Chapter 10 Waste Management

10.0 Introduction

This EIS Chapter assesses and evaluates the potential impacts associated with waste management during the construction and operational phases of the proposed integrated National Paediatric Hospital Project. The project, which is fully described in Chapter 2 of the EIS, comprises:

- within ï or associated with ï the main project site on the campus of St. Jamesõs Hospital, Dublin 8 are:
    - a new childrenõs hospital and associated Family Accommodation Unit, sited in the west of the campus;
    - a new Childrenõs Research and Innovation Centre sited along Jamesõs Street; and
    - associated works to boundaries, roads, entrances, parking areas, hard and soft landscaping *etc.* within the application site boundary;
- a construction compound, at Davitt Road, Drimnagh, Dublin 12, which is directly associated with the developments at St. Jamesõs Hospital Campus.
- a new children's hospital satellite centre at Tallaght Hospital, Dublin 24; and
- a new children's hospital satellite centre at Connolly Hospital, Blanchardstown, Dublin 15.

The assessment has been conducted in the context of current relevant standards and guidance, and identifies any requirements or possibilities for mitigation. The Chapter has been prepared by AWN Consulting Ltd. (AWN).

10.1 St. James's Hospital Campus

10.1.1 Introduction

The impacts associated with waste generated from the developments at St. Jamesõs Hospital Campus will be assessed in this section for both the construction and operational phases. This assessment will consider the impacts of the following developments:

- New childrenõs hospital;
- associated Family Accommodation Unit
- Childrenõs Research and Innovation Centre; and
- Davitt Road construction compound (offsite compound used for construction phase only).

10.1.2 Methodology

The assessment of the impacts of the proposed development arising from the generation of waste materials was carried out taking account of the methodology specificied in the following guidance documents:

- Environmental Protection Agency (EPA), *Guidelines on the Information to be Contained in Environmental Impact Statements* (2002).
- EPA, *Advice Notes on Current Practice (in the Preparation of EIS)* (2003).
- An extensive document review was carried out to assist in identifying current and future requirements for waste management and included national and regional waste policies, strategies and reports, such as:
- Department of the Environment, Heritage and Local Government (DoEHLG), *Changing Our Ways – A Policy Statement on Waste Management* (1998);
- DoEHLG, *Preventing and Recycling Waste - Delivering Change* (2002);
- DoEHLG, *Making Ireland's Development Sustainable – Review, Assessment and Future Action, World Summit on Sustainable Development* (2002);
- DoEHLG, *Taking Stock and Moving Forward* (2004);

- DoEHLG, *National Strategy on Biodegradable* Waste (2006);
- Department of the Environment, Community and Local Government (DoECLG), *A Resource Opportunity - Waste Management Policy in Ireland* (2012);
- *Eastern-Midlands Region (EMR) Waste Management Plan 2015 – 2021;*
- *Dublin City Development Plan 2011 – 2017;*
- *South Dublin County Development Plan 2010 – 2016; and*
- *Fingal Development Plan 2011 – 2017.*

The document review also included Best Practice Guidelines and Codes Of Practice, including:

- National Construction and Demolition Waste Council (NCDWC) and DoEHLG, *Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition* Projects (2006);
- FÁS and the Construction Industry Federation (CIF), *Construction and Demolition Waste Management – a handbook for Contractors and Site* Managers (2002);
- BS 5906:2005 *Waste Management in Buildings – Code of Practice* (2005);
- Health Service Executive (HSE) and Department of Health and Children (DOHC), *Healthcare Risk Waste Management Segregation Packaging and Storage Guidelines for Healthcare Risk Waste*, *4th Edition* (2010);
- HSE, *Waste Management Awareness Handbook* (2011); and
- Radiological Protection Institute of Ireland (RPII), *The Code of Practice on the Design of Diagnostic Medical Facilities where Ionising Radiation is used* (2009).

as well as Statutory Instruments (as amended) such as:

- Waste Management Act 1996 (S.I. No. 10 of 1996) as amended by the Waste Management (Amendment) Act 2001 and sub-ordinate legislation[1];
- Local Government Act 1994 (and Amendments) and Regulations (S.I. No. 8 of 1994);
- Litter Pollution Act 1997 (S.I. No. 12 of 1997); and
- Protection of the Environment Act 2003 (S.I. No. 413 of 2003).

And Local Authority Waste Bye-Laws such as:

- Dublin City Council (DCC), *Bye-Laws for the Storage, Presentation and Collection of Household and Commercial Waste* (2013);
- South Dublin County Council (SDCC), *Storage, Separation at Source, Presentation and Collection of Commerical Waste Bye-Laws* (2007); and
- Fingal County Council (FCC), *Bye-Laws for the Presentation and Storage of Waste* (2007).

[1] Å European Communities (Waste Directive) Regulations 2011 (SI 126 of 2011) as amended 2011 (S.I. No. 323 of 2011);
Å Waste Management (Collection Permit) Regulations S.I No. 820 of 2007 as amended 2008 (S.I No 87 of 2008);
Å Waste Management (Facility Permit and Registration) Regulations, S.I No. 821 of 2007 as amended 2008 (S.I No. 86 of 2008);
Å 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);
Å 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);
Å Waste Management (Planning) Regulations 1997 (S.I. No. 137 of 1997);
Å Waste Management (Landfill Levy) Regulations 2011 (S.I. No. 434 of 2011) as amended 2015 (S.I. No. 189 of 2015);
Å European Communities (Waste Electrical and Electronic Equipment) Regulations 2011 (S.I. No. 355 of 2011); and
Å Waste Management (Food Waste) Regulations 2009 (S.I. No. 508 of 2009), as amended 2015 (S.I. 190 of 2015) and European Union (Household Food Waste and Bio-waste) Regulation 2015 (S.I. No. 191 of 2015).

A site inspection was carried out at the St. James's Hospital Campus by a suitably qualified environmental consultant from AWN on the 27th April 2015 to gain an appreciation for the existing site conditions. A site inspection of the Davitt Road site was carried out on the 18th May 2015.

10.1.3 Receiving Environment

The St. James's Hospital Campus and Davitt Road compound are located within the Local Authority area of Dublin City Council (DCC).

In terms of waste management, the receiving environment is largely defined by DCC as the local authority responsible for setting and administering waste management activities in the area. This is governed by the requirements set out in the new EMR Waste Management Plan 2015 – 2021. This plan replaces the previous plan for the Dublin region due to changing National policy as set out in *A Resource Opportunity: Waste Management Policy in Ireland* and changes being enacted by the *Waste Framework Directive (WFD) (2008/98/EC)*.

The new regional plan sets out the following strategic targets for waste management in the region:

- A 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; and
- 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 new plan does not set a specific target for construction & demolition (C&D) waste. However, the WFD sets a target for Member States of *'70% preparing for reuse, recycling and other recovery of construction and demolition waste'* (excluding natural soils and stones and hazardous wastes) to be achieved by 2020.

The *Dublin City Development Plan 2011 – 2017* sets out a number of policies and objectives for waste management in Dublin City which reflect broadly the objectives of the new regional waste management plan. The development plan identifies the progress of recycling activities in order to minimise the use of landfill as the main objective of the City Council.

Waste policies and objectives with a particular relevance to the proposed development are:

Policies:

- *SI29: To support the principles of good waste management and the implementation of best international practice in relation to waste management in order for Dublin City and the region to become self-reliant in terms of waste management.*
- *SI30: To prevent and minimise waste.*
- *SI32: To encourage and support material recycling.*
- *SI33: To minimise the amount of waste which cannot be prevented and ensure it is disposed of without causing environmental pollution.*

Objectives:

- *SIO59: To provide for municipal/public recycling and communal composting facilities in accessible locations throughout the city.*
- *SIO60: To seek the provision of adequately sized public recycling facilities in new commercial developments where appropriate.*

Bye-Laws for the Storage, Presentation and Collection of Household and Commercial Waste were brought into force by DCC in May 2013. The Bye-Laws set a number of enforceable requirements on waste holders and collectors with regard to storage, separation, presentation and collection of waste within the DCC area. Key requirements under these bye-laws which are relevant to the project are summarised as follows:

- A management company must ensure that adequate numbers of waste containers are available for use by holders in a multi-use development.
- The categories of waste designated in the First Schedule (which includes WEEE and glass) hereto must be disposed of at an approved facility and shall not be presented for collection in

the manner specified in the Bye-Laws unless specifically provided for in a special door-to-door waste collection system approved by an appointed person.

- An authorised waste collector must only collect household or commercial waste outside the Central Commercial District (CCD) on a designated collection day between the hours of 6:00am and 9:00pm Monday to Friday, and 8:00am to 8:00pm Saturdays, Sundays and Bank Holidays, unless otherwise approved in writing by an appointed person.

This proposed development falls outside of the CCD so it will be necessary to consult with DCC on permissible collection days/times. The full Bye-Laws and a map showing the areas with designated waste collection days are available from the DCC website.

10.1.4 Characteristics of the Proposed Development

For each of the proposed developments at the St. James's Hospital Campus, the potential impacts associated with waste generation and management must be considered for two distinct stages:

- Construction Phase; and
- Operational Phase.

The Davitt Road construction compound will only be utilised during the construction phase and, therefore, there will be no operational waste arisings or associated operational phase impacts.

10.1.4.1 Construction Phase

St. James's Hospital Campus

A detailed Construction & Demolition (C&D) Waste Management Plan (WMP) has been prepared for the proposed works at the St. James's Hospital Campus and is included as Appendix 10.1.

The proposed works will include demolition of a number of existing buildings on the St. James's Hospital Campus as detailed in Chapter 2 (Description of the Development) of the EIS. Demolition wastes will typically include concrete, steel cladding, steel beams, gypsum, metals, plastic, wood, glass and waste electronic and electrical equipment (WEEE). The estimated demolition waste amounts and indicative reuse/recovery/recycling/disposal targets are presented in Table 10.1.

Table 10.1: On & Off-site Reuse, Recycling and Disposal Estimates for demolition waste at St. James's Hospital Campus

Waste Type	Tonnes	Reuse/Recovery		Recycle		Disposal	
		%	Tonnes	%	Tonnes	%	Tonnes
Glass	862	0	0	85	733	15	129
Concrete, bricks, tiles and ceramics	7,024	30	2,107	60	4,215	10	702
Plasterboard	494	5	25	75	370	20	99
Metals	1,725	5	86	80	1,380	15	259
Timber	1,848	10	185	40	739	50	924
Others	370	0	0	0	0	100	370
Total	**12,323**		**2,403**		**7,437**		**2,483**

All waste arisings will be transported offsite by an approved waste contractor holding a current waste collection permit. All waste arisings requiring reuse, recycling, recovery or disposal off-site will be brought to facilities holding the appropriate COR, licence or permit, as required.

It should be noted that until a detailed survey of the buildings to be demolished is carried out, it is difficult to predict with a high level of accuracy the demolition waste that will be generated from the proposed works. A demolition plan will be prepared by the contractor prior to commencement of the demolition phase which will refine the demolition waste figures detailed in Table 10.1.

Significant excavations will be required at the St. James's Hospital Campus to facilitate construction of basement levels (including two levels of basement at the new children's hospital complex and smaller basements at the Children's Research and Innovation Centre and Family Accommodation Unit), ramp access, construction of a utility tunnel and modifications to the Drimnagh sewer network. The project engineers, O'Connor Sutton Cronin & Associates Ltd. (OCSC), have estimated that the

total volume of material to be excavated will be approximately 413,000m^3 (approximately equivalent to 826,000 tonnes based on density of 2 tonnes per cubic metre[2]). OCSC have advised that it is unlikely that any of this material will be suitable for reuse onsite so it will require removal offsite for reuse, recovery and/or disposal, as appropriate.

In order to establish the appropriate reuse, recovery and/or disposal route for the material, it is necessary to firstly classify the material. A number of site investigations have been undertaken at the site since 2014. Site investigations have established that some localised contamination of the made ground/subsoils has occurred. Based on samples collected and the analysis results, OCSC have classified the soil as either non-hazardous or hazardous using the HazWasteOnline application and further classified the soil into five main categories for disposal purposes, i.e. inert (Category A1), inert (suitable for Murphy Environmental Landfill, Category A2), non-hazardous (Category B), stable non-reactive hazardous for disposal in non-hazardous landfill (Category C) or hazardous (Category D) in accordance with *European Communities Council Decision 2003/33/EC*[3]. Classification has been carried out on a horizontal 25m x 25m grid basis at 1m intervals vertically through the soil profile. A summary of the classification categories and the estimated volumes/quantum of each category as determined by OCSC are presented in Table 10.2. Further detail is provided in Chapter 7 (Soils and Geology) of the EIS.

Table 10.2: Soil classification at St. James's Hospital Campus (provided by OCSC)

Waste Category	Title	Estimated Vol (m^3)	Estimated Weight (tonnes) Footnote 2
Category A1	Inert Natural	332,500 - 343,500	665,000 ï 687,000
Category A2	Inert	33,500 ï 39,000	67,000 ï 78,000
Category B	Non-Haz	36,000 ï 40,500	72,000 ï 81,000
Category C	Stable non-reactive Haz for disposal in Non-Haz Landfill	400 - 500	800 ï 1,000
Category D	Hazardous		

Where possible, suitable material will be reused on site for landscaping and clean fill/capping material will be reused on nearby sites requiring material. If any of the material is to be reused on another site as a by-product (and not as a waste), this will be done in accordance with Article 27 of the *European Communities (Waste Directive) Regulations 2011*. Article 27 requires that certain conditions are met and that by-product decisions are made to the EPA, via their online notification form. If the material is deemed to be a waste, removal and reuse/recycling/recovery/disposal of the material will be carried out in accordance with 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*. The volume of waste removed will dictate whether a Certificate of Registration (COR), permit or licence is required by the receiving facility. Similarly, if any soils/stones are imported onto the site from another construction site as a by-product, this will also be done in accordance with Article 27.

A small area of Japanese Knotweed (*Fallopia japonica*), an invasive weed species, was identified at the eastern end of the landscape corridor behind Donnellan Avenue / McDowell Avenue. The plant is an invasive alien species as listed on the Third Schedule (Part 1: Plants) of the *European Communities (Birds and Natural Habitats) Regulations*, 2011 (SI No 477 of 2011, also known as the *Habitats Regulations*). In particular, Regulations 49 and 50 prohibit the introduction, dispersal, trading and keeping of certain this non-native invasive species. The affected area has been fenced-off and is excluded from construction works associated with the proposed development. A programme of management and treatment towards the eradication of the plant is being put in place under the supervision of a qualified ecologist and in accordance with best practice. No plant materials, soils or other arisings will be removed from the infected area. This affected area will be maintained as a construction exclusion zone during the proposed development. Further detail is provided in Chapter 9 (Flora and Fauna) of the EIS.

AWN have carried out a desktop study to identify the potential end-use options for the excavated soils/stones. This includes a detailed review of the re-use options and an assessment of the capacity of nearby facilities suitable to accept the various classifications of soil. This information is presented in the site specific C&D WMP for the St. James's Hospital Campus which is included as Appendix

[2] Typical density of 2 tonnes/m^3 used based on Dublin boulder clay density range of 2.2 ï 2.4 tonnes/m^3 (Long, Brangan, Menkiti, Looby and Casey) *Retaining Walls in Dublin Boulder Clay, Ireland – Geotechnical Engineering, Volume 165, Issue GE4* (2012). Total excavation volume will also include some made ground and non-boulder clay material.

[3] European Communities (EC) Council Decision 2003/33/EC establishing criteria and procedures for the acceptance of waste at landfill pursuant to article 16 of and Annex II to Directive 1999/31/EC.

10.1. The conclusion of the research is that there will be sufficient capacity available at authorised waste facilities in Ireland in 2016 for recovery and disposal of the inert and non-hazardous material. Hazardous soil will require disposal abroad via Transfrontier Shipping of Wastes (TFS). There are numerous suitable facilities available in Europe with sufficient capacity to accept this waste.

During the construction phase, waste will be produced from surplus materials such as broken or off-cuts of timber, plasterboard, concrete, tiles, bricks, etc. Waste from packaging (cardboard, plastic, timber) and oversupply of materials may also be generated. The construction contractor will be required to ensure that oversupply of materials is kept to a minimum and opportunities for reuse of suitable materials is maximised.

All waste arisings will be transported offsite by an approved waste contractor holding a current waste collection permit. All waste arisings requiring reuse, recycling, recovery or disposal off-site will be brought to facilities holding the appropriate COR, licence or permit, as required.

The estimated waste amounts and indicative reuse/recovery/recycling/disposal targets for all the construction works planned at the St. James's Hospital Campus are presented in Table 10.3.

Table 10.3: On & Off-site Reuse, Recycling and Disposal Estimates for construction waste at St. James's Hospital Campus

Waste Type	Tonnes	Reuse/Recovery		Recycle		Disposal	
		%	Tonnes	%	Tonnes	%	Tonnes
Concrete, bricks, tiles, ceramics and plasterboard	435	40	174	40	174	20	87
Asphalt, tar and tar products	159	0	0	25	40	75	119
Metals	40	5	2	90	36	5	2
Other	158	10	16	40	63	50	79
Total	**792**		**192**		**313**		**287**

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

Davitt Road site

The Davitt Road site was formerly occupied by Unilever and was used for the storage and production of foodstuffs and pharmaceutical goods. The Unilever site has not been operational since 2007 and in 2012-2013 the Unilever buildings were demolished down to slab level and arisings removed off site. A site investigation and assessment was carried out at the site. The assessment report concludes that the contamination encountered does not pose a significant risk to site users and the environment and overall the site was found to be in good condition for a brownfield site with a history of industrial use. Further detail is provided in Chapter 7 (Soils and Geology).

The site is intended to be used as a construction compound which will be made available to the contractor during the construction works. It will be used as a store for dry materials (steel, cladding, precast concrete etc.) and potentially as a staging area for the works. There will be no requirement for demolition at the site as there are no existing buildings on the compound site so there will be no demolition waste. There are no groundworks required with the exception of some minor site clearance and relocation of part of an existing mound to move it outside the proposed contractor compound area. It is not proposed to remove any soil or subsoil material from the site. Also, it is not anticipated that any importation of material will be required to prepare the site. There will be no construction required.

During the construction phase, when the site is in use as a store for dry materials and potentially a staging area, it is anticipated that there will be no waste generated at the site. It will be used for storage/staging only. No waste will be brought onto the site.

Further details of the Davitt Road construction compound site are presented in Chapter 2 (Description of the Development) of the EIS.

10.1.4.2 Operational Phase

St. James's Hospital Campus

The development at the St. James's Hospital Campus will give rise to a wide variety of waste streams during the operational phase, i.e. when the project is completed, open and occupied. Operational wastes will be generated in the various proposed new buildings; namely the new children's hospital, the Family Accommodation Unit and the Children's Research and Innovation Centre.

Healthcare waste is defined in the HSE and DOHC *Healthcare Risk Waste Management* publication as *"solid or liquid waste arising from healthcare"*. Waste materials generated will fall into two main categories, namely healthcare non-risk waste (i.e. non-clinical healthcare waste) and healthcare risk waste (hazardous). Hazardous waste can be further subdivided into non-clinical hazardous waste and clinical/risk waste. The main waste types will include the following:

- Non-Risk/Non-Clinical Non-Hazardous Waste
  - Dry Mixed Recyclables ï includes cardboard, non-confidential waste paper, newspaper, leaflets, plastic bottles, packaging, aluminium cans, tins and Tetra Pak cartons;
  - Confidential Paper;
  - Organic/catering waste (food waste from catering facilities, garden waste from landscaping activities). (Note: catering waste includes Cat 3 raw meat, fish or poultry)
  - Mixed Non-Recyclable Waste;
  - Glass;
  - Textiles;
  - Batteries (non-hazardous. Note: hazardous batteries may also be generated which are referred to below)
  - Waste electrical and electronic equipment (WEEE) including computers, printers and other ICT equipment (non-hazardous. Note: WEEE containing hazardous components may also be generated which are referred to below);
  - Metals, timber and mixed C&D waste generated from operational maintenance activities;
  - Polystyrene; and
  - Furniture (and from time to time other bulky wastes).

- Non-Clinical Hazardous Waste
  - Printer/toner cartridges;
  - Batteries (hazardous. Note: non-hazardous batteries may also be generated which are referred to in Section 3.2.1);
  - Waste electrical and electronic equipment (WEEE) including computers, printers and other ICT equipment (containing hazardous components. Note: WEEE not containing hazardous components may also be generated which are referred to in Section 3.2.1);
  - Cleaning chemicals (solvents, pesticides, paints, adhesives, resins, detergents, etc.);
  - Fluorescent bulb tubes and other mercury containing waste;
  - Waste cooking oil (new children's hospital only); and
  - Waste sludge from grease separator (new children's hospital only).

- Risk Waste
  - Healthcare risk wastes segregated into a number of categories as illustrated in Figure 10.1;
  - Chemical waste including spent and expired chemicals from laboratories; and
  - Radioactive waste (new children's hospital only).

Figure 10.1: Segregation of Healthcare Risk Waste (Source: HSE and DOHC Healthcare Risk Waste Management, 2010 and HSE, Waste Management Awareness Handbook, 2011)

A Waste Generation Model (WGM), developed and used by AWN, has been used to predict waste types, weights and volumes for the main waste types arising from the proposed development. The model incorporates building area, use, occupancy and combines these with other data including waste data for the existing St. James's Hospital, Tallaght Hospital, Temple Street Children's University Hospital, Our Lady's Children's Hospital Crumlin as well as Irish and US EPA waste generation rates. A project specific Operational Waste Management Plan (OWMP) has been prepared for the operational phase of the proposed developments at the St. James's Hospital Campus and is included as Appendix 10.2.

The predicted operational waste generation for the new developments at the St. James's Hospital Campus for the main waste types is presented in Table 10.4.

Table 10.4: Predicted Waste Generation from proposed developments at St. James's Hospital Campus

Waste Type	New children's hospital	Family Accommodation Unit	Children's Research and Innovation Centre	Total
	Tonnes/Annum	Tonnes/Annum	Tonnes/Annum	Tonnes/Annum
Mixed Dry Recyclable Waste	172.1	19.3	1.8	193.2
Confidential Paper	54.5		0.1	54.6
Mixed Non-Recyclable Waste	826.3	12.0	2.8	841.1
Organic (food/catering) Waste	122.8	17.8	4.7	145.3
Glass	4.4	2.6	0.3	7.2
Polystyrene	2.4			2.4
Timber	25.6			25.6
Batteries	1.2			1.2
WEEE	9.9			9.9
Healthcare Risk Waste	111.4		3.67	115.1
Chemical Wastes	5.1		0.26	5.4
Total	1335.7	51.7	13.6	1401.1

Dedicated disposal/waste rooms have been allocated on all floors within the new children's hospital building and waste storage areas (WSAs) have been provided in the Family Accommodation Unit and the Children's Research and Innovation Centre. All waste will be transferred from the disposal rooms and WSAs to a shared waste management area in the new children's hospital basement level B2. This waste management area has been designed to accommodate the majority of waste generated at the St. James's Hospital Campus including waste from the following:

- new children's hospital;
- Family Accommodation Unit;
- Children's Research and Innovation Centre;
- St. James's (Adult) Hospital and other campus buildings; and
- potential future maternity hospital.

It is not required to accommodate all waste as certain waste types are and will continue to be collected directly from standalone buildings as follows:

- Healthcare risk waste and chemical waste is and will continue to be collected directly from the existing Pathology Laboratory;
- Non-risk waste is and will continue to be collected directly from the Trinity Centre for Health Sciences and Haughton Institute which are managed by Trinity College Dublin; and
- Chemical waste will be collected directly from the Children's Research and Innovation Centre once it is operational.

The shared waste management area will have the following facilities:

- 40 cubic yard compactor for dry mixed recyclable waste with mechanical bin lifter

- 2 no. 40 cubic yard compactors for mixed non-recyclable waste with mechanical bin lifters
- Organic bin holding area
- Glass bin holding area
- Confidential waste paper bin holding room (secured)
- Healthcare risk waste wheelie bin and cage holding rooms for full/empty bins/cages (secured)
- Reusable sharps (Bio Systems) store rooms for full and empty containers (secured)
- Chemical store (secured)
- Waste cooking oil room (bunded)
- Storage areas for batteries (boxes), WEEE (cages), fluorescent tubes (coffins), polystyrene (containers/FIBC bags)
- Bin exchange and bin wash area
- Environmental Managers office, staff rest room, WC and showers

In addition to the shared management area provided in the service yard at Level B2, an external area has been provided for skips for metal, timber and mixed C&D waste generated from operational maintenance activities. A long term external radioactive store (which will be designed/constructed in accordance with the RPII Code of Practice) of 20m^2 has also been provided to accommodate longer life radioactive waste (Note: A radioactive store for short life radioactive waste will be provided within the new children's hospital. St. James's Hospital already has an internal store for short life radioactive waste).

Waste will be stored in dedicated receptacles in the shared waste management area and external yard pending collection/transfer offsite on a regular basis by a permitted waste contractor.

Further detail is provided in the OWMP which is included as Appendix 10.2.

Davitt Road site

The Davitt Road construction compound will only be utilised during the construction phase and, therefore, there will be no operational waste arisings or associated operational waste impacts.

10.1.5 Potential Impact of the Proposed Development

This section deals with the potential waste impacts associated with the proposed development at the St. James's Hospital Campus.

10.1.5.1 Construction Phase

St. James's Hospital Campus

The C&D phases of the project will generate a wide range of non-hazardous and hazardous waste materials. Correct segregation, storage, handling and transport of waste will be required to ensure litter is not generated at the St. James's Hospital Campus and does not become a nuisance to the public.

The use of non-permitted waste contractors or unlicensed facilities could give rise to inappropriate management of waste and result in environmental impacts/pollution. It is essential that all waste materials are dealt with in accordance with regional and national legislation, as outlined previously, and that time and resources are dedicated to ensuring efficient waste management practices in line with the attached C&D WMP (Appendix 10.1).

Made ground, subsoils and weathered bedrock will be excavated to facilitate the construction of building basements, ramp access, utility tunnel and modifications to the Drimnagh sewer network. Site investigations have established that two small isolated hydrocarbon contamination hotspots exist within the proposed excavation area. If these materials are not correctly identified, segregated and appropriately classified, there may be incorrect handling of the material which could impact negatively on workers as well as water and soil environments, both onsite and offsite.

In the event that the C&D WMP is not implemented, it is unlikely that the target recycling rate of 70% (outlined in the WFD) will be achieved.

Davitt Road site

The site will be used for storage/staging of materials only. There should be no waste generated at the site and therefore, there are no potential impacts associated with waste management at this compound.

10.1.5.2 Operational Phase

St. James's Hospital Campus

This significant development is planned to accommodate a large number of patients, staff, contractors and visitors. The potential impacts on the environment of improper, or a lack of, waste management during the operational phase would be a diversion from the priorities of the waste hierarchy which would lead to significant volumes of waste being sent unnecessarily to landfill. In addition, the requirements of the DCC Waste Bye-laws and Development Plan, along with the targets outlined in the *EMR Waste Management Plan 2015 – 2021*, would not be met.

Again, the use of non-permitted waste contractors or unlicensed facilities could give rise to inappropriate management of waste and result in negative environmental impacts or pollution. It is essential that all waste materials are dealt with in accordance with regional and national legislation, as outlined previously, and that time and resources are dedicated to ensuring efficient waste management practices in line with the attached OWMP (Appendix 10.2).

In addition, if waste material is not managed and stored correctly, it is likely to lead to litter or pollution issues at the campus and on adjacent developments. The knock-on effect of litter issues is the presence of vermin within the development and surrounding areas. For a development that intends to provide a *'best in class'* medical service to patients and visitors, this would be a negative impact.

Davitt Road site

The Davitt Road construction compound will only be utilised during the construction phase and, therefore, there will be no waste arisings or associated operational phase impacts.

10.1.5.3 'Do Nothing' Scenario

For the Do Nothing Scenario, there will be no construction activities on the St. James's Hospital site and as a result there will be no C&D waste materials generated. As regards operational waste, the existing waste management procedures at the St. James's Hospital Campus will continue with facilities and maintenance staff ensuring that waste is managed in accordance with DCC Waste Bye-Laws and the relevant legislation.

There will be no change to the Davitt Road site waste arisings. There are currently no wastes generated on site and it is not anticipated that any waste will be generated at the site during the construction or operational phases.

10.1.6 Ameliorative, Remedial or Reductive Measures

This section outlines the measures that will be employed in order to reduce the amount of waste produced at the development, manage the wastes generated in a responsible method and handle the waste in such a manner as to minimise the effects on the environment.

10.1.6.1 Construction Phase

St. James's Hospital Campus

As stated in Section 10.1.4.1, a project specific C&D WMP has been prepared to deal with waste generation during the C&D phase of the project and is included as Appendix 10.1 of this EIS. The C&D WMP has been prepared in accordance with the *Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects* document produced by the NCDWC in conjunction with the DoEHLG in July 2006. The C&D WMP will be employed to ensure effective waste management and waste minimisation, reuse, recycling, recovery and disposal of waste material generated at the site.

Mitigation measures proposed are summarised below and are described in more detail in the C&D WMP:

- Building materials should be chosen with an aim to 'design out waste';
- On-site segregation of non-hazardous waste materials into appropriate categories, where possible, including:
    - Excavated made ground/subsoils/weathered rock will be segregated into the categories detailed in Section 10.1.4.1 i.e. inert (Category A), inert (suitable for Murphy Environmental Landfill, Category A2), non-hazardous (Category B), stable non-reactive hazardous for disposal in non-hazardous landfill (Category C) or hazardous (Category D);
    - concrete, bricks, tiles, ceramics and plasterboard;
    - metals; and
    - timber.

- On-site segregation of all hazardous waste materials into appropriate categories including:
    - Contaminated soils;
    - Waste oil and fuels; and
    - Paints, glues, adhesives and other known hazardous substances.
- All wastes will be segregated at source, where possible.
- All waste materials will be stored in skips or other suitable receptacles in designated areas of the site. The waste storage area(s) will be assigned and all construction staff provided with training regarding the waste management procedures on commencement of the project;
- Left over materials (e.g. timber off-cuts) and any suitable construction materials shall be re-used on-site where possible;
- All waste leaving site will be reused, recycled or recovered where possible;
- All waste leaving the site will be transported by suitable permitted contractors and taken to suitably registered, permitted or licenced facilities; and
- All waste leaving the site will be recorded and copies of relevant documentation maintained.

Any nearby sites requiring clean fill material will be contacted to investigate reuse opportunities for clean and inert material. If any of the material is to be reused on another site as by-product (and not as a waste), this will be done in accordance with Article 27 of the *EC (Waste Directive) Regulations (2011)* as previously referred to Section 10.1.4.1 and detailed in the C&D WMP.

These mitigation measures will ensure that the waste arising from the C&D phase of the development is dealt with in compliance with the provisions of the *Waste Management Act 1996 (as amended 2001)*, and associated Regulations, the *Litter Act of 1997* and the *EMR Waste Management Plan (2015 - 2021)*. It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved.

Davitt Road site

The site will be used for storage/staging of materials only. There should be no waste generated at the site and therefore, there are no potential impacts associated with waste management at this compound and therefore, no ameliorative, remedial or reductive measures are required.

10.1.6.2 Operational Phase

St. James's Hospital Campus

A project specific OWMP has been prepared to deal with waste generation from the new children's hospital, the Family Accommodation Unit and Children's Research and Innovation Centre during the operational phase of the development and is included as Appendix 10.2.

Mitigation measures proposed in the OWMP include:

- On-site segregation of all waste materials into appropriate categories including (but not limited to):
    - Non-Risk/Non-Clinical Non-Hazardous Waste
        - Dry Mixed Recyclables
        - Confidential Paper;
        - Organic/catering waste (food waste from catering facilities, garden waste from landscaping activities).
        - Mixed Non-Recyclable Waste;
        - Glass;
        - Textiles;
        - Batteries (non-hazardous)
        - Waste electrical and electronic equipment (WEEE) including computers, printers and other ICT equipment (non-hazardous);
        - Metals, timber and mixed C&D waste generated from operational maintenance activities;
        - Polystyrene; and
        - Furniture
    - Non-Clinical Hazardous Waste

- Printer/toner cartridges;
- Batteries (hazardous);
- Waste electrical and electronic equipment (WEEE) including computers, printers and other ICT equipment (containing hazardous components);
- Cleaning chemicals (solvents, pesticides, paints, adhesives, resins, detergents, etc.);
- Fluorescent bulb tubes and other mercury containing waste;
- Waste cooking oil; and
- Waste sludge from grease separator.

○ Risk Waste

- Healthcare risk wastes segregated into a number of categories as illustrated in Figure 10.1;
- Chemical waste including spent and expired chemicals from laboratories; and
- Radioactive waste.

- All waste materials will be stored in colour coded bins or other suitable receptacles in designated, easily accessible locations. Bins will be clearly identified with the approved waste type to ensure there is no cross contamination of waste materials;

- All non-risk waste collected from the development will be reused, recycled or recovered where possible, with the exception of those waste streams where appropriate facilities are currently not available;

- All waste leaving the site will be transported by suitable permitted contractors and taken to suitably registered, permitted or licensed facilities;

- All waste leaving the site will be recorded and copies of relevant documentation maintained; and

- Approvals will be sought from DCC regarding collection of waste from the facility in respect of restrictions on collection days and times referred to in the Waste Bye-Laws.

These mitigation measures will ensure the waste arising from the development is dealt with in compliance with the provisions of the *Waste Management Act 1996 (as amended 2001)*, and associated Regulations, the *Litter Act of 1997* and the *EMR Waste Management Plan (2015 - 2021)*. It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved.

Davitt Road site

The Davitt Road construction compound will only be utilised during the construction phase and, therefore, there will be no operational waste arisings, associated operational phase impacts and no ameliorative, remedial or reductive measures are required.

10.1.6.3 'Do Nothing' Scenario

In the case of the Do Nothing Scenario, no waste management no ameliorative, remedial or reductive measures are required.

10.1.7 Predicted Impact of the Proposed Development

The implementation of the mitigation measures outlined in Section 10.1.6 for the James's Hospital Campus will ensure that a high rate of reuse, recycling and recovery is achieved at the development during the C&D phase as well as during the operational phase. It will also ensure that European, national and regional legislative requirements with regard to waste are met and associated targets for the management of waste are achieved. Primarily, implementation of the C&D and Operational WMP's will minimise the volume of waste requiring to be disposed of at landfill.

10.1.7.1 Construction Phase

A carefully planned approach to waste management and adherence to the C&D WMP during the construction phase will ensure that the impact on the environment will be neutral, short-term and imperceptible. The opportunities for waste materials to be reused off-site will provide positive impacts in the resourcing of materials for other developments and reduce the requirement for raw material extraction.

10.1.7.2 Operational Phase

During the operational phase, a structured approach to waste management will promote resource efficiency and waste minimisation. Provided the OWMP is implemented and a high rate of reuse, recycling and recovery is achieved, the predicted impact of the operational phase on the environment will be neutral, long term and imperceptible.

10.1.7.3 'Do Nothing' Scenario

The Do Nothing Scenario will not generate any C&D waste and ongoing waste management procedures for the operations of the existing facility will not be impacted.

10.1.8 Monitoring

10.1.8.1 Construction Phase

The objective of setting targets for waste management is only achieved if the actual waste generation volumes are calculated and compared. This is particularly important during the C&D phase where there is a potential for waste management to become secondary to progress and meeting construction schedule targets. The C&D WMP specifies the need for a waste manager to be appointed who will have responsibility to monitor the actual waste volumes being generated and to ensure that contractors and sub-contractors are segregating waste as required. Where targets are not being met, the waste manager should identify the reasons for targets not being achieved and work to resolve any issues. Recording of waste generation during the project will enable better management of waste contractor requirements and identify trends. The data should be maintained to advise on future projects.

There will be no waste arisings at the Davitt Road site during the construction phase so no monitoring of waste will be required.

10.1.8.2 Operational Phase

During the operational phase, facility management personnel should monitor waste generation volumes against the predicted waste volumes outlined in the OWMP. There may be opportunities to reduce the equipment and number of bins required for each element of the development where estimates have been too conservative. Reductions in equipment/bin requirements will reduce waste contractor costs and reduce workload on facilities management teams. Waste legislation and DCC Waste Bye-Laws should also be consulted on a regular basis in case of any changes which may impact on waste management procedures.

The Davitt Road construction compound will only be utilised during the construction phase and, therefore, there will be no operational waste arisings or monitoring of waste required.

10.1.9 Reinstatement

In the event that the proposed development is discontinued, there is not likely to be any significant impacts on waste management at the site. Where contaminated soil is excavated on site with the intention of removal off-site for treatment or disposal, a soil management plan should be put in place in the event that the work is stopped and that potentially contaminated soil is left exposed to the public and the environment.

Following completion of the Construction Phase it is proposed to reinstate the Davitt Road site to near its current condition. It is currently anticipated that there will be no waste arisings associated with reinstating the site.

10.2 Tallaght Hospital Campus

10.2.1 Introduction

The impacts associated with waste generated from the development at the new children's hospital satellite centre at the Tallaght Hospital Campus will be assessed in this section for both the construction and operational phases.

10.2.2 Methodology

The methodology is as set out under section 10.1.2 above.

10.2.3 Receiving Environment

The proposed new children's hospital satellite centre at Tallaght Hospital is located within the Local Authority area of South Dublin County Council (SDCC).

In terms of waste management, the receiving environment is largely defined by SDCC – as the local authority responsible for setting and administering waste management activities in the area. This is governed by the requirements set out in the new *EMR Waste Management Plan 2015 – 2021*. This plan replaces the previous plan for the Dublin region due to changing National policy as set out in *A Resource Opportunity: Waste Management Policy in Ireland* and changes being enacted by the *Waste Framework Directive (WFD) (2008/98/EC)*.

The new regional plan sets out the following strategic targets for waste management in the region:

- A 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; and
- 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 new plan does not set specific targets for C&D waste. The WFD sets a target for Member States of *'70% preparing for reuse, recycling and other recovery of construction and demolition waste'* (excluding natural soils and stones and hazardous wastes) to be achieved by 2020.

The *South Dublin County Development Plan 2010 – 2016* contains several policies in relation to waste management. The waste policies most relevant to the development are as follows:

Policies:

- *ES7: Waste Management Regulations*
  It is the policy of the Council to implement and monitor the Waste Management Regulations.
- *ES8: Waste Prevention and Reduction*
  It is the policy of the Council to promote the prevention and reduction of waste and to cooperate with industry and other agencies in viable schemes to achieve this in accordance with the Waste Management Plan for the Dublin Region and subsequent revisions and updates.
- *ES10: Waste Re-use and Recycling*
  It is the policy of the Council to reduce the amount of waste to be landfilled or incinerated and to promote increased re-use and recycling including the collection and transfer of product for resale, of materials from all waste streams.
- *ES17 : Construction and Demolition Waste*
  It is the policy of the Council to require that planning applications for development (apart from residential developments of less than 15 units) be accompanied by a Waste Management Plan which shall be agreed with the Planning Authority prior to the commencement of development. The Plan, as a minimum, shall include a provision for the management of all construction and demolition waste arising on site, shall make provision for the recovery or disposal of this waste to authorised facilities by authorised collectors. Where appropriate, the re-use of excavated material from development sites on the site is to be encouraged, for landscaping, land restoration or for preparation for development.

  SDCC prepared Bye-Laws in 2007 for commercial waste. Key requirements under these bye-laws which are relevant to project are summarised as follows:

- Waste should be stored in appropriate containers within the curtilage of the development;

- Containers should be kept in good condition;
- The storage of waste should not pose a health and safety, traffic or environmental risk or create a nuisance through odours or litter;
- Waste should be separated into mixed non-recyclable waste (referred to as residual waste in the bye-laws), dry recyclable waste and organic waste, if a collection service is available;
- Waste should only be presented for collection to an authorised waste contractor;
- Waste should be presented in waste containers appropriate for the waste type;
- Waste containers should not be overloaded and should be securely closed;
- Adequate numbers of waste containers should be provided and adequate and proper space should be allocated for the storage of the waste containers;
- Adequate access and egress should be available for refuse collection vehicles servicing the site;
- The holder of the waste must ensure that the dry recyclable waste is taken to an approved recycling collection or treatment facility, provide for the disposal of residual waste to an approved waste treatment or disposal facility; and
- A person who contravenes any provision of these bye-laws shall be guilty of an offence.

10.2.4 Characteristics of the Proposed Development

The proposed new children's hospital satellite centre at Tallaght Hospital consists of a new extension to the existing hospital and refurbishment of a portion of the existing hospital as outlined in Chapter 2 (Description of the Proposed Development). The proposed development will generate waste during both the construction and operational phases of the development.

10.2.4.1 Construction Phase

A detailed Construction & Demolition (C&D) Waste Management Plan (WMP) has been prepared for the proposed works at the Tallaght Hospital satellite centre and is included as Appendix 10.3.

The proposed works will include the removal of approximately 95m in length of external walls and the reconfiguration of a number of internal partitions to accommodate access to the new extension building. The refurbishment waste will typically comprise of concrete, steel cladding, steel beams, gypsum, mixed ferrous metals, stainless steel, aluminium, copper, hard plastic, glass and WEEE. The estimated refurbishment waste amounts are presented in Table 10.5 and are detailed in the site specific C&D WMP in Appendix 10.3.

Table 10.5: On & Off-site Reuse, Recycling and Disposal Estimates for refurbishment waste at Tallaght Hospital satellite centre

Waste Type	Tonnes	Reuse/Recovery		Recycle		Disposal	
		%	Tonnes	%	Tonnes	%	Tonnes
Glass	4.4	0	0	85	3.7	15	0.7
Concrete, bricks, tiles and ceramics	57.0	30	17.1	60	34.2	10	5.7
Plasterboard	11.0	10	1.1	70	7.7	20	2.2
Metals	16.5	5	0.8	80	13.2	15	2.5
Timber	11.0	10	1.1	40	4.4	50	5.5
Other	9.9	0	0	0	0	100	9.9
Total	**109.8**		**20.1**		**63.2**		**26.5**

It should be noted that until a detailed survey of the refurbishment areas has been carried out, it is difficult to predict with a high level of accuracy the waste that will be generated from the proposed works. A refurbishment plan will be prepared by the contractor prior to commencement of this phase of the project which will refine the waste figures detailed in Table 10.5.

Ground excavations will be required in the location of the new building to accommodate the building foundations and realigned access routes. It has been estimated by the project engineers, Roughan

and O'Donovan, that the volume of material to be excavated is approximately 1,000m^3. The excavated material will comprise made ground, topsoil and subsoil. Any suitable excavated material will be temporarily stockpiled for reuse as landscape fill, where possible. However, it is anticipated that there will be limited opportunities for reuse of the material on-site. Soil samples taken during the preliminary site investigation works at the site in December 2014 were analysed for the waste acceptance criteria (WAC) suite of parameters and all results were below the threshold for inert waste disposal. An additional phase of site investigation is currently underway which aims to identify any potential contamination at the site.

There are a number of options for offsite reuse, recovery and/or disposal of material available depending on a waste classification of the material using the HazWasteOnline application. A desk based study was carried out by AWN to establish suitable end-use destinations for excavated material. This information is presented in the C&D WMP for the developments at the St. James's Hospital Campus which is included as Appendix 10.1. Final destinations for surplus excavated material will be determined by the contractor prior to works commencing.

During the construction phase, waste will be produced from surplus materials such as broken or off-cuts of timber, plasterboard, concrete, tiles, bricks, etc. Waste from packaging (cardboard, plastic, timber) and oversupply of materials may also be generated. The construction contractor will be required to ensure that oversupply of materials is kept to a minimum and opportunities for reuse of suitable materials is maximised.

All waste arisings from the satellite centre development will be handled by an approved waste contractor holding a current waste collection permit. All waste arisings requiring removal off-site will be recycled, recovered and/or disposed of at a facility holding the appropriate COR, licence or permit, as required.

The estimated waste amounts and indicative reuse/recycle/disposal targets for the construction works planned at the Tallaght Hospital satellite centre are presented in Table 10.6.

Table 10.6: On & Off-site Reuse, Recycling and Disposal Estimates for Construction Waste at Tallaght Hospital satellite centre

Waste Type	Tonnes	Reuse/Recovery		Recycle		Disposal	
		%	Tonnes	%	Tonnes	%	Tonnes
Concrete, bricks, tiles, ceramics and plasterboard	13.5	40	5.4	40	5.4	20	2.7
Asphalt, tar and tar products	4.9	0	0	25	1.2	75	3.7
Metals	1.3	5	0.1	90	1.1	5	0.1
Other	4.9	10	0.5	40	2.0	50	2.4
Total	**24.6**		**6.0**		**9.7**		**8.9**

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

10.2.4.2 Operational Phase

The development at the satellite centre will give rise to a wide variety of waste streams during the operational phase.

Wastes generated will fall into two main categories ï healthcare non-risk waste and healthcare risk waste. Healthcare waste is defined in the HSE and DOHC guidelines on Healthcare Risk Waste as solid or liquid waste arising from healthcare. Hazardous waste has been further subdivided in this plan into non-clinical hazardous waste and clinical/risk waste. The main waste types include the following:

- Non-Risk/Non-Clinical Non-Hazardous Waste
  - Organic (food) waste
  - Confidential Paper
  - Dry Mixed Recyclables ï includes cardboard, non-confidential waste paper, newspaper, leaflets, plastic bottles, packaging, aluminium cans, tins and Tetra Pak cartons
  - Mixed Non-Recyclable Waste

- Cardboard packaging
- Plastic packaging
- Polystyrene (where deliveries are directly to the satellite centre and not decanted elsewhere in Tallaght Hospital)
- Glass
- Metals, timber and mixed C&D waste (generated from operational maintenance activities)
- Waste electrical and electronic equipment (WEEE) ï computers, printers and other ICT equipment (not containing hazardous components)
- Batteries (non-hazardous)

- Non-Clinical Hazardous Waste
  - WEEE containing hazardous components
  - Batteries (hazardous)
  - Printer/toner cartridges
  - Fluorescent tubes and other mercury containing waste

- Healthcare Risk Waste

Healthcare risk waste is further segregated into several risk waste types as detailed in the HSE and DOHC guidelines on Healthcare Risk Waste and illustrated in Figure 10.1. A project specific OWMP (included as Appendix 10.4 to this EIS) has been prepared for the operational phase of the satellite centre at Tallaght Hospital and provides more detail on the categories of healthcare risk waste.

Other wastes that will be generated on site in smaller quantities will include textiles (rags), cleaning products, aerosols, paints and bulky waste items such as furniture. It is assumed that landscape gardening waste will be managed under existing arrangements already in place at the hospital.

A Waste Generation Model (WGM) has been used to estimate waste types, weights and volumes for the main waste types arising from the proposed development. The model incorporates building area, use, occupancy and combines these with other data including waste data for the existing hospitals at St. Jamesôs Hospital, Tallaght Hospital, Temple Street Childrenôs University Hospital, Our Ladyôs Childrenôs Hospital Crumlin as well as Irish and US EPA waste generation rates.

The estimated operational waste generation for the satellite centre development is presented in Table 10.7.

Table 10.7: Estimated Waste Generation at Tallaght Hospital satellite centre

Waste Type	Tonnes/annum
Mixed Non-Recyclable Waste	57
Mixed Dry Recyclable Waste	7
Organics (Food) Waste	10
Cardboard	8
Confidential Paper	4
Polystyrene	<1
Glass	<1
Healthcare Risk Waste	17
Total	**103**

Segregated waste will be brought at regular intervals throughout the day to restricted access disposal hold rooms on the ground and first floor of the new development. The allocated rooms are located in the urgent care department on the ground floor and in the outpatients department on the first floor but will be used for waste from all departments, as required. When these bins/cages are full, they will be transferred from the disposal hold rooms to a larger internal waste storage area on a regular basis. From here, waste receptacles will be transferred via the hospital link corridors to the existing Tallaght Hospital waste compound for collection by a suitably permitted waste contractor on an agreed basis.

10.2.5 Potential Impact of the Proposed Development

This section details the potential waste impacts associated with the proposed satellite centre at Tallaght Hospital.

10.2.5.1 Construction Phase

The refurbishment and construction phases of the project will generate a wide range of non-hazardous and hazardous waste materials. Correct segregation, storage, handling and transport of waste will be required to ensure litter is not generated at the existing operational hospital or the adjacent construction compound and does not become a nuisance to the public.

The use of non-permitted waste contractors or unlicensed facilities could give rise to inappropriate management of waste and result in environmental impacts/pollution. It is essential that all waste materials are dealt with in accordance with regional and national legislation, as outlined previously, and that time and resources are dedicated to ensuring efficient waste management practices in line with the attached C&D WMP (Appendix 10.3).

Made ground, topsoil and subsoils will be excavated to facilitate the construction of the building foundations and new access routes. Preliminary site investigations indicate that the material to be excavated is clean inert material which may be suitable for offsite reuse. However, in the event that localised contamination is encountered, it is important that material is correctly identified, segregated and classified to ensure there is no negative impact to workers as well as water and soil environments, both on and offsite.

In the event that the C&D WMP is not implemented, it is unlikely that the target recycling rate of 70% (outlined in the WFD) will be achieved.

10.2.5.2 Operational Phase

The potential impacts on the environment of improper, or a lack of, waste management during the operational phase would be a diversion from the priorities of the waste hierarchy which would lead to significant volumes of waste being sent unnecessarily to landfill. In addition, the requirements of the SDCC Waste Bye-laws and Development Plan, along with the targets outlined in the *EMR Waste Management Plan 2015 – 2021*, would not be met.

Non-permitted waste contractors or unlicensed facilities could give rise to inappropriate management of waste and result in negative environmental impacts or pollution.

In addition, if waste material is not managed and stored correctly, it is likely to lead to litter or pollution issues at the new satellite centre, existing Tallaght Hospital and on adjacent developments. The knock-on effect of litter issues is the presence of vermin within the campus and surrounding areas. For a development that intends to provide a *'best in class'* medical service to patients and visitors, this would have a negative impact.

10.2.5.3 'Do Nothing' Scenario

For the Do Nothing Scenario, there will be no construction activities on site and as a result there will be no C&D waste materials generated. As regards operational waste, the existing waste management procedures will continue with facilities and maintenance staff ensuring that waste is managed in accordance with SDCC Waste Bye-Laws and the relevant legislation.

10.2.6 Ameliorative, Remedial or Reductive Measures

This section outlines the measures that will be employed in order to reduce the amount of waste produced at the development, manage the wastes generated in a responsible method and handle the waste in such a manner as to minimise the effects on the environment.

10.2.6.1 Construction Phase

As stated in Section 10.2.4.1, a project specific C&D WMP has been prepared to deal with waste generation during the refurbishment and construction phases of the project and is included as Appendix 10.3 to the EIS. The C&D WMP has been prepared in accordance with the *Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects* document produced by the NCDWC in conjunction with the DoEHLG in July 2006. The C&D WMP will be employed to ensure effective waste management and reuse, recycling, recovery and disposal of waste material generated at the site.

Mitigation measures proposed are summarised below and are described in more detail in the C&D WMP:

- Building materials should be chosen with an aim to ódesign out wasteô.
- On-site segregation of non-hazardous waste materials into appropriate categories, where possible, including:

- Excavated made ground, topsoil and subsoils will be segregated into the categories detailed in Section 10.1.4.1 i.e. inert (Category A), inert (suitable for Murphy Environmental Landfill, Category A2), non-hazardous (Category B), stable non-reactive hazardous for disposal in non-hazardous landfill (Category C) or hazardous (Category D);
- concrete, bricks, tiles, ceramics and plasterboard;
- metals; and
- timber.

- On-site segregation of all hazardous waste materials into appropriate categories including:
  - Contaminated soils (if encountered);
  - Waste oil and fuels; and
  - Paints, glues, adhesives and other known hazardous substances.

- All wastes will be segregated at source, where possible;

- All waste materials will be stored in skips or other suitable receptacles in a designated area of the site. This area will be signed and advised of to all construction staff on commencement of the project;

- Left over materials (e.g. timber off-cuts) and any suitable construction materials shall be re-used on-site where possible;

- All waste leaving site will be recycled, recovered or reused where possible;

- All waste leaving the site will be transported by suitable permitted contractors and taken to suitably registered, permitted or licenced facilities; and

- All waste leaving the site will be recorded and copies of relevant documentation maintained.

Any nearby sites requiring clean fill material will be contacted to investigate reuse opportunities for clean and inert material. If any of the material is to be reused on another site as by-product (and not as a waste), this will be done in accordance with Article 27 of the *EC (Waste Directive) Regulations (2011)* as detailed in the C&D WMP.

These mitigation measures will ensure the waste arising from the C&D phase of the development is dealt with in compliance with the provisions of the *Waste Management Act 1996 (as amended 2001)*, and associated Regulations, the *Litter Act of 1997* and the *EMR Waste Management Plan (2015 - 2021)*. It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved.

10.2.6.2 Operational Phase

A project specific OWMP has been prepared to deal with waste generation at the Tallaght Hospital satellite centre during the operational phase of the project and is included as Appendix 10.4.

Mitigation measures proposed in the OWMP include:

- On-site segregation of all waste materials into appropriate categories including (but not limited to):
  - Non-Risk/Non-Clinical Non-Hazardous Waste
    - Organic (food) waste
    - Confidential Paper
    - Dry Mixed Recyclables ï includes cardboard, non-confidential waste paper, newspaper, leaflets, plastic bottles, packaging, aluminium cans, tins and Tetra Pak cartons
    - Mixed Non-Recyclable Waste
    - Cardboard packaging
    - Plastic packaging
    - Polystyrene (where deliveries are directly to the satellite centre and not decanted elsewhere in Tallaght Hospital)
    - Glass
    - Metals, timber and mixed C&D waste (generated from operational maintenance activities)
    - Waste electrical and electronic equipment (WEEE) ï computers, printers and other ICT equipment (not containing hazardous components)
    - Batteries (non-hazardous)

- Non-Clinical Hazardous Waste
    - WEEE containing hazardous components
    - Batteries
    - Printer/toner cartridges
    - Fluorescent tubes and other mercury containing waste
    - Waste cooking oil
    - Waste oil/sludge from grease trap(s)
- Healthcare Risk Waste (further segregated by type as per Figure 10.1)

- All waste materials will be stored in colour coded bins or other suitable receptacles in designated, easily accessible locations. Bins will be clearly identified with the approved waste type to ensure there is no cross contamination of waste materials.
- All non-risk waste collected from the development will be reused, recycled or recovered where possible, with the exception of those waste streams were appropriate facilities are currently not available.
- All waste leaving the site will be transported by suitable permitted contractors and taken to suitably registered, permitted or licensed facilities.
- All waste leaving the site will be recorded and copies of relevant documentation maintained.

These mitigation measures will ensure the waste arising from the development is dealt with in compliance with the provisions of the *Waste Management Act 1996 (as amended 2001)*, and associated Regulations, the *Litter Act of 1997* and the *EMR Waste Management Plan (2015 - 2021)*. It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved.

10.2.6.3 'Do Nothing' Scenario

In the case of the Do Nothing Scenario, there will not be any waste management mitigation measures required.

10.2.7 Predicted Impact of Proposed Development

The implementation of the mitigation measures outlined in Section 10.2.6 will ensure that a high rate of reuse, recovery and recycling is achieved at the development during the C&D phase as well as during the operational phase. It will also ensure that European, national and regional legislative waste requirements with regard to waste are met and associated targets for the management of waste are achieved. Primarily, implementation of the C&D and Operational WMPs will minimise the volume of waste requiring to be disposed of at landfill.

10.2.7.1 Construction Phase

A carefully planned approach to waste management and adherence to the C&D WMP during the construction phase will ensure that the impact on the environment will be neutral, short-term and imperceptible. The opportunities for waste materials to be reused off-site will provide positive impacts in the resourcing of materials for other developments and reduce the requirement for raw material extraction.

10.2.7.2 Operational Phase

During the operational phase, a structured approach to waste management will promote resource efficiency and waste minimisation. Provided the OWMP is implemented and a high rate of reuse, recycling and recovery is achieved, the predicted impact of the operational phase on the environment will be neutral, long term and imperceptible.

10.2.7.3 'Do Nothing' Scenario

The Do Nothing Scenario will not generate any C&D waste and ongoing waste management procedures for the operations of the existing facility will not be impacted.

10.2.8 Monitoring

10.2.8.1 Construction Phase

The objective of setting targets for waste management is only achieved if the actual waste generation volumes are calculated and compared. This is particularly important during the construction and demolition phases where there is a potential for waste management to become secondary to progress and meeting construction schedule targets. The C&D WMP specifies the need for a waste manager to be appointed who will have responsibility to monitor the actual waste volumes being generated and to ensure that contractors and sub-contractors are segregating waste as required. Where targets are not being met, the waste manager should identify the reasons for targets not being achieved and work to resolve any issues. Recording of waste generation during the project will enable better management of waste contractor requirements and identify trends. The data should be maintained to advise on future projects.

10.1.8.2 Operational Phase

During the operational phase, facility management personnel should monitor waste generation volumes against the predicted waste volumes outlined in the OWMP. There may be opportunities to reduce the equipment and number of bins required for the development where estimates have been too conservative. Reductions in equipment/bin requirements will reduce waste contractor costs. Waste legislation and SDCC bye-laws should also be consulted on a regular basis in case of any changes which may impact on waste management procedures.

10.2.9 Reinstatement

In the event that the proposed development is discontinued, there is not likely to be any significant impacts on waste management at the site. In the event that contaminated soil is encountered and excavated at the site with the intention of removal from site for off-site treatment or disposal, a management plan should be put in place in the event that the work is stopped and the contamination is left exposed to the public and the environment.

10.3 Connolly Hospital Campus

10.3.1 Introduction

The impacts associated with waste generated from the development at the new children's hospital satellite centre at Connolly Hospital in Blanchardstown will be assessed in this section for both the construction and operational phases.

10.3.2 Methodology

The methodology is as set out under section 10.1.2 above.

10.3.3 Receiving Environment

The proposed new children's hospital satellite centre at Connolly Hospital is located with the Local Authority area of Fingal County Council (FCC).

In terms of waste management, the receiving environment is largely defined by FCC – as the local authority responsible for setting and administering waste management activities in the area. This is governed by the requirements set out in the new *EMR Waste Management Plan 2015 – 2021*. This plan replaces the previous plan for the Dublin region due to changing National policy as set out in *A Resource Opportunity: Waste Management Policy in Ireland* and changes being enacted by the *Waste Framework Directive (WFD) (2008/98/EC)*.

The new regional plan sets out the following strategic targets for waste management in the region:

- A 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; and
- 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 new plan does not set specific targets for C&D waste. The WFD sets a target for Member States of *'70% preparing for reuse, recycling and other recovery of construction and demolition waste'* (excluding natural soils and stones and hazardous wastes) to be achieved by 2020.

The *Fingal Development Plan 2011 – 2017* sets out objectives and policies for Fingal that will guide their actions in regard to physical infrastructure and environment as well as the facilitator of social, cultural and economic development. In particular, a number of specific development objectives and policies have been prepared with regard to waste management including the following:

Policy:

- *Statement of Policy: Conform to the European Union, National and Regional policy in all matters relating to the production, handling, treatment and disposal of waste*

Objectives:

- *WM01: Prevent and minimise the generation of waste in accordance with the Waste Management Plan for the Dublin Region.*
- *WM03: Introduce provisions to separate recyclable refuse, especially for new large-scale residential and mixed-use developments. Ensure new developments include well designed facilities to accommodate the 3 bin collection system and bottle banks. Alternative infrastructural systems which deliver an equivalent level of recycling, e.g. vacuum waste collection systems are also to be encouraged.*
- *WM04: Divert household waste from landfill and promote the increased re-use and recycling of waste.*
- *WM16: Provide, at each of the Waste Recycling Centres, for the reception of household hazardous wastes such as batteries, waste oil and waste paint.*
- *WM17: Undertake public information campaigns aimed at alerting businesses, householders, and farmers as to the dangers associated with the disposal of hazardous waste*

10.3.4 Characteristics of the Proposed Development

The proposed new children's hospital satellite centre at Connolly Hospital consists of a new extension to the existing hospital and minor tie-in works to a portion of the existing hospital as outlined in Chapter 2 (Description of the Proposed Development). The proposed development will generate waste during both the construction and operational phases of the development.

10.3.4.1 Construction Phase

A detailed Construction & Demolition (C&D) Waste Management Plan (WMP) has been prepared for the proposed works at the Connolly Hospital satellite centre and is included in Appendix 10.5.

The proposed works will include the removal of approximately 3.5m in length of external wall to provide access from the existing building into the new extension. The refurbishment waste generated from this work is anticipated to mostly comprise concrete blocks. The estimated refurbishment waste amounts are presented in Table 10.8 and are detailed in the site specific C&D WMP presented in Appendix 10.5.

Table 10.8: On & Off-site Reuse, Recycling and Disposal Estimates for refurbishment waste at Connolly Hospital satellite centre

Waste Type	Tonnes	Reuse/Recovery		Recycle		Disposal	
		%	Tonnes	%	Tonnes	%	Tonnes
Glass	0.4	0	0	85	0.3	15	0.1
Concrete, bricks, tiles and ceramics	4.7	30	1.4	60	2.8	10	0.5
Plasterboard	0.9	10	0.1	70	0.6	20	0.2
Metals	1.4	5	0.1	80	1.1	15	0.2
Timber	0.9	10	0.1	40	0.4	50	0.4
Other	0.8	0	0	0	0	100	0.8
Total	**9.1**		**1.7**		**5.2**		**2.2**

It should be noted that until a detailed survey of the refurbishment areas has been carried out, it is difficult to predict with a high level of accuracy the waste that will be generated from the proposed works. A refurbishment plan will be prepared by the contractor prior to commencement of this phase of the project which will refine the waste figures detailed in Table 10.8.

Ground excavations will be required in the location of the new building to accommodate the building foundations and realigned access routes. It has been estimated by Roughan and O Donovan that the volume of material to be excavated is approximately 4,000m^3. The excavated material will comprise made ground, topsoil, subsoil and possibly weathered bedrock. Any suitable material will be temporarily stockpiled for reuse as landscape fill, where possible. However, it is anticipated that there will be limited opportunities for reuse of the material on-site. Soil samples taken during preliminary site investigation works at the site in December 2014 were analysed for WAC suite of parameters and all results were below the threshold for inert waste disposal. An additional phase of site investigation is currently underway which aims to identify any potential contamination at the site.

There are a number of options for offsite reuse, recovery and/or disposal of material available depending on a waste classification of the material using the HazWasteOnline application. A desk based study was carried out by AWN to establish suitable end-use destinations for excavated material. This information is presented in the C&D WMP for developments at the St. James's Hospital Campus which is included as Appendix 10.1. Final destinations for surplus excavated material will be determined by the contractor prior to works commencing.

During the construction phase, waste will be produced from surplus materials such as broken or off-cuts of timber, plasterboard, concrete, tiles, bricks, etc. Waste from packaging (cardboard, plastic, timber) and oversupply of materials may also be generated. The construction contractor will be required to ensure that oversupply of materials is kept to a minimum and opportunities for reuse of suitable materials is maximised.

All waste arisings from the satellite centre development 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 COR, licence or permit, as required.

The estimated waste amounts and indicative reuse/recycle/disposal targets for the construction works planned at the Connolly Hospital satellite centre are presented in Table 10.9.

Table 10.9: On & Off-site Reuse, Recycling and Disposal Estimates for construction waste at Connolly Hospital satellite centre

Waste Type	Tonnes	Reuse/Recovery		Recycle		Disposal	
		%	Tonnes	%	Tonnes	%	Tonnes
Concrete, bricks, tiles, ceramics and plasterboard	17.7	40	7.1	40	7.1	20	3.5
Asphalt, tar and tar products	6.4	0	0	25	1.6	75	4.8
Metals	1.6	5	0.1	90	1.4	5	0.1
Other	6.4	10	0.6	40	2.6	50	3.2
Total	**32.1**		**7.8**		**12.7**		**11.6**

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

10.3.4.2 Operational Phase

The development at the satellite centre will give rise to a wide variety of waste streams during the operational phase.

Wastes generated will fall into two main categories ï healthcare non-risk waste and healthcare risk waste. Healthcare waste is defined in the HSE and DOHC guidelines on Healthcare Risk Waste as solid or liquid waste arising from healthcare. Hazardous waste has been further subdivided in this plan into non-clinical hazardous waste and clinical/risk waste. The main waste types include the following:

- Non-Risk/Non-Clinical Non-Hazardous Waste
  - Organic (food) waste
  - Confidential Paper
  - Dry Mixed Recyclables ï includes cardboard, non-confidential waste paper, newspaper, leaflets, plastic bottles, packaging, aluminium cans, tins and Tetra Pak cartons
  - Mixed Non-Recyclable Waste
  - Cardboard packaging
  - Plastic packaging
  - Polystyrene
  - Glass
  - Metals, timber and mixed C&D waste (generated from operational maintenance activities)
  - Waste electrical and electronic equipment (WEEE) ï computers, printers and other ICT equipment (not containing hazardous components)
  - Batteries (non-hazardous)

- Non-Clinical Hazardous Waste
  - WEEE containing hazardous components
  - Batteries (hazardous)
  - Printer/toner cartridges
  - Fluorescent tubes and other mercury containing waste

- Healthcare Risk Waste

Healthcare risk waste is further segregated into several risk waste types as detailed in the HSE and DOHC guidelines on Healthcare Risk Waste and illustrated in Figure 10.1. A project specific OWMP (included as Appendix 10.6 to this EIS) has been prepared for the operational phase of the satellite centre at Connolly Hospital and provides more detail on the categories of healthcare risk waste.

Other wastes that will be generated on site in smaller quantities will include textiles (rags), cleaning products, aerosols, paints and bulky waste items such as furniture. It is assumed that landscape gardening waste will be managed under existing arrangements already in place at the hospital.

A Waste Generation Model has been used to estimate waste types, weights and volumes for the main waste types arising from the proposed development. The model incorporates building area, use, occupancy and combines these with other data including waste data for the existing hospitals

at St. James's Hospital, Tallaght Hospital, Temple Street Children's University Hospital, Our Lady's Children's Hospital Crumlin as well as Irish and US EPA waste generation rates.

The estimated operational waste generation for the satellite centre development for the main waste types is presented in Table 10.10.

Table 10.10: Estimated Waste Generation at Connolly Hospital satellite centre

Waste Type	Tonnes/annum
Mixed Non-Recyclable Waste	61
Mixed Dry Recyclable Waste	8
Organics (Food)	11
Cardboard	8
Confidential Paper	4
Polystyrene	<1
Glass	<1
Healthcare Risk Waste	18
Total	**110**

There are dedicated disposal hold rooms allocated within departmental areas in the new satellite centre. All waste will be transferred from the disposal hold rooms to a larger waste storage area on a regular basis. From here, waste receptacles will be transferred to an external waste marshalling area for collection by a suitably permitted waste contractor on an agreed basis.

10.3.5 Potential Impact of the Proposed Development

This section details the potential waste impacts associated with the proposed satellite centre at Connolly Hospital.

10.3.5.1 Construction Phase

The construction and demolition/refurbishment phases of the project will generate a wide range of non-hazardous and hazardous waste materials. Correct segregation, storage, handling and transport of waste will be required to ensure litter is not generated at the existing operational hospital or the adjacent construction compound and does not become a nuisance to the public.

The use of non-permitted waste contractors or unlicensed facilities could give rise to inappropriate management of waste and result in environmental impacts/pollution. It is essential that all waste materials are dealt with in accordance with regional and national legislation, as outlined previously, and that time and resources are dedicated to ensuring efficient waste management practices in line with the attached C&D WMP (Appendix 10.5).

Made ground, topsoils, subsoils and possibly weathered bedrock will be excavated to facilitate the construction of the building foundations and new access routes. Preliminary site investigations indicate that the material to be excavated is clean inert material which may be suitable for offsite reuse. However, in the event that localised contamination is encountered, it is important that material is correctly identified, segregated and classified to ensure there is no negative impact to workers as well as water and soil environments, both on and offsite.

In the event that the C&D WMP is not implemented, it is unlikely that the target recycling rate of 70% (outlined in the WFD) will be achieved.

10.3.5.2 Operational Phase

The potential impacts on the environment of improper, or a lack of, waste management during the operational phase would be a diversion from the priorities of the waste hierarchy which would lead to significant volumes of waste being sent unnecessarily to landfill. In addition, the requirements of the FCC Waste Bye-laws and Development Plan, along with the targets outlined in the *EMR Waste Management Plan 2015 – 2021*, would not be met.

Non-permitted waste contractors or unlicensed facilities could give rise to inappropriate management of waste and result in negative environmental impacts or pollution. In turn, this could lead to regulatory prosecutions including enforcement notices and/or fines.

In addition, if waste material is not managed and stored correctly, it is likely to lead to litter or pollution issues at the new satellite centre, existing hospital and on adjacent developments. The knock-on effect of litter issues is the presence of vermin within the campus and surrounding areas. For a development that intends to provide a *'best in class'* medical service to patients and visitors, this would be a negative impact.

10.3.5.3 'Do Nothing' Scenario

For the Do Nothing Scenario, there will be no construction activities on site and as a result there will be no C&D waste materials generated. As regards operational waste, the existing waste management procedures will continue with facilities and maintenance staff ensuring that waste is managed in accordance with FCC Waste Bye-Laws and the relevant legislation.

10.3.6 Ameliorative, Remedial or Reductive Measures

This section outlines the measures that will be employed in order to reduce the amount of waste produced at the development, manage the wastes generated in a responsible method and handle the waste in such a manner as to minimise the effects on the environment.

10.3.6.1 Construction Phase

As stated in Section 10.3.4.1, a project specific C&D WMP has been prepared to deal with waste generation during the refurbishment and construction phases of the project and is included as Appendix 10.5. The C&D WMP has been prepared in accordance with the *'Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects'* document produced by the NCDWC in conjunction with the DoEHLG in July 2006. The C&D WMP will be employed to ensure effective waste management and reuse, recycling, recovery and disposal of waste material generated at the site.

Mitigation measures proposed are summarised below and are described in more detail in the C&D WMP:

- Building materials should be chosen with an aim to ódesign out wasteô;
- On-site segregation of non-hazardous waste materials into appropriate categories, where possible, including:
    - Excavated made ground, topsoils and subsoils will be segregated into the categories detailed in Section 10.1.4.1 i.e. inert (Category A), inert (suitable for Murphy Environmental Landfill, Category A2), non-hazardous (Category B), stable non-reactive hazardous for disposal in non-hazardous landfill (Category C) or hazardous (Category D);
    - concrete, bricks, tiles, ceramics and plasterboard;
    - metals; and
    - timber.
- On-site segregation of all hazardous waste materials into appropriate categories including:
    - Contaminated soils (if encountered);
    - Waste oil and fuels; and
    - Paints, glues, adhesives and other known hazardous substances.
- All wastes will be segregated at source, where possible;
- All waste materials will be stored in skips or other suitable receptacles in a designated area of the site. This area will be signed and advised of to all construction staff on commencement of the project;
- Left over materials (e.g. timber off-cuts) and any suitable construction materials shall be re-used on-site where possible;
- All waste leaving site will be recycled, recovered or reused where possible;
- All waste leaving the site will be transported by suitable permitted contractors and taken to suitably permitted or licenced facilities;
- All waste leaving the site will be recorded and copies of relevant documentation maintained.

Any nearby sites requiring clean fill material will be contacted to investigate reuse opportunities for clean and inert material. If any of the material is to be reused on another site as by-product (and not as a waste), this will be done in accordance with Article 27 of the *EC (Waste Directive) Regulations (2011)*.

These mitigation measures will ensure the waste arising from the C&D phase of the development is dealt with in compliance with the provisions of the *Waste Management Act 1996 (as amended 2001)*, and associated Regulations, the *Litter Act of 1997* and the *EMR Waste Management Plan (2015 - 2021)*. It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved.

10.3.6.2 Operational Phase

A project specific OWMP has been prepared to deal with waste generation at the Connolly Hospital satellite during the operational phase of the project and is included as Appendix 10.6.

Mitigation measures proposed in the OWMP include:

- On-site segregation of all waste materials into appropriate categories including (but not limited to):
    - Non-Risk/Non-Clinical Non-Hazardous Waste
        - Organic (food) waste
        - Confidential Paper
        - Dry Mixed Recyclables ï includes cardboard, non-confidential waste paper, newspaper, leaflets, plastic bottles, packaging, aluminium cans, tins and Tetra Pak cartons
        - Mixed Non-Recyclable Waste
        - Cardboard packaging
        - Plastic packaging
        - Polystyrene
        - Glass
        - Metals, timber and mixed C&D waste (generated from operational maintenance activities)
        - Waste electrical and electronic equipment (WEEE) ï computers, printers and other ICT equipment (not containing hazardous components)
        - Batteries (non-hazardous)
    - Non-Clinical Hazardous Waste
        - WEEE containing hazardous components
        - Batteries
        - Printer/toner cartridges
        - Fluorescent tubes and other mercury containing waste
        - Waste cooking oil
        - Waste oil/sludge from grease trap(s)
    - Healthcare Risk Waste (further segregated by type as per Figure 10.1)
- All waste materials will be stored in colour coded bins or other suitable receptacles in designated, easily accessible locations. Bins will be clearly identified with the approved waste type to ensure there is no cross contamination of waste materials.
- All non-risk waste collected from the development will be reused, recycled or recovered where possible, with the exception of those waste streams were appropriate facilities are currently not available.
- All waste leaving the site will be transported by suitable permitted contractors and taken to suitably registered, permitted or licensed facilities.
- All waste leaving the site will be recorded and copies of relevant documentation maintained.

These mitigation measures will ensure the waste arising from the development is dealt with in compliance with the provisions of the *Waste Management Act 1996 (as amended 2001)*, and associated Regulations, the *Litter Act of 1997* and the *EMR Waste Management Plan (2015 - 2021)*. It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved.

10.3.6.3 'Do Nothing' Scenario

In the case of the Do Nothing Scenario, there will not be any waste management mitigation measures required.

10.3.7 Predicted Impact of Proposed Development

The implementation of the mitigation measures outlined in Section 10.3.6 will ensure that a high rate of reuse, recovery and recycling is achieved at the development during the C&D phase as well as during the operational phase. It will also ensure that European, national and regional legislative waste requirements with regard to waste are met and associated targets for the management of waste are achieved. Primarily, implementation of the C&D and Operational WMPs will minimise the volume of waste requiring to be disposed of at landfill.

10.3.7.1 Construction Phase

A carefully planned approach to waste management and adherence to the C&D WMP during the construction phase will ensure that the impact on the environment will be neutral, short-term and imperceptible. The opportunities for waste materials to be reused off-site will provide positive impacts in the resourcing of materials for other developments and reduce the requirement for raw material extraction.

10.3.7.2 Operational Phase

During the operational phase, a structured approach to waste management will promote resource efficiency and waste minimisation. Provided the OWMP is implemented and a high rate of reuse, recycling and recovery is achieved, the predicted impact of the operational phase on the environment will be neutral, long term and imperceptible.

10.3.7.3 'Do Nothing' Scenario

The Do Nothing Scenario will not generate any C&D waste and ongoing waste management procedures for the operations of the existing facility will not be impacted.

10.3.8 Monitoring

10.3.8.1 Construction Phase

The objective of setting targets for waste management is only achieved if the actual waste generation volumes are calculated and compared. This is particularly important during the construction and demolition phases where there is a potential for waste management to become secondary to progress and meeting construction schedule targets. The C&D WMP specifies the need for a waste manager to be appointed who will have responsibility to monitor the actual waste volumes being generated and to ensure that contractors and sub-contractors are segregating waste as required. Where targets are not being met, the waste manager should identify the reasons for targets not being achieved and work to resolve any issues. Recording of waste generation during the project will enable better management of waste contractor requirements and identify trends. The data should be maintained to advice on future projects.

10.3.8.2 Operational Phase

During the operational phase, facility management personnel should monitor waste generation volumes against the predicted waste volumes outlined in the OWMP. There may be opportunities to reduce the equipment and number of bins required for each development where estimates have been too conservative. Reductions in equipment/bin requirements will reduce waste contractor costs. Waste legislation and FCC bye-laws should also be consulted on a regular basis in case of any changes which may impact on waste management procedures.

10.3.9 Reinstatement

In the event that the proposed development is discontinued, there is not likely to be significant impacts on waste management at the site. In the event that contaminated soil is encountered and excavated at the site with the intention of removal from site for off-site treatment or disposal, a management plan should be put in place in the event that the work is stopped and the contamination is left exposed to the public and the environment.