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CONSULTING ENGINEERS
CIVIL & STRUCTURAL

Construction & Demolition Waste Management Plan

Prepared for Trinity College Dublin

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TABLE OF CONTENTS

1.0 INTRODUCTION

This document is a Construction and Demolition Waste Management Plan for the proposed demolition of the existing Cunningham House student accommodation building and sports hall on the Trinity Hall campus and subsequent construction of new student accommodation building and sports hall.

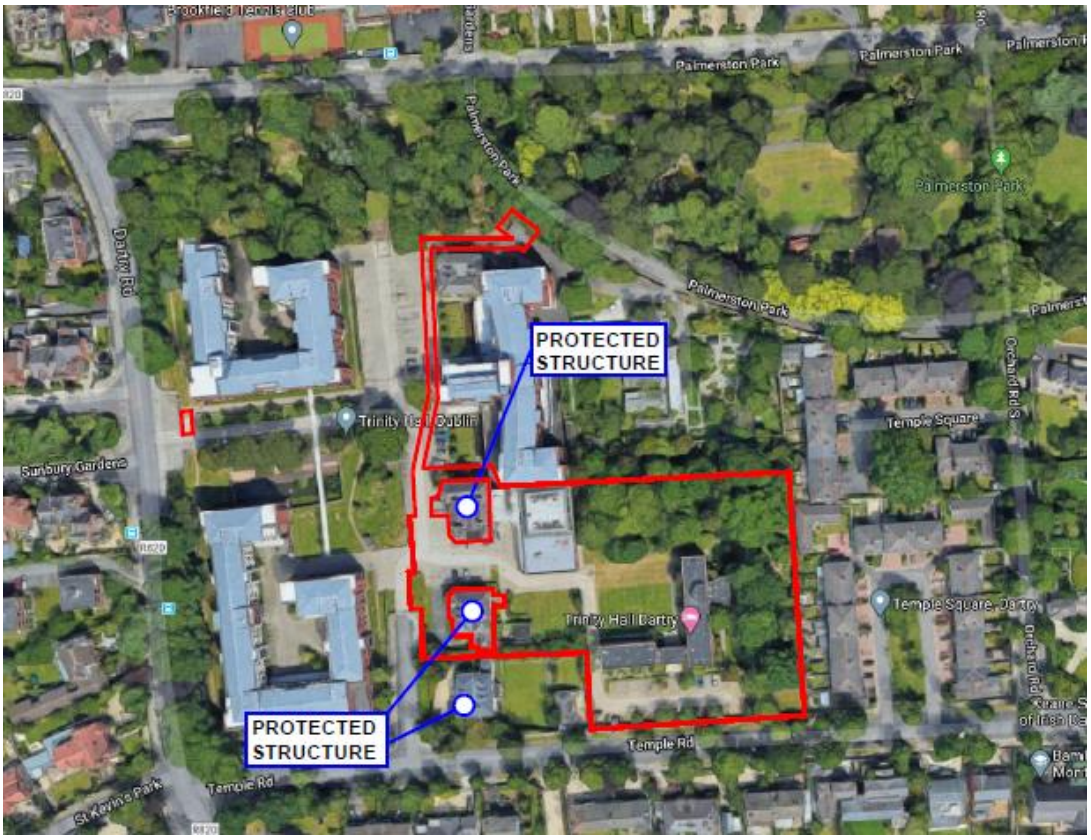

Figure 1 - Satellite View of Site at Trinity Hall, Dartry, Dublin 6

Figure 2 - View of Existing Sports Hall and Cunningham House at Trinity Hall

The Construction and Demolition Waste Management plan is intended to outline the approach to Construction Management and Waste Disposal during the course of the works to ensure that the successful contractor complies with all relevant Health & Safety & Waste Disposal Legislation and operates in such a manner to minimise disruption to the environs and to the neighbours. The successful contractor, appointed to carry out the works, must produce their own detailed Construction and Demolition Waste Management Plan which will, at a minimum, develop in detail the Principles outlined in this plan and produce a detailed management plan that complies with this outline plan and all relevant Legislation and ensures the works will be carried out in accordance with best practice.

2.0 PROPOSED WORKS

It is proposed demolish the existing Cunningham House student accommodation building and sports hall at Trinity Hall, Dartry, Dublin 6, and construct new student residences consisting of 358 No. bed spaces in 50 apartment clusters and 9 No. beds in 4 apartment clusters, along with sports hall and associated facilities. The proposed total site area for the works = 1.0982 ha.

2.1 DEMOLITION

This work will be carried out by a specialist Demolition Contactor with experience in this type of work. The scope of Demolitions is as follows:

- The Demolition of Cunningham House, the Sports Hall (including the removal of existing part basement of 104sqm), the eastern section of the historic rear boundary wall and associated single storey ancillary sheds within the curtilage of Greenane House (a Protected Structure) including all associated substructure.
- Grubbing up and removal of all hardstanding (including bit-mac surfacing) within the demolition boundary.
- Decommissioning and grubbing up of drainage pipelines and watermains and all associated chambers. It should be noted that, prior to decommissioning, all drainage pipelines will be pressure flushed clean and a CCTV survey will be carried out to ensure that there are no live pipelines connecting into same. All open ends of pipes remaining after decommissioning will be capped off.
- Decommissioning and grubbing up of all M & E services and associated chambers as shown on the drawings.

All services serving the buildings to be demolished are to be disconnected and confirmation obtained that all services are no longer live by the licensed operators prior to demolition. The final outfall surface water and foul pipes from the site are to be retained to facilitate temporary connections by the successful contractor during the demolition and construction period.

After removal of all hazardous material the buildings will be demolished safely by demolition contractors experienced in such works. Best practice methods will be used with regard to noise, vibration & dust control as outlined in more detail in the Construction & Environmental Management Plan, Document No 19.114-CEMP-01. A dust suppression system consisting of a fine mist water spray will be used on site. Due care and attention must be taken to protect the adjoining buildings and surfaces - a supervisor shall observe all works and be in visual contact with the excavator operator at all times.

The demolished materials will undergo sorting and salvage once the property has been demolished. All waste products shall be disposed of by licensed waste carriers. During the demolition phase the site management will ensure that no portions of the property are left in an unsafe manner overnight. The site will be inspected by the Contractor each morning before work commences.

The following are some of the key considerations for the Contractor when carrying out demolition works adjacent to the boundary.

- Demolition will result in no damage to areas outside the boundary.
- No foundations or supports of adjacent buildings to be disturbed or undermined.
- Contractor to immediately report to the Engineer any defects which are exposed or become apparent during the demolition works
- Any perimeter wall or structure to be demolished will involve hand demolition and mechanical demolition by pusher arm.

2.2 SURVEY DRAWINGS

It should be noted that survey drawings of the existing buildings will be included for information purposes in the tender package. It should not be assumed that they exactly reflect the "as built" structure which must be confirmed on site prior to demolition.

2.3 CONSTRUCTION

The scope of new construction is as follows:

- Construction of new sports hall and student accommodation building.
- New watermains as shown on the drawings.
- New foul and surface water pipework as shown on the drawings.
- New soft and hard landscaping around proposed structures.
- New mechanical and electrical services.
- New perimeter electrical loop line and associated ducts and chambers.
- Top-soiling and seeding the site as shown on the drawings.

3.0 SITE MANAGEMENT

3.1 General Site Management

The works will be carried out by a reputable contractor with adequate skilled resources and management skills to deliver the project to the quality required within the expected timeframe and budget and the minimisation of disruption in so far as practical.

The demolition and construction contractors will utilise best practices and most appropriate techniques to deliver the works in an efficient manner with the minimum nuisance created to the locality and environs of the site.

All works which are intended to be carried out will be reviewed in advance and detailed method statements provided to ensure that the site management team have taken into consideration all factors and all foreseen potential issues can be mitigated against.

The requirements of the Safety and Health Acts and Regulations will be taken into consideration and, as is required under law, a Project Supervisor Construction Stage will overview the safety arrangements which will cover both the site and the external environs of the work area.

The site working hours will generally be from 8 AM to 6 PM Monday to Friday and 8 AM to 1 PM on Saturdays and with no work on Sundays or Bank Holidays.

On occasion there may be need for works to be carried out outside of these hours. In such instances care will be taken to advise neighbours and to inform the relevant departments of Dublin City Council of any such requirements in advance. Such works will not be carried out without the consent of the Local Authority.

3.2 Traffic Management, Access Arrangements And Site Logistics

The purpose of the Traffic Management Plan is to control and manage the flow of traffic, and pedestrians entering the construction site during the construction works, and to consider the interaction of the construction traffic with the neighbouring environment. The plan will be drafted in accordance with all site information. During construction the traffic management plan will be implemented and monitored throughout to ensure minimum disruption to the day to day operations of neighbours and businesses in the surrounding streets. A detailed traffic management plan will be developed by the successful contractor and issued for review by the design team and agreed with the Transportation Department, Dublin City Council prior to commencing on site.

Site logistics and traffic management represent one of the critical activities required to support the construction effort. As such, a logistics coordinator will be put in place by the successful contractor to fully develop and implement the Traffic Management and Site Logistics Plan.

The Traffic Management and Site Logistics Plan incorporate in one document the general management of the site with regard to movement of traffic, movement of materials, storage of materials and site setup.

The objectives of the Traffic Management and Site Logistics Plan are as follows:

- To ensure the safety of employees, contractor personnel, the public, pedestrians, cyclists and traffic.
- To ensure compliance with the requirements of Dublin City Council and the conditions of the planning application
- To keep traffic delays to a minimum.

- To maintain satisfactory property access.
- To minimize disruption to the operations of neighbouring residents.
- To minimize disturbance to the environment.
- To ensure that emergency vehicles have clear access at all times
- To enforce a maximum speed limit of 15 kph on the site with pedestrians having the right of way.
- To ensure that strict site traffic controls shall be implemented and enforced.
- Ensure that permits and licenses are in place where required.
- The erection of appropriate road signage at all entrances and junctions
- All construction traffic entering and leaving the site will be closely controlled.
- Vehicles making deliveries to site or removing spoil or demolition material will be logged and the loads checked to ensure that have been loaded correctly and safely.
- Deliveries will be phased and controlled on a 'just in time' basis, all being clearly marked to show their designation. This will minimize travel time around the site and associated noise.
- Designated offload points will be identified, and a schedule of deliveries times and offload times generated and put in place.

The Traffic Management and Site Logistics Plan will provide for the following where required:

1) The contractor shall be responsible for and make good any damages to existing roads, footpaths caused by his own contractors or suppliers transport to and from the site.
2) The contractor shall at all times keep all public and private roads and footpaths entirely free of excavated materials, debris, rubbish and provide vehicle wheel wash and thoroughly clean all wheels and arches of all vehicles as they leave the site.
3) The contractor shall confine his activities to the area of the site occupied by the works and the builders' compound, as far as practicably possible, during any particular phase of the development.
4) Haul routes to and from the site will be defined and agreed with TCD.
5) An allowance for construction worker parking will be made on site for the period of construction.
6) Properly designed and designated access and egress points to the construction site will be used to minimize impact on external traffic.
7) Banksman and/or traffic lights will be used to control the exit of construction vehicles from the site onto the public road.
8) Establishment and maintenance of a HGV holding area within the site.
9) Access to the existing Trinity Hall Residences to be maintained for fire tenders. Existing hydrants to remain accessible.

Suggested headings for the Contractor's Traffic Management and Site Logistics Plan (not exhaustive):

- Construction Traffic Management – General Requirements
- Traffic Safety and Control
- Temporary Traffic Diversions
- Emergency Contact Numbers and Personnel
- Emergency Plan
- Access Arrangements
- Compound and Staff Parking

3.3 CONSTRUCTION TRAFFIC

The works associated with the Proposed Development will develop additional traffic on the road network associated, inter alia, with the removal of excavated material and demolition waste and the delivery of construction materials and ready mixed concrete. The total duration of construction activities is estimated to be approximately three-years from initial bulk excavations to final completion. It is proposed that construction traffic will access the site from Temple Road through a combination of

the existing south western and south eastern entrances to the Trinity Hall campus. These shall be the main access points to the site during the construction stage.

As it is proposed to permanently reposition the south eastern entrance on Temple Road the existing gate and wall will be demolished during construction works and suitable temporary controlled access gate installed. The south western entrance on Temple Road will be modified by relocating the access-controlled pedestrian gate to the western side, whilst the remaining section of gate and fencing will be carefully removed and put into temporary storage for the duration of the construction works and restored on completion. This area will then be hoarded and used solely for construction access. Access to the site compound within the campus will be flagman controlled.

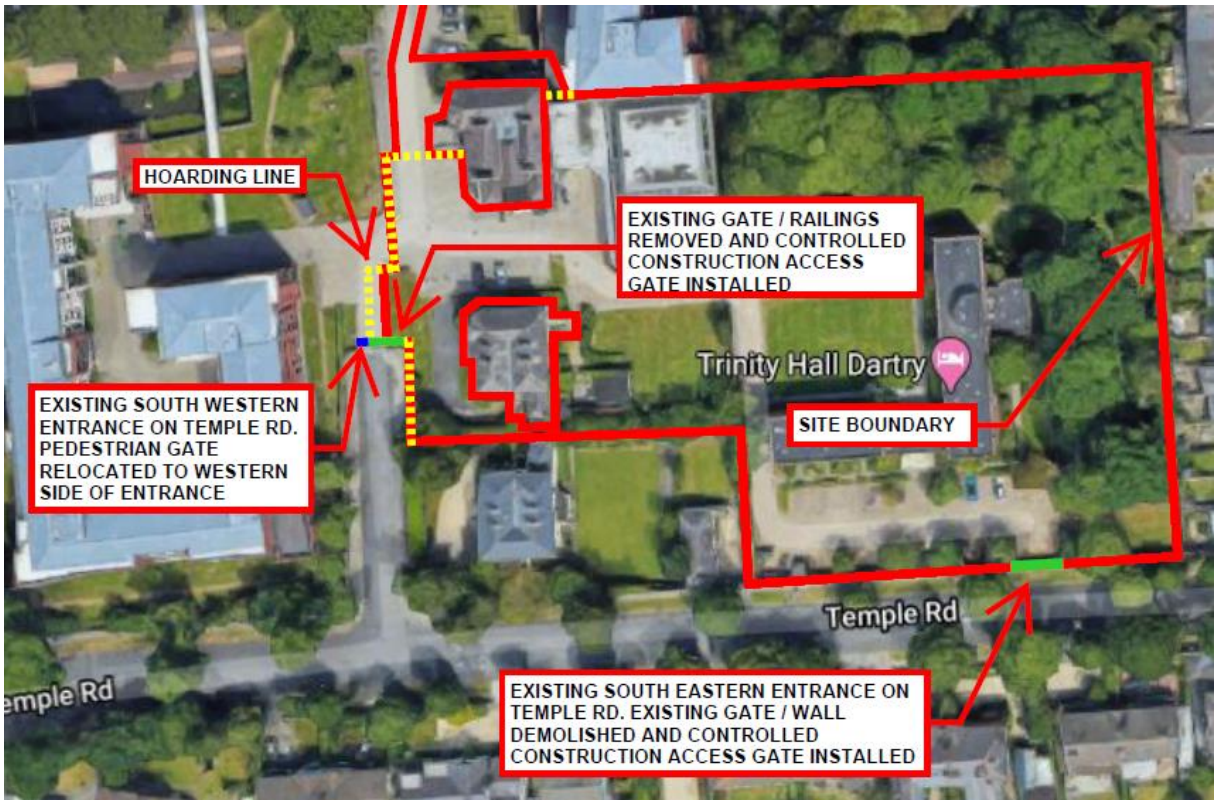

Figure 3 – Proposed Construction Traffic Access

The following is a non-exhaustive list of vehicles anticipated to be utilised during construction activities: -

- Excavators
- Dump trucks
- Concrete delivery trucks
- Concrete pumps
- Mobile cranes
- Mobile hoists.

The primary truck movements are expected to be associated with bulk earthworks which will include site strip, foundations and basement excavation. The estimated earthworks quantities are set out in the table below. The material excavated will generally be fill or naturally occurring boulder clay. The estimated volumes of excavation are as follows:

Item	Soil Excavation Volume (m^3)
Site Strip	1,738
Foundations	435
Lower Ground Floor (Plant Area)	224
Total	2,397

In addition to the above 2,397m^3, of bulk earthworks excavation, 3,471m^3 of waste material is estimated following the demolition of the existing sports hall and student residences buildings. Using 4-axle trucks with a 25-tonne capacity (15m^3) this equates to approximately 391 truck movements for bulk excavations and waste material removal. Assuming peak HGV movements would occur during the period of lower ground (plant area) excavation (224.2m^3), this would result in approximately 15 truck movements over a 2-day period giving 8 HGV in/out movements per day over that period. Excavated material will generally be disposed of off-site to an appropriate licensed waste disposal facility.

3.4 Construction Site Compound

A 2.4m high hoarding will be provided to the boundaries of the development and the site compound will be established within the site boundary. The exact location of the site offices to be selected by the contractor taking into account their proposed method statement and sequencing of the works.
The Contractor will be responsible for the security of the site. The Contractor will:

- Operate a site induction process for all site staff.
- Ensure all site staff shall have current “safe pass” cards.
- Install adequate site hoarding to the site boundary.
- Maintain site security staff at all times.
- Separate pedestrian access from vehicular access.
- Ensure restricted access is maintained to the works.

3.5 Contractor’s Parking

All contractor's vehicles and plant will be parked within the site area.

3.6 Reinstatement / Road Cleaning

Construction Stage

- Prior to the works a detailed photographic survey will be carried out and recorded in a Condition Schedule Report of adjoining walls, roads, footpaths and grass verges. Copies of this Report will be made available to adjoining owners and DCC. This record will form the basis of assessing repairs to adjoining areas in the future should a dispute arise as to their cause.
- Roadways will be kept clean of muck and other debris. A road sweeping truck will be provided to ensure that roads are kept clean and this will be monitored, at operational level, by the site security man reporting to the contractor’s site manager.
- A proprietary wheel wash system, utilising an integral tank which captures water for reuse, will be provided for the duration of the earthworks. All waters shall be drained through the settlement tank system described above prior to discharge to the surface water system via a temporary connection to the final outfall surface water pipe from the site.

On Completion

Reinstatement at completion of the works will involve:

- The cleaning of the existing sewers in the vicinity of the development as required.
- Prior to connection to the public watermain, all watermains in the development will be tested and cleaned to the requirements of the Local Authority. This will reduce the risk of contamination of the public water supply when the new network is connected to the system.
- Any damage to any adjacent public roadways, kerbs and grass verges will be fully repaired in accordance with DCC requirements.
- All excavations will be fully reinstated to the requirements of Dublin City Council.
- The area is to be left in a neat and clean condition, removing all material that may have been deposited during construction works.

3.7 Hours of Working / Delivery Times

It is proposed that standard construction working hours will apply, 8am to 6pm Mondays to Fridays, and 8am to 1pm on Saturdays, with the caveat that no works will be carried out outside daylight hours and no articficial light used. Any works outside this period shall be strictly by agreement with the Local Authority.

4.0 CONSTRUCTION & DEMOLITION WASTE MANAGEMENT

This plan addresses the management of the waste that will occur during the demolition and the construction phase of the project. It will cover the methods for prevention, minimization, reuse, recycling, recovery and disposal.

4.1 Relevant Legislation & Guidelines

This plan has been prepared with reference to:

- Waste Management Plan for the Dublin Region (2011)
- Waste Management (Amendment) Act 2001 and subsequent amendments.
- Waste management Act 1996
- East Midlands Regional Waste Management Plan 2015-2021
- Waste Classification - List of Waste and Determining if Waste is Hazardous or Non-Hazardous EPA 2018
- Department of Environment policy statements, including:
  - "Changing our Ways" (1998)
  - "Taking Stock and Moving Forward" (2004)
  - "Best Practice Guidelines on the Preparation of Waste Management Plans for Construction & Demolition Projects" (Dept. of Environment July 2006) which requires a WMP for projects generating in excess of 100m3 of Construction and demolition waste such as this project as per the recommendations of the National Construction and Demolition Waste Council Initiative

4.2 Details Of Waste Streams To Be Produced

Waste will be produced during the demolition phase of the project and during construction when there will be waste soil, due to site preparation & excavation, and general construction waste generated. Waste streams during these phases are categorised in sections 4.2.1, 4.2.2, and 4.2.3 that follow:

4.2.1 Demolition Waste Categories

The main non-hazardous waste streams that will be generated during the demolition phase are as follows:

- concrete, block, brick, tiles and ceramics
- gypsum based construction materials
- scrap metal
- waste wood
- Glass

The hazardous waste streams may include the following:

- ACMs (asbestos containing materials including pipes)
- batteries
- oils / fuels from machinery and equipment
- lead in paint finishes
- miscellaneous rubbish

At the time of writing, a detailed asbestos has not yet been undertaken. Prior to the demolition of the buildings and removal of existing elements a survey will be undertaken to identify any potentially hazardous wastes such as asbestos containing materials and lead in paint finishes and to identify any other possible hazards such as oil storage tanks and chemical containers.

4.2.2 Site Preparation & Excavation Waste Categories

The main non-hazardous waste streams that will be generated by Site Preparation and Excavation activities are:

- stones / bedrock, topsoil and subsoil
- green waste: trees, shrubs
- uPVC, Concrete & Clay Pipework
- blockwork & concrete from underground chambers

The hazardous waste streams may include the following:

- asphalt and tar products
- some of the buried electrical cables could possibly have oil insulation which will require special care in decommissioning and waste disposal.
- Contaminated Soil

A detailed asbestos survey will be carried out by the successful contractor prior to commencing demolition on site.

4.2.3 Construction Waste Categories

The main non-hazardous waste streams that will be generated by Construction activities are:

- cardboard packaging
- plastic wrapping, packaging
- paper packaging
- wood

The hazardous waste streams may include the following:

- Oils/Fuels from machinery and equipment

4.3 PROPOSALS FOR WASTE SEGREGATION AND STORAGE

4.3.1 Waste Arising from Demolitions

In general, all demolition waste will be collected in skips and the site will be kept tidy and free of debris at all times.

All material types, arising out of demolition of the buildings, will be separated. This will be done by means of an initial soft strip of the buildings and will be ongoing generally during demolition. Materials will be separated into categories including Reinforced Concrete, Masonry, Timber, Plasterboard and Materials containing asbestos, tarmacadam and roofing bitumen. Hazardous wastes will be identified, removed and disposed of in accordance with the relevant legislation. If, pending disposal off site, hazardous material has to be stored on site for a time then it will be stored at a remote location, separate from other Demolition waste materials and areas of work, in order to avoid contamination.

All asbestos containing materials will be removed in accordance with Safety, Health and Welfare at Work (Exposure to Asbestos) Regulations 2006/2013. A designated area on the site will be assigned for packaging and stockpiling of ACMs from the site, in advance of removal to a licensed facility. Notwithstanding that Regulations may not require air monitoring to be carried out when removing particular types of asbestos, it is a requirement of this contract that Air monitoring be carried out during all Asbestos removal to ensure the air quality is compliant with all H & S Regulations.

4.3.1 Waste Arising from Site Preparation & Excavation

Excavated material will be either stockpiled on site for re-use or disposed of off-site to a licensed landfill facility. The stockpiled topsoil / clay will be retained for landscaping / berming. The topsoil / clay will be carefully stored in segregated piles on the site until subsequent reuse.

A Site Investigation has been carried out on the subject site by Causeway Geotech Ltd. in August 2019. Minor contamination has been found in an isolated area. This was namely at trial pit location TP03, details of which can found in the Site Investigation report included separately with this application. A 'hydrocarbon odour' was noted between 0.7m and 1.7m below existing ground level. No further visual or olfactory evidence of contamination was noted at deeper depths. Further details of these findings can be found within the Waste Classification report included separately with this application. All such contaminated material will be stored in a segregated stockpile for disposal to an appropriately licensed disposal facility.

4.3.2 Waste Arising from Construction Activities

Appropriate measures will be taken to ensure excess waste is not generated during construction, including:

- Ordering of materials will be on an as needed basis to prevent over supply to site. Co-ordination is required with suppliers enabling them to take / buy back surplus stock.
- Purchase of materials pre-cut to length to avoid excess scrap waste generated on site.
- Ensuring correct storage and handling of goods to avoid unnecessary damage that would result in their disposal.
- Ensuring correct sequencing of operations.
- Use reclaimed materials in the construction works.

Packaging waste will be separated into paper, cardboard, plastic sheeting, and wood fractions and arrangements will be made for it to be collected by a Repak approved waste contractor.

The Contractor's office and canteen waste will be separated into paper/glass/plastic recycling and removed to an off-site recycling facility. Under no circumstances is the burning of waste material permitted.

The Contactor's Site Sanitary Facilities will be provided by a specialist sub-contractor who will also provide maintenance and licensed waste disposal for all such facilities.

Some hazardous waste may be produced during the construction stage of the development. Fuels used during construction are classified as hazardous. If fuel is stored on site for machinery and construction vehicles, then areas around fuel tanks and draw off points must be bunded. If fuel is correctly contained and bunded, then it is not expected that there will be any significant fuel wastage at the site – See Construction & Environmental Management Plan, Document No 19.114-CEMP-01, for further details on measures to ensure this environmental risk is properly managed.

4.4 Removal Of Waste Off Site

All waste material will be disposed of off-site to an appropriately licensed facility. All Disposal Contractors must be authorised to dispose of this waste and all licenses/permits must be valid, and conditions adhered to.

As stated in section 4.3.1, concrete and masonry waste will be source segregated separately and disposed of at a remote facility for reprocessing and reuse as aggregate or backfill material if suitable. Timber and scrap metal will be collected in receptacles for subsequent separation and recycling at a remote facility.

Contaminated excavated material must be disposed of at an approved licenced waste facility, and the local planning authority must be notified of the proposed route of disposal prior to removal off site.

The following are some of the of the recovery facilities which may be used for waste arising from this site.

Type of Waste	Potential Recovery Facility
Timber	Greenstar, Greenogue, Rathcoole, Co. Dublin
Concrete / Precast / Masonry	CRH
Metals	Hammond Lane, Pigeon House Road, Ringsend, Dublin 4
Plasterboard	Greenstar, Greenogue, Rathcoole, Co. Dublin
Asbestos	Rilta Environmental, Greenogue Business Park, Rathcoole, Co. Dublin
General Rubbish	Greenstar, Greenogue, Rathcoole, Co. Dublin

It is the Contractor's responsibility to either: gain a waste collection permit or, to engage specialist waste service Contractors who will possess the requisite authorizations, for the collection and movement of waste off site. Material will be brought to a facility which currently holds an appropriate waste disposal license.

Details of all waste will be documented prior to leaving the site and these records will be filed and held by the Site Waste Manager, as outlined in Section 4.5.

4.5 Roles And Responsibilities For Construction & Demolition Waste

A Construction and Demolition Site Waste Manager will be appointed and employed by the contractor to ensure that waste prevention/minimisation, storage and disposal are managed appropriately. Their main tasks will be:

- To effectively implement the requirements set out in the Waste Management Plan and to keep accurate records on the waste generated, and the cost associated with waste disposal and management.
- Document each consignment of waste, including:
  - type of material being transported,
  - quantity of material,
  - name and permit number of waste collection contractor,
    destination of material and proposed use. Note: Summary reports are required to be provided on the above, which must also include estimates of the quantity of waste that is diverted from landfill.
- Document the extent of re-use, salvage, recycling and waste disposal.

The Constriction & Demolition Site Waste Manager will have the authority to instruct all site personnel to comply with the Waste Management Plan.

At the operational level, sub-contractors will have an appointed person who has the responsibility to ensure the requirements of the Waste Management Plan are complied with.

4.6 Waste Auditing

The appointed Site Waste Manager will be responsible for conducting a quarterly waste audit on site. The audit will include a review of all the records for the waste generated and transported off site. This will include:

- reviewing details of materials arriving on site
- reviewing the amount, nature and composition waste leaving site.
- calculating the total cost of waste management.
- All areas, and stages of the project will be reviewed to ensure that obvious opportunities for waste reduction are not overlooked.
- Summary of waste arising will be sent to the environmental authority at the completion of the project

4.7 TRAINING

Copies of the Waste Management Plan will be made available to all personnel on site, and objectives, procedures and responsibilities of the Waste Management Plan will be outlined to all site personnel during their site induction.

Members of staff will be instructed on, waste segregation, and material reuse, and how to comply with the Waste Management Plan. Posters will be displayed on site reinforcing the key messages of the Waste Management Plan.

4.8 ESTIMATED COST OF WASTE MANAGEMENT

The cost of waste management will be estimated by the appointed contractor and included for in the Tender price so that it will be ensured that all the requirements of the Waste Management Plan can be carried out within the Contractor's price for the works. This will include:

- the purchase cost of waste materials
- handling costs
- storage and transportation costs
- disposal costs including landfill tax

It will then be possible to estimate:

- total waste concrete management costs
- total waste soil management costs
- total waste masonry management costs

This will help ensure that unproductive and avoidable costs of Construction & Demolition waste management are eliminated and will be effective in enhancing internal cost control procedures. The estimate of the cost of waste management will be updated throughout the project at each stage at which a waste audit is carried out.