TORONTO

# REPORT FOR ACTION

# Enwave Deep Lake Water Cooling – Expansion Proposal Amendment to the Energy Transfer Agreement

**Date:** November 21, 2019
**To:** Infrastructure and Environment Committee
**From:** General Manager, Toronto Water
**Wards:** Spadina-Fort York (Ward 10) & Toronto-Danforth (Ward 14)

## SUMMARY

This report seeks City Council authority for the General Manager, Toronto Water, to finalize negotiations with Enwave Energy Corporation ("Enwave"), and to enter into and execute an amending agreement to the Energy Transfer Agreement between Enwave and the City dated January 18, 2002, as subsequently amended (the "ETA") substantially consistent with the commercial principles outlined in the Term Sheet set out in Attachment A to this report (the "Term Sheet") to permit the expansion of the Deep Lake Water Cooling ("DLWC") system based on Enwave's 2019 DLWC expansion proposal (the “DLWC Expansion Project”). This report also seeks City Council authority for the City, as represented by the General Manager, Toronto Water, to undertake, on behalf of the City, any necessary related environmental assessment(s) as may be required for the DLWC Expansion Project, at Enwave's sole expense.

Back in 2013, City Council authorized the General Manager, Toronto Water, to enter into without prejudice negotiations with Enwave regarding Enwave's then proposed expansion of the DLWC system based on a raw water diversion system originating at the Island Water Treatment Plant ("IFP") and terminating at the John Street Pumping Station (“JSPS”), and to report back on the outcome of the negotiations once concluded.

Since 2013, the City has negotiated with Enwave on various technical solutions and business terms, culminating in the Term Sheet which, City staff is recommending in this report and, reflects the negotiated commercial principles intended to serve as a framework for the final negotiations between the parties and an amendment to the ETA to give effect to the DLWC Expansion Project, if approved. The purpose of the DLWC Expansion Project is to increase the capacity of the DLWC system to meet the growing demand for cooling in the downtown City core. The key technical difference in Enwave's 2013 and 2019 DLWC expansion proposals is the proposed addition of a fourth intake at the IFP before the proposed expanded DLWC system branches-off to a new raw

water diversion system separate and independent from the City's municipal drinking water infrastructure and supply.

Similar to its 2013 DLWC expansion proposal, Enwave's 2019 DLWC Expansion Project provides many benefits to the City including increased revenues, operational cost savings, new infrastructure at no cost to the City (including the repurposing of currently unused infrastructure), and environmental benefits such as significant carbon emission reductions and improved air quality in Toronto's environment.

## RECOMMENDATIONS

The General Manager, Toronto Water, recommends that:

1. City Council authorize the General Manager, Toronto Water, to finalize negotiations with Enwave Energy Corporation ("Enwave") and enter into and execute an amending agreement to the Energy Transfer Agreement between the City and Enwave dated January 18, 2002, as amended by the amending agreement dated August 20, 2007, the second amending agreement dated September 1, 2010, and the heat exchanger amendment authorized by City Council by its adoption of Item IE8.4 at its meeting on October 29 and 30, 2019 (collectively, the "Energy Transfer Agreement"), to permit the expansion of the Deep Lake Water Cooling system capacity, predicated on increasing the flow of cool water from the City's Island Water Treatment Plant to a new raw water diversion system terminating at the John Street Pumping Station, substantially consistent with the commercial principles outlined in the Term Sheet set out in Attachment A, and otherwise on terms and conditions satisfactory to the General Manager, Toronto Water, (the "Deep Lake Water Cooling Expansion"), and in a form satisfactory to the City Solicitor.

2. City Council authorize the General Manager, Toronto Water, on behalf of the City, to undertake any necessary related environmental assessment(s), including either as a sole proponent or a co-proponent with Enwave, as may be required for the Deep Lake Water Cooling Expansion at Enwave's sole expense.

3. City Council authorize subject to the adoption of Recommendation 1, the General Manager, Toronto Water to negotiate, enter into and execute any other related agreement(s) as may be necessary to give effect to Recommendation 1 on terms and conditions satisfactory to the General Manager, Toronto Water, and in a form satisfactory to the City Solicitor.

## FINANCIAL IMPACT

It is anticipated that the City will derive financial benefits from the DLWC Expansion Project in the form of the following: increased revenues under the ETA, the construction and installation of new City infrastructure as well as the repurposing of unused City infrastructure, operational cost savings, and the disposition at market value of any real property rights through lands owned by the City.

Under the ETA, Enwave pays the City (Toronto Water) an Energy Transfer Fee ("ETF") for the cooling energy transferred through the Energy Transfer Loop ("ETL") and the Incremental Operating Costs ("IOCs") for those net additional operating and maintenance costs directly and actually incurred by the City that are required to enable the City to fulfill its obligations under the ETA, over and above those costs that the City would have incurred had the DLWC project not been undertaken. The amount of the IOCs is not impacted by the proposed DLWC Expansion Project; however, the amount of the ETF revenue generated on an annual basis will increase significantly thereby benefitting the City.

In 2018, Toronto Water received $1.58 million in ETF annual revenues from Enwave under the terms of the ETA. Once the DLWC Expansion Project infrastructure is commissioned (expected by 2023), and the full benefit of the DLWC Expansion is realized (expected by 2025), it is estimated that the ETF revenues to be generated by the DLWC Expansion will increase annually by an additional estimated $944,211, or by about 57%. Any such ETF revenue increases will be reflected in Toronto Water's future year operating budgets.

Also under the ETA, the City is currently reimbursed directly for Enwave's monthly incremental energy consumption costs at JSPS. Under the DLWC Expansion Project, while it is anticipated that these hydro energy costs will increase, Toronto Water will continue to be fully reimbursed for this increased expense by Enwave. Similarly, under the proposed DLWC Expansion Project, Enwave will fully compensate the City for any direct costs incurred by it associated with the maintenance of Shaft #3 once commissioned. While these minor costs will be funded from Toronto Water’s operating budget, they will be fully reimbursed annually by Enwave.

As reflected in the Term Sheet, the DLWC Expansion will be at Enwave's sole expense. The City will not bear any cost for the design, construction, installation, testing or commissioning of the DLWC Expansion Project. As a result of the DLWC Expansion Project, the City will acquire new and repurposed infrastructure. Based on the current estimates provided by Enwave, the value of that new infrastructure alone is approximately $35 million, which is a significant addition to the value of the City's unused fourth pipeline appraised at approximately $11.7 million in 2017.

Enwave will also be responsible for obtaining, at its sole expense, all real property rights required for the DLWC Expansion Project. The DLWC Expansion Project includes a tunnel through City-owned land on the Toronto Islands, land owned by Ports Toronto, through City-owned parks, as well as privately-owned land. It is recommended in this report that the acquisition of property interests through lands owned by the City north of the common connection point (Shaft #3) will be negotiated between the parties, acting reasonably, in accordance with the City's delegated approving authority for real estate transactions at market value. The impacted lands include part of the Toronto Islands, HTO Park, lands designated as a future Reese Street Park, and lands near the JSPS. Enwave will also pay all costs associated with obtaining an exemption to Official Plan Policy 4.3.8 to allow the City to dispose of easements through lands designated parks and open space.

To permit the Fourth Intake, as that term is defined in the Term Sheet, the City will need to acquire an easement from the Ministry of Natural Resources ("MNR"). Enwave will bear the costs associated with the easement acquisition, including any annual easement fees imposed by the Province and estimated at $22,720 per year, as well as the cost of any temporary construction permission necessary to install the Fourth Intake.

In addition, as also reflected in the Term Sheet, the proposed DLWC Expansion Project will result in operational cost savings for Toronto Water in a number of ways primarily related to responsibility for the costs of infrastructure maintenance requirements under the ETA.

In 2018, the IFP's three intakes pipelines underwent maintenance cleaning at a cost to Toronto Water of $3,988,627. Toronto Water projects this cleaning cycle will continue in perpetuity every six years, at an optimized cost of approximately $2.04M, with the next cycles included in the 2020 - 2029 Recommended Capital Budget and Plan. The DLWC Expansion Project will transfer the full cost for cleaning the new Fourth Intake, which will be owned by the City, from Toronto Water to Enwave. Should Enwave require enhanced flow performance from the existing three intakes, then Enwave will reimburse Toronto Water for the pro-rated portion of the pipeline maintenance cleaning costs attributable to the accelerated cleaning requirement.

At its meeting on October 29 and 30, 2019, Council authorized the installation of three additional heat exchangers at the JSPS at Enwave's expense. Consistent with that Council decision, under the DLWC Expansion Project, Enwave will continue to pay for the maintenance of all heat exchangers, with annual cleaning operations being permanently transferred to Enwave. These costs, which in 2018 amounted to $123,542, will be reallocated within the business unit to address other Toronto Water operational requirements.

Under the ETA, the City has a shared obligation with Enwave for both ETL maintenance and equipment replacement. Under the Term Sheet, the parties have agreed to continue to share the ETL rehabilitation costs. In particular, the heat exchanger gasket rehabilitation work is anticipated to occur on a 15-year cycle at a total estimated project cost of $2-3M, based on current estimates, with Toronto Water's share being approximately $1-1.5M. This rehabilitation cost will be funded through Toronto Water's future capital program.

Similarly, the maintenance of the City water pumps within the ETL is clarified within the Term Sheet, such that Enwave will pay for the cost of the water pump parts and Toronto Water will complete the installation. Enwave forecasts that this work will be required on all 8 water pumps every 15 years. Any capital financial impact would be dealt with through the annual budget process. Favourable to Toronto Water, under the DLWC Expansion Project, as contrasted with the maintenance and repair, any full replacement of City Water Pumps will be at Enwave's sole expense.

The Chief Financial Officer and Treasurer has reviewed the report and agrees with the financial impact information.

## DECISION HISTORY

In September 1997, Councils of both the former City of Toronto and Metro Toronto approved a concept plan proposed by Enwave to develop a district cooling system using DLWC technology and a piping distribution network in the downtown core.

At its meeting of July 24, 25 and 26, 2001, in adopting Report No. 12, Clause 1 of the Works Committee, Council authorized the execution by the City of the ETA on specified terms and conditions.

The City Council decision document can be found at:
http://www.toronto.ca/legdocs/2001/agendas/council/cc010724/wks12rpt/cl001.pdf

City Council, at its meeting of September 25, 26 and 27, 2006, authorized an Amending Agreement to the ETA for the replacement of Enwave's contractual obligation to provide back-up power supply by way of diesel generation at the JSPS with steam driven turbine generation from Enwave's Simcoe Street Cooling Plant ("SSCP"), together with associated technical amendments as required by the General Manager, Toronto Water, subject to certain express conditions.

The City Council decision document can be found at:
https://www.toronto.ca/legdocs/2006/agendas/council/cc060925/pof7rpt/cl058.pdf

At its meeting of August 25, 26 and 27, 2010, City Council authorized, among other things, a second amending agreement to the ETA to resolve certain contractual issues between the City and Enwave related to the DLWC system and the ETA, and a Municipal Access Agreement with Enwave.

The Council decision document can be found at:
http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2010.EX46.9

At its meeting on June 11, 12 and 13, 2013, City Council adopted, without amendment, Item PW23.5 entitled "Enwave - Deep Lake Water Cooling System Expansion Proposal" thereby authorizing the General Manager, Toronto Water, in consultation with the Chief Corporate Officer and the City Solicitor, to enter into without prejudice contract negotiations with Enwave regarding Enwave's proposal to further amend the ETA to expand the DLWC system capacity by increasing the flow of cool water and to report back following the conclusion of negotiations to seek further Council direction.

The City Council decision can be viewed at:
http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2013.PW23.5

At its meeting on October 29 and 30, 2019, City Council adopted, without amendment, Item IE8.4 entitled "Proposed Heat Exchanger Amendment to the Energy Transfer Agreement" thereby authorizing the General Manager, Toronto Water, to enter into negotiations with Enwave to amend the ETA and to execute the necessary amending agreement to permit the installation and operation by Enwave at its expense of three additional heat exchangers to the ETL at the JSPS as part of the DLWC system.

The City Council decision can be viewed at:
http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2019.IE8.4

## COMMENTS

The ETA governs the relationship between the City and Enwave pertaining to DLWC. It is a 50 year agreement (from its Operational Date of July 29, 2004) ending in 2054 unless terminated earlier. The ETA was first executed on January 18, 2002 and, subsequently amended on August 20, 2007 and September 1, 2010. In addition, at its meeting on October 29 and 30, 2019, City Council authorized a further amendment to the ETA to permit the installation and operation by Enwave at its expense of three additional heat exchangers to the ETL at the JSPS as part of the DLWC system until such time as the ETA may be further amended to reflect the DLWC Expansion.

Since 2013, as authorized by City Council, the parties have negotiated, on a without prejudice basis, an expansion of the DLWC system proposed by Enwave, and since modified, with a view to significantly increasing the size of the DLWC system based on a new raw water diversion system originating at the IFP and terminating at the JSPS. The negotiations have resulted in the Term Sheet which contains the negotiated commercial principles intended to serve as a framework for the final negotiations between the parties and an amendment to the ETA to give effect to the DLWC Expansion Project, if approved. With the conclusion of these negotiations, and the finalization of the Term Sheet attached to this report, City staff is now reporting back to Council for further direction.

### Enwave's 2013 DLWC Expansion Proposal

In 2013, Enwave presented a proposal to the City aimed at expanding the DLWC system premised on the construction of a new supplementary raw water (untreated) system at the IFP and a diversion of a portion of that raw water so to by-pass the City's water treatment process at the IFP, thus creating a supplemental and independent DLWC cold water stream. The intent was to utilize unused pumping capacity and inactive or abandoned Toronto Water infrastructure. To accomplish this, infrastructure changes at the IFP were proposed by Enwave, including a raw water diversion and storage system using six large storage tanks. In addition, to convey the cold raw water to Enwave's heat transfer station located at the JSPS on the mainland, the 2013 DLWC expansion proposal contemplated that a parallel – but separate and distinct – piping network would be rehabilitated and/or constructed. Given its nature, the proposal was also subject to the Ministry of Environment, Conservation and Parks (MECP) approval. Under this 2013 DLWC expansion proposal, Enwave's proposed total investment was an estimated $50M to $60M in capital costs.

### Enwave's 2019 DLWC Expansion Proposal

Like the 2013 expansion proposal, Enwave's 2019 DLWC Expansion Project is also premised on the diversion of raw water from the IFP to JSPS. However, from the City's

perspective, the 2019 DLWC Expansion Project is improved by the following factors: i) it proposes the addition of a Fourth Intake to the IFP which it is expected would provide resiliency to Toronto Water's treated water system and additional flow capacity for Enwave, and ii) it better separates the City's and Enwave's infrastructure, making the coordination of operations between Enwave and the City less complicated and easier to sustain in the long term; thereby further minimizing risk to the City's water treatment system. In addition, Enwave's 2019 DLWC Expansion Project also contemplates other benefits to the City as detailed in this report; namely, increased revenues, operational cost savings, infrastructure additions at no cost to the City (including the repurposing of currently unused infrastructure), and environmental benefits.

The 2013 DLWC expansion proposal necessitated significant alterations to the IFP's footprint, which would have required Enwave to take-on various City infrastructure renewals, either directly due to asset condition or indirectly due to the benefits of improved efficiency for both parties. However, the 2019 DLWC Expansion Project fundamentally differs in that it only minimally relies on existing Toronto Water infrastructure; thus, any proposed modifications to the IFP are now geared to new infrastructure serving the DLWC Expansion Project, not to major retrofits of existing IFP infrastructure in operation. Nevertheless, under the DLWC Expansion Project, the City will benefit from new infrastructure, largely in the form of the Fourth Intake, which will provide Toronto Water with valuable system redundancy.

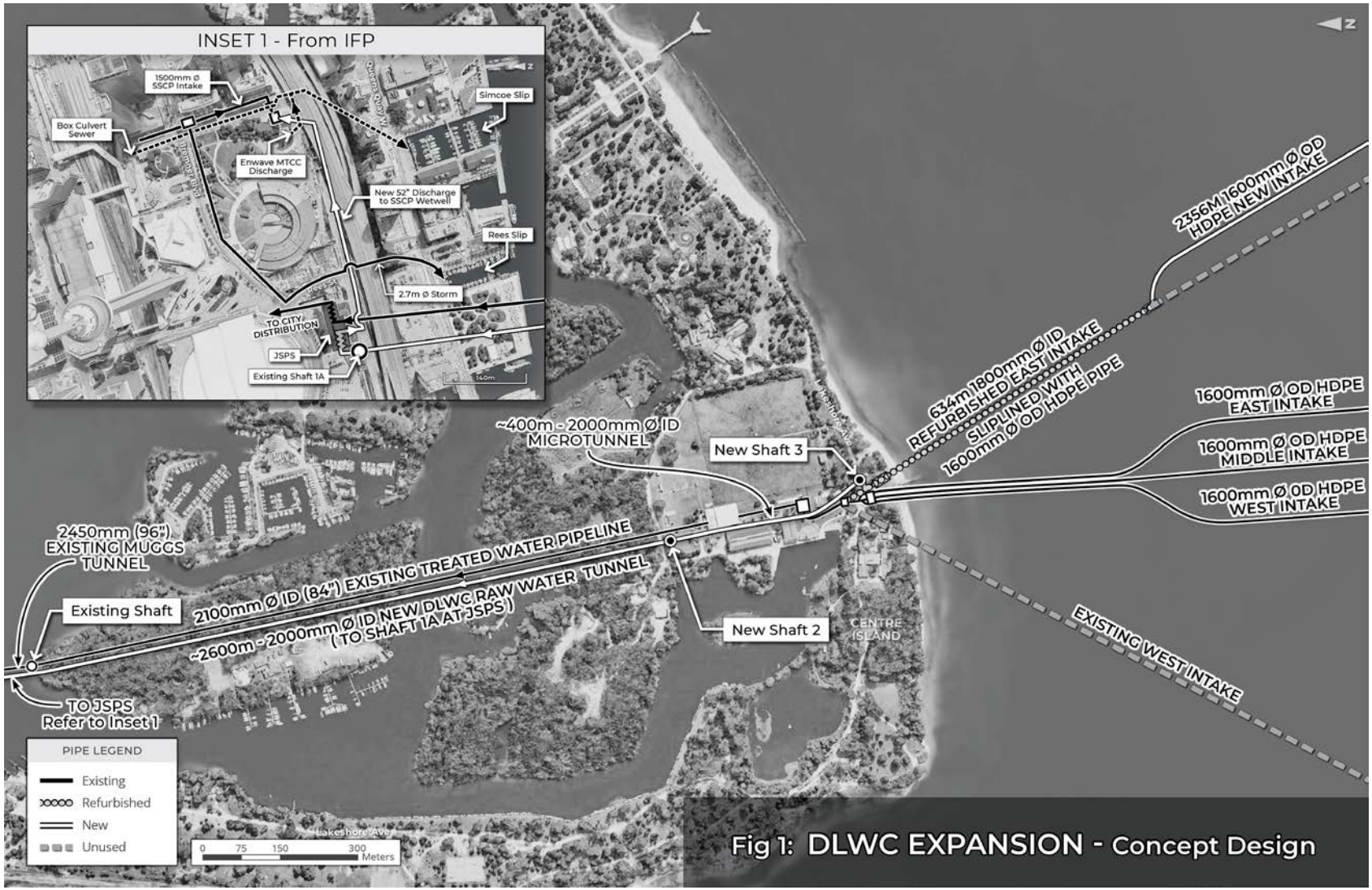
A non-negotiable City condition remains that the DLWC Expansion Project will in no way hinder, adversely impact or interfere with the operation of the IFP or the security of the City's water supply system. The City's water system will always take priority and precedent over any DLWC system. As noted in the Term Sheet, the preservation at all times of the security, quality and purity of the Toronto drinking water is of paramount importance in undertaking the DLWC Expansion.

**2019 DLWC Expansion Project**

The DLWC Expansion Project entails drawing an increased volume of dense cold raw water from deep in Lake Ontario, which would then be delivered and utilized at Enwave's side of the JSPS as a cooling medium for the proposed new raw water heat exchangers, adding more capacity to Enwave's DLWC system. After the raw water has extracted heat from Enwave's district cooling loops, the warmer raw water would then flow to Enwave's SSCP for further heat extraction and would ultimately be discharged back into the lake at the inner harbour via the City's existing Simcoe Street sewer and Enwave's existing permit. The DLWC Expansion Project conceptual design is illustrated in Figure 1 below.

To supply the required volume of raw water, a new 1450mm diameter high-density polyethylene ("HDPE") Fourth Intake will be constructed and extended by Enwave, for 3km into Lake Ontario to a depth of 70 metres. The nearshore portion of this Fourth Intake will be slip-lined through Toronto Water's existing - but unused - 1800mm diameter eastern intake. This new Fourth Intake will terminate at a pipeline-cleaning chamber (the "Valve Chamber Modifications") located south of the IFP's intake valve

**Figure 1: Deep Lake Water Cooling Expansion Project Conceptual Design**



chamber. The chamber upgrades will be required to facilitate interconnection of the existing and proposed DLWC systems. This chamber will also adjoin a new drop shaft ("Shaft #3"), which will house process equipment, including valves, flowmeters, screens, chemical addition diffuser, and a vacuum sustaining system. Once this new infrastructure is commissioned, the City will own the Fourth Intake, the Valve Chamber Modifications, and Shaft #3.

The new raw water DLWC Expansion Project will be interconnected to the IFP's raw water valve chamber to allow the system to draw from the existing raw water intakes system and the new Fourth Intake; similarly, the IFP will be able to draw from all four intake systems. Conceptual consideration for potential future capacity will be incorporated into the design assumptions.

North of Shaft #3, on Enwave's side, the DLWC raw water system will be isolated from Toronto Water's treatment and supply system. Enwave's raw water will flow out of Shaft #3 through a 0.4 km micro-tunnel (under the IFP) connected to a new deeper drop shaft (Shaft #2, located near the IFP's north boundary). Shaft #2 will then be connected via a new deep 2.6 km rock tunnel, 2100mm in diameter, underneath Toronto Harbour to an existing chamber (Shaft #1) at JSPS. Enwave's raw water flow will be routed from Shaft #1 into raw water pumps and through Enwave's new dedicated raw water heat exchangers for cooling. After heat is transferred to the raw water, it will be delivered to a new riser and tunnel outside of JSPS for conveyance to the SSCP. Enwave will further use this raw water for supplementary cooling, with its eventual discharge by permit to the City's Simcoe Street sewer chamber and, ultimately, Toronto Harbour. Also as an added benefit and a cautionary measure, Enwave will design and construct improvements to the Simcoe Street sewer (the "Simcoe Street Discharge & Connection Chamber Improvements") in order to mitigate any flooding potential during severe weather events which improvements the City will also own.

## Proposed Financial Benefits of the DLWC Expansion Project

The financial benefits of the DLWC Expansion Project, as reflected in the Term Sheet, are in the form of increased revenues, operational budget cost recoveries, reduced maintenance cost obligations under the ETA yielding operational savings, and capital cost sharing arrangements for common infrastructure rehabilitation.

Also beneficial to the City, under the DLWC Expansion Project, clarification is provided in the Term Sheet on the issue of rehabilitation and replacement of the heat exchangers and City water pumps, specifically: future replacement of any heat exchangers and the City water pumps will be entirely Enwave's cost and obligation.

a) Increased Revenue

The value for the City of this DLWC Expansion Project lies in collecting additional on-going operating revenues for the increased DLWC flows. Should the term be extended, as contemplated by the Term Sheet, this value would increase even more significantly.

Under the existing ETA, Toronto Water collects an ETF. The ETF is based on the amount of heat Enwave transfers to Toronto Water's treated drinking water, without

impacting water quality, through the ETL. It was important throughout the City's negotiations that any DLWC expansion which sought to extend the utilization of treated water to raw water be premised on price parity for energy transfer, regardless of the water source. That is, the ETF structure paid by Enwave to Toronto Water based on ten hours of cooling will remain equal with either cooling water source, thus maintaining consistent and efficient operating strategies, and ensuring that neither energy source becomes preferential.

In 2018, the ETF received by the City was $1,583,045. Based on the revised 2019 DLWC Expansion Project, as submitted by Enwave, once commissioned and full benefit from the expansion and existing system is realized, the ETF is projected to increase annually by about 57% (or an estimated $944,211, based on 2018 revenues).

b) Operational Budget Cost Recoveries

Enwave has committed to reimburse Toronto Water for any additional maintenance costs associated with the raw water diversion project.

Under the DLWC Expansion Project, Enwave will reimburse Toronto Water for the annual easement fee payable to the MNR for the fourth intake, estimated at $22,720 per year.

Additionally, Enwave will fully compensate Toronto Water for the cost of maintaining Shaft # 3, specifically the costs related to screen cleaning, air extraction, and chlorination. These costs are envisioned to be minor maintenance costs, with the details (such as frequency, process, and method) to be identified during detailed design.

c) Maintenance Cost Savings and Capital Rehabilitation

Under the DLWC Expansion Project, Enwave will be responsible for the maintenance cleaning of the existing heat exchangers, the new raw water heat exchangers, and the additional three heat exchangers, at Enwave’s sole expense. Enwave will, in its sole discretion, determine the appropriate frequency of such cleaning activities. Toronto will use its best reasonable efforts to accommodate Enwave’s requests to coordinate and schedule such cleaning activities.

Toronto Water expends considerable time and resources in the coordinated maintenance effort to clean the existing 36 heat exchangers (specifically, the portions of the heat exchangers through which City water passes). In 2018, cleaning operations cost Toronto Water $123,542 (net of HST recoveries), including labour, subcontractors, and parts and material costs. The DLWC Expansion Project will transfer that maintenance cost from Toronto Water to Enwave, for all heat exchangers (both on the treated water and the raw water systems), representing annual Toronto Water operating savings that will be reallocated to other operational requirements. Toronto Water will continue to support only heat exchanger isolation when requested by Enwave and as determined by the City (as only licenced operators are legislated to perform this function in relation to a municipal water supply system).

Given the equivalent use of the heat exchangers by Toronto Water and Enwave, as per the ETA, the City's ETL maintenance obligations include that portion of the heat exchangers through which the City's water passes. Thus any future cost of the existing heat exchanger gasket replacement work will be shared equally between the parties. Accordingly, Enwave will be responsible to perform gasket replacement work on the existing heat exchangers and Toronto Water will subsequently reimburse Enwave for 50% of the cost. Enwave predicts that this work is required on the existing 18 heat exchangers every 15 years at an estimated cost of $2-3M for all 900 gaskets. Any capital financial impact would be dealt with through the annual budget process. Any new heat exchangers added under the DLWC Expansion Project will be entirely Enwave's responsibility to maintain, refurbish, and replace.

Similarly, the maintenance of the ETL City water pumps has been clarified such that during refurbishment projects, Enwave will pay for the cost of the water pump parts and Toronto Water will complete the installation, at Toronto Water's cost, using City operations staff. Enwave predicts that this work is required on all 8 water pumps every 15 years. Any capital financial impact would be dealt with through the annual budget process.

d) Intake Cleaning

The IFP's raw water intake pipelines are susceptible to quagga mussel infestation (from Lake Ontario) which has the effect of reducing the overall flow available. In 2018, Toronto Water tendered a design-build contract to clean the three intake pipelines (the first cleaning since commissioning in 2004) at a cost of $3,988,627 (exclusive of HST), yielding a complete restoration of operational characteristics. Based on the results of Toronto Water's annual pipeline flow test, it is projected that this cleaning cycle would continue in perpetuity every six years, at a reduced and optimized cost of approximately $2.04M.

Within the DLWC Expansion Project, Enwave will take-on the full cost of cleaning the new Fourth Intake. In addition, should Enwave require enhanced flow performance from the existing three intakes, then Enwave will reimburse the City for pro-rated portion of the cleaning cost attributable to the accelerated cleaning requirement.

**The Term Sheet**

As noted above, subject to City Council approval, the Term Sheet has been negotiated with Enwave and is intended to serve as a framework for the final negotiations between the City and Enwave and an amendment to the ETA to give effect to the DLWC Expansion. While the Term Sheet provides many details of the proposed DLWC Expansion Project, below is a summary highlighting certain key principles.

1. City's Potable Water Supply Remains Paramount

The City operates its potable water supply system under high standards using best practices to ensure the preservation at all times of the security, quality and purity of the City's water supply. Enwave has acknowledged and agreed that the preservation at all times of the security, quality and purity of Toronto's drinking water is of paramount

importance in undertaking the DLWC Expansion Project. As previously noted in this report, the City's water system will always take priority and precedent over any DLWC system.

2. Enwave Will Pay for the DLWC Expansion Project

At Enwave's expense, it will design, construct, install, test and commission the entire DLWC Expansion Project. Enwave will obtain and maintain, at its own expense, bonds and insurances in respect of the DLWC Expansion Project acceptable to the City.

As the ETA already includes indemnities, these provisions will be reviewed and updated as may be necessary.

3. The City Will Receive Valuable New and Repurposed Infrastructure

The City will receive new infrastructure at no cost. Enwave will design, construct, install, test and commission the following infrastructure at a value of approximately $35 million which will be owned by the City:

- a new Fourth Intake, slip-lined through the City's existing unused nearshore intake, extended for 3km into Lake Ontario, to provide an additional source of raw water,
- Valve Chamber Modifications between the new Fourth Intake and the existing three-intake system to permit the transfer of raw water between the intake systems and to be connected to the IFP's raw water valve chamber to allow the two systems to draw water from common supply lines, and
- a new Shaft #3 drop chamber to house process equipment and serving as the delineation point to Enwave's raw water system.

In addition, Enwave will design and construct improvements to the City's existing Simcoe Street Discharge & Connection Chamber which improvements the City will also own.

Enwave will also obtain and assign/transfer to the City, as applicable, manufacturers' and contractors' warranties for the City's infrastructure.

4. Easements, Licences and Official Plan Exemption

Enwave will require real property rights through lands owned by the City, and others. For example, Enwave will require permanent easements through City-owned lands for the expansion tunnel, north of the common connection point (Shaft #3). The impacted lands include part of the Toronto Islands, HTO Park, lands designated as a future Reese Street Park, and lands near the JSPS. Enwave will pay all costs associated with obtaining an exemption to Official Plan Policy 4.3.8, to allow the City to dispose of easements through lands designated parks and open space. To the extent that Enwave requires real property rights through lands owned by the City, the terms of the disposal of those interests will be negotiated between the parties, acting reasonably, in accordance with the City's delegated approving authority for real estate transactions at market value.

Enwave will also obtain, at its sole expense, all other real property rights required for the DLWC Expansion Project.

To permit the Fourth Intake, the City will need to acquire an easement from the MNR. Enwave will pay the costs associated with this easement acquisition, including any annual easement fees imposed by the Province as described under the Operational Budget Cost Recoveries section above, as well as the costs of any temporary construction permission necessary to install the Fourth Intake.

5. Environmental Assessment

Due to the proposed DLWC Expansion Projects attributes, Enwave has recommended that a Class Environmental Assessment (“EA”), Schedule B be undertaken by the City and Enwave as co-proponents at Enwave's sole expense. This report recommends that the General Manager, Toronto Water, be authorized, on behalf of the City, to undertake any necessary related environmental assessment(s), including either as a sole proponent or a co-proponent with Enwave, as may be required for the DLWC Expansion Project. Within the EA process, it is important to consult and engage with key stakeholders who have a direct interest in the proposed undertaking or project, as well as with special interest groups who may be affected.

Subject to City Council approval, it is anticipated that the EA will commence in early January 2020. Therefore, it will be necessary for the City and Enwave to jointly develop and finalize the work plan, division of responsibilities, and consultation plan before the end of the 2019. Additional studies, especially for the Fourth Intake (water quality sampling and analysis; temperature monitoring programs; natural environmental inventory; intake protection zone delineation and vulnerability studies; and archaeological, bathymetric, and geophysical investigations), will also be required to support the Class EA.

6. Ten Year Extension of ETA Term

Given the proposed investment and financial commitment required by Enwave to proceed with an expansion project of this nature, the Term Sheet contemplates a 10 year extension of the ETA to 2064. In addition, the Term Sheet provides a mechanism whereby Enwave can seek further term extensions of 25 years but those extensions would have to be negotiated on such amended terms and conditions mutually acceptable to the parties and subject to City Council approval. In those circumstances, if either the parties could not agree or City Council did not approve same, the ETA would not be extended any further.

7. The City's Drinking Water System and Ministry Approvals

Enwave has agreed that at all material times, the DLWC Expansion Project must comply with the City's Permit to Take Water ("PTTW"), Drinking Water Works Permit ("DWWP") and Municipal Drinking Water License ("MDWL"), to the extent applicable. The City will, at Enwave's sole expense, enter into discussions with the MECP to negotiate and obtain, if possible, any necessary amendments to its PTTW, DWWP and

MDWL, or other approval(s) from the MECP as may be necessary for the DLWC Expansion Project.

a) Permit to Take Water

The Province issues a PTTW to limit water-taking rates from ground or surface water resources. Toronto Water holds a PTTW for the IFP through its existing intake system to draw water from Lake Ontario up to a maximum of 550 million litres per day ("MLD"). The maximum anticipated raw water draw by the IFP is 454 MLD, easily within the PTTW limit. Concurrent with the City's PTTW, Enwave has a similar PTTW (renewed in 2016) for the three-intake system to draw water from Lake Ontario up to a maximum of 545 MLD.

Based on the maximum anticipated water draw under the proposed DLWC Expansion Project, Enwave has recommended that both Enwave and the City seek an amendment of their respective PTTWs to add the Fourth Intake system onto the permits. PTTW amendment negotiations with the Province are proposed to take place in Q4 2019 and are expected to include the City and Enwave.

b) Drinking Water Works Permit and Municipal Drinking Water Licence

Similarly, amendments may be required to the City's DWWP and MDWL, which collectively define the physical works and operating and performance parameters for the City's drinking water system. The City will communicate directly with the MECP on these matters, with any costs borne by Enwave.

8. Other Permits and Approvals

Several permits and approvals are required for the DLWC Expansion Project through a variety of authorizing agencies. Enwave will, at its sole expense, obtain and maintain all other approvals as may be necessary for the DLWC Expansion.

9. Confidentiality

The current ETA has a confidentiality provision which the parties have agreed to amend to provide, among other things, that with the exception of any confidential financial information contained therein, the ETA, once amended, will not be confidential.

## Environmental Benefits

Enwave, as part of its proposal to the City, has outlined certain environmental benefits it believes will be realized by the DLWC Expansion Project. Enwave maintains that DLWC, which utilizes cold lake water, is an environmentally beneficial alternative to conventional chiller plant air-conditioning. It maintains that the existing DLWC system has already resulted in significant carbon emission reductions and improved air quality in Toronto's environment.

Enwave notes that the DLWC Expansion Project aligns with TransformTO's climate strategy on greenhouse gas (“GHG”) emissions reduction targets. Enwave explains that the environmental benefits associated with an expanded DLWC system would be further realized as follows:

a) DLWC cooling energy would be delivered using up to 80% less electricity than a standard chiller plant. To that end, the DLWC Expansion Project would provide 26,000 tons of cooling at peak, equivalent to a 12 - 14 MW peak demand reduction on the electricity grid. Where Ontario’s grid continues to be clean and low carbon, Enwave estimates indicate the growth of the DLWC system can deliver 22,000 tons of GHG reductions by 2030 and 61,000 tons by 2050.

b) Through facilitating the growth of Enwave’s cooling business, the DLWC Expansion Project would further increase Enwave's wintertime cooling load, wherein waste heat would be rejected to Enwave’s cooling system and then recovered and delivered as heating through heat pumps (called District Heat Recovery, or "DHR"); utilizing DHR at this scale will reduce carbon emissions compared to traditional boilers by up to 225,000 tons CO2 equivalent annually.

In addition, Enwave contends that the DLWC Expansion Project aligns with Toronto’s Resilience Strategy, which identifies infrastructure as one of the key focus areas for action in addressing resilience challenges. Finally, Enwave suggests that DLWC Expansion Project would reduce the strain that the City’s growth puts on the electrical grid by increasing the use of efficient lake-sourced cooling.

Given that the DLWC Expansion Project is in its very early stages, it is difficult to now determine the extent to which, if at all, the City's Carbon Credit Policy (EX31.15, 2013) applies and, if so, whether City ownership of any environmental attributes resulting from the DLWC Expansion Project is feasible. For this reason, as reflected in the Term Sheet, as part of the final negotiations, Enwave and the City have committed to discussing ownership of any emission reduction credits that may be attributable to the DLWC Expansion.

## CONTACT

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## SIGNATURE

Lou Di Gironimo, General Manager, Toronto Water

## ATTACHMENTS

Attachment A - Deep Lake Water Cooling Term Sheet