

MEMORANDUM

Date: September 21, 2020
To: Chris Radford and Rakesh Savani, Town of Okotoks
cc: Jeremy Huet, Town of Okotoks
Kris Nelson, Urban Systems
From: Ehren Lee, Urban Systems
File: 1306.0114.01
Subject: Off-Site Levy: Wastewater Treatment Plant Allocations rev 2

1.0 INTRODUCTION AND BACKGROUND

In 2019, Okotoks Staff retained Urban Systems to complete a comprehensive update to the Town's Off-Site Levy (OSL) program. As a separate but concurrent project initiated in Fall 2019, the Town asked our team to consolidate the findings of the *Asset Management Investment Plan* (Investment Plan) for the wastewater treatment plant (WWTP), with the ongoing OSL review. The intent of the consolidation assignment was to reconcile the cost implications of:

- growth-related upgrades to the wastewater treatment plant, with
- redundancy requirements for provincial regulations, and
- looming renewal needs based on the asset management desktop review.

The outcomes of this work will position the Town to integrate the findings with the OSL update. In addition, this memo makes important observations that support the Town's future engagement with the development community regarding the evolving cost figures and allocations. One item of relevance, which is fundamental to treatment facilities, is that their equipment is always deteriorating and often at a much faster pace than pipes or other linear infrastructure. As a result, the allocations between new customers from growth, and existing customers, can change from time to time.

2.0 WASTEWATER TREATMENT PLANT PLANNED UPGRADES

Three documents guide the list of upcoming WWTP upgrades relevant to the OSL program. Each document is outlined below with a concise description of how it relates to the upgrades.

2.1. ASSET MANAGEMENT INVESTMENT PLAN FOR THE WWTP (2019)

What is it? A desktop study that establishes a complete inventory of major treatment processes including subcomponents and their function, a statement of equipment installation year and age, an estimate of replacement value and remaining value, an assessment of it's overall condition, and a 20+ year schedule for anticipated renewal needs (i.e. needs driven by age or other known condition-based factors). The Investment Plan was completed in Fall 2019.

How it affects the OSL program update? Assets are installed, then used, and ultimately, they deteriorate until the point where they are replaced. The last OSL update occurred three years ago relying upon the best information on condition and capacity available at that time. At present, the Investment Plan characterizes the plant in generally good condition with

MEMORANDUM

Date: September 21, 2020
File: 1306.0114.01
Subject: Off-Site Levy: Wastewater Treatment Plant Allocations rev 2
Page: 2 of 5



looming improvements for ultraviolet disinfection, for front-end equipment, for solids handling and most elements of the central treatment unit and clarifiers.

2.2. WASTEWATER TREATMENT PLANT PHASE II UPGRADES (2019)

What is it? A design-oriented report that reviews existing capacities, regulatory impacts, performance results, and overall design-considerations for many components of the plant. The report includes some cost estimates for looming upgrades and design drawings for the proposed upgrades. The report was completed in Fall 2019.

How it affects the OSL update? Each major project identified to occur in the near-term at the plant (next three to five years) is itemized in detail. The report partly establishes why the projects are required and clarifies the need to complete the works to accommodate new growth and comply with provincial regulations. The cost estimates have been considered and revised to suit current cost planning approaches by the Town, which align with best practices for communities completing OSL updates. The Investment Plan and Phase II Upgrades report were completed concurrently.

2.3. OKOTOKS WWTP PROCESS CAPACITY EXPANSION STUDY (2020)

What is it? A design and performance report that reviews existing capacities, regulatory impacts, treatment results, and overall design considerations for many components of the plant once ongoing (from Phase II Upgrades, 2019-2023+) projects are completed. It is an important document for projecting long-term needs for plant capacity, based on growth in population and developable lands. The technical memorandum includes cost estimates and a schedule for the timing of the works. Population and developable land projections align with other master planning initiatives already underway in the Town. A draft version of the report was completed in July 2020. The proposed levies be should carried through the remainder of the OSL process yet remain active until the final version of the Expansion Study is complete.

How it affects the OSL update? OSL's intend to capture the impact that growth has on system capacity and then levy fees to recover costs to meet the future needs of the utility. The Expansion Study outlines growth projections (populations, which relate directly to developable lands), itemizes the criteria and scheduling for key upgrades, and includes costs for all projects (beyond Phase II upgrades) leading up to around 2075. Those upgrades required within the OSL planning horizon, which is up to 2045, comprise the major projects beyond the Phase II Upgrades (ongoing) identified in this memo.

In addition to the three documents noted above, the Town has published multiple documents such as design briefs to Council and applications to Alberta Environment which describe the need to invest into the treatment plant to a) avoid sudden failure from deteriorating equipment, b) comply with redundancy requirements and c) meet the demands from rising flows from growth now and into the long-term.

Table 1 outlines the proposed near-term WWTP projects relevant to the OSL update based on the results of all three background reports. While redundancy and growth are two self-explained criteria, renewal typically refers to two types of projects: those required due to end

MEMORANDUM

Date: September 21, 2020
 File: 1306.0114.01
 Subject: Off-Site Levy: Wastewater Treatment Plant Allocations rev 2
 Page: 3 of 5



of service life (e.g. age, condition) or those with performance issues that ought to be addressed by enhanced systems.

Table 1: Near-Term Upgrades for OSL Update

OSL Project 1: Near Term “2020 Upgrades”	Due By (Growth Trigger)	Renewal?	Redundancy?	Growth?
Phase A – CTU: BNR, Clarifier	15 ha	No	Partial	Yes
Phase B - Solids: Centrifuge	15 ha	Yes	Yes	Yes
Phase B - Front End: Screening, Grit, EQ	15 ha	Yes	Partial	Yes
Phase B – UV	15-30 ha	Yes	Yes	Yes
Phase C – APC Expansion	60 Ha	No	Yes	Yes

There is some benefit to all users (current and future i.e. growth) when projects address all three core drivers for upgrades at the WWTP. As a result, these projects are often cost-shared including an allocation to growth and existing users.

On the other hand, long-term projects which are those projects 8-10 years into the planning horizon, and beyond, rarely have a direct link to existing users because they do not typically include renewal-based upgrades (covered under separate plans) and don't account for new formula to calculate redundancy (not effective to speculate on future regulations). Instead, long-term projects typically focus on new or substantially expanded assets to accommodate growth. Accordingly, the cost-allocation of these OSL projects is typically the exclusive responsibility (e.g. full allocation) of new growth.

Table 2 presents the growth projections from 2021 to 2045. The rates are projected to change slightly in 2041 as the community reaches a scale where the relative pace of growth rises with an overall larger population. For reference, the projected annual rise in population from 2041 to 2045 (growth rate) is projected to remain relatively consistent to 2075, and beyond. For reference, an estimated land needs to support growth is 380 hectares up to 2045.

Table 3 outlines the long-term upgrades for the Okotoks WWTP which are relevant to the OSL update.

Table 2: Growth Projections

Term	Annual Rate of Growth	Projected Population at end of Period	Annual Land-Growth Rate	Cumulative New Lands at end of Period
2021 to 2040	668 per/year	43,698	15.12 ha/yr	302 ha
2041 to 2045	680 per/year	47,098	15.48 ha/yr	380 ha
2045+	680 per/year	TBD	16.75 ha/yr	TBD

MEMORANDUM

Date: September 21, 2020
File: 1306.0114.01
Subject: Off-Site Levy: Wastewater Treatment Plant Allocations rev 2
Page: 4 of 5

**Table 3: Long-Term Upgrades for OSL Update**

OSL Long-Term Projects	Due By (Growth Trigger)	Renewal?	Redundancy?	Growth?
Project 2: Upgrade: EQ, DAF, Centrifuge (inside current OSL horizon)	200 ha	No	No	Yes
Future Project: Upgrade: Front End, CTU, Filter (outside current OSL horizon)	555 ha	No	No	Yes

3.0 WASTEWATER TREATMENT PLANT: OFF SITE LEVY ALLOCATIONS

An allocation is a defined term which stipulates the percentage of the cost of a project to be rolled into the OSL rates. It is common for allocations to vary across projects and/or phases for a WWTP.

For projects that are precisely capacity-driven and intended to accommodate population growth, the allocation is typically guided by the ratio of new growth to existing population. For the long-term projects (Project 2) the allocation is 100% to new growth as the projects involve new assets or plant expansions to accommodate the flows from new customers.

For the near-term upgrades (Project 1: Phases A, B and C), the allocations are mixed. For Phases A and C, the projects are carry-overs from the previous (currently in place) OSL rates, which was driven primarily by capacity. As such, the cost allocations for A and C align with the original OSL projections with 100% and 70% of the costs allocated to the central treatment unit upgrade and activated primary clarifier expansion, respectively (as they were in the previous OSL). Phase B is different, and its allocations should be more balanced because the drivers for the projects are a combination of renewal, redundancy, and growth. This combination of drivers yields a 50:50 cost-share because:

- There is mutual, shared interest of both current customers and new growth to invest into these redundancy upgrades given the risk of failure and the impacts to environment if failure were to occur, and the requirement to comply with regulations.
- The units cannot accept new flows from growth until expansions are completed and they already demonstrate capacity-based challenges with recent increases in flow.
- There is a looming need in the next 5+ years to renew many of the Phase B units because their remaining life has dropped to about 50% (in some cases less) in the last few years. By advancing the upgrade now due to rising flows from growth, there is both a notable write-down of some of the existing assets (loss) as well as a benefit to existing customers in the replacement (gain) of deteriorating equipment. For reference, a write-down is the carefully chosen loss of asset value due to replacement before the value of the asset is consumed.

In summary, Phases A and C are primarily growth-related projects carried over from the previous OSL rates, and Phase B is a mix of renewal, redundancy, and growth. Table 4 summarizes the allocations for the Projects until 2045 at the WWTP for use in the upcoming OSL update. Cost estimates have been added which include construction cost, administration, project management, engineering design and short-term financing.

MEMORANDUM

Date: September 21, 2020
 File: 1306.0114.01
 Subject: Off-Site Levy: Wastewater Treatment Plant Allocations rev 2
 Page: 5 of 5

**Table 4: Proposed WWTP Upgrades for Inclusion into the OSL Update**

WWTP Projects for OSL Project/Upgrade		2020 Cost Estimate	Required By	Allocation to Growth	Allocation \$
Project 1: 2020 Upgrade		\$30,780,000	15ha		\$24,005,000
<i>Phase A</i>	<i>CTU/BNR</i>	<i>\$14,430,000</i>		<i>100%</i>	<i>\$14,430,000</i>
<i>Phase B</i>	<i>Solids, Front End, UV, Ancillary</i>	<i>\$9,350,000</i>		<i>50%</i>	<i>\$4,675,000</i>
<i>Phase C</i>	<i>APC #2</i>	<i>\$7,000,000</i>	60 ha	70%	\$4,900,000
Project 2: Upgrade: EQ, DAF, Centrifuge		\$5,100,000	200ha	100%	\$5,100,000
Total					\$29,105,000

Cost estimates for Phase 1 stem from financial models, current OSL formula, and budget allocations of the Town. Project 2 cost estimates stem from the WWTP Process Capacity Expansion Study. The projects, cost estimates, schedules and proposed allocations may be rolled into the comprehensive OSL rate update occurring in a separate concurrent assignment. Similarly, we recommend that future master plans for Okotoks include tasks that align with industry best practices and that integrate mixed drivers for capital projects such as condition, compliance, and capacity. With consideration to all three drivers there can be streamlined analysis into financial planning such as rates, levies, borrowing and project deferrals. Similarly, there can be enhanced communications and strong rationale for future capital works.

Thank you for the opportunity to have supported the Town with this important assignment.

URBAN SYSTEMS LTD.

A handwritten signature in purple ink, appearing to read "Ehren Lee", with a horizontal line drawn through the middle of the signature.

Ehren Lee, P.Eng
 Principal/Consultant

cc: Kris Nelson, Urban Systems

/el

U:\Projects_CAL\1306\0114\01\R-Reports-Studies-Documents\R1-Reports\AMIP Memo\Wastewater Memo\2020-09-04-MEM Background to OSL WWTP r2.docx