

**CONSTRUCTION &
DEMOLITION WASTE
MANAGEMENT PLAN FOR
RATHDOWN ROAD
STUDENT ACCOMODATION
DEVELOPMENT, DUBLIN 7**

Report Prepared For

NTM ROI Seed Capital LP

Report Prepared By

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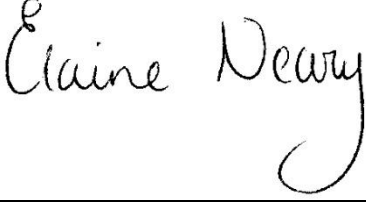
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1.0 INTRODUCTION

AWN Consulting Ltd. (AWN) has prepared this Construction & Demolition Waste Management Plan (C&DWMP) on behalf of NTM ROI Seed Capital LP. The proposed development will comprise the demolition of the existing buildings on site and the provision of 289 no. student accommodation units over 2 no. blocks ranging in height from 3 no. storeys to 7 no. storeys, along with student amenities, landscaping and ancillary services. Vehicular access will be off Grangegorman Lower and Marne Villas, with a pedestrian link proposed directly onto the Luas stop at Grangegorman.

The purpose of this plan is to provide information necessary to ensure that the management of construction and demolition (C&D) waste at the site is undertaken in accordance with current legal and industry standards including the *Waste Management Acts 1996 - 2011* and associated Regulations ¹, *Protection of the Environment Act 2003* as amended ², *Litter Pollution Act 1997* as amended ³ and the *Eastern-Midlands Region Waste Management Plan 2015 – 2021* ⁴. In particular, this Plan aims to ensure maximum recycling, reuse and recovery of waste with diversion from landfill, wherever possible. It also seeks to provide guidance on the appropriate collection and transport of waste from the site to prevent issues associated with litter or more serious environmental pollution (e.g. contamination of soil and/or water).

This C&DWMP includes information on the legal and policy framework for C&D waste management in Ireland, estimates of the type and quantity of C&D waste to be generated by the proposed development and makes recommendations for management of different waste streams.

2.0 CONSTRUCTION & DEMOLITION WASTE MANAGEMENT IN IRELAND

2.1 National Level

The Irish Government issued a policy statement in September 1998 known as '*Changing Our Ways*' ⁵, which identified objectives for the prevention, minimisation, reuse, recycling, recovery and disposal of waste in Ireland. The target for C&D waste in this report was to recycle at least 50% of C&D waste within a five year period (by 2003), with a progressive increase to at least 85% over fifteen years (i.e. 2013).

In response to the *Changing Our Ways* report, a task force (Task Force B4) representing the waste sector of the already established Forum for the Construction Industry, released a report entitled '*Recycling of Construction and Demolition Waste*' ⁶ concerning the development and implementation of a voluntary construction industry programme to meet the Government's objectives for the recovery of C&D waste.

The most recent national policy document was published in July 2012, entitled '*A Resource Opportunity - Waste Management Policy in Ireland*' ⁷. This document stresses the environmental and economic benefits of better waste management, particularly in relation to waste prevention. The document sets out a number of actions in relation to C&D waste and commits to undertake a review of specific producer responsibility requirements for C&D projects over a certain threshold.

The National Construction and Demolition Waste Council (NCDWC) was launched in June 2002, as one of the recommendations of the Forum for the Construction Industry, in the Task Force B4 final report. The NCDWC subsequently produced '*Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects*' ⁸ in July 2006 in conjunction with the then Department of the Environment, Heritage and Local Government (DoEHLG). The guidelines outline the issues that need to be addressed at the pre-planning stage of a development all the

way through to its completion. These guidelines have been followed in the preparation of this document and include the following elements:

- Predicted C&D wastes and procedures to prevent, minimise, recycle and reuse wastes;
- Waste disposal/recycling of C&D wastes at the site;
- Provision of training for waste manager and site crew;
- Details of proposed record keeping system;
- Details of waste audit procedures and plan; and
- Details of consultation with relevant bodies i.e. waste recycling companies, Dublin City Council etc.

Section 3 of the Guidelines identifies thresholds above which there is a requirement for the preparation of a C&D Waste Management Plan for developments. This development requires a C&D WMP under the following criterion:

- Demolition/renovation/refurbishment projects generating in excess of 100m³ in volume, of waste.
- New developments, other than above, including institutional, educational, health and other public facilities, with an aggregate floor area in excess of 1,250m².

Other guidelines followed in the preparation of this report include '*Construction and Demolition Waste Management – a handbook for Contractors and Site Managers*'⁹ published by FÁS and the Construction Industry Federation in 2002.

These guidance documents are considered to define best practice for C&D projects in Ireland and describe how C&D projects are to be undertaken such that environmental impacts and risks are minimised and maximum levels of waste recycling are achieved.

2.2 Regional Level

The proposed development is located in the Local Authority area of Dublin City Council (DCC).

The *Eastern-Midlands Region Waste Management Plan 2015 – 2021* is the regional waste management plan for the DCC area published in May 2015.

The Regional Plan sets out the strategic targets for waste management in the region and sets a specific target for C&D waste of “70% preparing for reuse, recycling and other recovery of construction and demolition waste” (excluding natural soils and stones and hazardous wastes) to be achieved by 2020.

Municipal landfill charges in Ireland are based on the weight of waste disposed. In the Leinster Region, charges are approximately €120 per tonne of waste which includes a €75 per tonne landfill levy introduced under the *Waste Management (Landfill Levy) (Amendment) Regulations 2012*.

The *Dublin City Development Plan 2016 – 2022*¹⁰ sets out a number of policies and objectives for Dublin City in line with the objectives of the regional waste management plan. The plan identifies the development of recycling in order to minimise the use of landfill as the main objective of the City Council. Waste policies and objectives with a particular relevance to the proposed development are:

Policies:

- *SI19: To support the principles of good waste management and the implementation of best international practice in relation to waste management in order for Dublin City and the region to become self-reliant in terms of waste management.*

- *SI20: To prevent and minimise waste and to encourage and support material sorting and recycling.*
- *SI21: To minimise the amount of waste which cannot be prevented and ensure it is managed and treated without causing environmental pollution.*

Objectives:

- *SIO17: To promote the re-use of building materials, recycling of demolition material and the use of materials from renewable sources. In all developments in excess of 10 housing units and commercial developments in excess of 1000 sqm, a materials source and management plan showing type of materials/proportion of re-use/recycled materials to be used shall be implemented by the developer.*
- *SIO18: To implement the current Litter Management Plan through enforcement of the litter laws, street cleaning and education and awareness campaigns.*
- *SIO19: To implement the Eastern-Midlands Waste Management Plan 2015-2021 and achieve the plan targets and objectives.*

2.3 Legislative Requirements

The primary legislative instruments that govern waste management in Ireland and applicable to the project are:

- Waste Management Act 1996 (No. 10 of 1996) as amended. Sub-ordinate legislation includes:
 - European Communities (Waste Directive) Regulations 2011 (SI 126 of 2011) as amended
 - Waste Management (Collection Permit) Regulations (S.I No. 820 of 2007) as amended
 - Waste Management (Facility Permit and Registration) Regulations 2007, (S.I No. 821 of 2007) as amended
 - Waste Management (Licensing) Regulations 2004 (S.I. No. 395 of 2004) as amended
 - Waste Management (Packaging) Regulations 2014 (S.I. 282 of 2014) as amended
 - Waste Management (Planning) Regulations 1997 (S.I. No. 137 of 1997)
 - Waste Management (Landfill Levy) Regulations 2015 (S.I. No. 189 of 2015)
 - European Union (Waste Electrical and Electronic Equipment) Regulations 2014 (S.I. No. 149 of 2014)
 - European Union (Batteries and Accumulators) Regulations 2014 (S.I. No. 283 of 2014) as amended
 - Waste Management (Food Waste) Regulations 2009 (S.I. 508 of 2009), as amended
 - European Union (Household Food Waste and Bio-waste) Regulation 2015 (S.I. No. 191 of 2015)
 - Waste Management (Hazardous Waste) Regulations, 1998 (S.I. No. 163 of 1998) as amended
 - Waste Management (Shipments of Waste) Regulations, 2007 (S.I. No. 419 of 2007) as amended
 - Waste Management (Movement of Hazardous Waste) Regulations, 1998 (S.I. No. 147 of 1998)
 - European Communities (Transfrontier Shipment of Waste) Regulations 1994 (SI 121 of 1994)
 - European Union (Properties of Waste which Render it Hazardous) Regulations 2015 (S.I. No. 233 of 2015)
- Environmental Protection Act 1992 (No. 7 of 1992) as amended.
- Litter Pollution Act 1997 (No. 12 of 1997) as amended.
- Planning and Development Act 2000 (No. 30 of 2000) as amended¹¹.

One of the guiding principles of European waste legislation, which has in turn been incorporated into the *Waste Management Act 1996 - 2001* and subsequent Irish legislation, is the principle of “*Duty of Care*”. This implies that the waste producer is responsible for waste from the time it is generated through until its legal recycling, recovery or disposal (including its method of disposal). As it is not practical in most cases for the waste producer to physically transfer all waste from where it is produced to the final destination, waste contractors will be employed to physically transport waste to the final destination. Following on from this is the concept of “*Polluter Pays*” whereby the waste producer is liable to be prosecuted for pollution incidents, which may arise from the incorrect management of waste produced, including the actions of any contractors engaged (e.g. for transportation and disposal/recovery/recycling of waste).

It is therefore imperative that the client ensures that the waste contractors engaged by construction contractors are legally compliant with respect to waste transportation, recycling, recovery and disposal. This includes the requirement that a contractor handle, transport and recycle/recover/dispose of waste in a manner that ensures that no adverse environmental impacts occur as a result of any of these activities.

A collection permit to transport waste must be held by each waste contractor which is issued by the National Waste Collection Permit Office (NWCPO). Waste receiving facilities must also be appropriately permitted or licensed. Operators of such facilities cannot receive any waste, unless in possession of a Certificate of Registration (COR) or waste permit granted by the relevant Local Authority under the *Waste Management (Facility Permit & Registration) Regulations 2007 and Amendments* or a waste or IED licence granted by the EPA. The COR/permit/licence held will specify the type and quantity of waste able to be received, stored, sorted, recycled, recovered and/or disposed of at the specified site.

3.0 DESCRIPTION OF THE PROJECT

3.1 Location, Size and Scale of the Development

The proposed development will comprise the demolition of the existing buildings on the site, extending to 0.43 ha, and the provision of 289 no. student accommodation units over 2 no. blocks ranging in height from 3 no. storeys to 7 no. storeys and comprising 47 no. clusters comprising a variety of 4, 6, 7 and 8 no. bedrooms respectively. 6 no. disabled access rooms are provided. Block A to the west extends to 3 no. storeys, with Block B to the east falling in height from 7 no. storeys at its most northerly point to 5 no. storeys moving south. Total gross floor area equates to 8,595.6 sq.m.

The proposed development includes a reception and administrative area, laundry room, gym, internal amenity areas, study rooms in both blocks and a TV room. Internal amenity space totals 538.5 sq.m, external landscaped amenity space is provided through a combination of shared surfaces, recreational and sports areas and seating, in combination with balconies and a roof terrace at fifth storey level, totalling 1602.4 sq.m. Total amenity space equates to 2,140.9 sq.m.

A specified set down area is located in the southern part of the site in close proximity to the entrance. 90 no. secure bicycle parking spaces are also provided. All ancillary servicing, refuse storage, and infrastructure is included within the application site, with plant enclosed at roof level at Block B.

3.2 Details of the Non-Hazardous Wastes to be produced

There will be waste materials generated from the demolition to the existing buildings on site, as well as from the excavation of the foundations of the buildings that are to

be demolished, to accommodate the student accommodation buildings. The volume of waste generated from demolition will be more difficult to segregate than waste generated from the construction phase, as many of the building materials will be bonded together or integrated i.e. plasterboard on timber ceiling joists, steel embedded in concrete etc.

There will also be soil, stones and concrete excavated to facilitate construction of the new buildings foundations. The volume of material to be excavated has been estimated at approximately c. 1,500m³. 1000m³ of the excavated material is hardstanding material, while the remaining 500m³ will be soil and stone. Any suitable excavated material will be reused on site, where possible, but it is anticipated that the opportunity for reuse of excavated material onsite will be limited.

During the construction phase there may be a surplus of building materials, such as timber off-cuts, broken concrete blocks, cladding, plastics, metals and tiles generated. There may also be excess concrete during construction which will need to be disposed of. Plastic and cardboard waste from packaging and oversupply of materials will also be generated.

Waste will also be generated from construction workers e.g. organic/food waste, dry mixed recyclables (waste paper, newspaper, plastic bottles, packaging, aluminium cans, tins and Tetra Pak cartons), mixed non-recyclables and potentially sewage sludge from temporary welfare facilities provided onsite during the construction phase. Waste printer/toner cartridges, waste electrical and electronic equipment (WEEE) and waste batteries may also be generated infrequently from site offices.

3.3 Potential Hazardous Wastes to be produced

3.3.1 Contaminated Soil

Environmental soil testing has not been undertaken to date as the site is currently operational. It is anticipated that it will be done prior to and/or during the excavation phase of the development, where required. Due to the history of the site and soil testing undertaken on the neighbouring site it is not expected that any contaminated material will be encountered during excavations. However, all excavations should be carefully monitored by a suitably qualified person to ensure that potentially contaminated material is identified and segregated, if encountered.

In the event that any potentially contaminated material is encountered, it will need to be segregated from clean/inert material, tested and classified as either non-hazardous or hazardous in accordance with the EPA publication entitled '*Waste Classification: List of Waste & Determining if Waste is Hazardous or Non-Hazardous*'¹² using the *HazWasteOnline* application (or similar approved classification method). The material will then need to be classified as clean, inert, non-hazardous or hazardous in accordance with the *EC Council Decision 2003/33/EC*¹³, which establishes the criteria for the acceptance of waste at landfills.

3.3.2 Fuel/Oils

As fuels and oils are classed as hazardous materials, any on-site storage of fuel/oil, all storage tanks and all draw-off points will be bunded (or stored in double-skinned tanks) and located in a dedicated, secure area of the site. Provided that these requirements are adhered to and site crew are trained in the appropriate refuelling techniques, it is not expected that there will be any fuel/oil wastage at the site.

3.3.3 Asbestos

A Demolition Asbestos Survey was undertaken at the site by OHSS Safety Consultants in June 2018 for the purpose of identifying and managing any asbestos containing

materials (ACMs) on the premises(s). A report was issued which contains a register showing the location and type of asbestos and the risks and recommendations in relation to the material found.

During the course of the survey, ACMs were identified in a number of locations including asbestos roof tiles, rope seals, decorative ceiling coating and several other locations.

Removal of asbestos or ACMs will be carried out by a suitably qualified contractor and ACM's will only be removed from site by a suitably permitted waste contractor. in accordance with *S.I. No. 386 of 2006 Safety, Health and Welfare at Work (Exposure to Asbestos) Regulations 2006-2010*. All asbestos/ACMs will be taken to a suitably licensed or permitted facility.

3.3.4 Japanese Knot Weed and Other Invasive Plant Species

Openfield Ecological services undertook a site survey as part of the Ecological Impact Statement in June 2018 for the purpose of identifying flora and fauna habitat on the proposed development site.

It was noted that the site is currently composed entirely of buildings and artificial surfaces and as such there is minimal presence of vegetation. Japanese Knotweed (*Fallopia japonica*) is an alien invasive species listed under schedule 3 of SI No. 477 and is historically known from the locality (it was found on an adjacent development site). Openfield ecology's report concludes that it is not present on this site and there was no indication that it is growing in the immediate Vicinity. No other alien invasive plant species were found during the course of the survey.

3.3.5 Other known Hazardous Substances

Paints, glues, adhesives and other known hazardous substances will be stored in designated areas. They will generally be present in small volumes only and associated waste volumes generated will be kept to a minimum. Wastes will be stored in appropriate receptacles pending collection by an authorised waste contractor.

In addition, WEEE (containing hazardous components), printer toner/cartridges, batteries (Lead, Ni-Cd or Mercury) and/or fluorescent tubes and other mercury containing waste may be generated from during C&D activities or temporary site offices. These wastes (if encountered) will be stored in appropriate receptacles in designated areas of the site pending collection by an authorised waste contractor.

3.4 Main C&D Waste Categories

The main non-hazardous and hazardous waste streams that could be generated by the construction and demolition activities at a typical site are shown in Table 3.1. The List of Waste (LoW) code (as effected from 1 June 2015) (also referred to as the European Waste Code or EWC) for each waste stream is also shown

| Waste Material | LoW Code |
|--|---------------------|
| Concrete, bricks, tiles, ceramics | 17 01 01-03 & 07 |
| Wood, glass and plastic | 17 02 01-03 |
| Bituminous mixtures, coal tar and tarred products | 17 03 02 |
| Metals (including their alloys) | 17 04 01-07 |
| Soil and stones | 17 05 04 |
| Gypsum-based construction material | 17 08 02 |
| Paper and cardboard | 20 01 01 |
| Mixed C&D waste | 17 09 04 |
| Green waste | 20 02 01 |
| Electrical and electronic components | 20 01 35 & 36 |
| Batteries and accumulators | 20 01 33 & 34 |
| Liquid fuels | 13 07 01-03 |
| Chemicals (solvents, pesticides, paints, adhesives, detergents etc.) | 20 01 13, 19, 27-30 |
| Insulation materials and asbestos-containing construction materials* | 17 06 04* |

Table 3.1 Typical waste types generated and EWCs (individual waste types may contain hazardous substances)

4.0 WASTE MANAGEMENT

4.1 Demolition Waste Generation

Demolition works at the site will involve the demolition of existing structures. Demolition figures published by the EPA in the 'National Waste Reports'¹⁴ and data from previous projects have been used to estimate the approximate break-down for indicative reuse (offsite), recycling and disposal targets of demolition waste. The approximate areas of the existing structures to be demolished are c.2539m². This breakdown is shown in Table 4.1.

| Waste Type | Tonnes | Reuse/Recovery | | Recycle | | Disposal | |
|-----------------------------------|---------------|----------------|--------------|---------|--------------|----------|--------------|
| | | % | Tonnes | % | Tonnes | % | Tonnes |
| Glass | 15.2 | 0 | 0.0 | 85 | 12.9 | 15 | 2.3 |
| Concrete, Bricks, Tiles, Ceramics | 837.9 | 30 | 712.2 | 65 | 41.9 | 5 | 83.8 |
| Plasterboard | 60.9 | 0 | 18.3 | 80 | 36.6 | 20 | 6.1 |
| Asphalts | 22.1 | 0 | 0.0 | 25 | 5.5 | 75 | 16.6 |
| Metal | 289.4 | 5 | 14.5 | 80 | 231.6 | 15 | 43.4 |
| Slate | 121.9 | 0 | 0.0 | 85 | 103.6 | 15 | 18.3 |
| Timber | 182.8 | 20 | 18.3 | 40 | 109.7 | 50 | 54.8 |
| Total | 1530.2 | | 763.2 | | 541.8 | | 225.3 |

Table 4.1 Estimated on and off-site reuse, recycle and disposal rates for demolition waste

The appointed demolition contractor will be required to prepare a detailed demolition management plan prior to work commencing which should refine the above estimated waste figures.

4.2 Construction Waste Generation

Table 4.2 shows the breakdown of C&D waste types produced on a typical site based on data from the EPA National Waste Reports, the GMIT¹⁵ and research reports.

| Waste Types | % |
|--------------|------------|
| Mixed C&D | 33 |
| Timber | 28 |
| Plasterboard | 10 |
| Metals | 8 |
| Concrete | 6 |
| Other | 15 |
| Total | 100 |

Table 4.2 Waste materials generated on a typical Irish construction site

Notwithstanding the information in Table 4.2, the quantity of excavated material generated has been estimated to be c. 1,500 m³, as the site will require excavation for additional basement levels. Any suitable excavated material will be temporarily stockpiled for reuse as fill, where possible, but reuse on site is expected to be limited. It is expected that most excavated material is to be removed off site for appropriate reuse, recovery and/or disposal.

Table 4.3 shows the predicted construction waste generation for the proposed development based on the information available to date along with the targets for management of the waste streams. The predicted waste amounts are based on an average large-scale development waste generation rate per m², using the waste breakdown rates shown in Table 4.2.

| Waste Type | Tonnes | Reuse/Recovery | | Recycle | | Disposal | |
|--------------|--------------|----------------|--------------|---------|--------------|----------|-------------|
| | | % | Tonnes | % | Tonnes | % | Tonnes |
| Mixed C&D | 168.8 | 10 | 16.9 | 80 | 135.0 | 10 | 16.9 |
| Timber | 143.2 | 40 | 57.3 | 55 | 78.8 | 5 | 7.2 |
| Plasterboard | 51.1 | 30 | 15.3 | 60 | 30.7 | 10 | 5.1 |
| Metals | 40.9 | 5 | 2.0 | 90 | 36.8 | 5 | 2.0 |
| Concrete | 30.7 | 30 | 9.2 | 65 | 19.9 | 5 | 1.5 |
| Other | 76.7 | 20 | 15.3 | 60 | 46.0 | 20 | 15.3 |
| Total | 511.4 | | 116.1 | | 347.3 | | 48.1 |

Table 4.3 Estimated on and off-site reuse, recycle and disposal rates for construction waste

It should be noted that until final materials and detailed construction methodologies have been confirmed, it is difficult to predict with a high level of accuracy the construction waste that will be generated from the proposed works as the exact materials and quantities may be subject to some degree of change and variation during the construction process.

4.3 Proposed Waste Management Options

Waste materials generated will be segregated on site, where it is practical. Where the on-site segregation of certain wastes types is not practical, off-site segregation will be carried out. Due to space restrictions onsite, it is expected that most segregation will occur offsite at the waste contractors licensed waste facilities. There will be skips and receptacles provided to facilitate segregation at source where feasible. All waste receptacles leaving site will be covered or enclosed. The appointed waste contractor will collect and transfer the wastes as receptacles are filled. There are numerous waste contractors in the Dublin Region that provide this service.

All waste arising's will be handled by an approved waste contractor holding a current waste collection permit. All waste arising's requiring disposal off-site will be reused, recycled, recovered or disposed of at a facility holding the appropriate registration, permit or licence, as required.

Some of the sub-contractors on site will generate waste in relatively low quantities. The transportation of non-hazardous waste by persons who are not directly involved with the waste business, at weights less than or equal to 2 tonnes, and in vehicles not designed for the carriage of waste, are exempt from the requirement to have a waste collection permit (Ref. Article 30 (1) (b) of the Waste Collection Permit Regulations 2007 as amended). Any sub-contractors engaged that do not generate more than 2 tonnes of waste at any one time can transport this waste offsite in their work vehicles (which are not design for the carriage of waste). However, they are required to ensure that the receiving facility has the appropriate COR / permit / licence.

Written records will be maintained by the contractor(s) detailing the waste arising throughout the C&D phases, the classification of each waste type, waste collection permits for all waste contactors who collect waste from the site and COR/permit or licence for the receiving waste facility for all waste removed off site for appropriate reuse, recycling, recovery and/or disposal

Dedicated bunded storage containers will be provided for hazardous wastes which may arise such as batteries, paints, oils, chemicals etc, if required.

The management of the main waste streams is outlined as follows:

Soil, Stone, Gravel, Clay & Made Ground

The Waste Management Hierarchy states that the preferred option for waste management is prevention and minimisation of waste, followed by preparing for reuse and recycling/recovery, energy recovery (i.e. incineration) and, least favoured of all, disposal. The excavations are required to facilitate construction works so the preferred option (prevention and minimisation) cannot be accommodated for the bulk excavation phase.

It is anticipated that most excavated material will be taken off site. When this material is removed off-site it could be reused as a by-product (and not as a waste), if this is done, it will be done in accordance with Article 27 of the *European Communities (Waste Directive) Regulations 2011*. Article 27 requires that certain conditions are met and that by-product notifications are made to the EPA via their online notification form. Excavated material should not be removed from site until approval from the EPA has been received.

The next option (beneficial reuse) may be appropriate for the excavated material pending environmental testing to classify the material as hazardous or non-hazardous in accordance with the EPA *Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous* publication. Clean inert material may be used as fill material in other construction projects or engineering fill for waste licensed sites. Beneficial reuse of surplus excavation material as engineering fill may be subject to further testing to determine if materials meet the specific engineering standards for their proposed end-use.

Any nearby sites requiring clean fill/capping material will be contacted to investigate reuse opportunities for clean and inert material. If any of the material is to be reused on another site as a by-product (and not as a waste), this will be done in accordance with Article 27. Similarly, if any soils/stones are imported onto the site from another construction site as a by-product, this will also be done in accordance with Article 27. However, it is not expected that this will be necessary.

If the material is deemed to be a waste, then removal and reuse/recycling/recovery/disposal of the material will be carried out in accordance with the *Waste Management Acts 1996 – 2011* as amended, the *Waste Management (Collection Permit) Regulations 2007* as amended and the *Waste Management (Facility Permit & Registration) Regulations 2007* as amended. The volume of waste removed will dictate whether a COR, permit or licence is required by the receiving facility. Once all available beneficial reuse options have been exhausted, the options of recycling and recovery at waste permitted and licensed sites will be considered.

In the event that contaminated material is encountered and subsequently classified as hazardous, this material will be stored separately to any non-hazardous material. It will require off-site treatment at a suitable facility or disposal abroad via Transfrontier Shipment of Wastes (TFS).

Bedrock

It is not anticipated that bedrock will be encountered during the excavation phase of this development.

Silt & Sludge

During the construction phase, silt and petrochemical interception should be carried out on runoff and pumped water from site works, where required. Sludge and silt will then be collected by a suitably licensed contractor and removed offsite.

Concrete Blocks, Bricks, Tiles & Ceramics

The majority of concrete blocks, bricks, tiles and ceramics generated as part of the construction and demolition works are expected to be clean, inert material and should be recycled, where possible.

Hard Plastic

As hard plastic is a highly recyclable material, much of the plastic generated will be primarily from material off-cuts. All recyclable plastic will be segregated and recycled, where possible.

Timber

Timber that is uncontaminated, i.e. free from paints, preservatives, glues etc., will be disposed of in a separate skip and recycled off-site.

Metal

Metals will be segregated into mixed ferrous, aluminium cladding, high grade stainless steel, low grade stainless steel etc., where practical and stored in skips. Metal is highly recyclable and there are numerous companies that will accept these materials.

Plasterboard

There are currently a number of recycling services for plasterboard in Ireland. Plasterboard from the demolition and construction phases will be stored in a separate skip, pending collection for recycling. The site manager will ensure that oversupply of new plasterboard is carefully monitored to minimise waste.

Glass

Glass materials will be segregated for recycling, where possible.

Waste Electrical and Electronic Equipment (WEEE)

Any WEEE will be stored in dedicated covered cages/receptacles/pallets pending collection for recycling.

Other Recyclables

Where any other recyclable wastes such as cardboard and soft plastic are generated, these will be segregated at source into dedicated skips and removed off-site.

Non-Recyclable Waste

C&D waste which is not suitable for reuse or recovery, such as polystyrene, some plastics and some cardboards, will be placed in separate skips or other receptacles. Prior to removal from site, the non-recyclable waste skip/receptacle will be examined by a member of the waste team (see Section 7.0) to determine if recyclable materials have been placed in there by mistake. If this is the case, efforts will be made to determine the cause of the waste not being segregated correctly and recyclable waste will be removed and placed into the appropriate receptacle.

Asbestos Containing Materials

The asbestos containing materials should be removed by an asbestos removal contractor and disposed of as asbestos waste before the demolition works begin. All asbestos removal work or encapsulation work must be carried out in accordance with *S.I. No. 386 of 2006 Safety, Health and Welfare at Work (Exposure to Asbestos) Regulations 2006-2010*

Other Hazardous Wastes

On-site storage of any hazardous wastes produced (i.e. contaminated soil if encountered and/or waste fuels) will be kept to a minimum, with removal off-site organised on a regular basis. Storage of all hazardous wastes on-site will be undertaken so as to minimise exposure to on-site personnel and the public and to also minimise potential for environmental impacts. Hazardous wastes will be recovered, wherever possible, and failing this, disposed of appropriately.

It should be noted that until a construction contractor is appointed it is not possible to provide information on the specific destinations of each construction waste stream. Prior to commencement of construction and removal of any construction waste offsite, details of the proposed destination of each waste stream will be provided to DCC by the project team.

4.4 Tracking and Documentation Procedures for Off-Site Waste

All waste will be documented prior to leaving the site. Waste will be weighed by the contractor, either by weighing mechanism on the truck or at the receiving facility. These waste records will be maintained on site by the nominated project Waste Manager (see Section 7.0).

All movement of waste and the use of waste contractors will be undertaken in accordance with the *Waste Management Acts 1996 - 2011, Waste Management (Collection Permit) Regulations 2007* as amended and *Waste Management (Facility Permit & Registration) Regulations 2007* and amended. This includes the requirement for all waste contractors to have a waste collection permit issued by the NWCPO. The nominated project waste manager (see Section 7.0) will maintain a copy of all waste collection permits on-site.

If the waste is being transported to another site, a copy of the Local Authority waste COR/permit or EPA Waste/IED Licence for that site will be provided to the nominated project waste manager (see Section 7.0). If the waste is being shipped abroad, a copy of the Transfrontier Shipping (TFS) notification document will be obtained from DCC (as the relevant authority on behalf of all local authorities in Ireland) and kept on-site along with details of the final destination (COR, permits, licences etc.). A receipt from the final destination of the material will be kept as part of the on-site waste management records.

All information will be entered in a waste management recording system to be maintained on site.

5.0 ESTIMATED COST OF WASTE MANAGEMENT

An outline of the costs associated with different aspects of waste management is provided below.

The total cost of C&D waste management will be measured and will take into account handling costs, storage costs, transportation costs, revenue from rebates and disposal costs.

5.1 Reuse

By reusing materials on site, there will be a reduction in the transport and recycle/recovery/disposal costs associated with the requirement for a waste contractor to take the material off-site.

Clean and inert soils, gravel, stones etc. which cannot be reused on site may be used as capping material for landfill sites, or for the reinstatement of quarries etc. This material is often taken free of charge or a reduced fee for such purposes, reducing final waste disposal costs.

5.2 Recycling

Salvageable metals will earn a rebate which can be offset against the costs of collection and transportation of the skips.

Clean uncontaminated cardboard and certain hard plastics can also be recycled. Waste contractors will charge considerably less to take segregated wastes, such as recyclable waste, from a site than mixed waste.

Timber can be recycled as chipboard. Again, waste contractors will charge considerably less to take segregated wastes such as timber from a site than mixed waste.

5.3 Disposal

Landfill charges in the Leinster region are currently at around €120 per tonne which includes a €75 per tonne landfill levy specified in the *Waste Management (Landfill Levy) Regulations 2015*. In addition to disposal costs, waste contractors will also charge a collection fee for skips.

Collection of segregated C&D waste usually costs less than municipal waste. Specific C&D waste contractors take the waste off-site to a licensed or permitted facility and, where possible, remove salvageable items from the waste stream before disposing of the remainder to landfill. Clean soil, rubble, etc. is also used as fill/capping material, wherever possible.

6.0 DEMOLITION PROCEDURES

The demolition stage will involve the removal of the existing buildings and hard standing areas. A formal demolition plan must be prepared for the site; however, in general, the following sequence of works should be followed during the demolition stage.

6.1 Check for Hazards

Prior to commencing works, buildings and structures to be demolished will be checked for any likely hazards including electric power lines or cables, gas reticulation systems, telecommunications, unsafe structures and fire and explosion hazards, e.g. combustible dust, chemical hazards, oil, fuels and contamination.

6.2 Removal of Components

All hazardous materials will be removed first. All components from within the buildings that can be salvaged will be removed next. This will primarily include metal however may also include timbers, doors, windows, wiring and metal ducting, etc.

6.3 Removal of Roofing

Steel roof supports, beams etc. will be dismantled and taken away for recycling/salvage.

6.4 Excavation of Services, Demolition of Walls and Concrete

Services will be removed from the ground and the breakdown of walls will be carried out once all salvageable or reusable materials have been taken from the buildings. Finally, any existing foundations and hard standing areas will be excavated.

7.0 TRAINING PROVISIONS

A member of the construction team will be appointed as the project waste manager to ensure commitment, operational efficiency and accountability during the C&D phases of the project.

7.1 Waste Manager Training and Responsibilities

The nominated waste manager will be given responsibility and authority to select a waste team if required, i.e. members of the site crew that will aid them in the organisation, operation and recording of the waste management system implemented on site. The waste manager will have overall responsibility to oversee, record and provide feedback to the client on everyday waste management at the site. Authority will be given to the waste manager to delegate responsibility to sub-contractors, where necessary, and to coordinate with suppliers, service providers and sub-contractors to prioritise waste prevention and material salvage.

The waste manager will be trained in how to set up and maintain a record keeping system, how to perform an audit and how to establish targets for waste management on site. The waste manager will also be trained in the best methods for segregation and storage of recyclable materials, have information on the materials that can be reused on site and be knowledgeable in how to implement this C&D WMP.

7.2 Site Crew Training

Training of site crew is the responsibility of the waste manager and, as such, a waste training program should be organised. A basic awareness course will be held for all site crew to outline the C&D WMP and to detail the segregation of waste materials at source. This may be incorporated with other site training needs such as general site induction, health and safety awareness and manual handling.

This basic course will describe the materials to be segregated, the storage methods and the location of the Waste Storage Areas (WSAs). A sub-section on hazardous wastes will be incorporated into the training program and the particular dangers of each hazardous waste will be explained.

8.0 RECORD KEEPING

Records will be kept for all waste material which leaves the site, either for reuse on another site, recycling or disposal. A recording system will be put in place to record the

construction waste arising's on site. A copy of the Waste Collection Permits, CORs, Waste Facility Permits and Waste Licences will be maintained on site at all times.

The waste manager or delegate will record the following;

1. Waste taken for reuse off-site;
2. Waste taken for recycling;
3. Waste taken for recovery;
4. Waste taken for disposal; and
5. Reclaimed waste materials brought on-site for reuse.

For each movement of waste off-site, a signed docket will be obtained by the Waste Manager from the contractor, detailing the weight and type of the material and the source and destination of the material. This will be carried out for each material type. This system will also be linked with the delivery records. In this way, the percentage of C&D waste generated for each material can be determined.

The system will allow the comparison of these figures with the targets established for the recovery, reuse and recycling of C&D waste presented earlier and to highlight the successes or failures against these targets.

9.0 OUTLINE WASTE AUDIT PROCEDURE

9.1 Responsibility for Waste Audit

The appointed waste manager will be responsible for conducting a waste audit at the site during the C&D phase of the development.

9.2 Review of Records and Identification of Corrective Actions

A review of all the records for the waste generated and transported off-site should be undertaken mid-way through the project. If waste movements are not accounted for, the reasons for this should be established in order to see if and why the record keeping system has not been maintained. The waste records will be compared with the established recovery/reuse/recycling targets for the site.

Each material type will be examined, in order to see where the largest percentage waste generation is occurring. The waste management methods for each material type will be reviewed in order to highlight how the targets can be achieved.

Waste management costs will also be reviewed.

Upon completion of the C & D phase, a final report will be prepared, summarising the outcomes of waste management processes adopted and the total recycling/reuse/recovery figures for the development.

10.0 CONSULTATION WITH RELEVANT BODIES

10.1 Local Authority

Once demolition and construction contractors have been appointed and prior to removal of any C&D waste materials offsite, details of the proposed destination of each waste stream will be provided to DCC.

DCC will also be consulted, as required, throughout the demolition, excavation and construction phases in order to ensure that all available waste reduction, reuse and recycling opportunities are identified and utilised and that compliant waste management practices are carried out.

10.2 Recycling/Salvage Companies

Companies that specialise in C&D waste management will be contacted to determine their suitability for engagement. Where a waste contractor is engaged, each company will be audited in order to ensure that relevant and up-to-date waste collection permits and facility COR/permits/licences are held. In addition, information regarding individual construction materials will be obtained, including the feasibility of recycling each material, the costs of recycling/reclamation and the means by which the wastes will be collected and transported off-site, and the recycling/reclamation process each material will undergo off site.

11.0 REFERENCES

1. Waste Management Act 1996 (No. 10 of 1996) as amended. Sub-ordinate and associated legislation includes:
 - European Communities (Waste Directive) Regulations 2011 (S.I. No. 126 of 2011) as amended.
 - Waste Management (Collection Permit) Regulations 2007 (S.I. No. 820 of 2007) as amended.
 - Waste Management (Facility Permit and Registration) Regulations 2007 (S.I. No. 821 of 2007) as amended.
 - Waste Management (Licensing) Regulations 2000 (S.I. No. 185 of 2000) as amended.
 - European Union (Packaging) Regulations 2014 (S.I. No. 282 of 2014) as amended.
 - Waste Management (Planning) Regulations 1997 (S.I. No. 137 of 1997) as amended.
 - Waste Management (Landfill Levy) Regulations 2015 (S.I. No. 189 of 2015)
 - European Union (Waste Electrical and Electronic Equipment) Regulations 2014 (S.I. No. 149 of 2014)
 - European Union (Batteries and Accumulators) Regulations 2014 (S.I. No. 283 of 2014) as amended.
 - Waste Management (Food Waste) Regulations 2009 (S.I. No. 508 of 2009) as amended.
 - European Union (Household Food Waste and Bio-waste) Regulations 2015 (S.I. No. 191 of 2015)
 - Waste Management (Hazardous Waste) Regulations 1998 (S.I. No. 163 of 1998) as amended.
 - Waste Management (Shipments of Waste) Regulations 2007 (S.I. No. 419 of 2007) as amended.
 - The European Communities (Transfrontier Shipment of Hazardous Waste) Regulations 1988 (S.I. No. 248 of 1988)
 - European Communities (Shipments of Hazardous Waste exclusively within Ireland) Regulations 2011 (S.I. No. 324 of 2011)
 - European Union (Properties of Waste which Render it Hazardous) Regulations 2015 (S.I. No. 233 of 2015)
2. Protection of the Environment Act 2003, (No. 27 of 2003) as amended.
3. Litter Pollution Act 1997 (S.I. No. 12 of 1997) as amended
4. Eastern-Midlands Region Waste Management Plan 2015 – 2021 (2015).
5. Department of Environment and Local Government (DoELG) *Waste Management – Changing Our Ways, A Policy Statement* (1998).
6. Forum for the Construction Industry – *Recycling of Construction and Demolition Waste*.
7. Department of Environment, Communities and Local Government (DoECLG), *A Resource Opportunity - Waste Management Policy in Ireland* (2012).
8. Department of Environment, Heritage and Local Government, *Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects* (2006).
9. FÁS and the Construction Industry Federation (CIF), *Construction and Demolition Waste Management – a handbook for Contractors and Site Managers* (2002).
10. Dublin City Council (DCC), *Dublin City Development plan 2016-2022* (2015)
11. Planning and Development Act 2000 (S.I. No. 30 of 2000) as amended
12. EPA, *Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous* (2015)

13. Council Decision 2003/33/EC, establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 of and Annex II to Directive 1999/31/EC.
14. Environmental Protection Agency (EPA), *National Waste Database Reports 1998 – 2012*.
15. EPA and Galway-Mayo Institute of Technology (GMIT), *EPA Research Report 146 – A Review of Design and Construction Waste Management Practices in Selected Case Studies – Lessons Learned (2015)*.