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# Environmental Assessment Registration

## Long Harbour Access Road Industrial Composting Facility

To:

**Honorable Graham Letto**

Minister

Department of Municipal Affairs and Environment

Government of Newfoundland and Labrador

P.O. Box 8700, St. John's, NL A1B 4J6, Canada

From:

**Terrence Penney**

Newfoundland Industrial Composting Ltd.

P. O. Box 19, 10 Point Road, Heart's Desire, NL A0B 2B0

**22 April 2019**

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# 2 NAME OF UNDERTAKING

The undertaking has been assigned the name:

"Long Harbour Access Road Industrial Composting Facility Project"

# 3 PROPONENT

Both Proponent and Consultant have extensive expertise related to the proposed project and have the resources and capability to bring the project to a fully successful outcome.

## 3.1 NAME OF THE PROPONENT

Newfoundland Industrial Composting Ltd.
P. O. Box 19, 10 Point Road

Heart's Desire, NL A0B 2B0

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## 3.2 CHIEF EXECUTIVE OFFICER

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NICL himself, Mr. Terrence Penney, has been directly involved in environmental remediation projects as a contractor and entrepreneur for over 20 years. Throughout Newfoundland and Labrador, these projects included demolitions, hazardous materials assessments and abatement, site soil assessments and remediation, and industrial environmental remediation. Mr. Penney has extensive knowledge in environmental science and remediation. He has been one of the greatest contributors to environmental remediation of this province. And in the same vein, with his experience, knowledge and business savvy, he is willing to undertake this indoor composting facility project. Upon successful achievement of getting this facility up and running properly, Mr. Penney's contribution to the environment in Newfoundland will be further recognized and appreciated.

## 3.3 Principal Contact Person for Purposes of Environmental Assessment

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The Consultant, Mr. Hubert Alacoque, P. Eng. MBA, is a consulting engineer based in St. John's, with 35 years of experience as a professional engineer, a consultant and an entrepreneur in Newfoundland.

Mr. Alacoque has extensive expertise, specifically in biotechnology industrial processing, environmental engineering and wastewater treatment in Newfoundland and Labrador. In addition to being a self-employed professional engineering consultant for the last 12 years, Mr. Alacoque worked for in mineral processing for IOC, offshore petroleum exploratory drilling as a subsea engineer, with the National Research Council.

Mr. Alacoque was a key developer and plant manager for the establishment of a state-of-the-art fish protein hydrolysate plant located in Mooring Cove (Marystown) in the late 80's and early 90's. This project resulted from a joint venture between FISHERY PRODUCTS INTERNATIONAL LTD., of St. John's, Newfoundland and EUROPRO S. A., of Boulogne Sur Mer, France.

The joint venture partners designed, built and operated a state-of-the-art fish protein hydrolysate plant. Fish offal was processed into a high-quality fish protein digest produced for the animal and aquaculture feed world markets. The plant operated 24 hours a day, 5 to 7 days a week and employed 20 to 30 people. At a capital cost of $20 million, the plant was highly automated, equipped with leading edge technology machinery, equipment and systems. The processing capacity of the plant was 10 metric tons per hour of fish offal collected from all the FPI processing plants on the island. As Plant Manager, Hubert was responsible for the procurement of raw material, the plant operation and administration. This included the receiving and processing of the fish offal as well as the packaging and shipping of the finished products worldwide. Finished product, shipped in marine containers, went to customers in Canada, the US, Chili, Scotland, Norway, France, Belgium, Spain, Japan, Singapore, the Philippines and Australia.

As the plant was being built, Mr. Alacoque was appointed Plant Manager. He went to France for six months to learn this unique process and technology at the plant of the French joint venture partner. Upon his return to Newfoundland, he prepared the organizational structure of the plant, the operating budget and the administrative framework, then hired and trained all the new employees. He commissioned the plant in August 1991 and gradually brought the plant to operating capacity. He was also directly involved in the negotiations between the company and the local union to establish a collective agreement.

As a consulting engineer, Mr. Alacoque also has extensive expertise in hazardous materials, environmental assessment and remediation, and wastewater treatment.

Mr. Alacoque's expertise and resume is therefore very pertinent and useful to the indoor industrial composting project. He has demonstrated knowledge and experience in industrial biotechnology, waste management, wastewater treatment and environmental remediation in Newfoundland.

# 4 THE UNDERTAKING

## 4.1 NATURE OF THE PROJECT

Newfoundland Industrial Composting Ltd. (NICL) intends to establish a commercial indoor composting facility to process a variety of organic waste collected from agricultural and industrial sources in Newfoundland.

The collection of organic waste will be very selective and focused on agricultural and food waste. The organic waste to be composted will consist of mink farm offal / carcasses, spent hens and dead birds, poultry feathers and slaughterhouse offal from poultry, sheep, cattle, hogs and fish processing wastes at later stages of operation.

The finished product will be a high-quality compost to be sold for soil conditioning for agricultural and landscaping purposes.

## 4.2 PURPOSE, RATIONALE AND NEED FOR THE PROJECT

In the development of the business plan and of the environmental assessment process, NICL has received a lot of positive feedback and information from a variety of waste management stakeholders. They all expressed a great interest in MES's project.

Currently in Newfoundland, agricultural and industrial organic waste is simply buried in landfills and dumped at sea. Everyone should recognize that it is a terrible environmental and waste management practice. But the waste management industry knows that there are no alternative available in Newfoundland now. We all know about fish offal being dumped at sea in substantial quantities. But most people are unaware of the extent of burial space required to dispose of substantial quantities organic wastes that the proposed composting facility intends to process into a valuable soil amendment material. The proposed facility will not have the capability, by far, to process all organic waste buried in landfills.

These large quantities of organic waste are buried at landfills such as St. John's, Sunnyside and Norris Arm. These burial practices create substantial landfill gases and odor problems, and more importantly contribute directly to the pollution of the groundwater, which ends up in the drinking water supply. As we all know, many towns have experienced boil-order situations that are very disrupting to the resident.

For example, the town of Sunnyside has recently implemented a completely new potable water treatment system with new potable water disinfection and treatment technology based on stabilized hydrogen peroxide to reduce the disinfection by-products of water treatment to a safe level. Sunnyside operates an industrial landfill receiving raw organic wastes, as well as a contaminated soil treatment facility.

We also all know that the cost of disposal at landfills is very high. That cost is directly transferred to the municipal tax base of the towns and cities being serviced by these landfills. In contrast, an industrial indoor composting facility will divert organic waste and wood products and demolition wastes from the landfill, for which the landfill is not capable of properly processing and recycling. The proposed industrial indoor composting facility will use organic waste and waste wood products to create a valuable product that exists only in short supplies currently in Newfoundland. We also know that the combined volume of organic waste and waste wood products is significant relative to the total waste buried at landfills. The operation of the industrial composting facility will substantially reduce the amount and volume of landfill use, thereby extending significantly the service life of these landfill facilities.

Organizations and companies producing organic waste, as well as the landfill and waste management agencies have indicated to NICL that such a composting facility was badly needed. All these stakeholders have responded very positively to the prospect of establishment of an industrial indoor composting facility on the Avalon Peninsula.

## 4.3 Impact on the Region and the Province

The establishment of an indoor composting facility at the proposed location will have very beneficial environmental and economic impact on the local area, the Avalon region and the Province overall.

### 4.3.1 Environmental Benefits

- Substantial amounts of organic waste and waste wood products diverted from the landfills;
- Extending service life of landfills;
- Reduction in operating costs of landfills (due to reduction of waste volume to be buried);
- Recycling of highly polluting solid wastes into organic soil amendment product for the farming and landscaping industry;
- Reduction of carbon footprint due to a more centralized geographical location of the composting facility for the Avalon region, Burin Peninsula and Bonavista Peninsula;
- Recycling of wood waste that are otherwise being landfilled;

### 4.3.2 Economic Benefits

- Direct employment for the Long Harbour and surrounding area, with construction and operation of the proposed composting facility;
- Procurement of supplies and services from the local area;
- Additional traffic stopping at Long Habour / Chapel Arm / Whitbourne for food, gas, etc...;
- Diversification of the local economy;
- Supply of value-added soil amendment products to the local area and the Avalon and beyond to the agricultural and landscaping industry, at a price lower than other equivalent products;

- Import substitution of soil amendment products (import into the province from other province or the USA);
- Supply of organic[1] soil amendment product to facilitate the development of local organic farming for production of fresh organically grown vegetables – (organic soil amendment will be available and affordable to these local organic farmers);
- 100% Newfoundland local business venture. Not a mainland or American company coming in to only provide low wage jobs.

### 4.3.3 Potential Negative Impact

- Part of the strategic approach to economic development of the greater Long Harbour area includes residential and cottage development. The objective is to expand the residential tax base of the community through economic diversity providing families the opportunity to live near their work. Long Harbour is in a good location with its proximity to St. John's and significant employers such as Vale NL, Grieg Aquaculture and NL Industrial Composting clustered to provide the community with a significant level of economic diversity. Although, the presence of an indoor industrial composting facility could be perceived as a deterrent to the residential development, the location and zoning of the proposed indoor composting facility is substantially far to have no negative effect whatsoever on residential dwellings of any kind in the community.
- The design and operation of the indoor composting facility will be such as to have no environmental impact as it relates to the quality of life enjoyed by the residents and visitors of the greater Long Harbour area. Both the ongoing Environmental Assessment and Registration process imposed by government regulations and the requirements of all the Federal and Provincial regulations relating to such a project will ensure that there will be no negative impact on the greater Long Harbour area in terms of any nuisances such as odors, pest, unsightly buildings, etc… Furthermore, NICL commits to building and operating the facility to the highest standards to peacefully and responsibly produce value-added products that are in demand in Newfoundland. NICL certainly commits to full compliance with all government regulations to successfully operate in the best interest of all stakeholders, including the residents and visitors of the greater Long Harbour area.

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[1] The intended meaning of the term "organic" is not "certified organic". There are many different standards for "organic" depending on the specific food products. Here we only mean that it a substantially organic product as a replacement for chemical fertilizers and as a soil amendment to lighten up the soil, add humus to increase the overall fertility of the soil for plant growth. As NICL progresses in the production of compost, the company may explore the organic certification avenue, based on market demand.

- Negative environmental impact from the facility operation will be effectively nil. In the unlikely or rare event that odors become a problem, both the odor management plan and immediate adjustment to the operation will take care of the problem in short order. There are a number of processing and production measures that will be implemented immediately to mitigate any eventual environmental impact.
- In the very unlikely situation of eventual decommissioning of the indoor composting facility, the remaining raw material would be processed, and the building would be cleaned, disinfected, and either demolished or modified to accommodate a different use or occupancy.
- NICL will work with the local voluntary Fire Department of Long Harbour and will pay the required compensation.

## 4.4 Contribution to Community

With the operation of the indoor composting facility, NICL will provide employment and pay tax to both provincial and federal governments, as well as to the Town of Long Harbour – Mount Arlington Heights. Such taxes are completely incremental to the current situation of solid waste management and processing.

Currently, the inadequate processing of organic waste through landfills impose a direct cost to the population of Newfoundland without generating any tax revenue to governments. Therefore, the current situation is a significant net loss or net cost to the population with no benefit derived from the activity, other than inadequately disposing of waste that substantially pollute our natural environment and potable water resources.

The operation of the indoor composting facility will have the five (5) significantly positive effects of:

1. Reducing substantially negative environmental practices to the betterment of the environment;
2. Recycling two types of solid waste – organics and wood;
3. Reducing the current waste management landfill operating cost and extending the service life of the landfills;
4. Producing value-added products at a lower price than the current supply from the mainland, that are in real demand in Newfoundland;
5. Generating tax revenues to Federal, Provincial and Municipal coffers.

The provincial waste management strategy aims to reduce waste by maximizing and adopting recycling opportunities, divert waste from landfill, improve environmental health and environmental protection, and reduce cost to the taxpayer.

Each year, Newfoundlanders and Labradoreans generate more than 400,000 tonnes of waste materials at a rate of approximately two kilograms per person per day (0.73 tonnes per person per year).

"Per capita residential solid waste disposal was highest in Newfoundland and Labrador (429 kilograms) and lowest in Nova Scotia (158 kilograms) in 2008."[2]

Large scale industrial composting is an explicit objective of both the Eastern Waste Management (Eastern Regional Service Board) and the provincial Department of Environment and Climate Change. One of the many environmental standards adopted by these organizations is "Municipal solid waste compost facilities will collect all organic waste that has been separated from other solid waste and convert it to a beneficial product - compost." [3]

The establishment of the proposed indoor composting facility fits as an integral part of the desired provincial and regional waste management strategy. And that is why all the stakeholders involved in the waste management industry have indicated such a strong support and encouragement for NICL's project.

# 5 DESCRIPTION OF THE UNDERTAKING

## 5.1 WINDROW COMPOSTING OF ORGANIC WASTES

The Proponent intends to establish an indoor windrow type composting facility on a 50 acres site. Choosing an indoor windrow composting system is primarily dictated by the local Nordic climate of the Avalon region.

Windrows are long piles of compost that are turned periodically with mechanical farm type equipment. The receiving and mixing of the raw materials, as well as the composting of the combined raw materials will all be done indoors. Therefore odor, dust, leachate and the potential for pathogenic aerosols must be controlled with the proper equipment and systems, as well as attentive operation and quality control. Aeration is achieved by turning frequently the organic waste in the process of composting. Composting generally occurs at higher rates (45 – 90 days)

[2] http://www.statcan.gc.ca/pub/16-201-x/2012000/part-partie3-eng.htm

[3] http://www.greateravalon.ca/provincial-solid-waste-management-strategy

within buildings and within vessels as compared to outdoor operations that depend more on climatic and outdoor temperature fluctuations.

Source Separated Organics (SSO) to be composted are either premixed prior to being formed into the windrows, or are layered (e.g., typically on a bed of ground yard trimmings, wood chips or sawdust) and then mixed with the turner. To control release of odors when the post-consumer foods products and organic offals in the SSO are “fresh,” windrow facility managers create the windrows and then wait for a few days or a week before the first pile turning. The windrows are covered with a layer of ground yard trimmings, which acts as a biofilter during this initial stage.

### 5.1.1 Composting Defined

There are a number of published definitions of composting, with several of these defining composting as: ‘The controlled biological decomposition and stabilization of organic substrates, under conditions that are primarily aerobic and that allow the development of thermophilic temperatures as a result of biologically produced heat. It results in a final product that has been sanitized and stabilized, is high in humic substances and can be beneficially applied to land.’

- Or, less formally - composting is a natural process that turns organic waste into a clean, stable and useful product by the action of bacteria, actinomycetes and fungi. It is worth emphasizing a few key words in these definitions: Biological process – composting is a living process.
- Aerobic – in the presence of oxygen, this separates the process from anaerobic digestion.
- Heat is produced – heat is a by-product of composting, it does not cause composting of and in itself.
- Result in a product than can be beneficially supplied to land – while not strictly part of the process it should be a key goal of any composting operation.

This process can be effectively accomplished in the backyard by occasional application of a fork. This option should not be discounted, as home composting can effectively contribute to waste reduction in some circumstances, but for collected waste in commercial or municipal quantities, a rather more engineered solution is required.

### 5.1.2 The Composting Process

Composting is an application of the natural processes of decay. The distinction being that sufficient organic material is gathered so enough energy (food) is available to support a large and active microbial population, which, through respiration, generates sufficient heat to accelerate the process. This also achieves a selective sterilization of potential pathogens and seeds that is variously known as sanitization, pasteurization or disinfection. Recognition of the process goes back to ancient times, and it is readily achieved on a small scale although often not very efficiently.

Composting is traditionally driven by a succession of microbial processes. Broadly the process may be considered as comprising four phases: heating, thermophilic decomposition, mesophilic decomposition and curing.

In the heating phase, microbial respiration in the presence of oxygen causes the temperature in the compost mass to rise. As this occurs there is a change in the microbial population from organisms that thrive at ambient temperatures to those that prefer elevated temperatures up to around 55-60 °C (thermophiles). While sufficient readily metabolisable material (energy) remains in the waste, the action of the thermophiles maintains the high temperature. From a practical standpoint this ensures that pathogens and weed seeds are destroyed and results in rapid waste treatment. It is important to note though that temperature is a function of microbial activity and heat removal from the process; a balance must be struck between allowing sufficient heat to accumulate to provide optimal conditions for compost microbes, and the elimination of seeds and pathogens, and removing sufficient heat to prevent overheating. While very high temperatures can be generated in composts, these are not particularly beneficial as very few organisms are able to function above 65 °C; various publications list the optimum temperature for composting as being between 53 and 65 °C, with a number indicating that the temperature should not exceed 60 °C.

As the readily available sources of energy (nutrients) decline the compost cools (as the rate of microbial respiration slows) and a new population of mesophilic microbes, preferring warm temperatures, becomes established. The compost remains warm and active, and considerable degradation can still occur. Indeed, where there is a high proportion of cellulosic material (wood, etc.) the mesophilic phase of composting is likely to be the longest and support the greatest numbers and diversity of microbes. Eventually, all the readily degradable material has been utilized, the temperature returns to ambient, and active composting has ceased. At this stage the compost is usually referred to as 'immature'. This is because it contains relatively high levels of ammonia and other compounds that are toxic to plants. Microbes able to oxidize ammonia to nitrate are not able to survive at elevated temperature. During curing these microbes recolonize and phytotoxic compounds are dissipated and stabilized.

Depending upon the goals of the process, and end use of compost, the curing stage can often be omitted. Where a compost-rich plant growing medium is produced, curing (and appropriate validation) is essential. Where compost is spread broadly to land, curing can often be dispensed with. Good engineering can optimize the composting process, but it must be recognized that the process is driven by the biology of microbial degradation.

Indoor composting cycles will require approximately 6 to 8 weeks. The normal turning period will be weekly when the compost is fresh and actively decomposing. Turning will be done using specialized windrow turning. Once the active composting phase is completed the compost will stay in the windrows for approximately 6 - 8 weeks for curing when less frequent turning can be used if necessary. After this, the compost will be quite stable, odour free and easy to handle for transportation to market.

## 5.2 Geographical Location; Physical Components; Existing Environment

### 5.2.1 Long Harbour Access Road Location

The Long Harbour Access Road (Route 202) was selected for the indoor industrial composting facility for the following reasons:

1. This was the best site available meeting all the necessary criteria in terms of location, access, distance for towns and residential properties, zoning and government regulatory requirements;
2. The site is centrally located in the Avalon region and relatively close to the Burin and Bonavista Peninsulas, where most of the organic waste generators, carbon material suppliers and end product users are located;
3. The site can be directly accessed through the major transportation routes (Trans-Canada Highway);
4. The site is geographically isolated at substantial distance from the nearest communities (4.2 kilometers to the intersection of Route 202 and the road going in to Long Harbour at the riverhead). Figure 1 provides GPS location coordinates of the site on the most recent aerial photo map.
5. The site is located within the municipal boundaries of the Town of Long Harbour – Mount Arlington Heights, and is zoned Commercial Industrial along Route 202 and Rural in the higher grounds of the site further away from Route 202.
6. The site is sufficiently large to establish the proposed indoor composting facility without causing any nuisance.

### 5.2.2 Site Description

The proposed location for the site is initially a 2.5 hectares (6 acres) section of land in the 21 hectares large area of crown land under application by NICL, on the east side of Highway 202, Long Harbour Access Road, 5.7 kilometers from the intersection of the Trans-Canada highway and Route 202. This large section of land is a green-field site with virgin boreal forest and totally undeveloped. The land under application by NICL is approximately 300 metres bordering the east side of Route 202 and 700 meters deep. The parcel is within the Long Harbour municipal boundaries. There is no protected watershed area involved with the parcel of land and the nearest body of water from the boundaries of the land is across Route 202, 300 meters away. As well, there are no cabins or cottages in the areas immediately surrounding the proposed site. The distance from the site to the nearest building at Long Harbour Station is 750 meters. A cluster of cabins alongside of Wolf Pond by the T Railway path is 1.25 kilometer away from the proposed site. These cabins are located outside of the Long Harbour municipal boundaries. An aerial photo of the section of land is shown in Figure 1.

The proposed composting facility site will be accessible from Tower Road, perpendicular to Route 202 and will be located from 50 meter to 100 meters from Route 202. The entrance to the site will be located about 5 kilometers from the intersection of Route 202 with the Trans-Canada Highway. The roadway leading to the site, Tower Road, is perpendicular to Highway 202 in a section of land free of peat bog and isolated from any waterway or marsh. The aerial photo of the area showing the location of the site is presented in Figure 1 and Figure 2.

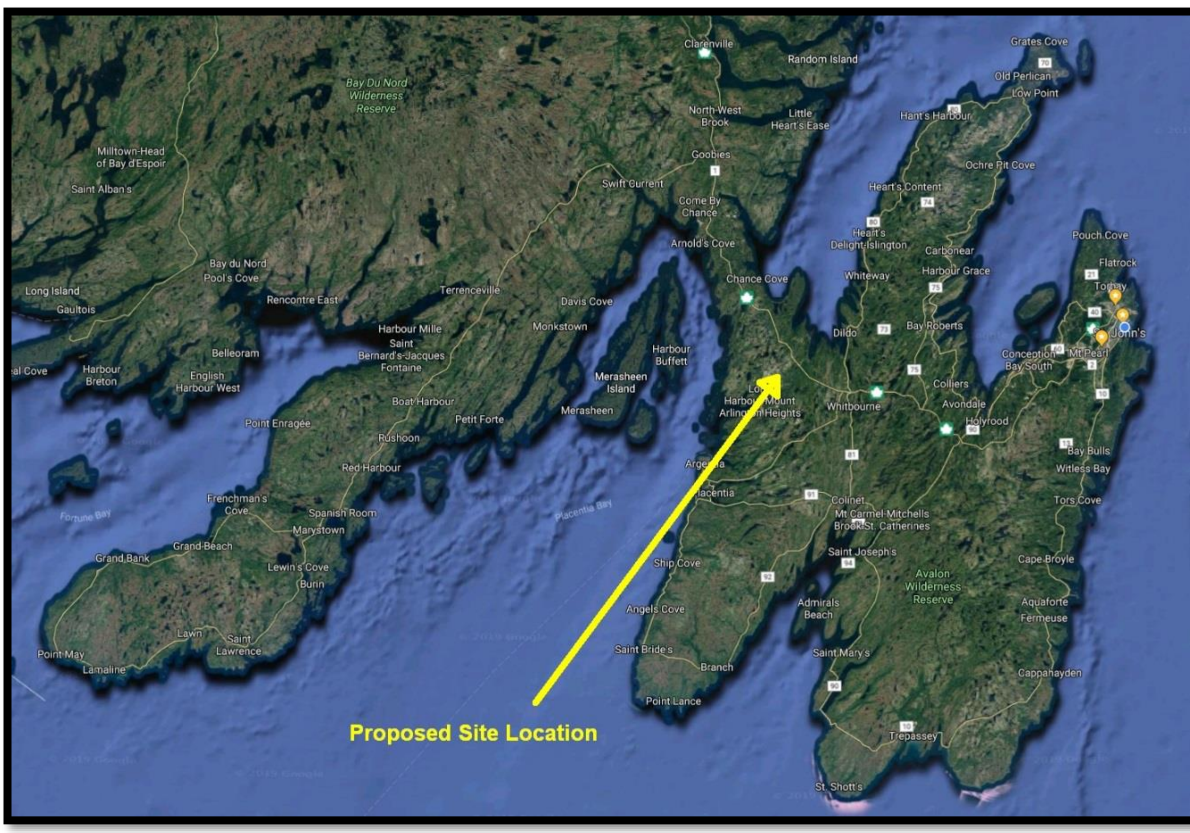


Figure 1 - Location of land area held by the Proponent


Figure 2 - Proposed Site Location - Hwy 202 – Long Harbour Access Road

### 5.2.3 Proximity of the Site

The site is 5.7 km from the Trans-Canada intersection along Route 202, the Long Harbour Access Road. And as the crow flies the site is:

- 5.3 km from the closest residences in Long Harbour,
- 7.5 km from Chapel Arm,
- 16.0 km from Whitbourne,
- 0.9 km from the T' Railway site and Route 202 intersection,
- 10.0 km from the Placentia Junction cabin area,
- 1.6 km from the Wolf Pond cabin area,
- 10.0 km from Mount Arlington Heights,

- 8.0 km from Vale Inco processing plant, and
- 30.0 km from Placentia.

These distances were measured and verified using the distance tool of Google Map.

### 5.2.4 Topography of the Site

The topography of the land is substantially flat with a gentle upward slope away from Route 202. By the road, land is at 101 meters of altitude above sea level, 111 meters mid-way up the 700 meter length of the parcel of land, and 126 meters at the back boundary. This represents an average slope of 3.6%. Presently, the land site intended to be used for the composting facility, is a green-field site. Typical local boreal forest covers all of the 21 hectares of the crown land section under application by NICL. The land area features wooded areas, with very few small peat bog areas and barren areas. See Figure 3 below.


Figure 3 - View of the land to the left from Route 202

There are no waterways or ponds in this large section of land. The nearest substantial ponds are 700 meters east of back boundary of the proposed land parcel, 500 meters to the west, across the road, 650 meters to the north east, and 850 meters to the south.

### 5.2.5 Current Ownership and Zoning of the Site Land

The ownership of this parcel of land rests with the provincial government, Lands Branch of the Department of Municipal Affairs (Crown's Land). The zoning of the land for the proposed undertaking is classified as Commercial along Route 202 over a width of about 150 meters (municipal plan restriction – pink in color), and the back is zoned by the Land Management Division as Rural (purple in color). The proposed use is classified as Rural Industrial, which is a permitted use in this zone under Section 6 of the Protected Road Zoning Regulations. It is also a discretionary use under the Long Harbour zoning regulations and municipal plan. Figure 4 and 5 show the area zoning.

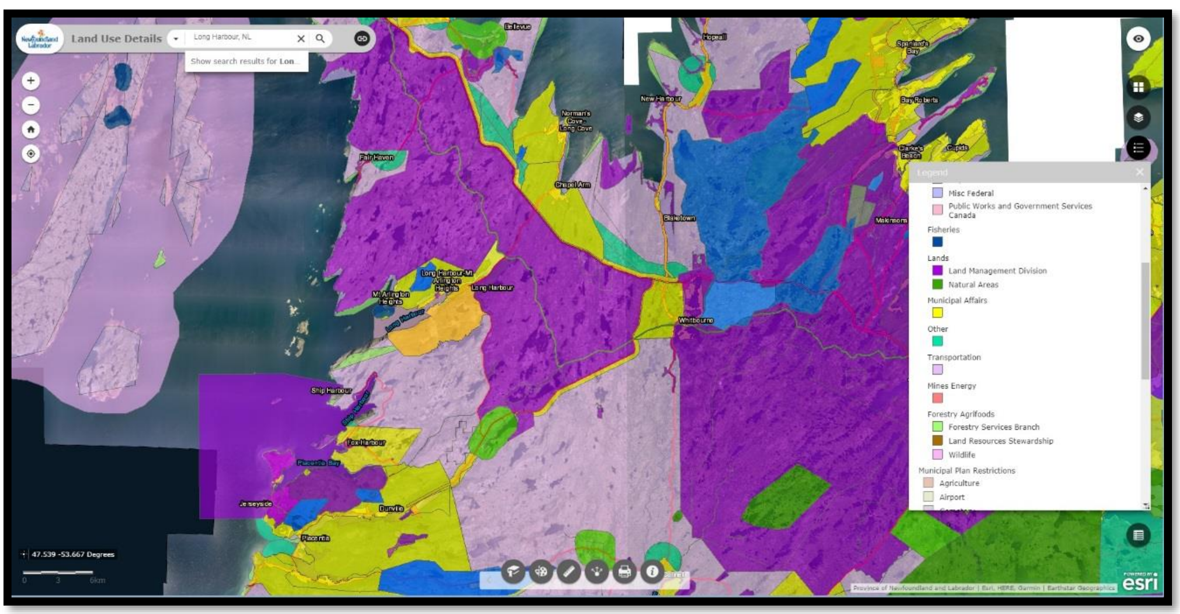


Figure 4 - Zoning West Avalon

Upon successful establishment of the indoor composting facility on the site, NICL intends to purchase the title of land from Crown Lands as per terms required by the Department of Municipal Affairs.

An application for Crown lands has been submitted for the proposal, and a decision on the application will be made pending the outcome of the environmental assessment and a review of all referrals from the Crown lands application.

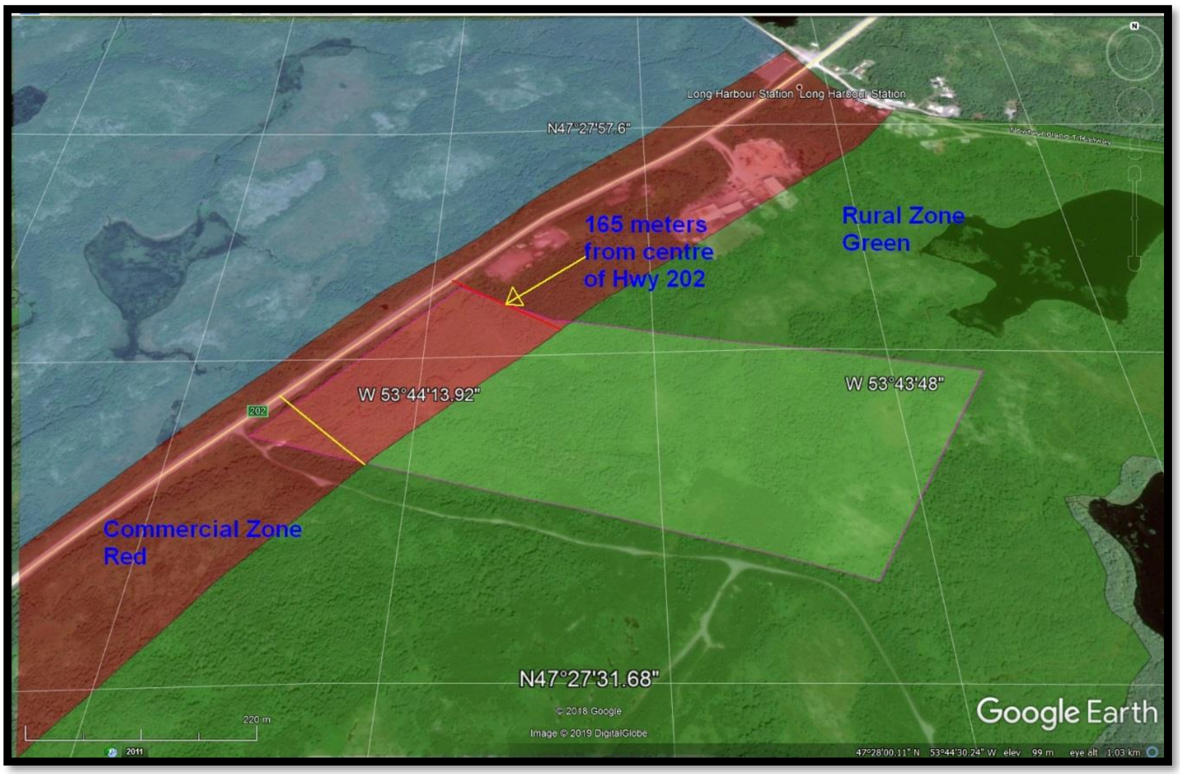


Figure 5 - Zoning map around the site

Long Harbour development regulations have the following requirements on the Commercial Zone:

**CONDITIONS FOR THE COMMERCIAL ZONE**

Including the standards contained in this part, Sections 1 to 6 and Parts I, II, Ill, IV and Schedules A and B must be considered when reviewing an application for development and/or a subdivision. Until such time as properties are hooked up to municipal water and sewage systems, an development must be approved by the Department of Government Services before a permit is issued by the Town. Minimum lot area and minimum lot frontage may be increased if so required by the Department of Government Services.

**1. Development Standards**

| | |
|---|---|
| Lot area (minimum) | 1860 m2 |
| Frontage (minimum) | 30 m |

| | |
|---|---|
| Building Line Setback (minimum) | 10 m |
| Side Yard Width (minimum) | 5 m |
| Side Yard Width Flanking Road (minimum) | 10 m |
| Rear Yard Depth (minimum) | 10 m |
| Lot Coverage (maximum - all buildings combined) | 33% |

**PART II -GENERAL DEVELOPMENT STANDARDS**

**41. Building Line and Setback**
(1) The Town, by resolution, may establish building lines on an existing or proposed street or service street and may require any new buildings to be located on those building lines, whether or not such building Jines conform to the standards set out in the tables in Schedule C of these Regulations.
(2) The building line setback is measured from the front property line.
(3) In accordance with the Building Near Highways Regulations 1997, the building fine along Provincial highways shall not be less than that specified under the Building Near Highways Regulations. The minimum building line is 15 metres from the centre-line of the Long Harbour Road (Highway 202) from the Trans Canada Highway to the former ERCO plant.

## 5.3 CONSTRUCTION

### 5.3.1 Land Development and Construction Period

NICL intends to start site work as soon as the project Environmental Assessment Registration process is completed with the release of the project by the minister of Municipal Affairs and Environment. NICL will likely be in the position to start such site work in late May 2019. The construction of the buildings will then be done by end of year 2019. Processing and operations can then start over late fall 2019 – early winter 2020. The facility would then reach full production by mid-2020.

### 5.3.2 Tree Screen to Eliminate Visibility of the Facility from Route 202

Land Management Division of the Department of Municipal Affairs requires that developments of a rural industrial nature must be set back a minimum of 100 metres from the centre line of the highway with a tree screen of not less than 50 metres, and must be separated from any adjacent incompatible developments by a minimum of 150 metres with a tree screen of not less than 100 metres.

NICL has every intention to comply with these requirements and the site is well suited to easily meet and exceed these requirements.

### 5.3.3 Construction Facilities and Equipment

Typical heavy equipment will be used during the construction period. Standard construction operating procedures with these machines will be used to operate efficiently and responsibly. The equipment will be maintained in good state of repair. Fueling on site will be done with standard equipment and procedures, including the use of spill kits to mitigate any accidental spills. A construction trailer and portable toilets will be used, as it is typically done in such isolated or remote sites.

### 5.3.4 Access Road Design

The access road from Route 202 via Tower Road to the indoor composting buildings and yard will be designed to meet the requirements of the Department of Transportation and Works, which include:

- Positioning the site access road so as to achieve the required intersection sight distance;
- Installing the guiderail along Route 202 to accommodate the site access road (if and as required);
- Construction of a 10 metre wide top surface on the access road, which is a requirement of commercial developments; and
- Installation of a 600 millimeter diameter culvert (minimum) across the access road.

The access driveway to the facility will be equipped with a gate to control access to the facility and prevent unauthorized entry and dumping.

### 5.3.5 Indoor Composting Facility – Site Layout and Buildings Details

A drawing and site layout of the facility is presented in Appendix I. It shows a site layout capable of receiving raw materials from dump trucks, a service building for weight scale operation, facility office, staff lunch room, washrooms and locker room, as well as the indoor composting facility buildings. The floor of the indoor composting buildings will be an impervious concrete slab with internal drainage to handle and collect excess leachates and waters to be reused in the ongoing composting process, either mixed with new raw materials or sprayed over composting windrows. As mentioned before, the pound (pit) to receive and mix the raw materials will also have an impervious concrete surface.

The types of building construction envisaged for the composting facility are both pre-engineered steel building and fabric building. The detailed design of the facility will involve the final selection of the building construction – steel or fabric. Both types of building enclosure are used for industrial composting in Canada. Both building types are capable of supporting the infrastructure required for an indoor industrial composting facility. At the moment, NICL leans toward a pre-engineered steel building construction. But the Consultant needs to do a comprehensive analysis about the pros and cons of each type of building construction in the design process. Considerations such as combustibility of construction, size, and layout relative to fire protection systems requirements; functionality and layout; ventilation system(s) and odor control systems (biofilter) and pollution prevention systems sizing and layouts; corrosion protection; lighting and electrical systems; structural resistance; life cycle costing, etc have to enter in the detailed design of the facility. A sufficient engineering and costing analysis must be done to make the right decision about the building type for all stakeholders involved, including the public.

For the purpose of information in the Environmental Preview Report, please see below examples of industrial composting buildings, in both steel and fabric types.

#### *5.3.5.1 Pre-Engineered Steel Frame Building*


CASE

### *5.3.5.2 Fabric Building*

### 5.3.6 Ventilation System

The organic raw material receiving and the composting windrows will be located inside the indoor composting building. The building will be equipped with a mechanical ventilation system whereby the outdoor air will be continuously drawn into the building and exhausted outdoors through a biofilter system located inside the building to remove all odors and any particulate within the air stream. The building will therefore be under slight negative pressure so as to contain within the building any air that has not been exhausted through the biofilter. This will control and contain any odor within the building envelope and prevent any odors from migrating outdoors. The raw material receiving area will have an outside overhead door leading to a vestibule equipped with industrial/warehouse type overhead curtains that will limit the volume of outdoor air drawn indoor, so that the ventilation system can be of reasonable scale and capacity. The biofilter system will abate odors within its confines and clean the air stream exhausted outdoors. The biofilter will have to be selected, sized, operated and maintained properly for the duty cycle such that its performance is ensured. The use of such biofilter system is typical in existing indoor industrial composting facilities. NICL has retained the services of a professional engineering consulting firm – Innovative Development & Design Engineers Ltd. (IDDEL) - to design the indoor composting facility. IDDEL is also preparing the Environmental Assessment Registration and this Environmental Preview Report on behalf of NICL for the Environmental Assessment division of the Department of Municipal Affairs and Environment.

### 5.3.7 Biofilter and Odor Removal

A biofilter for odor control operates on chemical reactions on odorous vapors contained in the air stream going through. Typically, a biofilter is an oxidizing and polishing dry air scrubber, which provides a multi-stage chemistry for the control of odors from hydrogen sulfide (H2S), mercaptans, ammonia, amines and other odors generated in composting or wastewater treatment systems. It is a simple, reliable, easy to use, effective and economical solution to odor removal.

A biofilter is the most common odor control technology that has been shown to be both economical and effective in farms and composting facilities. Biofiltration can reduce odor and hydrogen sulfide emissions from livestock and poultry facilities by as much as 95% and ammonia by 65%. This method of odor control has been used in industry for many years. Biofilters are most easily adapted to mechanically ventilated building or on the pit fans of naturally ventilated buildings. Biofilters can also treat air vented from covered manure storage covers.

A biofilter is simply a layer of organic material, typically a mixture of compost and wood chips or wood shreds that support a microbial population. Odorous air is forced through this material and is converted by the microbes to carbon dioxide and water. Key factors influencing biofilter performance are the amount of time the odorous air spends in the biofilter (contact time) and the moisture content of the filter material. The biofilter reliance on microorganisms requires an appreciation of ecological concepts which must be considered in biofilter design. Biofilter design includes the sizing of the biofilter bed, selecting fans to push the air through the biofilter, choosing biofilter media, moisture control, operation and management, and cost of construction and operation.

Biofilters can be configured as either open or closed beds. Open bed biofilters are the most prevalent configuration used today. Open bed biofilters are typically 10 to 18 inches deep and are much larger than closed bed biofilters. Open bed biofilters are typically built outdoors on the ground and are exposed to a variety of weather conditions including rain, snow, and temperature extremes. Closed bed biofilters are mostly enclosed with a small exhaust port for venting of the cleaned air. Closed bed biofilters usually treat smaller airflows, typically have deeper media (2-3 feet or more) to reduce the space needed to achieve the required treatment, and are more expensive. Figure 1 illustrates elements of an open-bed biofilter. They are:

- A mechanically ventilated space with biodegradable gaseous emissions.
- An air handling system to move the odorous exhaust air from the building or compost storage through the biofilter.
- An air plenum to distribute the exhaust air evenly beneath the biofilter media.
- A structure to support the media above the air plenum.
- Porous biofilter media that serves as a surface for microorganisms to live on, a source of some nutrients, and a structure where moisture can be applied, retained, and available to the microorganisms.

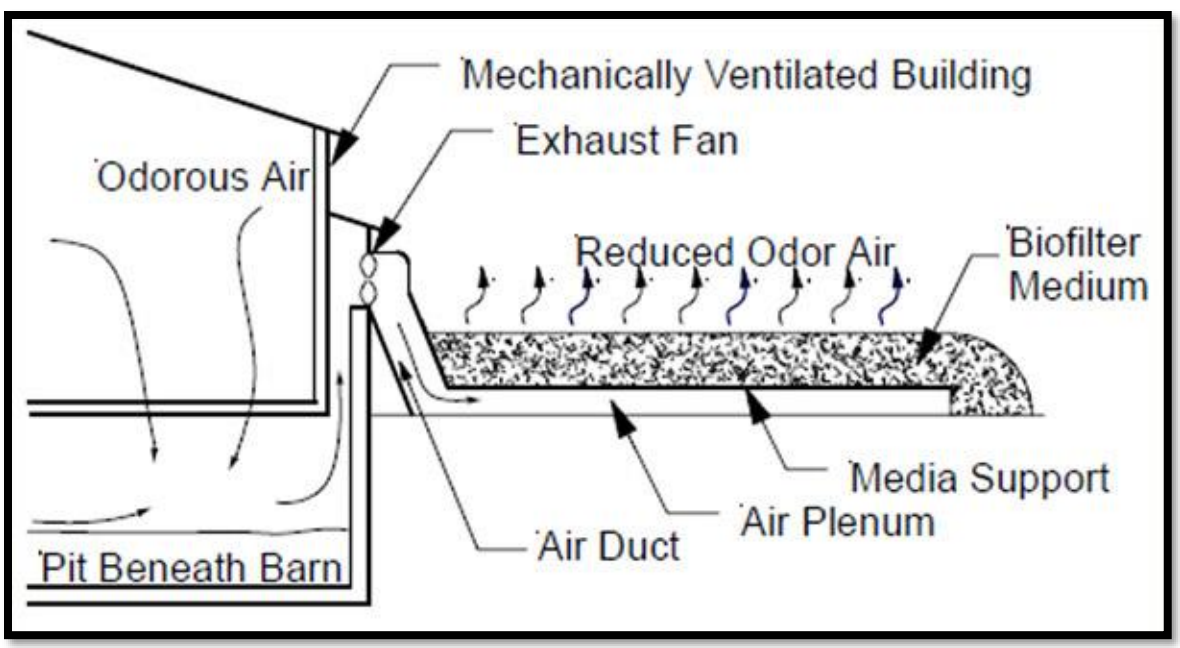


Figure 6 - Open Bed Biofilter System

The odorous air is exhausted by a fan from the building and uniformly distributed through the biofilter media. Microorganisms attached to the organic media create a biofilm. In the biofilm, the microorganisms oxidize the biodegradable gases into carbon dioxide, water, mineral salts, and biomass (i.e., microorganisms). The cleaned exhaust air then leaves the biofilter.

Biofilter designs are based on the volumetric flow rate of air to be treated, specific air contaminants and concentrations, media characteristics, biofilter size (area) constraints, moisture control, maintenance, and cost. These parameters all play a role in either the efficient cleaning of airstreams or in the economical operation of the biofilter.

NICL recognizes that odor removal and control is of utmost importance for the successful operation of the indoor composting facility. NICLs is totally committed to building and operating the indoor composting facility with a totally effective odor removal system, such that odor will not be an issue or nuisance at all.

### 5.3.8 Leachate Collection System

Indoor industrial composting involves the reception of raw material, the mixing of the raw material with a carbon containing material (wood chips), laying the mixed material into windrows, and periodically mixing/turning the material laid out in windrow to accelerate the composting to completion.

Leachate is the watery liquid that naturally drains out of a pile of material. This leachate is valuable and useful in the composting process. Therefore, the leachate will be properly collected and used in the composting process as a source of water and to a much minor level, a source of protein.

The raw material will be received into a pit or pound, made of concrete, which will be designed to collect, by gravity flow, the leachate into a reservoir. From this reservoir, a sump pump with proper piping will be used to wet (re-wet) the composting material mix laid out in windrows.

At the early stage of composting, the mixed material laid out in windrow will produce leachate in relatively small quantities. Collection of the leachate will be done with a trough/floor drain system that will drain to the leachate reservoir.

The entire leachate collection system will be designed and built so that it can be easily cleaned (hosed down) and disinfected to prevent further contribution to odors or vectors.

The leachate collection and handling system will be a closed system, completely within the confines of the indoor composting facility. There will be nothing collected from outdoors and there will be nothing going outside the building.

### 5.3.9 Employment

During the construction phase, the level of employment is projected as per Table 1, and for the operation phase as per Table 2.

The projected employment during construction will span the period from March to July 2019. Most of these jobs will be contractual through subcontractors.

For the production/operation phase, the permanent employment will start as soon as the construction phase is completed. In this case, all the employees will be direct hire (no subcontractors).

Table 1 - Employment during construction

| Occupation | NOC 2011 Code | Number of Workers | Duration (Month) | Person-Year Equivalent |
|---|---|---|---|---|
| Construction Manager | 0016 | 1 | 6 | 0.50 |
| Construcion Superintendant | 7204 | 1 | 6 | 0.50 |
| Heavy Equipment Operator | 7521 | 2 | 3 | 0.50 |
| Truck Driver | 7511 | 2 | 3 | 0.50 |
| Concrete Finishers | 7205 | 4 | 0.5 | 0.17 |
| Steel Workers | 7201 | 4 | 3 | 1.00 |
| Carpenters | 7271 | 6 | 3 | 1.50 |
| Pipe Fitters | 7252 | 2 | 1 | 0.17 |
| Electricians | 7242 | 2 | 1 | 0.17 |
| Painters | 7294 | 2 | 1 | 0.17 |
| Plasterers | 7284 | 2 | 1 | 0.17 |
| Laborers | 7611 | 2 | 6 | 1.00 |
| HVAC Technician | 7301 | 2 | 1 | 0.17 |
| **Totals** | | **32** | **6** | **6.50** |

In the case of the Operations Manager position, the candidate will have a university level agricultural and/or food technology background focused on composting and related waste management sciences and technologies. This person will design, oversee the execution and monitor the entire composting recipes and processes.

Table 2 - Employment during operation

| Occupation | NOC 2011 Code | Number of Workers | Duration (Month) | Person-Year Equivalent |
|---|---|---|---|---|
| Operations Manager | 9213 | 1 | 12 | 1.00 |
| Heavy Equipment Operator | 7521 | 2 | 12 | 2.00 |
| Truck Driver | 7511 | 2 | 12 | 2.00 |
| Laborers | 7611 | 2 | 12 | 2.00 |
| **Totals** | | **7** | **6** | **7.00** |

As the levels of production increase over time, the labor force will also increase.

### 5.3.10 Waste Management during Construction

The site work and construction of the indoor composting facility represents a relatively small construction project in terms of scale, budget and schedule. Any clearings will be kept and shredded to use in the composting facility operations. The soils on site are suitable for site development and construction. There will not be any significant surplus or deficit of soil and fill. Manufactured aggregates and related materials will be delivered on site as required.

Any solid waste generated by the construction activities are going to collected, held in containers and disposed as per standard construction site operations practices. Portable toilets will be used until a functional septic system is in place.

## 5.4 Operation and Maintenance

### 5.4.1 Sources of Feedstock and Carbon Fibres

As indicated in the Environmental Assessment Registration document, and its addendum, NICL intends to collect and process organic waste consisting of offal from poultry, mink, sheep, cattle, hogs and fish processing wastes.

The sources of carbon fiber will be come from shredded wood collected lumber waste diverted from landfills, wood chips from saw mills and lumber producers, and any source of waste wood that can be reused.

Both the organic raw material and the carbon source will have to be free of any contaminants that would compromise either the composting process or the required quality of the finished product. NICL will have quality control processes in place to ensure that pollutants and contaminants are not simply diverted from landfills to end up uncontrolled at the composting facility.

### 5.4.2 Duration of the Composting Process

From the reception of the raw material to the produced finished product as a soil amendment material, the composting process duration is 6 to 12 weeks. Therefore, the composting production will be a batch type process whereby different windrow sections will be at a different stage of composting. NICL will then be able to receive raw material on an ongoing basis to satisfy the needs of the raw material suppliers.

The duration of a composting cycle depends on many variables such as the specific nature of organic raw material input, the required carbon input from wood chips or other carbon sources, the moisture contents of organic materials and wood chip, as well as the amount and timing of additional water required to optimize the composting process performance over the composting cycle. All these parameters and more enter in the planning and preparation of a compost recipe. This requires knowledge and experience at composting.

On the notion of a projected date for a completed facility construction to be in November or December 2019, NICL is expecting to start operation immediately after that.

### 5.4.3 Estimated Annual Volumes for the First Five Years

NICL is planning to initially have three (3) large buildings to enclose the composting activities. The composting process consists of receiving of raw materials – organic waste (indoor), shredding wood waste (indoor and outdoor), mixing of raw materials with wood chips (indoor), laying the raw compost mix into windrows (indoor), turning/aerating composting material in windrows (indoor), and storing finished product (indoor).

The first building (90 ft x 120 ft) will be dedicated to receiving, mixing and primary composting. The second building (90 ft x 180 ft) will be used for the secondary composting process requiring regular winrow turning. The third building (90 ft x 120 ft) will be used to store finished products, package/bag a portion of the production, and to sell and ship bulk and bagged product.

NICL estimates a nominal annual production of compost of 13,200 tonnes. This production will require about 6,500 tonnes of organic waste and 10,000 tonnes of wood chip annually. On a monthly basis this represents 550 tonnes (37 tandem truck loads) of organic raw material to be received at the site, and 825 tonnes (55 tandem truck loads) of wood waste.

NICL expect to operate with these three (3) buildings and a compost production level of 16,500 tonnes per year for at least the first two years of operation. Production growth can only be done incrementally by adding buildings. Depending on market conditions, specific raw material available to process and other business-related conditions, NICL will consider adding another building of the same size, which would then double the production capacity. Therefore, it would be realistic to consider the subsequent 3 years to of operation at a production level of 33,000 tonnes annually.

### 5.4.4 Incremental Increase in Feedstock Over Time

The first 3 to 4 months of operation will involve a specific selection of raw materials to be composted using specific compost recipes and the execution of the specific composting recipe and process to completion. This will provide NICL with the basic necessary experience to then focus on what available raw material sources work best in the composting process for the longer term. Therefore, that start-up phase will determine NICL's ability to ramp up the production to targeted levels over time.

If all goes well and NICL finds one or two consistent sources of raw materials in abundant supply, that compost faster, more easily and better, then the production ramp up will be quicker and easier to execute and control. However, if several different composting recipes of varying lengths have to be implemented concurrently on an ongoing basis, the production management will be more complex. Consequently, the ramp up period will be longer.

Clearly, the goal of NICL is to be able to reach full production capacity of the singular building facility within the first 6 months of operations. NICL will engage a composting specialist over that period to assist in this commissioning phase.

### 5.4.5 Composting Workflow Process and Equipment

Successful composting involves up to seven different steps, as illustrated in Figure 5. Throughout all of the steps, odors and other nuisance conditions (e.g., dust, litter, and vectors) and leachate must be proactively managed. NICL will implement this process as illustrated in Figure 5.

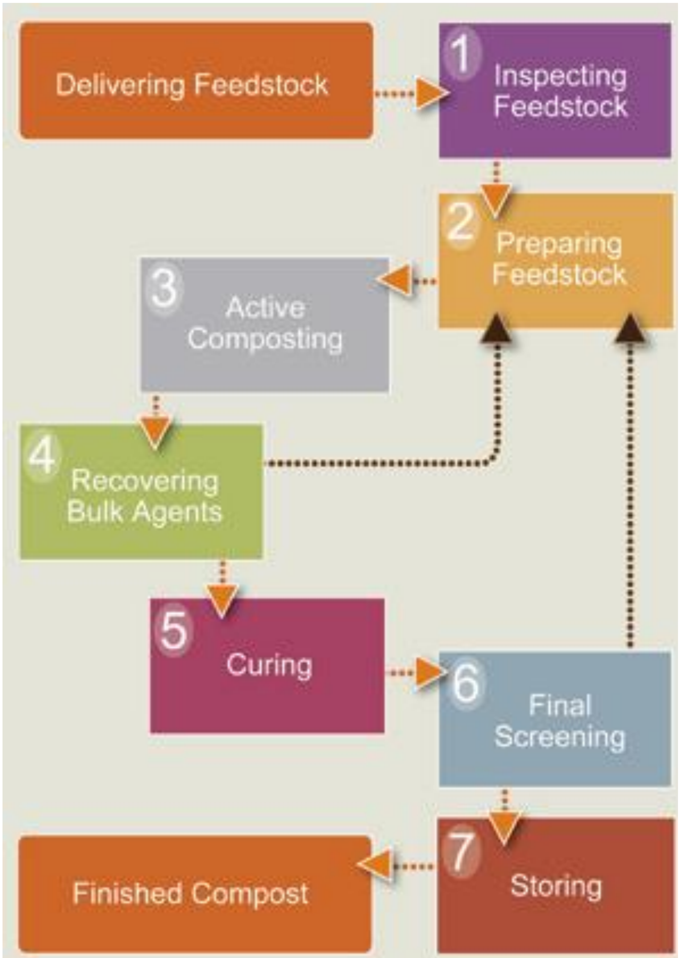


**Figure 7 - Steps of the Composting Process**

Step 1: Inspecting Feedstock.

This step involves visually inspecting and removing deleterious materials that are unacceptable or non-compostable items (e.g., metal cans, glass bottles, and plastic film). Particular emphasis is also placed on removing contaminants that could pose safety concerns to workers in the facility (e.g., sharps, and glass or metal pieces); or negatively impact finished compost product quality.

Step 2: Preparing Feedstock.

This step refers to the changes made to the feedstocks' physical and chemical characteristics in order to provide optimal conditions for active composting. This may involve grinding to change particle size, blending to ensure the feedstocks are homogeneous, or adding amendments or other materials to adjust physical or chemical characteristics of the feedstocks.

Step 3: Active Composting.

This step involves the rapid decomposition of feedstock components that degrade easily. Once the feedstocks have been amended and mixed with other materials, they are placed into the windrow where active composting takes place.

The active composting step is characterized by high levels of biological activity that create a high demand for oxygen. The activity of these microorganisms also results in a rapid rise in temperature within the feedstock mixture. When the optimal oxygen, moisture, and nutrient levels are present, the biological activity can raise the feedstock mixture's temperature from ambient levels into the 55 to 65°C range within 24 hours.

Most pathogenic bacteria, viruses, and parasites are inactivated when exposed to temperatures in excess of 55°C for 15 or more consecutive days.

The heat produced by the microorganisms that are decomposing the feedstocks provides several important benefits. Most importantly, it allows for the populations of pathogenic microorganisms in the feedstocks to be reduced to acceptable levels, as defined in regulatory guidelines and standards. The active composting phase's high temperatures also render weed and plant seeds inactive.

However, the temperatures encountered during active composting can also cause large quantities of water to evaporate from the composting piles. If this loss of moisture is not properly managed, and the moisture content of the material is allowed to drop below the optimal range (i.e., 55 to 65%), then the microorganisms are impeded, and the composting process slows down. If feedstocks are allowed to dry out too much (i.e., less than 40% moisture), they may also become a source of dust, increasing the risk of fires and causing health issues for site staff and visitors

This step of the composting process generally requires the closest monitoring, as it could result in objectionable odors and other nuisance conditions (i.e., the attraction of flies and rodents). Active composting can last from 3 to 4 weeks, or it can take 8 to 12 months. The wide variation in time can be attributed to several factors, including the type of feedstocks, the degree of feedstock preparation, the type of composting technology used, climatic conditions, and the level of operator control and management. In the case of NICL's indoor composting facility, active composting will take 2 to 3 weeks.

Step 4: Recovering Bulking Agents.

Some composting facilities recover coarse bulking agents, such as woodchips, from the feedstocks for reuse before curing by passing the materials over 2- or 2.5-centimetre (cm) screens; the smaller particles continue on to the curing step, and the larger particles are recycled back to the preparing feedstock step.

However, removing bulking agents reduces the free air space (FAS) within the material. This increases the potential for anaerobic conditions to develop, which can lead to objectionable odors and may create the need for closer monitoring and more frequent turning during the curing step. Thus, leaving bulking agents in the material and recovering them during the final screening step improves passive aeration during the curing step.

Step 5: Curing.

This step involves microorganisms converting carbon into carbon dioxide and humus, and nitrogen into nitrates, which is a much slower biological process. Microorganisms begin to decompose more complex organic structures, such as the lignins and cellulose contained in paper, wood, and plants, and stable humic substances are formed in the curing piles.

As the more readily degradable materials in the feedstock are consumed, the types of microorganisms in the feedstock change, and the overall populations become smaller. These changes results in a lower oxygen demand and lower temperatures, characteristics of the curing step.

The curing step is considered complete when the stability and maturity criteria are met. The terms “stability” and “maturity” are often used interchangeably, but they are actually two separate indicators that measure different properties:

• Stability is a measure of the biological activity in the compost material. Conceptually, material with a high amount of biological activity (e.g., more than 4 milligrams of carbon in the form of carbon dioxide per gram of organic matter per day [4 mg C-CO2/g OM/day]) indicates that the decomposition process is still occurring and that the material is not ready to be used as a soil supplement.

• Maturity is a measure of the broader chemical condition of compost and is used to indicate the presence or absence of phytotoxic effects (i.e., harmful to plants), which are usually caused by higher levels of ammonia or organic acids. Phytotoxic effects can also be caused by using compost that is not fully stabilized.

Stability is determined by using various tests that measure the oxygen demand or carbon dioxide evolution by microorganisms in a sample (i.e., higher oxygen demand or generation of more carbon dioxide indicates a sample is less stable), or by measuring the temperature increase (or lack thereof) in samples under controlled conditions. Temperature rise indicates that the microorganisms are still actively decomposing materials and generating heat; if this is still happening, the material is less stable.

The most common maturity test used is a seed germination test. However, ammonia and volatile organic acid concentrations in the compost also provide a measure of maturity.

Due to the potential for false positive results, two tests should be used when assessing whether compost is finished: one test for stability and one for maturity.

Based on such information, NICL will establish a quality control process that will follow the CCME Guidelines for Composting Quality and meet the requirements of the customers and the authorities having jurisdiction on the matter such as the Department of Environment and Climate Change, and others.

Step 6: Final Screening.

This step involves refining the cured compost before it is sold or used so that it is a more suitable soil amendment. Most commonly, this involves passing the material over 1- to 1.25-cm screens to remove oversized materials, such as large compost particles, stones, and uncomposted bulking agents (which can be reused in the active composting step). Screening can also remove some of the remaining physical contaminants that may be present, such as glass or metal pieces. Finished compost is sometiNICL further refined to produce value-added products. For example, compost can be blended with topsoil, sand, or gypsum to make customized horticultural media. Finished compost can also be dried and reformed into a pelletized or granulated product using specialized processing equipment.

NICL intends to produce bulk screened compost initially. Further refinements such as packaged compost or other value-added products could be developed later depending on market demand.

Step 7: Storing.

Properly storing the finished compost product is the final step of the composting process. Whether compost is in bulk form or placed in bags, it should be stored in a manner that prevents dust or odors from developing, and prevent contamination of the product from weeds, leachate, or other contaminants. For example, large stockpiles of finished compost can become a source of odors if they are saturated with rainfall and can quickly become infested by weeds. Fire prevention and control should also be considered in finished product storage areas, since compost can be a fuel source.

At the initial stage of operation of the composting facility, the cured compost will be held indoor until space in required for curing compost. We know that the demand for cured, finished compost, is mostly seasonal, from May to October. Cured compost needing to be stored outdoors will be over winter. Cured compost can be stored on an impervious surface such as a geomembrane, asphalt or concrete slab. The cured compost pile can be covered with impervious membrane to be protected from rain and snow. As a result, any cured compost stored outdoors will not emit any odors because it will be held at low temperatures, covered and protected. The piling height will be low enough to prevent any heating leading to spontaneous combustion.

### 5.4.6 Volume and Constitution of Output from the Facility

An estimate of the volume and constitution of output from the facility for each of the first five years is virtually impossible to determine with any accuracy until NICL experiences the actual start-up phase of the facility. This start-up phase will determine which raw materials will be preferably and actually composted based on availability, ease and speed of composting, and many other variables.

As indicated in section 4.3.3 above, NICL's goal is to reach an annual production capacity of 13,200 tonnes after about 6 months of initial operation and double that production with the construction of an additional building in year 3 or year 4 if all goes well.

The grades of the soil amendment (final product) that will be produced at the facility will be sold in bulk. If at a later stage there is a demand or opportunity for packaged compost products, NICL will consider this option.

There are no plans for on-site application of final compost product. It will only be a case of temporary storage of compost on site. The finished compost piles will be covered with an impervious membrane to prevent degradation from rain, sun, snow, etc. It will also prevent nitrogen and phosphorus overload of the underlying soil in the storage area.

NICL expects that all its annual production of finished compost will be sold. The demand for topsoil and amended topsoil in eastern Newfoundland is much larger than the possible annual production from the proposed composting facility. The amount of finished compost that may be on site at any one time will peak at spring time. NICL anticipates the demand for compost to be greater than the production of the facility.

### 5.4.7 Testing and Quality Control

In Canada, the following standards have been jointly developed to govern compost quality:

- The Fertilizer Act
- Canadian Council of Ministers of the Environment (CCME) Guidelines for Compost Quality
- Bureau de Normalisation du Québec (BNQ) Organic Soil Conditioners—Composts

As a result of the foresight of the agencies involved, these standards are closely harmonized, so if one standard is met, it is relatively easy to meet the requirements of the others.

**Table 3 - Compost Quality Standards**

| | Canadian Food Inspection Agency *Fertilizer Act* | CCME *Guideline for Compost Quality* | BNQ *Organic Soil Conditioners—Composts* |
|---|---|---|---|
| **Maximum trace element** | X | X | X |
| **Maturity** | X | X | X |
| **Pathogens** | X | X | X |
| **Foreign matter (including sharps)** | X | X | X |
| **Moisture content and Organic Matter** | X | | X |
| **Labelling** | X | | |

The frequency of testing of the final compost product required to be conducted and reported to the Department of Environment and Climate Change, is to sample and test every batch of finished compost. This is to ensure compliance with CCME Compost Quality Guidelines.

Testing procedures will be carried out as per the Guidance Document NL Environmental Standards for Municipal Solid Waste Compost Facilities – 2010, as per Table 2 – Recommended Sampling and Laboratory Practices to Asses Trace Element Concentration of MSW Compost Products.

| Table 2 - Recommended Sampling and Laboratory Practices to Assess Trace Element Concentration of MSW Compost Products |
| --- |
| • Obtain multiple composite samples from randomly selected locations within a pile or windrow.<br>• Use plastic containers for sampling and storage to avoid contamination; use field blanks ("samples" without the substance being analyzed) to test for such contamination during sample storage, transport, and processing.<br>• Analyze replicate subsamples of each composite sample, being careful to mix samples thoroughly and reduce particle size as needed.<br>• Use National Institute of Standards and Technology (NIST) or comparable standard reference materials to determine the accuracy and precision of the digest/analysis technique.<br>• Add a known concentration of the element of interest to compost digest solutions to check for potential matrix interferences.<br>• Carry reagent blanks throughout the digest and analysis protocols.<br>• Report metal concentrations of the compost on a dry weight basis.<br>• Report the ash content of samples.<br>• Report all quality assurance data along with sample data so that data quality can be independently evaluated.<br><br>Note: Additional care must be taken with some metals such as selenium and mercury that may volatilize during processing and for organic compounds that may volatilize or undergo chemical transformation prior to analysis. |

Parameters to be tested are as per CCME Guidelines for Compost Quality as per Table 4 below.

### Table 4 - Summary of CCME Guidelines for Compost Quality

| | Category | Categ | |
|---|---|---|---|
| | Maximum concentration within product (mg/kg | Maximum concentration within product (mg/kg dw) | Maximum cumulative additions to soil (kg/ha) |
| Trace elements | | | |
| **Arsenic** | **13** | **75** | **15** |
| **Cadmium** | **3** | **20** | **4** |
| **Chromium** | **210** | **1060** | **210** |
| **Cobalt** | **34** | **150** | **30** |
| **Copper** | **400** | **757** | **150** |
| **Lead** | **150** | **500** | **100** |
| **Mercury** | **0.8** | **5** | **1** |
| **Molybdenum** | **5** | **20** | **4** |
| **Nickel** | **62** | **180** | **36** |
| **Selenium** | **2** | **14** | **2.8** |
| **Zinc** | **700** | **1850** | **370** |
| Pathogens[a] | | | |
| **Compost produced solely from yard waste must meet PFRP criteria[a]** ***or*** **the following pathogen** | | | |
| ***Salmonella*** | **Less than 3 MPN/4-g (dw)** | | |
| **Fecal coliform** | **Less than 1000 MPN/g (dw)** | | |
| **Compost produced from all other feedstocks must meet PFRP criteria** ***and*** **the pathogen content** | | | |
| Foreign matter and sharp foreign matter | | | |
| **Foreign matter** | **Less than or equal to 1 piece greater than 25 mm in any dimension** | **Less than or equal to 2 pieces greater than 25 mm in any dimension per 500 mL** | |
| **Sharp foreign** | **None greater than 3 mm in any dimension per 500** | **Less than or equal to 3 pieces per 500 mL, 12.5-mm maximum dimension** | |
| Maturity/stability | | | |
| **All compost will be mature and stable at the time of sale and distribution. To be considered mature and stable, it must be cured for a minimum of 21 days, and meet one of the following requirements:**<br>• **Respiration rate less than or equal to 400 mg $O_2$/kg VS (or OM) per hour**<br>• **$CO_2$ evolution rate less than or equal to 4 mg C-$CO_2$/kg OM per day** | | | |
| Organic compounds | | | |
| **Avoid composting feedstocks with high concentrations of persistent bio-accumulating organic** | | | |

***Notes:***

***[a] To meet PFRP criteria for in-vessel and ASP composting, maintain material at operating conditions of 55°C or greater for 3 consecutive days. For windrow composting, maintain material at a temperature of 55°C or greater for at least 15 consecutive days during the composting period. During the high-temperature period, turn the windrow at least 5 times.***

***°C—degrees Celsius; ASP—aerated static pile; C-$CO_2$—carbon-carbon dioxide; dw—dry weight; g—gram; mL—milliliter; mm—millimeter; $O_2$—oxygen; PFRP—Process to Further Reduce Pathogens; VS—volatile solids***

Commercial laboratories such as Maxxam Laboratories with proper accreditations will be engaged to conduct the analytical work. The test results will be recorded and managed and made available to government inspectors.

Nutrient analysis of finished compost will be done as necessary to satisfy any requirement of customers and/or government department or agencies. Nutrient analysis is meant to help evaluate the quality of compost as an agronomic or horticultural resource. The following parameters are measured and reported in nutrient analysis of compost: pH, Soluble Salts (Electrical Conductivity), Bulk Density, Percent Solids and Moisture Content, Organic matter, Nitrogen, Total Nitrogen, Organic Nitrogen, Nitrate and Ammonium, Total Carbon, C:N Ratio, Macronutrients, Micronutrients, Heavy metals.[4]

From this quality assurance procedure, only compost batches tested that meet these regulatory requirements will be considered finished product.

### 5.4.8 Business Case for this Project

The basic business model for the indoor industrial composting facility rests on the facts that:

- The facility gets paid a tipping fee for receiving the raw material;
- The facility gets paid a tipping fee for receiving the waste wood and other carbonaceous materials;
- The facility processes the materials by composting process taking place indoor to avoid imparting any negative environmental impact to the surrounds;
- The facility incurs labor, material and overhead costs to carry out its business;
- The facility sells the finished compost product as soil amendment to agricultural and landscaping industry markets;
- The facility remits taxes to governments.

[4] https://soiltest.umass.edu/fact-sheets/interpreting-your-compost-test-results

The required capital investment and commitment is substantial, and the regulatory regime from environmental assessment registration, to release, to construction and to ongoing operation is very stringent and costly all along. This regulatory regime is designed to protect the public and the environment. NICL intends to do everything in its power to be successful. This means establishing and running a quality operation that meets all market and regulatory requirements for the finished compost produced.

### 5.4.9 Quarry Materials

At this stage, the NICL does not foresee requiring much of any quarry materials for the site development. Manufactured aggregate will be required for building foundations or for drainage purposes. Like any other construction projects, quarry materials required for the project will be sourced, either from a site permitted under the Quarry Materials Act, 1998, or from an external source as a by-product of development and for which royalties have been paid under the Quarry Materials Act, 1998, or from within the legal boundary of the project site.

During operations, the facility will neither require nor produce any quarry type materials.

### 5.4.10 Compliance with OHS Act and Regulations

NICL will ensure that activities associated with the industrial composting operation will be conducted in compliance with the Occupational Health and Safety Act and its Regulations.

NICL recognizes the responsibility to comply with OHS regulations, which includes ensuring that sub-contractors hired to perform work also comply with OHS legislation.

Standard Operating Procedures and Health and Safety Plans will include:

- A description of the necessary equipment, systems, tools, information, instruction, training and supervision that will be provided and maintained to ensure the health and safety of workers at the facility;
- A description of how the undertaking will be conducted to ensure that persons not employed at the facility are not exposed to health or safety hazards as a result of the undertaking, e.g. persons delivering feedstock and/or buying product;
- A description of the personal protective equipment that will be provided on-site, and periodic indoor air quality testing that will be conducted to ensure a safe environment for workers.

### 5.4.11 Risk Assessment Where Workers Are Assigned to Work Alone

A health and safety risk assessment will be established in cases where workers may be assigned to work alone or in isolation. Where such assessment identifies actual or potential hazards, appropriate controls will be implemented to eliminate, or minimize these risks. A procedure will be written for checking the well-being of a worker assigned to work alone or in isolation.

The Proponent does not plan or anticipate having only one person on site to operate the facility. Certainly, if a singular person or worker is working at the site, the scope of the work to be performed will be reduced to meet the results of the risk assessment.

### 5.4.12 Emergency Response Plan

A proper emergency response plan describing measures to be taken to effectively respond to foreseeable situations that may occur as a result of the facility operations will be prepared. Emergency evacuation and response drills will also be carried out regularly as part of the Health, Safety and Environment policies and program of the company. Such an emergency response plan will include lists and locations of proper first-aid kits, fire extinguishers, communication devices, a list of emergency names and numbers appropriately placed; and an action plan including the roles and responsibilities of workers. Such an emergency response plan is standard in industry and will be properly and professionally prepared and implemented.

### 5.4.13 Workers Facilities

The indoor composting facility will consist of two buildings. A small building located near the entrance yard of the site will house the scale wicket, the company offices, and the workers lunch room, washrooms and change rooms. The washrooms will have shower facilities. The indoor composting facility building will not have any workers facilities per se.

### 5.4.14 Adequate Ventilation System

The indoor composting facility building will be adequately ventilated to minimize the buildup of bioaerosols and decomposition gases. It will operate in two modes. The “Standard” mode will have ventilation rates throughout the building to maintain a zero-odor emission while the facility in not manned. A higher ventilation rate will be established for periods when workers are working in the indoor composting facility building. The “High” mode of ventilation will be operational for feedstock mixing, windrow formation, windrow turning, watering, and finished product removal from the building. The “High” mode will provide good fresh air intake into the building to enable the workers to breathe comfortably air that is dust-free and odor-free.

### 5.4.15 Air Quality for Equipment Operators

With the proposed ventilation of the composting building, NICL is not expecting to have provide additional respiratory protection to workers in cabs of the heavy equipment (e.g. windrow turner or loader).

### 5.4.16 Odor Management Plan

An Odor Management Plan will be implemented to control the dispersion of odors and prevent public concerns and complaints. Such an odor management plan will be derived from the odor management plan and document - THE COMPOSTING PROCESS: Odor Management – from the Composting Council of Canada, which can be found in Appendix II of this document.

This odor management plan contains all the elements necessary for NICL to formulate its detailed odor control system design and operation as indicated in Section 4.2.7 above. All odorous materials and activities will be confined indoor. An adequate ventilation system and biofilter system will be designed and operated. All the desirable and necessary good practices in the handling of the feedstock, its mixing, its composting and curing will be implemented in the design of the final process to prevent or reduce odors at the source.

From initial commissioning stage, NICL will only increase production volumes if odors (and any other operational parameter) are completely controlled and do not impact the surrounding outdoor environment. If odors become a problem at a given production level, NICL will reduce the production rate to avoid odors and look to solve the specific problem before increasing production rate again.

In the short term, NICL will have determined and optimized the composting recipes, the preferred feedstock, and other significant operating parameters to be able to operate at full capacity with no air pollution or odorous emissions.

### 5.4.17 Vector Management Plan

An on-going Vector Management Plan will be implemented at the facility over its operational lifetime.

Whether it is because feedstocks provide a food source or because processing operations generate heat, it is a reality that organic waste processing facilities are an attractant to insects, birds, and other animals, such as mice and rats, coyotes, and bears. Even processing grass, leaves, and brush, which are often thought of as relatively innocuous feedstocks, can attract insects, birds and animals.

The primary concern related to insects, birds and animals is the potential spread of pathogens and diseases. In this context, they are vectors for the spread of diseases. A secondary concern is that birds and animals can scatter feedstocks around the facility site or onto adjacent properties. Larger animals, such as coyotes, also pose a physical threat to site personnel and visitors.

As with other nuisance conditions, the primary means of controlling insects, birds, and animals is to follow sound operational practices. First among these is implementing good housekeeping and maintaining a clean site.

Birds are more difficult to control, since they can fly over fences and other barriers that deter animals. There are several bird control measures that can be incorporated into the facility, such as adapting the design of site buildings and structures to minimize potential perches; installing mist netting inside enclosures and using air curtains or other barriers on overhead doors; installing windmills with surfaces that reflect visible or ultraviolet light; and installing streamers and flags.

Relative to birds, insects are much easier to control. Insect control focuses primarily on flies and mosquitoes, both of which are vectors for disease and the spread of pathogens.

Mosquitoes lay their eggs in standing water; thus, they are attracted to surface water ponds, and water collected in ditches, ruts, and depressions. While it is not cost-effective to cover surface water ponds, tanks can normally be covered, or screens can be placed over openings and vents. Repairing damaged roads and pads, and regular regrading of working areas, can help prevent standing water accumulation.

Flies are attracted to decaying feedstocks. They are also attracted to the heat given off by the composting process; flies often lay their eggs on the outer surface of the compost pile where temperatures are above ambient, but not high enough that they kill the fly larvae.

The primary means of controlling flies is to process feedstocks as quickly as possible, thereby exposing eggs to heat or other conditions that kill the larvae before they hatch. Flies can also be controlled with various fly traps and bug zappers.

### 5.4.18 Level of Expertise in the Industrial Composting Process

The appropriate level of expertise in the industrial composting process is vital to the success of the project. At least one employee/operator on-site and the facility manager will be trained in the operation of an industrial composting facility, with training certified by the Composting Council of Canada, Solid Waste Association of North America, or equivalent. The services of an experienced industrial composting consultant may be secured initially to assist in the operation of the facility in the first couple of months.

As related in Section 8 below, NICL and its consultants already have extensive expertise in composting, industrial biotechnology and environmental science and engineering.

### 5.4.19 Chain of Custody Documentation

The content, volume, source and date of each shipment of feedstock received at the facility will be recorded and made available to government inspectors when requested. Proper records will be established and maintained in consultation with the Pollution Prevention Division of the Department of Environment and Climate Change.

### 5.4.20 Decommissioning Plan

A decommissioning plan for site clean-up, repair and rehabilitation, and removal or securing of infrastructure, equipment and access prior to closure of the industrial composting facility will be prepared and submitted to the Department of Environment and Climate Change.

Such a decommissioning plan will layout the processes of:

a. stopping the receiving of raw materials,
b. completing the composting of remaining raw materials,
c. selling/removing remaining finished product,
d. cleaning and disinfecting the entire facility,
e. demolishing or converting the facility to another use.

### 5.4.21 Fire and Emergency Protection Plan

A Fire and Emergency Protection Plan will be developed in consultation with Fire and Emergency Services-NL (FES-NL), to ensure adequate firefighting training and equipment on-site. The plan shall be approved by FES-NL prior to the initiation of construction activities.

Such a plan will be prepared in conjunction with the engineering design of the facility in terms of the fire suppression systems and technologies required by the National Fire Code, the NFPA codes and standards, and any other codes pertaining to the nature and operation of the indoor composting facility.

This fire and emergency protection plan will be communicated to the employees as part of their health and safety orientation and training, as well as to the local Volunteer Fire Department of Long Harbour contracted for firefighting services, and to any other authorities having jurisdiction.

The main indoor composting building will be classified as a medium hazard industrial occupancy category (Occupancy Category F, Division 2) as per the National Building Code 2010. Consequently, the building must meet a variety of requirements including fire suppression systems and flammability of construction, depending on size of building, proximity to “streets” or “fire lane(s)” and other parameters. The building can be designed such that no fire sprinkler system will be required and meet the requirements of the codes.

The Fire and Emergency Plan will include:

- A detailed description of the actions facility personnel shall take in the event of various emergency situations;
- A description of arrangements made with the Department and local police and fire departments which will allow for immediate entry into the facility by their authorized representatives should the need arise, such as in the case of response personnel responding to an emergency; and
- A list of names, addresses and phone numbers (office and home), if known at the time of submission of the engineering design, of all persons qualified to act as an emergency coordinator for the facility. The final list of names, addresses and phone numbers of such persons shall be submitted as part of the final operations and maintenance manual. This list shall be kept up to date. Where more than one person is listed, one shall be named as primary emergency coordinator and the others shall be listed in the order in which they will assume responsibility as alternates.
- Fire drills and emergency evacuations performed periodically to enhance emergency preparedness.
- Readily available, pressurized water supply, complete with standpipes and fire hoses.
- Driveway, yard and fire lane design that permits easy access by fire-fighting equipment.
- Providing aisles between windrows as a fire break and for access.
- Providing buffer distances between potentially combustible materials.

- Access to earth moving equipment in event of deep subsurface fire occurs and needs to be isolated and dug out.
- Having a readily available stockpile of soil to smother a fire (as an alternative to using water).

### 5.4.22 Environmental Emergency Contingency Plan

An Environmental Emergency Contingency Plan for the storage and handling of gasoline and associated products, will be prepared and will also include information regarding the location of spill response equipment and a trained contractor, in the event of a spill.

The Environmental Emergency Contingency Plan is part of the greater Contingency Plan for the Indoor Composting Facility which will include:

- Health and Safety plan
- Emergency evacuation plan
- Emergency Response Resources and Equipment
- Hazardous Goods Storage (products, location, inventory)
- Site map
- Fire Contingency Plan
- Petroleum Contingency Plan (spill, fire)
    - Spill prevention
    - Spill response

Such documents are standard operations documents for agricultural and industrial facilities. This Environmental Emergency Contingency Plan will be communicated to the employees as part of their health and safety orientation and training, as well as to the Department of Environment and Climate Change, and to any other authorities having jurisdiction.

### 5.4.23 Composting Potentially Hazardous Material

NICL has no intention whatsoever to accept, receive or compost any potentially hazardous material. NICL will be very selective in the nature and quality of raw material it intends to process.

NICL will inspect judiciously every load of raw material received and dumped inside the indoor composting facility.

NICL will not accept and compost any sewage sludge.

Through long standing activities and experience in demolition and environmental remediation conducted through a related company over many years, the Proponent has extensive expertise and experience in hazardous materials assessment, abatement and environmental remediation.

In the unlikely case of receiving raw material containing hazardous materials of any kind, NICL will contact immediately the Pollution Prevention Division of the Department of Environment and Climate Change, and deal with the proper removal, remediation and disposal of the potentially or actually hazardous material. Immediate measures will be taken to protect the employees and the public from any exposure to such hazardous materials.

### 5.4.24 On-Site Waste Management

On-site waste will be placed in suitable refuse containers which will be provided for the collection and weekly removal of waste to an approved waste disposal facility.

NICL intends to operate the facility responsibly and professionally. Garbage collection, storage and disposal will be done using standard industry practices.

# 6 Other Site Locations Considered

In his endeavor to establish the proposed indoor composting facility, Metro Environmental Services Ltd., (MESL), a company owned and operated by the proponent successively considered several sites before selecting the best suitable site located as proposed on the Long Harbour Access Road. NICL and related company, Metro Environmental Services Ltd. and his Engineering Consultant spent extensive time and efforts to identify and assess these sites in active consultation with governmental departments and agencies, municipalities and related stakeholders.

MESL started with a large track of undeveloped land at the north east corner of the Trans-Canada Highway and the Salmonier Line (Site 1). Although the land was initially zoned agricultural land, it has recently been rezoned by the Town of Holyrood for residential development. Furthermore, the majority of the land area is part of the watershed area for Harbour Main and Chapel Cove. Understandably, watershed areas have very restrictive development regulations.

MESL then considered Crown Land sites on Incinerator Road, in the Municipality of St. John's, near the Foxtrap Access Road from Trans-Canada Highway. Two sites were considered, explored and assessed. One on the south side of Incinerator Road, which was the actual incinerator site for CBS, decommissioned and removed at least 10 years ago (Site 2). Because of its previous use as a dump site and disposal facility, it was not possible to establish a facility for industrial composting at that site. Rightfully so, Crown Lands would not issue a lease. MESL then looked at a Crown Lands site on the north side of Incinerator Road (Site 3). Although the site initially appeared suitable, MESL discovered that the site was too close to the local hydrographic system in the Incinerator Road area which drains through Foxtrap and Seal Cove to Conception Bay. Both City of St. John's and Town of CBS had concerns over the protection of the local watershed and hydrographic system supplying well water to CBS residents.

With the ongoing assistance of staff from the Department of Fisheries, Forestry and Agrifoods, NICL considered several Crown Land sites.

- Kennys Gullies near Briens Pond, roughly between Trans-Canada Highway and town site of Avondale (Site 4).
- South east corner of intersection of Argentia Access Road and Newfoundland T Railway track, near Reversing Pond (Site 5).
- North west side of Argentia Access Road, between Hynes Pond and Snows Pond (Site 6).

Site 4 had an excellent location, albeit a more difficult and farther access from Trans-Canada Highway. It offered plenty of space and isolation. But the site had an existing Crown Land lease that could not be transferred to MESL.

Potentially suitable, Site 5 was an existing lease that could not be transferred to MESL. As well, the proximity of Site 5 to the T Railway track and the relative proximity to Markland made the site impossible to undertake.

Similarly, Site 6 was in too close proximity to Placentia Junction and turned out to be an existing Crown Land lease that could not be transferred to MESL.

Figure 8 below shows the locations of the 6 sites explored and assessed, as well as the previous site selection on the Argentia Access Road.

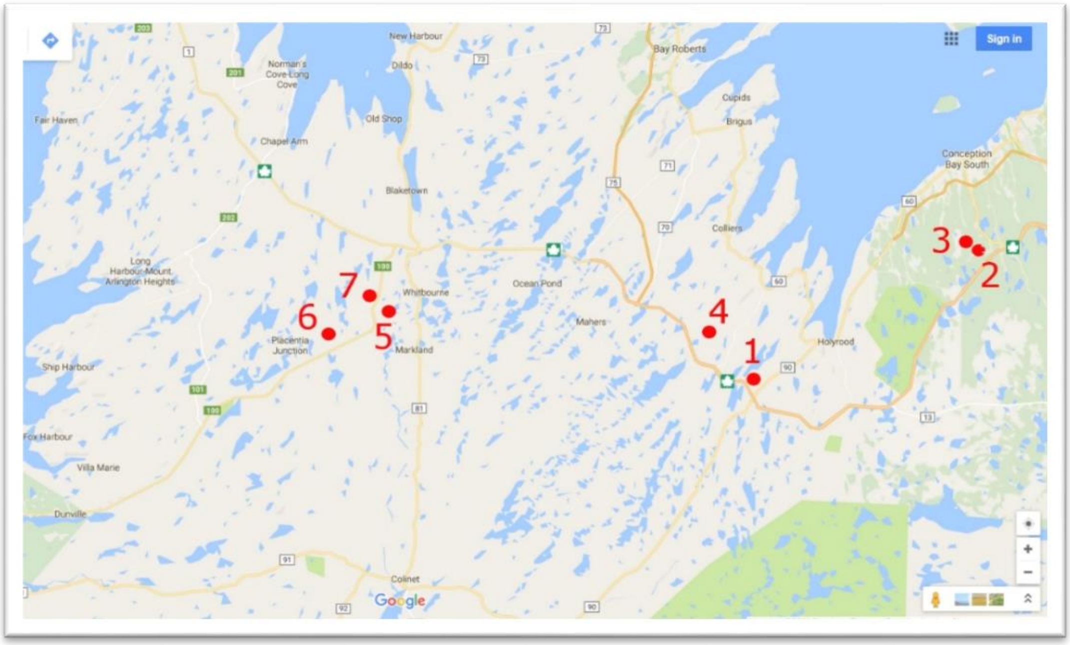


**Figure 8 - Location Map of Sites Considered**

# 7 POTENTIAL ENVIRONMENTAL EFFECTS AND MITIGATION

The potential effects of the project on the environment and the proposed mitigation to be used to avoid adverse environmental effects are presented in the 14 following subsections.

## 7.1 AIR DISPERSION MODELLING AND ANALYSIS

Air Dispersion Modelling and Analysis (ADMA) is an extensive scientific and engineering exercise to calculate and project the concentrations of contaminants emitted from a source such as a plant or a chimney stack at different distances and location surrounding that source. This analysis takes meteorological data, topographic and terrain geographical data to project average and maximum concentrations of contaminants of a area of interest and over a 3 year period of most recent meteo data. Such analysis requires specialized expertise and sophisticated (complex) software.

ADMA is performed by the Consultant, with the guidance and supervision of a specialist working with the Pollution Prevention Division of the Department of Municipal Affairs and Environment.

An ADMA was conducted in January 2018 for the Argentia Access Road site proposed earlier and provided very good results in that the odor concentrations at specific receptor sites, emanated from the site location, were very low to nil.

A new ADMA was conducted in February 2019 by the Consultant for the proposed Long Harbour Access Road site. The same analysis was done, following the procedures and specifications of the Pollution Prevention Division, and overseen by the specialist. The results of this new ADMA were (predictably) also very good with very low projected odor concentrations at specific receptor sites.

Information and details on the ADMA for Long Harbour site is presented in Appendix III.

## 7.2 Clearing of Trees

In the design and construction of the indoor composting facility, NICL will limit to a minimum the clearing of trees and brush to only what is necessary for construction and operation of the facility.

## 7.3 Erosion Control and Runoff

In the design and construction of the facility, NICL will ensure that sediments are contained during construction and operation, and will not be permitted to runoff into a water body or wetland. Following good civil construction practices, NICL will take preventative actions, such as: coordinating construction and excavation activities to avoid heavy precipitation and the freezing/thawing cycle; installing sediment control structures prior to land disturbance (e.g., silt fencing, sediment traps, sediment ponds); minimizing the exposed soil area and stabilizing exposed soil as soon as possible with mulch, erosion control blankets and/or native vegetation; monitoring nearby receiving waters for total suspended solids or contaminants from project related activities.

## 7.4 Wetlands Conservation

In the design and construction of the composting facility, NICL and his consultants will identify measures that will be undertaken to conserve wetlands, such as avoiding development on wetlands, maintaining a 30 metre undisturbed buffer around wetlands and watercourses and diverting surface runoff from construction and operation away from wetlands.

The site does not particularly contain wetlands. Otherwise, it would have been unsuitable from the initial evaluation. Detailed inspection and survey of the site will confirm the presence of any particular wetlands, at the pre-construction stage.

## 7.5 Spill Response Plan

With the assistance of his engineering consultant, NICL will be developing a contingency plan that ensures a quick and effective response to a spill event. Spill response equipment will be readily available on-site, including absorbents and open-ended barrels for collection of cleanup debris. Personnel working on the project will be knowledgeable and trained in emergency spill response procedures. In developing the contingency plan, the consultant will use the Canadian Standards Association publication Emergency Planning for Industry CAN/CSA-Z731-03.

The contingency plan will be included in the Fire and Emergency Services Plan required by Fire and Emergency Services-NL, described in Section 9 below.

## 7.6 Storage of Fuels and Lubricants

The storage of oils, greases, diesel, gasoline, hydraulic and transmission fluids will be located at least 100 metres from any body of water. All leaks/spills will be reported as they must, to Service NL at 729-2008 and the spill line: 1-800-563-9089.

## 7.7 Refueling and Mechanical Maintenance

Following standard good operational practices, NICL will be conducting refueling and maintenance activities at least 100 metres from any body of water and on level terrain, and using biodegradable fuels and fluids where possible.

## 7.8 Handling and Storage of Waste Fuels and Lubricants

NICL will be retaining waste oils and used lubricating oil in a tank or closed container, and will be disposing of them in an approved manner following the waste oil regulations of the Department of Environment and Climate Change.

## 7.9 WILDLIFE HABITAT DISTURBANCE

Negative habitat disturbance on wildlife, including migratory birds, by undertaking vegetative clearing and excessive noise activities outside of the nesting, breeding and brood rearing period (April 15 to August 15 in this region) will be reduced to a minimum. Where vegetation clearing will not avoidable and a nest is found:

- The nest and neighboring vegetation will be left undisturbed until nesting is completed;
- Construction activities will be minimized in the immediate area until nesting is complete.

For guidance on how to avoid the incidental take of migratory birds nests and eggs, please refer to the Avoidance Guidelines

(Website: http://www.ec.gc.ca/paom-itmb/default.asp?lang=En&n=AB36A082-1).

Reducing habitat disturbance will be diligently done, but we may have the opposite problem whereby wildlife may be attracted to the facility because of its operation. This comes back to the proper vector plan that will be established at the beginning and revised as experience teaches us.

## 7.10 BIRD DETERRENCE

Deterrence measures to prevent migratory and other birds from nesting in unattended stockpiles of soil and/or compost particularly during the breeding season will be developed by NICL. If migratory birds take up occupancy of these piles, any industrial activities will cause disturbance to these migratory birds and inadvertently cause the destruction of nests and eggs. Alternate measures will then need to be taken to reduce potential for erosion, and to ensure that nests are protected until chicks have fledged and left the area.

## 7.11 BIRD REPELLANT

Repelling devices will be used as necessary on the roof of the facility buildings, lighting poles, and product stockpiles. Such repellant may include the use of flags, streamer tape, scarecrows or human-like dummies, and electronic noisemaking devices.

## 7.12 Reducing Attraction of the Site to Migratory Birds

NICL will undertake measures to reduce the attraction of migratory birds to on-site lighting, such as: using LED lights instead of other types of lights where possible; shielding lights needed for the safety of employees to shine down and only to where it is needed; and installing the fewest number of site- illuminating lights needed for safety, at the lowest intensity and smallest number of flashes per minute allowable by Transport Canada.

## 7.13 Litter Control

NICL will put measures in place to ensure that litter, food scraps, feedstock and any other waste shall be made inaccessible to birds, mammals and other vectors so as not to artificially enhance populations of predators of eggs and chicks. Proper waste management practices and equipment will be in place at the site to properly control, collect and dispose of garbage that might be attractive to birds, vectors and wildlife.

## 7.14 Invasive Weed Control

Compost temperatures of 50 to 60 Celsius are reached during the active composting phase. At this temperature level, all seedling within the compost mix are destroyed. That will ensure that the soil created from the composting operation is not seeded with invasive species such as Purple Loosestrife. Therefore, the potential incidence of invasive species at the site will be limited to the wood waste raw material being received and stored outdoors. NICL will be selective as to what wood waste the facility will accept, and regular inspections will be done to prevent any progression from potential invasive botanical species. By developing and implementing such additional measures as regular cleaning and inspection of mechanical equipment (including ventilation equipment) will ensure that no vegetative matter is attached to the machinery to diminish the risk of introducing invasive species, such.

# 8 PROJECT RELATED DOCUMENTS

## 8.1 MESL DOCUMENTS

In its endeavor to establish the indoor industrial composting facility, ultimately proposed to be located on Argentia Access Road, Metro Environmental Services Ltd. (MESL) submitted several documents over the course of the Environmental Assessment and Environmental Preview Report phases of the provincial environmental process. The department of Municipal Affairs and Environment ultimately issued a request for an Environmental Impact Study for the Argentia Access Road site.

All these documents and the associated correspondence from the Department of Municipal Affairs and Environment are available at

https://www.mae.gov.nl.ca/env_assessment/projects/Y2016/1838/index.html

## 8.2 TECHNICAL DOCUMENTATION ON COMPOSTING AND RELATED SUBJECTS

NICL and the engineering consultant did extensive research about indoor industrial composting. Below is a short list of the main documents collected and studied. Many other documents and websites on the subject were consulted and saved.

Technical Document on Municipal Solid Waste Organics Processing, Environment Canada, 2013

http://www.compost.org/English/PDF/Technical_Document_MSW_Organics_Processing_2013.pdf

Various publication from The Compost Council of Canada

http://www.compost.org/English/ENGLISH_INDEX.htm

The Management of Organic Waste in Newfoundland and Labrador, Multi-Materials Stewardship Board, March 2012.

Code of Practice for Compost Facilities, Alberta Environmental Protection, Made under the Environmental Protection and Enhancement Act, RSA 2000, cE-12

http://www.qp.alberta.ca/documents/codes/COMPOST.PDF

Odor Management, The Compost Council of Canada, Christine Phillips, March 2002

http://www.compost.org/pdf/sheet_3.PDF

Leachate Management, The Compost Council of Canada, Christine Phillips, March 2002

http://www.compost.org/pdf/sheet_6.PDF

Guidance Document, Environmental Standards for Municipal Solid Waste Compost Facilities, Department of Environment and Climate Change, Pollution Prevention Division, Marie Ryan, Senior Environmental Scientist, April 2010.

http://www.env.gov.nl.ca/env/env_protection/waste/composting_facility_april.pdf

Composting Processing Technologies, Composting Council of Canada, August 2006

http://www.compost.org/pdf/compost_proc_tech_eng.pdf

Back to Basics Designing the New Colchester Compost Facility, 24th Annual National Compost Conference, Sept. 22-24, 2014, Halifax, NS, Paul Arnold, Bio-Logic Environmental Systems Tom Austin, ABL Environmental Herb Corbett, Municipality of the County of Colchester

Guidelines for Compost Quality, PN 1340, Canadian Council of Ministers of the Environment, 2005, www.ccme.ca

Study of Options for Organic Waste Processing in the Province of Newfoundland and Labrador (Revised Final Report), for Frank Huxter, Department of Municipal Affairs, Scott D. Kyle, P. Eng., Dillon Consulting Ltd., 31 July 2014

Issues Relating To Organic Waste Disposal, Part 1 – The Science Of Organic Waste Disposal, HotRot Organic Solutions (NZ) Ltd, PO Box 4442, Christchurch 8140, New Zealand, www.hotrotsolutions.com

Haug, Roger T.; The Practical Handbook of Compost Engineering, Lewis Publishers, 1993

# 9 PUBLIC AND MUNICIPAL SUPPORT

## 9.1 PUBLIC MEETINGS AND INFORMATION SESSIONS

In July 2018, NICL approached the Long Harbour Development Corporation to explore the possibility of establishing the indoor industrial composting facility in Long Harbour, within the Long Harbour – Mount Arlington Heights municipal boundaries.

Following several discussions, information gathering from both parties, the President of the Long Harbour Development Corporation (LHDC) took it upon himself to go to Nova Scotia and visit several industrial composting facilities in the late summer months of 2018. Later in early 2019, the deputy mayor made telephone call to people and managers operating commercial composting facilities in Nova Scotia. Both reported that these facilities were of no nuisance to the immediate neighboring occupancies.

Further to his information gathering and visits to operational composting facility, the President of LHDC presented his findings to the Board of the Long Harbour Development Corporation and to the Town Council of LH-MAH. Both groups were keen to see a presentation from the proponent.

The Proponent and Consultant were invited to present the project to the Town Council and to the board of Long Harbour Development Corporation jointly on 5 December 2019. The area MHA, Mr. Mark Brown, was also present at this presentation. Both executive councils confirmed that they were overall receptive to the project. Council nonetheless wanted the Proponent to do a project information session for the residents of LH-MAH, to confirm public support of the project.

A Town Hall meeting was held on 26 February 2019, at which the President of Long Harbour Development Corporation, presented the project to the residents in a Power-Point format. Both the proponent and the consultant were present at the resident's information session to answer questions and discuss the project with the participants. The session provided residents with accurate project information and overall the proposal was very well received by the 65 people in attendance.

Following the Town Hall meeting, residents of LH-MAH chose to hold their own "private" meeting about the project. It was a meeting for residents only. The residents meeting was held on 13 March 2019. The feedback received from this residents only meeting were also overall positive.

A development application for the project has been submitted to the Town of LH-MAH on 5 March 2019.

## 9.2 Public and Municipal Support

NICL obtained approval from the Town Council of LH-MAH for the development application submitted, and a strong letter of support from the Long Harbour Development Corporation. Both development approval documents and the letter of support from Long Harbour Development Corporation can be found in Appendix IV.

# 10 Approval of the Undertaking

The permits, licences, approvals, and other forms of authorization required for the undertaking prior to the start of construction, together with the names of the authorities responsible for issuing them (e.g., federal government department, provincial government department, municipal council, etc.), including but not limited to the following, are listed below:

- A Development Approval from the Town Manager of LH-MAH.
- A Building Permit from the town of LH-MAH.
- A Certificate-of-Approval (COA) from the Pollution Prevention Division of the Department of Environment and Climate Change. Financial assurances may be required for the issuance of a COA in the event that the Department may have to take over operation due to environmental issues or abandonment of the site. Contact Ms. Vicki Ficzere at 729-7012.
- Any use of halocarbons or other regulated substances, for example in fire suppression, air conditioning or refrigeration systems, associated with the proposed activity is subject to the Halocarbon Regulations NLR 41/05. Contact Ms. Vicki Ficzere at 729-7012.
- A Water Use Licence from Water Resources Management Division (WRMD) of the Department of Environment and Climate Change. Contact Ms. Dorothea Hanchar at 729-2539.
- A Site Drainage Plan may be required by WRMD. Contact Dr. Abdel-Zaher Razek at 729-4795.
- A permit from WRMD for the installation of a culvert across the access road to the site. Contact Dr. Abdel-Zaher Abdel Razek at 729-4795.
- All petroleum storage tanks shall be registered with Service NL, and all fuel storage tank systems must comply with the Heating Oil Storage Tank System Regulations and/or the Storage and Handling of Gasoline and Associated Products Regulations. Contact Mr. Robert Locke at 729-2008.
- Approval from Service NL is required for the proposed water and sewerage system.
- Application must be made to Service NL to review building plans for Fire/Life Safety and Building Accessibility, prior to the construction of on-site buildings. Contact Mr. Robert Locke at 729-2008.
- The site is located within 400 metres of the Argentia Access Road and falls within the jurisdiction of the Protected Road Zoning Regulations. A Preliminary Application To Develop Land must be submitted to the Government Service Centre for processing and a “Permit To Develop” issued before any construction takes place. Contact Mr. Robert Locke at 729-2008.

- Electrical plans must be submitted to the Government Service Centre for review and approval. An electrical permit is required for each meter. The applicable permit fees will apply. Contact Mr. Robert Locke at 729-2008.
- A commercial cutting permit must be obtained from the Department of Fisheries, Forestry and Agrifoods prior to any harvesting and or timber removal activities. An operating permit is also required during the declared Fire Season (May 1-Sept 30). Contact the local Forestry Office in Whitbourne at 759-2933 or the Paddy's Pond District Office at 729-4180.
- An application for Crown lands has been submitted for the proposal and a decision will be made pending the outcome of the EA and a review of all referrals from the processing of the Crown lands application. No activity or land clearing is to take place until the Lands Branch has issued the Crown lands title, and that any Crown title issued will be subject to those terms and conditions as prescribed by the Minister of Municipal Affairs. Contact Mr. Peter Hearns at 729-3231;
- A Fire and Emergency Protection Plan for the facility shall be developed in consultation with, and approved by Fire and Emergency Services-NL, prior to the commencement of construction activities on-site. The plan shall describe on- site fire protection equipment and procedures to be implemented in the event of a fire. The plan may also include a contingency plan that ensures a quick and effective response to a spill event. Contact Mr. Derek Simmons at 729- 1608.
- Any quarry materials (e.g. aggregate, fill, rock, stone, gravel, sand, clay, borrow material, etc.) required for the project must either be sourced from a site permitted under the Quarry Materials Act, 1998, from an external source as a byproduct of development and for which royalties have been paid under the Quarry Materials Act, 1998, or from within the legal boundary of the project site. Options for sourcing from a site permitted under the Quarry Materials Act, 1998, include 1) purchasing materials sourced from a permitted site, 2) applying for a subordinate quarry permit to obtain materials from a site for which a quarry permit or lease is held by a third-party, the 3) applying for a quarry permit, whether to establish a new site or re-activate an existing site. Quarry materials (e.g. aggregate, fill, rock, stone, gravel, sand, clay, borrow material, topsoil, peat) may not be legally removed off-site unless they are the byproduct of an approved development. Royalties must be paid on any quarry materials removed off-site. Grubbings (e.g. tree stumps, brush, sod) are not considered quarry materials, however any topsoil or subsoil obtained by screening grubbings is considered a quarry material. Contact: Quarry Rights Section, 729-4044.
- The proposed access road to the site must be approved by the Department of Transportation and Works. Traffic volume to be generated by the site should be provided for further assessment of turning lane requirements. Contact Mr. Patrick Shea, 729-5379.

- The construction of buildings on a Crown Land Lease for Agriculture is only permitted on approval from the Agrifoods Development Branch. Contact Ms. Tara Morgan, 637-2084.

# 11 Appendix I – Site and Facility Layout


Innovative Development & Design Engineers Ltd.
Anderson House, 42 Power's Court,
St. John's, NL A1A 1B6
Tel: (709) 368-8870
Web: www.iddel.ca

| Rev. | Description: | Date: |
|---|---|---|
| A | ISSUED FOR APPROVAL | MAR,19 |

North

Drawn by: ND Date: MAR, 19
Checked by: HA Date: MAR, 19
Approved by: HA Date: MAR, 19

Stamp:

REGISTERED PROFESSIONAL ENGINEER
PEG Newfoundland and Labrador
H. ALACOQUE
SIGNATURE
03/04/19
DATE
NEWFOUNDLAND & LABRADOR

Permit:

PROVINCE OF NEWFOUNDLAND AND LABRADOR
PEG Newfoundland and Labrador
PERMIT HOLDER
This Permit Allows
INNOVATIVE DEVELOPMENT & DESIGN ENGINEERS LTD.
To practice Professional Engineering in Newfoundland and Labrador.
Permit No. as issued by PEGNL N0428 which is valid for the year 2018

Client:
NL ENVIRO INDUSTRIAL COMPOSTING

Project:
PROPOSED COMMERCIAL INDOOR COMPOSTING FACILITY
LONG HARBOUR, NL

Drawing Title:
PROPOSED LOCATION PLAN

Project No.: XXXXX Scale: AS NOTED
Drawing No.: M-100 Revision No.:

M1 LOCATION PLAN
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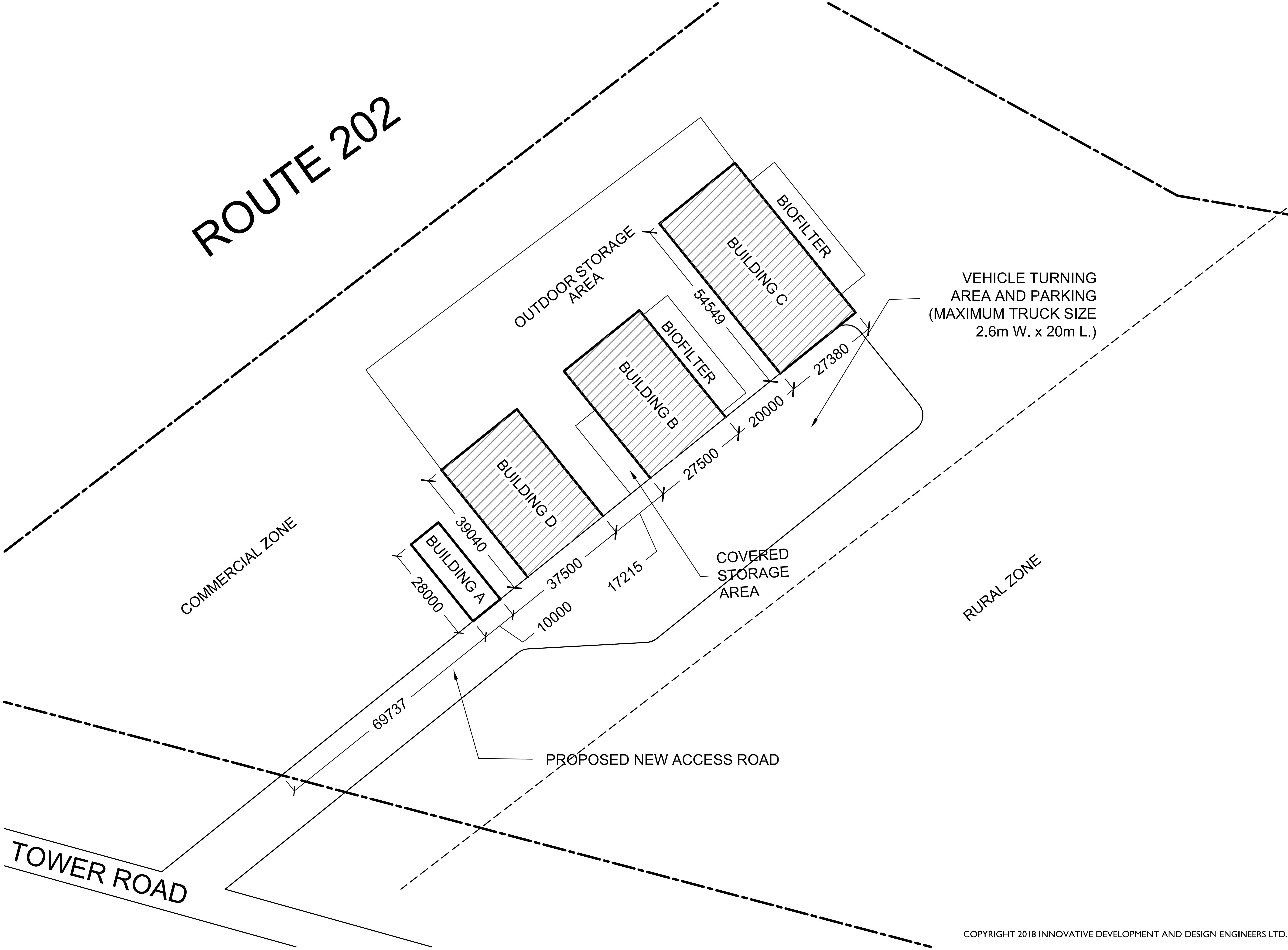




iddel
Innovative Development & Design Engineers Ltd.
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St. John's, NL A1A 1B6
Tel: (709) 368-8870
Web: www.iddel.ca

| Rev. | Description: | Date: |
|---|---|---|
| A | ISSUED FOR APPROVAL | MAR, 19 |

North

Drawn by: ND Date: MAR, 19
Checked by: HA Date: MAR, 19
Approved by: HA Date: MAR, 19

Stamp:

REGISTERED PROFESSIONAL ENGINEER
PEG Newfoundland and Labrador
H. ALACOQUE
SIGNATURE
03/04/19
DATE
NEWFOUNDLAND & LABRADOR

Permit:

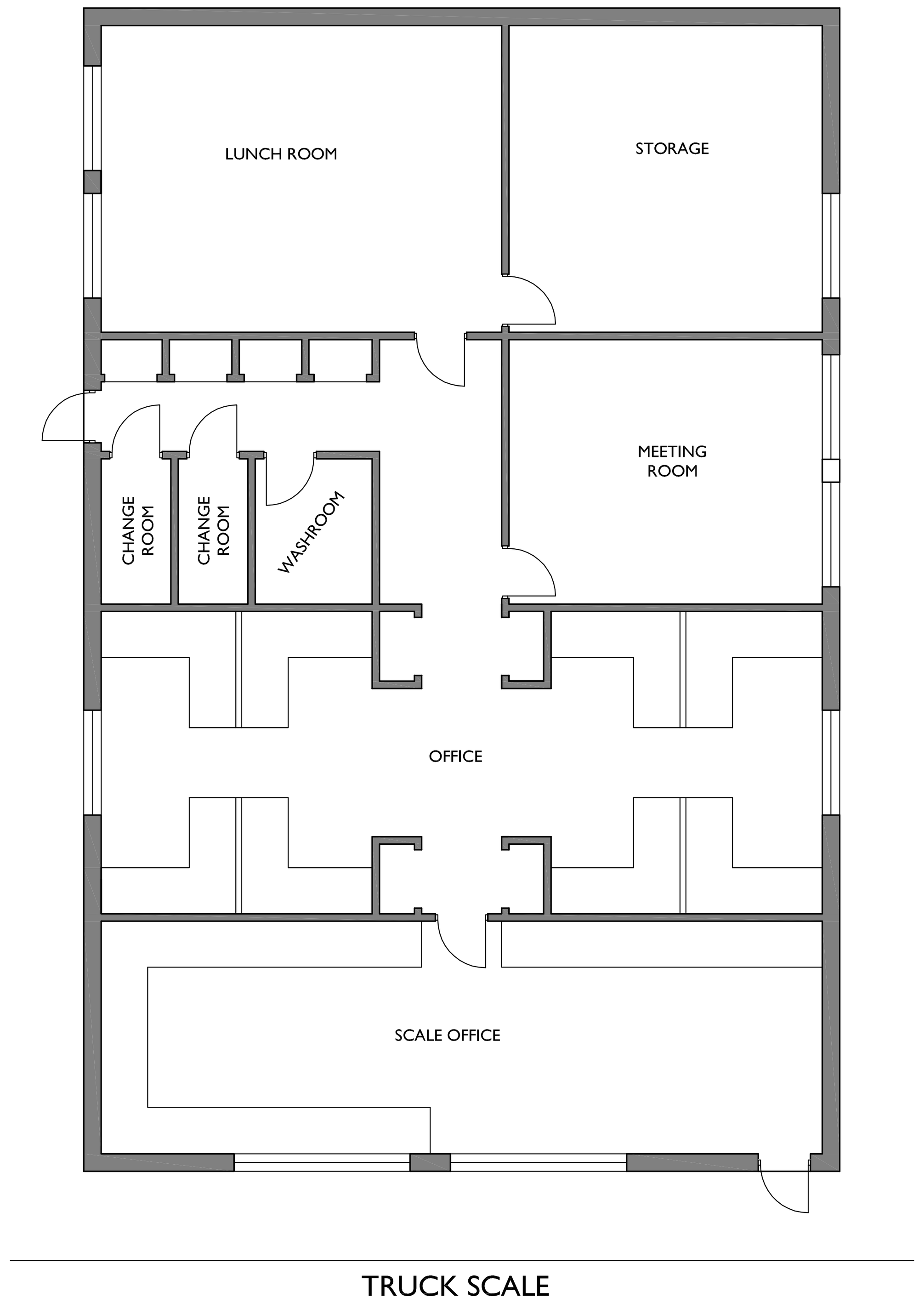
PROVINCE OF NEWFOUNDLAND AND LABRADOR
PEG Newfoundland and Labrador
PERMIT HOLDER
This Permit Allows
INNOVATIVE DEVELOPMENT & DESIGN ENGINEERS LTD.
To practice Professional Engineering in Newfoundland and Labrador.
Permit No. as issued by PEGNL N0428 which is valid for the year 2018

Client:
NL ENVIRO INDUSTRIAL COMPOSTING

Project:
PROPOSED COMMERCIAL INDOOR COMPOSTING FACILITY
LONG HARBOUR, NL

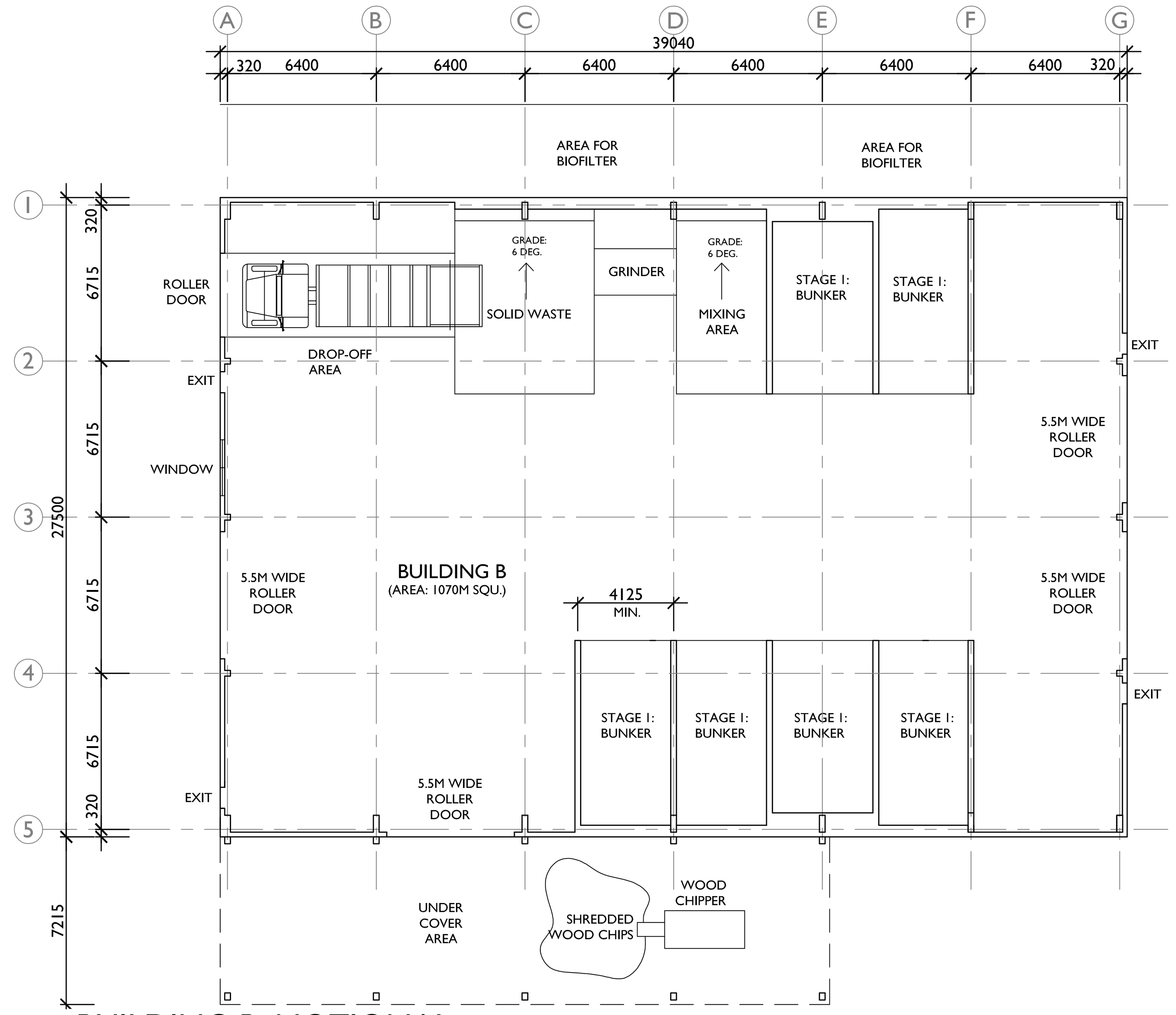
Drawing Title:
PROPOSED SITE PLAN

Project No.: XXXXX Scale: AS NOTED
Drawing No.: M-101 Revision No.:



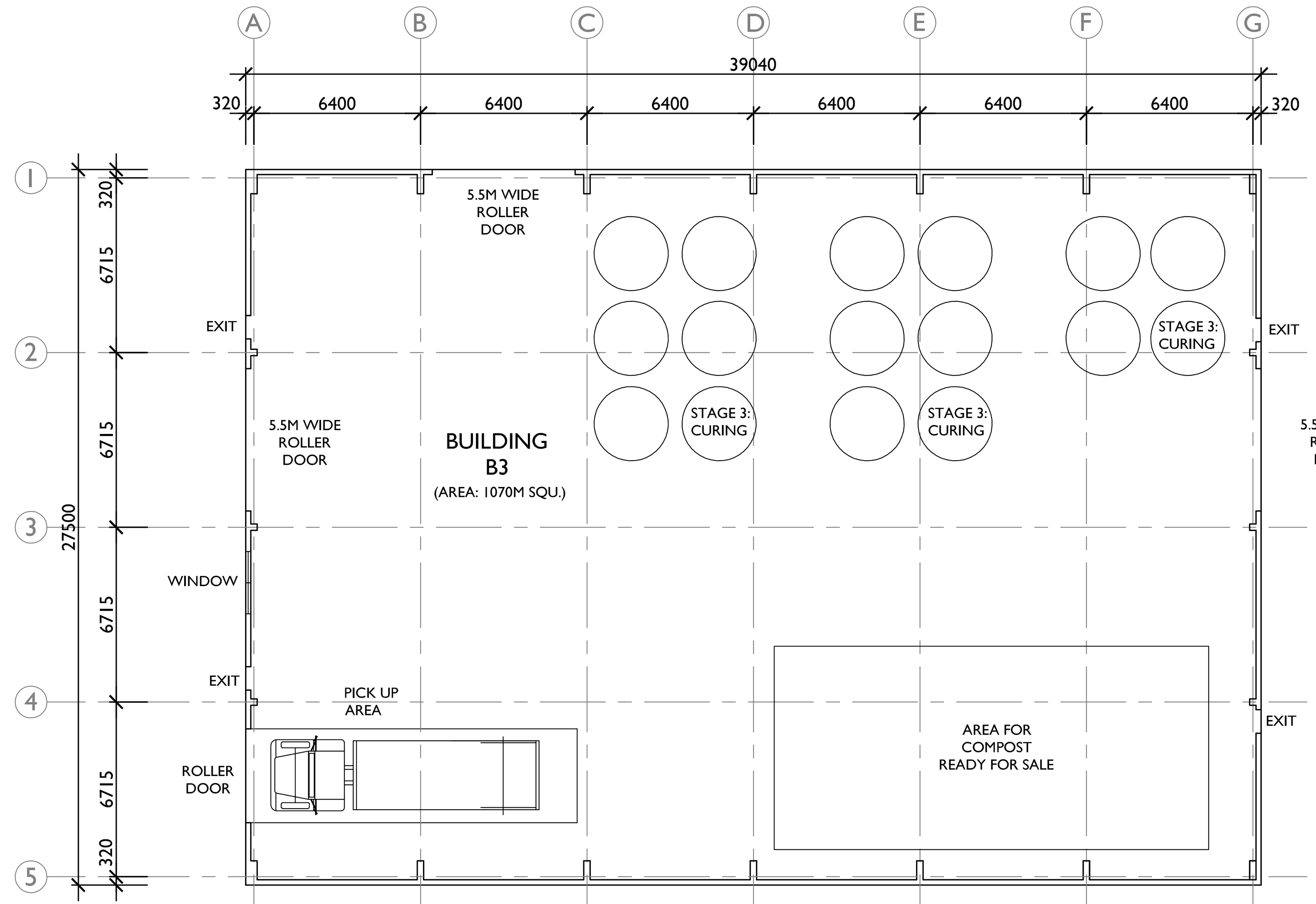

## M1 BUILDING A. NOTIONAL LAYOUT

SCALE: 1:100




## M2 BUILDING B. NOTIONAL LAYOUT

SCALE: 1:200




## M4 BUILDING D. NOTIONAL LAYOUT

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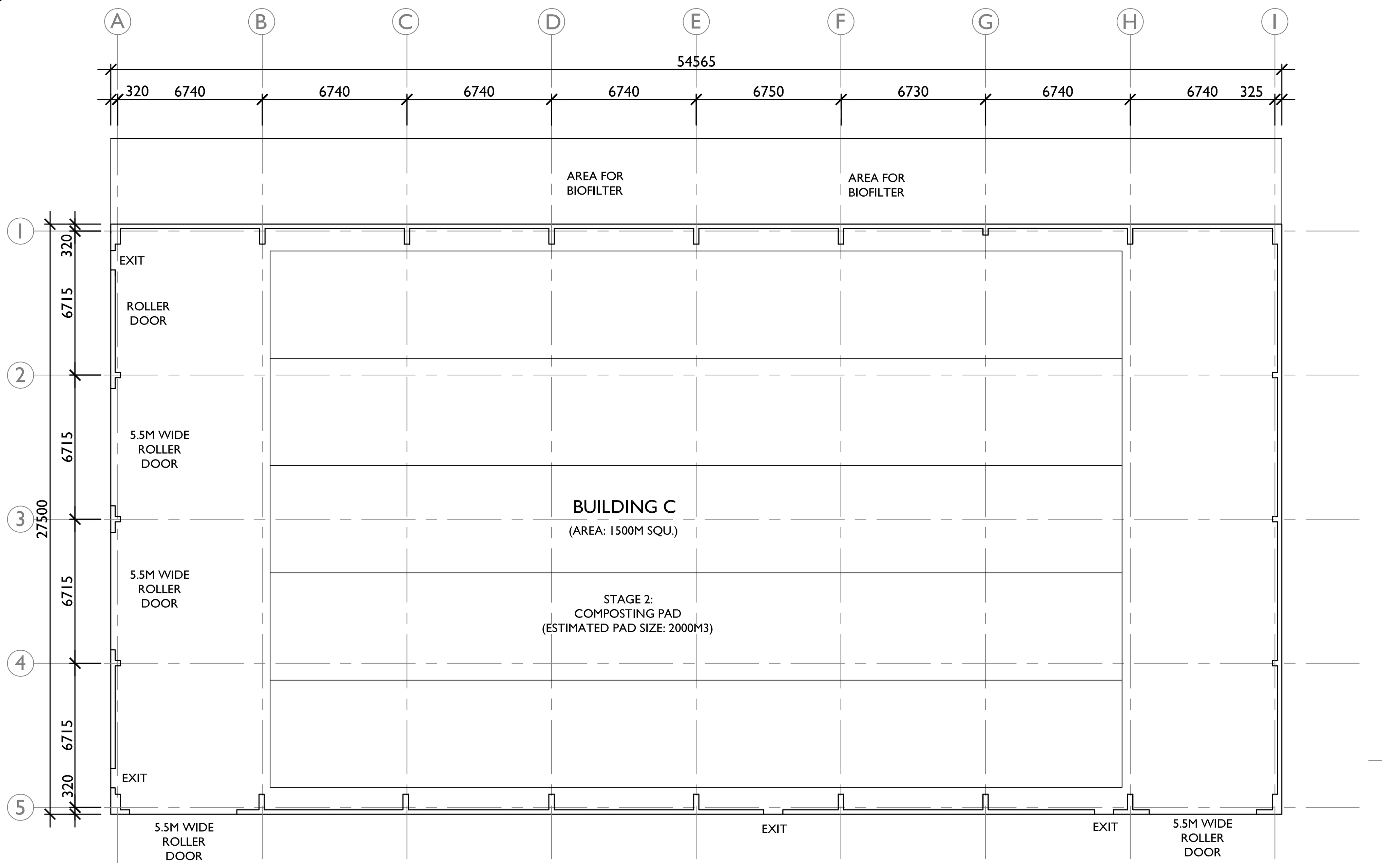


## M3 BUILDING C. NOTIONAL LAYOUT

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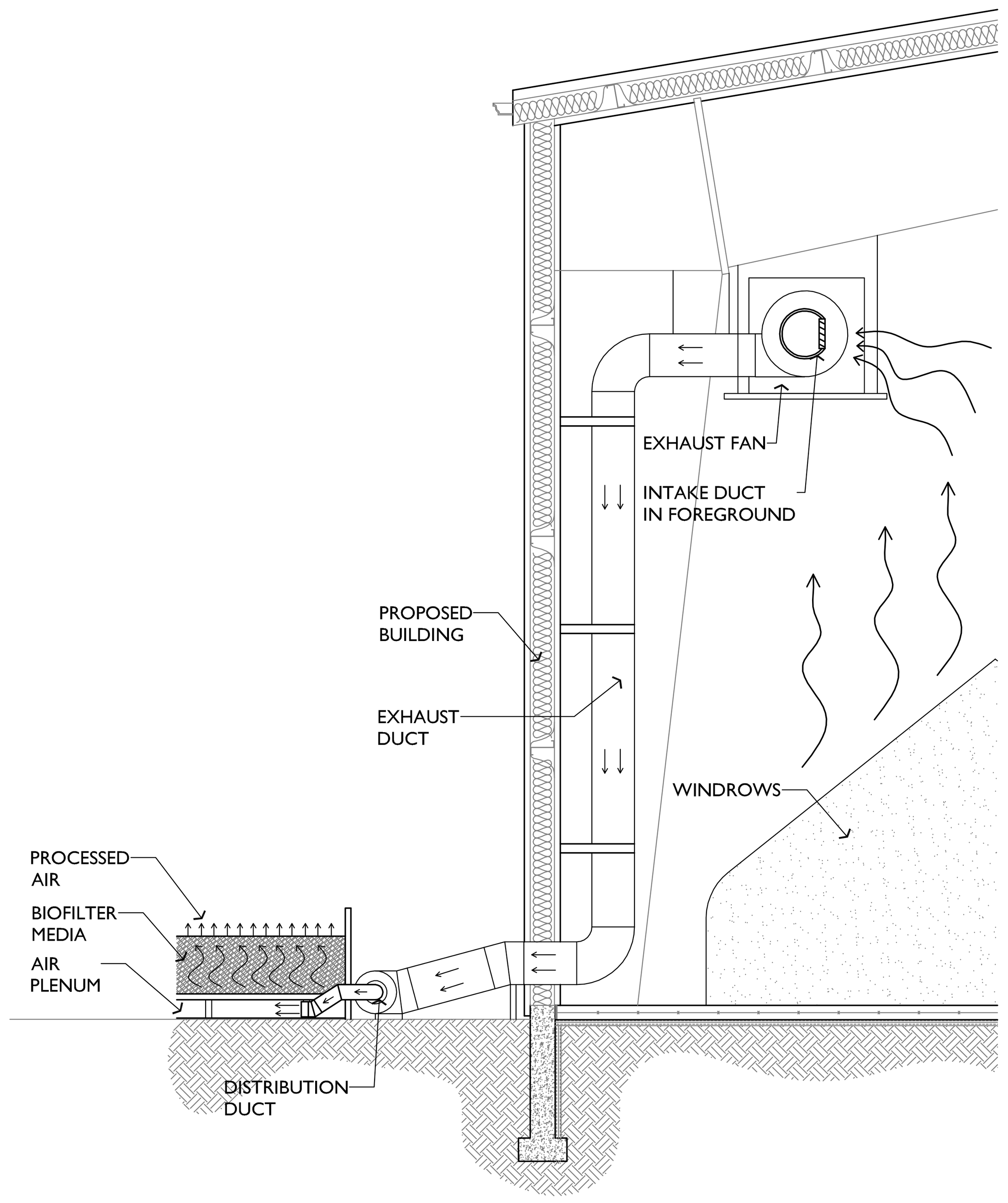
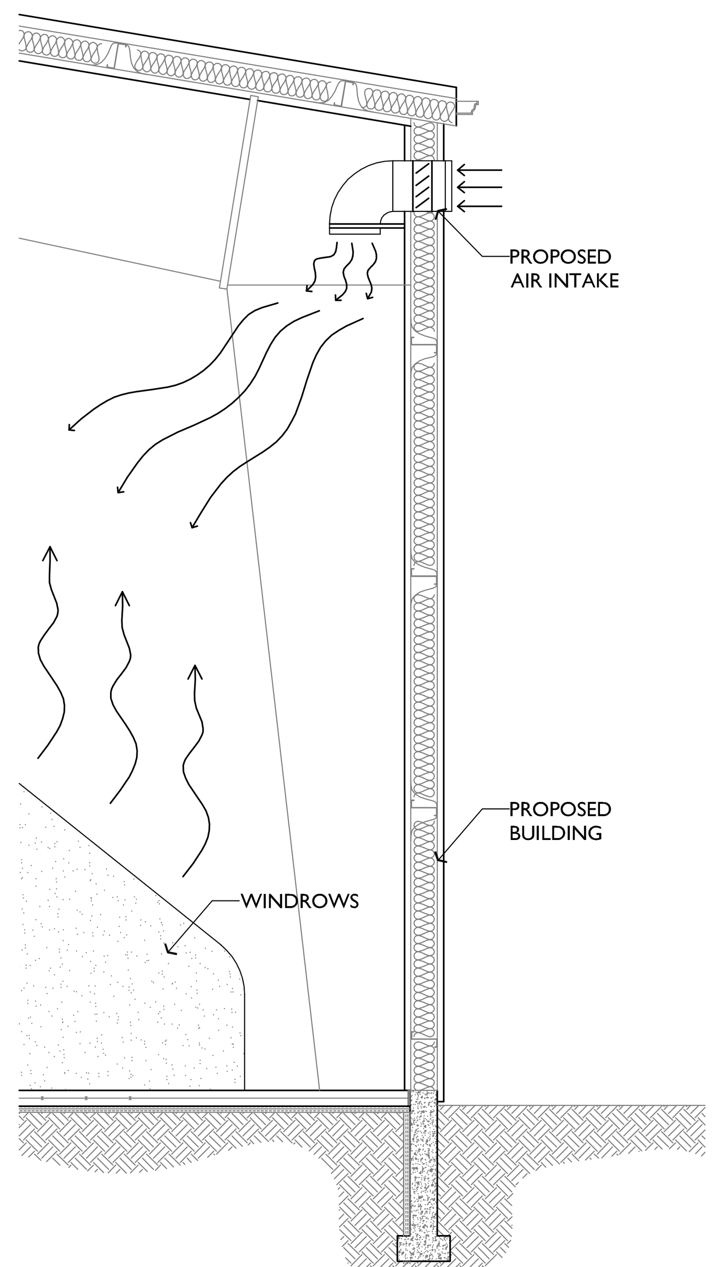


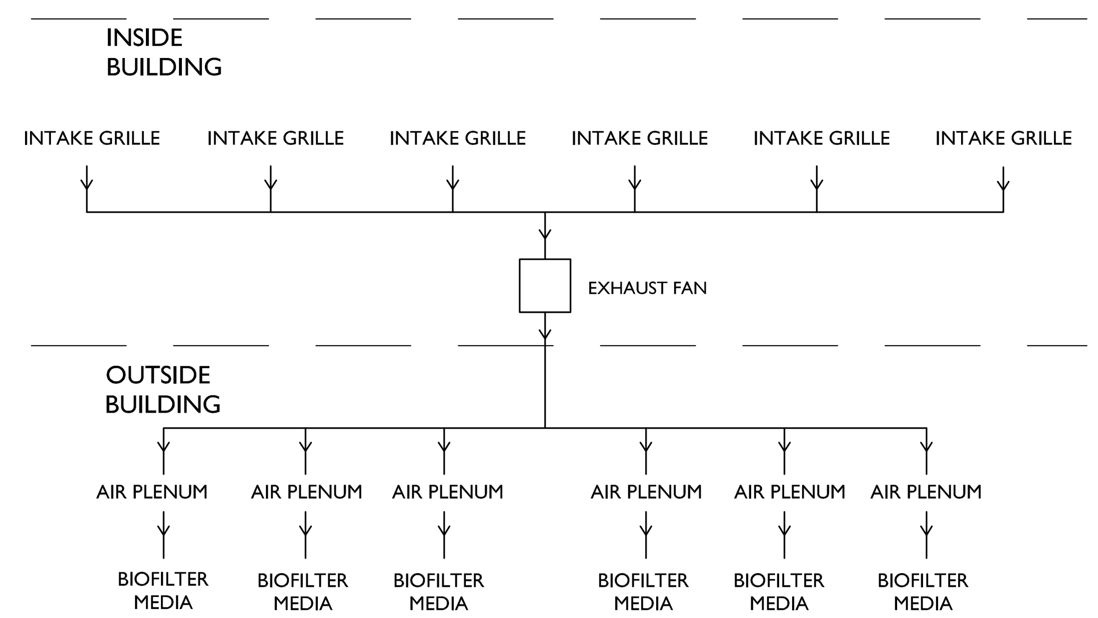

## M5 BIOFILTER TYPICAL SECTION

SCALE: 1:50




## M6 TYPICAL AIR INLET SECTION

SCALE: N.T.S.




## M7 TYPICAL BIOFILTER LINE DIAGRAM

SCALE: N.T.S.

Innovative Development & Design Engineers Ltd.
Anderson House
42 Power's Court,
St. John's, NL A1A 1B6
Tel: (709) 368-8870
Web: www.iddel.ca

Notes:

Drawn by: RC Date: -, 2017
Checked by: HA Date: -, 2017
Approved by: HA Date: -, 2017

| Rev. #: | Description: | Date: |
|---|---|---|
| B | IFA - LAYOUT REFINEMENT | MAR 17 |
| A | ISSUED FOR APPROVAL | OCT 16 |

Stamp:

Permit:

Consultants:

Client:

Project:
PROPOSED COMMERCIAL INDOOR COMPOSTING FACILITY
ARGENTIA ACCESS ROAD, NL

Drawing Title:
BUILDING LAYOUTS & DETAILS

TRUE NORTH

Project No.: 160919
Scale: AS INDICATED @ A1
Drawing No.: M-102
Revision No.: B

# 12 APPENDIX II – ODOR MANAGEMENT PLAN

## 12.1 DEFINING THE ISSUE

Odor control is a primary concern for any facility operator whose property is within range of residential or business areas. When the natural breakdown of organic materials is happening under optimum conditions it produces primarily carbon dioxide, water vapor, and heat. When the process is unbalanced in some way, other gases begin to be produced, some of which have objectionable odors. Odor management, then, is one of the primary motivators for optimizing our composting process.

## 12.2 KEY CONCEPTS

Unlike a mechanical process, the breakdown of organic materials is very difficult to stop. When the necessary components for a particular biological process are not present in adequate amounts, the microbial population will shift to favor microorganisms capable of capitalizing on the existing conditions. For example, when adequate oxygen is available, aerobic microorganisms will dominate the population, but a lack of oxygen will cause organisms that do not require oxygen (anaerobic microorganisms) to take over as the dominant group. These different microorganisms use alternative processes to degrade organic material. This diversity of options is very healthy for our planet as it ensures that most nutrients will be returned to the soil through one biological pathway or another.

From a facility operator's point of view, however, some of these processes are definitely preferable to others because of the associated odours. Microbes utilizing odour-producing processes commonly take over when conditions are:

- Anaerobic: processes occurring without adequate oxygen often release strong-smelling gases that many people find objectionable. Many of these odourous compounds are pervasive and likely to be noticed off-site.

- Low carbon/nitrogen ratio (C:N): a composting mixture that has a low C:N ratio will often release ammonia as part of the degradation process. Ammonia is not a pervasive odour and disperses easily, and so is more likely to be noticed on-site than by neighbours. It is, however, a signal that nitrogen is being lost from your mixture, which will lower the nutritive value of the final composted product.

There are two main stages at which material in a composting facility may be exposed to these odour-producing conditions: before entering the facility, and when in the active composting phase.

## 12.3 Managing Incoming Feedstock for Odour Control

### 12.3.1 CAUSES OF ODOUR

Material coming onto your site may already have developed a strong odour due either to the nature of the material itself or to the way it has been stored. This can include:

- Material stored under anaerobic conditions: fresh organic material stored in plastic bags or insufficiently ventilated carts. The potential for odour increases if the material has a high moisture content, has been kept in an anaerobic state for a number of days, and/or has been subjected to high temperature and direct sunlight. (E.g. grass clippings, fresh plant material, wet leaves).

- Material that has a low C:N ratio: this can be a particular problem if the material also has a high moisture content. (E.g. bio-solid or other high nitrogen sludges, fish processing or slaughterhouse residuals, raw manure).

### 12.3.2 MANAGEMENT STRATEGIES

Such feedstocks are often invaluable because of the nitrogen and moisture they provide to the composting recipe. Proactive management strategies can help you to capitalize on the benefits they offer while minimizing the potential for offensive odor release:

I. KNOW your organics delivery schedule or pattern! If you know when a potentially odorous load is likely to arrive you can be ready to deal with the material immediately, minimizing the potential for odors to spread off-site.

II. II. Have a plan in place for dealing with materials you know are likely to be offensive.

This can include the following:

a. Incorporate the material quickly. Have a stock of porous, high-carbon material on hand which can be mixed immediately with the incoming material. Examples being used with success by Canadian operators include wood chips, shavings, or sawdust, dry leaves, and straw. This helps to balance the C:N ratio, absorb the moisture in wet materials, and add porosity so that the mixture can remain aerobic.

b. If possible, work with loads of potentially offensive feedstock inside an enclosed work area ventilated to the outside through a biofilter. Be sure to close the outside doors so that air circulation systems operate effectively.

c. If the material must be stored before blending, add a blanket of finished compost to the outside of the pile to act as a built-in biofilter.

d. Control your pick-up schedule. Homeowners are most likely to mow lawns on weekends. Organics pickups on Monday, therefore, will be much less odorous than those on Thursday, when wet grass clippings have been sitting in carts or bags in the sun for three extra days.

e. Plan your staffing availability so that sufficient people and equipment are available to deal quickly and efficiently with planned load drop-offs.

## 12.4 MANAGING THE COMPOSTING PROCESS FOR ODOUR CONTROL

During active composting, effective odour control is best achieved by optimizing your process, ensuring that the microbes have ideal conditions to break down the material

Practical strategies to consider fall into two basic categories: Optimizing the Process and Minimizing Possible Odor Effects.

### 12.4.1 OPTIMIZING THE PROCESS

a. Check your carbon to nitrogen ratio (C:N) when preparing your mix: recipes with a C:N ratio of less than 25 are likely to lose nitrogen in the form of ammonia. A ratio of 25-40 is better, with 30 being considered ideal for most materials.

b. Check the moisture content of your recipe: while too little moisture will slow the composting process, too much moisture will cause anaerobic conditions—as all of the small spaces in the material fill with water, not enough space is left for the air that the aerobic microorganisms also need. A moisture content between 40 and 60% is considered to provide a good air/moisture balance to support aerobic processes.

c. Know the pH of your recipe. Basic mixtures above pH8.5 will release nitrogen as ammonia.

d. Consider porosity in formulating your mix: a mixture consisting of nothing but fine textured materials will likely become compacted as it settles, preventing air from penetrating the pile. To maintain porosity when composting such feedstocks, include some coarser material (such as wood shavings or chips) so that air can continue to move freely through the material as it breaks down. This is particularly important in systems where the material will not be turned during active composting.

e. Be sure that material is turned or aerated often enough to maintain aerobic conditions. Whether you are monitoring oxygen or temperature in deciding the timing of your management activities [see Sheet #1, The Composting Process], ensuring adequate oxygen will result in more efficient composting as well as control of odorous gases.

f. Ensure that the pile size is not too large: air will not be able to infiltrate to the centre of a large mass. Temperatures may be very high in center.

### 12.4.2 MINIMIZING POSSIBLE ODOUR EFFECTS:

Even in a facility being managed for optimum composting conditions, equipment problems, unexpectedly wet weather, or unfamiliar feedstocks can result in odours that need to be carefully managed. North American facility operators rely on a variety of helpful practices, including the following:

a. Check local weather conditions before turning or moving compost. Consider the wind direction relative to the location of your neighbors, and aim to handle potentially odorous or dusty material only when they will not be affected. Depending on your geography, the barometric pressure may also play a role in the “behavior” of odorous gases: low pressure may allow gases to flow at ground level while high pressure can allow them to disperse.

b. Keep external doors closed if handling material inside a building vented through a biofilter. This allows the air circulation system to operate properly. If heavy machinery passes through large roll-up doors many times in a day, consider automatic door openers to minimize the length of time the doors are open and to support operator efficiency.

c. Check your biofilter on a regular basis. Process air being passed through a well-constructed biofilter can be cleaned of a high percentage of odorous compounds. Because a biofilter is an organic system, it must be adequately maintained in order to continue functioning at an effective level.

d. Use blankets of finished compost to cover static windrows or piles outdoors. Canadian operators managing unturned biosolids composting operations have found that a 30 cm/12” layer of compost applied to the outside of a newly-constructed windrow serves as a built-in biofilter, trapping any odorous gases. This layer can also serve as insulation to help the material reach the required processing temperature, particularly in winter. If an insulation effect is desired, a deeper layer may be required in cold weather.

e. Ensure good site drainage. Standing water can result in waterlogged, anaerobic material.

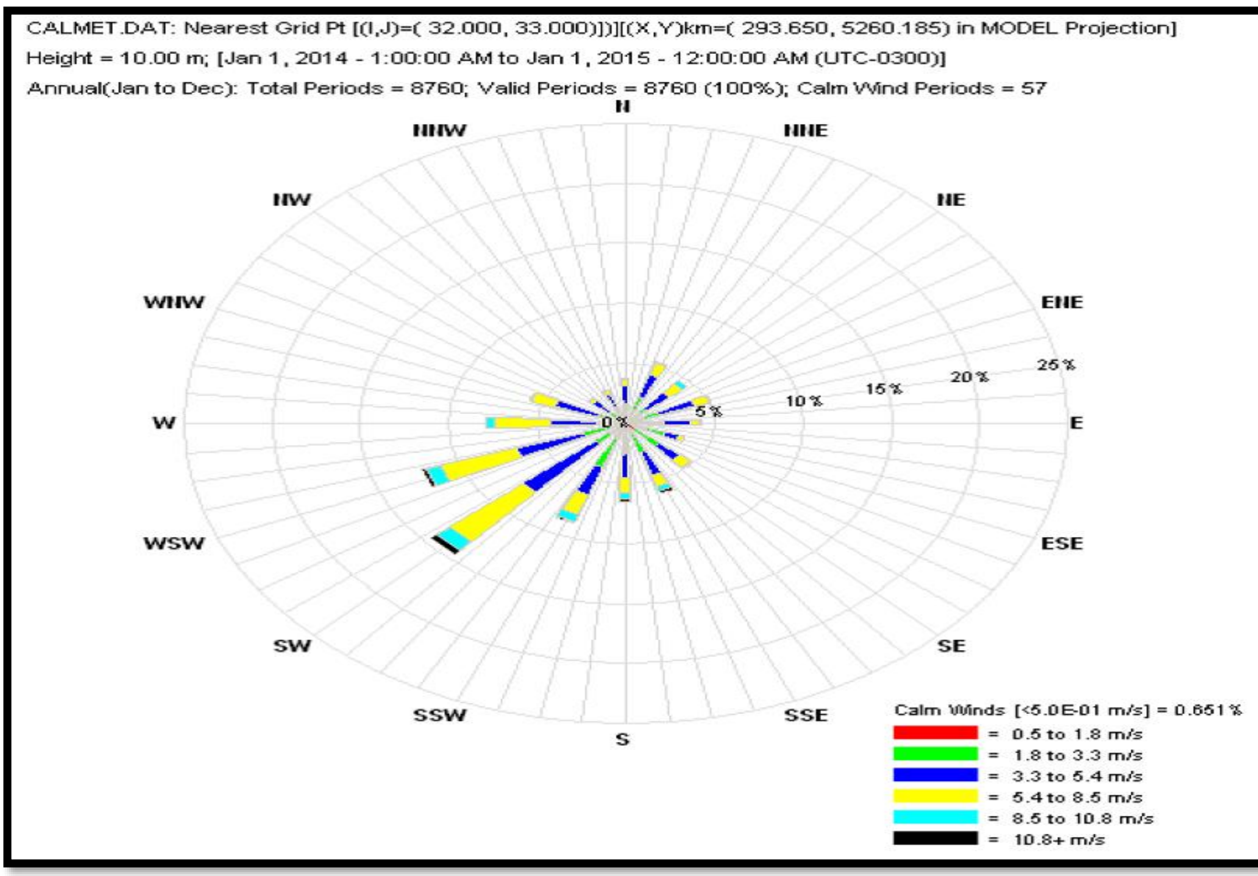
# 13 APPENDIX III – AIR DISPERSION MODELLING AND ANALYSIS – LONG HARBOUR SITE

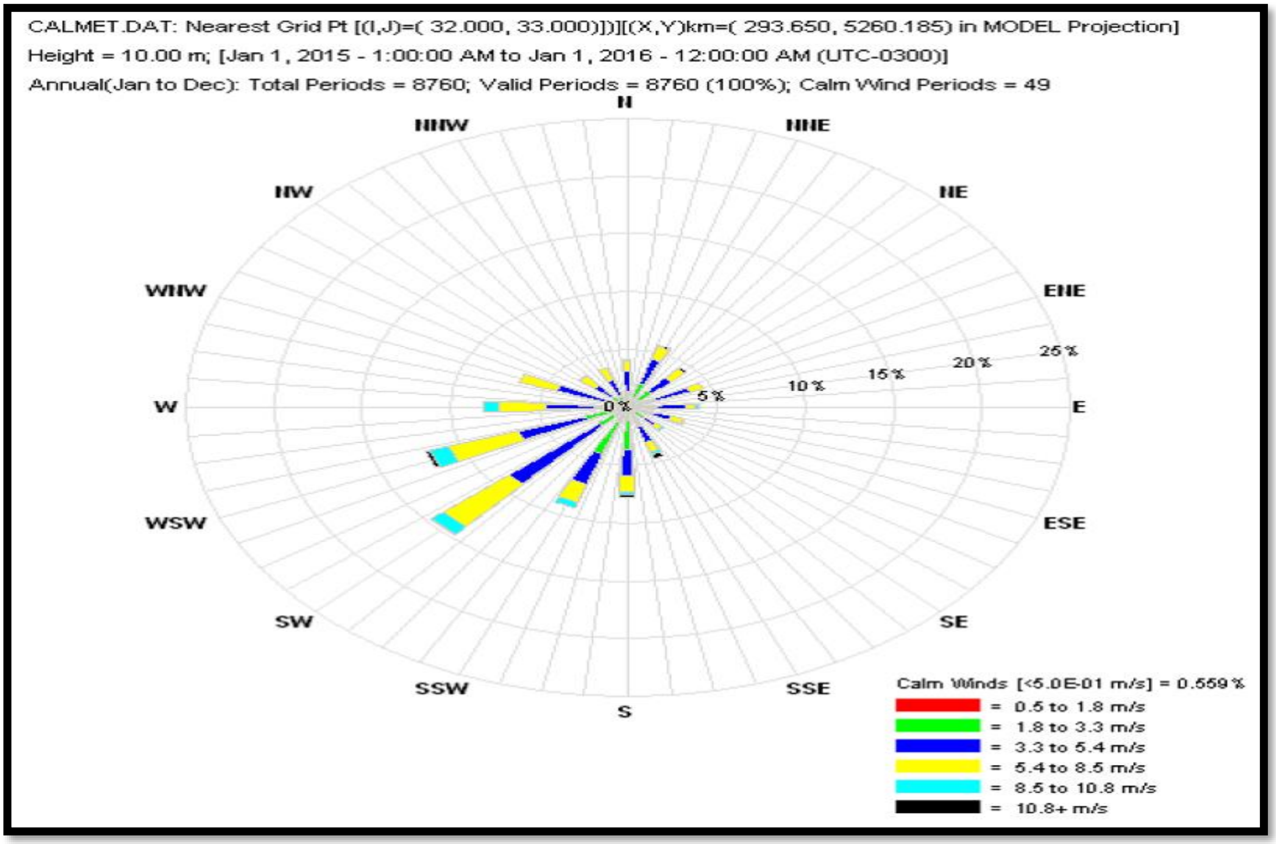
An additional air dispersion modeling and analysis was performed for the new location along the Long Harbour Access Road in the jurisdiction of Long Harbour. The same methodology for undertaking this model was performed by Innovative Development and Design Engineers Ltd. with oversight from the Department of Municipal Affairs and Environment – Pollution Prevention Division. For this air dispersion model the results that will be illustrated are for the expected case whereby the biofilters are indeed functioning as expected or close to expected and have an emission concentration of 300 o.u.

Figure 1: 16 km x 16 km square area that is being modeled

## 13.1 CALMET

The modeling software used to undergo this modeling and analysis is the CALPUFF suite of programs that are approved by the DoMAE. This software suite has several preprocessing applications (CTGPROC, TERREL, and MAKEGEO) which will be run initially to compile the terrain and land use data for the given domain, in this case a 16 km x 16 km square area with the composting facility at its center as shown in Figure 1 above. Having such a large domain ensures that all nearby communities are considered in the analysis. Once the preprocessing data has been compiled, that data along with some meteorological WRF data that was purchased from Lakes Environmental is inputted into the first major application, CALMET, the version used is 6.334, level 11042. The outputted meteorological model was able to generate some meteorological statistics, including the windrose data, shown in Figure 2 below, for each of the three years modeled. These graphics illustrate the average direction and speed of the wind at the location of the proposed facility and were extracted using PRTMET.




CALMET.DAT: Nearest Grid Pt [(I,J)=( 32.000, 33.000)])][(X,Y)km=( 293.650, 5260.185) in MODEL Projection]
Height = 10.00 m; [Jan 1, 2015 - 1:00:00 AM to Jan 1, 2016 - 12:00:00 AM (UTC-0300)]
Annual(Jan to Dec): Total Periods = 8760; Valid Periods = 8760 (100%); Calm Wind Periods = 49
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
0 %
5 %
10 %
15 %
20 %
25 %
Calm Winds [<5.0E-01 m/s] = 0.559 %
= 0.5 to 1.8 m/s
= 1.8 to 3.3 m/s
= 3.3 to 5.4 m/s
= 5.4 to 8.5 m/s
= 8.5 to 10.8 m/s
= 10.8+ m/s

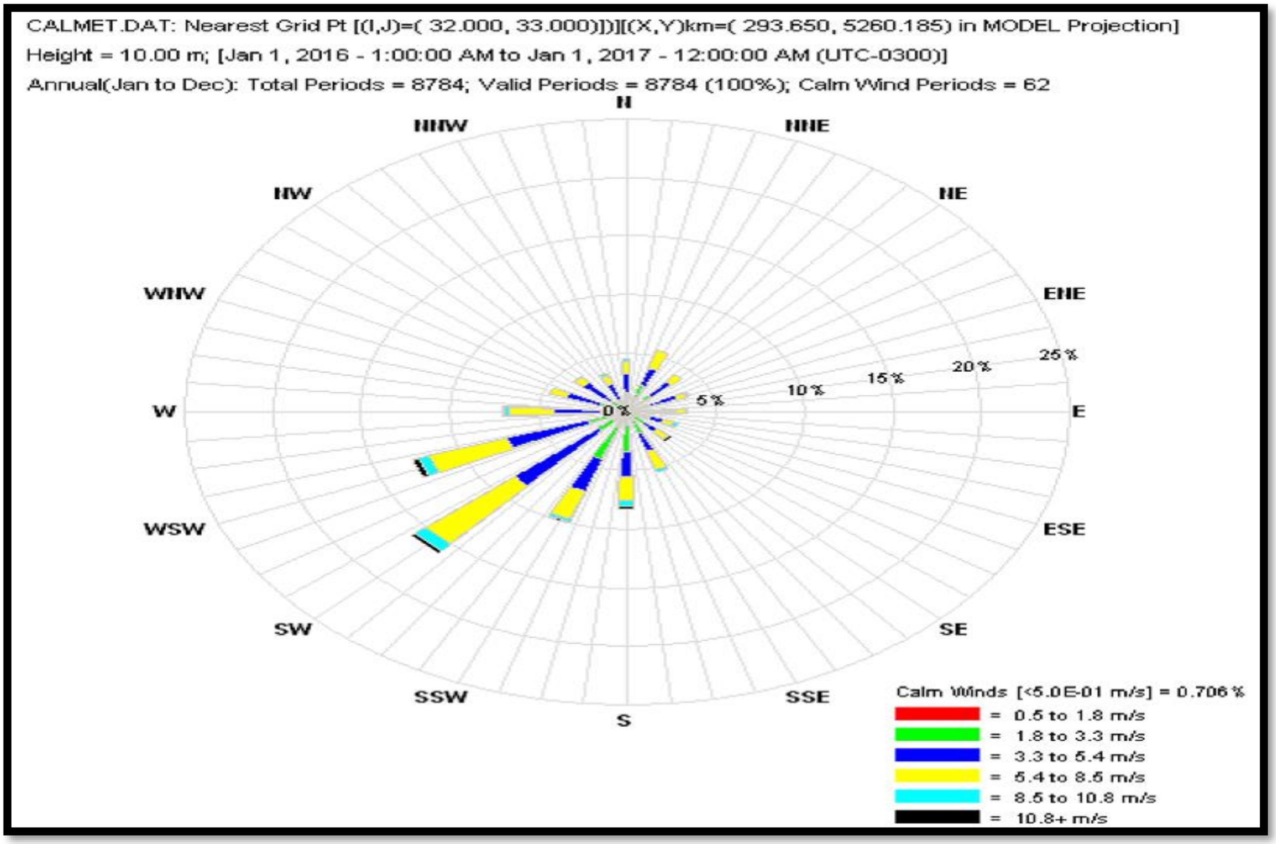



Figure 2: Windrose Graphics for 2014, 2015, and 2016

## 13.2 CALPUFF

The next application, CALPUFF, the version used was 6.42, level 110325, takes the outputted meteorological model from CALMET along with a manually generated set of discrete receptors and emissions sources to determine the concentrations of odor being emitted by the proposed facility. The set of discrete receptors follows the guidelines established by the DoMAE which are as follows:

- 50 metre spacing from the centre of the operation out to 500 metres;
- 100 metre spacing from 500 metres out to 1000 metres;
- 200 metre spacing from 1000 metres out to 2000 metres;
- 500 metre spacing beyond 2000 metres;

- 50 metre spacing within all residential areas located less than 1000 metres of the administrative boundary;
- 100 metre spacing within all residential areas located beyond 1000 metres of the administrative boundary, but located within 2000 metres of the administrative boundary;
- 200 metre spacing within all residential areas located beyond 2000 metres of the administrative boundary.[5]

The full domain receptor grid and a close-up of the receptor grid around the proposed facility is shown below in Figure 3. There are two area emission sources, one is 10 m x 34 m and the other is 10 m x 40 m. Each of these sources will be emitting a concentration of 300 o.u.[6] after having gone through the internal filtration process and biofilter, which a typical concentration for biofilter exhaust.

[5] Lawrence, B. (2012). *Guideline for Plume Dispersion Modelling.* St. John's: Department of Environment & Conservation.

[6] McGinley, C. M., & McGinley, M. A. (2006). An Odor Index Scale for Policy and Decision Making Using Ambient and Source Odor Concentrations. Lake Elmo: St. Croix Sensory Inc.

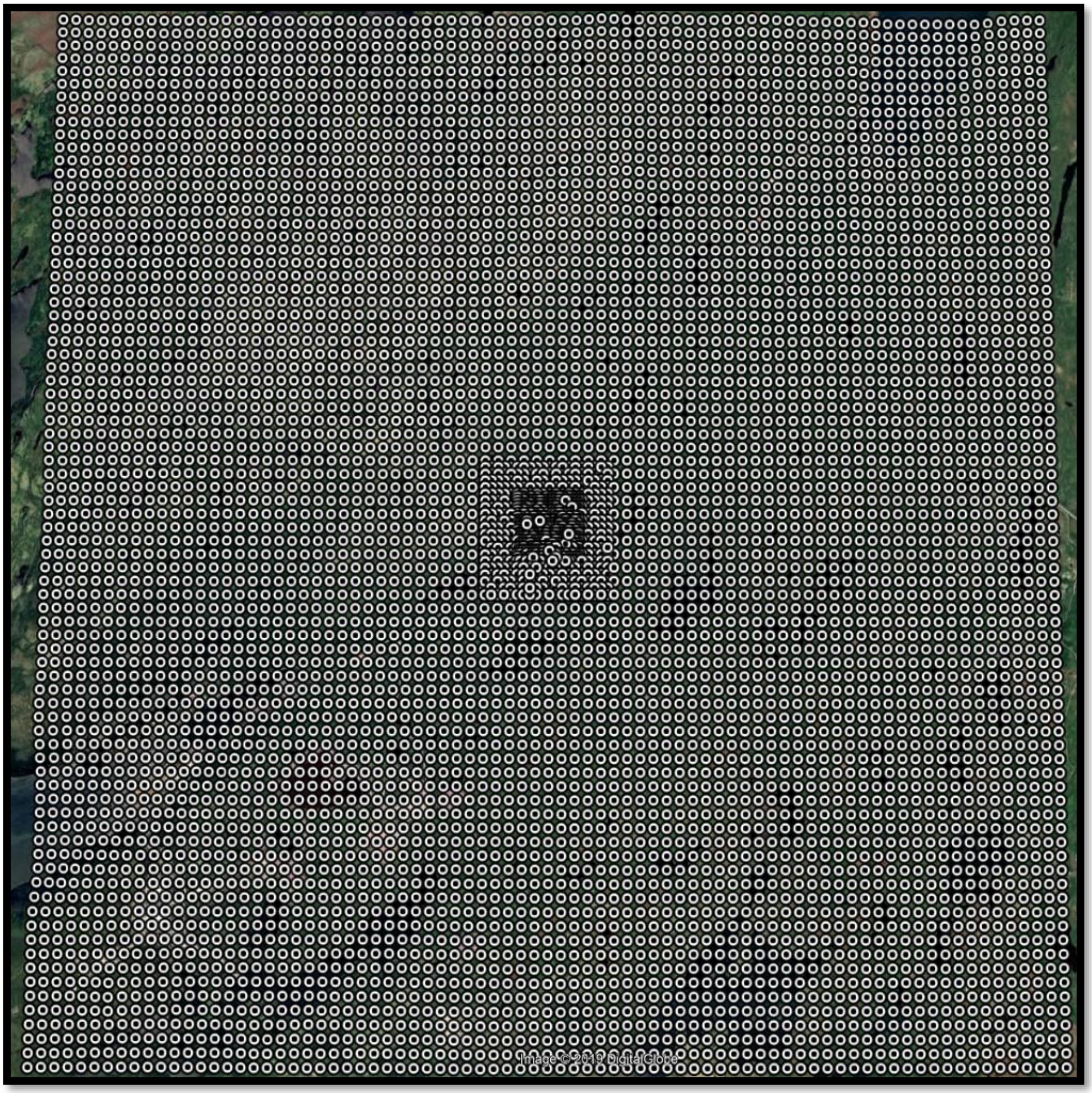


Image © 2019 DigitalGlobe

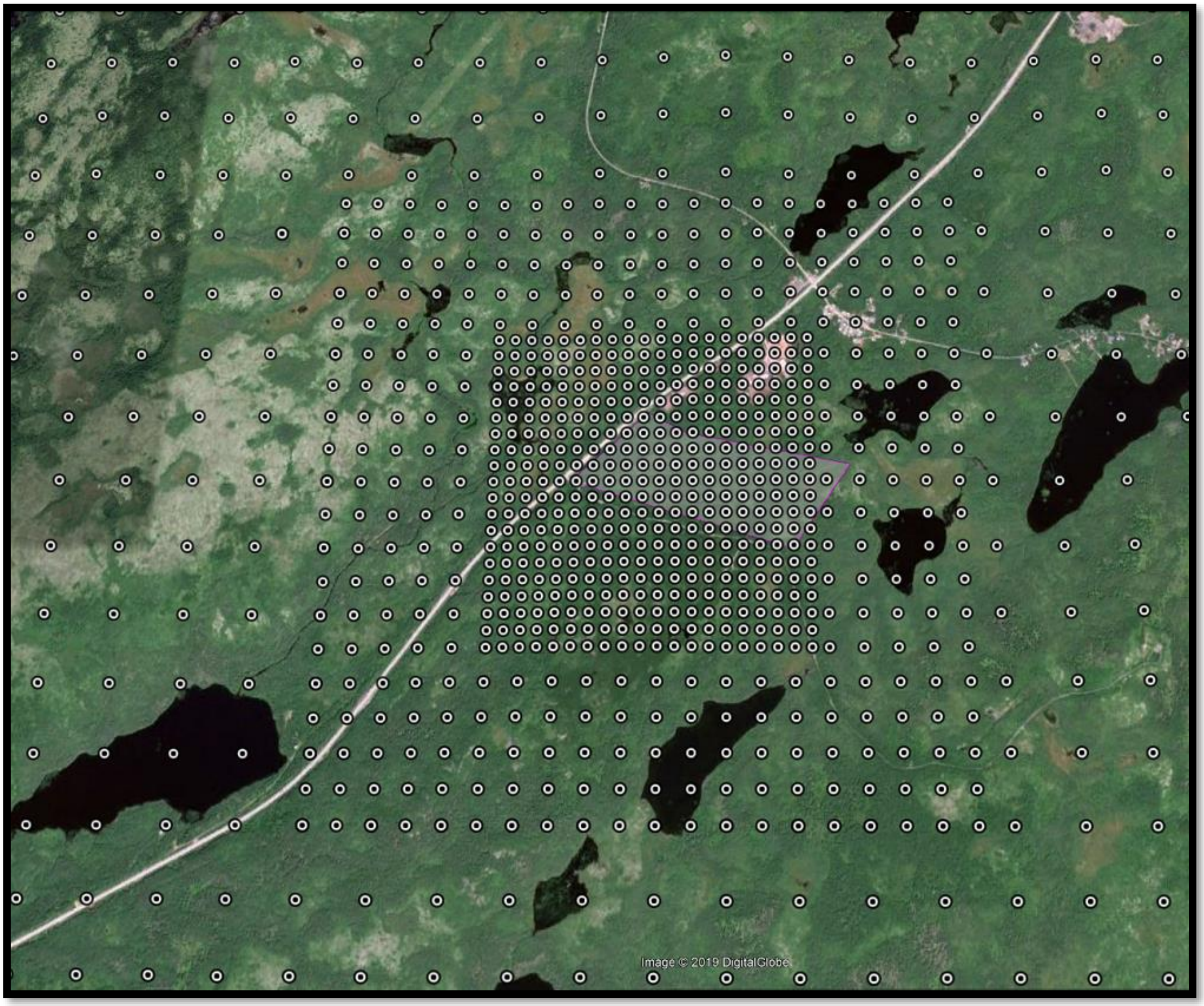



Figure 3: The full domain of receptors, as well as, a close-up of the receptors around the proposed facility

## 13.3 RESULTS

After running the CALPUFF application, the output from CALPUFF is ran through a couple post-processing applications (CALPOST and CALPUFF Plot) to compile the data and generate graphical representations of this data. As shown in Figure 4 below, the odor propagates and disperses quickly in the environment, and there are no detectable odor concentrations for any given 24-hr period across all three years modeled in any nearby communities. The full data results are included in Appendix X1 - Odor Concentrations at Affected Receptors.

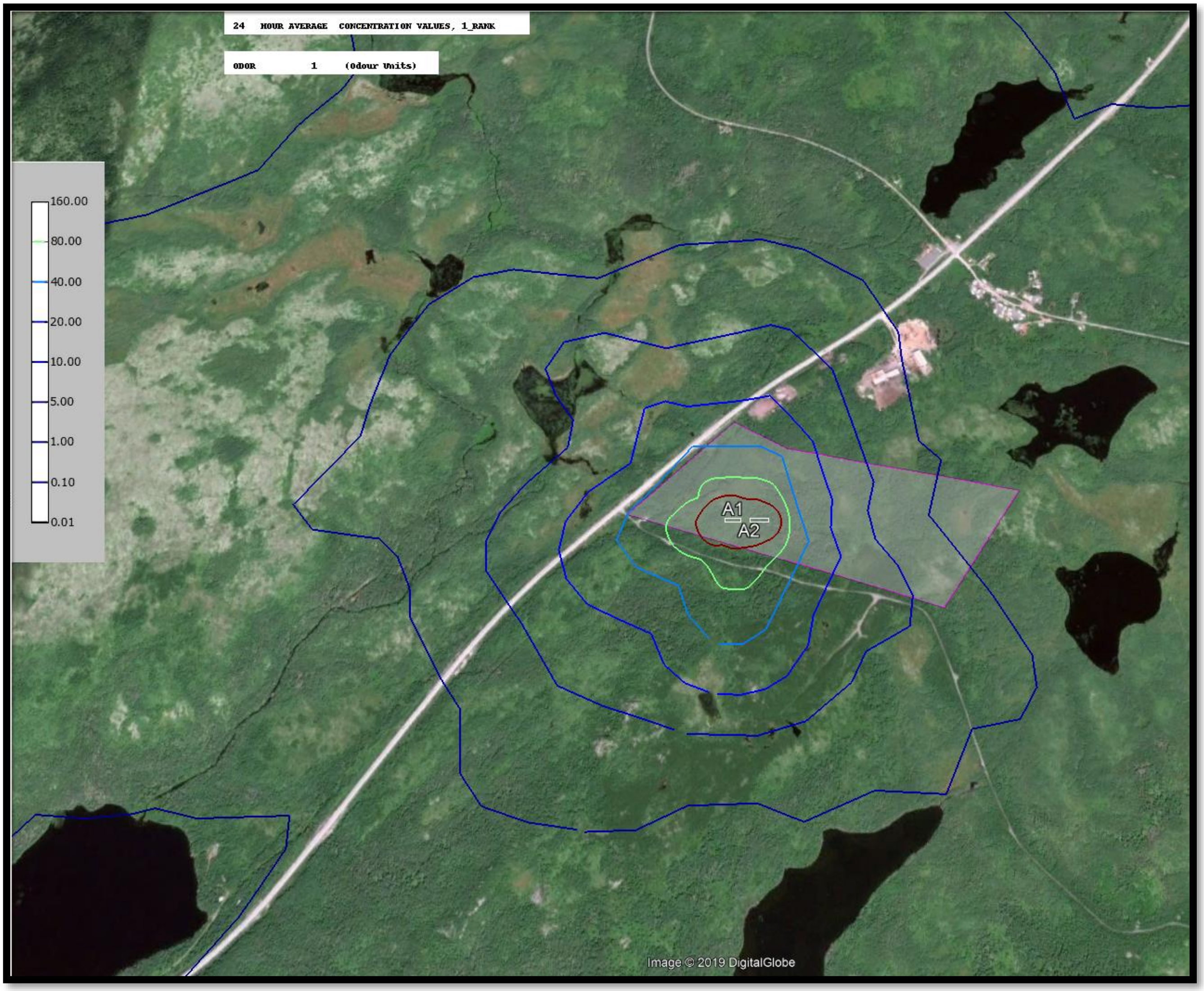



Figure 4: Isopleths of the worst-recorded 24-hr odor concentrations at any given receptor

# 14 APPENDIX IV – MUNICIPAL APPROVAL AND LETTER OF SUPPORT

March 26, 2019

NL Industrial Composting Ltd.
P.O. Box 19
Hearts Desire, NL
A0B 2B0

**Re: Commercial Development Application – Industrial Composting Facility**

Your application to develop an Industrial Composting Facility on Long Harbour Access Road, in the municipality of Long Harbour-Mount Arlington Heights, was presented at a regular meeting of Council held March 21, 2019. At that time, Council requested the developer submit an updated Environmental Assessment document. This information for the proposed development was considered at a special meeting of Council held Monday March 25, 2019. Council has conditionally approved the development and will ratify this decision at their next regular Council meeting of April 18, 2019.

The proposed Industrial Composting Facility development is approved in principal, subject to the following requirements:

Regulations

- Compliance with the Town of Long Harbour - Mount Arlington Heights Development Regulations;
- Compliance to the National Building and National Fire Codes;
- Provide a legal land survey;
- Provide a Deed of Conveyance or Grant signifying legal ownership or title to the property;
- Provide a plot plan showing the planned building locations, as well as all measurements regarding frontage, set back, rear yard, side yard and neighbouring buildings together with sufficient elevational data pertaining to any potential drainage problems;
- Provide a landscaping plan;
- Provide a parking plan;
- Provide a full set of building plans for each building on the proposed site;
- Provide approvals from all other regulatory bodies of government that may be impacted by your development;
- Provide the release of the Environmental Assessment by the Department of Municipal Affairs and Environment;
- Provide approval for access from the Department of Transportation and Works or other;
- If you are installing a driveway culvert or require a permit for access, please forwards to the town office, a copy of your permit from the Department of Works Services;

Septic System:

- You are required to send a copy of this letter of conditional approval, your application and a copy of the septic system design drawings to Government Services NL, 5 Mews Place, P.O. 8700, St. John's, NL A1B 4J6.

- Provide the Town with a copy of the approved septic system design from one of the approved designers;
- Provide the Town with a Certificate of Approval from Government Services, NL for the on-site sewage system.

On-site Water

- You are required to provide approval for an on-site well from Department of Health and/or Government Services NL.

Should you object to any of these conditions, under Section 42 of the Urban and Rural Planning Act 2000 you have the right to appeal with the Regional Appeal Board not more than 14 days from the receipt of this letter.

Fees

The following fees must be obtained, and a building permit issued before any development takes place: Based on the dimensions of the buildings:

- $ - Development permit

This permit is valid for (1) one year.

You will also be required to sign a development agreement outlining and agreeing to additional policies and procedures regarding the industrial composting facility development.

If you have any questions regarding your permit, please call the town office at 228-2920. We look forward to assisting you throughout the development process.

Sincerely,

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Juanita Gosse
Town Manager

LONG HARBOUR
DEVELOPMENT CORPORATION

P.O. Box 40, Long Harbour
Newfoundland & Labrador, CANADA A0B 2J0
T: (709) 228-2233 C: (709) 690-1224
F: (709) 228-3081 longharbour.net

April 3 – 2019

Mr. Terrance Penney
Newfoundland Industrial Composting Ltd.
P.O. Box 19
10 Point Road
Heart's Desire, NL
A0B 2B0

**Re: Industrial Composting Proposal – Long Harbour Access Road**

Dear Mr. Penney:

On behalf of the Long Harbour Development Corporation (LHDC) I am pleased to advise you that the Corporation is fully supportive of Newfoundland Industrial Composting Ltd.'s intention to build and operate a commercial composting facility on the Long Harbour access road in the community of Long Harbour-Mt. Arlington Heights.

LHDC has carried out a level of due-diligence with respect to your development proposal. Members of our senior leadership team visited similar facilities in Nova Scotia, we have studied the available science respecting commercial composting techniques and we have reviewed your proposal for Long Harbour through that prism. Our review provides the Board of Directors of LHDC with a comfort level that your proposal to build and operate a commercial composting facility in our Town is a significant development that will prove to be economically beneficial to our community and environmentally advantageous to the region and the province as a whole.

LHDC would like to commend you, your company and the consultancy team at IDDEL for your openness and professionalism in presenting the LHDC Board, Town Council and the Residents of Long Harbour-Mt. Arlington Heights with the information it needed in making an informed decision to support this project. We are pleased that Council has endorsed the project by affording you approval in principal to move your project forward.

We have every confidence that Newfoundland Industrial Composting Ltd. will develop and operate a commercial composting facility in our community that will make Long Harbour proud and set the standard for future composting facilities throughout the province.

We look forward to the successful completion of this important project.

Sincerely

Joe Bennett
JJ Bennett
President / CEO

CC: Hubert Alacoque / IDDEL
Gary Keating / Chair LHDC

Joe Bennett
Executive Director