DISTRICT OF HUDSON'S HOPE
AGENDA – LATE ADDITION
Council Chambers
Monday February 24, 2020 at 6:00 PM

9. Staff Reports:

SR9 Water Conservation Plan (Update 2019)

REQUEST FOR DECISION

RFD#: 2020MR04	**Date: February 1, 2020**
Meeting#: CM022420	**Originator: Mokles Rahman**
RFD TITLE: Water Conservation Plan Update – Final Report	

RECOMMENDATIONS:

That Council approve the District of Hudson's Hope Water Conservation Plan (Update 2019).

BACKGROUND:

In 2010, the District of Hudson's Hope completed a water conservation plan which outlined the water system information, conservation initiatives, implementation strategies, water conservation goals and performance measures. Since 2010, some activities have been completed to work towards increased water conservation including updated Water Service Regulations (2014), replacing water valves and hydrants etc.

Currently, a council endorsed water conservation plan that is less than five years old is a required document of many grant programs (for both application and final reporting). To support this, the District retained Urban Systems to update the current Water Conservation Plan. Urban Systems updated the water conservation plan by reviewing available data, work accomplished after the last update, and provided an implementation plan. Reducing per capita water usage remains a challenge.

To know the leaks in the system, a leak detection survey was conducted in summer 2019. The contractor identified leaks in six (6) hydrants. Some of those leaks were fixed in 2019 and some will be fixed in 2020, and the remaining will be put under maintenance program. Due to soil character of the town, most of the leaks are not visible over the ground. With the fixing of these leaks, it is expected that the water loss will be reduced, and the per capita water usage will be less.

Prepared by:

Mokles Rahman, Director of Public Works

Approved by:

Chris Cvik, CAO

URBAN systems

HUDSON'S HOPE
PLAYGROUND OF THE PEACE

Water Conservation Plan

District of Hudson's Hope

File: 0664.0046.01

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URBAN systems

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1.0 Background

The District of Hudson's Hope (District), population of 1071[1], currently draws raw water from the Peace River. The water system begins with an intake structure and pump house that provides raw water to the water treatment plant (WTP). From the WTP, treated water is sent to the lower part of distribution mains. Two reservoirs are used for storage in the upper portion of the distribution system. Both reservoirs supply the same upper distribution main lines which allows for ease of maintenance. This redundancy allows one to be shut down for a maintenance period while the other is actively supplying water to the upper main. In addition to this surface water system, the District also operates a ground water well in Beryl Prairie. This is a much smaller quantity of water and is primarily used to service a raw water bulk fill station. The District's water system was originally installed in the 1960's to provide living accommodations for the workers of the, under construction at the time, W.A.C. Bennett Dam. There was an upgrade to the system in 1979 to allow for future expansion and a residential subdivision. In 1980 there was another upgrade to include an auxiliary reservoir. The District went through an expansion of their WTP to include a filtration process, a new intake and new pump house; this was completed in 2011. Currently the District disinfects via chlorine gas to ensure no micro organisms or other potentially harmful bacteria are in the water system. The WTP is in the process of being upgraded as a result of the Site C Dam construction and associated impacts. The system has been in service for almost 60 years and has been servicing the District water needs continuously since then.

Figure 1 Surface vs. Ground Water

Figure 2 - Timeline of Construction

The last conservation plan was completed by the District in 2010. That plan had many recommendations that were implemented that aided in the Districts conservation goals. This plan will act as a plan for the next steps towards sustainable water management within the District of Hudson's Hope.

Water conservation is important because fresh water is becoming more expensive to extract, treat and distribute with ongoing inflation cost pressures for every part of the process. Fresh water resources are being used for more then just their primary function and that is adding additional pressure to the limited resource. Careful stewardship starts at the local level to ensure long-term sustainability. Even in areas where fresh water is plentiful, there are long term benefits to reducing water consumption. Everyone is dependent on water for life and as such it is our responsibility to help keep our water pure, plentiful and

[1] BC Stats. *2018 Sub-Provincial Population Estimates* (2019) - https://www2.gov.bc.ca/gov/content/data/statistics/people-population-community/population/population-estimates

safe for generations to come. Decreasing the District's water use can help to ensure water continues to be available for all parts of our ecosystem. Water conservation actions and behaviour can be embedded in residents' daily lives and be an expression of respect for the environment. The culture of a community like Hudson's Hope is an integral part of its existence as a sustainable community.

2.0 Current Conservation Initiatives

2.1 Usage

Water conservation is a prevalent topic with more and more municipalities providing incentives and running initiatives to reduce and reuse water. In 2010, when the last water conservation plan was created, water use was measured at 640 litres per person per day. Comparing to the national average of 427 litres per person per day[2], this is considered high. Over the last 10 years the national average water usage is on the constant decline. From 2011 to 2017 there was a 13% reduction in total water use nationally. The current water usage within the District is estimated for 2018 to be 649 litres per person per day[3]. This represents an increase of roughly 1% over nine years. This is very similar water usage to the last water conservation plan but still lags the national average. It also shows that the District is trending in the opposite direction as the national average. Therefore, a greater focus is needed to reduce the District's usage and there exist reduction strategies that can help make sizable decreases.

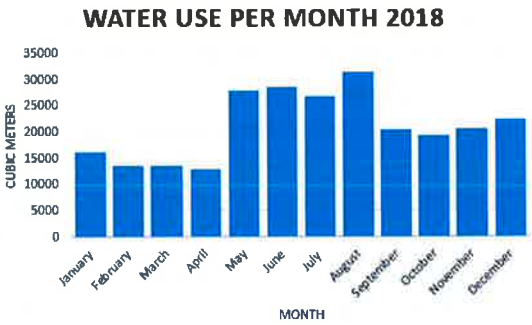

Figure 3 Water Use Per Month 2018

The goal of this water conservation plan is to identify strategies to reduce consumption and be in line with the national average. Operationally, water conservation impacts day to day costs with respect to both water treatment, storage, and conveyance as well as wastewater collection and treatment. The operation and maintenance of a WTP, Wastewater Treatment Plant (WWTP), and conveyance systems is an ever-growing cost. The District's annual expenses for the water and wastewater system are approximately $525,000. This is dependent on both the quantity and quality of the water and wastewater that is put through the treatment plants. The amount of water treated directly correlates to amount of disinfectant used, for every litre of water reduced there is a quantifiable reduction in operating cost. This is in addition to less frequent maintenance on other parts of the WTP and WWTP; the savings can be realized by further water use reduction. In addition, lower energy consumption within the plants helps to reduce greenhouse gas emissions and decrease the carbon footprint of the District, thereby addressing climate change at the same time. Therefore, it can be reasonably assumed that water usage reduction is both good for the environment as well as for the financial well being of the District. This can be done by reducing the amount of water

[2] Statistics Canada. *Potable Water use in Canada* (2019) - https://www150.statcan.gc.ca/n1/pub/11-627-m/11-627-m2019022-eng.htm
[3] Based on estimated population of 1071.

demanded by end users, improving water conveyance systems, and in turn reducing the amount of wastewater treated.

The District currently holds a water license for approximately 2200 cubic meters per day from the Peace River. This intake system currently accounts for roughly 98% of the water use within the District. The District is in the process of updating its water system to be able to withdraw more raw water. This will be accomplished through drilling and creation of new wells. Upon completion of this work, a new application to the province will be submitted for the groundwater. This would provide the District with a more secure water source and backup supply in the case of required maintenance to their existing surface water intake structure or any impacts from the Site C dam operation. Ultimately this will give District residents access to more potable water and will in turn allow the District to have enough potable water availability to support future expansion within the District.

2.2 Leakage

Leaking water mains and hydrants can account for a sizable amount of lost potable water. This water has been treated by the plant and is not being used by the end user as it is lost to the surrounding ground before it arrives at the end user. This inflates the water usage statistics within the District and can be reduced with a capital investment to fix aged water conveyance infrastructure. It is extremely important for fire hydrants to be operational to ensure fire safety within the District. The District is actively replacing leaking valves and hydrants that have been previously identified but more can be done to continue replacing aging fire hydrants that leak potable water. The district completed leak detection in 2019 and the independent contractor found six leaks, all at aging fire hydrants. This report can be seen in its entirety in Appendix B. It is recommended that these newly discovered leaks be fixed at the earliest opportunity to further reduce water usage and in turn provide long term cost savings. Another way to check the underground conveyance systems is using video inspection on the wastewater system. This can help to find additional losses to the wastewater system as well as show the condition of the underground infrastructure. This can give a better understanding of where existing water and wastewater is being lost and focus the investment of infrastructure upgrades.

There exists within the District a commercial water stand that provides potable water to residents. Currently there is no way to monitor the end use of the water that is purchased at the commercial water stand. Although not considered a traditional form of leakage, using this treated potable water for non potable use is an additional leakage from the system. This creates additional unnecessary cost of treating the water and is a poor use of residents' taxes. The recommendation is to create a method to enforce or educate the users of the commercial water stand that this potable water should be used for potable water uses only. If there are needs for non-potable water, these can be satisfied with other non-potable water sources. An additional review of pricing to ensure full cost-recovery of potable water provided should be completed to ensure help alleviate financial impacts to the District from other users.

Another way to reduce the amount of water loss throughout the Districts infrastructure is managing the pressure in the water conveyance system. By reducing the pressure in the system less water is lost through leaky infrastructure. The amount of flow through open faucets would be reduced as well as the amount of stress on pipes and joints. This reduced stress has been shown to extend the life of existing infrastructure and reduce water consumption in residential areas by 5 to 20%.

Dead end watermains are a problem for any municipal water supply. The District currently has eight dead end watermains within its network. Dead end water mains create a location for stagnant water to collect. Stagnant water creates a place for sediment to gather, for bacteria growth, and increased deterioration of nearby pipes. This happens from the residual chorine levels decreasing and in turn creating disinfection by products and nitrification of the water. If there are complaints of poor taste, odor or discoloration of water, it is generally by water users near dead end watermains. This is not only a poor use of money for treating water that's not used but also a decrease in the level of service for residents and even a potential public health risk. There are two ways to solve this problem either through watermain looping or creating a way to flush out the stagnant water within the dead end. Watermain looping is an expensive infrastructure investment whereas including a fire hydrant within 50m of the dead end watermains creates a place to facilitate flushing and remove that aging, stagnant water. There are other low-cost options available from water product manufacturers that can be added to watermains to help with flushing. This can be monitored by either testing the water for bacteria growth or residual chlorine. The recommendation would be to create a program that ensures dead end watermains do not have stagnant water through the combination of small infrastructure upgrades and a periodic flushing plan by maintenance staff. However, it should be noted that flushing results in a loss of potable water and from a water conservation perspective is not the most effective method at reducing impacts from dead end watermains.

2.3 Initiatives

It is recommended that the District pursue initiatives and fund incentives to reduce the District's total water use. This can be in the form of retrofitting low flow bathroom fixtures, low flow appliances, water efficient sprinkler heads and timers, or xeriscaping. These could be subsidized by the District directly or indirectly. One example could be giving these away as prizes during community events to encourage community uptake. The District is leading by example, when new infrastructure is to be installed, they are choosing to install less water intensive landscaping and efficient bathroom fixtures and appliances. This gives the impression to the general public that this is something that will be a focus within the District for many years to come. The consistent messaging from the District Staff can be used to educate the general public to show the impact of small incremental changes. Ultimately the hope is that as people become more aware of their water use they will in turn work towards reducing their individual water footprint and by extension the entire water usage within the District. This can help to create a culture of water stewardship within the community. Water conservation has the potential to benefit the community and the individual in complementary ways.

Water regulations are another opportunity to reduce the quantity of water that is being used. The largest increase in water use happens during the summer months. Likely this is from a combination of residential and commercial uses. The District could develop a bylaw limiting the amount of lawn watering done or limiting the time when residents and businesses can water their lawn. Efficiencies are realized when lawn watering is focused in the early morning and in the evening. By creating a regulation for when residents can water, they will need less total water to achieve the same quality of grass. With all regulations the enforcement of them is also an important part to consider. Other regulations to be considered aim at standards for fixtures in new construction.

Greywater reuse can be a way for lawns and flower beds to be watered, fields to be irrigated and industrial potable water use to be minimized. The drawback of this concept is that it involves new infrastructure and capital investment. This has been shown to be effective in municipalities where an industry partner helps to offset the initial capital cost. The business case would show that they would also in turn be reducing their water costs in the long run as well as the District reducing its potable water use. Rainwater harvesting is another way that potable water use can be reduced by collecting rainwater runoff from rooves. This water can used for drip irrigation or hand watering of flowers and other landscaping around the building where the rainwater is harvested. The District could partner with a local service provide to provide rainwater barrels at a incentivised rate to encourage this practice.

The District at this time has not developed an Emergency Response Plan for potable water. The emergency plan is a document that would detail a step by step response to, and recovery from, incidents in the case of a natural disaster or emergency. The ability for water utility staff to respond rapidly in an emergency will help prevent unnecessary complications and protect the water supply. This is important to ensure that potable water is available regardless of the length or magnitude of the disaster. Ideally this would be reviewed annually and updated as required. The recommendation would be to initiate this concept in conjunction with the new water upgrades that are currently underway. Although not directly a conservation tactic, it is worth noting that this is an important part of managing water availability within the District.

3.0 Future Conservation Initiatives

3.1 Water Meters

Universal water metering for residential customers can aid in bringing attention to their water usage. Currently water metering is successfully done for commercial and industrial customers. Without water monitoring residential customers do not consider their overuse. An example can be leaving the tap running or over watering lawns. There is no way to track how much is used and in turn there is no financial incentive to reduce consumption. Canadian households with meters on volume-based pricing use 73% less water then unmetered households[4]. If the District were to install water meters residents could be billed based on the quantity of the water they use, which in turn will create a financial incentive for residents to lower their consumption. As well the installation of water meters will create a discussion topic with residents and the District. This could be a prime opportunity for the District to highlight reduction initiatives led by the District as discussed earlier and show how an investment to the owner's dwelling can provide both long term savings in their water bill but also modernize their infrastructure. Since the District's last water conservation plan in 2009, residential water metering was started, but there was a strong pushback by the residents and technical constraints limited the implementation's effectiveness. A portion of homes within the District do not have basements and this resulted in the water meters being susceptible to seasonal weather changes. Since the water meters are not consistently installed across the District, the water meters are not used for quantity billing at this time. In future versions of residential metering, more attention should be given to ensure a palatable solution is developed.

[4] Government of Canada. *Residential Water Use* (2017) - https://www.canada.ca/en/environment-climate-change/services/environmental-indicators/residential-water-use.html

4.0 Implementation

The implementation of the previously discussed initiatives ultimately will fall on the shoulders of the District's senior management. Along with Council they will be tasked with taking all appropriate measures to spearhead the conservation campaign and create the framework to initiate positive change. Like all municipalities there is a finite amount of money available but with care and diligence a long-lasting impact can be realized. It is recommended that the District actively search out and apply for grants and federal funding to aid in their progress. The initial cost of starting a new initiative is usually high and can be funded primarily in two ways. By budgeting and setting aside money from previous years or by receiving outside grant money from either Federal or Provincial programs.

It is recommended that a resident educational program is put in place and appropriate communication channels are used to illustrate the importance and simple cost-effective ways that individual households can reduce their consumption. This can be in the form of newsletters, social media, District website updates, as well as public consultation at community events.

The best way to measure success will be to track water use versus population growth. This can show through data the water use per capita and can be compared to the national average. In addition, tracking the amount of uptake of the initiatives can be used to validate the success of the water conservation program.

The proposed plan has three main target areas: education, end user reduction, and conveyance system efficiency. The focus initially is on cost effective means of educating the residents with an expected roll out and implementation in 2020. Following this the District will focus on creating the framework for water conservation initiatives to allow residents to make changes to their homes and make a tangible difference in their water use. This document along with other District literature can be used to apply for grant funding while simultaneously budgeting for capital expenditures for watermain and hydrant assembly work to update aging infrastructure. The goal being that by 2025 water losses through conveyance systems would be reduced by 50%. This can be done by using an asset management program to highlight which watermains and hydrants are the biggest priority and initiating a design and tender process to complete the required work.

Appendix A

Water Conservation Goals Checklist				
Goals	Complete	2020 - 2023	2024 - 2027	Comments
Water Treatment plant upgrades		X		
Fix previously identified leaking valves and hydrants	X			
Watermain and hydrant upgrades to reduce conveyance losses by 50%		X		
Dead end watermain flushing program		X		
Low-flow fixtures in District properties	X			
Initiatives and Incentives for residential reduction			X	
Regulations for all user groups		X		
Residential water metering			X	

Appendix B

The District Of Hudson's Hope
2019 Water Leakage Detection Survey
Final Report

Prepared For:
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Date Submitted 31 July 2019

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District Of Hudson's Hope
2019 Leak Detection Final Report

Project Background and Overview

Watermark Solutions Ltd is pleased to provide this final report based on our findings from the Water Leakage Detection Survey which took place between 22 - 25 July 2019. The leak survey covered the entire distribution system: approximately 16 kilometres of water mains in the downtown area of Hudson's Hope as well as the Jamieson and Thompson Subdivisions. The majority of these mains are of asbestos cement material as well as ductile iron with diameters ranging from 150 – 250mm. Service connections are generally copper.

In total, six new leaks were located – all on hydrants. Several known leaks were also remarked upon, including those on valves at Beattie Drive and Kyllo Street, and a service leak on Carter Street at the rodeo grounds.

As water networks age, they deteriorate and become prone to leakage. In addition, new components within a network can frequently leak as a result of poor installation practice and incorrect materials. It is not generally an easy task to locate water leaks particularly as many do not rise to the surface and, although many are located using the traditional leak detection methods, new ones do occur; existing leaks found may also be masking the presence of additional problems.

Approach and Methodology

Recent technological developments have made it possible to accurately pinpoint water leaks. With the use of electronic acoustic listening equipment used by trained and qualified technicians, leak detection and pinpointing is carried out from the surface. During this portion of the survey, there is no need to expose further segments of mains and/or services until actual repairs are made. The survey can provide accurate locations of water loss for each individual water distribution system.

The following approach for a traditional leak detection survey is now recognized across North America as a standard for completing Acoustic Leak Detection Surveys. During these surveys Watermark Solutions Ltd will:

- Listen directly to all hydrants
- Listen directly to selected mainline valves
- Listen directly to selected curb valves (curb boxes)
- Listen directly over mains with a ground microphone when necessary
- Locate, pinpoint and identify leakage indications using a Computerized Leak Correlator
- Mark the location of the leak on the surface using marking paint where necessary

- Provide reports detailing the leak(s) found, a photograph of their location and their classification of severity ranked A, B or C (A being the most severe)
- Provide a final report at the completion of each survey, which will include all leaks discovered and their location and include all unusual observations detected by the consultant while conducting the survey.

Watermark Solutions maintains that those Water Utility Organisations and Municipalities that incorporate our processes and service work into their current water system management program will be able to save time and money through the following:

- Reduce and recover unaccounted-for-water due to system leakage
- Eliminate added cost from digging "dry holes" when searching for leaks
- Minimize the threat of litigation resulting from catastrophic system failures
- Reduce man-hour expenses through localizing and pinpointing leaks more productively by using modern equipment and advanced technology

Acoustic Leak Detection

At the start of the leak detection survey, a systematic 'listening' procedure is used. The consultant listens for sound on direct contact points such as main line gate valves, fire hydrants, curb-valves/meters, blow-offs, etc. In areas of large diameter mains staff can use a ground microphone to listen over the main approximately every three to four metres. With this method, comprehensive coverage of the system is attained, and leak sounds are investigated and pinpointed quickly.

Any leak noises that are located by our staff throughout the distribution system are graded by severity, this method of leak noise grading has proven to be effective and enables the field technician to prioritize and identify the larger leaks first, then the technician will systematically work through the quieter potential leak noises. The leak noises are graded from 1 to 5, 5 being the typical sized mains break and 1 being a small leak such as a weeping curb box or valve.

A proven method for leak detection involves the use of a sensitive X-Mic® acoustic listening device (Fig 1), and a trained operator. Pressurized water forcing its way through a crack or joint makes a distinct sound that can be heard on pipes, valves, hydrants or services. Potential leak sites can be identified by this method and further localized by Correlation Testing.

Correlating and Pinpointing

These tests are carried out with modern computer-based instruments, called 'Leak Noise Correlators' (Fig 2) that have a simple field setup and work by measuring leak signals (sound or vibration) at two points that bracket a suspected leak. A sensor is attached magnetically to a valve, hydrant or pipe on either side of the suspected leak location. The position of the leak is then determined electronically based on the time shift between the leak signals and calculated using a cross-correlation method.

Fig 1: X-Mic Listening System

Fig 2: Leak Noise Correlator

The pinpointing phase may require a brief interruption of service to an individual customer within a leakage area. This is only necessary to make a quick determination as to whether a leak is on the customer service line (customer or municipality side and/or responsibility) or the municipality main. There is no interruption of water flow on the main, no excavation and no traffic rerouting. Further investigation can be carried out by listening for leak noise through the ground, again using the X-Mic®. Only when the leak has been pinpointed and written up for repair does excavation begin.

Results

Initial Site Investigation

The approach taken was to listen on all appropriate and/or located fittings within the distribution system. Leak noise detection equipment was used to determine where 'leak sounds' were present. Several potential problem locations were identified and further investigation of these areas was conducted by rechecking at different times of day or night to ascertain if the noise was ongoing. If required, correlation equipment could then used to pinpoint the leak further or assistance from Public Works' Operators was sought.

Six leaks were found in total – all internal hydrant leaks. Additional noises heard throughout the survey on valves were either ruled out because they were due to usage and noise was not heard on subsequent visits to particular locations or attributed to known issues that were already highlighted for repair by Public Works.

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Leak Locations

	Location (Intersection)	Type
1.	Beattie Dr/Fredette Ave	Hydrant
2.	Kyllo St/Fredette Ave	Hydrant
3.	Kyllo St/Robison Ave	Hydrant
4.	Kyllo St/Paquette Ave	Hydrant
5.	MacDougall St/Silver Willow Ct	Hydrant
6.	Dudley Dr/Garbitt Cr	Hydrant

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The District Of Hudson's Hope

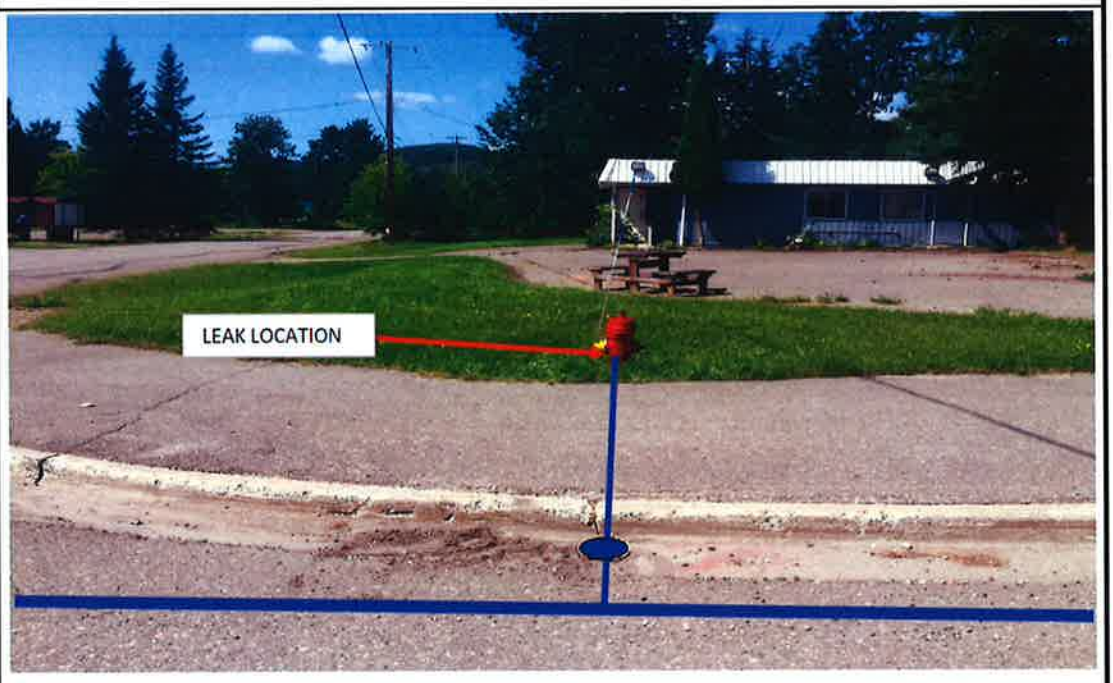
2019 Leak Location Report

Project #		Date 25/07/2019	Time 11:00:00
Material	ASBESTOS CEMENT/TRANSITE	Site Address	
Diameter	150MM	BEATTIE DR/FREDETTE AVE	
Priority	B	Intersection	
Asset ID		BEATTIE DR/FREDETTE AVE	
Leak Type	HYDRANT		

Legend

Water Main/Service

Valve/Curb-Box



Comments: LEAK ON HYDRANT AT BEATTIE/FREDETTE. GOOD LEAK NOISE ON HYDRANT. NONE ON OTHER FITTINGS IN AREA. UNABLE TO ISOLATE HYDRANT AS SECONDARY VALVE IS BROKEN. SUGGEST VALVE THEN HYDRANT REPLACEMENT OR REPAIR.

Notes:
When site detailed information is not available, the information is based on field locating and represents best knowledge of the approximate location.

Technician	LEE STANSFIELD	**Signature**	

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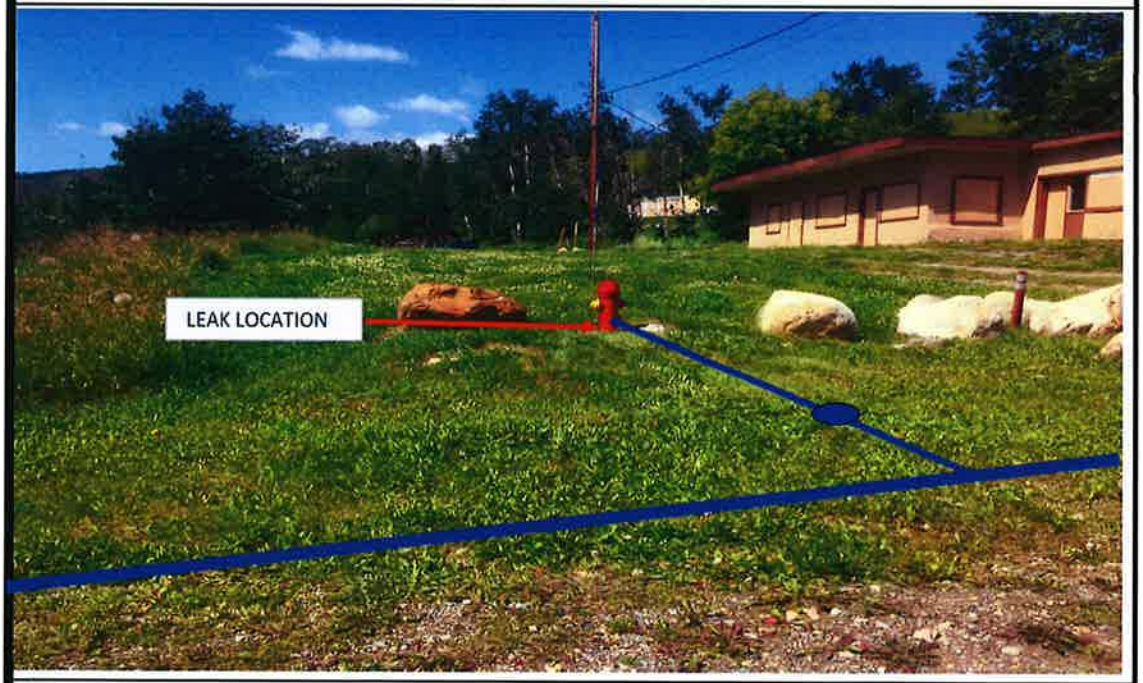
2019 Leak Location Report

Project #		**Date**	25/07/2019	**Time**	11:15:00
Material	ASBESTOS CEMENT/TRANSITE	**Site Address**			
Diameter	150MM	KYLLO ST/FREDETTE AVE			
Priority	B	**Intersection**			
Asset ID		KYLLO ST/FREDETTE AVE			
Leak Type	HYDRANT				

Legend

Water Main/Service

Valve/Curb-Box



Comments: LEAK ON HYDRANT AT KYLLO/FREDETTE. GOOD LEAK NOISE ON HYDRANT. NONE ON OTHER FITTINGS IN VICINITY EXCEPT SLIGHT ON HYDRANT SECONDARY VALVE. ISOLATION OF HYDRANT STOPS LEAK NOISE BUT SECONDARY VALVE STILL LETS SMALL AMOUNT THROUGH. SUGGEST FLUSH AND HYDRANT MAINTENANCE.

Notes:
When site detailed information is not available, the information is based on field locating and represents best knowledge of the approximate location.

Technician	LEE STANSFIELD	**Signature**	

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2019 Leak Location Report

Project #		**Date**	25/07/2019	**Time**	11:30:00
Material	ASBESTOS CEMENT/TRANSITE	**Site Address**			
Diameter	150MM	KYLLO ST/ROBISON AVE			
Priority	B	**Intersection**			
Asset ID		KYLLO ST/ROBISON AVE			
Leak Type	HYDRANT				

Legend

Water Main/Service

Valve/Curb-Box

Comments: LEAK ON HYDRANT AT KYLLO/ROBISON. GOOD LEAK NOISE ON HYDRANT. NONE ON OTHER FITTINGS IN VICINITY. ISOLATION OF HYDRANT AT SECONDARY VALVE STOPS LEAK NOISE. SUGGEST FLUSH AND HYDRANT MAINTENANCE.

Notes:
When site detailed information is not available, the information is based on field locating and represents best knowledge of the approximate location.

Technician	LEE STANSFIELD	**Signature**	

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2019 Leak Location Report

Project #		**Date**	25/07/2019	**Time**	11:45:00
Material	ASBESTOS CEMENT/TRANSITE	**Site Address**			
Diameter	150MM	KYLLO ST/PAQUETTE AVE			
Priority	B	**Intersection**			
Asset ID		KYLLO ST/PAQUETTE AVE			
Leak Type	HYDRANT				

Legend

Water Main/Service

Valve/Curb-Box

Comments: LEAK ON HYDRANT AT KYLLO/PAQUETTE. GOOD LEAK NOISE ON HYDRANT. NONE ON OTHER FITTINGS IN VICINITY.UNABLE TO ISOLATE HYDRANT AT SECONDARY VALVE DUE TO ROUNDED OFF VALVE STEM. SUGGEST VALVE AND HYDRANT MAINTENANCE.

Notes:
When site detailed information is not available, the information is based on field locating and represents best knowledge of the approximate location.

Technician	LEE STANSFIELD	**Signature**	

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2019 Leak Location Report

Project #		**Date**	25/07/2019	**Time**	12:00:00
Material	ASBESTOS CEMENT/TRANSITE	**Site Address**			
Diameter	150MM	MacDOUGALL ST/SILVER WILLOW CT			
Priority	B	**Intersection**			
Asset ID		MacDOUGALL ST/SILVER WILLOW CT			
Leak Type	HYDRANT				

Legend

Water Main/Service

Valve/Curb-Box

Comments: LEAK ON HYDRANT ON MacDOUGALL O/S GROCERY STORE. GOOD LEAK NOISE ON HYDRANT. NONE ON OTHER FITTINGS IN VICINITY.ISOLATION OF HYDRANT AT SECONDARY VALVE STOPS LEAK. SUGGEST HYDRANT MAINTENANCE.

Notes:
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Technician	LEE STANSFIELD	**Signature**	

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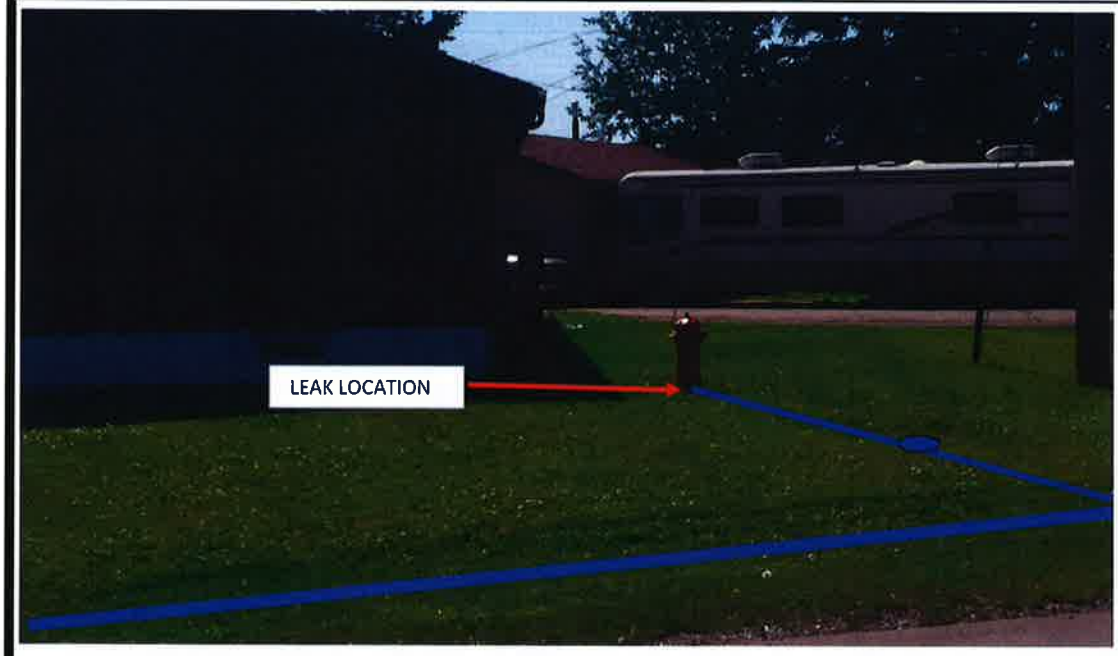
2019 Leak Location Report

Project #		**Date**	25/07/2019	**Time**	12:15:00
Material	ASBESTOS CEMENT/TRANSITE	**Site Address**			
Diameter	150MM	DUDLEY DR/GARBITT CR			
Priority	B	**Intersection**			
Asset ID		DUDLEY DR/GARBITT CR			
Leak Type	HYDRANT				

Legend

Water Main/Service

Valve/Curb-Box



Comments: LEAK ON HYDRANT ON E/SIDE OF GARBITT/DUDLEY. GOOD LEAK NOISE ON HYDRANT. NONE ON OTHER FITTINGS IN VICINITY.ISOLATION OF HYDRANT AT SECONDARY VALVE STOPS LEAK. SUGGEST HYDRANT MAINTENANCE OR REPLACEMENT DUE TO HYDRANT AGE.

Notes:
When site detailed information is not available, the information is based on field locating and represents best knowledge of the approximate location.

Technician	LEE STANSFIELD	**Signature**	

Conclusions and Recommendations

The detection and subsequent maintenance and repair of these leaks will assist in the reduction of water-loss in Hudson's Hope. Small hydrant leaks seem relatively inconsequential but when one considers these leaks may have been running for years undetected, the water loss is substantial. Almost all the hydrants that were leaking were of a certain type – five of the six were ageing Terminal City, the sixth being a McAvity that is almost sixty years old. All feature slide gate operation as opposed to the more modern compression fittings.

To this end, we would recommend that these older hydrants be replaced whenever possible. As was noted, some of this would also involve secondary valve replacement. It is also feasible that some of the leaks discovered are due to debris preventing full closure of the slide gate within the hydrants' internal mechanisms. This could be easily remedied by simply flushing the hydrant.

Watermark Solutions Ltd. Also recommends an ongoing annual water system assessment / leak detection program to effectively monitor the distribution network as it ages. There are several methodologies that can be deployed depending on budget allowances. The most cost effective maintenance program is to continue to conduct an annual leak detection survey of the distribution system by means of advanced acoustic and leak correlation methodologies.

We would also suggest a water metering program be implemented throughout the town. This would help provide an accurate indication of water usage and loss throughout the system as well as a source of income which would benefit the town as revenue could then be invested in infrastructure improvements. Water is often seen as an infinite and cost-free resource within un-metered communities and this results in such practices as excessive irrigation use. By-laws and community initiatives can often be used to good effect to help limit unnecessary water usage.

Watermark Solutions Ltd would like to thank the District Of Hudson's Hope Public Works team for their assistance throughout the Leak Detection Survey and the community for their hospitality. We look forward to seeing you again in the future.

Contact Information

Please feel free to contact us should you require any further information regarding this report or any other water related topic.

Best regards,

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