

10.0 Infrastructure

Goals

Promote fiscally responsible asset management of existing and proposed new infrastructure.

Promote all sources of water as a valuable resource through the conservation of water, maintenance of the natural water cycle, conservation of natural waterways and the reclamation and re-use of wastewater.

Revitalize the City Centre Neighbourhood by undertaking improvements and the replacement of infrastructure, in conjunction with redevelopment when possible.

Require development to consider onsite and offsite life cycle costs so as to be financially self supporting, as a minimum.

Utilize the Sustainable Infrastructure Investment Plan (SIIP) to recommend the timing, scope and funding required for infrastructure maintenance, replacement and improvements.

Utilize the Sustainable Infrastructure Investment Plan (SIIP) to define the type of infrastructure, services and maintenance that the City is able to provide with the funding that the community has provided.

Guiding Principles Met

Foster prosperity for people, business and government
Create a culture of sustainability
Revitalize the Downtown
Create strong, compact and complete neighbourhoods

Context

The City of Vernon owns and operates a broad range of municipal infrastructure including:

- Transportation infrastructure: roads, sidewalks, streetlights, etc.
- Utility infrastructure: wastewater collection piping, lift stations, wastewater treatment, wastewater disposal/reclamation, storm drainage piping and ditches storm drainage treatment
- Municipal buildings for recreation services and administration
- Airport facilities
- Municipal fleet vehicles

Additional services and infrastructure that complement the City of Vernon's infrastructure are operated by the provincial government, regional government, and private utilities including:

- Infrastructure related to drinking water treatment and water distribution: owned by the Regional District of North Okanagan with operation and maintenance performed by the City of Vernon for infrastructure within the City boundaries
- Infrastructure related to natural gas: owned by the City of Vernon and operated by Terasen Gas
- Infrastructure related to electrical power: owned by BC Hydro
- Infrastructure related to cable, telephone and internet services: owned by the private utilities of both Shaw and Telus

All of this infrastructure is inherently necessary to provide a livable city. Public awareness of the relationship between infrastructure and the services the City of Vernon provides, and the corresponding costs, is key to achieving long term sustainability for the community.

Asset Management

The City of Vernon has a diverse range of municipal infrastructure assets with a current replacement value of approximately \$800 million and an average service life of 47 years (see Figure 13). As Vernon’s infrastructure reaches the end of its service life, the cost burden on the City will continue to grow as infrastructure replacement is undertaken.

As calculated using the City’s Sustainable Infrastructure Investment Plan (SIIP), the City’s infrastructure assets are on average approaching half their expected service life. Those assets which are currently in service beyond their expected service life, meaning they will likely fail in the near future, make up an infrastructure backlog of approximately \$78 million. In the past, funds were not set aside to sufficiently address the renewal of this existing infrastructure at the end of its expected service life. The City has the opportunity to manage the infrastructure renewal challenge through the combination of strategically increasing tax and utility rates, containing costs and managing the risk associated with the infrastructure replacement backlog.

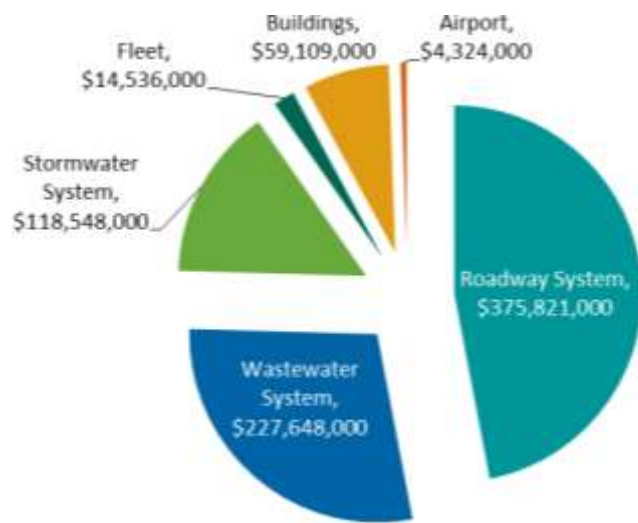


Figure 13: City infrastructure assets

The majority of the City’s asset value is made up from linear assets (wastewater, stormwater and transportation infrastructure). Figure 13 illustrates the replacement value of the City’s linear and non-linear infrastructure in 2013 dollars.

This combined linear and non-linear infrastructure has a remaining (deteriorated) value of approximately \$414 million (2013) which is 52% of the replacement value (remaining life). The City’s infrastructure assets are virtually at half their anticipated service life and with ongoing use and the passage of time, existing infrastructure is deteriorating. Much of the City’s infrastructure will be reaching the end of its expected service life over the next few decades and will require a significant investment to maintain existing levels of service. Reinvestment in Vernon’s existing infrastructure, including renewal and replacement, is required to ensure that City of Vernon infrastructure and services are preserved for future generations.

Asset management is necessary to identify when and where infrastructure maintenance and replacement should be undertaken. It is also critical to identify where upgrades of the infrastructure is warranted. Asset Management links the type of infrastructure, its inherent service life and maintenance requirements to the applicable funding available.

Asset management is necessary to define levels of service that are financially sustainable, provide the highest socioeconomic benefit of any upgrades to existing infrastructure and maximize the efficient replacement of existing infrastructure. Key components of asset management currently being developed are:

- Asset Management Revenue Plan that defines revenue available to fund replacement
- Asset Management Investment Plan that defines City infrastructure and its replacement cost
- Integrated Transportation Framework that defines a sustainable and affordable road system

Establishment of both short term (three year), and medium term (15 year) replacement plans for capital projects will enable the City to check and confirm utility and transportation conditions and thus prioritize replacement projects based on knowledge of material performance, soil conditions, field inspection and changes in use.

Starting now, dedicating funds towards asset renewal in the future will position Vernon well for long term infrastructure sustainability. Taking a proactive approach will also be looked upon favourably by senior levels of government. To close this sustainability gap, balancing costs and revenue is required, and can be addressed through a multi-faceted approach. The following is a list of available actions:

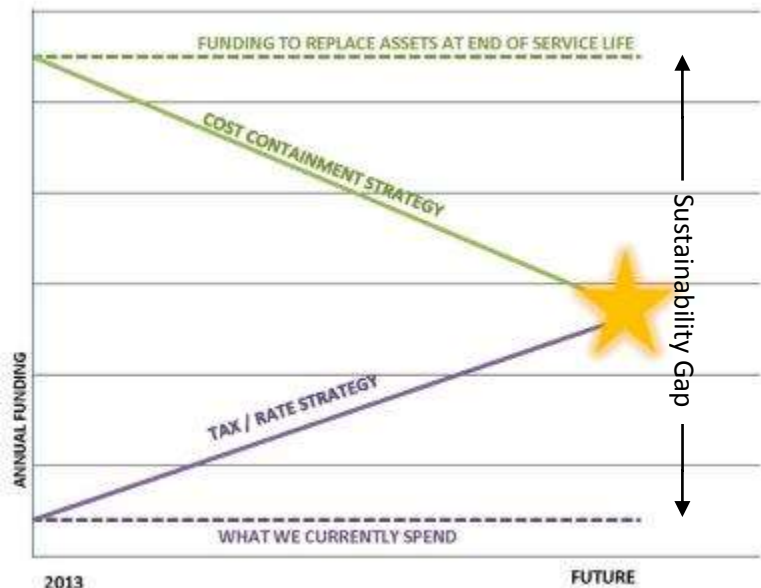


Figure 14: Infrastructure Sustainability Gap

- Creating and contributing to reserve accounts can help close the sustainability gap and smooth out cash flow from year to year;
- Adjustments to the master planning projects and DCC program are needed to contain costs;
- Increasing revenues from tax and utility rates within the threshold of affordability;
- Borrowing could be used to help address some short term cash flow challenges; and
- Cost containment measures are needed, such as timing and prioritizing capital improvements investments, strategically prioritizing renewal projects to address risk, investing in required efficient preventative maintenance, reviewing new renewal technologies, adjusting levels of service and multi-utility capital planning.

The City of Vernon is investigating a variety of solutions for closing this gap through the next steps in the SIIP which will be implemented in 2013, and will assist the City in determining the affordability limits for its infrastructure systems.

Transportation Services

The City of Vernon currently has over 282 km (683 lane km) of roads, 43 creek crossings and 176 km of sidewalks and multi-use paths. As with all infrastructure, these works have been installed over time and require continual maintenance and replacement to maintain an acceptable level of service with minimal risk and disturbance to the public. Updates to the Transportation Master Plan integrated the Pedestrian and Bike Master Plan as well as revise the scope and timing of transportation improvements



based on expected growth. Efforts to control costs associated with infrastructure renewal, operations and maintenance associated with transportation have also been studied in detail as part of the SIIP. For further information see Section 11 Transportation.

Sanitary Utility

The City of Vernon provides infrastructure and services related to sanitary collection, treatment and disposal through the Sanitary Utility. Currently, the City's Liquid Waste Management Plan is under review and anticipated to be completed in 2013. The Liquid Waste Management Plan provides direction to reduce the impact from liquid waste in the form of sanitary and storm drainage and improve water quality for the creeks and lakes. Upon completion and adoption of this plan, improvements and changes to operational and disposal methods may be planned and integrated through asset management to maximize the benefits to reduce liquid waste and minimize costs.

Sanitary Collection

The City of Vernon operates a sanitary collection system for the majority of its residents and also accepts flows from the District of Coldstream. The Sanitary Utility currently has over 265 km of sanitary sewer collection main which convey sanitary liquid waste to the Vernon Water Reclamation Center. The collection system consists of gravity trunk mains, collection sewers, lift stations and forcemains, gravity forcemains and low pressure systems. There are approximately 800 properties within the City of Vernon with residents who are not serviced by the sanitary sewer collection system and currently use onsite disposal systems, typically septic fields.

In order to plan for growth within the community and servicing of areas currently using onsite disposal systems, the City has several processes for extension of the sanitary collection system. Sanitary sewer main extensions are typically funded and constructed by private developers to areas of new development. Extension of local sanitary collection mains to existing unserviced developed neighbourhoods or properties typically occur through Local Area Services (LAS) with costs borne by the benefiting properties. Extension of local sanitary collection systems directly adjacent to trunk main extension may also be conducted through Municipal Fee projects with the costs borne by the benefiting properties when they connect. The City has completed pre-design engineering, including preliminary cost estimates, for existing built out areas to facilitate provision of servicing through the LAS or Municipal Fee processes. The City is also facilitating the progression of LAS projects by seeking grants, investigating project consolidation as well as alternate funding approaches. City of Vernon policy does not permit connection to the sanitary collection system by properties outside of the municipal boundaries.



New septic fields and onsite storage and treatment are only permitted on existing lots greater than one hectare in areas where no collection system is available or practical to extend, provided they have no access to a collection system and are constructed to the current Ministry of Health guidelines.

Through asset management the City will be analysing the life cycles of the pipes and conducting pipe inspection to verify the most cost effective management of the collection system. Continued replacement of old and undersized pipes will reduce infiltration, thereby cutting treatment costs as well as improving system hydraulics. Given the size of the collection system, asset management is necessary to ensure that long term system costs and the relation to user rates are not adversely impacted by short and medium term decisions regarding system replacement. Establishment of both short and medium term replacement projects will

enable the City to check and confirm pipe condition and thus prioritize replacement projects based on knowledge of pipe material performance, soil conditions and inspection.

Wastewater Treatment

The construction of the Vernon Water Reclamation Center (VWRC) was completed in 2005. This facility treats all the sanitary waste collected by the sanitary collection system to meet all federal and provincial wastewater standards. The VWRC utilizes an advanced Biological Nutrient Removal (BNR) process that removes both nitrogen and phosphorus from the treated water to limit the impacts to receiving waters. The VWRC also meets all environmental standards for the removal of pathogens through the use of filtration and UV.



The VWRC has the ability to treat sanitary liquid waste from 75,000 people based on current infiltration and per capita flows. With the replacement of older pipes and the use of water conservation devices (such as shower heads and low flow toilets), the infiltration and per capita flows may be reduced over time to allow the treatment of a larger population.

Wastewater Disposal/Reclamation

The City of Vernon is one of a few communities in BC that utilizes land based effluent disposal via irrigation. The City currently disposes of all treated effluent from the VWRC by way of land application through irrigation to agricultural land and local golf courses.



The current review of the Liquid Waste Management Plan (LWMP) is proposed for completion and adoption in 2013 and will provide direction for future system improvements and water quality objectives. The LWMP has completed an examination of disposal options that included:

- The cost to provide land based disposal
- Irrigation user rates
- Potential for expansion of the available land base to meet increasing disposal demand
- Seasonal fluctuation in annual water discharge
- The capacity of the existing land base to receive irrigation water

- Analysis and environmental studies regarding the option of disposal of a portion of the flow through an existing lake outfall in Lake Okanagan

The City has partnered with the City of Kelowna to establish and operate a bio-solids recycling facility on Commonage Road which began operation in 2006. This facility provides a marketable high grade compost product from previously wasted material that had an associated disposal cost to the City. This facility was expanded in 2009-2010 to improve odour control. The facility was designed to accommodate future expansions to meet increasing demand.

Storm Drainage

Rainfall and the corresponding runoff create the need for both natural drainage courses via creeks, streams, lakes and natural gullies as well as drainage infrastructure in the form of curb, gutter, underground piping, and ditches. The City of Vernon has two main creeks, Vernon Creek and BX Creek, two main lakes, Okanagan Lake and Swan Lake, 182 km of storm sewer main, 150 km of ditching and 34 storm retention and treatment devices. The storm drainage service is the only piped infrastructure that is not directly funded through a utility, therefore it is funded through taxation. The Master Drainage Plan, completed in 2001, indicates the need to protect these natural waterways from high flows, maintain base flows and water quality and recommends works to accomplish this and ensure capacity issues are addressed to reduce flooding. Senior levels of government recognise that the City of Vernon treats its sanitary liquid waste to a very high level and they are now emphasizing the need for improvements to water quality related to urban stormwater runoff. The Liquid Waste Management Plan, proposed for completion and adoption in 2013, will provide direction for future system improvements and water quality objectives with specific objectives for improvements to water quality in streams and lakes.

The intent of the Master Drainage Plan, detailed basin studies and the drainage section of the Subdivision and Development Servicing Bylaw is to maintain the natural water cycle and ensure water quality is considered. The City has initiated stormwater basin studies to review the Master Drainage Plan in more detail for each contributing catchment area. To date, basin studies for the Upper and Lower BX Creek basins have been completed and silt removal facilities have been provided in three locations in those basins. With completion of the Upper Vernon Creek and Lower Vernon Creek basin studies, the City will have the ability to accurately determine the scope of recommended improvements and conservation opportunities necessary to meet growing public concern over the environment and water quality in our lakes and streams. System improvements will also improve the City's ability to react to flooding and weather fluctuations. In conjunction with environmental initiatives, the City will identify, map and designate existing natural waterways such that they can be conserved.

Water Supply and Distribution

City of Vernon drinking and irrigation water is provided by the Greater Vernon Water Utility. All water supply is licensed and treated under jurisdiction of the Regional District of North Okanagan. Operation and maintenance of the water distribution network, as well as development review and approval, has been contracted by RDNO to the City to provide. The City is also providing input on the Master Water Plan which is proposed to be completed in 2013. This plan will provide direction for the future separation of agricultural and domestic water systems, staging of treatment improvements and expansion of supply to meet population growth.



Shallow Utilities

Natural gas, telephone, electrical and cable service provision in the city are undertaken by independent utility companies, though their works are installed and maintained by them, through agreement, within the City road rights-of-way. Historically all but natural gas were installed on overhead poles and in many areas of the city these services remain overhead. The City currently requires shallow utility services to be installed underground in all but industrial zones. A large component of improving the aesthetics of the City Centre is the replacement of overhead services with underground systems and the Subdivision and Development Servicing Bylaw has been amended to enable this to occur through staged redevelopment.

Supporting Policies

Through meeting the requirements of the *Public Sector Handbook Section 3150 – Tangible Capital Assets*, through the identification, in detail, of all City infrastructure through GIS and the creation of a detailed asset management plan, the City will be able to create policies to operate and maintain its infrastructure through its entire lifecycle.

- 10.1 Complete and maintain the infrastructure asset management plan and revise City policies and bylaws, as required, to support sustainable management of existing infrastructure for both taxation funded and utility funded infrastructure.
- 10.2 Encourage and support water conservation initiatives.
- 10.3 Work with the Okanagan Basin Water Board and member communities to protect the water supply, initiate water conservation measures and maintain and improve water quality.
- 10.4 Provide dedicated funding to support drainage improvements that will improve water quality in our lakes and streams.

- 10.5 Require development to design and construct all offsite infrastructure including roads, water, wastewater and storm systems with consideration for life cycle costs, sustainability and maintenance.
- 10.6 Continue to support the extension of sewer into existing built out areas in the city that are unserved through local area services or municipal fees.
- 10.7 Complete the Liquid Waste Management Plan and initiate policies and bylaw changes as necessary to support the recommendations of the Liquid Waste Management Plan.
- 10.8 Complete integrated stormwater management plans and construct identified improvements to the stormwater system.

Expand on current water quality requirements of the Subdivision and Development Servicing Bylaw and the Sanitary Use Bylaw through amendments to those bylaws that pro-actively protect the stormwater system, address the impacts of climate change and thereby improve the natural riparian and recreational areas through creation of storm discharge criteria.