

*This Report is Supplementary to:
“The Application Form of the City of Kelowna
Development Proposal”*

August 31, 2015

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1.0 Development Proposal and Rationale

1.1 Introduction

The Kirschner Mountain lands are located south of Highway 33 and north of Mission Creek. Together with the Black Mountain development area located on the opposite side of the highway, the Kirschner/Black Mountain complex forms a major development area of the city’s eastern sector. Although the Kirschner Mountain lands were planned and development initiated, almost 15 years ago, a substantial part of the mountain remains undeveloped. Two formerly approved and zoned neighborhoods accounting for approximately 105 single family homes are built out. Some minor zoned lands at the base of the mountain exist but development has not proceeded in this area. In early 2015, Kirschner Mountain JV (the Developer) decided it was timely to revisit the plan for the entire property. In February, 2015 the developer retained the services of CTQ Consultants Ltd. (CTQ) (Engineering, Planning and Urban Design), along with a number of other specialist consultants. On-going discussions have been held with City Planning and Engineering Departments. The development proposal that has resulted in recent months is embodied in this Official Community Plan Amendment Application.

1.2 Current Land Use Designations

The subject lands are contained in two contiguous properties: the most northerly block that had received approval for residential development consists of the mountain with its undulating terrain and side hills; the southern block is largely designated as a resource protection area and partially within the Agricultural Land Reserve (ALR). A minor development area in the southern block is located only in the northwest corner of the property. Agricultural uses, including wineries may be permitted in the ALR.

The current City of Kelowna Future Land Use Designations for the subject lands, are conceptual only. The land uses depicted on the attached Figure are Residential and Open Space, and further defined as follows:

1-2 HRES	Single and Two Unit Residential – Hillside
1-2 RES	Single and Two Unit Residential
MF-L	Multiple Unit Residential (Low Density)
OS	Major Park and Open Space

The MF-L designated lands are spread out throughout the plan area causing some concern and ultimately the need for review. Furthermore, topography, views and aspect on the mountain has suggested some amendment to allocation of the land uses. The changes have further defined protection of open space where steep slopes, natural areas, and wildlife corridors prevail.



1.3 Proposed Land Use Changes

The Official Community Plan amendment is based on the proposed land use concept shown on attached Figure. The concept respects placement of various land uses relative to slopes, views and visual impact. It also addresses opportunity for clustering residential uses of similar type in small areas to protect diversity of landscape and respond to market reality.

An area of cluster development is proposed for the south side of the mountain where proximity to farmland will provide lifestyle amenity, local farm produce, and unobstructed views from many residential units towards Scenic Canyon Regional Park. The intent is to create pockets of low density multiple unit residential development that are interconnected by open space, trails, parks and community amenities. (See attached Figure)

The remainder of the mountain is proposed for low density single family and two unit homes where lot sizes can vary in accordance with the hillside environment. There will be four main areas or sub-neighborhoods created by major breaks in topography and large swaths of open space between the main areas. Each sub-neighborhood will have a strategically located neighborhood park connected by trails and walkways throughout the Kirschner Mountain Estates community. (See attached Figure)

The proposed land use designations are as follows:

- Single/Two Unit Residential – Hillside
- Multiple Unit Residential – Cluster Housing
- Major Park and Open Space

1.4 Projected Buildout

Upon reviewing the former plans for the mountain and recent City of Kelowna policy directives, it was determined that there was opportunity to increase residential density and thereby allow for slightly more low density multi-unit forms of development. The plan has therefore called for varying lot sizes for single family, duplexes, townhouses and even two or three low profile condo apartments. This approach respects sound community planning principles and reality of the future market.

Proposed buildout for Kirschner Mountain is still within the projected unit allocation of the Official Community Plan. The City of Kelowna suggests approximately 700 units would be accommodated in the short term, with another 450 units added for an ultimate neighborhood of approximately 1,150 equivalent units. CTQ prepared a series of scenarios, taking into consideration the existing built and zoned areas (210 units) and various projections for both incremental single family and multi-unit developments. Several projections were derived for overall buildout; all were between 600 and 900 units. (See attached calculation sheet) The projection of expected units for this OCP amendment application is 770 units. This build out equates to 600 SFE (Single Family Equivalent) for the traffic analysis, and 658 SFE for the servicing analysis On site sanitary sewer, water and traffic infrastructure that is allocated for Kirschner Mountain will be designed accordingly. Off-site services

are readily available to continue the development at Kirschner Mountain. BMID approval for water is subject to payment of Capital Expenditure Charges as referenced in attached BMID correspondence dated May 19, 2015. More explanation regarding the servicing plans for water, sanitary sewer and storm drainage are noted in this report.

Approximate breakdown of the total area for various uses is as follows:

Single Family/Two Unit	98.41 Acres/39.84 Hectares (incl. Neighborhood Parks and Local Roads)
Cluster Development Area	49.64 Acres/20.10 Hectares
Open Space Park System	47.27 Acres/19.14 Hectares
Road (Major Only)	18.47 Acres/7.48 Hectares
TOTAL AREA	213.79 Acres/86.56 Hectares



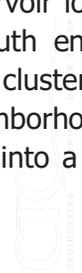
2.0 Development Rationale

Further to the above-noted development proposal, we offer the following rationale in support of this amendment application:

- 1. The Land Use Change is Minimal** – The new plan allocates 46% to single family (including neighborhood parks and local roads), 23% to cluster development (duplex and townhouses, and includes space of community amenity), and 22% to Open Space Park system. The clustering concept allows for similar build out as the previous plans, but includes more open space/protected area and slightly higher proportion of duplexes and townhouses to meet market demand and efficient use of the lands. Concept development based on the proposed OCP designations will allow for approximately 40% multi-unit development, including duplexes. If zoning and market conditions permit more duplex development in the single family/two unit designated area, the multi-unit proportion could reach closer to 60%.
- 2. Zoning to Conform with Land Use Designations** – The City of Kelowna Zoning Bylaw provides a series of “shelf ready” zones that can be used to achieve the vision set out in this plan amendment. Examples may include many of the RU Zones (RU2-RU6), many of the RH Hillside Zones (RH1 -RH3), and some of the Multiple Unit Residential Zones (RM1 –RM3). These zones are sensitive to the hillside conditions while some are adequate for achieving the cluster concept and protection of open space within the developments. Any other small special area development may warrant a CD zoning approach but otherwise the development will be subject to land use controls provided in the current City of Kelowna Zoning Bylaw. The City can also impose the Development Permit process for any of the steep slope/hazard areas.
- 3. Land Use Precedent** – The land use precedent has been set for much of the mountain development. The Official Community Plan and other policies of the City of Kelowna call for the area to be a residential neighborhood within a hillside environment. Preliminary phases of low density residential development have occurred along Loseth Road and on the sides of the mountain. Infrastructure is in place to continue development of future phases.
- 4. Hillside Development** – Over the last 15-20 years, the City of Kelowna has accepted the fact that much of the future low density residential growth will occur on many of our hillsides, thereby protecting the sensitive lowlands, agricultural land, important natural areas and flat areas that are more suited to accommodate commercial and industrial uses. Kirschner Mountain contains a significant amount of land that is gently sloping (less than 30% cross-slopes) that will permit contiguous development of a series of sub-neighborhoods. Hillside roads, construction standards and types of house design will respect steep slope development guidelines that help create another new mountain community for Kelowna.
- 5. Protection of ALR** – The north block (mountain area) is immediately adjacent to a small block of ALR lands that form part of the same ownership. A principle objective of the OCP amendment is to protect the integrity of this agricultural area. The land uses proposed for the development area will be buffered from the ALR by a new roadway (extension of Gallaghers Road), distance setbacks, parks and community amenity areas. It is also expected that the farmland can help form an integral part of the new community,

supplying the local residents with farm produce, community gardens, vineyards or a winery, all in keeping with the provisions of the Agricultural Land Commission Act.

6. **Natural Areas/Environment** – The study area consists of a young, uniform coniferous Ponderosa pine and interior Douglas-fir forest with no waterbodies or wetlands on the property. An environmental sensitivity analysis was undertaken and almost 60% of the study area consisted of Moderate value habitat due to the homogenous habitats that occur there. A total of 38% of the property was rated as High and 4% was rated as Low, with Low areas occurring in previously disturbed areas. There was no Very High value or critical habitat areas identified. Approximately 21% of the land area will be conserved as either park or open space, and these areas were strategically selected to also facilitate wildlife movement or to act as wildlife corridors, an improvement over previous land use plans for the site. Given the adjacency of Kirschner Mountain to Mission and Gopher Creeks, the movement of wildlife through Kirschner Mountain is deemed an important consideration and has largely been accomplished through the 21% set aside as natural area. Best Management Practices for development planning and specific recommendations to facilitate detailed designs in subsequent phases of Kirschner Mountain will help reduce potential environmental impacts.
7. **Cluster Development** – The cluster development concept is envisioned to achieve a number of goals for the new community. Some of the key aspects include housing affordability, diversity of housing product, sense of community, protection of forest and terrain, development efficiencies, views to the south (Scenic Canyon, Gallagher and agricultural lands) and close proximity to an extensive regional parks and trail system. Furthermore, this type of development respects sound planning principles and consumer preferences that are demanding smaller units in a predominantly residential area where quality views exist. Preference for parking in these developments will be in-structure or comprehensively planned for the site. This would include any parking for RV storage.
8. **Roads and Access** – Roads and access to the proposed development will proceed as originally planned. The main access to the area will be along the continuous route of Loseth Road, extending beyond Monte Vista Avenue and connecting with Gallagher Road. A loop road will serve as the main internal collector, with a hierarchy of local streets and common drives or lanes to access the homes and parks. Roadway standards for such hillsides will ensure sidewalks, curb and lighting as required. Wherever strata or cluster housing is envisioned, roads and lanes will be designed in accordance to respective zoning and development standards.
9. **Parks and Trails** – Neighborhood parks have been included for each sub-neighborhood. It is intended that the parks will be accessed via local roads and interconnected by a main trail/walkway system. At least one hilltop/view park will become part of the parks system and integrated with the water reservoir location at the top of Kirschner Mountain. A larger park and amenity area is proposed at the south end of the development area where the land is flatter or gently sloped and in close proximity to the cluster housing development. The trail system is proposed to permit access into the existing residential neighborhood to the north (and ultimately lead to Black Mountain Elementary School), and ultimately connect into a Regional Trail system leading towards Scenic Canyon.



10. **Community Amenities** – It is acknowledged that commercial development will not be supported in this area as commercial land is designated near the intersection of Highway 33 and Loseth Road. However, due to the relative isolation of this area and a forecast ultimate population of 1500 to 2000 residents, the plan envisions a small community amenity area in the form of a club house, tennis courts, lawn bowling, etc. It is expected that such amenity would form part of the residential development and be located in close proximity to a community or neighborhood park.
11. **Visual Impact** – Visual impact has been modeled from key perspectives towards the mountain. The main views are gained along Highway 33 eastbound (leaving the city) and westbound (entering the city). From the eastbound perspective, earlier developments, although quite distant (over 1 km) come into view as one climbs Highway 33 near the Garner Road corner. Some future low density residential development will come into view on slopes/bench above Loseth Road. However, a large swath of protected open space/forest will break up the mass. Subdivision design and siting of homes can also assist in mitigating most visual impact. Views of the main mountain ridgetop are minor from the west; but any visual impact will be mitigated by the hilltop park, siting of houses and strategic routing of the hillside roads. The ridge top on the second hill that is located at the southwest corner of the proposed development also comes into view going eastbound. The distance from the highway (over 2 km) and the fact that it is only in view momentarily due to the obstruction by the main mountain suggests limited visual impact. Once again, subdivision design and siting of homes along with the large swath of open space/forested area will break up the mass and mitigate visual impact.

From the westbound perspective, some of the townhouses at the back of the mountain will come into view. However the location along the highway where they become most visible is over 2 km away. Again the massing that may imply any visual impact will be mitigated by open space, agricultural fields and trees in the foreground as the development matures. Otherwise, distance and open space (in the foreground and on the hill) will mitigate any major visual impact.

The cluster housing development on the backside of the mountain is largely hidden from Highway 33 and any other major roadway. The overall massing of the developments will be broken up by significant green space interspersed throughout the projects. Although grading of the area will be required, additional landscaping will be incorporated with every new housing project. This entire area will be subject to form and character design guidelines that can stipulate quality of landscape, design of retaining walls, and character of buildings.

See attached visual impact graphics.



3.0 Servicing Introduction

CTQ has been retained by the Kirschner Mountain JV to develop concept designs for the infrastructure to service the remainder of developable lands on Kirschner Mountain. Individual Master Plans for Water, Sanitary Sewer and Storm Drainage utilities are presented in the following sections:

3.1 Water

3.1.1 Introduction

Black Mountain Irrigation District (BMID) is the water purveyor in the area of this development. Water for domestic use and for Fire Protection could be available through connections to BMID’s existing system at the termination of Loseth Road, Montenegro Drive and Gallagher Road. (See Attached letter from BMID)

There will be two pressure zones to service the proposed development to BMID minimum and maximum pressure standards, PZ 720m and PZ 760m. There is an existing Booster Station that will pump to a Proposed Reservoir near the highest elevation of the developed area. An Upper Booster Station will draw from this reservoir and pump to developed areas at elevations higher than the maximum service elevation of the Reservoir.

All components will be sized to City of Kelowna and/or BMID guidelines based on population served. The value used for Maximum Daily Demand (MDD) is 1,800 l/capita per day, this value is consistent with the City of Kelowna Bylaw and the Kelowna Joint Water Committee.

A Concept drawing for the proposed water system has been included for reference.

3.1.2 Design Criteria

The following design criteria are incorporated:

Unit Counts for Kirschner Mountain Development:

Single Family – (existing)	181 units	181 SFE
Multi-Family – (existing allowance)	45 units	30 SFE
Single Family – (possible addition)	250 units	250 SFE
Multi-Family – (possible addition)	295 units	197 SFE
TOTAL =	658 SFE	

Population per unit:	Single Family	3 persons/unit
	Multi Family	2 persons/unit



Per Capita Max Daily Demand:	1800 l/cap/day
Total Domestic MDD Flow:	13.7 l/sec
Design Fire Flow Rates:	150 l/sec (Comm. Zones) 60 l/sec (SF Residential Zone)
Ultimate Build-out Design Flow Rate (MDD plus Comm. Fire):	163.7 l/sec
Per Capita Peak Hour Demand:	4000 l/cap/day
Peak Hour Demand Factor:	2.20 x Max Day Demand
Peak Hour Demand:	360 l/sec
Allowable Pipe Velocity:	
Fire Flow Max:	4.0 m/sec
Peak Hour Max:	2.0 m/sec
System Pressures:	
Residual at Fire Flow	140 kPa (20 psi)
Min Service	280 kPa (40 psi)
Max Distribution	965 kPa (140 psi)

3.1.3 Existing Booster Station – BMID #5

An existing booster station (approximate elevation 605m) is located on Loseth Road, just north of Sunrise Road. It will supply water to a proposed reservoir through a dedicated supply main. An existing portion of the dedicated 250mm^ø cl 200 pvc reservoir supply main runs from Station #5 to a stub at the lane south of Montenegro Drive. This main will be extended to the proposed reservoir in an “as direct” a configuration as possible. The existing pumping capacity will likely need to be upgraded to meet an ultimate Maximum Daily Demand capacity to a TDH of 85 m.

3.1.4 Proposed Reservoir

The proposed reservoir will have a Top Water Level (TWL) of approximately 720m and will service to a maximum 690m elevation by gravity fed mains. It will also supply the suction side of the proposed Upper Booster Station that will service developed areas above the 690m elevation.

The reservoir size, according to BMID standards, to service the 658 SFE units is 2460 cu.m. It will also store 1,080 m³ of water for Fire Protection to provide for a 150 l/s flow for a 2 hour duration. A total capacity of 3,540 m³ would be required for the Kirschner Mountain Development.

The reservoir will be accessible to trucks for operation and maintenance purposes.



3.1.5 Proposed Upper Booster Station

There are proposed development areas above the 690m maximum service elevation of the proposed reservoir. These areas will be fed by a small booster station with variable frequency drive pumps, pressure tanks for domestic supply and a larger pump for fire protection. Standby power will be provided for the larger pump. This smaller booster station may be incorporated into the reservoir structure, depending on detailed site grading design.

The booster station will be located at an elevation of approximately 715m. The station will boost to an HGL of 760m. The design capacity of the small booster station will be determined by the number of units it services. The Upper Booster station will be accessible to trucks for operation and maintenance purposes.

3.1.6 Proposed Pressure Reducing Valve Stations

Looped water distribution mains for this development will improve flow capacities and water quality. In order to achieve the looped system when having several pressure zones, Pressure Reducing Valve Stations (PRVs) will be required. The PRVs will be sized based on the expected flow through each valve to City of Kelowna and/or BMID standards. At Preliminary Design stage these PRV locations will be examined to see if they are best configured as above-ground kiosk or below ground vault styles.

3.1.7 Fire Protection

Fire Protection throughout the developed areas will be provided by the water distribution network through mains and hydrants. These appurtenances will be sized to handle fire flows that will meet City of Kelowna Bylaw and BMID guidelines. Stored water in the Upper Reservoir will provide gravity fed fire flows to all zones except the highest 760m zone. Fire flows to this zone will be via a dedicated pump, with backup power, in the Upper Booster Station drawing water from the Upper Reservoir. The fire pump will have a capacity of 60 l/s to a TDH of approximately 25m.

3.1.8 Backup Power Generator

The proposed pumps will be driven by electric motors. In order to provide backup power in the case of electric power loss a generator set will be installed. This generator set will be diesel fuel powered and be located alongside of the new station in a weatherproof, sound-attenuated enclosure. The generator set will provide enough power to start and run the fire pump and building loads.

The generator set will be controlled to start automatically in the event of a utility power failure. It will have a battery charger to ensure it will start, and a coolant heater to allow for a short warm up time.

3.2 Sanitary Sewer

3.2.1 Introduction

Sanitary sewers exist in the neighborhoods to the west, north and northeast of the subject property. These sewers connect to the City of Kelowna’s Gopher Creek trunk sewer, running through Rutland to join the NE trunk main at the corner of Highway 97 and Highway 33.

3.2.2 Design Criteria

The following design criteria are incorporated:

Unit Counts for Kirschner Mountain Development:

Single Family – (existing)	181 units	181 SFE
Multi-Family – (existing allowance)	45 units	30 SFE
Single Family – (possible addition)	250 units	250 SFE
Multi-Family – (possible addition)	295 units	197 SFE
TOTAL =	658 SFE	

Population per unit:	Single Family	3 persons/unit
	Multi Family	2 persons/unit

Population Density: 1974 persons

Per Capita Flow: 300 l/cap/day

Harmon Peak Factor: 2.69

Reduction Factor for Peak: 0.75

Infiltration: 5,000 l/ha/day

Area of Infiltration: 86 ha

Roughness Coefficient: 0.011

Allowable Pipe Velocity:

Gravity Mains: 0.6 m/sec (min.)

Force Mains: 1.0 – 3.5 m/sec



3.2.3 Off-site Sewers

The design flows for the proposed development were supplied to the City of Kelowna for confirmation of capacity of the downstream. The city ran their sanitary model and confirmed there is capacity for the proposed flows.

The Kirschner Mountain Development, with its total developed number of SFE units = 658, will generate a total flow of 23.43 l/s. This flow is based on City of Kelowna's current bylaws. Results of additional monitoring tasks by the City may show this number to be a high estimate.

3.2.4 On-site Sewers

The proposed system will connect to the existing Gopher Creek System at three locations, Loseth Road, Montenegro Drive and Verde Vista Road. Approximately 50% of the developed units will connect by gravity mains to the existing system. The Southeastern portion of the developed area will drain to a proposed lift station at the SE edge of the subject property. A Concept drawing for the proposed sanitary system has been included for reference.

The lift station would service approximately 240 SFE units with a pumping capacity of 30 l/sec to a TDH of 67m through approximately 920m of 200mm diameter forcemain. There would be two 26 WHP pumps in the lift station. The pumps would have backup power provided by a diesel fueled generator set.

Detailed design tasks will include examining the possibility of using small sections of deep sewers to limit the number of units connecting to the proposed lift station.

3.3 Storm Sewer

3.3.1 Introduction

The total catchment area of this site is approximately 103ha. The future development of this site will increase the impermeable surface area on the property. The existing rainwater runoff must be safely collected and conveyed, and future development must restrict future runoff to the storm system to the values generated in this SWMP.

The objective of this SWMP is to identify peak flows and storage requirements and recommend effective measures to safely convey, store, and release excess runoff in an effective manner that will mitigate the risk of on-site flooding and control the impact to downstream watersheds. The storm water management plan will be prepared using Best Management Practices (BMP) and recommendations from the environmental report prepared by Ecoscape.

Please note: The information contained in this SWMP is based on information available at time of writing. Although every effort has been made to ensure information in this report is valid, the requirements may change due to design changes and new information.



3.3.2 Design Criteria

This section summarizes the design parameters used for analysis. The criteria used for rainfall are based on the City of Kelowna Subdivision Development and Servicing Bylaw No. 7900, Schedule 4, Section 3 and where applicable, accepted best management practices for storm water.

3.3.2.1 Design Approach

Storm water management analysis includes analyzing two specific scenarios, a minor storm and a major storm. The City of Kelowna requires that a piped drainage network shall be in place to collect and convey a 1 in 5 year rainfall event (minor storm). In addition, overland drainage routes must be designed to safely convey and store runoff for up to a 1 in 100 year rainfall event (major storm). Storage facilities are designed such that the release rate from the development is equivalent to runoff from the pre-development storm event. The predevelopment and post development storm water scenarios have been modeled using Autodesk Storm and Sanitary Analysis 2015 modeling software.

3.3.2.2 Rainfall Criteria

The rainfall hyetographs from Table 3 of Schedule 4 section 3 of the City of Kelowna Subdivision and Servicing Bylaw were used to determine the volume of rainfall for the 5 year and 100 year 1 hour design storms.

3.3.2.3 StormNet Model Parameters

The same parameters were used for each subcatchment area. The parameters used are shown below.

Max Infiltration Rate: 12mm/hr

Min Infiltration Rate: 7mm/hr

N-Impervious: 0.016

N-Pervious: 0.25

Depression Storage Impervious: 2mm

Depression Storage Pervious: 5mm

3.3.3 ENGINEERING ANALYSIS

In preparation of this analysis we reviewed the report prepared by Stantec Consulting Ltd.: Kirschner Mountain Drainage Study Dated November 7, 2000.

It should be noted that the analysis completed produced results consistent with the Stantec report.

3.3.3.1 Predevelopment Storm System

The storm water analysis is separated into two main catchments areas. The north area drains into the Gopher Creek watershed (63 Ha) and the south area drains into the Mission Creek watershed (40 Ha). As such we have divided our comments into two sections. The Pre-Development Storm Water Assessment figure is included for reference.

3.3.3.1.1 Gopher Creek watershed

The existing drainage for this area has three main catchments with the North West side of the mountain draining to the Garner Road pond which has a capacity of 1,250 m³. This pond is built to its ultimate size and future development will not drain into this pond so we have not looked at it further. The North side of the mountain drains to the Gopher Creek pond which has a capacity of 4,000 m³ (information obtained from the "As Constructed drawings prepared by A.C Ponto Associates dated December 10, 2005) and is an offset pond to Gopher Creek. The drainage area is only 25% developed to date but the pond has been built to its ultimate size. The North East side of the mountain drains to Gopher Creek itself through a series of open ditches and piped systems. This area consists of existing single family developments and large lots.

3.3.3.1.2 Mission Creek watershed

The existing drainage for this area drains to Mission Creek in two locations. The South West area drains through a natural ravine and the South East area drains generally to Gallagher Road and directly to the south to Mission Creek.

3.3.3.2 Post Development Storm System

As with the pre-development condition we have separated the drainage areas into the two watersheds for clarity. We have analyzed the system based on gravity flow of the runoff and as such identified where ROW's will be required to convey the runoff to the creek. The Post-Development Storm Water Assessment figure is included for reference.

3.3.3.2.1 Gopher Creek watershed

There are two main catchment areas that drain to the Gopher Creek Pond. For modelling purposes we divided the catchments into 29 sub-catchments based on the proposed road infrastructure and land-use. Catchment area #1 drains west to Gopher creek through the Garner Road pond and is fully developed. Catchment area #2 drains north via multiple locations along Loseth Road to the Gopher Creek pond. The model analysis indicates that when we use the existing release rate from the Gopher Creek pond (70 L/s) the required storage is 3,335 m³, which is consistent with the Stantec report. The exist capacity of the Gopher Creek pond is 4,000 m³. The East side however is a little more complicated as it has several options where it could drain. The ultimate option should be decided during the predesign portion of development as road alignments and development

areas will be further refined. We have identified here the options as we see them to date. These options are indicated on the Post-Development Storm Water Assessment figure included.

Drain to pond #1 on the East side of the mountain with a controlled release rate (pre-development flow rate) to the existing open ditch system on Lynrick Road. This will require a ROW acquisition through private lands from the development boundary to Lynrick Road. This will then drain to Gopher Creek upstream of the Gopher pond.

Drain to pond #1 on the East side of the mountain with a controlled release rate (pre-development flow rate) to the south towards Gallagher Road and to Mission Creek. This will require a ROW acquisition through private land holdings from the development to the Mission Creek corridor.

Drain to pond #1 on the East side of the mountain with a controlled release rate (pre-development flow rate) North to the existing pipe near Verdure Road and then down to the Gopher Creek pond. This will require a ROW acquisition through private currently owned by the developer.

3.3.3.2.2 Mission Creek watershed

There are two main catchment areas that drain to Mission Creek. For modelling purposes we divided the catchments into 13 sub-catchments based on the proposed road infrastructure and land-use

The South West area will drain towards the natural ravine to a proposed pond that requires a storage volume of 2,440 m³ at a release rate of 62 l/s.

The South East area and the extension of Gallagher Road will drain to the South to mission Creek. A storage structure will be required with a volume of 270 m³ and a release rate of 150 L/s.

4.0 Traffic Impact

The Official Community Plan Amendment considers the transportation requirements in the form of roads, transit and bicycle paths entering the property as well as throughout the neighborhood. Roadway planning includes routing for collectors and a conceptual configuration for local roads.

A second access via Gallagher Road is planned. Gallagher Road improvements (as a two lane rural collector), from Lago Vista Road to the eastern limit of the Kirschner Mountain neighborhood are included with the City of Kelowna 20year Servicing Plan, as a DCC improvement scheduled for completion within the fourth quarter of the plan (2025 to 2030).

Hillside roadway standards will be incorporated where appropriate, including but not limited to: narrow carriageways, pullout/parking bays, divided lanes to protect sensitive features, steeper grades, and common access driveways.

Roads and transit planning will respect policy direction from City Master Plans and other pertinent regulations of various authorities. Bicycle paths will be considered as a component of a regional system connecting to nearby parks and trail network as well as an opportunity for alternative modes along the proposed roads.

Current plans are to develop up to 770 units, with a mix of single family homes, townhomes and mid-rise apartments. A Traffic Impact Assessment (TIA) was completed for the initial Kirschner Area Structure Plan in October of 2000. The original plan was based on the development of up to 600 single family homes. The revised build out of 770 units with a mixed type of housing is projected to generate an equivalent number of trips as the original plan of 600 single family homes. With a similar number of trip generated from the overall development (as were envisioned with the original area Structure Plan) the impact on the adjacent City of Kelowna and Ministry of Transportation roadway infrastructure, is as presented in the October 2000 TIA. A comparison of the trip generation rates is presented on the following Table T-1:

Original Single Family Development

Description / ITE Code	Units	ITE Vehicle Trip Generation Rates							Expected Units	Total Generated Trips			Total Distribution of Generated Trips			
		Weekday	AM	PM	AM In	AM Out	PM In	PM Out		Daily	AM Hour	PM Hour	AM In	AM Out	PM In	PM Out
Single Family Homes ITE Code 210	Dwelling Unit	9.52	0.75	1.00	25%	75%	63%	37%	600.0	5,712	450	600	113	338	378	222
									600	5,712	450	600	113	338	378	222

Proposed Mixed Use Development

Description / ITE Code	Units	ITE Vehicle Trip Generation Rates							Expected Units	Total Generated Trips			Total Distribution of Generated Trips			
		Weekday	AM	PM	AM In	AM Out	PM In	PM Out		Daily	AM Hour	PM Hour	AM In	AM Out	PM In	PM Out
Existing Single Family Homes ITE Code 210	Dwelling Unit	9.52	0.75	1.00	25%	75%	63%	37%	181.0	1,723	136	181	34	102	114	67
Existing Resd. Condo / Townhouse ITE Code	Dwelling Unit	5.81	0.44	0.52	17%	83%	67%	33%	45.0	261	20	23	3	16	16	8
Single Family Homes ITE Code 210	Dwelling Unit	9.52	0.75	1.00	25%	75%	63%	37%	250.0	2,380	188	250	47	141	158	93
Resd. Condo / Townhouse 230	Dwelling Unit	5.81	0.44	0.52	17%	83%	67%	33%	235.0	1,365	103	122	18	86	82	40
Mid-Rise Apartment ITE Code 223	Dwelling Unit	3.96	0.30	0.39	31%	69%	58%	42%	60.0	238	18	23	6	12	14	10
									771	5,968	464	600	107	357	383	217

Table T-1 Trip Generation Comparison

5.0 Geotechnical Assessment

Interior Testing Services Ltd of Kelowna, BC completed their geotechnical assessment of the subject lands at the end of May, 2015. The report is appended as part of the submission in support of the OCP Amendment for Kirschner Mountain Estates.

6.0 Wildfire Threat Assessment

Swanson Forestry Services Ltd of Kelowna, BC completed their Wildfire Threat Assessment and Mitigation Plan in March/April of 2015. The report is appended as part of the submission in support of the OCP Amendment for Kirschner Mountain Estates.

7.0 Environmental Inventory and Impact Assessment

Ecoscape Environmental Consultants Ltd of Kelowna, BC completed their EIA for the subject property in August, 2015. The report is appended as part of the submission in support of the OCP Amendment for Kirschner Mountain Estates.