MEMORANDUM

URBAN systems

Date:	July 6, 2012
To:	Jenni Chancey, District of Squamish
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From:	Peter Gigliotti, Urban Systems
File:	1928.0005.01
Subject:	Technical Memorandum #3 – Biosolids Management

This technical memo is intended to provide the background data on the current procedures for dealing with waste sludge at the Mamquam WWTP in the District of Squamish. It is derived from an examination of plant records and discussion with plant operating staff. A brief description of the plant sludge processing facilities is also provided in the Technical Memorandum by Kerr Wood Leidal entitled *Mamquam Wastewater Treatment Plant Capacity and Risk Assessment* dated January 24, 2012.

1. THE SLUDGE PROCESSING UNIT OPERATIONS

Both wastewater process trains at the Mamquam plant are conventional activated sludge. This type of process sees a large part of the activated sludge returned from the clarifier to the activated sludge reactor. However, excess sludge not required for the process mass balance is wasted. The Mamquam plant diverts waste sludge to a thickener. The thickening process used is Dissolved Air Flotation (DAF). The addition of a polymer compound creates “flocs” that are floated to the surface of the tank by dissolved air. The thickened “float” is skimmed from the surface and directed to a storage tank.

Sludge in the storage tank is then dewatered by means of a centrifuge. The centrifuge also utilizes polymer to assist in the dewatering process. Dewatering is carried out on a batch basis of 4 to 5 times per week. The DAF thickener produces a solids content of 3-4% by weight. The centrifuge dewatering produces a product of 18-20% solids content. In both cases, the centrate (liquid fraction) is returned to the main plant stream.

The dewatered sludge is referred to as biosolids and the product is currently trucked to the Resort Municipality of Whistler for initial composting. The Whistler composting operation includes blending with other wastes (wood chips, food wastes, etc.) and high temperature composting in containerized vessels. The process achieves pasteurization temperatures. The product is then trucked back to the Squamish area (near the landfill site) for curing by means of static pile aeration. After curing, the product is screened and sold to nurseries, landscapers and developers.

2. SLUDGE PRODUCTION RATES

The records for 2010 and 2011 indicate the following waste activated sludge (WAS) production rates, prior to thickening and dewatering:

	2010	2011
Average daily (m^3/d)	626	601
Highest day (m^3/d)	1,061 (Aug)	951 (Dec)
Total annual (m^3)	230,575	219,768
Average Monthly (m^3)	19,215	18,314

After dewatering with the centrifuge, the dewatered product is trucked to Whistler. The weights of dewatered product are expressed in kilograms and tabulated as follows:

	2010	2011
Average daily (kg/d)	4,974	5,438
Highest day (kg/d)	6,660	6,900
Average monthly (kg/mo)	153,292	153,365
Total annual (kg)	1,839,500	1,840,376

The sludge production rates are reasonably consistent from year to year. The liquid sludge before thickening and dewatering is equivalent to 2,200,000 kg of dry solids per year (220,000 m^3 at 1% concentration). The dewatered biosolids is equivalent to 330,000 kg of dry solids per year (1,840,000 kg at 18% concentration). The effluent discharge is 2,920,000 m^3/yr at an average of 25 mg/L, or approximately 73,000 kg of dry solids per year.

The overall solids balance (in kg of dry solid equivalents) on an annual basis is:

Incoming raw sewage:	700,000 kg
Dewatered waste sludge:	300,000 kg
Plant effluent:	70,000 kg
Consumed in treatment process:	300,000 kg

3. COMPOSTED FINAL PRODUCT

The composting facility at Whistler receives biosolids from Squamish, Pemberton, Brittania Beach and Furry Creek. The curing operations near the Squamish landfill include static pile aeration and screening. The quantity of product ranges from 11,000 to 12,000 m^3/year.

The compost is categorized as Class A as defined by the Ministry of Environment and is tested regularly to ensure it meets the Class A compost criteria.

4. MATERIAL CLASSIFICATION

The classification of biosolids quality is provided by the BC Organic Matter Recycling Regulation (OMRR). Biosolids are classified as follows:

- Class A Biosolids
- Class B Biosolids
- Biosolids Growing Medium
- Class A Compost
- Class B Compost

The Schedules of the OMRR provide the requirements for vector and pathogen reductions as well as quality and monitoring and record-keeping criteria for biosolids. The allowable destinations or applications for the products must meet these requirements.

The dewatered biosolids that leave the WWTP do not conform with any of the above classifications, since there has not been any stabilization process such as digestion or composting to reduce pathogens. The composting process at the Whistler facility is reported to reduce volatiles and pathogens and yield a stabilized product, although it is not known under which OMRR classification this product falls under. The operators of the curing and screening process report that the final product available for sale is a Class A compost.

5. CONCERNS AND ISSUES

The District of Squamish has expressed concerns with the costs to the District of the current trucking operation, as well as the impact and sustainability of trucking product to Whistler and trucking back to Squamish.

Examination of alternatives should include on-site stabilization of sludge and potential re-use in local applications. It is recognized that there are potentially numerous opportunities for producing a product that is capable of meeting the OMRR standards, and marketable to users in the region.

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