SMOKY LAKE COUNTY

A G E N D A: County Council Meeting for the purpose of a
Utilities Meeting: Environment and Parks
to be held on
Tuesday, October 11, 2022 at 9:00 o'clock A.M.
Virtually through Zoom, Meeting ID: 893 2756 9106 Passcode: 581259
https://us02web.zoom.us/j/89327569106?pwd=cW56K0tXTDdmK0RyS282Sjh5QXZKZz09 And
with Council physically present in the County Council Chambers, Smoky Lake.
★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★

1. Meeting:

1.1 Call to Order.

2. Agenda:

Acceptance of Agenda:
as presented or
subject to additions or deletions

3. Minutes:

3.1. Adopt minutes of August 16, 2022– Utilities Meeting: Environmental Operations Meeting. ©

Recommendation: Motion to Adopt.

3.2 Utilities Meeting: August 16, 2022 Environmental Operations: **Action List.** ©

Recommendation: File for Information.

4. Request for Decision:

No Request for Decision.

5. Issues for Information:

5.1 Managers Report.

5.2 Evergreen Regional Waste Management Services Commission Meeting August 18, 2022. ©

5.3 Evergreen Regional Waste Management Services Commission Meeting September 15, 2022. ©

Recommendation: File for information.

6. Correspondence:

No Correspondence.

7. Delegation(s)
8. Executive Session:
9. Date and time of Next Meeting(s):
Adjournment

SMOKY LAKE COUNTY

Minutes of the County Council **Environmental Operations Meeting** (Water, Wastewater and Waste Management) held on Tuesday, **August 16, 2022,** at 3:14 P.M. held virtually online through Electronic Communication Technology: Zoom Meeting and in Council Chambers.

The meeting was called to Order by the Chairperson, Lorne Halisky, in the presence of the following persons:

		ATTENDANCE
Div. No.	Councillor(s)	Tuesday, Aug. 16, 2022
1	Dan Gawalko	Present in Chambers
2	Linda Fenerty	Present in Chambers
3	Dominique Cere	Present in Chambers
4	Lorne Halisky	Present in Chambers
5	Jered Serben	Present in Chambers
CAO	Gene Sobolewski	Present in Chambers
Assistant CAO	Lydia Cielin	Virtually Present
Finance Manager	Brenda Adamson	Virtually Present
Env. Oper. Manager	Dave Franchuk	Present in Chambers
Natural Gas Manager	Daniel Moric	Virtually Present
Legislative Svcs/R.S.	Patti Priest	Virtually Present
Comm. Tech.	Evonne Zukiwski	Virtually Present
GIS Operator	Carole Dowhaniuk	Virtually Present
Planning Technician	Kyle Schole	Virtually Present

****

No Members of the Media were present.
No Members of the Public were present.

2. Agenda:

926-22: Serben — That the Smoky Lake County Council Environmental Operations Meeting Agenda for Tuesday, August 16, 2022, be adopted, as presented.

Carried Unanimously.

3. Minutes:

927-22: Gawalko — That the Minutes of the Smoky Lake County Council Environmental Operations Meeting held on Friday, June 17, 2022, be adopted as presented.

Carried.

928-22: Fenerty — That the Action List from the Smoky Lake County Council Environmental Operations Meeting held on Friday, June 17, 2022, be filed for information.

Carried.

4. Request for Decision:

Alberta Parks & Recreation Association (ARPA) Conference

929-22: Cere — That Smoky Lake County Council and relevant staff who can attend – attend the Alberta Parks & Recreation Association (ARPA) Conference and Energize Workshop, scheduled for October 27-29, 2022, at the Fairmont Jasper Park Lodge, Jasper, Alberta.

Carried.

Alberta Coordinated Action for Recycling Enterprises (Alberta CARE) - Conference

930-22: Cere — That Smoky Lake County relevant staff who can attend – attend the 22nd Annual Alberta Coordinated Action for Recycling Enterprises (Alberta CARE) Fall Conference scheduled for September 7-9, 2022, at the Executive Royal Hotel, Leduc, Alberta.

Carried.

Jordan Ruegg, Planning Development Manager, virtually joined to the meeting, time 3:45 p.m.

5. Issues for Information:

Environmental Operations: Manager's Report

931-22: Serben That Smoky Lake County's Environmental Operations Manager's report dated August 10, 2022, as well as the verbal summary of the department's duties and activities, be accepted for information.

Carried.

Evergreen Regional Waste Management Services Commission – Minutes

932-22: Cere That the agenda package received by Smoky Lake County from Evergreen Regional Waste Management Services Commission's Regular Meeting held on June 16, 2022, at the County of St. Paul No. 19's office, be filed for information.

Carried.

Evergreen Regional Waste Management Services Commission – Minutes

933-22: Fenerty That the agenda package received by Smoky Lake County from Evergreen Regional Waste Management Services Commission's Regular Meeting held on July 21, 2022, at the County of St. Paul No. 19's office, be filed for information.

Carried.

6. Correspondence:

No Correspondence.

7. Delegation:

No Delegation.

8. Executive Session:

No Executive Session.

Next Meeting

934-22: Gawalko That the next Smoky Lake County Council **Environmental Operations Meeting** be scheduled for **Tuesday, October 11, 2022,** at **9:00 a.m.** to be held virtually, through Electronic Communication Technology as per Bylaw 1376-20 **and/or** physically in County Council Chambers.

Carried.

ADJOURNMENT:

935-22: Fenerty That the Smoky Lake County Council Environmental Operations Meeting of August 16, 2022, be adjourned, time 4:22 p.m..

Carried.

_____
CHAIRPERSON

S E A L

_____
CHIEF ADMINISTRATIVE OFFICER

ENVIRONMENT & PARKS ACTION LIST

2022/10/04

3.7

3	100%
GOALS	GOAL COMPLETION

Draft · Not started · Behind · On Track · Overdue · Complete · → Direct Alignment · ⇢ Indirect Alignment

GOAL

Meeting...	Motio...	Goal	Details	Owner	Progress Update	Curr...
		2022 08 16 Environmental Operations				Complet 100 / 100
2022/08/16	929-22	→ Alberta Parks & Recreation Association (ARPA) Conference	That Smoky Lake County Council and relevant staff who can attend – attend the Alberta Parks & Recreation Association (ARPA) Conference and Energize Workshop, scheduled for October 27-29, 2022, at the Fairmont Jasper Park Lodge, Jasper, Alberta.	Environmental Operations Manager	**Dave Franchuk:** **Achievements:** On September 9, 2022 Councillors Linda Fenerty and Dominique Cere were registered. The Environment and Parks Manager was also registered, and accomidations have been booked. **Challenges:** *No value* **Next Steps:** *No value*	Complet 100 / 100
2022/08/16	930-22	→ Alberta Coordinated Action for Recycling Enterprises (Alberta CARE) - Conference	That Smoky Lake County relevant staff who can attend – attend the 22nd Annual Alberta Coordinated Action for Recycling Enterprises (Alberta CARE) Fall Conference scheduled for September 7-9, 2022, at the Executive Royal Hotel, Leduc, Alberta.	Environmental Operations Manager	**Dave Franchuk:** **Achievements:** The Smoky Lake County's Recycle technition Scott Adamson had attended the Conference. **Challenges:** *No value* **Next Steps:** *No value*	Complet 100 / 100

ENVIRONMENT & PARKS PLAN

(E&P) COMMUNITY SERVICES

Goal	Progress Update	Current Completi...
Parks and Recreation Work Plan : 100%	**Dave Franchuk:** **Achievements:** *No value* **Challenges:** *No value* **Next Steps:** *No value* *2022/03/10*	76% 76 / 100%

(E&P) INFRASTRUCTURE

Goal	Progress Update	Current Completi...
Administrative Activity (E&P) : 100%	**Dave Franchuk:** **Achievements:** Reporting period from September 1 to October 3, 2022. Sept 6 Managers Meeting. Sept 9 Budget reserch. Sept 12 Managers meeting . Sept 15 Managers meeting/Joint Health and Safety meeting/Evergreen Regional Waste meeting. Sept 19 Managers meeting Sept. 20 Departmental meeting. Sept 21 Office staff meeting. Sept 26 Managers meeting/Water, Sewer, Waste, Parks and Recreation Budget meeting/Hwy 28/63 Regional Waterline meeting. Sept 27 Strategic Planning Session. Sept 28 Strategic Planning Session. Sept 29 Social Committe meeting. Oct 3 Managers meeting. **Challenges:** *No value* **Next Steps:** *No value* *2022/10/03*	**97%** **97 / 100%** 39% ahead
Council Member Inquiry : 100%	**Dave Franchuk:** **Achievements:** Reporting period from September 1 to October 3, 2022. No Council Member inquires during this reporting period. **Challenges:** *No value* **Next Steps:** *No value* *2022/10/03*	**95%** **95 / 100%** 19% ahead
Parks and Recreation : 100%	**Dave Franchuk:** **Achievements:** **Dave Franchuk:Achievements:** Reporting period from September 1 to October 3, 2022.	**95%** **95 / 100%** 19% ahead

Current Completi...

Sept 1 Cut grass at Bonnie Lake, weed wack at Warspite.

Sept 2 Mons Lake vadalism, remove garbage cans from lake repair toilet door, cut grass at Spedden.

Sept 6 Cut grass and garbage maintenance at house on middle of road and Victoria trail area. Tree removal at mons lake.

Sept 7 Clean up after vandalism at mons lake.

Sept 8 Clean up old shop, lower flags at all County sites.

Sept 9 Fallen tree removal on victoria trail, and clean up old shop.

Sept 12 Cut grass garner lake area resorts and cleanup at old shop.

Sept 13 Clean up and tidy old shop.

Sept 14 Remove swim ropes from lakes and ted to garbages at day use areas.

Sept 15 Replace signs at kaduik lake and tend to waste bins along the Iron Horse trail.

Sept 16 Move broken tables and replace at Hanmore Lake and replace broken wood stove at Bellis Beach kitchen.

Sept 19 Help waste department tidy up recycled electronics.

Sept 20 Raise all flags throughout the County with some replacements and repairs.

Sept 21 Replace fire pit at Hanmore lake and minor repairs on the toilets.

Sept 22 Take down tennis nets at Bonnie Lake, and clean up pick up trucks.

Sept 23 Continue cleaning trucks and tend to waste bins along the trail.

Sept 26 Cut grass around the main office and repaired soft spot in front of waste bin.

Sept 27 Cut grass at the new County property(Old Pankiw place).

Sept 28 Move tables and assist for pumpkin fair.

Sept 29 Set up for Pumkin fair.

Sept 30 Finish setting up for pumkin fair.

Oct 3 Septic truck pumping out toilets and moving tables and chairs after pumpkin fair.

Challenges: *No value*

Next Steps: *No value*

2022/10/03

Goal	Progress Update	Current Completi...
Regional Water : 100%	**Dave Franchuk:** **Achievements:** Reporting period from September 1 to October 3, 2022. Sept 6 Whitefish Lake reservoir check and clean floors and tidy up. Sept 8 CAV checks, and weed wack around them. Sept 12 Whitefish Lake check and repairs done to chlorine line. Sept 14 Whitefish Lake check and CAV checks on East end. Sept 14 Continue with CAV checks. Sept 22 Calibrate chlorine analyzers at Vilna, Spedden, and Smoky Lake. Sept 22 Calibrate chlorine analyzers at Warspite and Waskatenau. Sept 26 Pump out CAV's on East end/ Regional Waterline meeting. Sept 28 Pump out CAV's on West end of County. Sept 29 Continue pumping out CAV's/Whitefish Lake reservoir check. Oct 3 Assisting Nova with repairs at Whitefish Lake Reservoir. **Challenges:** *No value* **Next Steps:** *No value* *2022/10/03*	97% 97 / 100% 21% ahead
Training activity : 100%	**Dave Franchuk:** **Achievements:** Reporting period from September 1 to October 3, 2022 Sept 7th to 9th Alberta Care Conference (Scott Adamson) **Challenges:** *No value* **Next Steps:** *No value* *2022/10/03*	93% 93 / 100% 17% ahead

Goal	Progress Update	Current Completi...
Waste Management : 100%	**Dave Franchuk:** **Achievements:** Reporting period from September 1 to October 3, 2022 Sept 5 Remove oil jugs pails from ditch on RR 172 A Sept 6 Organize recycled paint stations. Move some dry waste from Bellis to Smoky Lake. Sept 12 Clean up chemical jug sites to prepare for pick up. Tidy up toilets. Freon removal from fefrigeration units at Waskatenau and Bellis. Sept 13 Recycle Ag jug and paint clean up. Clean up unwanted rubber from tire recycle areas. Sept 14 Freon removal at Vilna and Smoky Lake. removing twine pile at bellis and take to Smoky Lake dry fill. Sept 15 Pushing up fire pits and moving refrgeration units to metal piles (Freon had been removed) Sept 19 Tidy up all take it or leave it facilities, remove old old items. Sept 20 Assist DBS with pick up of chemicals and clean oil containment areas. Sept 21 Remove discarded furniture north of Vilna. Sept 22 Send pictures for electronic pic up and remove oil jugs and filters at the Hamlin bin site. Sept 26 Remove oil jugs and other unwanted waste at the 855 bin site. Sept 28 Remove wet waste at the Smoky Lake lanfill, move to bins. Oct 3 Clean up oil containment areas at Smoky Lake and Spedden. **Challenges:** *No value* **Next Steps:** *No value* *2022/10/03*	**94%** **94 / 100%** 18% ahead

Goal	Progress Update	Current Completi...
Waste Water : 100%	**Dave Franchuk:** **Achievements:** Reporting period from September 1 to October 3, 2022 Sept 6 Pull Warspite lift station pump #1 and remove debris, inspect and run alarm sequence. Sept 12 Pull both Warspite lift station pumps, remove debris, inspect and run alarm sequence. Sept 15 Skid steer level off ruts at Warspite lagoon road add a bit of gravel where required. Sept 20 Replace flame sensor rod on the furnace at the Warspite lift station. clean furnace. Sept 28 Pull Warspite lift station pumps, remove debris, inspect and run alarm sequence. Oct 3 Have septic truck clean out Warspite septic well before the lift station. **Challenges:** *No value* **Next Steps:** *No value* *2022/10/03*	**96%** **96 / 100%** 20% ahead

Goal	Progress Update	Current Completi...
Water Activity : 100%	**Dave Franchuk:** **Achievements:** Reporting period from September 1 to October 3, 2022. Sept 1 grass cutting and weed wacking at the Water sites. Sept 7 Wash floors and cleanup at the Warspite water facility. Sept 8 Repair vent pipe at the Waskatenau truck fill. Rebuild spare control valve. Sept 9 Wash floors and clean up at the Spedden water facility. Repair evestrough on Warspite water building and fix building isulation. Sept 12 Repairs to building and insulation on Warspite water building. Sept 13 Dig out pit at Warspite investigate possible leak. Sept 14 Meet with Nova Mechanical at Warspite water facility to get quote for bypassing leak. Sept 15 Finish repairing evestroughs at the Warspite water facility. Sept 20 Replace broken hose on the Smoky Lake raw water truck fill. Sept 22 Meet with Nova Mechanical to go over Repairs. Sept 26 Maintenance on both furnaces at the Warspite water facility. Sept 27 Minor inside piping repair at the Bellis truck fill. Sept 29 Complete rebuilding spare control valve. Read meters at Warspite. Oct 3 Shut service off at Warspite Hotel and remove meter. **Challenges:** *No value* **Next Steps:** *No value* *2022/10/03*	97% **97 / 100%** 21% ahead

(E&P) BUSINESS AS USUAL

Goal	Progress Update	Current Completi...
BAU Environment Actions		0% 0 / 100 -

5.2

EVERGREEN REGIONAL WASTE MANAGEMENT SERVICES COMMISSION MEETING

Thursday, August 18, 2022
Evergreen Regional Landfill
10:00 a.m.

AGENDA

1. Call to Order
   a. Additions to the Agenda

2. Minutes of July 21, 2022 Regular Meeting

3. Business Arising from Minutes
   a. Alberta Environmental Appeals Board- Decisions on Appeal No. EAB 19-048
   b.
   c.
   d.

4. Closed Meeting Session

5. Financials
   a. Treasurer's Report
   b.
   c.

6. New Business
   a. Regional Site Report
   b. Evergreen Server
   c. Compactor 2022
   d. Paul Performance Review
   e.
   f.

7. Other Business/Correspondence
   a.
   b.
   c.

8. Next Meeting

9. Adjournment

EVERGREEN REGIONAL WASTE MANAGEMENT SERVICES COMMISSION

Minutes of Regular Meeting

County of St. Paul Office
Thursday, July 21, 2022
10:00 a.m.

Members Present:
Maxine Fodness- Chairman
Dan Gawalko
Nathan Taylor- Virtually
Leroy Kunyk- Virtually
Tim Smereka- Virtually
Richard Warren- Virtually
Terry Makowichuk- Virtually

Alternates Present:
Ron Boisvert- Virtually
Evelynne Kobes
Ross Krekoski- Virtually

Paul Poulin- Manager Evergreen Landfill
Ashley Cozzens- Recording Secretary
Dave Franchuk- Smoky Lake County- Virtually
Steven Jeffery- Town of St. Paul- Virtually

1. CALL TO ORDER

Maxine Fodness called the meeting to order at 10:23 a.m.

a. Additions to Agenda

Add 6.e. MG30/ Gravel- Green gate to Evergreen site

Leroy Kunyk made a motion to accept the agenda with the addition.

CARRIED

2. MINUTES OF JUNE 16, 2022 REGULAR MEETING

Richard Warren made a motion to adopt the minutes of the June 16, 2022 Regular Meeting with the one change.

CARRIED

3. BUSINESS ARISING FROM MINUTES

a. AB Care Meeting

Paul's takeaways from the Alberta CARE Meeting in Edmonton:

- Mattress/furniture consumes a lot of landfills- need a cost analysis on shredding this type of material
- Westlock- vertical cell expansion instead of horizontal
- Westlock experimenting with watering popular trees with leachate water.
- MD of Bonnyville plans for a WTE expansion

Tim Smereka made a motion to file the AB Care Meeting discussion as information.

CARRIED

b. Feasibility Study

Zoom meeting with Linda, Maxine, Greg, Eric and Paul:

- Details of work to be done (outline)
- 4 to 6 week term to complete study
- 50% paid at the start, 50% paid after completion; $25,000 in total
- Eric and Greg came for a site visit on July 6 to see the layout of the landfill

Dan Gawalko made a motion to file the feasibility study discussion as information.

CARRIED

4. CLOSED MEETING SESSION

Attendance of closed meeting session: The closed meeting session includes all those Members and Alternates of the Commission previously listed in attendance and including Paul Poulin, Manager Evergreen Regional Landfill, Dave Franchuk, Smoky Lake County, Steven Jeffery, CAO Town of St. Paul, Ashley Cozzens, Recording Secretary.

Ron Boisvert made a motion to move to a closed meeting for personnel at 10:39 a.m.

CARRIED

Nathan Taylor came into the meeting at 10:41 a.m.

Ashley Cozzens left the meeting at 10:50 a.m.

Evelynne Kobes came into the meeting at 11:02 a.m.

Tim Smereka made a motion to return to the regular meeting at 11:10 a.m.

CARRIED

Ashley Cozzens returned to the meeting at 11:10 a.m.

Nathan Taylor made a motion that all communication by Robert Tomlinson be directed through the Evergreen Regional Waste Management Services Commission (ERWMSC)'s Chairman, that the ERWMSC does not pursue a second mediation for the Appeal No. EAB 19-048 and that the ERWMSC denies Robert Tomlinson's request to speak at a meeting while Appeal EAB 19-048 is in progress.

CARRIED

Nathan Taylor made a motion to approve a Cost of Living Increase of 4% for all hourly staff effective August 1, 2022.

CARRIED

Steven Jeffery left the meeting at 11:16 a.m.

5. FINANCIALS

a. Treasurer's Report

Ashley Cozzens presented the Treasurer's Report to June 30, 2022.

Leroy Kunyk made a motion to accept the treasurer's report as presented.

CARRIED

6. NEW BUSINESS

a. Regional Site Report

Paul presented the site report for the Evergreen Landfill July 2022:

- Grounded water monitoring well bailing at the transfer stations happening this month
- Staff holidays are well underway
- No applications received for the seasonal position; we will carry on as we have been doing all year

- Equipment minor repairs: Compactor thermostat and hard surfacing completed. The 950 loader needed the float accumulator replaced and the AC system recharged
- Waste survey will be done in early October for inert cells and MSW cells
- Using the Jeep and truck that we bought from the County of St. Paul

Richard Warren made a motion to accept the Regional Site Report as information.

CARRIED

b. Bylaw 12

Add information in Bylaw 12 regarding members missing three or more consecutive meetings.

Nathan Taylor made a motion that the Manager and CAO of the County of St. Paul draft a proposed entry for Bylaw 12 for membership attendance.

CARRIED

c. Shredder

Tim Smereka made a motion to rent the Impaktor 250 slow speed shredder from RBS Heavy Machinery for one day to shred our dry waste at the transfer station.

CARRIED

d. AB Care Conference

Alberta Care Conference in Leduc, AB September 7-9, 2022

Terry Makowichuk made a motion that Paul can attend the AB Care Conference in Leduc from September 7 to 9, 2022.

CARRIED

e. MG30/Gravel RR104

RR 104 (green gates to Evergreen site) is one mile.
MG30 (dust control) $7,500 - $8,000 for the mile
Gravel $16/ton applied at 300-400 tons for $4,800 to $6,400 for the mile.

Terry Makowichuk made a motion to approve the application of the MG30 and gravel to the one mile on RR104 (green gates to the Evergreen Site).

CARRIED

7. OTHER BUSINESS/CORRESPONDENCE

No other business/ correspondence.

8. NEXT MEETING

The next regular meeting is to be scheduled for Thursday, August 18, 2022 at 10:00 a.m. Evergreen Regional Landfill.

9. ADJOURNMENT

Maxine Fodness adjourned the meeting at 12:01 p.m.

Date **Commission Chairman**

5.3

EVERGREEN REGIONAL WASTE MANAGEMENT SERVICES COMMISSION MEETING

Thursday, September 15, 2022
Evergreen Regional Landfill
10:00 a.m.

AGENDA

1. Call to Order
   a. Additions to the Agenda

2. Minutes of August 18, 2022 Regular Meeting

3. Business Arising from Minutes
   a. Feasibility Study
   b. AB Care Leduc takeaways
   c. Update on Bylaw
   d.
   e.

4. Closed Meeting Session

5. Financials
   a. Treasurer's Report
   b.
   c.

6. New Business
   a. Regional Site Report
   b. Omni McCann- reponse to changing date on Approval
   c. Fundraising ideas for local clubs
   d. Transfer stations inspections
   e. AB Recycling site tour
   f.
   g.

7. Other Business/Correspondence
   a.
   b.
   c.

8. Next Meeting

9. Adjournment

EVERGREEN REGIONAL WASTE MANAGEMENT SERVICES COMMISSION

Minutes of Regular Meeting

Evergreen Regional Landfill
Thursday, August 18, 2022
10:00 a.m.

Members Present:
Maxine Fodness- Chairman
Dan Gawalko
Richard Warren
Leroy Kunyk- Virtually
Tim Smereka- Virtually
Terry Makowichuk- Virtually arrived at 10:19 a.m. (Evelynne Kobes voting in Meeting)

Members Absent:
Nathan Taylor

Alternates Present:
Ron Boisvert- Virtually
Evelynne Kobes
Ross Krekoski

Paul Poulin- Manager Evergreen Landfill
Ashley Cozzens- Recording Secretary
Dave Franchuk- Smoky Lake County
Tim Mahdiuk- County of St. Paul

1. CALL TO ORDER

Maxine Fodness called the meeting to order at 10:02 a.m.

a. Additions to Agenda

Add 6.e. Compost Course
Add 6.d.National Day for Truth and Reconciliation

Dan Gawalko made a motion to accept the agenda with the additions.

CARRIED

2. MINUTES OF JULY 21, 2022 REGULAR MEETING

Richard Warren made a motion to adopt the minutes of the July 21, 2022 Regular Meeting as presented.

CARRIED

3. BUSINESS ARISING FROM MINUTES

a. Alberta Environmental Appeal Board- Decisions on Appeal No. EAB 19-048

Discussion on the Alberta Environmental Appeal Board's three decisions regarding the appeal:

1. The reconsideration of the request to split the hearing into two parts
2. The stay request
3. The application to dismiss

"The Board has dismissed the appeal and has closed its file."

Evelynne Kobes made a motion to file the discussion on the Alberta Environmental Appeal Board Decisions on Appeal No EAB 19-048 as information.

CARRIED

4. CLOSED MEETING SESSION

Attendance of closed meeting session: The closed meeting session includes all those Members and Alternates of the Commission previously listed in attendance and including Paul Poulin, Manager Evergreen Regional Landfill, Dave Franchuk, Smoky Lake County, Tim Mahdiuk, County of St. Paul, Ashley Cozzens, Recording Secretary.

Tim Smereka made a motion to move to a closed meeting for legal at 10:07 a.m.

CARRIED

Ron Boisvert made a motion to return to the regular meeting at 10:14 a.m.

CARRIED

5. FINANCIALS

a. Treasurer's Report

Ashley Cozzens presented the Treasurer's Report to July 31, 2022.

Evelynne Kobes made a motion to accept the treasurer's report as presented.

CARRIED

Terry Makowichuk came into the meeting at 10:19 a.m.

6. NEW BUSINESS

a. Regional Site Report

Paul presented the site report for the Evergreen Landfill August 2022:

- Site tour after the meeting will take place for all members

Richard Warren made a motion to accept the Regional Site Report as information.

CARRIED

b. Evergreen Server

A new server is needed; estimate of $5,800

Evelynne Kobes made a motion to purchase the new server and to have an electrician look into our power surges.

CARRIED

c. Compactor 2022

2022 Compactor price for the same unit as we currently own is $ 839,000 plus GST. In the future we will have to look into getting either a new or used compactor.

Dan Gawalko made a motion to file the compactor discussion as information.

CARRIED

d. Paul Performance Review

Board members are to fill out the sent performance review for Paul and send it back to Maxine prior to the next board meeting on September 15, 2022.

e. Composting Course

The Alberta Care Conference is hosting a Composting Course on Tuesday, September 6 in Leduc before the conference begins.

Ron Boisvert made a motion that Paul Poulin attends the composting course that is being held at the Alberta Care Conference in Leduc on September 6.

CARRIED

f. National Day for Truth and Reconciliation

Tim Smereka made a motion to purchase a hot dog machine for free hotdogs for truck drivers the week of September 26-30 to recognize the National Day for Truth and Reconciliation on September 30.

CARRIED

7. OTHER BUSINESS/CORRESPONDENCE

No other business/ correspondence.

8. NEXT MEETING

The next regular meeting is to be scheduled for Thursday, September 15, 2022 at 10:00 a.m. County of St. Paul office.

9. ADJOURNMENT

Maxine Fodness adjourned the meeting at 10:52 a.m.

Date **Commission Chairman**

Alberta CARE LEDUC CONFERENCE,

TUESDAY, SEPTEMBER 6,2022

Compost course was held all day. To our surprise, no exam was written at days end. This course was to introduce the participants to a more in-depth course that can be taken at woodland county Fort MacMurray, 2 days of classes and a half day for exam. This was from 9am to 4pm. It gave great direction to the commitment needed to start a compost facility in our area.

My take aways.

1. Identify the feedstocks you hope to compost (will it be lawn and yard waste or organic waste) the processes will vary a little.
2. Monitoring wells may be required pending a review of the feedstock
3. Monitoring wells may be required based on the MT a site wishes to process
4. Classification of the facility will be determined once the above is determined.
5. There is no half-way to composting. Once the process is started, it must be followed through to the final product. Changes take place through the different phases of composting that can turn regular lawn and yard waste into a contaminated pile of product with leachate being produced along with odor if not managed.
6. There are many MT of feedstock that can be remove from a landfill with a well operated compost facility. Along with the feedstock many bulking agents such as your untreated woods, lumbers can also be removed from the waste stream to be repurposed for this function.

Overall, I was very pleased with the information from this course. We were all given a Compost Facility Operator Manual a USB stick with all the required information for the two-day course in fort MacMurray that would help anyone write the exam.

WEDNESDAY, SEPTEMBER 7, 2022

Tour of the Compost facility at the Westlock Landfill

Westlock Landfill was the site of the Altroot Compost to Regeneration Facility location. This was a partnership that was form between a local farmer, ranchers need to improve his soil conditions and a composting facility to produce large volumes of compost removed from the landfill itself and the industries from the region around him. Food waste from restaurants, grocery stores and from the locale residence disposing at the Westlock site, lawn and yard waste in large volumes combined with bulking agents such as rig mats that are gowned down on site (not chemically treated materials), tree stumps, tree trimming (that would have been burnt in burn pits) are the types of materials used.

The Altroot compost facility also planned with the Westlock landfill to utilize available space from its site to optimize its ability to divert the compostable materials entering the landfill site for landfilling. Partnering with the Westlock landfill also allowed Altroot to start the facility on a site approved for composting.

Grinders, shredders, material screening equipment, loaders, water pumps, sprinkler systems and all that is required for the composting process is owned and operated by the Altroot Composting. The benefits to the Westlock landfill are that it saves on the landfill space where all this material would other wise be landfilled.

The materials being utilized do not cross the landfill scale, rather they are brought directly to the compost area where Altroot sort and process the materials to build their composting recipes with the various products made available to them from the region. Any material that can't be utilized in composting will be scaled and landfilled at the Westlock landfill (treated fence post, railway ties) as examples.

Once the compost reaches maturity it is loaded and transported to the farmers land, applied by the farmer at an application rate that will optimize his soil condition for native grasses for grazing by his cattle herd and to his crop land at a rate for optimum growing condition. Soil samples and testing are taken to determine the application rates the same way as if the farmers applied commercial fertilizers.

Altroot and the Farmer have also teamed up with the UofA doing additional research in this field to gather data for information that will be published soon.

For the ERWMSC, working with our schools, community groups, 4-H clubs to create programs can greatly reduce compostable materials entering our landfill. A business model to suit the community needs, create feedstock, reduce landfill inputs through a more stringent waste management sorting will make a large impact on the waste being landfilled.

Altroot Compost facility produces large volumes of compost, they have been at the Westlock landfill site location since December 2021. The demand for their product continues to grow and the waste diversion for compostable material is also growing. Waste is only waste if it is wasted!!

The second tour was of the Westlock landfill plastic recycling program. Westlock landfill receives all grades of plastics from 5 other municipalities. They collect and transport the plastics to Westlock to be grown and shipped to another Alberta based company to produce 2x4, 4x4 plastic building materials. Westlock landfill can't keep up with the demand, as much as they process it is all shipped for building materials.

THURSDAY, SEPTEMBER 8, 2022

Speakers from Altroot, notes from the site tour reflected from the Wednesday site tour.

Waste to Energy; a few considerations, (Mark Parker)

As we all know, waste to energy is a growing industry. We have heard from many speakers and waste to energy companies about the changes taking place in the MSW industry. What is needed in our region? how can we make a difference? who can we team up with or support? Where can this take place? When is the right time to get involved? Why is it important to our region.

I have learned that WTE is a very integrated system. Waste recovery systems, waste recycling systems and waste reduction all play a big roll in waste to energy. Working with other municipalities may prove to be the best solution. Defining what our needs are in our region, knowing what our strengths and weaknesses are. Good processes find the right solutions.

Processing MSW from other municipalities and returning it as a desired feedstock for their WTE project may be a possible business model for our landfill.

This conference has allowed me to see a major composting facility in action as a possible waste input reduction into our landfill and the idea of a preferred WTE feedstocks that can be sourced out of the waste stream entering our landfill through a MRF type facility.

Identifying revenue stream, waste management processes and practises, waste reductions into the landfill, extending existing landfill cell life, municipal needs for waste management, working with other municipalities for the benefits of the greater region should be discussed.

TOUR OF THE LEDUC ECO-CENTER AND LANDFILL SHREDDER, COMPACTOR, BALER, WRAP

The eco-center was a wonderful site to visit. It won the award as the best site 2022 for an obvious reason. Pavement throughout the site, beautiful buildings for all recyclables, the flow system where the public have a pathway to drive through to dispose their recyclables and the commercial collection vehicles are to the inside area to collect recyclables and not interfere with the public. Very well-planned site.

The landfill tour was also very impressive. The new shredder, compactor, baler, and bale wrapping machine, and the building structure as well was my highlight. To think of how ugly MSW looks like to how neat and tidy it is once it goes through this system process.

With all bulky, heavy waste sorted from it outside, hauled into the shredder as clean MSW, with the baled final product being a dried MSW bale weighing 1.2MT, wrapped up ready to be utilized as feedstock for WTE system, that can be harvested later, with the bale size being the common size used in WTE system design, is just a great thing to see from start to finish. Amazing!!

Component costs vary as per the desired capacities one wishes to achieve. In this case, the shredder was $800,000.00, conveyer, baler, bale wrapper at $1.2million, (price may compare to a compactor at $839,000.00 and engineered cell construction at $1.5million) the building was 60feet by 120 feet and approx. 25-foot ceiling height increasing to 30-foot ceiling height to accommodate loaders, trucks, with expansion capabilities.

The bales weight 1.2MT, volume space is 1.6M3 which is the approx. optimum compaction done on a MSW cell on a landfill face with a compactor. no fugitive waste, 2 bales processed during the site tour took 15 minutes (not full operating capacity due to the tour), this system was capable of 400MT per day, based on hours of operations per day. To compare we currently receive 47MT per day. It was great to see this system.

FRIDAY, SEPTEMBER 9, 2022

BIO-MEDICAL WASTE; How is it identified and classified

Standards and guidelines for bio-medical waste exist for human and animal waste. What are the disposal practises, what is required? What is the definition of Bio-medical waste?

Packaging, labeling and color-coding storage containers are used by industry to identify bio-medical waste types and disposal methods required. The medical field staff are trained and have knowledge of the industry practices for safe disposal from hospital setting to home care. Waste segregation starts at the source.

Incineration is still the number one method to dispose Bio-medical waste. The definition of bio-medical waste is waste that is blood soaked. Waste from accident scene, surgical waste, injuries with lots of blood loss, to name a few.

Waste with blood acceptable for landfilling would be found on mattresses, dialysis lines, tissues, towels to name a few. The general rule used to distinguish this waste is "if you can squeeze blood from it and it flows or drips out, it is BIO-MEDICAL Waste all else can be landfill". This brought on much discussion for the safety of staff and all who must handle waste from the COVID-19 pandemic to any bloody type of waste. The Standards and Guidelines are in place to reference.

AEP and the EPR programs

This is an ongoing topic. Changes are made every day to improve the programs, and processes from consumers to final disposal. I will update board as changes take place.

CONCLUSION.

I would like to thank the board for the opportunity in attending the Leduc Alberta CARE conference. It was well supported by the commission municipalities as well, and with that, we had a chance to discuss firsthand the topics we heard and the tours that we participated on. Many of the recycling companies that we use for our recycled products had their both setup for questions or even just a meet and greet.

Time was spent networking and sharing thoughts ideas with neighboring municipalities getting to know more about what may be needed in our region for the near future.

Thank you for time

Paul

ERWMSC- 2022 Budget to Actual
January 1 to August 31, 2022

	2022					
Commission Members	**Budgeted Tonnage**	**Actual Tonnage**	**Rate**	**Budgeted Revenue**	**Actual Revenue**	**2021**
Revenue						
Commission Members Upfront Fees						
County of St. Paul				$ 116,908.61	$ 116,908.61	$ 117,857.45
Smoky Lake County				$ 45,986.95	$ 45,986.95	$ 44,677.31
Town of St. Paul				$ 70,082.39	$ 70,082.39	$ 69,983.27
Town of Smoky Lake				$ 10,635.17	$ 10,635.17	$ 10,522.95
Town of Elk Point				$ 16,383.68	$ 16,383.68	$ 16,911.60
Village of Vilna				$ 2,650.47	$ 2,650.47	$ 2,657.60
Village of Waskatenau				$ 2,352.73	$ 2,352.73	$ 2,389.82
Total Commission Members				**$ 265,000.00**	**$ 265,000.00**	**$ 265,000.00**
Commission Members						
Member County of St. Paul	2,498	1,593.41	40	$ 99,920.00	$ 63,809.25	$ 66,965.35
Member Town of St. Paul	1,125	801.98	40	$ 45,000.00	$ 32,092.90	$ 29,263.20
Member Town of Elk Point	392	237.89	40	$ 15,680.00	$ 9,515.60	$ 11,395.20
Member Smoky Lake County	1,133	687.73	40	$ 45,320.00	$ 28,270.40	$ 30,438.00
Member Town of Smoky Lake	622	437.68	40	$ 24,880.00	$ 17,507.20	$ 16,694.60
Total Commission Members	**5,770**	3,758.69		**$ 230,800.00**	**$ 151,195.35**	**$ 154,756.35**
Commission Private Haulers						
County of St. Paul	352	325.95	85	$ 29,920.00	$ 27,793.75	$ 25,830.33
Town of St. Paul	1,215	750.95	85	$ 103,275.00	$ 63,950.75	$ 62,208.83
Town of Elk Point	202	108.17	85	$ 17,170.00	$ 9,194.45	$ 8,648.00
Smoky Lake County	-		85	$ -	$ -	$ -
Town of Smoky Lake	-		85	$ -	$ -	$ -
Total Commission Private Haulers	**1,769**	1,185.07		**$ 150,365.00**	**$ 100,938.95**	**$ 96,687.16**
Non Member Tippage						
Get Trashed	1,376	873.58	85	$ 116,960.00	$ 74,254.30	$ 77,965.85
Wild Rose	3,015	2,106.82	141	$ 425,115.00	$ 297,061.66	$ 285,933.01
Seven Lakes	650	638.03	65	$ 42,250.00	$ 46,618.50	$ 58,544.65
Village of Glendon	118	109.77	100	$ 11,800.00	$ 7,720.00	$ 7,992.00
Saddle Lake	-	692.11	85	$ -	$ 58,829.35	$ 54,333.60
Frog Lake	350		85	$ 29,750.00	$ -	$ -
Kehewin	300	85.00	85	$ 25,500.00	$ 7,225.00	$ -
Non Member Tippage	-	5.99	125	$ -	$ 748.75	$ -
Total Non Member Tippage	**5,809**	4,511.30		**$ 651,375.00**	**$ 492,457.56**	**$ 484,769.11**
Other Revenue						
Transfer Station (Inert Waste)	2,183	1,239.48	55	$ 120,065.00	$ 66,105.95	$ 91,162.00
Saddle Lake- House Demo's		189.04	85	$ -	$ 21,015.40	$ -
Kehewin- Church		294.96	55		$ 16,222.80	
Kehewin- Site Cleanup		636.70	85		$ 50,179.30	
Asbestos		0.25	200	$ -	$ 160.00	$ -
Contaminated Soil			35	$ -	$ -	$ -
Town of St. Paul WWTP	213	396.20	35	$ 7,455.00	$ 13,867.00	$ 5,556.25
Interest Revenue				$ 25,000.00	$ 18,542.74	$ 2,241.91
Miscellaneous Sales				$ -	$ -	$ -
Recycling Revenue				$ 2,500.00	$ 15,148.06	$ -
Total Other Revenue	2,396	2,756.63		**$ 155,020.00**	**$ 201,241.25**	**$ 98,960.16**
Total Tonnage/Revenue	**15,744**	**12,211.69**		**$ 1,452,560.00**	**$ 1,210,833.11**	**$ 1,100,172.78**

Commission Private Haulers					
	Tonnes	Rate		$	
County of St. Paul					
Quik Pick	205.17	85	$	17,527.45	*88 spike charge
Waste Management	6.86	85	$	583.10	
E-Can Oilfield Services	3.81	85	$	323.85	
Lakeland Waste	10.57	85	$	898.45	
PuroClean	16.03	85	$	1,362.55	
Xtreme Oilfield	6.5	85	$	552.50	
St. Paul Seed Cleaning Plant	5.79	85	$	492.15	
On Track Contracting	0.44	85	$	37.40	
Commercial Cash	70.78	85	$	6,016.30	
Total	**325.95**		**$**	**27,793.75**	
Town of St. Paul					
Waste Management	191.37	85	$	16,266.45	
Quik Pick	342.21	85	$	29,087.85	
Vet Clinic	0.65	85	$	175.25	*120 Tote Bag
Lakeland Waste Disposal	145.97	85	$	12,407.45	
Get Trash'd	64.93	85	$	5,519.05	
C & N Property	5.26	85	$	447.10	
Extendicare	0.56	85	$	47.60	
Total	**750.95**		**$**	**63,950.75**	
Town of Elk Point					
Quik Pick	104.33	85	$	8,868.05	
Waste Management	3.84	85	$	326.40	
Total	**108.17**		**$**	**9,194.45**	
Smoky Lake County	0	85	$	-	
Town of Smoky Lake	0	85	$	-	

Total Commission Private Haulers **$** **100,938.95**

Expenses	Budgeted 2022	Actual 2022	2021
Fixed Operating			
Accounting & Legal	$ 10,000.00	$ 10,332.00	$ 12,293.11
Advertising & Promotions	$ 2,000.00	$ 777.21	$ 160.00
Administration/Council Honorarium	$ 11,550.00	$ -	$ -
Bad Debts	$ 150.00	$ -	$ -
Boot Allowance	$ 400.00	$ 95.24	$ -
Fuel & Oil	$ 10,000.00	$ 10,000.00	$ 10,000.00
Groundwater Monitoring	$ 80,000.00	$ 30,198.98	$ 38,603.86
Insurance	$ 52,000.00	$ 388.92	$ -
Interest & Bank charges	$ 2,700.00	$ 852.73	$ 1,647.05
Leachate	$ 52,000.00	$ 52,000.00	$ 52,000.00
Licenses	$ 150.00	$ -	$ -
Meeting Expenses	$ 2,000.00	$ 1,379.26	$ 965.24
Memberships and registration	$ 1,300.00	$ 2,198.40	$ 1,275.90
Mileage & Subsistence	$ 6,000.00	$ 3,028.59	$ 2,197.13
Miscellaneous - Approval/Appeal	$ 30,000.00	$ 350.00	$ 650.00
Office supplies	$ 12,000.00	$ 3,217.11	$ 9,426.00
Propane	$ 14,000.00	$ 11,127.10	$ 4,629.72
Road Maintenance	$ 25,000.00	$ 345.24	$ 1,714.29
Signage	$ 500.00	$ -	$ 65.00
Small Tools & shop supplies	$ 4,000.00	$ 901.21	$ 1,616.76
Telephone/Internet	$ 4,600.00	$ 2,803.13	$ 3,159.33
Training	$ 5,000.00	$ 2,668.20	$ 781.98
Transfer Station- Commission Sites	$ 5,000.00	$ 1,430.26	$ 2,729.76
Transfer Station- Regional Site	$ 2,100.00	$ 336.91	$ 1,199.79
Utilities	$ 7,500.00	$ 5,006.78	$ 4,095.56
Total Fixed Costs	**$ 339,950.00**	$ 139,437.27	**$ 149,210.48**
Variable Operating Costs			
Cell Operations & Maintenance	$ 19,500.00	$ 3,400.00	$ 7,559.53
Fuel & Oil	$ 50,000.00	$ 43,915.89	$ 25,245.68
Leachate	$ 158,000.00	$ 84,717.84	$ 4,409.53
Postage & Freight	$ 1,500.00	$ 781.64	$ 394.53
Rent of Equipment	$ 3,000.00	$ 517.61	$ 650.15
Repair & Maintenance - Equipment	$ 49,000.00	$ 22,243.31	$ 12,825.54
Repair & Maintenance - Buildings	$ 4,000.00	$ 740.98	$ 2,844.71
Site Operations & Maintenance	$ 20,000.00	$ 12,158.42	$ 7,608.42
Vehicle Maintenance & Repair	$ 5,000.00	$ 1,019.59	$ 792.12
Wages	$ 355,000.00	$ 215,675.27	$ 234,027.29
Workers Compensation	$ 10,650.00	$ 5,182.24	$ 4,705.12
Total Variable Costs	**$ 675,650.00**	**$ 390,352.79**	**$ 301,062.62**
Freight- Wildrose Disposal	$ 168,840.00	$ 118,002.08	$ 115,842.87
Wildrose- Payback End of Year	$ 63,315.00		$ -
Loans (loan pd off Jan 2022)	$ 14,323.30	$ 14,323.30	$ 114,586.40
Jan 28, 2022 made lump sum payment of $238,760.72			
Post Closure			
Post Closure Reclamation (3.5/tonne)	$ 46,718.00	$ 33,092.71	$ 32,702.57
Non-Member Tippage Reserve (7/tonne)	$ -	$ -	$ -
Total Post Closure	**$ 46,718.00**	**$ 33,092.71**	**$ 32,702.57**

	Budgeted 2022	Actual 2022	2021
Cell Replacement Reserve	$ 100,000.00	$ -	$ -
Equipment Replacement Reserves			
Compactor	$ -	$ -	$ -
Track Loader	$ -	$ -	$ -
Front End Loader	$ -	$ -	$ -
Total Equipment Replacement	$ -	$ -	$ -
Total Expenses	**$ 1,408,796.30**	**$ 695,208.15**	**$ 713,404.94**
Net Operating Income/Deficit	**$ 43,763.70**	**$ 515,624.96**	**$ 386,767.84**
Capital Expenditures (Money in Savings/Reserve)			
Security Camera's Equipment Shed	$ 6,000.00	$ -	$ -
Compactor	$ -	$ -	$ -
Dry Waste Pit	$ -	$ -	$ -
Feasibility Study	$ -	$ 12,500.00	$ -
Rock Truck	$ -	$ 35,000.00	$ -
Bale Processor	$ -	$ -	$ -
Zero Turn Mower	$ -	$ -	$ -
Vechicles to purchase new & Used	$ 18,000.00	$ 3,500.00	$ -
Net Surplus	**$ 19,763.70**	**$ 464,624.96**	**$ 386,767.84**

Cheque Register August 2022

Cheque #	Payable To:		Amount
5451	Wildrose Disposal	$	17,060.96
5452	MicroAge	$	1,128.74
5453	MCS Net	$	94.40
5454	Canadian Natural Resources- Leachate Disposal January to June	$	54,673.71
5455	Spaid Automotive	$	547.97
5456	County of St. Paul- Andy, PP 14-15, Grant Writing, Grading, Workhub	$	26,929.78
5457	RMA Insurance	$	168.92
5458	E-Can Oilfield Services	$	5,987.41
5459	Workers Compensation	$	1,775.00
5460	Servus Credit Union- MC- Direct Energy, Telus, Annual Fee, Zoom	$	1,152.49
5461	Cornerstone Cooperative- Oil, Propane Tank Rentals- Vincent Lake, St. Edouard. St. Lina	$	2,096.48
5462	Geoware	$	5,071.50
5463	Baxter Bailey- Compactor	$	1,020.00
5464	Omni McCann Geoscience- Stormpond sample	$	981.13
5465	Mike Gill- Gas for Jeep	$	75.00
	Total Cheques Issued	$	118,763.49

Accounts Receivable as attached

Bank Balance - August 31, 2022 $ 259,662.39

High Yield Savings- August 31, 2022 $ 237,706.58

Investments:

GIC # 36: 60 months **Maturity Date March 22, 2024** **Interest Rate 3.35%** $ 307,034.94

Compactor	$240,360.36
Trac Loader	$25,516.33
Post Closure	$12,258.76
Interest Earned	$28,899.49

GIC # 43; 2 Year Non Redeemable **Maturity Date; May 20, 2024** **Interest Rate: 3.4%** $ 75,148.73

Compactor	$75,148.73

GIC #44: 1 Year Non Redeemable **Maturity Date: May 20, 2023** **Interest Rate: 2.85%** $ 1,503,988.00

Post Closure	$620,232.96
Cell Replacement	$602,196.91
Capital Replacement	$81,558.13
Leachate	$200,000.00

Total Investments $ 1,886,171.67

Evergreen Regional Waste

Customer Aged Summary As at 13/09/2022

Name	Total	Current	31 to 60	61 to 90	91+
Alliance Heavy Industries Inc.	5,969.55	5,969.55	-	-	-
APEX Utilities Inc.	57.75	57.75	-	-	-
Black Track Paving	52.25	52.25	-	-	-
C & N Property Restoration Ltd.	2,056.20	937.15	452.35	666.70	-
Canadian Natural Resources	576.40	220.00	356.40	-	-
Car-ouells	10.00	10.00	-	-	-
Cornerstone Co-operative	30.25	30.25	-	-	-
E-Can Oilfield Service	120.70	120.70	-	-	-
Extendicare	47.60	47.60	-	-	-
Get Trash'd	19,211.65	12,474.60	6,737.05	-	-
Green Hills Construction Inc.	47.30	47.30	-	-	-
Kehewin Cree Nation	-381.10	1,872.55	1,769.70	-	-4,023.35
Lakeland Waste Disposal	3,945.15	2,587.70	1,357.45	-	-
North Bay Development Ltd.	31.55	31.55	-	-	-
Northview Canadian HY Properti...	63.65	63.65	-	-	-
Provision Renovations	124.35	64.35	-	60.00	-
Quest Disposal & Recycling Inc.	75.35	75.35	-	-	-
Quik Pick Waste Disposal	23,978.25	8,355.60	6,451.15	9,171.50	-
Saddle Lake Public Works	4,094.50	4,139.50	-45.00	-	-
Secure Energy (OnSite Service) ...	117.15	78.65	-	38.50	-
Seven Lakes Oilfield Services	10,093.35	5,138.00	4,955.35	-	-
Seventy Two Developments	208.45	208.45	-	-	-
Smoky Lake County	7,509.20	7,509.20	-	-	-
St. Paul Education Regional Div	29.15	29.15	-	-	-
St. Paul Seed Cleaning Plant	492.15	-	492.15	-	-
St. Paul Towing	144.30	144.30	-	-	-
Town of Elk Point	3,262.46	3,262.46	-	-	-
Town of Smoky Lake	3,248.46	3,651.66	-403.20	-	-
Town of St. Paul	23,217.47	11,615.76	-	9,615.55	1,986.16
Tranquility Bay RV Park	10.00	-	10.00	-	-
Village of Glendon	1,122.00	1,122.00	-	-	-
Waste Management of Canada ...	2,907.85	2,907.85	-	-	-
Wildrose Disposal Inc.	43,738.21	43,738.21	-	-	-
Xtreme Equipment	128.25	128.25	-	-	-
Total outstanding:	156,339.80	116,691.34	22,133.40	19,552.25	-2,037.19

FEASIBILITY STUDY for a Material Recovery Facility

Presented to:
Evergreen Regional Waste Management Services Commission
Box 3, Lafond, Alberta, T0A 2G0

Prepared by:
1689229 Alberta Inc. (ETGM2)
& Cool Green Solutions Inc. (CGSI)

September 6, 2022
ISSUED FOR REVIEW
FILE: 044-20220906-Feasibility Study-REV.0

SECTION 1.0 - INTRODUCTION

Section Summary

This section provides the Executive Summary, which provides budgetary estimates to the Evergreen Regional Waste Management Services Commission Landfill for a Material Recovery Facility (MRF) capable of processing the current input of approximately 50 tons per day and a future input of up to 100 tons per day of Municipal Solid Waste (MSW). There are also budgetary estimates for Waste to Energy System options. Various scenarios of operating combinations are summarized. A suggested road map for how to proceed is provided.

This section also contains the Table of Contents, Definition of Acronyms, List of Tables, List of Figures, the Cover Letter and the Purpose of this Feasibility Study.

PLEASE NOTE:

This document contains both Imperial and Metric units of measure.
"ton" is an Imperial unit of measurement equal to 2,000 pounds
"Metric tonne" or "tonnes" is a Metric unit of measurement equal to 1,000 kilograms or 2,204.6 pounds.

Please note that total waste received by the Evergreen Regional Landfill in 2021 was approximately 17,422 tonnes, or 47.7 tonnes per day.

Please note that 5 tonnes per hour (tph) for an 8-hour day is approximately 40 tons per day.
Please note that 5 tonnes per hour (tph) for a 10-hour day is approximately 50 tons per day.
For the purposes of **SECTION 7.0 – PROJECT ECONOMICS**, 5 tph is labelled as equivalent to 50 tpd.

Please note that 10 tonnes per hour (tph) for an 8-hour day is approximately 80 tons per day.
Please note that 10 tonnes per hour (tph) for a 10-hour day is approximately 100 tons per day.
For the purposes of **SECTION 7.0 – PROJECT ECONOMICS**, 10 tph is labelled as equivalent to 100 tpd.

1.1 Limitations of This Feasibility Study

This Feasibility Study is presented for informational and estimation purposes only.

The contents of this report are intended for the sole use of the Evergreen Regional Waste Management Services Commission and its agents. Neither 1689229 Alberta Inc. (operating as ETGM2), Cool Green Solutions Inc. (CGSI), their employees nor their sub-consultants assume any liability of any kind to any other party, in negligence or otherwise, for any representations, data, analyses, or the recommendations contained or referenced in this Feasibility Study, if this Feasibility Study is used or relied upon by any other Party, other than for informational and estimation purposes. Any unauthorized use of this Feasibility Study is at the sole risk of the user.

1.2 Executive Summary

The Evergreen Regional Waste Management Services Commission (Evergreen) wishes to evaluate the feasibility of building a Material Recovery Facility (MRF) for sorting the various waste streams that arrive at the Evergreen Regional Landfill near Lafond, Alberta. Once sorted, the recyclable categories would be sold to recycling companies. Alternatively, residue waste organics and/or some of these recyclable categories (paper, cardboard, plastics) could be sold or used internally as feedstock for a Waste to Energy (WTE) System. This recovery of recyclable materials and/or use of eligible waste for feedstock in a WTE System could divert as much 81% (14,200 Tonnes) of waste per year from the Evergreen Regional Landfill.

This Feasibility Study has the following objectives:

- To estimate the available recyclables content in the incoming waste by quantity and by category,
- To estimate the amount of recyclables material that the MRF can recover,
- To provide a conceptual MRF design, along with budgetary cost estimates in order to build and operate,
- To provide a conceptual WTE System, along with budgetary cost estimates in order to build and operate,
- To estimate the revenues that the MRF could provide,
- To estimate the revenues that a WTE System could provide,
- To provide an economic analysis comparing different facility and operating scenarios,
- To suggest a roadmap for the Evergreen Regional Landfill's waste management future.

Summary of Waste Received

The summary of the waste received at the Evergreen Regional Landfill during the most recent full-operating year, 2021 is shown in Table 1 below.

Type	Quantity (tonnes)
Class III Inert Waste	1,734.07
Class II MSW	15,688.26
Total	**17,422.33**

Table 1: Summary of Waste Received in 2021

Shown below in Table 2 is the breakdown of materials in the Class III Inert Waste Category.

Waste Type	Quantity (tonnes)
Shingles/Roofing	168.13
Clean Wood	134.82
Concrete	191.00
Construction and Demolition, Furniture, and any other sources	1,240.12
Subtotal	**1,734.07**

Table 2: Inert Waste (Class III) Received in 2021

Using the Recyclables Category percentages of materials determined from the 2017 Tetra-Tech Waste Characterization Study, the following Table summarizes the estimated amounts of the major Recyclable Categories that would be present. Since perfect separation of Recyclables is not possible, the following Table also shows a value for the Recyclables Recovered. Estimated Industry-based MRF sorting efficiencies are approximately 70%. Since a WTE System is an option, the missed quantities of cardboard, paper, and plastics Recyclables can be added to the amount of eligible WTE feedstock.

Recyclable Category	Amount Present (tonnes per year)	Amount Recovered (tonnes per year)
Paper	1,250	875
Cardboard	2,150	1,535
Plastic	2,030	1,421
Mixed Metals	650	455
Beverage Containers	125	88
	Sub-total	**4,374**
WTE Feedstock		9,200
Recyclables Lost		1,645
	Sub-total	**10,845**
Residue to Landfill		2,203
	TOTAL	**17,422**

TABLE 3: Major Waste quantity and composition

Considering the mixed waste composition of the Evergreen Regional Landfill's MSW, this MRF must be designed to produce clean, consistent, marketable products from heterogeneous materials. Designing, constructing and equipping a new MRF requires an efficient integration of automated technologies and manual labor.

The amount of the incoming MSW stream to the Evergreen Landfill and the costs of MRF sorting equipment dictate the complexity of MRF System. Based on the quantities of the waste received at the Evergreen Regional Landfill, the MRF selection approach requires the MRF System's ability to sort into the major recyclable categories. The ability to further sort major waste categories into sub-categories would require significantly more expensive equipment and/or manual labour that could not be justified by additional revenue at this time, with the current Recyclable Category market pricing. When Extended Producer Responsibility Regulations in the Province of Alberta provide higher values for Recyclables, additional sub-categories can be designed into the proposed Evergreen MRF.

When designing an MRF, the following are generally considered some of the key objectives in order to maximize efficiency and cost-effectiveness:

- Maximize material throughput,
- Maximize material recovery and minimize processing residue,
- Create a safe environment for workers,
- Produce consistent streams of quality recovered materials,
- Optimize system performance and uptime.

The potential also exists to use the residue from the MRF sorting process as a feedstock for a Waste-to-Energy (WTE) System. The more residues post-sorting that a WTE System is capable of processing, the more items can be repurposed into energy and away from landfill. The electrical and heat energy produced by a WTE System displaces new energy production, reducing fossil fuel consumption. A WTE System can also facilitate the remediation of waste in active landfill cells and the remediation of shut-in or abandoned landfills back into productive land.

There is a scale of relatively common MRF equipment available that matches well with Evergreen's current incoming MSW volumes and provides room for greater incoming MSW volumes. This range is from 5 tph to 10 tph, which roughly corresponds to 50 tpd to 100 tpd. The following Table summarizes Economic Analysis that we performed, including the budget prices for MRF equipment, optional WTE System options, and building structure options. It also provides Scenario revenues, expenses, and net profit (loss).

Ranking of Six Scenarios for Evergreen in this study:

Financial Criteria	Cell Construction	Waste Disposal Outsourcing	MRF only 950 m2 5 tph	MRF only 950 m2 10 tph	MRF/WTE 50 tpd	MRF/WTE 100 tpd
20 year Capital Investment	($11,675,384.48)	$0.00	($12,805,196.60)	($12,805,196.60)	($25,045,556.41)	($40,045,556.41)
20 year total Equity Investment	($2,597,011.51)	$0.00	($2,561,039.32)	($2,561,039.32)	($5,009,111.28)	($8,009,111.28)
20 year Estimated Operating costs incl Debt Service	($31,988,441.82)	($48,841,915.31)	($45,081,076.90)	($45,081,076.90)	($62,941,722.87)	($79,634,285.68)
20 year estmated total Revenue	$22,290,310.15	$36,142,337.58	$50,969,807.50	$56,900,795.46	$104,646,828.01	$182,223,267.14
20 year nominal Retained Earnings (EBITDA)	($12,295,143.18)	($12,697,261.38)	$3,327,691.28	$9,258,679.24	$36,695,993.85	$94,579,870.18
20 year average Retained Earnings/Deficit	($614,757.16)	($634,863.07)	$166,384.56	$462,933.96	$1,834,799.69	$4,728,993.51
20 year Levered Cash on Cash return	-33%	Not Applicable	56%	70%	87%	108%
20 year Closing Net Present Value	($4,558,735.77)	($5,623,318.25)	($208,474.75)	$3,423,156.01	$16,521,247.19	$49,158,023.88
20 year Internal Rate of Return	No return	No return	4%	10%	15%	27%
Notes	Revenues would need to climb 77% to break even with this scenario		Values reflect opening two new cells in 2030	Values reflect opening two new cells in 2031	No cell expansion required after system is operating	No cell expansion required after system is operating
Ranking Best (1) to Worst (6)	5	6	4	3	2	1

TABLE 4: Summary of Economic Analysis Scenarios for MRF and/ or WTE Systems

Material Recovery Facility and Waste to Energy System Recommendations

Based on the Summary of Scenarios in the Economic Analysis, we would recommend that the end goal for the Evergreen Regional Landfill is to increase the intake of MSW from the current rate of approximately 50 tpd to 100 tpd, install a MRF that can start at 5 tonnes per hour and handle up to 10 tonnes per hour. The MRF should be paired with a WTE System, both housed within a 1,500 square meter (16,140 square foot) building. Discussions would need to occur on how a transition to this end goal state might occur.

This recovery of recyclable materials and use of eligible waste for feedstock in a WTE System would divert approximately 81% or 14,200 tonnes of waste per year from the Evergreen Regional Landfill at the current 50 tpd rate of waste intake. This waste diversion would increase to approximately 28,400 tonnes per year at the increased 100 tpd rate of waste intake. This scenario generated significant annual revenues which would allow the Evergreen Regional Waste Management Services Commission to realize an economic return from their investment over the project's anticipated 20-year lifespan.

Circular Economy

It is crucial to solve our ongoing generation of waste and to remediate our legacy of waste. Our goal is to re-use our materials as much as possible, to extract the maximum value from the waste that remains, to generate significant revenues, and to provide maximum benefit to the community. The option of a MRF paired with a WTE System move Evergreen towards a much greater degree of landfill waste diversion by reducing landfill waste by up to 81%.

1.3 Table of Contents

1.4 List of Acronyms

The following is a commonly used list of acronyms. Some of these acronyms are used in this document; some are used in the articles and websites used as references.

Acronyms/Abbreviations	Definition
2-D	two-dimensional
3-D	three-dimensional
BHS	Bulk handling systems
BOD	Basis of Design
C&D	Construction and demolition
CGSI	Cool Green Solutions Inc.
CHP	Combined heat and power
Class I Landfill	Hazardous waste landfill
Class II Landfill	Non-hazardous municipal solid waste landfill
Class III Landfill	Inert waste landfill
DLC	Demolition, Land Clearing, and Construction
Dry Waste	Inert waste; typically construction, renovation and demolition waste, concrete, asphalt
ECS	eddy current separator
EPR	Extended Producer Responsibility
ETGM2	1689229 Alberta Inc. (operating name is ETGM2)
HDPE	high-density polyethylene
HHW	household hazardous waste
ICI	Industrial, Commercial, and Institutional LDPE low-density polyethylene
MP	mixed paper
MRF	Materials recovery facility
MSW	Municipal solid waste
NFPA	National Fire Protection Association O&M operation and maintenance
OCC	old corrugated containers
ONP	old newspaper
PE	polyethylene
PET	polyethylene terephthalate
PP	polypropylene
QC	quality control
RDF	Refuse Derived Fuel
RFP	Request for Proposal
RNG	Renewable Natural Gas
tpd or TPD	tonnes per day
tpd or TPH	tonnes per hour
TS	Total Solids
UBC	used beverage containers
VS	Volatile solids
WTE	Waste to Energy
Wet Waste	Non-hazardous solid waste that includes organics

1.5 - List of Tables

1.6 - List of Figures

1.7 Cover Letter

September 6, 2022

Paul Poulin
Manager
Evergreen Regional Landfill
Phone: 1 780 646-6125

Dear Paul:

RE: Feasibility Study for Material Recovery Facility – ISSUED FOR REVIEW

ETGM2 and Cool Green Solutions Inc. are pleased to submit the following Feasibility Study for a Material Recovery Facility to the Evergreen Regional Waste Management Services Commission (Evergreen) for Review. This Feasibility Study will help Evergreen to evaluate the economic feasibility of solid waste sorting system options, as well as Waste to Energy System options. We have also provided two building options.

With the Province of Alberta implementing Extended Producer Responsibility regulation, this Feasibility Study provides options to help Evergreen determine future facility and operations planning.

Eric Friesen and I, Greg Harasym, look forward to continuing our discussions with you. We want to partner with the Evergreen Regional Waste Management Services Commission to reduce waste going to landfill, while generating revenue for the Commission. We are ready to assist Evergreen with the implementation of future facility development.

If you have any questions or comments, please contact us.

Best Regards,
Greg Harasym
1689229 Alberta Inc. (ETGM2)
MOB: 1 403 869-4908
Email: harasym.greg@etgm2.com

Eric Friesen
COOL GREEN SOLUTIONS INC.
MOB: 1 587 891-5251
Email: ericfriesen@coolgreensolutions.ca

1.8 Purpose of Material Recovery Facility Feasibility Study

The Province of Alberta has begun implementing Extended Producer Responsibility regulation. This Feasibility Study will help the Evergreen Regional Waste Management Services Commission (Evergreen) to evaluate the economic feasibility of a facility that will sort incoming solid waste, along with Waste to Energy System options. This study provides options to help Evergreen determine future facility and operations planning, based on economic analysis, along with possible road map for how the final destination would be achieved.

1.9 Circular Economy

In our current Linear Economy, humans take materials from the Earth, make products from them, and eventually throw the products away as waste.

In a Circular Economy, the goal is to minimize the waste being produced. If a product no longer has useful life, cannot be repurposed into another product, it can be recycled. Many smaller communities collect waste in a mixed format in one truck load. This mixed waste needs to be sorted into its constituent recyclable categories, so that these recyclable materials can continue on their path through the Circular Economy. The more categories into which a Materials Recovery Facility (MRF) can sort recyclables, the more diversion from landfill can occur. The more recyclables that can be sorted, the more revenue can be derived.

The potential also exists to use the residue from the MRF sorting process as a feedstock for a Waste-to-Energy (WTE) System. The more residues post-sorting that a WTE System is capable of processing, the more items can be repurposed into energy and away from landfill. The electrical and heat energy produced by a WTE System displaces new energy production, reducing fossil fuel consumption. A WTE System can also facilitate the remediation of waste in active landfill cells and the remediation of shut-in or abandoned landfills back into productive land.

A Materials Recovery Facility is one of the Circular Economy's enabling solutions that has economic, social, and environmental benefits through reduced landfill gas emissions, reducing the amount of the land on which landfills are located, and job creation. The emergence of the Circular Economy will change the way society thinks about waste.

Each activity and step in the Circular Economy, such as obtaining materials, making products, re-purposing and recycling products, requires energy in order to happen. Waste-to-Energy would be the final step required to close this Circle.

2.0 Waste & Recycling Description Estimate

The following estimates in this section for the current quantity of the incoming waste streams to the Evergreen Regional Landfill are based on waste volume data from the report titled, "2021 Annual Operating Report Evergreen Regional Class II Landfill", produced by Omni-McCann Geoscience on February 2022. The following estimates in this section for the current composition of the incoming waste streams to the Evergreen Regional Waste composition data are based on data from the last full Waste Characterization Study, submitted on August 9, 2017 by Tetra Tech Canada Inc. out of Vancouver British Columbia.

2.1 Current Site Overview

The Evergreen Regional Landfill site is located in the St. Paul Grazing Reserve, approximately 20 km southwest of the town of St. Paul, Alberta. The Evergreen Regional Landfill is owned and operated by the Evergreen Regional Waste Management Services Commission and has been collecting commercial waste, construction waste and Municipal Solid Waste (MSW) since 2005.

There are five total phases to the Evergreen Regional Landfill. Phase 5 house the inert landfill. Phase 1 houses the initial 12 cells, 6 of which have been developed. At this rate, the first expansion would take place in 2030.

The current structures at the Evergreen Regional Landfill include a scale house for monitoring the weight of incoming vehicles, a storage shed for equipment, an attendant building, and an equipment maintenance building. In 2015, a landfill gas monitoring well was installed to measure emissions from decaying waste in the landfill cells.

The maintained working face is the active area at the landfill where landfill waste is spread and compacted before it is covered. This maintained working face of the landfill's MSW Cells in 2021 was between 225 m^2 and 400 m^2. The average waste thickness was 3 m. The inert waste area has varied due to seasonal waste volumes.

The land surrounding the Evergreen Regional Landfill is poorly drained, but overall, slopes towards the North Saskatchewan River. There are no creeks or large bodies of water within one kilometer of the landfill. Leachate levels in the Class II (MSW) Cells have never exceeded the conditions of the landfill's approval level (300 mm above the liner).

Precipitation records are recorded at the scale house. Between 2011 and 2021, there has been an average 413.4 mm of rainfall annually.

2.2 Landfill Cover

Soil cover is placed over the landfill cells in order to control litter, prevent litter from blowing in the wind, to limit the precipitation that reaches the waste, to prevent fires and to prevent odours. Over the Class III Inert Waste cells, cover is placed a minimum of two times per week. When cover is applied to advance the working face, it is a minimum of 30 cm thick.

In the summer, soil cover is used over the Class II MSW cells a minimum of once per week. In the winter, a mixture of soil, straw, crushed cement, and crushed wood is used as a cover; however, cover is only applied when needed to advance the working face. When cover is applied to advance the working face, it is a minimum of 30 cm thick.

In 2021, 1247 buckets of dirt, clay, and mulch were used, and 77 bales of hay were used for cover.

2.3 Waste not Accepted

The Evergreen Regional Landfill does not accept household hazardous waste (HHW) or ozone-depleting substances including refrigerants from household appliances from commercial sources or from outside the region. The Evergreen Regional Landfill does accept HHW or ozone-depleting substances including refrigerants from household appliances from residents of the region. The HHW and ozone-depleted substances are removed from the Evergreen Regional Landfill site within one year of arrival.

The Evergreen Regional Landfill does not receive waste from out-of-jurisdiction transfer stations and it does not accept biomedical waste or biosolids, even if it has been treated.

2.4 Map of the Evergreen Regional Landfill Area

(From Omni-McCann 2021 Environmental Monitoring Report)

Figure 1: Map of Evergreen Regional Landfill

2.5 Quantity of Landfill Waste (2021)

The following solid waste quantity data describes the annual waste quantities received at the Evergreen Regional Landfill during the most recent full operating year, 2021. This information is derived from the report titled, **"2021 Annual Operating Report Evergreen Regional Class II Landfill"**, produced by Omni-McCann Geoscience on February 2022. In 2021, the breakdown of waste entering the landfill was recorded at the scale house.

The summary of the waste received at the Evergreen Regional Landfill during the most recent full operating year, 2021 is shown in Table 5 below.

Type	Quantity (tonnes)
Class III Inert Waste	1,734.07
Class II MSW	15,688.26
Total	**17,422.33**

Table 5: Summary of Waste Received in 2021

Shown below in Table 6 is the breakdown of materials in the Class III Inert Waste Category.

Waste Type	Quantity (tonnes)
Shingles/Roofing	168.13
Clean Wood	134.82
Concrete	191.00
Construction and Demolition, Furniture, and any other sources	1,240.12
Subtotal	**1,734.07**

Table 6: Inert Waste (Class III) Received in 2021

Shown below in Table 7 is the breakdown of materials in the MSW (Class II) Category, received in 2021.

Waste Type	Quantity (tonnes)
Household Waste	12,059.59
Mixed Wet Waste	3,109.15
Ash (from burn pits)	228.73
Mixed Construction and Demolition	159.43
Dead Animals / Poultry	1.03
Tire Shred	79.00
Oil Hoses	5.07
Cardboard	44.71
Subtotal	**15,688.26**

Table 7: MSW (Class II) Received in 2021

2.6 Landfill Waste Composition (2021)

The following solid waste quantity data Table below describes the percentages of each waste sub-category within the majority waste categories received at the Evergreen Regional Landfill during the last full Waste Characterization Study, submitted on August 9, 2017 by Tetra Tech Canada Inc. out of Vancouver British Columbia.

TOTAL RESIDENTIAL WASTE (2021)		**15,169 metric tonnes**
CATEGORY	**RESIDENTIAL**	
01 Compostable Organics		
Clean wood	0.20%	30.338
Food waste – non-packaged	15.30%	2320.857
Food waste – packaged	12.10%	1835.449
Liquids	0.70%	106.183
Yard and garden waste	4.20%	637.098
Subtotal	**32.40%**	4914.756
02 Household Hygiene		
Biological – diapers/pet waste	9.60%	1456.224
Subtotal	**9.60%**	1456.224
03 Paper		
Paper – newsprint	6.20%	940.478
Paper – office	1.90%	288.211
Cardboard	14.10%	2138.829
Subtotal	**22.20%**	3367.518
04 Non-Compostable Organics		
Other – rubber, leather, composite organics	1.00%	151.69
Treated or painted wood	1.90%	288.211
Subtotal	**2.90%**	439.901

05 Plastic		
Plastic – film	4.80%	728.112
Plastic – rigid containers	3.50%	530.915
Plastic – styrofoam	0.80%	121.352
Plastic – other	4.30%	652.267
Subtotal	**13.30%**	2017.477
06 Textiles		
Natural and synthetic	5.60%	849.464
Subtotal	**5.60%**	849.464
07 Bulky Objects		
Furniture	0.30%	45.507
Subtotal	**0.30%**	45.507
08 Building Material		
Asphalt products	0.00%	0
Carpet and underlay	1.20%	182.028
Gypsum and drywall	0.00%	0
Other – insulation, siding, inorganics	0.90%	136.521
Subtotal	**2.10%**	318.549
09 Electronic Waste		
All corded and battery powered	1.20%	182.028
Subtotal	**1.20%**	182.028
10 Metal		
Metal – other	2.50%	379.225
Metal – recyclable	1.80%	273.042
Subtotal	**4.30%**	652.267
11 Glass		
Glass – other	0.70%	106.183

Glass – recyclable	1.00%	151.69
Subtotal	**1.70%**	257.873
12 Household Hazardous		
Batteries	0.10%	15.169
Other	0.10%	15.169
Medical/biological	0.80%	121.352
Products or containers	0.70%	106.183
Subtotal	**1.80%**	273.042
13 Beverage Containers		
Beverage containers	0.80%	121.352
Subtotal	**0.80%**	121.352
14 Fines		
Fines	1.80%	273.042
Subtotal	**1.80%**	273.042
TOTAL:	**100.00%**	**15,169 metric tonnes**

Table 8: Evergreen Regional Landfill Waste Quantities sorted by Category - Estimated

2.7 Estimates of Recyclables and Eligible Waste to Energy Feedstock

Using the quantity of waste data from **Section 2.5 - Quantity of Landfill Waste (2021)** and using the percentages of waste categories received at the Evergreen Regional Landfill during the last full Waste Characterization Study, submitted on August 9, 2017 by Tetra Tech Canada Inc. out of Vancouver British Columbia from **Section 2.6 - Landfill Waste Composition (2021),** estimates were determined for the major categories of Recyclable Categories that could be reasonably expected to be sorted. As well, estimates were determined for the eligible Waste to Energy System feedstock. The results are summarized in the Table below.

EVERGREEN REGIONAL LANDFILL WASTE BY RECYCLABLE CATEGORY - 2021										
Bulk Waste Categories			**Recyclable Materials by Category**			**Eligible Feedstock for WTE**			**RESIDUE to Landfill**	
	Tonnes per Year			**Tonnes per year**			**Tonnes per year**			**Tonnes per year**
Table A-I. Class III (Inert) Landfilled Waste										
Constrcution & Demolition, Furnture, etc.	1,240.12					C&D - WTE eligble port	600.00			
Shingles, Roofing	168.13					Shingles, Roofing	168.13			
Clean Wood	134.82					Clean Wood	134.82			
Concrete	191.00									
Sub-total	**1,734.07**									
Table A-II. Class II (MSW) Landfilled Waste										
Household Waste	12,059.58		Paper	1,250.00		Compostable Organics	4,930.00			
			Cardboard	2,150.00		Diapers/Hygiene/Pet \	1,460.00			
			Plastic	2,030.00		Other Organics	450.00			
			Mixed Metals	650.00		Textile	850.00			
Mixed Wet Waste	3,109.15		Beverage Containers	125.00		Furniture	50.00			
						Carpet/Underlay/Sidin	230.00			
						Fines (50%)	180.00			
Sub-total	**15,168.73**									
Ash (from county burn pits)	228.73									
Mixed C and D	159.43					Mixed C&D - WTE eligt	50.00			
Processed Fluorescent Bulbs	1.56									
Dead Animals/Poultry	1.03					Dead Animals/Poultry	1.03			
Tire Shred	79.00					Tire Shred	79.00			
Oil Hoses	5.07									
Cardboard	44.71		Cardboard	44.71						
Sub-total	**519.53**									
2021 - TOTAL Waste at Evergreen Regional Landfill	**17,422.33**	=	subtotal	**6,249.71**	+	subtotal	**9,182.98**	+		**1,989.64**

Table 9: Determining Estimated Annual Amounts per Recycle Category

Consider that the estimates determined above represent what quantity within the Recyclables Categories would be present. Perfect separation of what recyclables are present is not possible, with industry MRF sorting efficiencies at approximately 70%.

The missed quantities of cardboard, paper, and plastics recyclables would be added to the WTE eligible feedstock.

Therefore, 6,250 tonnes per year of recyclables present becomes 4,345 tonnes per year of recyclables recovered. Those 1630 tonnes are added to the WTE feed. The Table below summarizes the estimated annual quantities of Recyclables Categories and WTE eligible feedstock.

Recyclable Category	Amount Present (tonnes per year)	Amount Recovered (tonnes per year)
Paper	1,250	875
Cardboard	2,195	1,535
Plastic	2,030	1,421
Mixed Metals	650	455
Beverage Containers	125	88
	Sub-total	**4,374**
WTE Feedstock		9,200
Recyclables Lost		1,645
	Sub-total	**10,845**
Residue to Landfill		2,203
	TOTAL	**17,422**

Table 10: Summary of Estimated Annual Amounts per Recycle Category

Please note that total waste received by the Evergreen Regional Landfill in 2021 was approximately 17,422 tonnes, or 47.7 tonnes per day.

Please note that 5 tonnes per hour (tph) for an 8-hour day is approximately 40 tons per day.
Please note that 5 tonnes per hour (tph) for a 10-hour day is approximately 50 tons per day.
For the purposes of **SECTION 7.0 – PROJECT ECONOMICS**, 5 tph is labelled as equivalent to 50 tpd.

Please note that 10 tonnes per hour (tph) for an 8-hour day is approximately 80 tons per day.
Please note that 10 tonnes per hour (tph) for a 10-hour day is approximately 100 tons per day.
For the purposes of **SECTION 7.0 – PROJECT ECONOMICS**, 10 tph is labelled as equivalent to 100 tpd.

3.0 Preliminary Permitting and Approvals Review

The Permitting and Approvals for this project will run concurrently with the design development and engineering of the facility and roughly follow the process laid out below:

- After the acceptance of the Feasibility Study, Evergreen will approach the Alberta Ministry for Environment and Parks (AEP) for their initial response to the project proposal in consultation with ETGM2/CGSI (the project team) to determine the viability of the proposal, and determine whether AEP would favour the project or not.
- If AEP is in agreement with moving forward with the project, the project team will work with AEP to determine their design and engineering documentation requirements along with any proof-of-concept or testing requirements or authentication for the proposed systems, and determine an overall project development timeline.
- In discussions with other Alberta jurisdictions that have developed or are developing Material Recovery Facilities it is apparent that AEP has been very supportive of developing MRF facilities. The process has generally been straight forward but does rely a good deal on the relationship established with AEP and the communicated benefits of the proposed facility.
- The design and engineering documentation for AEP will also be used for Development and Building Permitting in the County of St. Paul, and will be supplemented with any additional documentation and/or information required by the County. The Development Permit fee is based on the estimated value of the overall development and would range between $4,500.00 and $7,000.00 for this project, depending on the size and scope of the project. This money has been allowed for in the budget estimate of the facility included in this study.
- A Development Permit will be required for the facility on the Evergreen Regional Landfill site. This is governed by the County of St. Paul No. 19 Land Use Bylaw, 2021-13, Section 8.9, Page 77 (please see copy attached in Appendix B). This is a Direct Control development district, meaning that the St. Paul County Council has direct involvement with the review and issuance of the development permit and it is not an administrative procedure as defined in other sections of the Land Use Bylaw. This could require multiple presentations to County Council with architectural design and engineering documentation that has been included in the budget costing for the project.
- Depending on the final determination of the systems included in the project, the facility will be classified as an Industrial use; either light, medium or heavy. All of these classifications should be acceptable to the County due to the location and to the proposed siting of the facility.
- When final approval is obtained from both AEP and the County of St. Paul for the Development Permit, a building permit will be applied for with the County for the facility with all the required construction documents and prior approvals. The building permit value will be based on the overall value of the construction of the facility, and we estimate that the building permit will be worth between $20,000.00 to $27,000.00, again depending on the size and scope of the facility. This money has been allowed for in the budget estimate of the facility included in this study.
- We estimate that the permits and approvals process will take between six to eight months to complete, but can vary depending upon what aspects of the proposed facility are included (WTE systems could take longer), the availability of design, engineering and technical personnel to complete documents, and the response of these jurisdictions.
- We estimate that the entire permitting and approvals process will take between six to eight months to complete.

As part of the Road Map to implement a MRF with optional WTE System, the AEP would likely require a Pilot-Scale WTE System as a first step to demonstrate WTE System compliance with AEP emissions regulations. A Pilot-Scale WTE System would be tested and proven within a 6 to 12 month period. This initial operating period would allow the Pilot Plant to become functional and would allow a variety of feedstock material to be performance tested. Environmental testing would include performing Air Quality Emissions Testing and Ash Residue and/or "Slag" Leaching Tests. Once the operating requirements, functional tests, and environmental tests are completed to the Province of Alberta's satisfaction (as specified in the Temporary Operating Permit), a Full Operating Permit/License would be granted.

The completion of the Pilot Plant's two-stage approval process assists in the application for a Full-Scale Waste-to-Energy Facility Operating Permit / License. Approval of the Full-Scale System Operating Permit / License will be helped by the successful proving process of the Pilot-Scale WTE System.

4.0 Materials Recovery Facility (MRF)

4.1 Alberta Extended Producer Responsibility (EPR) Program

Current Recyclable Materials Categories Regulation

As of the date of the submission of this Feasibility Study, there are no existing Alberta Extended Producer Responsibility Program (EPR) recyclable material category requirements currently in place.

Alberta EPR Background

On December 2, 2021 the Government of Alberta passed **Bill 83: The Environmental Protection and Enhancement Amendment Act,** enabling the creation of an Extended Producer Responsibility (EPR) framework that shifts the physical and financial responsibility of recycling waste to industry product and packaging producers and away from local governments and taxpayers.

The Government of Alberta then began working on developing an Extended Producer Responsibility (EPR) Framework that would create province-wide industry-led systems for managing single-use plastics, packaging, and paper products, as well as hazardous and special products like household pesticides and solvents. It is important to note that the EPR framework would not include the beverage container deposit system, which will continue to run as is. Bill 83 also claims to support Alberta's transition to a plastics circular economy that ensures plastics are kept out of landfills for longer, not just by reuse and recycling but also by remanufacturing into new products.

Bill 83 originally stated that the creation of the initial EPR regulatory framework would be targeted for spring 2022.

In April 2022, The Alberta Government announced that it was in the process of developing EPR regulations for Packaging and Paper Products (PPP) and Household Hazardous Waste (HHW). During the public consultation phase that occurred during the spring 2022, the Alberta Government stated that the first framework for EPR would be set to begin on June 30, 2022.

On July 12, 2022, The Alberta Government announced that while it remains committed to implementing EPR systems for residential recycling and hazardous and special products, it delayed the release of its EPR Framework regulations until Fall 2022. Once an EPR regulation would come into force, the industry would then have 28 months to fully transition the system from its current state.

Possible Future Trends

Using British Columbia's EPR history as a guideline, BC currently regulates the following items in their EPR Regulations:

- Electronics & Electrical
- Lead-Acid Batteries
- Packaging and paper product
- Paints, Solvents, Pesticides & Gasoline
- Pharmaceuticals
- Tires
- Used Oil and Antifreeze

B.C. announced in the fall of 2021 the expansion of product categories in their EPR initiative over a 5-year timeline to include:

- Hybrid and electric vehicle batteries and other battery types.
- Mattresses and foundations.
- Compressed canisters, such as single-use camping fuel and fire extinguishers.
- Medical sharps used by people at home.
- Emerging electronics and more moderately hazardous products by clarifying product categories.

BC's history might provide a guideline for what order New Recyclables Categories could come under Alberta's early Extended Producer Responsibility Program.

4.2 MRF Design

MRF's must be designed to produce clean, consistent, marketable products from heterogeneous materials. Designing, constructing and equipping a new MRF requires an efficient integration of automated technologies and manual labor.

When designing an MRF, the following are generally considered some of the key objectives in order to maximize efficiency and cost-effectiveness:

- Maximize material throughput,
- Maximize material recovery and minimize processing residue,
- Create a safe environment for workers,
- Produce consistent streams of quality recovered materials,
- Optimize system performance and uptime.

Initial Alberta EPR Regulations are believed to include Packaging and Paper Products (PPP) and Household Hazardous Waste (HHW). Some of the Recyclables Categories in the Table below will likely be part of the initial Alberta EPR Regulations, the remainder of the categories will likely become part of future Alberta EPR Regulations.

Since the initial announcement that Alberta was going to implement EPR Regulations, the actual creation of the Alberta EPR regulations has been slow. Predicting upcoming changes to the Extended Producer Responsibility program, including single use plastics and other consumer wastes, has become more difficult.

One method of predicting Alberta EPR regulations additions is to look at a jurisdiction with a longer history of EPR regulation. An example of a jurisdiction that has implemented EPR over a longer timeframe is British Columbia. BC initially implemented their EPR regulations in 2004. They have gradually made changes over time.

BC currently regulates the following items in their EPR Regulations:

- Electronics & Electrical
- Lead-Acid Batteries
- Packaging and paper product
- Paints, Solvents, Pesticides & Gasoline
- Pharmaceuticals
- Tires
- Used Oil and Antifreeze

The amount of the incoming MSW stream to the Evergreen Regional Landfill and the costs of MRF sorting equipment dictate the complexity of MRF System. Based on the quantities of the waste received at the Evergreen Regional Landfill, the MRF selection approach requires the MRF System's ability to sort into the major recyclable categories. The practical consideration for choosing these categories was recyclable categories with nearby markets with whom to sell the recyclables. The additional ability to further sort major waste categories into sub-categories would require significantly more expensive equipment that could not be justified by additional revenue at this time, with the current Recyclable Category pricing.

Using the Category percentages of materials determined from the 2017 Tetra-Tech Waste Characterization Study, the following Table summarizes estimated amounts of the major Recyclable Categories that would be present. Also consider that this estimate represents what recyclables would be present. Since perfect separation is not possible, the following Table shows a value for the Recyclables Recovered. Estimated Industry-based MRF sorting efficiencies are approximately 70%. Since a WTE System is an option, the un-recovered quantities of cardboard, paper, and plastics recyclables could be added to the amount of eligible WTE feedstock.

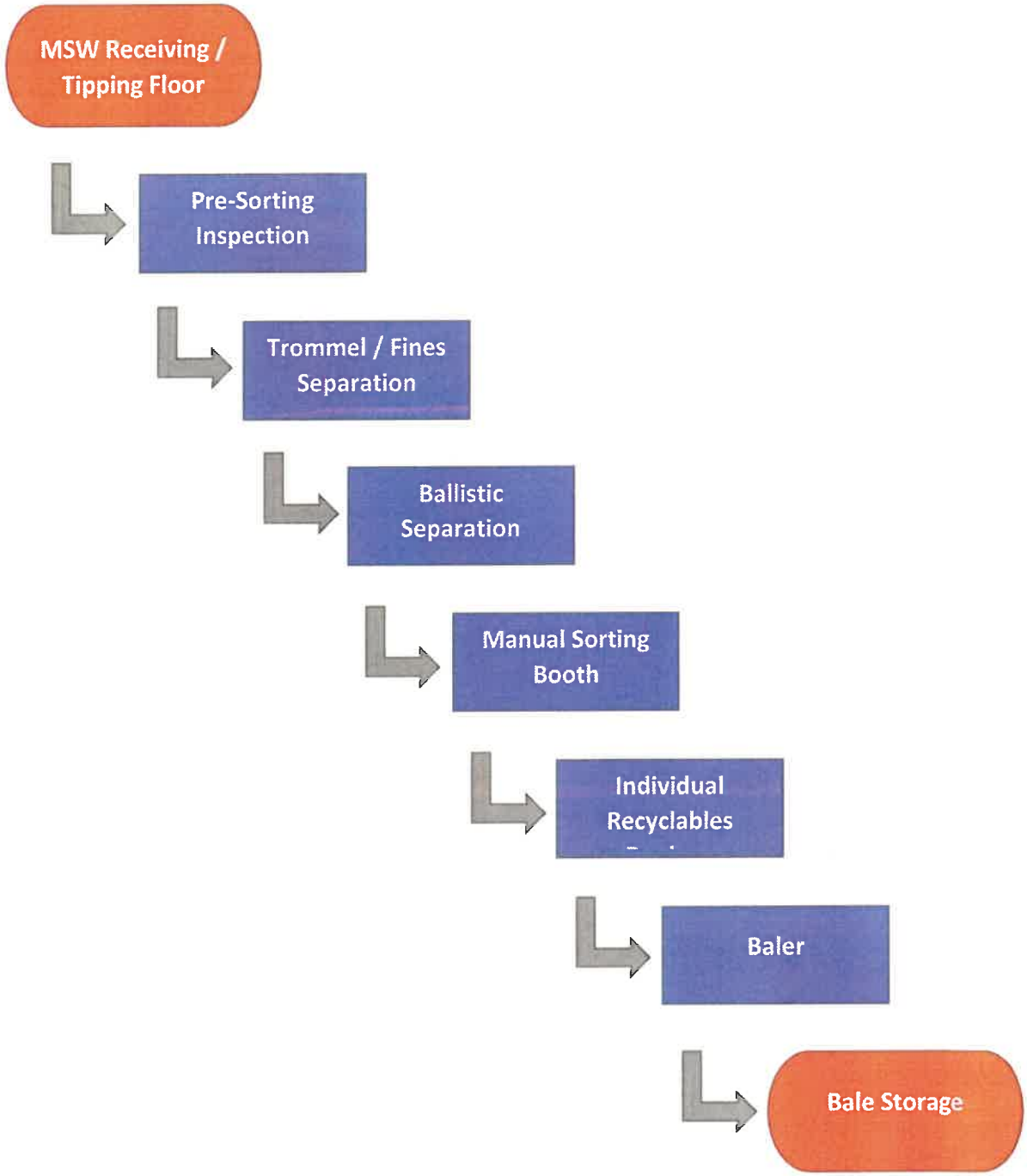
All of the Recyclables in the Table below have a market value. Future Extended Producer Responsibility regulations that incorporate any recyclable categories below would only help to increase its recovered value, and improve overall MRF System economics.

Recyclable Category	Amount Present (tonnes per year)	Amount Recovered (tonnes per year)
Paper	1,250	875
Cardboard	2,195	1,535
Plastic	2,030	1,421
Mixed Metals	650	455
Beverage Containers	125	88
	Sub-total	**4,374**
WTE Feedstock		9,200
Recyclables Lost		1,645
	Sub-total	**10,845**
Residue to Landfill		2,203
	TOTAL	**17,422**

Table 11: Major Recyclable Categories and Estimated Annual Recovery Volumes

The MRF Process Flow Diagram on the following page provides a visualization of the steps needed in the preliminary MRF design to attain the Major Recyclable Categories and Estimated Annual Recovery Volumes shown in the Table above. The Process Flow Diagram is arranged from the beginning of the process with the MSW Receiving / Tipping Floor, located at the top of the Process Flow Diagram, to the end of the process with the Recyclables Bales Storage, awaiting shipment to the appropriate Recyclable Category end-market.

Suggested Initial MRF Process Flow Diagram



4.3 How the MRF Facility can be Expanded and Modified

MRF Facility Expansion

The MRF Equipment Line suggested for this project has a flexible feed rate of approximately 5 tph to 10 tph. This flexibility is accomplished by the improvements in operating skills of the manual labourers catching up with the overall capabilities of the automated MRF Equipment. As the manual labourers improve on their learning curve, the MRF Equipment has the ability to speed up to its maximum throughput.

There is also the ability to twin the MRF Equipment in parallel with each other. This would double the capacity further.

The construction of the facility allows for expansion along the lengthwise dimension (250'). The wall between the old facility and the new facility would be required to be a 4-hour firewall. It could be expandable up to another 16,000 square feet. With the current EPR situation, the values for the recyclables categories, and the marginal MRF-only facility economics, there does not appear to be an immediate benefit to facility expansion.

MRF Facility Modification

The current recyclables marketplace allows for further sorting of major waste categories into sub-categories. This future accommodation of sorting could occur through additional automated methods or through additional manual sorting labour.

Although there are some sub-categories of recyclables that have significant extra value compared to the value of overall bulk recyclable, the trade-off can be that the volume, additional transport expense to more distant recyclables purchasers, and lack of storage space until baling can occur all chip away at the extra value benefit.

An example of a recyclables category and sub-category that should be considered for future additional sorting would be "Mixed Plastics". "Mixed Plastics" is a recyclables category that could yield approximately $100 per tonne. If further manual sorting of the Mixed Plastics recyclable category occurred, sub-categories such as "Natural HDPE", "PET", and "Polypropylene" could yield approximately $1200 per tonne, $200 per tonne, and $300 per tonne respectively.

4.4 Estimated Value by Recyclable Category

Recyclable Category	Amount Present (tonnes per year)	Amount Recovered (tonnes per year)	Value of Category (per tonne)	Annual Revenue per Category
Paper	1,250	875	$60	$52,500
Cardboard	2,150	1,505	$90	$135,450
Plastic	2,030	1,421	$125	$177,625
Mixed Metals	650	455	$150	$68,250
Beverage Containers	125	88	$150	$13,125
	Sub-total	**4,344**		**$446,950**
WTE Feedstock		9,200		
Recyclables Lost		1,630		
	Sub-total	**10,830**	***$179** If not fed in WTE onsite	**$1,936,000**
Residue to Landfill		2,249		
	TOTAL	**17,422**		**$988,450**

Table 12: Estimated Value by Recyclable Category

*The value per tonne of WTE Feedstock is based on the estimated annual revenue for the 40 tpd WTE System. From Section 5.5: "With up to 1300 kW generated and assuming average annual export electrical price to grid of $0.17 per kWh, including base load and peak demand cases, the annual amount of electrical power generation revenue is estimated to be approximately: **$1,936,000"**.

NOTES:
Estimated Value for all categories does not include operating cost savings from NOT putting this material into the landfill.

Although not broken out as a category, Mattresses and Furniture could provide significant revenue to the overall MRF operations if an extra tipping fee were to be charged per item. BC currently charges from $15 to $30 per mattress and from $25 to $50 per item for furniture.

A rough revenue estimate would be approximately 3,000 mattresses and 2,000 pieces of furniture in the Region.
This would yield annual revenue from: Low range - $45,000 (mattresses) + $ 30,000 (furniture) = $75,000
High range - $90,000 (mattresses) + $100,000 (furniture) = $190,000

Extra items could be solicited from outside the region for more revenues.

4.5 Impact of the Recyclable Streams on a Potential WTE System

If the entirety of the incoming MSW were to be processed by an onsite WTE System only, with no MRF to pre-sort WTE System feed stock, there would be more WTE feedstock in volume; however, this larger volume would include metals, glass, ceramics, fines, and other non-organic materials that would not contribute to electrical power nor heat power generation capabilities of the WTE System.

With a MRF to pre-sort WTE System feed stock, there would be better WTE System efficiency. Since less incoming MSW would be required to achieve a better electrical power and heat power result, certain components could be reduced in size; therefore, the onsite WTE System would become less expensive.

With less inerts in the WTE System feed stock, there would a lower volume ash slag.

Exporting WTE Feed Stocks

Exporting pre-sorted WTE feed stock to an outside location for revenue additional to a MRF is possible. With the approximate value per tonne of WTE feed stock estimated to be $179 per tonne as determined on the previous page, an outside WTE facility would need to pay some share of that WTE feedstock value in order to be worthwhile for Evergreen and worthwhile for the outside facility. There are also the costs of transportation to the outside WTE Facility location which need to be considered.

4.6 Material Recovery Facility Building, Equipment, Operations, Labour, and Maintenance

4.6.1 MRF Building - Description

Discuss features within the proposed MRF that will allow accommodation of the new composition of waste that the MSW will bring in the near future.

We have provided Order-of-Magnitude Budget pricing for both a 950 square meter facility, and a 1,500 square meter facility. The smaller footprint is for an MRF-only facility option, and the larger footprint is for a combined MRF/WTE facility (see Section 4.7 for details on Budget Estimate).

The basic design of the building options considered for the financial modeling of the Material Recovery Facility (MRF), and the Waste to Energy Facility (WTE) have been formulated with the following issues and parameters in mind:

- The facility will be sited on the Evergreen Waste Commission property in the southwest portion of the property, immediately adjacent to the existing Equipment Maintenance Building and Equipment Storage Shed. The new facility will also be within near proximity to the existing Storm Water Retention Pond (See attached site plan indicating the site for the proposed new facility in Appendix A.)
- The closest operating Firehall to the facility is in St. Paul, a minimum 15-minute drive away from the proposed facility, and not within immediate emergency response timing or distance. In order to meet National Building Code requirements for Fire Safety, one of the following design parameters must be adhered to:
    - The building can be under 1,500 square meters (16,140 square feet) built from non-combustible construction and be unsprinklered, or:
    - If the building is over 1,500 square meters, the building will require complete fire suppression, meaning that an automatic Fire Sprinkler system will need to be installed, including a Fire Pump and a separate Retention Pond to supply the Fire Suppression system.
    - In further analysis of the potential risks of building a facility without any kind of fire suppression system in it, we have included a budget allowance for a stand-alone fire suppression system for both building scenarios.
- In analysing the overall spatial requirements for the both the MRF and WTE systems, we have determined that both systems could be housed in a building of 1,500 square meters, with the MRF system resident in approximately 60% of the building, and the WTE system resident in the other 40%. Therefore, our overall building design and requirements have been based on these results and parameters.
- We have done Order-of-Magnitude Budget pricing for both a 950 square meter facility, and a 1,500 square meter facility. The smaller footprint is for an MRF-only facility option, and the larger is for a combined MRF/WTE facility.

- The smaller 950 square meter building could be expanded to 1,500 square meters. Should the facility need to be expanded beyond 1,500 square meters, this would require one of the following options to satisfy the National Building Code Fire Regulations:
    - Installation of a stand-alone fire suppression system in the entirety of the building (the initial building and the expansion area), including automatic fire sprinklers, a fire pump, and a retention pond constructed to store water in case of a fire emergency,
    - Installation of a 4-hour fire wall on one side of the building and expansion of the facility on the other side of the fire wall with no internal access between the existing building and the new through the fire wall with the expansion area being no larger than 1,500 square meters without fire suppression, or
    - Erection of a separate building on the site separated by the appropriate limiting distance for fire regulations and truck and equipment access to the interior for operations, again no larger than 1,500 square meters without fire suppression.
- For both facility options, we have included development of vehicle access to the site and a five-acre gravel yard surrounding the facility. Close attention will be paid to the civil design of the yard and access from the road to ensure proper access for semi-tractor trailers and site drainage.
- All building services will be self-contained on site and either installed new on site (this has been allowed for), or tap into existing building services from the adjacent facilities.

  The building will be designed and built to the current building codes that prevail in the region, and will include a washroom. No other interior improvements have been allowed for in this exercise but can be added in successive design iterations at additional cost to the initial budget.

4.6.2 MRF Building - Budget Estimate

Please note: Two Front-end Loaders and two smaller skid steer loaders would be leased and are included in operating expenses.

The following is a description of the two building options and their features:

- **Site Access** – two access points will be provided to the yard from the main road with the building sited to provide the best access points and turning radii for incoming and exiting traffic.
- **Site prep allowances and description (aprons)** – the property development includes developing a four-acre gravel yard space, with concrete aprons at all entry points to the building designed to take semi-tractor trailer traffic in all seasons.
- **Footprint** – There are two options for the overall building footprint, 1) 950 square meters (10,200 square feet) and 2) 1,500 square meters (16,140 square feet) designed to conform to the fire suppression requirements stated above.
- **Celling height** – The clear ceiling height to the centre ridge line will be 58'
- **Overall height** – overall exterior height of the building will be 60' +/-
- **Floor** – The 8" thick floor is designed for industrial/manufacturing loading including steel reinforcing and will be finished with a wet cure to ensure maximum tensile strength of the final product. In floor heating areas will be provided at the semi-tractor entry and exit locations and thermally broken from the rest of the floor structure. Mechanical drainage and floor sump systems will be included to match with the equipment layout for the MRF and/or WTE systems and be sloped for drainage. The floor will include hardener and sealer to ensure the top of the floor surface will be washable and is minimally penetrable by waste by-products and leachate. The layout of equipment on the floor provides generous floor sorting capacity.
- **Walls** – The walls will be constructed from Architectural "freezer" panels providing R20 wall insulation and a complete building envelope with no exposed metal building insulation on the interior, giving a completely non-porous and washable surface on the interior. Wall protection will be provided by bollards and steel cages where interior traffic may damage structural items or wall panels.
- **Roof details** – The roof will be either a single ply membrane roof or a metal roof insulated to R20 depending on the most economical options at time of tender.
- **Overhead Doors** – Two main entry points for semi-tractor traffic will be 12' wide by 40' high, the other overhead doors will be 12' wide by 10' high, all of them being insulated metal. These two overhead doors will be opposite from each other, allowing for a straight-line driving lane through the building. The layout of the overhead doors and the size of the building allow for walking floor tractor trailer unit access.
- **HVAC** – a basic HVAC system has been allowed for in the building package, and an allowance added for additional makeup air requirements that may be required during the engineering phase. WTE energy residual also has the economic benefit of providing building heat. This "free" heat allows for more frequent HVAC air exchanges in order to lower interior humidity and odours.

- **Electrical service** – A three-phase electrical service designed for 400 amps has been allowed for in this package. This is only preliminary as many other issues will come into play for the electrical service including the amperage delivered to the site, overall equipment design and electrical load requirements, and the potential of electrical power production by a WTE system.
- **Water** – Piping will be installed to allow wash water for facility cleaning.
- **Lighting** – High-bay industrial lighting has been allowed for throughout the space to a level of 400 lux.
- **Amenities** - Basic washroom facilities are included, but no other interior spaces are currently allotted.

The Budget Estimate values quoted below include the following:

- Building to the description above
- Yard/Civil improvements to the description above
- A 10% Construction Contingency
- Design and Engineering costs
- Project Management fees by EGTM2/CGSI
- Building permit allowance
- Interim Construction Financing allowance

The Order-of-Magnitude Budget Estimate for the 950 square meter facility is **$4,971,000** plus taxes.

The Order-of-Magnitude Budget Estimate for the 1,500 square meter facility is **$5,996,000** plus taxes.

These prices are quoted as guidance only to prepare for overall design and give the client cost parameters as the facility is being designed and prices are estimated. The pricing can substantially change higher or lower depending on market factors at tender time, design aspects and changes to the building design or systems, and supply issues when under construction.

Installation and Commissioning: Included.

Availability: Approximately 28 weeks after receipt of deposit, to be confirmed at time of purchase.

Since this a Budget Estimate, pricing and availability need to be confirmed at the time of the Formal Quotation. Market pricing for materials and shipping times have been volatile.

4.6.3 MRF Sorting Equipment – Description

MSW Receiving – Tipping Floor

When garbage hauling trucks enter through the entrance overhead door of the straight-line, drive-through offloading passage way, smaller trucks can back into MSW Receiving Bunker to offload MSW. Larger trucks can dump their load on the floor, where the front-end loader will push the waste into the MSW Receiving Bunker. Manual bag bursting would occur. Larger, unacceptable items can be removed. Manual sorting of bulky materials is possible in order to achieve a feedstock that is favorable for optional in-house WTE System expansion or to an existing WTE in a nearby community.

Figure 2: Tipping Floor

Conveyor to Trommel

From the MSW Receiving Bunker, a conveyor lifts the MSW to the elevation of the Trommel.

Figure 3: Conveyor to Trommel

Trommel Sorter

The entrance to the Trommel Sorter would be equipped with blades to further open any garbage bags. The Trommel Sorter is a large rotating drum that has a series of gradually increasing hole sized-screens that allow for smaller materials ("fines" - typically less than 50 mm - dirt, grit, broken glass, etc.) to be removed. Fines are removed because they do not have recycling value, they fall out of bales easily, they increase the wear of the down-stream components, and they are potentially dangerous for manual sorting workers.

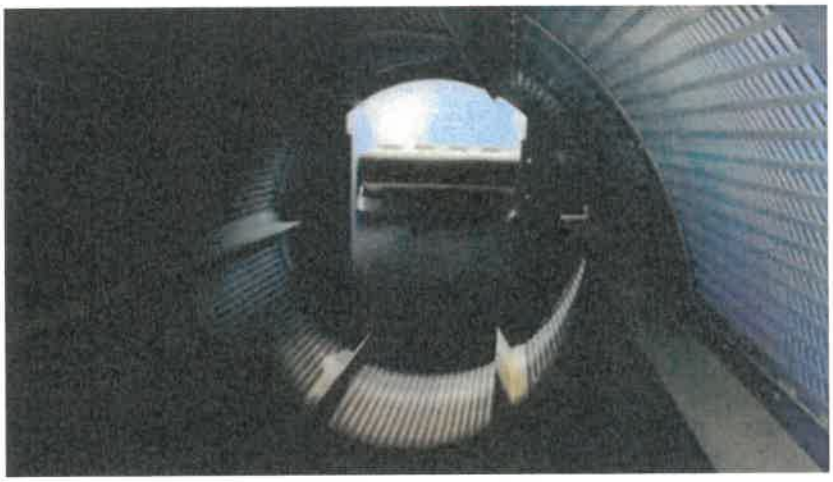


Figure 4: Trommel

The MSW fines and discards that fall out underneath the Trommel and are removed. These can become feedstock for the Waste to Energy System.

Figure 5: Fines Bin

Ballistic Separator

Ballistic separators are designed for sorting 2D materials (plastic film, paper, cardboard and fibers) and 3D materials (containers, plastic bottles, cans, stone, wood, etc.).

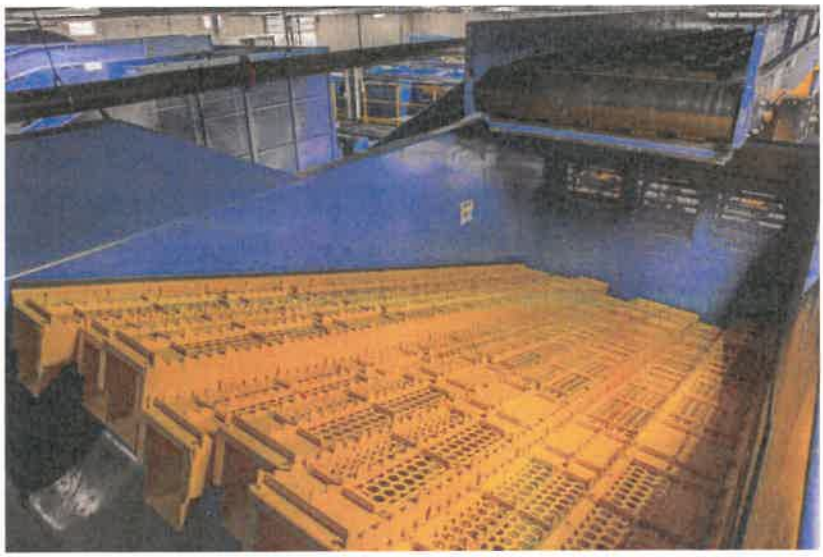


Figure 6: Ballistic Separator

Ferrous Metals and Eddy Current Screeners

Post – Manual Sorting, a strong electro-magnet is used to pull out the majority of the ferrous metals off the conveyor line. An Eddy Current Screener can pull out the majority of the non-ferrous metals off the conveyor line.

Figure 7: Magnetic Separation

Manual Sorting Station

Materials such as cardboard, paper, plastic wrap, plastic bottles, aluminum cans are manually separated into their individual recyclable categories. Aluminum cans could be sorted using an eddy-current separator; however, manual sorting helps reduce the system cost.

Figure 8: Manual Sorting

Post Sorting Recyclable Category Storage Bay

These individually sorted recyclable items fall down into their individual Recovery Bays.

Figure 9: Recyclable Bay

Baler Feed Conveyor

As the individual recyclable category Recovery Bay becomes full, a loader will gradually push the recyclables out the back of the individual recyclable category Recovery Bay onto a conveyor for transit the Recyclables Baler.

Figure 10: Baler Feed Conveyor

Recyclables Baler

The Recyclables Baler is capable of baling the entire variety of recyclables categories that have been sorted. Metal straps keep the bales compressed.

Figure 11: Baler

Recyclable Bales are moved around using a fork lift adapted with Bale Clamps.

Figure 12: Bale Forklift

Bale Storage

Recyclables Bales are stacked in storage awaiting transport to the appropriate processing centre.

Figure 13: Bale Storage

Residuals Out-loading

Residuals from the MSW Sorting Process are usually off-standard for recycling, but still contain organic materials which make these residuals eligible for as a feedstock for a Waste to Energy System.

Otherwise, the residual waste can be placed in the landfill.

Figure 14: Residuals Outloading

4.6.4 MRF Equipment Budget Estimate

The MRF Equipment Line suggested for this project has a flexible feed rate of approximately 5 tph to 10 tph. This flexibility is mostly accomplished by the improvements in operating skills of the manual labourers. As the manual labourer improved on their learning curve, the MRF Equipment has the ability to speed up to its maximum throughput.

The following MRF Equipment List (as detailed in Section 4.6.3) is included in this MRF Equipment Budget Estimate:

- MSW Receiving – Tipping Floor,
- Conveyor to Trommel,
- Trommel Sorter,
- Ballistic Separator,
- Ferrous Metals and Eddy Current Screeners,
- Manual Sorting Station,
- Post Sorting Recyclable Category Storage Bay
- Baler Feed Conveyor,
- Recyclables Baler,
- Bale Storage,
- Residuals Out-loading.

The Budget Estimate quoted below includes the following:

- Equipment supplied to the description in Section 4.6.3,
- Yard/Civil improvements to the description above,
- A 10% Construction Contingency,
- Design and Engineering costs,
- Project Management fees by EGTM2/CGSI,
- Building permit allowance,
- Interim Construction Financing allowance.

The Order-of-Magnitude Budget Estimate for MRF Equipment is **$3,500,000** plus taxes.

This Budget Estimate is quoted as guidance to prepare for overall design and give the client cost parameters as the MRF Equipment is being designed and prices are estimated. The pricing can substantially change higher or lower depending on market factors at tender time, design aspects and changes to the MRF Equipment design or systems, and supply issues when under construction.

Installation and Commissioning: Included.

Availability: Approximately 36 weeks after receipt of deposit, to be confirmed at time of purchase.

Terms: 50 % upon receipt of system order confirmation,
20 % progress payment, 10 weeks after start,
15 % progress payment, 20 weeks after start,
15 % after final inspection, prior to shipment.

Since this a Budget Estimate, pricing and availability need to be confirmed at the time of the Formal Quotation. Market pricing for materials and shipping times have been volatile.

4.6.5 MRF Operations

A MRF building is divided into three general areas; the **Receiving Area**, also called the tipping floor, the **Sorting / Processing Area**, and the **Commodity Storage / Loadout Area**.

Receiving Area. After a garbage truck has emptied its load, a bucket loader is typically used to load a feeding box consisting of a large bin with a live bottom floor that can be filled with feedstock and automatically metered onto the infeed conveyor. In this manner, the operator of the front-end loader can fill the box and not be concerned about keeping the infeed conveyor uniformly filled as frequently. He or she is then freed up for periods to manage and pre-sort the feed material on the tipping floor. Tipping floors generally allow for 2 or more days of storage of incoming material. If possible, 3 days of storage increases facility operating flexibility. It also allows for a short outage if necessary for equipment repairs, testing, or surges in material delivery.

Sorting / Processing Area. Sorting can be completed by positive or negative means. Positive sorting means that the desired product is pulled from the other commodities and the residue passes along the conveyor. Negative sorting means that the desired product remains on the conveyor while all other materials are removed. Often, when there is less residue or other non-desired commodity material, the system is designed for negative sorting since this requires fewer "shoots" or picks from the material. The risk is that everything remaining on the conveyor is considered product. If some residue or other material is hidden from the manual sorter, the residue might remain with the desired commodity.

In most cases, it is better to positively sort so that the desired material is positively removed. Since the goal is to obtain the purest recyclable products, a positive sort is the better approach.

Prohibitive materials (prohibitives) are materials which by their presence in a bale will make the bale unusable as the grade specified. Examples include any materials that may be damaging to equipment, food debris, medical or hazardous wastes, poisonous or other harmful substances, liquids, wax or wax coated items, and glass (for now).

Sorting Steps. Manual floor sorting is done to remove any large materials and contaminants such as bags of shredded paper, scrap metal, garden hoses, extension cords, and microwaves that might jam or damage the sorting line. Often, unopened plastic bags are opened at this point. The waste travels to the trommel where glass shards, metal shards, and other fines are removed and go to the residuals storage area. The ballistic separator then removes 2D and 3D objects, allowing for easier manual separation. The manual sorting station uses positive sorting, where objects are selected and placed into their respective chutes, travelling down to their individual storage bunkers. The remainder of waste after manual sorting go to the residuals storage area. As an individual recyclables storage bunker becomes full, that recyclable material is pushed through to a conveyor which feeds the baler. Completed bales are then ready for storage.

Scrap metal is usually shipped loose to a local scrap yard for further processing.

Commodity Storage / Loadout Area. Bales of individual recyclable categories are accumulated until there are enough to make a homogenous, full truckload, maximizing trucking efficiencies. Residuals can be removed as time allows, for transport to the nearby landfill cells.

4.6.6 MRF Labour

Based on this feasibility model, labour requirements for the Evergreen MRF, processing 5 to 10 tons per hour of MSW, is estimated to need 12 people to operate, including:

- a manager (position could be combined with existing landfill manager position),
- a foreman,
- a half time administrative person,
- a half time shipper/receiver,
- a half-time marketing/sales person to find markets for recyclable categories and to make sure the maximum commodity price is received,
- a half-time maintenance person (mechanic),
- a half-time maintenance person (electrician),
- an equipment monitor,
- and 8 manual sorters.

Staff training

The ideal MRF Equipment System Component Supplier and Integrator will provide comprehensive, initial operations training to the staff performing manual operations (or at minimum, staff foreman and lead staff) at the Evergreen MRF Facility. This training would start early on during the installation of components, when staff can see how everything is assembled and how everything works together. Early training during MRF Equipment commissioning allows for staff to experience common problems and troubleshooting solutions. This early training provides a quicker learning curve for staff once the MRF Facility beings operations.

Recommended Preventative Maintenance Service Contract visits by the MRF Equipment Vendor are also excellent opportunities for the vendor to provide refresher training to staff on their regular duties as well as updates/improvements on how to better work with their MRF Equipment.

4.6.7 MRF Maintenance

Facility maintenance and upkeep are critical for maintaining equipment performance and product quality. In the past, screens would quickly become plugged with film plastic and other streamers, thereby reducing the ability of the processing line to adequately separate containers from fiber and residue from products. Newer facility designs have focused on these historical maintenance headaches, and improvement has been achieved. Newer trommels and separators not only sort materials better but are less likely to plug and lose efficiency across a shift.

However, belts still rip, equipment still needs to be cleaned and greased, and components still need to be replaced. Today's MRF requires more programing, more electrical and instrumentation work, and less mechanical work than in the past. While the tasks often are less physically demanding, more training is needed, so maintenance labor rates are on the rise.

MRF Preventative Maintenance Program

It is recommended by MRF Equipment System Integrators that a MRF Equipment Preventative Maintenance Program should be implemented. The ideal vendor of the MRF Equipment is a vendor who provides all of the MRF Equipment components so that they have a complete understanding of all of the inter-relations between MRF Equipment System components.

Using the Preventative Maintenance Program offered by the proposed vendor is preferred because of their experience with their equipment. A quarterly trip to survey and perform routine maintenance would cost approximately $6,000 per trip / $24,000 per year. This cost would most certainly be less than any large repair that might occur due to lack of proper regular inspection.

These Preventative Maintenance visits by the MRF Equipment Vendor are also excellent opportunities for them to provide refresher training to staff on their regular duties as well as updates/improvements on how to better work with their MRF Equipment.

5.0 Optional Waste to Energy (WTE) System

Section Summary

This section describes the optional Waste-to-Energy (WTE) System that could use the Material Recovery Facility MRF Sorting System residue as well as other Waste Categories. Also included are budgetary prices for various sized WTE Systems, to be used in the economic modeling, Section 9.0-Project Economics.

5.1 Description of Waste to Energy Fundamentals

5.1.1 Gasification

Gasification Waste-to-Energy (WTE) technology is recommended in this Feasibility Study for the optional WTE System.

Gasification is a process that converts the carbon-based components of Municipal Solid Waste (MSW) into a synthesis gas (Syn Gas). This Syn Gas consists of mostly carbon monoxide and hydrogen with small amounts of methane and ethane. Gasification occurs in the Reactor Vessel (or Gasifier) at an elevated temperature between 600 to 1000 degrees Celsius, with a reaction time of approximately 1 to 2 hours, in the presence of steam which is produced by evaporating residual water present on the MSW feed, and air.

The style of Gasifier recommended in this Feasibility Study is an Updraft Gasifier. Other styles of gasifiers include Downdraft Gasifiers, Cross-draft Gasifiers, and Fluidized Bed Gasifiers.

In an Updraft Gasifier, air enters at the bottom of the Gasifier and the Syn Gas exits at the top of the Gasifier. MSW Feedstock is added at the top of the Gasifier and ash is removed from the bottom of the Gasifier. Updraft Gasifiers typically generate a higher heat-content Syn Gas, which is best suited for generating electricity. Since the style of Updraft Gasifier recommended in this Feasibility Study has a solid residue that is somewhat customizable in terms of how much carbon char remains, this style of system is sometimes referred to as a Hybrid Gasification / Pyrolysis System.

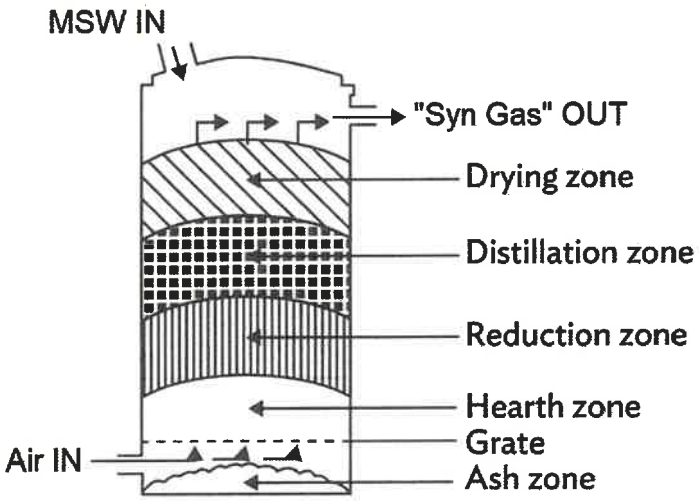


Figure 15 – Simplified Schematic of an Updraft Gasifier

As shown in Figure ??? above, MSW is fed through the top of the Gasifier, via an automated auger. Additionally, liquid wastes such as used motor oil and sewage sludge can be sprayed in at the top of the Gasifier, via a separate nozzle, onto the solid wastes.

Moisture from the solid waste is evaporated in the "Drying zone". The waste continues to decompose until it reaches the bottom, where the residue is ash, or carbon char with ash. The residue exits the Gasifier via an automated auger.

The Process Air which is necessary for the decomposition reaction to occur, enters the Gasifier at the bottom. Waste decomposes with heat and air, reacting to form Syn Gas, which exits at the top of the Gasifier.

Benefits of an Updraft Gasification WTE System include:

- Flexibility of feedstock,
- Variety of available outputs, including electricity, heat, fuel, hydrogen, biochar,
- Lower system cost per ton of garbage treated,
- Lower operating costs per ton of garbage treated,
- Greater reliability due to simpler overall system design,
- Easy to maintain due to simpler overall system design,
- Lower emissions than from landfill gases or from combustion-based WTE,
- Can create a non-leachable residue (carbon char plus ash).

The Updraft Gasification WTE System can process the following waste, mixed or separately

- Agricultural waste,
- Food processing waste,
- Landfill waste,
- Plastics / cardboard / paper,
- Sewage treatment sludge (if mixed with other solid feedstock),
- Wood waste,
- Used motor oil (if mixed with other solid feedstock),
- Used tires.

New and legacy waste can be processed.

5.1.2 Continuous Waste Processing

This Updraft Hybrid Gasification/Pyrolysis WTE System is a continuously operating process. Continuous Processing involves gradual feed of material into the Reactor Vessel with the steady transition of feedstock occurring from top to bottom where the steady rate of residual outputs is removed. Batch processing involves filling a cool process vessel, heating the vessel, gasifying it from start to finish, cooling the vessel, and emptying the vessel.

Continuous Processing offers faster overall processing and less energy consumption per unit weight of waste processed because batch systems require a significant warm-up and cool-down period for each processing cycle.

Continuous Process outputs have better quality because the process temperature is consistent and the process outputs are constantly available for sampling, allowing for process fine tuning. With batch processing, the quality of the output is not known until the batch cycle is completed, cooled, opened and sampled. Batch processing typically has more output variability.

Since the Waste-to-Energy Processing equipment operates at high temperatures up to 1,000 degrees Celsius, maintaining a constant operating temperature reduces the number of material expansion and contraction cycles due to heating and cooling. Reducing this stress extends the life of the equipment.

The benefits of a continuous process include:

- Consistent operating temperature,
- Consistent ash / carbon char production,
- Consistent Syn Gas composition production,
- Consistent heat available for electric power generation.

5.2 WTE Systems – Major Components

5.2.1 Solid Waste Shredder Module

A large object shredder will be included to shred large objects such as mattresses and furniture. A waste shredder breaks the solid waste down into pieces approximately 5 cm in size. This smaller, uniform size allows for more consistent processing times and output quality.

Waste can be fed into the Shredder using convenient bins that automate feeding and minimize handling. Other feed options include a top loading hopper that is fed by a front-end loader or a feed conveyor.

Shredding is enclosed, minimizing dust and noise.

Excess moisture can be removed via the post-shredding heater.

Figure 16: Bin-fed Version of Shredding Module

Figure 17: Large Object Shredder

5.2.2 Solid Waste Gasification Module

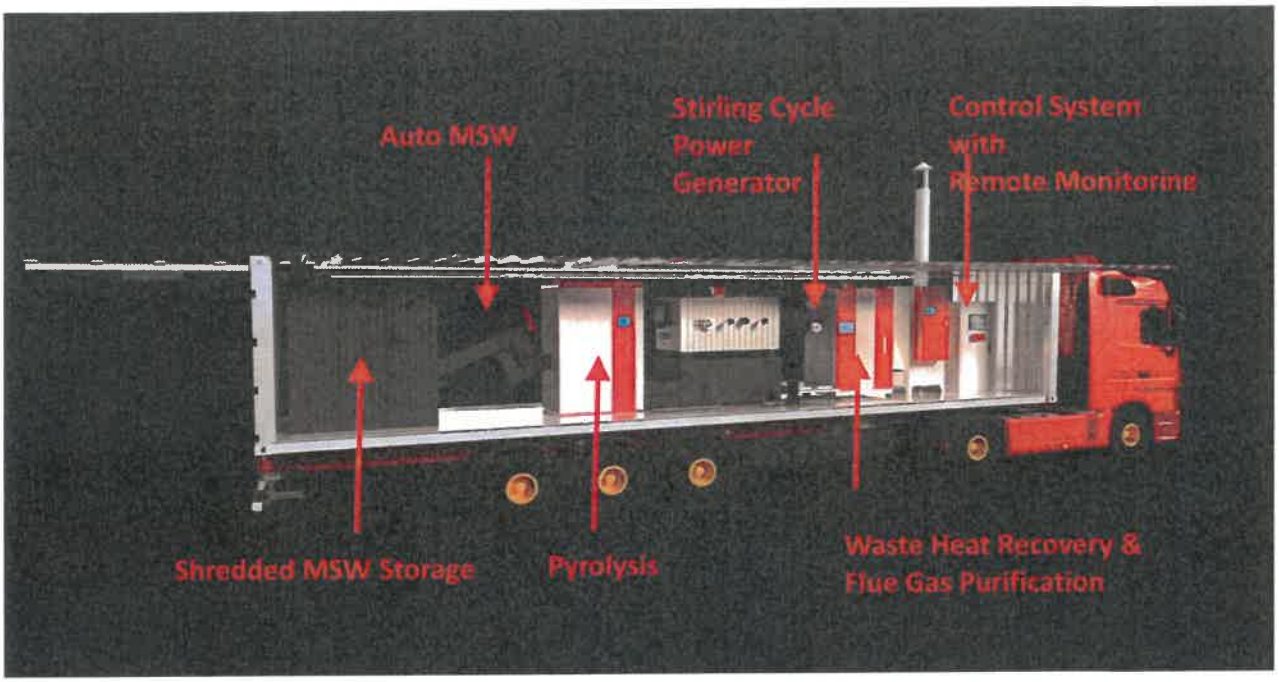


Figure 18: Gasification Processing Module Components

Shredded MSW Storage
After the MSW Shredding Module, the shredded feedstock is stored in the 24-hour, day storage bin.

Automated MSW Feed
The shredded feedstock is automatically fed from the day storage tank into the Gasification Reactor Vessel. The feed rate is controlled by the Control System based on the level in the Gasification Reactor Vessel.

Gasification Reactor Vessel
The shredded feedstock is fed from the day storage tank into the Gasification Reactor Vessel. Please see Section 6.1.1 for a detailed description of how this Reactor Vessel works. The Syn Gas produced by the Reactor Vessel is used for generating electricity (see Section 6.3.1), for heating the Reactor Vessel, and for the Waste Heat Recovery Boiler.

Electric Power Generation
Electricity is generated using the Syn Gas from the Reactor Vessel (see Section 6.3.1). Small sized WTE Systems would generate electrical power using a Reciprocating Engine or Stirling Engine. Medium sized WTE Systems

would generate electrical power using a Micro Gas Turbine. Large sized WTE Systems would generate electrical power using a Boiler with a Steam Turbine.

Waste Heat Recovery

Flue Gases are put through a water heating loop for use in building heat systems. Heat recovery can also occur with gas to gas or gas to liquid heat exchangers for further electric power or process heat applications.

Flue Gas Purification

The Waste to Energy System's exhaust emissions mitigation system consists of:

- **Denitrification system.** Using a high temperature denitrification system, urea solution is injected into the secondary combustion chamber to remove nitrogen oxides.
- **Desulfurization system.** Using a dry desulfurization system, the acid gas is removed by injecting sodium bicarbonate (baking soda) into the deacidification tower.
- **Activated carbon system.** Activated carbon is used in a filter housing to remove harmful substances such as chlorine compounds and heavy metals in the exhaust gas.
- **Bag filter system.** A bag filter is used to remove dust and particulate matter in the exhaust gas.

Control System

The automated control systems adjust for varying feedstock type and desired output conditions to provide smooth operations with minimal human intervention. Remote monitoring allows for the control system to alert operators when an operational parameter strays from optimal ranges.

5.2.3 Battery Storage Module

Lithium Batteries are the most common battery storage technology that is commercially available. Lithium-ion technology represents more than 90% of the installed power and energy capacity of large-scale battery storage in operation in North America at the end of 2018. Lithium batteries have deep cycle capability, meaning that the battery can be near-fully discharged and fully charged with a repeated number of cycles, over a long lifespan. In cold climates like Canada, lithium batteries perform well compared to lead-acid batteries that are typically found in most automobiles. Lithium-ion batteries have fast response times and high-cycle efficiency, meaning that they don't lose much energy between recharge and discharge. They also have high energy density (stored energy per unit of weight).

The Battery Storage System includes:

- Proven Battery Management System (BMS): achieves climate-proof operation over the widest range of hot/cold and wet/dry conditions.
- Fire protection and HVAC: built-in to optimize safety and lengthen battery life.
- Multiple AC/DC supply inputs: multiple connections to renewable energy sources (e.g. ground-mount/rooftop solar, wind turbine), AC grid connection, diesel generator.
- Customized EMS: battery monitoring & diagnostics and IoT data reporting; controllable load parameters for power on/off including microgrid demand, back-up triggers and hourly price schedules.
- Design life 20 years and 365 full charging cycles annually (1 cycle / day)

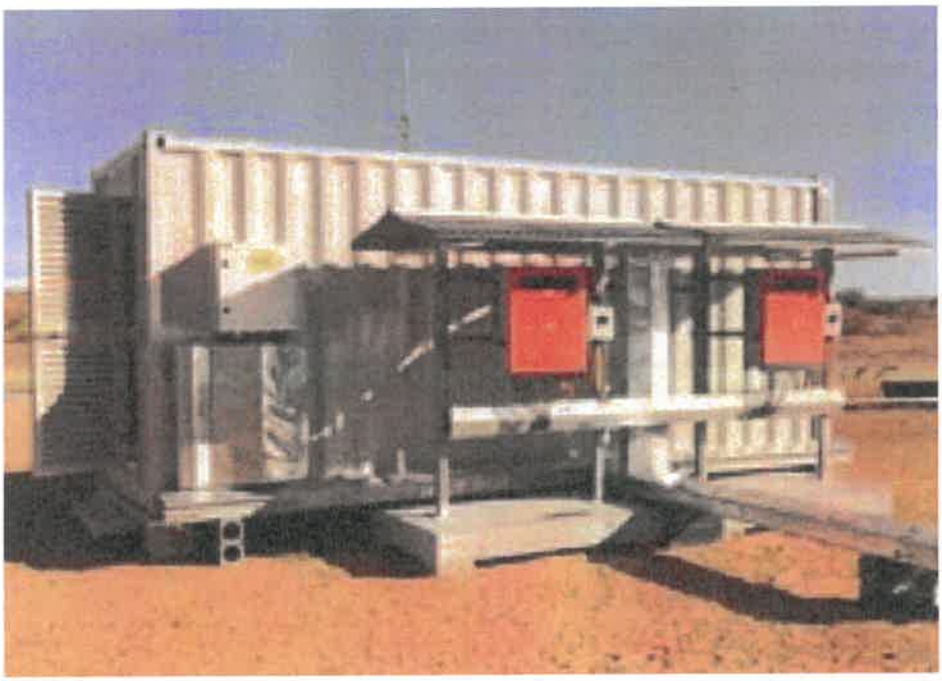


Figure 19: Battery Storage Module

5.3 WTE Systems - Output Options

5.3.1 Electric Power

Reciprocating Generator

All Reciprocating Generators have two main components:

- An **internal** combustion engine that uses Syn Gas, hydrogen, diesel, natural gas, or gasoline, and,
- An electrical generator that converts the shaft power from the reciprocating engine into electricity.

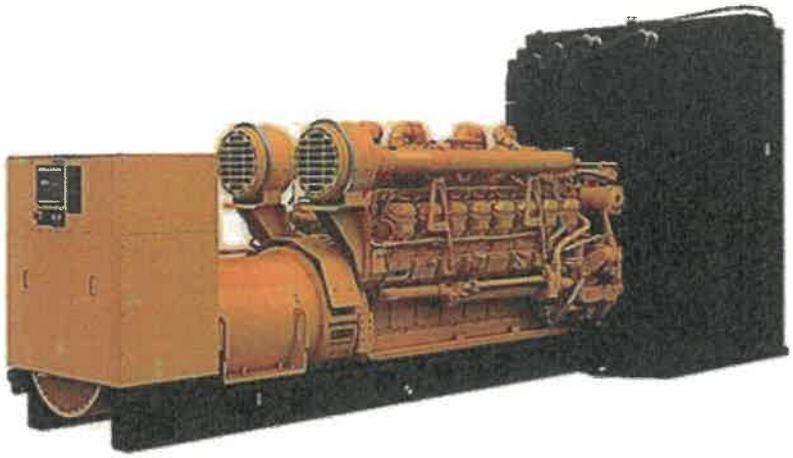


Figure 20 – Reciprocating Generator

Reciprocating Generators have a better ability to follow load demand compared to Gas Fired Turbines or Steam Turbines.

Stirling Cycle Generator

Stirling Cycle Generators have two main components:

- An **external** combustion Stirling Engine that uses heat from another process, in this case, MSW Gasification Process, and
- An electrical generator that converts the shaft power from the Stirling Engine into electricity.

Stirling Engines are considered an external combustion engine. With heat applied to the exterior of the engine's cylinder; therefore, fuel type or quality is not important to a Stirling Engine. External heat can be applied continuously, which allows for higher efficiency and lower emissions than an internal combustion engine. Since Stirling Engines do not require intake or exhaust valves, these engines run much quieter and require less maintenance than internal combustion engines or steam turbines. Stirling Engines are able to

capture and re-use some of the heat that would otherwise be wasted by using an internal heat exchanger called a Regenerator.

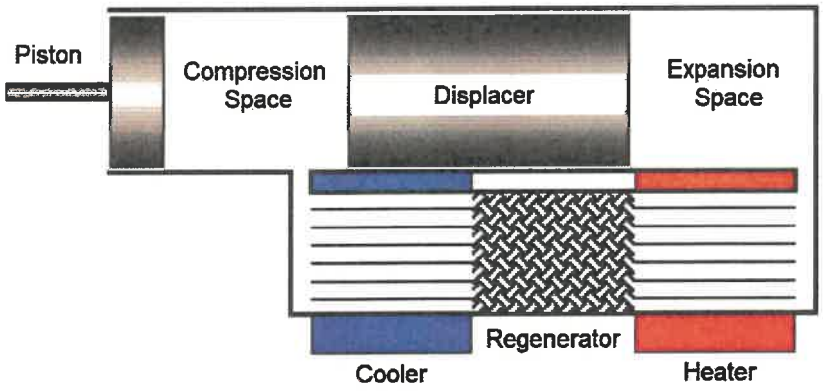


Figure 21 – Schematic of a Stirling Cycle Engine

Organic Rankine Cycle System

Organic Rankine Cycle (ORC) Electrical Power Generation Technology could be used in a larger-scale MSW Processing Plant.

ORC Systems are used for power production from low to medium temperature heat sources in the range of 80 to 350 degrees Celsius and for small to medium applications in the range of 60 to 150 degrees Celsius. An Organic Rankine Cycle power plant is similar to most steam power systems. The main difference is the use of an organic working fluid instead of water (liquid and steam) as the working fluid. The organic working fluid has a lower boiling point and a higher vapour pressure than water; therefore, it is able to use low temperature heat sources to produce electricity. Power outputs can range from as low as 10 kW to as high as 50 MW.

ORC systems require minimal operations staff, low maintenance, and lower operating pressures, which means less expensive piping/valve costs and safer operations.

ORC systems' main problem is high capital cost per kW of electrical power generated in small to medium systems.

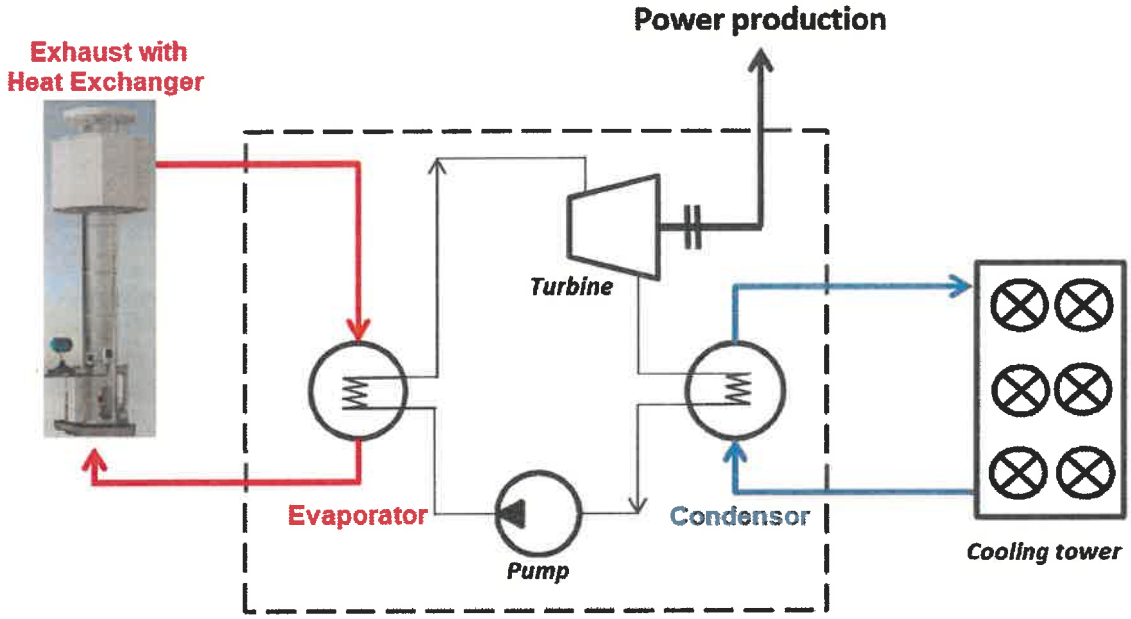


Figure 22 – Schematic of Organic Rankine Cycle System

Figure 23 – ORC System (20 kW)

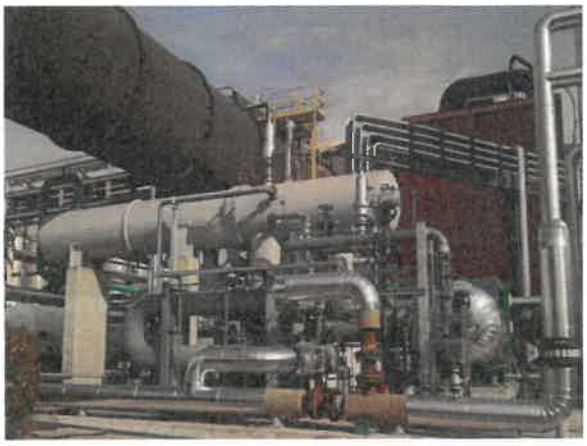


Figure 24 – ORC System (8 MW)

Gas Turbine

A Gas Turbine, also called a gas combustion turbine, is a type of continuous and internal combustion engine. A Simple-Cycle Combustion Turbine (SCCT) is the type of gas turbine most frequently used in lower capacity (down to 10 MW) power generation, but can be sized as small as 60 kW.

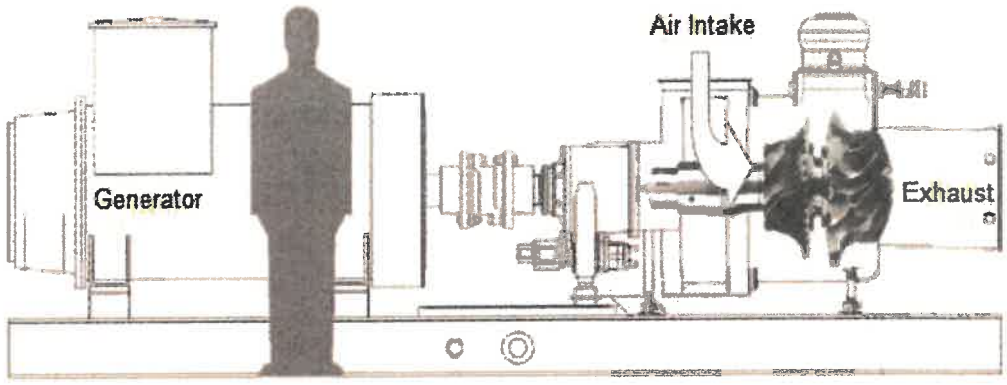


Figure 25 – Schematic of a Micro-Turbine (SCCT) Generator

Compared to Steam Turbines, Gas Turbines can reach full power relatively quickly, but are not as fast as Stirling Cycle Engines or Reciprocating Engines for following quickly fluctuating loads. Gas Turbines cost less per kW than Steam Turbines, but are more expensive per kW than Reciprocating Engines or Stirling Cycle Engines. Gas Turbines cannot tolerate low quality fuels. Gas Turbines are more complex to install and maintain.

Steam Turbine

A steam turbine is a rotating machine that extracts thermal energy from pressurized steam and uses it to perform mechanical work on a rotating output shaft. Steam turbines are often used in larger-scale power plants. Steam turbines are the most efficient power generating method, the most complex, and the most difficult to operate as well as maintain. The steam is part of a closed loop that circulates both liquid water and water vapour through the entire system. Since the steam is at a high pressure and temperature, the water has to be very clean and requires anti-corrosion chemicals to protect the steam turbine. Pure make-up water is required regularly.

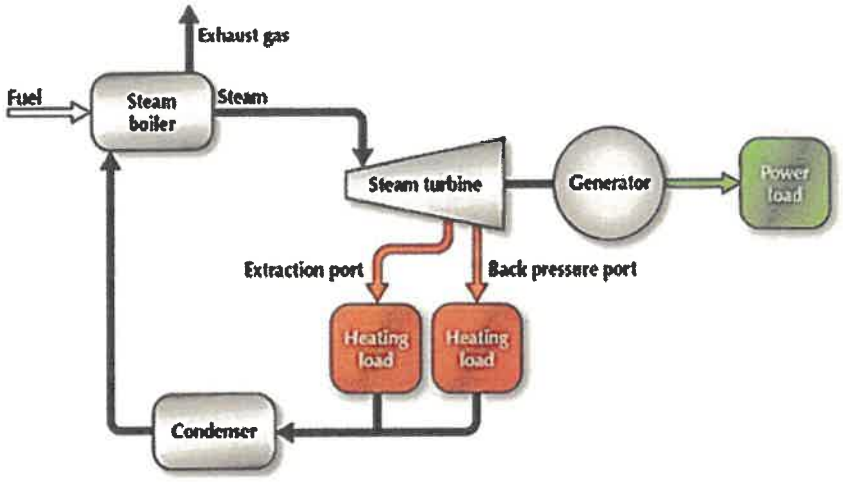


Figure 26 – Schematic of a Steam Turbine Generator

5.3.2 Thermal Energy

With the Electrical Power Generation Technologies described in Section 6.3.1, they all have a significant amount of exhaust heat that remains from making electricity. Electrical power generation and thermal heat energy recovery from electrical power generation is termed by industry as "Combined Heat and Power" (CHP).

The different power generating technologies described can have efficiencies from 10% to 40% of the total energy available. With heat recovery, this combined efficiency can range from 60% to 80%.

This thermal heat energy can be used to provide hot water for domestic or processing uses, process steam for domestic or industrial use, and even second stage electrical power generation (more common in larger scale systems).

The thermal energy generated from the WTE Process replaces the utility heat provided by fossil fuels or electric-powered heaters, providing a utility savings and providing another source of GHG reduction.

Pilot-Scale System Example: The ETGM2 Pilot-Scale WTE System processes up to 4 tons per day of MSW, generating up to 120 kW of electrical power, and producing up to 300 kW of thermal power.

5.3.3 Carbon Char

Carbon char can be produced by Gasification. It is the solid residue remaining after the bulk of the Syn Gas has been removed. The amount of carbon char remaining is somewhat customizable, depending on the feedstock, the process temperature and the process duration. Carbon char also can be used as a feedstock for activated carbon manufacturing and as a source of carbon in carbon nanotube processing.

Biochar refers to carbon char residue specifically from biomass feedstocks. Biochar can be used for agricultural purposes as a soil additive. For high acidity soils, Biochar lowers the overall acidity of the soil, as Biochar is inherently alkaline. It also increases water and nutrient retention due to its high porosity, helping to boost agricultural productivity. Biochar is highly efficient at binding atmospheric CO2. It can endure in soil for many years. Biochar can be used as a feed additive for chicken, hogs, and cattle where it improves digestion and reduces CH4 / NH3 production from animal waste.

Carbon char can trap the ash from the waste processing. If the ash has hazardous components, the carbon char is capable of trapping these contaminants and preventing leaching out. This leaching prevention would need to be tested to confirm this benefit. Common batch leaching tests include Extraction Procedure Toxicity (EP-Tox; US EPA Method 1310, 2001), Toxicity Characteristic Leaching Procedure (TCLP; US EPA Method 1311, 2001), Synthetic Precipitation Leaching Procedure (SPLP; US EPA Method 1312, 2001). Environment and Climate Change Canada has developed laboratory test methods for evaluating the physical and chemical properties of solidified wastes.

5.3.4 Ash

Waste-to-Energy (WTE) Processing of Municipal Solid Waste (MSW) produces residue that consists of two types of material:

1. **Fly Ash** is small particulate ash that is carried up through the Syn Gas exhaust vent at the top of the Hybrid Gasification / Pyrolysis System Reactor Vessel. The fine particulates are removed from the flue gas using air pollution control devices, such as bag filters. Fly Ash typically amounts to 10-20 percent by weight of the total ash.

2. **Bottom Ash** amounts to 80-90 percent by weight of the total ash content. Bottom Ash is the remainder of MSW Processing that falls through the grate in the Hybrid Gasification / Pyrolysis System Reactor Vessel and is automatically transferred out of the Reactor Vessel and into the ash disposal bin. The main chemical components of Bottom Ash are silica (sand and quartz), calcium, iron oxide, and aluminum oxide.

The amount and chemical composition of the ash varies depending on the original MSW feedstock and the type of WTE process. Approximately 2% to 10% of the original MSW remains as ash.

One common application for this ash residue is an aggregate substitute in concrete, asphalt pavements, and other road construction elements. It can also be used in soil stabilization and in concrete products.

Whether the ash is to be used for road construction or to be landfilled, its physical properties need to be tested for particle size distribution, abrasion and impact resistance, etc. using the American Society for Testing and Materials (ASTM) Method E830 – Standard Test Method for Ash in the Analysis Sample of Refuse-Derived Fuel. As well, an ash leaching test for the release of the ash's constituent chemicals as a function of time would need to be performed.

Carbon char can act to trap the ash from the WTE Processing. If the ash has hazardous components, the carbon char is capable of trapping these contaminants and can prevent these contaminants from leaching out. This leaching prevention would need to be tested to confirm this benefit. Batch leaching tests include Extraction Procedure Toxicity (EP-Tox; US EPA Method 1310, 2001), Toxicity Characteristic Leaching Procedure (TCLP; US EPA Method 1311, 2001), Synthetic Precipitation Leaching Procedure (SPLP; US EPA Method 1312, 2001).

Environment and Climate Change Canada has also developed laboratory test methods for evaluating the physical and chemical properties of solidified wastes.

5.3.5 End-Product Recyclables

Even with a Material Recovery Facility in advance of a Waste to Energy System, there may still be ferrous and non-ferrous metals that can be separated from the ash and the carbon char at the tail end of the process. These metals can be stored and sold as scrap metal.

5.3.6 Cryptocurrency Mining

The surplus electricity that would be generated from the optional WTE System can be exported to the Alberta Electric System Operator grid. Electric power can also be used for small-scale data processing modules, or it can be used for cryptocurrency mining.

Cryptocurrency mining machines are specialized computers that can consume this locally produced electricity to yield higher returns than electrical grid export power prices. A combination of electrical export to the grid when electrical demand prices are high plus cryptocurrency mining revenues when electrical demand prices are low can provide the best return.

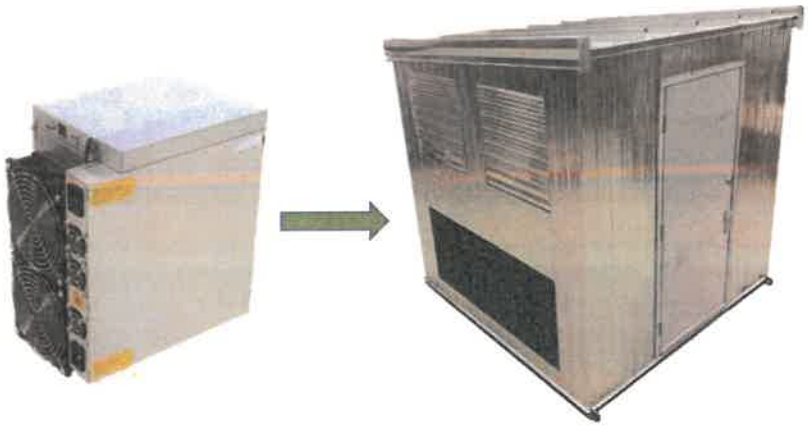


Figure 27 – Typical Crypto Mining Rig and Mining Hut

For example, 150 kW of electrical power produced by the WTE System would power cryptocurrency mining machines that would be housed in a climate-modulated, portable structure. Complete with its own network communications, it would operate autonomously. A continuous, 150 kW cryptocurrency mining operation would generate approximately $250,000 per year at today's cryptocurrency prices.

5.3.7 Renewable Diesel Fuel

Petroleum-based diesel fuel is derived by refining of crude oil that has been extracted from oil wells.

Biodiesel is a fuel typically derived from soybean oil, canola oil, other vegetable oils, animal fats, and recycled grease. It can serve as a substitute for petroleum-derived diesel fuel.

Renewable Diesel Fuel (RD) is a diesel fuel that is chemically the same as petroleum-based diesel fuel, but is produced through thermochemical processes such as gasification, pyrolysis, and hydrotreating.

RD would displace petroleum-based diesel which reduces overall CO2 emissions. For heavy-duty vehicles and marine vessels, Renewable Diesel Fuels will play an increasing role to reduce CO2 emissions, since electric vehicles and fuel cells are not practical for these transport modes.

Renewable Diesel Fuel System benefits include:

- Produces ready-to-use diesel fuel directly, satisfying ASTM tests, with no extra fuel upgrading or hydrotreatment required (significant CAPEX and OPEX savings),

- No CO2 removal required (converting both CH4 and extra CO2 actually improves this process' efficiency),
- Minimal impact to current operations (bolt-on modular plants),
- Eligible for Renewable Diesel Fuel Credits for extra revenues,
- Renewable Diesel Fuel burns cleaner with lower SOx emissions, lower NOx emissions, and lower PM / soot.

There is a strong demand for Renewable Diesel Fuel produced from a Waste-to-Energy Facility. The current Canadian Federal Government Mandate for Renewable Diesel Fuels in Canada requires a minimum of 2% of RD blended with 98% petroleum-based diesel. Discussions are ongoing to increase this mandate to a minimum of 4% of RD. Of the total amount of RD required currently to satisfy this mandate, approximately 97% of this RD is imported.

Currently, price discovery for Renewable Diesel Fuel in Canada is limited. In 2021, some Canadian producers of RD obtained up to $1.70 per litre for longer-term contract purchases.

Although the ETGM2 Waste-to-Energy System could produce Renewable Diesel Fuel, it has not been fully tested. The revenues provided by the low quantities of Renewable Diesel Fuel that would be produced in a smaller-scale WTE System would not outweigh the extra costs of the Renewable Diesel Fuel Production Module, extra operational costs, diesel storage tanks, and diesel storage environmental containment. Renewable Diesel Fuel Production would be practical for larger-scale ETGM2 Waste-to-Energy System with a waste processing capacity of 150 tons per day or more.

Garbage Processed (tons / day)	Approximate Diesel Generated
5	300 litres per day
25	1,500 litres per day
50	3,000 litres per day
100	6,000 litres per day
200	12,000 litres per day

Table 13 – Syn Gas to Diesel Fuel Estimated Production Rates

Renewal Diesel Fuels Processing Module Description

Most Syn Gas to Renewable Diesel Fuel Systems are very large scale, producing millions of litres per day. Or, they are medium scale and only produce long-chain hydrocarbons that still require further refining to become useable diesel fuel.

The ETGM2 Syn Gas to Diesel Module processes untreated Syn Gas in a reformer to make a clean Syn Gas. The clean Syn Gas then passes into a Fischer-Tropsch Reactor/Synthesizer to make "Ready-to-Use" Diesel Fuel that exceeds American Society of Testing and Materials (ASTM) Test D975 Specifications. With a Cetane# of 75 (versus ASTM D975, minimum 40) and a Lubricity# of 340 (versus ASTM D6079, maximum 520), this Renewable Diesel Fuel is high quality and can actually be blended to upgrade refinery-produced diesel fuels.

Figure 28 – Syn Gas to Diesel Fuel Processing Module

5.4 WTE System – Budget Estimates for Three System Sizes

5.4.1 SIZE 1 - Pilot-Scale System (3 tonnes per day)

Pilot-Scale System Description

Module 1 - Garbage Preparation Module

- Housed in a 20-foot-long standard shipping container,
- Garbage shredder,
- Garbage pre-dryer, prior to Garbage Processing Module,
- Automated auger to feed prepared waste to the storage bin located in the Processing Module,
- Internal electricity consumption provided by Garbage Processing Module.

Module 2 - Garbage Processing Module

- Housed in a 40-foot-long standard shipping container,
- Continuous operation (24 hours per day/7 days per week/365 days per year),
- Functional garbage processing ranges from approximately 1½ tons per day to 4 tons per day,
- Electric Power Generation, up to 120 kW, dependant on type and amount of waste,
- Flue gas purification,
- Self-sufficient for electrical power and heat,
- Control system with remote monitoring.

Module 3 – Battery Storage Module

- Housed in a 40-foot-long standard shipping container,
- Lithium-Ion phosphate batteries, made by world's largest storage battery manufacturer,
- 200 kW rating,
- Rated for 8,000 charge/discharge cycles (approximately 20 years at one cycle per day).

Module 4 – Cryptocurrency Mining Module

- 8' x 4' portable enclosure, with steel man door, panic hardware lock,
- 500 VA uninterruptible power supply,
- Internal electrical distribution bus,
- 2 x exhaust panel fans, 2 x filter boxes, fan exhaust deflectors,
- Steel racks for ASICs,
- Cellular Modem LTE Package,
- Crypto-Mining application-specific integrated circuit (ASIC) computers. High efficiency.

Pilot-Scale System's Budget Pricing & Terms

As per System Description above: **$CAD 3.6 million** (Delivered & installed. Taxes extra.)

Installation and Commissioning: Included.

Availability: Approximately 28 weeks after receipt of deposit, to be confirmed at time of purchase.

Terms:
50 % upon receipt of system order confirmation,
20 % progress payment, 10 weeks after start,
15 % progress payment, 20 weeks after start,
15 % after final inspection, prior to shipment.

Since this a Budget Quote, pricing and availability need to be confirmed at the time of the Formal Quotation. Market pricing for materials and shipping times have been volatile.

5.4.2 SIZE 2 – 40 tonnes per day System

System Description

System to be housed in the structure provided for the MRF.
System includes:

- Garbage Shredding,
- Garbage pre-dryer, prior to Garbage Processing Module,
- Automated auger to feed prepared waste to the storage bin located in the Processing Module,
- Internal electricity consumption provided by Garbage Processing Module,
- Garbage Processing up to 40 tonnes per day,
- Electrical Power (up to 1300 kW),
- Loading and Sorting Bunkers, Transfer Equipment, Ash Storage
- Cryptocurrency Mining Equipment:
  - Uninterruptible power supply,
  - Internal electrical distribution bus,
  - Exhaust panel fans, filter boxes, fan exhaust deflectors,
  - Steel racks for ASICs,
  - Cellular Modem LTE Package,
  - Crypto-Mining application-specific integrated circuit (ASIC) computers. High efficiency.

40 tonnes per day System's Budget Pricing & Terms

As per System Description above: **approximately $CAD 15 million**

Installation and Commissioning: Included.

Availability: Approximately 52 weeks after receipt of deposit, to be confirmed at time of purchase.

Terms: 50 % upon receipt of system order confirmation,
20 % progress payment, 20 weeks after start,
15 % progress payment, 40 weeks after start,
15 % after final inspection, prior to shipment.

Since this a Budget Quote, pricing and availability need to be confirmed at the time of the Formal Quotation. Market pricing for materials and shipping times have been volatile.

5.4.3 SIZE 3 – 80 tonnes per day System

System Description

System to be housed in the structure provided for the MRF.
System includes:

- Garbage Shredding,
- Garbage pre-dryer, prior to Garbage Processing Module,
- Automated auger to feed prepared waste to the storage bin located in the Processing Module,
- Internal electricity consumption provided by Garbage Processing Module,
- Garbage Processing up to 100 tonnes per day,
- Electrical Power (up to 2600 kW),
- Loading and Sorting Bunkers, Transfer Equipment, Ash Storage
- Cryptocurrency Mining Equipment:
  - Uninterruptible power supply,
  - Internal electrical distribution bus,
  - Exhaust panel fans, filter boxes, fan exhaust deflectors,
  - Steel racks for ASICs,
  - Cellular Modem LTE Package,
  - Crypto-Mining application-specific integrated circuit (ASIC) computers. High efficiency.

80 tonnes per day System's Budget Pricing & Terms

As per System Description above: **approximately $CAD 30 million**

Installation and Commissioning: Included.

Availability: Approximately 52 weeks after receipt of deposit, to be confirmed at time of purchase.

Terms: 50 % upon receipt of system order confirmation,
20 % progress payment, 20 weeks after start,
15 % progress payment, 40 weeks after start,
15 % after final inspection, prior to shipment.

Since this a Budget Quote, pricing and availability need to be confirmed at the time of the Formal Quotation. Market pricing for materials and shipping times have been volatile.

5.5 WTE System – Annual Revenue Estimates for Three System Sizes

SIZE 1 - Pilot-Scale System (3 tonnes per day)

Electricity

With up to 120 kW generated and assuming average annual export electrical price to grid of $0.17 per kWh, including base load and peak demand cases, the annual amount of electrical power generation revenue is estimated to be approximately: **$ 179,000**

Heat

There would be approximately 240 kW of surplus heat available in the form of hot water or hot air to provide building heat in the winter and the possibility of process MSW drying prior to sorting. This would help recyclables recovery due to soggy cardboard and paper.

SIZE 2 – 40 tonnes per day System

Electricity

With up to 1300 kW generated and assuming average annual export electrical price to grid of $0.17 per kWh, including base load and peak demand cases, the annual amount of electrical power generation revenue is estimated to be approximately: **$ 1,936,000**

Heat

There would be approximately 2600 kW of surplus heat available in the form of hot water or hot air to provide building heat in the winter and the possibility of process MSW drying prior to sorting. This would help recyclables recovery due to soggy cardboard and paper.

SIZE 3 – 80 tonnes per day System

Electricity

With up to 2600 kW generated and assuming average annual export electrical price to grid of $0.17 per kWh, including base load and peak demand cases, the annual amount of electrical power generation revenue is estimated to be approximately: **$ 3,872,000**

Heat

There would be approximately 5200 kW of surplus heat available in the form of hot water or hot air to provide building heat in the winter and the possibility of process MSW drying prior to sorting. This would help recyclables recovery due to soggy cardboard and paper.

6.0 Project Schedule

ID	Task Mode	Task Name	Duration	Start	Finish
1		**Evergreen MRF Development**	**345 days**	**Wed 22-07-13**	**Tue 23-11-07**
2		**Preliminary Activities**	**95 days**	**Wed 22-07-13**	**Tue 22-11-22**
3		Feasibility Study	2 mons	Wed 22-07-13	Tue 22-09-06
4		Project Acceptance by Evergreen	3 wks	Wed 22-09-07	Tue 22-09-27
5		Conceptual review and acceptance with AEP for MRF	2 mons	Wed 22-09-28	Tue 22-11-22
6		AEP MRF approval	0 days	Tue 22-11-22	Tue 22-11-22
7		**Facility**	**270 days**	**Wed 22-10-26**	**Tue 23-11-07**
8		**Facility Design and Procurement**	**130 days**	**Wed 22-10-26**	**Tue 23-04-25**
9		DesignBuild Contractor Identification and Interviews	1 mon	Wed 22-10-26	Wed 22-11-23
10		DesignBuild Contractor recommendation and award	2 wks	Wed 22-11-23	Tue 22-12-06
11		Building Contract execution	2 wks	Wed 22-12-07	Tue 22-12-20
12		Conceptual and Schematic Design	1 mon	Wed 22-12-21	Tue 23-01-17
13		Development permit application period	1 mon	Wed 23-01-18	Tue 23-02-14
14		Detailed Design and Engineering for construction documentation	2 mons	Wed 23-01-18	Tue 23-03-14
15		Building Permit application period	2 wks	Wed 23-03-15	Tue 23-03-28
16		Tender period and ancillary pricing	3 wks	Wed 23-03-29	Tue 23-04-18
17		Final pricing and contract value determination	1 wk	Wed 23-04-19	Tue 23-04-25
18		**Facility Construction**	**140 days**	**Wed 23-04-26**	**Tue 23-11-07**
19		Site mobilization	1 wk	Wed 23-04-26	Tue 23-05-02
20		Construction period	6 mons	Wed 23-05-03	Tue 23-10-17
21		Facility Substantial Completion	0 days	Tue 23-10-17	Tue 23-10-17
22		Deficiency period	2 wks	Wed 23-10-18	Tue 23-10-31
23		Final Completion & Turnover	1 wk	Wed 23-11-01	Tue 23-11-07
24		**Equipment**	**250 days**	**Wed 22-11-23**	**Tue 23-11-07**
25		**MRF Equipment procurement and installation**	**250 days**	**Wed 22-11-23**	**Tue 23-11-07**
26		MRF Equipment tender	2 wks	Wed 22-11-23	Tue 22-12-06
27		MRF Equipment award and order issuance	2 wks	Wed 22-12-07	Tue 22-12-20
28		MRF Equipment manufacturing period	7 mons	Wed 22-12-21	Tue 23-07-04
29		MRF Equipment delivery to site	3 wks	Wed 23-07-05	Tue 23-07-25
30		MRF installation	2 mons	Wed 23-07-26	Tue 23-09-19
31		MRF Equipment Commissioning, Training and Turnover	6 wks	Wed 23-09-27	Tue 23-11-07
32		**Finish**	**0 days**	**Tue 23-11-07**	**Tue 23-11-07**
33					

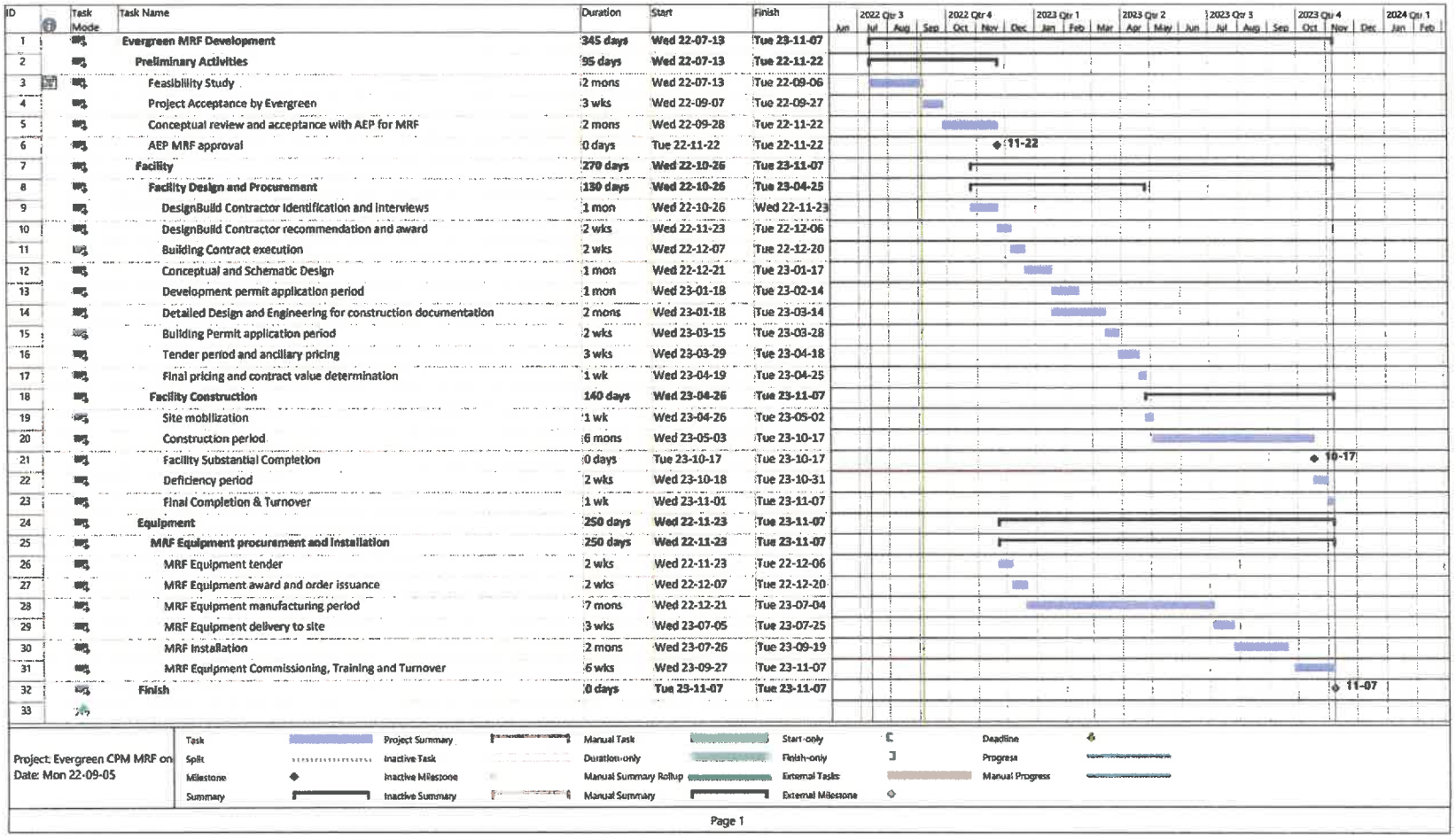
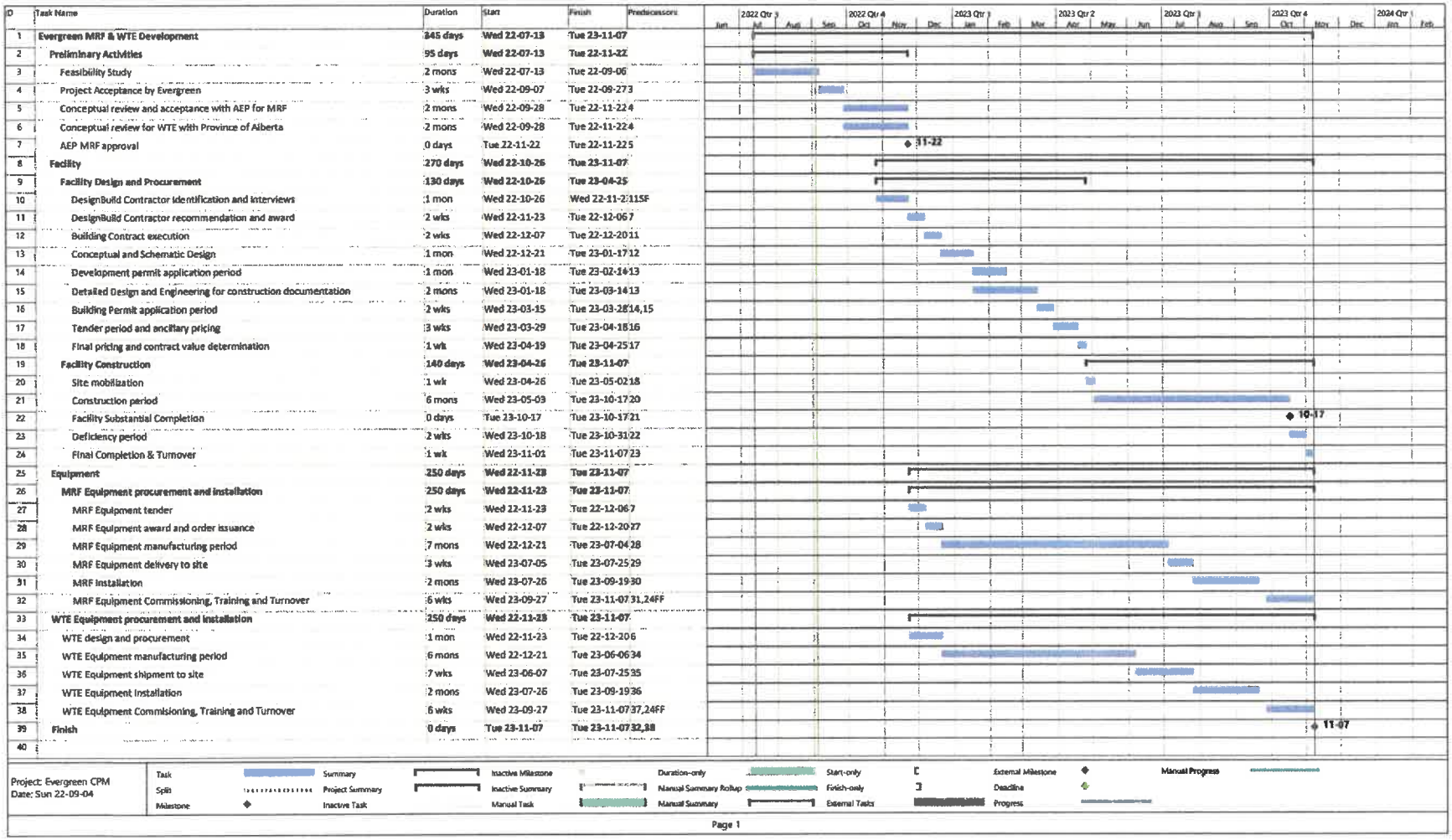


Figure 29: Estimated Project Schedule – 5 tph or 10 tph MRF only



ID	Task Name	Duration	Start	Finish	Predecessors
1	**Evergreen MRF & WTE Development**	345 days	Wed 22-07-13	Tue 23-11-07	
2	**Preliminary Activities**	95 days	Wed 22-07-13	Tue 22-11-22	
3	Feasibility Study	2 mons	Wed 22-07-13	Tue 22-09-06	
4	Project Acceptance by Evergreen	3 wks	Wed 22-09-07	Tue 22-09-27	3
5	Conceptual review and acceptance with AEP for MRF	2 mons	Wed 22-09-28	Tue 22-11-22	4
6	Conceptual review for WTE with Province of Alberta	2 mons	Wed 22-09-28	Tue 22-11-22	4
7	AEP MRF approval	0 days	Tue 22-11-22	Tue 22-11-22	5
8	**Facility**	270 days	Wed 22-10-26	Tue 23-11-07	
9	**Facility Design and Procurement**	130 days	Wed 22-10-26	Tue 23-04-25	
10	DesignBuild Contractor identification and interviews	1 mon	Wed 22-10-26	Wed 22-11-23	11SF
11	DesignBuild Contractor recommendation and award	2 wks	Wed 22-11-23	Tue 22-12-06	7
12	Building Contract execution	2 wks	Wed 22-12-07	Tue 22-12-20	11
13	Conceptual and Schematic Design	1 mon	Wed 22-12-21	Tue 23-01-17	12
14	Development permit application period	1 mon	Wed 23-01-18	Tue 23-02-14	13
15	Detailed Design and Engineering for construction documentation	2 mons	Wed 23-01-18	Tue 23-03-14	13
16	Building Permit application period	2 wks	Wed 23-03-15	Tue 23-03-28	14,15
17	Tender period and ancillary pricing	3 wks	Wed 23-03-29	Tue 23-04-18	16
18	Final pricing and contract value determination	1 wk	Wed 23-04-19	Tue 23-04-25	17
19	**Facility Construction**	140 days	Wed 23-04-26	Tue 23-11-07	
20	Site mobilization	1 wk	Wed 23-04-26	Tue 23-05-02	18
21	Construction period	6 mons	Wed 23-05-03	Tue 23-10-17	20
22	Facility Substantial Completion	0 days	Tue 23-10-17	Tue 23-10-17	21
23	Deficiency period	2 wks	Wed 23-10-18	Tue 23-10-31	22
24	Final Completion & Turnover	1 wk	Wed 23-11-01	Tue 23-11-07	23
25	**Equipment**	250 days	Wed 22-11-23	Tue 23-11-07	
26	**MRF Equipment procurement and installation**	250 days	Wed 22-11-23	Tue 23-11-07	
27	MRF Equipment tender	2 wks	Wed 22-11-23	Tue 22-12-06	7
28	MRF Equipment award and order issuance	2 wks	Wed 22-12-07	Tue 22-12-20	27
29	MRF Equipment manufacturing period	7 mons	Wed 22-12-21	Tue 23-07-04	28
30	MRF Equipment delivery to site	3 wks	Wed 23-07-05	Tue 23-07-25	29
31	MRF Installation	2 mons	Wed 23-07-26	Tue 23-09-19	30
32	MRF Equipment Commissioning, Training and Turnover	6 wks	Wed 23-09-27	Tue 23-11-07	31,24FF
33	**WTE Equipment procurement and installation**	250 days	Wed 22-11-23	Tue 23-11-07	
34	WTE design and procurement	1 mon	Wed 22-11-23	Tue 22-12-20	6
35	WTE Equipment manufacturing period	6 mons	Wed 22-12-21	Tue 23-06-06	34
36	WTE Equipment shipment to site	7 wks	Wed 23-06-07	Tue 23-07-25	35
37	WTE Equipment Installation	2 mons	Wed 23-07-26	Tue 23-09-19	36
38	WTE Equipment Commisioning, Training and Turnover	6 wks	Wed 23-09-27	Tue 23-11-07	37,24FF
39	**Finish**	0 days	Tue 23-11-07	Tue 23-11-07	32,38
40					

Figure 30: Estimated Project Schedule – 5 tph or 10 tph MRF & WTE System

7.0 Project Economics

Evergreen Financial Model Analysis

In the commissioning of the Feasibility Study and report, ETGM2 and CGSI met with Paul Poulin to identify what direction he believed the Evergreen Waste Commission should be going in, and what potential directions he would like to have identified and analyzed.

In response to this we have identified and analyzed the following future scenarios for Evergreen:

1. Continue with the current landfill cell expansion plan.
2. Outsource waste disposal functions to adjacent waste commissions and landfill operations in the surrounding municipalities.
3. Construct a Material Recovery Facility (MRF) in a 950 square meter (8,070 square foot) facility processing 5 tons per hour of recyclable material (low-end production)
4. Construct a Material Recovery Facility (MRF) in a 950 square meter (8,070 square foot) facility processing 10 tons per hour of recyclable material (high-end production)
5. Construct both MRF and a 50 ton-per-day Waste to Energy (WTE) systems in a 1,500 square meter facility.
6. Construct both MRF and a 100 ton-per-day Waste to Energy (WTE) systems in a 1,500 square meter facility.

In order to analyze these scenarios and communicate our calculations and conclusions as clearly as possible, the following are definitions of the terminology and methodology we have used to derive our analyses and conclusions:

1. Continue with the current landfill cell expansion plan:
   This uses the 2021 Annual Operating Report for Evergreen to interpolate future landfill cell expansion requirements and timing of those requirements.

2. Outsource waste disposal functions to adjacent waste commissions and landfill operations in the surrounding municipalities:
   This scenario would be based on Evergreen transporting waste and recyclables to waste commissions and landfills in surrounding locales, and would possibly lead to Evergreen either amalgamating with these other organizations or surrendering their functions to these organizations and ceasing operations.

3. 950 m^2 building with MRF equipment throughout processing 5 tons per hour of recyclable material

4. 950 m^2 building with MRF equipment throughout processing 10 tons per hour of recyclable material

5. 50 tpd 1,500 m^2 building with MRF equipment in half of the space and the 50 ton-per-day WTE system in the other half

6. 100 tpd 1,500 m^2 building with MRF equipment in half of the space and the 100 ton-per-day WTE system in the other half

Our financial analysis of each of these scenarios takes into consideration the following:

- All projections are "Order of Magnitude" budget considerations using interpolations of the information we have been given by Evergreen, general economic information for the region, and - in some cases – informed assumptions about future conditions.

- These estimates should not be taken as literal dollar figure expectations over the given periods of time but as indications of the future viability and trends of each scenario.

- Estimated future costs of landfill cell construction over the next twenty years.

- Estimated costs of both 750 square meter and 1,500 square meter facilities to house a MRF and/or WTE systems.

- Estimated costs to provide MRF equipment

- Estimated costs to provide WTE equipment

- Definition of financial variables as the follows:
    - Costs are analyzed in both Non-Leveraged (Full equity investment) manner and Leveraged (Bank or Lending Institution financed) manner.
    - Assumptions for financing are 20% equity of total costs required up front, loan amounts amortized over a ten-year period with a five-year loan term of 6.5%. Depending on the financing terms Evergreen could receive from potential lending partners, we would recalculate these projections based on those terms and for the selected scenario that Evergreen chooses.
    - Time value of money analysis for both Net Present Value and Internal Rate of Return calculations were given a 4% discount rate assuming the current high inflation rates will ease over time and come down to more recent pre-COVID levels.

- Financial Investment Analysis methodology definitions are as follows:
    - **Net Present Value:** Net Present Value applies to a series of cash flows occurring at different times. The present value of a cash flow depends on the interval of time between now and the cash flow. It also depends on the discount rate. NPV accounts for the time value of money. It provides a method for evaluating and comparing capital projects or financial products with cash flows spread over time, as in loans, investments, payouts from insurance contracts plus many other applications
    - **Internal Rate of Return:** The Internal Rate of Return on an investment or project is the "annualized effective compounded return rate" or rate of return that sets the net present value of all cash flows (both positive and negative) from the investment equal to zero.
    - The values generated by both investment methodologies are meant to serve as guidelines for determining future investment directions and not as literal monetary values.

Scenario Analysis

1. **Landfill Cell Expansion** – as stated above, this scenario follows the existing plan of expansion for Evergreen to the limits of the existing planned landfill cells as shown on the landfill site plan (ref?). Evergreen's current operations are outlined in the most recent Operating Report done by Omni McCann. From this report we took the information about the historic development of the current landfill cells (both Inert and MSW), and extrapolated a potential future expansion plan, including construction expansion timing and rough estimates of expansion costs.

   Along with the expansion projections for the landfill cells we assumed that the overall landfill capacity of Evergreen would be within 10% of the existing capacity which would trigger expansion at regular timing intervals. As shown in the Cell Construction sheet of the Evergreen Cell Expansion Analysis spreadsheet (see appendix ???, section ???), we have determined that if Evergreen chooses not to move ahead with a MRF and or WTE system, an MSW landfill cell expansion of two cells should be initiated for 2023, and more two cell expansion projects should be completed every seven to eight years based on historical intake data, and similar expansions of the Inert waste cells should be undertaken in 2026 and 2033.

Financial Criteria	Cell Construction
20 year Capital Investment	(11,675,384.48)
20 year total equity investment	($2,597,011.51)
20 year Estimated Operating costs incl debt service	($31,988,441.82)
20 year estmated total revenue	$22,290,310.15
20 year nominal retained earnings (EBITDA)	($12,295,143.18)
20 year average retained earnings/deficit	($614,757.16)
20 year Levered Cash on Cash return	-33%
20 year Closing Net Present Value	($4,558,735.77)
20 year Internal Rate of Return	No return
Notes	Revenues would need to climb 77% to break even with this scenario

Table 14: Scenario 1 Economic Summary

For the continued Landfill Cell Construction option, in the table above, we estimate that over twenty years projected from 2023, Evergreen would make a capital investment of **$11,675.384.48** to maintain enough landfill capacity to provide adequate waste capacity to its service region. The twenty-year total retained earnings (EBITDA) show a loss of **$12,295,143.18**, indicating that Evergreen would require subsidies from its constituent stakeholders totaling approximately **$614,757.16** per year to break even on its operations. Investment analysis of this scenario shows both a significant negative Net Present Value and No Return for Internal Rate of Return, indicating this option would not be recommended from a purely insular business viewpoint.

2. **Outsource Waste Disposal Functions** – One option that has been identified for Evergreen going forward would be to outsource its waste disposal functions to waste commissions and Class II landfill operations in adjacent vicinities. Assuming that tipping fees are similar or can be negotiated based on volume between operations, Evergreen could attempt to enter into a Shared Resources and Disposal Agreement with any one of a number of neighbouring waste commissions and/or Class II landfill operations. This would be negatively affected by the fact that the waste would be transported first to Evergreen and then on to the proposed waste partners, adding additional transportation cost and additional greenhouse gas pollution due to that transport. This would have the effect of rendering Evergreen becoming a transfer station for these other waste organizations. This would in turn raise the issue of whether Evergreen should remain an independent entity and could conceivably lead to Evergreen ceasing operations, and the succeeding waste organizations opening transfer stations in Evergreen's service area, or Evergreen becoming an operating subsidiary of another waste services. This could lead to significant losses in service and capacity for waste disposal in Evergreen's service area. Due to these potential developments and the risk associated with negotiating through to a successful conclusion, this option is not recommended.

Financial Criteria	Waste disposal outsourcing
20 year Capital Investment	$0.00
20 year total equity investment	$0.00
20 year Estimated Operating costs incl debt service	($48,841,915.31)
20 year estmated total revenue	$36,142,337.58
20 year nominal retained earnings (EBITDA)	($12,697,261.38)
20 year average retained earnings/deficit	($634,863.07)
20 year Levered Cash on Cash return	Not Applicable
20 year Closing Net Present Value	($5,623,318.25)
20 year Internal Rate of Return	No return
Notes	

Table 15: Scenario 2 Economic Summary

We have analyzed this scenario from the position of Evergreen becoming a transfer site for one of the surrounding waste commissions in Bonnyville or Vegreville, and being charged a similar tipping fee ($85.00) per ton of waste. This would require the cartage of the waste away from Evergreen to these other landfill sites which are on average approximately 100 kms away from Evergreen. Without any other economic inputs, this would result in a 20-year nominal retained earnings (EBITDA) deficit of $12,697,261.38 indicating that Evergreen's stakeholders would either have to contribute $634,318.25 per year for this scenario to break even, or Evergreen's transfer site tipping fee would have to be raised to $115.00 per ton of waste to break even. In this scenario with the current $85.00 tipping fee maintained, the 20-year closing Net Present Value of this scenario is significantly negative and the Internal Rate of Return did not calculate, indicating that this would not be a viable development scenario from an insular business standpoint.

3. **Material Recovery Facility only, 950 square meters at 5 tons of processing per hour**– This option houses a smaller scaled MRF (see description above) in a new facility of 950 square meters. In this facility we would have drive-through capability for up to 53' semi-tractor trailers to offload up to 18 tons of waste per load to be processed through the MRF to optimize the volume of recyclable material before disposal in a MSW or Inert landfill cell.

A 950 square meter facility would allow for a MRF line with equipment that would be able to process minimally 5 tons of recyclable material per hour and this scenario analyzes that amount of processing. As you will be able to see from the 950 square meter MRF Financial Analysis worksheets in Appendix (???), with the overall capital investment and associated projected operating costs only producing marginal revenue from marketing recyclable waste materials, this scenario would require Evergreen opening up minimally two more MSW cells before the end of the evaluation period, adding to the overall capital investment.

Financial Criteria	MRF only 950 m2
20 year Capital Investment	(12,805,196.60)
20 year total equity investment	(2,561,039.32)
20 year Estimated Operating costs incl debt service	(45,081,076.90)
20 year estmated total revenue	50,969,807.50
20 year nominal retained earnings (EBITDA)	3,327,691.28
20 year average retained earnings/deficit	166,384.56
20 year Levered Cash on Cash return	56%
20 year Closing Net Present Value	(208,474.75)
20 year Internal Rate of Return	4%
Notes	Values reflect opening two new cells in 2030

Table 16: Scenario 3 Economic Summary

For the 950 m2 MRF 5 tph only option, in the table above, we estimate that over twenty years projected from 2023, Evergreen would make a capital investment of **$12,805,196.60** to develop this operating model. The twenty-year total retained earnings (EBITDA) show a surplus of **$3,327,691.28**, indicating that Evergreen would be able to distribute to its constituent stakeholders approximately **$166,384.56** per year from its operations. Investment analysis of this scenario shows a slightly negative Net Present Value but a small positive IRR, indicating this option could be marginally feasible on a long-term basis with the caveat that achieving a goal of breaking even for operations annually would be challenging due to varying economic factors.

4. **Material Recovery Facility only, 950 square meters at 10 tons of processing per hour**– This option houses a smaller scaled MRF (see description above) in a new facility of 950 square meters. In this facility we would have drive-through capability for up to 53' semi-tractor trailers to offload up to 18 tons of waste per load to be processed through the MRF to optimize the volume of recyclable material before disposal in a MSW or Inert landfill cell.

A 950 square meter facility would allow for a MRF line with equipment that would be able to process 10 tons of recyclable material per hour as a maximum amount and this scenario analyzes that amount of processing. As you will be able to see from the 950 square meter MRF Financial Analysis worksheets in Appendix (???), with the overall capital investment and associated projected operating costs producing more revenue than the 5 ton per hour scenario from marketing recyclable waste materials, this scenario would still require Evergreen opening up minimally two more MSW cells before the end of the evaluation period, adding to the overall capital investment.

Financial Criteria	MRF only 950 m2 10 tph
20 year Capital Investment	($12,805,196.60)
20 year total equity investment	($2,561,039.32)
20 year Estimated Operating costs incl debt service	($45,081,076.90)
20 year estmated total revenue	$56,900,795.46
20 year nominal retained earnings (EBITDA)	$9,258,679.24
20 year average retained earnings/deficit	$462,933.96
20 year Levered Cash on Cash return	70%
20 year Closing Net Present Value	$3,423,156.01
20 year Internal Rate of Return	10%
Notes	Values reflect opening two new cells in 2031

Table 17: Scenario 4 Economic Summary

For the 950 m2 MRF 10 tph only option, in the table above, we estimate that over twenty years projected from 2023, Evergreen would make a capital investment of **$12,805,196.60** to develop this operating model. The twenty-year total retained earnings (EBITDA) show a surplus of **$9,258,679.24**, indicating that Evergreen would be able to distribute to its constituent stakeholders approximately **$462,933.96** per year from its operations. Investment analysis of this scenario shows a favourable 20-year Net Present Value of **$3,423,156,01**, and a small but significant IRR of **10%**, indicating this option could be feasible on a long-term basis, again with the caveat that achieving a goal of breaking even for operations annually could be challenging due to varying economic factors.

5. **Material Recovery Facility and 50 ton per day Waste to Energy System** – This scenario combines the smaller MRF system with a 50 ton per day Waste to Energy system to generate energy (electricity), in a 1,500 square meter facility, half of which would be dedicated to the MRF line, and half to the WTE system. The combination of the MRF and WTE systems gives Evergreen the best opportunity to realize significant returns on its investment. In this facility we would have drive-through capability for up to 53' semi-tractor trailers to offload up to 18 tons of waste per load to be processed through the MRF and WTE systems to optimize the volume of recyclable material and potentially eliminate any landfill disposal requirements.

   The combination of the MRF and WTE systems will provide Evergreen with the optimum combination of sorting and recovery systems coupled with the ability to use the remaining refuse as feedstock for the Waste to Energy system and therefore generate higher revenues.

   The 50 ton-per-day Waste to Energy system is sized to meet Evergreen's current usage levels. Depending on how the system is operated by Evergreen, there could possibly be capacity in the process to import waste from other regions or waste commissions to provide added revenue for Evergreen. This would have to be studied after a period of time where the operator would be able to determine overall waste processing levels.

Financial Criteria	MRF/WTE 50 tpd
20 year Capital Investment	(25,045,556.41)
20 year total equity investment	(5,009,111.28)
20 year Estimated Operating costs incl debt service	(62,941,722.87)
20 year estmated total revenue	104,646,828.01
20 year nominal retained earnings (EBITDA)	36,695,993.85
20 year average retained earnings/deficit	1,834,799.69
20 year Levered Cash on Cash return	87%
20 year Closing Net Present Value	16,521,247.19
20 year Internal Rate of Return	15%
Notes	No cell expansion required after system is operating

Table 18: Scenario 5 Economic Summary

For the MRF and 50 ton per day WTE option, in the table above we estimate that over twenty years projected from 2023, Evergreen would make a capital investment of **$25,045,556.41** to develop this operating model. The twenty-year total retained earnings (EBITDA) show a surplus of **$36,695,993.85**, indicating that Evergreen could contribute to its constituent stakeholders totaling approximately **$1,834,799.69** per year from its operations. Investment analysis of this scenario shows both a significantly positive Net Present Value of **$16,521,247.19** and an Internal Rate of Return of **15%**, indicating this option could be considered for development with the expectation of being a significant revenue source for Evergreen and its stakeholders.

Please note as well that Carbon or Greenhouse Gas (GHG) credits, the basis of the Cap-and-Trade system to regulate Carbon emissions in Canada, will also come into effect for landfills. GHG credits, which have been previously explained in other material we have presented, are still being defined for MSW categories, however we have considered that 10% of the waste that the WTE system will process would be eligible for GHG credits as Biomass – e.g.: wood and paper – and these have been accounted for in the revenue calculations above. Once GHG credits are defined and extended to MSW, the revenue realized from the WTE system has the potential to grow to four times the amount shown above, however this is dependent on how these credits are implemented by the Federal and Provincial governments.

6. **Material Recovery Facility and 100 ton per day Waste to Energy System** – This scenario combines the smaller MRF system with a 100 ton per day Waste to Energy system to generate energy (electricity), in a 1,500 square meter facility, half of which would be dedicated to the MRF line, and half to the WTE system. The combination of the MRF and WTE systems gives Evergreen the best opportunity to realize significant returns on its investment. In this facility we would have drive-through capability for up to 53' semi-tractor trailers to offload up to 18 tons of waste per load to be processed through the MRF and WTE systems to optimize the volume of recyclable material and potentially eliminate any landfill disposal requirements. The 100 ton-per-day WTE system is physically small enough to fit into the same size as the 50 ton-per-day system.

   The combination of the MRF and WTE systems will provide Evergreen with the optimum combination of sorting and recovery systems coupled with the ability to use the remaining refuse as feedstock for the Waste to Energy system.

   The 100 ton-per-day Waste to Energy system is designed to meet Evergreen's current usage levels and provide enough expansion capacity to grow many years into the future and/or allow Evergreen to expand its service region and take in waste from neighbouring waste commissions and communities. This again would be up to Evergreen and their board to develop their business strategy for a long-

   term vision including both the Material Recovery Facility and the Waste to Energy system.

Financial Criteria	MRF/WTE 100 tpd
20 year Capital Investment	(40,045,556.41)
20 year total equity investment	(8,009,111.28)
20 year Estimated Operating costs incl debt service	(79,634,285.68)
20 year estmated total revenue	182,223,267.14
20 year nominal retained earnings (EBITDA)	94,579,870.18
20 year average retained earnings/deficit	4,728,993.51
20 year Levered Cash on Cash return	108%
20 year Closing Net Present Value	49,158,023.88
20 year Internal Rate of Return	27%
Notes	No cell expansion required after system is operating

Table 19: Scenario 6 Economic Summary

For the MRF and 100 ton per day WTE option, in the table above we estimate that over twenty years projected from 2023, Evergreen would make a capital investment of **$40,045,556.41** to develop this operating model. The twenty-year total retained earnings (EBITDA) show a surplus of **$94,576,870.18**, indicating that Evergreen could contribute to its constituent stakeholders totaling approximately **$4,728,993.51** per year on average from its operations. Investment analysis of this scenario shows both a significantly positive Net Present Value of **$49,158.023.88** and Internal Rate of Return of **27%**, indicating this option could be considered for development with the expectation of being a significant revenue source for Evergreen and its stakeholders, and being the best financially performing option of all those that are being considered in this report.

Please note as well that Carbon or Greenhouse Gas (GHG) credits – the basis of the Cap-and-Trade system to regulate Carbon emissions in Canada, will also come into effect for landfills. GHG credits, which have been previously explained in other material we have presented, are still being defined for MSW categories, however we have considered that 10% of the waste that the WTE system will process would be eligible for GHG credits as Biomass – e.g.: wood and paper – and these have been accounted for in the revenue calculations above. Once GHG credits are defined and extended to MSW, the revenue realized from the WTE system has the potential to grow to five times the amount shown above, however this is dependent on how these credits are implemented by the Federal and Provincial governments.

Final Ranking of all identified future directions and investments for Evergreen in this study:

Financial Criteria	Cell Construction	Waste Disposal Outsourcing	MRF only 950 m2 5 tph	MRF only 950 m2 10 tph	MRF/WTE 50 tpd	MRF/WTE 100 tpd
20 year Capital Investment	($11,675,384.48)	$0.00	($12,805,196.60)	($12,805,196.60)	($25,045,556.41)	($40,045,556.41)
20 year total Equity Investment	($2,597,011.51)	$0.00	($2,561,039.32)	($2,561,039.32)	($5,009,111.28)	($8,009,111.28)
20 year Estimated Operating costs incl Debt Service	($31,988,441.82)	($48,841,915.31)	($45,081,076.90)	($45,081,076.90)	($62,941,722.87)	($79,634,285.68)
20 year estmated total Revenue	$22,290,310.15	$36,142,337.58	$50,969,807.50	$56,900,795.46	$104,646,828.01	$182,223,267.14
20 year nominal Retained Earnings (EBITDA)	($12,295,143.18)	($12,697,261.38)	$3,327,691.28	$9,258,679.24	$36,695,993.85	$94,579,870.18
20 year average Retained Earnings/Deficit	($614,757.16)	($634,863.07)	$166,384.56	$462,933.96	$1,834,799.69	$4,728,993.51
20 year Levered Cash on Cash return	-33%	Not Applicable	56%	70%	87%	108%
20 year Closing Net Present Value	($4,558,735.77)	($5,623,318.25)	($208,474.75)	$3,423,156.01	$16,521,247.19	$49,158,023.88
20 year Internal Rate of Return	No return	No return	4%	10%	15%	27%
Notes	Revenues would need to climb 77% to break even with this scenario		Values reflect opening two new cells in 2030	Values reflect opening two new cells in 2031	No cell expansion required after system is operating	No cell expansion required after system is operating
Ranking Best (1) to Worst (6)	5	6	4	3	2	1

TABLE 20: Summary of Economic Analysis Scenarios for MRF and/ or WTE Systems

8.0 Discussion

Inflation and Interest Rates

Inflation has been on the increase since COVID 19. The inflation rate has been affected greatly by increases in energy costs. Materials and equipment prices have been increasing and will likely stay elevated for a prolonged period.

Central Banks have begun raising interest rates as a tool to combat inflation.

Purchasing MRF System (and optional WTE System) in the hear future would allow Evergreen to lock in a system cost at an interest rate that is likely as low as it will be for a while.

Evergreen would then be well positioned to take advantage of rising recyclable prices and rising electrical power rates.

Benefits to MRF's due to Alberta EPR Implementation

When Alberta does implement EPR Regulation, it should benefit MRF operations financially. There would be direct additional financial inducements for recovering the regulated recyclable category materials. There should also be the more subtle benefits of improved recyclables markets. EPR would allow more quantity of a recyclables category to be recovered. This increase in quantity should make local recyclables processing more attractive. Nearby markets definitely keep transportation costs lower. Larger nearby markets would also help to stabilize prices, allowing for better budget forecasting.

Benefits of a Marketing/Sales Position

The supply chain that moves post-consumer recyclables from collection points to processors is different from the typical supply chain for other commodity materials. Most other commodities are traded on centralized markets with fairly transparent mechanisms for reporting prices and volumes. Recycled materials are typically traded "over-the-counter" through the personal and professional networks of processors, brokers, buyers and sellers. The recycling business has also suffered from quality and contamination issues; there are many stories about unscrupulous vendors mixing different grades of material, or even marketing trash as recycling loads.

The considerable volatility in prices, availability and quality of post-consumer materials make these products much more difficult to work with from the perspectives of large industrial users. These users instead turn to virgin materials while recyclables head to landfills or incinerators.

These factors highlight the importance of quality and consistency in the MRF sorting process as well as having a paid position on the Evergreen Regional Landfill staff for marketing and sales of recyclables, not only for obtaining the best prices for the Evergreen MRF's Recyclables, but to keep up with trends that Evergreen could plan and benefit from.

Oil Price Increase and Virgin Plastics

Oil is the main ingredient in plastics. With the global price increases in oil since its low price in April 2020, virgin plastics have become more and more expensive. This trend helps the recovery of recycled plastics because recycled plastics demand increase when virgin plastic costs go sky high. The question is how prolonged will the high oil prices be? If they stay high for over a year, the carry-through to elevated recycled plastics prices will be significant.

Key Developments and Trends in Material Recovery

According to a November 2021 article by the Solid Waste Association of North America (SWANA), recycling markets have recovered strongly since China's "National Sword" policy banned the import of several recyclable materials, including mixed paper and mixed plastics. The policy also reduced the level of contamination accepted in other scrap and recyclable materials to 0.5 percent. China later banned nearly all imported scrap and recyclables, effectively closing the country to US or Canadian recovered materials.

Although New England in the USA was data point, the following trends could be seen across North America in general.

The average, or "blended" value of a ton of recyclables recovered at MRFs in New England increased by 160 percent to $134.26 over the past two years (April/June 2019–April/June 2021). The value increased during the summer of 2021 as commodity prices continued to rise. Waste Management recently announced that the "single stream recycling blended rate" was more than $130 per ton as of September 2021. This was an increase from $30 per ton in early 2020.

Some Specifics:
The US national average price for a ton of old corrugated containers (OCC) was $171 in September 2021, up from $60 per ton a year ago, and from $25 per ton in January 2020.

Mixed paper is at $96 per ton, compared to $18 per ton last year, and a negative $2 per ton in January 2020.

Prices for PET have increased almost four-fold from $130 per ton a year ago to more than $500 per ton in September 2021.

Used beverage cans (UBC) in September 2021 were up almost 70 percent compared to September 2020.

Advantages and Disadvantages of Single Stream Recycling

Advantages

- More convenient for residents and businesses since it eliminates the need to sort materials.
- Increased participation as a result of greater convenience.
- Greater amounts of recyclables collected, because in multi-stream, many recyclables get thrown into garbage and then would not go through MRF sorting.
- No specialized (or compartmentalized) collection vehicles needed.
- No curb sorting allows more homes to be serviced per route.
- Allows for automated collection, which requires smaller labor force and results in fewer worker injuries.
- Lower collection costs.
- Potential to add more materials to the program, such as plastics #3-7, all types of fiber, and aseptic packaging.
- If wheeled carts are used, reduces scavenging and improves community aesthetics.

Disadvantages

- Higher MRF capital and operating costs (although cost per ton is typically lower).
- Higher container and vehicle capital costs under automated, cart-based system.
- Lower per-ton revenue to the local government.
- Less quality control at the curb under cart-based system.
- Higher percentage of processing residue.
- Potential for lower commodity value if quality control is not maintained.
- Potential operational and cost impacts to end users if market specifications are not met.

MRF's & LEED

A trend in MRF construction has been the implementation of a Leadership in Energy and Environmental Design (LEED) approach to the MRF. To the extent practical, we would use the following LEED considerations in the MRF building:

- Using products made with salvaged or recycled materials,
- Designs that save energy (with optional WTE, we create our own electricity and heat),
- Designing to provide a safe, healthy indoor environment (frequent air exchanges using heat recovery ventilators).
- Salvaging or recycling materials used during construction.
- Rooftop rainwater harvesting system, skylights, south-facing clerestory windows.
- Low volatile organic compounds (VOC) paint on any interior walls.
- Stormwater runoff controls to prevent damage to the building and vegetation and to minimize runoff into waterways.
- High-efficiency lighting fixtures, lamps, lighting controls/occupancy sensors and HVAC equipment.

9.0 Conclusions

This Feasibility Study for the Evergreen Regional Waste Management Services Commission (Evergreen) has evaluated the practicality of building a Material Recovery Facility (MRF) for sorting the various waste streams that arrive at the Evergreen Regional Landfill near Lafond, Alberta. Once sorted, the recyclable categories would be sold to recycling companies

The potential also exists to use the residue from the MRF sorting process as a feedstock for a Waste-to-Energy (WTE) System. The more residues post-sorting that a WTE System is capable of processing, the more items can be repurposed into energy and away from landfill. The electrical and heat energy produced by a WTE System displaces new energy production, reducing fossil fuel consumption. A WTE System can also facilitate the remediation of waste in active landfill cells and the remediation of shut-in or abandoned landfills back into productive land.

Of the six scenarios investigated for their project economics, the scenario with the highest economic return was for Evergreen to increase its intake of MSW to 100 tons per day, use a MRF for sorting Recyclables and a WTE System for processing eligible WTE feedstock into electricity and heat. This recovery of recyclable materials and/or use of eligible waste for feedstock in a WTE System could divert as much 81% (14,200 Tonnes) of waste per year from the Evergreen Regional Landfill. This scenario also generated significant annual revenues which would allow the Evergreen Regional Waste Management Services Commission to realize the economic return from their investment over the project's anticipated 20-year lifespan.

Appendix A Project Preliminary Drawings

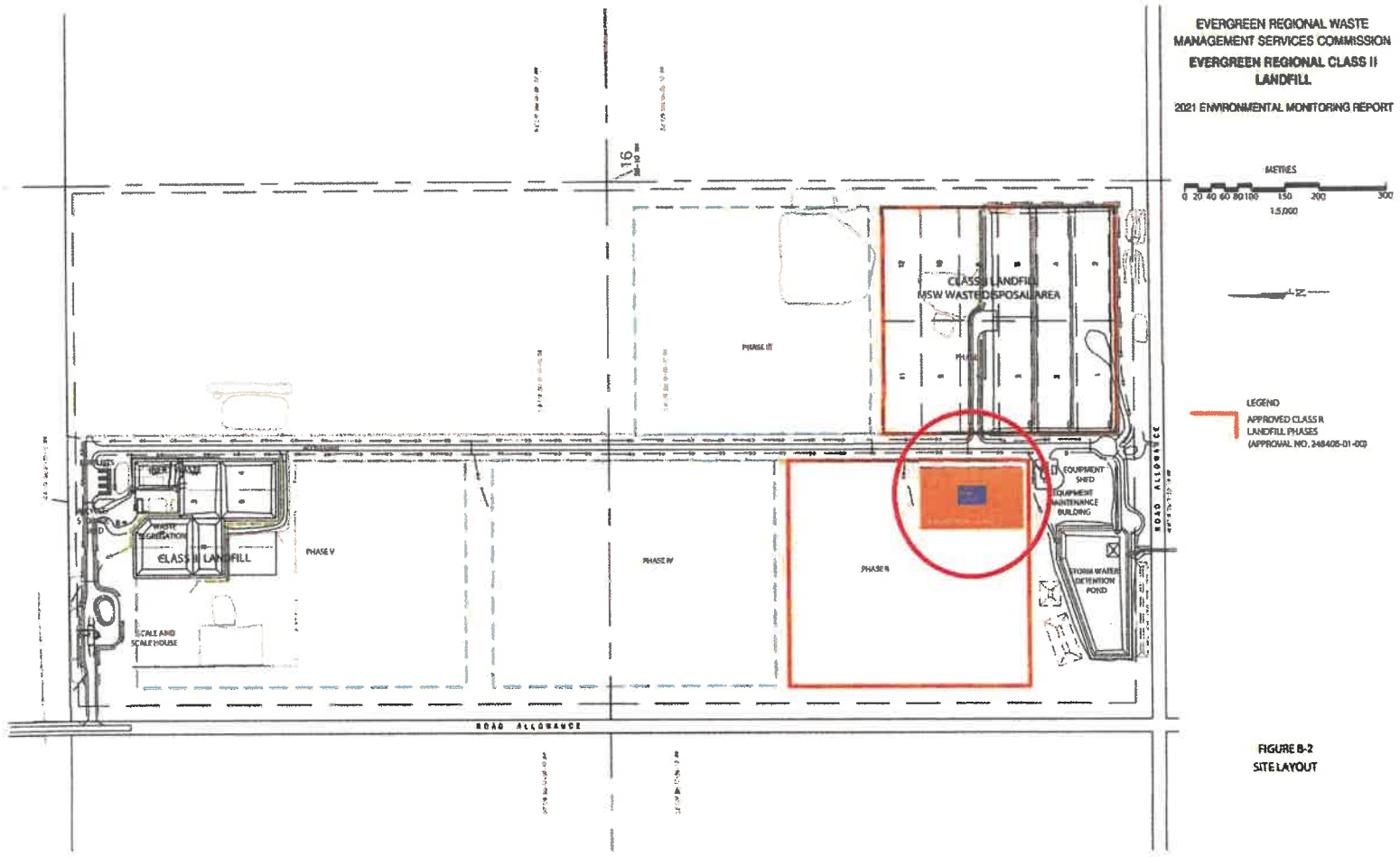


Figure 31: Preliminary Drawing - Evergreen Regional Landfill Site with Location of Development (circled)

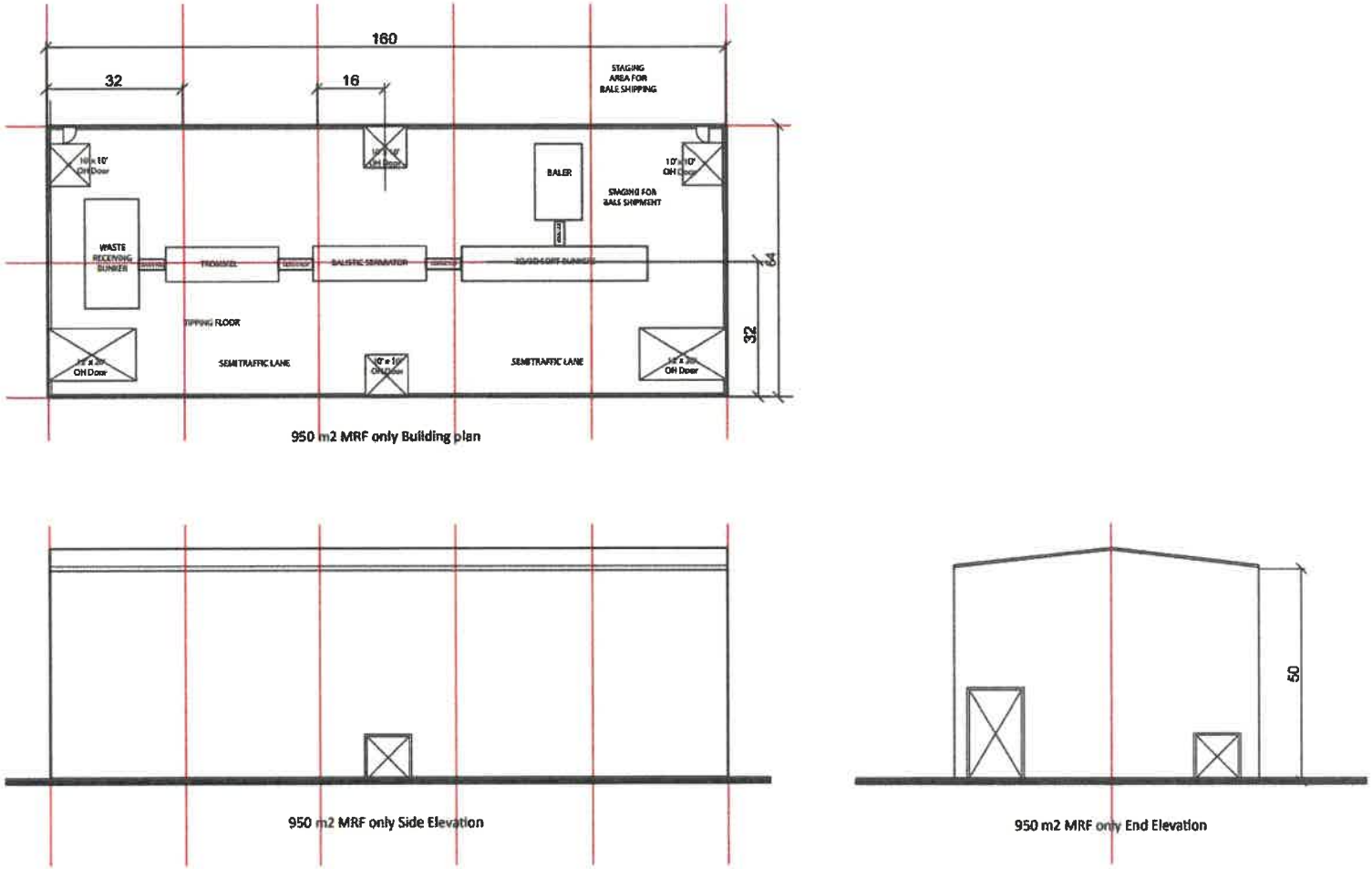
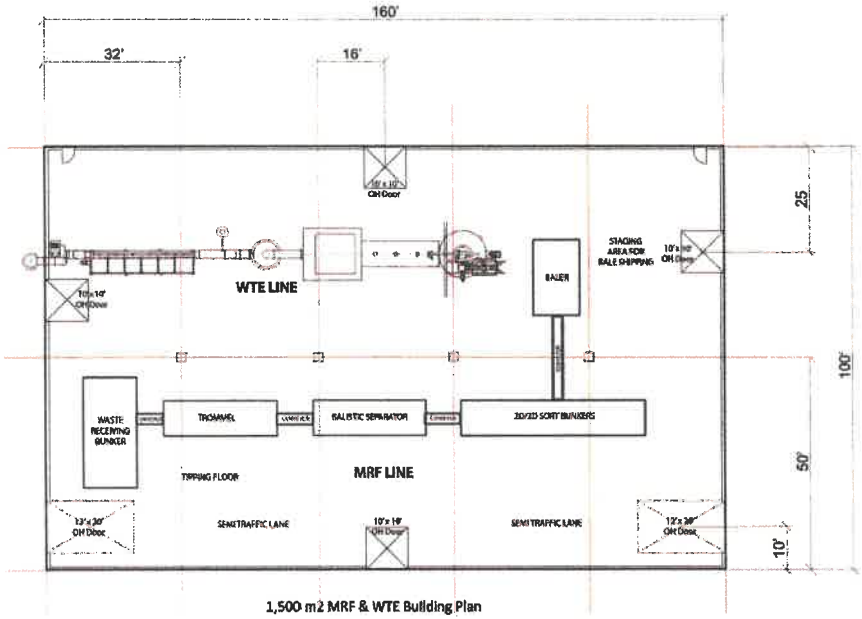
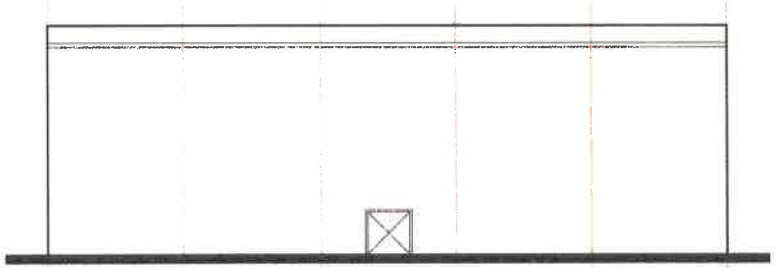


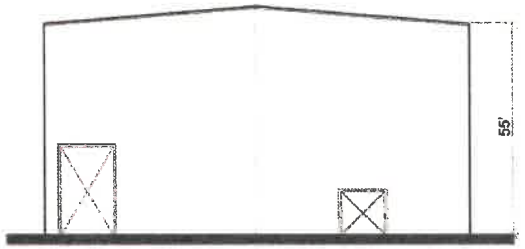
Figure 32: Preliminary Drawing - Plan and Elevations for 950 m2 Building



1,500 m2 MRF & WTE Building Plan



1,500 m2 MRF & WTE Building Side Elevation



1,500 m2 MRF & WTE Building End Elevation

Figure 33: Preliminary Drawing - Plan and Elevations for 1500 m2 Building

Appendix B St Paul Land Use Bylaw - (DC) Direct Control District

County of St. Paul No. 19 Land Use Bylaw 2021

8.9 DIRECT CONTROL (DC) DISTRICT

(1) Purpose:

a. To enable and permit Council to regulate and control the use, development and subdivision of land or buildings in any such manner as Council may by resolution consider necessary in an area designated as a Direct Control District on the Land Use District Map in Part 10 of this Bylaw.

(2) Council shall consider the application and designation of Direct Control Districts to those specific sites or area of the County where:

a. Development regulation and control by means of the other Land Use Districts provided for in this Bylaw may be inappropriate or inadequate having regard to existing or future developments and to the interests of the applicant, the County, the public generally; or
b. An approved statutory plan for the area could be more effectively implemented through the application of a Direct Control District;
c. Marshalling and laydown yards are proposed;
d. A proposed development is of a unique form or nature not contemplated or reasonably regulated by another Land Use District provided for in this Bylaw.

(3) Uses and Requirements:

a. Council shall decide on all development permit applications. The determination of appropriate uses and applicable development requirements within an area designated as a Direct Control District shall be approved by Council when considering any particular development permit application. An application for development may be refused approval with our without conditions. Council may require any and all information it deems necessary to make a proper decision.

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