

Subject: **Hamlet of Wimborne: Naturally Occurring Fluoride**
 Meeting Date: Tuesday, May 28, 2024
 Prepared By: John McKiernan
 Presented By: John McKiernan

RECOMMENDED MOTION:

That Council accept the Hamlet of Wimborne Fluoride reduction study as information.

STRATEGIC PLAN ALIGNMENT: (Check all that apply)

	<input checked="" type="checkbox"/>		<input type="checkbox"/>		<input checked="" type="checkbox"/>		<input type="checkbox"/>		<input checked="" type="checkbox"/>
High Quality Infrastructure		Economic Resilience		Quality of Life		Effective Leadership		Level of Service	

RELEVANT LEGISLATION:

Provincial (cite)- Code of Practice for Waterworks Systems Using High Quality Groundwater
 Guidelines for Canadian Drinking Water Quality

Council Bylaw/Policy (cite)- N/A

BACKGROUND/PROPOSAL:

Historically the groundwater for the Hamlet of Wimborne has been high in naturally occurring Fluoride with test results typically indicating an average of 2.00 mg/L. The Maximum Allowable Concentration (MAC) for fluoride in drinking water is 1.50 mg/L. Although the Sodium and TDS do not have a MAC they do have an Aesthetic Objective (AO) and these two parameters have historically exceeded the AO. An AO doesn't result in a contravention but, a parameter that exceeds the AO may affect the acceptance of the water as drinkable by the consumer.

In the past and in the present, there has been an exemption granted to waterworks with naturally occurring fluoride to not be in contravention of the parameters as set but, it has been dealt with as a notification and the Community residents are to be aware of the high level of fluoride in the drinking water. Kneehill County has had a notification on its website and has in the past included an AHS letter within the utility bill.

In June of 2022 Alberta Environment and Parks removed the exemption for naturally occurring fluoride exceeding the MAC in high quality groundwater. This change allowed communities time to undertake a system assessment, create a plan and then implement this plan to bring the fluoride concentration into line with the MAC of 1.50 mg/L. If the water system is not upgraded to reduce the Fluoride concentration then it will be considered non-compliant.

In the original communication in June 2022, the timelines set forth by Alberta Environment and Parks (AEP), was for the municipality to complete a study within a year to determine options and costs to treat the naturally occurring Fluoride and then have the desired option in place and operational by June 2027. However, a follow-up notification letter was to be received from AEP that would contain written notice of the changes and additional information, including instructions for coming into compliance, such as specific timelines and expectations, as of this date this letter has not been received.



Kneehill County has completed the Wimborne Fluoride Reduction Study in collaboration with consultant CIMA+ to assess the existing treatment system, capacity and quality, outline options to control the fluoride residual, and present estimate costs for these options.

DISCUSSION/OPTIONS/BENEFITS/DISADVANTAGES/OTHER CONSIDERATIONS:

Through the study CIMA+ reviewed the following four fluoride reduction options:

1) Centralized on-site treatment.

On-site treatment would be an upgrade within the current pumphouse. Although there are a few different on-site processes to reduce Fluoride, reverse osmosis (RO) would provide the added benefit of removing both sodium and TDS to eliminate these parameters from exceeding the AO.

The RO process effectively removes almost any minerals and elements, this results in the water becoming corrosive and lacking micro elements beneficial for human consumption so to overcome this lack of micro elements the treatment process would involve the blending of water that has been treated by the RO unit as well as non-treated water. The blending of the water will provide the most cost effective, reliable and safe solution for Wimborne.

The RO unit will produce wastewater so a connection to the current infrastructure will be required.

The current water would have to be filtered prior to RO as the system is sensitive to incoming water with a great amount of suspended matter. Biological activated pressure filters filled with sand and Granular Activated Carbon (GAC) can be used as a pre-filter, these filters will also reduce the ammonia concentration resulting in lowering the chlorine demand.

Estimated initial cost: \$550,000.00

Estimated on-going costs: \$104,000.00

2) Point of Use treatment.

Point of Use treatment can be installed in each individual household. There are many disadvantages to this option which should render it an option not to be pursued.

Firstly, the County would still be distributing water which exceeds the MAC, the burden of treatment would fall upon the consumer, the burden to maintain the system would fall upon the consumer and this would be difficult for the County to oversee.

Also, the RO unit would strip the water of essential micro elements and would require re-mineralization in order to be suitable for day-to-day use.

No cost estimate was developed as this option was not considered optimal from an operational standpoint.

3) Water supply line extension from Torrington.

Construction of a waterline from the current pumphouse/reservoir in Torrington to the current pumphouse/reservoir in the Hamlet of Wimborne.

Torrington receives water which is treated at the Town of Drumheller water treatment plant and is transmitted by the Aqua 7 Regional waterline to Kneehill County's Sunnyslope Pressure system.

There is an existing waterline from the Torrington reservoir that runs North out of the Hamlet approximately 5 km's. The quality of this pipe has not been verified so the estimate is to provide for a 9 km pipeline between the two Hamlets.



It should be noted that in 2018 a study was completed on the feasibility of the Sunnyslope system as there were concerns on the ability of that specific system to be able to expand due to reservoir size, pump capabilities, etc.

A concern with the connection to Torrington is the long waterline and small demand within Wimborne resulting in the water being in the pipeline for approximately 19 days before it reaches the residents of the Hamlet. This would most likely require the boosting of chlorine prior to distribution as well as at the Hamlet resulting in the potential of increasing THM levels.

Pipeline only cost estimate: \$2,500,000.00
 Pipeline/Sunnyslope Upgrades: \$5,500,000.00

4) Potable water delivery to the Hamlet.

Another option would be to haul water to the Hamlet via the Torrington bulk water station. Considerations for this option include the scheduling of the hauler, demands exceed the stored water on hand, frequent water deliveries during the summer months, added pressure on the Sunnyslope system and the Torrington bulk water site, dependance upon a third party to maintain the water deliveries, and the annual operational costs.

Water hauling estimate: \$300/8m³ (approximately \$150,000/year)

The daily water demand within the Hamlet of Wimborne is between 6 m³ – 20 m³ depending on the season, with an average of 8 m³ /day over the year.

With the ammonia in the groundwater it requires the chlorine dosage to be consistently high as we need to achieve chlorine breakthrough to provide disinfection residual. With the RO upgrade, including the required filtration, the ammonia will be removed through a biological process rather than through chlorine resulting in a significant drop in chlorine usage.

FINANCIAL & STAFFING IMPLICATIONS:

An option to address the high naturally occurring fluoride will be presented in a future budget.

If the treatment process was to change, the operator certification may change, requiring operators to participate in education courses and challenging a written exam to achieve a higher certification level.

RECOMMENDED ENGAGEMENT:

Directive Decision (Information Sharing, One-Way Communication)

Tools:	Individual Notification	Other:	Residents of Wimborne will be notified of any changes to the treatment of the drinking water.
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ATTACHMENTS:

Hamlet of Wimborne, Fluoride Reduction Study

COUNCIL OPTIONS:

- 1). Receive the Hamlet of Wimborne Fluoride Reduction Study as information.
- 2). Direct administration to bring forth a project to construct a centralized, on-site reverse osmosis treatment with filtration to reduce the fluoride concentration within the current groundwater for the Hamlet of Wimborne.



3). Direct administration to bring forth a project to extend a waterline from the Torrington pumphouse/reservoir to the Wimborne pumphouse and reservoir and discontinue the use of the high quality groundwater within the Hamlet of Wimborne.

FOLLOW-UP ACTIONS:

Administration will continue to abide by the Alberta Environment and Protected Areas timelines as set to become compliant with the Maximum Allowable Concentration for naturally occurring Fluoride.

APPROVAL(S):

Mike Haugen, Chief Administrative Officer

Approved-

