

REGIONAL DISTRICT OF NORTH OKANAGAN

BYLAW No. 2930

A bylaw to amend the Subdivision Servicing Bylaw No. 2600, 2013

WHEREAS Section 506 (7) [*Subdivision servicing requirements*] of the *Local Government Act*, states that when there is no community water system, the Regional Board may, by bylaw, require that each parcel to be created by the subdivision have a source of potable water having a flow capacity at a rate established in the bylaw;

AND WHEREAS there are areas of known groundwater supply concerns within Electoral Area “C”;

AND WHEREAS the Regional Board desires additional information regarding flow capacity and impact on neighbouring wells from a Qualified Professional for proposed subdivisions within Electoral Area “C”;

NOW THEREFORE, the Board of the Regional District of North Okanagan, in open meeting assembled hereby, ENACTS AS FOLLOWS:

CITATION

1. This Bylaw may be cited as the “**Regional District of North Okanagan Subdivision Servicing Amendment Bylaw No. 2930, 2022**”.

AMENDMENTS

Regional District of North Okanagan Subdivision Servicing Bylaw No. 2600, 2013 be amended as follows:

2. Section 406.1 Dug Wells by inserting “, **except Electoral Area “C”**” after “all Electoral Areas”.
3. Section 406.2 Drilled Wells by inserting “, **except Electoral Area “C”**” after “all Electoral Areas”.
4. Section 406.2.c, by removing “C” in the list of Electoral Areas.
5. By adding a new Section 406.4 as follows:

4. Proof of Water requirements for Electoral Area “C”

Where connection to a community water system is not required and a drilled well is proposed as a source of potable water for a parcel created by subdivision within Electoral Area “C”, proof of water shall consist of the following:

- a. Dug wells are not permitted as a water source for subdivision in Electoral Area “C”.
 - b. For each well that is proposed to be used as a water supply, at least one year of continuous groundwater level monitoring must be conducted and the results analyzed and interpreted by the **Qualified Professional** and documented in the hydrogeological report.
 - c. A site plan must be provided indicating the location of the well. The well must be constructed in compliance with the minimum construction requirements of the BC Groundwater Protection Regulation (GWPR) and sited in accordance with

the minimum setback distances from property boundaries, other wells and potential sources of contamination, as outlined in applicable legislation including the BC GWPR, BC Health Hazards Regulation (HHR), Sewerage System Regulation (SSR) and Municipal Wastewater Regulation (MWR). A survey of existing water supply wells on adjacent properties within a radius of 300 m from the proposed **parcel** must be undertaken and indicated on the site plan.

- d. A **well yield test** can not be used to demonstrate sustainable well yield in Electoral Area "C"
- e. The well must be assessed with a **pumping test** that has been conducted by a **Qualified Well Driller, Qualified Well Pump Installer** or a person working under the direct supervision of a **Qualified Well Driller, a Qualified Well Pump Installer, or Qualified Professional** and a hydrogeological report must be prepared by the **Qualified Professional** and submitted to the **Regional District**.
- f. The hydrogeological report must demonstrate that each proposed well can provide at least 6,550 litres of water per day (1.0 Imperial Gallon per Minute) for each dwelling or secondary dwelling permitted per **parcel** (except for secondary suites). If only one well is proposed, it must be demonstrated that the well can provide at least 6,550 litres of water per dwelling per day (1.0 Imperial Gallon per Minute). Parcels that cannot meet the minimum quantity for multiple dwellings (6,550 litres of water per dwelling per day) must register a restrictive covenant to limit the number of dwellings to the number which the well(s) on the parcel are capable of servicing. The report must also demonstrate that the use of the well will not negatively impact the use of neighbouring wells.
- g. Pumping tests are to be conducted in the dry part of the year when groundwater levels are lowest (no exceptions). The dry time of the year is from August 1st to March 1st; however, the seasonal low water levels must be confirmed by the results of the continuous groundwater level monitoring required in Section 406.4.b.
- h. Prior to conducting the **pumping test**, the static water level in the pumping well and observation well(s) must be monitored for a minimum of one week to assess pre-test trends and to provide the basis to estimate what the static water level is expected to be at the end of the testing period (i.e., projected to the end of the testing period to account for an increasing or decreasing trend).
- i. **Pumping tests** must be conducted for a duration of at least 48 hours for a well completed in an unconfined aquifer and at least 72 hours for a well completed in a bedrock aquifer.
- j. Water level recovery must be monitored for a period not less than the **pumping test**. Wells that have not achieved 100% recovery relative to what static is projected to be at the end of the test (based on the pre-test monitoring data described in Section 406.4.b.) must be further assessed by the **Qualified Professional**.
- k. At least one observation well must be monitored in the same aquifer and within the same fracture network (for bedrock wells), during the **pumping test** and

recovery period. The observation well must be located on the same property as the pumping well or adjacent property(ies) and within 300 m of the pumping well. If the fracture network cannot be determined, then a suitable well as recommended by the Qualified Professional with technical justification must be monitored in accordance with Section 406.4.j.

- I. Where more than one parcel would be created by a subdivision, the pumping **tests** must be conducted simultaneously for each well proposed to service each parcel, with each well pumped at a rate that is at least the minimum required rate. If deemed not possible by the Qualified Professional to conduct the tests simultaneously, then the well tests must be conducted sequentially. If proposed to be tested sequentially, then the test must be conducted as follows:
 - i. The first well would be pumped for the required duration and water levels monitored until 100% recovery relative to what the static water level (i.e., level of water under undisturbed, non-pumping conditions) is projected to be at the end of the test (based on the water level trend prior to initiation of the pumping test), as required in Section 406.4.i.
 - ii. The pumping test and recovery monitoring for the next well would then be conducted, and the process continued until each of the wells for the proposed subdivision are tested.
- m. If more than 4 new lots are proposed to be created, the hydrological assessment undertaken by the Qualified Professional must consider phasing of the development to verify that there would be an adequate groundwater supply to serve the proposed level of development and that there would be no negative impact on existing wells using the local aquifers. The assessment must include the collection and interpretation of on-site groundwater levels collected from multiple on-site wells for such duration as determined by the Qualified Professional and must include a review of seasonal groundwater fluctuations and aquifer recharge. This must allow for the effects of the initial phase of the development on the aquifer to be assessed before additional phases of the subdivision are approved.
- n. Water level monitoring for the sequential pumping test outlined in Section 406.4.l is required for each of the proposed wells in addition to the observation wells located on adjacent properties over the duration of the sequential pumping test program.
- o. The long-term sustainable yield of a well, which must be estimated based on the results of the pumping test and cannot be greater than the rate that was applied for the pumping test, shall be documented in a hydrogeological report that is signed and stamped by the **Qualified Professional** and submitted to the **Regional District**.
- p. The “Qualified Professional – Water Supply Evaluation Form” attached to and forming part of this Bylaw as Schedule A must be signed by a **Qualified Professional** confirming that all requirements in Section 406.4 have been completed and submitted to the Regional District.
- q. If any answers on the “Qualified Professional – Water Supply Evaluation Form” are “No”, the Regional District may hire, at the expense of the applicant, an

independent third-party Qualified Professional to review the report referenced in Section 406.6.o and the form referenced in Section 406.4.p.

- r. All hydrogeological reports, **pumping tests**, and Qualified Professional – Water Supply Evaluation Forms must be dated not more than five (5) years prior to the date of **subdivision** application.
 - s. For new and existing wells on the applicant’s property, a record of each well must be submitted to the Comptroller of Water Rights.
6. By adding the following as Section 407.1 and renumbering the following sections accordingly:
- 1. No Proof of Water exemptions apply to the proposed subdivision of properties located within Electoral Area “C” that are not serviced by a community water system.

7. By adding the following as Section 102 and renumbering the following sections accordingly:

102 Schedules

The following schedules are attached to and form part of this Bylaw:

Schedule A – Qualified Professional – Water Supply Evaluation Form

8. By adding Schedule A, *Qualified Professional – Water Supply Evaluation Form*, attached to and forming part of this Bylaw as Schedule A attached to and forming part of Subdivision Servicing Bylaw No. 2600, 2013.

Read a First Time	this	20th	day of	July, 2022
Read a Second Time as Amended	this	20th	day of	November, 2024
Advertised on	this	13th	day of	January, 2025
	this	4th	day of	February, 2025
Non-Statutory Delegated Public Hearing held	this	13th	day of	February, 2025
Read a Third Time	this		day of	, 2025
ADOPTED	this		day of	, 2025

Chair

Deputy Corporate Officer
Ashley Bevan



REGIONAL
DISTRICT
NORTH
OKANAGAN

Qualified Professional – Water Supply Evaluation Form (Subdivision Servicing Bylaw No. 2600 – Schedule A)

NOTE: This form must be filled out by a Qualified Professional (a person who is registered or licensed as a Professional Engineer or Professional Geoscientist under the *Engineers and Geoscientists Act* of British Columbia with competency in the field of hydrogeology and experience in evaluating sources for groundwater supply) and accompanied by a signed and sealed Hydrogeological Report).

Name of Property Owner(s):		Phone #:	
Address of Property:		Total Property Size (Ha):	
Name of Qualified Professional:		Phone #:	
Email of Qualified Professional:			
<p>Qualified Professional - Please complete the checklist below. Unsigned forms will <u>not</u> be accepted. A Qualified Professional must supervise the well pumping tests and submit this form as evidence of sufficient potable water for drilled wells.</p>			
A survey of existing water supply wells on adjacent properties within a radius of 300 m from the proposed parcel was undertaken and the results are presented on a site plan.	Yes <input type="checkbox"/>	No <input type="checkbox"/>	
At least one year of continuous groundwater level monitoring was conducted and the results analyzed to demonstrate that seasonal low groundwater levels have been characterized.	Yes <input type="checkbox"/>	No <input type="checkbox"/>	
The well has been constructed in compliance with the minimum construction requirements of the BC Groundwater Protection Regulation (GWPR) and sited in accordance with the minimum setback distances from property boundaries, other wells and potential sources of contamination, as outlined in applicable legislation including the BC GWPR, BC Health Hazards Regulation (HHR), Sewerage System Regulation (SSR) and Municipal Wastewater Regulation (MWR).	Yes <input type="checkbox"/>	No <input type="checkbox"/>	
Prior to conducting the pumping test, the static water level in the pumping well and observation well(s) were monitored for a minimum of one week to assess pre-test trends.	Yes <input type="checkbox"/>	No <input type="checkbox"/>	
Date pumping test was conducted:			
A pumping test was conducted during the dry season (defined as August 1 st to March 1 st however, must be confirmed by the results of the continuous groundwater level monitoring discussed above) and in accordance with the criteria outlined in the British Columbia Guide to Conducting Pumping Tests (BC Guide), and was at least 48-hours in duration for a well completed in an unconfined aquifer and 72-hours in duration for a well completed in a bedrock aquifer. (Note: A well yield test cannot be used to demonstrate sustainable well yield in Electoral Area "C".)	Yes <input type="checkbox"/>	No <input type="checkbox"/>	
The well pumping test demonstrates a sustainable yield of at least 6,550 litres of water per day (1.0 Imperial Gallon per Minute) per dwelling per parcel. (1.0 IGPM for each permitted single family dwelling and secondary single family dwelling)	Yes <input type="checkbox"/>	No <input type="checkbox"/>	

<p>Water level recovery was monitored for a period not less than the pumping test. If the static water level did not achieve 100% recovery relative to what static was projected to be at the end of the test (based on the pre-test monitoring data described above), recovery was further assessed and reported in the Hydrogeological report.</p>	<p>Yes <input type="checkbox"/></p>	<p>No <input type="checkbox"/></p>
<p>At least one observation well which is completed in the same aquifer (and within the same fracture network for bedrock wells) was monitored during the pumping test and recovery period. The observation well(s) should be located on the same property or adjacent property(ies) and within 300 m of the pumping well or as outlined in the Hydrogeological Report.</p>	<p>Yes <input type="checkbox"/></p>	<p>No <input type="checkbox"/></p>
<p>What is/are the address(es) of the property(ies) where the observation well(s) was/were monitored?</p>		
<p>Where more than one parcel would be created by a subdivision, the pumping tests must be conducted simultaneously or if not possible, sequentially (as outlined in Section 406.4.1 of Bylaw No. 2600) for each well proposed to service each parcel. Did you test all wells in accordance with Section 406.4.1?</p>	<p>Yes <input type="checkbox"/></p>	<p>No <input type="checkbox"/></p>
<p>How was the pumping test conducted?</p>	<p><input type="checkbox"/> Simultaneously <input type="checkbox"/> Sequentially</p>	
<p>If any of the above questions have been answered “No”, please provide an explanation within the signed and sealed Hydrogeological Report submitted by the Qualified Professional with this checklist. Be advised that in accordance with Section 406.6.p, the Regional District may, at the expense of the applicant, hire an independent third-party Qualified Professional to review the report.</p>		
<p>I acknowledge that this checklist is supplementary to the Hydrogeological Report for the property dated: _____</p>		
<p>I confirm that I supervised the well pumping testing on the property in accordance with Regional District of North Okanagan Subdivision Servicing Bylaw No. 2600, 2013 – Section 406.4 - Proof of Water Requirements for Electoral Area “C”</p>		
<p>Signature of Qualified Professional:</p>	<p>Date:</p>	

REGIONAL DISTRICT OF NORTH OKANAGAN

Extract from the Minutes of a Meeting of the

Board of Directors

Held on

Wednesday, November 20, 2024

Bylaw 2930 - Subdivision Servicing Amendment Proof of Water Requirements in Electoral Area "C"

Moved and seconded

That Subdivision Servicing Amendment Bylaw No. 2930 be amended as outlined in the staff report dated October 17, 2024 and as shown on the tracked changes version attached as Attachment B; and further,

That Bylaw No. 2930 be given Second Reading as amended and referred to a Public Hearing.

CARRIED

Moved and seconded

That the Public Hearing for Bylaw No. 2930 be delegated to the Electoral Area Advisory Committee under Section 231 of the *Local Government Act*.

CARRIED

TO: Electoral Area Advisory Committee

File No: 22-0403-C-TA

FROM: Planning Department

Date: October 17, 2024

SUBJECT: Subdivision Servicing Amendment Bylaw No. 2930 – WSP Review

RECOMMENDATION:

That Regional District of North Okanagan Subdivision Servicing Amendment Bylaw No. 2930, 2022 be amended as outlined in the staff report dated October 17, 2024 and as shown on the tracked changes version attached as Attachment B; and further,

That Bylaw No. 2930 be given Second Reading as amended and referred to a Public Hearing; and further,

That the Public Hearing for Bylaw No. 2930 be delegated to the Electoral Area Advisory Committee under Section 231 of the *Local Government Act*.

SUMMARY:

At the Board of Director's request, WSP Canada Inc. (WSP), (formerly Golder Associates Ltd.), have undertaken a technical review of the comments received through the referral process for Subdivision Servicing Bylaw No. 2930 (the Bylaw Amendment) which proposes amendments relating to proof of water requirements within Electoral Area "C" of the RDNO.

WSP have provided RDNO staff with a Technical Memorandum dated June 21, 2023 (the Technical Memorandum – Attachment A) which provides recommendations for further refinements to the Bylaw Amendment to address issues identified by the feedback received in 2022 and provide options to achieve the overall objectives of the proposed Bylaw Amendment which is to take a precautionary approach to approving new development in Electoral Area "C" that propose groundwater sources.

BACKGROUND:

At the Regular Meeting of the Board of Directors held on February 19, 2020, the Board resolved that staff be directed to develop a work plan to undertake a comprehensive review of the water supply in Aquifers 350 and 351 in Electoral Area "C" of the RDNO. Golder Associates Ltd. (Golder) was retained to complete the two-phase study and the final report titled *Keddeleston Groundwater Study – Phase 2* (the Golder Report) was endorsed by the Board of Directors at the Regular Meeting held on July 20, 2022.

At the Regular Meeting held on July 20, 2022, the Board gave First Reading to Subdivision Servicing Amendment Bylaw No. 2930, 2022 which, as recommended by Golder, includes the following changes to the proof of water requirements for subdivisions within Electoral Area “C” that are proposing to use groundwater sources:

- At least one year of continuous groundwater level monitoring be conducted and the results analyzed and interpreted by a Qualified Professional;
- Well pumping tests must be supervised by a Qualified Professional;
- 48-72 hour pumping tests at the current bylaw rate of 6,550 litres of water per day (1.0 Imperial Gallon per Minute) per parcel, depending on the aquifer type;
- Water level recovery must be monitored for the same period of time as the pumping test (48-72 hours) and achieve 90 to 95% recovery;
- At least one observation well must be monitored in the same aquifer and within the same fracture network, during the pumping test and recovery period;
- Pumping tests are to be conducted in the dry months of the year (August 1st –March 1st);
- Where an application to the RDNO includes more than one proposed lot, the pumping test must be conducted simultaneously at all wells proposed to service each lot;
- A Qualified Professional must submit a signed and stamped hydrogeological report and Schedule A: Qualified Professional - Proof of Water form confirming all requirements of the Bylaw have been met.

The Board further resolved to forward the Bylaw along with the *Keddleston Groundwater Study – Phase 2* report to internal and external agencies, stakeholders and the public. Feedback received through the referral process cited a number of concerns regarding the feasibility of conducting well tests to the extent recommended in the Phase 2 Report.

At the Regular Meeting held on December 14, 2022, the Board resolved that further consideration of Subdivision Servicing Amendment Bylaw No. 2930 be deferred until Golder Associates Ltd. (*now WSP Canada Inc.*) has completed the review and has provided recommendations on how to address the feedback received through the referral process.

On June 21, 2023, staff received the attached Technical Memorandum from WSP Canada Inc. which provides recommendations for amendments to the proposed Bylaw Amendment to address the feedback received.

With RDNO's comprehensive Zoning Bylaw rewrite complete (Zoning Bylaw No. 3000) and Phase I of the legislated mandate to implement Bill 44 requirements for Small Scale Multi-Unit Housing underway (Zoning Amendment Bylaw No. 3001), it is timely to move forward with Bylaw 2930.

DISCUSSION:

The Technical Memorandum from WSP states:

In general, the majority of the proposed changes to the proof of water requirements are consistent with the provincial Guide to Conducting Pumping Tests (Pumping Test Guide), including: minimum durations for pumping tests (i.e., 72 hours for bedrock aquifers and 48 hours for unconfined aquifers); water level recovery monitoring following pumping; monitoring of at least one observation well that is completed in the same aquifer unit; and conducting pumping tests during the dry period of the year, when groundwater levels are lowest. These durations for the pumping tests are not intended to reflect daily residential water use but rather provide an industry-accepted approach to estimating the sustainable yield for a well.

The Technical Memorandum from WSP provided the following recommendations to address the feedback received on Subdivision Servicing Amendment Bylaw No. 2930:

Pumping Test Flow Rate and Water Use

WSP Canada Inc. recommends that the proof of water requirements for Electoral Area “C” remain the same (6,550 L/day; 1.0 IGPM) as the requirement is intended to be greater than typical domestic use to provide some confidence for future buyers that the lot was demonstrated to have an adequate water supply at the time of subdivision. WSP acknowledges that the proof of water per parcel requirement is relatively high compared to the “water right” for domestic users under the Water Sustainability Act (2,000 L/day; 0.3 IGPM). However, 1 IGPM amount is not intended to reflect daily residential water use, but rather provide a conservative and industry accepted approach to estimating the sustainable yield for a well within the Keddleston area. RDNO staff are not proposing changes to the pumping test flow rates of 1.0 IGPM, however, with the Provincially mandated requirements under the Small-Scale Multi-Unit Housing legislation (Bill 44) to allow suites on all properties and with the Zoning Bylaw No. 3000 provisions to allow additional dwelling units on properties over 1.0 ha in size, the 1.0 IGPM requirements per parcel may not be enough to ensure sustainable groundwater supply. Therefore, staff are recommending 1.0 IGPM per stand alone dwelling (single family dwelling and secondary dwelling) per parcel. This would be consistent with the RDNO Building Bylaw which requires 1.0 IGPM per dwelling in Electoral Areas “B”, “C” and “F”.

Simultaneous Pumping Tests for Multiple Lots

Concerns were raised during the referral process regarding the proposed requirement for pumping tests to be conducted simultaneously for multiple lot subdivisions. It is recognized that it would be operationally challenging for Qualified Pump Installers to supply and operate the equipment and labour required to conduct simultaneous pumping tests for multiple lots at once.

WSP provides the following recommendation to address concerns about simultaneous pumping:

A compromise could be to require that the pumping tests for a multi-lot application be conducted sequentially, during the same dry season. For this approach, it is recommended that consideration be given to the following requirements:

- Water levels in each of the proposed wells should be monitored over the duration of the pumping test program, in addition to existing wells located on adjacent properties.
- Individual pumping tests would be conducted for each well in the application:
 - The first well would be pumped for the required duration and water levels monitored until 100% recovery relative to what the static water level (i.e., level of water under undisturbed, non-pumping conditions) is projected to be at the end of the test (based on the water level trend prior to initiation of the pumping test), as required in the Bylaw Amendment.
 - The pumping test and recovery monitoring for the next well would then be conducted, and the process continued until each of the wells for the proposed subdivision is tested.

Although this would not simulate pumping all the new wells together, the pumping and recovery data from each pumping test, combined with water level data from observation wells, together would provide the Qualified Professional a basis to assess water levels over a longer period of time when the new wells are pumped.

RDNO staff recommend changes to the Amendment Bylaw in accordance with the above recommendations for conducting the pumping tests sequentially if the Qualified Professional determines that it is not possible to do so simultaneously given available resourcing or for other technical reasons.

In addition, in keeping with a precautionary approach to water sustainability, staff are proposing changes to the Bylaw that include provisions that, for multiple lot proposals (4 proposed lots or more) the hydrogeologists shall provide a professional recommendation for phasing of the development based on on-going evaluation of the impacts on groundwater levels from the initial phases. This would be required to identify adequate groundwater supply to service the development and not have a negative impact on existing wells in the area.

Water Level and Observation Well Monitoring

The RDNO received feedback outlining concerns regarding the monitoring of each well for a one year period and the monitoring of the static groundwater levels in a pumping well for a minimum of one week prior to testing being conducted.

The Technical Memorandum states:

Continuous groundwater level monitoring for a period of at least one year for each well that will be used as a water supply was proposed to document baseline conditions and to identify seasonal low water levels. The results from this monitoring will provide the technical basis to identify the dry season and when the pumping test should be conducted, consistent with the recommendations in the pumping Test Guide. For applications that include more than one lot, consideration could be given to requiring continuous water level monitoring for at least one well (i.e., not each well), provided that the wells are completed within the same aquifer. Data from the groundwater level monitoring program that the RDNO is currently implementing in the Keddleston area could also provide the basis to identify when seasonal lows occur in the local aquifers and when pumping tests could be conducted. If, in the future, the data from the RDNO monitoring program are considered to be sufficient to adequately characterize the dry season for the respective aquifers, consideration could be given to revisiting the requirement for at least one year of groundwater level monitoring.

WSP state that the requirement to monitor static groundwater levels in a pumping well for a minimum of one week prior to conducting a pumping test enables the assessment of pre-test trends and the basis to assess whether the water level in the pumping well fully recovers or not.

Therefore, as both the dry period of the year and trends (up and down) provide good context and data, staff recommend that these conditions relating to monitoring the onsite wells remain in the Bylaw Amendment and that the requirement for a year of groundwater monitoring be revisited after another year of data is collected from observation wells that are part of the RDNO well monitoring program in the Keddleston area. This program is expected to be complete with data available at the end of 2024.

Also, applicants would be able to apply to the RDNO to vary the requirements of the Subdivision Servicing Bylaw, including the monitoring period, with supporting rationale.

Feedback was also received regarding the monitoring of an observation well within the same aquifer, WSP provided that:

It is recognized that there is relatively high uncertainty regarding the hydraulic connection between neighbouring wells that are completed in bedrock aquifers, and it could be difficult to identify an observation well that is hydraulically connected to the same fracture network as the pumping well.

Following WSP's recommendations the following amendments have been made to Bylaw 2930:

- For multi-lot applications, the requirement for a simultaneous pumping test has been modified to allow sequential testing (as discussed in the previous section), water level monitoring is required for each of the proposed wells in the application over the duration of the sequential pumping test program.
- In addition to the above requirement, and for single lot applications, the minimum distance of 100 m between the observation well and pumping well could be refined to be 300 m and include "or established by the Qualified Professional with technical justification"; this is an increase from the distance of 100 m that was specified in the Bylaw Amendment and is noted in the Pumping Test Guide, but is suggested particularly for bedrock aquifers.

Additionally, WSP recommended the following:

- The requirements for observation well monitoring could also be strengthened to require water level monitoring for wells on adjacent properties. It is recognized that gaining access to wells on neighbouring properties can be challenging, as they are on private property and residents may not grant access and/or the well conditions may not be suitable for water level monitoring. A Qualified Pump Installer should be retained to access wells on neighbouring properties. A clause could be added whereby the Applicant would notify the RDNO in advance of a pumping test if access to a neighbouring well for monitoring purposes cannot be obtained. The RDNO could then attempt to contact the owner of the neighbouring property and, if access still cannot be obtained, the response documented.

RDNO staff did not include the above in the proposed Bylaw amendments as the RDNO typically would not get involved in the coordination of third party access to a property.

Requirements of the Qualified Professional

Concerns were raised regarding the requirement of the Qualified Professional to sign and stamp/seal Schedule A of the proposed Bylaw Amendment. WSP recognize that the term "proof of water" is a general term that could be interpreted to imply that the Qualified Professional is "guaranteeing" or "ensuring" that there is sufficient water for a proposed development. It is also recognized that the Qualified Professional's opinion and the basis for that opinion, as well as the associated uncertainties, limitations and other considerations, would be documented in the Qualified Professional's report.

Staff recommend changing the title of the form to *Qualified Professional – Water Supply Evaluation* to be clear that it is not a guarantee, only that the Qualified Professional has completed the checklist requirements at the time of their report. Additionally, staff propose adding a section where the Qualified Professional provides a reference to the completed and stamped/sealed hydrogeological report.

The WSP Technical Memorandum suggests that the requirement of “yes” answers to all questions in the Water Supply Evaluation form may not always be practical and suggests that the Qualified Professional could instead provide a strong technical rationale as to why a certain requirement may not be applicable. WSP suggest that the RDNO could consider a requirement for a third party professional review (at the developer's expense) if the answer to one or more of the checklist items is “No”.

Staff recommend keeping the yes/no format on the renamed *Qualified Professional – Water Supply Evaluation* and providing spaces for the Qualified Professional to reference an explanation to their answer in the completed and stamped/sealed hydrogeological report. As stated by WSP, this form is similar to others that are required in some jurisdictions and for members of Engineers and Geoscientists of BC in other disciplines providing services as Qualified Professionals in B.C.

Additional Considerations from the Technical Memorandum

WSP provided additional considerations and comments regarding the proposed Bylaw Amendment that staff have included in the changes to the Bylaw:

- Including additional language stating that, for new applications, dug wells will no longer be considered a suitable water source in the Keddeleston area.
- Including a requirement that a record for each well on the Applicant's property be submitted to the Comptroller of Water Rights if the well is not already registered with the Province.

Additional considerations raised by WSP but **not** included in the Bylaw at this time include:

- Aquifer protection Development Permit Areas (DPAs) could be established to control and limit development in areas where groundwater availability issues have been identified. This could be addressed during the next review of the Electoral Areas “B” and “C” Official Community Plan or if there is a desire to do so a specific amendment to add this DPA, the Board could direct staff to draft OCP Bylaw amendments now.
- Consider a refined water balance analysis in areas of particular concern. The development of a regional numerical flow model would provide the technical basis to assess current and potential future groundwater use, along with the potential implications of climate change. This should be discussed as a project after the results of the well monitoring program are available later in 2024.
- Bylaw No. 2600 and the proposed Bylaw Amendment do not currently include consideration of the potential cumulative effects of onsite sewage disposal systems on local groundwater quality for parameters such as nitrates. Loading analysis would be required to assess the potential impacts to groundwater quality from septic systems. It is recommended that in addition to the requirement for septic systems to be properly designed and constructed, the QP for the septic system should be required to assess the potential for effects to groundwater quality. This could be considered a subsequent amendment to the Subdivision Servicing Bylaw or staff could be directed to include this requirement in Bylaw 2930.

LEGAL/STATUTORY AUTHORITY/REQUIREMENTS:

In accordance with Section 506(1)(c) of the *Local Government Act*, a local government may, by Bylaw, regulate and require the provision of works and services in respect to the subdivision of land, and for that purpose may, by Bylaw, require that, within a subdivision, a water distribution system, a fire hydrant system, a sewage collection system, a sewage disposal system, a drainage collection system or a drainage disposal system be provided, located and constructed in accordance with the standards established in the Bylaw.

Further, in accordance with Section 506, a Subdivision Servicing Bylaw is permitted to have separate thresholds for different areas with different circumstances and if there is no community water system, may require that each parcel to be created have a source of potable water having a flow capacity at a rate established by bylaw.

For any existing subdivision applications that have already been submitted, Section 511 of the *Local Government Act* states the Bylaw has no effect with respect to that subdivision for a period of 12 months after the Bylaw is adopted. There are approximately seven subdivision applications within Electoral Area "C" and outside of the Greater Vernon Water service area at the time of writing this report that will have a one-year period of time once the bylaw is adopted to advance under the existing regulations.

As a result of mandatory densification from Bill 44, updates will be required to the proposed changes as the Zoning Bylaw now allows for suites on properties of all sizes and Additional Dwelling Units on properties over 1 hectare in size. This could have the effect of doubling the number of residences drawing from the aquifer over time. Staff have proposed increasing the flow capacity to 1.0 IGPM per dwelling per parcel to account for the second residence on all properties over 1.0 ha. With a suite being limited to being contained within the principal residence, staff have not recommended an increase. Subsequent amendments will be brought forward to address water supply at the Building Permit stage in Building Bylaw 2670.

A Public Hearing is not a requirement when amending or adopting a Subdivision Servicing Bylaw in accordance with the *Local Government Act*. However, staff have recommended that a Delegated Public Hearing be held.

Attachments

- Attachment A - WSP Technical Memorandum dated June 21, 2023
- Attachment B - Regional District of North Okanagan Subdivision Servicing Amendment Bylaw No. 2930, 2022 [Tracked Changes]
- Attachment C - Regional District of North Okanagan Subdivision Servicing Amendment Bylaw No. 2930, 2022 [Changes Accepted]

Submitted by:



Rob Smails, MCIP, RPP
General Manager, Planning and Building

Approved for Inclusion:



David Sewell
Chief Administrative Officer



TECHNICAL MEMORANDUM

DATE 21 June 2023

Reference No. 20144760-013-TM-Rev0

TO Rob Smailes, General Manager, Planning and Building
Regional District of North Okanagan

CC Zee Marcolin, General Manager, Utilities

FROM Mark Bolton, WSP Canada Inc.

EMAIL mark.bolton@wsp.com

TECHNICAL REVIEW OF COMMENTS RECEIVED REGARDING PROPOSED AMENDMENTS TO BYLAW 2930, REGIONAL DISTRICT OF NORTH OKANAGAN, BC

As requested by the Regional District of North Okanagan (RDNO), WSP Canada Inc. (WSP) has conducted a technical review of comments received from the first round of stakeholder consultation of RDNO Subdivision Servicing Amendment Bylaw No. 2930 and has provided recommendations for further refinements to the amendment to address the feedback received and achieve the overall objectives of the bylaws (herein referred to as the “Technical Review”).

This technical memorandum should be interpreted and used in accordance with the limitations and considerations set out in WSP’s *Study Limitations*, provided at the end of this memo.

1.0 BACKGROUND AND OBJECTIVE

WSP (formerly Golder Associates Ltd., member of WSP) conducted a groundwater study that included assessment of the groundwater supply potential in the Keddleston area to support the RDNO in making informed decisions regarding sustainable development. The study included recommendations to strengthen the RDNO Subdivision Servicing Bylaw 2600 (RDNO, 2013) and RDNO Building Bylaw 2670 (RDNO, 2015) to require a more comprehensive hydrogeological assessment of aquifer conditions that demonstrates a sustainable potable water supply is available. Further details are presented in the report titled “Keddleston Groundwater Study – Phase 2 Electoral Area C, Regional District of North Okanagan, BC” dated 29 June 2022 (Reference: 20144760-004-R-Rev1).

Proposed changes to the Subdivision Servicing Bylaw for Electoral Area “C”, as outlined in Subdivision Servicing Amendment Bylaw No. 2930 (herein referred to as “the Bylaw Amendment”), received first reading at a Regular Meeting on 20 July 2022. RDNO staff also sought feedback from governments including First Nations, provincial ministries, local governments and RDNO departments, stakeholders and members of the public. The feedback received is presented in the RDNO Staff Report titled “Subdivision Servicing Amendment Bylaw No. 2930 – Feedback Received” and dated 25 November 2022 (File No. 22-0403-C-TA).

The objective of this Technical Review was to provide recommendations for further refinements to the Bylaw Amendment that consider the feedback received and alternative options to achieve the overall objectives of the Bylaw Amendment.

2.0 RESULTS OF TECHNICAL REVIEW

2.1 Summary and Discussion of Feedback Received

As discussed above, the feedback received from the first round of stakeholder consultation is presented in RDNO File No. 22-0403-C-TA. The feedback included supportive comments as well as concerns that generally included the following technical topics:

- pumping test requirements, particularly the proposed requirement to conduct simultaneous pumping tests for each well for applications that include more than one lot
- technical justification for water level monitoring requirements and concerns regarding observation wells (i.e., objective; selection; distance from, and hydraulic connection to, pumping well)
- variability and uncertainty related to bedrock aquifers

It is recognized that there is relatively higher uncertainty regarding groundwater conditions in bedrock aquifers and variability between neighbouring wells, resulting in some properties having an adequate water supply while others may not. The purpose of the Bylaw Amendment was to require a more comprehensive assessment to demonstrate that a sustainable potable water supply is available for proposed new lots without demonstrating negative impacts to neighboring wells and to support decision-making regarding sustainable development in the Keddleston Area. In general, the majority of the proposed changes to the proof of water requirements are consistent with the provincial *Guide to Conducting Pumping Tests* (Pumping Test Guide), including: minimum durations for pumping tests (i.e., 72 hours for bedrock aquifers and 48 hours for unconfined aquifers); water level recovery monitoring following pumping; monitoring of at least one observation well that is completed in the same aquifer unit; and conducting pumping tests during the dry period of the year, when groundwater levels are lowest. These durations for the pumping tests are not intended to reflect daily residential water use, but rather provide an industry accepted approach to estimating the sustainable yield for a well.

Other aspects of the Bylaw Amendment for which feedback was received are discussed further in the subsections below along with supporting information and complementary tools that could also be considered to achieve the overall objective of the Bylaw Amendment.

Pumping Test Flow Rate and Water Use

The RDNO Subdivision Servicing Bylaw 2600 (RDNO, 2013) requires that, in Electoral Area C, a pumping test is required to demonstrate that a well can provide at least 6,550 litres per day (L/day; 1.0 Imperial gallon per minute [IGPM]) per parcel. It is noted that the minimum requirement in Electoral Areas D and E is 2,273 L/day (0.35 IGPM).

Feedback was received that the proof of water requirement for Electoral Area C (i.e., 6,550 L/day; 1.0 IGPM) is too high; however, a conservatively high flow rate for the pumping test provides some confidence for future buyers that the lot was demonstrated to have an adequate water supply at the time of subdivision. The estimated long-term sustainable yield of a well cannot be greater than the rate that was applied for a pumping test (i.e., must demonstrate the yield with the test) and a relatively high flow rate for a pumping test is also favourable for assessment of aquifer properties such as hydraulic conductivity and transmissivity, boundary conditions, and potential interference with neighbouring wells. Furthermore, variability and uncertainty are relatively higher for bedrock aquifers, and it is recognized that water levels may decline in the future due to climate change. Therefore, a relatively higher proof of water requirement provides additional confidence that a well can provide adequate water supply for a lot. As discussed below, the proof of water requirement is not intended to reflect actual water usage.

Proof of water requirements vary between local governments based on a number of local considerations; however, overall, in BC, under the *Water Sustainability Act*, domestic well owners have a “water right” of up to 2,000 L/day (0.3 IGPM) and under periods of water scarcity, “essential household use” for occupants of one private dwelling is not more than 250 L/day (0.04 IGPM). A summary of licensing requirements in other provinces regarding domestic well withdrawals is presented in Table 1, below.

Table 1: Summary of Provincial Regulations Regarding Domestic Well Withdrawals

Jurisdiction	Regulatory Considerations
British Columbia	Domestic well owners have a right to 2,000 L/day (0.3 IGPM)
Alberta	No thresholds for domestic wells identified
Saskatchewan	Domestic water use up to 5,000 m ³ /year (13,700 L/day; 2 IGPM) allowed
Manitoba	Domestic wells exempt from licensing unless >25,000 L/day (3.8 IGPM)
Ontario	Permit to Take Water not required for withdrawals of less than 50,000 L/day (7.6 IGPM)
Quebec	Licensing requirements not readily apparent
New Brunswick	Permit required for use >50 m ³ /day (50,000 L/day; 7.6 IGPM), except domestic wells
Nova Scotia	Water withdrawal approvals needed for use >23,000 L/day (3.5 GPM) for more than two weeks
Prince Edward Island	Licensing required for use >25 m ³ /day (25,000 L/day; 3.8 IGPM)

The proof of water requirement for Electoral Area C is relatively high compared to the “water right” for domestic users under the *Water Sustainability Act*, but lower than licensing or permitting thresholds in some other provinces. As indicate above, the proof of water requirement for Electoral Area C is greater than the requirement for Electoral Areas D and E of the RDNO and some other jurisdictions. A detailed review of the requirements for other local governments has not been conducted; however, as an example, the Columbia Shuswap Regional District Subdivision Servicing Bylaw No. 641 requires that wells be tested at a rate of at least 3.8 litres per minute (5,475 L/day; 0.8 IGPM). Furthermore, the Okanagan Water Supply and Demand Project reports that total residential water use (indoor and outdoor uses) by Okanagan residents is greater than 1,000 L/day per person

(<https://www.obwb.ca/wsd/key-findings/water-use>) and the Okanagan Basin Water Board (OBWB) references the average water use per capita in the Okanagan to be 675/ L/day, which is higher than the national average of 411 L/day. If the RDNO wishes to consider lowering the proof of water requirements in Electoral Area C, it is recommended that the new value be based on a rationale that notes the provincial water rights under the *Water Sustainability Act* and outlines the rationale and basis such as a relevant water usage multiplied by average number of occupants (either from census data or by other means).

The proof of water requirement for Electoral Area C is intended to be greater than typical domestic use. Actual water use could potentially be managed by setting limitations on the size/capacity of the pump that is installed in a well to restrict water usage to a specified rate. Domestic water systems typically include a pressure tank to maintain a pressure in the range of 40 to 60 pounds per square inch (PSI). When the pressure in the system drops below the lower threshold, the pump turns on to increase the pressure in the system. If pumps are oversized (i.e., have a relatively high flow rate), when they turn on, they can cause relatively greater drawdown in the well and can maintain pressure in the system during periods of high water use. Alternatively, constant pressure systems with variable speed pumps can include smaller pressure tanks as the flow rate in the pump increases as needed to maintain pressure. These pumps operate at relatively lower flow rates when the rate of decrease in pressure is low (i.e., water use is lower), resulting in less drawdown during pumping. The pump could be selected with a maximum flow rate that would be appropriate for typical domestic use, above which the pressure would drop, thereby encouraging conservation. For low yielding wells, secondary storage could be considered to provide additional supply, if needed. A Qualified Pump Installer should be retained to provide advice regarding selection of an appropriate pump and to install the pump.

Conservation and sustainable water use could also be supported through other complementary tools that are discussed in the “Additional Considerations” section at the end of this memo.

Simultaneous Pumping Tests for Multiple Lots

Concerns were raised by a number of respondents regarding the proposed requirement for pumping tests to be conducted simultaneously for subdivision applications that would create more than one parcel. Several respondents noted that the data from such a test would not enable assessment of interference between individual wells; however, the objective of conducting simultaneous pumping tests is to assess the impacts of pumping all of the wells collectively, rather than individually. It is recognized that it would be operationally challenging for Qualified Pump Installers to supply and operate the equipment to conduct simultaneous tests for several lots.

A compromise could be to require that the pumping tests for a multi-lot application be conducted sequentially, during the same dry season. For this approach, it is recommended that consideration be given to the following requirements:

- Water levels in each of the proposed wells should be monitored over the duration of the pumping test program, in addition to existing wells located on adjacent properties (see following section).
- Individual pumping tests would be conducted for each well in the application:
 - The first well would be pumped for the required duration and water levels monitored until 100% recovery relative to what the static water level (i.e., level of water under undisturbed, non-pumping conditions) is

projected to be at the end of the test (based on the water level trend prior to initiation of the pumping test), as required in the Bylaw Amendment.

- The pumping test and recovery monitoring for the next well would then be conducted, and the process continued until each of the wells for the proposed subdivision was tested.

Although this would not simulate pumping all the new wells together, the pumping and recovery data from each pumping test, combined with water level data from observation wells, together would provide a basis to assess water levels over a longer period of time when the new wells are pumped. This refinement, in conjunction with a phased approach to development and limitations on the maximum number of lots per application, as discussed in the “Additional Considerations” section, may provide an alternative method to manage development of groundwater resources. In addition, a minimum period of monitoring could be required to demonstrate groundwater conditions following build-out, with the results requiring assessment by a Qualified Professional prior to considering availability of water for future development. This would provide the basis to approve a limited number of lots at a time and demonstrate groundwater conditions prior to considering additional development.

Water Level and Observation Well Monitoring

Several respondents provided comments regarding the proposed requirements for water level monitoring and observation wells, as discussed below.

Continuous groundwater level monitoring for a period of at least one year for each well that will be used as a water supply was proposed to document baseline conditions and to identify seasonal low water levels. The results from this monitoring will provide the technical basis to identify the dry season and when the pumping test should be conducted, consistent with the recommendations in the Pumping Test Guide. For applications that include more than one lot, consideration could be given to requiring continuous water level monitoring for at least one well (i.e., not each well), provided that the wells are completed within the same aquifer. Data from the groundwater level monitoring program that the RDNO is currently implementing in the Keddleston area could also provide the basis to identify when seasonal lows occur in the local aquifers and when pumping tests could be conducted. If, in the future, the data from the RDNO monitoring program are considered to be sufficient to adequately characterize the dry season for the respective aquifers, consideration could be given to revisiting the requirement for at least one year of groundwater level monitoring.

The requirement to monitor static groundwater levels in a pumping well for a minimum of one week prior to conducting a pumping test enables assessment of pre-test trends and the basis to assess whether the water level in the pumping well fully recovers. It is therefore recommended that this requirement remain in the Bylaw Amendment.

The objective of water level monitoring in at least one observation well within the same aquifer is recommended to assess the potential for well interference. It is recognized that there is a relatively high uncertainty regarding the hydraulic connection between neighbouring wells that are completed in bedrock aquifers, and it could be difficult to identify an observation well that is hydraulically connected to the same fracture network as the pumping well. Refinement of the requirement in the proposed Bylaw Amendment for observation well monitoring could consider the following:

- For multi-lot applications, if the requirement for a simultaneous pumping test is removed (as discussed in previous section), water level monitoring could be required for each of the proposed wells in the application over the duration of the sequential pumping test program.
- In addition to the above requirement, and for single lot applications, the minimum distance of 100 m between the observation well and pumping well could be refined to be 300 m and include “or established by the Qualified Professional with technical justification”; this is an increase from the distance of 100 m that was specified in the Bylaw Amendment and is noted in the Pumping Test Guide, but is suggested particularly for bedrock aquifers.
- The requirements for observation well monitoring could also be strengthened to require water level monitoring for wells on adjacent properties. It is recognized that gaining access to wells on neighbouring properties can be challenging, as they are on private property and residents may not grant access and/or the well conditions may not be suitable for water level monitoring. A Qualified Pump Installer should be retained to access wells on neighbouring properties. A clause could be added whereby the Applicant would notify the RDNO in advance of a pumping test if access to a neighbouring well for monitoring purposes cannot be obtained. The RDNO could then attempt to contact the owner of the neighbouring property and, if access still cannot be obtained, the response documented.

Requirements of the Qualified Professional

Concerns were also raised regarding the proposed requirement for the Qualified Professional to sign and stamp the proposed “Qualified Professional – Proof of Water (Subdivision Servicing Bylaw No. 2600 – Schedule A)” form. This form is similar to others that are required in some jurisdictions and for members of Engineers and Geoscientists of BC in other disciplines providing services as Qualified Professionals.

The Schedule A form does not require that a professional opinion be provided regarding the application. Rather, the form includes a number of factual questions documenting whether requirements of Bylaw No. 2600 have been provided; it is noted that the third requirement regarding well construction should be revised from “The well must be constructed in compliance with...” to “The well was constructed in compliance with...”. It is recognized that the term “proof of water” is general term that could be interpreted to imply that the Qualified Professional is “guaranteeing” or “ensuring” that there is sufficient water for a proposed development. Therefore, it is recommended that the term “proof of water” be removed from the title and text of the form.

It is also recognized that the Qualified Professional’s opinion and the basis for that opinion, as well as the associated uncertainties, limitations and other considerations, would be documented in the Qualified Professional’s report. Therefore, the Schedule A form should be refined to include a section where the professional provides a reference for this report (i.e., title, date and reference number) and the form include a statement that the reader must refer to the report.

Schedule A also requires that all answers be answered “Yes” to be accepted by the RDNO; however, it is not always practical for all requirements to be fulfilled or the Qualified Professional could provide a strong technical rationale as to why a certain requirement may not be applicable (e.g., if the subdivision is a large lot and there are no adjacent wells). The RDNO could consider refining the form to note that an independent third party review by a Qualified Professional may be required if the answer to one or more of the checklist items is “No”. If a third party

independent review were to be requested, open discussion between the Applicant, RDNO and two Qualified Professionals (i.e., the Applicant's Qualified Professional and the third party Qualified Professional) would provide the opportunity to share information and consider the interests of the Applicant and owners of neighbouring properties.

Reference to dug wells should also be removed from Schedule A; further discussion regarding dug wells is provided below. Refinements from the preceding sections that are selected by the RDNO should also be reflected in Schedule A.

Additional Considerations

The Bylaw Amendment included removal of references to dug wells, as they will not be considered for new developments. It is recommended that the Bylaw Amendment includes language explicitly stating that for new applications, dug wells no longer be considered a suitable water source. Reference to dug wells should also be removed from the Schedule A form.

As it is not stated in Bylaw No. 2600, it is also recommended that the bylaw be revised to require that a record for each well on the Applicant's property be submitted to the Comptroller of Water Rights, if the well is not already registered with the Province. It is also recommended that the Bylaw Amendment also include a requirement for unused wells to be deactivated or decommissioned in accordance with the requirements of the BC Groundwater Protection Regulation.

This Technical Review has focused on feedback received to the Bylaw Amendment. Subdivision Servicing Bylaw No. 2600 requiring water supplies to provide potable water, which is defined as "water that meets the microbiological parameters and the health based chemical and physical parameters of the Guidelines for Canadian Drinking Water Quality". Bylaw No. 2600 includes provision for water to be treated to become potable. The Bylaw Amendment requires that wells are sited in accordance with minimum setback distances from potential sources of contamination, as outlined in provincial legislation. Bylaw No. 2600 requires subdivisions to be serviced by a community sanitary sewage system or an onsite sewage disposal system that "...must be capable of being provided for each proposed lot in accordance with the standards prescribed by the authority having jurisdiction" that would require the systems to be properly designed and constructed; however, it is noted that Bylaw No. 2600 and the Bylaw Amendment do not consider the potential cumulative effects of onsite sewage disposal systems on local groundwater quality for parameters such as nitrates. Loading analysis would be required to assess the potential impacts to groundwater quality from septic systems. It is recommended that in addition to the requirement for septic systems to be properly designed and constructed, the QP for the septic system should be required to assess the potential for effects to groundwater quality.

In support of the bylaws, complementary tools to support conservation and sustainable water use could also be considered, including the following:

- Aquifer protection Development Permit Areas (DPAs) could be established to control and limit development in areas where groundwater availability issues have been identified. Approval of development in the DPAs could then be contingent upon specific requirements that could include implementation of the following:
 - a precautionary phased approach to development with a maximum number of proposed lots and minimum lot size per application, along with requirements for groundwater monitoring for a minimum

period following build-out to assess conditions and provide the basis to consider water availability for future development; it is anticipated that the RDNO would consider several factors in developing the new requirements for applications (i.e., number and size for new lots)

- water conservation measures and, if necessary, alternative water supplies (see below)
- site-specific groundwater protection measures to limit site disturbance and preserve natural soils and vegetation in order to promote infiltration
- Potentially in conjunction with implementation of DPAs, the RDNO could consider refined water balance analysis in areas of particular concern. Development of a regional numerical flow model would provide the technical basis to assess current and potential future groundwater use, along with the potential implications of climate change.
- For proposed lots with wells that do not meet the minimum water supply requirements, or are assessed as having a high potential to impact existing users, alternative water supplies could be required such as:
 - lots are required to be serviced by a water system that has demonstrated capacity, is licensed by the Province and is permitted by Interior Health; it is recognized that in areas of water scarcity, it is unlikely that a source with sufficient capacity to supply a multi-lot development will be available
 - secondary storage that could be supplemented with water that is supplied from another source (i.e., water delivery truck)

If requirements for alternative on-site water supplies such as secondary storage are considered, including provision for emergencies (e.g., drought conditions, fires, etc.), the RDNO may wish to provide further guidance regarding the requirements for design and oversight by Qualified Professionals.

- DPAs could be a tool to implement requirements for alternative water supplies for new development in certain areas. As an example, Land Use Bylaw No. 119 for Saturna Island, BC indicates that within a specified Water Management Area, building permits will not be issued until the lot is equipped with a water catchment system and cistern(s) of minimum capacities for storage of rainwater.

3.0 CLOSURE

We trust that this technical memorandum meets your needs at this time. Should you have any questions, please do not hesitate to contact the undersigned.

WSP Canada Inc.



Mark Bolton, MSc, PGeo
Senior Principal Hydrogeologist

A handwritten signature in black ink that reads "J. Sacré".

Jillian Sacré, MSc, PGeo
Senior Principal Hydrogeologist

MB/JPS/asd

[https://golderassociates.sharepoint.com/sites/127973/project files/6 deliverables/3.0_issued/20144760-013-tm-rev0/20144760-013-tm-rev0-bylaw comments 21jun_23.docx](https://golderassociates.sharepoint.com/sites/127973/project%20files/6%20deliverables/3.0_issued/20144760-013-tm-rev0/20144760-013-tm-rev0-bylaw%20comments%2021jun_23.docx)

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4.0 STUDY LIMITATIONS

WSP Canada Inc. (WSP) has prepared this technical memorandum in a manner consistent with that level of care and skill ordinarily exercised by members of the engineering and geoscience professions currently practicing in British Columbia, subject to the time limits and physical constraints applicable to this technical memorandum. No other warranty, express or implied is made.

The technical memorandum is of a summary nature and is not intended to stand alone without reference to the instructions given to WSP by the Client, communications between WSP and the Client, and to any other deliverables prepared by WSP for the Client relative to the specific site described in the technical memorandum. In order to properly understand the suggestions, recommendations and opinions expressed in this technical memorandum, reference must be made to the whole of the technical memorandum.

WSP cannot be responsible for use by any party of portions of the technical memorandum without reference to the entire technical memorandum and other relevant communications between WSP and the Client.

In preparing this technical memorandum, WSP has relied in good faith on information provided by the individuals and agencies noted in this technical memorandum. We accept no responsibility for any deficiency or inaccuracy contained in this technical memorandum as a result of errors, omissions, misinterpretations or fraudulent acts of the persons or agencies contacted.

The information, recommendations and opinions expressed in this technical memorandum are for the sole benefit of the Client.

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If new information is discovered in the future, WSP should be requested to re-evaluate the content of this technical memorandum and provide amendments as required prior to any reliance upon the information presented herein.

REGIONAL DISTRICT OF NORTH OKANAGAN

BYLAW No. 2930

A bylaw to amend the Subdivision Servicing Bylaw No. 2600, 2013

WHEREAS Section 506 (7) [*Subdivision servicing requirements*] of the *Local Government Act*, states that when there is no community water system, the Regional Board may, by bylaw, require that each parcel to be created by the subdivision have a source of potable water having a flow capacity at a rate established in the bylaw;

AND WHEREAS there are areas of known groundwater supply concerns within Electoral Area “C”;

AND WHEREAS the Regional Board desires additional information regarding flow capacity and impact on neighbouring wells from a Qualified Professional for proposed subdivisions within Electoral Area “C”;

NOW THEREFORE, the Board of the Regional District of North Okanagan, in open meeting assembled hereby, ENACTS AS FOLLOWS:

CITATION

1. This Bylaw may be cited as the “**Regional District of North Okanagan Subdivision Servicing Amendment Bylaw No. 2930, 2022**”.

AMENDMENTS

Regional District of North Okanagan Subdivision Servicing Bylaw No. 2600, 2013 be amended as follows:

2. Section 406.1 Dug Wells by inserting “, **except Electoral Area “C”**” after “all Electoral Areas”.
3. Section 406.2 Drilled Wells by inserting “, **except Electoral Area “C”**” after “all Electoral Areas”.
4. Section 406.2.c, by removing “C” in the list of Electoral Areas.
5. By adding a new Section 406.4 as follows:

4. Proof of Water requirements for Electoral Area “C”

Where connection to a community water system is not required and a drilled ~~or dug~~ well is proposed as a source of potable water for a parcel created by subdivision within Electoral Area “C”, proof of water shall consist of the following:

a. Dug wells are not permitted as a water source for subdivision in Electoral Area “C”.

a.b. For each well that is proposed to be used as a water supply, at least one year of continuous groundwater level monitoring must be conducted and the results analyzed and interpreted by the **Qualified Professional** and documented in the hydrogeological report.

b.c. A site plan must be provided indicating the location of the well. The well must be constructed in compliance with the minimum construction requirements of the BC Groundwater Protection Regulation (GWPR) and sited in accordance with

the minimum setback distances from property boundaries, other wells and potential sources of contamination, as outlined in applicable legislation including the BC GWPR, BC Health Hazards Regulation (HHR), Sewerage System Regulation (SSR) and Municipal Wastewater Regulation (MWR). A survey of existing water supply wells on adjacent properties within a radius of 300 m from the proposed **parcel** must be undertaken and indicated on the site plan.

e.d. A **well yield test** can not be used to demonstrate sustainable well yield in Electoral Area "C"

e.e. The well must be assessed with a **pumping test** that has been conducted by a **Qualified Well Driller, Qualified Well Pump Installer** or a person working under the direct supervision of a **Qualified Well Driller, a Qualified Well Pump Installer, or Qualified Professional** and a hydrogeological report must be prepared by the **Qualified Professional** and submitted to the **Regional District**.

e.f. The hydrogeological report must demonstrate that each proposed well can provide at least 6,550 litres of water per day (1.0 Imperial Gallon per Minute) for each dwelling or secondary dwelling permitted per parcel (except for secondary suites). If only one well is proposed, it must be demonstrated that the well can provide at least 6,550 litres of water per dwelling per day (1.0 Imperial Gallon per Minute). Parcels that cannot meet the minimum quantity for multiple dwellings (6,550 litres of water per dwelling per day) must register a restrictive covenant to limit the number of dwellings to the number which the well(s) on the parcel are capable of servicing.~~the well can provide at least 6,550 litres of water per day (1.0 Imperial Gallon per Minute) per parcel.~~ The report must also demonstrate that the use of the well will not negatively impact the use of neighbouring wells.

f.g. Pumping tests are to be conducted in the dry part of the year when groundwater levels are lowest (no exceptions). The dry time of the year is from August 1st to March 1st; however, the seasonal low water levels must be confirmed by the results of the continuous groundwater level monitoring required in Section 406.4.**ba**.

g.h. Prior to conducting the **pumping test**, the static water level in the pumping well and observation well(s) ~~should~~**must** be monitored for a minimum of one week to assess pre-test trends and to provide the basis to estimate what the static water level is expected to be at the end of the testing period (i.e., projected to the end of the testing period to account for an increasing or decreasing trend).

h.i. **Pumping tests** ~~shall also~~**must** be conducted for a duration of at least 48 hours for a well completed in an unconfined aquifer and at least 72 hours for a well completed in a bedrock aquifer.

i.j. Water level recovery must be monitored for a period not less than the **pumping test**. Wells that have not achieved 100% recovery relative to what static is projected to be at the end of the test (based on the pre-test monitoring data described in Section 406.4.**ab**.) must be further assessed by the **Qualified Professional**.

- ~~j-k.~~ At least one observation well must be monitored in the same aquifer and within the same fracture network (for bedrock wells), during the **pumping test** and recovery period. The observation well must be located on the same property as the pumping well or adjacent property(ies) and within ~~400-300~~ m of the pumping well. If the fracture network cannot be determined, then a suitable well as recommended by the Qualified Professional with technical justification must be monitored in accordance with Section 406.4.i.
- ~~l.~~ Where more than one parcel would be created by a subdivision, the pumping **tests** must be conducted simultaneously for each well proposed to service each parcel, with each well pumped at a rate that is at least the minimum required rate. If deemed not possible by the Qualified Professional to conduct the tests simultaneously, then the well tests must be conducted sequentially. If proposed to be tested sequentially, then the test must be conducted as follows:
- ~~i.~~ The first well would be pumped for the required duration and water levels monitored until 100% recovery relative to what the static water level (i.e., level of water under undisturbed, non-pumping conditions) is projected to be at the end of the test (based on the water level trend prior to initiation of the pumping test), as required in Section 406.4.i.
 - ~~ii.~~ The pumping test and recovery monitoring for the next well would then be conducted, and the process continued until each of the wells for the proposed subdivision are tested.
- ~~each at a pumping rate that is at least the minimum required rate~~
- ~~m.~~ If more than 4 new lots are proposed to be created, the hydrological assessment undertaken by the Qualified Professional must consider phasing of the development to verify that there would be an adequate groundwater supply to serve the proposed level of development and that there would be no negative impact on existing wells using the local aquifers. The assessment must include the collection and interpretation of on-site groundwater levels collected from multiple on-site wells for such duration as determined by the Qualified Professional and must include a review of seasonal groundwater fluctuations and aquifer recharge. This must allow for the effects of the initial phase of the development on the aquifer to be assessed before additional phases of the subdivision are approved.
- ~~n.~~ Water level monitoring for the sequential pumping test outlined in Section 406.4.l is required for each of the proposed wells in addition to the observation wells located on adjacent properties over the duration of the sequential pumping test program.
- ~~k-o.~~ The long-term sustainable yield of a well, which must be estimated based on the results of the pumping test and cannot be greater than the rate that was applied for the pumping test, shall be documented in a hydrogeological report that is signed and stamped by the **Qualified Professional** and submitted to the **Regional District**.
- ~~p.~~ The “Qualified Professional – Proof of Water/Water Supply Evaluation Form” attached to and forming part of this Bylaw as Schedule A must be signed **and stamped** by a **Qualified Professional** confirming that all requirements in Section 406.4 have been completed and submitted to the Regional District.

l.g. If any answers on the “Qualified Professional – Water Supply Evaluation Form” are “No”, the Regional District may hire, at the expense of the applicant, an independent third-party Qualified Professional to review the report referenced in Section 406.6.o and the form referenced in Section 406.4.p.

r. All hydrogeological reports, **pumping tests**, and Qualified Professional – Water Supply Evaluation Forms ~~Proof of Water reports~~ must be dated not more than five (5) years prior to the date of **subdivision** application.

s. For new and existing wells on the applicant’s property, a record of each well must be submitted to the Comptroller of Water Rights.

6. By adding the following as Section 407.1 and renumbering the following sections accordingly:

1. No Proof of Water exemptions apply to the proposed subdivision of properties located within Electoral Area “C” that are not serviced by a community water system.

7. By adding the following as Section 102 and renumbering the following sections accordingly:

102 Schedules

The following schedules are attached to and form part of this Bylaw:

Schedule A – Qualified Professional – ~~Proof of Water~~Water Supply Evaluation Form

8. By adding Schedule A, *Qualified Professional* – Water Supply Evaluation Form ~~Proof of Water~~, attached to and forming part of this Bylaw as Schedule A attached to and forming part of Subdivision Servicing Bylaw No. 2600, 2013.

Read a First Time	this	20th	day of	July, 2022
Read a Second Time <u>as Amended</u>	this		day of	, 202 <u>42</u>
Read a Third Time	this		day of	, 202 <u>42</u>
ADOPTED	this		day of	, 202 <u>42</u>

Chair

Deputy Corporate Officer
Ashley Bevan



REGIONAL
DISTRICT
NORTH
OKANAGAN

Qualified Professional – ~~Proof of Water~~ Water Supply Evaluation Form

(Subdivision Servicing Bylaw No. 2600 – Schedule A)

NOTE: This form must be filled out by a Qualified Professional (a person who is registered or licensed as a Professional Engineer or Professional Geoscientist under the *Engineers and Geoscientists Act of British Columbia* with competency in the field of hydrogeology and experience in evaluating sources for groundwater supply) and accompanied by a signed and sealed Hydrogeological Report).

Name of Property Owner(s):

Phone #:

Address of Property:

Total Property Size (Ha):

Name of Qualified Professional:

Phone #:

Email of Qualified Professional:

Qualified Professional - Please complete the checklist below. All answers must be “Yes” for this form to be accepted by the Regional District. Unstamped/Unsealed or unsigned forms will not be accepted.

A Qualified Professional must supervise the well pumping tests and submit this ~~Proof of Water~~ form as evidence of sufficient potable water for drilled ~~and dug~~ wells.

A survey of existing water supply wells on adjacent properties within a radius of 300 m from the proposed parcel was undertaken and the results are presented on a site plan.

Yes

No

At least one year of continuous groundwater level monitoring was conducted and the results analyzed to demonstrate that seasonal low groundwater levels have been characterized.

Yes

No

The well ~~must be~~ has been constructed in compliance with the minimum construction requirements of the BC Groundwater Protection Regulation (GWPR) and sited in accordance with the minimum setback distances from property boundaries, other wells and potential sources of contamination, as outlined in applicable legislation including the BC GWPR, BC Health Hazards Regulation (HHR), Sewerage System Regulation (SSR) and Municipal Wastewater Regulation (MWR).

Yes

No

Prior to conducting the pumping test, the static water level in the pumping well and observation well(s) were monitored for a minimum of one week to assess pre-test trends.

Yes

No

Date pumping test was conducted:

A pumping test was conducted during the dry season (defined as August 1st to March 1st however, must be confirmed by the results of the continuous groundwater level monitoring discussed above) and in accordance with the criteria outlined in the British Columbia Guide to Conducting Pumping Tests (BC Guide), and was at least 48-hours in duration for a well completed in an unconfined aquifer and 72-hours in duration for a well completed in a bedrock aquifer. (Note: A well yield test cannot be used to demonstrate sustainable well yield in Electoral Area “C”.)

Yes

No

The well pumping test demonstrates a sustainable yield of at least 6,550 litres of water per day (1.0 Imperial Gallon per Minute) per dwelling per parcel. (1.0 IGPM for each permitted single family dwelling and secondary single family dwelling)

Yes

No

Water level recovery was monitored for a period not less than the pumping test. If the static water level did not achieve 100% recovery relative to what static was projected to be at the end of the test (based on the pre-test monitoring data described above), recovery was further assessed <u>and reported in the Hydrogeological report.</u>	Yes <input type="checkbox"/>	No <input type="checkbox"/>
At least one observation well which is completed in the same aquifer (and within the same fracture network for bedrock wells) was monitored during the pumping test and recovery period. The observation well(s) should be located on the same property or adjacent property(ies) and within 100 <u>300</u> m of the pumping well <u>or as outlined in the Hydrogeological Report.</u>	Yes <input type="checkbox"/>	No <input type="checkbox"/>
What is/ <u>are</u> the address(es) of the property(ies) that where the observation well(s) was/ <u>were</u> monitored on ?		
Where more than one parcel would be created by a subdivision, the pumping tests must be conducted simultaneously <u>or if not possible, sequentially (as outlined in Section 406.4.1 of Bylaw No. 2600)</u> for each well proposed to service each parcel. <u>Did you test all wells in accordance with Section 406.4.1?</u> (For example, if a subdivision application is for three properties, where each property would consist of one dwelling and one potable water well, the pumping test program must be designed such that the three water wells are pumped at the same time, for the same duration, and each at the minimum required rate.) Did you test all wells in accordance with the above or Section 406.4.?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
<u>How was the pumping test conducted?</u>	<input type="checkbox"/> <u>Simultaneously</u> <input type="checkbox"/> <u>Sequentially</u>	
<u>If any of the above questions have been answered "No", please provide an explanation within the signed and sealed Hydrogeological Report submitted by the Qualified Professional with this checklist. Be advised that in accordance with Section 406.6.p, the Regional District may, at the expense of the applicant, hire an independent third-party Qualified Professional to review the report.</u>		
<u>I acknowledge that this checklist is supplementary to the Hydrogeological Report for the property dated:</u> <u>_____</u>		
I confirm that I supervised the well pumping testing on the property in accordance with Regional District of North Okanagan Subdivision Servicing Bylaw No. 2600, 2013 – Section 406.4 - Proof of Water Requirements for Electoral Area "C"		
Signature of Qualified Professional:	Stamp/Seal: <u>Date:</u>	

REGIONAL DISTRICT OF NORTH OKANAGAN

BYLAW No. 2930

A bylaw to amend the Subdivision Servicing Bylaw No. 2600, 2013

WHEREAS Section 506 (7) [*Subdivision servicing requirements*] of the *Local Government Act*, states that when there is no community water system, the Regional Board may, by bylaw, require that each parcel to be created by the subdivision have a source of potable water having a flow capacity at a rate established in the bylaw;

AND WHEREAS there are areas of known groundwater supply concerns within Electoral Area “C”;

AND WHEREAS the Regional Board desires additional information regarding flow capacity and impact on neighbouring wells from a Qualified Professional for proposed subdivisions within Electoral Area “C”;

NOW THEREFORE, the Board of the Regional District of North Okanagan, in open meeting assembled hereby, ENACTS AS FOLLOWS:

CITATION

1. This Bylaw may be cited as the “**Regional District of North Okanagan Subdivision Servicing Amendment Bylaw No. 2930, 2022**”.

AMENDMENTS

Regional District of North Okanagan Subdivision Servicing Bylaw No. 2600, 2013 be amended as follows:

2. Section 406.1 Dug Wells by inserting “, **except Electoral Area “C”**” after “all Electoral Areas”.
3. Section 406.2 Drilled Wells by inserting “, **except Electoral Area “C”**” after “all Electoral Areas”.
4. Section 406.2.c, by removing “C” in the list of Electoral Areas.
5. By adding a new Section 406.4 as follows:

4. Proof of Water requirements for Electoral Area “C”

Where connection to a community water system is not required and a drilled well is proposed as a source of potable water for a parcel created by subdivision within Electoral Area “C”, proof of water shall consist of the following:

- a. Dug wells are not permitted as a water source for subdivision in Electoral Area “C”.
- b. For each well that is proposed to be used as a water supply, at least one year of continuous groundwater level monitoring must be conducted and the results analyzed and interpreted by the **Qualified Professional** and documented in the hydrogeological report.
- c. A site plan must be provided indicating the location of the well. The well must be constructed in compliance with the minimum construction requirements of the BC Groundwater Protection Regulation (GWPR) and sited in accordance with

the minimum setback distances from property boundaries, other wells and potential sources of contamination, as outlined in applicable legislation including the BC GWPR, BC Health Hazards Regulation (HHR), Sewerage System Regulation (SSR) and Municipal Wastewater Regulation (MWR). A survey of existing water supply wells on adjacent properties within a radius of 300 m from the proposed **parcel** must be undertaken and indicated on the site plan.

- d. A **well yield test** can not be used to demonstrate sustainable well yield in Electoral Area "C"
- e. The well must be assessed with a **pumping test** that has been conducted by a **Qualified Well Driller, Qualified Well Pump Installer** or a person working under the direct supervision of a **Qualified Well Driller, a Qualified Well Pump Installer, or Qualified Professional** and a hydrogeological report must be prepared by the **Qualified Professional** and submitted to the **Regional District**.
- f. The hydrogeological report must demonstrate that each proposed well can provide at least 6,550 litres of water per day (1.0 Imperial Gallon per Minute) for each dwelling or secondary dwelling permitted per **parcel** (except for secondary suites). If only one well is proposed, it must be demonstrated that the well can provide at least 6,550 litres of water per dwelling per day (1.0 Imperial Gallon per Minute). Parcels that cannot meet the minimum quantity for multiple dwellings (6,550 litres of water per dwelling per day) must register a restrictive covenant to limit the number of dwellings to the number which the well(s) on the parcel are capable of servicing. The report must also demonstrate that the use of the well will not negatively impact the use of neighbouring wells.
- g. Pumping tests are to be conducted in the dry part of the year when groundwater levels are lowest (no exceptions). The dry time of the year is from August 1st to March 1st; however, the seasonal low water levels must be confirmed by the results of the continuous groundwater level monitoring required in Section 406.4.b.
- h. Prior to conducting the **pumping test**, the static water level in the pumping well and observation well(s) must be monitored for a minimum of one week to assess pre-test trends and to provide the basis to estimate what the static water level is expected to be at the end of the testing period (i.e., projected to the end of the testing period to account for an increasing or decreasing trend).
- i. **Pumping tests** must be conducted for a duration of at least 48 hours for a well completed in an unconfined aquifer and at least 72 hours for a well completed in a bedrock aquifer.
- j. Water level recovery must be monitored for a period not less than the **pumping test**. Wells that have not achieved 100% recovery relative to what static is projected to be at the end of the test (based on the pre-test monitoring data described in Section 406.4.b.) must be further assessed by the **Qualified Professional**.
- k. At least one observation well must be monitored in the same aquifer and within the same fracture network (for bedrock wells), during the **pumping test** and

recovery period. The observation well must be located on the same property as the pumping well or adjacent property(ies) and within 300 m of the pumping well. If the fracture network cannot be determined, then a suitable well as recommended by the Qualified Professional with technical justification must be monitored in accordance with Section 406.4.j.

- I. Where more than one parcel would be created by a subdivision, the pumping **tests** must be conducted simultaneously for each well proposed to service each parcel, with each well pumped at a rate that is at least the minimum required rate. If deemed not possible by the Qualified Professional to conduct the tests simultaneously, then the well tests must be conducted sequentially. If proposed to be tested sequentially, then the test must be conducted as follows:
 - i. The first well would be pumped for the required duration and water levels monitored until 100% recovery relative to what the static water level (i.e., level of water under undisturbed, non-pumping conditions) is projected to be at the end of the test (based on the water level trend prior to initiation of the pumping test), as required in Section 406.4.i.
 - ii. The pumping test and recovery monitoring for the next well would then be conducted, and the process continued until each of the wells for the proposed subdivision are tested.
- m. If more than 4 new lots are proposed to be created, the hydrological assessment undertaken by the Qualified Professional must consider phasing of the development to verify that there would be an adequate groundwater supply to serve the proposed level of development and that there would be no negative impact on existing wells using the local aquifers. The assessment must include the collection and interpretation of on-site groundwater levels collected from multiple on-site wells for such duration as determined by the Qualified Professional and must include a review of seasonal groundwater fluctuations and aquifer recharge. This must allow for the effects of the initial phase of the development on the aquifer to be assessed before additional phases of the subdivision are approved.
- n. Water level monitoring for the sequential pumping test outlined in Section 406.4.l is required for each of the proposed wells in addition to the observation wells located on adjacent properties over the duration of the sequential pumping test program.
- o. The long-term sustainable yield of a well, which must be estimated based on the results of the pumping test and cannot be greater than the rate that was applied for the pumping test, shall be documented in a hydrogeological report that is signed and stamped by the **Qualified Professional** and submitted to the **Regional District**.
- p. The “Qualified Professional – Water Supply Evaluation Form” attached to and forming part of this Bylaw as Schedule A must be signed by a **Qualified Professional** confirming that all requirements in Section 406.4 have been completed and submitted to the Regional District.
- q. If any answers on the “Qualified Professional – Water Supply Evaluation Form” are “No”, the Regional District may hire, at the expense of the applicant, an

independent third-party Qualified Professional to review the report referenced in Section 406.6.o and the form referenced in Section 406.4.p.

- r. All hydrogeological reports, **pumping tests**, and Qualified Professional – Water Supply Evaluation Forms must be dated not more than five (5) years prior to the date of **subdivision** application.
 - s. For new and existing wells on the applicant's property, a record of each well must be submitted to the Comptroller of Water Rights.
6. By adding the following as Section 407.1 and renumbering the following sections accordingly:
- 1. No Proof of Water exemptions apply to the proposed subdivision of properties located within Electoral Area "C" that are not serviced by a community water system.

7. By adding the following as Section 102 and renumbering the following sections accordingly:

102 Schedules

The following schedules are attached to and form part of this Bylaw:

Schedule A – Qualified Professional – Water Supply Evaluation Form

8. By adding Schedule A, *Qualified Professional – Water Supply Evaluation Form*, attached to and forming part of this Bylaw as Schedule A attached to and forming part of Subdivision Servicing Bylaw No. 2600, 2013.

Read a First Time	this	20th	day of	July, 2022
Read a Second Time as Amended	this		day of	, 2024
Read a Third Time	this		day of	, 2024
ADOPTED	this		day of	, 2024

Chair

Deputy Corporate Officer
Ashley Bevan



REGIONAL
DISTRICT
NORTH
OKANAGAN

Qualified Professional – Water Supply Evaluation Form (Subdivision Servicing Bylaw No. 2600 – Schedule A)

NOTE: This form must be filled out by a Qualified Professional (a person who is registered or licensed as a Professional Engineer or Professional Geoscientist under the *Engineers and Geoscientists Act* of British Columbia with competency in the field of hydrogeology and experience in evaluating sources for groundwater supply) and accompanied by a signed and sealed Hydrogeological Report).

Name of Property Owner(s):

Phone #:

Address of Property:

Total Property Size (Ha):

Name of Qualified Professional:

Phone #:

Email of Qualified Professional:

Qualified Professional - Please complete the checklist below. Unsigned forms will not be accepted. A Qualified Professional must supervise the well pumping tests and submit this form as evidence of sufficient potable water for drilled wells.

A survey of existing water supply wells on adjacent properties within a radius of 300 m from the proposed parcel was undertaken and the results are presented on a site plan.

Yes

No

At least one year of continuous groundwater level monitoring was conducted and the results analyzed to demonstrate that seasonal low groundwater levels have been characterized.

Yes

No

The well has been constructed in compliance with the minimum construction requirements of the BC Groundwater Protection Regulation (GWPR) and sited in accordance with the minimum setback distances from property boundaries, other wells and potential sources of contamination, as outlined in applicable legislation including the BC GWPR, BC Health Hazards Regulation (HHR), Sewerage System Regulation (SSR) and Municipal Wastewater Regulation (MWR).

Yes

No

Prior to conducting the pumping test, the static water level in the pumping well and observation well(s) were monitored for a minimum of one week to assess pre-test trends.

Yes

No

Date pumping test was conducted:

A pumping test was conducted during the dry season (defined as August 1st to March 1st however, must be confirmed by the results of the continuous groundwater level monitoring discussed above) and in accordance with the criteria outlined in the British Columbia Guide to Conducting Pumping Tests (BC Guide), and was at least 48-hours in duration for a well completed in an unconfined aquifer and 72-hours in duration for a well completed in a bedrock aquifer. (Note: A well yield test cannot be used to demonstrate sustainable well yield in Electoral Area "C".)

Yes

No

The well pumping test demonstrates a sustainable yield of at least 6,550 litres of water per day (1.0 Imperial Gallon per Minute) per dwelling per parcel. (1.0 IGPM for each permitted single family dwelling and secondary single family dwelling)

Yes

No

Water level recovery was monitored for a period not less than the pumping test. If the static water level did not achieve 100% recovery relative to what static was projected to be at the end of the test (based on the pre-test monitoring data described above), recovery was further assessed and reported in the Hydrogeological report.	Yes <input type="checkbox"/>	No <input type="checkbox"/>
At least one observation well which is completed in the same aquifer (and within the same fracture network for bedrock wells) was monitored during the pumping test and recovery period. The observation well(s) should be located on the same property or adjacent property(ies) and within 300 m of the pumping well or as outlined in the Hydrogeological Report.	Yes <input type="checkbox"/>	No <input type="checkbox"/>
What is/are the address(es) of the property(ies) where the observation well(s) was/were monitored?		
Where more than one parcel would be created by a subdivision, the pumping tests must be conducted simultaneously or if not possible, sequentially (as outlined in Section 406.4.1 of Bylaw No. 2600) for each well proposed to service each parcel. Did you test all wells in accordance with Section 406.4.1?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
How was the pumping test conducted?	<input type="checkbox"/> Simultaneously <input type="checkbox"/> Sequentially	
If any of the above questions have been answered “No”, please provide an explanation within the signed and sealed Hydrogeological Report submitted by the Qualified Professional with this checklist. Be advised that in accordance with Section 406.6.p, the Regional District may, at the expense of the applicant, hire an independent third-party Qualified Professional to review the report.		
I acknowledge that this checklist is supplementary to the Hydrogeological Report for the property dated: _____		
I confirm that I supervised the well pumping testing on the property in accordance with Regional District of North Okanagan Subdivision Servicing Bylaw No. 2600, 2013 – Section 406.4 - Proof of Water Requirements for Electoral Area “C”		
Signature of Qualified Professional:	Date:	

REGIONAL DISTRICT OF NORTH OKANAGAN

Extract from the Minutes of a Meeting of the

Board of Directors

Held on

Wednesday, December 14, 2022

Bylaw 2930 - Subdivision Servicing Amendment - Feedback Received [File No. 22-0403-C-TA]

Moved and seconded

That the report titled Subdivision Servicing Bylaw Amendment No. 2930 – Feedback Received dated November 25, 2022 be received, and further;

That additional Community Works Funding be secured to include a review by Golder Associates Ltd. of the technical feedback received through the referral process for Subdivision Servicing Amendment Bylaw No. 2930; and further,

That further consideration of Bylaw 2930 be deferred until Golder Associates Ltd. has completed the review and has provided recommendations on how to address the feedback received through the referral process.

CARRIED

Moved and seconded

That Golder Associates Ltd. be requested to continue and augment the groundwater monitoring program as recommended in the Keddleston Groundwater Study – Phase 2 report for at least one additional year; and further,

That Golder Associates Ltd. be requested to review the data collected through the extended groundwater monitoring program to determine if a numerical groundwater flow model can be developed to provide a technical basis to support decision making regarding the sustainability of additional development in the Keddleston study area.

CARRIED

TO: Electoral Area Advisory Committee

File No: 22-0403-C-TA

FROM: Planning Department

Date: November 25, 2022

SUBJECT: Subdivision Servicing Amendment Bylaw No. 2930 – Feedback Received

RECOMMENDATION 1:

That it be recommended to the Board of Directors, the report titled Subdivision Servicing Bylaw Amendment No. 2930 – Feedback Received dated November 25, 2022 be received, and further;

That additional Community Works Funding be secured to include a review by Golder Associates Ltd. of the technical feedback received through the referral process for Subdivision Servicing Amendment Bylaw No. 2930; and further,

That further consideration of Bylaw 2930 be deferred until Golder Associates Ltd. has completed the review and has provided recommendations on how to address the feedback received through the referral process.

RECOMMENDATION 2:

That Golder Associates Ltd. be requested to continue and augment the groundwater monitoring program as recommended in the Keddleston Groundwater Study – Phase 2 report for at least one additional year; and further,

That Golder Associates Ltd. be requested to review the data collected through the extended groundwater monitoring program to determine if a numerical groundwater flow model can be developed to provide a technical basis to support decision making regarding the sustainability of additional development in the Keddleston study area.

BACKGROUND:

At the Regular Meeting of the Board of Directors held on February 19, 2020, the Board resolved that staff be directed to develop a work plan to undertake a comprehensive review of the water supply in Aquifers 350 and 351 in Electoral Area “C” of the RDNO. Golder Associates Ltd. (Golder) was retained to complete the two phase study and the final report titled *Keddleston Groundwater Study – Phase 2* (the Golder Report) was endorsed by the Board of Directors at the Regular Meeting held on July 20, 2022.

At the Regular Meeting held on July 20, 2022, the Board gave First Reading to Subdivision Servicing Amendment Bylaw No. 2930, 2022 which, as recommended by Golder, include the following changes to the proof of water requirements for subdivisions within Electoral Area “C” that are proposing to use groundwater sources:

- At least one year of continuous groundwater level monitoring be conducted and the results analyzed and interpreted by a Qualified Professional;
- Well pumping tests must be supervised by a Qualified Professional;
- 48-72 hour pumping tests at the current bylaw rate of 6,550 litres of water per day (1.0 Imperial Gallon per Minute) per parcel, depending on the aquifer type;
- Water level recovery must be monitored for the same period of time as the pumping test (48-72 hours) and achieve 90 to 95% recovery;
- At least one observation well must be monitored in the same aquifer and within the same fracture network, during the pumping test and recovery period;
- Pumping tests are to be conducted in the dry months of the year (August 1st –March 1st);
- Where an application to the RDNO includes more than one proposed lot, the pumping test must be conducted simultaneously at all wells proposed to service each lot;
- A Qualified Professional must submit a signed and stamped hydrogeological report and Schedule A: Qualified Professional - Proof of Water form confirming all requirements of the Bylaw have been met.

The Board further resolved to forward the Bylaw along with the *Keddleston Groundwater Study – Phase 2* report to internal and external agencies, stakeholders and the public. On July 29, 2022, staff sent a referral letter to provincial ministries, local governments, First Nations, other RDNO departments, Hydrogeologists, Surveyors, Electoral Area “C” Advisory Planning Commission members and all in stream land use and subdivision applicants. Additionally, staff created a webpage (<https://www.rdno.ca/keddleston>) to provide an opportunity for residents to access the Keddleston Groundwater Study, the Keddleston Groundwater Study – Phase 2 and Subdivision Servicing Amendment Bylaw No. 2930. The website was visible on the RDNO websites but no advertisements were placed or social media campaigns ran.

The RDNO accepted referral comments through email or through an online web form. 18 comments were received. Feedback received through the referral process sited a number of concerns regarding the feasibility of conducting well tests to the level recommended in the Phase 2 Report. As a result of some of the feedback comments requesting additional stakeholders be provided an opportunity to comment and more time to review the proposal, staff sent out additional referrals targeting well pump drillers and installers and extended the referral period until November 15, 2022. 4 additional responses were received for a total of 22. Feedback is provided as *Attachment A* and redacted in accordance with the *Freedom of Information and Protection of Privacy Act*.

DISCUSSION:

Staff are proposing that additional Community Works Funding be secured to include a review by Golder of the feedback received on technical challenges identified in the proposed bylaw requirements prior to additional consideration of Subdivision Servicing Amendment Bylaw No. 2930. Additionally, staff recommend that Golder continue to monitor the observation wells outlined in the Phase 2 study for at least one additional year.

Feedback Received

Verbatim feedback is provided in *Attachment A* and included the following summary of supportive comments:

- Supportive of the alignment with provincial standards;
- Suggestions of a moratorium on any further development until existing properties have sufficient water;
- Commend the RDNO for taking protective measures for development proposing to use groundwater sources;
- Amendments align with provincial interests; aquifers require protection and water quantity is a limiting factor;
- Suggestions to apply proof of water requirements at Building Permit stage to capture subdivisions approved before the Bylaw is Adopted;
- Cautious approach is warranted based on the Aquifer characteristics and the aspects Golder revised between the Phase 1 study and the Phase 2 study.

The following is a summary of the concerns received:

- No technical justification for one year of monitoring and pumping tests
- Add to upfront costs without addressing the uncertainty of the bedrock aquifer groundwater supplies where some properties can be developed and have a reliable well while other nearby properties do not have sufficient groundwater available
- Concerns with the Bylaw applying to areas outside of Keddleston
- Concerns that the RDNO only sought industry feedback from two Hydrogeological Consultants and no Well Drillers or Pump Installers (initially)
- Concerns that insurance underwriters for Qualified Professional Hydrogeological Consultants will not approve the standardized certification documents
- How many wells can be feasibly tested simultaneously? Subdivisions will be limited in lot count in accordance with this number. Simultaneous well pumping is without precedent and operationally next to impossible
- Availability of testing hardware to conduct this testing. (Testing pumps, generators) Well pump installers do not possess the resources for undertaking multiple simultaneous tests. A single well requires not only a pump, but the pipe, electrical controls, generators, flow meters and the personnel to carry it out.
- The bar for proof of water is being raised to a point where it is no longer going to be possible, from logistical, technical and cost standpoints, for additional subdivisions to occur. A moratorium in disguise.
- Majority of the aquifers in this area in bedrock, with the recharge area and recharge times not modelled to assess what one year's data would provide value to and how the data would be connected to pumping and other influences in the hydrologic cycle
- Length of pumping required (48-72 hours) does not reflect daily residential water use
- Concerns regarding the observation well: What is the objective for monitoring? If it is to assess, aquifer impacts, then yes this is a good idea but if it is to assess potential well interference to/from neighbouring properties, then it would be better to monitor neighbouring wells.
- The requirement to verify an observation well is in the same fracture network as a pumping well may be difficult to achieve owing to the largely unpredictable nature of fractured bedrock aquifers
- Spacing requirements between new and existing wells are established by a professional to reflect the topography and makeup of the alluvial aquifer as opposed to a "one format fits all". ie 100 m

Additionally, suggestions received through the feedback process included proposing that the RDNO consider a community water system or allow cisterns be used in the area that homeowners could fill through another source.

Alternate Recommendations

Staff provide the following Alternate Recommendations for consideration and direction by the Board:

1. The Board of Directors could choose to gather additional public feedback at this time prior to Golder reviewing the technical concerns raised. Bylaw 2930 could be referred, either through a public hearing process or staff collecting written submissions, with notice requirements posted in accordance with the Public Notice Bylaw and advertised through the newspaper, the RDNO website and social media.
2. The Board of Directors could resolve to defer further consideration of Bylaw 2930 until one additional year of monitoring data is collected and reviewed by Golder (instead of bringing back Bylaw 2930 for further consideration after the technical review of feedback).
3. The Board of Directors could give Bylaw 2930 Second and Third Readings and Adoption to require new applicants to meet the threshold proposed by Bylaw 2930 immediately. The Bylaw could be amended once a technical review is completed if the Board chooses.

LEGAL/STATUTORY AUTHORITY/REQUIREMENTS:

In accordance with Section 506(1)(c) of the *Local Government Act*, a local government may, by Bylaw, regulate and require the provision of works and services in respect to the subdivision of land, and for that purpose may, by Bylaw, require that, within a subdivision, a water distribution system, a fire hydrant system, a sewage collection system, a sewage disposal system, a drainage collection system or a drainage disposal system be provided, located and constructed in accordance with the standards established in the Bylaw.

Further, in accordance with Section 506, a Subdivision Servicing Bylaw is permitted to have separate thresholds for different areas with different circumstances and if there is no community water system, may require that each parcel to be created have a source of potable water having a flow capacity at a rate established by bylaw.

For any existing subdivision applications that have already been submitted, Section 511 of the *Local Government Act* states the Bylaw has no effect with respect to that subdivision for a period of 12 months after the Bylaw is adopted. There are approximately seven subdivision applications within Electoral Area “C” at the time of writing this report that will have a one year period of time once the bylaw is adopted to advance under the existing regulations.

A public hearing is not a requirement when amending or adopting a Subdivision Servicing Bylaw in accordance with the Local Government Act. However, the Board of Directors could resolve to hold a public hearing to gather further public input.

Attachments

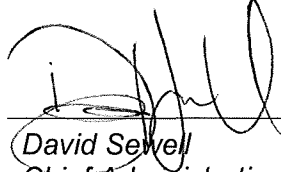
Attachment A – Feedback received through the referral process for Bylaw 2930

Submitted by:



*Rob Smailes, MCIP, RPP
General Manger, Planning and Building*

Approved for Inclusion:



*David Sewell
Chief Administrative Officer*

1. [REDACTED]

I fully endorse the proposed amendment to align with provincial standards. Area "C" along with the rest of the North Okanagan, is only going to see greater and greater development pressures (residential or agricultural) with water being the foremost of importance. I am pleased to see the RDNO take this leadership approach to ensuring water access for the future.

2. [REDACTED] – Hydrogeologist

As a former resident of Keddleston Road (2004 to 2013) and a local hydrogeologist, I read the proposed Bylaw amendments and could not help but come to the conclusion that RDNO instead should simply no longer allow subdivisions in Electoral Area "C" although passage of the bylaw will likely have the same affect (except, perhaps, with the occasional 1-lot subdivision from a larger parcel). One year of water level monitoring and simultaneous pumping tests (for which there is no technical justification available in the literature) merely add to developer's upfront costs without significantly addressing the uncertainty of bedrock aquifer groundwater supplies where some properties can be developed and have a reliable well while other nearby properties do not have sufficient groundwater available.

3. [REDACTED]

- Why haven't I heard ANYTHING about this Before hand.
- Why wasn't I contacted in any way.. about this issue.
- Why was the first reading read with out notification
- Why wasn't the report made available to residents before the first reading
- Is there a hidden addenda... it sure seems like it.
- Who PAYS for these costs .. this is not cheap. Multiple tests per year.
- It shouldn't be come by law untill. AFTER a trial period of tests. If the tests are in conclusive after a few years then this needs to be dropped.. but a trial period HAS TO BE INCORPORATED.. ONE STUDY IS NOT ENOUGH.
- are the costs on the home owners or city.

NONE of the above has been brought to my attention.. EVER...

I suggest you contact me urgently

4. [REDACTED]

The proposed by-law notes the Keddleston area but is proposing to affect all of Electoral Area C. This has not been made clear to those living outside of the Keddleston area. Everyone in area C needs to informed clearly of the proposals. I think the proposal comments time frame should be extended and a seperate notification be re-issued with a clearer headline and description.

5. [REDACTED]

Fully support proposed amendments

6. [REDACTED]

Why not allow water holding tanks like many other districts. That way if water becomes an issue for the homeowner they just fill up the tank from another water source. Many places up north operate this way, with no well, only holding tanks. Dawson Creek area as an example.

7. **Nodding Hill Developments Ltd**

We are recently in receipt of the enclosed RDNO Planning Department's letter dated July 29, 2022 which seeks feedback to Subdivision Servicing Amendment Bylaw No. 2930 – Proof of Water Requirements in Electoral Area "C" and we duly note that although the proposed changes specifically affect Qualified Well Drillers, Qualified Well Pump Installers, and Qualified Professional Hydrogeologists; it would appear that the RDNO has only sought industry feedback from two Qualified Professional Hydrogeological Consultants and has not provided direct referral to any Qualified Well Drillers or Qualified Well Pump Installers.

Upon review of the proposed changes to the Subdivision Servicing Bylaw we have concerns relating to feasibility, financial hardship, and the potential for a de facto moratorium on development in Electoral Area "C".

Accordingly, we raise the following questions and concerns:

- 1) Has the RDNO consulted with other Qualified Professional Hydrogeological Consultants in the Okanagan, apart from Golder Associates, to determine which consultants, if any, are prepared to conduct and certify testing to the proposed standards? Specifically, will Applicants seeking to pursue a subdivision actually be able to find and hire a consultant to perform the work necessary to satisfy the proposed new standards?
- 2) Has the RDNO prepared a list of Qualified Professional Hydrogeological Consultants who have confirmed that they will conduct and certify the scope of work prescribed under the proposed new standards?
- 3) Has the RDNO confirmed that insurance underwriters for Qualified Professional Hydrogeological Consultants are satisfied with the proposed standardized form letter and that Qualified Professional Hydrogeological Consultants are prepared to complete and affix their Professional seal to the proposed standardized form letter.
- 4) Is Golder Associates, the author of the Keddleston Groundwater Study – Phase 2, prepared to conduct and certify the scope of work prescribed under the proposed

new standards for Private sector clients, be it for a 2 lot, 10 lot, or +20 lot subdivision.

- 5) How many wells can be feasibly tested simultaneously?
 - 6) Should changes to the Subdivision Servicing Bylaw be adopted, subdivisions which propose the use of Drilled Wells as a source of potable water will be limited in lot count to the maximum number of wells that can be feasibly tested simultaneously. What is this maximum number?
 - 7) What is the availability of the testing hardware necessary to conduct pump testing? Has the RDNO investigated how many testing pumps Qualified Well Pump Installers have readily available and how many suitably sized generators are available for rent from local Equipment Rental companies?
 - 8) Cost Analysis – what is the estimated financial impact of the proposed new standards on an incremental cost per well.
- Costs include:
- i. Lease and installation of 1 pump and 1 generator per well.
 - ii. Purchase and installation of non-reusable 1-1/4" PVC pipe to conduct the 48/72 hour pump test (in our experience a typical well requires on averages 300ft per well although more is often required).
 - iii. Purchase of 1 water level monitor (transducer) per well and billable time for the Qualified Professional Hydrogeological Consultant to setup and quarterly retrieve water level data for a period of one year.
 - iv. Analysis and reporting costs to retain the services of a Qualified Professional Hydrogeological Consultant.
 - v. Landowner carrying costs attributed to the additional time required to conduct 1 year groundwater level monitoring before a subdivision can be completed.

As many of the above issues relate to the direct feasibility of satisfying the proposed Bylaw requirements, we request a written reply to the following items:

- 1) Has the RDNO conducted a feasibility assessment to review the practical application and financial implication of the proposed bylaw changes? If yes, we request that a copy be provided.
 - 2) A list of Qualified Professional Hydrogeological Consultants, available for hire from the Public sector, who have confirmed that they are prepared to conduct and certify the scope of work prescribed under the proposed new standards.
 - 3) Confirmation that Golder and Associates is prepared to conduct the necessary testing, reporting, and certification for Private sector clients to the standards proposed; be it for a 2 lot, 10 lot, or +20 lot subdivision.
 - 4) What is maximum number of wells that can be feasibly tested simultaneously?
 - 5) What is the forecasted increase to new housing costs upon implementation of the proposed bylaw amendment?
-

8. [REDACTED]

Hello, I am the owner of a property mentioned in this report that must truck water. The drilled wells on my property are dry. I suggest a complete moratorium on any further development until such a time when all existing properties are supplied with sufficient water. This could be from a community well supplied by the aquifers in this study, or working with the City of Vernon to add the Foothills PZ865 reservoir that would also service the Keddleston area (as outlined in the Foothills Neighbourhood Plan on City of Vernon website:

<https://www.vernon.ca/homes-building/neighbourhood-planning/supplementary-plans>

I have investigated digging a shallow well on an easement with an old cattle watering dug out, but the Water Sustainability Act of 2016 and environmental rules have made it impossible. A dug well needs to be in a water producing area and those areas are now classified as wetlands thus protected from ground disturbance. Again, I suggest a moratorium until all existing homes have adequate water, then the amended Bylaw No. 2600 implementation.

9. [REDACTED] – Well Pump Installer

I am a certified and registered well pump installer that specializes in performing pumping tests to determine well yield. I am also the contractor that Golder used to collect the data for their study of the Keddleston area. I have an intimate knowledge of the groundwater challenges, having worked on a number of the wells in that entire area. My company (Monashee Aquifer Testing) even drilled a number of the wells over the years.

I am absolutely in favour of proper stewardship of groundwater, and a robust legislative framework for assuring proper allocation, but this bylaw amendment has a number of areas of concern.

Firstly, the notion of simultaneous well pumping is without precedent, and is operationally next to impossible. As a contractor, I do pumping tests all the time, and a single well requires not only a pump, but the pipe, electrical controls, generators, flow meters and the personnel to carry it out.

I can tell you, that we do not possess the resources for undertaking multiple simultaneous tests, nor would it be remotely economically feasible to do so. This proposal is functionally untenable.

As a pump installer contractor, I must navigate an obfuscated and apparently arbitrary set of criteria for minimum required well yields, with area requirements differing (Why should a Silver Star resident require more water than a Cherryville resident?) . Furthermore, I have regularly encountered building permit office staff that are completely unaware of the existing requirements for minimum well yields. Customers are being given

contradictory information when exercising due diligence in meeting the existing statutory requirements for well yields, forcing the question, Why make it more complicated?

As someone with an academic background in health sciences, I am apt to place a great deal of importance upon solid evidence when researching best practices; while I do not possess the academic credentials to question the methodology or the science behind this bylaw, I note the dearth of scientific references in support of the conclusions upon which this bylaw is being based.

I would implore you to directly solicit input from the geoscientific community and from the pumping contractors before creating requirements that will be impossible to meet.

10. 

- 1) ensure that this amendment applies to dug wells as well as drilled wells
 - 2) ensure that spacing requirements between new dug wells and pre existing neighbouring dug wells are established by a professional hydrologist to reflect the topography and makeup of the alluvial aquifer as opposed to a “one format fits all” ..ie 100 m.
 - 3) ensure that all residents in area C be notified by email or Canada Post of any and all water supply related issues . That would include notification to all residents of any proposed development and the aquifer that it would tap into.
-

11. **Dan Gare Drilling**

I don't like the proposed changes and don't think they will be a benefit to Area C. Area C does have some challenges with water in some places. Keddleston Rd is a bit hit and miss, Jackpine Rd, Aspen Rd almost no water at all there. There is many more areas that have abundant water, even artesian flows and some sand and gravel aquifers are present. Proposing that water levels be monitored for a year adds tremendous cost and isn't really possible/helpful for subdivisions that would include an active well. Proposing all the wells be pumped at once is very difficult/impractical if the subdivision was large and doesn't allow to see potential well interference between wells. Maybe a simpler solutions with less detrimental effects would be to keep current policies in place and raise the minimum water requirement to 2 lmp gpm (13,100 litres per day) to help stop development in areas with marginal water supplies. Thanks for considering!

12. **Interior Health Authority**

We commend the Regional District of North Okanagan for taking these additional protective measures for land use development proposals proposing to use groundwater sources. We would additionally offer that the Regional District may want to consider including reference to the Guidance Document for Determining Groundwater At Risk of Containing Pathogens (GARP) within the amended bylaw.

13. [REDACTED] – Hydrogeologist

Hello, I am a hydrogeologist with Western Water based in Vernon and have reviewed the proposed amendments to the RDNO subdivision servicing Bylaw in Electoral Area C. My partner Doug Geller previously provided technical comments on the proposed changes that I am in agreement with. I won't repeat those here in detail but in brief, those included issues with testing wells in the dry part of the year and expecting full recovery when recharge is not occurring, and complications with assessing well interference when running multiple wells at the same time.

Under the proposed changes to the Bylaw, I think the bar for proof of water is being raised to a point where it is no longer going to be possible, from logistical, technical and cost standpoints, for additional subdivisions to occur, other than perhaps the occasional one or two lot subdivision. I would estimate the cost of completing a subdivision proof of water study for say a three lot subdivision would triple or more from the current costs incurred by a proponent. There are several issues with the proposed change requiring all wells to be pumped simultaneously. As mentioned, it will be nearly impossible to adequately discern and characterize well interference effects. In the case of monitoring offsite wells in the area, if interference effects are observed, we could not determine whether the interference was a result of pumping all the wells or just one of the wells. Further, it is logistically challenging to pump more than three wells at the same time. Well pump contractors are not set up for that. In my career, I have not been involved in a project where more than two wells have been purposely pumped simultaneously for a controlled pumping test.

Lastly, I have issues with the proposed certification document. This particular certification stops short of requiring me to certify with my seal that a given well will meet the Bylaw quantity requirement in perpetuity (which I have seen in other local government bylaws and which I will not sign). I provided this proposed RDNO document to our insurance provider for comment. It was recommended to me that I not sign certification documents like this until our insurance underwriter was given opportunity to review and approve.

As a professional of record, it is unlikely I could design and execute a proof water program that would fully satisfy the proposed Bylaw requirements for anything more than a two lot subdivision. Rather than take on a project I knew I would not be able to adequately complete, I would likely decline future opportunities in this area.

14. [REDACTED]

When we purchased our property on Keddleston Road, over 20 years ago, our plan was to one day subdivide and build a 2nd dwelling for our daughter. Creating a family homestead was our goal. I believe many people in the Keddleston neighbourhood have similar goals and values. The requirement to prove high-producing wells in order to rezone or subdivide, and test for a full year, represents an impossible barrier. I say high producing, since 1 gallon per minute is high in comparison to what previously drilled wells

in the area have produced - on average, 0.5 gallons per minute (according to the well logs presented in the study).

Our home functions very well with a low producing well. Our solution is a 3000 gallon cistern and we regularly tank in water. We estimated that when we were a family of 3, with 3 horses, and other critters too, we tanked in 3000 gallons of water every 4 - 6 weeks at the height of the dry season and at other times of the year, we filled the cistern about every 8 - 10 weeks. This is a far cry from 1 gallon per minute which equates to 1,440 gallons per day! And, there is no guarantee a well that produces 1 gallon a minute today, will produce that amount 2 years from now.

I believe RDNO could better support rezoning and subdividing in Area C by including installations of clean, approved/regulated cisterns within this bylaw. Well water can be pumped into a cistern and stored for use and additional water requirements can be addressed by water delivery. Currently, we have 2 water suppliers in our area. I would also suggest that water become a regulated utility. By permitting the use of cisterns, we open the area to families who are taking care of their families. With the housing shortage impacting so many families, the limitations of this bylaw may continue to fuel that situation, not to mention drilling a costly well and the amount of testing that will be required. Having an option to install cisterns and utilize the water delivery services would be an efficient and economic solution for the Keddleston area water situation.

15. [REDACTED]

I've taken the time to contact professionals that are trained and work in the drinking water industry which includes testing wells. I was surprised to learn that the ones are contacted were not aware of this proposed amendment.

After sharing the document, I was not surprised at the comments made to me: primarily, that this was outrageous, not well thought out and near impossible to adhere to. This proposed amendment is a moratorium in disguise.

With reference to the Water Sustainability Act

This Act is current to August 24, 2022

See the Tables of Legislative Changes for this Act's legislative history, including any changes

not in force.

Water Sustainability Act

[SBC 2014] CHAPTER 15

(8) Despite subsections (1) to (6), a person to whom section 6 (4) [use of water — excluded

groundwater users] applies is deemed to have rights that have precedence under those subsections, as if the deemed rights were granted under an authorization that

(a) sets out as the date of precedence the date of first use of the water, and

(b) authorizes the use of the greater of

(i) 2 000 litres of water per day for each private dwelling on a parcel, or

(439.93 imp. gallons)

(ii) the amount of water the engineer is satisfied the person has been using for domestic purposes.

16. Splatsin

Splatsin asserts Aboriginal rights and title in Secwepemculucw. As the Project falls within this area, any potential impact arising from the Project or cumulative impacts resulting from the Project on Splatsin's Aboriginal rights and title will trigger the duty to consult and accommodate Splatsin.

Given the extent of cumulative impacts in Splatsin's traditional territory, even a small project may have serious consequences for the exercise of our constitutionally-protected rights and title and may therefore require deep consultation and accommodation. Further, Splatsin asserts Aboriginal and other common law rights to the lands and water resources within, under, and adjacent to our reserve lands, and Splatsin has the right to govern those lands and water resources. To the extent the Project potentially impacts Splatsin's reserve land and/or water resources and/or Splatsin's ability and authority to govern our reserve lands and water resources, the duty to consult is engaged at the higher level, including the requirement to obtain Splatsin's consent.

Splatsin did not have the capacity to respond to this referral during the engagement period. Please notify us of any decisions that were made on this file and forward any monitoring reports, if applicable.

17. Township of Spallumcheen

- These regulations seem quite demanding; however considering that the aquifers require protection from contamination and that water quantity is a limiting factor, the proof of water requirements would be warranted.
 - The proposed requirements align with Provincial interests.
 - It is noted that the Golder report did not consider the portion of Provincially mapped aquifer #351 within Township boundaries. In future, collaboration between adjacent communities should be considered when commissioning a report of this nature in order to ensure that the overlapping community interests of groundwater supply are taken into account.
 - The Township would be interested in having Golder present the findings of this report to our Council as our municipality is adjacent to Area C, and several Township properties lie above aquifer #351.
-

18. [REDACTED]

I don't think the groundwater study on Keddleston Rd covers enough area to make changes to all of area C.

19. [REDACTED]

I am writing to request some clarification re: Subdivision Servicing Amendment Bylaw No. 2930 – Proof of Water Requirements in Electoral Area “C”. Would this only apply to new wells? Or existing wells? In June 2022, RDNO approved a subdivision which draws from three new wells which draw from the same water source as properties located on Jordashe Rd. I would request that before building permits are issued on Lots 1-5 and R20, the proof of water requirements would apply. Last year, our wells (Jordashe residents) were dry from July to October. I'm pretty certain any additional stress placed on this aquifer would result in future water shortages.

20. **Advisory Planning Commission Minutes**

- Unreasonable requirements in the report.
 - No one is set up in the valley to test to the volume required.
 - Need to look at community development / community water system.
 - Need to protect people already in the area.
 - We are adding a hardship to prove water.
 - Would like to see more consultation with people in the industry and the referrals for the report should have been sent to more people.
 - Do not want to put a moratorium on the area.
 - Feel that this study would be the same as a moratorium and that maybe a moratorium should be placed in areas.
 - Stricter testing should be in place.
 - Need more time to provide feedback.
 - Have people provide input through planning @rdno.ca.
 - Email APC members not in attendance at meeting to provide feedback.
 - Would like this report to come back to a future APC meeting for further discussion.
-

21. [REDACTED]

Overall, the proposed amendments are not supportive of developing the area. If it is RDNO's goal to reduce development of the area, then the proposed amendments should help with that goal.

Comments for the specific bullets are as follows:

-At least one year of continuous groundwater level monitoring be conducted, and the results analyzed and interpreted by a Qualified Professional;

What is the RDNO expecting to assess from one year's data? Impacts to the aquifer from residential pumping? Majority of the aquifers in this area in bedrock, with the recharge area and recharge times not modelled to assess what one year's data would provide value to and how the data would be connected to pumping and other influences in the hydrologic cycle.

-Well pumping tests must be supervised by a Qualified Professional;

Yes, pumping tests should be overseen by a QP registered with EGBC.

-48-72 hour pumping tests at the current bylaw rate of 6,550 litres of water per day (1.0 Imperial Gallon per Minute) per parcel, depending on the aquifer type;

What will stipulate whether a 48 hour or 72 hour pumping test should be completed? Is 6,550 litres per day over a 12-hour or 24-hour period? Why would a 48 hour pumping test be needed instead of a 24 hour pumping test? How does this length of pumping show impacts that may be similar to daily residential water use? I believe the objective of the Bylaw is to understand whether residential water use will be supported by the aquifer and testing should also reflect the objective for residential water use.

-Water level recovery must be monitored for the same period of time as the pumping test (48-72 hours) and achieve 90 to 95% recovery;

Yes, agreed.

-At least one observation well must be monitored in the same aquifer and within the same fracture network during the pumping test and recovery period;

What is the objective for monitoring? If it is to assess, aquifer impacts, then yes this is a good idea but if it is to assess potential well interference to/from neighbouring properties, then it would be better to monitor neighbouring wells.

-Pumping tests are to be conducted in the dry months of the year (August 1 –March 1) or as identified by the one year monitoring period;

Again, majority of producing aquifers in the area are in bedrock. Recharge does not only occur during wet months and impacts from dry month pumping will likely not add additional stress to the bedrock aquifer.

-Where an application to the RDNO includes more than one proposed lot, the pumping test must be conducted simultaneously at all wells proposed to service each lot;

This adds a lot of complicated analysis that will not result in telling whether there is well interference to/from neighbouring properties. It will also put extreme stress on the aquifer that will not represent residential water use.

-A Qualified Professional must submit a signed and stamped hydrogeological report and

Schedule A: Qualified Professional - Proof of Water form confirming all requirements of the Bylaw have been met.

A QP registered with EGBC should authenticate the hydrogeological report and include the completed Schedule A as part of the report. As a professional, I would not authenticate Schedule A because the authenticated page can be inserted to any other report for any other well or property. This is a liability risk. There is no need to authenticate the information twice. The authenticated report will cover the context in Schedule.

22. David Thompson, Hydrogeologist, MoF

I have reviewed the proposed bylaw amendments and the Golder report upon which they are based (<https://www.rdno.ca/keddleston>). While there are well-known historical and ongoing concerns regarding groundwater availability in the Study Area identified in Golder's Phase 2 Report, the Province of British Columbia regulates only non-domestic groundwater use through the Water Sustainability Act. It does not presently consider local groundwater availability for new domestic wells, although the Groundwater Protection Regulation does address well construction, siting and well owner requirements.

It is understood that the professional report and related recommendations, including the proposed bylaws, are intended to support sustainable development in the Keddleston area.

The professional report is substantive in scope, and as such increases confidence in the assessment of groundwater availability, and the measures suggested to ensure sustainable use.

Technical aspects of the revised proof-of-water requirements comprising the bylaw are more comprehensive than in the past. The fact that Golder revised aspects of their Phase 1 (2020) availability study downward based on new data indicates a cautious approach is warranted. On balance, the level of effort required in the proposed bylaws appear scaled to the level of concern currently indicated by the study.

I would note that the requirement to verify an observation well is in the same fracture network as a pumping well may be difficult to achieve owing to the largely unpredictable nature of fractured bedrock aquifers. Golder were able to determine that variations in groundwater quality data may differentiate shallow and deeper fracture networks.

In the event the bylaws are passed, consideration should be given to ensuring professional reports generated because of the bylaw are readily available to future QPs working toward satisfying the proof-of-water requirements. Future reports can (and should) reference and incorporate previously submitted professional reports and data.

REGIONAL DISTRICT OF NORTH OKANAGAN

Extract from the Minutes of a Meeting of the

Board of Directors

Held on

Wednesday, July 20, 2022

Bylaw 2930 - Regional District of North Okanagan Subdivision Servicing Amendment

Moved and seconded

That the Regional District of North Okanagan Subdivision Servicing Amendment Bylaw No. 2930, 2022 be given First Reading and be referred to internal and external agencies, stakeholders and the public; and further,

That the report by Golder Associates Ltd. titled *Keddleston Groundwater Study – Phase 2* dated June 29, 2022 be included with the referral package for Bylaw No. 2930.

CARRIED



STAFF REPORT

TO: Electoral Area Advisory Committee

File No: 22-0403-C-TA

FROM: Planning Department

Date: June 29, 2022

SUBJECT: New Proof of Water Requirement Thresholds in Electoral Area C –
Subdivision Servicing Bylaw Amendment

RECOMMENDATION:

That it be recommended to the Board of Directors, the Regional District of North Okanagan Subdivision Servicing Amendment Bylaw No. 2930, 2022 be given First Reading and be referred to internal and external agencies, stakeholders and the public; and further,

That the report by Golder Associates Ltd. titled *Keddleston Groundwater Study – Phase 2* dated June 29, 2022 be included with the referral package for Bylaw No. 2930.

SUMMARY:

Staff recommend amendments to the Subdivision Servicing Bylaw No. 2600 related to proof of water requirements for properties located within Electoral Area “C” that are not serviced by a community water system based on the recommendations included in the report by Golder Associates Ltd. (“Golder”) titled *Keddleston Groundwater Study – Phase 2* dated June 29, 2022 (“the Golder Report - Phase 2”) which is also being considered at the Electoral Area Advisory Committee on July 7, 2022 and Board of Directors on July 20, 2022.

DISCUSSION:

The current Subdivision Servicing Bylaw standards were established to ensure an adequate supply of water for households within the Electoral Areas of the region. Based upon the recommendations contained in the Golder Report – Phase 2, in addition to complaints received by the RDNO regarding limited water availability and timely recharge of wells within Electoral Area “C”, it is recommended that the Board take a precautionary approach to groundwater resources and that a higher threshold for proof of water be established for proposed subdivision of all properties located within Electoral Area “C” that are not serviced by a community water system. The proposed changes to the Subdivision Servicing Bylaw apply to Electoral Area “C” only and, as recommended by Golder, include the following:

- At least one year of continuous groundwater level monitoring be conducted and the results analyzed and interpreted by a Qualified Professional;
- Well pumping tests must be supervised by a Qualified Professional;
- 48-72 hour pumping tests at the current bylaw rate of 6,550 litres of water per day (1.0 Imperial Gallon per Minute) per parcel, depending on the aquifer type;

- Water level recovery must be monitored for the same period of time as the pumping test (48-72 hours) and achieve 90 to 95% recovery;
- At least one observation well must be monitored in the same aquifer and within the same fracture network, during the pumping test and recovery period;
- Pumping tests are to be conducted in the dry months of the year (August 1st –March 1st);
- Where an application to the RDNO includes more than one proposed lot, the pumping test must be conducted simultaneously at all wells proposed to service each lot;
- A Qualified Professional must submit a signed and stamped hydrogeological report and Schedule A: Qualified Professional - Proof of Water form confirming all requirements of the Bylaw have been met.

If the Board wishes to give Bylaw 2930 First Reading and referral to internal and external agencies, stakeholders and the public, staff would compile feedback received in a report and bring back for consideration prior to Second Reading. The Board could also direct staff to hold a Public Hearing to gather additional feedback at that time.

Alternate Recommendation

If the Board of Directors desire to implement these changes immediately, the following Alternate Recommendation is provided:

That it be recommended to the Board of Directors, the Regional District of North Okanagan Subdivision Servicing Amendment Bylaw No. 2930, 2022 be given First, Second and Third Readings; and further,

That the Regional District of North Okanagan Subdivision Servicing Amendment Bylaw No. 2930, 2022 be Adopted.

For any existing subdivision applications that have already been submitted, Section 511 of the *Local Government Act* states the Bylaw has no effect with respect to that subdivision for a period of 12 months after the Bylaw is adopted. There are approximately seven subdivision applications within Electoral Area “C” at the time of writing this report that will have a one year period of time once the bylaw is adopted to advance under the existing regulations.

LEGAL/STATUTORY AUTHORITY/REQUIREMENTS:

In accordance with Section 506(1)(c) of the *Local Government Act*, a local government may, by Bylaw, regulate and require the provision of works and services in respect to the subdivision of land, and for that purpose may, by Bylaw, require that, within a subdivision, a water distribution system, a fire hydrant system, a sewage collection system, a sewage disposal system, a drainage collection system or a drainage disposal system be provided, located and constructed in accordance with the standards established in the Bylaw.

Further, in accordance with Section 506, a Subdivision Servicing Bylaw is permitted to have separate thresholds for different areas with different circumstances and if there is no community water system, may require that each parcel to be created have a source of potable water having a flow capacity at a rate established by bylaw.

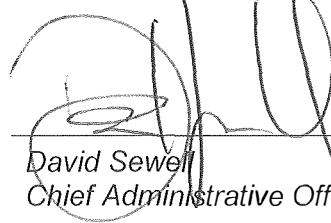
In light of findings regarding water availability in Electoral Area “C” outlined in the Golder Report-Phase 2 and increased strain on the region's water supply due to climate change, the proposed changes are recommended to be incorporated into the Subdivision Servicing Bylaw to provide robust information to ensure a sustainable water supply for existing residents and any future developments within Electoral Area “C”.

Submitted by:



*Rob Smiles, MCIP, RPP
General Manger, Planning and Building*

Approved for Inclusion:



*David Sewell
Chief Administrative Officer*

REGIONAL DISTRICT OF NORTH OKANAGAN

BYLAW No. 2930

A bylaw to amend the Subdivision Servicing Bylaw No. 2600, 2013

WHEREAS Section 506 (7) [*Subdivision servicing requirements*] of the *Local Government Act*, states that when there is no community water system, the Regional Board may, by bylaw, require that each parcel to be created by the subdivision have a source of potable water having a flow capacity at a rate established in the bylaw;

AND WHEREAS there are areas of known groundwater supply concerns within Electoral Area “C”;

AND WHEREAS the Regional Board desires additional information regarding flow capacity and impact on neighbouring wells from a Qualified Professional for proposed subdivisions within Electoral Area “C”;

NOW THEREFORE, the Board of the Regional District of North Okanagan, in open meeting assembled hereby, ENACTS AS FOLLOWS:

CITATION

1. This Bylaw may be cited as the “**Regional District of North Okanagan Subdivision Servicing Amendment Bylaw No. 2930, 2022**”.

AMENDMENTS

Regional District of North Okanagan Subdivision Servicing Bylaw No. 2600, 2013 be amended as follows:

2. Section 406.1 Dug Wells by inserting “, **except Electoral Area “C”**” after “all Electoral Areas”.
3. Section 406.2 Drilled Wells by inserting “, **except Electoral Area “C”**” after “all Electoral Areas”.
4. Section 406.2.c, by removing “C” in the list of Electoral Areas.
5. By adding a new Section 406.4 as follows:

4. Proof of Water requirements for Electoral Area “C”

Where connection to a community water system is not required and a drilled or dug well is proposed as a source of potable water for a parcel created by subdivision within Electoral Area “C”, proof of water shall consist of the following:

- a. For each well that is proposed to be used as a water supply, at least one year of continuous groundwater level monitoring must be conducted and the results analyzed and interpreted by the **Qualified Professional** and documented in the hydrogeological report.
 - b. A site plan must be provided indicating the location of the well. The well must be constructed in compliance with the minimum construction requirements of the BC Groundwater Protection Regulation (GWPR) and sited in accordance with the minimum setback distances from property boundaries, other wells and potential sources of contamination, as outlined in applicable legislation including the BC GWPR, BC Health Hazards Regulation (HHR), Sewerage

System Regulation (SSR) and Municipal Wastewater Regulation (MWR). A survey of existing water supply wells on adjacent properties within a radius of 300 m from the proposed **parcel** must be undertaken and indicated on the site plan.

- c. A **well yield test** can not be used to demonstrate sustainable well yield in Electoral Area "C"
- d. The well must be assessed with a **pumping test** that has been conducted by a **Qualified Well Driller, Qualified Well Pump Installer** or a person working under the direct supervision of a **Qualified Well Driller, a Qualified Well Pump Installer, or Qualified Professional** and a hydrogeological report must be prepared by the **Qualified Professional** and submitted to the **Regional District**.
- e. The hydrogeological report must demonstrate that the well can provide at least 6,550 litres of water per day (1.0 Imperial Gallon per Minute) per **parcel**. The report must demonstrate that the use of the well will not negatively impact the use of neighbouring wells.
- f. Pumping tests are to be conducted in the dry part of the year when groundwater levels are lowest (no exceptions). The dry time of the year is from August 1st to March 1st; however, the seasonal low water levels must be confirmed by the results of the continuous groundwater level monitoring required in Section 406.4.a.
- g. Prior to conducting the **pumping test**, the static water level in the pumping well and observation well(s) should be monitored for a minimum of one week to assess pre-test trends and to provide the basis to estimate what the static water level is expected to be at the end of the testing period (i.e., projected to the end of the testing period to account for an increasing or decreasing trend).
- h. **Pumping tests** shall also be conducted for a duration of at least 48 hours for a well completed in an unconfined aquifer and at least 72 hours for a well completed in a bedrock aquifer.
- i. Water level recovery must be monitored for a period not less than the **pumping test**. Wells that have not achieved 100% recovery relative to what static is projected to be at the end of the test (based on the pre-test monitoring data described in Section 406.4.a.) must be further assessed by the **Qualified Professional**.
- j. At least one observation well must be monitored in the same aquifer and within the same fracture network (for bedrock wells), during the **pumping test** and recovery period. The observation well must be located on the same property as the pumping well or adjacent property(ies) and within 100 m of the pumping well.
- k. Where more than one parcel would be created by a subdivision, the **pumping tests** must be conducted simultaneously for each well proposed to service each parcel each at a pumping rate that is at least the minimum required rate.

- l. The long-term sustainable yield of a well, which must be estimated based on the results of the pumping test and cannot be greater than the rate that was applied for the pumping test, shall be documented in a hydrogeological report that is signed and stamped by the **Qualified Professional** and submitted to the **Regional District**.
 - m. The “Qualified Professional - Proof of Water” form attached to and forming part of this Bylaw as Schedule A must be signed and stamped by a **Qualified Professional** confirming that all requirements in Section 406.4 have been completed and submitted to the Regional District.
 - n. All hydrogeological reports, **pumping tests**, and Qualified Professional – Proof of Water reports must be dated not more than five (5) years prior to the date of **subdivision** application.
6. By adding the following as Section 407.1 and renumbering the following sections accordingly:
- 1. No Proof of Water exemptions apply to proposed subdivision of properties located within Electoral Area “C” that are not serviced by a community water system.
7. By adding the following as Section 102 and renumbering the following sections accordingly:
- 102 Schedules
- The following schedules are attached to and form part of this Bylaw:
- Schedule A – Qualified Professional – Proof of Water
8. By adding Schedule A, *Qualified Professional – Proof of Water*, attached to and forming part of this Bylaw as Schedule A attached to and forming part of Subdivision Servicing Bylaw No. 2600, 2013.

Read a First Time	this	day of	, 2022
Read a Second Time	this	day of	, 2022
Read a Third Time	this	day of	, 2022
ADOPTED	this	day of	, 2022

Chair
Kevin Acton

Deputy Corporate Officer
Ashley Bevan



REGIONAL
DISTRICT
NORTH
OKANAGAN

Qualified Professional – Proof of Water (Subdivision Servicing Bylaw No. 2600 – Schedule A)

NOTE: This form must be filled out by a Qualified Professional (a person who is registered or licensed as Professional Engineer or Professional Geoscientist under the *Engineers and Geoscientists Act of British Columbia*)

Name of Property Owner(s):		Phone #:	
Address of Property:		Total Property Size (Ha):	
Name of Qualified Professional:		Phone #:	
Email of Qualified Professional:			
<p>Qualified Professional - Please complete the checklist below. All answers must be “Yes” for this form to be accepted by the Regional District. Unstamped/Unsealed or unsigned forms will <u>not</u> be accepted. A Qualified Professional must supervise the well pumping tests and submit this Proof of Water form as evidence of sufficient potable water for drilled and dug wells.</p>			
A survey of existing water supply wells on adjacent properties within a radius of 300 m from the proposed parcel was undertaken and the results are presented on a site plan.		Yes <input type="checkbox"/>	No <input type="checkbox"/>
At least one year of continuous groundwater level monitoring was conducted and the results analyzed to demonstrate that seasonal low groundwater levels have been characterized.		Yes <input type="checkbox"/>	No <input type="checkbox"/>
The well must be constructed in compliance with the minimum construction requirements of the BC Groundwater Protection Regulation (GWPR) and sited in accordance with the minimum setback distances from property boundaries, other wells and potential sources of contamination, as outlined in applicable legislation including the BC GWPR, BC Health Hazards Regulation (HHR), Sewerage System Regulation (SSR) and Municipal Wastewater Regulation (MWR).		Yes <input type="checkbox"/>	No <input type="checkbox"/>
Prior to conducting the pumping test, the static water level in the pumping well and observation well(s) were monitored for a minimum of one week to assess pre-test trends.		Yes <input type="checkbox"/>	No <input type="checkbox"/>
Date pumping test was conducted:			
A pumping test was conducted during the dry season (defined as August 1 st to March 1 st however, must be confirmed by the results of the continuous groundwater level monitoring discussed above) and in accordance with the criteria outlined in the British Columbia Guide to Conducting Pumping Tests (BC Guide), and was at least 48-hours in duration for a well completed in an unconfined aquifer and 72-hours in duration for a well completed in a bedrock aquifer. (Note: A well yield test cannot be used to demonstrate sustainable well yield in Electoral Area “C”.)		Yes <input type="checkbox"/>	No <input type="checkbox"/>
The well pumping test demonstrates a sustainable yield of at least 6,550 litres of water per day (1.0 Imperial Gallon per Minute) per parcel.		Yes <input type="checkbox"/>	No <input type="checkbox"/>

Water level recovery was monitored for a period not less than the pumping test. If the static water level did not achieve 100% recovery relative to what static was projected to be at the end of the test (based on the pre-test monitoring data described above), recovery was further assessed.	Yes <input type="checkbox"/>	No <input type="checkbox"/>
At least one observation well which is completed in the same aquifer (and within the same fracture network for bedrock wells) was monitored during the pumping test and recovery period. The observation well(s) should be located on the same property or adjacent property(ies) and within 100 m of the pumping well.	Yes <input type="checkbox"/>	No <input type="checkbox"/>
What is the address of the property that the observation well was monitored on?		
Where more than one parcel would be created by a subdivision, the pumping tests must be conducted simultaneously for each well proposed to service each parcel. (For example, if a subdivision application is for three properties, where each property would consist of one dwelling and one potable water well, the pumping test program must be designed such that the three water wells are pumped at the same time, for the same duration, and each at the minimum required rate.) Did you test all wells in accordance with the above?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
I confirm that I supervised the well pumping testing on the property in accordance with Regional District of North Okanagan Subdivision Servicing Bylaw No. 2600, 2013 – Section 406.4 - Proof of Water Requirements for Electoral Area “C”		
Signature of Qualified Professional:	Stamp/Seal:	