

Environment & Sustainability Standing Committee
August 8, 2013

TO: Councillor Barry Dalrymple, Chair, and Members of Environment & Sustainability Standing Committee
original signed

SUBMITTED BY: _____
Ken Reashor, P. Eng., Director, Transportation & Public Works

DATE: July 2, 2013

SUBJECT: **HRM Composting Facilities Wastewater Treatment Business Case Opportunity – Highway 101 Leachate Treatment Facility**

ORIGIN

Program delivery review – identification of the opportunity to reduce wastewater treatment costs by using existing capacity of a regional asset.

LEGISLATIVE AUTHORITY

HRM Charter, Part III, Section 60, Power to make policies, Item (b).

RECOMMENDATION

1. It is recommended that the ESSC request Regional Council to direct staff to undertake the community engagement process to provide Regional Council with sufficient information to decide whether or not to implement appropriate site infrastructure and receiving agreements with the two contracted composting facility operators for acceptance of organics wastewater from the two composting facilities for processing at the Highway 101 Leachate Treatment facility. Budget implications are outlined in this report.
2. It is recommended that the ESSC request Regional Council direct staff to submit application to the Province to obtain regulatory approval for the use of the Highway 101 site to process offsite leachate.

BACKGROUND

Escalating costs, as a result of limited options for processing wastewater from HRM's organics processing facilities, initiated a staff assessment of the potential to use the Regional leachate treatment facility located at the closed Highway 101 Landfill site. This Regional facility processes leachate generated at the closed landfill site. The wastewater treatment plant is currently operating at approximately 35% capacity. The Highway 101 landfill site has been closed since 1996.

HRM's two organic composting facilities (operated by Miller Waste and New Era Technologies) produce between 8 and 13 million litres of wastewater, including both bio-filter (large area of bark mulch in a shallow bed where plant exhaust air is filtered through to control odours) water (BFW) and organic leachate, per year. The BFW is generated from precipitation so the estimated amount is based on average annual rainfall, and therefore, can be higher. In September 2010, the AIS Debert wastewater treatment facility, which had been HRM's primary organic wastewater treatment site, stopped accepting HRM organic leachate due to operational issues. Until recent decisions by Halifax Water Commission (HWC) to no longer receive these wastewaters, the approximate annual cost of transporting and treating the BFW and leachate through the Aerotech Park lagoon (BFW), Mill Cove facility (portion of leachate) and a New Alta facility in Quebec (portion of leachate) was approximately \$1.4M.

As a result of regulatory compliance requirements identified following processing challenges, HWC notified staff in the spring of 2012 that as of the summer 2012 they were no longer able to accept organic wastewater from the two composting facilities. The closure of Aerotech and Mill Cove operations to HRM compost wastewater severely limits options for treatment of HRM's organic wastewater.

One alternative currently being used is the New Alta facility in Quebec. This option has several potential risks/issues related to trucking, capacity, transport time and costs. The estimated annual program cost (to HRM and the facility operators) of sending all organic composting facility wastewater to Quebec increases from approximately \$1.4M (with previous combination of using HWC facilities and Quebec) to approximately \$3M. An estimated program cost increase of \$1.6M per year.

HRM organic composting facility operators and local industry stakeholders are examining and testing alternative local treatment methods. This ongoing assessment process is at the sample analysis stage but has yet to be proven viable. Staff and HRM's operating partners are actively seeking additional alternatives and ways to minimize the generation of bio-filter water. Unfortunately, options for organic wastewater treatment processing capability are extremely limited in the Atlantic Provinces. However, one of the compost facility operators (New Era) has been able to use a facility in northern New Brunswick beginning in the fall of 2012 which has achieved savings over the Quebec facility option. This northern New Brunswick option has similar potential risks/issues as the Quebec option including trucking, capacity and transport time.

This escalating program cost issue generated a review of wastewater treatment alternatives. One alternative which became obvious was the Regional leachate treatment facility located within HRM at the closed Highway 101 Landfill site. The Highway 101 landfill site received the

Region's solid waste from around 1977 until it closed to solid waste disposal operations in 1996. The leachate treatment facility was built to process leachate generated at the site while it was in operation and continues to process leachate from the closed Highway 101 landfill site; however, the plant is operating well below its treatment capacity.

Following the AIS Debert operational change in the fall of 2010, HRM commissioned a follow-up consultant report (by CBCL Ltd.) to an earlier report completed in 2000 to verify the Highway 101 leachate treatment plant's ability to process external organic leachate and BFW from HRM's composting plants. The updated report, completed in spring 2011, confirms the leachate treatment facility at the Highway 101 landfill site is more than capable of processing all of HRM's composting facility organic wastewater.

Upon confirmation of the plant's ability to support external leachate processing, HRM reviewed the permitting options with Nova Scotia Environment (NSE). NSE has indicated that following public consultation and Regional Council approval, based on the CBCL updated report findings, a permit to receive external leachate would be obtainable.

Should Regional Council decide to approve the use of the Regional treatment facility for external organics leachate processing, it is anticipated that an RFP would be developed for the operation of the treatment plant on behalf of HRM. There exists a number of firms who could provide this service at competitive market pricing.

DISCUSSION

The Highway 101 site approval from NSE will have to be modified to allow for treatment of external organic wastewater at the leachate treatment facility. The basis of the application for modification will include the review report and analysis conducted by the consultant that concludes the leachate treatment facility is more than capable of treating external leachate.

As noted, the estimated annual program cost (to HRM and the facility operators) of sending all of the composting facility wastewater to Quebec would be approximately \$3M. HRM has operating agreements with the two composting facility operators that set out the operating fee per tonne to be paid for receipt of source-separated organics (current operating agreements are for the period April 1, 2009 to March 31, 2014). HRM's operating fee per tonne payment includes all of the cost of wastewater transport and treatment in the case of the Miller agreement and a portion of the cost of wastewater transport and treatment in the case of the New Era agreement. Miller is responsible for all wastewater costs in the current pricing agreement with HRM that expires March, 2014. The confirmation of a processing capability under HRM control is considered a significant factor in addressing escalating costs for compost processing on the future Miller price agreement.

In HRM's agreement with New Era, the actual annual cost of wastewater transport and treatment is reconciled with the base portion of the annual operating fee paid by HRM that is allotted to wastewater transport and treatment. However, again, the existence of a processing capability under HRM control will play a significant role in reducing risk in terms of processing cost analysis and the future negotiated price agreements with both compost processing operators.

The estimated additional annual cost to HRM of all of New Era's leachate being transported and treated in Quebec (rather than at Aerotech and Mill Cove) is \$882,000. The estimated additional annual cost to HRM of all of New Era's leachate being transported and treated in northern New Brunswick (rather than at Aerotech and Mill Cove) is \$174,000.

The estimated annual program cost for transporting and treating all compost wastewater (both Miller and New Era) at the Highway 101 leachate treatment plant is approximately \$222,000. This cost is derived from current operating costs of the leachate treatment plant with the consultant estimating the small incremental increase in operational costs due to receipt of external organic wastewaters plus transportation costs to the site from the compost plants.

HRM would recoup these incremental costs for treatment from New Era and Miller and also receive any savings from the portion of New Era's operating fee that is for transport and treatment of leachate and BFW should the Highway 101 leachate plant be made available. The net estimated result to HRM is savings ranging from \$388,000 to \$1.096M annually (i.e. range of \$174,000 (northern NB) to \$882,000 (Quebec) saved by not transporting and treating New Era leachate in these locations, recoup of incremental leachate treatment plant costs of approximately \$8,000 from the composting facility operators and savings of \$206,000 on the portion of New Era's operating fee that is designated for wastewater).

The savings range estimates are for a comparison of the expected costs of two compost wastewater treatment option scenarios outside HRM to the use of the Highway 101 Leachate Treatment Facility for compost wastewater.

See Table A – HRM Composting Facility Wastewater Treatment Options below.

Table A – HRM Composting Facility Wastewater Treatment Options

	Annual Volume	Previous		Option #1		Option #2		Option #3		Option #3	Option #3
	Estimate (litres)	Treatment Estimate	Site	Estimate (Quebec)	Site	Estimate (Quebec & NB)		Estimate (Hwy 101)	Site	Treatment Portion	Transport Portion
Biofilter Water											
Miller	2,300,000	\$138,239.58	Aerotech	\$830,300.00	Quebec	\$830,300.00	Quebec	\$65,743.58	Hwy 101	\$2,254.00	\$63,489.58
New Era	1,834,000	\$87,298.40	Aerotech	\$662,074.00	Quebec	\$345,021.25	NB	\$46,684.47	Hwy 101	\$1,797.32	\$44,887.15
(inc. Surface water)											
Leachate											
Miller	1,800,000	\$649,800.00	Quebec	\$649,800.00	Quebec	\$649,800.00	Quebec	\$51,451.50	Hwy 101	\$1,764.00	\$49,687.50
New Era	2,262,000	\$509,289.30	Mill Cove	\$816,582.00	Quebec	\$425,538.75	NB	\$57,579.21	Hwy 101	\$2,216.76	\$55,362.45
Total	8,196,000	\$1,384,627.28		\$2,958,756.00		\$2,250,660.00		\$221,458.76		\$8,032.08	\$213,426.68
	New Era Cost	\$596,587.70	New Era Cost (Quebec)	\$1,478,656.00	New Era Cost (NB)	\$770,560.00		\$104,263.68			
	HRM additional portion of New Era Cost	\$286,587.70	HRM additional portion of New Era Cost	\$1,168,656.00	HRM additional portion of New Era Cost	\$460,560.00		-\$205,736.32			
			Difference for HRM (New Era)	\$882,068.30	Difference for HRM (New Era)	\$173,972.30					
			HRM Total Savings (Est.)	\$1,095,836.70	HRM Total Savings (Est.)	\$387,740.70					
Notes:											

(1) Estimates based on information about volumes, haulage rates, loading and unloading times, travel times and treatment charges received from the two composting facilities, Halifax Water, other receiving facilities and CBCL estimates, as applicable. The volume of waste water from composting facilities can vary considerably year to year.

(2) Aerotech (Halifax Water) has advised that biofilter water can no longer be received effective April 16, 2012. Mill Cove Waste Water Treatment facility (Halifax Water) has advised that leachate can no longer be accepted effective June 25, 2012.

(3) Quebec option estimates shown here are for facility(s) sourced through NewAlta. EnviroSystems (AIS) may also have treatment options.

(4) Highway 101 Leachate Treatment Plant option estimates shown here based on information from report "Utilization of External Substrates for Enhanced Gas Production at the Highway 101 Landfill Site" dated April 2011 prepared by CBCL Ltd. for HRM.

Table B below shows the actual annual cost for organic wastewater transport and treatment at the New Era Facility over the past three years.

Table B – Wastewater Total Costs (New Era)

Fiscal Year	Wastewater Total Cost (including net HST)
2010/11	\$482,544
2011/12	\$860,414
2012/13	\$843,882

In order to support processing of external organic wastewater, the site may require some infrastructure in terms of an unloading station and possibly a holding tank to receive the organic wastewater. The intent of this infrastructure would be to manage and control the introduction of the organic wastewater into the Regional leachate treatment plant system. Based on the system assessment, the consultant determined that the most appropriate method of receiving and processing the external organic wastewater is to have it unloaded through the existing leachate collection system and conveyed to the leachate processing plant through this existing piping network.

The capital project budget has available resources to implement the appropriate design and infrastructure upgrades at the site to support this new operation within account CWU01064. The estimated cost for this design and infrastructure is on the order of \$100,000. HRM would enter into receiving agreements with the two composting facility operators to receive the BFW and organic leachate at the Regional leachate treatment plant and recoup the incremental cost for treatment.

Regional Council would need to approve use of the Regional leachate treatment facility for external organics composting facility wastewater. Based on the closure approval issued by NSE, community consultation would be required in order to inform a recommendation for Regional Council approval. An amendment to the site's Approval from NSE is required to facilitate acceptance of offsite organic wastewater. Based on the small number of tanker trucks this would involve, traffic and access to the site from Highway 101 is not anticipated to be an issue.

As noted above, there are currently limited identifiable alternatives for processing organic wastewater within Atlantic Canada and Quebec. However, as noted, there are a couple of potential alternative options in development through local stakeholders which are currently not operational. The recent requirement for transportation of organics wastewater to processing sites in northern New Brunswick and Quebec impose a significant increase to the solid waste resources operating budget.

The "in-house" treatment solution for organic facility wastewater using the Highway 101 Leachate Treatment facility more fully utilizes a Regional asset that has the capacity while removing significant program risks associated with external treatment options including trucking, capacity, transport time and associated costs.

Of note, based on the analysis in the Stantec Strategy Review Report, introduction of an anaerobic digestion (AD) technology for some portion of commercial organics could reduce the concentration and amount of organic wastewater generated from the existing two composting facility operations.

IMPACT/BENEFITS

The consultant report (by CBCL Ltd.) reviewed the quantity and quality of leachate and bio-filter water generated at HRM's two composting facilities (and at the Otter Lake Facilities) and analysed the receipt and processing of this wastewater by the Regional leachate treatment facility at the closed Highway 101 landfill and its receiving stream. The report concluded that:

- the Regional leachate treatment facility has more than enough capacity to treat the predicted external organic leachate and bio-filter water loads without any detrimental environmental impacts;
- the introduction and treatment of this external wastewater will increase the current treated wastewater Biological Oxygen Demand (BOD) concentrations a small amount (i.e. from 4 mg/L to 5 mg/L) but will not cause treated wastewater BOD concentrations to approach levels present prior to the closure of the Highway 101 Landfill;
- treated effluent concentration limits can be set and managed for the receiving stream that do not cause typical effluent stream quality levels to increase above the CCME Guidelines for Freshwater Aquatic Life; and,
- the addition of external organic wastewater does not degrade treated wastewater quality from the leachate treatment facility such that it would have any detrimental environmental impact or effect on the receiving stream.

Table C below shows the Design Capacity of the Regional Leachate Treatment Plant in comparison to the Influent Loads prior to landfill closure, current loading (2010/11) and loading with the addition of external organic wastewaters.

Table C – Leachate Treatment Plant Influent Loads

Parameter	Average Load (1996 - prior to Closure)	Current Loading (2010/11)	Loading with the Proposed External Wastewaters	Leachate Plant Design Capacity
Influent Flow (L/s)	4.2	4.5	6.8	4 – 12
Influent BOD Load (kg/d)	1780	5	43	2600
Influent Ammonia Load (kg/d)	80	21	38	120

Of note: the above table includes load volumes that are well above anticipated operational volumes which would result from a decision to use the leachate plant to process external waste water from the two HRM compost plants. The reason is that leachate from HRM's landfill at Otter Lake is included in the load analysis. However, Otter Lake landfill leachate is currently not contemplated to be sent to the Highway 101 site.

The content and analysis of this updated consultant report was assessed by HWC staff, HRM staff and submitted to NSE staff for review. Based on laboratory and staff analysis and system assessments, the data confirms that the Regional Leachate Plant is more than capable of processing all of HRM's organic leachate and BFW with no detrimental operational or environmental effects. The use of the Highway 101 Regional Leachate Treatment plant, a regional asset, would also significantly reduce current solid waste resource program operating costs.

There is an additional benefit in terms of environmental stewardship which can be realised through this proposal. As part of the consultant's review, HRM also had the consultant

undertake an analysis of the potential to boost captured landfill gas production at the site. The report findings confirmed that if external wastewater were to be introduced into the capped second generation lined landfill cell (these are the second generation cells developed at the site which were built with a modern cell liner and leachate management system) section, the added saturation of the residual waste materials would boost decomposition and the corresponding production of captured landfill gas. This boost in captured landfill gas production, which is captured through gas extraction wells and piping systems, would result in a corresponding increase to the existing onsite energy from waste electricity production project. This outcome supports the environment in two ways; it boosts gas production which is in turn used to create green electricity. Second, it speeds up the decomposition process reducing the time HRM will have to deal with landfill gases and allow the site to be returned to other purposes.

HRM has an existing agreement with Highland Energy for the production of electricity generated from landfill gas which is then sold into the Nova Scotia Power grid. HRM shares in the revenues from this project. An increase in landfill gas production would therefore result in additional revenues from the increased electricity production. This would result in further reducing net program costs.

FINANCIAL IMPLICATIONS

The annual financial implications of handling the two composting facilities wastewater at the Highway 101 Regional Leachate Treatment Facility rather than transporting and treating this wastewater at facility(s) external to Atlantic Canada was expected to be approximately \$1M/year. These savings were incorporated into the 2013/14 Solid Waste Resources operating budget. The northern New Brunswick facility that New Era identified in the fall of 2012 reduces the increased wastewater costs for HRM somewhat but annual savings in the order of \$388,000 are still achieved by changing to treatment of the compost wastewater through utilization of the Highway 101 Leachate facility.

COMMUNITY ENGAGEMENT

In the interest of providing Regional Council feedback from residents and stakeholder groups a community outreach presentation to explain this proposal and obtain feedback would be undertaken. It is expected that one to two public meetings would be held in the local community with a brief presentation regarding the capability and capacity of the Regional Leachate Treatment Facility to handle external organic wastewater.

ENVIRONMENTAL IMPLICATIONS

- The Leachate Treatment Facility has more than enough capability and capacity to effectively treat all HRM offsite wastewater.
- This operational change would reduce greenhouse gas emissions resulting from the difference in distance of transporting wastewater to Quebec and northern New Brunswick in

comparison to locally from the two compost facilities to the Highway 101 Leachate Treatment Facility.

- The addition of external wastewater to the closed final two landfill cells at the Highway 101 site is expected to increase green energy production from the landfill gas to energy project currently operating at the site.
- The Regional leachate treatment facility has more than enough capacity to treat the predicted external organic leachate and bio-filter water loads without any detrimental environmental impacts.

ALTERNATIVES

Council could decide to not seek to utilize the Regional Leachate Treatment Facility for compost wastewater. This alternative is not recommended as the Regional Leachate Treatment Facility is currently underutilized and there are potential savings ranging from \$388,000 to approximately \$1M per year with no identifiable environmental risk from utilizing this facility as outlined above.

ATTACHMENTS

Table A - HRM Composting Facility Waste Water Treatment Options

A copy of this report can be obtained online at <http://www.halifax.ca/commcoun/cc.html> then choose the appropriate Community Council and meeting date, or by contacting the Office of the Municipal Clerk at 490-4210, or Fax 490-4208.

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