APPENDIX 4-1

OUTLINE CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

Planning and Environmental Consultants

Construction and Environmental Management Plan

Kingston Stables Knocknacarra Proposed Large Scale Residential Development

DOCUMENT DETAILS

Client:	**Kingston Stables Limited**
Project Title:	**Kingston Stables Knocknacarra Proposed Large Scale Residential Development**
Project Number:	**240142**
Document Title:	**Construction and Environmental Management Plan**
Document File Name:	**CEMP F - 2025.10.16 - 240142**
Prepared By:	**MKO** **Tuam Road** **Galway** **Ireland** **H91 VW84**

Planning and Environmental Consultants

Rev	Status	Date	Author(s)	Approved By
01	Draft	13/02/2025	KMG/TM	EOS
02	Draft	08/10/2025	KMG/TM	EOS
03	Draft	11/10/2025	KMG/TM	EOS
04	Final	16/10/2025	KMG/TM	EOS

Table of Contents

TABLE OF TABLES

TABLE OF PLATES

TABLE OF FIGURES

1. INTRODUCTION

This Construction & Environmental Management Plan (CEMP) has been prepared by MKO on behalf of Kingston Stables Ltd. who intend to apply to Galway City Council (GCC) for permission to construct a large-scale residential development (LRD) comprising 362 residential dwellings, creche and all associated works at a site in Knocknacarra, Galway (Proposed Development). The Proposed Development is a component of a larger residential development project (Proposed Project). The Proposed Project involves the construction of more than 500 residential units, and the development will require separate, individual planning applications for each part of the project.

The CEMP provides the environmental management framework to be adhered to during the pre-commencement and construction phases of the Proposed Development, and it incorporates the mitigation measures necessary to ensure that the construction activities are carried out in a manner that minimises the potential for any adverse environmental impacts to occur. The CEMP has been informed by and takes account of the accompanying technical reports and assessments which have been prepared for the Proposed Development.

All measures identified in this CEMP, which will be finalised subsequent to any permission granted and updated prior to construction, will include all mitigation measures identified to be adhered to during the pre-commencement and construction phases of the Proposed Development.

The CEMP will serve as a single amalgamated document that can be used throughout the construction phase of the project, as a single consolidated point of reference relating to all construction, environmental and drainage requirements for the Planning Authority, developer, and contractors alike. The CEMP may evolve over further iterations as the construction works progress, but at all times must meet or exceed the standards and requirements set out in this document. It will be the contractor's current version of the CEMP, which at any point in time, will guide the construction activities on site and the implementation of which will be audited, and updated as necessary during construction by the contractor.

1.1 Scope of the Construction and Environmental Management Plan

This report is presented as a guidance document for the management of construction activities and waste materials generated during the works and following completion. It outlines clearly the mitigation measures that are required to be adhered to in order to manage activities and waste materials in an appropriate manner.

For the purpose of the CEMP:

- Where the 'Proposed Development' is referred to, this relates to all the project components described in detail in Chapter 4 of the Environmental Impact Assessment Report (EIAR) i.e. large scale residential development and all associated works as detailed below.
- Where 'the site' is referred to, this relates to areas within the planning application boundary where it is proposed to carry out construction works.
- Where the 'Proposed Development Site' is referred to, this refers to the residential development and all associated works. The planning application for the Proposed Development will be made to GCC.

The report is divided into nine sections, as outlined below.

- **Section 1** provides a brief introduction as to the scope of the report.

- **Section 2** outlines the Proposed Development details, detailing the construction methodologies that will be adopted throughout the construction phase of the Proposed Development.
- **Section 3** sets out details of the environmental controls to be implemented on site for drainage principles, traffic management, dust control and invasive species management. A waste management plan is also included in this section.
- **Section 4** sets out a fully detailed implementation plan for the environmental management of the Proposed Development outlining the roles and responsibilities of the project team.
- **Section 5** outlines the Emergency Response Procedure to be adopted in the event of an emergency in terms of site health and safety and environmental protection.
- **Section 6** consists of a summary table of all mitigation proposals to be adhered to during the Proposed Development, categorised into three separate headings, 1) pre-commencement measures; 2) construction-phase measures and 3) operational-phase measures.
- **Section 7** consists of a summary table of all monitoring requirements and proposals to be adhered to during the Proposed Development, categorised into three separate headings, 1) pre-commencement measures; 2) construction-phase measures and 3) operational-phase measures.
- **Section 8** sets out a programme for the timing of the works.
- **Section 9** outlines the proposals for reviewing compliance with the provisions of this report.

1.2 Targets and Objectives

The construction phase works are designed to approved standards, which include specified materials, standards, specifications and codes of practice. The design of the project has considered environmental issues, and this is enhanced by the works proposals.

The key site targets are as follows;

- Adopt a sustainable approach to construction and, ensure sustainable sources for materials supply where possible.
- Correct fuel storage and refuelling procedures to be followed.
- Construction Methods and designs will be altered where it is found there is an adverse effect on the environment.
- Good waste management and housekeeping to be implemented.
- Using recycled materials, if possible, e.g., excavated stone, soil and subsoil material.
- Avoidance of vandalism.
- Air and noise pollution prevention to be implemented.
- Monitoring of the works and any adverse effects that it may have on the environment
- Provide adequate environmental training and awareness for all project personnel.

The key site objectives are as follows.

- Keep impact of construction to a minimum on the local environment and wildlife.
- Ensure construction works and activities are completed in accordance with any planning conditions for the development.
- Ensure construction works and activities have minimal impact/disturbance to local landowners and the local community.
- Ensure construction works and activities have minimal impact on the Natural Environment.
- Keep impact of construction to a minimum on the local environment, watercourses and wildlife.
- Correct fuel storage and refuelling procedures to be followed.

- Good waste management and housekeeping to be implemented.
- Air and noise pollution prevention to be implemented
- Monitoring of the works and any adverse effects that it may have on the environment.
- Construction Methods and designs will be altered where it is found there is an adverse effect on the environment.
- Comply with all relevant water quality legislation.
- Ensure a properly designed, constructed and maintained drainage system appropriate to the requirements of the site is kept in place at all times.

1.3 Potential Amendment Scenarios

This CEMP may require further updating and final agreement with the various stakeholders should the Proposed Development receive Planning Permission, in alignment with all the conditions which apply and in order to identify, assess and satisfy the contract performance criteria. The final CEMP will also require updating by the selected contractor. Therefore, this is a working document and will be developed further prior to construction commencing.

Triggers for amendments to the CEMP will include:

- When there is a need to improve performance in an area of environmental impact;
- As a result of changes in environmental legislation applicable and relevant to the project;
- Where the outcomes from auditing establish a need for change;
- Where Work Method Statements identify changes to a construction methodology to address high environmental risk; and
- As a result of an incident or complaint occurring that necessitates an amendment.

2. SITE AND PROJECT DETAILS

2.1 Site Location and Description

The main site area comprises approximately 5.37 hectares (ha) of land located within the townland of Knocknacarra, Co. Galway, approximately 3.1 kilometres (km) to the west of Galway City. Irish Transverse Mercator (ITM) Coordinates for the approximate centre of the site are X 526636, Y 724682. A site location map is shown in Figure 2-1 below.

The site itself is comprised of a mixture of agricultural grassland and brownfield. Stone walls and treelines are also present within the boundary of the site. The surrounding area is urban in character with the site being surrounded by a number of residential estates and commercial and industrial buildings.

The site can be accessed via the Western Distributor Road which is located to the north of the site and the Kingston Road (R337) which runs in an east-west direction to the south of the site.

There are no Protected Structures or National Inventory Architectural Heritage (NIAH)-listed structures located within the Proposed Development site boundary.

The Proposed Development is not located in any European sites (designated pursuant to the obligations under the Habitats Directive and Birds Directive). The site is located approximately 795m north of the Galway Bay Complex Special Area of Conservation (SAC) and approximately 976m north of the Inner Galway Bay Special Protection Area (SPA).

There are no Environmental Protection Agency (EPA) mapped watercourses located within the confines of the Proposed Development site boundary. The closest mapped watercourse is located circa 10m to the northeast and is named as the Knocknacarragh Stream (EPA Code: 31K16 – Order 2). It should be noted that this stream is culverted and is not an open watercourse at this location.

The layout of the Proposed Development is outlined in Figure 2-2 below.

2.2 Development Description

The Proposed Development will consist of the following:

- Provision of 362 no. residential units in 4 no. development areas with a mix of apartment and house types on a site area of 5.37 ha. The buildings range between 2 no. and 6 no. storeys in height. The development will comprise the following:
  - 4 no. 2-bed townhouses;
  - 40 no. 3-bed townhouses;
  - 21 no. 4-bed townhouses;
  - 15 no. 1-bedroom duplex apartments;
  - 46 no. 2-bedroon duplex apartments;
  - 15 no. 2-bedroom duplex houses;
  - 46 no. 3-bedroom duplex houses;
  - 114 no. 1-bedroom apartments;
  - 56 no. 2-bedroon apartments;
  - 5 no. 3-bedroom apartments.
- Demolition of existing structures (333.8 m^2);
- Vehicular access to the proposed development from a permitted road (Planning Reference 24/60370 refers);

- The provision of new active travel cycle and pedestrian access from Millers Lane;
- Upgrades to the existing access at Kingston Road
- The provision of a childcare facility (440 m^2);
- The provision of public open space;
- The provision of 665 no. bicycle parking spaces;
- The provision of 313 no. car parking spaces;
- Public lighting, bin stores, signage, services, ESB substation, site landscaping and all ancillary site development and enabling works.

RECEIVED: 16/10/2025

Map Legend

Planning Application (Red Line) Boundary

Drawing Title
Site Location - Planning Application (Red Line) Boundary

Project Title
Proposed Large-Scale Residential Development at Knocknacarra, Galway

Drawn By	Checked By
EC	TM/EOS
Project No.	**Drawing No.**
240142	Figure2-1
Scale 1:18,000	**Date** 2025-10-10

MKO
Planning and Environmental Consultants
Tuam Road, Galway
Ireland, H91 VW84
+353 (0) 91 735611
email:info@mkoireland.ie
Website: ww.mkoireland.ie

Notes:

- Do not scale from this drawing. Use figured dimensions in all cases.
- Verify dimensions on site and report any discrepancies to the Architect immediately.
- This drawing to be read in conjunction with the Architect 's Specification.
- © This drawing is copyright and may only be reproduced with the Architect 's permission.

Drawing Notes:

Unit Breakdown:

2-Bedroom + Study Townhouses	4
3-Bedroom Townhouses	40
4-Bedroom Townhouses	21
2-Bedroom Mews Duplex Apartment	2
1-Bedroom Duplex Apts.	15
2-Bedroom Duplex Houses	15
2-Bedroom Ground Floor Duplex Apts.	44
3-Bedroom Duplex Houses	46
1-Bedroom Apartments	114
2-Bedroom Apartments	56
3-Bedroom Apartments	5
Total	**362**

Issues & Revisions

Rev.	Date	Drwn	Details of Issue / Revision
P3-S-01	16.09.25	JK	PLANNING PERMISSION

reddy a+u
Dartry Mills,
Dartry Road
Dublin 6,
D06 Y0E3
T: +353 (0)1 498 7000
W: www.reddyarchitecture.com
E: info@reddyarchitecture.com

Client Details:
Kingston Stables Ltd.

Project Details:
Residential Development
@ Knocknacarra District Centre South
Knocknacarra, Galway

Drawing Title:
Proposed Site Layout

Job No.	Sheet Size:	Scale @A1:	Status	Purpose of Issue
P23-180D	A1_Portrait	1 : 1000	**P3**	**PLANNING PERMISSION**

Issue Date:	Drawn By:	Reviewed By:	Project - System - Spatial Zone - Level - Type - Originator - Role - Number	Revision
13/08/2025	JK	DP	**P23-180D-RAU-00-XX-XX-DR-AR-1003**	**P3-S-01**

2.3 Construction Management

2.3.1 Introduction

All contractors which will be appointed will have the relevant experience to undertake the works for the construction phase of the Proposed Development. All contractors involved in the construction phase of the Proposed Development will be required to comply with this CEMP and any revisions made to this document. An overview of the anticipated Construction Methodologies is provided below under the following main headings.

2.3.2 Overview of Proposed Construction Methodology

The proposed anticipated construction methodology is summarised under the following main headings:

- Site Establishment
- Perimeter Fencing
- Demolition Works
- Site Excavation
- Traffic Measures and Junction Upgrade Works
- Proposed Site Roads and Footpaths
- Services and Utilities
- Residential Unit and Creche Construction
- Landscaping Works

2.3.2.1 Site Establishment

It is anticipated that construction works will be carried out over two phases with a total duration of 36 months. Prior to the commencement of any construction, entrances to the Proposed Development site will need to be fully established with appropriate security gates. Access to the site will be via a road which connects to the Western Distributor Road to the north and also via the Kingston Road (R337) to the south.

A site construction compound inclusive of a parking area for construction worker's vehicles will be provided within the confines of the site. There will be no parking permitted for any vehicles associated with the Proposed Developments construction phase on the adjacent public roads unless agreed with the local authority prior to works inception. A designated section of the site will be fenced off as the construction compound.

2.3.2.2 Perimeter Fencing

The existing site boundaries are comprised primarily of stone/block walls along with a section of hedgerows and treelines. Perimeter hoarding will be provided around the site, where required. This will be in the form of heras fencing, hoarding or similar, to provide a barrier against unauthorised access from the public areas. A controlled access point in the form of a site entrance will be kept locked outside of normal working hours.

The fencing and hoarding will be maintained and painted or covered with graphics portraying project information. Due to the nature of the works and the construction traffic using the site entrance, appropriate signage will be provided along relevant footpaths and site entrances to alert pedestrians to the traffic exiting/entering the site. Likewise, appropriate signage will be installed within and outside the site to alert drivers of the pedestrians crossing ahead. The contractor will be required to undertake the following.

- A site-specific Health and Safety Plan will be in place for the proposed site. All site staff will be made aware of and adhere to the Health and Safety Plan.
- Operate a Site Induction Process for all site staff,
- Ensure all site staff will have current Construction Skills Certification Scheme (CSCS) training or 'Safe Pass' cards,
- Site hoarding will include Health and Safety warnings at appropriate intervals.
- Fire extinguishers and first aid supplies to be available in the work area.
- All adjacent roadways will be maintained in clean condition at all times.
- Appropriate Personal Protective Equipment (PPE) to be worn at all times.
- Biometric turnstiles will be used at the site to prevent unauthorised access to the site.

2.3.2.3 Demolition Works

Demolition works will be carried out on existing agricultural sheds (333.8m^2) during the construction phase. The sequencing of the demolition works will be decided by the main contractor following detailed site survey of the buildings and surrounding area. Such a survey will provide detail on the:

- The condition of the buildings and demolition methods recommended.
- The location and removal methods for any toxic or hazardous materials.
- The type and location of adjoining and surrounding premises which may be affected by noise, vibration, dust and removal of the structures.

Demolition works at the Proposed Development site will primarily involve the following:

- Disconnection of services;
- Soft strip of the buildings to be demolished;
- Complete structural demolition of the buildings;
- Grubbing up of the rising walls, foundations and redundant underground services within the footprint of the demolished structures.

The demolition process will generally follow the sequencing shown in Table 2-1.

Table 2-1 Typical Demolition Sequence

Demolition Sequence	General Description
Removal of equipment	Plant & Equipment
Removal of fixtures	Fixtures & fittings
Removal of timber	Floors, trusses, rafters
Demolition of Structures Shells	Manual or mechanical demolition
Removal of groundworks	Foundation, slabs and redundant drainage infrastructure.
Source segregation of material fractions	C&D waste recovery
Transport of materials to authorised facilities	Authorised Waste Collection Permit holders and Waste Facility or Licence holders

2.3.2.4 Site Excavation

Soil Stripping and temporary stockpiling of soils and other excavated materials will be required around the site as the Proposed Development progresses. While these works occur, the following will apply:

- The area where excavations are planned will be surveyed and all existing services will be identified.
- All relevant bodies (i.e. ESB, Gas Networks Ireland, Eir, GCC, etc.,) will be contacted and all drawings for all existing services sought.
- All plant operators and general operatives will be inducted and informed as to the location of any services.
- All plant operators and general operatives will be inducted and informed as to the identification of invasive species.
- A tracked 360-degree excavator will be used to strip the topsoil, and a dumper will be used to move the excavated materials to the temporary stockpile location.
- All excavated material will be reused for future landscaping works or for backfill of excavations.
- All stockpiles will be covered in a sheet of polythene, as required, which will prevent the creation of nuisance dust, and will also prevent sediment runoff in times of heavy precipitation.
- In all circumstances, excavation depths and volumes will be minimised.
- All excavated spoil will be stockpiled and contained entirely within the confines of the site. Alternatively, spoil will be transported off site to a designated waste facility.
- Earthworks will only be carried out during periods of dry weather.
- Excavated (existing) overburden material will be reused on site, where possible;
- Temporary stockpiles will be covered with plastic sheeting;
- A minimal volume of topsoil and subsoil will be removed to allow for infrastructural work to take place due to optimisation of the layout by mitigation by design (no basement structures are proposed); and,
- Construction of service trenching, pumping station and surface water attenuation features will generate excess material. All excess material will be sent to an authorised soil and stone or waste recovery facility.

2.3.2.5 Traffic Measures and Junction Upgrade Works

As outlined in the Traffic and Transportation Assessment which has been prepared by Tobins Consulting Engineers for the Proposed Development, vehicular access to the Proposed Development will be gained via a priority T-junction off the Altan arm of the Western Distributor Road / Bothar Stiofain / Altan roundabout and from the Kingston Road (R337) at the location of an existing laneway.

Vehicular access to the site is proposed along the Altan Road via the southern arm of the Bothar Stiofain roundabout on the Western Distributor Road. Currently the roundabouts southern arm services the existing residential developments of Altan and Gort Siar along with the Knocknacarra National School.

Upgrades will include resurfacing which will have similar methodology to that outlined in Section 2.3.2.6 below

All internal roads will be designed in accordance with the requirements of DMURS and the Recommendations for Site Development Works for Housing Areas. Autotrack vehicle swept path analysis will be completed for the proposed site layout for a Large Car, a Refuse Truck and a Fire Tender to ensure the vehicles can safely manoeuvre around the Proposed Development site.

2.3.2.6 Proposed Site Roads and Footpaths

Site Roads and Parking Areas

The construction methodology for the proposed access roads and parking areas is as follows:

- Excavation will take place until a competent stratum is reached.
- The competent stratum will be overlain with up to 500mm of granular fill and compacted.
- A layer of geogrid/geotextile may be required at the surface of the competent stratum.
- A final hard surface layer will be placed over the excavated road to provide a road profile to accommodate construction traffic.
- Prior to completion of the construction works on site, the finished asphalt road surface will be applied.

Footpaths

- Excavation will be required to reach the desired levels,
- Shuttering will be installed along the section where footpaths are to be installed,
- A layer of granular material (clause 804 or similar) will be placed within the shuttered area. This layer will then be compacted.
- Once the layer of aggregate material has been compacted to the desired level, concrete will be poured into the shuttered area. The concrete will be levelled with the appropriate falls and allowed to cure for the appropriate time period.
- Once the concrete has cured, the shuttering will be removed.
- Mitigation measures to control potential concrete runoff are outlined in Section 3.3 below.

2.3.2.7 Services and Utilities

Any underground services encountered during the works will be surveyed for level and where possible will be left in place. If there is a requirement to move the service, then the appropriate body (ESB, Gas Networks Ireland, etc.) will be contacted, and the appropriate procedure put in place. Backfill around any utility services will be with dead sand/pea shingle where appropriate. All works will be in compliance with required specifications.

It is proposed to direct wastewater generated from the Proposed Development to an existing Uisce Eireann owned 225mm foul sewer line located west of the site, along the southern arm junction off the adjacent roundabout and Altan Road. The 225mm foul sewer outfalls to an existing Uisce Eireann 375mm foul network.

The foul sewer network has been designed using Causeway Flow drainage modelling software. All gravity pipes will be thermoplastic structured wall pipes, with diameters ranging from 150mm to 225mm. A pre-connection application was submitted to Uisce Eireann for the wastewater demand from the Proposed Development, and a Confirmation of Feasibility (CoF) statement has been received.

As outlined in the accompanying Civil Design Report (Appendix 4-4 of the EIAR) the proposed Storm water drainage infrastructure incorporates the philosophies of nature-based Sustainable Drainage Systems (SuDS) to manage surface water runoff quantity and quality.

Water will be provided to the Proposed Development via a new connection to a nearby Uisce Eireann owned 315mm watermain which runs along the Kingston Road.

The installation of services and connections to the residential units will be carried out as follows:

- The area where excavations are planned will be surveyed and all existing services will be identified.
- All relevant bodies (i.e., ESB, Gas Networks Ireland, Eir, GCC etc.) will be contacted and all drawings for all existing services sought.
- A traffic management plan will be produced if required for connection works to the existing service network.
- A road opening licence will be obtained where required for connection to existing services.
- All plant operators and general operatives will be inducted and informed as to the location of any services.
- A tracked 360-degree excavator or similar will be used to excavate the trench to the required dimensions.
- All excavated material will be removed to an authorised waste recovery facility or, if suitable, stockpiled and reused for backfilling and landscaping where appropriate.
- Once the trench has been excavated the ducting/pipework will then be placed in the trench as per specification.
- Once the service ducts/pipework has been installed couplers will be fitted as required and capped to prevent any dirt etc. entering the ducts/pipes.
- The as built location of the ducting/pipework will be surveyed using a total station/GPS.
- Backfill material will be carefully placed so as not to displace the ducting/pipework within the trench.
- The appropriate warning/marker tape will be installed above the ducts/pipes at the appropriate depths.
- The surface will be reinstated as per original specification or to the requirements of the site layout/Local Authority as appropriate.

2.3.2.8 Residential Unit Construction

The residential dwellings along with the proposed creche will be constructed using the following methodology:

- The area where excavations are foundations are to be installed will be surveyed and all existing services will be identified.
- All relevant bodies (i.e. ESB, Bord Gáis, Eircom, GCC etc.) will be contacted and all drawings for all existing services sought.
- The area of each building will be marked out using ranging rods or wooden posts and the soil and overburden stripped and removed to nearby storage area for later use in landscaping.
- All plant operators and general operatives will be inducted and informed as to the location of any services.
- A tracked 360-degree excavator or similar will be used to excavate the area down to a competent stratum as approved by the Design Engineer and appropriately shuttered reinforced concrete will be laid over it.
- Foundations will be shuttered and cast with reinforced concrete as per the Design Engineer's specification.
- The pre-cast elements/block work/brick work walls will be built up from the foundation including a Damp Proof Course (DPC) and the floor slab constructed, having first located any ducts or trenches required by the follow on mechanical and electrical contractors.
- The block work will then be raised to wall plate level and the gables & internal partition walls formed. Scaffold will be erected around the outside of the buildings for these works.
- Any concrete floor slabs in the apartments or town houses will be lifted into position using an adequately sized mobile crane

- Any concrete flooring slabs will be lifted into position using an adequately sized mobile crane.
- The timber roof trusses will then be lifted into position using a teleporter or mobile crane depending on site conditions. The roof trusses will then be felted, battened, tiled and sealed against the weather.
- Windows, electrics, plumbing and all other building components and services will be installed in as timely a manner as is possible.
- Each building will be inspected and certified by the project design engineer at the appropriate stages of construction.

2.3.2.9 Landscaping Works

Prior to the completion of works on the Proposed Development site, the landscaping works will be carried out. This work will be carried out before the completion of works in order to ensure that the development will be an aesthetically pleasing place for residents to live. These works will involve the use of plant and machinery in order to carry out tasks such as earth moving. Materials which have been stockpiled for the task will be used as much as possible, and material will only be imported where it is required. During site preparation works, where topsoil is stripped prior to excavation, this material will be retained on site for use in landscaping.

Cunnane Stratton Reynolds have prepared detailed landscape drawings and a Landscape Design Report which can be found in Appendix 6-3 of the EIAR.

The Landscape Design Report and Chapter 6 Biodiversity of the EIAR outlines a number of biodiversity friendly measures which are as follows:

- The use of native species will generally be preferred. However, a complimentary element of non-native species will also be used, where appropriate to achieve particular aims or requirements.
- The planting of predominantly pollinator friendly shrub and herbaceous species will integrate the scheme in line with the 'All Ireland Pollinator Plan'.
- Significant additional native tree planting mitigates necessary removals and ultimately will significantly increase the sites tree and vegetation cover overtime.
- Proposed tree planting includes a selection of native and naturalised trees such as alder, beech, birch, cherry, oak, pine, rowan, sycamore and whitebeam. The use of such trees will provide vertical scale and structure to the landscape over time, as well as ecological benefits.
- Approximately 238 linear metres of clipped beech hedgerow will be provided. Although the proposed beech hedgerows are likely to be of lower ecological value to the existing native hedgerows on site, they will result in a net gain in terms of hedgerow habitat post-construction.
- Whilst the proposed landscaping does not provide replacement treelines to offset the loss of those currently on site, it does provide for the planting of approximately 1,310m2 of woodland understorey, comprised of native species (hazel, holly, spindle and guelder-rose), in addition to 202 parkland, open space and feature trees and 389 street trees which will be comprise of native and non-native species. Therefore, it is likely that the Proposed Development will result in a net gain in terms of overall number of trees within the site.
- Approximately 784m^2 of wildflower meadow of Irish provenance, sourced from Design By Nature, or equivalent, will be created. A low frequency mowing regime in these areas will reduce the overall volume maintenance in the scheme and contribute to a reduction of carbon footprint.
- The proposed landscape plan aims to create a number of linear green corridors suitable for bat feeding

2.4 Hours of Working

It is expected that construction works will occur during normal working hours:

- 08:00 and 18:00 from Monday to Friday (inclusive);
- 09:00 to 13:00 on Saturday.
- No works will be undertaken on Sunday; and
- Public holidays will be observed unless otherwise agreed with the local planning authority.
- Deliveries will also be scheduled to avoid peak times, i.e. avoiding rush hours and school drop off/pick up times.

3. ENVIRONMENTAL MANAGEMENT

3.1 Protecting Water Quality

Prior to the commencement of any subsequent construction activities, the necessary mitigation measures will be put in place to ensure that no silt laden water runoff generated at the site will flow to nearby watercourses or drains thus ensuring the protection of surface water during the works. This will involve confirming the location of all existing services and delineating between drainage systems. Surface waters will be managed to ensure the prevention of run off from areas where excavation occur does not result in silt laden water entering the existing storm water network.

Particular emphasis will also be placed on hazardous materials management and prevention of spills or leaks of fuel oils to ensure watercourses and groundwater are not impacted. Section 5 provides an Emergency Response Plan for dealing with spillages which may result in adverse environmental effects

The site of the Proposed Development does not contain any open watercourses. The Proposed Development site is located within the Galway Bay North hydrological catchment (Catchment 31), and the Knock [Furbo]_SC_010 hydrological sub-catchment. The Knocknacarragh Stream (EPA code 31K16) watercourse, which is a 2nd order watercourse (part of the Knocknacarragh_010 system), and according to the EPA mapper, is located approximately 10m from the northeastern boundary of the site. During site walkovers, no evidence of this watercourse was recorded and it appears to have been culverted previously at this location. No other watercourses with perceptible flow were noted within the site.

The Proposed Development Site is underlain by the Spiddal groundwater body. The Water Framework Directive (WFD) status 2016-2021 for the Spiddal groundwater body was deemed “Good”.

Waters will not be discharged directly to any existing surface water sewers or drains. Particular emphasis will also be placed on hazardous materials entering the surface water management system as well as spill or leaks of fuel oils. Section 5 provides an Emergency Response Plan for dealing with spillages which may result in adverse environmental effects.

Excavation works have the potential to encounter sub-surface waters and ground water. In the event of encountering groundwaters during excavation, the excavation will be de-watered using a pump equipped with a silt bag on the discharge outlet. The pumped water will be discharged to either the existing surface water drainage system or to a suitably vegetated area within the site boundary. Where discharge to a vegetated area is required, the area will be enclosed with silt fencing, as necessary, to prevent sediment-laden runoff and ensure compliance with best practice environmental controls. In order to avoid hydrocarbons encountering groundwaters onsite, Section 3.4 below presents mitigation measures to avoid the release of hydrocarbons onsite.

Surface and storm water generated during the operational phase will be captured by the proposed drainage network within the confines of the site boundary as outlined in Section 2.3.2.7 above.

3.2 Prevention Pollution Control Measures

The following measures will be put in place to prevent the transportation of silt laden water or pollutants from entering any of the wider environments including watercourses/drains within or near the site:

- There are no watercourses on site and surface water will not be directly discharged into any external water bodies, surrounding land, or adjacent roadways. Any run-off generated on-site will undergo the necessary filtration process as previously outlined in Section 3-1.

- The works will be managed to ensure there will be no silt-laden run-off beyond the site boundary. This will be achieved through the use of appropriate excavation techniques during the initial construction works. Where necessary, silt fencing will be installed downslope of the construction areas, particularly where drains or drainage pathways are present. These measures will serve as a protective measure to contain silt material within the site.
- Any requirement for temporary fills or stockpiles will be damped down or covered with polyethylene sheeting as required to avoid sediment release associated with heavy rainfall.
- Excavations will be carried out using a suitably sized excavator and, in all circumstances, excavation depths and volumes will be minimised where practically possible.
- Excavated spoil will be stockpiled and contained entirely within the confines of the site boundaries. Any stockpile areas will be surrounded with silt fencing, if deemed necessary to prevent runoff.
- The minimum number of soil/subsoils and bedrock material should be removed from site. Soil may be reused for landscaping elsewhere on the site. However, any excess construction material shall be removed from the area and sent to an authorized waste recovery facility.
- Works shall not take place at periods of high rainfall and shall be scaled back if or suspended if heavy rain is forecast during excavation works.
    - High rainfall' is defined as follows:
    - >10 mm/hr (i.e. high intensity local rainfall events);
    - >25 mm in a 24-hour period (heavy frontal rainfall lasting most of the day);
- In the event of encountering groundwaters during excavation, groundwater will be pumped out of the excavation using a pump equipped with a silt bag on the discharge pipe, if necessary, to capture any silty material prior to subsequent natural percolation to ground. The area surrounding the silt bag will be surrounded by silt fencing if deemed necessary.
- No wastewater will be discharged on-site during the construction phase. Toilet facilities will be provided in a prefabricated sanitary unit which will be placed in the construction compound. This unit will have an enclosed wastewater holding tank which will be fitted with a fill level alarm and will be emptied on an as needed basis by the appropriately licensed contractor.
- Good construction practices will be implemented at the site. This will ensure minimal risk. The Construction Industry Research and Information Association (CIRIA) provides guidance on the control and management of water pollution from construction sites, as outlined in *Control of Water Pollution from Construction Sites, guidance for consultants and contractors* (CIRIA, 2001). This guidance will be adhered to throughout the construction phase to ensure that surface water generated on site contains minimum sediment.

Details of control measures which will be implemented at the site, if required are included in the Plates below.

Plate 3-1.Silt Bag with water being pumped through.

Plate 3-2. Silt Bag under inspection.

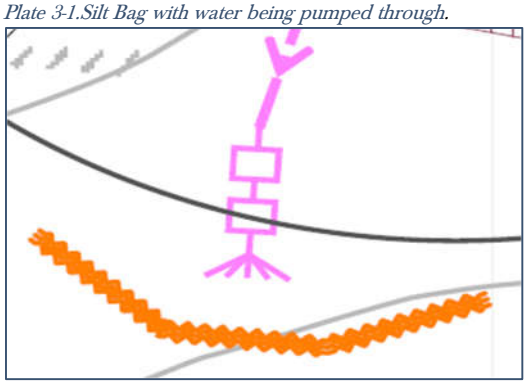

Plate 3-3. Silt Fence surrounding the discharge from Silt Bag.

Plate 3-4. Embedded Silt Fence

3.3 Cement Based Products Control Measures

The complete washing out of concrete trucks will not be permitted at the site. Suppliers will be directed back to their own facility to complete the washout process. However, a washout area for chute cleaning will be provided at various locations in close proximity to the concrete pour locations.

The following mitigation measures are proposed to avoid release of cement leachate from the site:

- No batching of wet-cement products will occur on site.
- Ready-mixed supply of wet concrete products and where possible, emplacement of pre-cast elements, will take place. Where possible pre-cast elements for culverts and concrete works will be used.
- No washing out of any plant used in concrete transport or concreting operations will be allowed on-site.
- Where concrete is delivered on site, only chute cleaning will be permitted, using the smallest volume of water possible. No discharge of cement contaminated waters to the construction phase drainage system or directly to any artificial drain or watercourse will be allowed.
- Use weather forecasting to plan dry days for pouring concrete.
- Ensure pour site is free of standing water and plastic covers will be ready in case of sudden rainfall event.

3.4 Refuelling, Fuel and Hazardous Materials Storage

The following measures are proposed to avoid release of hydrocarbons at the site:

- Minimal refuelling or maintenance of construction vehicles or plant will take place on site. Where possible, off-site refuelling will occur at a controlled fuelling station;
- On-site re-fuelling will be undertaken using a double skinned bowser or a refuelling truck with spill kits kept onboard;
- All oils, fuels, paints and other chemicals will be stored in a secure bunded construction hardstand area. Refuelling and servicing of construction machinery will take place in a designated hardstand area which is also remote from any drainage systems. A response procedure will be put in place to deal with any accidental pollution events and spillage kits will be available and construction staff will be familiar with the emergency procedures and use of the equipment;
- A temporary drainage system shall be installed prior to the commencement of the construction works;
- All works shall be undertaken in accordance with the CIRIA document, 'Control of Water Pollution from Construction Sites, guidance for consultants and contractors'
- All plant and machinery will be serviced before being mobilised to site;
- No plant maintenance will be completed on site, any broken down plant will be removed from site to be fixed;
- Concrete batching will take place off site, wash down and wash out of concrete trucks will take place off site and any excess concrete is not to be disposed of on site. Pumped concrete will be monitored to ensure there is no accidental discharge. Mixer washings are not to be discharged into surface water drains/sewers;
- Discharge from any vehicle wheel wash areas is to be directed to on-site settlement tanks/ponds, debris and sediment captured by vehicle wheel washes are to be disposed off-site at a licensed facility;
- Foul drainage discharge from the construction compound will be transported off site to a licensed facility until a connection to the public foul drainage network has been established.

3.5 Dust Control

Construction dust can be generated from many on-site activities such as excavation and backfilling. The extent of dust generation will depend on the type of activity undertaken, the location, the nature of the dust, i.e. soil, sand, etc and the weather. In addition, dust dispersion is influenced by external factors such as wind speed and direction and/or periods of dry weather. Construction traffic movements also have the potential to generate dust as they travel along the approach road. The measures below will also prevent construction debris arising on the public road network.

Proposed means to control dust include:

- Any site roads with the potential to give rise to dust will be regularly watered, as required, during dry and/or windy conditions.
- The designated public roads outside the site and along the main transport routes to the site will be regularly inspected by Site Management for cleanliness, and cleaned as necessary.
- Material handling systems and material storage areas will be designed and laid out to minimise exposure to wind.
- Water misting or bowsers will operate on-site as required to mitigate dust in dry weather conditions.

- The transport of soils or other material, which has significant potential to generate dust, will be undertaken in tarpaulin-covered vehicles where necessary.
- All vehicles leaving the construction areas of the site will rinse their wheels at a designated wheel wash area prior to entering the local road network.
- All construction related traffic will have speed restrictions on un-surfaced roads to 15 kph.
- Daily inspection of construction sites to examine dust measures and their effectiveness.
- If deemed necessary, sections of the approach road will be swept using a truck mounted vacuum sweeper.

It is also proposed to carry out dust monitoring at the site during the construction phase. Monitoring will be carried out quarterly using the Bergerhoff method. This monitoring will ensure that the mitigation measures outlined above are functional and being implemented. The locations of the dust monitoring gauges are outlined in Figure 3-1 below

Map Legend

- Planning Application (Red Line) Boundary
- Dust Monitoring Locations

RECEIVED: 16/10/2025

Drawing Title

Dust Monitroing Locations

Project Title

Proposed Large-Scale Residential Development at Knocknacarra, Galway.

Drawn By	Checked By
EC	TM/EOS
Project No. 240142	Drawing No. Figure 3-1
Scale 1:2,500	Date 2025-10-15

MKO
Planning and Environmental Consultants
Tuam Road, Galway
Ireland, H91 VW84
+353 (0) 91 735611
email:info@mkoireland.ie
Website: ww.mkoireland.ie

3.6 Noise Control

The operation of plant and machinery, including construction vehicles, is a source of potential noise impacts. Construction phase noise is typically assessed in light of guidance set out in British Standards Institution (BSI) (2014) *BS 5228-1:2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 1: Noise*[1], as well as the National Roads Authority (NRA) (now TII) (2014) *Good Practice Guidance for the Treatment of Noise during the Planning of National Road Schemes*[2]. Although the NRA document is not directly relevant to the Proposed Works, it has seen increasing application to non-road projects in recent years in the absence of any specific Irish guidance.

All construction plant used on-site will be required to comply with maximum sound power levels set out in *Directive 2000/14/EC of the European Parliament and of the Council of 8 May 2000*[3] on the approximation of the laws of the Member States relating to the noise emission in the environment by equipment for use outdoors, implemented in Ireland by the *European Communities* (Noise Emission by Equipment For Use Outdoors) *Regulations, 2001* (S.I. 632 of 2001)[4], as amended by the *European Communities* (Noise Emission by Equipment for Use Outdoors) (Amendment) *Regulations, 2006* (S.I. 241 of 2006)[5].

Proposed measures to control noise include:

- Construction operations will in general be confined to the periods Monday-Friday 0800-1800 h and Saturday 0900-1300 h.
- Hooting will be prohibited onsite. Drivers of plant and vehicles will be instructed to avoiding hooting at all times.
- Plant used onsite during the construction phase will be maintained in a satisfactory condition and in accordance with manufacturer recommendations. In particular, exhaust silencers will be fitted and operating correctly at all times. Defective silencers will be immediately replaced.
- Queuing of trucks on public roads will be prohibited.
- Machinery not in active use will be shut down.
- A site representative will be appointed as a liaison officer with the local community.
- Any complaints of noise received during the construction phase will be logged in a register, and investigated immediately. Details of follow-up action will be included in the register.
- Where it is proposed to import potentially noisy plant to the site, the potential impact of noise emissions will be assessed in advance.
- Guidance set out in BS 5228-1:2009 with respect to noise control will be applied throughout the construction phase.
- Advance notification will be given to residents immediately outside the site boundary when works are proposed within 50m of their dwellings.

3.7 Vibration Control

Vibration standards can be considered in two varieties: those dealing with human comfort and those dealing with cosmetic or structural damage to buildings. For example, vibration is perceptible at around 0.5mm/s in the case of road traffic, however at higher magnitudes, this vibration may become an

[1] *British Standards Institution (BSI). (2014) BS 5228-1:2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 1: Noise. London: BSI.*
[2] *National Roads Authority (NRA) (now TII) (2014) Good Practice Guidance for the Treatment of Noise during the Planning of National Road Schemes.*
[3] *Directive 2000/14/EC of the European Parliament and of the Council of 8 May 2000*
[4] European Communities *(Noise Emission by Equipment For Use Outdoors)* Regulations, 2001 *(S.I. 632 of 2001)*
[5] European Communities *(Noise Emission by Equipment for Use Outdoors) (Amendment)* Regulations, 2006 *(S.I. 241 of 2006)*[5].

annoyance. Guidance relevant to the protection of building structures is contained in the following documents:

- **British Standards Institution (BSI). (1993)** *BS 7385-2:1993 Evaluation and Measurement for Vibration in Buildings – Part 2: Guide to Damage Levels from Ground Borne Vibration*. **London: BSI**[6].
- **British Standards Institution (BSI). (2014)** *BS 5228-2:2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 2: Vibration*. **London: BSI**[7].

Vibration can be more difficult to control than noise, and there are few generalisations which can be made about its control. It should be borne in mind that vibration can cause disturbance by causing structures to vibrate and radiate noise in addition to perceptible movement. The following mitigation measures will be implemented at the site during the demolition and construction phases to control vibration levels:

- The hours of working should be planned, and account should be taken of the effects of vibration upon persons in areas surrounding site operations and upon persons working on site, taking into account the nature of land use in the areas concerned and the duration of work.
- Where reasonably practicable, low vibration working methods should be employed. Consideration should be given to use of the most suitable plant, reasonable hours of working for operations which might give rise to perceptible vibrations, and economy and speed of operations.
- Vibration should be controlled at source and the spread of vibration should be limited.
- Where reasonably practicable, plant and/or methods of work causing significant levels of vibration at sensitive premises should be replaced by other less intrusive plant and/or methods of working.
- Vibration from stationary plant (e.g. generators, pumps, compressors) can, in some instances, prove disturbing when located close to sensitive premises or when operating on connected structures. In these instances, equipment should be relocated or isolated using resilient mountings.
- Where processes could potentially give rise to significant levels of vibration, on-site vibration levels should be monitored regularly by a suitably qualified person appointed specifically for the purpose, particularly if changes in machinery or project designs are introduced. A method of vibration measurement should be agreed prior to commencement of site works.
- On those parts of a site where high levels of vibration are likely to be a hazard to persons working on the site, prominent warning notices should be displayed.
- Offsite fabrication - In method statement/risk assessment the contractor will highlight any activity that may cause significant vibration levels and include measures in helping to mitigate these emission levels.
- Equipment is to be task specific.
- Best practice vibration control measures will be employed by the contractor.
- A designated member of staff will be appointed as the point of contact for any queries or complaints from nearby local residents.

[6] ***British Standards Institution (BSI). (1993)*** BS 7385-2:1993 Evaluation and Measurement for Vibration in Buildings – Part 2: Guide to Damage Levels from Ground Borne Vibration***. London: BSI***
[7] ***British Standards Institution (BSI). (2014)*** BS 5228-2:2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 2: Vibration***. London: BSI***

3.8 Ecological Measures

As outlined in Chapter 6 Biodiversity of the EIAR, the following measures will assist in reducing the impact of habitat loss on local bats during construction:

- A pre-commencement survey is recommended on each of the structures to assess the buildings prior to any works. The function of this survey will be to assess any changes in baseline environment since the time of undertaking the survey in 2023 and 2024.
- 3 trees identified as potential roosts (PRF) are proposed for removal. While no roosting bats were recorded within any of the trees identified as PRF-Is, given the transient nature of tree roosts and in recognition of the fact that bats are a mobile species, a pre-commencement survey, at the appropriate time of year, will be undertaken on trees to be felled/pruned with suitable potential roost features, by a qualified ecologist to ensure there are no roosting bats. The requirement for a pre-commencement survey does not represent a lacuna in the survey assessment but is fully in line with industry best practice. The function of this survey will be to assess any changes in baseline environment since the time of undertaking the surveys in 2024. If a bat roost is identified within any of the trees to be removed/pruned, a bat derogation licence will be obtained from the National Parks and Wildlife Service (NPWS), prior to felling and the felling activity will be supervised by a qualified ecologist.

3.9 Traffic Management Proposals

A Traffic Management Plan (TMP) for the construction stage will be developed and agreed with GCC prior to the commencement of works.

The proposed traffic management measures (As listed in Chapter 15 Material Assets of the EIAR) to be adopted during the construction works are summarised below. Please note that this is not an exhaustive list, and it will be updated accordingly by the appointed contractor in consultation with the local authority:

- A detailed haulage plan will be put in place to ensure minimal impact on the surrounding road network. Spoil removal from site will be kept to a minimum with a detailed site survey completed to ascertain where spoil can be distributed on the site.
- All deliveries and removals will be subject to stringent site rules governing the loading / off-loading times, location of loading / off loading, covering of loads and cleaning of vehicles exiting the site, etc.
- Delivery loads to and from the site and management of large deliveries on site to occur outside of peak periods.
- No vehicle will be allowed to stop or park on the access road to the proposed development site.
- Ample parking will be provided within the site to cater for the staff and visitors during the construction phases of the proposed development.
- Construction traffic will be managed and scheduled to ensure no queueing occurs on either the internal road system or the main approach roads. The provision of an on-site vehicle staging area will facilitate waiting vehicles.
- Routine sweeping/cleaning of the road and footpaths in front of the site; and
- No uncontrolled runoff to the public road from dewatering/pumping carried out during construction activity.

3.10 Archaeological Management

3.10.1 Pre-Construction Investigations

The northern area of the Proposed Development site has been subject to significant modern ground disturbance while the southern end remains as a largely undisturbed area of green field pastureland containing areas of bedrock outcrops and waterlogging. The lands have been assessed by a geophysical specialist (Dr. Ger Dowling) and were considered to be unsuitable for an archaeo-geophysical survey due to the presence of areas of prior ground disturbance, undulating terrain with bedrock outcrops, waterlogged conditions and the presence of overhead electricity cables.

A programme of archaeological test trenching, under licence by the National Monuments Service, will therefore be carried within the Proposed Development site in advance of the construction phase. This archaeological investigation will also include the compilation of a written and photographic record of the existing field boundaries within the Proposed Development site. In the event that any sub-surface archaeological deposits, features or objects are identified during test trenching, their locations will be recorded and securely cordoned off while the National Monuments Service are notified of the discovery and consulted to determine further mitigation measures, which may entail preservation *in situ* by avoidance or preservation by record through a systematic archaeological excavation.

3.10.2 Monitoring of Mitigation Measures

There are a number of obligatory processes to be undertaken as part of applications to the National Monuments Service for licences to carry out archaeological test trench excavations and these will allow for monitoring of the successful implementation of the mitigation measures. A detailed method statement stating the proposed strategy for the site investigations will accompany the submitted licence application which will clearly detail the extent of the archaeological works and outline the processes to be enacted in the event that any archaeological features are encountered. Reports on the archaeological site investigations will then be submitted to the National Monuments Service, the National Museum of Ireland and the Planning Authority which will clearly describe the results of all archaeological works in written, mapped and photographic formats.

3.11 Invasive Species Management

A multidisciplinary walkover survey was carried out on the 20th of March 2024, 24th of April 2024, 15th of May 2024, 20th of March 2025 and a dedicated invasive species survey was carried out the 24th of April 2024 in line with NRA (2009) guidelines (Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes) by Fiona Killeen (B.Sc.) of MKO.

As outlined in the accompanying Invasive Species Management Plan (ISMP) (Appendix 6-2 of the EIAR), two invasive species listed on the Third Schedule of of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. 477 of 2011) and First Schedule of the European Union (Invasive Alien Species) Regulations 2024 (S.I. 374 of 2024) were recorded within the Proposed Development site boundary.

Three-cornered leek (*Alium triquetrum*) was recorded in the Proposed Development Site. A small cluster of Three-cornered leek was recorded in the east of the site adjacent a hedgerow habitat.

Sea buckthorn (*Hippophae rhamnoides*) saplings, categorised as minor infestations, were recorded in lands to the west of the Proposed Development site. Mature Sea buckthorn plants were recorded overhanging the western boundary of the EIAR Study Area. Overall, the infestation of Sea buckthorn within the site is very small in scale, with only juvenile saplings recorded.

The treatment and control of invasive alien species will follow best practice guidelines, including:

- National Roads Authority (NRA) (2010) Guidelines on the Management of Noxious Weeds and Non-native Invasive Plant Species on National Roads. Revision 1. Dublin: National Roads Authority.
- INNSA (2017) Code of Practice: Managing Japanese Knotweed. Invasive Non-Native Specialists Association.

3.11.1 Treatment and Management Methodologies

3.11.1.1 Preliminary Stages

A dedicated invasives species survey of the Proposed Development site will be carried out three months prior to commencement of works on site to determine if the species have spread further throughout the site. Surveys should be undertaken during the summer months (June - July) when the extent of infestation will be fully visible.

The treatment methodologies have been carefully considered and are proposed to eradicate Sea buckthorn and Three-corned leek and manage their spread further within the Proposed Development site. These treatment measures are considered as part of the planning application. An ecologist will be on site to supervise the treatment. The infested areas will be marked out with posts and hazard tape prior to any machinery ingress or works within or near this area.

3.11.1.2 Three- Cornered Leek

The following management is proposed in relation to Three-cornered Leek:

- An ecologist will be on site to supervise the treatment.
- The infested area will be marked out with posts and hazard tape prior to any machinery ingress or works within or near this area.
- Chemical treatment is the chosen treatment method. It is advised to treat the plant *in-situ* and avoid disturbance and the increased risk for spread and dispersal.
- This plant can be treated with a Glyphosate based chemical herbicide on an annual basis. It is recommended that a Glyphosate-based herbicide will be applied as a spot treatment to individual plants, or by foliar and stem spray in early spring before the plant flowers which typically happens between April and June. It is best to manually break the leaves prior to applying the chemical to ensure it enters the leaf. Follow-up annual treatments are necessary as large numbers of shoots may re-appear the following year as may new seedlings.
- The timing of the treatment applied is vital for the eradication of three-cornered leek. The control methods must be implemented in March or April when the leaves of the three-cornered leek are fully formed. Control methods should not be carried out if plants have finished flowering and produced seed (from the outset of May) as the movement of plants at this stage in the plant's cycle can cause a further spread of the invasive species.
- Three-cornered leek produces vast amounts of seeds annually and these seeds can persist and remain dormant in the soil for years before germinating. Due to this, a monitoring programme will be established to eradicate the invasive plant where the plants currently exist onsite. Therefore, it is key to undertake the control and treatment measures for a consecutive number of years to eradicate the seed bank and bulbs. The area will need to be surveyed by an ecologist in March/April, May and again in September for the presence of Three-cornered leek for a minimum of 3 years after the treatment to ensure no further spread is taking place.

3.11.1.3 Sea Buckthorn

Mechanical/ physical removal of Sea buckthorn controls the spread of the invasive species by either damaging or removing the plant material via physical action, i.e., uprooting, felling, slashing, mowing, grubbing etc. Juvenile Sea buckthorn saplings were recorded within the site. It is anticipated that the construction phase will span 3 years and as such it is likely to mature with time, in the absence of control measures being implemented.

The recommended treatment methodology for Sea buckthorn includes;

- Any juvenile new shoots of Sea buckthorn will be removed by hand pulling or manual removal using hand tools. The plant will be physically cut and dug up from the root either by hand or using an excavator to grub up the plant.
- Larger stumps will be cut and the stumps painted with Glyphosate herbicide.
- Following clearance of woody material, any necessary excavation of the ground will be undertaken. As sea-buckthorn can readily regenerate from root and rhizomatous material present in soil, any soil arising from areas infested with sea-buckthorn must be contained and disposed of appropriately.
- The vegetation material can be disposed of by burning or incineration.
- If for any reason, burning of plant material is not feasible on-site this material and the soil potentially contaminated within root or rhizome fragments must be gathered and disposed of off-site, to a waste disposal facility that has a pollution prevention and control permit or waste management licence. In order to move material potentially contaminated with Third or First Schedule invasive plant species, a licence is required to be obtained from NPWS. The conditions of the permit or licence of the waste disposal facility must allow the disposal of invasive plants at the site. Delivery should be agreed with the waste site in advance to make sure they can accept material containing invasive plants. When transporting invasive plant material and soil potentially contaminated with invasive plant material, any vehicle used must be covered or securely sheeted so that plant material cannot be accidentally dispersed during transportation.

3.11.1.4 Post Treatment Monitoring

Ongoing monitoring will be required within the Proposed Development site for all invasive species listed on the Third and First Schedules with suitable follow-up management implemented, in order to control new growth or re-establishment within the infested areas.

Following the initial removal, treatment and completion of the development, the treated areas will be re-surveyed annually and if necessary, re-treated until no growth of Three-cornered leek or Sea buckthorn is recorded for two consecutive years. If Three-cornered Leek or Sea buckthorn are found to be re-establishing, they shall be treated as per the measures outlined above and in Section 4 of the ISMP.

3.11.1.5 Site Hygiene

The following measures will be adhered to throughout the duration of the proposed construction works:

- The Project Ecologist will give a Toolbox Talk to all staff in relation to Three-cornered leek and Sea buckthorn and their management on site.
- A designated bio-secure area/exclusion zone will be set up at the Three-cornered Leek and Sea buckthorn locations to prevent disturbance in these areas.
- Prior to leaving the invasive species exclusion zones, all boots and clothing will be thoroughly brushed down to remove any contaminated material prior to leaving the area.

- The contractor will assign a member of their team as Environmental Officer to ensure the management plan is adhered to throughout the proposed works.
- All works in relation to invasive species will be supervised by the Ecological Clerk of Works (ECoW).
- As a precautionary measure, machinery will be thoroughly cleaned down before entering the site to prevent potential spread of invasive species from elsewhere.
- Clean down will be carried out using brushes and shovels and power washing avoided insofar as possible. This is to prevent potentially contaminated run-off spreading outside the site.
- All measures prescribed in the invasive species management plan will be incorporated into the contractor's respective method statements for works.

Plant and equipment which is operated within an area for the management of materials in contaminated areas will be decontaminated prior to relocating to a different works area. The decontamination procedures will take account of the following:

- Personnel may only clean down if they are familiar with the plant and rhizome material and can readily identify it.
- Decontamination will only occur within designated wash-down areas.
- Vehicles will be cleaned using stiff-haired brush and pressure washers, paying special attention to any areas that might retain rhizomes e.g., wheel treads and arches
- All run off will be isolated and treated as contaminated material and will be also sent for disposal to an authorized waste facility.

3.12 Resource Waste Management Plan

The generation of waste as a result of construction and demolition related activity will provide the majority of on-site wastes which will need to be managed under guidelines set out in this document. This section of the CEMP provides a Resource Waste Management Plan (RWMP) which outlines the best practice procedures during the construction and demolition phases of the project. This plan has been compiled based on The Department of the Environment document entitled, '*Best Practice Guidelines on the Preparation of Resource and Waste Management Plans for Construction and Demolition Projects'* (2021)[8].

The plan is based on the European waste hierarchy which sets out the most to least preferred options for waste management. Waste prevention and re-use are viewed as the most desirable options for managing wastes with the least desirable option considered being disposal to a licensed landfill.

This plan has a number of key objectives as outlined below:

- To set out management prescriptions that adhere to the waste management hierarchy.
- To outline the roles and responsibilities of the appointed Waste Manager.

The generation of waste as a result of construction & demolition related activity will provide the majority of on-site wastes which will need to be managed under guidelines set out in this document

3.12.1 Legislation

The Waste Management Act 1996 and its subsequent amendments, provide for measures in relation to waste management, recycling and recovery and provide a regulatory framework for attaining the

[8] **The Department of the Environment (2021)** *'Best Practice Guidelines on the Preparation of Resource and Waste Management Plans for Construction and Demolition Projects'*

objectives of EU and Irish law. The Act also provides a regulatory framework for meeting higher environmental standards set out by other national and EU legislation.

The Act requires that anyone carrying out a waste activity must have all necessary licenses and authorisations. It will be the duty of the Waste Manager on the site of the Proposed Development to ensure that all contractors hired to remove waste from the site have valid Waste Collection Permits and that waste is delivered to a licensed or permitted waste facility. The hired waste contractors and subsequent receiving facilities must adhere to the conditions set out in their respective permits and authorisations.

3.12.2 Guidance

This RWMP – which will incorporate all the measures set out in this document will be finalised subsequent to any permission granted by GCC and will be updated prior to construction to include, inter alia, any additional requirements pursuant to relevant planning conditions imposed – has a number of key objectives as outlined below:

- To set out management prescriptions that adhere to a waste management hierarchy;
- To outline the roles and responsibilities of the Waste Manager;
- Prevention and minimisation of waste at the construction stage of the development.

This RWMP is cognisant of Chapter 9 – Environment and Infrastructure Section 9.10 of the Galway City Development Plan 2023-2029 which states that waste management and disposal should be carefully considered as part of the construction process and waste management plans are required for medium to large scale developments. This RWMP also takes into account Chapter 15 Development Management (DM) Standards 39: Construction and Demolition Waste as outlined in the Galway County Development Plan 2022-2028. DM Standard 39 states that Construction and Demolition Waste Management Plans shall be required as part of any planning application in excess of the following thresholds:

- New residential development of 10 houses or more;
- Developments including institutional, educational, health and other public facilities, with an aggregate floor area in excess of 1,250 m^2;
- Demolition/renovation/refurbishment projects generating in excess of 100 m^3 in volume, of Construction and Demolition waste;
- Civil engineering projects producing in excess of 500 m^3 of waste, excluding waste materials used for development works on the site.

3.12.3 Waste Management Hierarchy

The waste management hierarchy sets out the most efficient way of managing waste in the following order:

Prevention and Minimisation:

The primary aim of the RWMP will be to prevent and thereby reduce the amount of waste generated at each stage of the project. The prevention and minimisation of waste of this development will be developed by implementing effective on-site materials management in terms of both material acquisition and storage on site

Reuse of Waste:

Reusing as much of the waste generated on site as possible will reduce the quantities of waste that will have to be transported off site to recovery facilities or landfill. Site management will be required to

encourage the appropriate reuse of materials where possible as well as identify re-use opportunities to achieve ultimate goal of waste reduction.

Recycling of Waste:

There are a number of established markets available for the beneficial use of construction waste such as using waste concrete as fill for new roads. A designated Waste Storage Area (WSA) will be maintained on site which will cater for segregation and recycling of various waste streams.

At all times during the implementation of the RWMP, disposal of waste to an appropriately licenced facility will be considered only as a last resort.

3.12.4 Resource Waste Management

3.12.4.1 Design Approach

The client and the design team have integrated the '*Best Practice Guidelines for the Preparation of Resource & Waste Management Plans for Construction & Demolition Projects'* guidelines into the design workshops, to help review processes, identify and evaluate resource reduction measures and investigate the impact on cost, time, quality, buildability, second life and management post construction. The design team have undertaken the design process in line with the international best practice principles to firstly prevent wastes, reuse where possible and thereafter sustainably reduce and recover materials. The below sections have been the focal point of the design process and material selections and will continue to be analysed and investigated throughout the design process and when selecting material. The approaches presented are based on international principles of optimising resources and reducing waste on construction projects through:

- Prevention;
- Reuse;
- Recycling;
- Green Procurement Principles;
- Off-Site Construction;
- Materials Optimisation; and
- Flexibility and Deconstruction.

The RWMP will be updated prior to construction and regularly revisited throughout the project's lifecycle so that opportunities to maximise waste reduction/efficiencies are exploited throughout, and that data is collected on an ongoing basis so that it is as accurate as possible.

3.12.5 Construction Phase Waste Management

The Proposed Development will involve the excavation of soil and subsoil material. Although a quantity of this material will be used for landscaping, backfilling and general restoration of excavated areas, it is anticipated that the majority of the excavated material will be removed off-site by a licenced haulier to an authorised waste and or soil recovery facility.

Waste generated post excavation on-site will be managed in the Waste Storage Area (WSA) where the various waste components will be segregated into a number of waste categories in accordance with a general waste segregation policy and placed into individual skips. The WSA will be located within a designated section of the Construction Compound. The categories for segregation will include timber, metal, cardboard and plastics. This material will be removed by authorised waste collection contractors for recycling and recovery at various licensed facilities. The remaining volume of waste material which cannot be allocated to any of these four waste streams will be disposed of in a general waste skip. This waste material will be transferred to a Materials Recovery Facility (MRF) by a fully licensed waste

contractor where the waste will be further sorted into individual waste streams for recycling, recovery or disposal. This general waste will be subject to constant monitoring by site management to ensure that potential reusable and recyclable material is not being disposed of therein. The on-site canteen will include waste receptacles for dry recyclables and food waste which will eliminate the potential of any waste produced within the canteen being sent to landfill. The expected wastes arising from the works including the individual List of Waste (LoW) codes are outlined in Table 3-1.

Table 3-1 Expected waste types arising during the Construction Phase

Materials type	Example	LoW Code
Cables	Electrical wiring	17 04 11
Concrete	Surfacing, foundations, flooring material	17 01 01
Insulation	Cavity & Floor Insulation	17 06 04
Tiles and ceramics	Wall and floor tiles	17 02 03
Bituminous materials	Tarmacadam	17 03 01
Metals	Rebar, reinforced steel joists, lead	17 04 07
Mixture of inert material	Sand, stones, plaster, rock	17 01 07
Plastic	PVC frames, electrical fittings	17 02 03
Soil & Stones	Overburden, soil, subsoil	17 05 04
Gypsum materials	Roof tiles/slabs	17 08 02
Wood	Frames and doors,	17 02 01
Canteen Waste	Miscellaneous waste from site staff	20 01 08

3.12.5.1 Waste Arisings and Proposals for Minimisation, Reuse and Recycling of Construction Waste

Construction waste will arise on the project mainly from excavation and unavoidable construction waste including material surpluses and damaged materials and packaging waste.

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

- Ordering of materials will be on an 'as needed' basis to prevent over supply to site.
- Purchase of materials pre-cut to length to avoid excess scrap waste generated on-site.
- Require suppliers to use least amount of packaging possible on materials delivered to the site.
- Ensuring correct storage and handling of goods to avoid unnecessary damage that would result in their disposal.
- Ensuring correct sequencing of operations.
- Use reclaimed materials in the construction works.

Hazardous waste will be kept separate from all other construction waste to prevent contamination and removed appropriately. In addition to fuel as outlined above, the potentially hazardous wastes that may be generated at the site during the construction include;

- Paints including all associated by products.
- Glues and solvents.
- Asphalt materials from roofing products and external paving finishes.

3.12.5.2 Wastes Arising from Construction Activities

All waste generated on site will be contained in waste skips at the WSA. This WSA will be kept tidy with skips clearly labelled to indicate the allowable material to be disposed of therein.

Site personnel will be instructed at induction that no under no circumstances can waste be brought to site for disposal in the on-site waste skip. It will also be made clear that the burning of waste material on site is forbidden.

3.12.5.3 Demolition Waste Management Plan

Prior to the commencement of any demolition works, as described in Section 2.3.2.3 above, a full audit of waste material that will be generated will be carried out. A list of expected waste types that may be generated has been drawn up and the European List of Waste (LoW) Codes pertaining to each waste type is included in Table 3-2.

Table 3-2 Expected Waste Types Arising from the Demolition Phase

Materials type	Example	LoW Code
Cables	Electrical wiring	17 04 11
Concrete	Surfacing, flooring material	17 01 01
Metals	Steel supports and cladding, roof and wall coverings, utility piping,	17 04 07
Mixture of inert material	Sand, stones, plaster, brick, rock	17 01 07
Plastic	PVC frames, electrical fittings	17 02 03
Soil & Stones	Overburden, soil, subsoil	17 05 04
Wood	Rafters, frames, doors, MDF	17 02 01

The majority of the waste generated by the demolition works will consist of concrete rubble, metal cladding and other associated support components (steel beams/wooden rafters). These materials will be segregated from all other waste components and sent by an authorised waste collector to an authorised waste recovery facility. The remaining volume of waste material will not be large enough to warrant any further segregation, therefore, this waste generated during the demolition works will be deposited into a single skip. This waste material will be transferred to a MRF by a fully licensed waste contractor where the waste will be sorted into individual waste streams for recycling, recovery or disposal. It is unlikely that re-use of materials will be possible at the site. However, clean inert concrete, rubble and stones may have a re-use potential for landscaping and raising levels to formation levels.

3.12.5.4 Reuse

Many construction materials can be reused a number of times before they have to be disposed of:

- Concrete can be reused as aggregate for roads backfilling material.
- Plastic packaging, etc. can be used to cover materials on-site or reused for the delivery of other materials.
- Soils and subsoils will be reused as part of landscaping and site re-instatement.

3.12.5.5 Recycling

If a certain type of construction material cannot be reused on-site, then recycling is the most suitable option.

All waste that is produced during the construction phase including dry recyclables will be sent directly for subsequent segregation at a remote facility. The low volume of such material that is anticipated to be generated at the Proposed Development is the justification for adopting this method of waste management.

3.12.5.6 Wastewater

The removal and disposal of wastewater from site welfare facilities, will be carried out by a fully permitted waste collector holding valid Waste Collection Permits as issued under the *Waste Management (Collection Permit) Regulations* (2007), as amended. Information on the appointed permitted contractor and evidence of a maintenance will be retained on-site and available for inspection on request.

3.12.6 Implementation

3.12.6.1 Roles and Responsibilities for Waste Management

Prior to the commencement of the Proposed Development a Waste Manager will be appointed by the project team. The role of Waste Manager is likely to be fulfilled by the Site Manager given the scale of the development and will be responsible for the implementation of the objectives of this plan, ensuring that all hired waste contractors have the necessary authorisations and that the waste management hierarchy is adhered to. The person nominated will have sufficient authority so that they can ensure everyone working on the Proposed Development adheres to the management plan. The Waste Manager will also be required to conducted regular waste audits in the WSA and throughout the site to ensure that the waste management plan is operating effectively.

3.12.6.2 Training

The Waste Manager will communicate effectively with colleagues in relation to the aims and objectives of the RWMP. All employees working on-site during the construction phases of the project will be trained in materials management and thereby, will be able to:

- Distinguish reusable materials from those suitable for recycling;
- Ensure maximum segregation at source;
- Co-operate with site manager on the best locations for stockpiling reusable materials;
- Separate materials for recovery; and
- Identify and liaise with waste contractors and waste facility operators.

3.12.6.3 Record Keeping

The implementation of the RWMP will ensure that all arisings, movements and treatments of construction and demolition waste to be recorded. This system will enable records the quantity of waste being generated to be maintained. It will highlight the areas from which most waste occurs and allows the measurement of arisings against performance targets. The RWMP can then be adapted with changes that are seen through record keeping.

The fully licensed waste contractor employed to remove waste from the site will be required to provide documented records for all waste dispatches leaving the site of the Proposed Development. Each record will contain the following:

- Consignment Reference Number
- Material Type(s) and LoW Codes
- Company Name and Address of Site of Origin
- Trade Name and Collection Permit Ref. of Waste Carrier
- Trade Name and Licence Ref. of Destination Facility
- Date and Time of Waste Dispatch
- Registration no. of Waste Carrier vehicle
- Weight of Material
- Signature of Confirmation of Dispatch detail
- Date and Time of Waste Arrival at Destination
- Weight of Material
- Site Address of the Destination Facility

3.12.7 Resource Waste Management Plan Conclusion

The RWMP will be adhered to by all staff involved in the project which will be outlined within the induction process for all site personnel. The waste hierarchy will always be employed when designing the plan to ensure that the least possible amount of waste is produced during the construction and demolition phases. Reuse of certain types of construction waste will cut down the costs and requirement of raw materials, therefore further minimising waste levels.

4. ENVIRONMENTAL MANAGEMENT IMPLEMENTATION AND EMERGENCY RESPONSE

4.1 Environmental Manager

The main contractor appointed to carry out the works on site will be required to provide a level of supervision on site in the form of an Environmental Manager who will also fulfil the role of Waste Manager. Due to the scale of activity proposed for the site, this role can be adopted by a Site Manager/Foreman as part of their duties. In general, this Environmental Manager will maintain responsibility for monitoring the works and Contractors/Sub-contractors from an environmental perspective. The Environmental Manager will act as the regulatory interface on environmental matters by reporting directly to the client and liaising with GCC and other statutory bodies as required. The Site Environmental Manager will report to the Site Supervisor/Construction Manager. The duties of the appointed Environmental Manager are summarised as follows:

- Maintain and update as required the Construction Phase CEMP and supporting environmental documentation and review/approval of contractor method statements.
- Undertake inspections and reviews to ensure the works are carried out in compliance with the CEMP.
- Monitor the implementation of the CEMP, particularly all proposed/required Environmental Monitoring.
- Generate environmental reports as required to show environmental data trends and incidents and ensure environmental records are maintained throughout the construction period.
- Advise site management/contractor/sub-contractors on:
    - Prevention of environmental pollution and improvement to existing working methods.
    - Changes in legislation and legal requirements affecting the environment.
    - Suitability and use of plant, equipment and materials to prevent pollution.
    - Environmentally sound methods of working and systems to identify environmental hazards.
- Ensure proper mitigation measures are initiated and adhered to during the construction phase.
- Liaise with Project Team and present the findings of site audits/inspections that are completed.
- Ensure adequate arrangements are in place for site personnel to identify potential environmental incidents.
- Ensure that details of environmental incidents are communicated in a timely manner to the relevant regulatory authorities, initially by phone and followed up as soon as is practicable by email.
- Support the investigation of incidents of significant, potential or actual environmental damage, and ensure corrective actions are carried out, recommend means to prevent recurrence and communicate incident findings to relevant parties.
- Identify environmental training requirements and arrange relevant training for all levels of site-based staff/workers.
- Fulfil the role of Waste Manager and implement the objectives of the Resource Waste Management Plan as set out in Section 3.12 above.

5. EMERGENCY RESPONSE PLAN

5.1.1 Emergency Response

The Emergency Response Plan (ERP) is presented in this section of the CEMP. It provides details of procedures to be adopted in the event of an emergency in terms of site health and safety and environmental protection. The site ERP includes details on the response required and the responsibilities of all personnel in the event of an emergency. The ERP will require updating and submissions from the contractor and suppliers as the proposed project progresses. Where sub-contractors that are contracted on site are governed by their own emergency response procedure a bridging arrangement will be adopted to allow for inclusion of the sub-contractor's ERP within this document.

This is a working document that requires updating throughout the various stages of the project.

5.1.2 Roles and Responsibilities

The chain of command during an emergency response sets out who is responsible for coordinating the response. The Site Manager will lead the emergency response which makes him responsible for activating and coordinating the emergency response procedure. The other site personnel who can be identified at this time who will be delegated responsibilities during the emergency response are presented in Figure 5-1. In a situation where the Site Manager is unavailable or incapable of coordinating the emergency response, the responsibility will be transferred to the next person in the chain of command outlined in Figure 5-1. This will be updated throughout the various stages of the project and considering the scale of the development, all roles may not be applicable during the construction phase.

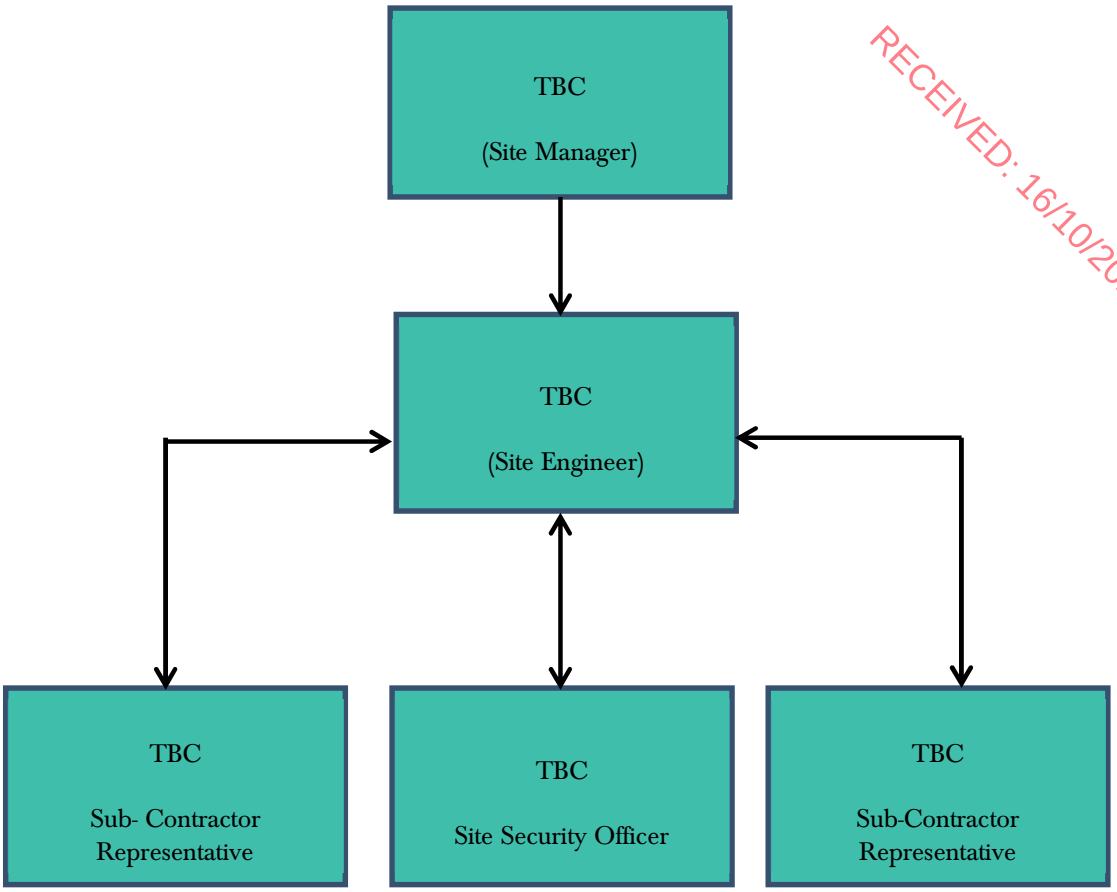

Figure 5-1 Emergency Response Procedure Chain of Command

5.1.3 Initial Steps

In order to establish the type and scale of potential emergencies that may occur, the following hazards have been identified as being potential situations that may require an emergency response in the event of an occurrence.

Table 5-1 Hazards associated with potential emergency situations

Hazard	Emergency Situation
Construction Vehicles: Dump trucks, tractors, excavators, cranes etc.	Collision or overturn which has resulted in operator or third-party injury.
Abrasive wheels/Portable Tools.	Entanglement, amputation or electrical shock associated with portable tools.
Contact with services.	Electrical shock or gas leak associated with an accidental breach of underground services.
Fire	Injury to operative through exposure to fire.
Falls from heights including falls from scaffold towers, scissor lifts, ladders and roofs.	Injury to operative after a fall from a height.
Sickness	Illness unrelated to site activities of an operative e.g. heart attack, loss of consciousness, seizure.

In the event of an emergency situation associated with, but not restricted to, the hazards outlined in Table 5-1 above, the Site Manager will carry out the following:

- Establish the scale of the emergency situation and identify the number of personnel, if any, have been injured or are at risk of injury.
- Where necessary, sound the emergency siren/foghorn that activates an emergency evacuation on the site.
- Make safe the area if possible and ensure that there no identifiable risk exists with regard to dealing with the situation e.g. if a machine has turned over, ensure that it is in a safe position so as not to endanger others before assisting the injured.
- Contact the required emergency services or delegate the task to someone if he is unable to do so. If delegating the task, ensure that they follow the procedures for contacting the emergency services as set out in Section 5.2.1.
- Take any further steps that are deemed necessary to make safe or contain the emergency incident e.g. cordon off an area where an incident associated with electrical issues has occurred.
- Contact any regulatory body or service provider as required e.g. ESB Networks the numbers for which as provided in Section 5.2.2.
- Contact the next of kin of any injured personnel where appropriate. The procedure for this is outlined in Section 5.2.1.

5.1.4 Site Evacuation/Fire Drill

A site evacuation/fire drill procedure will provide basis for carrying out the immediate evacuation of all site personnel in the event of an emergency. The following steps will be taken:

- Notification of the emergency situation. Provision of a siren or foghorn to notify all personnel of an emergency situation.
- An assembly point will be designated in the construction compound area and will be marked with a sign. All site personnel will assemble at this point.
- A roll call will be carried out by the Site Security Officer to account for all personnel on site.
- The Site Security Officer will inform the Site Manager when all personnel have been accounted for. At this time the Site Manager will decide the next course of action which will be determined by the situation that exists at that time. The Site Manager will advise all personnel accordingly.

All personnel will be made aware of the evacuation procedure during site induction. The Fire Services Acts of 1981 and 2003 require the holding of fire safety evacuation drills at specified intervals and the keeping of records of such drills.

5.1.5 Environmental Emergency Response Procedure

5.1.5.1 Spill Control Measures

It is not proposed to store any large volumes of oils/fuels for the purpose of refuelling on the site. A bunded fuel tank will be stored at the temporary construction compound which will be used for smaller plant and equipment i.e. site dumpers and teleporters. This will be stored on an impermeable surface and will be equipped with a spill kit. Onsite plant (excavator) will be refuelled by an external contractor who will call to site as required. Road vehicles will not be refuelled at the site.

Every effort will be made to prevent an environmental incident during the construction and operational phase of the proposed project. Oil/Fuel spillages are one of the main environmental risks that will exist on the proposed site which will require an emergency response procedure. The importance of a swift

and effective response in the event of such an incident occurring cannot be over emphasised. The following steps provide the procedure to be followed in the event of such an incident.

- Stop the source of the spill and raise the alarm to alert people working in the vicinity of any potential dangers.
- If applicable, eliminate any sources of ignition in the immediate vicinity of the incident
- Contain the spill using the spill control materials, track mats or other material as required. Do not spread or flush away the spill.
- If possible, cover or bund off any vulnerable areas where appropriate such as drains or sensitive habitats.
- If possible, clean up as much as possible using the spill control materials.
- Contain any used spill control material and dispose of used materials appropriately using a fully licensed waste contractor with the appropriate permits so that further contamination is limited.
- Notify the Environmental Manager immediately giving information on the location, type and extent of the spill so that they can take appropriate action.
- The Environmental Manager will inspect the site and will assist by providing any advice possible to ensure the necessary measures are in place to contain and clean up the spill and prevent further spillage from occurring.
- The Construction Manager will notify the appropriate regulatory body such as GCC and EPA etc. if deemed necessary.

Environmental Incidents are not limited to just fuel spillages. Therefore, any environmental incident must be investigated in accordance with the following steps.

- The Environmental Manager must be immediately notified.
- If necessary, the Environmental Manager will inform the appropriate regulatory authority. The appropriate regulatory authority will depend on the nature of the incident.
- The details of the incident will be recorded on an Environmental Incident Form which will provide information such as the cause, extent, actions and remedial measures that were used following the incident. The form will also include any recommendations made to avoid reoccurrence of the incident.
- If the incident has impacted on an ecologically sensitive receptor, such as a sensitive habitat, protected species or designated conservation site, (SPA or SAC), the Environmental Manager will liaise with an Ecologist.
- If the incident has impacted on a sensitive receptor such as an archaeological feature the Environmental Manager will liaise with the Project Archaeologist.
- A record of all environmental incidents will be kept on file by the Environmental Manager and the Main Contractor. These records will be made available to the relevant authorities such as GCC and the EPA if required.

The Environmental Manager will be responsible for any corrective actions required as a result of the incident e.g. an investigative report, formulation of alternative construction methods or environmental sampling, and will advise the Main Contractor as appropriate.

5.2 Contacting the Emergency Services

5.2.1 Emergency Communications Procedure

In the event of requiring the assistance of the emergency services the following steps should be taken:

- **Stay calm**. It is important to take a deep breath and not get excited. Any situation that requires 999/112 is, by definition, an emergency. The dispatcher or call-taker knows that and will try to move things along quickly, but under control.
- **Know the location of the emergency and the number you are calling from**. This may be asked and answered a couple of times but do not get frustrated. Even though many emergencies call centres have enhanced capabilities meaning they are able to see your location on the computer screen they are still required to confirm the information. If for some reason you are disconnected, at least emergency crews will know where to go and how to call you back.
- **Wait for the call-taker to ask questions, then answer clearly and calmly**. If you are in danger of assault, the dispatcher or call-taker will still need you to answer quietly, mostly "yes" and "no" questions.
- **If you reach a recording, listen to what it says**. If the recording says your call cannot be completed, hang up and try again. If the recording says all call takers are busy, **WAIT**. When the next call-taker or dispatcher is available to take the call, it will transfer you.
- **Let the call-taker guide the conversation**. He or she is typing the information into a computer and may seem to be taking forever. There is a good chance, however, that emergency services are already being sent while you are still on the line.
- **Follow all directions**. In some cases, the call-taker will give you directions. Listen carefully, follow each step exactly, and ask for clarification if you do not understand.
- **Keep your eyes open**. You may be asked to describe victims, suspects, vehicles, or other parts of the scene.
- **Do not hang up the call** until directed to do so by the call taker.

All staff members will know the address and location of the site as it may be necessary to liaise with the emergency services on the ground in terms of locating the site. This may involve providing an escort from a designated meeting point that may be located more easily by the emergency services.

5.2.2 Contact Details

A list of emergency contacts is presented in Table 5-2. A copy of these contacts will be included in the Site Safety Manual and in the site offices and the various site welfare facilities.

Table 5-2 Emergency Contacts

Contact	Telephone no.
Emergency Services – Ambulance, Fire, Gardaí	999/112
Doctor – Knocknacarra Medical Centre	091 862 220
Hospital –Galway University Hospital	091 524 222
ESB Emergency Services	1850 372 999
Gas Networks Ireland	1850 20 50 50
Gardaí – Mill Street Garda Station	091 538 00
Health and Safety Coordinator - Health & Safety Services	TBC
Health and Safety Authority	1890 289 389
Project Supervisor Construction Stage (PSCS): TBC	TBC

Contact	Telephone no.
Client –Kingston Stables Ltd	TBC

5.2.3 Procedure for Personnel Tracking

All operatives on site without any exception will have to undergo a site induction where they will be required to provide personal contact details which will include contact information for the next of kin.

In the event of a site operative becoming involved in an emergency situation where serious injury has occurred, and hospitalisation has taken place, it will be the responsibility of the Site Manager or next in command if unavailable to contact the next of kin to inform them of the situation that exists.

5.2.4 Induction Checklist

Table 5-3 provides a list of items highlighted in this ERP which must be included or obtained during the mandatory site induction of all personnel that will work on the site. This will be updated throughout the various stages of the project.

Table 5-3 Emergency Response Plan Items Applicable to the Site Induction process

ERP Items to be included in Site Induction	Status
All personnel will be made aware of the evacuation procedure during site induction.	
Due to the location of the site it may be necessary to liaise with and assist the emergency services on the ground in terms of locating the site. This may involve providing an escort from a designated meeting point that may be located more easily by the emergency services. This should form part of the site induction to make new personnel and sub-contractors aware of any such arrangement or requirement if applicable.	
All operatives on site without any exception will have undergo a site induction where they will be required to provide personal contact details which will include contact information for the next of kin.	

6. MITIGATION PROPOSALS

The Mitigation Measures which will be implemented during the construction phase of the Proposed Development are presented in this section of the CEMP and set out in various sections of the EIAR and NIS prepared as part of the planning application to GCC. The CEMP will be finalised subsequent to any permission granted by GCC and will be updated prior to construction to include, inter alia, any additional requirements pursuant to relevant planning conditions imposed.

By presenting the mitigation proposals in the below format, it is intended to provide an easy to audit list that can be reviewed and reported on during the future phases of the project.

Table 6-1 Mitigation Measures

Mitigation Measure	Reference	Mitigation Measure	Audit Result	Action Required
	Pre-Commencement Phase			
MM1	CEMP Section 1	All measures identified in the EIAR, Natura Impact Statement (NIS) and this Construction Environmental Management Plan, which will be finalised subsequent to any permission granted and updated prior to construction will include all mitigation measures identified to be adhered to during the pre-commencement and construction phases of the proposed development.		
MM2	CEMP Section 4.1	The main contractor will be required to engage a Construction Manager that will also fulfil the role of Environmental Manager (EM), and to monitor all site works and to ensure that methodologies and mitigation are followed throughout construction to avoid negatively impacting on the receiving environment.		
MM3	CEMP Section 2.3 EIAR Section 4	Prior to the commencement of any construction, entrances to the Proposed Development site will need to be fully established with appropriate security gates. Access to the site will be via a road which connects to the Western Distributor Road to the north and also via the Kingston Road (R337) to the south. A site construction compound inclusive of a parking area for construction worker's vehicles will be provided within the confines of the site. There will be no parking permitted for any vehicles associated with the Proposed Developments construction phase unless agreed with the local authority prior to works inception. A designated section of the site will be fenced off as the construction compound.		
MM4	CEMP Section 2.3	› A site-specific Health and Safety Plan will be in place for the proposed site. All site staff will be made aware of and adhere to the Health and Safety Plan. › Operate a Site Induction Process for all site staff,		

Mitigation Measure	Reference	Mitigation Measure	Audit Result	Action Required
	EIAR Section 5	› Ensure all site staff will have current Construction Skills Certification Scheme (CSCS) training or 'Safe Pass' cards, › Site hoarding will include Health and Safety warnings at appropriate intervals. › Fire extinguishers and first aid supplies to be available in the work area. › All adjacent roadways will be maintained in clean condition at all times. › Appropriate Personal Protective Equipment (PPE) to be worn at all times. › Biometric turnstiles will be used at the site to prevent unauthorised access to the site.		
MM5	CEMP Section 3 EIAR Section 15	A Traffic Management Plan (TMP) for the construction stage will be developed and agreed with GCC prior to the commencement of works.		
MM6	CEMP Section 3 EIAR Section 6	A pre-commencement survey is recommended on each of the structures to assess the buildings prior to any works. The function of this survey will be to assess any changes in baseline environment since the time of undertaking the survey in 2023 and 2024. 3 trees identified as PRF-I are proposed for removal. While no roosting bats were recorded within any of the trees identified as PRF-Is, given the transient nature of tree roosts and in recognition of the fact that bats are a mobile species, a pre-commencement survey, at the appropriate time of year, will be undertaken on trees to be felled/pruned with suitable potential roost features, by a qualified ecologist to ensure there are no roosting bats. The requirement for a pre-commencement survey does not represent a lacuna in the survey assessment but is fully in line with industry best practice. The function of this survey will be to assess any changes in baseline environment since the time of undertaking the surveys in 2024. If a bat roost is identified within any of the trees to be removed/pruned, a bat derogation licence will be obtained from the NPWS, prior to felling and the felling activity will be supervised by a qualified ecologist.		

Mitigation Measure	Reference	Mitigation Measure	Audit Result	Action Required
	Construction Phase			
		Fuel and Oil Control		
MM7	CEMP Section 3 NIS Section 6.2 EIAR Section 4, 7 & 8	› Minimal refuelling or maintenance of construction vehicles or plant will take place on site. Where possible, off-site refuelling will occur at a controlled fuelling station; › On-site re-fuelling will be undertaken using a double skinned bowser or a refuelling truck with spill kits kept onboard; › All oils, fuels, paints and other chemicals will be stored in a secure bunded construction hardstand area. Refuelling and servicing of construction machinery will take place in a designated hardstand area which is also remote from any drainage systems. A response procedure will be put in place to deal with any accidental pollution events and spillage kits will be available and construction staff will be familiar with the emergency procedures and use of the equipment; › A temporary drainage system shall be installed prior to the commencement of the construction works; › All works shall be undertaken in accordance with the CIRIA document, 'Control of Water Pollution from Construction Sites, guidance for consultants and contractors' › All plant and machinery will be serviced before being mobilised to site; › No plant maintenance will be completed on site, any broken down plant will be removed from site to be fixed; › Concrete batching will take place off site, wash down and wash out of concrete trucks will take place off site and any excess concrete is not to be disposed of on site. Pumped concrete will be monitored to ensure there is no accidental discharge. Mixer washings are not to be discharged into surface water drains/sewers; › Discharge from any vehicle wheel wash areas is to be directed to on-site settlement tanks/ponds, debris and sediment captured by vehicle wheel washes are to be disposed off-site at a licensed facility;		

Mitigation Measure	Reference	Mitigation Measure	Audit Result	Action Required
		› Foul drainage discharge from the construction compound will be transported off site to a licensed facility until a connection to the public foul drainage network has been established.		
MM8	CEMP Section 4 NIS Section 6.2 EIAR Section 7 & 8	› Stop the source of the spill and raise the alarm to alert people working in the vicinity of any potential dangers. › If applicable, eliminate any sources of ignition in the immediate vicinity of the incident › Contain the spill using the spill control materials, track mats or other material as required. Do not spread or flush away the spill. › If possible, cover or bund off any vulnerable areas where appropriate such as drains or sensitive habitats. › If possible, clean up as much as possible using the spill control materials. › Contain any used spill control material and dispose of used materials appropriately using a fully licensed waste contractor with the appropriate permits so that further contamination is limited. › Notify the Environmental Manager immediately giving information on the location, type and extent of the spill so that they can take appropriate action. › The Environmental Manager will inspect the site and will assist by providing any advice possible to ensure the necessary measures are in place to contain and clean up the spill and prevent further spillage from occurring. › The Construction Manager will notify the appropriate regulatory body such as GCC and EPA etc. if deemed necessary.		
Prevention Pollution Control Measures				
MM9	CEMP Section 3 NIS Section 6.2	› There are no watercourses on site and surface water will not be directly discharged into any external water bodies, surrounding land, or adjacent roadways. Any run-off generated on-site will undergo the necessary filtration process as previously outlined in Section 3-1.		

Mitigation Measure	Reference	Mitigation Measure	Audit Result	Action Required
	EIAR Section 4, 7 & 8	› The works will be managed to ensure there will be no silt-laden run-off beyond the site boundary. This will be achieved through the use of appropriate excavation techniques during the initial construction works. Where necessary, silt fencing will be installed downslope of the construction areas, particularly where drains or drainage pathways are present. These measures will serve as a protective measure to contain silt material within the site. › Any requirement for temporary fills or stockpiles will be damped down or covered with polyethylene sheeting as required to avoid sediment release associated with heavy rainfall. › Excavations will be carried out using a suitably sized excavator and, in all circumstances, excavation depths and volumes will be minimised where practically possible. › Excavated spoil will be stockpiled and contained entirely within the confines of the site boundaries. Any stockpile areas will be surrounded with silt fencing, if deemed necessary to prevent runoff. › The minimum number of soil/subsoils and bedrock material should be removed from site. Soil may be reused for landscaping elsewhere on the site. However, any excess construction material shall be removed from the area and sent to an authorized waste recovery facility. › Works shall not take place at periods of high rainfall and shall be scaled back if or suspended if heavy rain is forecast during excavation works. › High rainfall' is defined as follows: › >10 mm/hr (i.e. high intensity local rainfall events); › >25 mm in a 24-hour period (heavy frontal rainfall lasting most of the day); › In the event of encountering groundwaters during excavation, groundwater will be pumped out of the excavation using a pump equipped with a silt bag on the discharge pipe, if necessary, to capture any silty material prior to subsequent natural percolation to ground. The area surrounding the silt bag will be surrounded by silt fencing if deemed necessary.		

Mitigation Measure	Reference	Mitigation Measure	Audit Result	Action Required
		› No wastewater will be discharged on-site during the construction phase. Toilet facilities will be provided in a prefabricated sanitary unit which will be placed in the construction compound. This unit will have an enclosed wastewater holding tank which will be fitted with a fill level alarm and will be emptied on an as needed basis by the appropriately licensed contractor. › Good construction practices will be implemented at the site. This will ensure minimal risk. The Construction Industry Research and Information Association (CIRIA) provides guidance on the control and management of water pollution from construction sites, as outlined in *Control of Water Pollution from Construction Sites, guidance for consultants and contractors* (CIRIA, 2001). This guidance will be adhered to throughout the construction phase to ensure that surface water generated on site contains minimum sediment. › Adjacent drainage systems/groundwater need to be protected from sedimentation and erosion due to direct surface water runoff generated onsite during the construction phase. To prevent this from occurring surface water discharge from site will be managed and controlled within the site boundary for the duration of the construction works until the permanent surface water drainage system of the proposed site is complete. There will be no temporary construction phase uncontrolled discharges to surface water from the site. › A temporary drainage system shall be installed, comprising sump areas which will allow existing runoff regimes to be maintained, prior to the commencement of the construction works to collect surface water runoff from the site during construction. › As construction advances there may be a requirement to collect and treat surface water within the site. This will be completed using perimeter swales at low points around the construction areas, and if required water will be pumped from the swales into sediment bags prior to overland discharge allowing water to percolate naturally to ground. › Any proposed discharge area will avoid potential surface water ponding areas, and will only be located where suitable subsoils are present; › All works shall be undertaken in accordance with the CIRIA document, 'Control of Water Pollution from Construction Sites, guidance for consultants and contractors.		

Mitigation Measure	Reference	Mitigation Measure	Audit Result	Action Required
		› All stockpiles will be damped down or covered in a sheet of polythene, as required, which will prevent the creation of nuisance dust, and will also prevent sediment runoff in times of heavy precipitation. Silt fencing will be installed around these stockpiles, if required. › Material stockpiles will be kept at least 10m from any manholes. › Preventative measures during construction have been incorporated into the Construction and Environmental Management Plan (CEMP), which will be updated upon grant of permission and to provide any additional measures required pursuant to planning conditions and agreements with the planning authority. › Self-contained port-a-loo toilets within portacabins with an integrated waste holding tank will be used at the site compounds, maintained by the providing contractor, and removed from site on completion of the construction works; and, › No wastewater will be discharged on-site during either the construction or operational phase.		
		Air Quality and Dust Control		
MM10	CEMP 3 NIS Section 6.2 EIAR Section 4 & 9	› Any site roads with the potential to give rise to dust will be regularly watered, as required, during dry and/or windy conditions › The designated public roads outside the site and along the main transport routes to the site will be regularly inspected by Site Management for cleanliness, and cleaned as necessary › Material handling systems and material storage areas will be designed and laid out to minimise exposure to wind › Water misting or bowsers will operate on-site as required to mitigate dust in dry weather conditions › The transport of soils or other material, which has significant potential to generate dust, will be undertaken in tarpaulin-covered vehicles where necessary › All vehicles leaving the construction areas of the site will rinse their wheels at a designated wheel wash area prior to entering the local road network.		

Mitigation Measure	Reference	Mitigation Measure	Audit Result	Action Required
		› All construction related traffic will have speed restrictions on un-surfaced roads to 15 kph › Daily inspection of construction sites to examine dust measures and their effectiveness. › If deemed necessary, sections of the approach road will be swept using a truck mounted vacuum sweeper. › All vehicles to switch off engines when not in use; › No idling vehicles; › On-road vehicles to comply to set emission standards; › All non-road mobile machinery (NRMM) to be fitted with appropriate exhaust system and to be regularly serviced; › Haul routes to be hard surfaced and cleaned and appropriate speed limits applied around the site; › The methods of working will comply with all relevant legislation and best practice guidelines in reducing the environmental effects of the works.		
Noise				
MM11	CEMP 3 EIAR Section 4 & 11	› Construction operations will in general be confined to the periods Monday-Friday 0800-1800 h and Saturday 0900-1300 h. › Hooting will be prohibited onsite. Drivers of plant and vehicles will be instructed to avoiding hooting at all times. › Plant used onsite during the construction phase will be maintained in a satisfactory condition and in accordance with manufacturer recommendations. In particular, exhaust silencers will be fitted and operating correctly at all times. Defective silencers will be immediately replaced. › Queuing of trucks on public roads will be prohibited. › Machinery not in active use will be shut down. › A site representative will be appointed as a liaison officer with the local community.		

Mitigation Measure	Reference	Mitigation Measure	Audit Result	Action Required
		› Any complaints of noise received during the construction phase will be logged in a register, and investigated immediately. Details of follow-up action will be included in the register. › Where it is proposed to import potentially noisy plant to the site, the potential impact of noise emissions will be assessed in advance. › Guidance set out in BS 5228-1:2009 with respect to noise control will be applied throughout the construction phase. › Advance notification will be given to residents immediately outside the site boundary when works are proposed within 50m of their dwellings.		
		Traffic Management		
MM12	CEMP Section 3 EIAR Section 4 & 15	› A detailed haulage plan will be put in place to ensure minimal impact on the surrounding road network. Spoil removal from site will be kept to a minimum with a detailed site survey completed to ascertain where spoil can be distributed on the site. › All deliveries and removals will be subject to stringent site rules governing the loading / off-loading times, location of loading / off loading, covering of loads and cleaning of vehicles exiting the site, etc. › Delivery loads to and from the site and management of large deliveries on site to occur outside of peak periods. › No vehicle will be allowed to stop or park on the access road to the proposed development site. › Ample parking will be provided within the site to cater for the staff and visitors during the construction phases of the proposed development. › Construction traffic will be managed and scheduled to ensure no queueing occurs on either the internal road system or the main approach roads. The provision of an on-site vehicle staging area will facilitate waiting vehicles. › Routine sweeping/cleaning of the road and footpaths in front of the site; and › No uncontrolled runoff to the public road from dewatering/pumping carried out during construction activity.		

Mitigation Measure	Reference	Mitigation Measure	Audit Result	Action Required
		Waste Management		
MM13	CEMP Section 3.10 EIAR Section 4	Construction waste will arise on the project mainly from excavation and unavoidable construction waste including material surpluses and damaged materials and packaging waste. Appropriate measures will be taken to ensure excess waste is not generated during construction, including; › Ordering of materials will be on an 'as needed' basis to prevent over supply to site. › Purchase of materials pre-cut to length to avoid excess scrap waste generated on-site. › Require suppliers to use least amount of packaging possible on materials delivered to the site. › Ensuring correct storage and handling of goods to avoid unnecessary damage that would result in their disposal. › Ensuring correct sequencing of operations. › Use reclaimed materials in the construction works. Hazardous waste will be kept separate from all other construction waste to prevent contamination and removed appropriately. In addition to fuel as outlined above, the potentially hazardous wastes that may be generated at the site during the construction include; › Paints including all associated by products. › Glues and solvents. › Asphalt materials from roofing products and external paving finishes.		

Mitigation Measure	Reference	Mitigation Measure	Audit Result	Action Required
		Invasive Species Management		
MM14	CEMP Section 3.9 NIS Appendix 4 EIAR Section 6	**Three Cornered Leek** The following management is proposed in relation to Three-cornered Leek: › An ecologist will be on site to supervise the treatment. › The infested area will be marked out with posts and hazard tape prior to any machinery ingress or works within or near this area. › Chemical treatment is the chosen treatment method. It is advised to treat the plant *in-situ* and avoid disturbance and the increased risk for spread and dispersal. › This plant can be treated with a Glyphosate based chemical herbicide on an annual basis. It is recommended that a Glyphosate-based herbicide will be applied as a spot treatment to individual plants, or by foliar and stem spray in early spring before the plant flowers which typically happens between April and June. It is best to manually break the leaves prior to applying the chemical to ensure it enters the leaf. Follow-up annual treatments are necessary as large numbers of shoots may re-appear the following year as may new seedlings. › The timing of the treatment applied is vital for the eradication of three-cornered leek. The control methods must be implemented in March or April when the leaves of the three-cornered leek are fully formed. Control methods should not be carried out if plants have finished flowering and produced seed (from the outset of May) as the movement of plants at this stage in the plant's cycle can cause a further spread of the invasive species. › Three-cornered leek produces vast amounts of seeds annually and these seeds can persist and remain dormant in the soil for years before germinating. Due to this, a monitoring programme will be established to eradicate the invasive plant where the plants currently exist onsite. Therefore, it is key to undertake the control and treatment measures for a consecutive number of years to eradicate the seed bank and bulbs. The		

Mitigation Measure	Reference	Mitigation Measure	Audit Result	Action Required
		area will need to be surveyed by an ecologist in March/April, May and again in September for the presence of Three-cornered leek for a minimum of 3 years after the treatment to ensure no further spread is taking place. **Sea Buckthorn** Mechanical/ physical removal of Sea buckthorn controls the spread of the invasive species by either damaging or removing the plant material via physical action, i.e., uprooting, felling, slashing, mowing, grubbing etc. Juvenile Sea buckthorn saplings were recorded within the site. It is anticipated that the construction phase will span 2 years and as such it is likely to mature with time, in the absence of control measures being implemented. The recommended treatment methodology for Sea buckthorn includes; › Any juvenile new shoots of Sea buckthorn will be removed by hand pulling or manual removal using hand tools. The plant will be physically cut and dug up from the root either by hand or using an excavator to grub up the plant. › Larger stumps will be cut and the stumps painted with Glyphosate herbicide. › Following clearance of woody material, any necessary excavation of the ground will be undertaken. As sea-buckthorn can readily regenerate from root and rhizomatous material present in soil, any soil arising from areas infested with sea-buckthorn must be contained and disposed of appropriately. › The vegetation material can be disposed of by burning or incineration. › If for any reason, burning of plant material is not feasible on-site this material and the soil potentially contaminated within root or rhizome fragments must be gathered and disposed of off-site, to a waste disposal facility that has a pollution prevention and control permit or waste management licence. In order to move material potentially contaminated with Third or First Schedule invasive plant species, a licence is required to be obtained from NPWS. The conditions of the permit or licence of the waste disposal facility must allow the disposal of invasive plants at the site. Delivery should be		

Mitigation Measure	Reference	Mitigation Measure	Audit Result	Action Required
		agreed with the waste site in advance to make sure they can accept material containing invasive plants. When transporting invasive plant material and soil potentially contaminated with invasive plant material, any vehicle used must be covered or securely sheeted so that plant material cannot be accidentally dispersed during transportation.		
MM15	CEMP Section 2.3 EIAR Section 6 Landscape Design Report	The Landscape Design Report and Chapter 6 of the EIAR outlines a number of biodiversity friendly measures which are as follows: › The use of native species will generally be preferred. However, a complimentary element of non-native species will also be used, where appropriate to achieve particular aims or requirements. › The planting of predominantly pollinator friendly shrub and herbaceous species will integrate the scheme in line with the 'All Ireland Pollinator Plan'. › Significant additional native tree planting mitigates necessary removals and ultimately will significantly increase the sites tree and vegetation cover overtime. › Proposed tree planting includes a selection of native and naturalised trees such as alder, beech, birch, cherry, oak, pine, rowan, sycamore and whitebeam. The use of such trees will provide vertical scale and structure to the landscape over time, as well as ecological benefits. › Approximately 238 linear metres of clipped beech hedgerow will be provided. Although the proposed beech hedgerows are likely to be of lower ecological value to the existing native hedgerows on site, they will result in a net gain in terms of hedgerow habitat post-construction. › Whilst the proposed landscaping does not provide replacement treelines to offset the loss of those currently on site, it does provide for the planting of approximately 1,310m2 of woodland understorey, comprised of native species (hazel, holly, spindle and guelder-rose), in addition to 202 parkland, open space and feature trees and 389 street trees which will be comprise of native and non-native species. Therefore, it is likely that		

Mitigation Measure	Reference	Mitigation Measure	Audit Result	Action Required
		the Proposed Development will result in a net gain in terms of overall number of trees within the site. › Approximately 784m^2 of wildflower meadow of Irish provenance, sourced from Design By Nature, or equivalent, will be created. A low frequency mowing regime in these areas will reduce the overall volume maintenance in the scheme and contribute to a reduction of carbon footprint. › The proposed landscape plan aims to create a number of linear green corridors suitable for bat feeding.		
Operational Phase				
MM16	EIAR Section 4 EIAR Section 6 CEMP Section 2	Any underground services encountered during the works will be surveyed for level and where possible will be left in place. If there is a requirement to move the service, then the appropriate body (ESB, Gas Networks Ireland, etc.) will be contacted, and the appropriate procedure put in place. Back fill around any utility services will be with dead sand/pea shingle where appropriate. All works will be in compliance with required specifications. It is proposed to direct wastewater generated from the Proposed Development to an existing Uisce Eireann owned 225mm foul sewer line located west of the site, along the southern arm junction off the adjacent roundabout and Altan Road. The 225mm foul sewer outfalls to an existing Uisce Eireann 375mm foul network. The foul sewer network has been designed using Causeway Flow drainage modelling software. All gravity pipes will be thermoplastic structured wall pipes, with diameters ranging from 150mm to 225mm. Gradients will vary between 1/21 and 1/200, and flow velocities will remain within the required range of 0.75 to 2.5 m/s, in accordance with Uisce Éireann standards. A pre-connection application was submitted to Uisce Eireann for the wastewater demand from the Proposed Development, and a Confirmation of Feasibility (CoF) statement has been received.		

Mitigation Measure	Reference	Mitigation Measure	Audit Result	Action Required
		As outlined in the accompanying Civil Design Report 9Appendix 4-4 of the EIAR) which has been prepared by Tobins Consulting Engineers, the proposed Storm water drainage infrastructure incorporates the philosophies of nature-based Sustainable Drainage Systems (SuDS) to manage surface water runoff quantity and quality. Water will be provided to the Proposed Development via a new connection to a nearby Uisce Eireann owned 315mm watermain which runs along the Kingston Road. The installation of services and connections to the residential units will be carried out as follows: › The area where excavations are planned will be surveyed and all existing services will be identified. › All relevant bodies (i.e., ESB, Gas Networks Ireland, Eir, GCC etc.) will be contacted and all drawings for all existing services sought. › A traffic management plan will be produced if required for connection works to the existing service network. › A road opening licence will be obtained where required for connection to existing services. › All plant operators and general operatives will be inducted and informed as to the location of any services. › A tracked 360-degree excavator or similar will be used to excavate the trench to the required dimensions. › All excavated material will be removed to an authorised waste recovery facility or, if suitable, stockpiled and reused for backfilling and landscaping where appropriate. › Once the trench has been excavated the ducting/pipework will then be placed in the trench as per specification. › Once the service ducts/pipework has been installed couplers will be fitted as required and capped to prevent any dirt etc. entering the ducts/pipes.		

Mitigation Measure	Reference	Mitigation Measure	Audit Result	Action Required
		› The as built location of the ducting/pipework will be surveyed using a total station/GPS. › Backfill material will be carefully placed so as not to displace the ducting/pipework within the trench. › The appropriate warning/marker tape will be installed above the ducts/pipes at the appropriate depths. › The surface will be reinstated as per original specification or to the requirements of the site layout/Local Authority as appropriate.		

7. MONITORING PROPOSALS

All monitoring proposals relating to the construction phases of the Proposed Development are set out in various sections of the EIAR and NIS prepared as part of the planning application to GCC.

This section of the Construction and Environment Management Plan groups together all of the monitoring proposals presented in the EIAR. The monitoring proposals are presented in the following pages. The monitoring proposals are also outlined within Chapter 17: Schedule of Mitigation and Monitoring Measures.

By presenting the monitoring proposals in the below format, it is intended to provide an easy to audit list that can be reviewed and reported on during the future phases of the Proposed Development. The tabular format in which the below information is presented, can be further expanded upon during the course of future project phases to provide a reporting template for site compliance audits.

Table 7-1 Monitoring Measures

Ref. No.	Reference Heading	Reference Location	Monitoring Measure	Frequency	Reporting Period	Responsibility
Pre-Construction Phase						
MX1	General Construction Measures	EIAR Section 4 CEMP Section 4	The main contractor appointed to carry out the works on site will be required to provide a level of supervision on site in the form of an Environmental Manager. Responsibilities will include: › Undertake inspections and reviews to ensure the works are carried out in compliance with the CEMP. › Monitor the implementation of the CEMP, particularly all proposed/required Environmental Monitoring. › Identify environmental training requirements and arrange relevant training for all levels of site-based staff/workers.	On going	Monthly	Site Contractor/Environmental Manager
MX2	Biodiversity	EIAR Section 6 CEMP Section 3	**Monitoring** Evidence should be provided of how the mitigation measures will be monitored, and, should mitigation failure be identified, how that failure will be rectified. The applicant should not use any proposed post construction monitoring as mitigation to supplement inadequate information in the assessment.	Once	As required	Environmental Manager
MX3	Archaeological Monitoring	EIAR Section 12	As detailed in Section 12.3.2 of the EIAR, the northern area of the Proposed Development site has been subject to significant modern ground disturbance while the southern end remains as a largely undisturbed area of green field pastureland containing areas of bedrock outcrops and waterlogging. The lands have been assessed by a geophysical specialist (Dr. Ger Dowling) and were considered to be unsuitable for an archaeo-geophysical survey due to the presence of areas of prior ground disturbance, undulating terrain with bedrock	Once	As Required	Project Archaeologist

Ref. No.	Reference Heading	Reference Location	Monitoring Measure	Frequency	Reporting Period	Responsibility
			outcrops, waterlogged conditions and the presence of overhead electricity cables. A programme of archaeological test trenching, under licence by the National Monuments Service, will therefore be carried within the Proposed Development site in advance of the construction phase. This archaeological investigation will also include the compilation of a written and photographic record of the existing field boundaries within the Proposed Development site. In the event that any sub-surface archaeological deposits, features or objects are identified during test trenching, their locations will be recorded and securely cordoned off while the National Monuments Service are notified of the discovery and consulted to determine further mitigation measures, which may entail preservation *in situ* by avoidance or preservation by record through a systematic archaeological excavation.			
Construction Phase						
MX4	Air Quality and Dust Control	CEMP Section 3 EIAR Section 4 & 8	It is also proposed to carry out dust monitoring at the site during the construction phase. Monitoring will be carried out quarterly using the Bergerhoff method. This monitoring will ensure that the mitigation measures outlined above are functional and being implemented. A complaints log will be maintained by the construction site manager and in the event of a complaint relating to dust nuisance, an investigation shall be initiated. A sample Complaints Form is included in the CEMP.	Quarterly	As Necessary	Environmental Manager
MX5	Plant and Equipment Inspections	CEMP Section 4 EIAR Section 4	All vehicles will be suitably serviced and maintained to avoid any leaks or spillage of oil, petrol or diesel. Fule and chemical stores including tanks and drums will be regularly inspected for leaks and signs of damage.	As Required	Monthly	Environmental Manager

Ref. No.	Reference Heading	Reference Location	Monitoring Measure	Frequency	Reporting Period	Responsibility
MX6	Traffic and Transport	CEMP Section 3 EIAR Section 4	The designated public roads outside the site and along the main transport routes to the site will be regularly inspected for cleanliness, and cleaned as necessary, including cleaning silt from road gullies	Daily	Monthly	Environmental Manager

8. PROGRAMME OF WORKS

8.1 Construction Programme

The construction of the Proposed Development will take approximately 36 months to complete. Each stage is typically broken down into several phases. An example of the programme of works is outlined in Table 8-1 below. The construction programme will be finalised on appointment of a contractor before commencement of the development.

Table 8-1 Phasing Scope of Works

Phase No.	Description	Scope of works
Phase 1	Site Setup	This occurs in month 1 to 6 and includes laying the matting or gravel for the site setup and machinery mobilisation.
Phase 2	Foundations	This occurs from months 6-12. It includes digging laying foundations and other preparatory works.
Phase 3	Building Structures	This occurs from months 12-24. It includes building the main structures within the site.
Phase 4	Internal Fit Out and Underground Cabling	This occurs from months 24-30. It includes the fitting out of the buildings and civils connections.
Phase 5	Close Out	This occurs in the last months of construction (months 30 to 36) and includes landscaping followed by machinery demobilisation and site disassembly.

9. COMPLIANCE AND REVIEW

9.1 Site Inspections and Environmental Audits

Routine inspections of activities will be carried out on a daily and weekly basis by the Site Environmental Manager/Construction Manager as appointed by the applicant to ensure all controls to prevent environmental impact, relevant to the construction activities taking place at the time, are in place.

Environmental inspections will ensure that the works are undertaken in compliance with this CEMP. Environmental site inspections will be carried out by suitably trained staff.

9.2 Environmental Compliance

The following definitions shall apply in relation to the classification of Environmental Occurrences during the infilling works:

Environmental Near Miss

An occurrence which if not controlled or due to its nature could lead to an Environmental Incident.

Environmental Incident

Any occurrence which has potential, due to its scale and nature, to migrate from source and have an environmental impact beyond the site boundary.

Environmental Non-Compliance

Non-fulfilment of a requirement and includes any deviations from established procedures, programs and other arrangements related to the CEMP.

9.3 Corrective Action Procedure

A corrective action is implemented to rectify an environmental issue on-site. Corrective actions will be implemented by the Construction Manager, as advised by the Site Environmental manager. Corrective actions may be required as a result of the following:

- Environmental Audits
- Environmental Inspections and Reviews
- Environmental Incidents
- Environmental Complaints

A Corrective Action Notice will be used to communicate the details of the action required to the main contractor. A Corrective Action Notice is a form that describes the cause and effect of an environmental problem on site and the recommended corrective action that is required. The Corrective Action Notice, when completed, will include details of close out and follow up actions.

If an environmental problem occurs on site that requires immediate attention direct communications between the Construction Manager and the Site Environmental manager will be conducted. This in turn will be passed down to the site staff involved. A Corrective Action Notice will be completed at a later date.

APPENDIX 4-2

CLIMATE SCHEME SUSTAINABILITY STATEMENT

MOLONEYFOX
CONSULTING ENGINEERS

PROJECT NO. 24.2704

CLIMATE SCHEME SUSTAINBILITY STATEMENT

(MECHANCIAL AND ELECTRICAL SERVICES)

KNOCKNACARRA LRD

Moloney Fox Consulting Limited
46 O'Connell Street, Limerick
+353 (0)61 277 841
info@mfconsulting.ie
moloneyfoxconsulting.ie
Directors: John Moloney, Matt Fox

Contents

1.0 INTRODUCTION

It has become imperative to prioritize sustainability in the design of mechanical and electrical systems within residential buildings. The efficient operation of these systems is vital not only for the comfort and well-being of residents but also for minimizing environmental impact.

The mechanical and electrical systems in apartments play a crucial role in ensuring a comfortable and efficient living environment. Sustainable design principles focus on optimizing these systems to reduce energy consumption, minimize carbon emissions, and enhance the overall environmental performance of buildings.

Energy efficiency is a cornerstone of sustainable design. Upgrading to high-efficiency HVAC (Heating, Ventilation, and Air Conditioning) systems, using advanced insulation materials, and implementing smart controls for lighting and temperature regulation can significantly reduce energy consumption and associated greenhouse gas emissions. This not only benefits the environment but also results in cost savings for residents through reduced utility bills.

To achieve sustainability in mechanical and electrical systems, several key principles and strategies should be considered during the design and implementation phases.

Renewable Energy Integration: Incorporating renewable energy sources, such as solar photovoltaic panels, and heat pumps, into the electrical systems of apartments / landlord Areas can help reduce reliance on fossil fuels and lower carbon emissions.

Utilizing energy-efficient lighting technologies, such as LED (Light-Emitting Diode) bulbs, and employing smart controls, occupancy sensors, and daylight harvesting systems can optimize lighting energy consumption.

Implementing water-efficient fixtures, such as low-flow toilets and showerheads, can reduce water consumption.

Net-Zero Energy Buildings: The concept of net-zero energy buildings, which generate as much energy as they consume, is gaining traction. These buildings often employ a combination of energy-efficient measures, renewable energy integration, and energy storage systems.

The integration of apartments with smart grids allows for dynamic energy management, demand response programs, and optimal utilization of renewable energy resources.

As the electrification of the energy sector gains momentum, heat pumps and electric heating systems are becoming popular alternatives to fossil fuel-based heating systems.

As part of the design development, we shall pay particular attention to the Galway City Development Plan 2023 -2029, and in particular Chapter 2 of the development plan in relation to Climate Change.

2.0 NZEB REQUIREMENTS

The Definition: 'Nearly Zero Energy Buildings', nZEB means a building that has a very high energy performance where the nearly zero or very low amount of energy required should be covered to a very significant extent by energy from renewable sources including energy from renewable sources produced on-site or nearby".

In order to achieve this, a target of 20% Renewables Energy Ratio (RER) has been set as the NZEB energy from renewable sources onsite or nearby target. The software tool provided by SEAI will be provided to support the calculation of the RER. It is recognised that in certain confined situations it may not be possible to achieve the full 20% RER.

In addition to the reduced energy usage, all new buildings must generate 20% of their energy from renewable energy sources, although this may be reduced to 10% where the energy performance of the building is more than 10% better than the reference building. This option of further reducing energy use is likely to be selected for most buildings.

As part of the design process, consideration shall be taken in account with regards to the requirements of nZEB to ensure the building meets with its requirements.

The 20% or 10% requirement can be provided by Heat Pumps or Heat pumps / PV's.

The building will be constructed to meet the latest building regulations and U-Values for each element of the envelope:

Building Fabric / Specification

Floor	0.12 W/m²k
Walls	0.18 W/m²k
Roof	0.15 W/m²k
Doors	1.6 W/m²k
Windows	1.2 W/m²k
Thermal Bridging Factor	0.08 (ACDs must be adhered to)

Ventilation

Ventilation Method	Demand Controlled Ventilation (DCV)
Ventilation openings	-
Air Permeability Test Result	3ac/h | 0.15 adj (assumption)

These target values shall achieve an A2 rating dwelling using a heat pump solution with no PV panels.

3.0 DESIGN INTENT FOR APARTMENTS

The apartments will be heated by means of exhaust air heat pump systems. It is proposed to utilize exhaust air heat pumps. The unit is A++ rated. Aluminium radiators will be provided in each space complete with thermostatic radiator valves (TRVs) as required. These radiators are specifically designed to work with low temperature heating systems and have quicker heat up periods and transfer rates than standard steel panel radiators.

The unit is complete with an integral 210 litre hot water calorifier and will provide both domestic heat and hot water generation. We estimate the apartments will require a 3.5kw unit.

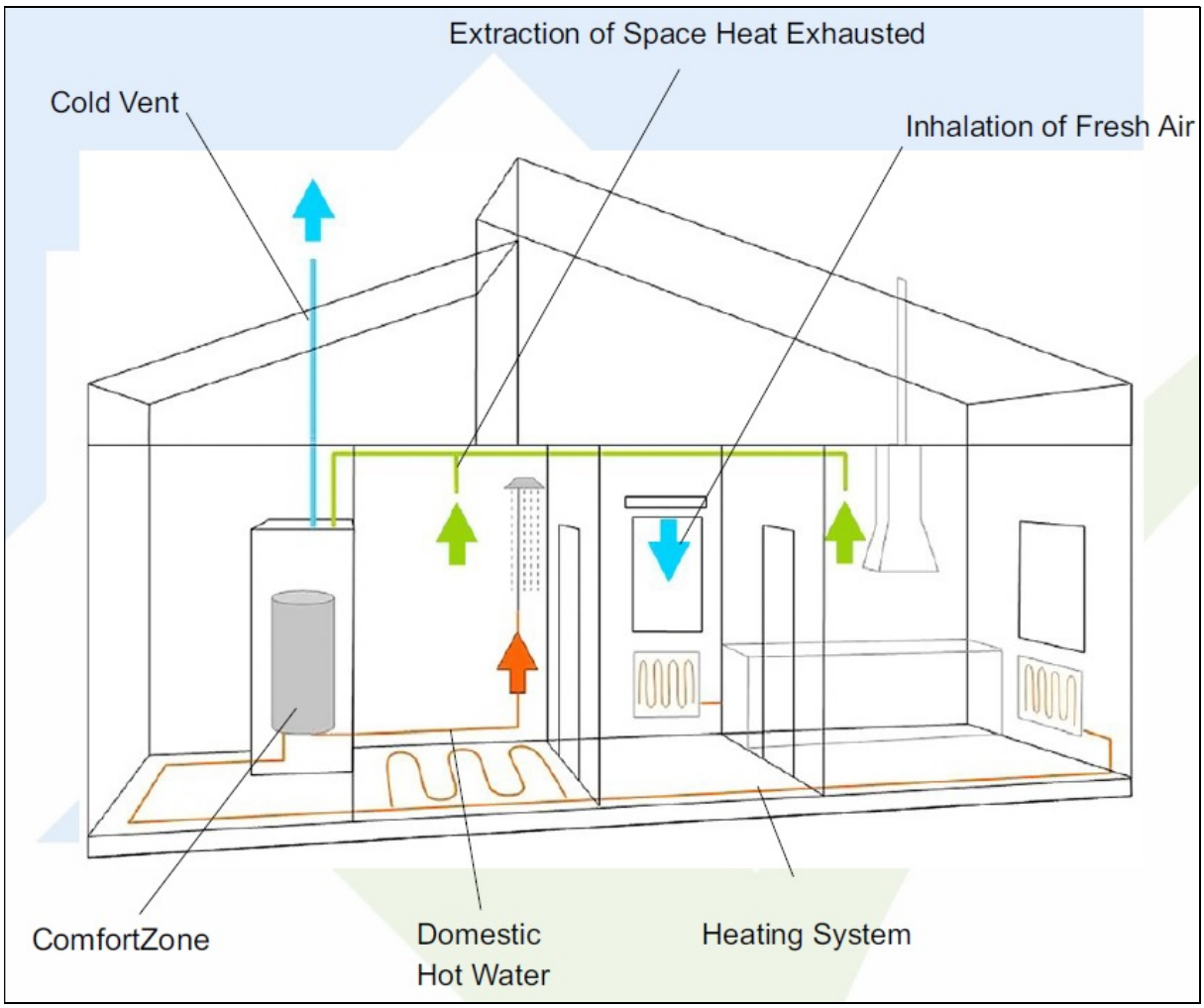

Figure 1: Proposed Heating System Schematic

Demand Control Ventilation will be provided to provide controlled natural ventilation to each dwelling.

Demand Control Ventilation (DCV) is an energy-saving strategy used in building ventilation systems to optimize the amount of fresh air brought into a space based on its actual occupancy and ventilation requirements. DCV systems improve indoor air quality while reducing energy consumption by delivering the right amount of ventilation air when and where it is needed.

DCV systems utilize sensors and controls to monitor various factors such as occupancy, carbon dioxide (CO2) levels, temperature, humidity, and volatile organic compounds (VOCs) in the space. These sensors provide feedback to the ventilation system, allowing it to modulate the amount of fresh air supplied accordingly.

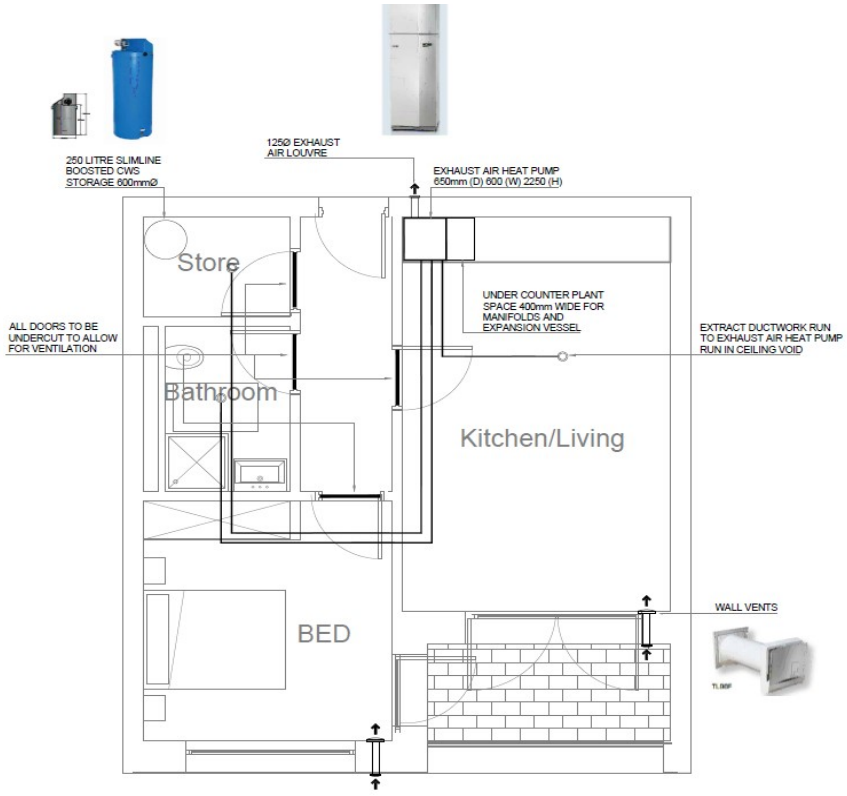

Figure 2: Proposed Ventilation System Schematic

3.1 DESIGN INTENT FOR HOUSES

It is proposed that the houses will be heated by means of an air to water heat pump heating systems.
It is proposed to utilize a mono-block unit to heat each individual house. The mono-block unit is A+++ rated and uses the latest refrigerant gas. The unit will provide heat energy for heating and hot water generation.
We estimate the houses will require either 4-6kw units depending on the house type and size.

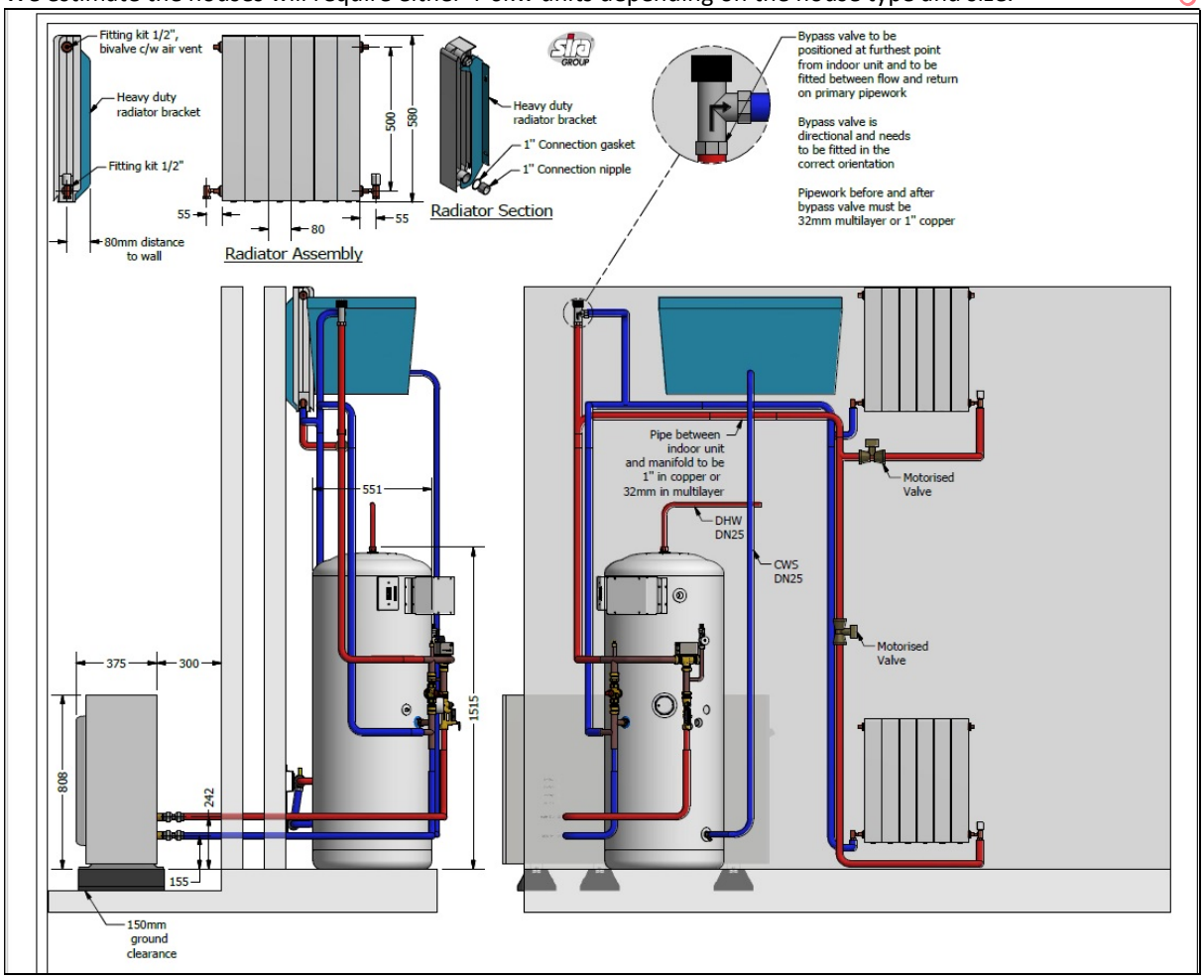

Figure 1: Proposed Heating System Schematic

4.0 LIGHTING AND LIGHTING CONTROLS

LED lighting and advanced lighting controls shall be implemented into the houses and apartments.

LED Lighting: LEDs (Light Emitting Diodes) have become the lighting technology of choice in modern apartment buildings due to their numerous advantages over traditional lighting options.

Energy Efficiency: LED lights are highly energy-efficient, consuming significantly less electricity than incandescent or fluorescent bulbs. They convert a higher percentage of electrical energy into light, minimizing wasted energy as heat.

1. Longevity: LED lights have an impressive lifespan, lasting up to 25 times longer than traditional bulbs. This extended lifespan reduces maintenance costs and the frequency of bulb replacements.
2. Versatility: LEDs offer a wide range of color temperatures, from warm white to cool white, allowing for flexible lighting designs to suit different moods and activities within apartment spaces. They can also be dimmed smoothly without compromising the quality of light.
3. Eco-Friendliness: LED lighting is environmentally friendly as it does not contain hazardous materials like mercury, found in fluorescent bulbs. Additionally, their low energy consumption helps reduce carbon emissions and contribute to sustainability efforts.

Lighting Controls: Lighting controls complement LED lighting systems, providing enhanced functionality, convenience, and energy savings. The following lighting control systems are commonly employed in modern buildings:

1. Smart Lighting Systems: These systems utilize advanced technologies, such as wireless communication and Internet of Things (IoT) integration, to enable centralized control of lighting in individual apartments. Residents can adjust lighting settings, including brightness, color temperature, and even create customized scenes, using smartphone applications or voice commands.

Benefits and Applications: The combined use of LED lighting and lighting controls in modern houses offers several benefits:

1. Energy Efficiency: LED lighting, coupled with smart controls and sensors, significantly reduces energy consumption and lowers utility costs.
2. Enhanced User Experience: Lighting controls provide residents with personalized lighting settings, enabling them to create desired ambiances for different activities and moods.
3. Maintenance Cost Reduction: LED lights' long lifespan reduces the need for frequent bulb replacements, resulting in lower maintenance expenses.
4. Sustainability: LED lighting and efficient controls contribute to green building initiatives by reducing carbon footprints and promoting energy conservation.

LED lighting and lighting control systems have transformed modern buildings, offering energy-efficient illumination, improved user experiences, and sustainable practices. The combination of LED technology and advanced controls provides residents with flexibility, comfort, and cost savings while promoting environmental stewardship in residential communities