Environmental Screening Report

Commercial Upgrade of Existing Pilot Plant
Used Tire Processing Facility
155 Yates Avenue
Sault Ste. Marie, Ontario

Prepared by: Ellsin Environmental Ltd.

155 Yates Avenue
Sault Ste. Marie, Ontario
Canada P6C 1G1

Plant:(705) 575-4662
Head Office: (905) 686-8689
web: http://www.ewi.ca

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EXECUTIVE SUMMARY

Every year millions of scrap tires are generated in Ontario. Some of these tires are recycled, but others make their way into landfills, are burned in cement kilns or are stockpiled throughout the province. These stockpiles can become a breeding ground for disease-carrying mosquitoes if they fill with water. These tires also pose a risk to the environment as they break down in uncontrolled locations. Environmental Waste International (EWI) and its wholly owned subsidiary Ellsin Environmental have developed a patented process that it believes will add value to used tires.

With regulatory approval, the commercial upgrade of the existing pilot facility located in Sault Ste. Marie, Ontario to a fully operating facility processing up to 10 tonnes of used tires per day. Based on data collected during the pilot stage the commercial facility will produce useable products consisting of 1.8 tonnes of steel, 3.2 tonnes of oil, 1.3 tonnes of synthetic gas (Syngas) and 3.7 tonnes of reclaimed carbon black (rCB) which is used to make 7.4 tonnes of black plastic Masterbatch.

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1.0 PROJECT DESCRIPTION

1.1 Background

Ellsin Environmental operated a pilot facility to treat used tires at its 155 Yates Avenue location in Sault Ste. Marie from June 2011 until the expiration of the Ontario Ministry of Environment, Conservation and Parks (MECP) Pilot permits in June 2016. The permits were: Air/Noise Environmental Compliance Approval (ECA) No. 0755-8ETPNW and Waste ECA No. 1180-7XRKUW.

Note: The Ministry of Environment has gone through 3 name changes since this project was initiated. For the purposes of this document the Ministry of the Environment will be referenced by its latest name: Ministry of Environment, Conservation and Parks (MECP).

The purpose of the Pilot Plant was to test the innovative process developed by EWI to convert waste tires into usable, saleable products. The technology is EWI's patented Reverse Polymerization™ process, which uses high efficiency microwaves in a low temperature nitrogen environment to prevent oxidation. EWI has successfully applied this technology elsewhere for several different scenarios such as medical waste management and wastewater sterilization. The intent of the Pilot Plant was to translate this success into a commercial facility to convert waste tires into useful by-products.

The Pilot Plant was originally approved to operate on a 24-hour basis, seven days a week, for a 12 month period from the "Commencement Date of Operation", defined as "the date when approved waste is first received at the Site", which was June 20, 2011.

During the five years of operation the facility was inspected by the local MECP office and had quarterly reports completed on the operation of the facility. Attached in Appendix A is the summary of the non-compliant issues that were noted in the Inspection Reports and the Quarterly Reports.

Based on the experience gained in operating the Pilot Plant, Ellsin is currently seeking to commercialize the facility and is completing a Screening level Environmental Assessment (EA) and applying for permanent ECAs for Air/Noise and Waste.

Ellsin originally worked in cooperation with the Ontario Tire Stewardship Program (OTS) to acquire tires for processing. However, with the closure of the OTS, Ellsin has initiated discussions with Producers and Producer Responsibility Organizations (PROs) in the Resource Productivity &

Recovery Authority (RPRA) program. Due to limited availability of tires through that program, Ellsin has moved on to source tires from other suppliers. Commitments for a supply of tires from PROs are forthcoming once Ellsin is commercially operating; in the meantime Ellsin has secured a supply of used tires from shred facilities in Windsor, Ontario and Michigan. As such, once in operation Ellsin will play an important role in Ontario's economy and environment by diverting used tires into usable/salable products. In addition, Ellsin's project will provide a valuable source of raw materials that can be used to manufacture other products.

The function of the Commercial Plant is to continue to use EWI's innovative, patented microwave process to convert waste tires into usable/saleable products (reclaimed carbon black (rCB), hydrocarbon oil, hydrocarbon gas (Syngas), and scrap metal) at the same site with primarily the existing equipment. Modifications of the equipment to improve the process will include: infeed and out feed material handling; processing shredded tires; infeed, process tunnel and out feed heaters; Syngas utilized as fuel for the heaters; reclaimed carbon pulverizer and a plastic extruder to manufacture plastic black concentrate called Masterbatch. The Site, as is, incorporates extensive engineering development work in all aspects of an operating plant including but not limited to: an operating logic control system; infeed system; tunnel design; microwave power supplies; individual control; material recovery system; and software development for intrinsically safe logic and control.

1.2 Problem and Opportunity Statement

A great concern for the environment is the production of greenhouse gases (GHGs). These gases are suspected to be the main contributor to the increased temperature of the earth. Without reduction of GHGs the world will go through numerous changes that could have devastating effects on humankind. With the operation of the Ellsin facility we are able to solve the environmental issue of used tires while reducing the GHGs produced in the production of new components; namely carbon black and black plastic masterbatch. As shown in Section 5.3 the carbon footprint for the facility is less than from burning tires, producing virgin carbon black and creating crumb rubber.

Another environmental advantage is the plan to make black Masterbatch at the facility with the carbon black and recycled plastic. This will create the first 100% recycled black masterbatch, will limit transportation of raw materials to outside locations and provide a means to recycle plastic material in northern Ontario. This Masterbatch is then used in the manufacture of black plastic products; anything from garbage bags, to cell phone covers to car dashboards. This is far better than the traditional taking used tires and creating ground rubber to put into low value products.

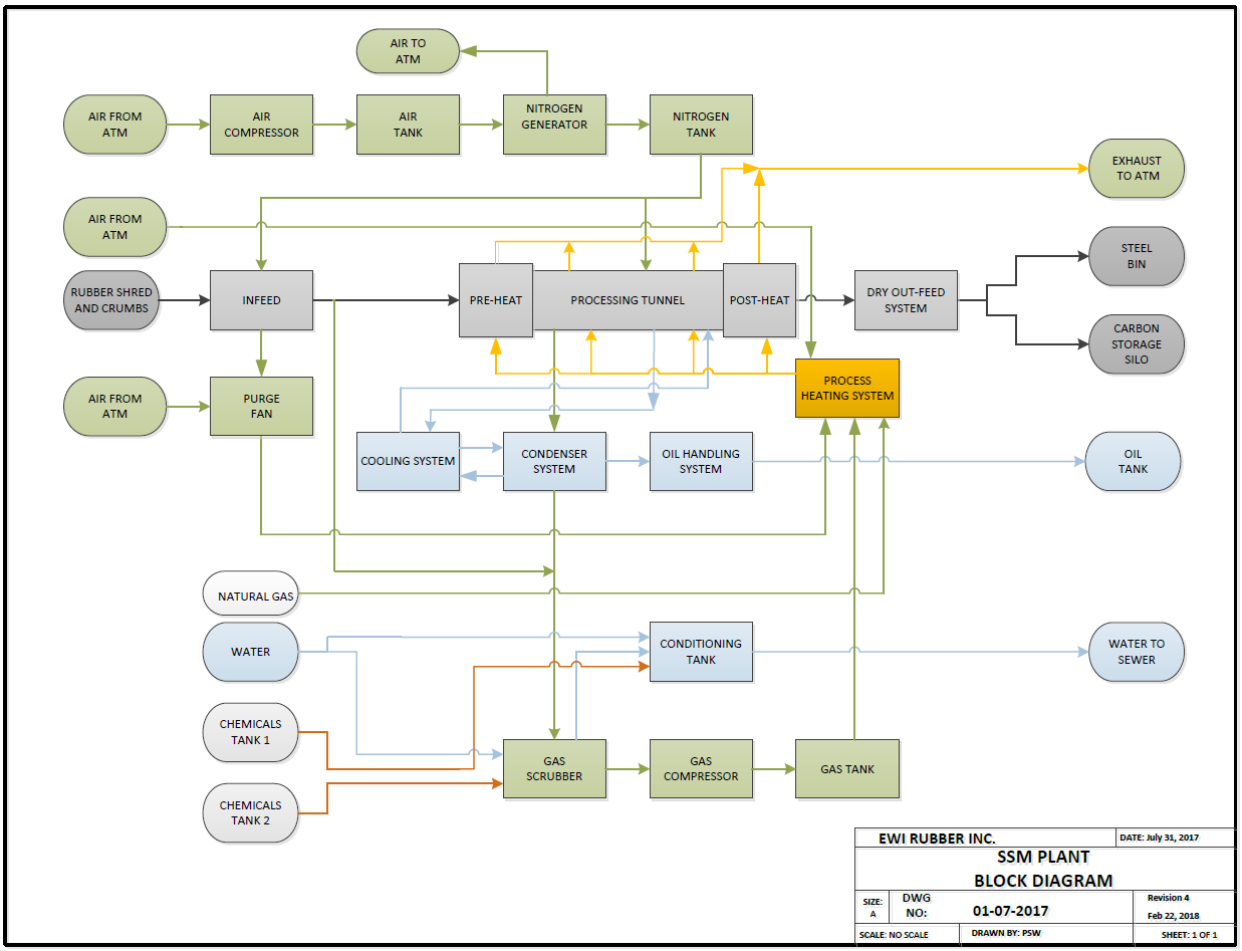
The negative effects from the facility are: greenhouse gas emissions; the office and off spec wastes; and air emissions from the use of Syngas and the carbon pulverizer. These effects are mitigated by the controls put in place by Ellsin. These mitigation controls are explained in the Air Emissions Calculation Report included in Appendix F.

The facility has a potential negative effect based on the greenhouse gases produced to transport tire shred to the facility and to ship the products created to consumers. We have taken these effects into consideration and are working with local groups to set up a local tire shredding operation that will process all the tires from northern Ontario. This will actually lower the GHGs currently produced to ship all the used tires to southern Ontario for processing. Producing black Masterbatch onsite will also limit the GHGs produced by removing the shipping of the rCB to Masterbatch producers in southern Ontario or elsewhere in North America. Instead we will be shipping a densely packed material directly to the end user, similar to the existing Masterbatch producers. Also in the manufacture of black Masterbatch we will require used plastic, we are hopeful that we will be able to work with northern blue box collection companies to have them supply us with the required material, again saving in the shipping and lowering the GHGs. The estimated potential Green House Gas reductions are shown in section 5.3.

1.3 Project Components and Activities

Ellsin will upgrade the existing Pilot Plant to a commercial facility operating at a rate of 10 Tonnes per day utilizing the information gained throughout the Pilot Plant phase. The upgrades include: modifications to the infeed and outlet to accept shredded tires; preheating of the shredded rubber; heating of the tunnel and post heating of the recovered tire carbon; Syngas utilized as fuel for the heaters and additional processing of the rCB to produce a black Masterbatch product. The process will rely on the patented Reverse Polymerization process to breakdown tire shred into useable products. Below is the Process Flow Diagram, a more detailed process description and secondary flow diagrams are located in Appendix B.

Process Diagram



The majority of the rCB will be mixed with plastic and extruded as black Masterbatch to be utilized in the plastics industry. To continually develop the market for the rCB, a portion of the rCB will be sold to companies who manufacture plastic master batch, rubber products and coatings. The steel will be recycled by the metal recycling company located next door to the facility, while the oil will be sold to petroleum companies as a raw feedstock for use in the lubricant and solvent markets. All Syngas will be utilized as a fuel for the gas heaters to preheat the tire shred, provide supplemental heat to the process tunnel and to post heat the recovered carbon black. The gas engine which was used at the previous 5 years pilot project to create electricity that is currently on-site will no longer be utilized.

Based on discussions with producers and PROs in the RPRA, the facility will have to be operating commercially before Ellsin will receive any RPRA tires. Ellsin is working with Triple M and local First Nations in an effort to have a local supply of shredded tires. In the short term Ellsin has sourced tire shred from Windsor Rubber Processing located in Windsor, Ontario and Silver Lining Tire Recycling located in Wyandotte, Michigan. It is the intention of Ellsin to process Ontario used tires but due to market uncertainties Ellsin will request a service area of North America. The shredded tires will be shipped to site on as needed basis, the tire shred will be stored onsite in the transport trucks they are delivered in until needed and then unloaded directly from the truck into the facility. The tire shred will shipped either loose in enclosed trailers or in 1 tonne super sacks. There will be no piles of used tires or shred located outside the facility.

Transportation

The transport of materials will be limited to deliveries between 6am and 9pm Monday to Friday. The facility will operate 7 days per week 24 hours per day; unloading and loading of trucks may occur at any time during the day. Based on operating at full capacity (10 tonnes of tire shred) below is a chart showing the estimated number of shipments/deliveries.

Material	Weekly	Monthly	Total/Year
Tire Shred (In)	4	16	192
Plastic Resin (In)	2	8	96
Finished Master Batch (Out)	3	12	144
Scrubber Chemicals (In)	1	4	48
Recovered Steel (Out)	1	4	48
Recovered Oil (Out)	1	5	60

A complete project description is in the Design and Operations Report presented in Appendix C.

1.4 Projected Financials

Ellsin Environmental Limited - Subsidiary of Environmental Waste International Inc.	
Master Batch Production and Upgrade of Sault Ste. Marie Plant	
Tire Shred Producing Master Batch	
Imperial Measurement	
EWS SSM Upgrade Operating Projections	
Recycled Products Tire Shred	Average Selling Price
Carbon Black, pound	$0.00
Steel, pound	$0.05
Refined Oil, US gallon	$0.95
Light Oil, US gallon	$0.76
Master Batch per lb	$0.77
EWI MODEL	**Sault Ste Marie Facility Upgrade**
	CDN$
	System Upgrade
CAPITAL COST for the Upgrade at SSM	**$7,494,000**
Annual By-Product Production	
Operational Days Per Year	**330**
Tonnes of Tires Processed	3,300
Pounds of Carbon Black	3,275,854
Pounds of Steel	-
Refined Oil in USG	262,488
Light Oil in USG	88,345
Pounds of Masterbatch	6,551,707
Revenues from Sale of Products per Year	
Master Batch Sales	$5,062,683
Carbon Black Sales	
Steel Sales	$0
Refined Oil Sales	$248,707
Light Oil Sales	$66,966
Electricity Sales	$0
Gross Income	**$5,378,356**
Gross Income Per Ton	**$1,630**
Estimated Expenses	
General Maintenance (Including Labor)	$486,000
Chemicals	$356,590
Natural Gas	$140,500
Electricity Cost	$650,000
Water	$29,454
Labor / Eng /Benefits	$572,000
Building Lease	$194,088
Carbon Pulverizer Maintenance	$253,968
Waste Disposal	$33,000
Business Insurance	$85,140
Packaging	$65,517
Sales commission	$131,034
Royalty	$65,517
Tire Shred Costs	$198,000
Engineering, Compliance and Management Costs	$170,135
Sub Total	$3,430,943
Material Cost	
Recycled Resin	$982,756
Sub Total	
Total Estimated Expenses:	**$4,413,700**
Projected Operating Income:	**$964,657**
ASSUMPTIONS	
- EWI Projections are estimates at time of writing and are for guideline purposes only.	
- EWI makes no guarantee, implied or otherwise, that these values will be achievable.	
- Price includes the estimated average costs associated with installation and commissioning.	
- Operation and production based on operating 330 days per year 24/7	

1.5 Project Location

The Ellsin Plant is located at 155 Yates Avenue in Sault Ste. Marie, Ontario, in the area zoned for Heavy Industrial (M3) use. The neighbouring companies include: Essar Steel, Triple M (Auto Recycling), Algoma Industrial and Municipal Waste Recycling Consultants.

Figure 1 Project Location

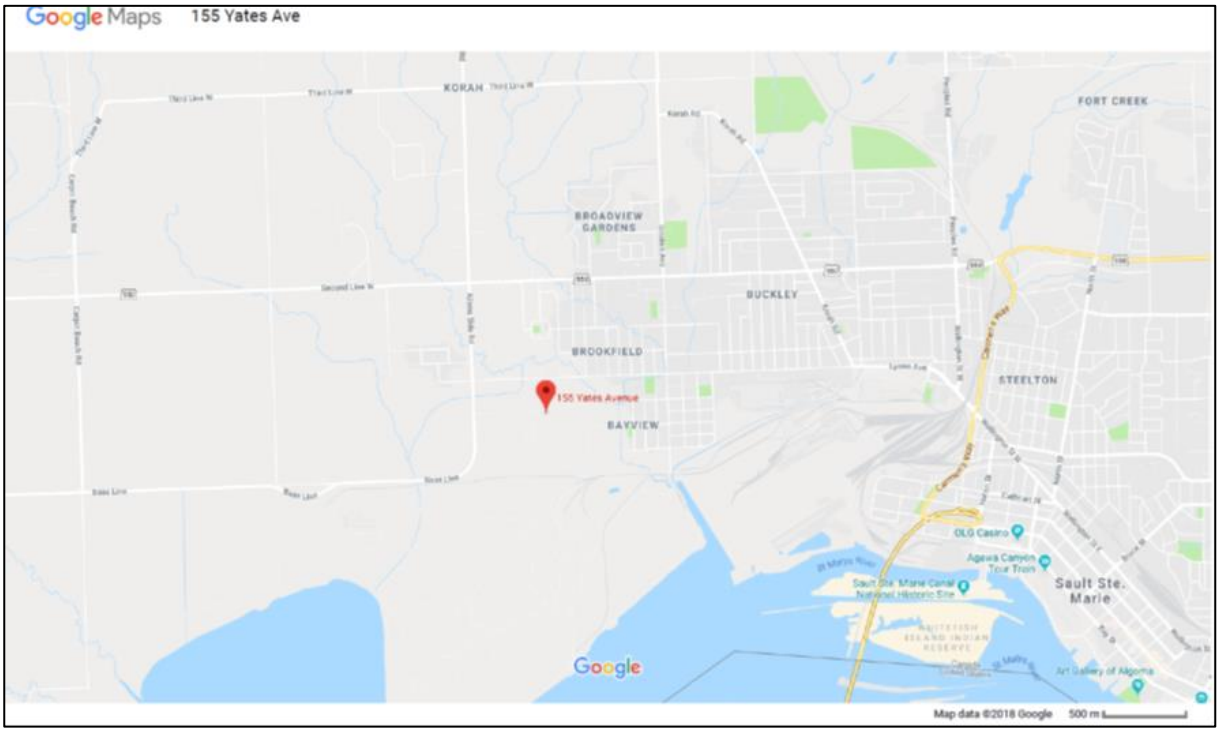
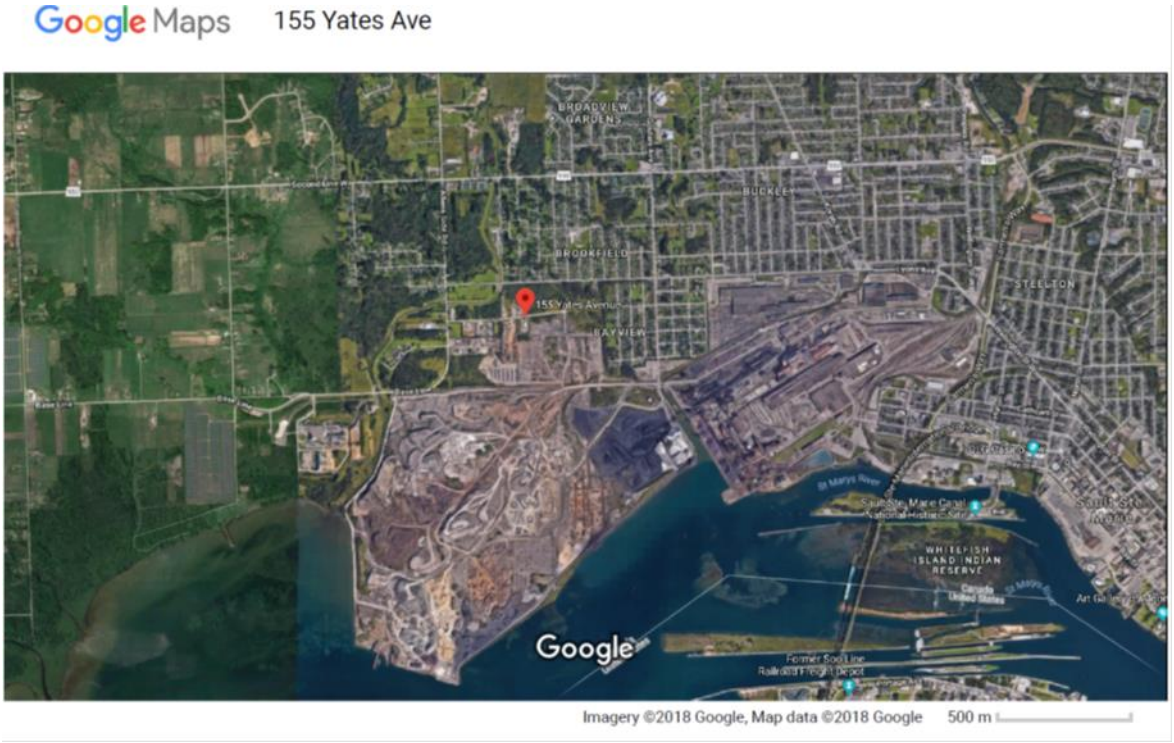


Figure 2



1.6 Approvals Requirements

Ellsin Environmental operated the pilot facility processing used tires at its 155 Yates Avenue location from June 2011 until the expiration of the Ontario Ministry of Environment, Conservation and Parks (MECP) Pilot permits in June 2016. The permits were: Air/Noise Environmental Compliance Approval (ECA) No. 0755-8ETPNW and Waste ECA No. 1180-7XRKUW.

To reopen the facility as a commercial operation Ellsin must complete an Environmental Assessment (EA). Due to the nature of the facility it qualifies under Waste Regulation 101/07 Section 11 (1) 3 for a self-assessment Environmental Screening Process (ESP). Once the ESP has been completed Ellsin will also require Environmental Compliance Approvals (ECAs) for air emissions, noise emissions and for waste processing.

2.0 ENVIRONMENTAL SCREENING PROCESS

Overview of regulatory screening approach

https://www.ontario.ca/page/guide-environmental-assessment-requirements-waste-management-projects#section-4

The steps the environmental screening process includes the following:

1. Prepare and publish notice of commencement of a screening project.
2. Identify problem or opportunity and provide project description.
3. Apply screening criteria checklist to identify potential environmental effects.
4. Describe the potential environmental effects, concerns and issues to be addressed.
5. Consult with interested persons, Aboriginal peoples and government agencies to identify any issues or concerns.
6. Conduct studies and assessment of potential environmental effects.
7. Develop impact management measures (e.g. mitigation measures).
8. Consult with interested persons and government agencies to identify any issues or concerns.
9. If there are no significant net effects and all concerns are resolved, proceed to step 11.
10. If there are significant net effects and/or all concerns are not resolved, conduct additional studies and assessment of effects and impact management measures (in consultation with key parties/agencies).
11. Prepare Environmental Screening Report (includes results of review and consultation, mitigation and impact management measures)
12. Publish Notice of Completion of Environmental Screening Report and begin 60 day review period.
13. If there are no request(s) for elevation of project, proponent submits Statement of Completion to the Ministry, and the project may proceed subject to any other required approvals.
14. If there are request(s) for elevation of project, the proponent begins preparation of terms of reference and an individual EA.

3.0 CONSULTATION AND ENGAGEMENT

3.1 Consultation and Engagement Methods

Consultation and engagement with the public, interested parties, government agencies, and indigenous groups were carried out during the Environmental Screening Process as follows:

- Notice of Commencement Published in Local Papers, emailed to MECP (EA office and District office), hand delivered to all local businesses and residents, and placed on company website
- Open House Notice published in local papers, emailed to MECP (EA office and District office), delivered to local businesses and residents and placed on company website
- Open House, provided tours, answered any questions and showed a presentation of the project
- Individual meetings with each Indigenous group at the facility
- Notice of Completion published in local papers, emailed to MECP (EA office, District office and Approval office), delivered to local businesses and residents, placed on company website – April 24, 2019
- ESR delivered to MECP offices (EA, District and Approvals), each Indigenous group, placed in local library and placed on company website – April 24, 2019

The following interested parties were consulted during the Environmental Screening Process:

- Thessalon First Nations
- Batchewana First Nations
- Garden River First Nations
- Metis Nation of Ontario/MNO Historic SSM Metis Council
- Local Businesses and Residents

The following list of Federal, Provincial and local government agencies that were consulted during the Environmental Screening Process:

- MECP, Sault Ste. Marie District office
- MECP, Approvals Branch, Air and Waste
- MECP, EA Sudbury
- City of Sault Ste. Marie

- Sault Ste. Marie Conservation Authority
- Clean North
- St. Mary's River Remedial Action Plan

The complete list of consultations is detailed in Appendix H.

3.2 Pre-Commencement

Ellsin has and will continue to work very closely with the MECP, in particular the local Sault Ste. Marie office. Ellsin initially contacted the local office prior to initializing the ESP and subsequently arranged a conference call meeting regarding the commencement of the ESP. The Pre Commencement conference call, on January 20, 2017, had the following participants from the MECP offices: Gillianne Marshall – EA Coordinator Northern Region; Kevin Belsito – Acting Supervisor; Kira Fry – Senior Environmental Officer, Sault Ste. Marie; Margaret Wojcik – Senior Review Engineer; Bijal Shah – Senior Review Engineer. As well Ellsin representatives on the call were: Steve Kantor – Chief Technology Officer and Paul Weinwurm – Engineer, Independent Environment Consultants: Don Gorber and Christine Cinnamon. The meeting minutes are included in Appendix E.

3.3 Notice of Commencement

After consultation and review by the MECP Ellsin published the Notice of Commencement (NoC) twice in the two local papers and also placed it on Environmental Waste's website: www.ewi.ca. The email correspondence with the MECP can be found in Appendix E. A copy of the NoC is included in Appendix G.

Ellsin also went in person to each of the Site's neighbours and provided them with a copy of the NoC.

Ellsin received two responses to the NoC:

1. John Bobiwash, a local businessman and member of Thessalon First Nation, contacted both Clint Wardlaw and Steve Kantor to explore how he could work with Ellsin to create a business.
2. Fred Post, Environmental Engineer from Essar Steel was glad to hear we were moving forward with the project. He offered Essar's support on the project.

3.4 Indigenous, Public and Government Consultation

Following the publication of the NoC, Ellsin was provided a list of local agencies and Indigenous Communities to consult with from the MECP, see emails in Appendix H. Ellsin sent the NoC to the Indigenous groups and all other groups indicated by the MECP, arrangements were made with all the Indigenous communities to meet at the Ellsin facility. The agencies contacted did not indicate any concerns with the project. A list of all consultations can be found in Appendix H.

3.4.1 INDIGENOUS MEETINGS AND CORRESPONDENCE

Ellsin met separately with four local Indigenous Communities: Garden River First Nation, Metis Nation of Ontario, Batchewana First Nation and Thessalon First Nations. The meetings all took place at the Ellsin facility where a presentation of the project was shown to the groups and an electronic version was provided to each group. Also a tour of the facility was completed. Each group was enthusiastic and very supportive.

Following the meetings each Indigenous group was hand delivered a Notice of Completion and the original Environmental Screening Report (ESR). The only group to respond was the Metis Nation of Ontario. They wished us success with the project and wanted to be updated as we moved forward with the project.

After consultations with the MECP Ellsin updated its original ESR from processing 20 tonnes per day to 10 tonnes per day and has sent each group this updated report for their comments.

The Indigenous groups did ask to have a follow up meeting once the project was operating. The summary of the Indigenous consultations is included in Appendix H.

3.4.2 PUBLIC MEETINGS AND CORRESPONDENCE

A Public Open House was held at the Ellsin facility where tours of the facility were completed and any concerns were answered. The Notice of Public Open House was published in the two local papers prior to the open house on June 1, 2017. The Open House Notices are included in Appendix I. Also a copy of the Open House notice was delivered personally to each neighbour.

A total of 7 people attended the Open House. All were local people who wanted to see what Ellsin was doing or local people who wanted to show their support for the project. There were no concerns brought forward by the attendees. The list of attendees is included in Appendix I.

3.4.3 GOVERNMENT CONSULTATION AND CORRESPONDENCE

Ellsin has regularly met with MECP personnel's regarding this project, a summary is listed below:

- December 8, 2016 – email sent to MECP requesting who our contact is for initiating the EA, Kira Fry responded December 8, 2016 that our contact is Gilianne Marshall
- December 12, 2016 – email sent to Gilianne Marshall to initiate the EA process. Gilianne responded later that day requesting a meeting sometime during the week of January 9, 2017. It was arranged that we would try to setup a conference call/meeting on January 9, 2017
- January 10, 2017 – Ellsin sends through a further email requesting a meeting to initiate the EA process. Gilianne responds January 11; the meeting is confirmed for January 20, 2017.
- January 20, 2017 – Pre Commencement meeting held. Attendees were: Gillianne Marshall – EA Coordinator Northern Region; Kevin Belsito – Acting Supervisor; Kira Fry – Senior Environmental Officer, Sault Ste. Marie; Margaret Wojcik – Senior Review Engineer; Bijal Shah – Senior Review Engineer. As well Ellsin representatives on the call were: Steve Kantor – Chief Technology Officer and Paul Weinwurm – Engineer, Independent Environment Consultants: Don Gorber and Christine Cinnamon
- February 22, 2017 – follow up from the meeting Ellsin requested the list of Indigenous groups and Non-Indigenous groups we should contact throughout the process. MECP provided the lists on February 22 and February 27.
- April 4, 2017 – Ellsin submitted their proposed Notice of Commencement to the MECP for their review. April 18, 2017 the final version of the Notice of Commencement was sent to the MECP.
- June 13, 2017 – Ellsin submitted a draft ESR and Notice of Completion to the MECP for review. August 18, 2017 – MECP sent through their comments. A conference call was arranged by MECP for August 29, 2017 to discuss their comments to our draft ESR. September 22, 2017 – Ellsin received the MECP's follow up comments from our conference call.

- March 1, 2018 – Ellsin sends email to MECP requesting the list of individuals to send through the completed ESR. April 6, 2018 – MECP replies with a list of MECP people to send the ESR. The ESR is sent out April 9, 2018.
- June 12, 2018 – Ellsin contacts the MECP prior to submitting a Statement of Completion. Ellsin did not have any enquiries from the MECP, public or Indigenous groups during the 60 day review period. MECP responds that we will have to have a discussion prior to moving forward with the Statement of Completion.
- June 27, 2018 – MECP and Ellsin had a conference call to review our completed ESR. The MECP brought forwards concerns about missing information and said that because were processing 20 tonnes per day we could not move forward as is. Ellsin agreed to reduce the processing rate to 10 tonnes per day to meet the requirements.
- June 29, 2018 – MECP requested further information; Ellsin forwarded the information July 3, 2018. MECP replied on August 8, 2018.
- July 17, 2018 – Ellsin requested a clarification to the classification under Waste Regulation 101/07. Ellsin argued that they should fall under Section 11 (1) 2 not Section 11 11(1) 3 as suggested by the MECP which would allow Ellsin to process 20 tonnes per day. The MECP replied August 3, 2018 that to meet Section 11 (1) 2 we would have to meet a number of other requirements. Ellsin decided to continue at 10 tonnes per day and fall under Section 11 11(1) 3
- August 9, 2018 – Ellsin sent an email to the local MECP office listing their concerns with the project and suggestions on how it could move forward. The local office forwarded our email to the MECP EA office. EA office acknowledged receipt of the email September 6, 2018.
- October 19, 2018 – Ellsin sent an email MECP EA office requesting clarification on what is required from Ellsin to continue with the ESP. MECP replied October 23, 2018.
- October 19, 2018 – Ellsin requested the updated list of Indigenous groups required to consult with for the ESR. MECP replied on October 30, 2018
- October 31, 2018 – Ellsin's environmental consultants (IEC) had an in person meeting with Bijal Shah regarding the air emissions at the Ellsin facility and what was expected in the ESR and ECAs. Also attending by phone were: Shelley Wainio, Guowang Qiu (Sudbury MECP), Kira Fry (SSM MECP). Steve Kantor joined the end of the call.
- November 21, 2018 – MECP set up a call with Ellsin to work with Ellsin to move this project forward. On the call were: Ron Dorscht (MECP), Brian Cameron (MECP), Steve Kantor

(EWI/Ellsin), Paul Weinwurm (EWI/Ellsin) and Bob MacBean (EWI/Ellsin), Paul Kirby (EWI/IEC)

3.5 Notice of Completion and ESR

The original Notice of Completion was placed twice in local newspapers during the week of April 9, 2018 and placed on the EWI website. A copy of the original ESR was delivered to the four Indigenous groups, MECP Sudbury EA Office, MECP Local District Office, MECP Toronto Approvals Branch, placed in a local library, and placed on EWI's website. During the 60 day consultation period Ellsin/EWI did not receive one inquiry. Following the 60 day period Ellsin/EWI consulted with the MECP who then brought forward issues with the original ESR that have been addressed in this ESR.

The subsequent Notice of Completion will be placed twice in the two local papers and placed on EWI's website. The updated ESR will be delivered to the four Indigenous groups, MECP Sudbury EA Office, MECP Local District Office, MECP Toronto Approvals Branch, placed at the local library, and placed on EWI's website www.ewi.ca

4.0 SCREENING CRITERIA AND POTENTIAL ENVIRONMENTAL EFFECTS

The potential environmental effects (either positive or negative) that are anticipated from the project were identified using the Screening Criteria Checklist which can be found in Appendix D. The following subsections provide a summary of the results of the screening process.

4.1 Surface and Groundwater

The site is located in the south-west part of the city called White Fish Island Lowland which is underlain by horizontally bedded quartzose sandstone, shale and conglomerate of Jacobsville Group, a sedimentary formation of Mesoproterozoic age.

The property slopes gradually to the northwest. The yard surface is covered by compacted ground slag from a nearby steel operation. No surface water courses are located on Site. Storm water generated at the Site either infiltrates the Site surface or flows overland towards the roadside ditch located along Yates Avenue. Surface water within the ditch either infiltrates into the ground or flows west towards the ditch located on the east side of Allen's Side Road, approximately 530 metres from the Site. Due to the above storm water does not cause any significant

sedimentation or soil erosion on or off site or negative effects on ground and surface water quality, quantity or flow.

There is one covered containment berm around the outdoor oil above ground storage tank (AST). A steel cover prevents rain and snow from entering the berm. The berm also has a drain valve that is kept closed. If for any reason water enters the berm area, it is inspected for contamination, if clean it is drained to the ditch at the east side of the building. If the water is contaminated with a small amount of oil it is pumped into the conditioning tank in the scrubber area for treatment before being discharged into the sewer system.

The Ellsin building discharges to the City of Sault Ste. Marie sanitary sewer system. It consists of sanitary discharge from sinks, toilets and floor drains located within the building as well as treated scrubber water which meets Sault Ste. Marie sewer discharge bylaw.

The nearest major watershed and the closest watercourse is the West Davignon Flood Control Channel located approximately 245 metres northwest of the property boundary. It is part of the minor watershed Bennett Creek and it goes into the drainage basin of St Mary's River.

All waste materials delivered to the Site are unloaded directly into the building. All incoming tire materials, residual wastes, recovered recyclable materials, and processed end products are: stored within the building; in covered trailers enclosed shipping containers; dumpsters; or within the outdoor oil AST. The outdoor oil AST is surrounded by a steel covered berm to contain major spills and minor spills due to drips or connection leaks during oil loading operations. As such, no waste materials come into contact with on-Site surface water. The operation does not cause significant negative effects on surface or ground water from accidental spills or releases to the environment.

Based on the above the potential environmental impact from the operation is negligible.

4.2 Land

The Ellsin Plant is located on a 1.21 hectare (ha) property at 155 Yates Avenue in Sault Ste. Marie, Ontario. The Site location (Figure 1) shows the property relative to major arterial roads. The property is located directly south of Yates Avenue, approximately 450 metres east of the Yates Avenue and Allen's Side Road intersection. The Site and local topography are generally flat with the exception of material storage piles on nearby properties.

The property is owned by Ellsin and resides on land zoned for Heavy Industrial (M3) use. The Site zoning plan (D&O Appendix C Figure 2) shows the current zoning in the vicinity of the Site. Also in

Appendix C Design and Operation (Appendix C) is the letter from the City of Sault Ste. Marie permitting the use of the property as a tire recycling facility. Properties located adjacent to the Site include the following:

- Essar Algoma Steel Inc., a primary steel production facility located south of the Site
- Triple M Metal, a scrap metal recycling facility located west of the Site
- Municipal Waste & Recycling Consultants located north of the Site
- Vacant undeveloped, industrial land located east of the Site

Other businesses in the vicinity of the Site include: Superior Slag Products Inc. (slag recycling), Algoma Industrial (auto body repair and industrial cleaning facility), and Your Site Sanitation and Septic Specialists (septic tank cleaning and repair).

The closest residential receptor is located approximately 180 metres west of the Site located on industrially zoned property. A residential development is located approximately 300 metres north of the Site, north of Wallace Terrace.

The closest water supply and observation water wells are located approximately 400 metres northwest of the Site and 500 metres west and southeast of the Site. Water wells located in the vicinity of the Site are shown in the D&O Appendix C Figure 3.The closest surface water body is the Bennett-West Davignon Flood Control Channel, which is located approximately 245 metres northwest of the Site.

The site is located in a heavy industrial area in close proximity to large steel, slag and waste processing facility it does not cause significant increase of negative effects on residential, commercial, institutional or other sensitive land uses.

4.3 Air and Noise

The project will result in emissions of noise, dust and combustion products from the facility. The following potential environmental effects on air and noise are anticipated:

- Potential increase in emissions of greenhouse gases and other combustion products (e.g., nitrogen oxides) from process heaters and other combustion equipment at the facility;
- Potential increase in emissions of dust and associated constituents (e.g., metals) from processing of recovered carbon and plastic masterbatch at the facility; and

- Potential increase in noise emissions from additional truck movements and facility equipment requirements.

As a result of these potential impacts, air and noise related emissions have been assessed in more detail in Section 5.0 - Effects Assessment.

4.4 Natural Environment

The site location is in a heavily industrialized area, there are no waterways or wetlands located on the property. The property has been backfilled with slag from the local steel mill. To our knowledge there are no threatened or endangered flora or fauna species located on the property. Due to the nature of the property and the location there are no protected natural areas, no fish on the property and we will not be impacting the bird population in the area.

4.5 Resources

Every year millions of scrap tires are generated in Ontario. Some of these tires are recycled, but others make their way into landfills, are burned in cement kilns or are stockpiled throughout the province. These tires also pose a risk to the environment as they break down in uncontrolled locations. Environmental Waste International (EWI) and its wholly owned subsidiary Ellsin Environmental have developed a patented process that will add value to used tires. By processing waste tires and creating products the process has decreasing impact on greenhouse gas emission.

With regulatory approval the commercial upgrade of the existing pilot facility located in Sault Ste. Marie, Ontario to a fully operating facility will increase the throughput of the facility to 10 tonnes of used tires per day, producing useable products consisting of 3.7 tonnes of reclaimed carbon black (rCB) which is used to make 7.4 tonnes of black plastic masterbatch, 1.8 tonnes of steel, 3.2 tonnes of oil and 1.3 tonnes of synthetic gas (Syngas). The Syn gas will be utilized as a fuel for heaters that are used to conserve the required amount of microwave energy required. All heat will be utilized in the process.

Ellsin originally worked in cooperation with the Ontario Tire Stewardship Program (OTS) to acquire tires for processing. However, with the closure of the OTS Ellsin has initiated discussions with Producers and Producer Responsibility Organizations (PROs) in the Resource Productivity & Recovery Authority (RPRA) program. Due to limited availability of tires through that program, Ellsin has moved on to source tires from other suppliers. Commitments for a supply of tires from PROs are

forth coming once Ellsin is commercially operating; in the meantime Ellsin has secured a supply of used tires from shred facilities in Windsor, Ontario and Michigan. As such, once in operation Ellsin will play an important role in Ontario's economy and environment by diverting used tires into usable/salable products. In addition, Ellsin's project will provide a valuable source of raw materials that can be used to manufacture other products. The function of the Commercial Plant is to continue to use EWI's innovative, patented microwave process to convert waste tires and waste plastic into usable/saleable products (reclaimed carbon black (rCB) and black Masterbatch made of rCB and recycled plastic, hydrocarbon oil, hydrocarbon gas (Syngas), and scrap metal). On-Site processing operations including receiving, handling, processing, and storage of waste tires and recycled plastic pellets (including shredded/chopped tires) as well as the handling, storage and off-Site shipment of residual wastes, recovered recyclables and process outputs.

The site is located in heavy industrial area. There is no agricultural activity in the vicinity of the site. The plant activity does not have any negative effects on existing agricultural production.

4.6 Socio-Economic

Tire material receiving and processed material shipping will take place at the Site between 6:00 am to 8:00 pm, Monday to Friday. Internal operations at the Plant including unloading trucks, processing tires and managing wastes and recyclables may occur 24 hours each day, during the year. The Sault Ste Marie has relatively high unemployment and good and labour supply so adding 12 new jobs will have positive effects on local employment.

The Site is operated and maintained in a secure manner such that unauthorized persons cannot enter. The Site is equipped with security fencing. The entrance to the outdoor storage area is controlled by a gate, which is closed and locked when the Site personnel are not present. To access to the Site trucks travel east along Yates Avenue and enter the Site via one of the entrances off of Yates Street. Estimated 3 trucks per day enter the Site to drop off loads of waste tires, materials, equipment, products and process chemicals as required. Drivers are required to check in at the building before proceeding to one of the loading/unloading areas on the north or south sides of the building. Trailers of incoming waste tires are deposited in the appropriate area south of the building and the trucks drive off-Site immediately, picking up an empty trailer on the way, if required. Tire materials are delivered to the Site via transport trucks operated by licensed and designated haulers. Shredded/chopped tires are delivered to the Site in bulk bags via transport truck. All tires (including shredded/chopped tires) are delivered in enclosed trailers. Incoming truck drivers are required to check in at the building and the Site operator records the date and time of shipment, the source,

and the trailer license number, etc. The quantity of incoming tire materials are recorded as the trailer weight. The tare weight is recorded after the trailer is emptied. Site personnel review log sheets and weight tickets on a continual basis to ensure that no more than maximum of tire materials is received at the Site per day and that less than maximum tonnes of solid waste and process end products and residuals are present at the Site at any given time. This is a very small amount of additional traffic and will not cause negative effects related to traffic. Because the Site is located in heavy industrial area we expect minimal negative effects on neighbourhood or community character. The industry located in the neighborhood is in similar nature so Ellsin activities will not cause negative effects on local businesses.

The tires (including bulk bags of shredded tires) are removed from the delivery trailers when required for production. The tire materials are removed from the trailer and visually inspected to ensure the tire materials conform to the approved incoming material stream. Trucks transporting materials off-Site for sale, recycling and/or disposal enter the Site by the Yates Street entrance and check in at the building. The empty trucks proceed either to one of the loading/unloading areas on the north or south side of the building. When leaving the Site, trucks travel west along Yates Avenue. Due to the type of waste received at the Site and the storage of wastes indoors or within enclosed trailers, litter is not expected to be an issue. The Site will be monitored on a daily basis to ensure that litter does not become an issue. To address potential litter, trucks transporting materials to and from the Site will be adequately loaded and secured to prevent any residual debris from becoming windblown from the vehicle. The fully enclosed building prevents the migration of waste from the building. Any material from loading operations which inadvertently falls on to the ground surface will be picked up manually and transferred to the appropriate area. Wind-blown debris, which accumulates on the perimeter fence, will be monitored and collected on a weekly basis to prevent debris from accumulating and/or leaving the Site. We do not expect any negative results in aesthetics impacts.

Once operating commercially the facility will employ up to 20 individuals, including trade people, office and general labourers. Contractors and local companies will be utilized to complete the $7.5 million upgrade and to supply goods and services on a continuing basis. Ellsin will also be contributing local taxes to Sault Ste. Marie. There will also be opportunities for local businesses to supply tire shred, provide recycled plastic and utilize the plastic masterbatch in new products.

4.7 Heritage and Culture

Ellsin has had meetings with all levels of government, local people and local Indigenous groups, during these meetings there have not been any areas of cultural or heritage structures/sites or archeological importance brought to our attention. The site is adjacent to a steel mill and other heavy industries as such we do not negatively affect the local scenery or landscapes.

4.8 Indigenous

Ellsin has met with the four local Indigenous groups, Batchewana First Nation, Garden River First Nations, Thessalon First Nations and the Metis Nation of Ontario. The groups all brought forward concerns with the possible effects our facility would have on the land but after consultation with Ellsin they were satisfied the facility would have no negative effects on their interests. We have agreed to keep them informed throughout the process and will address any issues they may bring forward in the future.

4.9 Other

All wastewater is handled in accordance with regulatory requirements including transportation and disposal by appropriately licensed companies and manifesting where required. Any non-processed, incidental municipal solid wastes and office wastes produced at the Site will be removed from the Site on a regular basis. Recovered recyclable materials, for example wood or cardboard, will be removed from the Site as soon as a full bin of material is accumulated. All waste materials will be processed or removed from the Site as soon as practically possible. Processed materials/residual wastes will be shipped from the Site via truck transport. To ensure against material falling from trucks, waste/recyclable materials are transported from the Site in enclosed vehicles and covered containers including roll-off trucks, lugger trucks, dump trailers, transport trucks and tanker trucks. Residual waste transferred from the Site to other waste management facilities for disposal are transported in covered transfer trailers, dump trailers, etc. designed for the hauling of waste materials. Various wastes and other materials are received and created at the Site including solid and liquid wastes, process end products, and process chemicals. Wastes and other materials are stored within: the building, within the outdoor AST, enclosed trailers, shipping containers (sea cans), or dumpsters located within the fenced compound.

All outgoing residual waste and recyclable materials from the Site are managed using waybills indicating the transporter name and license number, the truck license number, date, net weight,

and destination. Receipt of each shipment is documented on the shipping waybill and returned to the Site for record keeping. These records are kept on Site and/or at the legal address of the owner to facilitate the preparation of annual reports for quantities shipped to each destination. Licensed/registered trucking companies transport waste materials from industrial, commercial, and institutional sources to the Site. Licensed/registered trucking companies also transport waste and residual waste from the Site for disposal/recycling, as required. It is expected that occasionally a relatively small amount of incidental, non-hazardous waste may be received mixed in with the incoming tire shipments, which will be transferred off-Site for disposal at a licensed facility.

Additional wastes produced at the Site that require off-Site disposal typically include office/lunchroom type wastes as well as off-specification carbon, off-specification oil and oily water, which will be transferred off-Site by licensed transporters for disposal at licensed facilities in accordance with Ontario Regulation 347. Facilities within Ontario that offer economical waste management alternatives to landfilling such as processing, resource recovery, and waste to energy recovery may also be utilized. Only facilities permitted in accordance with applicable regulations/regulatory agencies to accept waste from the Site/service area are or will be used. We do not expect negative environmental effects caused by the handling or shipment of the waste materials or products.

5.0 ENVIRONMENTAL EFFECTS ASSESSMENT

5.1 Air Quality

The potential environmental effects of the project were identified as a potential increase in emissions of criteria air contaminants and other air pollutants due to: the generation and combustion of syngas; and dust generated by the grinding and handling of recovered carbon and black plastic masterbatch. The assessment of potential effects on local air quality was completed as follows:

- Existing background air quality levels in Sault Ste. Marie were quantified based on local monitoring data made available by the MECP and Essar Steel Algoma Inc.;
- Potential incremental effects on air quality associated with the project were predicted in accordance with applicable MECP guidance [1] [2]; and
- Predicted incremental concentrations were added to the existing background and compared against applicable air quality criteria set by the MECP to determine the potential effects on local air quality due to the project.

Criteria and Background

A summary of applicable air quality criteria from the MECP's list of Ontario Ambient Air Quality Criteria (AAQC) [3] and Air Contaminants Benchmark List [4] is provided in Table 1.

Table 1: Local Air Quality Criteria in Ontario

Contaminant Name	CAS No.	Time Averaging Period	Air Contaminants Benchmark List			Ontario AAQC (µg/m³)
			POI Limit (µg/m³)	Limiting Effect	Regulation Schedule #	
TSP	n/a	24h	120	Visibility	O.Reg.419/05 Sch.3	120
		Annual	n/a			60
PM_{10}	n/a	24h	n/a		n/a	50
$PM_{2.5}$	n/a	24h	n/a		n/a	30
Carbon black	1333-86-4	24h	10	Soiling	O.Reg.419/05 Sch.3	10
Sulphur (S)	7704-34-9	24h	2.5	Health	SL-JSL	n/a
Sodium (Na) [1]	7440-23-5	24h	0.5	Health	SL-JSL	n/a
NOx (as NO_2)	10102-44-0	1h	400	Health	O.Reg.419/05 Sch.3	400
		24h	200			200
SO_2	7446-09-5	1h	690	Health & Vegetation	O.Reg.419/05 Sch.3	690
		24h	275			275
		Annual	n/a			55

Note: [1] No ACB List value exists for sodium. The value of 0.5 µg/m³ for sodium monoxide (CAS No. 12401-86-4) is used as a conservative surrogate.

The MECP maintains an air quality monitoring station at Sault College in Sault Ste. Marie. In addition, Essar Steel Algoma Inc. maintains two air quality monitoring stations in Sault Ste. Marie, which are located on Patrick Street and Wallace Terrace (Figure 3). Three years (2015-2017) of monitoring data for these three stations were collected and summarized (see Table 2). To ensure a conservative assessment, the 95th percentile background concentrations measured at the stations were averaged to develop the background concentrations carried forward to the air quality effects assessment. Note that background monitoring data for carbon black, sulphur and sodium were not available for any of the three stations.

Table 2: Background Air Quality in Sault Ste. Marie (2015-2017)

Contaminant Name	CAS No.	Averaging Period	95th Percentile Measured Background (µg/m³)									Background Used in Effects Assessment(µg/m³)
			Sault Ste. Marie (MECP)			Patrick Street (Algoma)			Wallace Terrace (Algoma)			
			2015	2016	2017	2015	2016	2017	2015	2016	2017	
TSP	n/a	24h	n/a	n/a	n/a	109.5	56.6	47.3	73.6	59.0	56.1	67.0
	n/a	Annual	n/a	n/a	n/a	36.3	24.5	21.6	36.0	29.1	27.2	29.1
PM_{10}	n/a	24h	n/a	n/a	n/a	n/a	n/a	n/a	41.2	31.8	31.2	34.7
$PM_{2.5}$	n/a	24h	11.8	10.4	9.6	n/a	n/a	n/a	n/a	n/a	n/a	10.6
Carbon black	1333-86-4	24h	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
Sulfur (S)	7704-34-9	24h	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
Sodium (Na)	7440-23-5	24h	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
NO_2	10102-44-0	1h	26.3	22.6	24.4	n/a	n/a	n/a	n/a	n/a	n/a	24.4
		24h	20.4	16.3	17.8	n/a	n/a	n/a	n/a	n/a	n/a	18.2
SO_2	7446-09-5	1h	10.5	7.9	10.5	n/a	n/a	n/a	n/a	n/a	n/a	9.6
		24h	7.8	7.5	7.4	n/a	n/a	n/a	n/a	n/a	n/a	7.6
		Annual	2.0	1.6	1.7	n/a	n/a	n/a	n/a	n/a	n/a	1.8

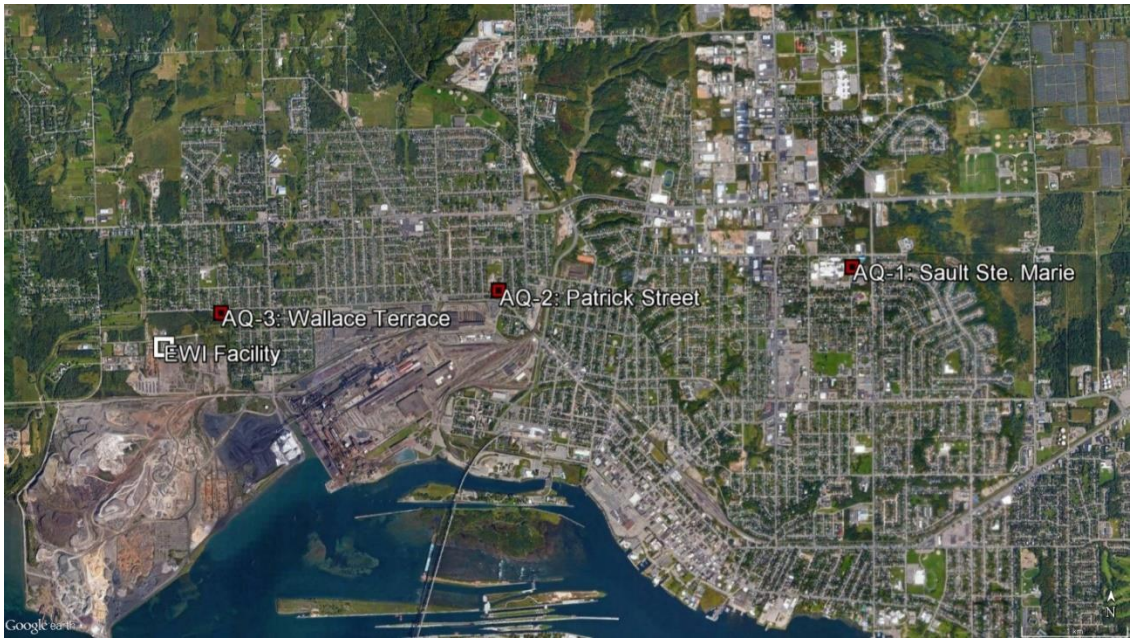


Figure 3: Air Quality Monitoring Locations

Assessment

The assessment of the environmental effects of the project on local air quality considered emissions from the following sources and processes at the facility:

Combustion emissions from natural gas-fired comfort heating equipment;

- Combustion emissions from Syngas-fired process heating equipment that is used to maintain the temperature during tire processing ;
- Fugitive emissions of volatile organic compounds (VOCs) from the outdoor oil tank, which provides temporary storage of waste oil produced by the facility; and
- Dust (including metallic constituents) emitted from the two dust collectors that serve the carbon grinding and plastic masterbatch pellet production processes.

In accordance with MECP guidance [1], only emissions from the dust collectors and the Syngas combusted in the tunnel pre/post/tunnel-heaters were considered significant. Estimates of emissions for these sources were developed using published emission factors and emissions guarantees supplied by the manufacturer of the pre/post/tunnel-heater burners. Detailed emissions calculations are supplied in Appendix F. To ensure a conservative assessment, only the worst-case operating scenario for each source was considered, which included each source operating at its individual maximum rate of operations. The list of significant sources and contaminants considered in the effect's assessment is shown in Table 3.

Table 3: Significant Sources and Contaminants

Source Description	Source Data				Emission Data			
	Stack Volumetric Flow Rate (m^3/s)	Stack Gas Exhaust Temperature (°C)	Stack Inner Diameter (m)	Stack Height Above Grade (m)	Contaminant	CAS No.	Maximum Emission Rate (g/s)	% of Overall Emissions
General Dust Collector	2.832	26	0.305	16	TSP	n/a	2.98E-02	28%
					PM_{10}	n/a	2.98E-02	28%
					$PM_{2.5}$	n/a	2.98E-02	28%
					Carbon black	1333-86-4	1.25E-02	16%
					Sulfur (S)	7704-34-9	3.26E-04	16%
					Sodium (Na)	7440-23-5	1.13E-05	16%
Product Dust Collector	3.776	26	0.305	16	TSP	n/a	7.55E-02	71%
					PM_{10}	n/a	7.55E-02	71%
					$PM_{2.5}$	n/a	7.55E-02	71%
					Carbon black	1333-86-4	6.65E-02	84%

					Sulfur (S)	7704-34-9	1.74E-03	84%
					Sodium (Na)	7440-23-5	6.04E-05	84%
Pre/Post Heaters	0.246	450	0.25	11.2	TSP	n/a	1.23E-03	1%
					PM_{10}	n/a	1.23E-03	1%
					$PM_{2.5}$	n/a	1.23E-03	1%
					NOx	10102-44-0	4.86E-02	100%
					SO2	7446-09-5	7.08E-04	100%

In accordance with MECP guidance [2], emissions from the sources shown in Table 3 were modelled with the AERMOD air dispersion model (v16216R) to predict concentrations of each of the listed contaminants at the maximum point of impingement (POI). The results of the modelling were then added to the conservative background concentrations (see Table 2) to produce estimates of total concentrations. The total concentrations were then compared to the applicable MECP air quality limits (see Table 1) to assess potential air quality impacts associated with the project. This exercise is shown in Table 4.

Table 4: Summary of Maximum Predicted Air Concentrations at POI

Contaminant Name	Total Facility Emission Rate (g/s)	Averaging Period	Max. Predicted Incremental Concentration at POI (µg/m³)	Background Concentration (µg/m³)	Total Predicted Conc. at POI (µg/m³)	ACB List POI Limit (µg/m³)	Ontario AAQC (µg/m³)	Total Conc. as Percent of Limit (%)
TSP	1.07E-01	24h	12.7	67.0	79.7	120	120	66%
		Annual	1.7	29.1	30.8	n/a	60	51%
PM_{10}	1.07E-01	24h	12.7	34.7	47.4	n/a	50	95%
$PM_{2.5}$	1.07E-01	24h	12.7	10.6	23.3	n/a	30	78%
Carbon black	7.89E-02	24h	9.2	0	9.2	10	10	92%
Sulphur (S)	2.06E-03	24h	0.24	0	0.24	2.5	n/a	10%
Sodium (Na)	7.17E-05	24h	0.008	0	0.008	0.5	n/a	2%
NOx (as NO_2)	4.86E-02	1h	61.6	24.4	86.0	400	400	22%
		24h	32.3	18.2	50.4	200	200	25%
SO_2	7.08E-04	1h	0.90	9.6	10.5	690	690	2%
		24h	0.47	7.6	8.0	275	275	3%
		Annual	0.10	1.8	1.9	n/a	55	3%

As shown in Table 4 emissions of air contaminants from the facility's operations were predicted to comply at the maximum POI with applicable ambient air quality limits set by the MECP. Notably, this includes the addition of conservative background concentrations. For example, although the

total predicted 24-hour concentration of PM_{10} at the POI was 47.4 µg/m³ (or 95% of the 50 µg/m³ limit), 73% of this predicted value (34.7 µg/m³) was attributable to background PM_{10} and only 27% (12.7 µg/m³) was attributable to emissions from the facility. Further, as detailed in Appendix F, it was conservatively assumed at all particulate emissions from the facility were within the fine particulate fraction known as $PM_{2.5}$ (i.e., emissions of $PM_{2.5}$ and PM_{10} were assumed to be equal to TSP emissions). During actual operations of the facility, it is expected that fine particulates (PM_{10} and $PM_{2.5}$) will comprise only a fraction of total particulate (TSP) emissions. As a result, actual concentrations of the particulate fractions (TSP, PM_{10}, $PM_{2.5}$) and associated significant constituents (carbon black, sulphur, sodium) will likely be less than the levels shown in Table 4.

Since the predicted total concentrations at the maximum POI were judged to be highly conservative, predicted concentrations at all other locations in the modelling domain would be expected to be lower than those values shown in Table 4. On this basis, the project is therefore not expected to result in effects to local air quality.

5.2 Noise

In order to determine whether the project has the potential to increase the local noise levels at nearby sensitive receptors, an assessment of potential noise impacts due to facility operations was completed in accordance with relevant the MECP guideline, Publication NPC-300 Environmental Noise Guideline [5]. A noise source inventory was developed based on facility design drawings and the project description, and each identified noise source was characterized using either manufacturer data or technical calculations based on projected operating parameters. An acoustic model of the facility was developed in Cadna-A, which implements the industry standard outdoor noise propagation calculation described in ISO 9613-2 [6], using the facility design and site layout drawings. The model was populated with the identified noise sources, and the nearest sensitive receptor in each direction from the facility was configured in the model at the representative location and height. Sound levels from facility operations were predicted at each location and compared to the relevant MECP criteria from NPC-300. The results of the assessment indicated that the facility is predicted to be in compliance with the relevant sound level limits at each receptor, and an assessment of noise control measures was not required. The results of the noise impact assessment are summarized in Table 5 (steady sources) and (impulse sources). For the complete Acoustic Assessment Report see Appendix J

Table 5: Acoustic Assessment Summary Table (Steady Sources)

POR ID	POR Description	Time of Day	Sound Level at POR (Leq, dBA)	Verified by Acoustic Audit (Y/N)	Performance Limit (Leq, dBA)	Compliance with Limit (Y/N)
POR1a	Residential: Side Yard	Day	45	N	50	Y
		Evening	45	N	45	Y
POR1b	Residential: 2nd Storey Window	Day	43	N	50	Y
		Evening	43	N	50	Y
		Night	43	N	45	Y
POR2a	Residential: Front Yard	Day	41	N	50	Y
		Evening	41	N	45	Y
POR2b	Residential: 1st Storey Window	Day	41	N	50	Y
		Evening	41	N	50	Y
		Night	41	N	45	Y
POR3a	Residential: Side Yard	Day	35	N	50	Y
		Evening	35	N	45	Y
POR3b	Residential: 2nd Storey Window	Day	36	N	50	Y
		Evening	36	N	50	Y
		Night	36	N	45	Y

Table 6: Acoustic Assessment Summary Table (Impulse Sources)

POR ID	POR Description	Time of Day	Sound Level at POR (LLM, dBAI)	Verified by Acoustic Audit (Y/N)	Performance Limit (LLM, dBAI)	Compliance with Limit (Y/N)
POR1a	Residential: Side Yard	Day	43	N	50	Y
		Evening	43	N	50	Y
POR1b	Residential: 2nd Storey Window	Day	40	N	50	Y
		Evening	40	N	50	Y
		Night	40	N	45	Y
POR2a	Residential: Front Yard	Day	34	N	50	Y
		Evening	34	N	50	Y
POR2b	Residential: 1st Storey Window	Day	33	N	50	Y
		Evening	33	N	50	Y
		Night	33	N	45	Y
POR3a	Residential: Side Yard	Day	22	N	50	Y
		Evening	22	N	50	Y
POR3b	Residential: 2nd Storey Window	Day	22	N	50	Y
		Evening	22	N	50	Y
		Night	22	N	45	Y

5.3 Greenhouse Gases

The Ellsin facility dramatically reduces overall GHG gas emissions when compared to production of virgin products and current recycling technologies for used tires.

1. Recycled Carbon Black Compared to Virgin Carbon Black.
    - Virgin carbon black is produced by the combustion of petroleum materials; typically the fuel is natural gas or lower grades of oils. Cabot Corporation, a world leader in the manufacture of carbon black in 2009 had a GHG emission rate of 2.62 MT CO_{2e} per MT of product produced. (Carbon Black Manufacture tCO_{2e} / t Carbon Black per IPCC 2006. Assumes furnace black process is used.)

- Ellsin recycled carbon black (rCB) can be substituted or blended with virgin carbon black in products. When compared to virgin carbon black production rCB reduces the GHG emissions by **89%,** to 0.28$MTCO_{2e}$ / MT of recycled carbon black produced. See chart below.

2. Ellsin Facility Compared to Tire Derived Fuel.
    - About 50% of used tires in the United States are used as tire derived fuel (TDF). Many of Ontario's tires end up as TDF. This is based on the Ontario Tire Stewardship's (OTS) information relating to crumb rubber shipped to the US. The OTS does not collect information on all shipments to the US. The GHG emission rates for TDF facilities are estimated to be 2.45 $MTCO_{2e}$ /MT of used tires burnt.
    - Not only does the Ellsin process produce useful products (recycled carbon black, oil, steel and synthetic fuel), it dramatically reduces the GHG emissions. When compared to TDF the Ellsin process reduces the GHG emissions by **73%,** to 0.66 $MTCO_{2e}$ / MT of use tire processed. See chart below.
3. Ellsin Facility compared to Tire Crumbing Technology
    - Tire crumbing technologies require massive amounts of energy to size reduce and separate the components to produce crumb rubber. Compared to the Ellsin process a crumb rubber operation must shred twice before finally breaking it down to crumb and separating the fibers which are sent to a landfill.
    - The overall Ellsin process reduces GHG emissions in the production of recycled carbon black, recovered steel, oil production and synthetic fuel production.
    - Tire crumbing reduces the GHG emissions by 30% where the Ellsin process reduces the GHG emissions by **61%.** See chart below.

GHG from Tire Processing

Processing Rate:	10000 kg/day	Ellsin Process	Virgin Manufactured Materials		
	416.7 kg/hr	% Recovered	GHG Production	GHG Production	GHG Production
		kg /kg tire	kgCO2e/kg tire	kgCO2e/day	kgCO2e/year
oil production		37%	0.43	434.58	143,412.08
carbon production		43%	1.13	1,126.60	371,778.00
steel production		4%	0.01	5.20	1,716.00
syngas production		16%	0.13	131.29	43,326.62
Total per processed rubber (CO2e/kg)			**1.70**	**1,697.67**	**560,232.70**

GHG Resulting from the Ellsin Process		GHG Production	GHG Production	GHG Production
		kgCO2e/kg tire	kgCO2e/day	kgCO2e/year
Electricity consumed per rubber (kWh/kg)	0.83			
CO2 for Electricity per rubber (kgCO2e/kg)		0.08	83.28	27,482.40
Syngas use for burners per rubber (Mj/kg)	7.38			
Syngas use for burners per rubber (kgCO2e/kg)		0.58	578.06	190,758.85
er Ellsin Process (kgCO2e/kg)		**0.66**	**661.34**	**218,241.25**
GHG Emission Reduction		**1.04**	**1,036.34**	**341,991.45**

Emission Source				
Ellsin Carbon Black Production Emissions	**Material (tCO2e/t)**	**EWI RP Process (tCO2e/t)**	**EWI RP Emission Reduction (tCO2e/t)**	**Percentage Reduction**
	2.62	0.28	2.34	89%
TDF Emissions	**Combustion of Tires (tCO2e/t)**	**Avoided Utilitity Emissions (tCO2e/t)**	**Increased Emissions (tCO2e/t)**	**Percentage of Increase**
	2.45	1.87	0.58	24%
Recycling/Crumbing Products	**Manufactured Virgin Material (tCO2e/t)**	**Manufactured from Recycled Tires (tCO2e/t)**	**Reduced Emissions (tCO2e/t)**	**Percentage Reduction**
	0.61	0.43	0.18	30%
Ellsin overall process	**Products Produced (tCO2e/t)**	**Energy Used (tCO2e/t)**	**Reduced Emissions (tCO2e/t)**	**Percentage Reduction**
	1.70	0.66	1.04	61%

Notes:

347	kWh Ellsin electricity consumption magnetrons, auxiliary equipment and post processing (carbon pulverising)
2.62	Embedded Carbon Dioxide – Carbon Black Manufacture t CO2 / t Carbon Black per IPCC 2006. Furnace black.
0.13	Embedded Carbon Dioxide – Steel Manufacture tCO2e/T steel per EPA WARM v12
33.7	Oil Production kg CO2e/GJ per CRS 2013 (assumes refined Canadian Oil Sands)
38.3	Energy Content – Fuel Oil MJ/L per EC 2013
0.91	Specific Gravity of Oil kg/L
34.9	Energy Content – Fuel Oil MJ/kg per EC 2013
1.17	eCO2 kg/kg of oil
17.8	LPG/Syngas Production kg CO2/GJ per Greenhouse Gas Emissions Inventory Summary for Canada EC (2002)
78.37	LPG/Syngas Combustion kg CO2/GJ per EC 2002
46.1	Energy LPG MJ/kg
0.82	LPG/Syngas Production kg CO2/kg
	Carbon black was assumed to be furnace black , approximately 95% of carbon black production (per IPCC 2006).
	Ellsin process syngas was assumed to generate equivalent CO2e emissions when compared to marketable LPG
0.1	Electricity kgCO2/kWh , Average in Canada, Exhibit 2-3, Source ICF Consulting , Determination of the Impact of Waste Management Activities on Greenhouse Gas Emissions: 2005 Update. Ontario Electricity Source: Canada - National Inventory Report 1990-2009, Greenhouse Gas Sources and Sinks in Canada, Part 3
2.58	Required Energy for pre/post heating of rubber (Mj/kg)
330	Days of operation per year
2.6477	www.epa.gov/sites/production/files/2015-07/documents/emission-factors_2014.pdf

6.0 COMMITMENTS TO MITIGATION AND MONITORING

A summary of the commitments made during the Environmental Screening Process to mitigation and monitoring are provided in the table below.

ID	Commitment	Reference
General		
G-1	Follow-up with interested parties on results of ESR	Appendix H
Air Quality		
AQ-1	A Continuous Emission Monitoring system will be installed and maintained for the pre/post/tunnel burners in accordance with MECP *Guideline A-7: Air Pollution Control, Design and Operation Guidelines for Municipal Waste Thermal*. The CEMS system will include continuous monitoring of temperature and concentrations of oxygen, nitrogen oxides, carbon monoxide, sulphur dioxide and organic matter (undiluted, expressed as equivalent methane) in the undiluted flue gases leaving the burner stacks.	Appendix F
AQ-2	Source testing will completed determine the rates of emission of key contaminants from the pre/post/tunnel burner stacks in accordance with the Ontario Source Testing Code. Key contaminants will include those listed in Appendix B of the Company's previous ECA # 2455-9JHFLE or as otherwise agreed upon with the MECP.	Appendix F
AQ-3	Dust collectors will be installed and maintained to control fugitive emissions from the carbon finishing and Masterbatch processing areas	Appendix F

7.0 NEXT STEPS

This Environmental Screening Report will be submitted to the MECP and a Notice of Completion will be published to inform the public, interested parties, government agencies, Indigenous communities and groups that the 60-day review period is commencing.

The Notice of Completion will indicate where copies of the Environmental Screening Report can be viewed (i.e., local public library, project website). A copy of the Notice of Completion is included in Appendix G. During this review period any person may bring forward concerns. If they feel their concerns have not been sufficiently addressed by EWI this will cause an elevation request. All elevation requests are taken to the MECP where the parties attempt to resolve any concerns.

If no elevation requests are received within the 60-day review period, or if an elevation request is resolved or withdrawn, EWI will complete a Statement of Completion form, per Schedule II of the Guide to Environmental Assessment Requirements for Waste Management Projects, and submit it to the MECP. Upon acknowledgement of the Statement of Completion by the MECP, EWI will prepare and submit ECA applications for Air/Noise and Waste.

8.0 SUMMARY AND CONCLUSIONS

Ellsin completed a 5 year pilot plant operation at its 155 Yates Avenue facility in Sault Ste. Marie, Ontario and is transitioning to a commercial operation from the information gathered during the pilot plant operation. The next step is for Ellsin to complete the Environmental Screening Process. After completing the Pre-commencement meeting with the MECP and follow up consultations with the MECP, Ellsin sent out the Notice of Commencement. As part of the process Ellsin held an Open House, sent notices to all interested parties and met with the four local Indigenous groups. Ellsin did not receive any negative comments or concerns from any of the groups or individuals.

An ESR was prepared and submitted to the MECP for comment, after receiving Ellsin included the MECP's suggestions and then released the Notice of Completion and ESR. The Notice of Completion was sent to all interested groups, Indigenous groups, MECP, published in the local newspapers and placed on Ellsin's website. After 60 days there were no elevation requests.

As Ellsin was preparing to issue the Statement of Completion the MECP raised concerns with the processing rate. In the ESR Ellsin had included processing 20 tonnes of used tires/day, the MECP argued that it could not be over 10 tonnes/day to meet the ESP requirements. Ellsin has completed the modifications to the ESR and is resubmitting it and the revised Notice of Completion to all interested parties and Indigenous groups. The Notice of Completion will also be published in local newspapers and a copy of the ESR will be available at the local library and on Ellsin's website.

It is anticipated that due to Ellsin's continued effort throughout this process to work with the MECP, local groups, individuals and the local Indigenous, that once the 60day period has passed Ellsin will be issuing the Statement of Completion.

Ellsin will then proceed with the necessary Air/Noise and Waste ECAs and plan to start operating the facility by the end of 2019.

9.0 REFERENCES

[1] Ontario Ministry of the Environment and Climate Change, "Guideline A-10: Procedure for Preparing an Emission Summary and Dispersion Modelling Report, Version 4.1," March 2018.

[2] Ontario Ministry of the Environment and Climate Change, "Guideline A-11: Air Dispersion Modelling Guideline for Ontario, Version 3.0," Feb. 2017.

[3] Ontario Ministry of the Environment, Conservation and Parks, "Ontario Ambient Air Quality Criteria," 29 March 2019. [Online]. Available: https://www.ontario.ca/page/ontarios-ambient-air-quality-criteria-sorted-contaminant-name. [Accessed April 2019].

[4] Ontario Ministry of the Environment and Climate Change, "Air Contaminants Benchmarks List, Version 2.0," April 2018. [Online]. Available: https://www.ontario.ca/page/air-contaminants-benchmarks-list-standards-guidelines-and-screening-levels-assessing-point.