



## **Wastewater Collection and Treatment Options for the Residences along the Henderson Highway Catchment area in the R.M. of St. Clements**

### **1. Background**

- The residences along the Henderson Highway (HH) utilize groundwater for domestic water supply and septic fields for disposal of wastewater.
- The soils in the area is not suitable for a septic field, especially in the small sized lots (under 1 acre) that exist. This leads to a situation called “breakouts”, where the wastewater leaches into the groundwater and in the adjacent ditches.
- In 2009, Manitoba enacted new regulations for on-property (private) septic fields. These regulations do not allow any new septic field system to be constructed along the Red River corridor, irrespective of the lot size. For other areas, subject to soil suitability, a minimum lot size of 2 acres is required for constructing a septic field disposal system.
- Most of the homes in the HH corridor have been “grandfathered” in. However, should these fields fail, the homeowner is not allowed to re-construct a new septic field. They must either install a holding tank (for pump-outs) or connect to a municipal sewer (piped) system.
- Province of Manitoba expressed concerns high levels of fecal coliform in the groundwater in the area known as Old River Road (ORR). It was suspected that the cause of the high fecal coliform levels may have been due to leaching of septic field wastewater into the groundwater.
- This led to the Province issuing a Public Health Order against the R.M. of St. Clements (St. Clements or the Municipality), indicating that a municipal sewer system be built to serve the residences in the ORR.
- St Clements in partnership with the RM of East St Paul (ESP) was successful in receiving a notional grant of \$4.0 M, which would have the homes in ORR connected to the ESP wastewater treatment plant. However this option, to be cost effective, required homes in ESP along HH to be connected as well. The homes in ESP declined to participate in the proposal and St Clements was able to re-profile the funding, whereby the ORR area would be connected by a piped low pressure sewer system to the existing Lockport wastewater treatment plant.
- A sewer system along HH was completed in 2015. However due to capacity limitations, only the homes in the ORR were allowed to be connected to the existing Lockport Wastewater treatment plant (LWWTP).

- For the remaining homes in the HH catchment area, the LWWTP needs to be expanded.
- The HH catchment area is defined as all of the land from Lockport to the St Clements' southern border, from the Red River in the west to the floodway in the east. With federal/ provincial funding from the Build Canada Fund (BCF) sewer mains were installed in all of the streets west of the CEMR rail lines. In addition, sewer service lines with curb stops were installed to all of the homes in the ORR area.
- Based on the costs for the sewer system in the HH catchment area, a sewer levy study was completed in 2014. Based on the study, the Municipal council established a connection cost of \$ 12,700 per home that is to be paid when connections are made. The homes in the ORR paid for the connection fee (\$12.7 K) through a borrowing by-law.
- A separate study completed in 2014, estimated the costs for expanding the LWWTP at its current location to be \$6.5 M (Class "D" estimate).
- Within the past 6 years, due to similar concerns about the degradation of the groundwater in the community of East Selkirk, St. Clements, with assistance from senior governments, installed a complete water and sewer system in East Selkirk, with a lagoon for wastewater treatment. The system is now connected to about 280 homes, but has a capacity of connecting a total of 750 homes.

## 2. Current Status

- At the present time, only the 60+ homes in the ORR are allowed to be connected to the LWWTP. In order for the remaining homes in the HH catchment to be connected, the LWWTP expansion needs to occur.
- Three years ago, the City of Winnipeg (COW) entered into an agreement with the R.M. of West St Paul (WSP) to connect the residences in WSP to the COW's North End wastewater Treatment Plant (NEWWTP) located along Main Street (PTH # 9).
- With financial assistance from the Manitoba Water Services Board (MWSB), the gravity sewer mains from COW to WSP were oversized to accommodate the residential developments in the RM of St. Andrews (St A) north along PTH 9. MWSB is presently project managing the 2<sup>nd</sup> phase of this project, which would extend the sewer mains from Rivercrest in WSP, to a lift station on River Road in St. A, south of the junctions of PTHs 9 and 27.
- Over the past 2 years, St Clements has made applications for financial assistance from MWSB for completing the sewer system and expanding the LWWTP for the homes in HH catchment area.



- In response, MWSB has indicated that St Clements may wish to consider connecting to the St. A sewer system.
- St A and MWSB have indicated that there is additional capacity within the main trunk sewer main from COW to accommodate 1300 homes in St Clements to be connected. This could be achieved by extending a forcemain from the River Road lift station in St. A to the Donald lift station in St Clements. A portion of the forcemain would be twinned and tunneled under the Red River.
- A study was recently completed by Stantec (for MWSB), with 50% grants from MWSB, to look at the feasibility of accepting St Clements wastewater by St A sewer system, with class “D” cost estimates.

### 3. Scope of the Report

With the completion of the Stantec study to possibly connect the HH area to St. A sewer system, the St Clements Council may wish to compare the cost benefits with 4 other options for developing a sustainable sewer system for servicing the HH catchment area homes. The scope of this report is conceptual in nature and meant to provide the St Clements Council with the pros and cons of each of the options available, with at best a Class “E” (desk top) cost estimate for developing a long term solution for servicing the HH catchment area.

The HH catchment consists of 2 distinct areas, west of the railway line along HH and east of the railway line to Birds Hill Road (PR 202). From earlier planning and technical reports, for conceptual purposes, the current and future residential density in the 2 areas have been assumed as follows:

Areas	Existing Residences	Future Residences	Total Residences
West of CEMR	600	400	1,000
East of CEMR	300	700	1,000
<b>Total Homes</b>	<b>900</b>	<b>1,100</b>	<b>2,000</b>

To put the potential developments of the HH catchment area in perspective, this area, if fully developed, could have 2.6 times more residences than the community of East Selkirk. This may be a reasonable assumption, due to the close proximity to COW. The area along HH, north of Lockport, to East Selkirk has not been included in any of the options considered.

#### 4. Wastewater Collection and treatment Options

Between 2013 and 2015 low pressure sewers were installed in the HH catchment system, west of the CEMR railway line. Only the homes from ORR were permitted to be connected to this sewer system. Although the low pressure sewers were installed in the other streets within this catchment area, sewer services were installed in ORR area only. This report compares 5 potential options available to St Clements for developing a sustainable wastewater management plan for the HH catchment area, with 2,000 homes.

For all options, some assumptions have been made, as follows:

- All costs have been estimated for 2016 dollars.
- A 3% per year cost increase has been allocated to 2014 costs for comparison purposes.
- For options wherein the HH area is to be connected to either the St. A or ESP, it is assumed that agreements can be reached with COW, WSP, St. A and ESP.
- If connections are made in a trickle fashion over 5 years, a double forcemain may be required for some of the options. Cost of installing a double forcemain is assumed to be 130% more than the cost for a single forcemain.
- Henderson Highway is a provincial highway (PR). To keep traffic inconveniences to a minimum and cost efficiencies, it would be preferable to connect the homes along HH all at once, rather than in a trickle fashion.

The wastewater collection and treatment options being considered in this report are as follows:

##### 4.1 Expansion of Lockport WWTP

A functional design report completed in 2014, estimated the cost of building a new wastewater treatment plant adjacent to the existing Lockport WWTP, for the 2000 homes in the HH catchment area to be \$6.5 M in 2014 dollars.

The main downside to this option is that St Clements would need to operate a Class 3 WWTP, requiring full time operators. The WWTP is also located in a developed area, which may give rise to some opposition from the area residents. However, it should also be kept in mind that an undersized wastewater treatment plant already exists within the developed area, without much concerns being expressed. MB Environmental Approvals Branch, would consider that the existing plant has been in operation at the current location for almost 25 years.

The projected capital cost estimate for this option:

- |                                     |                 |
|-------------------------------------|-----------------|
| • WWTP expansion (2014)             | \$ 6.5 M        |
| <b>Total (2016) estimated costs</b> | <b>\$ 6.9 M</b> |

#### 4.2 Build a new lagoon in the Lockport Industrial Park

In reviewing the surrounding lands within the Lockport area, there appears to be about 300 acres of land available in the industrial park, east of the floodway. Because of provincial “buffer” requirements around lagoons, it will not be possible to construct a wetland to reduce nutrients, within the available lands. Nutrients will be reduced by physical/ chemical process using alum, similar to the process in East Selkirk.

This option will require:

- the Lockport WWTP to be de-commissioned
- Upgrade the Lockport lift station
- Construct a forcemain to the site
- Build a new outfall line to the Red River floodway.
- Construct a lagoon, with physical/ chemical process for nutrient reduction.
- HH area has a potential to connect 2,000 homes, which is 260% more than the ES lagoon capacity. A 200% higher cost has been assumed for the new Lockport lagoon in 2014 costs, to the ES lagoon costs.

The estimated costs for this option:

- |   |                |
|---|----------------|
| • Upgrade Lockport lift station               | \$ 0.3 M       |
| • Decommission LWWTP                          | \$ 0.5 M       |
| • Forcemain                                   | \$ 0.5 M       |
| • New lagoon, with an outfall to the floodway | \$ 7.7 M       |
| • Land costs                                  | \$ 0.5 M       |
| <b>Total estimated (2016) cost</b>            | <b>\$9.5 M</b> |

#### 4.3 Connect to St. Andrews System

This option as presented in the recently completed Stantec study, includes upgrades to the Donald (St Clements) and river Road (St A) lift stations and a forcemain to connect the two. The wastewater would be pumped from the River Road lift station

in ST A to a lift station/ manhole in Rivercrest in WSP. From Rivercrest, the combined flows from St Clements, St A and WSP would flow through a gravity sewer system to a manhole on Main Street in Winnipeg. From the manhole the combined flows would flow by gravity to the NE WWTP.

There are a number of limitations/ concerns/ issues with this option:

- Maximum number of homes that can be connected is 1,300. This would not allow most of the homes west of CEMR to be connected.
- Costs are subject to detailed geotechnical soil investigations to determine if tunneling would be possible under the Red River.
- Cost of forcemain from Donald LS to Rivercrest is estimated at \$ 2.3 M, or \$2.9 M with double forcemains (with 4 forcemains under Red River).
- Cost for upgrading River Road LS, with forcemain to Rivercrest ~ \$1. 8 M. (Actual costs may be lower due to MWSB grants).
- Each of the existing homes connected to the system will be required to pay \$2,350 (in 2016) to COW or \$1.4 M, as connection fees.
- Remaining 700 future homes will be required to pay \$5,510 as they connect, as fees to COW, or \$ 3.86 M.
- It is **not known** at this time whether St A and/ or WSP will impose an additional connection fee.
- In addition to the quarterly sewer service charges, COW will impose an annual participation charge of \$225 per home. It is not known if St A and WSP will have additional participation fees.
- Given that COW is expected to spend over \$5 to 10 billion dollars to expand the 3 sewage treatment plants to meet the nutrient reduction standards. The sewer service charges will likely increase substantially from the current charge of \$2.40 per m<sup>3</sup> plus administrative charges, due to these capital works.
- COW bases all of their billings on water meter readings. Therefore, St Clements will have to install water meters on all private wells, at the point where the water enters the house.
- St A is presently in the process of a public hearing process for the borrowing by-law required to construct the forcemain to the River Road lift station. The outcome of the by-law is not known at this time (large portion of the residents have indicated that they are not in favour of the proposal).

The main advantage of this option is that St Clements will not be required to treat the wastewater. Winnipeg includes a greater portion of the capital and all of the operating costs on the sewer charges, while St Clements in the past has put most of



the capital costs on at-large levies. Therefore, with impending expansion of the COW NEWWTP, the sewer charges for this option likely be considerably higher than for any of the other options.

The capital costs for 1,300 connections:

• Forcemain and Lift station Upgrades	\$ 3.9 M
• Main trunk main share	\$ 1.8 M
• Water meters	\$ 0.4 M
<b>Total estimated Capital costs (2016)</b>	<b>\$ 6.1 M</b>

Additional connection fees which are the home owner direct costs:

• Connection fees for 600 homes	\$ 1.41 M
• Connection fees for 700 future homes	\$ 3.86 M
<b>Total fees in 2016 dollars</b>	<b>\$ 5.27 M</b>

#### 4.4 Connect to East St. Paul System

In this option, all of the wastewater from the 1,300 homes in the HH catchment area would be pumped from the Donald lift station (St Clements) to the ESP wastewater treatment plant. The proposed forcemain (7.5 km) from Donald lift station to ESP WWTP would be installed within the CEMR right-of-way, as opposed to Henderson Highway, to reduce capital costs. St Clements would be expected to pay 100% of the cost of5 expanding the ESP WWTP, i.e. adding another SBR basin. It is not known whether ESP will have an annual participation fee, similar to the one charged by COW.

The Capital cost for 1,300 connections:

• Forcemain from Donald to ESP WWTP	\$ 4.6 M
• Water meters	\$ 0.4 M
• Decommission LWWTP	\$ 0.5 M
<b>Total estimated capital costs (2016)</b>	<b>\$ 5.5 M</b>

Additional connection costs, that the homeowners would be required to pay:

• <b>Connection costs to ESP ( \$6,000 x 1,300)</b>	<b>\$ 7.8 M</b>
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Preliminary indication is that the ESP WWTP can accommodate approximately 400 homes currently, without any expansion. For expansion to accommodate additional 900 (1,000 less 400) homes, it is estimated cost \$ 9.0 M for an additional SBR basin. Initial discussions with ESP indicates that they will charge connection fees only, not



the cost for expanding the ESP WWTP. As well, St Clements will likely pay towards the operation and maintenance of the forcemain.

#### 4.5 Connect to East Selkirk lagoons, with expansion and wetland tertiary treatment

The Donald/ Lockport lift stations would pump wastewater north, through a forcemain, via CEMR right-of-way to an expanded East Selkirk lagoon and wetland system. The current lagoon in East Selkirk was designed for about 750 homes. To accommodate 2,000 more homes, the lagoon would need to be expanded by 260% in size/ volume. A recent estimate from La Broquerie, for a constructed wetland for 3,000 homes was used to estimate the estimated costs for the wetlands. The wetlands would be constructed by Native Plants Solutions (a wholly owned Ducks Unlimited company). The estimates shown below does not include either the land purchase, which would be subject to soil tests to determine suitability.

The existing lagoon has an excess capacity to accept wastewater from 400+ homes, without an expansion. Therefore, it is possible to accept the current wastewater from Lockport, including ORR, for a limited time, before an expansion is required. To accommodate such a staging of works, the costs have been broken into 2 phases.

The capital cost estimates in 2016 for the East Selkirk option:

Phase 1:

• Forcemain from Lockport	\$ 2.6 M
• Upgrades to Donald & Lockport LSs	\$ 1.0 M
• LWTP decommissioning	\$ 0.5 M
<b>Total Phase 1 costs</b>	<b>\$ 4.1 M</b>

Phase 2:

• Lagoon expansion	\$ 7.0 M
• Land costs	\$ 0.5 M
• Wetlands	\$ 1.2 M
<b>Total estimated (2016) capital costs</b>	<b>\$ 8.7 M</b>

The main advantages of this option are:

- St Clements currently operates a lagoon and so staff are familiar with operation.
- Lagoon has excess capacity to accommodate about 400 homes from Lockport, without an expansion. Thus the phase 2 can be delayed until the demand for service in the HH catchment.

- Requires much less manpower and hydro power to operate the system. Thus a reduction in sewer charges.
- Lower operator class than for a mechanical system.
- The location is ideal for PW staff, with improved efficiencies in the operation of the system.
- The Lockport WWTP would be converted to a lift station only, requiring much less on site personnel time.

### 5. Summary of costs for each Option

Option	Capital Costs (2016)	Development Fees & other non- shareable costs	Other Issues
1. Lockport WWTP expansion	\$ 6.9 M		<ul style="list-style-type: none"> <li>- Potential grants \$4.6 M</li> <li>- Mun. Costs \$2.3M</li> </ul>
2. Lockport Ind. Park Lagoon	\$ 9.5 M		<ul style="list-style-type: none"> <li>- Decom LWWTP</li> <li>- Pot. Grants \$5.7M</li> <li>- Mun.costs \$3.8M</li> </ul>
3. St Andrews (including West St. Paul and City of Winnipeg)	\$ 6.1 M	\$5.27 M	<ul style="list-style-type: none"> <li>- Annual Participation fees</li> <li>- Treatment not required in St C</li> <li>- Decom existing LWWTP</li> <li>- Agreements with COW, WSP &amp; St A</li> <li>- Pot. Grants \$4.0M</li> <li>- Mun. Costs \$7.27M</li> </ul>
4. East St. Paul WWTP	\$ 5.5 M	\$7.8 M	<ul style="list-style-type: none"> <li>- Agreement with ESP</li> <li>- Treatment not required in St C</li> <li>- Decom existing LWWTP</li> </ul>

			<ul style="list-style-type: none"> <li>- Pot grants \$3.7 M</li> <li>- Mun. Costs \$9.6M</li> </ul>
5. East Selkirk lagoon and wetlands	<ul style="list-style-type: none"> <li>\$4.1 M for phase 1</li> <li>\$8.7 for phase 2</li> </ul>		<ul style="list-style-type: none"> <li>- All treatment central</li> <li>- Operational efficiencies.</li> <li>- Lower power requirements.</li> <li>- Decom existing LWWTP</li> <li>- Pot. Grants \$7.9M</li> <li>- Mun. Costs \$4.9M</li> </ul>

## 6. Preferred Option

To assist with selecting a preferred option, a rating matrix has been prepared (next page) with rating criteria and sub-criteria. Weights (1 to 5) have been assigned for the variables for each of the options. The points are added up to arrive at a preferred option. This is by means an objective method for choosing a preferred option, but gives some guidance to the Council for making the final decision.

Weights have been assigned as 5 being the best preferred criteria and 1 for the least preferred criteria. For option 3, an assumption is made that the Municipal Board will approve the capital project in St Andrews. For rating capital costs, an assumption is made that the 2 senior governments will fully share (2/3<sup>rd</sup>) all eligible costs). A summary of sewer rates for each option is provided in Attachment 1.

Rating Criteria & Points	Option 1 LWWTP Expansion	Option 2 Lockport Lagoons	Option 3 Connect to St Andrews	Option 4 Connect to ESP	Option 5 Connect to E. Selkirk
<b>1. Costs</b>					
- Capital (2016)	4.5	4	2.5	3	4.5
- Utility rates	3	4	1	3	5
- Grants	4	4	5	5	5
- Non shareable	5	4	2	1	4

<b>Costs (20 points)</b>	<b>16.5</b>	<b>16</b>	<b>10.5</b>	<b>12</b>	<b>18.5</b>
<b>2. Hearings</b>					
- Borrowing	2	2	2	2	2
- LID	2	2	2	2	2
- Cond. Use	2	2	5	5	2
<b>Hearings (15)</b>	<b>6</b>	<b>6</b>	<b>9</b>	<b>9</b>	<b>6</b>
<b>3. Risks</b>					
- Partnerships	5	5	2	3	5
- Legislation	3	3	5	4	3
- Staff Capacity	1	3	5	5	3
- Rate increases	2	4	1	2	4
<b>Risks (20)</b>	<b>11</b>	<b>15</b>	<b>13</b>	<b>14</b>	<b>15</b>
<b>4. Environmental</b>					
- EAP	1	2	5	4	3
- Time line	1	2	5	4	3
- Feasibility study	5	3	2	4	3
<b>Environmental (15)</b>	<b>7</b>	<b>7</b>	<b>12</b>	<b>12</b>	<b>9</b>
<b>5. Other</b>					
- Serv. Capacity	5	5	3	5	5
- Const. time	3	2	5	3	3
<b>Other (10)</b>	<b>8</b>	<b>7</b>	<b>8</b>	<b>8</b>	<b>8</b>
<b>Total Rating (80 Points)</b>	<b>48.5</b>	<b>51</b>	<b>52.5</b>	<b>55</b>	<b>56.5</b>

The table below shows a comparison of costs for each option with timelines for the start of construction:

	<b>Option 1</b> Lockport WWTP Expansion	<b>Option 2</b> Lockport Lagoon	<b>Option 3</b> St. Andrews (COW/ WSP)	<b>Option 4</b> East St. Paul WWTP	<b>Option 5</b> East Selkirk Lagoons
<b>Initial Capital Costs</b>	\$6.9 M	\$9.5 M	\$6.1 M	\$5.5 M	\$4.1 M
<b>Future Costs</b> incl. Buy-in fees	None	None	\$5.27 M (grant in-eligible)	\$7.8 M (grant in-eligible)	\$8.7 M
<b>Service Charges</b> per Quarter	\$198.78 Per REU	\$100.00 Per REU (estimate)	\$238.25 Plus Regional	\$153.91 Plus pumping	\$36.90 Plus pumping

(based on 70 m <sup>3</sup> )			costs	costs	costs
<b>Rating summary (80 Total)</b>	48.5	51	52.5	51	56.5
<b>Ranking</b>	5	4	3	2	1 (best)
<b>Connection start date Outside ORR</b>	2022	2020	2018	2018	2020

## 7. Next Step(s)

Project Development Schedules (optimistic scenario):

- Select a preferred option
- If options 3 or 4, begin preliminary negotiations with neighbouring municipalities.
- Public open house to seek input
- Based on public responses, conduct a detailed feasibility study with soils investigations (Class C estimates).
- Apply for funding from the 2 senior governments.
- Subject to funding approvals from the 2 senior governments, develop cost sharing scenarios and develop by-laws.
- Complete functional design and Environment Act Proposal (EAP) to construct and operate the preferred option.
- If either option 3 or 4, begin negotiations for into long term agreements with neighboring municipalities.
- If either option 2 or 5, purchase land required for works, subject to soil suitability tests.
- If option 5, expansion can be delayed for 2-5 years. The time lapse allows for proper planning.
- Complete detailed design, tender construction contracts in late 2017.
- Begin construction in 2018 and commission the new/ expanded facility.

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## Attachment 1

### Sewer Rates for Options

Option	Sewer Rates
<b>Option 1:</b> LWWTP Expansion	<ul style="list-style-type: none"> <li>- Current minimum sewer rate is \$55.21 per quarter based on 15 m<sup>3</sup> or \$198.78 per quarter for REU based billings.</li> </ul>
<b>Option 2:</b> Lockport Lagoon	<ul style="list-style-type: none"> <li>- Assumes the rate will reduce by 50%.</li> <li>- Sewer rate per REU is \$100.00 per quarter</li> </ul>
<b>Option 3:</b> Join with St. Andrews, West St. Paul and City of Winnipeg	<ul style="list-style-type: none"> <li>- COW sewer rate \$ 2.40 per m<sup>3</sup> plus admin charges.</li> <li>- COW waste diversion cost of \$14.00 per quarter.</li> <li>- Sewer Participation cost of \$56.25 per quarter</li> <li>- Potential additional costs imposed by West St. Paul and St. Andrews for O &amp; M costs related to Regional sewer mains and lift station</li> <li>- Additional costs for operating 2 lift stations and forcemain</li> <li>- 3 municipalities may wish to consider creating a Regional co-op to operate the system north of Winnipeg.</li> <li>- Future COW costs for NEWWTP expansion to meet nutrient reduction standards are unknown</li> </ul>
<b>Option 4:</b> Join with East St. Paul	<ul style="list-style-type: none"> <li>- 2012 sewer rate \$2.05 per m<sup>3</sup>.</li> <li>- Minimum quarterly sewer charge \$39.11 (based on 14 m<sup>3</sup>)</li> <li>- Additional costs for operating lift stations and forcemain</li> </ul>
<b>Option 5:</b> Join with East Selkirk	<ul style="list-style-type: none"> <li>- Proposed Sewer rate \$0.47 per m<sup>3</sup> per quarter.</li> <li>- Minimum quarterly sewer charge \$10.59 (based on 14 m<sup>3</sup>)</li> </ul>

with a lagoon expansion and wetlands	- Additional O& M costs for 2 lift stations and forcemain (St C may wish to create one sewer utility).
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