

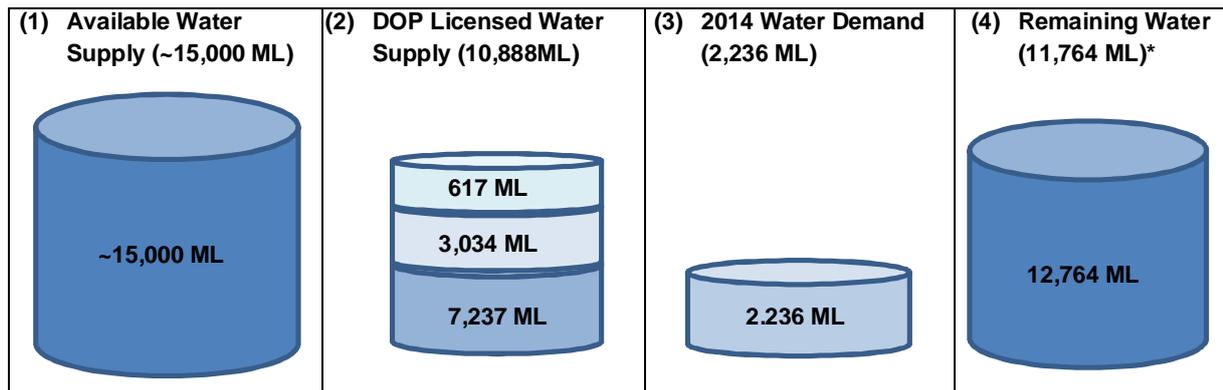
MEMORANDUM

Date: January 30, 2015
To: Joe Mitchell
cc: Jeremy Clowes, Scott Shepherd
From: Suzan Lapp and Don Dobson
File: 0655.0170.11
Subject: Tech Memo #1 – Peachland Available Water Supply

Summary

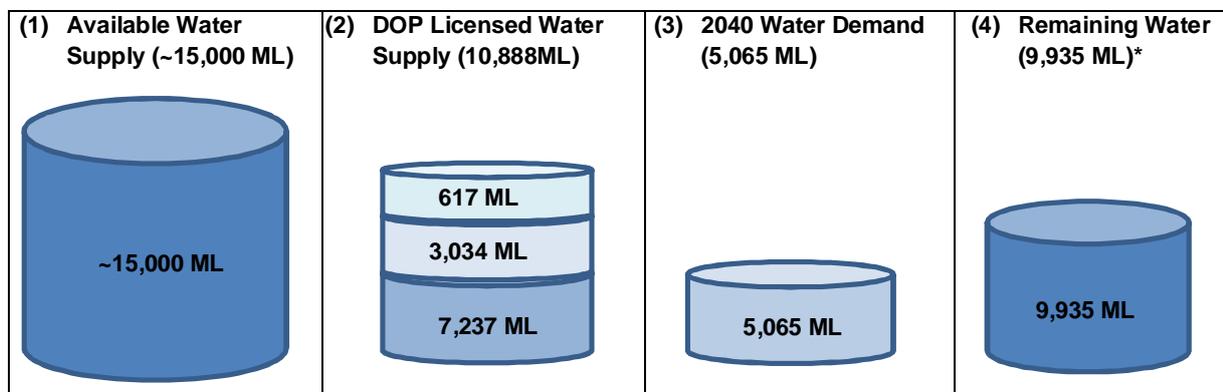
The following figures summarize the total water available from (1) Peachland Creek watershed, (2) the total supply of water the District of Peachland holds in water licenses, (3) the total demand for 2014 and 2040 and (4) the total water remaining in Peachland Creek once the demands are met. These volumes are based on the assumptions that Peachland Creek is only source of water to meet the demands of the District and that the additional storage and water licenses from Peachland Reservoir and MacDonald Creek are acquired. In summary, sufficient water is available in the Peachland Creek watershed and water licenses to meet all the District’s water demands and the Ministry’s environmental flow requirement. The details to support this summary are provided below.

Figure 1 – 2014 Summary of water supply and demand in Peachland Creek watershed



*Sufficient water remains to meet the Ministry’s environmental flow requirements of 3,075 ML.

Figure 2 – 2040 Summary of water supply and demand in Peachland Creek watershed



*Sufficient water remains to meet the Ministry’s environmental flow requirements of 3,075 ML.

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Background

This memo summarizes the water supply available to the District of Peachland (DOP) through the Peachland Creek watershed system. The water in Peachland Creek is supported by storage in Peachland Reservoir and Glen Lake Reservoir. The following items are discussed in detail to address the annual water supply and demand to the year 2040:

- Current water licenses held by the District of Peachland
- Additional water licenses to be secured
- Summary of the discussion with Glencore
 - MacDonald Creek and Brenda Water Treatment Plant water
- Summary of the available supply and storage in Peachland Lake with diversion from MacDonald Creek
- Summary of current and future demands

A summary of each item is provided below.

Current Water Licenses Held by the District of Peachland

Currently the District holds irrigation and domestic licenses on Peachland Creek at the intake totalling 7,237 ML. This is supported by upstream storage licenses on Peachland Reservoir (4,070 ML) and Glen Lake Reservoir (308 ML). The District also holds a diversion license in MacDonald Creek to divert 617 ML of water to Peachland Reservoir. There is presently no access to MacDonald Creek for water under this license.

The District also holds irrigation and domestic licenses on Trepanier Creek totalling 3,034 ML at the intake, with an alternative diversion point at Okanagan Lake. A small water storage license of 1,031 ML is also held upstream of the intake on Trepanier Creek.

Additional Water Licenses to be Secured

In order to support the water demands of the District from the Peachland Creek watershed, additional water licenses need to be secured. There is currently 4,613 ML of unlicensed storage in Peachland Reservoir, which used to be held by Brenda Mines. An application for this storage volume has been submitted to the province by the District.

The MacDonald Creek diversion license of 617 ML needs to be restored and diverted to Peachland Reservoir. Historically during the operation of the Brenda Mine, the mine had a license to divert the entire flow of MacDonald Creek to the Peachland Reservoir. Conversations are ongoing with Glencore regarding options to either restore the diversion from MacDonald Creek or, to have the mine provide the equivalent volume of water, including the 617 ML, from the Brenda Mines water treatment plant.

In order for the District to supply enough water to meet the entire demands from the Peachland Creek watershed concurrent conversations are required to replace the volume of the District's irrigation and domestic licenses from Trepanier Creek (3,041 ML) with water from either MacDonald Creek or from the

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Brenda Mine WTP diverted into the Peachland Reservoir to support the additional storage applied for. The Trepanier Creek water licenses would remain in place and would become the back-up water supply from the intake on Okanagan Lake.

Initial conversations have been held with the ministry regarding the unlicensed storage in Peachland Reservoir and the MacDonald Creek diversion. Additional conversations are required with the ministry sectors to secure the unlicensed storage within Peachland Reservoir, to determine the best option to restore the MacDonald Creek diversion (i.e., divert entire creek upstream of mine or obtain water from the Brenda Mines water treatment plant), and shift of the volume of the Trepanier water licenses to Peachland Creek to support the MacDonald Creek diversion (assuming that the entire flow is diverted, equalling ~4,000 ML/annually).

Summary of the Discussion with Glencore

A meeting was held on Monday, January 26, 2015 between Don Dobson, Urban Systems, Joe Mitchell, District of Peachland, and John Stroiazzo, Glencore to discuss options for the additional water supply that the District requires. A summary of the outcomes from that meeting are provided below.

1. Joe summarized the current direction of the District's Water Master Plan (WMP) based on recent direction from Council. The WMP proposes to supply the entire community with drinking water from the Peachland Creek watershed and the proposed WTP on Peachland Creek. The Trepanier Creek water supply would become the back-up water supply from the intake on Okanagan Lake.
2. Don summarized the volume of water that the District requires. He explained that the District has made application to the province for the remaining 4613 ML of unlicensed storage in the Peachland Reservoir. The 4613 ML of additional storage in the Peachland Reservoir is equivalent to the licensed volume the District holds on Trepanier Creek. In order for the province to issue a water license to the District on the remaining storage in the Peachland Reservoir it needs to include access to additional supply to support this storage volume. Originally the additional water came from the diversion of the entire flow from MacDonald Creek into the reservoir. The province has advised that the District would have to secure a water license to restore the MacDonald Creek diversion to support the additional storage before the province could issue the new storage license.
3. Don suggested that the District has two options to secure the additional supply it requires. The first option is to restore the original MacDonald Creek diversion that was operating from 1967 until 1996. As part of the Brenda Mine's decommissioning plan the province issued a water license to the mine to restore the entire flow of MacDonald Creek to Trepanier Creek. The second option is for water to be supplied from the Brenda Mine's WTP to Peachland Reservoir. Since the District is planning to construct its own WTP on Peachland Creek it is not a matter of whether or not the additional water is treated but what is the least cost option.
4. Timing for the additional water supply will be a function of demand. Joe indicated that the Pincushion development that started in 2007 expects to have ~60 homes completed by March 2015, the developer had hoped to build about the same number of homes each year but due to the state of the real estate market this is not happening right now. The proposed plan for both

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Pincushion and New Monaco was to develop over a 20-year period. Ultimately this will be determined by the market. So it is difficult to predict when the additional supply may be required, it could be as late as 2022. The requirement will be a gradual increase in supply based on the demand.

5. John summarized his opinion of the two options discussed in item 3. Based on the likely increased monitoring of tailings facilities as a result of the Mount Polley failure, the requirements placed on mining companies that have tailings facilities, like Brenda, will increase. John suggested that it would likely be very expensive and time consuming for the District to secure a right-of-way for a pipeline from the MacDonald intake across the mine to connect with the District's existing permit to cross Crown land (PCL). He suggested that the alternative of supplying water from the mine's WTP would be a much simpler process.
6. A good discussion ensued after John had presented the option of securing water from the mine's WTP. He emphasized that should the collaboration between the District and Glencore move ahead that it would be necessary to involve the Ministry of Energy and Mines since the ministry would have to approve any changes to the disposal of water from the WTP as well as any changes within the mine site such as new pipelines etc. In addition, it would be necessary to meet with staff from the Ministry of Forests, Lands and Natural Resource Operations in the fisheries program regarding the proposal to change in releases from the WTP from Trepanier Creek watershed to the Peachland Creek watershed.
7. John recommended that the next steps would involve the following:
 - a. A signed confidentiality agreement between the District and Glencore that would require both parties to keep the discussions regarding the collaborative water supply as confidential.
 - b. A signed good faith working agreement between the District and Glencore that would confirm that the two parties will freely share information relevant to the project.
 - c. Glencore would maintain control of its WTP and would supply drinking quality water to the district.
 - d. Any new infrastructure required to deliver water from the WTP to Peachland Reservoir would be the paid for by the district.
 - e. A risk assessment will be required to address questions such as 'What if Glencore could not supply the water required by the district?' etc.
 - f. There are a variety of pipeline route options for the delivery of water from the WTP to the Peachland Reservoir. The District will explore these and provide initial concept plans to Glencore.
 - g. The District will develop and share potential conceptual plans for the delivery of water with Glencore.
8. The meeting concluded with John offering to provide Joe with a copy of a draft confidentiality agreement for his review as well as a copy of a draft good-faith working agreement. Once these agreements are in place Glencore can provide the District with details on its WTP and contour maps of the mine site etc. that will be required by the District as it develops various options. John indicated that he is scheduled to be back at the mine in early May and proposed the group meet again at that time to review progress. John also asked if it would be reasonable for Glencore to expect some detailed concept plans by the end of the calendar year and Joe agreed.

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**Summary of the Available Supply and Storage in Peachland Lake with the Diversion**

The total water supply available to the District is based on the following assumptions:

- The District's water supply will be provided from Peachland Creek
- The intake will remain in its current location
- The District obtains the unlicensed storage (4,613 ML) for Peachland Reservoir [application submitted]
- The MacDonald Creek diversion and water license will be restored (617 ML)
- That 3,034 ML will be diverted to the Peachland Reservoir to support the additional storage in Peachland Reservoir by either restoring the MacDonald Creek diversion or supplied from the Brenda Mines WTP

Available supply: The District of Peachland holds a total of 10,888 ML of water under licenses on Peachland and Trepanier Creek based on:

- Peachland Creek irrigation and domestic license at the intake (7,237 ML)
- Trepanier Creek irrigation and domestic license at the intake (3,034 ML)
- MacDonald Creek diversion license (617 ML)

Available storage: This District of Peachland holds a total of 8,991 ML of water under storage licenses on Peachland Reservoir and Glen Lake Reservoir.

- Peachland Reservoir storage is 8,683 ML. Includes the DOP license and unlicensed volumes.
 - DOP license (4,070 ML)
 - Unlicensed (4,613 ML)
- Glen Lake Reservoir storage is 308 ML

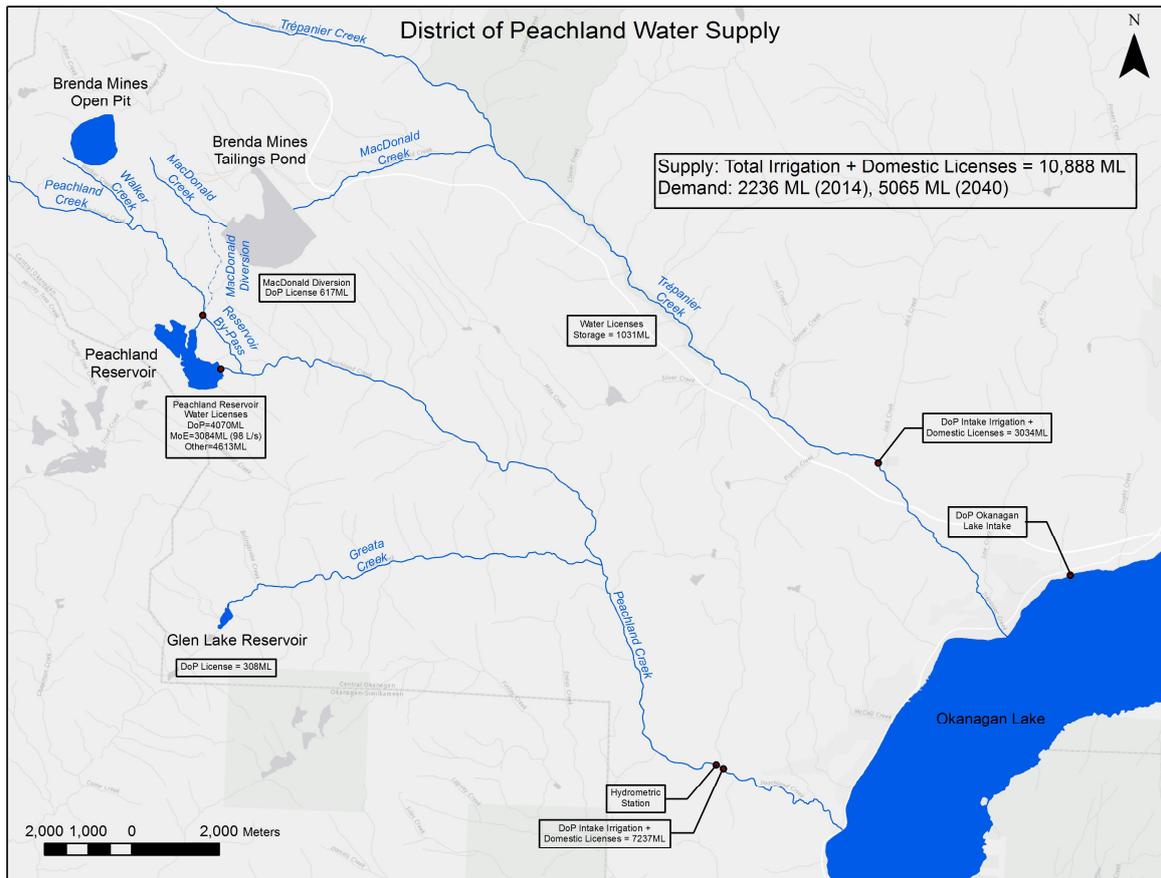
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The following **Figure 1 – Peachland’s Water Supply** schematically outlines the supply of water for Peachland and the corresponding licenced amounts with the MacDonald Creek diversion.

Figure 1 – Peachland’s Water Supply



Summary of Current and Future Demands

Available annual water supply: Based on the WEAP modelling results, the total annual water supply available from Peachland Creek watershed is ~11,000 ML. Assuming that total volume of MacDonald Creek from the original diversion is restored to Peachland Reservoir (~4,000 ML), either via the diversion or through the Brenda Mine’s WTP (Glencore), the estimated total annual water supply available is estimated to be ~15,000 ML at the Peachland Creek drinking water intake.

Current and future demands: In 2014 the total water demand was 2,236 ML. It is project that by the year 2040 the total annual water demand will be 5,065 ML. The following table summarizes the maximum daily water demand (MDD) and the peak hour water demand (PHD) for the existing systems and for the year 2040.

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Table 1 – Peachland’s Water Demand

Scenario	MDD (L/s)	PHD (L/s)
Existing system	193	262
Existing agricultural demands	12.7	19.5
Existing system fed by Peachland Creek source	145	N/A
Existing system fed by ponderosa wells	4	N/A
Existing system fed by OK Lake/Trepanier Creek	44	N/A
2040 demand scenarios	436	627

* all numbers include leakage/unaccounted for water

Conclusion

Sufficient water is available within the Peachland Creek watershed to meet the demands of the District of Peachland and the environmental flows as required by the Ministry. This is based on the assumption that the MacDonald Creek diversion is restored, along with the District’s water license, that the District acquires the unlicensed storage in Peachland Reservoir, and that the Trepanier Creek water license is used as an emergency back-up. The District has applied to the Ministry to acquire the unlicensed storage in Peachland Reservoir. Additional conversations within the Ministry are required to confirm acquisition of the MacDonald Creek diversion.

Please contact the undersigned if you have any questions or any clarification of the above information.

URBAN SYSTEMS LTD.

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