



ENVIRONMENTAL BALANCE IN DESIGN AND CONSTRUCTION

BORD NA MÓNA PLC

**DUTY CAPACITY REPORT FOR TULLAMORE WASTE
TRANSFER FACILITY WASTE LICENCE REG. W0104-02**

MARCH 2012



BORD NA MÓNA PLC

DUTY CAPACITY REPORT FOR TULLAMORE WASTE TRANSFER FACILITY WASTE LICENCE REG. W0104-02

User is Responsible for Checking the Revision Status of this Document

Rev. Nr.	Description of Changes	Prepared by:	Checked by:	Approved by:	Date:
0	Issue to Client	DFM/MT	DO'S	DO'S	23.04.12

Client: Bord na Móna PLC

Keywords: capacity analysis, throughput, plant, storage

Abstract: This document presents an assessment of the capacity of plant and infrastructure at the Tullamore waste transfer station.

For inspection purposes only.
Consent of copyright owner required for any other use.

TABLE OF CONTENTS

PAGE

1. INTRODUCTION	1
1.1 CURRENT FACILITY LAYOUT & INFRASTRUCTURE.....	1
1.2 WASTE QUANTITIES	2
2. ASSESSMENT OF FACILITY CAPACITY	2
2.1 WASTE RECEPTION AND PROCESSING BUILDING CAPACITY	2
2.1.1 <i>Plant operating within the processing building</i>	2
2.1.2 <i>Physical dimensions of the waste reception & processing building</i>	3
2.1.3 <i>Hours of operation</i>	8
2.1.4 <i>Daily waste acceptance rate</i>	8
2.1.5 <i>Waste reception and processing building capacity</i>	9
2.1.6 <i>Waste reception and processing building potential maximum capacity</i>	10
2.1.7 <i>Other considerations</i>	10
3. SUMMARY	11

TABLE OF FIGURES

PAGE

FIGURE 1.1: FACILITY ENTRANCE	2
FIGURE 1.2: TULLAMORE FACILITY LAYOUT	1
FIGURE 2.1: DRY RECYCLABLE RECEPTION AREA	3
FIGURE 2.2: PROCESSING BUILDING LAYOUT	4
FIGURE 2.3: DRY RECYCLABLE MECHANICAL PROCESSING AREA	5
FIGURE 2.4: BALING PLANT AREA.....	5
FIGURE 2.5: RESIDUAL WASTE BULKING AND C&D PROCESSING	6
FIGURE 2.6 BALE STORAGE AREA	6
FIGURE 2.7: LOADING BAY	7
FIGURE 2.8: CANOPY AREA OVER BALE STORAGE.....	7

LIST OF TABLES

PAGE

TABLE 1.1: TONNAGES ACCEPTED JANUARY TO DECEMBER 2011	2
TABLE 2.1: AVERAGED DAILY WASTE ACCEPTANCE	8

1. INTRODUCTION

Bord na Móna PLC has retained Fehily Timoney & Company (FTC) to carry out an assessment of the capacity of the Tullamore materials recycling & waste transfer facility in order to ascertain the maximum tonnage that could be passed through the facility as it currently stands. FTC personnel visited the facility on the 23rd of February 2012.

In terms of assessing the quantity of waste that could be accepted at the facility, the physical capacity of the waste reception and processing building and/or plant therein will directly influence the volume of material that can be accepted.

In addition, the extent of operations at the facility i.e. the number and duration of shifts and the extent of storage areas etc. will also impact on the throughput of the facility.

Other infrastructural elements, such as the surface water and leachate management systems do not directly influence the tonnage that can be accepted at the facility but are required for effective operation of the facility.

1.1 Current Facility Layout & Infrastructure

The current layout of the Tullamore facility is presented in Drawing LW12-660-03-003.

Waste vehicles access the facility through the access gate off the local Cappincur Road via the N52 bypass. A portion of the site was acquired under compulsory purchase order by Offaly County Council as part of the N52 bypass construction in 2009 and facility layout was altered as a result.

After entering through the access gate, waste delivery vehicles travel along the internal northern boundary and turn south onto the facility weighbridge, prior to travelling to the southern side of the waste reception and processing building where the entrance doors are located. 2 doors on the southern side of the waste reception and processing building allow for vehicle entry. A third entrance door, located on the northern side of the building, facilitates entry of skip trucks, primarily for the deposit and collection of C&D and residual MSW.

Car parking is provided adjacent to the administration building and is cordoned off with individual car parking spaces identified. A skip storage area is located directly adjacent to the car parking area.

A bunded diesel tank is located along the southern side of the processing building to facilitate vehicle refuelling and further skip storage is provided in this location.

Storage of baled recyclable materials, prior to transportation offsite, is facilitated to the rear of the waste reception and processing building and in the south eastern corner of the facility.

A covered loading bay at the south western corner of the waste reception and processing building allows for the loading of trailers with baled recyclable material.

Surface waters generated on hardstanding areas and building roofs are collected via gullies before passing through an oil interceptor prior to discharge to a stream located at the southeastern boundary of the site.

Effluent generated within the processing building and from the office accommodation flows to a foul effluent sump at the north eastern corner of the waste reception and processing building and is then pumped to a leachate storage tank located along the eastern flank of the processing building, prior to transportation offsite for appropriate treatment.

The Tullamore facility has over the past number of years undergone a review of its waste licence as well as having being granted planning permission by Offaly County Council for intensification of waste activities at the site. It is considered that there are no significant issues in terms of supporting infrastructure at present that would impact on a potential increase in tonnage at the facility, should it be determined that the capacity for such an increase exists.

Figure 1.1: Facility Entrance



1.2 Waste Quantities

The quantity of waste accepted from January to December 2011 is presented in Table 1-1. Waste Licence W0240-01 allows for the acceptance of the following waste streams:

- Non-hazardous Municipal Solid Waste (MSW)
- Non-hazardous Commercial & Industrial
- Non-hazardous Construction & Demolition (C&D)
- Specified hazardous wastes

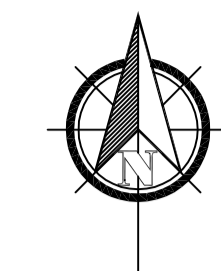
Table 1.1: Tonnages accepted January to December 2011

Material Description	Tonnage
Textile packaging	0.38
Baled cardboard	6,759.97
Baled plastic	3,595.05
Metallic packaging	694.72
Mixed packaging	15,917.5
All Glass Bottles and Jars	403.3
Non-hazardous C&D	299.46
Wood from C&D	751.11
Steel, construction metal, pipes	715.5
Soil	34.9

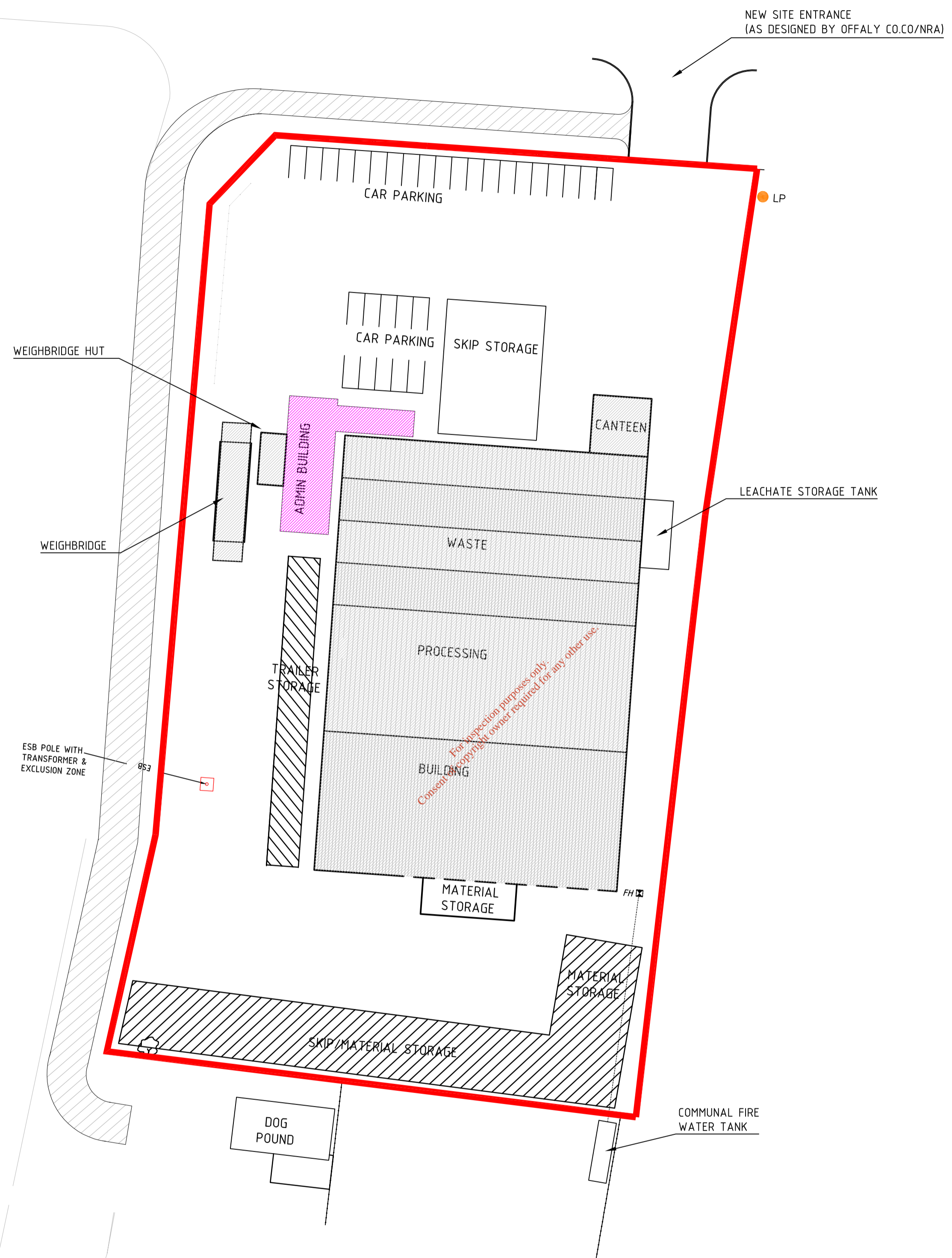
Material Description	Tonnage
Non-hazardous gypsum	12.74
Mixed C&D	2,033.43
Off spec compost	107.36
Mechanical treatment wastes	2,803.88
Biodegradable waste	20.44
Separately collected paper & card	584.26
WEEE	0.78
Industrial plastics	120.12
Mixed municipal waste	20,789.1
Street cleansing waste	15.56
Total	55,659.64

Waste acceptance in 2010 was 51,733.02 tonnes and in 2009 was 51,201.61 tonnes as per the respective AER submissions.

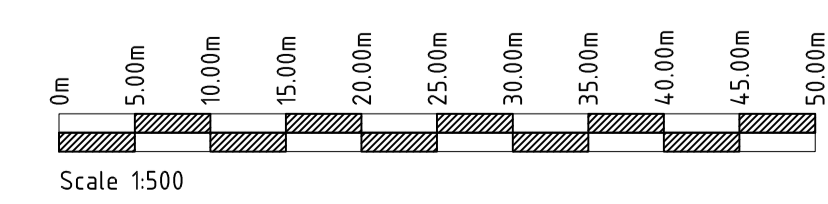
For inspection purposes only.
Consent of copyright owner required for any other use.



NOT FOR CONSTRUCTION UNLESS SPECIFICALLY STATED OTHERWISE
 No part of this document may be reproduced or transmitted in any form or stored in any retrieval system of any nature without the written permission of Fehily Timoney & Company as copyright holder except as agreed for use on the project for which the document was originally issued.
 Do not scale. Use figured dimensions only. If in doubt - Ask!



SITE PLAN
 Scale 1:500



Rev.	Drawn	Checkd	Appd	Rev Origin Date	Description
A				Cork 28.02.12	ISSUE FOR CLIENT

Name of Client
 BORD NA MONA PLC

Name of Job
 DUTY CAPACITY REPORTS

Title of Drawing
 TULLAMORE FACILITY LAYOUT

Scales Used
 1:500

Dwg. No.
 LW12-660-03-003

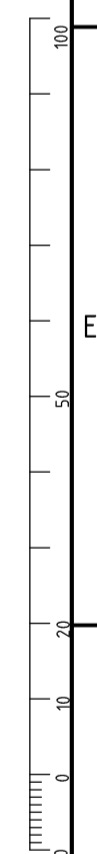
© Ireland 2012 (w/12,660-03) (w/1266003_003)

CONSULTANTS IN ENGINEERING & ENVIRONMENTAL SCIENCES

FEHILY TIMONEY & COMPANY

W: www.fehilytimoney.ie, E: info@ftco.ie
 Core House, Pouladuff Rd, Cork, Ireland.
 T: +353-21-4964133, F: +353-21-4964464
 Unit 16, 3rd Floor, North Park Offices
 North Park Business Park, North Road, Dublin 11, Ireland.
 T: +353-1-6583500, F: +353-1-6583501

SCALE - VERTICAL



SCALE HORIZ.

2. ASSESSMENT OF FACILITY CAPACITY

The main purpose of this assessment is to ascertain the potential maximum throughput of the Tullamore facility. The primary determinant in this assessment is the physical footprint of the waste reception and processing building at the site as all of the material entering the facility for processing must pass through this building prior to being taken offsite. In addition, processing infrastructure within the building is examined.

The following section examines the capacity of the processing building, as well as issues related to supporting infrastructure and overall facility footprint.

2.1 Waste Reception and Processing Building Capacity

Three items are considered when assessing the potential maximum facility throughput:

1. Plant operating within the waste reception & processing building
2. Physical dimensions of the waste reception & processing building
3. Hours of operation

2.1.1 Plant operating within the processing building

A number of differing processing operations are undertaken at the Tullamore facility:

1. Mechanical processing of dry recyclable material
2. Bulking of residual waste
3. Bulking (inc. some gross recovery) of C&D waste

Mechanical processing of dry recyclable material

Dry recyclable material is loaded onto a conveyor that feeds a screen followed by a manual picking line that is installed at an elevated height. After screening, operatives remove recoverable/recyclable material from the waste stream as it passes along a horizontal belt. Materials reclaimed from the waste stream are placed in individual chutes such that paper, card and plastics are isolated, then separated at the picking line and collected in containers underneath the picking line.

After passing through the picking line, the materials pass through near infra-red (NIR) separators for the separation of remaining plastics by colour/type and it then passes through a magnetic separator and eddy current separator to reclaim both ferrous and non ferrous metals. Recyclable materials like paper, cardboard, plastics and metals are baled onsite prior to transport off site to dedicated facilities. In some instances, materials are passed through the dry recyclables plant a number of times to produce a material to a particular specification.

It is considered that the combined capacity of the various elements of the dry recyclables processing plant is 8 tonnes per hour. Therefore, it is considered that, on a single 8 hour shift, and allowing 1 hour for plant maintenance per shift, the dry recyclable mechanical processing plant will have a throughput of 56 tonnes per shift.

In addition, the dry recyclable plant is fed using a dedicated excavator and the various separated waste streams are moved using a skidsteer and forklift. As individual items of plant, it is not considered that these items would be a limiting factor in terms of the throughput of the mechanical plant as the excavator is very capable of feeding the plant at a rate of 8 tonnes per hour. In addition, spares/replacements for this plant can be provided at short notice in the event of breakdown.

Bulking of residual waste and bulking/gross recovery of C&D waste

The bulking of residual waste and C&D waste occurs in the same area of the waste reception and processing building. A second designated excavator with grab attachment is used to fill high sided trailers and skips when necessary. The excavator is not considered a limiting piece of equipment in terms of throughput as the bulking of this material is a function of the time i.e. shifts which can be increased as required.

2.1.2 Physical dimensions of the waste reception & processing building

The existing layout of the waste reception and processing building is presented in Drawing LW12-660-03-004.

The processing building is laid out in a number of distinct areas:

- Dry recyclable reception area of c. 205 m²
- Dry recyclable mechanical processing area of c. 672 m²
- Baling Plant area of c. 220 m²
- Low level trailer loading area of c. 136 m²
- Combined residual waste bulking, and C&D processing area of c. 440 m²
- Timber recovery/storage area of c. 220m²
- Bale storage of combined areas of c. 114 m²
- Loading bay of c. 60 m²
- External area under canopy of c. 210 m²

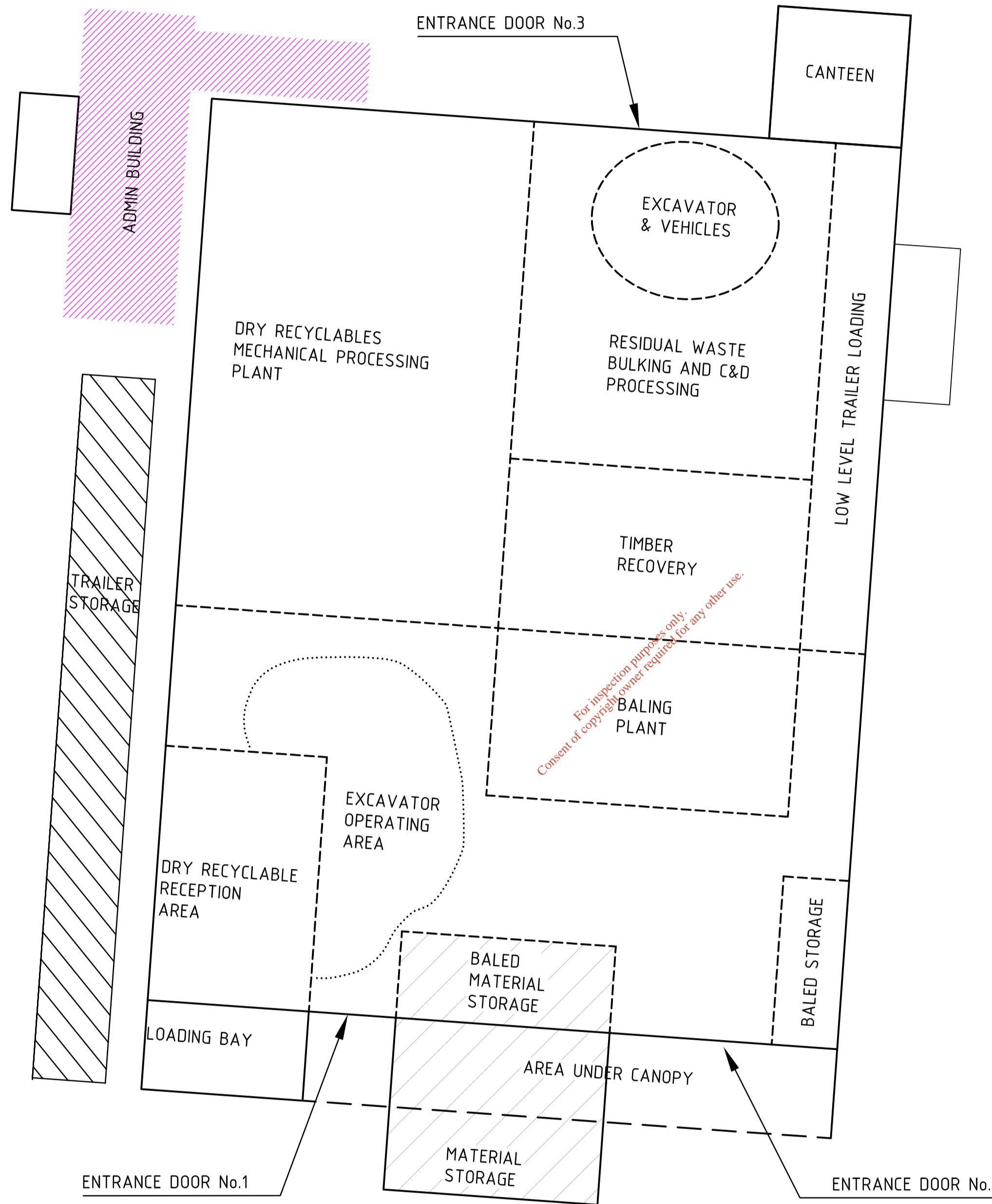
The overall processing building has a footprint of c. 2925 m² and space not identified as a designated area above, is used for the movement of waste delivery vehicles and/or the excavators and other plant.

Dry recyclable reception area

The dry recyclable reception area is shown in Figure 2-1. Dry recyclable material is unloaded from delivery vehicles and temporarily stockpiled prior to loading of the feed conveyor to the dry recyclables mechanical plant. It is considered that dry recyclable material can be stockpiled to a height of c 3.5 m in this area. As evident from Figure 2-1, the installation of protective steel sheeting at a height above the mass concrete push walls may be beneficial to prevent damage to the cladding of the building.

Figure 2.1: Dry recyclable reception area





PROCESSING BUILDING LAYOUT
Scale 1:250

NOT FOR CONSTRUCTION UNLESS SPECIFICALLY STATED OTHERWISE
No part of this document may be reproduced or transmitted in any form or stored in any retrieval system of any nature without the written permission of Fehily Timoney & Company as copyright holder except as agreed for use on the project for which the document was originally issued.
Do not scale. Use figured dimensions only. If in doubt - Ask!

Rev.	Drawn	Check	Appd	Rev Origin	Date	Description
A	FT	FT	FT	Cork	28.02.12	ISSUE FOR CLIENT

Name of Client
BORD NA MONA PLC

Name of Job
DUTY CAPACITY REPORTS

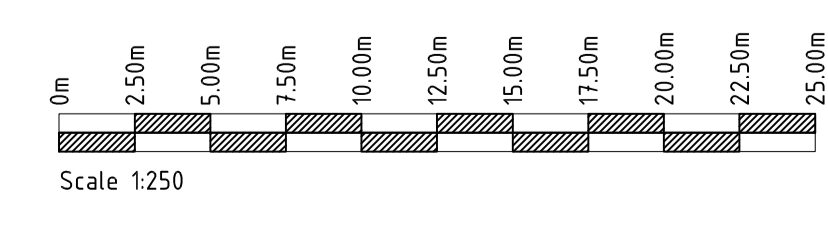
Title of Drawing
PROCESSING BUILDING LAYOUT

Scales Used
1:250

Dwg. No.
LW12-660-03-004

Rev.
A

FEHILY TIMONEY & COMPANY
CONSULTANTS IN ENGINEERING & ENVIRONMENTAL SCIENCES
W: www.fehilytimoney.ie, E: info@ftco.ie
Core House, Pouladuff Rd, Cork, Ireland.
T: +353-21-4964133, F: +353-21-4964464
Unit 16, 3rd Floor, North Park Offices
North Park Business Park, North Road, Dublin 11, Ireland.
T: +353-1-6583500, F: +353-1-6583501



SCALE - VERTICAL

SCALE HORIZ.

Dry recyclable mechanical processing area

The dry recyclable mechanical processing area contains all of the plant elements identified in Section 2.1.1 and is shown in Figure 2-2. No changes are proposed to the current layout of this area and its impact on facility throughput is a function of the plant capacity (identified at 56 tonnes per shift) and the hours which it operates.

Figure 2.3: Dry recyclable mechanical processing area



Baling Plant area

The baling plant, shown in Figure 2-3, is in a fixed location and is used for the baling of the differing types of materials processed i.e. paper, cardboard, plastics etc. The throughput of the baling plant varies depending on the type of material being baled but is generally considered to be between 20 – 35 tonnes per hour. It is not considered that, at this throughput, the baling plant is a limiting item of plant in terms of facility throughput.

Figure 2.4: Baling Plant area



Low level trailer loading area

The low level trailer loading area facilitates the loading of high sided trailers in a location adjacent to the residual waste and C&D storage area. Residual waste and C&D waste is loaded using an excavator prior to transportation off site. It is not considered that this process is limiting in terms of facility throughput as the filling of high sided trailers is a function of the time spent doing so.

Residual waste bulking and C&D processing area

Residual waste and C&D material are accepted in the north eastern corner of the waste reception and processing building, as shown in Figure 2-4. Residual waste is stored temporarily prior to filling of a high sided trailer and transportation offsite. Some gross recovery of the C&D waste accepted occurs in this area with wood and metals being manually removed or being removed using the excavator and loaded into skips. Temporary storage of residual/C&D waste in stockpiles of c. 3 metres is possible in this location.

Figure 2.5: Residual waste bulking and C&D processing



Bale storage areas

There are a number of locations in the southern end of the waste reception and processing building used for the storage of baled recyclable material, as well as storage areas external to the building. Bales are generally stored at a height of c. 3.5 metres.

Figure 2.6 Bale storage area



Loading Bay area

An area to the south eastern corner of the waste reception and processing building houses the loading bay. A mobile ramp is used by the facility forklift to load trailers with bales of recycled material for transportation offsite.

Figure 2.7: Loading Bay*External area under canopy*

The southern end of the building forms an external canopy over Entrance Doors No. 1 & 2 and over an area used for external storage of baled material. Bales are generally stacked to a height of c.3 metres at this location.

Figure 2.8: Canopy area over bale storage

2.1.3 Hours of operation

W0104-02 allows for the acceptance of waste from 06:00 to 00:00 Monday to Saturday with waste handling being limited to 07:00 to 23:00 on the same days. No operational time limits are imposed by the facility planning authorisation.

Operations during 2011 were managed in a number of ways:

- The acceptance and bulking of residual and C&D waste operated on a single 8 hour shift basis
- The dry recyclable mechanical treatment plant operated on a double shift basis for c. 50% of the year
- When not operating on a double shift, the dry recyclable mechanical treatment plant operated on an 11 hour shift basis.

2.1.4 Daily waste acceptance rate

The throughput of the differing waste streams accepted in 2011 is presented in Table 1-1.

In order to assess processing capacity at the facility, the average daily throughput for 2011 was derived and presented in Table 2-1. It is assumed that waste acceptance occurred on a 5.5 day basis.

A number of materials have been combined in Table 2-1 from those in Table 1-1 as it is considered that these materials are accepted within the same areas of the processing building.

Naturally, the different waste streams will not all follow a regular daily acceptance pattern, with differing collection routes for different materials, but it is considered that this method gives a good approximation of building capacity.

Given the nature of activities on the site i.e. bulking and transfer of wastes accepted, material is constantly moving through the site and requires available space for its temporary storage only prior to accumulating a sufficient volume for movement offsite.

Table 2.1: Averaged Daily waste acceptance

Material Description	Tonnage	Averaged Daily Acceptance in 2011	Storage/Reception Area
Textile packaging	0.38	negligible	Dry recyclables reception area
Baled cardboard	6,759.97	23.6	Dry recyclables reception area
Baled plastic	3,595.05	12.5	Dry recyclables reception area
Metallic packaging	694.72	2.4	Dry recyclables reception area
Mixed packaging	15,917.5	55.65	Dry recyclables reception area
All Glass Bottles and Jars	403.3	1.41	External Storage
Non-hazardous C&D	299.46	1.04	Residual waste & C+D bulking area
Wood from C&D	751.11	2.62	Residual waste & C+D bulking area
Steel, construction metal, pipes	715.5	2.5	Residual waste & C+D bulking area
Soil	34.9	0.12	Residual waste & C+D bulking area
Non-hazardous gypsum	12.74	0.04	Residual waste & C+D bulking area

Material Description	Tonnage	Averaged Daily Acceptance in 2011	Storage/Reception Area
Mixed C&D	2,033.43	7.1	Residual waste & C+D bulking area
Off spec compost	107.36	0.37	Residual waste & C+D bulking area
Mechanical treatment wastes	2,803.88	9.8	Dry recyclables reception area
Biodegradable waste	20.44	0.07	Residual waste & C+D bulking area
Separately collected paper & card	584.26	2.04	Dry recyclables reception area
WEEE	0.78	negligible	External Storage
Industrial plastics	120.12	0.42	Dry recyclables reception area
Mixed municipal waste	20,789.1	72.68	Residual waste & C+D bulking area
Street cleansing waste	15.56	0.05	Residual waste & C+D bulking area

* 286 working days i.e. 5.5 days

With the dry recyclables reception area and the residual waste & C+D bulking areas being the main locations within the waste reception and processing building in which the reception and temporary storage of incoming material occurs, respective average daily tonnages accepted in these areas in 2011 were **106.41 tonnes** and **86.59 tonnes**.

2.1.5 Waste reception and processing building capacity

An examination of the capacity of the waste reception and processing building must examine:

- The available temporary storage space within the building and
- The throughput of the mechanical plant (in terms of dry recyclables capacity)
- Impact of shift operations

Available temporary storage space

Temporary storage for dry recyclable materials occurs in the location identified in Drawing LW11-660-03-004. An area of c. 205 m² is available for the storage of this material and assuming a storage height of 3.5 metres and a material density of 0.15 t/m³, there is a potential storage capacity of c. 107 tonnes in this area.

Similarly, with an area of c. 440 m² available for the temporary storage of residual waste and C&D processing and allowing for 1/3 of this area for the operation of the excavator, c. 290 m² remains for temporary material storage. Assuming an average storage height of 1 metre (to allow for the differing material types) with an average density of 0.7 t/m³, there is a potential temporary storage capacity of c. 203 tonnes in this area.

Throughput of the mechanical plant

As indicated previously, the throughput of the dry recyclables mechanical plant may be a limiting factor in terms of dry recyclables processing capacity. At 56 tonnes per shift, on a **two** shift basis, there is capacity to process c. 112 tonnes of dry recyclable material, which roughly corresponds to the potential dry recyclable storage capacity identified previously.

Impact of shift operations

As per Section 2.1.3, it is identified that, in 2011, the dry recyclable mechanical plant operated on a double shift basis for approximately 50% of the year and on an 11 hour shift basis for the remaining time. The option of running a double shift for the dry recyclable mechanical plant on a full time basis remains while the C&D processing area has operated on a single shift basis for all of 2011 with potential to run this operation on a double shift also.

2.1.6 Waste reception and processing building potential maximum capacity

In 2011, an average of c. 106 tonnes of dry recyclable material was accepted on a daily basis at the facility. It is identified that the maximum capacity of the mechanical plant is c. 112 tonnes across a double shift, corresponding to c. 30,000 tonnes per annum. This would indicate that the dry recyclables mechanical plant operated at or very close to capacity during the year of 2011. There may be some potential to increase throughput by c. 5% but it is considered that this is very limited, if possible at all.

However, in 2011, an average of 86 tonnes of material was accepted daily into the residual & C&D waste storage area. It has been identified that up to 200 tonnes of storage capacity may be available in this area and that there remains potential to operate this process on a double shift also. A crude estimate would suggest that a doubling of the material being accepted in this area may be possible with the potential requirement to operate a second shift to facilitate this.

From Table 1-1, it can be seen that material accepted into the residual and C&D processing area comprised c. 24,900 tonnes in 2011 (c. 45% of facility throughput). A doubling of this tonnage would suggest c. 50,000 tonnes of residual & C&D waste acceptance capacity. Allied to the c. 30,000 tonnes of dry recyclables processing capacity available in the mechanical plant, this would suggest a combined potential input tonnage of **c. 80,000 tonnes** per annum at the facility.

2.1.7 Other considerations

While 80,000 tonnes may represent a potential facility throughput in terms of temporary storage and processing capacity, issues such as vehicle movement within the facility boundary, scheduling of vehicle arrival and departures etc. would require consideration. Furthermore, there are planning and waste licence issues to be considered in any review of facility throughput.

However, it may be the case that, for commercial reasons, there is more of a requirement for extra dry recyclable processing capacity rather than residual and C&D bulking capacity, in which case the figure of 80,000 tonnes may not be applicable. In this event, a focus on the arrangement and/or type of mechanical plant employed at the facility may be required.

In addition, any proposal to increase throughput at the Tullamore facility should be considered in light of all relevant health and safety obligations.

3. SUMMARY

This report assesses the existing infrastructure at the Tullamore facility in order to determine the maximum throughput that may be possible.

In 2011, 55,659.64 tonnes of waste was accepted at the facility, which was broken into a daily average per waste type. This average was then compared to the maximum potential daily temporary storage capacity to ascertain the maximum daily temporary storage capacity, which was equated to a yearly figure. It is considered that the dry recyclable mechanical plant is operating at, or very close to, capacity at an approximate throughput of 30,000 tonnes per annum. However, it is considered that there is capacity to increase the residual waste and C&D waste bulking throughput to perhaps double the current throughput, which would result in a total facility throughput of c. 80,000 tonnes.

However, this potential increase must be viewed in light of the need to actually increase residual or C&D capacity versus dry recyclable capacity, as well as in terms of vehicle movements and scheduling, planning, waste licencing and health and safety issues.

*For inspection purposes only.
Consent of copyright owner required for any other use.*