MEMORANDUM

URBAN systems

Date:	May 09, 2012
To:	Sheila Kitz, CAO
cc:	Cristina Fonseca
From:	Matt Brassard
File:	3144.0003.02
Subject:	Design Rational

Sheila,

Further to the questions in your email dated May 8, 2013, we have summarized the questions and provide the following design rationale for your review and consideration.

Questions and Design Rationale:

Q1: What is the rationale for the chemical quantities as they relate to tote storage and the subsequent need for a forklift?

A1: Totes were selected as the most efficient way to deliver chemicals to the County. The volumes are summarized below and represent the required amount for 30 days at the Expansion ADD as required by AESDR. The actual volumes initially required by AESRD were higher but we have agreed to the reduced amount proposed.

- Sodium hypochlorite storage volume (30 d) – 1,699 L
- Anti-scalant storage volume (30 d) – 82 L
- Sodium hydroxide, assuming a 20 mg/L dose (30 d) – 552 L
- Sulfuric acid, assuming a 50 mg/L dose (30 d) – 3,385 L

There remains the possibility that a forklift may not be required should delivery via truck and transfer pump be available. However, this delivery method is not guaranteed and a tote/forklift option is the preferred and proposed option.

Q2: Why is a concrete pad required outside the proposed water treatment plant?

A2: A concrete pad was incorporated into the design to accommodate forklift operation to unload chemical totes. The concrete pad may be removed as long as the method to deliver chemicals to site does not compromise safe delivery. (e.g. a forklift with tires appropriate to run on uneven surfaces)

Q3: Why does the existing sanitary dump tank need to be relocated?

A3: There are several issues or potential issues with the location of the existing sanitary dump tank and the location of the proposed new WTP.

- Our structural specialist consultant has some concerns about potential conflicts during construction; based on the location of the existing sanitary dump concrete pad, the proposed building piles may come into contact with the buried tank.

- The access doors to the chlorine and sodium hydroxide rooms are adjacent to the existing sanitary dumping station. At a minimum, the curb and bollards around the sanitary dump station will have to be removed to allow access to these rooms.

- From a structural perspective, the loading rating of the existing tank and installation methods are unknown as record drawings and/or information about the tank is not available. Unloading chemical totes has the potential to compromise the buried tanks and cause safety issues.

- From a site perspective, keeping the sanitary dump in the existing location adjacent to a new WTP is not ideal.

While relocating the sanitary dump station is the preferred option, confirmation from a structural review of the buried tank to withstand the loading associated with chemical deliveries and confirmation of potential conflicts with building pile installation could allow the sanitary tank to remain in place. However, additional costs to 'bridge' across the tank to allow for the concrete pad and associated chemical unloading would be required.

Q4: Why has the building footprint expanded since the conceptual and preliminary design stages?

A4: The building footprint grew due to forklift operation requirements, the connecting vestibule from the old to the new WTP (19 m^2; which was not envisioned or included in the initial design) and the RO skids being longer than originally quoted during pre-design. The plant is also designed to accommodate the ultimate design flows when Mallaig is added to the system. Should the County want to reduce the building footprint, there are some options available which may save up to a combined 38m^2 but may cause operational challenges (like walking outside between buildings).

Q5: Why do the pumps need to be upgraded at the well (source) and in the WTP?

A5: The existing groundwater well pumps do not meet the required raw water supply design flow. The issue is related to the Reverse Osmosis membranes which need to operate within a narrow flow tolerance in order to optimally perform.

The membranes we are installing are sized to treat 5.6 L/s, each, assuming a recovery rate of 75%. The current raw water supply pumps can only pump 3.8 L/s which is considerably less than the design flow even for one of the membrane skids.

The reason we need a booster pump at the WTP is because of headlosses in the small diameter raw water pipe (100 mm) going from the well pump station to the WTP. At the design flow and up to 9.2 L/s (which the pump is rated at), the pressure at the plant is lower than the pressure required by the RO membrane system (40 – 45 psi). The pressure at the WTP can be as low as 5 psi.

Q6: How do the programming costs relate to recent electrical scope changes?

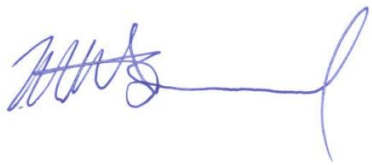
A6: The programming costs cover the control system configuration for the Ashmont WTP. A copy of the quotation is attached for reference. The electrical consultant will coordinate their work with the contractor once the components are installed. The recent electrical scope changes included the addition of communication towers so that the Lottie Lake system could communicate with the existing Ashmont water

treatment plant and newly installed transmission line and associated pumps, as well as the purchase, installation and control work required for the two distribution systems to be able to communicate with the future Ashmont WTP.

Should you have any further questions we would be happy to meet with you to discuss the project.

Sincerely,

URBAN SYSTEMS LTD.



Matthew Brassard, P.Eng.
Principal, Branch Leader

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