



BECKIE
HYDROGEOLOGISTS

Elkridge Utility
Proposal for the Construction of Well PW8
August 24, 2024



Association of Professional Engineers and Geoscientists
of Saskatchewan
CERTIFICATE OF AUTHORIZATION
Beckie Hydrogeologists (1990) Ltd.
Number 664

Discipline	Permission to Consult Held By: Sask. Reg. No.	Signature
Hydrogeological	9716	M.S. Famulak

Beckie Hydrogeologists (1990) Ltd.

Professional Engineers and Geoscientists

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August 24, 2024

Elkridge Utility
PO Box 182
Waskesiu, Sk, S0J 2Y0

Attn: Russell Nelson, Utility Manager utility_manager@hotmail.com

Dear Mr. Russel

Re: Elkridge Utility – Proposal for the Construction of Well PW8

In response to your recent telephone request, Beckie Hydrogeologists (1990) Ltd. (Beckie) is pleased to submit this proposal to provide professional hydrogeologic services on the above referenced project.

Proposed Scope of Work:

Beckie recommends following scope of work for this project:

- 1) Pre-design services, including a review of the relevant hydrogeologic information that is available for the existing Utility water wells (this work was completed by Beckie during the preparation of this proposal) and the preparation of an application for “Permit to Conduct Ground Water Investigation” for submission by the Utility to the Water Security Agency of Saskatchewan (WSASK).
- 2) Well design, in consultation with the Utility and BCL Engineering Ltd. The proposed water well will be referred to herein as well PW8.

Existing wells PW6-2011 and PW7-2014 were both designed and constructed using identical standards and procedures, however there is an excessive concentration of entrained sediment in the water produced from well PW7-2014. Therefore, it is proposed that the design for well PW8 be modified to minimize or eliminate the potential for entrained sand in the water produced from this well.

- 3) Bid Period services, including the preparation of a unit price tender document in standard Beckie format, invitational project tendering (minimum of 3 pre-qualified and competitively priced drilling contractors), receipt and analyses of the tender submissions and recommendation for contractor selection by the Utility.

The Utility has indicated that they may want to sole source Hayter Drilling Ltd. for the work. If so instructed, Beckie will obtain fixed unit prices from Hayter without formal tendering and then re-estimate the drilling contractor’s costs accordingly.

- 4) Personnel and equipment mobilization to Elkridge, including daily travel disbursements.

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- 5) General and resident hydrogeologic services related to confirmatory test drilling and the installation of one – 50 mm nominal diameter PVC plastic cased observation well at the proposed well PW8 site.

The WSASK generally requires 2 observation wells developed with the same aquifer as a condition of issuing a user regulatory “Water Rights License” (WRL) and “Approval to Construct and Operate Works” (ATC/ATO). The proposed observation well at the well PW8 site, along with the existing observation wells, will satisfy this regulatory requirement.

The proposed observation would be equipped with a Solinst levellogger and barologger that would be programmed by Beckie to automatically measure and record the aquifer water level and barometric pressure on 1 hour time intervals.

Information from the loggers will assist with future aquifer assessment and can be submitted to the WSASK to comply with their regulatory monitoring requirements (applicable to the existing wells and to well PW8).

- 6) General and resident hydrogeologic services related to confirmatory test drilling and to the subsequent construction, development and pump testing (24 hour duration) of one - 200 mm nominal diameter PVC plastic cased water well, to an approximate depth of 110 metres.

Subject to encountering acceptable aquifer conditions in the confirmation testhole, well PW8 would be located ~150 metres north of the water treatment plant (WTP), on a land parcel owned by the Utility.

- 7) Collection of 1 set of water samples from well PW8 and laboratory analyses of these samples for general chemical, total metals, DOC, TOC, ammonia, silicone and total suspended solids.
- 8) Post-construction services, including hydrogeologic data analyses and the preparation of a summary hydrogeologic report to document the work completed during this project, including:
 - ◆ Record drawings and graphical and tabulated pump test information;
 - ◆ The recommended maximum day pumping capacity of well PW8; and
 - ◆ Tabulated raw water quality data.

This item of work will also include the completion of the hydrogeologic section of an application for a Water Rights License (WRL) and for regulatory Approval to Construct and Operate Works (ATC/ATO) for well PW8, for submission by the Utility to the WSASK.

The summary report will be suitable for presentation to the WSASK in support of this application.

- 9) Optional concurrent installation of a 75 mm diameter stainless steel screen liner into well PW7-2014. The intent of the screen liner is to eliminate or reduce the entrained sediment in the water produced from this well so that it can be regularly operated by the Utility as a primary, as a supplementary and/or as a backup water source.

The screen liner may reduce the specific capacity (pumping rate per unit of water level drawdown) of well PW7-2014 and in that event, there may be an increase in the water level drawdown at any given pumping rate. To compensate for this, the service pump in the well can be lowered by ± 10 metres.

The theoretical design capacity of the proposed screen liner is 6.49 L/s, however the recommended pumping rate from well PW7-2014 after liner placement cannot be confirmed until the liner has been installed and a pumping test has been completed on the well.

It is understood that the Utility currently requires a maximum day (intermittent) well(s) pumping rate of + 6.05 L/s (80 igpm). Simultaneous well(s) pumping could be implemented if the individual capacity of the proposed or the existing wells is less than 6.05 L/s and/or if a higher well(s) pumping rate is required at a future date. Provided that the work outlined in items 6) and 9) above is completed as proposed, the Utility would have 3 operational wells and any 2 of the wells could then be pumped simultaneously to supply the water requirements and the third well would provide redundancy; the operating and the redundant wells could be alternated as required.

Estimated / Proposed Project Costs:

The estimated costs to complete the proposed scope of work are tabulated below:

Proposed Scope of Work	Fees and Disbursements For Beckie (refer to note 3 below)	Drilling Contractor (refer to note 2 below)
Pre-design, Design and Bid Period services.	5,000.00	0.00
Personnel and equipment mobilization to Elkridge, including travel time and daily travel disbursements.	5,000.00	10,000.00
Confirmatory test drilling and the installation of one - 50 mm diameter observation well at the PW8 site, including the supply programming and installation of a levellogger and barologger into the observation well.	6,000.00	25,000.00
Confirmatory test drilling followed by the construction, development and pump testing (24 hour duration) of well PW8.	35,000.00	130,000.00
Collection and laboratory analyses of 1 set of water samples from well PW8.	500.00	0.00
Hydrogeologic data analyses and reporting.	6,500.00	0.00
Total Estimated Cost (assuming all the work is completed - refer to note 1 below)	\$ 58,000.00	\$ 165,000.00
	\$ 223,000.00 (plus GST and applicable Sk. PST)	
Plus the optional concurrent installation of a screen liner into well PW7-2014, including the removal and re-installation of the service pumping equipment, post-installation development work and pump testing, laboratory water analyses and supplementary hydrogeologic data analyses and reporting.	12,000.00	42,000.00

Notes to the estimated / proposed project costs:

1. The Utility will only be charged for the work that is approved and actually completed.
2. The estimated drilling contractor costs are based on tendered unit prices recently received by Beckie for other similar projects and on the **estimated** quantities of labour and materials that the drilling contractor will supply on the proposed project.

The drilling contractor costs will be **re-estimated** by Beckie following the completion of the Bid Period services portion of the project.

The final amount invoiced by the selected drilling contractor will be based on their tendered unit prices and on the **actual** quantities of labour and materials that they supply on the project, as will be field verified by Beckie.

3. The hydrogeologic services are subject to the Federal GST and 30% of the design portion of the hydrogeologic services is also subject to the Sk. PST. The cost of the hydrogeologic services are based on the 2024 Fee Schedule Guideline Summary, as published by the Association of Consulting Engineering Companies.

The hydrogeologic services will be directed by an experienced professional engineer or a professional geoscientist employed by Beckie.

4. The pumping capacity and the water quality from well PW8 cannot be determined until the well has been constructed and pump tested.
5. The estimated costs were prepared with the assumption that the field portion of the work will not be completed during severe winter weather conditions.
6. The estimated costs do not include the design or construction of the ancillary works and appurtenances (pitless adapter, connecting pipeline, electrical, mechanical or pumping equipment, water treatment upgrades, etc.) that would be required to place the replacement water well into regular service.

Beckie Qualifications and Experience:

Beckie is fully licensed and qualified to provide consulting hydrogeologic services in Saskatchewan and Alberta and is insured against general liability (\$5,000,000) and professional errors and omissions (\$2,000,000 per claim/aggregate). Copies of our insurance certificates are available upon request.

Beckie personnel have designed and directed approximately 1,000 successful groundwater exploration and water well(s) construction and rehabilitation projects in Saskatchewan, including the water wells currently operated by the Utility.

Beckie also directed the installation of the 50 mm diameter observation wells located throughout the Elkridge Resort that were previously required to satisfy the regulatory requirements of the WSASK for the Utility supply and for the golf course irrigation supply. A profile page for Beckie is attached.

Closure:

Thank you for the opportunity to submit this proposal. We look forward to working with the Elkridge Utility on this project.

Please contact the undersigned or Stephen Famulak (306-530-4920) if you have any questions.

Regards,

Beckie Hydrogeologists (1990) Ltd.



Mike Famulak, P.Geol, Principal Hydrogeologist

1 (306) 536-1625

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2024 Beckie Hydrogeologists (1990) Ltd.



Beckie Hydrogeologists (1990) Ltd. provides professional consulting services in geology, hydrogeology, and environmental sciences. The company is licensed to practice in Saskatchewan and Alberta and since 1990 have designed and directed over 1,000 successful groundwater exploration and water supply well(s) construction projects.

Company Personnel:

Mr. Stephen M. Famulak, B.A.Sc., P.Eng. (SK/AB), *President and Principal Engineer*

Mr. Mike S. Famulak, P.Geo. (SK), P.Geol. (AB), *Principal Hydrogeologist*

Mr. Devin D. Mutschler, B.Sc., P.Eng. (SK), P.Geo. (SK), P.Geol. (AB), *Senior Geologist*

Mr. Eric J. Bryce, B.A., *Geologist*

Mr. Tyler P. Smith, B.Sc., Geoscientist-in-Training (SK), *Geologist*

Mrs. Brittany M. Mosewich, B.B.A., *Marketing Director*

Company Description:

Our company specializes in the design, direction, and evaluation of unique drilling and water well installation programs as applied to source water supplies, induced surface water infiltration systems, flowing artesian well installations, dewatering well systems, aquifer monitoring and management, well maintenance, well decommissioning, and environmental impact assessments. Representative clients include First Nations, all levels of government, Crown Corporations, private sector companies, consulting engineering companies and agricultural ventures.

Professional Services Provided:

Water Resources

- ♣ Preliminary evaluation and feasibility assessment.
- ♣ Groundwater resources development, including test drilling and development of high-capacity wells.
- ♣ Air photo interpretation and analyses.
- ♣ Groundwater quality sampling.
- ♣ Pumping tests and aquifer yield analyses.
- ♣ Aquifer monitoring and management.
- ♣ Public consultation and Regulatory liaison.
- ♣ Geological Mapping.
- ♣ Project Management.

Specialized Drilling and Well Installations

- ♣ Fluid engineering for flowing artesian well installations and abandonments.
- ♣ Well decommissioning.
- ♣ Well testing and maintenance.
- ♣ Source and return wells for Geothermal applications.
- ♣ Induced surface water infiltration well systems.
- ♣ Groundwater interceptor wells.
- ♣ Artificial aquifer recharge systems.

Environmental

- ♣ Environmental impact assessments.
- ♣ Design and installation of groundwater monitoring systems.
- ♣ Design and installation of contaminant recovery and containment well systems.
- ♣ Analyses of contaminant transport migration and dispersion.
- ♣ Landfill and lagoon siting, monitoring, and evaluation.
- ♣ GUDI Assessments.
- ♣ Injection and waste disposal wells.

Mining, Energy, and General Construction

- ♣ Design of Pore pressure relief wells.
- ♣ Design and development of dewatering well systems for the mining industry.
- ♣ Design and development of dewatering well systems for construction with open excavations.
- ♣ Design and development of source water supplies for enhanced oil recovery (SAGD).
- ♣ Design and development of source water supplies for the construction of natural gas storage caverns.

