Trans Canada Highway– Corridor Management Plan: Boys Road to Beverly Street

Technical Memorandum

Prepared for:
District of North Cowichan
City of Duncan
Ministry of Transportation and Infrastructure

Prepared by:
Roseanne Parrott, P.Eng.

May 21, 2014

Sign-off Sheet

This document entitled Trans Canada Highway – Corridor Management Plan: Boys Road to Beverly Street was prepared by Stantec Consulting Ltd. (Stantec) for the account of City of Duncan and District of North Cowichan. The material in it reflects Stantec's best judgment in light of the information available to it at the time of preparation. Any use which a third party makes of this report, or any reliance on or decisions made based on it, are the responsibilities of such third parties. Stantec Consulting Ltd. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

Prepared by _____
(signature)

Roseanne Parrott, P.Eng.

Reviewed by _____
(signature)

Graeme Masterton

Table of Contents

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

Executive Summary

The section of the Trans Canada Highway (TCH) that runs through the District of North Cowichan (DNC) and the City of Duncan (CoD) was originally constructed as a by-pass route around the City of Duncan due to traffic congestion. A similar congestion situation has developed over the years along the by-pass as property has been sub-divided and developed. Properties abutting the highway have been allowed access directly off the highway resulting in significant safety issues as well as exacerbating congestion as traffic volumes on the highway and intersecting roads increase.

Though there have been many studies conducted in the last ten years relating to transportation and safety along this stretch of highway, the last Corridor Management Plan was updated nearly ten years ago and an updated review of the corridor is due. This Corridor Management Plan (CMP) endeavors to provide an update in the form of a review of these previous reports and combine the findings with input from local corridor users to develop a CMP that is achievable and makes sense.

Through extensive public consultation we have arrived at recommendations that we believe will be mutually acceptable to the public and the roadway authorities. We recommend a staged infrastructure improvement approach to address traffic congestion and access management incrementally.

These recommendations are based on the corridor objectives that resulted from the consultations:

1. Safety of pedestrians, cyclists, and motorists along the corridor
2. Traffic congestion for local traffic and truck traffic travelling through the DNC and CoD between the cities of Nanaimo and Victoria
3. Accessibility for emergency services
4. Sustainability of local business and economy
5. Affordability of future infrastructure projects

A summary of the primary recommended infrastructure improvement projects are:

- Upgrade pedestrian indicators at signalized intersections to include count-downs.
- Extend sidewalk and add curb, gutter, and boulevard on west side of the TCH from James Street/York Road to Beverly Street.
- Construct a multi-use pathway along the east side of the TCH between Boys Road and Beverly Street complete with curb, gutter, and boulevard where feasible.
- Construct attractive and functional gateways near Boys Road and Beverly Street to welcome people to the urban area and prevent unsafe pedestrian TCH crossings.
- Install permanent radar speed signs and changeable messaging signs to encourage motorists to reduce speeds before entering the urban area.
- Install temporary pedestrian activated signals at Cowichan Way and near University Way with future full signalized intersection at Cowichan Way and a pedestrian overpass near University Way.

- Improve local roadway network connectivity and parking opportunities to facilitate phasing out direct access off the TCH.
- Undertake a detailed traffic analysis to determine improvements to corridor intersections in terms of signal timing, number of turning lanes, and turning lane lengths.
- Construct a multi-use pedestrian bridge over the Cowichan River.
- Realign James Street/York Road intersection.

The following report lays out in detail the process and results of this review, consultation, option development, planning, recommendations, and implementation strategy.

While we recognize that the implementing of these recommendations presents a fiscal challenge, the DNC, CoD, and MoTI should prepare a funding strategy, to further prioritize the most effective projects to create a plan to make these projects a reality.

1.0 Introduction

With the continued economic and residential growth of both the City of Duncan and the District of North Cowichan, it is necessary to continue planning for the future infrastructure needs. The DNC and CoD hired Stantec Consulting (Stantec) to complete the University Village Local Area Plan (LAP) which will provide a land use plan that will take into account the growth potential of the DNC over the next 25+ years. As the LAP process progressed it became readily apparent that significant changes to the Trans Canada Highway are needed to address both safety concerns along the corridor as well as access/egress issues both in the short term and into the future.

As such, the DNC, CoD, and MoTI hired Stantec to complete a review of the TCH corridor from Boys Road to Beverly Street, in conjunction with the current ongoing LAP process, and come up with an implementable Corridor Management Plan. The purpose of this CMP is to take existing information from previous studies; information, ideas, and concerns from local corridor users; and coordinate them with future land use plans to make infrastructure project and implementation recommendations for the corridor in the:

1. Short term (approximately 1–5 years)—which would help alleviate immediate concerns
2. Medium term (approximately 5–10 years)—which would continue addressing various issues along the corridor while also preparing for future land use and long term corridor projects
3. Long term (approximately 10–20+ years)—which would address future corridor needs while taking into consideration the LAP

2.0 Background

Figure 2-1 Existing TCH Corridor

2.1 EXISTING INFORMATION REVIEW

A number of studies, reviews, and plans have been prepared in the last ten years with regards to safety and transportation within and around the corridor area. See

Figure 2-1 for an aerial diagram of the existing TCH corridor and local roadway network.

Previous works of particular relevance to this CMP are:

- Trans Canada Highway Corridor Management Plan–Drinkwater Road to Cowichan Bay Road prepared by Urban Systems October 2005
- Safety Review of Trans Canada Highway Corridor: James Street to Beverly Street prepared by Bunt & Associates March 2009
- DRAFT Duncan Area Active Transportation Plan and Design Guidelines prepared by Alta September 2013
- Cowichan Valley Regional District Regional Parks & Trails Master Plan prepared by Lanarc Consultants Ltd. March 2007
- Capital Regional District Regional Pedestrian & Cycling Master Plan prepared by Alta March 2011
- Traffic Impact Assessment for Cowichan Place prepared by Boulevard Transportation Group October 2007
- Cowichan Place Access Review prepared by Boulevard Transportation Group August 2007
- DRAFT James-Alexander Neighborhood Traffic Calming Review prepared by Boulevard Transportation Group July 2006
- City of Duncan Age-friendly Seniors Safety Project Report prepared by Pam Alcorn Project Facilitator July 2010
- Transit Future Plan–Cowichan Valley Region | March 2012

The following items were taken into consideration when reviewing these works:

1. Safety issues.
2. Existing vehicular traffic patterns (including side streets and crossing movements) and expected future growth.
3. Pedestrian and cyclist traffic patterns.
4. Existing and potential future land use types and locations and their effect on traffic patterns and safety.
5. Consideration for DNC and CoD plans for future infrastructure projects.
6. Consideration for BC Ministry of Transportation and Infrastructure (MoTI) plans for the movement of people, goods, and services along the corridor.
7. Consideration for BC Transit plans for future service improvements.

2.2 EXISTING REVIEW FINDINGS

The Cowichan Valley has continued to grow through recent years; as such, existing residential and commuter traffic volumes are also on the rise. With the TCH bisecting both municipalities with limited

roadway network connectivity, crossing and circulating movements for local traffic have experienced an increase in traffic congestion. An increase in traffic volumes inevitably carries with it an increase in the total number of collisions annually; however, this corridor experiences higher collision rates than is acceptable for the current traffic volumes on this type of roadway. These issues are partly due to the access density that has been allowed to grow as business developed along the highway, the posted speed reduction on the highway entering the urban area, and the mixing of traffic with different travel goals (i.e.: traveling through versus the local circulating traffic).

The significant volume of truck traffic along the TCH between Nanaimo and Victoria has become an issue due to conflicting travel types (i.e. local traffic, commuter traffic, tourist traffic, commercial traffic, and active transportation all compete for space in the corridor).

These traffic issues have contributed to a general feeling of unease by local pedestrian and cyclist corridor users as there are limited facilities geared towards active transportation and limited alternative routes. There are no bike lanes along the corridor and few on adjacent street network. The sidewalks are narrow and end near University Way.

There have been a number of pedestrian casualties along this section of road, as the traffic in this area continues to grow and pedestrian traffic patterns remain the same with high volumes (many mid-block crossings). As plans for the University Village expansion and the Cowichan Secondary School relocation progress, consideration for the safe movement of students will also play a key role in any future corridor improvements. **Figure 2-2** illustrates collision statistics from the Insurance Corporation of British Columbia (ICBC) which indicate a need for improvement in safety. The probability of incidents occurring at intersections is naturally high due to the number of conflicting movements using the same space.

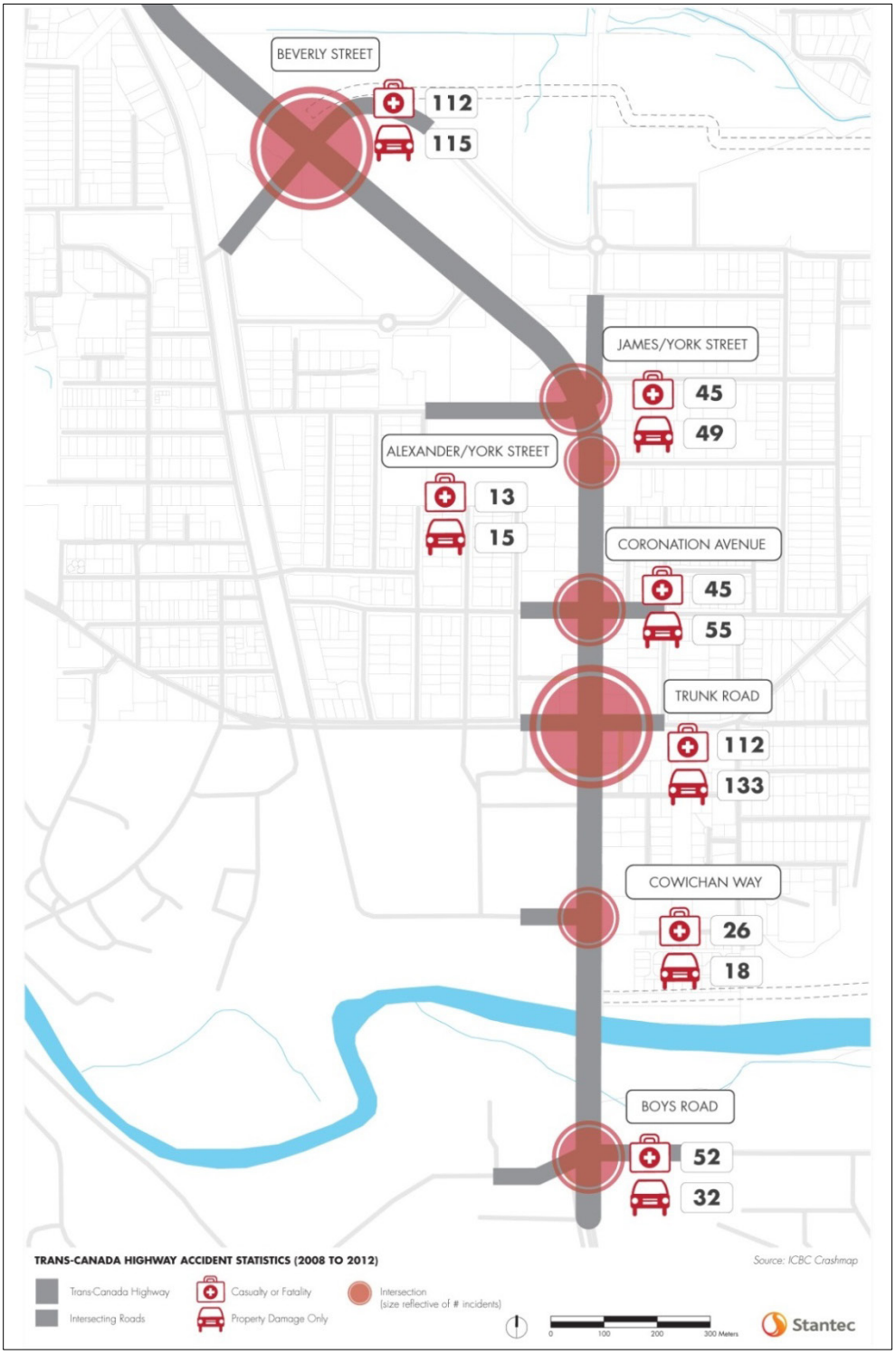

Figure 2-2 TCH Corridor Collision Data

(Data source: ICBC.com)

3.0 Consultation

Proactive consultation with the local public, business owners, municipalities, transportation authorities, and Cowichan Tribes was undertaken, as early as possible in the planning process, to ensure that ample opportunity was provided for affected corridor users to be involved, to be heard, carefully considered, and incorporated into the Corridor Management Plan.

3.1 PROCESS

The following workshops and open houses were held to facilitate communication between the community and the planning team:

1. Public information and comment via 'Place Speak' website effective (January 2014 to March 25, 2014 for the CMP)
2. Cowichan Tribes/Environment Committee Meeting (November 29, 2013)
3. Transportation authorities workshop (December 20, 2013) was held to take into consideration future plans and service improvements by the municipalities, MoTI, and BC Transit for the movement of people, goods, and services along the corridor.
4. Stakeholder Advisory Group (SAG) Meeting #3 (December 5, 2013) - The SAG was created to represent the interests of the community as a whole and consisted of members of the Cowichan Tribes, the Cyclists Coalition, RCMP, Emergency Services, School Board, Vancouver Island University, TCH Owners, BC Transit, DNC and CoD, and MoTI (SAG Meetings #1 and #2 were for the LAP only).
5. TCH Business Owner's Meeting #1 (December 5, 2013)
6. TCH Business Owner's Meeting #2 (January 5, 2014)
7. Stakeholder Advisory Group (SAG) Meeting #4 (February 5, 2014)
8. Youth/Schools (February 2014)
9. Public Open House #2 (February 26, 2014) (Public Open House #1 was for the LAP only)
10. Stakeholder Advisory Group (SAG) Meeting #5 (April 1, 2014)
11. Public Open House #3 (April 14, 2014)

3.2 SUMMARY OF RESULTS

A summary of the primary concerns that were brought forward through these consultations form the general objectives for the TCH corridor CMP:

1. Safety of pedestrians, cyclists, and motorists along the corridor.
2. Traffic congestion for local traffic and through traffic travelling through the DNC and CoD between the cities of Nanaimo and Victoria.
3. Accessibility for emergency services.
4. Sustainability of local business and economy.
5. Affordability of future infrastructure projects.

3.3 RESULTING VISION STATEMENT

The Vision Statement for the TCH Corridor summarizes these objectives:

> *"The Trans Canada Highway and local road network improvements will support safe, welcoming, and convenient travel for all modes that is compatible with the surrounding land uses. It will provide a significant opportunity for creating an economic driver for the area through investment in "hard" and "soft" infrastructure that will facilitate residential intensification, infill and redevelopment, enhanced commercial and employment opportunities."*

4.0 Considerations

In conjunction with the consultation process, various ideas for potential improvement projects were explored namely the highway, intersections, active transportation facilities, local roadway network, access management, local trail network connectivity, traffic calming, and pedestrian/cyclist TCH crossings.

4.1 HIGHWAY

This section deals simply with the lanes of roadway in isolation to the other corridor components based on vehicle volumes and characteristics.

4.1.1 Description

This section of the Trans Canada Highway cannot be treated simply as a typical rural highway. It is situated in the midst of a growing commercial and urban area. It must continue to function as a highway, with consideration for the local traffic that surround and use it. **Figure 4-1** below illustrates more or less how this section of highway should function: as an urban arterial roadway. The current situation is a 50 km/h to 60 km/h four lane roadway with some turning lanes provided at the main intersections. These intersections are currently operating at capacity during the rush periods and the highway is congested.

Figure 4-1 Arterial Roadway Example

4.1.2 Option Exploration

A few options were brought up regarding the Trans Canada Highway itself, most of which have been brought forward in the past in one form or another; some have been implemented, some have not. Options that were evaluated for the CMP were namely: widening the TCH, adding continuous right-turn-only lanes, creating a one-way highway couplet, and re-routing the TCH.

TCH Widening

Widening the TCH is not a feasible or desirable option because it would mean much wider paved area (aesthetically unattractive), a longer crossing width and time for circulating traffic and pedestrians (which would impact the performance of the intersections), and high cost due to right of way that would be required along the corridor, not to mention that additional turning lanes would likely achieve the desired effect without increasing the width of the corridor through its entire length.

Continuous Right Turn Lanes

Continuous right turn lanes (which motorists enter in order to turn at the next crossing road only, they are not to be used as through lanes) would mean the addition of a lane the length of the corridor which would add to the paved width and would require right of way acquisition.

One-way Highway Couplet

A one-way highway couplet may increase the intersection capacity and thus level of service, but would require significant infrastructure changes and would significantly affect properties along whichever direction were slated to be outside the existing corridor. There would still be intersections along the new stretch of corridor as well as existing accesses that would need to be addressed.

TCH Alternate Route

Re-routing the TCH would improve the traffic level of service by reducing the amount of conflicting movements (crossing travel paths) for local circulating traffic as well as highway through traffic, however the time savings would be negated for highway traffic by replacing a shorter corridor and signalized intersections with a longer corridor. This option is cost prohibitive, would likely affect some existing businesses along the existing TCH, and would significantly impact the environment and properties along any proposed new corridor.

4.1.3 Findings

All improvements explored above prove to be too costly for the small benefit or the lack of benefit to the local economy. It is proposed that any improvements to the Highway be borne through improvements as described in the following sections.

4.2 INTERSECTIONS

This section deals with the major intersections along the TCH within the corridor limits.

4.2.1 Description

The existing signalized intersections are at capacity in the peak traffic hours, especially left turn movements and through movements across the TCH. The option exploration below seeks to find a way to alleviate some of this traffic pressure.

4.2.2 Option Exploration

The intersections along the TCH were evaluated and similarly to the highway options, several ideas have been brought forward by previous studies, namely: the addition of lanes at intersections, grade separation at intersections, roundabouts, shared space roundels, and signal optimization/coordination.

Additional Lanes

Undoubtedly, adding turning lanes at the intersections would increase the capacity at the intersections, however the scope of this CMP does not cover detailed traffic analysis which would need to be done in order to make a more definitive plan with regards to how many lanes would be needed where, and how long they would need to be, in order to achieve the desired level of service. Adding lanes would make the intersections larger and would take pedestrians longer to cross and right of way would likely be required for the length of any additional lanes, depending on what other treatments are implemented (i.e.: widths of median, boulevard, shoulder, and sidewalk or path).

Grade Separation

Grade separation at the intersections would also certainly improve traffic flow and reduce the number of traffic conflicts, however in order to achieve the proper vertical clearance and maintain acceptable grades onto and off of the interchange ramps would mean hundreds of metres of inaccessible elevated roadway. This option is also cost prohibitive since it would require several new bridge structures and quite a bit of additional right of way. Incremental improvements should be implemented before resorting to such a drastic change. Grade separation remains a possibility far enough into the future.

Roundabouts

Roundabouts are quite common in other parts of the world and work quite well in certain conditions. There were circular junctions at intersections in North America at the turn of the last century. They since fell out of favor, but in the early 1990's roadway authorities in North America began to re-introduce them as traffic calming devices to reduce congestion and the severity of collisions by channeling vehicles in the same direction (no head-on or high speed T-bone collisions). Roundabouts also reduce the pollution produced by idling vehicles, the noise made by the mass acceleration of a platoon of vehicles, and the

roadway width required between intersections. Where left turn is prohibited, roundabouts provide the opportunity to turn around safely and efficiently.

Unfortunately, we currently have a driver population that is somewhat unaccustomed to navigating multi-lane roundabouts, but as motorists are exposed to more of them, they become more comfortable with them. One lane roundabouts are much better received than two (or more) lane roundabouts due to the lack of public knowledge on how to navigate the two laned exit. Roundabouts function best when they can be located far enough away from signalized intersections that they are not overwhelmed by the platoons of vehicles and they do not have traffic back up into them. Roundabouts have very poor level of service for lower volume roads intersecting high volume roads where there is a very disproportionate traffic volume in one direction starving the intersecting road for gap opportunities to enter the roundabout. Another challenge is that pedestrians have farther to walk to cross the intersection if it is a roundabout and pedestrians with limited or no sight must rely on their hearing to determine where vehicles are. It can be quite challenging to distinguish circulating vehicles from exiting vehicles about to cross the pedestrian crossing using hearing alone.

Roundabouts on highways generally require larger footprints to accommodate large vehicles and to allow higher circulating speeds. This section of highway has a relatively low posted speed, however a roundabout at any of the corridor's intersections would still require additional right of way in order to accommodate the diameter needed for large trucks, two circulating lanes, and appropriate entrance and exit curve radii. Beverly Street and Boys Road are very near speed transition zones where motorists may not be expecting to encounter a roundabout which may pose a safety hazard. A detailed traffic analysis would need to be done in order to make a judgment on the feasibility of a roundabout here, but it remains a possibility in the future as Canadians gain experience driving them. It may be prudent to install a two lane roundabout within the local roadway network (such as at the intersection of Trunk Road and Coronation Avenue) and monitor motorist behavior over a few years. **Figure 4-2** illustrates a two lane roundabout with right turn lanes.

Figure 4-2 Two Lane Roundabout Example

Shared Space Roundels

Similar to a roundabout, a shared space roundel is a round intersection; however, they have no center island and no dedicated right of way given to any traffic movement at any given time. An example of this traffic innovation from Poynton in Great Britain where a congested intersection with heavy pedestrian and truck traffic was converted from a congested signalized intersection to a twin shared space roundel as illustrated in **Figure 4-3** below. The idea is that by not defining right of way, motorists are forced to negotiate (without words) the taking and giving of right of way. Pedestrian crossing is accommodated by refuge islands and differentiated pavement coloration for pedestrian crossing zones. Although we feel that this is very innovative, our professional opinion is that given the unfamiliarity of local motorists with roundabouts in general, it may be a better idea to test this type of solution at a lower risk intersection in the local roadway network. The TCH corridor would not make a good North American test candidate at this time.

Figure 4-3 Shared Space Roundel Example

Traffic Signal Optimization and Corridor Coordination

Signal optimization is something that can temporarily improve the efficiency and level of service of an intersection as traffic volumes increase, if there is enough available capacity. Signal phasing can also be implemented to improve safety. Split phase timing for example, is when one direction at a time has a green light and all left turns and throughs are able to travel freely. Protected left turn phases on the other hand allow left turns in opposing directions to have a separate green time from through traffic. These should both be investigated as they create a much safer condition for vehicles turning left and for pedestrians, although they can increase the delay for other movements.

Signal coordination through a corridor is when signals are optimized as a system to allow as much through traffic as possible to travel through a stretch of roadway without having to stop for red lights at every signal. Signal coordination also has its limitations. If signals are to be coordinated, they must be

timed based on the lowest common denominator and can only be coordinated in one direction at any given time. There currently is signal coordination between signals along the corridor; however, it may be possible to improve this coordination with upgrades to allow coordination in one direction for the a.m. peak traffic and gradually switch the direction of coordination mid-day for the p.m. traffic. Of course, during the mid-day there would be limited coordination and signals would likely experience a period where they are neither optimized nor coordinated.

4.2.3 Findings

Grade separation is not practical, nor is it cost effective. Roundabouts would take a considerable footprint to function properly and may not be well suited for this location. Shared space roundels are deemed too risky for this situation and have not been proven in North America. Signal coordination and optimization is the best option for the short term while undertaking traffic analysis in order to determine the most efficient laning configuration and the requirement for any turning lane additions or extensions.

4.3 ACTIVE TRANSPORTATION

4.3.1 Description

The facilities for active modes of transportation are outdated for the population density and land use. There are no facilities dedicated solely for cyclists and the existing sidewalk is often narrow and abuts the busy roadway. We looked at what could be done to improve active transportation along the corridor while ensuring safety of all types of active transportation users.

4.3.2 Option Exploration

Ideas brought forward include replacing sidewalk with multi-use paths, a transit exchange along the highway, and a transit exchange/park and ride facility just off of the highway.

Multi-Use Pathways

Many people also report feeling unsafe traveling along the corridor due to the heavy traffic and lack of separation from traffic by shoulder width, boulevard width, sidewalk width, and in some places a lack of sidewalk altogether. Many people also expressed that they would not feel comfortable cycling along the highway using a bike lane due to highway traffic volume and speed. Replacing regular width sidewalk with a 3 metre (minimum) to 4 metre (desirable) multi-use pathway would provide enough space to allow cyclists to safely use the corridor in both directions without endangering the safety of pedestrians. In order to accommodate a 4 metre pathway through the entire corridor, additional right of way would need to be acquired and some utilities may need to be relocated. Provision for a boulevard between a 3 metre multi-use path and the highway, similar to that illustrated in **Figure 4-1**, can be achieved without the requirement for additional right of way (in the absence of any additional turning lanes at the intersections) with a 4.3 metre shared outside lane which would not require a shoulder in place of having 3.7 metre outside lane which requires a minimum 1.5 metre shoulder. This 4.3 metre lane is intended to be shared between motorists and cyclists. Of course cyclists would have the option of using the shared

lane or the multi-use pathway. A boulevard would also create a more effective buffer than a shoulder would due to the space not being occupied by vehicle traffic at any time, while providing an opportunity for beautification and rain gardens. We recommend installing a multi-use pathway in at least one direction along the TCH and provide for bicycle lanes as a minimum in the east–west direction on the local roadways intersecting the TCH as the traffic speeds tend to be less on the local roadways. This does not mean that multi-use pathways could not be implemented east–west in the future. We believe that the east side of the TCH is better suited for the multi-use pathway based on the existing commercial type and density. This may need to be re-evaluated in the future. **Figure 4-4** is an illustration of an urban multi-use pathway in use.

Figure 4-4 Urban Multi-Use Pathway

Transit

We saw opportunity for a transit exchange along the highway near Beverly Street where the existing roadway right of way is quite large. Normally this would not be prudent along a busy highway, however with the reduced speed limit and given the proper setback from through traffic on the highway, we believe this could be achieved safely. BC Transit has no plans for any additional bus stops directly off the highway at this time. There are currently plans to have a transit exchange near the railway tracks in downtown Duncan in future.

We also considered the possibility of a park and ride facility to provide intercity commuters with an affordable and environmentally friendly alternative to driving themselves (often single occupancy vehicles). BC Transit currently has no plans for a park and ride facility in Duncan. Should commuter volumes increase, this may change.

4.3.3 Findings

A multi-use pathway along the east side is the best option for cyclists and may be shared with pedestrians, persons using assistive devices, and other modes of active transportation. Any future transit facilities will likely be located off the TCH within the corridor (except for Boys Road which will remain as a bus pullout) for the foreseeable future.

4.4 LOCAL ROADWAY NETWORK

A roadway network refers to the way in which the roads link up with each other (like a grid or a web). In this case the local roadway network refers to the side roads, how they interact with the TCH, but mostly how they interact with the other local roads apart from the TCH.

4.4.1 Description

The existing local roadway network is not well connected to allow various route options to get from one place to another. With a lack of local roadway network connectivity, due in part by the lack of continuity between municipalities, local traffic is forced to use a limited number of roadways that connect east to west and north to south (the TCH in particular). This lack of connectivity adds unnecessary congestion to the highway and is an inefficient use of the local roadway network.

4.4.2 Option Exploration

Many possibilities exist as to which local roads could be extended or connected. There were a few iterations, some of which appear in **Figure 5-1**, **Figure 5-2**, and **Figure 5-3**. We propose the configuration illustrated in **Figure 6-2**, **Figure 6-4**, and **Figure 6-6** to improve connectivity east-west and north-south which should alleviate congestion of the local through roads and the TCH.

4.4.3 Findings

With sufficient local roadway network connectivity, local trips could be made with minimal use of the highway which would increase the level of service experienced at the highway intersections.

The proposed local roadway extensions and connections would include adding backage roads parallel to the highway for safer access to local businesses along the highway. These connections would require additional right of way and would increase the local traffic on existing local roads.

4.5 ACCESS MANAGEMENT

Access management refers to the control of roadway access to properties abutting the TCH along the corridor with the goal of balancing safety and accessibility.

4.5.1 Description

The existing access density along much of the corridor is at an unacceptable level for a highway or urban arterial roadway. Accesses which are too near one another and/or intersections make it more difficult to provide safe access once traffic volumes reach certain levels. They are one more added complexity to the task of driving and navigating through a congested corridor and are the source of many slammed brakes. Accesses in high vehicle and pedestrian traffic areas also create a safety issue for pedestrians as they cross the driveways. The challenge is to provide adequate access to existing businesses, while reducing the potential for collisions, and maintaining access for emergency services.

4.5.2 Option Exploration

Left Turn Restriction

Permanent left turn direct TCH (partial) access removal via raised median would be ideal in terms of improving safety (reduces the likelihood of side impact and head-on collisions) and corridor beautification. In this scenario, direct right turn access remains and no alternate access route is required. Right turns are safer than left turn access by the very nature of the types of collisions that are more likely, should any occur, being mostly rear impact (same direction collisions are generally less severe).

Restricting or reducing direct access may have an impact on some existing businesses. Other businesses do well despite not having direct highway access (such as the mixed commercial development north of Cowichan River and west of the TCH).

Some concerns have also been raised in the past regarding raised median and emergency access. It should be noted that motorists are required to make way for emergency vehicles displaying flashing lights and blaring sirens. Two lanes of highway in each direction provide ample width to complete this maneuver, as is the case in many other municipalities on Vancouver Island and in British Columbia. Where there is a requirement for emergency access from the opposing direction, median let-downs designed for emergency vehicles only can be installed.

Left and Right Turn Restriction

For pedestrians and cyclists however, it matters very little which type of turn is being performed in terms of severity, although left-turning vehicles may be more likely to be looking at oncoming traffic rather than looking for pedestrians. Permanent right turn and left turn direct TCH (complete) access removal and providing indirect back or side road access is much safer than highway access. Drivers are more likely to be prepared for a vehicle slowing in front of them for a focal point such as a side road intersection rather than one of a multitude of accesses. Back road accesses are also safer to enter and exit since back roads are generally traveled at lower speeds and vehicles turning left are crossing much less traffic (more gap opportunities).

Before any complete direct TCH access is removed, second accesses and many left turn accesses may be removed, and pavement marking or colour-differentiated pavement can be installed where

sidewalks/pathways cross accesses in order to improve safety while partial access is still in place (right turns only). In order to provide adequate access to properties abutting the TCH prior to complete direct access removal, alternate access must be constructed. Roadway right of way must be acquired as funding is available and development permits, subdivisions, variances, or re-zonings (etc.) are sought; back or side roads must be designed and constructed to connect the parcels to the local roadway network for indirect access. Parking must also be provided by constructing shared parking areas on acquired parcels in strategic locations if there is not yet the space within the lot (i.e. the lot is not yet redeveloped).

As per the LAP, future redevelopment is encouraged to be located closer to the TCH with parking provided at the rear of the property with access provided through the local roadway network extended to improve accessibility for consumers and services. This concept is illustrated in **Figure 4-5**.

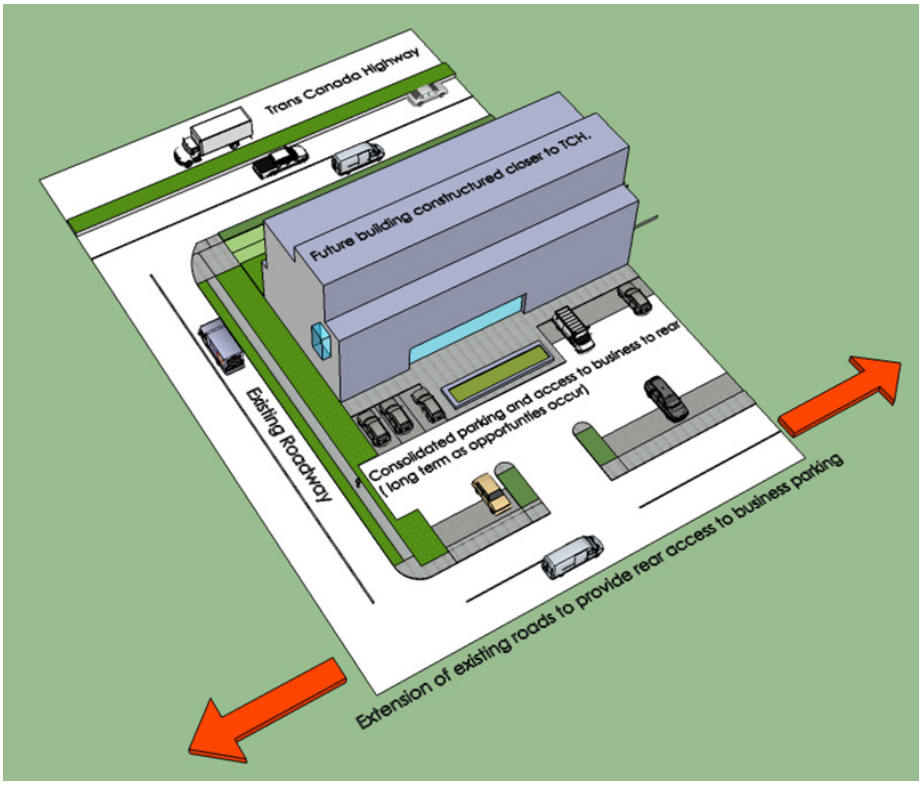

Figure 4-5 Future TCH Access Configuration Example

Full Access Remains

Where left turn access is granted to remain, it is to have channelizing raised median and will be re-evaluated in the future for safety.

4.5.3 Findings

From a safety perspective restricting all direct TCH accesses is most desirable, but may not be feasible in all cases. In any event, a carefully staged approach must be used to ensure a smooth transition between direct and indirect access. Each parcel was assessed on a case-by-case basis to come up with the recommended layout illustrated in **Figure 6-2**, **Figure 6-4**, **Figure 6-6**, and **Figure 6-8**. The following section is also closely related to the provision for indirect access.

4.6 LOCAL TRAIL NETWORK CONNECTIVITY

Local trail network connectivity referred to here is meant to describe the local trails in a similar way to that of the local roadway network described above.

4.6.1 Description

There are a few trails being developed in the area, but there is yet to be a complete network without the use of the roadway network. A dedicated network of trails encourages and facilitates safe local transportation by bicycle or by foot.

4.6.2 Option Exploration

A few options were looked at in terms of enabling cyclists and pedestrians to get to the downtown area and circulate around Duncan with and without using the TCH corridor. Several routes were identified: the E & N Rail Trail extension, Allenby Road, and using local roads east of the highway.

The main challenge with any continuous active transportation route running north-south is the infrastructure required to cross the Cowichan River safely. The E&N railway bridge has only width for a passing train. The Allenby Road Bridge is quite narrow and has a narrow sidewalk. Neither of the two existing TCH Cowichan River Bridges has adequate width for the safe travel of pedestrians sharing the sidewalk with mounted cyclists. In order for any of these alternate routes to be viable and continuous for mounted cyclists, they would need to either cycle in the outer edge of the outer traffic lane, or a separate pedestrian/cyclist bridge would need to be constructed with enough width to allow for the safe two-way travel of pedestrians alongside mounted cyclists.

In the east-west direction there are fewer corridors with enough existing right-of-way to dedicate to a trail. Based on the roadway classification of the main east-west local roads and the Duncan Active Transportation Plan, bicycle lanes are appropriate and can serve to connect future dedicated north-south trails. Provision should be made for future bicycle lanes along the existing east-west roadways.

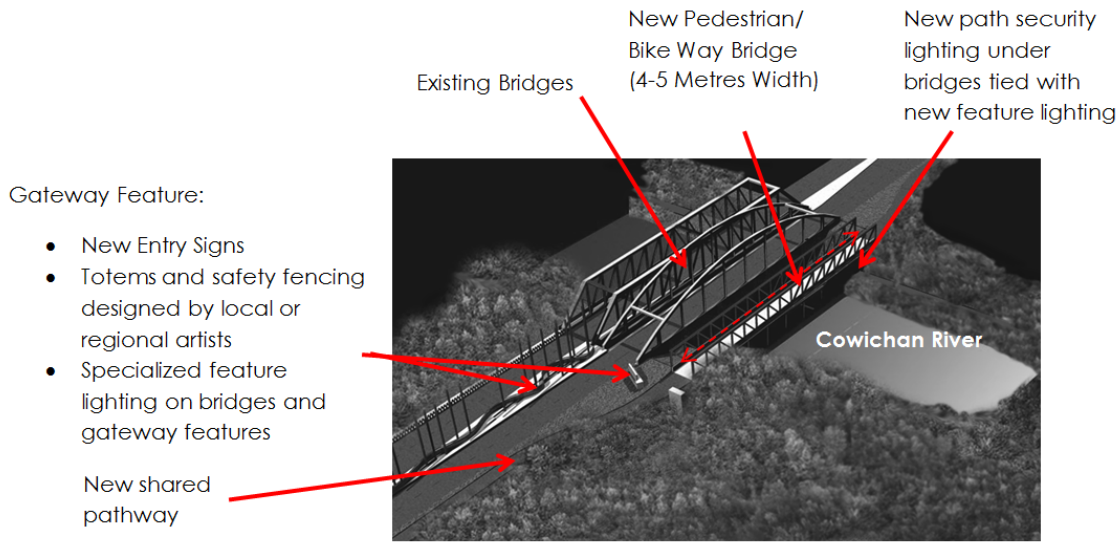

Figure 4-6 Cowichan River Trail Bridge and Gateway Concept

4.6.3 Findings

Since one of the goals of this CMP is to provide for active transportation within the corridor, a multi-use pathway along the highway is recommended. In order to have this pathway be a part of a connected network, a structure is recommended across the Cowichan River. The images in **Figure 4-6** are renderings of our preferred concept: a pedestrian/cyclist bridge just east of the existing Cowichan River

Bridges that would connect the recommended TCH multi-use pathway across the river in the long term. In the interim, signage such as shown in **Figure 4-19** can be implemented for cyclists to dismount to share the sidewalk with pedestrians and vehicles to share the roadway with cyclists in advance of the TCH Cowichan River Bridges.

4.7 TRAFFIC CALMING

Traffic calming refers to any physical measure put in place to slow motorists to the appropriate speed for the circumstance and may range from enforcement to physical obstacles.

4.7.1 Description

Traffic calming encompasses a wide variety of improvements that can be made to slow traffic to the posted speed and can range from geometric/physical roadway features to roadside features and paint marking. Basically anything that widens the driver's focus from the narrow space directly in front of the vehicle, to include the surrounding roadside.

4.7.2 Option Exploration

Some traffic calming ideas that have been brought forward during the review and consultation process are: gateways, posted speed reduction, radar speed signs, permanent changeable message signs, pavement markings, roundabouts, and roundels. Roundabouts and roundels are discussed at length in **Section 4.2 Intersections**; below are descriptions of the other traffic calming ideas.

Gateways

Gateways are aesthetic features at the entrances to areas with the purpose of preparing drivers for the upcoming community and giving them a feel for the character of the community they are entering. In this area the gateways have a dual purpose of also providing for pedestrian median fencing. Gateway art can provide an opportunity for a local community building art project that can encourage a feeling of pride for those who create it and the community at large.

The entrance to Duncan from the south near Boys Road and the Cowichan River Bridges, for example, could have median features designed to represent a river flowing through totems or river reeds as shown in **Figure 4-6** and **Figure 4-7**. These features would not only function as a visual gateway for drivers, but as an artistic pedestrian fencing to discourage mid-block crossings.

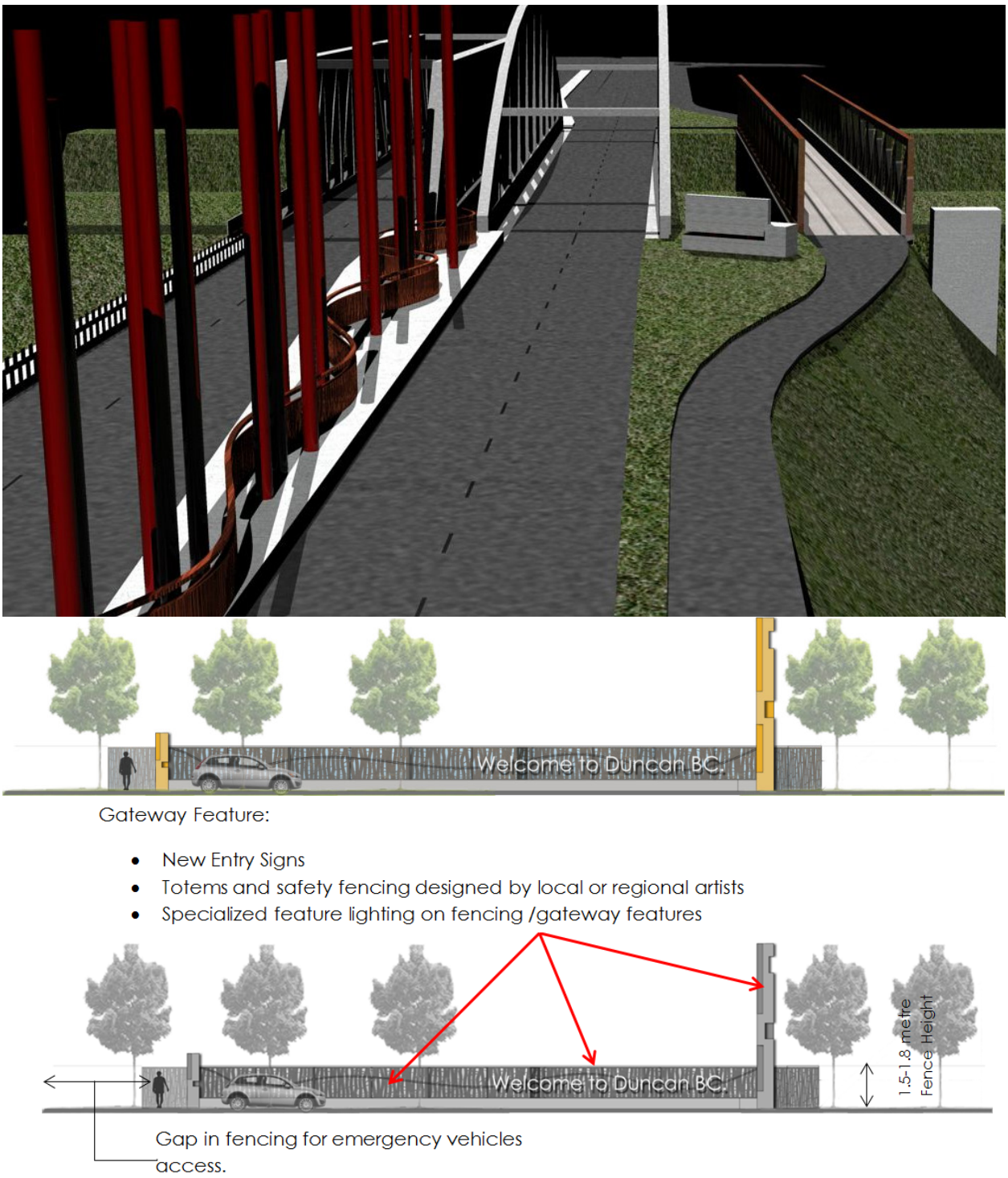

Figure 4-7 Gateway Improvement Examples at the Cowichan River Bridges

The Cowichan River Bridges are currently in a state of delayed painting maintenance due to environmental sensitivity surrounding the removal of any lead paint on the bridges. In the short term, to improve the visitors' entering experience, bridge lighting could be added to create gateway enhancing effect similar to that illustrated in **Figure 4-8** below.

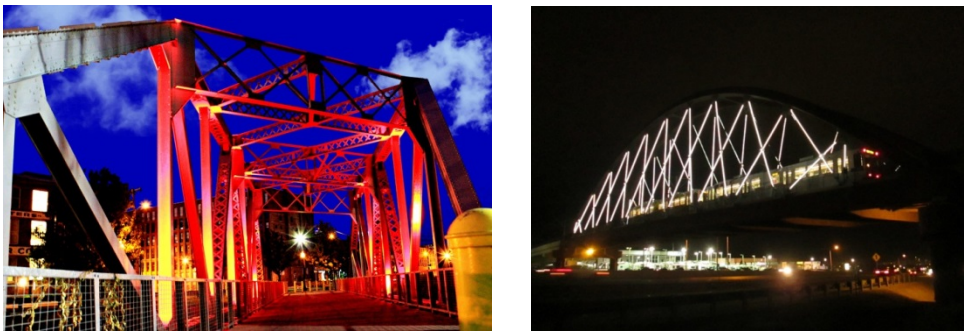

Figure 4-8 Gateway Improvement Examples–Cowichan River Bridge Lighting

The entrance to the greater Duncan area from the north could have median features that represent the Somenos Marsh habitat north of Beverly Street with feature lighting to maintain the gateway's appeal during hours of darkness as shown in **Figure 4-9** below.

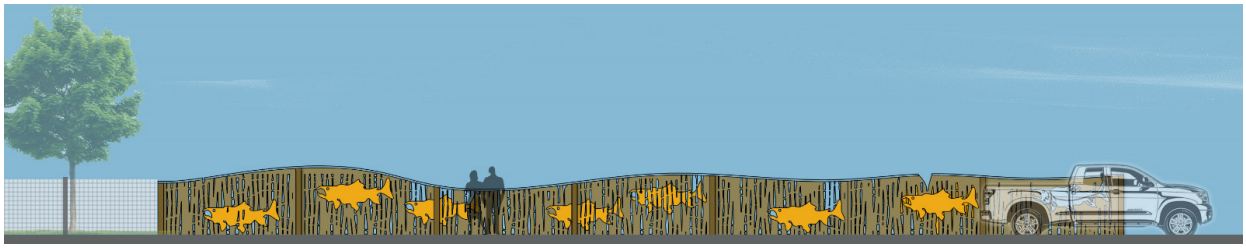

Figure 4-9 Gateway Improvement Examples at Beverly Street

Posted Speed Reduction

Posted speed reduction is another method of slowing traffic. It is not recommended for the entire corridor as it is a highway serving intercity traffic that is accustomed to travelling at much higher speeds. Since there is difficulty enforcing the current speed reduction from 80 km/h to 50 km/h, it is unlikely that any further reduction in posted speed would be effective. It may be possible to move the speed reduction transition at the north end of the corridor from south of Beverly Street to north of Beverly Street to be in advance of the gateway for southbound traffic.

Radar Speed Signs

Temporary radar speed signs have been used successfully in many areas to notify drivers whether the speed that they are traveling at is acceptable or not. In some areas, when the temporary radar speed signs are removed, the vehicle speed patterns return. Recently, permanent radar speed signs have been

installed in some locations in Victoria with unknown success at this time. We believe that temporary or permanent radar speed signs would be effective at the posted speed reduction locations before entering the urban area. See **Figure 4-10** for sign examples.

Figure 4-10 Radar Speed Signs

Changeable Message Signs

Temporary portable changeable message signs have been successfully used during highway and other infrastructure construction projects to inform motorists of changing conditions ahead and give information and instruction. In the last number of years, permanent changeable message signs have been introduced to provide opportunity for public safety education, warning for motorists of unforeseeable conditions ahead, weather advisories, construction ahead, etc. Permanent changeable message signs could be erected in advance of Boys Road northbound and Beverly Street southbound to notify drivers of the likelihood of encountering pedestrians in the urban area ahead and encourage them to exercise vigilance. The benefit of changeable message signs is that they can be changed on a regular basis to retain their 'freshness' and can be used in cases of emergency to instruct drivers how to safely navigate or avoid hazards. **Figure 4-11** below provides examples permanent roadside changeable message signs.

Figure 4-11 Permanent Roadside Changeable Message Sign Example

Traffic Calming Pavement Marking

Some roadway authorities in jurisdictions in the UK and the United States have tried different longitudinal pavement marking schemes along the outer lane edges to give the appearance of narrower

lanes in order to encourage motorists to slow down, with varying degrees of success. Pavement markings provide low-risk to drivers and are a cost effective alternative for influencing driver behavior without limiting large vehicle maneuverability and can easily be removed if proven ineffective (as opposed to narrowing the roadway with curb). Since these types of longitudinal pavement markings are not currently in the Canadian or British Columbian pavement marking standards, a test case would need to be applied for and perhaps tested in lower traffic volume locations. We would recommend holding off on this approach for now until these measures are proven elsewhere. The following **Figure 4-12** shows some images of what has been tried elsewhere in terms of traffic calming pavement markings.

Figure 4-12 Traffic Calming Pavement Marking Examples

We do, however, recommend the installation of pavement markings or color-differentiated pavement along the sidewalks/pathways that cross any driveway accesses that remain in order to alert the entering motorists that there may be pedestrians present (as shown in **Figure 4-13**). This type of pavement treatment is often used in parking lots in front of stores, at intersections, and at crosswalks to demarcate where pedestrians and cyclists can be expected.

Figure 4-13 Pedestrian and Cyclist Crossing Pavement Marking Examples

4.7.3 Findings

Gateway features, radar speed signs, and permanent changeable message signs are recommended at Boys Road and Beverly Street to encourage drivers to slow down prior to entering the urban area. While longitudinal traffic calming pavement markings are not recommended at this time, we do recommend looking into providing coloured pavement or pavement markings to contrast where sidewalks and multi-use pathways cross driveway accesses. A further speed reduction is not recommended, however, relocating the speed transition zone at the north end of the corridor (from south of Beverly Street to north of Beverly Street) should be considered.

4.8 PEDESTRIAN AND CYCLIST TCH CROSSINGS

4.8.1 Description

Pedestrian and cyclist safety while crossing the TCH is a major concern as these corridor users are the most vulnerable during collisions.

4.8.2 Option Exploration

Several options are available to enhance crossing safety: pedestrian tunnels/underpasses, pedestrian overpasses, pedestrian activated traffic signals, pedestrian fencing, pedestrian count-down indicators at intersections, pedestrian education campaign, corner curb bulb-outs at pedestrian crossings, and other pedestrian crossing lighting innovations.

Pedestrian Tunnels/Underpasses

Pedestrian tunnels have been installed on the island in the past with often little acceptance from users due to their size and lack of proper lighting. Pedestrian tunnels have been used in urban centers with great success when designed well. Unfortunately the flood risk in the area is not conducive to justifying the expenditure required to provide a welcoming underground structure. **Figure 4-14** below shows some examples of appropriate scale and lighting for pedestrian comfort in tunnels.

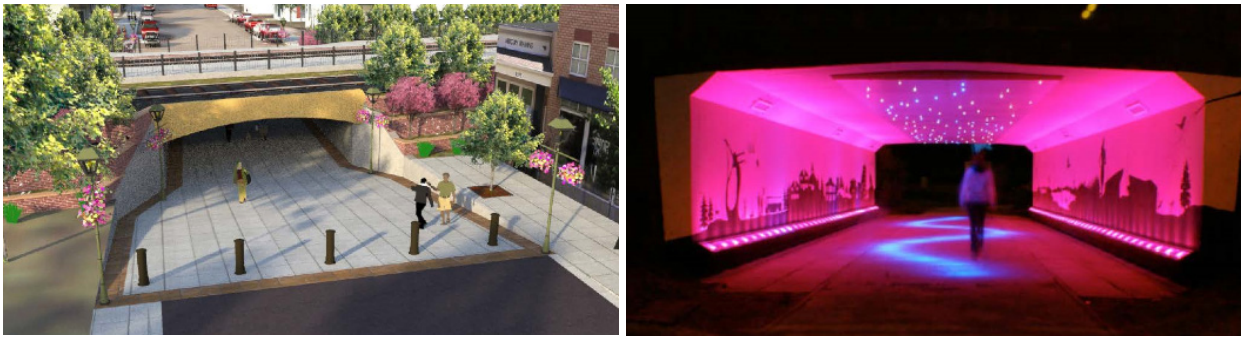

Figure 4-14 Pedestrian Tunnel/Underpass Example

Pedestrian Overpasses

Pedestrian overpasses are the next logical idea. If there is a high pedestrian crossing demand at a particular location, justification for the expense can be made. In order for the structure to be utilized by the public, it must be properly located and designed. For the TCH corridor, the conditions could be appropriate for a pedestrian overpass, between University Way and James Street/York Road, should plans for the Vancouver Island University expansion or the Cowichan High School relocation to Cowichan Place follow through. Any pedestrian structure should be constructed in conjunction with the recommended median fencing treatment described above. The below **Figure 4-15** shows some examples of attractive pedestrian overpasses.

Figure 4-15 Pedestrian Overpass Examples

Pedestrian Activated Traffic Signals

In the interim, pedestrian activated traffic signals can be installed at locations where pedestrian overpasses are being contemplated. The reason for pedestrian activated traffic signals being undesirable as long term solutions is that they impede the flow of traffic and interfere with the corridor's traffic signal coordination. It may be possible to coordinate pedestrian activated traffic signals with the nearest upstream full traffic signal which would lead to longer wait times for pedestrians, but better traffic flow. Based on current pedestrian trip patterns, Cowichan Way and University Way are the logical locations for pedestrian activated signals in the short to medium term. Once the Cowichan Way pedestrian signal has been active for a few years in conjunction with median pedestrian fencing, pedestrian crossing patterns can be re-evaluated for the need for an additional crossing at Dobson Road.

Pedestrian Fencing

Currently there are many pedestrians who choose to cross the TCH at uncontrolled locations which poses a serious safety risk. There are two predominant areas where these crossings occur: in the area between Boys Road and Cowichan Way, and between James Street/York Road and University Way. These are due to large pedestrian generating areas and pedestrian destination areas being separated by the TCH with inadequate crossing facilities. Students report having to wait long times during the lunch hour rush to cross the highway at intersections to reach the fast food restaurants on the other side. People crossing near the Cowichan River are traveling from their residences to a shopping hub and would have to go out

of their way to cross at a designated crossing intersection. Median or road side fencing (in conjunction with appropriate crossing facilities) would serve to enforce the use of safe and designated crossing locations only. See figures in **Section 4.7 Traffic Calming** for illustrations of median fencing that we recommend implementing within the gateway areas. The below **Figure 4-16** illustrates an example of standard pedestrian fencing that may be used in the median beyond the gateways.

Figure 4-16 Pedestrian Fencing Example

Pedestrian Count-down Indicators

During consultation events, inadequate intersection crossing time has been mentioned. This may be due to an improper calculation of the required pedestrian crossing time, or pedestrians may be starting to cross in the middle of the pedestrian signal phase and having to rush to reach the other side before through traffic approaches. These situations are a safety concern and can affect the flow of traffic. This can be remedied by adjusting the traffic signal timing and upgrading the pedestrian indicators to include a count-down as illustrated in **Figure 4-17** below. Pedestrian count-down indicators have been very popular wherever they are installed as they give the pedestrian the ability to make an informed decision as to whether or not they have enough time to complete the crossing safely. They have an added benefit of notifying through traffic when to expect the signal to change from green to yellow.

Figure 4-17 Pedestrian Count-down Indicator

Public Education Initiatives

Public education initiatives have been implemented in the past and are a cost effective way to educate the general public, especially students, of safe highway crossing behavior and the risks of choosing unsafe crossing locations. Students can be shown how to cross safely, safe crossing routes can be developed highlighting crossing locations and safe sidewalks and pathways to use. Below in **Figure 4-18** are some examples of pedestrian signing and pavement markings used to entertain and educate. We recommend that any pedestrian crossing infrastructure improvements be preceded by a public education campaign to encourage safe behavior and to explain improvements.

Figure 4-18 Public Education Initiatives Examples

In the interim period before any multi-use pathway bridge over the Cowichan River is constructed, signage should be erected at the sidewalk entrances instructing cyclists to dismount to cross the bridge. This should help inform them that cycling on the narrow bridge sidewalks poses a safety hazard to pedestrians. It may also be advantageous to install signs for motorists entering the bridge that any cyclists on the bridge be allowed full use of the outside lane. Some signing examples are provided in **Figure 4-19**.

Figure 4-19 Interim Traffic Signing Examples for Cowichan River Bridges

Corner Curb Bulb-outs

Curb bulb-outs are commonly used at mid-block and corner pedestrian crossings to narrow the roadway at the crossing to slow traffic and make pedestrians desiring to cross more visible to the driver where there are parking lanes, bus lanes, or other auxiliary lanes that may block motorists' view of waiting pedestrians. There is inadequate space between the pedestrian zone and the vehicle zone to provide effective corner curb bulb-outs along the TCH corridor as there are no parking or bus lanes and little shoulder width. In other words, any curb bulb-outs would be minimal at best; therefore, any functionality gained would not likely outweigh the cost to implement them. There is also real danger of large turning vehicles over-tracking onto a curb bulb-out where pedestrians expect to be able to wait in safety. Any bollards put in place to mitigate this safety hazard would likely impede truck turning movements.

Pedestrian Crossing Lighting

Under the north ends of the Cowichan River Bridges there is an unofficial path that crosses the TCH under the bridges. People report feeling unsafe using that path, however there is an opportunity to improve the existing path as an alternative TCH crossing location. There is also a pathway along the dike on the north bank of the Cowichan River. We propose installing lighting under the bridges in the interim to improve safety with the intention of making the path official and extending it along the north bank

towards the E & N railway to connect to the future E & N trail extension. This will also serve to enhance the local trail network connectivity. It should be noted, however, that upgrading this pathway would involve geotechnical and environmental challenges and the pathway would be closed and allowed to flood every year during high runoff periods. See **Figure 4-20** below for a few examples of what has been implemented under bridges elsewhere.

Figure 4-20 Pathway Safety Lighting Under Cowichan River Bridges Examples

Pedestrian Crossing Lighting Innovations

There are also pedestrian crossing safety innovations being implemented in other jurisdictions that may not be suitable for this corridor, but are worth illustrating for future reference. Below are illustrations of pedestrian crossing holograms and in-pavement lighting. Holograms, similar to the one illustrated in **Figure 4-21**, may be a bit extreme for this corridor and could cause rear-end collisions for drivers unaccustomed to them. It would be of use in situations where driver attention is drawn in many directions in a busy urban environment. In-pavement lighting may be more common in the future, but may also pose maintenance issues. We recommend a 'wait and see' approach for the time being.

Figure 4-21 Pedestrian Crossing Innovations

4.8.3 Findings

Recommendations for safe TCH crossing for pedestrians and cyclists are as follows: pedestrian count-down indicators at all signalized intersections; interim pedestrian activated signals at Cowichan Way and near University Way in conjunction with pedestrian fencing; public education initiatives; ensuring adequate lighting for pedestrians crossing at night; and a pedestrian overpass near University Way.

5.0 Option Development

Throughout the consultation process, various corridor improvement options and ideas were brought forward and revised. Following are some of the options as they evolved and why:

5.1 OPTION 1

Option 1 focused on active transportation and maintaining Trunk Road as the main entrance way to downtown Duncan (see **Figure 5-1** developed from consultations for Open House #2).

Figure 5-1 Overall Corridor Option Evolution–Option 1

5.2 OPTION 2

Option 2 focused on local roadway network connectivity, median treatments, and diverting traffic heading for downtown to Cowichan Way rather than Trunk Road to alleviate some intersection congestion at Trunk Road (see **Figure 5-2** developed from consultations for Open House #2).

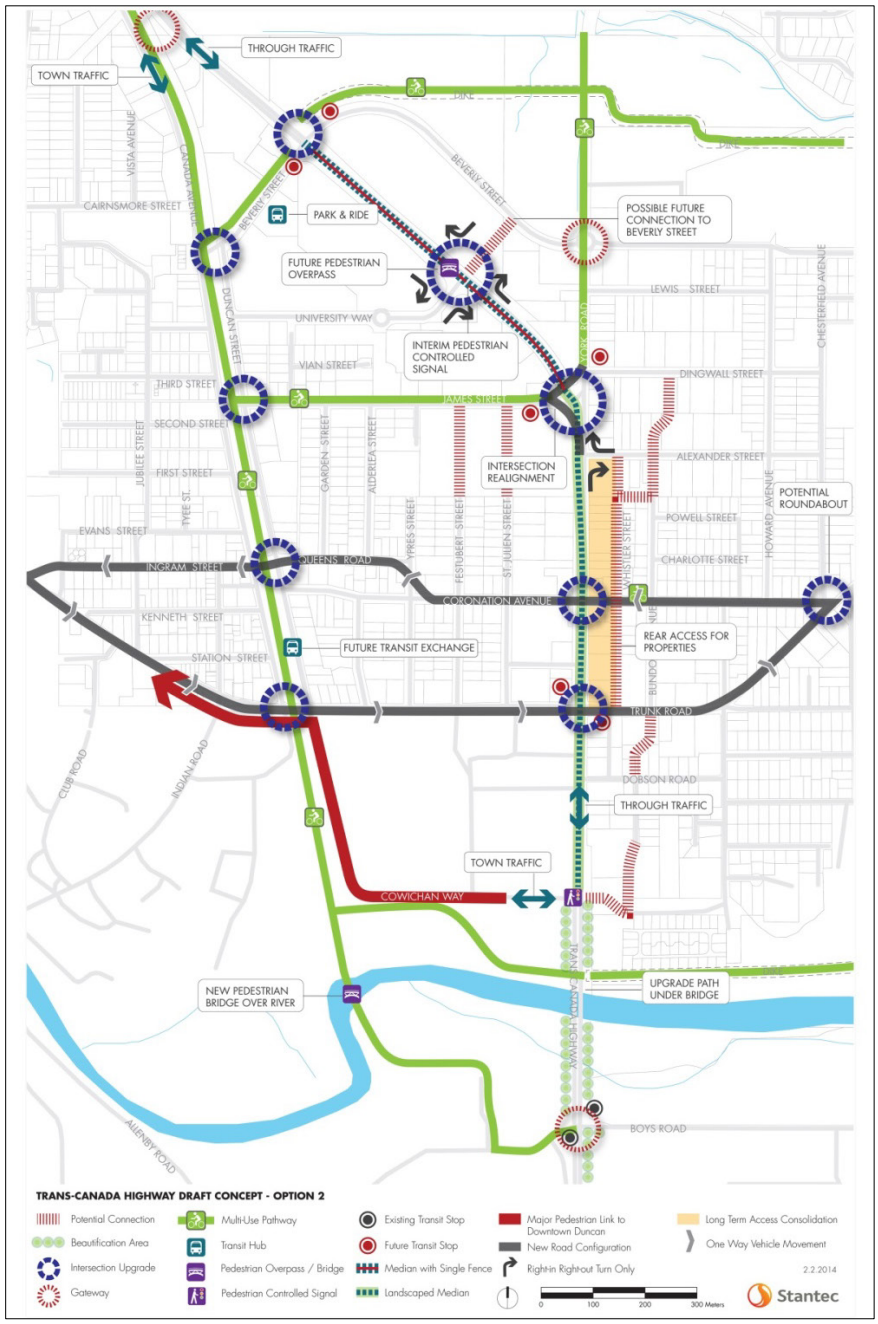

Figure 5-2 Overall Corridor Option Evolution–Option 2

5.3 PREFERRED OPTION

The **Preferred Option** is a combination and optimized version of these two options that we believe will effectively and feasibly alleviate most of the corridor safety issues and reduce traffic congestion (see **Figure 5-3** developed from consultations for Open House #3).

Elements that were considered in the option evolution include: highway, intersections, active transportation, local roadway network, access management, local trail network connectivity, traffic calming, and pedestrian and cyclist TCH crossing.

Figure 5-3 Overall Corridor Option Evolution–Preferred Option

For more detailed drawings (i.e. Details A, B, C, D, and E) see figures in **Section 6.0 Planning and Development**.

5.4 EVALUATION

While no solution is perfect, we endeavor to provide the most reasonable solutions. Below is a table that summarizes the options described in the previous section and their respective suitability.

Legend for the table below: On a scale from 1 to 5, 1 being unsuitable and 5 being most suitable

1	2	3	4	5	Not Applicable

For example: for a safety column yellow would indicate that the option is neither safe, nor unsafe or has elements of safety and risk that more or less cancel each other out; for the cost column a red would indicate the option is cost prohibitive; under the traffic flow column a dark green would indicate an improvement in traffic flow, increase in capacity or reduction in volume by providing alternate routes and an orange would indicate that flow is decreased.

Table 5-1 Improvement Options Evaluation Summary

Improvement/ Evaluation Criteria	Safety (Ped./ Cyc.)	Safety (Veh.)	Traffic Flow	Emerg. Access	Econo. Sustain.	Cost	Enviro. Impact	Recommended? Rank:
Pedestrian Count-Down Indicators								Yes (1)
Pedestrian Education Initiatives								Yes (2)
Pedestrian Signals								Yes (3)
Pedestrian Fencing								Yes (4)
Direct TCH Access Removal								Yes (5)
Multi-Use Paths								Yes (6)
Pavement Markings Across Driveways								Yes (7)
Gateways								Yes (8)
Pedestrian Overpass(es)								Yes (9)
Trail Network Connections								Yes (10)
Radar Speed Signs								Yes (11)

Improvement/ Evaluation Criteria	Safety (Ped./ Cyc.)	Safety (Veh.)	Traffic Flow	Emerg. Access	Econo. Sustain.	Cost	Enviro. Impact	Recommended? Rank:
Permanent Changeable Message Signs								Yes (12)
Signal Optimiz./Coord.								Yes (13)
Add Intersection Turn Lanes								Yes (14)
Local Road Network Connect.								Yes (15)
Under Bridge Lighting for Path								Yes (16)
Shared Space Roundels								No (0)
TCH Widening								No (0)
Continuous RT Only Lanes								No (0)
One Way Highway Couplet								No (0)
Alternate TCH Route								No (0)
Intersections Grade Separation								No (0)
East/West One Way Couplet								No (0)
Roundabouts								No (0)
Transit Exchange								No (0)
Transit Exchange/Park N Ride								No (0)
Posted Speed Reduction								No (0)
Traffic Calming Pavement Markings								No (0)
Pedestrian Tunnel(s)								No (0)
Corner Curb Bulb-Outs								No (0)
Pedestrian Crossing Innovations								No (0)

6.0 Planning and Development

To enable the continued coordination between the DNC, CoD, MoTI, Cowichan Tribes, local corridor users/business owners, and the planning team, a linear development plan was implemented to systematically collect all required information, meet with affected users, and develop options that will address the short, medium, and long term objectives for the corridor. Listed below are the various improvements that were identified for the final recommendations.

6.1 PEDESTRIAN AND CYCLIST SAFETY

As the volume of pedestrian, bicycle, and vehicular traffic along the corridor increases, there are inevitably more conflicts between these different modes of transportation. Increasing the number of travel conflicts have led to growing concern about pedestrian and cyclist safety (both crossing the highway and driveways accessing businesses along the TCH). With a significant proportion of the pedestrian trips crossing the TCH and a number of unsafe mid-block crossing fatalities, a clear and concise pedestrian transportation plan needed to be developed. This plan was broken into 3 significant locations: Boys Road to Cowichan Way, Cowichan Way to James Street/York Road, and James Street/York Road to Beverly Street.

6.1.1 Boys Road to Cowichan Way

There is a considerable amount of pedestrian traffic traveling along the TCH from the residential areas along the east side of the TCH, especially in the area near Boys Road northward over the existing bridges to the commercial developments on the west side just north of Cowichan Way. The existing TCH currently has minimum width sidewalks on both sides of the highway adjacent to the traveled lanes separated from vehicular traffic by curb and gutter only. There are no bike lanes for cyclists who then use the sidewalks because they feel safer doing so. It is illegal for cyclists to travel on regular sidewalk; cyclists travelling on the sidewalk also create a safety hazard for pedestrians since the existing sidewalks are too narrow to accommodate mixed use. Pedestrians have also reported feeling unsafe walking along the sidewalks of this section of the corridor due to heavy truck traffic primarily using the outside lanes directly adjacent to the sidewalks where there are no existing shoulders, bike lanes, or boulevard to provide any separation or buffer. In addition to this, there are no dedicated pedestrian crossings through this section of the corridor other than at the signalized intersections and many pedestrians choose to cross the TCH unsafely at mid-block. There is little to no refuge along the narrow median and as such these pedestrians end up caught on the existing median or in the dedicated left turn lanes while waiting for a gap in one direction while impeding traffic in the other direction.

One way to reduce the vulnerability of pedestrians and cyclists through this section of the corridor (and the entire TCH corridor from Boys Road to Beverly Street) would be to provide a wide multi-use path (3 metres minimum) for the shared use of pedestrians and cyclists with a landscaped boulevard along the east side of the TCH. This provides for cyclists who feel uncomfortable riding on the highway, yet maintains the safety of pedestrians by allowing enough room for both types of users. With a wide pathway along the east side of the TCH, the existing narrow sidewalk along the west side could be maintained as it is to provide localized access to businesses and the local roadway network with the main north/south movement of pedestrians and cyclists focused along the east side of the TCH.

Figure 6-1 Existing Condition–Boys Road to Cowichan Way

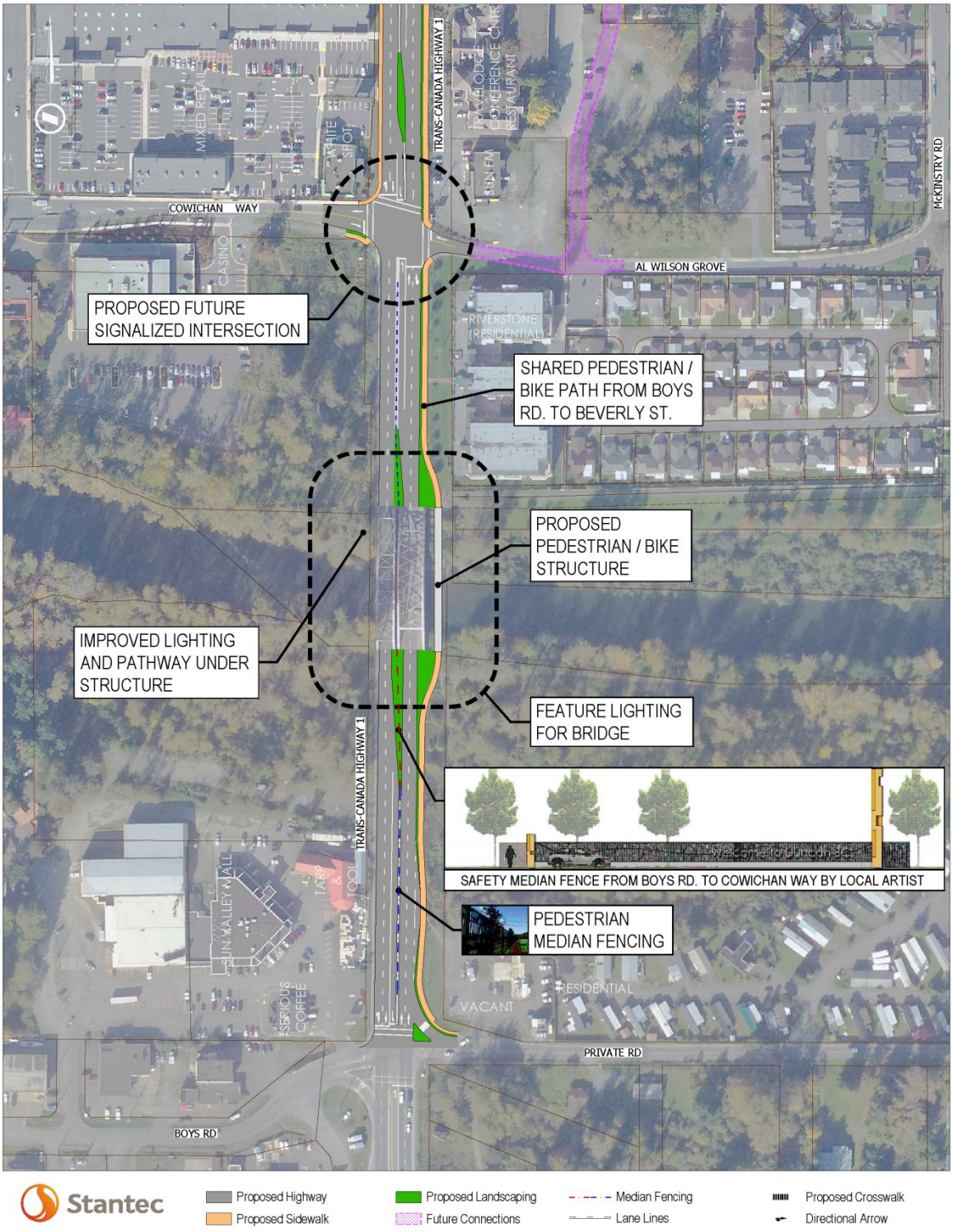

Figure 6-2 Long Term Transportation Plan–Boys Road to Cowichan Way

Another way to increase the separation between pedestrians and vehicle traffic is to widen the outside lanes from 3.7 metres to a 4.3 metre shared vehicle/bicycle lane which eliminates the need for a shoulder and provides space for cyclists who choose to ride on the roadway.

Should a wide multi- use pathway be constructed on the east side of the TCH from Boys Road to Beverly Street, there would still be limited sidewalk width on the existing bridge structure. A separate bridge structure for the shared use of pedestrians and cyclists (4 metres minimum to allow for shy distance or buffer between the parapets and the traveled way) could be constructed parallel to the existing structures to provide continuity and a safer Cowichan River crossing for pedestrian and cyclist traffic.

There is an existing path that runs east/west along the north bank dike of the Cowichan River with an unofficial path under the existing Cowichan River bridges. Despite this crossing eliminating any potential conflict with vehicles on the highway, many people indicate feeling unsafe there and avoid it because it is dark. Lighting along the underside of the bridges would provide an element of safety for pedestrians and cyclists traffic travelling east/west. More pedestrians and cyclists choosing this TCH crossing, would alleviate some of the crossing demand in the area. There is also potential for this path crossing under the TCH to be made into an official pathway that connects the dike path to the future E & N trail to the west giving pedestrians and cyclists another route for getting to downtown Duncan.

Should lighting be installed under the Cowichan River bridges, there will be pedestrians and cyclists who may not be able to use this crossing and would rather cross at roadway level. A dedicated pedestrian crossing in the area between the Cowichan River and Cowichan Way is needed since this is where a large number of mid-block crossings occur. The uncontrolled intersection at Cowichan Way is the logical location for such a crossing. Cowichan Way could be upgraded to have a pedestrian controlled signal in the interim with the provision for it to become a fully signalized intersection as connecting roads, such as the Price Road connection, become implemented.

Another problem that exists with mid-block crossings of the TCH is that no matter how many safe dedicated crossings there are, some pedestrians will still choose to cross unsafely with the intention of shortening their trip. Introducing decorative fencing along the median throughout the entire length of this section of highway would impede unsafe mid-block crossing while providing the opportunity to create a visually appealing gateway into the CoD and DNC. That way pedestrian and bicycle crossings will be handled in a safe and efficient manner.

6.1.2 Cowichan Way to James Street/York Road

Consistent with the situation mentioned above, the existing pedestrian facilities along the section of the TCH from Cowichan Way to Trunk Road are also deemed to be too close to the existing traffic lanes and there are no bicycle facilities. From Trunk Road up to James Street/York Road there is an existing intermittent boulevard separating the existing sidewalk from the traveled lanes.

Upgrading the sidewalk along the east side of the TCH between Cowichan Way and James Street/York Road to a 3 metre wide (minimum) multi- use pathway with a 1 metre wide (minimum) boulevard and 4.3 metre outside lanes (northbound and southbound) would have the same benefits as mentioned in the previous sub-section. Similarly, the existing 1.5m sidewalk, and 1m boulevard, running along the west side

of the TCH could remain as it is with minor modifications as required for commercial access and southbound dedicated right turn lanes.

Figure 6-3 Existing Condition–Cowichan Way to Trunk Road

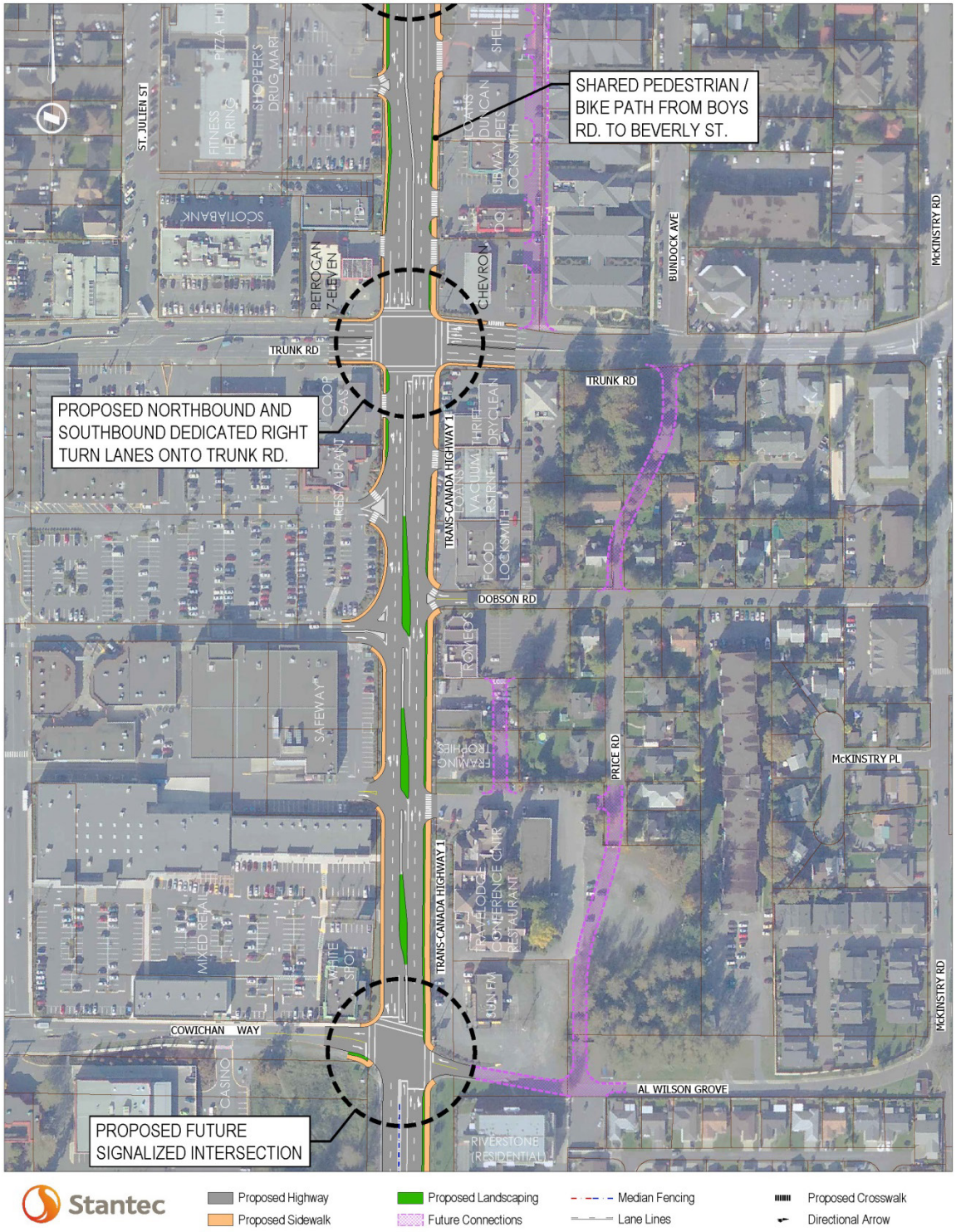

Figure 6-4 Long Term Transportation Plan–Cowichan Way to Trunk Road

Figure 6-5 Existing Condition–Trunk Road to James Street/York Road

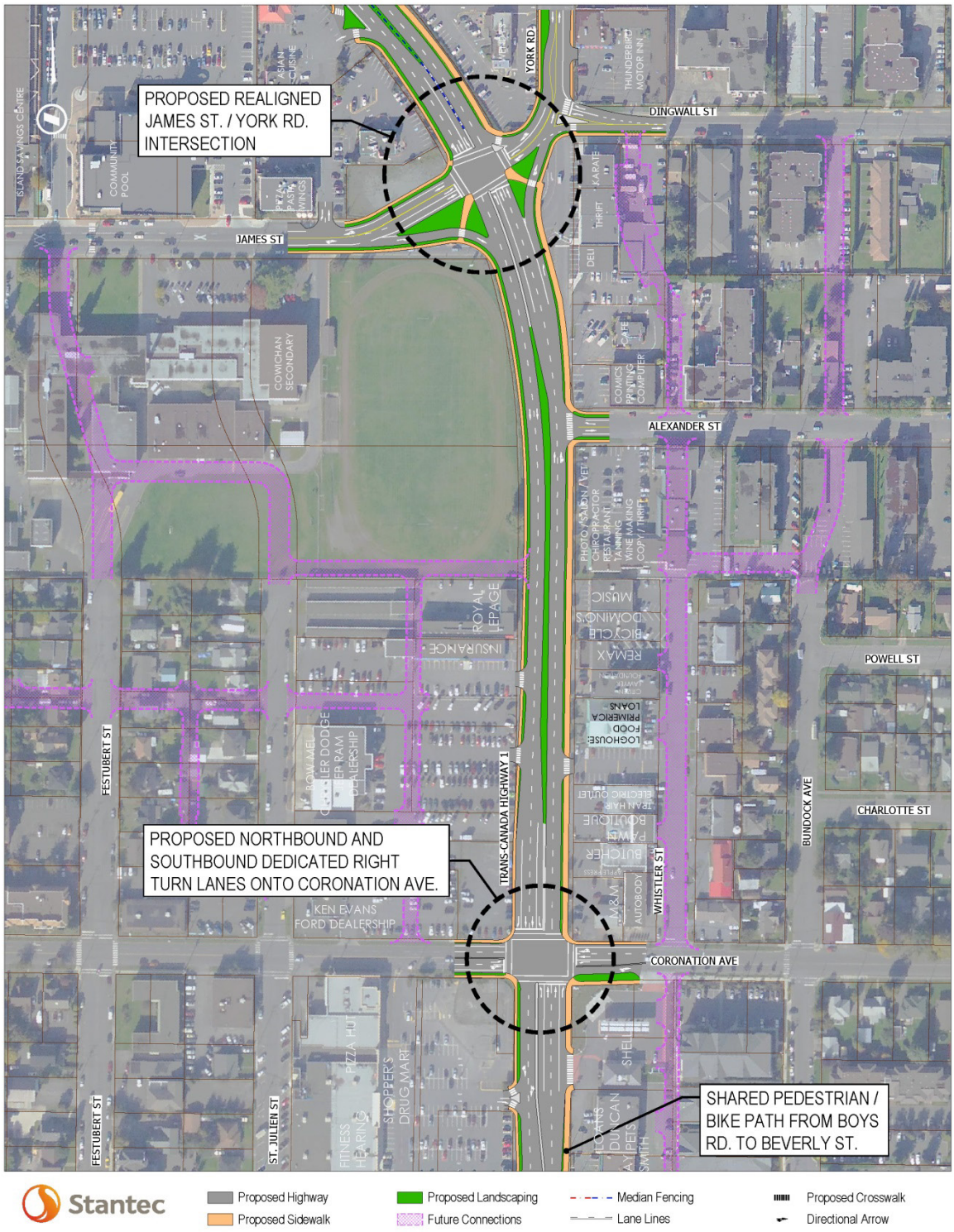

Figure 6-6 Long Term Transportation Plan–Trunk Road to James St/York Rd

Along the east side of the TCH from Cowichan Way to York Road, there are a large number of access/egress points to existing businesses which create movement conflicts between pedestrians and vehicles, movement conflicts between local traffic and through traffic, and impede pedestrian and vehicle movement. Access management is discussed in more detail in the following sections, however the addition of paint markings denoting the continuation of the sidewalk and multi- use pathway across the accesses would emphasize for motorists the potential presence of pedestrians and cyclists crossing the access.

The existing signalized intersections with pedestrian crossing movements, namely Coronation Avenue, Trunk Road, and James Street/York Road, have been reported to have pedestrian crossing times inadequate for some users to complete the crossing safely. One way to remedy this is to adjust the signal phasing time to increase the pedestrian crossing time. Another way to increase pedestrian ease would be to upgrade the pedestrian indicators with "countdown" timers to give pedestrians crossing at the intersections a better understanding of the amount of time they have in order to make an informed decision as to whether or not they have enough time to complete their crossing maneuvers safely.

6.1.3 James Street/York Road to Beverly Street

The existing condition of the TCH changes along this section from urban curb and gutter to an open shoulder with minimal sidewalks/pedestrian facilities. Along the section of the TCH corridor between James Street/York Road and University Way, there are a large number of unsafe mid-block pedestrian crossing movements due to students from the high school and university crossing the highway to access the existing fast food restaurants.

Figure 6-7 Existing Condition–James Street/York Road to Beverly Street

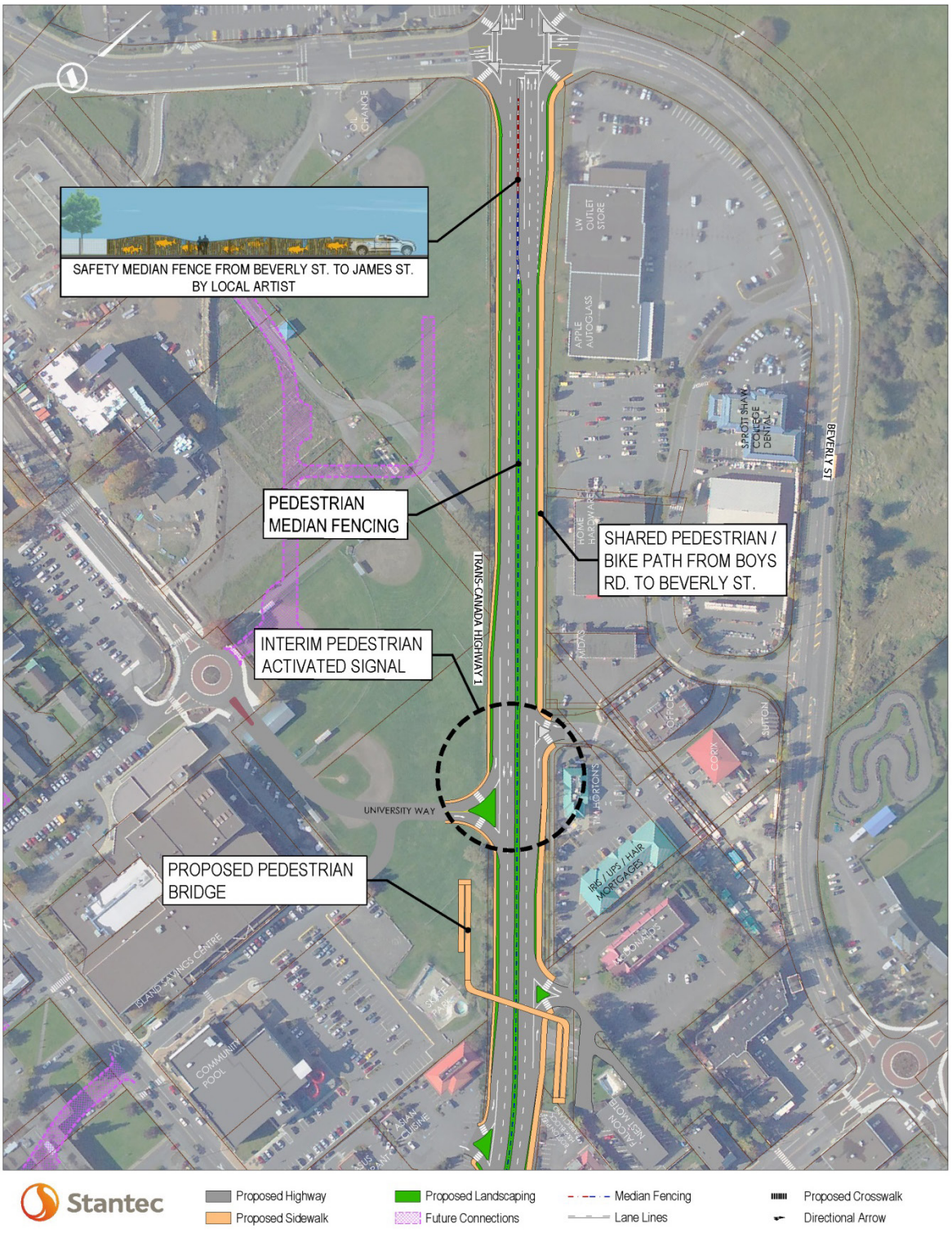

Figure 6-8 Long Term Transportation Plan–James St/York Rd to Beverly St

The challenge for accommodating student pedestrian traffic from schools or universities, especially in this area, is that there are scheduled and limited breaks in class time when a large number of pedestrians create crossing demands that overwhelm the dedicated crossing at James Street/York Road where pedestrians cue and have a long wait time, while at other times there are much fewer pedestrians wishing to cross. This creates a challenge for signal phase timing as an overly long pedestrian crossing time when there are not crowds of students would create unnecessary delay for vehicle traffic. The result is that many mid-block crossings occur along this stretch of the corridor creating safety issues for both pedestrians and vehicles. To alleviate some of the demand at the James Street/York Road intersection and mitigate the mid-block crossings, an interim pedestrian controlled signal could be installed near University Way. This signal's timing could be coordinated with an upgraded signal at the James Street/York Road intersection and would be an interim improvement until traffic and pedestrian crossing demands increase substantially and budget or redevelopment enables the construction of a dedicated pedestrian overpass at this location.

In order to improve the safety and accessibility of this section of the corridor, the continuation of the 3 to 4 metre wide multi- use pathway with 1 metre wide (minimum) boulevard along the east side of the TCH and 4.3 metre wide shared vehicle/cyclist outside lanes (northbound and southbound) would have the same benefits as mentioned in the previous sub-sections.

To maintain continuity with the section of TCH corridor to the south as well as improve pedestrian accessibility and safety, a 1.5 metre wide sidewalk and 1 metre wide (minimum) boulevard could be constructed along the west side of the highway north to Beverly Street. As mentioned above for the section of TCH from Boys Road to Cowichan Way, a raised median (where there currently is none) and decorative fence could be also be implemented through the length of this section of TCH corridor to impede any unsafe mid-block pedestrian crossings and provide another opportunity to create inviting gateway features for motorists entering the community from the north.

6.2 TRANSIT

BC Transit plans and implementation will continue to evolve as the area continues to develop. Upon consultation with BC Transit representatives, there are currently no long term plans for any additional transit services directly on the TCH. The existing bus pull-outs at the Boys Road intersection will remain. It is anticipated that there will be a transit exchange in the downtown Duncan area. Future bus stops will be required along the existing local cross-streets to service this exchange. Bus stops located near crossing roadways are ideal for transit users and route planners. For motorists however, they can create queues that spill over through the adjacent intersection. Should this occur and cause traffic flow problems, it is recommended that such problem bus stops be converted to bus bays or pullouts that allow other traffic to pass a stopped bus safely and easily.

6.3 ACCESS MANAGEMENT

Access management along the TCH can be separated into two primary categories: median treatments and business accesses along the length of the highway.

6.3.1 Median Treatment

The existing TCH corridor from Boys Road to Beverly Street contains raised medians as well as painted left turn and two-way left turn median treatments. With painted medians and painted left turn lanes, without raised median or concrete barrier, there is a higher risk of errant vehicles crossing into oncoming traffic and motorists making unsafe movements. In theory, two-way left turn lanes are to be used by vehicles exiting the through roadway only. In reality many drivers use the two-way left turn lanes as acceleration lanes as they turn onto the through roadway. This can create a significant opposing traffic conflict. The simple solution is for this section of the corridor to be upgraded with raised medians with consolidated left turn access provided at strategic locations to provide business access and let-downs for emergency vehicle use only where required. As mentioned previously for Boys Road to Cowichan Way and James Street/York Road to Beverly Street, decorative fencing should be installed along the center of the raised concrete median to help eliminate pedestrian mid-block crossing movements further increasing the safety of the corridor. As traffic volumes increase along the highway, should mid-block left turn volumes be significant, safety issues will develop.

6.3.2 Business Access

As the DNC and CoD have continued to grow and expand along the length of the TCH, local businesses have continued to garner more access directly to and from the highway. Vehicles using these accesses are impeding both through town traffic, and local commuters, as well as causing safety concerns with pedestrians and bicycles. Local business and land owners want to maintain direct access as there are concerns that there may be a drop in traffic to businesses and in sales/income if direct access is removed or consolidated. A sensitive and viable solution must be considered that will reduce impediments for through town traffic, maintain safety for pedestrians, and yet still entice travelers to want to stop and shop at these local businesses. It is proposed that a phased approach be taken to any direct access removal. In the short term, direct right turn access will remain predominately as it is currently, and that left turn access will be limited as the proposed median treatments are implemented. Once local roadway network connectivity and shared parking projects are constructed, and after an adjustment period for businesses, land owners, consumers, and services, the long term solution is to start consolidating local business accesses and create indirect accesses via back roads with ample room for parking and shopping along this corridor.

6.4 ROAD NETWORK

6.4.1 Existing Conditions

The existing TCH currently bisects the DNC and CoD municipalities and accommodates accesses to local businesses and communities, while still providing a route for the transport of people, goods, and services for the lower island between Nanaimo and Victoria. As this corridor serves multiple purposes it has continued to get more congested as these municipalities continue to grow.

The existing cross section is predominantly a 2-lane northbound and 2-lane southbound configuration with both raised and painted medians throughout. There is currently little to no accommodation for

bicycles along the roadway and sidewalks for pedestrians vary from being right up against the outside lane, to having a small boulevard between the sidewalk and traffic. Intersections occur at the following locations:

1. Boys Road/Private Road access–This intersection is currently a signalized intersection with accommodation for transit along the TCH in the SW and NE corners. It is also the south end of the project design limits
2. Cowichan Way–Currently an unsignalized T-intersection. This intersection is used frequently by local NB traffic to access the downtown core.
3. Dobson Road–Currently a right in/right out configuration with a raised median along the TCH prohibiting left turn movements.
4. Trunk Road–This is a full movement signalized intersection. There are dedicated left turn lanes in all four quadrants as well as pedestrian cross-walks on all four legs.
5. Coronation Avenue–This is also a full movement intersection and has dedicated left turn lanes ion all four quadrants and pedestrian cross-walks on all four legs.
6. Alexander Street–This is an unsignalized T-intersection with a dedicated SB to EB left turn off of the TCH.
7. James Street/York Road–This intersection is a very tight fully signalized intersection with dedicated left turn lanes and cross-walks in all four quadrants. The intersection itself occurs along a curve on the TCH which creates traffic channeling challenges as James Street runs west/east and York Road runs north/south.
8. University Way–This is a relatively new T-intersection providing right in/right out only access to community amenities and Vancouver Island University campus.
9. Beverly Street Intersection–This is also a full movement intersection and has dedicated left turn lanes on all four quadrants and pedestrian cross-walks on three legs. It stands as the north end limit for this study.

6.4.2 Proposed Works

The proposed works along the TCH corridor could include works mentioned above such as median treatments and dedicated multi-use paths for pedestrians and bicycles, as well as the following:

1. Interim pedestrian activated signals, located at Cowichan Way and near University Way. With the advent of median fencing along the south section of the TCH from Boys Road to Cowichan Way and along the north section of the TCH from James Street to Beverly Street, a solution is required for the pedestrians (a high proportion of which are students) to safely cross the TCH. These signals would be a short term solution with the provision that should growth in this area continue and funding be available, that Cowichan Way be upgraded to a full signalized intersection and that a pedestrian overpass may be constructed near University Way in the future.
2. Upgrade the existing outside lane widths, both northbound and southbound, from 3.7m to 4.3m to allow separation from the traffic to existing pedestrian facilities, as well as accommodating bicycles on the highway if desired.

3. Introduce a signalized full movement intersection at Cowichan Way, once existing backage roads along Price Road and McKinstry Road become developed. This intersection would provide an improved level of service for users entering the CoD from the south by providing drivers who currently use Trunk Road as the main downtown access the viable option of heading west along Cowichan Way to the downtown core.
4. Provide dedicated right turn lanes off of the TCH to help alleviate northbound and southbound traffic congestion at both the Trunk Road intersection, and Coronation Avenue intersections.
5. Make Alexander Street a dedicated right in/right out configuration only and eliminate any left turn crossing movements. Users traveling southbound along the TCH wishing to head down Alexander Street can turn left at the James Street/York road intersection and garner access via the proposed backage roads connecting Dingwall Street to Alexander Street.
6. Reconfigure the existing James Street/York Road intersection to alleviate the tight and awkward geometry. By to moving the intersection northward, clearer sightlines and more left turn storage can be provided. This reconfiguration would also include dedicated right turn lanes eastbound to southbound from James Street to the TCH and northbound to eastbound from the TCH to York Road. As this is a significant change to the existing infrastructure of the intersection, it is recommended as a medium to long term solution that may come into effect as congestion at the existing intersection continues to grow.
7. Minimal work is proposed at the Beverly Street intersection other than accommodating a possible increase in pedestrian traffic as the median work and multi-use path come into fruition. Note that a fourth pedestrian crossing is not recommended without more detailed traffic analysis. There is heavy southbound left turning traffic, thus adding a pedestrian crosswalk on the north leg would reduce the available green time allotted for this vehicle movement and could result in an increase in delay and reduction to level of service for the intersection.

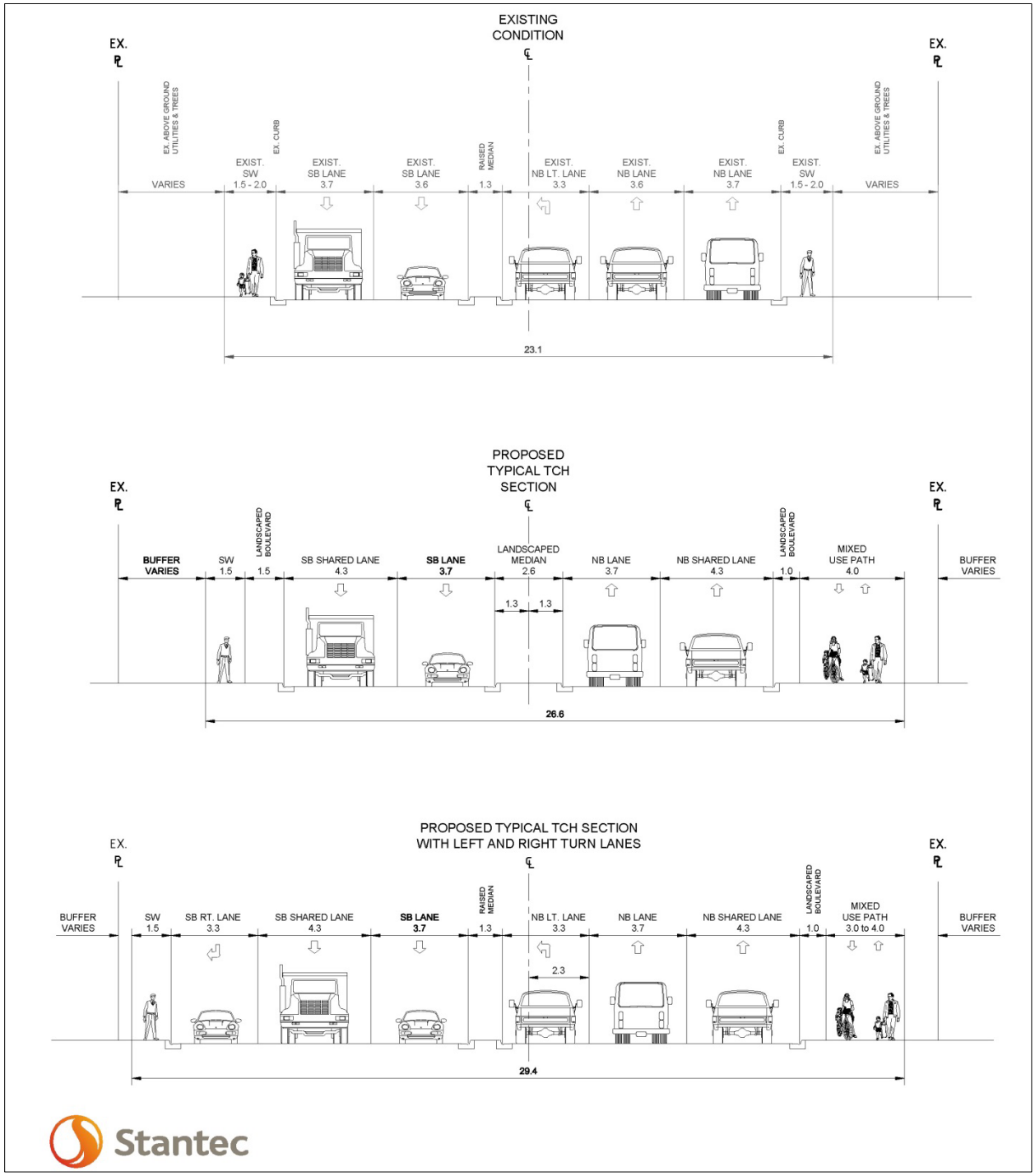

Figure 6-9 TCH Typical Sections

6.5 SPECIAL CONSIDERATIONS

Pedestrian and bicycle safety is of paramount concern for the municipalities, Cowichan Tribes, MoTI, and local public along this stretch of highway. With that philosophy in mind, it is imperative to include design options that will help to safely move pedestrian and bicycle traffic in a safe and efficient manner without severely impacting road users or creating additional congestion along the highway. Updates to the various existing intersections would help move traffic in a more efficient manner while still providing dedicated crossing points for general public use.

The other major issue along this corridor is maintaining accessibility for business owners along the length of this project while adding to the local road network to help minimize highway access points. Various local road connections, backage roads, and consolidated accesses have been considered to help those wishing to visit local businesses have a clear and concise understanding of how they can easily get to said businesses.

6.6 COORDINATION WITH UNIVERSITY LAP PROCESS

This plan has been developed in coordination with the LAP proposed land use changes that contemplate future businesses built closer to the TCH with access and parking to the rear is currently under review. This is a long term solution that would be implemented via development policies aimed at increased density and mixed commercial uses along the highway as the opportunity arises. Another key integration point is the proposed upgrade of the James Street/York Road and TCH intersection to support James Street as a new focus for future institutional, recreational, mixed commercial and residential uses.

7.0 Recommendation and Implementation

The primary corridor objectives derived from the consultation and planning phases of this CMP for the TCH corridor between Boys Road and Beverly Street described in previous sections are summarized below:

- Improve safety along the corridor, especially at intersections and for pedestrians.
- Improve traffic flow in, out, and through the corridor.
- Maintain accessibility for emergency vehicles.
- Provide appropriate access to commercial properties to allow the economic viability of local businesses to continue.
- Include active transportation considerations in plans.
- Provide feasible and cost effective short term solutions.
- Provide long term solutions that integrate with the surrounding community plans and maintain the functionality of the corridor.

In order to achieve these corridor objectives, we have recommended projects and their sequence as described in the following sections. The schedule is proposed with the understanding that many factors influence the implementation of future infrastructure improvement projects such as funding opportunities, and traffic and safety changes along the corridor. The conditions of the corridor should be continually reassessed to determine the appropriateness of the overall plan and schedule for implementation:

1. Short term (approximately 1 - 5 years) - will help alleviate immediate concerns.
2. Medium term (approximately 5 - 10 years) - will continue addressing various issues along the corridor while also preparing for future land use and long term corridor projects.
3. Long term (approximately 10 - 20+ years)–will address future corridor needs while taking into consideration the LAP.

Where “shall” or “must” is used in a policy, the policy is considered mandatory. Nevertheless, where quantities or numerical standards are contained within mandatory policies, such quantities or standards may be varied at the discretion of the approving authority, so long as the intent of the policy is still achieved and the variation is necessary to address unique circumstances that would otherwise render compliance impractical or impossible.

Where “should”, “would”, “could”, “will”, or “may” is used in a policy, the intent is that the policy is strongly encouraged, but can be varied where unique or unforeseen circumstances provide for courses of action that would satisfy the general intent of the policy.

General Policies:

In conjunction with the recommended proposed projects and policies in the following sections, we propose a few general policies (below) to guide the overall process of implementation:

- This CMP *shall* be reviewed near the end of the short and medium terms and the completed improvements *shall* be assessed and re-assessed for effectiveness.
- The LAP and other current and relevant community planning initiatives *shall* be reviewed near the end of the short and medium terms to ensure next steps are coordinated with area plans.
- Consultation with local affected corridor users, businesses, Cowichan Tribes, and relevant authorities *should* take place prior to plan finalization for medium and long term infrastructure improvement projects.
- Public safety *shall* be the first priority of any reviews and plan finalizations.
- Indirect access (via side roads) *shall* be provided and an adjustment period given prior to the complete removal of any direct right in/right out TCH accesses.

7.1 SHORT TERM PROJECTS

Short term (ST) projects are categorized as smaller scale improvements that can be easily implemented without a large capital expenditure or reconstruction of existing infrastructure, but that will nonetheless advance the objectives for the corridor. See **Table 7-1 Recommended Projects Summary–Short Term Projects** for a summary and ranking of the following recommended Short Term Projects.

7.1.1 Multi-Use Pathways, Bikeways, and Sidewalks (ST)

As the communities surrounding the TCH corridor move forward with initiatives to encourage more active and sustainable modes of transportation, by creating connectivity between communities and trail systems, the corridor is expected to keep pace with this movement.

Policies:

In the short term, the following policies are recommended to achieve the Corridor Objectives:

- Where there is no existing sidewalk on the west (southbound) side of the TCH, a minimum 2.0 metre sidewalk *should* be provided along the west side of the TCH corridor from Boys Road to Beverly Street, separated from the TCH by a raised curb and gutter as a minimum, and with a minimum of 1 metre wide landscaped boulevard between intersections where right-of-way exists and where feasible. See **Figure 4-1** and **Figure 7-4**.
- Where there is no existing sidewalk on the east (northbound) side of the TCH between Boys Road and Beverly Street, a multi- use paved pathway of four (4) metres *shall* be provided, separated from the TCH by a raised curb and gutter as a minimum, and a 1 metre boulevard where right-of-way exists and where feasible. See **Figure 4-4** and **Figure 7-4**.

- Paint lines, such as "elephants' feet" or zebra crosswalk lines, to delineate the sidewalks and multi-use pathways across driveway let-downs *may* be installed to aid in alerting drivers of the potential presence of pedestrians and cyclists. See **Figure 4-13**.
- Signs indicating that cyclists are to dismount while traveling along the bridge sidewalks *shall* be erected in each direction of the Cowichan River Bridges sidewalks until such time as an alternate river crossing is provided for cyclists in the area. See **Figure 4-19**.

7.1.2 Pedestrian and Cyclist TCH Crossings (ST)

As the demographics of the community changes, different safety concerns need to be considered. The population of Duncan and surrounding area is expected to have increased numbers of seniors who rely on walking aids and need more time to cross the street. There is also anecdotal evidence of mid-block crossings at many locations, especially between the Cowichan River and Trunk Road, and adjacent to the sports complex and schools between James Street/York Road and Beverly Street.
These are the two main areas where pedestrians currently cross the TCH based on high destination areas being on the opposite side of the TCH to high residential and institutional pedestrian generation. In the short term, there are improvements and temporary measures that can be implemented to improve safe movement of pedestrians across the TCH as described below.

7.1.2.1 Traffic Signal Improvements

Policies:

- Traffic signal pedestrian phase timing at all existing signalized intersections *should* be checked and may need to be re-calculated for a slower pedestrian speed in the range of 1.0 to 1.1 m/s rather than the standard 1.2 m/s to account for pedestrians with limited mobility challenges. See **Section 4.8 Pedestrian and Cyclist TCH Crossings** and **4.2 Intersections - Traffic Signal Optimization and Corridor Coordination**.
- Pedestrian indicators *shall* be upgraded to include count-down indicators at every signalized intersection. See **Figure 4-17**.

7.1.2.2 Cowichan Way Pedestrian Activated Signal

There is little opportunity for safe crossings in the area north of the existing Cowichan River Bridges and many pedestrians choose to make unsafe mid-block crossings.

Policies:

- A pedestrian crossing with pedestrian activated signal *shall* be installed at the Cowichan Way intersection with the TCH. See **Section 4.8 Pedestrian and Cyclist TCH Crossings - Pedestrian Activated Traffic Signals**.

7.1.2.3 Lighting Improvements

Improving lighting can visibly improve the safety of an area and make pedestrians and cyclists feel more comfortable traveling during hours of darkness.

Policies:

- Lighting *should* be installed under the north end of the Cowichan River TCH Bridges to increase safety along the path currently in use. See **Figure 4-20**.
- All pedestrian and cycling pathways and roadway crossings *shall* have adequate lighting (to current standards) to ensure pedestrian and cyclist visibility during nighttime hours. See **Section 4.8 Pedestrian and Cyclist TCH Crossings - Pedestrian Crossing Lighting**.

7.1.2.4 Public Education Initiatives:

Public education initiatives have been implemented in the past to encourage safe crossing practices; we recommend the continuation of these initiatives and encourage the use of creative signing and pavement markings at crossing locations similar to those discovered in other municipalities throughout the world.

Policies:

- Public education initiatives, such as in-school education, on-site signage and pavement marking) *should* be implemented to emphasize the importance of using dedicated crossing locations and to emphasize the use of caution when crossing the TCH. Examples of such are illustrated in **Section 4.8 Pedestrian and Cyclist TCH Crossings - Public Education Initiatives**.
- Permanent Changeable Messaging Signs *may* be erected in advance of the urban area to alert motorists of the upcoming active pedestrian and cyclist area. Messages *should* be changed every six months at a minimum to keep messages fresh in motorist consciousness. Messages *may* also be changed at any time for emergency use. See **Figure 4-11**.

7.1.3 Accesses (ST)

The current density of accesses along the TCH within the Duncan corridor is far higher than is advisable for the existing road use and classification. This leads to conflicts between vehicles on the TCH as well as between vehicles and pedestrians.

Policies:

In the short to medium term, depending on re-development rates and types, accesses and parking areas directly off of the TCH *should* be consolidated wherever possible and shared access and parking agreements should be made to ensure that:

- No more than one (1) right-in/right-out direct access off of the TCH *will* be granted for any one parcel abutting the TCH. See **Sections 4.5 Access Management** and **6.3 Access Management**.

- Any parking areas with inadequate area for the safe maneuvering of vehicles without backing onto pedestrian/cyclist areas or the TCH *shall* be remedied within six (6) months of identification or decommissioned as soon as alternate access is possible.
- Any unused driveway let-downs *shall* be reinstated to full height curb and gutter.
- Parcels in derelict condition and/or in strategic locations *may* be purchased, if and when the funds and opportunity become available, and *could* be maintained by shared agreement between the appropriate municipality and the Province, to provide temporary shared parking for businesses whose parking and access will be removed. Upon long term re-development, governments *may* choose to re-sell these parcels to private ownership. See **Section 4.5 Access Management**.
- Bylaw(s) *will* be created to address the granting of access permits for parcels abutting the TCH stating that: prior to any change in land use, ownership, or zoning; or to any application for variance, subdivision, or redevelopment; an access permit *shall* be required. Permits for direct access from the TCH *will* only be granted if there is no legal access available from the local roadway network. See **Figure 4-5**.
- Raised median *will* be constructed in areas where left turn access is being removed as described in Section 7.1.4 Median Treatments (ST).

7.1.4 Median Treatments (ST)

The number of mid-block uncontrolled left turn areas is too high for the existing roadway classification (urban arterial/highway) and traffic volumes creating undue risk of collisions.

Policies:

- Existing concrete median barrier (CMB) between Boys Road and Beverly Street *should* be replaced with raised concrete median curbed island to reinforce the visual indication that motorists are entering an urban area. See **Figure 4-1**.
- The existing two-way left turn lanes and existing painted median *shall* be replaced with raised concrete median island, wherever possible, with channelized left turn lanes at designated locations only, with allowance for let-downs at required locations for the use of emergency vehicles only (as determined by MoTI in consultation with emergency response providers). See **Figure 7-1** to **Figure 7-4** for the recommended median configuration.
- Median *shall* have pedestrian fencing from Boys Road to Cowichan Way and from James Street/York Road to Beverly Street to encourage pedestrians and cyclists to use designated crossing locations only. See **Figure 4-16**, **Figure 4-7**, and **Figure 4-9**.
- Median *should* have appropriate landscaping and/or rain gardens wherever median width allows as illustrated by **Figure 4-1**.

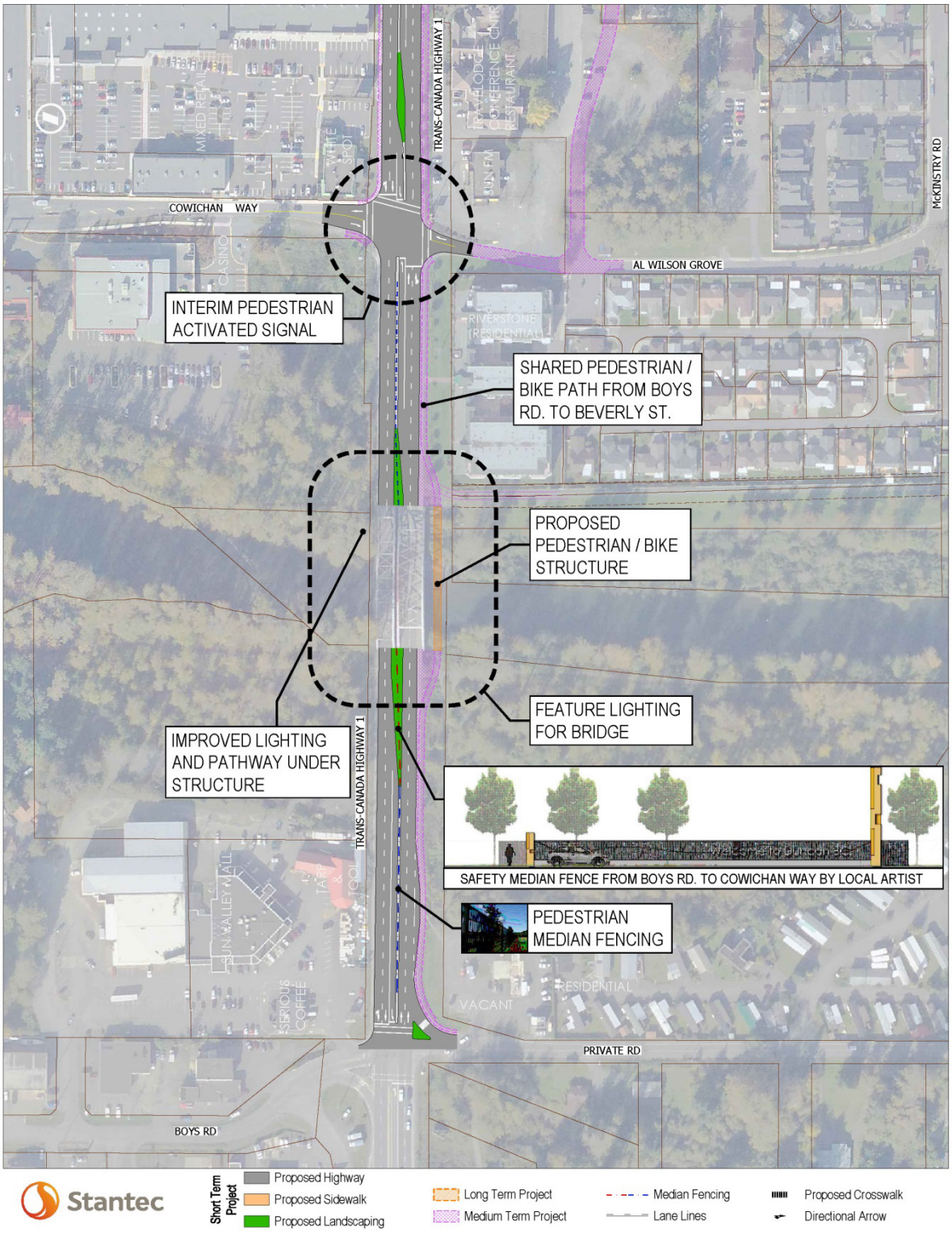

Figure 7-1 TCH Project Sequence–Boys Road to Cowichan Way

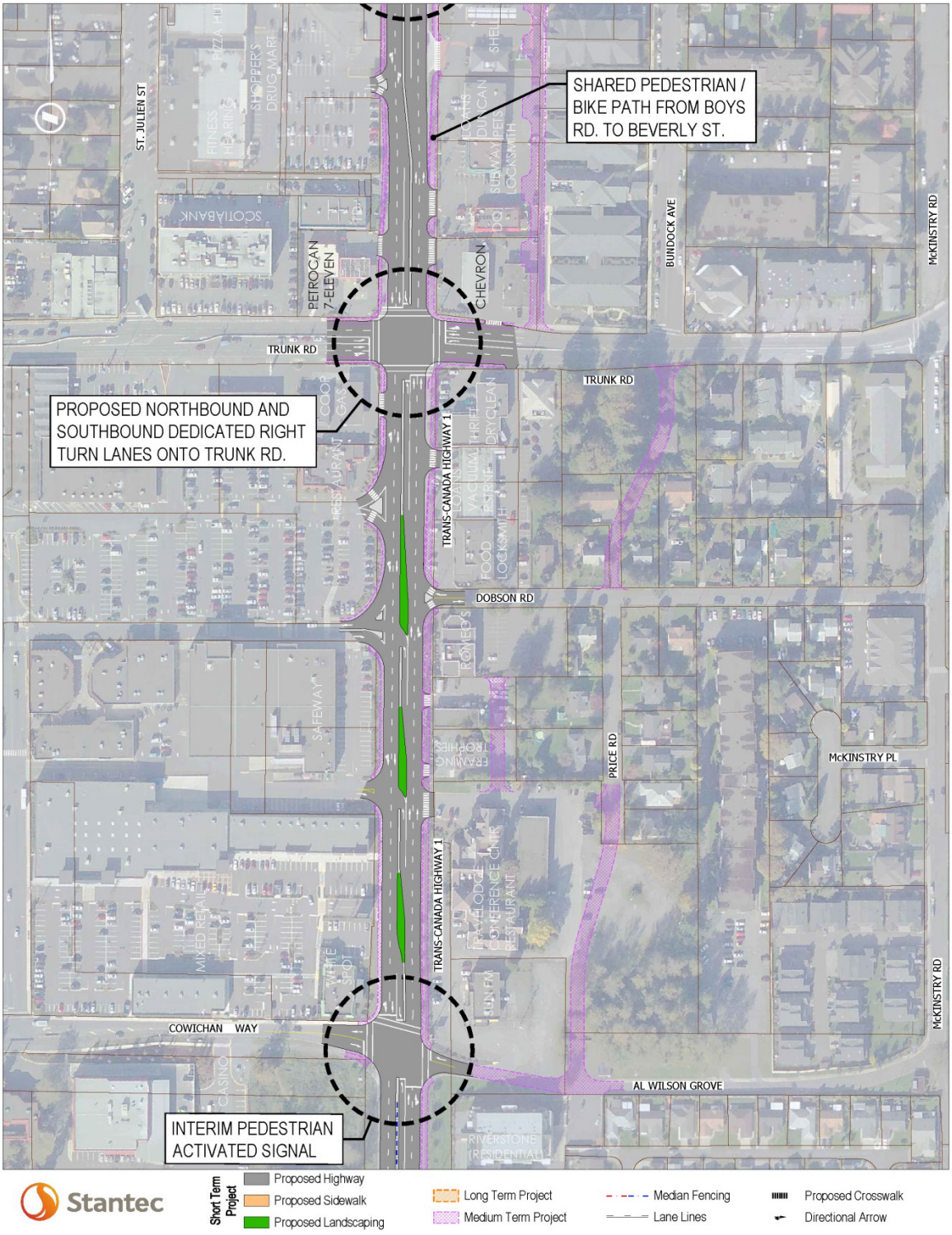

Figure 7-2 TCH Project Sequence–Cowichan Way to Trunk Road

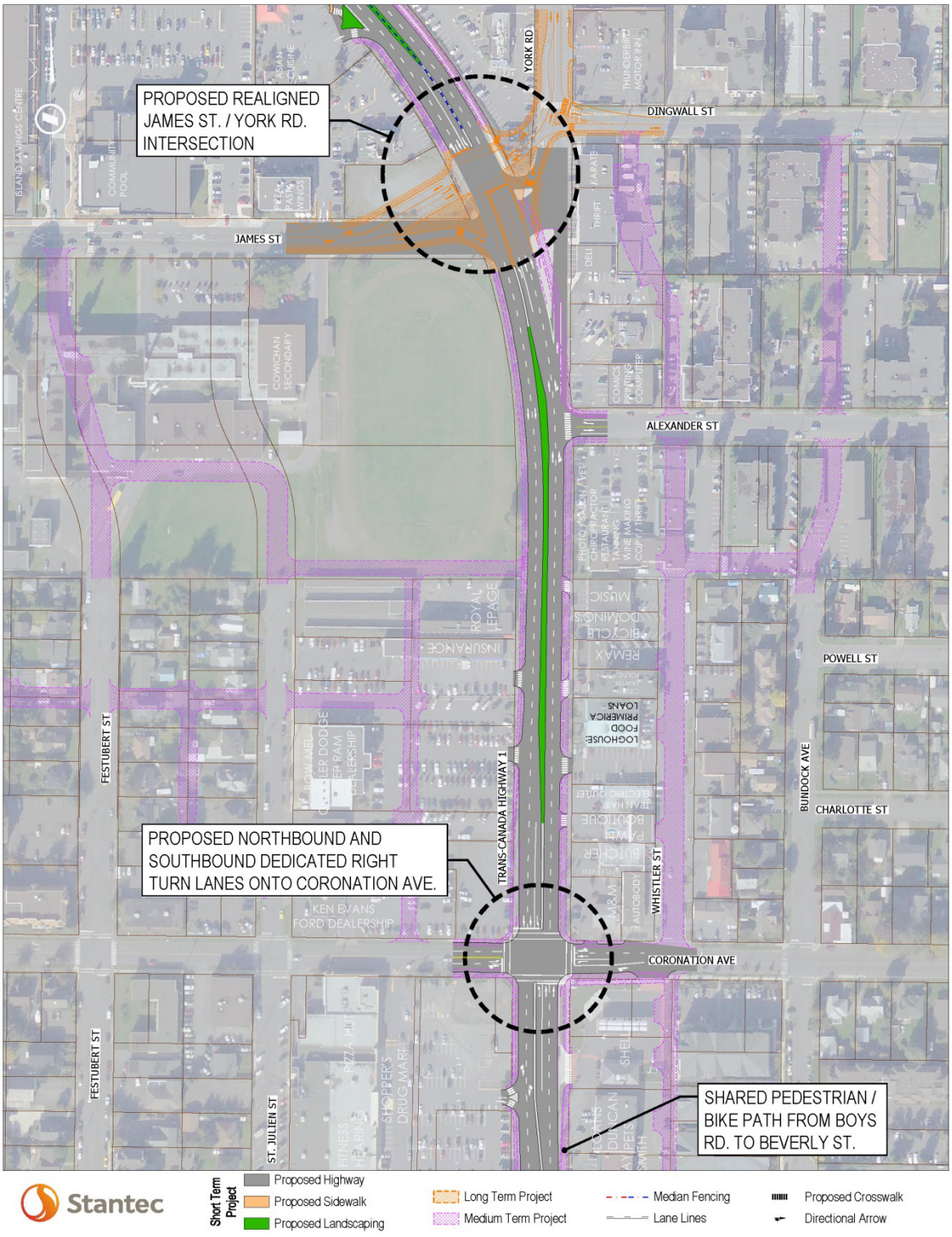

Figure 7-3 TCH Project Sequence–Trunk Road to James Street/York Road

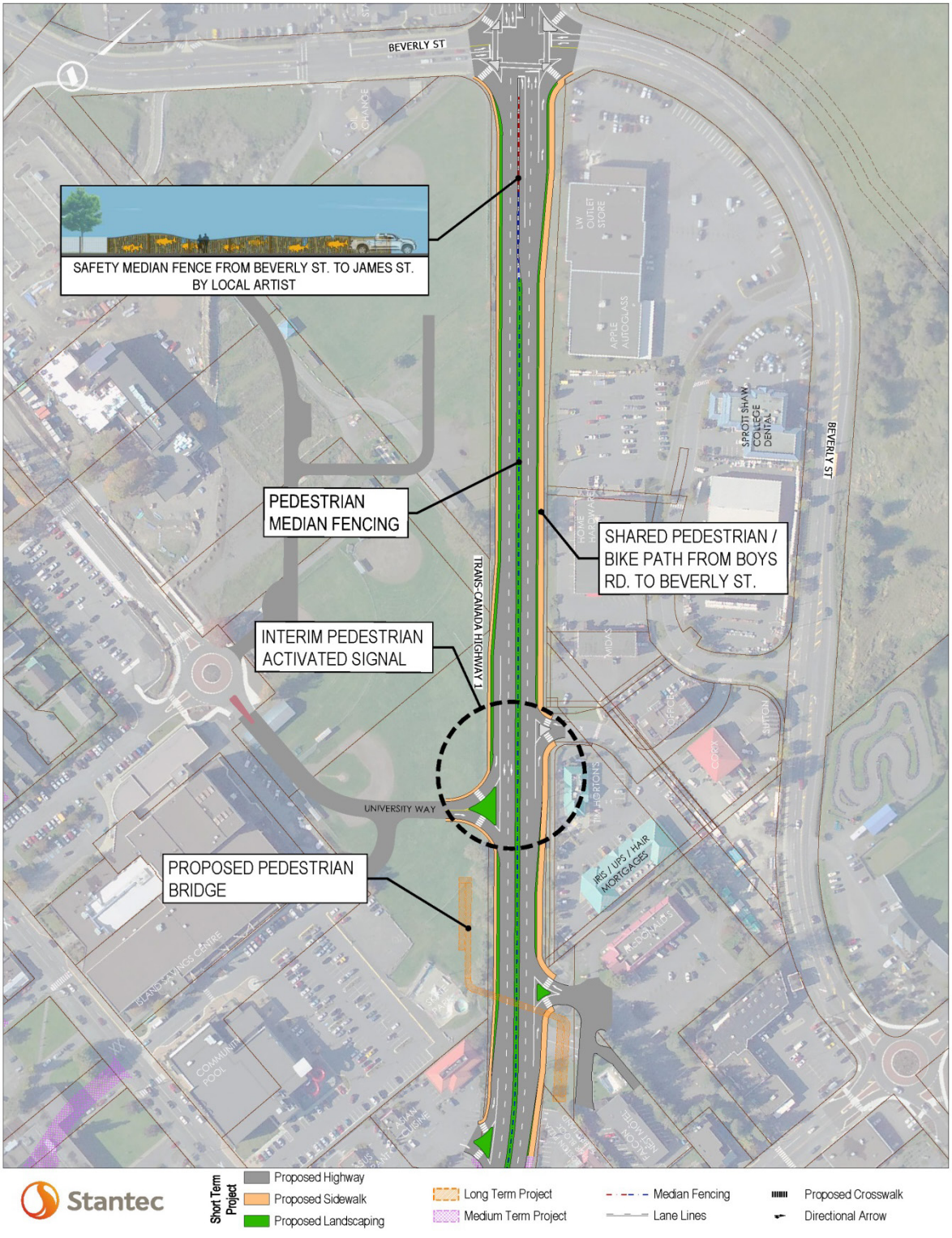

Figure 7-4 TCH Project Sequence–James Street/York Road to Beverly Street

7.1.5 Gateway Improvements (ST)

Gateways help prepare motorists to slow down when entering high pedestrian and cyclist areas by giving them visual cues that they are now entering an urban area. They also provide an opportunity to create an inviting image of the cultural character of the surrounding area and to be a source of pride for the community.

Policies:

- Signature and artistic gateway structures (such as locally designed and constructed totem poles/sculptures), incorporating artistic pedestrian median fencing, *should* be erected within the raised median and boulevard between Boys Road and Cowichan River, and in the area of Beverly Street. See **Figure 4-7** and **Figure 4-9**.
- Signature and artistic gateway structures and landscaping *should* be erected along the roadside north of Beverly Street in order to slow southbound traffic in advance of the intersection. See **Figure 4-9**.
- Permanent electronic road-side radar speed signs *should* be installed south of Boys Road facing the northbound direction and north of Beverly Street facing the southbound direction to alert drivers entering the urban area of their speed and that they must slow down. See **Figure 4-10**.
- Moving the speed reduction zone further north of Beverly Street *should* be considered. See **Section 4.7 Traffic Calming - Posted Speed Reduction.**
- The Cowichan River Bridges *should* be repainted to keep up with maintenance and enhance their appearance. See **Section 4.7 Traffic Calming - Gateways**.
- Feature lighting *should* be installed on the Cowichan River Bridges to enhance their appearance. See **Figure 4-8**.
- Where median and boulevard width permit in the gateway areas, there *should* be landscaping installed that is coordinated with and enhances the appearance of the gateway features. See **Figure 4-1**, **Figure 4-6**, and **Figure 4-9**.

7.1.6 Intersection Improvements (ST)

As the population of the area and the island grows, increased pressure will be placed on the current system of signalized and un-signalized intersections along the corridor. In the short term, the existing traffic signals should be analyzed to optimize and coordinate signal timing through the Duncan area. Wherever pedestrian signals are installed may interfere with signal coordination. There may be opportunity to upgrade the nearby signals to coordinate the pedestrian signals, however this would only function in one direction.

Policies:

- Traffic signals *shall* be reviewed using detailed traffic analysis (including investigation as to the feasibility of implementing protected left or split phases) and *should* be upgraded to have phase timing optimized and coordinated for optimum level of service for the dominant traffic direction along the corridor (i.e.: phased timing transition from a.m. to p.m. peak flow directions during mid-

day or early afternoon). Any alternate phasing that improves safety *should* be considered. See **Section 4.2 Intersections - Traffic Signal Optimization and Corridor Coordination**.

7.1.7 Local Roadway Network Connectivity (ST)

As population increases, development occurs and traffic demands increase; the local roadway network connectivity weak points are made visibly apparent by the traffic congestion caused by funneling all the traffic to a few continuous roadways. Motorists then tend to take circuitous routes to avoid congestion which puts additional strain on roadways with lesser capacity. Adding connections to the local roadway network will alleviate some of the congestion on the TCH by diverting local traffic to side and back roads and provide safer access for properties abutting the TCH.

7.1.7.1 Future Local Roadways Property Acquisition

Policies:

- Road right of way *should* be acquired when possible and/or upon re-development application to connect the following roads:
  - Extend Al Wilson Grove to the TCH at Cowichan Way as shown in **Figure 7-1**.
  - Extend Price Road to Al Wilson Grove as shown in **Figure 7-1** and **Figure 7-2**.
  - Provide for a backage road to the west of and parallel to Price Road connecting properties along TCH south of Dobson as shown in **Figure 7-2**.
  - Extend Bundock Avenue south to connect with Price Road at Dobson Road as shown in **Figure 7-2**.
  - Extend Whistler Street south to Trunk Road as shown in **Figure 7-2** and **Figure 7-3**.
  - Extend Whistler Street north across Alexander Road to Dingwall Street as shown in **Figure 7-3**.
  - Extend Bundock Avenue north across Alexander Road to Dingwall Street as shown in **Figure 7-3**.
  - Connect Bundock Avenue and Whistler Street between Alexander Street and Powell Street as shown in **Figure 7-3**.
  - Extend Festubert Street north to James Street as shown in **Figure 7-3**.
  - Extend St. Julien Street north and west to Festubert Street as shown in **Figure 7-3**.
  - Revise backage road connection between the TCH and St. Julien Street at the south end of the Cowichan Secondary property as shown in **Figure 7-3**.
  - Create an east–west connecting roadway between the existing lots occupied by car dealerships across Festubert Street to Ypres Street between Coronation Avenue and Cowichan Secondary property as shown in **Figure 7-3**.
  - Connect the roadway described in previous bullet to Coronation Avenue as shown in **Figure 7-3**.
  - Create various other connections in the area between the TCH and Duncan Avenue as per the LAP document.

7.1.8 Transit (ST)

As BC Transit expands its operations in Duncan to improve service for the increased population and demand, the TCH corridor should be ready to accommodate additional transit. In the short term it is not

anticipated that any additional bus stops will be required directly on the TCH, but may be on the local roadway network. Any motorists that choose transit rather than driving reduce the number of vehicles circulating within Duncan, thus reducing congestion.

Policies:

- Yearly updates *shall* be sought from BC Transit regarding future service improvement plans to ensure coordination between municipality infrastructure improvements and BC Transit plans. See **Section 4.3 Active Transportation - Transit**.

7.2 MEDIUM TERM PROJECTS

Medium term (MT) projects are categorized as larger scale improvements and can be implemented without depending on large population demand triggers. See **Table 7-2 Recommended Projects Summary–Medium Term Projects** for a summary and ranking of the following recommended Medium Term Projects.

7.2.1 Multi-Use Pathways, Bikeways, and Sidewalks (MT)

Policies:

In the medium term, the following policies are recommended to achieve the Corridor Objectives:

- A multi- use paved pathway of at least three (3) metres (with provision of wider sections where right-of-way consistently allows) *shall* be provided along the east (northbound) side of the corridor, separated from the TCH by a raised curb and gutter as a minimum, and a minimum 1 metre boulevard where right-of-way exists and where feasible. See **Figure 4-1**, and **Figure 7-1** to **Figure 7-4**.
- Bicycle lanes in the east-west direction shall be provided for at all intersections with the TCH to allow for connectivity to local road and trail network. See **Figure 7-1** to **Figure 7-4**.

7.2.2 Pedestrian and Cyclist TCH Crossings (MT)

7.2.2.1 Cowichan Way Signalized Intersection

Policies:

- The pedestrian activated signal at Cowichan Way and the Trans Canada Highway *may* be upgraded to a full signalized intersection as traffic demands, the need for better corridor signal coordination, and roadway connectivity increases. See **Section 6.4.2 Proposed Works**.
- A review of pedestrian crossing patterns and accident history between Cowichan Way and Trunk Road *should* be conducted to determine any further requirements, such as a crossing facility at Dobson Road.

7.2.2.2 University Way Temporary Pedestrian Activated Signal

Policies:

- A review of pedestrian crossing patterns and accident history involving pedestrians between James Street/York Road and Beverly Street *shall* be conducted to determine any further requirements, such as a crossing facility at University Way.
- A pedestrian activated signal *shall* be constructed near or at the University Way intersection with the Trans Canada Highway, if required due to pedestrian safety issues and pedestrian traffic increases. See **Section 4.8 Pedestrian and Cyclist TCH Crossings - Pedestrian Activated Traffic Signals**.

7.2.3 Accesses (MT)

Policies:

In the short to medium term, depending on re-development rates and types, accesses directly off of the TCH *should* be removed to ensure that:

- Prior to any change in land use, ownership, or zoning; or to any application for variance, subdivision, or redevelopment; an access permit *shall* be required. Permits for direct access from the TCH *will* only be granted if there is no legal access available from the local roadway network. See **Figure 4-5** for recommended access and parking configuration for redeveloped parcels.
- Once a back or side road alternative indirect access becomes available for a parcel abutting the TCH, an adjustment period of one (1) year *will* be granted after which all direct TCH access *shall* be removed.

7.2.4 Median Treatments (MT)

Policies:

- A safety review *shall* be conducted to assess the safety of the remaining channelized left turn lanes at direct accesses. Any left turn lanes deemed unsafe *shall* be converted to raised median with let-downs for emergency access only as warranted. See **Figure 4-1**.

7.2.5 Gateway Improvements (MT)

Policies:

- Any gateway improvements that were not constructed during the Short Term (see **Section 7.1.5 Gateway Improvements (ST)**) *should* be constructed during the Medium Term.

7.2.6 Intersection Improvements (MT)

7.2.6.1 Additional Lanes at Intersections

In the medium term, as traffic increases and the signalized intersections become further congested to the point of lack in function, additional turning lanes should help alleviate the burden on each intersection.

Policies:

- A detailed review and traffic analysis *should* be conducted to determine the number and length of additional turning lanes required for adequate level of service into the long term.
- Dedicated right turn lanes *may* be constructed northbound and southbound on the TCH at the Trunk Road and Coronation Avenue intersections. Turning lane lengths are to be determined by detailed traffic analysis.
- Additional turning lanes *should* be constructed at the intersections with the TCH as recommended by detailed traffic analysis.

7.2.6.2 James Street/York Road Intersection

The northbound right turn onto York Road poses a safety hazard for pedestrians crossing from the existing channelizing island southbound towards Alexander Street because in fact there is no curvature to the turn lane which allows motorists to make the movement without slowing down to negotiate a turn with a zebra crosswalk not far from the exit. There is a lot of information for a driver, especially one unfamiliar with this unconventional layout, to absorb in this area.

Policies:

- The northbound right turn lane *should* be reconfigured so that it parallels the TCH through lanes until closer to the intersection, as illustrated for the Medium Term Projects on **Figure 7-3**, would be much safer for pedestrians.

7.2.7 Local Roadway Network Connectivity (MT)

Addressing the lack of local roadway network connectivity will reduce traffic congestion at the intersections with the TCH since local circulating traffic will have more alternative routes to choose from.

7.2.7.1 Future Local Roadways Construction

Policies:

- Any roadway right of way for the local roadway network connections shown on **Figure 7-1** to **Figure 7-4** or updated community plan, not acquired in the Short Term *should* be acquired.
- Roadways *should* be constructed within the rights of way acquired during Short Term Projects to connect the following roads:
  - Extend Al Wilson Grove to the TCH at Cowichan Way as shown in **Figure 7-1**.

- Extend Price Road to Al Wilson Grove as shown in **Figure 7-1** and **Figure 7-2**.
- Provide for a backage road to the west of and parallel to Price Road connecting properties along TCH south of Dobson as shown in **Figure 7-2**.
- Extend Bundock Avenue south to connect with Price Road at Dobson Road as shown in **Figure 7-2**.
- Extend Whistler Street south to Trunk Road as shown in **Figure 7-2** and **Figure 7-3**.
- Extend Whistler Street north across Alexander Road to Dingwall Street as shown in **Figure 7-3**.
- Extend Bundock Avenue north across Alexander Road to Dingwall Street as shown in **Figure 7-3**.
- Connect Bundock Avenue and Whistler Street between Alexander Street and Powell Street as shown in **Figure 7-3**.
- Extend Festubert Street north to James Street as shown in **Figure 7-3**.
- Extend St. Julien Street north and west to Festubert Street as shown in **Figure 7-3**.
- Revise backage road connection between the TCH and St. Julien Street at the south end of the Cowichan Secondary property as shown in **Figure 7-3**.
- Create an east–west connecting roadway between the existing lots occupied by car dealerships across Festubert Street to Ypres Street between Coronation Avenue and Cowichan Secondary property as shown in **Figure 7-3**.
- Connect the roadway described in previous bullet to Coronation Avenue as shown in **Figure 7-3**.
- Create various other connections in the area between the TCH and Duncan Avenue as per the LAP document.

7.2.8 Transit (MT)

In the medium term as BC Transit's plan to have a transit hub/exchange in downtown Duncan progresses, bus stops will likely be required on roadways intersecting the TCH. As the intersections along the TCH are upgraded, there is an opportunity to coordinate design and construction between the municipalities and BC Transit. Any bus stops should be installed at locations near the TCH along the main roadways intersecting the highway where there is adequate right-of-way for future bus pullouts if possible. In the medium term, transit demands may be reassessed to determine any changes in requirements.

Policies:

- Bus stop construction *should* be constructed in accordance with bus route requirements for the downtown transit exchange. See **Section 4.3 Active Transportation - Transit**.
- Yearly updates *shall* be sought from BC Transit regarding future service improvement plans to ensure coordination between municipality infrastructure improvements and BC Transit plans.

7.3 LONG TERM PROJECTS

Long term (LT) projects are those of a larger scale and/or that will be implemented contingent upon the surrounding area reaching certain development and population levels. See **Table 7-3 Recommended Projects Summary–Long Term Projects** for a summary and ranking of the following recommended Long Term Projects.

7.3.1 Multi-Use Pathways, Bikeways, and Sidewalks (LT)

7.3.1.1 Cowichan River Multi-Use Pathway Bridge

There is a residential area south and east of the Cowichan River that generates high numbers of pedestrians with destinations across the TCH north and west of the Cowichan River. The existing TCH bridges have no safe accommodation for cyclists. Cyclists tend to use the sidewalks along the bridge since the bridges do not have bicycle lanes. The existing sidewalks on the bridges are not wide enough to accommodate both cyclists and pedestrians safely. A Multi-Use Pathway Bridge east of the existing Cowichan River Bridges would connect the Multi-Use Pathway on either side of the river and allow for separation of pedestrians and cyclists from highway traffic and should be wide enough for safe simultaneous two-way pedestrian and cyclist travel.

Policies:

- A four (4) metre minimum width Multi-Use Pathway Bridge *should* be constructed over the Cowichan River east of the existing Cowichan River Bridges to provide safe connection between multi-use pathways on either side of the river. See **Figure 4-6**.

7.3.2 Pedestrian and Cyclist TCH Crossings (LT)

7.3.2.1 University Way Multi-Use Pathway Overpass

There are currently many pedestrians crossing near the James Street/York Road intersection with the TCH. Consultation with the School District and Vancouver Island University (VIU) revealed the need to accommodate a future increase of student population in the area. Plans for the future secondary school relocation have yet to be finalized. It may share a site with the VIU expansion or be relocated to the east of the TCH which would relieve some of the TCH pedestrian crossing demands in the James Street/York Road area; however the VIU has plans to expand its campus would likely increase demand. Should the VIU campus expansion go ahead and other developments with high pedestrian trip generation volumes occur, a pedestrian overpass may be required.

Policies:

- A review of pedestrian crossing patterns, accident history involving pedestrians, and a cost-benefit and traffic analysis *shall* be conducted for the Trans Canada Highway corridor between James Street/York Road and Beverly Street to determine any further crossing requirements, such as a grade separated pedestrian crossing facility near University Way.
- A four (4) metre minimum width Multi-Use Pathway Overpass *should* be constructed between James Street/York Road and University Way, if recommended by the above mentioned review. See **Figure 4-15**.

7.3.2.2 Multi-Use Pathway under Cowichan River Bridges

Many pedestrians use an existing pathway that crosses the TCH under the north ends of the Cowichan River Bridges. To make best use of this alternative crossing point, upgrades would need to be made to provide safe connections to the sidewalk west of the TCH and the multi-use pathway east of the TCH. A feasibility assessment should be conducted before this option can be implemented.

Policies:

- An environmental assessment and geotechnical investigation *should* be conducted to determine the feasibility of upgrading the dike path along the north bank of the Cowichan River to extend it under Cowichan River Bridges. See **Section 4.8 Pedestrian and Cyclist TCH Crossings-Pedestrian Crossing Lighting.**

7.3.3 Accesses (LT)

In the long term, as parcels are re-developed and land use changed to higher density, taller buildings set closer to the TCH, access and parking will be through side and back roads only.

Policies:

- Prior to any change in land use, ownership, or zoning; or to any application for variance, subdivision, or redevelopment; an access permit *shall* be required. Permits for direct access from the TCH *will* only be granted if there is no legal access available from the local roadway network. See **Figure 4-5** for recommended access and parking configuration for redeveloped parcels.
- Once a back or side road alternative indirect access becomes available for a parcel abutting the TCH, an adjustment period of one (1) year *will* be granted after which all direct TCH access *shall* be removed.

7.3.4 Median Treatments (LT)

Policies:

- Any remaining channelized left turn lanes at direct accesses *shall* be re-evaluated for potential removal should safety become an issue. See **Section 4.5 Access Management**.

7.3.5 Gateway Improvements (LT)

Policies:

- Any gateway improvements not done in the Short or Medium Terms *should* be completed in the Long Term. See Section 7.1.5 Gateway Improvements (ST).

7.3.6 Intersection Improvements (LT)

7.3.6.1 James Street/York Road Intersection Realignment

The existing James Street/York Road intersection configuration is the result of the original TCH by-pass route through the existing roadway network. This solution may have been appropriate for a low volume road, but does not suit the current traffic and surrounding land use requirements. Realigning the existing intersection so that it intersects the TCH at a more perpendicular angle with a smoother grade would improve driver sight lines and thus, the overall safety of the intersection.

Policies:

- The existing James Street/York Road intersection *shall* be realigned to be perpendicular to the TCH, have appropriately smooth approach grades, and have channelized right turn lanes in the south east and south west quadrants as illustrated in **Figure 6-6** and **Figure 7-4**.

7.3.7 Local Roadway Network Connectivity (LT)

Policies:

- Any local roadway network connections described in Section 7.2.7 Local Roadway Network Connectivity (MT) remaining *should* be constructed in the Long Term.

7.3.8 Transit (LT)

In the long term, as re-development north of James Street/York Road area progresses and demand for intercity transit increases, should BC Transit construct a park-and-ride facility accessing the highway via Beverly Street, the intersection should be analyzed and lane widening, additional lanes and signal upgrades may be required.

Policies:

- Accommodation for intercity buses *should* be provided for intersections along route to and from the TCH, should an intercity park and ride facility be constructed.
- Bus stops along main side streets intersecting the TCH *should* be upgraded to pullouts/bus bays as traffic volumes and analysis warrant. See **Section 4.3 Active Transportation - Transit**.
- Yearly updates *shall* be sought from BC Transit regarding future service improvement plans to ensure coordination between municipality infrastructure improvements and BC Transit plans.

7.4 FUTURE OPTIONS

Some future options have been discussed at various workshops and meetings that fall out of the time range or would require more in-depth traffic and cost-benefit analysis to determine the feasibility. Below we present some of these ideas, that they may be further explored at a later date.

7.4.1 Traffic Calming Pavement Marking

The TCH transitions from a rural highway with a posted speed of 80 km/h to an urban highway with a posted speed of 50 km/h in the Duncan gateway areas near Boys Road and Beverly Street. Drivers tend to continue with the higher speed they are accustomed to traveling at within the urban area. With the addition of gateway features, the intent is to mentally prepare drivers for entering an urban area with a higher number of pedestrians. Some jurisdictions have used pavement markings to further emphasize this by making the lanes appear narrower. Since this is non-standard practice on British Columbia's highways, a pilot project may be possible in the future. See the figures in **Section 4.7 Traffic Calming** for a few examples of what has been implemented elsewhere.

7.4.2 Shortened One Way Couplet East-West

The Trans Canada Highway Corridor Management Plan prepared by Urban Systems in 2005 highlighted an option where a one way couplet is created with Trunk Road being the eastbound leg and Coronation Avenue being the westbound leg. There are problems associated with having a full one way couplet as presented since the westbound leg would need to make a one block jog north in order to avoid having to construct a new railway crossing and a new stretch of roadway would need to be built where an existing building and natural area currently are. Having a shortened couplet west of the Highway would avoid these problems, while providing the TCH intersections of Trunk Road and Coronation Avenue with a bit more capacity. See also **Section 4.1 Highway - One-way Highway Couplet**.

7.4.3 E & N Rail Trail

While not directly part of the TCH corridor in the Duncan area, expansion of the E & N Rail Trail to connect Downtown Duncan with the District of North Cowichan to the north and the Cowichan First Nations to the south would give pedestrians and cyclists an alternate route to and from Downtown Duncan. This would alleviate some of the pedestrian and cyclist demands crossing the TCH. This trail would ultimately function as a north-south corridor with connections to the trail along the Cowichan River and the Somenos Marsh dike trail. Anecdotal evidence suggests that people currently use the existing E & N Railway Bridge or the Allenby Road Bridge and there is currently little to no provision for pedestrians or cyclists on these bridges. A multi-use pathway bridge should be considered east of the existing railway bridge to allow for safe crossing of Cowichan River for the residents farther west of the TCH. See also **Section 4.6 Local Trail Network Connectivity**.

7.4.4 Roundabouts

A detailed traffic analysis would need to be done in order to make a judgment on the feasibility of a roundabout on the Trans Canada Highway along this stretch of the corridor, but it remains a possibility in the future as local motorists gain experience driving them. It may be prudent to install a two lane roundabout within the local roadway network (such as at the intersection of Trunk Road and Coronation Avenue) and monitor motorist behavior over a few years to assess local acceptance of them. See also **Section 4.2 Intersections - Roundabouts**.

7.5 SUMMARY TABLE

Table 7-1 Recommended Projects Summary–Short Term Projects

Recommended Projects Descriptions	Project Priority
7.1.1 Multi-Use Pathways, Bikeways, and Sidewalks (ST)	
a. Construct sidewalk where absent along west side of TCH (incl. C&G and boulevard)	a. 14
b. Construct MUP where sidewalk absent along east side of TCH (incl. C&G and boulevard)	b. 13
c. Delineate sidewalk/MUP driveway crossings with paint markings	c. 15
d. Install cyclist dismount signs at bridge sidewalk entrances	d. 2
7.1.2 Pedestrian and Cyclist TCH Crossings (ST)	
a. Review and revise pedestrian crossing phase timing at traffic signals (included in intersection phase timing upgrade below)	a. 24
b. Install pedestrian crossing countdown indicators at traffic signals	b. 1
c. Construct pedestrian activated signal at Cowichan Way	c. 5
d. Review and revise pedestrian lighting as required	d. 3
e. Implement public education initiatives (school assembly education, signage, and pavement markings at pedestrian crossings)	e. 4
f. Install lighting underneath north ends of Cowichan River Bridges	f. 25
g. Install roadside permanent changeable messaging signs in advance of gateways	g. 22
7.1.3 Accesses (ST)	
a. Remove any excess direct TCH accesses	a. 10
b. Decommission any unsafe parking areas	b. 9
c. Property acquisition for shared parking	c. 12
d. Access permit requirement bylaw	d. 11
7.1.4 Median Treatments (ST)	
a. Replace existing Concrete Median Barrier with raised concrete curbed islands between Boys Rd and Beverly St	a. 17
b. Replace existing painted median with raised concrete curbed islands between Boys Road and Beverly Street	b. 8
c. Medians to include mountable curb where required, channelized turning lanes as per **Figure 7-1** to **Figure 7-4**, and pedestrian fencing from Boys Rd to Cowichan Way and James St/York Rd to Beverly St	c. 6
d. Medians to include appropriate landscaping and/or rain gardens where median width permits	d. 7
7.1.5 Gateway Improvements (ST)	
a. Construct gateway structures, artistic pedestrian fencing, and feature lighting at the gateway locations (see **Figure 7-1** & **Figure 7-4**)	a. 16 (fencing 6)
b. Complete any overdue maintenance on Cowichan River Bridges required and install feature lighting of bridges	b. 19
c. Install median and boulevard landscaping coordinated with gateway features	c. 18
d. Install permanent electronic radar speed signs in advance of gateways	d. 20
e. Move speed transition zone further north from Beverly Street	e. 21

Table 7-1 Recommended Projects Summary–Short Term Projects

Recommended Projects Descriptions	Project Priority
7.1.6 Intersection Improvements (ST) a. Review and revise signal timings to improve signal optimization and coordination within the corridor–exploring protected left and split phase	a. 23
Recommended Projects Descriptions	**Project Priority**
7.1.7 Local Roadway Network Connectivity (ST) a. Acquire Right of Way for local roadway connections and shared parking areas where and when possible and/or upon redevelopment application as illustrated in **Figure 7-1** to **Figure 7-4**	a. 12
7.1.8 Transit (ST) a. Keep abreast of BC Transit future service improvement plans	a. 26

Table 7-2 Recommended Projects Summary–Medium Term Projects

Recommended Projects Descriptions	Project Priority
7.2.1 Multi-Use Pathways, Bikeways, and Sidewalks (MT)	
a. Replace sidewalk with MUP along east side of TCH (with boulevard where possible)	a. 7
b. Construct bicycle lanes east–west along local roadways intersecting the TCH	b. 8
7.2.2 Pedestrian and Cyclist TCH Crossings (MT)	
a. Conduct pedestrian crossing review from James Street to Beverly Street	a. 1
b. Construct temporary pedestrian activated signal near University Way if required	b. 2
c. Upgrade pedestrian activated signal at Cowichan Way with full signal	c. 11
d. Review and evaluate whether crossing required at Dobson Road	d. 3
7.2.3 Accesses (MT)	
a. Once adjustment period complete after back road alternative indirect TCH accesses constructed, remove direct TCH accesses	a. 5
7.2.4 Median Treatments (MT)	
a. Conduct safety review for channelized left turn accesses and remove as warranted	a. 6
7.2.5 Gateway Improvements (MT)	
a. Construct any remaining gateway features	a. 9
7.2.6 Intersection Improvements (MT)	
a. Review and detailed traffic analysis of intersection laning	a. 12
b. Construct right turn lanes at Trunk Road and Coronation Avenue	b. 13
c. Construct any additional lanes as required by traffic analysis	c. 14
d. Realign James Street/York Road northbound right turn lane	d. 4
7.2.7 Local Roadway Network Connectivity (MT)	
a. Complete Right of Way acquisition to complete roadway network connections	a. 15
b. Construct local roadway network connections	b. 16
7.2.8 Transit (MT)	
a. Install bus stops along local main roadways intersecting TCH as required	a. 10

Table 7-3 Recommended Projects Summary–Long Term Projects

Recommended Projects Descriptions	Project Priority
7.3.1 Multi-Use Pathways, Bikeways, and Sidewalks (LT)	
a. Construct Cowichan River MUP Bridge	a. 3
7.3.2 Pedestrian and Cyclist TCH Crossings (LT)	
a. Conduct pedestrian crossing patterns and accident history review, and traffic and cost-benefit analysis to determine pedestrian crossing requirements and feasibility in the University Way area.	a. 4
b. Construct MUP overpass and decommission pedestrian activated signal near University Way, if required	b. 5
c. Environmental assessment to extend existing dike path under Cowichan River Bridges to E&N Rail corridor	c. 7
7.3.3 Accesses (LT) and 7.3.4 Median Treatments (LT)	
a. Review safety and close any direct TCH accesses as warranted	a. 2
7.3.5 Gateway Improvements (LT)	
a. Construct any remaining gateway features	a. 6
7.3.6 Intersection Upgrades (LT)	
a. Construct James Street/York Road intersection realignment	a. 1
7.3.7 Local Roadway Network Connectivity (LT)	
a. Construct any connections not previously constructed	a. 9
7.3.8 Transit (LT)	
a. Review intersections for accessibility by intercity buses if Park & Ride facility planned by BC Transit	a. 10
b. Construct bus pullouts on main streets as traffic volumes warrant	b. 8

7.6 PRIORITY LIST

For the sake of convenience, here is a list of the recommended projects in order of priority is as follows:

7.6.1 Short Term Projects

1. Install pedestrian crossing countdown indicators at traffic signals
2. Install cyclist dismount signs at bridge sidewalk entrances
3. Review and revise pedestrian lighting as required
4. Implement public education initiatives (school assembly education, signage, and pavement markings at pedestrian crossings)
5. Construct pedestrian activated signal at Cowichan Way
6. Medians to include mountable curb where required, channelized turning lanes as per **Figure 7-1** to **Figure 7-4**, and pedestrian fencing from Boys Rd to Cowichan Way and James St/York Rd to Beverly St (excludes artistic fencing and landscaping included in gateways estimate)
7. Medians to include appropriate landscaping and/or rain gardens where median width permits
8. Replace existing painted median with raised concrete curbed islands between Boys Road and Beverly Street
9. Decommission any unsafe parking areas
10. Remove any excess direct TCH accesses
11. Access permit requirement bylaw
12. Acquire Right of Way for local roadway connections and shared parking areas where and when possible and/or upon redevelopment application as illustrated in **Figure 7-1** to **Figure 7-4**
13. Construct MUP where sidewalk absent along east side of TCH (incl. C&G and boulevard)
14. Construct sidewalk where absent along west side of TCH (incl. C&G and boulevard)
15. Delineate sidewalk/MUP driveway crossings with paint markings
16. Construct gateway structures, artistic pedestrian fencing, and feature lighting at the gateway locations (see **Figure 7-1** & **Figure 7-4**)
17. Replace existing Concrete Median Barrier with raised concrete curbed islands between Boys Rd and Beverly St
18. Install median and boulevard landscaping coordinated with gateway features
19. Complete any overdue maintenance on Cowichan River Bridges required and install feature lighting of bridges
20. Install permanent electronic radar speed signs in advance of gateways
21. Move speed transition zone further north from Beverly Street
22. Install roadside permanent changeable messaging signs in advance of gateways
23. Review and revise signal timings to improve signal optimization and coordination within the corridor–exploring protected left and split phase
24. Review and revise pedestrian crossing phase timing at traffic signals (included in intersection phase timing upgrade below)
25. Install lighting underneath north ends of Cowichan River Bridges
26. Keep abreast of BC Transit future service improvement plans

7.6.2 Medium Term Projects

1. Conduct pedestrian crossing review from James Street to Beverly Street
2. Construct temporary pedestrian activated signal near University Way if required
3. Review and evaluate whether crossing required at Dobson Road
4. Realign James Street/York Road northbound right turn lane
5. Once adjustment period complete after back road alternative indirect TCH accesses constructed, remove direct TCH accesses
6. Conduct safety review for channelized left turn accesses and remove as warranted
7. Replace sidewalk with MUP along east side of TCH (with boulevard where possible)
8. Construct bicycle lanes east–west along local roadways intersecting the TCH
9. Construct any remaining gateway features
10. Install bus stops along local main roadways intersecting TCH as required
11. Upgrade pedestrian activated signal at Cowichan Way with full signal
12. Review and detailed traffic analysis of intersection laning
13. Construct right turn lanes at Trunk Road and Coronation Avenue
14. Construct any additional lanes as required by traffic analysis
15. Complete Right of Way acquisition to complete roadway network connections
16. Construct local roadway network connections

7.6.3 Long Term Projects

1. Construct James Street/York Road intersection realignment
2. Review safety and close any direct TCH accesses as warranted
3. Construct Cowichan River MUP Bridge
4. Conduct pedestrian crossing patterns and accident history review, and traffic and cost-benefit analysis to determine pedestrian crossing requirements and feasibility in the University Way area.
5. Construct MUP overpass and decommission pedestrian activated signal near University Way, if required
6. Construct any remaining gateway features
7. Environmental assessment to extend existing dike path under Cowichan River Bridges to E&N Rail corridor
8. Construct bus pullouts on main streets as traffic volumes warrant
9. Construct any connections not previously constructed
10. Review intersections for accessibility by intercity buses if Park & Ride facility planned by BC Transit

8.0 Conclusion

The corridor objectives that have informed the recommendations in this Corridor Management Plan are:

1. Safety of pedestrians, cyclists, and motorists along the corridor.
2. Traffic congestion.
3. Accessibility for emergency services.
4. Sustainability of local business and economy.
5. Affordability of future infrastructure projects.

We recommend a staged infrastructure improvement approach to address traffic congestion and access management incrementally. A summary of the primary recommended infrastructure improvement projects are:

- Upgrade pedestrian indicators at signalized intersections to include count-downs.
- Extend sidewalk and add curb, gutter, and boulevard on west side of the TCH from James Street/York Road to Beverly Street.
- Construct a multi-use pathway along the east side of the TCH between Boys Road and Beverly Street complete with curb, gutter, and boulevard where feasible.
- Construct attractive and functional gateways near Boys Road and Beverly Street to welcome people to the urban area and prevent unsafe pedestrian TCH crossings.
- Install permanent radar speed signs and changeable messaging signs to encourage motorists to reduce speeds before entering the urban area.
- Install temporary pedestrian activated signals at Cowichan Way and near University Way with future full signalized intersection at Cowichan Way and a pedestrian overpass near University Way.
- Improve local roadway network connectivity and parking opportunities to facilitate phasing out direct access off the TCH.
- Undertake a detailed traffic analysis to determine improvements to corridor intersections in terms of signal timing, number of turning lanes, and turning lane lengths.
- Construct a multi-use pedestrian bridge over the Cowichan River.
- Realign James Street/York Road intersection.

Through extensive public consultation and option evaluation, we have arrived at recommendations that we believe will be mutually acceptable to the public and the roadway authorities. While we recognize that the implementing of these recommendations presents a fiscal challenge, the DNC, CoD, and MoTI should prepare a funding strategy, to further prioritize the most effective projects to create a plan to make these projects a reality. The attached **Appendix A** contains an estimate of probable cost prepared for the proposed projects.

Appendix A
Conceptual Level Estimate of Probable Cost

Trans Canada Highway Corridor Management Plan - Conceptual Level Estimate of Probable Cost May 21, 2014

Item	Quantity	Unit	Unit Price	Cost	Subtotals		Notes:
Short Term Projects (1 to 5 years):						***$15,350,650***	
Multi-Use Pathways (MUP), Bikeways, and Sidewalks							(used average) to calculate totals.
MUP (3m) James to Beverly Street (east) OR	420	m	$225.00	$94,500.00			
MUP (4m) James to Beverly Street (east)	420	m	$300.00	$126,000.00			
Sidewalk (2m) James to Beverly Street (west)	580	m	$180.00	$104,400.00			
Curb and Gutter James to Beverly Street	1,000	m	$100.00	$100,000.00			
Boulevard planting (1m) James to Beverly Street	890	m	$15.00	$13,350.00			
Paint markings across accesses (ped./cyc.)	160	m	$15.00	$2,400.00			
Cyclist dismount signs for bridges	4	each	$100.00	$400.00			
					$330,800.00		
Pedestrian & Cyclist TCH Crossings							
Review and revise pedestrian crossing phase timing at signals (included with intersection phase timing review below)	5	intersection	$0.00	$0.00			
Install pedestrian countdown indicators at signals	5	intersection	$5,000.00	$25,000.00			
Pedestrian activated Signal at Cowichan Way	1	lump sum	$250,000.00	$250,000.00			
Review and revise pedestrian lighting as required	1	lump sum	$50,000.00	$50,000.00			
Implement public education initiatives (talks, signs, paint)	1	lump sum	$5,000.00	$5,000.00			
Install lighting underneath north ends of Cowichan River Bridges	1	lump sum	$25,000.00	$25,000.00			
Install roadside permanent changeable message signs in advance of gateways	2	each	$150,000.00	$300,000.00			
					$655,000.00		
Accesses							
Excess access and unsafe parking area removals (after appropriate consolidation)	1	lump sum	$50,000.00	$50,000.00			
					$50,000.00		
Median Treatments							
Replace ex. CMB and painted medians with raised concrete curbed islands	2,660	m	$85.00	$226,100.00			includes removals and median curb
Standard pedestrain median fencing Cowichan River to Cowichan Way & James to Beverly Street	815	m	$250.00	$203,750.00			
Median landscaping Cowichan River to Beverly Street	3,000	m²	$15.00	$45,000.00			does not include rain garden features
					$474,850.00		
Gateways							
Gateway structures, artistic pedestrian median fencing, and feature lighting at gateway locations	1	lump sum	$150,000.00	$150,000.00			
Cowichan River Bridges maintenance painting	1	lump sum	$3,000,000.00	$3,000,000.00			
Cowichan River Bridges lighting	1	lump sum	$50,000.00	$50,000.00			
Median and boulevard landscaping (gateways)	3,000	m²	$50.00	$150,000.00			
Permanent electronic radar speed signs	2	each	$5,000.00	$10,000.00			
					$3,360,000.00		
Intersection Improvements							
Review and revise signal timings to improve signal optimization and coordination within corridor	5	intersection	$5,000.00	$25,000.00			
					$25,000.00		
Local Roadway Network Improvements							
Acquire ROW for back roads and shared parking	62	ha	$170,000.00	$10,455,000.00			assumes 20m ROW at $425K per acre
					$10,455,000.00		
Transit							
Keep abreast of BC Transit future service improvement plans	1	lump sum	$0.00	$0.00			
					$0.00		
Medium Term Projects:						***$7,699,600***	
Multi-Use Pathways (MUP), Bikeways, and Sidewalks							(used average) includes removal of ex. Sidewalk
MUP (3m) Boys Road to James Street (east) OR	1,400	m	$255.00	$357,000.00			
MUP (4m) Boys Road to James Street (east)	1,400	m	$340.00	$476,000.00			
Bicycle lane pavement marking east - west along local roadway approaches (25m) to intersecting the TCH	600	m	$1.00	$600.00			
Boulevard planting (1m) Cowichan River to James Street	1,500	m	$15.00	$22,500.00			
					$439,600.00		
Pedestrian & Cyclist TCH Crossings							
Temporary pedestrian activated signal near University Way	1	lump sum	$150,000.00	$150,000.00			
Upgrade pedestrian signal at Cowichan Way to full signal	1	lump sum	$250,000.00	$250,000.00			
Conduct pedestrian crossing review from James Street to Beverly Street	1	lump sum	$20,000.00	$20,000.00			
Review and evaluate need for crossing at Dobson Road	1	lump sum	$10,000.00	$10,000.00			
					$430,000.00		
Accesses							
Once adjustment period complete after back road alternative indirect TCH accesses constructed, complete direct TCH access removal	1	lump sum	$50,000.00	$50,000.00			
					$50,000.00		
Median Treatments							
Conduct safety review of channelized left turn accesses and remove as warranted	1	lump sum	$25,000.00	$25,000.00			
					$25,000.00		
Gateways							
Any remaining projects from Short Term	1	lump sum	$0.00	$0.00			cost would correspond to any unused portion from Short Term Projects
					$0.00		
Intersection Improvements							
Detailed traffic analysis of intersection laning	1	lump sum	$100,000.00	$100,000.00			
Construct any additional turning lanes as required	1	lump sum	$1,000,000.00	$1,000,000.00			
Construct right turn lanes at Trunk Road and Coronation Avenue	1	lump sum	$500,000.00	$500,000.00			
Realign James St/York Rd northbound right turn lane	1	lump sum	$50,000.00	$50,000.00			
					$1,650,000.00		
Local Roadway Network Improvements							
Complete ROW and shared parking area property acquisition	1	lump sum	$0.00	$0.00			cost would correspond to any unused portion from Short Term Projects
Construct local roadway network connections	6,000	lane m	$800.00	$4,800,000.00			30000 m2
Construct shared parking areas	1,500	m²	$150.00	$225,000.00			assumes two 750m2 lots in dense area
					$5,025,000.00		
Transit							
Install bus stops along local main roadways that intersect the TCH as required	4	each	$20,000.00	$80,000.00			
					$80,000.00		
Logn Term Projects:						***$4,015,000***	
Multi-Use Pathways (MUP), Bikeways, and Sidewalks							
Cowichan River MUP Bridge	1	lump sum	$1,500,000.00	$1,500,000.00			< Note that our Structural Bridge Engineer believes that a cantilever structure is possible for around $750,000 in the unlikely event that the bridge has enough capacity and earthquake resistance to accommodate a 5m wide cantilever. We estimate the actual cost to be at least the same as a separate bridge, therefore we have left this as one line item.
					$1,500,000.00		
Pedestrian & Cyclist TCH Crossings							
Conduct thorough review and feasibility study for crossing requirements in the University Way area	1	lump sum	$50,000.00	$50,000.00			
MUP overpass near University Way	1	lump sum	$800,000.00	$800,000.00			
Decommission ped. activated signal at University Way	1	lump sum	$10,000.00	$10,000.00			
Environmental assessment for extension of existing dike pathway under Cowichan River Bridges to E&N Rail corridor	1	lump sum	$20,000.00	$20,000.00			
					$880,000.00		
Accesses and Median Treatments							
Review safety and close any direct TCH accesses as warranted	1	lump sum	$50,000.00	$50,000.00			
					$50,000.00		
Intersection Improvements							
James Street / York Road intersection realignment	1	lump sum	$1,500,000.00	$1,500,000.00			
					$1,500,000.00		
Local Roadway Network Improvements							
Construct any connections remaining	1	lump sum	$0.00	$0.00			cost would correspond to any unused portion from Medium Term Projects
					$0.00		
Transit							
Review intersections for accessibility by intercity buses	1	lump sum	$5,000.00	$5,000.00			
Construct bus pullouts on main streets as traffic volumes warrant	4	each	$20,000.00	$80,000.00			
					$85,000.00		
						$27,065,250.00	
General Contingency (30% for conceptual level est.)						*$8,119,575.00*	
Total Estimate						***$35,184,825.0***	

Excludes any utility relocation and any rain gardens

Stantec