

May 1, 2024
Our File: 24008
Revision: 1

City of West Kelowna
2760 Cameron Road
West Kelowna, BC
V1Z 2T6

Attention: Cam Graham, Planner II

Dear Mr. Graham:

Re: Functional Servicing Report – 3590 Webber Road Development

Protech Consulting has been retained by Rodney Webber to prepare a Functional Servicing Report for the City of West Kelowna in support of an Official Community Plan (OCP) amendment application for 4.1 hectares located at 3590 Webber Road (herein referred to as “the Webber Road development”).

This functional servicing report outlines the servicing concepts proposed for the development. This report provides conceptual servicing strategies to a level of detail suitable for that of an OCP amendment which includes a general analysis of the existing infrastructure and its ability to accommodate this development. This report assesses the servicing for sanitary sewer, storm sewer and stormwater management, water distribution, shallow utilities, and road access.

1 GENERAL AND PROJECT DESCRIPTION

This development is located in the Glenrosa neighborhood of the City of West Kelowna. The legal description is Lot 13 Plan KAP1256 and the property encompasses a 4.1 hectare area.

The Webber Road development is currently zoned A1 – Agricultural Zone and has an agricultural land use designation in the OCP but is not in the Agricultural Land Reserve. The proposed zone for this development is R3 – Low Density Multiple Residential to allow for both duplex and townhouse units. The property is located within the growth boundary of the OCP.

Surrounding land uses primarily include single detached residential zoned properties except for the neighboring lot on the southeast corner zoned A1 and Glenrosa Middle School zoned P2 on the west side of the property. The subject property is mostly treed but has a large field on the west side. The natural topography of the area mostly consists of gently sloping terrain from the northwest corner to the southeast corner towards Webber Road with an approximate average grade of 10%.

The OCP and zoning amendment application is proposed to facilitate a development that could consist of duplex lots accessed by municipal road and a townhouse site with privately owned roads. The duplex lots are proposed along the perimeter interface with existing single family residential lots to provide a buffer for the townhouse portion. The proposed land use for the development is medium density residential to facilitate these two types of housing consisting of approximately 130 units. A subdivision plan has been included in the Appendix as a possible layout for the property. The City of West Kelowna Works and Services Bylaw 0249 (herein referred to as “the Bylaw”), requires a density of 2 people per unit to be used for servicing analysis. For the purposes of this functional servicing report and determining the impact of this development on the existing infrastructure, the population of 260 people is used in the following sections as required.

2 SANITARY SEWER

Surrounding City of West Kelowna sanitary infrastructure is limited to an existing 200mm diameter sanitary sewer on Webber Road north of the intersection of Webber Road and Scotstown Road, and a 250mm diameter sanitary sewer on Webber Road south of the same intersection. This sanitary sewer is conveyed by gravity with ultimate discharge to the Westside Regional Wastewater Treatment Plant operated by the Regional District of Central Okanagan.

2.1 Webber Road Development Sanitary Demands

As mentioned in Section 1 of this report, the proposed servicing population added to the existing sanitary sewer infrastructure is 260 people. The Bylaw requires new development to consider a domestic flow rate of 350 L/cap/d and a minimum infiltration & inflow rate of 5,000 L/ha/d. The following table outlines the sanitary sewer demands for the Webber Road development.

| SANITARY SEWER DESIGN FLOWS | |
|--------------------------------------|-----------------|
| Average Daily Dry Weather Flow = | 350 Lpcd |
| Total Population = | 260 people |
| Average Domestic Flow = | 1.05 L/s |
| Peaking Factor = | 3.08 |
| Peak Domestic Flow = | 3.24 L/s |
| Groundwater Infiltration Rate = | 5,000 L/ha/d |
| Site Area = | 4.1 ha |
| Total Groundwater Infiltration = | 0.24 L/s |
| Total Peak Hour Design Flow = | 3.48 L/s |

2.2 Webber Road Development Sanitary Servicing Strategy

The subject development can be serviced through connection to the existing 200mm sanitary sewer main on Webber Road. Servicing of the development would consist of a city owned sanitary collection for the duplex lots within the municipal road and a privately owned sanitary sewer collection system for the townhouse site. A tie in location at the intersection of the new municipal road and Webber Road would provide service to the duplex lots, while a separate connection at the southeast corner of the property would provide service to the townhouse portion of the property.

Further coordination with the City of West Kelowna through future application processes can confirm if downstream capacity in the sanitary sewer exists for this development. All new onsite sanitary sewer collection should be designed in accordance with the current version of the BC Plumbing Code and good engineering practices. All new offsite sanitary sewer collection should be designed to the requirements of the Bylaw.

2.3 Review of City of West Kelowna Sanitary Sewer Utility Master Plan

The current edition of the City of West Kelowna's Sanitary Sewer Utility Master Plan (March 2014) was reviewed to cross reference any required system upgrades contributed to by the subject development.

Based on the 10-year, 20-year and full build out conditions reviewed in the Master Plan, there are no upgrades proposed to the downstream sanitary sewer system between the Webber Road development and the Wastewater Treatment Plant.

3 STORM SEWER AND STORMWATER MANAGEMENT

Surrounding City of West Kelowna stormwater management infrastructure includes a shallow ditch on Webber Road along the entire east side of the property. There is currently no storm sewer present within Webber Road along the frontage of the subject property. The nearest storm sewer available to service this property is a 1,050mm pipe located approximately 112m south of the property on Webber Road.

Traditional stormwater management practice results in little or no impact on the existing storm infrastructure or creeks with respect to the peak flows. Municipal bylaws require the detention of stormwater captured under post development conditions with controlled release to existing infrastructure at pre-development runoff rates in attempts to mimic the existing runoff conditions and not overwhelm the downstream drainage capacities. While this practice results in no increase in peak flow due to the increase in impervious areas, there is an increase in overall runoff volume released to the downstream infrastructure and major flow routes over longer time durations.

The capacities of the downstream ditches and storm sewer are the potentially limiting constraints in the drainage system for this area. These drainage routes are typically sized for the major storm events including the upstream undeveloped contributions (including the Webber Road development) and if typical stormwater management practices are followed then no downstream issues should be encountered. If during future detailed design, storm sewer capacity issues are identified, the upgrades can be completed, or the development can detain larger volumes of water with slower release rates that are within any limiting capacities downstream.

3.1 Webber Road Development Stormwater Management Strategy

Stormwater infrastructure required to service the Webber Road development will be based on the final iterations of the development layouts determined through future application processes. In any event, stormwater infrastructure will need to be extended north on Webber Road from the existing 1,050mm pipe. As this development has both private and public owned infrastructure, stormwater management should be developed in the same way. The stormwater management infrastructure for the publicly owned road related to the duplex fee simple lots will be designed as a separate system from the privately owned works related to the townhouse site.

Future detailed design of the stormwater management infrastructure will be based on computer modelling of the infrastructure to validate designs. Evaluation of the native soils for ground infiltration of surface runoff should be reviewed as a possible option for a component of the stormwater management design. Whether the stormwater detention is accommodated through a below ground tank or above ground pond, the most natural location for these storage facilities is at the lowest topographical points on the site adjacent to Webber Road. This also allows for a simple connection of the stormwater release to an offsite drainage route.

All storm sewer systems should be designed in accordance with the Bylaw, the current version of the BC Plumbing Code and good engineering practices to collect all runoff captured by new impervious areas and route it to the stormwater detention facility. The following stormwater management design concepts should also be utilized to the greatest extent possible:

- Implement and utilize City of West Kelowna Storm Water Best Management Practices for both temporary works during construction and permanent works in design.
- Maintain post development drainage courses in their natural locations to the greatest extent possible.
- Utilize groundwater infiltration methods wherever possible and where soil conditions permit. This needs to be carefully considered on a case-by-case basis with geotechnical recommendations and consideration for groundwater breakout downstream.
- Provide treatment of stormwater prior to discharge to environmentally sensitive areas or where the potential for larger concentrations of contaminants are likely to enter captured stormwater systems (i.e. parking lots).

3.2 Review of City of West Kelowna Master Drainage Plan

The current edition of the City of West Kelowna's Master Drainage Plan Vol. I (October 2011) was reviewed to highlight any pre-identified drainage projects within the vicinity of or downstream of the Webber Road development. The following were noted:

- Although not identified as a formal project in the Master Drainage Plan, the mapping shown on Figure 3.6 identifies a flow path through the subject property as well as 2971 Gorman Road. This flow path is proposed to pass runoff from a low point on Gorman Road to Webber Road. The Master Drainage Plan notes an estimated 100-year flow rate of 104 Lps is expected along this route, although further coordination with the City of West Kelowna will be required to confirm. To manage this flow, this development should provide an overland flow route that bypasses any new stormwater detention infrastructure required for this development and routes this design flow to Webber Road.
- Project 3.6 involving establishing a drainage easement from Webber Road to Inverness Road downstream of the subject property was identified. It is assumed that this project has already been completed with the development of the property at the previous civic address 3645 Webber Road.

- Project 3.7 involving installing erosion protection from Webber Road to Inverness Road downstream of the subject property was identified. It is assumed that this project has already been completed with the development of the property at the previous civic address 3645 Webber Road.

4 WATER SYSTEM

Surrounding City of West Kelowna water infrastructure is limited to an existing 350mm diameter watermain on Webber Road along the entire length of the frontage of the subject property. This main is within pressure zone PZ578 which sees direct gravity feed from the Powers Creek Water Treatment Plant. There is an existing irrigation service to the property from Webber Road.

4.1 Webber Road Development Water Demands

As mentioned in Section 1 of this report, the proposed servicing population added to the existing water infrastructure is 260 people. The Bylaw requires new development to consider domestic average, maximum, peak, and fire flow rates listed in the below table with corresponding development flow rates calculated for the Webber Road development.

| DOMESTIC WATER DESIGN FLOWS | |
|--|------------|
| Average Annual Daily Demand (ADD) = | 900 Lpcd |
| Maximum Daily Demand (MDD) = | 2,400 Lpcd |
| Peak Hour Demand (PHD) = | 4,000 Lpcd |
| Population = | 260 people |
| Domestic ADD = | 2.71 Lps |
| Domestic MDD = | 7.22 Lps |
| Domestic PHD = | 12.04 Lps |
| Multi-Family Residential Fireflow (FF) = | 90 L/s |
| Q _{design} (MDD + FF) = | 97.22 Lps |

4.2 Webber Road Development Water Servicing Strategy

All new water servicing for the Webber Road development should aim to comply with the Bylaw design criteria as follows:

- Maximum pipe velocity of 2 m/s during PHD
- Maximum pipe velocity of 4 m/s during MDD + FF
- Maximum Static Pressure of 900 kPa (130 psi)
- Minimum Dynamic at PHD of 275 kPa (40 psi)

- Minimum Residual Pressure at MDD + FF conditions 140 kPa (20 psi)
- Minimum Static Pressure of 275 kPa (40 psi)

The static hydraulic grade line of the water main in Webber Road is 583m and the highest elevation of the subject property is approximately 523m. This gives an elevation difference of 60m, a static head of 588.6kPa (85.4psi) and is within the requirements of the Bylaw.

Further coordination with the City of West Kelowna on available pressures determined from their model is required. Analysis of the water distribution system has not been included with the scope of this report due to the complexities of modelling a system of this size with numerous loops, demands and pressure zones. It is best that an analysis of the system be performed by the City or their preferred consultant as they will have an up-to-date model that can be used to easily confirm flow capacity, pressures, and velocities. If required, a fire hydrant flow test can be performed to validate the model results.

Based on the existence of similar nearby developments, it is doubtful that there will be any issues meeting demands of the subject development with respect to minimum flows and maximum velocities in the existing watermain pipes. Furthermore, existing nearby development likely confirms that minimum pressures are available for all flow conditions as defined in the Bylaw.

4.3 Review of City of West Kelowna Water Utility Master Plan

The current edition of the City of West Kelowna's Water Utility Master Plan (November 2014) was reviewed to identify any existing offsite system upgrades proposed within the vicinity of the Webber Road development. The following was noted:

- Project 4 involving upgrading the water main from a 150mm diameter pipe to a 200mm diameter pipe on Webber/McAllister/McIver Road was identified according to the existing demand conditions. Further coordination with the City of West Kelowna will be required to determine if the new water demands of the subject property will trigger the requirement for this water system upgrade.
- Project 9 involving upgrading the 150mm and 200mm mains to 250mm mains on McIver and Gorman Road were identified according to the existing demand condition. Further coordination with the City of West Kelowna will be required to determine if the new water demands of the subject property will trigger the requirement for this water system upgrade.

5 SHALLOW UTILITIES

Shallow utility service providers in the Webber Road development area are BC Hydro, Fortis BC Gas, Telus, and Shaw. All new development should be provided with electricity, gas (if desired), telephone, cable and internet services. Designs for shallow utility servicing will comply with the individual standards for each service provider and in accordance with the City of West Kelowna's standard road drawings.

6 ROAD ACCESS

The Webber Road development has frontage on one existing road dedication. The National Fire Protection Association (NFPA) outlines the minimum number of access routes into a neighborhood based on the number of residential units. The below table outlines the NFPA requirements.

| Number of Residences | Number of Access Routes |
|-----------------------------|--------------------------------|
| 0-100 | 1 |
| 101-600 | 2 |
| > 600 | 3 |

If the total unit count is over 100 units, a second access will be required. Site layouts will need to carefully consider this requirement to ensure a second access can be provided to Webber Road.

Any new public roads on the property will likely be classified as Urban Local which will include curb and gutter and a sidewalk on one side of the road. Frontage improvements along Webber Road will also likely be required to bring the road up to the current standards. The current City of West Kelowna Transportation Master Plan defines Webber Road as a Major Collector. Further coordination with the City of Kelowna during future development applications will determine whether the urban or rural standard should be used.

Designs of any onsite private roads should consider adequate space for utility infrastructure, compliance with the BC Building Code emergency access standards, and good engineering practices.

7 CLOSURE

We have reviewed the existing sanitary sewer, storm sewer, water distribution system, and transportation networks in vicinity of the development of 3590 Webber Road and have outlined the servicing strategies necessary to accommodate this development to the standards set in the City of West Kelowna Works and Services Bylaw 0249.

Further review and coordination with the City of West Kelowna during future applications will be required to confirm the information provided in this report. With the information available at this time, there do not appear to be any major obstacles that would prevent this development from proceeding.

We trust you will find the foregoing to be in order, however if you have any questions, please feel free to contact the writer.

Yours truly,

PROTECH CONSULTING

Kyle C. Lorincz, P.Eng.
Permit To Practice 1001403



PRELIMINARY

ISSUED FOR COORDINATION

| LEGEND | |
|-----------------------------|--|
| WATER | |
| SAN. SEWER | |
| STORM SEWER | |
| GAS | |
| U/G UTILITY (ALIGNMENT) | |
| EX. MANHOLE | |
| PROP. MANHOLE | |
| POWER POLE | |
| LAMP STANDARD | |
| CATCH BASIN | |
| HYDRANT | |
| SURVEY MONUMENT | |
| WATER CURB STOP | |
| SANITARY INSPECTION CHAMBER | |
| STORM INSPECTION CHAMBER | |
| TRANSFORMER - POWER | |
| SERVICE BOX | |

PROTECH CONSULTING

300 - 3275 Lakeshore Rd Kelowna B.C. Phone 860-1771

PERMIT TO PRACTICE NO.: 1001403

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THE CITY OF KELOWNA
ENGINEERING DEPARTMENT

ROD WEBBER
3590 WEBBER ROAD
LOT 13 DL 3189 ODYD PLAN 1259

| | |
|-------------|----------|
| DIVISION | |
| DRAWING NO. | REV. NO. |
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