-Seymour and Allan-Oak corridors, respectively.

Funding in the amount of \$1,102,303 will be available pending the approval of the 2018/19 capital budget for this purpose from Capital Project CR180001 – Active Transportation.

Generally speaking the scope for the above noted local street bikeway facilities includes:

- Asphalt removal and minor intersection widening;
- Relocation of curb, gutter, and catch basins;
- Sidewalk removal and installation;
- Pavement markings;

- Potential changes to RA-5 signals;
- Installation of new traffic signals and traffic control boxes;
- Installation of speed table / raised pedestrian crossing;
- Topsoil, sod, and trees.

### **RISK CONSIDERATION**

There are no significant risks associated with the recommendations in this Report. The risks considered rate Low.

### **COMMUNITY ENGAGEMENT**

Community stakeholders, neighbours, and the general public were invited to learn more about Local Street Bikeways and provide feedback on the preliminary design options for each corridor. Both Vernon-Seymour and Allan-Oak were discussed at each meeting. Some of the feedback received is detailed in the appendices to this report.

A community stakeholder meeting was held on October 24, 2017 involving representatives from Halifax Cycling Coalition, Ecology Action Centre, Walk 'N' Roll, NS Department of Energy, Dalhousie University, and the Quinpool Road Mainstreet District Business Association. Their feedback favoured pedestrian improvements as well as the inclusion of design treatments that greater prioritized people on bicycles.

A separate meeting was requested to present to the Board of the Quinpool Road Mainstreet District Business Association on November 16<sup>th</sup>. Their primary concerns included reduced access to parking on side streets of Allan and questions about vehicular circulation leading to more traffic on Quinpool Road. Opportunity was provided for feedback via email or online survey. Three business owners filled out the online survey – two were generally 'very concerned' about the intersection treatments whereas one was 'somewhat concerned'. The most controversial issue was the intervention at Allan and Harvard Street.

Two public engagement open house sessions were held on November 8<sup>th</sup>, 2017 from noon-2pm and 4pm-6pm. A combined total of 155 residents participated. Attendees were given opportunity to view and comment on preliminary design options presented on panel displays and paper maps. Sticky notes were organized into 'Likes' and 'Concerns' columns for each intersection. Public response was generally positive and in support of establishing these two Local Street Bikeway routes (65%), with suggestion of even greater protection for cyclists (11%). Some concerns were around safety (6%), neighbourhood traffic circulation (11%) and overall warrant for the facilities (2%). A summary of feedback is available in Appendix B.

In addition to the public engagement event, an online survey on Shape Your City was launched to collect feedback on the two proposed Local Street Bikeways. The survey was available from Nov 9<sup>th</sup> to Nov 22<sup>nd</sup>. Information panels from the open house were available alongside more specific questions about how each of the design treatments best met the objectives of creating a safe, convenient cycling corridor. The survey received 384 responses and 6 mailed responses. The majority of respondents (68-77%) felt that one or all of the design options met the objectives of creating a safe, convenient cycling corridor and overall improved walkability in the area. When asked about the possible impact on traffic, between 46-53% were 'not concerned', 23-27% were somewhat concerned, and 21-24% 'very concerned'. A summary of feedback is available in Appendix C.

To ensure that all abutting residents and property owners on Vernon, Seymour, Allan, and Oak Streets were aware of the online survey and public open house sessions, each dwelling was notified with a postcard-style invitation in their mail box. In addition, a notification boundary including the surrounding side streets was created to distribute further post cards (e.g. Henry St, Lawrence St, one block into all perpendicular streets abutting bikeway corridor). As there is a high proportion of rentals along these streets,

property owners were mailed a letter explaining the purpose of Local Street Bikeways and directing them to the website for more information. The letters also contained invitation details of the open house and online survey. Survey results were similarly positive (75-81% support for Vernon-Seymour and 64-69% support for Allan-Oak), however, some specific concerns were raised which factored into the final preferred design. Particularly, the turn restrictions around the Allan-Oxford intersection were revisited to improve neighbourhood traffic circulation. Feedback from abutters and neighbourhood residents was separated out from the rest of the responses and is summarized in Appendix D.

Further, the project was presented and discussed amongst AT stakeholders at the Nov 23<sup>rd</sup> meeting of the Active Transportation Advisory Committee (ATAC). The committee underscored the need for more bikeway treatments mid-block to reduce vehicular speed as well as the preference against centre bike lanes (at the Quinpool intersection specifically).

### **ENVIRONMENTAL IMPLICATIONS**

Attracting more residents to bicycle for utilitarian purposes helps to reduce the public's reliance on motor vehicles as a means of transportation. Enhanced bicycle infrastructure (such as Local Street Bikeways) creates a comfortable environment for new bicyclists and helps to establish a connected network of safe cycling routes. This will in turn encourage residents to replace trips by car with trips by bicycle, helping to improve air quality and reduce greenhouse gas emissions. The neighborhoods where these two Local Street Bikeways are proposed have strong potential for modal shift to bicycling due to their proximity to downtown, mid-high residential density and land use mix.

### **ALTERNATIVES**

Halifax and West Community Council may recommend to Regional Council that this project not proceed.

Halifax and West Community Council may recommend to Regional Council that only some elements of the Local Street Bikeway be implemented.

Halifax and West Community Council may recommend to Regional Council more study is needed.

Halifax and West Community Council may recommend to Regional Council that the Vernon-Seymour and Allan-Oak Local Street Bikeways be implemented on a trial basis. This is not recommended by staff for the reasons presented on pages 7 of this report.

### **ATTACHMENTS**

- Attachment A: Map of Proposed Local Street Bikeways and Network Context
- Attachment B: Project Details for Vernon-Seymour and Allan-Oak Street Local Street Bikeway Corridors
- Attachment C: Summary of Public Feedback from Public Open House Sessions Nov 8<sup>th</sup>
- Attachment D: Summary of Public Feedback from Online Survey Nov 9<sup>th</sup> – 23<sup>rd</sup>
- Attachment E: Summary of Feedback from Neighbouring Residents and Abutters

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A copy of this report can be obtained online at [halifax.ca](http://halifax.ca) or by contacting the Office of the Municipal Clerk at 902.490.4210.

Report Prepared by: Siobhan Witherbee, Active Transportation Planner, 902.490.6822

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## Attachment B: Project Details for Implementation of Vernon-Seymour and Allan-Oak Local Street Bikeway Corridors

### Local Street Bikeways

Local Street Bikeways are designated streets with low motorized traffic volumes and speeds that have been modified to optimize bicycle travel. Local Street Bikeways will help establish critical connections in the bicycle network and create convenient routes for cycling in the Regional Centre. The aim is to create a street environment where bicyclists of all ages and abilities can comfortably share the road with motor vehicles in a shared lane, without the need for painted lanes or separation (Figure 1). However, they may require special treatments at intersections (such as separation, painted lanes, or signal priority measures) to assist cyclists in the crossing of major streets.

Local Street Bikeways have been successfully implemented in other jurisdictions in North America such as Vancouver, BC, Montreal, QC, Winnipeg, MB, Portland, OR, and Palo Alto, CA (Figure 2). This type of facility has been credited with enabling a rapid expansion of the bicycle network and helping to increase bicycle ridership. Local Street Bikeways are also cost-effective, and generally do not require the loss of on-street parking.

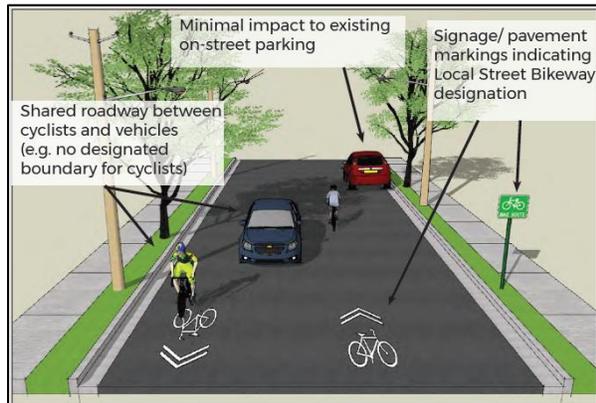


Figure 1: Typical Local Street Bikeway Cross Section

Figure 2: Rendering of Local Street Bikeway from Palo Alto

The A.O. identifies basic elements of Local Street Bikeways as:

- wayfinding and route identification signage;
- pavement markings (typically sharrows, as per the *Canadian Bikeway Traffic Control Guidelines*);

The A.O. identifies the following elements if required to facilitate improved safety and comfort:

- treatments to facilitate the crossing of major streets (e.g. refuge medians, curb extensions);
- treatments to modify motor vehicle speeds as required (e.g. speed humps or curb extensions)
- treatments to modify motor vehicle volumes as required (e.g. traffic diversion measures);
- the assessment and improvement of pavement conditions; and
- the addition of bicycle amenities, streetscaping features and pedestrian enhancements where possible (e.g. a curb extension proposed for traffic calming would also provide shorter pedestrian crossing distances and may provide an opportunity for streetscaping)

### Policy Direction

The 2014-2019 Active Transportation Priorities Plan (AT Plan) has objectives to (1) expand and connect the on-road bicycling network, (2) increase the number of residents who bicycle for transportation purposes, and (3) focus on bicycling facilities that are attractive to new bicyclists and bicyclists of all ages and abilities. There are specific recommendations to introduce a new facility type that is the Local Street Bikeway.

The AT Plan identifies approximately 40 local streets as ‘Candidate Local Street Bikeways’. These routes were identified due to their connectivity to origins and destinations, their adjacency to commercial areas and their connectivity to other AT routes. Many of the proposed Local Street Bikeways in the AT Plan run parallel to higher order arterial or collector streets as a convenient alternative route for cycling. The recently passed Integrated Mobility Plan (IMP) prioritizes that an all ages and abilities cycling network be established in the Regional Centre by 2022. Local Street Bikeways are a key component to building this network quickly and effectively. Consideration of this facility type also contributes to the IMP-prescribed *Complete Streets* approach where design aims to improve the safety and experience of all road users, including pedestrians, cyclists, and transit users.

Administrative Order (AO) 2016-002OP ‘Respecting the Implementation of Local Street Bikeways’ was adopted by Council in November 2016. The AO designates a process for planning, implementing, and monitoring Local Street Bikeways as well as some criteria around their design (Table 1).

Table 1: Criteria from Administrative Order

| Criteria for Consideration of Traffic Diversion and/or Traffic Calming Measures | Traffic Volume*                | Traffic Speed**   |
|---|--------------------------------|-------------------|
| Design Intervention <b>Shall Not</b> Be Considered                              | Under 1,000 vehicles per day   | Under 30 km/h     |
| Design Intervention <b>May</b> Be Considered                                    | 1,000 – 3,000 vehicles per day | 30 km/h – 45 km/h |
| Design Intervention <b>Shall</b> Be Considered                                  | Over 3,000 vehicles per day    | Over 45 km/h      |

\* Based on Average Annual Daily Traffic (AADT) calculations

\*\* Based on 85<sup>th</sup> percentile speed calculations

### Context and Existing Condition: Vernon-Seymour Street Corridor

Vernon-Seymour Street is a north-south local street corridor between Quinpool Road and University Avenue. This 1.08 km section of roadway had a number of bike route signs installed over 5 years ago, but currently has no other bicycle facilities. In 2013, the Vernon-Seymour corridor was approved as a proposed Local Street Bikeway as part of the North-South Peninsula Cycling Corridor report. However, an A.O. was required before installation.

Vernon-Seymour is identified as a ‘Candidate Local Street Bikeway’ in the AT Plan and is prioritized in the IMP as part of the ‘All Ages and Abilities Cycling Network’. It is a desirable corridor for cyclists as it connects the Windsor St Painted Bike Lanes to Dalhousie University and the University Ave Protected Bike Lanes via the new St Pat’s AT Greenway.

The cross-section of Vernon-Seymour Street is 9m wide through most sections, with roadside parking on one side of the street (alternates between west side north of Jubilee Rd to east side south of Jubilee Rd). There is one 12m section on the block of Vernon leading up to Quinpool Rd. There are three major road crossings to consider along this corridor: Quinpool Rd, Jubilee Rd, and Coburg Rd (Figure 3). There is also a future Local Street Bikeway connection to consider at the intersection with Shirley St.

Vernon-Seymour is already well-used by cyclists. Bike counts on October 11, 2017 found a two-way cyclist volume of 577 along peak segment (between Jubilee and Cedar). This translates to as much as 70 cyclists per hour at PM peak (4-5pm).

Traffic counts for Vernon-Seymour indicate a weekday two-way traffic volume of approximately 3,500 vehicles per day. However, some segments are busier than others. Vernon between Quinpool and Jubilee has the greatest amount of traffic, whereas Seymour between Coburg and University has the lowest along the route. These values impact the type of design treatments that can be considered according to the AO.



Figure 3: Vernon-Seymour Corridor Near Jubilee Rd



Figure 4: Allan-Oak Corridor Near Chebucto Lane

### **Context and Existing Condition: Allan-Oak Street Corridor**

Allan-Oak is an east-west corridor spanning between Windsor Street and Connaught Avenue. This 1.06 km corridor runs parallel to Quinpool Road and Chebucto Road, serving as alternative route to cycling on these busy arterial roads. Allan-Oak is identified as a 'Candidate Local Street Bikeway' in the AT Plan and is prioritized in the IMP as part of the 'All Ages and Abilities Cycling Network'. This corridor has been chosen as it provides a critical connection between the residential West End and the HRM core cycling network, which can (1) create a more comfortable and convenient ride for existing cyclists, and (2) hopefully be used to attract new riders.

The cross-section of Allan-Oak contains a 9m wide roadway. Parking is permitted on the north side of Allan from 8am to 6pm and other both sides through the evening and overnight (Figure 4). Parking is permitted on both sides of Oak Street at all hours of the day. There are two major road crossings to consider along this corridor: Harvard St and Oxford St. There are also two future Local Street Bikeway connections to this corridor at Harvard St and Beech St.

Allan-Oak is used by a smaller number of cyclists each day, but has great potential for ridership growth as the network connection is established and new riders are encouraged to bicycle. Bike counts on October 17<sup>th</sup>, 2017 found a two-way cyclist volume of 147 per day along peak segments (between Windsor St and Monastery Ln). This translates to roughly 30 cyclists per hour at peak hours (8-9am and 5-6pm).

Traffic counts for Allan-Oak indicate a weekday two-way traffic volume of approximately 3,200 vehicles per day. However, some segments are busier than others. Allan St between Harvard and Monastery has the greatest amount of traffic, whereas Oak St between Oxford and Beech has the lowest along the route. These values impact the type of design treatments that can be considered according to the AO.

### **Project Objectives and Scope**

HRM Staff hired transportation engineering consultants at WSP to assist with the planning and design of these two Local Street Bikeway routes.

The specific project objectives include:

1. Completing a detailed investigation of existing conditions using available data and site visits;
2. Developing an understanding of AT needs and major connections in the Municipality;
3. Preparing conceptual (30%) design options for the two Local Street Bikeway corridors;
4. Engaging with HRM staff, external stakeholders, neighbourhood residents, and the general public to obtain feedback on design options towards selecting a preferred design;
5. Preparing preliminary (60%) drawings for the preferred design option for each Local Street Bikeway corridor including Class 'C' cost estimates; and,
6. Preparing a final report that summarizes the findings, including the finalized 60% design drawings as well as phasing recommendations for each Local Street Bikeway corridor.

The design options proposed do not change the current on street parking inventory or regulations (signage).

## **Baseline Conditions and Design Options**

A detailed investigation of existing conditions concluded that the volume and speed of motor vehicles is currently higher than recommended for establishing a Local Street Bikeway corridor. Segments on both the Vernon-Seymour and Allan-Oak corridors exceed the 3,000 vehicles per day threshold outlined in the AO. In addition, recorded traffic speed on the Allan-Oak corridor sits on the 45 km/h threshold for motor vehicle speed. The crossing of two major streets was identified as a challenge for cycling: Coburg Road and Oxford Street.

Therefore, the Local Street Bikeway design options considered volume reduction (traffic diversion), speed reduction (traffic calming) and safer crossings for cyclists (intersection treatments). Examples of the measures considered as part of this planning study include:

- Turn restriction for motor vehicles only;
- Raised intersection medians;
- Diagonal diverters;
- Pedestrian and cyclist-actuated half signals;
- Full intersection signalization with pedestrian and bicycle sensing;
- Raised crosswalks / speed tables;
- Curb extensions/ bump outs; and/or
- Any combination of the above.

## **Evaluation of Design Options**

The proposed design options were evaluated and preferred treatment selected using four criteria:

1. Professional guidelines (Transportation Association of Canada, National Association of City Transportation Officials, etc);
2. Consultant and staff review;
3. Public and stakeholder feedback; and
4. Case studies and other best-practices.

Approximately 575 people were engaged in the form of three stakeholder meetings, two open house sessions, and an online survey. Additionally, the concepts were discussed and comments provided by members of the Halifax Active Transportation Advisory Committee (ATAC).

Participants at the public open house were asked about their 'Likes' and Concerns' for each design option, while online respondents were asked the following three questions:

1. Does the design help meet the objectives of creating a safe, convenient cycling corridor?
2. Does the design help to improve walkability and the pedestrian realm as a co-benefit?
3. How concerned are you that this design will impact driving?

Public response to the open house and online survey were generally positive and in support of establishing these two Local Street Bikeway routes. The majority of respondents either liked the traffic diversion and suggested even greater protection for cyclists, or had questions of clarification around safety and/or neighbourhood traffic circulation. A smaller number of participants thought the bikeway treatments were confusing, inconvenient, or not warranted. Any pedestrian gains from additional crosswalks, bump outs, and/or signal phasing were praised by many. In terms of vehicular traffic impact, between 46-53% were 'not concerned', 23-27% were somewhat concerned, and 21-24% 'very concerned'.

Thirty-six online surveys were submitted by residents immediately abutting the proposed Local Street Bikeways, while 77 surveys were completed by residents of adjacent streets. Results were similarly positive, however, there was some sensitivity to the turn restrictions at Allan and Oxford. This was factored in when formulating the preferred design. Abutters and neighbourhood residents also showed stronger preference for the full signalization options for the clarity, cyclist priority and pedestrian gains. About 20% of area residents identified as 'very concerned' about possible traffic and access impacts (see Table 2).

Table 2: Online Survey Results of Abutting Residents and Property Owners:  
 'How concerned are you that this design will impact driving?'

|                                       | Not Concerned | Somewhat Concerned | Very Concerned | Blank |
|---------------------------------------|---------------|--------------------|----------------|-------|
| Turn Restrictions at Vernon-Jubilee   | 50%           | 25%                | 19%            | 6%    |
| Full Signals at Vernon-Seymour-Coburg | 47%           | 28%                | 17%            | 8%    |
| Full Signals at Allan-Oak-Oxford      | 31%           | 28%                | 22%            | 19%   |
| Diagonal Diverter at Allan-Harvard    | 33%           | 17%                | 25%            | 25%   |

**Preferred Design: Vernon-Seymour Street Corridor**

The following design treatments are recommended to establish the conditions for a Local Street Bikeway along the Vernon-Seymour Street corridor:

*Maintain Existing Turn Restrictions at Intersection of Vernon and Quinpool*  
 Motor vehicles may only proceed left or right through the intersection. There is no through traffic with the exception of bicycles.

*Painted Bicycle Lane at Approach to Quinpool Intersection*  
 A 2.4m painted bicycle lane will be added to the northbound approach to this intersection to give cyclists a designated space while waiting for the traffic signal. The lane will also assist in positioning cyclists to be more visible to left-turning cars, and helps communicate their intentions to proceed straight through the intersection.

*Narrowed, Shared Lane Approach with Sharrows and Signage from Pepperell to Quinpool*  
 The road will be narrowed from Pepperell to Quinpool to achieve a narrowed cross section to assist with positioning approaching the Quinpool intersection. This will be reinforced with proper signage and sharrows in the centre of the lane for positioning purposes.

*Curb Extensions (Sidewalk Bump-Outs) at Intersection of Vernon and Pepperell*  
 Curb extensions will be added to visually narrow the roadway and help reduce speed along the corridor. There are pedestrian gains associated with improved visibility and a reduced crossing distance.

*Turn Restrictions at Vernon and Jubilee 4-Way Stop*  
 Right turns only will be permitted from Vernon onto Jubilee with the exception of bicycles. This will help reduce vehicle traffic on the corridor. The existing 4-way stop will be maintained.

*Narrowed, Shared Lane Approach with Sharrows and Signage at Jubilee*  
 All four approaches to this intersection will have narrowed cross sections to assist with positioning for all users. This will be reinforced with proper signage and sharrows in the centre of the lane for positioning purposes.

*Curb Extensions (Sidewalk Bump-Outs) at Intersection of Vernon and Jubilee*  
 Curb extensions will be added to visually narrow the roadway and therefore reduce speed along the corridor. There are pedestrian gains associated with improved visibility and a reduced crossing distance. This is a busy pedestrian crossing.

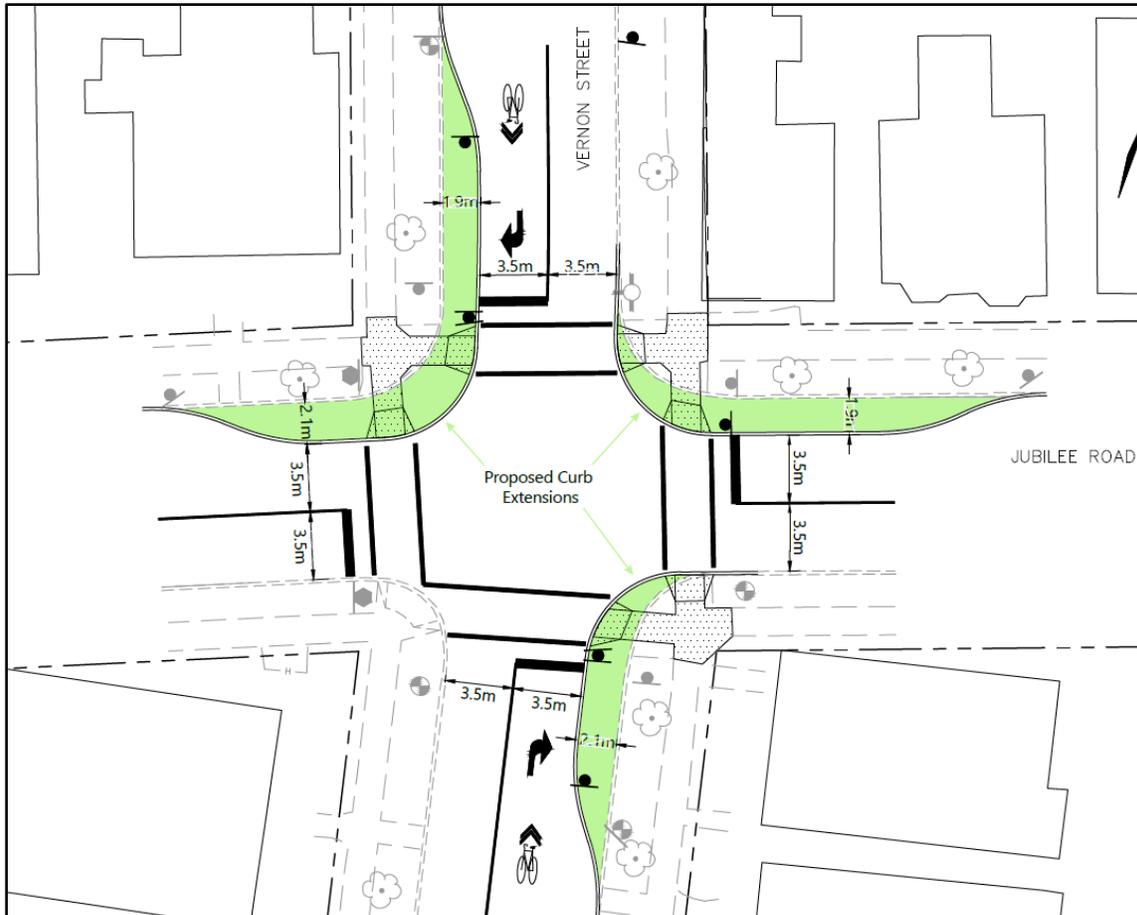


Figure 5: Proposed Curb Extensions and Single-File Approach at Vernon-Jubilee Intersection

*Curb Extensions (Sidewalk Bump-Outs) at Intersection of Vernon and Watt*

Curb extensions will be added to visually narrow the roadway and therefore reduce speed along the corridor. There are pedestrian gains associated with improved visibility and a reduced crossing distance. This is an important crossing for students walking to LeMarchant St Thomas School.

*Turn Restrictions at Intersection of Vernon/Seymour and Coburg*

Right turns only will be permitted from Vernon and Seymour Streets onto Coburg Rd with the exception of bicycles. This will help discourage traffic using Vernon as a shortcut therefore reducing traffic volume.

*Addition of Traffic Signals and/or Other Measures at Intersection at Vernon/Seymour and Coburg*

Staff are currently working to determine whether a pedestrian and cyclist actuated half signal, full signal, or other measure would be most appropriate to facilitate bicycle through-movement at this intersection. Considerations include: (1) challenges related to the offset intersection, (2) high pedestrian traffic and crossing volumes, and (3) continued access to and from Halifax Transit stops.

*Painted Bicycle Lane Approach to Coburg Intersection*

A 2.0m painted bicycle lane will be added to the approach of this intersection for through and left turning bicycles. The lane will be located in the centre of the road, immediately to the left of the designated right turn only lane for vehicles and cyclists. This placement eliminates the possibility of "right hooking" and helps align this offset intersection so bicyclists can travel in a straight line through the intersection.

### Preferred Design: Allan-Oak Street Corridor

The following design treatments are recommended to establish a Local Street Bikeway along the Allan-Oak Street corridor:

#### *Curb Extensions and Possible Signalization of Intersection at Allan/Oak and Oxford*

Full or partial signalization of the intersection of Oxford and Allan/Oak Streets was considered, however, it is not yet clear that this will be necessary to attain the gaps required to safely cross the street. Therefore, the approach will be to install curb extensions that narrow the crossing distances as part of this project and to install conduit that will enable the future installation of signals, if necessary.

#### *Turn Restrictions at Intersection of Oak and Oxford*

Eastbound vehicles on Oak Street will only be permitted to turn right onto Oxford Street with the exception of bicycles. This will divert traffic using this corridor as a shortcut, and contribute to lower “local only” use by motor vehicles. Additionally, this will reduce conflicts between bicycles and left-turning vehicles from Oak Street. Westbound vehicles from Allan Street will have no restrictions.

#### *Painted Bicycle Lane Approach on Oak at Oxford*

A 2.0m painted bicycle lane will be added on Oak Street on the approach to Oxford Street for through and left turning bicycles. The lane will be located in the centre of the road, immediately to the left of the designated right turn only lane for vehicles and cyclists. This placement eliminates the possibility of “right hooking” and helps align this offset intersection so bicyclists can travel in a straight line through the intersection.

#### *Shared Lane Approach on Allan at Oxford WITHOUT Turn Restrictions*

Sharrow pavement markings will be added in the centre of Allan’s westbound lane on approach to Oxford Street to position cyclists for a single file approach. Both cyclists and vehicles can proceed with all turning movements westbound through the intersection.

#### *Diagonal Diverter at Intersection of Allan and Harvard*

A raised intersection median will be placed diagonally across the intersection of Allan and Harvard Streets from northeast to southwest corners. The diverter will force a left hand turn on approach from Allan Street, and a right hand turn on approach from Harvard Street. Two 1.8m gaps in the median permit through passage by bicycles only – cyclists can proceed left, right or straight. Pedestrians may proceed as usual crossing at any four legs of the intersection with painted crosswalks. This treatment will help to reduce traffic volumes on the street.



Figure 6: Plan View of Diagonal Diverter



Figure 7: Photo of Diagonal Diverter in Victoria BC

**Estimated Cost of Implementation**

The estimated cost of implementing these two Local Street Bikeways is approximately \$1,102,303 (net HST included) which includes a 25% contingency (Class C). This breaks down to \$560,016 (net HST included) and \$542,288 (net HST included) for the Vernon-Seymour and Allan-Oak corridors respectively.

Consideration is given to:

- Asphalt removal and minor intersection widening
- Relocation of curb, gutter, and catch basins
- Sidewalk removal and installation
- Pavement markings
- Removal and installation of new RA-5 signals
- Installation of new traffic signals and traffic control boxes
- Installation of speed table / raised pedestrian crossing
- Topsoil, sod, and trees

## Attachment C: Summary of Public Feedback from Public Open House Sessions Nov 8<sup>th</sup>

### VERNON STREET & SEYMOUR STREET

| VERNON STREET & QUINPOOL ROAD  |   |
|--|---|
| Option 1   |   |
| <p>Likes:</p> <ul style="list-style-type: none"> <li>— More clear where cyclists wait to cross – green paint excellent idea.</li> <li>— Markings more visible for motorists than current.</li> <li>— Really like green paint markings, bicycle centre lane love through option.</li> </ul>   | <p>Concerns:</p> <ul style="list-style-type: none"> <li>— Don't want motor vehicle grid pattern disrupted</li> <li>— Do not support bikeways.</li> <li>— Just make the right turn lane single file with bikes. No awkward middle bike lane.</li> <li>— Eliminate right turns on red to allow single file solution.</li> <li>— Will the bike lane continue to Quingate?</li> <li>— Wouldn't feel comfortable as cyclist going into center of road between lanes from right side of road, but if this marking was on the superstore exit side that would reduce confusion for cyclists going straight.</li> <li>— Consider all pedestrian phase.</li> <li>— Why is there no green paint on Quingate Place?</li> <li>— Needs a raised median.</li> <li>— Needs a centre island to split traffic.</li> <li>— Bike lane on right ending with a painted bike box.</li> <li>— How will the cyclists going north from Vernon to Quingate be safe from cars turning left from Quingate to Quinpool?</li> </ul> |
| VERNON STREET & JUBILEE ROAD   |   |
| Option 1 (Right-turn only for traffic on Vernon Street)  |   |
| <p>Likes:</p> <ul style="list-style-type: none"> <li>— Like option 1, not too restricting to cars but good for bikes.</li> <li>— Better traffic flow, no conflict between cyclists and left turning cars. Very clean traffic situation.</li> <li>— Would be very disruptive for residents on nearby streets trying to drive to work.</li> <li>— Option 1 is preferred to option 2, as it leaves the intersections as is for bikes and pedestrians and keeps traffic flow on Jubilee as is (which is not bad).</li> <li>— Have bike line – leave all turn.</li> <li>— Both options look great! Option 1 seems fine and a lot easier.</li> <li>— Less expensive than Option 2.</li> <li>— Vernon has a lot of traffic and both options 1 and 2 would help to reduce this traffic.</li> </ul> | <p>Concerns:</p> <ul style="list-style-type: none"> <li>— Concerned drivers will still go through.</li> <li>— Option 1 does not go far enough to limit thru traffic – needs physical intersection.</li> <li>— Don't understand the rationale for not allowing through traffic at Jubilee and Vernon.</li> <li>— Licence cyclists and register bikes – that is the only fair way to implement bicycle lanes.</li> <li>— My main concerns: elementary school on Walnut and Watt Street 30 km zone – please do not divert traffic onto Walnut for obvious safety reasons; consider impact two parallel streets, i.e. Walnut and Chestnut; need a baseline for traffic volume.</li> <li>— Main concerns: elementary school, traffic getting diverted to this area with little kids walking.</li> <li>— Parallel running streets (Chestnut, Walnut, Henry) not equipped to take brunt of diverged traffic.</li> </ul>  |

- Enable parking 15 minutes drop off on west side of Vernon between Jubilee and Watt and east side on Walnut to facilitate drop off at LMST Elementary schools and pick-up.

- Will drive traffic onto side streets.
- Single file intersection is better. Need painted lanes.
- Do not want to have lights activated at Jubilee, rather keep the 4 way stop.
- Very concerned about traffic backing up on Jubilee and diverting streets.
- When vehicles cannot turn a certain way and bicycles can, this causes confusion for drivers, in my experience.
- Make it single file.

### Option 2 (Raised median in intersection with half signal)

#### Likes:

- Best option by far!
- Option 2 preferred. To put bike lanes in the middle of car lanes, protection is needed, raised median is good.
- Why no bike boxes?
- Option 2 is great!
- Option 2 is the best option.
- More concrete = more safety for all.
- Option 2 for Vernon Street and Seymour Street provides great protection at the intersection.
- Love the median. Drivers will need the push.
- I like it.
- Option 2 is best I think, since the signal activation provides the safest options for pedestrians and cyclists. Disruption of options for motorists is a concern, but the current 4 way stop is really inefficient anyway.
- Like option 2 - barriers will help with flow - need to consider all pedestrian lights, and for Quinpool too.
- Option 2 is good but add bike boxes and traffic calming for Vernon. Have button and sensors for cyclists to show when to cross.
- I like the raised median.
- I like it!
- Would be very disruptive for residents on nearby streets trying to drive to work, etc.
- Great idea to have designated bike lane for through traffic and right turn only for cars along Vernon. Option 2 with the half signal for pedestrians and cyclists is a lot better and safer.
- Safer for pedestrian and cyclists.

#### Concerns:

- Don't like it.
- Better to block Vernon between Linden and Cherry. Lots of room for bikes then.
- Lack of protection down the middle of the street, separating the cyclists and cars.
- Why though?
- There is nothing wrong with the 4 way stop as it stands now. Segregating bikes and forcing them into the middle lane is difficult to navigate and doesn't facilitate bike movement - it prioritizes cars. Also, left turn more challenging.
- I like this but how do you prevent increased traffic on Walnut and other streets? Particularly concerned with school traffic already and children's safety.
- Option 2 would appear to create undue traffic stops on Jubilee resulting from intermittent but frequent bike and pedestrian crossings under timed control.
- Why remove the pedestrian crossing on the west rather than open a path through the median there like it is to the east.
- Get rid of middle lane. Just make it single file.
- Will drive traffic onto side streets.
- Give bikes priority right and through lane, not weird middle lane. This intersection is pretty good as is.
- The gap for cyclists looks wide enough for cars to get through. And if they can, they will. The infrastructure has to force a division.

### General Feedback

- Do the bike lanes coming from the north and south combine as you cross the intersection or does it become 2 lanes?
- If it combines into 1, than how wide are the lanes? Are they comfortable for 2 bikes passing each other?
- Full signals and bike boxes are needed.
- A cross section of the intersection options would be helpful to visualize.
- Have you considered micro-roundabouts? (see Vancouver)
- A little worried that drivers won't understand the sharrows.
- All options will increase traffic on Walnut as it is the only through street off Coburg as the school already creates extra traffic. No parking at all on Vernon.



### Option 3 (Fully signalized intersection)

#### Likes:

- Option 3 is best but doesn't force bike traffic to centre lane.
- Lights are really important to let people cross.
- Like option 3 – lights will be safer for bikes to cross to Vernon / Seymour, so much traffic on Coburg.
- Option 3 is great.
- Yeah!
- Like option 3, but add bike boxes to make Seymour / Vernon slow for cars. More paint, humps, etc.
- This option looks okay, but possibly doesn't go far enough.
- Safety.
- Best option – most clear.

#### Concerns:

- Hard for motorists to quickly gather all info at a glance (car / pedestrian).
- Will likely have significant impact on traffic.
- Light at Vernon / Seymour would benefit everyone: pedestrians, cyclists, and cars. Dangerous corner.
- If there's only a sign, and no infrastructure, telling cars to turn right, some will ignore the signs.
- For bikes this is a great option, safest. However, there is a bus stop right after the intersection. Room for congestion with a red light and bus stopping.

### General Feedback

- If the light gives the #1 bus a green than this is great.
- I like that cars can only turn right!
- Like – reduction on Vernon Street of traffic commuters.
- Drawings for Vernon / Seymour and Vernon / Coburg options are not clear. Regarding the bike lane: pictures make you think that there is only a green bike lane all along Vernon which is not the case.
- Turning only on Vernon for cars is a great idea to reduce traffic volume and speed on that street.
- Option 3 with traffic lights is my preferred option for Vernon and Coburg to provide a safer crossing for children at LMST School.
- Options for Vernon Street are good.
- Option 2 or 3 are better as they help improve existing dangerous pedestrian movements.
- Please paint bike lane all the way through intersection, for clarity for drivers, cyclists and pedestrians!
- Zebra crosswalks at all 4 crosswalks!
- Do we have the evidence to make these decisions? This plan impacts ~2,000 drivers daily, and parkers to benefit ~200 cyclists. Have there been accidents or significant data / problems we are trying to solve? Or just a special interest group?
- All good options but I think the proposed changes at Jubilee / Vernon will have a big impact on reducing thru traffic on Vernon between Coburg and Jubilee. So, at Vernon and Coburg why not allow vehicles to go north on Vernon from Seymour, and south on Seymour from Vernon (if go straight thru intersection) at the intersection don't allow left turns but allow right turns and straight thru.
- Full signalization and bike boxes needed.

## ALLAN STREET & OAK STREET

| Allan Street & Harvard Street  |   |
|--|---|
| Option 1 (Right-turn only for traffic on Allan Street)   |   |
| <p>Likes:</p> <ul style="list-style-type: none"> <li>Through-traffic on Harvard.</li> <li>I like the bike lanes and division.</li> <li>Simpler option (clearer than option 2). Better.</li> <li>Option 1 is better since it's less disruptive to motorists but both options are problematic for local residents who want to drive to Quinpool Superstore. Not sure what solution is.</li> <li>Prefer option 1 - better movement of traffic. Suggest no left turn from Windsor onto Allan. Right vs. left turn off Allan.</li> <li>Traffic calming on Allan (where I live).</li> </ul>  | <p>Concerns:</p> <ul style="list-style-type: none"> <li>Get rid of the dangerous middle lane. Just make it single file.</li> <li>I'm concerned that a bike going through on Allan has to be on the left side of the lane, and then after crossing Harvard has to be on the right side of the lane, and whether cars turning right onto Allan from Harvard will see them.</li> <li>I'm concerned that the bike lane paint is not continuous through the intersection.</li> <li>Allan Street is a nightmare! Adding bikes = death.</li> </ul>   |
| Option 2 (Diagonal Diverter)   |   |
| <p>Likes:</p> <ul style="list-style-type: none"> <li>I like option 2 - strongly prioritizes cyclists and pedestrians.</li> <li>This is sick!</li> <li>Option 2 is nice because it directs traffic flow away.</li> <li>I like this option. Currently used too much during rush hour - this addresses that best.</li> <li>Love the diverter. Cutting traffic on Allan is key. This is the proper layout for that.</li> <li>Traffic calming.</li> <li>Option 2 looks really interesting!</li> <li>Probably diverts more traffic than option 1. Yay!</li> <li>Beautiful. Love the diversion.</li> <li>Option 2 is great.</li> <li>I really like this idea because it brings a new perspective on directing traffic. I think this option could be flipped so neighbourhoods are connected and those who are travelling towards Chebucto. Therefore, both intersections can work better in terms of directing traffic, for bikes and cars to either Quinpool or Chebucto. Neighbourhood hubs are still able to access Quinpool and Chebucto Roads. <ul style="list-style-type: none"> <li>Good point.</li> </ul> </li> </ul> | <p>Concerns:</p> <ul style="list-style-type: none"> <li>Emergency vehicle access?</li> <li>Straight / fast through needed for cyclists, essential - don't want to make it tricky for tag-alongs, etc.</li> <li>More restrictive to vehicle traffic than option 1.</li> <li>Where do cyclists wait before they approach the median? Not obvious. Diverting traffic would reduce through traffic which is cool. But, diverting cars into the neighbourhood on Allan St. will just get more traffic stuck in that neighbourhood, unsure how to get out.</li> <li>Option 2 - where do emergency vehicles get through?</li> <li>With only 1 option for cars, it seems cars would blow through the intersection because they know they don't have to worry about cars coming straight ahead or left hand side. Therefore this would not calm traffic, it would allow cars to drive faster. <ul style="list-style-type: none"> <li>Agreed. Cyclists trying to get across will wait longer and design is less safe in general.</li> </ul> </li> </ul> |
| General Feedback   |   |
| <ul style="list-style-type: none"> <li>Have you considered a mini traffic circle for this intersection instead?</li> <li>Make Harvard one way for cars and use option 2.</li> <li>If traffic forced south on Harvard, how to enter Quinpool?</li> <li>Planters / community planters on raised median would look good.</li> <li>Parking should be eliminated on the south side of Allan in front of Lutheran church.</li> <li>I'm confused about how traffic flow would work when the Harvard and Oxford intersections are changed. Concerned about how local traffic will navigate out of the neighbourhood.</li> <li>I really like the idea of limiting car movement! Make it more appealing to bikes!</li> <li>Option 1 is a lot better with a 4 way stop. Cars may not stop for pedestrians otherwise in option 2.</li> </ul>   |   |

- Just build something! Too many meetings, not enough construction.
- I like what I see - either option. Allan Street – too heavy traffic right now.
- Allan Street needs to be able to at least turn right onto Oxford Street.
- I don't think either are appropriate for anyone. Keep working on it!
- Traffic circle?
- No longer able to access Allan from Oak or Harvard could result in diverting more traffic to Allan at Windsor as traffic will be trying to access retail at supercenter.
- Driver education of new routes to warn them before they drive down Allan.
- I think the centre of option 1 and the diagonal barrier of option 2 would be best, you need to have throughway for bikes.
- If there is no way to go straight across Harvard on Allan for motorists, I fear it will inconvenience too many drivers. As a resident of Oak, it doesn't affect me because I walk / bike to superstore, but this plan needs to suit drivers as well.
- Great to see human powered options promoted.

### Oak Street / Allan Street & Oxford Street

#### Option 1 (Right-turn only for traffic on Allan Street and Oak Street)

##### Likes:

- Traffic calming.
- Add traffic calming – speed bumps?
- All way stops on Oak Street.
- Option 1 works for cyclists at intersections, but least intrusive in slowing traffic.

##### Concerns:

- Doesn't improve situation for pedestrian crossing. Drivers ignore flashing yellow.
- This is not an actual option. There is no way for a bike to turn left in this option as there is through traffic for cars with no reprieve.
- Nothing done to reduce east bound traffic on Oak to Oxford from Connaught.
- Allan Street is far too busy for bike lanes!
- Allan is a dangerous throughway because of shopping centre.
- Replace centre lane with single file plus bike box to position bikes in centre for left turning.

#### Option 2 (Bicycle and pedestrian half signal)

##### Likes:

- Traffic calming.
- Add traffic calming – speed bumps?
- All way stops on Oak Street.
- I like option 2! The lights stopping traffic on Oxford would be helpful for pedestrians and bikers and gives priority to the movement on the bikeway.
- Option 2 gives the bike rider the right of way when choosing the direction it wants to go, which is the general purpose, instead of promoting vehicle movement / direction.
- If option 2 on Allan and Harvard is used with Option 2 on Oak and Allan and Oxford, will reduce traffic on Allan.
- Like the optional wait at signal for bikes.
- Option 2 looks good. Encourage more bicycle & pedestrian traffic. Sidewalks on Allan need to be replaced.
- For all intersections: traffic lights at all corners; button and sensor for bikes; policeman to discourage traffic. (see diagram)

##### Concerns:

- Centre lane bias for bicycles may lead to confusion for bikes wishing to turn right.
- Barriers or raised asphalt may be problematic for snow removal and pedestrian usability during large snowfalls.
- How about no left turn (even just 7 – 9 am) from Connaught onto Oak?
- Need bike box on Allan at Oxford. Otherwise people run into each other on Allan between Oxford and Harvard.

### Option 3 (Fully signalized intersection)

#### Likes:

- Options 2 and 3 seem to be most appealing, but I feel option 3 will be less disruptive to cars (heading to superstore, etc.) so will suit more needs (pedestrians, cyclists and drivers).
- I like the signals.
- Option 3 as a walker and a cyclist – important to have crosswalks on all 4 sides and safest options.
- More bike boxes at front of areas where bikes waiting to cross. (all intersections)
- Option 3 is great.
- Signals are best. There is also enough car traffic from Allan St. to justify this.

#### Concerns:

- More restrictive for vehicles and yet no increased safety for bikes. I like option 2.
- I'm worried that with the left turning bike lane, cars will not tolerate bikes going straight or right. This will effectively be more dangerous for cyclists.
- 4-way stops on Oak (all intersections).

### General Feedback

- As a resident of Oak Street I am concerned about having to turn right on Oxford to get where I have to go. Going around the horse's barn is not an option. Lights might be a better option. Do you actually think that drivers would respect cyclists? No! Just run them over.
- Divert Oak traffic in the afternoon by prohibiting left turns off of Oxford.
- Vehicles can no longer get to Allan from Oak (only as far as Harvard) or from Harvard. Given the time of day, left hand turning restrictions at Oxford / Quinpool will make getting to Superstore / Canadian Tire very challenging.
- Four way stops on every intersection. (At the least!)
- Two way bike traffic on Chebucto Lane please!
- Need to reduce traffic from Connaught onto Oak – speed of vehicles is an issue (like on corner of Oak / Poplar). Suggest no left turn from Connaught onto Oak between 7 – 9 am and 4 – 6 pm.
- Zebra painted crosswalk on all 4 crosswalks!
- Winter? Car lanes are already challenging to navigate with loss of lane lines. Middle bike lane totally disregarded?
- 4 way stops on all intersections on Oak Street.
- Overall I like the idea of all the modifications, i.e. in support!
- The parking on north side of Allan Street close to intersection of Oxford Street needs to be removed to facilitate the bike lane area.
- Traffic calming on Oak. Parking on both sides? Residents will have difficulty getting around because of right hand turns. 4 way stops on side streets helpful.
- Speed bumps into all intersections.
- Suggest eliminating left turns from Connaught to Oak, eliminate left turns from Allan to Oxford, and eliminate left turns from Monastery to Allan.
- Both option 2 and 3 are good, but 3 is better for both cyclists and pedestrians. I'd vote for option 3!
- This plan does not divert traffic between Connaught and Oxford on Oak in the mornings. Please restrict lefts onto Oak from Connaught to allow family to bike in a low traffic environment.
- Need a signal at Quinpool and Monastery.
- Centre lane concept – very dangerous for right turns for bikes.
- Traffic cutting through on Oak.
- Restrict left turns onto Oak from Connaught in the mornings.
- Make streets one way.
- Oak Street is very busy, more work needed to ensure Oak (crossing Poplar, Elm, Beech and Kline) is safe for vehicles, bikes and pedestrians. Currently, when vehicles are parked on both sides of Oak there is not always room for vehicles travelling both directions to actually proceed on Oak. Adding bikes will only compound issue. Is Oak Street parking being taken away? How will traffic congestion on Oak be handled?
- No option makes sense to residents of this area. It will inconvenience travel to neighbourhood businesses and other places in the area. We will spend our time going in circles to make a very straight forward trip.

- I also live on Oak Street and use my bike as my main mode of transport in the spring, summer and autumn. There is already too much car traffic on Oak, just ask my neighbour who lost their cat. These options are an improvement.
- How will the east bound centre advisory bike lane at Harvard connect with the west bound centre advisory bike lane at Oxford? What will cyclists do in between Harvard and Oxford Street?
- Are there building entrances on Allan Street? How would they enter? How would they travel south?
- Love the info that's coming down the pipe!

# Attachment D: Summary of Public Feedback from Online Survey Nov 9th – 23<sup>rd</sup>

## (1) Vernon and Quinpool

### Cycling Considerations

- More negative comments were received than positive comments about this intersection design
- Many mentioned concerns about cyclist safety at this intersection
  - Vehicles forced to turn, may not be looking for cyclists proceeding straight
  - Should we be encouraging use of this intersection without safe way to proceed through?
- Many concerned about the centre bike lane
  - May not be comfortable for all ages and abilities
  - Prefer to stay near curb
  - Prefer to have “no right turn on red” so traffic isn’t flowing past on right
  - Are concerned about transitioning into centre bike lane from curb – more conflicts?
  - Worried about cars not respecting painted lane, blocking lane
  - Queue of cars at rush hour may prevent clear transition into this lane
  - Width of lane may be too narrow leading to side swiping or feeling squeezed
- Some liked the addition of the designated lane
  - Gives cyclists more visibility on the road / while waiting / leading up to intersection
  - More clearly demonstrates intention to go straight
  - Potentially safer for conflicts with left-turning vehicles of Quingate Place
- Many mentioned that some form of physical protection would be preferable
  - Minimizes potential conflict with cars waiting at lights
  - Optimal safety, comfort for all ages and abilities
- Many mentioned that the green paint and through pavement markings were helpful
  - More markings are needed to demonstrate / clarify cyclist placement for left/right turns
  - Preferred markings all the way through the intersection
- Some mentioned that a painted bike box would be preferable
  - Approach from curbside, allows cyclist to get in front of traffic and position for straight thru
  - Maximizes visibility
  - “No right turn on red” would be necessary for this
- Many mentioned that the painted lane would not be respected by vehicles and was confusing
  - Could lead to more conflicts as vehicles and cyclists navigate through in unpredictable way
- Some mentioned that it was confusing that vehicles and cyclists had different turning movements through the intersections, petitioned to drive straight through from Vernon

### Pedestrian Considerations

- Many respondents believed there weren’t any pedestrian gains to the design
- Some mentioned there should be pedestrian infrastructure improvements such as bump outs
  - Shorten crossing distance, improve visibility, improve safety
  - Could investigate pedestrian refuge islands
- A few mentioned that the turning radii at the corners were too large, should be made tighter
  - Current situation allows too much speed around corners
- A few mentioned that there should be a pedestrian and cyclist-only signal phase
  - Prevents cars turning across crosswalk while “walk” sign is lit up – this is unsafe and many people get anxious waiting and do this, coming very close to pedestrians

### Vehicular Considerations

- No change (question not included)

## **(2) Vernon and Jubilee**

### **Cycling and Pedestrian Considerations**

- Many respondents thought the raised intersection median was a good idea
  - Extra measure to prevent vehicles from ignoring turn restrictions and driving through
  - Has potential to reduce traffic speed on both Vernon Street and Jubilee Road
  - Acts as pedestrian/cyclist refuge to improve safety
  - Draws attention to cyclist movement through intersection and establishes priority corridor
- A few respondents feel that a fully protected and separated bicycle lane is preferred
  - Completely separate cyclists from vehicles on road to minimize conflicts
  - May be the only way to achieve full safety and AAA use of this corridor
- Some respondents noted concerns about the centre bike lane
  - Does not feel comfortable to have traffic passing on the right side of a cyclist, very exposed
  - Difficulties and safety concerns with transition away from curb into centre lane
  - May not be suitable for all ages and abilities
- Some mentioned that the intersection functions well as it is
  - Generally single file approach in shared lane
  - Stop sign and pedestrians create adequate gap for cyclists
  - Right of way of cyclists is generally respected
- Some noted that the half signal was too confusing for users of the intersection
  - Not entirely clear whether cyclists can proceed with any gap or wait for light
  - Not entirely clear whether pedestrians can proceed with any gap or wait for light
  - Unusual intersection treatment may catch drivers off guard, lead to unpredictable behaviour
- Many respondents prefer that stop signs are maintained on Jubilee Road
  - Can be used as alternative to half signal, achieves same gaps while minimizing delay
  - This is more familiar as intersection is currently 4-way stop working well
  - Slows free-flowing traffic speed on Jubilee Road which is a major safety concern for pedestrians
- Some respondents noted that crosswalks should be maintained across all 4 legs of intersection
  - Any loss of crosswalk would be a loss for pedestrian priority in this busy area
  - Half signal could improve safety through protected phase and improve traffic flow
  - Pedestrian “beg button” for signal is a step away from pedestrian priority
- Some mentioned that the raised intersection medians were an issue
  - Unclear that cyclists could proceed through, potentially dangerous as cars not expecting
  - Prevents some drivers from making the turns they need to make
- A few respondents mentioned concerns about winter maintenance
  - Paths through raised intersection median must be well cleared in the winter
  - Median can not used for snow piling

### **Vehicular Considerations**

- Many respondents mentioned that the turn restrictions were too prohibitive
  - Prefer to keep through traffic on Vernon for access to homes, Quinpool, downtown
  - Route serves to alleviate congestion on Robie, Quinpool, Coburg, Oxford
  - Leads to major driver inconvenience for very small gains
- Some noted concerns about increased traffic on adjoining/parallel streets to find alternate route
  - Can't stop shortcutters, they will just go somewhere else nearby
  - Speed may increase due to driver aggravation, cause circuitous traffic flow
- Some mentioned that slowing traffic is a positive thing to improve safety through this area
- Some mentioned that cars have the capacity to go elsewhere

- Keeping traffic on nearby arterials is not a bad thing, won't have major impact
- Some mentioned that designs are meant to establish cyclist priority and they do just that

### **(3) Vernon/Seymour and Coburg**

#### **Cycling and Pedestrian Considerations**

- Many respondents believe that some form of signalization is good for improving safety at this intersection
  - Safety for pedestrians, cyclists, and drivers alike
  - Current offset alignment with high volumes on Coburg makes it difficult to navigate, risky behaviour
- Many mentioned that full signalization is best
  - Unmistakeable clarity. People know how to use these
  - Maintains all four crosswalks for pedestrians, which is important
- Some noted that making pedestrians and cyclists wait for a light is a negative thing
  - Causes more delays than in current situation where they can proceed when coast is clear
  - Loss of active transportation priority over vehicles on this corridor
- A few respondents mentioned that full signalization is not needed
  - Volumes on Vernon and Seymour too low to substantiate full signal controlling their traffic flow
  - Waiting a full signal phase may lead to more congestion on Coburg, other streets nearby
- A few respondents mentioned concerns with cyclists transitioning into centre bicycle lane
  - Does not feel comfortable to have traffic passing on the right side of a cyclist, very exposed
  - Difficulties and safety concerns with transition away from curb into centre lane
  - May not be suitable for all ages and abilities
- Some mentioned there may be confusion and safety issues associated with turning restrictions
  - Possibility of collisions if bicycles and vehicles have different turning restrictions
  - Drivers may not be expecting or watching for through cyclists
- A few noted that true safety cannot be achieved until there is full separation of cyclists and cars
  - Call for fully protected bikeway down this corridor

#### **Vehicular Considerations**

- An equal number of generally positive and generally negative comments were received
- Many respondents noted that the turn restrictions are too prohibitive
  - Hinders one of the main access routes to Dalhousie University
  - Major vehicular inconvenience for very small gains not worth it
  - Driver may not obey these restrictions without a physical barrier
- Some mentioned that turn restrictions will push more traffic onto nearby roads
  - Shortcutting down Preston, Henry instead
  - Keeps traffic on Robie which is already busy and often congested
  - Increased speed due to driver aggravation may cause safety concerns
- Some mention that signalization will lead to congestion and travel delays on Coburg Road
- Some are generally positive about how slight delays may lead to increased safety and flow of this intersection
  - Creates a better pedestrian environment with addition of crosswalk, protected crossing phase
  - Established cyclist priority when allowing to proceed straight through intersection
  - Traffic diversion and reduced speeds will have overall positive impact on neighbourhood

## **(4) Allan/Oak and Oxford**

### **Cycling and Pedestrian Considerations**

- A greater number of generally positive comments than generally negative were received about these designs
- Many respondents believe that some form of signalization is good for improving safety at this intersection
  - Safety for pedestrians, cyclists, and drivers alike
  - Current offset alignment with high volumes on Oxford makes it difficult to navigate, risky behaviour
- Some mentioned that full signalization would be preferable
  - Unmistakeable clarity. People know how to use these
  - Maintains all four crosswalks for pedestrians, which is important
- Some (slightly less) noted that a full signal is not necessary
  - Not enough volume on Allan or Oak Street to substantiate
  - Waiting full signal phase will likely lead to more congestion on Oxford Street – already full of traffic
- Some (slightly less) respondents mentioned their desire for cyclists and pedestrians not to have to wait at light
  - Loses the priority for active transportation through this intersection
  - Will lead to more travel time delay vs current situation where they can proceed at gap/when safe
- A few respondents mentioned concerns with cyclists transitioning into centre bicycle lane
  - Does not feel comfortable to have traffic passing on the right side of a cyclist, very exposed
  - Difficulties and safety concerns with transition away from curb into centre lane
  - May not be suitable for all ages and abilities
- A few noted that true safety cannot be achieved until there is full separation of cyclists and cars
  - Call for fully protected bikeway down this corridor
- A few mentioned visibility concerns with proximity of crosswalks to bus stop
- A few mentioned the need to incorporate pedestrian bump outs
  - Improve pedestrian visibility
  - Visually narrow street to slow traffic volumes

### **Vehicular Considerations**

- Many neighbourhood residents have concerns about how the turn restrictions will impact how they enter and exit their neighbourhood, especially at rush hour
  - Turn restrictions make it difficult to go south from Allan St neighbourhood without either (1) making two difficult left hand turns onto Chebucto then Oxford, or (2) proceeding all the way over to Robie via Chebucto or Welsford
  - Turn restrictions make it difficult to go north from Oak St neighbourhood
  - A few wish to keep the possibility of proceeding straight through Oak/Allan to access downtown and Quinpool Road shopping area
  - Noted that turn restrictions may lead to use of private driveways to turn around in right direction
- Some are worried about the possible congestion on Oxford that signalization may cause
  - Must not impact buses, or they have signal priority
- A few are happy that vehicles will need to slow down through this often speedy segment
- Some are happy that the designs create a better pedestrian environment and establish cyclist priority
- Some respondents are concerned that there is undue driver inconvenience for such a small number of cyclists

## (5) Allan and Harvard

### Cycling and Pedestrian Considerations

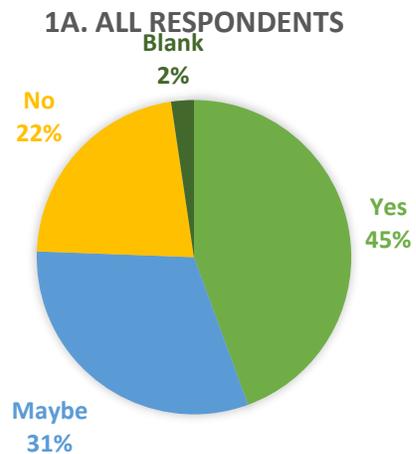
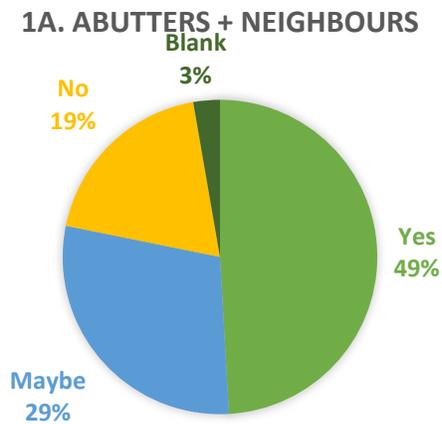
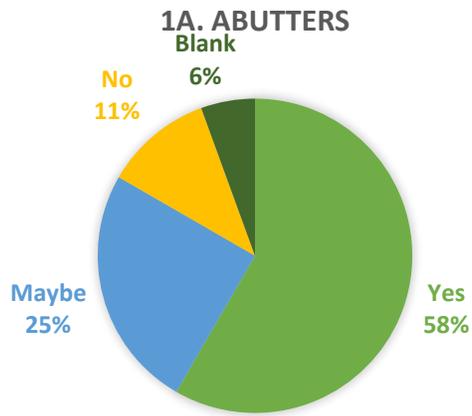
- The majority of comments received about this were positive
  - Respondents generally liked the “novel” / “radical” idea of the diagonal diverter at this location
  - Have seen it working in other world class cycling cities
  - Major intervention shows commitment to traffic calming and cyclist priority along corridor
- Many had questions and were confused about how the diverter worked
  - Education, pavement markings, and clear signage are needed to ease transition
  - How do the cyclists transition through the diverter safely?
  - Drivers may be too caught up trying to understand diverter to watch out for cyclists/pedestrians
- Many believe that the turn restrictions were good for reducing traffic volume and improving cyclist safety
- Some respondents mentioned that the intersection works well as its current state as 4-way stop
  - Prefer wither turn restrictions with 4 way stop, or just 4 way stop with no restrictions
  - Have not encountered cyclist safety issues here
- Some respondents want to see physical changes to the intersection but think that a stop sign is necessary for cars turning right off of Harvard Street
  - Without stop sign, cars will move through this turn too quickly – almost like a slip lane
  - Potentially dangerous for pedestrians crossing in either direction. No incentive to slow and look
  - Don't understand rationale for removing stop sign that's already working at this spot
  - Extra stop signs will improve pedestrian and cyclist safety
- A few mentioned that a protected (or clearly delineated) bike lane leading into the diverter would help
  - Clarify cyclist movement and smooth transition
  - More predictable way to introduce new infrastructure
  - Prevent conflict with cars
- Very few people mentioned the idea of flipping the diverter to allow right turns off of Allan onto Harvard
  - Preserves some paths of desired movements through the neighbourhood

### Vehicular Considerations

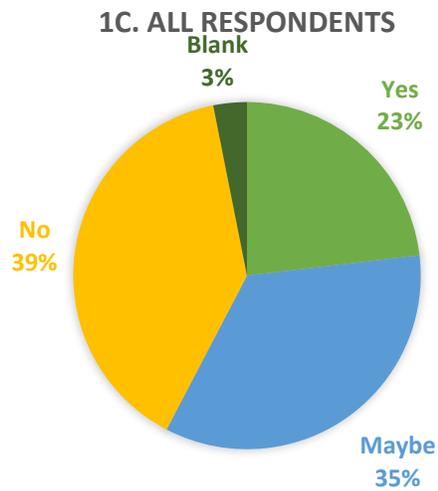
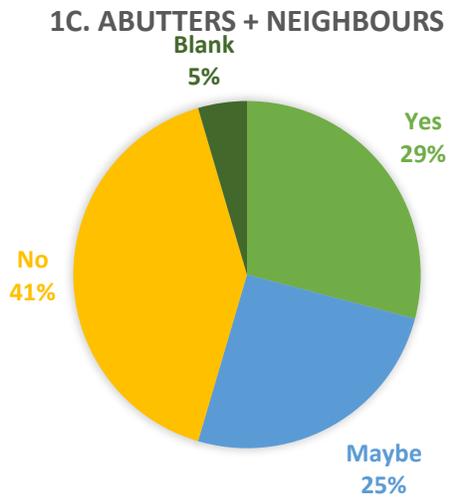
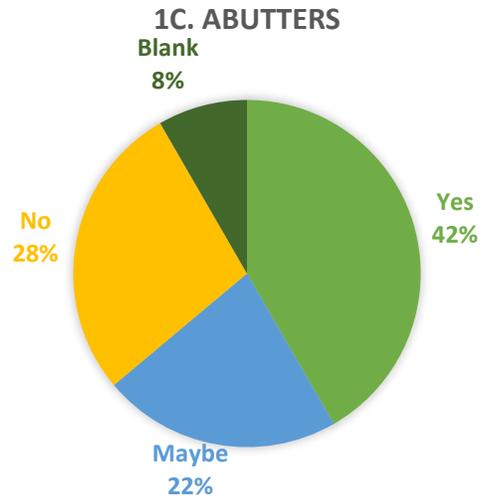
- The majority of comments received about this were negative
- Many respondents were concerned that that turn restrictions were prohibitive
  - Limits options for residents of Allan area to get into/out of neighbourhood, especially at rush hour
  - Neighbourhood connectivity is lost – no connection between Allan and Duncan/Lawrence
  - Limits access to Quinpool Road area, Canadian Tire complex
  - Makes it more difficult for people generally to drive on the peninsula towards downtown
  - Forces inconvenient routes, potentially aggravating drivers
- Some respondents mentioned that the design may impact traffic on nearby streets
  - Contribute to more traffic and higher speeds on Harvard Street
  - Funnel vehicles onto Quinpool and Chebucto which are already gridlock at rush hour
- Some feel that traffic diversion is good and necessary for safety
- A few feel that cars will adapt over time and that there is capacity elsewhere for drivers to still get around
- Many felt positive about the trade offs of slight inconvenience for cycling corridor were worth it
- A few felt there wasn't enough cyclists / need for changes
- A few noted that most traffic issues are coming from Monastery, and more should be done to alter this intersection instead
  - Possible full closure at Monastery and Yukon?

## Attachment E: Summary of Feedback from Neighbouring Residents and Abutters

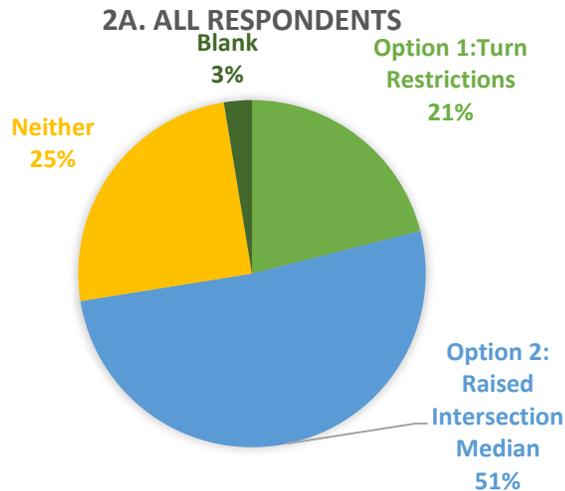
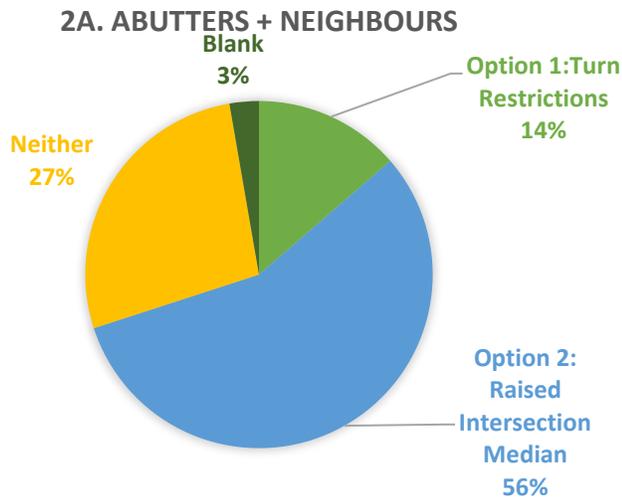
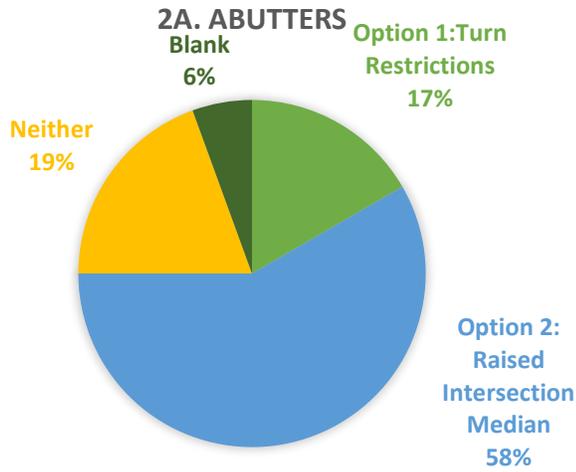
**1a. Vernon Quinpool -- Does this design help meet the objectives of creating a safe, convenient cycling corridor?**



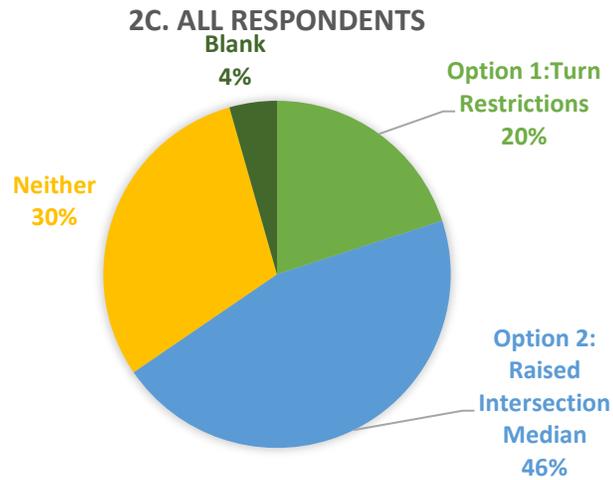
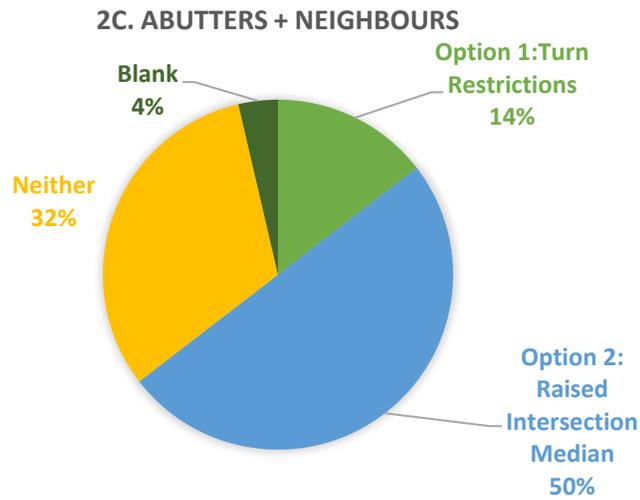
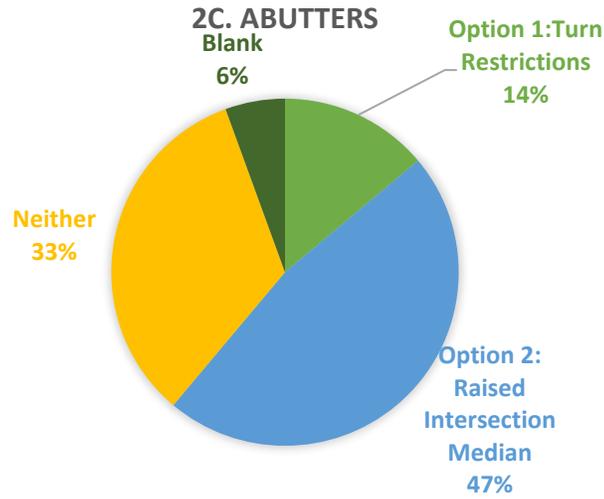
**1c. Vernon Quinpool -- Does this design help to make it easier and safer to walk?**



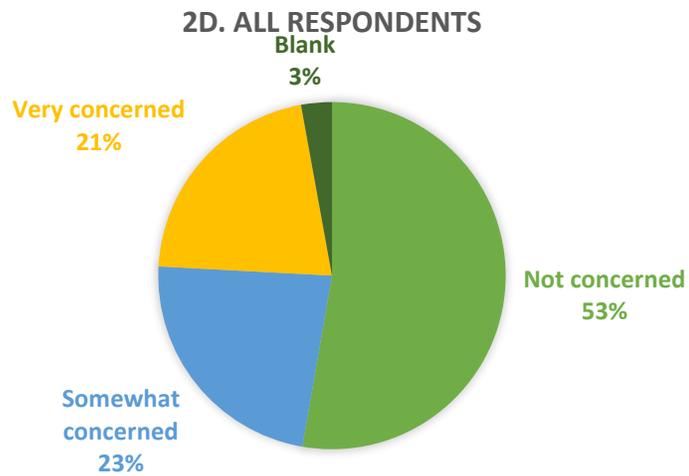
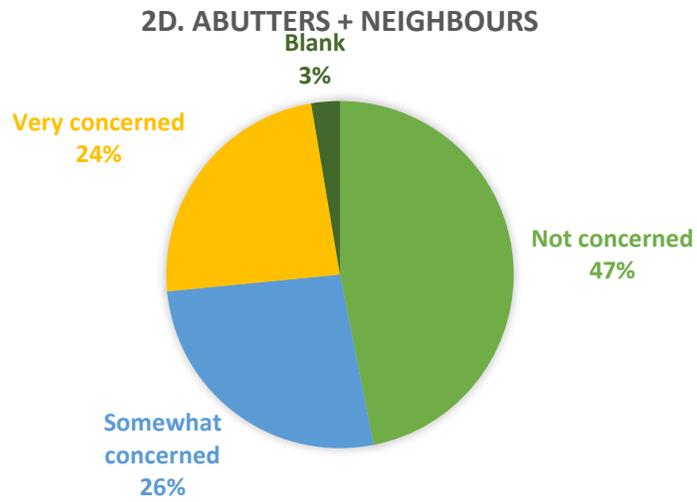
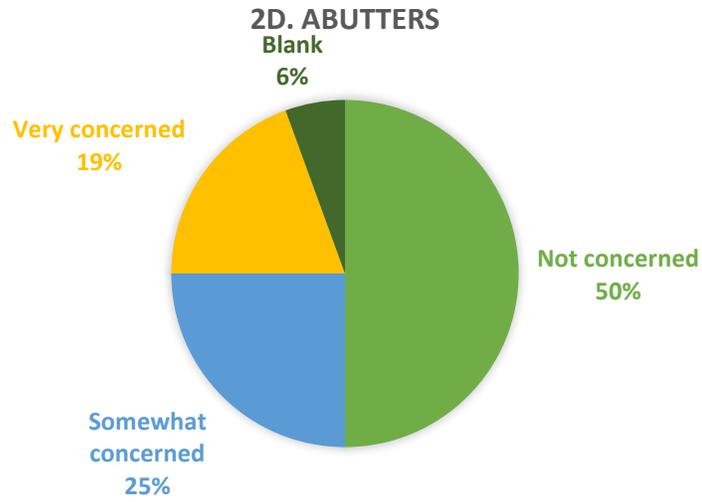
**2a. Vernon-Jubilee -- Which of these designs best meet the objectives of creating a safe, convenient cycling corridor?**



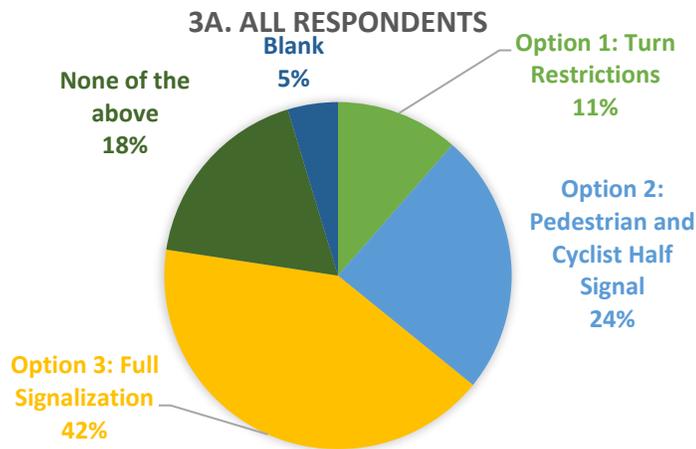
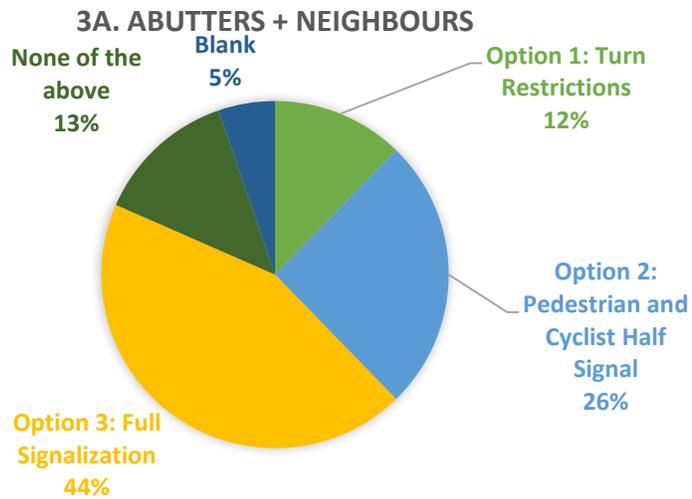
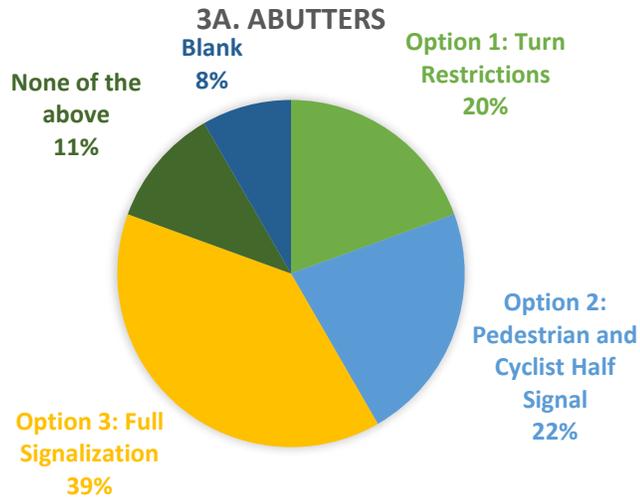
## 2c. Vernon-Jubilee -- Which of these designs makes it easier and safer to walk?



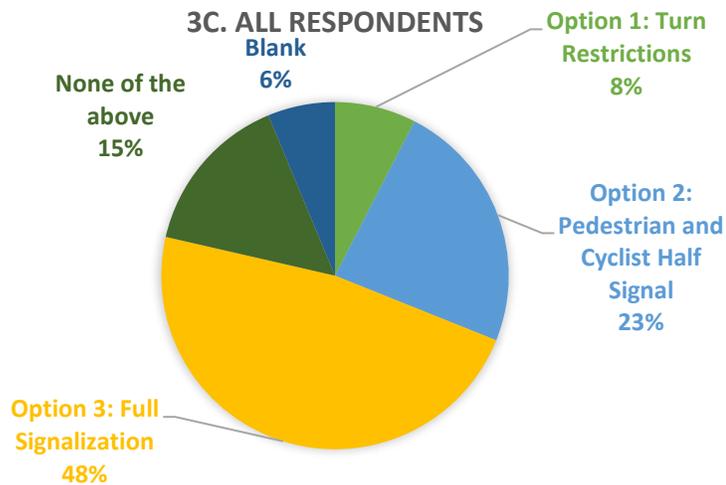
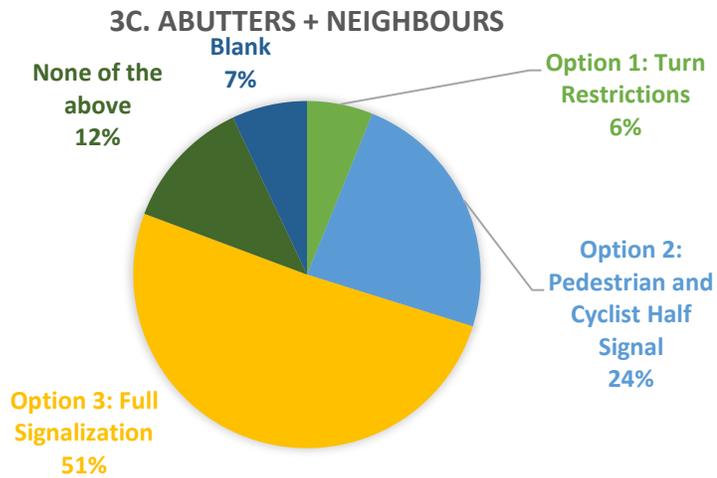
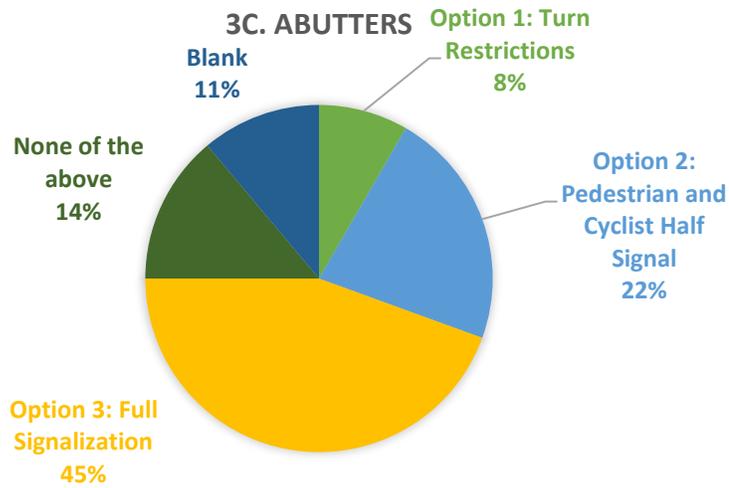
**2d. Vernon-Jubilee -- How concerned are you that this design will impact driving?**



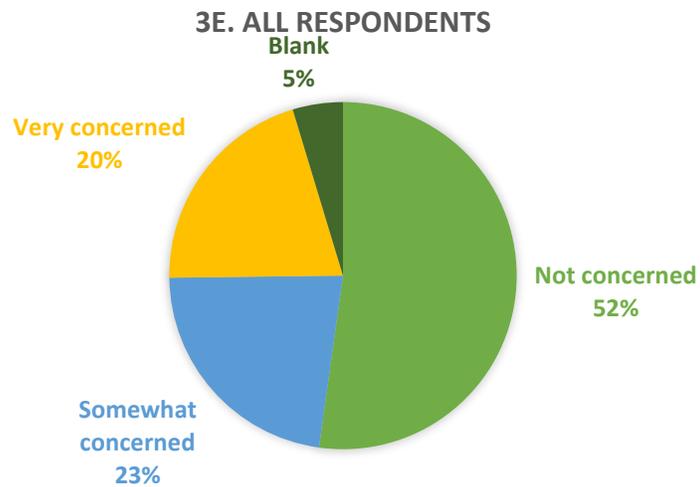
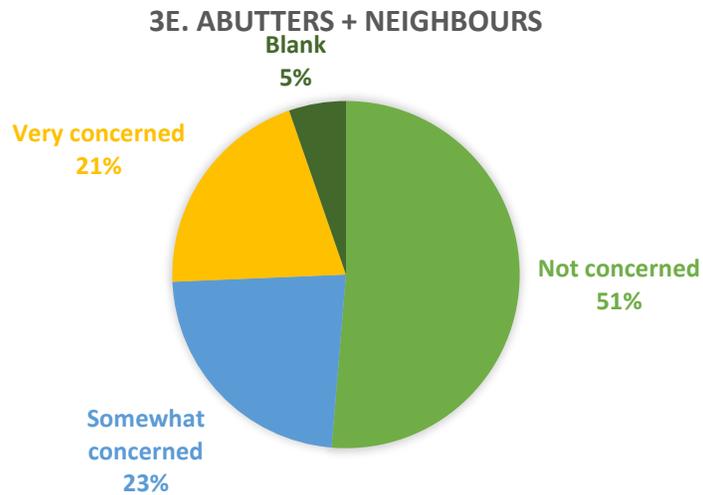
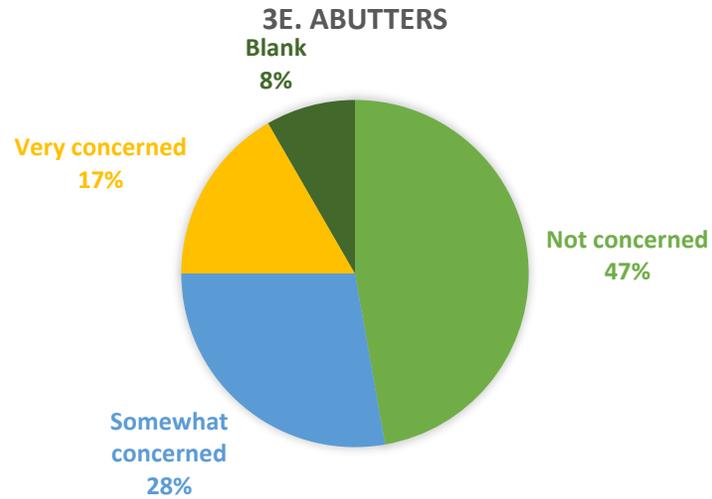
**3a. Vernon-Seymour-Coburg -- Which of these designs best meet the objectives of creating a safe, convenient cycling corridor?**



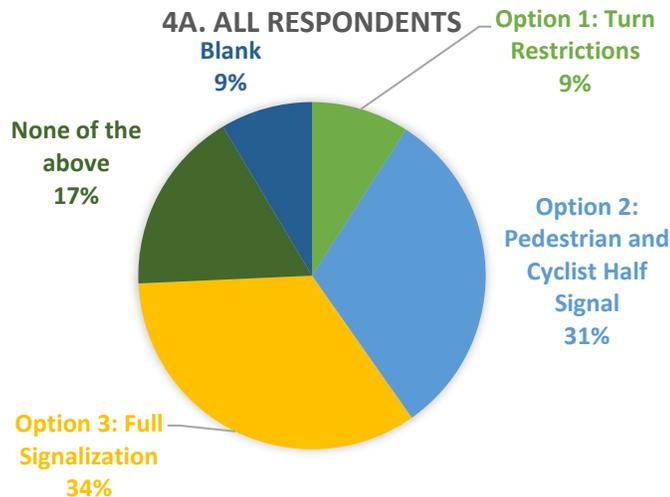
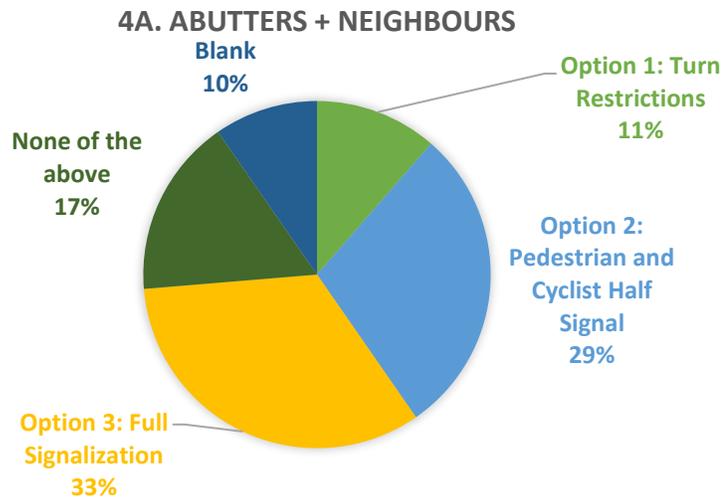
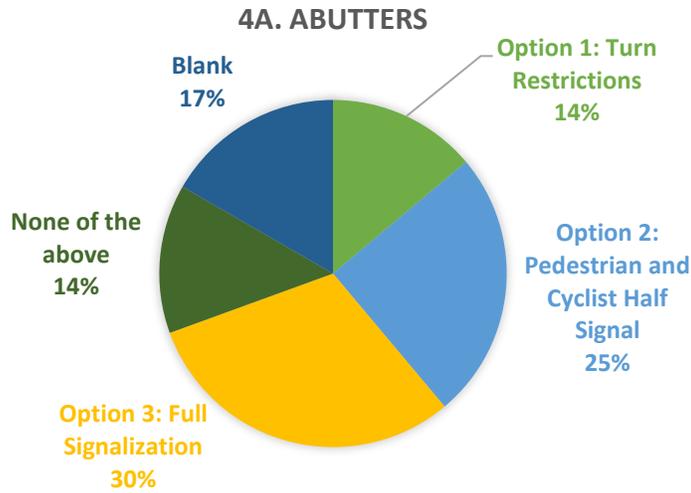
**3c. Vernon-Seymour-Coburg -- Which of these designs makes it safer and easier to walk?**



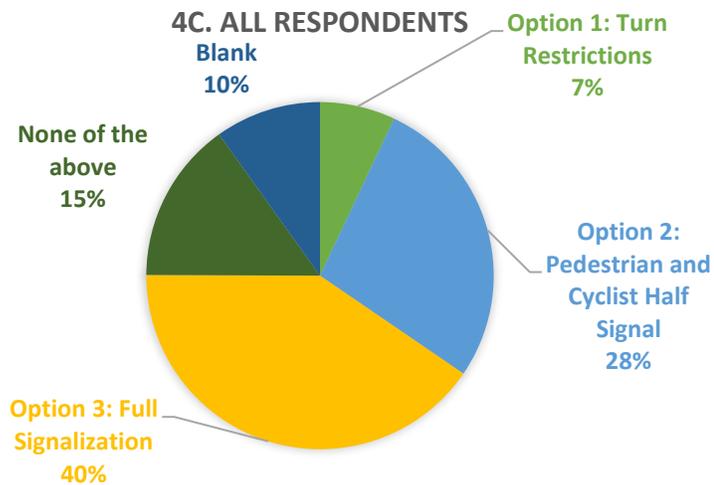
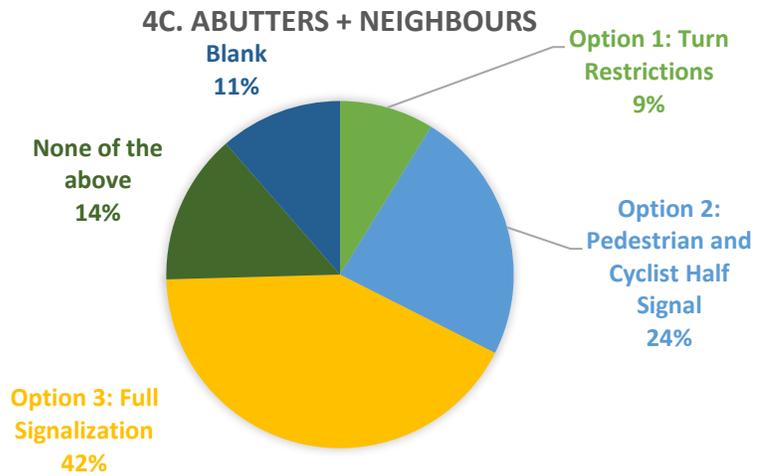
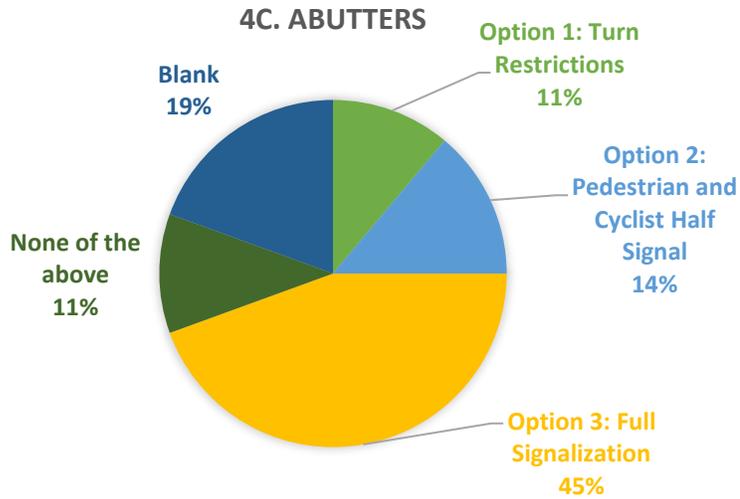
### 3e. Vernon-Seymour-Coburg -- How concerned are you that this design will impact driving?



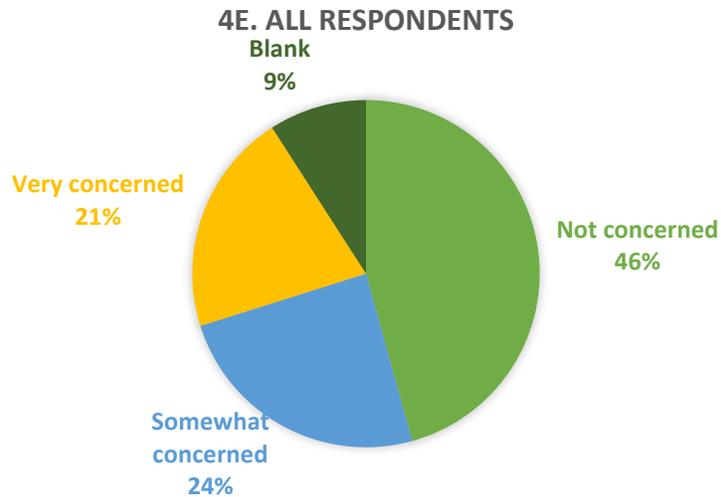
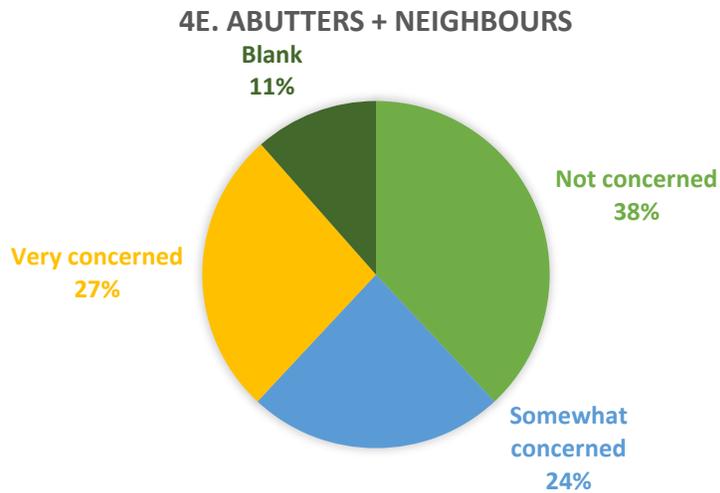
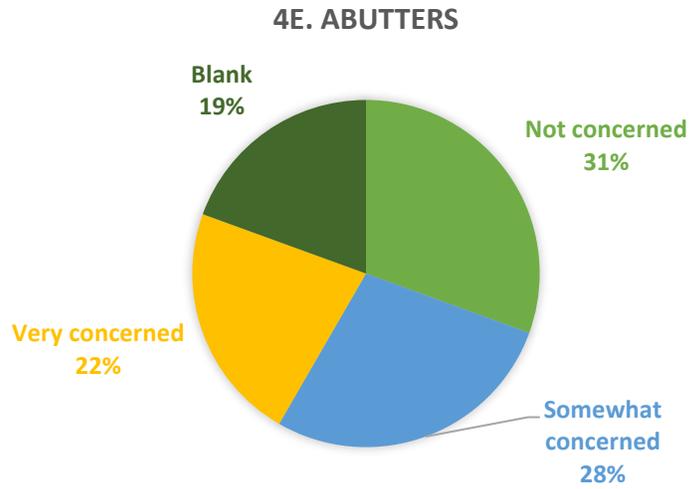
**4a. Allan-Oak-Oxford -- Which of these designs best meet the objectives of creating a safe, convenient cycling corridor?**



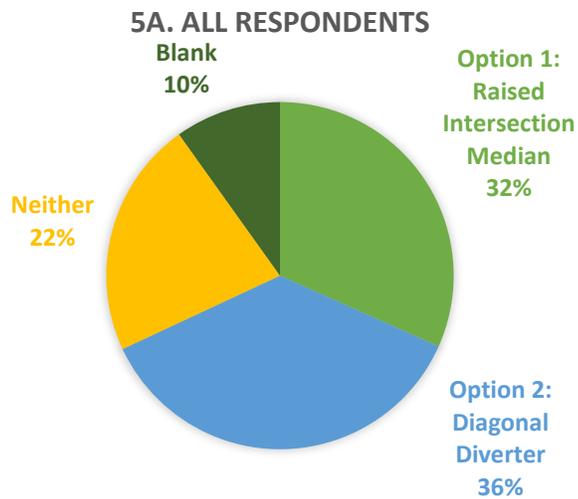
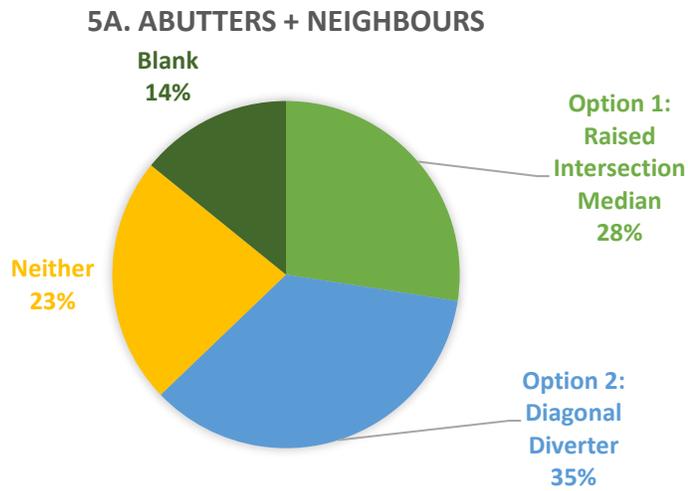
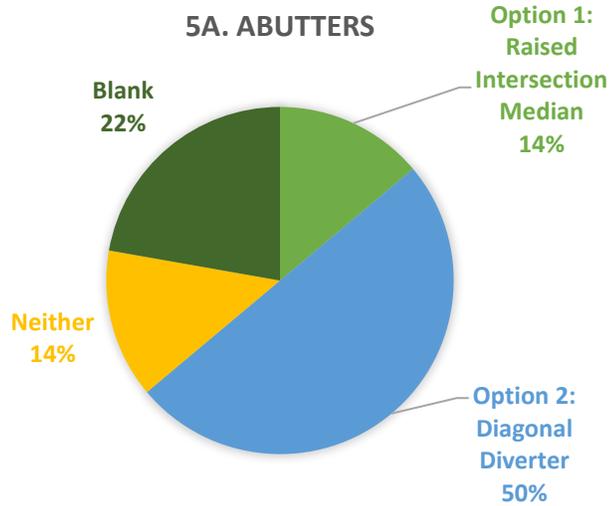
**4c. Allan-Oak-Oxford -- Which of these designs makes it easier and safer to walk?**



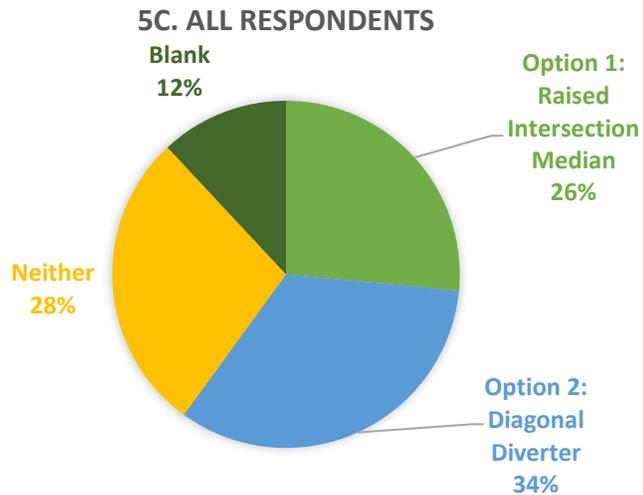
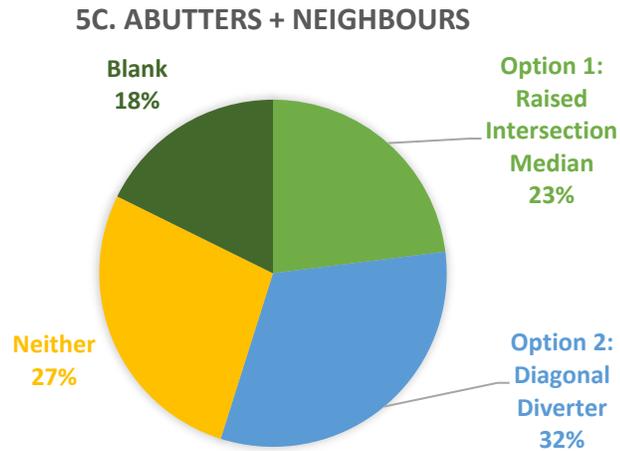
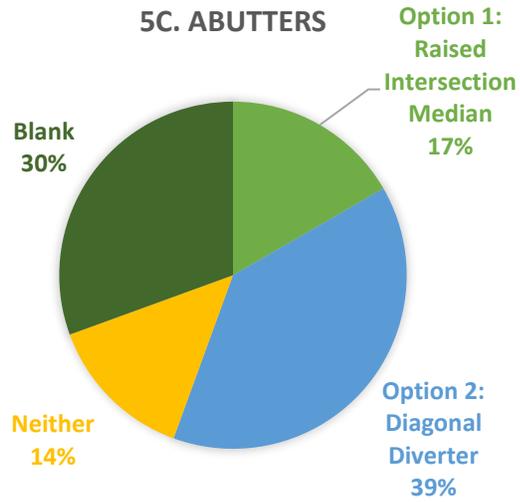
**4e. Allan-Oak-Oxford -- How concerned are you that this design will impact driving?**



**5a. Allan-Harvard -- Which of these designs best meet the objectives of creating a safe, convenient cycling corridor?**

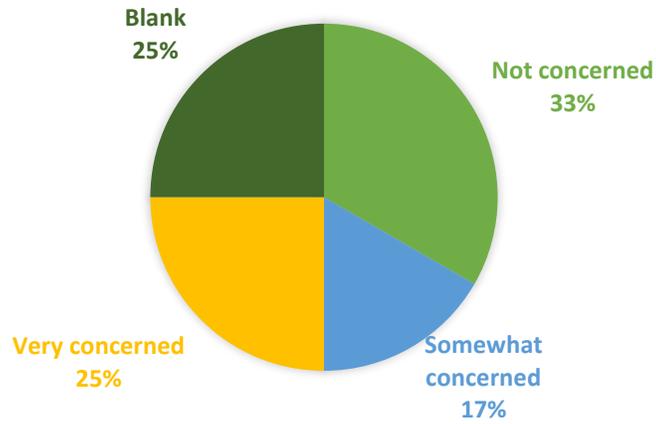


## 5c. Allan-Harvard -- Which of these designs makes it easier and safer to walk?

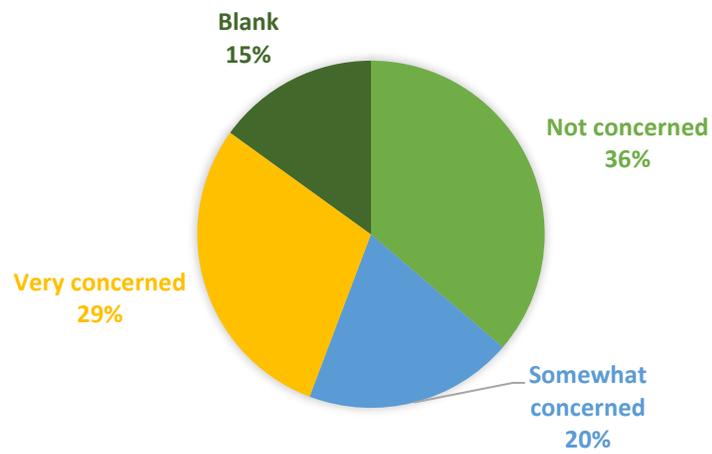


## 5e. Allan-Harvard -- How concerned are you that this design will impact driving?

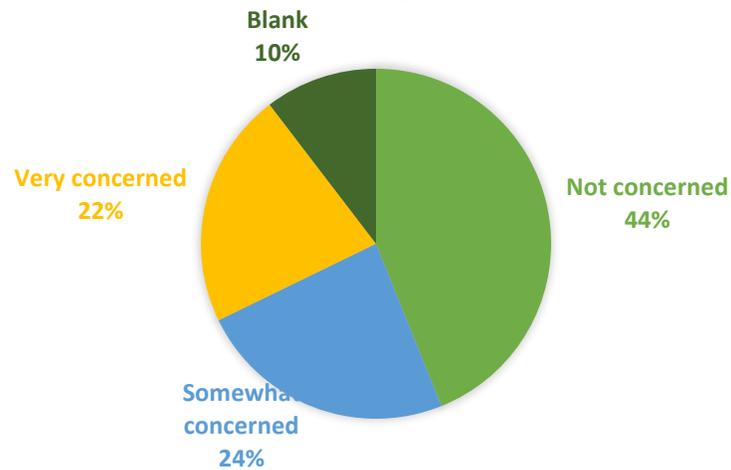
### 5E. ABUTTERS



### 5E. ABUTTERS + NEIGHBOURS



### 5E. ALL RESPONDENTS



**6a. Please describe how Local Street Bikeways will impact your bicycling habits.**

