

Biosolids Disposal Assessment

**.....and a recommendation
on what to do next**

Existing Situation

- **67,770 megalitres (15 billion gallons) treated**
- **17,000 dry tonnes removed**
- **0.025% in sewage to 26% solids in sludge**
- **Incinerated without natural gas supplement**
- **Ash to landfill**
- **Some heat recovery for plant buildings**
- **Capacity for 20 years**
- **50% of sludge in Ontario**

Performance Comparison

- Cost /megalitre treated – **at median**
- Odour complaints /1000 pop. – **at median**
- Energy consumption – **at median**
- Sludge disposal cost / DT – **below the median**
- Water quality – **1/3 of median**

Before improvements due to recent work

Recent Improvements

- \$12 million
- Dewatering system performance – no NG
- Save \$700,000/yr
- Odours contained inside equipment
- Staff reduced by 7



Organic Rankine Cycle (ORC) engine

- generate up to 600kW / yr
- \$633,000 annually (vs. \$300,000 by digestion / biogas)
- 35% reduction in sludge management operating costs
- \$7.5 M - 10 year payback
- Possible \$1M grant
- TSSA – favourable interpretation or changes to regulations re: operator license
- BC, Nova Scotia, Europe

Optimistic

Pessimistic

Options

Anaerobic Digestion - Dewatering - Incineration

Dewatering - Anaerobic Digestion - Land Application

Dewatering - Lystek (proprietary) - Land Application

Dewatering - Sludge Drying - Beneficial Use

N-Viro - Land Application

Economic

**20 year NPV
/DT**

Environmental

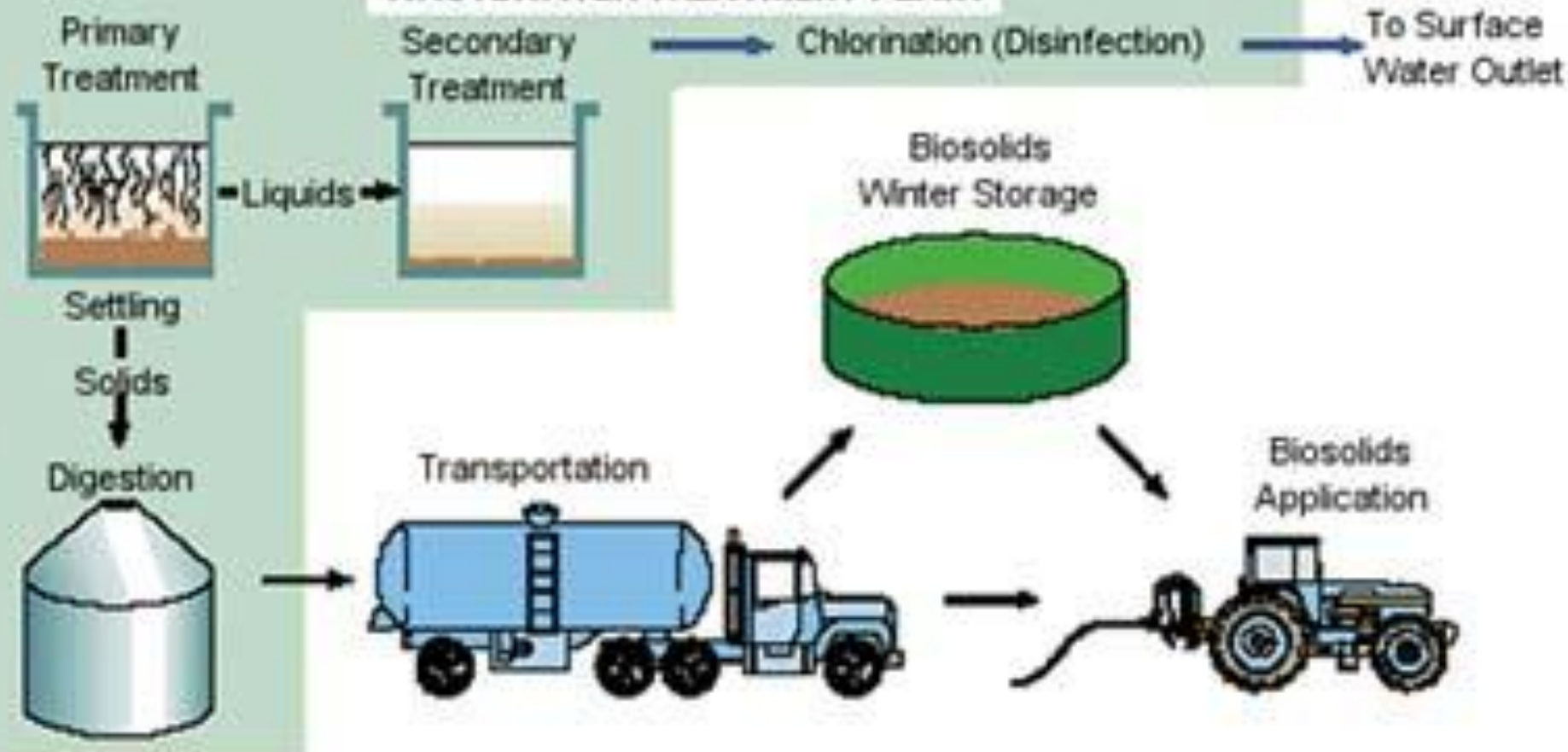
**equivalent
tonnes of CO₂**

Social

**haulage, odour,
land, beneficial use**



WASTEWATER TREATMENT PLANT



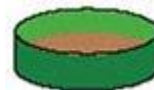
Existing



Option 1



Option 2



Option 3



Option 4



Option 5







Cost	Present Value Cost / Dry Tonne (based on 18,250 DT/yr	Annual Cost in Millions	Effect on Sewer Rate
Base (Dewatering-Incineration)	\$88	\$1.6	0.0%
Base plus ORC engine - optimistic	Lower than the Base	Lower than the Base	same
Base plus ORC engine – pessimistic	same	same	same
Alternatives:			
1. Anaerobic Digestion- Dewatering-Incineration	\$294	\$5.4	4.7%
2. Dewatering-Anaerobic Digestion- Land Application	\$289	\$5.3	4.6%
3. Dewatering-Lystek-Land Application	\$207	\$3.8	2.6%
4. Dewatering-Sludge Drying- Beneficial Use	\$249	\$4.5	3.5%
5. N-Viro-Land Application	\$358	\$6.5	6.2%

Major Cost Factors

- Tanks – digestion and storage
- Equipment / mechanical / electrical
- Trucking
- Equipment operating – energy

Land not included

Environmental	CO ₂ Emissions In tonnes per year
Base Dewatering-Incineration	987
Base plus ORC engine - optimistic	Much lower than the Base
Base plus ORC engine - pessimistic	Much lower than the Base
Alternatives:	
1. Anaerobic Digestion-Dewatering-Incineration	5817
2. Dewatering-Anaerobic Digestion-Land Application	-5074
3. Dewatering-Lystek-Land Application	-4302
4. Dewatering-Sludge Drying-Beneficial Use	6815
5. N-Viro-Land Application	-10971

Social	Hauling (1000 m3/day)	Potential for Odour Increase	Long Term Storage Required	Beneficial Use
Base Dewatering-Incineration	155.8	low	no	n/a
Base plus ORC engine - optimistic	same	same	same	Much better than the Base
Base plus ORC engine - pessimistic	same	same	same	Much better than the Base
Alternatives:				
1. Anaerobic Digestion- Dewatering-Incineration	977.9	med	no	n/a (A)
2. Dewatering-Anaerobic Digestion-Land Application	1818.8	high	yes	B
3. Dewatering-Lystek-Land Application	285	low	yes	A
4. Dewatering-Sludge Drying- Beneficial Use	253.8	med	yes	A
5. N-Viro-Land Application	321.7	med	yes	A

London System -- Summary

- **Lowest cost by a factor of $1/4 - 1/2$**
 - **No new capital – 20 year capacity**
 - **Lowest operating**
 - **Lowest hauling**

London System -- Summary

- **Environmental**
 - **4th out of 6 for CO₂ emissions**
 - **Could be much better with ORC**
- **Social**
 - **Least hauling**
 - **Lowest odour potential**
 - **No storage / another processing site**
 - **Little beneficial use - Could be much better with ORC**

Alternatives

- **2 – 4 Xs more costly**
 - **New tanks, buildings**
 - **Land not included**
 - **Equipment operating costs**
 - **Some off-setting revenue**

Alternatives

- **Environmental**

- **Some - More emissions – energy use**
- **Some - Less emissions – beneficial use**

- **Social**

- **Most better -- beneficial end product**
- **Worse for land use**
- **Worse for odour**
- **Worse for hauling**

Recommendations

Pursue significant increases in the Cost, Environmental and Social factors associated with London's Biosolids Management System through power generation from waste incinerator heat.

Specifically, direct the Civic Administration to report back on a strategy to implement an ORC Engine project at Greenway Pollution Control Plant.