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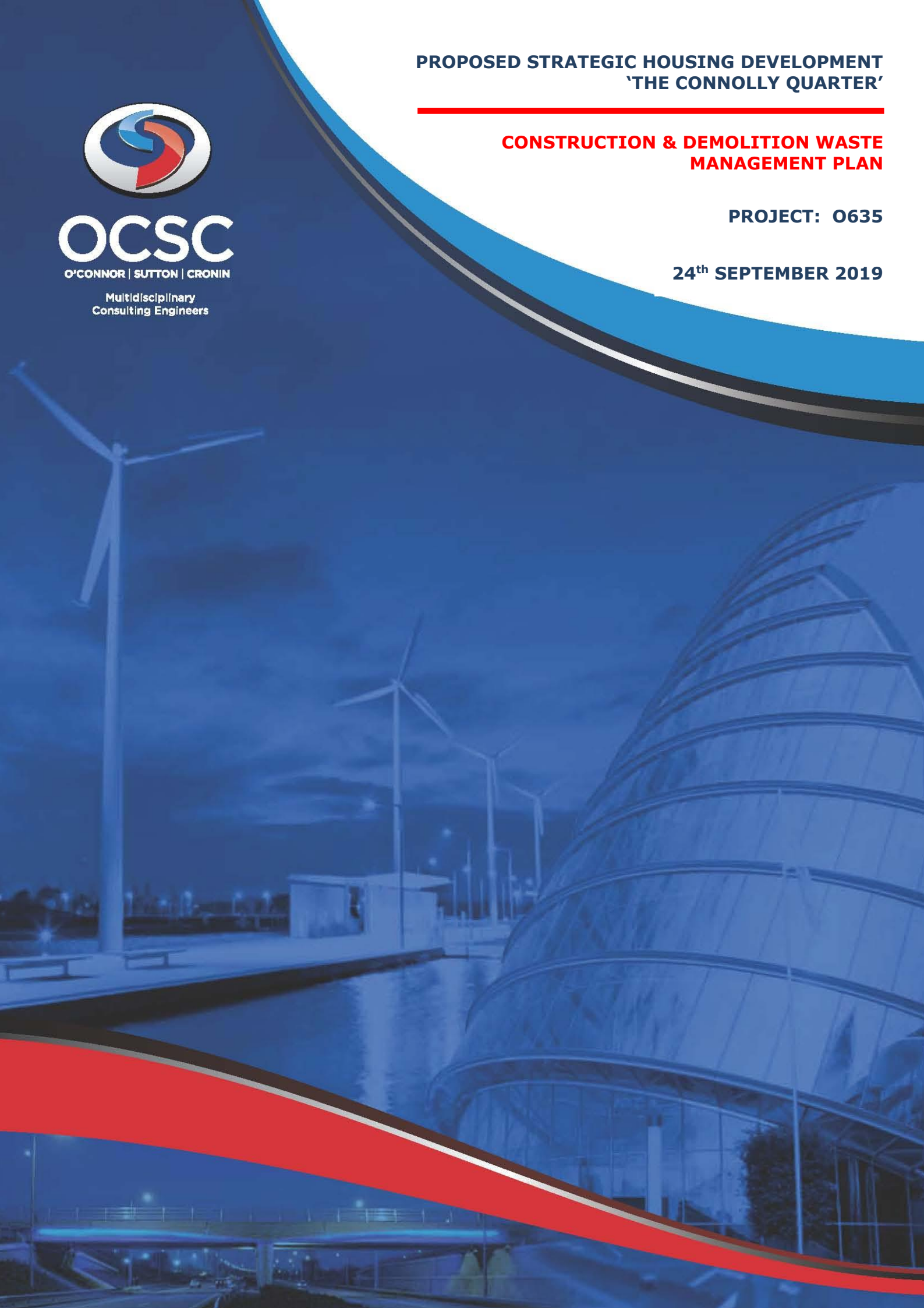
PROPOSED STRATEGIC HOUSING DEVELOPMENT 'THE CONNOLLY QUARTER'

CONSTRUCTION & DEMOLITION WASTE MANAGEMENT PLAN

PROJECT: O635

24th SEPTEMBER 2019



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Proposed Strategic Housing Development
‘The Connolly Quarter’

Construction & Demolition Waste Management Plan

NOTICE

DOCUMENT CONTROL & HISTORY

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PROPOSED STRATEGIC HOUSING DEVELOPMENT 'THE CONNOLLY QUARTER'

CONSTRUCTION & DEMOLITION WASTE MANAGEMENT PLAN

OXLEY HOLDINGS LIMITED

O'CONNOR SUTTON CRONIN & ASSOCIATES

MULTIDISCIPLINARY CONSULTING ENGINEERS

PROJECT NO. O635

24th SEPTEMBER 2019

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1. INTRODUCTION

OCSC were commissioned by Oxley Holdings Limited to prepare a Construction & Demolition Waste Management Plan (CDWMP) in respect of the proposed redevelopment of lands at Connolly Station, Dublin 1.

The subject site is bounded by Sheriff Street Lower, Oriel Street Upper and Oriel Hall. The overall proposed masterplan development will comprise mixed residential, commercial, amenity and community use with basement level car parking and associated infrastructure. The site is currently in use as a car park for Connolly Station.

This CDWMP has been prepared with reference to the following legislation and plans:

- The Waste Management Act 1996 – 2008, Amendments & Associated Regulations;
- The Litter Pollution Act 1997;
- The Eastern Midlands Region Waste Management Plan 2015 – 2021.

The CDWMP is designed so as to ensure the highest possible levels of waste reduction, waste reuse and waste recycling are achieved for the proposed development. Specifically, the CDWMP aims to achieve waste prevention, maximum recycling and recovery of waste. The plan has as a central tenet, the diversion of waste from landfill wherever possible.

The CDWMP describes the applicable legal and policy framework for C&D waste management in Ireland (both nationally and regionally), it also estimates the category and quantity of waste generated by the proposed development and makes recommendations for the bespoke management of the various waste streams. The plan also provides guidance on collection and transport of waste to prevent issues associated with litter or more serious environmental pollution (e.g. contamination of soil or water resources).

2. SITE LOCATION & PROPOSED DEVELOPMENT OUTLINE

Development Outline

The proposed Schedule of Accommodation for the Strategic Housing Development (SHD) application comprises the following:

- the demolition of 4 no. structures with a combined gross floor area of 3,028sq.m;
- the construction of 741 no. Build to Rent (BTR) residential units in 8 no. apartment blocks ranging in height from 4 storeys to 23 storeys with lower height buildings located adjacent to the northeast and east site boundaries, with a cumulative gross floor area of 68,535sq.m comprising;
    - Block B1 (maximum building height 54.917m, total gross internal floor area 11,260sq.m, Apartment Mix: Studio: 25, 1-bed: 37, 2-bed: 51);
    - Block B2 (maximum building height 54.917m, total gross internal floor area 10,831sq.m, Apartment Mix: Studio: 20, 1-bed: 35, 2-bed: 51,);
    - Block B3 (maximum building height 51.767m, total gross internal floor area 9,766sq.m, Apartment Mix: Studio: 22, 1-bed: 60, 2-bed: 27, 3-Bed: 1);
    - Block C1 (maximum building height 79,450m, total gross internal floor area 12,705sq.m, Apartment Mix: Studio: 84, 1-bed: 40, 2-bed: 41);
    - Block C2 (maximum building height 39,615 m, total gross internal floor area 4,890 sq.m, Apartment Mix: Studio: 9, 1-bed: 33, 2-bed: 3, 3-Bed: 4);
    - Block C3 (maximum building height 39,650 m, total gross internal floor area 6,775sq.m, Apartment Mix: Studio: 40, 1-bed: 18, 2-bed: 23);
    - Block D1 (maximum building height 53,392 m, total gross internal floor area 8,418 sq.m, Apartment Mix: Studio: 10, 1-bed: 25, 2-bed: 44, 3-Bed: 1);

  - Block D2 (maximum building height 30,950 m, total gross internal floor area 3,890 sq.m, Apartment Mix: Studio: 18, 1-bed: 8, 2-bed: 11);
- residential support amenities including 1 no. gyms, a resident's lounge, work areas, meeting rooms, dining rooms, recreational areas with a combined GFA of 1,444 sq.m;
- change of use from club house to pedestrian passageway of the existing vault (137sq.m GFA) fronting Seville Place, a Protected Structure (RPS No. 130);
- a basement of 7,253.4 sq.m with vehicular access from Oriel Street Upper incorporating residents' car parking (58 no. spaces), residents cycle parking (640 no. spaces) 7 no. plant rooms (combined 2,228sq.m), waste management facilities (393 sq.m)
- 766 no. covered cycle parking spaces for residents and visitors, concierge office (233 sq.m) and waste management facilities (126 sq.m);
- 'other uses' including 10 no. units providing retail, commercial, and community use with a combined GFA of 3,142 sq.m;
- A total of 18,562 sq.m of hard and soft landscaping comprising both public, communal and private open space located throughout the development;
- A service and emergency vehicle only access ramp from the Oriel Street Upper site entrance to serve CIE's transport needs at Connolly Station;
- Enabling works of a non-material nature to safeguard the existing vaults (Protected Structures - RPS No. 130) that form part of the subject site fronting Sherriff Street Lower, Oriel Street Upper, and Seville Place during the construction phase;
- All associated ancillary development works including drainage, 6 no. electricity substations, pedestrian access; and
- Works to the Masonry wall fronting Oriel Street and the Vaults fronting Seville Place (both a Protected Structure) consisting of the creation of a new vehicular and pedestrian entrance.

An image of the proposed masterplan for the entire of the site (including the proposed Section 34 application to DCC) is shown in Figure 1.

Figure 1: Masterplan View

Proposed Planning Regime

It is proposed to submit separate planning applications in respect of the Residential and Commercial elements of the project. The apartment units along with the minor ancillary retail, amenity, and community uses along with the proposed basement, will be submitted via the SHD process to An Bord Pleanála. The commercial elements comprising the office, hotel and remaining retail uses will be submitted to DCC.

Site Location

As noted earlier, the site is bounded by Sheriff Street Lower to the south, Oriel Street Upper to the east and Oriel Hall and Seville Place to the north. The site abuts Connolly Railway Station on the west – see Figure 2 over.

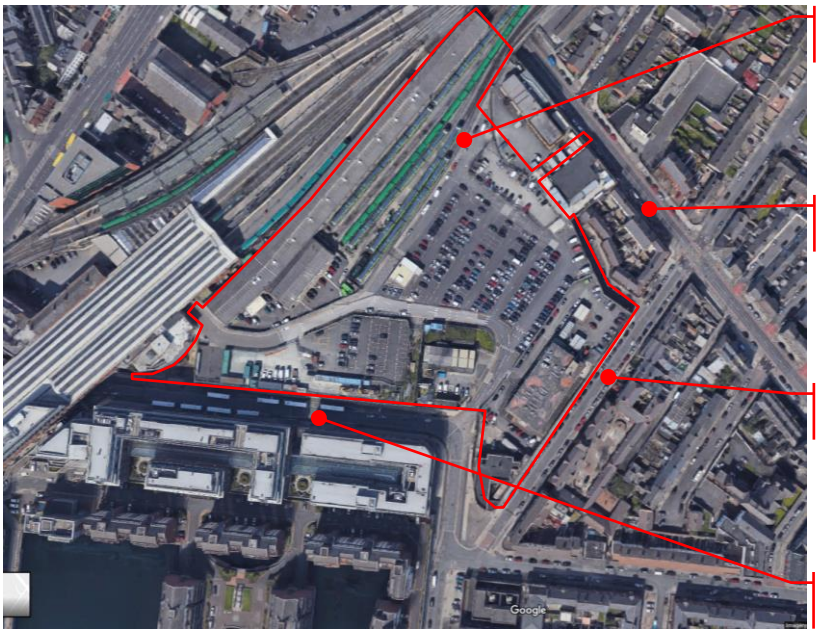


Figure 2: Planning Scheme & City Block 8 Extents

Note:

The current application is for the residential element of the overall masterplan along with the minor ancillary retail, amenity, and community sues along with the proposed basement. This application is to be submitted via the SHD process, to An Bord Pleanála.

3. PREDICTED WASTE ARISINGS

WASTE CATEGORISATION

Typical non-hazardous and hazardous waste streams generated by construction and demolition at typical sites are shown below along with their accompanying European Waste Code (EWC) Classification.

Waste Materials Categorisation		
Category	Description	Code
Non-Hazardous	Metals	17 04
	Wood, glass, plastic	17 02
	Soil, stones, dredged soils	17 05
	Gypsum based materials	17 08
	Cardboard	15 01 01
	Glass	17 02 02
	Bituminous mixtures, coal tar, tar products	17 03
	Concrete, bricks, tiles, ceramics	17 01
Hazardous	Electrical and Electronic Components	16 02
	Oil/water separator contents	13 05
	Liquid Fuels	13 07
	Wood Preservatives	03 02
	Batteries	16 06
	Soil and stones containing dangerous substances	17 05 03
	Waste construction material containing asbestos	17 06 05
	Other construction and demolition wastes containing dangerous substances	17 09 03
	Wastes from soil and groundwater remediation	19 13

Table 1: C&D Waste Categories

NON HAZARDOUS ARISINGS

Significant excavation will take place at the site for the provision of a basement carpark. It is likely that waste will be generated from basement excavation and from secant pile operations – see later for estimated volumes of materials.

During the construction phase there will be some building materials waste generated. This will include excess ready mix concrete and mortars, timber off-cuts, damaged concrete blocks, plastics, metals off-cuts, cladding off-cuts and tiles. 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.

The classification of materials as non-hazardous and/or hazardous will be based on the www.hazwasteonine.com web based system as well as classification using Waste Acceptance Criteria in accordance with the European Communities (EC) Council Decision 2003/33/EC, which establishes criteria for the acceptance of waste at landfills.

HAZARDOUS ARISINGS

Contaminated Soil

The removal of existing made ground for basement excavation and pile arisings will result in the generation of some soils waste on the site. As the Connolly site is a brownfield site with a history of uses, there is a possibility that there were historical releases of hazardous materials on the site which may have impacted on the ground conditions.

Environmental Site Assessment

It is noted that an Environmental Site Assessment has been prepared for the site and is available under separate cover. It is not intended to repeat the findings of that assessment wholesale in this document however the immediately following sections of this report are noted.

Previous Assessments

Burro Happold undertook a preliminary site investigation of the Connolly Station car park site between July and September 2008. All of the intrusive investigation works were carried out by Glover. The intrusive investigation completed included the following:

- Drilling of 12No. windowless sample boreholes:
  - WS1-WS12.
- Drilling of 7No. cable percussion boreholes:
  - BH01-BH07.
- Drilling of 3No. rotary core follow on borehole to prove bedrock;
- Convert 14No. boreholes as gas and/or groundwater monitoring wells:
  - BH01, BH02, BH03, BH04, BH05, BH06, BH07, WS3, WS6, WS9, WS10, WS12.
- Sampling and analysis of soil from the boreholes;
- Sampling and analysis of water from the boreholes.

Laboratory Analysis – Soil

Forty (40 No.) soil samples were collected in total and submitted to ALcontrol Geochem Laboratories, a UKAS accredited laboratory. From these 40No. of soil samples, 38No. were tested for metals, 15No. for TPHs, 32No. for PAHs, 9No. for PCBs, 35No. for Organics and 35No. for Inorganics. The waste soil assessment made on this data set, indicates that the upper part of the soil is:

- Potentially predominantly non-hazardous, with a hotspot hazardous nature resultant of lead and copper content. There is not sufficient data to exclude the potential for TPH hotspots, however it is considered probably unlikely;
- Probably unlikely to be acceptable at an inert soil disposal or recovery facility. It is expected that, excepting the potential for heavy metal hotspots, the soil would generally be acceptable at a non-hazardous landfill.

It is noted that soil generated as part of the construction works will be managed in accordance with a *Soil Waste Management Plan* to be produced

by O'Connor Sutton Cronin Multidisciplinary Consulting Engineers in advance of the construction stage. That report will identify the nature and classification of the soil waste and will detail management procedures to be implemented to ensure appropriate handling and disposal in accordance with Irish and EU legislative requirements.

Fuels/Oils

As fuels and oils are classed as hazardous materials, if there is any onsite storage of fuel/oil, all storage tanks and draw-off points will be bunded 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.

Other 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.

4. WASTE MANAGEMENT IN IRELAND

OVERARCHING LEGISLATION

The overarching legislative instruments governing waste management in Ireland are as follows:

- Waste Management Act 1996 (S. I. No. 10 of 1996) as amended by the Waste Management (Amendment) Act 2001;
- Sub-ordinate legislation includes:
  - European Communities (Waste Directive) Regulations 2011 (S. I. 126 of 2011) as amended 2011 (S. I. No. 323 of 2011);
  - EC Commission Decision (2014/955/EC) and associated Commission Regulation No. 1357/2014 as detailed in the EPA document List of Waste & Determining if Waste is Hazardous or Non-Hazardous;
  - European Union (Properties of Waste which render it Hazardous) Regulations 2015;
  - EC Classification, Labelling & Packaging Regulations (No. 1272/2008)
  - Waste Management (Collection Permit) Regulations S. I. No. 820 of 2007 as amended 2008 (S. I. No. 87 of 2008);
  - Waste Management (Facility Permit and Registration) Regulations, S.I No. 821 of 2007 as amended 2008 (S.I No. 86 of 2008) as amended 2014 (S.I No. 320 and No. 546 of 2014) and as amended 2015 (S. I. No. 198 of 2015)Waste Management (Licensing) Regulations 2000 (S. I. No. 185 of 2000) as amended 2004 (S. I. No. 395 of 2004), 2010 and (S. I. No. 350 of 2010);
  - Waste Management (Packaging) Regulations 2003 (S. I. No. 61 of 2003) as amended 2004 (S. I. No. 871 of 2004), 2006 (S. I. No. 308 of 2006) and 2007 (S. I. No. 798 of 2007);
  - Waste Management (Planning) Regulations 1997 (S. I. No. 137 of 1997);

  - Waste Management (Landfill Levy) Regulations 2015 (S. I. No. 189 of 2015)European Communities (Waste Electrical and Electronic Equipment) Regulations 2011;
  - Waste Management (Registration of Brokers and Dealers) Regulations 2008 (S. I. No. 113 of 2008);
  - Waste Management (Hazardous Waste) Regulations, 1998 (S. I. No. 163 of 1998) as amended 2000 (S. I. No. 73 of 2000);
  - Waste Management (Shipments of Waste) Regulations, 2007 (S. I. No. 419 of 2007);
  - Waste Management (Movement of Hazardous Waste) Regulations, 1998 (S. I. No. 147 of 1998);
  - 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).
- Planning and Development Act 2000 as amended (S. I. No. 30 of 2010) as amended (S. I. No. 310 of 2015)
- Protection of Environment Act 1992 as amended (S. I. No. 413 of 2003) as amended by the Planning and Development Act 2000 (S. I. No. 30 of 2000) as amended.
- Litter Pollution Act 1997 (S. I. No. 12 of 1997) as amended by Protection of the Environment (amendment) Act 2003 as amended.

The above Acts and Regulations transpose European Union policy and Directives into Irish law. The over-riding 'Duty of Care' principle implies that the producer is responsible for waste from the time it is generated through until its legal 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 disposal area, waste contractors will be employed to transport waste to the final waste disposal site. In addition, the 'Polluter Pays' principle means that 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 (for transportation and disposal/recovery/recycling of waste).

It is imperative that the developer ensures that waste companies engaged by construction contractors are legally compliant with respect to waste transport and disposal/recovery/recycling. This includes the requirement that a contactor handle, transport and dispose of waste in a manner that ensures that no adverse environmental impacts occur as a result of any of these activities. In this regard, a waste collection permit, issued by the National Waste Collection Permit Office (NWCPO), must be held by every waste contractor engaged on the project. Waste receiving facilities must also be appropriately permitted or licensed to accept waste. Operators of such facilities cannot receive any waste, unless in possession of a waste permit granted by the relevant Local Authority under the Waste Management (Facility Permit & Registration) Regulations 2007 and Amendments or a waste licence granted by the Environmental Protection Agency (EPA). The permit/licence held will specify the type and quantity of waste able to be received, stored, sorted, recycled and/or disposed of at the specified site.

Where waste is to be transported out of the state it must be done in accordance with the Transfrontier Shipment of Waste (TFS) Regulations and must meet the approval of the National TFS office operated by Dublin City Council.

NATIONAL WASTE MANAGEMENT POLICY

The 1998 '*Changing Our Ways*' policy document by the Irish Government 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 an initial five year period with incremental increases to at least 85% by 2013. A waste industry task force of the *Forum for the Construction Industry* released '*Recycling of Construction and Demolition Waste*' recommending the development of a voluntary construction industry programme to meet Government objectives for the recovery of C&D waste. '*A Resource Opportunity - Waste Management Policy in Ireland*' published in 2012 stresses the environmental and economic benefits of better waste management, particularly in relation to waste prevention. In respect of C&D waste, the report commits to

undertaking a review of specific producer responsibility requirements for C&D projects above a certain threshold.

The National Construction and Demolition Waste Council (NCDWC) published '*Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects*' in 2006 in conjunction with the 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, Local Authority etc.

Section 3 of the Best Practice Guidelines identifies thresholds above which there is a requirement for the preparation of a C&D Waste Management Plan. The Connolly redevelopment project requires a CDWMP under the following criterion:

- Demolition/renovation/refurbishment projects generating in excess of 100m^3 in volume, of waste.

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

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

REGIONAL WASTE MANAGEMENT PLANS

The proposed development is located within the Dublin City Council administrative area. The '*Eastern Midlands Region Waste Management Plan 2015-2021*' (EMRWMP) currently applies to the Dublin City Council area. This Regional Waste Management Plan for the Eastern Midland Region covers the four Dublin Councils (DCC, FCC, DRCC & SDCC) as well as Kildare, Laois, Longford, Louth, Meath. Offaly, Wicklow and Westmeath.

The EMRWMP 2015 – 2021 was adopted in May 2015. The overall vision of the Plan is to rethink the approach taken towards managing waste and that waste should be seen as a valuable material resource. The Plan also supports a move towards achieving a circular economy which is essential if the region is to make better use of resources and become more resource efficient. In the global economy, the demand and competition for finite and sometimes scarce resources will continue to increase, and pressure on resources is causing greater environmental degradation and fragility. Making better uses of these resources and reducing the leakage of materials from our economies, will deliver benefits economically and environmentally. The move to a circular economy replacing outdated industrial take-make-consume and dispose models, is essential to deliver the resource efficiency ambition of the Europe 2020 Strategy.

The Plan contains three targets:

- 1% reduction per annum in the quantity of household waste generated per capita over the period of the Plan;
- Achieve a recycling rate of 50% of Managed Municipal Waste by 2020;

- Reduce to 0% the direct disposal of unprocessed residual municipal waste to landfill (from 2016 onwards) in favour of higher value pre-treatment processes and indigenous recovery practices.

The Plan states that Construction and Demolition Waste (C&D) consists of all wastes that arises from C&D activities which includes excavated soil from contaminated sites. This type of waste is generally collected by authorised collectors and its recovery is managed by placing it in a variety of land uses such as backfilling. Sites chosen for backfilling are generally considered to be of marginal agricultural land, but these can include wetlands and associated habitats. The Regional Waste Management Plan recognises that at many of these sites it is deposition rather than improvement that is the primary activity, and this can have complications for habitats. Also given the move away from landfill which is a significant outlet for C&D waste, alternative recovery options will be required to facilitate C&D Waste in future years.

The bulk of the C&D waste collected is waste materials such as rubble, metals, timber, plastic, glass, wood, contaminated soils and mixed C&D waste, accounting for approximately 59% of all C&D waste collected with the remaining 41% consisting of soil and stones. The soil and stone waste collected within the Eastern & Midlands Region is primarily managed at Local Authority permitted infill sites, with the other C&D waste types primarily managed at EPA licensed activities. Contaminated soils are treated at appropriately licensed hazardous waste sites in the region.

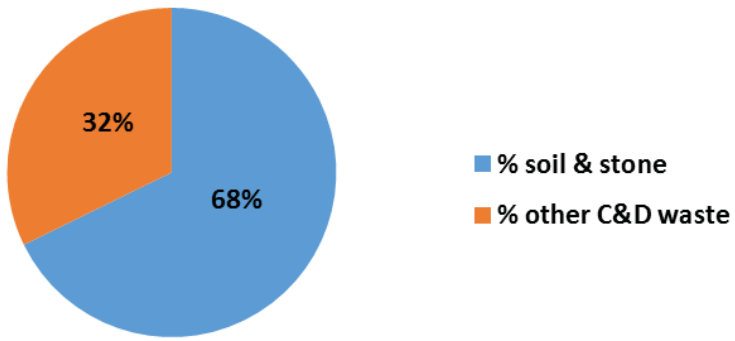


Figure 3: C&D Wastes Collected in the Eastern-Midlands Region in 2012

The EC (Waste Directive) Regulations 2011, sets a 70% target for the re-use, recycling and recovery of man-made C&D waste in Ireland by 2020. The EPA reported that Ireland has achieved this target, with a recovery rate of 97% being reported. Backfilling activities account for a significant portion of the recovery rate, with recycling of C&D wastes not as prevalent. The quantification of the different treatment options for C&D wastes is important to show if higher recovery activities, i.e. preparing for reuse and recycling, are growing.

The *Dublin City Development Plan 2016 – 2022* identifies facilitation of the development of recycling in order to minimise the use of landfill as the main objective of the City Council. The development plan also outlines a number of policies and objectives, the most relevant of which, in the context in C&D waste are:

- Plan Policies:
    - Policy SI19: To support the principles of good waste management and the implementation of best practice in relation to waste management in order for Dublin City and the region to become self-reliant in terms of waste management;
    - Policy SI20: To prevent and minimise waste and to encourage and support material sorting and recycling;
    - Policy SI21: To minimise the amount of waste which cannot be prevented and ensure it is disposed of without causing environmental pollution;
    - Policy SI22: To ensure that effect is given as far as possible to the 'polluter pays' principle.

- Plan Objectives:
    - Objective SIO17: To promote the reuse 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 1,000 sq.m, a *Materials Source & Management Plan* showing type of materials/proportion of reuse/recycled materials to be used shall be implemented by the developer.

- Objective SIO19: To implement the Eastern-Midlands Waste Management Plan 2015-2021 and achieve the plan targets and objectives.

5. PROPOSED SITE WASTE MANAGEMENT PLAN

DEMOLITION WASTE

OCSC has carried out an initial assessment of the amount of cut material that will arise as a result of piling, basement excavation and reduced dig and this is as set out below for the SHD application:

- Total cut volume: 85,600 m^3:
  - Made ground cut: 68,000 m^3;
  - Natural ground: 17,600 m^3.
- Estimated pile arisings: 12,000 m^3:
  - Made ground arisings: 6,000 m^3;
  - Natural ground arisings: 6,000 m^3;
- Overall Arisings: 97,600 m^3:
  - Made ground: 74,000 m^3;
  - Natural ground: 23,600 m^3.

CONSTRUCTION WASTE

The Environmental Protection Agency (EPA) produce figures on the amounts of waste generated by various developments. These figures are contained in EPA databases. The split between individual C&D waste categories is shown in Table 2.

Waste Types	%
Soil & Stones	51
Concrete, Bricks, Tiles, Ceramics, Plasterboard	39
Asphalt, Tar and Tar products	2
Metals	2
Other	6
Total Waste	100

Table 2: Breakdown of C&D Waste Materials at a Typical Site

Given the significant excavation proposed at the Connolly site it is evident that 'soil & stones' will constitute a greater percentage of overall waste on the subject site than on standard sites, and this has been taken into account in deriving site specific volumes.

Figures are available for typical overall waste generation figures for construction sites based on the type and scale of development. Therefore, by using the EPA category split figures and industry standard overall waste generation figures, couple finally, with site specific information the C&D waste arisings for the subject site can be estimated – Table 3. The predicted waste amounts shown in the table have been derived on this basis, assuming a conversion factor of 1.6 tonnes/m^3 for soil, with amendments and additions being made for bespoke site data.

Construction Waste: Reuse, Recovery, Recycle & Disposal							
Waste Type	tonnes	Reuse/Recover		Recycle		Disposal	
		%	tonnes	%	tonnes	%	tonnes
Soil & stone	156,160	0	0	0	0	100	156,160
Concrete, brick, tiles	225	0	0	80	180	20	45
Asphalt, tars	5	0	0	25	1	75	4
Metals	25	5	1	90	22	5	2
Misc.	125	10	13	40	50	50	62
Total:	156,540	-	14	-	253	-	156,273

Table 3: Construction Waste Reuse, Recycle & Disposal Amounts

The quantity of soils/stones to be excavated to facilitate construction of new basement areas, foundations and the installation of underground services has been estimated and incorporated into the construction waste estimates in the table. It is assumed for now that all soils/stones excavated will go offsite for disposal with none of the soils/stones suitable for on or offsite reuse/recovery. Therefore, the quantity of soils/stones for disposal shown in the table is a worst case scenario.

It should be noted that, until final materials and methods of construction have been decided, it is not possible to predict with a high level of accuracy the construction waste that will be generated.

The assumption that all the made ground/subsoils excavated will require offsite disposal results in a significant increase in the disposal rate for the construction phase. However, there may be an option to remediate the soil off-site which may reduce this disposal rate. As detailed above, any contaminated material encountered will have to be classified and disposed of in accordance with the OCSC *Soil Waste Management Plan*.

SITE WASTE MANAGEMENT OPERATIONS

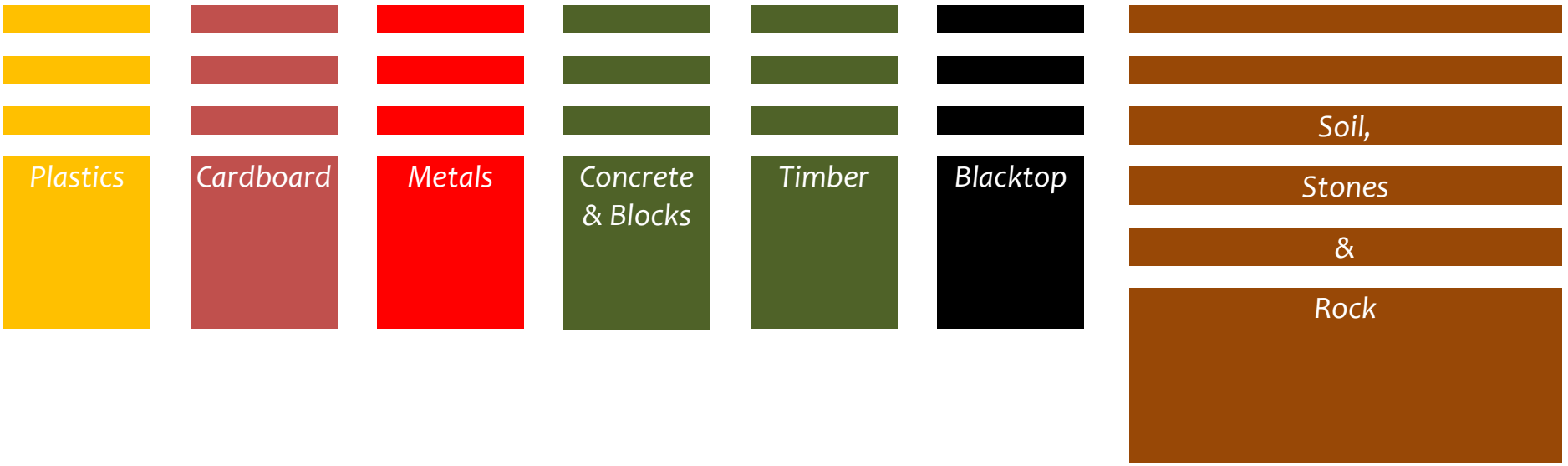
Waste materials generated will be segregated on site where it is practical. A Layout Plan for a site-based waste segregation compound is shown in Figure 4 over. Where the on-site segregation of certain wastes types is not practical, off-site segregation will be carried out. There will be skips and receptacles provided to facilitate segregation at source. All waste receptacles leaving site will be covered or enclosed. The appointed waste contractor will collect and transfer the wastes as receptacles are filled.

All waste arisings will be handled by an approved waste contractor holding a current waste collection permit. All waste arisings requiring disposal off-site will be disposed of at a facility holding the appropriate licence or permit, as required. Written records will be maintained by the contractor(s) detailing the waste arising throughout the construction and demolition phases, the classification of each waste type, the contact details and waste collection permit number of all waste contactors who collect waste from the site and the end destination and waste facility permit or licence number for all waste removed and disposed off-site. Dedicated bunded storage containers will be provided for hazardous wastes such as batteries, paints, oils, chemicals etc., if required. The management of the main waste streams are detailed as follows:

Soil/Subsoil:

Made ground/subsoil will be excavated to facilitate construction of new basement areas, foundations and the installation of underground services.

Any soil removed off-site will be carried by contractors licensed under the Waste Management Acts 1996 - 2008, the Waste Management (Collection Permit) Regulations 2007 and Amendments and the Waste Management (Facility Permit & Registration) Regulations 2007 and Amendments.



O'Connor Sutton Cronin Consulting Engineers

Redevelopment of Connolly Carpark Oxley Holdings Limited

Figure 4:

Proposed C & D Waste Storage Area - Layout Plan

Scale: NTS

Soil/Subsoil (Cont'd):

If any of the excavated spoil is found to be clean/inert, the site manager will investigate whether nearby construction sites may require clean fill material, to both minimise the costs of transport and to reuse as much material as possible. Any soil/subsoil deemed to be contaminated will be stored separately to the clean and inert soil/subsoil. The material will be appropriately classified as non-hazardous or hazardous in accordance with the www.hazwasteonline.com application and EC Council Decision 2003/33/EC, which establishes the criteria for the acceptance of waste at landfills, before being transported to an appropriately permitted/licensed facility by permitted contractors.

Bedrock:

Based on the site investigations carried out at the site, bedrock is $20m^{+}$ below ground level. Therefore, it is not anticipated that bedrock will be encountered during excavation works.

Concrete, Bricks, Tiles & Ceramics:

The majority of concrete, bricks, tiles and ceramics generated as part of the construction works is 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. It will be diverted from landfill and recycled. 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 segregated and stored in skips.

Metal:

Metals will be segregated into mixed ferrous, cladding, aluminium, high grade stainless steel, low grade stainless steel etc. categories, where

practical. Metal is highly recyclable and there are numerous companies that will accept these materials. Metals will be segregated and stored in skips.

Plasterboard:

There are currently a number of recycling services for plasterboard in Ireland. Plasterboard from the construction phase 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.

Organic (Food) Waste:

An on-site canteen will be provided to allow workers to prepare and eat food. This facility will incorporate provisions so that organic waste will be segregated for separate collection. Segregation at source and separate collection of organic waste is required in accordance with the Waste Management (Food Waste) Regulations 2009 (if food is prepared on site).

Waste Electrical and Electronic Equipment (WEEE):

WEEE that does not contain hazardous components will be stored in dedicated covered cages/receptacles/pallets pending collection for recycling. There is not expected to be any significant amounts of such materials as there are little by way of existing buildings on the subject site.

Non-Recyclable Waste:

C&D waste which is not suitable for reuse or recovery will be placed in separate skips or other receptacles. This will include polystyrene, some cardboard and plastic which are deemed unsuitable for recycling.

Prior to removal from site, the non-recyclable waste skip/receptacle will be examined by a member of the waste team to determine if recyclable materials have been misplaced. 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.

Hazardous Wastes:

On-site storage of any hazardous wastes produced (i.e. contaminated soil 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 as described in the OCSC *Soil Waste Management Plan*.

MANAGEMENT & CONTROL SYSTEMS

It will be the role of an appointed Waste Manager to try to find alternative options for demolition waste before sending it to landfill. Waste materials will be stored in the specifically designated compound. All waste collected from the site will be by a permitted waste contractor, under the Waste Management (Collection Permit) Regulations 2001. The contractor will provide the Waste Manager on site with documentation of the waste to be removed and a copy of the waste collection permit. Prior to the waste leaving the site, the Waste Manager will have documentation to show where the waste is being taken to, and that the facility is licensed to accept the particular waste. A receipt will be issued for each load that leaves the site.

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 Contractor. All movement of waste and the use of waste contractors will be undertaken in accordance with the Waste Management Acts 1996 - 2008, Waste Management (Collection Permit) Regulations 2007 and Amendments and Waste Management (Facility Permit & Registration) Regulations 2007 and Amendments. This includes the requirement for all waste contractors to have a waste collection permit issued by the NWCPO. The nominated project Waste Manager will maintain a copy of all waste collection permits.

Some wastes may be transported to another site for reuse on that site. The Waste Manager will be in contact with other sites to ensure that as much waste is reused as possible, such as concrete for fill purposes etc. All wastes leaving the site will be placed in appropriate containers. Any concrete, soil, gravel, or broken stone transported off site will be covered to prevent dust or particle emissions from the load.

If the waste is being transported to another site, a copy of the Local Authority waste permit or EPA Waste Licence for that site will be provided to the nominated project Waste Manager. If the waste is being shipped abroad, a copy of the Transfrontier Shipping (TFS) document will be obtained from Dublin City Council (as the relevant authority on behalf of all local authorities in Ireland) and kept on-site along with details of the final destination (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.

6. FINANCIAL ISSUES OF WASTE

An outline of the costs associated with different aspects of waste management is provided below. The total cost of implementation of this CDWMP will be measured and will take into account handling costs, storage costs, transportation costs, revenue from rebates and disposal costs.

REUSE/RECOVERY

By reusing materials on site, there will be a reduction in the transport and disposal costs associated with the requirement for a waste contractor to take the material away to landfill. 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 for such purposes, reducing final waste disposal costs.

RECYCLING

Salvageable metals will earn a rebate which can be offset against the cost of collection and transportation of the skips. Clean uncontaminated cardboard and certain hard plastics can 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.

DISPOSAL

Landfill charges in the Leinster region are currently at around €160/tonne (includes a €75 per tonne landfill levy introduced under the Waste Management (Landfill Levy) (Amendment) Regulations 2012). 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.

7. TRAINING PROVISIONS

Training Provisions for Waste Manager and Site Crew

One of the construction team or the foreperson will be appointed as a Waste Manager to ensure commitment, operational efficiency and accountability. The 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 him/her in the organisation, operation and recording of the waste management system on the 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 salvage on site.

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 the waste management on site. He/she will be also trained in the best methods for segregation and storage of recyclable materials, have information on the materials that can be reused on site and know how to implement the CDWMP.

Training of the site crew is the responsibility of the Waste Manager. A waste training program will be organised. A basic awareness course will be held for all site crew to outline the CDWMP and to detail the segregation of waste materials at source. This may be incorporated into the induction course or the safety-training course. This basic course will describe the materials to be segregated, the storage methods and the location of the waste storage areas. A subsection on hazardous wastes will be incorporated and the particular dangers of each hazardous waste will be explained.

8. RECORD KEEPING, AUDITING & CONSULTATION

RECORD KEEPING

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

The Waste Manager or a member of his team will record the following:

- Waste taken for Reuse off-site (i.e. for capping of landfill cells or at another site);
- Waste taken for Recycling;
- Waste taken for Disposal;
- Reclaimed waste materials brought on-site for reuse.

For each movement of waste on- or off-site, the Waste Manager will obtain a signed docket 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 construction 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 construction waste and to highlight the successes or failures against these targets.

OUTLINE WASTE AUDIT PROCEDURE

The appointed Waste Manager on site will be responsible for conducting a waste audit at the site. A review of all the records for the waste generated and transported on- or off-site will be undertaken. 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.

A Summary Report will be prepared and 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.

CONSULTATION

Ongoing consultation with waste contractors and Dublin City Council will be pursued in order to ensure that the best practicable option is being followed for waste management on site.

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