

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

DRAFT Technical Memorandum



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

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Sign-off Sheet

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**TRANS CANADA HIGHWAY – DRAFT CORRIDOR MANAGEMENT PLAN:
BOYS ROAD TO BEVERLY STREET**

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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 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 of the highway which has resulted in significant safety issues as well as exacerbating congestion as traffic volumes on the highway and intersecting roads increase.

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 conducted 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:

- i) Safety of pedestrians, cyclists, and motorists along the corridor.
- ii) Traffic congestion for local traffic and truck traffic travelling through the DNC and CoD between the cities of Nanaimo and Victoria.
- iii) Accessibility for emergency services.
- iv) Sustainability of local business and economy.
- v) 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.
- 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.
- James Street / York Road intersection realignment.

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 total list of recommendations is a long expensive one, the DNC, CoD, and MoTI will now need to work together to prepare a funding strategy, taking into consideration what is affordable, and further prioritize the most effective potential projects to plan for the analysis, design, purchasing, and saving required to make these projects a reality.

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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:

- i) Short term (approximately 1 - 5 years) - which would help alleviate immediate concerns.
- ii) 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.
- iii) Long term (approximately 10 - 20+ years) – which would address future corridor needs while taking into consideration the LAP.

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2.0 Background

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. 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

See over for an aerial diagram of the existing TCH corridor and local roadway network.

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Figure 1 Existing TCH Corridor

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

- i) Safety issues.
- ii) Existing vehicular traffic patterns (including side streets and crossing movements) and expected future growth.
- iii) Pedestrian and cyclist traffic patterns.
- iv) Existing and potential future land use types and locations and their effect on traffic patterns and safety.
- v) Consideration for DNC and CoD plans for future infrastructure projects.
- vi) Consideration for BC Ministry of Transportation and Infrastructure (MoTI) plans for the movement of people, goods, and services along the corridor.
- vii) 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. This has 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 and the sidewalks are narrow and do not extend the length of the corridor.

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 (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. See over for a diagram illustrating collision statistics from the Insurance Corporation of British Columbia (ICBC).

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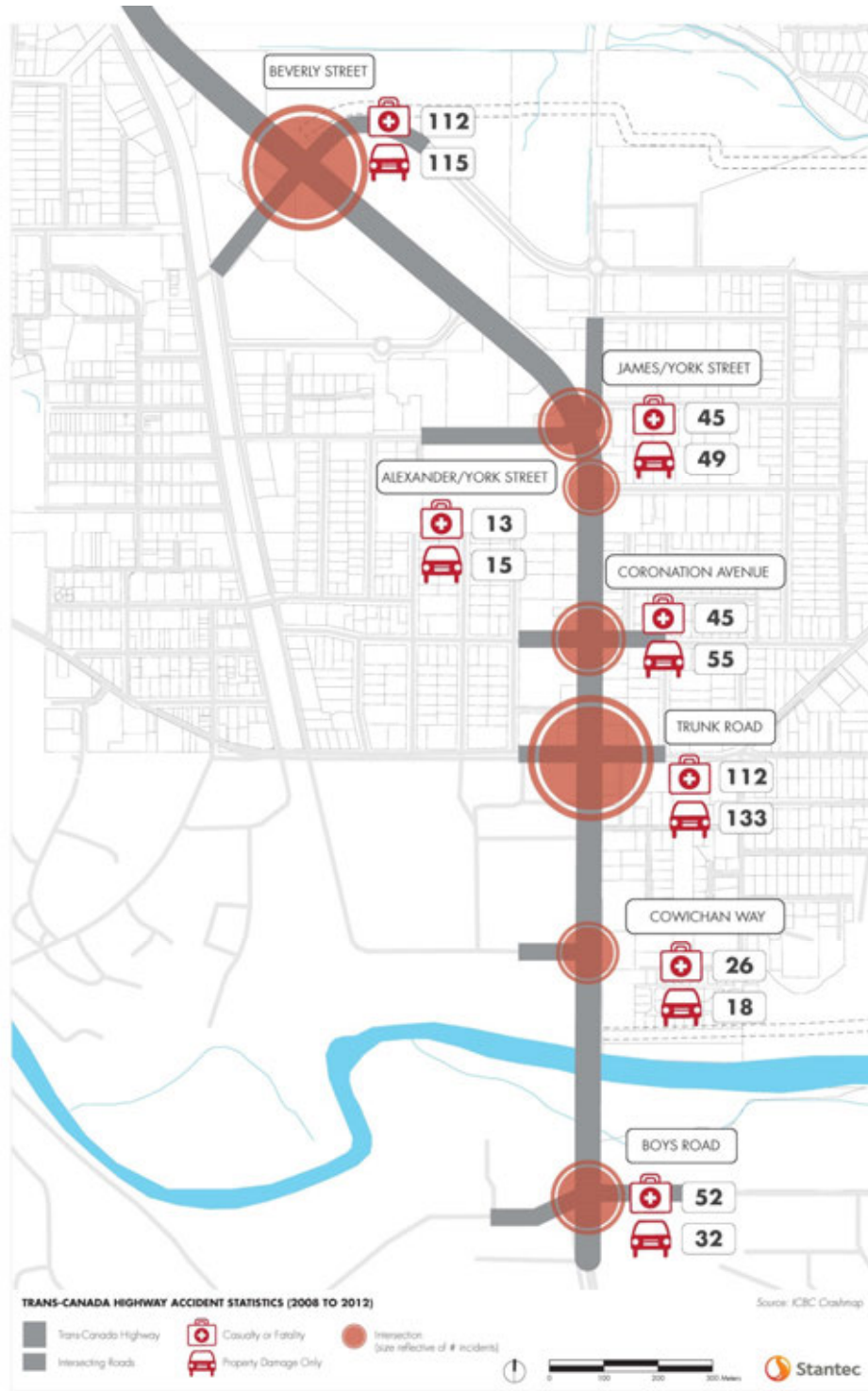


Figure 2 TCH Corridor Collision Data

(Data source: ICBC.com)



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3.0 Consultation

Proactive consultation with the local public, business owners, municipalities, transportation authorities, and Cowichan Tribes was done, 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:

- i) Public information and comment via 'Place Speak' website effective (January 2014 to March 25, 2014 for the CMP)
- ii) Cowichan Tribes / Environment Committee Meeting (November 29, 2013)
- iii) 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.
- iv) 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).
- v) TCH Business Owner's Meeting #1 (December 5, 2013)
- vi) TCH Business Owner's Meeting #2 (January 5, 2014)
- vii) Stakeholder Advisory Group (SAG) Meeting #4 (February 5, 2014)
- viii) Youth / Schools (February 2014)
- ix) Public Open House #2 (February 26, 2014) (Public Open House #1 was for the LAP only)
- x) Stakeholder Advisory Group (SAG) Meeting #5 (April 1, 2014)
- xi) Public Open House #3 (April 14, 2014)

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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:

- i) Safety of pedestrians, cyclists, and motorists along the corridor.
- ii) Traffic congestion for local traffic and through traffic travelling through the DNC and CoD between the cities of Nanaimo and Victoria.
- iii) Accessibility for emergency services.
- iv) Sustainability of local business and economy.
- v) Affordability of future infrastructure projects.

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.”

3.3 OPTION EVOLUTION

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:

Option 1 focused on active transportation and maintaining Trunk Road as the main entrance way to downtown Duncan.

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.

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.

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.

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Figure 3 Overall Corridor Option Evolution – Option 1

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Figure 4 Overall Corridor Option Evolution – Option 2



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Figure 5 Overall Corridor Option Evolution – Preferred Option

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3.3.1 Highway

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.

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Figure 6 Arterial Roadway Example

3.3.2 Intersections

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 meters 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

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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 due for the accommodation of 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 at or 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 7 Two Lane Roundabout Example

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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 the figure 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 8 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 being delayed by more than a few red lights. Signal coordination

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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.

3.3.3 Active Transportation

We looked at what could be done to improve active transportation along the corridor while ensuring safety and came up with a few options. Ideas brought forward include median / roadside fencing to discourage mid-block pedestrian crossing, 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.

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 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 3.3.7 TCH Traffic Calming** for illustrations of median fencing that we recommend implementing.



Figure 9 Pedestrian Fencing Example

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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 meter (minimum) to 4 meter (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 meter 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 meter multi-use path and the highway 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 meter shared outside lane which would not require a shoulder in place of having 3.7 meter outside lane which requires a minimum 1.5 meter shoulder. This 4.3 meter 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. Below is an illustration of an urban multi-use pathway in use.



Figure 10 Urban Multi-Use Pathway

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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.

3.3.4 Local Roadway Network

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 do 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. 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.

3.3.5 Access Management

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 impossible to provide safe access once traffic volumes reach certain levels. 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.

Permanent left turn direct TCH (partial) access removal via raised median would be ideal in terms of safety (reduces the likelihood of side impact and head-on collisions) and corridor beautification, but may have an impact on existing business. Direct right turn access is safer than left turn access by the nature of collisions that may occur being mostly rear impact (same direction collisions are generally less severe). 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 less likely to be looking for pedestrians and more likely to be looking at oncoming traffic. Permanent right turn direct TCH (complete) access removal while

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providing indirect back or side road access is much safer than highway access since back roads have lower speeds and any vehicles turning left are crossing much less traffic.

In order to provide adequate access to properties abutting the TCH where complete direct access is being removed, we propose that roadway right of way be acquired, as development permits or rezonings are sought, and that back road connections be constructed to the local roadway network for indirect access, as well as constructing shared parking areas on acquired parcels in strategic locations. 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. In the meantime, direct access will be reduced to eliminate second accesses and many left turn accesses, and pavement marking or colour-differentiated pavement is to be installed where sidewalks / pathways cross accesses. 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.

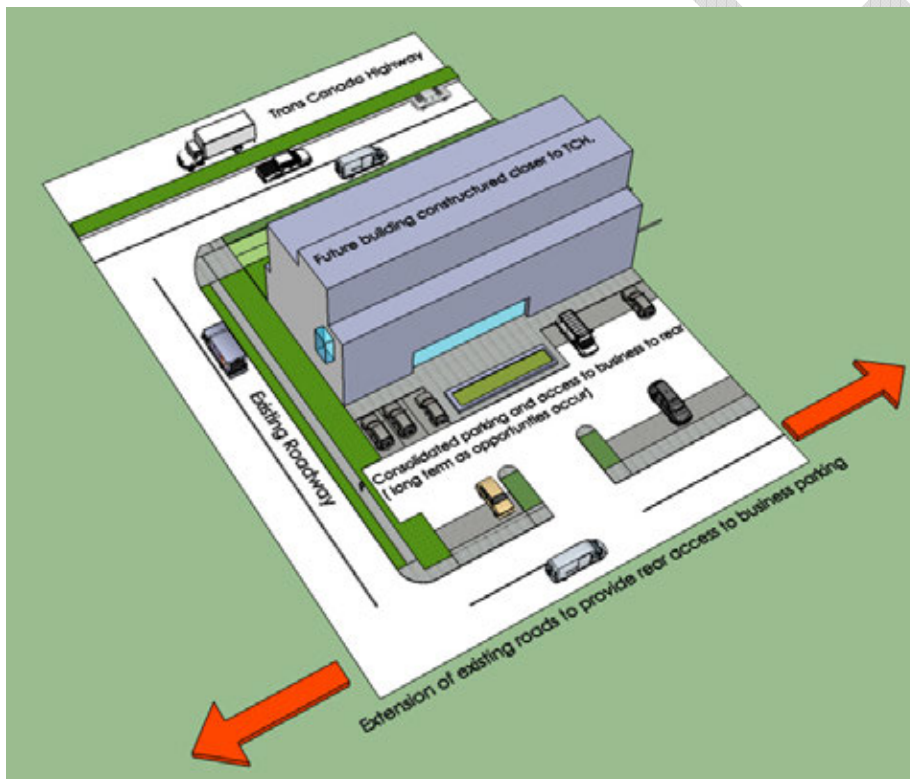


Figure 11 Future TCH Access Configuration Example

Some concerns have 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.

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3.3.6 Local Trail Network Connectivity

This option looked at other routes for cyclists and pedestrians to get to the downtown area and circulate around Duncan 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 active transportation route is the infrastructure required to cross the Cowichan River safely. None of the existing bridges has adequate width for the safe travel of both pedestrians and cyclists. In order for any of these alternate routes to be viable, a separate pedestrian / cyclist bridge would need to be constructed. The following figures 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.

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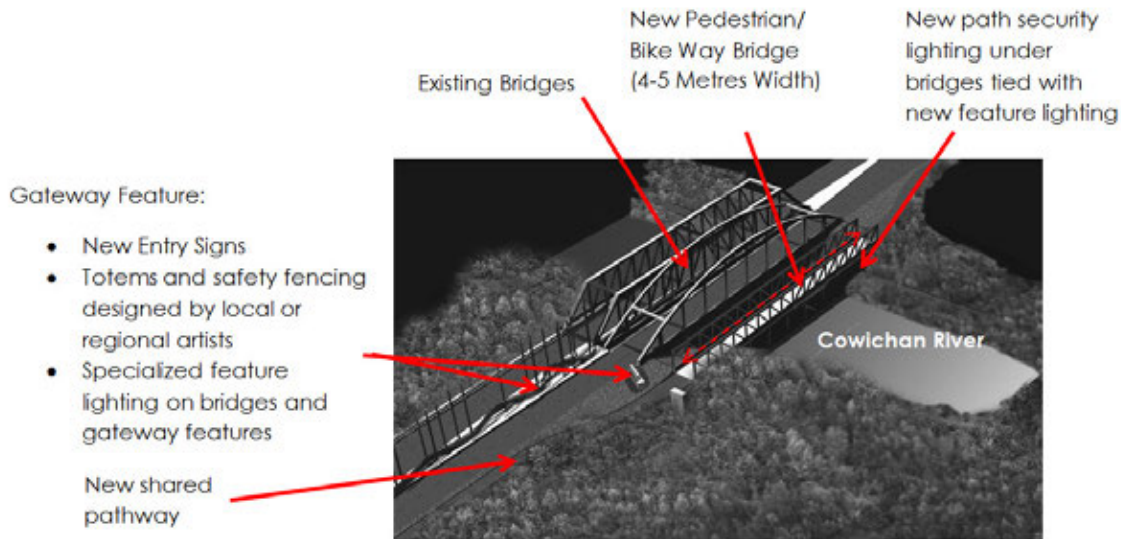
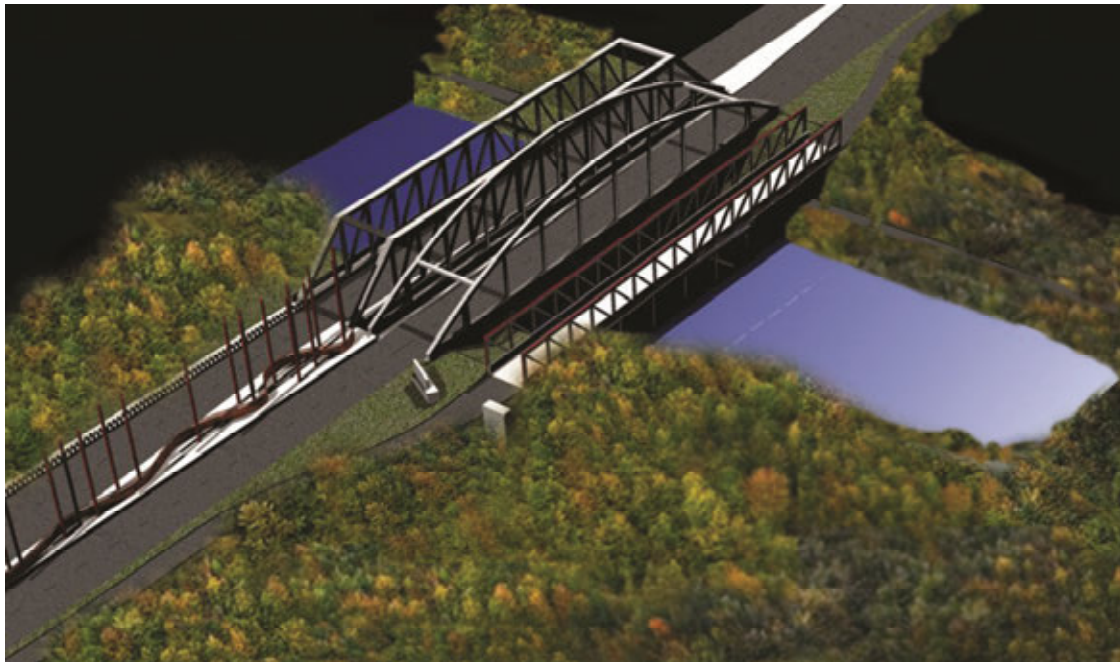


Figure 12 Cowichan River Trail Bridge and Gateway Concept

3.3.7 Traffic Calming

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. 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

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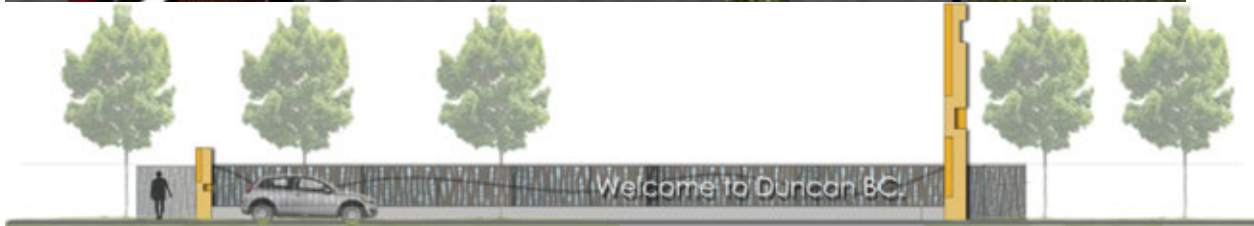
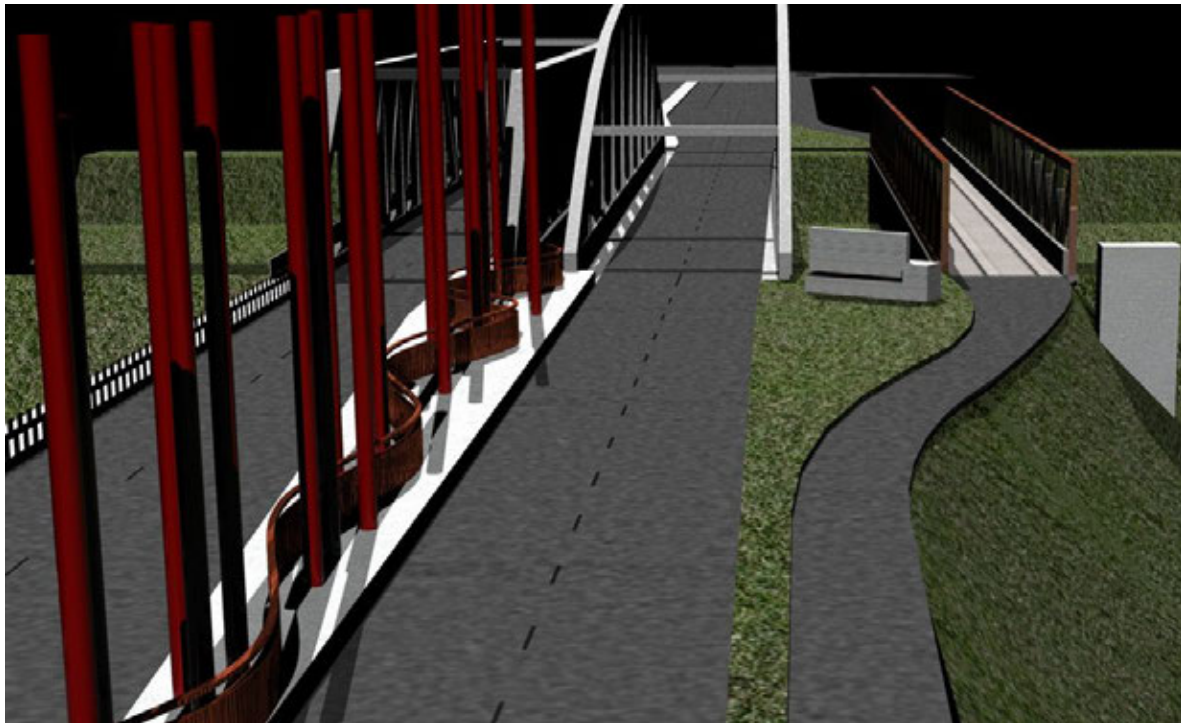
and roundels are discussed at length in **section 3.3.2 Intersections**; below are descriptions of the other traffic calming ideas.

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 providing pedestrian median fencing. 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.

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Gateway Feature:

- New Entry Signs
- Totems and safety fencing designed by local or regional artists
- Specialized feature lighting on fencing /gateway features

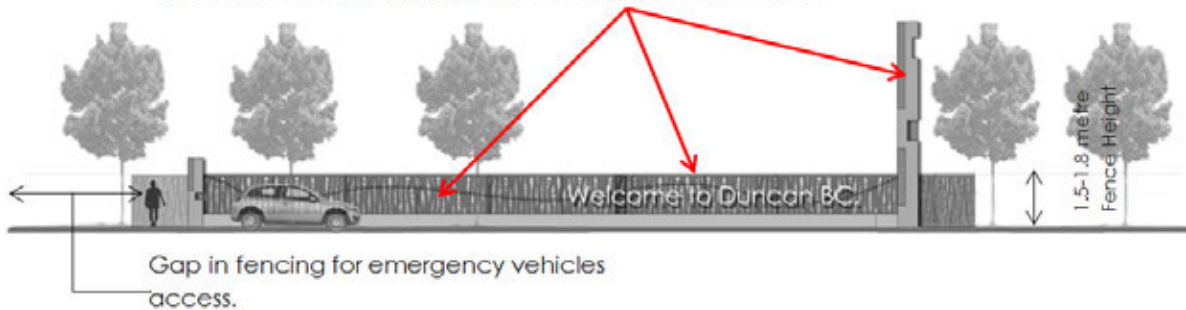


Figure 13 Gateway Improvement Examples at the Cowichan River Bridges

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The Cowichan River Bridges are currently in a state of delayed painting maintenance due to environmental sensitivity surrounding the removal of the 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 below.



Figure 14 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.



Figure 15 Gateway Improvement Examples at Beverly Street



Figure 16 Gateway Feature Structures Community Building Examples

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 transition

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to 50km/h at the north end of the corridor further north to be in advance of Beverly Street gateway for southbound traffic.

Radars 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.



Figure 17 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. 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 18 Permanent Roadside Changeable Message Sign Example

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Traffic Calming Pavement Marking

Some roadway authorities in other jurisdictions in the UK and the United States have tried different pavement marking schemes to 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 a safe and cost effective alternative for influencing driver behavior without limiting large vehicle maneuverability and can easily be removed if proven ineffective. While not currently in the Canadian or British Columbian pavement marking standards; however, a test case could be applied for and perhaps tested in lower traffic volume locations. The following are some images of what has been tried elsewhere in terms of traffic calming pavement markings.

We do, however, recommend the installation of pavement markings or color-differentiated pavement along the sidewalks / pathways that cross any driveways that will remain in order to alert the entering motorists that there may be pedestrians present (as shown in **Figure 4.1**).



Figure 19 Traffic Calming Pavement Marking Examples

3.3.8 Pedestrian and Cyclist TCH Crossings

Pedestrian and cyclist safety while crossing the TCH is a major concern as these corridor users are the most vulnerable during collisions. Several options are available to enhance crossing safety: pedestrian tunnel(s)/underpass(es), pedestrian overpass(es), pedestrian activated traffic signals, 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

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expenditure required to provide a welcoming underground structure. Below are some examples of appropriate scale and lighting for pedestrian comfort in tunnels.

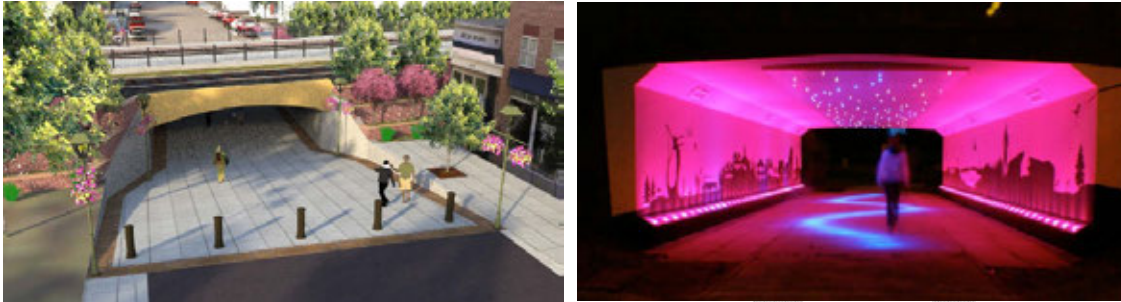


Figure 20 Pedestrian Tunnel / Underpass Example

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 follow through. Any pedestrian structure should be constructed in conjunction with the recommended median fencing treatment described above. Below are some examples of attractive pedestrian overpasses.



Figure 21 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.

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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 the image 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.



Figure 22 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 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 23 Public Education Initiatives Examples

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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.



Figure 24 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.

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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.



Figure 25 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 below, 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.

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Figure 26 Pedestrian Crossing Innovations

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3.3.9 Summary Table

While no solution is perfect, we endeavor to provide the most reasonable solutions. Below is a table that summarizes the options described above 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 1 Improvement Options Evaluation Summary

Improvement / Evaluation Criteria	Safety (Ped.)	Safety (Veh.)	Traffic Flow	Emergency Access	Economic Sustainability	Cost	Environment Impact
TCH Widening							
Continuous RT Only Lanes							
One Way Highway Couplet							
Alternate TCH Route							
Add Intersection Turn Lanes							
Intersections Grade Separation							
East / West One Way Couplet							
Roundabouts							
Shared Space Roundels							
Signal Optimiz. / Coord.							
Pedestrian Fencing							
Multi-Use Paths							
Transit Exchange							
Transit Exchange/Park N Ride							
Local Road Network Connect.							
Direct TCH Access Removal							
Trail Network Connections							
Gateways							
Posted Speed Reduction							
Radar Speed Signs							
Permanent Changeable Message Signs							

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Improvement / Evaluation Criteria	Safety (Ped.)	Safety (Veh.)	Traffic Flow	Emergency Access	Economic Sustainability	Cost	Environment Impact
Traffic Calming Pavement Markings	Yellow	Yellow	Yellow	Yellow	Yellow	Light Green	Grey
Pavement Markings Across Driveways	Light Green	Light Green	Yellow	Light Green	Light Green	Light Green	Grey
Pedestrian Tunnel(s)	Yellow	Light Green	Green	Yellow	Yellow	Orange	Grey
Pedestrian Overpass(es)	Green	Green	Green	Yellow	Yellow	Orange	Grey
Pedestrian Signals	Light Green	Yellow	Orange	Yellow	Yellow	Yellow	Grey
Pedestrian Count-Down Indicators	Green	Light Green	Light Green	Grey	Grey	Light Green	Grey
Pedestrian Education Initiatives	Light Green	Yellow	Yellow	Grey	Grey	Green	Grey
Under Bridge Lighting for Path	Light Green	Yellow	Light Green	Grey	Grey	Yellow	Orange
Corner Curb Bulb-Outs	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Grey
Pedestrian Crossing Innovations	Light Green	Light Green	Yellow	Yellow	Yellow	Orange	Grey

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4.0 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.

4.1 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.

4.1.1 Boys Road to Cowichan Way

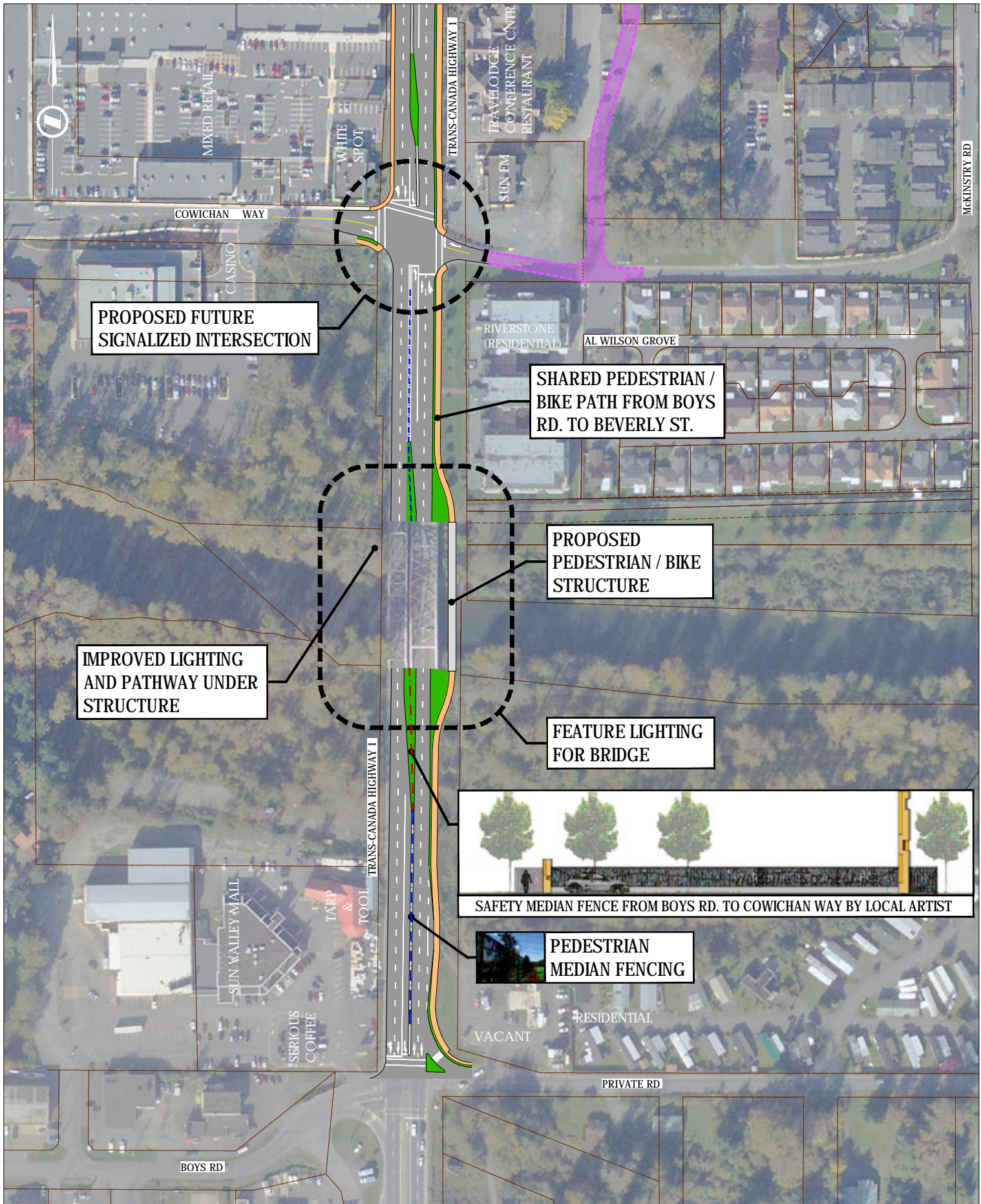
There is a considerable amount of pedestrian traffic traveling along the TCH from the residential areas along the east side of the TCH, especially in the area near Boys Road northward over the existing bridges to the commercial developments on the west side just north of Cowichan Way. The existing TCH 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 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 meters 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



- Proposed Highway
- Proposed Sidewalk
- Proposed Landscaping
- Future Connections
- Proposed Crosswalk
- Directional Arrow
- Lane Lines
- Median Fencing

FIGURE 4.1A
TRANS CANADA HIGHWAY
EXISTING CONDITION
BOYS ROAD TO COWICHAN WAY



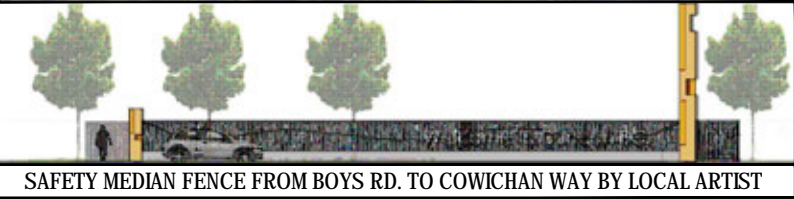
PROPOSED FUTURE SIGNALIZED INTERSECTION

SHARED PEDESTRIAN / BIKE PATH FROM BOYS RD. TO BEVERLY ST.

PROPOSED PEDESTRIAN / BIKE STRUCTURE

IMPROVED LIGHTING AND PATHWAY UNDER STRUCTURE

FEATURE LIGHTING FOR BRIDGE



PEDESTRIAN MEDIAN FENCING

- Proposed Highway
- Proposed Sidewalk
- Proposed Landscaping
- Future Connections
- Proposed Crosswalk
- Directional Arrow
- Lane Lines
- Median Fencing



FIGURE 4.1B
TRANS CANADA HIGHWAY
TRANSPORTATION PLANNING
BOYS ROAD TO COWICHAN WAY

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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.

Another way to increase the separation between pedestrians and vehicle traffic is to widen the outside lanes from 3.7 meters to a 4.3 meter 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 meters 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.

4.1.2 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 boulevard separating the existing sidewalk from the traveled lanes.

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Upgrading the sidewalk along the east side of the TCH between Cowichan Way and James Street / York Road to a 3 meter wide (minimum) multi- use pathway with a 1 meter wide (minimum) boulevard and 4.3 meter 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.

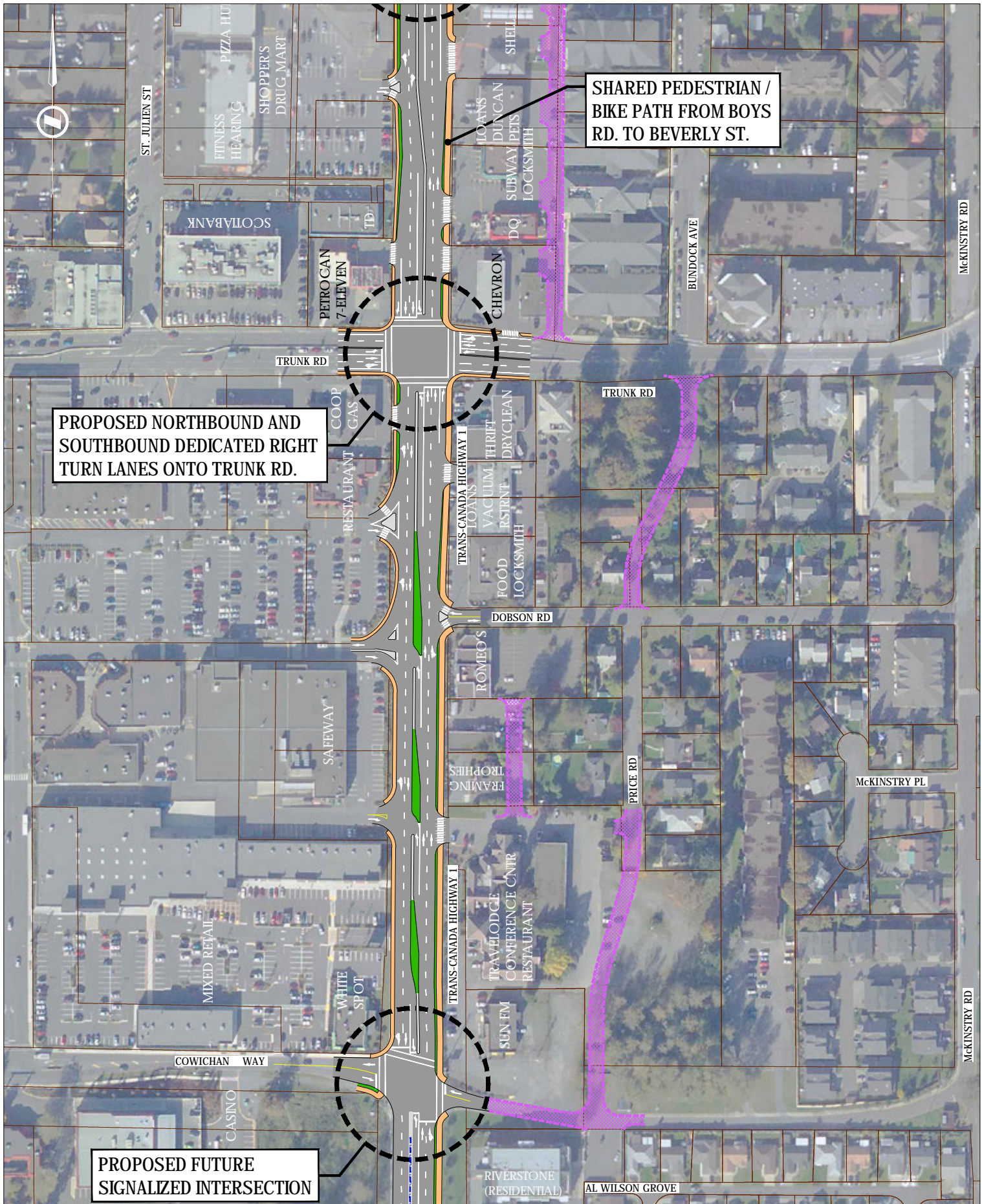
DRAFT



- Proposed Highway
- Proposed Sidewalk
- Proposed Landscaping
- Future Connections
- Proposed Crosswalk
- Directional Arrow
- Lane Lines
- Median Fencing

FIGURE 4.2A
TRANS CANADA HIGHWAY
EXISTING CONDITION
COWICHAN WAY TO TRUNK ROAD





PROPOSED NORTHBOUND AND SOUTHBOUND DEDICATED RIGHT TURN LANES ONTO TRUNK RD.

SHARED PEDESTRIAN / BIKE PATH FROM BOYS RD. TO BEVERLY ST.

PROPOSED FUTURE SIGNALIZED INTERSECTION



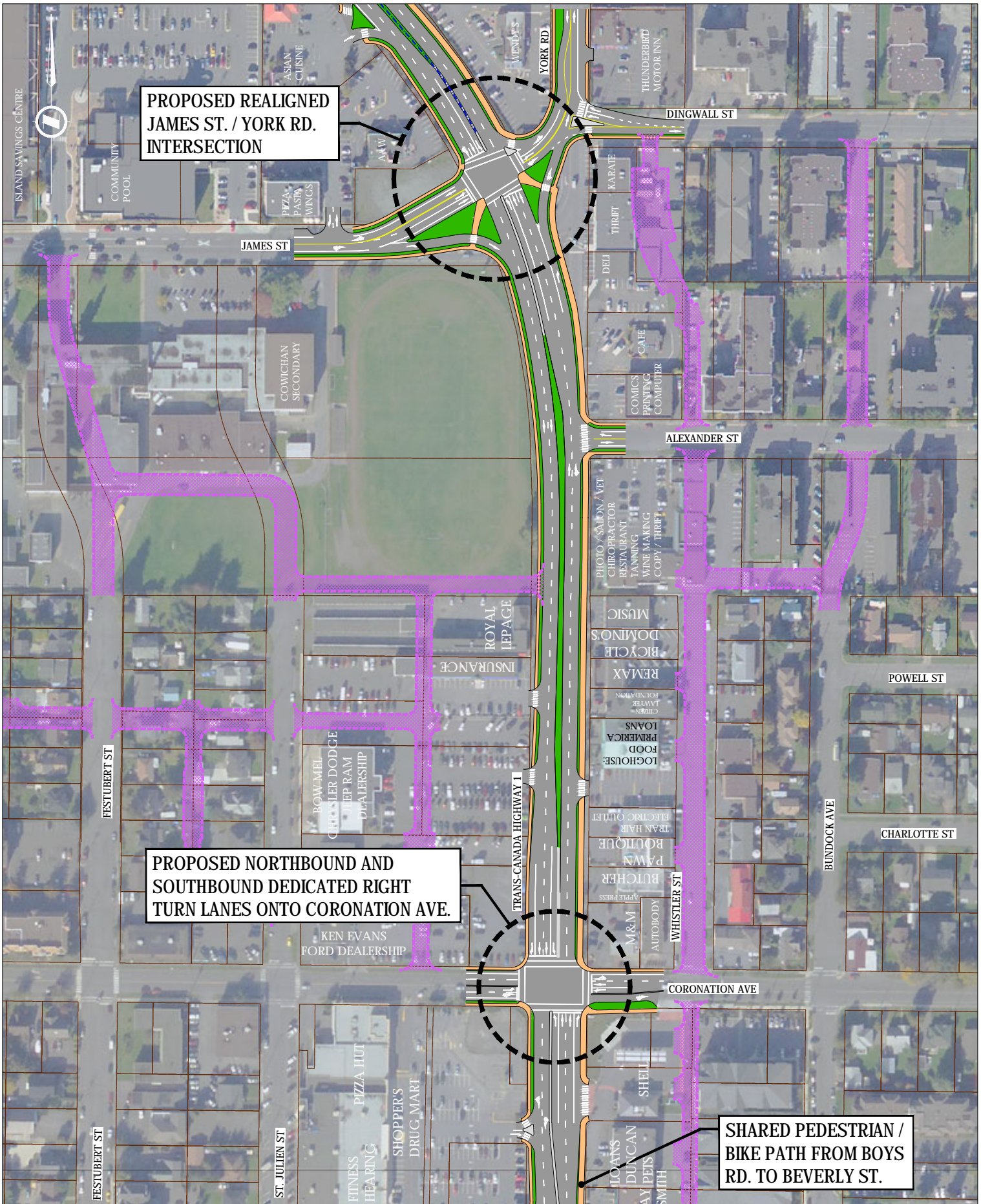
- Proposed Highway
- Proposed Sidewalk
- Proposed Landscaping
- Future Connections
- Proposed Crosswalk
- Directional Arrow
- Lane Lines
- Median Fencing

FIGURE 4.2B
TRANS CANADA HIGHWAY
TRANSPORTATION PLANNING
COWICHAN WAY TO TRUNK ROAD



- Proposed Highway
- Proposed Sidewalk
- Proposed Landscaping
- Future Connections
- Proposed Crosswalk
- Directional Arrow
- Lane Lines
- Median Fencing

FIGURE 4.3A
TRANS CANADA HIGHWAY
EXISTING CONDITION
TRUNK ROAD TO JAMES STREET / YORK ROAD



**PROPOSED REALIGNED
JAMES ST. / YORK RD.
INTERSECTION**

**PROPOSED NORTHBOUND AND
SOUTHBOUND DEDICATED RIGHT
TURN LANES ONTO CORONATION AVE.**

**SHARED PEDESTRIAN /
BIKE PATH FROM BOYS
RD. TO BEVERLY ST.**

- Proposed Highway
- Proposed Sidewalk
- Proposed Landscaping
- Future Connections
- Proposed Crosswalk
- Directional Arrow
- Lane Lines
- Median Fencing



**FIGURE 4.3B
TRANS CANADA HIGHWAY
TRANSPORTATION PLANNING
TRUNK ROAD TO JAMES STREET / YORK ROAD**

TRANS CANADA HIGHWAY – DRAFT CORRIDOR MANAGEMENT PLAN: BOYS ROAD TO BEVERLY STREET

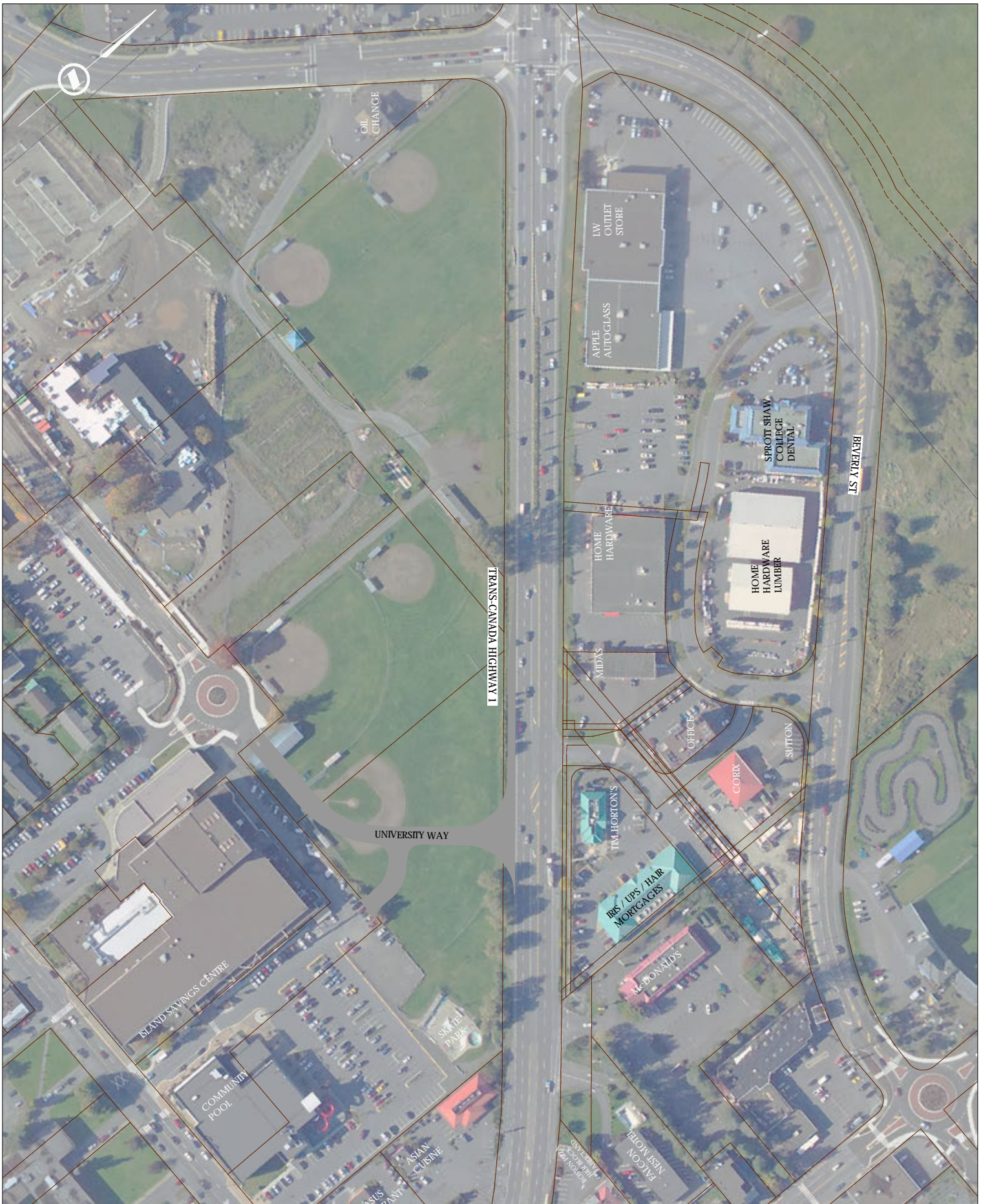
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Along the east side of the TCH from Cowichan Way to York Road, there are a large number of access / egress points to existing businesses which create movement conflicts between pedestrians and vehicles, movement conflicts between local traffic and 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.

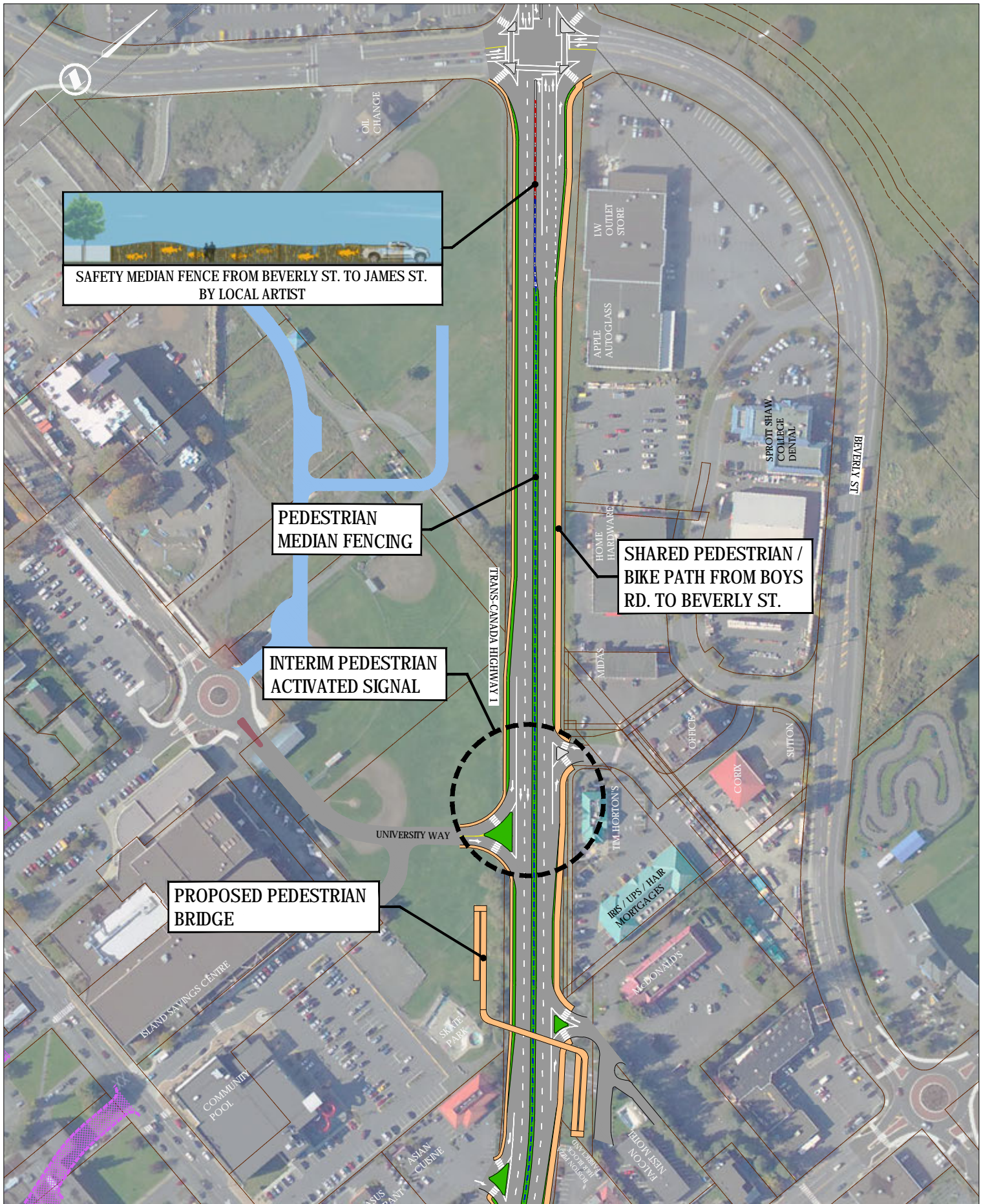
4.1.3 James Street / York Road to Beverly Street

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.



- Proposed Highway
- Proposed Sidewalk
- Proposed Landscaping
- Future Connections
- Proposed Crosswalk
- Directional Arrow
- Lane Lines
- Median Fencing

FIGURE 4.4A
TRANS CANADA HIGHWAY
EXISTING CONDITION
JAMES STREET / YORK ROAD TO BEVERLY STREET



- Proposed Highway
- Proposed Sidewalk
- Proposed Landscaping
- Future Connections
- Proposed Crosswalk
- Directional Arrow
- Lane Lines
- Median Fencing

FIGURE 4.4B
TRANS CANADA HIGHWAY
TRANSPORTATION PLANNING
JAMES STREET / YORK ROAD TO BEVERLY STREET

TRANS CANADA HIGHWAY – DRAFT CORRIDOR MANAGEMENT PLAN: BOYS ROAD TO BEVERLY STREET

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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 meter wide multi- use pathway with 1 meter wide (minimum) boulevard along the east side of the TCH and 4.3 meter 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 meter wide sidewalk and 1 meter 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 and unsafe mid-block pedestrian crossings and provide another opportunity to create inviting gateway features for motorists entering the community from the north.

4.2 TRANSIT

BC Transit plans and implementation will continue to evolve as the DNC and CoD continue 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.

4.3 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.

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4.3.1 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 will 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.

4.3.2 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.

4.4 ROAD NETWORK

4.4.1 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

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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:

- i) 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
- ii) Cowichan Way – Currently an unsignalized right in / right out T-intersection. This intersection is used frequently by local NB traffic to access the downtown core.
- iii) Dobson Road – Currently a right in / right out configuration with a raised median along the TCH prohibiting left turn movements.
- iv) 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.
- v) Coronation Avenue – This is also a full movement intersection and has dedicated left turn lanes on all four quadrants and pedestrian cross-walks on all four legs.
- vi) Alexander Street – This is an unsignalized T-intersection with a dedicated SB to EB left turn off of the TCH.
- vii) 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.
- viii) University Way – This is a relatively new T-intersection providing right in / right out only access to community amenities and University of Vancouver Island campus.
- ix) 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.

4.4.2 Proposed Works

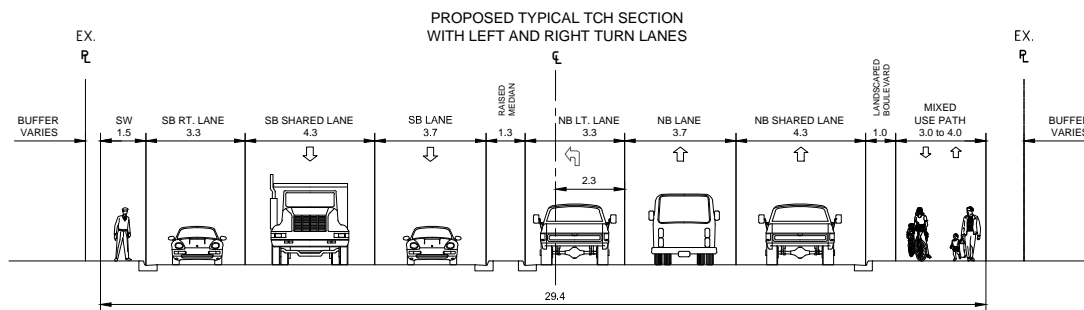
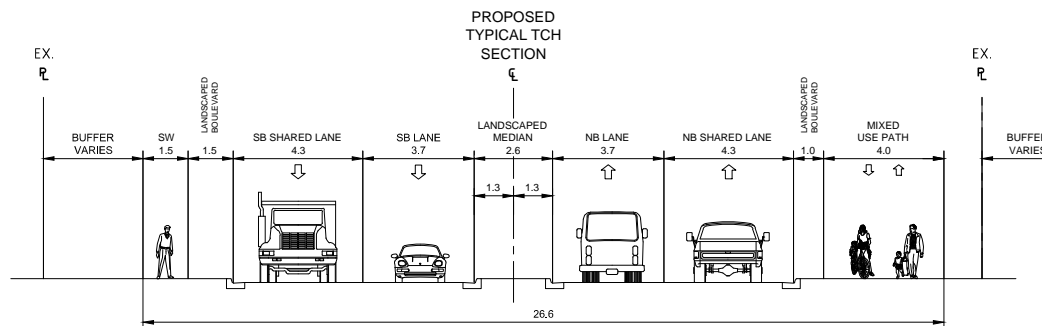
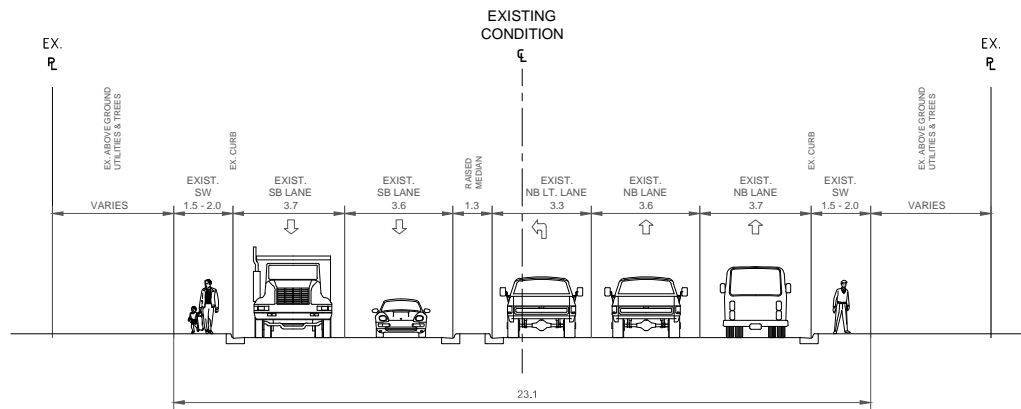
The proposed works along the TCH corridor could include works mentioned above such as median treatments and dedicated multi-use paths for pedestrians and bicycles, as well as the following:

- i) Upgrading 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.

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- ii) It is proposed to 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 the option of continuing north along the TCH or heading west along Cowichan Way to the downtown core.
- iii) Helping alleviate northbound and southbound traffic congestion at both the Trunk Road intersection, and Coronation Avenue intersection, by providing dedicated right turn lanes off of the TCH.
- iv) Making 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 revised James Street / York road intersection and garner access via the proposed backage roads connecting Dingwall Street to Alexander Street.
- v) Due to the tight and awkward configuration of the existing James Street / York Road intersection, it is proposed to move the intersection northward to allow clearer sightlines and provide more left turn storage. This intersection would then also include dedicated right turn lanes EB to SB from James Street to the TCH and NB from the TCH to York Road. As this is a significant change to the existing infrastructure of the intersection, it is proposed as a medium / long term solution that may come into effect as congestion at the existing intersection continues to grow.
- vi) With the advent of median fencing 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. A proposed interim pedestrian activated signal, located near University Way, would be a short term solution with the provision that should growth in this area continue and funding be available, that a full pedestrian overpass may be constructed in the future.
- vii) 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.



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4.5 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.

4.6 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 “Main Street” focus for future residential and retail uses.

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5.0 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:

- Improving safety along the corridor, especially at intersections and for pedestrians.
- Improving traffic flow in, out, and through the corridor.
- Maintaining accessibility for emergency vehicles.
- Maintaining 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:

- i) Short term (approximately 1 - 5 years) - will help alleviate immediate concerns.
- ii) 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.
- iii) Long term (approximately 10 - 20+ years) – will address future corridor needs while taking into consideration the LAP.

Where “shall” 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.

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Where “should” 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.

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5.1 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.

5.1.1 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 meter 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 meter wide landscaped boulevard between intersections where right-of-way exists and where feasible.
- 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) meters shall be provided, separated from the TCH by a raised curb and gutter as a minimum, and a 1 meter boulevard where right-of-way exists and where feasible.
- Paint lines to delineate the sidewalks and multi- use pathways across driveway let-downs should be installed to aid in alerting drivers of the potential presence of pedestrians and cyclists.
- 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.

Cost Estimate: \$Pending

5.1.2 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 and elders 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.

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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.

5.1.2.1 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.
- Pedestrian indicators shall be upgraded to include count-down indicators.

Cost Estimate: \$Pending (excludes phase timing upgrades)

5.1.2.2 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.

Cost Estimate: \$Pending

5.1.2.3 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.
- All pedestrian and cycling pathways and roadway crossings shall have adequate lighting (to current standards) to ensure pedestrian and cyclist visibility during nighttime hours.

Cost Estimate: \$Pending

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April 11, 2014

5.1.2.4 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 3.3.8 Pedestrian and Cyclist TCH Crossings**.
- Permanent Changeable Messaging Signs shall be erected in advance of the urban area to alert motorists of the upcoming active pedestrian and cyclist area. Messages should be changed every 6 months at a minimum to keep messages fresh in motorist consciousness. Messages may also be changed at any time for emergency use.

Cost Estimate: \$Pending

5.1.3 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 shall 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 shall be granted for any one parcel abutting the TCH.
- Any parking areas with inadequate area for the safe maneuvering of vehicles without backing onto pedestrian / cyclist areas or the TCH shall be 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 will be purchased, when the funds and opportunity become available, and maintained by shared agreement between the appropriate municipality and the Province to provide temporary shared parking for businesses with parking

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and access removed. Upon long term re-development, governments may choose to re-sell these parcels to private ownership.

- Bylaw(s) will be created to address the granting of permits for parcels abutting the TCH that will state that: prior to any change in land use, ownership, or zoning, 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.
- Raised median will be constructed in areas where left turn access is being removed as described in **section 5.1.4 Median Treatments (ST)**.

Cost Estimate: \$Pending (excludes median treatment)

5.1.4 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.

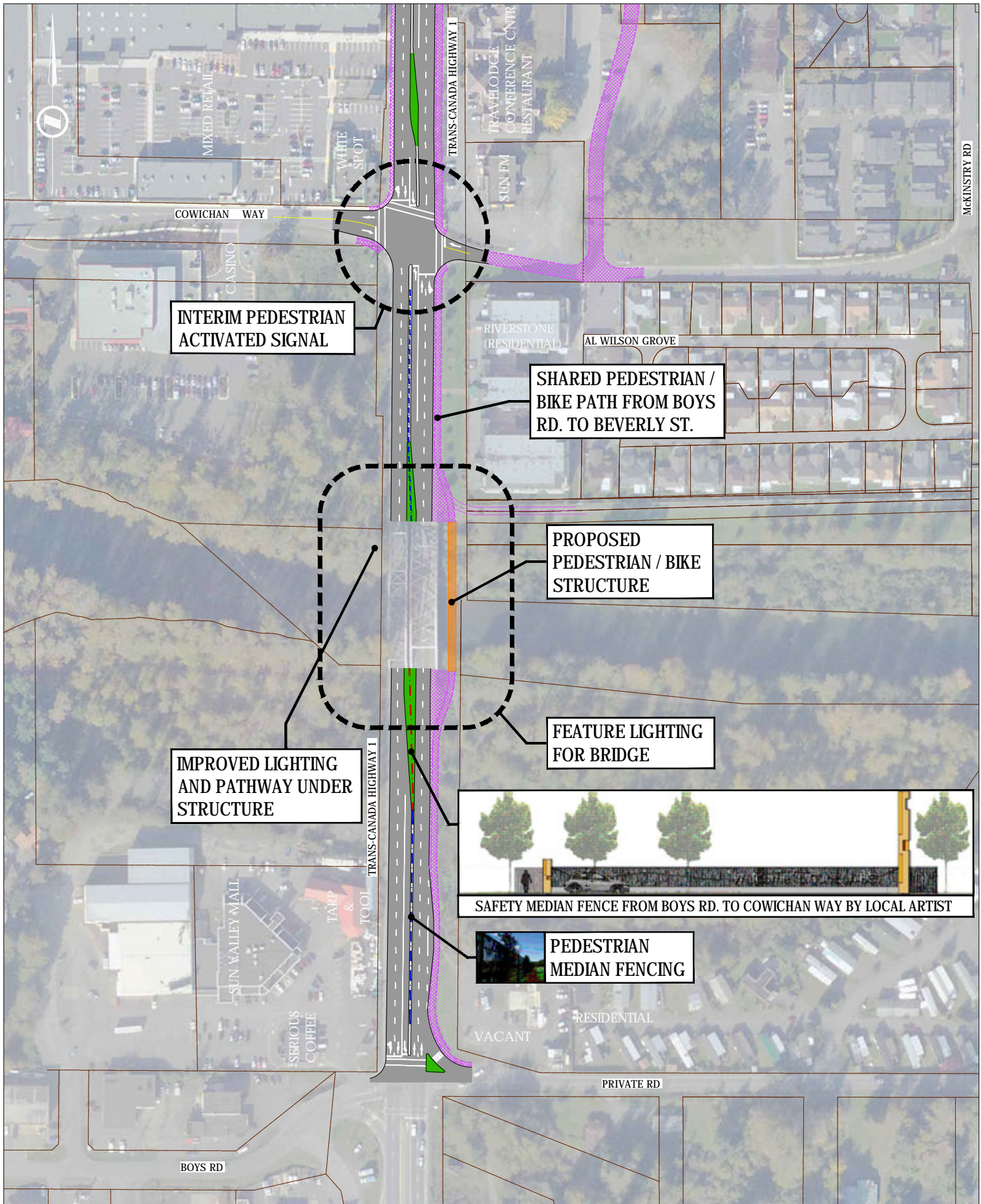
Policies:

- 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.
- 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 **Figures 5.1 to 5.4** 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.
- Median should have appropriate landscaping and/or rain gardens wherever median width allows.

Cost Estimate: \$Pending (excludes artistic fencing and landscaping within gateway areas)

5.1.5 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



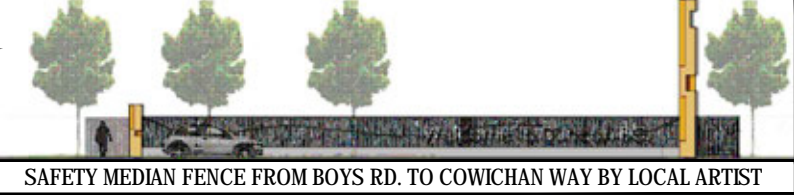
INTERIM PEDESTRIAN ACTIVATED SIGNAL

SHARED PEDESTRIAN / BIKE PATH FROM BOYS RD. TO BEVERLY ST.

PROPOSED PEDESTRIAN / BIKE STRUCTURE

FEATURE LIGHTING FOR BRIDGE

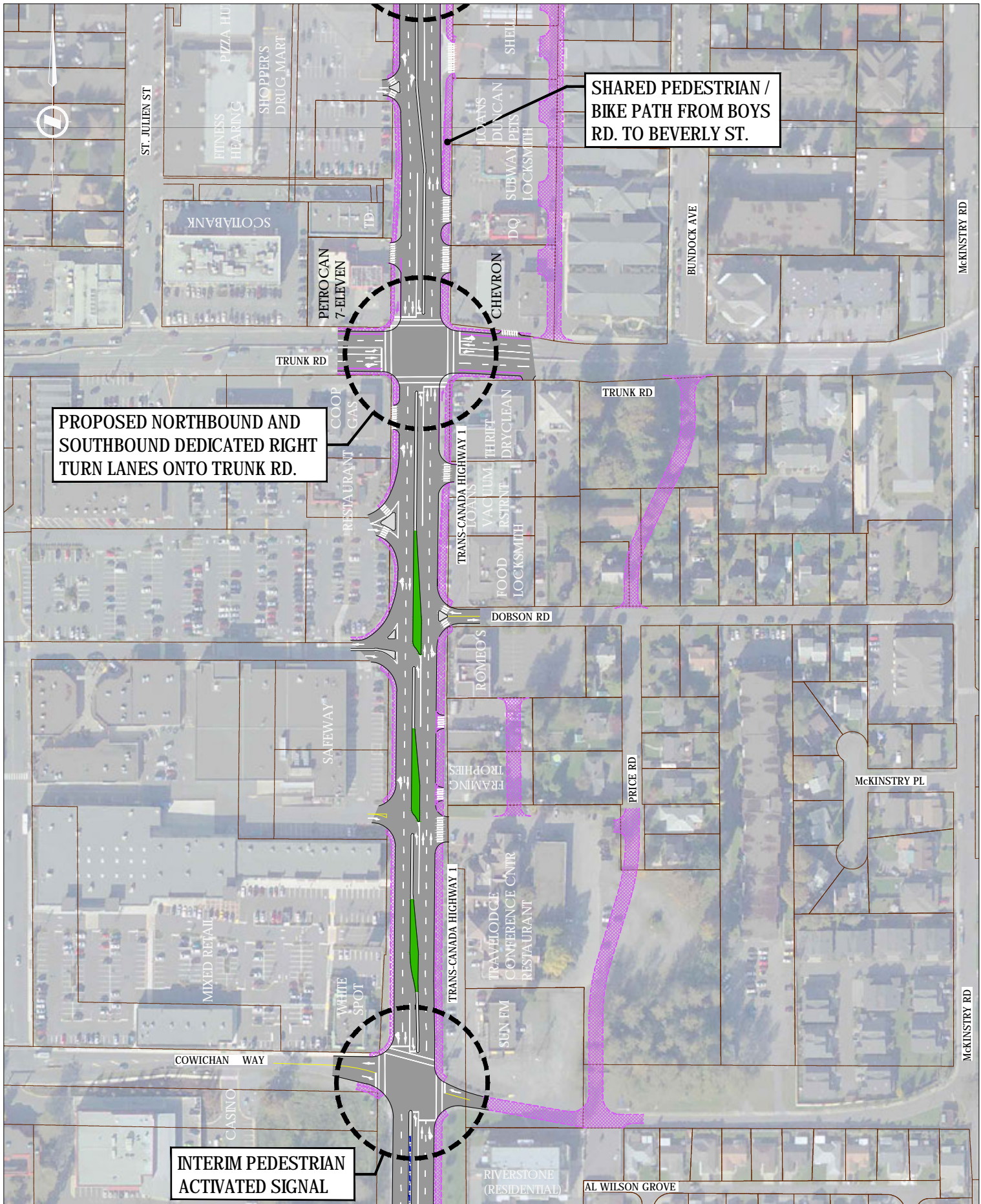
IMPROVED LIGHTING AND PATHWAY UNDER STRUCTURE



- Proposed Sidewalk
- Proposed Landscaping
- Medium Term Project
- Long Term Project
- Proposed Crosswalk
- Directional Arrow
- Lane Lines
- Median Fencing

FIGURE 5.1
TRANS CANADA HIGHWAY
TRANSPORTATION PLAN
PROJECT SEQUENCE
BOYS ROAD TO COWICHAN WAY





PROPOSED NORTHBOUND AND SOUTHBOUND DEDICATED RIGHT TURN LANES ONTO TRUNK RD.

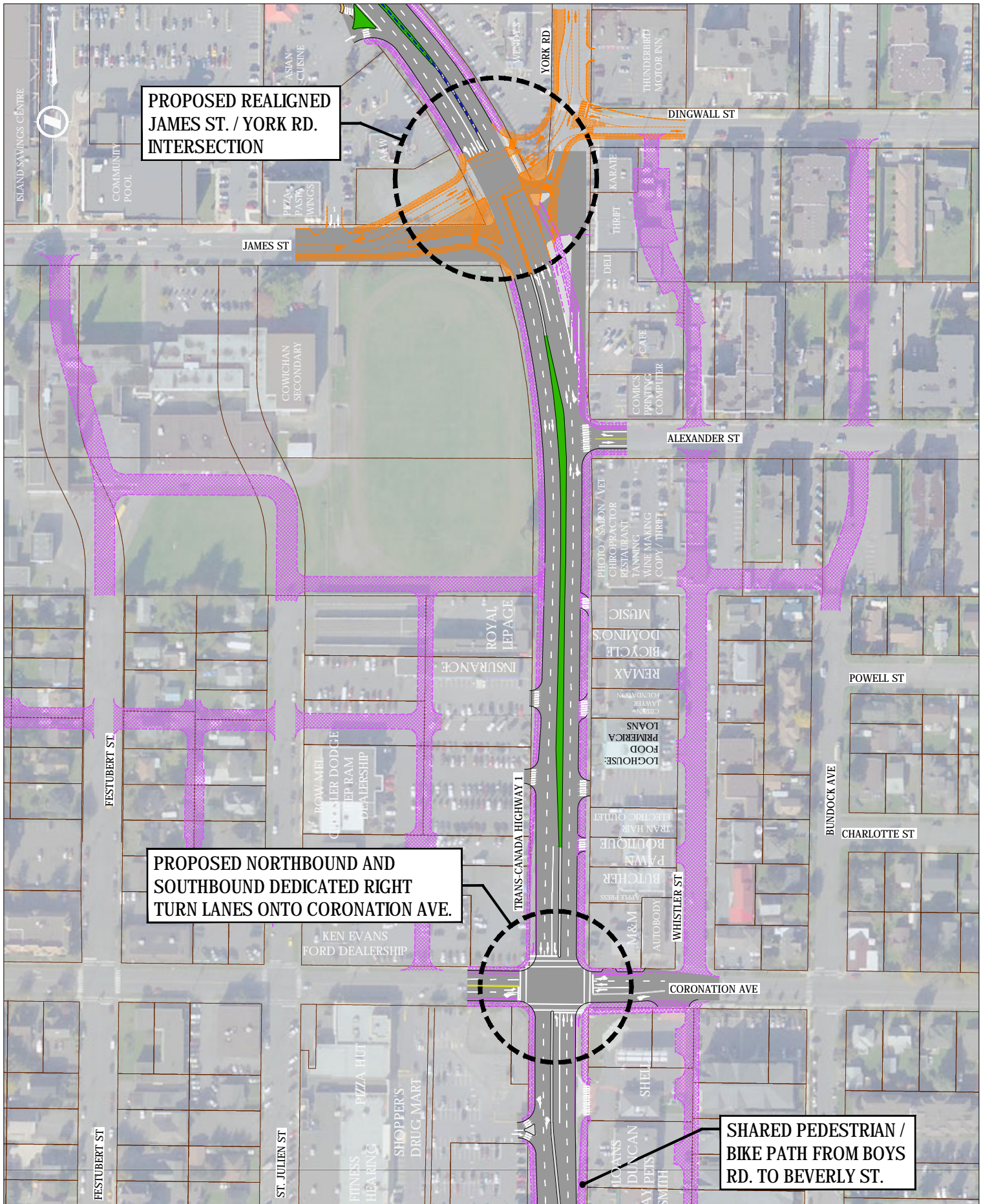
SHARED PEDESTRIAN / BIKE PATH FROM BOYS RD. TO BEVERLY ST.

INTERIM PEDESTRIAN ACTIVATED SIGNAL

- Proposed Sidewalk
- Proposed Landscaping
- Medium Term Project
- Long Term Project
- Proposed Crosswalk
- Directional Arrow
- Lane Lines
- Median Fencing

FIGURE 5.2
TRANS CANADA HIGHWAY
TRANSPORTATION PLAN
PROJECT SEQUENCE
COWICHAN WAY TO TRUNK ROAD





**PROPOSED REALIGNED
JAMES ST. / YORK RD.
INTERSECTION**

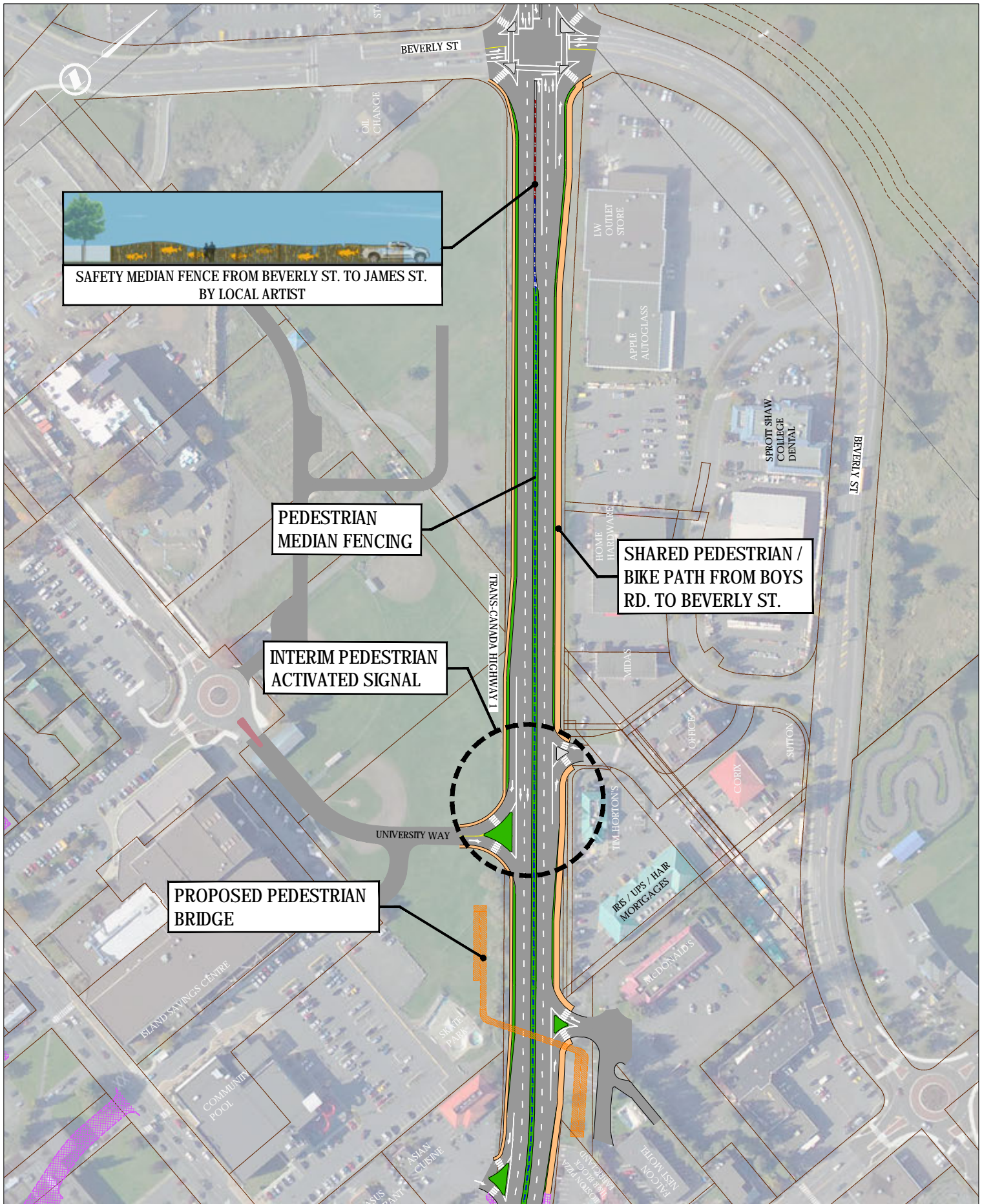
**PROPOSED NORTHBOUND AND
SOUTHBOUND DEDICATED RIGHT
TURN LANES ONTO CORONATION AVE.**

**SHARED PEDESTRIAN /
BIKE PATH FROM BOYS
RD. TO BEVERLY ST.**



- Proposed Sidewalk
- Proposed Landscaping
- Medium Term Project
- Long Term Project
- Proposed Crosswalk
- Directional Arrow
- Lane Lines
- Median Fencing

**FIGURE 5.3
TRANS CANADA HIGHWAY
TRANSPORTATION PLAN
PROJECT SEQUENCE
TRUNK ROAD TO JAMES STREET / YORK ROAD**



SAFETY MEDIAN FENCE FROM BEVERLY ST. TO JAMES ST.
BY LOCAL ARTIST

PEDESTRIAN
MEDIAN FENCING

INTERIM PEDESTRIAN
ACTIVATED SIGNAL

PROPOSED PEDESTRIAN
BRIDGE

SHARED PEDESTRIAN /
BIKE PATH FROM BOYS
RD. TO BEVERLY ST.



- Proposed Sidewalk
- Proposed Landscaping
- Medium Term Project
- Long Term Project
- Proposed Crosswalk
- Directional Arrow
- Lane Lines
- Median Fencing

FIGURE 5.4
TRANS CANADA HIGHWAY
TRANSPORTATION PLAN
PROJECT SEQUENCE
JAMES STREET / YORK ROAD TO BEVERLY STREET

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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.
- 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.
- Permanent electronic road-side radar speed signs shall 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.
- Moving the speed reduction zone further north of Beverly Street should be considered.
- The Cowichan River Bridges should be repainted to keep up with maintenance and enhance their appearance.
- Feature lighting should be installed on the Cowichan River Bridges to enhance their appearance.
- Where median and boulevard width permit in the gateway areas, there shall be landscaping installed that is coordinated with and enhances the appearance of the gateway features.

Cost Estimate: \$Pending

5.1.6 Intersection Upgrades (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 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).

Cost Estimate: \$Pending



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5.1.7 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.

5.1.7.1 Future Local Roadways Property Acquisition

Policies:

- Road right of way shall 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
 - Extend Price Road to Al Wilson Grove
 - Provide for a backage road parallel to Price Road connecting properties along TCH south of Dobson as shown on **Figure 5.1**.
 - Extend Bundock Avenue south to connect with Price Road at Dobson Road.
 - Extend Whistler Street south to Trunk Road.
 - Extend Whistler Street north across Alexander Road to Dingwall Street.
 - Extend Bundock Avenue north across Alexander Road to Dingwall Street.
 - Connect Bundock Avenue and Whistler Street between Alexander Street and Powell Street.
 - Extend Festubert Street north to James Street.
 - Extend St. Julien Street north and west to Festubert Street.
 - Revise backage road connection between the TCH and St. Julien Street at the south end of the Cowichan Secondary property.
 - 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.

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- Connect the roadway described above to Coronation Avenue.
- Create various other connections in the area between the TCH and Duncan Avenue as per the LAP document.

Cost Estimate: \$ Pending

5.1.8 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.

Cost Estimate: \$0

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5.2 MEDIUM TERM PROJECTS

Medium term (MT) projects are categorized as larger scale improvements and can be implemented without depending on large population demand triggers.

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

Policies:

In the medium term, the following policies shall be implemented to achieve the Corridor Objectives:

- A multi-use paved pathway of at least three (3) meters (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 meter boulevard where right-of-way exists and where feasible.
- 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.

Cost Estimate: \$ Pending

5.2.2 Pedestrian and Cyclist TCH Crossings (MT)

5.2.2.1 Cowichan Way Signalized Intersection

Policies:

- The pedestrian activated signal at Cowichan Way and the Trans Canada Highway should be upgraded to a full signalized intersection as traffic demands and the need for better corridor signal coordination increases.
- 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.

Cost Estimate: \$ Pending

5.2.2.2 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.

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- 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.

Cost Estimate: \$ Pending

5.2.3 Accesses (MT)

Policies:

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

- Prior to any change in land use, ownership, or zoning, 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.
- 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.

Cost Estimate: \$ Pending

5.2.4 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.

Cost Estimate: \$ Pending

5.2.5 Gateway Improvements (MT)

Policies:

Any gateway improvements that were not constructed during the Short Term should be constructed during the Medium Term.

Cost Estimate: Refer to Short Term Recommended Projects

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5.2.6 Intersection Improvements (MT)

5.2.6.1 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 lanes should help alleviate the burden on each intersection.

Policies:

- A detailed review and traffic analysis shall 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 should 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 shall be constructed at the intersections with the TCH as recommended by detailed traffic analysis.

Cost Estimate: up to \$ Pending

5.2.6.2 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.

Policies:

The northbound right turn lane should be reconfiguring so that it parallels the TCH through lanes until closer to the intersection, as illustrated in the Medium Term Projects on **Figure 5.3**, would be much safer for pedestrians.

Cost Estimate: \$ Pending

5.2.7 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.

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5.2.7.1 Future Local Roadways Construction

Policies:

- Any roadway right of way for the local roadway network connections shown on **Figures 5.1 to 5.4** or updated community plan, not acquired in the Short Term shall be acquired.
- Roadways shall 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
 - Extend Price Road to Al Wilson Grove
 - Provide for a backage road parallel to Price Road connecting properties along TCH south of Dobson.
 - Extend Bundock Avenue south to connect with Price Road at Dobson Road.
 - Extend Whistler Street south to Trunk Road.
 - Extend Whistler Street north across Alexander Road to Dingwall Street.
 - Extend Bundock Avenue north across Alexander Road to Dingwall Street.
 - Connect Bundock Avenue and Whistler Street between Alexander Street and Powell Street.
 - Extend Festubert Street north to James Street.
 - Extend St. Julien Street north and west to Festubert Street.
 - Revise backage road connection between the TCH and St. Julien Street at the south end of the Cowichan Secondary property.
 - 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.
 - Connect the roadway described above to Coronation Avenue.
 - Create various other connections in the area between the TCH and Duncan Avenue as per the LAP document.

Cost Estimate: \$ Pending

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5.2.8 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 shall be constructed in accordance with bus route requirements for the downtown transit exchange.
- Yearly updates shall be sought from BC Transit regarding future service improvement plans to ensure coordination between municipality infrastructure improvements and BC Transit plans.

Cost Estimate: up to \$ Pending per bus stop

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5.3 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.

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

5.3.1.1 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) meter minimum width Multi-Use Pathway Bridge shall 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.

Cost Estimate: \$ Pending

5.3.2 Pedestrian and Cyclist TCH Crossings (LT)

5.3.2.1 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 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

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James Street / York Road and Beverly Street to determine any further crossing requirements, such as a grade separated crossing facility near University Way

- A four (4) meter minimum width Multi-Use Pathway Overpass shall be constructed between James Street / York Road and University Way, if recommended by the above mentioned review.

Cost Estimate: \$ Pending

5.3.2.2 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 to extend it under Cowichan River Bridges.

Cost Estimate: \$ Pending

5.3.3 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, 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.
- 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.

Cost Estimate: Refer to Medium Term Recommended Projects

5.3.4 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.

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Cost Estimate: up to \$ Pending

5.3.5 Gateway Improvements (LT)

Policies:

Any gateway improvements not done in the Short or Medium Terms shall be completed in the Long Term.

Cost Estimate: Refer to Short Term Recommended Projects

5.3.6 Intersection Upgrades (LT)

5.3.6.1 James Street / York Road Intersection Realignment

The existing James Street / York Road intersection configuration is the result of an in-situ / field fit solution that may have been adequate at the time of construction, but would never be designed in such a configuration for a new intersection. 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 4.3**.

Cost Estimate: \$ Pending

5.3.7 Local Roadway Network Connectivity (LT)

Policies:

Any local roadway network connections described in **section 5.2.7 Local roadway Network Connectivity (MT)** remaining shall be constructed in the Long Term.

Cost Estimate: Refer to Medium Term Recommended Projects

5.3.8 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.

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Policies:

- Accommodation for intercity buses shall 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 shall be upgraded to pullouts / bus bays as traffic volumes and analysis warrant.
- Yearly updates shall be sought from BC Transit regarding future service improvement plans to ensure coordination between municipality infrastructure improvements and BC Transit plans.

Cost Estimate: up to \$ Pending

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5.4 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.

5.4.1 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 figures in **section 3.3.7 TCH Traffic Calming** for a few examples of what has been implemented elsewhere.

5.4.2 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.

5.4.3 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.

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5.4.4 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.

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5.5 SUMMARY TABLE

Table 2 Recommended Projects Summary – Short Term Projects

Implementation Timeline	Recommended Projects	Policy Priority Level	Estimated Cost
Short Term (1 to 5 years)	<p>Multi-Use Pathways, Bikeways, and Sidewalks</p> <ul style="list-style-type: none"> a. Construct sidewalk where absent along west side of TCH (incl. C&G and boulevard) b. Construct MUP where sidewalk absent along east side of TCH (incl. C&G and boulevard) c. Delineate sidewalk/MUP driveway crossings with paint markings d. Install cyclist dismount signs at bridge sidewalk entrances 	<ul style="list-style-type: none"> a. Should b. Shall c. Should d. Shall 	\$ Pending
	<p>Pedestrian & Cyclist TCH Crossings</p> <ul style="list-style-type: none"> a. Review and revise pedestrian crossing phase timing at traffic signals (included in intersection phase timing upgrade below) b. Install pedestrian crossing countdown indicators at traffic signals c. Construct pedestrian activated signal at Cowichan Way d. Review and revise pedestrian lighting as required e. Implement public education initiatives (school assembly education, signage, and pavement markings at pedestrian crossings) f. Install lighting underneath north ends of Cowichan River Bridges g. Install roadside permanent changeable messaging signs in advance of gateways 	<ul style="list-style-type: none"> a. Should b. Shall c. Shall d. Shall e. Should f. Should g. Shall 	\$ Pending
	<p>Accesses</p> <ul style="list-style-type: none"> a. Remove any excess direct TCH accesses b. Decommission any unsafe parking areas c. Property acquisition for shared parking d. Access permit requirement bylaw 	<ul style="list-style-type: none"> a. Shall b. Shall c. Will d. Will 	\$ Pending
	<p>Median Treatments</p> <ul style="list-style-type: none"> a. Replace existing Concrete Median Barrier with raised concrete curbed islands between Boys Road and Beverly Street b. Replace existing painted median with raised concrete curbed islands between Boys Road and Beverly Street c. Medians to include mountable curb where required, channelized turning lanes as per Figures 5.1 to 5.4, and pedestrian fencing from Boys Road to Cowichan Way and James Street / York Road to Beverly Street (excludes artistic fencing and landscaping included in gateways estimate) d. Medians to include appropriate landscaping and / or rain gardens where median width permits 	<ul style="list-style-type: none"> a. Should b. Shall c. Shall d. Should 	\$ Pending

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	<p>Gateways</p> <ul style="list-style-type: none"> a. Construct gateway structures, artistic pedestrian fencing, and feature lighting at the gateway locations (see Figures 5.1 & 5.4) b. Complete any overdue maintenance on Cowichan River Bridges required and install feature lighting of bridges c. Install median and boulevard landscaping coordinated with gateway features d. Install permanent electronic radar speed signs in advance of gateways e. Move speed transition zone further north from Beverly Street 	<ul style="list-style-type: none"> a. Should b. Should c. Shall d. Shall e. Should 	\$ Pending
	<p>Intersection Improvements</p> <ul style="list-style-type: none"> a. Review and revise signal timings to improve signal optimization and coordination within the corridor – exploring protected left and split phase 	<ul style="list-style-type: none"> a. Shall 	\$ Pending
	<p>Local Roadway Network Improvements</p> <ul style="list-style-type: none"> 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 Figures 5.1 to 5.4 	<ul style="list-style-type: none"> a. Shall 	\$ Pending
	<p>Transit</p> <ul style="list-style-type: none"> a. Keep abreast of BC Transit future service improvement plans 	<ul style="list-style-type: none"> a. Shall 	\$0
<i>Review completed projects & Local Area Plans, and conduct public consultations for Medium Term Projects</i>			
<i>Estimated Cost Subtotal</i>			<i>\$ Pending</i>

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Table 3 Recommended Projects Summary – Medium Term Projects

Implementation Timeline	Recommended Projects	Policy Priority Level	Estimated Cost
Medium Term (5 to 10 years)	Multi-Use Pathways, Bikeways, and Sidewalks a. Replace sidewalk with MUP along east side of TCH (with boulevard where possible) b. Construct bicycle lanes east – west along local roadways intersecting the TCH	a. Shall b. Shall	\$ Pending
	Pedestrian & Cyclist TCH Crossings a. Conduct pedestrian crossing review from James Street to Beverly Street b. Construct temporary pedestrian activated signal near University Way if required c. Upgrade pedestrian activated signal at Cowichan Way with full signal d. Review and evaluate whether crossing required at Dobson Road	a. Shall b. Shall c. Should d. Should	\$ Pending
	Accesses a. Once adjustment period complete after back road alternative indirect TCH accesses constructed, remove direct TCH accesses	a. Shall	\$ Pending
	Median Treatments a. Conduct safety review for channelized left turn accesses and remove as warranted	a. Shall	\$ Pending
	Gateway Improvements a. Construct any remaining gateway features	a. Should	See Short Term
	Intersection Improvements a. Review and detailed traffic analysis of intersection laning b. Construct right turn lanes at Trunk Road and Coronation Avenue c. Construct any additional lanes as required by traffic analysis d. Realign James Street / York Road northbound right turn lane	a. Shall b. Should c. Shall d. Should	\$ Pending
	Local Roadway Network Improvements a. Complete Right of Way acquisition to complete roadway network connections b. Construct local roadway network connections	a. Shall b. Shall	\$ Pending
	Transit a. Install bus stops along local main roadways intersecting TCH as required	a. Shall	\$ Pending
<i>Review completed projects & Local Area Plans, and conduct public consultations for Long Term Projects</i>			
<i>Estimated Cost Subtotal</i>			<i>\$ Pending</i>

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Table 4 Recommended Projects Summary – Long Term Projects

Implementation Timeline	Recommended Projects	Policy Priority Level	Estimated Cost
Long Term (10 to 20+ years)	Multi-Use Pathways, Bikeways, and Sidewalks a. Construct Cowichan River MUP Bridge	a. Shall	\$ Pending
	Pedestrian & Cyclist TCH Crossings 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. b. Construct MUP overpass and decommission pedestrian activated signal near University Way, if required c. Environmental assessment to extend existing dike path under Cowichan River Bridges to E&N Rail corridor	a. Shall b. Shall c. Should	\$ Pending
	Accesses and Median Treatments a. Review safety and close any direct TCH accesses as warranted	a. Shall	\$ Pending
	Gateway Improvements a. Construct any remaining gateway features	a. Shall	See Short Term
	Intersection Improvements a. Construct James Street / York Road intersection realignment	a. Shall	\$ Pending
	Local Roadway Network Improvements a. Construct any connections not previously constructed	a. Shall	See Med. Term
	Transit a. Review intersections for accessibility by intercity buses if Park & Ride facility planned by BC Transit b. Construct bus pullouts on main streets as traffic volumes warrant	a. Shall b. Shall	\$ Pending
<i>Estimated Cost Subtotal – Long Term Projects</i>			<i>\$ Pending</i>
			\$ Pending

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6.0 Conclusion

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

- i) Safety of pedestrians, cyclists, and motorists along the corridor.
- ii) Traffic congestion.
- iii) Accessibility for emergency services.
- iv) Sustainability of local business and economy.
- v) 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.
- 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.

TRANS CANADA HIGHWAY – DRAFT CORRIDOR MANAGEMENT PLAN: BOYS ROAD TO BEVERLY STREET

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- James Street / York Road intersection realignment.

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 total list of recommendations is a long expensive one, the DNC, CoD, and MoTI will now need to work together to prepare a funding strategy, taking into consideration what is affordable, and further prioritize the most effective potential projects to plan for the analysis, design, purchasing, and saving required to make these projects a reality.

DRAFT