FORWARD

This document represents the work of three independent consultants: Boulevard Transportation Group; Strategic Infrastructure Management Inc.; and Urban Systems Ltd. The experience of each of these consultants was drawn upon to develop and interpret available transportation system data to produce a long-term strategy and plan intended to achieve a diverse, affordable and sustainable transportation system based upon the vision and goals described herein.
## Revision Log

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EXECUTIVE SUMMARY

The Transportation Master Plan (TMP) builds upon the goals and objectives of the District’s Official Community Plan (OCP) to support the social and economic health of the District. The TMP uses current and future travel patterns and public expectations to determine incremental system improvements, and integrates these with existing infrastructure maintenance and renewal needs, to present a practical and affordable long-term transportation strategy.

The recommended goals for the West Kelowna TMP are separated into the short-term and long-term. Short-term goals reflect supporting the gaps in the existing road network system as priority. The long-term goals focus on the improvements that will refine the transportation network and the efficiency of the system.

Goals and Objectives

The TMP’s 3 short term goals are:
- Connect residential, business, and industrial communities effectively and efficiently;
- Promote the safety and security of the transportation system; and
- Reduce vehicular travel with higher degree of mixed land uses.

The TMP’s 3 long term goals are:
- Enhance mobility by providing reasonable transportation choices to all residents;
- Enhance economic vitality by providing transportation choices to all businesses; and
- Promote healthy and environmentally responsible transportation choices.

The TMP’s 4 objectives are:
- Adopt road network plan to meet the needs of the District;
- Adopt capital plan to meet intersection capacity needs into the future;
- Improve connectivity of pedestrian network; and
- Work with BC Transit, Ministry of Transportation and Infrastructure (MoTI) and adjacent municipal governments, and Westbank First Nations to provide for the growing needs of the community.
Methodology Overview
To meet these goals and objectives the TMP methodology addressed the following:

- Logic of the current road classification hierarchy to determine which roads should be arterial (high mobility), collectors (mix of mobility and property access); and local (property access). A sound road classification hierarchy allows road users to move around the District quickly to access their destinations or evacuate during times of emergency;

- Improvements to current road cross-section as it is important to have typical cross-sections for each defined road classification. Each cross-section should include lane widths and numbers, on-street parking (presence or absence), sidewalks, boulevards and utility corridors and bicycle accommodations. The cross-sections developed were iteratively through meetings with representatives of the Urban Development Institute (UDI) and input from Boulevard Transportation Group. The cross-sections developed are:
  - Arterial Roads - There are three (3) cross-sections, the urban arterial, rural arterial, and wine trail;
  - Town Centre Streets - There are two (2) cross-section, these layouts are applicable to Westbank Centre roads. They may alter between parking styles depending on adjacent land use and where left turns occur at intersections;
  - Collector Roads - There are three (3) collector road cross-sections; the urban collector, rural collector, and minor collector;
  - Local Roads – There are four (4) typical local road cross-section types proposed for the District, a typical urban local road, typical rural local road, and variations for two types of hillside developments for single and double loaded scenarios; and

- The ongoing costs to upgrade roads to the new cross-sections, renew, and maintain the entire roadway system over time.

Traffic
A traffic model of the District’s major road network was developed using Synchro software to determine District intersection improvements needed over the next 20 years. This model estimates traffic growth based on a 2.0% growth rate on District roads and 2.5% on Highway 97. The model is assessed in 5-year increments to prioritize improvements over the next 20 years.

The model shows that prior to reaching 2033, the intersections along Highway 97 will need capacity improvements or other alternatives to reduce traffic on Highway 97 will need to be implemented. By 2018, The Highway 97 intersections with Bartley Road, Ross Road, Westlake Road / Hudson Road, Boucheerie Road, and Gosset Road / Gellatly Road will fail in the southbound directions for the PM peak. By 2028,
the signalized intersections in the Westbank Centre will fail in the southbound directions for the PM peak. Solutions for the Highway 97 intersections will have to be developed for the entire corridor or improvements to one will merely send congestion downstream to the next intersection. The development of West Kelowna’s road network will allow for improved connectivity between neighbourhoods and enable alternative routes than Highway 97.

**Bicycle and Pedestrian Networks**

Short-term improvements to the pedestrian and bicycle networks should correspond with improvements on the major road network and should give priority to transit routes and high pedestrian areas such as the Westbank Centre. The District should continue to prioritize sidewalks with the Road Rehabilitation and Pedestrian Improvement Program.

In the future, a more comprehensive Active Transportation Plan should be developed including on- and off-road facilities and destinations that are consistent with the Recreational Trails Master Plan.

**Transit**

Priorities for the current transit system should invest in improving the pedestrian system to provide connectivity from the bus stop to the surrounding network focusing on higher order roads (arterials and major collectors). Bus landings, shelters, and furniture are important and there are opportunities to acquire partial funding from BC Transit. The District should continue to rationalize transit route and RapidBus projects. This supports a practical approach to meet community transit needs, maintain and increase ridership levels, and identify associated costs.

In the long-term, a transit plan should be developed with BC Transit in partnership with adjacent municipalities and the Ministry of Infrastructure that support the needs of transit users and promotes the system’s use.

**TMP Costs**

The costs associated with the TMP are divided into maintenance, renewal and replacement, and improvements (e.g. upgrades to new cross-section configuration). Renewal, replacement and improvement costs will need to be balance against available funding, net of developer and grant funding contributions.
**Maintenance Costs**
The District of West Kelowna currently has a 5 year contract to deliver the majority of its roadway maintenance services. The base year of this contract was valued at $1,731,496, and this amount is subject to inflation, and the frequency of winter storms above a typical winter.

**Renewal and Replacement**
The ideal funding allocation for the District’s roadway system is approximately $5.4 million annually; allocation not spent in a given year would be placed in reserve for impending use. However, most British Columbia communities in the interior only allocate approximately 40% of their ideal renewal/replacement requirements, this would suggest that the District could fund its annual roadway system renewal and replacement program at $2.16 million and be consistent neighbouring communities.

**Improvements**
The TMP requires the following capital for roadway improvements over the next 20 years. The costs in this report are only for planning purposes and design studies will be required to finalize estimated costs for more accurate budgeting purposes:

- Intersections @ $4.0M;
- Related Road Studies @ $2.7M.
- Arterial Road Upgrades @ $79.5M;

Additional costs that might be anticipated but are not required in the next 20 years are:

- New Road Connections @ $44.3M;
- Major Collector Road Upgrades @ $55.0M;
- Minor Collector Road Upgrades @ $54.2M;
- Glenrosa Access @ $9.6M.

These costs can be covered by development cost charges, partnerships with others (MOTI), and other development and capital opportunities.

As the TMP is a strategic document it will be necessary to develop an implementation plan that will effectively operationalize the TMP over time, based upon priorities and affordability. Ideally the implementation plan should be reviewed on a 3-year cycle in order to make adjustments based upon more detailed costs, changing priorities, any partnership concurrence, and available funding.
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1 PURPOSE OF THE TRANSPORTATION MASTER PLAN

The purpose of this Transportation Master Plan (TMP) is to develop a long-term strategy to guide planning and development, identify transportation alternatives for all District users, determine affordable and sustainable levels of service and performance, and balance the long-term investments required between maintenance, renewal and system improvement for the transportation system.

The TMP builds upon the goals and objectives of the District’s Official Community Plan (OCP) to support the social and economic health of the District. The TMP uses current and future travel patterns and public expectations to determine incremental system improvements, and integrates these with existing infrastructure maintenance and renewal needs, to present a practical and affordable long-term transportation strategy.

Having a comprehensive and defensive TMP provides the District with a basis for:
- Adopting safe, innovative, sustainable approaches to all modes of transportation;
- Guiding future development;
- Engaging in partnership discussions with other agencies;
- Applying for grants and other funds;
- Negotiating development conditions with the private sector; and
- Forming the basis for the District to develop affordable work programs and budgets.

It is important to note that the TMP is a long-term strategic planning document to effectively guide future transportation investment decisions designed to promote a community-wide transportation system vision that provides for all users and is sustainable over time. It is not intended to address site-specific issues and projects.

2 INTRODUCTION

West Kelowna is situated on the western shore of Okanagan Lake, located across from the City of Kelowna. The area covered by the OCP (see Map 1 Official Community Plan Area) totals approximately 12,197 hectares (122 sq. km) and extends from Highway 97C in the south to Rose Valley and Bear Creek Road in the north. The municipality was formerly part of the Regional District of Central Okanagan (RDCO) and was incorporated in December 2007.

The Westbank First Nation (WFN) governs two reserves situated within the central and northeast portions of the municipal boundaries of West Kelowna. Created in 1860 and overseen by the WFN since 1963, Indian Reserves 9 and 10 (Tsinstikeptum) together cover about 980 hectares (2,420 acres).
The District is bounded on the north and east by mountainous and forested lands mostly held as crown lands remaining within the RDCO, on the west and south by the District Municipality of Peachland, and on the south and east by Okanagan Lake. The District’s current population is approximately 30,900, with internal traffic growth forecast over 2.0% per year, and traffic on Highway 97 forecast to grow at approximately 2.5% per year.

Highway 97 is the primary provincial highway in the Okanagan Valley, and it bisects the District of West Kelowna. The District is also connected by the W.R. Bennett Bridge (Highway 97) crossing of Okanagan Lake to the City of Kelowna.

Development in the District prior to incorporation has been predominantly rural in nature. Typical rural or suburban infrastructure has dominated subdivision development over the past few decades, with mostly paved roads with some shoulders, ditch drainage, minimal street lighting, few sidewalks, and limited bicycle facilities. The combination of high growth, geographical barriers, urbanization, and the protection of the District’s natural environment poses challenges in developing an appropriate transportation system to serve current and future needs.

3 DISTRICT OF WEST KELOWNA CONTEXT

As a young and rapidly growing municipality it is vital that the District of West Kelowna have clear and concise objectives. Each year, Council establishes Strategic Priorities to guide decision making and set long term goals for West Kelowna. Council is dedicated to its strategic planning process, working to ensure that the municipality is pursuing goals that reflect the community’s needs and wishes.

3.1.1 Vision Statement

“To make informed decisions that meet community needs to protect, enhance and celebrate our West Kelowna home.”

3.1.2 Mission Statement

“The District of West Kelowna is an innovative local government that will make informed decisions to benefit the community by welcoming input and giving consideration to fiscal responsibility, environmental stewardship, healthy living and economic enhancement.”
3.1.3 Council Strategic Priorities
West Kelowna has adopted the following 4 primary strategic priorities for the current period of 2012 to 2014:

1. Economic Development;
2. Transportation and Utility Infrastructure;
3. Community Enhancement; and

This TMP is consistent with the goals and objectives of all 4 primary strategic priorities.

3.1.4 Consistency with Official Community Plan
The District’s Official Community Plan (OCP) is a strategic tool that sets up a framework to facilitate community growth in a planned and structured manner designed to support the social and economic health and affluence, rather than development on an ad-hoc basis.

The inter-connectivity between the transportation system and adjacent land use are critical components of the OCP. Transportation demand is supported for multiple modes by adequately providing the necessary connectivity and effective mobility between the residential, commercial, industrial, park and other areas of the community, as well as to points external to the District. Providing a safe and efficient multi-modal transportation network can reduce single occupant vehicular travel by encouraging the use of car-pooling, transit, and active transportation modes such as walking and cycling. Promoting and facilitating these modes will help the community meet greenhouse gas emissions and promote healthy living.

Through incorporation, the District has adopted a transportation network from the Ministry of Transportation and Infrastructure that consist of mainly rural standard facilities, lacks connectivity between neighbourhoods, continuity on the sidewalk network, and a lack of bicycle facilities. The Ministry maintains jurisdiction over Westside Road and Highway 97. Highway 97 is the main route through the Okanagan and is classified as a Provincial Primary Highway and part of the National Highway System linking the Trans-Canada Highway to the U.S. Border at Osoyoos. Bus transit is provided on several routes within DWK with connectivity to the District of Peachland and the City of Kelowna. This includes the RapidBus between UBCO and Westbank Centre.

The Transportation Master Plan provides guidance to staff and Council to address current deficiencies and plan for future requirements of the transportation network to support the growing community. This
plan is consistent with and supports other plans, including the OCP and the Westbank (completed) and Boucherie (not completed) Centre Plans.

The OCP’s general transportation system objectives include:

- Working with the Province and WFN to provide a safe, cohesive and efficient road network that connects neighbourhoods and adjacent communities, and has the potential to reduce local trips on Highway 97;
- Promoting the safety, efficiency and viability of the transportation system;
- Developing a safe, integrated system of community trails and commuter pedestrian and cycling routes;
- Enhancing mobility by providing reasonable transportation choices to all residents;
- Coordinating efforts with provincial mandates to consider the reduction of greenhouse gases in the design and operation of the transportation system;
- Promoting a higher degree of mixed land uses in order to reduce vehicular travel, in combination with the promotion of healthy choices in the transportation system;
- Promoting active transportation (e.g. walking, cycling) and public transit as priority over all other modes of transportation within Boucherie/Westbank Centres, Corridors, and Neighbourhood Centres; and
- Coordinating Land Use Planning and Transportation Planning to reduce transportation demands.

3.2 Document and Organization

To facilitate the reading of this TMP document the overall format as well as each section is laid out, where applicable, so that they begin with a high-level description of the relevant component, then provides the analysis and rationale, and finished with findings and/or recommendations.

4 APPROACH

Developing and maintaining a preferred transportation system requires the District to consider the full life cycle costs of developing, retro-fitting, renewing, maintaining and operating the system. These cost drivers also must be held in context with other non-transportation infrastructure and non-infrastructure service needs.

This approach enables the District to identify reasonable levels of transportation services, infrastructure supply, and state of ongoing repair. These considerations translate directly to transportation affordable levels of service and performance. To accomplish this, the TMP and all other District master plans and
strategic plans are anticipated to be adjusted from time to time based upon a balanced distribution of available revenues and public acceptance.

The TMP therefore addresses:
- Transportation improvement needs, timing and costs;
- Transportation renewal and replacement needs, timing and costs;
- Transportation maintenance annual service requirements and costs;
- Public understanding and feedback; and
- An awareness of other District-wide non-transportation cost pressures.

5 STRATEGIC GOALS AND OBJECTIVES

The Transportation Master Plan sets out basic goals, defines principle objectives to achieve those goals, and then establishes specific policies that will accomplish the objectives. The goals represent the larger, over-riding visions of the community.

The objectives provide the guidance necessary to develop specific transportation facilities and programs that will achieve those goals. The objectives may change from time-to-time as the community grows, as travel behaviour changes and needs change, and as technologies change. They should to be reviewed and updated about every five years.

The recommended goals for the West Kelowna Transportation Master Plan are separated into the short-term and long-term. Short-term goals focus on supporting the gaps in the existing road network system as priority. The long-term goals focus on the improvements that will refine the transportation network and the efficiency of the system.

5.1.1 Short Term Goals

Short-term goals focus on completing the transportation network and providing the infrastructure needed to accommodate users safely and efficiently.

Goal 1: Connect residential, business, and industrial communities effectively and efficiently

The District will provide an effective road network to allow the safe and efficient movement of people and goods between all of the residential, commercial, industrial, recreational, and agricultural communities in the District.
Goal 2: Promote the safety and security of the transportation system
The District will place a high priority on the safety and security of people, equipment, goods, and property in the design and operation of the transportation system.

Goal 3: Reduce vehicular travel with higher degree of mixed land uses
The District will place a high priority on transit, walking and cycling in higher density residential and commercial districts as they develop within the District in order that the total number of vehicles on the roads may be minimized.

5.1.2 Long Term Goals
Long-term goals require the short-term goals to be met that provide the necessary infrastructure to support alternative transportation modes.

Goal 4: Enhance mobility by providing reasonable transportation choices to all residents
The District will provide personal mobility choices, such as driving vehicles, using public transit and ridesharing programs, and walking or cycling, to as many residents as possible within the financial capability of the District and its partners.

Goal 5: Enhance economic vitality by providing transportation choices to all businesses
The District will provide the same personal mobility choices to employees and customers of businesses in the District and opportunities for moving goods by truck, as is reasonable within the financial capability of the District and its partners.

Goal 6: Promote healthy and environmentally responsible transportation choices
The District will partner with other agencies to educate the public on healthy transportation choices and to minimize the environmental impacts of the transportation system.

5.1.3 Transportation Objectives
The following objectives target short-term transportation goals. Appendix A contains objectives and policies that address long-term goals for consideration in the future.

Objective 1: Adopt road network plan to meet the needs of the District.
The District will adopt a hierarchy of road facilities including arterials, collectors, and local streets to meet the vehicular traffic needs of travel within and through the District. The network plan includes road cross-sections that will provide the needed pedestrian and bicycle facilities adjacent to the road network.
Objective 2: Adopt capital plan to meet intersection capacity needs into the future.
The District will adopt a capital plan of roadway improvements at key intersections to meet capacity requirements into the future.

Objective 3: Improve connectivity of pedestrian network.
The District will continue to improve the connectivity of the pedestrian network through the Road Rehabilitation and Pedestrian Improvement Program.

Objective 4: Work with BC Transit, MoTI and adjacent municipalities to provide for the growing needs of the community.
The District will continue to work with BC Transit, MoTI, and adjacent municipalities to provide and support local and regional transportation needs of the growing community. Through these partnerships the District will continue to rationalize and develop transit routes and RapidBus. This includes the facilitation of on-going improvements to the supporting pedestrian facilities (sidewalks, bus landings, shelters, benches, and so on).
6 TRANSPORTATION IMPROVEMENTS

6.1 Road Network

6.1.1 Road Classifications

Road Hierarchy
A road network, including road classifications and typical cross sections, should be defined for any municipality. This will allow the municipality to properly manage the street and plan for traffic volumes and adjacent development. In addition, road user groups, such as heavy vehicles, emergency services, and bicyclists require consideration of route consistency and continuity. Typically, road hierarchies are identified by road classifications and are defined into the following categories: highway, arterial, collector and local. This hierarchy, from high mobility / larger volume (e.g. highways / arterials) to high accessibility / lower volumes (e.g. local roads), defines the function of the road and associated design requirements (to ensure roads are built to an appropriate standard for the intended function).

Road Classifications for West Kelowna
The road classification scheme was developed to provide the functions of each road hierarchy along with desire lines and emergency response routes in the context of the existing and proposed road network, and the anticipated land uses. This assisted in determining the areas of higher use and enabled the designation of roads. The proposed network has three major classifications: arterial, collector, and local road.

Arterial Roads
The primary purpose of arterial roads is to provide mobility and restrict access. They also (1) accommodate all modes with bike lanes and sidewalks; (2) provide continuity and connectivity with other arterial roads and higher order roads (i.e. highways); (3) typically do not have single-family dwellings fronting the road; (4) typically do not provide on-street parking; and (5) typically provide turning lanes and bus bays. These are the major routes for areas of higher use throughout the District.

The arterial road network is important to provide an alternative to Highway 97 and an efficient means for all modes of transportation to link between local neighbourhoods. Providing this network is challenged by topography and existing built-up lands. Therefore, the Transportation Master Plan identifies possible corridors and existing arterials in order to plan budgets and take advantage of opportunities. The arterial road network is described as follows:

- **Boucherie Corridor (Wine Trail):** East-West route south of Highway 97 along lakefront with unique cross-section featuring multi-use trail, landscaped medians for aesthetics and traffic calming.
• **New Connector Route:** East-West route north of Highway 97. This route may use upper levels of the un-built Tallus Ridge Drive, Shannon Lake Road, Rosewood Drive, and Westlake Road. An alternative route is a separate new route near the steep mountain slope to the north. Build-out for this would be beyond this 20-year plan, however, once a feasibility and functional review is conducted, opportunities can be taken advantage of. The “New Connector Route” should be considered with MoTI as the function of this road assists both agencies in dealing with traffic in the future. No financial commitment should be made, except for the cost sharing of a corridor feasibility study with MOTI to select a route.

• **Glenrosa Corridor:** Major Glenrosa neighbourhood route. This requires an additional connection for emergency access and, if feasible, to the Smith Creek neighbourhood. This may be a direct connection to the Smith Creek neighbourhood, Trepanier Road (RDCO), or Highway 97. Section 6.1.2 further describes connections to the neighbourhood.

• **Elliot Corridor:** The corridor is comprised of Elliot Road and Smith Creek Road. It will provide a potential connection to the “New Connector Route”.

• **Old Okanagan Corridor:** This route is made up of Old Okanagan Highway, Shannon Lake Road, and Tallus Ridge Drive. Portions of this route exist, but will need to be upgraded to an arterial standard to provide sidewalks and bike lanes.

• **Bartley Corridor:** Bartley Road north of Highway 97 exists for a small section and connects to the Shannon Lake Road arterial. A connection from Bartley Road to the “New Connector Route” will require a feasibility and functional review.

• **Stevens-Hudson Corridor:** This section consists of Stevens Road from Bartley Road to Westlake Road, Westlake Road to Hudson Road, and Hudson Road to Boucherie Road. These are existing sections which will need to be upgraded to an arterial cross-section.

• **Westlake Corridor:** This section consists of Westlake Road from Highway 97 to Rosewood Drive. It is important that this links to the “New Connector Route” to provide connectivity in the arterial network. A connection from McDougall Road (reservoir road) to the new Bartley Road extension should be scheduled for a feasibility and functional design study.
**Collector Roads**

Collector roads provide a mix of accessibility and mobility. They also (1) connect the local roads to the arterials; (2) accommodate all users with bike lanes or shared bike facilities and sidewalks; (3) typically provide on-street parking; and (4) accommodate direct access.

There are two classes of collectors; major and minor. Major collectors feature a higher degree of mobility. Minor collector roads feature a higher degree of access and are primarily long local residential roads with approximately 50 single-family dwellings or the potential to develop over 50 single-family dwellings.

New major collector roads will provide connections between Westbank Centre and the waterfront as well as potential Glenrosa connections.

The road classifications are shown in Figure 1. A more detailed map is provided in Appendix B. The road network will require upgrades of existing roads to the applicable standard cross-sections (see Section 3.2), feasibility and functional design studies for new alignments, and property acquisition and construction of new alignments. The proposed new roads are not needed in the next 20 years, but will be required beyond. Therefore, time for planning and budgeting is ample.
Figure 1: Road Classification Map

- NEW CONNECTOR ROUTE
- POTENTIAL GLENROSA ACCESS
- FUTURE ROUTE TO BE STUDIED TO DETERMINE ALIGNMENT OPTIONS AND FEASIBILITY
- CONNECT TO TREPANIER RD
- CONNECT TO WESTSIDE RD
- WESTBANK FIRST NATIONS IR #8

Legend:
- Red: Minor Highway
- Blue: Arterial Road
- Green: Major Collector Road
- Purple: Future Road
- Light Purple: Urban Centre
- Orange: WFN Indian Reserve

Road Classification Plan
District of West Kelowna
October 2013
6.1.2 Road Network Connectivity
The following section discusses the connectivity within the District of West Kelowna’s road network. The connections within the network are important to provide safe and efficient transportation between neighbourhoods.

The existing road network has many gaps or missing sections that limit travel between communities. Traffic must frequently access Highway 97 to connect between neighbourhoods. The Glenrosa neighbourhood is accessed from Highway 97 and Lower Glenrosa Road, which only provides two access routes both from the south. This limited access became a particular concern during the forest fires in 2009. Providing road network continuity within the District is essential to facilitating and maintaining accessibility and mobility. The completed network of West Kelowna roads will provide connectivity between neighbourhoods that will enable less use of Highway 97 for vehicle trips within West Kelowna and improved emergency access.

Future Road Connections
The road network map (Figure 1) also identifies key links to be added to the existing system to provide continuity within the District owned roads, alternative access for neighbourhoods, and emergency access (particularly for fire incidents). These links will require corridor feasibility studies, the procurement of right-of-way, and designed to an appropriate standard cross-section.

The corridor feasibility study incorporates a survey, land title search, geotechnical review and engineering (including cut and fill), environmental assessment, and development of road alignment. Partnerships (i.e. with MoTI) should be considered for the New Connector Route.

The future road segments and their road classification are described in Table 1. It should be noted that on a traffic capacity perspective, the future road connections are not required over the next 20 years. This has been modeled and analyzed for a traffic growth scenario of 2.0% per year (see Section 6.2 for more information). Development may trigger the need for these future road connections and the road reserves should be secured through development.
Table 1: Future Road Connections

<table>
<thead>
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<th>Future Road Segment</th>
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<tr>
<td>New Connector Route Glenrosa Road to West Side Road</td>
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</tr>
<tr>
<td>Glenrosa Road from Carre Road to New Connector Route</td>
<td>Arterial</td>
</tr>
<tr>
<td>Bartley Road Extension from Bartley Road to New Connector Route</td>
<td>Arterial</td>
</tr>
<tr>
<td>Rosewood Drive from McDougall Road to Bartley Road Extension</td>
<td>Arterial</td>
</tr>
<tr>
<td>Smith Creek Road Copper Ridge Drive to New Connector Route</td>
<td>Arterial</td>
</tr>
<tr>
<td>Tallus Ridge Drive from Smith Creek Road to Cobblestone Road</td>
<td>Arterial</td>
</tr>
<tr>
<td>Asquith Road from Iron Ridge Road to Tallus Ridge Drive</td>
<td>Collector</td>
</tr>
<tr>
<td>Auburn Road from End to Bartley Road</td>
<td>Collector</td>
</tr>
<tr>
<td>Reece Road from Glencoe Road to Elliot Road</td>
<td>Collector</td>
</tr>
<tr>
<td>Lower Glenrosa Road from Glencoe Road to Elliot Road</td>
<td>Collector</td>
</tr>
<tr>
<td>Westbank Centre Ingram Road to Gellatly Road</td>
<td>Collector</td>
</tr>
<tr>
<td>Westbank Centre connection to Waterfront</td>
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Note: Corridor feasibility studies are required for future road connections.

Glenrosa Access Road

Access to the Glenrosa neighbourhood is limited and became a critical concern during the forest fires in the summer of 2009. Existing access is provided from Highway 97 / Glenrosa Road and Webber Road / Lower Glenrosa Road. The north extents of Glenrosa Road travel into forestry roads in the mountains and provide a long circuitous route back into West Kelowna. This section covers a high level assessment of potential alternatives to access routes. These routes would use a local road standard, at a minimum, to enable two-way traffic flow and storm drainage to prevent washouts. The access roads will use an urban local road standard as a minimum to provide two-way traffic flow and protect against run-off. Options to provide the additional connection to the neighborhood are shown in Figure 1 and include:

- a connection to Trepanier Road in the RDCO
- a bridge over Glen Canyon / Powers Creek and upgrade of access road to water treatment plant
- a roadway from Highway 97 west of Glenrosa Rd

The access route options would each have a high capital cost from land acquisition, functional road corridor review study, environmental assessment, road construction, and water crossings. The routes shown indicate the general desired connection. The alignments themselves can be altered to take advantage of opportunities for land acquisition, access locations, ease of construction, and so on.
Trepanier Road Connection
A connection from Glenrosa Road to Trepanier Road would facilitate an alternate emergency access that would not require direct access to Highway 97. Trepanier Road is in the jurisdiction of the Regional District of the Central Okanagan (RDCO). This option still requires an access to the Smith Creek neighbourhood. A potential alignment is illustrated in Figure 2.

Figure 2: Glenrosa Access Option: Trepanier Road (RDCO) Connection

This link could also be an extension of the New Connector Route to a potential future bypass route for Peachland.
Glen Canyon/Powers Creek Connection
A two-lane bridge over Glen Canyon / Powers Creek can connect Glenrosa to the Smith Creek neighbourhood. This would provide the needed access to each neighbourhood. The connection could be made from the northern extent of Webber Road to the Powers Creek Water Treatment access road (shown in Figure 3). This would include an upgrade of the Water Treatment Access Road to a local road standard. It is recommended that the route has access beyond emergency only to provide additional benefit for the cost of the infrastructure.

Figure 3: Glenrosa Access Option: Powers Creek Crossing

Note that providing full access to this route may influence travel behaviours in the Glenrosa and Smith Creek neighbourhoods and road classifications may need to be altered as a result. If this route were open to full access, a transportation study should be conducted to study the implications to the neighbourhood, travel behaviour, and confirm road alignment and standards.
Highway 97 Access
The Highway 97 access would require a new road to be built to connect to Glenrosa from Highway 97 south of the Gorman Brother’s Lumber Mill. Developing a road through the terrain may provide opportunities for development. The alignment of the road would require a functional corridor review. It should be noted that the proposed access would pass through a DPA 5 Aquatic Ecosystem Development Permit Area designation and may pose challenges and increase the costs of developing an access route (see Figure 4).

![Figure 4: Potential Emergency Access Route for Glenrosa through DPA](image)

This option will likely only be suitable for right-in / right-out access onto Highway 97 due to traffic volumes or it will have to be routed to the Glenrosa Road / Highway 97 interchange which would defeat its purpose. The access does not provide the strategic network link facilitated by a crossing over Powers Creek as it is a third access to the south of the neighbourhood. The Powers Creek option serves Smith Creek and Glenrosa, while the Highway 97 option still requires an alternative access for the Smith Creek neighbourhood.
**Assessment of Alternatives**

The three routes represent a high level assessment of potential access alternatives to the Glenrosa neighbourhood. Access to the neighbourhood is challenged by a multitude of factors including, but not limited to: terrain, water crossings, existing development, a sensitive environment, land acquisition, and so on. It is recommended that potential access routes are reviewed through a neighbourhood land use and transportation study, feasibility assessment and functional road corridor review, and an environmental assessment. The neighbourhood land use and transportation study will assess the implications of a new full access route on travel behaviours and road classifications in the neighbourhood (this is particularly important for connecting the Smith Creek neighbourhood to the Glenrosa neighbourhood). A functional road corridor review study would incorporate a survey of potential alignments and a geotechnical review for the proposed alignments. Very high level costs for the alternatives and studies can be found in Section 10 on the Investment Strategy.

**6.1.3 Road Cross-Sections**

It is important to have typical cross-sections for each defined road classification. Each cross-section should include lane widths and numbers, on-street parking (presence or absence), sidewalks, boulevards and utility corridors and bicycle accommodations.

The cross-sections were developed iteratively with representatives of the Urban Development Institute (UDI) on three different occasions; through a road tour on November 23, 2011 and then vetted with at meetings held on May 18, 2012 and June 8, 2012. All road users and parking were considered for each classification. The cross sections for urban and rural arterials, collectors, and the “Wine Trail” are shown in Figure 5 through Figure 7.

**Arterial Cross-Sections**

The arterial cross-sections provide facilities for all users with bike lanes and sidewalks / paved pathways. There are three cross-sections, the urban arterial, rural arterial, and wine trail. The urban arterial *(Figure 5)* features curb and gutter, two-sided 2.0m sidewalks separated by 2.0m boulevard, 1.5m bike lanes, and 3.6m traffic lanes within a 24.0m right-of-way.
The rural arterial (Figure 6) provides two 2.0m paved pathways separated by a 1.0m boulevard and 2.0m ditch, 1.8m bike lanes, and 3.7m traffic lanes within a 24.0m right-of-way.
The Wine Trail (Figure 7) is a unique cross-section that provides curb and gutter, a 4.0m paved pathway, 2.5m sidewalk, two 1.5m bike lanes, 3.6m traffic lanes, and a 1.8m wide landscaped median that provides aesthetics and traffic calming.

**Figure 7: Wine Trail (WA-1)**

Town Centre Streets
Downtown side street cross-sections were developed in the 2011 Westbank Centre Revitalization Plan. These streets incorporate two-way traffic with 4.25m shared use vehicle and bike facilities, 2.5m curbside parallel parking on two sides or 5.1m perpendicular/angle parking on one side, and 2.0m to 3.0m wide sidewalks depending on the need, considering the overall pedestrian network. **Figure 8** and **Figure 9** show the proposed cross-section dimensions for the town centre streets. These are typical layouts that may alter between parking styles depending on adjacent land use and where left turns occur at intersections. Town centre streets are applied to all streets within the Westbank Centre that are not Highway 97 or High Street routes. Old Okanagan Highway is an exception to this. All other District roads that lead to Westbank Centre will be classified as town centre streets within the Westbank Centres boundary.
Figure 8: Town Centre Street with Perpendicular / Angle Parking (TC-1)

Figure 9: Town Centre Street Cross-Section with Parallel Parking (TC-2)
Collector Road Cross-Sections
There are three collector road cross-sections; the urban collector, rural collector, and minor collector. The urban collector (Figure 10) features curb and gutter, two-sided 2.0m sidewalks, and two shared 5.5m vehicle and bicycle traffic lanes to support on-street parking and cycling.

The rural collector (Figure 11) features two 1.5-2.0m paved paths separated from the road with two 5.1m shared traffic lanes, and a 0.5m shoulder.
The minor collector (Figure 12) features curb and gutter, two-sided 2.0m sidewalks, and an 8.5m roadway for shared vehicle and bicycle use, and on-street parking within an 18.0m right-of-way. This cross-section is to be applied on major reconstruction of existing roads and with new development.
Local Road Cross-Sections

Four typical local road cross-section types are proposed for the District, a typical urban local road, typical rural local road, and two types for hillside developments; one being with development on one side (single loaded) and the other with development on both sides (double loaded). The following apply to all local roads:

In all scenarios it is appropriate to consider offsetting the road in the right-of-way to accommodate steep slopes or utilities.

The standard sections consider that two-sided sidewalks will be provided when the local road is within 500m of a school, major park, or major facility. The rationale is that most communities are trending towards this as the separation of traffic and pedestrians encourages pedestrian travel, supports transit, safe routes to school, and active transportation principles. Sidewalks are typically maintained by the frontage owner so there is minimal maintenance burden on the District by two-sided sidewalk accommodation. The exception to two-sided sidewalk will be considered where justification is presented showing an effective pedestrian circulation plan with no breaks in continuity and conform to Transportation Association of Canada (TAC) crosswalk guidelines. In areas where sidewalks are only provided on one side of the street they should be provided on the development frontage.

All sidewalks will be 2.0m wide, measured from the face of curb, or where mountable curb is used, 1.8m measured from the back of curb. The reason for this width is to build age friendly neighbourhoods. Most jurisdictions have realized that the aging population is requiring other walking support mechanisms and the need for wider sidewalks has been identified to accommodate the various users. The encouragement and support for pedestrian travel also supports transit initiatives.

Two-sided parking is assumed to be allowed unless the District deems that due to other demands (cycling) or for safety reasons, it should be managed otherwise.

For safety reasons, barrier curb will be used, particularly on hillside development. Exceptions should be in subdivisions where driveway location may not be known at the time of implementation.

Typical Local Road Sections

The typical urban local road cross-section (shown in Figure 13) has an 18m right-of-way with an 8.5 m paved surface. Sidewalks are directly adjacent the curb and light standards and other surface utilities (power or telephone poles) are recommended to be installed behind the sidewalk so as to not constrain the available pedestrian area. The typical local road cross-section is recommended for all local roads that are not hillside roads.
The typical rural local road cross-section (shown in Figure 14) has a 16m right-of-way with 7.4m paved surface. Shoulders are 1.0m wide gravel with a 0.5-1.0m option to pave. This rural local road cross-section has limited application. It is not recommended to be used in residential or commercial developments.
Hillside Local Road Cross Sections

Hillside areas pose challenges in subdivisions and roadway development due to the steep grades, environmental impacts and inherent building challenges. It is understood that Hillside development guidelines are being developed however the major considerations in determining what constitutes a hillside road include storm drainage requirements, sanitary sewer, water, erosion protection, geotechnical design, retaining walls, and so on. This report addresses and recommends the road section requirements only based on discussions with UDI and reviewing adjacent municipalities such as Kelowna. Alternative road standards are proposed to minimize the environmental impact while still serving the general public in a safe manner. In these alternative standards, slopes can be retained within the cross sections (i.e. the right-of-way does not have to be level). However, all retaining walls should be contained within private property and offset from the property line. The design speed for local hillside roads should be less than 50 km/h, in designing horizontal and vertical curvature, so as to inherently include a traffic calming component in the design. Curvilinear roads should be used and straight tangent sections should be avoided.

The recommended cross sections include the following:

- Single loaded roadways (units on one side of the road only); and
- Double loaded roadways (units on both sides of the road).
The single loaded scenario has a 13m right-of-way and 8.5m paved surface. The paved surface can also be reduced to 7m where on-street parking is not desirable. In this scenario, sidewalk on one side could be considered favourable to lessen environmental impacts if the pedestrian plan indicates appropriate alternatives (see Figure 15). The double loaded scenario has a 15m right-of-way and 8.5 m paved surface. The paved surface could be reduced to 7m where on-street parking is not desirable (see Figure 16).

Figure 15: Hillside Roads - Single Loaded
HILLSIDE LOCAL ROAD - FOR LOCAL ROADS WITHIN 500m OF SCHOOL, MAJOR PARKS, OR MAJOR FACILITIES TWO-SIDE SIDEWALK OPTION UNITS ON BOTH SIDES OF STREET

HILLSIDE LOCAL ROAD
ON-STREET PARKING ONE SIDE
UNITS ON BOTH SIDES OF STREET

HILLSIDE LOCAL ROAD - ONE-SIDE SIDEWALK OPTION
NO ON-STREET PARKING
UNITS ON BOTH SIDES OF STREET

Figure 16: Hillside Roads - Double Loaded
6.1.4 Existing Traffic Conditions

Highway 97 is an expressway providing the primary north/south link for the movements of goods and people in the Okanagan. It links Highway 1 in Sicamous, BC to the U.S.-Canada Border south of Osoyoos, BC. West of the Glenrosa Interchange, average annual daily traffic (AADT) volumes are 21,000 vehicles per day (vpd) with summer volumes of 27,000 vpd. On the W.R. Bennett Bridge, the AADT is 51,000 vpd with summer volumes of 59,000 vpd. Morning AM and afternoon PM peak hour traffic operate under congested conditions. These conditions can last for more than an hour during the summer months.

The Couplet is an arterial section of Highway 97 from Gellatly Road to Glencoe through the commercial Westbank Centre. It is formed by two two-lane one-way streets, Main Street and Dobbin Road each carrying about 17,000 vpd. This segment has a posted speed of 50 km/h. There are four signalized intersections in the arterial section which accommodate pedestrian crossings. Major transit stop facilities are located on each of the one-way streets. A transit exchange is being developed on Elliot Road between Main Street and Dobbin Road.

The major roads under the jurisdiction of the District of West Kelowna include Glenrosa Road, Shannon Lake Road, Westlake Road, Boucherie Road, Gellatly Road, and Hudson Road. Traffic volumes on these roads range from about 5,000 vpd to more than 10,000 vpd. Volumes for these routes are shown in Figure 17.
6.2 Traffic Assessment

6.2.1 Methodology

The need for road improvements from a traffic operations perspective was assessed through the development and analysis of a District-wide traffic model. A model of the major road network of the District of West Kelowna was developed using Synchro software. SIDRA software was used for the analysis of roundabouts. Short-term deficiencies and areas requiring further investigation were identified from the model for current conditions and future. A list of recommended capital improvements is developed for intersections to address these deficiencies. Based on the growth rate and priority weightings for other road improvements (i.e. sidewalks) the capital list was prioritized and broken into 5-year increments for 2013, 2018, 2023, 2028, and 2033.

6.2.2 Model Development

The Synchro model of the District of West Kelowna was developed for the weekday PM peak period during the summer peak season. The model includes intersections with the Ministry of Transportation and Infrastructure highways, but excludes the highway network within the Westbank First Nation land. Data on intersection turning movements were gathered from the District of West Kelowna, the Ministry of Transportation and Infrastructure, and past projects involving Boulevard for the PM peak period. Flow balancing and additional counts were conducted by Boulevard for intersections without turning movement data. Collected traffic data were expanded to the 2013 year and summer traffic conditions. Road geometric data were gathered from aerial photographs and combined with the turning movement data to develop the model. Intersection signal timing plans were obtained for the signalized intersections along Highway 97. The model was developed, then calibrated and verified. Long-term growth was projected for the next 5, 10, 15, and 20 years at 2.0% per year for District roads (based on population growth) and 2.5% per year for Highway 97 (based on permanent traffic count data). Figure 18 shows the model network and the location of the analyzed intersections.

6.2.3 Model Evaluation

The modeled traffic conditions were evaluated based on the three measures of effectiveness; level of service (LOS), queue lengths, and delays. The LOS indicates the quality of the transportation system as experienced by the user. Letter grades from LOS A (excellent operations) to LOS F (unstable/failing) are derived from the type of traffic control and delay. For the purpose of this study, intersections with an overall LOS C or better are considered acceptable, while D is considered to be on the threshold between acceptable and unacceptable. For individual movements and approaches, a LOS of D or better is considered acceptable, while E is considered to be on the threshold between acceptable and unacceptable. The measures of effectiveness are evaluated for the PM peak period. Appendix C provides additional information on the modeling software and LOS.
6.2.4 Traffic Conditions
This section highlights traffic conditions for the existing case and the 5-, 10-, 15-, and 20-year horizons. Intersections that have an unstable or failing LOS are listed and mitigation is prescribed. Intersections requiring a change in traffic control to signalization or a roundabout may be eligible for both. The use of roundabouts is recommended at suitable intersections to provide improved safety and traffic conditions (over signalized intersections). Additionally, roundabouts feature aesthetics opportunities (with room for public art, landscaping, etc), no traffic signal electrical cost or signal system maintenance, and can accommodate transit buses and large trucks when designed appropriately. Routes such as Boucherie Road may maintain their aesthetics and character and improve traffic flow and safety with the use of roundabouts at suitable intersections. All roundabout options were modeled for this project result in a LOS A to 2033; however, locations with high truck volumes, grades, and other geometric elements may render the provision of a roundabout at a high cost and/or not possible. It is recommended that these locations be further assessed before installation of traffic signals.

There are cases where the intersections are beyond capacity in the future and will require solutions that focus on the corridor to add capacity or develop other alternatives to reduce demand. These cases all occur on Highway 97 and mitigation beyond intersection improvements are outside of the scope of this project. Therefore, the Highway 97 roads are discussed, but the District of West Kelowna intersections are the focus. New District road links will improve connectivity between neighbourhoods and may reduce local travel on Highway 97.

The following subsections describe locations with unstable or failing LOS including maps of the analyzed intersections showing overall LOS and failing turning movements, and maps indicating proposed mitigation.

Existing 2013 PM Peak Traffic Conditions
The existing 2013 PM peak traffic conditions are described below. Figure 19 shows the overall LOS at each of the analyzed intersections and identifies intersections with unstable or failing LOS turning movements. Figure 20 identifies recommended improvements for District of West Kelowna intersections that were identified as unstable or failing.

The intersection of Stevens Road / Westlake Road has an overall LOS F with LOS E for the westbound direction and LOS F for the eastbound direction. These movements can be alleviated with a traffic signal and a northbound left-turn lane to LOS B. The option of providing a roundabout will improve the overall operation to LOS A. Note that Stevens Road and Westlake Road experience significant truck volumes, which can influence the size of the roundabout and may require additional right-of-way. For this reason
the signalized intersection is used for further analysis, however, it is strongly recommended that the incorporation of a roundabout be evaluated in the future prior to implementing signals.

The Highway 97 / Gosset Road / Gellatly Road and Highway 97 / Boucherie Road / Horizon Drive intersections exceed their capacity and will require grade separation or more through lanes on Highway 97 or other means to reduce traffic volumes at peak periods to appropriately improve the LOS. Options need to be considered for the entire Highway 97 corridor as alleviating the congestion at this location may cause worsened conditions downstream.

**Future 2018 PM Peak Traffic Conditions**

During the 2018 PM peak, traffic conditions along Highway 97 further deteriorate. Figure 21 shows the overall LOS at each of the analyzed intersections and identifies unstable or failing traffic conditions. Figure 22 identifies recommended improvements for District of West Kelowna intersections that were identified as unstable or failing.

The Gosset Road / Old Okanagan Highway intersection fails in the westbound direction. These westbound movements originate from Highway 97, Gellatly Road, and commercial land use along Gosset Road. The traffic conditions can be improved with a one-lane roundabout (to LOS A) or traffic signals (to LOS B).

The intersection of Highway 97 / Westlake Road / Hudson Road, Highway 97 / Bartley Road, Highway 97 / Ross Rd, will exceed their capacity. Changes to signal timings can improve operations, but conditions will ultimately fail by 2023. The corridor will require additional capacity through grade separation or more through lanes on Highway 97 or reduction in vehicles through transportation demand management. Options need to be considered for the entire corridor as alleviating the congestion at this location may cause worse conditions downstream.

**Future 2023 PM Peak Traffic Conditions**

The 2023 PM peak traffic LOS are described below. Figure 23 shows the overall LOS at each of the analyzed intersections and identifies unstable or failing LOS for turning movements. Figure 24 identifies recommended improvements to the intersections to alleviate unstable/failing traffic conditions.

The Boucherie Road / Hudson Road intersection will have an overall LOS E and LOS F for the eastbound direction (Hudson Drive). This can be alleviated by either adding a roundabout (LOS A) or installing signals and adding a northbound left-turn lane (LOS B). The addition of a roundabout is recommended for this intersection.
The intersections along Highway 97 entering the couplet begin to fail at Dobbin Road / Elliot Road and Main Street / Old Okanagan Highway. These intersections will have an overall LOS E and LOS D, respectively. Solutions for intersections in the Westbank couplet should be developed together in partnership with the Ministry of Transportation and Infrastructure.

**Future 2027 PM Peak Traffic Conditions**
The 2027 horizon year PM peak traffic LOS conditions are described below. Figure 25 shows the overall LOS at each of the analyzed intersections and identifies unstable or failing LOS for turning movements. Figure 26 identifies recommended improvements to the intersections to alleviate unstable/failing traffic conditions.

The intersection of Boucherie Road / Cordova Way / Anders Road will have an overall LOS D and LOS F in the eastbound direction (Cordova Way). Adding a roundabout or installing signals with a southbound left-turn lane will improve conditions to LOS A. Grades at this intersection may make the construction of a roundabout more costly or unfeasible. It is strongly suggested that the feasibility of a roundabout be further studied prior to installation of signals.

Shannon Lake Road / Bartley Road will have an overall LOS C and LOS F in the westbound approach. Either signals or a roundabout may alleviate these conditions to LOS A. Note that Shannon Lake Road / Bartley Road experience significant truck volumes which can influence the size of the roundabout and may require additional right-of-way.

The remaining signalized intersections modeled for the couplet begin to fail. Main Street / Elliot and Dobbin Road / Old Okanagan Highway will exceed their capacity. Capacity must be added and/or alternative options must be implemented prior to this point.

**Future 2033 PM Peak Traffic Conditions**
The 2033 horizon year PM peak traffic LOS conditions are described below. Figure 27 shows the overall LOS at each of the analyzed intersections and identifies unstable or failing LOS for turning movements. Figure 28 identifies recommended improvements to the intersections to alleviate unstable/failing traffic conditions.

The intersection of Butt Road / Old Okanagan Highway will exceed its capacity and have failing movements for the eastbound, westbound, and southbound approaches. This can be alleviated with a
southbound left-turn lane. This will bring the intersection to an overall LOS C. Additional right-turn lanes may be added to the eastbound and westbound approaches to raise the intersection LOS to B.

The Glenrosa Road / Webber Road intersection will have unstable/failing conditions for the westbound approach. Signalization of the intersection can resolve this to LOS B and an overall LOS B.

Webber Road / Lower Glenrosa Road will have LOS E in the westbound direction (Lower Glenrosa Road). The addition of westbound left-turn lane will alleviate queue lengths for the westbound movement.

The Highway 97 northbound and southbound ramps intersecting with Glenrosa Road will exceed their capacity. Solutions to resolve the capacity for these intersections should be developed with the Ministry of Transportation and Infrastructure.
Figure 21: 2018 PM Peak LOS
Figure 23: 2023 PM Peak LOS

Legend
- 2023 LOS
  - A
  - B
  - C
  - D
  - E
  - F

District of West Kelowna Transportation Master Plan
Figure 24: 2023 PM Peak Improvements
Figure 25: 2028 PM Peak LOS
Figure 26: 2028 PM Peak Improvements

Legend

- Intersections Studied
- Roads Studied
- District Boundary
Figure 28: 2033 PM Peak Improvements
6.2.5 Discussion – Model Results

Prior to reaching 2033, the intersections along Highway 97 will need capacity improvements or other alternatives to reduce traffic on Highway 97 will need to be implemented. By 2018, The Highway 97 intersections with Bartley Road, Ross Road, Westlake Road / Hudson Road, Boucherie Road, and Gosset Road / Gellatly Road will fail in the southbound directions for the PM peak. By 2028, the signalized intersections in the Westbank Centre will fail in the southbound directions for the PM peak. Solutions for the Highway 97 intersections will have to be developed for the entire corridor or improvements to one will merely send congestion downstream to the next intersection. The development of West Kelowna’s road network will allow for improved connectivity between neighbourhoods and enable alternative routes than Highway 97.

While the Highway 97 intersections have LOS F for the southbound direction into 2033, the traffic simulation model does not indicate cases of vehicles spilling back from the Ministry intersections into District intersections upstream.
6.3 Bicycle and Pedestrian Networks

6.3.1 Existing Conditions

Cycling facilities in West Kelowna are limited. Paved shoulders of varying widths on some roads, including Highway 97, provide limited facilities and limited incentives for cyclists. Newer roadway cross-sections have added bicycle lanes, such as the Gellatly Road Upgrades.

In September of 2008, the District undertook the development of a Draft Bikeway Network Master Plan. Public feedback on target cycling mode share suggested that a significant number of people are willing to cycle if better facilities are provided. The targets for cycling mode share in the Draft Bikeway Network Master Plan were quite ambitious, as follows:

- 17% for cycling all the way to end destinations, such as work or school
- 10% for combining cycling and transit, with all buses equipped with bike racks; and
- 7% for combined cycling and driving.

An update to the District's Recreational Trails Master Plan is concurrently underway. This plan considers many of the paths proposed in the 2008 Bikeway Network Master Plan, as well as other connections within linear parks. The draft recreational trails network map is shown in Figure 29.

Pedestrian facilities are also limited within the District. Most of the subdivisions were built with rural standards where pedestrians walk on roads or shoulders. Some areas have sidewalks, such as around the Westbank commercial centre and near schools. There are also pathways within parks. The connectivity to and from the existing pedestrian facilities need to be established.

6.3.2 Active Transportation Network Improvements

In the short-term, the pedestrian system should correspond with improvements on the major road network and should give priority to transit routes and high pedestrian areas such as the Westbank Centre. The District should continue to prioritize sidewalks with the Road Rehabilitation and Pedestrian Improvement Program.

Bicycle facilities should follow with improvements to the roadway network and road cross-sections as described in Section 6. Once the fundamental improvements are complete then a bicycle master plan should be followed.

In the future, a more comprehensive Active Transportation Plan should be developed including on- and off-road facilities and destinations that are consistent with the Recreational Trails Master Plan.
Figure 29: Recreational Trails Network

Recreation Trails Master Plan

MAP 1: TRAIL LOCATIONS AND TYPES

LEGEND
- Roadside - Proposed DWK Trail
- Roadside - Existing DWK Sidewalk
- Off-Road - Proposed DWK Trail
- Off-Road - Existing DWK Trail
- Off-Road - Existing RDCG Trail
- Off-Road - Existing Crown Land Trail
- Road
- Watercourse
- Jurisdiction Boundary
- Westbank First Nation

CONTEXT MAP

REFERENCES
Trail locations are approximate and some unsanctioned trails are shown crossing private property. Several planned roads are shown crossing private property and are subject to road assessment and approval by the District of West Kelowna.

Date: 7/11/13. Projection: UTM Zone 11 Datum: NAD 83

0 0.5 1 1.5 2
KILOMETRES
6.4 Public Transit

6.4.1 Existing Networks and Passengers
Transit service in West Kelowna is provided by BC Transit as part of the Kelowna Regional Transit System. This network connects West Kelowna to Peachland, Kelowna, Lake Country, and to Vernon’s Regional Transit System. Figure 30 shows the routes serving West Kelowna. The main West Kelowna routes (20 Lakeview, 21 Glenroa, and 24 Shannon Lake) operate on 30-minute headways in peak commute periods and 60-minute headways in off-peak periods. Route 22 Peachland operate on 60-minute headways. These routes carry about 1,500 passengers per day. The Route 97 RapidBus was introduced in 2012 provides direct service from West Kelowna’s Westbank and Stevens Exchanges to the Queensway Exchange in Kelowna and to the University of British Colombia Okanagan (UBCO) Campus. This route only operates during the peak hours at 15-minute headways.

Figure 30: BC Transit Routes in West Kelowna

Source: BC Transit Website 2013
There are also four community bus routes; Route 25 East Boundary, Route 27 Horizon Route 28 Smith Creek and Route 29 Bear Creek. These routes operate at variable headways and collectively carry about 460 passengers per day (2013).

The transit passenger activity is shown in Table 2 for average weekday passenger boardings by route for last quarter of 2012, and the first quarter of 2013. The 97 RapidBus Route has the highest passenger boardings, which are also occurring in the City of Kelowna and are likely due to the service provided to the UBCO. Shannon Lake, Glenrosa, and Lakeview have the highest passenger activity of the West Kelowna routes.

### Table 2: Transit Average Passenger Boardings

<table>
<thead>
<tr>
<th>Route #</th>
<th>Route Name</th>
<th>Passengers (in Q4 2012)</th>
<th>Passengers (in Q1 2013)</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>Lakeview</td>
<td>323</td>
<td>403</td>
</tr>
<tr>
<td>21</td>
<td>Glenrosa</td>
<td>387</td>
<td>365</td>
</tr>
<tr>
<td>22</td>
<td>Peachland</td>
<td>223</td>
<td>341</td>
</tr>
<tr>
<td>24</td>
<td>Shannon Lake</td>
<td>418</td>
<td>396</td>
</tr>
<tr>
<td>25</td>
<td>East Boundary</td>
<td>172</td>
<td>274</td>
</tr>
<tr>
<td>27</td>
<td>Horizon</td>
<td>22</td>
<td>63</td>
</tr>
<tr>
<td>28</td>
<td>Smith Creek</td>
<td>47</td>
<td>43</td>
</tr>
<tr>
<td>29</td>
<td>Bear Creek</td>
<td>91</td>
<td>83</td>
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<tr>
<td>97</td>
<td>RapidBus</td>
<td>3,143</td>
<td>3,113</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>4,826</strong></td>
<td><strong>5,081</strong></td>
</tr>
</tbody>
</table>

### 6.4.2 Transit Network Improvements

Priorities for the current transit system should invest in improving the pedestrian system to provide connectivity from the bus stop to the surrounding network focusing on higher order roads (arterials and major collectors). Bus landings, shelters, and furniture are important and there are opportunities to acquire partial funding from BC Transit. The District should continue to rationalize transit route and RapidBus projects. This supports a practical approach to meet community transit needs, maintain and increase ridership levels, and identify associated costs.

In the long-term, a transit plan should be developed with BC Transit in partnership with adjacent municipalities and the Ministry of Infrastructure that support the needs of transit users and promotes the system's use.
7 ASSET MANAGEMENT

Transportation planning is crucial to effective asset management practices, just as asset management is crucial to controlling transportation plan expectations. The ability to create a sustainable community or multi-modal transportation system requires infrastructure supply, its condition and operational performance to be affordable. It also requires the right organizational structure, governance, processes, and oversight to enable the plan to be pursued. Without this structure, status quo day-to-day activities and inertia will prevent the plan from being adopted.

Therefore it is critical to integrate long term transportation planning with asset management multi-asset, life cycle investment planning. By doing this future infrastructure growth and replacement expectations can be practically traded-off against the need to manage current assets, infrastructure repair backlog (deficit), available funding, and future revenue sources.

7.1 System Maintenance

On December 7, 2012, five years after its incorporation, the District ceased to benefit from the Province’s ‘Offer of Assistance’ for the provision of roadway maintenance services. To accommodate this transfer of roadway maintenance the District developed its own RMS and procured a new roadway maintenance service provider through a competitive selection process.

Roadway maintenance has four basic outcomes or impacts:

- Safety;
- Asset preservation
- User comfort; and
- Aesthetics.

Each element of a roadway maintenance program, when conducted, benefits from one or more of these outcomes. When a roadway maintenance element is not conducted then not only are these outcomes not achieved, but additional costs are encumbered through safety and flood claims, and the loss of asset service life.

From an administrative perspective, poor roadway maintenance practices can cause local residents to question whether they are getting value for money from community leadership. This situation is more acute in a municipality than a provincial highway primarily due to the greater roadway exposure and use by local vehicles, bicycles and pedestrians.
The new roadway maintenance program is delivered through a combination of in-house and contracted services, these services cover:

- Surface Maintenance;
- Water Drainage;
- Roadside Maintenance;
- Traffic Maintenance;
- Structure Maintenance;
- Emergency Maintenance; and
- Winter Maintenance.

7.1.1 Surface Maintenance
Surface maintenance addresses repairs such as pothole filling, crack sealing, road patching, gravel road grading, sweeping, shoulder drop off, and large debris and animal removal on the travel surface.

Regular surface maintenance helps prevent water from penetrating the road base and breaking up the structure through water movement and freeze/thaw cycles, and assist driver safety and comfort.

7.1.2 Water Drainage
Water drainage maintenance addresses repairs such as ditch cleaning, culvert cleaning, catchbasin cleaning, dry well cleaning, shoulder washouts, and debris and animal removal in the ditch and right-of-way.

Regular water drainage maintenance is critical in enabling the effective removal of water from the roadway system to ensure a long road segment service life.

7.1.3 Roadside Maintenance
Roadside maintenance addresses repairs such as mowing, vegetation removal, sidewalk repair, graffiti removal, and tree and branch control.

Regular roadside maintenance provides a healthy and aesthetic appearance to the roadway system that is important to non-vehicular
traffic, and provides added safety through the removal of vegetation that blocks road user sight lines.

7.1.4 Traffic Maintenance
Traffic maintenance addresses repairs such as sign cleaning and resetting, line painting and signal repairs.

Regular traffic maintenance reduces road user conflict points, thereby reducing collision frequency and can also reduce the collision severity.

7.1.5 Structure Maintenance
Structure maintenance addresses repairs such as bridge deck repair, bridge rail repair, bridge pile repair, timber replacement, and bridge cleaning.

Bridges are points along the roadway system that can disrupt a large component of the system with full or partial failure. Regular bridge maintenance ensures that bridge crossings are reliable and safe.

7.1.6 Emergency Maintenance
Emergency maintenance addresses services such as traffic incident management, evacuation support, flood control, and spill clean-up.

Being prepared for emergencies allows the District to mobilize quickly and effectively manage any emergency condition.

7.1.7 Winter Maintenance
Winter maintenance addresses services such as loose and compact snow removal, ice removal, winter patrolling, de-icing materials and application, equipment management, and winter condition reporting.

Winter maintenance is the most expensive component of Canadian roadway maintenance practices. Regular control or clearing of snow and ice improves road user safety, ease of use, and comfort.
The District of West Kelowna currently has a 5 year contract to deliver the majority of its roadway maintenance services. The base year of this contract was valued at $1,731,496, and this amount is subject to inflation, and the frequency of winter storms above a typical winter.

### 7.2 System Renewal and Replacement

The District’s roadway system is approximately 243km in length and is made up of the following major components: arterial roads (64km), collector roads (22km), local roads (175km), sidewalks (134km) and streetlights (2,110 locations). Based upon the detailed analysis from the District’s draft asset management investment plan, the estimated full replacement value of the District’s roadway system is approximately $245 million (2013), with an estimated remaining life of only 35% (Table 3).

<table>
<thead>
<tr>
<th>Component</th>
<th>Replacement Value</th>
<th>Loss in Value</th>
<th>Remaining Value</th>
<th>Remaining Life</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arterial Roads</td>
<td>$60,649,860</td>
<td>$48,064,411</td>
<td>$12,585,449</td>
<td>21%</td>
</tr>
<tr>
<td>Collector Roads</td>
<td>$20,577,376</td>
<td>$16,903,642</td>
<td>$3,673,734</td>
<td>18%</td>
</tr>
<tr>
<td>Local Roads</td>
<td>$127,632,311</td>
<td>$75,150,402</td>
<td>$52,481,909</td>
<td>41%</td>
</tr>
<tr>
<td>Sidewalks</td>
<td>$22,786,778</td>
<td>$11,621,843</td>
<td>$11,164,935</td>
<td>49%</td>
</tr>
<tr>
<td>Streetlights</td>
<td>$13,270,000</td>
<td>$8,526,886</td>
<td>$4,743,114</td>
<td>36%</td>
</tr>
<tr>
<td><strong>Sub-total</strong></td>
<td><strong>$244,916,325</strong></td>
<td><strong>$160,267,184</strong></td>
<td><strong>$84,649,141</strong></td>
<td><strong>35%</strong></td>
</tr>
</tbody>
</table>

Costs for roadway construction include the following:

- 5% for planning;
- 7% for design;
- 8% for construction administration; and
- 30% project contingency.

The following terms have been used for each component’s service life:

- Arterial roads: 20 years for road surface, and 60 years for road base;
- Collector roads: 30 years for road surface, and 60 years for road base;
- Local roads: 40 years for road surface, and 80 years for road base;
- Asphalt sidewalks: 25 years;
- Concrete sidewalks: 50 years; and
- Streetlights: 35 years.
Those roadway components in the advanced stages of their service life (e.g. less than 50% remaining life) have an element of ‘infrastructure deficit’ which is more accurately referred to as a backlog of renewal and/or replacement capital works. As some roadway segments that are well-maintained can last longer than expected, it is not unreasonable to risk manage these road segments by deferring expensive renewal or replacement without compromising system integrity or levels of service. This deferment is a backlog of work that will eventually need to be done.

In the District’s case there is a backlog of work currently being risk managed with a value of approximately $22 million (2013) per Table 4.

**Table 4: Roadway Backlog**

<table>
<thead>
<tr>
<th>Component</th>
<th>Replacement Value</th>
<th>Loss in Value</th>
<th>Remaining Value</th>
<th>Remaining Life</th>
<th>Backlog (Deficit)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arterial Roads</td>
<td>$ 60,649,860</td>
<td>$ 48,064,411</td>
<td>$ 12,585,449</td>
<td>21%</td>
<td>$ 14,720,608</td>
</tr>
<tr>
<td>Collector Roads</td>
<td>$ 20,577,376</td>
<td>$ 16,903,642</td>
<td>$ 3,673,734</td>
<td>18%</td>
<td>$ 4,364,145</td>
</tr>
<tr>
<td>Local Roads</td>
<td>$ 127,632,311</td>
<td>$ 75,150,402</td>
<td>$ 52,481,909</td>
<td>41%</td>
<td>-</td>
</tr>
<tr>
<td>Sidewalks</td>
<td>$ 22,786,778</td>
<td>$ 11,621,843</td>
<td>$ 11,164,935</td>
<td>49%</td>
<td>$ 27,209</td>
</tr>
<tr>
<td>Streetlights</td>
<td>$ 13,270,000</td>
<td>$ 8,526,886</td>
<td>$ 4,743,114</td>
<td>36%</td>
<td>$ 2,523,000</td>
</tr>
<tr>
<td><strong>Sub-total</strong></td>
<td><strong>$ 244,916,325</strong></td>
<td><strong>$ 160,267,184</strong></td>
<td><strong>$ 84,649,141</strong></td>
<td><strong>35%</strong></td>
<td><strong>$ 21,634,961</strong></td>
</tr>
</tbody>
</table>

Based upon the age and expected service lives of the roadway components the District can expect to spend approximately $135 million in capital to renew and/or replace its aging roadway infrastructure over the next 20 years (**Figure 31**). Roadway components not replaced and/or renewed will need to be risk managed.
Wherever reserves are unavailable to cover capital costs funds will need to be borrowed or acquired through partnerships or qualifying federal and provincial grant programs. The ideal funding allocation for the District's roadway system is approximately $5.4 million annually; allocation not spent in a given year would be placed in reserve for impending use. However, most British Columbia communities in the interior only allocate approximately 40% of their ideal renewal/replacement requirements, this would suggest that the District could fund its annual roadway system renewal and replacement program at $2.16 million and be consistent neighbouring communities.

In reality, it is unlikely that any British Columbia community can fund 100% of its ideal infrastructure renewal and replacement and this unfortunately results in a growing amount of public infrastructure being (cost) risk managed, providing lower and lower service levels, or failing. Dedicated, non-partisan long term infrastructure renewal and replacement grant funding is pivotal to closing the infrastructure backlog (deficit) gap.

The District should consider undertaking an analysis to determine what the affordable levels of service are for each of its roadway classifications and segments. Similar exercises are being conducted by the City of Kelowna, City of Vernon and District of Lake Country.
8 PUBLIC INVOLVEMENT

A key component in development of the Transportation Master Plan was the consultation process with the public.

The study process was initiated with a public Open House to obtain opinions about current conditions, perceived deficiencies, and preferences for future transportation investments. A detailed survey was distributed at the Open House and made available to other residents who were not able to attend the Open House. Information on the transportation systems and preferences was also posted on the District Web-Site.

The key public involvement process was the formation of a Stakeholder Advisory Group. The stakeholder group included representatives from:

- District of West Kelowna staff, including Public Works, Planning, Parks & Recreation, and Communications;
- West Kelowna Neighborhoods, including the Westside Residents Association, the Shannon Lake Neighborhood Association, the Lakeview Heights Community Association, the Glenrosa Residents Association, and the West Kelowna Residents Association.
- Business Associations, including the Westbank Chamber of Commerce, and the Urban Development Institute;
- Health and Accessibility Advocates, including the Interior Health Department, the Central Okanagan Access Awareness Team, the Community Action Towards Community Health, and School District 21;
- Roads and Safety Advocates, including the BC Road Builders Association, the ICBC, and the Highway 97 Task Force;
- Bicycle and Hiking Advocates, including the Kelowna Area Cycling Coalition, the Central Okanagan Hiking Club, and the Gellatly Bay Parks and Trails Society;
- Regional Transportation Agencies, including the BC Ministry of Transportation and Infrastructure, and BC Transit; and
- Adjacent municipalities including, the Westbank First Nations, the RDCO, the District of Peachland, and the City of Kelowna.

The Stakeholder Advisory Group met four times throughout the course of the study in intensive 3-hour workshops. The stakeholders:

- Reviewed data on the existing conditions and future growth forecasts;
• Provided advice on transportation goals and objectives;
• Provided opinions of future travel behaviour;
• Identified potential road, transit, bicycle and pedestrian projects;
• Reviewed options on specific transportation projects;
• Resolved conflicts between alternative transportation projects; and
• Provided their priorities on potential transportation projects.

The development of the District of West Kelowna Transportation Master Plan is significantly due to the dedication, intelligence, and cooperation of the Stakeholders in providing ideas, advice, and direction.

9 NON-TRANSPORTATION INFRASTRUCTURE NEEDS

The District of West Kelowna has a broad range of linear and non-linear infrastructure that will require ongoing renewal, upgrading, operations and maintenance. The District’s draft asset management investment plan estimates that the District owns approximately $800 million in infrastructure (2013 replacement value), and the weighted average service life is approximately 55 Years. This means that the District will renew and/or replace $800 million in infrastructure every 55 years, or $14.5 million per year.

This annual amount of $14.5 million will likely grow at a rate of $0.3 million per year based upon 2% annual growth; for example in 20 years the annual $14.5 million will have grown to $20.5 million annually.

What these figures demonstrate is that, whatever investment amounts are disclosed in a Master Plan, they must be placed within an affordable context that contrasts the investment needs, urgency and level of service for all competing infrastructure assets.

To accomplish this, the District will be developing a Master Municipal Plan (MMP) this Fall that incorporates all investment requirements, urgency and level of service information from all its Master Plans as well as renewal and replacement requirements from its asset management investment plan. The MMP will balance all competing costs against available funding while ensuring the overall integrity of public services.

10 INVESTMENT STRATEGY

The District of West Kelowna Transportation Master Plan requires significant capital investments over the next 20 years. Capital plans are developed in five-year increments and prioritize capital road improvements based on capacity at major intersections.
10.1 Cost Drivers

Table 5 outlines the proposed implementation and costs for the intersection improvements in 5-year horizons. The following describes the magnitude of costs and excludes any property acquisition costs required to obtain property to complete the improvements. These costs are only for planning purposes and design studies are required to finalize estimated costs for budgeting purposes. The timing of improvements may be adjusted as development occurs in an area.

Table 5: Intersection Mitigation Timings and Costs

<table>
<thead>
<tr>
<th>Intersection</th>
<th>Improvement (Option)</th>
<th>Year</th>
<th>Cost (Option)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stevens Rd / Westlake Rd</td>
<td>Signals &amp; northbound left-turn lane (Roundabout)</td>
<td>2013</td>
<td>$300,000 ($400,000)</td>
</tr>
<tr>
<td>Tallus Ridge Dr / Shannon Lake Rd</td>
<td>Roundabout</td>
<td>2015</td>
<td>$900,000</td>
</tr>
<tr>
<td>Boucherie Rd / Mission Hill Rd</td>
<td>Roundabout</td>
<td>2018</td>
<td>$500,000</td>
</tr>
<tr>
<td>Gosset Rd / Old Okanagan Hwy</td>
<td>Add roundabout (Signals)</td>
<td>2018</td>
<td>$350,000 ($250,000)</td>
</tr>
<tr>
<td>Boucherie Rd / Hudson Rd</td>
<td>Roundabout (signals &amp; northbound left-turn lane)</td>
<td>2023</td>
<td>$350,000 ($300,000)</td>
</tr>
<tr>
<td>Boucherie Rd / Cordova Way / Anders Rd</td>
<td>Signals &amp; southbound left-turn lane (Roundabout)</td>
<td>2028</td>
<td>$300,000 ($400,000)</td>
</tr>
<tr>
<td>Shannon Lake Rd and Bartley Rd</td>
<td>Signals (Roundabout)</td>
<td>2028</td>
<td>$250,000 ($350,000)</td>
</tr>
<tr>
<td>Glenrosa Rd / Webber Rd</td>
<td>Signals</td>
<td>2033</td>
<td>$250,000</td>
</tr>
<tr>
<td>Webber Rd / Lower Glenrosa Rd</td>
<td>Signals (Roundabout)</td>
<td>2033</td>
<td>$250,000 ($350,000)</td>
</tr>
<tr>
<td>Butt Rd / Old Okanagan Hwy</td>
<td>Westbound right-turn lane and southbound left-turn lane</td>
<td>2033</td>
<td>$150,000</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
<td><strong>$3,450,000 - $4,000,000</strong></td>
</tr>
</tbody>
</table>

Note: Costs do not include land acquisition or utility adjustments if necessary

Future Road Network Connections

Future road network connections will require some land acquisition and the construction of the roads to a suitable road standard cross-section. High level costs for the connections are shown in Table 6 and do not include costs for land acquisition. They are estimated for planning purposes and should be verified through design studies to determine budget amounts. None of the future road links are needed by 2033 to satisfy capacity issues. However, these links will provide benefit to the entire network of roads that
incorporates Highway 97 and WFN road networks by providing improved neighbourhood connectivity. This will also be of benefit to emergency services, cyclists, transit, and pedestrians.

**Table 6: High Level Capital Costs for Future Road Connections**

<table>
<thead>
<tr>
<th>Future Road Segment</th>
<th>Road Class</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Connector Route Glenrosa Rd to West Side Rd</td>
<td>Arterial</td>
<td>$15,000,000</td>
</tr>
<tr>
<td>Glenrosa Rd from Carre Rd to New Connector Route</td>
<td>Arterial</td>
<td>$4,000,000</td>
</tr>
<tr>
<td>Bartley Rd Ext from Bartley Rd to New Connector Route</td>
<td>Arterial</td>
<td>$4,200,000</td>
</tr>
<tr>
<td>Rosewood Dr from McDougall Rd to Bartley Rd Ext</td>
<td>Arterial</td>
<td>$3,400,000</td>
</tr>
<tr>
<td>Smith Creek Rd Copper Ridge Dr to New Connector Route</td>
<td>Arterial</td>
<td>$6,300,000</td>
</tr>
<tr>
<td>Tallus Ridge Dr from Smith Creek Rd to Cobblestone Rd</td>
<td>Arterial</td>
<td>$3,600,000</td>
</tr>
<tr>
<td>Asquith Rd from Iron Ridge Rd to Tallus Ridge Dr</td>
<td>Major Collector</td>
<td>$300,000</td>
</tr>
<tr>
<td>Auburn Rd from End to Bartley Rd</td>
<td>Major Collector</td>
<td>$1,100,000</td>
</tr>
<tr>
<td>Reece Rd from Glencoe Rd to Elliot Rd</td>
<td>Major Collector</td>
<td>$800,000</td>
</tr>
<tr>
<td>Lower Glenrosa Rd from Glencoe Rd to Solar Rd</td>
<td>Major Collector</td>
<td>$400,000</td>
</tr>
<tr>
<td>Westbank Centre connection to Waterfront</td>
<td>Major Collector</td>
<td>$2,000,000</td>
</tr>
<tr>
<td>Westbank Centre Ingram Road to Gellatly Road</td>
<td>Major Collector</td>
<td>$1,100,000</td>
</tr>
<tr>
<td>Paramount Dr from Mountain Hollow Ln to Smith Creek Rd Ext</td>
<td>Minor Collector</td>
<td>$2,100,000</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td><strong>$44,300,000</strong></td>
</tr>
</tbody>
</table>

*Note: Costs are approximate and do not include land acquisition, utility adjustments, or feasibility and functional design study. Costs are not fixed and provide estimate for planning purposes and should be verified.*

**Road Upgrades**

Road upgrades will be needed to bring existing roads to the new standard cross-sections to facilitate all modes of travel. On-road improvements for pedestrian, bicycle, and transit facilities are addressed with other road upgrade projects for when standard road cross-sections are implemented. These upgrades should be timed with underground utility replacements/upgrades, development/redevelopment, and/or other related projects. Costs can be predominantly financed by development cost charges (DCCs). Arterial road upgrade costs are shown in **Table 7** and sum to approximately $79.5 million. It should also be noted that the major collector road upgrade costs sum to approximately $55.0 million and the minor collector road upgrade costs sum to $54.2 million.
## Table 7: Capital Costs for Arterial Road Upgrades

<table>
<thead>
<tr>
<th>Road Upgrades to Standard Cross-Section</th>
<th>Class</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bartley Rd from Hwy 97 to Stevens Rd</td>
<td>Urban Arterial</td>
<td>$1,203,000</td>
</tr>
<tr>
<td>Boucherie Rd from Gellatly Rd to WFN IR#9 Border</td>
<td>Wine Trail</td>
<td>$2,077,200</td>
</tr>
<tr>
<td>Boucherie Rd from WFN IR#9 Border to Stuart Rd</td>
<td>Wine Trail</td>
<td>$20,663,000</td>
</tr>
<tr>
<td>Gellatly Rd from Boucherie Rd to Hwy 97</td>
<td>Urban Arterial</td>
<td>$2,868,500</td>
</tr>
<tr>
<td>Gellatly Rd South from Hwy 97 to 4035 Gellatly Rd South</td>
<td>Wine Trail</td>
<td>$6,977,500</td>
</tr>
<tr>
<td>Gellatly Rd South from 4251 Gellatly Rd South to Whitworth Rd</td>
<td>Wine Trail</td>
<td>$1,980,000</td>
</tr>
<tr>
<td>Elliot Road from Solar Rd to Butt Rd</td>
<td>Urban Arterial</td>
<td>$2,117,500</td>
</tr>
<tr>
<td>Elliot Rd from Butt Rd to Reece Rd</td>
<td>Rural Arterial</td>
<td>$3,450,000</td>
</tr>
<tr>
<td>Elliot Rd from Reece to Smith Creek Rd</td>
<td>Rural Arterial</td>
<td>$2,587,500</td>
</tr>
<tr>
<td>Smith Creek Rd from Elliot Rd to Wild Horse Drive</td>
<td>Rural Arterial</td>
<td>$2,260,000</td>
</tr>
<tr>
<td>Glenrosa Rd from Webber Rd to Glen Abbey Pl</td>
<td>Urban Arterial</td>
<td>$2,697,000</td>
</tr>
<tr>
<td>Glenrosa Rd from Glen Abbey Pl to McGinnis Rd</td>
<td>Rural Arterial</td>
<td>$3,262,500</td>
</tr>
<tr>
<td>Shannon Lake Rd from WFN IR#9 Border to 2835 Shannon Lake Rd</td>
<td>Urban Arterial</td>
<td>$3,542,000</td>
</tr>
<tr>
<td>Shannon Lake Rd from 2835 Shannon Lake Rd to Golf Course Dr</td>
<td>Urban Arterial</td>
<td>$3,617,250</td>
</tr>
<tr>
<td>Shannon Lake Rd from 1850 Shannon Lake Rd to Bartley Rd</td>
<td>Urban Arterial</td>
<td>$2,025,000</td>
</tr>
<tr>
<td>Old Okanagan Hwy from Dobbin Rd to Reece Rd</td>
<td>Urban Arterial</td>
<td>$5,695,250</td>
</tr>
<tr>
<td>Stevens Rd from Bartley Rd to Westlake Rd</td>
<td>Urban Arterial</td>
<td>$5,915,000</td>
</tr>
<tr>
<td>Westlake Rd from Hwy 97 to Rosewood Dr</td>
<td>Urban Arterial</td>
<td>$5,661,860</td>
</tr>
<tr>
<td>Hudson Rd from Guidi Rd to Boucherie Rd</td>
<td>Urban Arterial</td>
<td>$889,000</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>$79,489,060</strong></td>
<td></td>
</tr>
</tbody>
</table>

Note: Costs are approximate and do not include land acquisition, utility adjustments or feasibility and functional design study. Costs are not fixed and provide estimate for planning purposes and should be verified.

### Glenrosa Access

Glenrosa access alternatives are given cost estimates for infrastructure and additional studies can be found in **Table 10**. These do not include costs for land acquisition, which may be substantial for the Trepanier Road or Highway 97 Access option. Additional studies include the functional corridor review, environmental assessment and transportation study. Costs for the bridge and roads do not include geotechnical components (blasting, retaining walls, length of piles, etc.). Roads only include storm sewer utility.
Table 10: Glenrosa Access Option Cost Estimates

<table>
<thead>
<tr>
<th>Access Route</th>
<th>Additional Studies</th>
<th>Road Costs</th>
<th>Bridge Cost</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trepanier Road Connection</td>
<td>$300,000</td>
<td>$7,000,000</td>
<td>-</td>
<td>$7,300,000</td>
</tr>
<tr>
<td>Powers Creek Crossing</td>
<td>$300,000</td>
<td>$1,800,000</td>
<td>$7,500,000</td>
<td>$9,600,000</td>
</tr>
<tr>
<td>Highway 97 Access</td>
<td>$300,000</td>
<td>$3,000,000</td>
<td>-</td>
<td>$2,900,000</td>
</tr>
</tbody>
</table>

Note: Costs are approximate and do not include land acquisition or utility adjustments. Costs are not fixed and provide estimate for planning purposes and should be verified.

Capital Plan

The capital plan summarizes the road capital improvements and corridor feasibility studies required for the next 20 years. The improvements are categorized as: intersection mitigation, road corridor feasibility studies (for new road sections), and long-term roadway improvements. Capital plans are broken into five-year increments as shown in Table 11 thru Table 14. Long-term roadway improvements are not included as they will be implemented along with development and financed with DCCs. Corridor studies are required to plan where alignments will go and plan for road reserves. No costs for land acquisition are included. Mitigation incorporates intersection improvements to maintain capacity for District roads. The capital plans result in an average of $250,000 per annum in road capacity improvements and planning for new road alignments over the next 20 years.

Table 11: 2013-2018 Capital Plan

<table>
<thead>
<tr>
<th>Description</th>
<th>Category</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stevens Rd / Westlake Rd Intersection Improvement</td>
<td>Mitigation</td>
<td>$400,000</td>
</tr>
<tr>
<td>Tallus Ridge Dr / Shannon Lake Rd Intersection Improvement</td>
<td>Mitigation</td>
<td>$900,000</td>
</tr>
<tr>
<td>Boucherie Rd / Mission Hill Rd Intersection Improvement</td>
<td>Mitigation</td>
<td>$500,000</td>
</tr>
<tr>
<td>Gosset Rd / Old Okanagan Hwy Intersection Improvement</td>
<td>Mitigation</td>
<td>$350,000</td>
</tr>
<tr>
<td>Glenrosa alt connection - Trepanier Road Connection</td>
<td>Corridor study</td>
<td>$300,000</td>
</tr>
<tr>
<td>Glenrosa alt connection - Powers Creek Crossing</td>
<td>Corridor study</td>
<td>$300,000</td>
</tr>
<tr>
<td>Glenrosa alt connection - Highway 97 Access</td>
<td>Corridor Study</td>
<td>$300,000</td>
</tr>
<tr>
<td>Tallus Ridge Dr from Smith Creek Rd to Cobblestone Rd</td>
<td>Corridor Study</td>
<td>$100,000</td>
</tr>
<tr>
<td>Asquith Rd from Iron Ridge Rd to Tallus Ridge Dr</td>
<td>Corridor Study</td>
<td>$100,000</td>
</tr>
<tr>
<td>*New Connector Route: Initiate Study and Develop Partners</td>
<td>Corridor Study</td>
<td>$100,000</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td>$3,350,000</td>
</tr>
</tbody>
</table>

Note: Costs are approximate and do not include land acquisition, utility adjustments, or feasibility and functional design study. Costs are not fixed and provide estimate for planning purposes and should be verified. *Define if project will occur and develop partnerships.
### Table 12: 2019-2023 Capital Plan

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boucherie Rd / Hudson Rd Intersection Improvement</td>
<td>Mitigation</td>
<td>$350,000</td>
</tr>
<tr>
<td>Westbank Centre connection to Gellatly Rd</td>
<td>Corridor Study</td>
<td>$100,000</td>
</tr>
<tr>
<td>Old Okanagan Hwy connection to Gellatly Rd</td>
<td>Corridor Study</td>
<td>$100,000</td>
</tr>
<tr>
<td>New Connector Route: Complete Feasibility Study</td>
<td>Corridor Study</td>
<td>$300,000</td>
</tr>
</tbody>
</table>

**TOTAL** $850,000

*Note: Costs are approximate and do not include land acquisition, utility adjustments, or feasibility and functional design study. Costs are not fixed and provide estimate for planning purposes and should be verified.*

### Table 13: 2024-2028 Capital Plan

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boucherie Rd/ Cordova Way/ Anders Rd Intersection Improvement</td>
<td>Mitigation</td>
<td>$400,000</td>
</tr>
<tr>
<td>Shannon Lake Rd and Bartley Rd Intersection Improvement</td>
<td>Mitigation</td>
<td>$350,000</td>
</tr>
<tr>
<td>Auburn Rd from End to Bartley Rd</td>
<td>Corridor Study</td>
<td>$100,000</td>
</tr>
<tr>
<td>Reece Rd from Glencoe Rd to Elliot Rd</td>
<td>Corridor Study</td>
<td>$100,000</td>
</tr>
<tr>
<td>Lower Glenrosa Rd from Glencoe Rd to Solar Rd</td>
<td>Corridor Study</td>
<td>$100,000</td>
</tr>
<tr>
<td>Glenrosa Rd from Carre Rd to New Connector Route</td>
<td>Corridor Study</td>
<td>$100,000</td>
</tr>
<tr>
<td>Smith Creek Rd Copper Ridge Dr to New Connector Route</td>
<td>Corridor Study</td>
<td>$200,000</td>
</tr>
</tbody>
</table>

**TOTAL** $1,350,000

*Note: Costs are approximate and do not include land acquisition, utility adjustments, or feasibility and functional design study. Costs are not fixed and provide estimate for planning purposes and should be verified.*

### Table 14: 2029-2033 Capital Plan

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glenrosa Rd / Webber Rd Intersection Improvement</td>
<td>Mitigation</td>
<td>$250,000</td>
</tr>
<tr>
<td>Webber Rd / Lower Glenrosa Rd Intersection Improvement</td>
<td>Mitigation</td>
<td>$350,000</td>
</tr>
<tr>
<td>Butt Rd / Old Okanagan Hwy Intersection Improvement</td>
<td>Mitigation</td>
<td>$150,000</td>
</tr>
<tr>
<td>Bartley Rd Ext from Bartley Rd to New Connector Route</td>
<td>Corridor Study</td>
<td>$200,000</td>
</tr>
<tr>
<td>Rosewood Dr from McDougall Rd to Bartley Rd Extension</td>
<td>Corridor Study</td>
<td>$200,000</td>
</tr>
</tbody>
</table>

**TOTAL** $1,150,000

*Note: Costs are approximate and do not include land acquisition, utility adjustments, or feasibility and functional design study. Costs are not fixed and provide estimate for planning purposes and should be verified.*
10.2 Funding Sources
The following section describes other funding sources.

Partnerships
Partnerships should be formed with a number of public agencies and private developers. The BC Ministry of Transportation and BC Transit are obvious partners on regional projects such as Highway 97 and transit exchanges. They may also be partners on arterial roads such Westside Road and where overpasses of Highway 97 are required, or providing bus shelters and benches along arterial bus routes.

Many of the arterial and collector roads, bus routes, and trails will require partnerships with neighboring jurisdictions. The most relevant of these will be the Westbank First Nations, but Kelowna and Peachland will also need to be solicited for support on many projects. Other large projects such as the extension of Boucherie Road west of Gellatly Road to Highway 97 may require special partnerships with developers. Partnerships can also be formed with provincial and federal agencies where economic development or redevelopment is planned, such as the Westbank Centre.

Highway 97 Corridor
The Highway 97 Corridor will require significant effort and cooperation to develop a common vision to find the correct balance of facilities for cars, trucks, buses and bicycles. To ensure that the corridor development moves forward in a timely manner, it may be necessary for local jurisdictions to provide leadership in developing the plan. The Highway 97 corridor plan is a fundamental element of all of the other arterial, collector, and local transportation systems. A strong local partnership will also enhance the potential for provincial and federal funding on a consistent basis.

Development Cost Charges
Development cost charges (DCCs) for roads are a means to recoup costs for the impact of development on the transportation network’s road infrastructure. This funding source is integral to supporting the 20-year capital plan. It is recommended that the District of West Kelowna update their DCC policies to incorporate the cost of road infrastructure based on the 20-year plan.

Local Improvement Areas
In addition to the DCC contributions Direct Developer Contributions can be negotiated where new transportation facilities are required for the sole purpose of supporting a specific development. The 2008 Westside Development Costs Charges study found that more than $12 million (11%) of the $110 million of projects could be subject to Direct Developer Contributions. Several projects in this
Transportation Master Plan, such as the Gates Road realignment or the South Powers Creek Road, could also fall into this category.

Transportation Facilities Management
Building the transportation infrastructure proposed in this Transportation Master Plan also requires investments in managing, operating and maintaining these capital facilities.

Asset Management
Asset management is a program that inventories all infrastructure assets of the District including civic buildings, water and sewer facilities, and transportation infrastructure. Assets must be maintained throughout their lifetime, and then they must be replaced at the end of their lifetime. The District of West Kelowna - Transportation Master Plan appropriate investments in maintenance will maximize the life-cycle value of the infrastructure. Many municipalities in North America are experiencing the severe impacts of deteriorating infrastructure and are developing intensive Asset Management programs to evaluate investments and to budget for replacements.

Asset management also includes monitoring the effectiveness of the infrastructure investments. For road facilities it is common to collect traffic data through permanent or temporary counting devices. It is highly recommended that permanent counting devices should be installed at 20 to 30 locations throughout the District to maintain a record of the growth and efficiency of traffic movements. In the same manner, passenger count data should be obtained from BC Transit on an annual basis for evaluation of the multi-modal objectives. Counting devices may also be useful for some bicycle and pedestrian trails to evaluate crossing needs. It would also be prudent to monitor the travel behaviour in the District over the period of the Transportation Master Plan to ensure that targets are being achieved. The future reliability of Canada Census data to obtain this information may be in some question, so other forms of census or surveys may be required.

Operational Management
Operations management includes the day-to-day activities that are required to maintain the proper use and utility of the transportation infrastructure. To gain the maximum value of the transportation infrastructure, the facilities must be operated at an efficient level. This includes operations such as traffic signals, on-time bus arrival information, and security surveillance for trails. It also includes clearing snow on a priority basis for arterial transit and bicycle routes, as well as immediate response to accidents on expressways. The operations management requires setting up the key priorities for all modes to ensure that they are operating at peak efficiency.
Operations and Maintenance Costs
Operations and maintenance costs (O&M) costs must be budgeted and monitored to ensure that the transportation facilities are operating efficiently and that there is an appropriate allocation of resources. The O&M costs can be budgeted in the same manner as the capital costs, starting with the life-cycle costs in an Asset Management Program, and developing Five-Year and Annual budgets. It is recommended that the O&M costs be segregated by mode whenever possible to ensure that the true costs of different transportation facilities are visible.

11 Conclusion
The Transportation Master Plan provides guidance to the District of West Kelowna for the development, maintenance, and operations of the Municipality’s transportation system. The document is a culmination of efforts to develop a Master Plan that meets the District’s short-term transportation needs and plans for the long-term.

Short-term needs target gaps in the existing system’s road network infrastructure and subsequent users of the road (cyclists, pedestrians, and transit users). The priority is to provide safe and continuous pedestrian facilities that will meet sustainability goals and connect transit infrastructure.

Standard road cross-sections for urban and rural arterial, collector, local and hillside, and the Wine Trail were developed by the District with input from the Urban Development Institute and Boulevard Transportation Group. The town centre streets are developed by Boulevard Transportation Group based on the approved Westbank Centre Plan. Hillside development guidelines are being further developed by the DWK as they combine several design elements to additionally support storm drainage, sanitary sewer, water, erosion protection, geotechnical design, and so on. The development of all road cross-sections consider cycling, walking, and transit and through the adoption of these sections the implementation of these important networks will be ensured.

The development of a model of the District of West Kelowna’s major roadway network provides an alternative approach to developing a capital plan from the existing Master Transportation Plan. The modeling shows that for the next 20 years intersection improvements are required, but the 4-laning of District roads is not required. Capital improvements were prioritized and broken into 5-year increments for 20 years and focus on the intersections rather than the roadway segments. The model was developed for the PM peak period using a growth rate of 2.0% per year for District roads and 2.5% for Highway 97.
The worst intersection operations in the DWK are the Ministry highway intersections. These intersections occur with Highway 97 and:

- Boucherie Road
- Westlake Road / Hudson Road
- Ross Road
- Bartley Road
- Gosset Road / Gellatly Road
- Old Okanagan Road (at Main Street and Dobbin Road); and
- Elliot Road (at Main Street and Dobbin Road).

Working with the Ministry of Transportation and Infrastructure is critical as the interfaces to Highway 97 and Westside Road are essential for the operation of the network. The establishment of interchanges at these intersections may improve operations however, the cost is high and congestion will move downstream to the next intersection.

Completion of the District’s road network will provide improved connectivity and reduce the amount of traffic using Highway 97 to access adjacent neighbourhoods. While this is not needed for the District’s road capacity, it will be of benefit to Highway 97 and the WFN road network. This will also improve access and mobility for emergency services, cyclists, transit, and pedestrians.

Access alternatives to the Glenrosa neighbourhood need to be assessed further to evaluate their feasibility and impacts. The option to cross Glen Canyon / Powers Creek will have high infrastructure costs, but provide a needed connection between the Smith Creek and Glenrosa neighbourhoods. Providing access from the south via Highway 97 has redundancies with existing access and may be limited to emergency access.

The pedestrian system should correspond with improvements on the major road network and should give priority to transit routes and high pedestrian areas such as the Westbank Centre. The District should continue to prioritize sidewalks with the Road Rehabilitation and Pedestrian Improvement Program. In the future, a more comprehensive pedestrian master plan should be developed.

Bicycle facilities should follow with improvements to the roadway. Once the fundamental improvements are complete then a bicycle master plan should be followed.
Priorities for the current transit system should invest in improving the pedestrian system to provide connectivity from the bus stop to the surrounding network focusing on higher order roads (arterials and major collectors). The District should continue to rationalize transit route and RapidBus projects. This supports a practical approach to meet community transit needs, maintain and increase ridership levels, and identify associated costs. In the long-term, a transit plan should be developed with BC Transit in partnership with adjacent municipalities and the Ministry of Infrastructure that support the needs of transit users and promotes the system’s use.

The long-term needs focus on reducing single occupant vehicles. Based on the District’s current resources, the existing gaps in the transportation network must first be addressed so there is continuity in the network to support the promotion of alternatives. Since a Transportation Master Plan should be reassessed every 5 to 10 years, this will give the opportunity to reflect on how the needs are being met by the Plan and how the existing system has changed.

12 RECOMMENDATIONS
It is recommended that the District of West Kelowna:

- Implement the proposed plan (capital 5-year plans) for short-term improvements;
- Monitor and enhance the District’s annual road maintenance to preserve the roadway system and optimize travel safety;
- Identify an affordable level of funding for ongoing road renewal, and advocate for long term grant programs to help fund road renewal;
- Place priority on pedestrian facilities and continue to develop their continuity through the Road Renewal & Pedestrian Improvement program;
- Review the plan in 5 years to address the progress and review the long-term needs; and
- Continue to work with the MoTI and the Westbank First Nations to strategically plan highway and transportation network improvements in the communities. The District should approach its neighbouring communities and work with the MoTI to develop a highway corridor plan between Kelowna, the District of West Kelowna and Peachland that builds growth patterns and metrics from local Official Community Plans, Transportation Master Plans, available cycling and pedestrian plans, and traffic models:
  - Mobility;
  - Modal splits;
  - Congestion;
  - Reliability;
- Safety; and
- Regional economics.

This approach will establish system deficiencies, their magnitude and growth, and thereby ground the development and evaluation of remedial options. Having analysis details enables the overall process for implementing a solution, no matter how challenging, as the recommended option(s) will likely be expensive it is unlikely that anything but a strong business case will enable realistic dialogue regarding solutions.
APPENDIX A

Transportation Policies
A. TRANSPORTATION OBJECTIVES AND POLICIES

As the District is in a state of rural/suburban development and many infrastructure pressures come to bear on providing the appropriate infrastructure, the following objectives and policies are broken into longer term and shorter term goals.

A.1 Road Development Policies

Objective 1: Adopt a long-range road network plan to meet the needs of the District.

The District will adopt a hierarchy of road facilities including freeways, expressways, arterials, collectors, and local streets to meet the vehicular traffic needs of travel within and through the District.

Policy 1.1

Develop road design and operating standards. The District will develop appropriate design and operations standards such as road capacity, design speed, lane widths, access management, traffic controls, and surface treatments for each road category.

Policy 1.2

Develop strategic placement of major arterial roads, and interchanges. The District will develop a strategic network grid of major road facilities including freeways and arterials, with locations of potential interchanges, and grade separations determined.

Policy 1.3

Partner with provincial agencies and other jurisdictions to provide system continuity. The Ministry of Transportation, Westbank First Nations, and adjacent municipalities to ensure that the major road facilities including freeways, expressways and arterials, provide the public with continuous corridors throughout the District and connect to key destinations beyond the District.

Policy 1.4

Provide for transit and high occupancy vehicles in the peak hours. The District will promote the use of special lane designations for buses and carpoolls (HOV and HOT lanes) on freeways and expressways, and transit signal priority (TSP) in key corridors where transit ridership and carpooling is to be encouraged.

Policy 1.5

Require provision of appropriate road facilities in all new developments. The District will publish a hierarchy of road facility design standards for use by developers and their consultants to ensure that minimum standards are maintained in future developments.
Policy 1.6
Promote road safety within neighbourhoods. The District will provide a process to allow neighbourhoods to evaluate road safety and develop appropriate traffic calming techniques to manage traffic speeds.

A.2 Public Transit Development Policies
Objective 2: Work with BC Transit to develop a long-range transit service network plan to meet the needs of the District.
The District will consider adopting a hierarchy of transit facilities including the equivalents of freeways (BRT), arterials, collectors, and locals, to meet the ridership needs of travel within and through the District.

Policy 2.1
Develop transit facility and service standards. The District will promote appropriate design and operations standards such as corridor capacity, design speed, bus frequency, station/stop frequency, traffic controls, and station/stop amenities for each transit facility category.

Policy 2.2
Develop strategic placement of major transit corridors, stations, and park-and-ride facilities. The District will develop a strategic network grid of major transit facilities including freeways (BRT) and arterials, with locations of potential station/stops, park-and-ride facilities for bicycles and vehicles, bus only connections, grade separations and railway crossings determined.

Policy 2.3
Partner with the transit authority and other jurisdictions to provide system continuity. The District will partner with BC Transit and local municipalities to ensure that the major transit facilities, including equivalents of freeways and arterials, provide the public with continuous corridors throughout the District and connect to key destinations beyond the District.

Policy 2.4
Require provision of appropriate transit facilities in all new developments. The District may publish a hierarchy of transit facility design standards for use by developers and their consultants to ensure that minimum standards are maintained in future developments.
Policy 2.5
Prioritize transit services for commuters in higher density land uses. The District will set priorities and provide land-use incentives in higher density transit-oriented-districts (TOD) and special corridors to achieve higher than average use of transit facilities (i.e. proportions of 25% or more of commuter trips as transit passengers)

A.3 Active Transportation Policies

Objective 3: Adopt long range pedestrian and bicycle network plans.
The District will adopt a hierarchy of active transportation facilities including the equivalents of freeways (trails), arterials (bike lanes), collectors, and locals, to meet the walking and cycling travel needs within the District.

Policy 3.1
Develop pedestrian and bicycle facility standards. The District will develop appropriate design and operations standards such as capacity, design speed, lane widths, safety separation, traffic controls, and surface treatments for each pedestrian and bicycle category.

Policy 3.2
Develop strategic placement of major trail corridors and station connections. The District will develop a strategic network grid of major bicycle facilities including freeways (trails), and arterials (bike lanes), with locations of potential destinations such as major employment centres, schools, transit station/stops, clearly identified and crossings of major natural and man-made barriers such as freeways and arterials determined.

Policy 3.3
Require provision of pedestrian and cycling facilities including bicycle parking facilities in all new developments. The District will publish a hierarchy of pedestrian and bicycle facility design standards for use by developers and their consultants to ensure that minimum standards are maintained in future developments. Bicycle parking standards will also be provided to developers to ensure that end-of-trip facilities are available.

Policy 3.4
Prioritize pedestrian and cycling facilities for all schools and public facilities. Encouraging young people to walk or cycle to school to school on a daily basis is a healthy option for current and future trip needs. The District will partner with School District to ensure that facilities and education are provided on the benefits
of walking and cycling. The District will prioritize pedestrian and cycling near transit facilities, near transit arterials, BRT stops, and all transit stations or exchanges.

**Policy 3.5**
Partner with other jurisdictions to provide system continuity. The District will partner with MoTI, Westbank First Nations, and other local municipalities to ensure that the major bicycle facilities, including equivalents of freeways (trails) and arterials (bike lanes), provide the public with continuous corridors throughout the District and connect to key destinations beyond the District.

**A.4 Aircraft and Marine Transport Policies**

**Objective 4:** The District will make provisions for regional access by air and by water.

**Policy 4.1**
Evaluate cost effective ferry/water taxi alternatives. The District will evaluate ferry and/or water taxi services as an alternative to additional bridges over Okanagan Lake.

**Policy 4.2**
Support helicopter access. The District will evaluate land uses in proximity to the helicopter base near the Highway 97 and Westlake Road intersection to preserve the function of the base.

**A.5 Transportation Demand Management**

**Objective 5:** Reduce the proportion of peak hour commuter trips by single occupant vehicles.
The District should consider establishing targets and reducing the proportion of commuter trips made by Single Occupant Vehicles (SOV) in 10 years. The overall targets will be achieved by using the following Transportation Demand Management (TDM) policies.

**Policy 5.1**
Adopt peak hour travel behaviour targets for 2020 and 2030. The District will achieve the following travel behaviour targets for trips made in the peak weekday commute hours by using a variety of Transportation Demand Management techniques:

**Policy 5.2**
Approve higher density residential and commercial districts to allow for shorter trips. The District may approve zoning for higher residential and commercial densities in appropriate locations, such as Mount Boucherie and Westbank Centres. Higher density land uses allow transit services to be provided at an
economical level. Mixed land uses allow residents the opportunity to walk or cycle to work or school. Parking standards may be reduced for higher density developments to reflect lower vehicle demands.

**Policy 5.3**
Balance the provision and encouragement of carpools, transit, walk, and cycle vehicle modes. The District may identify subareas where it is feasible to promote higher use of the alternative modes, such as transit, walking and cycling. Even in lower density areas, carpools can become an efficient means of reducing travel by SOV.

**Policy 5.4**
Develop and fund a TDM program that partners with businesses and institutions to achieve mode split targets. The District may develop programs to promote alternative modes, partnering with agencies such as school districts and health providers. The District may investigate the benefits of employer-based TDM programs, such as Ride-Matching for carpools, and identify specific partners that will support the TDM programs, such as major employers and business agencies.

**Policy 5.5**
Monitor congestion levels to schedule implementation of TDM strategies. The District may investigate multi-modal level-of-service measurements to promote awareness of alternative modes of travel and will gather new data on multi-modal congestion to support the implementation of TDM strategies.

### A.6 Implementation, Operations and Maintenance Policies

**Objective 6: Adopt 5-year capital and O&M Programs to support travel demands.**
The District will develop separate capital facility programs for roads, transit, bicycles and pedestrians to ensure that a balanced transportation network is achieved over the long-term planning horizon of 20 years. Funding for the facilities should be proportionate to the target share of commuter trips for 2030.

**Policy 6.1**
Prepare 5-year Capital Programs for road and freight infrastructure. The District will prepare four 5-Year Capital Programs to ensure that the major road facilities, including arterials are constructed in a timely manner by the District, the Ministry of Transportation, and other partner agencies. The plan will include potential funding sources.

**Policy 6.2**
Develop asset management inventories and programs for all facilities. The District will prepare inventories of all Transportation Capital Facilities and develop an asset management plan to ensure that these
facilities are well maintained and that programs and budgets are developed to replace the facilities at the end of their life-cycles.

**Policy 6.3**

Develop maintenance schedules and operational plans to achieve efficient and safe operations on the transportation system as well as to protect and manage the asset. Maintenance schedules will be developed for all transportation facilities to ensure that pedestrians and cyclists have safe and continuous access.
APPENDIX B

Detailed Road Classification Map
Figure B1: Road Classification Map

Future route to be studied to determine alignment options and feasibility.
APPENDIX C

Synchro Background Information
Modelling Software Description
The traffic analysis was completed by using a software program called Synchro and SimTraffic, and the results were measured in delay, Level of Service (LOS) and 95th percentile queue length. Synchro is based on the Highway Capacity Manual (HCM) methodology. SimTraffic integrates established driver behaviours and characteristics to simulate actual conditions by randomly “seeding” or positioning vehicles travelling throughout the network. The simulation, is run five times (five different random seedings of vehicle types, behaviours and arrivals) to obtain statistical significance of the results.

Levels of Service
Traffic operations are typically described in terms of Levels of Service (LOS) which rates the amount of delay per vehicle for each movement and the entire intersection. Levels of service range from LOS A (representing the best operations) to LOS E/F (LOS E being poor operations and LOS F being unpredictable/disruptive operations). LOS E/F are unacceptable levels of service under normal everyday conditions.

The hierarchy of criteria for grading an intersection or movement not only includes delay times, but also takes into account traffic control type (stop signs or traffic signal). For example, if a vehicle is delayed for 19 seconds at an unsignalized intersection, it is considered to have an average operation, and would therefore be graded as an LOS C. However, at a signalized intersection, a 19 second delay would be considered a good operation and therefore it would be given an LOS B. The two tables below indicate the ranges of delay for LOS for signalized and unsignalized intersections.

Table C1: LOS Criteria

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<tr>
<th>Level of Service</th>
<th>Unsignalized Intersection</th>
<th>Signalized Intersection</th>
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<tbody>
<tr>
<td>A</td>
<td>Less than 10</td>
<td>Less than 10</td>
</tr>
<tr>
<td>B</td>
<td>11 to 15</td>
<td>11 to 20</td>
</tr>
<tr>
<td>C</td>
<td>16 to 25</td>
<td>21 to 35</td>
</tr>
<tr>
<td>D</td>
<td>26 to 35</td>
<td>36 to 55</td>
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<td>E</td>
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<td>56 to 80</td>
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<tr>
<td>F</td>
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