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RESIDENTIAL DEVELOPMENT, HEATHFIELD, BALLINCOLLIG, CORK

CONSTRUCTION & ENVIRONMENTAL MANAGEMENT PLAN

DATE 28/06/2023

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JOB NO. 4208

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Contents

1 Introduction

Denis O'Sullivan & Associates were engaged as Consulting Engineers for the proposed Phase 3 Development at Heathfield, Carriganarra, Ballincollig, Co. Cork

This document comprises the Construction & Environmental Waste Management Plan and 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. The location of the site compound, parking facilities and proposed access road are shown on the attached Proposed Construction Access & Site Facilities Drawing No. 4208-PH03-0302-A in Appendix A.

2 *Existing Situation*

The subject site (currently greenfield) is located approximately 8.0km southeast of Cork City Centre in Carriganarra on the southern side of Ballincollig to the south of the Link Road. The site is a brownfield site characterised by its undulating topography and its even slope rising at the southern end. The Killumney Link Road runs along the site's northern edge, the Poulavone Link to the east and the existing residential Heathfield development to the west.

A snapshot of the application boundary is outlined in Figure 1 below.

Figure 1 – Context Map

3 *Proposed Development*

The proposed development consists of the construction of 42 no. 3 bedroom semi-detached dwelling houses, 12 no. 3 bedroom townhouses, 16 no. 2 bedroom townhouses and all ancillary site works at Heathfield, Carriganarra, Carrigrohane, Ballincollig, Co. Cork.

The proposed development will be an extension to the residential development known as Heathfield and which is currently under construction with access provided via the junction from the Killumney Road and internal road network which was permitted by Cork County Council Governing Planning References 15/06813 & 17/04270.

The current proposal will comprise of the residential units and all ancillary service infrastructure. This report has been compiled to deal with the availability of services relating to the proposed development.

4 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 excavation of foundations and trenches for ductwork and sewers may require the removal of some rock underlying the site. The contractor will select the method of rock removal; however, it is likely the volume of rock to be removed will be minimal and localised, and should not require a rock-breaker. The requirement to raise ground levels to facilitate the construction of the gravity drainage strives 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.

4.1 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 dwellings. 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 9.2 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 Killumney Rd, 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.

4.2 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.

5 Construction Works & Sequencing

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

5.1 Phasing

It is anticipated that the works will be carried out in a couple of phases to be confirmed in due course.

5.2 Construction Site Access

Access to the works will be from the spine road serving the adjoining Heathfield estate which will now serve as the construction entrance as outlined in the Proposed Construction Access & Site Facilities Drawing No. 4208-PH03-0302-A in Appendix A.

5.3 Perimeter Fencing

The first task in the construction phase will be to erect a stock-proof fence along the perimeter boundary of the development. This will restrict public access to the work area.

5.4 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 5.2 above will be adequate to cater for the construction works.

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

5.5 Earthworks Impact

The topography of the site slopes northwards towards the public road. It comprises one large single field across which the levels vary from +30m O.D. and +32m O.D. along the Link Road to +22m O.D. at the southern extremity. The design of road levels and finished floor levels has been carried out in such a way as to minimize cut/fill type earthworks 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). Like 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.

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

- Excessive Dust deposition

5.6 Earthworks Mitigation

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

- Cattle (Rumble) grids will be placed at vehicular exit gates during excavation to remove spoil from truck wheels leaving from site.
- A street sweeper will attend 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;
- 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.

5.7 Site Establishment

- On commencement of works on site a site compound will be established over the proposed green area. 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 Whitegate Rd.
- 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 will be taken from the mains supply which is adjacent the site in the existing Heathfield estate. Power for the pumps and small power requirements for construction activities will be supplied from diesel generators until such time as the permanent site power supply is available.

5.8 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.

5.9 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 chapter.

5.10 Residential Unit Construction

Once the site development and infrastructure are sufficiently advanced, construction of individual residential units will commence. It is envisaged that this will commence with the proposed units at the entrance to the site working inwards.

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 all excavated material will be disposed of 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 apartment blocks. This is generally completed in a single pour involving several concrete trucks delivering in one day.

External & Internal Walls:

Construction of external and internal blockwork walls of 100/215mm solid blockwork will commence. Blocks, mortar, etc. will be delivered on standard trucks over a continued period as the work progresses.

Floor Installation & Prefabricated Roof Truss Installation:

Construction of floor and Roof erection will commence. Prefabricated floor joists & roof trusses 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.

Second Fix Carpentry, Mechanical & Electrical Services:

Installation of sprinkler, 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.

6 *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.

6.1 Surface Water Drainage

The storm water system will involve a network of underground pipelines and manholes discharging to an existing stormwater manhole in the adjoining Heathfield estate which will be fitted with 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.

6.1.1 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.

6.1.2 Mitigation

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

- 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.
- Constructing buildings and roads above the flood level to ensure that back flows through the surface water outfalls will not occur.
  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 area is serviced by mains gas and this utility will be provided to the new development. The use of home heating oil is therefore eliminated so the risk has been removed.

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.

6.2 Foul Sewer Drainage

The proposed foul water drainage system is illustrated in the services drawings and will discharge to the foul network in the adjoining Heathfield estate. All works will be in accordance with Irish Water Specifications and details.

6.2.1 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.

6.2.2 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

6.3 Potable Water

It is proposed to provide a new 100mm I.D. Ø (inside diameter) HDPE connection to the watermain located in the adjacent Heathfield estate adjacent to the proposed site with associated 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.

6.3.1 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.

6.3.2 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.

6.4 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. There are some overhead lines that require to be undergrounded and rerouted to facilitate the project.

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 extensive 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.

7 Health & Safety

7.1 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, construction and operation of the PV Plant. 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.

7.2 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.

7.3 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.

8 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 CWMP 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.

8.1 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.

8.2 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.

8.3 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.

8.4 Dust

Dust control will be best achieved at sources, and if possible, activities will be carried out in a manner 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:

- 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;

9 *Noise Management*

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.

9.1 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.

Normal working hours are outlined below, however these will be subject to agreement with Cork County Council prior to commencement.

Normal Working Hours:

Monday to Friday:	08:00 to 17:30hrs
Saturdays:	08:00 to 14:00hrs
Sundays & Bank Holidays:	Periodically 08:00 to 14:00hrs

On occasions it may prove necessary to carry out noisy activities outside of normal working hours. In such instances prior consultation will be carried out with Cork County Council and local residents outlining the nature and reason for the works and their likely duration.

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;
- Vehicles and machinery will not be left running when not in use (i.e. no idling);

- Choice of routes and programming for the transport of construction materials.

9.2 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 NRA guidelines).

9.3 Vibration

Monitoring devices will be placed on all boundaries proximate to the construction site and along routes for construction traffic.

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

10 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.

10.1 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 be 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 and 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.

11 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 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 10.1 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 10.1 – 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			

11.1 Additional Measures from Ecological Impact Assessment

11.1.1 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.

11.1.2 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.

11.1.3 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.

11.1.4 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.

11.1.5 Measures for Invasive Species

It should be noted that any medium invasive species to be removed onsite such as butterfly bush, although currently unregulated. must be treated with the necessary precautions.

To mitigate against the unintentional introduction of invasive species during construction, the following biosecurity measures will be implemented. These measures are in line with NRA (now TII) Guidance for the Management of Noxious Weeds and Non-Native Invasive Plant Species (NRA, 2010):

- All vehicles. machinery and any other equipment used for the works will be washed prior to its use at the Site to prevent the import of plant material or seeds;
- Before machinery or equipment is unloaded at the Site, equipment will be visually inspected to ensure that all adherent material and debris has been removed;
- Any vehicles and machinery that are not clean will not be permitted entry to the Site;

12 Construction & Demolition Waste Management on Site

12.1 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.

12.2 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.

12.3 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.

12.4 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.

12.5 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

12.6 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)

12.7 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.

12.8 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.

12.9 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.

The following table is a list of the current bodies with a valid Waste Collection Permit within the Cork area from which it is anticipated any waste transported off the site will carried by.

Permit Ref Number	Name of Permit Holder	Location of Site	Soil & Stone	C&D Waste
WCP-CK-10-611-04	Country Clean Recycling	Ballygown, Mallow, Co. Cork	✓	✓
NWCPO-10-04783-03	O'Brien Skip Hire Limited	Ballyrussell, Midleton, Co. Cork	✓	✓
NWCPO-10-04759-03	Midleton Skip Hire Ltd	Knockgriffin, Midleton, Co. Cork	✓	✓
NWCPO-10-04738-05	Wiser. Ltd	Unit 6 Rosehill Industrial Estate, Midleton, Co. Cork	✓	✓
NWCPO-10-04758-05	Cork Recycling Co. Ltd	Lehenaghmore Togher Cork Co. Cork	✓	✓

12.10 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.

The following table is a list of the current facilities with valid permits within the Cork area in which it is anticipated any waste arising from the site will be delivered.

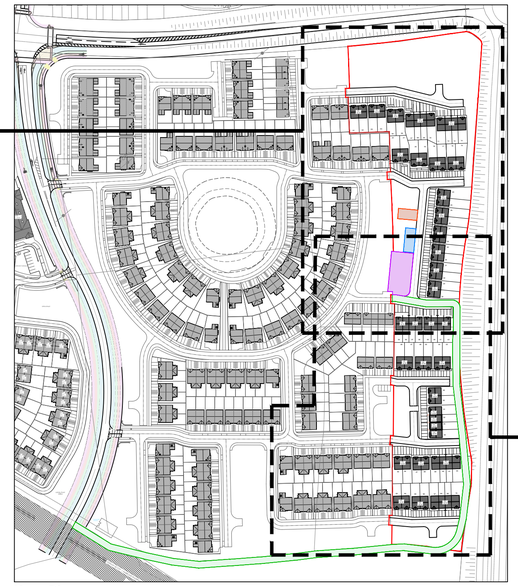
Permit Ref Number	Name of Permit Holder	Location of Site	Soil & Stone	C&D Waste
WFP-CK-22-0224-01	Midleton Skip Hire Ltd	Knockgriffin, Midleton, Co. Cork	✓	✓
WFP-CK-11-0094-04	O'Brien Skip Hire Limited	Ballyrussell, Midleton, Co. Cork	✓	✓
WFP-CK-15-0154-01	Roadstone Limited	Ballynabointra & Ballyvodock West, Carrigtwohill, Co Cork	✓	✓
WFP-CC-26-2019	Redfox Recycling	John F. Connolly Road, Churchfield Industrial Estate Cork	✓	✓
WFP-CK-13-0126-03	O'Flynn Construction Co. Unlimited Company	Knockanemore, Ovens, Co. Cork	✓	

12.11 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 for 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.

Appendix A



Key Plan
Scale 1:2500

Legend:

- Construction Traffic Access Road
- Site Compound
- Site Parking
- Waste Storage & Management

Site Layout (Northern Section)
Scale 1:500

Site Layout (Southern Section)
Scale 1:500

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REV.	DRAWN	CHKD	APPRVD	DATE	DETAILS
B	K.M.	S.O'G.	L.O'T.	05.07.'23	Issued for Information

CLIENT: MOS Homes Ltd.

PROJECT: Residential Development at Carriganarra, Ballincollig.

DRAWING TITLE: Proposed Construction Access & Site Facilities

SHEET	SCALE	PROJECT NO.	PHASE	DRAWING NO.	STATUS/ISSUE
A1/ A3	1:500/ 1:1000	4208	PH03	0302	B