

Nanaimo Goes Dutch

The Development of the
Nanaimo Complete Street
Design Guideline
and
Application on the Metral
Drive Complete Street
Project

Submission by the
City of Nanaimo
and ISL Engineering
and Land Services

TAC Sustainable
Transportation
Award Finalist

Roy Symons, P.Eng.
Manager
Transportation Planning
ISL Engineering and Land Services

Annalisa Fipke P.Eng.
Transportation Engineer
Engineering and Public Works
City of Nanaimo

1 ABSTRACT

Nanaimo has been developing its Complete Street Design Guideline while in parallel putting it into practice on the Metral Drive corridor, showcasing sustainable urban transportation design in the City. The guidelines set a high bar for all future street design, reallocating the right-of-way in an equitable manner and managing conflicts safely.

The immediate implementation of the guidelines on Metral Drive will demonstrate how such designs can contribute to community wellbeing by providing a safe environment that enables people to choose active and healthier travel options while also enhancing the streetscape. Metral Drive currently has varying levels of pedestrian provision from sidewalks to gravel shoulders, and cycling provision from none to narrow painted shoulders. Provision is inconsistent and not conducive to attracting people out of their cars. Using the guidelines to develop the Metral Drive detailed design, the City will provide people, regardless of their age, income or physical ability, with safe travel options to the Woodgrove Centre, one of Nanaimo's key mobility and economic hubs. While the guideline recommends best practice levels of space and separation, it also includes retrofit guidance and speaks to how similar outcomes can be achieved for lower costs or in constrained right-of-ways.

The guideline and the Metral Drive design include many best practices, but most innovative is the adoption of Dutch design principles prioritizing active modes through design with continuous sidewalks and bike paths across local roads. While this old design technique is often used in Europe, we believe it has not been fully implemented in Canada.

To understand the value this would add to the Canadian context and confirm our belief that this technique has not been widely adopted, the team queried many well respected planners, engineers, and advocates through twitter to try and find examples of such designs. It revealed nobody in Canada appears to be adopting such designs and Nanaimo aims to change that! Metral Drive will provide a Canadian showcase for Dutch style intersections in Canada prioritising the safety of our most vulnerable, and will position Nanaimo as an example of best practice for all communities in Canada to reference.

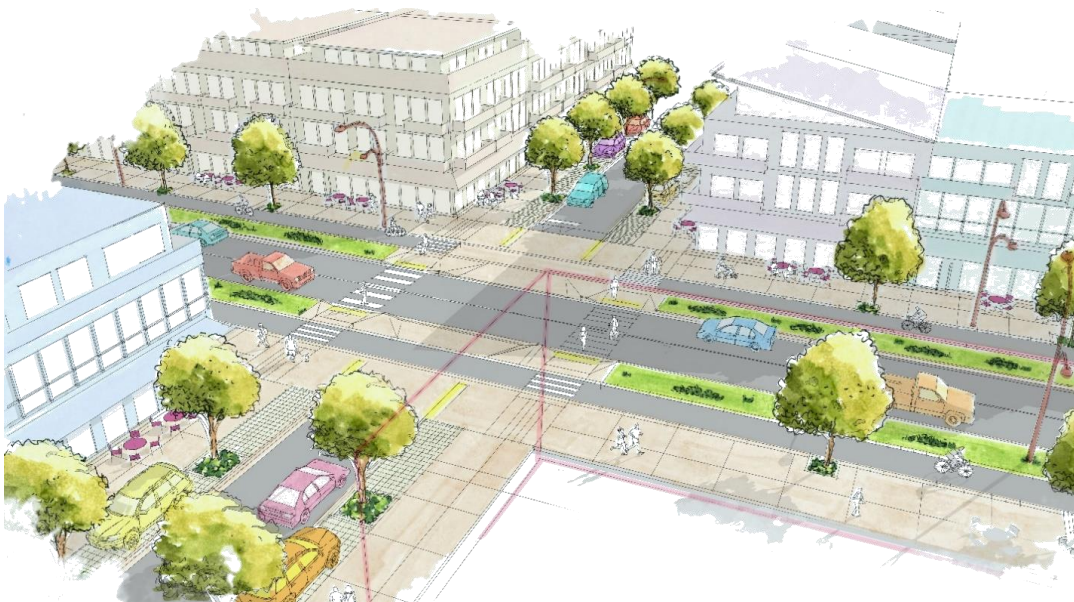


Figure 1: Mobility Collector and Local Street Raised Intersection from Nanaimo CSDG

2 INTRODUCTION

The City of Nanaimo and ISL Engineering and Land Services have been working together over the past year on two projects that will guide street design in the City for years to come, demonstrate the benefits immediately through implementation of the guidance, and provide examples of built infrastructure that other Canadian cities can draw upon to improve the sustainability of their cities.

Our work began with the development of the Complete Street Design Guideline (CSDG). This project followed a typical process including best practice reviews, a SWAT analysis, design workshops with all interested City departments, and the creation of a revised classification system and street cross-sections that met the City's needs. To understand the practical implementation along a corridor and at intersections, these cross-sections were translated into plan view and intersected with streets of varying adjacent classifications. Many guidelines suggest narrow lane widths and narrowing of intersection crossing distances with curb extensions. With single lane roads, this is not simple; to accommodate even bus turning movements, let alone larger trucks, care must be taken to balance the relationship of lane width and corner radii. One of the most significant components of the guideline and that which has sparked most interest to date, is the inclusion of Dutch-style raised intersections. These are featured at local streets where there should be no need for drivers to enter or exit a neighbourhood at speed. Rather than traditional curb returns, they feature driveway-style letdowns and continuous raised sidewalks and bike paths. The approach while facing some resistance at first, quickly gained support of the City team and through discussions with emergency services, all fears were allayed. This component specifically has been extremely well received in the planning and design community through social media.



Figure 2 - Metral Drive Rendering of Raised Intersection

A guideline that sits on a shelf and is never applied is worth less than the paper it is written on. Fortunately, the City and ISL are also undertaking the Metral Drive Complete Street project (Figure 2). This project allowed the guideline, as it was being developed, to be tested and refined on a real project. This was invaluable in understanding the constraints the City commonly faces, forcing our hand to make decisions with respect to design ideas, and helping inform the retrofit section of the guideline given the constraints along the corridor. The project will provide a finished example of the type of street the guideline is striving to create, providing a showcase project for the guideline and sustainable transportation direction in the City, particularly with respect to the Dutch-style raised intersection that is featured frequently along the corridor (Figure 3). For the rest of Canada, and even North America, it will provide design guidance and a built example, and is already drawing eyes to Canada and the City of Nanaimo. While Nanaimo is not the Netherlands, it can still benefit from their design practices, apply them in Canadian context, and realize their benefits.



Figure 3 - Mobility Collector and Local Street Raised Intersection from Nanaimo CSDG

A large part of the guideline speaks to the design principles or philosophies that guide complete streets. These are conveyed through thought provoking quotes and brief descriptions of key principles that support the need for complete streets and speak to several important aspects of street design:

Vision Focused Streets: planNanaimo supports greater accessibility and more opportunity for safe and convenient movement around the City by transit, cycling, and walking, as well as enhanced regional connections. Street designs should reflect this vision.

Equitable Streets: Equitable streets accommodate everybody's transportation needs, the primary components missing from the City street network are walking and cycling infrastructure. Equitable streets must also be accessible streets that people can safely navigate no matter their disability.

Efficient Streets: It is difficult to widen constrained urban streets, thus as population increases and streets are required to carry more people, designs should consider how streets may increase their people carrying capacity.

Functional Streets: Streets must balance the two functions of link and place, with arterial roads catering for higher traffic volumes and local roads catering more towards places for people.

Safe Streets: People are fallible, safe streets separate and protect the most vulnerable, manage conflicts appropriately, and reduce speeds so that when collisions do occur, the severity is reduced. Furthermore, they draw people to the street and these "eyes on the street" improve safety for many.

Healthy Streets: Streets that make it safe and easy to walk or cycle, provide the community with opportunities to improve their health through the course of their normal day, improving physical health, mental wellbeing, and ultimately reducing healthcare costs.

Climate Friendly Streets: A city with a network of complete streets can help mitigate some climate impacts by reducing vehicle use, and must be adaptable to others, for example increasing need for shade in the hotter months or stormwater management during periods of intense rainfall. The carbon footprint of the infrastructure itself may also be a consideration.

Connected Streets: Complete streets are only useful when they form complete networks, providing safe and easy access between origins and destinations.

Useful Streets: Complete streets and complete networks of complete streets are only as useful as the land use that they provide access to. Complete communities will provide access to amenities within a short walk or bike ride. They provide places people like to be through designs and features that are people orientated.

3 SOCIAL SUSTAINABILITY

When the Hudson's Bay Company established the settlement of Nanaimo in 1852, they named it Colville Town after HBC governor Andrew Colville. In 1858 it became Nanaimo. In those early years before the dawn of the automobile Nanaimo evolved in a relatively compact manner and the downtown core still benefits from this human scale development pattern. However, like many North American cities, it sprawled significantly after the introduction of the automobile in the early 1900's, with many spread-out single-family neighbourhoods. For many decades planning and design was focussed around the automobile, with many four lane roadways bordered only by narrow sidewalks, or worse, no sidewalks. These streets make it easy to drive, uncomfortable and sometimes impossible to walk along, and only the most fearless cyclists would consider riding a bicycle.

The ability to move freely and safely around the City no matter your mode of transportation should be a minimum requirement, yet unless you drive, that is not currently the case. Today, like in many other cities,

people are demanding more and are changing how they travel whether by choice or circumstance. Housing affordability, while better in Nanaimo than some parts of British Columbia, is still a challenge with average single-family homes still over \$500,000. The cost of living can be further exacerbated by the burden of car ownership for those on lower incomes and no option but to own a car, or multiple cars even. For those that cannot afford to own and maintain a vehicle, they must negotiate incomplete networks or infrequent transit services. That is beginning to change with the CSDG and the Metral Drive project providing equitable streets and alternative transportation choices where previously there were none. While just a start, on Metral Drive at least, people will not feel excluded simply because they use a certain mode of transportation.

With the recent release of the Provincial Active Transportation Strategy, the need to provide people with the ability to safely travel in a healthy way was further brought to the forefront of planning policy and design needs. By providing complete networks for pedestrians, cyclists, other micro-mobility modes, greater access to transit, and reduced friction for those with mobility impairments, the City will enable the community to make healthier transportation choices where previously the lack of infrastructure and risk to safety would force people into their cars. No matter their age or ability the designs will separate and protect the most vulnerable.

The new facilities prioritize the most vulnerable, providing design solutions such as the raised intersections across local streets, protected intersections for cyclists to safely make two-stage turns from raised bike paths behind a treed boulevard. These facilities are recommended for all streets where motor vehicle traffic volumes or speeds are high enough to be unsafe for shared use. On Local Streets where speeds are lower, shared use by cyclists is permitted, and sidewalks continue across the local street to prioritize pedestrians.

Those with mobility impairments benefit from the raised intersections also, reducing the need to negotiate awkward curb ramps, slowing traffic and demonstrating priority. The visually impaired benefit from tactile surface warning devices where they cross bike paths or vehicle lanes improving their ability to negotiate the urban environment safely.

4 ECONOMIC SUSTAINABILITY

The CSDG provides some new cross-sections that feature larger right-of-ways, in theory increasing the City's cost. However, too many traffic lanes and wide travel lanes are expensive to maintain. The intent of the CSDG is to narrow street space for motor vehicles, providing a side benefit that there is less roadway and full depth pavement structure to construct and then maintain. Moving the bike facilities off-street means they move from a facility with full pavement structure, and one that must be rehabilitated with the vehicle lanes, to one that has much less asphalt and subbase because it only carries low impact cyclists. Economically a Complete Street can be cheaper to construct and maintain for some components. Of course, a complete street often requires more space to make it complete.

Complete Streets can support economic vitality in a few different ways, they enable people on lower incomes without access to a motor vehicle improved access to employment opportunities. The Metral

Drive project in particular will connect the E&N Trail to the Woodgrove Centre, Nanaimo’s largest mall, enabling a large part of the population to access the mall along a route separated from traffic.

Nanaimo’s Official Community Plan contains a number of mobility hubs throughout the City that are essentially activity centres that attract people. In the CSDG, special Mobility Streets were created that place greater emphasis on people, swinging the balance between link and place firmly towards the place function. Compete Streets when matched with land use, create attractive streets with space for the adjacent land use to spill out into the street, helping support a vibrant economy and a vibrant street life. Bringing activities out onto the street is a great way to bring more people to the street as they become interested in seeing other people enjoying the businesses that offer such opportunities.

5 ENVIRONMENTAL SUSTAINABILITY

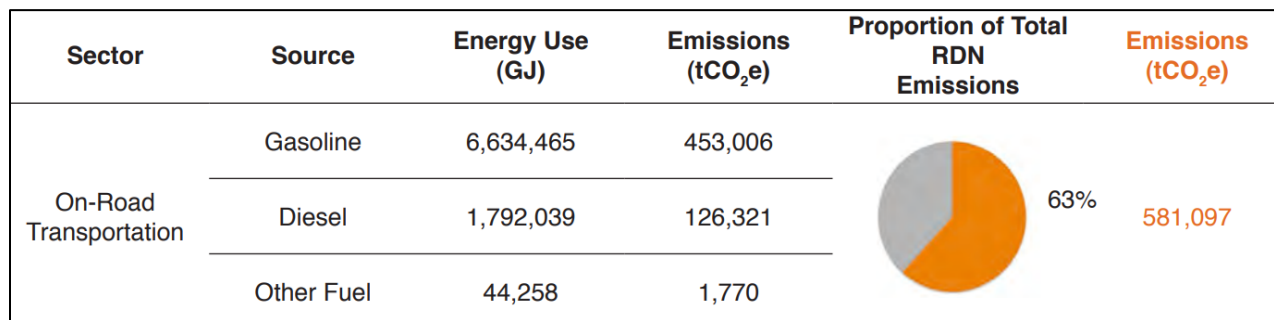


Figure 4 - Regional District of Nanaimo Community Energy Emission Inventory Extract

In 2019 The City of Nanaimo along with many others declared a climate emergency, and in doing so, set a mandate that any decisions must be viewed through a sustainability lens. Transportation in the Region accounts for 63% of community emissions (Figure 4) and as such, present one of the biggest opportunities for reduction. In transportation there are primarily two ways to effect environmental impacts, mitigation, and adaption.

Mitigating transport related emissions is a difficult task in the short term. Over time electrification of the transportation system will reduce direct vehicle emissions, improve air quality, and reduce noise pollution on the street. This will make our streets a nicer place to be and will perhaps encourage more people onto the street. As the active transportation network is built out, the CSDG’s impact will begin to enable the community to consider active modes of transportation as an alternative to the motor vehicle, reducing personal emissions.

Adaption to environmental and climate change is another important consideration for the transportation network. In Nanaimo, the primary climate impact is increased rainfall and drainage solutions must be sized appropriately to accommodate stormwater. With narrower roads, the amount of run-off is reduced, however the addition of bike paths increases the impermeable surface area behind the curb. Fortunately, with the addition of increased boulevard space, this can often be designed to better manage stormwater.

6 INNOVATION

The CSDG and Metral Drive design includes many best practices, but most innovative is the adoption of Dutch design principles prioritising active modes through design with continuous sidewalks and bike paths across local streets (Figure 5). While this old design technique is often used in Europe, we believe it has not been fully implemented in Canada.



Figure 5 - Urban Local Street Rendering of Raised Intersection from the CSDG

The raised intersection makes a fleeting appearance in the TAC Traffic Calming Guideline, but is not featured in the Geometric Design Guideline. It is featured in the BC Road Safety Toolkit in schematic form, but we have yet to discover an example where this has been implemented. The Nanaimo Guideline will document and illustrate how the design can work in Canada and the application on Metral Drive will provide a real-world example to show it is possible.

The benefits are unquestionable, indeed when the advantages and disadvantages are considered, it is hard to understand why local roads are designed without raised intersections. When comparing the two options, traditional curb return intersections or raised intersections, it is a landslide for the raised intersection:

- **Pedestrians:** Raised continuous sidewalk emphasises priority for pedestrians over turning traffic. The vehicle has to cross the pedestrian space, not the other way around.
- **Mobility Impaired Pedestrians:** Raised continuous sidewalks remove barriers. People in wheelchairs or mobility devices do not have to negotiate curb ramps and have priority per pedestrian.

- **Visually Impaired Pedestrians:** Raised continuous sidewalks remove barriers. Visually impaired individuals do not negotiate the road, but instead, drivers negotiate the sidewalk.
- **Cyclists:** If provided, continuous bike paths emphasise priority for cyclists over turning traffic. The vehicle has to cross the bike path.
- **Intersection Safety:** The narrow entry and exit from the local road and need to cross the raised bike path and sidewalk slow traffic considerably reducing the likelihood and severity of any collisions.
- **Neighbourhood Safety:** Vehicle speeds are reduced entering and exiting a neighbourhood indicating to the driver that conditions are different and encouraging them to reduce their speed.
- **Motor Vehicles:** While drivers may add seconds to their journey, given the need to negotiate the turn at a slower speed, they also benefit by the reduced likelihood and severity of a collision with a pedestrian, cyclist, or any other motor vehicle.

7 TRANSFERABILITY IN CANADA

The theme of the 2020 Conference is the Journey to Safer Roads, marking the end of the UN Decade of Action for Road Safety. European countries are progressing: the Norwegian Capital Oslo just recently closed 2019 with no pedestrian or cycling fatalities. In North America, the end of this decade sees increasingly distracted drivers (Figure 6) and a disproportionate number of injuries and fatalities amongst vulnerable road users. The safety benefits of raised intersections are considerable and the downsides negligible. If we are serious about the ‘Journey to Safer Roads’ we need to build infrastructure that prioritises and protects our most vulnerable road users.

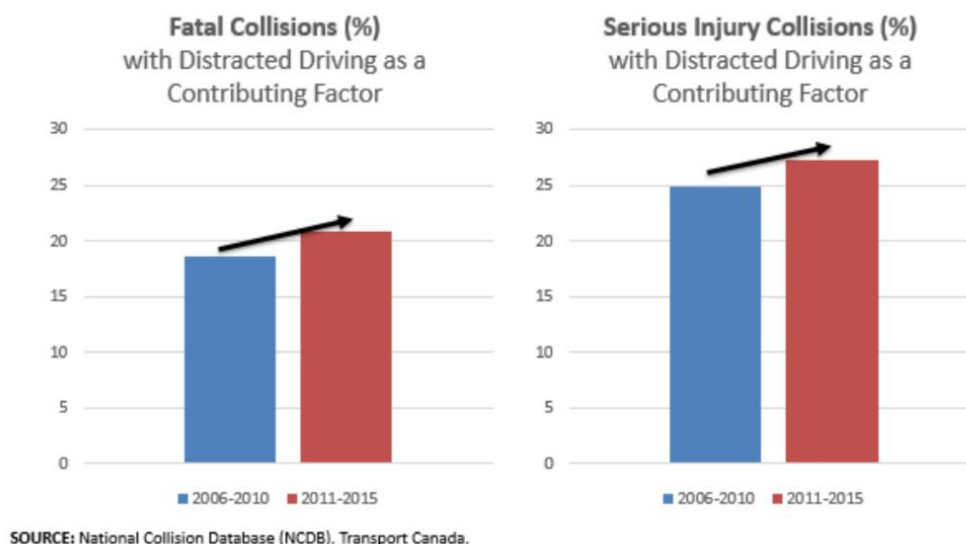


Figure 6 - Transport Canada Distracted Driving Statistics

Vancouver is becoming a shining example and is frequently referenced with respect to bike facility design. Nanaimo drew inspiration from Vancouver with respect to the protected intersection designs in the CSDG and aims to inspire other cities with respect to Dutch-style raised intersections. It is hoped the TAC Geometric Design Guideline may even draw inspiration and include such designs in a future update. As well as inclusion in the CSDG, the raised intersection is a key update to the City’s Manual of Engineering Standards and Specifications (Figure 7).

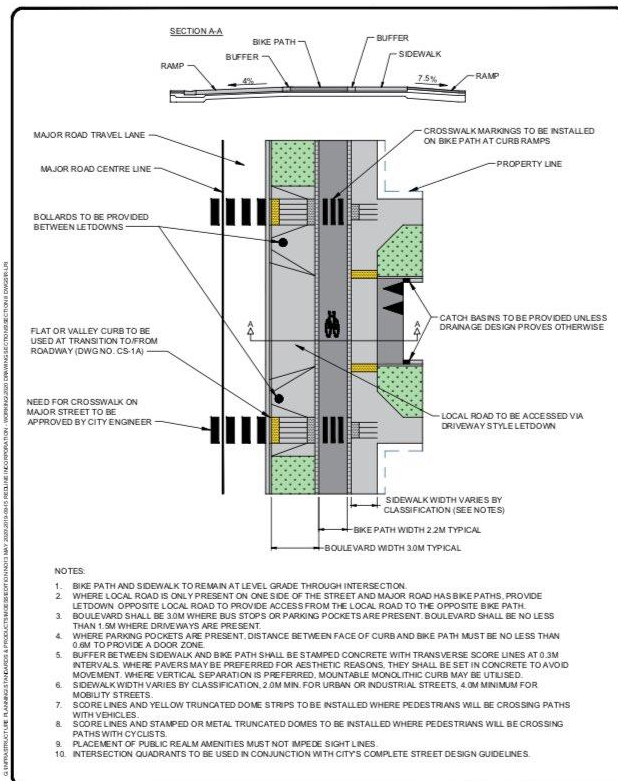


Figure 7 - CSDG Concept Translated to Nanaimo Manual of Engineering Standards and Specifications

If we can show it works in a Canadian context, if we can demonstrate the desire for such facilities in communities across Canada, and if TAC can include this highly effective design solution in the Geometric Design Guide, we can inspire others in Canada to use this design and positively contribute to road safety and accessibility for decades to come.

8 ADDED VALUE

To understand the value the CSDG and Metral Drive design would add to the Canadian context and confirm our belief that this technique has not been widely adopted, the team queried many well respected planners, engineers, and advocates for better urban design through twitter to try and find examples of such designs (Figure 8). It revealed nobody in Canada appears to be adopting the raised intersection despite the overwhelming benefits that it provides. Nanaimo aims to change that!

Roy Symons @roytheplanner · Aug 2, 2019
 Twitter I need your help. Is there an example in North America of a Dutch style **raised intersection** where the sidewalk (and bike path if there) on the major road continues through the minor road. Can't be just a driveway and can't have curb returns. Something like this...



Brent Toderian and 7 others
 35 38 114

Modacity @modacitylife · Aug 3, 2019
 Replying to @roytheplanner @BrentToderian and 6 others
 We haven't *yet* seen an example in North America, but spotted a decent attempt in Melbourne last year:



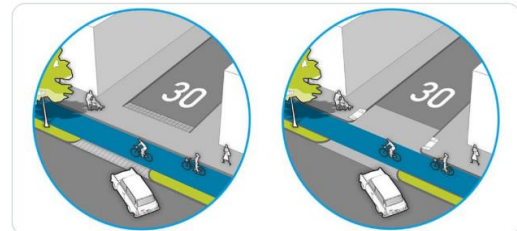
2 3 15

Roy Symons @roytheplanner · Aug 4, 2019
 Thanks to @dongho_chang who has provided numerous good example from Seattle. They are leading the way...



1 4 10

Darmstadt fährt Rad @DAfaehrtRad · Aug 3, 2019
 Replying to @roytheplanner @BrentToderian and 7 others
 You would be surprised: This design is recommended in german Designbooks but not very much implemented



2 1 7

Figure 8 - Selected Examples of Similar Installations Elsewhere Shared Through Twitter


Examples provided included raised intersections, but mostly done with asphalt and still including traditional crosswalk markings. This still tells the pedestrian they are crossing the roadway and tells the driver that the pedestrian is in their space. These solutions are often just infills and can often still include curb returns that open up the mouth of the intersection and promote higher travel speeds than a more constrained driveway style letdown. Canmore perhaps comes closest in Canada, providing a relatively Dutch-style intersection; however, their use of largely mountable curb rather than bringing cars up and over a sidewalk height crossing lessens the traffic calming effect. The best examples in North America were found in Seattle where the City has begun to implement several Dutch-style raised intersection in a few places. We believe Nanaimo would be the first to implement a true Dutch-style design in Canada and the first City to include it in their engineering standards.

The Metral Drive project will provide a Canadian showcase for Dutch-style raised intersections in Canada prioritising the safety of our most vulnerable, and will position Nanaimo as an example of best practice for all communities in Canada to reference. Sharing of the Metral Drive project renderings has already gained significant praise from notable organizations and people through social media, further validating

the design decisions made during these two projects and highlighting the interest for this kind of design in Canada (Figure 9).

Roy Symons @roytheplanner

Nanaimo will soon be leading the way in Canada with Dutch style raised intersections across local streets. Pleased to be a part of the @ISLEngineering and @cityofnanaimo team on this. nanaimo.ca/NewsReleases/N...



10:07 PM · Nov 27, 2019 · Twitter for iPhone

View Tweet activity

99 Retweets 372 Likes

ItsEasyBeingGreen @Fresh_Kermit · Dec 11, 2019
Love to see Canadian small towns ahead of NYC on street design.

Richard Campbell @wrychrd · Nov 28, 2019
Hey @Dale_Bracewell. The City of Vancouver needs to do this too both at local streets and alleys. Can't let Nanaimo outdo us :)

Hans on the Bike @HansontheBike · Nov 28, 2019
I very much like to see this in Ottawa.

Tweet Analytics

Impressions	34,803
<small>times people saw this Tweet on Twitter</small>	
Total engagements	3,300
<small>times people interacted with this Tweet</small>	
Media engagements	1,997
<small>number of clicks on your media counted across videos, vines, gifs, and images</small>	
Link clicks	443
<small>clicks on a URL or Card in this Tweet</small>	
Likes	372
<small>times people liked this Tweet</small>	
Detail expands	223
<small>times people viewed the details about this Tweet</small>	
Profile clicks	156
<small>number of clicks on your name, @handle, or profile photo</small>	
Retweets	99
<small>times people retweeted this Tweet</small>	

BC @bclarkinAB · Dec 11, 2019
Would love to see streets like this, or an approach to street design like this, in Calgary, particularly around schools and other community activity centres. #yycbike #yycwalk

Doug Klotz @Geo_Rex_H · Nov 28, 2019
I hope Portland will be considering these as part of their Streets 2035 project! @Why_Not_Bikes @Scott_Kocher @OregonWalks @thetreetrust @portland_bus

Dutch Cycling Embassy @Cycling_Embassy · Dec 4, 2019
The seamless continuation of foot and cycle paths across side streets is a hallmark of Dutch street design built on "Systematic Safety": ow.ly/WFFr50xmOel

And the small island city of Nanaimo hopes to be the first to apply it to a Canadian context: ow.ly/I45P50xmOel

880 Cities @880Cities · Nov 28, 2019
Very exciting progress for Canadian street design!

Figure 9 - Selected Twitter Responses to the Metral Drive Rendering

In summary, Nanaimo is pushing forward with a progressive set of design guidelines and standards that will improve social, economic, and environmental sustainability in the City. Through providing documentation and built examples for other cities to learn from, the City of Nanaimo and ISL Engineering have the potential to dramatically influence urban design of Canadian cities and is continuing the journey towards safer roads.