

# Report to Council



**Date:** August 12, 2019  
**To:** Council  
**From:** City Manager  
**Subject:** 2040 Infrastructure Impact Analysis  
**Division:** Infrastructure

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## **Recommendation:**

THAT Council receives for information, the report from the Infrastructure Engineering Manager dated August 12, 2019, with respect to the 2040 Infrastructure Impact Analysis.

## **Purpose:**

To provide Council with a high-level review of the infrastructure impacts associated with the 2040 Official Community Plan (2040 OCP) Growth Scenario.

## **Foreward:**

Servicing and infrastructure must be in place in advance to allow our community to grow in a manner that meets citizen requirements and expectations. There is not a question of 'if we will grow', but more importantly, 'how are we prepared to respond to this anticipated growth'. Growth patterns have a direct impact on the cost of servicing and infrastructure. For example, public transit can be more effective at mitigating rising congestion levels in a dense urban environment. This is the deliberate product of more sustainable land use patterns and choices for moving around our community that yield fiscally, socially and environmentally responsible outcomes.

The City's goal is to optimize each infrastructure system to best service existing customers while consciously expanding systems to accommodate growth. This is accomplished through integrated master plans that anticipate infrastructure requirements guided by the 2040 OCP's growth strategy.

## **Background:**

The 2040 OCP Update is currently in progress and Council has endorsed the preferred Growth Scenario (March 3<sup>rd</sup>, 2019). As part of the ongoing work to update the 2040 OCP and the associated infrastructure servicing plan, an Infrastructure Impact Analysis was completed to identify challenges and opportunities to service growth. This analysis will inform Council on any anticipated major servicing impacts and challenges that will influence the pending update to the 20 Year Servicing Plan and Financial Strategy (out to 2040). This is the first of a series of infrastructure servicing updates that will be presented to Council during the development of the 2040 OCP with the intent of keeping Council and the community informed.

There are four major, interdependent planning studies involved in this analysis (three are currently underway and one pending). These include:

- 2040 Official Community Plan (2040 OCP)
- 2040 Servicing Plan and Financial Strategy
- Transportation Master Plan (TMP)
- Parks Master Plan (pending Council approval for 2020)

These planning studies are being developed in parallel, with the project teams meeting regularly to coordinate activities and ensure alignment of the plans.

#### **Service Areas Reviewed:**

Major service areas reviewed as part of this analysis include Transportation, Parks, Water and Wastewater utilities. Additional commentary on Solid Waste and Storm Drainage is included as these infrastructure systems impact indirectly the 2040 Growth Scenario. Not included in this analysis are Building and Facility infrastructure required to satisfy recreational, cultural, safety and operational demands for growth.

#### **Transportation**

Kelowna's population is projected to grow by 50,000 people by 2040. If all those additional residents rely on driving to the degree we do today, the result will be a very congested Kelowna, with few transportation alternatives and a less attractive place to build a business or raise a family. The impacts will be most noticeable in the Core Area, where residents commuting in and out of car-dependent hillside neighbourhoods will be competing for limited roadway space with Core Area residents who will have options to get around using a variety of travel modes. Without a clear transportation policy, a change in behavior or improvements to the network, the project result will be higher traffic congestion.

One of the most effective long-term congestion mitigation strategies is to reduce auto-dependence by giving people more convenient and realistic alternatives for getting around, especially during the morning and afternoon rush hours. This requires a coordinated approach to land use and transportation planning that shortens trip distances and creates complete, connected and safe bicycle, pedestrian and transit networks between key destinations.

To help keep Kelowna moving, it will be necessary to shift as many future trips as possible to more sustainable transportation modes that can move more people in the same amount of space (i.e. biking, walking, transit and shared mobility options).

For the most part, the best opportunities for mode shift are within the Urban Centres and Core Area, where the terrain is relatively flat, and some supporting infrastructure for walking, biking and transit is already available. Increased densification will result in shorter trip distances, thus removing the primary barrier to walking and biking for nearby residents. If the City takes consistent and complementary action to ensure the transportation network provides safe, attractive and convenient infrastructure for walking, biking and transit in these densifying areas, the number of trips that are shifted to these modes can be maximized. This will help prioritize road space for trips that must be made by driving, while giving Kelowna residents more choices for getting around.

Investment will need to increase above existing funding levels for transportation to support the Transportation Master Plan and the 2040 OCP Growth Scenario. While population growth alone will necessitate substantial future investment in the transportation network to maintain Kelowna's quality of life, the endorsed Growth Scenario helps to manage future costs by focusing transportation and infrastructure investments in locations that benefit a high number of people and yield strong returns on investment. Details and cost estimates for needed future investment will be provided as part of the Transportation Master Plan moving forward.

## Parks

Parks are integral to the establishment of new neighbourhoods and further development of existing communities. The acquisition and development of park space will be key to meet the needs of the 2040 OCP Growth Scenario. The Scenario assumes a 67% population increase in the Urban Core, and notably this geographic area envelopes three centres: Downtown, Rutland and South Padosy. In these urban centres, land is less available and real estate values are up to three times the City average. These centres are also currently less well served by local neighbourhood and community parks than other sectors in the City. The following challenges are anticipated:

- **Availability of suitable locations in high density areas:** The acquisition modelling studies concluded that larger areas are required for local neighbourhood and community parks. This is difficult to achieve in the three urban centres.
- **Rebalancing with the provision of Recreation and City-wide parks:** To balance any reduction in the current OCP's target of 1.0 Hectare (ha)/1000 standard for Neighbourhood and Community parks in the urban centres, Recreation and City-wide parks are increased elsewhere in the City to maintain the overall standard of 2.2 Ha/1000.
- **Availability of suitable locations for recreational use:** Recreation parks require large areas of flat land to meet the very specific geometries for sports fields, ball diamonds, tracks and courts. Due to the topography of our City, it is becoming increasingly challenging to identify suitable flat sites for such parks.
- **Acquisition cost and availability of waterfront property:** There is a strong demand by residents and visitors for increased access to the waterfront, and many water-based activities and sports groups request shared or dedicated access to waterfront properties. However, waterfront properties hold some of the highest land values, making them expensive to acquire for park use.

The City's current park strategy has financial challenges when combining past practices with the projected Growth Scenario. The 2040 OCP and subsequent Parks Master Plan<sup>1</sup> affords the City opportunities to maximize the use of existing municipal land assets within achievable financial targets. These may include:

- **Future land use:** The next phase of the OCP development will start to identify specific locations for future park sites. Low current land values and City ownership will be among the primary drivers in determining park location. In doing so, the proposed acquisition costs discussed above, currently based on average costs, may be reduced. Identifying specific sites for future park use is a valuable tool in ensuring the park acquisition and development program remains both achievable and affordable.

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<sup>1</sup> The Parks Master Plan process is anticipated to commence in 2020 pending budget approval.

- **Linear parks:** Investing in more linear parks provides walkable green links between other parks, urban centres and other amenities. Mill Creek, Mission Creek and the Okanagan Rail Trail in particular, provide valuable pedestrian links through some of the densest urban sectors and improve walkability with limited interface with traffic.
- **Urban Parks:** Investment will be shifted to accommodate more compact urban neighbourhood parks, providing a greater density of amenities on a smaller footprint. This makes our urban parks more capable of adapting to existing lot sizes and reduces the need for consolidation.
- **Other opportunities under consideration include:** Shared streets, pedestrian or green streets, pockets parks or rooftop parks.

By developing strong neighbourhoods through attractive green spaces and generous park amenities, the City builds on the existing desirability of Kelowna as future home for new residents. Through the 2040 OCP, the City will seek opportunities to leverage benefits for the acquisition and development of our park system.

## Water

There will be substantial changes in how the City supplies water to citizens to the year 2040. Integrating water service providers into the City's water utility has commenced in Southeast Kelowna with potentially more to follow to meet the goal of providing all areas of the City with high quality drinking water. The population increases anticipated from the 2040 OCP Growth Scenario will result in major water transmission projects that "shoulder" the supply between our largest lake supply at Poplar Point to our main reservoir on Dilworth mountain. System resiliency and upsizing will be key needs as existing large transmission mainlines are renewed and upgraded over the next 20 years. The key new projects include:

- Twinning and ultimate renewal of transmission main from Poplar Point to Knox Mountain Reservoir down Richter Street towards downtown.
- Upgrade to the transmission main between Knox Mountain Reservoir to Dilworth Reservoir, which services most of Clifton, Glenmore and commercial areas downtown.
- Adding a reservoir cell to Dilworth Reservoir to accommodate future capacity and fire flow needs.
- Adding pumps and capacity at Poplar Point.

Construction in these areas is complex and costly given the "congestion" of existing buried utilities, high groundwater levels and changing residential fire flow requirements. These new mainline projects will need to be coordinated with other actions in the Transportation and Parks sectors to improve efficiencies and cost effectiveness.

The City Utility's water quality, sourced from Okanagan Lake, meets and exceeds Canadian Drinking Water Quality Guidelines. To date, the City has had no need to filter the lake water prior to disinfection because of the high source water quality. Should the water quality deteriorate due to climate change or other factors, Interior Health may require the City to construct water filtration plants on each intake to meet mandated guidelines. This presents a financial risk to the City as the filtration plant costs would be well in excess of \$200 million. The City will continue to work in collaboration with provincial regulators to understand the need and timing of changes so that the City can plan in advance for the required infrastructure improvements. During this period, staff will identify potential sites for one of the filtration plants in the downtown industrial area.

Since 2018, the City has operated an irrigation water supply and transmission system to over 1000 properties in Southeast Kelowna. The converted works include several dams and storage, including McCulloch Reservoir, that impound water for irrigation and general farm use. The irrigation system also provides fire protection in Southeast Kelowna and will require upgrades in areas where future development occurs.

The 2040 Growth Scenario forecasts minimal development in Southeast Kelowna. However, the City, in allowing any growth in the agricultural sector, is cognizant that upland water supply is almost fully allocated. The City will be reviewing water consumption practices and water conservation opportunities.

Currently, the irrigation network requires a new balancing reservoir, pipe upgrades and upgrades to the dams and reservoirs upstream. The costs of maintaining these assets are yet to be determined. The portion of these projects attributed to growth will be addressed at a later date.

## **Wastewater**

All wastewater collected in the City's sanitary sewer system routes to the Kelowna Wastewater Treatment Facility (WWTF). The facility has been in operation at this site since 1913 and utilizes a technology that biologically reduces and removes nutrients from the sewage stream and in turn discharges high quality effluent back into Lake Okanagan. While some minor future upgrades are necessary, the facility is expected to have adequate capacity to address future population growth until upgrades or a new treatment facility is constructed after 2050.

In the short-term, the City will need to address the growing quantities of bio-solids being generated from the WWTF as the City's Regional Compost Facility used for bio-solids treatment nears capacity. Significant infrastructure investment is required to expand the existing Compost Facility, or the City will need to implement a more process-oriented digestion and gas generation system.

Otherwise, the City is well positioned for wastewater capacity to 2040. The City will continue its programs to renew and upgrade its pumping facilities, large collector mains, and increasing capacity from the Rutland and Glenmore areas. The 2040 Growth Scenario will impact the order of which projects require construction, however funding levels are not likely to be impacted in the long-term. The major upgrades required include:

- Compost Facility expansion or Digester addition.
- Byrns/Barons 1050 mm transmission main routing existing and future flows from the Rutland and Glenmore areas.
- Transmission upgrades from Glenmore to Bernard, where growth from the north will overwhelm the crossing under Clement Drive towards the Ethel main.
- Renewal and upgrades to approximately 20 Lift Stations throughout the City.
- Upsizing, renewal and twinning of the crossing under Harvey (Hwy 97) at Water Street will be triggered by the Council-endorsed growth scenario. The project would likely extend down to the Water Street Lift Station.
- Should grant funding materialize, sanitary sewer for approximately 5,000 residents would be added, eliminating legacy septic systems across the City.

A planning process will be initiated over the next 20 years in preparation for the 2050 change-over to a larger, modern and higher capacity treatment complex. The City has purchased land north of the Munson

Pond area on KLO Road for the new future site. All new contemplated major works are to be constructed considering service to the future location.

### **Solid Waste**

The Glenmore Landfill is not anticipated to reach its capacity for another 90 years. The facility is self-funded through tipping fees and related revenues.

There are many factors however, that can impact this timeline negatively, including excessive growth, wasteful practices, changes in regulatory needs and negative impacts from the recycling business. The City goes to great lengths to minimize landfill biogas and methane production: a greenhouse gas contributor. The City is also adding impervious lining to eliminate any risk of leachate intrusion into the surrounding area. This, combined with odor control efforts, will ensure that the landfill operates efficiently with minimal nuisance to residents and institutions.

The 2040 Growth Scenario is not expected to impact the current plan for the landfill, although care will be needed to assure that any form of development is planned while not impacting the location or operation of the facility. The City will continue to work with UBCO to research methods that will extend the life of the landfill, and further minimize impacts to the environment. Concepts such as bio-diesel, incineration and plastics management are all possible projects for the future.

### **Drainage and Flood Mitigation**

The recent flood, fire, storm and landslide events have left residents and businesses concerned about safety and the City's capacity for recovery. Operationally, the City is committed to protecting public, environmental and economic health. To meet the development needs in the City's more populated areas means addressing flood management, where flood protection, flow measurement, indigenous nations consultation, riparian conditions and policy development will be required.

The 2040 OCP Growth Scenario identified areas of growth where flood mitigation is required. This is required as increased building density, a decreasing number of natural flow paths, and a changing climate are impacting how we look at flood management. Many grandfathered privileges allowed in the past must be removed in the future to re-establish flood capacity and protect areas from flooding throughout the City. To allow for future development in the key growth areas, two watercourses are recommended to take priority over the next 20 years; Mill Creek and Brandts Creek. Both creeks meander through industrial, commercial and populated residential areas of the City and have been identified as flood prone areas in recent studies.

The four flood mitigation projects identified as part of the future growth strategy include:

- Mill Creek re-alignment and flood conveyance through the airport property and Highway 97 to help achieve 2045 Airport Master Plan outcomes.
- Flood Capacity Improvements throughout the Mill Creek corridor to re-establish creek boundaries, enhance riparian habitat and flood capacity.
- Lower Mill Creek Diversion through Brandts Creek as a solution to further route flood flows around the more populated downtown flood zone.
- Upper Watershed Storage Attenuation – new operations or reservoir storage on Mill Creek and reduce flood impacts at the airport.

The City has secured federal grant funding of \$22M to subsidize the above four projects estimated to cost \$55M. Combined, these projects mitigate flooding in the inner core growth areas. The above projects are identified in the 10 year Capital Plan, and are anticipated to be completed over the next nine years.

## **Financial Considerations:**

### **20 Year Servicing Plan & Finance Strategy**

This impact analysis has outlined that in order to accommodate continuing growth in Kelowna, construction of new services or expansion of existing services will be required.

The purpose of the 20 Year Servicing Plan and Financing Strategy document is to provide a detailed analysis of the major infrastructure required to service growth as outlined in the 2040 OCP. The 20 Year Servicing Plan & Finance Strategy will reflect the impact of the new 2040 OCP on the City's municipal infrastructure through:

- Updating project costs to reflect more recent construction costs.
- Removing projects in the previous plan that have been completed.
- Removing, revising the scope and adding projects that respond to the locations and magnitude of projected growth in the 2040 OCP.
- Recalculating the Development Cost Charges (DCCs) based on the planned projects divided by the anticipated growth.
- Determining an equitable and fair allocation of costs between development and the existing tax base.

### **Infrastructure included in the 20 Year Servicing Plan & Finance Strategy**

A municipality's ability to finance new infrastructure to accommodate growth is limited to powers granted by the *Local Government Act*. The Provincial Government through legislation, has empowered municipalities with the right to impose DCCs for major services such as arterial and collector roads, water systems, sanitary sewer systems, drainage systems, parkland acquisition and development. The City currently collects DCCs for all allowable services except:

- Park development (in progress)
- Drainage or flood mitigation (Mill and Brandts Creek areas)

### **Infrastructure not included the 20 Year Servicing Plan & Finance Strategy**

Infrastructure that cannot be funded through DCCs, and is therefore excluded from the 20 Year Servicing Plan & Financing Strategy, includes natural open space acquisition, park development related to playing fields, recreational/cultural facilities, or operational facilities and equipment that will be required in order to satisfy operational, recreational, cultural and safety demands. All of these costs are funded through user fees and property taxes.

### **Next Steps for the 20 Year Servicing Plan & Finance Strategy**

Integration of a servicing plan and financing strategy with the 2040 OCP growth plan is necessary to ensure that the plan is affordable in the form that Council and the community is being asked to support and adopt as a blueprint for future development. As the servicing areas are still in the process of developing and estimating costs of capital projects, multiple Council touch points will be necessary to achieve a holistic review of the proposed changes to the 20 Year Servicing Plan & Finance Strategy. These touch points will include updates on proposed projects, the investigation of new DCC's in the area of parks development and major storm drainage systems, and changes in DCC rates. Each phase of this

analysis will yield a more fine-grained analysis that will shift from high level impacts, to a capital list with corresponding infrastructure costs.

**Existing Policy:**

Imagine Kelowna called to create great public spaces, grow vibrant urban centres, preserve Okanagan Lake as a shared resource, and build healthy neighbourhoods for all.

Council Priorities 2019-2022 identified measures to transform this vision into action. Specifically, relevant to infrastructure in this report:

- Social and inclusive, through increasing inclusivity and diversity.
- Transportation and mobility, by increasing trips by transit, carpooling, cycling and walking.
- Vibrant neighbourhoods, by increasing the number of urban centre development plans.
- Vibrant neighbourhoods, by creating animated parks and public spaces.
- Vibrant neighbourhoods, through developing accessible and multi-purpose amenities.
- Vibrant neighbourhoods, by proactively planning key sites.
- Economic resiliency, through the reduction of the infrastructure deficit.
- Economic resiliency, attracting top talent to live in Kelowna.
- Environmental protection, through resiliency and adaptability to climate change.
- Environmental protection, by decreasing greenhouse gas emissions.

**Internal Circulation:**

OCP Project Planner  
Policy and Planning Department Manager  
Parks & Buildings Planning Manager  
Integrated Transportation Manager  
Utility Planning Manager  
Communications Advisor  
Deputy City Manager  
Divisional Director, Active Living and Culture  
Divisional Director, Corporate Strategic Services  
Divisional Director, Infrastructure Division  
Divisional Director, Partnerships & Investments

**Considerations not applicable to this report:**

Legal/Statutory Authority:  
Legal/Statutory Procedural Requirements:  
Personnel Implications:  
External Agency/Public Comments:  
Communications Comments:  
Alternate Recommendation:



Submitted by:

J. Shaw, Infrastructure Engineering Manager

**Approved for inclusion:**



A. Newcombe, Infrastructure Divisional Director

Attachment 1 - 2040 Infrastructure Impact Analysis Presentation

cc: Airport Director

Deputy City Manager

Divisional Director, Active Living & Culture

Divisional Director, Corporate Strategic Services

Divisional Director, Financial Services

Divisional Director, Infrastructure

Divisional Director, Partnership & Investments