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CONSULTING ENGINEERS

RESIDENTIAL DEVELOPMENT, AT CARRIGALINE ROAD & CHURCHYARD LANE, DOUGLAS, CORK

CONSTRUCTION & ENVIRONMENTAL MANAGEMENT PLAN

DATE 16/01/2025

REVISION 2

JOB NO. 7114

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DOCUMENT CONTROL

PROJECT NAME: Residential Development, at Carrigaline Road & Churchyard Lane, Douglas, Cork

PROJECT NUMBER: 7114

REVISION	DATE	FILE NAME: Residential Development, at Carrigaline Road & Churchyard Lane, Douglas, Cork			
0	14.10.2024	DESCRIPTION: Construction & Environmental Management Plan			
			PREPARED	CHECKED	APPROVED
		INITIAL	BO'S	BO'S	BO'S
		DATE	04.10.2024	14.10.2024	14.10.2024
1	13.01.2025	FILE NAME: Residential Development, at Carrigaline Road & Churchyard Lane, Douglas, Cork			
		DESCRIPTION: Construction & Environmental Waste Management Plan			
			PREPARED	CHECKED	APPROVED
		INITIAL	BO'S	BO'S	BO'S
		DATE	13.01.2025	13.01.2025	13.01.2025
2	16.01.2025	FILE NAME: Residential Development, at Carrigaline Road & Churchyard Lane, Douglas, Cork			
		DESCRIPTION: Construction & Environmental Waste Management Plan			
			PREPARED	CHECKED	APPROVED
		INITIAL	BO'S	BO'S	BO'S
		DATE	16.01.2025	16.01.2025	16.01.2025
#	Insert Date	FILE NAME:			
		DESCRIPTION: Insert description			
			PREPARED	CHECKED	APPROVED
		INITIAL	Initials	Initials	Initials
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#	Insert Date	FILE NAME:			
		DESCRIPTION: Insert description			
			PREPARED	CHECKED	APPROVED
		INITIAL	Initials	Initials	Initials
		DATE	Insert Date	Insert Date	Insert Date

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1 Introduction

Denis O'Sullivan & Associates were engaged as Consulting Engineers for the proposed development at Carrigaline Road & Churchyard Lane, Douglas, Cork.

This document comprises the Construction & Environmental Waste Management Plan and in particular provides details of the intended construction practice for the development including construction access and phasing, the proposed hours of working, noise management measures and off-site disposal of construction waste. The proposed sustainable management of wastes arising during the construction phase are also provided demonstrating how environmental impacts are minimised during the construction phase of the development.

Finally, the site compound location, construction traffic routes and parking proposals of workers along with general site considerations are also outlined. This CEMP will be provided to the main contractor for implementation during the site clearance and construction stages. It will be considered as a 'Live Document' and will be updated accordingly throughout the project as required.

The purpose of this CEMP is to:

- Identify stakeholder requirements.
- Ensure compliance with the grant of planning.
- Effectively avoid any potential significant adverse environmental effects during site clearance and construction; and
- Translate mitigation measures set out in the planning documentation into committed site procedures.

On appointment, the main contractor is required to implement the mitigation and protective measures set out in this document and maintain environmental monitoring records for the duration of the project which shall be made available to representatives from Cork City Council for inspection on request.

1.1 Site Location

The subject site is located to the south-east of Douglas Village shopping centre and just off East Douglas Street on the Carrigaline Road. The subject site presents a greenfield landscape characterised by its level terrain. Bordered by the Carrigaline Roads to the east, Churchyard Lane to the west, the Telephone Exchange to the south, and a residential dwelling alongside a restaurant and bar to the north. The land is currently zoned mixed use development in the Current Development Plan

A snapshot of the site is outlined in Figure 1-1 below.

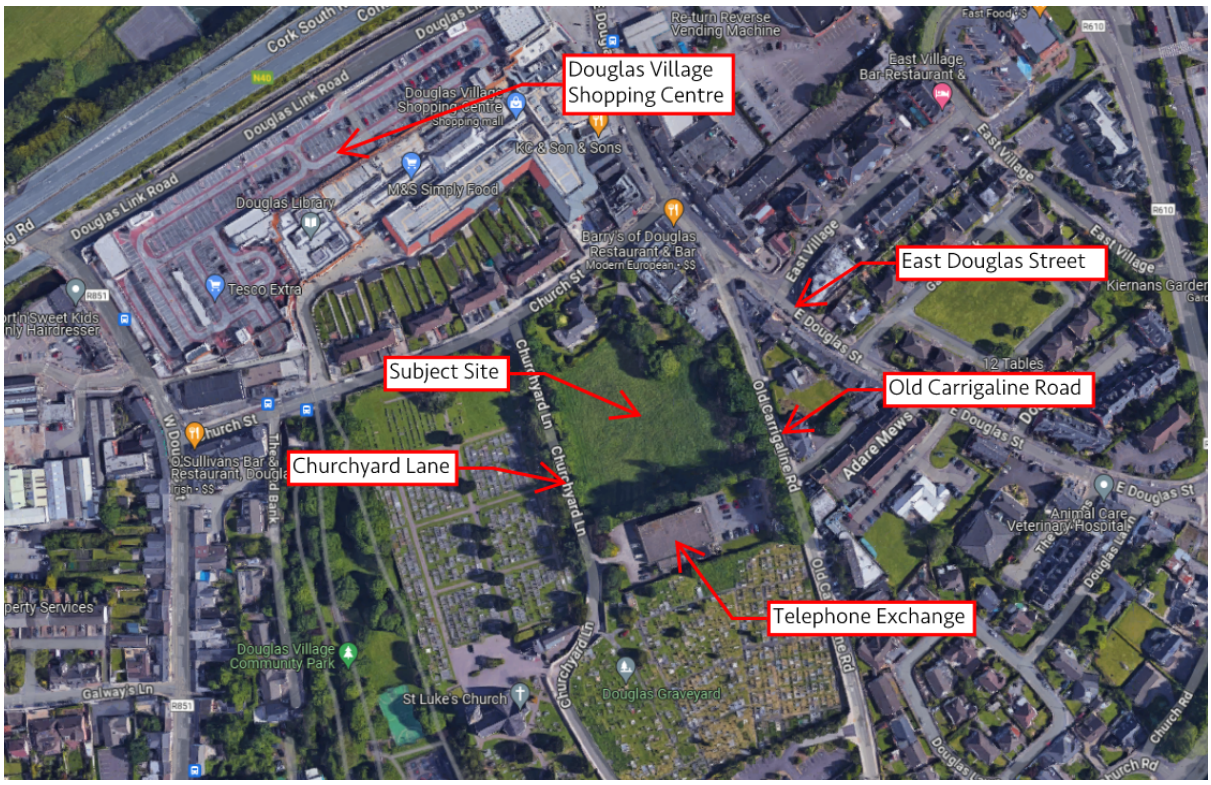

Figure 1-1 Site Location (Google Maps)

1.2 Site Topography

The subject site presents a greenfield landscape characterised by its level terrain. There is a very gentle incline from South to Northerly direction to a low point on the Northern boundary which is approximately 5.00m OD.

1.3 Site History

There are two previous planning applications on the site for a mixed use development dated 2016 & 2018. Both planning application had been granted by Cork County Council but were appealed to An Bord Pleanála and refused.

1.4 Proposed Development

The proposed development on the site entails the construction of 124 no. residential apartments (consisting of a mix of 1, 2 and 3 bed units), 1 no. cafe unit and 2 no. office units, in a development ranging in height from 1 to 5 storeys and all associated site development works including footpaths, car and bicycle parking, drainage, bicycle and bin stores, lighting, fencing, landscaping/amenity areas, ESB substation/switchroom and plant room. Site development works include 2 no. new uncontrolled pedestrian crossings and footpath improvements on Churchyard Lane which requires the removal of 6 no. existing on-street car parking spaces. The proposed development works include a connection and construction of a new storm water and foul sewer along Carrigaline Road. Access to the site will be via a new vehicle access point and a new pedestrian connection from Carrigaline Road and 2 new pedestrian connections onto Churchyard Lane. The new vehicular access requires the removal of 4 no. existing car parking spaces. This comprehensive proposal outlines a significant residential development that aims to contribute to the local area while providing a range of housing options for potential residents.



Figure 1-2 Proposed Site Layout (O'Mahony Pike Architecture/Urban Design)

2 *Potential Impact of Construction Works*

The construction phase of the development will generate a certain amount of activity on the site. The general activities on site are likely to generate air and noise emissions and traffic movements. Alongside these general activities there will also be an amount of construction waste generated. The requirement to raise ground levels above the expected flood level will ensure that most of the excavated material will be re-used on site and therefore minimise movements of earthworks vehicles out of the site.

2.1 General Construction Activities

When considering a development of this nature, the potential noise & traffic impact on the surroundings must be considered for the construction phase. The construction phase will involve the preparation of the site, excavation of on-site material, construction of site roads and building of the proposed apartments. With the construction activity there will be an increased number of vehicular movements in the locality, both construction and worker vehicles. The construction at the site will also have the potential of raising dust into the air and depositing or spilling material on access roads during the construction works. Noise will also be emitted from the construction site during the works, with limits on the hours of operation the norm to keep noise impacts to a minimum (see section 8.2 below). The flow of vehicular traffic to and from a construction site is also a potential source of relatively high noise levels.

The potential for vibration at neighbouring sensitive locations during construction is typically limited to excavation works and lorry movements on uneven road surfaces, see section 9.3 below.

There is potential for some noise and dust impacts on the closest buildings adjoining the northern boundary, with the most significant constraint centring on vehicular access and egress from the site and the impact on the public roads.

The likely effects include noise and air blown dust being emitted from the site. The measures outlined in general for the site will seek to mitigate and/or remove impacts on the existing residents and the public road and these mitigation measures are detailed in the subsequent sections.

2.2 Developer Liaison

An information notice board will be erected at the construction site entrance. This notice board will be listed with a designated contact number to assist residents in contacting the developer with any queries.

3 Construction Works & Sequencing

Construction activities will undoubtedly have impacts and associated mitigation measures will be required to address any proposed works.

3.1 Phasing

It is anticipated that the works will be carried out in a single phase.

3.2 Working Hours

It is proposed that Construction works will be carried out between the hours of 08:00 and 18:00 from Monday to Friday and 08:00 and 14:00 on Saturdays.

No construction works will be carried out on Sundays or Bank Holidays, without the specific agreement of Cork City Council.

3.3 Pre-Construction Surveys

Topographical and utility surveys have been carried out for the site and are available to the Contractor. The Contractor will be required to carry out pre-condition photo survey of the site which will include all perimeter boundaries, footways, existing carriageway on approach to the site. Any damage caused to existing boundaries or elements to be retained will be rectified by the Contractor in accordance with relevant standards.

3.4 Construction Site Access

Access to the works will be from the Carrigaline Road. There will be sufficient space for construction vehicles to enter onto the site for delivery of materials and collection of waste without causing an obstruction on the public road network. There will also be sufficient space for HGVs to turn within the site. Signage will be erected on the local roads to notify motorists of the construction works ahead. Signage at the site entrance will be provided to ensure members of the public do not enter the site road mistakenly.

3.5 Construction Compound and Storage Areas

The construction compound for the development will be located adjacent to the site entrance, so that it will not need to be moved. The compound will include a site office and welfare facilities for construction workers. Portaloo's will be provided in the compound initially with a dedicated toilet block installed at a later date. Electrical and potable water supply will be provided from a temporary connection. Car parking will be located adjacent to the construction compound as well as at an off-site location which shall be confirmed at the construction stage Environmental Management Plan.

Waste skips will be located adjacent to the site office. Containers and skips used for construction waste handling will be moved close to the work face, as required. Incoming construction materials will be offloaded and stored in the materials compound.

3.6 Perimeter Fencing

The site will be secured using temporary fencing or hoarding at all times to ensure that the ongoing works are separated from the public. Netting will be erected on any fencing used to prevent debris

and dust release from the site and provide screening of the construction and works. A secure lockable gate will be erected at the site entrance and visitors to the site will be directed to the adjacent site office. The Site management team will carry out regular inspections and maintenance of the security fencing/ hoarding while also ensuring areas are kept clean.

3.7 Stripping & Earthworks

In parallel with access road construction the main earthmoving works will be undertaken on the site. As the plant required for this phase will remain on site and not leave until the work is complete and the materials input is minimal, it is considered that the site access outlined in Section 3.4 will be adequate to cater for the construction works.

Level platforms will be excavated for each building and there will be a requirement to import stone material for the access roads. Measures will be in place to contain dust and/or to ensure that mud and other debris are kept off the public roadways.

3.8 Earthworks Impact

There is a very gentle incline from South to Northerly direction to a low point on the Northern boundary which is approximately 5.00m OD. The development is raised above the expected flood level which will in turn minimise any excavation earthwork operations. The duration that subsoils layers are exposed to the effects of weather shall be minimised. Disturbed subsoil layers will be stabilised as soon as practicable (e.g., backfill of service trenches, construction of road capping layers, construction of building foundations and completion of landscaping). Similar to comments regarding stripped topsoil, stockpiles of excavated subsoil material shall be protected for the duration of the works. Stockpiles of subsoil material shall be located separately from topsoil stockpiles. These stockpiles will be monitored throughout the construction phase. Monitoring of ground conditions and stability of excavations will be monitored on an on-going basis. Once the earthworks and landscaping are completed, the risk of sediment loading of water courses is significantly reduced

The main areas of potential impact with respect to earthworks are as follows: -

- Excessive Dust deposition
- Increased sediment loading in the surface water runoff from the site and entering the adjoining drainage infrastructure.
- Potential spillage of oil and diesel used on site for plant and equipment

3.9 Earthworks Mitigation

The proposed mitigation measures for both the construction and operational phases include:

- Careful selection of stockpile locations to-avoid, as far as practical, double handling of materials; avoid steep slopes; avoid natural overland flow paths of stormwater runoff; provide shelter from the prevailing wind direction.
- Blading off the vegetative layer (for separate storage). Vegetation will not be incorporated in the stripped topsoil.
- Avoid stripping in inclement wet weather conditions. Wet soils are more difficult to work and handle and it is more likely to damage soil structure in wet conditions.
- Avoid extending topsoil stripping into the mineral soil layer. Limiting height of stockpiles to avoid anaerobic conditions occurring.
- Profiling of stockpiles to promote rainwater runoff.
- Check dams and / or straw bales will be installed along the alignment of roadside drainage to slow flows and remove silt. These will be constructed using clean stone and geotextile spanning across the drainage channel
- Placement of silt fencing downgradient of stockpiles to catch any fines carried by stormwater runoff.
- Stockpiles will be allowed vegetate naturally, which will reduce erosion by wind and water.
- A street sweeper will attend site regularly to clean the road when there are truck movements in and out of the site.
- Earthworks will be suspended during extreme weather conditions. An extreme rainfall event will be classified as an event that corresponds to the Met Éireann Orange–Weather Alert for Rainfall.
- Hard surface roads will be regularly swept to remove mud and aggregate materials from their surface;
- Public roads outside the site will be regularly inspected for cleanliness, and cleaned as necessary;
- Material handling systems and Site stockpiling of materials will be designed and laid out to minimise exposure to wind; and
- Water misting or sprays will be used on stockpiles as required if particularly dusty activities are necessary during dry or windy periods.
- Most of the earthworks for the housing development will take place at a 60m to 100m (approximately) offset from the stream.
- Potential hydrocarbon spillages during the construction stage are unmitigated and depend largely on the volume released, hydrocarbons reaching the surface water environment would have a local short-term direct slight negative impact on water quality and a short term indirect slight negative impact on habitats downstream. Hydrocarbons attenuate naturally in the environment, so any negative impacts are reversible. During the operational phase there would be comparatively little hydrocarbons apart from parked cars. Interceptors as part of the Suds train will mitigate this concern.
- Any storage of oils and diesel on site will be in steel or plastic tanks of good integrity and bunded to 110 % of tank capacity. All fuel and hydraulic fluids will be stored in the site COSHH store located in the site compound.

- Refuelling of site plant will be carried out at the site compound where a concrete refuelling pad will be provided adjacent to the fuel storage tank. When refuelling takes place directly from self-bunded mobile refuelling bowsers, spill kits will be readily available (kept in the machine). Refuelling of mobile plant will not take place within 50m of any sensitive receptor. Toolbox talks on refuelling will be given to delivery drivers in addition to plant operatives.
- Fuels, lubricants and hydraulic fluids for equipment used on the construction site will be carefully handled to avoid spillage, properly secured against unauthorised access or vandalism, and provided with spill containment according to best codes of practice.
- Any spillage of fuels, lubricants or hydraulic oils will be immediately contained, and the contaminated soil removed from the site and properly disposed of. Waste oils and hydraulic fluids will be collected in leak-proof containers and removed from the site for disposal or re-cycling.
- Appropriate spill control equipment, such as oil soakage pads, will be kept in the site plant to deal with any accidental spillage. Spare spill kits will be kept at the construction site compound in the container adjacent to the fuel storage

3.10 Site Establishment

On commencement of works on site a site compound will be established at the site entrance. In this area the following facilities/provisions will be made:

- Site offices, canteen and toilet / changing facilities c/w temporary water supplies and wastewater disposal to the existing foul sewer on the adjoining Carrigaline Road.
- Secure compound and containers for storage of materials and plant.
- Temporary vehicle parking areas.
- Contained area for machinery refuelling and construction chemical storage.
- Contained area for washing out of concrete and mortar trucks.
- A security/herras fencing will be provided at the main site entrance. All vehicles and personnel will be checked on entry to ensure no unauthorised access or fly-tipping. Heras fencing will also be provided around all boundaries as required.
- Water supply for the construction facilities shall be taken from the mains supply to the agricultural farm lands. Power for the pumps and small power requirements for construction activities will be supplied from diesel generators until such time as the temporary site power supply is available.
- The development's road network will be finished with tarmac or asphalt surface which will discharge runoff to a piped drainage system, and surface water drains will be installed in roads and streets and in pre-determined wayleaves adjacent to building structures.
- All car parking and refuel areas at the site will be located on substrate underlain with an impermeable liner to prevent contaminant leaching to groundwater.

3.11 Storage and Use of Materials

Specific areas for storage, delivery and loading/unloading of materials will be designated, which will have appropriate containment/spill protection measures where required.

- Handling and storage areas will be actively managed and fine, dry material will be stored inside enclosed shields/coverings or within central storage areas.
- A regular review of weather forecasts of heavy rainfall will be conducted, and a contingency plan will be prepared before and after such events to minimise any potential nuisances.
- Discharge water generated during the placement of concrete will be stored and removed off-Site for treatment and disposal.
- Prolonged exposure of contaminated soils or groundwater to the atmosphere will be avoided where practical or unnecessary.

3.12 Landscaping

Any trees shown on planning drawings to be retained will be protected for the duration of the construction activities on site and in accordance with BS 5837. Protective measures will include a protection fence erected beyond the branch spread of the trees and no construction activities will take place within the protective barrier save for perimeter fencing along the site boundaries, refer to submitted details from Cunnane Stratton Reynold for further information.

3.13 Maintenance of Plant and Machinery

All plant and equipment will be regularly cleaned and properly maintained and there will be no washing out of any concrete trucks on site. Pumped concrete will be monitored to ensure there is no accidental discharge and will be carried out in dry weather and with impermeable pouring mats laid down where possible.

3.14 Storage and Use of Fuels, Oils, and Chemicals

Where possible, refuelling of vehicles and equipment will not be carried out on site to minimise the potential for spills or leaks to occur. However, some fuel, lubricants and hydraulic fluids will need to be stored on site during construction works for equipment such as excavators and generators.

- Appropriate bunding, storage and signage arrangements for all deleterious substances (e.g., fuels, oils, and chemicals) will be used.
- Fuels, lubricants, and hydraulic fluids for equipment used on the construction Site will be carefully handled to avoid spillage, properly secured against unauthorised access or vandalism, and provided with spill containment according to best codes of practice (Enterprise Ireland BPGCS005).
- Waste oils and hydraulic fluids will be collected in leak-proof containers and removed from the Site for disposal or recycling.
- Diesel tanks, used to store fuel for the various items of machinery, will be self-contained and double-walled.

- Spillage and leaks of oil from cars parked in the development during the Construction Phase are unavoidable. To reduce the potential impacts, oil interceptors will be incorporated into the Site drainage design.
- Any spillage of fuels, lubricants or hydraulic oils will be immediately contained and the contaminated soil removed from the Site and properly disposed of.
- Refuelling will be carried out from tanks or delivery vehicles on a designated impermeable surface and will not be left unattended.
- Plant will not be left running when not in use (i.e., no idling) and plant with dust arrestment equipment will be used where practical.
- The fuel storage area will be properly secured to prevent unauthorised access or vandalism and all triggers will be locked when not in use. Spill kits and drip trays will be used during refuelling to collect any potential spills or overfills. No vehicles or containers will be left unattended during refuelling.
- Mobile fuel bowsers may be used for refuelling heavy equipment. Bowsers used will be double skinned and spill kit/drip tray equipment will be used during refuelling which will take place away from any nearby drains or watercourses and from any surface water drainage gulley's.

3.15 Spill/Environmental Response Procedures

Robust and appropriate Spill Response Plan and Site Environmental Emergency Plans (SEP) will be implemented for the duration of the works.

- Identifying fuel storage and refuelling locations on designated areas within the compound, away from drainage ditches/waterbodies, and on substrate underlain with an impermeable liner to prevent contaminant leaching to groundwater;
- Identifying spill kit locations (spill kits will be required for each piece of heavy equipment (e.g., excavators, loaders, trucks, etc.,) which will be at least 21L drum size each with spill pads, sorbent, small boom, plastic garbage bag and gloves;
- A specially trained and dedicated Environmental and Emergency Spill Response team will be appointed before the commencement of works on Site.
- Staff will be trained and experienced in using appropriate control measures and spill kits on-Site, and will be familiar with the location of all spill kit locations and the Site layout.

A register will be kept of all hazardous substances either used on Site or expected to be present. The register shall be always available and shall include as a minimum:

- Valid safety sheets; Health & Safety, environmental controls to be implemented when storing, handling, using and in the event of spillage of materials;
- Emergency response procedures/precautions for each material;
- Personal Protective Equipment (PPE) is required when using the material.

3.16 Training And Awareness

All site staff will be required to complete an induction prior to commencement of works on the site. The details of the site induction will be provided by the main contractor in the Construction Health & Safety Plan.

As part of the site induction, all site staff will be made aware of the presence of the sensitive ecological areas in the vicinity of the site. Employees will also be informed about the risks associated with stormwater runoff on site and will be required to ensure no runoff or chemicals will enter the adjoining network once installed.

During the project works, the Site Manager or Project Environmental Manager will deliver strategic toolbox talks focused on potential environmental and safety risks associated with the works being carried out at that stage of the project.

3.17 Site Infrastructure

Proposed site infrastructure will be completed in a coordinated approach in line with the delivery of the residential units. It is anticipated that works will be staged in a similar nature. A more detailed discussion on site infrastructure is contained further in this document.

3.18 Construction of Apartment Blocks

Once the site development and infrastructure are sufficiently advanced, construction of individual blocks will commence. It is envisaged that this will commence with the proposed unit to the west of the site and work will continue outward to the east.

The basic sequence of residential construction is well established and the basic steps are as follows:

Substructure:

Construction of foundations and rising walls. This involves a degree of excavation and piling and all excavated material which cannot be re-used on-site will be disposed off site in a licenced waste management facility. Concrete and blocks will be delivered over several days. At this stage hard-core will be placed over the footprint of the units and roadways, which will generate a significant amount of truck movements into the site. The substructure will include allowances for under slab services/ utilities serving the units.

Concrete Floor Slab:

Pouring of concrete floor slab over the internal footprint of the blocks. This is generally completed in a single pour involving several concrete trucks delivering in one day.

Super-structure, External & Internal Walls:

Construction of the super-structure will commence with the casting of reinforced concrete columns and flat slab construction. This will generate significant amount of truck movement into the site delivering reinforcement steel and concrete trucks. Construction of external & internal walls involve infill light steel gauge panels or blockwork/brickwork. Metal framing, blocks, mortar, etc. will be delivered on standard trucks over a continued period as the work progresses.

Window & Installation:

Sealing of the building will continue with the installation of windows and doors. Again, these will be manufactured off site and deliver for installation.

Plastering (Internal & External):

Plastering of both the internal and external walls will involve the delivery of material supplies on an on-going basis.

Mechanical & Electrical Services:

Installation of lighting, alarm system, power outlets, etc. This is undertaken once the building is weathered and does not involve the delivery of bulk materials.

Site Finishes:

Tie-ins to main site services, road surfacing, and general landscaping will be carried out with no need for bulk materials. The delivery of construction materials and its impact on traffic volumes will be dealt with in a construction stage Traffic Management Plan.

4 Infrastructural Works

The site development works will comprise new roads, footpaths, surface, and foul water drainage, watermains and installation of service ducts for various utilities such as electricity, gas, and telecommunications services. Each of these services are dealt with individually in the following sections.

4.1 Surface Water Drainage

The storm water system will involve a network of underground pipelines and manholes discharging to an existing local authority stormwater manhole via an attenuation system, which will be fitted with flow control devices to ensure no increase in peak flows and an oil interceptor and silt trap to remove any traces of oil and silt washed off road surfaces.

The services layout drawings included at planning stage show the proposed surface water drainage layout for the entire site.

4.1.1 Impact

The main areas of potential impact with respect to storm water runoff are as follows: -

- Discharge of hydrocarbons can be a source of contamination of watercourses/groundwater.
- Siting of drainage services within the development to avoid future undermining/subsidence of building structures.
- Local flooding caused by overloading of the drainage system.
- Potential settlement of services through filled areas of the site.
- Back flows through surface water outfalls during extreme flood events.

4.1.2 Mitigation

The proposed mitigation measures for both the construction and operational phases include:

- Silt traps such as a combination of an earthen berm, silt-fencing and associated interception trenches will be installed along the extent of the northern boundary of the Site, such that no contaminated surface water run-off can leave the Site and make its way to the adjoining drainage network.
- Settlement ponds will be lined with cohesive material, with the addition of an engineered liner where a sealed drainage system is in use, and outlet by infiltration will not be permitted in order to protect the receiving groundwater at the Site.
- Under no circumstances will wastewater from equipment, wheel or surface cleaning be allowed to discharge into any drainage ditches, the ground or local storm network.
- Debris and sediment captured by vehicle wheel washes will be collected and disposed of off-Site at a licensed facility.
- In addition, the below-listed measures serve to work in tandem with and complement efforts to mitigate sedimentation/siltation and the release of pollutants on Site during the Construction Phase.

- A Site Environment Plan (SEP) identifying fuel storage and refuelling locations will be developed and this plan will also identify the spill kit locations. Spill response kits will be required for each piece of heavy equipment (i.e. Excavators, Loaders, Trucks) which will be at least 21 litre drum size each with spill pads, sorbent, small boom, plastic garbage bag and gloves.
- Silt traps will be installed on surface water drains during the site development works.
- All foul and other waste water will be discharged to the foul drainage system. The storm drainage system with associated hydrocarbon interceptors and silt collection will be cleaned and maintained on an on-going basis throughout its lifetime in a manner and frequency that is in line with guidelines. All bypass separators are required by legislation to be fitted with an oil level alarm system with recommendations that the alarm is installed, tested, commissioned, and regularly serviced by a qualified technician. The alarm indicates when the separator needs immediate maintenance in order for it to continue to work effectively. The Environmental Agency's PPG3 guidelines stipulate that every 6 months, and in accordance with manufacturer's instructions, experienced personnel should carry out maintenance to both the separator and alarm. It is proposed to enter into a maintenance agreement with the bypass separator supplier will be to provide a full technical and service package including separator and alarm installation, commissioning, oil and silt removal and route service contracts.

The following measures will be implemented for the storage and use of hydrocarbons on site:

- Diesel tanks, used to store fuel for the various items of machinery, will be self-contained and double-walled.
- Refuelling will be carried out from these tanks or from delivery vehicles and will not be left unattended.
- Fuels, lubricants and hydraulic fluids for equipment used on the construction site will be carefully handled to avoid spillage, properly secured against unauthorised access or vandalism, and provided with spill containment according to best codes of practice - (Enterprise Ireland BPGCS005).
- Any spillage of fuels, lubricants or hydraulic oils will be immediately contained and the contaminated soil removed from the site and properly disposed of.
- Waste oils and hydraulic fluids will be collected in leak-proof containers and removed from the site for disposal or re-cycling.
- The development's road network will be finished with tarmac or asphalt surface which will discharge runoff to a piped drainage system.
- Proven engineering practice will apply during the hydraulic design process.
- Surface water drains will be installed in roads and streets and in pre-determined wayleaves adjacent to building structures.
- Spillage and leaks of oil from cars parked in the development during the operational phase is unavoidable. To reduce the potential impacts, oil interceptors will be incorporated into the site drainage design.

The proposed development is not anticipated to cause an adverse impact on the surface water regime given the remedial and reductive measures previously outlined. Normal proven construction reinstatement and backfilling procedures will follow pipe laying, jointing, and testing procedures.

4.2 Foul Sewer Drainage

The proposed foul water drainage system is illustrated in the services drawings and will discharge to the foul network on the adjoining Carrigaline Road. All works will be in accordance with Uisce Eireann Specifications and details.

4.2.1 Impact

The potential impacts of the proposed development in terms of foul sewer are:-

- Impacts on surface water drains and watercourses in the event of leaks from the foul water drainage system.
- Impact on groundwater and soils in the event of leaks from the foul water drainage system.
- Overloading of foul water drainage infrastructure causing damage and blockages.
- Potential damage to local authority wastewater treatment plant and utilities.
- Siting of foul drains to avoid future undermining/subsidence of building structure.

4.2.2 Mitigation

The proposed mitigation measures are:

- Proven engineering practice shall apply during the hydraulic design process of the foul sewer network.
- Foul sewers will be installed in accordance with I.S. EN 752: Drains and Sewer Systems outside buildings.
- The ability of the ground to support the proposed drainage network will be confirmed by preliminary site investigation works.
- The foul sewer network will be vented in accordance with standard working practice.
- Foul water drains will be installed in roads and streets

4.3 Potable Water

It is proposed to provide a new 100mm I.D. Ø (inside diameter) HDPE connection to the watermain located in the East Douglas Street adjacent to the proposed site with associated hydrants, valves and metering requirements.

Water distribution supply to each building will be sized to cater for the requirements of those particular uses. Metered connections will be made to the trunk supply main.

4.3.1 Impact

The main areas of potential impact with respect to water supply are as follows:-

- New developments can cause difficulties for existing water supply.
- Reduction of existing storage capacity.
- Reduction of pressure in existing water supply.
- Siting of watermains to avoid future undermining/subsidence of building structures and permit ease of maintenance.

4.3.2 Mitigation

The proposed mitigation measures are:-

- The existing water supply feeds will be always protected during construction.
- Watermains will be installed in roads and streets.

The existing water supply will have adequate capacity to meet the projected water demand of the development. No adverse impact is foreseen on existing water supply or pressure. Firefighting provision will have no extra significance over and above any similar development of this kind.

4.4 Electrical Systems

Power and communications cabling will generally be run underground in a system of ducts and draw pits. Power supply will be taken from an incoming 10kV supply and stepped down to 380V 3- phase for distribution through the site.

The basic infrastructure will be constructed at an early stage and the branch lines will be extended to various areas of the site as construction progresses. The installation of these services involves trenching and the generation of surplus excavated material. The volume of this material has been calculated and it will be used within the site for re-grading around the site as development progresses. The impact of such works will be disturbance to users of the existing supply. The client will seek to minimise any disturbance to existing users by complying with the supplier utilities specifications/conditions and details.

5 Health & Safety

5.1 General

As required by the Safety Health and Welfare at Work (Construction) Regulations 2013, a Project Supervisor Design Process (PSDP) will be appointed by the developer to co-ordinate the design effort and to address and minimise construction risks during the design period. Notification of this appointment will be sent to the HSA by means of their Approved Form 1 (AF1). As design advances, a Preliminary Health and Safety Plan will be drawn up by the PSDP.

This will be passed on to the appointed Project Supervisor Construction Stage (PSCS) to be developed into a full project Health and Safety Plan. Notification of this appointment and the commencement date of construction will sent be to the HSA by means of their Approved Form 2 (AF2).

The construction areas will be delineated and will be under the control of the PSCS who will co-ordinate and supervise all safety aspects of the project. A Safety File will be compiled and maintained on site for the duration of the project and this and the implementation of the Plan will be subject to regular audits. All personnel and their subcontractors who will be working on or attending site will attend and comply with a Site Safety Induction Course to be provided by the Site Safety Officer. Construction workers carrying out safety critical tasks must complete Construction Skills Certification Scheme (CSCS) training, and general operatives will be required to have a valid and current safepass card.

All Contractors shall be requested to provide a sound working environment for all employees involved in the design and construction. This shall consider all applicable national laws, guidelines and standards.

The Contractors must ensure that the following HSE objectives are met:

- Zero accidents and injuries with respect to all involved workers.
- Zero harm to workers, the public and the environment.

Each Contractor shall prepare and implement the Health, Safety and Environmental (HSE) Plan and associated working instructions and procedures that will always govern their actions. The HSE Plan will cover the following aspects:

- Project Policy Statement.
- Roles and Responsibilities.
- Site regulation, including, for example, housekeeping, barricades, excavations, tools and equipment, electrical work, ladders, and scaffolds, etc.
- Risk Management and Hazard Identification.
- HSE training.
- HSE management of subcontractors.
- Work Permit system.
- Personnel Protective Equipment (PPE).
- Inspection and auditing
- HSE meetings.
- Incident Investigation and Reporting
- Site security
- Medical care and first aid

Furthermore, the Contractors shall develop and implement an emergency response plan outlining all necessary measures and communication procedures in case of emergency situations. The preparation and application of the HSE shall be audited independently throughout the construction period.

Minimum PPE required during the construction works will include protective footwear, high visibility vests, gloves, safety glasses and hard hats. Ear defenders will be used during noise works, as required.

Further details will be set out on the Construction Health & Safety Plan to be prepared by the appointed contractor.

Signage will be erected at the site entrance to warn the public of the ongoing construction works. The signage used will be like that shown in Figure 7.1 below.



Figure 7.1 – Signage Example

5.2 Control Substances Hazardous to Health

The strategy for controlling all substances coming onto site and all work activities and progress which may generate hazardous substances will be managed and controlled in accordance with best practice guidance. Some control measures to be employed are as follows:

- All fuels and chemicals will be stored in designated areas, with deliveries of all hazardous materials supervised;
- Storage tank or container facilities will be appropriately bunded with designated areas as far as possible from any watercourses or surface drains;
- In case of spills or discharges, remedial action will be taken as soon as possible, and set procedures will be compiled with;
- A logistics plan will be developed to consider the management and control of hazardous substances on site; and
- Personal protective equipment (PPE) suitable to prevailing conditions will be used by all construction workers.

5.3 Emergency, Fire and Accident Procedures

Emergency routes and procedures will be continuously adapted to suit the construction sequence and stage of the Development. An Emergency Fire and Accident plan will be prepared, generally following the guidelines for plan contents below and updated on a regular basis to take account of construction progress:

- Definition of the management organisation and responsibility for safety;
- Definition of appropriate fire prevention measures, including good housekeeping of site, welfare facilities and offices;
- Use of non-flammable/fire retardant materials for protection of finished works;

- Safe use and safe storage of flammable materials of all categories, whether solid, liquid or gas;
- Appropriate waste management procedures;
- Monitoring the type and frequency of fire inspection/audits;
- Suitable site accommodation location, construction and detection/firefighting systems;
- Development of evacuation plans, to include setting of systems in place to ensure that emergency vehicles have been called and all personnel have safely left the area;
- Training and fire drills.

6 *Construction Traffic Management*

The majority of construction traffic coming to and leaving the site will use the Carrigaline Road via East Douglas Street & Carrigaline Road. Transport of construction material will comprise the majority of HGV traffic movements during the construction works. Similarly, the Contractor will be required to use licenced and permitted waste management facilities within the Cork area which can accept C&D waste which will be generated from the site.

The appointed contractor will determine which facilities will provide construction materials and collect waste from the site. Suitably permitted waste contractors will be appointed to transport any waste off-site.

Construction traffic, delivering to or collecting from the site, will be able to drive into the site from the Carrigaline Road and turn within the site such that there will be no queuing of traffic on the adjacent road network. Drivers coming to site will be informed of the site working hours and suppliers will not be permitted to park at the site entrance awaiting the gates to open.

There will be a noticeable increase in HGV traffic on the road network during the construction stage works as waste materials are removed from site and deliveries brought to site, however this activity will be of short duration and generally staggered. Parking will be provided within the site boundary for construction staff where practical and alternative car parking shall be arranged by the contractor so as to eliminate the need to for car parking on the adjoining streets.

Visual surveys of the road network approaching the site will be carried out on a regular basis. The main contractor will carry out road sweeping operations, employing a suction sweeper or similar appropriate method, to remove any project related dirt and/or material deposited on the road network by construction/delivery vehicles. The contractor will be required to provide suitable hard standing directly within the site boundary off the main access to minimize spoil being transferred onto the public road. Nonetheless, a wheel wash system will be set up in the event there is a risk of debris deposit on the road.

Waste collection vehicles leaving the site will be required to cover their loads with a canvas to prevent waste or dust emissions from the vehicle on the road network.

7 Environmental Management

7.1 Air Quality

Construction works will be carried out in such a way as to limit the emissions to air of pollutants (particularly dust and fine particles (PM10)), employing Best Practicable Means. The site will be managed in accordance with the CRWMP to minimise the potential effects on air quality from construction. Monitoring will be undertaken throughout the construction period to enable proactive management of dust and PM10 levels. Wind speed and direction will be included in the monitoring.

Dust will be generated mainly from earthworks activities at the early stage of the project and to a lesser extent from new construction and traffic movements. The closest human receptors are

- The residential properties along Church Street & Carrigaline Road
- The commercial properties to the north-east corner of the site
- And the offices to the south in the Telephone Exchange building

Measures will be put in place to minimise the impact of dust generated from the works with reference to best practice guidance such as the *Control of Dust from Construction and Demolition Activities* document. These measures will include:

- During periods of dry weather, the site access routes will be kept damp to minimise dust generation from construction traffic.
- Street sweepers will be employed to ensure the adjacent R474 is maintained free of dust.
- Establishing a 10 km/hr speed limit for vehicles on site.
- Minimisation of extent of working areas at any one time.
- Netting and/or hard surface hoarding around the perimeter of the site will minimise dust migration from the site at low levels.
- Stockpiling of imported materials will be limited to the volumes required to practically meet the construction schedule.
- Excavated materials will be removed from site as soon as possible to minimise potential for stockpiles to create windblown dust; and
- Daily inspections by the main contractor will be carried out to identify potential sources of dust generation along with implementation measures to remove causes where found.

Contact details for the site manager will be provided at the entrance to the site and local residents/public will be encouraged to report any off-site dust deposition issues. Any air quality complaints made during the works will be logged, investigated and followed up with measures to limit emissions, where appropriate.

There will also be some exhaust emissions generated from use of excavators, HGVs and vibrating rollers during the demolition and construction phase. These impacts will be temporary in duration and are not considered likely to give rise to significant air quality impacts following the implementation of the following measures:

- All machinery will be suitably maintained to ensure that emissions of engine- generated pollutants shall be kept to a minimum in accordance with Measures Against the Emission

of Gaseous and Particulate Pollutants from Internal Combustion Engines to be Installed in Non-Road Mobile Machinery (2002/88/EC) and Emissions of Pollutants from Diesel Engines (2005/21/EC)

- Vehicles will not be left unnecessarily idling on the site and trucks removing demolition waste from the site will turn off engines during loading.
- Pre-start checks on all machinery will be conducted on a daily basis prior to commencement of activities.
- Low emission fuels will be used insofar as possible; and
- Mains power will be used for small plant and equipment, where possible, in preference to generators.

7.2 Effective material storage and handling

The storage and handling of construction materials can be a significant dust emission source. The adoption of appropriate dust control measures will greatly reduce dust emissions from these sources and ensure that any adverse effects are reduced or eliminated.

Handling and storage areas will be sited as far away as is reasonably and practically possible from public/residential areas. Handling and storage areas will be actively managed and fine, dry material will be stored inside enclosed shield/coverings or within a central storage areas. Any storage areas that are not enclosed will be covered/sheeted. Prolonged storage of debris on site will be avoided. Vehicles carrying dusty materials into or out of the site shall be sheeted down to prevent any escape of materials.

7.3 Construction Plant

Construction plant can be a significant source of emissions although control measures can be implemented to minimise any adverse impacts. The following measures will be employed:

- Site plant and equipment will be kept in good repair and maintained in accordance with the manufacturer's specifications. Allowing for economic constraints, the plant will be selected on the basis of which has the least potential for dust and other emissions;
- Plant will not be left running when not in use (i.e. no idling);
- Plant with dust arrestment equipment will be used where practical;
- Where practical, cleaner fuels will be employed for construction plant; and
- Enclosures will be erected around major construction plant items as appropriate and where practical.

7.4 Vehicle Movements

Vehicle movements may result in dust emissions (by re-suspending dust from the road or from spilling dusty loads) and exhaust emissions. However, a number of control measures can be adopted to eliminate or minimise such emissions:

- Wheel washing facilities close to the site entrance to prevent mud from construction operations being transported on to adjacent public roads;
- Any spillages from vehicles leaving the site will be promptly removed;
- Damping down of site haul roads by water bowser during prolonged dry periods;

- Regular cleaning of hard-surfaced site entrance roads;
- Ensuring that dusty materials are transported appropriately (e.g. sheeting of vehicles carrying spoil and other dusty materials);
- Confinement of vehicles to designated haul routes within the site;
- Restricting vehicle speeds on haul roads and other unsurfaced areas on the site;
- All vehicles will be maintained to minimise exhaust emissions;
- Hoarding and gates to prevent dust breakout; and
- Appropriate dust site monitoring will be included within the site management practices to inform site management of the success of dust control measures used.

7.5 Dust

Dust control will be best achieved at sources, and if possible, activities will be carried out in a manner so as to preclude dust generation. Dust levels will be controlled and the development operated in a way which is not detrimental to the amenity of local residents. If dust is generated, steps will initially be taken to protect workers in the vicinity who shall, as a minimum, be issued with dust masks. Dust will, if possible, be contained in the location in which it is generated, and be controlled and managed therein. Dust suppression measures will be carried out to ensure that dust nuisance affecting neighbouring properties is minimised and the following control measures and good management practices, will be employed:

- Undertake daily on-site and off-site inspections, where receptors (including roads) are nearby, to monitor dust, record inspection results in the site inspection log. This should include regular dust soiling checks of surfaces such as street furniture, cars and windowsills within 100 m of site boundary, with cleaning to be provided if necessary.
- Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.
- Site operations will be planned to take into account local topography, prevailing wind patterns and local sensitive receptors e.g., schools, residences and ecological designated sites;
- Burning of materials on site will be prohibited;
- Loading and unloading will only be permitted in designated hard standing areas;
- Provision of water sprays and wind/dust fences where possible, particularly in dust sensitive locations;
- Stockpiles of soil, arising or other granular material will be sheeted, covered and/or treated to prevent dust raising that may cause risk to health or nuisance to the public;
- Hoarding will be erected around construction activities to minimise dust blow from site;
- An appointed person will oversee/control activities and handle complaints;

Contact details for the site manager will be provided at the entrance to the site and local residents/public will be encouraged to report any off-site dust deposition issues. Any dust complaints made during the works will be logged, investigated and followed up with measures to limit the impact, where appropriate.

8 Noise Management

All works will be carried out being mindful of potential noise impacts from construction activities. Plant and machinery operating on the site will be the main source of noise during the works most notably during any earthworks, rock breaking etc. The works will be carried out in accordance with the requirements of BS5228-1:2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites.

Noise and vibration levels will be controlled as set out below to ensure that the Development is operated in a way that minimises detrimental impact to the amenities of local residents.

8.1 Construction Noise

Infrastructure works, excavations, and foundation construction will be among the most significant activities. Although concreting operations will also give rise to noise, the levels generated would not be significant.

In order to minimise the noise impact further on the adjoining properties it is proposed that heavy equipment and machinery including pneumatic drills, construction vehicles and generators only work between the hours shown below. In addition, no deliveries and/or removal of materials will occur outside of these hours. All plant and equipment will be maintained in good working order in accordance with BS.5228 in order to minimise air and noise emissions.

The primary measure to limit the potential impact of noise from the works will be to limit working hours to the suitable daytime hours outlined earlier in the Report. This will reduce the potential noise impact on the local human receptors by avoiding early morning noise generating activities.

During construction, the measures summarised below, are to be employed:

- Details of construction activities, prediction levels/assessments will be discussed with the relevant authority, both prior to construction and during construction. Detailed construction programmes will be available in advance of work starting on site;
- Where work outside of agreed hours or likely to exceed specified noise limits is necessary then this shall only proceed subject to notification to Cork County Council Environmental Health Officer and local residents, and approval given.
- Except for emergency situations, notification will be in advance of any requirement for out of hours/noisy working.
- Where the potential for noise exists, 'Best Practicable Means' will be used to reduce noise to achieve compliance consistent with the recommendations of BS 5228, and may include:
- Careful selection of plant items, construction methods, programming, and implementing a 'noise and vibration protocol', which outlines monitoring frequency and action levels etc;
- Design and use of site hoarding and screens/noise barriers, to provide acoustic screening at the earliest opportunity;
- Ensuring that HGV drivers turn off engines when parked for prolonged periods on the site and turning off engines during loading of demolition waste materials.
- Choice of routes and programming for the transport of construction materials.

- Using minimal impact reversing alerts and avoiding the use of horns, where possible. These alerts, however, are essential safety measures for busy construction sites and cannot be avoided.
- Choosing equipment with reduced noise output and silencers/dampeners.
- Using radio contact across the site to avoid workers shouting or whistling.
- Maintaining plant and equipment in good condition to ensure noise emissions are as per plant specifications and that all noise attenuation features are in good working order; and
- Use of mains power supply instead of generators insofar as is possible.

Contact details for the site manager will be provided at the entrance to the site and local residents/public will be encouraged to report any noise issues. Any noise complaints made during the works will be logged, investigated and followed up with measures to limit noise emissions, where appropriate.

8.2 Noise Limits

Noise Limits to be applied for the duration of construction works are as set out in the National Roads Authority (NRA) Guidelines for Treatment of Noise and Vibration in National Roads Schemes (summarised below in Figure 9.1) and BS 5228-1:2009+A1:2014 (Code of Practice for Noise Control on Construction and Open Sites).

Days & Times	$L_{Aeq\ (1hr)}$ dB	$L_{pA(max)slow}$ dB
Monday to Friday 07:00 to 19:00hrs	70	80[2]
Monday to Friday 19:00 to 22:00hrs	60[2]	65[2]
Saturday 08:00 to 16:30hrs	65	75
Sundays and Bank Holidays 08:00 to 16:30hrs	60[2]	65[2]

Table 9.1 – NRA Guidelines for Maximum Permissible Noise Levels at the Façade of Dwellings during Construction.

BS 5228 applies a noise limit of 70 dBA between 07:00 am and 19:00 pm outside the nearest window of the occupied room closest to the site boundary in suburban areas away from main road traffic and industrial noise. For the duration of construction works, a daytime noise limit (07:00 am to 19:00 pm) of 70 dBA shall apply (in accordance with the requirements of BS 5228 and generally in agreement with the TII guidelines).

8.3 Vibration

It is not anticipated that there will be any significant vibration impacts from the proposed works. Some minor vibrations will be generated from heavy plant and machinery but it is anticipated that there will be no significant percussion plant required which could have the potential to cause vibration effects or damage.

Contact details for the site manager will be provided at the entrance to the site and local residents/public will be encouraged to report any issues. Any vibration complaints made during the works will be logged, investigated and followed up with measures to limit vibration, where appropriate.

Vibration Limits to be applied for the duration of construction works are as set out in BS 5228-2:2009+A1:2014 (Code of Practice for Vibration Control on Construction and Open Sites) and BS 7385: 1993 (Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from ground borne vibration). Allowable vibration during the construction phase is summarised below in Figure 9.2. These will be checked at a minimum of twice a week.

Allowable vibration velocity (Peak Particle Velocity) at the closest part of any sensitive property to the source of vibration, at a frequency of		
Less than 10Hz	10 to 50Hz	50 to 100Hz (and above)
8 mm/s	12.5 mm/s	20 mm/s

Table 9.2 – NRA Guidelines for Allowable Vibration (in terms of peak particle velocity) at the closest part of sensitive property to the source of vibration

9 *Lighting*

All temporary lighting installed within the proposed development site will be completed with sensitivity for local wildlife while still providing the necessary lighting for human usage during construction.

9.1 Lighting Mitigation Principles

Temporary lighting design should be flexible and be able to fully take into account the presence of protected species. Therefore, appropriate lighting, as detailed below, should be used within a proposed development and adjacent areas with more sensitive lighting regimes deployed in wildlife sensitive areas in accordance with the mitigation measures outlined in the Bat Survey.

- Construction should be limited to daylight hours in order to minimise adverse effects on nocturnal fauna.
- Light Emitting Diodes (LED's) will be used and the brightness will be set as low as possible.
- Lighting will be kept to the minimum necessary for health and safety purposes
- Lighting will only be utilised during working periods where required and will be shut down during non-working periods.
- Lighting will be directed away from landscaped areas and retained sections of hedgerows, treelines, and mature parkland areas.
- LED luminaires will be used because they are highly directional, lower intensity, good colour rendition and dimming capability.
- Luminaires will feature peak wavelengths higher than 550nm to avoid the component of light most disturbing to bats.
- The use of specialist bollard or low-level downward directional luminaires should be considered in bat sensitive areas to retain darkness above.
- Column heights should be carefully considered to minimise light spill. The shortest column height allowed should be used where possible.
- Only luminaires with an upward light ratio of 0% and with good optical control should be used.
- Luminaires should always be mounted on the horizontal, i.e. no upward tilt.
- Any external security lighting should be set on motion-sensors with short (1min) timers.
- As a last resort, accessories such as baffles, hoods or louvres can be used to reduce light spill and direct it only to where it is needed.
- Monitoring of light levels along the treelines and hedgerow areas will be undertaken pre-construction, during-construction and post-construction to identify any areas where light spill is affecting background levels. Where monitoring detects light spill is affecting these habitat areas, remedial measures will be implemented to ensure that background light levels are maintained. All lumina Lighting Extract - ires used should lack UV/IR elements to reduce impact.

Contact details for the site manager will be provided at the entrance to the site and local residents/public will be encouraged to report any issues. Any complaints made during the works will be logged, investigated and followed up with measures to limit impact, where appropriate.

10 Environmental Risk Assessment & Management Plan

The potential risks are typically assessed under a number of headings, including but not limited to:

- Noise – proximity of neighbouring residences
- Nuisance caused by dust emissions
- Impact of traffic - deliveries and removal of material
- Impact of traffic – road safety and cleanliness
- Hazardous Materials –storage
- Containment – spillage from oil tanks
- Containment – potentially turbid surface water
- Containment – concrete truck washings
- Disposal of foul water from compound
- Disposal of demolition waste and surplus materials

The risks are to be discussed on site during construction as if unmitigated and then with proposed mitigation measures in place. The nature of these risks will change as the project progresses. For instance, in the earthworks phase the principal concerns would be noise, dust/mud and turbid surface water runoff, whereas in later phases issues such as traffic control and waste management would be seen as critical.

An Ecological Clerk of Works (ECoW) will inspect the Site in advance of works commencing and will undertake Site inspections as required during the works, to ensure that they will be completed in line with the mitigation measures detailed within this CEMP, the NIS & the Ecological Impact Statement.

RISK MATRIX

The above section outlines the type of risks associated with the project at this stage of development. These can then be tabulated to give a qualitative assessment of these risks, based on the potential consequences and likelihood of occurrence. The matrix identified in Table 12.1 can be used as a basis to classify the risk. The objective is that following implementation of the appropriate mitigation measures all identified risks are in the Low-Intermediate range, and are therefore considered acceptable.

Table 12.1 – Risk Matrix

	H	Low-Med (Intermediate)	Medium (Unacceptable)	High (Unacceptable)	Emergency (Unacceptable)
Likelihood	M	Low	Low-Med (Intermediate)	Medium (Unacceptable)	High (Unacceptable)
	L	Low	Low	Low-Med (Intermediate)	Medium (Unacceptable)
	LL	Low	Low	Low	Low-Med (Intermediate)
		LL	L	M	H
		Consequence			

10.1 Additional Measures from Ecological Impact Assessment

10.1.1 Protection for Trees, Hedgerows and Treelines

A number of individual trees and hedgerow treelines onsite are to be retained and protected from unnecessary damage. During construction, care will be required to protect trees from both direct and indirect disturbance. The following protection measures will be adhered to during the works:

- Trees, treelines, and hedgerows to be retained that will be located within close proximity to the construction areas will be fenced off by effective construction proof barriers before construction works commence. These barriers will cover an area larger than the branch spread of the protected tree, with a radius of half the tree's height, measured from the trunk. These barriers will remain in place for the duration of the works to prevent accidental disturbance and define the limits for construction vehicles and other construction staff;
- Care will be required to prevent disturbance to root systems - excavation within the protected area will be done by hand and backfilled as soon as possible. No roots will be cut within these barriers. Outside of the construction proof barriers, no roots exceeding 25mm will be cut without approval.
- Where machinery access must encroach areas within proximity to the retained hedgerows / treelines or the mixed broadleaved woodland, a Root Protection Area (RPA) will be established and suitable ground protection which will be put in place to prevent any significant soil compaction or root damage.
- When tree removal is required near retained trees, felling must be carried out in small sections to avoid damage to adjacent trees.
- Trench digging or other excavation works for services etc. will not be permitted within close proximity to retained trees and hedgerows unless approved and supervised using methods outlined in BS5837: Trees in relation to design, demolition, and construction (2012);
- No materials, equipment or machinery will be stored within close proximity to retained hedgerows and trees;

- For treeline protection measures to work effectively, all personnel associated with the operation of heavy plant machinery must be familiar with the above principles for the protection of treelines;
- Care will be taken when planning site operations to ensure that wide or tall loads or plant with booms, jibs and counterweights can operate without encountering retained trees. Such contact can result in serious damage to them and might make their safe retention impossible;
- Notice boards, wires, etc. will not be attached to any trees. Site offices, materials and contractor parking will all be outside the Construction Exclusion Zone; and,
- The retained trees will be assessed following the completion of the construction works.

10.1.2 Protection & Measures for Terrestrial Mammals

Where deep excavations will be required on-site, appropriate measures to protect mammals from ingress will be installed and if unidentified burrows are identified within the works area during construction, the project ECoW will be contacted for advice.

10.1.3 Measures for Bats

In order to ensure that the works in relation to the Proposed Development do not have significant impacts on bats, the following construction procedures and mitigation measures will be implemented. These measures are in line with the NRA (now TII) Guidance for Bats (National Roads Authority, 2006).

- Any trees with Potential Roost Features (PRF) to be removed will be supervised by the ECoW and will be felled using hand tools only. The ECoW will visually inspect the trees following felling for the presence of bats. Should bats be found, the NPWS will be consulted;
- The findings of any required bat surveys will be submitted to the planning authority prior to the commencement of the demolition works; and,
- Following the installation of the lighting for the Proposed Development, a suitably qualified Ecologist should undertake a further Site inspection in order to check the lighting patterns and lux levels along the Site boundaries to ensure there are no impacts to bats or other nocturnal species.

10.1.4 Measures for Birds

In order to ensure no impacts occur to breeding birds as a result of the Proposed Development, the following mitigation measures will be put in place:

- Any vegetation clearance required will take place outside of the nesting bird season (1st March to 31st August), as per Section 40 of the Wildlife Act 1976, as amended by Section 46 of the Wildlife (Amendment) Act 2000;
- In the event that works need to be undertaken within the main breeding season, this would be undertaken in consultation with NPWS and under the supervision of the project ECoW;
- Prior to the vegetation removal the ECoW will inspect the Site and the management and removal of vegetation at the Site will be undertaken under the direction of the project

ECoW in a systematic way to ensure that retained areas of vegetation are not damaged by the works; and,

- Should birds' nest within the active working area during the construction phase, works within the area will stop within the area and the project ECoW will be consulted.

It should be noted that birds may be subject to some temporary minor disturbances during construction. However, as birds are a highly mobile species, should any birds be impacted, these birds will move away from the disturbance to a more suitable area, therefore, this is not considered likely to be significant.

10.1.5 Measures for Invasive Species

The following best practice Site hygiene and biosecurity measures will be in place to avoid the spread of any Invasive Alien Plant Species (IAPS) into the Site or surrounding areas:

- To reduce the likelihood of invasive species (IAPS) being introduced to the Site from construction works on other sites, all soils/materials being introduced to the Site will be sourced from a certified invasive flora-free source Site, to ensure no introduction of invasive plant materials to the Site occurs. All plant and equipment will be visually inspected before being permitted on Site.
- Vehicular movements will be restricted to the footprint of the Proposed Development. Construction plant and vehicles will not encroach onto areas that are not permitted for the development.
- All vehicles leaving the Site and/or transporting infested IAPS soil/materials must be thoroughly pressure-washed with clean water in a designated wash-down area before being used for other work. Mud and organic debris will not be allowed to accumulate on tyres, wheels or under wheel arches. Any machinery or equipment returning from a different construction Site will be cleaned, steam washed and visually inspected again before re-entering the site.

It is noted that all plant and equipment will remain on-Site for the duration of the stripping and earthworks stage of the Construction Phase.

- Material handling systems and Site stockpiling of materials will be designed and laid out to minimise exposure to wind.
- Water misting or sprays will be used on stockpiles as required if particularly dusty activities are necessary during dry or windy periods to prevent seed dispersal of IAPS.
- Personnel working on the Site will ensure that all PPE including clothing and footwear brought to the Site is to be clean and dry. All PPE is to be visually inspected, and any attached vegetation or debris removed. Work boots will be dipped in or scrubbed with a disinfectant solution and thoroughly dried afterwards before being used on the Site for the first time, ensuring they are visually free from soil and organic debris, to prevent the inadvertent spread of IAPS material.
- Construction personnel involved in works are to be trained in basic relevant invasive species identification, prevention, and management.
- Where any IAPS is identified within the footprint of the work, the appointed contractor is to develop and implement an appropriate method statement with regard to managing

IAPS on-Site. Fencing and/or advisory signage is to be erected. Where stands are small, comprising individual plants, the use of signage may suffice.

- Cattle (Rumble) grids will be placed at vehicular exit gates during excavation to remove spoil from truck wheels leaving the Site.
- A street sweeper will attend the Site regularly to clean the road when there are truck movements in and out of the Site.
- Hard surface roads will be regularly swept to remove mud and aggregate materials from their surface.
- Public roads outside the Site will be regularly inspected for cleanliness and cleaned as necessary.

All IAPS management and control measures implemented on-Site during the Construction Phase are to be carried out strictly in accordance with best practice guidance as set out in 'The Management of Noxious Weeds and Non-native Invasive Species on National Roads' (TII (formerly NRA), 2010), 'The Management of Invasive Alien Plant Species on National Roads – Technical Guidance' (TII, 2020) and 'Best Practice Management Guidelines' by Invasive Species Ireland (2008).

11 Construction & Demolition Waste Management on Site

11.1 Site Clearance

The management of construction and demolition waste should reflect the waste management hierarchy, with waste prevention and minimisation being the first priority succeeded by reuse and recycling.

During site clearance and construction works, there are numerous opportunities for the beneficial reuse and recycling of the demolition materials. The subsequent use of recycled materials in construction works also reduces the quantities of waste which ultimately needs to be consigned to landfill sites.

11.2 Source of Fill & Aggregates

All fill and aggregate for the proposed development will be sourced from reputable suppliers. All suppliers will be vetted for;

- Aggregate compliance certificates/declarations of conformity for the classes of material specified for the proposed development
- Environmental management status and
- Regulatory and legal status of the company.

11.3 Prevention of Waste

The primary effort therefore should be to engage in waste prevention and reduce the amount of waste generated in the first place i.e. minimise the resources needed to do the job.

Prevention is financially advantageous as it reduces the purchase of construction materials and obviates the need to remove wastes from site. It is important to emphasise the potential for certain purchasing procedures to contribute to a reduction in excessive material wastage on site.

Examples include:

- ensuring materials are ordered on an "as needed" basis to prevent over supply to site;
- purchasing construction materials in shape, dimensions and form that minimises the creation of excessive scrap waste on site;
- ensuring correct storage and handling of construction materials to minimise generation of damaged materials/waste, e.g. keeping deliveries packaged until they are ready to be used;
- ensuring correct sequencing of operations; and
- assigning individual responsibility (through appropriate contractual arrangements) to sub-contractors for the purchase of raw materials and for the management of wastes arising from their activities, thereby ensuring that available resources are not expended in an extravagant manner at the expense of the main contractor.

11.4 Waste Streams

Waste materials generated on site will fall into three categories for management, these are:

- Re-use

- Recycle
- Landfill

Re-use

Waste material that is generated should be reused on site or salvaged for subsequent reuse to the greatest extent possible and disposal should only be considered as a last resort. Initiatives should be put in place to maximise the efficient use/reuse of materials.

Recycling

There are a number of established markets available for the beneficial use of C&D waste:

- waste timber can be:
    - recycled as shuttering or hoarding, or
    - sent for reprocessing as medium density fibreboard;
- waste concrete can be utilised as fill material for roads or in the manufacture of new concrete when arising at source; and
- in addition, the technology for the segregation and recovery of stone, for example, is well established, accessible and there is a large reuse market for aggregates as fill for roads and other construction projects.

Landfill

If either of the above cannot be satisfied then the only option left is to send the surplus materials to landfill.

11.5 Overall Management of Construction and Demolition Waste

Waste minimisation, reuse and recycling can best be managed operationally by nominating a "Construction and Demolition Waste Manager" to take responsibility for all aspects of waste management at the different stages of the Project.

This C&D Waste Manager may well be a number of different individuals over the life-cycle of the Project, but in general is intended to be a reliable person chosen from within the Contracting Team, who is technically competent and appropriately trained, who takes the responsibility to ensure that the objectives and measures within the Project Waste Management Plan are delivered and who is assigned the requisite authority to secure achievement of this purpose.

Specifically, the function of the C&D Waste Manager will be to communicate effectively with colleagues in relation to the aims and objectives for waste management on the Project. The primary responsibility for delivery of the objectives of the Waste Management Plan will fall upon the C&D Waste Manager designated at the demolition/ construction stage. A key objective for the C&D Waste Manager should be to maintain accurate records on the quantities of waste/ surpluses arising and the real cost (including purchase) associated with waste generation and management.

The preparation, application and documentation of a Project Waste Management Plan should enable all parties - including contractors, designers, and competent authorities - to learn from the systematic implementation and assessment of best practice, particularly through the recording of summary information on performance outcomes.

11.6 Waste Generated during Works

Waste Types	Waste Category	European Waste Code (EWC)	Colour Code	Origin of Waste
Tarmac	Inert	17 01 06		Site Strip & Demolition Works
Concrete	Inert	17 03 01		Site Strip
Brick/Block	Inert	17 01 06		Site Strip & Demolition Works
Timber	Active/Bio	17 02 01		Construction & Demolition Works
Glass	Active/Bio	17 02 02		Construction & Demolition Works
Subsoils	Inert	17 05 04		Site Strip & Excavation Works
Metals	Active/Bio	17 04 07		Construction & Demolition Works
Plasterboard	Active/Bio	17 08 02		Construction & Demolition Works
Packaging		15 01 01 (Note 1) 15 01 02 (Note 2) 15 01 03 (Note 3)		Construction Works
Mixed		17 09 04		Construction & Demolition Works

Note 1: 15 01 01 is the EWC code for paper and cardboard packaging

Note 1: 15 01 02 is the EWC code for plastic packaging

Note 1: 15 01 03 is the EWC code for wooden packaging

11.7 Site Segregation

A specific area on the site shall be laid out and labelled to facilitate the separation of materials for potential recycling, salvage, reuse and return. Recycling and waste bins are to be kept clean and

clearly marked in order to avoid contamination of materials. The labelling systems shall be the Waste Awareness Colour Coding Scheme. The skips will be clearly identified to ensure the workforce will deposit the correct materials into the correct skip. Skips for segregation of waste for the construction works will be:

- Wood
- Metal
- Brick/rubble
- Canteen waste

As works progress and other trades come to site other skips will be placed to enable certain waste to be removed from site. This is likely to include:

- Plasterboard
- Paper and cardboard (bagged up)

11.8 Waste Cycle

Site Enabling Works (including Demolition)	
Waste Types	**Waste Stream**
Concrete	Crushed & Re-used on site
Tarmac	Landfill
Stone/Blocks	Crushed & Re-used on site
Timber	Recycled
Subsoils	Re-used on site or sent to Landfill
Metals	Scrap Value
Plasterboard	Landfill

Construction Works	
Waste Types	**Waste Stream**
Plasterboard	Return/Landfill
Bricks/Blocks	Landfill
Timber	Recycled
Cardboard	Landfill

Mortar	Landfill
Metals	Scrap Value
Paints	Landfill
Soils	Re-used on Site/Landfill

The skips will be monitored to ensure that contamination of segregated skips does not occur.

The client and contractor will need to continually review the type of surplus materials being produced and where they can change the site set up to maximise on re-use or recycling and ensure that the use of landfill will be the last resort.

11.9 Transport of Waste

Any of the waste that is removed from the site (including inert waste) shall only be transported by an individual or company which holds a valid Waste Collection Permit to transport such material. The Contractor should ensure that any person transporting waste off the site should always have a copy of their Waste Collection Permit on the vehicle.

11.10 Permitted/Licensed Waste Collection Used

Any of the waste that is removed from the site (including inert waste) shall only be transported by an individual or company which holds a valid Waste Collection Permit to transport such material. The Contractor should ensure that any person transporting waste off the site should always have a copy of their Waste Collection Permit on the vehicle.

11.11 Permitted/Licensed Waste Facilities Used

Any waste (including inert waste) removed from any site shall only be taken to facilities which hold either a valid Waste Facility Permit issued by Cork City & County Council or a Waste License issued by the EPA.

11.12 Site Recording

The Contractor shall be required to ensure that a record shall be maintained of all waste removed from the site. The record shall include information on the type of waste removed, the quantity removed, the date removed, and details of whether the waste in question was being removed for either disposal or recovery/recycling, details of the transporter of waste, details of the facility to which waste is removed (including license or permit number). A location shall be identified where all records in regard to waste transport, recycling, disposal will be held fr inspection.

Details of the inputs of materials and outputs of wastes from the project will be investigated and recorded in a Waste Audit, which will identify the amounts, nature and composition of the waste generated. The audit will examine the manner in which the waste is produced and how management practices may contribute to the production of waste. The measured waste quantities will be used to quantify the costs of management and disposal in a Waste Audit Report, which will also record lessons learned for future projects.

A record of all waste movements from the site will also be maintained and copies of the waste transfer dockets will be held on site. The Project Environmental Manager will ensure that all waste haulage vehicles are identified on the waste collection permit and that the waste description and associated List of Waste code stated on the waste transfer docket are correct.

Any incidents resulting in a potential negative impact on soils or groundwater will be notified immediately to the Project Environmental Manager and the Site Manager. Spill kits will be used where possible to clean up any release and measures taken to ensure that any release does not reach a watercourse or surface water drain. Cork City Council will be notified of any such incident which has the potential to cause a negative impact.

A record of any complaints received in relation to construction works will also be maintained and categorised (e.g., noise, property damage, traffic, dust etc.) within a central Site Complaints Log. The log will include the following key details:

- Name, address and contact details of the complainant (with the complainant's permission).
- Brief outline of the complaint.
- Date of complaint.
- Name of person receiving complaint details; and
- Agreed timeline for response to the complaint.

Any complaints made will be notified to the Site Manager and the Project Environmental Manager immediately and a plan put in place to investigate and seek to resolve the complaint. The Site Manager will also notify the Developer of complaints received. The complainant, Developer and other stakeholders will be kept informed of the progress in resolving the issue.

Hard copy folders will be maintained on site for inspection by the planning authority at any time.