



APPENDIX 4-2

**CONSTRUCTION AND
ENVIRONMENTAL
MANAGEMENT PLAN**



OCSC

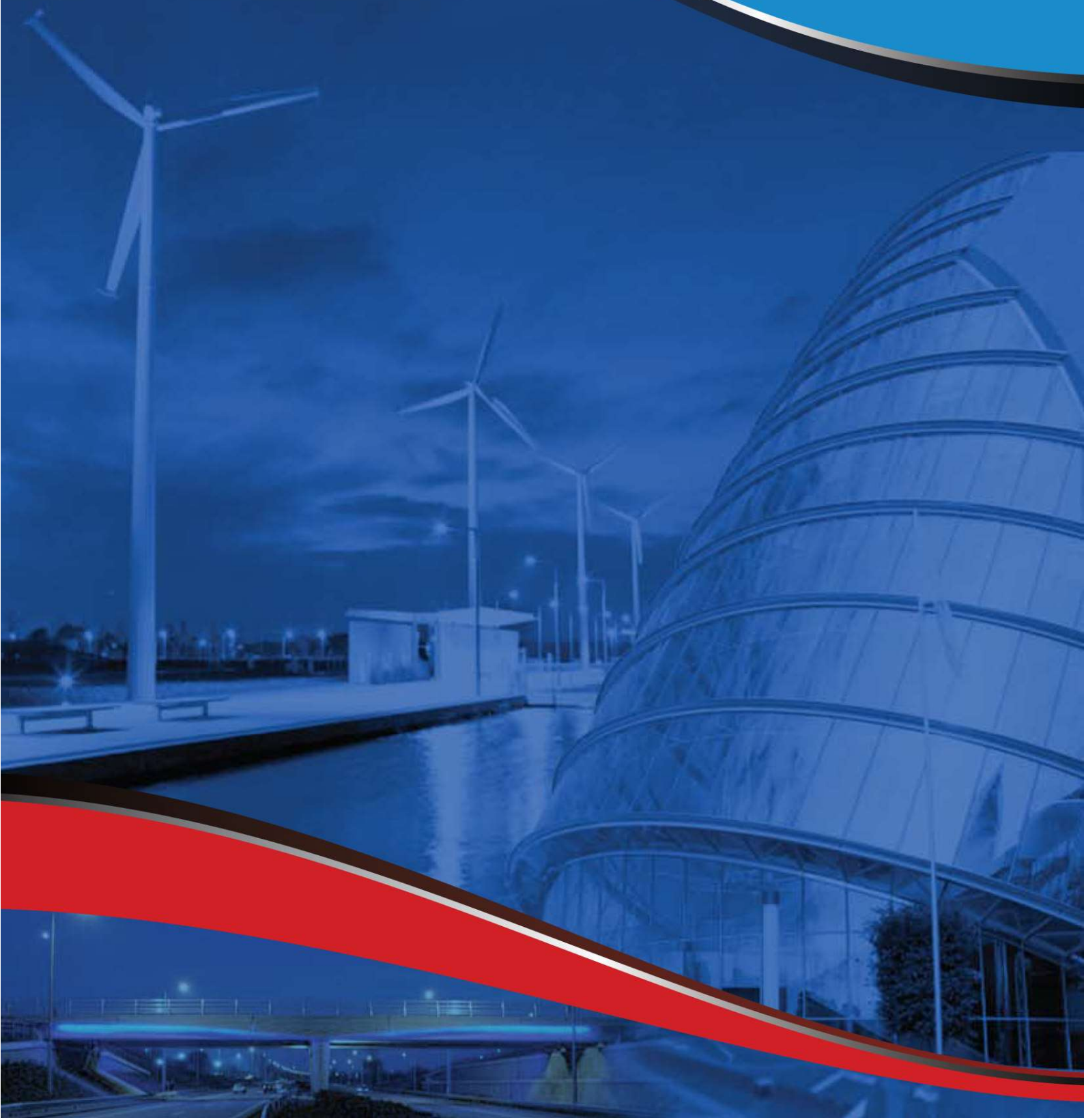
O'CONNOR | SUTTON | CRONIN

Multidisciplinary
Consulting Engineers

CONSTRUCTION & ENVIRONMENTAL MANAGEMENT PLAN

MAYNOOTH OUTER ORBITAL ROAD

Sky Castle Ltd
S665
24 August 2022



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DOCUMENT CONTROL & HISTORY

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1 INTRODUCTION

APPOINTMENT

O'Connor Sutton Cronin & Associates (OCSC) have been appointed by Sky Castle Ltd to carry out the design of the civil engineering services associated with the development of the proposed Maynooth Outer Orbital Road (MOOR) on lands at Moygaddy, Co. Meath, which is located northeast of the town of Maynooth, Co. Kildare.

SETTING

Maynooth environs is a large growth area, category II Town status located in south County Meath, and is an economically vibrant area with high-quality transport links to larger towns/cities. The Meath Development Plan 2021-2027 outlines the social, economic, and planning context for the Maynooth environ lands, setting the framework for the plan's policies and objectives. It has a core strategic vision that seeks to ensure that future growth is based on principles of sustainable development that meet the needs of residents per National and Regional guidelines. The environs of Maynooth is a Core Economic Area included in the Gateway Core Economic Area located on the M4 corridor. The wider Maynooth Environs Lands proposed land-use zoning includes A2 – New Residential, E1 – Strategic Employment Zones, G1 – Community Infrastructure, D1 – Tourism and H1 – High Amenity.

The delivery of the Maynooth Outer Orbital Route (MOOR) is critical to facilitating residential, high-end employment, tourist, and leisure development in the Maynooth environ lands and fulfilling the transport infrastructure needs in proximity to Maynooth University and Maynooth town.

ADMINISTRATIVE JURISDICTION

The proposed development is located primarily in the jurisdiction of Meath County Council (MCC), and therefore the Maynooth Outer Orbital Route design and the associated civil engineering services were carried out with reference to the following:

- Meath County Development Plan 2021-2027;
- Maynooth Environs Local Area Plan 2014 (incorporated into adopted MCDP);
- Regional Spatial and Economic Strategy for the Eastern and Midland Region (2019);

Even though Maynooth Environs is situated in the Meath County Council administrative area, the Maynooth Environs Local Area Plan contains an objective to liaise with Kildare County Council in the identification, design, reservation and delivery of the section of the Maynooth Outer Relief Road located within the administrative area of Meath County Council. The administrative area of Kildare County Council is located immediately adjacent to the LAP environs lands and some infrastructure improvements will be located within the Kildare County Council (KCC) administrative area. Therefore, the design will also be conducted with due regard to:

- Maynooth LAP
- Kildare County Development Plan
- Maynooth Traffic Management Plan

STUDY AREA

The subject site is located on the southernmost extent of County Meath, as shown in Figure 1, aligning with the county boundary to Co. Kildare. It is approximately 1.5km north of the town of Maynooth, Co. Kildare, which forms part of a larger strategic landbank on zoned lands known as Maynooth Environs. The site is immediately bound by:

- R157 Maynooth – Dunboyne Road, to the east;
- Agricultural lands, to the north and west; and
- River Rye Water, to the south;

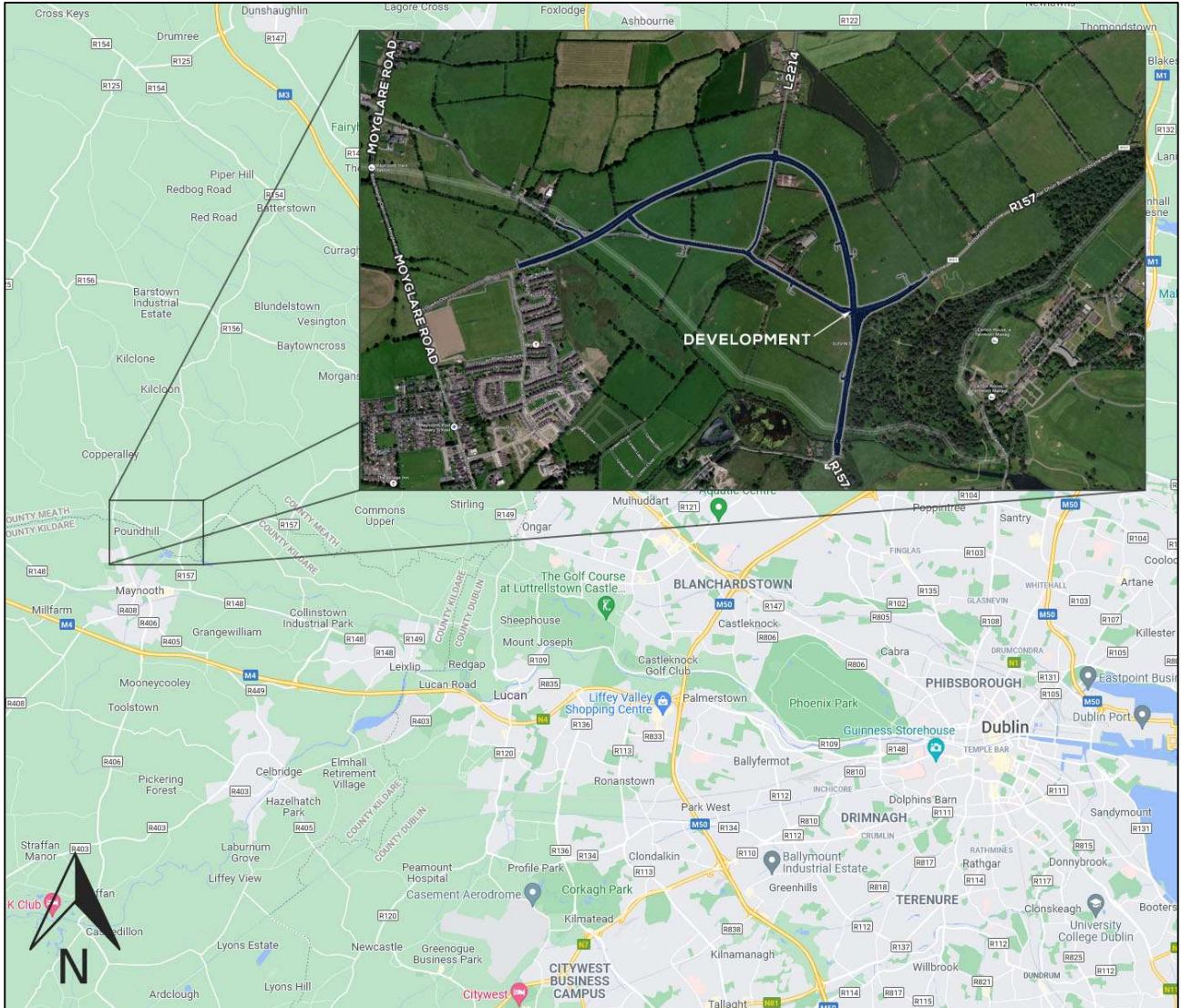


Figure 1: Development Locality Plan

The above image highlights the location of the overall road area and there are small areas of incidental works outside of that for elements such as attenuation facilities, demolition of existing roads, etc.

DEVELOPMENT DESCRIPTION

Planning Permission is sought by Sky Castle Ltd. for the development of the Maynooth Outer Orbital Road (MOOR) in the townland of Moygaddy, Maynooth Environs, Co. Meath.

The proposed road development will consist of the following:

1. Provision of approximately 1,700m of new distributor road (MOOR Arc) comprising of 7.0m carriageway with turning lane where required, footpaths, cycle tracks and grass verges. All associated utilities and public lighting including storm water drainage with SuDS treatment and attenuation.
2. Proposed road improvement and realignment works including:
 - (i) realignment of a section of the existing L6219 local road, which will entail the demolition of an existing section of the road which extends to circa 2,500 sqm.
 - (ii) Provision of pedestrian and cycle improvement measures along the L6219 and L22143 which abuts the boundary of Moygaddy House which is a Protected Structure (RPS ref 91558).
 - (iii) Provision of pedestrian and cycle improvement measures along the R157 which abuts the Carton Demense Wall which is a Protected Structure (RPS Ref 91556).
 - (iv) Realignment of a section of the existing L22143 local road and R157, which will entail the demolition of an existing section of the road which extends to circa 3,200 sqm.
 - (v) Provision of a new signalised junction at the realigned junction between the L22143 and R157.
 - (vi) Provision of a new signalised junction between the L2214 local road and the MOOR with right-turn lanes on approaches.
 - (vii) Reconfiguration of the L2214 section within the MOOR arc to a one-way from north to south with right-turn lanes, where applicable.

- (viii) Reconfiguration of the northbound lane of the L2214 within the arc to a shared facility for use by pedestrians and cyclists.
 - (ix) Addition of chicanes on the L6219 and L22143 local road to reduce traffic flow and encourage utilisation of the MOOR.
3. Provision of 4 no. bridge structures comprising:
- (i) an integral single span bridge at Moyglare Hall over the River Rye Water to connect with existing road infrastructure in County Kildare and associated floodplain works and embankments.
 - (ii) a new pedestrian and cyclist bridge at Kildare Bridge which will link the proposed site with the existing road network in County Kildare.
 - (iii) a new pedestrian and cycle bridge across Blackhall Little Stream on the L22143 adjacent to the existing unnamed bridge.
 - (iv) an integral single span bridge on the north-eastern section of the MOOR arc, over the Blackhall Little Stream, and associated floodplain works and embankments.
4. Provision of site landscaping, public lighting, site services and all associated site development works.
5. A Natura Impact Statement (NIS) and Environmental Impact Assessment Report (EIAR) has been included with this application.

This document serves to inform the planning process in respect of the proposed development. It is intended that this Construction and Environmental Management Plan (CEMP) will be an interim assessment and it is not intended to be a final version to cover the eventual construction of any permitted development. This document will be expanded by the appointed contractor for the works. This document will be updated continuously to take account of any necessary changes on the foot of the recommendations of the EIAR, the planning process and throughout any phased construction period.

The CEMP to be prepared by the appointed contractor, and agreed upon with the Local Authority before the commencement of any construction works, will ultimately include details on the following:

- Daily and weekly working hours;
- Agreed haul routes for incoming materials;
- Licensed hauliers to be used;
- Disposal sites;
- Travel arrangements for construction personnel;
- Appropriate on-site parking arrangements for construction personnel to prevent overspill parking on the local road network;
- Temporary construction entrances to be provided;
- Wheel wash facilities if required;
- Road cleaning and sweeping measures to be put in place if required;
- Temporary construction signage to be put in place and maintained;
- Any proposed traffic management measures such as temporary traffic lights and signage on any public roads;
- Construction traffic routing;
- Temporary footpaths & road closures (if required);
- Fuel & oil storage;
- Noise vibration & dust monitoring and management;
- Construction waste management & disposal;
- Surface water runoff management.

2 CHARACTERISTICS OF THE DEVELOPMENT

DEVELOPMENT & SITE OVERVIEW

The MOOR will be a single carriageway road connecting the Maynooth environs between the east and west. A portion on the western side will be constructed in County Kildare and tie in with existing infrastructure by means of a new bridge and road section. This can be seen in the figure below.

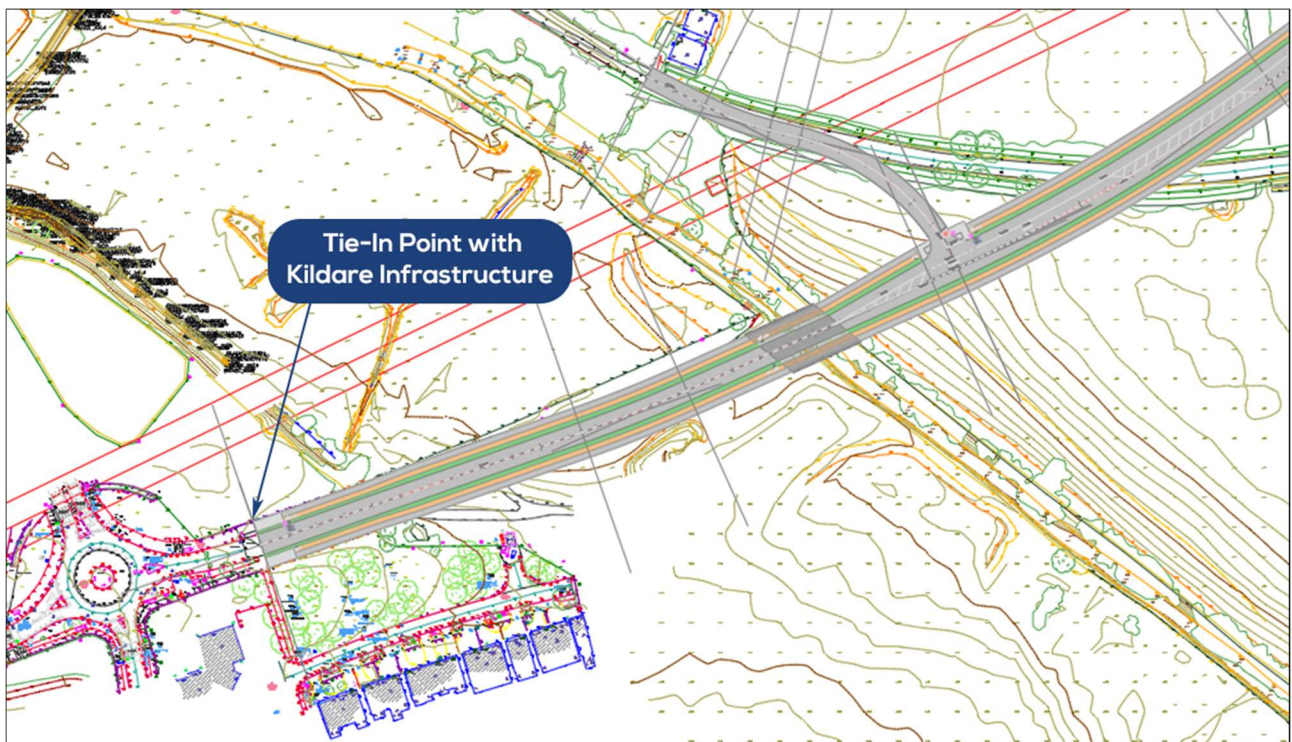


Figure 2: MOOR Western Kildare Tie-In

On the eastern side, the road will again tie in in County Kildare, just north of the roundabout on the R157. A separate cycle and pedestrian bridge will be constructed alongside the existing bridge to allow for continuation of this infrastructure, tying in with existing infrastructure in County Kildare. The tie-in location has been agreed with Kildare and on review of planning compliance submission made by Cairn Homes. This can be seen in the figure below.



Figure 3: MOOR Eastern Kildare Tie-In

The rest of the MOOR will form an arc through the Maynooth Environs, connecting the western and eastern ends. A portion of the L6219 on the western side will be realigned to accommodate the arc. This section is shown in the figure below.

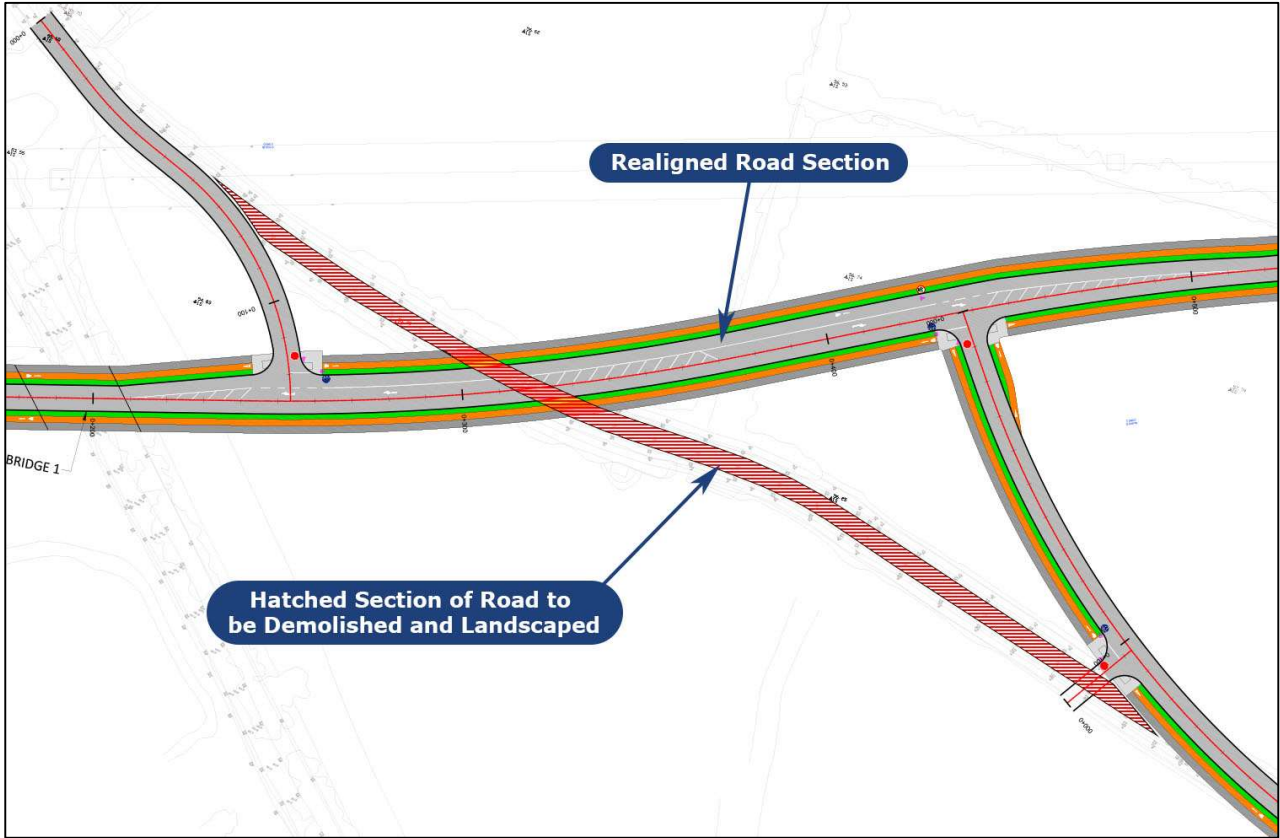


Figure 4: Road Section to be Realigned

The current L2214 (Kilcloon Road) will change to a north-to-south one-way road within the arc. The current south-to-north lane will be converted to a shared facility which can be used by pedestrians and cyclists. The new northern junction between the MOOR and the L2214 will be constructed as a signalised junction. This is shown in the figure below.

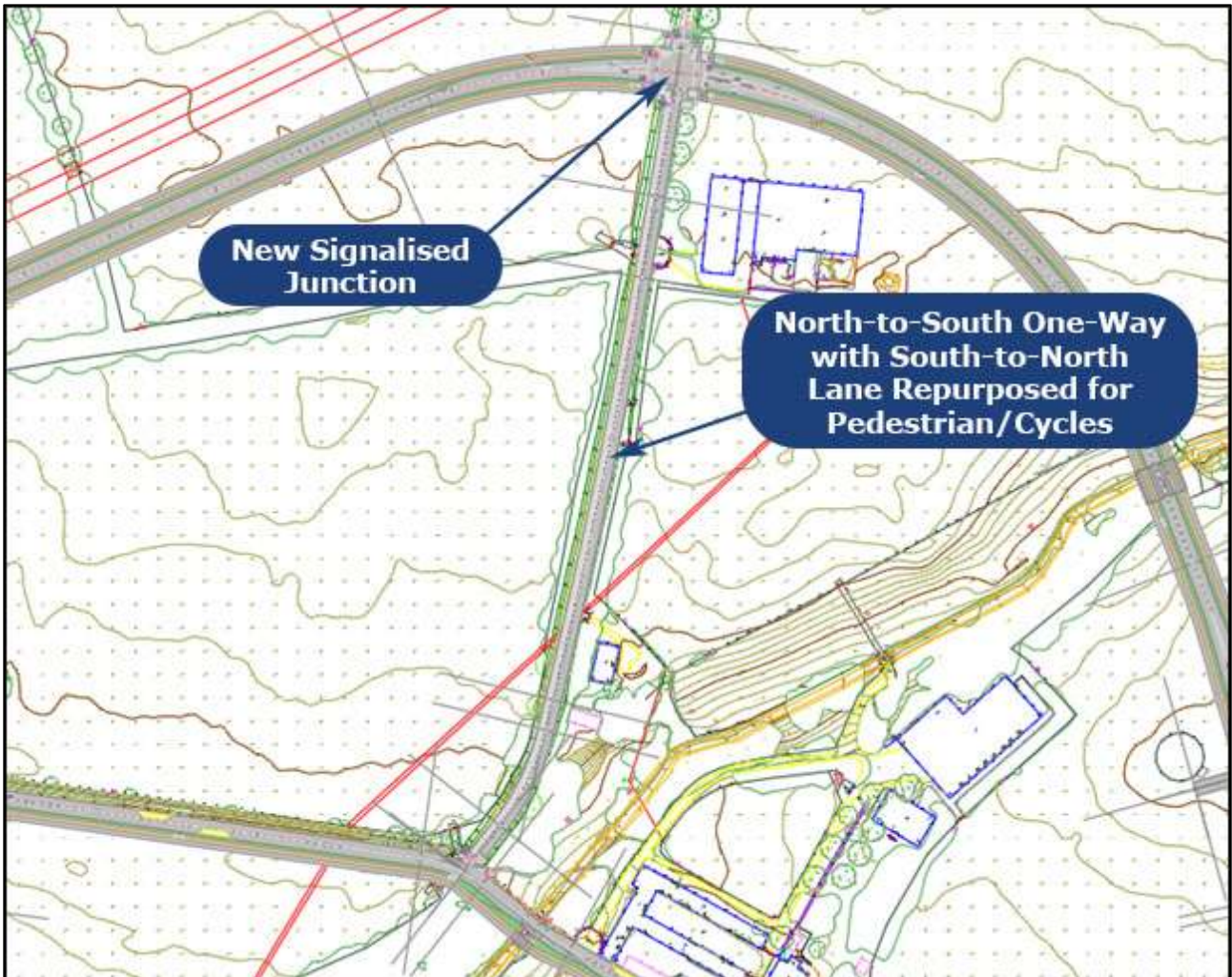


Figure 5: Center of Arc (L2214 - Kilcloon Road)

The junction between the R157, L6219, MOOR and Dunboyne Road on the eastern side of the arc will be realigned and constructed as 4-leg signalised junction, as shown below.

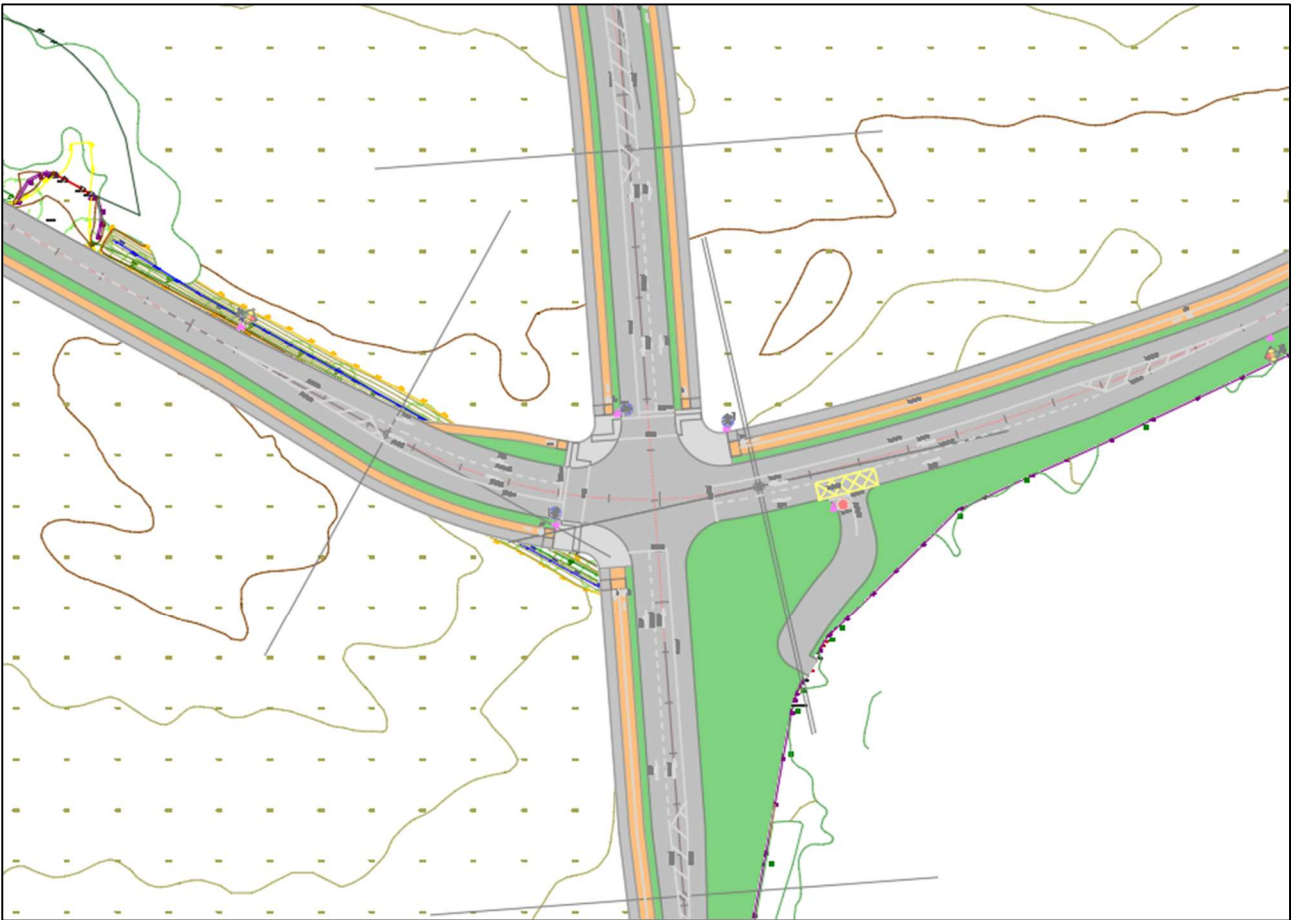


Figure 6: Realigned Signalised Junction on Eastern

For the construction of this junction, a portion of the existing R157 and Dunboyne Road will be realigned, as shown in the figure below.

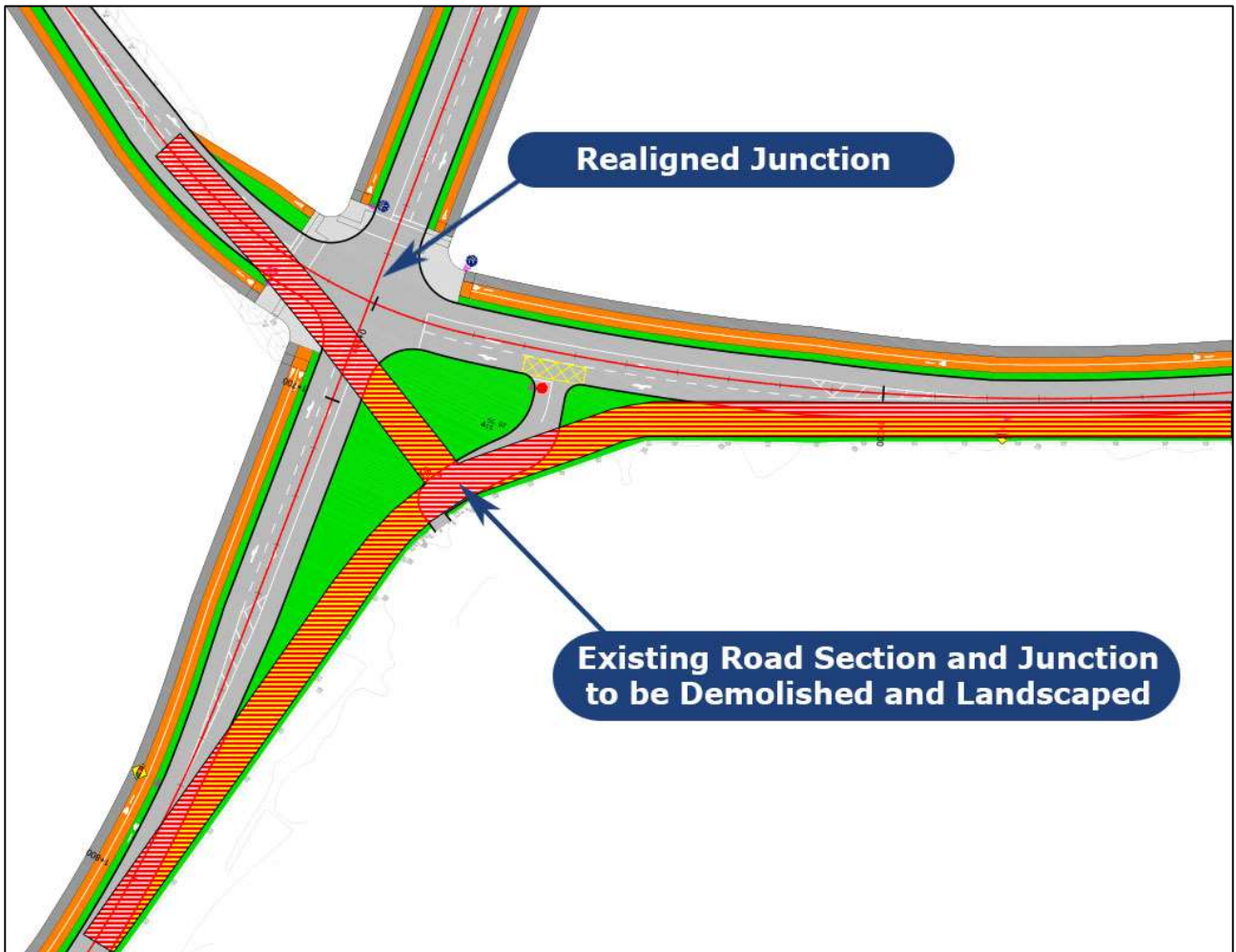


Figure 7: Existing R157/Dunboyne Road Realignment

Four different bridges will be constructed as part of the MOOR. These are highlighted in the figure below.

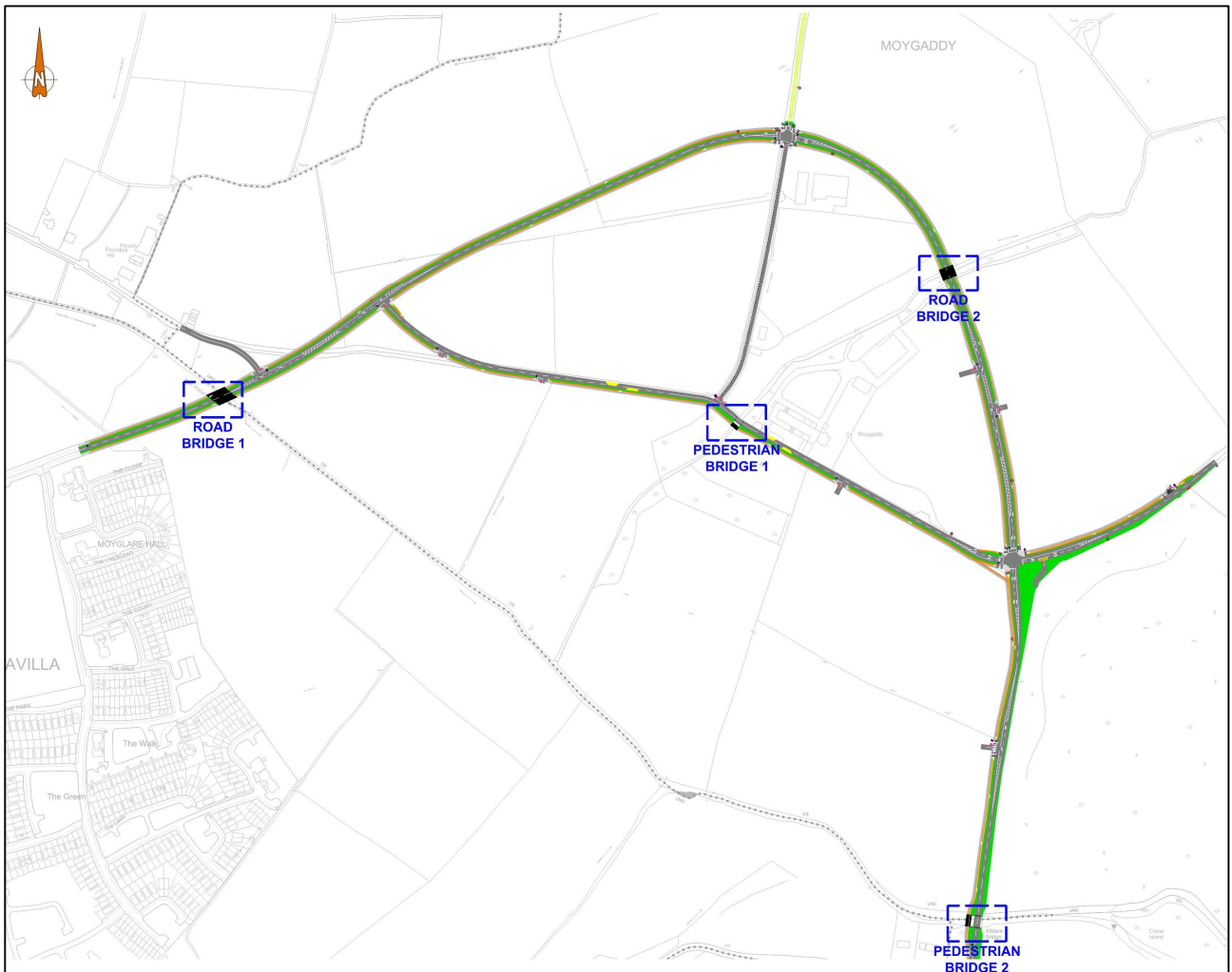


Figure 8: MOOR Bridges

Road bridges 1 and 2 will be new bridges which will be constructed as part of the MOOR. Pedestrian bridges 1 and 2 will be additional structures constructed adjacent to the existing bridge structures to accommodate pedestrian and cycle permeability. More information on these bridges is available in OCSC report "Bridge Options Report" submitted separately.

3 CONSTRUCTION PROGRAMME & PHASING

PHASING

It is anticipated that the construction of the full MOOR will be completed in one phase.

PROGRAMME

At present, the planned construction programme for the development is as follows:

- Planning Submission – September 2022
- Assumed Grant – Q4 2022
- Detailed Design Completion – Q2 2023
- Construction Commencement – Q3 2023
- Construction Completion – Q3 2025

It is anticipated that the construction duration will be approximately 21 months.

APPLICANT & DESIGN TEAM

The following are the main participants in the project:

Role	Name	Contact
Applicant	Sky Castle Ltd	Ronan Barrett
Consulting Engineer	OCSC	Anthony Horan
Landscape Architect	RMDA Ltd	Ronan Mac Diarmada
Planning Consultant	MKO	Pamela Harty
Main Contractor	TBC – Subject to Tender	TBC

Table 1: Project Participants

4 SITE ESTABLISHMENT

SITE ACCESS & OPERATIONS

Site access will be provided via the regional road network.

The location for the site compound and construction hauling route are shown in the figure overleaf. It should be noted that these are only indicative and will be finalised prior to construction.



Figure 9: Indicative Site Compound and Hauling Route

HOARDING

Perimeter hoarding will be provided around the different phases of the site and along the public road to prevent unauthorised access to the site. Controlled access points will also be provided. Hoarding will be maintained to a high standard and painted or covered as appropriate. Temporary hoarding will be provided as necessary within the site as safety restrictions to prevent public access. The locations of this temporary hoarding will vary as work progresses across the site.

TREE PROTECTION

Appropriate measures will be put in place to protect any trees on the site which are designated for protection or retention under any granted planning permission for the development. For more information and detailed measures, please refer to the EIAR and Arborist/Tree Protection reports submitted under separate cover.

ARCHAEOLOGY

Appropriate arrangements will be made with a licensed archaeologist to monitor soil stripping and other development works as may be conditioned in any planning permission for the proposed development. The environmental mitigation measures are described in detail in Chapter 15: Schedule of Mitigation and Chapter 12 Cultural Heritage within the EIAR.

ENABLING WORKS & WORKS ON THE PUBLIC ROAD

Works on the public road will be carried out subject to, and under, a Road Opening Licence from the Local Authority. All works on the public road will be carried out per the Local Authority and HSA guidelines for working on public roads, with traffic management per Chapter 8 of the TSM and the appropriate traffic management guidelines.

INSTREAM AND ADJACENT WORKS

The sustainable drainage network requires the construction of filler drains along the entire site boundary and the contribution of an outfall to the River Ryewater, which consists of the construction of a new concrete headwall at the edge of the river.

As headwalls and bridges are to be constructed in proximity to watercourses, OCSC has considered their construction methodology in detail.

HEADWALLS

All headwalls required for the construction of this scheme are small in nature and will be precast. As such, the site work will be minimal. The contractor will set out the position of the headwall and prepare the base with lean mix concrete or CI 808 crushed stone (product dependant). Once the base is prepared the headwall will be placed on the base in the pipeline and will be constructed from the back of the headwall.

BRIDGES

All of the bridges to be constructed as part of the scheme share a number of key characteristics. They all have:

- Piled foundations;
- Cast in situ abutments;
- Precast deck elements;

- On deck cast in situ slabs or screeds;
- Post-fix parapets.

In advance of the construction of each bridge, a bridge-specific Risk Assessment and Method Statement (RAMS) shall be produced by the Contractor. This RAMS will be reviewed by the Project Supervisor Construction Stage (PSCS) to ensure that the works are taking place in a safe manner. This RAMS will also be reviewed by the designer to ensure that the construction methodology is compatible with the individual design. As all of these structures are over water, approval for the RAMS will also be required from the project ecologist and Inland Fisheries Ireland. The RAMS will also require a review by the relevant local authority for the four structures to be built on or adjacent to the existing and proposed public road.

Although it is acknowledged that there are many ways to construct structures like this, which meet the requirements of all the aforementioned bodies, the below construction sequence is envisaged at this juncture to be likely adopted for construction:

1. Clear the works area and install silt traps and drainage controls under archaeological and ecological supervision as required;
2. Prepare the area with a geotextile and piling mat of approximately 300 to 600mm of 6F material;
3. Install bored piles for the foundations by way of a mobile CFA piling rig;
4. Mobilise the in situ reinforced concrete team of steel fixers and carpenters under engineering supervision to build the abutments and central piers (where required);
5. Place the main deck structure in accordance with a bespoke lifting plan prepared by a competent person;
6. Install falsework and permanent shutters;
7. Fix and pour the bridge deck;
8. Erect parapets and complete the bridge construction.

The bridges will be constructed both over and adjacent to the live water courses as shown in the figure below.

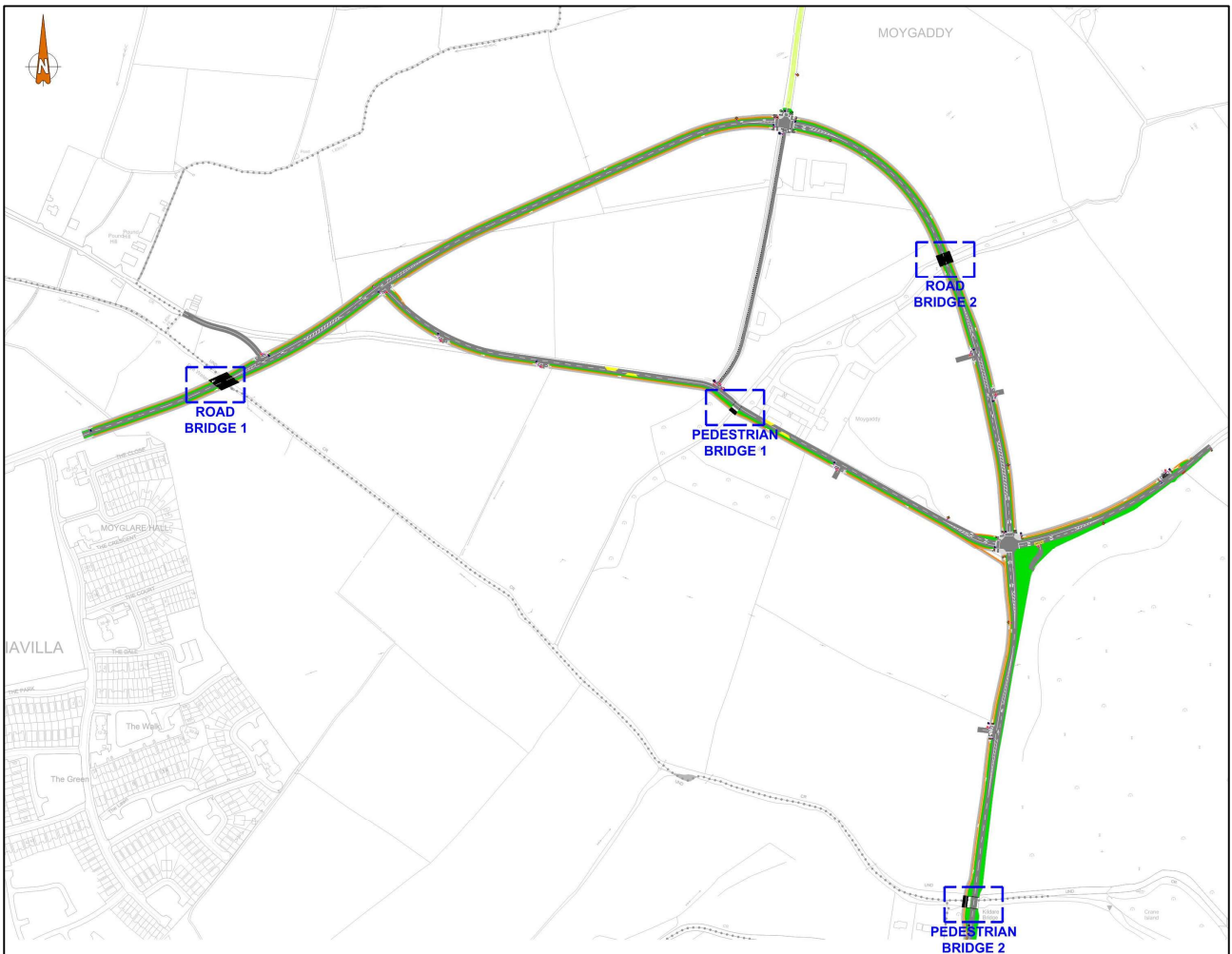


Figure 10: Location of Bridges on the MOOR

These bridges are designed to be constructed without carrying out works in the wetted area of the water courses. All structures in proximity to water and over water will be planned and built in line with a detailed Risk Assessment and Method Statement that takes into account the requirement of Inland Fisheries Ireland and the mitigation measures as outlined in the EIAR. The structures have been preliminarily designed based on the ground conditions present local to each individual structure and they are to be detail designed to the approval of Meath County Council in line with Transport

Infrastructure Ireland's design criteria for such structures. The construction of the bridges will be subject to appropriate oversight and supervision as is normal for similar public works.

Any plant and machinery being used should mitigate against oil spillage by sitting on a drip tray, with bunded surround, or similar approved. Silt traps and protection nets, or similar methods to prevent silt, debris, and other material, from falling into the river during construction activity should be employed. For more information, please refer to the EIAR submitted under separate cover.

All works in or near watercourses will be carried out in line with the Guidelines on the protection of fisheries during construction works in and adjacent waters" as published by Inland Fisheries Ireland in 2016 or as updated prior to construction works.

DEMOLITION

As part of this application, a section of the existing L6219 local road will be realigned. This will entail the demolition and removal of an existing section of the road, as indicated in the figure below.

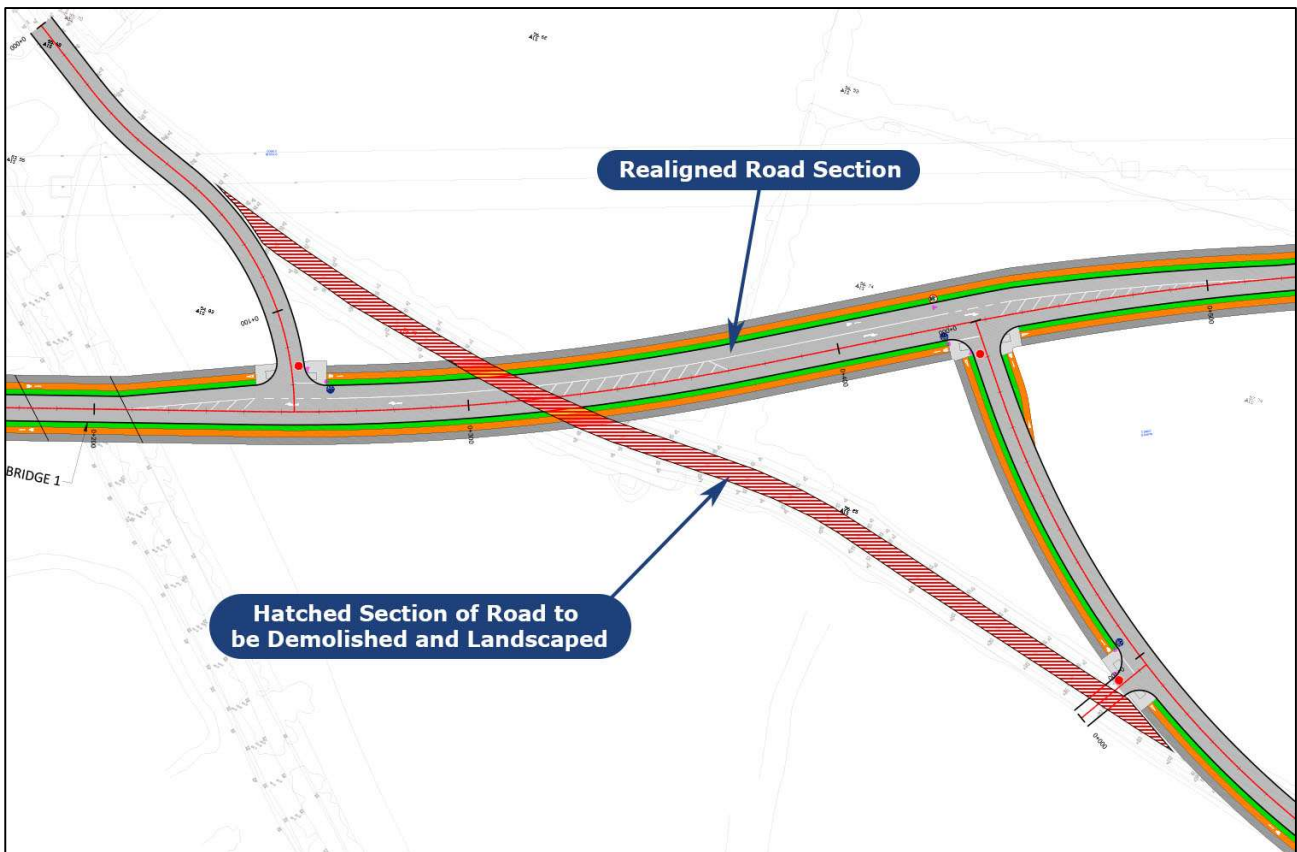


Figure 11: Road Section to be Demolished

The approximate combined demolition area of the existing road is c. 2 500 m².

Demolition of the above will generate low volumes of waste. The waste will predominantly be soil and stone with the potential for bitumen and tar to be found. Any road materials to be excavated and removed will be subject to a full suite of testing to establish if they are contaminated by way of either constituent or recent spillages. Any contaminants will be identified and disposed of in an appropriate facility should they be found.

The following table is a preliminary estimate of the demolition waste which might be generated, assuming a 200mm thick asphalt layer overlaying a 400mm thick stone layer with an average density of 2.3 tons/m³. It should be noted that these numbers are approximated and are not indicative of the final values of the site:

Predicted demolition waste targets for the proposed road realignment:

Waste Types	Waste	Recycle		Disposal	
	tonnes	%	tonnes	%	tonnes
Bound Road Materials	1 150	75	863	25	287
Unbound Road Materials	2 300	95	2 185	5	115

Table 2: Demolition Recycle Targets

In addition a further section of the existing L6219 local road on the east will be realigned. This will entail the demolition and removal of an existing section of the road, as indicated in the figure below.

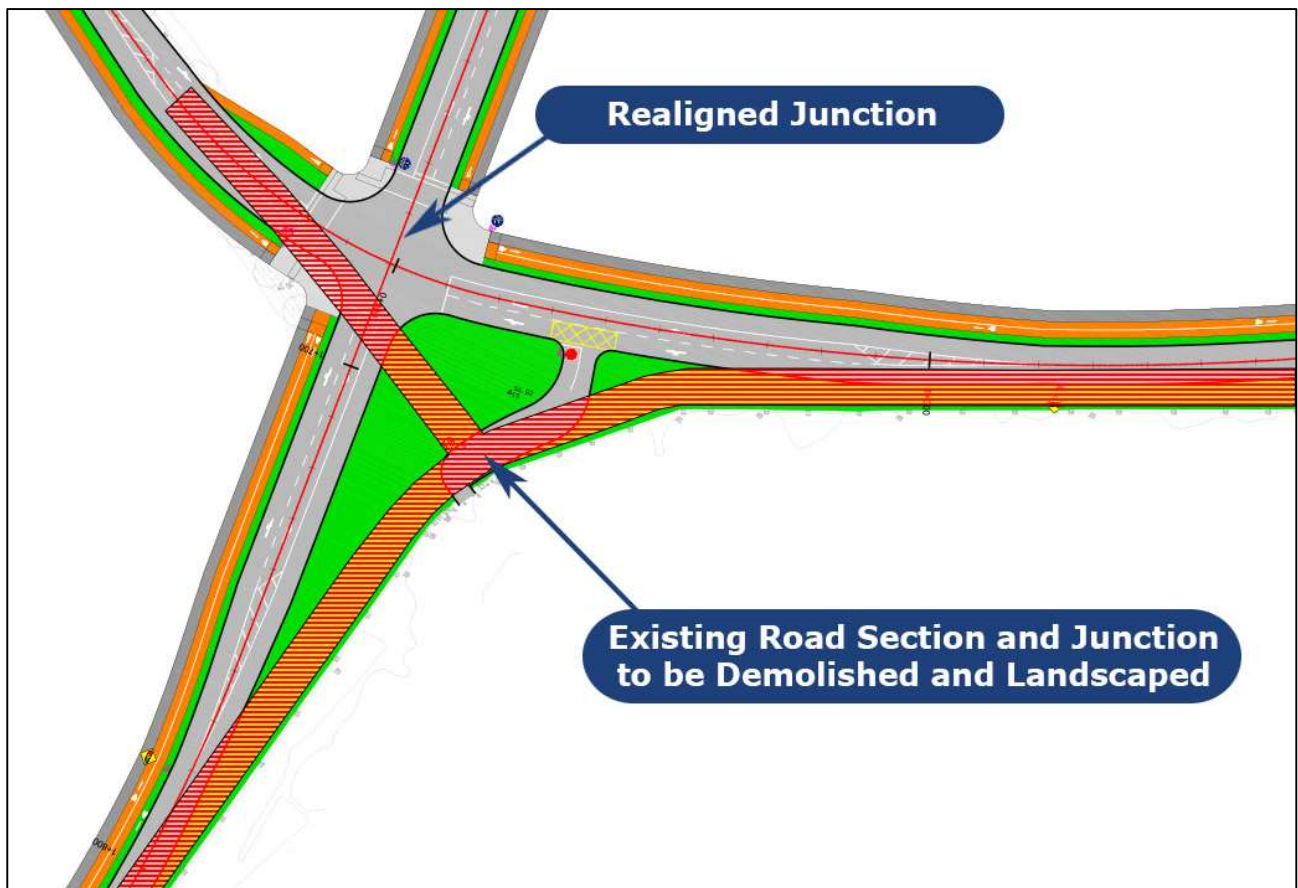


Figure 12: Road Section to be Demolished

The approximate combined demolition area of the existing road is c. 3 200 m².

Demolition of the above will generate low volumes of waste. The waste will predominantly be soil and stone with the potential for bitumen and tar to be found. Any road materials to be excavated and removed will be subject to a full suite of testing to establish if they are contaminated by way of either constituent or recent spillages. Any contaminants will be identified and disposed of in an appropriate facility should they be found.

The following table is a preliminary estimate of the demolition waste which might be generated, assuming a 200mm thick asphalt layer overlaying a 400mm thick stone layer with an average density of 2.3 tons/m³. It should be noted that these numbers are approximated and are not indicative of the final values of the site:

Predicted demolition waste targets for the proposed road realignment:

Waste Types	Waste	Recycle		Disposal	
	tonnes	%	tonnes	%	tonnes
Bound Road Materials	1 500	75	1 125	25	375
Unbound Road Materials	3 000	95	2 850	5	150

Table 3: Demolition Recycle Targets

5 ESTIMATED CUT & FILL

Topsoil and subsoil/stones will be excavated to accommodate roads, footpaths, services, and construction. It is noted that for all areas of new construction (excluding green areas such as public open spaces and gardens) that the existing topsoil needs to be removed. As is good sustainable practice the topsoil excavated on the site will all be utilised on the site and added to the existing topsoil in areas such as gardens and open spaces. This will improve the depth of the growing medium in these areas and remove any requirement to transport topsoil from the site. The geotechnical investigations of the site suggest that there is generally 100mm of topsoil in the area for construction with some areas of 200mm of topsoil uncovered in the study area. There will be a requirement to remove topsoil from the site. Based on a 3d ground model of the existing site the expected volume of materials has been calculated. The following calculations have been made (see Table 2 over):

Item	Cut Volume (m ³)		Fill Volume (m ³)
Roads	34 750		17 250
Total Cut	Cut	Reuse	Export
	34 750 m ³	17 250 m ³	17 500 m ³
Total Fill	Fill	Reuse	Import
	17 250 m ³	17 250 m ³	0 m ³
Total Haulage	c. 40 250 Tonnes		

Table 4: Development Cut & Fill Calculations

The cited figures in the table above are overall cumulative cut and fill volumes and relate to all proposed works at the site. It should be noted that these numbers are approximated and will be subject to change depending on construction methodologies and ambient weather conditions at the time of the works. It was assumed that the density of excavated material is approximately 2.3 tons/m³.

6 CONSTRUCTION TRAFFIC

TRAFFIC ROUTING

Regarding traffic routing, traffic management routes will utilise the Regional & National Road network and waste will be disposed of by licensed hauliers in appropriately licensed facilities only. All final traffic management routes will be agreed upon by the contractor with the relevant Local Authority in advance of the commencement of construction.

The exact location of batching plants and disposal sites will be established once a contractor has been appointed.

L6219/R157 REROUTING

As part of the work, the L6219 & R157 is to be rerouted onto the new proposed road network. It is envisaged that this will occur without recourse to a Road closure. The Contractor will build the new road network and reroute the L6219 & R157 traffic onto the new network prior to the demolition of the existing L6219 & R157. The traffic management procedures for this will be subject to a Road Opening Licence application to Meath County Council. All Traffic Management will be carried out in accordance with Ch. 8 of the Traffic Signs Manual and be managed and controlled by appropriately skilled and experienced staff in accordance with the conditions that are set out in the Road Opening licence procedure.

CONSTRUCTION TRAFFIC VOLUMES

It is difficult to assess the exact quantum of traffic that will be generated during the construction period. However, to estimate the volume and rate of construction traffic, it is first necessary to estimate the amount of excavation and earthworks required on the site, which is shown in the previous section.

Based on this, and from the experience of similar construction projects, it is considered that there will be a maximum of twelve HGVs serving the site during any given daytime hour. This is based upon the knowledge that it takes on average 10 minutes to load a lorry with spoil but could be as short as 5 minutes. As such, the two-way HGV traffic is unlikely to be higher than 24 vehicles per hour at any point of the day. Based on an 8-hour day and a 22-working day month, 24 vehicles per hour equates to 4,224 vehicles per month.

It is worth noting however that the 40 250 tonnes of combined recycling & disposal equate to just over 2 015 truckloads based on 20 tonnes per load. It should be further noted that three other developments, an office development, Nursing Home & Primary Care Centre & SHD development, are earmarked for construction during a similar timeframe as this development, within the same area. It could be possible that excess cut volumes from these sites can be used for the shortfall of fill volume for this site, reducing the amount of material that needs to be imported.

Measures will be put in place to minimise the amount of construction traffic generated by the development. These measures will include the reuse of materials within the site for landscape purposes, or within adjacent sites for fill, to limit the amount of spoilage.

It will be an objective of this development to reuse as much material as possible and minimise the amount of material to be transported off-site. Furthermore, the possibility will be investigated of using excess cut material in other developments which form part of the wider masterplan, implemented within the same timeframe of this development. This will minimise the transportation distance, which will reduce the environmental impacts and cost of the development.

The contractor will maximise the use of precast materials or prefabricated materials wherever possible and economically viable. Adequate storage space will be provided on site for the storage of materials and a site strategy will be put in place to manage the timing of deliveries to the site. Trips by construction workers will be limited by the

provision of car-sharing and Travel to Work Scheme benefits. Construction workers will be encouraged to use public transport to the maximum possible extent. Adequate storage space will be provided on site for the storage of materials and a site strategy will be put in place to manage the timing of deliveries to the site.

It is not anticipated that the amount of construction traffic will exceed the amount of operational traffic.

SITE PARKING

A limited number of on-site parking will be provided for construction workers and site visitors.

STAFF WELFARE

Appropriate welfare facilities will be provided on site for construction staff and will include, inter alia:

- Canteen facilities;
- Toilet and Shower Facilities;
- Office accommodation;
- Drying areas/changing areas;
- Tool storage areas.

CONSTRUCTION TRAFFIC MITIGATION MEASURES

The appointed contractor will put in place measures to keep public roads free of detritus and debris. This will include undertaking regular road sweeping by a mechanical sweeper and the provision of wheel wash facilities on the site.

7 SITE WASTE MANAGEMENT PLAN

Waste materials generated will be segregated on site. This will allow for the maximum possible degree of recycling. Where on-site segregation of certain waste types is not practical, off-site segregation will be carried out. Skips and receptacles will be provided to facilitate segregation at the source.

All waste receptacles leaving the site will be covered or enclosed. The on-site waste storage area will be secured within the overall site which will be hoarded off from the public and unauthorised access.

The appointed waste contractor will collect and transfer the waste as receptacles are filled. Any soil removed off-site will be carried by contractors licensed under the Waste Management Acts 1996 - 2008, the Waste Management (Collection Permit) Regulations 2007 and Amendments and the Waste Management (Facility Permit & Registration) Regulations 2007 and Amendments.

All waste arisings will be handled by an approved waste contractor holding a current waste collection permit. All waste arisings requiring disposal off-site will be disposed of at a facility holding the appropriate licence or permit, as required. Written records will be maintained by the contractor(s) detailing the waste arising throughout the construction phase, the classification of each waste type, the contact details and the waste collection permit number of all waste contractors who collect waste from the site and the end destination and waste facility permit or licence number for all waste removed and disposed of off-site.

Dedicated bunded storage containers will be provided for hazardous wastes such as batteries, paints, oils, chemicals etc. if required.

The management of the main waste streams is detailed in the figure overleaf:



Figure 13: Proposed C&D Waste Storage Area (Scale: NTS)

WASTE MANAGEMENT CATEGORIES

SOIL/SUBSOIL

Any soil removed off-site will be carried by contractors licensed under the Waste Management Acts 1996 - 2011, the Waste Management (Collection Permit) Regulations 2007 and Amendments and the Waste Management (Facility Permit & Registration) Regulations 2007 and Amendments.

If any of the excavated spoil is found to be clean/inert, the site manager will investigate whether nearby construction sites may require clean fill material, to both minimise the costs of transport and to reuse as much material as possible. Any soil/subsoil deemed to be contaminated will be stored separately from the clean and inert soil/subsoil. The material will be appropriately classified as non-hazardous or hazardous under the www.hazwasteonline.com application and EC Council Decision 2003/33/EC, which establishes the criteria for the acceptance of waste at landfills, before being transported to an appropriately permitted/licensed facility by permitted contractors.

CONCRETE, BRICKS, TILES & CERAMICS

The majority of concrete, bricks, tiles and ceramics generated as part of the construction works are expected to be clean, inert material and should be recycled, where possible.

HARD PLASTIC

Since hard plastic is a highly recyclable material, much of the plastic generated will be primarily from material off-cuts. It will be diverted from landfill and recycled. All recyclable plastic will be segregated and recycled, where possible.

TIMBER

Timber that is uncontaminated, i.e. free from paints, preservatives, glues etc., will be segregated and stored in skips.

METAL

Metals will be segregated into mixed ferrous, cladding, aluminium, high-grade stainless steel, low-grade stainless steel etc. categories, where practical. Metal is highly recyclable and numerous companies will accept these materials. Metals will be segregated and stored in skips.

PLASTERBOARD

There are currently several recycling services for plasterboard in Ireland. Plasterboard from the construction phase will be stored in a separate skip, pending collection for recycling. The site manager will ensure that the oversupply of new plasterboard is carefully monitored to minimise waste.

GLASS

Glass materials will be segregated for recycling, where possible.

ORGANIC (FOOD) WASTE

An on-site canteen will be provided to allow workers to prepare and eat food. This facility will incorporate provisions so that organic waste will be segregated for separate collection. Segregation at source and separate collection of organic waste is required under the Waste Management (Food Waste) Regulations 2009 (if food is prepared on-site).

WASTE ELECTRICAL AND ELECTRONIC EQUIPMENT (WEEE)

WEEE that does not contain hazardous components will be stored in dedicated covered cages/receptacles/pallets pending collection for recycling. There are not expected to be any significant amounts of such materials as there are no existing buildings on the subject site.

NON-RECYCLABLE WASTE

C&D waste which is not suitable for reuse or recovery will be placed in separate skips or other receptacles. This will include polystyrene, some cardboard and plastic which are deemed unsuitable for recycling.

Before removal from the site, the non-recyclable waste skip/receptacle will be examined by a member of the waste team to determine if recyclable materials have been misplaced. If this is the case, efforts will be made to determine the cause of the waste not being segregated correctly and recyclable waste will be removed and placed into the appropriate receptacle.

HAZARDOUS WASTES

On-site storage of any hazardous wastes produced (i.e. contaminated soil and/or waste fuels) will be kept to a minimum, with removal off-site organised regularly. Storage of all hazardous wastes on site will be undertaken to minimise exposure to on-site personnel and the public and to also minimise the potential for environmental impacts.

MANAGEMENT & CONTROL SYSTEMS

It will be the role of an appointed Waste Manager to try to find alternative options for waste before sending it to the landfill. Waste materials will be stored in the specifically designated compound. All waste collected from the site will be by a permitted waste contractor, under the Waste Management (Collection Permit) Regulations 2007 as amended. The contractor will provide the Waste Manager on site with documentation of the waste to be removed and a copy of the waste collection permit. Before the waste leaves the site, the Waste Manager will have documentation to show where the waste is being taken to, and that the facility is licensed to accept the particular waste. A receipt will be issued for each load that leaves the site.

All waste will be documented before leaving the site. Waste will be weighed by the contractor, either by a weighting mechanism on the truck or at the receiving facility.

These waste records will be maintained on-site by the Contractor. All movement of waste and the use of waste contractors will be undertaken under the Waste Management Acts 1996 - 2008, Waste Management (Collection Permit) Regulations 2007 and Amendments and Waste Management (Facility Permit & Registration) Regulations 2007 and Amendments. This includes the requirement for all waste contractors to have a waste collection permit issued by the NWCPO. The nominated project Waste Manager will maintain a copy of all waste collection permits.

Some wastes may be transported to another site for reuse on that site. The Waste Manager will be in contact with other sites to ensure that as much waste is reused as possible, such as concrete for fill purposes etc. All wastes leaving the site will be placed in appropriate containers. Any concrete, soil, gravel, or broken stone transported off-site will be covered to prevent dust or particle emissions from the load.

If the waste is being transported to another site, a copy of the Local Authority waste permit or EPA Waste Licence for that site will be provided to the nominated project Waste Manager. If the waste is being shipped abroad, a copy of the Transfrontier Shipping (TFS) document will be obtained from Dublin City Council (as the relevant authority on behalf of all local authorities in Ireland) and kept on-site along with details of the final destination (permits, licences etc.). A receipt from the final destination of the material will be kept as part of the on-site waste management records.

All information will be entered into a waste management recording system to be maintained on-site.

8 ENVIRONMENTAL MANAGEMENT

A full suite of Environmental Mitigation Measures are described in detail in Chapter 15: Schedule of Mitigation of the EIAR. The CEMP will be updated in accordance with the planning permission and any mitigation contained within the permission.

POLLUTION PREVENTION

Pollution prevention measures will be undertaken per best practice guidelines from Inland Fisheries Ireland (2016). There are no sensitive fisheries habitats on the site, however drainage ditches lead to the River Rye. A programme for the control of sediment will therefore be required. This will be put in place by the appointed contractor.

Only sediment-free run-off is to leave the site. A suitably sized detention basin or settlement area will be installed at the lowest point before discharge where excess run-off must leave the site. Silt curtains or earth berms will be used to channel run-off to locations where it can be controlled. These may take the form of an open detention area or, where the need arises, a portable skip/s, or similar, where inflow passes through straw bales, gravel etc.

The Site Manager will be responsible for the pollution prevention programme and will ensure that at least daily checks are carried out to ensure compliance. A record of these checks will be maintained.

The site compound will include a dedicated bund for the storage of dangerous substances including fuels, oils etc. Refuelling of vehicles/machinery will only be carried out within the bunded area. The site compound will display emergency contact details for Inland Fisheries Ireland, the National Parks and Wildlife Service, the Local Council, and the Environmental Protection Agency in the event of a pollution incident or environmental emergency. Adequate spill kits will be available in the event of a spill of oil or other hazardous substance.

TRAINING

All site personnel will be trained in the importance of good environmental practices including reporting to the Site Manager when pollution, or the potential for pollution, is suspected.

PROTECTION OF TREES

As noted previously, appropriate measures will be put in place to protect any trees on the site which are designated for protection or retention under any granted planning permission for the development. For more information and detailed measures, please refer to the EIAR and Arborist/Tree Protection reports submitted under separate cover.

NOISE CONTROL

Measures will be implemented to minimise the impact of noise emissions at sensitive locations during the construction phase. Such measures will include the following:

- Construction contractors will be required to comply with the requirements of the European Communities (Construction Plant and Equipment) (Permissible Noise Levels) Regulations and the Safety, Health and Welfare at Work (Control of Noise at Work) Regulations;
- All plant items used during the construction phase should comply with standards outlined in the 'Safety, Health and Welfare at Work (Control of Noise at Work) Regulations and the 'European Communities (Construction Plant and Equipment) (Permissible Noise Levels) Regulations'. Reference will be made to BS 5228: Part 1: 2009 (Noise Control on Construction and Open Sites - Part 1. Code of Practice for Basic Information and Procedures for Noise Control) and will include the following mitigation measures:
 - Training of site staff in the proper use and maintenance of tools and equipment;
 - The positioning of machinery on-site to reduce the emission of noise and to site personnel;

- Sources of significant noise will be enclosed where practicable;
 - Machines that could be in intermittent use will be shut down between work periods or will be throttled down to a minimum;
 - A plant known to emit noise strongly in one direction will, when possible, be orientated so that the noise is directed away from noise-sensitive areas; and
 - Plant and/or methods of work causing significant levels of vibration at sensitive premises will be replaced by other less intrusive plants and/or methods of working where practicable.
- The inherently quiet plant will be selected where appropriate;
 - Screening and enclosures will be utilised in areas where construction works are continuing in one area for a long period or around items such as generators or high-duty compressors. For maximum effectiveness, a screen will be positioned as close as possible to either the noise source or the receiver. The screen will be constructed of material with a mass of $>7\text{kg/m}^2$ and should have no gaps or joints in the barrier material. This can be used to limit noise impact to any noise-sensitive receptors;
 - Operators of all mobile equipment will be instructed to avoid unnecessary revving of machinery and mobile equipment will be throttled down or switched off when not in use;
 - Accordingly, where possible all construction traffic to be used on-site will have effective well-maintained silencers; and
 - All mobile plants will be maintained to a high standard to reduce any tonal or impulsive sounds.

For more information on noise control, including indicative locations for noise monitoring, please refer to the EIAR submitted under separate cover.

VIBRATION CONTROL

Any construction works that have the potential to cause vibration at sensitive receptors will be carried out per the limit values in Table 3 hereunder, at the most affected sensitive receptor.

Allowable PPV (mm/s) at Sensitive Receptors at Given Frequencies (Hz)		
<10 Hz	10 – 15 Hz	50 Hz and above
8 mm/s	12.5 mm/s	20 mm/s

Table 5: Vibration Limits

DUST CONTROL

The main activities that may give rise to dust emissions during construction include the following:

- Materials handling and storage; and
- Movement of vehicles (particularly HGVs) and mobile plants.

The following mitigation measures will be implemented on-site during the construction phase, as required:

- Site roads shall be regularly cleaned and maintained as appropriate;
- Hard surface roads shall be swept to remove mud and aggregate materials from their surface as a result of the development works;
- Any un-surfaced roads shall be restricted to essential site traffic only;
- Any road that has the potential to give rise to fugitive dust may be regularly watered, as appropriate, during extended dry and/or windy conditions;
- On-site speed limits will be stipulated to prevent the unnecessary generation of fugitive dust emissions;
- Material handling systems and site stockpiling of materials shall be designed and laid out to minimise exposure to the wind;
- A complaints register will be maintained on-site and any complaints relating to dust emissions will be immediately dealt with;
- In periods of dry weather when dust emissions would be greatest, a road sweeper, which would also dampen the road, will be employed to prevent the generation of dust;
- Water misting or sprays shall be used as required if particularly dusty activities are necessary during dry or windy periods; and

- If appropriate, dust monitoring will be carried out during the construction phase of the scheme. If the level of dust is found to exceed $350\text{mg}/\text{m}^2\text{day}$ in the vicinity of the site, further mitigation measures will be incorporated into the construction of the proposed scheme.

For more information on dust control, including indicative locations for dust monitoring, please refer to the EIAR submitted under separate cover.

9 CONSTRUCTION PHASE MITIGATION MEASURES

GENERAL MITIGATION MEASURES

The following general environmental mitigation measures are proposed during the construction phase:

- Before the outset of these works, small defined works areas will be fenced off at the location of the storm water outfalls (between the main construction site and both water courses). Silt fences will be attached to these fences. The silt fence will provide a solid barrier between the proposed pipelaying works and the Rye Water River and the Blackhall Little River
- The necessary pipelaying works will be undertaken within this defined area.
- Following the installation of the pipework and reinstatement of the ground, the small section of the silt fence that protects the Rye Water River or the Blackhall Little River will be removed to facilitate the construction of the outfall.
- No instream works will take place outside the period July 31st – September 31st in line with Inland Fisheries Ireland (2016) Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters.
- Cofferdams will be constructed using one-tonne sandbags at the edge of the Rye Water River and the Blackhall Little River at the outfall point to create dry working areas.
- A submersible pump will be used to dewater inside the cofferdam area and will discharge any waters to land at a location of over 30m from the rivers. The pumped waters will discharge through a silt bag.
- The bankside will be excavated and a small pre-cast concrete headwall installed (with outfall pipe included).
- The banks and channel beds will be reinstated to avoid erosion or runoff of silt. Following this, the dams will be removed.
- The surface water discharge point is likely to take less than one day to install.

- Sondes will be put in place in the Rye Water River and the Blackhall Little River upstream and downstream of the works area. These will continuously measure turbidity throughout the construction period. If there is a 10% or greater difference between upstream and downstream turbidity, an alarm will sound and a message will be sent to the site foreman and the ECoW. Works will be ceased.

CEMENT-BASED MITIGATION MEASURES

To avoid the release of cement-based material during construction, the following measures are proposed:

- No batching of wet-cement products will occur on site. Ready-mixed supply of wet concrete products and 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.

SITE DRAINAGE/POLLUTION PREVENTION

Prior to the commencement of any construction activities, mitigation measures will be put in place to ensure the protection of surface water during the works. Surface waters will be managed, allowing water to percolate naturally to ground. Particular emphasis will also be placed on preventing any hazardous materials entering the surface water management system as well as spills or leaks of fuel oils.

The following measures will be put in place to prevent the transportation of silt laden water or pollutants from entering the wider environments including downstream watercourses.

- A solid boundary fence will be constructed around the construction footprint in order to create a defined perimeter for the proposed works, leaving a natural vegetation buffer between the construction footprint and the stream.
- No works will be undertaken outside the confines of this fence with the exception of the installation of the two surface water outfalls, which will be undertaken as a separate element of the development that is described below.
- A silt fence will also be attached to this boundary fence. This will protect the stream from any potential sediment laden surface water run-off generated during construction activities. The silt fence will comprise a geotextile membrane that will be buried beneath the ground to filter any run-off that may occur as a result of the proposed works.
- The silt fence will be monitored throughout the proposed works and will remain in place after the works are completed and until the exposed earth has re-vegetated.
- As construction advances there may be a small 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;
- Discharge onto ground will be via a silt bag which will filter any remaining sediment from the pumped water.
- The entire discharge area from silt bags will be enclosed by a perimeter of double silt fencing;
- Any proposed discharge area will avoid potential surface water ponding areas, and will only be located where suitable subsoils are present;
- Daily monitoring and inspections of site drainage during construction will be completed;
- Earthworks will take place during periods of low rainfall to reduce run-off and potential siltation of watercourses; and,

- Good construction practices such as wheel washers and dust suppression on-site roads, and regular plant maintenance will ensure minimal risk.

CONSTRUCTION TRAFFIC ACCESS & MANAGEMENT

The following is a list of the proposed traffic management measures to be adopted during the construction works:

- Warning signs / Advanced warning signs will be installed at appropriate locations in advance of the construction access locations;
- Construction and delivery vehicles will be instructed to use only the approved and agreed means of access, and movement of construction vehicles will be restricted to these designated routes;
- Appropriate vehicles will be used to minimise environmental impacts from transporting construction material, for example, the use of dust covers on HGVs carrying dust-producing material;
- Speed limits of construction vehicles are to be managed by appropriate signage, to promote low vehicular speeds; 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.
- On-site wheel washing will be undertaken for construction vehicles to remove any debris prior to leaving the site, and to remove any potential debris on the local roads if it is deemed necessary; All vehicles will be suitably serviced and maintained to avoid any leaks or spillage of oil, petrol or diesel. All scheduled maintenance will not be carried out on the public highway; and
- Minimal impact on the surrounding road network will be ensured.

10 HEALTH AND SAFETY

GENERAL HEALTH, SAFETY AND ENVIRONMENTAL CONSIDERATION

Construction works will be carried out in such a way as to limit, as far as practicable, adverse environmental impact. Works will be carried out under the following general provisions:

- Planning approvals from the Local Authority;
- Requirements of the Local Authority.

As part of any Construction Method Statement, the process will ensure that construction techniques and materials used are a fundamental consideration of the design and intended long-term use and that the aims below are achieved:

- Design for durability and low maintenance;
- Design for flexibility and adaptability;
- Use of materials from sustainable sources;
- Use of local materials where possible.

Safety, health, and environmental issues of the development are primary considerations in the construction methods adopted. The construction team will develop detailed health and safety plans, and specific environmental, fire and accident procedures to suit the construction sequence of the development.

Contractors involved in the development will ensure that all non-English speaking employees are provided with relevant Health and Safety information in their national language. All contractors will be required to adopt the relevant skills certification required for that element of the work. A site-specific Safety Statement and a detailed Construction Stage Safety & Health Plan will be compiled before any works on-site and will be per the Health & Safety Authority and Local Authority guidelines.

CONTROL OF SUBSTANCES HAZARDOUS TO HEALTH

The strategy for controlling all substances and all work processes that may generate hazardous substances will have to be addressed and control measures put in place. Some of the control measures to be employed include the following:

- All fuel and chemicals are to be stored in designated areas, with deliveries of hazardous materials, supervised.
- Storage tanks and container facilities will be appropriately bundled.
- In the case of spills or discharges, remedial action will be taken as soon as possible under company procedures.
- Personal protective equipment (PPE) suitable to the pertaining conditions will be used by all site personnel.

ENVIRONMENTAL, EMERGENCY AND ACCIDENT PROCEDURE

Measures will be carried out to avoid environmental incidents, however, if these occur then the following types must be reported to the responsible person in the construction team. The overall strategy in the event of a spillage will be to 'Stop-Contain-Notify' in the event of:

- Spills or discharges to the atmosphere, water supplies, sewage systems, rivers, and other watercourses, or the ground:
 - Any chemical products
 - Oils or fuels
 - Effluent/fumes and gases
 - Waste or contaminated materials
- Damage to existing:
 - Trees and wildlife
 - Flora and existing local habitats
- Any environmental incidents that could lead to:
 - Local Authority or regulatory enforcement

- Public complaint

Emergency routes and procedures will be continuously adapted to suit the construction sequence and stage of the Development. An *Emergency & Evacuation Plan* will be prepared following the guidelines detailed below and updated regularly during construction:

- Definition of the management organisation and responsibility for safety
- Definition of appropriate fire prevention measures, including good housekeeping of site, welfare facilities and offices.
- Adequate provision of fire extinguishers across the site.
- Use of non-flammable/fire retardant materials for protection of finished works.
- Safe use and safe storage of flammable materials of all categories, whether solid, liquid or gas.
- Appropriate waste management procedures.
- Monitoring the type and frequency of fire inspections/audits.
- Development of evacuation plans, including escape routes, muster stations, means of sounding alarms and general emergency procedures.
- Site safety inductions and fire drills.
- The application of permit systems for Hot works, Confined Space Entry and Electrical Access Control.
- The provision of first aiders. Checking of emergency routes is available and unobstructed at all times.
- Liaison with the emergency services and occupants of the adjacent buildings.

First aid facilities will be established and at least one trained first aider will be present on-site at all times. In addition, trained Fire Wardens / Fire Marshalls will be in place on-site to address fire safety.

11 HOURS OF WORKING

Construction operations will be carried out under any granted planning conditions. It is expected that normal working hours will be from 07:00 – 19:00 Monday to Friday and from 08:00 – 15:00 on Saturdays.

It may be necessary for some specific construction activities to take place outside of these times and in those cases, a specific derogation will be sought from the Local Planning Authority.

Deliveries to the site will be arranged to arrive within normal working hours as set out above.

There may, again, be specific deliveries which need to arrive outside of these hours e.g. in respect of wide loads. In all such cases, the applicant will again liaise and agree to any necessary derogations with the Local Planning Authority.

12 VERIFICATION

This report was compiled and verified by:

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