

Strategic Housing Development, Blackrock, Dundalk, Co. Louth.

Outline Construction and Demolition Waste
Management Plan

Kingsbridge Consultancy Ltd.

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Notice

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1. Introduction

This Outline Construction and Demolition (C&D) Waste Management Plan (WMP) has been prepared by WS Atkins Ireland Ltd. (Atkins) on behalf of Kingsbridge Consultancy Ltd. (the applicant) as part of the supporting documents required for a planning application for a proposed residential development at Blackrock, Dundalk, Co. Louth. The proposed development, on a 17.9Ha greenfield site, comprises the construction of 483no. residential units, an access road, creche, 824no. car parking spaces (including 2no. undercroft parking facilities with a combined total of 96no. spaces), 512no. cycle parking spaces, open space / landscaped areas, and all associated ancillary works. The proposed development will be accessed from Blackrock Road. The existing site is bounded to the north by residential housing and Finnabair Industrial Park, to the west by Dundalk Golf Course, to the east by urban residential developments and agricultural land, and to the south by agricultural land.

The principle objective of this Outline WMP is to provide a framework at the planning stage of the project to facilitate the development of a project specific Detailed C&D WMP by the Contractor. Atkins understands that this development will be constructed as 11no. phases. Therefore, the following waste management considerations will apply for the entire life-cycle of this construction project (hereafter referred to as 'the project').

1.1. Aim of the Plan

The purpose of this plan is to provide sufficient information to ensure that the management of construction waste is undertaken in accordance with all relevant legislation and best practice standards (as set out in Section 4 of this document). This plan aims specifically to ensure the guiding principles of responsible waste management (prevent, reuse, recycle, recover) are implemented throughout the project, thereby limiting the volume of waste disposed of to landfill.

1.2. Methodology

This document has been prepared in accordance with the relevant industry standard guidance document; '*Best Practice Guidelines on the Preparation of Waste Management Plans for Construction & Demolition Projects*' (Department of Environment, Heritage and Local Government (DoEHLG), 2006);

In addition, the following relevant best practice guidance documents have also been consulted:

- 'Waste Classification: List of Waste & Determining if Waste is Hazardous or Non-Hazardous' (EPA, 2015);
- 'A review of Design and Construction Waste Management Practices on Selected Case Studies – Lessons Learned' (EPA, 2015);
- 'Design out Waste: Preparation of Waste Reduction Factsheets for Design Teams' (EPA, 2015); and,
- 'Development of an Audit Methodology to Generate Construction Waste Projection Indicators for the Irish Construction Industry' (EPA, 2009).

1.3. Need for the Plan

Within Section 3.1 of the guidelines (DoEHLG, 2006) relevant thresholds for developments are identified above which there is a requirement for the preparation of a project specific Detailed C&D WMP. This Outline WMP has been prepared as the proposed development falls under the following criterion:

'New residential development of 10 houses or more'.

This document applies only to the construction stage of the proposed development. A standalone WMP should be prepared separately for the operational stage, in advance of the site being fully commissioned.

1.4. Format of the Plan

This is a live document, which will be updated throughout the project lifecycle. This document will provide a framework for waste management and will clearly identify the processes that will be implemented onsite, whilst also seeking to ensure compliance with relevant waste legislation, government policy objectives and project

specific waste objectives. The Plan will provide a mechanism for monitoring and auditing waste management performance and compliance for the duration of the project. This document provides a detailed overview of key waste management considerations for the project at this preliminary stage, while also allowing for further refinement as the project progresses through to the design and construction stages.

It will be the responsibility of the appointed Contractor to develop this document further and to prepare a project specific Detailed C&D WMP, as more information becomes available and there is more certainty in terms of the proposed project layout, construction methods, programme and waste streams.

1.5. List of Acronyms

The following list of abbreviations have been used within this document;

- AOD – Above Ordnance Datum
- C&D - Construction and Demolition
- DoEHLG - Department of Environment, Heritage and Local Government
- LCC – Louth County Council
- EPA - Environmental Protection Agency
- EWC - European Waste Catalogue
- NWCPO - National Waste Collection Permit Office
- PSCS - Project Supervisor Construction Stage
- PSDP - Project Supervisor for the Design Process
- SDS - Safety Data Sheet
- LoW - List of Waste
- WAC - Waste Acceptance Criteria
- WMP - Waste Management Plan

1.6. Site Location & Surrounding Land Use

The proposed development site is located at an existing 17.9Ha greenfield site in Blackrock, Dundalk, Co. Louth. For the purposes of this report the site boundary is outlined in red in Figure 1.1 below. The site is bordered to the north by residential developments, Bothar Maol, and Finnabair Industrial Park, to the west by Dundalk Golf Course, to the east by rural residential housing / agricultural land and to the south by agricultural land.

1.7. Roles & Responsibilities

For the purposes of clarity, the roles and responsibilities of the project team for the proposed development should be determined at the very outset of the construction stage of this project. Key roles are typically performed by the Client, Engineer, and Contractor. Specific details will be determined during the Detailed Design and Contract stage.

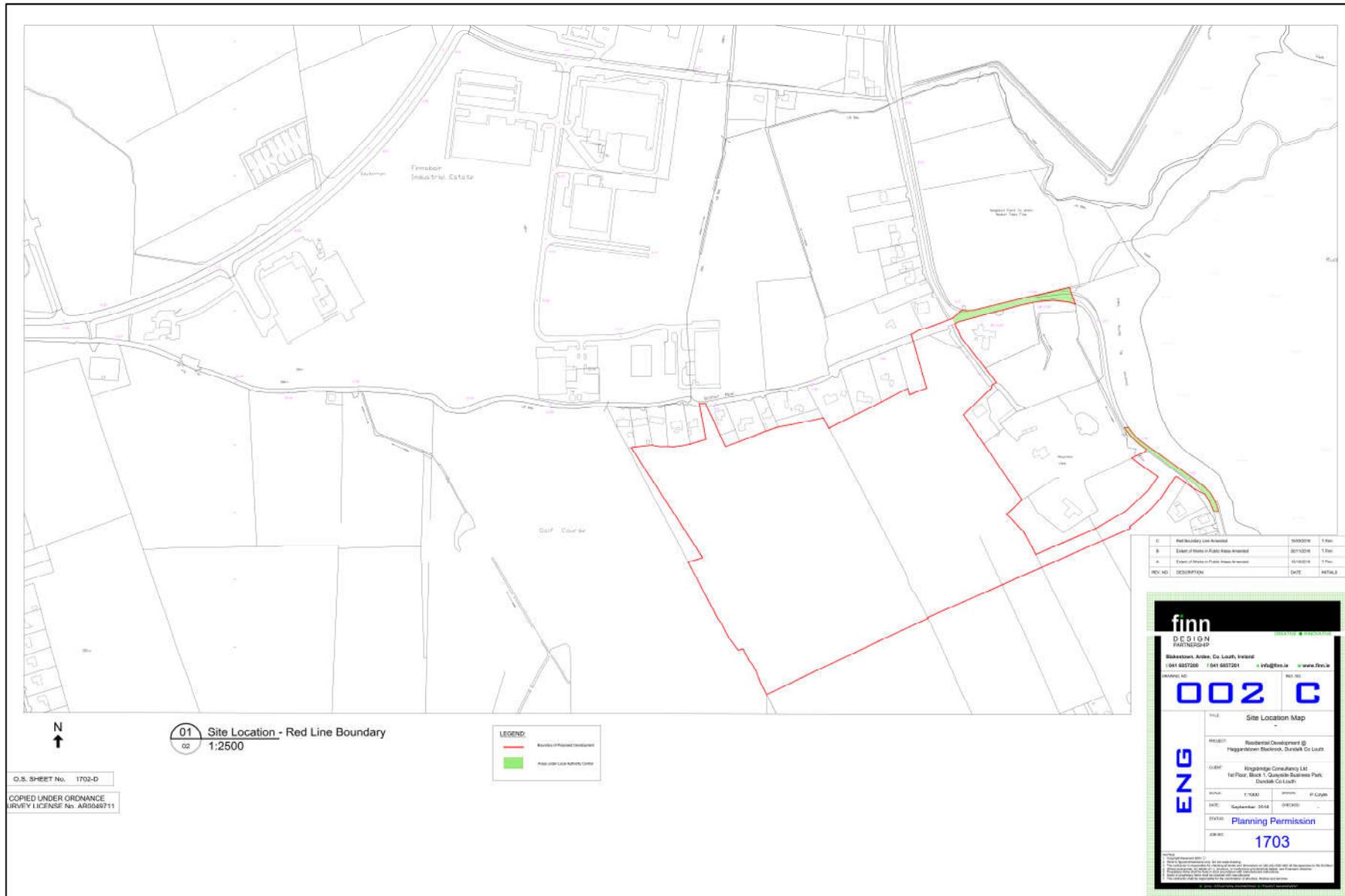


Figure 1.1 - Site Location

2. Project Details

2.1. Location, Nature and Scale of the Development

The proposed residential development will facilitate the growing population of the general Dundalk area. The area of Blackrock benefits from connectivity to the M1 motorway, which allows for reasonable commuting distances to Dublin and Belfast Cities and their surrounding areas. The proposed development lands are designated as 'Residential 2' and 'Recreation, Amenity and Open Space' zoning by Louth County Council (LCC) within the Dundalk and Environs Development Plan 2009-2015. The zoning objective vision for these lands is stated by LCC as follows:

- 'To provide for new residential communities and supporting community facilities subject to the availability of services'; and,
- 'To provide for the provision of public parks, open spaces, amenity and recreational facilities.'

Refer to Figure 2.1 for the proposed development layout. Further details of the proposed development are presented in the planning documents and drawings submitted as part of this planning application. No demolition works will be required on this project.



Figure 2.1 - Proposed Development Layout

2.2. Details of the Non-Hazardous Wastes to be produced

Waste materials generated during the construction stage will primarily comprise topsoil, subsoil and excavated bedrock (via excavation during the installation of structural foundations, internal roads, drainage networks and underground utilities), surplus general building waste materials, and waste generated by construction workers.

In accordance with good practice, excavated soils will be reused onsite where feasible, including for boundary treatment and landscaping purposes. Given that the site is a greenfield site (both currently and historically) and taking account of site-specific information (including '*Proposed Residential Development Blackrock Dundalk County Louth Ground Investigation Factual and Interpretative Report*' prepared by Geotechnical Environmental Service Limited, 2018), it is assumed that all of the soils excavated during the construction stage will be native material. Therefore (subject to appropriate testing), such materials should largely be suitable for onsite reuse. Any surplus material will be disposed of offsite.

According to the EPA '*Correct classification is the foundation for ensuring that the collection, transportation, storage and treatment of waste is carried out in a manner that provides protection for the environment and human health and in compliance with legal requirements*'. Hence soils requiring offsite disposal must be characterised as per the requirements of the relevant Waste Acceptance Criteria (WAC) under the European Communities Council Decision ((EC) 92003/33/EC) '*COUNCIL DECISION of 19 December 2002 establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 of and Annex II to Directive 1999/31/EC*'. Soils requiring offsite disposal will also require waste classification in strict accordance with the requirements of the EPA as set out in the following document '*Waste Classification List of Waste & Determining if Waste is Hazardous or Non-hazardous*' (EPA, 2015). All waste soils removed from site must be transported by appropriately permitted hauliers and must be disposed of to an appropriately authorised disposal / recovery facility (via. valid Certificate of Registration, Waste Facility Permit, or Waste Facility Licence).

Surplus construction materials including concrete blocks, cladding, metals, tiles, glass, plastics, packaging, and timber will be generated during the Construction Phase. Materials will be segregated and recycled where possible; all other materials will be disposed of offsite. Additional waste generated by onsite personnel during the construction works will include the following; canteen waste, waste arising from temporary onsite self-contained welfare facilities, and a minor volume of waste electrical and electronic equipment.

2.3. Potential Hazardous Wastes to be produced

2.3.1. Fuels, Oils and Chemicals

Hazardous materials (fuels, oils and chemicals) will be used at the site during the Construction Phase. As per industry standards any fuel and oils temporarily stored onsite will be stored in double skinned / appropriately banded storage tanks, in a secure dedicated fuel storage location onsite. All other chemicals including paints, varnishes, glues, adhesives, degreasing agents and cleaning agents will be securely stored in a dedicated temporary banded chemical store onsite. All machinery including any generators / pumps used onsite should be checked at the start of each work shift for evidence of any fuel or oil leaks (and removed offsite for any repairs as may be required).

Fuel, oil and chemical spill kits should be available at the designated storage areas, along with the relevant Safety Data Sheet (SDS). SDS documents contain information on the potential hazards (health, fire, reactivity and environmental) and how to work safely with the relevant chemical. All site operatives should receive training in appropriate refuelling methods and machinery checks, and chemical handling methods to be implemented onsite. Taking account of these control measures, along with the fact that the volumes of paints, varnishes, glues, adhesives etc. will be minor, it is not expected that any waste fuel, oil or chemicals will be generated during the Construction Phase.

2.3.2. Contaminated Soils

Based on available information no potential sources of onsite ground contamination associated with current or historic land-use have been identified. Therefore, the risk of encountering ground contamination beneath the site is considered to be highly unlikely at this preliminary juncture.

Nonetheless excavation works during the Construction Phase should be monitored and in the highly unlikely event that contaminated materials are encountered these will need to be segregated from all uncontaminated soils, temporarily stored (any stockpiles should be lined and covered by heavy duty 1000 gauge plastic) sampled and analysed for relevant parameters (Waste Acceptance Criteria suite e.g. Rilta Disposal Suite). Any contaminated soils must be characterised as per the requirements of the relevant Waste Acceptance

Criteria (WAC) under the relevant European Communities Council Decision (EC) (92003/33/EC), and classified in accordance with the requirements of the EPA as set out in the following documents 'Waste Classification List of Waste & Determining if Waste is Hazardous or Non-hazardous' (EPA, 2015). Any contaminated soils must be transported by appropriately permitted hauliers and disposed of to an appropriate EPA licensed Waste Facility in accordance with all relevant waste management legislation.

2.3.3. Non-native Invasive Species

The site was surveyed by Brian Keeley for the presence of invasive species in July 2018. The findings of this report (a copy of which is presented in the planning documents and drawings submitted as part of this planning application) clearly state the following:

'There were no invasive species within the landtake nor in the adjoining fields. This is not an issue for this site and there is no requirement to initiate any control measures. Precautionary measures in the introduction of any soil and plants should be implemented but no special requirements apply.'

Therefore, the presence of invasive alien species warrants no further consideration at this juncture. However, in the highly unlikely event that any non-native invasive species including Japanese Knotweed (*Fallopia japonica*) are identified prior to or during construction activity, appropriate measures (designed, scoped and managed by a relevant specialist) will be required in order to remediate any identified Japanese Knotweed stems and any soils impacted by the plant roots.

In regard to non-native invasive species the following points should be noted;

- Regulations 49 and 50 of Part 6 of the European Communities (Birds and Natural Habitats) Regulations, 2011 (S.I. No. 477 of 2011) outlines the legal context for the prohibition of the introduction and dispersal of certain plant and animal species. Specifically, Section 49, paragraph 2 states that any person without the required licence "who plants, disperses, allows or causes to disperse, spreads or otherwise causes to grow" any plant species listed in Part 1 of the Third Schedule within the State shall be guilty of an offence.
- Under Section 50 paragraph 1, a person without the required licence "shall be guilty of an offence if he or she has in his or her possession for sale, or for the purposes of breeding, reproduction or propagation, or offers or exposes for sale, transportation, distribution, introduction or release" of any plant species listed in Part 1 of the Third Schedule or anything from which "a plant referred to in Part 1 of the Third Schedule can be reproduced or propagated or "a vector material listed in Part 3 of the Third Schedule".

2.4. Summary of Potential Waste Streams (LoW / EWC Codes)

A summary of the main hazardous and non-hazardous waste streams, which could arise during the Construction Phase is presented below, along with the relevant List of Waste (LoW) code. The LoW code (also referred to as European Waste Catalogue (EWC) code) serves as a common method of characterising various waste streams. Assignment of waste codes will determine how and where the generated waste can be disposed of. LoW codes must be selected for each waste type – a full description of each code is available on the EPA website¹.

It should be noted that the summary list presented in Table 2.1 is a non-exhaustive list and it will be the Contractor's responsibility to ensure all waste streams generated onsite during the Construction Phase for this project are appropriately characterised, managed and disposed of in accordance with all relevant waste management legislation.

Table 2.1 - Summary list of LoW Codes, which may be relevant to the site (See also Note 1)

| Waste Material | LoW Code |
|---------------------------------------------|----------|
| Concrete, bricks, tiles and ceramics | |
| concrete | 17 01 01 |
| bricks | 17 01 02 |
| tiles and ceramics | 17 01 03 |

¹ https://www.epa.ie/pubs/reports/waste/stats/wasteclassification/EPA_Waste_Classification_2015_Web.pdf

| | |
|------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| mixtures of concrete, bricks, tiles and ceramics other than those mentioned in 17 01 06 | 17 01 07 |
| Wood, glass and plastic | |
| wood | 17 02 01 |
| glass | 17 02 02 |
| plastic | 17 02 03 |
| Bituminous mixtures, coal tar and tarred products | |
| bituminous mixtures | 17 03 02 |
| metals (including their alloys) | |
| mixed metals | 17 04 07 |
| Soil (including excavated soil from contaminated sites), stones and dredging spoil | |
| soil and stones containing hazardous substances | 17 05 03* |
| soil and stones other than those mentioned in 17 05 03 | 17 05 04 |
| Gypsum-based construction material | |
| Gypsum-based construction material | 17 08 02 |
| Other construction and demolition wastes | |
| mixed construction and demolition wastes other than those mentioned in 17 09 01, 17 09 02 and 17 09 03 | 17 09 04 |
| Miscellaneous Waste | |
| Paper and cardboard | 20 01 01 |
| biodegradable waste (Green waste) | 20 02 01 |
| batteries and accumulators included in 16 06 01, 16 06 02 or 16 06 03 and unsorted batteries and accumulators containing these batteries | 20 01 33* |
| batteries and accumulators other than those mentioned in 20 01 33 | 20 01 34 |
| Waste fuel oil and diesel | 13 07 01* |
| Waste petrol | 13 07 02* |
| Waste other fuels (including mixtures) | 13 07 03* |
| Chemicals – Solvents | 20 01 13* |
| Chemicals – Pesticides | 20 01 19* |
| Chemicals - paint, inks, adhesives and resins containing hazardous substances | 20 01 27* |
| Chemicals - paint, inks, adhesives and resins other than those mentioned in 20 01 27 | 20 01 28 |
| Chemicals - detergents containing hazardous substances | 20 01 29* |
| Chemicals - detergents other than those mentioned in 20 01 29 | 20 01 30 |
| insulation materials other than those mentioned in 17 06 01 and 17 06 03 | 17 06 04 |

| Waste Material | LoW Code |
|------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| Concrete, bricks, tiles and ceramics | |
| concrete | 17 01 01 |
| bricks | 17 01 02 |
| tiles and ceramics | 17 01 03 |
| mixtures of concrete, bricks, tiles and ceramics other than those mentioned in 17 01 06 | 17 01 07 |
| Wood, glass and plastic | |
| wood | 17 02 01 |
| glass | 17 02 02 |
| plastic | 17 02 03 |
| Bituminous mixtures, coal tar and tarred products | |
| bituminous mixtures | 17 03 02 |
| metals (including their alloys) | |
| mixed metals | 17 04 07 |
| Soil (including excavated soil from contaminated sites), stones and dredging spoil | |
| soil and stones containing hazardous substances | 17 05 03* |
| soil and stones other than those mentioned in 17 05 03 | 17 05 04 |
| Gypsum-based construction material | |
| Gypsum-based construction material | 17 08 02 |
| Other construction and demolition wastes | |
| mixed construction and demolition wastes other than those mentioned in 17 09 01, 17 09 02 and 17 09 03 | 17 09 04 |
| Miscellaneous Waste | |
| Paper and cardboard | 20 01 01 |
| biodegradable waste (Green waste) | 20 02 01 |
| batteries and accumulators included in 16 06 01, 16 06 02 or 16 06 03 and unsorted batteries and accumulators containing these batteries | 20 01 33* |
| batteries and accumulators other than those mentioned in 20 01 33 | 20 01 34 |
| Waste fuel oil and diesel | 13 07 01* |
| Waste petrol | 13 07 02* |
| Waste other fuels (including mixtures) | 13 07 03* |
| Chemicals – Solvents | 20 01 13* |
| Chemicals – Pesticides | 20 01 19* |

| | |
|--------------------------------------------------------------------------------------|-----------|
| Chemicals - paint, inks, adhesives and resins containing hazardous substances | 20 01 27* |
| Chemicals - paint, inks, adhesives and resins other than those mentioned in 20 01 27 | 20 01 28 |
| Chemicals - detergents containing hazardous substances | 20 01 29* |
| Chemicals - detergents other than those mentioned in 20 01 29 | 20 01 30 |
| insulation materials other than those mentioned in 17 06 01 and 17 06 03 | 17 06 04 |

Note 1: The use of an asterisk on a LoW code denotes that the material is characterised as hazardous.

3. Waste Management – Policies, Legislation And Guidance

3.1. National Level

The implementation of the Waste Management Act in 1996 provided a legal basis for waste management, practice and infrastructure in Ireland. Following the implementation of this Act government policy moved from primarily relying on landfill disposal towards a more sustainable system of waste treatment through the promotion of recycling and recovery. The policy document entitled ‘Changing our ways’ (DoEHLG, 1998) set specific targets for recycling and consolidated the now familiar waste hierarchy of prevention, minimisation, reuse/recycling, energy recovery and disposal. This approach was supported by subsequent legislation.

In 2002, the policy statement ‘Preventing and Recycling Waste: Delivering Change’ (DoEHLG, 2002) specifically focused on waste prevention and recycling. This document emphasised the importance of adopting a hierarchical approach, with prevention highlighted as the most desirable option. Various national waste prevention programmes and best practice guidance documents were subsequently delivered by the government.

The relevant guidance document in respect of the preparation of waste management plans for the construction sector was subsequently published by the DoEHLG in 2006. This document, entitled ‘Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects’ clearly sets out recommendations for the development of C&D WMPs. The purpose of these guidelines was to promote an integrated approach to the management of C&D waste, which all parties from planners, designers, contractors and regulators can adopt throughout the project lifecycle, to ultimately minimise the generation of C&D waste and to establish specific thresholds for the requirement of a C&D WMP.

In 2011 the revised EU Waste Framework Directive was transposed into Irish law by the European Commission (Waste Framework Directive) Regulations 2011 (SI 126 of 2011) (EC, 2008). The Waste Framework Directive focussed on sustainable and efficient materials management strategy and provides a legal basis for the waste hierarchy. Therefore, the waste hierarchy presented in Figure 3-1 should be applied as a priority in Ireland.

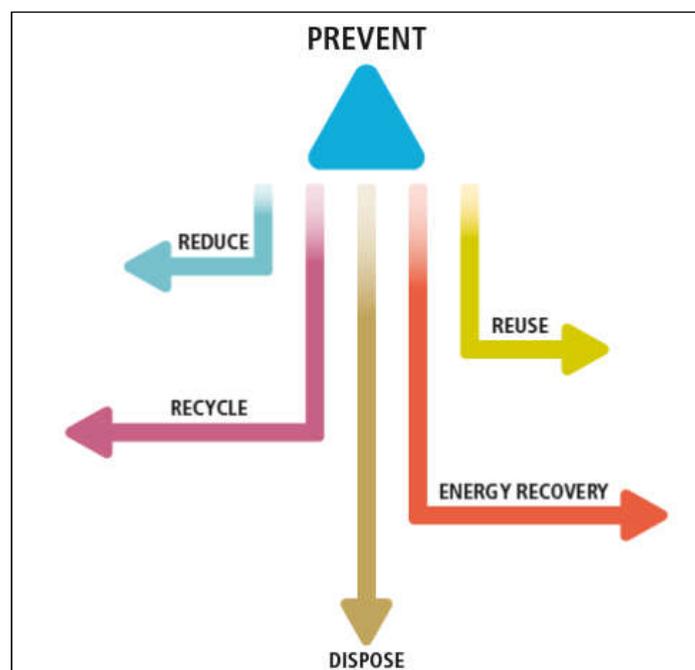


Figure 3.1 - Accepted Best Practice Waste Hierarchy (EPA, 2018)

In 2012 the Government published a new policy document entitled ‘A Resource Opportunity Waste Management Policy in Ireland’ (DoECLG, 2012). This document sets out the steps to be implemented on a national scale in order to make further progress on resource efficiency and seeking the elimination of landfilling

of municipal waste in Ireland. This approach is further supported by subsequent guidance including the EPA publication 'Green Procurement: Guidance for the Public Sector' (EPA, 2014), which clearly states the following Core Green Public Procurement (GPP) Criteria for the Construction sector:

- Construction environmental management plan;
- Staff training;
- Management of fuel and hazardous substances;
- Use of secondary aggregate and recycled materials;
- Water Management; and,
- Waste Management.

This EPA publication clearly sets out the responsibility of the Contractor with regard to waste management and disposal, as follows:

'The Contractor must apply appropriate measures in order to reduce and recover waste that is produced during the construction activity. The Contractor shall prepare and submit a waste management plan with its tender which shall form part of the Construction Management Plan to be agreed with the Contracting Authority in advance of the commencement of works. The waste management plan must be prepared in accordance with the Department of Environment, Community and Local Government Best practice guidelines on the preparation of waste management plans for construction and demolition projects (2006).

'Contractors are responsible for disposing of all waste generated under the contract in accordance with the Waste Management Act 1996 as amended. The Contractor must have full use of, or access to, waste disposal facilities with appropriate licenses and permits. The Contractor must provide copies of valid EPA Waste licences and Local Authority Waste Permits (including those relating to their subcontractors or brokers, where applicable) for collection and waste treatment/disposal/export facilities.

3.2. Regional Level

The relevant Regional Waste Management Plan for Louth County Council is the Eastern-Midlands Region Waste Management Plan 2015-2021. The Eastern-Midlands Region encompasses the following local authorities: Dublin City, Dún Laoghaire-Rathdown, Fingal, South Dublin, Kildare, Louth, Laois, Longford, Meath, Offaly, Westmeath and Wicklow. The regional plan, which was launched in May 2015, provides the framework for waste management up to 2021 and sets out a range of policies and actions in order to meet mandatory and performance targets. The key objectives of this plan are as follows:

- **Prevent waste:** a reduction of one per cent per annum in the amount of household waste generated over the period of the plan;
- **Increase recycling:** increase the recycling rate of municipal waste to 50 per cent by 2020; and,
- **Further reduce landfill:** eliminate all unprocessed residual municipal waste going to landfill from 2016.

The overarching objectives of the Eastern-Midlands Region Waste Management Plan 2015-2021 have been incorporated into the latest development plan pertinent to this site i.e. Louth Development Plan 2015-2021 (LCC). According to LCC (2015) all Regional Waste Management Plans have the following objectives:

- Prevent or minimise the production and harmful nature of waste;
- Encourage and support the recovery of waste;
- Ensure that such waste as cannot be prevented or recovered is safely disposed of; and,
- Address the need to give effect to the polluter pays principle, in relation to waste disposal.

The Louth Development Plan 2015-2021 specifically states the following with regards to construction and demolition waste management:

'... developers and builders should minimise construction waste generated in development projects. During the construction process measures should be implemented to minimise soil removal (as part of the scheme design process), properly manage construction waste and encourage off-site prefabrication where feasible.

3.3. Waste Legislation

It will be the Contractor's responsibility to ensure that they are familiar with and comply with the requirements of all relevant waste legislation for the duration of the project. The following non-exhaustive list of legislative requirements typically apply to the construction stage of major developments:

- Waste Framework Directive 2008/98/EC of the European Parliament and Council on waste, as amended, 2018 (S.I. 2018/851);
- European Communities (Waste Directive) Regulations 2011 (SI 126 of 2011) as amended 2016 (S.I. 315 of 2016);
- Waste Management Act of 1996, 2001 and 2003;
- Litter Pollution Act of 1997, and as amended in 2017;
- Litter Pollution Regulations 1999, S.I. No. 359 of 1999);
- European Communities (Waste Electrical and Electronic Equipment) Regulations 2011 (S.I. 355 of 2011), as amended 2011 (S.I. No. 397 of 2011), 2013, (S.I. No. 32 of 2013);
- European Union (Waste Electrical and Electronic Equipment) Regulations 2014 (S.I. No. 149 of 2014);
- Waste Management (Facility Permit and Registration) Regulations 2007, S.I. No. 821 of 2007, as amended, 2008 (S.I. No. 86 of 2008), 2015 (S.I. No. 198 of 2015);
- Waste Management (Collection Permit) Regulations 2007, S.I. No. 820 of 2007), as amended, 2015 (S.I. No. 197 of 2015), 2016 (S.I. No. 24 of 2016);
- Waste Management (Licensing) Regulations 2004 (S.I. No. 395 of 2004) as amended 2010 (S.I. No. 350 of 2010);
- Waste Management (Miscellaneous Provisions) Regulations, 1998, S.I. No. 164 of 1998;
- Waste Management (Miscellaneous Provisions Act 2015);
- Waste Management (Landfill Levy) Regulations 2008, S.I. No. 199 of 2008, as amended 2009, (S.I. No. 550 of 2009), 2010 (S.I. No. 31 of 2010), 2012 (S.I. No. 221 of 2012), 2013 (S.I. No. 194 of 2013), 2015 (S.I. No. 189 of 2015);
- Waste Management (Hazardous Waste) Regulations, 1998, as amended, 2000 (S.I. No. 73 of 2000);
- Waste Management Shipment of Waste Regulations 2007, S.I. No. 419 of 2007;
- Waste Management (Movement of Hazardous Waste) Regulations, 1998 (S.I. No. 147 of 1998);
- European Communities (Shipments of Hazardous Waste Exclusively within Ireland) Regulations 2011, S.I. No 324 of 2011;
- European Communities (Transfrontier Shipment of Waste) Regulations 1994 (S.I. No. 121 of 1994);
- Waste Management (Transfrontier Shipment of Waste) Regulations 1998, as amended, 2014 (S.I. No. 861 of 2014);
- Waste Management (Tyres and Waste Tyres) Regulations 2007 (S.I. No. 664 of 2007), as amended 2017, (S.I. No. 400 of 2017), 2018 (S.I. No. 96/2018);
- European Union Batteries and Accumulators Regulations 2014, S.I. No. 283 of 2014, as amended, 2014 (S.I. No. 349 of 2014), 2015 (S.I. No. 347 of 2015);
- Waste Management (Registration of Brokers and Dealers) Regulations 2008, SI No. 113 of 2008;
- Waste Management (Prohibition of Material Disposal by burning) Regulations 2009, S.I. No. 286 of 2009, as amended 2013 (S.I. No. 504 of 2013), 2017 (S.I. No. 599 of 2017);
- European Communities (Waste Directive) Regulations 2011, S.I. No. 126 of 2011, as amended 2016 (S.I. No. 315 of 2016);
- European Waste Catalogue (EWC) and Hazardous Waste List 2002;
- Waste Management (Food Waste) Regulations 2009, S.I. No 508 of 2009, as amended, 2015 (S.I. No. 430 of 2015);
- European Union (Properties of Waste which Render it Hazardous) Regulations 2015, S.I. No. 233 of 2015, as amended 2018 (S.I. No. 383 of 2018);
- Air Pollution Act, 1987 (Emission Limit Values for use of Asbestos) Regulations, 1990, S.I. No. 28 of 1990, as amended 1996 (S.I. No. 264/1996);
- EC (Control of Emissions of Gaseous & Particulate Pollutants from Non-Road Mobile Machinery) Regulations 2007, S.I. No.147 of 2007, as amended, 2011 (S.I. No. 263 of 2011), 2012 (S.I. No. 407 of 2012), 2013 (S.I. No. 417 of 2013), 2016 (S.I. No. 2016/1628);

- The EU Regulation 2037/2000 (CFC's, HCFC's, Halons) - Ozone Depleting Substances. Control of Substances that Deplete the Ozone Layer Regulations 2006, S.I. No 281 of 2006, as amended, 2011 (S.I. No. 465 of 2011);
- EU F Gas Regulations 2014, S.I. No. 517 of 2014;
- Waste Management (Packaging) Regulations 2007 (S.I. No. 798 of 2007), as amended 2014 (S.I. 282 of 2014), 2015 (S.I No 542 of 2015);
- Planning and Development Acts 2000 to 2015, as amended (2018);
- Protection of Environment Act 1992 as amended (2003 and 2017).

3.4. Relevant Guidance

The purpose of the DoEHLG (2006) guidelines (*'Best Practice Guidelines on the Preparation of Waste Management Plans for Construction & Demolition Projects'*) was to establish a common framework and standard methodology for the preparation of WMPs within the Construction sector. This document provides a clear definition of C&D waste:

'Construction and demolition waste is defined as waste which arises from construction, renovation and demolition activities, together with all waste categories mentioned in chapter 17 of the European Waste Catalogue (EWC). Also included within the definition are surplus and damaged products and materials arising in the course of construction work or used temporarily during the course of onsite activities'.

The following specific objectives are set out within the guidelines:

- To promote a clear, integrated strategy for the management of C&D waste which is followed throughout the project lifecycle;
- To set out a process which the Client, planner, designer, Contractor, sub-contractors and suppliers can engage in proactively in order to reduce C&D waste and to improve waste management procedures;
- To provide a standardised platform for designers, developers, practitioners and competent authorities in order to assess the robustness and adequacy of C&D WMPs; and,
- To provide guidance as to when a C&D WMP is required through the establishment of clear thresholds.

4. Waste Management

4.1. Soil Generation

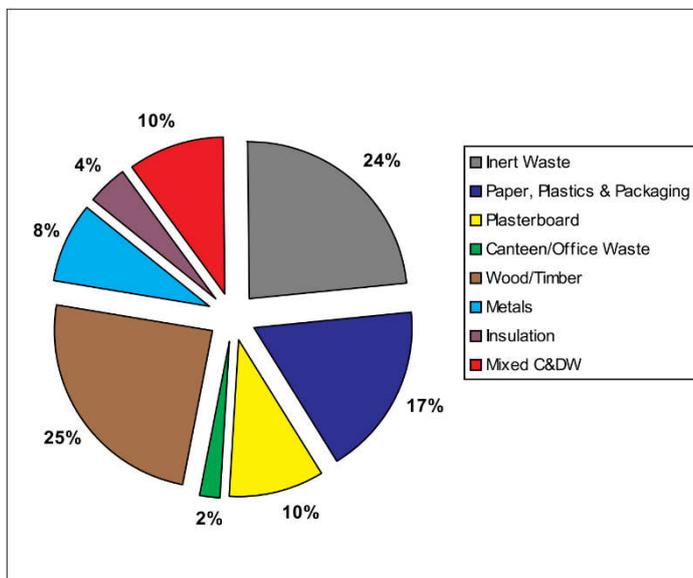
It is estimated that a total soil volume of c.46,929 will be generated during the construction of the proposed development, as the application site will require some levelling and excavation for utilities, building foundations, services and roads. Fill material will predominately comprise imported aggregate as required for construction. A preliminary breakdown of proposed cut and fill volumes is presented in Table 4.1.

Table 4.1 - Preliminary Estimated Cut and Fill Volumes

| Construction Element | Cut (m ³) | Fill (m ³) |
|---------------------------------|-----------------------|------------------------|
| Roads | 14,729 | 3,521 |
| Drainage/Services (Excavations) | 16,895 | 14,365 |
| Infiltration Basin/Pond | 3,551 | 200 |
| Dwellings | 4,635 | 9,459 |
| Under-croft Car Parking | 7,119.3 | 1,076 |
| Total | 46,929 | 28,621 |

4.2. Construction Waste Generation

A typical breakdown of C&D wastes generated during construction of this development type in Ireland is presented in Figure 4.1 below (EPA, 2009).



Taking account of an average generated waste factor of 0.107m³ per m² (of completed floor space) for 'new residential construction' (EPA, 2009)², and based on the building floor space areas for the proposed development provided by O'Mahony Pike (OMP) Architects, preliminary waste volumes have been calculated, and are estimated to be 5,686m³ or 4,958 tonnes.

The total estimated C&D waste volume of 5,686m³ (4,958 tonnes) has been further broken down into various waste streams tonnages, as presented in Table 4.2.

This calculation is based on representative data gathered during a case study of waste composition arising from a new residential construction (EPA, 2009) (refer to Figure 4.1). Volumes have been converted to tonnes using factors obtained from relevant UK waste guidance³.

Figure 4.1 - New residential construction composition by volume (m³) (C&D Waste) (EPA, 2009).

It is noted that these volumes are based on literature values for representative Irish construction sites and are an approximate guideline only. In addition, no specific allowance has been made for C&D waste arising from

² Waste factor based on EPA audited data from 19no. new residential construction sites (2004 to 2005). EPA STRIVE Report Series 26 (2009) available at: http://www.epa.ie/researchandeducation/research/researchpublications/strivereports/STRIVE_26_Kelly_ConstructionWaste_syn_web.pdf

³ http://www.sustainabilityexchange.ac.uk/conversion_factors_for_calculation_of_weight_to_vol?end

the construction of access roads, utilities and services. Final volumes can only be confirmed via site audited waste disposal / recovery records.

Table 4.2 - Predicted Construction Waste Generation for each development type – Breakdown for each Waste Stream

| Property | Estimated Volume of C&D Waste (m3) | Estimated Waste Stream - Breakdown (tonnes) | | | | | | | |
|--------------------|------------------------------------|---------------------------------------------|------------------------|-----------------------|-----------------|--------------------------------------|---------------------------------|----------------------|---------------------|
| | | Mixed C&D Waste (tonnes) | Wood / Timber (tonnes) | Plasterboard (tonnes) | Metals (tonnes) | Paper, Plastics & Packaging (tonnes) | Canteen / Office Waste (tonnes) | Inert Waste (tonnes) | Insulation (tonnes) |
| TA | 463 | 56 | 81 | 46 | 44 | 47 | 7 | 111 | 11 |
| TB | 359 | 43 | 63 | 36 | 34 | 37 | 5 | 86 | 9 |
| TC | 162 | 19 | 28 | 16 | 16 | 17 | 2 | 39 | 4 |
| TC1 | 115 | 14 | 20 | 11 | 11 | 12 | 2 | 28 | 3 |
| TD | 47 | 6 | 8 | 5 | 4 | 5 | 1 | 11 | 1 |
| TE | 341 | 41 | 60 | 34 | 33 | 35 | 5 | 82 | 8 |
| TF | 103 | 12 | 18 | 10 | 10 | 10 | 2 | 25 | 2 |
| TG | 646 | 78 | 113 | 65 | 62 | 66 | 10 | 155 | 16 |
| D.B. | 17 | 2 | 3 | 2 | 2 | 2 | 0 | 4 | 0 |
| TH | 113 | 14 | 20 | 11 | 11 | 12 | 2 | 27 | 3 |
| TH1 | 106 | 13 | 19 | 11 | 10 | 11 | 2 | 25 | 3 |
| TI | 404 | 48 | 71 | 40 | 39 | 41 | 6 | 97 | 10 |
| TJ | 600 | 72 | 105 | 60 | 58 | 61 | 9 | 144 | 14 |
| 1 Bed Apt. | 379 | 46 | 66 | 38 | 36 | 39 | 6 | 91 | 9 |
| 2 Bed Apt. | 1309 | 157 | 229 | 131 | 126 | 134 | 20 | 314 | 31 |
| DP - 2 Bed | 53 | 6 | 9 | 5 | 5 | 5 | 1 | 13 | 1 |
| DP - 3 Bed | 76 | 9 | 13 | 8 | 7 | 8 | 1 | 18 | 2 |
| Creche | 72 | 9 | 13 | 7 | 7 | 7 | 1 | 17 | 2 |
| Undercroft Carpark | 321 | 38 | 56 | 32 | 31 | 33 | 5 | 77 | 8 |
| Tonnes | - | 682 | 995 | 569 | 546 | 580 | 85 | 1365 | 136 |

4.3. Construction Waste Management & Disposal Costs

In terms of waste management and disposal costs, at this preliminary juncture it would not be feasible to estimate the total cost of waste management and disposal associated with the proposed development. Estimated costs will be determined by the Contractor and presented within the project specific Detailed C&D WMP.

4.4. Proposed Management Strategy for each Waste Stream

One of the key principles set out in the guidelines (DoEHLG, 2006) is the prevention of waste and this concept should be at the core of each project from the planning and preliminary design stages through to the construction and operational phases. Specifically, the guidance states:

'During the inception and preliminary planning stages of the project, special attention should be given to the development of a C&D waste management approach, which should establish goals for the diversion of waste from landfill and focus upon waste prevention, reuse and recycling opportunities'

Therefore, every effort should be made to prevent and limit the amount of waste generated at the very outset of the project. At the preparatory phase of the Construction Phase the following measures will aid the prevention of waste in the first instance:

- Schedule and plan delivery of materials on an 'as needed' basis to limit any surplus materials;
- Schedule and plan delivery of materials in sufficient dimensions so as to optimise the use of these materials onsite;
- Careful handling of materials will limit the potential for any damage; and,
- Where feasible, ensure that sub-contractors are responsible for the provision of the materials they require onsite; this will help reduce any surplus waste.

Each waste stream will be managed onsite as follows:

4.4.1. Native Non-Contaminated Soils

The estimated volume of soil generated during the construction phase (est.: 46,929) will be minimised by reducing / eliminating the need for excavation and importing of capping layers. Lime stabilisation may also be used to reduce the amount of soils generated onsite. The balance of soil materials excavated from the site will be reused where possible for landscaping purposes, and infill where appropriate, ensuring that any residual soil waste is kept to a minimum. Any surplus soil will be characterised and removed offsite in accordance with all relevant waste management legislation.

4.4.2. Mixed C&D Waste

Following segregation onsite, any residual mixed C&D waste (est.: 682 tonnes) will be collected in containers specifically for mixed C&D waste; these will be removed offsite for subsequent offsite separation and disposal at a waste disposal / recovery facility.

4.4.3. Wood / Timber

Timber waste (est.: 995 tonnes) will be segregated in order to prevent contamination by other wastes and will be stored so as to limit the potential for this material to rot. Wooden pallets will be returned to relevant suppliers where possible. Timber offcuts will be reused onsite where feasible. A covered receptacle for waste wood will be placed in the waste storage area, prior to removal from site for recycling. All such timber will be free from chemical treatment.

4.4.4. Metals

Metal waste (est.: 546 tonnes) will be generated during the project, particularly arising from the use of rebar. All waste metal will be segregated offsite at the waste disposal / recovery facility for reuse and recycling. Given the significant scrap value associated with metal waste, this waste will be stored in a dedicated container within

a secure part of the site, and regular collections from site to the waste recycling facility will limit the potential for unauthorised entry and theft.

4.4.5. Paper, plastics and Packaging

Packaging wastes (est.: 580 tonnes) will be removed (paper / cardboard / plastic / general waste) offsite for subsequent offsite separation and disposal at a waste disposal / recovery facility. Waste packaging will be stored in dedicated containers in the waste storage area for collection and subsequent segregation and recycling.

4.4.6. Canteen / Office Waste

Onsite staff canteens will generate food and packaging waste (est.: 85 tonnes). Dedicated containers will be provided at each canteen to permit easy segregation of these wastes; brown bins will be provided for compostable food waste, green bins will be provided for dry recyclables (packaging, hard plastic, paper, cardboard, tetrapak etc.) and black bins will be provided for any residual waste.

4.4.7. Other wastes

In addition to the above waste streams, other waste materials (est.: 2,070 tonnes) will be generated during the construction phase. These residual wastes will typically comprise non- recycling waste such as soiled paper / cardboard / plastics / cloth, canteen food waste, fibreglass, polystyrene insulations and plasterboard. These materials will be stored separately to all other waste streams in order to prevent any cross contamination.

All C&D waste materials will be segregated onsite into the various waste streams, via. dedicated skips and storage areas. Waste will be removed from site by a suitably permitted waste haulage contractor. The Contractor should clearly identify all proposed waste haulage contractors within the project specific Detailed C&D WMP. Each waste haulage contractor must hold a current valid waste collection permit issued by the National Waste Collection Permit Office (NWCPO). All waste materials generated during the Construction Phase must be removed offsite to an appropriately permitted or licenced waste disposal / recovery facility.

4.5. Tracking and Documentation Procedures for Off-Site Waste

All waste transport and disposal / recovery must be carried out in accordance with relevant waste management legislation (outlined in Section 4) and any subsequent future legislation which may apply. A nominated Waste Manager for the project will be responsible for ensuring correct tracking and documentation procedures are undertaken for all waste removed from site during the project. Each consignment of waste removed from site will be tracked and recorded. A site record detailing the date, truck registration, waste type, estimated volume and destination will be filed onsite for each consignment, along with the corresponding truck docket and weighbridge record at the offsite disposal / recovery destination. A copy of the relevant waste collection permits and waste permit / waste licence for the relevant disposal / recovery facilities will be available onsite for the duration of the project.

5. Training Awareness And Competence

5.1. Waste Manager - Training and Responsibilities

The Contractor will nominate a Waste Manager for the duration of the Construction Phase. The Waste Manager will be responsible for the efficient operation of onsite waste management procedures. They will also be responsible for ensuring that all waste removed offsite is appropriately characterised (under the correct LoW / EWC code), transported and disposed of in accordance with all relevant waste management legislation. It will be the Waste Managers responsibility to maintain all waste management and disposal / recovery records onsite throughout the project. These site records should be made available for viewing by the Client, Employer's Representative and statutory consultees (LCC, EPA) as required.

The Waste Manager should be appropriately trained in the correct documentary procedure, waste auditing and best practice methods in onsite waste minimisation and waste management. It will be the Waste Managers responsibility to implement the project specific Detailed C&D WMP during the Construction Phase. Onsite toolbox talks with site operatives to highlight any specific waste management concerns will also be carried out should the need arise.

5.2. Site Operatives - Training and Responsibilities

All site personnel should receive waste management information as part of their initial site briefing from the Waste Manager. The initial briefing should include a discussion of the key points set out in the project specific Detailed C&D WMP, along with the specific procedures to be implemented onsite in order to segregate and appropriately store the generated waste and key control measures such as refuelling procedures and oil, fuel and chemical storage requirements. This will ensure that all onsite personnel are familiar with the site-specific waste management strategy. The project specific Detailed C&D WMP should be available onsite for the full duration of the Construction Phase.

6. Record Keeping

The Contractor, through the appointed Waste Manager, will be responsible for ensuring that the full details of all materials deliveries, materials movements and C&D waste generated are recorded during the Construction Phase. Each C&D waste consignment removed from site will be tracked and documented in order to ensure full traceability of the material from site to the final destination. A single record will be completed for each individual consignment.

The Contractor will also receive printed receipts / weighbridge records from the waste disposal / recovery facilities for each individual consignment. These records will enable the Contractor to accurately quantify the total volume of waste removed for offsite disposal / recovery for each individual waste stream. These records will be maintained onsite and will be made available for auditing of the project specific Detailed C&D WMP.

7. Outline Waste Audit Procedures

According to DoEHLG (2006), a Waste Audit represents a systematic study of the waste management practices applied in the Project and is required in order to highlight firstly, the potential issues that can arise during the waste management process and, secondly, the benefits of waste prevention and minimisation. Therefore, Waste Audits should be carried out routinely onsite by the Waste Manager. The specific Audit Plan will be set out by the Contractor within the project specific Detailed C&D WMP. However, at this preliminary stage the following measures will be undertaken as a minimum:

- When materials arrive on site, they will be properly recorded including the assignment of such materials to specific uses within the works;
- A review will be undertaken of onsite waste management practices in order to identify any improvements which may be required;
- Onsite waste management processes from materials delivery through to waste disposal / recovery (including the quantity, type and composition of all waste) will be reviewed in order to identify any opportunities for waste reduction;
- Corrective actions will be highlighted and implemented following each audit. Such actions include applying 'lessons learned' regarding efficient waste management on this project to other projects in the future to enable further waste reduction; and
- The key steps and findings from each waste audit should be presented in a summary report.

Separately a routine waste report (i.e. Waste Validation Report), which clearly presents the types and total quantities of waste removed from site for subsequent disposal / recovery, transport details and the final destination of each waste stream will be prepared by the Contractor. This report will include all required tracking documentation, including any site records, truck dockets and weighbridge receipts (final destination). The guidelines (DoEHLG, 2006) state that *'these summary reports should be prepared within three months of the end of each calendar year. Where the period of construction is greater than one year, reports should be submitted as required by the local authority'*.

8. Consultation with Relevant Bodies

Appropriate consultation will be undertaken with relevant bodies by various members of the project team as required throughout the project. Relevant consultees include, but are not limited to, the following:

- LCC (as the relevant local authority for waste matters);
- The EPA (as the relevant regulatory body for environmental matters);
- NWCPO;
- Permitted hauliers; and,
- Suitably permitted / licenced waste disposal / recovery facilities.

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