

City of Kelowna
Regular Council Meeting
AGENDA



Monday, August 10, 2020
1:30 pm
Council Chamber
City Hall, 1435 Water Street

Pages

1. Call to Order

I would like to acknowledge that we are gathered today on the traditional, ancestral, unceded territory of the syilx/Okanagan people.

This Meeting is open to the public and all representations to Council form part of the public record. A live audio-video feed is being broadcast and recorded on kelowna.ca and a delayed broadcast is shown on Shaw Cable.

2. Confirmation of Minutes

4 - 12

PM Meeting - July 27, 2020

3. Development Application Reports & Related Bylaws

3.1 Lawson Ave 1021 - Z20-0041 (BL12065) - Susan D. Glendinning

13 - 42

To consider an application to rezone the subject property from the RU6 – Two Dwelling Housing zone to the RM5 – Medium Density Multiple Housing zone to facilitate an apartment building.

3.2 Lawson Ave 1021 - BL12065 (Z20-0041) - Susan D. Glendinning

43 - 43

To give Bylaw No. 12065 first reading in order to rezone the subject property from the RU6 – Two Dwelling Housing zone to the RM5 – Medium Density Multiple Housing zone to facilitate an apartment building.

3.3 Park Ave. 374, Z20-0039 (BL12087) - Kevin L. Fierbach and Jacqueline A. Fierbach

44 - 68

To rezone the subject property from the RU1 – Large Lot Housing zone to the RU6 – Two Dwelling Housing zone to facilitate the development of a second single family home and detached garage.

3.4	Park Ave. 374, BL12087 (Z20-0039) - Kevin L. Fierbach and Jacqueline A. Fierbach	69 - 69
	To give Bylaw No. 12087 first reading in order to rezone the subject property from the RU1 – Large Lot Housing zone to the RU6 – Two Dwelling Housing zone to facilitate the development of a second single family home and detached garage.	
3.5	Mugford Rd 595 - Z19-0143 (BL12088) - Corey Knorr Construction Ltd., Inc. No. BC0380398	70 - 90
	To consider an application to rezone the subject property from the RU1 – Large Lot Housing zone to the RU2 – Medium Lot Housing zone to facilitate a future 2-lot subdivision.	
3.6	Mugford Rd 595 - BL12088 (Z19-0143) - Corey Knorr Construction Ltd., Inc. No. BC0380398	91 - 91
	To give Bylaw No. 12088 first reading in order to rezone the subject property from the RU1 – Large Lot Housing zone to the RU2 – Medium Lot Housing zone to facilitate a future 2-lot subdivision.	
3.7	Summit Dr 1920-1936, TA20-0018 (BL12089) - Summit Real Estate Holdings Ltd., Inc.No. BC1098449	92 - 107
	To amend the Zoning Bylaw by removing the maximum Gross Floor Area for Retail Liquor Sales, removing the limit on the number of Retail Liquor Sales businesses, and addressing how the Retail Cannabis Sales subzone was created within Area 2 of the CD3 zone.	
3.8	Summit Dr 1920-1936, BL12089 (TA20-0018) - Summit Real Estate Holdings Ltd., Inc.No. BC1098449	108 - 109
	To give Bylaw No. 12089 first reading in order to amend the Zoning Bylaw by removing the maximum Gross Floor Area for Retail Liquor Sales, removing the limit on the number of Retail Liquor Sales businesses, and addressing how the Retail Cannabis Sales subzone was created within Area 2 of the CD3 zone.	
3.9	Supplemental Report - Barton St 4642 - Z20-0034 - Jeff and Jasmine Clark, Brian and Nancy Clark - Correspondence Received	110 - 111
	To receive a summary of correspondence for Rezoning Bylaw No. 12063 and to give the bylaw further reading consideration.	
3.10	Barton St. 4642 - BL12063 (Z20-0034) - Jeff M. Clark, Jasmine C. Bedard, Brian G. Clark and Nancy S. Clark	112 - 112
	To give Bylaw No. 12063 second and third reading and adopt in order to rezone the subject property from the RU1 - Large Lot Housing zone to the RU1c - Large Lot Housing with Carriage House zone.	

- 3.11 Supplemental Report - Bach Rd 185 - Z20-0019 - Ashwani K and Komal R. Lakha - Correspondence Received RTC** 113 - 114

To receive a summary of correspondence for Rezoning Bylaw No. 12064 and to give the bylaw further reading consideration.

- 3.12 Bach Road 185 - BL12064 (Z20-0019) - Ashwani K. Lakha and Komal R. Lakha** 115 - 115

To give Bylaw No. 12064 second and third reading in order to rezone the subject property from the RU1 - Large Lot Housing zone to the RU2 -Medium Lot Housing zone.

4. Non-Development Reports & Related Bylaws

- 4.1 Transportation Master Plan Scenarios** 116 - 152

To provide Council with an overview of three transportation scenarios and to receive direction to continue development of the draft 2040 Transportation Master Plan based on Scenario 2

- 4.2 20 Year Servicing Plan Update – Water, Wastewater, Stormwater** 153 - 198

To update Council on the proposed Future Service Levels required to address the growth projections proposed for the 2040 Official Community Plan.

5. Bylaws for Adoption (Non-Development Related)

- 5.1 Leon Ave 815 - BL12044 - Housing Agreement Authorization Bylaw - 815 Leon Developments Ltd., Inc. No. BC1053909** 199 - 206

To adopt Bylaw No. 12044 in order to authorize the City of Kelowna to enter into a Housing Agreement with 815 Development Ltd., Inc. No. BC1053909.

- 5.2 Clement Ave 740 and Richter St 1195 - BL12046 - Housing Agreement Authorization Bylaw - PC Urban Clement Holdings Ltd., Inc. No. BC1099980** 207 - 221

To adopt Bylaw No. 12046 in order to authorize the City of Kelowna to enter into a Housing Agreement with PC Urban Clement Holdings Ltd., Inc. No. BC1099980.

- 5.3 BL12066 - Amendment No. 21 to the Subdivision, Development & Servicing Bylaw No. 7900** 222 - 366

To adopt Bylaw No.12066 in order to amend the Subdivision, Development and Servicing Bylaw No. 7900.

6. Mayor and Councillor Items

7. Termination



City of Kelowna
Regular Council Meeting
Minutes

Date: Monday, July 27, 2020
 Location: Council Chamber
 City Hall, 1435 Water Street

Members Present Mayor Colin Basran, Councillors Maxine DeHart, Ryan Donn, Brad Sieben, Mohini Singh and Luke Stack*

Members Participating Remotely Councillors Gail Given, Charlie Hodge and Loyal Wooldridge

Staff Present City Manager, Doug Gilchrist; City Clerk, Stephen Fleming, Deputy City Manager Joe Creron*; Divisional Director, Infrastructure, Alan Newcombe*; Utility Planning Manager, Rod MacLean*; Utility Services Manager, Kevin Van Vliet*; Deputy City Clerk, Laura Bentley*; Divisional Director, Planning and Development Services, Ryan Smith*; Development Planning Department Manager, Terry Barton*; Community Planning & Development Manager, Dean Strachan*; Planner II, Andrew Ferguson*; Planner, Aaron Thibeault*; Integrated Transportation Department Manager, Rafael Villarreal Pacheco*; Transit and Programs Manager, Jerry Dombowsky*; Transit Services Coordinator, Mike Kittmer*; Controller, Jackie Dueck*; Corporate Finance Manager, Shelly Little*; Policy & Planning Department Manager, Danielle Noble-Brandt*; Acting Manager, Ross Soward*; Legislative Coordinator (Confidential), Clint McKenzie

(*Denotes partial attendance)

1. Call to Order

Mayor Basran called the meeting to order at 1:34 p.m.

Mayor Basran advised that the meeting is open to the public and all representations to Council form part of the public record. A live audio-video feed is being broadcast and recorded on kelowna.ca and a delayed broadcast is shown on Shaw Cable.

2. Confirmation of Minutes

Moved By Councillor Donn/Seconded By Councillor DeHart

(R483/20/07/27) THAT the Minutes of the Regular Meetings of July 13, 2020 be confirmed as circulated.

Carried

3. Non -Development Reports

3.1 Water Supply Update

Staff displayed a PowerPoint presentation with an update to the SEKID water project and the implementation of Phase 3 water restrictions, and responded to questions from Council.

Moved By Councillor Stack/Seconded By Councillor Wooldridge

(R484/20/07/27) THAT Council receives, for information, the report from Utility Services dated July 27, 2020 regarding an update on potable water supply in southeast Kelowna;

AND THAT Council direct staff to bring forward a bylaw amendment to extend the deadline to request the \$500 credit for using new irrigation services to October 1, 2020.

Carried

3.2 COVID-19 Pandemic Public Hearing and Tuesday Meeting Measures

Staff displayed a PowerPoint presentation summarizing the COVID-19 related changes to public hearing and Tuesday evening procedures and practices and responded to questions from Council.

Moved By Councillor Sieben/Seconded By Councillor Stack

(R485/20/07/27) THAT Council receives, for information, the report from the Office of the City Clerk dated July 27, 2020 with respect to the COVID-19 pandemic public hearing and meeting measures.

AND THAT Council direct staff to no longer recommend public hearings be waived when rezonings are brought forward at initial consideration

Carried

Mayor Basran, Councillors Donn and Given - Opposed

4. Development Application Reports & Related Bylaws

4.1 Highway 97 N 2339-2397 - Z20-0014 (BL12083) - Dilworth Shopping Centre Ltd., Inc. No. 319846

Staff displayed a PowerPoint presentation summarizing the application and responded to questions from Council.

Moved By Councillor Stack/Seconded By Councillor Sieben

(R486/20/07/27) THAT Rezoning Application No. Z20-0014 to amend the City of Kelowna Zoning Bylaw No. 8000 by changing the zoning classification of portions of Lot A, District Lots 126 and 532, ODYD, Plan 40108, located at 2339-2397 Highway 97 N, Kelowna, BC from the C4rcs – Urban Centre Commercial (Retail Cannabis Sales) zone to the C4rls/rcs – Urban Centre Commercial (Retail Liquor Sales / Retail Cannabis Sales) zone as shown on Map "A" attached to the Report from the Development Planning Department dated July 27, 2020, be considered by Council;

AND THAT the Rezoning Bylaw be forwarded to a public hearing for further consideration;

AND THAT final adoption of the Rezoning Bylaw be considered subsequent to the approval of the Ministry of Transportation and Infrastructure.

Carried

4.2 Highway 97 N 2339-2397 - BL12083 (Z20-0014) - Dilworth Shopping Centre Ltd., Inc. No. 319846

Moved By Councillor Dehart/Seconded By Councillor Stack

(R487/20/07/27) THAT Bylaw No. 12083 be read a first time.

Carried

4.3 Pacific Ave 1144 - Z20-0013 (BL12084) - 1217799 BC Ltd., Inc.No. BC1217799

Staff displayed a PowerPoint presentation summarizing the application and responded to questions from Council.

Moved By Councillor Donn/Seconded By Councillor Sieben

(R488/20/07/27) THAT Rezoning Application No. Z20-0013 to amend the City of Kelowna Zoning Bylaw No. 8000 by changing the zoning classification of Parcel A (DD KL82857) District Lot 137 ODYD Plan 2862, located at 1144 Pacific Avenue, Kelowna, BC from the RU6 – Two Dwelling Housing zone to the C4 – Urban Centre Commercial zone, be considered by Council;

AND THAT the Rezoning Bylaw be forwarded to a Public Hearing for further consideration;

AND THAT final adoption of the Rezoning Bylaw be considered subsequent to the outstanding conditions of approval as set out in Schedule "A" attached to the Report from the Development Planning Department dated July 27, 2020;

AND FURTHER THAT final adoption of the Rezoning Bylaw be considered subsequent to the approval of the Ministry of Transportation and Infrastructure.

Carried

4.4 Pacific Ave 1144 - BL12084 (Z20-0013) - 1217799 BC Ltd., Inc. No. BC1217799

Moved By Councillor Dehart/Seconded By Councillor Stack

(R489/20/07/27) THAT Bylaw No. 12084 be read a first time.

4.5 Park Ave 409 - Z20-0042 (BL12085) - Brenda Rusnak

Staff displayed a PowerPoint presentation summarizing the application.

Moved By Councillor Given/Seconded By Councillor Wooldridge

(R490/20/07/27) THAT Rezoning Application No. Z20-0042 to amend the City of Kelowna Zoning Bylaw. No. 8000 by changing the zoning classification of Lot 7, Block 6, District Lot 14 Osoyoos Division Yale District Plan 431, located at 409 Park Ave, Kelowna, BC, from the RU1-Large Lot Housing zone to the RU2- Medium Lot Housing zone, be considered by Council;

AND THAT the Rezoning Bylaw be forwarded to a Public Hearing for further consideration;

AND THAT final adoption of the Rezoning Bylaw be considered subsequent to the issuance of a Preliminary Layout Review Letter by the Approving Officer;

AND THAT final adoption of the Rezoning Bylaw be considered subsequent to the approval of the Ministry of Transportation and Infrastructure;

AND FURTHER THAT final adoption of the Rezoning Bylaw be considered subsequent to the outstanding conditions of approval as set out in Schedule "A" attached to the Report from the Development Planning Department dated July 27, 2020.

Carried

4.6 Park Ave 409 - BL12085 (Z20-0042) - Brenda Rusnak

Moved By Councillor Sieben/Seconded By Councillor Stack

(R491/20/07/27) THAT Bylaw No. 12085 be read a first time.

Carried

4.7 Robson Rd W 235, 285 and Rutland Rd S 240 - Z20-0010 (BL12086) - 1918951 Alberta Ltd., Inc. No. A0110539

Staff displayed a PowerPoint presentation summarizing the application.

Moved By Councillor Sieben/Seconded By Councillor Singh

(R492/20/07/27) THAT Rezoning Application No. Z20-0010 to amend the City of Kelowna Zoning Bylaw No. 8000 by changing the zoning classification of Lot 1 and Lot 2, Section 23, Township 26, Osoyoos Division Yale District, Plan 12830 and Lot 10, Section 23, Township 26, Osoyoos Division Yale District, Plan 12078, located at 235 and 285 Robson Rd W and 240 Rutland Rd S, Kelowna BC from the RU1- Large Lot Housing zone to the RM3- Low Density Multiple Housing zone, be considered by Council;

AND THAT the Rezoning Bylaw be forwarded to a public hearing for further consideration;

AND THAT final adoption of the Rezoning Bylaw be considered subsequent to the outstanding conditions of approval as set out in Schedule "A" attached to the Report from the Development Planning Department dated July 27, 2020;

AND THAT final adoption of the Rezoning Bylaw be considered subsequent to the approval of the Ministry of Transportation and Infrastructure;

AND FURTHER THAT final adoption of the Rezoning Bylaw be considered in conjunction with Council's consideration of a Development Permit for the subject property.

Carried

4.8 Robson Rd W 235, 285 and Rutland Rd S 240 - BL12086 (Z20-0010) - 1918951 Alberta Ltd., Inc. No. A0110539

Moved By Councillor Stack/Seconded By Councillor Sieben

(R493/20/07/27) THAT Bylaw No. 12086 be read a first time.

Carried

4.9 Snowsell St 505-525 - OCP14-0027 (BL11105) and Z14-0059 (BL11106) - 1074470 B.C. Ltd., Inc.No. BC1074470

Moved By Councillor Stack/Seconded By Councillor DeHart

(R494/20/07/27) THAT Council receives, for information, the Report from the Development Planning Department dated July 27, 2020 with respect to Bylaw No. 11105 for OCP Amendment Application (OCP14-0027), and Bylaw No. 11106 for Rezoning Application (Z14-0059) for the property located at Lot 1, District Lot 9, Township 23, Osoyoos Division Yale District Plan EPP21900, at 505-525 Snowsell Street, Kelowna, BC;

AND THAT Bylaw No. 11105 and Bylaw No. 11106 be forwarded for rescindment consideration and the file be closed.

Carried

- 4.10 Snowsell Rd N 505-525 - BL11105 (OCP14-0027) - 1074470 B.C. Ltd., Inc. No. BC1074470

Moved By Councillor Sieben/Seconded By Councillor DeHart

(R495/20/07/27) THAT Bylaw No. 11105 be rescinded.

Carried

- 4.11 Snowsell Rd N 505-525 - BL11106 (Z14-0059) - 1074470 B.C. Ltd., Inc. No. BC1074470

Moved By Councillor Sieben/Seconded By Councillor DeHart

(R496/20/07/27) THAT Bylaw No. 11106 be rescinded.

Carried

5. **Bylaws for Adoption (Development Related)**

- 5.1 Landsdowne Pl 1990 - BL12052 (Z19-0116) - Raul Holdings Inc., Inc. No. BC0968428

Moved By Councillor Dehart/Seconded By Councillor Sieben

(R497/20/07/27) THAT Bylaw No. 12052 be adopted.

Carried

- 5.2 Underhill St 1940, 1960 - BL12061 (Z18-0071) - 1940 Underhill Developments Corp., Inc. No. BC1159386

Moved By Councillor Dehart/Seconded By Councillor Sieben

(R498/20/07/27) THAT Bylaw No. 12061 be adopted.

Carried

The meeting adjourned at 3:33 p.m.

The meeting reconvened at 3:39 p.m.

6. **Non-Development Reports & Related Bylaws**

- 6.1 **Okanagan Gateway Study**

Staff introduced the item and consultant Stephen Powers.

The consultant displayed a PowerPoint presentation and responded to questions from Council.

Moved By Councillor Donn/Seconded By Councillor Hodge

(R499/20/07/27) THAT Council receives, for information, the report from the Integrated Transportation Department dated July 13, 2020, with respect to the Okanagan Gateway Study.

Carried**6.2 Budget Adjustment - Cast and Ductile Iron Watermain Replacement**

Staff summarized the reasons for the requested budget amendment.

Moved By Councillor Sieben/Seconded By Councillor Stack

(R500/20/07/27) THAT Council receives for information, the report from Infrastructure Engineering dated July 27, 2020 regarding the project creation and budget adjustments required to replace approximately 850 m of poor condition cast and ductile iron watermain as part of the Ethel Street Active Transportation Corridor – Phase 3C;

AND THAT the 2020 Financial Plan be amended to reflect the transfer of \$390,000 from the carry over budget for the Ethel St Watermain Replacement, Sutherland – Springfield (329001W), as part of the Ethel Street Active Transportation Corridor – Phase 4 to the Ethel Phase 3C ATC Water Main Replacement project;

AND THAT the 2020 Financial Plan be amended to reflect the cancellation and transfer of \$195,880 from the Chute Lake Rd Pressure Reducing Valve Upgrade (3387) to the Ethel Phase 3C ATC Water Main Replacement project;

AND FURTHER THAT the 2020 Financial Plan be amended to include an additional \$415,000 from the Water Utility for the Ethel Phase 3C ATC Water Main Replacement project.

Carried**6.3 Fall 2020 Transit Service Levels and System Performance Update**

Staff displayed a PowerPoint presentation updating Council on fall transit plans and responded to questions from Council.

Moved By Councillor Given/Seconded By Councillor Sieben

(R501/20/07/27) THAT Council receives for information, the report from the Integrated Transportation Department, dated July 27, 2020, regarding fall 2020 transit service levels, transit system performance update, and financial mitigation strategies.

Carried**6.4 Subdivision, Development and Servicing Bylaw 7900 - update**

Staff displayed a PowerPoint presentation summarizing the proposed amendments to the Bylaw and responded to questions from Council.

Carried

Moved By Councillor DeHart/Seconded By Councillor Donn

(R502/20/07/27) THAT Council receives, for information, the report from the Infrastructure Engineering Department dated July 27th, 2020, with respect to amending the Subdivision, Development and Servicing Bylaw No. 7900;

AND THAT Bylaw No. 12066, being Amendment No. 21 to Subdivision, Development and Servicing Bylaw No. 7900 be forwarded for reading consideration;

AND THAT Council Policy No. 266, being Subdivision, Development & Servicing – Approved Products List, be revised as outlined in the Report from Infrastructure Engineering Department dated July 27th, 2020.

Carried

6.5 Amendment to Council Policy No. 266 - Subdivision, Development & Servicing - Approved Product List

Council Policy No. 266 was not read as it is included in the Council resolution in Item 6.4.

6.6 BL12066 - Amendment No. 21 to the Subdivision, Development & Servicing Bylaw No. 7900

Moved By Councillor Donn/Seconded By Councillor Singh

(R503/20/07/27) THAT Bylaw No. 12066 be read a first, second and third time.

Carried

6.7 Audit Committee Meeting Review for 2019

The Mayor made comments on the City receiving the Canadian Award for Financial Reporting for the 2018 Financial Statements and the Distinguished Budget Presentation Award for the 2019 Financial Plan. This is the 17th and 18th consecutive year the City has been awarded each of these recognitions.

Staff provided an overview of the Audit Committee meeting.

Moved By Councillor Donn/Seconded By Councillor Hodge

(R504/20/07/27) THAT Council receive the report of the Corporate Finance Manager, Financial Services dated July 27, 2020 for information.

Carried

6.8 2019 Consolidated Financial Statements

Staff displayed a PowerPoint presentation showing the Consolidated Statements and responded to questions from Council.

Moved By Councillor Donn/Seconded By Councillor DeHart

(R505/20/07/27) THAT Council receives, for information, the Report from the Audit Committee dated July 27, 2020 with respect to the Consolidated Financial Statements and Auditor's Report for the City of Kelowna for the year ending December 31, 2019.

AND THAT Council approves the appropriation of \$8,113,748 of surplus generated from all general fund operations in 2019 to reserves and accumulated surplus as detailed in the Report from the Audit Committee dated July 27, 2020.

AND FURTHER THAT the Consolidated Financial Statements and Auditor's Report be reprinted in and form part of the City of Kelowna's annual report.

Carried

6.9 Permissive Tax Exemption Policy 327 - Non-Profits

Councillor Stack declared a perceived conflict of interest with items. 6.9, 6.10, 6.11, 6.12 and 6.13 as his employer enjoys a current permissive tax exemption and has in the past applied for housing agreements and left the meeting at 5:12 p.m.

Staff displayed a PowerPoint presentation summarizing the current permissive tax exemption policy and responded to questions from Council.

Moved By Councillor Donn/Seconded By Councillor Given

(R506/20/07/27) THAT Council receives the report from the Revenue Supervisor dated July 27, 2020 which provides information for the Permissive Tax Exemption Policy 327 as it relates to non-profits.

Carried

6.10 Rental Housing Agreement Bylaws

Staff displayed a PowerPoint presentation.

Moved By Councillor Given/Seconded By Councillor Wooldridge

(R507/20/07/27) THAT Council, receives for information, the report from Policy and Planning dated July 27, 2020 recommending that the City of Kelowna enter into two housing agreements to secure 285 long-term rental housing units.

AND THAT Bylaw No. 12044 authorizing a Housing Agreement between 815 Leon Developments Ltd., Inc. No. BC105909, which requires the owners to designate 127 dwelling units in a purpose-built rental housing for Lot A, District Lot 138, ODYD, Plan EPP78759, at 815 Leon Avenue, Kelowna, BC be forwarded for reading consideration.

AND FURTHER THAT Bylaw No. 12046 authorizing a Housing Agreement between PC Urban Clement Holdings Ltd. NO. BC1099980, which requires the owners to designate 158 dwelling units in purpose-built rental housing for Lot A Section 30 Township 26, ODYD, PLAN EPP83554 at 740 Clement Ave and 1195 Richter Street, Kelowna BC be forwarded for reading consideration.

Carried

6.11 Leon Ave 815 - BL12044 - Housing Agreement Authorization Bylaw - 815 Leon Developments Ltd., Inc. No. BC1053909

Moved By Councillor Donn/Seconded By Councillor Singh

(R508/20/07/27) THAT Bylaw No. 12044 be read a first, second and third time.

Carried

6.12 Clement Ave 740 and Richter St 1195 - BL12046 - Housing Agreement Authorization Bylaw - PC Urban Clement Holdings Ltd., Inc. No. BC1099980

Moved By Councillor Donn/Seconded By Councillor Singh

(R509/20/07/27) THAT Bylaw No. 12046 be read a first, second and third time.

Carried

6.13 Rental Housing Tax Exemption Agreements

Staff made comments on each of the projects meeting City objectives.

Moved By Councillor DeHart/Seconded By Councillor Given

(R510/20/07/27) THAT Council, receives, for information, the Report from the Acting Manager Long Range Policy Planning dated July 27, 2020 recommending that Council adopt the following Revitalization Tax Exemption Agreements for two rental housing projects.

AND THAT Council approves the City of Kelowna entering into a Revitalization Tax Exemption Agreement with 815 Leon Developments Ltd., Inc. No. BC105909 for Lot A District Lot 138 ODYD, Plan EPP78759 at 815 Leon Avenue, Kelowna, BC.

AND FURTHER THAT Council approves the City of Kelowna entering into a Revitalization Tax Exemption Agreement with PC Urban Clement Holdings Ltd., INC. NO. BC1099980, for Lot A Section 30 Township 26 ODYD PLAN EPP83554, at 740 Clement Avenue and 1195 Richter Street, Kelowna BC.

Carried

7. **Mayor and Councillor Items**

There were no items.

8. **Termination**

This meeting was declared terminated at 5:27 p.m.

Mayor Basran
/cm



City Clerk

REPORT TO COUNCIL



Date: August 10, 2020
To: Council
From: City Manager
Department: Development Planning Department
Application: Z20-0041 **Owner:** Susan Dorothy Glendinning
Address: 1021 Lawson Ave **Applicant:** BlueGreen Architecture Inc.
Subject: Rezoning Application
Existing OCP Designation: MRM – Multiple Unit Residential (Medium Density)
Existing Zone: RU6 – Two Dwelling Housing
Proposed Zone: RM5 – Medium Density Multiple Housing

1.0 Recommendation

That Rezoning Application No. Z20-0041 to amend the City of Kelowna Zoning Bylaw No. 8000 by changing the zoning classification of Lot 2, District Lot 138, ODYD, Plan 5065, located at 1021 Lawson Ave, Kelowna, BC from the RU6 – Two Dwelling Housing zone to the RM5 – Medium Density Multiple Housing zone, be considered by Council;

AND THAT the Rezoning Bylaw be forwarded to a Public Hearing for further consideration;

AND THAT final adoption of the Rezoning Bylaw be considered subsequent to the outstanding conditions of approval as set out in Schedule "A" attached to the Report from the Development Planning Department dated August 10th2020;

AND THAT final adoption of the Rezoning Bylaw be considered subsequent to the approval of the Ministry of Transportation and Infrastructure;

AND FURTHER THAT final adoption of the Rezoning Bylaw be considered in conjunction with Council's consideration of a Development Permit and a Development Variance Permit for the subject property.

2.0 Purpose

To consider an application to rezone the subject property from the RU6 – Two Dwelling Housing zone to the RM5 – Medium Density Multiple Housing zone to facilitate an apartment building.

3.0 Development Planning

The subject property is located between the downtown Urban Centre and the Capri-Landmark Urban Centre within close proximity to the Bernard Avenue corridor. The subject property is within close proximity to services, employments, and nearby amenities including parks, restaurants, and shops. The property is also close to the Ethel Street Active Transportation corridor providing good cycling connectivity to various core destinations. The properties' Walk Score is 72 (Very Walkable – most errands can be accomplished on foot).

The application is a rezoning to the RM5 – Medium Density Multiple Housing in order to facilitate the construction of a proposed four floor apartment building with half sunk parkade. The zone and the proposed land use are consistent with the Official Community Plan future land use designation of MRM – Multiple Unit Residential (Medium Density). Staff are recommending support for the proposed rezoning.

4.0 Proposal

4.1 Project Description

There is an existing single-family dwelling on the lot which is proposed to be demolished. The applicant is proposing a construction of a new apartment building. The proposal contains four floors with a parkade sunk halfway into the ground.

Staff are currently tracking five variances proposed for the initial application. The first three variances are related to setbacks and the last two variances are related to parking stall sizes. Should the land use be supported by Council, Staff will bring forth a Council report for the Development Permit and Development Variance Permit detailing the form and character conformance to the design guidelines with analysis on the proposed variances.

4.2 Site Context

The subject property is located between two urban centres: Capri-Landmark to the South-East and the City Centre to the West. The surrounding area is mixed between apartment buildings and RU7 lots with existing single-family dwellings. Specifically, adjacent land uses are as follows:

Orientation	Zoning	Land Use
North	RU7 - Infill Housing	Single / Two Unit Residential
East	RM5 – Medium Density Multiple Housing	Medium Density Residential
South	RM5 – Medium Density Multiple Housing	Medium Density Residential
West	RU7 - Infill Housing	Single / Two Unit Residential

Subject Property Map: 1021 Lawson Ave**5.0 Current Development Policies****5.1 Kelowna Official Community Plan (OCP)**

Contain Urban Growth. Reduce greenfield urban sprawl and focus growth in compact, connected and mixed-use (residential and commercial) urban and village centres.

Complete Communities. Support the development of complete communities with a minimum intensity of approximately 35-40 people and/or jobs per hectare to support basic transit service – a bus every 30 minutes. (approx. 114 people / hectare proposed).

Compact Urban Form. Develop a compact urban form that maximizes the use of existing infrastructure and contributes to energy efficient settlement patterns. This will be done by increasing densities (approximately 75 - 100 people and/or jobs located within a 400 metre walking distance of transit stops is required to support the level of transit service) through development, conversion, and re-development within Urban Centres (see Map 5.3) in particular and existing areas as per the provisions of the Generalized Future Land Use Map 4.1.

Objective 5.9. Support the creation of affordable and safe rental, non-market and / or special needs housing.

Objective 5.10. Ensure opportunities are available for greater use of active transportation and transit to: improve community health; reduce greenhouse gas emissions; and increase resilience in the face of higher energy prices.

Objective 5.11. Support parking management programs that promote reduced vehicle ownerships, reduced vehicle trips and increased use of active modes of transportation.

Objective 5.18. Ensure efficient land use.

Objective 5.19. Ensure development is compatible with surrounding land uses.

6.0 Technical Comments

6.1 Development Engineering Department

6.1.1 See Attachment 'B', memorandum dated May 20, 2020

6.2 Ministry of Transportation

6.2.1 No objection to proposal.

7.0 Application Chronology

Date of Application Received: May 13, 2020

Date Public Consultation Completed: June 15, 2020

Report prepared by: Adam Cseke, Planning Specialist

Reviewed by: Terry Barton, Development Planning Department Manager

Approved by: Ryan Smith, Divisional Director, Planning and Development Services

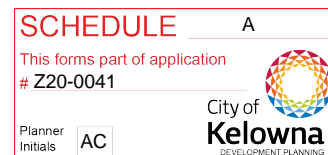
Attachments:

Schedule A: Development Engineering Memo

Attachment 'B': Conceptual Drawing Package

CITY OF KELOWNA
MEMORANDUM

Date: May 20, 2020
File No.: Z20-0041
To: Community Planning (AC)
From: Development Engineering Manager (JK)
Subject: 1021 Lawson Ave



RU6 to RM5

The Development Engineering Department has the following comments and requirements associated with this rezoning application. The road and utility upgrading requirements outlined in this report will be a requirement of this development. The Development Engineering Technologist for this project is Ryan O'Sullivan

1. Domestic Water and Fire Protection

- a) Property 1021 Lawson Ave is currently serviced with a 13mm-diameter water service. The developer's consulting mechanical engineer will determine the domestic, fire protection requirements of this proposed development and establish hydrant requirements and service needs. The applicant will arrange for the removal and disconnection of the existing services and the installation of one new larger service at the applicants cost.
- b) A water meter is mandatory for this development and must be installed inside the building on the water service inlet as required by the City Plumbing Regulation and Water Regulation bylaws. The developer or building contractor must purchase the meter from the City at the time of application for a building permit from the Inspection Services Department, and prepare the meter setter at his cost. Boulevard landscaping, complete with underground irrigation system, must be integrated with the on-site irrigation system
- c) The developer must obtain the necessary permits and have all existing utility services disconnected prior to removing or demolishing the existing structures. The City of Kelowna water meter contractor must salvage existing water meters, prior to building demolition. If water meters are not salvaged, the developer will be invoiced for the meters.

2. Sanitary Sewer

Our records indicate that these properties are currently serviced with a 100mm-diameter sanitary sewer service. The applicant's consulting mechanical engineer will determine the requirements of the proposed development and establish the service needs. Only one service will be permitted for this development. If required, the applicant will arrange for the removal and disconnection of the existing service and the installation of one new larger service at the applicants cost.

SCHEDULE		A
This forms part of application # Z20-0041		
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3. **Storm Drainage**

The developer must engage a consulting civil engineer to provide a storm water management plan for this site which meets the requirements of the City Subdivision Development and Servicing Bylaw 7900. The storm water management plan must also include provision of lot grading plans, minimum basement elevations (MBE), if applicable, and provision of a storm drainage service and recommendations for onsite drainage containment and disposal systems

4. **Road Improvements**

- (a) Lawson Ave has been upgraded to a urban standard however, the existing driveway let-down will need to be removed and new Curb, Gutter and sidewalk and BLVD will be constructed. Due to the likelihood of larger services for this development, the entire sidewalk fronting this development will need to be re-constructed.
- (b) The Laneway fronting this development will need to be constructed to a SS-C7 standard.

4. **Road Dedication and Subdivision Requirements**


- (a) Grant Statutory Rights of Way if required for utility services.
- (b) If any road dedication or closure affects lands encumbered by a Utility right-of-way (such as Hydro, TELUS, Gas, etc.) please obtain the approval of the utility. Any works required by the utility as a consequence of the road dedication or closure must be incorporated in the construction drawings submitted to the City's Development Manager.
- (c) 2.0m dedication to road right of way will be required on Lawson Ave
- (d) Laneway dedication is needed for this development. Due to safety reasons and access issue to this property, a minimum of *1.0m* will need to be dedicated as laneway right-of-way.

5. **Development Permit and Site Related Issues**

- a) Direct the roof drains into on-site rock pits or splash pads.
- b) The vehicle access to this site must be from a fully constructed 6.0m laneway. City of Kelowna will not allow access to Lawson Ave for this development.

6. **Electric Power and Telecommunication Services**

The electrical and telecommunication services to this building must be installed in an underground duct system, and the building must be connected by an underground service. It is the developer's responsibility to make a servicing application with the respective electric power, telephone and cable transmission companies to arrange for these services, which would be at the applicant's cost.

SCHEDULE		A
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7. **Design and Construction**

- (a) Design, construction supervision and inspection of all off-site civil works and site servicing must be performed by a Consulting Civil Engineer and all such work is subject to the approval of the City Engineer. Drawings must conform to City standards and requirements.
- (b) Engineering drawing submissions are to be in accordance with the City's "Engineering Drawing Submission Requirements" Policy. Please note the number of sets and drawings required for submissions.
- (c) Quality Control and Assurance Plans must be provided in accordance with the Subdivision, Development & Servicing Bylaw No. 7900 (refer to Part 5 and Schedule 3).
- (d) A "Consulting Engineering Confirmation Letter" (City document 'C') must be completed prior to submission of any designs.
- (e) Before any construction related to the requirements of this subdivision application commences, design drawings prepared by a professional engineer must be submitted to the City's Works & Utilities Department. The design drawings must first be "Issued for Construction" by the City Engineer. On examination of design drawings, it may be determined that rights-of-way are required for current or future needs.

8. **Servicing Agreement for Works and Services**

- (a) A Servicing Agreement is required for all works and services on City lands in accordance with the Subdivision, Development & Servicing Bylaw No. 7900. The applicant's Engineer, prior to preparation of Servicing Agreements, must provide adequate drawings and estimates for the required works. The Servicing Agreement must be in the form as described in Schedule 2 of the bylaw.
- (b) Part 3, "Security for Works and Services", of the Bylaw, describes the Bonding and Insurance requirements of the Owner. The liability limit is not to be less than \$5,000,000 and the City is to be named on the insurance policy as an additional insured.

9. **Administration Charge**

An administration charge will be assessed for processing of this application, review and approval of engineering designs and construction inspection. The administration charge is calculated as (3.5% of Total Off-Site Construction Cost plus GST).

9. **Survey, Monument and Iron Pins**

If any legal survey monuments or property iron pins are removed or disturbed during construction, the developer will be invoiced a flat sum of \$1,200.00 per incident to cover the cost of replacement and legal registration. Security bonding will not be released until restitution is made.

10. Geotechnical Report

As a requirement of this application the owner must provide a geotechnical report prepared by a Professional Engineer qualified in the field of hydro-geotechnical survey to address the following:

- (a) Area ground water characteristics.
- (b) Site suitability for development, unstable soils, etc.
- (c) Drill and / or excavate test holes on the site and install piezometers if necessary. Log test hole data to identify soil characteristics, identify areas of fill if any. Identify unacceptable fill material, analyse soil sulphate content, identify unsuitable underlying soils such as peat, etc. and make recommendations for remediation if necessary.
- (d) List extraordinary requirements that may be required to accommodate construction of roads and underground utilities as well as building foundation designs.
- (e) Additional geotechnical survey may be necessary for building foundations, etc.

11. Bonding and Levy Summary

- (a) Bonding
 - (i) Offsite improvements **TBD**

James Kay

 James Kay, P. Eng.
 Development Engineering Manager
 RO

SCHEDULE		A
This forms part of application		
# Z20-0041		
Planner Initials	AC	 City of Kelowna <small>DEVELOPMENT PLANNING</small>

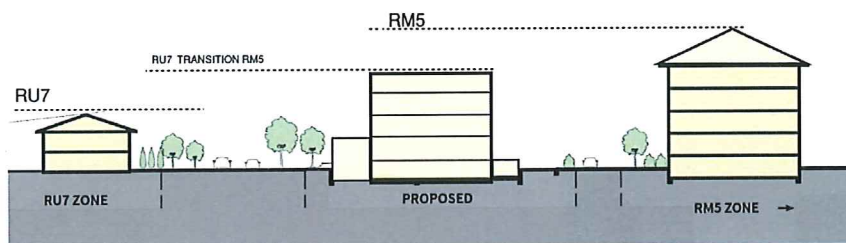


1.0 PROJECT DESCRIPTION

• The building site is located in the Cities Eastern End, close to the corner of Gordon Drive and Bernard Ave, both major traffic arteries. The site is flanked by adjacent existing single family homes to either side and to the rear. The project will be a Modern esthetic, multi-level apartment style building form. The units will be creatively expressed within the main structure, evoking a sense of class and style found in the upscale neighborhoods of many large North American cities. The layouts, features, and quality materials will define these units apart as being a positive contribution to the neighbourhood streetscape. The building is four stories in height with a low level parkade floor that is set lower into the ground 3'-3" (1.2m), while remaining above the high-water table designated by soils. Construction will consist of one floor of concrete construction for the parkade podium with wood-frame above, and will use finish materials and construction techniques appropriate to an upper-end residential offering. The proposed gross floor area is 13,393 sq. ft. which consists of approximately 9,875 sq. ft. gross living area making up the 16 units. The remaining 9,764 sq. ft. is for the basement parkade level to provide private storage and ancillary space. The required parking is satisfied by 18 private parking stalls (1 per unit and 2 visitor) in the parkade. Space has also been provided for class 1 bonus bicycle parking and refuse bins located within the property.

The project has an abundance of space on the podium that provides extensive landscaped open space. This will be used for private yard space for all the units. The circulation and surrounding green space garden planting areas will encourage outdoor social interaction.

Our project proposes to address the transition from RU7 developments on the North side of Lawson Avenue to RM5 & the MRM (Multiple Unit Residential (Medium Density) designation for the South & East side of the property, extending East to Gordon Drive. The OCP is supportive of rezoning the block between Lawson Avenue and Bernard Avenue which is essentially RM5. This permits a floor area ratio of up to 1.2 and building heights of up to 4.5 storeys. This project manages the challenge of an abrupt change in building form and character from RU7 to RM5. The lane to the West of the site helps soften the transition to the higher density RM5. Set Back to the rear yard and side yard variance set backs allow the building form and character to adjust in a way that acknowledges the existing built form context and allows the intent of to RM5 zoning bylaw to be met while maximizing the opportunity for architectural quality.



With pedestrian friendly ground-oriented units placed along Lawson Avenue the project also responds to the surrounding houses character, as well as any future projects that the RU7 zoning allows and encourages.

Beyond the benefits of the improved streetscape, the ground-oriented units form was designed to appeal to a local demographic that is under served with housing options. The majority of options in the Central City area are either older, traditional single detached homes or older condo developments.

It's our hope that this project will set precedent for future development along Gordon Street to continue this transitional format of housing.

VARIANCES REQUESTED

In addition to the proposed zoning change the following variances from the RM5 zoning are required to accommodate the format envisioned:

VARIANCES:

1. Parcel Size: 1400sm required/843sm proposed.
2. Parcel Width: 30m required/22.9m proposed.
3. Rear yard requirements for the parkade, building areas (BA) under 2.5 storeys and areas over 2.5 storeys are all exceeded.
4. East Side Yard for BA under 2.5 storeys and over 2.5 storeys.
5. West Side Yard for BA over 2.5 Storey.
6. Parking ratio. See table on A2.0.
7. Parking – Accessible Van Stall. See table on A2.0.

Site Coverage: The RM5 zone permits an increase in FAR from 1.1 to 1.2 if all parking is screened from view. This project provides all the required parking within a below grade parking structure screened from view. The parking structure projects above the natural grade by a half storey, similar to the basement of the single-family homes in the area. This allows the building to present a 1 ½ storey façade to the street, with the required setback to the second, third and fourth floor breaking up the building mass. This creates a gentle transition from the two storey massing of the RU7 zone across the street and provides a pedestrian friendly interface. The parking access ramp, utility, and refuse areas at the rear of the building will be similar to that of any future RM5 development.

Utilizing the area of the parkade podium for greenspace provides ample opportunity for soft landscaping. The growing medium for the grass and planters will retain significant amounts of rainwater, and once saturated, the potential of on-site storage tanks will further reduce the infiltration rate into municipal storm drains. Extensive exterior flatwork (drive lanes, sidewalks) will be of permeable construction to accelerate absorption into the natural grade and further softens the landscape.

The alternating rhythm of the third-floor terraces allows more natural light to reach the interiors of the units.

The rear yard is primarily service oriented, providing access to the parkade, access to refuse, and bicycle parking. Our proposed setback takes the distance that's usually intended as a minimum rear yard and shifts it to the greenspaces to provide a more desirable outdoor living space.

Having the rear windows and decks looking over the greenspace has the benefits of additional resident safety and security. The immediate presence and visibility from windows will help discourage undesirable behaviour.

SITE and parking ACCESS

All of the project parking is located under the building in a covered and secured parkade. The parkade is accessed by ramp located off the side lane. There is one accessible parking stall located in the underground parkade. Access from the private garage to the building is facilitated by the elevator and central stair core.

Access to the electrical/mechanical room and refuse and bicycle areas are provided off the rear lane.

The front facade along Lawson Avenue has ground oriented access to the street similar to other recently built developments. All residences have access to the back communal greenspace, which is accessed through a handicapped accessible zone or the amenity room located in the building off the lobby.

2.0 URBAN CONNECTIVITY

The project is located within close proximity to Downtown and the Clement Cultural District, allowing pedestrians and cyclists easy access to all the shopping, recreational opportunities and cultural events without the need to take a vehicle. Bernard Avenue is always going to be a major Corridor for pedestrian, cycling & automobiles to downtown and to the east end of the City. Transit is available on Bernard and on Gordon. When going further from the immediate area, and a car is the only option, Bernard Ave & Gordon street offer excellent connectivity to the rest of the City and the region.

3.0 SUSTAINABILITY

The use of naturally sourced materials is used to a large extent, and thereby reduces the carbon foot print as much as possible. Envelope details that prevent water and moisture ingress while still allowing the assemblies to dry are being incorporated. Minimizing thermal bridging combined with appropriate continuous insulation will reduce heating and cooling loads. South and west facing windows will be specified to have appropriate shading and glazing coefficients to utilize the summer sun by blocking the heat while still allowing the winter sun to penetrate, reducing cooling and heating loads in the summer and winter seasons respectively. Providing windows in all of the occupied spaces allows natural day lighting and views reducing energy consumption required for illumination. Operable windows on opposite sides allow for cross ventilation and give residents the option to naturally ventilate the units reducing the demand for mechanical ventilation to provide fresh air.

Other sustainable measures will include drought resistant landscaping and a geo-exchange system for internal climate management. Eco-friendly waste receptacles and electric charging stations will be incorporated into the parking structure and lane development.

4.0 CRIME PREVENTION

The intentions of CPTED have been addressed with well-maintained entrances and frontages that promote pride in ownership amongst the residents, and with the reduced setback increasing the buildings presence. The sight lines of the occupants from decks and windows will discourage vandalism and crime.

Site lighting along Lawson Avenue, the side lane, and pathways will be balanced to provide enough illumination to ensure there are no high contrast areas that could conceal potential offenders, but not so much that the site is excessively contributing to local light pollution.

5.0 LANDSCAPING

The Owner has selected Outland Design Landscape Architecture to create an interesting and aesthetically pleasing landscape solution that responds to the architectural style of the project. This will also compliment the character of the surrounding neighborhood. A number of annual and perennial shrubs have been selected for along the planters throughout the site, and in special groupings in the courtyard.

Trees will be planted in the front and rear yards, and also in the greenspaces. Given enough time to mature, the trees will help the project blend with the existing neighbourhoods numerous established and mature trees lining Lawson Avenue and in back yards.



The landscape concept for the setback areas, will provide a visually exciting and high volume of green space. If viewed from above, there would appear to be significantly more "green" than building.

6.0 SUMMARY

Bluegreen Architectures design team feel that the combination of a modern design esthetic coupled with pedestrian friendly landscape features and contemporary building materials will provide for a very functional and highly desirable residential neighbourhood project.

By bridging the RU7 zone on Lawson Avenue and the future RM5 zone that's supported by OCP with appropriate transitional massing, it's our intent that this project will set precedent for future development in the area to follow a similar form.

We look forward to your support for all this project brings to our community, and this unique opportunity to create a bridge between RU7 or RM5 zones.

Respectfully submitted,

Signature

Mark Aquilon, Architect AIBC,
Associate, M.Arch., B.A. BEC
BLUEGREEN ARCHITECTURE INC
www.bluegreenarchitecture.com
100 – 1353 Ellis Street, Kelowna, BC V1Y 1Z9
P - 236.420.3550 ex 211

ATTACHMENT		B
This forms part of application		
# Z20-0041		
Planner Initials	AC	 City of Kelowna DEVELOPMENT PLANNING

April 13, 2020

1021 Lawson Avenue
C/o BlueGreen Architecture
#100-1353 Ellis Street
Kelowna, BC V1Y 1Z9
Attn: Aaron Whalen, Building Designer
Tel: (236) 420-3550 ex. 204
Email: awhalen@bluegreenarch.com



Re: 1021 Lawson Avenue – Preliminary Cost Estimate for Bonding

Dear Aaron:

Please be advised of the following preliminary cost estimate for bonding of the proposed landscape works shown in the 1021 Lawson Avenue conceptual landscape plan dated 20.04.13;

- On-site Improvements: 238 square metres (2,562 square feet) = \$38,530.50
- Off-site Improvements: 11 square metres (118 square feet) of = \$1,079.00

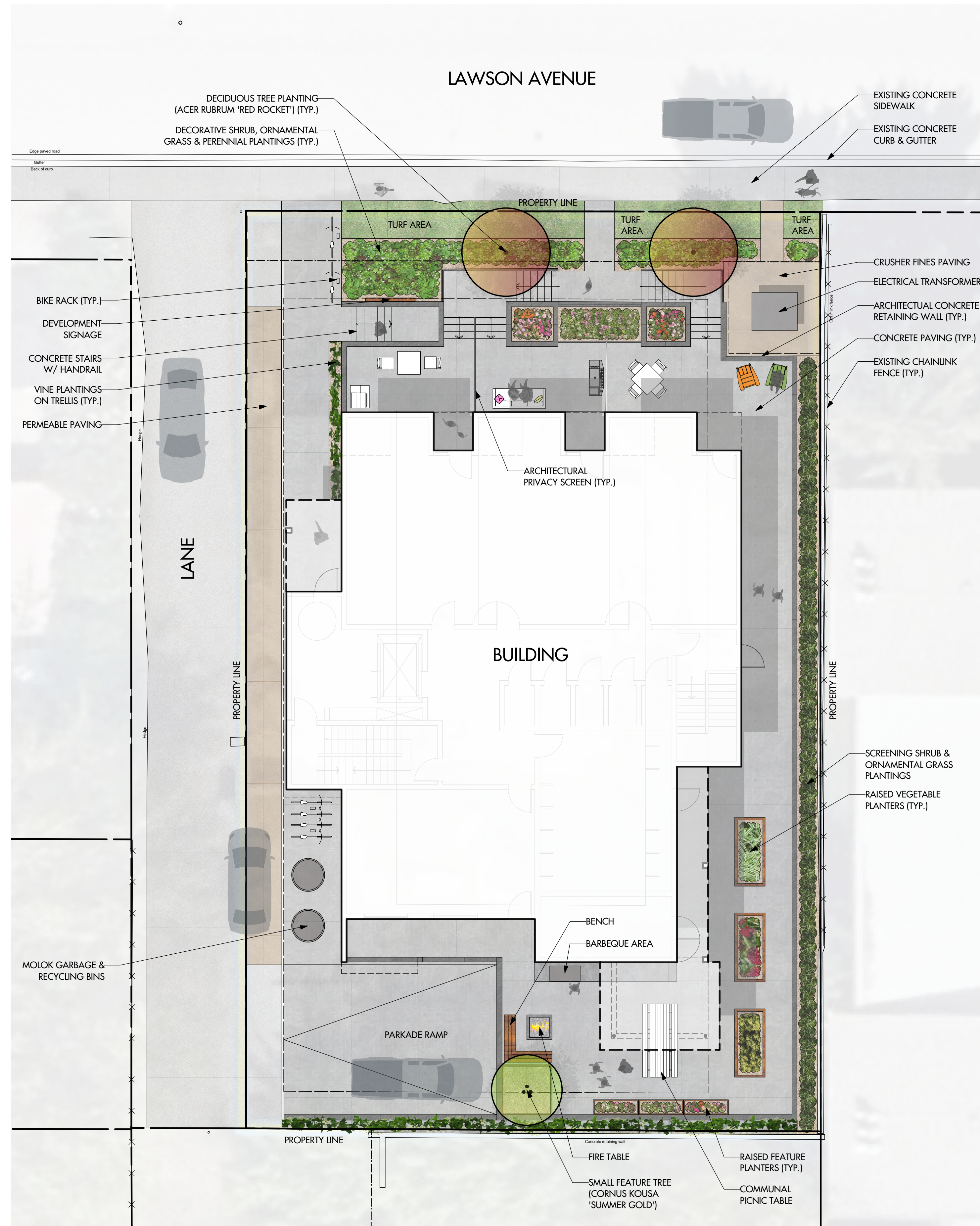
This preliminary cost estimate is inclusive of hardscapes, site furnishings, trees, shrubs, turf, mulch, topsoil & irrigation.

You will be required to submit a performance bond to the City of Kelowna in the amount of 125% of the preliminary cost estimate. Please do not hesitate to contact me with any questions about the landscape plan.

Best regards,



Fiona Barton, MBCSLA, CSLA
as per
Outland Design Landscape Architecture



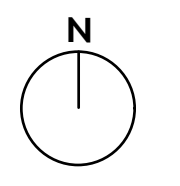
ATTACHMENT B
This forms part of application # Z20-0041
Planner Initials AC
City of Kelowna DEVELOPMENT PLANNING

NOTES

- 1. PLANT MATERIAL AND CONSTRUCTION METHODS SHALL MEET OR EXCEED CNLA STANDARDS.
- 2. ALL OFFSITE LANDSCAPE WORKS TO MEET CITY OF KELOWNA BYLAW 7900 STANDARDS.
- 3. ALL SOFT LANDSCAPE AREAS SHALL BE WATERED BY A FULLY AUTOMATIC TIMED UNDERGROUND IRRIGATION SYSTEM.
- 4. TREE AND SHRUB BEDS TO BE DRESSED IN A MINIMUM 50mm DEPTH MOUNTAIN ASH ROCK MULCH, AS SHOWN IN PLANS. DO NOT PLACE WEED MAT UNDERNEATH TREE AND SHRUB BEDS.
- 5. TREE AND SHRUB BEDS TO RECEIVE A MINIMUM 300mm DEPTH TOPSOIL PLACEMENT.
- 6. TURF AREAS FROM SOD SHALL BE NO. 1 GRADE GROWN FROM CERTIFIED SEED OF IMPROVED CULTIVARS REGISTERED FOR SALE IN B.C. AND SHALL BE TOLERANT OF DROUGHT CONDITIONS. A MINIMUM OF 150mm DEPTH OF GROWING MEDIUM IS REQUIRED BENEATH TURF AREAS. TURF AREAS SHALL MEET EXISTING GRADES AND HARD SURFACES FLUSH.
- 7. SITE GRADING AND DRAINAGE WILL ENSURE THAT ALL STRUCTURES HAVE POSITIVE DRAINAGE, AND THAT NO WATER OR LOOSE IMPEDIMENTS WILL BE DISCHARGED FROM THE LOT ONTO ADJACENT PUBLIC, COMMON, OR PRIVATE PROPERTIES.

PLANT LIST

BOTANICAL NAME	COMMON NAME	QTY	SIZE/SPACING & REMARKS
TREES			
ACER RUBRUM 'RED ROCKET'	RED ROCKET MAPLE	2	6cm CAL.
CORNUS KOUSA 'SUMMER GOLD'	SUMMER GOLD DOGWOOD	1	6cm CAL.
SHRUBS			
HYDRANGEA SERRATA 'TUFF STUFF AH-HA'	REBLOOMING MOUNTAIN HYDRANGEA	5	#02 CONT. /1.5M O.C. SPACING
JUNIPERUS VIRGINIANA 'BLUE ARROW'	BLUE ARROW JUNIPER	8	MIN. 1.5m HT./1.2M O.C. SPACING
PICEA ABIES NIDIFORMIS	NEST SPRUCE	2	#02 CONT. /2.0M O.C. SPACING
SPIREA BULMALDA 'ANTHONY WATERER'	ANTHONY WATERER SPIREA	5	#02 CONT. /1.5M O.C. SPACING
PERENNIALS, GRASSES & VINES			
ATHYRIUM FILIX-FEMINA	LADY FERN	6	#01 CONT. /1.2M O.C. SPACING
CALAMAGROSTIS ACUTIFLORA 'KARL FOERSTER'	FOERSTER'S FEATHER REED GRASS	6	#01 CONT. /1.2M O.C. SPACING
CLEMATIS JACKMANII	JACKMAN'S CLEMATIS	12	#01 CONT. /2.0M O.C. SPACING
COREOPSIS VERTICILLATA 'MOONBEAM'	MOONBEAM THREADLEAF COREOPSIS	4	#01 CONT. /1.0M O.C. SPACING
EUPATORIUM DUBIUM 'LITTLE JOE'	LITTLE JOE DWARF JOE PYE	4	#01 CONT. /1.8M O.C. SPACING
LAVANDULA ANGUSTIFOLIA 'HIDECOTE'	HIDECOTE ENGLISH LAVENDER	5	#01 CONT. /1.0M O.C. SPACING
SCHIZACHYRIUM SCOPARIUM 'THE BLUES'	LITTLE BLUESTEM	4	#01 CONT. /1.5M O.C. SPACING



PROJECT TITLE
1021 LAWSON AVENUE

Kelowna, BC
DRAWING TITLE

CONCEPTUAL LANDSCAPE PLAN

ISSUED FOR / REVISION

NO.	DATE	REVISION
1	20.03.31	Review
2	20.04.13	Development Permit
3		
4		
5		

PROJECT NO: 20035
DESIGN BY: KM
DRAWN BY: KM
CHECKED BY: FB
DATE: APR. 13, 2020
SCALE: 1:100
PAGE SIZE: 24"x36"

SEAL



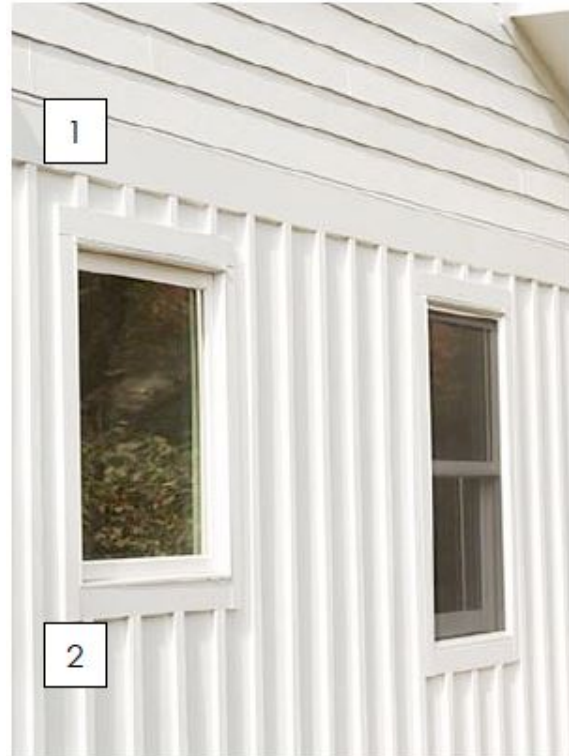
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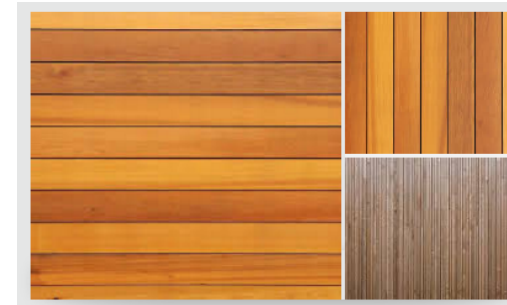
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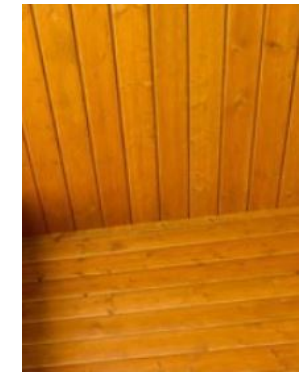
ALUMINUM STOREFRONT GLAZING SYS-



FIBER CEMENT
WOLF GREY HDC



EXTERIOR CLADDING WOODTONE



SOFFIT PERFERATED WOODTONE



DOUGLAS FIR ACCENTS

ATTACHMENT B

This forms part of application
Z20-0041

Planner Initials **AC**



ARCHITECTURALALLY EXPOSED CONCRETE



CEMENT PANEL SYSTEM
DARK CHARCOL



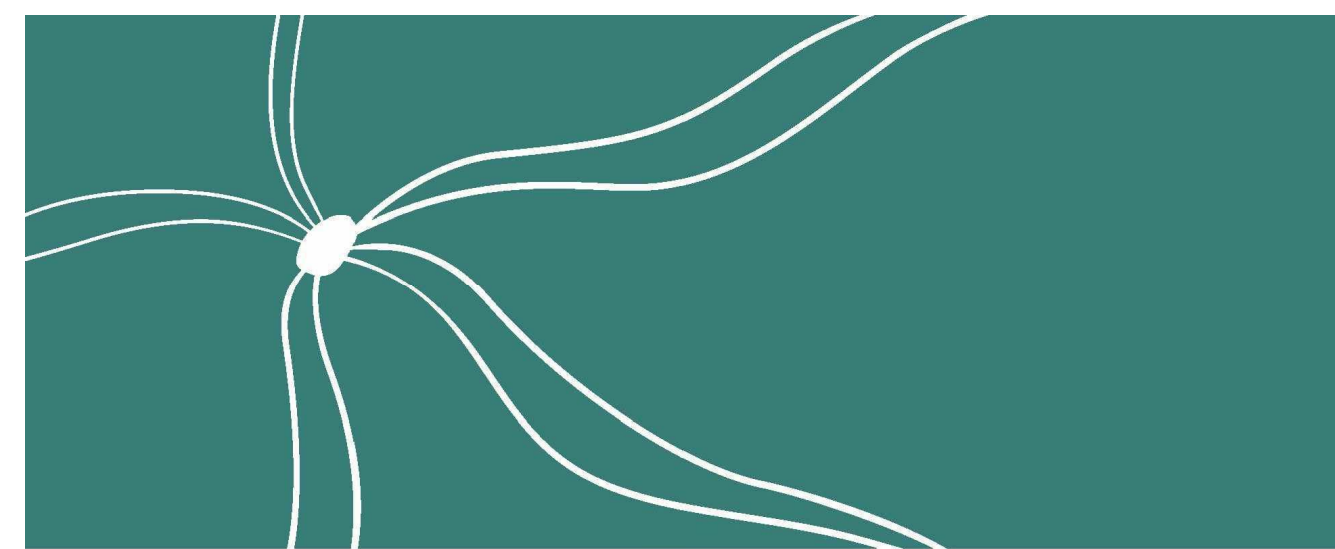
VINLY, METAL CLAD WINDOW SYSTEM



RAILING SYSTEM



PERMIABLE PAVING



**BLUEGREEN
ARCHITECTURE INC.**

ARCHITECTURAL DRAWING LIST

- A0.0 COVER SHEET & DRAWING LIST
- A1.0 LEGAL SURVEY & AERIAL PHOTOS
- A1.1 SITE PLAN , BUILDING & ZONING INFORMATION
- A2.0-A2.2 FLOOR PLANS
- A3.0-A3.1 BUILDING ELEVATIONS
- A4.0-A4.1 BUILDING SECTIONS

LAWSON AVE RESIDENTIAL DEVELOPMENT

ISSUED FOR DEVELOPMENT PERMIT - 2020.04.08

CITY OF KELOWNA, BRITISH COLUMBIA



Disclaimer: This image is a conceptual rendering and is proposed for illustrative purposes only. Some elements including but not limited to the finish colours, proposed/existing landscaping may vary to that shown.

ARCHITECT :

Bluegreen Architecture Inc.
#100 - 1353 Ellis Street
Kelowna, BC,
V1Y 6Y9

Contact:

Aaron Whalen, Building Designer
awhalen@bluegreenarch.com

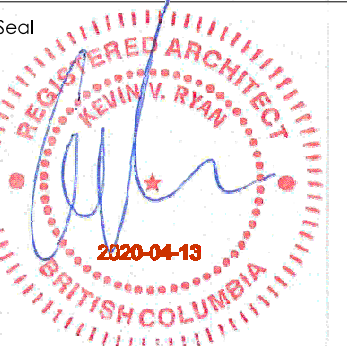
Kevin Ryan, Architect
kryan@bluegreenarch.com

www.bluegreenarchitecture.com

LANDSCAPE ARCHITECT

Outland Design Landscape Architecture
590 K.L.O. Road, Suite 303
Kelowna, BC
V1Y 7S2

**BLUEGREEN
ARCHITECTURE INC.**
#100 - 1353 Ellis Street,
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www.bluegreenarchitecture.com
 KAMLOOPS
 KELOWNA



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Consultants

NO.	DATE	RECORD OF REVISIONS

1	20.04.08	ISSUED FOR DEVELOPMENT PERMIT
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NO.	DATE	RECORD OF REVISIONS

Project
**LAWSON AVE
RESIDENTIAL
DEVELOPMENT**
1021 LAWSON AVE
KELOWNA, BC

Sheet Title
COVER SHEET

Job Number 20.781
Date 2020.04.08
Scale
Revision Number 6
Drawing Number

ATTACHMENT B
This forms part of application # Z20-0041
Planner Initials AC
City of Kelowna DEVELOPMENT PLANNING

A0.0₂₈



1 SOUTH BUILDING ELEVATION
A3.0 3/16"=1'-0"



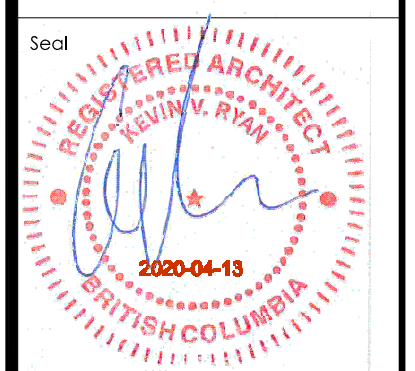
2 EAST BUILDING ELEVATION
A3.0 3/16"=1'-0"

ATTACHMENT B
This forms part of application # Z20-0041
Planner Initials AC
City of Kelowna
DEVELOPMENT PLANNING

EXTERIOR FINISH SCHEME: EFS1

1	ARCHITECTURALLY EXPOSED CONCRETE TYPE: MEDIUM DENSITY FORM FINISH COLOUR: NATURAL CONC.
2	EXTERIOR ACCENT FLASHING/TRIM COLOUR COLOUR: CATFISH BLACK-HDC
3	FIBRE CEMENT BOARD & BATTEN - FIELD COLOUR #1 COLOUR: ARTIST GREY-HDC
4	FIBRE CEMENT BOARD & BATTEN - FIELD COLOUR #2 COLOUR: WOLF GREY-HDC
5	PRE-FINISHED METAL - FIELD COLOUR #3 COLOUR: AS SHOWN
6	FIBRE CEMENT PANEL - FIELD COLOUR #4 COLOUR: DARK CHARCOAL NOTE: BLACK EASTTRIM (OR EQUAL)
7	EXTERIOR CLADDING - 'WOOD' LOOK COLOUR: RIVER ROCK (WOODSTONE)
8	PRE-FINISHED METAL GUARDS (PICKETS) COLOUR: BLACK
9	METAL CLAD VINYL WINDOW/DOOR EXT. COLOUR: CHARCOAL
10	ALUMINUM STOREFRONT COLOUR: CHARCOAL
11	MASS TIMBER FRAMING COLOUR: STAINED TO MATCH 7
12	RSS STEEL POST - SIZE AS NOTED COLOUR: CATFISH BLACK

BLUEGREEN ARCHITECTURE INC.
#100 - 1353 8th Street,
Kelowna, BC V1Y 1Z9
p: 236.420.3550
www.bluegreenarchitecture.com



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Consultants

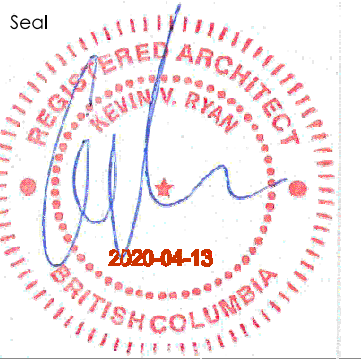
NO.	DATE	RECORD OF REVISIONS
1	20.04.08	ISSUED FOR DEVELOPMENT PERMIT
NO.	DATE	RECORD OF ISSUES

Project
LAWSON AVE
RESIDENTIAL DEVELOPMENT
1021 LAWSON AVE
KELOWNA, BC

Sheet Title
BUILDING ELEVATIONS

Job Number 20.781
Date 2020.04.08
Scale AS SHOWN
Revision Number 6
Drawing Number

A3.0₃₀



These drawings are instruments of service, and the exclusive property of the architect and cannot be reproduced or used for construction without the architect's prior written permission.
 This drawing must not be scaled. The general contractor shall verify all dimensions, datums and levels prior to commencement of work. Any errors or omissions are to be reported immediately to the architect.

Consultants

EXTERIOR FINISH SCHEME: EFS1

- ① ARCHITECTURALLY EXPOSED CONCRETE
 TYPE: MEDIUM DENSITY FORM FINISH
 COLOUR: NATURAL CONC.
- ② EXTERIOR ACCENT FLASHING/TRIM COLOUR
 COLOUR: CATFISH BLACK HDC
- ③ FIBRE CEMENT BOARD & BATTEN - FIELD COLOUR #1
 COLOUR: ARTIST GREY HDC
- ④ FIBRE CEMENT BOARD & BATTEN - FIELD COLOUR #2
 COLOUR: WOLF GREY HDC
- ⑤ PRE-FINISHED METAL - FIELD COLOUR #3
 COLOUR: AS SHOWN
- ⑥ FIBRE CEMENT PANEL - FIELD COLOUR #4
 COLOUR: DARK CHARCOAL
 NOTE: BLACK EASTYRIM [OR EQUAL]
- ⑦ EXTERIOR CLADDING - "WOOD" LOOK
 COLOUR: RIVER ROCK (WOODDIONE)
- ⑧ PRE-FINISHED METAL GUARDS (PICKETS)
 COLOUR: BLACK
- ⑨ METAL CLAD VINYL WINDOW/DOOR
 EXT. COLOUR: CHARCOAL
- ⑩ ALUMINIUM STOREFRONT
 COLOUR: CHARCOAL
- ⑪ MASS TIMBER FRAMING
 COLOUR: STAINED TO MATCH ⑦
- ⑫ RSS STEEL POST - SIZE AS NOTED
 COLOUR: CATFISH BLACK

ATTACHMENT B
 This forms part of application # Z20-0041
 City of Kelowna
 DEVELOPMENT PLANNING
 Planner Initials: AC



1 SOUTH BUILDING ELEVATION
 A3.1 3/16"=1'-0"



2 EAST BUILDING ELEVATION
 A3.1 3/16"=1'-0"

NO.	DATE	RECORD OF REVISIONS

1	20.04.08	ISSUED FOR DEVELOPMENT PERMIT
---	----------	-------------------------------

NO.	DATE	RECORD OF ISSUES

Project
LAWSON AVE RESIDENTIAL DEVELOPMENT
 1021 LAWSON AVE
 KELOWNA, BC

Sheet Title
BUILDING ELEVATIONS

Job Number 20.781

Date 2020.04.08

Scale AS SHOWN

Revision Number 6

Drawing Number



Z20-0041 1021 Lawson Ave

Rezoning Application



Proposal

- ▶ To consider a Rezoning application to rezone the subject property from RU6 to RM5 zone to facilitate an apartment building.

Development Process

May 13th 2020

Development Application Submitted

Staff Review & Circulation

June 15th 2020

Public Notification Received

July 13, 2020

Initial Consideration

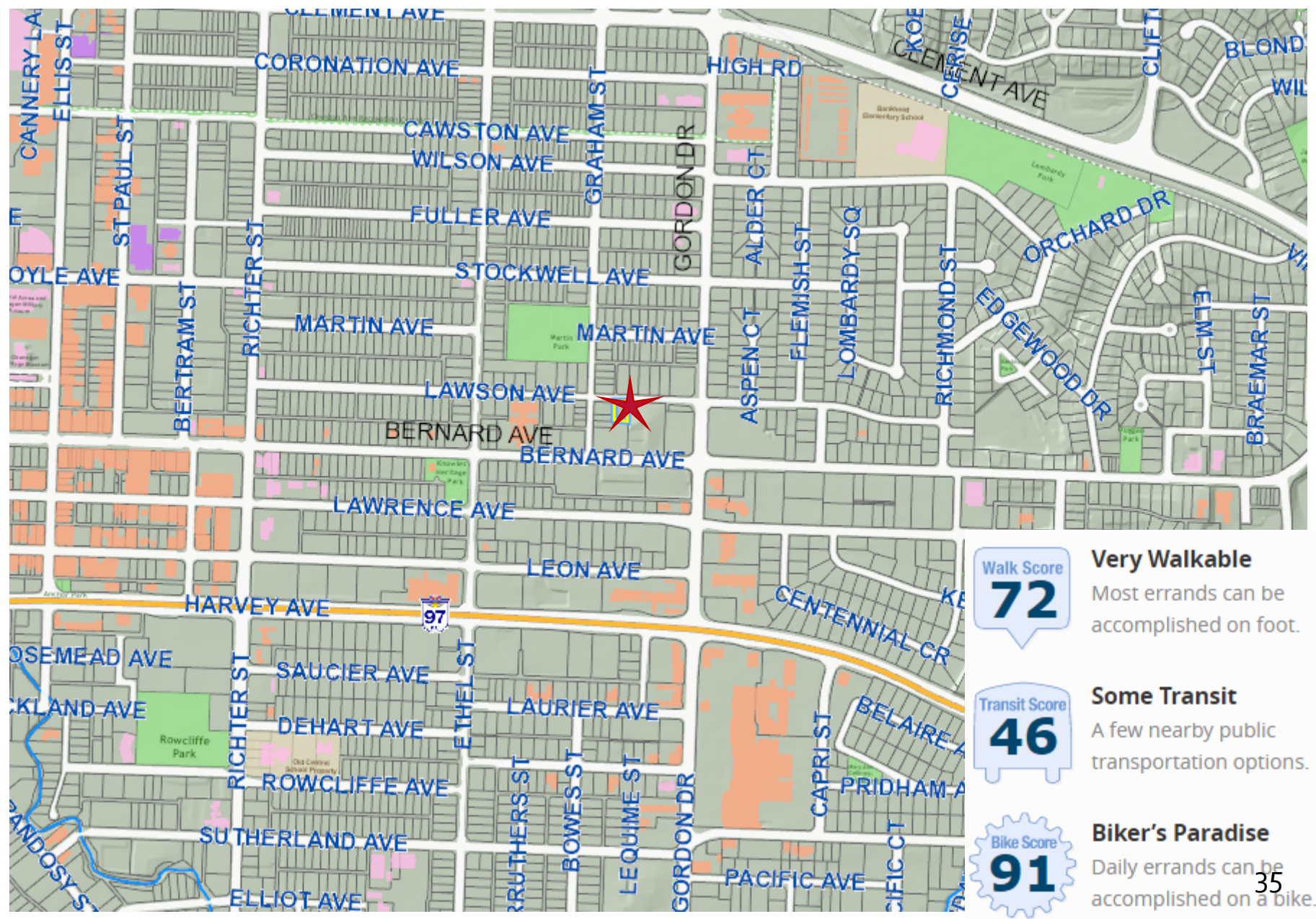
Public Hearing
Second & Third Readings

Final Reading

Building Permit

Council Approvals

Context Map



Walk Score **72**
Very Walkable
Most errands can be accomplished on foot.

Transit Score **46**
Some Transit
A few nearby public transportation options.

Bike Score **91**
Biker's Paradise
Daily errands can be accomplished on a bike.

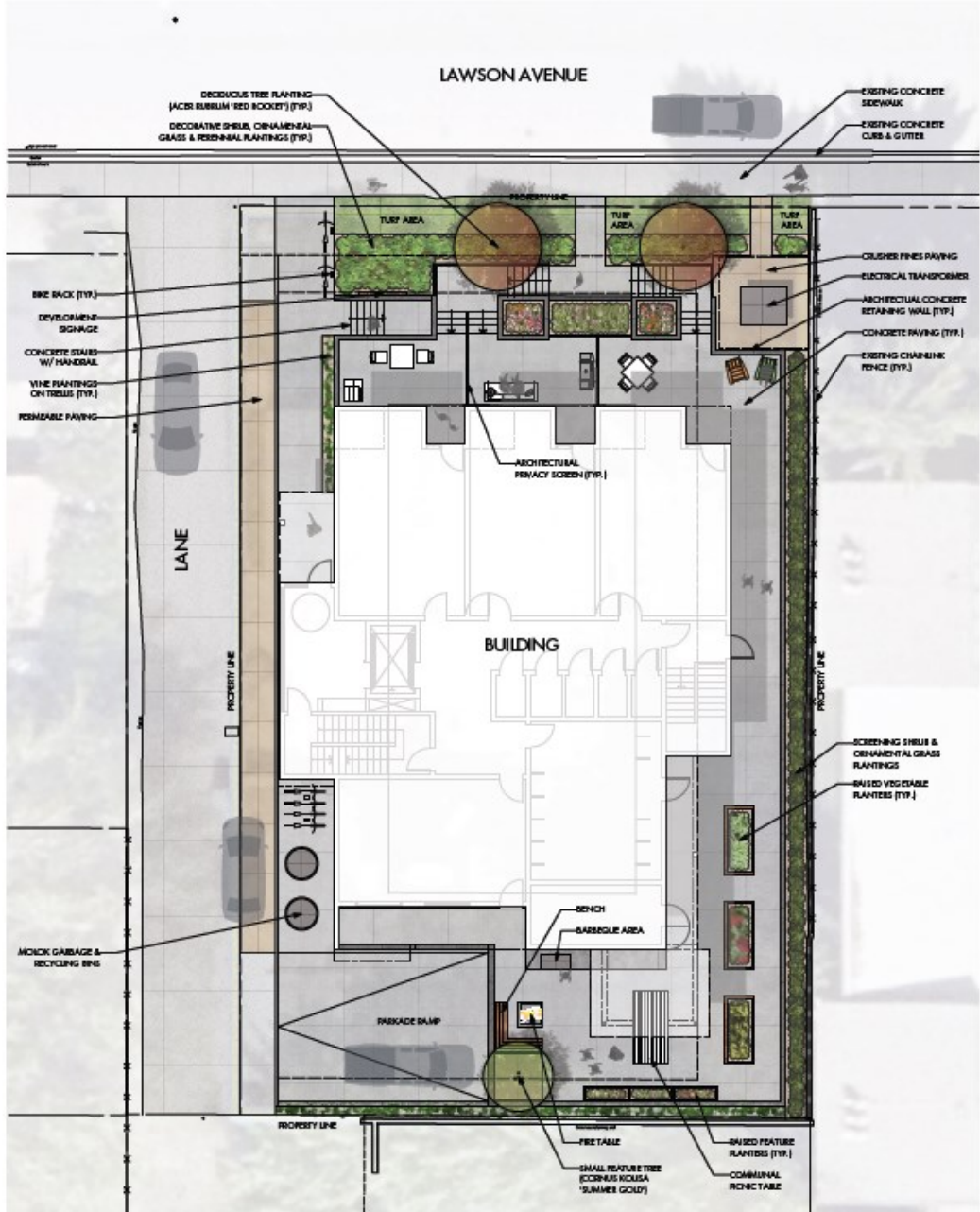
Subject Property Map





FOR SALE 1021 LAWSON AVENUE
DEVELOPMENT OPPORTUNITY
RU 6 ZONING
LANEWAY ACCESS
FUTURE LAND USE MRM ZONING
250.862.7675 StoneSisters.com
STONE SISTERS
RE/MAX Kelowna

Conceptual Site Plan



Rendering



Development Policy

- ▶ Meets the intent of Official Community Plan Urban Infill Policies:
 - ▶ Within Permanent Growth Boundary
 - ▶ Complete Communities
 - ▶ Sensitive Infill
 - ▶ Compact Urban Form
- ▶ Consistent with Future Land Use **MRM – Multiple Residential (Medium Density)**
- ▶ Currently 5 proposed variances
 - ▶ 3 related to setbacks
 - ▶ 2 related to parking stall sizes

Staff Recommendation

- ▶ Staff recommend **support** of the proposed rezoning
 - ▶ Meets the intent of the Official Community Plan
 - ▶ Urban Infill Policies
 - ▶ Appropriate location for adding residential density
- ▶ Recommend the Bylaw be forwarded to Public Hearing



Conclusion of Staff Remarks

CITY OF KELOWNA
BYLAW NO. 12065
Z20-0041 – 1021 Lawson Avenue

A bylaw to amend the "City of Kelowna Zoning Bylaw No. 8000".

The Municipal Council of the City of Kelowna, in open meeting assembled, enacts as follows:

1. THAT City of Kelowna Zoning Bylaw No. 8000 be amended by changing the zoning classification of Lot 2, District Lot 138, ODYD, Plan 5065 located at Lawson Avenue, Kelowna, BC from the RU6 – Two Dwelling Housing zone to the RM5 – Medium Density Multiple Housing zone.
2. This bylaw shall come into full force and effect and is binding on all persons as and from the date of adoption.

Read a first time by the Municipal Council this

Considered at a Public Hearing on the

Read a second and third time by the Municipal Council this

Approved under the Transportation Act this

(Approving Officer – Ministry of Transportation)

Adopted by the Municipal Council of the City of Kelowna this

Mayor

City Clerk

REPORT TO COUNCIL



Date: August 10, 2020

To: Council

From: City Manager

Department: Development Planning

Application: Z20-0039

Owner: Kevin L. Fierbach & Jacqueline A. Fierbach

Address: 374 Park Ave.

Applicant: Birte Decloux; Urban Options Planning and Permits

Subject: Rezoning Application

Existing OCP Designation: S2RES – Single / Two Unit Residential

Existing Zone: RU1 – Large Lot Housing

Proposed Zone: RU6 – Two Dwelling Housing

1.0 Recommendation

THAT Rezoning Application No. Z20-0039 to amend the City of Kelowna Zoning Bylaw No. 8000 by changing the zoning classification of Lot 4 District Lot 14 ODYD Plan 482, located at 374 Park Ave., Kelowna, BC from the RU1 – Large Lot Housing zone to the RU6 – Two Dwelling Housing zone, be considered by Council;

AND THAT the Rezoning Bylaw be forwarded to a Public Hearing for further consideration;

AND THAT final adoption of the Rezoning Bylaw be considered subsequent to the outstanding conditions of approval as set out in Schedule "A" attached to the Report from the Development Planning Department dated August 10, 2020;

AND THAT final adoption of the Rezoning Bylaw be considered subsequent to the approval of the Ministry of Transportation and Infrastructure;

AND FURTHER THAT final adoption of the Rezoning Bylaw be considered in conjunction with Council's consideration of a Heritage Alteration Permit and Development Variance Permit for the subject property.

2.0 Purpose

To rezone the subject property from the RU1 – Large Lot Housing zone to the RU6 – Two Dwelling Housing zone to facilitate the development of a second single family home and detached garage.

3.0 Development Planning

Development Planning supports the proposal to rezone the property to RU6 – Two Dwelling Housing to facilitate the development of a second single family home and detached garage.

To begin with, the property is in the City's Heritage Conservation Area. The proposal is to retain the existing heritage home on the lot and add a second single family home and detached garage at the back of the property.

The lot is an area of the city with existing infrastructure (including roads, sewer and water) that is able to accommodate a moderate amount of infill. Also, the lot is in relatively close proximity to the city's downtown urban centre with its associated amenities and destinations. As such, the lot is in an appropriate location to accommodate a moderate amount of infill, and the proposal does advance the Official Community Plan (OCP) goal of promoting a compact urban form. Accordingly, the lot has a future land use designation of S2RES in the OCP, which does support the RU6 zone. For these reasons, Staff support the proposed rezoning.

4.0 Proposal

4.1 Project Description

The applicant proposes to rezone the property to RU6 – Two Dwelling Housing to facilitate the development of a second single family home and detached garage. The proposal is to keep the existing heritage home on the property and add a second single family home and detached garage at the back of the lot. The second home would have car access from Knox Cr. through an existing access easement on the adjacent property to the north.

The proposed development will yet require a Heritage Alteration Permit for amending a lot in the City's Heritage Conservation Area. Staff are tracking one variance at this stage, related to reducing the minimum distance between an accessory building (the proposed detached garage) and a principal dwelling (the proposed single family home).

The Heritage Advisory Committee (HAC) was not in operations at the time of application; however, the applicant was required to provide a Heritage Review to help determine whether the proposed development is consistent with the City's Heritage Conservation Area Guidelines. That said, specifics related to heritage design will not be addressed formally until the Heritage Alteration Permit is considered.

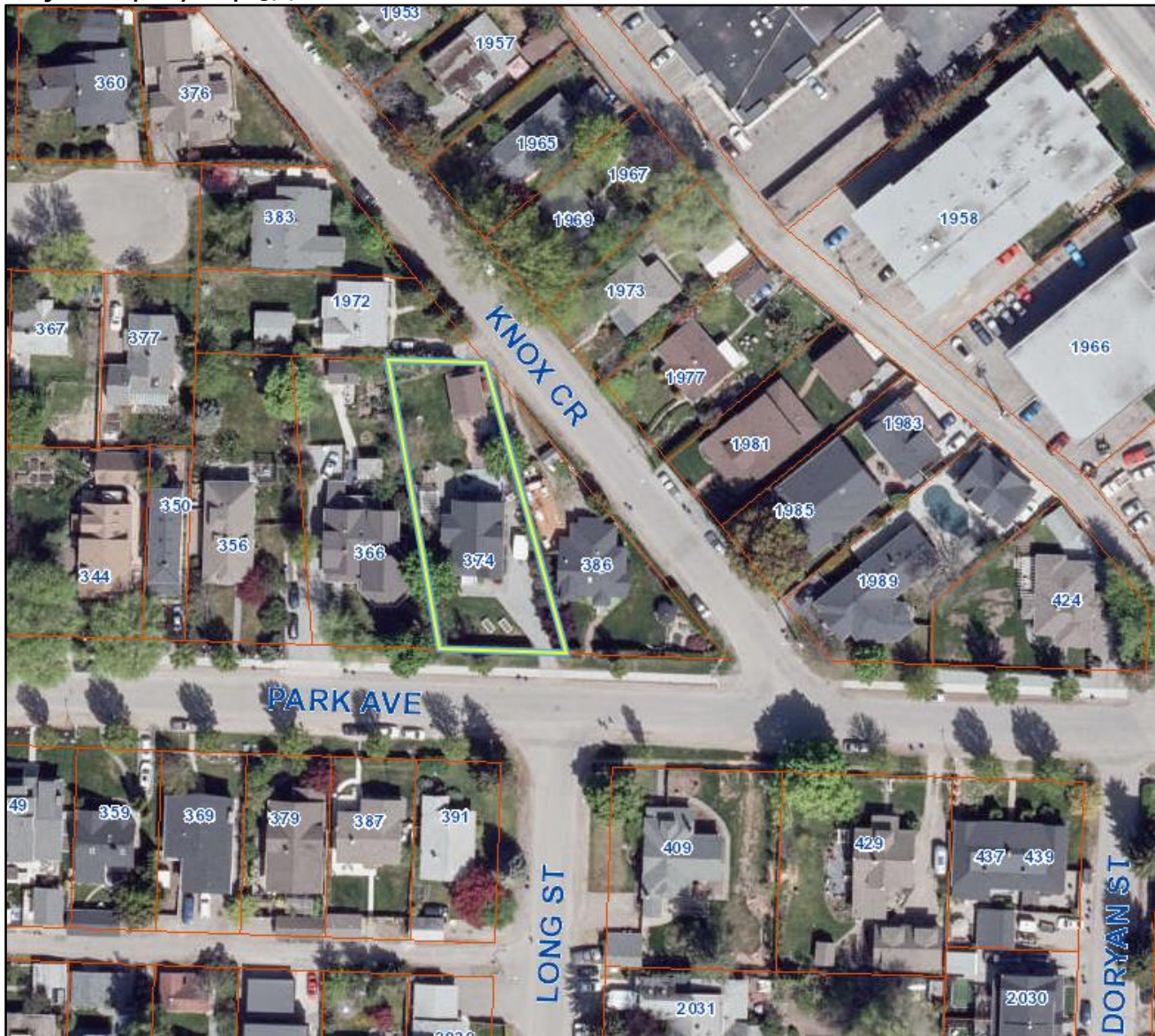
4.2 Site Context

The property is in the City's Heritage Conservation Area in the Central City Sector and is in close proximity to the City Centre Urban Centre (within 200m). As such, the property has good access to the downtown core, with its amenities and destinations. Accordingly, the lot has a WalkScore of 73, where 'most errands can be accomplished on foot'.

Adjacent land uses are as follows:

Orientation	Zoning	Land Use
North	RU1 – Large Lot Housing	Single Family Housing
East	RU1 – Large Lot Housing	Single Family Housing
South	RU1 – Large Lot Housing	Single Family Housing
West	RU1 – Large Lot Housing	Single Family Housing

Subject Property Map: 374 Park Ave.



5.0 Current Development Policies

5.1 Kelowna Official Community Plan (OCP)

Chapter 5: Development Process

Objective 5.3 Focus development to designated growth areas.

Policy .2 **Compact Urban Form.** Develop a compact urban form that maximizes the use of existing infrastructure and contributes to energy efficient settlement patterns.

Chapter 16: Heritage Conservation Area Guidelines

JUSTIFICATION: The purpose of the Heritage Conservation Area is to sustain the historical legacy of the neighbourhoods shown on Map 9.1. The special qualities of these neighbourhoods will be preserved by ensuring changes complement the established streetscape and maintain the integrity of traditional architectural forms.

6.0 Technical Comments

6.1 Development Engineering Department

- See Schedule A

7.0 Application Chronology

Date of Application Received: May 8, 2020
Date Public Consultation Completed: May 26, 2020

Heritage Advisory Committee: N/A

Report prepared by: Aaron Thibeault, Planner II

Reviewed by: Terry Barton, Development Planning Department Manager

Approved for Inclusion: Ryan Smith, Divisional Director, Planning & Development Services

Attachments:

Schedule A: Development Engineering Memo


Attachment A: Applicant Rationale

Attachment B: Conceptual Drawing Package

CITY OF KELOWNA

MEMORANDUM

Date: May 21, 2020
File No.: Z20-0039
To: Community Planning (AT)
From: Development Engineering Manager (JK)
Subject: 374 Park Ave.

SCHEDULE	A
This forms part of application # Z20-0039	
Planner Initials	AT
 City of Kelowna COMMUNITY PLANNING	
RU1 to RU6	

The Development Engineering Department has the following comments and requirements associated with this application to rezone the subject property from RU1 to RU6. The road and utility upgrading requirements outlined in this report will be a requirement of this development. The Development Engineering Technician for this project is Aaron Sangster.

1. Domestic Water and Fire Protection

- a) The subject property is currently serviced with a 19mm water service. One metered water service will be required for the development. The disconnection of the existing small diameter water services and the tie-in of a larger service is the developer's responsibility. You can engage an engineer and contractor to manage the work on your behalf or it can be provided by City forces at the developer's expense. If you chose to have it completed by City forces, you will be required to sign a Third-Party Work Order and pre-pay for the cost of the water service upgrades. For estimate inquiries please contact Mike Thomas, by email mthomas@kelowna.ca or phone, 250-469-8797.

2. Sanitary Sewer

- a) This property is currently serviced with a 100-mm sanitary service. The developer's consulting mechanical engineer will determine the development requirements of this proposed development and establish the service needs. Only one service will be permitted for this development. The applicant, at their cost, will arrange for the removal and disconnection of the existing services and the installation of one new larger service, if necessary.

3. Storm Drainage

- a) The developer must engage a consulting civil engineer to provide a storm water management plan for the site, which meets the requirements of the Subdivision, Development and Servicing Bylaw No. 7900. The storm water management plan must also include provision of lot grading plan, minimum basement elevation (MBE), if applicable, and provision of a storm drainage service for the development and / or recommendations for onsite drainage containment and disposal systems. Only one service will be permitted for this development. The applicant, at his cost, will arrange the installation of one overflow service if required.

SCHEDULE **A**

This forms part of application
Z20-0039

Planner Initials **AT**

City of **Kelowna**
COMMUNITY PLANNING



4. Electric Power and Telecommunication Services

- a) All proposed service connections are to be ~~installed underground. It is the~~ developer's responsibility to make a servicing application with the respective electric power, telephone and cable transmission companies to arrange for these services, which would be at the applicant's cost.

5. Road Improvements

- a) Park Ave. must be upgraded to a local standard along the full frontage of this proposed development, curb and gutter, drainage system, catch basin, manholes, pavement removal and replacement, and re-location or adjustment of utility appurtenances if required to accommodate the upgrading construction. The road cross section to be used is a SS-R3. A one-time cash payment in lieu of construction must be collected from the applicant for future construction by the City. The cash-in-lieu amount is determined to be **\$26,892.56. not including utility service cost.** Knox Cr. driveway must be constructed now.

6. Road Dedication and Subdivision Requirements

- a) Grant Statutory Rights of Way if required for utility services.
- b) If any road dedication or closure affects lands encumbered by a Utility right-of-way (such as Hydro, Telus, Gas, etc.) please obtain the approval of the utility. Any works required by the utility as a consequence of the road dedication or closure must be incorporated in the construction drawings submitted to the City's Development Manager.

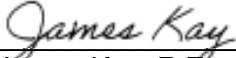
7. Geotechnical Report

Provide a geotechnical report prepared by a Professional Engineer competent in the field of hydro-geotechnical engineering to address the items below: NOTE: The City is relying on the Geotechnical Engineer's report to prevent any damage to property and/or injury to persons from occurring as a result of problems with soil slippage or soil instability related to this proposed subdivision. The Geotechnical reports must be submitted to the Development Services Department (Subdivision Approving officer) for distribution to the Development Engineering Branch and Inspection Services Division prior to submission of Engineering drawings or application for subdivision approval.

- (i) Area ground water characteristics, including any springs and overland surface drainage courses traversing the property. Identify any monitoring required.
- (ii) Site suitability for development.
- (iii) Site soil characteristics (i.e. fill areas, sulphate content, unsuitable soils such as organic material, etc.).
- (iv) Any special requirements for construction of roads, utilities and building structures.
- (v) Recommendations for items that should be included in a Restrictive Covenant.
- (vi) Recommendations for roof drains, perimeter drains and septic tank effluent on the site.
- (vii) Any items required in other sections of this document.


8. Charges and Fees

- a) Development Cost Charges (DCC's) are payable.
- b) Fees per the "Development Application Fees Bylaw" include:
 - i) Survey Monument, Replacement Fee: \$1,200.00 (GST exempt) – only if disturbed.



James Kay, P.Eng.
Development Engineering Manager

AS

SCHEDULE		A
This forms part of application		
# <u>Z20-0039</u>		
Planner Initials	<input type="text" value="AT"/>	 City of Kelowna COMMUNITY PLANNING



January 31, 2020

City of Kelowna
Urban Planning Department
1435 Water Street
Kelowna, BC

ATTACHMENT A

This forms part of application
Z20-0039

Planner Initials **AT**

City of Kelowna
COMMUNITY PLANNING

The City of Kelowna logo is a colorful, multi-layered circular design with various colors like red, yellow, blue, and green.

RE: Proposed Rezoning and Heritage Alteration Permit at 374 Park Avenue

Dear Urban Planner:

The purpose of this application is to rezone the subject property from the existing "RU1 – Large Lot Housing" zone to the "RU6 – Two Dwelling Housing" zone to permit the construction of a new single-family dwelling. The property exceeds the minimum frontage and area required in the RU6 zone to allow for two full houses. The dwelling that is currently located on the property is to remain in place with no alterations.

The subject property is located within the Abbott Street Heritage Conservation area and thus requires an application for a Heritage Alteration Permit to authorize construction of the new dwelling. The existing dwelling is not listed on the Heritage Register but is identified as within the "Victorian Revival" dominant style in the "Abbott Street & Marshall Street Heritage Conservation Area Development Guidelines."

Owing to challenges with the site plan, the proposed location of the new garage building is located only 1.2m from the new dwelling, where the zoning bylaw requires a separation of 3.0m. As part of this application, we are seeking a development variance permit to authorize this request.

Despite its modern architectural design, the proposed dwelling is incorporated with elements reminiscent of the "Victorian Revival" style in order to complement the heritage design elements of other dwellings located in the neighbourhood. The building meets the following character defining qualities:

- Gable roof forms
- Gable dormer forms
- Returned eaves & projecting verges
- Up to 2.5 storey massing
- Vertical double-hung window openings
- Multiple pane windows (leaded glass)
- Side or rear yard parking

The new dwelling adjacent to the Knox Crescent frontage is 2 storeys in height. Plenty of outdoor spaces are provided, including a patio and garden area which extends from the kitchen on the west side of the dwelling, in addition to a patio extending from the master bedroom on the east side. Other small outdoor spaces are located around the proposed dwelling. Victorian style gardens are known for various types stonework and patio space in combination with beautiful vegetation to compliment the property. In turn, the outdoor space of the proposed dwelling has been designed for the owner to take advantage of the opportunity to contribute to the Victorian fashion of the neighbourhood.

The proposed dwelling will be located to the north of the existing dwelling, with a privacy fence being built to provide separation. Two vehicle parking stalls have been allocated to the north of the proposed dwelling. The colour palette of the proposed building compliments the existing dwelling on the site, and much care has been taken to ensure the design of the building blends seamlessly into the existing dwelling. With regards to access, the driveway for the proposed dwelling will be connected to Knox Crescent through an easement that is currently registered on title (KF35403). The easement covers a small corner of Lot 2, which is located at the northeast corner of the subject property.

The downtown area was developed with single unit dwellings on large lots dating back to the early 1900's, a time associated with the early incorporation of the City of Kelowna. The neighbourhood has seen a resurgence of development in the last 20 years. The construction of the proposed dwelling will create density in a desirable area of Kelowna, providing walkable access to many employment and commercial uses in the nearby downtown business district as well as to several parks and beaches on Okanagan Lake.

We believe this proposal is a good fit within the foundation of the neighbourhood and will contribute to positive infill in this area of Kelowna.

Regards



Birte Decloux on behalf of the owners

ATTACHMENT		A
This forms part of application		
# Z20-0039		
Planner Initials	AT	 City of Kelowna COMMUNITY PLANNING

KNOX CRESCENT

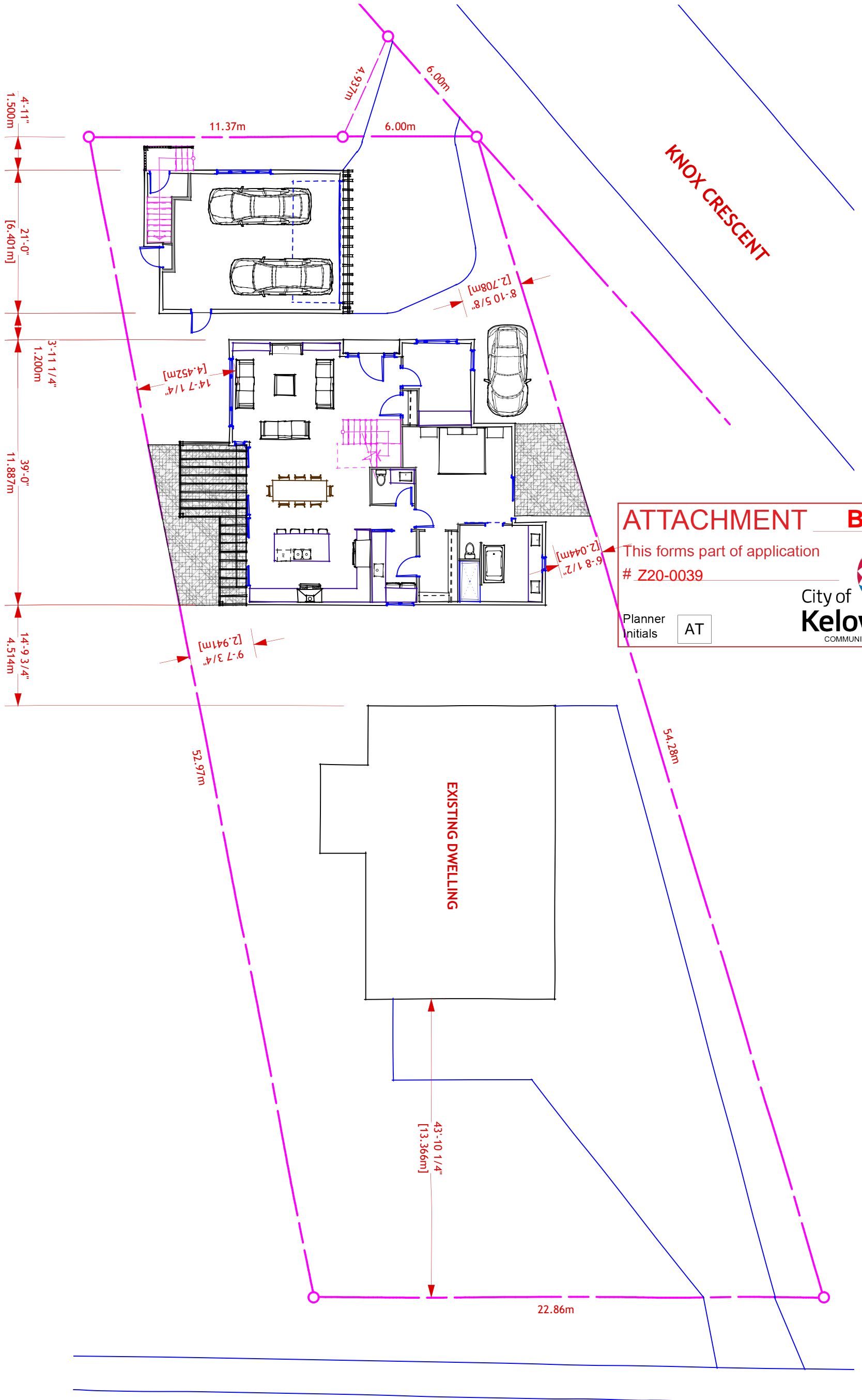
ATTACHMENT B

This forms part of application # Z20-0039

Planner Initials



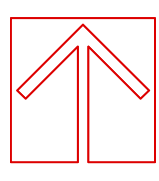
City of Kelowna
COMMUNITY PLANNING



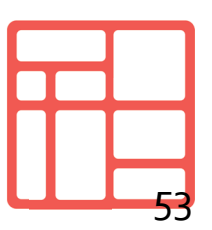
1 SITE PLAN
Scale: 1:175



PARK AVENUE



IHS DESIGN
#202-1470 ST. PAUL ST.
KELOWNA, BC
250.212.7938
info@ihdesign.ca



FIERBACH RESIDENCE
374 PARK AVENUE
KELOWNA, BC

SITE PLAN

DATE: Thu, 9 Jul 2020

SCALE: 3/16" = 1'-0"

ISSUED FOR: HAP/REZONE

SHEET: A2

374 PARK AVENUE DEVELOPMENT

PROJECT INFORMATION

LEGAL DESCRIPTION: LOT 4, PLAN KAP485, ODYD
 CIVIC ADDRESS: 374 PARK AVENUE, KELOWNA, BC V1Y 5P8
 PID: 010-666-133

CURRENT ZONING: RU1 - LARGE LOT HOUSING
 PROPOSED ZONING: RU6 - TWO DWELLING HOUSING
 FUTURE LAND USE: S2RES - SINGLE / TWO UNIT RESIDENTIAL

OWNER INFORMATION

KEVIN & JACKIE FIERBACH
 PH 250.681.2029

CONTACT: JACKIE FIERBACH
 fierbachs@outlook.com



ATTACHMENT B

This forms part of application
 # Z20-0039



City of
Kelowna
 COMMUNITY PLANNING

Planner
 Initials

AT

DRAWING LIST

ARCHITECTURAL DRAWING INDEX

- A1 PROJECT SHEET
- A2 SITE PLAN
- A3 SITE PLAN DETAIL/ZONING CALCULATIONS
- A4 ELEVATIONS
- A5 ELEVATIONS
- A6 PRINCIPAL DWELLING MAIN FLOOR PLAN
- A7 PRINCIPAL DWELLING SECOND FLOOR PLAN
- A8 ACCESSORY GARAGE MAIN FLOOR PLAN
- A9 ACCESSORY GARAGE SECOND FLOOR PLAN
- A10 BUILDING/SITE SECTIONS
- A11 EXTERIOR MATERIALS
- L1 LANDSCAPE PLAN

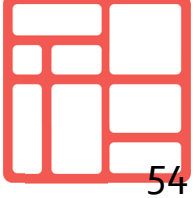
BUILDING DESIGN

IHS DESIGN
 #202 - 1470 ST. PAUL STREET
 KELOWNA, BC V1Y 2E6
 PH 250.212.7938

CONTACT: CHRIS VICKERY
 chris@ihdesign.com

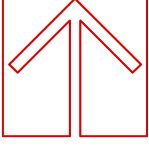
URBAN PLANNING CONSULTANT
 URBAN OPTIONS PLANNING & PERMITS
 287 RIALTO DRIVE
 KELOWNA, BC V1V 1E9
 PH 250.575.6707

CONTACT: BIRTE DECLOUX
 birte@urbanoptions.ca



IHS DESIGN

#202-1470 ST. PAUL ST.
 KELOWNA, BC
 250.212.7938
 info@ihdesign.ca



FIERBACH RESIDENCE
 374 PARK AVENUE
 KELOWNA, BC

PROJECT INFORMATION

DATE: Thursday, July 9, 2020
 SCALE: 1:200
 ISSUED FOR: HAP/REZONE
 SHEET: A1



Z20-0039 374 Park Ave.

Rezoning Application



Proposal

- ▶ To rezone the subject property from the RU1 – Large Lot Housing zone to the RU6 – Two Dwelling Housing zone to facilitate the development of a second single family home and detached garage.

Development Process

May 8, 2020

Development Application Submitted



Staff Review & Circulation



May 26, 2020

Public Notification Received



Aug. 10, 2020

Initial Consideration



Public Hearing
Second & Third Readings

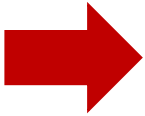


Final Reading
DP & Variances

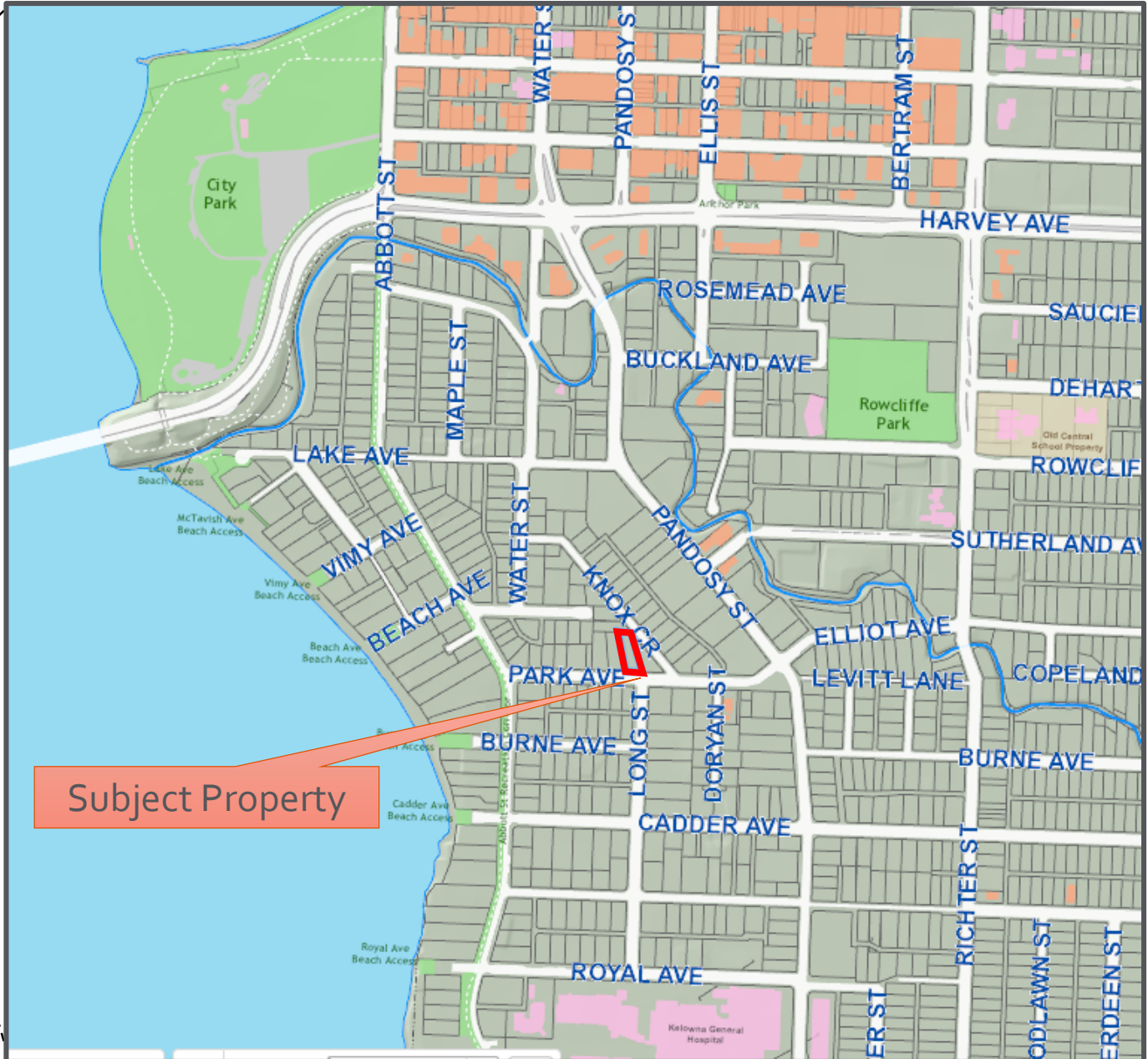
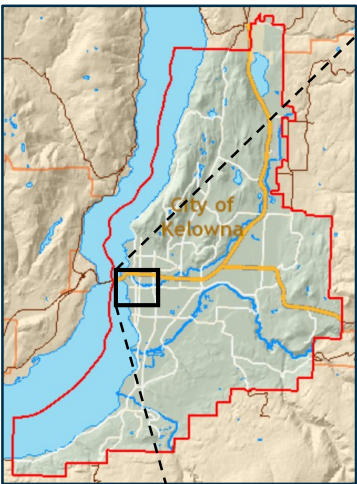


Building Permit

Council
Approvals

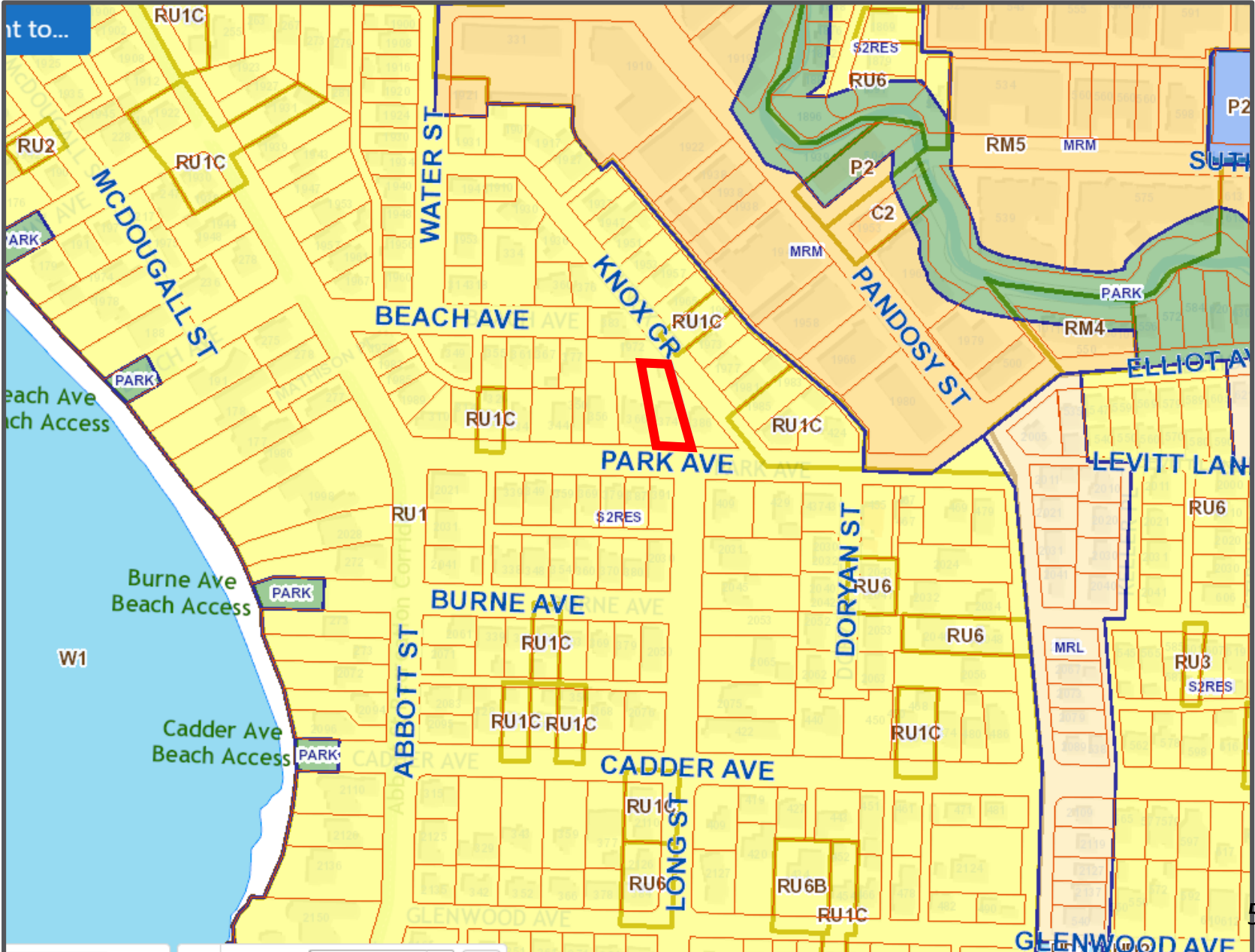


Context Map

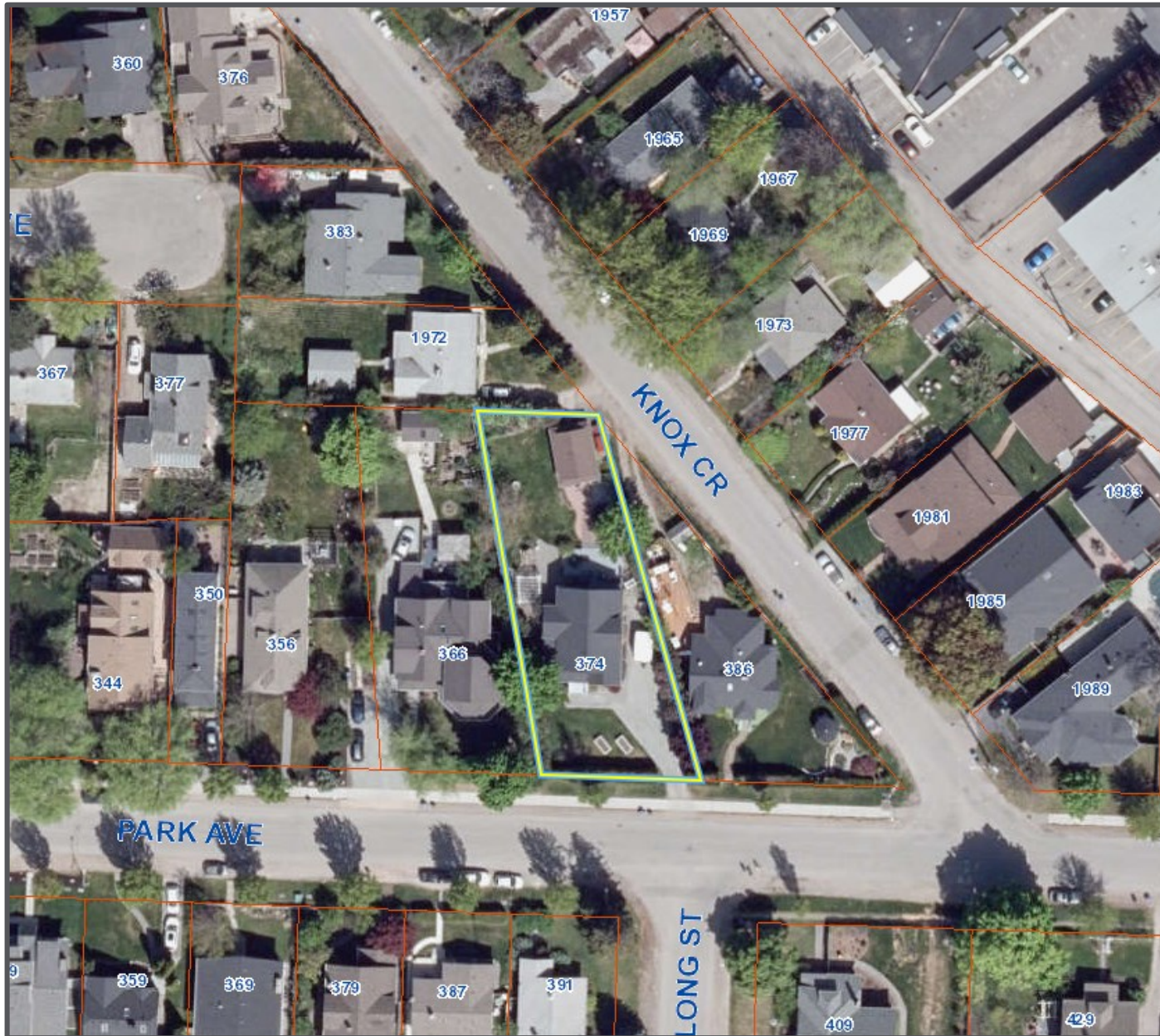


Subject Property

OCP Future Land Use / Zoning



Subject Property Map



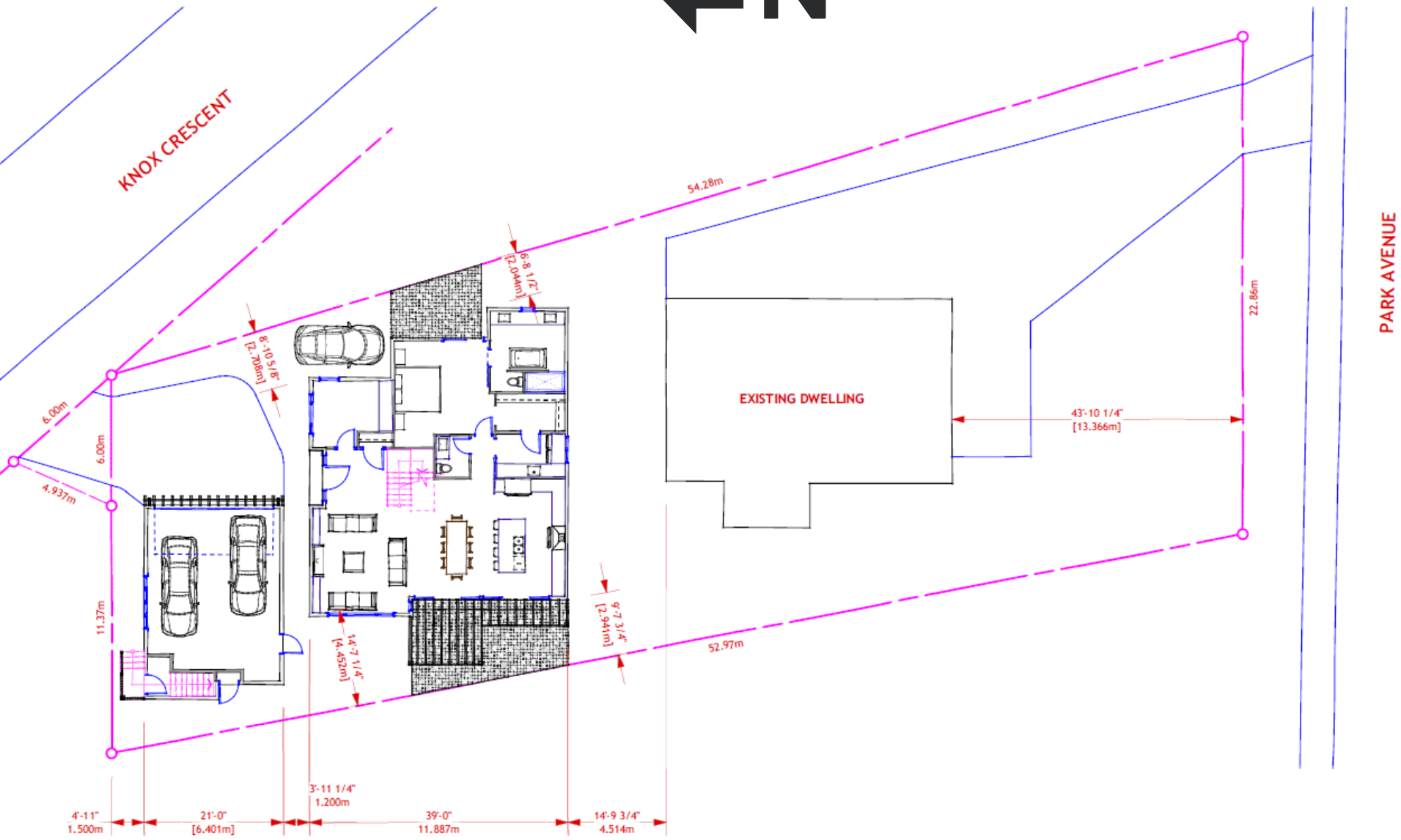
Project/technical details

- ▶ Rezone the property to RU6 – Two Dwelling Housing to facilitate the development of a second single family home and detached garage.
- ▶ Keep the existing heritage home on the property.
- ▶ Second home would have car access from Knox Cr. through an existing access easement on the adjacent property to the north.

Project/technical details

- ▶ Proposed development will yet require a Heritage Alteration Permit.
- ▶ Heritage Review was required to help determine whether the proposed development is consistent with the City's Heritage Conservation Area Guidelines.
 - ▶ Specifics related to heritage design will not be addressed formally until the Heritage Alteration Permit is considered.
- ▶ Staff are tracking one variance, related to reducing the minimum distance between an accessory building (the proposed detached garage) and a principal dwelling (the proposed single family home).

Site Plan



1 **SITE PLAN**
Scale: 1:175



Conceptual Rendering



Development Policy

- ▶ Compact urban form
- ▶ Heritage Conservation Area
 - ▶ Special qualities will be preserved by ensuring changes complement the established streetscape and maintain the integrity of traditional architectural forms
 - ▶ Upheld via Heritage Conservation Area Guidelines

Public Notification Policy #367

- ▶ Public consultation conducted in full compliance with Policy 367
 - ▶ Complete by May 26, 2020

Staff Recommendation

- ▶ Staff support rezoning the property to RU6 – Two Dwelling Housing to facilitate the development of a second home and detached garage.
 - ▶ Compact urban form
 - ▶ Heritage Conservation Area
 - ▶ Special qualities will be preserved by ensuring changes complement the established streetscape and maintain the integrity of traditional architectural forms
 - ▶ Upheld via Heritage Conservation Area Guidelines



Conclusion of Staff Remarks

CITY OF KELOWNA
BYLAW NO. 12087
Z20-0039 – 374 Park Avenue

A bylaw to amend the "City of Kelowna Zoning Bylaw No. 8000".

The Municipal Council of the City of Kelowna, in open meeting assembled, enacts as follows:

1. THAT City of Kelowna Zoning Bylaw No. 8000 be amended by changing the zoning classification of Lot 4, District Lot 14, ODYD, Plan 482 located at Park Avenue, Kelowna, BC from the RU1 – Large Lot Housing zone to the RU6 – Two Dwelling Housing zone.
2. This bylaw shall come into full force and effect and is binding on all persons as and from the date of adoption.

Read a first time by the Municipal Council this

Considered at a Public Hearing on the

Read a second and third time by the Municipal Council this

Approved under the Transportation Act this

(Approving Officer – Ministry of Transportation)

Adopted by the Municipal Council of the City of Kelowna this

Mayor

City Clerk

REPORT TO COUNCIL



Date: August 10, 2020

To: Council

From: City Manager

Department: Development Planning

Application: Z19-0143 **Owner:** Corey Knorr Construction Ltd.,
Inc. No. BC0380398

Address: 595 Mugford Road **Applicant:** Ryan Knorr

Subject: Rezoning Application

Existing OCP Designation: S2RES – Single / Two Unit Residential

Existing Zone: RU1 – Large Lot Housing

Proposed Zone: RU2 – Medium Lot Housing

1.0 Recommendation

THAT Rezoning Application No. Z19-0143 to amend the City of Kelowna Zoning Bylaw No. 8000 by changing the zoning classification of Lot 1 Section 26 Township 26 ODYD, Plan 17560, located at 595 Mugford Road, Kelowna, BC from the RU1 – Large Lot Housing zone to the RU2 – Medium Lot Housing zone be considered by Council;

AND THAT final adoption of the Rezoning Bylaw be considered subsequent to the outstanding conditions of approval as set out in Schedule "A" attached to the Report from the Development Planning Department dated August 10, 2020;

AND THAT final adoption of the Rezoning Bylaw be considered subsequent to the approval of the Ministry of Transportation and Infrastructure.

AND FURTHER THAT final adoption of the Rezoning Bylaw be considered in conjunction with Council's consideration of a Development Variance Permit for the subject property.

2.0 Purpose

To consider an application to rezone the subject property from the RU1 – Large Lot Housing zone to the RU2 – Medium Lot Housing zone to facilitate a future 2-lot subdivision.

3.0 Development Planning

Development Planning Staff are recommending support for the proposed rezoning from the RU₁ – Large Lot Housing zone to the RU₂ – Medium Lot Housing zone to facilitate a future 2-lot subdivision as it is consistent with the Official Community Plan (OCP) Future Land Use designation of S₂RES – Single / Two Unit Residential. The property is located within the Permanent Growth Boundary (PGB), is fully serviced, and is located in close proximity to parks and schools.

The intent of the application is to rezone the property to facilitate a future 2-lot subdivision. The applicant has proposed to keep the existing dwelling and accessory garage located on the eastern most lot identified as Lot B. Should the rezoning application be supported, the applicant would proceed with a subdivision application. Currently, Staff are tracking a variance to lot width in the RU₂ zone, which would come to Council for consideration.

4.0 Proposal

4.1 Background

The property as it stands today comprises an existing single-family dwelling with two detached accessory buildings and with existing access off of both Mugford Rd and Merrifield Rd. Should a Rezoning application be supported and the applicant move forward with a 2-lot subdivision application, the applicant will be required to remove the existing driveway access on Mugford Rd at the northeast site corner and formalize the other existing access located off of Merrifield Rd to be consistent with the site access provisions in City of Kelowna Subdivision, Development & Servicing Bylaw No. 7900.

4.2 Project Description

The purpose of the rezoning application is to facilitate a 2-lot subdivision.

4.3 Site Context

The subject property is located in the Rutland City Sector at the intersection of Mugford and Merrifield roads and just west of Mugford Park. The surrounding neighbourhood is largely comprised of single-family properties predominantly zoned RU₁ – Large Lot Housing with some RU₂ – Medium Lot Housing and RU₆ – Two Dwelling Housing zoned sites. Other surrounding zones include P₃ – Parks and Open Space, A₁ – Agriculture 1 and RU₄ – Low Density Cluster Housing. Surrounding Future Land Use designations include predominantly S₂RES – Single / Two Unit Residential with some MRL – Multiple Unit Residential (Low Density), PARK – Major Park / Open Space (Public), REP – Resource Protection Area and EDINST – Educational / Major Institutional. The subject property has a walk score of 31 meaning most errands require a vehicle.

Specifically, adjacent land uses are as follows:

Orientation	Zoning	Land Use
North	RU ₁ – Large Lot Housing	Single Dwelling Housing
East	RU ₁ – Large Lot Housing	Single Dwelling Housing
South	RU ₂ – Medium Lot Housing	Single Dwelling Housing
West	RU ₁ – Large Lot Housing	Single Dwelling Housing

Subject Property Map: 595 Mugford Road



5.0 Current Development Policies

5.1 Kelowna Official Community Plan (OCP)

Chapter 5: Development Process

Objective 5.3 Focus development to designated growth areas

Policy.2 Compact Urban Form. Develop a compact urban form that maximizes the use of existing infrastructure and contributes to energy efficient settlement patterns. This will be done by increasing densities (approximately 75 – 100 people and/or jobs per ha located within a 400 metre walking distance of transit stops is required to support the level of transit service) through development, conversion, and re-development within Urban Centres (see Map 5.3) in particular and existing areas as per the provisions of the Generalized Future Land Use Map 4.1.

Chapter 5: Development Process

Objective 5.22 Ensure context sensitive housing development.

Policy .6 Sensitive Infill. Encourage new development or re-development in existing residential areas to be sensitive to or reflect the character of the neighbourhood with respect to building design, height and siting.

6.0 Technical Comments

6.1 Development Engineering Department

- See attached memorandum dated January 15, 2020.

7.0 Application Chronology

Date of Application Received: December 19, 2019

Date Public Consultation Completed: June 30, 2020

Report prepared by: Andrew Ferguson, Planner II

Reviewed by: James Moore, Acting Urban Planning & Development Policy Manager

Approved for Inclusion: Terry Barton, Development Planning Department Manager

Attachments:

Schedule A: Development Engineering Memo

Attachment A: Conceptual Site Plan

CITY OF KELOWNA

MEMORANDUM

Date: January 15, 2020
File No.: Z19-0143
To: Urban Planning Management (AF)
From: Development Engineering Manager (JK)
Subject: 595 Mugford Rd



RU1 to RU2

The Development Engineering Branch has the following comments and requirements associated with this application to rezone the subject property from RU1 (Large-lot housing) to RU2 (Medium-lot housing) to support a two-lot subdivision. The road and utility upgrading requirements outlined in this report will be a requirement of this development. The Development Engineering Technician for this project is Jim Hager.

1. **General**

- a) These are the Development Engineering Branch comments/requirements and are subject to the review and requirements from the Ministry of Transportation and Infrastructure (MoTI).

2. **Domestic Water and Fire Protection**

- a) The subject lot is within the Rutland Waterworks District (RWD) water service area. The developer is required to make satisfactory arrangements with RWD for all water and fire protection-related issues. All charges for service connection and upgrading costs, as well as any costs to decommission existing services, shall be the responsibility of the developer.
- b) The developer's consulting mechanical engineer will determine the domestic and fire protection requirements of this proposed development and establish hydrant requirements and service needs. All fire flow calculations approved by RWD are to be shared with the Development Engineering Branch upon submittal of off-site civil engineering drawings.
- c) Provide an adequately sized domestic water and fire protection system complete with individual lot connections. The water system must be capable of supplying domestic and fire flow demands of the project in accordance with the Subdivision, Development & Servicing Bylaw No. 7900.

3. **Sanitary Sewer**

- a) Each legal lot shall require an individual sanitary service connection complete with an inspection chamber (SS-S7) and Brooks Box (SS-S9).
- b) The existing lot is currently serviced with a 200-mm sanitary service. The existing service connection is to be completed with an inspection chamber and Brooks box.
- c) Proposed LOT A requires a new 100-mm sanitary service connection (c/w inspection

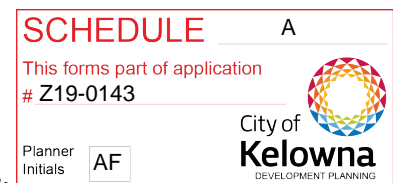
chamber and Brooks box), to be installed at the applicant's cost.

4. **Storm Drainage**

- a) The developer must engage a consulting Civil Engineer to provide a storm water management plan for the site, which meets the requirements of the Subdivision, Development and Servicing Bylaw No. 7900. The storm water management plan must also include provision of lot grading plan, minimum basement elevation (MBE), if applicable, and provision of a storm drainage service for the development and / or recommendations for onsite drainage containment and disposal systems. Only one service will be permitted for this development. The applicant, at his cost, will arrange the installation of one overflow service if required.
- b) Provide the following drawings:
 - i. A detailed Lot Grading Plan (indicate on the Lot Grading Plan any slopes that are steeper than 30% and areas that have greater than 1.0 m of fill);
 - ii. A detailed Stormwater Management Plan; and
 - iii. An Erosion and Sediment Control Plan.

5. **Subdivision Requirements**

- a) Grant statutory rights-of-way if required for utility services.

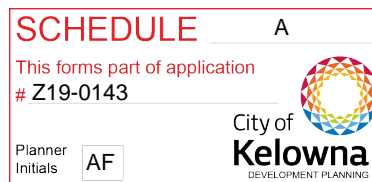


6. **Electric Power and Telecommunication Services**

All proposed service connections are to be installed underground. It is the developer's responsibility to make a servicing application with the respective electric power, telephone and cable transmission companies to arrange for these services, which would be at the applicant's cost.

7. **Road Improvements**

- a) The subject lot's frontage on Mugford Rd is to be fully urbanized to an SS-R5 standard, including catch basins, barrier curb and gutter, fillet paving, a concrete letdown (SS-S7) for LOT A access, landscaped and irrigated boulevard, 1.5-m wide sidewalk, and re-location or adjustment of utility appurtenances if required. The existing access and driveway letdown to LOT B on Mugford Rd is to be removed and the existing curb bulge to be re-established.
- b) The subject lot's frontage along Merrifield Rd is to be fully urbanized to an SS-R3 standard, including catch basins, barrier curb and gutter, fillet paving, a concrete letdown for LOT B access, landscaped and irrigated boulevard, 1.5-m wide sidewalk, and re-location or adjustment of utility appurtenances if required. The existing access and driveway letdown to LOT B on Merrifield Rd is to be formalized by a concrete letdown (SS-C7).
- c) The City has collected cash-in-lieu for the off-site upgrades at 330 and 350 Merrifield Rd. At the City's cost, the applicant is to have their Civil Engineer design an additional 30 m of sidewalk (c/w concrete letdowns), fillet paving, and drainage for the frontage of 330 and 350 Merrifield Rd. Based on the Civil Engineer's design and cost estimate, the applicant, at the City's cost, will be required to complete the construction of the urbanization along 330 and 350 Mugford Rd. Please contact Jim Hager (jhager@kelowna.ca) for more



information on this request.

- d) The estimated cost of off-site construction, for performance security purposes, is to be submitted by the Developer's Consulting Engineer.

8. Land Dedication

- a) A 6.0-m corner rounding will be required on the northeast corner of proposed LOT B.

9. Geotechnical Report

- (a) Provide a geotechnical report prepared by a Professional Engineer competent in the field of hydro-geotechnical engineering to address the items below: NOTE: The City is relying on the Geotechnical Engineer's report to prevent any damage to property and/or injury to persons from occurring as a result of problems with soil slippage or soil instability related to this proposed subdivision.
- (b) The Geotechnical reports must be submitted to the Development Services Department (Subdivision Approving officer) for distribution to the Development Engineering Branch and Inspection Services Division prior to submission of Engineering drawings or application for subdivision approval.
- (i) Area ground water characteristics, including any springs and overland surface drainage courses traversing the property. Identify any monitoring required.
 - (ii) Site suitability for development.
 - (iii) Site soil characteristics (i.e. fill areas, sulphate content, unsuitable soils such as organic material, etc.).
 - (iv) Any special requirements for construction of roads, utilities and building structures.
 - (v) Recommendations for items that should be included in a Restrictive Covenant.
 - (vi) Recommendations for roof drains, perimeter drains and septic tank effluent on the site.
 - (vii) Any items required in other sections of this document.

9. Design and Construction

- (a) Design, construction supervision and inspection of all off-site civil works and site servicing must be performed by a Consulting Civil Engineer and all such work is subject to the approval of the City Engineer. Drawings must conform to City standards and requirements.
- (b) Engineering drawing submissions are to be in accordance with the City's "Engineering Drawing Submission Requirements" Policy. Please note the number of sets and drawings required for submissions.

- (c) Quality Control and Assurance Plans must be provided in accordance with the Subdivision, Development & Servicing Bylaw No. 7900 (refer to Part 5 and Schedule 3).
- (d) A “Consulting Engineering Confirmation Letter” (City document ‘C’) must be completed prior to submission of any designs.
- (e) Before any construction related to the requirements of this subdivision application commences, design drawings prepared by a professional engineer must be submitted to the City’s Works & Utilities Department. The design drawings must first be “Issued for Construction” by the City Engineer. On examination of design drawings, it may be determined that rights-of-way are required for current or future needs.

10. Servicing Agreements for Works and Services

- (a) A Servicing Agreement is required for all works and services on City lands in accordance with the Subdivision, Development & Servicing Bylaw No. 7900. The applicant’s Engineer, prior to preparation of Servicing Agreements, must provide adequate drawings and estimates for the required works. The Servicing Agreement must be in the form as described in Schedule 2 of the bylaw.
- (b) Part 3, “Security for Works and Services”, of the Bylaw, describes the Bonding and Insurance requirements of the Owner. The liability limit is not to be less than \$5,000,000 and the City is to be named on the insurance policy as an additional insured.

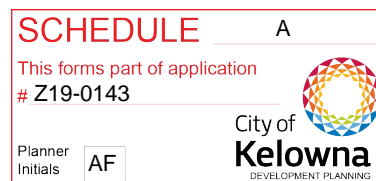
12. Charges and Fees

- a) Development Cost Charges (DCC’s) are payable.
- b) Fees per the “Development Application Fees Bylaw” include:
 - i) Engineering and Inspection Fee: 3.5% of construction value (plus GST).

James Kay

 James Kay, P.Eng.
 Development Engineering Manager

JKH



PROPOSED SUBDIVISION OF LOT 1, SEC 26, TP 26, ODYD, PLAN 17560.

PID: 008-391-246
CIVIC ADDRESS: 595 MUGFORD ROAD, KELOWNA
CLIENT: COREY KNORR

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Scale 1:500 Metric. Distances shown are in metres and decimals thereof.

Proposed lot sizes based on RU2 zoning.

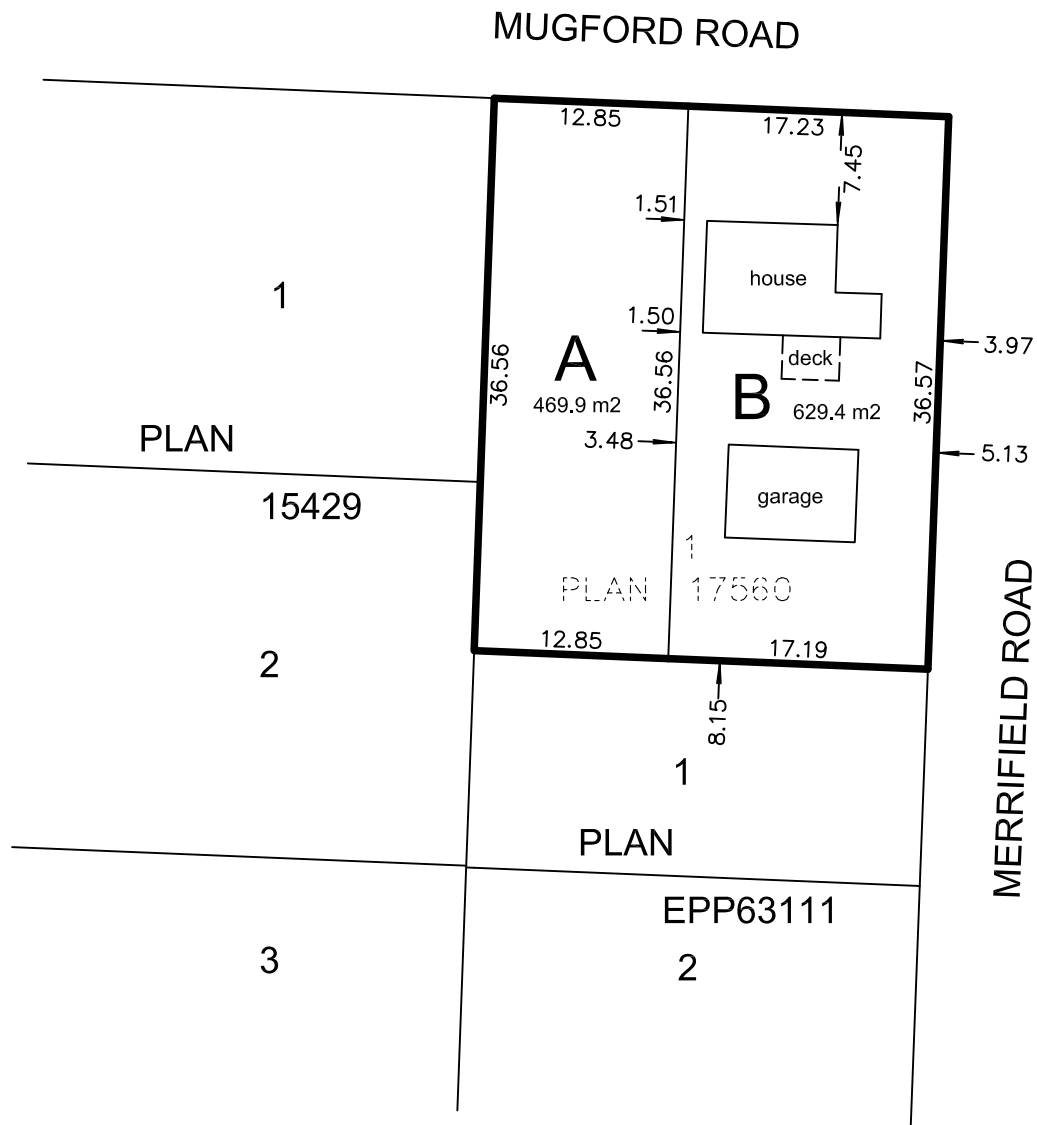
ATTACHMENT A

This forms part of application
Z19-0143

Planner Initials **AF**



City of
Kelowna
DEVELOPMENT PLANNING





Z19-0143

595 Mugford Road

Rezoning Application



Proposal

- ▶ To consider an application to rezone the subject property from the RU1 – Large Lot Housing zone to the RU2 – Medium Lot Housing zone to facilitate a future 2-lot subdivision.

Development Process

Dec 19, 2019

Development Application Submitted

Staff Review & Circulation

June 30, 2020

Public Notification Received

Aug 10, 2020

Initial Consideration

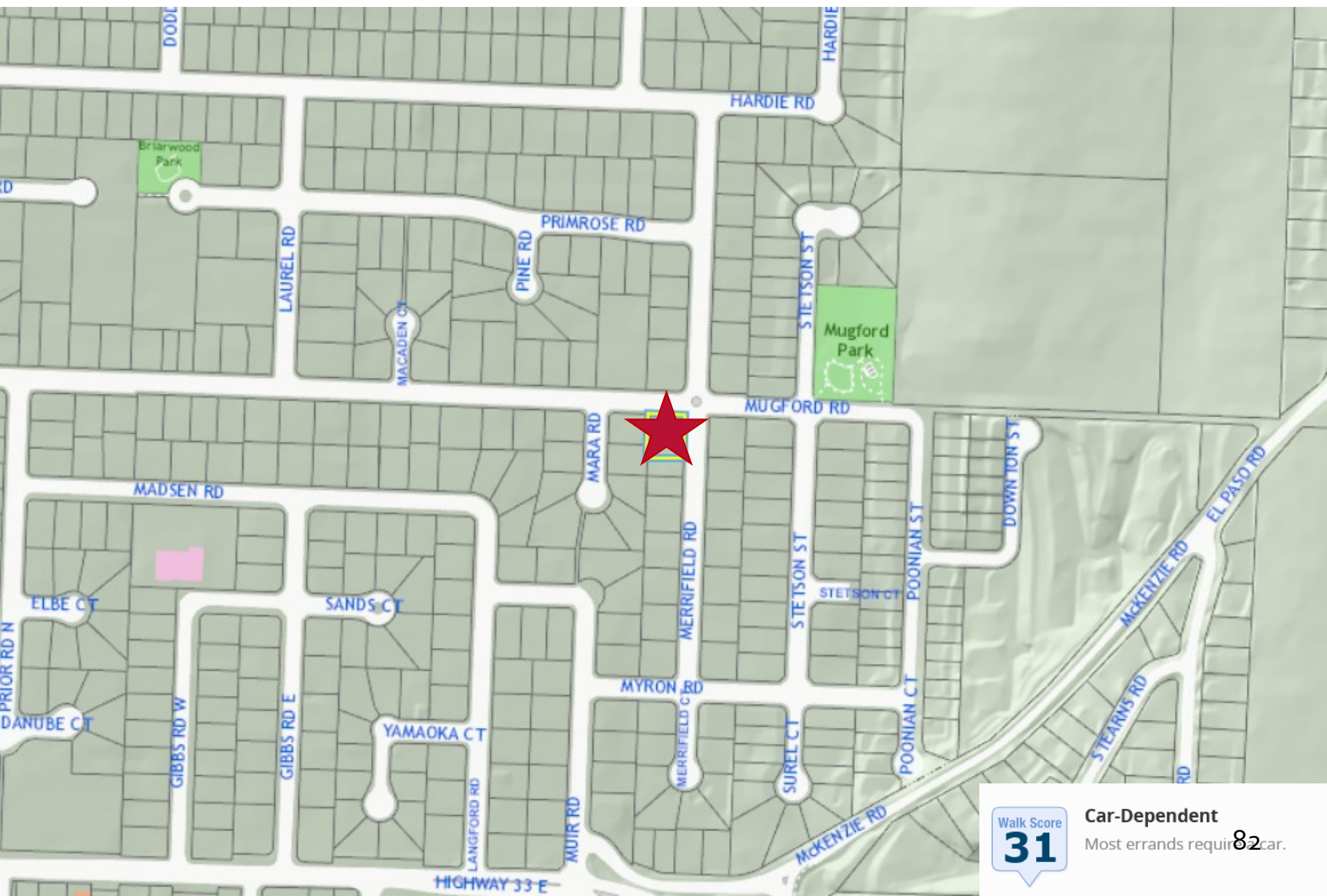
Public Hearing – Request to Waive
Second, Third Readings, DVP

Final Reading

Subdivision Application

Council Approvals

Context Map



Walk Score
31

Car-Dependent
Most errands require a car.

Subject Property Map



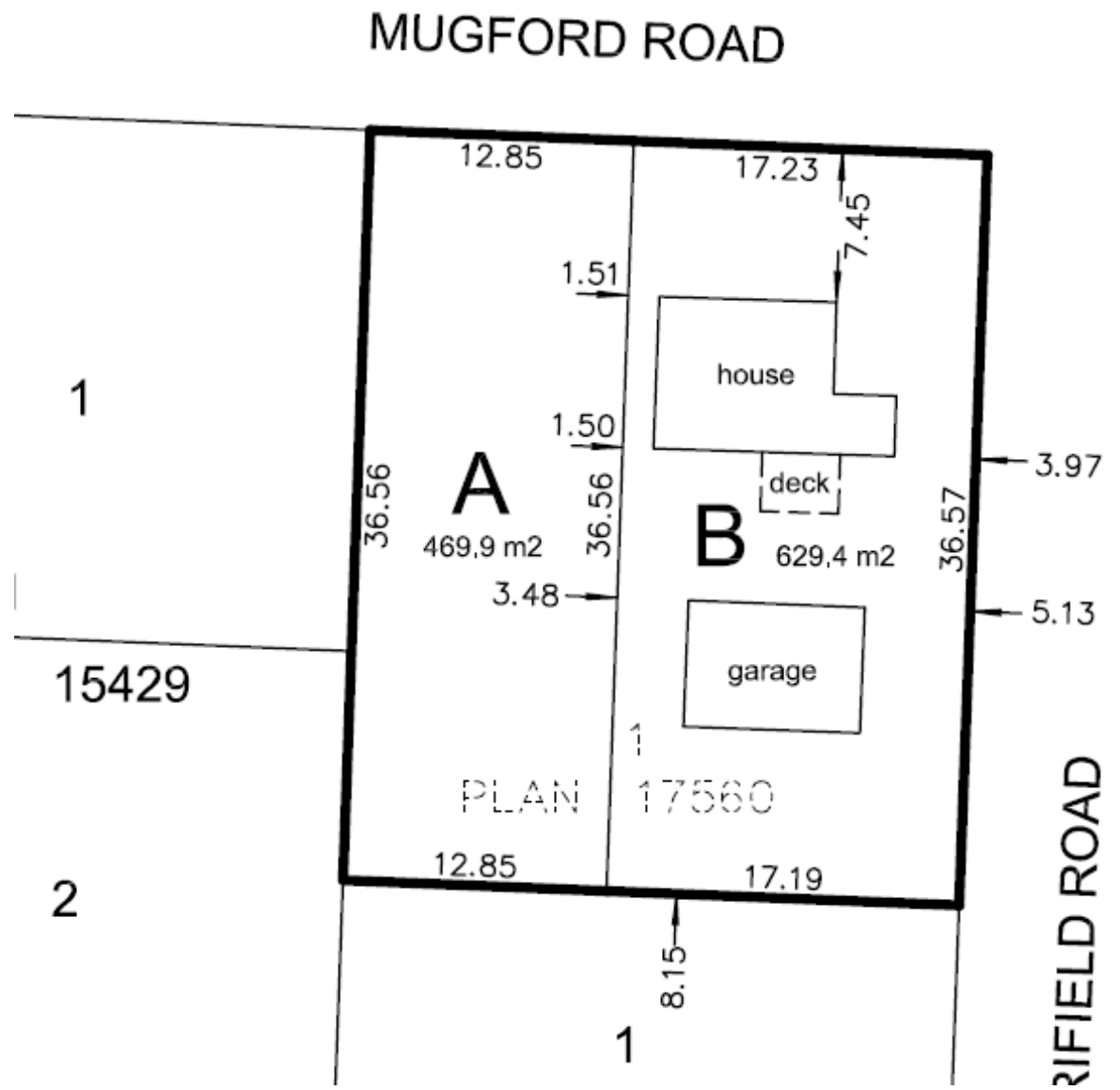
Street View Image



Street View Image



Conceptual Site Plan



Development Policy

- ▶ Meets the intent of Official Community Plan Urban Infill Policies:
 - ▶ Within Permanent Growth Boundary
 - ▶ Sensitive Infill
 - ▶ Compact Urban Form
- ▶ Consistent with Future Land Use of S2RES.

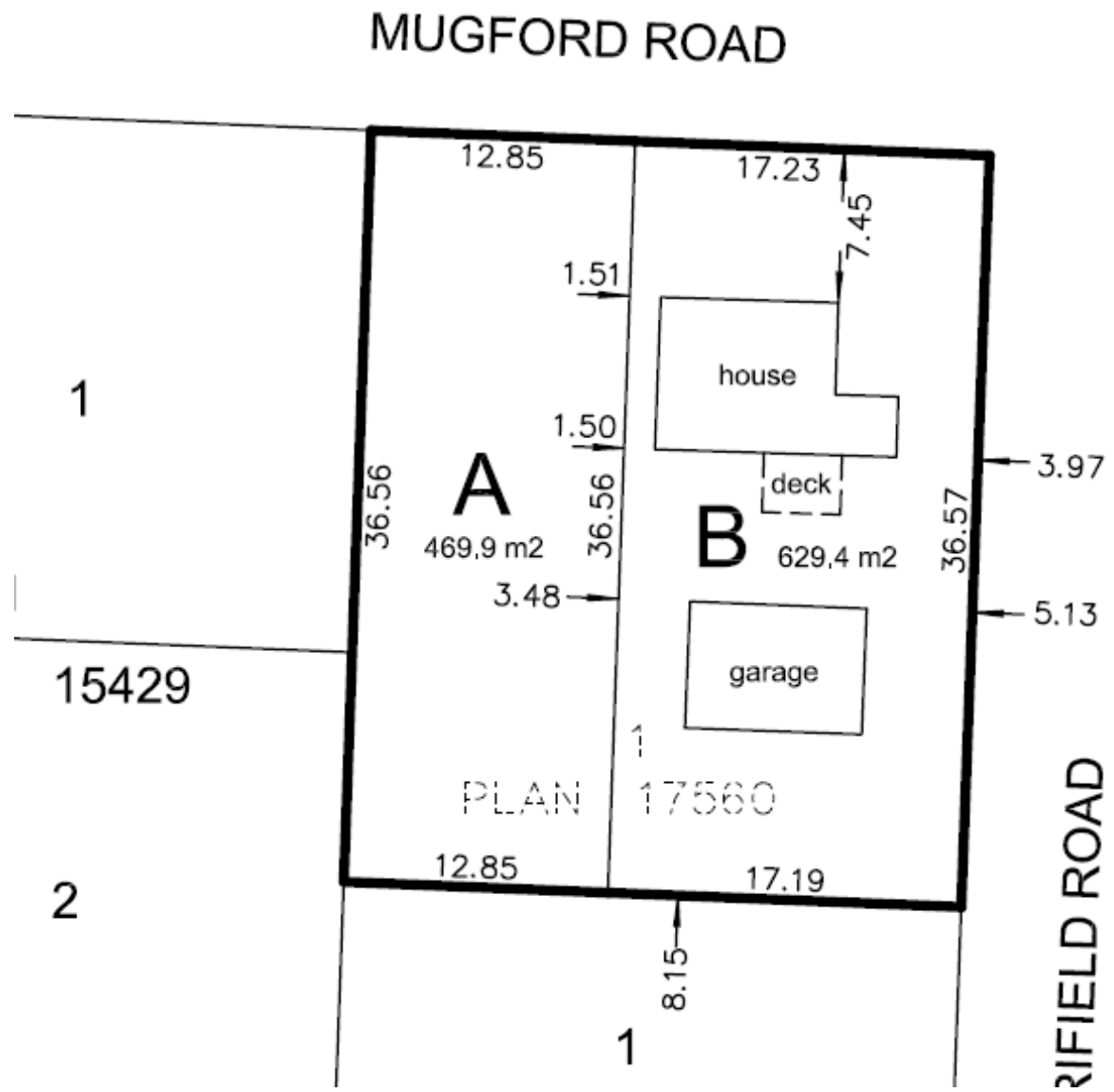
Staff Recommendation

- ▶ Staff recommend **support** of the proposed rezoning
 - ▶ Meets the intent of the Official Community Plan
 - ▶ Urban Infill Policies
 - ▶ Appropriate location for adding residential density
- ▶ Recommend Public Hearing be waived for rezoning bylaw



Conclusion of Staff Remarks

Conceptual Site Plan



CITY OF KELOWNA
BYLAW NO. 12088
Z19-0143 – 595 Mugford Road

A bylaw to amend the "City of Kelowna Zoning Bylaw No. 8000".

The Municipal Council of the City of Kelowna, in open meeting assembled, enacts as follows:

1. THAT City of Kelowna Zoning Bylaw No. 8000 be amended by changing the zoning classification of Lot 1 Section 26 Township 26 ODYD Plan 17500 located on Mugford Road, Kelowna, BC from the RU₁ – Large Lot Housing zone to the RU₂ – Medium Lot Housing zone.
2. This bylaw shall come into full force and effect and is binding on all persons as and from the date of adoption.

Read a first time by the Municipal Council this

Considered at a Public Hearing on the

Read a second and third time by the Municipal Council this

Approved under the Transportation Act this

(Approving Officer – Ministry of Transportation)

Adopted by the Municipal Council of the City of Kelowna this

Mayor

City Clerk

REPORT TO COUNCIL



Date: August 10, 2020

To: Council

From: City Manager

Department: Development Planning

Application: TA20-0018 **Owner:** Summit Real Estate Holdings Ltd., Inc.No. BC1098449

Address: 1920-1936 Summit Drive **Applicant:** Kent-Macpherson

Subject: Text Amendment Application

Existing OCP Designation: COMM - Commercial

Existing Zone: CD3rcs – Comprehensive Development 3 (Retail Cannabis Sales)

1.0 Recommendation

THAT Zoning Bylaw Text Amendment Application No. TA20-0018 to amend City of Kelowna Zoning Bylaw No. 8000 as outlined in Schedule "A" attached to the Report from the Development Planning Department dated August 10, 2020 be considered by Council;

AND FURTHER THAT the Zoning Bylaw Text Amending Bylaw be forwarded to a Public Hearing for further consideration.

2.0 Purpose

To amend the Zoning Bylaw by removing the maximum Gross Floor Area for Retail Liquor Sales, removing the limit on the number of Retail Liquor Sales businesses, and addressing how the Retail Cannabis Sales subzone was created within Area 2 of the CD3 zone.

3.0 Development Planning

Development Planning Staff support the Text Amendment application to remove the maximum size of a retail liquor sales establishment, and to remove the limit of one retail liquor sales business within Area 2 of the CD3 zone. The original intent of this size regulation was to not have retail liquor sales occupying a predominant or dominate portion of a site. Now that the development is complete and units are occupied, a large liquor store on this property is no longer a concern of staff.

Development Planning Staff further support the removal of regulation allowing one Retail Liquor Sale Business within Area 2 only. This is because the provincial *Liquor Control and Licensing Regulation* restricts

Retail Liquor Stores from opening if they are within 1 km of any other Retail Liquor Store, so it would not be possible for another Retail Liquor Store to open on this property.

Council supported a Text Amendment and Rezoning application relating to retail cannabis sales establishments within Area 2 of the CD₃ zone in November 2019. An amendment is needed to address how this subzone was created in the Zoning Bylaw, and has been included as part of this application.

The applicant completed neighbourhood notification in accordance with Council Policy No. 367.

4.0 Proposal

4.1 Background

Retail Liquor Sales was added as a permitted use to Area 2 of the CD₃ zone through a Text Amendment that was adopted by Council in 2017. This Text Amendment also included regulations that there only be one Retail Liquor Sales establishment located in Area 2, and that it is limited to a maximum Gross Floor Area of 185 m². A Retail Liquor Sales establishment has been in a unit on the property since 2018.

4.2 Project Description

The applicant is requesting a Text Amendment to the CD₃ zone which would allow for the existing Retail Liquor Sales establishment to relocate from their current unit on the site to a slightly larger commercial unit located on the perimeter.

4.3 Site Context

The property is located at the northeast corner of the Glenmore Rd and Summit Dr intersection and has a Future Land Use Designation of Commercial. The surrounding area has a mix of residential uses and densities as well as retail and personal service use.

Specifically, adjacent land uses are as follows:

Orientation	Zoning	Land Use
North	CD ₃ – Comprehensive Development 3	Apartment housing
East	CD ₂₇ – Comprehensive Development 27	Apartment housing
South	P ₃ – Parks and Open Space	Participant recreation services, outdoor
West	RU ₁ – Large Lot Housing	Single dwelling housing

Subject Property Map: 1920-1936 Summit Dr



5.0 Application Chronology

Date of Application Received: June 30, 2020
Date Public Consultation Completed: July 16, 2020

Report prepared by: Kimberly Brunet, Planner II
Reviewed by: Terry Barton, Development Planning Department Manager
Approved for Inclusion: Ryan Smith, Divisional Director, Planning & Development Services

Attachments:

Schedule A: Amendments to the City of Kelowna Zoning Bylaw No. 8000

SCHEDULE "A" – Proposed Amendments to the City of Kelowna Zoning

Bylaw No. 8000

TA20-0018

Zoning Bylaw No. 8000										
No.	Section	Existing Text	Proposed Text	Rationale						
1.	Section 1 – General Administration 1.3 Zoning Map	Section 18 – Comprehensive Development Zones <table border="1"> <tr> <td>CD3</td> <td>Comprehensive Development Three</td> </tr> </table>	CD3	Comprehensive Development Three	Section 18 – Comprehensive Development Zones <table border="1"> <tr> <td>CD3</td> <td>Comprehensive Development Three</td> </tr> <tr> <td>CD3rcs</td> <td>Comprehensive Development Three (Retail Cannabis Sales)</td> </tr> </table>	CD3	Comprehensive Development Three	CD3rcs	Comprehensive Development Three (Retail Cannabis Sales)	Creation of a retail cannabis sales subzone in the CD3 zone
CD3	Comprehensive Development Three									
CD3	Comprehensive Development Three									
CD3rcs	Comprehensive Development Three (Retail Cannabis Sales)									
2.	Section 18 - Schedule 'B' – Comprehensive Development Zones CD3 – Comprehensive Development Three	CD3 - Comprehensive Development Three	CD3 - Comprehensive Development Three CD3rcs - Comprehensive Development Three (Retail Cannabis Sales)	Addition of a retail cannabis sales subzone to the CD3 zone						
3.	Section 18 - Schedule 'B' – Comprehensive Development Zones CD3 – Comprehensive Development Three 1.2 Permitted Uses	The permitted principal uses in Area 2 of this zone, as shown on Figure CD 3.1, are: (k) retail cannabis sales establishment	The permitted principal uses in Area 2 of this zone, as shown on Figure CD 3.1, are: (k) retail cannabis sales establishment (CD3rcs only)	Specification that retail cannabis sales is only permitted on properties zoned CD3rcs						
4.	Section 18 - Schedule 'B' – Comprehensive Development Zones	(f) Only one Retail Liquor Sale business is permitted in Area 2.	(f) Deleted	Removal of the limit to the number of Retail Liquor Sales businesses within Area 2						

	CD3 – Comprehensive Development Three 1.5 Other Regulations			
5.	Section 18 - Schedule 'B' – Comprehensive Development Zones CD3 – Comprehensive Development Three 1.5 Other Regulations	(g) Retail Liquor Sales within Area 2 shall be limited to a maximum Gross Floor Area of 185 m ²	(g) Deleted	Removal of maximum Gross Floor Area for Retail Liquor Sales within Area 2



TA20-0018

1920-1936 Summit Dr.

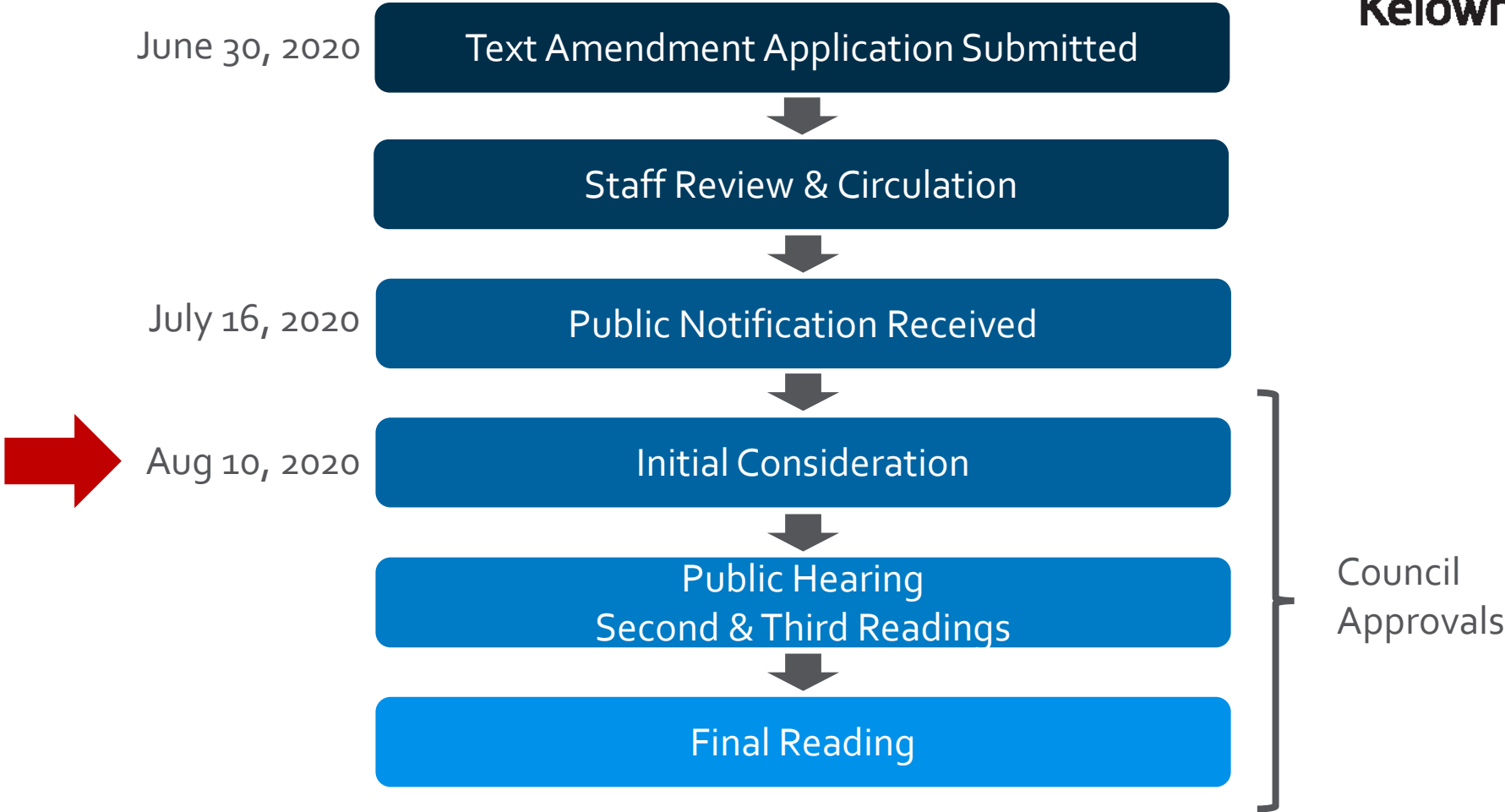
Text Amendment Application



Proposal

- ▶ To amend the Zoning Bylaw by removing the maximum Gross Floor Area for Retail Liquor Sales and removing the limit on the number of Retail Liquor Sales businesses within Area 2 of the CD3 zone.
- ▶ To amend the Zoning Bylaw to address how the Retail Cannabis Sales subzone was created within Area 2 of the CD3 zone.

Development Process



Context Map



Subject Property Map



Project/technical details

- ▶ Existing Retail Liquor Store is wanting to move to a larger perimeter unit
 - ▶ Currently ~185 m², proposed ~200 m² unit
- ▶ Current CD3 regulations:
 - ▶ Restricts Retail Liquor Sales to a maximum of 185 m² GFA
 - ▶ Specifies only one Retail Liquor Sales business permitted

Staff Recommendation

- ▶ Development Planning Staff recommend support for the Text Amendment application
 - ▶ Retail Liquor Sales
 - ▶ No longer a concern about a large liquor store on the property
 - ▶ Only one store would be permitted, as per provincial regulations
 - ▶ Retail Cannabis Sales
 - ▶ Amendments address how the subzone was created under a previous Text Amendment



Conclusion of Staff Remarks



Proposed Amendments – Retail Liquor Sales

4.	<p>Section 18 - Schedule 'B' – Comprehensive Development Zones</p> <p>CD3 – Comprehensive Development Three</p> <p>1.5 Other Regulations</p>	(f) Only one Retail Liquor Sale business is permitted in Area 2.	(f) Deleted	Removal of the limit to the number of Retail Liquor Sales businesses within Area 2
5.	<p>Section 18 - Schedule 'B' – Comprehensive Development Zones</p> <p>CD3 – Comprehensive Development Three</p> <p>1.5 Other Regulations</p>	(g) Retail Liquor Sales within Area 2 shall be limited to a maximum Gross Floor Area of 185 m ²	(g) Deleted	Removal of maximum Gross Floor Area for Retail Liquor Sales within Area 2

Proposed Amendments – Retail Cannabis Sales

Zoning Bylaw No. 8000

No.	Section	Existing Text	Proposed Text	Rationale						
1.	Section 1 – General Administration 1.3 Zoning Map	Section 18 – Comprehensive Development Zones <table border="1"> <tr> <td>CD3</td> <td>Comprehensive Development Three</td> </tr> </table>	CD3	Comprehensive Development Three	Section 18 – Comprehensive Development Zones <table border="1"> <tr> <td>CD3</td> <td>Comprehensive Development Three</td> </tr> <tr> <td>CD3rcs</td> <td>Comprehensive Development Three (retail cannabis sales)</td> </tr> </table>	CD3	Comprehensive Development Three	CD3rcs	Comprehensive Development Three (retail cannabis sales)	Creation of a retail cannabis sales subzone in the C ₃ zone
CD3	Comprehensive Development Three									
CD3	Comprehensive Development Three									
CD3rcs	Comprehensive Development Three (retail cannabis sales)									
2.	Section 18 - Schedule 'B' – Comprehensive Development Zones CD3 – Comprehensive Development Three	CD3 - Comprehensive Development Three	CD3 - Comprehensive Development Three CD3rcs - Comprehensive Development Three (retail cannabis sales)	Addition of a retail cannabis sales subzone to the C ₃ zone						
3.	Section 18 - Schedule 'B' – Comprehensive Development Zones CD3 – Comprehensive Development Three 1.2 Permitted Uses	The permitted principal uses in Area 2 of this zone, as shown on Figure CD 3.1, are: (k) retail cannabis sales establishment	The permitted principal uses in Area 2 of this zone, as shown on Figure CD 3.1, are: (k) retail cannabis sales establishment (CD3rcs only)	Specification that retail cannabis sales is only permitted on properties zoned CD3rcs						

CITY OF KELOWNA

BYLAW NO. 12089

CD3 – Comprehensive Development Three Zone Amendments

A bylaw to amend the "City of Kelowna Zoning Bylaw No. 8000".

The Municipal Council of the City of Kelowna, in open meeting assembled, enacts as follows:

1. THAT **Section 1 – General Administration, 1.3 Zoning Map, Section 18 – Comprehensive Development Zones** be amended by:

a) Deleting the following:

CD3	Comprehensive Development Three
-----	---------------------------------

And replacing it with:

CD3	Comprehensive Development Three
CD3rcs	Comprehensive Development Three (Retail Cannabis Sales)

2. AND THAT **Section 18 - Schedule 'B' – Comprehensive Development Zones, CD3 – Comprehensive Development Three** be amended by:

b) Adding to the end of the title in **CD3 – Comprehensive Development Three** the following:

"CD3rcs – Comprehensive Development Three (Retail Cannabis Sales)"

3. AND THAT **Section 18 - Schedule 'B' – Comprehensive Development Zones, CD3 – Comprehensive Development Three, 1.2 Permitted Uses** be amended by:

c) Deleting the following:

"(k) retail cannabis sales establishment"

And replacing it with:

"(k) retail cannabis sales establishment (CD3rcs only)"

4. AND THAT **Section 18 - Schedule 'B' – Comprehensive Development Zones, CD3 – Comprehensive Development Three, 1.5 Other Regulations** be amended by deleting:

"(f) Only one Retail Liquor Sale business is permitted in Area 2."

5. AND FURTHER THAT **Section 18 - Schedule 'B' – Comprehensive Development Zones, CD3 – Comprehensive Development Three, 1.5 Other Regulations** be amended by deleting:

"(g) Retail Liquor Sales within Area 2 shall be limited to a maximum Gross Flor Area of 185 m²."

6. This bylaw shall come into full force and effect and is binding on all persons as and from the date of adoption.

Read a first time by the Municipal Council this

Considered at a Public Hearing on the

Read a second and third time by the Municipal Council this

Approved under the Transportation Act this

(Approving Officer – Ministry of Transportation)

Adopted by the Municipal Council of the City of Kelowna this

Mayor

City Clerk

Report to Council



Date: August 10, 2020
To: Council
From: City Manager
Subject: Rezoning Bylaw No. 12063 for Z20-0034 Summary of Correspondence
Department: Office of the City Clerk

Recommendation:

THAT Council receives, for information, the report from the Office of the City Clerk dated August 10, 2020 with respect to the summary of correspondence received for Zoning Bylaw No. 12063;

AND THAT Rezoning Bylaw No. 12063 be forwarded for further reading consideration.

Purpose:

To receive a summary of correspondence for Rezoning Bylaw No. 12063 and to give the bylaw further reading consideration.

Background:

At the March 23, 2020 Council Meeting, Council passed a resolution directing staff to recommend that Council waive the Public Hearing for rezoning applications if they are consistent with the Official Community Plan, have a recommendation of support from staff and are not expected to generate significant public input based on correspondence received. Council passed a resolution on July 27, 2020 directing staff to no longer recommend that Public Hearings be waived under these criteria; however, Council waived the Public Hearing for this application prior to that direction being given.

The public has the opportunity to submit written correspondence for applications where the Public Hearing has been waived. Notification is done through signage on the subject property, newspaper advertisements, and mailouts in accordance with the *Local Government Act* and Development Application Procedures Bylaw No. 10540.

Discussion:

Rezoning Application Z20-0034 for 4642 Barton Street was brought forward to Council for initial consideration on July 13, 2020. At this meeting, Council passed a resolution to waive the Public Hearing and correspondence was accepted between July 15, 2020 and July 27, 2020.

The Office of the City Clerk received zero pieces of correspondence.

This application was brought forward with a recommendation of support from the Development Planning Department. Staff are recommending Council proceed with further readings of the Bylaw.

Conclusion:

Following the public notification period, staff are recommending that Council give Rezoning Bylaw No. 12063, located at 4642 Barton Street, further reading consideration.

Considerations applicable to this report:

Legal/Statutory Authority:

Local Government Act s. 464(2)

Legal/Statutory Procedural Requirements:

Following the notification period under s. 467 of the *Local Government Act*, Council may choose to give a bylaw further reading consideration, advance the bylaw to a Public Hearing, or defeat the bylaw. These are the same options available to Council for a bylaw that is considered at a Public Hearing.

Considerations not applicable to this report:

Existing Policy:

Financial/Budgetary Considerations:

External Agency/Public Comments:

Communications Comments:

Submitted by: R. Van Huizen, Legislative Technician

Approved for inclusion: S. Fleming, City Clerk

cc:
Development Planning

CITY OF KELOWNA
BYLAW NO. 12063
Z20-0034 – 4642 Barton Street

A bylaw to amend the "City of Kelowna Zoning Bylaw No. 8000".

The Municipal Council of the City of Kelowna, in open meeting assembled, enacts as follows:

1. THAT City of Kelowna Zoning Bylaw No. 8000 be amended by changing the zoning classification of Lot 3 District Lot 580A SDYD Plan KAP69497, located on Barton Street, Kelowna, BC from the RU1 – Large Lot Housing zone to the RU1c – Large Lot Housing with Carriage House zone;
2. This bylaw shall come into full force and effect and is binding on all persons as and from the date of adoption.

Read a first time by the Municipal Council this 13th day of July, 2020.

Public Hearing Waived by the Municipal Council this 13th day of July, 2020.

Read a second and third time by the Municipal Council this

Adopted by the Municipal Council of the City of Kelowna this

Mayor

City Clerk

Report to Council



Date: August 10, 2020
To: Council
From: City Manager
Subject: Rezoning Bylaw No. 12064 for Z20-0019 Summary of Correspondence
Department: Office of the City Clerk

Recommendation:

THAT Council receives, for information, the report from the Office of the City Clerk dated August 10, 2020 with respect to the summary of correspondence received for Zoning Bylaw No. 12064;

AND THAT Rezoning Bylaw No. 12064 be forwarded for further reading consideration.

Purpose:

To receive a summary of correspondence for Rezoning Bylaw No. 12064 and to give the bylaw further reading consideration.

Background:

At the March 23, 2020 Council Meeting, Council passed a resolution directing staff to recommend that Council waive the Public Hearing for rezoning applications if they are consistent with the Official Community Plan, have a recommendation of support from staff and are not expected to generate significant public input based on correspondence received. Council passed a resolution on July 27, 2020 directing staff to no longer recommend that Public Hearings be waived under these criteria; however, Council waived the Public Hearing for this application prior to that direction being given.

The public has the opportunity to submit written correspondence for applications where the Public Hearing has been waived. Notification is done through signage on the subject property, newspaper advertisements, and mailouts in accordance with the *Local Government Act* and Development Application Procedures Bylaw No. 10540.

Discussion:

Rezoning Application Z20-0019 for 185 Bach Road was brought forward to Council for initial consideration on July 13, 2020. At this meeting, Council passed a resolution to waive the Public Hearing and correspondence was accepted between July 15, 2020 and July 27, 2020.

The Office of the City Clerk received zero pieces of correspondence.

This application was brought forward with a recommendation of support from the Development Planning Department. Staff are recommending Council proceed with further readings of the Bylaw.

Conclusion:

Following the public notification period, staff are recommending that Council give Rezoning Bylaw No. 12064, located at 185 Bach Road, further reading consideration.

Internal Circulation:

Considerations applicable to this report:

Legal/Statutory Authority:

Local Government Act s. 464(2)

Legal/Statutory Procedural Requirements:

Following the notification period under s. 467 of the *Local Government Act*, Council may choose to give a bylaw further reading consideration, advance the bylaw to a Public Hearing, or defeat the bylaw. These are the same options available to Council for a bylaw that is considered at a Public Hearing.

Considerations not applicable to this report:

Existing Policy:

Financial/Budgetary Considerations:

External Agency/Public Comments:

Communications Comments:

Submitted by: R. Van Huizen, Legislative Technician

Approved for inclusion: S. Fleming, City Clerk

cc:

Development Planning

CITY OF KELOWNA
BYLAW NO. 12064
Z20-0019 – 185 Bach Road

A bylaw to amend the "City of Kelowna Zoning Bylaw No. 8000".

The Municipal Council of the City of Kelowna, in open meeting assembled, enacts as follows:

1. THAT City of Kelowna Zoning Bylaw No. 8000 be amended by changing the zoning classification of Lot B Section 26 township 26 ODYD Plan KAP57577, located on Bach Road, Kelowna, BC from the RU₁ – Large Lot Housing zone to the RU₂ – Medium Lot Housing zone;
2. This bylaw shall come into full force and effect and is binding on all persons as and from the date of adoption.

Read a first time by the Municipal Council this 13th day of July, 2020.

Public Hearing Waived by the Municipal Council this 13th day of July, 2020.

Read a second and third time by the Municipal Council this

Adopted by the Municipal Council of the City of Kelowna this

Mayor

City Clerk

Report to Council



Date: August 10, 2020
To: Council
From: City Manager
Subject: Transportation Master Plan Scenarios
Department: Integrated Transportation

Recommendation:

THAT Council receives, for information, the report from the Integrated Transportation Department, dated August 10, 2020, regarding the Transportation Master Plan Scenarios;

AND THAT Council directs staff to continue development of the draft 2040 Transportation Master Plan based on the general direction of Scenario 2.

Purpose:

To provide Council with an overview of three potential transportation scenarios and to receive direction to continue development of the draft 2040 Transportation Master Plan based on Scenario 2

Background:

This report builds off the July 27th report to Council on the Transportation Master Plan scenarios, which provided preliminary information on the transportation scenarios and resulting changes in budget allocations. This report provides a more in-depth discussion of the content of the TMP Scenarios Report (available online at: <https://kelowna.ca/tmp-scenarios-report>), including the scenario development process, scenario content, and scenario comparison analysis.

Local and Global Context: Our world is changing rapidly and global events are shaping our local community, including how we get around, both now and in the future. The TMP is being developed to be resilient and adaptable to these changing trends on the horizon:

- COVID-19: The pandemic has changed the way people travel in the short-term, with rapid increases in working from home, walking and bicycling and decreases in transit ridership. While the situation continues to be uncertain, it is important not to lose sight of the long-term vision established by Imagine Kelowna. While COVID-19 has created short-term impacts, the need to plan for long-term population growth over the next 20 years is still relevant. In addition, the TMP can help provide a roadmap for investment in Kelowna that will be an important part of economic recovery.
- Climate Change: Transportation accounts for over 50 per cent of greenhouse gas emissions in Kelowna. Given the urgency of the climate crisis, the TMP is being designed to support and align

with [Kelowna's Community Climate Action Plan](#) and will deliver on most of the transportation related actions recommended in the Plan. Examples include actions to reduce automobile dependence and improving more sustainable transportation modes, such as walking, bicycling, transit and electric vehicles.

- **Inclusiveness:** Ensuring that the planning, design and operation of our transportation network allows all people to move safely through our community is of vital importance. Council heard through Imagine Kelowna that people want to live in an inclusive city where all people feel safe and respected. Reflecting this, the TMP is being designed to align with [the Community for All Action Plan](#) and staff have applied an equity lens to the option evaluation.

What is a Transportation Master Plan? The Transportation Master Plan (TMP) will be a long-range, system-level transportation plan for the City of Kelowna. It will help to identify the strategic, prioritized investments (policies, programs, and projects) that will be needed over the next 20 years to achieve the community's vision and goals for transportation.

The TMP will help determine the projects that serve as the best investments, balancing the City's goals and financial considerations. It is a process designed to consider the "opportunity cost" of our funds, using data and analysis to compare projects to each other so that only the most cost-effective projects that are aligned with policy and provide high returns on investment are advanced.

As a system-level plan, the TMP will necessarily be at a high-level, and is not intended to provide detailed cross-sections or designs for every roadway in the City. Once the TMP is adopted, projects will continue through the project development process, which in most cases will include more detailed project-level planning and design, prior to construction.

TMP Timeline and Summary of Work to Date: Development of the TMP began in 2018 and is being developed in five phases. This report marks the culmination of Phase 3: Transportation Scenarios.



Scenario development, analysis and selection is an important part of the transportation master

planning process and marks a major milestone in the development of the TMP. Once a scenario is selected, work on Phases 4 and 5 will begin, including development of an implementation strategy and writing the draft plan. A summary of work to date is provided in the full TMP Scenarios Report (available online at: <https://kelowna.ca/tmp-scenarios-report>).

Coordination with other Plans: This report is also part of a coordinated series of reports for the 2040 Official Community Plan (OCP) and 20-Year Servicing Plan. This report, together with similar reports for parks and utilities, will culminate with a comprehensive report for the 20-Year Servicing Plan in the future that balances service levels and costs across all three of these areas to determine the total financial cost to service the 2040 OCP.

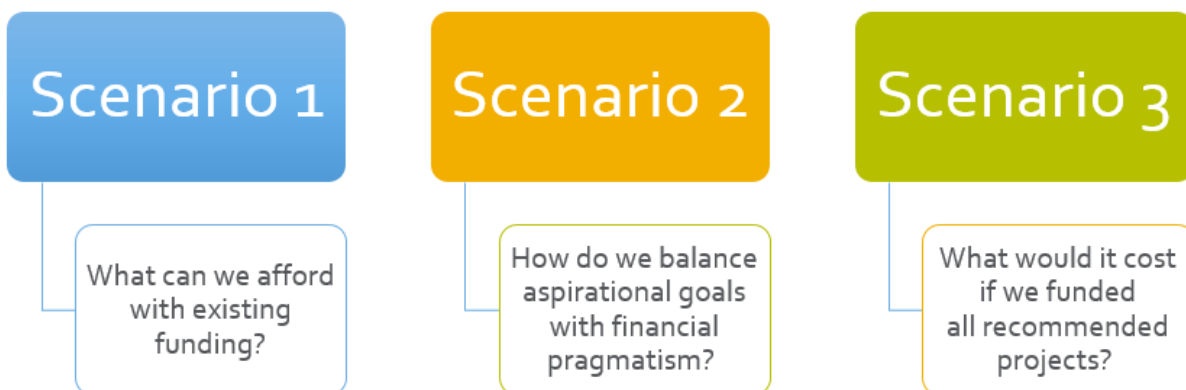
The transportation scenarios presented in this report have also been coordinated with and incorporate recommendations from the ongoing draft Regional Transportation Plan (RTP), draft Regional Bicycling and Trails Master Plan (RBTMP), and the draft Okanagan Gateway Transportation Study (OGTS). In addition, they incorporate options from existing plans, such as the 10-Year Capital Plan, Pedestrian and Bicycle Master Plan, and Community Climate Action Plan, among others.

Most importantly, the transportation scenarios are coordinated with the 2040 OCP. Notably, the OCP's growth strategy has deliberately focused on accommodating 50,000 new residents in a more compact land use form. As growth is focused in our urban centres and core area it will be important to take consistent and complementary action to invest in safe, attractive and convenient transportation infrastructure for walking, biking and transit. Due to the highly coordinated nature of the TMP and OCP, Council's direction for this report will also guide refinement to land use and policies in the draft 2040 OCP, expected to be launched later this year.

Discussion:

The detailed content of the three transportation scenarios and the supporting analysis can be viewed in the full TMP Scenarios Report (available online at: <https://kelowna.ca/tmp-scenarios-report>).

The online report includes an overview of the scenario development process, the content of each scenario, project descriptions, maps, and a comparison of the scenarios in regard to outcomes, service levels, and TMP Goal achievement.



Scenario 1 was designed to answer the question, what can we afford with current funding levels for transportation over the next 20 years? In other words, the budget for transportation would not

increase, aside from basic revenue increases due to population growth. However, Scenario 1 is not business as usual. Using the results of the evaluation process, Scenario 1 was crafted to maximize OCP support and TMP goal achievement within a similar budget as today. However, Scenario 1 would not be able to fund many of the recommended projects and would not fully support the 2040 OCP Growth Scenario.

On the other end of the spectrum, Scenario 3 was designed to answer the question, what would it cost if all the recommended projects over the next 20 years were included in the TMP? It provides a full list of all the projects that performed well in the evaluation process, fully supports the 2040 OCP Growth Scenario, and provides strong progress toward the TMP goals. However, Scenario 3 would require increasing the current transportation budget by approximately 60 per cent and is likely considered cost-prohibitive, as substantial DCC and property tax increases would be needed to fund the investment package.

To balance these two ends of the spectrum, staff prepared Scenario 2, which does a responsible job at supporting the OCP and provides meaningful progress toward the TMP goals. Scenario 2 manages to achieve this while staying within the median budget submitted by the public during the Phase 3 public engagement. Examples of some of the additional projects that could be funded in Scenario 2 include the Clement Avenue extension project, Dilworth ATC (an active transportation connection between the Okanagan Rail Trail and Mission Creek Greenway), multi-modal improvements for Lakeshore and Glenmore Road, and many of the recommendations in the draft Regional Transportation Plan and Okanagan Gateway Study. Scenario 2 does the best job at maximizing benefits while keeping costs reasonable and is the staff recommendation.

	Scenario 1	Scenario 2	Scenario 3
Financial Summary			
Annual Transportation Budget	\$48 M (+0 %)	\$58 M (+20 %)	\$77 M (+ 60 %)
DCC Revenue Increase¹	0.0% / yr	0.3% / yr	4.5% / yr
Average Property Tax Increase	0.0% / yr	0.2% / yr	0.7% / yr
Outcome Summary			
Support of 2040 OCP	minimal	moderate	most
TMP Goal Progress	minimal	moderate	most
Alignment with Regional Transportation Plan & Gateway Study	minimal (many projects not included)	moderate (most projects included)	most (all projects included)
Number of funded projects	71	99	111

¹ Estimated increase in revenue required annually over the next twenty years. Revenue changes are based on the 2030 20-Year Serving Plan & Financing Strategy which is currently under review and is subject to change. Figures are meant to illustrate at a high level the impact on the size of the future 2040 20-Year Servicing Plan & Financing Strategy. Conclusions based on development cost charge rate impacts cannot be drawn from this information.

TMP Goals – Balancing Tradeoffs: While the majority of the twelve TMP Goals show improved outcomes in 2040 compared to today, the two goals “Optimizing Travel Times” and “Protecting the Environment” are anticipated to perform worse compared to today. The reason is that Kelowna’s population is projected to increase 40 per cent by 2040. If all our future residents continue to drive as much as we do today, both traffic congestion and driving-related greenhouse gas emissions will also increase. However, all three scenarios are able to reduce the growth of traffic congestion and greenhouse gas emissions from what would have been otherwise, if we made no investments in transportation between now and 2040. While the end result is still an increase compared to today, the reality is that the scenarios all help manage these important issues, which are challenging to trend downwards in the face of a growing population and thriving economy. The degree to which each scenario manages these important issues is summarized below²:

- *Scenario 1* would result in the most future traffic congestion and greenhouse gas emissions of the three scenarios.
- *Scenario 2* helps to reduce the growth of traffic congestion more than Scenario 1 and manages to provide the same environmental benefit and greenhouse gas reductions as Scenario 3 - at a fraction of the cost. Scenario 2 has been tailored to improve roadway safety and traffic flow without tipping the scales to inducing more auto travel, working to optimize benefits and balance trade-offs across these two important goals.
- *Scenario 3* manages future traffic congestion the best of the three scenarios but performs about the same on protecting the environment and greenhouse gas emissions as Scenario 2. This is because the more than doubling of investment in road projects would likely induce some additional auto travel, counteracting some of the environmental benefits of the increased investment in transit, biking and walking that is also present in Scenario 3.

A full discussion of how the three transportation scenarios perform against each of the twelve TMP Goals is provided in the TMP Scenarios Report (available online at: <https://kelowna.ca/tmp-scenarios-report>).

Conclusion:

Transportation is consistently ranked as one of the most important public issues in the City’s *Citizen Surveys* and is critical for supporting the direction of the 2040 OCP growth scenario.

To help achieve the vision established by Imagine Kelowna it will be necessary to increase investment in the transportation network to shift as many future trips as possible to more sustainable, affordable and healthy modes of transportation. This will be necessary to keep Kelowna moving and maintain our high quality of life. The best way to do this will be by making land use decisions that reduce residential and employment growth in car dependent areas and making corresponding transportation investments to move more people in the same amount of road space and make it easy, convenient and enjoyable for people of all ages and abilities to use space-efficient and sustainable transportation modes.

² Note that mobility pricing has not been included in any of the three scenarios at this time as the tool is highly complex and likely best implemented at the provincial level, at least initially. However, it could be an effective tool at managing both traffic congestion and reducing greenhouse gas emissions over the long term. Further explorations of this strategy are recommended as part of implementing both the Regional Transportation Plan and Kelowna Community Climate Action Plan.

That said, the future is uncertain, and a key part of the Imagine Kelowna vision is to remain financially sound and economically resilient. To balance the community's aspirational goals with financial pragmatism, staff have carefully tailored Scenario 2 to deliver a cost-effective suite of options that will support the 2040 OCP and help achieve the Imagine Kelowna vision and TMP goals, while staying within the budget submitted through the public engagement process.

Next Steps:

Following Council's direction regarding the preferred transportation scenario, Phase 4 of the TMP will begin. This will include development of a phasing and implementation strategy and writing the draft Transportation Master Plan. It is anticipated that the draft plan will be circulated for public engagement later this year.

Internal Circulation:

- Communications
- Development Planning
- Development Services
- Financial Planning
- Financial Services
- Infrastructure Delivery
- Infrastructure Engineering
- Infrastructure Operations
- Parks & Buildings
- Policy and Planning
- Public Works
- Real Estate
- Utility Services

Considerations applicable to this report:

Financial/Budgetary Considerations:

Information set forth in this report contains "forward-looking information," except for historical fact, the information contained constitutes projected financial performance of the corporation with plans and bylaws that have not yet been approved/adopted by Council and is based on what staff believe to be reasonable assumptions. There can be no assurance that forward-looking information will prove to be accurate as actual results and future events, such as the adoption of the 20-Year Servicing Plan & Financing Strategy and 2040 Infrastructure Plan, could differ materially from the anticipated information and assumptions contained in this report. Readers are cautioned not to place undue reliance on forward looking information

Considerations not applicable to this report:

- Legal/Statutory Authority
- Legal/Statutory Procedural Requirements
- External Agency/Public Comments
- Communications Comments

Submitted by: M. VanZerr, Strategic Transportation Planning Manager

Reviewed and Approved by: R. Villarreal, Department Manager, Integrated Transportation

Approved for inclusion:



A. Newcombe, Divisional Director, Infrastructure

Attachment 1 - TMP Scenarios Presentation

cc: Deputy City Manager
Divisional Director, Planning & Development Services
Divisional Director, Corporate Strategic Services
Divisional Director, Infrastructure
Divisional Director, Partnership & Investments
Divisional Director, Financial Services
Infrastructure Operations Department Manager



Transportation Master Plan

Transportation Scenarios

August 10, 2020



Transportation Master Plan



TMP Vision

"Kelowna will be a city with vibrant urban centres where people and places are conveniently connected by diverse transportation options that help us transition from our car-centric culture"



TMP Goals



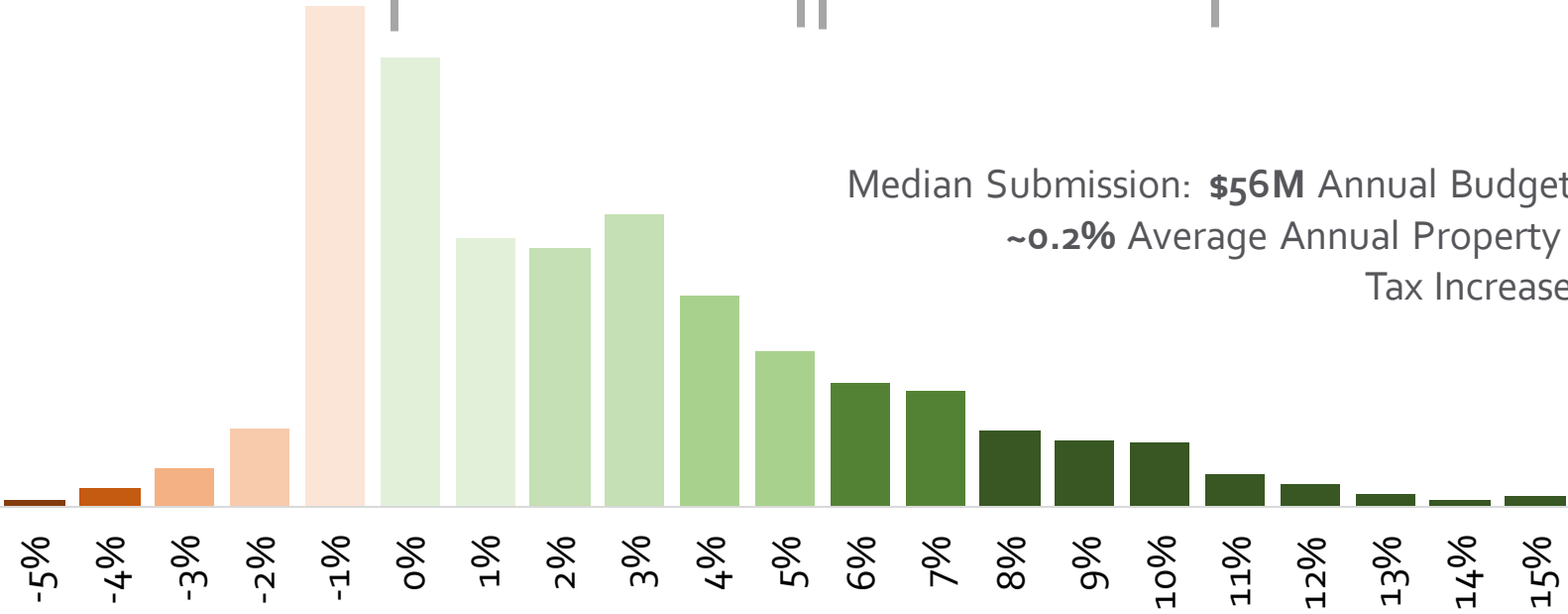
Budget Allocator Results

1/4 Decreased Budget

3/4 of Respondents Increased Budget

1/2 Increased 0 to 5%

1/4 Increased 6 to 10%



Median Submission: **\$56M** Annual Budget
 ~0.2% Average Annual Property Tax Increase

Estimated Tax Increase

Coordination with other Plans

- ▶ 2040 Official Community Plan & 20 Year Servicing Plan
 - ▶ Part of a coordinated series of reports to help determine the total cost to service the 2040 OCP
- ▶ Concurrent planning efforts:
 - ▶ Regional Transportation Plan (draft)
 - ▶ Regional Bicycling and Trails Master Plan (draft)
 - ▶ Okanagan Gateway Transportation Study
- ▶ Existing Plans

Option Evaluation

- ▶ Evaluated over 400 options (projects, policies, programs) from existing plans, public engagement, and existing and future conditions analysis
 - ▶ Policy Alignment (Imagine Kelowna, OCP, TMP Vision)
 - ▶ Benefits
 - ▶ Costs
- ▶ Methodology
 - ▶ Multiple Accounts Evaluation
 - ▶ Travel Demand Model
 - ▶ Net Benefit Analysis

Technical Analysis
+
Public Input
= **Scenarios**

Multiple Account Evaluation

▶ Benefits

- ▶ Distance driven (VKT)
- ▶ Travel mode share
- ▶ Travel time
- ▶ Connectivity
- ▶ Transit access
- ▶ Greenhouse gas emissions (GHGs)
- ▶ Travel choice
- ▶ Safety
- ▶ Number of people

▶ Policy Alignment

- ▶ Imagine Kelowna
- ▶ 2040 OCP Pillars
- ▶ TMP Goals

▶ Costs

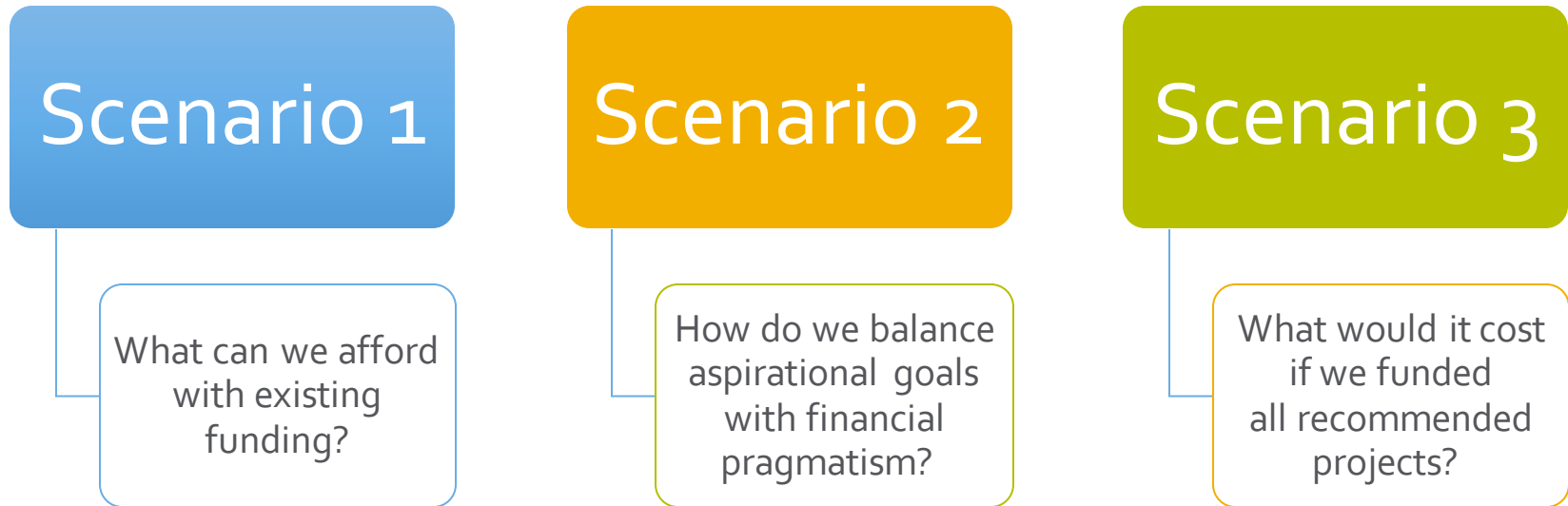
- ▶ Capital
- ▶ Operating

Travel Demand Model & Net Benefit Analysis

- ▶ More than 50 projects / project combinations modeled
- ▶ Net Benefit Analysis
 - ▶ Time savings
 - ▶ Safety
 - ▶ GHGs
 - ▶ Capital & Operating Costs
 - ▶ User costs

Illustrative example only

Scenario Development



- ▶ Scenarios developed using a financial lens
- ▶ Key question: what is the **desired level of funding** for transportation over the next 20 years?

Full TMP Scenario Report Online

<https://kelowna.ca/tmp-scenarios-report>

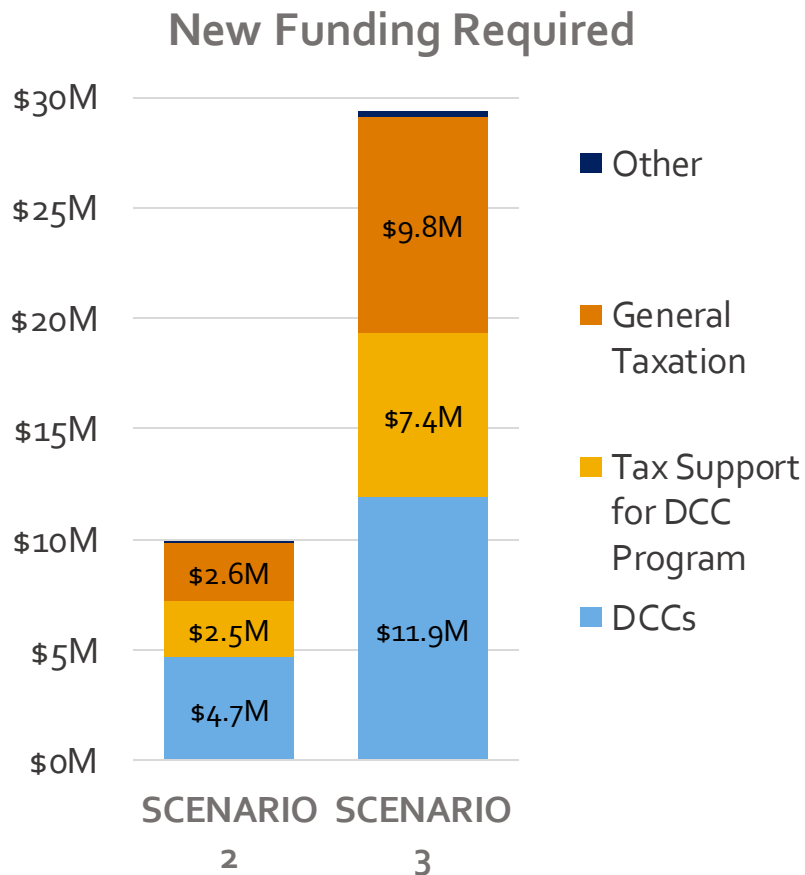
- ▶ Details of methodology
- ▶ Scenario content
 - ▶ Scenarios-at-a-glance (recommended projects)
 - ▶ Scenario maps
 - ▶ Project descriptions
- ▶ Scenario comparison
 - ▶ Financial summary
 - ▶ TMP Goal achievement
 - ▶ Outcomes / service levels

Financial Summary

	Scenario 1	Scenario 2	Scenario 3
Total Budget (20 Years)	\$960 M	\$1.16 B	\$1.55 B
Total Budget (Annual)	\$47.9 M (+0 %)	\$57.8 M (+20%)	\$77.3 M (+60%)
<i>Capital</i>	<i>\$25.2 M</i>	<i>\$32.9 M</i>	<i>\$49.4 M</i>
<i>Operating</i>	<i>\$22.8 M</i>	<i>\$25.2 M</i>	<i>\$28.1 M</i>
Partner Total (20 Years)	\$215 M	\$250 M	\$310 M
DCC Revenue Increase	0.0% / yr	0.3% / yr	4.5% / yr
Property Tax Increase	0.0% / yr	0.2% / yr	0.7% / yr

- ▶ Costs are high-level estimates
- ▶ Revenue increases are shown as annual increases (percent increase each year over the 20 year planning horizon)

Funding Sources

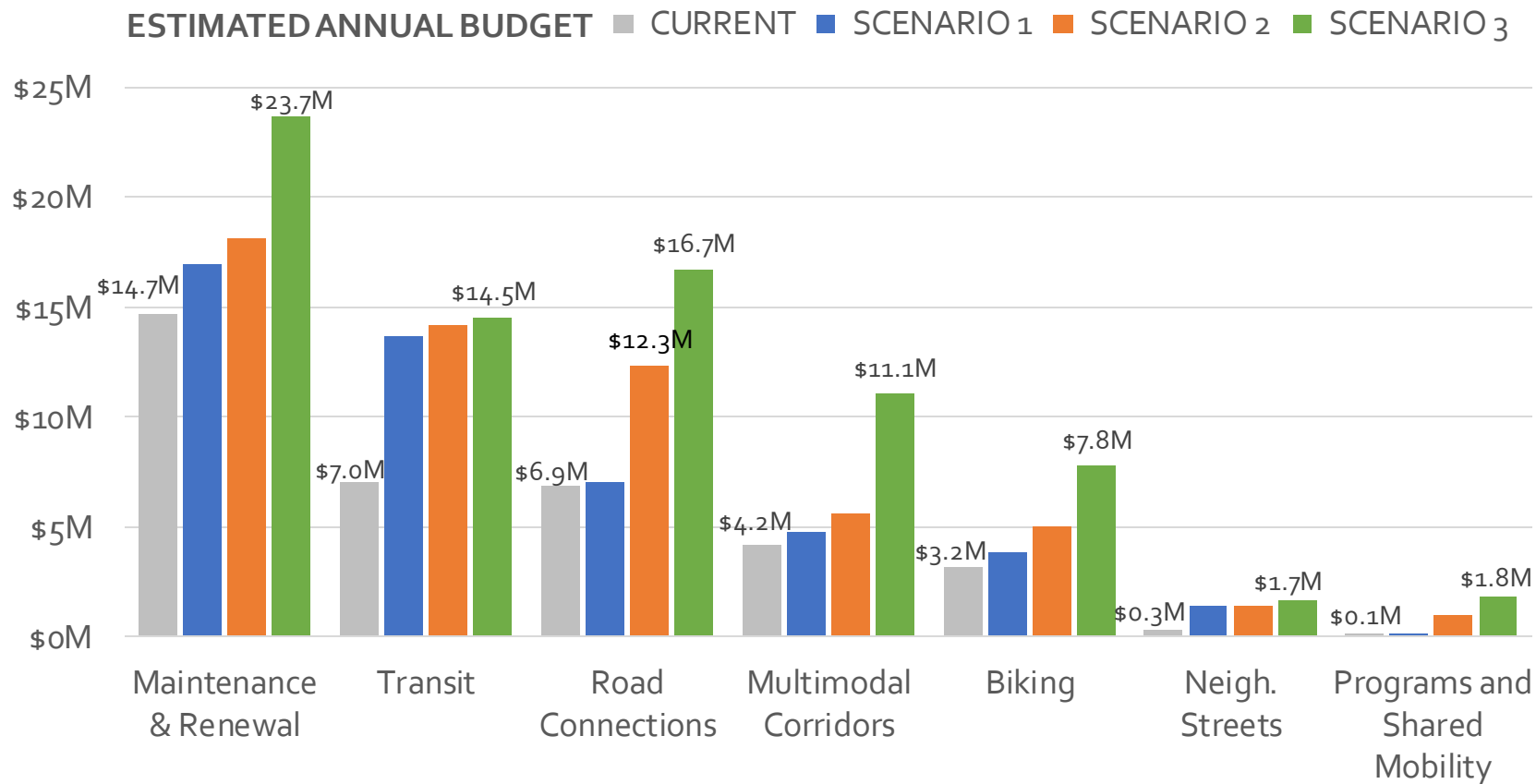


▶ Est. Annual Increases for Scenario 2

▶ Property Tax - **0.2% / yr**

▶ DCC Revenue - **0.3% / yr**

Funding by Category



Spotlight on Transit: 'Big Moves'

- ▶ Dedicated transit lanes on Harvey (RTP project)
- ▶ Better & more reliable service (~45% increase in service hours)
- ▶ Transit priority infrastructure (Scenarios 2 and 3 only)
- ▶ Improved exchanges
- ▶ New transit garage
- ▶ Leverages external funding sources
~ \$200 M



TRANSPORTATION MASTER PLAN - ROAD CONNECTIONS AND MULTIMODAL CORRIDORS

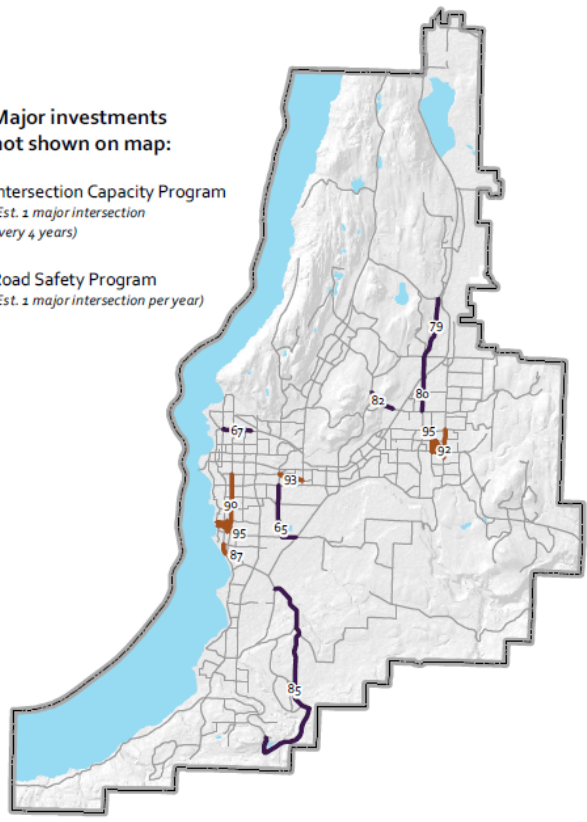
SCENARIO 1

- Road Connections in Scenario 1
- Multimodal Corridors in Scenario 1

Major investments not shown on map:

Intersection Capacity Program
(Est. 1 major intersection every 4 years)

Road Safety Program
(Est. 1 major intersection per year)



Estimated Annual Funding:

Road Connections - **\$7M**
Multimodal Corridors - **\$5M**

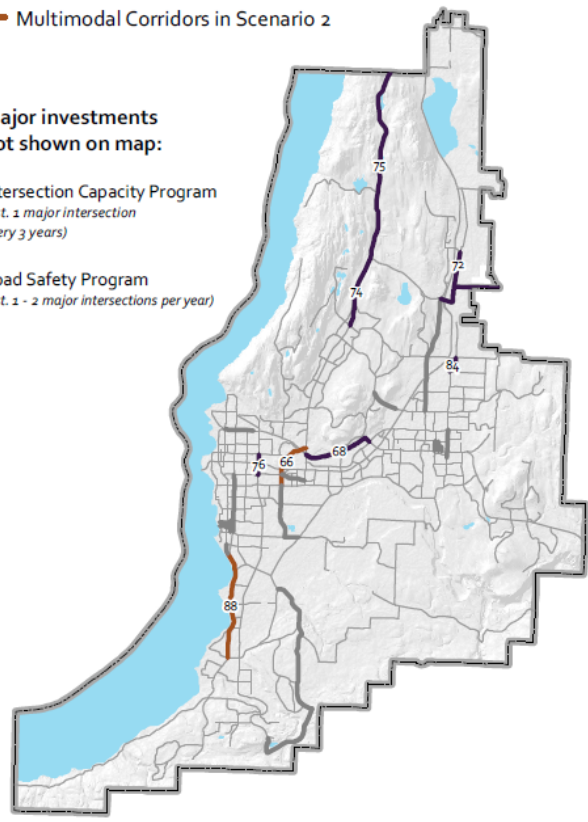
SCENARIO 2

- Projects in Scenario 1
- Road Connections in Scenario 2
- Multimodal Corridors in Scenario 2

Major investments not shown on map:

Intersection Capacity Program
(Est. 1 major intersection every 3 years)

Road Safety Program
(Est. 1 - 2 major intersections per year)



Estimated Annual Funding:

Road Connections - **\$12M**
Multimodal Corridors - **\$6M**

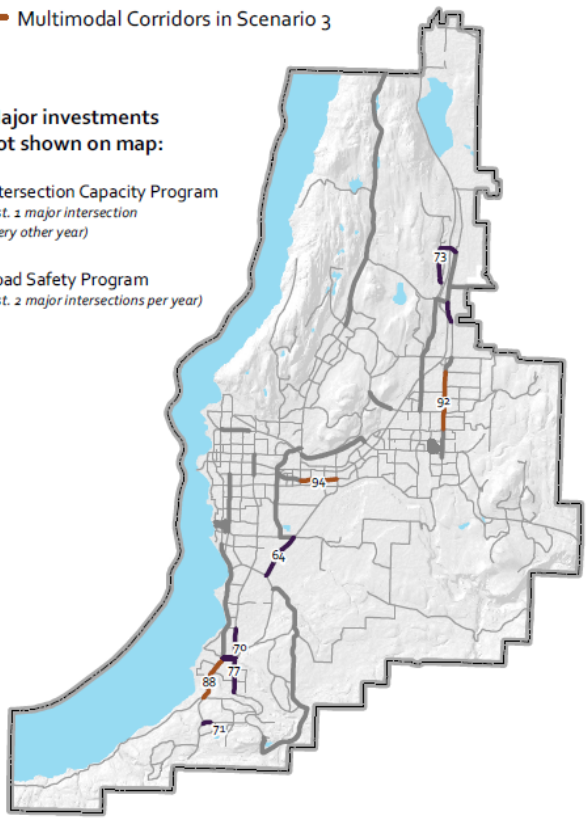
SCENARIO 3

- Projects in Scenario 1 + 2
- Road Connections in Scenario 3
- Multimodal Corridors in Scenario 3

Major investments not shown on map:

Intersection Capacity Program
(Est. 1 major intersection every other year)

Road Safety Program
(Est. 2 major intersections per year)



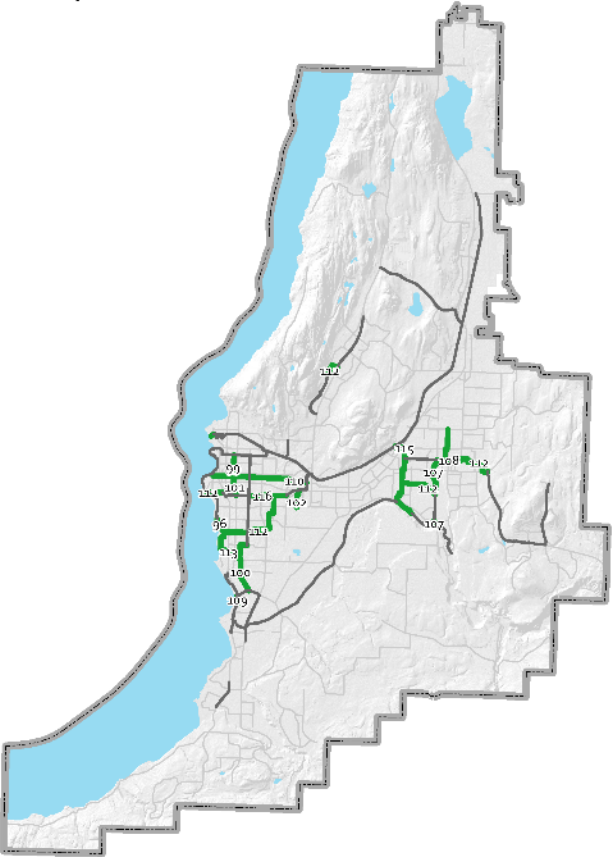
Estimated Annual Funding:

Road Connections - **\$16M**
Multimodal Corridors - **\$11M**

TRANSPORTATION MASTER PLAN - BIKING

SCENARIO 1

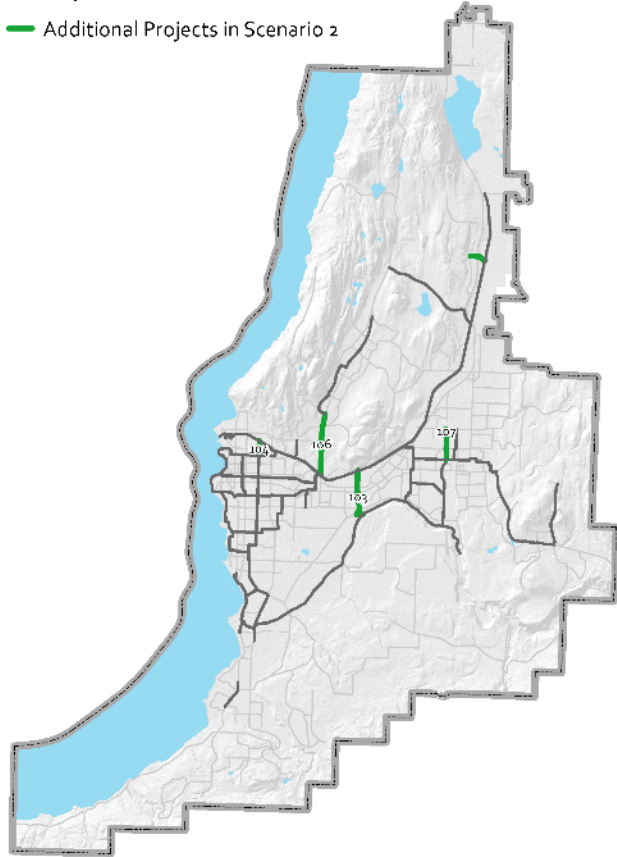
Primary Bike Network
 — Projects in Scenario 1



Estimated Annual Funding:
 Primary Bike Network - \$3.75M

SCENARIO 2

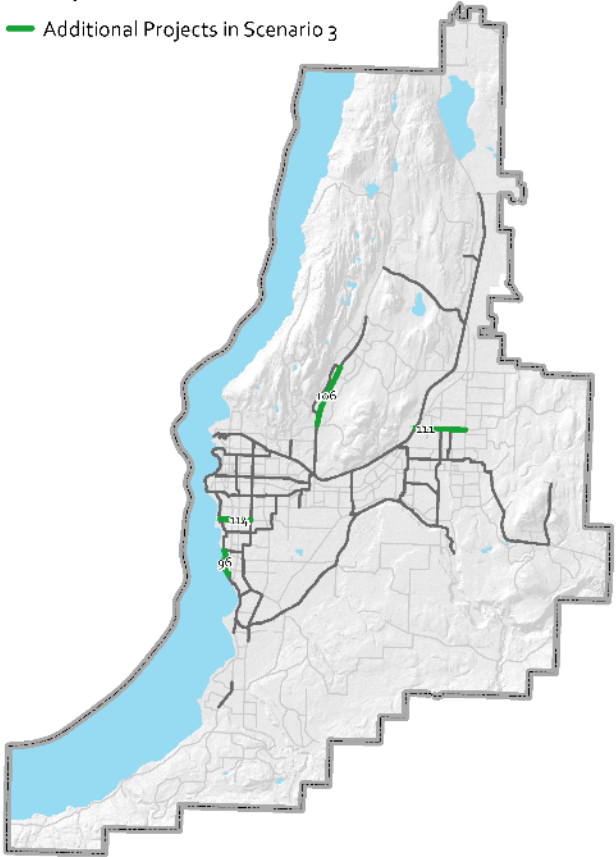
Primary Bike Network
 — Projects in Scenario 1
 — Additional Projects in Scenario 2



Estimated Annual Funding:
 Primary Bike Network - \$5M

SCENARIO 3

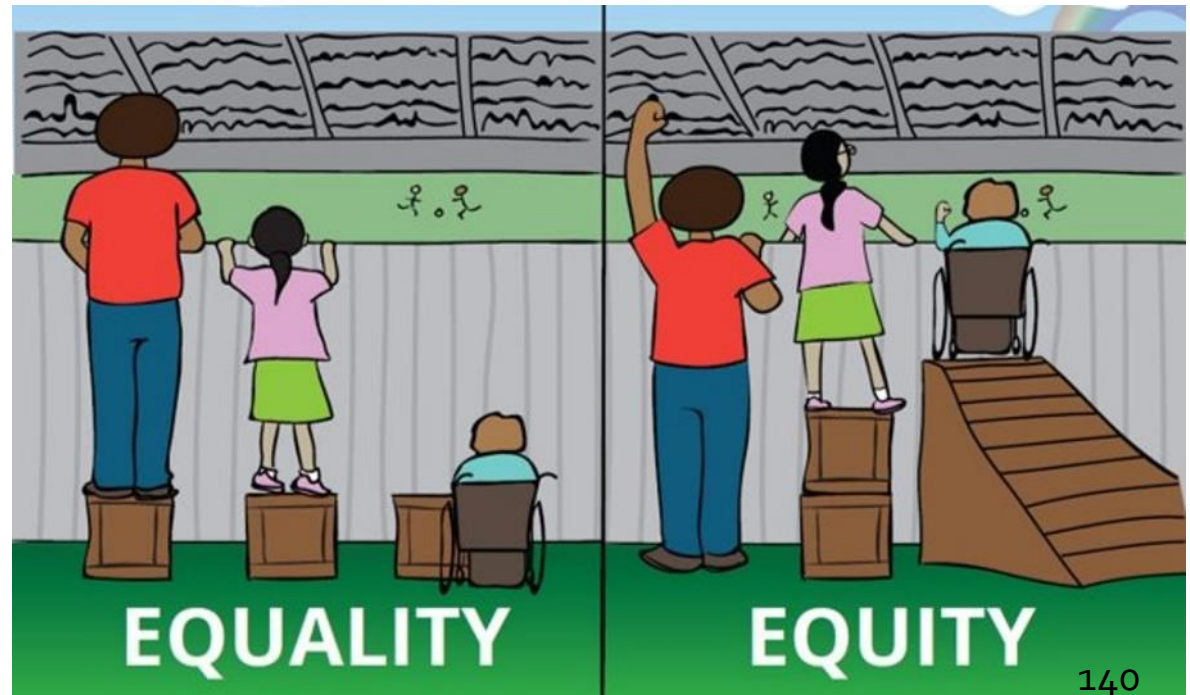
Primary Bike Network
 — Projects Scenario 1 + 2
 — Additional Projects in Scenario 3



Estimated Annual Funding:
 Primary Bike Network - \$7.75M

TMP Scenarios: Equity Analysis







- Number of people served
- Geographic distribution of investments
- Population groups served
 - All ages
 - All incomes
 - All abilities



TMP Goal Performance

TMP Goal	SCENARIO 1 (+0% Funding)	SCENARIO 2 (+20% Funding)	SCENARIO 3 (+60% Funding)
Improve safety 	Somewhat better than today	Moderately better than today	Much better than today
Foster a growing economy 	Somewhat better than today	Moderately better than today	Much better than today
Improve travel choices 	Somewhat better than today	Moderately better than today	Much better than today
Enhance urban centres 	Somewhat better than today	Moderately better than today	Much better than today
Support livable communities 	Somewhat better than today	Moderately better than today	Much better than today
Be innovative and flexible 	Somewhat better than today	Moderately better than today	Much better than today

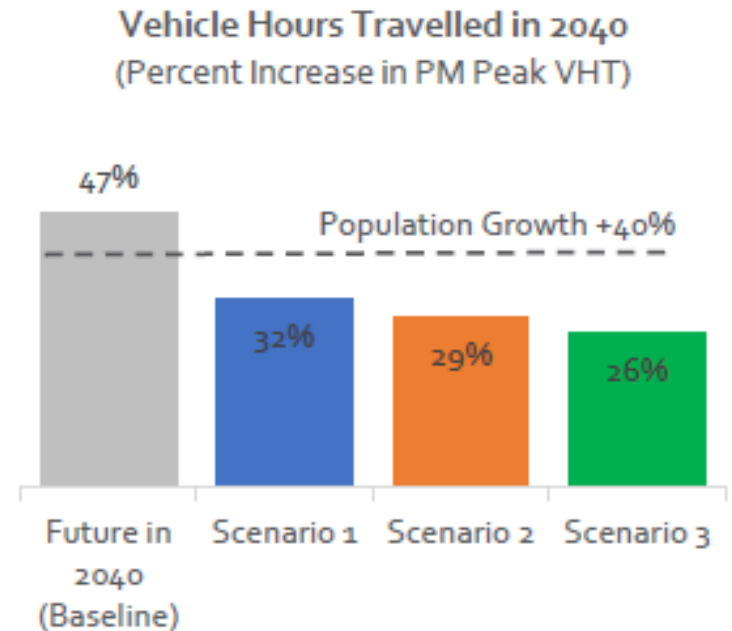
TMP Goal Performance

TMP Goal	SCENARIO 1 (+0% Funding)	SCENARIO 2 (+20% Funding)	SCENARIO 3 (+60% Funding)
Enhance travel affordability 	Somewhat better than today	Moderately better than today	Much better than today
Improve health 	Somewhat better than today	Moderately better than today	Much better than today
Promote inclusive transportation 	Somewhat better than today	Moderately better than today	Much better than today
Ensure value for public investment 	Much better than today	Moderately better than today	Somewhat better than today
Optimize travel times 	Much worse than today	Moderately worse than today	Somewhat worse than today
Protect the environment 	Much worse than today	Moderately worse than today	Moderately worse than today

TMP Goal: Optimize Travel Times



- ▶ Total VHT projected to increase
- ▶ The scenarios are able to reduce the amount of that increase



TMP Goal: Optimize Travel Times

- ▶ Average driving trip estimated to be 1.5 minutes longer by 2040 in all scenarios

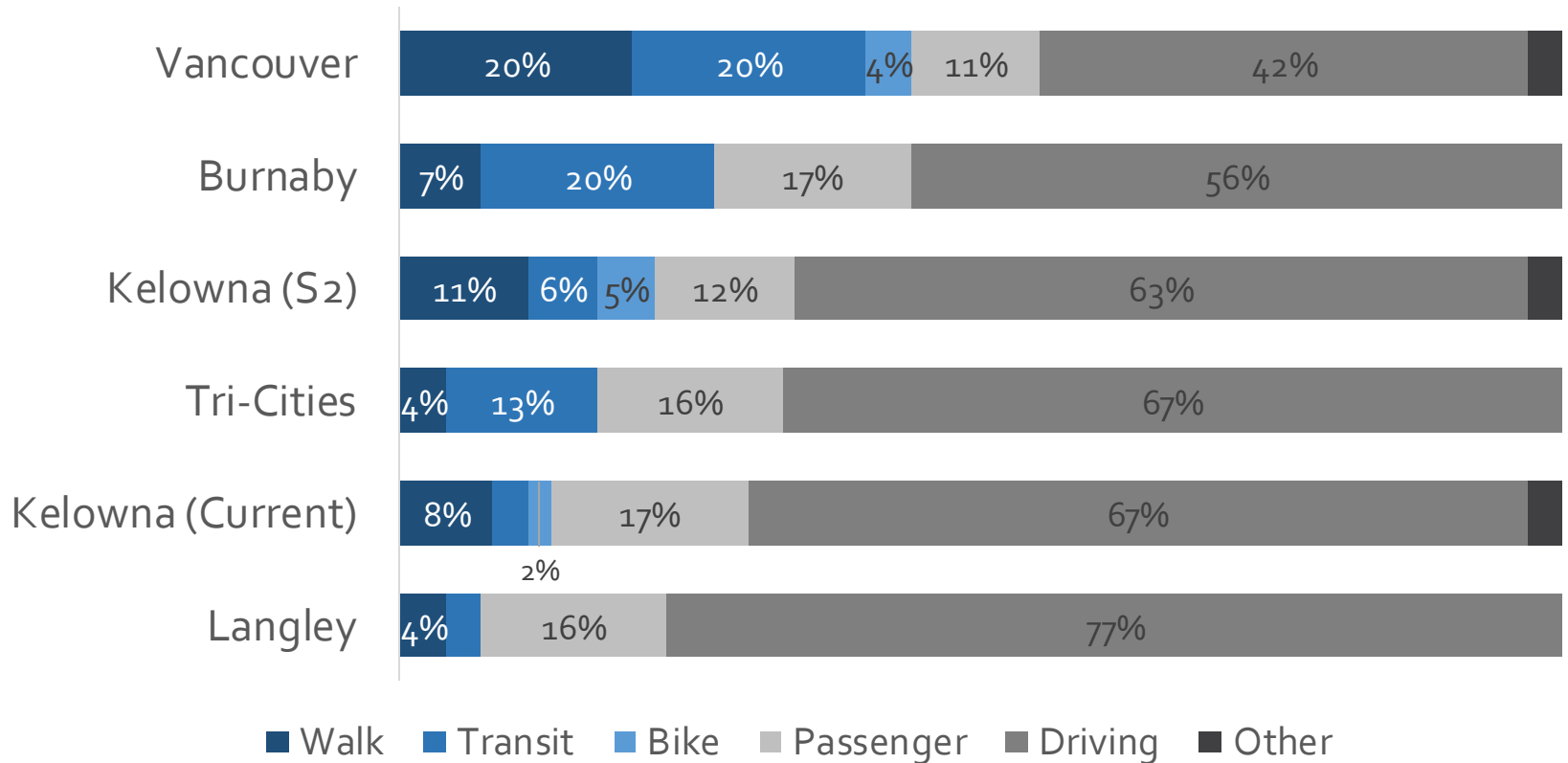
Current and Estimated Future Driving Travel Times in the PM Peak (minutes)

Route	Current	Scenario 1	Scenario 2	Scenario 3
Downtown to Lake Country (via Glenmore)	27.8	32.3	32.5	31.3
Downtown to Lake Country (via Hwy 97)	26.8	32.0	32.5	30.8
Downtown to Black Mountain	22.5	26.3	27.0	26.5
Downtown to Kettle Valley	18.8	22.5	22.8	22.5
Capri to Glenmore	9.5	12.0	12.0	12.3
Downtown to Rutland	15.8	19.3	20.0	19.5
Downtown to Pandosy	7.0	8.8	9.3	9.3
Rutland to UBCO	12.0	13.0	13.3	13.3
Landmark to Capital News Centre	9.3	12.5	12.5	12.5
KGH to Farmers Market	10.0	12.0	11.8	11.3



TMP Goal: Protect the Environment

Mode Share



Sources: 2017 Translink Trip Diary (4PM Mode Share), Central Okanagan Regional Transportation Model



TMP Goal: Protect the Environment

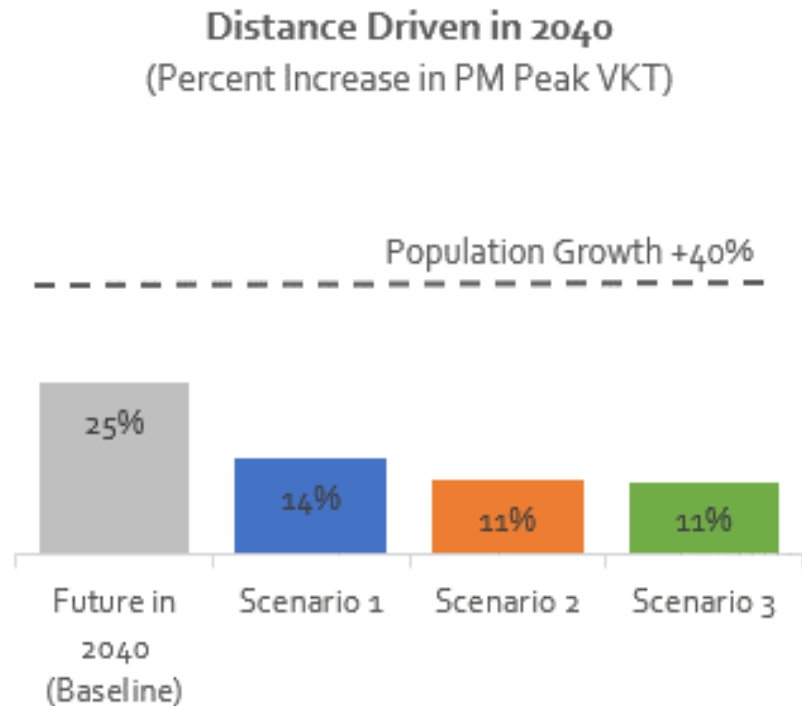
Mode Share and Distance Driven:

- ▶ Distance driven (VKT) is a better measure of emissions and congestion than mode share
- ▶ Relationship between traffic volumes and delay is not linear
 - ▶ Small shifts in volume can have a big impact on congestion

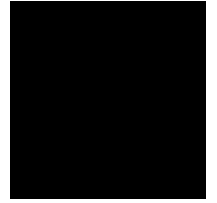


TMP Goal: Protect the Environment

- ▶ Distance driven (VKT) is projected to increase
- ▶ The scenarios are able to reduce the amount of that increase



TMP Goals – Balancing Tradeoffs



- ▶ The TMP ‘Big Moves’ will benefit *both* travel times and the environment
 - ▶ VHT and VKT are connected
 - ▶ Investing in travel options allows those who want to bike, walk or take transit to do so
 - ▶ Frees up road space for trips that must be made by auto/truck
- ▶ Scenario 2 tailored to optimize benefits and balance tradeoffs, while avoiding “induced demand”

Alignment with Servicing Plan

Service Level Summary

Transportation	Scenario 1		Scenario 2		Scenario 3	
Category	Funding Increase	Service Level	Funding Increase	Service Level	Funding Increase	Service Level
Roads	Minor	↓↓	Moderate	↓	Significant	↓
Transit	Moderate	↑	Moderate	↑↑	Moderate	↑↑
Active Transportation	Minor	↑	Moderate	↑↑	Significant	↑↑↑
Annual Transportation Budget	Current + 0% (Model A)		Increased Funding + 20% (Model C)		Increased Funding + 60% (Model D)	

TMP Scenarios Summary

	SCENARIO 1	SCENARIO 2	SCENARIO 3
Financial Summary			
Annual Transportation Budget	\$48 M (+0 %)	\$58 M (+20 %)	\$77 M (+60 %)
DCC Revenue Increase	0.0%/yr	0.3%/yr	4.5%/yr
Average Property Tax Increase	0.0%/yr	0.2%/yr	0.7%/yr
Outcome Summary			
Support of 2040 OCP	minimal	moderate	most
TMP Goal Progress	minimal	moderate	most
Alignment with Regional Transportation Plan & Gateway Study	minimal (many projects not included)	moderate (most projects included)	most (all projects included)
Number of funded projects	71	99	111

Conclusion

- ▶ Transportation is important to the public and critical for supporting the 2040 OCP
- ▶ Increased investment over the next 20 years is necessary to keep Kelowna moving and protect our quality of life
- ▶ Scenario 2 (staff recommendation):
 - ▶ Crafted to support the 2040 OCP & Imagine Kelowna
 - ▶ Balances aspirational goals with financial pragmatism
 - ▶ Aligns with the median budget submitted by the public

Next Steps

- ▶ Phase 4:
Implementation
Strategy
- ▶ Phase 5:
Development of
draft TMP (fall 2020)
 - ▶ Public engagement
- ▶ Development of final
2040 TMP



Report to Council



Date: August 10, 2020
To: Council
From: City Manager
Subject: 20 Year Servicing Plan Update – Water, Wastewater, Stormwater
Department: Infrastructure Engineering

Recommendation:

THAT Council receives, for information, the report from the Infrastructure Engineering Department dated August 10, 2020, with regard to the 20 Year Servicing Plan Update – Water, Wastewater, Stormwater;

AND THAT Council supports the recommended Water and Wastewater Future Levels of Service as identified in the report from the Infrastructure Engineering Department dated August 10, 2020;

AND THAT Council directs staff to report back with a recommended Stormwater Future Level of Service;

AND FURTHER THAT Council directs staff to report back with a financing strategy for the 20 Year Servicing Plan

Purpose:

To update Council on the proposed Future Service Levels for required to address the growth projections proposed for the 2040 Official Community Plan.

Background:

The Water, Wastewater and Stormwater systems will continue to expand to support the endorsed Growth Scenario for the 2040 OCP, which shifts growth from suburban areas to the City’s Urban Centres and Core Area. From the Water and Wastewater utility perspective, increased infrastructure servicing in existing urbanized areas is more efficient and cost-effective. Existing facilities can also be expanded effectively to add resiliency to systems, such as additional pumping and transmission, to allow seamless operation when key components fail. Additional stormwater and flood mitigation infrastructure will be required to achieve the development intensification planned in the growth areas, as many of these areas are within established flood plains in the City. Managing natural assets, where possible, to relieve the additional stresses from major storm events, can also lead to improved stormwater quality into Okanagan Lake.

This analysis expands on an earlier Report to Council (March 16, 2020) that examined possible utility service levels based on three possible funding models. Based on Council direction, the service levels have been fine tuned to minimize increases to the Development Cost Charge Program (DCC Program), except where new Level of Service needs are warranted. These costs will be further refined to be included in the financial impact analysis to be completed in the fall as part of the 20 Year Servicing Planning process.

Below is the rationale for future levels of service for the self-funded wastewater and water utilities, as well as for an enhanced stormwater program that is currently funded only through General Revenue.

Wastewater

The City Wastewater Utility provides basic collection, transmission, treatment, biosolids management, operations and maintenance of all sanitary system assets. The treated effluent produced meets or exceeds regulatory requirements needed to discharge to Okanagan Lake. The biosolids are managed to meet the Organic Matter Management Regulation (OMRR) at the compost facility shared with the City of Vernon. The Wastewater Treatment Facility (WWTF) on Raymer Road has an anticipated life or capacity to around the Year 2060.

The Regional Compost Facility produces Class A compost; a safe and productive soil amendment marketed as OgoGrow. In its current configuration, the facility is nearing capacity. To accommodate growth, a new or additional biosolids management process is required. Staff have reviewed various options, which will be presented to Council in more detail later this summer.

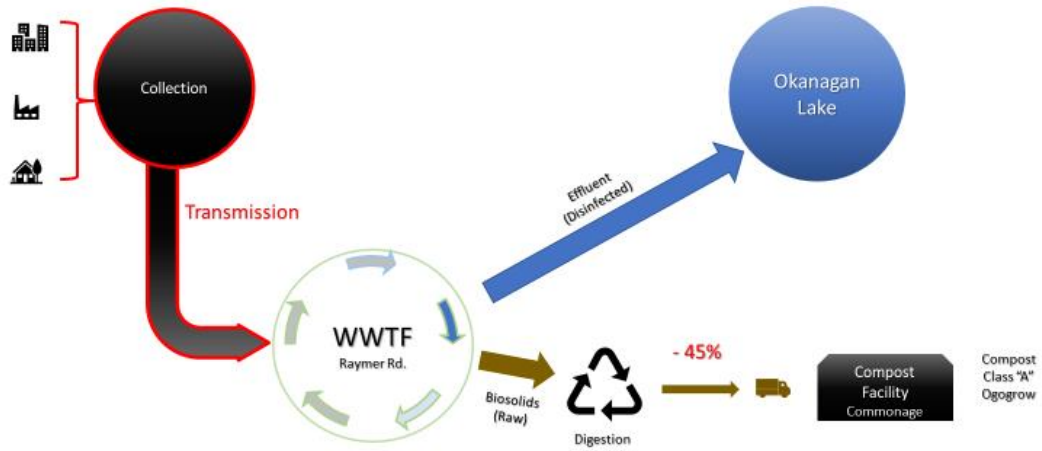
The new projects are anticipated to result in a significant net reduction of the City's greenhouse gas footprint. The digestion process alone will reduce biosolids volumes by approximately 45 percent, producing biogas which can be scrubbed and converted to natural gas.

New or expanded wastewater collection and transmission components will also be required to accommodate growth particularly the urban core areas.

Recommended Future Level of Service:


Customers can expect an efficient, reliable and sustainable wastewater collection, transmission and treatment with minimal impact to the environment.

2040 Growth Scenario



Cost and Rate Implications - Wastewater

The revenue for the new projects required for this growth is anticipated to follow current revenue projections and rate patterns. The digester, which forms the largest cost component of the plan, will require a loan/payback model. Loan payments are consistent with major treatment components costs, and therefore no utility rate increases will be required. The growth component funded by the DCC Program has yet to be determined and will be incorporated into the upcoming 20-Year Servicing Plan financial analysis. It is assumed, at this stage, that no government funding or grant program is applied.

Wastewater 		Current Program to 2040		Increase Funding by 20%		Accelerated	
Category		Funding	Service Level	Funding Increase	Service Level	Funding Increase	Service Level
2040 Infrastructure Plan	Collection	BAU	↔	Moderate	↑	High	↑
	Treatment	BAU	↔	Moderate	↑	High	↑
Growth Cost*		\$102 million		\$130 million		\$147 million	

* Estimates only based on preliminary analysis.

Water:

The City of Kelowna's Water Utility is going through some significant changes. The City has responded to the need from its agricultural and rural communities in the southeast Kelowna to provide high quality potable water for domestic use and a non-potable supply for irrigation and agricultural use.

The City potable supply comes from four deep intakes out of Okanagan Lake. Today, the raw lake water is of excellent quality, but still requires disinfection using chlorination and ultraviolet light to meet regulations and ensure public safety. Costly filtration has been avoided to date, and City staff have been trained to address operational and maintenance issues. The non-potable supply to agricultural properties in southeast Kelowna comes from upland watersheds east of the City which are operated and maintained by staff. All areas of the City serviced by the City Water Utility have systems that can provide fire flow protection, which includes adequate supply, storage and conveyance to the customer with its highest need.

Customers outside of the City utility are supplied water through purveyors, private water systems, groundwater wells, or through end-user agreements with the District of Lake Country. Purveyors are each responsible for the quality and supply to City residents within their area of operation, and are allowed to charge fees for maintenance, renewal, treatment, and administration of their systems. These systems are regulated by various agencies within the Province.

The City's ultimate goal is for all residents and customers to be supplied with a safe and reliable supply of high quality water, consistent with the Kelowna Water Integration Plan established in 2017. Over the next 20 years, the City Water Utility will be incorporating more resiliency options that result in improved interconnectivity and water quality improvements along with the other purveyors supplying water within the City limits.

From a servicing perspective, growth areas supplied by the Kelowna Water Utility will require additional capacity to meet demand. A key focus will be on the transmission of water from Poplar Point to service the City's growth areas and downtown core. A series of transmission projects will provide supply flexibility to move water efficiently and cost-effectively across the City. This strategy succeeds the previous servicing plan which focused on resiliency and improved supply conditions in the south. This earlier plan was enhanced with the conversion of the South East Kelowna Irrigation District (SEKID) system into the utility.

The Integration Plan's goal will be to extend filtration avoidance as long as possible. The City is also working on an Area Based Water Management Plan, which looks more holistically at the water cycle and the risk associated with using the Okanagan Lake for drinking water, wastewater, stormwater, source water protection, environmental and natural asset management practices. For the Area Based Water Management to be successful, other communities and the Province need to be in line with the same initiatives.


Recommended Level of Service

It is recommended that the City of Kelowna level of service apply to all customers within the City limits, to provide a cost-effective, resilient and sustainable supply of safe and high-quality water to its citizens. Water quality will be consistent and available in emergency to all users using a multi-barrier approach, which assures adequate water treatment, source water protection, operator certification, a secure distribution system, regular monitoring and a strong governance structure. The City Utility provides a non-potable and disinfected water source where possible for agricultural purposes from upland watersheds.

Cost and Rate Implications - Water

Overall, the water utility will need to increase rates to achieve the future level of service expectations (see table below). To meet the goals of the Kelowna Water Integration Plan, existing and future users will need to contribute more through either increased rates or modified use of the Water Quality Enhancement Fund currently being charged to City utility customers. DCC Program funding will likely see an increase in size to accommodate some of the major “brownfield” work required to accommodate downtown growth, costs to avoid an even more expensive water filtration plant, and accommodate operational enhancements in the agricultural system to meet growth. We foresee a 20 percent increase in DCC Program size to meet the new minimum level of service requirement under the current DCC Program methodology which is under review.

DCC Program projects and costs are currently being defined, reviewed and incorporated into an upcoming 20 Year Servicing Plan financial impacts analysis exercise which will inform the DCC rates required to support the growth scenario. It is assumed, at this stage, that no government funding or grant program is available.

Water 		Current Program to 2040		Increase Funding by 20%		Accelerated	
Category		Funding	Service Level	Funding Increase	Service Level	Funding Increase	Service Level
2040 Infrastructure Plan	Distribution	BAU	↔	Moderate	↑	High	↑
	Treatment	BAU	↔	Moderate	↑	High	↑
Growth Cost*		\$73 million		\$90 million		\$112 million	

* Estimates only based on preliminary analysis.

Stormwater:

Stormwater infrastructure is used to convey water ultimately to Okanagan Lake that would otherwise flood critical areas in the City. The stormwater system, as defined in the City's Subdivision and Servicing Bylaw 7900, consists of minor, major and natural systems.

- Minor systems are the surface infrastructure we have added to efficiently collect runoff from our City development, and typically consists of buried infrastructure such as pipeline, manholes, catch-basins and road ditches flowing to a Major or Natural system. Minor systems are typically installed through development and subdivision projects, and are acquired by the City through transfer. Minor systems are usually operated privately or maintained by City staff, are typically designed for a 1 in 5 year storm event.
- Major systems are man-made conveyances such as roads, ditches, channels, storm ponds, culverts and dams that are designed to handle larger events (typically 1 in 100 or 200 years) and prevent major damage to natural features. Major systems are usually operated and maintained by City staff.
- Natural systems are the creeks, ponds, streams, riparian areas, forests and lakes that make up the eco-system. Natural systems are typically NOT maintained infrastructure, and fall under Provincial Regulation for streamflow activities and federal regulation for Fish habitat.

Climate change patterns and an over-reliance on ground-infiltration as a conveyance put many of our existing minor and major systems under pressure during storm events, as they are unable to handle more frequent but high intensity events. Our major and natural systems are being overwhelmed more regularly, resulting in increased damage and consistently poor-quality stormwater entering Okanagan Lake.

Stormwater quality and flood protection improvements are expected to be major goals moving forward. This requires a greater focus on natural asset management; particularly stormwater assets (creeks, streams) whose key natural protections for flooding and riparian habitat have been squeezed by urban development. Policy enhancements will be required to invest further in recovering some natural asset setbacks. Mill Creek will be the main focus area in the next 10 years, where additional flood capacity, diversion upgrades, channel improvements and riparian improvements are needed to route the anticipated increase in municipal storm flows and freshet events.

To service growth, stormwater infrastructure is required. This 20 year servicing plan includes:

- Renewal, redesign and upsizing of major outlets and stormwater ponds.
- Increased capacity and operational improvements for storm outfalls in the downtown core during high lake level events.
- Increased riparian area on Mill Creek leads to improve flood capacity, stormwater quality and fish passage. Focus is on major system conveyance from the Sexsmith-Appaloosa area, Rutland and Brandts Creek.
- Flood impacts from Mill Creek and Brandts Creek need to be mitigated by rebuilding flood capacity. Projects include upgrades to the existing diversion to Mission Creek, reduce debris flow and pluggage, and temporary storage solutions. All of this requires land purchase and acquisition, channel enhancements, replacement or removal of inadequate bridge or culverts crossings, and a floodway diversion option down Clement Avenue for extreme events.


Suggested Level of Service

The City provides efficient and reliable stormwater collection systems that convey stormwater and flood waters safely to natural water courses with minimal impact to infrastructure and the environment.

Cost and Rate Implications

Flood management issues must be managed in order to achieve the area development expectations outlined in the 2040 Growth Plan. Currently, stormwater funding is limited to covering minor system replacement and some major system renewal. Major systems are expensive, and their failure can lead to catastrophic impacts. Much of this work will occur in “brownfield” conditions, where a combination of existing works, historical excavation issues and environmental permitting form much of the cost risk associated in this sector. As these components are both shared by existing users and growth, establishing a self-funded stormwater utility and DCC reserve makes sense as it is consistent with Kelowna’s funding strategy for the existing water and wastewater utilities.

To meet the revenue targets needed, a new DCC Program could be proposed to fund a portion of the costs of flood protection and major system needs. Today, stormwater renewal and upgrades are funded entirely through taxation and available grants, additional growth funding of approximately \$50 million over 20 years as noted in the table below would lead to some increased service levels.

Stormwater 		Current Program to 2040		Increase Funding		Accelerated	
Category		Funding	Service Level	Funding Increase	Service Level	Funding Increase	Service Level
2040 Infrastructure Plan	Major Systems	0	↔	Moderate	↑	High	↑
	Flood Mitigation	0	↓	Any	↑	High	↑
Growth Cost		\$0 million		\$50 million		\$50 Million	

Next Steps

Using the utility service levels provided through Council’s direction, the next step will be to provide a more detailed cost analysis and initiation plan for each infrastructure component required for the 2040 OCP and 20 Year Servicing Plan. Estimates will also be provided for growth ultimately for determination of Development Cost Charges (DCC’s) to be applied in the future. These costs will be further summarized in the financial impact analysis to be completed in the fall of 2020 as part of the 20 Year Servicing Planning process.

Internal Circulation:

Divisional Director, Corporate Strategic Services
 Divisional Director, Financial Services
 Utilities Services Manager

Wastewater Operations Manager
Water Operations Manager
Communications.
Community Planning Division;

Financial/Budgetary Considerations:

Coordination with other plans: This report is part of a series of upcoming coordinated reports for the 2040 OCP and 20-year Servicing Plan. Building off the 20-year Servicing Plan Update provided to Council on March 16, 2020, this report provides the deeper level of analysis of utility requirements for the 20-year Servicing Plan. Similar reports for transportation and parks have been submitted, culminating with a comprehensive report for the 20-year Servicing Plan that will look at balancing the service levels and costs for the three major cost centres to establish the total financial cost to service the 2040 OCP.

Considerations applicable to this report:

Financial/Budgetary Considerations: 20-Year Servicing and Financial Plan

Considerations not applicable to this report:

Existing Policy:

Personnel Implications:

External Agency/Public Comments:

Communications Comments:

Alternate Recommendation:

Submitted by: Rod MacLean, Utilities Planning Manager

Approved for inclusion:



A. Newcombe, Divisional Director, Infrastructure

Attachment 1 – 20 Year Servicing Plan Update – Water, Wastewater, Stormwater presentation

cc: Divisional Director, Infrastructure
Deputy City Manager
Divisional Director, Corporate Strategic Services
Divisional Director, Financial Services
Utilities Services Manager
Wastewater Operations Manager
Water Operations Manager

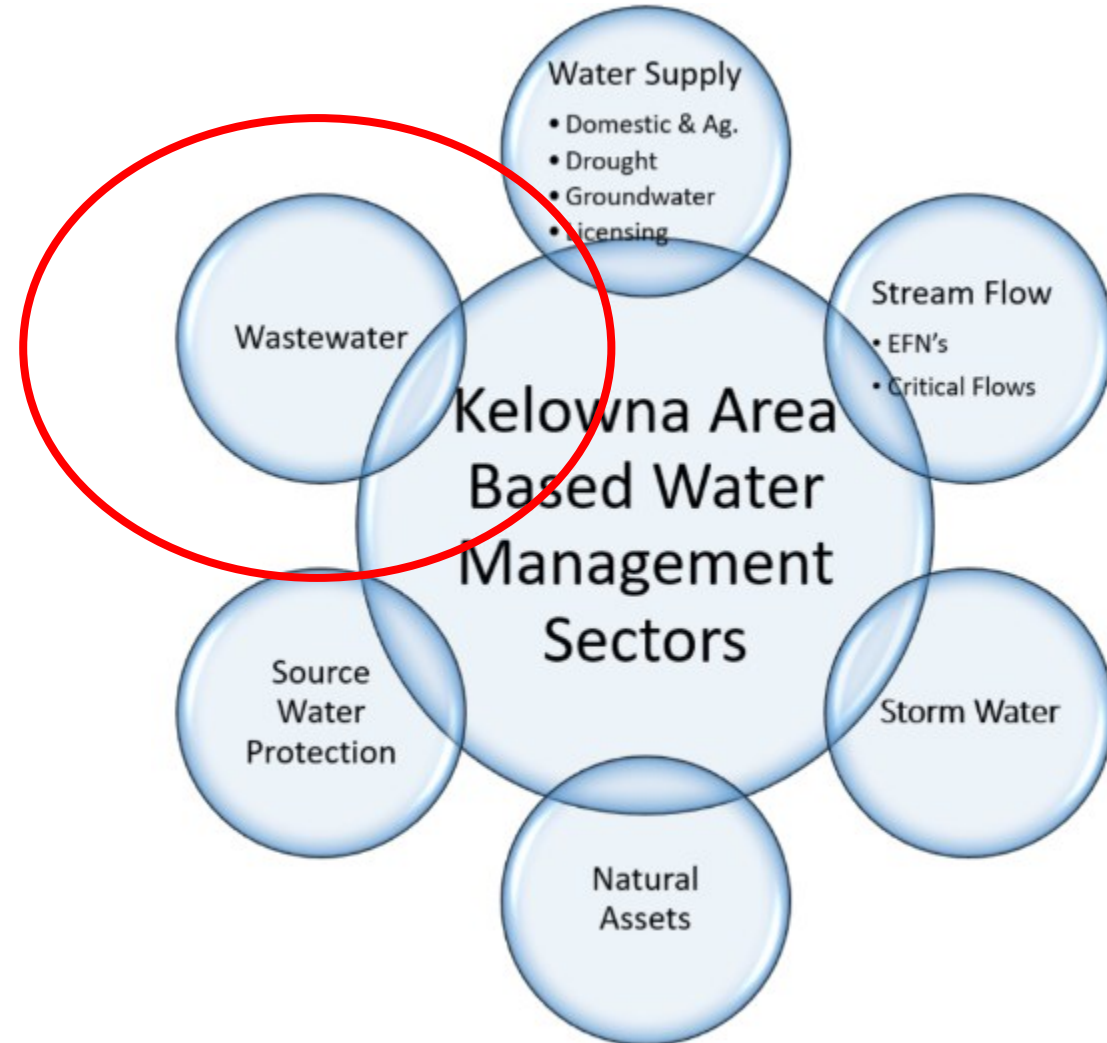
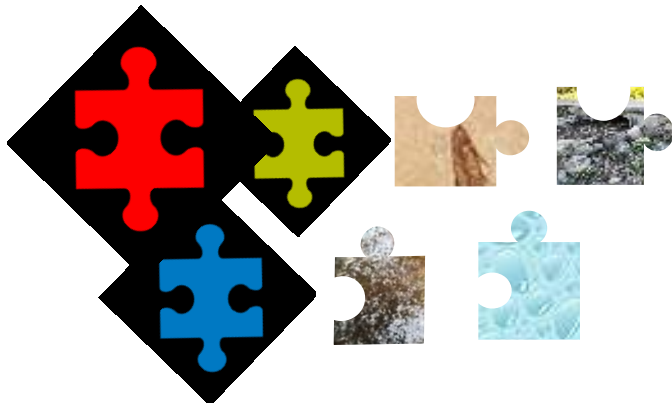
20 Year Servicing Plan – Utilities Update

Infrastructure Engineering Department | August 10, 2020

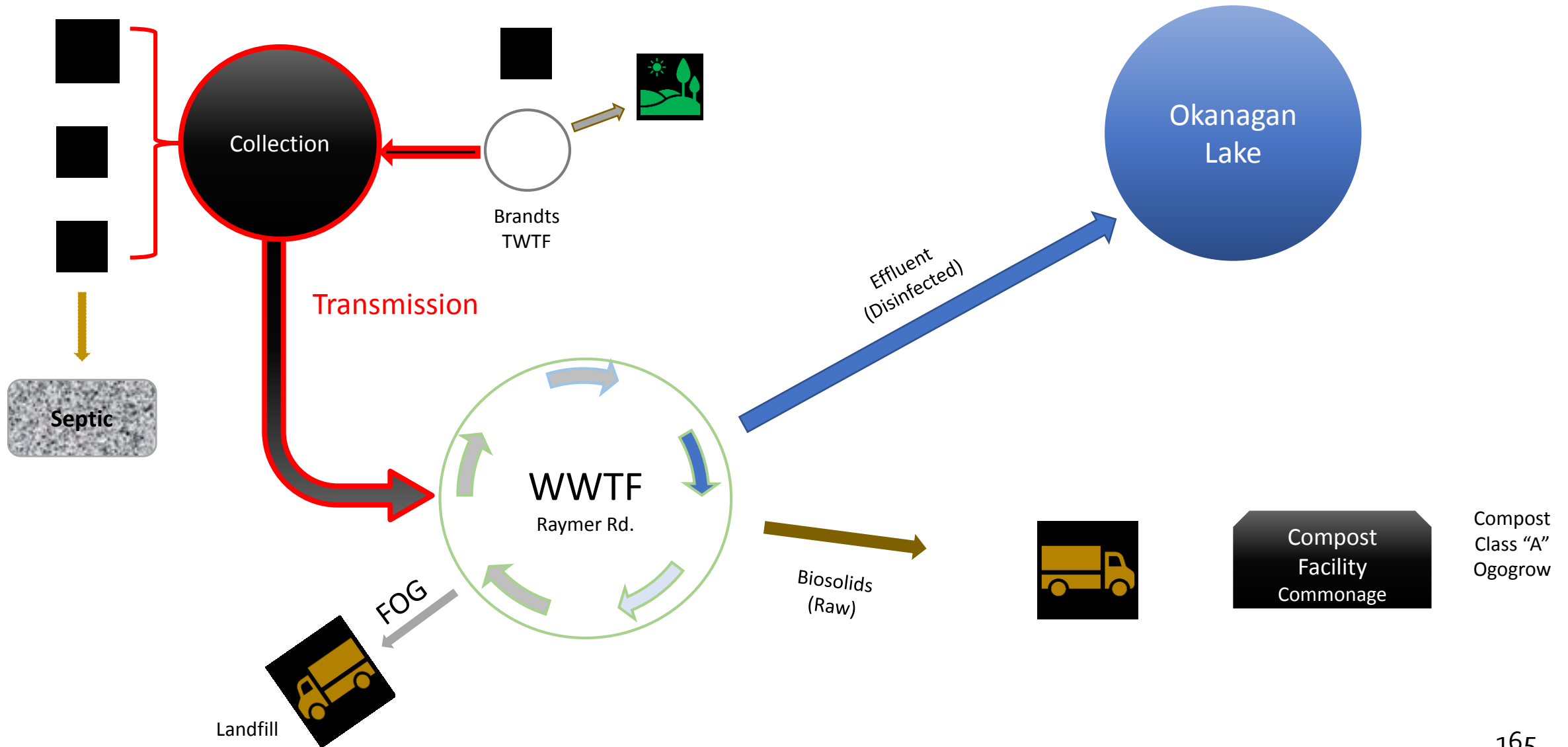
Wastewater Servicing

Area Based Water Management

- Focus on Okanagan Lake
- Strategic Planning and Policy initiatives.



Components - Wastewater



Current Level of Service

City of Kelowna Wastewater Utility

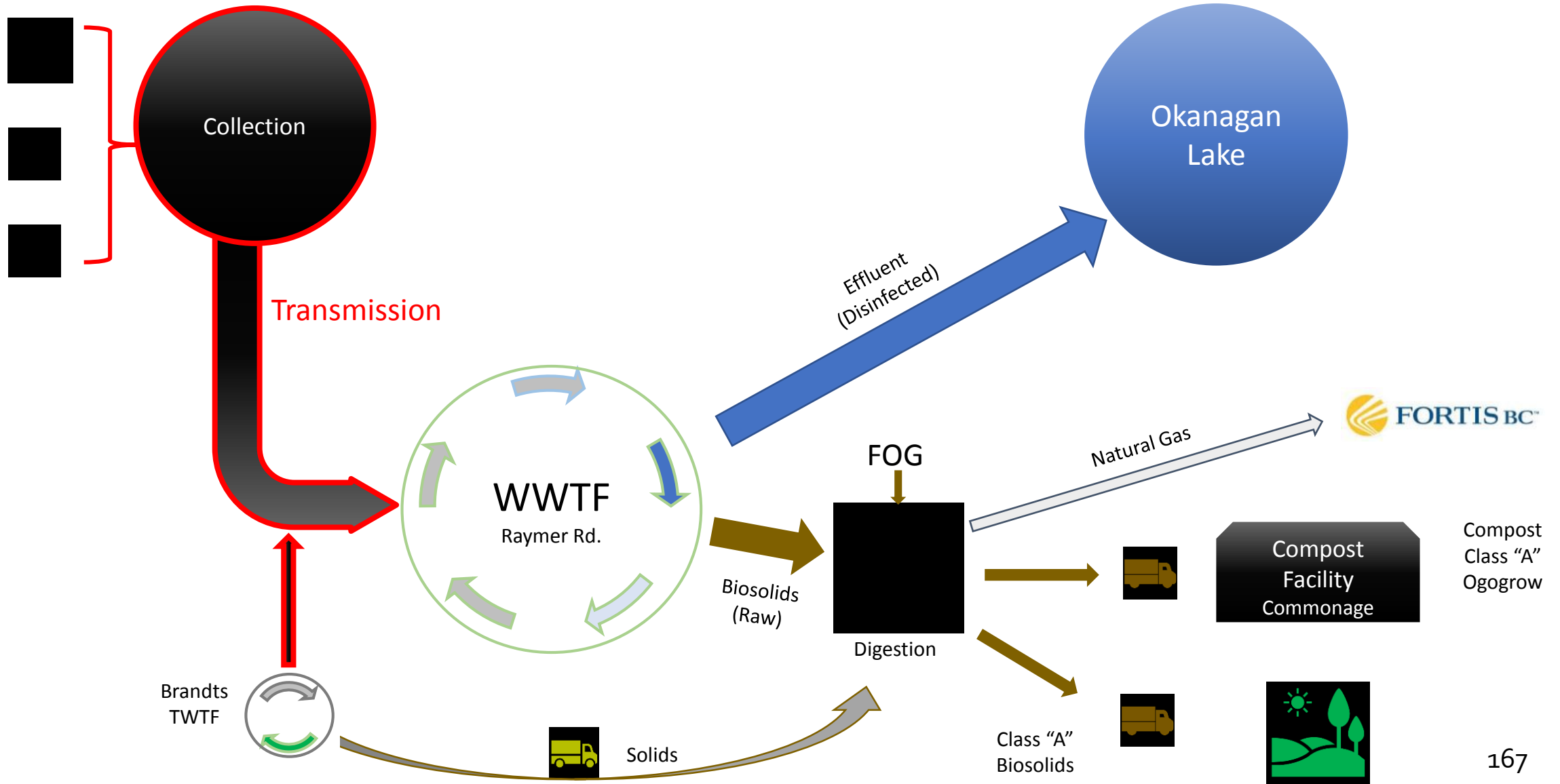
Current

- Capacity to at least 2030
 - Collection for 90% Population
 - Septic – 10%
 - Transmission
- Modern Treatment
 - Effluent Disposal to OK Lake
- Biosolids Management
 - Class “A” Compost

Goals

*Efficient and cost-effective service.
Meets regulatory needs with some flexibility
Aligns to the needs of a growing community.
Responsible discharge to the Environment*

2040 Growth Scenario




2040 OCP Level of Service

City of Kelowna Wastewater Utility

2040 LOS

- Capacity to at least **2040**
 - Collection for **95%** Population
 - Septic – **5%**
 - Transmission
- Modern Treatment
 - Effluent Disposal to OK Lake
- Biosolids Management
 - Class “A” Compost
 - **Class “A” Biosolids**
 - **FOG & Tradewaste Solids Removal**

Wastewater 		Current Program to 2040		Increase Funding by 20%		Accelerated	
Category		Funding	Service Level	Funding Increase	Service Level	Funding Increase	Service Level
2040 Infrastructure Plan	Collection	BAU	↔	Moderate	↑	High	↑
	Treatment	BAU	↔	Moderate	↑	High	↑
Growth Cost*		\$102 million		\$130 million		\$147 million	

* Estimates only based on preliminary analysis.

Additional Options

City of Kelowna Wastewater Utility

2040 LOS

- Capacity to at least 2040
 - Collection for 95% Population
 - Septic – 5%
 - Transmission
- Modern Treatment
 - Effluent Disposal to OK Lake
- Biosolids Management
 - Class “A” Compost
 - Class “A” Biosolids
 - FOG & Tradewaste Solids Removal

Goals

Efficient and cost-effective service

Exceeds regulatory needs with added flexibility

Aligns to the needs of a growing community

Holistic Approach - Source to Environment

Net reduction in GHG

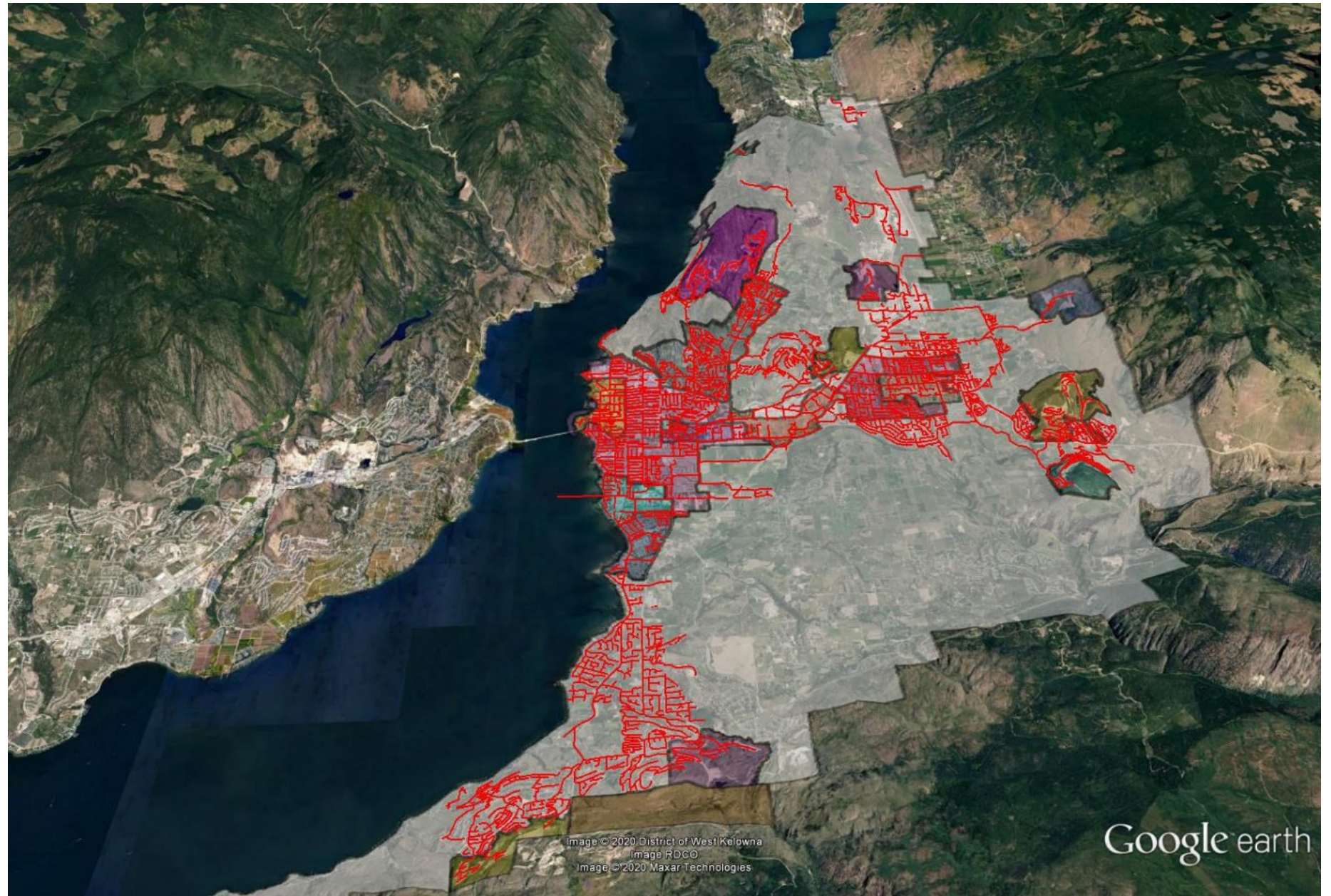
Resiliency

Other Future Considerations?

- Regional Facility(?)
- Added Biosolids Side Streams
 - Nitrogen Removals
 - Phosphorus Removals
 - Metals Removals
 - Odour control facility
- Effluent Post-Treatment (WWTF)
 - Pharmaceuticals?
 - Dissolved metals?

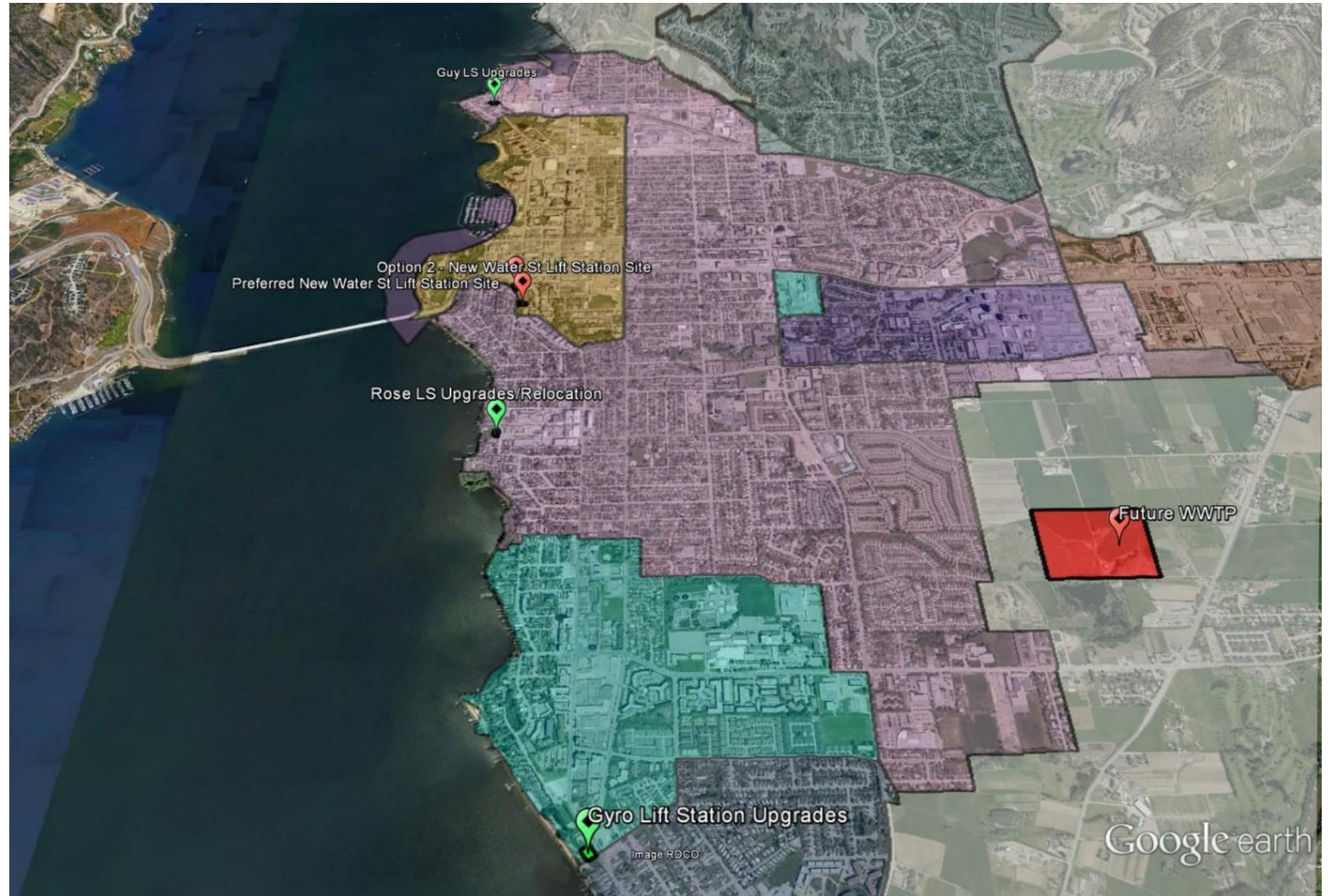
Existing System

Sanitary Mains



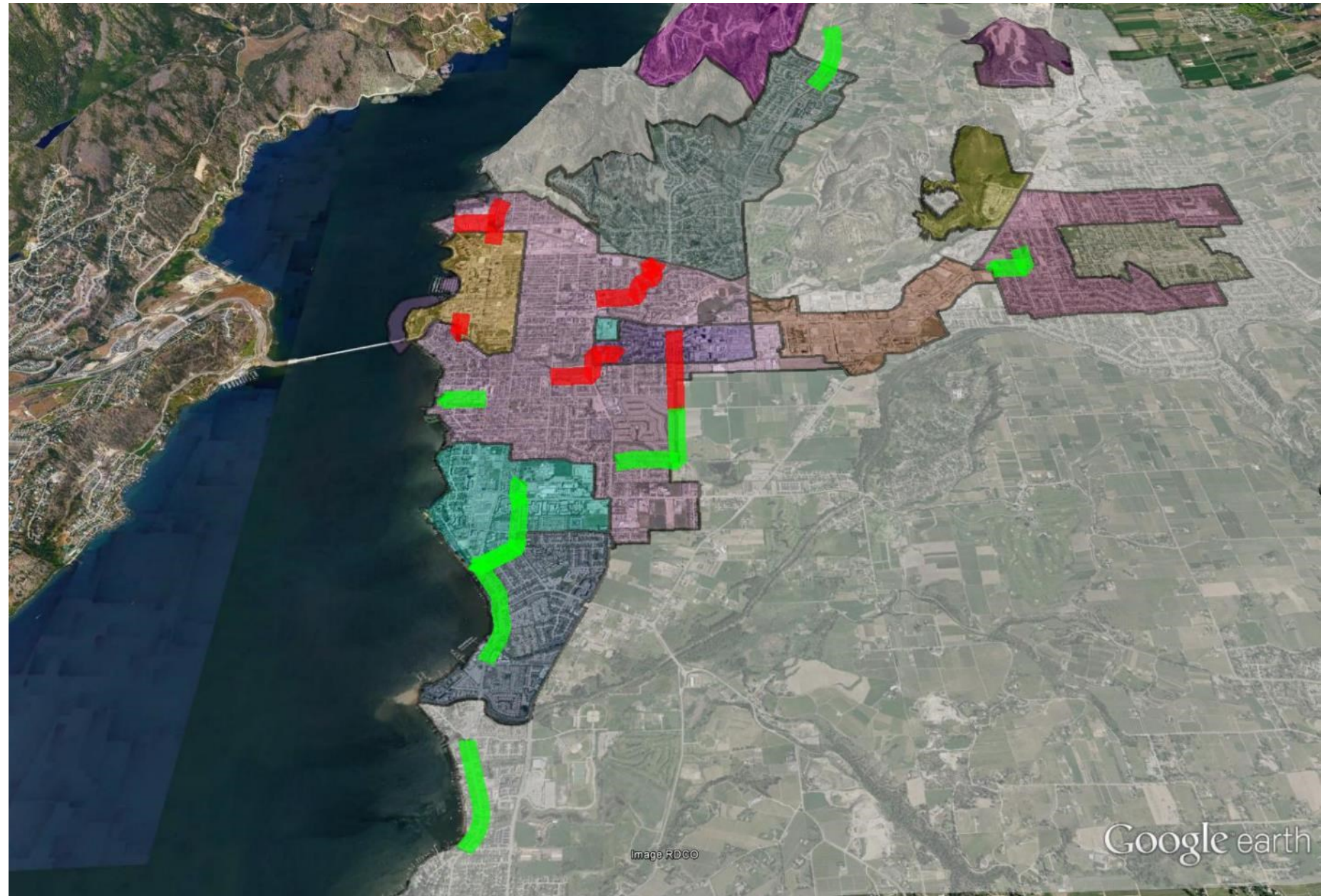
Growth Projects

Vertical



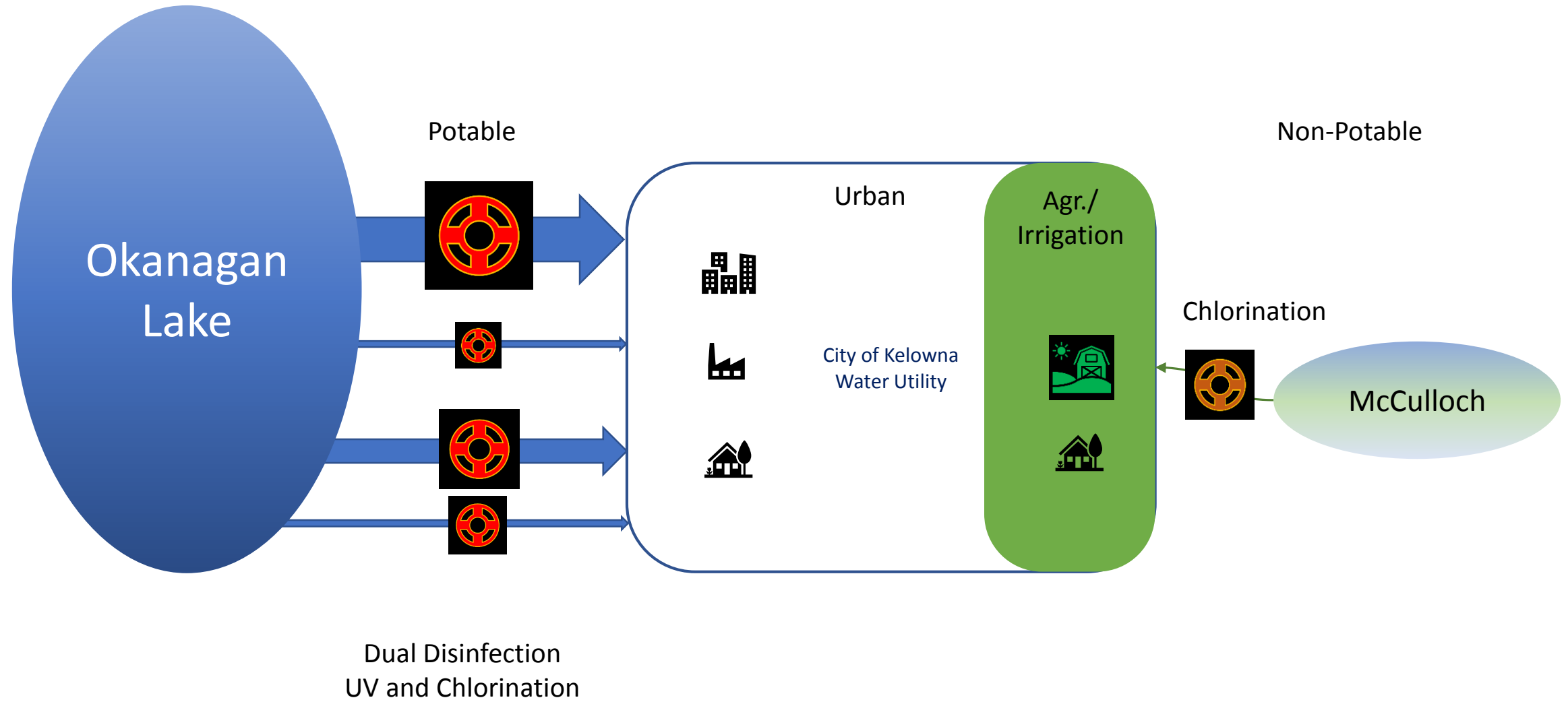
Growth Projects

Mains



Water Servicing

Water – Kelowna Water Utility





Current Level of Service - Water Servicing

Kelowna Water Utility

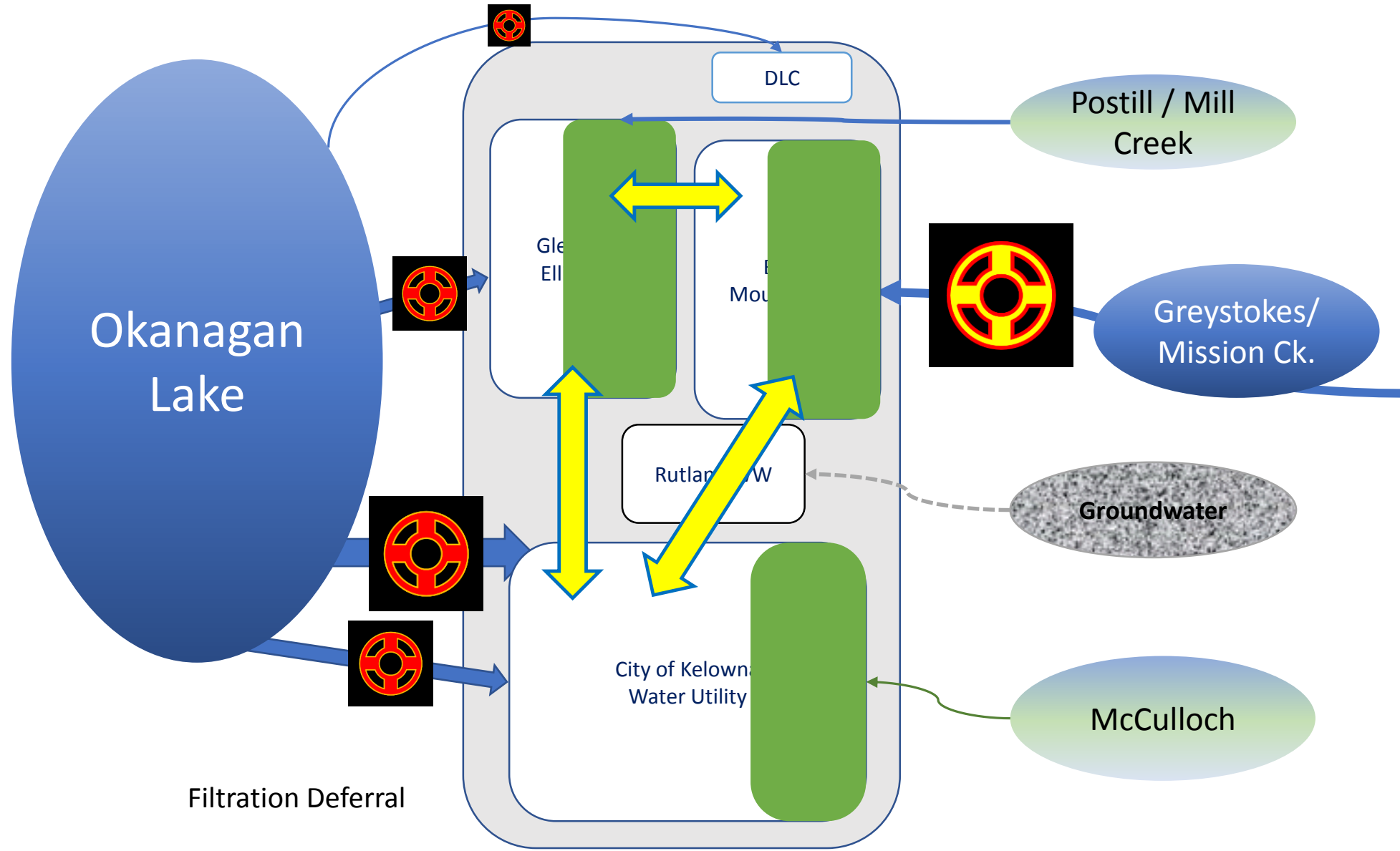
Customer Service Level Statement

Current

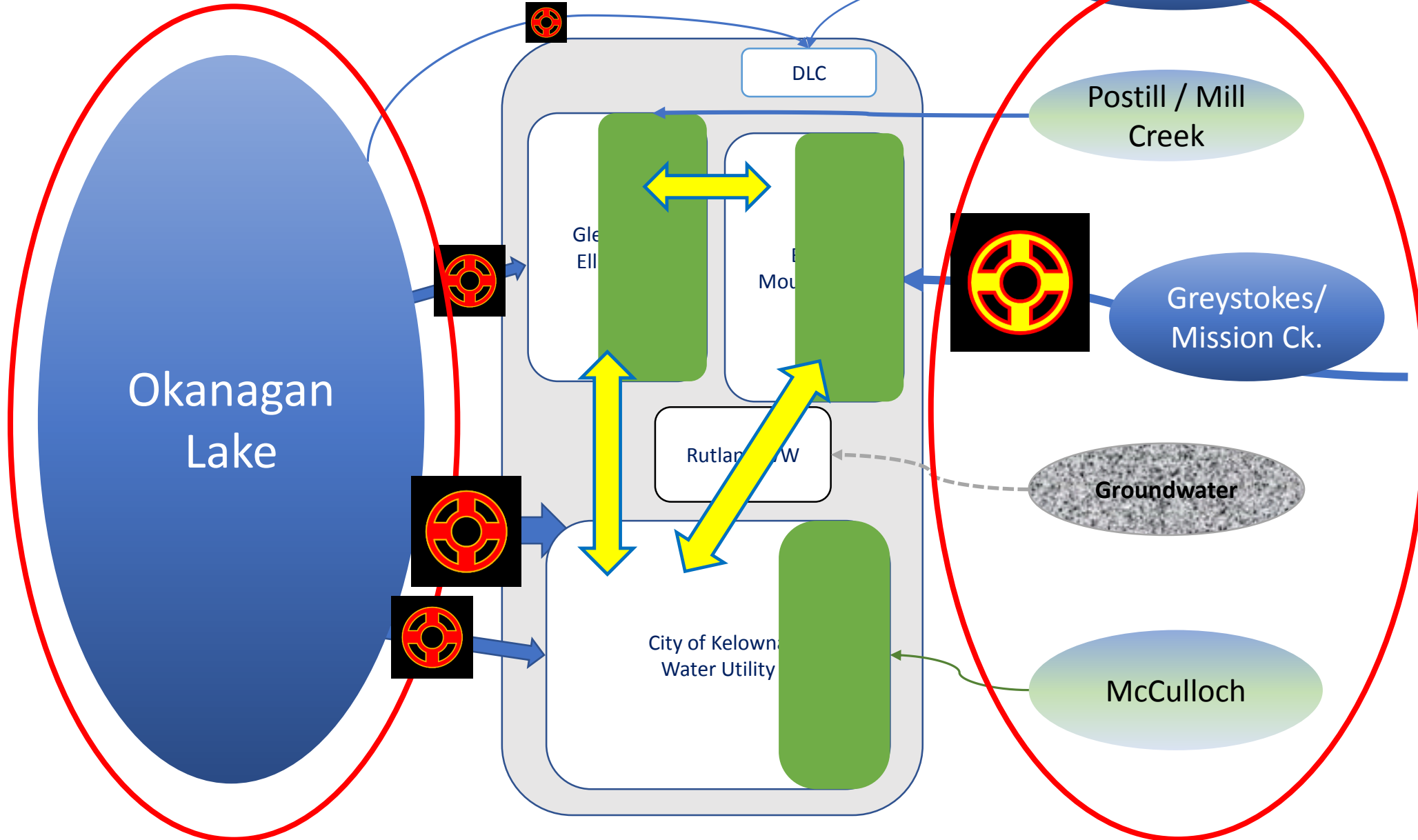
- Delivery and Mainlines
 - Capacity to at least 2030
 - 75,000 Population
- Suppliers
 - Kelowna Water Utility
 - Small Utilities and Private Systems
 - District of Lake Country
- Agriculture and Irrigation
 - Capacity to 2030
- Regulatory Compliant and forward looking

Efficient and sustainable delivery of high quality, safe, sufficient and reliable water to all customers in the Kelowna Water Utility.

Kelowna Water Integration Plan - 2017

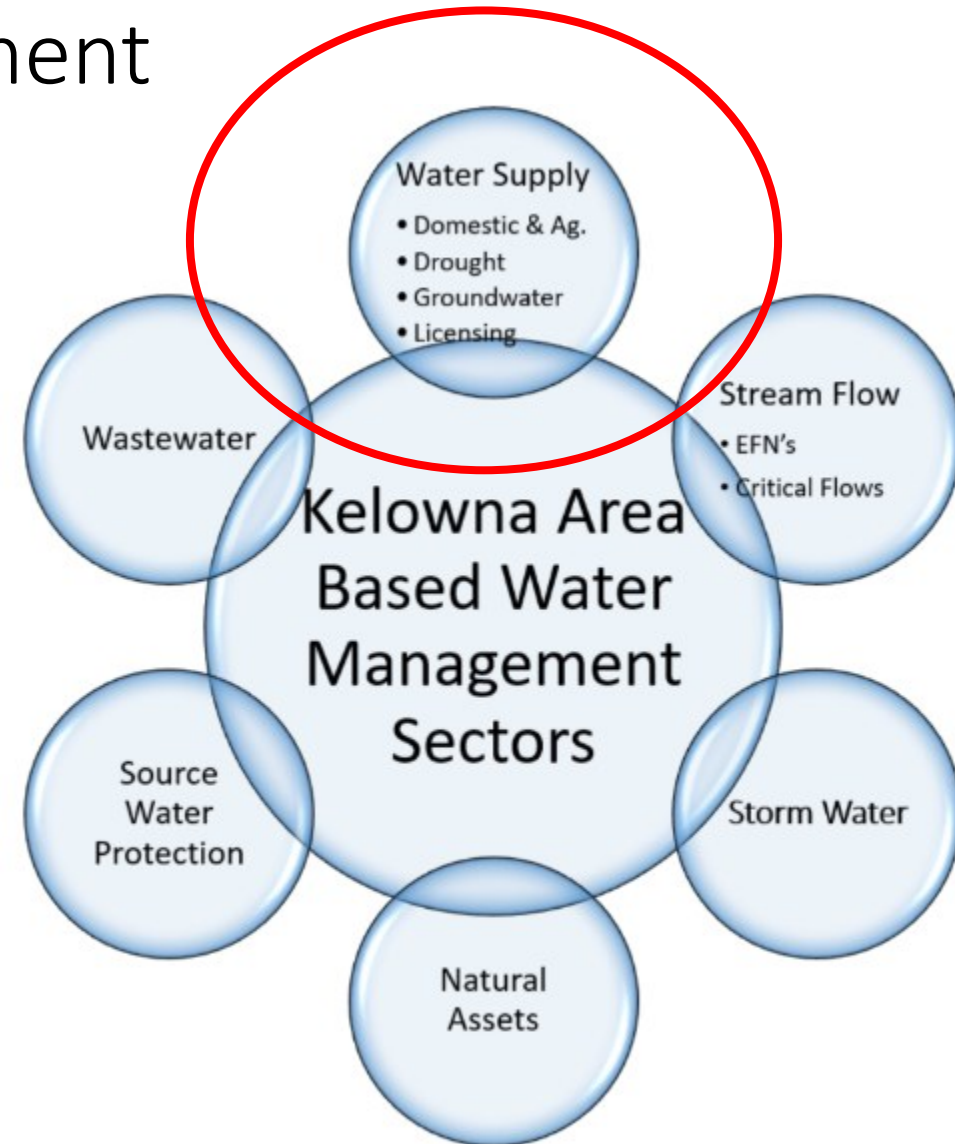
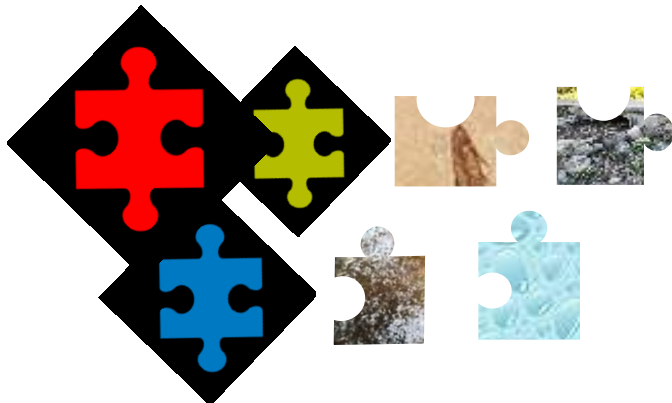


Area Based Water Management Plan

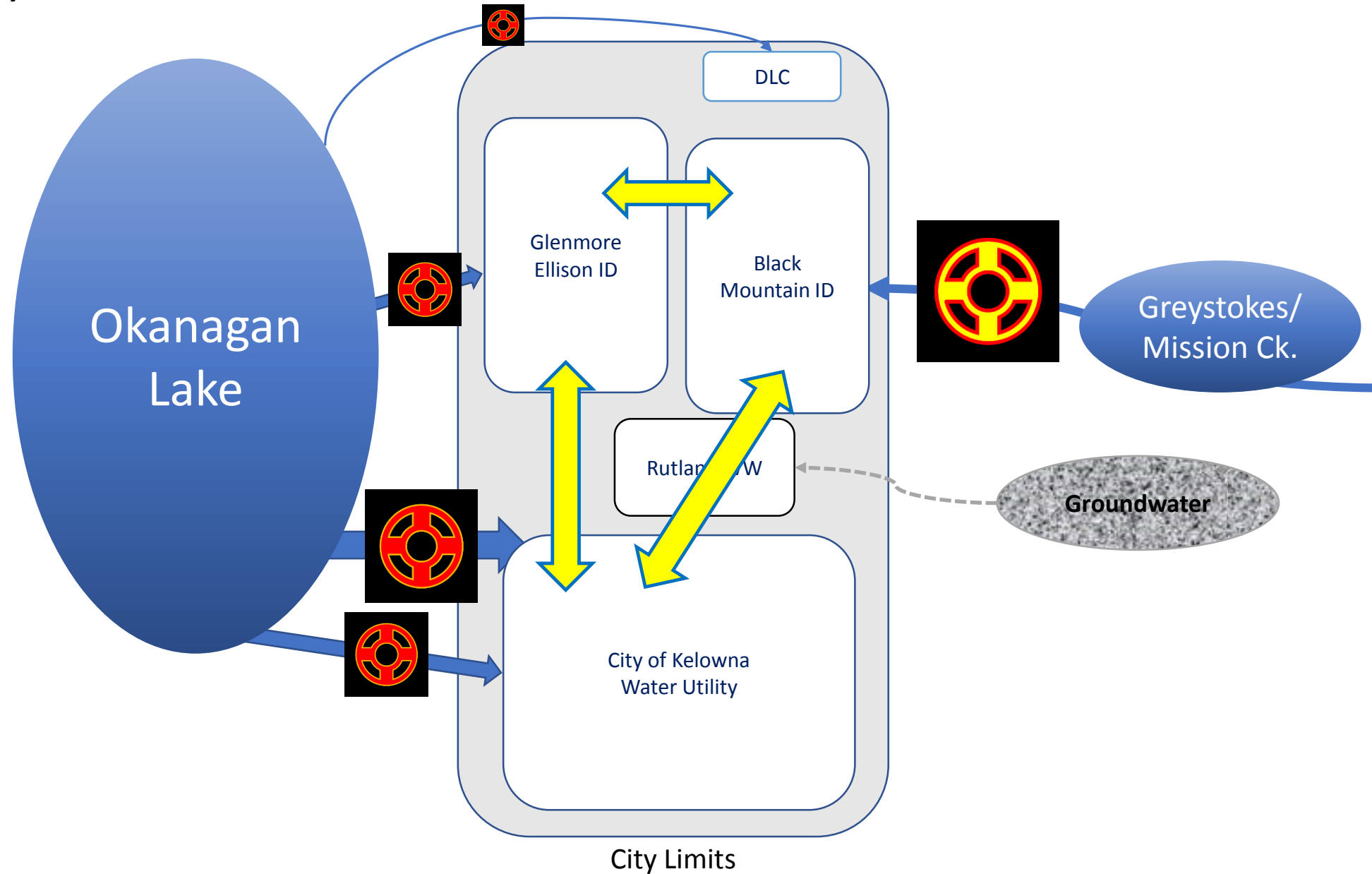


Area Based Water Management

- Focus on Okanagan Lake
- Strategic Planning and Policy initiatives.




City – 20 Year Level of Service



2040 Level of Service – Water Utility

Future

- Emphasis on Protection on Okanagan Lake water quality
- Delivery
 - Capacity to at least 2040
 - Interconnectivity with other suppliers
- Suppliers
 - Kelowna Water Utility
 - Improvement Districts
 - District of Lake Country
- Agriculture and Irrigation
 - Capacity to 2040
- Added Resiliency and movement of water
- Regulatory Compliant and forward looking

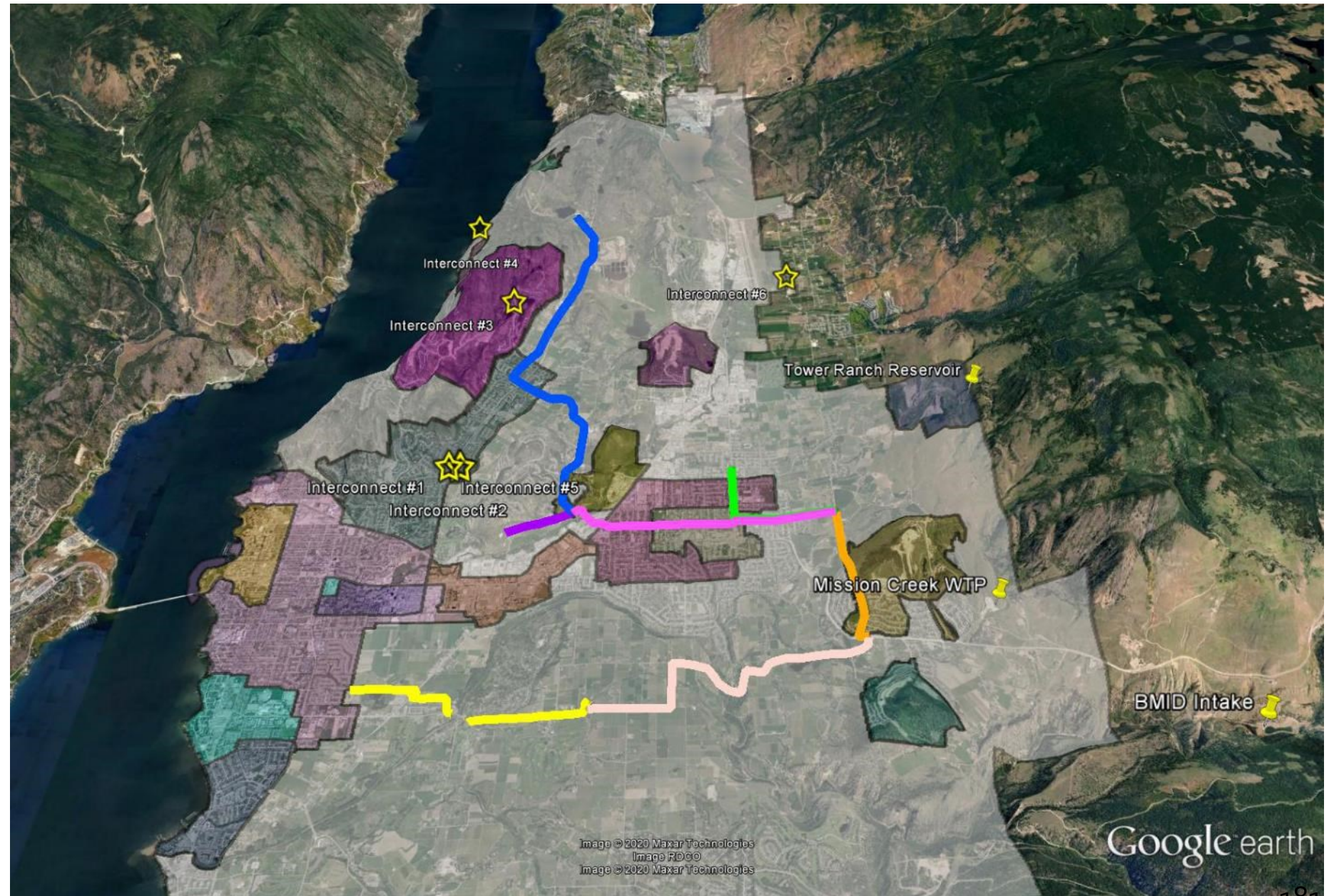
Water 		Current Program to 2040		Increase Funding by 20%		Accelerated	
Category		Funding	Service Level	Funding Increase	Service Level	Funding Increase	Service Level
2040 Infrastructure Plan	Distribution	BAU	↔	Moderate	↑	High	↑
	Treatment	BAU	↔	Moderate	↑	High	↑
Growth Cost*		\$73 million		\$90 million		\$112 million	

* Estimates only based on preliminary analysis.

KWIP Projects

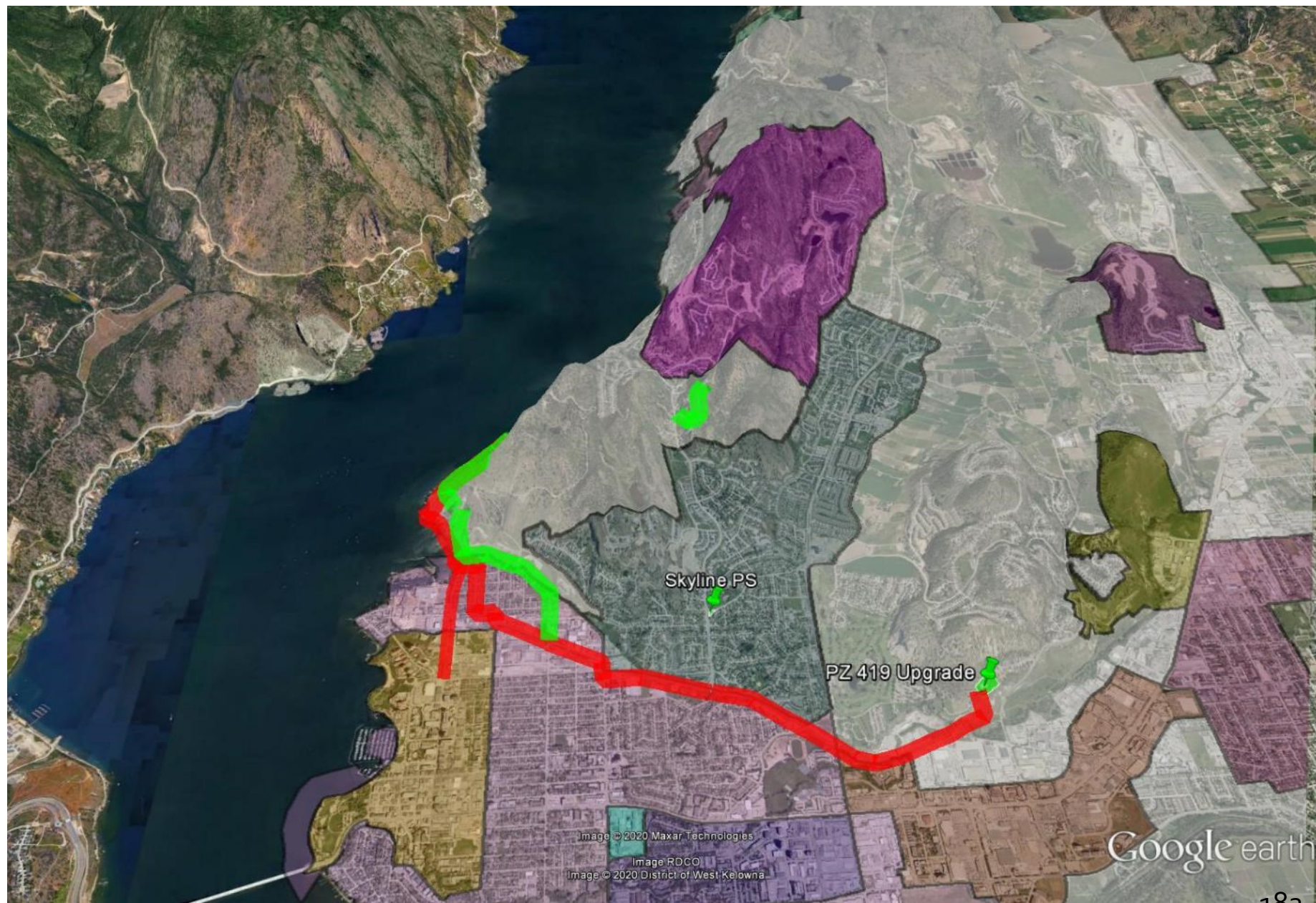
Possible
Interconnections

Work to Progress



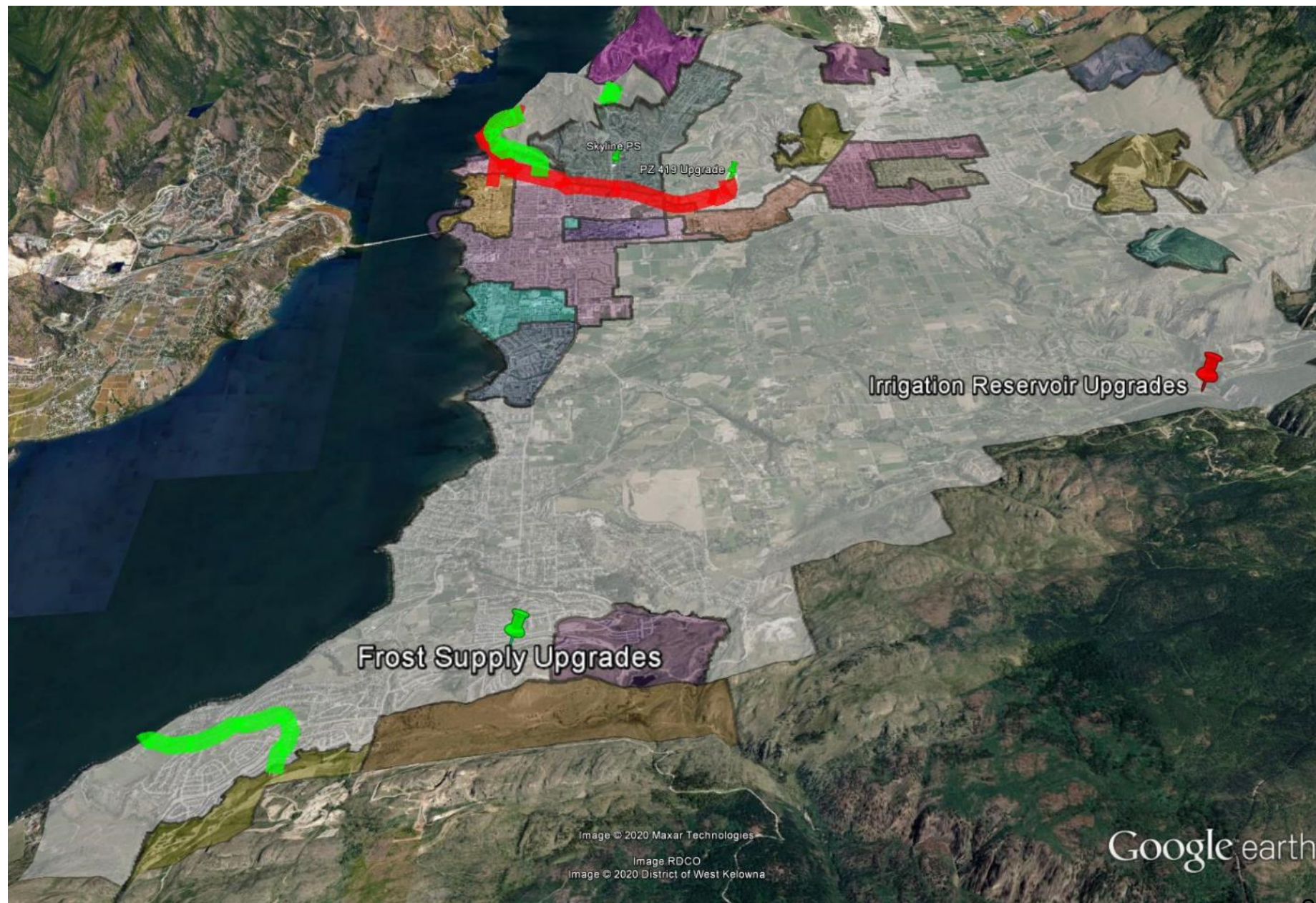
Growth Projects

Kelowna Utility Only



Growth Projects

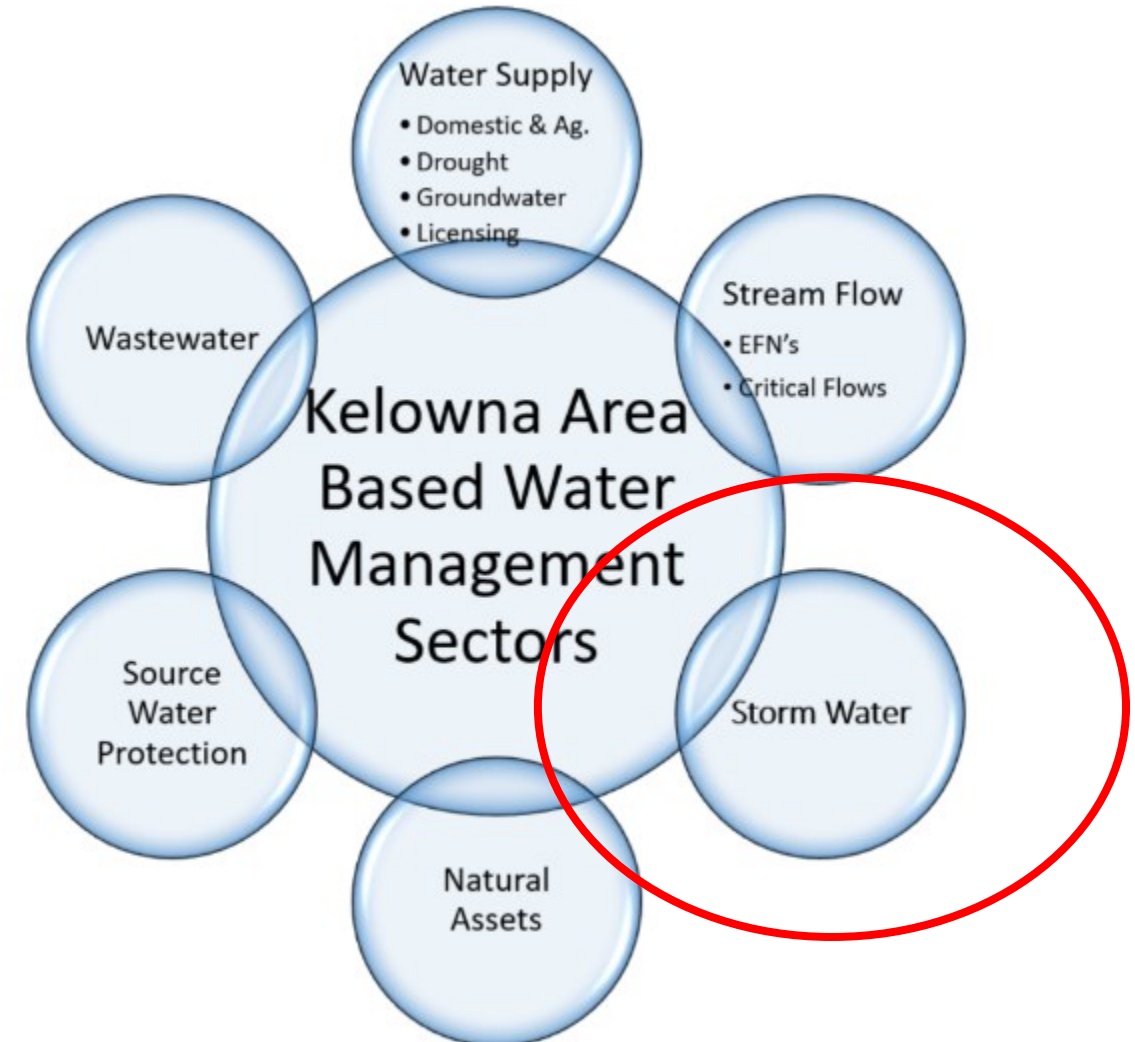
Kelowna Utility Only



Stormwater Servicing

Area Based Water Management

- Focus on Okanagan Lake
- Strategic Planning and Policy initiatives.





Stormwater Assets

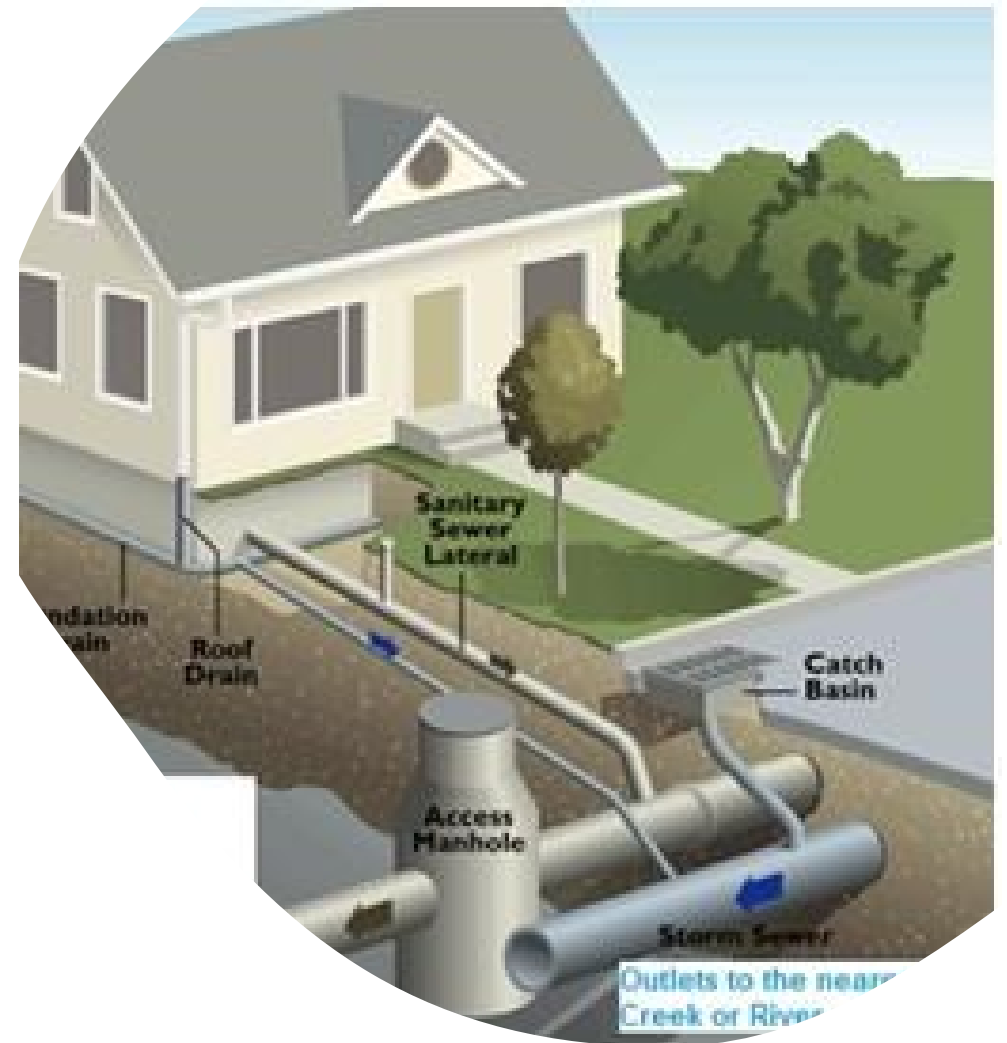
- Minor System
- Major System
- Natural System

Minor Systems

- Ditches,
- Manholes
- Catchbasins
- Buried pipe
- Infiltration

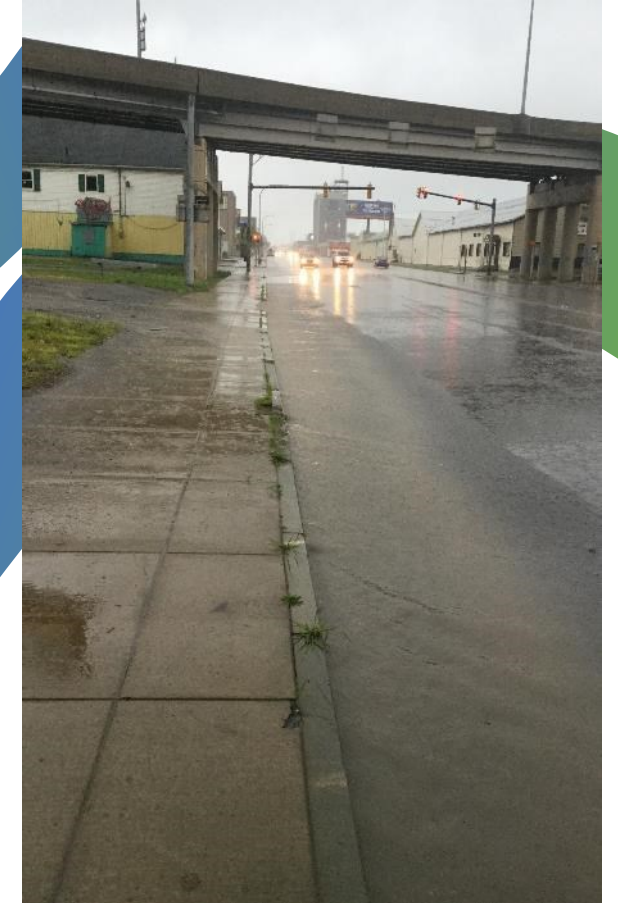
New construction

- Roads
- Development



Major Systems

- Transmission Mains
- Lake/Creek outlets
- Roads
- Channels
- Culverts
- Dykes
- Channelized creeks



Natural Systems

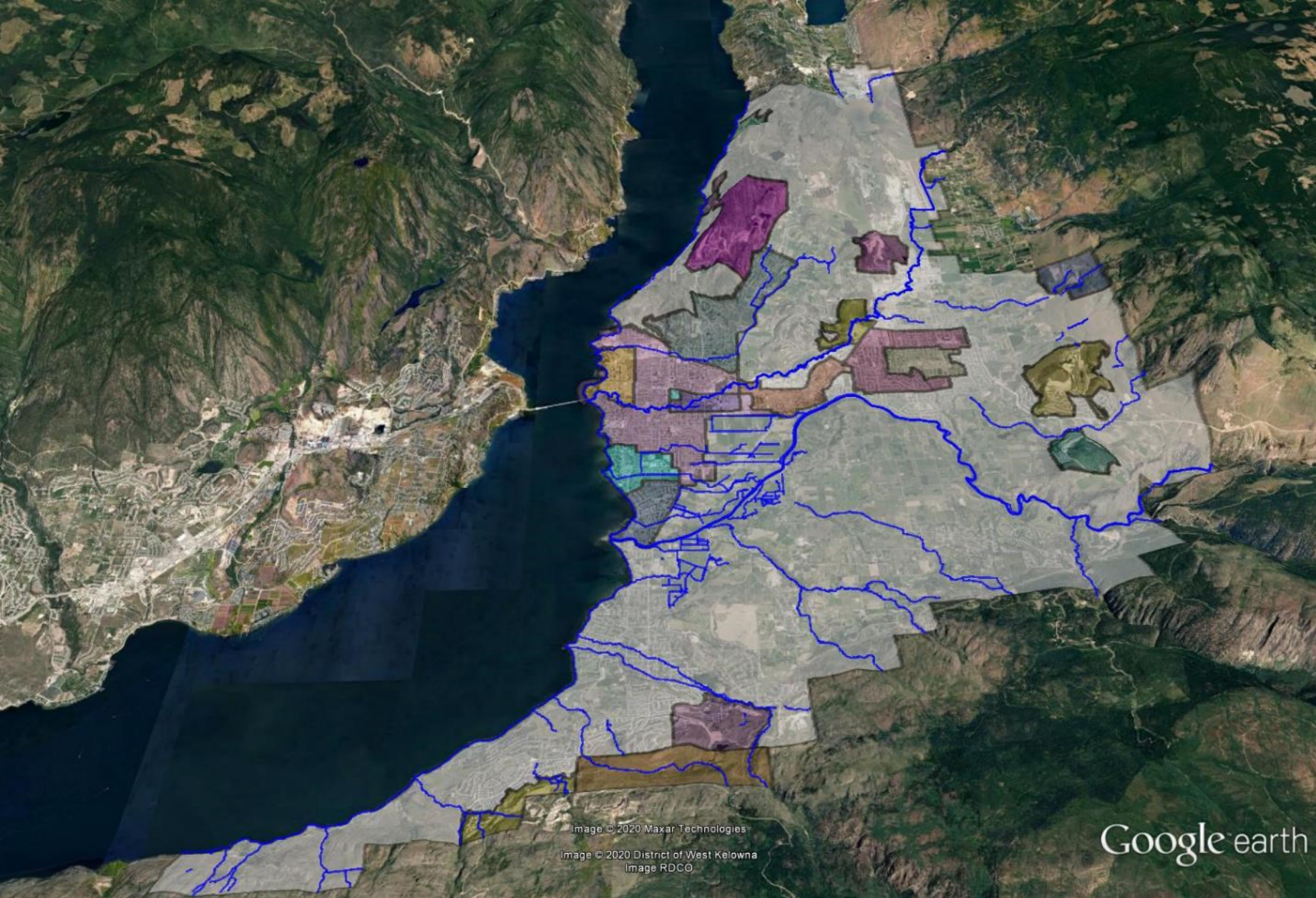
- Okanagan Lake
- Creeks
- Ponds
- Riparian Areas
- Woods



Current Practices

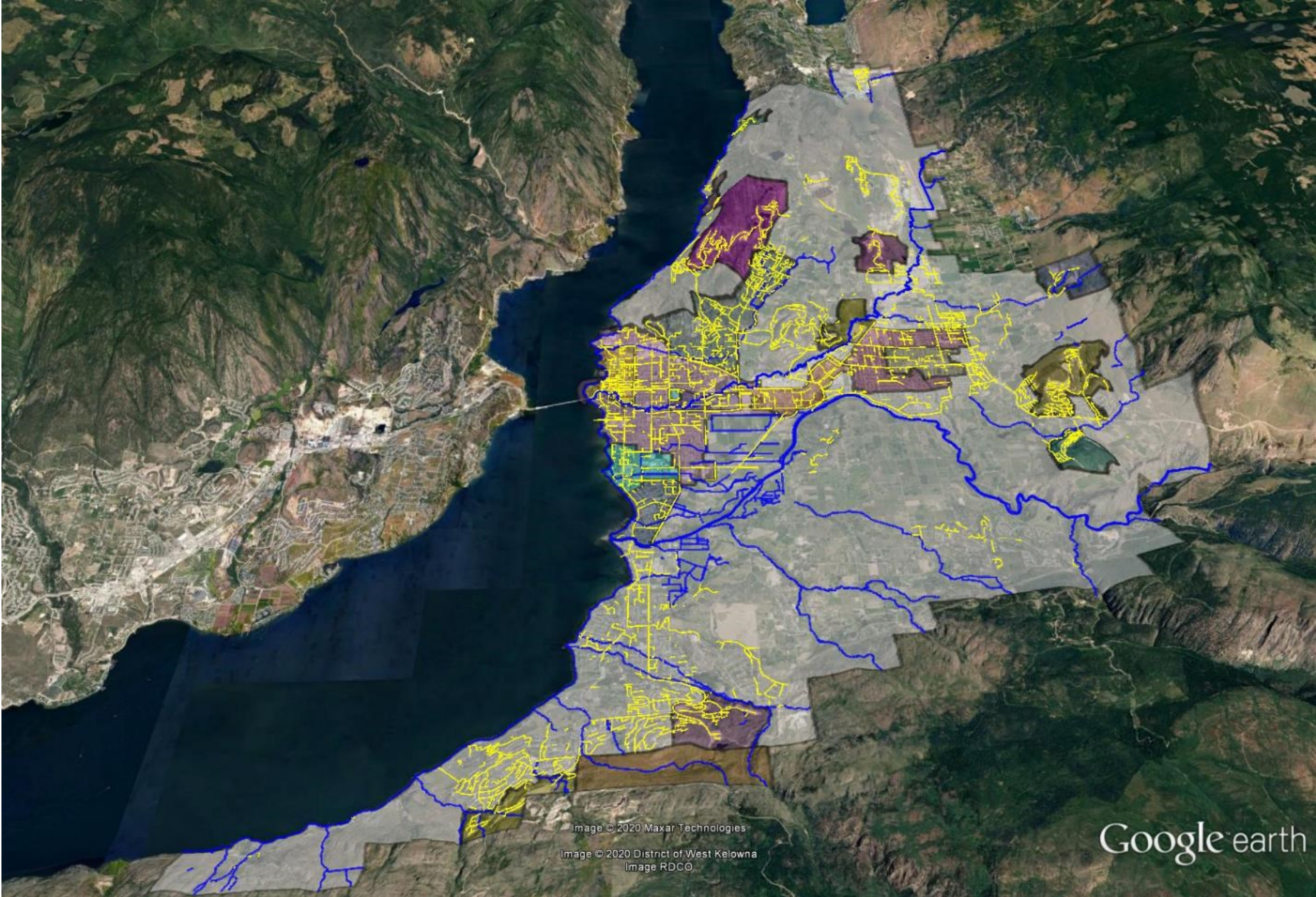
- **Minor Systems**
 - Some renewal
 - Some adjustments to flow directions
 - Maintenance
- **Major Systems**
 - Some Renewal
- **Natural Systems**

Watercourses

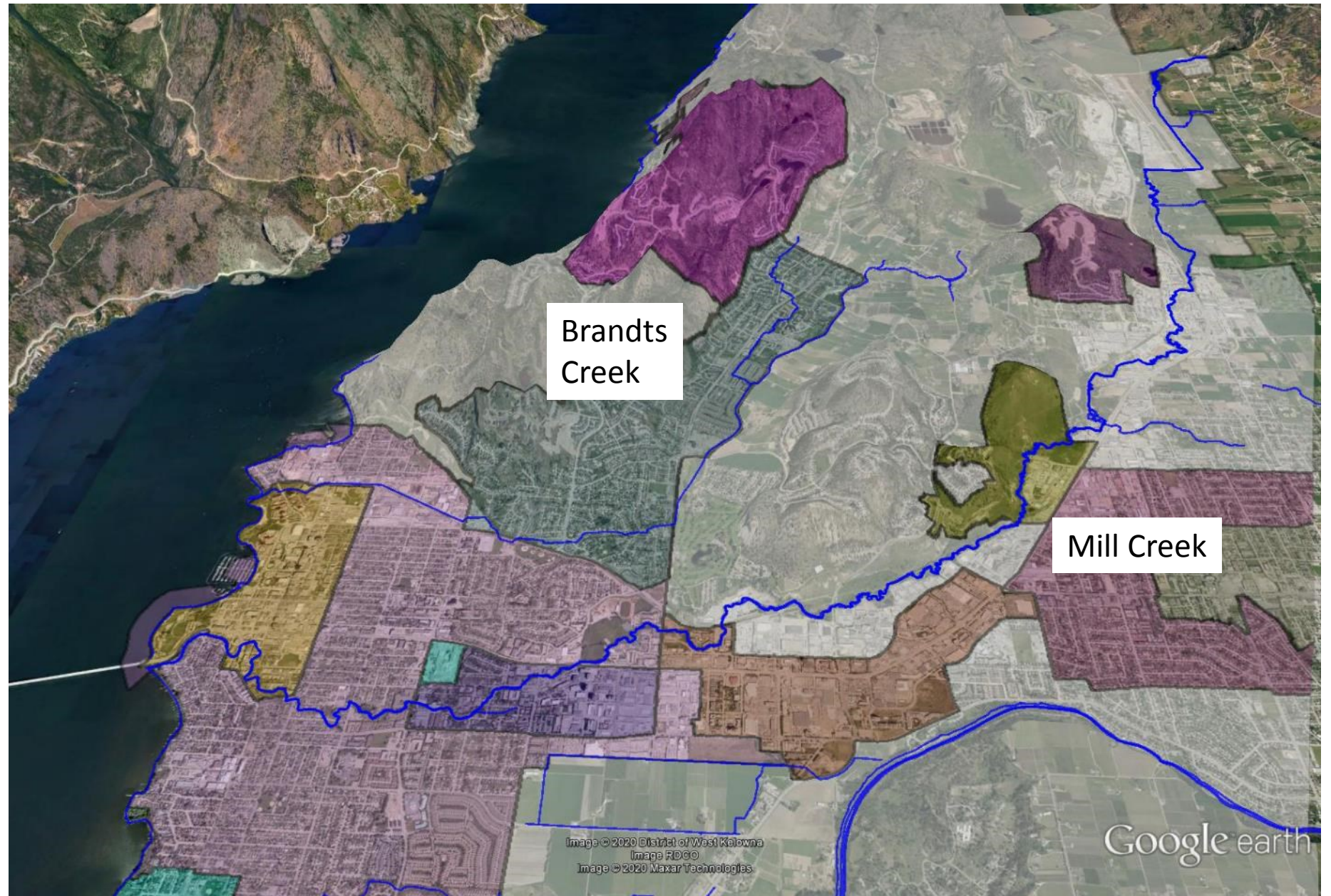


Existing Infrastructure

Storm

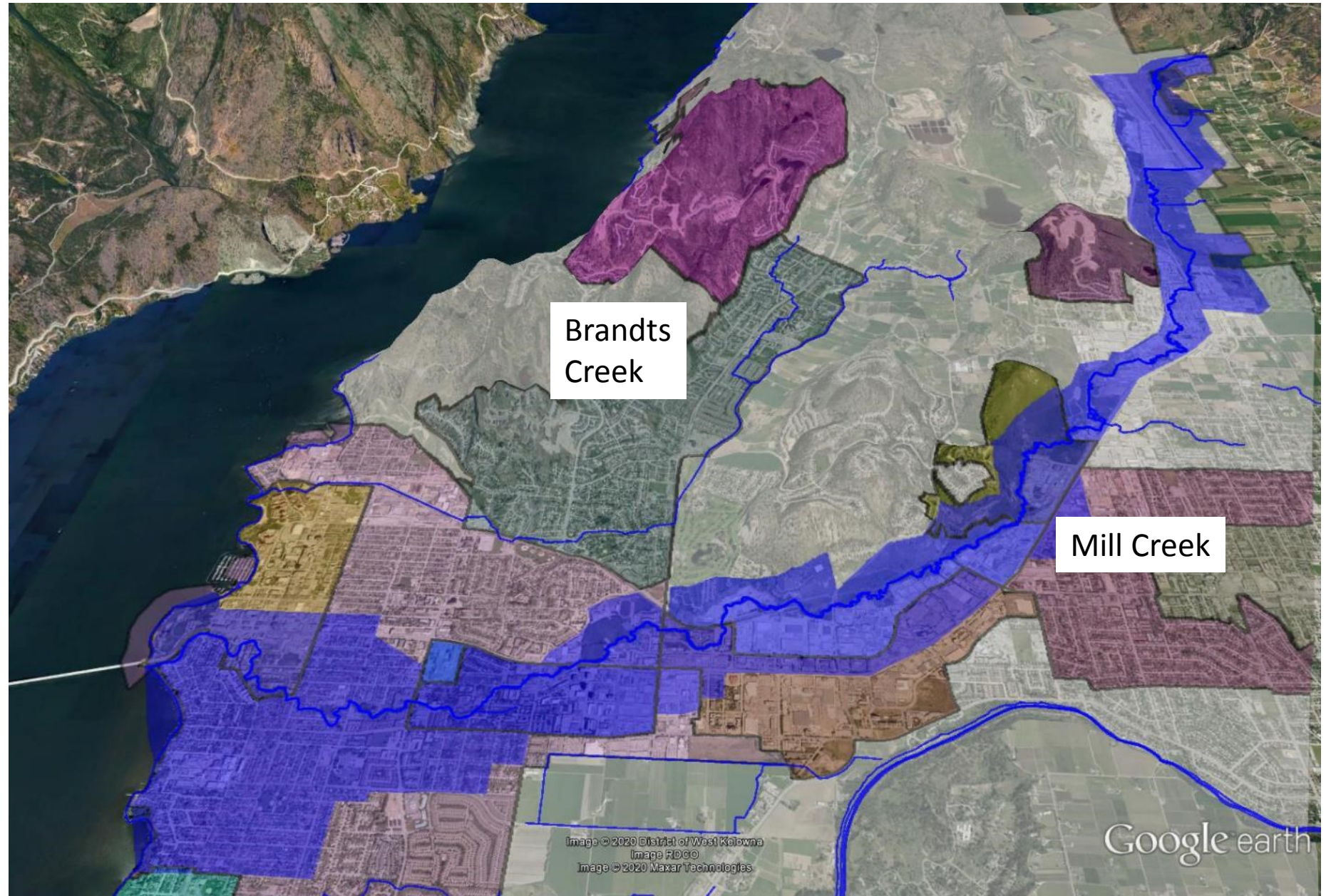


Creeks

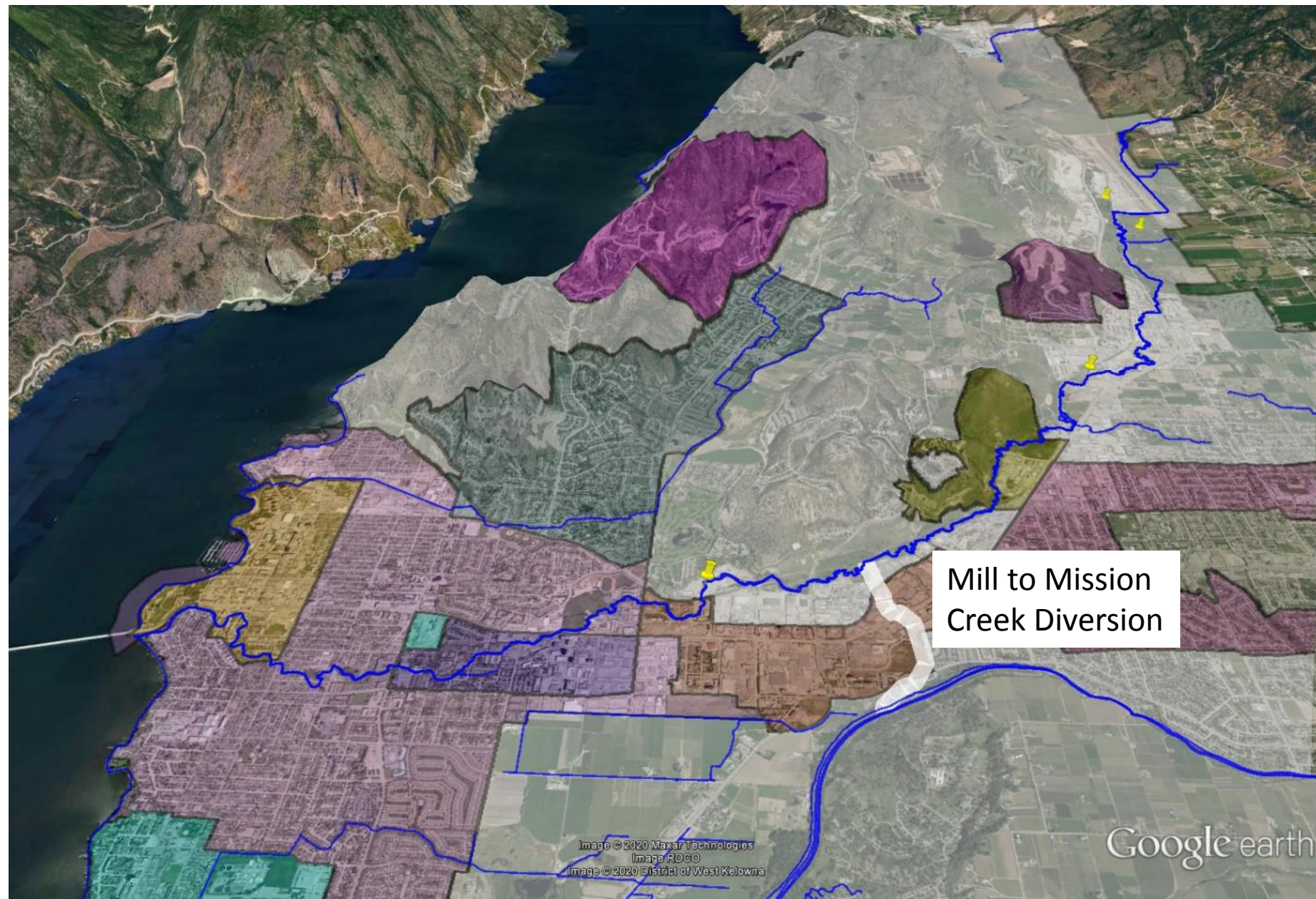


Mill Creek

Floodplain
200 Yr Event

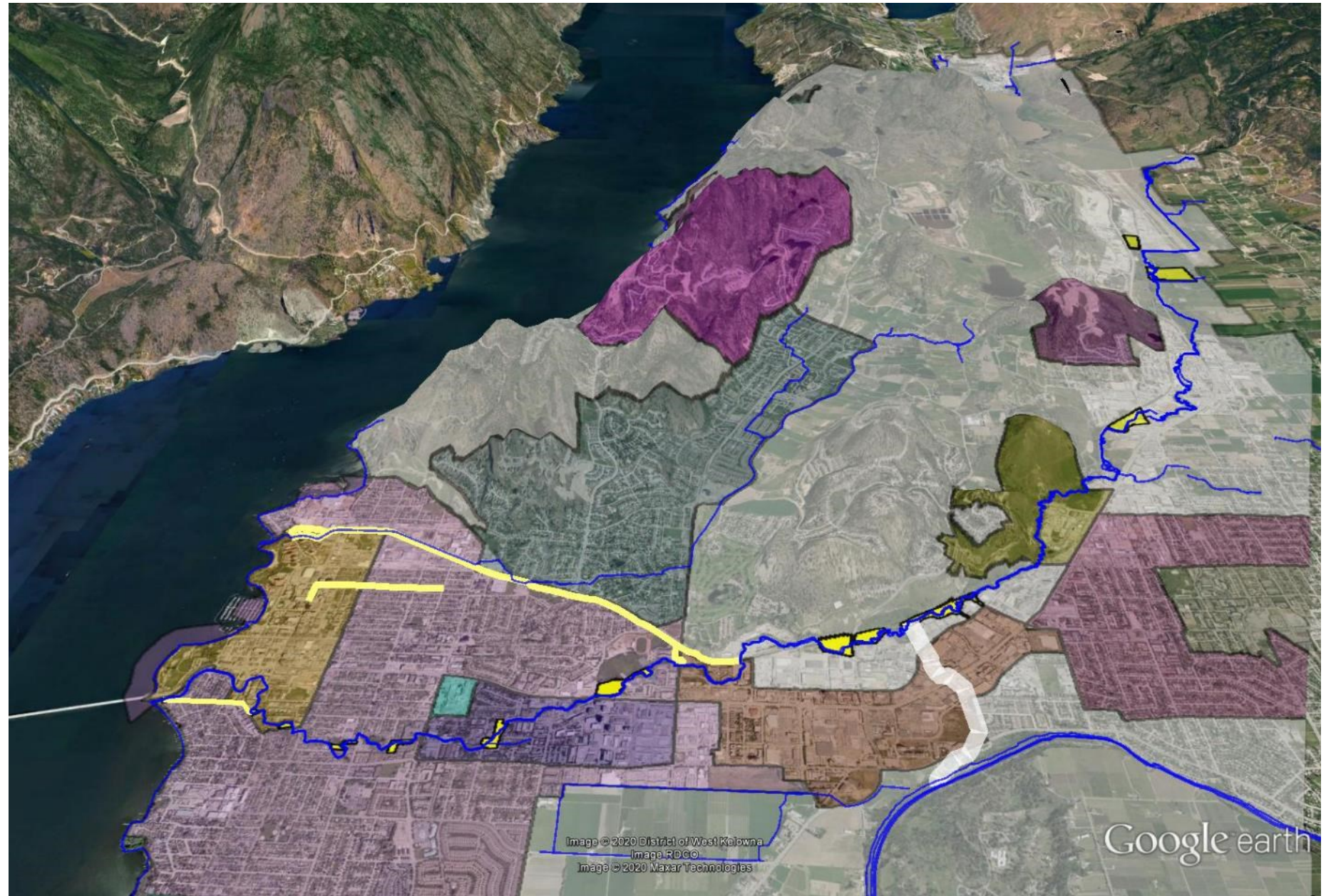


Existing Works




Mill Creek Flood Protection Project

Draft



Suggested Level of Service

Stormwater 		Current Program to 2040		Increase Funding		Accelerated	
Category		Funding	Service Level	Funding Increase	Service Level	Funding Increase	Service Level
2040 Infrastructure Plan	Major Systems	0	↔	Moderate	↑	High	↑
	Flood Mitigation	0	↓	Any	↑	High	↑
Growth Cost		\$0 million		\$50 million		\$50 Million	

- **Minor System**
Renewal / use of Green Infrastructure
Focus on Stormwater Quality
- **Major Systems**
Focus on Stormwater Quality
Adapted to Climate Change
Adapt to lake fluctuations / Downtown
- **Natural Systems**
Work with Parks
Flood Protection of Mill and Brandt's Creek

Questions?

For more information, visit kelowna.ca.



CITY OF KELOWNA

BYLAW NO. 12044

**Housing Agreement Authorization Bylaw - 815 Leon Developments
Ltd., Inc. No. BC1053909
815 Leon Avenue**

Whereas pursuant to Section 483 of the *Local Government Act*, a local government may, by bylaw, enter into a housing agreement.

Therefore, the Municipal Council of the City of Kelowna, in open meeting assembled, enacts as follows:

1. The Municipal Council hereby authorizes the City of Kelowna to enter into a Housing Agreement with 815 Leon Developments Ltd., Inc. No. BC1053909 for the lands known as Lot A District Lot 138 ODYD Plan EPP78759 located on Leon Avenue, Kelowna, B.C., a true copy of which is attached to and forms part of this bylaw as Schedule "A".
2. The Mayor and City Clerk are hereby authorized to execute the attached agreement as well as any conveyances, deeds, receipts or other documents in connection with the attached agreement.
3. This bylaw shall come into full force and effect and is binding on all persons as and from the date of adoption.

Read a first, second and third time by the Municipal Council this 27th day of July, 2020.

Adopted by the Municipal Council of the City of Kelowna this

Mayor

City Clerk

PURPOSE-BUILT RENTAL HOUSING AGREEMENT

THIS AGREEMENT dated for reference April 24, 2020 affects:

LEGAL DESCRIPTION OF PROPERTY SUBJECT TO THE AGREEMENT:

Lot A District Lot 138 ODYD Plan EPP78759

("Land")

And is

BETWEEN:

815 LEON DEVELOPMENTS LTD. (Inc. No. BC1053909
612 Bernard Avenue
Kelowna, BC V1Y 6P3

("Owner")

AND:

CITY OF KELOWNA, a local government incorporated pursuant to the *Community Charter* and having its offices at 1435 Water Street, Kelowna, B.C. V1Y 1J4

("City")

GIVEN THAT:

- A. The Owner has applied to the City for rezoning of the Lands to permit the construction of a housing complex that will include purpose-built rental housing units, as defined in this Agreement, on certain lands more particularly described in this Agreement;
- B. The City may, pursuant to section 483 of the *Local Government Act*, enter into an agreement with an owner of land that includes terms and conditions regarding the occupancy, tenure, and availability of the housing units on the land or construction on land;
- C. The Owner and the City wish to enter into this Agreement to provide for purpose-built rental housing on the terms and conditions set out in this Agreement, and agree that this Agreement is a housing agreement under s. 483 of the *Local Government Act*; and
- D. The City has, by bylaw, authorized the execution of this Agreement and the Owner has duly authorized the execution of this Agreement;

This Agreement is evidence that in consideration of \$1.00 paid by the City to the Owner (the receipt of which is acknowledged by the Owner) and in consideration of the promises exchanged below, the City and Owner agree, as a housing agreement between the Owner and the City under s. 483 of the *Local Government Act*, as follows:

**ARTICLE 1
INTERPRETATION**

1.1 Definitions -

"Caregiver" means an individual who provides assistance with the performance of the personal functions and activities necessary for daily living that a person is unable to perform efficiently for himself or herself;

"City" means the City of Kelowna;

"Dwelling Unit" means accommodation providing sleeping rooms, washrooms, and no more than one kitchen, intended for domestic use, and used or intended to be used permanently or semi-permanently for a Household. This use does not include a room in a hotel or a motel.

"Household" means

- (a) a person;
- (b) two or more persons related by blood, marriage, or adoption; or associated through foster care, all living together in one dwelling unit as a single household using common cooking facilities;
- (c) a group of not more than five persons, including boarders, who are not related by blood, marriage, or adoption, or associated through foster care, all living together in one dwelling unit as a single household using common cooking facilities; or
- (d) a combination of (b) and (c), provided that the combined total does not include more than 3 persons unrelated by blood, marriage or adoption or associated through foster care; all living together in one dwelling unit as a single household using common cooking facilities.

In addition, a household may also include up to one Caregiver or nanny;

"Land" means the land described herein;

"LTO" means the Kamloops Land Title Office or its successor;

"Official Community Plan" means the City of Kelowna Official Community Plan Bylaw No. 10500, or its successor bylaw;

"Owner" means the registered owner of the Lands from time to time and any parcels into which the Lands are subdivided;

"Purpose-Built Rental Housing" means a Dwelling Unit that is intended to be used for rental housing; and

"Tenancy Agreement" means a tenancy agreement as defined in, and subject to, the *Residential Tenancy Act*.

1.2 Interpretation - In this Agreement:

- (a) reference to the singular includes a reference to the plural, and vice versa, unless the context requires otherwise;
- (b) article and section headings have been inserted for ease of reference only and are not to be used in interpreting this Agreement;
- (c) reference to a particular numbered section or article, or to a particular lettered Schedule, is a reference to the correspondingly numbered or lettered article, section or Schedule of this Agreement;
- (d) if a word or expression is defined in this Agreement, other parts of speech and grammatical forms of the same word or expression have corresponding meanings;
- (e) the word "enactment" has the meaning given in the *Interpretation Act* on the reference date of this Agreement;
- (f) reference to any enactment includes any regulations, orders or directives made under the authority of that enactment;
- (g) reference to any enactment is a reference to that enactment as consolidated, revised, amended, re-enacted or replaced, unless otherwise expressly provided;
- (h) the provisions of s. 25 of the *Interpretation Act* with respect to the calculation of time apply;
- (i) time is of the essence;
- (j) all provisions are to be interpreted as always speaking;
- (k) reference to a "party" is a reference to a party to this Agreement and to their respective successors, assigns, trustees, administrators and receivers;
- (l) reference to a "day", "month", "quarter" or "year" is a reference to a calendar day, calendar month, calendar quarter or calendar year, as the case may be, unless otherwise expressly provided;
- (m) the definitions given in the City of Kelowna Zoning Bylaw No. 8000, or its successor bylaw, and the Official Community Plan apply for the purposes of this Agreement; and
- (n) any act, decision, determination, consideration, consent or exercise of discretion by a party, or other person, as provided in this Agreement will be performed, made or exercised acting reasonably.

1.3 Purpose of Agreement - The Owner and the City agree that:

- (a) this Agreement is intended to serve the public interest by providing for occupancy of a certain number of Dwelling Units, of the kinds provided for in this Agreement, that are in demand in the City of Kelowna but that are not readily available;

- (b) damages are not an adequate remedy to the City in respect of any breach of this Agreement by the Owner, such that the Owner agrees the City should be entitled to an order for specific performance, injunction or other specific relief respecting any breach of this Agreement by the Owner.

**ARTICLE 2
HOUSING AGREEMENT AND LAND USE RESTRICTIONS**

2.1 Land Use Restrictions - The Owner and the City hereby covenant and agree as follows:

- (a) The Land will be used only in accordance with this Agreement;
- (b) The Owner will design, construct and maintain one or more buildings providing 127 Dwelling Units as Purpose-Built Rental Housing
- (c) The Owner acknowledges that the City will not support applications to stratify the building(s) on the Land, thereby allowing the identified Purpose-Built Rental Housing Dwelling Units to be sold independently of each other, for a period of ten (10) years from the date of this Agreement.

**ARTICLE 3
HOUSING AGREEMENT AND TRANSFER RESTRICTIONS**

3.1 Purchaser Qualifications - The City and the Owner agree as follows:

- (a) the Owner will not sell or transfer, or agree to sell or transfer, any interest in any building containing Purpose-Built Rental Housing Dwelling Units on the Land other than a full interest in the fee simple title to an agency or individual that will continue to ensure that the Purpose-Built Rental Housing Dwelling Units are available in accordance with this Agreement.

3.2 Use and Occupancy of Purpose-Built Rental Housing Dwelling Unit - The Owner agrees with the City as follows:

- (a) the Owner will rent or lease each Purpose-Built Rental Housing Dwelling Unit on the Land in accordance with the *Residential Tenancy Act*, and in no event may the Owner itself occupy a Purpose-Built Rental Housing Dwelling Unit or use the Purpose-Built Rental Housing Dwelling Unit for short-term vacation accommodation; and
- (b) the Owner will deliver a copy of the Tenancy Agreement for each Purpose-Built Rental Housing Dwelling Unit to the City upon demand.

**ARTICLE 4
GENERAL**

4.1 Notice of Housing Agreement - For clarity, the Owner acknowledges and agrees that:

- (a) this Agreement constitutes a housing agreement entered into under s. 483 of the *Local Government Act*;

- (b) the City is requiring the Owner to file a notice of housing agreement in the LTO against title to the Land;
- (c) once such a notice is filed, this Agreement binds all persons who acquire an interest in the Land;
- (d) in the event the parties agree to release this Agreement from the title of the Land, which may not occur before the tenth (10th) anniversary of the date of this Agreement, the Owner will repay the City for 100% of the amount of the rental grant received from the City. Such repaid funds will be directed to the City's Housing Opportunities Reserve Fund.

4.2 No Effect On Laws or Powers - This Agreement does not

- (a) affect or limit the discretion, rights, duties or powers of the City under any enactment or at common law, including in relation to the use or subdivision of land,
- (b) impose on the City any legal duty or obligation, including any duty of care or contractual or other legal duty or obligation, to enforce this Agreement,
- (c) affect or limit any enactment relating to the use or subdivision of land, or
- (d) relieve the Owner from complying with any enactment, including in relation to the use or subdivision of land.

4.3 Management – The Owner covenants and agrees that it will furnish good and efficient management of the Dwelling Units and will permit representatives of the City to inspect the Dwelling Units at any reasonable time, subject to the notice provisions of the *Residential Tenancy Act*. The Owner further covenants and agrees that it will maintain the Dwelling Units in a satisfactory state of repair and fit for habitation and will comply with all laws, including health and safety standards applicable to the Land. Notwithstanding the foregoing, the Owner acknowledges and agrees that the City, in its absolute discretion, may require the Owner, at the Owner's expense, to hire a person or company with the skill and expertise to manage the Dwelling Units.

4.4 Notice - Any notice which may be or is required to be given under this Agreement will be in writing and either be delivered or sent by facsimile/electronic transmission. Any notice which is delivered is to be considered to have been given on the first day after it is dispatched for delivery. Any notice which is sent by fax/electronic transmission is to be considered to have been given on the first business day after it is sent. If a party changes its address, facsimile number or electronic address, it will promptly give notice of its new address, facsimile number or electronic address, to the other party as provided in this section.

4.5 Agreement Runs With the Land - Every obligation and covenant of the Owner in this Agreement constitutes both a contractual obligation and a covenant granted by the Owner to the City in respect of the Land and this Agreement burdens the Land and runs with it and binds the Owner's successors in title and binds every parcel into which it is consolidated or subdivided by any means, including by subdivision or by strata plan under the *Strata Property Act*.

- 4.6 Limitation on Owner's Obligations** - The Owner is only liable for breaches of this Agreement that occur while the Owner is the registered owner of the Land.
- 4.7 Release** – The Owner by this Agreement releases and forever discharges the City and each of its elected officials, officers, directors, employees and agents, and its and their heirs, executors, administrators, personal representatives, successors, and assigns, from and against all claims, demands, damages, actions, or causes of action by reason of or arising out of advice or direction respecting the ownership, lease, operation or management of the Land or the Dwelling Units which has been or at any time after the commencement of this Agreement may be given to the Owner by all or any of them. This clause will survive the termination of this Agreement.
- 4.8 Joint Venture** – Nothing in this Agreement will constitute the Owner as the agent, joint venturer, or partner of the City or give the Owner any authority to bind the City in any way.
- 4.9 Waiver** - An alleged waiver of any breach of this Agreement is effective only if it is an express waiver in writing of the breach. A waiver of a breach of this Agreement does not operate as a waiver of any other breach of this Agreement.
- 4.10 Further Acts** - The Owner will do everything reasonably necessary to give effect to the intent of this Agreement, including execution of further instruments.
- 4.11 Severance** - If any part of this Agreement is held to be invalid, illegal or unenforceable by a court having the jurisdiction to do so, that part is to be considered to have been severed from the rest of this Agreement and the rest of this Agreement remains in force unaffected by that holding or by the severance of that part.
- 4.12 Equitable Remedies** – The Owner acknowledges and agrees that damages would be an inadequate remedy for the City for breach of this Agreement and that the public interest strongly favours specific performance, injunctive relief (mandatory or otherwise), or other equitable relief, as the only adequate remedy for a default under this Agreement.
- 4.13 No Other Agreements** - This Agreement is the entire agreement between the parties regarding its subject and it terminates and supersedes all other agreements and arrangements regarding its subject.
- 4.14 Amendment** - This Agreement may be discharged, amended or affected only by an instrument duly executed by both the Owner and the City.
- 4.15 Enurement** - This Agreement binds the parties to it and their respective successors, heirs, executors and administrators. Reference in this Agreement to the "City" is a reference also to the elected and appointed officials, employees and agents of the City.
- 4.16 Deed and Contract** - By executing and delivering this Agreement each of the parties intends to create both a contract and a deed executed and delivered under seal.

IN WITNESS WHEREOF the parties hereunto have executed this Agreement on the date and year first above written.

SIGNED, SEALED & DELIVERED in)
the presence of:)

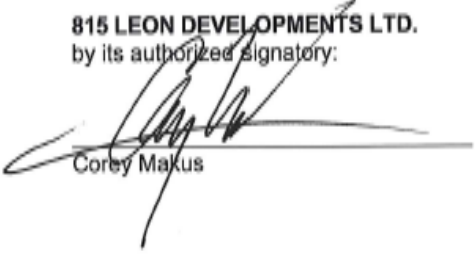
Signature of Witness)

Print Name JAMES A. PATERSON)
BARRISTER & SOLICITOR)
301-1665 ELLIS STREET)
KELOWNA, BC V1Y 2B3)

Address)

Occupation)

815 LEON DEVELOPMENTS LTD.
by its authorized signatory:



Corey Makus

SIGNED, SEALED & DELIVERED in)
the presence of:)

Signature of Witness)

Print Name)

Address)

Occupation)

CITY OF KELOWNA
by its authorized signatories:

Mayor

City Clerk

CITY OF KELOWNA

BYLAW NO. 12046

**Housing Agreement Authorization Bylaw - PC Urban Clement
Holdings Ltd., Inc. No. BC109980
740 Clement Avenue and 1195 Richter Street**

Whereas pursuant to Section 483 of the *Local Government Act*, a local government may, by bylaw, enter into a housing agreement.

Therefore, the Municipal Council of the City of Kelowna, in open meeting assembled, enacts as follows:

1. The Municipal Council hereby authorizes the City of Kelowna to enter into a Housing Agreement with PC Urban Clement Holdings Ltd., Inc. No. BC109980 for the lands known as Lot A Section 30 Township 26 ODYD Plan EPP83554 located on Clement Avenue and Richter Street, Kelowna, B.C., a true copy of which is attached to and forms part of this bylaw as Schedule "A".
2. The Mayor and City Clerk are hereby authorized to execute the attached agreement as well as any conveyances, deeds, receipts or other documents in connection with the attached agreement.
3. This bylaw shall come into full force and effect and is binding on all persons as and from the date of adoption.

Read a first, second and third time by the Municipal Council this 27th day of July, 2020.

Adopted by the Municipal Council of the City of Kelowna this

Mayor

City Clerk

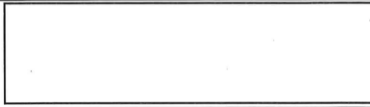
Schedule A

FORM C_V25 (Charge)

LAND TITLE ACT
FORM C (Section 233) CHARGE
GENERAL INSTRUMENT - PART 1 Province of British Columbia

PAGE 1 OF 13 PAGES

Your electronic signature is a representation that you are a designate authorized to certify this document under section 168.4 of the *Land Title Act*, RSBC 1996 c.250, that you certify this document under section 168.41(4) of the act, and that an execution copy, or a true copy of that execution copy, is in your possession.



1. APPLICATION: (Name, address, phone number of applicant, applicant's solicitor or agent)

Kathleen Higgins, Barrister & Solicitor
YOUNG ANDERSON
1616 - 808 Nelson Street
Vancouver BC V6Z 2H2

Phone: (604) 689-7400
 File: 122-459
 Purpose-Built Rental Housing Agreement and Section 219
 Covenant

Deduct LTSA Fees? Yes

2. PARCEL IDENTIFIER AND LEGAL DESCRIPTION OF LAND:
 [PID] [LEGAL DESCRIPTION]

030-571-219 LOT A SECTION 30 TOWNSHIP 26 OSOYOOS DIVISION YALE DISTRICT PLAN EPP83554

STC? YES

3. NATURE OF INTEREST CHARGE NO. ADDITIONAL INFORMATION

SEE SCHEDULE

4. TERMS: Part 2 of this instrument consists of (select one only)

(a) Filed Standard Charge Terms D.F. No. (b) Express Charge Terms Annexed as Part 2
 A selection of (a) includes any additional or modified terms referred to in Item 7 or in a schedule annexed to this instrument.

5. TRANSFEROR(S):

SEE SCHEDULE

6. TRANSFEREE(S): (including postal address(es) and postal code(s))

CITY OF KELOWNA

1435 WATER STREET
KELOWNA

BRITISH COLUMBIA
CANADA

V1Y 1J4

7. ADDITIONAL OR MODIFIED TERMS:

8. EXECUTION(S): This instrument creates, assigns, modifies, enlarges, discharges or governs the priority of the interest(s) described in Item 3 and the Transferor(s) and every other signatory agree to be bound by this instrument, and acknowledge(s) receipt of a true copy of the filed standard charge terms, if any.

Officer Signature(s)

J. SCOTT MYERS
Solicitor
619, 610 GRANVILLE STREET
VANCOUVER, B.C. V6C 3T3
(604) 682-8670

Execution Date		
Y	M	D
20	06	11

Transferor(s) Signature(s)

PC URBAN CLEMENT HOLDINGS LTD. by its authorized signatory (ies):

Name: **J. Brent Sawchyn**

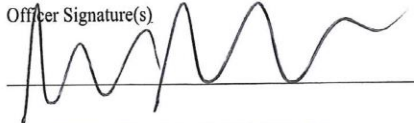
Name: _____

OFFICER CERTIFICATION:

Your signature constitutes a representation that you are a solicitor, notary public or other person authorized by the *Evidence Act*, R.S.B.C. 1996, c.124, to take affidavits for use in British Columbia and certifies the matters set out in Part 5 of the *Land Title Act* as they pertain to the execution of this instrument.

LAND TITLE ACT
FORM D

EXECUTIONS CONTINUED

Officer Signature(s)


STEPHEN SCHNEIDERMAN
BARRISTER, SOLICITOR, NOTARY PUBLIC
309-850 WEST HASTINGS STREET
VANCOUVER, B.C. V6C 1E1

(as to all signatures)

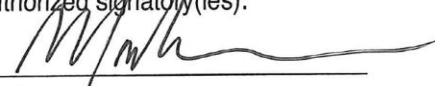
(as to all signatures)

(as to all signatures)

Execution Date		
Y	M	D
2020	6	9

Transferor / Borrower / Party Signature(s)

SHELMARJAY HOLDINGS LTD. by its
authorized signatory(ies):



Name:

Mark Spewakow

Name:

BRITISH COLUMBIA HOUSING
MANAGEMENT COMMISSION by its
authorized signatory(ies):

Name:

Name:

CITY OF KELOWNA by its authorized
signatory(ies):

Name:

Name:

OFFICER CERTIFICATION:

Your signature constitutes a representation that you are a solicitor, notary public or other person authorized by the *Evidence Act*, R.S.B.C. 1996, c.124, to take affidavits for use in British Columbia and certifies the matters set out in Part 5 of the *Land Title Act* as they pertain to the execution of this instrument.

LAND TITLE ACT
FORM D
EXECUTIONS CONTINUED

Officer Signature(s)

(as to all signatures)



CHARLOTTE K. WONG
Barrister & Solicitor
2110 Burquitlam Drive
Vancouver, BC V5P 2P1

(as to all signatures)

(as to all signatures)

Execution Date		
Y	M	D
20	06	11

Transferor / Borrower / Party Signature(s)

SHELMARJAY HOLDINGS LTD. by its authorized signatory(ies):

Name: _____

Name: _____

BRITISH COLUMBIA HOUSING MANAGEMENT COMMISSION by its authorized signatory(ies):


Name: **Stacey Lee**


Name: **Abbas Barodawalla**

CITY OF KELOWNA by its authorized signatory(ies):

Name: _____

Name: _____

OFFICER CERTIFICATION:

Your signature constitutes a representation that you are a solicitor, notary public or other person authorized by the *Evidence Act*, R.S.B.C. 1996, c.124, to take affidavits for use in British Columbia and certifies the matters set out in Part 5 of the *Land Title Act* as they pertain to the execution of this instrument.

LAND TITLE ACT
FORM E

SCHEDULE

NATURE OF INTEREST	CHARGE NO.	ADDITIONAL INFORMATION
Covenant		Section 219

NATURE OF INTEREST	CHARGE NO.	ADDITIONAL INFORMATION
Priority Agreement		Granting the Covenant herein priority over Mortgage CA7566393

NATURE OF INTEREST	CHARGE NO.	ADDITIONAL INFORMATION
Priority Agreement		Granting the Covenant herein priority over Mortgage CA7678849 and Assignment of Rents CA7678850

NATURE OF INTEREST	CHARGE NO.	ADDITIONAL INFORMATION
--------------------	------------	------------------------

NATURE OF INTEREST	CHARGE NO.	ADDITIONAL INFORMATION
--------------------	------------	------------------------

NATURE OF INTEREST	CHARGE NO.	ADDITIONAL INFORMATION
--------------------	------------	------------------------

**LAND TITLE ACT
FORM E**

SCHEDULE

ENTER THE REQUIRED INFORMATION IN THE SAME ORDER AS THE INFORMATION MUST APPEAR ON THE FREEHOLD TRANSFER FORM, MORTGAGE FORM, OR GENERAL INSTRUMENT FORM.

5. TRANSFEROR(S):

PC URBAN CLEMENT HOLDINGS LTD. (Inc. No. BC10999800)

SHELMARJAY HOLDINGS LTD. (Inc. No. BC0855415) [as to priority]

BRITISH COLUMBIA HOUSING MANAGEMENT COMMISSION [as to priority]

PURPOSE-BUILT RENTAL HOUSING AGREEMENT AND 219 COVENANT

THIS AGREEMENT, dated for reference June 1, 2020, which affects:

LEGAL DESCRIPTION OF PROPERTY SUBJECT TO THE AGREEMENT:

PID: 030-571-219
LOT A SECTION 30 TOWNSHIP 26 OSOYOOS DIVISION YALE DISTRICT PLAN EPP83554

(the "Land")

IS BETWEEN:

PC URBAN CLEMENT HOLDINGS LTD. INC.NO. BC1099980
880 - 1090 West Georgia Street
Vancouver, BC
V6E 3V7

(the "Owner")

AND:

CITY OF KELOWNA, a local government incorporated pursuant to the *Community Charter* and having its offices at 1435 Water Street, Kelowna, B.C. V1Y 1J4

(the "City")

GIVEN THAT:

- A. The Owner intends to construct on the Land a commercial and residential development consisting of two mixed-use buildings that will include Purpose-Built Rental Housing (hereinafter defined);
- B. The City may, pursuant to section 483 of the *Local Government Act*, enter into an agreement with an owner of land that includes terms and conditions regarding the occupancy, tenure, and availability of the housing units on the land or construction on land;
- C. Section 219 of the *Land Title Act* permits the registration of a covenant of a negative or positive nature in favour of the City in respect of the use of land and buildings on land, construction on land, or the subdivision of land;
- D. As a condition of rezoning the Land, the Owner and the City wish to enter into this Agreement to provide for Purpose-Built Rental Housing on the terms and conditions set out in this Agreement and to restrict the use of, and construction on, the Land and the use of the Purpose-Built Rental Housing constructed on the Land, on the terms and conditions of this Agreement, to have effect as both a covenant under section 219 of the *Land Title Act* and a housing agreement under section 483 of the *Local Government Act*; and
- E. The City has, by bylaw, authorized the execution of this Agreement and the Owner has duly authorized the execution of this Agreement.

This Agreement is evidence that in consideration of \$1.00 paid by the City to the Owner (the receipt of which is

acknowledged by the Owner) and in consideration of the promises exchanged below, the City and Owner agree, pursuant to s. 483 of the *Local Government Act* and s. 219 of the *Land Title Act*, as follows:

ARTICLE 1 INTERPRETATION

1.1 Definitions -

"Caregiver" means an individual who provides assistance with the performance of the personal functions and activities necessary for daily living that a person is unable to perform efficiently for himself or herself;

"Dwelling Unit" means accommodation providing sleeping rooms, washrooms, and no more than one kitchen, intended for domestic use, and used or intended to be used permanently or semi-permanently for a Household. This use does not include a room in a hotel or a motel.

"Household" means

- (a) a person;
- (b) two or more persons related by blood, marriage, or adoption; or associated through foster care, all living together in one Dwelling Unit as a single household using common cooking facilities;
- (c) a group of not more than five persons, including boarders, who are not related by blood, marriage, or adoption, or associated through foster care, all living together in one Dwelling Unit as a single household using common cooking facilities; or
- (d) a combination of (b) and (c), provided that the combined total does not include more than 3 persons unrelated by blood, marriage or adoption or associated through foster care; all living together in one Dwelling Unit as a single household using common cooking facilities.

In addition, a household may also include up to one Caregiver or nanny;

"Land" means the land described herein;

"LTO" means the Kamloops Land Title Office or its successor;

"Owner" means the registered owner of the Land from time to time and any parcels into which the Land is subdivided;

"Purpose-Built Rental Housing" means a Dwelling Unit that is intended to be used for rental housing;

"Purpose-Built Rental Housing Dwelling Units" means the 158 Dwelling Units on the Land designated as Purpose-Built Rental Housing Dwelling Units under section 2.2 of this Agreement.

"Tenancy Agreement" means a tenancy agreement as defined in, and subject to, the *Residential Tenancy Act*.

1.2 Interpretation - In this Agreement:

- (a) reference to the singular includes a reference to the plural, and vice versa, unless the context requires otherwise;
- (b) article and section headings have been inserted for ease of reference only and are not to be used in interpreting this Agreement;
- (c) reference to a particular numbered section or article, or to a particular lettered Schedule, is a reference to the correspondingly numbered or lettered article, section or Schedule of this Agreement;
- (d) if a word or expression is defined in this Agreement, other parts of speech and grammatical forms of the same word or expression have corresponding meanings;
- (e) the word "enactment" has the meaning given in the *Interpretation Act* on the reference date of this Agreement;
- (f) reference to any enactment includes any regulations, orders or directives made under the authority of that enactment;
- (g) reference to any enactment is a reference to that enactment as consolidated, revised, amended, re-enacted or replaced, unless otherwise expressly provided;
- (h) the provisions of s. 25 of the *Interpretation Act* with respect to the calculation of time apply;
- (i) time is of the essence;
- (j) all provisions are to be interpreted as always speaking;
- (k) reference to a "party" is a reference to a party to this Agreement and to their respective successors, assigns, trustees, administrators and receivers;
- (l) reference to a "day", "month", "quarter" or "year" is a reference to a calendar day, calendar month, calendar quarter or calendar year, as the case may be, unless otherwise expressly provided;
- (m) the definitions given in the City of Kelowna Zoning Bylaw No. 8000, or its successor bylaw, and the City of Kelowna Official Community Plan Bylaw No. 10500, or its successor in function, apply for the purposes of this Agreement; and
- (n) any act, decision, determination, consideration, consent or exercise of discretion by a party, or other person, as provided in this Agreement will be performed, made or exercised acting reasonably.

1.3 Purpose of Agreement - The Owner and the City agree that:

- (a) this Agreement is intended to serve the public interest by providing for occupancy Purpose-Built Rental Housing that is in demand in the City of Kelowna but that is not readily available;
- (b) performance of this Agreement by the Owner is a condition, as contemplated by s. 482 of the *Local Government Act*, of the Owner becoming entitled to certain density bonuses respecting development of the Land, which density bonuses the Owner acknowledges are a benefit to the Owner; and
- (c) damages are not an adequate remedy to the City in respect of any breach of this Agreement by the

Owner, such that the Owner agrees the City should be entitled to an order for specific performance, injunction or other specific relief respecting any breach of this Agreement by the Owner.

**ARTICLE 2
HOUSING AGREEMENT AND LAND USE RESTRICTIONS**

2.1 Land Use Restrictions – Pursuant to section 219 of the *Land Title Act*, the Owner and the City hereby covenant and agree as follows:

- (a) the Land will be used only in accordance with this Agreement;
- (b) the Owner will design, construct and maintain one or more buildings on the Land and such buildings will include not less than 158 Dwelling Units which will be designated, used and occupied as a Purpose-Built Rental Housing Dwelling Unit in accordance with this Agreement; and
- (c) the Owner may only subdivide the Land via deposit of a strata plan pursuant to the *Strata Property Act*.

2.2 Designation – The Owner will, prior to applying for an occupancy permit for any Dwelling Unit located on the Land, notify the City in writing which Dwelling Units located on the Land it has designated as Purpose-Built Rental Housing Dwelling Units. Such written designation is irrevocable by the Owner upon receipt by the City of the same, but the designation is not effective unless and until the City confirms its approval of such designation in writing.

2.3 Partial Release – If the Owner subdivides the Land and not all strata lots created as a result thereof contain Purpose-Built Rental Housing Dwelling Units, the Owner is entitled to apply for a release of this Agreement (including registered notice of the housing agreement herein) from such non-Purpose-Built Rental Housing Dwelling Unit strata lots pursuant to section 2.4. Notwithstanding the foregoing, the Owner will not apply for a release of this Agreement pursuant to section 2.4 below in respect of such non- Purpose-Built Rental Housing Dwelling Unit strata lots, and the Municipality will be under no obligation to provide such release, unless, at the time that the Owner applies for such release:

- (a) the Owner is not in breach of any of its obligations under this Agreement;
- (b) the Owner has notified the City in writing which of the strata lots located on the Land contain Purpose-Built Rental Housing Dwelling Units. Such written designation is irrevocable by the Owner upon receipt by the City of the same, but the designation is not effective unless and until the City confirms its approval of such designation in writing;
- (c) occupancy permits for all Purpose-Built Rental Housing Dwelling Units have been issued by the City; and
- (d) the Purpose-Built Rental Housing Dwelling Units are used and always have been used, occupied and transferred in compliance with this Agreement.

2.4 Process for Partial Release – Subject to section 2.3, at the request of the Owner and at the Owner's sole expense, the City will deliver to the Owner releases of this Agreement (including registered notice of the housing agreement herein) in registrable form for each strata lot on the Land that does not contain a Purpose-Built Rental Housing Dwelling Unit, provided that the City may withhold delivery of any release against any such non- Purpose-Built Rental Housing Dwelling Unit strata lot unless:

- (a) the Owner has filed a Rental Disclosure Statement pursuant to section 139 of the *Strata Property Act* designating each Purpose-Built Rental Housing Dwelling Unit located on the Land as a rental strata lot with a rental period expiry date no earlier than 10 years from the date of stratification; and
- (b) the strata corporation created by the filing of the strata plan over the Land has the following contained within its bylaws:

"Residential Strata Lots within the Strata Corporation are subject to a Housing Agreement with the City of Kelowna. No action will be taken by the owners or the strata corporation to restrict or limit the terms of the Housing Agreement, including, but not limited to, amendment to these bylaws".

ARTICLE 3 HOUSING AGREEMENT AND TRANSFER RESTRICTIONS

3.1 Purchaser Qualifications - The City and the Owner agree as follows:

- (a) the Owner will not sell or transfer, or agree to sell or transfer, any interest in any strata lot designated as a Purpose-Built Rental Housing Dwelling Unit on the Land other than a full interest in the fee simple title to a person, firm, agency, society, or corporation that will continue to ensure that such Purpose-Built Rental Housing Dwelling Unit is used in accordance with this Agreement.

3.2 Use and Occupancy of Purpose-Built Rental Housing Dwelling Unit – The Owner agrees with the City as follows:

- (a) a Purpose-Built Rental Housing Dwelling Unit will only be used as a rental unit and occupied as a permanent residence by a Household pursuant to a Tenancy Agreement;
- (b) the Owner will rent or lease each Purpose-Built Rental Housing Dwelling Unit on the Land in accordance with the *Residential Tenancy Act*, and in no event may the Owner itself occupy a Purpose-Built Rental Housing Dwelling Unit or use or allow the use of the Purpose-Built Rental Housing Dwelling Unit for short-term rental accommodation; and
- (b) the Owner will deliver a copy of the Tenancy Agreement for each Purpose-Built Rental Housing Dwelling Unit to the City upon demand.

ARTICLE 4 GENERAL

4.1 Notice of Housing Agreement - For clarity, the Owner acknowledges and agrees that:

- (a) this Agreement constitutes a housing agreement entered into under s. 483 of the *Local Government Act*;
- (b) the City is requiring the Owner to file a notice of housing agreement in the LTO against title to the Land;
- (c) once such a notice is filed, this Agreement binds all persons who acquire an interest in the Land.

- 4.2 No Effect On Laws or Powers** - This Agreement does not
- (a) affect or limit the discretion, rights, duties or powers of the City under any enactment or at common law, including in relation to the use or subdivision of land,
 - (b) impose on the City any legal duty or obligation, including any duty of care or contractual or other legal duty or obligation, to enforce this Agreement,
 - (c) affect or limit any enactment relating to the use or subdivision of land, or
 - (d) relieve the Owner from complying with any enactment, including in relation to the use or subdivision of land.
- 4.3 Management** – The Owner covenants and agrees that it will furnish good and efficient management of the Purpose-Built Rental Housing Dwelling Units and will permit representatives of the City to inspect the Purpose-Built Rental Housing Dwelling Units at any reasonable time, subject to the notice provisions of the *Residential Tenancy Act*. The Owner further covenants and agrees that it will maintain the Purpose-Built Rental Housing Dwelling Units in a satisfactory state of repair and fit for habitation and will comply with all laws, including health and safety standards applicable to the Land. Notwithstanding the foregoing, the Owner acknowledges and agrees that the City, in its absolute discretion, may require the Owner, at the Owner's expense, to hire a person or company with the skill and expertise to manage the Purpose-Built Rental Housing Dwelling Units.
- 4.4 Registration & Priority** – The Owner shall, at its expense, do or cause to be done all acts necessary to register this Agreement in the land title office against title to the Land with priority over all financial charges, liens and encumbrances registered, or pending registration, at the time of application for registration of this Agreement against the title to the Land.
- 4.5 Notice** - Any notice which may be or is required to be given under this Agreement will be in writing and either be delivered or sent by fax or email. Any notice which is delivered is to be considered to have been given on the first day after it is dispatched for delivery. Any notice which is sent by fax is to be considered to have been given on the first business day after it is sent and any notice which is sent by email is to be considered to have been given on the day it is sent, and if such day is not a business day, the subsequent business day. If a party changes its address, fax number or email address, it will promptly give notice of its new address, fax number, or email in accordance with this section.
- 4.6 Agreement Runs With the Land** - Every obligation and covenant of the Owner in this Agreement constitutes both a contractual obligation and a covenant granted by the Owner to the City in respect of the Land and this Agreement burdens the Land and runs with it and binds the Owner's successors in title and binds every parcel into which it is consolidated or subdivided by any means, including by subdivision or by strata plan under the *Strata Property Act*.
- 4.7 Limitation on Owner's Obligations** - The Owner is only liable for breaches of this Agreement that occur while the Owner is the registered owner of the Land.
- 4.8 Release** – The Owner by this Agreement releases and forever discharges the City and each of its elected officials, officers, directors, employees and agents, and its and their heirs, executors, administrators, personal representatives, successors, and assigns, from and against all claims, demands, damages, actions, or causes of action by reason of or arising out of advice or direction respecting the ownership, lease, operation or management of the Land or the Dwelling Units which has been or at any time after the

commencement of this Agreement may be given to the Owner by all or any of them. This clause will survive the termination of this Agreement.

- 4.9 **Joint Venture** – Nothing in this Agreement will constitute the Owner as the agent, joint venturer, or partner of the City or give the Owner any authority to bind the City in any way.
- 4.10 **Waiver** - An alleged waiver of any breach of this Agreement is effective only if it is an express waiver in writing of the breach. A waiver of a breach of this Agreement does not operate as a waiver of any other breach of this Agreement.
- 4.11 **Further Acts** - The Owner will do everything reasonably necessary to give effect to the intent of this Agreement, including execution of further instruments.
- 4.12 **Severance** - If any part of this Agreement is held to be invalid, illegal or unenforceable by a court having the jurisdiction to do so, that part is to be considered to have been severed from the rest of this Agreement and the rest of this Agreement remains in force unaffected by that holding or by the severance of that part.
- 4.13 **Equitable Remedies** – The Owner acknowledges and agrees that damages would be an inadequate remedy for the City for breach of this Agreement and that the public interest strongly favours specific performance, injunctive relief (mandatory or otherwise), or other equitable relief, as the only adequate remedy for a default under this Agreement.
- 4.14 **No Other Agreements** - This Agreement is the entire agreement between the parties regarding its subject and it terminates and supersedes all other agreements and arrangements regarding its subject.
- 4.15 **Amendment** - This Agreement may be discharged, amended or affected only by an instrument duly executed by both the Owner and the City.
- 4.16 **Enurement** - This Agreement binds the parties to it and their respective successors, heirs, executors and administrators. Reference in this Agreement to the "City" is a reference also to the elected and appointed officials, employees and agents of the City.
- 4.17 **Deed and Contract** - By executing and delivering this Agreement each of the parties intends to create both a contract and a deed executed and delivered under seal.

IN WITNESS WHEREOF the parties hereunto have executed this Agreement on the General Instrument – Part 1 which is attached to and forms part of this Agreement.

CONSENT AND PRIORITY AGREEMENT

RECITALS:

- A. **PC URBAN CLEMENT HOLDINGS LTD.** is the registered owner of PID: 030-571-219, Lot A Section 30 Township 26 Osoyoos Division Yale District Plan EPP83554 (the "Land");
- B. **PC URBAN CLEMENT HOLDINGS LTD.** granted SHELMARJAY HOLDINGS LTD. (Inc. No. BC0855415) (the "Prior Chargeholder") a mortgage which was registered against the title to the Land in the Kamloops Land Title Office under number CA7566393 ("Prior Charge");
- C. **PC URBAN CLEMENT HOLDINGS LTD.** granted to the City ("Subsequent Chargeholder") a Section 219 Covenant to which this Priority is attached ("Subsequent Charge"); and
- D. Section 207 of the *Land Title Act* permits the Prior Chargeholder to grant priority over a charge to a subsequent chargeholder.

This Priority Agreement is evidence that in consideration of \$1.00 paid by the Subsequent Chargeholder to the Prior Chargeholder (the receipt and sufficiency of which is hereby acknowledged) the Prior Chargeholder grants to the Subsequent Chargeholder priority over the Prior Charge and the Prior Chargeholder covenants and agrees to subordinate and postpone all its right, title and interest in and to the Land with the intent and with the effect that the interests of the Subsequent Chargeholder in and under the Subsequent Charge are the same as if the Subsequent Charge had been executed, delivered and registered against the title to the Land before registration of the Prior Charge.

As evidence of its agreement to be bound by the above terms of this Consent and Priority Agreement, the Prior Chargeholder has executed and delivered Part 1 of *Land Title Act* Form C Form C which is attached hereto and forms part of this Agreement.

CONSENT AND PRIORITY AGREEMENT

RECITALS:

- A. **PC URBAN CLEMENT HOLDINGS LTD.** is the registered owner of PID: 030-571-219, Lot A Section 30 Township 26 Osoyoos Division Yale District Plan EPP83554 (the "Land");
- B. **PC URBAN CLEMENT HOLDINGS LTD.** granted BRITISH COLUMBIA HOUSING MANAGEMENT COMMISSION (the "Prior Chargeholder") a mortgage and assignment of rents which were registered against the title to the Land in the Kamloops Land Title Office under number CA7678849 and CA7678850 ("Prior Charges");
- C. **PC URBAN CLEMENT HOLDINGS LTD.** granted to the City ("Subsequent Chargeholder") a Section 219 Covenant to which this Priority is attached ("Subsequent Charge"); and
- D. Section 207 of the *Land Title Act* permits the Prior Chargeholder to grant priority over a charge to a subsequent chargeholder.

This Priority Agreement is evidence that in consideration of \$1.00 paid by the Subsequent Chargeholder to the Prior Chargeholder (the receipt and sufficiency of which is hereby acknowledged) the Prior Chargeholder grants to the Subsequent Chargeholder priority over the Prior Charges and the Prior Chargeholder covenants and agrees to subordinate and postpone all its right, title and interest in and to the Land with the intent and with the effect that the interests of the Subsequent Chargeholder in and under the Subsequent Charge are the same as if the Subsequent Charge had been executed, delivered and registered against the title to the Land before registration of the Prior Charges.

As evidence of its agreement to be bound by the above terms of this Consent and Priority Agreement, the Prior Chargeholder has executed and delivered Part 1 of *Land Title Act* Form C Form C which is attached hereto and forms part of this Agreement.

CITY OF KELOWNA

BYLAW NO. 12066

Amendment No. 21 to Subdivision, Development and Servicing Bylaw No. 7900

The Municipal Council of the City of Kelowna, in open meeting assembled, enacts that the City of Kelowna Subdivision, Development and Servicing Bylaw No. 7900 be amended as follows:

1. **THAT SUBDIVISION, DEVELOPMENT AND SERVICING BYLAW NO. 7900 Part 1 – INTRODUCTION – Section 4.1 Definitions** be amended by the following:

a) adding the definition "Active Transportation Corridor" in it's appropriate location that reads:

"Active Transportation Corridor" means a corridor reserved for human powered and electric assisted transportation modes such as walking or bicycling, amongst other modes, as defined in the current version of the City of Kelowna Pedestrian and Bicycle Mater Plan. An Active Transportation Corridor, or ATC, may exist along a Highway right-of-way or it may exist along other public land such as but not limited to, the Okanagan Rail Trail or Mission Creek Greenway";

b) deleting the definition for "Certificate of Substantial Performance" that reads:

"Certificate of Substantial Performance" means a certificate issued by the Consulting Engineer in accordance with Section 9.5 of this bylaw, certifying that Substantial Performance of all of the Works and Services has been achieved."

And replacing it with:

"Certificate of Substantial Performance" means a certificate issued by the Consulting Engineer in accordance with Section 9.5 of this bylaw, **verified by the City Engineer**, certifying that Substantial Performance of all of the Works and Services has been achieved";

c) deleting the definition for "Certificate of Total Performance" that reads:

"Certificate of Total Performance" means a certificate issued by the Consulting Engineer in accordance with Section 10.2 of this bylaw, certifying that Total Performance of all of the Works and Services has been achieved."

And replacing it with:

"Certificate of Total Performance" means a certificate issued by the Consulting Engineer in accordance with Section 10.2 of this bylaw, **verified by the City Engineer**, certifying that Total Performance of all of the Works and Services has been achieved.";

d) deleting the definition for "Fees" that reads:

"Fees" means those fees payable to the City in connection with the Subdivision or Development of land, as prescribed by the City of Kelowna Development Fees Application Bylaw No. 8034."

And replacing it with:

"Fees" means those fees payable to the City in connection with the Subdivision or Development of land, as prescribed by the current version of the City of Kelowna Development Fees Application Bylaw.";

- e) deleting the definition for "General Conditions" that reads:

"General Conditions" means the following general conditions contained in Volume II of the Master Municipal Construction Document published by the Master Municipal Construction Documents Association, 1996, as may be amended from time to time, and referred to in the Specifications and Standard Detail Drawings: GC 4.2 (Safety), GC 4.3 (Protection of Work, Property and Public), GC 4.4 (Temporary Structure and Facilities), GC 4.12 (Inspections), and GC 20 (Laws, Notices, Permits and Fees).

And replacing it with:

"General Conditions" means the following general conditions contained in Volume II of the Master Municipal Construction Document published by the Master Municipal Construction Documents Association, 2009, as may be amended from time to time, and referred to in the Specifications and Standard Detail Drawings located in Schedule 5";

- f) deleting the definition for "Highways" that reads:

"Highway" includes a street, road, lane, bridge, viaduct, walkway and any other way open to public use, but does not include an easement on private property.

And replacing it with:

"Highway" includes a street, road, lane, bridge, viaduct, walkway, active transportation corridor and any other way open to public use, but does not include an easement on private property.";

- g) deleting the definition for "Highway Reservation Agreement" that reads:

"Highway Reservation Agreement" means an agreement between the Owner and the City, in the form prescribed by the City, as referred to in Section 526 of the *Local Government Act*."

And replacing it with:

"Highway Reservation Agreement" means an agreement between the Owner and the City, in the form prescribed by the City, as referred to in Section 513 of the *Local Government Act*.";

- h) deleting the definition for "Latecomer Agreement" that reads:

"Latecomer Agreement" means an agreement between the Owner and the City, in the form prescribed by the City, as referred to in Section 939 of the *Local Government Act*."

And replacing it with:

"Latecomer Agreement" means an agreement between the Owner and the City, in the form prescribed by the City, as referred to in Section 508 of the *Local Government Act*.";

- i) deleting the definition for "Maintenance Period (c)" that reads:

"(c) with respect to Works and Services that appear to be incomplete, defective or deficient during the Maintenance Period referred to in either (a) or (b) above, the period of one

year from the date on which such Works and Services are completed or corrected in accordance with Section 10.3"

And replacing it with:

"(c) with respect to Works and Services that appear to be incomplete, defective or deficient during the Maintenance Period referred to in either (a) or (b) above, the period of one year from the date on which such Works and Services are completed or corrected in accordance with Section 10.3

Notwithstanding, the Maintenance Period does not expire until the City has been contacted and conducts a final inspection of the Works";

j) deleting the definition for "OCP" that reads:

"OCP" means the City of Kelowna Official Community Plan (1994 – 2013) Bylaw No. 7600."

And replacing it with:

"OCP" means the current version of the City of Kelowna Official Community Plan Bylaw";

k) deleting the definition for "Specifications and Standard Detail Drawings" that reads:

"Specifications and Standard Detail Drawings" means the specifications and standard detail drawings for Works and Services prescribed by Volume II of the Master Municipal Construction Document, and the General Conditions referred to therein, published by the Master Municipal Construction Documents Association, 1996, attached as Schedule 6 hereto and as further amended or supplemented by City of Kelowna Construction Standards attached as Schedule 5 hereto.

And replacing it with:

"Specifications and Standard Detail Drawings" means the specifications and standard detail drawings for construction of Works and Services, located in Schedule 5 of this bylaw.";

l) deleting the definition for "Statutory Right-of-Way Agreement" that reads:

"Statutory Right-of-Way Agreement" means an agreement between the Owner and the City, in the form prescribed by the City, as referred to in Part 14 of the *Land Title Act*."

And replacing it with:

"Statutory Right-of-Way Agreement" means an agreement between the Owner and the City, in the form prescribed by the City, as referred to in Part 7, Division 11 of the *Land Title Act*.";

m) deleting the definition for "Substantial Performance" that reads:

"Substantial Performance" means the stage of completion of all of the Works and Services when:

(a) the Works and Services are ready to be used for their intended purpose, as certified by the Consulting Engineer; and

(b) the total of the incomplete, defective and deficient Works and Services can be completed at a cost, as estimated by the Consulting Engineer and verified by the City Engineer, of no more than 3% of the total cost of the Works and Services."

And replacing it with:

"Substantial Performance" means the stage of completion when:

All Works and Services, as certified by the Consulting Engineer, and verified and inspected by the City Engineer, is capable of completion or correction at a cost of not more than:

- (a) 3% of the first \$500,000 of the Works and Services;
- (b) 2% of the next \$500,000 of the Works and Services; and
- (c) 1% of the balance of the Works and Services; and

the Works and Services, or a substantial part of it, is ready for use or is being used for the purpose intended";

- n) deleting the definition for "Works and Services" that reads:

"Works and Services" includes Highways, sidewalks, boulevards, boulevard crossings, transit bays, street lighting, wiring, water distribution systems, fire hydrant systems, sewage collection and disposal systems, drainage collection and disposal systems and such other infrastructure or systems as may be provided within the City from time to time."

And replacing it with:

"Works and Services" includes Highways, sidewalks, boulevards, boulevard crossings, transit bays, street lighting, wiring, water distribution systems, fire hydrant systems, sewage collection and disposal systems, drainage collection and disposal systems and such other infrastructure or systems as may be provided within the City from time to time";

- 2. AND THAT **SUBDIVISION, DEVELOPMENT AND SERVICING BYLAW NO. 7900 Part5 - OWNER TO PERFORM WORK 9.6 Section Design and Construction Requirements** be amended:

Delete the following:

"As-Built Drawings and Disks. The Owner must provide the City in accordance with Section 9.5, Item (d) with detailed, reproducible as-built drawings of the Works and Services, sealed by the Consulting Engineer, and City compatible computer disks, as Constructed as of the date of Substantial Performance."

And replace with:

"As-Built/Record Drawings and Electronic Information. The Owner must provide the City in accordance with Section 9.5, Item (d) and Policy 265 (Engineering Drawing Submission Requirements), with detailed, reproducible as-built drawings of the Works and Services, sealed by the Consulting Engineer, and City compatible electronic information, as Constructed as of the date of Substantial Performance.;"

- 3. AND THAT **SCHEDULE 1 – WORKS & SERVICES REQUIREMENTS, WORKS & SERVICES REQUIREMENTS** Table be amended by:

- (a) adding the following rows in their appropriate location that reads:

HD1	WTR	SWR	STM	UG	SL	URBAN	N/A	SS – R7	SS – R6
HD2	WTR	SWR	STM	UG	SL	URBAN	N/A	SS-R7	SS-R6
HD3	WTR	SWR	STM	UG	SL	URBAN	N/A	SS-R7	SS-R6
16	WTR	SWR	STM	UG	SL	URBAN	N/A	SS-R5	SS-R6

(b) deleting text in the Table - ARTERIAL column that reads:

"IN ACCORDANCE WITH 'MAJOR ROAD NETWORK PLAN' CLASSIFICATION"

and replacing it with:

"IN ACCORDANCE WITH 'MAJOR ROAD NETWORK PLAN' CLASSIFICATION (SS-R8 to SS-R16)"

(c) amend Notes by deleting the following:

"(2) Where the collector road is on a bikeway route, as defined by the City's Bikeway Network Plan the road requirement will be based on Drawing Standard SS – R6";

and replacing it with:

"(2) Where the collector road is on a bikeway route, as defined by the City's Bikeway Pedestrian and Bicycle Master Plan or Transportation Master Plan, the road requirement will be based on Drawing Standard SS – R6.";

(d) amend Notes by adding the following in its appropriate location:

"(6) Active Transportation Corridors not located with road right-of-way's, such as but not limited to the Okanagan Rail Trail and Mission Creek Greenway, are transportation corridors requiring frontage improvements";

4. AND THAT **SCHEDULE 3 – QUALITY CONTROL AND ASSURANCE** be amended by adding the following at the end of the first paragraph:

"Professional Engineers shall fulfill their obligations under the Engineers and Geoscientists Act and the Engineers and Geoscientists of British Columbia's Quality Management Guidelines";

5. AND THAT **SCHEDULE 4 – Design Standards** be deleted in its entirety and replaced with Schedule "A" attached to and forming part of this bylaw;

6. AND THAT **SCHEDULE 5 – CONSTRUCTION STANDARDS, 1. CONSTRUCTION SPECIFICATIONS INDEX** be amended by removing the title:

"93 01S – Planting of Tress, Shrubs & Ground Covers"

and replacing it with:

"32 93 01S – Planting of Trees, Shrubs & Ground Covers";

7. AND THAT **SCHEDULE 5 – CONSTRUCTION STANDARDS, 1. CONSTRUCTION SPECIFICATIONS, Soil Cells Section 2.4** be amended by:

(a) removing the title in its entirety and replacing it with

"Inspector Riser Assembly";

(b) replacing "Fitings" with "Fittings";

8. AND THAT **SCHEDULE 5 – CONSTRUCTION STANDARDS, 1. CONSTRUCTION SPECIFICATIONS** be amended by replacing all instances of "Personel" with "Personnel";
9. AND THAT **SCHEDULE 5 – CONSTRUCTION STANDARDS, 2. STANDARD DRAWINGS, CITY OF KELOWNA STANDARD DRAWINGS INDEX AND CROSS-REFERENCE TO MMCD** be updated by adding the following in their appropriate location under **STORM AND SANITARY SEWERS**:

Comment	Dwg.	Title
Added	SS-S58	Groundwater Recharge Suitability Map
Added	SS-S59	Typical Lift Station Site Layout
Added	SS-S60	Sanitary Lift Station
Added	SS-S61	Above Ground Valve Kiosk
Added	SS-S62	Pigging Port
Added	SS-S63	Radio Antenna mast and Base

10. AND THAT **SCHEDULE 5 – Drawings – Index for Reference, CITY OF KELOWNA STANDARD DRAWINGS INDEX AND CROSS-REFERENCE TO MMCD** be updated by adding the following in their appropriate location under **STORM AND SANITARY SEWERS**:

Comment	Dwg.	Title
Added	SS-S58	Groundwater Recharge Suitability Map
Added	SS-S59	Typical Lift Station Site Layout
Added	SS-S60	Sanitary Lift Station
Added	SS-S61	Above Ground Valve Kiosk
Added	SS-S62	Pigging Port
Added	SS-S63	Radio Antenna mast and Base

11. AND THAT **SCHEDULE 5 – Drawings - Part 2b – Storm and Sanitary Sewers** be amended by adding a standard detailed drawing for **TYPICAL LIFT STATION LAYOUT SS-S59** as attached to and forming part of this bylaw as Drawing A;
12. AND THAT **SCHEDULE 5 – Drawings - Part 2b – Storm and Sanitary Sewers** be amended by adding a standard detailed drawing for **SANITARY LIFT STATION SS-S60** as attached to and forming part of this bylaw as Drawing B;
13. AND THAT **SCHEDULE 5 – Drawings - Part 2b – Storm and Sanitary Sewers** be amended by adding a standard detailed drawing for **ABOVE GROUND VALVE KIOSK SS-S61** as attached to and forming part of this bylaw as Drawing C;
14. AND THAT **SCHEDULE 5 – Drawings - Part 2b – Storm and Sanitary Sewers** be amended by adding a standard detailed drawing for **PIGGING PORT SS-S62** as attached to and forming part of this bylaw as Drawing D;
15. AND FURTHER THAT **SCHEDULE 5 – Drawings - Part 2b – Storm and Sanitary Sewers** be amended by adding a standard detailed drawing for **RADIO ANTENNA MAST AND BASE SS-S63** as attached to and forming part of this bylaw as Drawing E;
16. This bylaw may be cited for all purposes as "Bylaw No.12066, being Amendment No. 21 to Subdivision, Development and Servicing Bylaw No. 7900."
17. This bylaw shall come into full force and effect and is binding on all persons as and from the date of adoption.

Read a first, second and third time by the Municipal Council this 27th day of July, 2020.

Adopted by the Municipal Council of the City of Kelowna this

Mayor

City Clerk

SCHEDULE 4
OF BYLAW 7900
CITY OF KELOWNA
DESIGN STANDARDS

0. GENERAL DESIGN CONSIDERATIONS
1. WATER DISTRIBUTION
2. SANITARY SEWER
3. STORMWATER MANAGEMENT
4. HIGHWAY
5. ROADWAY LIGHTING
6. TRAFFIC SIGNALS
7. LANDSCAPE AND IRRIGATION
8. HILLSIDE DEVELOPMENT STREET STANDARDS

GENERAL

This latest update of Schedule 4 of Bylaw 7900 - City of Kelowna Design Standards is based on the Municipal Infrastructure Design Guidelines 2014 as prepared under the auspices of the Master Municipal Construction Document Association (MMCDA), which is an association of British Columbia Municipalities, Regional Districts, Contractors and Consultants. The purpose of the Design Standards is to provide a standardized set of guidelines to be utilized by consultants, contractors and City staff involved with design and construction of municipal infrastructure. Users of this Schedule should note the following:

- These Standards are considered a “living document” and will be updated on a regular basis to reflect evolving industry advancements, new materials, improved methods and best practices.
- The contents of this manual are intended to complement the following documents:
 - MMCD Specifications and Standard Detailed Drawings.
 - City of Kelowna Schedule 5 – Supplementary Specifications and Supplementary Standard Detailed Drawings.
 - Policy 265 (Engineering Drawing Submission Requirements).
 - Policy 266 (Approved Products List).
- Links to other documents have been provided to augment the material included in these Design Standards.

This manual is not intended to be a substitute for sound engineering knowledge and experience. It is the designer's responsibility to exercise professional judgment on technical matters in the best interests of the owners and users of the infrastructure. Standards contained herein are provided to assist in making these judgments, but should not be used as a substitute. Since the standards are general, they do not, and cannot, cover all particular cases.

DISCLAIMER

This manual is not intended to be used as a basis for establishing civil liability.

o.o General Design Considerations

o.1 General

This latest update of Schedule 4 of Bylaw 7900 - City of Kelowna Design Standards is based on the Municipal Infrastructure Design Guidelines 2014 as prepared under the auspices of the Master Municipal Construction Document Association (MMCD), which is an association of British Columbia Municipalities, Regional Districts, Contractors and Consultants. The purpose of the Design Standards is to provide a standardized set of guidelines to be utilized by consultants, contractors and City staff involved with design and construction of municipal infrastructure. Users of this Schedule should note the following:

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o.2 Sustainability and Asset Management

Development of appropriate design guidelines for municipal infrastructure involves consideration of the principles of sustainability and asset management. These principles include the following:

- Improve and enhance quality of life.
- Minimize negative impacts on health, safety and the environment.
- Investigate the impacts of potential actions to manage and mitigate risk.
- Consistently make informed long-term infrastructure decisions.
- Minimize overall life cycle investment.

Some of the above principles involve conflicting priorities, for example, undue concentration on financial economies may have adverse impacts on environmental protection and life cycle costs of infrastructure.

A balanced approach to design of municipal infrastructure requires careful consideration of all of the above principles.

o.3 Independent Utilities

Independent utilities are those not normally supplied by municipal or regional authorities and are not included in these guidelines. Independent utilities include:

- Electrical power
- Communications (telephone, data, fibre optics and cable)
- Gas

Design of municipal infrastructure must include consideration of the above utilities. Design of these utilities is normally carried out by the utility owner and coordinated for conflicts by the municipal designer and/or the local authority.

In new urban developments, all wiring is generally to be underground as per Policy 101 – Conversion of Overhead Power Lines to Underground Installation. This excludes electrical transmission lines, which are normally located in separate rights-of-way.

o.4 Utility Rights-of-Way

Utility right-of-way locations should be selected to avoid environmentally sensitive areas, such as, watercourses, wetlands, wildlife migration corridors and forested areas, as outlined in the Official Community Plan (OCP).

Where the location of a municipal utility in a right-of-way is approved by the City, the minimum desirable right-of-way widths are as follows:

Table o.4 Right-of-Way Widths

Service Type	Right-of-Way Width
Single service	Twice the depth from surface to the crown of the pipe plus trench width (4.5 m minimum width).
Two services within the same trench	Twice the depth from surface to the crown of the deeper pipe PLUS trench width (5.5 m minimum width).
Two or more services adjacent to one another but in separate trenches	Cumulative widths for single services (noted above) PLUS any difference to provide the required separation (6 m minimum width).
When the service is within a road allowance, and the distance from the property line to the centre of the service is less than one half of the width indicated above for a single service, the difference should be provided as right-of-way on the adjacent property.	
The rights-of-way noted are desirable but in some cases may not be practical and alternative	

combined right-of-way corridors may be required as approved by the City Engineer.

In all cases, the width of rights-of-way should be sufficient to permit an open excavation with side slopes in accordance with the WorkSafeBC Requirements for excavation and trenching safety, without impacting on or endangering adjacent structures.

Where required, sanitary trunk and interceptor sewers should have rights-of-way wide enough for future widening and/or twinning. The width of the right-of-way should be the required separation between pipe centrelines plus 2 times the depth to the crown of the deeper sewer.

The designer should provide cross sections indicating the minimum safe distances to adjacent building footings based on a safe angle of repose from the limits of the excavation.

Where a utility is located within a right-of-way, and valves, valve chambers, manholes, or other appurtenances which require maintenance are located within a right-of-way, maintenance road access from a public road must be provided. The maintenance access must be sufficiently wide and structurally adequate to support the maintenance vehicles for which the access is intended.

0.5 Utility Separation

Requirements for separation of sanitary or storm sewers from water mains are as follows, unless otherwise indicated by Interior Health (IH).

0.5.1 Horizontal Separation

At least three (3) metre horizontal separation (pipe wall to pipe wall) should be maintained between a water main and either a sanitary sewer or a storm sewer.

In special circumstances where 3.0 m separation is not possible, a smaller separation than 3.0 m may be permitted upon approval from Interior Health.

The designer shall obtain Interior Health approval for all water main designs prior to commencement of construction.

0.5.2 Vertical Separation

Where a water main crosses a sanitary sewer or storm sewer, the water main should be above the sewer with a minimum clearance of 0.45 m and installed in accordance with Interior Health requirements.

0.5.3 Sewers in Common Trench

In special circumstances when typical separation cannot be reasonably achieved (i.e. hill side development, rock excavation), storm and sanitary sewers may be installed in a common trench provided that the design has taken into account:

- Interference with service connections,
- Stability of the benched portion of the trench,
- Conflict with manholes and appurtenances.

The horizontal clearance between sewer pipes should be not less than 1.0 m. Separation between manholes should be not less than 0.3 m.

o.6 Trenchless Technologies

Installation or rehabilitation of pipelines using trenchless methods may be indicated. The MMCD Specifications Section 33.05.23 Trenchless Sewer Pipe Bursting; and MMCD Specifications Section 33.05.24 Cured in Place Pipe Liners are two examples of trenchless applications.

Circumstances favouring trenchless installation include:

- Installation or rehabilitation in heavily built-up areas,
- Stream crossings,
- Railway crossings,
- Highway crossings.

Available technologies include the following:

- Slip-lining
- Cured-in-place pipe (CIPP)
- Pipe bursting
- Horizontal directional drilling (HDD)
- Micro-tunnelling
- Pipe jacking

o.7 Seismic and Geo-hazard Design Standards

Underground utilities are at risk of damage caused by seismic events, soil liquefaction and land slides. The most significant seismically-triggered geo-hazard that underground utilities are exposed to is horizontal ground displacement from landslides and soil liquefaction induced lateral ground displacement. Seismic design standards must be considered in seismically active zones with a potential for landslide or soil liquefaction. This becomes even more critical when considering a shared fire flow and potable water distribution system, which, during a severe seismic event, is required to remain functional if it is to be relied upon to provide fire suppression throughout the community.

The design shall consider the stability of the soils present, as well as establishing the site's susceptibility to lateral ground displacement during seismic activity.

This section does not cover seismic design considerations of larger size chambers (typically in excess of 10 m² in footprint), pump station structures, storage tanks, reservoirs and similar large components of the water and sanitary systems. These structures, along with seismically resistant pipe connections, shall be individually assessed by civil, geotechnical and structural engineers using the latest edition of BC Building Code and Application of the Seismic Guidelines for Government to meet post-disaster requirements and other specialty seismic standards applicable to buried and above ground structures.

o.8 Referenced Standards

All referenced standards contained within (i.e. AWWA, BC Building Code, Water Supply for Public Fire Protection, etc.) are to be the most recent version unless specifically noted otherwise.

o.9 Record Drawings and Operation and Maintenance Manuals

Record drawings are to be prepared and submitted in accordance with Policy 265 (Engineering Drawing Submission Requirements).

Operation and Maintenance Manuals are to be prepared and submitted for pump stations, lift stations, PRVs, reservoirs, valves, air valves and appurtenances as described below:

Supply two (2) paper copies and one (1) electronic copy of operating and maintenance manuals prior to substantial completion.

Bind contents in a three-ring, hard covered, plastic jacketed binder with the name of the facility to be embossed onto binder cover and spine.

Each section shall be separated from the preceding section with a plasticized cardboard divider with a tab denoting contents of the section.

Contents to include:

- Title sheet, labelled "Operation and Maintenance Instructions", and containing project name and date.
- List of contents.
- Reviewed shop drawings of all equipment.
- Equipment list showing all model and serial numbers.
- All equipment manufacturers manuals.
- Record drawings of all mechanical, electrical, control and alarm installations.
- Full description of system operations including: design points, designed pump and system curves, ultimate capacity, area served and any relevant design criteria relevant to the operation of the system.
- Full description of entire mechanical, electrical and alarm system operation.
- Names, addresses and telephone numbers of all major sub-contractors and suppliers.
- Commissioning report showing pressures, flows, current drawings for all possible operating conditions.

o.10 Kiosks/Laminate Wrapping Requirements

All electrical kiosks to be wrapped with anti graffiti vinyl wrapping. Wrap material shall be a cast vinyl then laminated with a high gloss laminate. The wrap is to be visually pleasing and compliment the area it would be situated in considering the landscape, geography, or general theme of the specific area. Artwork to have a high degree of contrast so as to be more impervious to graffiti vandalism and not to be for commercial advertising. All artwork to be approved before installation.

o.11 Interpretation

If there is any inconsistency or conflict between the provisions of these Design Standards and the Standard Drawings the Design Standards shall govern.

1. WATER DISTRIBUTION

- 1.1 [General](#)
- 1.2 [Metering](#)
- 1.3 [Per Capita Demand](#)
- 1.4 [Non-Residential Demand](#)
- 1.5 [Fire Flows](#)
- 1.6 [Design Flows](#)
- 1.7 [Water Pressure](#)
- 1.8 [Hydraulic Design](#)
- 1.9 [Minimum Pipe Diameter](#)
- 1.10 [Dead Ends](#)
- 1.11 [Minimum Depth of Cover](#)
- 1.12 [Grade](#)
- 1.13 [Corrosion Protection](#)
- 1.14 [Valves](#)
- 1.15 [Hydrants](#)
- 1.16 [Blow Offs and Blow Downs](#)
- 1.17 [Test Points](#)
- 1.18 [Air Valves](#)
- 1.19 [Thrust Restraint](#)
- 1.20 [Chambers](#)
- 1.21 [Service Connections](#)
- 1.22 [Alignments and Corridors](#)
- 1.23 [Reservoirs](#)
- 1.24 [Pump Stations](#)
- 1.25 [Pressure Reducing Valve \(PRV\) Stations](#)
- 1.26 [Facility Site Requirements](#)

3 General

These guidelines are not intended to be a substitute for sound engineering knowledge and experience. Water distribution system designs should be prepared under the direction of a design professional who has the appropriate experience and is registered with Engineers and Geoscientists British Columbia.

Water for Kelowna is provided by the City of Kelowna Water Utility and three major water purveyors.

- Black Mountain Irrigation District
- Glenmore Ellison Improvement District
- Rutland Water Works

These design standards apply to the City of Kelowna Water Utility and are in general conformance with

the four major water purveyors. The Purveyors requirements may differ in some instances so it is the responsibility of the designer to confirm with the independent water purveyors regarding their specific requirements. The location of water infrastructure within roadways shall be in accordance with these standards.

4 Metering

Water meters tend to reduce per capita water demand and are required as per the City of Kelowna Plumbing Bylaw, Water Use Regulation Bylaw and Water Purveyors bylaw(s).

5 Per Capita Demand

Use the following per capita demands for future residential requirements:

- Average annual daily demand (ADD): 900 litres per capita per day (L/c/d)
- Maximum day demand (MDD): 1800 litres per capita per day
- Peak hour demand (PHD): 4000 litres per capita per day

Design population density:

Single Family	3.0 people/dwelling
Multi-Family	2.0 people/dwelling

6 Non-Residential Demand

Commercial, industrial and institutional demands should be determined using specific data related to the development or zoning. In the absence of such data, or municipal regulations, use the following for maximum day demands for single story buildings (MDD):

Commercial or institutional:	22,500 litres per hectare per day
Industrial:	100,000 litres per hectare per day

Note: the above rates do not include outdoor irrigation and assume that all connections are metered.

BL11913 amended section 1.5

7 Fire Flows

Fire flows are subject to the following minimum requirements (Table 1.5) for all offsite works.

Table 1.5 Minimum Required Fire Flow by Zoning Designation

General Zoning Designation	Minimum Fire Flow*
Single Family & Two Dwelling Residential	60 L/s
Modular / Mobile Home	60 L/s
Three & Four Plex Housing	90 L/s
Apartments, Townhouses	150 L/s
Commercial	150 L/s
Institutional	150 L/s
Industrial	225 L/s

*Off-site fire flow requirements are calculated in accordance with the requirements of the current edition of "Water Supply for Public Fire Protection - A Guide to Recommended Practice", published by Fire Underwriters Survey.

Subdivisions and main extensions must utilize hydraulic information from water model results provided by the City.

Onsite requirements are defined during the Building Permit process:

- a) Fire flow requirements for structures are to be calculated based on the worst-case requirement consistent with Section 3.2.5.7 of the BC Building Code.
- b) Where a structure design includes an automated sprinkler system to NFPA 13 as per Section 3.2.5.12 of the BC Building Code, then:
 - i. The NFPA 13 fire flow result for the worst-case building shall be the fire flow requirement on site.
 - ii. Confirmation of meeting the NFPA 13 requirement must be provided to the City.

The Owner or Developer must report to the City that the calculated fire flow does not exceed the minimum requirements for that zoning found in Table 1.5.

8 Design Flows

Unless otherwise indicated by the City Engineer, system design flows should be based on the ultimate population and fully developed non-residential land as anticipated in the Official Community Plan (OCP).

Total design flows (Q_{design}) are to be the greater of the following:

$Q_{design} = MDD+FF$ Maximum Day Demand plus the Fire Flow, or

$Q_{design} = PHD$ Peak Hour Demand

9 Water Pressure

The water system must be designed to provide domestic water at the building main floor elevation on each Parcel as follows:

Maximum allowable static pressure	830 kPa(120 psi)
Minimum static pressure	275 kPa(40 psi)
Minimum system pressure at Peak Hour Demand (PHD)	275 kPa(40 psi)
Minimum pressure in system during design Maximum Day Demand and Fire Flow (MDD+FF)	140 kPa(20 psi)

For large lot and hill side development the designer shall be responsible to identify suitable building elevations for all buildings based on available hydraulic pressure. Determination of pressure limits should include consideration of property elevations relative to street level. Designer to note properties on service cards and record drawings where pressure at service connection exceeds 75 psi.

Where the maximum pressure exceeds 515 kPa (75 psi), design must identify service connections that must be individually protected by pressure reducing valves located in the buildings being served.

10 Hydraulic Design

Where there is an existing hydraulic network in place, the City will provide any available information for assistance in designing changes to the network. Depending on the complexity and extent of the proposed distribution system, the City may require a hydraulic analysis design showing flows and pressures.

Use a proven network analysis computer model based on the Hazen-Williams formula:

$$Q = \frac{CD^{2.63} S^{0.54}}{278,780} \quad \text{Where:}$$

- Q = Rate of flow in L/s
- D = Internal pipe diameter in mm
- S = Slope of hydraulic grade line in m/m
- C = Roughness coefficient (Table 1.8)

Table 1.8 Roughness Coefficients for Various Pipe Materials

Pipe Material	C Factor
PVC	130

Cement Lined Ductile Iron, Cement Lined Steel, Asbestos Cement	120
Cast Iron	100

It should be noted that the values listed in the above table are for pipe losses only and do not include losses associated with fittings, tees and valves which also require design consideration.

The maximum allowable design velocity shall not exceed the following:

Pump Supply, Reservoirs and Trunk Mains	2.0 m/s
Distribution Lines	
- At Peak Hour Demand (PHD)	2.0 m/s
- At Maximum Day Demand (MDD) plus Fire Flow (FF)	4.0 m/s
-	

Designers are responsible for assuring that surge and transients pressures are accounted for in their design.

When water mains cross railroads, major regional roads including Provincial highways, or watercourses, a steel casing pipe must be provided and must be designed to all applicable static, dynamic and seismic loadings and all other requirements of the authority having jurisdiction. The water main must be constructed with the appropriate spacers to support the pipe and prevent sagging or uplift (floating) inside the casing pipe. The water main inside the casing must be joint restrained. Service connections crossing highways and railroads are not recommended and require approval from the City Engineer.

11 Minimum Pipe Diameter

Distribution mains:	200 mm*
Fire hydrant connections:	150 mm
Service connections:	19 mm CU / 25 mm PE

Service diameter for buildings with sprinklers to be determined on a case by case basis based on fire flow demand.

* For looped distribution mains with lengths less than 500 m in residential subdivisions, the diameter can be reduced to 150 mm, providing that fire flow requirements can be met.

* Subject to approval of the City Engineer, distribution main minimum diameter in residential areas may be reduced to 100 mm provided that the main terminates in a short residential cul-de-sac, has a length less than 80 m, serves no fire hydrants or fire sprinkler systems and where no further extension is planned.

* In separated water systems where irrigation and fire flow are separated from domestic (potable)

water, the minimum pipe size for the domestic water system may be 100 mm.

For commercial/industrial/institutional areas, the minimum allowable water main size shall be 200 mm diameter.

12 Dead Ends

Water mains must be looped wherever possible. Where dead ends are unavoidable, and approved by the City Engineer, blow-offs shall be provided (see Section 1.16 for sizing).

The maximum length of any permanent non-interconnected water main is 200 m. All mains exceeding 200 m in length, unless it is a temporary situation, must be looped.

Where the water system network is deficient, installation of additional water main capacity may be required and may necessitate the provision of rights-of-way in favour of the City.

13 WD_Minimum_Depth_of_Cover

The cover over any water main must not be less than 1.5 m from pipe crown to surface. U-bends should be used to avoid conflict and maintain minimum depth of cover. Rigid insulation may be used to provide protection to the water main from freezing for short sections of water main (< 4 m) with approval from the City Engineer, as per manufacturer's recommended guidelines for Utility line insulation (ex. DOW Tech Solutions 602.0 Styrofoam Brand Highload Insulation for Buried Utility lines).

14 Grade

Water mains must be designed with a rising grade wherever possible, to minimize high points in the main. Grades should be straight lines between defined deflection points. Elevations should be recorded on record drawings.

The minimum grade of water mains shall be 0.1%. Grading should be designed to minimize the number of high points and maintain continuous grade.

When the slope exceeds 15%, provide anchorage, joint restraints, trench dams and trench drainage as per standard MMCD drawing G8. Provide geotechnical engineering report where appropriate that assesses slope stability.

15 Corrosion Protection

Where there is a potential for encountering corrosive soils, a geotechnical corrosion analysis on the alignment of any proposed metallic water main or metallic appurtenances shall be conducted to determine the corrosiveness of the native soils and the suitability of metallic pipe and appropriate corrosion protection measures. One example is MMCD Specification Section 26 42 13, Cathodic Protection.

Regardless of soil condition, all metallic pipe shall be installed with poly-wrap as per the manufacturers

recommended procedures.

Petrolatum tape and paste shall be used to wrap all nuts and bolts on buried metallic fittings and joint restraint fasteners.

Metallic water main with less than 400 mm diameter are not permitted.

16 Valves

In general, valves should be located as follows:

- In intersections, either in a cluster at the pipe intersection or at projected property lines to avoid conflicts with curbs and sidewalks:
 - 3 valves at "X" intersection;
 - 2 valves at "T" intersection;
 - Or as directed by the City Engineer, in order to allow for the isolation of specific sections of the main, minimize service disruption and/or facilitate network operation and maintenance.
- Not more than 200 m apart (except on trunk mains greater than 300 mm diameter, where spacing can be increased upon approval of the City Engineer). Where possible avoid the use of inline valves.
- In locations and at a frequency so that not more than two hydrants are out of service when a section of the main is turned off. An isolation valve is required for each hydrant, typically flanged to the hydrant tee.
- Not more than 20 service connections isolated.

In order to permit the use of pigging cleaning methods the valve sizing and type selection should be as follows:

- The valves shall be the same diameter as the water main.
- All valves shall be gate valves. Butterfly valves with appropriate chamber sized for maintenance and replacement may be used in special circumstances for water mains greater than 400 mm with approval from the City Engineer.

17 Hydrants

Fire hydrants should be located in general at street intersections and as follows:

- Not more than 150 m apart in single family residential areas measured along road centre line.
- Not more than 100 m apart in higher density residential, commercial, industrial and institutional areas.
- Hydrant locations as per BC Building Code for all buildings.
- In accordance with "Water Supply for Public Fire Protection - A Guide to Recommended Practice" (latest edition), published by Fire Underwriters Survey.

- 1.5 m back from curb or 0.5 m back of sidewalk to centre line of hydrant.
- Minimum 1.0 m clear of any other utility structure in all directions.
- Minimum 3.0 m clear in direct line with hose connections.
- At property lines in mid-block locations.
- SRW required where open cut excavation to base of hydrant assembly extends into private property.
- Bollards or concrete barriers for hydrant protection may be required at the City Engineer's discretion.

Hydrants shall not be located on sidewalks. Where this is not possible and with approval from the City Engineer, a minimum distance of 1.5 m must be maintained between the front of the pumper port and the back of curb, in accordance with the Transportation Association of Canada Manual for Canadian Roads.

On arterial highways with, or designated to be constructed with, a raised median, fire hydrants shall be installed on both sides of the highway with each side treated exclusively for spacing requirements.

18 **Blow Offs and Blow Downs**

Blow-offs shall be provided at the terminal ends of all water mains whether permanent or temporary to facilitate scouring velocities during flushing. Blow-off sizes are:

- 50 mm dia. for 100 mm dia. water mains (see Drawing SS-W8A)
- 100 mm dia. for 150 mm dia. and larger water mains (see Drawing SS-W8B)

Where practical, and approved by the City Engineer, a hydrant may serve a secondary role as a blow-off.

On all mains greater than 300 mm diameter, install blow downs at the lowest point in the water main profile between the line valves.

19 **Test Points**

Test points shall be installed on all water mains in order to provide for the ability to collect water samples in accordance with AWWA C651 – Disinfecting Water Mains.

20 **Air Valves**

Combination air valves shall be installed at the summits of all mains. Air valves may not be required on water mains 200 mm diameter and smaller upon approval by the City Engineer for the following:

- Where active service connections are suitably located to dissipate entrapped air,
- Where the difference in elevation between the summit and valley is less than 600 mm and it can be shown that air pockets will be carried by typical flows.

Air valve sizes, subject to design analysis, are as follows (Table 1.18):

Table 1.18 Typical Air Valve Sizes

Water Main Size	Valve Size
100 mm to 300 mm	25 mm
350 mm to 600 mm	50 mm
Larger than 600 mm	Special design

Air valves must be vented to an appropriate secured above-grade location to eliminate any potential for cross connection in a flooded or contaminated chamber.

21 Thrust Restraint

Cast in place concrete thrust blocking and/or adequate joint restraining devices must be provided at bends, tees, wyes, reducers, plugs, caps, valves, hydrants and blow-offs. Bends at 5-degrees may not require thrust blocking and/or joint restraining devices provided they are properly engineered.

The restraint system must take into account potential future excavations in the vicinity of the water main. Design calculations must be based on fitting type, water pressure and soil conditions.

Precast thrust blocks are not permitted except in combination with joint restraints as approved by the City Engineer.

When required, provide the City Engineer with calculations for the thrust block/joint restraint design.

22 Chambers

Chambers or manholes should allow adequate room for maintenance, including headroom and side room. Access openings must be suitable for removing valves and equipment and permitting inspection cameras and pigging equipment. The chamber is to be provided with a drain to a storm sewer or ditch, complete with backflow prevention, to prevent flooding of the chamber. Rock pits may be considered subject to suitable soil and groundwater conditions and subject to approval by the City Engineer. A pumping system may be required for drainage.

Adequate venting should be provided. The City Engineer may require provision of forced ventilation, lighting, heating and dehumidification. Access and ventilation details must comply with WorkSafeBC requirements.

Insulation to prevent freezing should be provided where necessary.

23 Service Connections

Service connection size should be calculated on the basis of the designated land use including sprinkler systems and/or on-site hydrants, where applicable. The minimum size is outlined in 1.9 - Minimum Pipe Diameter.

All service connections to be made with service saddles at water main.

Multiple corporation stops must have a minimum spacing of 1.0 m.

The curb stop at the end of each service pipe must be located as per SS-W2. Where such locations will conflict with other services, the location may be revised with the approval of the City Engineer.

Each connection of 100 mm or larger shall be installed with tee and isolation gate valve on the service at the water main. The designer may choose to add an additional valve at property line to facilitate testing and tie-in procedures.

Services and curb stops must have a minimum depth of cover of 1.5 m and curb stops must be no deeper than 2.0 m. Valve boxes shall be used for curb stops greater than 50 mm diameter.

24 Alignments and Corridors

On straight roads, water mains should have straight alignments with uniform offsets between intersections.

For curved roads and alignments, where approved by the City Engineer, design joint deflections shall be limited to half the maximum deflection specified by the pipe manufacturer or through the use of 5-degree bends. Pipe alignment to be at a parallel offset with an established road right-of-way or property line.

Metallic marking tape labeled WATERWORKS is to be placed above all pipes at a depth of 0.45 m below finished grade in statutory rights-of-way or irregular alignments.

Water mains on new roads must be located as indicated in the applicable Standard Drawing typical cross-section.

Where a water main crosses private land, right-of-way requirements are as indicated in Section 0.3, General Design Considerations – Utility Rights-of-Way.

Clearance from sewer is as indicated in Section 0.4, General Design Considerations – Utility Separation.

25 Reservoirs

The following reservoir design standards apply to the City of Kelowna Water Utility and are in general agreement with the other four water purveyors in Kelowna. The designer should consult with the applicable water purveyor for specific design details.

1.23.1 Preliminary Design

Reservoir design shall include a preliminary design which is to be approved by the City Engineer before the detail design begins. Preliminary designs should cover the following issues:

- Site layout,
- Design standards,
- Volume,
- Shape,
- Number of cells,
- Geotechnical report on foundation conditions,
- Appearance.

1.23.2 Reservoir Capacity

Reservoir capacity must not be less than the greater of the following:

- One-day average annual consumption for the service area.
- Total Storage Volume = A + B + C

Where:

- A = Fire Storage (from Fire Underwriters Survey guide)
- B = Equalization Storage (25% of Maximum Day Demand)
- C = Emergency Storage 25% of (A + B).

1.23.3 Reservoir Structural Design Codes

Design in accordance with the latest edition of the BC Building Code and one of the following specialty codes:

- ACI 350/350R: Code Requirements for Environmental Engineering Concrete Structures, and Commentary.
- PCA: Circular Concrete Tanks Without Prestressing.
- ACI 350.3/350.3R: Seismic Design of Liquid Containing Concrete Structures, and Commentary.
- AWWA D110: Wire and Strand-Wound Circular Prestressed-Concrete Water Tanks.
- AWWA D115-06 Tendon-Prestressed Concrete Water Tanks.
- AWWA 0100-11 Welded Carbon Steel Tanks for Water Storage.
- AWWA D103: Factory-Coated Bolted Steel Tanks for Water Storage.

1.23.4 Reservoir Design Features

1. Seismic Loading: Design for the following:

- Watertight structure and fully operational mechanical equipment, following a 475 year return period earthquake.
- Repairable damage and no uncontrolled release of water following a 2475-year return period earthquake.

2. Two cells, each containing one-half of total required volume and capable of being drained and filled independently.
3. Reservoir to be below ground, unless approved by the City Engineer.
4. Each cell is to have an access opening and hatch in the roof for cleaning and maintenance with minimum dimension 900 mm x 900 mm. Opening to be located so that the overflow pipe is clearly visible inside the reservoir, when viewed from the opening.
5. For all access hatches, a survey mark inlaid inside showing the geodetic elevation is to be provided.
6. Finished elevation of the top of the hatch when closed to be 0.6 m above the finished elevation of the reservoir roof.
7. Access hatch(es) to have the following:
 - Aluminium 1/4" tread plate
 - Perimeter drain
 - Perimeter sealing gasket
 - Slam lock with aluminium removable sealing plug and opening tool
 - Flush lift handle
 - Gas spring assist cylinder
 - 90-degree hard open arm
 - Flush fitting padlock tang
8. The hatch must be reinforced for 1,465 kg/m² (300 lbs./sq.ft.) complete with hatch alarm.
9. All fasteners for the hatch to be made of 316 stainless steel.
10. Ventilation pipes or openings sized to handle appropriate intake and exhausting volumes of air for filling and drawing the reservoir. Ventilation pipes outlets to be screened.
11. Reservoir floor to slope to drain sump.
12. Drain sump to be a minimum of 1000 mm X 1000 mm X 400 mm, invert of drain pipe to be flush with sump floor, grating to be installed over sump.
13. Sub-drain under floor to collect and drain any leakage (may be connected to overflow pipe provided suitable measures are incorporated to prevent surcharging).
14. Overflow drain to be provided and sized to transmit the maximum pump discharge with all pumps running.
15. A stainless steel interior wall ladder is required from roof access to floor. All ladders to meet WCB regulations, supply attachment points for fall arrest equipment.
16. Top rung of the ladder to be the same elevation as the finished elevation of the reservoir roof.
17. Where public access could be gained to reservoir, install appropriate fall prevention railings.
18. Re-chlorination may be required based on demand forecasts. Chlorine residual analyser required.

19. All pipework within the reservoir to be PVC or fiberglass except overflow fitting which may be stainless steel to AWWA standards.
20. All metal parts within the reservoir including bolts, nuts, screws, anchors, ladders etc. to be 316 stainless steel. All welded stainless steel components located in the reservoir to be appropriately passivated.
21. Reservoir inlet pipe to terminate with a diffuser positioned opposite the reservoir outlet and a distance of $\frac{3}{4}$ the length of the reservoir from the outlet. Diffuser to cover $\frac{3}{4}$ the wall length.
22. Ports in diffuser pipe to be engineered to produce circulation within the reservoir during fill cycle.
23. Diffuser to incorporate removable end caps.
24. Backup high and low level control balls for each cell set at 40% and 95% levels, (not to contain lead or mercury).
25. The reservoir must be cleaned, disinfected and leak tested to AWWA and local authority requirements.
26. Gated black chain link perimeter fencing is required to address security and safety issues.
27. Landscaping acceptable to the City is to be provided including irrigation.
28. In special circumstances, at the request of the City Engineer, vehicle access road to the top of the reservoir roof to be provided.
29. Manuals to be supplied as per Section 0.8.

1.23.5 Reservoir Valve Chamber

Reservoir to incorporate valve chamber containing:

1. Chamber to include all valves associated with the reservoir operations.
2. Design in accordance with seismic codes noted above.
3. Entrance at grade large enough to permit safe removal of largest single piece of equipment.
4. Lifting beams and hoists where necessary to enable removal of equipment or components.
5. Floor drains and drainage system.
6. Separate inlet and outlet piping including check valves to separate inlet and outlet flows.
7. All inlet and outlet piping to incorporate a $\frac{3}{4}$ inch sampling port with isolating ball valve.
8. A 19 mm Schedule 80 PVC sample line with isolating ball valve for each cell terminating in the middle of a cell wall at the 50% level and extending 25% towards the centre of the reservoir.
9. A 50 mm 316 stainless steel schedule 80 pipe with isolating ball valve extending into each cell for connection of cleaning hoses.

10. A 19 mm stainless steel pipe with isolating ball valve extending into each cell connected to a pressure transmitter for level sensing.
11. Minimum 30 amp, 120 VAC electrical service.
12. Heat, light and ventilation to meet WCB requirements and to maintain minimum 5-degree C on coldest day. Insulate interior walls and ceiling as required.
13. All control wiring junction boxes.
14. A PLC control system to current Pump Operations standards.
15. Chlorine residual analyzer.
16. Interior and exterior of all steel piping to be coated to AWWA standards, or use 316 stainless steel.
 - Inlet piping – Mid Blue
 - Outlet piping – Dark Green
 - Drain piping – Gull Grey
 - All other piping – Mid Blue
 - Include flow direction arrows where appropriate.
17. Check valves to show direction of flow with white painted arrows.
18. PLC controlled modulating inlet valve where more than one reservoir serves a single zone.
19. PLC control to City of Kelowna SCADA system, including:
 - Security switches
 - Discharge and suction pressure transmitters
 - Temperature sensor
 - Flowmeter
 - Uninterruptable power supply
 - Radio or hard wire modem
 - External antenna
 - Operator interface panel
20. The modulating inlet valve shall:
 - Have non-contact 0 - 100% valve position indicator with 4-20 mA output.
 - Be hydraulically operated with pressure tank (minimum 40 psi) sized to operate valve for 3 cycles during power failure.
 - Be complete with a hydraulically operated diaphragm actuated globe or angle.
 - Pattern valve of 'Powertrol type'.
 - Pilot system to be protected by single continuous flow 100 micron filter.
 - Space for safe and convenient operating and maintenance access to all valves, piping, equipment and instrumentation.
 - Manuals to be supplied as per Section 0.8.

26 Pump Stations

The following Pump Station design standards apply to the City of Kelowna Water Utility. The designer should consult with the applicable water purveyor for specific design details.

1.24.1 Preliminary Design

Pump station design must include a preliminary design report which is to be approved by the City Engineer before detailed design proceeds. Preliminary designs should include the following issues:

- Location
- Capacity
- Number and type of pumps
- Preliminary piping layout
- Type and appearance of structure
- Foundation conditions
- Maintenance requirements and access
- Energy requirements
- Standby power
- HVAC
- Controls and monitoring

1.24.2 Capacity

Pumping capacity should be designed to suit the particular circumstances. In general, capacity should meet maximum day demand with the largest pump out of service and balancing storage online. If balancing storage is not on line, pumping capacity should meet peak hour demand with the largest pump out of service. Stand-by power should be provided, where sufficient reservoir storage does not exist, to allow the greater of maximum day demand plus fire flow or peak hour demand (MDDD+FF, or PHH) during a power outage.

1.24.3 Design Features

1. Structure, piping and mechanical systems designed in accordance with seismic codes for post-disaster structures.
2. Located above 200-year flood level or 1.0 m above highest recorded flood elevation.
3. Reinforced concrete, blockwork or brick construction, aesthetically pleasing.
4. Access doorways sized so that the largest single piece of equipment may be safely removed and replaced. Lifting hooks or rails with pulley blocks as required.
5. Adequate HVAC with filtered air inlet.
6. Standby power.

7. Adequate lighting.
8. Housekeeping pads for MCC's.
9. Electric motors to be premium efficiency.
10. Motors to have thermal protection.
11. Motors 200 hp and above to have analogue vibration recording and protection.
12. All pilot, air relief discharge to be piped to floor drains to avoid standing water.
13. Air relief valves and pilot lines to be piped to floor drains.
14. Hydraulically operated pump control valves with isolation valves.
15. Flow meter and totalizers.
16. Spring return 'silent' check valves.
17. High pressure and surge relief valves with isolation valves.
18. Suction and discharge pressure gauges for each pump with isolation valves.
19. Mechanical pump seals.
20. Lockable roof hatches for motor and pump removal.
21. Water quality sampling ports.
22. Off road vehicle parking.
23. Landscaping to City Parks Department specifications.
24. Interior and exterior of pipework to be coated to AWWA standards. Exterior colours to be:
 - Inlet piping – Mid Blue
 - Outlet piping – Mid Blue
 - Drain piping – Gull Grey
 - All other piping – Mid Blue
 - Include flow direction arrows where appropriate.
 - Check valves to show direction of flow with white painted arrows
25. Pump system to be PLC controlled and connected to City of Kelowna Pump Operations SCADA system.
26. Control system to include but not limited to:
 - Security switches
 - Discharge and suction pressure transmitters
 - Temperature sensor
 - Uninterruptable power supply
 - Radio or hard wire modem
 - External antenna

- Operator interface panel
 - Power meter without outputs to PLC
 - Phase loss protection
 - 5 spare fuses for all fuse holders
 - Current copy of PLC and MMI program to be left in control enclosure
 - (see Pump Operations Department for current standards).
27. Motors to be 600volt, 3 phase.
 28. Hour meters and ammeters for each pump.
 29. Power factor correction if required by Power Authority.
 30. MCC, breaker boxes, receptacles to be labelled.
 31. Station to be cleaned and dust free.
 32. Separate or isolated room required for electrical.
 33. Noise attenuation to suit the location and local authority.
 34. Manuals to be provided as per Section o.8.

27 Pressure Reducing Valve (PRV) Stations

The following PRV design standards apply to the City of Kelowna Water Utility. Designer should consult with the applicable water purveyor for specific design details.

PRV station design parameters should be reviewed and approved by the City Engineer before detailed design proceeds. PRVs are to be above ground stations housed in a suitable kiosk. Above ground installation to be located outside of road ROW or in approved location.

1.25.1 Preliminary Design Parameters

- Design Flows: peak hour, maximum day plus fire.
- Continuous, emergency or fire flow operation.
- Location.
- Kiosk details: structure and access, controls and monitoring, HVAC.

1.25.2 Design Features

- PRV to be above ground including electrical kiosk.
- Minimum chamber size: 4 m x 2 m x 2 m (inside dimensions).
- Minimum 30 amp, 120 VAC service.
- External kiosk and antenna.
- Forced air ventilation, heat and light.
- Isolating valves.
- Parallel pressure reducing valves sized for peak hour and maximum day plus fire flows.

- Air release valves.
- Water quality sample points.
- Sump drain to storm.
- Hatch as per Reservoir section.
- Off road vehicle parking.
- Manuals to be provided as per Section o.8.
- Landscaping.
- Basket strainers upstream of each control valve.
- Upstream and downstream pressure gauges.
- Flowmeter.
- Interior and exterior of pipework coated to AWWA standards, or use stainless steel.
- PLC-controlled with connection to City SCADA system, including:
 - Security switches
 - Discharge and suction pressure transmitters
 - Temperature sensor
 - Flow meter and transmitter
 - Uninterruptible power supply (UPS)
 - Radio or hard wire modem
 - External antenna, height designed for communication connection (min. 6 m)
 - Operator interface panel.

28 Facility Site Requirements

Paved vehicular access must be provided to all reservoirs and pump stations. The minimum standard must be for an emergency access road as shown in the Standard Drawings, with drainage provisions as may be required.

Provision shall be made for vehicle turn-around and crane access.

Provide site grading and landscaping plans that identifies drainage issues, retaining walls and site safety issues.

2. Sanitary Sewers

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2.1 General

These guidelines are not intended to be a substitute for sound engineering knowledge and experience. Sanitary sewer system designs shall be prepared under the direction of a design professional who has the appropriate experience and is registered with Engineers and Geoscientists British Columbia.

Sanitary sewers are intended to convey wastewater only as specified in the Sanitary Sewer/Storm Drain Regulation Bylaw.

These guidelines apply to City of Kelowna sewage collection system only.

2.2 Per Capita Flow

In absence of sanitary sewer flow data, sanitary sewer design shall be based on an average daily dry weather flow (ADWF) of 300 litres/capita/day, except when used for the analysis of older areas (pre-1980), where a ADWF = 420 litres/capita/day shall be used.

For system design in undeveloped areas, ADWF shall be estimated based on current zoning as follows:

Table 2.2 Flow Values for Undeveloped Residential Areas

Zoning	Population/ Hectare (gross)	Population/Unit
Single Family	24-30	3
Multi-Family Low	65	2
Multi-Family Medium	120 (3 storey)	2
Multi-Family High	320-960 (4-12 storey)	2
Mobile Home	40	2

2.3 Non-Residential Flows

Average dry weather flows (ADWF) for non-residential areas should be based on specific data related to the development. In the absence of such data, use the following flow values which are based on zoning designations (Table 2.3):

Table 2.3 Flow Values for Non-Residential Areas

Land Use	Equivalent Population/Hectare (gross)	ADWF* (L/ha/day)
Commercial	83	25,000
Institutional	83	25,000
Industrial	83	25,000

*ADWF calculated at 300 Litres per day per capita

2.4 Peaking Factor

The peaking factor is the ratio of peak dry weather flow (PDWF) to the average dry weather flow (ADWF). Where possible, the peaking factor should be based on locally recorded flow data from similar developments. It is recommended that if possible residential equivalents not be used but that each customer type calculates peak flows independently. When using hydraulic modelling software it is recommended that diurnal patterns be used that reflect varying time of day flows from each customer class. In the absence of such data, the peaking factor is to be calculated using the design residential population and non-residential equivalent population, with the formula indicated below:

The ADWF is multiplied by the Peaking Factor to determine PDWF. The Peaking factor is calculated as follows:

$$\text{Peaking Factor} = f \times \left(1 + \frac{14}{4 + \sqrt{P}} \right)$$

where: P = Population in Thousands

f = Reduction factor, applied as follows:

- New residential areas = 0.75
- Old residential areas = 0.85
- Commercial and Industrial area = 1.00

2.5 Infiltration

Design flow should include an infiltration allowance to cover groundwater infiltration and system inflows. For urban, suburban or commercial areas, the allowance should be based on the gross tributary area and the following:

- New system with pipes above groundwater table: 0.06 L/s/ha (5,184 L/d/ha)
- Old system (pre-1980) and/or pipes below groundwater table: 0.12 L/s/ha (10,368 L/d/ha)

The above values are based on systems where roof leaders and foundation drains are not connected to the sanitary sewer.

For older systems it is recommended that the above value be confirmed with flow monitoring since, in some systems, this value can be substantially higher.

For low density areas with large lots (>90 m frontage), or spaces between developed areas, the infiltration allowance should be based on the total sewer system pipe sizes and lengths, including sewer mains, service connections and building sewers, and the following:

- New system with pipes above groundwater table: 0.45 L/mm dia./100m length/hour
- Old system (pre-1980) and/or pipes below groundwater table: 1.0 L/mm dia./100m length/hour

2.6 Design Flow

Design flow $Q = \text{PWWF} = (\text{population and equivalent}) \times (\text{per capita flow}) \times (\text{peaking factor}) + (\text{infiltration allowance})$.

2.7 Pipe Flow Formulas

For Gravity Sewers use Manning's Formula: $Q = \frac{AR^{0.667}S^{0.5}}{n}$

n

Where: Q = Design flow in m^3/s
 A = Cross sectional area in m^2
 R = Hydraulic radius (area/wetted perimeter) in m
 n = Roughness coefficient, where:
 $n_{\text{concrete}} = 0.013$
 $n_{\text{PVC}} = 0.011$

Pipes shall be designed so that the sewer flow does not exceed $d/D=0.67$ for pipes 250mm diameter and less, or $d/D=0.75$ for pipes greater than 250mm diameter. (d =flow depth and D =pipe diameter).

For Sewage Force Mains use Hazen-Williams formula: $Q = \frac{CD^{2.63}S^{0.54}}{278,780}$

$278,780$

Where: Q = Rate of flow in L/s
 D = Internal pipe dia. in mm
 S = Slope of hydraulic grade line in m/m
 C = Friction coefficient = 120 for all pipe

2.8 Flow Velocities

Minimum design velocities:

- Gravity sewers: 0.60 m/s
- Force mains: 0.75 m/s

Where steep grades result in velocities exceeding 6.0 m/s , sewer design must consider measures to prevent pipe and manhole erosion, movement and the effects of dynamic loading. Pipe anchors shall be installed on steeper grades in accordance with MMCD standard drawings.

2.9 Alignment

Except as indicated for Curved Sewers (Section 2.12), horizontal and vertical alignments should be straight lines between manholes for gravity sewers, and between defined deflection points for force mains.

Force main line and grade requirements are as indicated for water mains. Air release valves are required at high points.

2.10 Minimum Pipe Diameter

- Residential: 200 mm except for the upstream section where future extension is not possible, in which case 150 mm is acceptable provided it has a grade of 1% or greater.
- Commercial and Industrial: 250 mm except for the upstream section where future extension is not possible, in which case 200 mm is acceptable provided it has a grade of 0.6% or greater.
- Service connections: 100 mm
- Sewage force mains: 100 mm.

Gravity sewer mains shall be designed so that the sewer flow does not exceed $d/D = 0.67$ for pipe diameters of 250 mm and less, or $d/D = 0.75$ for pipe diameters greater than 250 mm. (where d =flow depth and D =pipe diameter).

2.11 Minimum Grade

Minimum grades of gravity sewers are as required to obtain the minimum velocity of 0.60 m/s. If the calculated design flow is not expected to produce a velocity of at least 0.6 m/sec., then the minimum grade shall be calculated on the basis of the pipe flowing 35% full at a theoretical velocity of 0.6 m/sec.

Force main grades are as indicated for Water section of these design standards.

2.12 Curved Sewers

Where permitted by the City Engineer, horizontal and vertical curves may be formed using pipe joint deflections as follows (no deflection along the pipe barrel permitted):

- Minimum radius = 60 m.
- Constant radius throughout curve and constant offset to road centreline where possible.
- Joint deflection not to exceed 75% of maximum recommended by pipe manufacturer.
- Minimum design velocity = 0.9 m/s.
- Only one horizontal and/or vertical curve allowed between manholes.
- Curve locations to be accurately recorded on record drawings.

2.13 Depth

Sewers should be of sufficient depth to:

- Permit gravity service connections to basements on both sides of the road.

- The minimum depth of the sewer main (from the surface of the road or ground to the top of pipe) is normally 2.0 m.
- Prevent freezing. Minimum depth is 1.2m (measured from the surface to the top of pipe).
- Allow for future extension(s) to properly service all of the upstream tributary lands for ultimate development.
- Clear other underground utilities.
- Prevent damage from surface loading.
- Maximum cover depth: 4.5 m, except under special circumstances and with the City Engineer's approval. Pump services shall be used on low side where maximum cover would be exceeded.

2.14 Manholes

2.14.1 Manholes are required at the following locations:

- Every change of pipe size.
- Every change in grade, except as indicated in the Curved Sewers section.
- Every change in direction, except as indicated in the Curved Sewers section.
- Upstream and downstream end of curvilinear sewer mains.
- Every pipe intersection except for 100 mm and 150 mm service connections (see Section 2.16).
- Upstream end of every sewer line.
- Every future pipe intersection.
- All terminal ends, except as noted in section 2.14.3.
- 150 m maximum spacing.

Sanitary manhole rim elevation shall not be located in a low point that may be subject to ponding or storm water infiltration and shall be designed to be:

- Above the adjacent storm manhole rim and catch basin elevations.
- Above the surrounding ground elevation when the manhole is located off road to prevent inflow from ponding.

2.14.2 Hydraulic Details

Crown elevations of inlet sewers not lower than crown elevation of outlet sewer. When connecting a collector sewer main to a trunk sewer 300 mm or greater, the invert of the collector main must not connect lower than $0.75D$ ($\frac{3}{4}$ of the pipe diameter).

Minimum drop in invert elevations across manholes:

- Straight run: 10 mm drop
- Deflections up to 45-degrees: 25 mm drop
- Deflections 45 to 90-degrees: 50 mm drop.

Drop manhole and ramp structures should be avoided where possible by steepening inlet sewers. Where necessary, provide drop structures as follows (table 2.14):

Table 2.14 Drop Structures

Invert Difference	Structure
Up to 0.45 m	Inside Ramp
0.45 to 0.90 m	Outside Ramp
Greater than 0.90 m	Outside Drop*
*Inside drop may be used if specifically approved by the City Engineer.	

Drop manholes and outside ramps must be installed in accordance with standard drawings.

The maximum deflection angle created in a junction is 90°.

Force main discharges should be directed into the receiving manhole outflow pipe. Manhole benching should be extended a minimum 200 mm above the force main crown. If a manhole drop cannot be avoided, an inside drop pipe is required as approved by City Engineer.

2.14.3 Temporary Clean-Outs

Temporary clean-outs may be provided at terminal sections of a main provided that all of the following conditions are met:

- Future extension of the main is proposed or anticipated within 3-years.
- The length of sewer to the downstream manhole does not exceed 45.0 m.
- The depth of the pipe does not exceed 2.0 m at the terminal point.

2.15 Odour Control

Odour control shall be considered in all sanitary sewer systems designs. Of particular importance are areas where sewage has the potential to go septic. This typically occurs within pump station wet wells or sanitary force mains where sewage age exceeds 4 hours. Once the sewage has gone septic odours can be released not only from the pump station but also from the air release valves on sanitary force

mains and the discharge manhole. In this situation odour gasses can be released and cause a significant public nuisance. Hydrogen sulphide is also toxic and explosive and can pose a risk to human health.

By properly designing a sewer system, odours can be reduced and where they can't be avoided technologies exist to reduce or eliminate odour and dangerous gases.

The following criteria must be met in all sanitary sewer systems

- Dissolved sulphide maximum limit at any point in the system is to be 0.5 mg/l.
- Odour Criteria:
 - At 10 m from any gravity main, force main, manhole and lift station or other sewer facility (summer conditions, winds between 2-10 km/h), 1.0 odour units.
 - Where sewer facilities are close to houses, parks or walkways, 0.0 odour units.
- Analysis for odour and sulphides may be required.
- Odour Control provision shall be designed to accommodate both at 25% buildout and at 100% buildout.
- All lift station designs to include odour control or the provision for future odour control facilities.

When selecting the appropriate odour control technologies, the designer shall consider operating variables such as flow rates, power and consumables. It should be recognized that estimating the pre-treatment hydrogen sulfide gas concentrations is critical in evaluating the various technologies. All Odour Control treatment designs to be approved by the City Engineer.

2.16 Service Connections

Every legal lot and each unit of a residential duplex shall be provided with a separate service connection.

Lots are allowed one service connection per property. In special circumstances where the servicing of all buildings on existing Industrial or Commercial properties is not feasible, two services may be permitted if authorized by the City Engineer.

Service connections shall not be extended at an angle that exceeds 45° from perpendicular to the main, and in no case shall a service connection be placed so that it extends in front of any property other than the one being serviced.

Unless otherwise approved by the City Engineer, connections are to service all plumbing by gravity. Building elevations should be established accordingly. Pumped connections may be permitted if approved by the City Engineer prior to sewer design. Pumped connections shall be considered as an option to eliminate mains in rear yard rights-of-way.

2.16.1 Size

- Pipe size is to accommodate peak design flow.
- Minimum pipe size is 100 mm diameter for residential services and 150 mm for all other services.

2.16.2 Location and Depth

Connections to large lots are to be located at the lower portion of each lot. For urban developments, locate connections in accordance with standard drawings. Service connections must be installed at least 0.5 m horizontally from the water service and a minimum of 1.5 m from any side lot line.

Service connections shall not be extended at an angle that exceeds 45° from perpendicular to the main, and in no case shall a service connection be placed so that it extends in front of any property other than the one being serviced.

The minimum depth of a service at the property line must be 1.5 m provided that gravity service to the Minimum Building Elevation is available.

2.16.3 Grade

Minimum grade from property line to sewer main:

- 100 mm diameter pipe: 2.0%
- 150 mm diameter pipe: 1.0%
- Larger sizes: Grade based on minimum velocity of 0.75 m/s.

2.16.4 Details

Use standard wye fittings for connections to new mains. For connections to existing mains, use wye saddles or, where approved by the City Engineer, insertable tees may be used. The service connection centreline must not be below the sewer main centreline.

Service connections may be permitted into manholes provided:

- The connection is not oriented against the flow in the main.
- The connection enters the manhole so the service invert is no lower than the sewer main crown.
- Manhole hydraulic requirements are met.

Inspection chambers (IC) are required for all service connections unless the service is less than 2.5 m long and ties into a manhole. Service boxes are to be installed on every inspection chamber.

Inspection manholes are required on all industrial connections. Inspection manholes will be required for commercial connections at the discretion of the City Engineer. Inspection manholes shall be installed on private property as close to property line as practical to allow for access by the City.

Manholes are required at the main on service connections in accordance with standard drawing.

The maximum length of any service connection is 30 m. Connections exceeding 30 m in length will be treated as mains.

2.17 Locations and Corridors

Sanitary sewers to be located within roadways, preferably along the centerline, as shown in the applicable standard road cross-section drawings. Manhole covers to be located outside of wheel path.

For curved roads and alignments, where approved by the City Engineer, pipe alignment to be at a parallel offset with an established road right-of-way or property line.

Servicing from roadways is required unless a depth of greater than 4.5 m would be required to provide gravity service. Rear yard sewers are to be avoided, and advance approval is required from the City Engineer.

Where the main may exceed 4.5 m depth of cover to provide a gravity service, the City Engineer may permit a design based on sewer pumps. Ideally, main floors should be designed for gravity service.

Where a sewer crosses private land, right-of-way requirements are as indicated in Section 0.3 - Utility Rights-of-Way.

Clearance from water mains as detailed in General Design Considerations Section 0.4.

Common trench with storm sewer per General Design Considerations Section 0.4, may be approved at the discretion of the City Engineer.

2.18 Lift Stations

The use of sanitary lift stations is to be discouraged. Any proposed use of lift stations must receive prior approval from the City Engineer. Sanitary lift stations should normally be located within a right-of-way outside the required road dedication.

This section covers both dry well and submersible sewage lift stations. Larger capacity sewage lift stations or lift stations with special design or siting requirements may require additional assessment

and review of criteria.

Preliminary design must be approved by the City Engineer before detailed design proceeds.

2.18.1 Preliminary Design Requirements

System layout: Select location(s) to minimize the number of sewage lift stations and avoid lift stations wherever practical.

Capacity: The lift station must be designed to handle the ultimate flows of the designated catchment. Design must consider short, intermediate and long-term future flows.

Location and Layout: The location and layout of a lift station must include an assessment of the following basic design considerations:

- Type of station and impact on neighbours.
- Construction dewatering requirements.
- Access for construction.
- Access for maintenance.
- Aesthetics, noise, odour control and landscaping requirements.
- Security against vandalism and theft.
- Flood elevations. Station uplift design must be based on maximum load level.
- Proximity of receiving sewers, water mains, and adequate power supply.
- Minimizing energy requirements.
- Standby power and its compatibility.
- Soils. Geotechnical investigations must be undertaken prior to site approval.
- Convenience of operation and maintenance.
- Safety for operators and public.
- Capital and operation and maintenance costs.
- Radio Path assessment on existing and proposed building line of sight.
- Off street Parking (5 m x 7 m) shall be provided for pump maintenance.
- Fenced perimeter with 1.8 m high black chain link fencing. Fencing to MMCD standards.
- Above ground valve chamber with no ladder or platform requirement for maintenance access.

2.18.2 Design Features

Lift stations should be designed with a minimum of two pumps, each capable of handling the maximum flow condition. A mixer should be provided, or one pump equipped with an automatic flush valve.

Where the design flow exceeds the capacity of a single, commonly available pump, use three or more pumps with capacities such that there is always one pump available for standby.

(1) Pump requirements:

- Capable of passing solids up to 75 mm in size.
- Equipped with appropriately rated stainless steel chain and connecting rings.
- Equipped with hour meters.
- Easily removed for maintenance.
- Maximum motor speed: 1750 RPM.
- Explosion proof.
- Operate on a 347/600 volt electrical source (pump motors between 5 hp and 75 hp (max) and to be 600 volt 3 phase type).
- Able to operate alternately and independently of each other.
- Able to meet maximum flow condition with one pump in failure mode.
- Designed so that each motor does not cycle more than 4 times in one hour under normal operating conditions. For example, in a duplex pump station that is designed to alternate the pump starts, each motor can have a maximum of 4 starts in an hour which could result in a total of 8 motor starts per hour for this station.
- All pumps must be factory tested prior to installation.
- Wet well storage shall be sized assuming pump is fully submersed and will accommodate design flow with no storage in the pipe network.
- All internal piping and fittings shall be 316 stainless steel (Victaulic style) as per Approved Products List.
- Pump start water level to be set above the top of the pump casing to prevent buildup on pump and reduce level monitoring issues.

(2) Motor cables, power cables, etc., must be continuous from within the pump station to within the kiosk unless an adequate exterior pull pit and junction box is installed.

(3) Levels to be controlled by ultrasonic level transmitter with emergency high and low level

- balls. A radar level transmitter is required when lift station service is in an area that produces large amounts of "foam" or "steam" e.g. a laundry facility. Level transmitters to be accessible at the top of the wet well to be serviced without entering into the lift station.
- (4) All auxiliary equipment and control panels must be mounted in a suitable kiosk adjacent to the station. The kiosk must be located a minimum of 3.0 m from the station lid.
 - (5) The control kiosk must be designed to contain all control and telemetry equipment on the front panel and all power equipment on the rear panel.
 - (6) Check valves must be ball lift check valves. All valving to be installed in an above ground kiosk.
 - (7) All stations require an explosion-proof exhaust fan which can be activated by manual switch, and which meets WCB requirements for ventilation in a confined space.
 - (8) The entrances to all stations must be waterproof and be provided with a suitable lock. The access must be a minimum 900 mm x 900 mm in size. The access hatch shall have:
 - An aluminum ¼" tread plate
 - A perimeter drain
 - A perimeter sealing gasket
 - A slam lock with an aluminum removable sealing plug and opening tool
 - A flush lift handle
 - A gas spring assist cylinder
 - A 90-degree hold open arm
 - A flush fitting padlock tang.The hatch must be reinforced for 1465 kgs/m² (300 lbs./sq.ft.). All fasteners to be made of 316 stainless steel.
- The entrance must be above ground level where feasible but, in no case, more than 300 mm above the ground.
- (9) All wiring must be explosion-proof, Class 1, Division 2, and electrical design and installation is subject to the acceptance of the Provincial Safety Inspector. Metal stations must be protected by impressed current cathodic protection.
 - (11) All stations must provide an automatic generator for standby power in case of power failure. Provision for a telemetry system must be included for connection into the Municipality's Telemetry System. For small lift stations with an ultimate capacity less than

- 100 units, emergency storage may be considered in place of standby power; emergency storage is to be based on 8 hours of average day flows.
- (12) All equipment must be CSA approved and have at least a one year guarantee for parts and labour.
- (13) Designer is to provide three copies of Operating and Maintenance Manuals (see Section 0.8).
- (14) Wet well to have above ground valve chamber that houses the ball check and isolation plug valves for each pump as well as the air relief valve and flow meter. Valve chamber to have at a minimum 50 mm of insulation, 1000W intrinsically safe baseboard heater, door seals, floor drain back to the wet well with p-trap and the air relief drain ports piped to the Valve Chamber floor drain. A plug valve is required on the influent line and on each pump discharge. The valves must be outside the station and be complete with square operating nut and nelson box. Gear box on plug valves in the ground to be designed for submersion.
- Mixer to be provided only when required for the purposes of odour control (no automatic flush valves).
- (15) If a lift station is authorized, by the City Engineer, to be constructed in an area that may be subject to vehicle loads, the roof and cover of the pump station should be designed to withstand a loading of H-20 (highways standard). Roof design to also allow for fall arrest assembly on the roof (2X's the max arresting force, typically 1800 lbs).
- (16) Provision(s) must be made for standby pumping from an external source. An adaptor flange ("Kamlock") complete with a quick coupling and lockable cap will be required.
- (17) The area around the station and all associated equipment or building must be asphalted. The size of the area to be determined by the requirements for maintenance.
- (18) Stations to be fiberglass unless otherwise approved by the City Engineer. The surfaces of all steel components and fiberglass stations must receive at least two coats of two component white epoxy enamel. Concrete wet wells are discouraged but where approved, must be designed and constructed to prevent sulphide corrosion, and the concrete surface must be coated with at least 2 coats of blue epoxy and then an additional 2 coats of white epoxy. All steel piping and components to be 316 stainless steel.
- (19) The wet well bottom must be sloped to direct all solids into the pump suction. The influent line must be located tangent to the wet well to encourage scouring of the wet well.
- (20) The station shall be complete with an Uninterruptable Power Supply (UPS) to serve all alarms and controls.

- (21) Separate starter enclosures must be provided for each pump.
 - (22) PLC control to be based on City of Kelowna standards.
 - (23) Station communication to be provided via radio transmission compliant with the City's telemetry system, and an antenna must be installed on a suitable mast or pole to ensure reliable transmission.
 - (24) An hour meter must be built into the panel for each pump.
 - (25) An amp meter must be provided for each pump.
 - (26) Minimum storage between the high level alarm and the start of overflow under the more critical of:
 - Minimum 1 hour in wet well at average wet weather flow.
 - Minimum 1 hour in wet well and influent pipes at peak wet weather flow.
- Ensure operating level is above the top of the pumps to keep the pumps submerged (Minimum 1 m separation between the inlet pipe invert and pump stop level).
- (27) Station to have a magnetic flow meter located in above ground valve chamber.
 - (28) Station to allow removal of pumps using hoist truck with 1.8 m (6') boom.
 - (29) Perimeter fencing is to be provided. The fence must be made of black chain link and installed with privacy slats. Fence to be minimum 1.8 m high with minimum 5 m wide opening for vac truck access.
 - (30) Landscaping, acceptable to the City, is to be provided including irrigation.
 - (31) Noise control may be required when criteria in Section 2.16 is exceeded.
 - (32) Odour control may be required when criteria in Section 2.17 is exceeded.
 - (33) Minimum barrel size must be 2440 mm (8') in diameter.

2.19 Force Main

As part of the lift station design, the following criteria must be noted in the design of force main systems: Design computations for force mains must be made using a 'C' factor of 120 (for PVC pipe)

and then re-calculating the system curve using a 'C' factor of 145 to ensure adequate motor horsepower and pump characteristics. Show pump and system curves on design drawings.

2.19.1 Velocity

At the lowest pump delivery rate anticipated to occur at least once per day, a minimum cleansing velocity of 0.75 m/sec should be maintained. Maximum velocity should not exceed 4.0 m/s.

2.19.2 Air Relief Valve

An automatic air relief valve must be placed at high points in the force main to prevent air locking when the difference in elevation between the invert of the summit and the invert of the valley is greater than the diameter of the pipe. The air relief valve must be located in a chamber, complete with adequate and environmentally safe drainage and odour control, unless a suitable injected odour control agent is used at the Lift Station. Air valve must be vented and drained into the gravity sanitary sewer system at a manhole, where possible.

2.19.3 Termination

Force mains should enter the gravity sewer system so that the force main invert is not more than 200 mm above the crown of the pipe in the receiving manhole. A smooth, turbulent free transition must be incorporated. If the receiving manhole design does not allow this, then a manhole drop structure in accordance with the standard drawings is required.

2.19.4 Size

The minimum size for force mains is 100 mm diameter.

2.19.5 Materials

Force mains must generally meet the standards specified for water mains and in accordance with Schedule 5, however there are specific requirements for force mains that may supersede water main standards, as follows:

- Force main pipe must be identifiably different than water main pipe. Refer to supplemental specifications 5.1 Section 33 34 01S.
- Valves used on force mains, pigging ports or cleanouts shall be lubricated full port plug valves size on size sufficient for long term use in a corrosive environment. Plug valve gear boxes installed in the ground must be designed for submersion conditions.

2.19.6 Loads and Transient Pressures

All force mains must be designed to prevent damage from superimposed loads. Must also be designed to prevent damage from water hammer or column separation phenomena. Transient surge and cyclic surge analysis must provide at least a 75-year life of the pipe.

2.19.7 Corrosion and Odour

Corrosion and odour control is required when limited daytime flows, or long force main lengths cause the pumped sewage to remain in the force main for longer than 45 minutes.

2.19.8 Pigging Port

A "size on size" pigging port that is convenient for the City Operations to use and maintain must be incorporated in the force main outside of the Lift Station.

2.20 Noise Control

Noise levels for facilities must not exceed 65 dB at property line or 20 m away whichever is closer.

2.21 On-site Sewage Disposal (Septic systems)

On-site sewage disposal systems will only be considered for properties that are:

- Not near or adjacent to the City's sanitary sewer system, and
- Greater than 1 ha in size.

Where permitted, site conditions and on-site sewage disposal systems shall meet the BC Public Health Act "Sewerage System Regulation" and Ministry of Health Special Conditions for placing septic systems with Environmental Control Zones. The City Engineer' approval is required for on-site sewage disposal systems.

2.22 Low Pressure Sewers

Low pressure sanitary sewer systems servicing a group of properties is discouraged and requires approval from the City Engineer. Preliminary design must be approved by the City Engineer before detailed design proceeds.

BL8847 replaced Part 3 Drainage

BL11913 replaced Part 3 Drainage

3 Stormwater Management

- 3.1 [General](#)
- 3.2 [Stormwater Flow Control](#)
- 3.3 [On-Site Stormwater Management and Practice](#)
- 3.4 [Runoff Analysis](#)
- 3.5 [Site and Lot Grading](#)
- 3.6 [Minimum Building Elevations \(MBE\)](#)
- 3.7 [Rational Method](#)
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- 3.10 [Major System Design](#)
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- 3.12 [Outlet Controls](#)
- 3.13 [Drainage Pump Stations](#)
- 3.14 [Erosion and Sediment Control \(ESC\)](#)

3.1 General

The City stormwater system integrates surface water flows collected through the City's infrastructure and the natural watercourses that flow into Okanagan Lake. Proper integrated stormwater management practice mitigates impacts with the goal of maintaining Okanagan Lake as a high quality water source, with an abundant water supply, and with a balanced ecosystem. While urban, agricultural and natural areas all benefit from Okanagan Lake, drainage impacts from our systems must be mitigated, as well as be resilient to flood hazard and a changing climate.

The presence of an existing stormwater management facility does not imply that there is adequate capacity to receive the design flow, nor does it imply the facility is necessarily acceptable to the City. Where required, stormwater facilities must be upgraded to accommodate the appropriate flow as specified in this standard.

3.1.1 Outcomes

With respect to stormwater, the City's goals are to:

- a) Improve and protect water quality from creek flows, outfalls and groundwater entering Okanagan Lake.
- b) Reduce the risk of health hazard, life, and damage to property and infrastructure from flooding, and provide strategies to attenuate peak flows and volumes.
- c) Preserve and protect aquatic and riparian habitat and provide opportunity for restoration.

- d) Minimize risks to the Okanagan Lake drinking water source.
- e) Increase the resiliency of our watersheds to climate change impacts.

This stormwater management standard applies the latest Best Management Practices (BMP) and processes in use in British Columbia. New systems and development within the City are to use the practices described within this Section as a *minimum* standard.

All flows must be routed through sewer pipe, ditching, water courses, riparian areas, or road allowances with the required capacity and right of way access for operation and maintenance. The City requires that major system flows must be safely routed downstream to an adequately sized municipal drain or natural watercourse without impacting private property.

3.1.2 Regulations

Stormwater management designs must conform to this standard, City of Kelowna bylaws, regulations and policies; in addition to federal and provincial statutes where applicable. These include but are not limited to the following: Supplementary Design Criteria

- Existing Master Drainage Plans,
- Local Government Act
- Fisheries Act of BC
- Water Sustainability Act
- BC Water Act
- Navigable Waters Protection Act
- Canada Wildlife Act
- Migratory Birds Convention Act
- Dike Maintenance Act
- Standards and Best Practices for Instream Works (Canada/BC)
- Land Development Guidelines for the Protection of Aquatic Habitat (Canada/BC)
- Urban Runoff Quality Control Guidelines for British Columbia
- National Guide to Sustainable Municipal Infrastructure (Canada)
- Canadian Dam Association Dam Safety Guidelines

3.1.3 Climate Change

The City accepts that climate patterns are changing, and that its customers are impacted by creek flooding, lake rises, temperature fluctuations and fire. The design standards for infrastructure outlined in this bylaw are to be considered a minimum expectation. The City requires that design professionals consider impacts of climate change, through potential changing weather patterns or water levels when implementing a design; particularly in components where critical and long term

design decisions are being made, or in areas where the consequence of failure is high.

To account for a changing climate, the capacity of storm works will include an additional 15 percent (15%) upward adjustment, and applied to the rainfall intensity curve stage (IDF) in Section 3.7.2. This is consistent with recommendations in EGBC (2018): Legislated Flood Assessments in a Changing Climate in BC.

The design professional will be required to consider debris flow and flow management as a result of higher peak flows.

On larger projects, basin characteristics are required elements of the Stormwater Management Plan (See Section 3.2.1). Developers will need to anticipate this form of analysis as part of their overall cost strategy.

3.1.4 Hillside Areas

Hillside areas or areas of poor infiltration conditions have been identified by the City in Drawing **SS-S58**.

- a) For development in Hillside Areas, the City focus is on safe conveyance of water. Roof or site drainage must discharge directly to the storm system. This focus is to not allow infiltration to ground except for foundation drainage. Where storm drains are not available or not considered feasible, minor system designs (see 3.2.a below) will require a hydrogeological review provided by a qualified Professional (P.Eng. or P.Geo.) to ensure that site infiltration is possible while not exceeding pre-development conditions, not impacting slope stability or off-site seepage, or not directly impacting downhill properties. The terms of reference of the review must be confirmed by the City Engineer and approved as a condition for obtaining a Development Permit.
- b) For new development where Groundwater Recharge is designated **Not Suited**, the City will not permit minor systems (see Item 3.2a) to infiltrate to ground.

3.2 Stormwater Flow Control

The City's Stormwater Management system consists of three main components:

- a) **The Minor System** consists of sewer pipes, gutters, catch basins, driveway culverts, open channels, watercourses and storm water management BMPs designed to capture, convey, treat or modify flows up to a 5-year return design event as directed by the City.
- b) **The Major System** consists of surface flood paths, roadways, roadway culverts, channels and storm water management facilities designed to capture, convey, treat or modify larger flows up to a 100-year return design event. A piped minor system may be enlarged or supplemented to accommodate major flows. Major roads and arterials, bridges and creek protection armouring are to be designed for the 1 in 200 year event. This is discussed further in Section 3.10.
- c) **The Natural System** consists of all natural lakes, rivers, creeks, streams and ephemeral drains that flow naturally downstream ultimately to Okanagan Lake. Natural system capacity and water quality

can be impacted negatively by incoming Minor or Major systems.

3.2.1 Stormwater Management Plan

Stormwater Management Plans are required for all municipal development. A plan should include the following:

- a) Tributary areas in the catchment which identify existing and potential land uses or current development.
- b) References to applicable Area Stormwater Drainage Plans.
- c) Details indicating how the proposed site relates to the Master Plan and its recommendations. Contours at 0.5 m elevation intervals.
- d) Conceptual lot grading patterns.
- e) Existing watercourses, including environmental classifications and/ or fish presence information, if available.
- f) Layouts of existing and proposed drainage systems.
- g) Major flow paths to a municipal drain or natural watercourse without impacting private property.
- h) Proposed control features to meet the water quantity and quality targets identified in the applicable Master Plan
- i) Locations, sizes, design flows, volumes, and capacities of all existing and proposed works.
- j) Capacity assessment of receiving downstream works, or reference to the applicable Master Plan demonstrating adequate capacity. The City will provide the required stormwater area plans upon request.
- k) Minor and Major hydraulic grade line elevations on profiles for all proposed works.
- l) Proposed service connection locations and their associated minimum building elevations (MBE). Pre and post development flows both entering and leaving the subject lands.
 - i. Pre development is defined as the natural condition prior to any development changes, including those resulting from past development activities.
- m) The City may exempt plan requirements for development in rural or agricultural areas upon request or determination by the City Engineer.

3.3 On-Site Stormwater Management and Practice

3.3.1 Storm Effluent Limitations to City Storm System

- a) For structures designed or constructed above the proven high groundwater table, intermittent stormwater pumping will be permissible to the City stormwater system where approved by the City Engineer. All operations and testing must be consistent with the

requirements in Sanitary Sewer/Storm Drain Regulation Bylaw 6618.

- b) Where structures are designed or constructed below the proven high groundwater table, permanent groundwater pumping will not be permitted to discharge to the storm system. The City will approve designs that include provisions for eliminating groundwater penetration into the structure, while addressing buoyancy concerns. These design aspects must be reviewed and approved by the City Engineer.
- c) Refer to the latest BC Building code for drainage discharge requirements in parkades.

3.3.2 Water Quality

Whether water is routed through creeks, pipelines or infiltration into ground, the City will require consideration for treatment, emergency management and maintenance of the stormwater infrastructure and water quality. Stormwater designs on private property must meet or exceed minimum water quality guidelines prior to entering the City storm system. Water quality for a minor system flow (50% of the 1 in 2-year) must meet minimum BC Ministry of Environment Recreational Water Quality Guidelines and as per Sanitary Sewer/Storm Drain Regulation Bylaw 6618 .

3.3.3 Construction Sites

The City storm system can be used for temporary site water management provided the water quality exiting the property meets BC Ministry of Environment Recreational Water Quality Guidelines. This temporary use must be approved by the City prior to issuance of the Development Permit and/or Building Permit, following a confirmation of capacity within the downstream system, and adequacy of the quality of storm effluent. There must be no discharge to the sanitary sewer system.

3.3.4 High Density Residential, Commercial and Industrial Storm Systems

- a) A control manhole is to be installed within 3 metres of the property line, and downstream of any water quality enhancement system. The manhole will include provision for isolating runoff into the City Storm system.
- b) The City requires access to the structure in an emergency and inspection. An SROW is required. Provisions must be considered for response to emergency toxic spills on site. Any costs associated with emergency response are the responsibility of the property owner.
- c) Water quality enhancement systems such as oil/grit separators, fuel/water separator (where required), naturalized storm ponds or other approved systems are the responsibility of the site owner, and must be maintained on a regular basis. The City can request regular maintenance records.
- d) Minor system flows must meet water quality guidelines described above prior to discharging to a creek or city storm system.
- e) On industrial sites where perforated storm systems or dry wells are used, the design must include provisions to manage emergency spills on site and minimize groundwater impacts.

3.4 Runoff Analysis

Storm drainage design should be carried out using one or both of the following methods. Calculations are to be submitted with designs.

- a) **Rational Method:** To be used only for hydrologically simple and uniform areas with contributing area less than 10 Ha.
- b) **Hydrograph Method:** Applicable for all larger areas or more hydrologically complex catchments, or where stormwater management systems require more than basic conveyances. Use SWMM based models or approved equivalent to analyze these processes. Each model must include a level of complexity dependent on the watershed and the hydrologic processes that need to be considered (e.g., detention, groundwater recharge and infiltration, evapotranspiration, continuous simulation, etc.).

For all modelling, use the rainfall Intensity Duration Frequency (IDF) curves found in standard drawing **SS-S56**. Both historical data as well as climate change information must be incorporated into the runoff analysis.

3.5 Site and Lot Grading

Grading is to comply with the BC Building Code and the following:

- a) Swales and site drainage must be constructed to prevent ponding within lots, with runoff routed, where possible, to storm services in public streets or other appropriate stormwater management system for the site.
- b) Grade lots to drain to an approved City drainage system or roadway. Use 1% minimum grade. Grading directly to a natural drainage path must include adequate erosion control and water quality improvement measures.
- c) Avoid drainage across adjacent lots. Where cross-lot drainage is unavoidable, provide adequate measures such as channelling, swales, inlets or piped connections to direct flow appropriately. A statutory right of way in favour of the City or private easement is required for unobstructed access.
- d) Positive drainage is required for buildings and foundations.
- e) Set building elevations above the hydraulic grade line (HGL) of the major drainage system as per Minimum Building Elevations (MBE) guidelines below.

3.6 Minimum Building Elevations (MBE)

The MBE applies to the elevation of the lowest floor slab in a building or the underside of the floor joists where the lowest floor is constructed over a crawl space. Crawl space is defined as the space between a floor and the underlying ground having a maximum height of 1.2 m to the underside of the joists and not used for the storage of goods or equipment damageable by flood waters.

The MBE is to be at least 0.60 m above the storm sewer service connection invert and 0.30 m above the major drainage system hydraulic grade line (HGL), whichever governs except where permissible on Hillside development where:

- foundation drains are disconnected from the storm main; or
- intermittent foundation pumping has backflow prevention.

For developments within close proximity to the Okanagan Lake shoreline, the MBE is elevation 343.66m. Further consideration shall be given to wind and wave action when setting the required MBE.

For sites near a watercourse where a floodplain elevation has been established through flood mapping, the MBE is to be a minimum of 300mm above the 200-year return period peak flood elevation or as per City of Kelowna Mill Creek Flood Plain Bylaw No. 10248. Where a flood elevation has not been established, setbacks are to be as per the Provincial guidelines or 1.5 metres above the natural boundary of any watercourse, lake, marsh or pond.

3.7 Rational Method

The Rational Method for calculation of peak flows is as follows:

$$Q = R A I N$$

Where:

- Q = Peak flow in cubic metres per second (m³/s)
- R = Runoff Coefficient (C) x Adjustment Factor (C_{AF5})
- A = Area of catchment in hectares (ha)
- I = Intensity of rainfall (mm/hr)
- N = 1/360

Factors for use in the Rational Formula are indicated below.

3.7.1 Runoff Coefficients (C)

The following runoff coefficients are for use with the Rational Formula. These coefficients are for general application only. Design values are subject to verification by the designer and approval by the City. Higher values may be applicable in those areas which experience rainfall during the winter when the ground is frozen.

Table 3.7.1 Runoff Coefficients (C)

Land Use	Percent Impervious	C	
		Minor Storm (1:5 year)	Major Storm (1:100 Year)
Residential			
• Suburban Residential (Lots>0.4 ha)	20%	0.35	0.40
• Low Density (Single Family)	40%	0.50	0.55
• Medium (Multi-Units Detached)	65%	0.60	0.65
• High Density (Multi-Units Attached)	90%	0.85	0.90
Commercial	90%	0.85	0.90
Industrial	90%	0.85	0.90
Institutional (e.g. Schools)	80%	0.75	0.80
Parks/Grasslands	20%	0.20	0.30
Cultivated Fields	30%	0.30	0.40

Runoff Coefficient Adjustment Factor (C_{AF})

An adjustment factor is to be applied to the runoff coefficient to reflect variations in soil permeability and slope.

Table 3.7.2 Runoff Coefficient - Soil Adjustment Factor (C_{AF})

Soil type and Slope	C _{AF}
Sandy soil with flat slope (up to 5%)	0.9
Sandy soil with steep slope (over 5%)	1.0
Clayey soil with flat slope (up to 5%)	1.0
Clayey soil with steep slope (over 5%)	1.1
Rock	1.1

Note: The above runoff coefficient adjustment factors are subject to verification by the designer. The product of C and C_{AF} can not exceed 1.0.

3.7.2 Rainfall Intensity (I)

Rainfall intensity for use in the Rational Method should be determined using the rainfall IDF curve in standard drawing **SS-S56** for the City of Kelowna. This curve was developed from the Atmospheric Environment Service recording station located at the Kelowna international Airport. To account for climate change, as noted in Section 3.1.3, a **15 percent increase (15%)** will be applied to the intensity derived from the IDF curve. The duration is equal to the Time of Concentration (T_c), as calculated below.

Time of Concentration (T_c)

The time of concentration is the time required for runoff to route from the most remote part of the catchment area under consideration to the design outlet node. The time of concentration can be calculated using the following formula:

$$T_c = T_i + T_t$$

Where:

T_c = time of concentration (minutes)

T_i = inlet or overland flow time (minutes)

T_t = travel time in sewers, ditches, channels or watercourses (minutes).

Inlet or Overland Flow Time (T_i)

Typical inlet times for urban areas, assuming BMP's are not applied, are as follows:

- | | |
|--|------------|
| a) Single Family Lot | 10 minutes |
| b) Multi-Family Lot | 8 minutes |
| c) Commercial/Industrial/Institutional | 5 minutes |

For relatively flat areas, the inlet time for larger areas can be calculated using the "Airport Method" as follows:

$$T_i = \frac{3.26 (1.1 - C) L^{0.5}}{S^{0.33}}$$

Where:

T_i = inlet time (minutes)

C = runoff coefficient (See above)

L = travel distance (Maximum length = 300 m)

S = slope of travel path (%)

Travel Time

The travel time for routing in sewers, ditches, channels or watercourses can be estimated using

the Modified Manning formula:

$$T_t = \frac{L n}{60 R^{0.667} S^{0.5}}$$

Where:

T_t = travel time (minutes)

L = length of flow path (m)

n = Manning roughness coefficient:

0.050 Natural channels

0.030 Excavated ditches

0.013 Pipe and concrete lined channels.

R = Hydraulic radius = Area/Wetted Perimeter (m)

S = slope (m/m)

3.7.3 Design Summary Sheet

All design calculations are to be tabulated and shown on the design drawings, or in a report and summarized on design drawings.

3.8 Hydrograph Method

Analysis using the Hydrograph Method requires computer modeling capable of analyzing the hydrologic characteristics of the watershed and generating runoff hydrographs.

For City applications, SWMM based models are appropriate. The City of Kelowna must be consulted before selecting a more specialized software program.

3.8.1 Modelling Procedures

Modelling results are to be calibrated using observed historical rainfall and flow data from the design watershed. Sensitivity of the model predictions to variations of key parameters should be tested and the findings used to develop a realistic and conservative model.

At a minimum, post-development hydrographs are to be generated at key points of the drainage system for a 5-year and 100 year design storm with durations of 1, 2, 6, 12, and 24 hours for each development condition. A different range of storm durations may be appropriate, subject to City approval. This will identify the critical storm event to be used in designing the system component. Note that the storm durations that generate the critical peak flow may be different from the durations that generate the critical storage volume.

Systems with a number of interconnected ponds or with restricted outlet flow capacity may require a more detailed analysis for sequential storm events or modelling with a continuous rainfall record.

Detailed designs should include hydraulic grade lines (HGLs) of the minor and major systems plotted on profiles of the minor system components and compared with MBE to demonstrate flood protection.

3.8.2 Submission of Modelling Results

Modelling results are to be submitted to the City in a report or drawing containing at least the following information:

- a) Stormwater Control Plan as defined in Section 3.2,
- b) Name and version of modelling program(s)
- c) Parameters and simulation assumptions.
- d) Design precipitation details.
- e) Pre-development and post-development hydrographs.

3.9 Minor System Design

The minor system includes all drainage works that collect, convey, detain, divert and intercept design storm runoff. The minor design event must be the 5-year design storm.

3.9.1 Pipe and Channel Capacity

Use Manning's formula.

$$Q = \frac{A R^{0.667} S^{0.5}}{n}$$

Where:

A = Cross sectional area in m²

R = Hydraulic radius (area/wetted perimeter) in m

S = Slope of hydraulic grade line in m/m

n = Roughness coefficient:

0.013 for all smooth pipes.

0.024 for corrugated pipes and culverts.

3.9.2 Flow Velocities

- a) Pipes/Culvert Flow
 - i. Minimum design velocity for pipes flowing full or half full: 0.60 m/s.
 - ii. Where grades are greater than 10%, measures are required to prevent pipe erosion and movement such as control structures and/or tie-backs and anchor blocks.
 - iii. Where a storm sewer discharges into a watercourse, provide riprap bank protection and, if necessary, energy dissipation facilities. Avoid discharge perpendicular to stream flow.
- b) Conveyance channels must be armoured and sized for a 1:100-year event. For riprap design chart see standard drawing **SS-S57**.
- c) Road Ditches
 - i. Maximum road ditch velocity is 0.5 m/s without armouring.
 - ii. Ditch Inlets - Ditch inlets to storm sewers must include wing wall structures, safety grillage for large pipes (>600 mm diameter), debris screens and sedimentation basins.

3.9.3 Alignment

Except as indicated for Curved Sewers, horizontal and vertical alignments are to be straight lines between manholes.

3.9.4 Minimum Pipe Diameter

- | | |
|-------------------------------|--------|
| • Storm Sewers | 250 mm |
| • Culverts crossing roads | 450 mm |
| • Culverts crossing driveways | 300 mm |
| • Catch Basin Leads | 200 mm |
| • Double Catch Basin Leads | 250 mm |

Downstream pipe sizes are not to be reduced unless the downstream pipe is 600 mm diameter or larger and increased grade provides adequate capacity. Detailed hydraulic analysis is required. The maximum reduction is one standard pipe size.

3.9.5 Minimum Grade

Minimum grades of storm sewers are as required to obtain the minimum velocity of 0.6 m/s at design flow except for catch basin leads and service connections, for which minimum grades are as indicated in Section 3.9.12, Service Connections.

3.9.6 Curved Sewers

Where permitted by the City, horizontal and vertical curves may be formed using pipe joint deflections as follows:

- a) The radius of the curve is to be no less than the recommended manufacturer's minimum radius of curvature at a constant radius.
- b) Horizontal curves must be parallel to the centre line of road at a constant offset.
- c) Only one horizontal curve is permitted between manholes, unless the mainline is installed and appropriately anchored outside the road on a steep hill slope requiring multiple vertical curves.
- d) Where the pipe curve does not have a consistent offset from a road centre line, the offsets must be properly referenced on Record Drawings.
- e) Subject to City Engineer approval, curved storm sewer systems larger than 600 mm diameter may include deflections formed by mitred bends to a maximum mitre of 45°.

3.9.7 Depth

The minimum depth of the sewer must be sufficient to provide all service connection piping with a minimum cover of 1.2m to the top of the service, anywhere within the finished right-of-way. In no instance shall the cover over the crown of the sewer main be less than 1.2m when installed in travelled areas. The depth of course can be reduced to 1.0m when installed outside of travelled areas.

- a) The maximum depth of cover must be 4.5m, except under special circumstances and with permission of the City Engineer.
- b) For catch basin leads, the minimum depth of cover is 0.90m.

3.9.8 Pipe Joints

All pipe joints are to be watertight.

3.9.9 Perforated Storm Pipe

- a) The City will only consider the installation of perforated storm sewers and/or dry wells to discharge water back to the ground where soil conditions, slope and water table elevation are suitable. The perforated pipe system design must be designed to provide surcharge conditions.
- b) Perforated pipes can only be installed in areas of the City described as "Possibly Suited" in the Groundwater Recharge Suitability Map in Standard Drawing **SS-S58** and confirmed by a hydro-geotechnical site investigation.

3.9.10 Manholes

- a) Manholes are required at:
 - i. Every 150m or less.
 - ii. Every change of pipe size.
 - iii. Every change in grade, except on curvilinear pipe alignments.
 - iv. Every change in direction, except on curvilinear pipe alignments.
 - v. All terminal sections.
 - vi. Every sewer main intersection.
- b) Placement of manholes in existing or future wheel paths must be avoided.
- c) Manhole sizes must be in accordance with the Standard Drawings: Manhole connection details as per MMCD S₃ & S₄, or City of Kelowna supplemental standard drawing **SS-S1a**.
- d) Hydraulics: Crown elevations of inlet sewers not lower than crown elevation of outlet sewer. When connecting a collector sewer main to a trunk sewer 300 mm or greater, the invert of the collector main must not connect lower than 0.75D ($\frac{3}{4}$ of the pipe diameter).
- e) Minimum drop in invert elevations across manholes:
 - i. Straight run: 10 mm drop
 - ii. Deflections up to 45 degrees: 25 mm drop
 - iii. Deflections 45 to 90 degrees: 50 mm drop
- f) Drop manhole and ramp structures should be avoided where possible by steepening inlet sewers. Where necessary, provide drop structures as follows (table 3.9.10):

Table 3.9.10 Drop Structures

Invert Difference	Structure
Up to 0.45m	Inside Ramp
0.45 to 0.90 m	Outside Ramp
Greater than 0.90 m	Outside Drop*

*Inside drop may be used if specifically approved by the City Engineer.

- g) Drop manholes and outside ramps must be installed in accordance with standard drawings.
- h) Hydraulic losses are to be calculated for manholes with significant change of grade or alignment. For high velocity flows, particularly for pipes 600 mm or larger, detailed analysis is required using the Froude number, or utilizing appropriate computer models. The Manning's equation should not be relied on for pipe slopes above 10%. For low to moderate

velocities and smaller pipes, use the following formula:

$$H_L = k v^2/2g$$

Where:

H_L = head loss (m)

v = flow velocity entering junction (m/s)

g = gravitational acceleration (9.81 m/s²)

k = head loss coefficient (1.0 for channeled 90° bends and tees, to 1.5 without channelized benching)

Where benching is used, the minimum drops listed above are applicable for velocities below 1 m/s. Where flows exceed 1 m/s, H_L should be specifically computed and used as the drop across the junction.

3.9.11 Catch Basins

- a) Catch basins are required at regular intervals along roadways, at intersections and at low points to:
 - i. Prevent overflows to driveways, boulevards, sidewalks and private property.
 - ii. Avoid interference with crosswalks.
 - iii. Avoid low points in curb returns at intersections.
- b) Catch basin leads are minimum 200 mm diameter.
- c) Minimum grade of a catch basin lead is 1%.
 - i. Catch basin leads require a 0.9 m minimum cover. If 0.9 m is not available, design to protect from freezing and traffic loads; design calculations must be provided.
- d) Spacing is to provide sufficient inlet capacity to collect the entire minor flow or major flow, where required, into the sewer system.
- e) Local suppliers are required to provide rating curves for available catch basin grates. As a general rule, space catch basins to drain maximum impervious areas of:
 - i. 500 m² on roads with grades up to 4%,
 - ii. 400 m² on roads with grades greater than 4% at 100 m maximum.
- f) Lawn basins are required on boulevards and private properties where necessary to prevent ponding or flooding of sidewalks, boulevards, driveways, buildings and yards.
- g) Double or twinned catch basins must not be connected directly together, rather one basin will be wyed into the lead of the other. Maximum lead length to the mainline must be 30 meters and be minimum 250mm diameter. Each CB will have a trapping hood (standard drawing **SS-S54**).
- h) Double or twinned catch basins are to be provided at all sag points or sump locations as a minimum. Inlet calculations are required where the major storm needs to be accommodated,

such as downhill cul-de-sacs or where there is potential for excessive ponding or overflow onto private property.

- i) Oversized grates and/or secondary emergency inlets must be considered where leaves and/or debris collection is anticipated.

3.9.12 Service Connections

Service connections to the City storm system are required for all multi-family, commercial, industrial and institutional land uses.

Single Family Residential service connections to the City Storm system are required in instances where site conditions do not provide for safe infiltration or dispersal of storm water on site. The safe use of infiltration is to be confirmed by a qualified Professional.

a) Service connection requirements:

- i. The minimum storm service diameter for any property is 150mm.
- ii. Inspection chambers (ICs) are required to be installed as per **SS-S7** and **SS-S9**. Where this is not possible, identify offset on the record drawings and service card. An IC is not required on residential connections where the service is less than 2.5 m long and connected directly into a manhole.
- iii. Refer to Drawing **SS-S50** for all service connection requirements to a storm mainline.
- iv. All storm services 200 mm and larger require a manhole either on the storm mainline or on the storm service at the property line. The service manhole must be offset from the property line a sufficient distance to ensure replacement will not impact private property.
- v. Flow control manholes are to be installed on the private side of the property line as per Drawing **SS-S55**.
- vi. Service connections are permitted into manholes as per Drawing **SS-S1a**.
- vii. Depth to be minimum 1.2 m.
- viii. Minimum grade from property line to storm sewer main is 2%.
- ix. Wye fittings are preferred for service connections into proposed City storm sewers. Insertable tees are permitted into 250mm or larger existing mains.

b) Roof Leaders (drains):

- i. Where permissible and not in Hillside Areas, roof water is expected to be contained on site as part of best management practices to meet requirements for pre-development storm rate. Acceptable best management practices include splash-pad onto green space, rain harvesting systems or appropriately sized rock pits where soil infiltration parameters permit.
- ii. Roof leaders are not permitted to be directed to any infiltration device or soak away

pit near to or part of an engineered retaining wall or reinforced earth structure.

- iii. Roof leaders or inlets from downward sloping driveways in Hillside Areas must be connected to the City storm sewer.

c) Perimeters Drains

- i. Perimeter drains for buildings are required as per the British Columbia Building Code.
- ii. Discharge may be to the surface or a soak away pit.
- iii. Foundation perimeter drains are not permitted to be directed to any infiltration device or soak away pit that impacts an engineered retaining wall or reinforced earth structure.
- iv. Foundation perimeter drains can be routed by gravity through a storm service to the storm sewer provided that:
 - the elevation of the basement/crawlspace floor is at least 600 mm above the MBE (Section 3.6), or
 - 600 mm above the anticipated or known high ground water table, or
 - 600 mm above the 100 year hydraulic grade line within the sewer main at that point, whichever is higher.
- v. Where a sump pump is required, a backflow prevention device must be installed as part of the mechanical configuration to prevent backflow into a basement from the City Storm sewer.
- vi. As per Section 3.3.1, permanent groundwater pumping is not permitted to City storm sewers.

3.9.13 Perforated Sub-Drains

Perforated subsurface drainage systems designed for the purpose of permanent groundwater level reduction are not permitted to be connected to the City Storm sewer system.

3.9.14 Locations and Corridors

Wherever possible, storm sewers and service connections should be located within the public road right of way. Side or rear yard easements should be avoided where possible. Where it can't be avoided, statutory right-of-ways will be required for permanent City access.

3.10 Major System Design

The major drainage system includes all drainage pathways that convey, detain and/or intercept flows in excess of the capacity of the minor system. Its primary purpose is to provide flood protection for the 1:100 year return event. The major system generally includes surface flow paths such as ditches, swales, sewers, roadways, plus roadway culverts and watercourses.

3.10.1 Surface Flow Routing

All surface flows should have specially designed routes that are preserved and protected by right-of-ways and are accessible for maintenance. Design criteria include:

- a) HGL is to be at least 600 mm below the MBE of adjacent buildings.
- b) Maximum flow depth on roadways: 300 mm. Boulevards and intersecting driveway profiles will need to be set such that roadway surface flows are contained within the public right-of-way.
- c) One lane, or a 3.5 m width at the crown of each roadway, is to be free from flooding.
- d) Where a roadway is used as a major flow path, the road grades are to be designed to accommodate and control the flow at intersections.
- e) Flood routing is not permitted on to private property except in engineered flow channels or sewers protected in a statutory right-of-way.
- f) Overflow routes are required at all sags and low points in roadways and other surface flow routes.
- g) Major flood routes are required to exit down-slope in cul-de-sacs with Statutory Rights of Way established.

3.10.2 Surface Flow Capacity

Flow capacity of road surfaces and swales can be calculated using the Manning formula, presented in Section 3.9.2, Time of Concentration. Typical values of the Manning Roughness Coefficient "n" are:

- a) 0.018 for paved roadway
- b) 0.03 for grassed boulevards and swales
- c) 0.04 to 0.10 for irregular or treed channels.

Design detail is to include consideration of flow velocities and the potential requirement for erosion control measures. Ditches should be designed using a low n-value to determine velocity and provide the basis for stable channel design and a high n-value to determine ditch capacity and free board to prevent flooding or submergence of adjacent roadway subgrades.

3.10.3 Piped System

As noted in Section 3.2.1, the minor drainage system may be enlarged or supplemented to accommodate major flows in special circumstances. Modifications to the design criteria must be included in Stormwater Management Plan. Design considerations include:

- a) Provision of adequate inlets to accommodate major flows. Capacity calculations are to be provided in the Stormwater Management Plan.

- b) The requirement for surface overflow routes at potential surface ponding locations.
- c) Flow depth and velocity.
- d) Where applicable, design in accordance with minor drainage system guidelines.

3.10.4 Culverts and Bridges

The following service levels are to be used for design:

Road Class	Design Flood Frequency for Bridges and Culverts
Arterial and Collector	1:200 Year Flood
Local	1:100 Year Flood + provision for overflow if on major channel

The fishery value (aquatic classification) of the watercourse will establish the design requirements for the crossing. Particular designs will apply if fish passage is needed. Approvals are required under the BC Water Act and the Federal Fisheries Act, and may be required under the federal Navigable Waters Protection Act.

Culvert design is to be in accordance with the procedures outlined in an applicable design manual including but not limited to:

- a) American Concrete Pipe Association - Concrete Pipe Design Manual
- b) Corrugated Steel Pipe Institute - Handbook of Steel Drainage and Highway Construction Products.
- c) Standards and Best Practices for In-stream Works - Culverts, Province of British Columbia and DFO.

Inlet and outlet protection is required for all major system culverts. Design considerations are to include inlet control and outlet control conditions, energy dissipation and erosion control measures.

The City requires all municipal channel culverts 500mm or greater to be constructed with headwalls, end-walls and safety grillage as per Standard Drawings.

3.10.5 Watercourses

Natural watercourses are integral components of both the major drainage system and the ecological system. Riparian areas are to be preserved and/or enhanced to sustain habitat for aquatic and other wildlife as well as convey storm runoff.

Increases in peak storm flows and volumes to major watercourses and receiving waters shall be minimized. Consideration must be given to fish bearing streams and to streams presently at capacity.

Designers must consider all federal, provincial and municipal laws, regulations and guidelines noted above, and must obtain comments and approvals from the appropriate agencies.

Runoff Controls

Runoff controls are required to meet the objectives indicated previously. The controls may include:

3.10.6 Detention Storage

Detention storage is used to capture and store water on site to assure that storm releases are limited to the pre-development release rate for a 1 in 5 year storm. Drainage Basin Plans are available upon request to the City Engineer.

As a guideline, detention storage is not required on any lands west of Richter Street between Bernard Avenue to the north and Wardlaw Avenue to the South unless approved by the City Engineer. Where peak flow rates or volumes are increased and will cause detrimental impacts, provisions for downstream improvements must be provided in order to mitigate the impacts.

Detention storage options and design guidelines include the following:

3.10.7 Parking Lot Storage

- a) Requires detailed lot grading design to ensure proper drainage, pedestrian safety and convenience, and major flow paths .
- b) Maximum ponding depth: 300 mm outside vehicle stalls, 150 mm within vehicle stalls, however, also with consideration to frequency of ponding and impact to users of the parking lot.

3.10.8 Underground Storage

- a) Facilities include tanks and oversized pipes, with outlet controls.
- b) Tanks, fencing and graded slopes to be constructed off-line and on-site.
- c) Cross sections and inlet and outlet locations should be designed to minimize maintenance requirements.
- d) Structural design to accommodate traffic loads and groundwater pressure.
- e) Maintenance access provisions required.

3.10.9 Dry Detention Ponds

- a) Intended to provide storage only during severe storm events.
- b) May be on-line or off-line, although off-line is preferred. Fencing and graded slopes required.
- c) May accommodate active recreational uses.
- d) Overflow elevations to be coordinated with MBEs.
- e) Emergency overflow spillway to be constructed for 1:100yr storm event.
- f) Design details, other than discharge rates should be in accordance with current technologies as outlined in Land Development Guidelines for Protection of Aquatic Habitat (Canada/BC).
- g) Provide warning signage indicating facility is a stormwater detention structure subject to flooding or rapid water level changes. Signs to be posted at all public access points or road frontages.

3.10.10 Wet Detention Ponds

- a) Intention is to provide on-line detention storage and maintain a permanent minimum water levels.
- b) Catchment area must be large enough to provide sufficient base flow to ensure wet storage and is sustained without becoming stagnant (based on local hydrologic characteristics).
- c) Generally located off-site, and must include fencing and graded slopes on-site.
- d) Can provide a public amenity within a passive park.
- e) Overflow elevations to be coordinated with MBEs.
- f) Design details, other than discharge rates, should be in accordance with current technologies as outlined in Land Development Guidelines for the Protection of Aquatic Habitat (Canada/BC), and related documents.
- g) Provide warning signage indicating facility is a stormwater detention structure subject to flooding or rapid water level changes. Signs to be posted at all public access points or road frontages.

3.10.11 Subsurface Disposal / Infiltration Systems

- a) These systems are intended to promote stormwater retention and groundwater recharge.
- b) Suitable for high permeability soils with low groundwater elevation. Geotechnical investigation is required.
- c) Design details should be in accordance with current technologies as outlined in Infiltration systems guidelines in land Development Guidelines for the Protection of Aquatic habitat (Canada/BC), and related documents.

- d) Stormwater infiltration basins planned for Hillside Areas must be designed by a qualified Professional with experience in hydrogeology. The design must be reviewed and confirmed by the City Engineer. See Section 3.1.4.

3.11 Outlet Controls

Outlet controls for storage facilities may be designed using the standard orifice and weir equations:

Orifice Equation:

$$Q = C A (2 g h)^{0.5}$$

Where:

Q = release rate (m³/s)

C = orifice coefficient (0.62 for sharp or square edge, 0.85 for rounded edge)

A = area of orifice (m²)

g = gravitational acceleration (9.81 m/s²)

h = net head on orifice (m)

Weir Equation:

$$Q = CLH^{1.5}$$

Where:

Q = release rate (m³/s)

C = weir coefficient

L = effective length of weir crest (m)

H = net head on weir crest (m)

Larger storage facilities are to include provisions for discharges at rates greater than the design release rate (i.e., major storm event and emergency conditions). Rapid drawdown of the water level may be necessary for emergency purposes or to restore the available storage to accommodate subsequent storm events. Simple reducers are permitted on smaller facilities.

Orifices shall be fixed and designed to pre-development outflow rate. Adjustable mechanisms such as slide gates or removable orifice plates are not permitted unless approved by the City Engineer.

Design of inlet and outlet structures is to include consideration of energy dissipation and erosion control. Safety grates are required over all inlet and outlet openings larger than 500 mm diameter. Locks for access hatches are required.

The following is an introductory list of some runoff controls focused on water quality treatment.

- a) Bio-filtration Swales and Constructed Wetlands
- b) Intended to provide bio-filtration and sediment removal.
- c) May be designed to provide on-line detention storage as well as quality treatment.

- d) May be located on-site or off-site.
- e) Qualified professional required for design.
- f) Design requires consideration of climatic conditions.

3.11.1 Oil and Grit Separators

Oil and Grit Separators are required:

- a) On site with parking for 50 or more vehicles (does not apply to parkades).
- b) On all industrial zoned properties, unless it can be proven that there is no risk of storm water contamination.
- c) Supplier design details are required.

Design criteria for Oil and Grit Separators must include:

- a) Devices must have a current Canadian Environmental Technology Verification (ETV) or ISO 14034 ETV verification.
- b) A target Total Suspended Solids removal of 60% of the ETV Particle Size Distribution.
- c) Performance predictions for all proposed units.
- d) A maintenance plan and commitment from all Owners. This will be included in the business license renewal.
- e) A location on-site, including a Statutory Right of Way or covenant on title should the City need to inspect the unit.

3.11.2 Oil/Water Separators

- a) Required for gas stations, vehicle service areas and storage areas for highway vehicles and construction equipment.
- b) Design details in accordance with current technologies as outlined in Urban Runoff Quality Control Guidelines for British Columbia.

3.12 Drainage Pump Stations

Drainage pump stations are not commonly used in the City. Where drainage pumping is required, the designer must review the design concept and proposed guidelines with the City, submit a pre-design report and obtain approval of the City before proceeding with design. At a minimum, the pre-design report should include the following:

- a) Delineated catchment area map
- b) Estimated flows and HGL
- c) Pump station location

- d) Connection to existing infrastructure.

3.13 Erosion and Sediment Control (ESC)

All construction projects in the City require an Erosion and Sediment Control (ESC) Plan approved by the City. Storm water runoff from construction sites commonly contains significantly higher contaminant concentrations than storm water from developed sites. Poor construction practices and lack of attention to detail are contributors to sediment transport, in turn impacting both downstream infrastructure, aquatic habitats and Okanagan Lake.

Erosion and Sediment Control will be managed as a separate process with a cost identified as a separate line item in the development planning process

The following policies will be administered:

- a) No Person may cause, or permit another Person to cause, sediment or sediment-laden water to discharge into the storm system, with concentrations greater than 75 milligrams per litre (ppm) of total suspended solids (TSS). A sample measuring greater than 60 nephelometric turbidity units (NTU) will be the trigger point where the sample must also be sent to the lab for analysis.
- b) A Security Deposit for ESC Works equal to 3% of the Consulting Engineer's opinion of probable costs of civil earthworks and infrastructure will be added to the Servicing Agreement.
 - i. The Security Deposit submitted is to secure the full and proper compliance with the provisions of the By-law. In the event, that the Owner, Developer, or Person Responsible has not complied with the provisions of this By-law, the necessary funds from the security deposit may be drawn down, at the City's option, and the money used either by the City or its agents to protect the storm system from sediment or sediment-laden water in adherence with the terms and conditions of this By-law. Notwithstanding, the City is under no obligation to initiate or complete remedial works in or under the Land.
 - ii. If the amount of the security deposit is insufficient for the City to complete the ESC Facilities, the Owner and Developer jointly and severally will pay any deficiency to the City on demand.
- c) The Owner must retain a Qualified Professional (P.Eng, RPBio, P.Ag, ASCT, CPESC, CISEC or CESCL) responsible for inspecting and monitoring the ESC Facilities weekly and after any rain event which exceeds the intensity of 25mm of total rainfall depth in a 24-hour period. All records and data must be made available to the City upon request. Should a site be determined to be non-compliant, the Professional will be responsible for submitting notification and presenting a remediation plan to the City within two days of the event.
- d) The ESC will include a construction plan and site management plan ESC features must be installed before any clearing, excavation, or soils mobilization takes place.
- e) The fundamental approaches to effective ESC include:
 - i. reduce clearing and grading and preserve natural vegetation as much as possible;
 - ii. phase construction to limit soil exposure at any one time, particularly in wet seasons;
 - iii. stabilize exposed soils as quickly as possible, whether temporary or permanent;
 - iv. protect slopes and cuts;

- v. prepare the site to limit soil tracked off-site by haul vehicles;
- vi. sweep off-site streets when dirt is tracked;
- vii. filter runoff water before it leaves the site;
- viii. install filters or barriers to protect downstream drains and inlets;
- ix. adjust ESC plan to suit changing weather and construction phasing;
- x. assess ESC practices after rain event; and
- xi. maintain the works throughout construction.

Ideally, practices and features are put in place to prevent erosion from occurring in the first place, but realistically some degree of erosion and sediment transport will occur. When it does, other practices and features are to intercept and capture the sediment before reaching vulnerable areas. As such, the following sub-sections introduce ESC practices in two core categories; erosion control and sediment control.

3.13.1 Erosion Control

Rainfall and wind can aggressively displace and transport soil, although rainfall tends to be the more damaging in BC climates. The soil composition has a significant bearing on its erosion potential. The first line of defense is to either maintain or provide protective cover to the soil. Ideally, natural vegetative cover is maintained for areas that do not need to be disturbed. Where soils do need to be exposed or stockpiled, temporary covers should be applied when rainfall events are imminent.

For exposed site areas, straw mulch is the most common form and can be effective with low cost. However, it is commonly not applied thick enough or replenished frequently enough. It is important that a uniform blanket be provided and refreshed as the straw decays or is displaced. For the most part, bare soil should not be visible.

For steeper slopes, or for areas exposed and inactive for considerable time, manufactured erosion control blankets may be most appropriate. There are many products available and local suppliers should be consulted for the selection of the appropriate one. While they have a higher purchase cost, with proper selection and installation they will provide longer and more effective service with far less maintenance than straw mulch.

For soil stockpiles, poly tarps should be applied when the stockpile is inactive, including short overnight periods if there is any threat of precipitation. If inactive for considerable time, other measures such as temporary seeding, mulching, or matting may be considered.

Once disturbance to an area is complete, permanent cover practices should be established as soon as possible. Top dressing the area with topsoil having high organic content in itself can be a significant benefit; a minimum of 100 mm should be applied for purposes of erosion control. Greater depth is often required to meet landscape growing medium and hydrologic management needs. Sodding, broadcast seeding, hydro-seeding, and drill seeding are acceptable methods to re-establish a blanket of vegetative.

Aside from maintaining good quality ground cover, there are a number of other techniques that can be applied as erosion control, including the following, but not necessarily limited to those below. They should be selected based upon the specific conditions and requirements of the site.

Construction of stable haul roads for transport vehicles coming and going from the site is required.

At a minimum, haul roads include 200 mm of a coarse granular running surface, but strong consideration for underlying filter fabric, and potentially geogrid reinforcing in weak soils, should be given;

- a) Intercept trenches on the upstream edges of the working area to redirect runoff;
- b) Terracing steeper slopes;
- c) Scarifying the soil surface;
- d) Bio-engineered protection of very steep slopes;
- e) Rip-rap with appropriate underlying filter.

3.13.2 Sediment Control

Silt fences can be an effective barrier to contain soil, but are not an effective filter of sediment laden runoff. Their permeability is insufficient to allow water to pass through, and therefore more commonly act as a dam which is then often undermined or circumvented by the flow of water. When used appropriately as a soil containment barrier, they must be sufficiently installed and maintained. Design criteria include: stakes should be > 7.5cm in diameter and > 1.5m long and driven > 40cm into the ground; stakes should be < 2.4m apart unless wire backing is used; and bottom should be buried in a trench > 20cm.

- a) Storm drains and catch basins potentially receiving site runoff are to be protected with filters.
- b) Straw bales and gravel berms are to be used within flow paths to slow water and promote trapping of coarse sediment. Note that these are less effective for fine sediment.
- c) Dust control is required at all times.
- d) Soil transport from vehicles coming and going from the site must be controlled. Where a wheel wash facility is constructed, wash water must be appropriately contained and treated prior to release off-site.
- e) Sediment ponds (or basins) are generally applied to larger construction sites (> 2 hectares) to settle suspended sediments larger than 0.02mm. The outlet should consist of a perforated riser pipe with a gravel jacket. Internal gravel baffles are to be installed to create individual cells to reduce velocities and prevent short circuiting of flow to the outlet. As a design guideline, ponds should be sized to accommodate 125 m³/ha of site area. Of this volume, at least 20% should be dedicated to a forebay. The remainder, as a permanent pool, should measure 1.3-1.8m in average depth, and not exceed 2.4m.
- f) Sediment traps are similar to sediment ponds, but designed for small sites. Generally fed by swales, these facilities are located on the low-side of the site to receive site runoff water and allow settling of solids before discharge off-site.

4 DESIGN STANDARDS HIGHWAY

BL10696 amended the following:

- 4.1 [General](#)
- 4.2 [Road Classification](#)
- 4.3 [Vertical Alignment](#)
- 4.4 [Horizontal Alignment](#)
- 4.5 [Road Cross-Section](#)
- 4.6 [Curb and Gutter, Sidewalks and Bikepaths](#)
- 4.7 [Appurtenances](#)
- 4.8 [Pavement Structure](#)
- 4.8.1 [Subgrade Preparation](#)
- 4.8.2 [New Pavement Design](#)
- 4.8.3 [Design of Overlays for Existing Pavements](#)

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4.1 General

All highways (roads, lanes, Active Transportation Corridors) within the City of Kelowna shall be designed with good engineering judgement, in accordance with the recommended practice as outlined in the most current editions of the following design guidelines, unless specifically addressed by City Bylaw or policy:

- Transportation Association of Canada – Geometric Design Guide for Canadian Roads;
- Transportation Association of Canada – Manual of Uniform Traffic Control Devices for Canada;
- Other applicable Transportation Association of Canada best practice design guides, such as but not limited to, the Canadian Roundabout Design Guide, the Canadian Guide to Traffic Calming, Pedestrian Crossing Control Guide and Bikeway Traffic Control Guidelines for Canada;
- Master Municipal Construction Documents Association – Design Guidelines;
- British Columbia Active Transportation Design Guide, and
- BC Transit Infrastructure Design Guidelines

Highway

Developments may require Frontage Roads, double Frontage lots, deep lots with rear service Lanes, or such other treatment as may be necessary in the public interest for the adequate protection of residential properties and to afford separation of through and local traffic.

In reviewing engineering plans, the Approving Officer or Building Inspector must consider the sufficiency and suitability of the proposed Road system, the arrangement, width, grade and location of all Roads in relation to existing and planned Roads, to topographical features, to public convenience and safety, and to the proposed uses of the land to be served by such Roads.

The arrangement of Highways in a Subdivision must either:

- (a) provide for the continuation or appropriate projection of existing Roads in surrounding areas; or
- (b) where topographic or other conditions make continuation or projection of existing Roads impractical, provide an adequate and suitable Highway system having regard to the uses of the land to be served.

The dimensions, locations and standard of all Roads in a proposed Subdivision must conform substantially to any applicable community plan.

Local residential Roads must be aligned so that their use by through traffic will be discouraged.

Cul-de-sac Roads, designed to be permanent, must be provided at the closed end with an area designed to permit safe and adequate space for the turning of motorvehicles.

Walkways must be provided where they are deemed desirable to provide access through the Subdivision to schools, playgrounds, shopping centres, transit, beaches and other community facilities or for proper circulation of pedestrian traffic.

Jogs in Highway alignment at intersections may be allowed provided that the distance between centre lines is sufficient to maintain traffic safety.

Intersections are to be designed and located within a range of angles between 70° and 110°.

To reduce vehicular delays and for safety considerations, modern roundabouts must be considered as the first option for intersection designs where all way stop control or traffic signals are warranted by traffic analysis.

In the design of all street intersections, including those with lanes and walkways, the Consulting Engineer must give consideration to providing adequate sight and stopping distances for conflicting traffic streams involving pedestrians, bicycles and/or vehicles. The City of Kelowna Traffic Regulation Bylaw No. 8120 prohibits sight

obstruction greater than 1 m in height within 8 m of intersections.

If reversed curves are required in a Highway alignment, the City Engineer may require that they be separated by means of tangents of sufficient length.

Where angular deflections occur in a Highway alignment, the City Engineer may require that the angle be replaced by a curve of suitable radius.

Designs for significant work to a major collector or arterial road identified on the Major Road Network and Road Classification Plan, must undertake an independent Road Safety Audit.

Road name signs and traffic signs required as a result of constructing or improving Roads must be provided by the City of Kelowna at the expense of the Owner.

Transit bays must be provided where required by the City Engineer.

4.2 Road Classification

The roadway classification applicable to the Road under consideration will be determined from Table 1. Where topographical or other conditions make continuation or projection of an existing street impractical, the City Engineer will review the Developer's proposal and may approve the alternative.

NOTE: All vertical and horizontal alignment elements will be designed utilizing information from Tables 1 and 2 and in accordance with:

1. Transportation Association of Canada - Geometric Design Guide for Canadian Roads, 2017 Edition.

Highway

TABLE 1 – ROADWAY CLASSIFICATION

Road Class/R.O.W. Improvements	Road Allowance Width (min.)	Surface Width (min.)	Curb Type	Standard (Dwg. No.)
<u>LANES</u> Residential and Emergency and Private Access Roads Commercial	6.0 7.6	6.0 7.6	N/A N/A	SS-R2 SS-R2
<u>LOCAL STREET</u> Class -1, 2 Lane - ULU - RLU Class -2, 2 Lane - ULU - RLU	18 18 15 15	10.3 7.0 9.1 7.0	Rollover N/A Rollover N/A	SS-R3 SS-R3 SS-R4 SS-R4
<u>COLLECTOR STREETS</u> Class -1, 2 Lane - UCU – - RCU - Class -1, 2 Lane - UCU – with BikeLanes - RCU - with BikeLanes Class -2, 2 Lane - UCU - • RCU -	20 20 22 22 18 18	13.1 10.0 14.5 10.0 11.3 10.0	Barrier N/A Barrier N/A Rollover N/A	SS-R5 SS-R6 SS-R7
<u>ARTERIAL STREETS</u> Class -1, 4 (6) Lane - UAD - Parkway Class -1, 4 Lane (Ult.) - UAD - Parkway Class -1, 2 Lane (Stage I) - UAD - Parkway Class -1, 2(4) Lane - RAD - Class -2, 4 Lane - UAD - Residential Class -2, 3 Lane (one way) - UAU – Residential Class -2, 2 Lane - RAU - Residential Class -3, 4 Lane - UAU - TwnCntre Class -3, 3 Lane (one way) - UAU - TwnCntre	35 30 30 30 30 20 20 28 25	21.5 21.5 21.5 20.6 20.9 12.3 10.3 20.9 17.7	Barrier Barrier Barrier N/A Barrier Barrier N/A Barrier Barrier	SS-R8 SS-R9 SS-R10 SS-R11 SS-R12 SS-R13 SS-R14 SS-R15

Note the following definitions:

ULU - Urban/Local/Undivided	RCU - Rural/Collector/Undivided
RLU - Rural/Local/Undivided	UAU - Urban/Arterial/Undivided
UCU - Urban/Collector/Undivided	UAD - Urban/Arterial/Divided
RAU - Rural/Arterial/Undivided	RAD - Rural/Arterial/Divided

Surface Width - on urban section, this measures from face of curb to face of curb
- on rural section, it measures from the edge of asphalt to edge of asphalt.

Highway

4.3 Vertical Alignment

The vertical alignment of roads must be set so the grades of driveway to adjacent properties will conform to MMCD Drawing C7. Where it is impractical to meet this criteria, the City Engineer may approve the use of private access roads.

The minimum and maximum road centreline grades allowed on various classes of roads must be as per Table 2.

TABLE 2 - GEOMETRIC STANDARDS

Facility Classification	Design Speed (km/h) (min.)	% Super. Elevation (max.)	Radius (metres) (min.)	% Grade		K-Value (min.)			Sight Distance (min.)	
				Min.	Max.	Crest	Sag		Stopping (metres)	Decision (metres)
							No Illum.	Illum.		
Walkway				1.0	15					
Emergency Access	30		12	1.0	15		2			
Driveway Single Fam.				1.0	15					
Driveway Multi-Fam.	30			1.0	12					
Rear Laneway See Notes Below	40	*I.C.	18	1.0	12 (10)	4	7	4	45	110 - 160
Local Roadway See Notes Below	50	*N.C.	100	0.5	12 (10)	7	11	6	65	140 - 190
Collector Roadway See Notes Below	50	6 (4)	115 (500)	0.5	10 (8)	7	11	6	65	140 - 190
Arterial Roadway See Notes Below	70	6 (4)	190 (1,000)	0.5	8 (6)	22	25	15	110	200 - 270

Notes: 6% super-elevation only permitted on collector roads in segments without intersecting roads or private access.

Notes: Through roads at an intersection are governed by the numbers shown in brackets, with the reduced grades on each side of the intersection for a distance equivalent to the "stopping sight distance".

*Inverted Crowns (I.C.) and Normal Crowns (N.C.) shall be built with 2% crossfall.

At road intersections, the minor road and/or cul-de-sac must be constructed with an approach grade of not greater than 3% for a distance of not less than 15 m from the adjacent edge of asphalt of the major road.

The draining grade around the outside curb of a cul-de-sac must be not less than 0.50% and not greater than 5.00%. Longitudinal gradients of cul-de-sac bulbs shall not exceed 5.00%.

When a cul-de-sac is at the bottom of a hill, the longitudinal gradient of the first 50m of roadway uphill from the cul-de-sac bulb shall not exceed 5.00%. The maximum longitudinal gradient for the rest of the hill shall not exceed 8.00%.

When a cul-de-sac is at the top of a hill, the longitudinal gradient for the roadway downhill from the cul-de-sac must not exceed 12.00%.

All changes in gradient over 1.00% on arterial and collector Roads and over 2.00% on all other road classifications must be connected by vertical curves. Vertical curves must be designed in accordance with the latest edition of the Geometric Design Guide for Canadian Roads as published by the Transportation Association of Canada.

Standard cross slopes (normal crown) must be 2.00% on all road classifications unless specified otherwise by the City Engineer. Design road elevations must give due consideration to flood-proofing requirements of adjacent properties. Full road crossfall (reverse crown) may be considered in special circumstances, as a means of more closely matching property grade adversity on either side of the highway.

The length of a transition from a normal cross-sectioned road to a section of road where there is super-elevation or crossfall must, in no case, be less than 70 m for a 50 kmh designed road or 110 m for a 70 kmh designed road. In selecting the length of the transition, care and consideration must be given to draining all of the pavement. Typically, if no horizontal spiral curve is used, 60% of the super-elevation is introduced prior to the beginning of the curve, and the balance is developed in the curve.

Gutter elevations on curb returns and cul-de-sacs must be shown on the drawings at the beginning, one-quarter points and end of curb returns and at 7.50 m intervals around cul-de-sacs.

4.4 Horizontal Alignment

The horizontal centreline alignment of the road will be located on the centreline of the right-of-way, unless approved otherwise by the City Engineer. Typical locations of works and utilities in Roads are shown on Standard Drawings.

Centreline chainage stations must be fully referenced and dimensioned from property lines.

Minimum radius of curve and maximum super-elevation normally allowed are shown in Table 2 (Geometric Standards). The Minimum radius of curb return at intersections must be 7.50 m. Transitions in road widths, tapers, etc., must be formed with smooth curves and tangents, including no less than 30:1 for

50 km/h design speeds and preferably 40:1 tapers.

A horizontal curve must be fully described showing internal angle, radius, tangent length and arc.

Curb returns located on roads within industrial and commercial districts may require a larger radius to facilitate truck traffic and bus traffic, and will be as specified by the City Engineer.

When a new road with curbs intersects an existing road without curbs, only half the curb returns must be constructed unless the road design for the uncurbed road is available and will allow construction of the full curb returns. Full curb returns must be constructed at the intersection of two curbed roads.

A cul-de-sac, turn-around, or a second point of access is required at the terminus of roads longer than 90m.

4.5 Road Cross-Section

The standard Road cross-section shall be as detailed in Table 1. Measurement for roadway width shall be measured from face of curb, or edge of asphalt, to centreline of paint line.

Note that the objectives of the standard road cross-sections as detailed in Table 1 and the Standard Drawings are the clear and intended goals on all roadways within the City of Kelowna. It is recognized, however, that ambient conditions may require variance from these standards in existing and substantially "built-up" areas, where provisions to accommodate the required roadway modification may not have been anticipated. A variance to these standards may be considered by the City Engineer.

For the design of local and collector roads with on-street parking, curb extensions shall be considered at intersections and at pedestrian crossings.

For road designs in rock cut sections, a rockfall catchment area sized by a qualified Geotechnical Engineer (minimum 3.0m wide), is required. The rockfall catchment area is defined as the area between the edge of the highway pavement (or back of sidewalk if present) and the base of the rock slope. This structure has the function of preventing fallen rock from reaching the highway (or sidewalk) surface and intercepts seepage water from the rock cut.

For all urban roads in cut sections greater than 1 m, a 100 mm perforated subdrain located 600 mm deep (minimum dimensions), is required behind the sidewalk or curb. The sub-drain shall connect to the nearest catchbasin with a long radius bend and include an inspection chamber with service box at the top end.

4.6 Curb and Gutter, Sidewalks and Bike Lanes

The standards for curbs, gutters, sidewalks and bike lanes shall be as detailed in Table 1 and in the MMCD standard drawings and City of Kelowna supplemental drawings to the MMCD.

Each property shall only have one (1) driveway access per road frontage. Upon demonstrated need and approval from the City Engineer, more than one (1) driveway access may be granted to service stations, major commercial and other developments. Where a lot abuts a lane or road of different classification, the driveway shall be located to access the lane or road of the lower classification.

Residential driveway access onto an arterial or Class 1 collector road, is not permitted unless alternate access is impossible. Wherever physically possible, alternate local road or lane access shall be dedicated to preclude residential driveways accessing directly onto major roads.

Residential driveway accesses serving corner lots shall be a minimum of 7 m from the lot corner nearest the intersection. All residential driveway accesses shall have a minimum width of 4 m and a maximum width of 6 m.

Driveway accesses to commercial and industrial corner lots shall be a minimum of 15 m from the property line of the adjoining road. The maximum width of a driveway to a commercial or industrial property having only one access shall be 11 m. The maximum width of each driveway to a commercial or industrial property having more than one access shall be 9 m. A variance to these standards may be considered by the City Engineer.

At the discretion of the City Engineer, access to large parking areas shall be by curb returns rather than a driveway letdown. The City Engineer may require deceleration and acceleration lanes for access off major roads for safety reasons and to minimize disruption to traffic flows. Design of such access shall follow the recommendations in the Ministry of Transportation & Highways, Highway Engineering Branch "Design Manual".

Wheelchair ramps must be provided at all intersections as an integral part of the sidewalk.

4.7 Appurtenances

All proposed traffic islands, retaining walls, guard-rails, and permanent barricades must be designed in keeping with good engineering practices.

Traffic control devices shall be designed and installed in accordance with applicable and current City of Kelowna requirements.

For all utility poles and tie-downs which require re-locating prior to road construction, the utility must confirm the feasibility of their re-location prior to design completion.

4.8 Pavement Structure

4.8.1 Subgrade Preparation

Subgrade preparation shall be considered integral for construction of new roads.

Frost Susceptible Soils (ML): The susceptibility of soils to frost heave is commonly classified using the US Corp of Army Engineers four categories, as shown in Table 15.2 of the "Canadian Foundation Engineering Manual", 3rd edition, 1992. All geotechnical reports shall address the frost susceptibility of the subgrade soil.

Swelling Soils (CH): Pockets of soils known to change volume with variation of moisture content are known to exist in several locations within the limits of the City of Kelowna. These soils are typically identified as high plastic clays (CH) using the Unified Soil Classification System and Atterberg Limits index test (ASTM D4318). Where these soils are encountered as subgrade, special subgrade preparation considerations are required, as outlined below.

Scarification should render the subgrade to cohesive pieces of a maximum size of 20 mm to allow adequate moisture conditioning of the soil. The soil should be moisture conditioned to achieve a homogeneous moisture content between 0 and 3% over optimum. Following moisture conditioning, the subgrade soil should be compacted to a minimum of 95% of Modified Proctor density, as determined by ASTM D1557. The subgrade should be covered with granular sub-base as soon as practical to minimize the variation of the moisture content in the subgrade. The contractor should be aware that additional moisture condition and compaction may be required, at the contractor's expense, should the moisture content be allowed to vary significantly from optimum prior to placing the sub-base.

4.8.2 New Pavement Design

Designers of pavement structures shall consider four primary factors in undertaking a specific design. These are:

- Subgrade support quality (geotechnical report)
- Design life (20 years)
- Traffic loading (expressed in ESALs)
- Climate

New pavement structures shall be designed in accordance with the methodologies presented in "AASHTO Guide for Design of Pavement Structures", 1993. The pavement structure shall be designed for a twenty (20) year design life.

The AASHTO design method is based on a Structural Number (SN) for the entire pavement structure (i.e. hot mix asphalt, granular base and granular sub-base). The method incorporates the subgrade strength expressed as the Subgrade Resilient Modulus (M_r), and design loading (ESALs). Each component of the pavement structure is assigned a layer coefficient.

Subgrade strength is frequently characterized utilizing the California Bearing Ratio (CBR) test procedure (ASTM D1883). This test should be performed on soaked subgrade soil specimens compacted to 95% of Modified Proctor density as determined by ASTM D1557. The Resilient Modulus may be approximated from the soaked CBR test values using the following relationships:

$$\begin{aligned} M_r \text{ (MPa)} &= 10.3 \text{ CBR, or} \\ M_r \text{ (psi)} &= 1500 \text{ CBR} \end{aligned}$$

The soaked CBR properties of subgrade soil should be determined at a frequency of at least one test per every 150 lineal metres, or a portion there of, and for each major soil type encountered. Where more than one test is required, the tests should be evenly spaced.

The required SN for the pavement structure is the sum of the product of the layer coefficient, the component thickness, and a drainage coefficient for each component:

$$\text{eq'n (1) } SN = a_{ac}D_{ac} + a_bD_bM_b + a_{sb}D_{sb}M_{sb}$$

where:

SN	=	Structural Number for pavement structure
a_{ac}	=	layer coefficient for hot mix asphalt (0.4)
a_b	=	layer coefficient for granular base (0.14)
a_{sb}	=	layer coefficient for granular sub-base (0.10)
D_a	=	Thickness of hot mix asphalt (mm)
c		
D_b	=	Thickness of granular base (mm)
D_s	=	Thickness of granular sub-base (mm)
b		
M_b & M_{sb}	=	layer drainage coefficient (1.0 for Kelowna)

Road classifications, design traffic values and minimum depths of hot mix asphalt and granular base components of the total pavement structure are defined in Table 3.

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Table 3 - Minimum Asphalt & Granular Base Depth vs Design Traffic

Road Classification	Design Traffic (ESALs) ⁽¹⁾	Minimum Depth of Hot Mix Asphalt	Minimum Depth of Granular Base
Walkways	n/a	50	75
Local, Lanes & Access Roads	2.8×10^4 (28,000)	50	75
Collector	2.8×10^5 (280,000)	100	75
Arterial ⁽²⁾	1.0×10^6 (1,000,000)	100	75

Notes:

- (1) See Part 1 – Chapter 1 of AASHTO for definition of an Equivalent Single Axle Load (ESAL).
- (2) Special design reviews may be requested by the City Engineer.

Standard pavement structures, including required SN values, are provided on Table 4 for three strengths of subgrade. The standard pavement structures incorporate the minimum depths of hot mix asphalt and granular base shown in Table 3.

Table 4 - Standard Pavement Structures

Street Classification	Structure Component	Thickness in mm for Soaked CBR ⁽¹⁾ of		
		3.0 ⁽⁴⁾ CBR ₅	5.0 CBR ₁₀	CBR ₁₀
Walkways	Asphalt - Surface Course	50	50	50
	Granular Base	75	75	75
	Granular Sub-base ⁽³⁾	150	150	150
	Required SN Value	n/a	n/a	n/a
Local, Lanes & Access Roads	Asphalt - Surface Course	50	50	50
	Granular Base	75	75	110 ⁽²⁾
	Granular Sub-base ⁽³⁾	275	165	0
	Required SN Value	58	47	35
Collector	Asphalt - Surface Course	40	40	40
	Asphalt - Base Course	60	60	60
	Granular Base	75	75	100 ⁽²⁾
	Granular Sub-base	335	185 ⁽³⁾	0
	Required SN Value	84	69	53
Arterial	Asphalt - Surface Course	40	40	40
	Asphalt - Base Course	60	60	60
	Granular Base	75	75	75
	Granular Sub-base	535	355	155 ⁽³⁾
	Required SN Value	104	86	66

Notes:

- (1) Soaked CBR value shall be at 95% of Modified Proctor maximum dry density and optimum moisture content, as determined by ASTM D1557.
- (2) Placement of equivalent sub-base layer is not practical and shall be replaced with additional granular base.
- (3) Maximum aggregate size of sub-base material to be no more than 50% of total depth of sub-base.
- (4) Where the top 1 m of subgrade has a soaked CBR value of less than 3, then the subgrade strength should be supplemented with an additional thickness of granular sub-base material in order to achieve a soaked CBR value of 3 or greater. The thickness of the supplemental sub-base and the corresponding composite CBR value for the top 1 m of composite subgrade can be determined by the following formula:

$$\text{CBR Composite} = ((t_{\text{ssb}} \times \text{CBR}_{\text{ssb}}^{0.33} + (100 - t_{\text{ssb}}) \times \text{CBR}_{\text{sg}}^{0.33}) / 100)^3$$

Where CBR Composite is 3 or greater.

t_{ssb} = thickness of supplemental sub-base (cm). CBR_{ssb} = CBR value of supplemental sub-base. CBR_{sg} = CBR value of subgrade soil.

Design pavement structure to be placed on a prepared subgrade or adequately compacted fill embankment. Refer to Section 4.8.1 and 02226 of the MMCD.

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Granular base and granular sub-base to have a minimum soaked CBR value of 80 and 20, respectively (refer to City Supplemental S02226).

For design purposes, the maximum subgrade soaked CBR value shall not exceed 10.

Required physical properties for granular base and granular sub-base are given in Schedule 5, Section S02226.

Staged construction may be considered by the City Engineer when a road is to be constructed and to be widened at a later date.

Table 4 provides standard pavement structures for roads constructed on only three strengths of subgrade. Alternate pavement structures may be designed based on the SN determined using Figure 1. For example, for a Collector Road with soaked subgrade CBR value of 4, then the corresponding pavement structure requires a SN of 75. Using eq'n (1), and the specified layer coefficients, a suitable pavement structure alternative may be determined as shown on Table 5:

Table 5 - Example Pavement Structure

Pavement Structure Component	Thickness, D (mm)	Layer Coefficient, a	SN
Hot Mix Asphalt	100	0.40	40
Granular Base	100	0.14	14
Granular Sub-base	210	0.10	21
Total SN			75

Note that the minimum depths of hot mix asphalt and granular base shown on Table 3, and the required SN have been met.

The curves shown on Figure 1 are derived from the methodologies presented in AASHTO. A description of all variables used to derive the curves is presented in the MoT Technical Circular T - 9/95, "Pavement Design Standards".

5 ASHTO Structural Number (SN) Values
for Kelowna Street Classifications
as a Function of Soaked Subgrade CBR Value

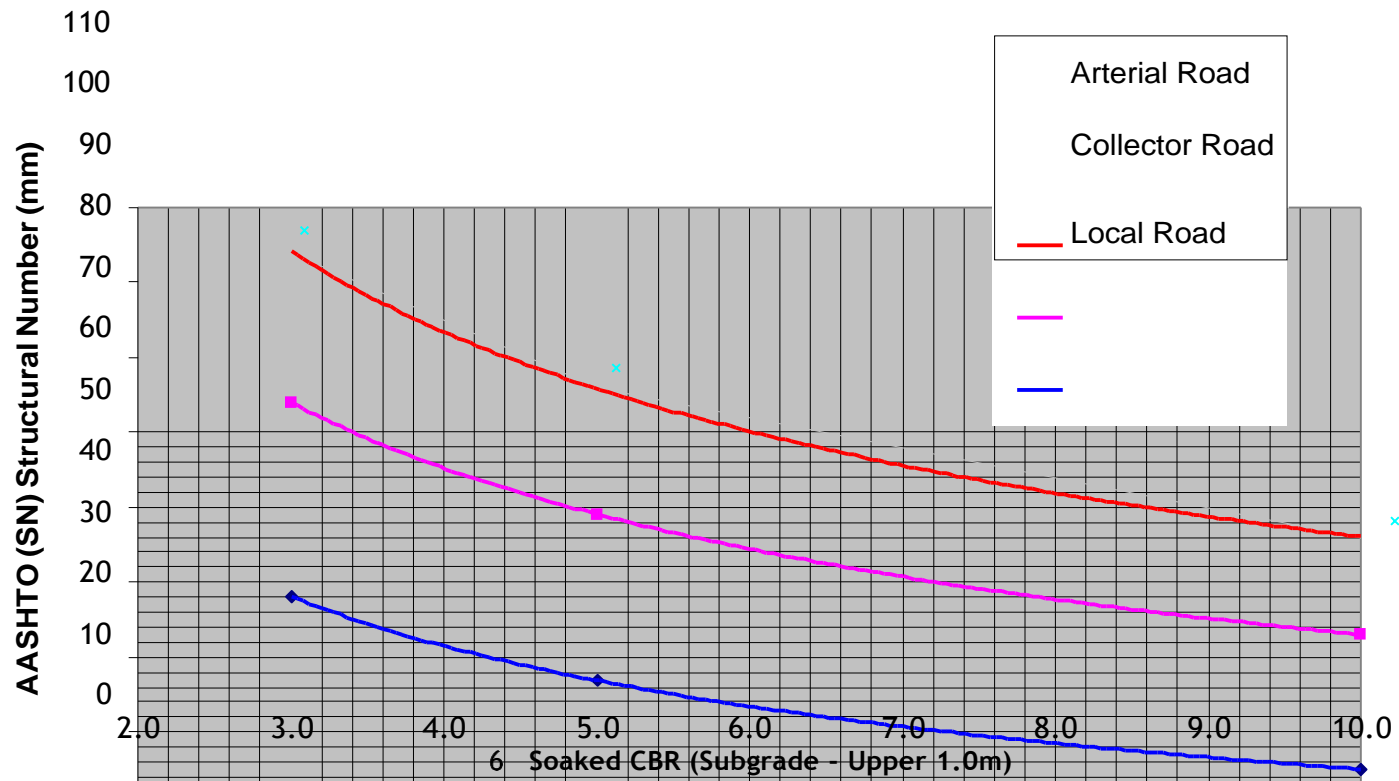


FIGURE 1

4.8.3 Design of Overlays for Existing Pavements

Overlay designs for existing pavements are to be performed in accordance with "Technical Publication No. 12" published by the Roads & Transportation Association of Canada. The design criteria for overlays are based on limiting Benkelman Beam deflections as follows in Table 6:

Table 6 - Benkelman Beam Criteria for Overlays

Road Classification	Maximum Deflection (mm)
Arterial Roads	1.00
Collector Roads	1.25
All Other Road Classifications	1.50

- Notes:
- (1) The design Benkelman Beam rebound ($x + 2\sigma$) should be determined on the basis of at least 10 uniformly spaced readings per two-lane kilometre (one half in each lane).
 - (2) The summary rebound statistic for a pavement section should be seasonally adjusted to the spring peak rebound value.

5 Roadway Lighting

- 5.1 [General](#)
- 5.2 [Codes, Rules, Standards and Permits](#)
- 5.3 [Roadway and Pedestrian Criteria](#)
- 5.4 [Light Measurements](#)
- 5.5 [Variable Lighting Criteria](#)
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5.1 General

Street Lighting (also referred to as Roadway Lighting) generally refers to lighting of streets and roadways including sidewalk, crosswalks, intersection, roundabouts, walkway and tunnels. The principal purpose of street lighting is to enhance visibility at night. For a pedestrian, street lighting improves visibility of the surroundings and the sidewalk, while for the driver of a motor vehicle it increases visibility resulting in more time to stop or to maneuver around an obstruction. Good lighting has been shown to significantly reduce night-time collisions specifically on urban streets, urban and rural intersections, roundabouts and mid-block crosswalks.

This bylaw is intended to provide some basic lighting and electrical criteria and guidelines to aid in the design of street lighting. Further information should be obtained from the most current edition of the Transportation Association of Canada (TAC) Guide for the Design of Roadway Lighting. Those undertaking street lighting design must be knowledgeable of all parts of the TAC guide.

These design guidelines are not intended to be a substitute for sound engineering knowledge, experience in street lighting design and the Canadian Electrical Code. Roadway lighting designs should be prepared under the direction of a design professional registered with Engineers and Geoscientists of British Columbia (EGBC).

5.2 Codes, Rules, Standards and Permits

Street lighting shall be designed to meet the required levels of illumination and uniformity at the lowest

annual cost to the City. Streetlight materials selected must be based on minimizing energy demand, long term annual costs, including replacement costs and maximize service life. Street lighting systems shall be designed in general conformance with the following.

5.2.1 Codes Rules and Regulations

- Canadian Electrical Code, latest edition, and bulletins issued by Electrical Safety Branch of the Province of British Columbia.
- AASHTO Standard Specification for Structural Supports for Highway Signs, Luminaires and Traffic Signals or CAN/CSA-S6-00 Canadian Highway Bridge Design Code,
- WorksafeBC,
- Canadian Standards Association (CSA),
- Local Power Utility Company regulations,
- Regulations issued by municipal, provincial and federal Authorities.

5.2.2 Standards and Guidelines

- TAC-Guide for the Design of Roadway Lighting,
- Canadian Standards Association (CSA),
- Local Power Utility Company regulations,
- MMCD Standard Specifications and Drawings, plus Supplementary Specification Drawings,
- Approved Products List 266 and Council Policy 265.
- IESNA RP8 (current revision)

5.2.3 Permits

- Electrical Permits as required by provincial or municipal inspection authorities

5.3 Roadway and Pedestrian Criteria

Street lighting illumination levels are defined by the road classification and the pedestrian activity level on the sidewalk adjacent to the roadway..

Street classifications are defined as follows:

- Arterial: Serves a continuous route primarily for inter-community through-traffic.
- Collector: Performs the dual function for traffic of land access and movement between arterial and local streets.
- Local: Provide direct land access and is not intended to carry through traffic.

Night-time pedestrian activity levels on sidewalks and in crosswalks are defined as follows.

- High: Areas with significant numbers of pedestrians expected to be on the sidewalks or crossing the streets during darkness.
- Medium: Areas where lesser numbers of pedestrians utilize the streets at night, Typical are downtown office areas, blocks with libraries, apartments, neighbourhood shopping, industrial, parks, and streets with transit lines.
- Low: Areas with very low volumes of night pedestrian usage. These can occur in any of the cited roadway classifications but may be typified by suburban single family streets. Very low density residential developments, and rural or semi-rural areas.

The choice of the appropriate pedestrian activity level for a street should be based on engineering judgement. If needed, one-hour pedestrian counts can be taken during the first hour of darkness on selected days, to estimate average pedestrian traffic counts. A section of typical land use can be sampled by counting one or two representative blocks, or a single block of unusual characteristics can be counted, perhaps at a different hour, such as discharge from a major event. Recommended pedestrian activity levels are defined as follows:

- Low- 10 or fewer
- Medium – 11 -99
- High – 100 or more

These volumes represent the total number of pedestrians walking in both directions in a typical block or 200-meter section. Additional definitions are as follows:

- Sidewalk: Pedestrian movement adjacent to the street
- Walkway: Pedestrian movement away from the street
- Crosswalk: Marked pedestrian access across a street
- Bikeway: Marked area between the sidewalk and street. From a lighting perspective a bikeway shall be considered part of the street and street lighting levels shall therefore apply to the street and bikeway.

5.4 Light Measurements

5.4.1 Illuminance

When lighting is incident upon a surface, it creates “illuminance” on that surface. Illuminance is a measure of the light landing on a defined area therefore, the more lumens on a given surface area, the greater the level of illuminance. The illuminance method of design is used for lighting sidewalks, crosswalks, intersection and roundabouts and curved streets. Illuminance can be calculated using two methods vertical or horizontal.

5.4.2 Luminance

Luminance is the concentrations of light (intensity) reflected towards the eyes per unit area of surface. As road surfaces do not reflect light uniformly, reflectance varies depending on the angle of the incident light in both the vertical and horizontal plane, and, on the angle that the driver views the pavement. For a Luminance calculation the driver’s viewing angle is fixed at one degree below the horizontal and an observer distance of approximately 83m. The luminance design method is suitable for straight sections of a street and tunnels.

5.4.3 Veiling Luminance

Veiling luminance (also referred to as disability glare) may be numerically evaluated. Because of contrast reduction by disability glare, visibility is decreased. Increasing the luminance level will counteract this effect by reducing the eye’s contrast sensitivity. As glare limits our visibility, veiling luminance is an important consideration.

The effect of veiling luminance on visibility reduction is dependent upon the average lighting level, or average luminance level, of the pavement.

5.5 Variable Lighting Criteria

5.5.1 Light Sources and Luminaries

Light sources shall be LED and selected from the City of Kelowna Approved Products List, which is subject to change from time to time. The list is based on a review of energy efficiency and cost/benefit of installation and ongoing operation. The City is sensitive to light pollution and selects luminaires that are night sky friendly, meaning that they minimize glare while reducing light trespass and skyglow.

5.5.2 Light Loss Factor (LLF)

A Light Loss Factor of 0.8 is to be applied.

5.6 Street Lighting

Street lighting levels for various street types and night-time pedestrian activity levels are defined in the the Transportation Association of Canada Guide for the Design of Roadway Lighting.

Luminance calculations should be used for straight sections of roadway but are not practical on curved and steep grade roadways. Lighting for curved sections (less than 600m radius) and steep grades (6% or greater) should be calculated using horizontal illuminance values.

Use R2/R3 pavement classification for typical asphalt streets, For a definition of other pavement classification refer to the Transportation Association of Canada Guide for the Design of Roadway Lighting.

5.7 Sidewalk Lighting

Sidewalk lighting levels for various pedestrian activity levels are defined in the Transportation Association of Canada Guide for Design of Roadway Lighting. Refer to TAC guide for grid set-up and spacing.

5.8 Intersection Lighting

Intersection lighting levels for various street types and pedestrian activity level are defined in the intersection Horizontal Illuminance Table found in the Transportation Association of Canada Guide for Design of Roadway Lighting.

5.9 Crosswalk Lighting

Visibility of crosswalk users can be best achieved by placing poles in advance of the cross walk to create high levels of vertical illumination thus improving driver visibility of pedestrians. This is covered in more detail in the Transportation Association of Canada Guide of the Design of Roadway lighting.

This is primarily aimed at mid-block crosswalks and crosswalks at free turn lanes where island are present. It is doubtful crosswalk levels will be achieved for the main road crossings at signalized intersections; however, by placing the first lighting pole on the approach roads (away from the intersection) within one pole mounting height from the crosswalk, partial vertical illumination levels can be achieved at the crosswalk. Refer to the Transportation Association of Canada Guide of the Design of Roadway lighting.

5.10 Walkways

Walkways between roadways where the roadway is lit at either end and there is a straight line of sight will not have additional lighting added.

5.11 Roundabout Lighting

Roundabouts have more complex visibility consideration than typical intersections. Key design consideration in lighting roundabouts include the following;

- The effectiveness of motor headlights is limited in a roundabout due to the constrained curve radius, making the street lighting system a necessity to aid in the night time visibility of obstructions, hazards and pedestrians in crosswalks.
- Where there is no lighting on the approach streets, lighting should be added on the approaches for a distance of approximately 80m in advance of the roundabout crosswalk.

Lighting for a roundabout street surface shall meet or exceed the levels for an intersection. Crosswalks shall meet vertical lighting levels listed for crosswalks. For further information on Roundabout Lighting refer to the Transportation Association of Canada Guide for the Design of Roadway Lighting or IESNA RP8-18.

5.12 Tunnel Lighting

Lighting for streets and sidewalks in tunnels less than 25m in length shall meet the lighting levels required for the approached street and sidewalk. Lighting may be required in daytime depending on the amount of daylight penetration. Lighting for tunnels over 25m in length are covered in the IESNA RP-8-18..

5.13 Poles

Pole types and heights are to be as specified in the Approved Products List

Where poles are mounted on top of service bases they shall be supplied 0.9m shorter. For rural roads, if approved by the City and the power company, light may be installed on the power poles.

Poles shall be located at the outer edges behind curb and gutter or edge of pavement, or in special circumstances, in the median of the street. The exact offset of the pole (behind curb, edge of pavement or sidewalk) is typically defined via standard local authority road cross-section drawings which show all utilities and equipment locations for various road types. Where standard cross sections are not available then poles and foundations shall be located to:

- Provide at least 0.3m clearance from the back of curb of roadway

- Maintained wheelchair access on sidewalk
- Not to be in conflict with other utilities or overhead power lines as defined in CSA standards and by the local utility.
- Poles shall be located within 0.6 meters of the property corners and shall not conflict with driveways, underground services and fire hydrants

In areas where speed is over 60km/hr with no curb and gutter clear zones shall be considered in accordance with the Transportation Association of Canada Geometric Design Guide for Canadian Roads. Pole Spacing patterns include staggered, opposite and one side arrangements, depending on the roadway classification, road geometrics and lighting level design criteria.

5.14 Pole Foundations

The MMCD Standard Specifications and Drawings define typical bases to support standard lighting poles. The designer is responsible for determining the suitability of these standard foundations for the given soil conditions. Where soil conditions are in question a geotechnical engineer should be consulted to define the suitability of the base. Where foundations are not suitable, custom foundations will be required.

5.15 Luminaires

Refer to City of Kelowna Approved Products List.

5.16 Power Supply and Distribution

The designer shall confirm voltage and locations of suitable power sources for the proposed lighting system. Roadway lighting systems shall be serviced from a 120/240-volt single phase 3 wire system. Power is generally supplied by the utility through an unmetered service when servicing only street lights, however, in some instances the utility power provider may require a metered service. Metering requirements must be confirmed with local utility provider. Where tree lights and pole receptacles are included, the utility company may require a metered service. Power will be controlled from an approved service disconnect point allowing electrical isolation for de-energized work. If an installation calls for multiple streetlights the system should be designed to minimize the number of service disconnects required.

The lighting system shall be fed via a service base which shall contain panel boards, breakers, lighting contactor(s) and photocell bypass switch as per MMCD Standard Specifications and Drawings. The lighting shall be controlled by a single photocell located on a luminaire nearest the service panel.

Power distribution requirements include;

- Wiring to be installed in minimum 50mm Rigid PVC conduit
- Wiring to be stranded copper with RW90 insulation.
- Wiring to be Colour coded per Canadian Electrical Code.
- Conduit burial depth as specified in the Canadian Electrical Code.
- Conduit alignments shall be designed to avoid tree roots.

5.17 Design

5.17.1 Lighting

Lighting design requires a computer lighting design software such as AGI32 or Visual Roadway Tool and lighting supplier photometric files in IESNA format. Typically, luminaire photometric files are based on a reference lamp which can vary from the actual lamp used in the test, provided it is similar. This is referred to as "relative" photometry. LED photometric files must be "absolute" which means the photometric file must be for the exact luminaire being tested.

5.17.2 Decorative Lighting

Where decorative street lighting is required to enhance the streetscape it will be limited to the palette specified in the Approved Products List.

When installed in front of a property luminaires will be supplied with house side shields as standard.

5.17.3 Electrical

Design requirements include:

- Meet all requirements of the Canadian Electrical Code (CEC), latest edition, and bulletins issued by Electrical Safety Branch of the Province of British Columbia.
- Maximum voltage drop from branch circuits: 3%
- Provisions for future expansion.
- Conductor sizes: maximum #6 RW90, minimum #10 RW90 for branch circuits
- For branch circuits the load not to exceed 80% of the breaker rating (as per CEC).
- Accommodation of loads for pole receptacles, if applicable
- Junction boxes to conform to City of Kelowna standard drawings.
- All empty conduits shall have a 6mm nylon pull string installed and the ends capped.
- Traffic signal interconnection / communication conduit design shall be common trenched with the street lighting conduit system

5.17.4 Drawing Requirements

Lighting design drawings shall show all civil drawing information such as curbs, sidewalks, property lines, all physical features that may impact the lighting design, as well as the lighting poles, service/control equipment and wiring. Lighting drawings shall fully describe the proposed installation and all related existing lighting and electrical information. The detailed information required on the drawings shall include, but not be limited to the following:

- Site plan drawings at a scale of 1:500 showing poles locations, conduit and service equipment. For beautification type projects, which have more electrical features such as pedestrian scale lighting and pole/tree receptacles, site plan drawing at a scale of 1:250 may be required. Poles and service equipment shall all be located by station and offset. Conduit shall be located by offset from edge of pavement or face of curb and gutter:
- Legend and notes:

- Completed Lighting Design Criteria Figure 6.6 for each road, walkway, intersection or roundabout:
- List specific product such as luminaires, pole anchor bolts and related hardware, junction boxes and service panels by manufacturer, make and model number.
- Drawings shall include sufficient street name and land or block location information to identify particular sections of road referenced in the lighting design summaries.

All lighting drawings shall be signed and sealed by a professional Engineer registered with the EGBC. Design drawings shall be submitted for approval along with signed and sealed computer lighting calculations.

The electrical systems must be installed in accordance with the requirements of the appropriate utility company.

Where overhead distribution is permitted, pole and anchor locations must be approved by both the City Engineer and the appropriate utility company. Care must be taken to avoid aerial trespass.

Plans and agreements for rights of way for anchors, pad-mounted transformers, etc., must be provided and registered by the Developer.

The City's requirements for allowing overhead or underground wires is as follows:

- a) In all Town Center and Village Center areas as identified by the Official Community Plan all wires shall be buried and installed in conduits.
- b) All streets and highways that are created as a result of new development shall have all wires buried underground.
- c) Outside of these areas where existing overhead wires parallel the existing road the developer shall have the option to bury or to leave overhead the wires.
- d) On roadways identified in the City's 20 Year Servicing Plan for upgrade and urbanization, all service wires crossing the roadway must be buried.

6 Traffic Signals

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6.1 General

The purpose of these design standards is to establish the traffic signal design standards used for all projects undertaken within the City of Kelowna.

These guidelines are not intended to be a substitute for sound engineering knowledge and experience. Traffic signal designs are highly specialized therefore all designs are to be prepared under the direction of a design professional who has a minimum of five years of traffic signals experience.

Lighting requirements for intersections are defined in the City of Kelowna Roadway Lighting Bylaw.

6.2 Standardization

Traffic signal details are standardized throughout British Columbia to avoid potential confusion of the travelling public, both local and visiting and are defined in the BC Motor Vehicle Act.

6.3 Codes, Rules, Standards and Permits

Traffic signal systems are to be designed in general conformance with the following:

6.3.1 Codes, Rules and Regulations

- Canadian Electrical Code, latest editions, and bulletins issued by Electrical Safety Branch of the Province of British Columbia.
- AASHTO Standard Specification for Structural Supports for Highway Signs, Luminaires and Traffic Signals or CAN/CSA-S6-00 Canadian Highway Bridge Design Code,
- WorkSafeBC,
- Local power utility regulations,
- Regulations and policies issued by municipal, provincial and federal authorities.

6.3.2 Standards

- Canadian Standards Association (CSA),
- Local power utility standards,
- MMCD Standard Specifications and Drawings, plus City Supplementary Specifications and Drawings.
- BC Ministry of Transportation Electrical and Traffic Engineering Manual
- Institute of Transportation Engineers (ITE)
- National Electrical Manufacturers Association (NEMA) - Traffic Controller Assemblies
- Canadian Manual of Uniform Traffic Control Devices (MUTCD)
- British Columbia Pedestrian Crossing Control Manual.
- City of Kelowna approved products list.

6.3.3 Permits

- Electrical permits as required by provincial or municipal inspection authorities
- Right-of-way and utility crossing permits for crossings of electrical transmission lines, railways, highways and regional, provincial and federally regulated pipelines.

6.4 Signal Heads

Signals should be mounted on vertical posts or horizontal mast arms

General locations of signal heads are as follows:

- Primary: Mounted over the roadway which a vehicle is travelling upon. (refer to MUTCD for mounting)
- Secondary: Mounted to the left of the roadway which a vehicle is travelling upon (Refer to MUTCD and City Supplemental Specification drawings for mounting)
- Auxiliary: Mounted at any other location to enhance visibility. (Refer to MUTCD and City Supplemental Specification drawings for mounting)
- Pedestrian: Mounted on the far side of the intersection in line with the painted crosswalk. (refer to MUTCD and City Supplemental Specification drawings for mounting)
- Bicycle: Mounted in a location clearly visible to an approaching cyclist. Used in special circumstances and in consultation with the City.

Each signalized vehicle movement (phase) at an intersection requires a minimum of one primary and one secondary signal head. Additional signal heads may be required if visibility is a concern.

Signal visibility distance is defined as the distance in advance of the stop line from which a signal must be continuously visible for approach speeds varying between 40 and 80 km/h. Refer to Canadian Manual of Uniform Traffic Control Devices (MUTCDC).

Visibility of a signal head is influenced by three factors:

- Vertical, horizontal and longitudinal position of the signal head.
- Height of driver's eye
- Windshield area

Lateral vision is considered to be excellent within 5° degrees of either side of the centerline of the eye position (10° cone) and adequate within 20° (40° cone). Horizontal signal position should therefore be as follows:

- Primary heads within the 10° cone
- Secondary heads within the 40° cone.

Vertical vision is limited by the top of the windshield. Signal heads should be placed within a 15° vertical sight line. Overhead signals should be located a minimum of 15 m beyond the stop line. Refer to Canadian Manual of Uniform Traffic Control Devices (MUTCDC) for additional details.

Traffic Signals

Drivers of vehicles following high vehicles must be able to see at least one signal head upon reaching the dilemma point. The dilemma point is defined as the location where a driver's visibility of the signal indication goes from green to yellow and driver must decide either to bring the vehicle to a safe stop or proceed through and clear the intersection prior to the start of the conflicting green.

Major factors to consider in assessing signal head visibility are road geometry, design speed, spacing between vehicles, and the horizontal and vertical signal head locations.

Signal heads need to stand out from the surroundings in order to prevent confusion due to distractions. Primary signal heads should have backboards. Backboards are optional for secondary and auxiliary heads. Backboards should be yellow with a reflective surface. A 75mm fluorescent yellow retro-reflective tape border (ASTM Type 9 sheeting) on the outside edge of the entire backboard shall be installed

Signal head materials will be yellow polycarbonate for primary heads and green polycarbonate for secondary and pedestrian signal heads.

Signal head sizes are to be as indicated in Figure 6.4.1 below.

Figure 6.4.1 Signal Head Sizes

SIGNAL HEAD TYPE	AREA CLASSIFICATION LENS SIZE AND SHAPE
Primary	300 mm round
Secondary and	300 mm round
Auxiliary	300 mm round
Bike	300 mm round (bike symbol)
Pedestrian	Combination walk/don't walk indication 300mm square (12" x 12") or Combination walk/don't walk indication with countdown timer 450mm x 406mm (18" x 16")

Combination walk/don't walk heads to be installed where there is a high volume of young children or the elderly crossing and on all roadways with two lanes or more in each direction.

All signal displays shall be LED and ITE approved. Tunnel visors are required on all signal heads.

Figure 6.4.2 Signal Head Placement

STRAIGHT THROUGH LANES		
No. of Lanes	No. of Primary Heads	Placement of Primary Heads
One	One	Centered over through lane
Two	Two	Centered over each through lane
Three	Three	Centered over each through lane
LEFT TURN LANES		
Protected/Permissive	4 Sections with Flashing Green Arrow and Steady Yellow Arrow	Centered over left-most through lane
Protected – Single Left Turn Lane	3 Section with Steady Green Arrow	Centered on the left turn lane, either post mounted in median or mast-arm mounted
Protected – Dual Left Turn Lanes	3 Sections with Steady Green Arrow	Centered on the left turn lane, either post mounted in median or mast-arm mounted

6.5 Pole Placement and Wiring

6.5.1 Pole placement

Signal poles should be placed between 1m and 3m from the face of curb or edge of pavement, preferably behind the sidewalk. Pole arms should be oriented at 90° to the centerline of the road, except where the intersection is skewed. When laying out a skewed intersection, ensure the arms do not block the view of the signal heads for other approaches.

Other key considerations for pole placement are:

- Ease of access to pushbutton for pedestrians, handicapped and the visually impaired in accordance with the TAC - Guidelines for Understanding, Use and Implementation of Accessible Pedestrian Signals.
- Maintaining 1.2m wheelchair access around poles and from pushbuttons to wheelchair ramps.
- Minimizing the number of poles required.
- Locating poles outside vehicle turning radii to avoid damage.
- Underground and overhead utility conflicts.

- For optimum visibility of vehicle, bicycle and pedestrian heads

6.5.2 Conduit

- Conduit should be installed parallel or perpendicular to the roadway and routed to run in a direct line between poles and junction boxes. Skewed road crossings are to be avoided.
- Conduits shall be installed by qualified personnel and certified with the BC Technical Safety Authority as an underground raceway installer (UR)
- Ninety-degree bends are to be kept to a minimum and not exceed the maximum as per the Canadian Electrical Code. If this is not possible an additional junction box shall be installed.
- All conduit will be RPVC.
- For each road crossing two 75mm and two 50mm diameter conduits shall be run.
- Communications conduit shall be 75mm in diameter.
- Shall be installed to conform to the Canadian Electrical Code.
- All empty conduits will have a pull string installed and be capped.

6.5.3 Junction Boxes

Will be installed:

- At each pole and controller for splicing and have bonding installed, as per Supplementary Specification Drawings.
- Concrete junction boxes will have a galvanized lid marked with "KELTS" for traffic signals and "COMM" for communication conduits, as per Supplementary Specification Drawings.

6.5.4 Conductors

For signal control:

- Stranded, multi conductor, IMSA cable will be used to connect the controller cabinet to each of the junction boxes on the corner nearest to the traffic signal pole. The wire will run continuous with no splices between the controller and the destination junction box.
- Single conductor stranded #14 RW90 will be installed from the junction boxes to poles. The wire will run continuous with no splices between the junction box and the signal head.
- Signal wiring to be spliced in junction boxes only.
- Streetlight wiring will have an in-line fuse installed in pole hand-hole and be of the type

noted in the approved products list.

- All conductors to be bundled and marked as per the City color coding

6.6 Left Turn Phasing

Left turn phasing options are numbered as follow in the NEMA convention: Phase 1 for SBLT, 3 for WBLT, 5 for NBLT and 7 for EBLT. This is in conjunction with straight through phasing as follows: Phase 2 for northbound, 4 for eastbound, 6 for southbound and 8 for westbound.

Left turn phasing options are as follows:

- **Permissive** - Green ball display. A Permissive left turn has no signal indication other than a green ball, which permits a vehicle to turn left when there is a gap in the opposing traffic.
- **Protected** - Green arrow display. A Protected left turn presents a continuous green arrow indication while all opposing traffic is held by a red ball. A Protected Left Turn is always terminated with a yellow ball.

Protected left turns are typically used in the following circumstances: Dual left turn lane.

- Limited sight distance to oncoming vehicle.
- High pedestrian volumes.
- High speeds.
- High collisions.
- Left turn phase is in a lead-lag operation.
- Split phasing.
- When crossing more than 2 lanes of traffic.
- **Protected/Permissive** - Yellow/Flashing Green arrow display. A Protected/Permissive left turn presents a flashing green arrow and yellow arrow followed by a green ball. During the flashing phase (advanced movement), opposing through traffic is held by a red ball. After the left turn phase has timed out, left turn traffic is presented with a green ball permitting the movement when safe. The protected green arrow is always terminated with a non-flashing yellow arrow indication.

Protected/Permissive left turns are appropriate in cases where:

- Single left turn lane.

- Good sight distance to oncoming vehicles.
- Volumes warrant it.
- Low collisions probability.

Care should be taken when considering a left turn phase, as it can impact the intersection level of service by increasing the total cycle length.

6.7 Advanced Warning Flashers

Advanced warning flashers (AWF) should be used where sight distance and grade to an intersection is less than optimal, or where design speed of the road is sufficiently high to justify warning motorists of signal status. Follow Ministry of Transportation and Infrastructure Electrical and Traffic Engineering Design Guidelines for the design and placement of Advance Warning Flasher Signs.

Where AWF are required a back up power supply (UPS) will be installed.

6.8 Signal Pre-emption

Consult with the City to determine if pre-emption equipment is required at the intersection. The City shall supply and install all equipment, other than the cable, which the City will supply to the contractor for installation.

6.9 Audible Pedestrian Signals

Where required by the City, use audible pedestrian signals to assist visually impaired pedestrians.

The City will supply all equipment. The contractor will install the wiring and pushbutton units and the City will install the cabinet equipment.

6.10 Control Types

Traffic signals will be designed to be fully actuated, meaning they require traffic detectors for all phases. Fully actuated controls allow for the maximum flexibility of signal control.

6.11 Detection Methods

Traffic detection for signal actuation is typically accomplished through one of the following methods:

- Vehicle detector loops (induction). - If detector loops being installed, they must be of the preformed type, as per approved products list, and laid in the crush under the asphalt layers.
- Image sensor (video detector system). City will supply and install equipment. City will supply the wire to the contractor for installation.

Other methods are available and will be at the discretion of the City as to the choice of system used.

6.12 Signal Timing Plans

The City will create and or approve signal timing plans.

6.13 Signal Coordination

The City will create and or approve signal coordination plans.

6.14 Pedestrian Controlled Signals

There are two styles of pedestrian controlled signals, a traffic signal with a green-yellow-red indication, and a special crosswalk signal. The requirement for a pedestrian signal and the type of signal to be installed will be established by the City and should be supported by warrants as indicated in the BC Pedestrian Crossing Control Manual.

- a) **Pedestrian signals** serve pedestrian traffic only and are generally placed in areas of high pedestrian traffic or in school zones.

A full pedestrian signal has heads placed on the main road only. Cross street traffic is controlled by signage. When not activated, the signal presents a flashing green ball indication to drivers. When the signal is activated by a pedestrian, the flashing green ball indication becomes a steady green ball, followed by a yellow and then red ball. Pedestrian heads provide the Walk/Don't Walk indications to the pedestrian.

Pedestrian signals as above will have vehicle detection installed on the main street. This will allow the signal to extend the green time during periods of heavy traffic, to ensure more efficient flow.

- b) **Special Crosswalk Signals** consist of signage and pedestrian controlled lighting designed to draw driver attention to the crosswalk.

See TAC guidelines for pedestrian crosswalks and City supplemental drawings to match the crosswalk with the road type.

See approved products list for the type of controller to be installed.

Where a suitable power source is not available or is costly to deliver to the site, solar powered crosswalks can be considered.

6.15 Poles and Foundations

The MMCD Standard Specifications and Drawings define typical signal poles. Traffic signal poles shall be designed to accommodate the weight of the arms and the items mounted on the poles, as well as wind and ice loading, arm length, anchor bolt size and concrete base size.

The MMCD Standard Specifications and Drawings define typical bases to be used with standard signal poles. The designer is responsible for determining the suitability of these standard foundations for the given soil conditions. Where soils are in question a geotechnical engineer should be consulted to define the suitability of the foundations for the given soil conditions. Where foundations are not suitable, custom foundations will be required.

Refer to the City supplemental drawings for any additional information.

When selecting pole location identify and avoid possible utility conflicts. If installing close to a tree, the base should be outside of the drip line

The identification numbering of bases/poles for traffic signals on plans will start at one and increase in a clockwise direction starting at the base/pole nearest to traffic controller location

6.16 Controller Cabinets

The City shall supply and install controller cabinets.

Cabinets should be located entirely within the road right-of-way, including the concrete pad and door swing. Location should be safe and reasonably protected from motor vehicle damage, with access door on the side away from the sidewalk where possible and the signals visible from the access.

The cabinet will have a concrete pad allowing a safe platform while accessing and working in and around. See City supplemental drawings.

Adequate working space from other equipment and structures will be provided as per the Canadian Electrical Code.

6.17 Traffic Controller Equipment

The City shall supply and install all controller equipment.

6.18 Power Supply and Distribution

A metered power supply is required from the electrical utility. The designer shall confirm voltage and locations of suitable power sources for the proposed signal system. Signals systems are serviced from a 120/240 volt single phase 3 wire system.

Refer to City supplemental drawings for installation of meter and service panel.

Grounding shall be as per MMCD Standard Specifications and Drawings.

Contractor to consult with local power authority of any special installation requirements and service location.

6.19 Uninterruptable Power Supplies (UPS's)

The City shall supply and install UPS equipment

6.20 Signs

Overhead street name signs shall be installed on signal pole arms. Signs to be banded with manufactured wind dampening sign brackets. Signs shall be blue background with 215mm high white clear-vue font (alternate colours may be required by the local jurisdiction). Sign sheeting shall be ASTM Type 9. Other signs mounted on signal poles may include turn restriction signs, lane use signs, one-way signs, etc. as required by the BC Motor Vehicle Act and defined in the MUTCDC.

6.21 Drawing Requirements

Signal design drawings shall show all civil drawing information such as curbs, sidewalks, property lines, utilities, pavement markings, all physical features that may impact the signal design, as well as the signal and lighting poles, detector loops, service/control equipment and wiring. Signal drawings shall fully describe the proposed installation and all electrical and lighting information. The detailed information required on the drawings shall include, but not be limited to the following:

Plan/profiles or underground drawings.

- Scale is 1:200.
- The plan will have the north arrow oriented at 0 degrees.

- Existing and proposed civil information including roadway, sidewalks, letdowns, underground utilities, signing and road markings
- The designed signal including pole locations, controller, conduits, power and communications junction boxes, wiring/cabling, point of electric service.
- Poles and service equipment shall be located by station and offset. Conduit shall be located by offset from edge of pavement or curb and gutter;
- General notes
- Existing signal equipment to be retained and/or removed
- City colour code chart.)
- Pole coordinate table
- Signal display schematic
- Signal phasing diagram
- Intersection illuminance table
- Loop detector coordinate table (if applicable)
- Image sensor table (if applicable)
- References to Supplementary Standard Drawings

Plan view or Elevation

- Scale 1:75
- Elevation and description for each signal pole including corresponding concrete base type, signal displays, luminaire, push buttons, signs and image sensor (if applicable)
- Pre-approved product list for applicable equipment to be supplied
- Reference to Supplementary Standard Drawings

All signal drawings shall be signed and sealed by a Professional Engineer.

Design drawings shall be submitted for approval by the City.

7 Landscape and Irrigation

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7A.2 [Water Conservation Requirements and Report](#)

7B [Landscape](#)

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7A Landscape and Irrigation Water Conservation

7A.1 General

7A.1.1 Application

For purposes of this bylaw, an automatic irrigation system means any outdoor watering device that includes a timeclock, connected valves opened by the timeclock, and underground distribution pipe to water outlets used for watering plant materials.

These landscape standards and specifications shall apply:

- (a) To all landscape areas within highway limits in the City of Kelowna including: medians, soft landscape areas between the curbs and the highway limits, and plantings in urban plaza and sidewalk areas.
- (b) To new construction and rehabilitated landscapes for City projects including all utilities and facilities for water, sanitary sewer, drainage, electrical and communication Works and Services infrastructure.

The following exemptions to the requirements of Section 6 apply:

- (a) Projects where the sum of all new or renovated landscape areas does not exceed 100 square metres in area are exempt from the requirement for landscape and irrigation plan and detail submittals set out in these requirements.

-
- (b) Projects without an automatic irrigation system are exempt from the irrigation system design guidelines, but the landscape, grading and soil management requirements and related drawing submittals other than irrigation drawings still apply;

Landscape and irrigation shall be designed, installed and operated to meet the requirements of the City of Kelowna Water Regulation Bylaw No. 10480, including the requirement to not exceed the Landscape Water Budget for landscape areas of the project and to calculate the Estimated Landscape Water Use.

The standards specified herein reflect the City's minimum expectations and are intended for most applications. These standards may be enhanced or revised by the City or the Owner at the discretion of the City Engineer where the Works and Services are intended for large, complex, unusual and innovative applications and provided they meet the intent and objectives of the requirements herein.

7A.1.2 Qualifications

The Owner, at their expense, shall retain as a Qualified Professional a Landscape Architect registered with the British Columbia Society of Landscape Architects (BCSLA) to design, inspect and certify all landscape Works and Services covered by this section.

The Owner, at their expense, shall retain as a Qualified Professional a Certified Irrigation Designer registered with the Irrigation Industry Association of British Columbia (IIABC) to design, inspect and certify all irrigation Works and Services covered by this section.

With proper qualifications from both BCSLA and IIABC, one individual may serve as both the Landscape Architect and Certified Irrigation Designer.

For the Works and Services covered by this section the Landscape Architect(s) and/or Certified Irrigation Designer(s) shall have the powers and responsibilities prescribed elsewhere in this bylaw to the Contract Administrator.

7A.2 Water Conservation Requirements and Report

All subject applications shall include a Landscape Water Conservation Report – either as a set of drawings or a bound report - that defines how the development will meet the design requirements for water conservation. The report shall meet the requirements of the City prior to "Issued for Construction" Documents or Building Permits under this bylaw. The Landscape Water Conservation Report shall:

- (a) Include the calculations for the proposed landscape area of Landscape Water Budget and Estimated Landscape Water Use in the format as required by the City of Kelowna (equivalent to Schedule C in the City of Kelowna Water Use Bylaw No. 10480).
- (b) Indicate by drawings, notes, specifications and if necessary other written materials how the application complies with or varies from the Design Criteria 6A.2.1 and 6A.2.2 below.
- (c) The City may, at its discretion, accept the information in two stages: Stage One requires the report and a conceptual landscape drawing with corresponding hydrozone and Landscape Water Conservation Report – and may be submitted at the Preliminary Layout Review or Application

for Subdivision Approval stage for Subdivision Projects, or Building Permit application stage for Works and Services in Development Projects. Stage Two requires detailed landscape and irrigation drawings and specifications, and update to the report and calculations, to be generally consistent with and substituting for the earlier design concept submission – Stage Two must be submitted and approved prior to City Engineer’s ‘Issued for Construction’ documents in both Subdivision and Building Permit processes.

7A.2.1 Landscape Design

The Applicant shall appoint a Qualified Professional to create and submit a Landscape Plan and supervise installation to produce a landscape installation that:

- (a) Groups planting areas into ‘hydrozones’ of high, medium and low or unirrigated/unwatered areas. Submit a plan diagram and table showing the extent and area of hydrozones in the project.
- (b) Shows appropriate use of plant material with similar water demand within hydrozones.
- (c) Maximizes the percentage of landscape area that is unirrigated/unwatered area, commensurate with landscape aesthetics and plant survival e.g. using pervious paving, unplanted stone or organic mulch, pervious deck (strive for a minimum of 25% of the total landscape area).
- (d) Maximizes retention or replanting of vegetation with low water-use requirements after the establishment period e.g. existing native vegetation to remain, wildflower meadow, rough grass, xeriscap plant species (strive for a minimum of 25% of the total landscape area).
- (e) Designs to minimize mown turf areas that are high water use areas (strive for 25% of total landscape area, and consider a maximum of 50% of the total landscape area) – substitute with areas of lower water use treatments.
- (f) Provides mulch cover to shrub and groundcover areas, to reduce evaporation from soil.
- (g) Uses recirculated water systems for any water features such as pools and fountains.
- (h) Ensures landscape installation standards including growing medium depth and quality to meet the requirements of this bylaw. A submitted soils report or notes on the plans shall indicate proposed growing medium depth, amendments, and shall refer to appropriate sections of the reference or supplementary specifications, or the qualified professional shall supply a custom specification of similar detail.
- (i) Includes the following written declarations signed by a licensed Landscape Architect qualified by the British Columbia Society of Landscape Architects (BCSLA):
 - At the time of application: “This landscape plan is subject to and complies with the Landscape Water Conservation Design requirements of the City of Kelowna for the efficient use of water”.

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- At the time of substantial performance of the construction: "This landscape installation complies substantially with the submitted water conservation and landscape plans, specifications and reports."

7A.2.2 Irrigation Design

If irrigation is to be installed, the Applicant shall appoint a Qualified Professional to create and submit an Irrigation Plan and supervise installation to produce an irrigation system that:

- Groups irrigation circuits/ zones into 'hydrozones' of high, medium and low or unirrigated areas consistent with the landscape planting plan.
- Uses reclaimed or recycled water or rainwater capture from roofs or rain barrels for outdoor water use when such is available, as a substitute for use of potable water.
- Minimizes use of high-volume spray heads, and employs drip or low volume irrigation where practical to meet the watering needs of hydrozones.
- Uses surface or subsurface drip irrigation or low volume irrigation technology to water long, narrow or irregularly shaped areas including turf areas less than 2.4m in width.
- Keeps drip, spray and rotor heads (different precipitation rates) on different irrigation circuits.
- Designs with irrigation head-to-head coverage in accordance with manufacturer's specifications.
- Ensures matched precipitation rates on each irrigation circuit.
- Minimizes the elevation change in each irrigation circuit – and where required provides pressure compensating devices to minimize pressure variations or check valves to stop low head drainage.
- Ensures irrigation mainlines are proved leak-free with hydrostatic tests, as a part of the construction quality assurance review. Re-test irrigation mainlines after major repair or nearby excavation work.
- Provides pressure regulating devices to ensure irrigation outlets are operating at the manufacturer's optimum pressure range.
- Designs head placement and type, and adjusts head radius, arc and alignment to avoid overspray of paved surfaces or buildings.
- If irrigating slopes greater than 25%, designs an irrigation system with a precipitation rate not greater than 20mm/hour.
- Provides automatic shut off devices that shut off the system in cases of pipe leak or breakage, and that shut off the system when rain is present.
- Installs - and programs to minimize water use – one or more 'Smart Controllers' with water-conserving functions. Acceptable Smart Controllers are identified in the City of Kelowna Water Regulation Bylaw 10480. Includes a written Irrigation Schedule or equivalent instructions for operation of the Smart Controller, with a copy stored with the controller cabinet, that adjusts the amount of applied water scheduled to be applied on a daily basis – schedule different run-times as weather changes, by using the weather-sensitive features of a Smart Controller. In cases where manual irrigation

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- (o) program adjustment is temporarily required, adjust water programming at least once per month to recognize that highest water need is in July and lower water needs exist in other months of the growing season.
- (p) Ensures irrigation design and installation standards including adjustments and scheduling meet the requirements of the Supplementary Specifications in , Schedule 5 Construction Standards, or a custom or alternate irrigation specification at a similar level of detail provided by the Qualified Professional.
- (q) Includes the following written declarations signed by a Certified Irrigation Designer qualified by the Irrigation Industry Association of BC (IIABC):
- At the time of application: "This irrigation plan is subject to and complies with the Irrigation Water Conservation Design requirements of the City of Kelowna for the efficient use of water."
 - At the time of substantial performance of the construction: "This irrigation installation complies substantially with the submitted water conservation and irrigation plans, specifications and reports".

7B Landscape**7B.1 General****7B.1.1 General Landscape Requirements**

The general design and construction of the landscape shall be in accordance with the standards set out in this section.

Street Tree plantings shall be required on streets and highways in all subdivisions where new roads (including cul-de-sacs) or road extensions are required.

All soft Boulevard and Median Areas within the highway limits shall be landscaped to the standards of *Section 6B.2 Boulevard* and *Section 6B.3 Medians*.

Rough grass or wildflower mixture may be used on all or part of boulevards visually backed by areas of woodland or rural appearance - subject to the approval of the City Engineer.

The Landscape Maintenance Period for landscape establishment shall be one year from the date of Substantial Performance of the landscape components of the work. All landscape areas shall be provided establishment maintenance which shall include irrigation maintenance and watering, mowing, weeding, pruning and supplemental fertilization until the end of the Landscape Maintenance Period. The Landscape Maintenance Period shall continue until a Certificate of Acceptance of all Landscape Works and Services is issued by the City upon the expiration of the Landscape Maintenance Period.

Plants or other materials that fail in the Landscape Maintenance Period shall be replaced at no cost to the City. Replacement trees shall be guaranteed for a further year after planting, with maintenance and replacements repeated until trees are provided that are acceptable to the City at the end of the Landscape Maintenance Period.

The use of Naturescape or similar wildlife habitat principles in landscape development is encouraged. Refer to Naturescape Kit Southern Interior, available from Naturescape British Columbia.

Site and planting design shall co-ordinate with watering 'hydrozones' and irrigation plans in accordance with *Sub-Section 6C – Irrigation*.

All landscape and irrigation products, installation and operations shall be completed in accordance with the requirements of Schedule 5 of this Bylaw.

7B.1.2 Landscape Plan Requirements for Works and Services

For landscape Works and Services that will be owned by the City of Kelowna, the Owner's Qualified Professional is required to submit the following plans, gain City 'Issued for Construction' documents, and certify construction quality assurance. Landscape plan and design submittals required are:

- (a) Landscape Plan
- (b) Landscape Grading Plan
- (c) Landscape Water Conservation Report as required by the Water Regulation Bylaw.

The following information shall be shown on the Landscape Plan:

- (a) property lines and easements.
- (b) buildings, edge of pavement, curb lines and curbs, sidewalks, lighting fixture locations, surface utilities and related service boxes or other elements that would affect the landscape and street tree location.
- (c) Location of all existing vegetation to remain.
- (d) Location of retaining walls and existing or proposed slopes that exceed 3:1 vertical.
- (e) Location of all proposed trees, shrubs, ground cover and lawn areas.
- (f) Indication of which areas will be seeded grass vs sodded lawn.
- (g) Plant list showing botanical name, common name, size at planting, quantity, typical spacing, and root zone volume of supplied growing medium for trees.
- (h) Location of all proposed trees, shrubs, ground cover and lawn areas.
- (i) Hydrozone information table for the project.
- (j) Planting hydrozones – delineate and label each hydrozone by number, letter or other method and identify each area of similar water requirement e.g. high, medium, low, or no supplemental water after establishment. Hydrozones may be shown on a separate drawing if required for clarity.
- (k) Water features, if applicable.
- (l) Type of mulch and application depth.
- (m) Growing medium depths for each planting type.

The following information shall be shown on the Landscape Grading Plan.

- (a) Spot elevations of top and bottom of retaining walls and at top and bottom of any slopes exceeding 3:1
- (b) Drainage patterns by slope arrow and percent slope. Drain inlets or culvert inlet elevations.
- (c) Finished floor elevations if applicable.
- (d) General shaping of finished grades by a combination of proposed contour, spot elevations and slope arrows for landscape areas that are bermed, dished, or that have noteworthy grading constraints or design intents.
- (e) Stormwater retention or infiltration facilities if applicable.
- (f) Rain harvesting or catchment technologies if applicable.

The general requirements used by the City for review of the Landscape and Grading Plan is specific to the site and use thereof. The landscape design shall:

- (a) respond functionally and aesthetically to existing and proposed land uses, utilities, terrain and flood patterns, drainage facilities, roads, driveways, cycle, transit and pedestrian facilities;
- (b) promote accessibility as it relates to pedestrians, cyclists and people with limited physical or visual abilities
- (c) consider appearance of the proposed plant material and site landscape, including appropriateness, aesthetics, visual screening, sight lines and functionality
- (d) provide access for maintenance equipment and personnel;
- (e) allow for cost effective maintenance methods and practices;

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- (f) provide access to park, recreation or environmental opportunities;
 - (g) incorporate protection of existing trees where feasible;
 - (h) consider protection of the natural environment and restoration or enhancement of natural habitat;
 - (i) coordinate with engineering site drainage, water levels, ponding and overland flow;
 - (j) consider design features that minimize the opportunity for crime and undesirable behavior;
 - (k) provide for weed control;
 - (l) coordinate with sediment and erosion control practices;
 - (m) follow fire hazard reduction principles.

The completed Landscape and Grading Plan(s) shall be considered part of the package that forms the "issued for Construction" documents.

7B.1.3 Landscape Construction

Prior to the start of construction the Owner shall provide the City with a schedule of construction of the landscape and irrigation Works and Services and Related Work. In addition, the Owner shall provide the City with the name and contact information for the Consulting Landscape Architect and Engineer, Certified Irrigation Designer, the general Contractor and the Landscape Contractor of the site, as well as the designated Contract Administrator for each of the Landscape and Irrigation works.

Proposed changes to the landscaping from that shown on the "Issued for Construction" Landscape Drawings or related documents shall be submitted to the City for review and approval at least five (5) working days prior to anticipated construction of the change. Submission of a proposed change in no way implies or suggests approval of the proposed change by the City.

Changes to the landscaping performed without approval from the City will not be accepted at the time of Substantial Performance or Total Performance. Changes to the landscaping performed without approval from the City will be corrected by the Owner at the Owner's expense or the cost of making the corrections will be held back by the City upon release of the Performance Bond.

7B.2 Boulevard Landscape

Unless specified otherwise herein boulevards shall be vegetated with sodded lawn or densely planted groundcover. Rough grass and/or wildflower seeding may be used on boulevards and side slopes that are visually backing onto natural or rural areas, or for temporary boulevard treatments, subject to the approval of the City Engineer.

For the boulevards of arterial and collector roads within Urban and Village Centre DP areas, the treatment shall be as per the streetscape improvement plan for that area.

For boulevards adjacent to commercial property and locations outside Urban/Village Centre DP areas, or where no plan is in place, the boulevard treatment shall generally be turf or hard-surfaced, and shall include street trees and irrigation. Acceptable hard surface materials for the boulevard may include:

- (a) unit pavers
- (b) exposed aggregate concrete;
- (c) stamped and coloured concrete;

- (d) irrigated turf; or
- (e) xeriscape or dryland landscaping

For boulevards where the land use of the adjacent property is industrial, institutional or multi-family the boulevard treatment shall generally be street trees and turf or dryland landscaping, serviced and maintained by the Owner of the parcel with the boulevard frontage.

For boulevards where the land use of the adjacent property is one, two or four-family residential or park, and where the boulevard is accessible for maintenance mowing and watering from the adjacent property, the boulevard treatment shall generally be street trees and turf,

For boulevards where it is unlikely that the adjacent property owner will be able to adequately maintain the boulevard, the boulevard treatment shall generally be hard surfaced and may include street trees. Acceptable boulevard materials in these cases may include:

- (a) unit pavers; or
- (b) exposed aggregate concrete

7B.3 Median Landscape

The landscaping of medians shall be designed and constructed generally as follows:

- (a) for Highway 97 and Highway 33 - with sloped aprons of concrete unit pavers with irrigated street trees and irrigated landscaping;
- (b) in Urban Centre and Village Centre DP Areas - except as described above or per the approved streetscape improvement plan for that area, with sloped aprons of concrete unit pavers and irrigated street trees; or
- (c) elsewhere - with sloped aprons of exposed aggregate concrete, concrete unit pavers or stamped and coloured concrete and irrigated street trees..

The landscaping of roundabouts and cul-de-sac islands shall have a hard surface material or landscaping with low shrubs or groundcovers, and should feature:

- (a) a single specimen tree;
- (b) a group of like trees; or
- (c) public art if the roundabout or cul-de-sac is in an Urban or Village Centre. The selection, design and placement of public art shall be made in cooperation with the Public Art Committee.

Lighting of trees or public art in a median shall be provided as required by the Parks Division or the Public Art Committee.

7B.4 Utilities Coordination with Planning

Underground utilities shall be aligned and buried to provide a continuous 1.0m deep utility-free trench beneath tree planting locations.

Planting and paving design shall be co-coordinated with the design and construction of surface utility boxes, such that boxes fall entirely within either a paved surface or entirely within a planted surface but

not partly in paving and partly in planting and that grades and alignment of boxes match the final design and construction of all elements to create a co-coordinated and orderly appearance, free of trips and hazards.

7B.5 Plant Material

7B.5.1 Urban Trees in Pavement

Select urban trees in pavement in accordance with Section 7B.5.6.

Select and site urban trees in pavement to eliminate long term above-ground and below ground conflicts with utilities, buildings and structures, and pedestrian and vehicular traffic.

7B.5.2 Planting Details and Procedures

Landscape Drawings shall specify the appropriate planting detail standard from the City of Kelowna Standard Details.

All planting shall meet the City of Kelowna Specifications in Schedule 5.

7B.5.3 Planting Provisions in Single Family Subdivisions

Street trees and landscape finish of the public highway fronting occupied homes shall be completed no later than the date that 85% of the homes in a single family development are completed and occupied. Earlier completion dates are encouraged provided that landscape maintenance and repair is provided at no cost to the City until such time as units are occupied.

Planting of street trees in the hot dry summer period of June, July and August is discouraged, due to the risk of failure of the planting caused by heat and drought.

Minimum number of boulevard trees shall be calculated as follows:

- (a) Medium Trees (\pm 10 - 20m ht. at maturity) Greater of 1 per lot or 15m.
- (b) Small Trees (Under 10m ht. at maturity) Greater of 1 per lot or 10m.
- (c) Plantings of trees closer than 6m on centre shall require the written concurrence of the City Engineer.
- (d) Locate trees fronting on single family lots in locations that avoid all utility service alignments and driveways. Generally this will lead to tree placement in the half of the lot frontage away from the driveway side, and not at either the lot centerline or at a lot line.

7B.5.4 Plant Material Selection

7B.5.4.1 Plant Materials:

- (a) Plants shall have the ability to withstand adverse conditions such as airborne pollutants, maximum sun exposure and reflected heat from pavements, high winds and abrasive forces, occasional snow loading and exposure to salt from road clearing operations, and limited root zone soil volumes.

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- (b) Plant hardiness requirements vary by elevation. Plants shall be hardy to Canadian Plant Hardiness Zone 5A to 1A as site conditions dictate.
 - (c) Plants shall be capable of reduced water demand following a one year establishment period.
 - (d) Plants shall have relatively low maintenance attributes including: fine to medium leaf size and canopy density; non-fruit bearing or having only berry-sized non-staining and non-toxic fruits; low susceptibility to disfiguring or fatal diseases and infestations; infrequent demands for pruning, fertilizing and other cultural requirements.
 - (e) Plants shall be of appropriate size and form at maturity to meet criteria in Section 6B.5.6 *Street Tree Selections and Soil volumes*.

7B.5.4.2 Lawns/Fine Grass, Rough Grass and Wildflowers:

- (a) Sod shall be used on all lawn/fine grass areas. Seeding, as an alternate, shall require approval of the City Engineer.
- (b) Rough grass and wildflower areas shall be seeded. Seeding method shall be noted on drawings.
- (c) Areas to be seeded with grades greater than 3:1 and/or highly erodible soils shall be hydroseeded with a nurse crop seed mix, a hydraulically applied erosion control mulch, or erosion control blanket. Erosion control method to be noted on drawings.

7B.5.4.3 Trees

- (a) Boulevard or 'street' trees shall be of a single species/cultivar on either side of the street within a given block. Median tree species may vary.
- (b) Street tree species shall vary between intersecting streets. Street tree selection will be made with consideration of maintaining a diverse and varied street tree distribution across a neighbourhood to minimize disease risks.
- (c) All street trees shall have:
 - i. A compact or upward branching structure.
 - ii. Ability to withstand pruning for pedestrian, vehicle and/or building clearance without compromise to tree health or form.
 - iii. Absence of species/variety characteristics of structural weakness, susceptibility to wind damage, or thin, easily damaged bark.

7B.5.5 Street Tree Size, Spacing and Location

Trees shall be minimum 5 cm caliper measured at 300mm above the rootball at the time of planting, and of uniform size if planted in a boulevard row.

Tree branch clearance requirements are 5m over the traveled portion of road and 2.25m over the sidewalk.

7B.5.6 Street Tree Selections and Soil Volumes

Refer to City of Kelowna website for requirements for tree species selections: <http://www.kelowna.ca/CM/Page292.aspx>

Trees for directly under Hydro lines

- (a) Minimum allowable soil volume per tree is 4 cu.m. with 1m depth pit.
- (b) Mature height not greater than 7.62m.

Trees for beside hydro lines

- (a) Minimum lateral distance from nearest line 2.75m.
- (b) Minimum allowable soil volume per tree is 4 cu.m. with 1m depth pit.
- (c) Mature spread not greater than 5m.

Trees for limited available soil volume

- (a) Minimum allowable soil volume per tree is 4 cu.m. with 1m depth pit.
- (b) Mature height not greater than 10m.

Trees for available soil volumes of 9 cu. m. or greater

- (a) 1m pit depth
- (b) Mature height not greater than 20m.

Trees for a wide boulevard or wide median use only

- (a) Minimum available root zone of 20 cu. m. per tree
- (b) Minimum boulevard or median width of 3.5m

7B.5.7 -Setbacks for Trees

Minimum setbacks for trees to objects in new developments shall be as follows:

Underground street light conduit or irrigation main	0.6m
Other underground utilities	3.0m
Lamp standards	6.0m
Steel and wooden utility poles	3.0m
Driveways	1.5m
Catch basins	1.5m
Manholes, valve boxes, services	3.0m
Sewer service boxes	3.0m
Fire hydrants	2.0m
Road intersection	7.0m

Curb face (see SS-L3 for Root Barriers required)	0.5m
Sidewalk	0.85m
Curb face and sidewalk with root barrier	0.60m
Buildings - fastigate (columnar) tree	2.0m
Buildings - regular crown tree	3.0-5.0m

The City Engineer may consider custom setbacks where trees are being installed in existing streets with established utilities.

7B.6Landscape Maintenance Schedule

The Owner's qualified professional shall submit a maintenance schedule with the Certificate of Substantial Performance. It shall include timing and arrangements for:

- (a) Routine inspection
- (b) Aerating and dethatching turf areas
- (c) Replenishing mulch
- (d) Fertilizing
- (e) Pruning
- (f) Weeding

The project applicant is encouraged to implement sustainable or environmentally-friendly practices for overall landscape maintenance.

7C Irrigation**7C.1 General Irrigation Requirements**

- (a) A complete and working automatic irrigation system shall be provided for all landscaped areas within a high, medium or low hydrozone of a Highway, utility parcel or utility facility. Temporary watering provisions shall also be made for planted areas of a 'non-irrigated' hydrozone – to allow for watering through a maximum 1 year establishment period or in severe drought.
- (b) Boulevard trees, shrubs and ground covers shall be watered from an automatic irrigation system.
- (c) Urban trees in pavement shall be irrigated with an automatic irrigation system that may include bubblers or drip elements.
- (d) Sleeves shall be provided under sidewalks and driveways, and to medians / islands, as required for installation and maintenance of the irrigation system without removing surface paving.
- (e) Provide a flow sensor and master valve, both connected to the controller, that will stop flow to the system or irrigation circuit in cases of an irrigation water leak. Provide an isolation gate valve upstream of all automatic sprinkler valves.
- (f) Design to water plant materials with different watering requirements (e.g. grass vs. shrub areas and high vs medium vs low water use shrub areas) on different valve circuits.
- (g) Where surface sprinklers are used, ensure unobstructed sprinkler coverage to tree bases from at least two sides.
- (h) Every drip system shall be designed with a filter, pressure regulator, flush valve and air relief valve. The drip component manufacturer's instructions for installation and maintenance shall be included in the project specifications.
- (i) The Irrigation System shall perform to within 15% of the targeted application efficiency standards for irrigation systems, as determined by the Irrigation Association and the Irrigation Industry Association of British Columbia, as follows:
 - i. Spray Zones: 75% or higher;
 - ii. Rotor Zones: 80% or higher;
 - iii. Microjet Irrigation Zones: 85% or higher.
 - iv. Drip Irrigation Zones: 90% or higher.
- (j) Sprays and rotors shall be designed with head to head coverage to meet the application efficiency standards.
- (k) It is the responsibility of the Certified Irrigation Designer to identify to the Owner and to the City of Kelowna any landscape impediments, existing or planned, that will impede reaching the targeted efficiencies. At the discretion of the City of Kelowna, irrigation system design audits may be performed to ensure design efficiency has been met.

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- (l) The Irrigation System shall be designed with minimal pressure losses where possible. Pressure losses between any two sprinklers on the same zone shall be less than 10%.
- (m) Pipes shall be sized to allow for a maximum flow of 1.5m/sec.
- (n) The Irrigation System shall be sized and designed to 80% of Point of Connection available flow and pressure; allowing for 20% growth of system or 20% reduction in operating pressure while retaining targeted operational efficiencies.
- (o) Locate Point of Connection or Pedestal to meet the following requirements:
- i. No Pedestal or Point of Connection locations will be permitted with medians without the explicit written consent of the City of Kelowna.
 - ii. No Pedestal location shall be subject to application of irrigation watering.
 - iii. No Point of Connections shall be placed within a sidewalk without the explicit written consent of the City of Kelowna.
- (p) The irrigation design shall include voltage loss calculations to the electrical control valve furthest from the controller. The drawings are to include:
- i. A chart comparing the actual voltage drop to the allowable voltage drop on common and zone signal wires;
 - ii. Voltage loss shall not exceed the maximum voltage loss as specified by the manufacturer of the irrigation controller;
 - iii. Indicate wire locations, wire gauge required, spare wires and necessary splice box locations on the Contract Drawing.
- (q) Install one spare control wire for every five (5) electric control valves connected to the controller;
- (r) Install one spare common wire for every ten (10) electric control valves connected to the controller.
- (s) Irrigation sleeves shall be installed to route irrigation lines under hard surfaces and features. Non-metallic CSA approved electrical conduit shall be installed adjacent to irrigation sleeves.
- (t) Electric control valves used in the design of the Irrigation System are to remain consistent in size and manufacturer, where possible. Renovations or additions to the Irrigation System shall use the same manufacturer, model and size that exist on site. It is permissible to use an electric control valve from a different manufacturer for specialized applications. In general:
- i. Electric control valves must be sized to the design flow;
 - ii. Drip and Micro irrigation zones must include filtration and pressure regulation to manufacturers' specifications. Drip and Micro zones must have an isolation valve prior to zone valve for maintenance of filtration.
 - iii. Unless it has deemed not possible, valves are to be located on the periphery of green spaces and where available, within planting beds.
 - iv. Design approval will be required to insert valve locations within hardscape surfaces.

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- (u) Sprinklers used in the design of the Irrigation System are to remain consistent in size, nozzling and manufacturer. Renovations or additions to the existing Irrigation System shall use the same manufacturer, model and size that exist on site. Sprinkler choice is based upon:
 - i. Available operating pressure at the base of the sprinkler;
 - ii. Desired radius;
 - iii. Type of landscape/plant material to be irrigated.
 - iv. Preference will be given to sprinklers incorporating pressure compensating devices.
 - v. Preference will be given to sprinklers incorporating check valves to reduce low head drainage.
 - (v) Sprinkler arcs, radius and alignment are to be designed and capable of adjustment to minimize overspray onto adjacent surfaces outside of landscape areas.
 - (w) Drip line and emitters must incorporate technology to limit root intrusion.
 - (x) Specify all irrigation components from a coordinated manufacturer's line listed in the Subdivision, Development & Servicing Approved Products List Policy 266.
 - (y) All irrigation products, installation and operations shall be completed in accordance with the requirements of Schedule 5.
 - (z) The Landscape Maintenance Period for landscape establishment shall be one year from the date of Substantial Performance of the landscape components of the work. All landscape areas shall be provided establishment maintenance which shall include irrigation maintenance and watering.

7C.2 Irrigation Plan and Irrigation Design Report Requirements for Works and Services

For irrigation Works and Services that will be owned by the City of Kelowna, the Owner's Qualified Professional is required to submit the following plans and reports, gain City "Issued for Construction" status, and certify construction quality assurance:

- a) Irrigation Plan
- b) Landscape Water Conservation Report (in accordance with Water Use Regulation Bylaw 10480)
- c) Irrigation Design Report
- d) Maintenance Schedule

The following information shall be shown on the Irrigation Plans and Landscape Water Conservation Report

- (a) Name and contact information for the IIABC Certified Designer.
- (b) Name and contact information for the water utility provider and the electrical utility provider.
- (c) property lines.

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- (d) buildings, edge of pavement, curb lines and curbs, sidewalks, lighting fixture locations, surface utilities and related service boxes or other elements that would affect the irrigation system – but with an objective of minimizing drawing clutter.
 - (e) Location of all existing vegetation to remain.
 - (f) Location of retaining walls and slopes that exceed 3:1 vertical.
 - (g) Landscape Water Budget, and Estimated Landscape Water Use and calculations (in accordance with Schedule C of the Water Regulation Bylaw No. 10480 - may be a separate Landscape Water Conservation Report).
 - (h) Hydrozones shall be designated by number, letter or other designation.
 - (i) Designate the areas irrigated by each valve (irrigation zones) and assign a number to each valve.
 - (j) Indication of which irrigation zones will be automatic vs manual watering systems. Clearly identify any 'temporary zones': those zones which are intended to operate for less than a two (2) year grow in period.
 - (k) Schematic layout showing all points of connection, backflow prevention, water meters, electrical supply and meters, winterization facilities, timeclocks, heads, valves, piping, sleeves, sensors and other elements critical to construction and maintenance of the irrigation system.
 - (l) Irrigation legend describing brand, model and size of timeclocks, heads, valves, piping, sleeves, sensors and all other elements shown on the irrigation plan.
 - (m) Any details specific to the project that are not included in Schedule 5.

The Irrigation Design Report shall be submitted with the Irrigation Plans, in booklet form on 8.5 x 11 paper and shall include:

- (a) Static water pressure obtained either by pressure gauge reading from the site; or from the City of Kelowna.
- (b) Design flow calculations indicating maximum water flows required to irrigate the proposed site in the desired water window;
- (c) Water utility jurisdiction; inclusive of any regulations or restrictions imposed by the said water utility that will affect the operation of the Irrigation System.
- (d) The electrical requirements necessary to operate the proposed Irrigation System. Verification from the applicable electrical utility that the service is available and what is required to route it to the necessary location(s);

- (e) Identification of the micro-climates throughout the proposed site;
- (f) A chart illustrating a zone by zone breakdown of the following items;
- i. Type of plant material
 - ii. Product Type (micro, spray, rotor); and area based calculated precipitation rates.
 - iii. Required operating pressure
 - iv. Required zone flow
 - v. Zone valve size
- (g) Scheduling data utilizing a maximum ET value of 7"/month (Kelowna July ET); taking into consideration soil type, slope and micro-climate. Show the cumulative watering time required to water all circuits in the project. Except where otherwise required or approved, the irrigation water window shall not be greater than 6 hours per day on an odd or even scheduling format.

7C.3 Establishment Watering Provisions in Single Family Subdivisions

Watering provisions are required for establishment of all street tree planting. Automatic irrigation systems to be provided to the boulevard area as an extension of privately held irrigation systems on the fronting lot. Provide irrigation sleeves across the sidewalk at the lot centerline and across the driveway as necessary to accommodate the irrigation pipe connecting all landscape areas and the fronting boulevard and medians.

In cases where boulevard landscape and related irrigation is being installed in advance of single family lots being occupied, the developer is to install a temporary irrigation system to water the boulevard. When private homes are constructed and occupied, within 6 months of occupancy the developer must arrange to have the boulevard irrigation fronting each lot removed from the temporary irrigation system and attached permanently to the irrigation system of the fronting lot. Design of the temporary irrigation system may follow one of two general arrangements:

FULL LANDSCAPED BOULEVARD: generally in accordance with Schedule 5 Standard Drawing "Temporary Boulevard Irrigation", based on a spray or drip irrigation system to serve grass, groundcover, shrubs and trees in the boulevard, OR

TREES ONLY BOULEVARD: if trees only are being planted, with dryland or paved landscape in between, a Root Watering System (Double) on public property shall be provided that meets the requirements Schedule 5 Standard Drawings.

- (a) For temporary boulevard irrigation systems, and/or for permanent median irrigation systems, water supply, backflow prevention and irrigation smart controller shall be provided in central location(s) in the subdivision, with valves and distribution piping designed in accordance with Section 6C – *Irrigation*. Water supply may be obtained from the services of the new lots. A water billing account must be established prior to use.

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- (b) Irrigation sleeves for the temporary or permanent boulevard and median systems shall be provided under all driveways or other paved areas to provide pipe access to all landscape areas within the highway for installation and maintenance of the irrigation system without removing surface paving.
 - (c) The City will withhold part of the maintenance bond at a value of 140% of the cost of connecting temporary irrigation in boulevards to permanent irrigation systems on fronting private lots, and abandonment of any temporary irrigation system. If this conversion is not completed by the Developer within 6 months of home occupancy, the City may if necessary at the Developer's expense undertake the connection of the boulevard irrigation system to the adjacent private lot system and decommission the temporary irrigation with its own forces.

7C.4 Irrigation Service Connections

Except as required otherwise all landscaped areas of a Highway or Utility Facility shall be serviced with a metered water service (50mm diameter, and a metered electrical service (120/240 volts, 60 amps minimum). Provision of water and electrical services by the Owner shall include the establishment of service accounts with the utility providers, all necessary permits, testing and certification, and all materials, labour, fees and utility costs necessary to provide the service until the end of the Landscape Maintenance Period.

Hillside Development Street Standards

8 Hillside Development Street Standards

- 8.1 [General](#)
- 8.2 [Street Trees](#)
- 8.3 [Hillside Street Classification](#)
 - 8.3.1 [Arterial Streets](#)
 - 8.3.2 [Village Collector Streets \(“Main Street”\)](#)
 - 8.3.3 [Collector Streets](#)
 - 8.3.4 [Minor Collector Streets](#)
 - 8.3.5 [Village Local Streets](#)
 - 8.3.6 [Local Streets](#)
 - 8.3.7 [Public Lanes](#)
 - 8.3.8 [Cul-de-Sac Streets and Hillside Emergency Accesses](#)

- **LIST OF TABLES (located at back of section)**

<u>NO.</u>	<u>TITLE</u>
Table 1	Hillside Street Standards
Table 2	Alignment Design Criteria

- **LIST OF DRAWINGS (located at back of section)**

<u>NO.</u>	<u>TITLE</u>
TYP-1	Local Road
TYP-01SW	Local Road – Optional Sidewalk
TYP-02	Minor Collector – No Parking – No Access
TYP-03	Minor Collector – Parking – Access One Side
TYP-04	Minor Collector – Parking – Access Both Sides

8.1 General

Where development lands receive hillside zoning (Residential Hillside (RH) zone or “h” designation to parent RU1 zone), these standards may be utilized in place of the specific sections in the HIGHWAY DESIGN STANDARDS (Section 4 of this Schedule). The Hillside Street Standard drawings are included in Schedule 5, Section 2 (Drawings) of this Bylaw.

The hillside standards have been designed for environmental sensitivity with reduced physical impacts in mind. Generally, the street standards proposed herein have been drawn from the following principles:

- The public interest requires safe, liveable and attractive streets that contribute to the urban fabric;
- Streets should be designed to suit their function. Many streets, especially local ones, have purposes other than vehicular traffic;
- A hierarchical street network should have a rich variety of types, including bicycle, pedestrian and transit routes; and
- Standards should be developed to enhance local streets’ contributions to urban design. Issues such as sense of enclosure, landscaping, parking, building setbacks,

Hillside Development Street Standards

surface materials, street furniture, signs and street lighting are vital determinants of liveability in neighbourhoods.

These street standards have largely been designed for application under specific traffic volumes and development densities. Traffic volume determines which general street type (Arterial, Collector, Minor Collector, Local, etc.) is required to service an area and, in most cases, density of fronting development determines which specific street condition ("Condition A", "Condition B", "Condition C", etc.) will be applied. In the case of Collector Streets, whether or not the street acts as a village centre "main street" is also a factor. For Arterial Streets, proximity to a village centre and local environmental conditions are the determinants of "condition" application.

Development that has direct public street access is defined as "fronting" the street. In other words, only those units that are oriented to the street are considered to "front" on it. This will most often occur in areas of fee-simple single family, mixed-use, or apartment development. Circumstances where strata units "front" onto a public street may also arise; however, strata and bareland strata developments will primarily be serviced by Private Streets. Standards for Public Lanes, Cul-de-sac Streets and Hillside Emergency Accesses are also included.

8.2 Street Trees

Street trees contribute to the liveability of a street. Trees modify the microclimate and foster a sense of comfort and safety for drivers and pedestrians by creating an edge between the sidewalk and the moving traffic. In hillside areas it is desired that the natural landscape be more prominent. While in some instances, such as along Arterials and Collectors and in a village centre, street trees are thought to be appropriate, even necessary, in other areas a more natural approach is desired, and the retention of natural vegetation is encouraged.

Therefore, those hillside street standards that will be applied to areas that will have a tighter "fit" to the natural landscape will not be required to incorporate street trees. For Minor Collector Streets and Local Streets street trees are considered optional. The planting of stands of native trees and vegetation is encouraged in these areas to contribute some of the elements of liveability that would otherwise be missed with the elimination of formal street tree plantings. Street trees and landscaping are to be to the satisfaction of the City's Development Services Department/Subdivision Approval Branch and a landscape plan showing proposed planting on private property are required. The City's Development Services Department/Subdivision Approval Branch will require a performance bond for landscaping on private property.

A discussion of each class of street follows.

8.3 Hillside Street Classification – See Table 1

An overall plan is required allocating the location of each street type and its relationship to adjacent land uses proposed. A discussion of each class of street follows.

Hillside Development Street Standards

8.3.1 Arterial Streets

Arterial streets provide a continuous drive path for inter-community through traffic. The Arterial corridors of hillside areas will be different in that, while they will continue to provide a throughway for automobiles, the experience will take on qualities of a scenic drive.

8.3.2 Village Collector Streets (“Main Street”)

Collector streets perform the dual function of land access and traffic movement between arterial and local roads. In the village centre the unique and very social function of this more localized type of street will be reflected in a more urban feel than will be found on collectors elsewhere throughout the site.

8.3.3 Collector Streets

Collector streets perform the dual function of land access and traffic movement between arterial and local roads; however, this more localized type of street plays a social as well as a functional role in the neighbourhood. Street design, therefore, must balance all objectives including, but not limited to, the need to provide a driving path for automobiles to access the neighbourhood.

8.3.4 Minor Collector Streets

There is the potential for some portions of Collector streets to experience lower traffic volumes. In these instances, Minor Collector streets will be utilized. Toward reducing the street section, a sidewalk will be provided on only one side of the street for all Minor Collectors.

8.3.5 Village Local Streets

The residential areas of the village centre will be more urban than those that will be found elsewhere within the Hillside areas. Narrow local streets with on-street parking and framed by street trees and sidewalks on both sides will provide a comfortable environment for all users in the neighbourhood. This condition is for use where development fronts at least one side of the street.

8.3.6 Local Streets

Local streets serve a multitude of functions that are important in the day-to-day lives of residents: residents walk their dogs on the street, they wash their cars on the street and they meet and talk to their neighbours on the street. Children play on the street, they learn to ride their bicycles on the street; they treat the street as an extension of the local neighbourhood park system. At this level, the street plays a very social role. Local street design, therefore, should continue to be sensitive to the needs of non-vehicle street users as well as seeking the best fit between street and landscape.

Hillside Development Street Standards

8.3.7 Public Lanes

Public Lanes are also used by the residents of a community as a venue for social interaction and play and they can contribute greatly to the fabric of a liveable community. One opportunity for their use, however, is in areas such as the village centre. Such higher density development is generally located in more gently sloping areas where steeply sloping terrain is not an issue. The inclusion of Public Lanes in these neighbourhoods will contribute to the more urban feel envisioned as well as provide an alternate route for bikes and pedestrians.

8.3.8 Cul-de-Sac Streets Hillside Emergency Accesses and Hillside Private Lanes

In complex topographic hillside areas long streets may be required to access developable pockets within areas of steep terrain. Due to the complex topography it may not be possible for connectivity to be achieved at both ends of a street. However, in response to public safety a:

- 1) A cul-de-sac, turn-around, or a second point of access is required at the terminus of roads longer than 90m.
- 2) A Hillside Emergency and Utility Vehicle Access is required on roads between 90m and 360m in length, serving more than 100 units*.
- 3) Access Public Lane is required within the last 360m on roads longer than 360m and serving/designed to serve up to 100 units*.
- 4) Local street is required within the last 360m on roads longer than 360m and serving more than 100 units*.

*unit count total shall include all units that depend on a single point of access to the major road network, including branching cul-de-sacs. The number of units shall include the maximum potential unit count of single family, multi-family, secondary suite/carriage houses as permitted by zoning. For non-residential land uses, building occupancy will be considered.

. Beyond 600 units, a 3rd access route is required. Turnarounds are required every 360m.

In general, temporary secondary points of access will not be considered. However, a Hillside Emergency Access may be considered, consistent with the limitations of this access type, where it is; 1) ultimately replaced by a permanent connection on another alignment or to higher standard (i.e. public lane, local street, etc.), 2) constructed over the applicants lands within a highway road reservation, 3) constructed to the Hillside Emergency Access standard (but unpaved) and 4) maintained by the applicant to the satisfaction of the Fire Department. Temporary secondary points of access will not be considered to defer the construction of ultimate works on the same alignment.

Maintaining street connectivity for safety reasons wherever possible will remain a priority.

Hillside Development Street Standards

- ROW: min 13.0m radius;
- Radius to edge of paved surface: min 12.0m radius;
- Alternative types of street turnarounds will be considered for use based on site specific topographic conditions. In certain circumstances reduced cul-de-sac radii or hammer head type turnarounds will be permitted.

Hillside Emergency Access

- Maximum grade: 15%;
- 4.5m ROW; 4.5m roadway;
- Horizontal Alignment, Minimum Radius = R12m
- Vertical Alignment, Minimum K Value = 2
- Design Vehicle, Fire Truck
- Restrict non-emergency vehicles access through the use of removable bollards or gates;
- Shared use with pedestrian trails.

Hillside Private Lanes/Emergency Access Lanes/Maintenance Roads

Maximum grade: 15%;

Private Lanes must have a turn-around at or near their terminus. Acceptable turn-around types include cul-de-sac, eyebrow or hammerhead.

6.0m ROW; 6.0m roadway.

Hillside Development Street Standards

Street Conditions		Street Section Specifications							
Street Type and Condition (Std Drawing number)	Max. Units Served	Design Speed ¹ (km/h)	Max. Grade (%)	ROW (m)	Street Width ² (m)	Parking	Curb & Gutter	Sidewalk ³	Street Trees
Arterial Streets		>600							
Condition A (median) (SS-H1)	within village centre where environmental conditions permit	60 (50) ⁴	8 (10) ¹¹	23.0	16.0 ⁵	none permitted	barrier curb required	Required both sides ⁶	required both sides and in median
Condition B (SS-H2)	within 10-minute walking distance ⁷ of village centre; or, within village centre where environmental conditions do not permit the use of Condition A	60 (50) ⁴	8 (10) ¹¹	17.0 ⁸	10.0 ⁸	none permitted	barrier curb required	Required both sides ⁶	required both sides
Condition C (SS-H3)	greater than a 10-minute walking distance ⁷ from village centre.	60 (50) ⁴	8 (10) ¹¹	15.0 ⁸	10.0 ⁸	none permitted	barrier curb required	Required one side ⁶	required both sides
Village Collector Streets (main street)		600							
Condition A (SS- H4)	• where commercial development fronts street	50	10	20.0	12.8	required on- street both sides	barrier curb required	required both sides	required both sides
Condition B (SS- H5)	• where no commercial development fronts street	50	10	20.0	12.8	required on- street both sides	barrier curb required	required both sides	required both sides
Collector Streets		600							
Condition A (SS- H6)	• development ⁹ fronts both sides	50 (40) ⁴	10 (12) ¹¹	18.2 ⁸	8.6 ⁸	required above curb both sides	rollover curb required	required both sides ⁶	required both sides
Condition B (SS- H7)	• development ⁹ fronts one side only	50 (40) ⁴	10 (12) ¹¹	14.9 ⁸	8.6 ⁸	required above curb one side	rollover curb required ¹²	required one side ⁶	required both sides
Condition C (SS- H8)	• no development ⁹ fronts street	50 (40) ⁴	10 (12) ¹¹	14.0 ⁸	8.6 ⁸	none permitted ¹⁰	rollover curb required ¹²	required one side ⁶	required both sides
Minor Collector Streets		500							
Condition A (SS- H9)	• development ⁹ fronts both sides; or, • development ⁹ fronts one side only	50 (40) ⁴	10 (12) ¹¹	13.3 ⁸	7.0 ⁸	required above curb one side	rollover curb required	required one side ⁶	required on one side
Condition B (SS- H10)	• no development ⁹ fronts street	50 (40) ⁴	10 (12) ¹¹	12.4 ⁸	7.0 ⁸	none permitted ¹⁰	rollover curb required	required one side ⁶	required on one side

Hillside Development Street Standards

Street Conditions		Street Section Specifications							
Street Type and Condition (Std Drawing number)	Max. Units Served	Design Speed ¹ (km/h)	Max. Grade (%)	ROW (m)	Street Width ² (m)	Parking	Curb & Gutter	Sidewalk ³	Street Trees
Village Local Streets		200							
Village Local (SS-H11)	• development ⁹ fronts at least on side	40 (30) ⁴	12	17.4	8.7	required on-street both sides	barrier curb required	required minimum one side ⁶	required both sides
Local Streets		200							
Condition A (SS-H12)	• development ⁹ fronts both sides	30	15	14.1	6.0	required above curb both sides	rollover curb required	optional one side ⁶	required on one side
Condition B (SS-H13)	• development ⁹ fronts one side only	30	15	12.3	6.0	required above curb one side	rollover curb required	optional one side ⁶	required on one side
Condition C (SS-H14)	• no development ⁹ fronts street	30	15	10.5	6.0	none permitted ¹⁰	rollover curb required	optional one side ⁶	required on one side
Public Lane		10							
(SS-H15)	• all cases	20	12 (15) ¹¹	6.0	5.7	on edge of paved surface	rollover curb required	none	--
Hillside Emergency and Utility Vehicle Access		--							
• provide a secondary access route, if possible, where a cul-de-sac exceeds maximum street length as specified by the City of Kelowna. Radius (min) = 12m; K (min) = 2.		--	15	4.5	4.5	--	--	--	--

Notes:

1. See Table 2 for alignment design criteria for each design speed.
2. Street width measured from curb face (gutterline).
3. For all conditions, sidewalks should terminate at a destination or connect with another sidewalk or trailhead.
4. Minimum permitted design speed reduction, where necessary due to topographic constraints, and approved by the City.
5. Separate left turn lanes to be provided in the medians.
6. Where issues of livability warrant, (e.g. extreme topographic conditions) sidewalk(s) may be located in a separate dedicated corridor

Hillside Development Street Standards

and street ROW width reduced accordingly. Unless necessary for pedestrian connectivity to schools, parks, commercial areas or land beyond, a sidewalk is not required for local streets accessing 30 lots or less. Street right of way may be reduced accordingly if a sidewalk is not required. (see Standard Drawings)

7. For this purpose, the 10-minute walking distance is considered to be ½ mile (0.8 km).
8. Where required, ROW and street widths will be increased at major intersections to provide for separate turning lanes.
9. "Development" includes all residential, mixed-use, commercial, institutional and park uses.
10. All parking shall be managed on-site or within small parking pullouts, as required.
11. Maximum grade permitted where necessary due to topographic constraints and as approved by the City.
12. Where no fronting development (driveway access not required), barrier curbs to be considered to restrict illegal parking on sidewalks.

Hillside Development Street Standards

**Table 2
Alignment Design Criteria**

BL10640 amended the following:

1. Horizontal Curve Radii

Criteria	60 km/h	50 km/h	40 km/h	30 km/h
Roadway Crossfall				
normal crown (-2%)	260m	165m	90m	25m
2% superelevation	205m	120m	65m	25m
4% superelevation	150m	80m	45m	22m
6% superelevation	120m	-	-	-
Through Intersections	200m	120m	70m	40m

2. Superelevation

Criteria	60 km/h	50 km/h	40 km/h	30 km/h
Maximum Superelevation	6%	4%	4%	4%
Maximum Superelevation at Intersections	4%	4%	4%	4%

3. Superelevation Transition Lengths

Criteria	60 km/h	50 km/h	40 km/h	30 km/h
Transition Lengths (2 / 4-lane roadways)				
normal crown to +2%	24m / 36m	22m / 34m	20m	20m
normal crown to +4%	38m / 54m	33m / 50m	30m	30m
normal crown to +6%	48m / 72m	-	-	-
Min Tangent Length between reversing curves				
2% superelevation (2 / 4-lane roadways)	15m / 22m	13m / 20m	12m	12m
4% superelevation	28m / 42m	26m / 40m	24m	22m
6% superelevation	42m / 64m	-	-	-

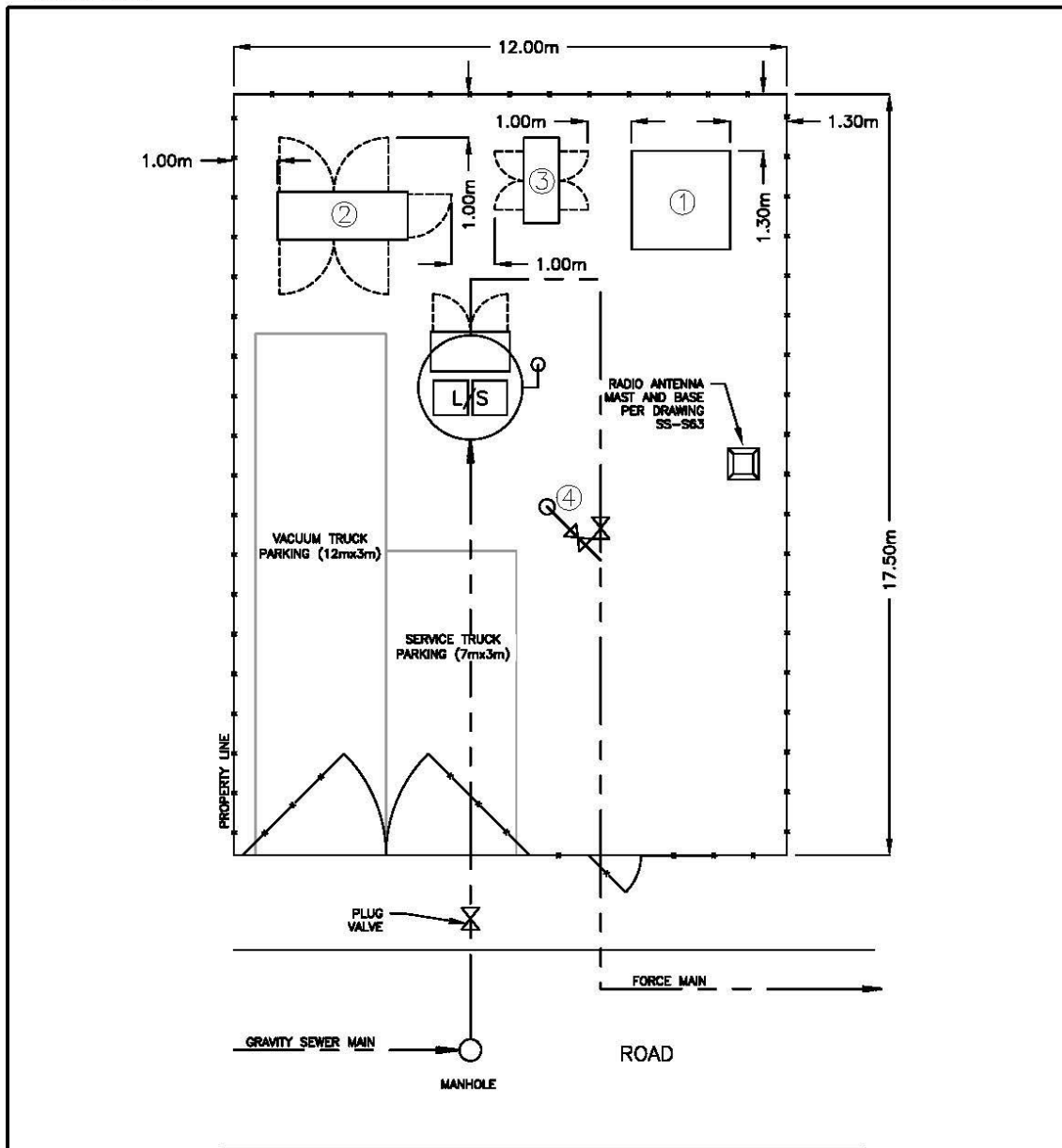
- 1 Values for transition lengths include tangent runoff applied at the same rate as superelevation runoff.
- 2 60% of superelevation runoff occurs on the tangent approach and 40% on the curve, resulting in a minimum length of tangent between reversing curves of 120% of the superelevation runoff length.

Table 2 (continued)
Alignment Design Criteria

4. Gradients				
Criteria	60 km/h	50 km/h	40 km/h	30 km/h
Minimum Grade	0.5%	0.5%	0.5%	0.5%
Maximum Grades				
on horizontal tangents	8% ¹	10% ²	12%	12%
on minimum radius horizontal curves ³	8%	9%	10%	10%
Grades Through Intersections				
with design speed on major road	8%	8%	8%	-
approach distance for major road ⁴	15 / 5m ⁵	5m	0m	-
with design speed on minor road	5% ⁶	5%	6%	6%
approach distance for minor road ⁷	20m	15m	5m	5m
<ol style="list-style-type: none"> 1 Under special circumstances, grades up to 10% may be permitted. 2 Under special circumstances, grades up to 12% may be permitted. 3 Applies where radius is less than 1.5 times minimum allowable radius. 4 Minimum distance back from the gutter line of the minor road that the specified grade may not be exceeded. 5 Distances for design road approach to intersection with collector road / local road. 6 4% desirable. 7 Minimum distance back from the gutter line of the major road that the specified grade may not be exceeded. 				
5. Vertical Curve K Values				
Criteria	60 km/h	50 km/h	40 km/h	30 km/h
Minimum Crest	15	8	4	2
Minimum Sag	10	7	4	2
Crest / Sag on approach to stop condition	4	3	2	2
<i>K values listed assume that new roadways will be illuminated</i>				
6. Stopping Sight Distances				
Criteria	60 km/h	50 km/h	40 km/h	30 km/h
Down grades:				
12%	109	78	52	34
9%	101	73	50	32
6%	94	69	48	31
3%	89	66	46	30
0%	85	63	45	30
Up grades:				
3%	81	61	44	29
6%	78	59	42	29
9%	76	57	41	28
12%	73	56	40	28
7. Decision Sight Distance				
Minimum decision sight distance for 60 km/h: 175m – 235m.				
<ol style="list-style-type: none"> 1. Note that decision sight distance applies only to multi-lane roads at intersections. 2. The range of values recognizes the variation in complexity that occurs at various sites. For less complex situations, values towards the lower end of the range are appropriate and for more complexity, values at the upper end are used. 				

Drawing A

BYLAW NOTE



NOTES:

- 1.) IF PERMANENT GENSET IS NOT REQUIRED, PROVIDE A LOCATION FOR A PORTABLE GENSET.
- 2.) CONDUIT FROM KIOSK TO PROPERTY LINE REQUIRED FOR FUTURE FIBRE CONNECTION. TERMINATE IN JUNCTION BOX.
- 3.) CHEMICAL FEED CONDUIT TO BE STUBBED FOR FUTURE ODOUR CONTROL BUILDING.
- 4.) OFF STREET PARKING TO ACCOMMODATE A VACUUM TRUCK (HSU) AND FULL SIZE PICKUP TRUCK SIMULTANEOUSLY.
- 5.) ANTENNA MAST LOCATION TO BE DETERMINED BASED ON SITE CONDITIONS.
- 6.) ENTIRE SITE TO BE PAVED AND FENCED w/ VEHICLE ACCESS GATES AND MAN GATE.
- 7.) IF ODOUR CONTROL BUILDING IS REQUIRED, AN ADDITIONAL 13m x 13m AREA MAY BE REQUIRED.
- 8.) CONCRETE BASES FOR TRANSFORMER, ELECTRICAL KIOSK AND GENSET TO BE 200mm ABOVE GRADE.

LEGEND

- ① TRANSFORMER
- ② ELECTRICAL KIOSK
- ③ GENSET
- ④ PIGGING PORT PER DRAWING SS-582

**STANDARD
DETAIL
DRAWING**

DATE:
05/22/20
SCALE:
NTS

**TYPICAL LIFT STATION
SITE LAYOUT**

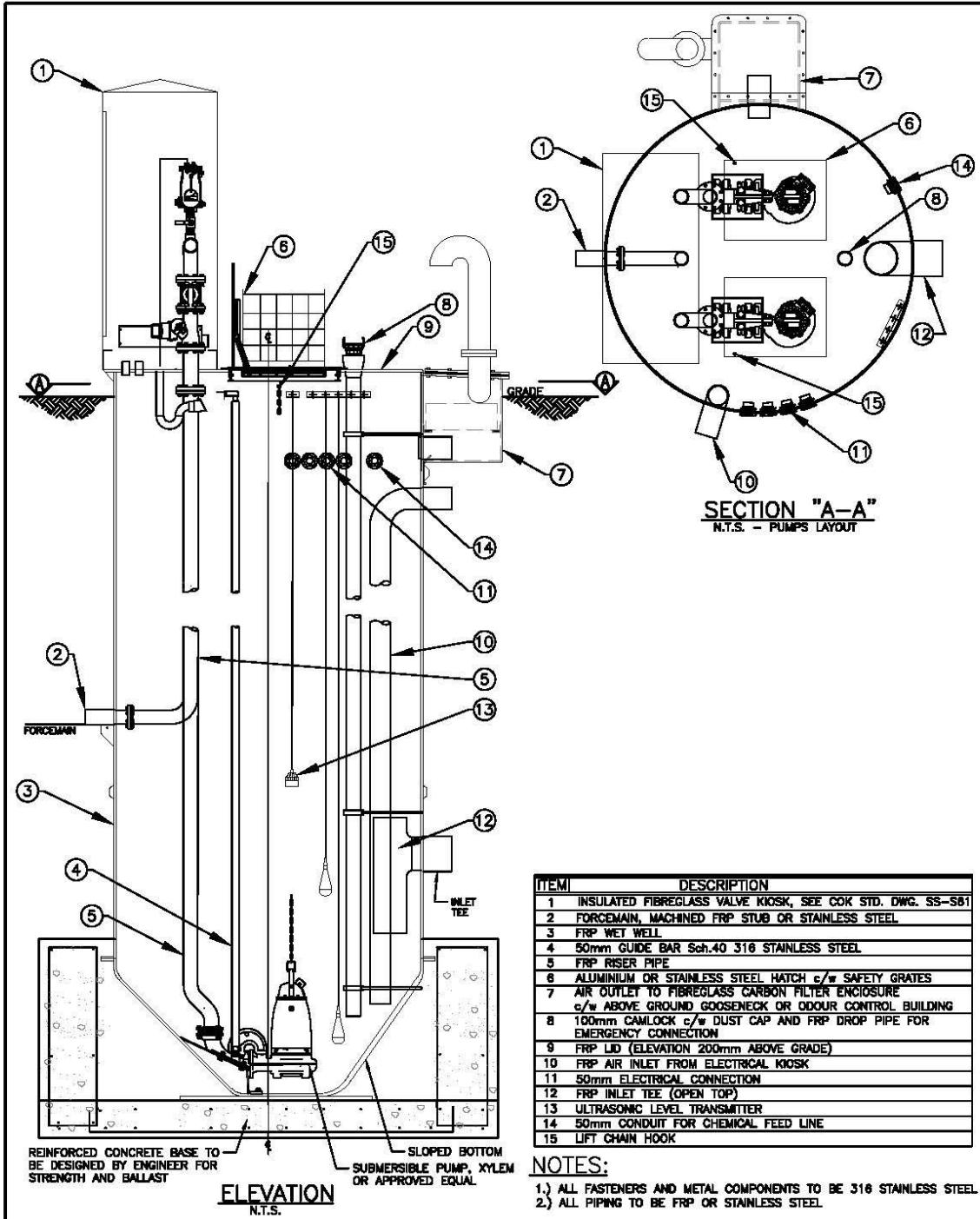
DWG. NO.

SS-S59



Drawing B

BYLAW NOTE



ITEM	DESCRIPTION
1	INSULATED FIBREGLASS VALVE KIOSK, SEE COK STD. DWG. SS-S81
2	FORCEMAIN, MACHINED FRP STUB OR STAINLESS STEEL
3	FRP WET WELL
4	50mm GUIDE BAR Sch.40 316 STAINLESS STEEL
5	FRP RISER PIPE
6	ALUMINIUM OR STAINLESS STEEL HATCH c/w SAFETY GRATES
7	AIR OUTLET TO FIBREGLASS CARBON FILTER ENCLOSURE c/w ABOVE GROUND GOOSENECK OR ODOUR CONTROL BUILDING
8	100mm CAMLOCK c/w DUST CAP AND FRP DROP PIPE FOR EMERGENCY CONNECTION
9	FRP LID (ELEVATION 200mm ABOVE GRADE)
10	FRP AIR INLET FROM ELECTRICAL KIOSK
11	50mm ELECTRICAL CONNECTION
12	FRP INLET TEE (OPEN TOP)
13	ULTRASONIC LEVEL TRANSMITTER
14	50mm CONDUIT FOR CHEMICAL FEED LINE
15	LIFT CHAIN HOOK

NOTES:
 1.) ALL FASTENERS AND METAL COMPONENTS TO BE 316 STAINLESS STEEL
 2.) ALL PIPING TO BE FRP OR STAINLESS STEEL

**STANDARD
 DETAIL
 DRAWING**

DATE:
 05/22/20
 SCALE:
 NTS

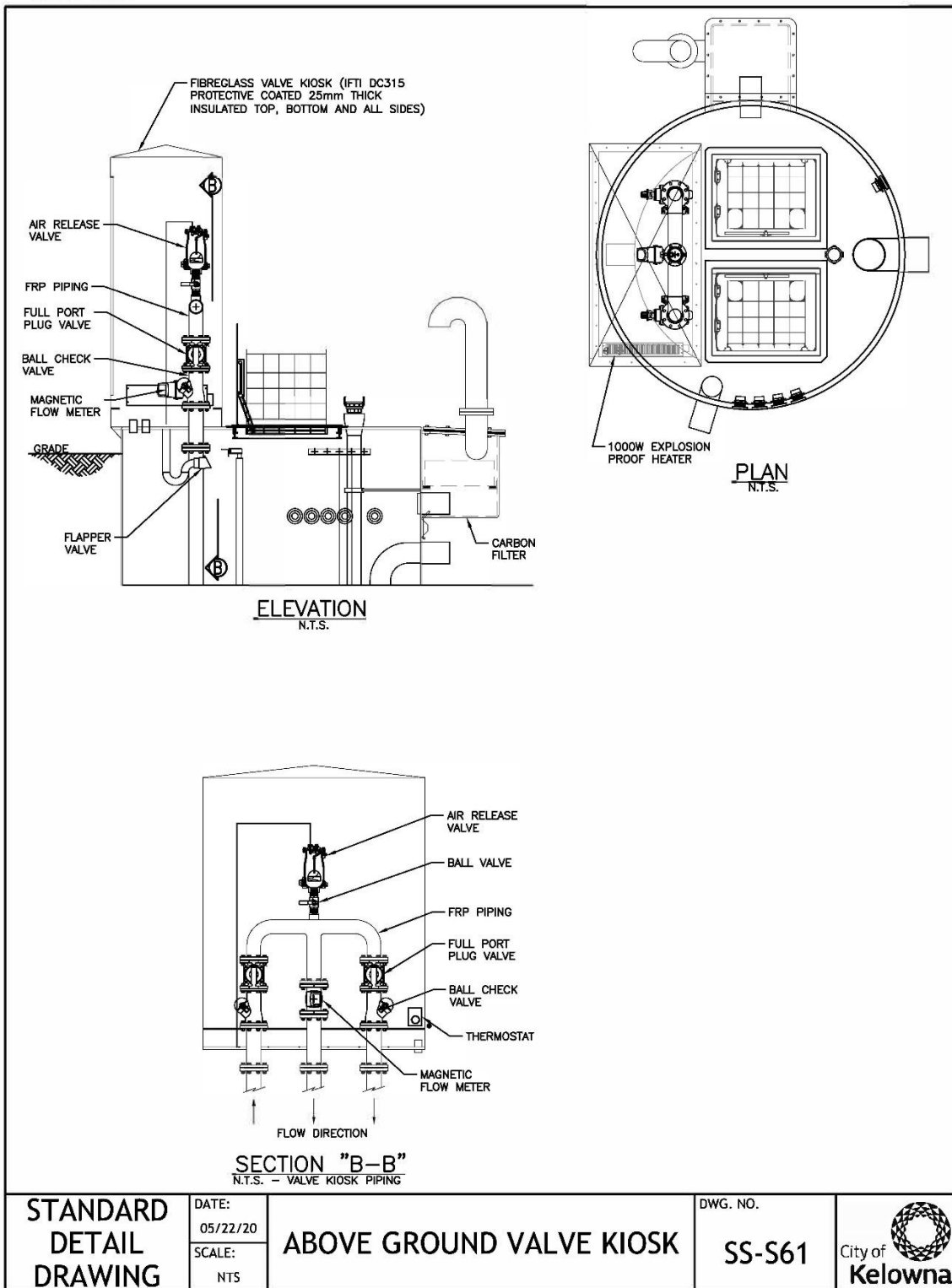
SANITARY LIFT STATION

DWG. NO.
SS-S60



Drawing C

BYLAW NOTE



**STANDARD
DETAIL
DRAWING**

DATE:
05/22/20
SCALE:
NTS

ABOVE GROUND VALVE KIOSK

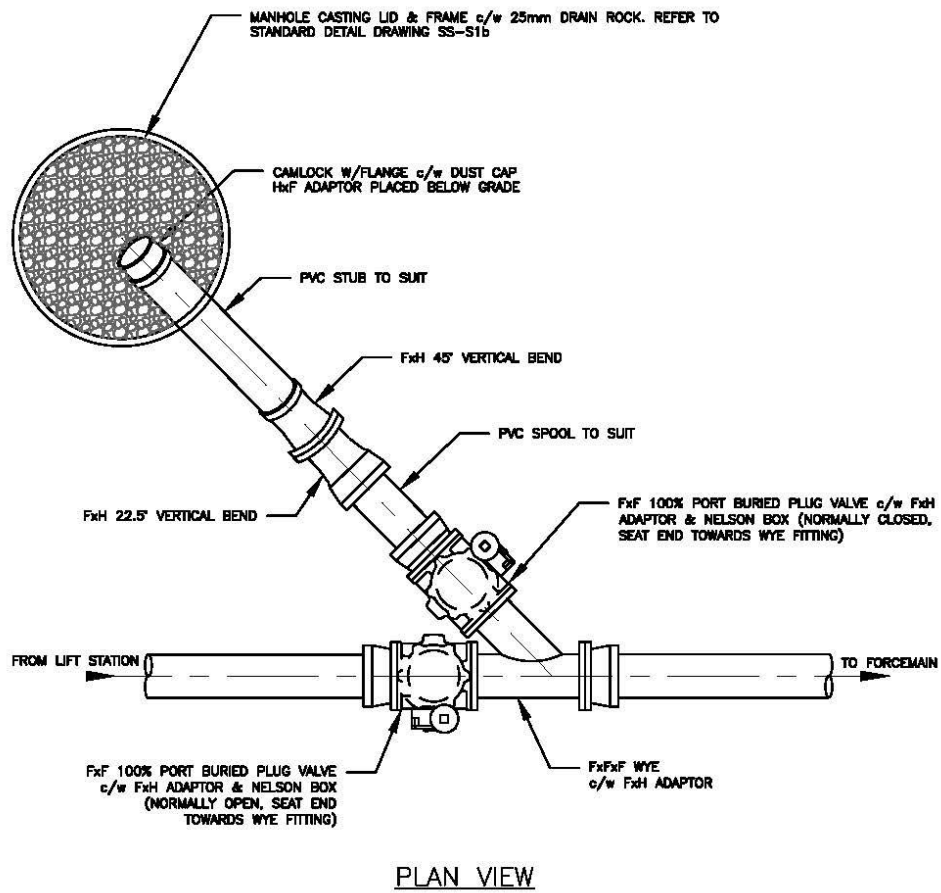
DWG. NO.

SS-S61



Drawing D

BYLAW NOTE



PLAN VIEW

NOTES:

- 1.) ALL FITTINGS SHALL BE JOINT RESTRAINED.
- 2.) SIZE OF ALL FITTINGS AND PIPE TO MATCH SIZE OF FORCEMAIN.

STANDARD DETAIL DRAWING	DATE: 05/22/20	PIGGING PORT	DWG. NO.	 City of Kelowna
	SCALE: NTS		SS-S62	

Drawing E

BYLAW NOTE

