

Desirability vs. Asset Management

Prioritizing Pedestrian and Cycling Infrastructure

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ABSTRACT

This paper compares and contrasts alternative infrastructure prioritization approaches based on transportation policies and discusses community goals, public perception, planning and engineering initiatives, funding strategies, public health, and sustainability. It discusses municipal prioritization of pedestrian and bicycle infrastructure with a focus on the City of West Kelowna, BC as a case study for the development of their Pedestrian and Bicycle Infrastructure Plan. West Kelowna is a newly incorporated City with many gaps in the pedestrian network and few bicycle facilities. The plan shifted approaches from an asset management prioritization to desired facilities and ultimately was adopted with an increased budget from \$150,000 to \$600,000 for pedestrian and bicycle facilities for a five-year term.

INTRODUCTION AND BACKGROUND

Following a paradigm shift throughout North America to better facilitate walking and cycling, road authorities are challenged with providing facilities and prioritizing the infrastructure investments. Discontinuous, substandard, and/or a lack of supporting infrastructure affect the perceived and actual safety of pedestrians and cyclists and ultimately influence their travel choices. The pedestrian infrastructure also largely supports transit and requires connectivity to transit stops, accessible design, and supporting end use facilities. The types of bicycle facilities will influence the number of users as separated facilities tend to be more desirable for all users as opposed to on-road shared facilities. End use facilities for cycling support users by providing different levels of secure bicycle parking, repair kitchens, and shower facilities. Communities

have been challenged to provide the pedestrian and bicycle infrastructure in order to support Safe Route to School programs, improved transit ridership, eco-tourism, and implement travel demand management strategies.

In the bigger picture, facilitating active transportation (i.e. pedestrian and cycling infrastructure) can improve urban mobility, reduce vehicle emissions, improve economic competitiveness, and mitigate traffic congestion. Healthy living opportunities also arise to reduce chronic illness from physical inactivity. Heart disease, obesity, stroke, cancer, and diabetes cost the Canadian health care system billions of dollars annually, however can also be mitigated with active transportation infrastructure. The absence of the infrastructure results in a low likelihood of active transportation users due to perceived road safety conditions. Safety concerns keep one in five Canadians from cycling or walking (Federal Active Transportation Coalition, 2016).

For this paper, the prioritization of pedestrian and bicycle facilities was evaluated by two approaches. The first is to rank by anticipated demand of facilities and the second approach is to tie with asset management strategies. The anticipated demand approach aims to determine desire lines from major trip generators such as schools, transit exchanges, commercial centres, and so on. Each category is given a weighting to prioritize importance based on proximity to the trip generator and valued need to provide network connections for pedestrian and cycling infrastructure. Pedestrian and bicycle facility segments in close proximity to a number of these locations will likely have a higher total value than segments close to only one location. These segments are thusly ranked higher for demand and prioritization.

INVENTORY AND ASSESSMENT

An inventory and assessment of the pedestrian and bicycle networks are the first steps to establishing a network and determining projects. This can be done by conducting an in-field investigation, ranking the condition of existing facilities, and GIS mapping to spatially map data and provide attribute information. Attributes collected may include the type of facility (sidewalk, off-road trail, multi-use trail, shoulder, bike lane, etc.), surface (concrete, asphalt, gravel), condition, width, steep grades, deficiencies, and other features which may impact mobility (e.g. stairs).

The assessment of the inventory is a critical step to identifying gaps. Stakeholders and the public may also be engaged to identify key gaps in the network. An assessment on pedestrian and bicycle related collision data can identify safety deficiencies in the existing road network

and indicate where safety benefits could be made by providing the infrastructure where there is none. From there, infrastructure projects are identified, costs are estimated, and projects must then be prioritized.

HOW TO PRIORITIZE PROJECTS?

In order to prioritize projects, there should be an understanding of the objective of the exercise, transportation policies, municipal/council strategic priorities, and so on. For example, a prioritization scheme could be developed from a combination of the following objectives:

- Focus on asset management to reduce capital construction costs.
- Projects that will help meet greenhouse gas emission reduction targets.
- Projects that are most likely to qualify for relevant infrastructure grant money.
- Improving safety of vulnerable users.
- Reduce vehicular traffic congestion to address air pollution and related serious health conditions.
- Promote economic growth by reducing congestion, creating walkable tourist and village destinations, and/or supporting tourism.

EVALUATION

Once segments have been prioritized and a capital plan implemented, the program should be evaluated over time to determine if the prioritization scheme is meeting the objectives. Performance indicators should be determined to measure the benefit of new facilities. Consider the following examples:

- Reduction in motor vehicle trips and emissions; measured through a vehicle traffic data collection program.
- Improved personal health; measured by health authority.
- Increased eco-tourism; measured through tourism industry / chamber of commerce.
- Increased active mode travel to schools; measured by school board/authority.
- Increased recreation; measured with trail counts.
- Increased transit ridership; measured by transit authority.

CASE STUDY

The West Kelowna Pedestrian and Bicycle Infrastructure Plan identifies and prioritizes pedestrian and bicycle infrastructure projects. The following describes two approaches for prioritization that were investigated as part of the assignment which were to prioritize by most desired facilities and an asset management approach. The original assignment was to prioritize projects that aligned with capital utility improvements.

DESIRABILITY

Prioritizing by desirability considers the anticipated demand of facilities to determine desire lines from major trip generators such as schools, transit exchanges, commercial centres, urban/village/town centres, neighbourhood commercial, parks, heritage sites, tourist destinations, and so on. This is conducted as a high-level planning exercise and is useful where pedestrian and cycling volumes are low/unknown due in part to insufficient facilities and/or perceived safety issues by users. Demand for facilities may be apparent from worn desire paths adjacent to the roadway (**Figure 1**). These paths may also occur along the roadside or shoulder where there are gaps in the network (**Figure 2**).



Figure 1: Desire Path's Identify Demand for Missing Pedestrian Facilities at University of Victoria, BC



Photo Credit: Mitchell Jacobson, Watt Consulting Group

Figure 2: Desire Path May Also Occur in Roadway near Constable Neil Bruce Middle School,
West Kelowna, BC

Determining desirable connections in this method is also a surrogate for determining latent demand. Once desirable pedestrian and/or cycling facilities are provided, that increase perceived safety by providing sufficient space and/or separation for users, more users will travel by these modes on the segments. To prioritize the pedestrian and bicycle projects, each segment is evaluated for its proximity to key trip generators. Weighting values for both pedestrian and cycling facilities were established for 5- (400m) and 10-minute (800m) walking radii. **Figure 3** shows an example of a plan of the existing and proposed pedestrian facilities compared to their proximity to trip generators.

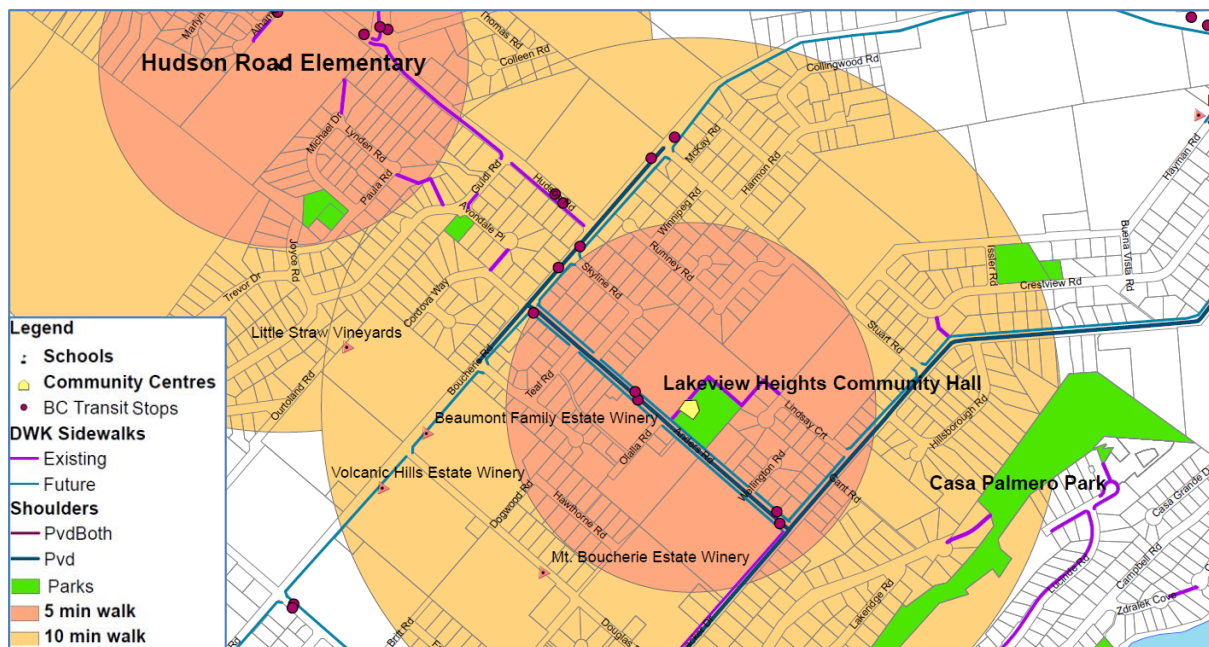


Figure 3: Planning Exercise for Pedestrian Infrastructure and Proximity to Trip Generators

When a project is within these radii (or walking circles) it gets a value by the proximity to a combination of weightings. Pedestrian and bicycle facility segments in close proximity to a number of these locations will likely have a higher total value than segments close to only one location. These segments are therefore ranked higher for desirability. **Table 1** shows the prioritization weightings used for the West Kelowna Pedestrian and Bicycle Infrastructure Plan. The weightings are added together and ranked from highest to lowest.

Table 1: Prioritization Weightings from West Kelowna Pedestrian and Bicycle Infrastructure Plan

TRIP GENERATOR	5-MINUTE WALK	10-MINUTE WALK
Transit Exchange	10	6
Elementary School	9	6
Middle/Secondary School	8	5
Community Centres	7	4
Neighbourhood Commercial	7	5
Major Parks & Heritage Sites	7	4
Network Link Weights		
Connects Links		5
Extend Link		2
Major Bus Stop on Link		4
Winery or Farm Route on Link		2

The result of the exercise was a list of prioritized pedestrian and bicycle projects with cost estimates and rankings. The projects were then reviewed to ensure results are consistent with expectations.

ASSET MANAGEMENT

The asset management approach prioritizes needed pedestrian and cycling infrastructure based on capital projects where road infrastructure will be removed and replaced as a result of the work. This approach provides a sustainable capital infrastructure funding scheme to prioritize pedestrian and bicycle facilities. In the case of water and sewer upgrades, the result may prioritize the construction of adjacent pedestrian and cycling facilities to save on mobilization and construction costs. The result of this takes advantage of capital construction and ensures opportunities for network improvements are made with other adjacent municipal construction projects.

The City of West Kelowna's various capital infrastructure plans were reviewed to determine where opportunities for overlap in projects may occur. Pedestrian and bicycle projects with direct overlap of capital projects were identified along with optional pedestrian and bicycle projects adjacent to the site. For example, if 100m of a road had a watermain replacement then 100m of sidewalk would be grouped and the continuation of the sidewalk beyond the 100m project area would be an optional item.

OUTCOMES

The initial capital plan was prioritized with the asset management approach, as per the assignment given. This meant that priority projects were tied to capital infrastructure projects and would be appended to their implementation plans. The outcomes would still provide needed infrastructure, but not necessarily where the most demand for it may be. Financial implications determined that the current budget of \$150,000 per year would need to increase to \$420,000 for 20 years to complete the projects grouped with the capital utility plans.

City Council decided to change the approach to focus on school zones and prioritize those projects above all. Effective 2016, the City increased their budget for pedestrian and bicycle infrastructure to \$600,000 for five years followed by \$250,000 for the following five years. This will accommodate 26 short-term priority projects within 10-minute walking radius of schools (estimated at \$4.0 million) within the first 10 years.

CONCLUSIONS

Prioritization schemes for pedestrian and bicycle infrastructure projects are best determined through transportation policies, project objectives, municipal/council strategic priorities, and so on. While prioritizing by the asset management approach can provide a sustainable scheme for managing capital projects, its focus is more on prioritizing projects in a fashion to reduce costs. In contrast, the desirability approach is geared to prioritize projects based on the higher benefit. No one scheme, will determine what a best way to prioritize pedestrian and bicycle infrastructure projects. Instead, in this case, evaluating a combination of the two approaches provides a method to holistically assess the projects and to pragmatically achieve the most benefit and group projects with capital construction works when it makes sense to do so.

One of the biggest challenges with pedestrian and bicycle infrastructure plans is securing sufficient funding to carry out a capital plan. A success of the West Kelowna Pedestrian and Bicycle Infrastructure Plan was that Council approved an increase in funding. Evaluation of the program to illustrate the benefits back to Council may garner additional funding into the future.

REFERENCES

City of West Kelowna (2016): Pedestrian and Bicycle Infrastructure Plan. West Kelowna, BC

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