

TAC Sustainable Urban Transportation Award Submission
City of Kelowna’s 2030 Active Transportation Program
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INTRODUCTION

In April 2011, Kelowna City Council approved an Active Transportation Network (ATN) and a fully-funded financing strategy to build over 50km of off-street continuous urban arterials for walking, biking and other forms of active mobility. The ATN will connect all of the major town centres and institutional destinations within the City. The new system is a direct response to several facts. Kelowna is one of the most car-dependent cities in Canada; it has the second highest per-capita carbon footprint attributed to on-road transportation in BC; and it has the oldest demographic in Canada that would see extensive health benefits by engaging safe active mobility options for both commuting and recreational uses. The explicit purpose of the ATN is to support connectivity and stimulate densification of the five existing mixed-use urban centres as envisioned in the *2030 Official Community Plan: Greening our Future* (OCP) (Annex 1). The ATN is an explicit action item intended to meet the City’s GHG emission reduction targets mandated under the BC Climate Action Charter. Additionally, the ATN is a key strategy in future-proofing the city against peak oil and the rising cost of transportation.

Over the past few years, over 1/3 of the program has been constructed (Table 1, Annex 2), benefitting extensively through the federal economic stimulus grants. Work is underway to complete a unique set of standards and bylaws to rethink the design of multi-use corridors and to strengthen the priority of sustainable transportation in the City. A multiple bottom line framework pursuant to a new sustainable infrastructure policy has provided 16 indicators and targets to measure the success of the program.

Table 1: 2030 DCC Active Transportation Program

Description		Quick Facts*
Projects	Total	56
	Completed	11
	Remaining	46
Program Costs	Total	\$117 Mln
	Completed	\$25 Mln
	Remaining	\$92 Mln
Network Length	Total	50.5 Km
	Completed	12.5 Km
	Remaining	38 Km
Crossings	Grade Separated Crossings	2
	Signalized Intersections	35
	Bridges (rivers, creeks)	6
Destinations within 0.5 Km	Schools, Colleges, Universities	30
	Parks	129
	Transit Route	99 Km
	Urban/Village Centres	8
Targets	Transportation GHG Emission Reduction by 2020 from 2007 Level	29%
	Walking & Cycling Mode Share (Kilometer-Travelled) by 2020	20%

* Numbers are estimates & approximate only

DEVELOP & ENHANCE SUSTAINABLE URBAN TRANSPORTATION

The OCP rebalances the transportation system to favour modes in the following order: walking, biking, public transit, goods and services, HOVs and finally SOVs. An infrastructure investment plan was developed to achieve the related OCP policy objectives (Annex 2). Kelowna's ATN was a key component of the plan, designed to improve the connectivity among all major employment, shopping, academic, and health destinations, and the overall resilience of the transportation system. The anticipated sustainability outcomes follow.

Social components

For the individual, active transportation improves overall health, reduces obesity and increases the opportunities for socialization. The uptake of safe and accessible active modes of transportation will reduce individual isolation by alleviating car dependency and reduce community severance by providing at least 3 grade-separated ATN crossings of the 6-lane provincial Highway 97 that bisects the community. In conjunction with the program implementation, residential neighbourhoods have lobbied for the system to be expanded into their areas. For instance, a 'safe routes to school' initiative has cited the ATN program to lobby for active transportation infrastructure to be built in the old Glenmore neighbourhood. This gives children safe access to the local elementary school and leaves parents more comfortable about not driving their kids to school.

Economic Components

Transportation costs rank second in terms of household expenses. The less expensive ATN increases disposable income for housing and other household expenditures. In addition, the ATN increases the availability of existing road networks for the movement of goods and services versus commuters thereby improving economic efficiency. Furthermore, increased personal productivity levels are seen through improved health that comes with expanded active transportation options. Specific economic impacts of Kelowna's ATN include:

- The plan has resulted in reduced need for road widening & extensions allowing the City to cancel or reduce the scope of 23 already planned road widening & extension projects primarily intended for increasing road capacity for vehicular movements. The saving has been diverted to the implementation of ATN plan without any additional financial burden to citizens, businesses or developers.
- Life cycle costs for the ATN are less than for the road network reducing the asset management impact on future taxation. The \$92 million ATN cost will be funded by Development Cost Charges, gas tax rebates, grants and partnerships, with no impact on taxation. Together, these will only help ensure that Kelowna retains its position as one of the lowest property and business tax communities in BC for municipalities of its size.

- The 50 Km long ATN connects within 0.5 km of 30 schools/colleges/universities, 129 parks, 8 urban/village centres and bus stops to 99 Km of public transit. The result is more cost effective access to major destinations for all modes, user types, trip purposes & income levels.
- The Insurance Corporation of BC pays approximately \$68 million in claims per year as a result of vehicular collisions in Kelowna. The ATN plan, which is meant to reduce vehicular trips, is likely to reduce the number of collisions, the collision claim costs, and finally, premium costs.
- The program improves transportation mode diversity making the City more resilient and better prepared to meet challenges of any future energy crises or price shocks.

Environmental components

A recent TAC report showed that Kelowna has the highest per capita ownership of light duty vehicles (second highest for heavy duty vehicles) of the 33 Canadian municipalities reviewed. The same study identified Kelowna as having the second highest number of daily trips per capita. In conjunction with the 80% SOV commuting mode, Kelowna is demonstrably car dependent. All these have resulted in making on-road transportation emissions the largest source of greenhouse gases in Kelowna, accounting for over 65% of all GHG emissions in 2007. In accordance with Kelowna’s commitments to the BC Climate Action Charter, Kelowna adopted the following policy into the 2030 OCP:

- The City of Kelowna will, in partnership with senior governments, local residents and businesses, NGOs, external agencies and utility providers, work towards reducing community greenhouse gas emissions by 33% by 2020.
- The City of Kelowna’s efforts will be focused on creating more mixed-use neighbourhoods (as identified on the OCP Future Land Use map) and on ensuring that residents can conveniently and safely travel by bus or by foot, bicycle and other forms of active transportation to get to major community destinations while also ensuring the efficient movement of goods and services.

Subsequently, Council-approved a Climate Action Plan with detailed strategies on the achievement of that goal (Table 2). It anticipates that the active transportation mode share (by kilometers travelled) will need to be increased to 20% from the 2007 level of less than 5%. The ATN is integral to that goal.

Table 2: Transportation GHG Emission Reduction Targets

2007 GHG Emissions (CEEI)			2020 Forecasted Business as Usual			Target 2020 GHG Emission Levels (tonnes)
GHG Emissions (tonnes)	Emission Reduction from 2007 Levels (tonnes)	% Reduction from 2007 Levels	GHG Emissions (tonnes)	Emission Reduction from 2020 Levels (tonnes)	% Reduction from 2020 Levels	
519,104	149,167	28.74	586,588	216,651	36.93	369,937

Besides reduction in GHG emission, other environmental benefits of the ATN include:

- Strengthening trends to urban densification which, in turn, will reduce the pressure to convert agricultural land (ALR) to urban uses (57% of Kelowna's 21,700 ha land base is in the ALR).
- The ATN is integrated with transit to provide a truly multi-modal system for door-to-door trips.
- The ATN is integrated with the linear park systems combining mobility with environmental restoration and development mitigation projects. Notably, the ATN will be linked with the 22km Mission Creek Greenway recreational/environmental corridor in the next few years.
- Kelowna's air quality is sensitive due to the Okanagan Valley's inversion effects. Decreasing fuel consumption will improve air quality and reduce the incidence of respiratory stress.
- The ATN will help reduce the City's ecological footprint; this is a specific goal of Kelowna's Sustainable Infrastructure Policy.

DEGREE OF INNOVATION

Functional Innovation: The ATN arterial system is not congruent with the vehicular arterial system. This protects the resilience of one system when the other is blocked by traffic incidents.

Technical Innovation - Cross Section Framework: The ATN has spawned the development of an innovative regulatory framework for roadway cross sections, intersection crossings, wayfinding, traffic calming and functional classification systems to accommodate active transportation.

Generally, road cross sections are defined through the use of *standard prescriptive* cross sections or through customized *context sensitive* design approaches. The prescriptive cross sections provide for design consistency, quantifiable levels of service and rapid approval of development applications. The context sensitive approach is more responsive to public engagement, working within limited right of ways, customized balancing of levels of service across several mobility modes, and compatibility with different land uses along transportation corridors, but often at the expense of additional time, money and frustration for developers for whom a lack of certainty translates into reduced economic viability.

The ATN has led to a synthetic *modular* approach for generating road cross sections (Annex 4). The kit-of-parts approach prescribes the immutable characteristics of individual spaces for each mode based on function and land use that can then be combined as required to adapt to existing constraints without loss of safety and functionality. Constraints include available right of way widths, public concerns, project costs, accommodation of utilities etc. Using a total 46 types of spaces, hundreds of unique cross section can be developed to meet multiple community objectives and circumstances (Annex 4-5).

The *modular* approach is intended to reconcile traditional objectives of road design with a broader set of societal objectives so that urban streets are a more supportive part of community planning. The approach is objective, practical, repeatable and transparent applying interdisciplinary expertise. It results in an integrated multimodal transportation system based on functional requirements, targeted users and interface characteristics that match adjacent land use & context zones.

The approach divides the City into five broad categories of context zones (Natural / Rural, Suburban, Core Area, Urban Centres / Village Centres and Downtown) with varying levels of urbanization, density & compactness. Each context zone can have one or more type of land uses (Agricultural, Rural Residential, Industrial, Urban Residential, Commercial, Public & Institutional and Health District). The function (mobility, access or destination) of a roadway segment or corridor is established for both auto & active modes with corresponding design users (i.e. pedestrians, cyclists/skaters and vehicles) based on context zones, surrounding land uses, current/future transportation network and other community objectives. Seven categories of design speeds (80, 70, 60, 50, 40, 30 and 20 Km/hr) are used. Once the function, design user and design speed have been established, suitable space types can be determined from the cross section module tables (Annex 4). There are four different modules based on mode types & their mixes: Walking, Cycling, Driving & Shared. The ‘shared’ module has three sub-modules; (shared walking & cycling; shared walking, cycling & driving; shared cycling & driving). Each module or sub-module has strictly defined independent spaces to serve different context zones, land uses & functions to respond to the full range of probable combinations of modal infrastructures.

For cycling, the methodology provides guidance on when to use separated cycle tracks, bike lanes, shared pathways, shared laneways or off-street cycle tracks based on corridor function and speed, and land use context, as well as policy and public objectives. The end product is a system of utilities and roadway elements optimized for life cycle costs & seamlessly integrated with the surrounding context.

Intersection Crossings Framework: Success of the ATN requires a framework to establish intersection priorities based on functions of the intersecting auto & active transportation corridors and to develop intersection designs tailored to the priority setting. A departure from the existing practice of designing intersection and traffic control devices to maximize or optimize the flow of vehicular traffic is under development. The City has developed a priority matrix for intersection crossings including intersection layouts, traffic control devices, signage and marking plans to safely prioritize the movement of pedestrian & cyclists.

Way-finding Guidelines: Way-finding is critical to increasing active transportation mode share. Kelowna has developed an integrated system consisting of information signs, markings, trailheads, kiosks, banners & route markers to assist users to navigate the ATN safely, efficiently & seamlessly.

Although there are abundant national & international way-finding guidelines & best practices for cyclists & pedestrians separately, integrated way-finding for active transportation is not yet well-established. Developing way-finding for active transportation is challenging because active transportation corridors serve a wide varieties of user types and trip purposes. Further complicating is the fact that users have to navigate through complex intersections and busy road-traffic environments to make proper travel decisions.

Administrative/Financial Innovation: Kelowna's ATN is fully nested in a hierarchical system of legislative instruments: the 2030 OCP, supported by the 20-year Servicing Plan and Financing Strategy that is funded over by the new Development Cost Charge (DCC) Bylaw (# 10515, adopted in 2011), supported again by the Subdivision, Servicing and Development Bylaw (#7900). Finally, the City's Sustainable Municipal Infrastructure Policy and multiple bottom line framework provides measurable and targeted indicators with which to audit the ATN system's success. The comprehensive nature of the program makes it particularly robust. An important secondary consideration in the financial innovation area relates to Kelowna's proactive use of gas tax funding and federal / provincial stimulus funding for active transportation instead of road building. Structured in this way, the significant ATN investments are guided by a responsibly phased and affordable implementation schedule.

TRANSFERABILITY TO OTHER CANADIAN COMMUNITIES & ORGANIZATIONS

The ATN's technical matrices for cross sections, intersection crossings and way-finding are predicated on broad national standards and regulatory norms and are, therefore, readily adaptable to local circumstances. The modular approach described in the previous section may be used to create a cross-section framework that is applicable to unique in other jurisdictions.

- Context sensitive to surrounding land uses & context zones;
- Provides explicit, predictable and consistent space requirements;
- Serves varying levels of functional requirements for each mode or mixes of different modes;
- Encourages design creativity by allowing permutation and combination of different space types that are independent and strictly defined;
- Provides multiple options for new or retrofit situations with limited right of ways, shallow/deep utility constraints, stakeholders' needs and other difficult to change constraints;
- Flexible & open to future modification or customization for other jurisdiction;
- Simple & methodological (a simple spreadsheet or software program can be developed to establish the most appropriate cross section satisfying all the competing objectives).

The technical, administrative, financial elements, as well as the sustainability measurement protocols are transferrable to other mid-size communities. The clear linkage between high performance sustainability intentions and measurable results is a key best practice. In that a post-carbon society needs to be universally adopted in the near future, Kelowna would be happy to share what it has learned through the ATN development to improve efficiencies, reduce costs, and support the strengthening culture of healthy communities.

At the root of the ATN's transferability is the notion that this is a place-based approach in which design features, quality of materials and construction schedules are considered to respect existing community contexts and specific right-of-way characteristics while, at the same time, attracting users to an integrated system of multi-modal corridors.

ADDED VALUE

Introducing the ATN has been a change management challenge. New infrastructure would be of no use if people didn't use it. Engagement and communication have been key elements to its early success. One positive outcome of this attention to communications was a private ROW donation along the Cawston Avenue Multi-modal Corridor.

The process of developing the new OCP supported the iterative development of the land-use designations, urban intensification and the reduction of the urban growth boundary in conjunction with a sustainable transportation network. Public consultation was integrated with discussions on overall policy objectives and the impacts on other infrastructure systems (boulevards for run-off filtration and trees for CO₂ sequestration, etc.) so that interdependencies, externalities and tradeoffs became more apparent. Timing permitted the ATN program to get a jump start through the recent federal stimulus funding to complete about 15 km of the 50 km system in 2 years allowing an early promotions and monitoring of commuter choice changes. Further public engagement on sustainable infrastructure choices is planned for 2012-13.

The ATN Plan and its roll-out in Kelowna represents the important convergence of several elements, First, a supportive City council prioritized this plan in the face of a number of other competing alternatives including highway building. They also supported its long-term funding at about \$3M per year (over 5% of the annual capital budget) over 20 years. Second, broader social trends toward sustainable transportation options were recognized and articulated by citizens. Surveys indicated that 83% supported "...transportation corridors in each part of the City that will retain pedestrian/cyclist focus regardless of increased vehicular needs." These informed ATN's inclusion in the new 2030 OCP. Finally, the operational usage of a multiple bottom line framework as the criteria for capital investment provided a business case for ATN.

Given this convergence, the leadership potential of the ATN Plan becomes more evident and compelling. Kelowna is ripe for the comprehensive development of an active transportation system. 54% of Kelowna residents live within 5km of their primary daily trip destination. Because of the geographic constraints of the surrounding steep hillsides and protected agricultural lands, Kelowna is still one of the denser cities in BC. The denser parts of the city are in the geological remains of a flat river bed which is home to 50% of its residents. Finally, an aging population, the new UBCO cohort of university students and the burgeoning influx of medical and digital professionals are all looking for safe and healthy opportunities to use active forms of transportation to their daily destinations and to engage casual exercise with their families. For all of these reasons, Kelowna looks forward to a highly utilized ATN, and a healthier, more compact and accessible city.