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Environmental Impact Assessment Report

Sky Castle Ltd – Moygaddy
Mixed Use Scheme, Co.
Meath & Co. Kildare

Volume 3e: Kildare Bridge

Appendices – 2-1 – 11-1



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APPENDIX 2-1

SCOPING RESPONSES

David Naughton

From: Environmental Co-ordination (Inbox) <Environmental_Co-ordination@agriculture.gov.ie>
Sent: Wednesday 27 October 2021 08:56
To: David Naughton
Subject: FW: 210414 - Scoping Document for Proposed Mixed Use Development at Moygaddy, Co. Meath

Good Morning David

Further to my email below, I wish to inform you that the Department of Agriculture, Food & the Marine has no observations on the scoping document for the proposed development at this time.

Kind regards

Cathy Hewitt

Executive Officer

An tAonad um Chomhordú Timpeallachta, An Rannóg um Athrú Aeráide agus Beartas Bithfhuinnimh,
Environmental Co-ordination Unit | Climate Change & Bioenergy Policy Division |

An Roinn Talmhaíochta, Bia agus Mara

Department of Agriculture, Food and the Marine

Pailliún A, Páirc Gnó Grattan, Bóthar Átha Cliath, Port Laoise, Co Laoise, R32 K857

Pavilion A, Grattan Business Park, Dublin Road, Portlaoise, Co Laois, R32 K857

T +353 (0)57 868 9915 environmentalco-ordination@agriculture.gov.ie

www.agriculture.gov.ie

From: Environmental Co-ordination (Inbox)
Sent: Friday 22 October 2021 08:34
To: 'dnaughton@mkoireland.ie' <dnaughton@mkoireland.ie>
Cc: Hennebry, Breeda <Breeda.Hennebry@agriculture.gov.ie>
Subject: RE: 210414 - Scoping Document for Proposed Mixed Use Development at Moygaddy, Co. Meath

Good Morning David

I have received your query below. Upon checking it would appear that we did not receive your original request for comments on the 9th August. The email you used was incorrect (there is an underscore excluded). However, I will forward the documents to the relevant sections and ask them to revert with any obs they may have ASAP.

Kind regards

Cathy Hewitt

Executive Officer

An tAonad um Chomhordú Timpeallachta, An Rannóg um Athrú Aeráide agus Beartas Bithfhuinnimh,
Environmental Co-ordination Unit | Climate Change & Bioenergy Policy Division |

An Roinn Talmhaíochta, Bia agus Mara

Department of Agriculture, Food and the Marine

Pailliún A, Páirc Gnó Grattan, Bóthar Átha Cliath, Port Laoise, Co Laoise, R32 K857

Pavilion A, Grattan Business Park, Dublin Road, Portlaoise, Co Laois, R32 K857

T +353 (0)57 868 9915 environmentalco-ordination@agriculture.gov.ie

www.agriculture.gov.ie

From: McGoldrick, David
Sent: Thursday 21 October 2021 16:48
To: Environmental Co-ordination (Inbox)
Subject: FW: 210414 - Scoping Document for Proposed Mixed Use Development at Moygaddy, Co. Meath
Hello,
Please see query below. Thanks.
David

From: David Naughton <dnaughton@mkofireland.ie>

Sent: 20 October 2021 16:24

To: Info@agriculture.gov.ie

Subject: FW: 210414 - Scoping Document for Proposed Mixed Use Development at Moygaddy, Co. Meath

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Dear Sir or Madam,

Just following up on the below to see if the department has any comments or recommendations on the proposed project.

Kind regards,



David Naughton B.Sc. (Env.)

Environmental Scientist

MKO

Tuam Road, Galway

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www.mkofireland.ie



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From: David Naughton

Sent: Monday 9 August 2021 15:11

To: environmentalco-ordination@agriculture.ie

Subject: 210414 - Scoping Document for Proposed Mixed Use Development at Moygaddy, Co. Meath

Dear Sir or Madam,

Please find attached a cover letter and Scoping Document for a proposed mixed use development in Moygaddy, Co. Meath. The site is located just north of Maynooth town.

As part of the scoping exercise for the proposed development, we would welcome any comments in relation to the proposed project.

If you have any queries, please do not hesitate to contact me.

Kind regards,



David Naughton B.Sc. (Env.)

Environmental Scientist

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Tuam Road, Galway

Ireland, H91 VW84

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Department of Agriculture, Food and the Marine

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An Roinn Talmhaíochta, Bia agus Mara

Tá an t-eolais san ríomhphost seo, agus in aon ceangláin leis, faoi phribhléid agus faoi rún agus le h-agmaigh an seolaí amháin. D'fhéadfadh ábhar an seoladh seo bheith faoi phribhléid profisiúnta nó dlíthiúil. Mura tusa an seolaí a bhí beartaithe leis an ríomhphost seo a fháil, tá cosc air, nó aon chuid de, a úsáid, a chóipeál, nó a scaoileadh. Má tháinig sé chugat de bharr dearmad, téigh i dteagmháil leis an seoltóir agus scrios an t-ábhar ó do ríomhaire le do thoil.

Emily Lynch

From: CorporateSupport.Unit <CorporateSupport.Unit@decc.gov.ie>
Sent: 27 August 2021 15:21
To: David Naughton
Cc: CorporateSupport.Unit
Subject: Reply from DECC re EIS 21/ 297 Proposed Mixed Use Development at Moygaddy, Co. Meath
Attachments: GSI datasets relevant to EIA & SEA_20210421.pdf; 21_297 Proposed Mixed Use Development at Moygaddy Co. Meath.pdf; 20210809 Frm MKO re DECC cover letter ref 210414.pdf

Good afternoon,

Please see attached and below a reply from Ms. Trish Smullen and Dr Clare Glanville (Senior Geologist) on behalf of Geological Survey Ireland, (a division of the Department of Environment, Climate and Communications) for the subject below.

Please forward an acknowledgment of receipt to CorporateSupport.Unit@decc.gov.ie at your earliest convenience. I have attached your letter of 09/08/2021 for reference.

Regards,
Enda Brady,
Corporate Support Unit,
Department of Environment, Climate and Communications.

From : GSI Planning
Sent: 27 August 2021 13:52
To: CorporateSupport.Unit
Cc: Clare Glanville; GSI Planning
Subject: Re: EIS 21/ 297 Proposed Mixed Use Development at Moygaddy, Co. Meath

Hi Enda,
Please see attached for return to MKO.
Thanks and regards,
Trish

From: GSI Planning
Sent: 10 August 2021 10:14
Cc: GSI Planning
Subject: EIS 21/ 297 Proposed Mixed Use Development at Moygaddy, Co. Meath

EIS 21/ 297 Proposed Mixed Use Development at Moygaddy, Co. Meath.

Request for observations by MKO for direct reply. Scoping document attached.

Regards,
Trish

Emily Lynch

From: CorporateSupport.Unit <CorporateSupport.Unit@decc.gov.ie>
Sent: 21 October 2021 10:34
To: David Naughton
Cc: CorporateSupport.Unit
Subject: RE: 210414 - Scoping Document for Proposed Mixed Use Development at Moygaddy, Co. Meath

Good morning David,

Corporate Support Unit have forwarded two replies to you on 16/08/2021 (Inland Fisheries Ireland) and 27/08/2021 (Geological Survey Ireland). I have circulated the reminder below to the other appropriate contacts and asked for a reply (if any) before the end of this month. If there are any observations I will forward these to you.

Regards,
Enda Brady,
Corporate Support Unit,
Department of Environment, Climate and Communications.
087 623 7714

From: David Naughton [mailto:dnaughton@mkoireland.ie]
Sent: 19 October 2021 16:14
To: CorporateSupport.Unit
Cc: CorporateSupport.Unit
Subject: RE: 210414 - Scoping Document for Proposed Mixed Use Development at Moygaddy, Co. Meath

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Dear Sir or Madam,

Just following up on the below to see if the department has any comments or recommendations on the proposed project.

Kind regards,



David Naughton B.Sc. (Env.)
Environmental Scientist

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Mr. David Naughton BSc
MKO,
Tuam Road,
Galway
H91VW84
1st September 2021

Re: 210414 - Scoping Document for Proposed Mixed Use Development at Moygaddy, Co. Meath

Dear David,

The Department of Transport would like the following to be taken into consideration in relation to the proposed mixed use development at Moygaddy, Co. Meath

Given the proximity of the Moygaddy sites to the Royal Canal Greenway and NTA plans for additional cycling and pedestrian facilities within Maynooth, it will be vital that the masterplan being developed includes significant provision for cycling and pedestrian access from the sites to Maynooth train station, the University and the Royal Canal Greenway and also significant provision for cycle parking within the sites.

Yours sincerely,

Jacqui Traynor
Reform Communications Emergency Planning

An Roinn Iompair
Department of Transport

Lána Liosain, Baile Átha Cliath, D02 TR60
Leeson Lane, Dublin, D02 TR60

T +353 (0)1 604 1177
Jacquitraylor@transport.gov.ie www.gov.ie/transport

David Naughton

From: planning applications <planning.applications@failteireland.ie>
Sent: Thursday 19 August 2021 11:48
To: David Naughton
Subject: RE: 210414 - Scoping Document for Proposed Mixed Use Development at Moygaddy, Co. Meath
Attachments: Fáilte Ireland EIAR Guidelines.pdf

Hello David,

Thank you for your email regarding the scoping document for the proposed Mixed Use Development at Moygaddy, Co. Meath

Please see attached the updated copy of Fáilte Ireland's Guidelines for the Treatment of Tourism in an EIA, which you may find informative for the preparation of the Environmental Impact Assessment for the proposed project. The purpose of this report is to provide guidance for those conducting Environmental Impact Assessment and compiling an Environmental Impact Assessment Reports (EIAR), or those assessing EIARs, where the project involves tourism or may have an impact upon tourism. These guidelines are non-statutory and act as supplementary advice to the EPA EIAR Guidelines outlined in section 2.

Regards,

Yvonne

Yvonne Jackson

Product Development-Environment & Planning Support | Fáilte Ireland
Áras Fáilte, 88/95 Amiens Street, Dublin 1. D01WR86
T +353 (0)1 884 7224 | M +353 (0) 860357590 | www.failteireland.ie



Please consider the environment before printing this email

From: David Naughton <dnaughton@mkoireland.ie>
Sent: Monday 9 August 2021 16:16
To: planning applications <planning.applications@failteireland.ie>
Subject: 210414 - Scoping Document for Proposed Mixed Use Development at Moygaddy, Co. Meath

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Dear Sir or Madam,

Please find attached a cover letter and Scoping Document for a proposed mixed use development in Moygaddy, Co. Meath. The site is located just north of Maynooth town.

As part of the scoping exercise for the proposed development, we would welcome any comments in relation to the proposed project.

If you have any queries, please do not hesitate to contact me.

Kind regards,



David Naughton B.Sc. (Env.)
Environmental Scientist

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Fáilte Ireland

National Tourism Development Authority

EIAR Guidelines for the Consideration of Tourism and Tourism Related Projects



An tUdarás Náisiúnta Forbartha Turasóireachta
Áras Fáilte, 88–95 Sraid Amiens
Baile Átha Cliath 1
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National Tourism Development Authority
Áras Fáilte, 88 - 95 Amiens Street
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Phone 1890 525 525
or +353 1 884 7700
Email info@failteireland.ie
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1. Introduction

Tourism is a growing sector and substantial part of the Irish Economy. It contributes to both urban and rural economies in every part of the country. The impact and interaction of tourism with the environment is complex and the assessment of environmental impacts is of utmost importance to creating a sustainable tourism economy and protecting the natural resources that are so often a tourism attraction.

The purpose of this report is to provide guidance for those conducting Environmental Impact Assessment and compiling an Environmental Impact Assessment Reports (EIAR), or those assessing EIARs, where the project involves tourism or may have an impact upon tourism. These guidelines are non-statutory and act as supplementary advice to the EPA EIAR Guidelines outlined in section 2.

This guidance document has been prepared by Cunnane Stratton Reynolds on behalf of Fáilte Ireland to update their EIA guidelines in line with changes in legislative requirements.

2. Background to this Document

Tourism is one of the largest and most important sectors of the economy, providing employment for approximately **260,000 people**, an economic contribution of **€8.4 billion**, and exchequer revenue of **€1.78 billion** in 2018, which helps fund other key public services.

In 2018 Ireland welcomed **10.6 million overseas visitors**.

Fáilte Ireland is the National Tourism Development Authority. Fáilte Irelands role is to support the tourism industry and work to sustain Ireland as a high-quality and competitive tourism destination. They provide a range of practical business supports to help tourism businesses better manage and market their products and services.

Fáilte Ireland also work with other state agencies and representative bodies, at local and national levels, to implement and champion positive and practical strategies that will benefit Irish tourism and the Irish economy.

Fáilte Ireland promotes Ireland as a holiday destination through a domestic marketing campaign (DiscoverIreland.ie) and manage a network of nationwide tourist information centres that provide help and advice for visitors to Ireland.

Tourism related projects cover a broad range of plans, programmes and developments, from the Wild Atlantic Way to a single hotel conversion. These guidelines apply to projects involving or impacting upon tourism. A tourism plan, strategy or programme where it is part of the statutory plan making process under the Planning and Development Acts (as amended), may be more appropriately assessed by a Strategic Environmental Assessment (SEA) as discussed in the next section.

It should be borne in mind that EIA is required where there is anticipated to be a significant impact on the environment, where tourism projects are of a prescribed type or meet thresholds identified below.

Where Natura 2000 Designated Sites are potentially affected by tourism development Appropriate Assessment must be carried out by the appropriate authority in accordance with Article 6(3) of the EU Habitats Directive.

3. Legislation and Statutory Guidance

Environmental Impact Assessment is a procedure that ensures that the environmental implications of decisions are taken into account before planning based decisions are made. The assessment results in a report, called an Environmental Impact Assessment Report (EIAR).

Legislation

These guidelines are produced under current EIAR legislative requirements, having regard to Directive 2011/92/EU (known as 'Environmental Impact Assessment' – EIA Directive), as amended by Directive EU 2014/52 which came into effect in May of 2017. These requirements were transposed into Irish Law on 1 September 2018 as most of the provisions of the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (S.I. No. 296 of 2018) came into effect. The principle of both Directives is to ensure that plans, programmes and projects likely to have significant effects on the environment are made subject to an environmental assessment, prior to their approval or authorisation.

Statutory Guidance

In response to the changes to the EIAR requirements under Directive EU 2014/52, the Environmental Protection Agency (EPA) developed Draft guidelines on the information to be contained in Environmental Impact Assessment Reports in August 2017. At the time of this document the guidelines have not been adopted from draft.

In addition to the EPA statutory guidance, the Department of Housing has produced Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment in August 2018.

The process of EIA is set out in the EPA EIAR Guidelines, which this document should be read in conjunction with and used as supplementary guidance to. The process for ascertaining whether an EIAR is required is known as 'screening' and the process to determine the breadth and scope of an EIAR is known as 'scoping'. Guidance on this can be found in Section 3.2 of the EPA Guidelines.

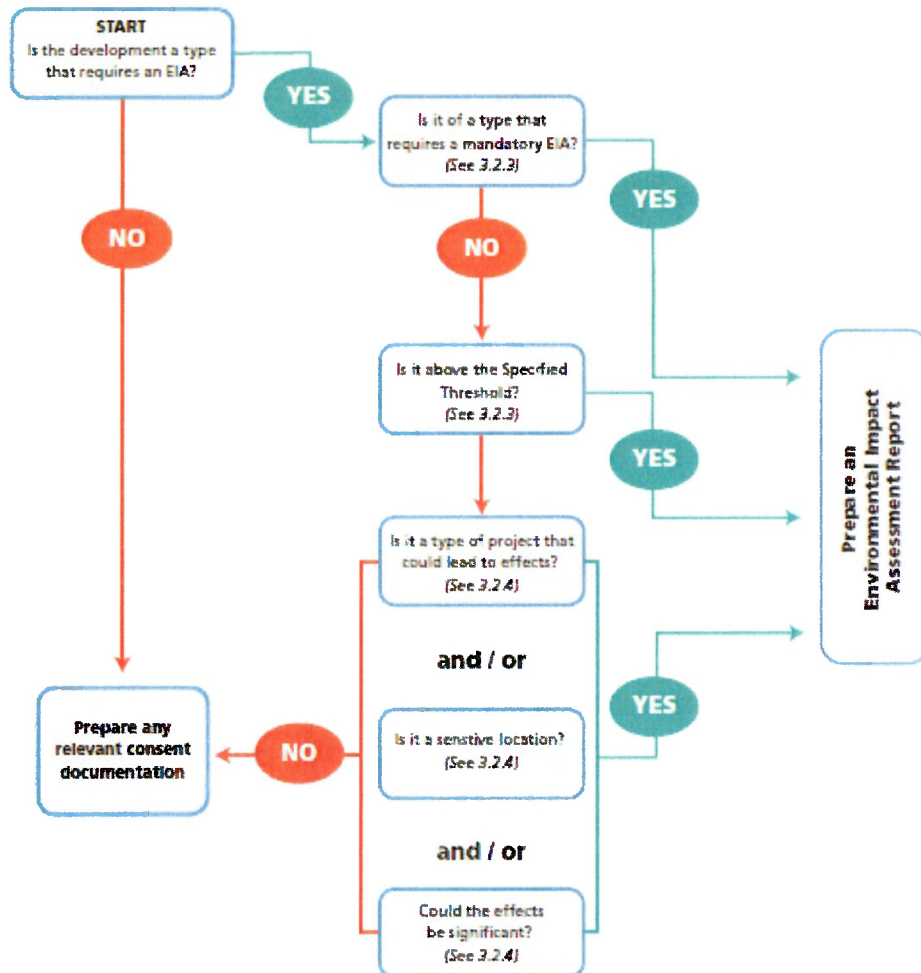
Screening

Through EIAR Screening, developments are either considered as requiring an EIAR due to the project type or because they exceed a threshold level. The screening process begins by establishing whether the proposal is a 'project' as understood by the Directive (as amended).

The prescribed development types and thresholds are set out in Annex I and II of the EIA Directive as transposed into Schedule 5 of the Planning and Development Regulations 2010-2018 (as amended). Development which do not exceed these thresholds but may require an EIAR are called sub threshold. Sub-Threshold considerations are outlined in Schedule 7 of European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (S.I. No. 296 of 2018) as transposed from Annex III of the Directive. The Guidelines on Environmental Impact Assessment Reports note that projects at first glance may not appear to come under the Schedule

but on closer examination when the process is further examined, they may do so because of the sensitivity or significance of the receiving environment etc. Sub threshold developments require an EIAR if they are likely to have significant environmental impacts and must undergo assessment for likely significant impacts through an EIAR screening report. The contents of a screening report for subthreshold development are contained in Annex III of the EIA Directive.

Figure 1: EIAR Screening Process



(Taken from Fig 3.2 of the EPA Guidelines)

Tourism locations should be identified as sensitive receptors in screening assessments for particular impacts, depending on scale and sensitivity, as they would in a full EIAR. Section 6 below can act as guidance for Screening Reports as well as for full EIAR.

The screening process for considering where an EIAR is necessary, is summarised below in Figure 1 (excerpted from Figure 3.2 of the EPA Guidelines).

Strategic Environmental Assessment (SEA) is a more strategic level of environmental assessment that examines plans, policies, objectives and programmes specifically rather than projects. For some tourism developments it may be more appropriate that they be examined through SEA, while individual projects or specific proposals are likely to be more assessed through EIAR. If a project is part of a plan, programme or policy/objective assessed by SEA there will still be a requirement for an EIAR for that development.

EIAR Scoping

Scoping an EIAR is an opportunity to look at the breadth of issues and ensure that any areas of possible significant impact are assessed. Identifying sensitivities and stakeholders should take account of tourism facilities and consider Fáilte Ireland in scoping requests where necessary.

4. Assessing Tourism

There is no legal definition of 'tourism' in Irish legislation. The UNWTO definition of sustainable tourism is *"Tourism that takes full account of its current and future economic, social and environmental impacts, addressing the needs of visitors, the industry, the environment and host communities"*. This is widely accepted as a key definition of tourism as we move to a more sustainable future.

Tourism assessments are frequently carried out by economic consultants and by specific tourism consultants. It is always advisable, particular for tourism projects, that suitably qualified and experienced personnel are used to determine the impact of tourism related projects or to assess the impact of more general proposals on a tourism asset identified in a particular location. There is a requirement for EIAR under current legislation to contain a statement of competency within all EIAR documents, including screening and scoping reports.

Projects which involve a tourism element

Tourism projects are wide ranging and diverse. While there are some projects which cater to tourism and are easily identified as such - Hotels, Museums, etc. there are other projects where tourism is a key service or element, but which may not be immediately obvious - forest trails, community facilities and others. EIAR conducted for developments containing tourist elements should be completed in accordance with the current guidance from the EPA.

Projects which include a tourism element have potential particular environmental effects which differ from a non-tourism development. These impacts can be intermittent, event related, inconsistent, dependent on weather, temporal, temporary or seasonal. This is considered within the prescribed environmental topics for EIAR outlined in Section 7 below.

Projects which may have an impact upon tourism

While tourism projects may be diverse, the projects which can impact tourism are considerably more wide ranging, from large infrastructural developments to local energy developments. Disruption to or suppression of a tourist resource or amenity can have very local or more strategic impacts, directly or indirectly- for example energy projects in a rural area can have both a negative and positive impact in different regards. There can be temporary, periodic or even seasonal impacts occurring during construction or operational periods.

According to the Fáilte Ireland Tourism Facts 2018 Report, the most important factors in determining the attractiveness of tourism destinations for visitors to Ireland are;

- Beautiful Scenery and Unspoiled Environment
- Hospitality
- Safety
- Nature, Wildlife and Natural Attractions
- History and Culture
- Pace of Life

These factors used for the promotion of tourism in Ireland are also barometers of sensitivity to change in tourism sensitive or dominant locations where development may have an impact upon the tourism asset. The potential for development to impact these sensitivities, and the environmental criteria under which they can be considered, are identified in section 7 of the guidelines.

5. Guiding Principles of EIAR

As outlined in the EPA Draft EIAR Guidelines, the fundamental principles to be followed when preparing an EIAR, including screening and scoping, are:

- Anticipating, avoiding and reducing significant effects
- Assessing and mitigating effects
- Maintaining objectivity
- Ensuring clarity and quality
- Providing relevant information to decision makers
- Facilitating better consultation.

Environmental assessment should be undertaken in accordance with the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018.

6. Consideration of Competency and Qualifications

As per Section 2.5 of the EPA Guidelines, EIAR is required to be completed by 'competent experts'.

Contributors to the preparation of environmental impact assessment reports, including screening and scoping assessments, should be qualified and competent. Sufficient expertise, in the relevant field of the project concerned, is required for the purpose of its examination by the competent authorities in order to ensure that the information provided by the developer is complete and of a high level of quality so that a full and proper assessment can be undertaken.

For tourism related projects, or projects likely to affect tourism assets, competent experts in the area of tourism should be utilised in the environmental assessment.

The competency of all involved in the production of an EIAR or any related report (eg. Screening and scoping) is required to be stated at the beginning of the EIAR report with further details as necessary in each following chapter.

Where tourism projects involve for example heritage or cultural components, input from heritage consultants, conservation architects, or historians may be required.

7. EIAR Requirements

The following are the key requirements for an EIAR under the current guidance. This is not a definitive list and should be read in conjunction with regulations.

- project description;
- assessment of alternatives considered;

- baseline assessment;
- impact assessment;
- cumulative impact
- interaction of impacts
- mitigation.

Project Description

Project descriptions are required to describe the whole project including site, scale, design and key factors. It is important that the EIAR and design team have a consistent understanding of the development description in full. The key requirements are outlined in section 3.5 of the EPA Guidelines however they identify the following;

- the location of the project
- the physical characteristics of the whole project
- the main characteristics of the operational phase of the project
- an estimate, by type and quantity, of the expected residues and emissions

The location of the project should include identifying key sensitive receptors (including tourism receptors). In the operational phase of the project any tourism based, or potentially tourism related activity, should be identified.

Assessment of Alternatives

The assessment of alternatives is a requirement of EIAR

Where tourism projects are location dependent the assessment of alternatives should consider alternative methods and technologies, detail the key considerations culminating in the selection of the design, the reasoning for these and the environmental effect of these decisions. This is particularly important for tourism projects which are often location tied. The developer is expected to consider reasonable alternatives. What is considered reasonable may vary from case to case.

Baseline Assessment

Baseline descriptions are evidence based, current descriptions of environmental characteristics with consideration of likely changes to the baseline environment evidenced in planning histories, unimplemented permissions, and applications pending determination. Baseline assessments should identify any tourism sensitivities in the zone of influence of a development. This zone of influence of a development is highly dependant on its **Context, Character, Significance, and Sensitivity**, as outlined in the Draft Guidelines. These characteristics apply to both the development and the environment.

For example, in a tourism context;

The location of sensitive tourism resources that are likely to be directly affected should be highlighted, and other premises which although located elsewhere, may be the subject of in combination impacts such as alteration of traffic flows or increased urban development.

The character of an area from a tourism perspective should be described and the principal types of tourism in the area. Where relevant, the specific environmental resources or attributes in the existing environment which each group uses or values should be stated and where relevant, indicate the time, duration or seasonality of any of those activities.

The significance of the tourism assets or activities likely to be affected should be highlighted. Reference to any existing formal or published designation or

recognition of such significance should be. Where possible the value of the contribution of such tourism assets and activities to the local economy should be provided.

If there are any significant concerns or opposition to the development known to exist among tourism stakeholders and interest groups, this should be highlighted. Identify, where possible, the particular aspect of the development which is of concern, together with the part of the existing tourism resource which may be threatened or impacted.

In addition, the baseline should include any methodologies employed in the study to obtain information, if particular databases are used to locate sensitive receptors they should be acknowledged. In relation to tourism information, the suggested information sources at the end of this document are a non-exhaustive list which may be of assistance in identifying tourism receptors.

Impact Assessment

The topics for consideration of impact are prescribed in the EIA Directive and transcribed into Irish law by the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (S.I. No. 296 of 2018). Impact assessment should contain the likely significant effects of a development arising from both construction and operation of a development. Advice on describing the effects is contained within the Draft Guidelines and includes the **quality, significance, extent, probability, type** and **duration** of the effect, with particular descriptors for each. In describing effects upon tourism receptors these descriptors should take account of the particular aspects and sensitivities of tourism, for example a temporary annual effect from a development may have different impacts upon tourism if it falls at peak season rather than off-peak.

Impact assessment should be carried out as per EPA guidelines and the best practice for that prescribed topic. It may be considered appropriate to consider impact on tourism assets under the 'material assets' topic below.

Population and Human Health

The consideration of tourism projects within the Population and Human Health is extensive, with impacts ranging from rural employment population impacts of seasonal tourism, to the health impact of air pollution from increased traffic in urban areas.

The impact upon tourism can be considered within this section through the sensitivities of Hospitality, Safety and Pace of Life. Changes in population can impact the perception of pace of life or safety in a particular location. Impacts upon these issues in areas which rely heavily on tourism or have a particular sensitive tourism generator should be considered in this section.

Biodiversity

Particular tourist activities can have a significant impact upon biodiversity. Landscapes which are 'unspoiled' can be attractors of tourism. However, the disturbance to ecology must be managed to minimise impact. Biodiversity is also a tourism asset and should be protected as such from other development and should be provided for in proposals where possible.

Land, Soils and Geology

A link between tourism and this prescribed environmental factor, beyond the normal development impacts, is rare, however particular activities or facilities which use geological features may have an impact upon soils and geology, such as mountain biking trails, recreational uses of old quarries etc. Indirect impacts such as material use for extensive landscaping and public realm should also be considered.

Water

Tourism uses can be water intense, depending on development type. Recreational use of a surface water feature, water-based leisure centres etc have different impacts to standard development.

Air Quality and Climate

Tourism impact upon air quality is dependent on activity proposed and sensitivity of the location.

Noise and Vibration

A link between tourism and this prescribed environmental factor, beyond the normal development impacts, is rare, however the impact upon tourism of issues of noise and vibration can be significant. Construction adjoining hotels for example should consider the sensitivity of the development and ensure mitigation is in place.

Material Assets; Traffic and Transport

The different transport patterns associated with tourism activities is a key impact of tourism and should be considered especially for tourism projects. These produce temporal and seasonal changes on the norm and specialist consideration and interpretation should be given. Tourism proposals should, where possible, be well served by public transport and should be accessible by modes other than the car. The impact of traffic on tourism assets can be substantial and can vary in severity according to season, the weather, etc. The impact of construction traffic can be a particular concern in tourism sensitive areas in terms of noise pollution and visual impact. The construction programme of developments should work to avoid peak tourism periods in tourism areas and should consider planned or anticipated tourism events and festivals.

Cultural Heritage

Cultural heritage can be a key component of tourism projects and the impact of tourism on the maintenance of cultural heritage should be given the utmost consideration, whether positive or negative. As a tourism attraction, cultural heritage should be strongly considered in non-tourism developments and the impact upon tourism considered as a potential impact.

Archaeology

Archaeology can be of tourism interest and can be an attractive or key component of tourism projects. Archaeology can be a tourism attractor but is generally not kept in situ except in key cases which could also be considered under cultural heritage.

Material Assets; Waste Management

Tourism is a resource heavy activity and can impact waste streams and waste segregation. Impacts here should be considered strongly and with knowledge of the variation that arises from the particular tourist activity. Waste and Waste disposal issues can also impact the perception of an unspoiled environment, effecting tourism, which should be considered.

Material Assets

Material assets are utilities and infrastructure. Tourism itself could be considered a material asset as its impact upon the economy and the infrastructure in place to support it is a material consideration in assessing economic impact.

Landscape

The visual impact of a tourism development, especially in locations which are visually sensitive or renowned for their scenic or landscape beauty, should be considered carefully. A

development intended to utilise or enjoy a particular vista or environment should minimise impact upon that environment.

Major Accident and Natural Disaster

There is a requirement for tourist developments to describe expected significant effects on the environment of the proposed development's vulnerability to major accidents and/or natural disasters relevant to it. Where appropriate measures should be identified to prevent or mitigate the significant adverse effects of such accidents or disasters, including resulting from climate change, on the environment and detail the preparedness for the proposed response.

Interaction of Effects

Where two or more environmental impacts combine or interact they should be considered under the prescribed topics. It is best practice to provide a table of interactions within an EIAR or EIAR Screening Report.

Mitigation

Mitigation should follow the hierarchy of minimisation in descending order of preference- Avoid, Reduce, Remedy

Avoid sensitive tourism resources- such as views, access and amenity areas including habitats as well as historical or cultural sites and structures.

Reduce the exposure of sensitive resources to excessive environmental impact

Reduce the adverse effects to tourism land uses and patterns of activities, especially through interactions arising from significant changes in the intensity of use or contrasts of character or appearance.

Remedy any unavoidable significant residual adverse effects on tourism resources or activities.

Mitigation measures must be measurable and achievable within the bounds of the project.

Cumulative Impact

The cumulative impact is that of the project combined with any known likely project which will interact or compound an environmental impact.

Transboundary Impact

Transboundary impacts should be included in EIAR. In the case of tourism, especially international travel, the transboundary impacts may not be proximate to the EIAR site.

8. Sources of information on Tourism

Information available online

Fáilte Ireland

Fáilte Ireland offers detailed research analysis and insights into the Irish Tourism Industry. The National Tourism Development Authority has a portfolio of research across a number of areas including facts and figures, briefing papers and reports and visitor feedback. The Fáilte Ireland website has a dedicated research library which can be accessed [here](#)

Tourism Ireland

Tourism Ireland is responsible for marketing the island of Ireland overseas as a holiday and business tourism destination. Tourism Ireland publishes a range of research documents including; visitor facts and figures, seasonal updates and industry insights which are accessible [here](#)

Local Authorities

Local Authorities are an invaluable source of information. They produce tourism strategies and audits of tourism assets within their jurisdiction. Local authorities will also produce landscape and seascape studies. Protected views and prospects as well as the record of protected structures and other designated protected buildings are contained within the Statutory Development Plans.

Regional Authorities

Regional Authorities can also be consulted on high level strategic tourism and potential Regional Spatial and Economic Strategies (RSEs) should be consulted.

Central Statistics Office

The Central Statistics Office (CSO) is Ireland's national statistical office and their purpose is to impartially collect, analyse and make available statistics about Ireland's people, society and economy. The Tourism and Travel Section of the Central Statistics Office is the major source for tourism statistics in Ireland and is updated regularly.



David Naughton
MKO
Tuam Road
Galway
H91 VW84

27 August 2021

Re: Proposed Mixed Use Development at Moygaddy Co. Meath
Your Ref: 210414
Our Ref: 21/297

Dear David,

Geological Survey Ireland is the national earth science agency and is a division of the Department of the Environment, Climate and Communications. We provide independent geological information and advice and gather various data for that purpose. Please see our [website](#) for data availability. Use of our data or maps should be attributed correctly to 'Geological Survey Ireland'.

With reference to your letter dated 09 August 2021, concerning the proposed Mixed Use Development at Moygaddy Co. Meath, Geological Survey Ireland would encourage use of and reference to our datasets. Please find attached a list of our publicly available datasets that may be useful to the environmental assessment and planning process. We recommend that you review this list and refer to any datasets you consider relevant to your assessment. The remainder of this letter and following sections provide more detail on some of these datasets.

Geoheritage

Geological Survey Ireland is in partnership with the National Parks and Wildlife Service (NPWS, Department of Housing, Local Government and Heritage), to identify and select important geological and geomorphological sites throughout the country for designation as geological NHAs (Natural Heritage Areas). This is addressed by the Geoheritage Programme of Geological Survey Ireland, under 16 different geological themes, in which the minimum number of scientifically significant sites that best represent the theme are rigorously selected by a panel of theme experts.

County Geological Sites (CGSs), as adopted under the National Heritage Plan, include additional sites that may also be of national importance, but which were not selected as the very best examples for NHA designation. All geological heritage sites identified by Geological Survey Ireland are categorised as CGS pending any further NHA designation by NPWS. CGSs are now routinely included in County Development Plans and in the GIS of planning departments, to ensure the recognition and appropriate protection of geological heritage within the planning system. CGSs can be viewed online under the Geological Heritage tab on the online [Map Viewer](#).

The audit for Co. Meath was carried out in 2007. The full report details can be found at [The Geological Heritage of Meath](#). **Our records show that there are no CGSs in the vicinity of the proposed mix use development.**

Groundwater

Geological Survey Ireland's [Groundwater and Geothermal Unit](#), provides advice, data and maps relating to groundwater distribution, quality and use, which is especially relevant for safe and secure drinking water supplies and healthy ecosystems.

Proposed developments need to consider any potential impact on specific groundwater abstractions and on groundwater resources in general. We recommend using the groundwater maps on our [Map viewer](#) which should include: wells; drinking water source protection areas; the national map suite - aquifer, groundwater vulnerability, groundwater recharge and subsoil permeability maps.



For areas underlain by limestone, please refer to the karst specific data layers (karst features, tracer test database; turlough water levels (gwlevel.ie). Background information is also provided in the Groundwater Body Descriptions. Please read all disclaimers carefully when using Geological Survey Ireland data.

The Groundwater Data Viewer indicates a ‘Locally Important Aquifer - Bedrock which is Moderately Productive only in Local Zones’ underlies the proposed development. The Groundwater Vulnerability map indicates a range of groundwater vulnerabilities within the vicinity of the proposed development. We would therefore recommend use of the Groundwater Viewer to identify areas of High to Extreme Vulnerability and ‘Rock at or near surface’ in your assessments, as any groundwater-surface water interactions that might occur would be greatest in these areas.

GWClimate is a groundwater monitoring and modelling project that aims to investigate the impact of climate change on groundwater in Ireland. This is a follow on from a previous project (GWFlood) and the data may be useful in relation to Flood Risk Assessment (FRA) and management plans. Maps and data are available on the [Map viewer](#).

The Groundwater Protection Response overview and link to the main report is here: <https://www.gsi.ie/en-ie/programmes-and-projects/groundwater-and-geothermal-unit/projects/protecting-drinking-water/what-is-drinking-water-protection/county-groundwater-protection-schemes/Pages/default.aspx>.

Geological Mapping

Geological Survey Ireland maintains online datasets of bedrock and subsoils geological mapping that are reliable and accessible. We would encourage you to use these data which can be found [here](#), in your future assessments.

Geotechnical Database Resources

Geological Survey Ireland continues to populate and develop our national geotechnical database and viewer with site investigation data submitted voluntarily by industry. The current database holding is over 7500 reports with 134,000 boreholes; 31,000 of which are digitised which can be accessed through downloads from our [Geotechnical Map Viewer](#). We would encourage the use of this database as part of any baseline geological assessment of the proposed development as it can provide invaluable baseline data for the region or vicinity of proposed development areas. This information may be beneficial and cost saving for any site-specific investigations that may be designed as part of the project.

Natural Resources (Minerals/Aggregates)

Geological Survey Ireland provides data, maps, interpretations and advice on matters related to minerals, their use and their development in our [Minerals section](#) of the website. The Active Quarries, Mineral Localities and the Aggregate Potential maps are available on our [Map Viewer](#).

We would recommend use of the Aggregate Potential Mapping viewer to identify areas of High to Very High source aggregate potential within the area. In keeping with a sustainable approach we would recommend use of our data and mapping viewers to identify and ensure that natural resources used in the proposed development are sustainably sourced from properly recognised and licensed facilities, and that consideration of future resource sterilization is considered.

Geochemistry of soils, surface waters and sediments

Geological Survey Ireland provides baseline geochemistry data for Ireland as part of the Tellus programme. Baseline geochemistry data can be used to assess the chemical status of soil and water at a regional scale and to support the assessment of existing or potential impacts of human activity on environmental chemical quality. Tellus is a national-scale mapping programme which provides multi-element data for shallow soil, stream sediment and stream water in Ireland. At present, mapping consists of the border, western and midland regions. Data is available at <https://www.gsi.ie/en-ie/data-and-maps/Pages/Geochemistry.aspx>. This page also hosts Geochemical Mapping of Agricultural and Grazing Land Soil of Europe (GEMAS) and lithogeochemistry (rock geochemistry) from southeast Ireland datasets.



Geological Survey Ireland and partners are undertaking applied geochemistry projects to provide data for agriculture ([Terra Soil](#)), waste soil characterisation ([Geochemically Appropriate Levels for Soil Recovery Facilities](#)) and mineral exploration ([Mineral Prospectivity Mapping](#)).

Other Comments

Should development go ahead, all other factors considered, Geological Survey Ireland would much appreciate a copy of reports detailing any site investigations carried out. Should any significant bedrock cuttings be created, we would ask that they will be designed to remain visible as rock exposure rather than covered with soil and vegetated, in accordance with safety guidelines and engineering constraints. In areas where natural exposures are few, or deeply weathered, this measure would permit on-going improvement of geological knowledge of the subsurface and could be included as additional sites of the geoheritage dataset, if appropriate. Alternatively, we ask that a digital photographic record of significant new excavations could be provided. Potential visits from Geological Survey Ireland to personally document exposures could also be arranged.

The data would be added to Geological Survey Ireland's national database of site investigation boreholes, implemented to provide a better service to the civil engineering sector. Data can be sent to Beatriz Mozo, Geological Mapping Unit, at Beatriz.Mozo@gsi.ie, 01-678 2795.

I hope that these comments are of assistance, and if we can be of any further help, please do not hesitate to contact me Clare Glanville, or my colleague Trish Smullen at GSIPlanning@gsi.ie.

Yours sincerely,

Clare Glanville
Senior Geologist
Geological Survey Ireland

Enc: Table - Geological Survey Ireland's Publicly Available Datasets Relevant to Planning, EIA and SEA processes.



Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive

Environmental Health Department
County Clinic
Navan
Co. Meath
T: 046 9098758
E: meath.peho@hse.ie

MKO Consultants
Tuam Rd
Galway
Ireland
H91 VW84

9th September 2021

Re: HSE SCOPING SUBMISSION REPORT

Dear Sir/Madam,

Please find enclosed the HSE consultation report in relation to the above proposal. The following HSE departments were notified of the consultation request for this development on 11th August 2021.

- Emergency Planning – Brendan Lawlor
- Estates – Helen Maher
- Assistant National Director for Health Protection – Kevin Kelleher/Helen Mulcahy
- CHO – Des O’Flynn

This report only comments on Environmental Health impacts of the scoping request. If you have any queries regarding this report the contact is Ms Elish O’Reilly, Principal Environmental Health Officer, Co. Clinic, Navan, Co. Meath.

Yours sincerely,

A handwritten signature in brown ink that reads 'Elish O'Reilly'.

Principal Environmental Health Officer



Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive

Environmental Health Department
County Clinic
Navan
Co. Meath
T: 046 9098758
E: meath.peho@hse.ie

HSE EIS SCOPING REPORT

Environmental Health Service Consultation Report
(as a Statutory Consultee (Planning and Development Acts 2000,
& Regs made thereunder).

Date: 9th September 2021

Type of consultation: Scoping

Planning Authority: An Bord Pleanála

EHIS Reference: 1908

Applicant: Skycastle Ltd

Proposed Development: Development of site at Moygaddy, Maynooth, Co. Meath. The subject site is comprised of four main parcels of land including; residential units, an office/ tech business park, community infrastructure including a nursing home, primary care centre and public hospital and tourism and amenity centre, including a hotel, retail, sport and leisure facilities and a cultural heritage centre. It is envisaged that the Proposed Development will consist of six to eight separate planning applications for the different aspects of the proposed Moygaddy development. The EIAR will cumulatively assess all elements of the Proposed Development and will be submitted alongside the lodgement of the first planning application for Moygaddy, which is likely to be the nursing home and primary care centre elements of the Proposed Development.

This report only comments on Environmental Health impacts of the proposed development. We have made observations on the following specific areas:

Description of the Project:

The EIAR must fully describe the existing physical environment and detail any potential impacts on the existing environment both during the construction and operational phase of the project.

The design characteristics of the project and the reasons for proposing same should be outlined. It is recommended a diverse variety of household types is provided in the residential development to offer people a range of lifestyle, affordability and lifestyle choices. All residential development should incorporate the 'Universal Design' Principle to ensure the housing can meet the needs of the occupants regardless of their age, size, ability or disability.

It is also recommended that the development proposals are assessed to ensure compliance with the objectives of the Meath County Development Plan 2020 -2026.

Later Consents Required:

Information on any possible future monitoring requirements for the proposed strategic urban development should be included in the EIAR.

Consideration of Alternatives:

The EIAR should fully describe and consider any alternatives to this project. The applicant should outline a rationale for the site selection and the proposed scheme design.

Public Consultation:

The EIAR should describe measures the applicant took to inform the public about the project. Details of feedback from the public regarding the proposal should be included within the EIAR. Public consultation should be a two way process between the applicant and the public. The EIAR should clearly demonstrate how the legitimate concerns of the public have been assessed and evaluated and how the outcome of consultation with the public influenced decision making within the environmental impact assessment.

Construction

The construction phase of the development creates the potential for temporary emissions which may have a negative impact on the environment and on the health of local residents. The applicant should assess the impacts of construction works having particular regard to:

- Waste Management,
- Pest Control Management,

- Dust Impacts,
- Excessive Noise
- Emissions to Surface/Groundwater

All sensitive receptors in the vicinity of construction works should be identified and measures implemented to ensure they are protected. It is also recommended a Site Specific Construction Management Plan is prepared and included in the EIAR.

Drainage

Any natural flood plains or wetlands on or in the vicinity of the site should be identified and measures implemented to ensure they are protected from the development. The impact of the proposed Strategic Urban Development on watercourses/wetlands further downstream should be assessed.

An integrated approach to surface water management should be implemented on the site. It is recommended that green space and nature based solutions are provided for the storage and conveyance of rainwater on site and to improve flood mitigation in line with the principals outlined in the Greater Dublin Strategic Drainage Study (SUDS)¹.

Climate

It is recommended the applicant ensures climate considerations are fully integrated into the planning of the strategic urban development and outlines how the proposed buildings contribute to climate action through their design. Specific measures which conserve energy consumption and reduce carbon emissions should be outlined in the EIAR.

The applicant should assess the vulnerability of the proposed development against the predicted impacts of a warming climate and they should predict and should outline proactive adaption measures to ensure the long term resilience of the site infrastructure to the impacts of climate change.

Health

Directive 2014/52/EU has an increased requirement to assess potential significant impacts on Population and Human Health. In the experience of the EHS impacts on human health are generally inadequately assessed in EIA in Ireland. It is recommended that the wider determinants of health and wellbeing are considered. Guidance on determinants of health can be found at www.publichealth.ie

The proposed strategic urban development should be explored for any opportunity to promote physical activity and any potential for health gain should be exploited.

¹ <https://www.sdcc.ie/en/download-it/publications/gdsds-new-development.pdf>

It is recommended that measures to promote walking and cycling throughout the development are implemented along with proposals to ensure the connectivity of the site with the wider urban area. Recreational facilities should be provided to cater specifically for the needs of adolescents and the elderly, along with younger children.

Sustainable transport

The impact of traffic from the proposed Strategic Urban Development should be assessed by carrying out a traffic and transport assessment. An assessment of existing sustainable transport facilities and capacity should also be carried out. It is recommended that the applicant outlines a travel plan for the proposed development which will facilitate and promote the use of public or active transport options for residents.

Landscape

Green recreational space is proven to have positive impacts on health, both physical and mental.² The recent global pandemic has highlighted the importance of access to open green space for recreational purposes for the public. The provision of quality, usable, urban green space is of paramount importance as housing design becomes more compact.

The applicant should assess the impact the proposed Strategic Urban Development will have on existing biodiversity in the area. The applicant should also assess the impact of any possible loss of recreational and amenity green area as a result of the proposed development.

It is recommended that green planting is integrated at all opportunities throughout the development to improve the quality of the built environment and the applicant should outline a diverse range of green spaces for the development in the EIAR. The applicant shall also outline proposals to protect and promote biodiversity on the site.

Noise:

The World Health Organisation (WHO) has identified Environmental Noise as an increasing cause of ill health and detrimental effect on health and wellbeing³.

A full and thorough noise survey must be carried out to assess the impact of noise from the proposed Strategic Urban Development on the residents living in the vicinity. Noise

² Urban Green Space Interventions and Health – a review of impacts and effectiveness, WHO, 2017
https://www.euro.who.int/_data/assets/pdf_file/0010/337690/FULL-REPORT-for-LLP.pdf

³ http://www.euro.who.int/_data/assets/pdf_file/0008/136466/e94888.pdf

from traffic movements or heavy goods vehicles associated with the operation of the development should also be included in the noise assessment.

It is essential that up to date baseline monitoring is carried out to establish the existing noise environment. All noise sensitive receptors in the vicinity of the facility shall be identified. The selection of noise monitoring locations for background noise is of critical importance in the noise survey, therefore the rationale for choosing the number and the positioning of these should be provided by the applicant.


Once the existing noise environment has been established, the predicted increase in noise from the proposed Strategic Urban Development should then be quantified and assessed. It is this department's opinion that adherence to specified noise limit values does not always protect sensitive receptors from noise nuisance therefore the significance of the predicted change in the noise environment should be fully assessed. It is requested that this information is outlined and displayed clearly in the EIAR.

Sustainable Development

The significance of the impact the new Strategic Urban Development will have on the existing town centre of Maynooth should be examined and assessed in the EIAR. The applicant should demonstrate compliance with the Retail Planning Guidelines 2013⁴ and Retail Design Manual 2012⁵ which promote *"town centre vitality through a sequential approach to planning"*.

It is recognised that Maynooth is designated as a strategic development area in the greater Dublin Metropolitan Area. There has already been a large volume of residential development permitted for the Maynooth area. It is imperative that the key infrastructure facilities and amenities currently within the town of Maynooth are examined to ensure the town can sustainably accommodate the proposed increase in residential development.

The cumulative impacts of any other proposed housing developments in the vicinity should also be assessed.



Lisa Maguire
Environmental Health Officer

⁴ <https://www.gov.ie/en/publication/aa2d8-retail-planning-guidelines-april-2012-418-mb/>

⁵ <https://www.gov.ie/en/publication/0b081-retail-design-manual-april-2012/>



**Iascach Intíre Éireann
Inland Fisheries Ireland**

16/08/2021

RE: EIA Scoping Document for the Proposed Mixed-Use Development at Moygaddy, Co. Meath

Inland Fisheries Ireland is responsible for the protection, management and conservation of the inland fisheries resource. "Fisheries" includes all inland fisheries recreational and commercial, sea angling and mollusc fisheries stipulated under the Fisheries Acts, the physical habitat upon which the fishery relies, the facilities and access, the quantity and quality of the water and the plant and animal life on which fish depend for shelter and food and the spawning areas where in fish deposit their eggs. The protective role of IFI relates to all aspects of the aquatic environment and all factors that influence the biotic communities within waters, which in any way relate to the propagation of fish stocks

The following observations and comments are of necessity of a general nature, while they apply to the proposed development in general, IFI request you have particular regard to the following in the proposed development:

The proposed development is located within the River Ryewater catchment, an important salmonid system. The River Rye Water supports a resident population of Brown trout, a migratory population of Sea trout and importantly a healthy population of the Atlantic salmon. Thus, it is vital to note that salmonid waters constraints apply to any development in this area. The Ryewater also supports populations of Freshwater Crayfish and Lamprey (both Habitats Directive Annex II species). It is also an important spawning tributary of the Liffey. The River Liffey itself is exceptional among most rivers in the area in supporting Atlantic salmon (*Salmo salar*, listed under Annex II and V of the EU Habitats Directive) and Sea trout, resident Brown trout (both *Salmo trutta*) and several other fish species. This highlights the sensitivity of local watercourses and the Liffey catchment in general. The river is regarded as a very important fishery.

IFI's policy is to maintain watercourses in their open natural state in order to prevent habitat loss preserve and enhance biological diversity and aid in pollution detection. An undisturbed buffer zone between development area and the Rye river bank should be maximised (10m minimum). The Moygaddy stream which runs through the middle of the site should not be altered or diverted and again an undisturbed buffer zone between development area and riverbank should be maximised. Riparian vegetation should be retained in as natural a state as possible at all times while providing open space and recreational amenity for river users. IFI is strongly opposed to any development on floodplain lands.



Iascach Intíre Éireann
Inland Fisheries Ireland

An Invasive Species and Biosecurity Plan should be included to treat and manage identified invasive species onsite.

Best practice should be implemented at all times in relation to any activities that may impact on surface water. Any discharges to surface streams present on the site must not impact negatively on the salmonid status of the system. Comprehensive surface water management measures must be implemented at the construction and operational stage to prevent any pollution entering local waterways. As specific details of the construction works at this site are as yet unknown IFI are not in a position to comment further on potential impacts

Consultation between the project team and IFI will be essential in order that a fisheries-sustainable solution is arrived at and incorporated in the final works programme.

Pre-construction baseline data (biotic and abiotic) is essential within the EIA process and IFI would be delighted to contribute any information that may be relevant to the fishery section (fish data can be accessed at <http://wfdfish.ie/>). Potential impacts (likely and significant effects) of the development on the system should be comprehensively assessed and recommendations and mitigation measures should be formulated. The identification of good baseline data across a range of sites, both close to the development and at a distance from the site will allow for comparison between the current situation and that which may develop over time if the project proceeds.

IFI have recently published the following guidelines which should also be referred to in the EIAR. They can be accessed on our website www.fisheriesireland.ie :

Revised "Planning for watercourses in the urban environment" which can provide guidance on site specific measures to enhance, protect, rehabilitate or establish riparian and aquatic habitats.

"River Restoration Works - Science based Guidance centred on Hydromorphological Principles in an Era of Climate Change – 2020" has also been published by IFI and describes a framework to plan, design, implement and monitor river restoration projects. A list of best practice riparian and instream measures are presented alongside measures to address channel connectivity and invasive species that are compliant with the EU Water Framework Directive (WFD), other EU Directives and State regulations.



Iascach Intíre Éireann
Inland Fisheries Ireland

I trust you will take our observations on board when compiling the EIAR.

Kind regards,

Roisin O' Callaghan

Fisheries Environmental Officer
Inland Fisheries Ireland - Dublin
Iascach Intíre Éireann
Inland Fisheries Ireland

Telephone: +353 (01) 8842651

Email: roisin.ocallaghan@fisheriesireland.ie

David Naughton

From: INFO <Information @tii.ie>
Sent: Thursday 23 September 2021 10:18
To: David Naughton
Subject: RE: 210414 - Scoping Document for Proposed Mixed Use Development at Moygaddy, Co. Meath

You don't often get email from information@tii.ie. [Learn why this is important](#)

Dear Mr. Naughton,

Thank you for your email of 9 August 2021 regarding the above.

TII will endeavour to consider and respond to planning applications referred to it given its status and duties as a statutory consultee under the Planning Acts. The approach to be adopted by TII in making such submissions or comments will seek to uphold official policy and guidelines as outlined in the Section 28 Ministerial Guidelines 'Spatial Planning and National Roads Guidelines for Planning Authorities' (DoECLG, 2012). Regard should also be had to other relevant guidance available at www.TII.ie.

The issuing of this correspondence is provided as best practice guidance only and does not prejudice TII's statutory right to make any observations, requests for further information, objections or appeals following the examination of any valid planning application referred.

With respect to EIAR scoping issues, the recommendations indicated below provide only general guidance for the preparation of an EIAR, which may affect the national road network.

The developer/scheme promoter should have regard, inter alia, to the following:

- TII notes that the subject site accesses the regional/local road network prior to access to the M4, national road, consultations should be had with the relevant Local Authority/National Roads Design Office with regard to locations of existing and future national road schemes,
- TII would be specifically concerned as to potential significant impacts the development would have on the national road network (and junctions with national roads) in the proximity of the proposed development,
- The developer should assess visual impacts from existing national roads,
- The developer should have regard to any Environmental Impact Statement and all conditions and/or modifications imposed by An Bord Pleanála regarding road schemes in the area. The developer should in particular have regard to any potential cumulative impacts,
- The developer, in preparing EIAR, should have regard to TII Publications (formerly DMRB and the Manual of Contract Documents for Road Works),
- The developer, in preparing EIAR, should have regard to TII's Environmental Assessment and Construction Guidelines, including the Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes (National Roads Authority, 2006),
- The EIAR/EIS should consider the Environmental Noise Regulations 2006 (SI 140 of 2006) and, in particular, how the development will affect future action plans by the relevant competent authority. The developer may need to consider the incorporation of noise barriers to reduce noise impacts (see Guidelines for the Treatment of Noise and Vibration in National Road Schemes (1st Rev., National Roads Authority, 2004)),

- It would be important that, where appropriate, subject to meeting the appropriate thresholds and criteria and having regard to best practice, a Traffic and Transport Assessment (TTA) be carried out in accordance with relevant guidelines, noting traffic volumes attending the site and traffic routes to/from the site with reference to impacts on the national road network and junctions of lower category roads with national roads. In relation to national roads, TII's Traffic and Transport Assessment Guidelines (2014) should be referred to in relation to proposed development with potential impacts on the national road network. The scheme promoter is also advised to have regard to Section 2.2 of the NRA/TII TTA Guidelines which addresses requirements for sub-threshold TTA. Any improvements required to facilitate development should be identified. It will be the responsibility of the developer to pay for the costs of any improvements to national roads to facilitate the private development proposed as TII will not be responsible for such costs,

- The designers are asked to consult TII Publications to determine whether a Road Safety Audit is required,

- In the interests of maintaining the safety and standard of the national road network, the EIAR should identify the methods/techniques proposed for any works traversing/in proximity to the national road network.

- TII recommends that that applicant/developer should clearly identify haul routes proposed and fully assess the network to be traversed. Where abnormal 'weight' loads are proposed, separate structure approvals/permits and other licences may be required in connection with the proposed haul route and all structures on the haul route through all the relevant County Council administrative areas should be checked by the applicant/developer to confirm their capacity to accommodate any abnormal 'weight' load proposed.

The national road network is managed by a combination of PPP Concessions, Motorway Maintenance and Renewal Contracts (MMaRC) and local road authorities in association with TII. The applicant/developer should also consult with all PPP Companies, MMaRC Contractors and road authorities over which the haul route traverses to ascertain any operational requirements such as delivery timetabling, etc. and to ensure that the strategic function of the national road network is safeguarded.

Additionally, any damage caused to the pavement on the existing national road arising from any temporary works due to the turning movement of abnormal 'length' loads (e.g., tearing of the surface course, etc.) shall be rectified in accordance with TII Pavement Standards and details in this regard shall be agreed with the Road Authority prior to the commencement of any development on site.

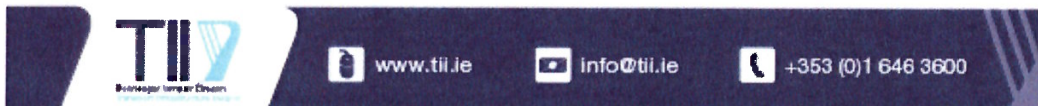
Designers should consult TII Publications to determine whether a Road Safety Audit is required for any of the temporary works proposed. Any recommendations should be incorporated into designs.

Notwithstanding any of the above, the developer should be aware that this list is non-exhaustive, thus site and development specific issues should be addressed in accordance with best practice.

I trust that the above comments are of use in your EIAR preparation.

Yours sincerely,

Alban Mills
Senior Regulatory & Administration Executive
Ref No. TII21-114295



From: David Naughton <dnaughton@mkoireland.ie>

Sent: Monday 9 August 2021 18:05

To: Landuse Planning <LandUsePlanning@tii.ie>

Subject: 210414 - Scoping Document for Proposed Mixed Use Development at Moygaddy, Co. Meath

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Dear Sir or Madam,

Please find attached a cover letter and Scoping Document for a proposed mixed use development in Moygaddy, Co. Meath. The site is located just north of Maynooth town.

As part of the scoping exercise for the proposed development, we would welcome any comments in relation to the proposed project.

If you have any queries, please do not hesitate to contact me.

Kind regards,



David Naughton B.Sc. (Env.)
Environmental Scientist

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APPENDIX 4-1

**SITE LAYOUT PLANNING
DRAWINGS**



PLANNING DRAWING.
NOT FOR CONSTRUCTION.
ALL LEVELS GIVEN ARE
RELATIVE TO ORDNANCE DATUM.
THIS DRAWING HAS BEEN PREPARED FOR INFORMATION
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	Rev No.	Description Note	Date	Issued By	Checked By	Coin by	Check by
* FOR SETTING OUT REFER TO ARCHITECT'S DRAWINGS.	P01	09/17/21	SUITABLE FOR INFORMATION	RM	SMC		
* THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS AND SPECIFICATIONS.	P02	30/06/22	FOR INFORMATION	NM	NM		
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	P05	25/06/22	FOR PLANNING	JC	WM		

[illegible]

			
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		Dublin London Belfast Limerick City Birmingham	
Code Organization Zone Level Type Role Number Status Revision		S6685 OCSC JB KE A1 DR C 0100 S4 P05	
Date: NOV 21 Scale: 1:1000		A1 Drawn By: RM Checked by: JMK Approved by: MK	



APPENDIX 4-2

CONSTRUCTION AND ENVIRONMENTAL MANAGEMENT PLAN

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OCSC

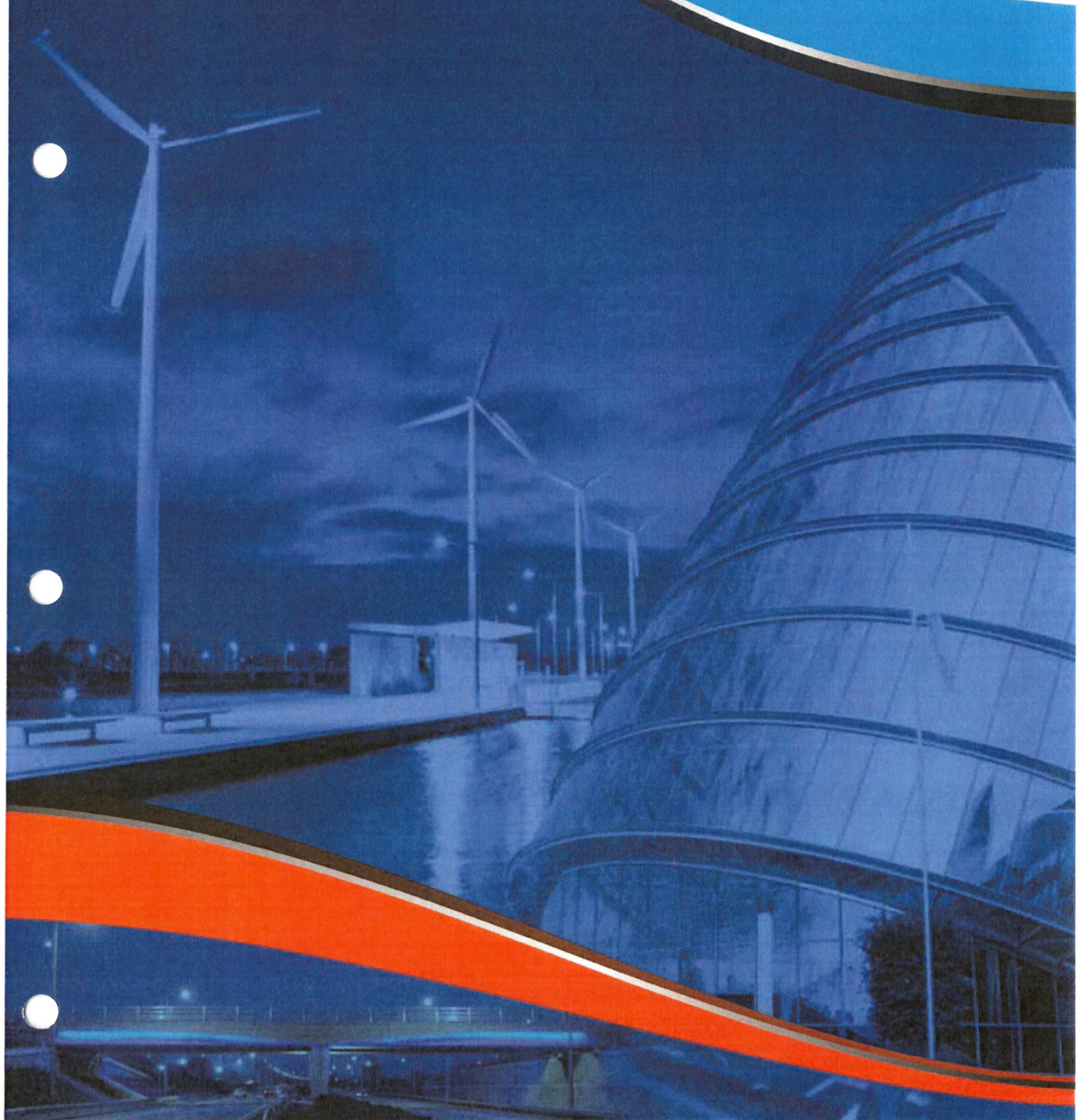
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Multidisciplinary
Consulting Engineers

CONSTRUCTION & ENVIRONMENTAL MANAGEMENT PLAN

KILDARE BRIDGE SECTION

Sky Castle Ltd
S665
30 August 2022



CONSTRUCTION & ENVIRONMENTAL MANAGEMENT PLAN

Kildare Bridge Section

Sky Castle Ltd

S665

30 August 2022

CONSTRUCTION & ENVIRONMENTAL MANAGEMENT PLAN

KILDARE BRIDGE SECTION



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Consulting Engineers

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DOCUMENT CONTROL & HISTORY

OCSC Job No.: S665	Project Code	Originator	Zone Volume	Level	File Type	Role Type	Number	Status / Suitability Code	Revision
	S665	OCSC	1B	KE	RP	C	0008	S4	P01
Rev.	Status	Authors	Checked	Authorised	Issue Date				
P01	S4	WM	AH	AH	30.08.2022				

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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 in the jurisdiction of Kildare County Council (KCC). The majority of the Maynooth Outer Orbital Road is primarily located in the jurisdiction of Meath County Council, 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 northernmost extent of County Kildare, as shown in Figure 1, aligning with the county boundary to Co. Meath. 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:

- Agricultural lands, to the east, south and west; and
- River Rye Water, to the north;



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 Limited for the development of a portion of the Maynooth Outer Orbital Road (MOOR) in the townlands of Carton Demesne, Mariavilla and Maynooth, Co. Kildare.

The proposed development will consist of the following:

1. Provision of a new bridge structure comprising the following:
 - (i) a pedestrian and cycle bridge structure to be erected adjacent to the upstream/western side of the existing Kildare Bridge, with a 2m clearance, with the infrastructure tying into new infrastructure in Co. Meath.
 - (ii) This bridge will be a standalone, independent structure that will also support new water main assets
2. New wastewater rising mains to be installed underground adjacent the bridge structure, to the west.
3. New walkways and cycle track will tie-in with new infrastructure to be constructed by Cairn Homes and their Agents.
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. On the eastern side, the road will tie in in Kildare County, 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 Kildare County. This can be seen in the figure below.



Figure 2: MOOR Eastern Kildare Tie-In

3 CONSTRUCTION PROGRAMME & PHASING

PHASING

It is anticipated that this construction 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 2024

It is anticipated that the construction duration will be approximately 12 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 below. It is anticipated that the site compound will be shared with the Nursing Home & Primary Care Centre development just north of the border, within County Meath. It should be noted that these are only indicative and will be finalised prior to construction.

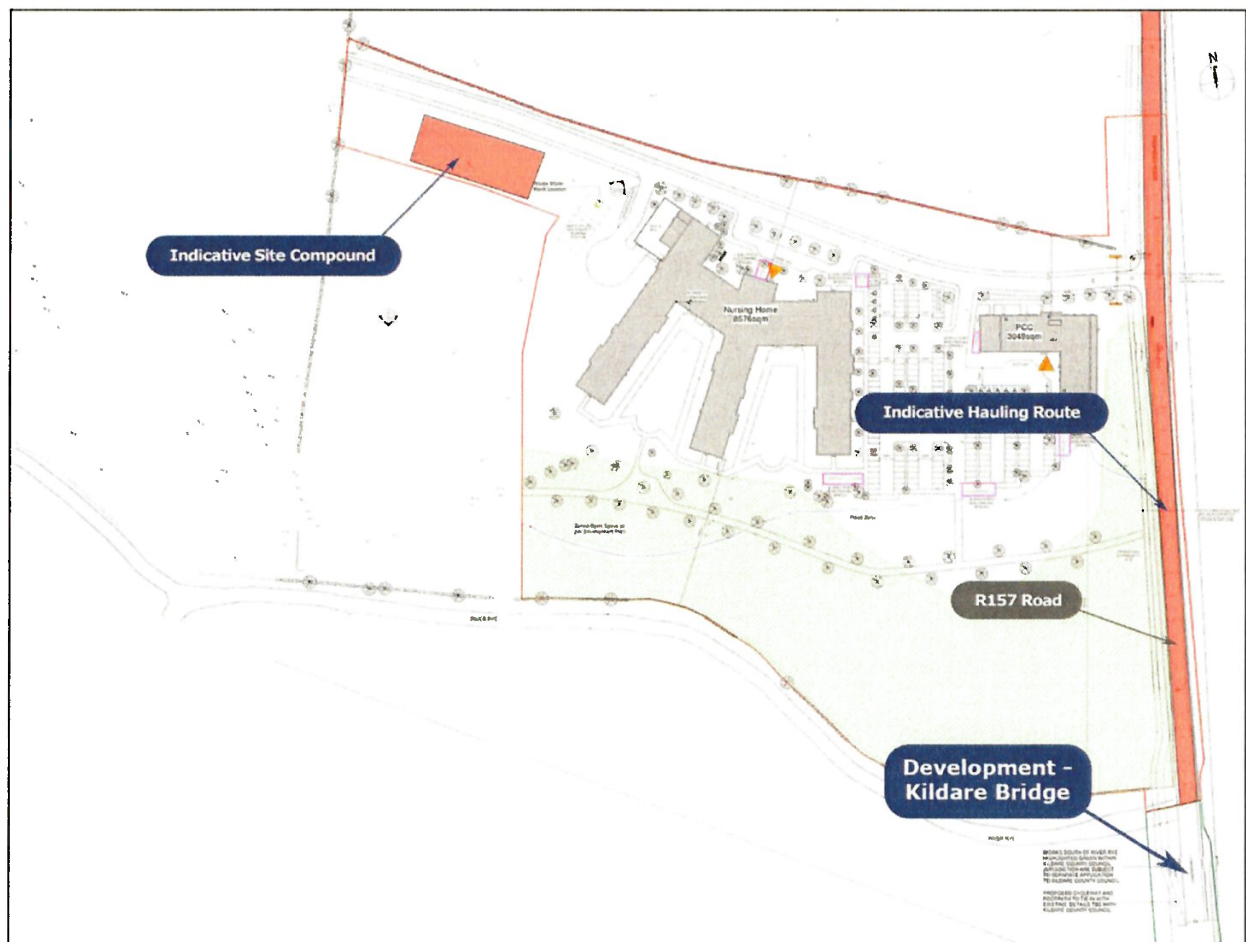


Figure 3: Indicative Site Compound and Hauling Route

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 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 both headwalls and the bridge 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

The bridge to be constructed as part of the scheme has the following key characteristics:

- 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 the 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 this structure is 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 structure to be built adjacent to the existing and proposed public road.

Although it is acknowledged that there are many ways to construct a structure 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 bridge will be constructed both over and adjacent to the live water courses

This bridge is designed to be constructible without carrying out works in the wetted area of the water courses. The structure 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 structure has been preliminarily designed based on the ground conditions present local to the individual structure and 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 bridge 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.

5 ESTIMATED CUT & FILL

Topsoil and subsoil/stones will be excavated to accommodate roads, footpaths, services, and construction. 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	500		320
Total Cut	Cut	Reuse	Export
	500 m ³	320 m ³	180 m ³
Total Fill	Fill	Reuse	Import
	320 m ³	320 m ³	0 m ³
Total Haulage	c. 420 Tonnes		

Table 2: 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.

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 420 tonnes of combined recycling & disposal equate to just over 21 truckloads based on 20 tonnes per load.

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 banded 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 4: 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 in flow 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 3: 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 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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Civil Engineer

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APPENDIX 4-3

**CONSTRUCTION & DEMOLITION
WASTE MANAGEMENT PLAN**

CONSTRUCTION & DEMOLITION WASTE MANAGEMENT PLAN

KILDARE BRIDGE SECTION

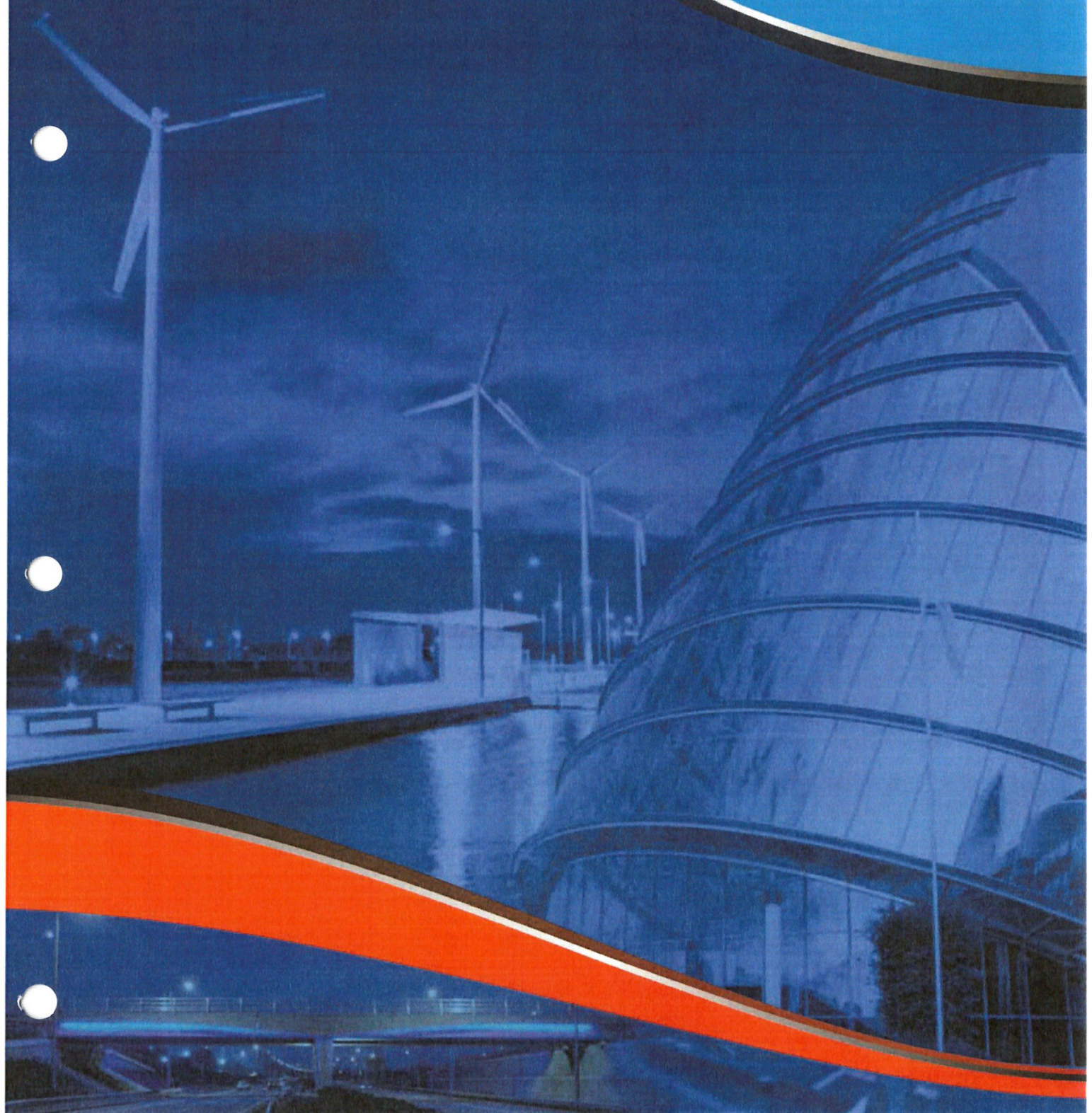
Sky Castle Ltd
S665
30 August 2022



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CONSTRUCTION & DEMOLITION WASTE MANAGEMENT PLAN

Kildare Bridge Section

Sky Castle Ltd

S665

30 August 2022

CONSTRUCTION & DEMOLITION WASTE MANAGEMENT PLAN

KILDARE BRIDGE SECTION



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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 in the jurisdiction of Kildare County Council (KCC). The majority of the Maynooth Outer Orbital Road is primarily located in the jurisdiction of Meath County Council, 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

OVERVIEW AND PURPOSE OF THE CDWMP

This report sets out the Outline Construction & Demolition Waste Management Plan (CDWMP) for the proposed development site. This CDWMP is a preliminary plan written by OCSC multidisciplinary design engineers and will be finalised after the granting of planning permission.

The purpose of this plan is to provide information necessary to outline the final management of Construction and Demolition (C&D) Waste at the site and that this is undertaken in accordance with current legal and industry standards including the *Waste Management Acts 1996 - 2013* and associated Regulations 1, *Protection of the Environment Act 2003* as amended with EPA Acts 1992 to 2013 2, *Litter Pollution Act 1997* as amended 3 and the *relevant Waste Management Plans* and to provide information necessary to ensure that the management of waste produced by the site is carried out in accordance with all current legal and environmental standards. This report has been prepared in accordance with the 'Best Practice Guidelines for the Preparation of Construction & Demolition Waste Management Plans for Construction and Demolition Projects' document produced by the Environmental Protection Agency.

The primary legislative instruments that govern waste management in Ireland and are applicable to the project are:

- Waste Management Act 1996 (No. 10 of 1996) as amended. Sub-ordinate legislation includes: European Communities (Waste Directive) Regulations 2011 (SI 126 of 2011) as amended
- Waste Management (Collection Permit) Regulations (S.I No. 820 of 2007) as amended
- Waste Management (Facility Permit and Registration) Regulations 2007, (S.I No. 821 of 2007) as amended
- Waste Management (Licensing) Regulations 2004 (S.I. No. 395 of 2004) as amended
- Waste Management (Packaging) Regulations 2014 (S.I. 282 of 2014) as amended
- Waste Management (Planning) Regulations 1997 (S.I. No. 137 of 1997)
- Waste Management (Landfill Levy) Regulations 2015 (S.I. No. 189 of 2015)
- European Union (Waste Electrical and Electronic Equipment) Regulations 2014 (S.I. No. 149 of 2014)
- European Union (Batteries and Accumulators) Regulations 2014 (S.I. No. 283 of 2014) as amended
- Waste Management (Food Waste) Regulations 2009 (S.I. 508 of 2009), as amended
- European Union (Household Food Waste and Bio-waste) Regulation 2015 (S.I. No. 191 of 2015)
- Waste Management (Hazardous Waste) Regulations, 1998 (S.I. No. 163 of 1998) as amended

- Waste Management (Shipments of Waste) Regulations, 2007 (S.I. No. 419 of 2007) as amended
- Waste Management (Movement of Hazardous Waste) Regulations, 1998 (S.I. No. 147 of 1998)
- European Communities (Transfrontier Shipment of Waste) Regulations 1994 (SI 121 of 1994)
- European Union (Properties of Waste which Render it Hazardous) Regulations 2015 (S.I. No. 233 of 2015) as amended
- Environmental Protection Act 1992 (No. 7 of 1992) as amended.
- Litter Pollution Act 1997 (No. 12 of 1997) as amended.
- Planning and Development Act 2000 (No. 30 of 2000) as amended

One priority of the CDWMP shall be to promote recycling, reuse and recovery of waste and diversion from landfills wherever possible. Guidance will also be given to ensure the appropriate method of transportation of waste is used to prevent littering or other serious environmental pollution. This plan aims to ensure maximum recycling, reuse and recovery of waste with a diversion from landfills, wherever possible. It also seeks to provide guidance on the appropriate collection and transport of waste from the site to prevent issues associated with litter or more serious environmental pollution (e.g. contamination of soil and/or water) .

In preparation for the CDWMP, the following publications have been used as references:

- BEST PRACTICE GUIDELINES for the preparation of construction & demolition waste management plans for construction & demolition projects. Environmental Protection Agency 2021.
- Construction and Demolition waste management - A handbook for contractors and site managers, FAS and the construction industry federation 2002.
- In tandem with the launch of the National Construction and Demolition waste council, the Department of the Environment, Heritage and Local Government published the "Guidelines for preparation of waste management plans for construction and demolition projects".
- BS 10175:2011+A2:2017, Investigation of potentially contaminated sites, Code of Practice.

- EPA, 2015, Waste Classification, List of Waste & Determining if Waste is Hazardous or Non-hazardous.
- EPA 2013, Guidance on the Management of Contaminated Land and Groundwater at EPA Licensed Sites.
- EPA 2007, Code of Practice, Environmental Risk Assessment for Unregulated Waste Disposal Sites.
- EA, 2015, Guidance on the classification and assessment of waste, Technical Guidance WM3.
- EA, 2019, Land Contamination: Risk Management (CLRM).

These guidelines cover issues to be addressed from the preplanning stage right through to completion. These include:

- Predicted Construction and demolition wastes;
- Classification of material;
- Waste disposal/recycling of construction & demolition wastes at the site;
- List of the sequence of operations to be followed;
- Provision of training for waste managers and site crew;
- Details of the proposed record-keeping system;
- Details of waste audit procedures and plans;
- Details of consultation with relevant stakeholders.

OVERVIEW OF C&D WASTE MANAGEMENT IN IRELAND

Directive 2006/12/EC (repealed with effect from 12th of December 2010) of the European Parliament and of the Council of 19th November 2008 on waste and Directive 2008/98/EC (amended by Directive (EU) 2018/851 and approved by the EU in July 2018, and transposed into Irish Law in July 2020) which is transposed into Irish law by the Waste Management Acts and the European Communities (Waste Directive) Regulations 2011 (the "Waste Directive Regulations") in addition the national legislation is relevant.

The European council of ministers has adopted the revised waste framework directive, a decision that means member states will now be expected to reach a 70% recycling

rate for non-hazardous construction and demolition by 2020. The Waste Directive 2008/98, which is transposed into Irish law by the Waste Management Acts and the European Communities (Waste Directive) Regulations 2011 (the "Waste Directive Regulations") states that uncontaminated soil and other naturally occurring material excavated in the course of construction activities where it is certain that the material will be used for the purposes of construction in its natural state on the site from which it was excavated will not be deemed to be waste. If it is used on a site elsewhere, it may or may not be waste depending on the individual circumstances of the case. It will not be waste if there is no intention to discard it.

The Third Schedule to the Waste Management Acts lists activities commonly regarded as disposal activities while common recovery activities are listed in the Fourth Schedule. Broadly, disposal means getting rid of waste forever by, for example, landfilling it or burning it without recovering the energy from it.

Directive 2008/98/EC lays down the five-step hierarchy of waste management options, with waste prevention as the preferred option, followed by re-use, recycling, recovery and safe disposal, in descending order.

The five-stage waste hierarchy, which is designed to prevent and reduce waste production, is made more certain and comprehensive and moved to a more prominent place in the Waste Directive 98/2008. Article 7 of the Waste Directive Regulations 2011, which came into force on March 31, 2011, transposes the waste hierarchy into Irish law. It is understood that it is not proposed to reuse any material on site with the possible exception of rubble from the demolition works. These will be confirmed by the Contractor and completed in accordance with all legislation. In addition, the directive also deals with the issue of "end of waste" and "by-products" and clarifies the definitions of recovery, disposal and by-product.

The Irish Government issued a policy statement in September 1998 known as 'Changing Our Ways', which identified objectives for the prevention, minimisation, reuse, recycling, recovery and disposal of waste in Ireland. The target for C&D waste in this report was to recycle at least 50% of C&D waste within a five-year period (by 2003), with a progressive increase to at least 85% over fifteen years (i.e. 2013). In response

to the Changing Our Ways report, a task force (Task Force B4) representing the waste sector of the already established Forum for the Construction Industry, released a report entitled 'Recycling of Construction and Demolition Waste' concerning the development and implementation of a voluntary construction industry programme to meet the Government's objectives for the recovery of C&D waste.

The most recent national policy document was published in July 2012, entitled 'A Resource Opportunity - Waste Management Policy in Ireland'. This document stresses the environmental and economic benefits of better waste management, particularly in relation to waste prevention. The document sets out a number of actions in relation to C&D waste and commits to undertake a review of specific producer responsibility requirements for C&D projects over a certain threshold.

The Environmental Protection Agency published a guidance document in 2021 BEST PRACTICE GUIDELINES for the preparation of construction & demolition waste management plans for construction & demolition projects. These guidelines outline the issues that need to be addressed from the pre-planning stage of development all the way through to its completion. These guidelines have been followed in the preparation of this document and include the following elements:

- Predicted C&D wastes and procedures to prevent, minimise, recycle and reuse wastes;
- Waste disposal/recycling of C&D wastes at the site;
- Provision of training for a waste manager and site crew;
- Details of the proposed record-keeping system;
- Details of waste audit procedures and plan; and
- Details of consultation with relevant bodies i.e. waste recycling companies

These guidance documents are considered to define best practice for C&D projects in Ireland and describe how C&D projects are to be undertaken such that environmental impacts and risks are minimised and maximum levels of waste recycling are achieved.

LEGISLATIVE REQUIREMENTS

WASTE MANAGEMENT ACTS, 1996 AS AMENDED AND REGULATIONS MADE UNDER THE ACTS

Waste management in Ireland is subject to EU, national and regional waste legislation which defines how waste materials must be managed, transported and treated. The overarching EU legislation is the Waste Framework Directive (2008/98/EC) which is transposed into national legislation in Ireland. The cornerstone of Irish waste legislation is the Waste Management Act 1996 (as amended).

In addition, the Irish government issues policy documents which outline measures aimed to improve waste management practices in Ireland and help the country to achieve EU targets in respect of recycling and disposal of waste. The most recent policy document A Resource Opportunity – Waste Management Policy in Ireland was published in 2012 and stresses the environmental and economic benefits of better waste management, particularly in relation to waste prevention.

The strategy for the management of waste from the construction phase is in line with the requirements of the Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects published in 2021. The guidance document Construction and Demolition Waste Management: A handbook for Contractors and Site Managers were also consulted in the preparation of this assessment.

The Waste Management Act, of 1996 (as amended) sets out the responsibilities and functions of various persons in relation to waste. In summary the act:-

- Prohibits a person from holding, transporting, recovering or disposing of waste in a manner which causes or is likely to cause environmental pollution.
- Requires any person who carries out activities of an agricultural, commercial or industrial nature to take all such reasonable steps as are necessary to prevent or minimise the production of waste.

- Prohibits the transfer of waste to any person other than an authorised person (i.e. a holder of a waste collection permit or a local authority.)
- Requires the environmental protection agency (EPA) to make a national plan in relation to hazardous waste.
- Requires local authorities to make waste management plans in relation to non-hazardous waste.
- Imposes certain obligations on local authorities to ensure that a service is provided for the collection of household waste and to provide facilities for the recovery and disposal of such waste;
- Enables the minister of the environment and local government to make regulations for various purposes to promote better waste management and provides for substantial penalties for offences including fines, imprisonment and/or liability for clean-up measures.

There are currently no Irish guidelines on the assessment of operational waste generation and guidance is taken from industry guidelines, plans and reports including the EMR Waste Management Plan 2015 – 2021 and BS 5906:2005 Waste Management in Buildings – Code of Practice.

WASTE MANAGEMENT (COLLECTION PERMIT) REGULATIONS, 2007 AS AMENDED

Waste from the proposed development may only be collected by the holder of a waste collection permit or a local authority. The effect of s.34 of the Waste Management Acts is that waste (whether hazardous or not) should only be given to a haulier or collector who has the correct permit under the Waste Management (Collection Permit) Regulations 2008 (the "Waste Collection Permit Regulations"), or whatever regulations amend or replace them, to collect and transport the particular waste in question, or to a local authority.

Waste storage and collection areas on site should be designed to prevent environmental pollution.

WASTE MANAGEMENT (SHIPMENTS OF WASTE) REGULATIONS 2007 S.I. NO. 419

Where waste from the proposed development is exported outside of Ireland for recovery or disposal the national TFS office within Dublin City Council must be notified. Certain financial guarantees must be in place and certificates issued by the national TFS officer prior to the waste movement taking place. If the waste involved is hazardous, the contractor must ensure that it complies with the Waste Management (Hazardous Waste) Regulations 1998 (as amended) and the European Communities (Shipments of Hazardous Waste exclusively within Ireland) Regulations 2011, unless it is exempted from compliance with those Regulations under art.35 of the Collection Permit Regulations. Hazardous waste can only be given to a collector or haulier with a collection permit under the Waste Collection Permit Regulations and the collector or haulier must bring the waste to a licensed hazardous waste management facility and ensure that it is shipped within Ireland in accordance with the stringent requirements of the European Communities (Shipments of Hazardous Waste exclusively within Ireland) Regulations 2011 and/or exported from Ireland in accordance with the Waste Management (Shipments of Waste) Regulations 2007 (as amended) and Council Regulation (EC) No. 1013/2006 on shipments of wastes, as amended (the "TFS Regulations").

POLICIES AND GUIDANCE – A HISTORY

DOEHLG – WASTE MANAGEMENT CHANGING OUR WAYS (SEPTEMBER 1998)

The October 1998 policy statement on waste management – "changing our ways" – outlines the government's policy objectives in relation to waste management and suggests some key issues and considerations that must be addressed in order to achieve these objectives. In particular, it focuses on the need to give clear and particle expression to the requirements of the hierarchy, by developing and pursuing integrated solutions, which combine progressive policies with a suitable and cost-effective waste infrastructure.

Changing our ways set the following ambitions targets for achievement over a fifteen-year time scale.

- A diversion of 50% of overall household waste away from landfill
- A minimum 65% reduction in biodegradable municipal wastes consigned to landfill
- The development of composting and other feasible biological treatment facilities capable of treating up to 300,000 tonnes of organic waste annually.
- Materials recycling of 35% of municipal waste.
- Recovery of at least 50% of construction and demolition waste within a five-year period, with a progressive increase to at least 85% over fifteen years.
- Rationalisation of municipal waste landfills with progressive and sustained reductions in numbers, leading to an integrated network of some 20 or so state-of-the-art facilities incorporating energy recovery and high standards of environmental protection.

DOEHLG – PREVENTING AND RECYCLING WASTE – DELIVERING CHANGE – A POLICY STATEMENT (2002)

The government added to the messages presented in waste management “changing our ways” with the publication of preventing and recycling waste – delivering change 2002. In addition to setting objectives, the policy statement set out how these might be achieved through investment from the national development plan in waste infrastructure. The key objectives of the policy statement are:

- The setting up of a market development group focusing on markets for recyclables.
- Formulating a national strategy on biodegradable waste policy.
- Expansion of the network of civic amenity sites and materials recycling facilities.

DOEHLG – WASTE MANAGEMENT – TAKING STOCK AND MOVING FORWARD (2004)

Waste management – taking stock and moving forward reviews progress of implementing key policies including the national waste prevention to 2004. It sets up a framework for implementing key policies including the national waste prevention programme and the setting up of a market development group. It also sets an objective

date of 1st January 2005 for the implementation of user-based sharing for waste collection.

DOEHLG – NATIONAL STRATEGY ON BIODEGRADABLE WASTE (2021)

The national strategy on biodegradable municipal waste published by the DoEHLG in 2021 sets out measures to progressively divert biodegradable municipal waste from landfill in accordance with the agreed targets in EU Directive 1999/31/EC on the landfill of waste (landfill Directive). By 2016, the region of 1.8 million tonnes of biodegradable municipal waste will need to be diverted annually in order to meet the directive's targets.

The strategy is based on the integrated waste management approach established as government policy since the publication of "change our ways" in 1998. The preferred options for dealing with biodegradable municipal waste (BMW) are:

- Prevention and minimisation – avoiding generating waste.
- Recycling – mainly paper and cardboard but also textiles.
- Biological treatment – mainly of kitchen and garden waste including composting.
- Residual treatments – thermal treatment with energy recovery by way of mechanical biological treatment.

WASTE MANAGEMENT PLAN FOR THE DUBLIN REGION 2005-2010

The Dublin Region Waste Management Plan 2005-2010 aims toward achieving 59% recycling, 25% incineration and 16% landfill. The 2011 annual progress report shows waste management rates are improving year on year. The household recycling rate is up 3%- 44%, municipal waste recovery is up 1% to 47% and landfilling has decreased by 1% to 53%. The region remains overly reliant on the landfill with 49% of commercial waste sent for disposal. There remains a need to develop recovery alternatives for residual waste.

EASTERN - MIDLANDS REGIONAL WASTE MANAGEMENT PLAN 2015 – 2021

The Eastern Midlands Regional Waste Management Plan 2015-2021 identified the following targets:

- Preparing for reuse and recycling rate of 60-70% of Municipal Waste by the end of 2030.
- Eliminate the use of landfilling of all major waste streams including municipal, industrial and construction and demolition wastes in favour of recovery of residual wastes.

NATIONAL WASTE PREVENTION PROGRAMME (NWPP)

A National Waste Prevention Programme (NWPP) operated by the EPA, focuses on reporting on the prevention and minimization of waste. It produces annual progress reports. A Resource Efficiency Unit (formerly known as the Core Prevention Team), within the EPA, promotes waste minimization. A Prevention Programme Steering Group also known as the NWPP Steering Committee was established to "liaise with public authorities, monitor the overall thrust of the NWPP, and provide strategic direction to the CPT." A new National Waste Prevention Plan entitled "Towards a Resource Efficient Ireland, A National Strategy to 2020" was published in 2014. A report on the Overview of progress made on waste prevention projects during 2014 was published by the EPA in 2015 and is available on its website.

2 PROJECT DESCRIPTION

STUDY AREA

The subject site is located on the northernmost extent of County Kildare, as shown in Figure 1, aligning with the county boundary to Co. Meath. 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:

- Agricultural lands, to the east, south and west; and
- River Rye Water, to the north;

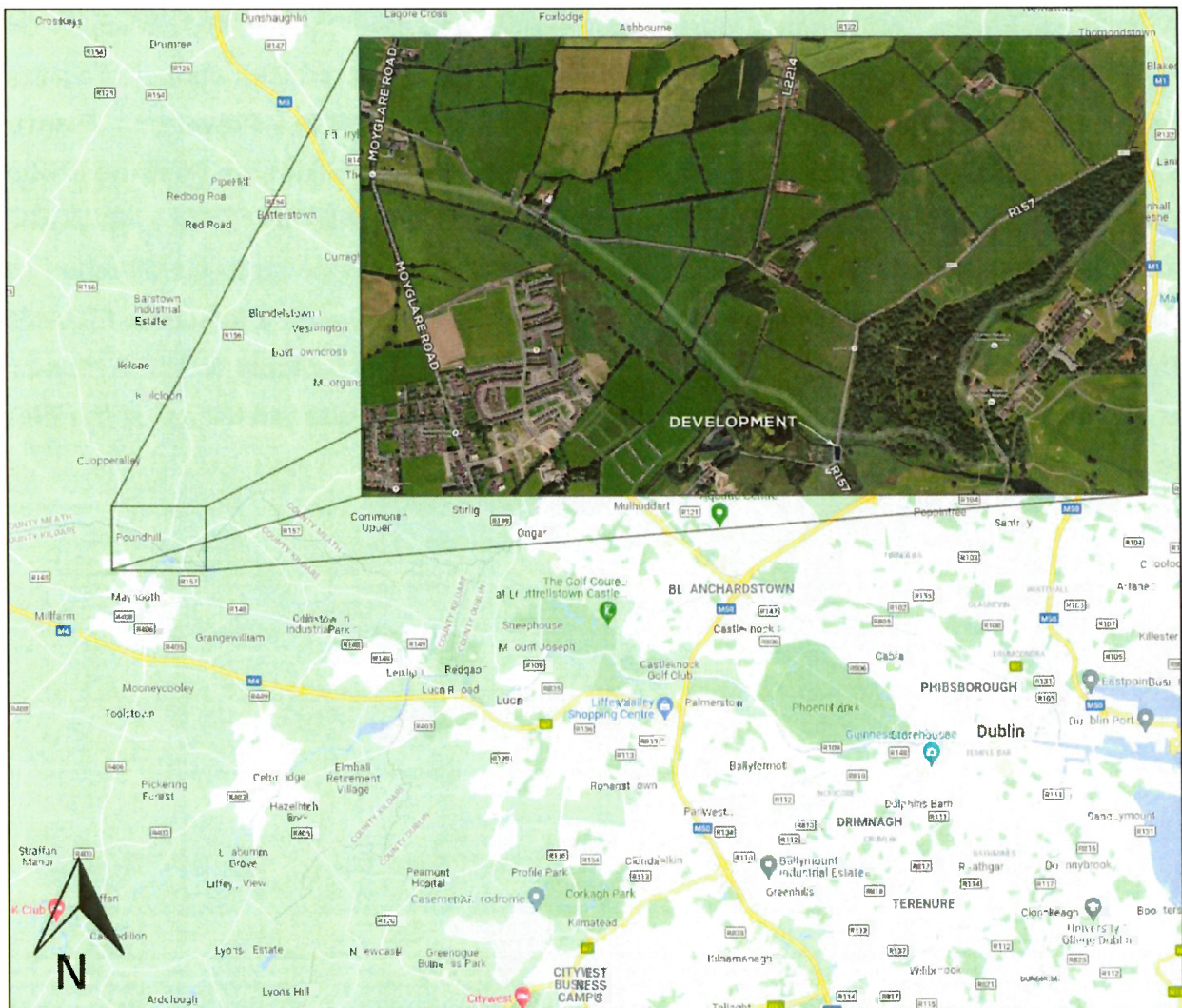


Figure 1: Development Locality Plan

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 Limited for the development of a portion of the Maynooth Outer Orbital Road (MOOR) in the townlands of Carton Demesne, Mariavilla and Maynooth, Co. Kildare.

The proposed development will consist of the following:

1. Provision of a new bridge structure comprising the following:
 - (i) a pedestrian and cycle bridge structure to be erected adjacent to the upstream/western side of the existing Kildare Bridge, with a 2m clearance, with the infrastructure tying into new infrastructure in Co. Meath.
 - (ii) This bridge will be a standalone, independent structure that will also support new water main assets
2. New wastewater rising mains to be installed underground adjacent the bridge structure, to the west.
3. New walkways and cycle track will tie-in with new infrastructure to be constructed by Cairn Homes and their Agents.
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.

DEVELOPMENT & SITE OVERVIEW

The MOOR will be a single carriageway road connecting the Maynooth environs between the east and west. On the eastern side, the road will tie in in Kildare County, 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 Kildare County. This can be seen in the figure below.



Figure 2: MOOR Eastern Kildare Tie-In

PHASING & CONSTRUCTION

It is anticipated that this construction will be completed in one phase.

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 2024

It is anticipated that the construction duration will be approximately 12 months.

3 KEY MATERIALS & QUANTITIES

CONSTRUCTION PHASE WASTE

The bulk of waste material generated from the proposed development will be from the excavation of the subsoil to accommodate the construction of the under-croft and foundation structures.

Soil generated as part of the construction works will be managed in accordance with a *Soil Waste Management Plan* to be produced by an environmental management company based on the site investigation results in advance of the construction stage. That report will identify the nature and classification of the soil waste and will detail management procedures to be implemented to ensure appropriate handling and disposal in accordance with Irish and EU legislative requirements.

Additional waste as part of construction activities is expected. This waste will be produced from surplus materials such as broken or cut-offs of concrete blocks, bricks, tiles, timber, steel reinforcement etc. Waste from packaging and the oversupply of materials is also expected and should be recycled where possible.

Paints, glues, adhesives, and other known hazardous substances will be stored in designated areas. They will generally be present in small volumes only and associated waste volumes generated will be kept to a minimum. Wastes will be stored in appropriate receptacles pending collection by an authorised waste contractor.

In addition, WEEE (containing hazardous components), printer toner/cartridges, batteries (Lead, Ni-Cd or Mercury) and/or fluorescent tubes and other mercury-containing waste may be generated from C&D activities or temporary site offices. These wastes (if encountered) will be stored in appropriate receptacles in designated areas of the site pending collection by an authorised waste contractor.

CATEGORIES OF CONSTRUCTION WASTE GENERATED

The European Waste Catalogue (EWC) classifies waste materials and categorises them according to what they are and how they are produced. It is referred to in a number of European Union directives and commission decisions regarding waste management.

In 1994, the first European waste catalogue and the hazardous waste list were published as two separate documents. The lists were used by the Environment Protection Agency for the compilation of waste data from 1995 and were adopted into Irish legislation by the Waste Management Act 1996. In 1996 the Environmental Protection Agency published a single list incorporated both the European Waste Catalogue and the Hazardous waste list. The European Waste Catalogue and the hazardous waste list are used for the classification of all wastes and hazardous wastes and are designed to form a consistent waste classification system across the EU. They form the basis of all national and international waste reporting obligations, such as those associated with waste licences and permits, the national waste database and the transport of waste. The EPA published a more concise guide of these in January 2002.

Correct classification is the foundation for ensuring that the collection, transportation, storage and treatment of waste is carried out in a manner that provides protection for the environment and human health and is in compliance with legal requirements.

The waste classification system applies across the EU and is the basis for all national and international waste reporting obligations. From 1 June 2015, waste classification is based on:

- Commission Decision of 18 December 2014, amending Decision 2000/532/EC on the list of waste pursuant to Directive 2008/98/EC of the European Parliament and of the Council (2014/955/EEC) [referred to hereafter as 'The List of Waste (LoW)'].
- Commission Regulation (EU) No 1357/2014 of 18 December 2014, replacing Annex III to Directive 2008/98/EC of the European Parliament and of the Council on waste and repealing certain Directives.

The aforementioned document consolidates the legislation and allows the generators of waste to classify the waste as hazardous or non-hazardous and in the process assign the correct List of Waste entry. It also replaces the 2002 European Waste Catalogue and the Hazardous Waste List

A non-exhaustive List of Waste expected for typical waste materials to be generated for this site is as follows and available online Waste Classification List of Waste & Determining if Waste is Hazardous or Non-hazardous APPLICABLE FROM 5 JULY 2018:

17 CONSTRUCTION AND DEMOLITION WASTES (INCLUDING EXCAVATED SOIL FROM CONTAMINATED SITES)	
17 01 01	concrete
17 01 02	bricks
17 01 03	tiles and ceramics
17 01 06*	mixtures of, or separate fractions of concrete, bricks, tiles and ceramics containing hazardous substances
17 01 07	mixtures of concrete, bricks, tiles and ceramics other than those mentioned in 17 01 06
17 02 01	wood
17 02 02	glass
17 02 03	plastic
17 02 04*	glass, plastic and wood containing or contaminated with hazardous substances
17 05 03*	soil and stones containing hazardous substances
17 05 04	soil and stones other than those mentioned in 17 05 03*
17 06 01*	insulation materials containing asbestos
17 06 03*	other insulation materials consisting of or containing hazardous substances
17 06 04	insulation materials other than those mentioned in 17 06 01* and 17 06 03*
17 06 05*	construction materials containing asbestos
17 09 04	mixed construction and demolition wastes other than those mentioned in 17 09 01, 17 09 02 and 17 09 03

Table 1: Construction & Demolition Wastes

ANTICIPATED CONSTRUCTION HAZARDOUS WASTE

Fuels used during construction will be classed as hazardous and these will be stored (for site machinery etc.), in suitable tanks with the draw-off points banded. Where this is the case, it is not expected that there will be any fuel wastage.

Waste mixtures contain dangerous substances classified as hazardous waste. This will not be used as fill on the site and only be disposed of in a licensed hazardous waste facility.

ESTIMATED CONSTRUCTION WASTE GENERATED

Taken from the Irish EPA figures, the following is the breakdown of construction and demolition waste types expected to be generated from a typical site such as this per m².

Waste Types	%
Soil & Stones	83
Concrete, Bricks, tiles, plastics etc	13
Asphalt, tar/tar products	1
Metals	1
Others	2
Total Waste	100

Table 2: Waste materials generates from a typical Irish construction site

It should be noted that until final materials and detailed construction methodologies have been confirmed, it is difficult to predict with a high level of accuracy the construction waste that will be generated from the proposed works as the exact materials and quantities may be subject to some degree of change and variation during the construction process.

If the material is deemed to be waste, then removal and reuse/recovery/disposal of the material will be carried out in accordance with the Waste Management Acts 1996 – 2011 as amended, the Waste Management (Collection Permit) Regulations 2007 as amended and the Waste Management (Facility Permit & Registration) Regulations 2007 as amended. Once all available beneficial reuse options have been exhausted, the options of recycling and recovery at waste-permitted and licensed sites will be considered.

In the event that contaminated material is encountered and subsequently classified as hazardous, this material will be stored separately from any non-hazardous material. It will require off-site treatment at a suitable facility or disposal abroad via Transfrontier Shipment of Wastes (TFS):

Category	Qualifying Criteria
Category A	Inert Material, suitable for disposal at a waste permitted site in Ireland
Category B	Inert Material is suitable for disposal at an inert waste landfill in Ireland. Note this can be subdivided into B1 and B2
Category C	Non-hazardous material, suitable for disposal at a landfill facility in Ireland or for disposal/recovery in continental Europe
Category D	Hazardous material as defined by the application of the 'Hazardous Waste Classification Tool' is suitable for disposal/recovery in Continental Europe.

Table 3: Waste Categories

The following table shows typical target values for the management of waste at the site, to be completed by the contractor prior to starting on site.

Waste Types	Waste	Reuse/Recover		Recycle		Disposal	
	tonnes	%	tonnes	%	tonnes	%	tonnes
Soil & Stones	420	20	84	0	0	80	336
Concrete, Bricks, tiles, plastics etc	66	0	0	80	53	20	13
Asphalt, tar/tar products	5	0	0	20	1	80	4
Metals	5	5	0	90	5	5	0
Others	10	10	1	40	4	50	5
Total	506	-	85	-	62	-	359

Table 4: Predicted construction waste targets for the proposed development

4 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 3: 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.

SITE MANAGEMENT

RESOURCE MANAGER

A dedicated Resource manager will be appointed to ensure commitment, efficiency and site protocols are upheld during the construction stage.

The role of the Resource manager will be to record, oversee and manage the everyday handling of waste on the site.

Their training will be in setup and maintaining record-keeping systems and how to produce an audit to ensure waste management targets are being met.

They shall also be trained in the best methods for the segregation and storage of recyclables. They will also be familiar with the suitability of material reuse and know how to implement the CDWMP.

Dún Laoghaire-Rathdown County Council will be consulted throughout the Construction phase to ensure that all available waste reduction, reuse and recycling options are being explored and utilised and that compliant Waste Management is being carried out at the site.

SITE CREW

This shall be the responsibility of the resource manager and a training programme will be organised, and incorporated into typical onsite inductions to give an awareness of waste segregation on the site.

This will outline the types and treatments that should be given to different materials and hazardous materials.

DOCUMENTATION

All waste will be weighed and documented prior to leaving the site. Records will be kept at the site and at the relevant waste facility.

All movement of waste and the use of waste contractors will be undertaken in accordance with the *Waste Management Acts 1996 - 2011*, *Waste Management (Collection Permit) Regulations 2007* as amended and *Waste Management (Facility Permit & Registration) Regulations 2007* and amended. This includes the requirement for all waste contractors to have a waste collection permit issued by the NWCPO. If the waste is being transported to another site, a copy of the Local Authority waste COR/permit or EPA Waste/IE Licence for that site will be provided to the nominated project waste manager.

Construction and Demolition municipal waste will be separated and stored wherever possible and monitored/inspected by the site foreperson prior to removal to ensure that site protocol for recycling is being adhered to.

RECORD KEEPING

Specialist companies, where required, will be contacted to determine their suitability and each company's record reviewed to ensure relevant current collection permits/licenses are held.

Companies will also be contacted to gather information regarding the treatment of hazardous materials and if required costs of handling and the best methods of transportation for recycling or reuse when hauling off-site.

Records shall be kept for each material leaving the site for all types of use or disposal. This shall take the following basic outline form:

- Waste taken for reuse off-site
- Waste taken for recycling
- Waste taken for disposal

- Reclaimed waste materials brought to the site for reuse.

For any movement of waste, a docket shall be signed and recorded by the waste manager, detailing the type and weight of material and source or destination.

This will be readily comparable with all delivery records to the site, so a waste generation percentage for each material can be determined.

This will allow ease of comparison of figures with targets established for the recovery, reuse and recycling of Construction waste. It will also highlight the source of failure in meeting these targets.

WASTE AUDITS

The resource manager shall perform audits at the site during the complete construction phase of the works.

This shall ensure that all records are maintained for all movements of all materials.

Records shall also be readily available for comparison with the site's targets.

At the completion of the Construction phase, a final report will be prepared to outline the results of the Resource Management process and the total reuse, recycling and recovery figures for the site.

SIGNAGE

The resource manager shall ensure that appropriate signage is in place

STORAGE

The resource manager shall ensure that appropriate storage is provided for the different waste streams including:

- Dedicated skips
- Hazardous materials storage
- Stockpile management

5 PREDICTED IMPACTS OF THE PROPOSED DEVELOPMENT

Assuming all the proposed mitigation measures are implemented, the following impacts are expected to arise as a result of the proposed development.

CONSTRUCTION PHASE

Significant volumes of waste materials will be generated during the construction of the proposed development. Careful management of waste including segregation at source will help to ensure maximum recycling, reuse and recovery are achieved, in accordance with current local national waste targets.

It is expected however that a certain amount of waste will still need to be disposed of at landfill. Assuming appropriate facilities are provided, environmental impacts (e.g. litter, contamination of soil or water etc.) arising from waste storage are expected to be minimal. Particular attention must be given to the appropriate management of construction waste containing contaminated or hazardous materials. The use of suitably licenced waste contractors will ensure compliance with relevant legal requirements and appropriate off-site management of waste.

In summary, if the final CDWMP is implemented and a high level of due diligence is carried out at the site, it is envisaged that the environmental impact of the construction phase of the proposed development will be short-term and slight, with respect to waste management.

OPERATION PHASE

As with the construction phase, waste materials will be generated during the operational phase of the proposed development. Again, careful management of these, including segregation at source, will help ensure acceptable local and national waste targets are met. It is expected that some waste, for example, mixed non-recyclables will still be required to be disposed of at landfill.

Assuming appropriate on-site storage is provided, environmental impacts (e.g. litter and to a lesser extent contamination of soil and water etc.) arising from waste storage are expected to be minimal. Bin stores will be located throughout the development. The use of suitably licenced waste contractors will ensure compliance with the relevant legal requirements and appropriate off-site management of waste.

In summary, if the operational phase management plan is implemented and a high level of due diligence is carried out at the site, it is envisaged that the environmental impact of the operation phase of the proposed development will be long-term and slight, with respect to waste management. A separate Operation Waste Management Plan has been prepared for this phase.

6 VERIFICATION

This report was compiled and verified by:

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Civil Engineer
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APPENDIX 4-4

BRIDGE OPTIONS REPORT



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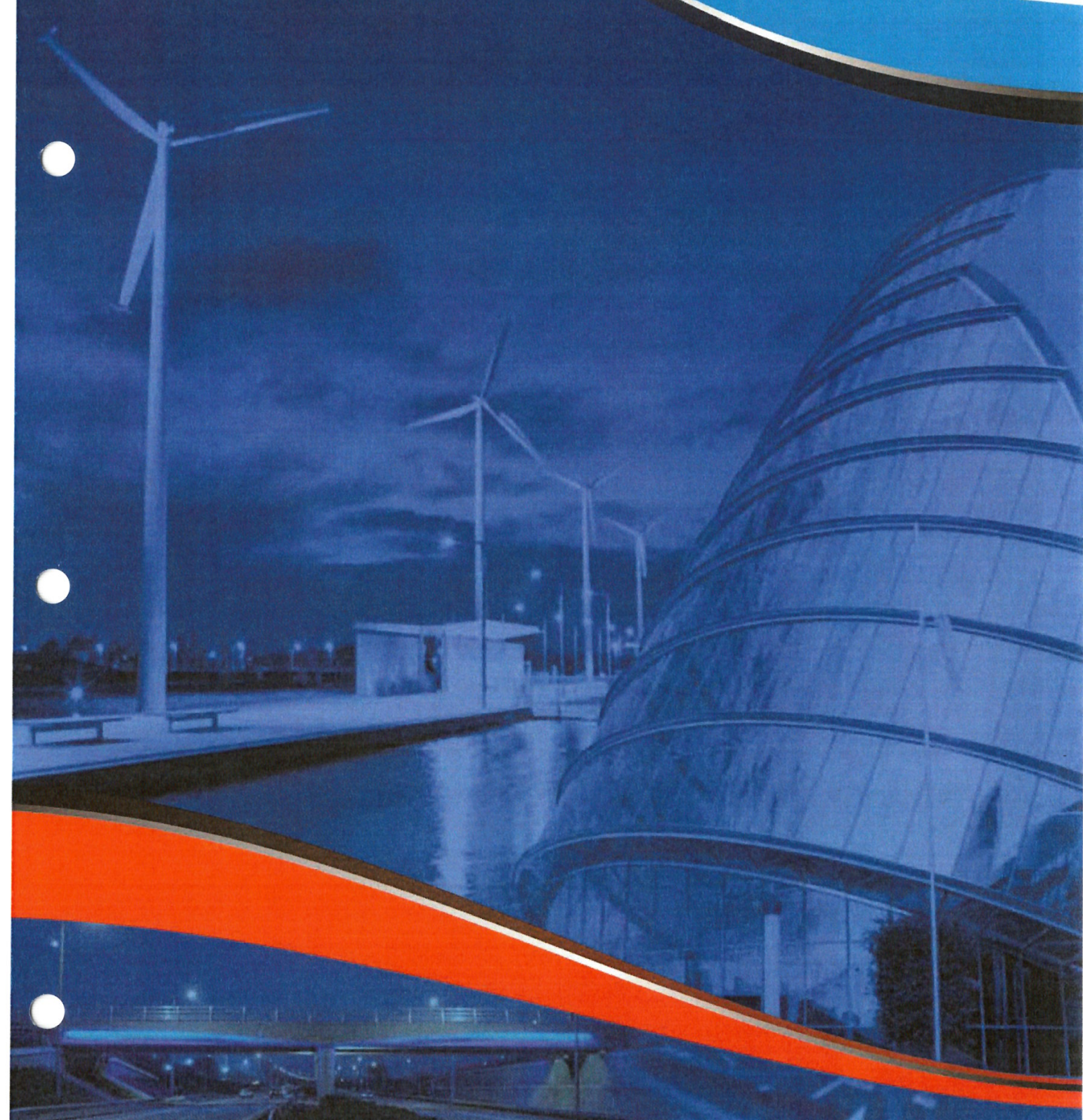
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BRIDGE OPTIONS REPORT

MOYGADDY MASTERPLAN LANDS

Sky Castle Ltd
S665

19 August 2022



BRIDGE OPTIONS REPORT

Moygaddy Masterplan Lands

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BRIDGE OPTIONS REPORT

MOYGADDY MASTERPLAN LANDS



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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;

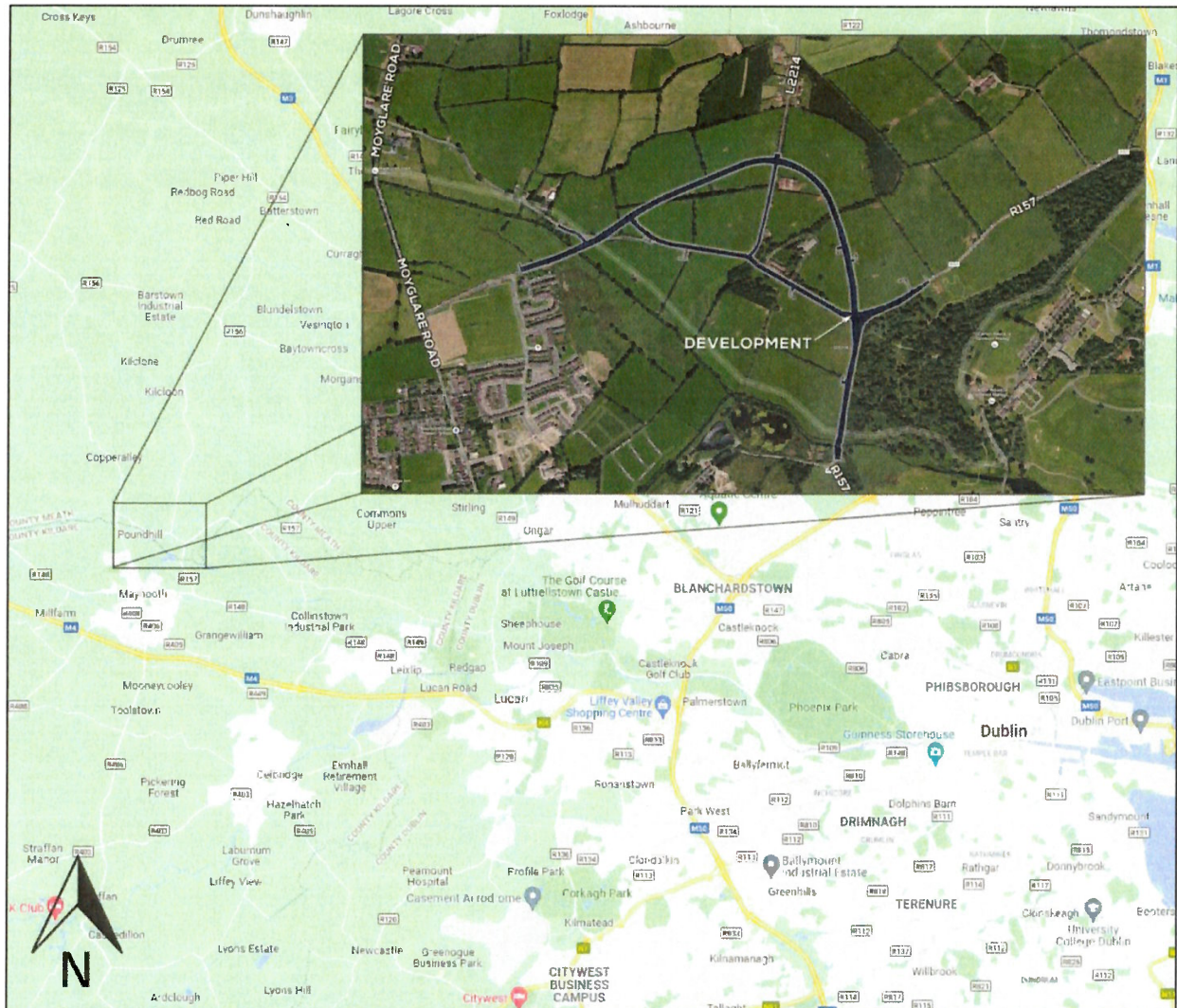


Figure 1: Development Locality Plan

BRIDGE STRUCTURES

There are five bridge structures required within the project's extent. Two bridge structures carry a regional road and a shared pedestrian/cyclist laneway, and three structures carry a shared pedestrian/cyclist laneway only. These are referred to as 'road' bridges and 'pedestrian' bridges for the remainder of the report. All bridge structures will be built to facilitate the phased development. This Options Report has been prepared per TII standard DN-STR-03001 Appendix B.

2 DESCRIPTION OF STRUCTURES AND OPTIONS CONSIDERED

SITE LOCATION

The proposed development is bounded by the River Ryewater to the south, and farmland to the north. A Site-Specific Flood Risk Assessment has determined that the development is located without a flood zone. Refer to the separate SSFRA OCSC report, S665-OCSC-1C-XX-RP-C-0009, and JBA Consulting's Flood Risk Assessment report on the Moygaddy Masterplan for details. The conclusions in these reports have been considered in the road alignment and hence, the geometry and type of bridge structures.

Refer to the figure below for the location of Applicant-owned lands, in the Maynooth Environs area, in which the new bridge structures are to be provided, along with local watercourses. A total of 5nr. bridge structures are to be provided through the Maynooth Environs area, to facilitate the provision of the new Maynooth Outer Orbital Route (MOOR) and improvements to pedestrian and cycle connectivity throughout.



Figure 2: Site Location and Local Watercourses

BRIDGE STRUCTURES

A total of 5 nr. bridge structures are to be provided through the Maynooth Environs area, to facilitate the provision of the new Maynooth Outer Orbital Route (MOOR) and improvements to pedestrian and cycle connectivity throughout.

Refer to the figure below for the location of the proposed bridge structures.

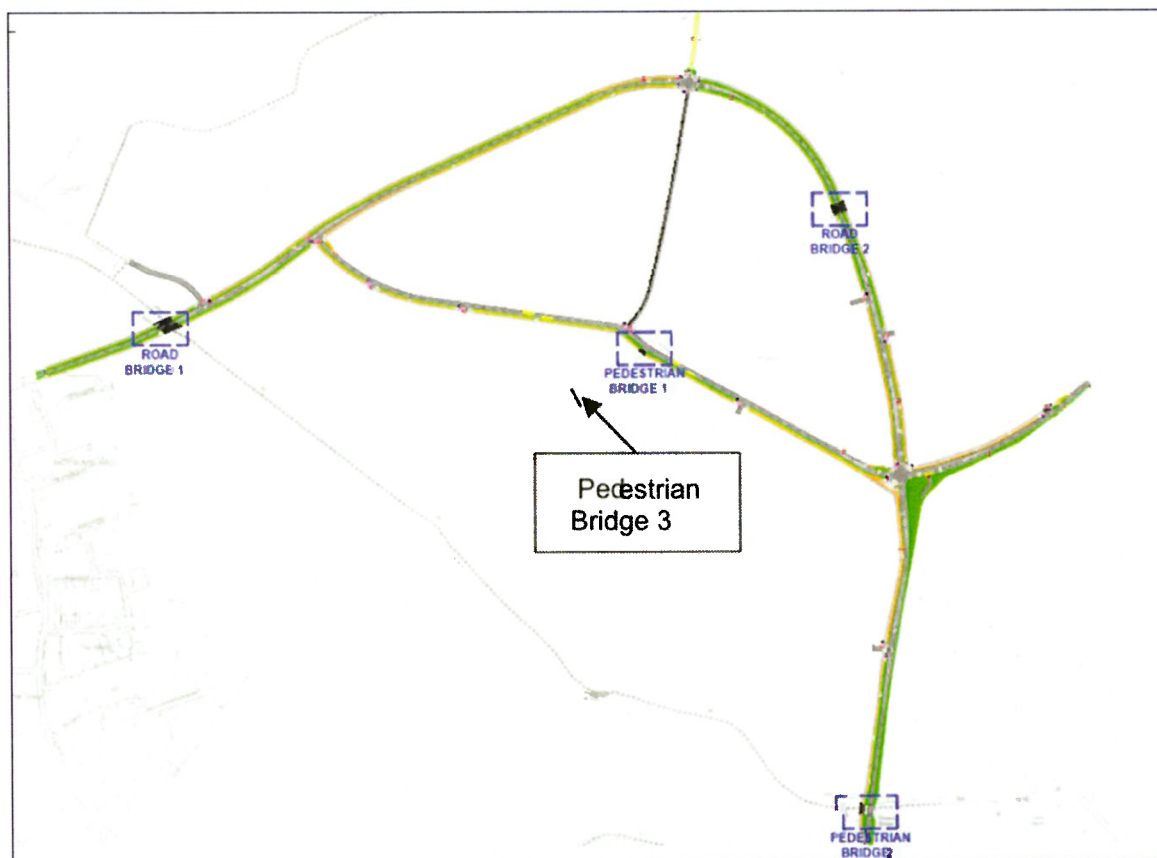


Figure 3: Location of Bridges

The noted bridges are summarised as follows:

ROAD BRIDGE 1

This is to comprise a 50m span across the River Rye Water, and link west Maynooth to the proposed new MOOR, which shall include pedestrian and cycle facilities and extension of water main assets to serve new development in Maynooth Environs. The elevation and cross-section of this bridge is shown in the figure below.

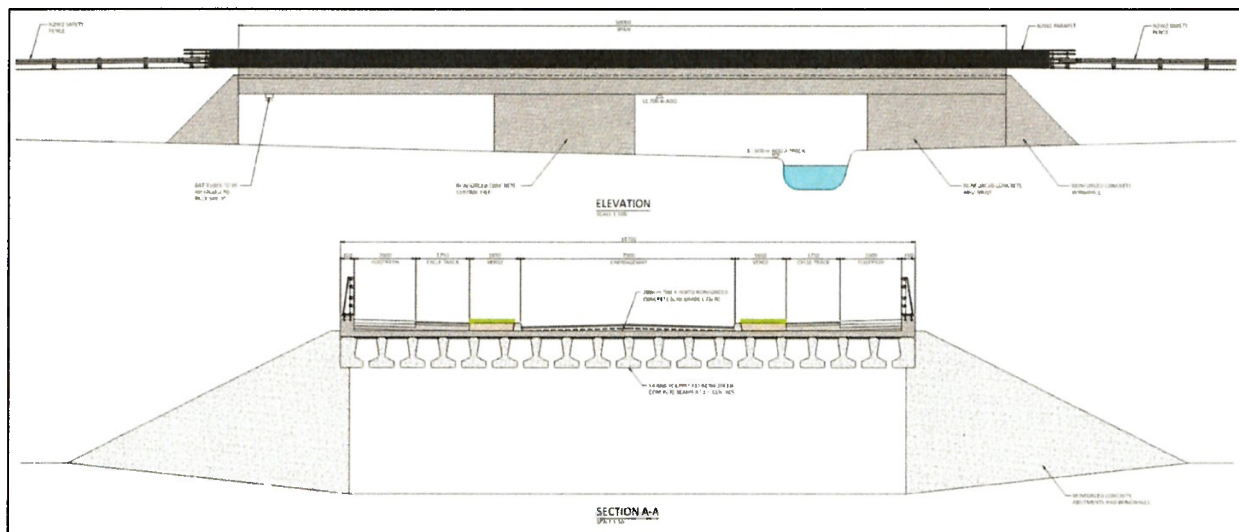
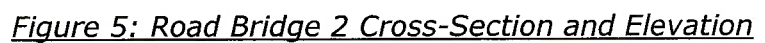


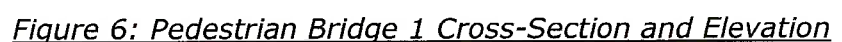
Figure 4: Road Bridge 1 Cross-Section and Elevation

ROAD BRIDGE 2

This is to comprise a short-span vehicular bridge, as part of the new MOOR, including pedestrian and cycle facilities. The elevation and cross-section of this bridge is shown in the figure below.



This is a new pedestrian and cycle bridge structure that will be erected adjacent to the downstream side of the existing vehicular bridge at this location, which spans the Blackhall Little stream. It is to be a standalone, independent structure. The elevation and cross-section of this bridge is shown in the figure below.



PEDESTRIAN BRIDGE 2

This is a new pedestrian and cycle bridge structure that will be erected adjacent to the upstream/western side of the existing Kildare Bridge at this location and is to be a standalone, independent structure, that shall also support new water main assets. New wastewater rising mains shall also be installed underground, adjacent to this bridge structure, to its west. The elevation and cross-section of this bridge is shown in the figure below.

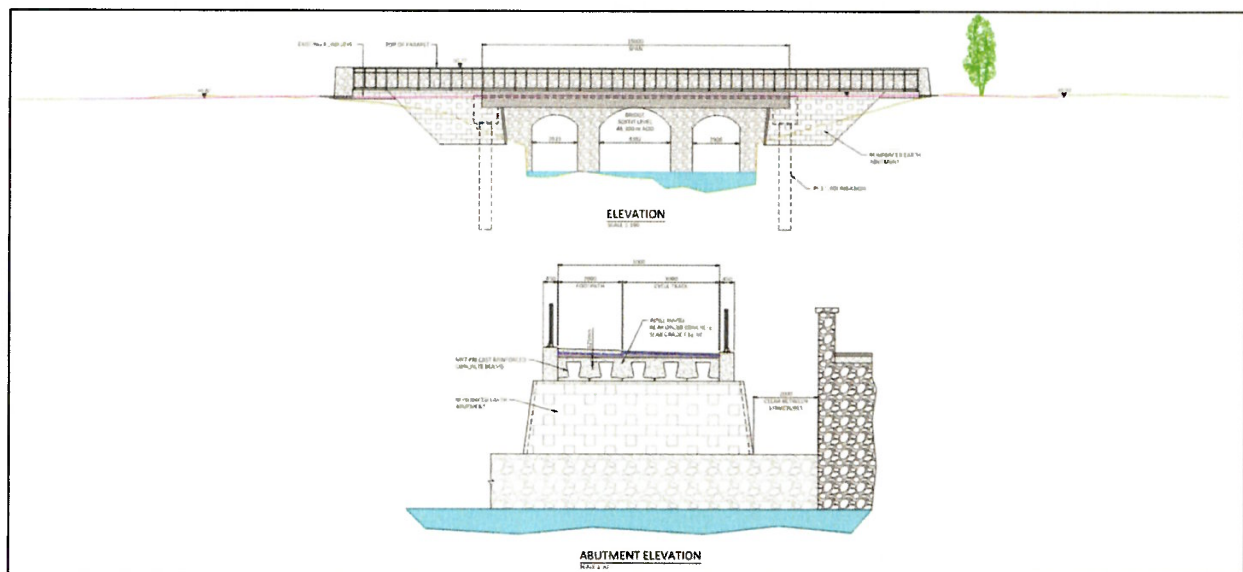


Figure 7: Pedestrian Bridge 2 Cross-Section and Elevation

PEDESTRIAN BRIDGE 3

A new pedestrian and cycle bridge structure is to be provided as part of the Strategic Housing Development scheme, over the Blackhall Little, linking the residential units with the proposed scout's den and creche. The new bridge structure will also support a gravity wastewater pipe, to facilitate a connection over to the location of the proposed strategic wastewater pumping station. The elevation and cross-section of this bridge will be similar to Pedestrian Bridge 1, shown in Figure 6.

FUNCTION OF THE STRUCTURES

The function of the structures is to carry motorists, pedestrians and cyclists over the two watercourses, the River Rye and the Blackhall Little Stream, that dissect the proposed development. The structures are to have little or no impact on the adjacent flood plain and properties. A freeboard of 600mm between the design flood level and the minimum bridge soffit level has been adopted. The location of bridge supports will be located outside of the flood plain where practically possible. The purpose of this report is to discuss the various options of structural form to minimise the impact on the surrounding environs .

ALIGNMENTS AND CROSS-SECTIONS

The vertical and horizontal alignments are designed by OCSC. They are in accordance with TII standard DN-GEO-03031 Rural Road Link Design. A design speed of 60 kph is adopted for the development. The road bridge design consists of a 7m wide single carriageway with a hard paved verge, footpath and cycle track. The pedestrian bridges are 5m wide between parapets and have a 2m wide footpath and a 3m wide cycle track.

GROUND CONDITIONS

A number of percussion boreholes, rotary cores, dynamic probes and trial pits have been undertaken on the site . The existing ground strata consist of a brown overlaying a black sandy gravelly clay which is consistent in the Leinster region. Occasional cobbles are present in the clay, which is limestone in origin. The underlying bedrock consists of strong limestone interbedded with strong calcareous mudstone.

STRUCTURE OPTIONS

Three options have been explored for the development:

1. In-situ reinforced concrete bridge deck.

2. Precast reinforced concrete bridge deck.
3. Composite steel girder and in-situ bridge deck.

All options are integral in their abutments to minimise future maintenance requirements and adhere to the TII standards. The abutments are formed of reinforced concrete which sits on bored concrete piles in all instances.

The evaluation of the options considered in the remainder of this report relates to the road bridges only. The pedestrian bridge options are identical in nature but have a narrower bridge deck. i.e the options for the pedestrian bridge deck construction are in-situ reinforced concrete, precast beams and an in-situ deck, and a steel girder with an in-situ deck. The evaluation of the options and the recommendation in the following chapters are applicable to both road bridges and pedestrian bridges.

3 TECHNICAL EVALUATION

OPTION 1 – IN-SITU REINFORCED CONCRETE BRIDGE DECK

A reinforced concrete bridge deck continuous over pier supports (where applicable) and integral at the abutment bank seats and a voided deck. For a span length of 25m, the depth of the deck is approximated at 1.25m.

The technical advantages of this option are:

- The supports are outside the width of the flood plain, eliminating the risk of scouring and an effect on the existing hydrology.
- Integral construction removes the need for bearings and expansion joints at deck level.
- Concrete will require minimal future maintenance over the river.
- The geometry of the structure on plan and elevation is easily manipulated

The technical disadvantages of this option are:

- The construction of in-situ concrete options required significant falsework and formwork over the river.
- There is a significant time required in steel fixing, with less quality control than is typically available for precast construction, leading to long-term durability and maintenance issues.
- There are multiple pours required leading to cold-formed joints and potential water ingress locations at small void locations.

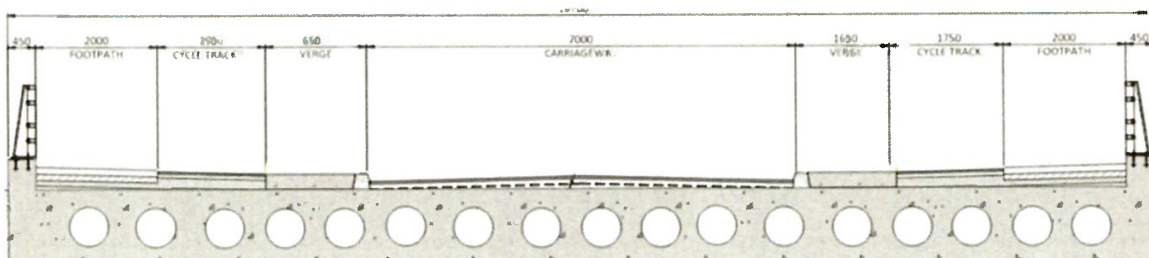


Figure 8: Reinforced Concrete In-situ Deck

OPTION 2 – PRECAST REINFORCED CONCRETE BRIDGE AND IN-SITU DECK

A precast concrete bridge deck is simply supported at abutment and pier locations with an in-situ deck. All structures are integral at the abutment bank seats. For a span length of 25m, the depth of the deck is approximated at 1.20m.

The technical advantages of this option are:

- The supports are outside the width of the flood plain, eliminating the risk of scouring and an effect on the existing hydrology.
- Integral construction removes the need for bearings and expansion joints at deck level.
- Concrete will require minimal future maintenance over the river.
- Falsework and formwork are largely reduced in comparison to an in-situ option.
- Quality control is factory controlled.
- Steel fixing and shuttering on-site are significantly reduced, as are the hazards and risks associated with the works, and construction over a watercourse.
- The available span lengths for precast products will suffice for all bridge structures, bringing the economy to the scheme from repetition.

The technical disadvantages of this option are:

- The single-span option is not as efficient as the two-span option of Option 1 (Applicable at 1no. structure only)
- The heavy lifting of prefabricated elements

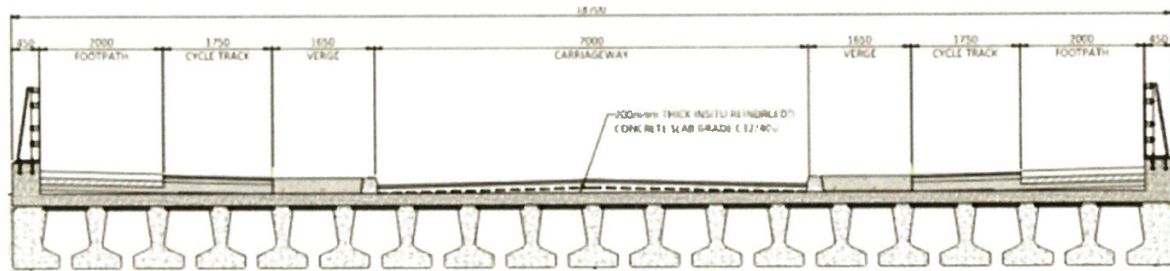


Figure 9: Precast Beams and In-situ Deck

OPTION 3 – COMPOSITE STEEL GIRDER AND IN-SITU DECK

A steel girder bridge beam arrangement with an in-situ deck. All structures are to be integral at the bridge abutments. The bridge is continuous over the pier supports where applicable (1no. road bridge structure) The overall depth of the girder and RC deck is approximately 1.2m, 1.0m girder depth and 200mm RC deck.

The technical advantages of this option are:

- The supports are outside the width of the flood plain, eliminating the risk of scouring and an effect on the existing hydrology.
- Integral construction removes the need for bearings and expansion joints at deck level.
- The structure is lightweight in comparison with a concrete alternative.
- The girders are fabricated and assembled off-site

The technical disadvantages of this option are:

- Maintenance - The steel girders will require a paint protection system which will need to be maintained over a period of 120 years, in an area of difficult access over a watercourse.
- The economy is achieved with spans in the vicinity of 25-45m, as opposed to the 15-25m spans required for this development.

- Structural steel availability is low with a large lead in times due to import requirements. Concrete and reinforcement are locally and readily available.

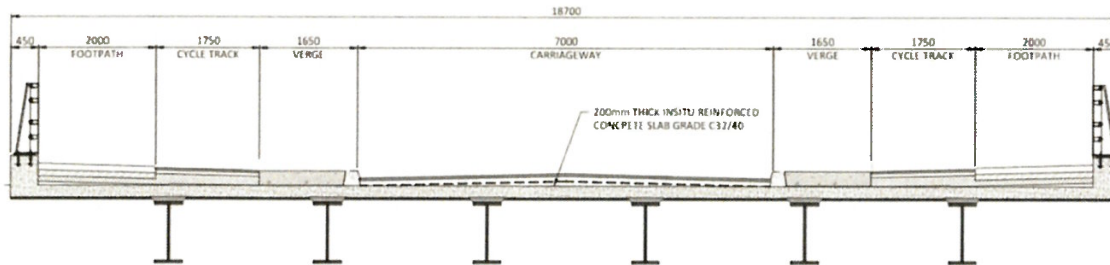


Figure 10: Composite Steel Girder and In-situ Deck

4 ECONOMIC EVALUATION

At this early stage in the project, it is difficult to calculate a precise value for each structural option, particularly with the inflation in construction products witnessed in recent years. As all substructure is the same for all options, the costs below are based upon the superstructure bridge deck only. The figures below are based on Road Bridge 1, which consists of a two-span deck totalling 50m in length, and 18.7m in width.

OPTION 1 – IN-SITU REINFORCED CONCRETE BRIDGE DECK

The in-situ deck will require falsework in the floodplain/watercourse, steel fixing and shuttering. The supports remain consistent across all options. The rate used to calculate the deck construction is €1200 / m². Note, that the rate includes costs for falsework, reinforcement, concrete, pavement installation, waterproofing, and parapet install. The total cost is 50m x 18.7m x 1200 = **€1,122,000**

OPTION 2 – PRECAST REINFORCED CONCRETE BRIDGE AND IN-SITU DECK

The precast beams will be manufactured and lifted on-site. The in-situ deck will be constructed on top of the permanent shuttering planks, eliminating any falsework in the watercourse. The current rate for the precast beams is €450 per metre. The number of beams per span is 18no. The rate used to calculate the deck construction is €625 / m². Note, that the rate includes costs for lifting operations, reinforcement, concrete, pavement installation, waterproofing, and parapet install.

Construction Cost: Precast Beams = 18no. x 2no. spans x 25m per beam x €450 =
€405,000
Deck Construction = 50m x 18.7m x 625 = €584,375
Total Cost = **€989,375**

OPTION 3 – COMPOSITE STEEL GIRDER AND IN-SITU DECK

The steel girder option requires a paint protection system to be applied to the beams prior to site installation. The rate for structural steel supply including the paint protection system is €3000 per tonne. The cross-sectional area per girder is 0.06m² allowing 10% for connections. There are 6no. girders are required to take the deck cross-section. Note, that the cost does not include future maintenance requirements.

Construction Cost: Steel Girders = 6no. x 2no. spans x 25m per beam x €3000/tonne
x 7.85 t/m³ x 0.06 m²/girder = €423,900
Deck construction (as before) = €584,375
Total Cost = **€1,008,275**

The land take requirement and substructure are the same for all three options.

Option 2 is the cheapest option and has very low future maintenance costs. The cost of falsework and reinforcement tonnage contribute significantly to the total construction cost of Option 1, making it the most expensive option. Although Option 3 is not much more expensive than Option 1, the future maintenance costs over the design life of the steel girder option are viewed as a substantial additional cost, ranging in the hundreds of thousands.

5 AESTHETIC EVALUATION

The aesthetics of the bridge structures is an important aspect to consider. The scale and diversity of the development will create various viewing angles for all structures. However, a balance is required between function, value, constructability, and aesthetics. Due to the traditional structural nature of each bridge option, the aesthetics will be inherently similar i.e. a beam and slab solution. The optimisation of the aesthetic between the three options is achieved by reducing structural depth, creating a slim, clean line visual for the viewer and reducing the impact on its surroundings. Another consideration is the view of the structure for the road user, pedestrian and cyclist, so pavement type and parapet aesthetic are important considerations.

OPTION 1 – IN-SITU REINFORCED CONCRETE BRIDGE DECK

The in-situ deck is estimated as 1.25m in depth, while this is only fractionally deeper than the alternatives, it will have the greatest impact on the surroundings. There is an option to create a cantilevered narrow edge than can support the footway and parapet on the road bridges, however, this is difficult to form, shutter and steel-fix over a watercourse.

OPTION 2 – PRECAST REINFORCED CONCRETE BRIDGE AND IN-SITU DECK

The precast beam option is 1.2m in depth. There is an option to precast an edge beam with a curved or tapering soffit which can create a shadow effect which appears to make the deck shallower to the eye. Forming the edge beam is a controlled factory process and it can easily be dropped into position and tied in with the in-situ deck pour. Various options can be considered at tender and detailed design stages.

OPTION 3 – COMPOSITE STEEL GIRDER AND IN-SITU DECK

The composite steel and in-situ deck will be 1.2m deep. The cantilevered deck is a natural visual line for a narrow element, creating the least impact on the surrounding area. Over the lifetime of the structure, significant maintenance will be required for the steelwork, unless this is undertaken in a timely manner, any paint flaking or corrosion pitting can become a detrimental aesthetic.

6 MAINTENANCE REQUIREMENT EVALUATION

The maintenance requirements for a bridge structure can be the largest cost over its design life if not fully considered in the concept. They can largely outweigh the initial construction cost if not 'designed out' effectively, and in instances, lead to the requirement of a complete structural replacement. The key items to consider in the maintenance of a bridge are materials, bearings, joints, and workmanship. The three options proposed are integral structures, hence, bearings and expansion joints have been designed out of any future maintenance requirements. Resurfacing and waterproofing of the RC deck are common to all three options, so they are not further considerations.

OPTION 1 – IN-SITU REINFORCED CONCRETE BRIDGE DECK

The maintenance costs for the in-situ option will be low. The risk with the in-situ pour is in the quality of workmanship and cover to reinforcement. Any areas that do not achieve the required cover, due to lower quality control associated with on-site works, may be subject to reinforcement corrosion and concrete spalling over time.

OPTION 2 – PRECAST REINFORCED CONCRETE BRIDGE AND IN-SITU DECK

The precast option has the least maintenance costs if any. The quality control of the reinforcement and tendon fixing for the precast beams will reduce the risk of corrosion and spalling in the future. The high grade of concrete strength, typically C50/60 will also increase the resistance to penetrating chlorides, carbonation and freeze-thaw attack.

OPTION 3 – COMPOSITE STEEL GIRDER AND IN-SITU DECK

The composite steel and in-situ deck will require a maintenance schedule for the girders. The paint system is likely to require a full refurbishment after approx. 25 years. This will be a substantial cost in the design life of the structure requiring access and encapsulation over the watercourse.

7 FURTHER CONSIDERATIONS

HYDRAULIC CONSIDERATION

A flood study has been undertaken for the entire scheme. The flood plains have been considered in the calculation of the bridge spans, flood levels and clear heights to the bridge soffit, which remains constant for all three options. For this report, the hydraulic criteria do not impact the three options considered.

HEALTH AND SAFETY CONSIDERATIONS

Other than standard construction-related health & safety issues, the primary health and safety concern with the construction of this bridge is working adjacent to and over a river.

Option 1, the in-situ deck, requires considerable falsework over the watercourse. Shuttering, fixing and casting the deck will be time-consuming and labour intensive, giving a high potential for incidents.

Option 2, the precast concrete beam option, requires the lifting of heavy precast elements. However, once the main beams are in position, precast panels are laid across the beams from a safe working platform for the in-situ works, which are considerably less intense than Option 1 with regard to reinforcement size and quantity. The prefabrication of the precast beams reduces the time for construction on site, which is a significant reduction of risk for the scheme.

Option 3, the steel girder and in-situ deck offer similar health and safety benefits as Option 2. There is slightly more time and consideration in the cantilevered deck edge which is likely to be cast in situ, hence falsework supported off the main beams is required. However, a proprietary product may be available to attach to the main girder prior to lifting in, or perhaps the cantilevered deck may be offered as precast, both can be considered at the detailed design stage.

CONSTRUCTION AND BUILDABILITY

The construction and buildability of a bridge over a river are critical considerations. The use of precast beams in Option 2 and the prefabricated steel members in Option 3 give them a distinct advantage over Option 1, which requires falsework over the river to carry out the in-situ construction.

While Options 2 and 3 do not require falsework over the river, they do require significant transport and crane operations to install the heavy precast/prefabricated elements. There is very good access to the development from the eastern side via N4 and regional roads from Leixlip and Maynooth.

Option 1, while of relative standard construction has some complex falsework requirements over the river. There will also be restrictions on the time of year that construction can take place due to fisheries and flood considerations. Option 2 is a standard form of construction which has been commonly used in Ireland in recent decades and as such would be the most straightforward from a buildability perspective. Similarly, Option 3 is a simple form of construction, but consideration has to be given to forming the deck, which is not as straightforward as Option 2 as previously described.

GROUND CONDITIONS

The ground strata are formed of topsoil underlaid by clay. The brown/black clay varies in stiffness with depth and can be described as typical conditions across the North Leinster region. Beneath the clay a very strong limestone bedrock is present. As all bridge options are integral piled solutions that extend to bedrock, the ground conditions do not affect the three options presented.

8 RECOMMENDATION

In addition to whole-life costs, the most critical technical considerations in evaluating the options proposed for these bridges are:

- Construction over a watercourse
- Maintenance considerations

Option 1 has the highest cost and most complex construction requirements. There is higher health and safety, constructability and environmental risk associated with the in-situ works over a watercourse. There are greater time and labour requirements for the workforce on-site. The maintenance costs and aesthetics are similar for both concrete options.

Option 2 has the lowest cost and maintenance requirements and simplest construction requirements. The aesthetics can be altered via a precast edge beam at the detailed design stage if required. The health and safety and constructability aspects of the proposal are advantageous over all the other options. There are economic benefits from repetition in the prefabrication of standardised precast beams for all bridge locations across the development. Alternative solutions such as girders will vary in plate thicknesses and depths, while in-situ decks will require differing reinforcement sizes and additional design and construction timeframes.

Option 3, while construction cost is competitive with the other options, has a large cost implication due to future maintenance requirements. The construction sequence is relatively simple and there are reduced health and safety risks due to prefabrication off-site. The narrow deck profile will give the impression of a 'light' design in comparison to a concrete alternative.

Based on the points above, Option 2 appears to offer the best solution for the bridge structures required within this development.

9 VERIFICATION

This report was compiled and verified by:

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APPENDIX 6-1

BAT SURVEY REPORT

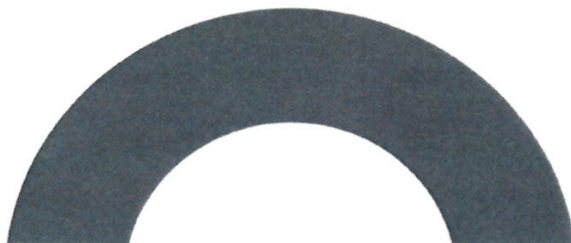
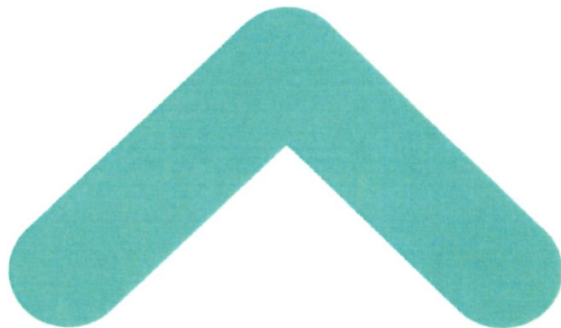
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Bat Report





DOCUMENT DETAILS

Client: **Sky Castle Ltd.**

Project Title: **Sky Castle Ltd – Moygaddy Mixed Use Scheme, Co. Meath & Co. Kildare**

Project Number: **210414**

Document Title: **Bat Report**

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Planning and
Environmental
Consultants

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1. INTRODUCTION

MKO was commissioned to undertake a bat survey for a proposed Mixed-Use Scheme at Moygaddy, Co. Meath and Co. Kildare. (Grid Ref: N 94468 39390).

MKO undertook two dusk and one dawn bat activity surveys in 2021 and a bridge inspection in August 2022, within the site of the proposed development works. The main objective of the surveys was to gather information on roosting, commuting, and foraging bats using the site and to identify any important features for bats. Three full spectrum bat detectors, Song Meter SM4BAT (Wildlife Acoustics, Maynard, MA, USA), were deployed for the duration of the survey period (4 weeks) to record bat activity at six fixed locations.

The bat survey and assessment were informed by a desk study and with reference to the following guidelines:

- *Bat Surveys for Professional Ecologists – Good Practice Guidelines (3rd edn.) (Collins, 2016)*
- *Bat Roosts in Trees (Andrews, 2018)*
- *Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes (NRA, 2006a)*
- *Guidelines for the Treatment of Bats during the Construction of National Road Schemes (NRA, 2006b)*
- *British Bat Calls: A Guide to Species Identification (Russ, 2012)*
- *Bat Mitigation Guidelines for Ireland. Irish Wildlife Manuals, No. 25. (Kelleher & Marnell, 2006)*
- *Bat Mitigation Guidelines for Ireland – V2. Irish Wildlife Manuals, No. 134. (Marnell, Kelleher & Mullen 2022)*
- *Guidance Note 08/18: Bats and Artificial Lighting in the UK (ILP, 2018)*

1.1 Policy and Legislation

All Irish bats are protected under European legislation, namely the Habitats Directive (92/43/EEC). All Irish species are listed under Annex IV of the Directive, requiring strict protection for individuals, their breeding sites and resting places. The Lesser horseshoe bat (*Rhinolophus hipposideros*) is further listed under Annex II of the Directive, requiring the designation of conservation areas for the species. Under this Directive, Ireland is obliged to maintain the favourable conservation status of Annex-listed species. This Directive has been transposed into Irish law through the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477/2011).

In addition, Irish species are further protected by national legislation (Wildlife Acts 1976-2021). Under this legislation, it is an offence to intentionally disturb, injure or kill a bat or disturb its roost. Any work at a roost site must be carried out with the agreement of the National Parks and Wildlife Service (NPWS) and a derogation licence must be granted before works commence.

1.2 Statement of Authority

The bat surveys were undertaken by MKO ecologists Tim Murphy (BSc.), Neil Campbell (BSc.) and Kevin McElduff (BSc.) who have over 1 years' experience in ecological consultancy. All staff have relevant academic qualifications to complete the surveys and assessments that they were required to do. This report was prepared by Tim Murphy (BSc.) and was reviewed by Aoife Joyce (BSc., MSc.). Aoife has over three years' experience in ecological assessments and has completed CIEEM and BCI courses in Bat Impacts and Mitigation, Bat Tree Roost Identification and Endoscope training and Kaleidoscope Pro Analysis.

2.

CHARACTERISTICS OF PROPOSED DEVELOPMENT

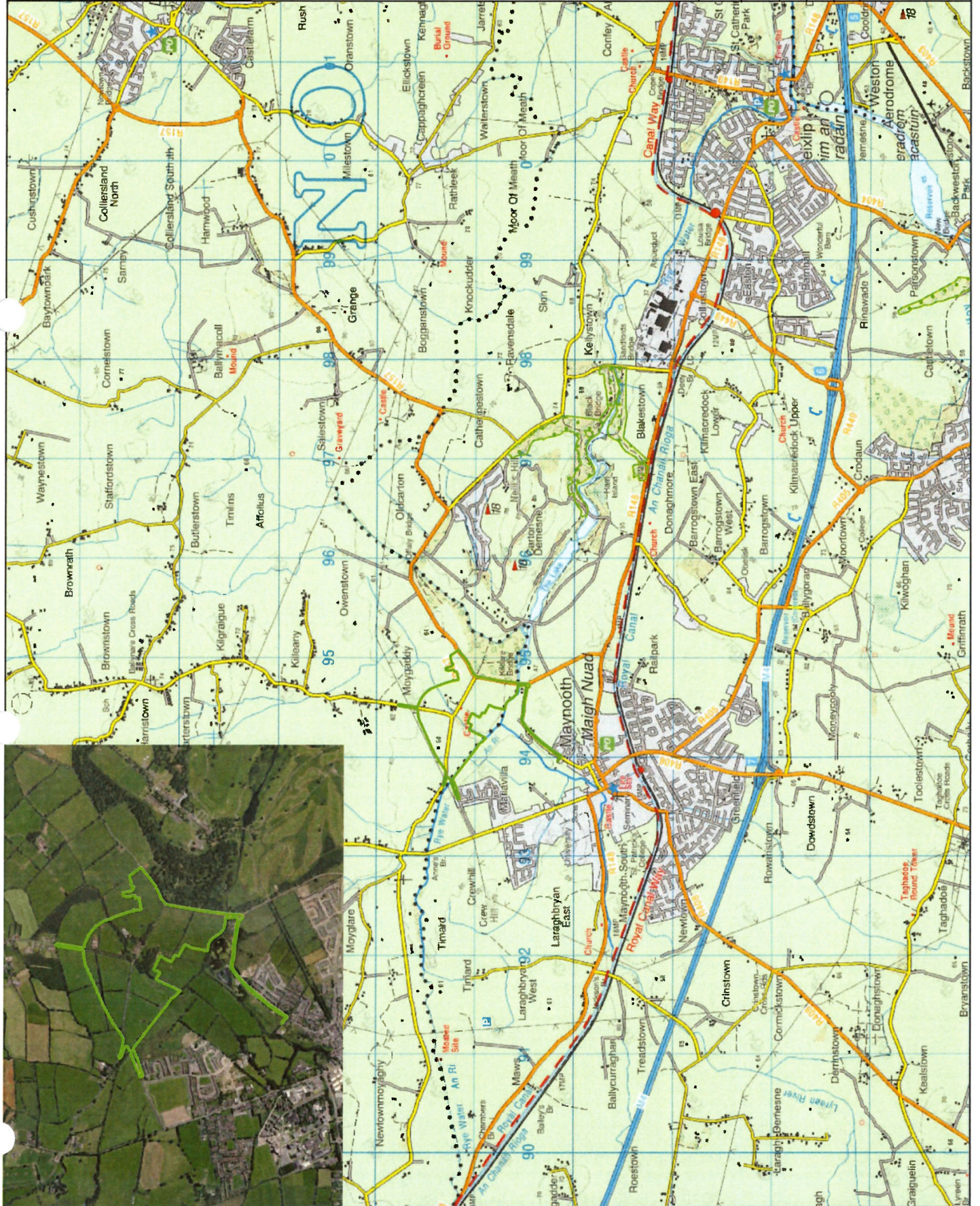
The proposed development site is located in the townland of Moygaddy, Maynooth Environs, Co. Meath and Co. Kildare (Grid Ref: N 94468 39390).

Sky Castle Ltd. intends to submit to a total of six planning applications as part of the Moygaddy Mixed Use Development (henceforth referred to as the Proposed Development). A total of three planning applications will be submitted to Meath County Council as the competent authority. One planning application seeks to provide a Strategic Employment Zone (Biotechnology & Life Sciences Campus) (Site A), the second planning application for Community Infrastructure which includes a Nursing Home and Primary Care Centre (Site B), and the third planning application for the delivery of the proposed Maynooth Outer Orbital Road (MOOR).


A planning application for a Strategic Housing Development (SHD) (Site C) will be submitted to An Bord Pleanála under the Strategic Housing Provisions of the Planning and Development (Housing) and Residential Tenancies Act, 2016.

There will also be two separate planning applications submitted to Kildare County Council (KCC) for shared infrastructure, proposed services and utilities connections to Maynooth town in County Kildare. One planning application to KCC includes a proposed pedestrian / cycle bridge adjacent to the existing Kildare Bridge, as well as a proposed wastewater connection to the Maynooth Municipal Wastewater Pumping Station to the southeast of the Proposed Development. The second planning application to be submitted to KCC is located to the southwest of Site C (SHD) for the provision of an integral single span bridge over the River Rye Water with associated flood plain works and embankments.

Figures 2-1 and 2-2 show site location and site boundaries.



Map Legend

 EIAR Site Boundary

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EIAR Site Boundary

Project File	Sky Castle Ltd - Moygaddy Mixed Use Scheme, Co. Meath & Co. Kildare
Drawn by	CM
Checked by	CM
Project No.	210414
Figure	Figure 2-1
Scale	1:49,500
Date	2022-08-30

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3. METHODS

3.1 Consultation

A scoping exercise was undertaken as part of the proposed development. A Scoping Document, providing details of the application site and the proposed development, was prepared by MKO and circulated to the Development Applications Unit in August 2021. As of 23rd August 2022, no response has yet been received.

3.2 Desktop Study

A desktop review of published material was undertaken to inform all subsequent field studies and assessments. The aim of the desktop review was to identify the presence of species of interest within the proposed site and surrounding region.

3.2.1 National Bat Database of Ireland

The National Bat Database of Ireland holds records of bat observations received and maintained by Bat Conservation Ireland. These records include results of national monitoring schemes, roost records as well as ad-hoc observations. The database was searched for bat presence and roost records within a 10km radius of the proposed development site.

In addition, information on species' range and distribution, available in the 2019 Article 17 Reports (NPWS, 2019), was reviewed in relation to the location of the Proposed Development. The NPWS monitors the conservation status of European protected habitats and species and reports their findings to the European Commission every 6 years in the form of an Article 17 Report. The most recent report for the Republic of Ireland was submitted in 2019.

3.2.2 Designated Sites

The National Parks and Wildlife Service (NPWS) map viewer and website provides information on rare and protected species, sites designated for nature conservation and their conservation objectives. A search was undertaken of sites designated for the conservation of bats within a 10 km radius of the Study Area (BCI 2012, Hundt, 2012, SNH 2019). This included European designated sites, i.e. SACs, and nationally designated sites, i.e. NHAs and pNHAs.

3.3 Ecological Appraisal (Bats)

Bat walkover surveys of the study area were carried out during daylight hours on the 8th July, 22nd July, 9th August 2021 and 18th August 2022. The landscape features on the site were visually assessed for potential use as bat roosting habitats and commuting/foraging habitats using a protocol set out in BCT *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (3rd edn.) (Collins, 2016). Table 4.1 of the 2016 BCT Guidelines identifies a grading protocol for assessing structures, trees and commuting/foraging habitat for bats. The protocol is divided into four Suitability Categories: *High*, *Moderate*, *Low* and *Negligible*.

3.3.1 Roost Surveys

During the bat walkover surveys, a search for roosts was undertaken within the boundary of the proposed development. The aim was to determine the presence of roosting bats and the need for

further survey work or mitigation. During the walkover, mature trees, a castle tower and bridge within the proposed development site were assessed for their suitability to support bats.

This comprised a detailed inspection of the exteriors and interiors (if accessible) to look for evidence of bat use, including live and dead specimens, droppings, feeding remains, urine splashes and fur oil staining and noises (Collins, 2016).

The small castle tower and bridge (IG Ref: N 94448 39151 & N 94726 38561) were subject to a roost assessment. The exteriors of the structures were inspected first from ground level, with the aid of binoculars. The search included the ground, accessible windowsills, walls, and roofs. A systematic search of all accessible interiors was also undertaken by a licensed bat ecologist. Searches were carried out with the aid of torches and a ladder and focused on walls, floors, roofs, windowsills, lintels, etc. Results of the roost assessments are detailed in section 4.3 below.

Trees within the site were also assessed from ground level, with the aid of binoculars. Any potential tree roosts were examined for the presence of rot holes, hazard beams, cracks and splits, partially detached bark, knot holes, gaps between overlapping branches and any other potential roost features (i.e. PRFs) identified by Andrews (2018).

3.4 Emergence Survey

A dusk emergence survey was carried out on the evening of the 8th July 2021 on the small castle tower (Grid Ref: N 94448 39151). Two surveyors were equipped with active full spectrum bat detectors, Batlogger M (Elekon AG, Lucerne, Switzerland). Where possible, species identification was made in the field and any other relevant information was also noted, e.g. numbers, behaviour, features used, etc. All bat echolocation was recorded for subsequent analysis to confirm species identifications.

Conditions were suitable for bat surveys on all survey nights. The emergence surveys commenced 30 minutes before sunset and concluded 1 hour after sunset and were followed by walked transect surveys. The purpose was to identify any bat species, numbers, access points and roosting locations within the structure.

3.5 Dusk and Dawn Activity Surveys

Dusk and dawn activity surveys were carried out on 8th July, 22nd July and 9th August 2021. Two surveyors were equipped with active full spectrum bat detectors, a Batlogger M (Elekon, Lucerne, Switzerland) and walked a transect route within the site, focusing on potentially suitable habitat features for bats. Where possible, species identification was made in the field and any other relevant information was also noted, e.g. numbers, behaviour, features used, etc. All bat echolocation was recorded for subsequent analysis to confirm species identifications.

The dusk survey on 8th July 2021 commenced 30 minutes before sunset and was completed within 3 hours after sunset. Conditions were suitable for bat survey as per Collins (2016); dry, mild (18°C at sunset) with only light air (Beaufort Scale Force 1). The moon was not visible, and cloud cover was approximately 100% during the dusk survey.

The dawn survey on 22nd July 2021 commenced 2 hours before sunrise and was completed at sunrise. Conditions were suitable for bat survey as per Collins (2016); dry, mild (15°C at sunrise) with only light air (Beaufort Scale Force 1). Cloud cover was approximately 10% throughout the dawn survey.

The dusk survey on 9th August 2021 commenced 30 minutes before sunset and was completed within 3 hours after sunset. Conditions were suitable for bat survey as per Collins (2016); dry, mild (17°C at sunset), with only light air to light breeze (Beaufort Scale Force 1). Cloud cover was approximately 25% throughout the dusk survey.

July and August are within the optimum survey period for bat activity surveys, provided weather conditions are favourable (Collins, 2016). No limitations associated with seasonality, timing or weather conditions were identified.

Table 3-1 - Bat Activity Survey Effort 2021

Date	Surveyor	Type	Sunrise/Sunset	Weather
8 th July 2021	Tim Murphy and Neil Campbell	Dusk	21:52	18° C; Dry, Light air
22 nd July 2021	Tim Murphy and Neil Campbell	Dawn	05:27	15° C; Dry, Light air
9 th August 2021	Tim Murphy and Neil Campbell	Dusk	21:05	17° C; Dry, Light air

3.6 Static Detector Surveys

Full spectrum bat detectors, Song Meter SM4BAT (Wildlife Acoustics, Maynard, MA, USA), were deployed during static surveys to record bat activity at six fixed locations over 2-week periods in 2021. The six locations of static detectors were selected to represent the range of habitats present within the site, including favourable bat habitats as well as open spaces within the site. Settings used were those recommended by the manufacturer for bats, with minor adjustments in gain settings and band pass filters to reduce background noise when recording. Detectors were set to record from 30 minutes before sunset until 30 minutes after sunrise. The Song Meter automatically adjusts sunset and sunrise times using the Solar Calculation Method when provided with GPS coordinates.

The survey was designed to utilise three static detectors to monitor bat activity. Two Song Meter SM4BAT detectors were deployed on site on 8th July 2021. The Song Meter SM4, dual-channel acoustic recorder is capable of the long-term acoustic monitoring of bats. After approximately two weeks, the static detectors were relocated to three separate new locations within the site. Static detector locations can be found in Figure 3-1. The static detectors were collected on the 9th August 2021.

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Map Legend

-  EIAR Site Boundary
-  Detector Locations

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Static Detector Locations

Project Title		Moygaddy Mixed Use Scheme, Co. Meath & Co. Kildare	
Drawn By	TM	Checked By	AJ
Project No.	210414	Drawing No.	Fig - 3-1
Scale	1:7500	Date	23.08.2022

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3.6.1 Analysis of Static Detector Results

Echolocation signal characteristics (including signal shape, peak frequency of maximum energy, signal slope, pulse duration, start frequency, end frequency, pulse bandwidth, inter-pulse interval and power spectra) were compared to published signal characteristics for local bat species (Russ, 1999). Myotis species (potentially Daubenton's bat (*M. daubentonii*), Whiskered bat (*M. mystacinus*), Natterer's bat (*M. nattereri*) were considered as a single group, due to the difficulty in distinguishing them based on echolocation parameters alone (Russ, 1999). The echolocation of soprano pipistrelle (*P. pygmaeus*) and common pipistrelle (*P. pipistrellus*) are distinguished by having distinct (peak frequency of maximum energy in search flight) of ~55 kHz and ~46 kHz respectively (Jones & van Parijs, 1993).

Plate 3-1 below shows a typical sonogram of echolocation pulses for common pipistrelle recorded with a SM4BAT bio-acoustic static bat recording device. The recorded file is illustrated using Wildlife Acoustics Kaleidoscope software.

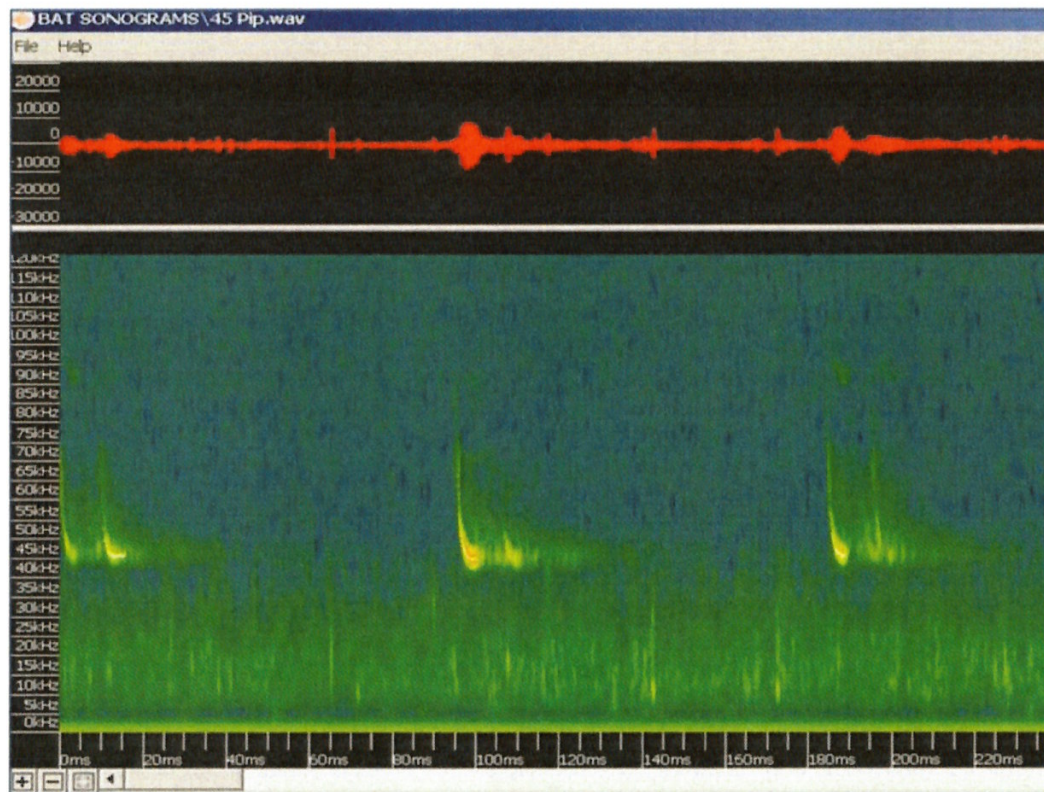


Plate 3-1 Sonogram of Echolocation Pulses of Common pipistrelle (Peak Frequency 45kHz)

Individual bats of the same species cannot be distinguished by their echolocation alone. Thus, 'bat passes' was used as a measure of activity (Collins, 2016). For the purposes of this survey, a bat pass was defined as a recording of an individual species/species group's echolocation containing at least two echolocation pulses and of maximum 15 seconds length.

Survey Limitations

Survey design and effort was created in accordance with the most current best practice guidelines for surveying bats (Collins, 2016).

The information provided in this report accurately and comprehensively describes the baseline environment. July and August are within the optimal survey period for bat activity surveys, (Collins, 2016). In addition, there were no limitations associated with weather conditions or access. Therefore, a full and comprehensive survey was achieved.

4. RESULTS

4.1 Desktop Study

4.1.1 National Bat Database of Ireland

A review of the National Biodiversity Data Centre was made on the 26th November 2021, to obtain bat records from within 1km and 10km of the proposed development site.

Within the 1km square (N9439) there were no records of any bat species. Within the 10km hectad search (N93) there were records of seven bat species. Table 4-1 lists the bat species recorded within the hectad which pertains to the current study area (N93).

Table 4-1 NBDC Bat Records

Hectad	Species	Database	Status
N93	Daubenton's bat <i>Myotis daubentonii</i>	National Bat Database of Ireland	HD Annex IV, WA
N93	Common pipistrelle <i>Pipistrelle pipistrellus</i>	National Bat Database of Ireland	HD Annex IV, WA
N93	Soprano pipistrelle <i>Pipistrellus pygmaeus</i>	National Bat Database of Ireland	HD Annex IV, WA
N93	Natterer's bat <i>Myotis nattereri</i>	National Bat Database of Ireland	HD Annex IV, WA
N93	Brown long-eared bat <i>Plecotus auritus</i>	National Bat Database of Ireland	HD Annex IV, WA
N93	Lesser Noctule <i>Nyctalus leisleri</i>	National Bat Database of Ireland	HD Annex IV, WA
N93	Whiskered Bat <i>Myotis mystacinus</i>	National Bat Database of Ireland	HD Annex IV, WA

4.1.2 Designated Sites

Within Ireland, the Lesser horseshoe bat is the only bat species requiring the designation of Special Areas of Conservation (SACs) and the proposed development site is situated outside the known range of this species. Natural Heritage Areas (NHAs) and proposed Natural Heritage Areas (pNHAs) may be designated for any bat species. A search of NHAs and pNHAs within a 10 km radius of the Study Area found no sites designated for the conservation of bats.

4.2 Bat Habitat Appraisal

A walkover survey was conducted on the 8th July, 22nd July and 9th August. Habitats within the site include *Improved Agricultural Grassland (GA1)*, *Stone Walls and Other Stonework (BL1)*, *Scrub (WS1)*, *Hedgerow (WL1)*, *Treeline (WL2)*, *Buildings and Artificial Surfaces (BL3)* *Eroding/Upland rivers (FW1)* and *(Mixed) broadleaf woodland (WD1)*.

With regard to foraging and commuting bats, the exposed areas of open grassland habitats were considered *Negligible-Low* suitability, i.e. habitat that could be used by small numbers of commuting or foraging bats (Collins, 2016). Mature hedgerows, treelines and scrub habitats show potential for foraging and commuting bats. These habitats connect the wider area via linear features such as the Blackhall Little Stream and Rye Water River. As such, these habitats were classified as *Moderate* suitability, i.e. Continuous habitat connected to the wider landscape that could be used by bats for commuting such as

lines of trees and scrub (Collins, 2016). Low stone walls, which form the field boundaries may be utilized by occasional commuting and foraging bats and were classified as having *Low* suitability for commuting and foraging bats.

With regard to roosting bats, mature trees were assessed for their suitability to support roosting bats. A number of individual trees throughout the proposed development site were assessed as have *Low-Moderate* roosting potential. This included two individual mature ash (*Fraxinus excelsior*) trees located on the eastern boundary of site A, two individual mature ash trees located on the eastern boundary of site B, One mature Ash and one mature Sycamore (*Acer pseudoplatanus*) at the eastern section of site C and one mature ash at the northern boundary of the MOOR along the Blackwater little stream.

A tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation status (Collins, 2016). All other hedgerows and treelines which are being retained were assessed as having *Negligible* roosting potential due to their size and lack of PRFs.

The castle tower was assessed as having *High* roosting potential i.e. a structure with one or more potential roost sites that are obviously suitable for use by larger number of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat (Collins, 2016) due to the presence of a number of PRF's visible during the roost inspection. The bridge did not provide any significant suitable roosting features and was classified as "*Negligible*" to "*Low*" Suitability for roosting bats.

All other habitats present were assigned a *Negligible* value. Further details on structures within the site, can be found in section 4.3 below.



Plate 4-1 WL1 present in the northern section of the site



Plate 4-2 WL2 in the background & GAI in the foreground

4.3

Roost Surveys

4.3.1

Castle Tower

A dedicated exterior roost inspection survey was undertaken during daylight hours on 8th of July 2021 (Plate 4-3 – 4-5). The tower castle is two stories and approximately 30 feet tall. The tower consists of stone walls and a partially collapsed stone roof. The interior of the structure was accessible through the main door at the ground level and the multiple windows on the first floor. The PRF's consisted of ivy cover over outer walls and a large number of crevices in the stonework. Gaps with potential for roosting bats were present between the stonework. The ivy cover was extensive along the south facing wall. Due to the number of PRF's, the tower was identified as having "*High suitability*" potential for roosting bats, i.e. a structure with one or more potential roost sites that are obviously suitable for use by larger number of bats on a more regular basis and potentially for longer periods of time due to their size,

shelter, protection, conditions and surrounding habitat (Collins, 2016). No evidence of bat use, including droppings, fur oil staining, signs of feeding remain etc., were identified within or surrounding the building. No bats were observed exiting or entering the building during the dusk activity survey.



Plate 4-3 South facing wall of the castle tower with dense ivy cover



Plate 4-4 East facing wall of the castle tower with potential access through door and window

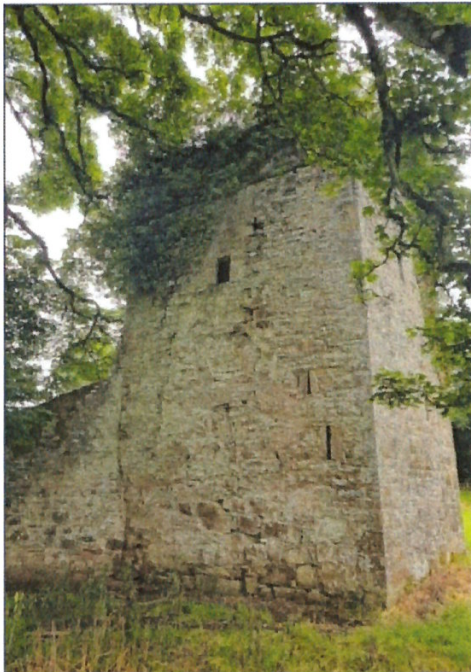


Plate 4-5 North facing wall of castle tower with potential access through windows

4.3.2 Kildare Bridge

A dedicated exterior roost inspection survey was undertaken on Kildare bridge (Grid Ref: N 94726 38561) during daylight hours on 18th of August 2022 (Plate 4-6 – 4-7). The bridge did not provide any significant suitable roosting features and no evidence of bats or bat use was found during the inspection. As such, it was classified as “Negligible” to “Low” Suitability for roosting bats.



Plate 4-6 Exterior bridge view



Plate 4-7 Interior bridge view

The results of the bat surveys, carried out in 2021 indicate that the proposed development site does provide suitable habitat for a roosting bat population of ecological significance; however, no roosts were identified on site.

4.4 Emergence Survey

An emergence survey was carried out on 8th July 2021 by two surveyors to assess the castle tower structure. During the emergence survey, no bats were observed exiting or entering the structure. However, bats were observed commuting and foraging between the trees and commuting to surrounding areas. It is noted that there are structures located to the north of the castle tower, not forming part of the application, which may also provide potential habitat for roosting bats.

4.5 Dusk and Dawn Activity Surveys

Numerous foraging and commuting bats were recorded during the dusk and dawn bat activity surveys. Overall, bat activity was low with a total of 521 bat passes recorded across all surveys. Activity was dominated by common pipistrelle (*Pipistrellus pipistrellus*) n=293. This was followed by Leisler's bat (*Nyctalus leisleri*) n=159 and soprano pipistrelle (*Pipistrellus pygmaeus*) n=67. In addition, very small numbers of brown long-eared bat (*Plecotus auritus*) n=2 were also recorded. Activity levels were concentrated along the treeline edge habitats and field boundary hedgerows bordering the Study Area (Figure 4-1 – 4-3). Plate 4-8 shows total bat species composition and Table 4-2 presents the results per survey. Plate 4-9 shows total bat passes per night.

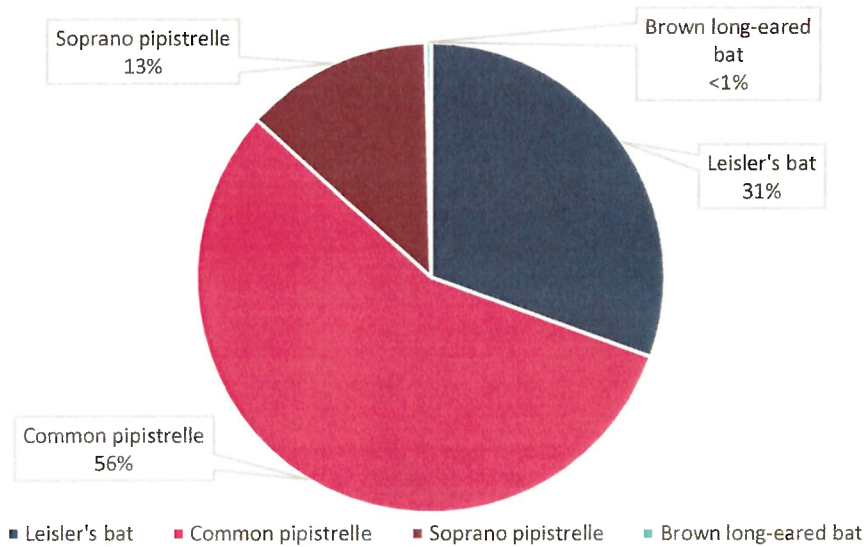


Plate 4-8 Species Composition – Dusk and Dawn surveys

Table 4-2 - Manual Transect Bat Pass Results Per Survey

Species	Dusk 8 th July 2021	Dawn 22 nd July 2021	Dusk 9 th August 2021	Total
Brown long-eared bat	-	-	2	2
Leisler's bat	150	6	3	159
Common pipistrelle	124	47	122	293
Soprano pipistrelle	46	3	18	67
Grand Total	320	56	145	521

There was an accumulation of bat activity around the small castle tower and surrounding WD1 habitat to the eastern section of Site C (Figure 4-1). The concentration of activity can be attributed to the surveyors being positioned here for 1.5 hours during the emergence survey on the small castle tower. Bats were recorded commuting between the structure and foraging along woodland, hedgerow and treeline boundaries. However, no bats were observed emerging or re-entering the structure. This was followed by walked transects for the remainder of the surveys.

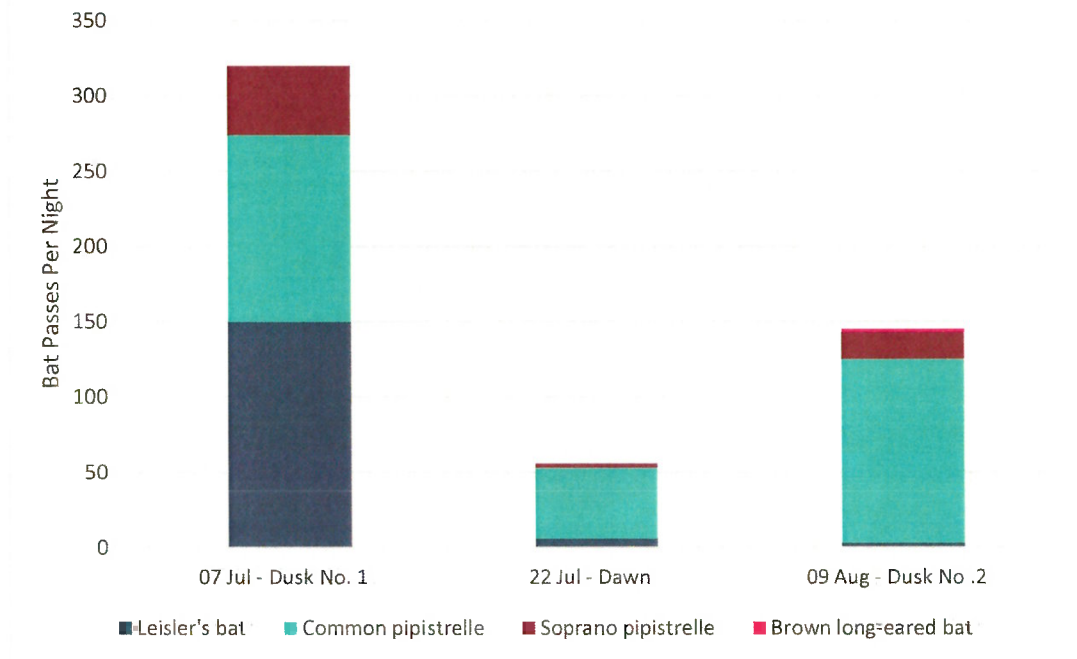


Plate 4-9 Species Composition Per Survey



Map Legend

- EIAR Site Boundary
- - - Transect Route
- Species
 - Leisler's bat
 - Common pipistrelle
 - Soprano pipistrelle

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Project Title		Moygaddy Mixed Use Scheme, Co. Meath & Co. Kildare	
Drawn By	TM	Checked By	AJ
Project No.	210414	Drawing No.	Fig 4-1
Scale	1:6500	Date	23.08.2022
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Map Legend

- EIAR Site Boundary
- Transect Route
- Species**
 - Leisler's bat
 - Common pipistrelle
 - Soprano pipistrelle

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Project No.	210414	Drawing No.	Fig 4-2
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Map Legend

- EIA Site Boundary
- Transect Route
- Species
 - Leisler's bat
 - Common pipistrelle
 - Soprano pipistrelle
 - Brown long-eared bat

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Static Detector Survey Results

Three static detectors were deployed on the site at six different locations (Figure 3-1), based on likely areas of bat activity, for a total of 33 nights in July/August 2021. These detectors allowed a specified look into species composition, commuting and foraging activities within the site.

All recordings were later analysed using bat call analysis software Kaleidoscope Pro v.5.4.2 (Wildlife Acoustics, MA, USA). Bat species were identified using established call parameters, to create site-specific custom classifiers. All identified calls were also manually verified. In total, 20,160 bat passes were recorded.

Analysis of the detector recordings positively identified five bats to species level with *Myotis* genus also present. Bat species included: common pipistrelle (*Pipistrellus pipistrellus*) n=10,061, Leisler's bat (*Nyctalus leisleri*) n=6,062 and soprano pipistrelle (*Pipistrellus pygmaeus*) n=3,596. *Myotis* spp. n=276, brown long-eared bat (*Plecotus auritus*) n=97 and nathusius' pipistrelle (*Pipistrellus nathusii*) were rarely encountered, with 1% or less compared to the total bats recorded (Plate 4-10).

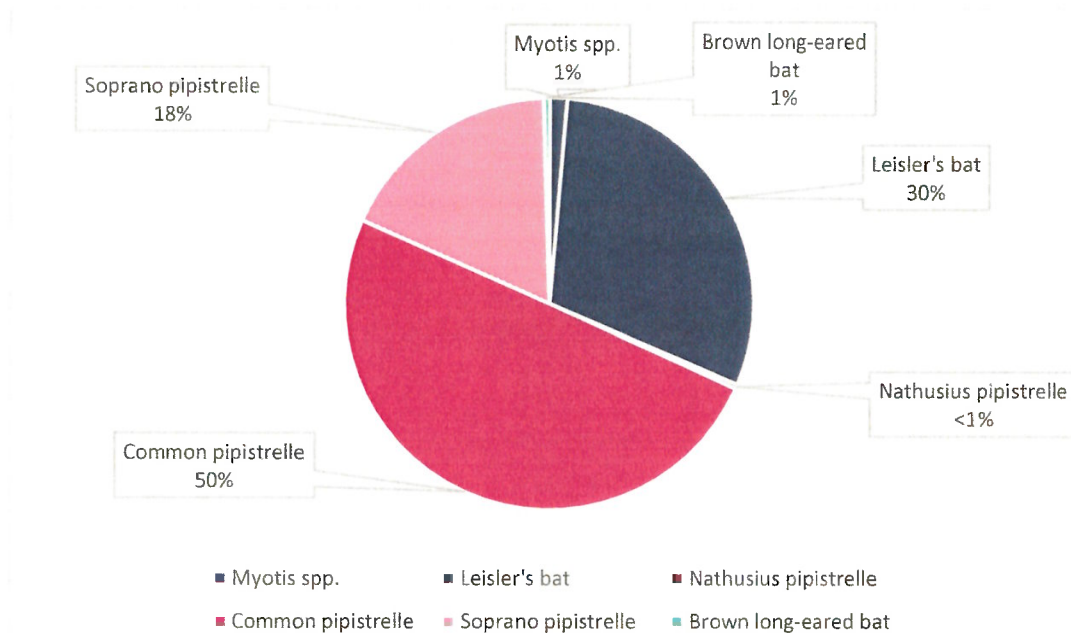


Plate 4-10 - Species Composition

Plate 4-11 shows total bat passes per detector. Detectors D01, D02 and D03 are associated with the first two-week deployment from 8th July to 22nd July 2021. Detector D01 was located to the northeast of Site C along a birch treeline habitat next to and open grassland. Detector D02 was located to the southeast of Site C along a treeline edge habitat, adjacent to the stream running north to south through the Study Area. Detector D03 was located along the hedgerow in the northwest of the Maynooth Outer Orbital Road (MOOR) Site. This area has a strong linear feature, that could provide suitable commuting and foraging opportunities for bats.

Detectors D04, D05 and D06 are associated with the second two-week deployment from 22nd July to 9th August 2021. Detector D04 was located north of Site A and east of the MOOR Site where two hedgerows converge. This area had high quality linear features suitable for foraging and commuting bats. Detector D05 was located along a hedgerow next to the Rye Water River along the southern boundary of Site C. Detector D06 was located to the northwest of Site C and the MOOR Site. Figure 3-1 shows all static detector locations.

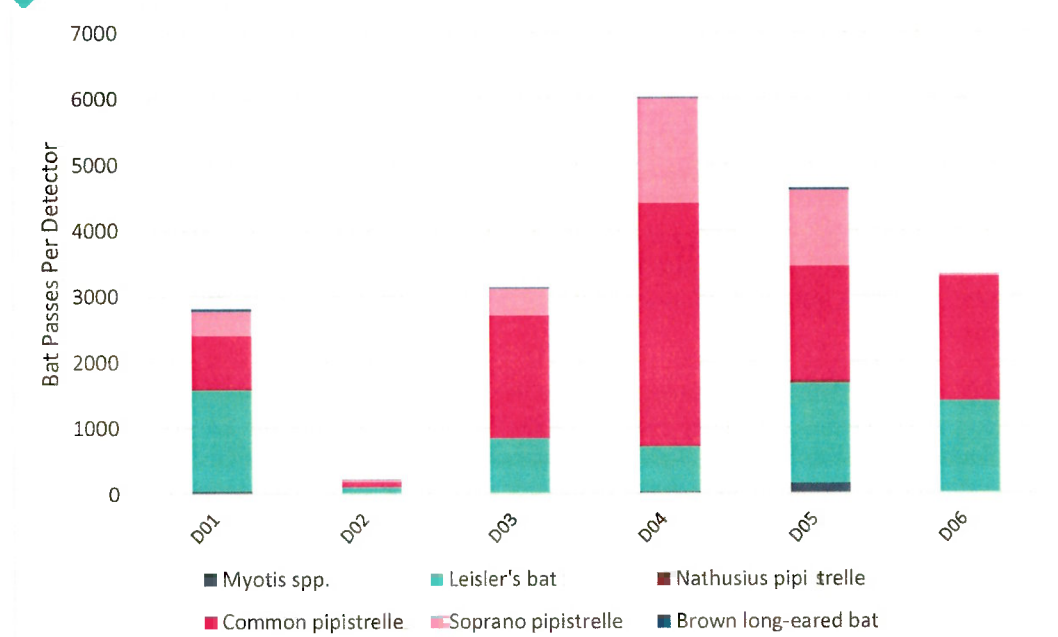


Plate 4-11 - Bat Passes Per Detector

Analysis of the detector recordings also highlighted the total bat passes per night. Species composition per night is shown in Plate 4-12. Nights from 1 to 16 are associated with the first deployment locations (D1, D2 and D3). Nights from 17 to 33 include bat passes from the second deployment locations D4, D5 and D6. Activity varied across each deployment and each night. The graph demonstrates that common pipistrelle, Leisler's bat and soprano pipistrelle species were most commonly recorded during the survey periods. These species are common and widespread across Ireland.



Plate 412 - Bat Passes Per Night

4.7

Importance of Bat Population Recorded at the Site

Ecological evaluation within this section follows a methodology that is set out in Chapter three of the 'Guidelines for Assessment of Ecological Impacts of National Roads Schemes' (NRA, 2009).

All bat species in Ireland are protected under the Bonn Convention (1992), Bern Convention (1982) and the EU Habitats Directive (92/43/EEC). Additionally, in Ireland bat species are afforded further protection under the Birds and Natural Habitats Regulations (2011) and the Wildlife Acts 1976-2021.

Bats as an Ecological Receptor have been assigned *Local Importance (Higher value)* on the basis that the habitats within the proposed development site are utilized by a regularly occurring bat population of *Local Importance*.

No roosting bats or evidence of bat use was identified within the structures or trees within the site. The results of the bat surveys, carried out in 2021 indicate that the proposed development site does provide suitable habitat for a roosting bat population of ecological significance. However, no roosting site of *National Importance* (i.e. site greater than 100 individuals) was recorded within the site.

5. OVERALL FINDINGS

The daytime roost inspections identified the Kildare bridge and castle tower as having “Negligible” to “Low” and “*High*” roosting potential, respectively, due to the presence/lack of presence of PRFs. No evidence of roosting bats was identified within any of the structures during the daytime roost inspections. Mature trees within the site may provide potential suitable roosting habitat for bats, although no roosts were identified during the surveys.

Following the daytime inspections, a dedicated emergence survey was carried out on the tower castle. No bats were observed emerging from the structure; however, bats were observed commuting and foraging along linear habitat features within the proposed development site. The site does not support any maternity roosts or a roost of National Importance.

Bat activity levels were mainly associated with woodland edge, treeline and hedgerow habitats within the proposed development site. Species composition was comprised predominantly of common pipistrelle, Leisler’s bat and soprano pipistrelle, all of which are common and widespread across Ireland.

Impact Assessment and proposed mitigation measures are outlined in Section 6.7 of Chapter 6.

6.

CONCLUSION

In total, six bat species were recorded across the proposed development site. No roosting bats were identified within the site. Foraging and commuting was mainly associated with woodland edge, mature treeline and hedgerows habitats forming field boundaries.

The surveys methodology and results provided in this report are in accordance with the relevant industry guidance. The information provided in this report accurately and comprehensively describes the baseline environment. July and August are within the optimal survey period for bat activity surveys. In addition, there were no limitations associated with weather conditions or access. Therefore, a full and comprehensive survey was achieved.

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APPENDIX 8-1

FLOOD RISK ASSESSMENT

Moygaddy Masterplan Flood Risk Assessment

Technical Report

August 22

2021s1492

Sky Castle Ltd.

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Revision History

Revision Ref / Date Issued	Amendments	Issued to
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A3-C01 / 19th August 2022	Final Issue	Sky Castle Ltd.
A3-C02/ 25th August 2022	Minor Changes	Sky Castle Ltd.

Contract

This report describes work commissioned by Ronan Barrett, on behalf of Sky Castle Ltd, by a letter dated 10 September 2021. Sky Castle Ltd's representative for the contract was Anthony Horan, on behalf of O'Connor Sutton Cronin and Associates (OCSC). Paul Browne, Anastasiya Ilyasova, David Casey and Ross Bryant of JBA Consulting carried out this work.

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Abbreviations

1D	One-Dimensional (modelling)
2D	Two-Dimensional (modelling)
AEP	Annual Exceedance Probability
AFA	Area for Further Assessment
CFRAM	Catchment Flood Risk Assessment and Management
DEHLG	Department of the Environment, Heritage and Local Government
FFL	Finished Floor Level
FRA	Flood Risk Assessment
FSU	Flood Study Updates
GDSDS	Greater Dublin Strategic Drainage Strategy
GSI	Geological Survey Ireland
MCC	Meath County Council
MCDP	Meath County Development Plan
MRFS	Mid-Range Future Scenario
NCFHM	National Coastal Flood Hazard Mapping
NIFM	National Indicative Fluvial Mapping
OD	Ordnance Datum
OPW	Office of Public Works
PFRA	Preliminary Flood Risk Assessment
RPS	Record of Protected Structure
SFRA	Strategic Flood Risk Assessment

1 Executive Summary

The Site Specific Flood Risk Assessment (SFRA) has been prepared for the entire land bank of c. 240 acres at Maynooth Environs Moygaddy which forms the Masterplan area owned by Sky Castle Ltd. The development is located in the townland of Moygaddy, Co Meath although some of the road/bridge infrastructure will be located in Co Kildare.

Individual planning applications are to be submitted for

- An office campus
- A Primary Care Centre & Nursing Home
- The Maynooth Outer Orbital Route (MOOR)
- A Strategic Housing Development of 360no Homes, creche, Scout Den, Public Park and Playground,
- Utility connections & road, pedestrian and cycle connections with Maynooth, County Kildare

A review of the available flood maps confirms that both the Ryewater River and the Blackhole Little Stream overtop during the 1% AEP and 0.1% AEP flood events, which results in limited inundation to the Masterplan site. To confirm the flood extents for the Masterplan site a hydraulic model has been developed for the study area.

Based on the findings of the SFRA and hydraulic model, all development proposed is located within Flood Zone C i.e. at a low risk of flooding. Some of the road bridge, pedestrian & cycle and utility connection infrastructure where they cross the Rye Water & Blackhole Little stream, which by their nature, are within Flood Zones A & B.

The new bridge infrastructure has been designed to ensure they have no impact on flooding and therefore, there will be no increase in flood risk resulting from the development. If planning permission is granted, a Section 50 application will be submitted to the OPW for all the proposed bridge structures.

Climate change and residual risks (blockage) have also been assessed for the Masterplan site. The results confirm the development will not be impacted by the predicted impact of climate change nor by the modelled blockage events.

In summary, the FRA was undertaken in accordance with 'The Planning System and Flood Risk Management - Guidelines for Planning Authorities' (2009), and agrees with the core principles contained within

2 Introduction

2.1 Terms of Reference and Scope

JBA Consulting was appointed by Sky Castle Ltd to prepare a comprehensive Site-Specific Flood Risk Assessment (SSFRA) study for the proposed masterplan development of a site located in Moygaddy, Co. Meath. The development of the site will involve the construction of utility road bridge infrastructure connections that will be undertaken in Maynooth, Co. Kildare. The masterplan within Moygaddy has been identified in the Meath County Development Plan 2021-2027 (Masterplan Reference: MP 16).

Under the 'Planning System and Flood Risk Management - Guidelines for Planning Authorities' (DEHLG / OPW, 2009), proposed development must undergo a Flood Risk Assessment (FRA) prior to planning to ensure sustainability and effective management of flood risk. The planning authorities in this instance are Meath County Council (MCC) and Kildare County Council (KCC).

2.2 Flood Risk Assessment; Aims and Objectives

This study is being completed to inform the future design and development of the site as it relates to flood risk. It aims to identify, quantify and communicate to the client the risk of flooding to land, property and people and the measures that would be recommended to manage the risk in order to facilitate the development of the site.

The objects of this FRA are to:

- Identify potential sources of flood risk;
- Confirm the level of flood risk, and identify key hydraulic features;
- Assess the impact the proposed development has on flood risk;
- Develop appropriate flood risk mitigation and management measures, which will allow for the long-term development of the site.

Recommendations for development have been provided in the context of the 'Planning System and Flood Risk Management - Guidelines for Planning Authorities' by the DEHLG / OPW (2009). A review of the likely effects of climate change, and the long-term impacts this may have on development has also been undertaken.

For general information on flooding, the definition of flood risk, flood zones and other terms, refer to 'Understanding Flood Risk' in Appendix A.

2.3 Development Proposal

It is proposed to construct the following developments:

- a residential estate on a c.13.52ha site, as part of a c.96ha masterplan development (MP 16), located in Moygaddy, Co. Meath.
- Maynooth Outer Orbital Road (MOOR)
- 2 road bridges
- 3 pedestrian and cycle bridges

The c.96-hectare Moygaddy masterplan site area is to be subject to a phased development over a 25+ year period, with the initial phasing comprising:

- Maynooth Outer Orbital Road;
- 360nr. residential development, creche and public park (SHD ABP-312213-21)
- Phase 1 Medical i.e., Primary Care Centre and Nursing Home
- Phase 1 Biomedical, Lifesciences and Technology Park i.e., 3nr. Office Blocks

The overall masterplan development provides for a total of 5no bridges across the Ryewater River and Blackhall Little Stream. This consists of 2no. road bridges and 3no pedestrian walkway/cycleway bridges.

The SHD application will be submitted to An Bord Pleanála and each of the other applications are to be submitted to Meath County Council for planning permission under independent applications, with further applications for the remaining masterplan area to be submitted on a phased basis, until all development within Masterplan area is completed. Planning applications will also be submitted to Kildare County Council for the road, bridge, pedestrian/cycle path and utility connection infrastructure within County Kildare.

The masterplan area is aligned with the River Ryewater along its southern boundary, and is also bisected (North – South) by the Blackhall Little Stream, near its centre. All development that is to occur on site is to provide significant sustainable drainage infrastructure that is to be integrated with the intensive landscaping, and comply with Meath County Council's County Development Plan and SuDS policies. All rainfall runoff is to be treated and attenuated on site, with development discharge rates restricted to a flow rate that is less than the greenfield equivalent runoff rate (5.61 l/s/ha). The proposed bridge designs are provided in Appendix B.

Refer to Figure 2-1 or the site location masterplan.

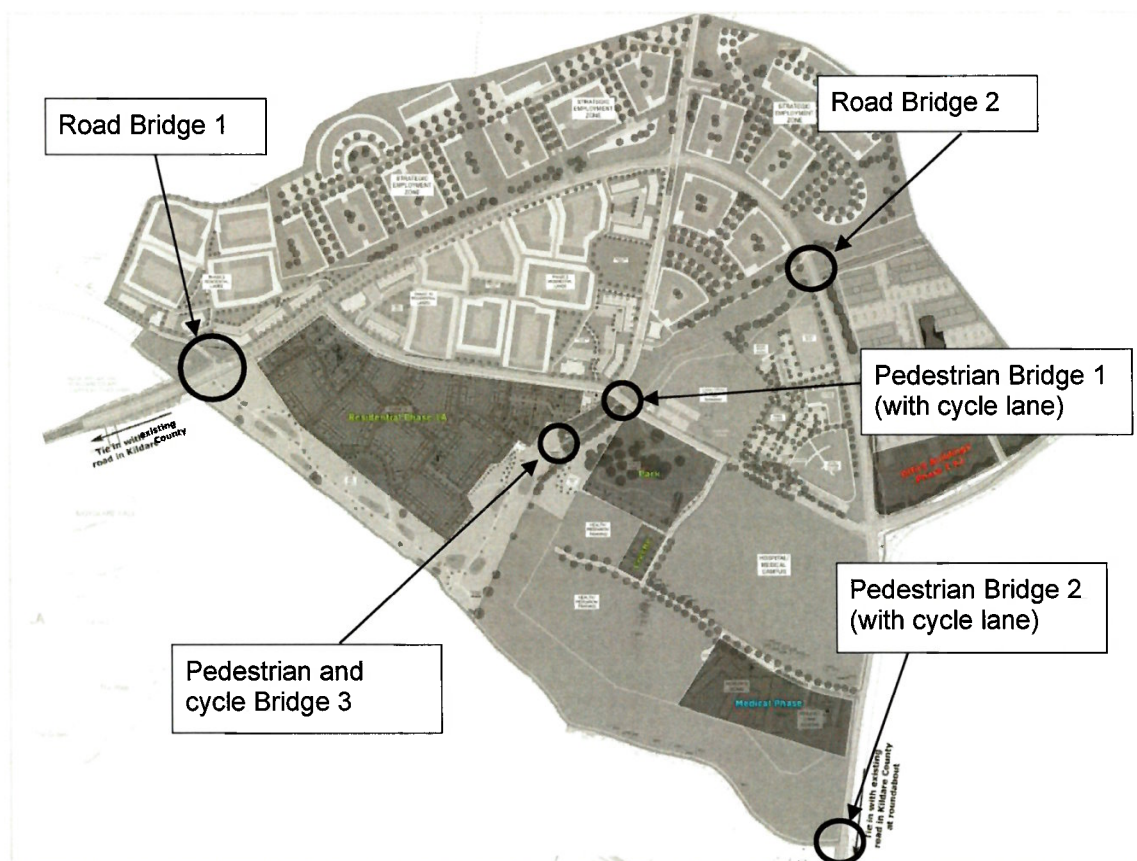


Figure 2-1: Site Location Masterplan (Source: OCSC)

2.4 Report Structure

Section 3 of this report gives an overview of the study location and associated watercourses. Section 4 contains background information and initial assessment of flood risk. The hydraulic model and hydrology are outlined in Section 5. Mitigation measures are outlined in Section 6, while conclusions are provided in Section 7.

3 Site Background

This section describes the watercourses and hydraulic features, topography, geology and wider geographical areas of Moygaddy, Co. Meath and Maynooth, Co. Kildare.

3.1 Location

The proposed site is mainly located in Moygaddy, Co. Meath, but works will also extend across the Ryewater River as part of the bridge/ road construction and to facilitate connections to utility infrastructure. The lands are primarily agricultural greenfields however there are some residential dwellings and farm buildings within the site boundary. A number of local access roads cross the site.

Maynooth town is located to the south of the site across the Ryewater River.

Refer to Figure 3-1 for the existing site overview.

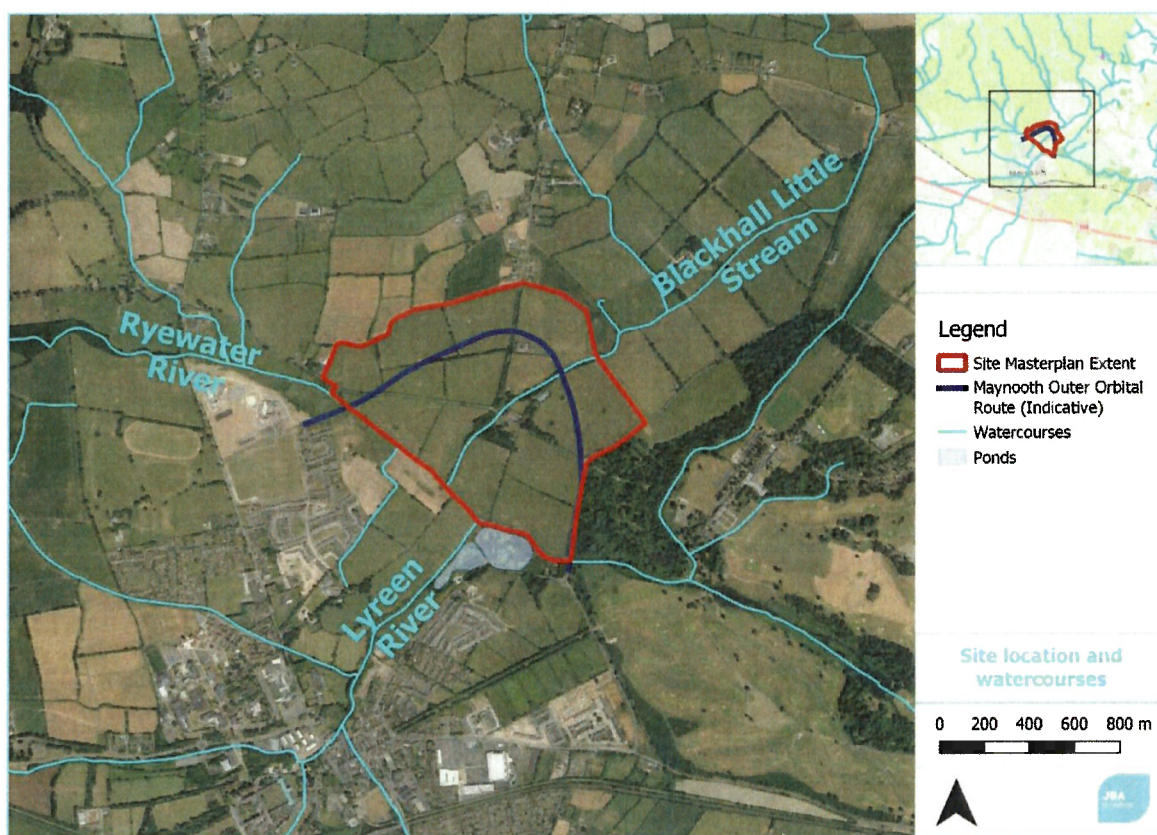


Figure 3-1: Site Location and watercourses

3.2 Site Topography

The masterplan site covers some 96Ha. It consists mainly of open fields. Public topographical data was available for review from the Geological Survey Ireland (GSI), courtesy of the OPW. Digital Terrain Model LiDAR data has been reviewed, which is topographical data that does not include buildings. As expected, the site falls naturally towards the Ryewater and Blackhole Little Stream. These 2 watercourses serve to naturally drain these lands. There is a high point located to the north with an elevation of c.62.66mOD. There is a low point at the southeast corner, located in the Ryewater river channel, with an elevation of c.44.40mOD. Refer to Figure 3-2 for the local topography.

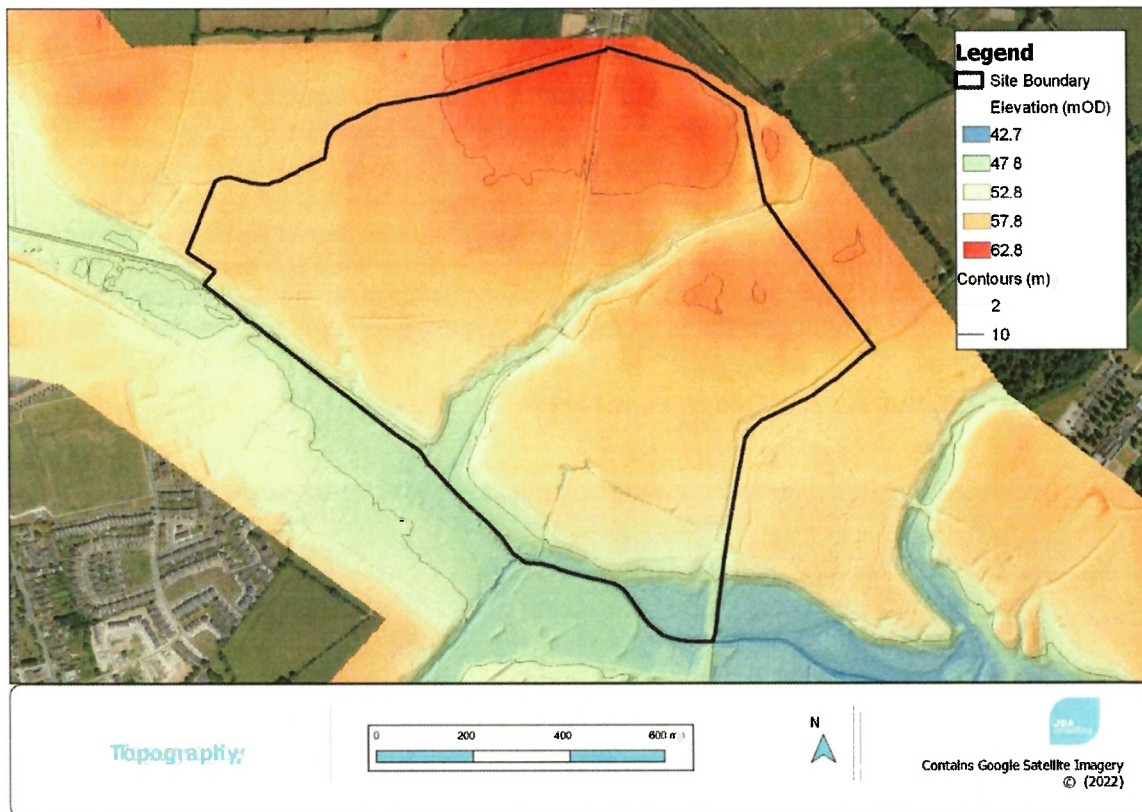


Figure 3-2: Site Topography (Source: site survey)

3.3 Watercourses

There are several watercourses in the area, and these are summarised as follows:

The main local watercourse is the Ryewater, also known as the River Rye. The Ryewater rises in Agher, Co. Meath. It flows through Kilcock, Maynooth and Leixlip before discharging to the River Liffey. The main tributaries of the Ryewater near Maynooth are summarised (amongst others) as follows:

To the north of the Ryewater, the Blackhole Little Stream runs through the site in a NE-NW direction. This stream rises near Cullendragh, Co. Meath and flows for c.10.3km before discharging to the Ryewater.

To the south, the Lyreen River merges with the Ryewater River along the southern boundary of the site. It flows through Maynooth town centre. It is c.12.2km in length and rises near Rathcoffey, Co. Kildare.

Refer to Figure 3-1 for an overview of local watercourses.

3.4 Site Geology

3.4.1 Local Subsoils

The GSI geological maps were available for review. The local subsoils are presented in Figure 3-3. The quaternary sediments present on site are TLs - Limestone till Carboniferous; while Alluvium undifferentiated gravelly is located along the waterbody systems. A thin line of Bedrock outcrop along the left bank of the Blackhole Little Stream at site. The underlying bedrock on-site is identified as 'Lucan Formation' and described as "dark limestone and shale (calp)". There were no karstic features identified on-site.

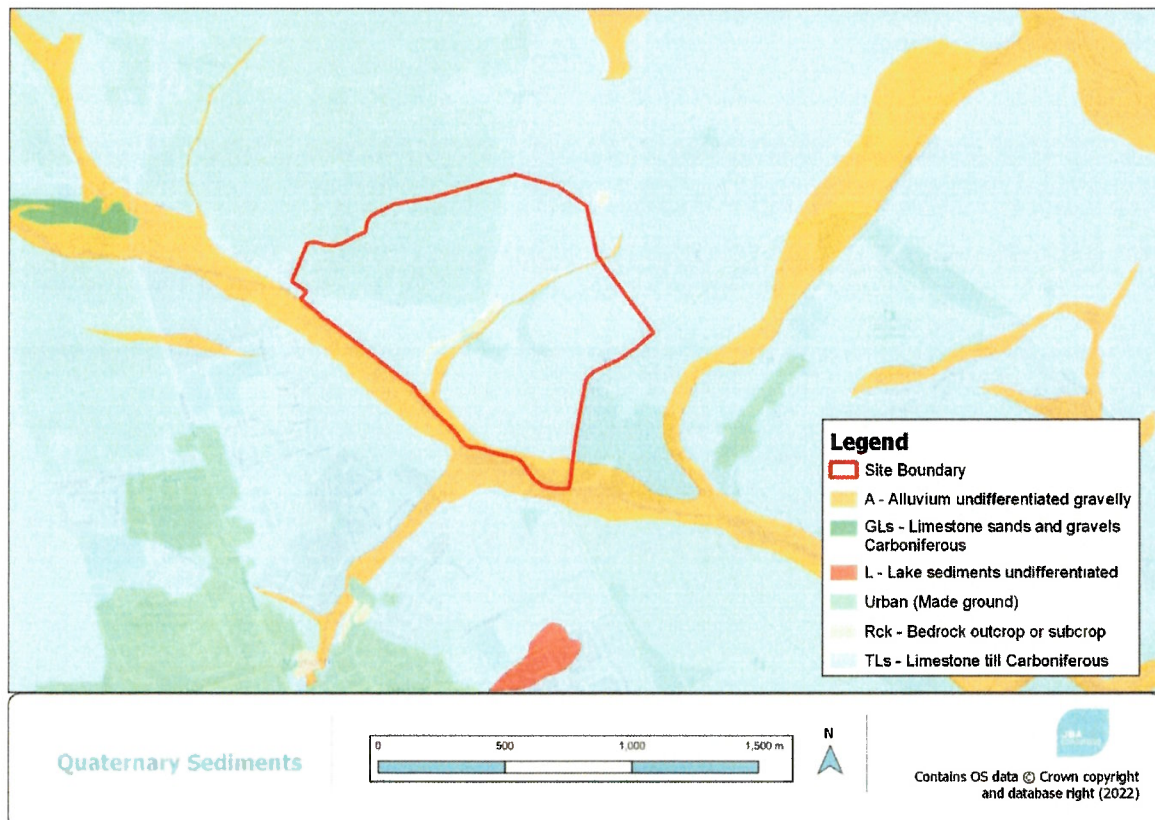


Figure 3-3: Quaternary Sediments (Source: GSI Database)

4 Flood Risk Identification

An assessment of the potential for, and scale of, flood risk at the site is conducted using historic and predictive information. This identifies any sources of potential flood risk to the site and reviews historic information. The findings from the flood risk identification stage of this FRA are provided in the following sections.

4.1 Flood History

A number of sources of flood information were reviewed to establish any recorded flood history at, or near the site. This includes the OPWs national flood information portal, www.floodinfo.ie and general internet searches.

4.1.1 Floodinfo.ie

The OPW host a national flood information portal, www.floodinfo.ie, which highlights areas at risk of flooding through the collection of recorded data and observed flood events. Refer to Figure 4-1 for an overview of past flood events in the Maynooth / Moygaddy areas.

Two areas of possible groundwater flooding have been identified onsite, at the south-eastern area of the site in close proximity to the Ryewater and an area at the junction between the Blackhole Little Stream and Ryewater River.

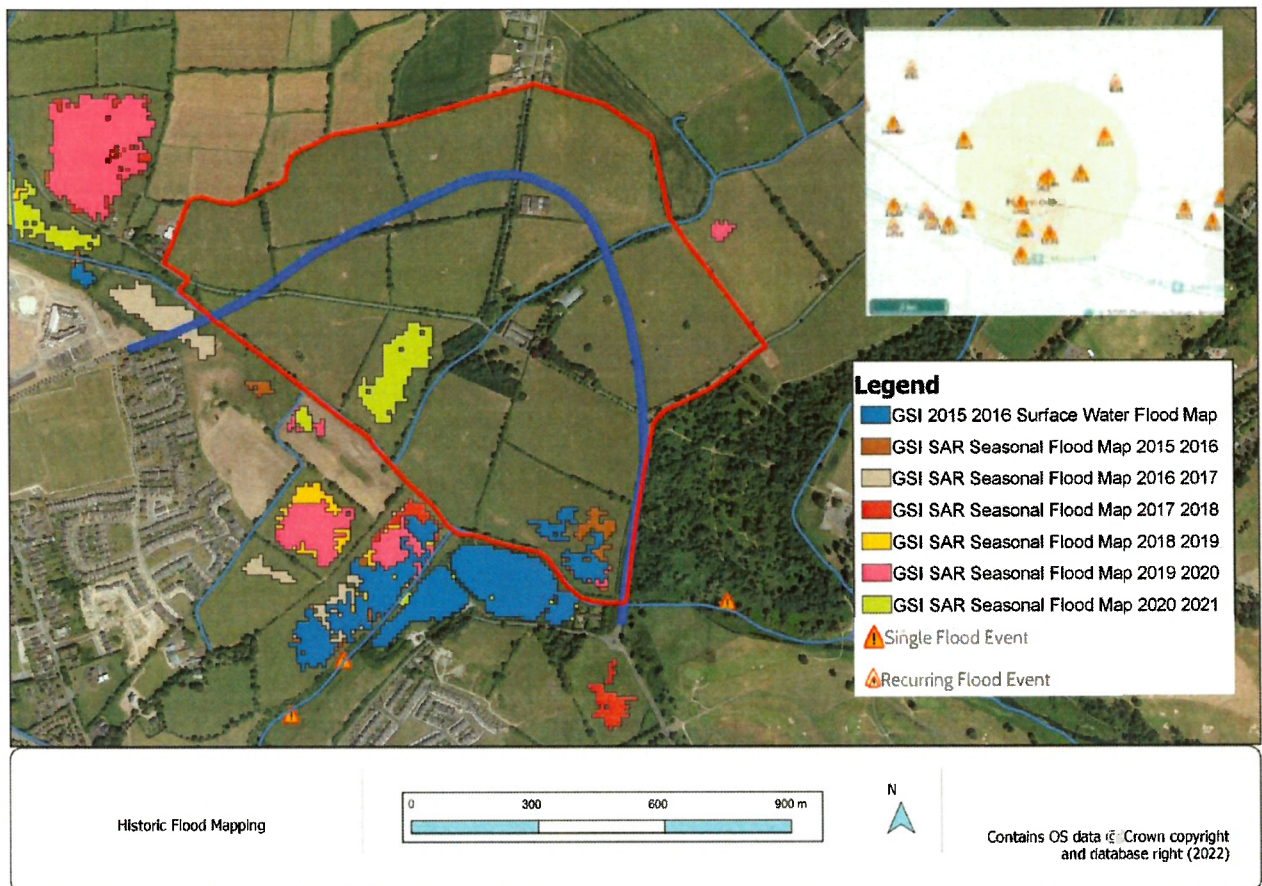


Figure 4-1: Flood History (floodinfo.ie)

Maynooth has been associated with significant flooding in its recent history. A summary of recent flood events is outlined as follows:

- ID-1948 - Lands along the Rye Water were flooded during the November 2000 event
- ID-11489 - Minor flooding along the Lyreen River near the fish ponds during October 2011
- ID-352 - In November 2000, flooding occurred on the Lyreen River at the weir near the fish ponds upstream of the confluence with the Rye Water

- ID-1942 - In June 1993, farmlands were flooded near the M4 motorway culvert and Jackson's Bridge. The flood source was the Lyreen River. Met Éireann estimated the June 1993 event equated to a 1-in-50 year storm;
- ID-1523 - Low lying lands and the R157 Maynooth-Dunboyne regional road in Co. Meath were flooded in 14th-15th November 2002.
- Surface water flooding from the Winter 2015/2016 flood event was identified at the southeast corner of the masterplan site. This flooding is located to the north east of Lyreen River and three artificial fishing ponds in County Kildare, and the surface water flooding close to the Masterplan boundary itself.

There were no historic or predictive groundwater flooding extents identified within a 2.5km radius of the masterplan site

4.1.2 Internet Searches

An internet search was conducted to gather information about whether the existing site was affected by flooding previously. The search returned no results.

4.2 Predictive Flooding

The local area has been subject to several predictive flood mapping or modelling studies and other related studies and plans:

- Meath County Development Plan 2021-2027 Strategic Flood Risk Assessment;
- Eastern Catchment Flood Risk Assessment and Management (CFRAM) Study;
- National Indicative Fluvial Mapping (NIFM) Study.

The level of detail presented by each method varies according to the quality of the information used and the approaches involved.

42.1 Meath County Development Plan 2021-2027 Strategic Flood Risk Assessment

In accordance with Section 11 of the Planning and Development Act 2000 (as amended), Meath County Council (MCC) completed a review of the Meath County Development Plan (MCDP) 2013-2019 and subsequently prepared a new MCDP for the period 2021-2027. A Strategic Flood Risk Assessment (SFRA) for the MCDP 2021-2027 was prepared by JBA in accordance with the requirements of 'The Planning System and Flood Risk Management - Guidelines for Planning Authorities' (2009) and Circular PL2/2014 'Flooding Guidelines' by the Department of Housing, Local Government and Heritage. The SFRA provides an assessment of all types of flood risk within the County and assisted MCC in making informed strategic land-use planning decisions and formulate flood risk policies. This flood risk information has enabled MCC to apply 'The Guidelines' sequential approach, and where necessary, the Justification Test, to appraise sites for suitable land zonings and identify how flood risk can be managed as part of the MCDP.

Flood zone mapping for the Moygaddy area was prepared as part of the Maynooth Environs LAP. A review shows that areas along the Rye Water and Blackhole Little Stream are subject to flooding during the 1% (Flood Zone A) and 0.1% (Flood Zone B) AEP fluvial flood events. These areas have accordingly been zoned as 'H1 - High Amenity'. Refer to Figure 4-2.



Figure 4-2: Extract from Maynooth County Plan Zoning (Meath SFRA)

4.2.2 Eastern Catchment Flood Risk Assessment and Management (CFRAM) Study

The primary source of data with which to identify flood risk to the site is the Eastern CFRAM study. The Eastern CFRAM study covers c.6,300 sq.km and involves detailed hydraulic modelling of rivers and their tributaries, along with coastal flood modelling. Flood maps are publicly available for the 10%, 1% and 0.1% AEP fluvial flood events, and covers Maynooth Town (amongst others):

Maynooth was identified as an Area for Further Assessment (AFA) as part of the superseded OPW PFRA study. The AFAs were the focus of the CFRAM studies. The flood extents for the Maynooth area were available from the OPW CFRAM WMS online layers. A review shows lands along the Rye Water and Blackhole Little Stream are subject to flooding during the 10%, 1% (Flood Zone A) and 0.1% (Flood Zone B) AEP fluvial flood events. The CFRAM extents are based on the undefended scenario, and therefore do not take account of flood protection structures such as embankments. Refer to Figure 4-3 for the CFRAM fluvial flood extents and Table 4-1 for CFRAM flood levels in Moygaddy. The study also confirms no flooding on the subject site for the 10%, 0.5% and 0.1% AEP from coastal flood events.

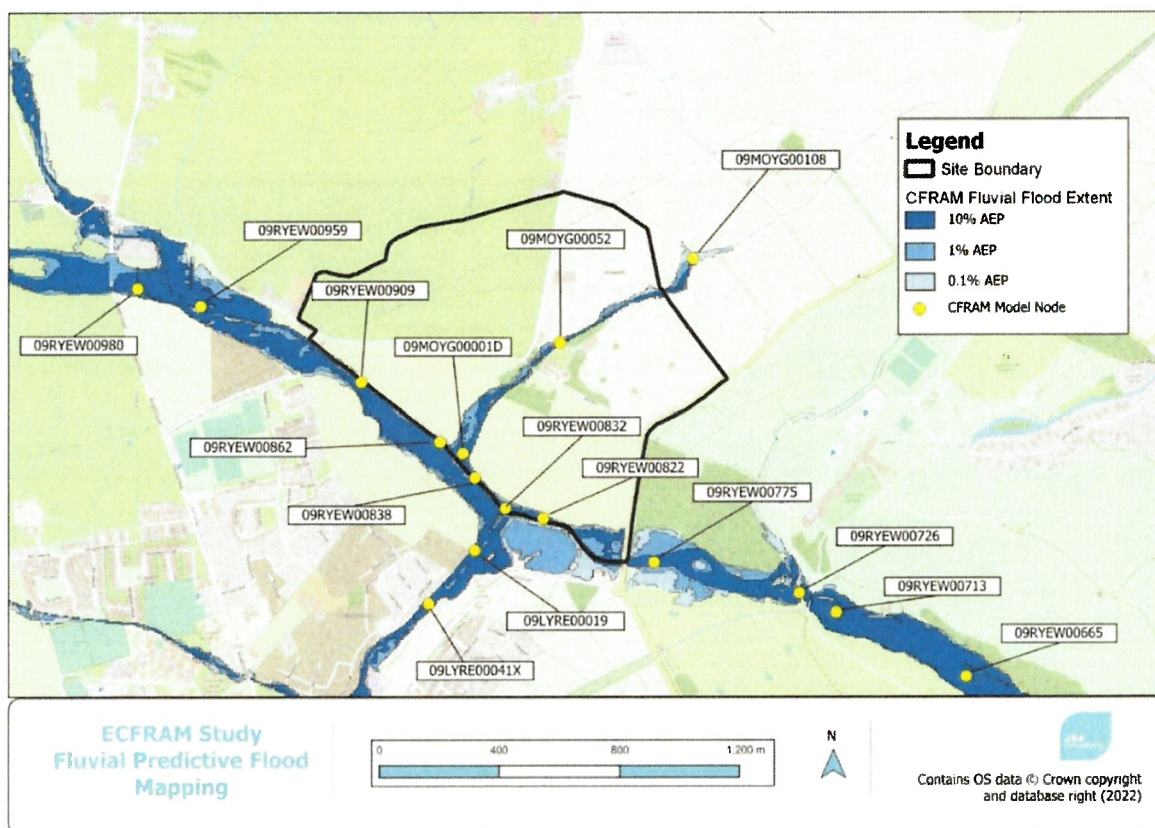


Figure 4-3: ECFRAM Study Fluvial Flood Extents (Source: Floodinfo.ie)

Table 4-1: ECFRAMS Flood Levels (mOD) (Source: Floodinfo.ie)

ECFRAMS Model Node	10% AEP	1%AEP	0.1%AEP
Blackhole Little Stream			
09MOYG00108	57.80	58.21	58.56
09MOYG00052	51.97	52.37	52.80
09MOYG00001D	48.12	48.40	48.52
Ryewater River			
09RYEW00980	51.94	52.12	52.334
09RYEW00959	50.95	51.23	51.29
09RYEW00909	49.70	49.98	50.31
09RYEW00862	47.94	48.19	48.45
09RYEW00838	47.31	47.64	48.04
09RYEW00832	46.89	47.38	47.85
09RYEW00822	46.60	47.04	47.55
09RYEW00775	45.28	45.65	46.11
09RYEW00726	44.64	44.87	45.24
09RYEW00713	44.66	44.88	45.22
09RYEW00665	44.62	44.82	45.11

ECFRAMS Model Node	10% AEP	1%AEP	0.1%AEP
Lyreen River			
09LYRE00019	47.51	47.85	48.08
09LYRE00041X	47.84	48.27	48.68

4.2.3 National Indicative Fluvial Mapping (NIFM) Study..

Data has been produced for catchments greater than 5km² in areas for which flood maps were not produced under the National CFRAM Programme and should be read in this context. The NIFM datasets have been edited to remove overlaps with the datasets produced under the National CFRAM Programme and other flood studies. The NIFM datasets should be read in conjunction with the outputs of the National CFRAM Programme and other studies.

Refer to Figure 4-4 for NIFM flood extents

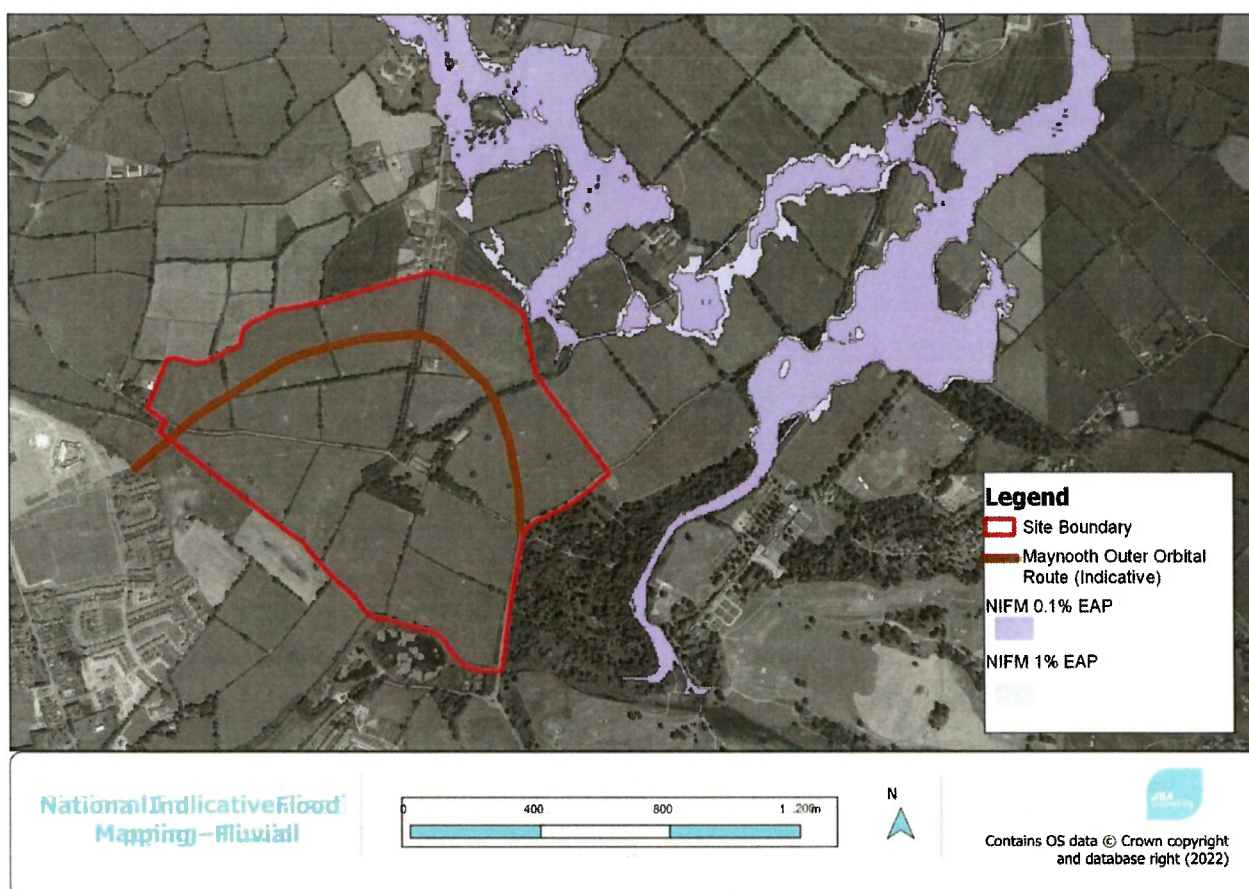


Figure 4-4: NIFM for Moygaddy area (Source: Floodinfo.ie)

4.3 Flood Sources

The initial stage of a site-specific Flood Risk Assessment (FRA) requires the identification and consideration of probable sources of flooding. Following the initial phase of this FRA, it is possible to summarise the level of potential risk posed by each source of flooding. The flood sources are described as follows:

4.3.1 Fluvial / River

There are several watercourses in the area, principally the Ryewater, Blackhole Little Stream and Lyreen River. The Ryewater lies along the Masterplan boundary and discharges to the River Liffey in Leixlip, Co. Kildare. The flood risk is identified as follows:

- The Meath County Development Plan 2021-2027 Strategic Flood Risk Assessment shows that areas of the masterplan site are subject to flooding during the 1% (Flood Zone A) and 0.1% (Flood Zone B) AEP fluvial flood events. The remaining areas are therefore within Flood Zone C;
- The Eastern CFRAM study shows that areas of the masterplan site and the proposed MOOR corridor are located in lands which are subject to flooding during the 10%, 1% (Flood Zone A) and 0.1% (Flood Zone B) AEP fluvial flood events;
- The National Indicative Fluvial Mapping (NIFM) study shows that lands immediately northeast of the masterplan site are subject to flooding during the 1% (Flood Zone A) and 0.1% (Flood Zone B) AEP fluvial flood events, however, the floodwaters do not encroach onto the Masterplan site area.

Based on the identified fluvial flood risk, a hydraulic model has been developed to confirm the Flood Zone A/B flood extents within the stie, while also appraising for the potential impacts of climate change and also testing for residual risks (blockage). The hydraulic model is outlined in Section 5, which also includes the flood map outputs.

Utilising hydraulic model outputs site-specific mitigation measures to manage the ongoing fluvial risk are outlined in Section 6. Residual risk is further discussed in Section 6.3.

4.3.2 Tidal / Coastal

Maynooth and Moygaddy are located inland and are not impacted by predictive and historic tidal flooding, as confirmed by the Eastern CFRAM and National Coastal Flood Hazard Mapping (NCFHM) 2021 studies.

The risk of tidal flooding has been screened out at this stage.

4.3.3 Pluvial / Surface Water

Pluvial, or surface water, flooding is the result of rainfall-generated flows that arise before runoff can enter a watercourse or sewer. It is usually associated with high-intensity rainfall events. Flood risk from pluvial sources exists in all areas. Adequate surface water drainage systems will assist with the alleviation and management of pluvial flooding risk.

It is noted that there were instances of surface water flooding from the Winter 2015/2016 flood event at the southeast corner of the masterplan site. This event represented the largest groundwater flood on record. This flood map encompasses fluvial (rivers) and pluvial (rain) flooding in non-urban areas and has been developed under the GWFlood¹ project as a by-product of the historic groundwater flood map. It was not clear at the time of writing this report whether the flooding in the southeast corner was fluvial or pluvial-related.

Site-specific mitigation measures to manage the pluvial flooding risk are outlined in Section 6. Residual risk is further discussed in Section 6.3.

4.3.4 Groundwater

Review of the historic flooding and GSI datasets outlined in Section Figure 4-1 provides some indication that historic groundwater flooding has occurred within the masterplan site. However, the confidence rating given to the occurrence of the event is 'Low'. Following review of the topography of the affected areas are partially elevated to the Ryewater and Blackhole Little Stream flood plains. If groundwater flooding was to occur onsite it will be contained within the low-lying flood plains.

¹ GWFlood project (2016-2019) (gsi.ie)

No development is proposed within these areas therefore, the flood risk from groundwater flooding has been screened out at this stage.

5 Hydraulic Model

5.1 Hydrology Assessment

To assist in the estimation of potential flood risk to the proposed development within the Masterplan Area, from each of the Ryewater River, Moygaddy Stream and Lyreen River, this section provides flow estimates for the 1% and 0.1% AEP flood event flows.

5.1.1 Catchment Characteristics

The catchment characteristics for the HEPs have been transferred from corresponding node from FSU database. The physical characteristics of the catchment influence the hydrology, this includes catchment size (AREA), soil type, steepness and the average annual rainfall. The values have been reviewed and the URBEXT value was updated, using the latest CORINE 2018 land use data set and information from myplan.ie. Table 4-1 outlines the parameters calculated for the site catchment. Figure 5-2 overpage details the catchment area.

Table 5-1: Catchment Characteristics (source: OPW FSU)

Descriptor	HEP_1	HEP_2	HEP_3	HEP_4a	HEP_4b	HEP_5	HEP_6
FSU Node	09_301_2	09_1857_2	09_1863_2	09_1241_1	09_1060_3	09_611_3	09_1260_3
Area	59.141	70.314	71.806	17.086	18.00	87.635	193.858
SAAR	805.71	804.55	803.76	807.87	805.46	768.16	785.64
FARL	1	1	1	1	1	1	1
BFI Soil	0.474	0.474	0.475	0.444	0.442	0.473	0.477
URBEXT	0.037	0.031	0.034	0	0	0.045	0.048
MSL	15.108	16.173	16.674	8.992	10.314	16.684	19.465
S1085	2.114	1.832	1.971	6.193	5.444	1.794	2.468
Stream Frequency	29	35	37	7	9	37	99
DrainD	0.806	0.833	0.837	1.096	1.125	0.699	0.809
ArtDrain2	0.2818	0.245	0.2455	0	0	0	0.1116
Soil (number)	2(25%), 4(75%)	2(25%), 4(75%)	2(35%), 4(65%)	2(50%), 4(50%)	2(55%), 4(45%)	2(90%), 4(10%)	2(65%), 4(35%)
M5-2day	54	54	54	54	54	54	54
r	0.33	0.33	0.33	0.33	0.33	0.33	0.33

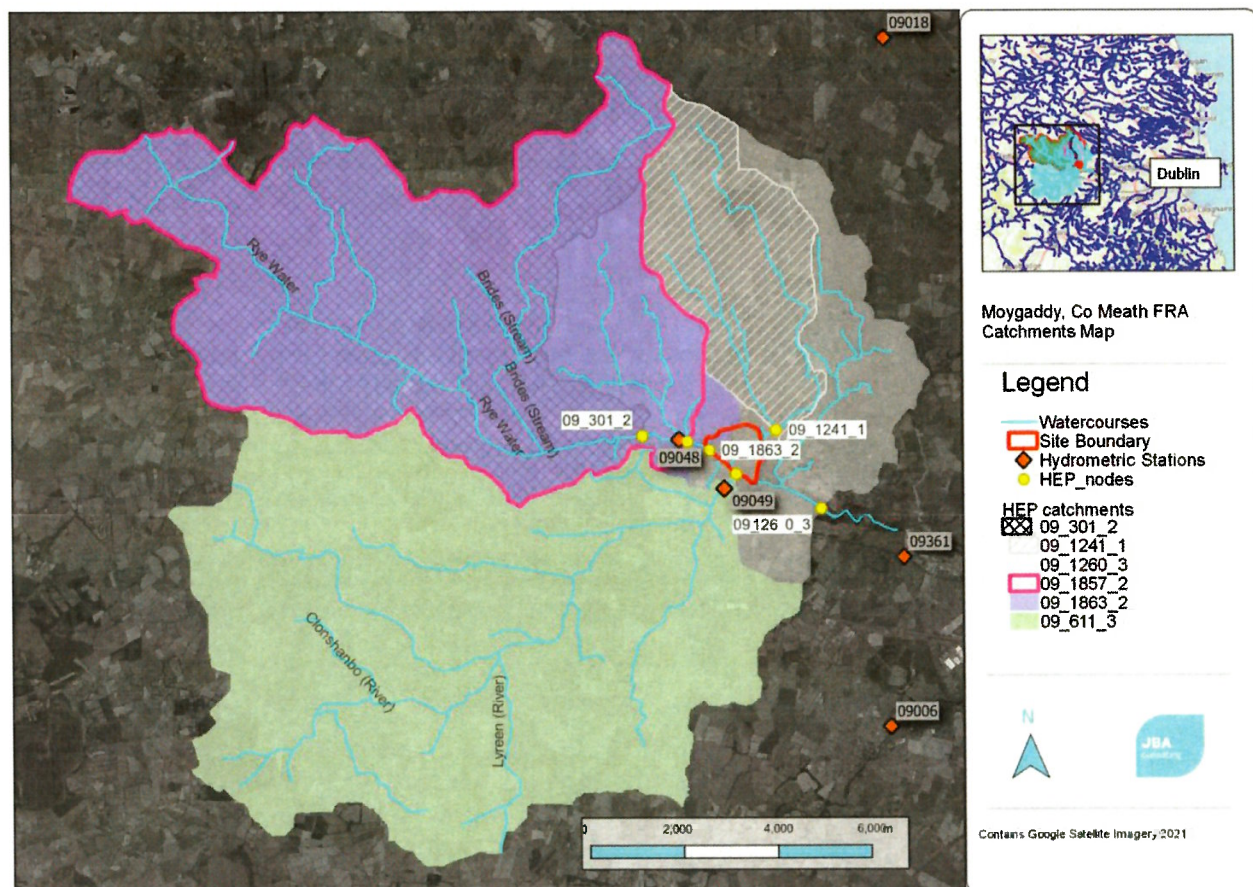


Figure 5-1: Catchment Area

5.1.2 Flow estimation

The flow estimations for the Ryewater River, Blackhole Little Stream and Lyreen Stream are provided in Table 5-2. The FSU (Flood Studies Update) method was selected as it produced more conservative flows and is considered the most applicable method based on the catchment size and characteristics.

Table 5-2: Design Flows (m³/s)

Site code	Flood peak (m ³ /s) for the following return periods (% AEP)						
	50%	20%	10%	5%	2%	1%	0.1%
HEP_1	17.19	26.64	31.97	37.13	43.83	48.82	66.35
HEP_2	20.01	29.21	35.41	41.41	49.02	54.62	73.63
HEP_3	20.75	30.29	36.72	42.94	50.83	56.64	76.35
HEP_4a	6.35	9.85	11.82	13.72	16.20	18.04	24.53
HEP_5	13.71	21.25	25.49	29.61	34.95	38.93	52.91
HEP_6	46.44	71.98	86.37	100.30	118.42	131.88	179.25

5.1.3 Climate Change

Current OPW guidance requires that the effects of climate change be considered when assessing flood risk. The expected increase in peak flows, rainfall and tidal level is provided in the draft OPW guidance which provides allowances for two different climate change scenarios. These are the Mid-Range Future Scenario (MRFS) and the High-End Forecast Scenario (HEFS). The recommended allowances for climate change are given in Table 5-3 below. The potential implications for the proposed development within the Masterplan Area from climate change are discussed further in Section 5.1.3.

Table 5-3: OPW Climate Change Guidance

	MRFS	HEFS
Extreme Rainfall Depths	+20%	+30%
Flood Flows	+20%	+30%
Mean Sea Level Rise	+500mm	+1000m

5.2 Hydraulic Model

To provide a detailed assessment of flood risk within the Masterplan site area, a 1D-2D ESTRY-TUFLOW hydraulic model was constructed. It allows for the modelling of river channels, streams, floodplains and hydraulic structures to predict water levels for a range of scenarios (see Figure 5-2 for the hydraulic model structure). The hydraulic model was developed in the following stages:

- A 1D-2D ESTRY-TUFLOW model of the Ryewater River and Blackhole Little Stream was created using a DTM and available surveyed data;
- The Lyreen River was represented in the 2d model.
- Existing structures were inserted into the model based on survey data and a baseline condition was established, in the vicinity of the site. Refer Figure 5-2 for the existing structure in the vicinity of the masterplan site;
- Hydraulic simulations were run to derive the existing flood extents for the 1% and 0.1% AEP flood events;
- The post-development design has been assessed against a climate change scenario (MRFS);
- Residual risks have been tested to assess the residual risk for the site.

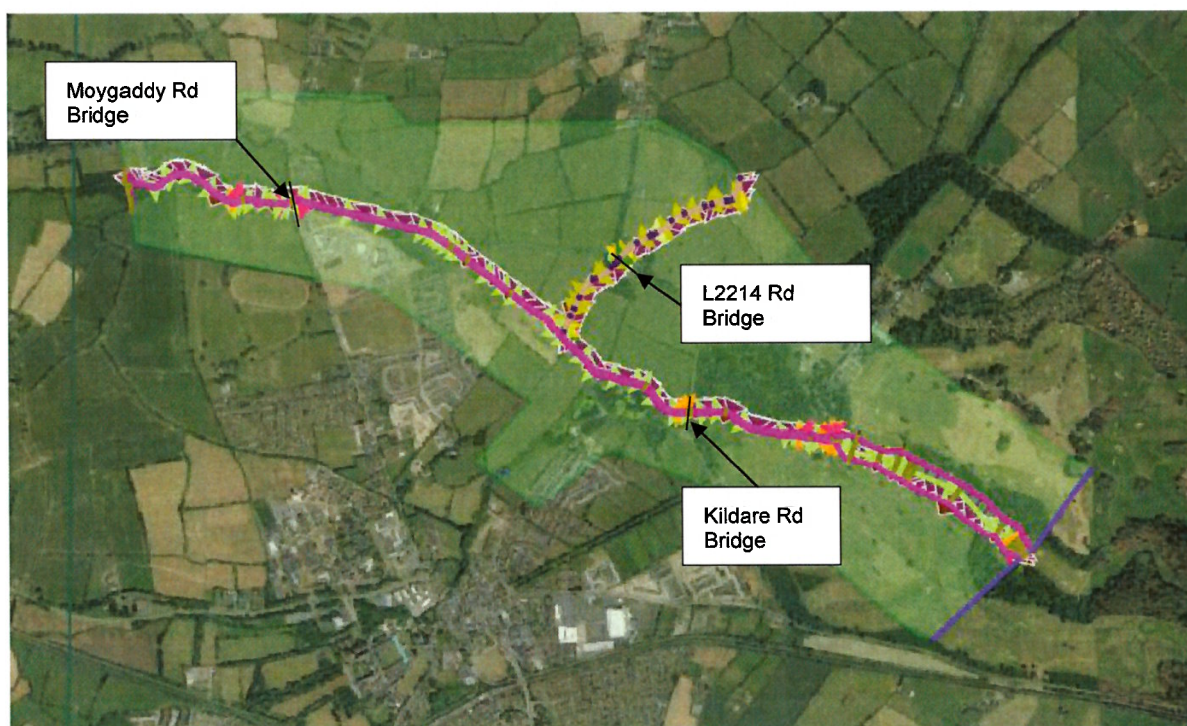


Figure 5-2: Model Schematisation

5.2.1 Site Survey

The flood model of the Ryewater River and Blackhole Little Stream has been based on OPW sourced site survey data (2013). This was supplemented and updated by site specific river survey data undertaken during July 2021 by Murphy Surveys.

A comprehensive site survey was undertaken of the site and wider lands during September 2021. This survey data was incorporated into the model to ensure that the model is based on accurate and up to date data.

5.3 Model Results

The model results are presented in the following sections that focus on the confirmation of Flood Zone A & B, while also providing the post-development flood extents for the various development areas.

5.3.1 Delineation of Flood Zone A and B

The model results show the Masterplan area is not impacted by fluvial inundation during both the 1% and 0.1% AEP fluvial flood events. The flood extents identified in parts of the masterplan site are presented in Figure 5-3 and indicative flood levels are presented in Table 5-4. The complete output from the model is presented in Appendix D.

The outputs from hydraulic model have been compared to the CFRAM model outputs (Figure 4-3) and the results show a good agreement between the two studies. This provides confidence in the produced flood extents and also suggest a well-defined flood plain.

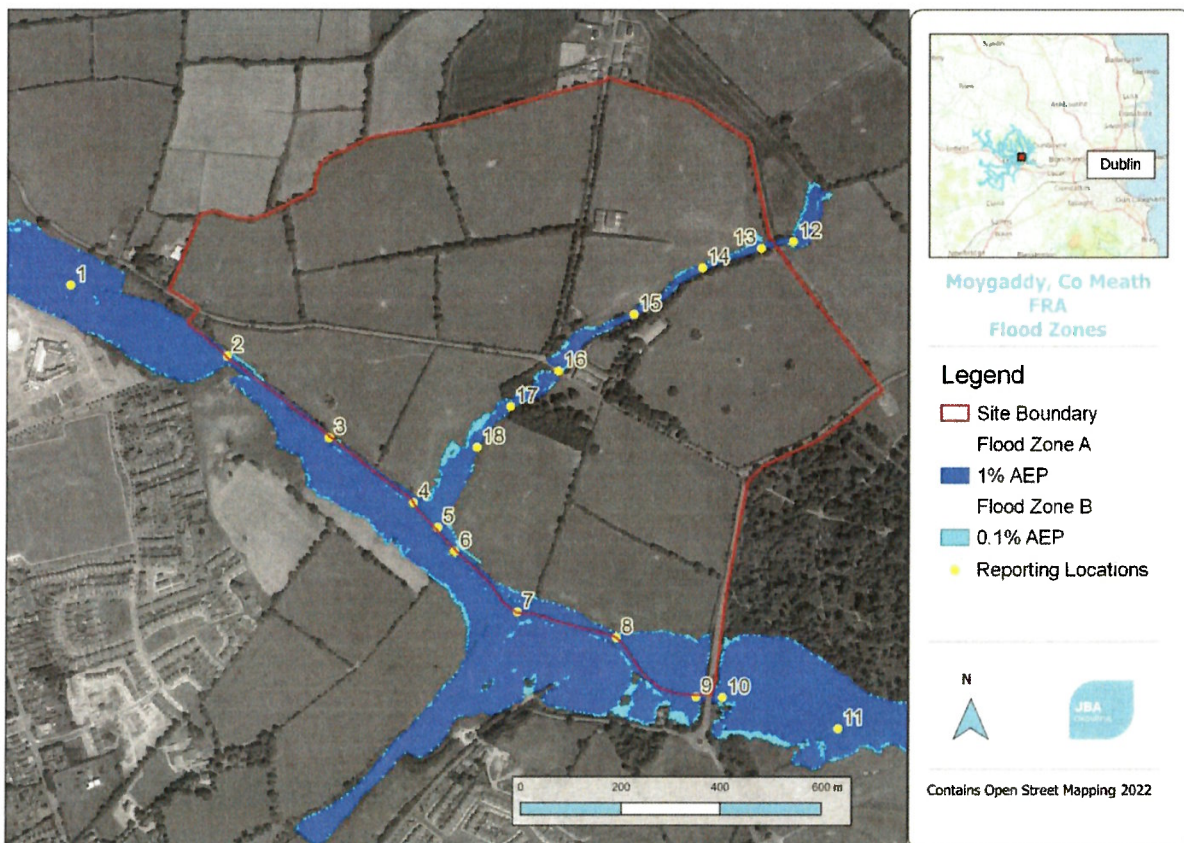


Figure 5-3: 1% and 0.1% AEP fluvial flood extents - pre-development scenario

5.4 Post-Development Model Results

The post-development model results are presented in the following sections. As no development is proposed within Flood Zone A/B the post-development model only includes the proposed bridge structures outlined in Section 5.4.1.

The resulting flood map is presented in Figure 5-5 and levels in Table 5-4.

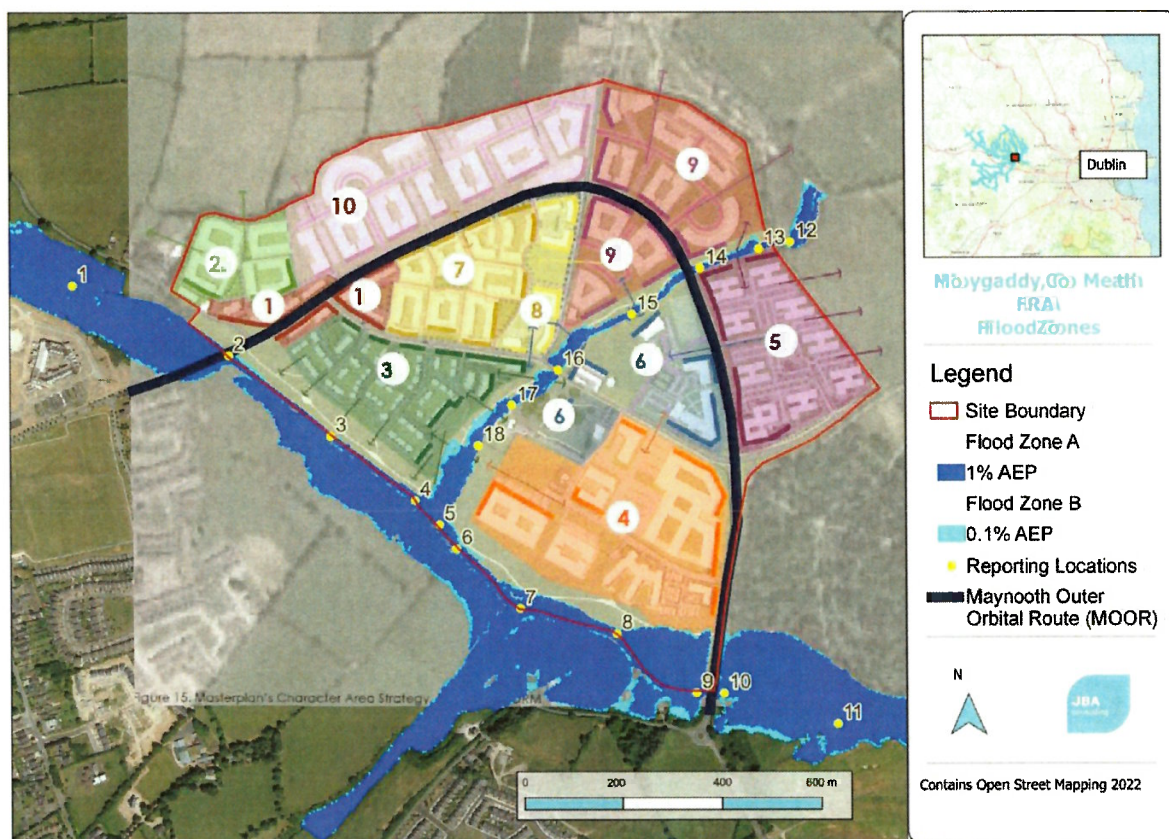


Figure 5-4: 1% and 0.1% AEP fluvial flood extents - post-development scenario

Table 5-4: Flood Levels (mOD)

Reporting Location	1%AEP	0.1%AEP	1% AEP MRFS
1	50.98	51.01	51.00
2	50.17	50.30	50.25
3	49.33	49.39	49.37
4	48.52	48.63	48.58
5	48.72	48.63	48.72
6	48.20	48.36	48.29
7	47.77	47.99	47.90
8	47.12	47.36	47.26
9	46.59	46.90	46.77
10	46.24	46.43	46.35
11	45.68	45.93	45.83
12	56.73	56.91	56.83
13	56.25	56.41	56.34
14	55.22	55.40	55.32
15	54.07	54.15	54.13
16	52.78	53.44	53.04
17	50.34	50.48	50.43
18	49.39	49.53	49.47

5.4.1 Post-Development Bridge Structures

As part of the dynamic modelling exercise a specific scenario has been developed to assess the potential impact of with the proposed bridges in place and the results are presented in the following section. The proposed bridges which are integral to the development of the Masterplan site is presented in Figure 5-5.

Note: that the results presented in the following section are the 1% and 0.1% AEP flood events. All bridge structures will undergo a Section 50 application post granting of planning which will be assessed in accordance with the Section 50 design standards.

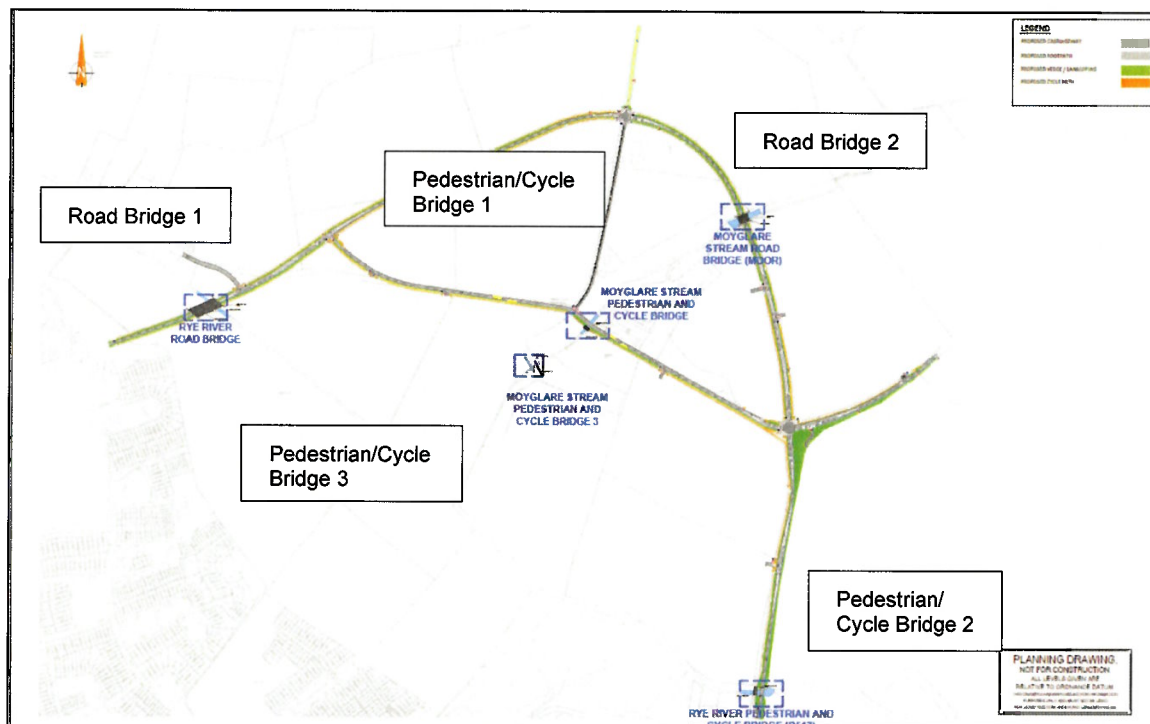


Figure 5-5: Bridge Structures

5.4.1.1 Road Bridge 1

This proposed bridge forms part of the MOOR and it will link the subject land with County Kildare at Moygaddy. This new road bridge will also have a pedestrian and cycle facilities. The proposed bridge soffit level has been set at 51.7mOD which provides a minimum freeboard of 1.10m above the 0.1% AEP flood level. The bridge design is provided in Figure 5-6.

The bridge design is based a multi-span design consisting of two 25m span sections.

The post-development flood levels are presented in Figure 5-6.

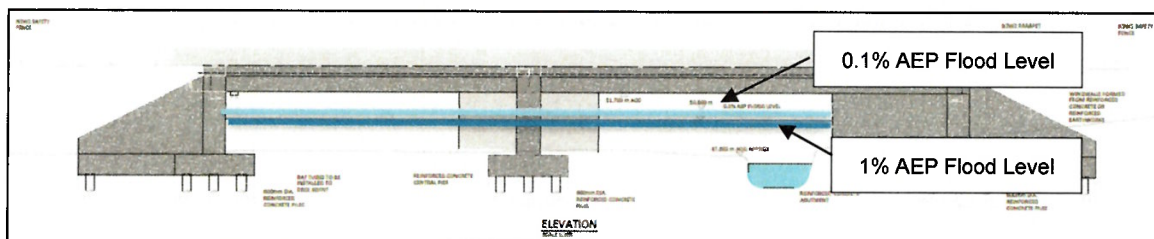


Figure 5-6: Post-development Flood Levels for Road Bridge 1

Post-development modelling has been undertaken of the proposed Road Bridge 1 structure. The results confirm that the bridge has been designed to convey the 1% AEP and 0.1% AEP flood events without increasing flood risk upstream and downstream of the site. The flood levels are presented in Figure 5-6.

Note: The bridge has been designed to the OPW's Section 50 design standards and an application will be submitted to the OPW following granting of planning.

5.4.1.2 Road Bridge 1

This proposed bridge forms part of the MOOR and it will link the Western and Eastern half of the subject Masterplan lands by providing a crossing over the Blackhole Little Stream. The proposed bridge soffit level has been set at 48.3mOD which provides a minimum freeboard of 1.36m above the 0.1% AEP flood level.

The model confirms that there is no impact on level during the 1% AEP or 0.1% AEP events. The post-development flood levels are presented in Figure 5-7.

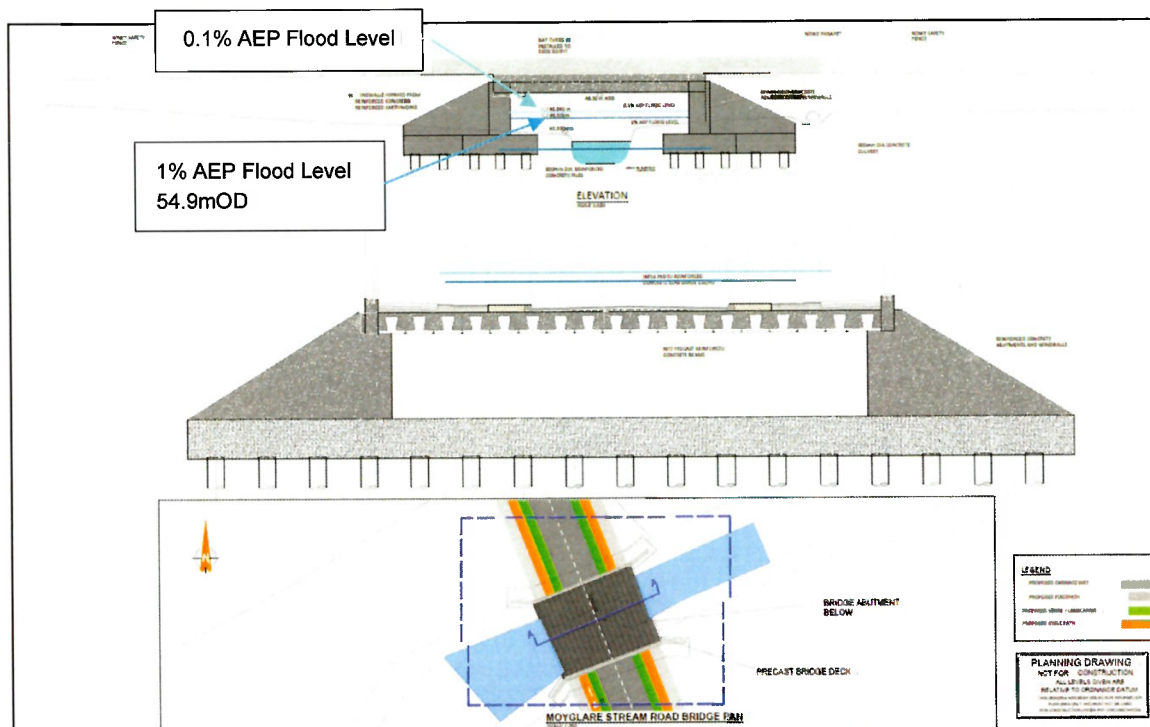


Figure 5-7: Proposed Bridge Layout- Road Bridge 2

5.4.2 Pedestrian Bridge 1 (with Cycle Lane)

The existing road bridge on the L2214 local road which crosses the Blackhole Little Stream does not have existing pedestrian or cycle facilities.

As part of the proposed development within the Masterplan area, it is proposed that a new pedestrian and cycle bridge will be installed to the south of the existing road bridge.

The modelled flood levels are as follows: 1%AEP is 52.82mOD and 0.1% AEP - 53.37mOD. The model confirms that there is no impact on flood level during the 1% AEP or 0.1% AEP events. The post-development flood levels are presented in Figure 5-8

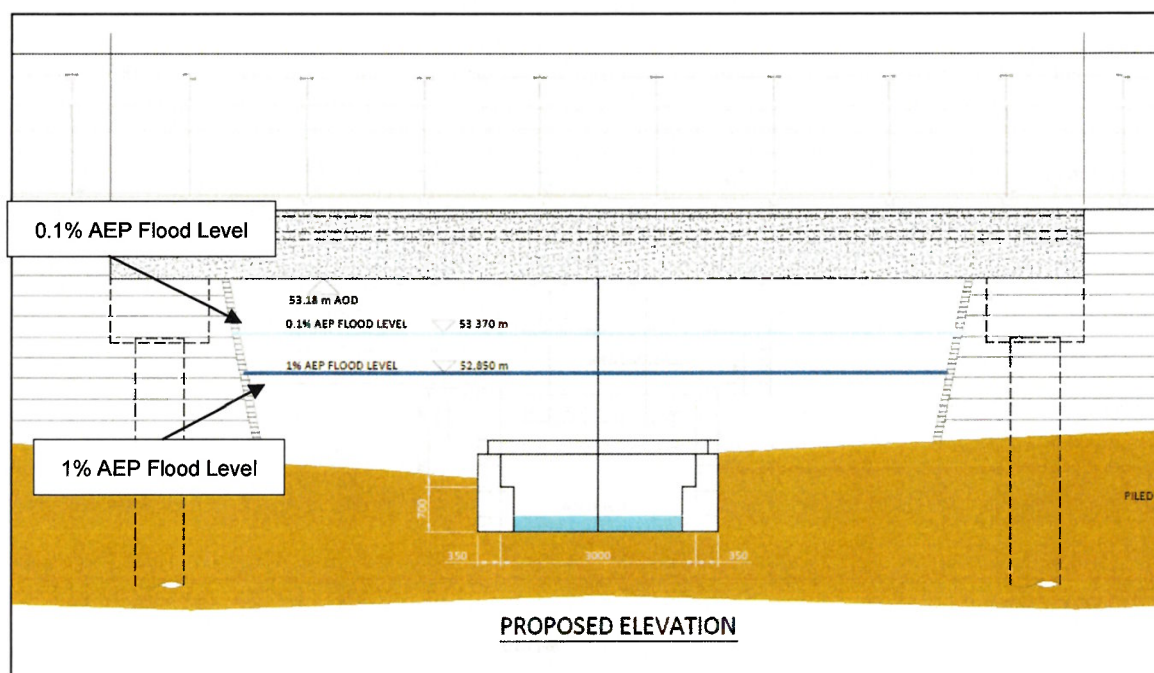


Figure 5-8: Post-development Flood Levels for Pedestrian Bridge 1

As the proposed pedestrian and cycle bridge will be located on the downstream face of the existing road bridge, it has no impact on the hydraulic flow regime and therefore has no impact on the existing flood levels.

5.4.3 Pedestrian Bridge 2 (with cycle lane)

To enhance connectivity and permeability between the Masterplan lands and Maynooth town, a new pedestrian and cycle bridge is proposed to the west of the existing Kildare Bridge.

The 'Pedestrian Bridge 2' is located upstream of the Kildare Bridge, the existing bridge structure over the Ryewater River along the R157. The main flow restriction in the area is caused by the existing Kildare Bridge.

A single span bridge is proposed which is wider than the existing multi-span arch bridge. Refer to Figure 5-9.

The existing 1% and 0.1 % AEP flood event level are 46.57mOD and 46.94mOD respectively. The proposed bridge soffit level has been set at 48.3mOD which provides a minimum freeboard of 1.36m above the 0.1% AEP flood level.

The model confirms that post-construction of the new bridge there is no impact on level during the 1% AEP or 0.1% AEP events. The post-development flood levels are presented in Figure 5-9. Some minor infilling is required in order to facilitate construction of the earthen embankments within Flood Zone A/B.

Furthermore, due to the single span nature of the bridge it will not increase the risk of blockage occurring in the area, nor is there any impact on flood levels upstream of the bridge for both the 1% AEP and 0.1% AEP flood events. The post-development flood levels are presented in Figure 5-9.

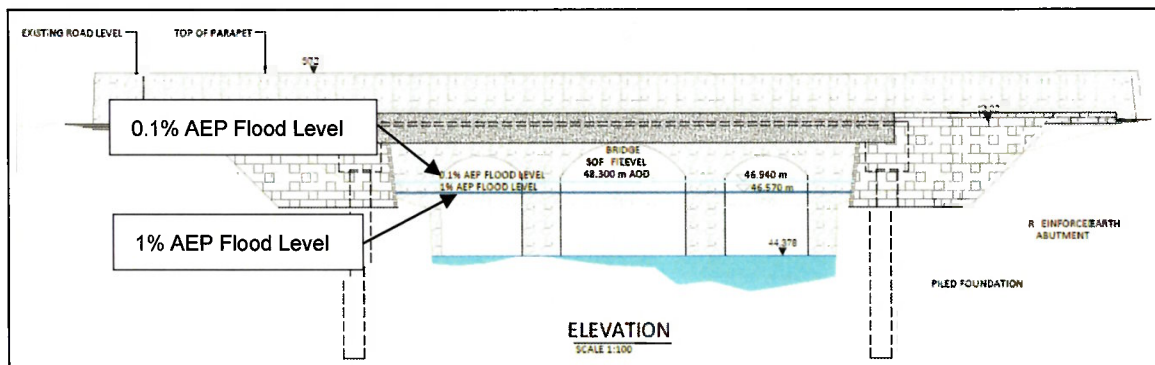


Figure 5-9: Post-development Flood Levels for Pedestrian Bridge 2

5.4.4 Pedestrian Bridge 3

In order to enhance permeability and connectivity between the proposed residential development to the west of the Blackhole Little Stream and the east, a second pedestrian and cycle bridge will be installed. The Pedestrian Bridge 3 provides local walkway access across the Blackhole Little. Refer to Figure 5-10 for the location of the bridge. The bridge will be of lightweight construction with a span of 30m.

The modelled 1% AEP and 0.1% AEP flood levels at the bridge are 50.20mOD and 50.35mOD respectively.

The bridge will undergo a Section 50 application to the OPW post-planning.

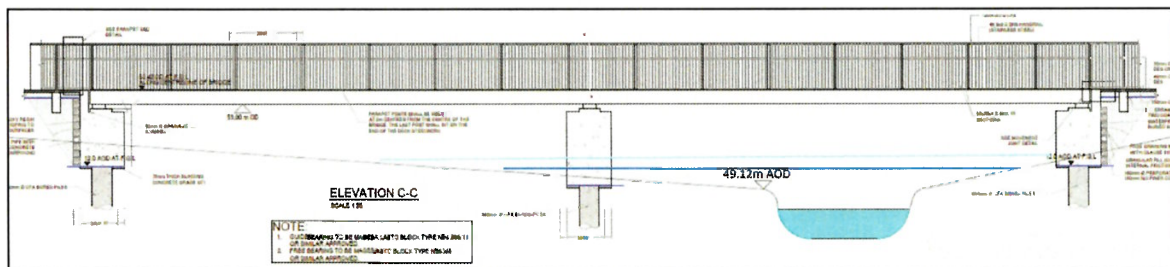


Figure 5-10: Pedestrian and cycle Bridge 3 Location

5.5 Office (Areas 5, 9 and 10)

With reference to Figure 2-1, the Office space covers Area 5 (Eastern), 9 (Central) and 10 (western) sections of the masterplan. Areas 5 and 9 are located adjacent to the Blackhole Little Stream. Review of Figure 5-11 confirms that all the office area are located in Food Zone C.

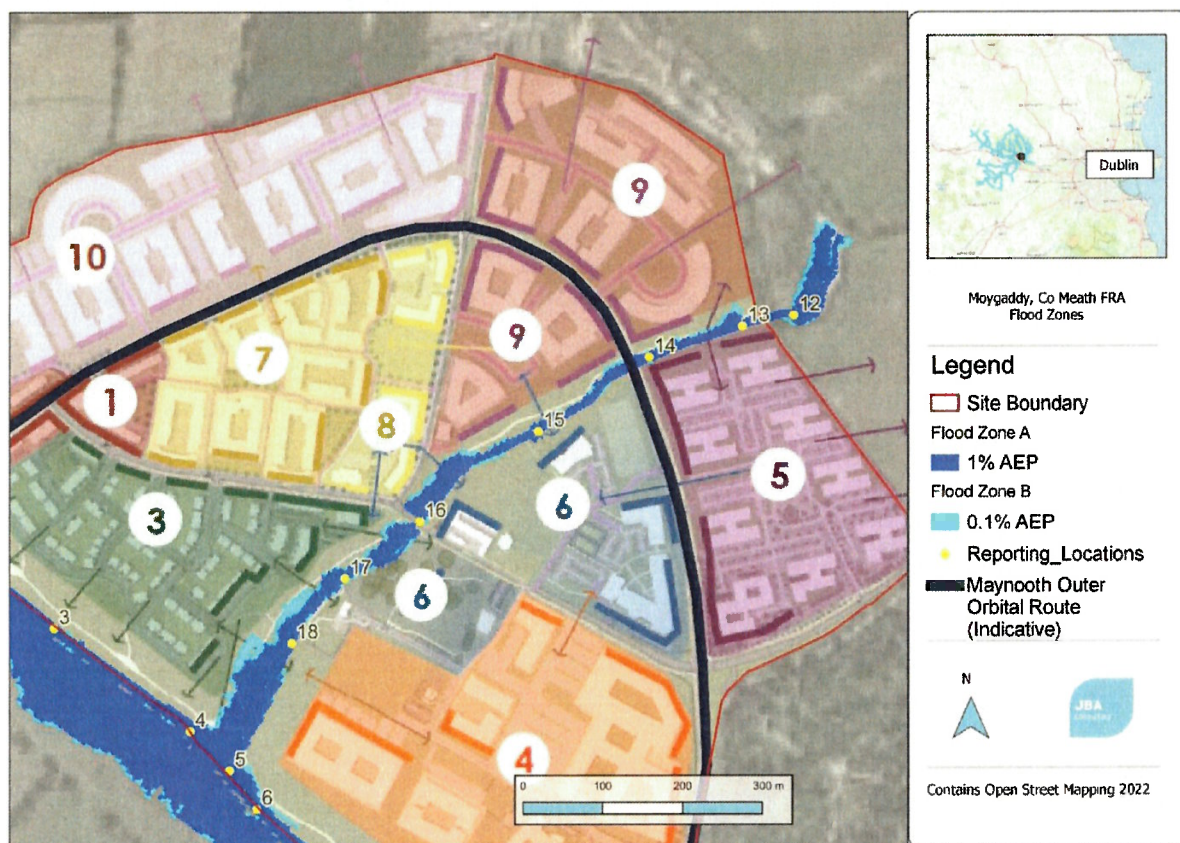


Figure 5-11: Office Areas (5,9 & 10)- Flood Zone

5.6 Primary Care & Nursing Home

The Primary Care & Nursing Home is located in Area 4 of the Masterplan. The Blackhole Little Stream runs along the site to the west and the Ryewater to the south. All areas of the development have been located on Flood Zone C, refer to Figure 5-12 for the flood extents in proximity to the Primary Care & Nursing Home.

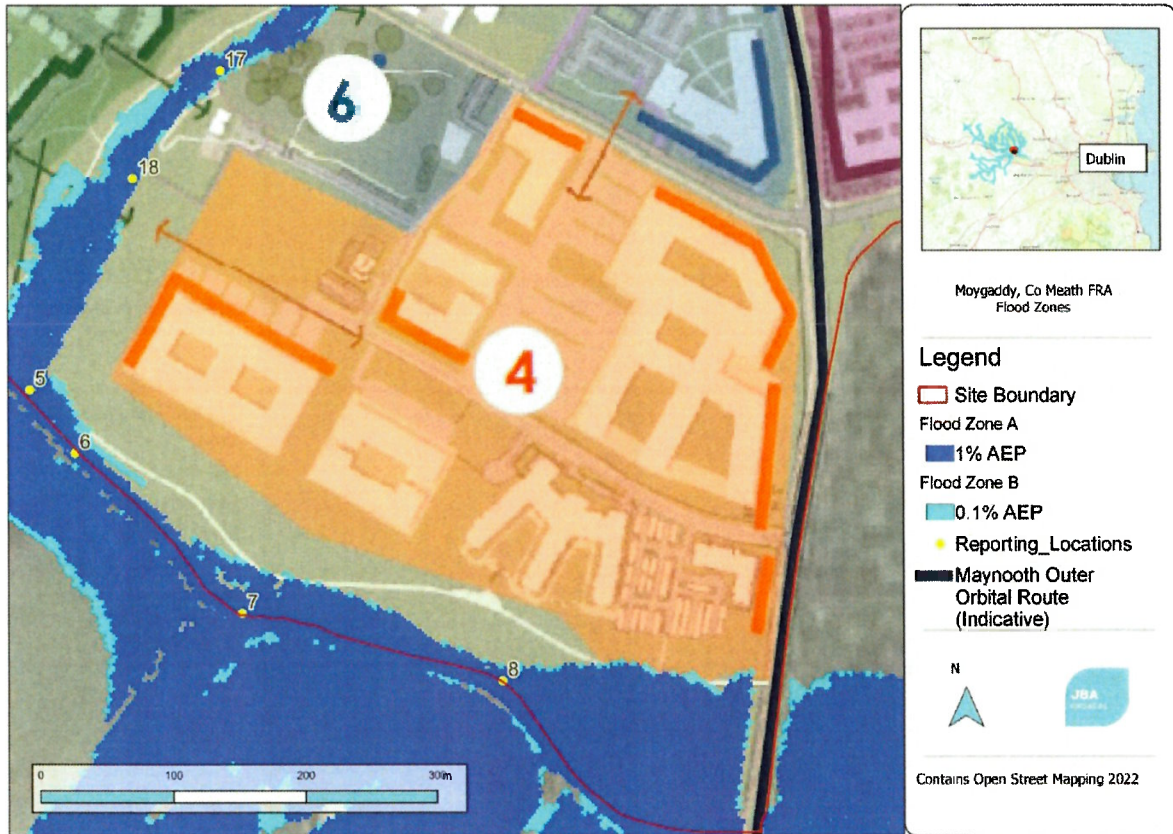


Figure 5-12: Primary Care & Nursing Home- Flood Zone

5.7 MOOR

The Maynooth Outer Orbital Route (MOOR) is the main road infrastructure that connects the development to the wider Maynooth area. The majority of the MOOR is located in Flood Zone C, however it does cross the Ryewater and Blackhole Little Stream. Where the MOOR infrastructure crosses the Ryewater/ Blackhole Little Stream a bridge structure will be provided with the soffit level placed above the 1% AEP and 0.1% AEP flood levels. Figure 5-13 provides the flood extents along the MOOR route.

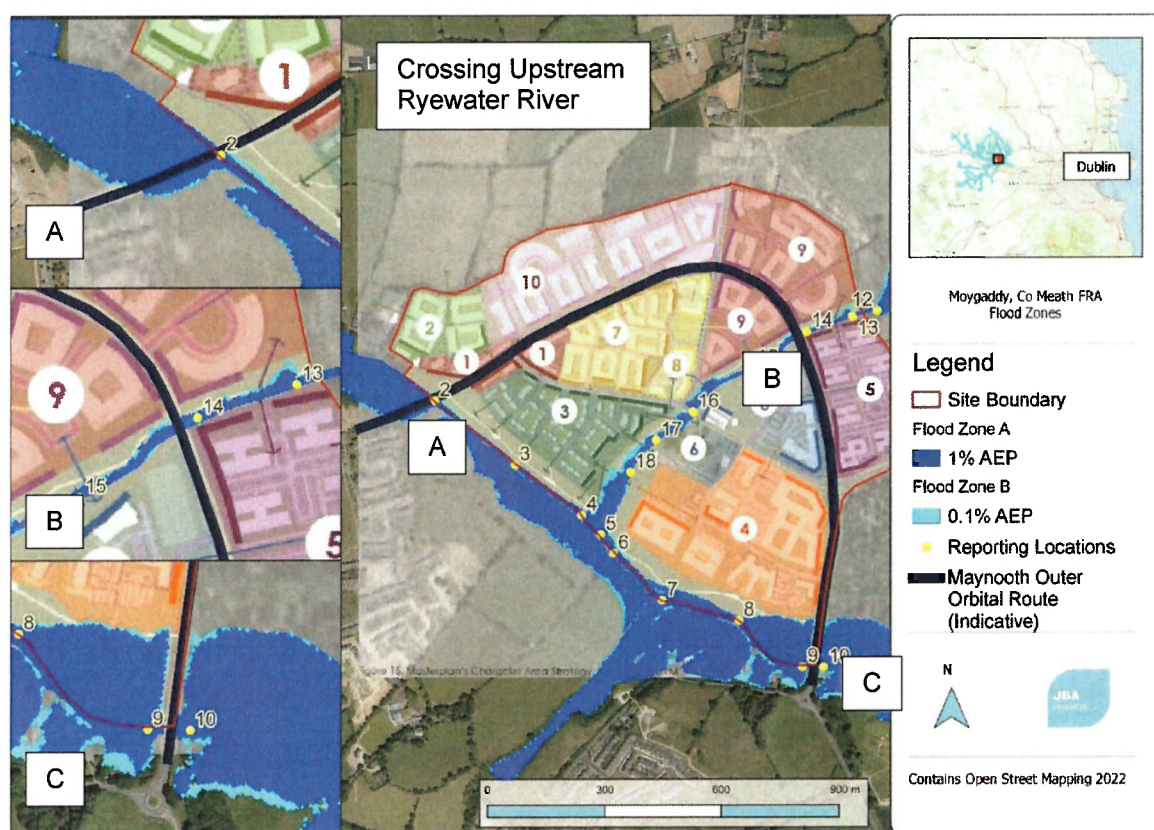


Figure 5-13: MOOR- Flood Zone

5.8 SHD application for 360 Homes, Creche, Scout Den, Public Park & playground

The SHD will consist of 360no Homes, creche, Scout Den, Public Park and Playground, located in zones 3, 6 and 4. The locations are provided in Figure 5-14.

The areas are follows;

- Area 2 - South-West Residential Zone
- Area 3 - Southern Residential Area
- Area 6 - Moygaddy Central - Local Services, Leisure & Tourism
- Area 7 - Central Residential Area and
- Area 8 - Transitional residential Area

Review of Figure 5-14 confirms that development under the SHD areas are all located in Flood Zone C and are not impacted by any of the modelled flood events.

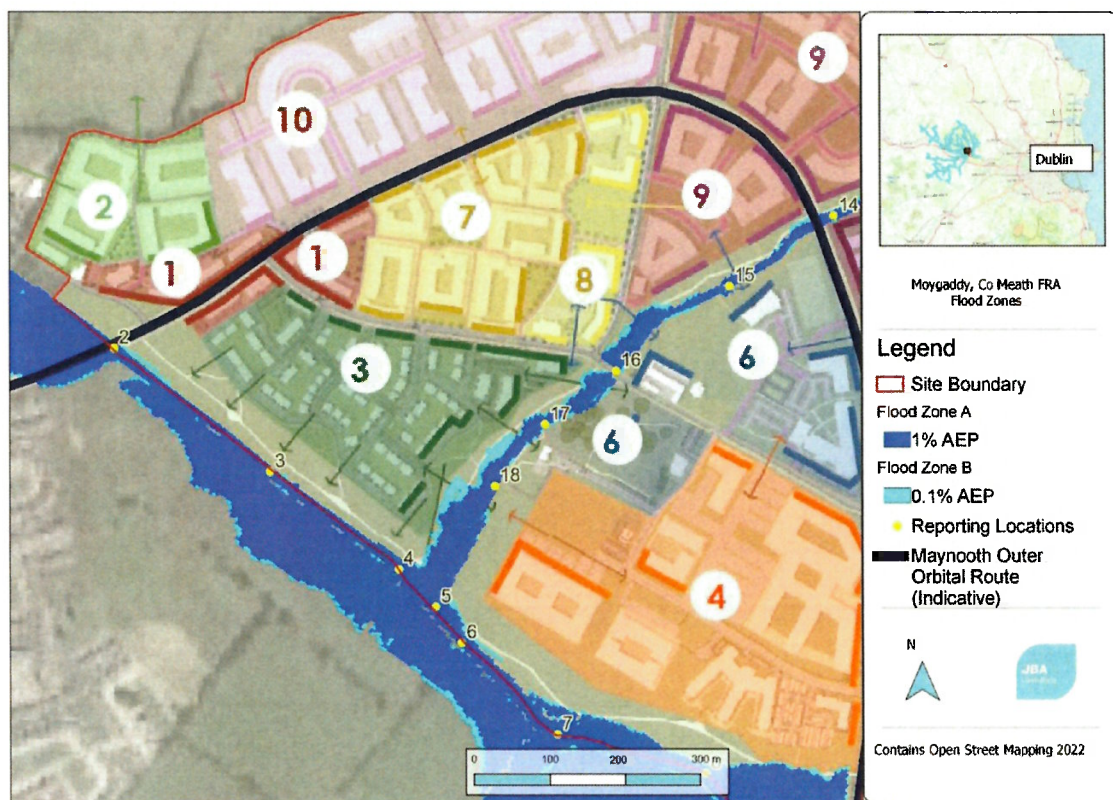


Figure 5-14: SHD Flood Zone

6 Flood Risk Assessment

6.1 Flood Risk

A review of the available historic and predictive flood risk information contained in Section 4 confirms that the majority of the Masterplan site is located in Flood Zone C and it has not been identified as being at risk from flooding during the 0.1% AEP fluvial event. Localised areas of flood extent are in proximity to the Blackhole Little Stream and Ryewater River, however these areas are zoned as high amenity and no development is proposed in these areas save for bridge infrastructure.

The flood extents have been confirmed by the development of a hydraulic model based on up-to-date survey information.

The proposed residential properties, creche, public park & scout den which are subject to a SHD planning application will be located in Flood Zone C, and not at risk of a 0.1% AEP flood event. Further mitigating measures and analyses is undertaken in Section 6.

The proposed bridges will not be impacted by the 1% AEP and 0.1% AEP flood events and will not increase the flood risk elsewhere. A Section 50 assessment for each bridge structure will be prepared following the granting of planning.

6.1.1 Finished Floor Levels (Fluvial / River Flood Risk)

Based on a review of the available and predictive information, all residential development within the masterplan area will be located wholly within Flood Zone C. Therefore, site-specific mitigation measures are not required to manage the ongoing fluvial risk.

For any residential dwelling located in proximity to the Ryewater River or Blackhole Little Stream, the minimum FFL needs to be set 300mm above the 1% AEP climate change (MRFS) flood event.

With reference to Figure 5-3 which provides the monitoring point locations, the minimum FFLs along the Ryewater River and Blackhole Little Stream is provided in Table 6-1, also refer to Appendix D. The provided minimum FFL will also protect against the 0.1% AEP flood event.

Table 6-1: Minimum FFLs (mOD)

Reporting Location	1% AEP MRFS	
1	51.03	51.33
2	50.50	50.8
3	48.63	48.93
4	48.60	48.9
5	56.83	57.13
6	56.34	56.64
7	55.32	55.62
8	53.10	53.4
9	48.34	48.64
10	47.95	48.25
11	46.84	47.14
12	46.39	46.69

6.1.2 Surface Water Drainage Systems (Pluvial / Rainfall Flood Risk)

The existing masterplan site is greenfield in nature. A stormwater system has been designed by OCSC for the purposes of each individual planning application and specific design measures will be included within the proposed development to manage surface water flows. It is recommended that the system is designed in accordance with the Greater Dublin Strategic Drainage Strategy (GDSDS) guidance document and the Meath County Development Plan 2021-2027 and associated SFRA. This recommends a minimum allowance for climate change of 20% increase in rainfall depths / intensities for the 100-year Mid-Range Future Scenario (MRFS) event. We note that OSCS have acknowledged that these criteria are incorporated into their designs.

6.2 Climate Change

In accordance with the OPW guidelines, it is necessary to assess the risk associated with climate change. The masterplan site has been assessed in accordance with the Mid-Range Future Scenario (MRFS) for 1% AEP. FFL have been set to be a minimum of 300mm above the peak water level reported for the MRFS scenario

6.3 Residual Risk

Residual risks are defined as risks that remain after all risk avoidance, substitution and mitigation measures have been taken. This flood risk assessment identifies the following as the main sources of residual risk to the development proposal:

- Blockage of Bridge structures,
- Failure of the surface water drainage systems (pluvial risk).

As part of the FRA assessment, all proposed and existing bridges that could impact upon the masterplan site will be tested for blockage (66%). For the larger road bridge (Road Bridge 1) a more realistic blockage value of 33% has also been adopted. The purpose is to ensure that any development within the masterplan site will not be impacted during a blockage scenario. The result of the modelling confirms that the provided minimum FFLs in Table 6-1 is sufficient to protect the development from the identified residual risks.

To protect against the potential failure of the stormwater system it is recommended that a threshold of 150mm is provided from the ground floor level to the surrounding hardstanding area.

The climate change assessment for the masterplan site has been based on the assessment outlined in Section 5.1.3. The minimum FFL onsite is based on the 1% AEP MRFS climate change event.

7 Conclusion

JBA Consulting has undertaken a site-specific Flood Risk Assessment (FRA) for the masterplan site located in the townland of Moygaddy, Co Meath. The existing site is greenfield in nature.

A review of the available sources of flooding indicates there are no instances of historic flooding on-site, and the site is at a low risk of fluvial / river flooding.

This FRA has determined that the site is predominantly located within Flood Zone C. Localised areas in proximity to the Blackhole Little Stream and Ryewater River are within Flood Zone A, however as these areas are zoned High Amenity, it is noted that no development is proposed in these areas save for bridge & utility infrastructure. The residential, office, nursing home and primary care development will be located in Flood Zone C., therefore does not require site-specific mitigation measures to manage the risk of fluvial flooding.

Climate change has been assessed for the development for the Mid-Range Future Scenario (MRFS). At a minimum, all FFLs onsite will be placed 300mm above the 1% AEP MRFS climate change and the relevant minimum FFLs have been provided for the various model nodes along the Ryewater River and Blackhole Little Stream.

Residual risks have been assessed for the development such as the potential blockage of existing and proposed bridges that could impact upon the site. The results confirm that the proposed minimum FFLs provided are sufficient to protect against the identified residual risks.

The various proposed bridge structures have been included within the model and the results confirm that they will not be impacted by the modelled 1% AEP and 0.1% AEP flood events, and nor will they increase flood risk elsewhere. A Section 50 application will be submitted for each structure to the OPW following the granting of planning.

This FRA was undertaken in accordance with 'The Planning System and Flood Risk Management - Guidelines for Planning Authorities' (2009), and agrees with the core principles contained within.

Appendices

A Appendix - Understanding Flood Risk

Flood Risk is generally accepted to be a combination of the likelihood (or probability) of flooding and the potential consequences arising. Flood Risk can be expressed in terms of the following relationship:

Flood Risk = Probability of Flooding x Consequences of Flooding

A.1 Probability of Flooding

The likelihood or probability of a flood event (whether tidal or fluvial) is classified by its Annual Exceedance Probability (AEP) or return period years, a 1% AEP flood 1 in 100 chance of occurring in any given year. In this report, flood frequency will primarily be expressed in terms of AEP, which is the inverse of the return period, as shown in the table below and explained above. This can be helpful when presenting results to members of the public who may associate the concept of return period with a regular occurrence rather than an average recurrence interval and is the terminology which will be used throughout this report.

Table: Conversion between return periods and annual exceedance probabilities

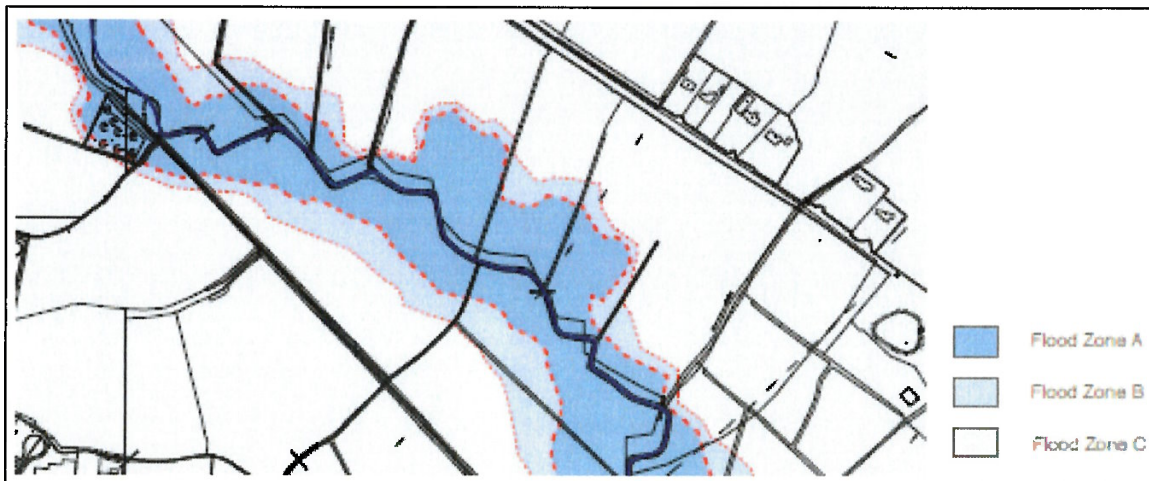
Return period (years)	Annual exceedance probability (%)
2	50
10	10
50	2
100	1
200	0.5
1000	0.1

A.2 Flood Zones

Flood Zones are geographical areas illustrating the probability of flooding. For the purpose of the Planning Guidelines, there are 3 types of levels of flood zones, A, B and C.

Zone	Description
Flood Zone A	Where the probability of flooding is highest, greater than 1% (1 in 100) from river flooding or 0.5% (1 in 200) for coastal/ tidal Flooding
Flood Zone B	Moderate probability of flooding, between 1% and 0.1% from rivers and between 0.5% and 0.1% from coastal/ tidal.
Flood Zone C	Lowest probability of flooding, less than 0.1% from both rivers and coastal/ tidal.

It is important to note that the definition of the flood zones is based on an undefended scenario and does not take into account the presence of flood protection structures such as flood walls or embankments. This is to allow for the fact that there is a residual risk of flooding behind the defences will be maintained in perpetuity.



A.3 Consequences of Flooding

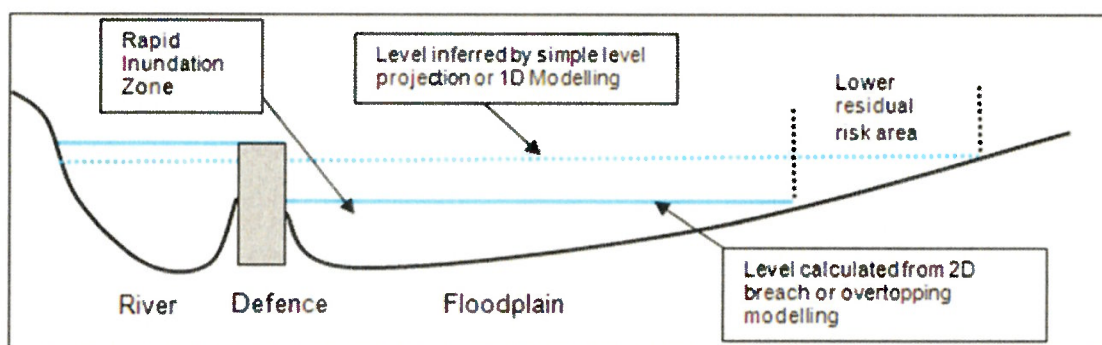
Consequences of flooding depend on the Hazards caused by flooding (depth of water, speed of flow. Rate of onset, duration, wave-action effects, water quality) and the vulnerability of receptors (type of development, nature, e.g. age-structure of the population, presence and reliability of mitigation measures etc.)

The 'Planning System and Flood Risk Management' provides three vulnerability categories, based on type of development, nature, which are detailed in the Guidelines, and are summarised as:

- **Highly vulnerable**, including residential properties, essential infrastructure and emergency service facilities
- **Less vulnerable**, such as retail and commercial and local transport infrastructure, such as changing rooms.
- **Water compatible**, including open space, outdoor recreation and associated essential infrastructure, such as changing rooms.

A.4 Residual Risk

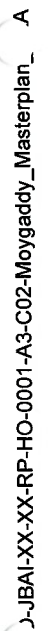
The presence of flood defences, by their very nature, hinder the movement of flood water across the floodplain and prevent flooding unless river levels rise above the defence crest level or a breach occurs. This is known as residual risk:

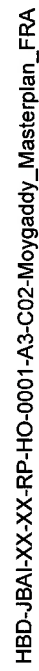


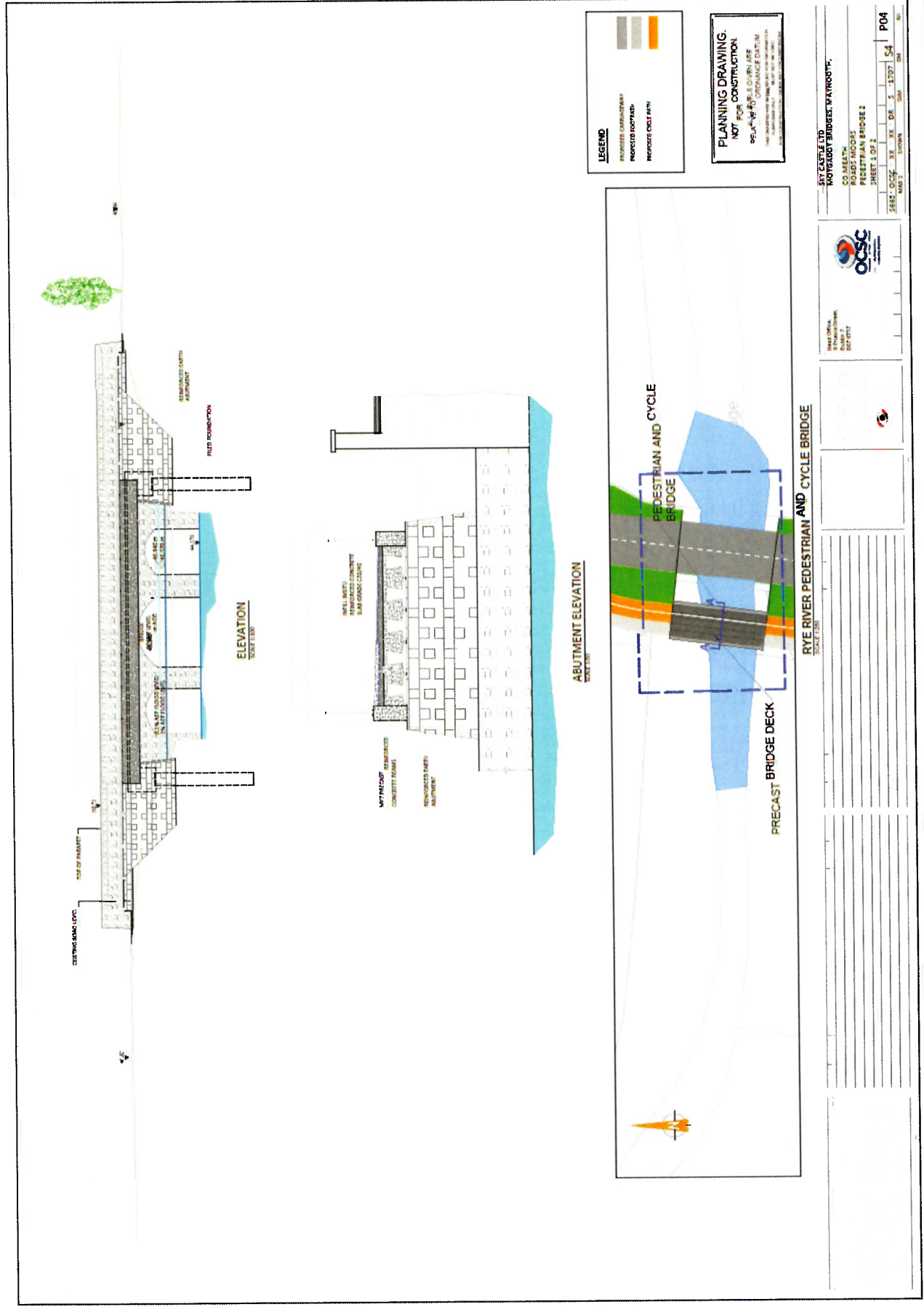
B Site Layout

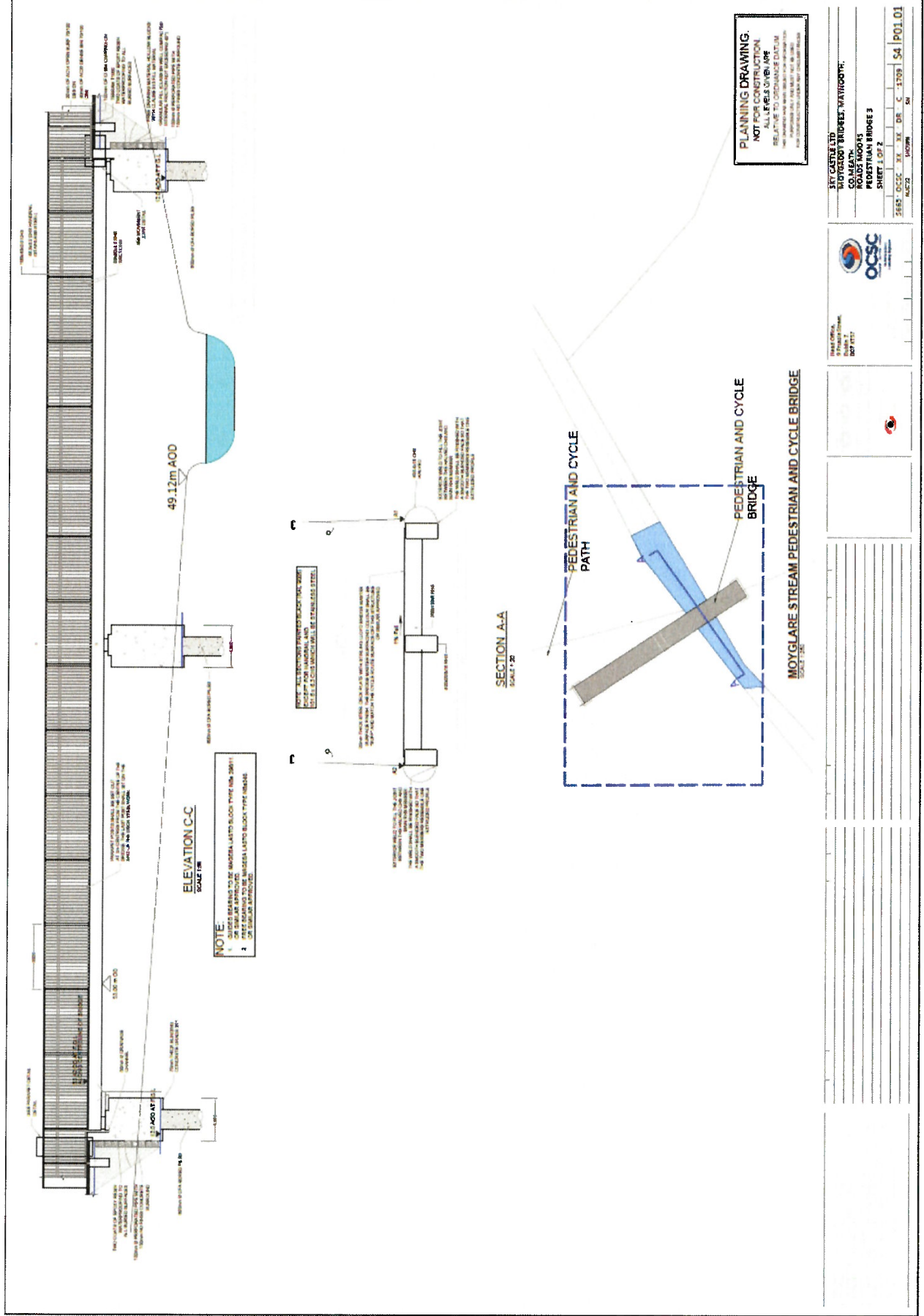


C Bridge Design









D Hydraulic Model Results

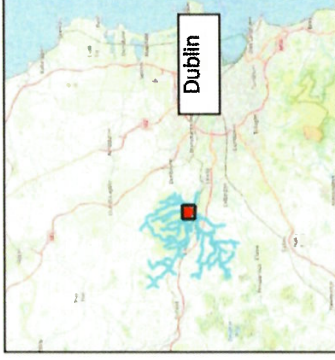
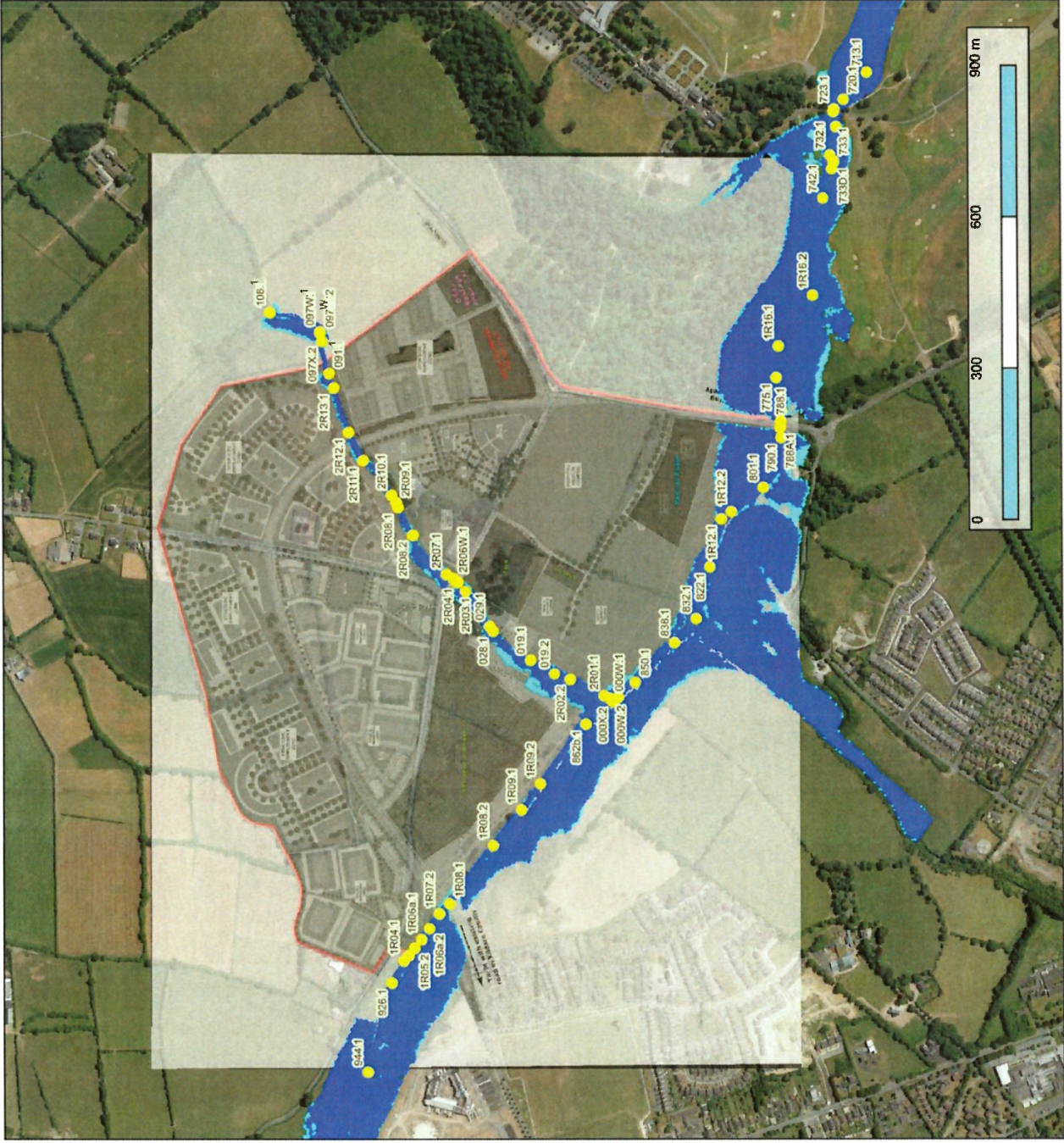
D.1 1D Model Flows

Table A- 1: Modelled Existing Scenario 1D Peak Levels (mOD) from Present Day (Current) events on Ryewater River

Node	1% AEP	0.1% AEP	1% AEP MRFS
862b.1	48.5152	48.6282	48.5815
944.1	50.9766	51.0124	50.9993
926.1	50.5178	50.5798	50.5539
1R04.1	50.4107	50.5111	50.47
1R04.2	50.3814	50.4927	50.4479
1R05.2	50.3564	50.4755	50.4283
1R06a.1	50.3298	50.4533	50.4047
1R06a.2	50.2768	50.4052	50.3548
1R07.2	50.1678	50.3007	50.2487
1R08.1	50.0948	50.2187	50.1701
1R08.2	49.6562	49.7362	49.7036
1R09.1	49.3313	49.3949	49.3681
1R09.2	49.0241	49.063	49.0412
000X.2	48.3987	48.5057	48.471
862a.2	48.3637	48.4859	48.431
850.1	48.1991	48.3551	48.2904
838.1	47.8758	48.0756	47.9978
832.1	47.7711	47.9857	47.904
822.1	47.5025	47.7656	47.6649
1R12.1	47.1217	47.3575	47.2606
1R12.2	46.992	47.2148	47.1204
801.1	46.751	47.0156	46.9024
790.1	46.5862	46.9049	46.7731
788A.1	46.525	46.8323	46.7074
788.1	46.3524	46.5492	46.4657
785.1	46.2398	46.4267	46.35
775.1	45.9914	46.1723	46.097
1R16.1	45.9104	46.1181	46.0309
1R16.2	45.6814	45.9283	45.8257
742.1	45.314	45.5813	45.4728
735.1	45.1852	45.464	45.3478
733D.1	45.4462	45.431	45.3118
733.1	45.4247	45.4295	45.3102
732.1	45.0994	45.3965	45.2742
726.1	44.9494	45.2635	45.1306
723A.1	44.8749	45.1848	45.0538
723.1	44.7445	44.9908	44.8895
720.1	44.7103	44.9516	44.8525
713.1	44.6887	44.9267	44.8291

Table A- 2: Modelled Existing Scenario 1D Peak Levels (mOD) from Present Day (Current) events) on Moygaddy Stream

Node	1% AEP	0.1% AEP	1% AEP MRFS
108.1	58.2463	58.3764	58.3247
097W.1	57.691	57.7888	57.7507
097W.2	56.8717	57.0403	56.974
097X.2	56.7292	56.909	56.8345
91.1	56.2464	56.4096	56.338
2R13.1	56.0133	56.2031	56.1248
2R12.1	55.2243	55.3971	55.3247
2R11.1	54.7584	54.9523	54.8727
2R10.1	54.1255	54.2294	54.1837
2R09.1	54.0677	54.1547	54.1251
2R08.1	53.3826	53.5292	53.4443
2R08.2	52.8672	53.4229	53.0742
2R07.1	52.7953	53.4476	53.0198
2R06W.1	52.7823	53.4424	53.0386
2R05.1	0	0	0
2R04.1	51.3359	51.4777	51.4104
2R03.1	51.0603	51.2278	51.1539
29.1	50.3436	50.4805	50.4256
28.1	50.2802	50.4117	50.3589
19.1	49.3925	49.529	49.4734
19.2	48.8728	48.9851	48.9408
2R02.2	48.7254	48.8481	48.803
2R01.1	48.505	48.6139	48.5759
000W.1	48.6324	48.6105	48.6732
000W.2	48.7191	48.6272	48.7213



Moygaddy, Co Meath FRA Flood Zones

- Legend**
- Site Boundary
 - Reporting Locations
 - Flood Zone A
 - 1% AEP
 - Flood Zone B
 - 0.1% AEP



Contains Open Street Mapping 2022

E Flood Zones



Legend

- Masterplan Extents
- Maynooth Outer Orbital Route (Indicative)
- Flood Zone A
- Flood Zone B
- 1% AEP
- 0.1% AEP

Moygaddy, Co Meath FRA
Flood Zones



Contains Google Satellite Imagery
© (2022)



**Moygaddy, Co Meath FRA
Flood Zone A with Climate
Change**



Contains Google Satellite Imagery
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JBA Consulting Engineer and
Scientists Limited

Registration number 444752

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ISO 9001:2015

ISO 14001:2015

OHSAS 18001:2007



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APPENDIX 8-2

LAB REPORTS

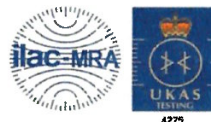
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McCarthy Keville & O'Sullivan Ltd
2nd Floor
H91VW84
Tuam Road
Galway
Ireland



Attention :	David Naughton
Date :	23rd August, 2021
Your reference :	210414
Our reference :	Test Report 21/12143 Batch 1
Location :	Moygaddy Mixed Use Scheme
Date samples received :	10th August, 2021
Status :	Final Report
Issue :	1

Three samples were received for analysis on 10th August, 2021 of which three were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied. All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Authorised By:



Hayley Prowse
Project Manager

Please include all sections of this report if it is reproduced

Element Materials Technology

Client Name: McCarthy Keville & O'Sullivan Ltd
Reference: 210414
Location: Moygaddy Mixed Use Scheme
Contact: David Naughton
EMT Job No: 21/12143

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
 H=H₂SO₄, Z=ZnAc, N=NaOH, HN=HNO₃

EMT Sample No.	1-3	4-6	7-9								Please see attached notes for all abbreviations and acronyms		
Sample ID	SW-1	SW-2	SW-3										
Depth													
COC No / misc													
Containers	H P BOD	H P BOD	H P BOD										
Sample Date	05/08/2021	05/08/2021	05/08/2021										
Sample Type	Surface Water	Surface Water	Surface Water										
Batch Number	1	1	1								LOD/LOR	Units	Method No.
Date of Receipt	10/08/2021	10/08/2021	10/08/2021										
Dissolved Phosphorus #	330	48	87								<5	ug/l	TM30/PM1 4
Chloride #	27.1	24.4	27.6								<0.3	mg/l	TM38/P MO
Nitrates NO ₃ #	2.1	3.8	3.1								<0.2	mg/l	TM 38/PM0
Nitrites NO ₂ #	0.03	<0.02	0.03								<0.02	mg/l	TM 38/PM0
OrthoPhosphate as P #	0.20	<0.03	0.04								<0.03	mg/l	TM38/PM0
Ammoniacal Nitrogen as NH ₃ #	0.12	0.14	0.08								<0.03	mg/l	TM38/PM0
Ammoniacal Nitrogen as NH ₄ #	0.13	0.15	0.08								<0.03	mg/l	TM38/PM0
BOD (Settled) #	<1	<1	<1								<1	mg/l	TM58/PM0
Electrical Conductivity @25C #	642	652	645								<2	uS/cm	TM76/PM0
pH #	7.97	8.25	8.30								<0.01	pH units	TM73/PM0
Total Nitrogen	3.5	1.9	1.7								<0.5	mg/l	TM38/PM125/PM0
Total Suspended Solids #	112	<10	<10								<10	mg/l	TM37/PM0

Client Name: McCarthy Keville & O'Sullivan Ltd
Reference: 210414
Location: Moygaddy Mixed Use Scheme
Contact: David Naughton

Matrix : Liquid

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
21/12143	1	SW-1		1-3	BOD	Sample holding time exceeded
21/12143	1	SW-2		4-6	BOD	Sample holding time exceeded
21/12143	1	SW-3		7-9	BOD	Sample holding time exceeded

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating. Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 21/12143

SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overestimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory.

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

Please include all sections of this report if it is reproduced

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

EIMT Job No: 21/12143

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec.1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEPA Method 3050B, Rev.2, Dec.1996	PM14	Preparation of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for Dissolved metals, and remain unfiltered for Total metals then acidified	Yes			
TM37	2540D:1999 22nd Edition; VSS: USEPA 1684 (Jan 2001), USEPA 160.4 (1971) and SMEWW 2540E:1999 22nd Edition. Gravimetric determination of Total Suspended Solids (TSS) and Volatile Suspended Solids (VSS). Sample is filtered through a 1.5µm pore size glass fibre filter and the resulting residue is dried and weighed at 105°C for TSS and 550°C for VSS	PM0	No preparation is required.	Yes			
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013	PM0	No preparation is required.	Yes			
TM38/TM125	Total Nitrogen/Organic Nitrogen by calculation	PM0	No preparation is required.				
TM58	APHA SMEWW 5210B:1999 22nd Edition. Comparable with ISO 5815:1989. Measurement of Biochemical Oxygen Demand. When cBOD (Carbonaceous BOD) is requested a nitrification inhibitor is added which prevents the oxidation of reduced forms of nitrogen, such as am	PM0	No preparation is required.	Yes			
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM0	No preparation is required.	Yes			
TM76	Modified US EPA method 120.1 (1982). Determination of Specific Conductance by Metrohm automated probe analyser.	PM0	No preparation is required.	Yes			

McCarthy Keville & O'Sullivan Ltd

2nd Floor
H91VW84
Tuam Road
Galway
Ireland

Attention : David Naughton

Date : 21st December, 2021

Your reference : 21041

Our reference : Test Report 21/19583 Batch 1

Location : Moygaddy Mixed Use Scheme

Date samples received : 9th December, 2021

Status : Final Report

Issue : 1

Three samples were received for analysis on 9th December, 2021 of which three were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied. All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Authorised By:

Bruce Leslie
Project Manager

Please include all sections of this report if it is reproduced

Element Materials Technology

Client Name: McCarthy Keville & O'Sullivan Ltd
Reference: 21041
Location: Moygaddy Mixed Use Scheme
Contact: David Naughton
EMT Job No: 21/19583

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
 H=H₂SO₄, Z=ZnAc, N=NaOH, HN=HNO₃

EMT Sample No.	1-3	4-6	7-9								Please see attached notes for all abbreviations and acronyms		
Sample ID	SW1	SW2	SW3										
Depth													
COC No / misc													
Containers	H P BOD	H P BOD	H P BOD										
Sample Date	08/12/2021	08/12/2021	08/12/2021										
Sample Type	Surface Water	Surface Water	Surface Water										
Batch Number	1	1	1								LOD/LOR	Units	Method No.
Date of Receipt	09/12/2021	09/12/2021	09/12/2021										
Total Phosphorus	702	400	355								<5	ug/l	TM30/PM14
Chloride #	20.4	33.9	30.6								<0.3	mg/l	TM38/PM0
Nitrate as NO ₃ #	17.8	16.2	15.7								<0.2	mg/l	TM38/PM0
Nitrite as NO ₂ #	0.08	0.04	0.05								<0.02	mg/l	TM38/PM0
Ortho Phosphate as PO ₄	0.85	0.30	0.38								<0.03	mg/l	TM38/PM0
Ammoniacal Nitrogen as NH ₃ #	0.39	0.12	0.17								<0.03	mg/l	TM38/PM0
Ammoniacal Nitrogen as NH ₄ #	0.41	0.13	0.18								<0.03	mg/l	TM38/PM0
BOD (Settled) #	5	3	3								<1	mg/l	TM58/PM0
Electrical Conductivity @25C #	400	534	570								<2	uS/cm	TM76/PM0
pH #	7.82	8.00	8.05								<0.01	pH units	TM 73/PM0
Total Suspended Solids #	122	108	75								<10	mg/l	TM 37/PM0

Please include all sections of this report if it is reproduced

All solid results are expressed on a dry weight basis unless stated otherwise.

Client Name: McCarthy Keville & O'Sullivan Ltd
Reference: 21041
Location: Moygaddy Mixed Use Scheme
Contact: David Naughton

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
No deviating sample report results for job 21/19583						

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating. Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 21/19583

SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overestimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory.

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

Please include all sections of this report if it is reproduced

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

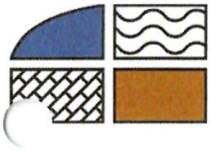
EIMT Job No: 21/19583

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/IS ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
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TM37	Modified EPA Method 1631, Rev. 2, Dec. 1996; USEPA 1631 (1971) and SMEVW 2540E:1999 22nd Edition, Gravimetric determination of Total Suspended Solids (TSS) and Volatile Suspended Solids (VSS). Sample is filtered through a 1.5um pore size glass fibre filter and the resulting residue is dried and weighed at 105°C for TSS and 550°C for VSS	PM0	No preparation is required.	Yes			
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013	PM0	No preparation is required.				
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013	PM0	No preparation is required.	Yes			
TM56	APHA SMEVW 5210B:1999 22nd Edition. Compatible with ISO 6815:1989. Measurement of Biochemical Oxygen Demand. When cBOD (Carbonaceous BOD) is requested a nitrification inhibitor is added which prevents the oxidation of reduced forms of nitrogen, such as am	PM0	No preparation is required.	Yes			
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM0	No preparation is required.	Yes			
TM76	Modified US EPA method 120.1 (1982). Determination of Specific Conductance by Metrohm automated probe analyser.	PM0	No preparation is required.	Yes			



APPENDIX 8-3

**WATER FRAMEWORK
DIRECTIVE ASSESSMENT**



**HYDRO
ENVIRONMENTAL
SERVICES**

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**WATER FRAMEWORK DIRECTIVE ASSESSMENT
PROPOSED MOYGADDY MIXED USE DEVELOPMENT, CO. MEATH**

FINAL REPORT

Prepared for:
SKY CASTLE LTD

Prepared by:
HYDRO-ENVIRONMENTAL SERVICES

DOCUMENT INFORMATION

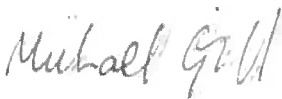
Document Title:	WATER FRAMEWORK DIRECTIVE ASSESSMENT PROPOSED MIXED USE DEVELOPMENT, MOYGADDY, MAYNOOTH, CO. KILDARE
Issue Date:	30 TH AUGUST 2022
Project Number:	P1615-0
Project Reporting History:	NONE
Current Revision No:	FINAL_REV F0
Author:	MICHAEL GILL CONOR MCGETTIGAN JENNY LAW
Signed:	 <hr/> Michael Gill B.A., B.A.I., M.Sc., MIEI Managing Director – Hydro-Environmental Services
Disclaimer: This report has been prepared by HES with all reasonable skill, care and diligence within the terms of the contract with the client, incorporating our terms and conditions and taking account of the resources devoted to it by agreement with the client. We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above. This report is confidential to the client and we accept no responsibility of whatsoever nature to third parties to whom this report, or any part thereof, is made known. Any such party relies upon the report at their own risk.	

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1. INTRODUCTION

1.1 BACKGROUND

Hydro-Environmental Services (HES) were commissioned by MKO to complete a Water Framework Directive (WFD) Compliance Assessment as an accompanying document for a proposed 'Mixed Use Development' at Moygaddy, Co. Meath.

The 'Proposed Development' comprises a number of components:

- **Site A** – Strategic Employment Zone, which consists of three office buildings, public road widening, and road realignment works along the existing R157 Regional Road and L22143 Local Road, the delivery of a new public access road under the Maynooth Outer Orbital Road (MOOR) scheme, internal access road and associated car parking;
- **Site B** – Healthcare Facilities which includes a nursing home and primary care centre as well public road widening and road realignment works along the existing R157 Regional Road, internal access road and associated car parking, and all associated infrastructure;
- **Site C** – Strategic Housing Development which consists of 360 no. residential homes, a creche facility, scout den, public park and internal access roads, approximately 500m of distributor road, pedestrian and cycle improvements, 2 no. cycle bridges, shared communal and private open space and all associated site development works.
- **Maynooth Outer Orbital Road (MOOR)** which consists of approximately 1.7km of new distributor road, a single span bridge, pedestrian and cycle improvement measures, a pedestrian & cycle bridge, upgrade works to existing road network and all associated utilities.
- **The Kildare Bridge** planning application includes road upgrade works to the existing R157 Regional Road, a proposed pedestrian / cycle bridge adjacent to the existing Kildare Bridge, as well as a proposed wastewater connection to the Maynooth Municipal Wastewater Pumping Station to the southeast of the Proposed Development in County Kildare.
- **The Moyglare Bridge** planning application includes for the provision of an integral single span bridge over the Rye Water River with associated flood plain works and embankments, as well as services and utilities connections.

The 'Proposed Development' consists of six planning applications under the definition of one 'Proposed Development' due to the proximity, timeline and links between the applications. Three planning applications will be submitted to Meath County Council (MCC) (Site A, Site B and MOOR). One planning application will be submitted to An Bord Pleanála (Site C: SHD) as the competent authority. Two planning applications will be submitted to Kildare County Council (KCC) as the proposed development is located on the northern environs of Maynooth town, Co. Kildare, and works are required to connect the Proposed Development to the road network and services and utility infrastructure within Co. Kildare.

The purpose of this WFD assessment is to determine whether specific components or activities associated with the proposed development at Moygaddy, will compromise WFD objectives or result in a deterioration of the status of any waterbodies in the vicinity or downstream of the site. This assessment will provide details of proposed mitigation measures if there is a perceived risk deterioration in the status of any waterbody.

1.2 STATEMENT OF AUTHORITY

Hydro-Environmental Services (HES) are a specialist hydrological, hydrogeological and environmental practice that delivers a range of water and environmental management consultancy services to the private and public sectors across Ireland and Northern Ireland. HES was established in 2005, and our office is located in Dungarvan, County Waterford. We routinely complete impact assessments for hydrology and hydrogeology for a large variety of project types.

This WFD assessment was prepared by Michael Gill, Conor McGettigan and Jenny Law.

Michael Gill (BA, BAI, Dip Geol., MSc, MIEI) is an Environmental Engineer and Hydrogeologist with over 18 years' environmental consultancy experience in Ireland. Michael has completed numerous hydrological and hydrogeological impact assessments for a variety of development types across Ireland. He has substantial experience in surface water drainage design and SUDs design and surface water/groundwater interactions.

Conor McGettigan (BSc, MSc) is a junior Environmental Scientist, holding an M.Sc. in Applied Environmental Science (2020) from University College Dublin. Conor has also completed a B.Sc. in Geology (2016) from University College Dublin. In recent times Conor has assisted in the preparation of hydrological and hydrogeological impact assessments for a variety of developments.

Jenny Law (BSc) is a master's student in Applied Environmental Geoscience. Jenny holds a BSc in Earth and Ocean Science. In recent times Jenny has assisted in the preparation of hydrological and hydrogeological impact assessments for a variety of developments.

1.3 WATER FRAMEWORK DIRECTIVE

The EU Water Framework Directive (2000/60/EC), as amended by Directives 2008/105/EC, 2013/39/EU and 2014/101/EU, was established to ensure the protection of the water environment. The Directive was transposed in Ireland by the European Communities (Water Policy) Regulations 2003 (S.I. No. 722 of 2002).

The Directive requires that all member states protect and improve water quality in all waters, with the aim of achieving good ecological status by 2027 at the latest WFD aims. Any new development must ensure that this fundamental requirement of the Directive is not compromised.

The WFD is implemented through the River Basin Management Plans (RBMP) which comprises a six-yearly cycle of planning, action and review. RBMPs include identifying river basin districts, water bodies, protected areas and any pressures or risks, monitoring and setting environmental objectives. In Ireland the first RBMP covered the period from 2010 to 2015 with the second cycle plan covering the period from 2018 to 2021.

The River Basin Management Plan (2018 - 2021) objectives, which have been integrated into the design of the proposed development, include:

- Ensure full compliance with relevant EU legislation;
- Prevent deterioration and maintain a 'high' status where it already exists;
- Protect, enhance and restore all waters with aim to achieve at least good status by 2021;
- Ensure waters in protected areas meet requirements; and,
- Implement targeted actions and pilot schemes in focused sub-catchments aimed at (1) targeting water bodies close to meeting their objectives and (2) addressing more complex issues that will build knowledge for the third cycle.

Our understanding of these objectives is that surface waters, regardless of whether they have 'Poor' or 'High' status, should be treated the same in terms of the level of protection and mitigation measures employed, i.e. there should be no negative change in status at all.

2. WATERBODY IDENTIFICATION CLASSIFICATION

2.1 INTRODUCTION

This section identifies those surface water and groundwater bodies with potential to be affected by the proposed development and reviews any available WFD information.

2.2 SURFACE WATERBODY IDENTIFICATION

Regionally, the site is located in the Liffey and Dublin Bay surface water catchment within Hydrometric Area 09 of the Eastern River Basin District (www.epa.ie). Locally the site is located predominantly within the Liffey_SC_080 and the Rye Water_030 sub-basin, whilst the very eastern part of the site is located within the Rye water _040 sub-basin. The south-eastern portion of the site at Kildare Bridge, is situated within the Lyreen_SC_010 sub-catchment and the Lyreen_020 WFD river sub-basin.

Sites A, B and C are bounded to the south by the Rye Water River, referred to by the EPA as the Rye Water_030 (IE_EA_09R010400). The Rye Water River travels through the south of the MOOR at two points, one located to the west and one located to the east. The Blackhall Little stream is a tributary of the Rye water, flowing through the centre of the site from north to south. The Blackhall Little stream also crosses the MOOR at two locations, at the northeast and centre of the site. The Rye Water then flows ~8km to the southeast towards Leixlip, where it then feeds into the River Liffey (IE_EA_09L011900). The River Liffey continues east for approximately 18km before discharging into the Liffey Estuary Upper transitional waterbody, which in turn discharges into the Liffey Estuary Lower transitional waterbody and the Dublin Bay coastal waterbody thereafter.

Figure A below highlights those surface waterbodies located downstream of the proposed development at Moygaddy.

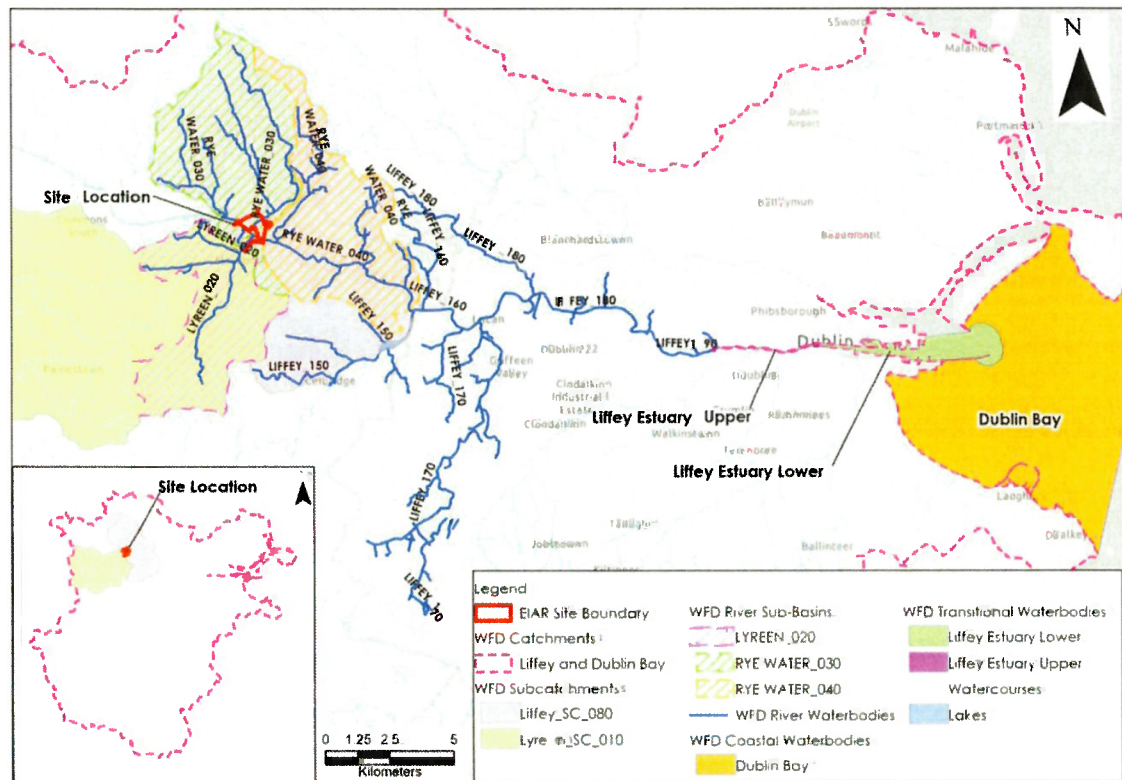


Figure A: Hydrological Setting and Downstream Surface Water Bodies

2.3 SURFACE WATER BODY CLASSIFICATION

A summary of the WFD status and risk result for Surface Water Bodies (SWBs) downstream of the proposed development are shown in **Table A**.

The Rye Water_030 river waterbody (IE_EA_09R010400) that bounds Sites A, B and C to the south and includes the Blackhall Little stream that flows through the centre of the proposed development achieved "Moderate" status in the latest WFD Cycle (2013-2018) (www.catchments.ie). Downstream of the R157 the Rye Water_040 waterbody (IE_EA_09R010600) is of "Poor" status. The Rye Water_040 discharges into the Liffey_150 waterbody (IE_EA_09L011900) at Leixlip which has achieved 'Good' status in the latest round (2013-2018). Downstream the Liffey_160 waterbody (IE_EA_09L012040) achieved 'poor' status, whilst the lower reach of the River Liffey, including the Liffey_170 (IE_EA_09L012100), Liffey_180 (IE_EA_09L012350) and the Liffey_190 (IE_EA_09L012360) waterbodies all achieved a 'Moderate' status in the latest WFD Cycle (2013-2018). Both the Liffey Estuary Upper (IE_EA_09O_0400) and Liffey Estuary Lower transitional waterbodies achieved 'Good' status, and so too did the Dublin Bay coastal waterbody (IE_EA_09O_0000) under the WFD 2013-2018. This status is based on the ecological, chemical and quantitative status of the SWB.

The 2 no. river waterbodies immediately downstream of the proposed development have been deemed to be "at risk" of failing to meet their WFD objectives. The Rye Water_030 in the vicinity of the site is listed as being under significant pressure from agriculture activities and domestic wastewater. Agriculture, urban runoff and domestic wastewater have been identified as significant pressures on the Rye Water_040 waterbody. The risk status for the downstream Liffey_150, Liffey_160 river waterbodies and the Liffey Estuary Upper and Liffey Estuary Lower transitional waterbodies are under review. The Liffey_150 is listed on (www.catchments.ie) as being under significant pressure from urban run-off, whilst the Liffey_160 is listed as being under significant pressure from agriculture. Urban wastewater is identified as a significant pressure for the Liffey Estuary Upper transitional waterbody. The Liffey_170, Liffey_180 and the Liffey_190 river waterbodies are 'at risk' of failing to meet their WFD objectives. These lower reaches of the Liffey River are listed as being under significant pressures from urban wastewater and urban run-off. The Dublin Bay coastal waterbody is not at risk of failing to meet its WFD objectives.

SWB status for the 2013-2018 WFD cycle are shown on **Figure B**.

Table A: Summary WFD Information for Surface Water Bodies

SWB	Overall Status	Risk Status	Pressures
Rye Water_030	Moderate	At Risk	Agriculture and domestic wastewater
Rye Water_040	Poor	At Risk	Agriculture urban runoff and domestic wastewater
Liffey_150	Good	Under Review	Urban Run-off
Liffey_160	Poor	Under Review	Agriculture
Liffey_170	Moderate	At Risk	Urban Wastewater and Urban Run-off
Liffey_180	Moderate	At Risk	Urban Wastewater and Urban Run-off
Liffey_190	Moderate	At Risk	Urban Wastewater and Urban Run-off
Liffey Estuary Upper	Good	Review	Urban Wastewater
Liffey Estuary Lower	Good	Review	-
Dublin Bay	Good	Not at Risk	-

2.4 GROUNDWATER BODY IDENTIFICATION

According to data from the GSI database the proposed development is underlain by the Dinantian Upper Impure Limestones of the Lucan Formation and are classified by the GSI as being a Locally Important Aquifer – Bedrock which is Moderately Productive only in Local Zones. The site is underlain by the Dublin Groundwater Body (GWB) (IE_EA_G_008) which is characterised by poorly productive bedrock.

2.5 GROUNDWATER BODY CLASSIFICATION

The site is located within the Dublin Groundwater Body (GWB) (IE_EA_G_008). This GWB achieved "Good" status under the WFD 2013-2018 review cycle (**Table B**). This status is based on the quantitative and chemical status of the GWB.

The risk status of the Dublin Groundwater Body (GWB) (IE_EA_G_008) is currently "under review". No significant pressures have been identified to be impacting on this GWB.

Table B: Summary WFD Information for Groundwater Bodies

GWB	Overall Status	RiskStatus	Pressures
Dublin	Good	Under Review	-

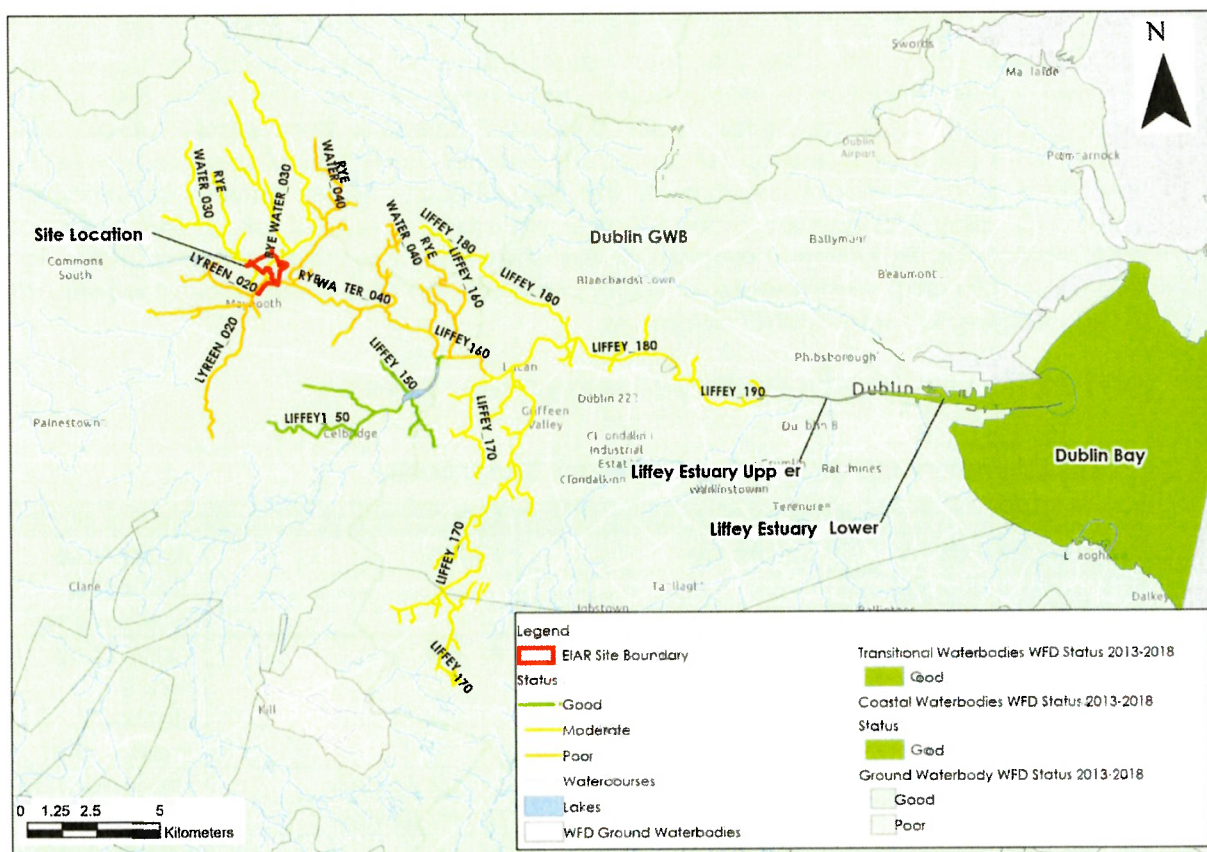


Figure B: WFD Surface Waterbody Status (2013-2018)

3. WFD SCREENING

As discussed in **Section 2**, there are a total of 10 no. surface water bodies that are located in the vicinity or downstream of the proposed development site. In addition, 1 no. groundwater body underlies the proposed development site.

3.1 SURFACE WATER BODIES

As shown in **Figure A** above, there are 7 no. river water bodies, 2 no. transitional waterbody and 1 no. coastal waterbody located in the vicinity or downstream of the proposed development.

With consideration for the construction and operational phases of the proposed development, it is considered that the Rye water _030 and Rye Water _040 that are in the vicinity and downstream of the site are carried through into the WFD Impact Assessment. All sections of the downstream Liffey River (Liffey_150, Liffey_160, Liffey_170, Liffey_180 and Liffey_190) have been screened out due to their distal location from the proposed development site and the large volumes of water within these surface waterbodies. The downstream transitional waterbodies including the Liffey Estuary Upper, Liffey Estuary Lower and the downstream coastal waterbody of Dublin Bay, have been screened out also due to their distal location from the proposed development site, the large volumes of water within these surface waterbodies and the saline nature of these waters.

3.2 GROUNDWATER BODIES

The underlying Dublin groundwater body will be carried through to the WFD Impact Assessment due to its proximal location directly underlying the proposed development site.

3.3 WFD SCREENING SUMMARY

A summary of WFD Screening discussed above is shown in **Table C**.

Table C: Screening of WFD water bodies located within the study area

Type	WFD Classification	Waterbody Name/ID	Inclusion in Assessment	Justification
Surface Waterbody	River	Rye Water_030	Yes	The proposed development is in the vicinity and downstream of the Rye Water_030 River. An assessment is required to consider potential impacts of the proposed development to this SWB.
	River	Rye Water_040	Yes	The proposed development is in the vicinity and downstream of the Rye Water_040 River. An assessment is required to consider potential impacts of the proposed development to this SWB.
	River	Liffey_150	No	The Liffey River waterbody has been screened out due to its distal location from the proposed development site and the large volume of water within the river.
	River	Liffey_160	No	The Liffey River waterbody has been screened out due to its distal location from the proposed development site and the large volume of water within the river.
	River	Liffey_170	No	The Liffey River waterbody has been

				screened out due to its distal location from the proposed development site and the large volume of water within the river.
	River	Liffey_180	No	The Liffey River waterbody has been screened out due to its distal location from the proposed development site and the large volume of water within the river.
	River	Liffey_190	No	The Liffey River waterbody has been screened out due to its distal location from the proposed development site and the large volume of water within the river.
	Transitional	Liffey Estuary Upper	No	The Liffey Estuary Upper transitional waterbody has been screened out due to its distal location from the proposed development site, the large volume of water within the estuary and the saline nature of these waters.
	Transitional	Liffey Estuary Lower	No	The Liffey Estuary Lower transitional waterbody has been screened out due to its distal location from the proposed development site, the large volume of water within the estuary and the saline nature of these waters.
	Coastal	Dublin Bay	No	The Dublin Bay coastal waterbody has been screened out due to its distal location from the proposed development site, the large volumes of water within the surface waterbody and the saline nature of its water.
Groundwater Body	Groundwater	Dublin	Yes	The proposed development site immediately overlies the groundwater body. An assessment is required to consider potential impacts of the proposed development to this GWB.

4. WFD COMPLIANCE ASSESSMENT

4.1 PROPOSED DEVELOPMENT

The proposed development comprises a strategic employment zone (Site A), healthcare facilities (Site B), a strategic housing development (Site C), Maynooth Outer Orbital Road (MOOR) which consists of approximately 1.7km of new distributor road along with upgrade works, a standalone pedestrian and cycle bridge adjacent to the existing Kildare Bridge and the provision of an integral single span bridge (Moyglare Bridge) over the Rye Water River.

Aspects of each of the components of the proposed development include:

The Strategic Employment Zone (**Site A**) will consist of:

- The proposed development comprises 3 no. office blocks and all associated site development works
- The development includes a surface car park which includes 323 no. car parking spaces and 320 no. bicycle car parking spaces.
- Undertaking of road upgrade works on the R157 Dunboyne Road and the construction of a section of the Maynooth Outer Orbital Route and provision of associated pedestrian and cycle infrastructure.
- Vehicular access to the site will be provided via the R157 Dunboyne Road.
- Provision of a new pedestrian & cycle bridge structure at the River Rye Water adjacent to the existing Kildare Bridge.
- Provision of roof mounted solar PV panels on Office Blocks A, B & C.
- Provision of 3 no. ESB Kiosks.
- Provision of bin stores, bike stands, landscaping, boundary treatments and public lighting and all other site development works and services ancillary to the proposed development.

The Healthcare Facilities (**Site B**) will consist of:

- Construction of a new two-storey Nursing Home of 156 no. bedrooms with a Gross Floor Area (GFA) of 8,576m², including vehicular pick up/drop-off area and service road;
- Construction of a new three-storey Primary Care Centre (PCC) with a Gross Floor Area (GFA) of 3,049m²;
- The development includes a shared surface car park providing 161 no. car parking spaces.
- Provision of communal (semi-private) and public open space
- Provision of hard and soft landscaping including amenity equipment, fencing and gates.
- Provision of substation and public lighting.
- Proposed road improvement and realignment works along the R157 Dunboyne Road

The Strategic Housing Development SHD (**Site C**) will consist of:

- Construction of 360 no. residential homes comprising:
 - 196 no houses (including 19 no. 2 beds, 156 no. 3 beds and 21 no. 4 beds).
 - 102 no. duplexes (including 51 no. 1 beds and 51 no. 2 beds) set out in 6 no. blocks.
 - 62 no. apartments (including 26 no. 1 beds and 36 no. 2 beds) set out in 2 no. blocks.
- Provision of a public park and playground with associated 42 no. car parking spaces adjacent to Moygaddy Castle Towerhouse and pedestrian and cyclist links along the Blackhall Little and Rye Water River. The overall public open space (including the High Amenity Lands) equates to 7.98 hectares.

- Provision of private open spaces in the form of balconies and terraces is provided to all individual apartments and duplexes to all elevations.
- Development of a two-storey creche facility (514 sqm), outdoor play area and associated parking of 29 no. spaces.
- Provision of a single storey Scout Den facility, including a hall, kitchen, meeting room and ancillary facilities (220sqm) and associated parking of 6 no. spaces.
- Provision of 500m of distributor road 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.
- Proposed road improvement and realignment works of the existing L6219 local road
- Provision of 3 no. vehicular and pedestrian accesses from the L6219 local road and an additional vehicular and pedestrian access from the R157 to the Childcare and Scout Den facilities.
- A total of 667 no. car parking spaces are provided on site located at surface level. The car parking provision includes 10 no. Electric Vehicle charging and Universally Accessible spaces allocated for the Apartment & Duplex units. All Houses will be constructed with provision for EV Charging.
- Provision of site landscaping, public lighting, bin stores, 3 no. ESB unit substations, site services and all associated site development works.

The planning application for the Maynooth Outer Orbital Road (**MOOR**) will consist of:

- 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.
- Proposed road improvement and realignment works including:
 - 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.
 - 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).
 - Provision of pedestrian and cycle improvement measures along the R157 which abuts the Carton Demense Wall which is a Protected Structure (RPS Ref 91556).
 - 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.
 - Provision of a new signalised junction at the realigned junction between the L22143 and R157.
 - Provision of a new signalised junction between the L2214 local road and the MOOR with right-turn lanes on approaches.
 - Reconfiguration of the L2214 section within the MOOR arc to a one-way from north to south with right-turn lanes, where applicable.
 - Reconfiguration of the northbound lane of the L2214 within the arc to a shared facility for use by pedestrians and cyclists.
 - Addition of chicanes on the L6219 and L22143 local road to reduce traffic flow and encourage utilisation of the MOOR.
- Provision of site landscaping, public lighting, site services and all associated site development works.

The planning application for the **Kildare Bridge** will consist of:

- Provision of a new bridge structure comprising the following:
 - a pedestrian and cycle bridge structure to be erected adjacent to the upstream/western side of the existing Kildare Bridge, with a 2m clearance, with the infrastructure tying into new infrastructure in Co. Meath.
 - This bridge will be a standalone, independent structure that will also support new water main assets

- New wastewater rising mains to be installed underground adjacent the bridge structure, to the west.
- New walkways and cycle track will tie-in with new infrastructure to be constructed by Cairn Homes and their Agents in County Kildare.
- Provision of site landscaping, public lighting, site services and all associated site development works.

The planning application for the **Moyglare Bridge** will consist of:

- Provision of approximately 200m of new portion of distributor road comprising of 7.0m carriageway with footpaths, cycle tracks and grass verges. All associated utilities and public lighting including storm water drainage with SuDS treatment and attenuation. This new road section with pedestrian and cycle infrastructure will tie in with existing infrastructure which provides access to the Maynooth Community College and Moyglare Hall Estate.
- Provision of a new bridge structure comprising the following:
 - an integral 50m 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.
 - The bridge will include pedestrian and cycle facilities
 - Extension of the water main assets to serve new developments in Maynooth Environs
- Provision of site landscaping, public lighting, site services and all associated site development works.

It is proposed that surface water within Sites A, B and C (from roads, roofs and hardstanding areas) will drain via gravity to hydrocarbon interceptors, and infiltration area/attenuation storage areas. The main Site A, Site B and Site C attenuation systems will comprise underground poly-tunnel systems, to be located within the Proposed Development's green spaces in Site A and within the shared car park area of Site B and within the public open spaces in Site C with adequate drainage to maintain functionality. Various other SuDS (sustainable drainage systems) have been incorporated into the surface water drainage design including permeable pavements, swales, hydrocarbon interceptors, rainwater harvesting systems, and downstream attenuation/infiltration.

A proposed new connection to one of the existing watermains local to the site will be made for the Proposed Development. There is a 200mm watermain just south from the Kildare bridge, south of the Proposed Development. An extension from the existing 200mm watermain to be provided along the MOOR road, to the connection point at the site boundaries of Site A & Site B. It is proposed to provide an extension to the existing 200mm watermain at Moyglare Close, to serve Site C. The Proposed Development will be subject to a New Connection Agreement with Irish Water, with all details in accordance with their requirements.

It is proposed to provide a new underground pumping station constructed to IW standards and specifications to the west of the proposed nursing home building at Site B within the Proposed Development. The Proposed Development (Both Site A to the north and Site B to the east and Site C to the west of the proposed pumping station) will drain by gravity to the Pumping Station where it will then be pumped to the existing Irish Water network along the L1013 Local Road in County Kildare, approximately 1km south of the proposed pumping station. The foul sewers are sealed and there will be no discharge of wastewater to ground within the Proposed Development. Wastewater will be pumped from the Proposed Development to the Maynooth pumping station, and onwards from Maynooth pumping station to the Leixlip Wastewater Treatment Plant.

The proposed development works include works in close proximity to waterbodies. There are a number of potential adverse effects to both surface and groundwater.

The primary risks of degradation of surface water bodies include:

- Changes in surface runoff flow volumes and flow patterns;
- Entrainment of suspended solids in surface waters; and,
- Chemical pollution of surface waters by oil and or fuels.

The primary risks of degradation of groundwaters include:

- Chemical pollution of groundwaters by oils and fuels; and,
- Changes in local groundwater flow patterns.

4.2 POTENTIAL EFFECTS

4.2.1 Construction Phase (Unmitigated)

4.2.1.1 Potential Surface Water Quality Impacts from Earthworks

Construction phase activities including site levelling and excavations for building foundations, and attenuation tanks will require earthworks resulting in the removal of vegetation cover where present and excavation of soil and subsoils. The main risk will be from surface water runoff from bare soil and spoil storage areas during construction works.

These activities can result in the release of suspended solids in surface water runoff and could result in an increase in the suspended sediment load, resulting in increased turbidity. This could affect the water quality and fish stocks of downstream water bodies such as the River Rye Water.

Estimated flow volumes at the EPA gauging station on the Rye Water River at Annes BR (Station Code: 09048) and on the Rye Water at Leixlip (Station Code: 09001) highlight the increase in flow volumes downstream. The EPA estimate that 95% of flows in the Rye Water River, approximately 500m upstream from the proposed development equal or exceed 0.060m³/s while in the Rye Water at Maynooth, 95% of flows equal or exceed 0.133m³/s at Leixlip. Therefore, there is a significant increase in flow volumes from the Rye Water_030 River in the vicinity of the proposed development site to the Rye Water_040 River downstream.

These contaminants have the potential to cause a deterioration in the overall status of the Rye Water_030 and could result in the prevention of the Rye water_030 SWB from achieving 'Good' status in the future, due to its proximal location to the proposed development. Further downstream the status of the Rye Water_040 river waterbody is unlikely to be impacted even in an unmitigated scenario due to the significant increase in flow volumes between the Rye Water_030 and Rye Water_040 Rivers.

A summary of potential status change to SWBs arising from surface water quality impacts from earthworks during the construction phase of the proposed development in the unmitigated scenario are outlined in **Table D**.

Table D: Surface Water Quality Impacts during Construction Phase (Unmitigated)

SWB	WFD Code	Current Status	Assessed Potential Status Change
Rye Water_030	IE_EA_09R010400	Moderate	Poor
Rye Water_040	IE_EA_09R010600	Poor	Poor

4.2.1.2 Groundwater Quality Impacts

Accidental spillage during refuelling of construction plant with petroleum hydrocarbons is a significant pollution risk to groundwater. The accumulation of small spills of fuels and lubricants

during routine plant use can also be a pollution risk. Chemicals such as paints and detergents also pose a threat to the groundwater environment. Potential accidental wastewater discharges from temporary on-site welfare facilities have the potential to impact on groundwater quality. Runoff from concrete works can impact on surface water and groundwater quality.

These sources of contamination have the potential to impact on groundwater quality in the underlying groundwater bodies.

A summary of potential status change to the GWB arising from potential groundwater quality impacts during the construction phase of the proposed development in the unmitigated scenario are outlined in **Table E**.

Table E: Groundwater Quality Impacts during Construction Phase (Unmitigated)

GWB	WFD Code	Current Status	Assessed Change
Dublin	IE_EA_G_008	Good	Moderate

4.2.2 Operational Phase (Unmitigated)

4.2.2.1 Reduced Groundwater Flows

Without appropriate mitigation replacement of the existing greenfield surfaces with impermeable hardstanding surfaces can affect and redirect rainfall recharge to the groundwater flow system at the development site, and as a result can alter local groundwater flow patterns. This may have an adverse impact on the quantitative status of the Dublin GWB.

A summary of potential status change to GWBs arising from reduced groundwater flows during the operation stage of the proposed development in the unmitigated scenario are outlined in **Table F**.

Table F: Potential Impact on Groundwater Flows during Operational Phase (Unmitigated)

GWB	WFD Code	Current Status	Assessed Change
Dublin	IE_EA_G_008	Good	Moderate

4.2.2.2 Groundwater Quality Impacts

Surface water runoff from roads and car parking areas can potentially contain elevated levels of contaminants such as hydrocarbons and suspended solids. These could alter pH or nutrient concentrations in groundwater. The use of fertilizers (organic and inorganic, which can increase nitrate and phosphate concentrations in groundwater) and pesticides could also impact on groundwater quality. These contaminants have the potential to adversely impact local groundwater quality in the underlying aquifers.

A summary of potential status change to the Dublin GWB arising from groundwater quality impacts during the operation stage of the proposed development in the unmitigated scenario are outlined in **Table G**.

Table G: Groundwater Quality Impacts during Operational Phase (Unmitigated)

GWB	WFD Code	Current Status	Assessed Change
Dublin	IE_EA_G_008	Good	Moderate

4.2.2.3 Surface Water Quality Impacts

Surface water runoff from roads and car parking areas can potentially contain elevated levels of contaminants such as hydrocarbons and suspended solids. These could alter pH or nutrient concentrations in surface water. The use of fertilizers (organic and inorganic, which can increase nitrate and phosphate concentrations in and surface water). These contaminants have the potential to cause a deterioration in the overall status and could result in the prevention of the Rye Water_030 SWB from achieving 'Good' status in the future, due to its proximal location to the proposed development. Further downstream the status of the Rye Water_040 river waterbody is less at risk.

A summary of potential status change to SWBs arising from surface water quality impacts during the operation stage of the proposed development in the unmitigated scenario are outlined in **Table H**.

Table H: Surface Water Quality Impacts during Operational Phase (Unmitigated)

SWB	WFD Code	Current Status	Assessed Change
Rye Water_030	IE_EA_09R010400	Moderate	Poor
Rye Water_040	IE_EA_09R010600	Poor	Poor

4.3 MITIGATION MEASURES

In order to mitigate against the potential adverse effects on surface and groundwater quality, quantity and flow patterns, mitigation measures will be implemented during the construction and operational phases of the proposed development. These are outlined below.

4.3.1 Construction Phase

4.3.1.1 Mitigation Measures for Surface water Quality

Management of surface water runoff and subsequent treatment prior to release off-site will be undertaken during construction work as follows:

- Silt fencing 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 (other than operational surface water outfall installations which are described below) and surface water receptors and associated riparian habitats.
- A silt fence will also be attached to solid boundary fencing where it is in place and where there is a surface water receptor. 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 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 at a distance of over 30m from nearby watercourses (Rye Water River and Blackhall Little Stream) 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;
- A suitably sized detention basin or settlement area will be installed at the lowest point before discharge to ground 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.
- 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;
- No instream works will take place outside the period July 1st – September 31st in line with Inland Fisheries Ireland (2016) Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters.
- All guidance / mitigation measures proposed by the OPW or the Inland Fisheries Ireland is incorporated into the design of the proposed works.
- Surface water outfalls will be constructed in accordance with the measures described in Section 4.3.1.3 below and subject to agreement with IFI.
- Good construction practices such wheel washers and dust suppression on site roads, and regular plant maintenance, which will be implemented, will ensure minimal risk. The Construction Industry Research and Information Association (CIRIA) provide guidance on the control and management of water pollution from construction sites ('Control of Water Pollution from Construction Sites, guidance for consultants and contractors', CIRIA, 2001), which provides information on these issues. This will ensure that surface water arising during the course of construction activities will contain minimum sediment.
- Preventative measures during construction have been incorporated into the Construction and Environmental Management Plan, 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.
- There will be no direct discharge to any water body, and therefore no risk of hydraulic loading or contamination will occur;
- The MOOR stream crossing upgrade works, the Moyglare Bridge and the Kildare Bridge Works will all require a Section 50 application (Arterial Drainage Act, 1945). The river/stream crossings will be designed in accordance with OPW guidelines/requirements on applying for a Section 50 consent, where considered necessary by the designer.

Construction phase activities at Kildare Bridge include directional drilling which will require earthworks resulting in removal of vegetation cover and excavation of any minor local pockets of organic soil/subsoils, and bedrock. The main risk from directional drilling will be from frac-out, therefore the following mitigation measures will be followed:

- For directional drilling the area around the bentonite batching, pumping and recycling plant will be bunded using terram (as it will clog) and sandbags in order to contain any spillages.
- Drilling fluid returns will be contained within a sealed tank / sump to prevent migration from the works area;

- Spills of drilling fluid will be clean up immediately and stored in an adequately sized skip before been taken off-site;
- The drilling fluid/bentonite will be non-toxic and naturally biodegradable (i.e., Clear Bore Drilling Fluid or similar will be used);
- The drilling process / pressure will be constantly monitored to detect any possible leaks or breakouts into the surrounding geology or local watercourse;
- This will be gauged by observation and by monitoring the pumping rates and pressures. If any signs of breakout occur then drilling will be immediately stopped;
- Any frac-out material will be contained and removed off-site;

Release of effluent from on-site wastewater systems during the construction phase has the potential to impact on groundwater and surface waters. The proposed mitigation measures relating to wastewater effluent include:

- A self-contained port-a-loo 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.

4.3.1.2 Mitigation Measures to Protect Groundwater Quality

The potential pollution of groundwater during the construction phase will be mitigated by the provision of appropriate controls and working methods. These include best practice methods for storage and handling of fuels and chemicals and include:

- 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;
- Refuelling will be completed in a controlled manner using drip trays at all times;
- Mobile bowzers, tanks and drums will be stored in secure, impermeable storage areas away from open water;
- Fuel containers will be stored within a secondary containment system, e.g. bunds for static tanks or a drip tray for mobile stores;
- Containers and bunding for storage of hydrocarbons and other chemicals will have a holding capacity of 110% of the volume to be stored;
- Ancillary equipment such as hoses and pipes will be contained within the bund;
- Taps, nozzles or valves will be fitted with a lock system;
- Fuel and chemical stores including tanks and drums will be regularly inspected for leaks and signs of damage;
- Drip-trays will be used for fixed or mobile plant such as pumps and generators in order to retain oil leaks and spills;
- Only designated trained operators will be authorised to refuel plant on site;
- Procedures and contingency plans will be set up to deal with emergency accidents or spills; and,
- An emergency spill kit with oil boom, absorbers etc. will be kept on-site for use in the event of an accidental spill. A specific team of staff will be trained in the use of spill containment.

Highest standards of site management will be maintained, and utmost care and vigilance followed to prevent accidental contamination or unnecessary disturbance to the site and surrounding environment during construction. A suitably qualified individual will be given the task of overseeing the pollution prevention measures agreed for the site to ensure that they are operating safely and effectively as well as having responsibility for the implementation of Emergency Procedures for spill control measures.

The proposed mitigation measures relating to concrete include:

- 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.
- No washing out of any plant used in concrete transport or concreting operations will be allowed on-site;
- Where possible pre-cast elements for culverts and concrete works will be used.
- Where concrete is delivered on site, only the chute will be cleaned, using the smallest volume of water practicable. No discharge of cement contaminated waters to the construction phase drainage system or directly to any artificial drain or watercourse will be allowed. Chute cleaning water will be undertaken at lined cement washout ponds.
- Weather forecasting will be used to plan dry days for pouring concrete.
- The pour site will be kept free of standing water and plastic covers will be ready in case of sudden rainfall event.

4.3.1.3 Mitigation Measures to Protect against Morphological Changes to Surface Water Courses & Drainage Patterns

Diversion, culverting and bridge crossing of surface watercourses can result in morphological changes, changes to drainage patterns and alteration of aquatic habitats. Construction of structures over water courses has the potential to significantly interfere with water quality and flows during the construction phase. Mitigation by design is the key factor in minimising the potential for effects on water course morphology.

The proposed mitigation measures relating to morphological changes include:

- The proposed design for water course crossings and culverts, which minimises interactions with water courses, ensures that there will be no perceptible effects on the morphology of those watercourses.
- Prior to the outset of these works, small defined works areas will be fenced off at the location of the storm water outfall (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 Blackhall Little Stream.
- 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/Blackhall Little Stream 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/Blackhall Little Stream at the outfall point to create dry working areas.
- A submersible pump will be used to dewater inside the coffer dammed 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 bed will be reinstated to avoid erosion or run off of silt. Following this the dams will be removed.
- The surface water discharge point is likely to take less than one day to install. During the near stream construction work double row silt fences will be emplaced immediately down-gradient of the construction area for the

- duration of the construction phase. There will be no batching or storage of cement allowed in the vicinity of the crossing construction areas; and,
- All watercourse crossing works will require a Section 50 application (Arterial Drainage Act, 1945). The river/stream crossings will be designed in accordance with OPW guidelines/requirements on applying for a Section 50 consent, where considered necessary by the designer.

4.3.2 Operational Phase

4.3.2.1 Mitigation Measures to Protect Groundwater Flow Regimes

The alteration of local groundwater flow patterns due to the replacement of the greenfield surface with hardstand surfaces will be minimised by the incorporation of a properly designed surface drainage and gravity sewer network, and by using underground attenuation tanks for drainage management which will control discharge to the Rye Water River less than the greenfield rates.

Sites A, B & C will direct surface water from surfaced areas roads, and roofs, via gravity, infiltration area/attenuation storage, hydrocarbon interceptors and filtration drain to outfalls at the River Rye Water/Blackhall Little, just west of the Kildare Bridge and the Blackhall Little stream. The remaining areas are considered green space and will be allowed to drain naturally to ground, with negligible impact on the performance of the surface water network, and groundwater flows and therefore do not contribute to the surface water drainage networks.

Surface water attenuation will be used to control runoff from all hard surfaces in accordance with the Greater Dublin Strategic Drainage Study (GDSDS), with these being restricted to a maximum flow rate of 5.5 l/s/ha, which is less than the calculated greenfield runoff equivalent. Attenuation Storage will be provided at strategic locations, in the form of unlined proprietary poly-tunnel storage units (or similar approved). These poly-tunnel storage units will be underground, in proposed green-spaces for both Site A and Site C and in the car parking area for Site B, for the attenuation of rainfall runoff prior to discharge. The attenuation for the proposed MOOR are to comprise of largely enclosed vegetated ponds, and be preceded by a Class 1 bypass fuel separator.

Attenuation Storage will temporarily store excessive surface water, due to the restricted flow rates during rainfall events up to, and including, the design 1% AEP with a 20% additional allowance for climate change. This will allow for the limiting discharge rates to less than greenfield run off rates at the Proposed Development outfall.

Discharge rates at the proposed surface outfalls, that serve Sites A, B and C are to be restricted by using a flow control device, in a chamber upstream of the outfalls, such as Hydro-Brake Optimum Vortex Flow control unit, or similar approved by Meath and Kildare County Councils, downstream of the proposed attenuation systems.

It is proposed that surface water run off on the MOOR is to be captured by adequately spaced trapped road gullies, which connect to a main carrier drain under the road. The rainfall runoff on the aligning footpath and cycle track shall be intercepted by the dividing tree-lined grass verge, with excess runoff only being collected by the road's gully network.

Surface water run off on the Kildare Bridge and the Moyglare Bridge are to be captured by the proposed drainage features proposed as part of the MOOR.

The proposed surface water network is to be split into 4 no. catchments, in order to optimise the network based on the natural topography of the site.

A series of best practice SuDs drainage design controls have been included in the site drainage design to ensure there is no perceptible impact on groundwater flows. These include rainwater harvesting at Sites A and C, Permeable paving and road gullies.

4.3.2.2 Mitigation Measures to Protect Groundwater Quality

Potential emissions to ground and / or surface water include storm water run-off and wastewater.

In relation to storm water run-off, the surface water drainage system will consist of a gravity sewer network that will convey runoff from the roofs and paved areas of the development to outfall manholes, which will discharge at controlled flow rates to the Rye Water River/Blackhall Little Stream. Discharge will be less than the greenfield equivalent runoff rate. Temporary underground attenuation will also be provided at separate locations in the form of underground cellular storage units. Silt traps will be provided for upstream of the attenuation tanks. Surface water will pass through oil interceptors prior to discharging from the site.

Wastewater from the development will discharge to the proposed onsite underground wastewater pumping station, which will ultimately link up to the existing Maynooth town wastewater network prior to discharging to Leixlip Wastewater Treatment Plant. The wastewater treatment plant is regulated and operates under an EPA licence which controls emissions to acceptable levels.

Rainfall allowed to percolate to ground and/or flow via subsurface flow to the Rye Water River/Blackhall Little Stream will be within the green/ landscaped areas of Site A and so there is no significant source of pollution related to these areas.

These standard drainage design controls will ensure the development will not give rise to any significant surface water or groundwater quality impacts at or downstream of the site.

4.3.2.3 Mitigation Measures to Protect Surface Water Quality

Water quality of the surface water, discharging from site, is to be improved with the following provisions:

- Permeable Paving in all private driveways;
- Intensive landscaping, where practical;
- Trapped road gullies on all road carriageways, to trap silt and gross pollutants;
- Traditional gravity pipe and manhole network will be provided, to convey the collected rainfall runoff as far as the development's outfall. Manholes are provided for maintenance access at branched connections, change in pipe size and gradient, and at intervals no greater than 90m distance.
- Silt traps to be provided on manholes immediately upstream of attenuation systems, as a further preventative measure to trap silt and other gross pollutants;
- Surface water attenuation storage in the form of poly-tunnel installation at both Site A and Site C (green spaces) and Site B (car parking area);
- A Class 1 Bypass Fuel/Oil Separator is to be provided as an additional and final mitigation measure, prior to surface water discharge from the Proposed Development sites.

These standard drainage design controls will ensure the development will not give rise to any significant surface water quantity impacts or increased flood risk downstream of the site.

4.3.3 Potential Effects with the Implementation of Mitigation

In all instances, the mitigation measures described in **Section 4.3** are sufficient to meet the WFD Objectives. The assessment of WFD elements for the WFD waterbodies is summarised in **Table I** below.

Table I: Summary of WFD Status for Unmitigated and Mitigated Scenarios

WFD Element	WFD Code	Current Status	Assessed Status – Unmitigated	Assessed Status – with Mitigation Measures
Rye Water_030 SWB	IE_EA_09R010400	Moderate	Poor	Moderate
Rye Water_040 SWB	IE_EA_09R010600	Poor	Poor	Poor
Dublin GWB	IE_EA_G_008	Good	Moderate	Good

5. SUMMARY AND CONCLUSION

5.1 SUMMARY

WFD status for SWBs (Surface Water Bodies) and GWB (Groundwater Body) hydraulically linked to the proposed development site are defined in **Section 2** above.

The surface water connections from the proposed development site to the Rye Water River/Blackhall Little Stream could transfer poor quality surface water that may affect its WFD status. However, as described in **Section 4.2.1.1**, flow volumes in the Rye Water_040 at Louisa Bridge are significantly greater than those recorded in the Rye Water_030 River upstream from the proposed development.

Nevertheless, a series of mitigation measures, designed for the protection of surface and groundwater quality, have been proposed to ensure the protection of receiving waters during the construction and operational phase of the proposed development.

Surface water drainage measures, pollution control and other preventative measures have been incorporated into the project design to minimise significant negative or adverse impacts on water quality including the adjacent Rye Water River Blackhall Little Stream. Preventative measures during construction include fuel and concrete management and a waste management plan which have been incorporated into the Construction and Environmental Management Plan. A range of surface water control measures will also be used including silt fencing along the Rye Water River/Blackhall Little Stream and the maintenance of a set back from the watercourse during construction.

During the operational phase, the key surface water control measure is that there will be a gravity fed sewer network, water drainage system with a Hydro-Brake flow restrictor, filter drain and attenuation systems along with petrol / oil interceptors prior to outflow to the Rye Water River/Blackhall Little Stream. The proposed system will control discharge volume and discharge quality to acceptable greenfield levels. It is also proposed to retain the existing riparian zone which will act as a buffer between the development and the river/stream.

There will be no change in GWB or SWB status in the underlying GWBs or downstream SWBs resulting from the proposed development. There will be no change in quantitative (volume) or qualitative (chemical) status, and the underlying GWBs and downstream SWBs are protected from any potential deterioration.

In the event where the current status of the waterbody is Poor (i.e. Rye Water_040) the proposed development will not prevent them from achieving Good Status in the future.

As such, the proposed development will not impact upon any surface water or groundwater body as it will not cause a deterioration of the status of the body and/or it will not jeopardise the attainment of good status. Therefore, the proposed development is compliant with the requirements of the Water Framework Directive (2000/60/EC) and the Groundwater Directive (2006/118/EC).

* * * * *

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APPENDIX 9-1

PUBLIC LIGHTING REPORT

DATE: 24 August 2022
DESIGNER: Alex Naper
PROJECT No: SES 11522 Rev A
PROJECT NAME: Pedestrian Bridge 2 - Kildare - Sky Castle Ltd



Road section meets recommendations of EN13201-2:2015 Category P2.

Rev A: Project name updated.

Outdoor Lighting Report

PREPARED BY: Sabre Electrical Services Ltd.
Unit 11,
Bellview Industrial Estate,
Tolka Valley Road,
Dublin 11
Phone Number: 01 8110875
Contact: Graham Sheehan
eMail: graham@sabrelighting.ie

Layout Report

General Data

Dimensions in Metres Angles in Degrees

Calculation Grids

ID	Grid Name	X	Y	X' Length	Y' Length	X' Spacing	Y' Spacing
1	Grid 1	694597.79	738514.02	111.00	114.00	1.50	1.50

Luminaires

Luminaire J Data

Supplier	
Type	2685 SNN-1C#
Lamp(s)	1 ST 150 17500 2000 E40
LampFlux(klm)/Colour	17.50 1950 / 23
File Name	Arc 2685 SNN 1C# 1 ST 150 17500 1950 E 40.lgt
Maintenance Factor	0.75
Imax70,80,90(cd/klm)	352.0, 100.0, 5.0
No. in Project	3

Layout

ID	Type	X	Y	Height	Angle	Tilt	Cant	Out-reach	Target X	Target Y	Target Z
1	J	694670.57	738542.77	10.00	171.00	5.00	0.00	2.00			
2	J	694674.67	738564.91	10.00	171.00	5.00	0.00	2.00			
3	J	694679.85	738609.29	10.00	171.00	5.00	0.00	2.00			



APPENDIX 10-1

**EQUIPMENT SPECIFICATION
AND WEATHER CONDITIONS**

Survey details

Weather	Cloud cover	0 %
	Precipitation	0 mm
	Temperature	28 °C at set up, falling to 17 °C overnight, returning to 28 °C next day
	Wind direction	SE
	Wind speed	0-2 m/s during daytime, falling to 0 m/s overnight
	WS measurement	Anemo anemometer 2 m above ground level
Field details	DB1 calibration	Station N4 20.07.21 1615 @ 39.3 mV/Pa
	DB2 calibration	Station N3 20.07.21 1530 @ 41.4 mV/Pa
	DB3 calibration	Station N1 20.07.21 1440 @ 42.0 mV/Pa
	DB4 calibration	Station N5 20.07.21 1415 @ 41.0 mV/Pa
	DB5 calibration	Station N2 20.07.21 1549 @ 42.9 mV/Pa
	Acoustic field	Free field
	Microphone height	1.2 m above ground level
Instruments	Standard	ISO 1996 (2016 & 2017)
	Survey operator	Damian Brosnan BSc MSc MIOA MIEI
	Calibrator	Brüel & Kjær Type 4231 Serial 2342544 Verification 13.05.21
	SLM DB1	NTi Audio XL2 Serial A2A-13658-E0 Microphone A14735 Pre-amp 7066 Verification 13.05.21
	SLM DB2	NTi Audio XL2 Serial A2A-14337-E0 Microphone A14972 Pre-amp 7266 Verification 13.05.21
	SLM DB3	NTi Audio XL2 Serial A2A-15392-E0 Microphone A16340 Pre-amp 7956 Verification 13.05.21
	SLM DB4	NTi Audio XL2 Serial A2A-15429-E0 Microphone A16329 Pre-amp 7945 Verification 14.02.20
	SLM DB5	NTi Audio XL2 Serial A2A-17932-E0 Microphone A18747 Pre-amp 9220 Verification 24.07.20
	Certificates	Available on request



APPENDIX 10-2

BASELINE NOISE MONITORING RESULTS

Baseline noise data

Start time	N1	N1	N2	N2	N3	N3	N4	N4	N5	N5
	L _{Aeq}	L _{A,F90}	L _{Aeq}	L _{A,F90}	L _{Aeq}	L _{A,F90}	L _{Aeq}	L _{A,F90}	L _{Aeq}	L _{A,F90}
20/07/2021 15:00	61	38	-	-	-	-	-	-	50	39
20/07/2021 15:15	61	38	-	-	-	-	-	-	52	41
20/07/2021 15:30	60	40	-	-	-	-	-	-	52	41
20/07/2021 15:45	62	43	-	-	-	-	-	-	51	40
20/07/2021 16:00	63	41	46	39	54	38	-	-	52	41
20/07/2021 16:15	64	45	47	42	54	38	-	-	52	41
20/07/2021 16:30	63	45	47	40	54	36	-	-	52	41
20/07/2021 16:45	63	45	46	40	54	38	-	-	52	43
20/07/2021 17:00	64	45	47	41	55	39	64	47	52	42
20/07/2021 17:15	64	48	48	42	54	38	64	43	54	44
20/07/2021 17:30	65	46	47	41	54	37	64	45	52	42
20/07/2021 17:45	64	47	48	41	54	38	64	48	52	42
20/07/2021 18:00	63	45	47	39	52	37	63	40	52	39
20/07/2021 18:15	63	43	46	40	53	37	64	43	51	41
20/07/2021 18:30	62	38	47	39	52	36	63	42	51	40
20/07/2021 18:45	62	40	45	39	53	36	62	39	51	39
20/07/2021 19:00	62	40	47	38	52	36	61	40	51	41
20/07/2021 19:15	60	37	46	36	53	36	62	38	49	38
20/07/2021 19:30	60	38	44	37	52	36	61	36	50	39
20/07/2021 19:45	59	38	44	37	53	38	61	37	49	38
20/07/2021 20:00	58	35	42	34	51	39	60	35	49	38
20/07/2021 20:15	61	37	45	36	54	37	62	36	51	38
20/07/2021 20:30	59	37	42	36	51	36	61	38	51	37
20/07/2021 20:45	60	38	43	37	51	37	60	40	49	37
20/07/2021 21:00	58	39	42	37	51	37	61	41	49	38
20/07/2021 21:15	59	39	43	38	52	37	60	39	49	38
20/07/2021 21:30	54	38	42	36	49	35	59	36	47	38
20/07/2021 21:45	57	39	43	37	49	35	60	36	49	39
20/07/2021 22:00	55	39	40	36	51	36	58	36	47	40
20/07/2021 22:15	55	37	40	35	49	34	59	35	47	39
20/07/2021 22:30	55	37	45	35	46	34	58	32	48	38
20/07/2021 22:45	56	37	40	35	48	35	59	34	47	39
20/07/2021 23:00	54	36	39	33	48	34	58	33	47	38
20/07/2021 23:15	56	35	46	32	46	32	58	32	49	38
20/07/2021 23:30	56	36	47	35	51	34	60	35	49	38
20/07/2021 23:45	52	34	41	32	45	31	56	31	45	37
21/07/2021 00:00	53	31	37	29	43	29	52	29	41	36
21/07/2021 00:15	52	30	42	27	44	29	55	27	45	36
21/07/2021 00:30	47	31	34	28	43	28	51	28	42	37
21/07/2021 00:45	49	30	35	28	38	26	51	26	40	36
21/07/2021 01:00	53	30	37	27	38	27	54	28	39	36
21/07/2021 01:15	34	29	32	27	45	27	49	26	41	36
21/07/2021 01:30	45	29	33	26	38	27	47	26	42	35
21/07/2021 01:45	30	28	29	26	30	26	46	26	38	35
21/07/2021 02:00	49	28	34	26	40	28	50	27	40	35
21/07/2021 02:15	31	27	29	25	33	27	48	27	38	35
21/07/2021 02:30	47	27	32	25	41	26	46	25	36	35
21/07/2021 02:45	31	26	39	24	32	25	50	25	40	35
21/07/2021 03:00	48	28	44	26	32	27	49	26	39	35
21/07/2021 03:15	31	27	30	26	30	26	31	27	36	35
21/07/2021 03:30	31	28	28	26	30	26	45	28	38	35
21/07/2021 03:45	47	29	33	27	33	27	51	29	39	36
21/07/2021 04:00	53	29	37	27	33	27	50	29	39	36
21/07/2021 04:15	51	29	35	28	35	27	51	29	40	35

21/07/2021 04:30	44	31	36	29	45	28	55	30	44	36
21/07/2021 04:45	54	34	52	32	37	32	54	32	43	38
21/07/2021 05:00	55	34	51	33	46	33	56	33	43	38
21/07/2021 05:15	55	35	46	33	51	35	55	34	46	38
21/07/2021 05:30	59	37	49	37	50	37	59	37	48	38
21/07/2021 05:45	57	37	47	36	50	37	59	36	46	38
21/07/2021 06:00	62	40	53	38	53	41	61	41	48	40
21/07/2021 06:15	64	44	57	42	57	44	65	49	52	42
21/07/2021 06:30	65	45	51	44	55	45	65	48	52	43
21/07/2021 06:45	64	45	47	44	56	44	65	47	54	44
21/07/2021 07:00	64	46	48	44	56	44	64	46	53	45
21/07/2021 07:15	65	46	52	43	58	44	65	45	54	46
21/07/2021 07:30	65	45	50	41	59	41	65	48	53	44
21/07/2021 07:45	63	41	51	37	54	37	65	43	52	41
21/07/2021 08:00	63	41	52	37	54	37	63	43	52	39
21/07/2021 08:15	63	39	49	36	54	36	63	38	52	40
21/07/2021 08:30	63	37	50	36	57	35	63	44	52	40
21/07/2021 08:45	64	37	55	35	56	34	63	36	51	43
21/07/2021 09:00	61	36	43	33	52	32	62	37	51	43
21/07/2021 09:15	62	37	50	35	53	33	63	38	51	42
21/07/2021 09:30	62	38	42	34	53	35	62	42	54	43
21/07/2021 09:45	62	36	42	34	52	34	62	35	50	41
21/07/2021 10:00	62	39	43	34	52	34	62	38	50	39
21/07/2021 10:15	61	34	53	34	53	34	62	37	51	38
21/07/2021 10:30	61	34	53	32	52	33	61	39	50	37
21/07/2021 10:45	60	38	46	33	51	33	61	36	51	38
21/07/2021 11:00	61	37	45	34	51	34	61	35	50	39
21/07/2021 11:15	60	35	52	34	54	34	62	38	50	38
21/07/2021 11:30	62	39	45	35	52	34	62	33	51	40
21/07/2021 11:45	60	37	52	35	52	34	61	35	50	38
21/07/2021 12:00	60	37	44	34	51	34	61	40	50	37
21/07/2021 12:15	61	36	42	35	51	34	61	34	49	38
21/07/2021 12:30	61	37	46	36	51	35	62	41	51	40
21/07/2021 12:45	60	35	43	35	52	35	61	40	50	39
21/07/2021 13:00	59	37	39	34	51	35	61	38	52	39
21/07/2021 13:15	60	39	45	35	51	35	61	39	50	39
21/07/2021 13:30	62	38	44	36	51	35	62	38	50	40
21/07/2021 13:45	60	37	43	36	53	35	62	42	50	37
21/07/2021 14:00	61	38	45	36	51	36	62	41	50	37
21/07/2021 14:15	61	39	47	38	54	37	62	38	51	39
21/07/2021 14:30	61	37	53	39	52	36	63	45	51	39
21/07/2021 14:45	62	40	57	39	52	37	63	45	51	40
21/07/2021 15:00	-	-	51	38	50	37	63	41	-	-
21/07/2021 15:15	-	-	45	38	52	37	62	42	-	-
21/07/2021 15:30	-	-	45	39	53	38	64	43	-	-
21/07/2021 15:45	-	-	49	40	51	38	64	43	-	-
21/07/2021 16:00	-	-	-	-	-	-	64	46	-	-
21/07/2021 16:15	-	-	-	-	-	-	64	46	-	-
21/07/2021 16:30	-	-	-	-	-	-	64	46	-	-
21/07/2021 16:45	-	-	-	-	-	-	63	43	-	-



APPENDIX 11-1

PHOTOMONTAGE ASSESSMENT TABLES

1.

PHOTOMONTAGE ASSESSMENT TABLES

This document should be read in conjunction with the Volume 2 photomontage booklet forming Volume 2 of this EIAR. The following images are shown in the Photomontage Booklet for each viewpoint location:

- **Baseline VVM:** Shows the baseline landscape/streetscape conditions as it currently exists in a do-nothing scenario.
- **Proposed VVM;** Shows a scaled render of the Proposed Development within the current landscape/streetscape.
- **Proposed VVM & Cumulative Wirelines:** Shows the photomontage as presented in the 'Proposed VVM' view; as well as wirelines indicating the relative physical position and scale of the Proposed Development irrespective of screening. The wirelines of the various above ground development elements are colour coded with the following:
 - **Red Wireline = Site A** - Proposed Strategic Employment Zone
 - **Blue Wireline = Site B** - Proposed Healthcare Facilities
 - **Purple Wireline = Site C** - Proposed Strategic Housing Development

Less visually prominent elements of the Proposed Development such as the MOOR, Kildare Bridge works and Moyglare Bridge are included in the photomontages. In order to ensure the photomontage booklet is clean and coherent, no wirelines have been added around these surface features within the 'Proposed VVM & Cumulative Wirelines', as this would have resulted a relatively confusing visual output. Where they will be seen, the MOOR, the Kildare Bridge works and the Moyglare Bridge are included in the photomontages and are assessed within the assessment narrative in the photomontage assessment tables below.

The following tables demonstrate a structured assessment of the 17 no. photomontages (15 No. Viewpoints) included in the Volume 2 photomontage booklet. The assessment follows the 'Assessment of Visual Effects' methodology included in Section 11.2.4 in Chapter 11. The likely significance of visual effects occurring at each viewpoint is determined in each table by balancing viewpoint (and receptor) sensitivity with the magnitude of change. A residual visual effect accounting for mitigating factors is stated in the final row of each table, following the EPA (2022) Definition of Significance.

The viewpoint assessments account for the potential of cumulative visual effects, such as inter-visibility between the Proposed Development elements of Site A (Strategic Employment Zone), Site B (Healthcare Facilities), Site C (SHD), The MOOR, Kildare Bridge works and the Moyglare Bridge. Where applicable, other permitted and planned developments of similar scope and scale within the surrounding landscape (mapped in Section 11.5 and listed in Chapter 2) will be considered in the judgement of visual effects.

Viewpoint 1 – Residential Receptor on the R157 north-east	
Viewpoint Description and Details	<ul style="list-style-type: none"> View west from a residential property on the R157 Regional Road as it approaches Site A and Maynooth from the north-east. This viewpoint is located on the verge of the R157 Regional Road approximately 205 metres east of the nearest proposed building (Office Block C) within Site A. Field of View: West-south-west Grid Ref (ITM): E:695,157; N:739,327
Visual Receptors and their sensitivity	A Single Residential Receptor – High/Medium Motorised traffic on the R157 – Low
Description of 'Baseline VVM'	The Baseline image shows medium ranging views across a flat field of agricultural pasture. Site A of the Proposed Development is located beyond the mature treeline demarking the field boundary in the background of the image. A driveway entrance to a residential dwelling forms the foreground of the image. The R157 Regional Road is visible to the left tracking away from the viewpoint to the south-west. Approximately 300 metres (~150m to 400 metres at different locations) metres of relatively dense deciduous woodland separates Site A from Carton Demone to the south-east, the westerly extent of which is seen in the left background of the baseline image beyond the R157. The view is of a rural character, however, aesthetic qualities of the landscape are diminished by the presence of the R157, utility poles and overhead lines seen through the view.
Proposed Photomontage Description	The second and third storeys of the proposed office blocks of Site A are visible above the treeline in the background of the photomontage. The ground floor and surface infrastructure of Site A are obscured from view by the intervening vegetation. The Proposed Development comprises a relatively small spatial extent within this view and although the proposed office blocks raise the skyline in the centre of the view, they do not obstruct any longer ranging landscape views. As a background addition to the existing view, the Proposed Development slightly alters the character and composition of the existing landscape.
Cumulative Effects	As shown by the cumulative wireline image, no other infrastructure of the Proposed Development will not be visible from this viewpoint and no cumulative effects will occur.
Sensitivity of Visual Receptor(s) (Definition, See Section 11.2.4)	"Medium: Includes viewers who may have some susceptibility to a change in view. Viewers such as residents in medium proximity but who do not have views focused in the direction of the Proposed Development or whose views are not of a particularly scenic quality; those from views which are not designated but may have local recreational uses or those travelling along routes or at view which are considered moderately scenic."
Magnitude of Change (Definition, See Section 11.2.4)	"Moderate: The change in the view may involve partial obstruction of existing view or partial change in character and composition of the baseline through the introduction of new elements or removal of existing elements. Likely to occur at locations where the development is partially visible over a moderate or medium extent, and which are not in close proximity to the development. Change may be readily noticeable but not substantially different in scale and character from the surroundings and wider setting"

Viewpoint 1 – Residential Receptor on the R157 north-east	
Significance of Effect (Definition, See Section 11.2.4)	Medium x Moderate = Moderate/Minor = Slight (EPA, 2022) An effect that alters the character of the environment in a manner consistent with existing and emerging baseline trends
Mitigation Factors	<ul style="list-style-type: none"> ➤ The Proposed Development is only visible from the gable end of the residential property where this photomontage was captured. The primary residential visual amenity of this property is directed to the north-west and south-east, away from the Proposed Development. ➤ This is the only residential receptor which will have any visibility of the proposed infrastructure of Site A. ➤ The proposed infrastructure of Site A aligns with the zoning of these lands as 'E1 – Strategic Employment Zone' in the Maynooth Environs Written Statement (2021-2027). ➤ The impact of vegetation screening has seasonal variation. In order to show a worst-case scenario for visual effects, all photomontages were captured during the winter months. As demonstrated by images within Chapter 11 (See Section 11.4.1.3), roadside vegetation on the R157 will be much denser during summer months when existing hedges and deciduous trees are full of foliage. In this regard, the distant deciduous treeline and vegetation in the foreground of the view will greatly reduce visibility of the Proposed Development in summer months and reduce the significance of visual effects from this location.
Residual Effect (incl. mitigating factors)	Slight (EPA, 2022) An effect which causes noticeable changes in the character of the environment without affecting its sensitivities

Viewpoint 2 – R157 Approach from the north-east	
Viewpoint Description and Details	<ul style="list-style-type: none"> ➤ View west from the R157 Regional Road as it approaches Site A and Maynooth from the north-east. ➤ This viewpoint is located on the verge of the R157 Regional Road approximately 105 metres east of the nearest proposed building (Office Block C) within Site A. ➤ Field of View: West ➤ Grid Ref (ITM): E: 695,078 N: 739,238
Visual Receptors and their sensitivity	Motorised traffic on the R157 - Low
Description of 'Baseline VVM'	The baseline view is directed along the R157 Regional Road within a landscape of rural character. The eye is drawn along the path of the roadway which is enclosed by hedgerows and a stone wall. A tall treeline is visible in the middle distance. No long ranging views are available from this location and the view does not comprise any landscape features of unique aesthetic value.
Proposed Photomontage Description	The second and third storeys of the proposed office blocks of Site A are visible above the treeline in the background of the view. The ground floor and surface infrastructure of the proposal such as the proposed car parks and internal road network are obscured from view by the intervening vegetation. The mass and bulk of the proposed office buildings raise the skyline in the centre of the view and alter the composition and character of the landscape to that of a semi-urban, semi-rural landscape.
Cumulative Effects	As shown by the cumulative wireline image, no other infrastructure of the Proposed Development will not be visible from this viewpoint and no cumulative effects will occur.
Sensitivity of Visual Receptor(s) (Definition, See Section 11.2.4)	"Low: Includes viewers engaged in activities where the focus is not on the landscape or view. These including those travelling along a busy route, viewers at work or engaged in sport not related to views or experience of the landscape"
Magnitude of Change (Definition, See Section 11.2.4)	"Moderate. The change in the view may involve partial obstruction of existing view or partial change in character and composition of the baseline through the introduction of new elements or removal of existing elements. Likely to occur at locations where the development is partially visible over a moderate or medium extent, and which are not in close proximity to the development. Change may be readily noticeable but not substantially different in scale and character from the surroundings and wider setting."
Significance of Effect (Definition, See Section 11.2.4)	Low x Moderate = Minor = Slight (EPA, 2022) An effect which causes noticeable changes in the character of the environment without affecting its sensitivities
Mitigation Factors	<ul style="list-style-type: none"> ➤ The proposed infrastructure of Site A aligns with the zoning of these lands as 'E1 – Strategic Employment Zone' in the Maynooth Environs Written Statement (2021-2027). ➤ The impact of vegetation screening has seasonal variation. The photomontages within the Volume 2 booklet were captured during the winter months. As demonstrated by images within Chapter 11 (See

Viewpoint 2 – R157 Approach from the north-east	
	Section 11.4.1.3), roadside vegetation on the R157 will be much denser during summer months when existing hedges and deciduous trees are full of foliage. In this regard, the distant deciduous treeline will greatly reduce visibility of the Proposed Development from Viewpoint 02 in summer months and reduce visual effects from this location.
Residual Effect (incl. mitigating factors)	Slight (EPA, 2022) An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.

Viewpoint 3 – Queen Victoria Gate on the R157	
Viewpoint Description and Details	<ul style="list-style-type: none"> ➤ Viewwest from Queen Victoria Gate, an old disused access gate into the woodland within the Carton Estate east of the R157 Regional Road. ➤ This viewpoint is located within the EIAR Study Boundary and at the south-eastern extent of Site A on the verge of the R157 Regional Road where there is a gap in the roadside hedgerow ➤ Field of View: West ➤ Grid Ref (ITM): E: 694,937; N 7 39,41
Visual Receptors and their sensitivity	Motorised traffic on the R157 – Low
Description of 'Baseline VVM'	The baseline view looks across the R157 Regional Road through a gap in the existing hedgerows to a flat agricultural field beyond. Overhead lines and utility poles are man-made features visible along the roadside. As demonstrated by the baseline image, distant visibility is limited in the flat landscape. The mature woodland surrounding Moygaddy House can be seen in the middle distance and form the background of the view
Proposed Photomontage Description	<p>The proposed MOOR and proposed internal roads of Site A are visible in the foreground of the photomontage. Two of the proposed office blocks of Site A are clearly visible in the centre of the photomontage. Due to the proximity of this viewpoint, the proposed office blocks are seen as large and prominent features of the landscape. The addition of the office blocks, new roads, car parks, pedestrian walkway and cycleway alter the character of the existing view to that of a semi-urban, semi-rural landscape.</p> <p>The most easterly office block (Block C) is not visible in the field of view presented in the photomontage but would be fully seen as a prominent feature from this location if the view was focussed in a northerly direction. This has been factored into the rating of 'magnitude of change' and visual effects determined for this viewpoint.</p>
Cumulative Effects	As shown by the cumulative wireline image, no other infrastructure of the Proposed Development will not be visible from this viewpoint and no cumulative effects will occur.
Sensitivity of Visual Receptor(s) (Definition, See Section 11.2.4)	“Low: Includes viewers engaged in activities where the focus is not on the landscape or view. These including those travelling along a busy route, viewers at work or engaged in sport not related to views or experience of the landscape.
Magnitude of Change (Definition, See Section 11.2.4)	Substantial: Substantial change, where the proposals would result in large-scale, prominent or very prominent change leading to substantial obstruction of existing view or complete change in character and composition of the baseline though removal of key elements or addition of uncharacteristic elements which may or may not be visually discordant. This includes viewpoints where the Proposed Development is fully or almost fully visible over a wide extent, at close proximity to the viewer. This change could be long-term or of a long duration.
Significance of Effect (Definition, See Section 11.2.4)	<p>Low x Substantial = Moderate/Minor = Moderate (EPA, 2022)</p> <p>An effect that alters the character of the environment in a manner consistent with existing and emerging baseline trends</p>

Viewpoint 3 – Queen Victoria Gate on the R157	
Mitigation Factors	<ul style="list-style-type: none"> ➤ The proposed infrastructure of Site A aligns with the zoning of these lands as ‘E1 – Strategic Employment Zone’ in the Maynooth Environs Written Statement (2021-2027). ➤ Proposed planting as part of the landscape plan softens the visual impact of the three and five story office blocks, improving the integration of the Proposed Development within the existing rural landscape.
Residual Effect (incl. mitigating factors)	<p>Moderate (EPA, 2022)</p> <p>An effect that alters the character of the environment in a manner consistent with existing and emerging baseline trends.</p>

Viewpoint 04A – View focussed on Site A from Existing Junction (R157 & L2214-3)	
Viewpoint Description and Details	<ul style="list-style-type: none"> View north towards Site A – proposed Strategic Employment Zone from the existing junction between the L2214-3 Local Road and R157 Regional Road. This viewpoint is located on the verge of the L2214-3 Local Road, approximately 62 metres south of the nearest proposed Office Block building of Site A at its closest point. Field of View: north-north-west Grid Ref (ITM): E: 694,728; N: 739,023
Visual Receptors and their sensitivity	<p>Motorised traffic on the L2214-3 - Low</p> <p>Motorised traffic on the R157 - Low</p>
Description of 'Baseline VVM'	<p>The baseline view looks across the L2214-3 local road where it joins the R157 Regional Road which tracks around a bend away from the viewpoint to the right of the image. This is a relatively recognisable location due to the collection of traffic signage at this junction. A field of agricultural grassland is seen through roadside vegetation in the centre and left of the image. Dense woodland extends approximately 400 metres east from the wall seen to the right of the photomontage. This woodland screens any visibility of this location or the Proposed Development from Carton House and Carton Demesne which are sensitive receptors to the east.</p>
Proposed Photomontage Description	<p>All three office blocks of Site A are clearly visible from this location. Due to the proximity of this viewpoint, they are seen as large and prominent features of the landscape. The proposed north-westerly section of the MOOR is visible to the left of the photomontage and the proposed realigned R157 cuts across the photomontage from left to right. The removal of existing vegetation and addition of the office blocks, new roads, pedestrian walkways and cycleways alter the character of the existing view to that of a semi-urban, semi-rural landscape.</p>
Cumulative Effects	<p>Photomontage Viewpoint 4B (seen next in the photomontage booklet and described in the following table) was captured from the roadside verge adjacent to the signage visible in the right foreground of 'Baseline View', the view in that photomontage is focussed in the opposite direction – to the south (Viewpoint 4B). As shown by Viewpoint 4B, the infrastructure of the proposed Site B - Healthcare Facilities will be partially visible beyond a distant treeline. Upgrades to the local road forming the proposed MOOR will also be visible to the left of the photomontage as it tracks west towards Site C, Moygaddy House and Moygaddy Castle ruins. In this regard, cumulative visual effects will occur and have been factored into the rating of visual effects given to this viewpoint.</p>
Sensitivity of Visual Receptor(s) (Definition, See Section 11.2.4)	<p>"Low: Includes viewers engaged in activities where the focus is not on the landscape or view. These including those travelling along a busy route, viewers at work or engaged in sport not related to views or experience of the landscape.</p>
Magnitude of Change (Definition, See Section 11.2.4)	<p>"Substantial: Substantial change, where the proposals would result in large-scale, prominent or very prominent change, leading to substantial obstruction of existing view or complete change in character and composition of the baseline though removal of key elements or addition of uncharacteristic elements which may or may not be visually discordant. This</p>

Viewpoint 04A – View focussed on Site A from Existing Junction (R157 & L2214-3)	
	includes viewpoints where the Proposed Development is fully or almost fully visible over a wide extent, at close proximity to the viewer. This change could be long term or of a long duration.”
Significance of Effect (Definition, See Section 11.2.4)	Low x Substantial = Moderate/Minor = Moderate (EPA, 2022) An effect that alters the character of the environment in a manner consistent with existing and emerging baseline trends
Mitigation Factors	<ul style="list-style-type: none"> ➤ The proposed infrastructure of Site A aligns with the zoning of these lands as ‘E1 – Strategic Employment Zone’ and the ‘indicative road route’ within the Maynooth Environs Written Statement (2021-2027). ➤ Landscape elements such as a large agricultural field and mature vegetation along field boundaries act as a buffer, visually separating the proposed infrastructure of Site A, Site B and Site C, therefore mitigating the potential for significant cumulative visual effects. ➤ Proposed planting as part of the landscape plan softens the visual impact of the three and five story office blocks, enabling the Proposed Development to better assimilate within the existing rural landscape.
Residual Effect (incl. mitigating factors)	Moderate (EPA, 2022) An effect that alters the character of the environment in a manner consistent with existing and emerging baseline trends.

Viewpoint 04B – View focussed on Site B from Existing Junction (R157 & L2214-3)	
Viewpoint Description and Details	<ul style="list-style-type: none"> View south-west towards Site B – proposed Healthcare Facilities from the R157 Regional Road at the existing junction with the L2214-3 Local Road. This viewpoint is on the verge of the R157 Regional Road approximately 250 metres north of the nearest proposed building of Site B (Primary Care Centre building) at its closest point. This viewpoint is located at the southern extent of Site A, across the road from Viewpoint 4A (Assessed in the previous table above). Field of View: south-west Grid Ref (ITM): E: 694,745; N: 739,033
Visual Receptors and their sensitivity	<p>Motorised traffic on the L2214-3 - Low</p> <p>Motorised traffic on the R157 - Low</p>
Description of 'Baseline VVM'	<p>The baseline view looks southwest across the existing junction between the R157 Regional Road which seen to the left of the image and the L2214-3 Local Road seen to the right. The junction is located at a bend in the R157 as it tracks along the boundary wall of Carton Demesne which is seen to the very left of the view. The thin roadside verges are lined by mature deciduous trees and low hedgerows. Beyond the junction there are medium range views across a flat field of grazing pasture. A line of dense woodland forms the distant field boundary comprising the background of this view.</p>
Proposed Photomontage Description	<p>The proposed MOOR is visible tracking across the foreground of the photomontage, loss of existing roadside hedgerows and trees has opened up views across the agricultural grasslands in the middle distance. An access path to woodlands of Carton Demesne is visible in the left foreground of the photomontage. Infrastructure of Site B is just discernible beyond the distant treeline, it is substantially screened from view by the intervening vegetation. Elevated elements of the proposed PCC is just visible through the trees to the left of the photomontage. The proposed nursing home (the light-coloured building) is visible beyond the distant treeline in the centre of the photomontage, the ground floor and surface elements are obscured from view by the treeline.</p>
Cumulative Effects	<p>Photomontage Viewpoint 4A (seen in the booklet and described in the previous table) was captured from the roadside verge visible in the centre foreground of this photomontage (Viewpoint 4B). As shown by viewpoint 4A, the infrastructure of Site A and MOOR will be visible directly behind this photomontage. As there will be substantial change to the landscape and visual amenity to the north of this viewpoint, cumulative visual effects will occur and have been factored into the rating of visual effects given to this viewpoint.</p> <p>As shown by the indicative (purple) wireline image Site C is located beyond the treelines to the west (right) of the photomontage. However, due to the intervening screening, visibility is likely to be very limited and no significant cumulative visual effects will arise in relation to the Site C SHD from this viewpoint.</p>
Sensitivity of Visual Receptor(s)	<p>“Low: Includes viewers engaged in activities where the focus is not on the landscape or view. These include those travelling along a busy route,</p>

Viewpoint 04B – View focussed on Site B from Existing Junction (R157 & L2214-3)	
<i>(Definition, See Section 11.2.4)</i>	viewers at work or engaged in sport not related to views or experience of the landscape.
Magnitude of Change <i>(Definition, See Section 11.2.4)</i>	“Moderate: The change in the view may involve partial obstruction of existing view or partial change in character and composition of the baseline through the introduction of new elements or removal of existing elements. Likely to occur at locations where the development is partially visible over a moderate or medium extent, and which are not in close proximity to the development. Change may be readily noticeable but not substantially different in scale and character from the surroundings and wider setting.”
Significance of Effect <i>(Definition, See Section 11.2.4)</i>	Low x Moderate = Minor = Slight (EPA, 2022) An effect which causes noticeable changes in the character of the environment without affecting its sensitivities
Mitigation Factors	<ul style="list-style-type: none"> ➤ Landscape elements such as the mature vegetation along the field boundaries and the field itself act as a buffer, visually separating the proposed infrastructure of Site A, Site B and Site C, therefore mitigating the potential for significant cumulative visual effects. ➤ The Proposed Development is sited in a location zoned for its purpose; the Site B Healthcare Facilities are sited in lands zoned for ‘G1 – Community Infrastructure’ in the Maynooth Environs Written Statement (2021-2027). ➤ As demonstrated by images within Chapter 11 (See Plate 11-14; Plate 11-51; & Plate 11-52) vegetation will be much denser during summer months when existing hedges and deciduous trees are full of foliage. In this regard, visibility of the Proposed Development will have some seasonal variation. It is unlikely that the proposed Healthcare Zone at Site B would be visible from this viewpoint if the photomontage was captured from this location during the summer months, therefore there would be no visual impact during that time.
Residual Effect (incl. mitigating factors)	Slight (EPA, 2022) An effect which causes noticeable changes in the character of the environment without affecting its sensitivities

Viewpoint 5 – Residential Receptors on the L2214 north-west	
Viewpoint Description and Details	<ul style="list-style-type: none"> ➤ View south-south-east from the L2214 Local Road as it approaches The Proposed Development from the north. ➤ This viewpoint represents a small cluster of residential receptors situated on this local road. ➤ This viewpoint is located approximately 250 metres north of the ELAR Study Boundary. ➤ Field of View south-south-east ➤ Grid Ref (ITM) E: 694,494; N: 740,058
Visual Receptors and their sensitivity	Cluster of Residential Receptors – High Motorised traffic on the R157 – Low
Description of 'Baseline VVM'	The Baseline view is of a rural character. The image shows open views across flat fields of grazing pasture. The verge of the L2214 Local Road is seen to the right of the view. The three residential dwellings seen in the middle distance are located off the local road in a linear arrangement. Site A of the Proposed Development is located beyond the mature tree line. The distant field boundaries in the background centre of the image. A large electricity pylon is seen above the tree line in the background left of the view, utility poles and overhead lines are also prominent features along the roadway.
Proposed Photomontage Description	As indicated by the red wireline in the photomontage, the proposed Development will be almost entirely screened from view behind the distant tree lines. The most western rooftops of Office Block A may be just discernible above the tree line, no other elements of the Proposed Development can be seen from this location.
Cumulative Effects	As shown by the cumulative wireline image, Site B and Site C of the Proposed Development will not be visible from this viewpoint. It is not anticipated that the MOOR will be visible from this location and no cumulative visual effects will occur.
Sensitivity of Visual Receptor(s) (Definition, See Section 11.2.4)	“High: Includes viewers at designated views or landscapes. Viewers such as residents in close proximity to the viewpoint who have primary views that will be in the direction of the development that may not necessarily be of a particularly scenic quality; viewers at well-known heritage or popular tourist or recreational areas, viewers along scenic or tourist routes.”
Magnitude of Change (Definition, See Section 11.2.4)	“Negligible: Any change would only be barely distinguishable from the status quo “do-nothing scenario” in the surroundings. The composition and character of the view would be substantially unaltered, approximating to little or no change”
Significance of Effect (Definition, See Section 11.2.4)	High x Negligible = Minor = Slight (EPA, 2022) An effect which causes noticeable changes in the character of the environment without affecting its sensitivities
Mitigation Factors	<ul style="list-style-type: none"> ➤ The primary residential visual amenity of these properties is directed east, not directly towards the Proposed Development which is located to the south-south-east.

Viewpoint 5 – Residential Receptors on the L2214 north-west	
	<ul style="list-style-type: none"> > The proposed infrastructure of Site A aligns with the zoning of these lands as 'E1 – Strategic Employment Zone' in the Maynooth Environs Written Statement (2021-2027). > The impact of vegetation screening has seasonal variation. The photomontages within the Volume 2 booklet were captured during the winter months. In general, vegetation will be much denser during summer months when existing hedges and deciduous trees are full of foliage. In this regard, the distant deciduous treeline will completely obscure the Proposed Development from view in summer months causing no visual effects from this location.
Residual Effect (incl. mitigating factors)	<p>Not Significant (EPA, 2022)</p> <p>An effect which causes noticeable changes in the character of the environment but without significant consequences.</p>

Viewpoint 06 - Site B from the R157 Regional Road	
Viewpoint Description and Details	<ul style="list-style-type: none"> ➤ View south-west towards Site B from the R157 Regional Road. ➤ This viewpoint is located on the verge of a public road, within the EIAR Study Boundary, immediately adjacent to the proposed vehicular access road into Site B. ➤ Field of View: south-west ➤ Grid Ref (ITM): E: 694,707; N: 738,84
Visual Receptors and their sensitivity	Motorised traffic on the R157 – Low
Description of 'Baseline VVM'	Beyond the roadside verge of the R157, the baseline image shows the existing eastern field boundary of Site B comprising low timber fencing and deciduous vegetation. The mature woodland that forms the northern boundary of Site B is visible to the right of the image. From this specific location on the R157, there is a gap in the roadside screening and a relatively unobstructed view into the agricultural field where Site B is located. Several residential developments are just discernible in the distant background of the view where they are located beyond the valley of lower ground along the Rye Water.
Proposed Photomontage Description	<p>The proposed Primary Care Centre (PCC) is visible in the foreground of the photomontage as well as the proposed vehicular access route and junction with the R157. The proposed nursing home is visible beyond the PCC in the background right of the photomontage, although it is softened by the proposed tree planting along the access road.</p> <p>The proposed PCC is a three-storey building viewed in close proximity to this viewpoint (approximately 37 metres at its closest point), due to its scale and mass it is seen as a substantial feature of the photomontage. The proposed PCC causes some visual obstruction, blocking longer ranging views of the landscape beyond. The Proposed Development alters the baseline character and composition of the view from that of a rural landscape to one of a more urban nature.</p>
Cumulative Effects	The proposed road upgrade to the R157 as part of the MOOR and new junction will be visible along the road to the north (right of photomontage view). The proposed Kildare bridge works may have some minor visibility within views to the south from this viewpoint, although it is likely to be screened from view by the intervening roadside vegetation. From this viewpoint there will be some minor visual connectivity with the nearest proposed Office Block of Site A which will be visible to the north (right of photomontage field of view), although visual effects will be mitigated by distance. A view of the Proposed Development at Site A from the south are presented in Photomontage Viewpoint 04A and visual effects are assessed in a table previously. Site C and Moyglare Bridge will not be visible from this viewpoint.
Sensitivity of Visual Receptor(s) (Definition, See Section 11.2.4)	Low: Includes viewers engaged in activities where the focus is not on the landscape or view. These including those travelling along a busy route, viewers at work or engaged in sport not related to views or experience of the landscape.

Viewpoint 06 - Site B from the R157 Regional Road	
Magnitude of Change (Definition, See Section 11.2.4)	Substantial: Substantial change, where the proposals would result in large-scale, prominent or very prominent change, leading to substantial obstruction of existing view or complete change in character and composition of the baseline though removal of key elements or addition of uncharacteristic elements which may or may not be visually discordant. This includes viewpoints where the Proposed Development is fully or almost fully visible over a wide extent, at close proximity to the viewer. This change could be long term or of a long duration.
Significance of Effect (Definition, See Section 11.2.4)	Low x Substantial = Moderate/Minor = Moderate (EPA, 2022) An effect that alters the character of the environment in a manner consistent with existing and emerging baseline trends
Mitigation Factors	<ul style="list-style-type: none"> ➤ Receptors will only have this view momentarily and the road is not oriented towards the site. ➤ The Proposed Development is sited in a location zoned for its purpose; the Site B Healthcare Facilities are sited in lands zoned for 'G1 – Community Infrastructure'. ➤ Proposed infrastructure at Site A and Site B will not be visible within the same field of view from this location. Cumulative visual effects are mitigated by distance and screening.
Residual Effect (incl. mitigating factors)	Moderate (EPA, 2022) An effect that alters the character of the environment in a manner consistent with existing and emerging baseline trends

Viewpoint 07 – Kildare Bridge	
Viewpoint Description and Details	<ul style="list-style-type: none"> ➤ View north-west towards Site Band Kildare Bridge from a location on the R157 Regional Road. ➤ This viewpoint is located on the public footpath approximately 10 metres south of the existing Kildare Bridge structure and the location/origin of County Kildare Designated Scenic View RW-4. ➤ This viewpoint was chosen south of the designated scenic view in order to show a wider perspective and more open view towards the Proposed Development, set back from existing roads and screening. ➤ Field of View: north-north-west ➤ Grid Ref (ITM): E: 694,671, N: 738,561
Visual Receptors and their sensitivity	County Kildare Designated Scenic View RW-4 (in close proximity) - High Motorised traffic on the R157 - Low
Description of 'Baseline VVM'	The existing Kildare Bridge structure and the R157 is visible in the foreground of the view. As shown in the baseline image there is limited safe pedestrian access to the western side of the bridge. The verge of the road either side of the bridge is lined by tall hedges and deciduous trees. The road and landform rises to the north, away from the viewpoint and bridge over the Rye Water. The agricultural field comprising Site B is visible beyond the bridge in the centre of the image.
Proposed Photomontage Description	<p>The cycleway/pedestrian access is visible as part of the MOOR along the verge of the existing R157. The Proposed Kildare Bridge works is visible adjacent to the stone wall of the existing Kildare Bridge structure in the left foreground. The proposed bridge itself has limited visibility from this viewpoint as it is located beyond the stone wall parapet of the existing Kildare Bridge Structure.</p> <p>Due to its elevated position from this perspective, the three storey Primary Care Centre (PCC) of Site B is a relatively prominent feature in the background-right of the photomontage beyond the treeline existent along the verge of the R157. The two-storey proposed nursing home is visible in the centre background of the photomontage, although a large portion of it is substantially screened from view by existing vegetation. The proposed car park is located upon the flat ground between the two proposed healthcare buildings. As shown by the photomontage, visibility of cars (and other element of the Proposed Development within Site B) will be softened by the proposed planting of native trees along the proposed recreational walking route to the south of the site.</p>
Cumulative Effects	<p>From this viewpoint location the Proposed Development at Site A will not be visible. From this viewpoint the R157 heads north and bends slightly to the north-north-east as it passes the entrance to proposed Site B. The dense woodland and topographical characteristics will therefore screen Site A (to the right of the field of view presented in the photomontage) from view. As shown by the indicative cumulative wireline image, Site C will not be visible from this viewpoint.</p> <p>The Permitted Dunboyne Road housing development is located approximately 200 metres south-west of this viewpoint, however no visibility of this development is expected from this viewpoint due to screening from intervening landform and vegetation. Plans for the proposed Maynooth</p>

Viewpoint 07 – Kildare Bridge	
	Eastern Ring Road (MERR – P82019.08) which is a transport network linking with the Dunboyne roundabout, and associated works for this development will likely be visible from this viewpoint, however, cumulative visual effects will not be significant.
Sensitivity of Visual Receptor(s) (Definition, See Section 11.2.4)	<p>“Medium: Includes viewers who may have some susceptibility to a change in view. Viewers such as residents in medium proximity but who do not have views focused in the direction of the Proposed Development or whose views are not of a particularly scenic quality; those from views which are not designated but may have local recreational uses or those travelling along routes or at view which are considered moderately scenic.”</p> <p>Although this photomontage viewpoint is located in proximity (within 10m) to a designated scenic view, on-site appraisal determined that, on balance, this viewpoint does not represent receptors of high sensitivity and due to limited pedestrian access and height of the walls on the existing Kildare Bridge it is unlikely that receptors will come to this location to appreciate the designated scenic views.</p>
Magnitude of Change (Definition, See Section 11.2.4)	Moderate: The change in the view may involve partial obstruction of existing view or partial change in character and composition of the baseline through the introduction of new elements or removal of existing elements. Likely to occur at locations where the development is partially visible over a moderate or medium extent, and which are not in close proximity to the development. Change may be readily noticeable but not substantially different in scale and character from the surroundings and wider setting.
Significance of Effect (Definition, See Section 11.2.4)	<p>Medium x Moderate = Moderate/Minor = Moderate (EPA, 2022)</p> <p>An effect that alters the character of the environment in a manner consistent with existing and emerging baseline trends</p>
Mitigation Factors	<ul style="list-style-type: none"> ➤ The designated scenic views are from the existing Kildare Bridge and are oriented directly east and directly west along the Rye Water, in a direction perpendicular to the Proposed Development. Therefore, the Proposed Development is not the focus of the designated scenic view from this location and receptors will only have this view (shown in the photomontage) momentarily as they walk or drive across the existing Kildare Bridge. ➤ Whilst nice views of the Rye Water can be seen from above the wall on the existing Kildare Bridge (presented in Plate 11-35 & Plate 11-36 of Chapter 11), a pedestrian (receptor) walking across the bridge (or within a car driving past) would struggle to experience these scenic views due to the height of the stone walls on the bridge which have been constructed higher than average human eye height. Unless a receptor is either very tall or within an elevated vehicle these scenic views cannot be experienced. ➤ The proposed Kildare Bridge works and pedestrian and cycleway will enhance the accessibility of the designated scenic views (RW-4) available to the west ➤ As demonstrated by images within Chapter 11 (Plate 11-37, Plate 11-38), tall and dense vegetation will provide visual screening along much of the R157 during summer months when existing hedges and deciduous trees are full of foliage. The existing roadside screening, as well as

Viewpoint 07 – Kildare Bridge	
	<p>proposed planting as part of the landscape plan will restrict visibility and mitigate visual effects from this viewpoint location.</p> <p>➤ The Proposed Development is sited in a location zoned for its purpose; Site B Healthcare Facilities is sited in lands zoned for 'G1 – Community Infrastructure'.</p>
Residual Effect (incl. mitigating factors)	<p>Slight (EPA, 2022)</p> <p>An effect which causes noticeable changes in the character of the environment without affecting sensitivities</p>

Viewpoint 08 – Lyreen Housing Estate	
Viewpoint Description and Details	<p>➤ View north-east from the Lyreen Housing Development in the townland of Maria villa.</p> <p>➤ This viewpoint is located adjacent to an area of recreational green space at the eastern extent of the Lyreen Housing Development.</p> <p>➤ The viewpoint is approximately 500 metres south-west of the proposed nursing home in Site B.</p> <p>➤ Field of View north-east</p> <p>➤ Grid Ref (ITM): E: 694,051, N: 738,522</p>
Visual Receptors and their sensitivity	Residential Receptors - The Lyreen Housing Estate – High/Medium Park users and Pedestrians along the River Lyreen – High/Medium
Description of 'Baseline VVM'	The baseline view shows a relatively long ranging view across the Rye Water Valley where the River Lyreen joins the Rye Water. Several small loughs which are part of the Lyreen angling centre are visible in the middle distance amongst bushes and riparian vegetation. The park and boundary fencing of the Lyreen Housing estate is seen in the foreground left of the image. An agricultural field which is the location of Site B is seen in the distance beyond the low-lying ground surrounding the water courses and waterbodies. Tall mature woodland is visible across the background of the view restricting longer ranging views of the wider landscape.
Proposed Photomontage Description	The proposed buildings of the Site B are visible in the background centre of the photomontage, they are enclosed in a backdrop of tall woodland. The proposed buildings of Site B (nursing home and PCC) comprise a wide horizontal extent of the view, however, they do not raise the height of the skyline and are neatly framed within the surrounding woodland. Surface elements of Site B are not discernible at this distance. Due to its siting on elevated ground beyond Site B, the Proposed Development at Site A is visible in the background centre-left of the Photomontage. The proposed five storey Office Block A is a prominent feature as its profile raises the skyline within the landscape. Lower elements of Site A will be obscured from view by intervening vegetation. Elevated ridgelines of housing infrastructure of Site C is just visible to the far left of the photomontage.

Viewpoint 08 – Lyreen Housing Estate	
	Cumulatively, all elements of the Proposed Development will alter the composition and character of this view, but will not detract value from its more aesthetic attributes such as the riparian landscape visible in the middle distance.
Cumulative Effects	<p>The proposed Site C SHD is located beyond the Lyreen Housing estate located to the left (west-north-west) of the photomontage. It will have very limited visibility from this location.</p> <p>There will be combined successional visibility of the Proposed Development with several other SHD developments located to the south (Proposed Moyglare Road – ABP 314337) and east (Permitted Dunboyne Road ABP 310865-21) of this viewpoint. These developments will be partially visible in opposing fields of view to the Proposed Development. They will add to the existing residential and suburban character of the landscape immediately east and west of this viewpoint. These developments and the Proposed Development will have a cumulative effect aligning with the current trend of urbanisation in this area. Considering the separation distances and screening elements obscuring full intervisibility between the Proposed Development and these two developments, significant cumulative visual effects are not likely to occur.</p>
Sensitivity of Visual Receptor(s) <i>(Definition, See Section 11.2.4)</i>	<p>Although residential receptors are generally deemed to be of high sensitivity, the separation distance and orientation of houses are such that primary residential visual amenity is not directed towards the Proposed Development. On balance, sensitivity of this viewpoint is deemed to be of medium sensitivity.</p> <p>“Medium: Includes viewers who may have some susceptibility to a change in view. Viewers such as residents in medium proximity but who do not have views focused in the direction of the Proposed Development or whose views are not of a particularly scenic quality; those from views which are not designated but may have local recreational uses or those travelling along routes or at view which are considered moderately scenic.”</p>
Magnitude of Change <i>(Definition, See Section 11.2.4)</i>	<p>“Moderate: The change in the view may involve partial obstruction of existing view or partial change in character and composition of the baseline through the introduction of new elements or removal of existing elements. Likely to occur at locations where the development is partially visible over a moderate or medium extent, and which are not in close proximity to the development. Change may be readily noticeable but not substantially different in scale and character from the surroundings and wider setting.”</p>
Significance of Effect <i>(Definition, See Section 11.2.4)</i>	<p>Medium x Moderate = Moderate/Minor = Moderate (EPA, 2022)</p> <p>An effect that alters the character of the environment in a manner consistent with existing and emerging baseline trends</p>
Mitigation Factors	<ul style="list-style-type: none"> ➤ The woodland surrounding the Proposed Development and proposed planting at Site B effectively absorb the Proposed Development within the landscape and it does not obstruct views of aesthetic landscape features such as the loughs visible in the middle distance. ➤ In order to capture a completely unobstructed view of the Proposed Development from this perspective, the photomontage was captured outside of the Lyreen Housing estate boundary (seen to the left of the

Viewpoint 08 – Lyreen Housing Estate	
	<p>photomontage) Visual receptors in the park would therefore have more limited visibility of the Proposed Development than is shown in the photomontage.</p> <ul style="list-style-type: none"> ➤ Orientation of housing in the development (left of the photomontage) is such that most primary residential visual amenity is directed to the south-east and north-west, therefore, not directly focussed in the direction of the Proposed Development reducing the visual impact upon residential receptors. ➤ Visual effects are mitigated by distance and appropriate siting of the various Proposed Development elements within the subject lands aligns with the zoning strategy detailed in the Maynooth Environs Written Statement (2021-2027).
Residual Effect (incl. mitigating factors)	<p>Moderate (EPA, 2022)</p> <p>An effect that alters the character of the environment in a manner consistent with existing and emerging baseline trends</p>

Viewpoint 09A – View Focused on Site B from Mogaddy House & Moygaddy Castle Ruins	
Viewpoint Description and Details	<ul style="list-style-type: none"> View south-south-east towards Site B from the L2214-3 Local Road in proximity to Moygaddy House and Moygaddy Castle Ruins. The viewpoint is located within the EIAR Study Boundary, approximately 295 metres north of the proposed nursing home in Site B at its closest point. Field of View: south-south-east Grid Ref (ITM): E: 694,461; N: 739,171
Visual Receptors and their sensitivity	L2214-3 Local Road - Low Nearby Moygaddy Castle Ruins (Cultural Heritage Receptor) – Medium
Description of 'Baseline VVM'	An open view across a flat field of agricultural grassland. The field boundary comprising mature trees and hedges are visible in the middle distance, they partially restrict long ranging views towards distant hills just visible in the background of the view. The pinnacle of an obelisk of Conolly's Folly (located in the townland of Barrogstown West) is just discernible above the treeline in the background left of the baseline image.
Proposed Photomontage Description	The proposed Healthcare Zone is visible from this viewpoint beyond the distant treeline; however, it is substantially screened from view by the intervening vegetation. The upper storeys of the proposed PCC and nursing home buildings are visible amongst the treetops across the centre of the photomontage. The ground floor and surface elements are obscured from view by the vegetation. The proposed PCC building slightly obscures longer ranging views and the lower section of the obelisk at Conollys Folly. The Proposed Development comprises a relatively wide horizontal extent of the view, however, as a whole it is a minor addition to the background of the view and does not fundamentally change the character of the landscape from this viewpoint.
Cumulative Effects	From this viewpoint location the Proposed Development at Site A will not be visible due to the dense woodland to the north of the Local Road – east of Moygaddy House. Site C is located to the west of this viewpoint location and is not visible in the field of view presented in the photomontage. Photomontage 9B was captured from the same location and shows the view west focussed to the west towards Site C where various infrastructure elements of the proposed housing development will be visible beyond a distant treeline, as well as landscaping proposals around Moygaddy castle ruins and the MOOR.
Sensitivity of Visual Receptor(s) (Definition, See Section 11.2.4)	<p>The rural agricultural landscape view has some aesthetic value. Also, as Moygaddy Castle Ruins are located in proximity to this viewpoint and has local cultural heritage value. However, as there is currently limited public access to the ruins it is only seen by the public from the Local Road and in essence, the only visual receptors are the local road users. On balance this viewpoint is on balance deemed to be of Medium sensitivity.</p> <p>“Medium: Includes viewers who may have some susceptibility to a change in view. Viewers such as residents in medium proximity but who do not have views focused in the direction of the Proposed Development or whose views are not of a particularly scenic quality; those from views which are not designated but may have local recreational uses or those travelling along routes or at view which are considered moderately scenic.”</p>

Viewpoint 09A – View Focused on Site B from Mogaddy House & Moygaddy Castle Ruins	
Magnitude of Change (Definition, See Section 11.2.4)	“Slight: The proposals would be partially visible or visible at sufficient distance to be perceptible and result in a low level of change in the view and its composition and a low degree of contrast. The character of the view may be altered but will remain similar to the baseline existing situation. This change could be short term or of a short duration.”
Significance of Effect (Definition, See Section 11.2.4)	Medium x Slight = Minor = Slight (EPA, 2022) An effect which causes noticeable changes in the character of the environment without affecting its sensitivities
Mitigation Factors	<ul style="list-style-type: none"> ➤ Due to roadside vegetation screening, receptors will only have this view momentarily and the road is not oriented towards Site B. ➤ The Proposed Development is sited in a location zoned for its purpose; the proposed Healthcare Facilities (which is visible in the photomontage) is sited in lands zoned for ‘G1 – Community Infrastructure’ in the Maynooth Environs Written Statement (2021-2027). ➤ As demonstrated by images within Chapter 11 vegetation will be much denser during summer months when existing hedges and deciduous trees are full of foliage. In this regard, visibility of the Proposed Development will have some seasonal variation. It is likely that visibility of the proposed Healthcare Zone at Site B would have much more limited visibility from this viewpoint if the photomontage was captured from this location during the summer months.
Residual Effect (incl. mitigating factors)	Not Significant (EPA, 2022) An effect which causes noticeable changes in the character of the environment but without significant consequences.

Viewpoint 09B – View Focused on Site C from Moygaddy House & Moygaddy Castle Ruins	
Viewpoint Description and Details	<ul style="list-style-type: none"> > View focused west towards Site C and Moygaddy Castle Ruins from the L2214-3 Local Road adjacent to Moygaddy House. > The viewpoint is located within the EIAR Study Boundary. > Field of View: west-north-west > Grid Ref (ITM): E: 694,447; N: 739,187
Visual Receptors and their sensitivity	L2214-3 Local Road - Low Moygaddy Castle Ruins, a Cultural Heritage Receptor of Local Importance – Medium
Description of 'Baseline VVM'	A short distance view along the local road adjacent to Moygaddy House. The ruins of Moygaddy Castle are visible beyond a low stone wall lining the narrow road. Moygaddy Castle ruins are located within a small field of grassland enclosed by relatively dense woodland.
Proposed Photomontage Description	The Proposed MOOR (upgrades to the existing roadway in this location) is visible in the foreground of the photomontage. A new walking path tracks through the grasslands via Moygaddy Castle ruins to the proposed Scout Den Facility which is seen as a small single storey building within the field enclosure. The two upper storeys of Apartment Block B of the Site C infrastructure are visible above the treeline in the centre background of the photomontage. The addition of the apartment block and Scout Den facility alters the character of the view and slightly intrudes upon the wider setting of this landscape view. The Proposed Development does not obstruct views or alter the integrity of key sensitivities such as the immediate setting of the castle ruins within its field, enclosed by woodland.
Cumulative Effects	As shown in Viewpoint 9A, Site B will also be visible beyond a distant treeline to the south-east and will be a further addition to landscape views from this location.
Sensitivity of Visual Receptor(s) (Definition, See Section 11.2.4)	<p>The view of Moygaddy Castle Ruins has local cultural heritage value and some scenic value. However, as there is currently limited public access to the ruins it is only seen by the public from the Local Road and in essence, the only visual receptors are the local road users. On balance this viewpoint is deemed to be of Medium sensitivity.</p> <p>“Medium: Includes viewers who may have some susceptibility to a change in view. Viewers such as residents in medium proximity but who do not have views focused in the direction of the Proposed Development or whose views are not of a particularly scenic quality; those from views which are not designated but may have local recreational uses or those travelling along routes or at view which are considered moderately scenic.”</p>
Magnitude of Change (Definition, See Section 11.2.4)	“Moderate: The change in the view may involve partial obstruction of existing view or partial change in character and composition of the baseline through the introduction of new elements or removal of existing elements. Likely to occur at locations where the development is partially visible over a moderate or medium extent, and which are not in close proximity to the development. Change may be readily noticeable but not substantially different in scale and character from the surroundings and wider setting.”

Viewpoint 09B – View Focused on Site C from Mogaddy House & Moygaddy Castle Ruins	
Significance of Effect (Definition, See Section 11.2.4)	Medium x Moderate = Moderate/Minor = Moderate (EPA, 2022) An effect that alters the character of the environment in a manner consistent with existing and emerging baseline trends
Mitigation Factors	<ul style="list-style-type: none"> ➤ The Proposed Development infrastructure – (Site C- visible in the photomontage) is appropriately sited, aligned with the land zoning in the Maynooth Environs Written Statement (2021-2027). Proposed housing infrastructure is visible within lands zoned as ‘A2 – New Residential’ and the proposed Scout Den Facility and landscaped pathways within lands zoned as ‘H1 Amenity’ which include for development such as “Cycleways / Greenways / Trail Development, Land & Water Based Recreational Activities Open Space, Cultural Activities”. ➤ Provision of safe public rights of way included in the landscape plan, as well as the cycleway and pedestrian route along the MOOR will enhance the accessibility of Moygaddy Castle ruins to the general public and a variety of visual receptors beyond regular commuter traffic along the local road.
Residual Effect (incl. mitigating factors)	Moderate (EPA, 2022) An effect that alters the character of the environment in a manner consistent with existing and emerging baseline trends

Viewpoint 10 – Carton Demesne	
Viewpoint Description and Details	<ul style="list-style-type: none"> View north-west towards Site B from Carton Demesne. The viewpoint is located on a popular walking path (Extension of carton Avenue or ‘Lime Walk’) through Carton House Golf Course. Field of View: north-north-west Grid Ref (ITM): E: 694,945; N: 738,366
Visual Receptors and their sensitivity	Carton House Demesne (Landscape Receptor) - High Carton Avenue (Lime Walk) Walking Route – High Carton House Golf Course – Low/Medium
Description of ‘Baseline VVM’	The baseline image shows a relatively short-range view across the fairway and green of Carton House Golf Course towards flat marshy lands around the Rye Water which is located at lower elevation in the middle distance. The landscape is enclosed by mature woodland and hedgerows. There is a narrow corridor of visibility through the trees around the existing Kildare Bridge where the agricultural field of Site B is visible in the background of the image.
Proposed Photomontage Description	The elevated profile of the proposed nursing home (Site B) and a row of housing from Site C are just visible beyond the trees in the background of the photomontage. Most of the Proposed Development is substantially screened from view by the intervening woodland. Kildare Bridge, Site A, The MOOR and Moyglare Bridge are not visible from this location. Due to the set back distance and screening, the Proposed Development is a very small addition to the background of the view and has a very minor alteration to the character of this view.
Cumulative Effects	It is likely that there will be some in-combination visibility of the Proposed Development with the permitted Dunboyne Road SHD which may be partially visible left of the view shown in the photomontage, beyond the distant treeline. The Proposed Development and this proposed SHD would add minor visibility of built infrastructure to the landscape seen from within Carton Demesne, however, cumulative visual effects are not deemed to be significant.
Sensitivity of Visual Receptor(s) (Definition, See Section 11.2.4)	“High: Includes viewers at designated views or landscapes. Viewers such as residents in close proximity to the viewpoint who have primary views that will be in the direction of the development that may not necessarily be of a particularly scenic quality; viewers at well-known heritage or popular tourist or recreational areas, viewers along scenic or tourist routes.”
Magnitude of Change (Definition, See Section 11.2.4)	“Slight: The proposals would be partially visible or visible at sufficient distance to be perceptible and result in a low level of change in the view and its composition and a low degree of contrast. The character of the view may be altered but will remain similar to the baseline existing situation. This change could be short term or of a short duration.”
Significance of Effect (Definition, See Section 11.2.4)	High x Slight = Moderate/Minor = Moderate (EPA, 2022) An effect that alters the character of the environment in a manner consistent with existing and emerging baseline trends.
Mitigation Factors	<ul style="list-style-type: none"> This viewpoint is one of the only locations within Carton Demesne where the Proposed Development will be visible. The dense woodland

Viewpoint 10 – Carton Demesne	
	<p>located between the Proposed Development and Carton Demesne obscures the Proposed Development from view elsewhere within the vast majority of Carton Demesne. The Proposed Development will not have any impact on the setting of Carton House or designated scenic amenity along the Rye Water.</p> <ul style="list-style-type: none"> ➤ Receptors walking along Carton Avenue will only have views of the Proposed Development for a brief period as visibility will be greatly restricted to the east of this viewpoint location. ➤ The Proposed Development is not located within any particularly scenic parts of views within the demesne landscape. ➤ The Proposed Development is sited in a location zoned for its purpose the proposed Healthcare Zone (which is visible in the photomontage) is sited in lands zoned for 'G1 – Community Infrastructure' in the Maynooth Environs Written Statement (2021-2027). ➤ As demonstrated by images within Chapter 11, vegetation will be much denser during summer months when existing hedges and deciduous trees are full of foliage. In this regard, visibility of the Proposed Development will have some seasonal variation. It is likely that visibility of the proposed Healthcare Zone at Site B would have much more limited visibility from this viewpoint if the photomontage was captured from this location during the summer months.
Residual Effect (incl. mitigating factors)	<p>Slight (EPA, 2022)</p> <p>An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.</p>

Viewpoint 11 – Moygaddy Local Road T-Junction	
Viewpoint Description and Details	<ul style="list-style-type: none"> ➤ View south-west towards Site C from the T junction between the L6219, L2214 and the L2214-3 Local roads. ➤ The viewpoint is located within the EIAR Study Boundary. ➤ Field of View: South-west ➤ Grid Ref (ITM): E: 694,339; N: 739,258
Visual Receptors and their sensitivity	Local Road Users - Low
Description of 'Baseline VVM'	Beyond the road junction visible in the foreground, there is a medium distance view to the right along the L6219 local road which is lined by hedgerows and occasional deciduous trees. The centre of the view comprises a gateway into a field of agricultural grassland. Trees and bushes are seen to the left of the image adjacent to the roadside, this vegetation forms part of a tract of woodland either side of the Blackhall Little stream. These trees and a small V-shape valley act as a physical and visual buffer between the agricultural field seen in the centre of the view (site of the proposed housing infrastructure) and the field enclosure at Moygaddy Castle ruins, approximately 45 metres east of the viewpoint.
Proposed Photomontage Description	The Proposed SHD infrastructure of Site C is clearly visible in the centre and right of the photomontage. A four storey apartment block (Block B) is visible in the centre foreground and a streetscape of residential development lines the entirety of one side of the roadway to the right of the photomontage. The carriageway and cycle/pedestrian access of the MOOR is visible along the route of the existing roadway, until the road is re-aligned to the right (north-west) in the background right of the photomontage. The existing hedgerows along the southern side of the local road have been removed to enable the proposed cycleway and pedestrian access alongside the MOOR. Proposed tree planting along the roadside will soften the landscape and visual impact where these hedgerows have been removed. The woodland to the left of the photomontage will be retained. The Proposed Development has altered the character of the rural view to that of a semi-urban, residential setting.
Cumulative Effects	It is unlikely that the proposed Development at Site A, Site B, Kildare Bridge and Moyglare Bridge will be visible from this location. Road and bridge upgrades included as part of the MOOR will be visible to the east (left of the photomontage).
Sensitivity of Visual Receptor(s) (Definition, See Section 11.2.4)	"Low: Includes viewers engaged in activities where the focus is not on the landscape or view. These including those travelling along a busy route, viewers at work or engaged in sport not related to views or experience of the landscape."
Magnitude of Change (Definition, See Section 11.2.4)	"Substantial: Substantial change, where the proposals would result in large-scale, prominent or very prominent change, leading to substantial obstruction of existing view or complete change in character and composition of the baseline though removal of key elements or addition of uncharacteristic elements which may or may not be visually discordant. This includes viewpoints where the Proposed Development is fully or almost fully visible over a wide extent, at close proximity to the viewer. This change could be long term or of a long duration."

Viewpoint 11 – Moygaddy Local Road T-Junction	
Significance of Effect (Definition, See Section 11.2.4)	Low x Substantial = Moderate/Minor = Moderate (EPA, 2022) An effect that alters the character of the environment in a manner consistent with existing and emerging baseline trends
Mitigation Factors	<ul style="list-style-type: none"> ➤ The Proposed housing infrastructure is visible within lands zoned as 'A2 – New Residential' land zoning in the Maynooth Environs Written Statement (2021-2027). ➤ The woodland seen to the left of the image will not be removed, retaining the integrity of the of the Blackhall Little stream and its surrounds, as well as providing a visual buffer between the proposed housing infrastructure and the amenity area at Moygaddy Castle and Moygaddy House. ➤ The proposed Development does not obscure any long -ranging views of high scenic value.
Residual Effect (incl. mitigating factors)	Moderate (EPA, 2022) An effect that alters the character of the environment in a manner consistent with existing and emerging baseline trends

Viewpoint 12 – Residential Development South of the Rye Water	
Viewpoint Description and Details	<ul style="list-style-type: none"> View north towards Site C from a residential housing estate (Mariavilla/Moyglare Hall) south of the Rye Water. The viewpoint is located approximately 340 metres south of the ELAR Site Boundary at its closest point. Field of View: north Grid Ref (ITM): E: 694,447; N: 739,187
Visual Receptors and their sensitivity	Residential Receptors (medium distance) – High/Medium
Description of 'Baseline VVM'	The baseline image shows an open and medium-distance view across the Rye Water flood plain comprising grassland and wooded field boundaries. Beyond the walled enclosure of a residential housing development, the landform dips to the low elevation of the Rye Water River in the middle distance. A relatively flat field and dense treeline form the background of the view. Utility infrastructure such as telecommunications uprights and large overhead power line are visible throughout the view. The view is of a semi-urban, semi-rural character.
Proposed Photomontage Description	The proposed residential infrastructure of site C is visible as a linear array of development across the background of the view on the elevated lands beyond the Rye Water River. The ridgelines of the proposed residential infrastructure is vertically aligned with the existing treeline forming the background of the view, however, the profile of the Proposed Development slightly raises the skyline in the very centre of the photomontage. Although the Proposed Development only alters a small spatial extent of the view, it contributes an additional suburban influence to the landscape view.
Cumulative Effects	No visibility of Site A is anticipated from this viewpoint. There may be some limited visibility of Site B, but this will be mostly restricted by intervening woodland. And the housing developments
Sensitivity of Visual Receptor(s) (Definition, See Section 11.2.4)	<p>The residential receptors are approximately 390 metres from the nearest proposed residential unit of Site C and are deemed to be in moderate proximity and the view does not comprise any unique features or attributes of value.</p> <p>"Medium: Includes viewers who may have some susceptibility to a change in view. Viewers such as residents in medium proximity but who do not have views focused in the direction of the Proposed Development or whose views are not of a particularly scenic quality; those from views which are not designated but may have local recreational uses or those travelling along routes or at view which are considered moderately scenic."</p>
Magnitude of Change (Definition, See Section 11.2.4)	"Moderate: The change in the view may involve partial obstruction of existing view or partial change in character and composition of the baseline through the introduction of new elements or removal of existing elements. Likely to occur at locations where the development is partially visible over a moderate or medium extent, and which are not in close proximity to the development. Change may be readily noticeable but not substantially different in scale and character from the surroundings and wider setting."

Viewpoint 12 – Residential Development South of the Rye Water	
Significance of Effect (Definition, See Section 11.2.4)	Medium x Moderate = Moderate/Minor = Moderate (EPA, 2022) An effect that alters the character of the environment in a manner consistent with existing and emerging baseline trends
Mitigation Factors	<ul style="list-style-type: none"> ➤ The proposed housing infrastructure is visible within lands zoned as A2 – New Residential’ land zoning in the Maynooth Environs Written Statement (2021-2027) ➤ Once planting as part of the landscaping plan establishes over time, the planting at the southern perimeter of Site C will soften the visual impact of the Proposed Development from this perspective.
Residual Effect (incl. mitigating factors)	Moderate (EPA, 2022) An effect that alters the character of the environment in a manner consistent with existing and emerging baseline trends

Viewpoint 13 – Moyglare Hall Road	
Viewpoint Description and Details	<ul style="list-style-type: none"> View north-east towards Site C from Moyglare Hall Road, the viewpoint is located adjacent to Maynooth Community College Campus. The viewpoint is located just within the ELAR Study Area, on the southern perimeter of the Moyglare Bridge Application. Field of View: north-east Grid Ref (ITM): E: 693,551; N: 739,208
Visual Receptors and their sensitivity	<p>Traffic and Local Road Users – Low</p> <p>Maynooth College Campus – Low to Medium</p> <p>Residential Receptors in the vicinity – High/Medium</p>
Description of 'Baseline VVM'	<p>The foreground of the view shows a field of grassland in a relatively derelict state. Housing from a residential estate is visible to the right of the view. The landform dips to the low elevation of the Rye Water River in the middle distance, agricultural grassland and wooded field boundaries comprise the background of the view. A large overhead power line is a dominant man-made feature to the left of the view detracting quality from the rural landscape character seen in that direction.</p>
Proposed Photomontage Description	<p>The Proposed MOOR and Moyglare Bridge are substantial features visible throughout the foreground of the photomontage. The proposed carriageway, verge and cycle/pedestrian routes extending away from the viewpoint, across the Rye Water valley to Site C which is visible in the background of the photomontage. The proposed Duplex Block A is the most visually prominent building, seen adjacent to the MOOR in the centre-left background of the photomontage. At this distance and perspective, the proposed residential developments of Site C only slightly raise the skyline. The eastern extent of Site C is screened from view by vegetation in the intervening landscape.</p>
Cumulative Effects	<p>No visibility of Site A, Site B or Kildare Bridge is anticipated from this viewpoint.</p>
Sensitivity of Visual Receptor(s) (Definition, See Section 11.2.4)	<p>Human influences detract value from this view and it is not a landscape view of any particularly scenic value or uniqueness. Whilst there are residential receptors in proximity to this viewpoint, it is not deemed to be a viewpoint of high sensitivity. On balance, the viewpoint is deemed to be of Medium sensitivity.</p> <p>“Medium: Includes viewers who may have some susceptibility to a change in view. Viewers such as residents in medium proximity but who do not have views focused in the direction of the Proposed Development or whose views are not of a particularly scenic quality; those from views which are not designated but may have local recreational uses or those travelling along routes or at view which are considered moderately scenic.”</p>
Magnitude of Change (Definition, See Section 11.2.4)	<p>“Substantial: Substantial change, where the proposals would result in large-scale, prominent or very prominent change, leading to substantial obstruction of existing view or complete change in character and composition of the baseline though removal of key elements or addition of uncharacteristic elements which may or may not be visually discordant. This includes viewpoints where the Proposed Development is fully or almost</p>

Viewpoint 13 – Moyglare Hall Road	
	fully visible over a wide extent, at close proximity to the viewer. This change could be long term or of a long duration.”.
Significance of Effect (Definition, See Section 11.2.4)	Medium x Substantial = Moderate = Significant (EPA, 2022) An effect, which by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
Mitigation Factors	<ul style="list-style-type: none"> ➤ The MOOR and Moyglare Bridge are visible, following a route where it is envisaged for a transport road network to exist within local planning policy. The MOOR and Moyglare Bridge are sited within lands zoned as ‘Transport - Indicative Road Route’ in the land zoning (Sheet No: 26(a)) in the Maynooth Environs Written Statement (2021-2027). ➤ The photomontage imagery was captured from a viewpoint in the very centre of the Proposed MOOR/Moyglare Bridge route, accentuating the perceived magnitude of change from this location. In reality the visual effects of the Proposed Development is not by its character or magnitude adversely impacting any valuable landscape view or sensitive visual amenity. ➤ Immediately behind this viewpoint is the end of an existing road network, therefore, visual effects of the MOOR is best categorised as ‘An effect that alters the character of the environment in a manner consistent with existing and emerging baseline trends’ (See EPA Definition below). ➤ The proposed housing infrastructure is visible, sited within lands zoned as ‘A2 – New Residential’ land zoning in the Maynooth Environs Written Statement (2021-2027). ➤ The gable end of residential properties in proximity to the viewpoint is directed in the same direction as the view shown in the photomontage - to the north-east. Primary residential amenity of these residences is directed north-west, over/across the road of the Proposed MOOR and only a small spatial extent of the Proposed Development will be actually visible compared to the extent which is shown in the photomontage which shows a view to the north-east. ➤ Once planting as part of the landscaping plan establishes over time, the planting at the southern perimeter of Site C will soften the visual impact of the Proposed Development from this perspective.
Residual Effect (incl. mitigating factors)	Moderate (EPA, 2022) An effect that alters the character of the environment in a manner consistent with existing and emerging baseline trends

Viewpoint 14 – L1012 Local Road, Moyglare	
Viewpoint Description and Details	<ul style="list-style-type: none"> View south-west from an elevated vantage point on the L1012 Local Road in the townland of Moyglare. The viewpoint is located approximately 850 metres from the EIAR Study Boundary at its closest point. Field of View: north-north-west Grid Ref (ITM): E: 693,003; N: 739,904
Visual Receptors and their sensitivity	Local Road Users – Low Residential Receptors in the vicinity – High/Medium Moyglare Stud (in proximity to the west) – High/Medium
Description of 'Baseline VVM'	The baseline image shows a relatively open and long ranging view across an agricultural landscape of grassland and woodland. The northern fringes of Maynooth Town is visible, framed amongst the deciduous trees to the right of the view. Maynooth Community Campus is identifiable as a large white building to the far right. The Wicklow Mountains form the distant backdrop of the long-ranging landscape view.
Proposed Photomontage Description	Site A, Site B, and Kildare Bridge are not visible, they are screened from view by intervening landscape elements, primarily mature treelines, hedgerows and localised topography. Moyglare Bridge and the MOOR may be slightly visible from this viewpoint, but are difficult to distinguish at this distance.
Cumulative Effects	As demonstrated by the wireline image, no cumulative visual effects will occur.
Sensitivity of Visual Receptor(s) (Definition, See Section 11.2.4)	<p>The main receptor at this viewpoint is local traffic, however, there are some residential receptors located in close proximity to this viewpoint. Also, the open, rural landscape view has some scenic qualities. On balance, the sensitivity is deemed to be Medium.</p> <p>"Medium: Includes viewers who may have some susceptibility to a change in view. Viewers such as residents in medium proximity but who do not have views focused in the direction of the Proposed Development or whose views are not of a particularly scenic quality; those from views which are not designated but may have local recreational uses or those travelling along routes or at view which are considered moderately scenic."</p>
Magnitude of Change (Definition, See Section 11.2.4)	"Negligible: Any change would only be barely distinguishable from the status quo "do-nothing scenario" in the surroundings. The composition and character of the view would be substantially unaltered, approximating to little or no change."
Significance of Effect (Definition, See Section 11.2.4)	Medium x Negligible = Minor/Negligible = Not Significant (EPA, 2022) An effect which causes noticeable changes in the character of the environment but without significant consequences.
Mitigation Factors	<ul style="list-style-type: none"> The MOOR and Moyglare Bridge are visible, following a route where it is envisaged for a transport road network to exist within local planning policy. The MOOR and Moyglare Bridge are sited within lands zoned as 'Transport - Indicative Road Route' in the land zoning (Sheet No: 26(a)) in the Maynooth Environs Written Statement (2021-2027).

Viewpoint 14 – L1012 Local Road, Moyglare	
Residual Effect (incl. mitigating factors)	Not Significant (EPA, 2022) An effect which causes noticeable changes in the character of the environment but without significant consequences.

Viewpoint 15 – L6219 Local Road West	
Viewpoint Description and Details	<ul style="list-style-type: none"> ➤ View east-south-east towards Site C along the L6219 Local Road ➤ The viewpoint is located approximately 10 metres west of the EIAR Study Boundary. ➤ Field of View: north-north-west ➤ Grid Ref (ITM): E: 693,621; N: 739,358
Visual Receptors and their sensitivity	Local Road Users - Low Residential Receptors in Proximity to Proposed Development - High
Description of 'Baseline VVM'	The 'Baseline VVM' shows a short-distance view around a slight bend on the narrow local road. The road is enclosed on both sides by narrow hedgerows. A cluster of bushes and trees are visible to the left of the view. The skyline is broken by overhead power lines and a large pylon structure to the right of the view.
Proposed Photomontage Description	A small portion of the Proposed SHD infrastructure of Site C is visible at the end of the bend where the Proposed MOOR begins. A vast majority of Site C is screened from view behind the roadside hedgerows and other roadside vegetation. The loss of some hedgerows and addition of housing infrastructure slightly alters the character of the rural view to that of a semi-urban, semi-rural setting.
Cumulative Effects	Site A, Site B, Kildare Bridge and Moyglare Bridge will not be visible from this location and no cumulative visual effects will occur.
Sensitivity of Visual Receptor(s) (Definition, See Section 11.2.4)	<p>The main receptor at this viewpoint is local traffic. Some residential receptors are located in close proximity to this viewpoint, however they will have limited visibility of the Proposed Development due to the nature of vegetation screening in the area. On balance, the sensitivity is deemed to be Medium.</p> <p>"Medium: Includes viewers who may have some susceptibility to a change in view. Viewers such as residents in medium proximity but who do not have views focused in the direction of the Proposed Development or whose views are not of a particularly scenic quality; those from views which are not designated but may have local recreational uses or those travelling along routes or at view which are considered moderately scenic."</p>
Magnitude of Change (Definition, See Section 11.2.4)	"Moderate: The change in the view may involve partial obstruction of existing view or partial change in character and composition of the baseline through the introduction of new elements or removal of existing elements. Likely to occur at locations where the development is partially visible over a moderate or medium extent, and which are not in close proximity to the development. Change may be readily noticeable but not substantially different in scale and character from the surroundings and wider setting."
Significance of Effect (Definition, See Section 11.2.4)	Medium x Moderate = Moderate/Minor = Moderate (EPA, 2022) An effect that alters the character of the environment in a manner consistent with existing and emerging baseline trends
Mitigation Factors	<ul style="list-style-type: none"> ➤ Due to roadside vegetation, as well as the winding and undulating nature of the local road, there will be very limited visibility of the

Viewpoint 15 – L6219 Local Road West	
	<p>Proposed Development from much of the Local road to the west of this viewpoint.</p> <ul style="list-style-type: none"> ➤ The Proposed housing infrastructure is visible within lands zoned as 'A2 - New Residential' land zoning in the Maynooth Environs Written Statement (2021-2027). ➤ The Proposed Development does not obscure or intrude upon sensitive or scenic landscape views or valuable scenic amenity from this perspective.
Residual Effect (incl. mitigating factors)	<p>Slight (EPA, 2022)</p> <p>An effect which causes noticeable changes in the character of the environment without affecting its sensitivities</p>

