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 you 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 as 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
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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@mkoireland.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

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
Ireland, H91 VW84
+353 (0) 91 735611
www.mkoireland.ie

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
MKO
Tuam Road, Galway
Ireland, H91 VW84
+353 (0) 91 735611
www.mkoireland.ie

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-aghaigh 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

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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An Roinn Iompair
Department of Transport

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 Líosain, Baile Átha Cliath, D02 TR60
Leeson Lane, Dublin, D02 TR60

T +353 (0)1 604 1177
Jacquitraynor@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

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 tÚdarás Náisiúnta Forbartha Turasóireachta
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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 breath and scope of an EIAR is known as ‘scoping’. Guidance on this can be found in Section 3.2 of the EPA Guidelines.

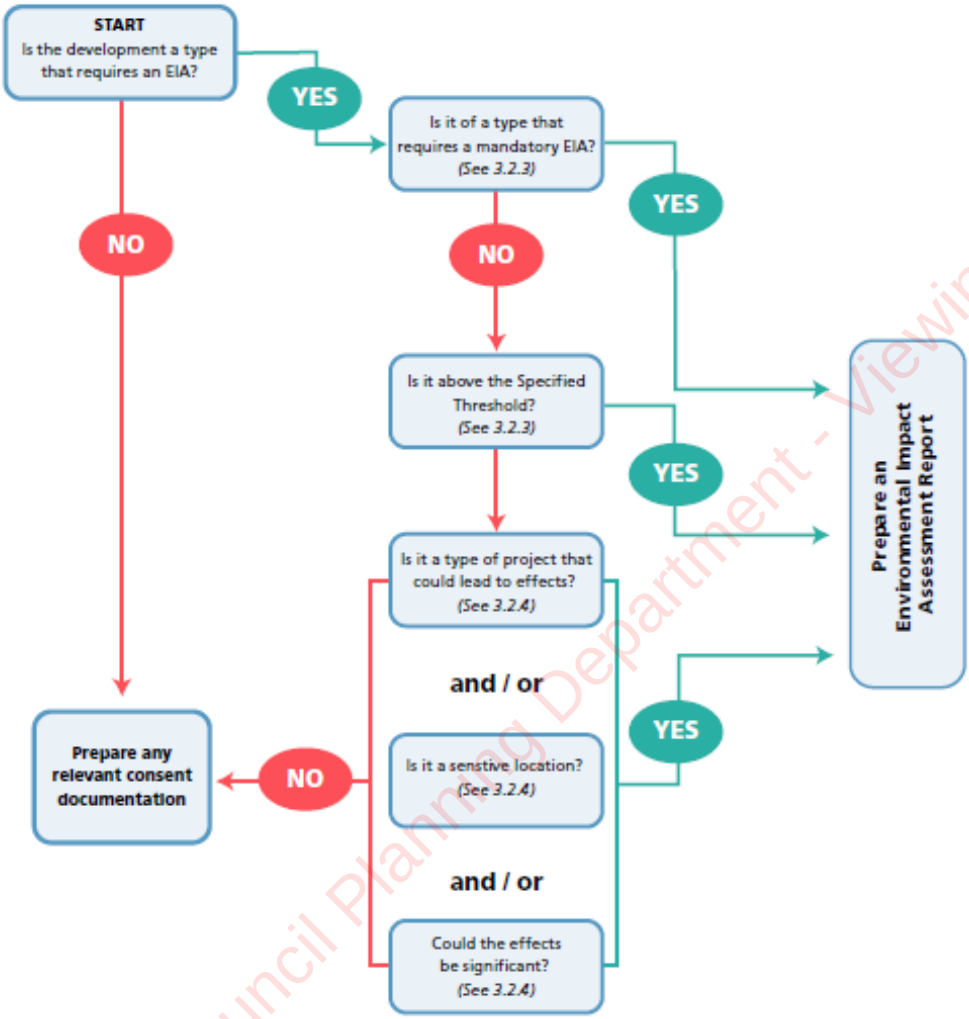
Screening

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 my 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 an 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 (RSESs) 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.

An Roinn Comhshaoil,
Aeráide agus Cumarsáide
Department of the Environment,
Climate and Communications

Geological Survey
Suirbhéireacht Gheolaíochta
Ireland | Éireann

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 20021, 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.

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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.

An Roinn Comhshaoil, Aeráide agus Cumarsáide
Department of the Environment, Climate and Communications

Geological Survey Suirbhéireacht Gheolaíochta Ireland | Éireann

Geological Survey Ireland's Publicly Available Datasets Relevant to Planning, EIA and SEA processes

following European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018
(S.I. No. 296 of 2018)

Geological Survey Ireland Programme	Dataset	Relevant EIA Topic	Coverage	Description / Notes	Link to Geological Survey Ireland map viewer
Geohazards	Landslide: National landslide database and landslide susceptibility map	Land & Soil/Climate/Landscape	National	Associated guidance documentation relating to the National Landslide Susceptibility Map is also available.	https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=b68cf1e4a9044a5981f950e9b9c5625c
Geohazards	Groundwater Flooding (Historic)	Water	Regional	Provide information of historic flooding, both surface water and groundwater. [A lack of flooding presented in any specific location of the map only indicates that a flood has not been detected. It does not indicate that a flood cannot occur in that location at present or in the future]	https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=848f83c85799436b808652f9c735b1cc
Geohazards	Groundwater Flooding (Predictive)	Water	Regional	Provides information on the probability of future karst groundwater flooding (where available). [The maps do not, and are not intended to, constitute advice. Professional or specialist advice should be sought before taking, or refraining from, any action on the basis of the flood maps]	https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=848f83c85799436b808652f9c735b1cc
Geohazards	Radon Map	Land & Soils/Air	National		http://www.epa.ie/radiation/radonmap/
Geoheritage	County Geological Sites as adopted by National Heritage Plan and listed in County Development Pla	Land & Soils/Landscape	Regional	All geological heritage sites identified by Geological Survey Ireland are categorised as CGS pending any further NHA designation by NPWS.	https://dcenr.maps.arcgis.com/apps/MapSeries/index.html?appid=a30af518e87a4c0ab2fbde2aaac3c228
Geological Mapping	Bedrock geology:	Land & Soils	National	1:100,000 scale and associated memoirs.	https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=de7012a99d2748ea9106e7ee1b6ab8d5&scale=0
Geological Mapping	Bedrock geology:	Land & Soils	Regional	1:50,000 scale	https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=de7012a99d2748ea9106e7ee1b6ab8d5&scale=0
Geological Mapping	Quaternary geology: Sediments	Land & Soils	National	1:50,000 scale	https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=de7012a99d2748ea9106e7ee1b6ab8d5&scale=0
Geological Mapping	Quaternary geology: Geomorphology	Land & Soils	National	1:50,000 scale	https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=de7012a99d2748ea9106e7ee1b6ab8d5&scale=0
Geological Mapping	Physiographic units:	Land & Soils	National	Broad-scale physical landscape units mapped at 1:100,000 scale in order to be represented as a cartographic digital map at 1:250,000 scale	https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=afa76a420fc54877843aca1bc075c62b
Geological Mapping	GeoUrban: Spatial geological data for the greater Dublin and Cork areas	Land & Soils	Regional	includes 3D models	https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=9768f4818b79416093b6b2212a850ce6&scale=0
Geological Mapping	Geotechnical database	Land & Soils	National	Digitised geotechnical and Site Investigation Reports and boreholes which can be accessed through online downloads	https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=a2718be1873d47a585a3f0415b4a724c
Goldmine	Historical data sets including geological memoirs and 6" to 1 mile geological mapping records	land & Soils/Water	National	available online	https://secure.dccae.gov.ie/goldmine/index.html
Groundwater & Geothermal	Groundwater resources (aquifers)	Water	National	Data limited to 1:100,000 scale; sites should be investigated at local scale	https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=7e8a202301594687ab14629a10b748ef
Groundwater & Geothermal	Groundwater recharge.	Water	National	Data limited to 1:40,000 scale; sites should be investigated at local scale; long term annual average recharge	https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=7e8a202301594687ab14629a10b748ef
Groundwater & Geothermal	Groundwater vulnerability.	Water	National	Data limited to 1:40,000 scale; sites should be investigated at local scale	https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=7e8a202301594687ab14629a10b748ef
Groundwater & Geothermal	Group scheme and public supply source protection areas.	Water	National	Not all PWS / GWS have SPZ / ZOC. Check with IW / coco / NFGWS for private supplies.	https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=7e8a202301594687ab14629a10b748ef
Groundwater & Geothermal	Groundwater Protection Schemes	Water	National	Data is limited to scale of 1:40,000. Data does not include all of the source protections areas	https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=7e8a202301594687ab14629a10b748ef
Groundwater & Geothermal	Catchment and WFD management units.	Water	National		https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=7e8a202301594687ab14629a10b748ef
Groundwater & Geothermal	karst specific data layers	water	National	For areas underlain by limestone, includes karst features, tracer test database; turlough water levels (gwlevel.ie).	https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=7e8a202301594687ab14629a10b748ef
Groundwater & Geothermal	Wells and Springs	Water	National	Not comprehensive, there may be unrecorded wells and springs	https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=7e8a202301594687ab14629a10b748ef
Groundwater & Geothermal	Groundwater body Descriptions	Water	National	Not exhaustive; only those in designated SACs; could be other GWDTEs; for more information contact NPWS / EPA / site investigations	https://www.gsi.ie/en-ie/programmes-and-projects/groundwater-and-geothermal-unit/activities/understanding-ireland-groundwater/Pages/Groundwater-bodies.aspx
Groundwater & Geothermal	Geothermal Suitability maps	land & Soils/Water	National	Also, Roadmap for a Policy and Regulatory Framework for Geothermal Energy, November 2020	https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=9ee46bee08de41278b90a991d60c0b9e
Marine & Coastal Unit	INFOMAR - Ireland's national marine mapping programme; providing key baseline data for Ireland's	Water	National		https://secure.dccae.gov.ie/GSI/INFOMAR_VIEWER/
Marine & Coastal Unit	CHERISH - Coastal change project (Climate, Heritage and Environments of Reefs, Islands, and Headla	Water	Regional		http://www.cherishproject.eu/en/
Marine & Coastal Unit	Coastal Vulnerability Index (CVI).	water /Land & Soils	Regional	Currently the project is being carried out on the east coast and will be rolled out nationally	https://www.gsi.ie/en-ie/programmes-and-projects/marine-and-coastal-unit/projects/Pages/Coastal-Vulnerability-Index.aspx
Minerals	Aggregate potential	Land & Soils/Material Assets	National	Consideration of mineral resources and potential resources as a material asset which should be explicitly recognised within the environmental assessment process	https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=ee8c4c285a49413aa6f1344416dc9956
Minerals	Active quarries	Land & Soils	National		https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=ee8c4c285a49413aa6f1344416dc9956
Minerals	Historic mines	Land & Soils/Cultural Heritage	National	Inventory and Risk Classification 2009. Environmental Protection Agency, Economic Minerals Division and Geological Survey Ireland (DECC).	https://gis.epa.ie/EPAMaps/default?easting=?&northing=?&lid=EPA:LEMA_Facilties_Extractive_Facilities https://www.epa.ie/enforcement/mines/
Tellus	Geochemical data: multi-element data for shallow soil, stream sediment and stream water	Land & Soils	Regional	A national mapping programme	https://dcenr.maps.arcgis.com/apps/MapSeries/index.html?appid=6304e122b733498b99642707ff72f754
Tellus	Airborne geophysical data including radiometrics, electromagnetics and magnetics	Land & Soils	Regional	A national mapping programme	https://dcenr.maps.arcgis.com/apps/MapSeries/index.html?appid=6304e122b733498b99642707ff72f754
Tellus	urban geochemistry mapping (Dublin SURGE project),	Land & Soils	Regional		https://dcenr.maps.arcgis.com/apps/MapSeries/index.html?appid=6304e122b733498b99642707ff72f754

Notes:

1. The maps and data listed above are available on the Geological Survey Ireland map viewer https://www.gsi.ie/en-ie/data-and-maps/Pages/default.aspx

2. Please read all disclaimers carefully when using Geological Survey Ireland data

3. Geological Survey Ireland and Irish Concrete Federation published guidelines for the treatment of geological heritage in the extractive industry in 2008.

Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive

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MKO Consultants
Tuam Rd
Galway
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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,

Elish O' Reilly

Principal Environmental Health Officer

Feidhmeannacht na Seirbhíse Sláinte
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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 Pleanala**

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 lifestage 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 implement 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 wellbeing[3].

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 rational 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 2013[4] and Retail Design Manual 2012 [5]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

_____

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 Ryeriver 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.

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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 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.

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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 Eireann
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

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

TII Bonneagar Iompair Éireann Transport Infrastructure Ireland
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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

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

MOBILITY MANAGEMENT PLAN

MOBILITY MANAGEMENT PLAN

MOYGADDY CASTLE SHD

Sky Castle Ltd
S665
26 August 2022

OCSC
O'CONNOR | SUTTON | CRONIN
Multidisciplinary
Consulting Engineers

MOBILITY MANAGEMENT PLAN

Moygaddy Castle SHD

Sky Castle Ltd
S665
26 August 2022

MOBILITY MANAGEMENT PLAN

MOYGADDY CASTLE SHD

OCSC

O'CONNOR | SUTTON | CRONIN

Multidisciplinary
Consulting Engineers

NOTICE

DOCUMENT CONTROL & HISTORY

OCSC Job No.: S665	Project Code	Originator	Zone Volume	Level	File Type	Role Type	Number	Status / Suitability Code	Revision
	S665	OCSC	1C	XX	RP	C	0005	S4	P07

Rev.	Status	Authors	Checked	Authorised	Issue Date
P07	S4	J.Tai	W.Marais	A.Horan	26.08.2022
P06	S4	J.Tai	W.Marais	A.Horan	19.08.2022
P05	S4	J.Tai	W.Marais	A.Horan	05.08.2022
P04	S4	S.McGivney	S.McGivney	A.Horan	07.12.2021
P03	S3	S.McGivney	S.McGivney	A.Horan	01.12.2021
P02	S3	S.McGivney	S.McGivney	A.Horan	15.10.2021
P01	S3	S.McGivney	S.McGivney	A.Horan	08.10.2021

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1 INTRODUCTION

O'Connor Sutton Cronin & Associates (OCSC) have been appointed by *Mobility Management Plan* to carry out the design of the civil engineering services associated with the proposed 360nr. unit residential and crèche development at Moygaddy, Co. Meath, which is located northeast of the town of Maynooth, Co. Kildare.

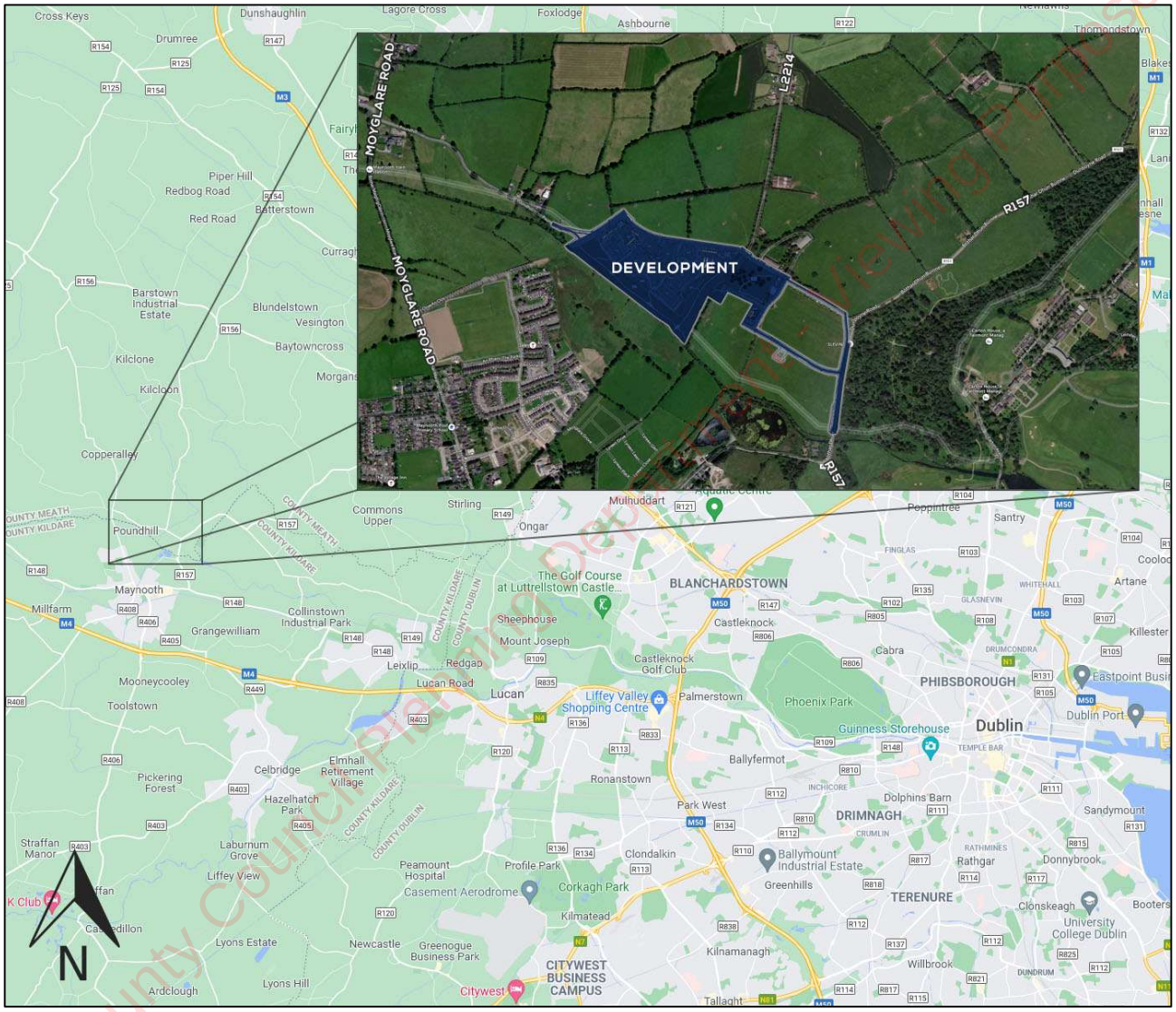

Figure 1: Site Location

The overall gross site area is 19.52 hectares gross site area in the townland of Moygaddy, Maynooth Environs, Co. Meath. The net developable area equates to 7.89 hectares which equates to a residential density of 45.6 units per hectare.

Planning Permission is sought be Sky Castle Ltd. for the development of a site which extends to 19.52 hectares gross site area in the townland of Moygaddy, Maynooth Environs, Co. Meath. The net developable area equates to 7.89 hectares which equates to a residential density of 45.6 units per hectare.

The proposed development will consist of the following:

1. Construction of 360 no. residential units comprising:
   (i) 196 no houses (including 19 no. 2 beds, 156 no. 3 beds and 21 no. 4 beds).
   (ii) 102 no. duplexes (including 51 no. 1 beds and 51 no. 2 beds) set out in 6 no. blocks.
   (iii) 62 no. apartments (including 26 no. 1 beds and 36 no. 2 beds) set out in 2 no. blocks.
2. Provision of a public park and playground with associated 42 no. car parking spaces adjacent to Moygaddy Castle and pedestrian and cyclist links along the River Rye. The overall public open space (including the High Amenity Lands) equates to 7.98 hectares.
3. Provision of private open spaces in the form of balconies and terraces is provided to all individual apartments and duplexes to all elevations.
4. Development of a two-storey creche facility (514 sqm), outdoor play area and associated parking of 29 no. spaces.
5. 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.
6. Provision of 4 no. bridge structures comprising:
   (i) an integral single span bridge at Moyglare Hall over the River Rye Water to connect with existing road infrastructure in County Kildare and associated floodplain works and embankments.
   (ii) a new pedestrian and cyclist bridge at Kildare Bridge which will link the proposed site with the existing road network in County Kildare.
   (iii) a new pedestrian and cycle bridge across Blackhall Little Stream on the L22143 adjacent to the existing unnamed bridge.
   (iv) a new pedestrian and cycle bridge over the Moyglare Stream linking the proposed residential site with the proposed Childcare Facility, Scout Den and Moygaddy Castle Public Park.

7. 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.
8. Proposed road improvement and realignment works including:
   (i) realignment of a section of the existing L6219 local road, which will entail the demolition of an existing section of the road which extends to circa 2,500 sqm.
   (ii) Provision of pedestrian and cycle improvement measures along the L6219 and L22143 which abuts the boundary of Moygaddy House which is a Protected Structure (RPS ref 91558).
   (iii) Provision of pedestrian and cycle improvement measures along the R157 which abuts the Carton Demense Wall which is a Protected Structure (RPS Ref 91556).
9. Provision of 2 no. vehicular and pedestrian accesses from the L6219 local road, 1 no. vehicular and pedestrian entrance from the L22143 and an additional vehicular and pedestrian access from the R157 to the Childcare and Scout Den facilities.
10. The proposed development will provide 283 no. of bicycle parking spaces, of which 200 no. are long term spaces in secure bicycle stores and 83 no. are short term visitor bicycle parking spaces. 12 no. bicycle spaces are provided for the creche and 12 no. bicycle spaces are provided for the Scout Den.
11. 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.
12. Provision of site landscaping, public lighting, bin stores, 3 no. ESB unit substations, site services and all associated site development works.
13. A Natura Impact Statement (NIS) and Environmental Impact Assessment Report (EIAR) has been included with this application.

The site is currently greenfield and used for agricultural purposes, and can be accessed from the L6219 Road which aligns the northern boundary of the subject site. Ground levels across the site typically fall gently from north to south, with a sharp decline at the southern and eastern boundaries, which align the River Rye Water and Moyglare Stream respectively.

The proposed works also include the provision of a section (c.500m) of the Maynooth Outer Orbital Route (MOOR) from the River Rye to the proposed residential lands. A small section of realignment works to the L6219 to tie into the new section of the MOOR and the upgrade of the existing L6219 from the residential lands to the creche and public parklands to the east that include pedestrian and cycle infrastructure links.

A separate application will be made to Kildare County Council for the provision of the section of MOOR south of the River Rye that ties into the already constructed section adjacent to Moyglare Hall that is within the Kildare County Council jurisdiction This overlap of applications will ensure unimpeded access to the proposed development lands for all modes of transport including vehicular and dedicated pedestrian and cyclists' facilities.

This plan is being prepared as a transportation demand management tool for the site and is aimed particularly at residents to encourage travel by sustainable modes of transport.

The MMP targets set out herein will take account of future potential improvements in sustainable transport infrastructure over and above those currently in operation.

2 CONTENT OF THE TRAVEL PLAN

The Meath County Development Plan 2021 -2027 considers that a Mobility Management Plan (MMP) is to provide for the achievement of acceptable modal shares for both public and private transport within an appropriate timeframe. In addition, MMP is considered a tool to reduce dependency on private car use by promotion of public transport, cycling, walking and provision of the physical infrastructure to support cycling/walking.

Hence, based on the best practice, this MMP is intended to meet the following requirement,

- Provide a comprehensive outline of public transport services available (proposed and existing);
- Promote alternative sustainable travel options i.e. walking and cycling;
- Prepare a statement on the nature and extent of facilities that will be considered for provision, and that would serve to encourage walking and cycling;
- Provide an outline of various schemes that may be appropriate to facilitate a change in travel patterns to and from work.

Based on the above, this report is a statement of the broad objectives in respect of Mobility Management for the site as a whole. The plan sets out targets and objectives along with the mechanisms, including both hard and soft measures, which could be put in place to support the modal shift.

However, at this stage, the plan is intended to be preliminary and will be revised accordingly once more detailed information regarding the final occupiers becomes available. Moving forward from this, the plan will continue to be regularly updated based on experience gained from its implementation and operation.

3 EXISTING PUBLIC TRANSPORT, CYCLE & PEDESTRIAN FACILITIES

The Moygaddy site is located within walking distance of the town centre of Maynooth that is well serviced by a number of existing public transport options. On completion of the first sections of the MOOR, residents of the new developments will be able to access Maynooth Town Centre by foot via Moyglare Road and the new sections of the MOOR.

EXISTING BUS SERVICES

The closest existing bus stop to the development site is a 28-minute walk (1.7km) from the proposed site near Maynooth University. Routes serving this location along the R148 include a number of Dublin Bus services including the 66, 66e, and 66x as well as a number of private operators including JJ Kavanagh & Sons route 139 that links Blanchardstown, Maynooth, Clane, Sallins and Naas General Hospital. A number of Bus Éireann Routes including routes 115 and 115c link Mullingar to Dublin City with stops in Maynooth.

The key routes serving the bus stop within a short walk of the development site are summarised in the table below.

Route	Description
Route 66	Merrion Square – Maynooth
Route 66e	Merrion Square – Maynooth
Route 66x	Maynooth – UCD Belfield
Route 139	Naas – Blanchardstown
Route 115	Mullingar – Kinnegad – Engield – Kilcock – Dublin
Route 115c	Mullingar – Kinnegad – Engield – Kilcock - Dublin

Table 1: Local Bus Services

The above services are operated by Dublin Bus, Bus Eireann and JJ Kavanagh & sons. More details of these bus services can be found at **www.dublinbus.ie**, ***www.buseireann.ie & jjkavanagh.ie*** **.**

It is expected that future residents can utilise the existing bus routes to travel from Maynooth to other local areas of interest and employment.

EXISTING RAIL SERVICES

The proposed site will be a 35-minute walk (2.7km) from Maynooth Train Station via the proposed MOOR and the Moyglare Road that provides convenient access along the Dublin Sligo train line that provides intermediate stops at Carrick on Shannon, Longford, Mullingar, Enfield, Leixlip, Clonsilla, Drumcondra.

The imminent DART+ Programme will also provide higher frequency connections and capacity to the Maynooth line connecting to Dublin Connolly & the proposed Spencer Dock stations.

More details of these rail services can be found at **www.irishrail.ie**

EXISTING CYCLE FACILITIES

Existing cycling infrastructure in Maynooth is currently confined to the town centre only. Within Maynooth Town Centre there is a mix of on and off-road cycle tracks, as outlined with Green Line in the figure below.

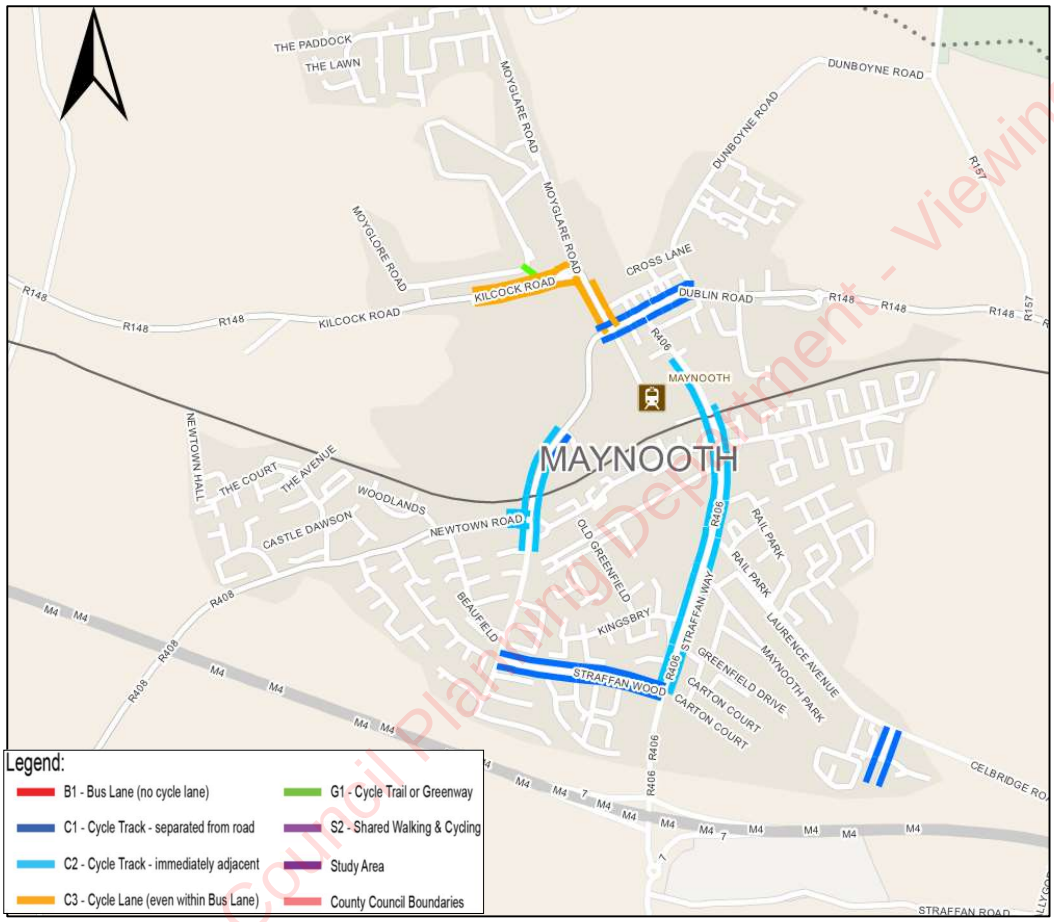

Figure 2: Existing Cycle Facilities Locally

It is also noted that the Maynooth Easter Relief Road (MEER) was granted planning in 2019 that will provide additional cycle and pedestrian infrastructure for 1.55 km along the eastern boundary of Maynooth. The location of the MEER can be seen in Figure 4 following.

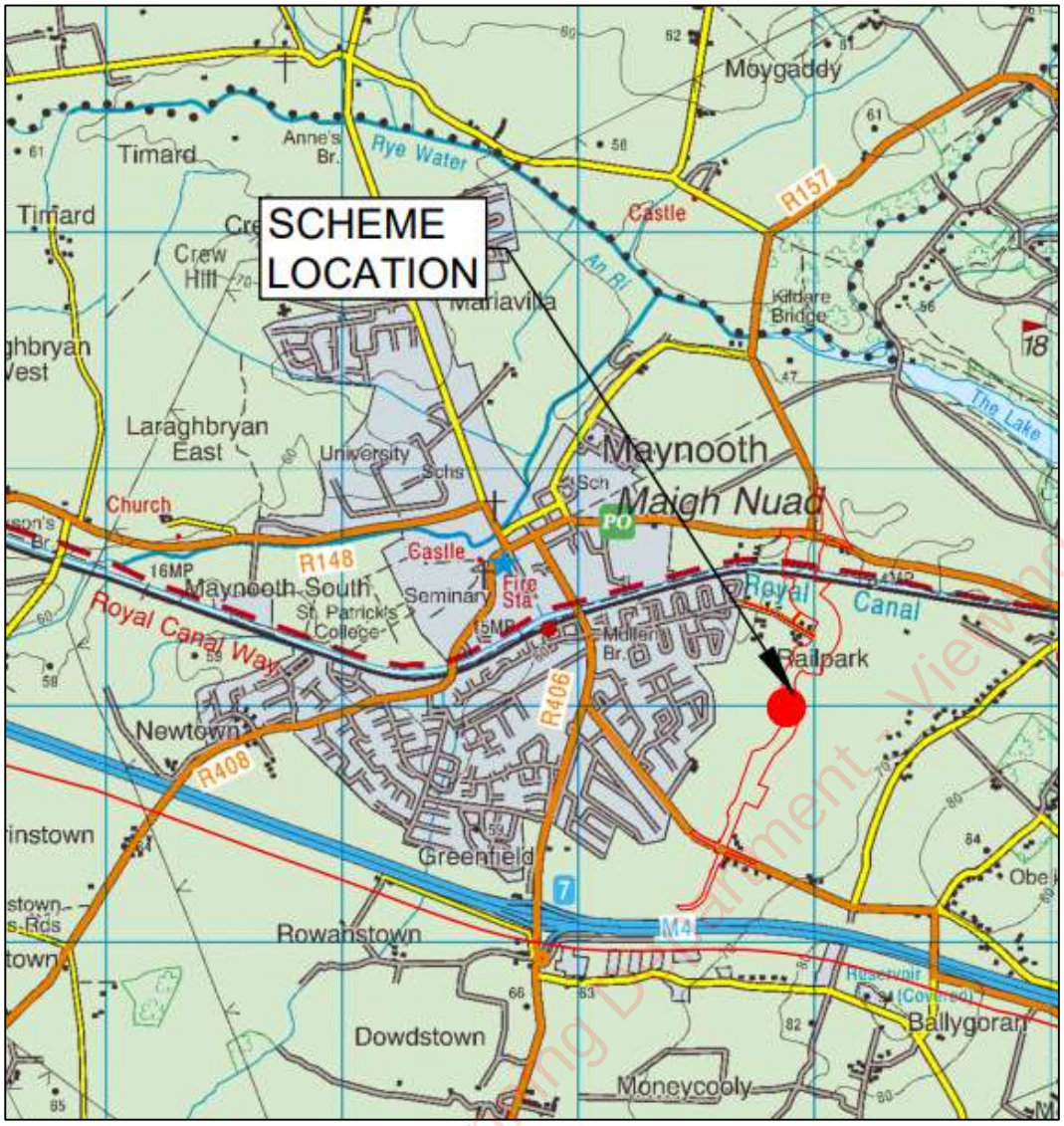

Figure 3: Maynooth Eastern Relief Road

Hence, it is expected that future residents will consider cycling as an attractive travel option to/from the development site.

Further details of improvement on the existing cycle facilities are covered in Chapter 4 of this report.

EXISTING PEDESTRIAN FACILITIES

The proposed development will be located within 1,600m or 20 minutes walking (Main Street will be a 1,800m or 23-minute walk) distance of Maynooth Town Centre via the

Moyglare Road & the new infrastructure provided. Within Maynooth Town Centre where there are a large number of areas of retail and employment. It is expected that future residents will consider travelling on foot from/to the proposed development to/from the Maynooth Town Centre.

In terms of pedestrian access, the existing footpath along the Moyglare Road that will connect the proposed development to Maynooth Town Centre is considered as good quality public access, which will enable future residents access to the nearby bus stops and town centre.

The existing pedestrian facilities along Moyglare Road can be seen in Figure 5 below.

Figure 4: Existing Pedestrian Facilities

4 FUTURE PUBLIC TRANSPORT, CYCLE & PEDESTRIAN FACILITIES

A number of future public transport schemes are planned for the local Maynooth area that will improve sustainable transport options locally and make them a more attractive travel option. These future transport options include:

BUSCONNECTS

Bus Connects aims to overhaul the current bus system in the Greater Dublin region by building a network of next-generation bus corridors on the busiest bus routes to make bus journeys faster, predictable and more reliable.

Relative to the development site, the most relevant is the proposed C – Spine route of the proposed New Dublin Area Bus Network which will travels from Maynooth to Dublin City Centre and on to Ringsend, this route will have a frequency of 30 mins. In addition, there will be an orbital route W8 peak time routes 325, and 326 servicing the vicinity of the proposed development site. The W8 orbital route will be a short 900m (12 minute) walk from the proposed development site. The proposed BusConnects services in the Maynooth area can be seen in Figure 5.

It is noted that the applicant has written to the NTA / Busconnects to provide outcome notification of the proposed development and a copy of the letter can be seen in Appendix A of this report.

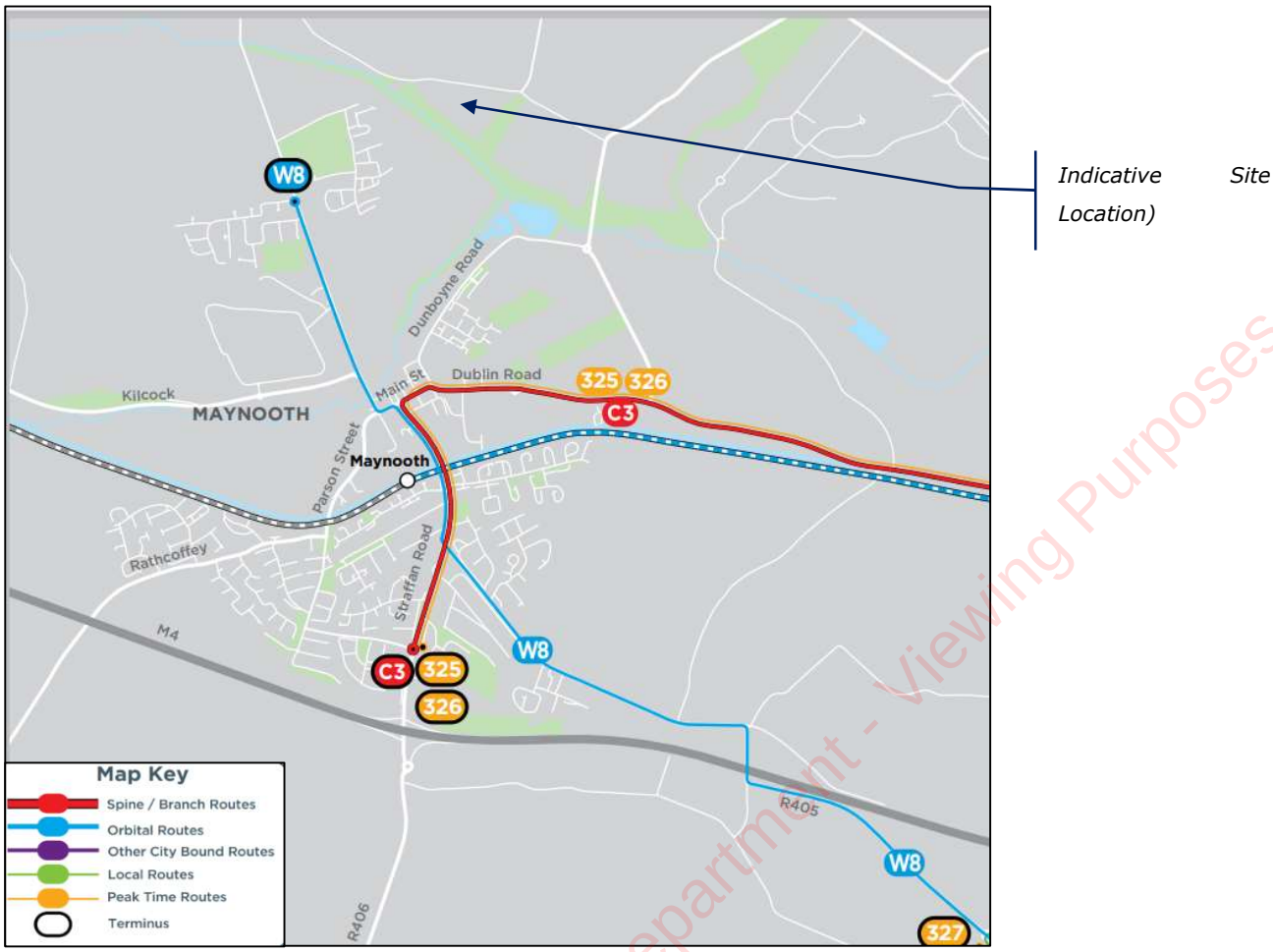

Figure 5: Proposed Bus Connects Services

It is envisaged on completion of the Maynooth Outer Orbital Route that additional public and private bus services will establish new routes in the area to serve the new developments. Details of these new routes are not yet available, however, it is the applicant's intention to liaise with these bodies to ensure that connectivity is enhanced as part of the masterplan strategy.

It is shown that these proposed service routes will significantly enhance the connection and reduce travel time between the proposed development and the main destinations such as Maynooth Town Centre and Dublin City Centre.

Further details of the improvement can be found at **www.BusConnects.ie**

DART+ PROGRAMME

DART+ is a programme of projects that aims to modernise and improve existing rail services in the Greater Dublin Area (GDA). It will provide a sustainable, electrified, reliable and more frequent rail service, improving capacity on rail corridors serving Dublin. It will see the DART network grow from its current 50km in length to over 150km. Bringing DART travel with all its benefits to new and existing communities.

It will promote multi-modal transit, and active transport, boost regional connectivity and make public transport the preferred option for more and more people. The DART+ Programme will deliver frequent, modern, electrified services within the Greater Dublin Area (GDA) and will improve connectivity to Regional towns and cities. The DART+ Programme will involve rail improvements from:

- DART+ West - Maynooth and M3 Parkway to the City Centre
- DART+ South West - Hazelhatch & Celbridge to the City Centre
- DART+ Coastal North - Drogheda to the City Centre
- DART+ Coastal South - Greystones to the City Centre
- DART+ Fleet - purchase of new train fleet to increase train services.

The DART+ Programme envisages the upgrade and enhancement of services on the Maynooth line that will deliver frequent, modern, electrified services to/from Dublin City Centre (Connolly and Spencer Dock) to:

- Maynooth and M3 Parkway;
- Hazelhatch and Celbridge;
- Drogheda; and
- Greystones

The DART+ Programme map can be seen in *Figure 6* overleaf.

Graphic showing schematic diagram of DART+ Programme

Figure 6: DART + Programme

As noted previously, Maynooth is currently serviced by an intercity rail service, with connecting services to Dublin City Centre. However, the DART+ Programme will provide for increased capacity and frequency of the Maynooth existing rail line. The DART+ Programme will increase the accessibility of the proposed development to sustainable modes of transport and will make this an attractive alternative to travel.

Irish Rail has confirmed that the Railway Order application for DART+ WEST is set to be lodged on 29th July 2022, seeking permission to extend the current network to the west of Maynooth, and to M3 Parkway. It is anticipated that construction will commence in 2024 and will enter into operation in 2029.

GDA CYCLE NETWORK PLAN

National Transport Authority (NTA) published the "*Greater Dublin Area Cycle Network Plan (GDA)*" which focuses on the enhancement and extension of the cycling infrastructure across Dublin. Further proposals for the local areas are outlined overleaf.

Further cycle proposals in the local area are shown following with the development site indicatively circled in red.

Figure 7: Proposed Cycle Network

Shown in Figure 7 is an extract from the GDA Cycle Network Plan, showing that a number of cycle facilities are proposed in close proximity to the development site. Under this cycle network proposal, it is proposed to build a primary/secondary cycle route (M1) that will connect the MOOR to the Maynooth Town Centre and ensure the development

can be accessed via convenient sustainable modes of transport. These new cycle routes will greatly improve the local cycle infrastructure and will make cycling a more attractive option.

Taking the above into consideration, the site is highly accessible by a wide variety of transportation options which will facilitate a modal shift away from private car travel.

5 CAR PARKING STRATEGY

In developing the car parking provision, consideration has been given to a wide variety of factors including the applicable standards, realistic demand and measures that can be put in place to manage and control parking at the SHD site. Each of these factors is discussed in further detail as follows:

CAR PARKING STANDARDS

The development is primarily located within the jurisdiction of MCC, however, the Maynooth Environs Local Area Plan contains an objective to liaise with KCC in the identification, design, reservation and delivery of the section of the Maynooth Outer Relief Road located within the administrative area of MCC. However, as this SHD application is located solely within the MCC jurisdiction, this report will only reference the parking standards of the MCC Development Plan.

Apartment Guidelines

The "Sustainable Urban Housing: Design Standards for New Apartments" (December 2020) defines three types of urban areas:

- **Central/Accessible Urban** - In larger scale and higher density developments, comprising wholly of apartments in more central locations that are well served by public transport, the default policy is for car parking provision to be minimised, substantially reduced or wholly eliminated in certain circumstances (15 minutes walk of city centre/employment location, 10 minutes of rail, 5 minutes of high-frequency bus services (10 min peak hour frequency);
- **Intermediate Urban Locations** - suburban/urban locations served by public transport or close to town centres or employment areas and particularly for housing schemes with more than 45 dwellings per hectare net (18 per acre), planning authorities must consider a reduced overall car parking standard and apply an appropriate maximum car parking standard;

- **Peripheral/Less Accessible Urban Locations** - one car parking space per unit, together with an element of visitor parking, such as one space for every 3-4 apartments, should generally be required.

As this development is approximately 1.5 km north of the town of Maynooth, Co. Kildare, it can be considered a Peripheral and/or Less Accessible Urban Location. This results in a requirement of one car parking space per unit, together with an element of visitor parking such as one space for every 3-4 apartments.

Meath County Development Plan

The latest *Meath County Development Plan* 2021 – 2027 plan was adopted on 22 September 2021 and came into effect on 3 November 2021.

The *MCC County Development Plan 2021 – 2027,* Section 9 – Parking Standards, Table 11.2, notes the following car parking requirements:

the County requires 2 spaces per flat or apartment and conventional dwellings, and 1 visitor space per 4 apartments. It is noted that reduced car parking requirements are available for developments adjacent to existing and future rail stations, and there are minimum requirements in peripheral/or less accessible urban locations, as per the "Sustainable Urban Housing: Design Standards for New Apartments" (December 2020) referenced above.

Furthermore, for the other parts of the development, the following is required as per the Development Plan:

- Creche – 1 space per 5 children, or 1 per employee & set-down
- Scout Den – 1 space per employee/Scout Leader

CAR PARKING PROVISION

It is proposed for the house-type units to provide parking in line with the local guidance as set out in the Development Plan, and for the apartment/duplex type units it is proposed to provide parking in line with national guidance as set out in the Apartment Guidelines. The following table shows the details of the development, as well as the provided car parking spaces:

Unit Type	Provision (spaces per unit)	Number of Units	Number of Spaces	Percentage EV Charging Points
Apartments & Duplexes	1.25	164	207	5% (10)
2-Bedroom Houses	1.5	19	29	-
3- & 4- Bedroom Houses	2	177	354	-
Total	**-**	**360**	**590**	**10**

Table 2: Car Parking Provision - Residential

The comparison of the provided car parking and the requirements of the various documents mentioned earlier in this chapter is shown in the table below:

Unit Type	Provided	Apartment Guidelines	MCC Development Plan
Apartments & Duplexes	207	205	-
2-Bedroom Houses	29	-	38
3- & 4- Bedroom Houses	354	-	354
Total	**590**	**597**	

Table 3: Car Parking Comparison

From the above, the following conclusions can be drawn:

- In reference to the *Design Standards for New Apartments*, the required car parking spaces for apartments and duplexes are 164 for residents and 41 for visitors. The development provides for 207 car parking spaces, which meets the requirements;

- As the *Design Standards for New Apartments* do not specify requirements for houses, the *MCC Development Plan* takes precedence in this regard. This states a requirement of 392 car parking spaces for housing. The development provides for 354 at a rate of 2 spaces per 3- & 4- Bedroom House, and 29 spaces at a rate of 1.5 spaces per 2-Bedroom House.

The provided parking is under the relevant guidance, i.e. it is in line with the guidelines for apartments & duplexes, as per the Apartment Guidelines, and in line with the guidelines for houses, as per the MCC Development Plan.

The provision of car parking for the creche is in line with the requirements set out in the Meath County Development Plan 2021-2027. The requirement as set out in the development plan for a creche is for 1 car parking space per employee & dedicated set down and 1 car parking space for 4 children & dedicated set down.

Based on the number of children and staff expected at the creche, it is proposed to provide 29 no. car parking spaces plus set down to service the creche. This would be in line with the development plan requirements and is expected to adequately meet the expected demand.

The other developments within the SHD for which car parking is provided is:

- Scout Den – 6 car parking spaces;
- Playground & Moygaddy Castle Public Park – 42 car parking spaces (Includes 18 no. additional spaces for future creche expansion).

This means that the development provides a total of 667 no. car parking spaces, with 10 EV charging points for apartments and duplexes. These EV charing points will be provided at Visitor/Universally Accessible spaces. Furthermore, all houses will be provided with EV charger connection points in the external ESB box units.

BICYCLE PARKING

In the interest of sustainable transport, extensive, high-quality cycle parking is proposed at the development. The Local Development Plan requires 1 cycle parking space per unit and 1 cycle parking space per 2 units for visitors. This equates to a total of 246 cycle parking spaces. The current allocation of cycle parking is 1 cycle parking space per unit, and 1 visitor space per 2 units, which totals 164 long-term, secure cycle parking spaces and 82 no. on-surface, short-term visitor cycle parking spaces. The current quantum of cycle parking satisfies the requirements of the Local Development Plan.

Bicycle parking for the crèche will be proposed in line with the Meath County Development Plan 2021-2027. The standard applicable to the creche is for a standard of 1 bicycle parking space per employee. The development provides 12 bicycle spaces as per the development plan.

Furthermore, a total of 12 no. bicycle spaces are provided for the Scout Den and Playground & Public Park respectively.

This means that the development as a whole provides for a total of 200 no. long-term and 83 no. short-term bicycle spaces.

6 OBJECTIVES OF THE TRAVEL PLAN

This MMP sets out targets and objectives along with the mechanisms, including both hard and soft measures, which could be put in place to support the modal shift of future residents.

At this stage, the plan is intended to be preliminary and will be revised accordingly once the development is occupied. Moving forward from this, the plan will continue to be regularly updated based on experience gained from its implementation and operation.

CAR TRAVEL & OCCUPANCY

It is an objective of this plan to maximise the number of people travelling by sustainable means and, where travel by private car does occur, maximise the number of people travelling as passengers.

BUS USAGE

As noted in Section 3, the existing service bus route is available for future residents to use as their daily commuters. It is an objective of this plan to increase awareness of these services and encourage their use as a viable and convenient alternative to private car travel where possible. It is also an objective to inform residents about any changes to these services and any new services that come online.

CYCLING & WALKING

There is a good quality pedestrian and cycling infrastructure proposed in the vicinity of the proposed development. As mentioned earlier, the scheme will have new cycle facilities which link the development site to further areas. It is an objective of this plan to promote cycling/walking as a viable means of transport and to facilitate their use wherever possible.

MODAL SPLIT

In order to establish preliminary modal split targets for the development, the 2016 Census data for the electoral division of Maynooth, where the development site locates was reviewed. This data has been used as the basis for establishing the following targets.

Mode	Modal Share
Walking	25%
Bicycle	5%
Public Transport	15%
Car Driver	38%
Car Passenger	12%
Work from Home	5%

Table 4: Preliminary Target Modal Split

Hence, the intention is that a detailed travel survey is planned to be carried out after 6 months once the development is occupied to facilitate a more accurate analysis of resident travel patterns at the development site.

7 SPECIFIC MEASURES

In order to achieve the objectives and modal split targets set out in *Section 5*, a number of specific measures are proposed to be put in place.

MANAGEMENT & COORDINATION

A Mobility Manager/Travel Coordinator is suggested to be appointed after the development is completed. The duties of the Mobility Manager will include inter alia:

- Conducting surveys at regular intervals once the development is completed and operational. These surveys will provide detailed and up-to-date information on travel habits which can be used to develop new strategies that encourage travel by alternate modes;
- Implementation of various schemes/plans aimed at encouraging the uptake of more sustainable means of travel;
- Acting as an information point;
- Negotiating with public transport companies and other service providers;
- Branding of the plan;
- Ongoing promotion and marketing of the plan through various mediums;
- Evaluation and adaptation of the plan in light of experience.

CAR SHARING

The appointed Mobility Manager will ensure that car sharing will be promoted throughout the development via schemes such as establishing a car sharing database. The residents will be able to avail of this service in order to get in contact with other people who are travelling to and from similar destinations with the aim of sharing the costs and increasing the number of people travelling as passengers.

BUS USAGE

The appointed Mobility Manager will encourage and facilitate the use of the numerous existing bus facilities operating in the local area and any future services.

Timetables and information on routes, ticket prices etc. will be kept on hand at all times for residents. The appointed Mobility Manager will also promote and distribute information on any special tickets available such as tax-saver tickets, integrated ticket systems etc. on an ongoing basis. All information will be updated on a regular basis for the residents.

The appointed Mobility Manager will also keep in contact with all bus service providers working in the area with the aim of improving/creating new services locally where possible. Furthermore, the possibility of having local service providers set up on-site at various times in order to promote their services and any special offers available will also be investigated.

CYCLE & PEDESTRIAN FACILITIES

The site Mobility Manager will continue to promote cycling through various schemes and promotions which may include:

- 'Bike to Work';
- Cycle safety training;
- Site visits from trained mechanics to check/repair resident bikes;
- Discounts on bikes and accessories from various stores;
- Provision of high visibility vests.

Similarly, walking will also be promoted through various schemes such as the Pedometer Challenge, as part of the Smarter Travel WorkPlace programme.

WELCOME PACK

The residents of the development could likely be provided with a simple Welcome Pack upon moving into the proposed development. The Welcome Pack will contain a high-quality map of the neighbourhood, showing cycling, walking and public transport routes to key local facilities, plus current timetables for local bus and rail services. A key role of the welcome pack will also be to raise awareness of the sustainable travel initiatives being implemented through the Travel Plan including:

- *Promotion of key services and facilities* – Full details of the key services and facilities provided by the travel plan will be included within the Welcome Pack;
- *Promote Cycling* – Full details of the local cycle network to be included within the Welcome Pack
- *The promotion of additional schemes* – There are a number of additional schemes which could be hugely beneficial with regard to encouraging travel by more sustainable means. These include, but are not limited to:
  - Bike Week, which includes a number of events designed to cater for all cyclists regardless of experience;
  - World Environment Day, which is an annual event aimed at educating people about environmental issues and positive actions that can be taken in that regard;
  - Car Free Day, which focuses on raising the awareness of urban dwellers with respect to nuisances caused by the use of private cars while also promoting the rights of pedestrians and cyclists and the need for improved public transport.

The Welcome Pack will also invite those persons wishing to raise specific transport-related matters to discuss them with the appointed Mobility Manager for consideration. The appointed Mobility Manager will also be able to provide personalised travel planning advice to residents if required.

USE OF TECHNOLOGY

Recent advancements in technology present a number of additional opportunities in relation to encouraging positive modal shift. As part of this MMP, residents at the

completed development will be informed of a variety of potentially useful tools including the following:

- *The NTA Journey Planner* – Available on the NTA website and as a downloadable app, the journey planner provides a comprehensive list of travel options available from any origin/destination point in the country. Most notably, this is not limited to a single mode of travel and includes routes which consider multiple modes and multiple public transport services while also providing details such as journey times and distances for each option;
- *Public Transport Providers* – Each of the major public transport providers, including Dublin Bus, Bus Éireann and Irish Rail, now have their own dedicated app that can be downloaded to a smartphone and/or tablet. These contain detailed information on all services offered including timetables and also allow for real time up-dates on changes or disruptions to services;
- *RealTime Ireland* – An application available for download to smartphones and tablets, this app provides real time arrival and departure listings for a range of public transport options from major rail stations to individual bus stops. This app also links with the aforementioned NTA Journey Planner to provide a compressive travel planning tool.

The above are just a few examples of the services available which would be of significant use in promoting more sustainable means of transport. The availability of such services will be promoted amongst residents alike on a regular basis and information on any new services that become available will also be provided.

8 SUMMARY

Overall, the location of the proposed development, along with the measures considered, will aim to reduce the number of private car users and encourages the residents to travel by public transport, by bike or by foot.

9 PHASING & MONITORING

A critical part of any MMP is ongoing monitoring. It is proposed that an initial evaluation of the operation of the plan will take place 6 months into its operation. The plan will be appropriately adjusted at that stage based on the results.

The MMP will be monitored and regularly reviewed on a minimum yearly basis with regular travel surveys being carried out. In general, the overall plan will be refined based on experience and consultations with the respective stakeholders.

10 VERIFICATION

This report was compiled and verified by:

Joshua Tai BE, MIEI

Civil Engineer

O'Connor Sutton Cronin & Associates

Appendix A **BUSCONNECTS SUBMISSION LETTER**

Bus Connects
National Transport Authority
Dún Scéine
Hardcourt Lane
Dublin 2
D02 WT20

15/11/2021

Ref: T-SMG

Project No. S665

30 YEARS
OCSC
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RE: Maynooth Transport Strategy (MTS)
Our Client; Sky Castle Limited
Maynooth Environs – Lands At Moygaddy, Co, Meath, Maynooth

Dear

We are writing to draw your attention to our client's submission to the Maynooth Transport Strategy (MTS) review initiated by Kildare County Council.

We enclose a copy of the submission to the MTS for your information.

We would like to draw your attention to the opportunity to expand the public transport network to include Bus Connects as part of the strategic Residential and Employment lead developments proposed on our client's landholding at Moygaddy Co. Meath which forms part of the Maynooth Environs.

We would welcome the opportunity to speak with you about this initiative and we look forward to your feedback in early course
Yours sincerely

Shane McGivney
Chartered Engineer
For O'Connor Sutton Cronin

CC. Ronan Barrett, Sky Castle Limited

cc. Meath County Council

cc. Kildare County Council

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APPENDIX 4-2

SITE LAYOUT PLANNING DRAWINGS

COORDINATES
IRISH GRID COORIDINATES: E= 293992, N= 239166
ITM COORDINATES: E= 693923, N= 739192

LANDS SITUATED IN CO. KILDARE

SITE LOCATION
SCALE: 1:2000

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NOT FOR CONSTRUCTION.
ALL LEVELS GIVEN ARE
RELATIVE TO ORDNANCE DATUM.
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Rev No.	Date	Revision Note	Drn by	Chkd by
P01	15/10/21	SUITABLE FOR INFORMATION	RM	MK
P02	01/12/21	SUITABLE FOR INFORMATION	RM	SMG
P03	07/12/21	SUITABLE FOR STAGE APPROVAL	RM	SMG
P04	11/08/22	FOR PLANNING	RM	WM

Rev No.	Date	Revision Note	Drn by	Chkd by

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Client: SKY CASTLE LTD
Project: MOYGADDY CASTLE SHD
Title: SITE LOCATION

Code	Originator	Zone	Level	Type	Role	Number	Status	Revision
S665	OCSC	1C	MH	DR	C	0100	S4	P04

Date: OCT '21 Scale: 1:2500@ A1 Drn by:RM Chkd by:MK Aprvd by:MK

DRAWINGS 0501 & 0504

DRAWINGS 0502 & 0505

DRAWINGS 0503 & 0506

POROUS ASPHALT TO BE PROVIDED IN ALL CAR PARKING. 300mm BASE COURSE TO BE PROVIDED. STONE TO BE IN ACCORDANCE WITH CL.505 OF TII SPECIFICATION FOR ROAD WORKS AND HAVE A MINIMUM POROSITY OF 30%

PROPOSED STORMTECH SC-740 ATTENUATION STORAGE TO BE PROVIDED. STORAGE TO BE PROVIDED FOR RAINFALL EVENTS UP TO AND INCLUDING 1 IN 100-YEAR RAINFALL EVENT INCLUDING 20% ALLOWANCE FOR CLIMATE CHANGE. 180m³ TEMPORARY STORAGE TO BE PROVIDED.

PROPOSED STORMTECH SC-740 OR SIMILAR APPROVED. ATTENUATION STORAGE TO BE PROVIDED. STORAGE TO BE PROVIDED FOR RAINFALL EVENTS UP TO AND INCLUDING 1 IN 100-YEAR RAINFALL EVENT INCLUDING 20% ALLOWANCE FOR CLIMATE CHANGE. 1188m³ TEMPORARY STORAGE TO BE PROVIDED.

PROPOSED ATTENUATION STORAGE TO BE PROVIDED. STORAGE TO BE PROVIDED FOR RAINFALL EVENTS UP TO AND INCLUDING 1 IN 100-YEAR RAINFALL EVENT INCLUDING 20% ALLOWANCE FOR CLIMATE CHANGE. 1819m³ TEMPORARY STORAGE TO BE PROVIDED.

PROPOSED OUTFALL TO RIVER RYEWATER

PERVIOUS PAVING TO BE PROVIDED IN ALL IN-CURTILAGE CAR PARKING. 300mm BASE COURSE TO BE PROVIDED. STONE TO BE IN ACCORDANCE WITH CL.505 OF TII SPECIFICATION FOR ROAD WORKS AND HAVE A MINIMUM POROSITY OF 30%

PROPOSED STORMTECH SC-740 OR SIMILAR APPROVED. ATTENUATION STORAGE TO BE PROVIDED. STORAGE TO BE PROVIDED FOR RAINFALL EVENTS UP TO AND INCLUDING 1 IN 100-YEAR RAINFALL EVENT INCLUDING 20% ALLOWANCE FOR CLIMATE CHANGE. 400m³ TEMPORARY STORAGE TO BE PROVIDED.

5m offset from pipe c/line

DESIGN ROUTE OF IW RISING MAIN (MAGENTA)

TWIN HDPE WASTEWATER RISING MAIN (100mm & 150mm), IN ACCORDANCE WITH IRISH WATER REQUIREMENTS AND CONNECTION AGREEMENT.
ROUTED ALONG EXISTING FOOTPATH / ROAD

NEW STRATEGIC WASTEWATER PUMPING STATION, TO SERVE THE MOYGADDY AREA. WWPS TO COMPRISE DUTY AND STANDBY PUMPS, AND IN ACCORDANCE WITH IRISH WATER REQUIREMENTS AND CONNECTION AGREEMENT.
REFER TO SPECIALIST DESIGN FOR CHAMBER AND PUMP DESIGN DETAILS. DUCTING AND POWER SUPPLY BY M&E DESIGNERS.

DRAWING 0520

5m offset from pipe c/line

DESIGN ROUTE OF IW RISING MAIN (MAGENTA)

DRAWING 0521

DRAWING 0522

MAYNOOTH MUNICIPAL WASTEWATER PUMPING STATION

TWIN HDPE WASTEWATER RISING MAIN (100mm & 150mm), IN ACCORDANCE WITH IRISH WATER REQUIREMENTS AND CONNECTION AGREEMENT.
ROUTED ALONG EXISTING FOOTPATH / ROAD

DRAWING 0523

LEGEND:

SITE BOUNDARY (CO. MEATH)	
SITE BOUNDARY UNDER SEPARATE APPLICATION	
WORKS WITHIN CO. KILDARE	
MASTER PLAN BOUNDARY	
TWIN HDPE RISING MAIN	
uPVC SN8 WASTEWATER DRAINAGE OR SIMILAR APPROVED	WW-?.??? Ømm
1200mmØ WASTEWATER DRAINAGE PRECAST CONCRETE MANHOLE	WW-??
uPVC SN8 WASTEWATER DRAINAGE SERVICE CONNECITON	WW-?.??? Ø150mm
600mm x 600mm WASTEWATER DRAINAGE INSPECTION CHAMBER	WW-??

LEGEND:

SITE BOUNDARY	
uPVC TWINWALL SURFACE WATER DRAINAGE OR SIMILAR APPROVED	SW-?.??? Ømm
1200mmØ SURFACE WATER DRAINAGE PRECAST CONCRETE MANHOLE	SW-??
uPVC TWINWALL PERFORATED SURFACE WATER DRAINAGE OR SIMILAR APPROVED	SW-?.??? Ømm
FILTER DRAIN	
SURFACE WATER ATTENUATION	
PERVIOUS PAVING	
POROUS ASPHALT	
KLARGESTER CLASS I "BYPASS NSBP NSBE / FULL RETENTION NSFP NSFA" FUEL SEPARATOR	

GENERAL NOTES:

1. ALL NOTED LEVELS ARE TO ORDNANCE DATUM, MALIN HEAD.
2. REFER TO ARCHITECT'S LAYOUT FOR ALL SET-OUT INFORMATION.
3. REFER TO ARCHITECT / LANDSCAPE ARCHITECT'S DESIGN DRAWINGS FOR DETAILS OF PROPOSED SURFACE FINISHES AND LANDSCAPING.
4. REFER TO ARCHITECT DRAWINGS FOR DETAILS OF PRIVATE DRAINAGE.
5. ALL SURFACE WATER DRAINAGE IS TO BE INSTALLED IN ACCORDANCE WITH THE GREATER DUBLIN REGION CODE OF PRACTICE FOR DRAINAGE WORKS, THE BUILDING REGULATIONS PART H AND THE SITE DEVELOPMENT SPECIFICATION.
6. ALL CAR PARK DRAINAGE IS TO BE INSTALLED IN ACCORDANCE WITH THE GREATER DUBLIN REGION CODE OF PRACTICE FOR DRAINAGE WORKS, THE BUILDING REGULATIONS PART H AND THE SITE DEVELOPMENT SPECIFICATION.
7. ALL WASTEWATER DRAINAGE IS TO BE INSTALLED IN ACCORDANCE WITH THE IRISH WATER CODE OF PRACTICE FOR WASTEWATER INFRASTRUCTURE (REVISION 2 - JULY 2020), THE BUILDING REGULATIONS PART H AND THE SITE DEVELOPMENT SPECIFICATION.
8. ALL DRAINAGE COVER LEVELS ARE TO BE COORDINATED WITH PROPOSED ROAD DESIGN LEVELS AND ARCHITECT/LANDSCAPE ARCHITECT'S PROPOSED FINISH LEVELS.
9. ALL BASEMENT CHAMBER COVERS TO BE DOUBLE SEALED, AND CLASSIFICATION D400 LOADING WHERE LOCATED IN VEHICULAR AREAS.
10. ALL CONNECTIONS TO NEW DRAINAGE NETWORKS ARE TO BE MADE AT AN ANGLE OF 90° OR IN THE DIRECTION OF FLOW.
11. REFER TO ARCHITECT AND M&E ENGINEERING DESIGN DRAWINGS FOR CONFIRMATION OF LOCATION AND SPECIFICATION OF FLOOR GULLIES.
12. REFER TO M&E ENGINEERING DESIGN FOR CONFIRMATION OF WASTE AND SANITARY POP-UP/OUTLET LOCATIONS.
13. THE CONTRACTOR IS TO VERIFY INVERT LEVEL AT PROPOSED CONNECTION TO EXISTING SEWERS, PRIOR TO ANY OTHER WORKS BEING CARRIED OUT, AND MAKE ANY DISCREPANCIES KNOWN TO THE ENGINEER.
14. THE CONTRACTOR IS RESPONSIBLE FOR CONFIRMATION OF PRESENCE ALL EXISTING UTILITIES, IF ANY, ALONG ROUTE OF PROPOSED DRAINAGE NETWORKS - BY INTRUSIVE INVESTIGATION OR EQUAL.
15. EXISTING PUBLIC SEWER TO BE JET CLEANED AND CCTV SURVEYED PRIOR TO, AND AFTER PROPOSED CONNECTIONS FROM NEW NETWORK.
16. ALL NEW DRAINAGE INFRASTRUCTURE TO BE JET CLEANED AND CCTV SURVEYED, WITH ANY NOTED DEFECTS REMEDIATED, ON COMPLETION OF WORKS, TO THE SATISFACTION OF THE LOCAL AUTHORITY.
17. WHERE MANHOLE COVERS ARE TO BE LOCATED IN SOFT LANDSCAPED/GRASS AREAS; TO ENSURE THAT MANHOLE COVERS ARE IDENTIFIABLE, ACCESSIBLE AND WILL NOT BECOME OVERGROWN, COVERS ARE TO BE SURROUNDED BY A CONCRETE PLINTH, 200MM ALL ROUND AND 100MM DEEP FORMED WITH C20/25 CONCRETE, 20MM AGGREGATE SIZE, BEDDED IN CLAUSE 804 MATERIAL.

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P01	15/10/21	SUITABLE FOR INFORMATION	RM	MK
P02	01/12/21	SUITABLE FOR INFORMATION	EH	MK
P03	07/12/22	SUITABLE FOR STAGE APPROVAL	RM	SMG
P04	04.08.22	SUITABLE FOR INFORMATION	EH	MK
P05	10.08.22	SUITABLE FOR INFORMATION	EH	MK
P06	16.08.22	SUITABLE FOR INFORMATION	ZB	MK

ENVIRONMENT ISO 14001:2015 NSAI Certified | QUALITY ISO 9001:2015 NSAI Certified | HEALTH & SAFETY ISO 45001:2018 NSAI Certified
bsi BIM Design & Construction Capital/Delivery ISO 19650-1 and -2 VERIFIED

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OCSC O'CONNOR | SUTTON | CRONIN
Multidisciplinary Consulting Engineers

Dublin | London | Belfast | Galway | Cork | Birmingham

Client: SKY CASTLE LTD.
Project: MOYGADDY CASTLE SHD

Title: PROPOSED DRAINAGE LAYOUT MASTERPLAN

Code	Originator	Zone	Level	Type	Role	Number	Status	Revision
S665	OCSC	1C	XX	DR	C	0500	S4	P06

Date: OCT'21 Scale: 1:1250@ A1 Drn by:RM Chkd by:MK Aprvd by:MK

APPENDIX 4-3

CONSTRUCTION AND ENVIRONMENTAL MANAGEMENT PLAN

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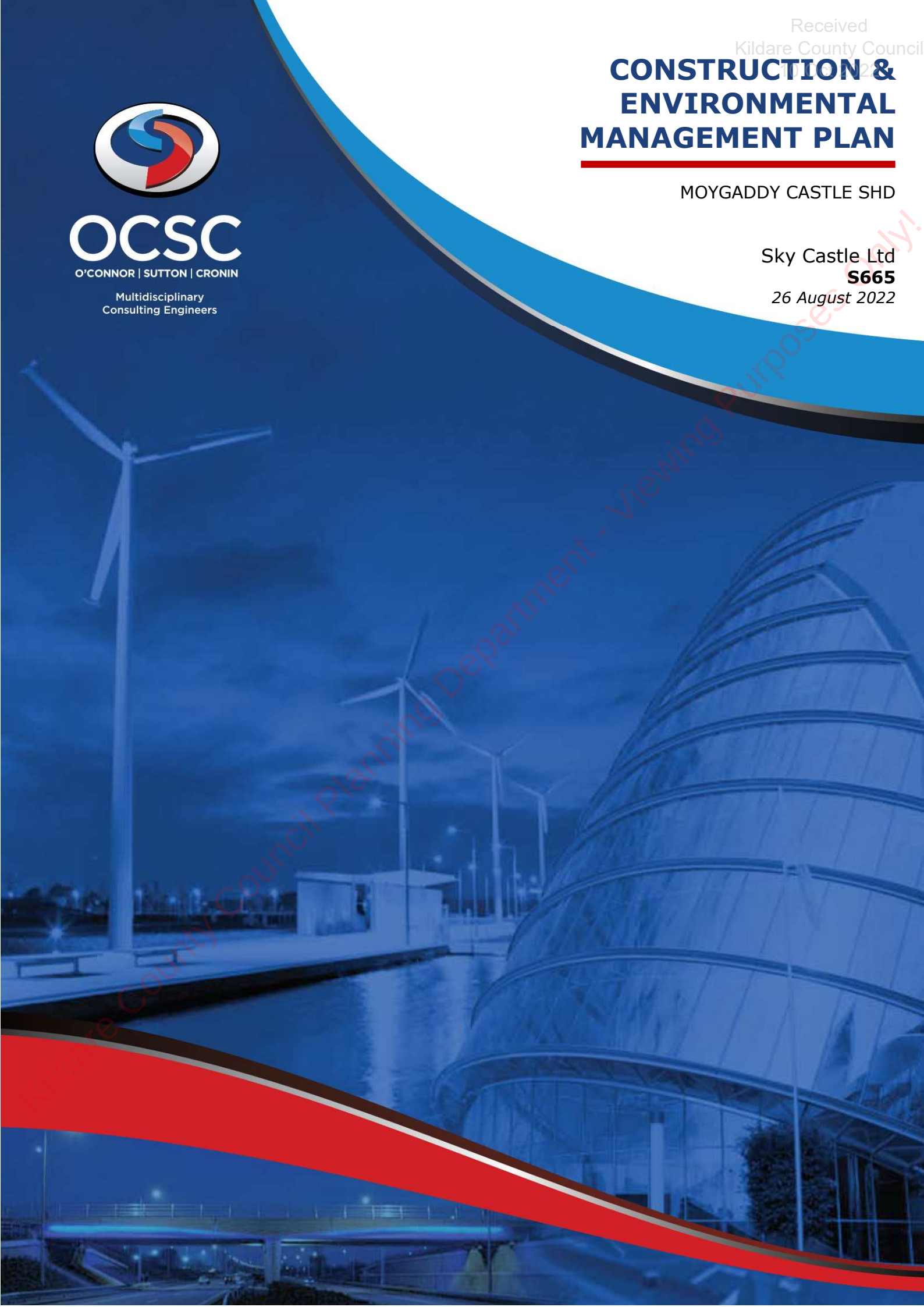
CONSTRUCTION & ENVIRONMENTAL MANAGEMENT PLAN

MOYGADDY CASTLE SHD

Sky Castle Ltd
S665
26 August 2022



CONSTRUCTION & ENVIRONMENTAL MANAGEMENT PLAN

Moygaddy Castle SHD

Sky Castle Ltd
S665
26 August 2022

CONSTRUCTION & ENVIRONMENTAL MANAGEMENT PLAN

MOYGADDY CASTLE SHD

NOTICE

DOCUMENT CONTROL & HISTORY

OCSC Job No.: S665	Project Code	Originator	Zone Volume	Level	File Type	Role Type	Number	Status / Suitability Code	Revision
	S665	OCSC	1C	XX	RP	C	0008	S4	P06

Rev.	Status	Authors	Checked	Authorised	Issue Date
P06	S4	WM	AH	AH	26.08.2022
P05	S4	WM	AH	AH	25.08.2022
P04	S4	WM	AH	AH	19.08.2022
P03	S4	WM	AH	AH	11.08.2022
P02	S4	WM	AH	AH	26.04.2022
P01	S4	WM	AH	AH	31.03.2022

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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 proposed 360nr. unit residential and crèche development 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, aligning with the county boundary to Co. Kildare, and is approximately 1.5km north of the town of Maynooth, Co. Kildare, as shown in Figure 1, and is immediately bound by:

- Agricultural lands, to the east;
- Agricultural lands, to the north;

- Agricultural lands to the west; and
- River Rye Water to the south.

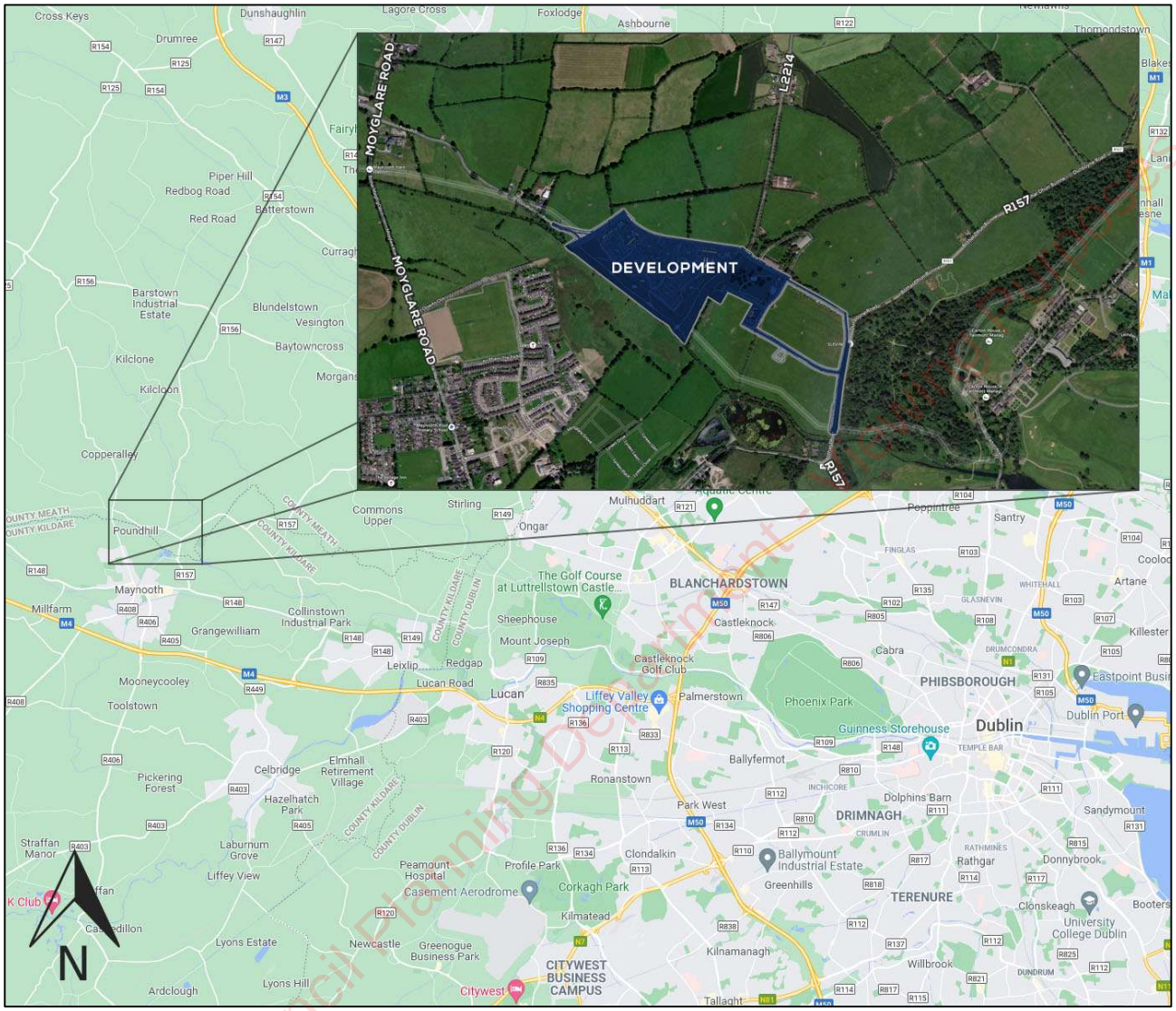

Figure 1: Development Locality Plan

DEVELOPMENT DESCRIPTION

Planning Permission is sought be Sky Castle Ltd. for the development of a site which extends to 19.52 hectares gross site area in the townland of Moygaddy, Maynooth Environs, Co. Meath. The net developable area equates to 7.89 hectares which equates to a residential density of 45.6 units per hectare.

The proposed development will consist of the following:

1. Construction of 360 no. residential units comprising:
   (i) 196 no houses (including 19 no. 2 beds, 156 no. 3 beds and 21 no. 4 beds).
   (ii) 102 no. duplexes (including 51 no. 1 beds and 51 no. 2 beds) set out in 6 no. blocks.
   (iii) 62 no. apartments (including 26 no. 1 beds and 36 no. 2 beds) set out in 2 no. blocks.
2. Provision of a public park and playground with associated 42 no. car parking spaces adjacent to Moygaddy Castle and pedestrian and cyclist links along the River Rye. The overall public open space (including the High Amenity Lands) equates to 7.98 hectares.
3. Provision of private open spaces in the form of balconies and terraces is provided to all individual apartments and duplexes to all elevations.
4. Development of a two-storey creche facility (514 sqm), outdoor play area and associated parking of 29 no. spaces.
5. 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.
6. Provision of 4 no. bridge structures comprising:
   (i) an integral single span bridge at Moyglare Hall over the River Rye Water to connect with existing road infrastructure in County Kildare and associated floodplain works and embankments.
   (ii) a new pedestrian and cyclist bridge at Kildare Bridge which will link the proposed site with the existing road network in County Kildare.

(iii) a new pedestrian and cycle bridge across Blackhall Little Stream on the L22143 adjacent to the existing unnamed bridge.

(iv) a new pedestrian and cycle bridge over the Moyglare Stream linking the proposed residential site with the proposed Childcare Facility, Scout Den and Moygaddy Castle Public Park.

7. 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.
8. Proposed road improvement and realignment works including:
   (i) realignment of a section of the existing L6219 local road, which will entail the demolition of an existing section of the road which extends to circa 2,500 sqm.
   (ii) Provision of pedestrian and cycle improvement measures along the L6219 and L22143 which abuts the boundary of Moygaddy House which is a Protected Structure (RPS ref 91558).
   (iii) Provision of pedestrian and cycle improvement measures along the R157 which abuts the Carton Demense Wall which is a Protected Structure (RPS Ref 91556).
9. Provision of 2 no. vehicular and pedestrian accesses from the L6219 local road, 1 no. vehicular and pedestrian entrance from the L22143 and an additional vehicular and pedestrian access from the R157 to the Childcare and Scout Den facilities.
10. The proposed development will provide 283 no. of bicycle parking spaces, of which 200 no. are long term spaces in secure bicycle stores and 83 no. are short term visitor bicycle parking spaces. 12 no. bicycle spaces are provided for the creche and 12 no. bicycle spaces are provided for the Scout Den.
11. 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.
12. Provision of site landscaping, public lighting, bin stores, 3 no. ESB unit substations, site services and all associated site development works.
13. 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 overall gross site area is 19.52 hectares gross site area in the townland of Moygaddy, Maynooth Environs, Co. Meath. The net developable area equates to 7.89 hectares which equates to a residential density of 45.6 units per hectare.

The site is currently greenfield and used for agricultural purposes and can be accessed from the L6219 Road which aligns with the northern boundary of the subject site. Ground levels across the site typically fall gently from north to south, with a sharp decline at the southern and eastern boundaries, which align with the River Rye Water and Moyglare Stream respectively.

A separate application will be made to the Kildare County Council for the provision of the section of MOOR south of the River Rye that ties into the already constructed section adjacent to Moyglare Hall which is within the Kildare County Council Jurisdiction. This overlap of applications will ensure unimpeded access to the proposed development lands for all modes of transport including vehicular and dedicated pedestrian and cyclists facilities. The proposed site layout is shown in Figure 2 below.

Figure 2: Proposed Development Layout

3 CONSTRUCTION PROGRAMME & PHASING

PHASING

The development will be constructed in phases, as shown in the figure below. The yellow areas will be part of Phase 1 and include the new and upgraded external roads, public open space, residential units, high amenity lands, public park & creche. The second phase, highlighted in pink, includes additional residential units and public open space. Phase 3, highlighted in red, includes the final residential units, as well as some open spaces.

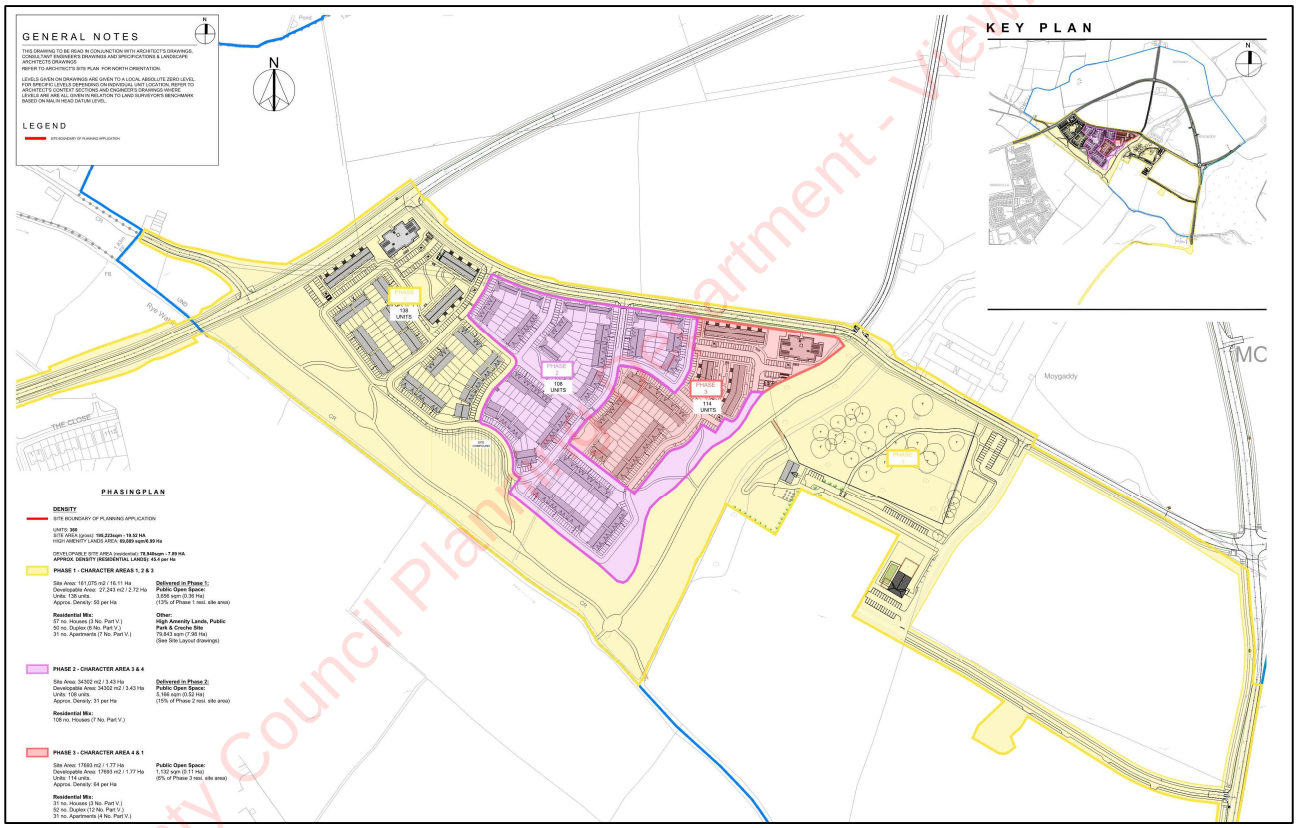

Figure 3: Development Phasing

PROGRAMME

At present, the planned construction programme for the development is a commencement date of September 2023, with a completion date of December 2025. This means that the planned construction duration is 27 months.

Even though the development will be constructed in phases, it is anticipated that all of the phases will overlap within the construction period mentioned above. This is to clearly identify that the intention is to maintain activities on site in a consistent manner. For example, once the earthworks and main civil infrastructure are developed to the extent required to commence on the building construction this activity will then move to Phase 2, similarly when main structures are completed in Phase 1 the associated trades will move to Phase 2 and allow finishing trades to move in and complete the homes in Phase 1.

It is anticipated that only one contractor will be appointed for the entire site, including all three phases.

APPLICANT & DESIGN TEAM

The following are the main participants in the project:

Role	Name	Contact
Applicant	Sky Castle Ltd	Ronan Barrett
Architect	MCORM Architecture	James Coakley
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 on the L6219 via the regional road network. Construction will be done through offsite and onsite construction that may require the use of mobile cranes. The crane locations (if required) will be established at a later date in consultation with the main contractor.

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

Figure 4: Indicative Site Compound and Hauling Route

HOARDING

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

TREE PROTECTION

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

ARCHAEOLOGY

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

ENABLING WORKS & WORKS ON THE PUBLIC ROAD

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

INSTREAM AND ADJACENT WORKS

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

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

HEADWALLS

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

BRIDGES

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

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

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

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

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

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

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

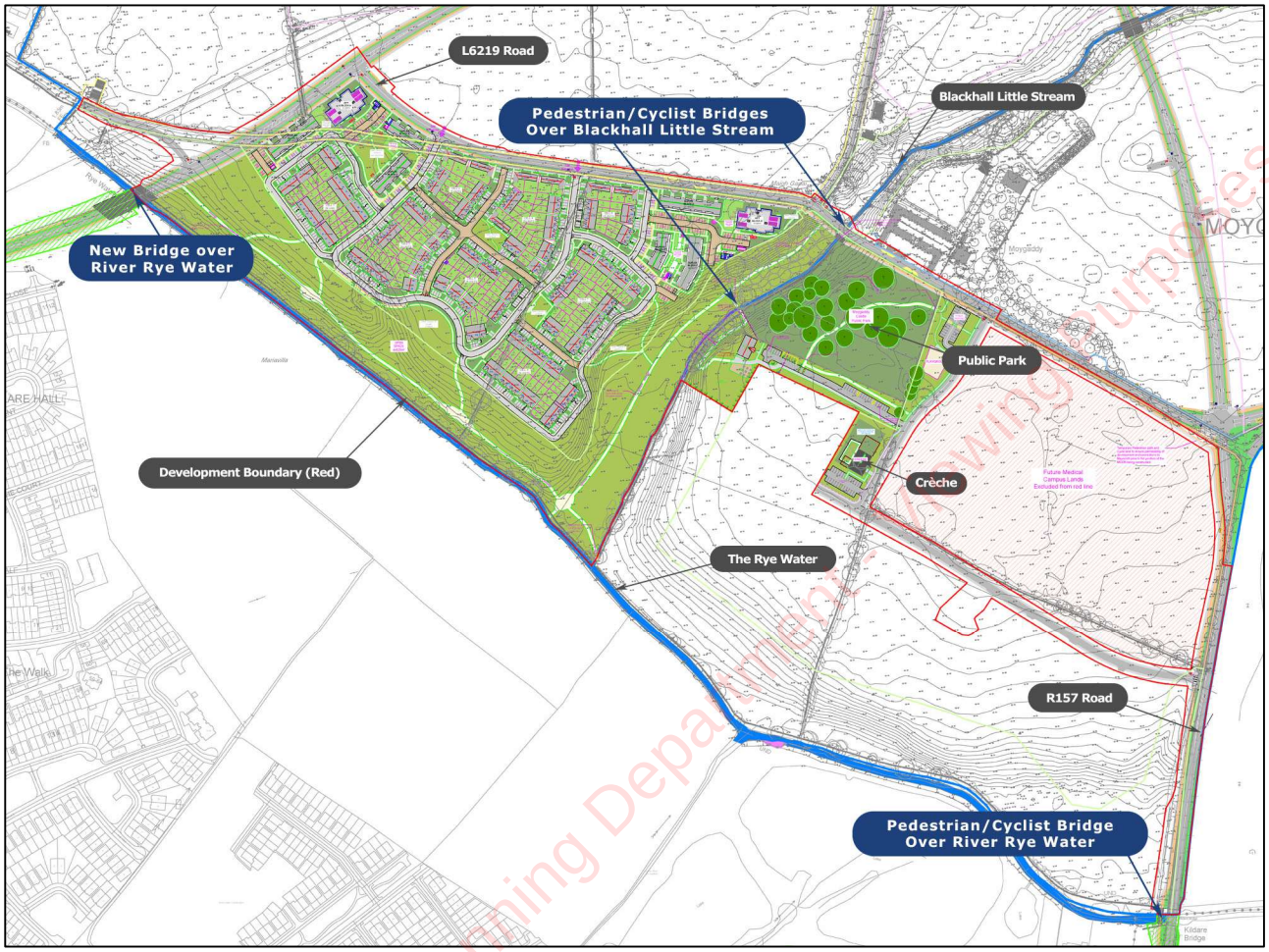

Figure 5: Location of Bridges in SHD Development

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

bridges will be subject to appropriate oversight and supervision as is normal for similar public works.

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

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

DEMOLITION

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

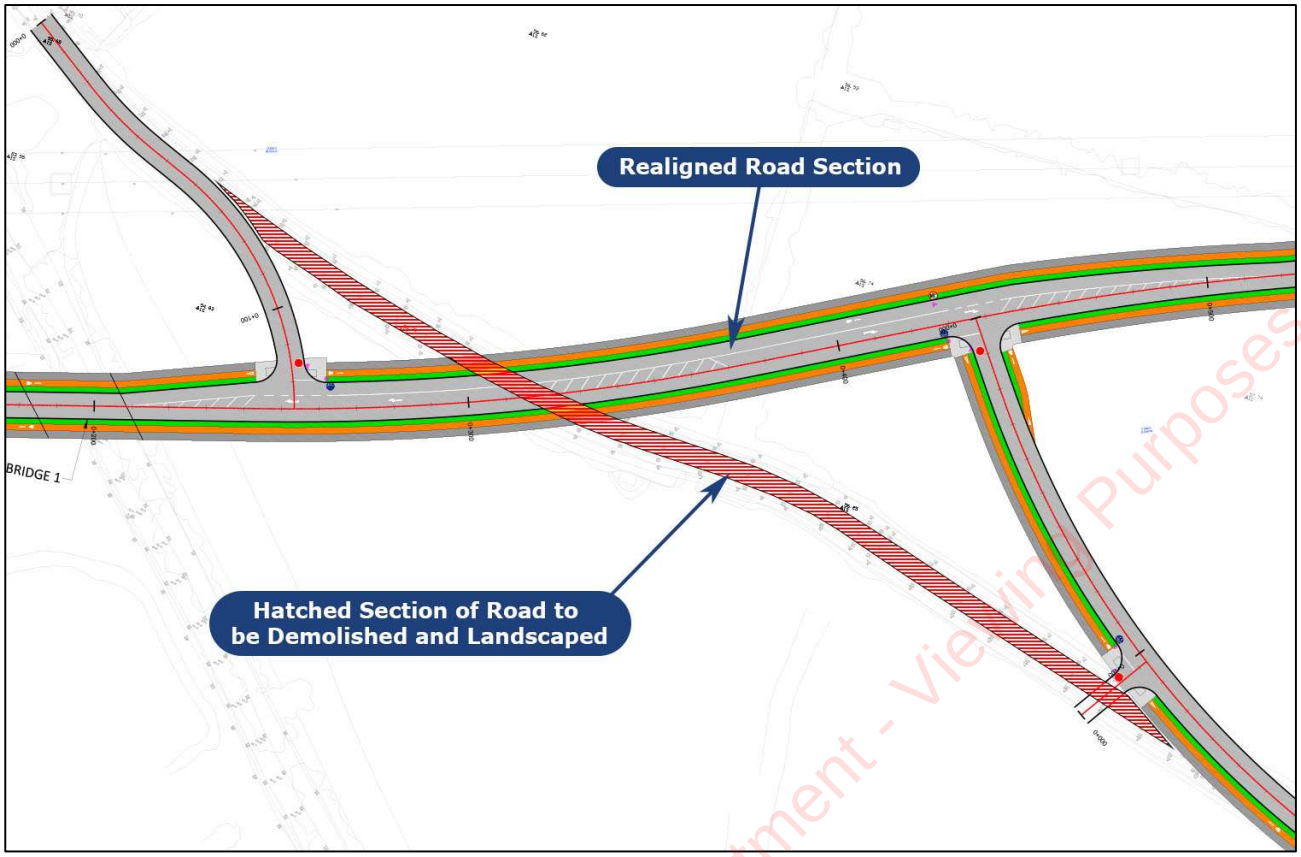

Figure 6: Road Section to be Demolished

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

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

The following table is a preliminary estimate of the demolition waste which might be generated, assuming a 200mm thick asphalt layer overlaying a 400mm thick stone layer with an average density of 2.3 tons/m^3. It should be noted that these numbers are approximated and are only indicative of the final values of the site:

Predicted demolition waste targets for the proposed road realignment:

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

Table 2: Demolition Recycle Targets

ALTERATION WORKS

A section of the existing boundary wall south of the L6219, at the existing agricultural field entrance, will need to be altered to allow for the update to a continuous walkway and cycle lane along this road. The location of this wall section is shown in the figure below.

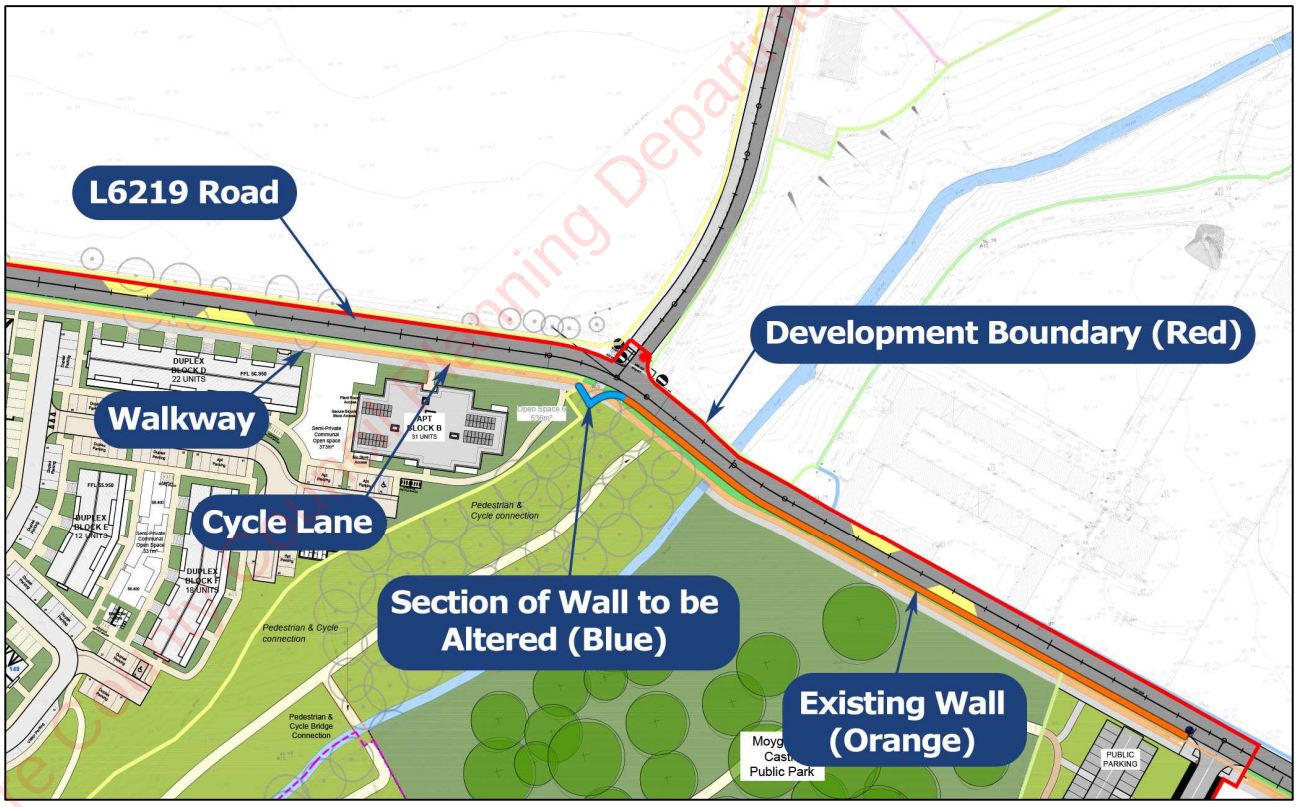

Figure 7: Existing Wall Section to be Demolished

The approximate combined removal volume of the existing wall is c. 8 m^3.

Removal of the above section will generate low volumes of waste. The following table is a preliminary estimate of the waste which might be generated, assuming a density of 2.3 tons/m^3. It should be noted that these numbers are approximated and are only indicative of the final values of the site:

Predicted waste targets for the wall section alteration:

Waste Types	Waste	Recycle		Disposal	
	tonnes	%	tonnes	%	tonnes
Stones & concrete	19	0	0	100	19

Table 3: Wall Alteration Recycle Targets

It should be noted that although the Carton Boundary Wall on the R157, as well as the existing Moygaddy Wall on the L22143 are within the redline of the development, no demolition or alteration work will be performed, aside from the abovementioned.

5 ESTIMATED CUT & FILL

Topsoil and subsoil/stones will be excavated to accommodate roads, footpaths, services, and construction. It is noted that for all areas of new construction (excluding green areas such as public open spaces and gardens) that the existing topsoil needs to be removed. As is good sustainable practice the topsoil excavated on the site will all be utilised on the site and added to the existing topsoil in areas such as gardens and open spaces. This will improve the depth of the growing medium in these areas and remove any requirement to transport topsoil from the site. The geotechnical investigations of the site suggest that there is generally 100mm of topsoil in the area for construction with some areas of 200mm of topsoil uncovered in the study area. As a conservative estimate of this, OCSC has assumed that the average depth of topsoil to be excavated is 150mm. This equates to a volume of topsoil to be excavated of approximately 9,000 m^3. This volume of soil can be easily accommodated in the areas of gardens and open spaces (excluding areas close to the river and stream), therefore there will not be a requirement to remove topsoil from the site. Based on a 3d ground model of the existing site the expected volume of materials has been calculated. Given that the entire site is approximately 19.52 hectares, the following calculations have been made (see Table 2 over):

- Cut & Fill is taken from Site Strip Level to Formation Level. Topsoil is excluded from the calculation.
- 450mm Road Build Ups
- 450mm Building Pad Build Ups
- An allowance has been made for some soil not being acceptable for reuse on the site.

Item	Cut Volume (m^3)	Fill Volume (m^3)
Fill 4.4m – 5.5m	-	10
Fill 3.3m – 4.4m	-	50
Fill 2.2m – 3.3m	-	1 250
Fill 1.1m – 2.2m	-	6 600
Fill 0m – 1.1m	-	41 100
Cut 0m – 1.1m	17 300	-
Cut 1.1m – 2.2m	3 300	-
Cut 2.2m – 3.3m	1 400	-
Cut 3.3m – 4.4m	400	-
Cut 4.4m – 5.5m	50	-
Cut 5.5m – 6.6m	-	-

Total Cut	Cut	Reuse	Export
	22 450 m^3	17 450 m^3	5 000 m^3
Total Fill	**Fill**	**Reuse**	**Import**
	49 010 m^3	17 450 m^3	31 560 m^3
Total Haulage	**c. 84 100 Tonnes**		

Table 4: Development Cut & Fill Calculations

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

6 CONSTRUCTION TRAFFIC

SITE ACCESS & TRAFFIC ROUTING

As mentioned previously, the site will be accessed via the L6219 as per Figure 4.

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

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

L6219 REROUTING

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

CONSTRUCTION TRAFFIC VOLUMES

It is difficult to assess the exact quantum of traffic that will be generated during the construction period. However, to estimate the volume and rate of construction traffic,

it is first necessary to estimate the amount of excavation and earthworks required on the site, which is shown in the previous section.

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

It is worth noting however that the 84 100 tonnes of combined recycling & disposal equate to just over 4 205 truckloads based on 20 tonnes per load. It should be further noted that two developments are earmarked for construction during a similar timeframe as this development, within the same area. It could be possible that excess cut volumes from these sites can be used for the shortfall of fill volume for this site, reducing the amount of material that needs to be imported.

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

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

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

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

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

SITE PARKING

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

STAFF WELFARE

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

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

CONSTRUCTION TRAFFIC MITIGATION MEASURES

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

7 SITE WASTE MANAGEMENT PLAN

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

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

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

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

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

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

Figure 8: Proposed C&D Waste Storage Area (Scale: NTS)

WASTE MANAGEMENT CATEGORIES

SOIL/SUBSOIL

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

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

CONCRETE, BRICKS, TILES & CERAMICS

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

HARD PLASTIC

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

TIMBER

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

METAL

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

PLASTERBOARD

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

GLASS

Glass materials will be segregated for recycling, where possible.

ORGANIC (FOOD) WASTE

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

WASTE ELECTRICAL AND ELECTRONIC EQUIPMENT (WEEE)

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

NON-RECYCLABLE WASTE

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

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

HAZARDOUS WASTES

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

MANAGEMENT & CONTROL SYSTEMS

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

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

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

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

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

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

8 ENVIRONMENTAL MANAGEMENT

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

POLLUTION PREVENTION

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

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

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

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

TRAINING

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

PROTECTION OF TREES

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

NOISE CONTROL

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

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

- Sources of significant noise will be enclosed where practicable;
- Machines that could be in intermittent use will be shut down between work periods or will be throttled down to a minimum;
- A plant known to emit noise strongly in one direction will, when possible, be orientated so that the noise is directed away from noise-sensitive areas; and
- Plant and/or methods of work causing significant levels of vibration at sensitive premises will be replaced by other less intrusive plants and/or methods of working where practicable.

- The inherently quiet plant will be selected where appropriate;
- Screening and enclosures will be utilised in areas where construction works are continuing in one area for a long period or around items such as generators or high-duty compressors. For maximum effectiveness, a screen will be positioned as close as possible to either the noise source or the receiver. The screen will be constructed of material with a mass of >7kg/m^2 and should have no gaps or joints in the barrier material. This can be used to limit noise impact to any noise-sensitive receptors;
- Operators of all mobile equipment will be instructed to avoid unnecessary revving of machinery and mobile equipment will be throttled down or switched off when not in use;
- Accordingly, where possible all construction traffic to be used on-site will have effective well- maintained silencers; and
- All mobile plants will be maintained to a high standard to reduce any tonal or impulsive sounds.

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

VIBRATION CONTROL

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

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

Table 5: Vibration Limits

DUST CONTROL

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

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

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

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

- If appropriate, dust monitoring will be carried out during the construction phase of the scheme. If the level of dust is found to exceed 350mg/m^{2}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 the pour site is free of standing water and plastic covers will be ready in case of a sudden rainfall event.

SITE DRAINAGE/POLLUTION PREVENTION

Before 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 the ground. Particular emphasis will also be placed on preventing any hazardous materials from 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 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 the ground;
- Discharge onto the ground will be via a silt bag which will filter any remaining sediment from the pumped water.
- The entire discharge area from silt bags will be enclosed by a perimeter of double silt fencing;
- Any proposed discharge area will avoid potential surface water ponding areas, and will only be located where suitable subsoils are present;
- Daily monitoring and inspections of site drainage during construction will be completed;
- Earthworks will take place during periods of low rainfall to reduce run-off and potential siltation of watercourses; and,

- Good construction practices such as wheel washers and dust suppression on 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-to 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.

BADGER SETT MITIGATION

A section of the footpath is proposed within 22 metres of the identified badger sett along the Blackhall Little River. As such, the following mitigation is prescribed during the construction phase to avoid impacts on badgers:

- Badger sett tunnel systems can extend up to c. 20m from sett entrances. Therefore, no heavy machinery should be used within 30m of badger setts (unless carried out under licence); lighter machinery (generally wheeled vehicles) should not be used within 20m of a sett entrance; light work, such as digging by hand or scrub clearance should not take place within 10m of sett entrances.
- During the breeding season (December to June inclusive), none of the above works should be undertaken within 50m of active setts nor blasting or pile driving within 150m of active setts.
- If construction works are required closer to the active sett during the breeding season, consultation with the NPWS will be carried out and appropriate mitigation measures will be put in place, e.g. sett screening, restricted working hours, etc.

Although no badger activity was recorded at the outlier sett along the hedgerow within the site, taking a precautionary approach, the following mitigation is prescribed during the construction phase to avoid impacts on badgers:

- It is recommended that a pre-construction badger survey be carried out in order to assess activity levels at the outlier sett and to identify any additional sett entrances that may have been excavated in the intervening period. All badger survey work will be undertaken in line with current NRA best practice guidance.
- Should this sett be found to be in use by badgers during the pre-construction badger monitoring, it will be necessary to apply to NPWS for a licence for the temporary closure of the sett during the construction phase only.
- Construction activities within the vicinity of affected setts may commence once these setts have been evacuated and destroyed under a licence from the NPWS.

- Where a survey indicates that suitable alternative natural setts are not present, a badger expert may recommend the construction of an artificial sett to replace the sett that will be affected.

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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APPENDIX 4-4

CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT PLAN

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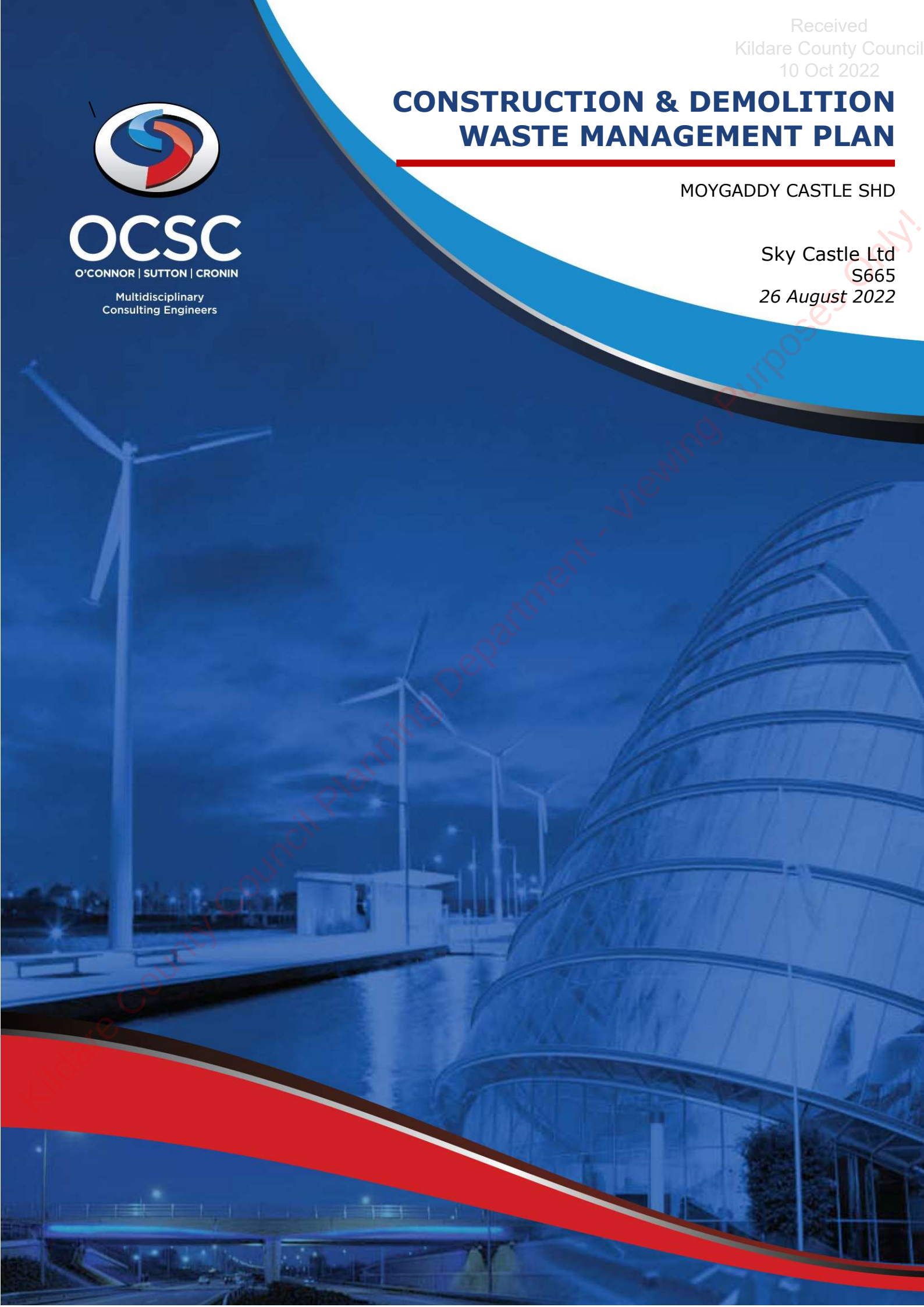
CONSTRUCTION & DEMOLITION WASTE MANAGEMENT PLAN

MOYGADDY CASTLE SHD

Sky Castle Ltd
S665
26 August 2022



CONSTRUCTION & DEMOLITION WASTE MANAGEMENT PLAN

Moygaddy Castle SHD

Sky Castle Ltd
S665
26 August 2022

CONSTRUCTION & DEMOLITION WASTE MANAGEMENT PLAN

MOYGADDY CASTLE SHD

OCSC

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NOTICE

DOCUMENT CONTROL & HISTORY

OCSC Job No.: S665	Project Code	Originator	Zone Volume	Level	File Type	Role Type	Number	Status / Suitability Code	Revision
	S665	OCSC	1C	XX	RP	C	0007	S4	P02

Rev.	Status	Authors	Checked	Authorised	Issue Date
P02	S4	WM	AH	AH	26.08.2022
P01	S4	WM	AH	AH	19.08.2022

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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 proposed 360nr. unit residential and crèche development 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

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 composing and other feasible biological treatment facilities capable of treating up to 300,000tonnes 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 southernmost extent of County Meath, aligning with the county boundary to Co. Kildare, and is approximately 1.5km north of the town of Maynooth, Co. Kildare, as shown in Figure 1, and is immediately bound by:

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

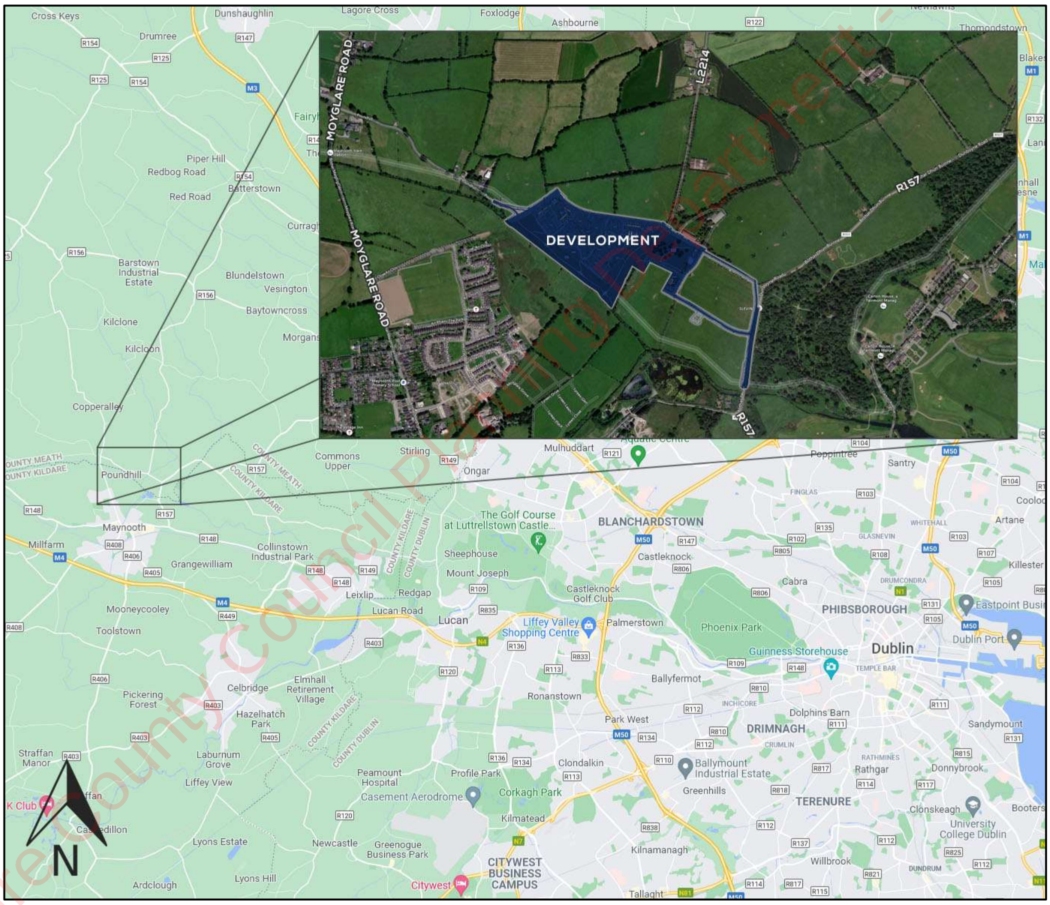

Figure 1: Development Locality Plan

DEVELOPMENT DESCRIPTION

Planning Permission is sought be Sky Castle Ltd. for the development of a site which extends to 19.52 hectares gross site area in the townland of Moygaddy, Maynooth Environs, Co. Meath. The net developable area equates to 7.89 hectares which equates to a residential density of 45.6 units per hectare.

The proposed development will consist of the following:

1. Construction of 360 no. residential units comprising:
   (i) 196 no houses (including 19 no. 2 beds, 156 no. 3 beds and 21 no. 4 beds).
   (ii) 102 no. duplexes (including 51 no. 1 beds and 51 no. 2 beds) set out in 6 no. blocks.
   (iii) 62 no. apartments (including 26 no. 1 beds and 36 no. 2 beds) set out in 2 no. blocks.
2. Provision of a public park and playground with associated 42 no. car parking spaces adjacent to Moygaddy Castle and pedestrian and cyclist links along the River Rye. The overall public open space (including the High Amenity Lands) equates to 7.98 hectares.
3. Provision of private open spaces in the form of balconies and terraces is provided to all individual apartments and duplexes to all elevations.
4. Development of a two-storey creche facility (514 sqm), outdoor play area and associated parking of 29 no. spaces.
5. 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.
6. Provision of 4 no. bridge structures comprising:
   (i) an integral single span bridge at Moyglare Hall over the River Rye Water to connect with existing road infrastructure in County Kildare and associated floodplain works and embankments.
   (ii) a new pedestrian and cyclist bridge at Kildare Bridge which will link the proposed site with the existing road network in County Kildare.
   (iii) a new pedestrian and cycle bridge across Blackhall Little Stream on the L22143 adjacent to the existing unnamed bridge.
   (iv) a new pedestrian and cycle bridge over the Moyglare Stream linking the proposed residential site with the proposed Childcare Facility, Scout Den and Moygaddy Castle Public Park.

7. 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.
8. Proposed road improvement and realignment works including:
   (i) realignment of a section of the existing L6219 local road, which will entail the demolition of an existing section of the road which extends to circa 2,500 sqm.
   (ii) Provision of pedestrian and cycle improvement measures along the L6219 and L22143 which abuts the boundary of Moygaddy House which is a Protected Structure (RPS ref 91558).
   (iii) Provision of pedestrian and cycle improvement measures along the R157 which abuts the Carton Demense Wall which is a Protected Structure (RPS Ref 91556).
9. Provision of 2 no. vehicular and pedestrian accesses from the L6219 local road, 1 no. vehicular and pedestrian entrance from the L22143 and an additional vehicular and pedestrian access from the R157 to the Childcare and Scout Den facilities.
10. The proposed development will provide 283 no. of bicycle parking spaces, of which 200 no. are long term spaces in secure bicycle stores and 83 no. are short term visitor bicycle parking spaces. 12 no. bicycle spaces are provided for the creche and 12 no. bicycle spaces are provided for the Scout Den.
11. 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.
12. Provision of site landscaping, public lighting, bin stores, 3 no. ESB unit substations, site services and all associated site development works.
13. A Natura Impact Statement (NIS) and Environmental Impact Assessment Report (EIAR) has been included with this application.

DEVELOPMENT & SITE OVERVIEW

The overall gross site area is 19.52 hectares gross site area in the townland of Moygaddy, Maynooth Environs, Co. Meath. The net developable area equates to 7.89 hectares which equates to a residential density of 45.6 units per hectare.

The site is currently greenfield and used for agricultural purposes and can be accessed from the L6219 Road which aligns with the northern boundary of the subject site. Ground levels across the site typically fall gently from north to south, with a sharp decline at the southern and eastern boundaries, which align with the River Rye Water and Moyglare Stream respectively.

A separate application will be made to the Kildare County Council for the provision of the section of MOOR south of the River Rye that ties into the already constructed section adjacent to Moyglare Hall which is within the Kildare County Council Jurisdiction. This overlap of applications will ensure unimpeded access to the proposed development lands for all modes of transport including vehicular and dedicated pedestrian and cyclists facilities. The proposed site layout is shown in Figure 2 below.

Figure 2: Proposed Development Layout

PHASING & CONSTRUCTION

The development will be constructed in phases, as shown in the figure overleaf. The yellow areas will be part of Phase 1 and include the new and upgraded external roads, public open space, residential units, high amenity lands, public park & creche. The second phase, highlighted in pink, includes additional residential units and public open space. Phase 3, highlighted in red, includes the final residential units, as well as some open spaces.

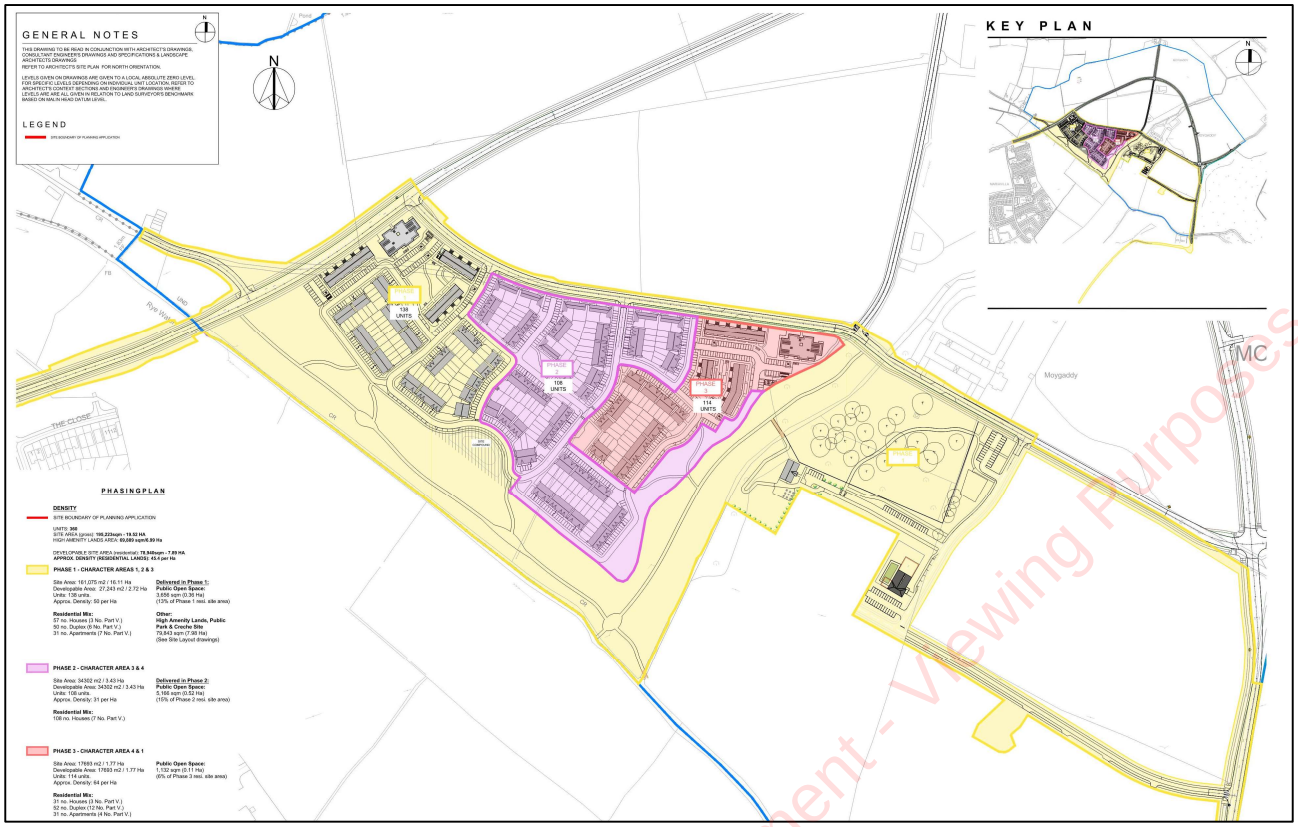

Figure 3: Development Phasing

At present, the planned construction programme for the development is a commencement date of September 2023, with a completion date of December 2025. This means that the planned construction duration is 27 months.

Even though the development will be constructed in phases, it is anticipated that all of the phases will overlap within the construction period mentioned above. This is to clearly identify that the intention is to maintain activities on site in a consistent manner. For example, once the earthworks and main civil infrastructure are developed to the extent required to commence on the building construction this activity will then move to Phase 2, similarly when main structures are completed in Phase 1 the associated trades will move to Phase 2 and allow finishing trades to move in and complete the homes in Phase 1.

It is anticipated that only one contractor will be appointed for the entire site, including all four phases.

DEMOLITION

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

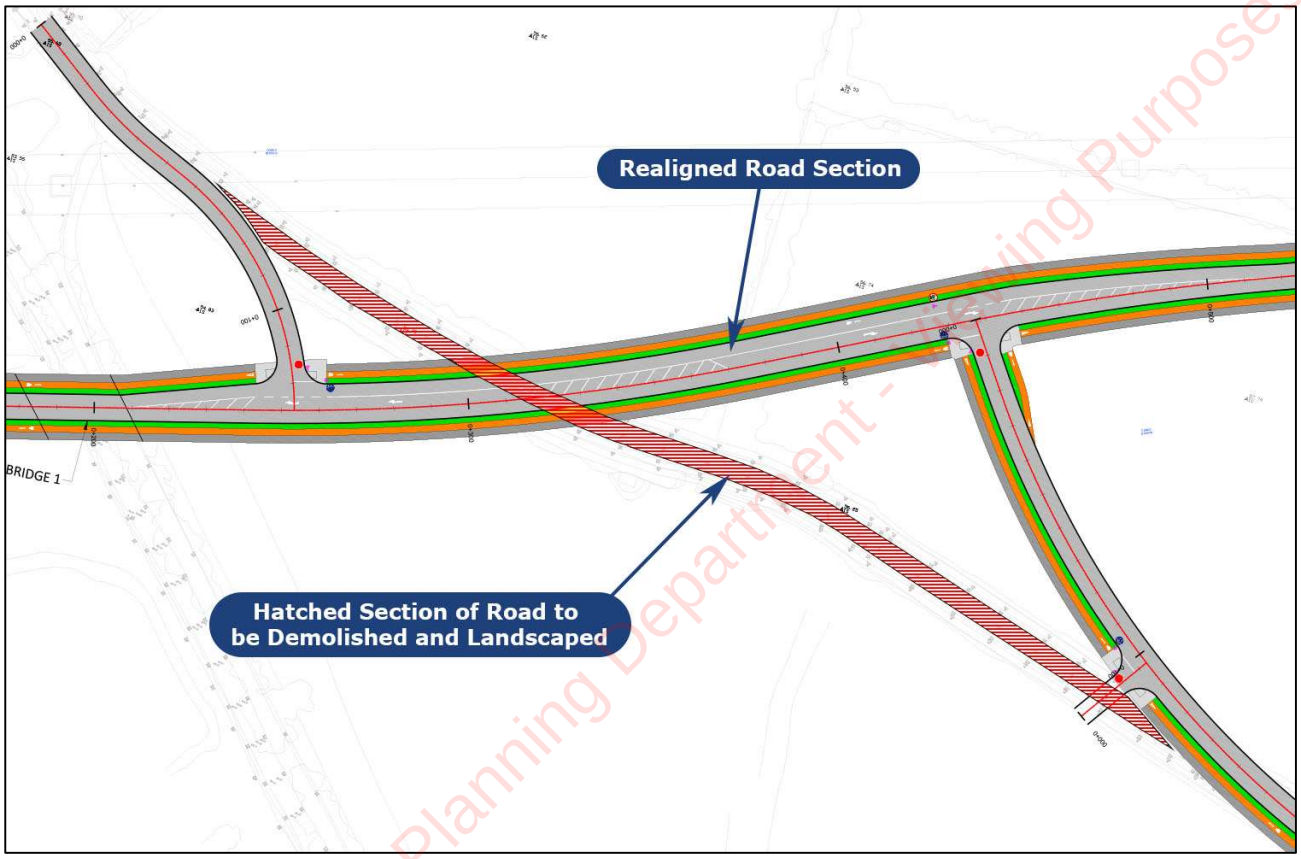

Figure 4: Road Section to be Demolished

The approximate combined demolition area of the existing road is c. 2,500 m^2.
Demolition of the above will generate low volumes of waste. The waste will predominantly be soil and stone with the potential for bitumen and tar to be found. Any road materials to be excavated and removed will be subject to a full suite of testing to establish if they are contaminated by way of either constituent or recent spillages. Any contaminates will be identified and disposed of in an appropriate facility should they be found.

The following table is a preliminary estimate of the demolition waste which might be generated, assuming a 200mm thick asphalt layer overlaying a 400mm thick stone layer with an average density of 2.3 tons/m^3. It should be noted that these numbers are approximated and are only indicative of the final values of the site:

Predicted demolition waste targets for the proposed road realignment:

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

Table 1: Demolition Recycle Targets

ALTERATION WORKS

A section of the existing boundary wall south of the L6219, at the existing agricultural field entrance, will need to be altered to allow for the update to a continuous walkway and cycle lane along this road. The location of this wall section is shown in the figure below.

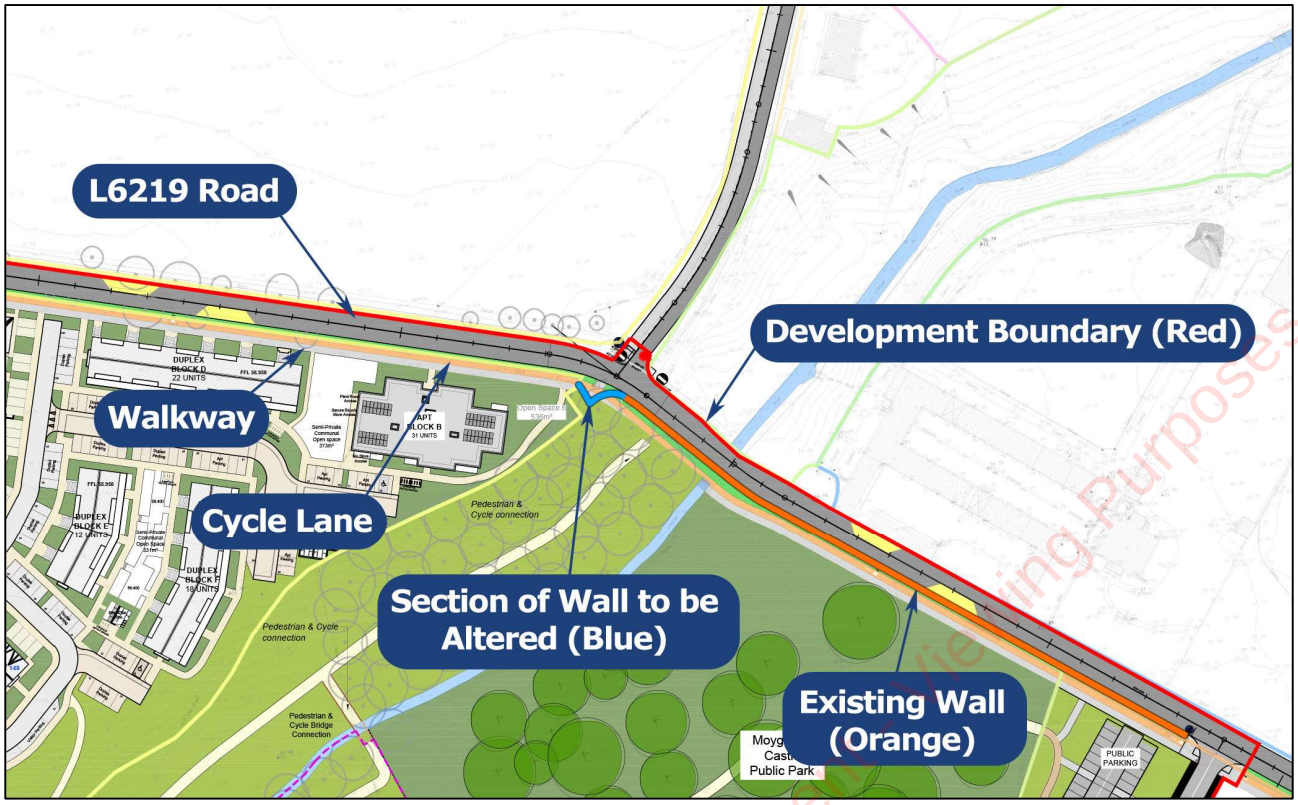

Figure 5: Existing Wall Section to be Demolished

The approximate combined removal volume of the existing wall is c. 8 m^3.

Removal of the above section will generate low volumes of waste. The following table is a preliminary estimate of the waste which might be generated, assuming a density of 2.3 tons/m^3. It should be noted that these numbers are approximated and are only indicative of the final values of the site:

Predicted waste targets for the wall section alteration:

Waste Types	Waste	Recycle		Disposal	
	tonnes	%	tonnes	%	tonnes
Stones & concrete	19	0	0	100	19

Table 2: Wall Alteration Recycle Targets

It should be noted that although the Carton Boundary Wall on the R157, as well as the existing Moygaddy Wall on the L22143, are within the redline of the development, no demolition or alteration work will be performed, aside from the abovementioned.

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 3: 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 bunded. 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 m^2.

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

Table 4: 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'5 is suitable for disposal/recovery in Continental Europe.

Table 5: 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	11500	20	2300	0	0	80	9200
Concrete, Bricks, tiles, plastics etc	1801	0	0	80	1441	20	360
Asphalt, tar/tar products	139	0	0	20	28	80	111
Metals	139	5	7	90	125	5	7
Others	277	10	28	40	111	50	139
Total	13855	-	2335	-	1704	-	9817

Table 6: 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 6: 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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APPENDIX 4-6

BRIDGE OPTIONS REPORTS

BRIDGE OPTIONS REPORT

MOYGADDY MASTERPLAN LANDS

Sky Castle Ltd
S665
19 August 2022

OCSC
O'CONNOR | SUTTON | CRONIN
Multidisciplinary
Consulting Engineers

BRIDGE OPTIONS REPORT

Moygaddy Masterplan Lands

Sky Castle Ltd
S665
19 August 2022

BRIDGE OPTIONS REPORT

MOYGADDY MASTERPLAN LANDS

OCSC

O'CONNOR | SUTTON | CRONIN

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NOTICE

DOCUMENT CONTROL & HISTORY

OCSC Job No.: S665	Project Code	Originator	Zone Volume	Level	File Type	Role Type	Number	Status / Suitability Code	Revision
	S665	OCSC	XX	XX	RP	C	0010	S4	P01

Rev.	Status	Authors	Checked	Authorised	Issue Date
P01	S4	G Mullins	A Horan	A Horan	19.08.2022

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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 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;

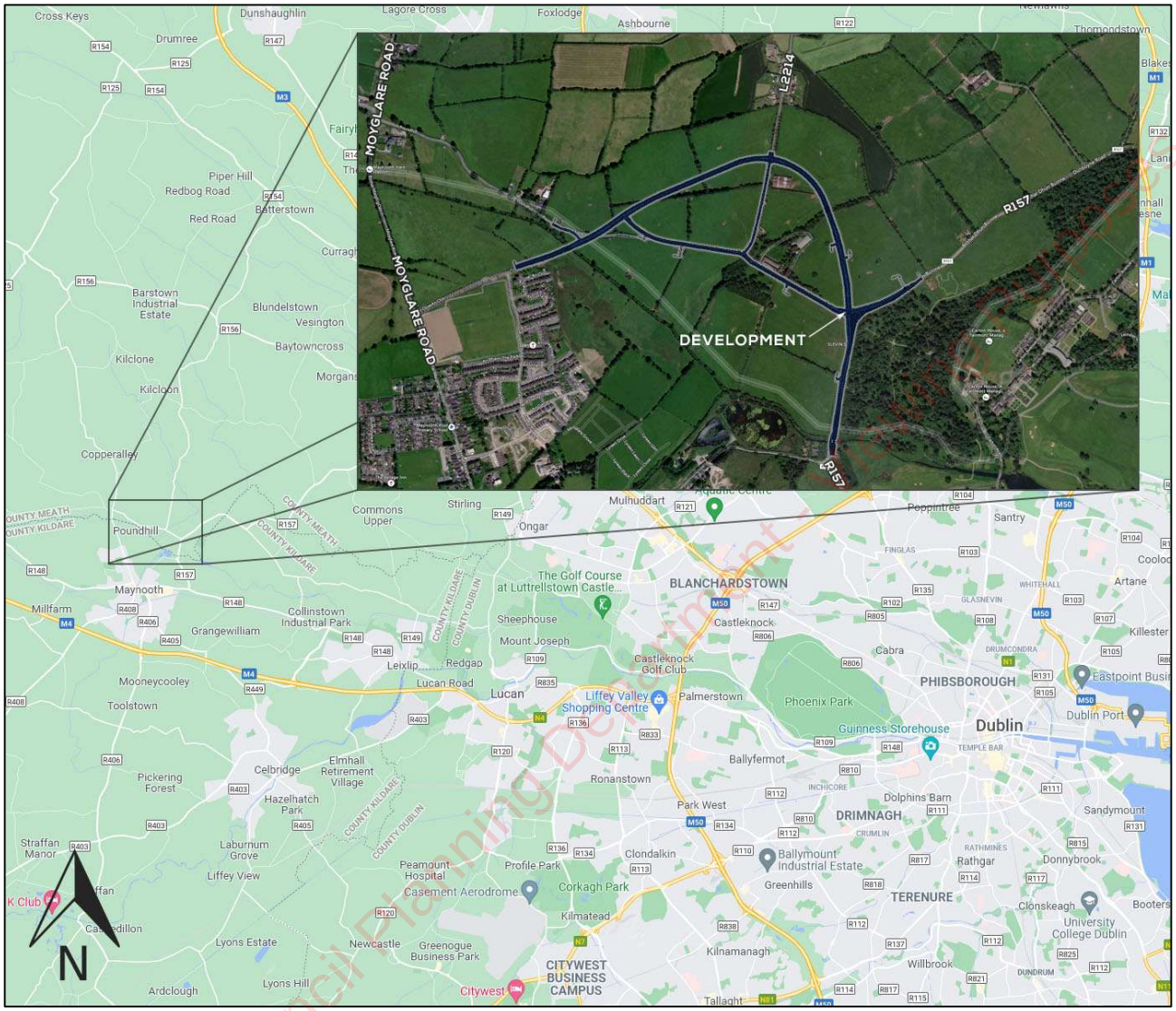

Figure 1: Development Locality Plan

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.

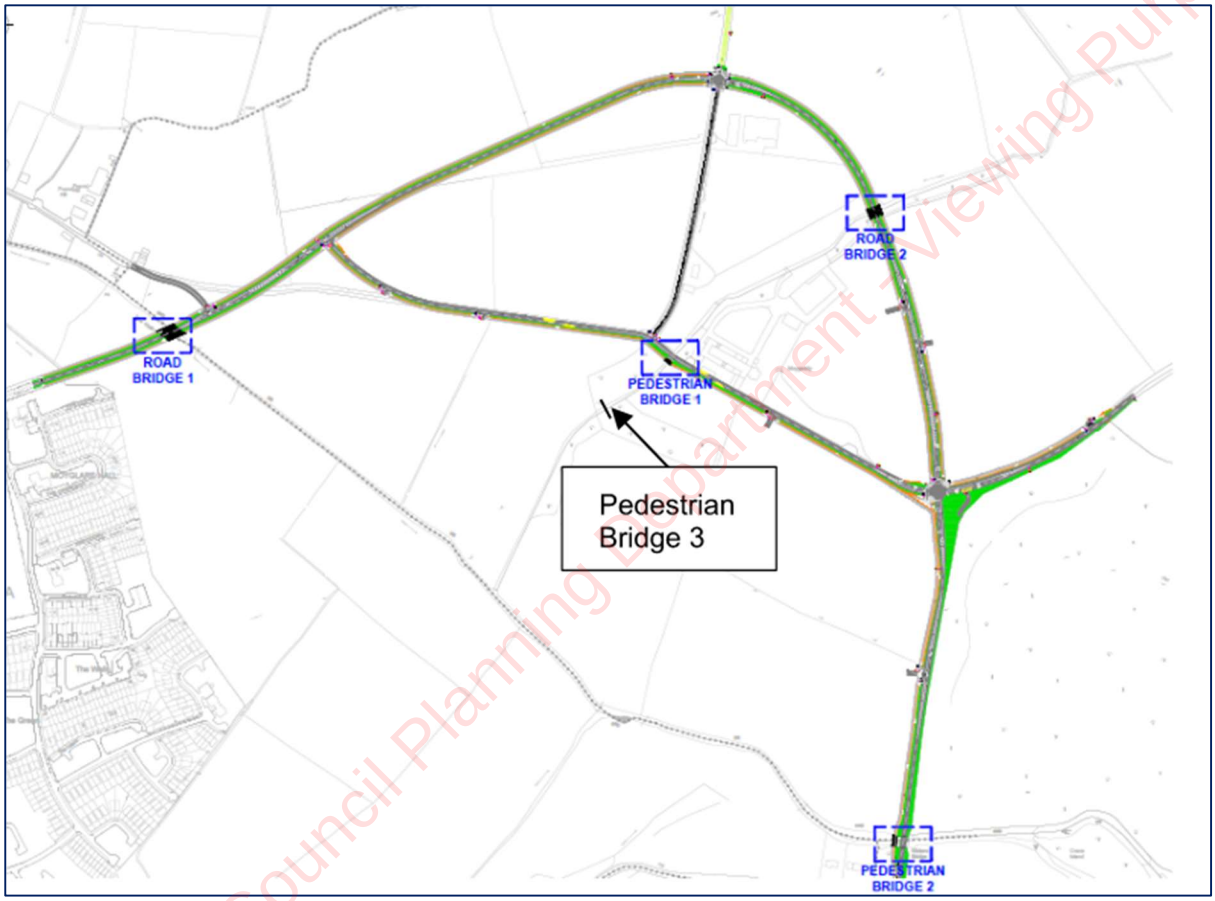

Figure 3: Location of Bridges

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.

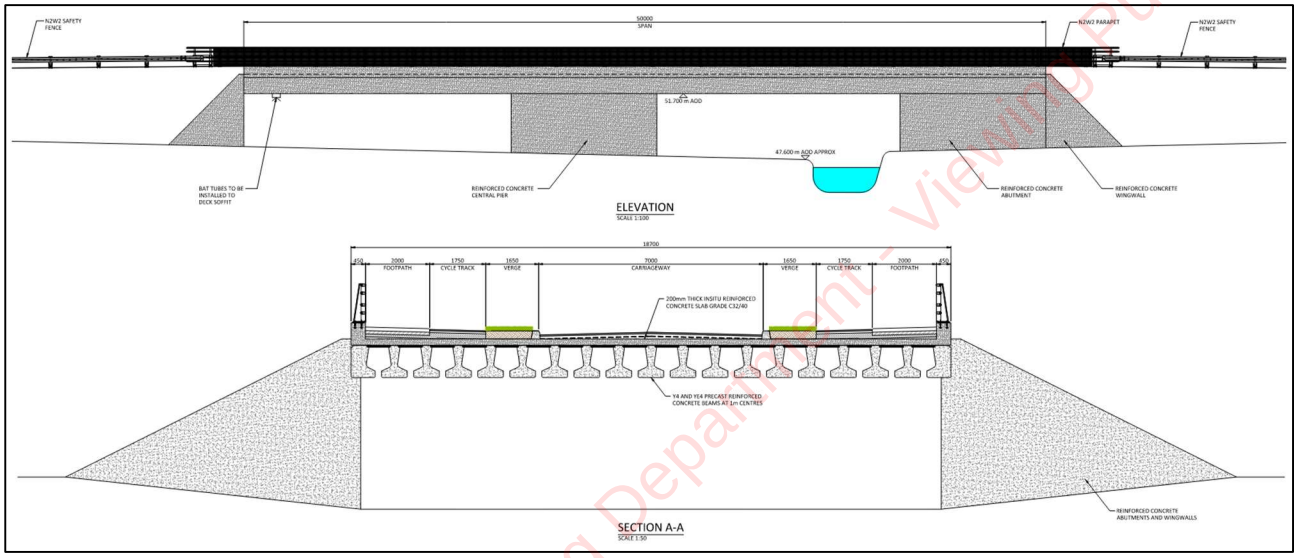

Figure 4: Road Bridge 1 Cross-Section and Elevation

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.

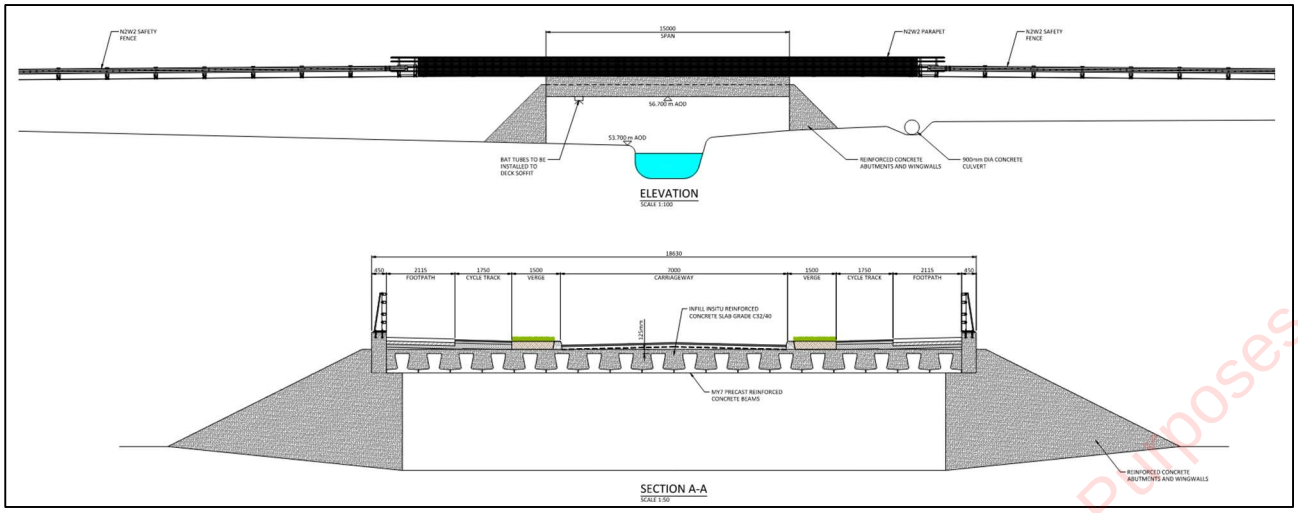

Figure 5: Road Bridge 2 Cross-Section and Elevation

PEDESTRIAN BRIDGE 1

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 (also known as the Moygaddy Stream). It is to be a standalone, independent structure. The elevation and cross-section of this bridge is shown in the figure below.

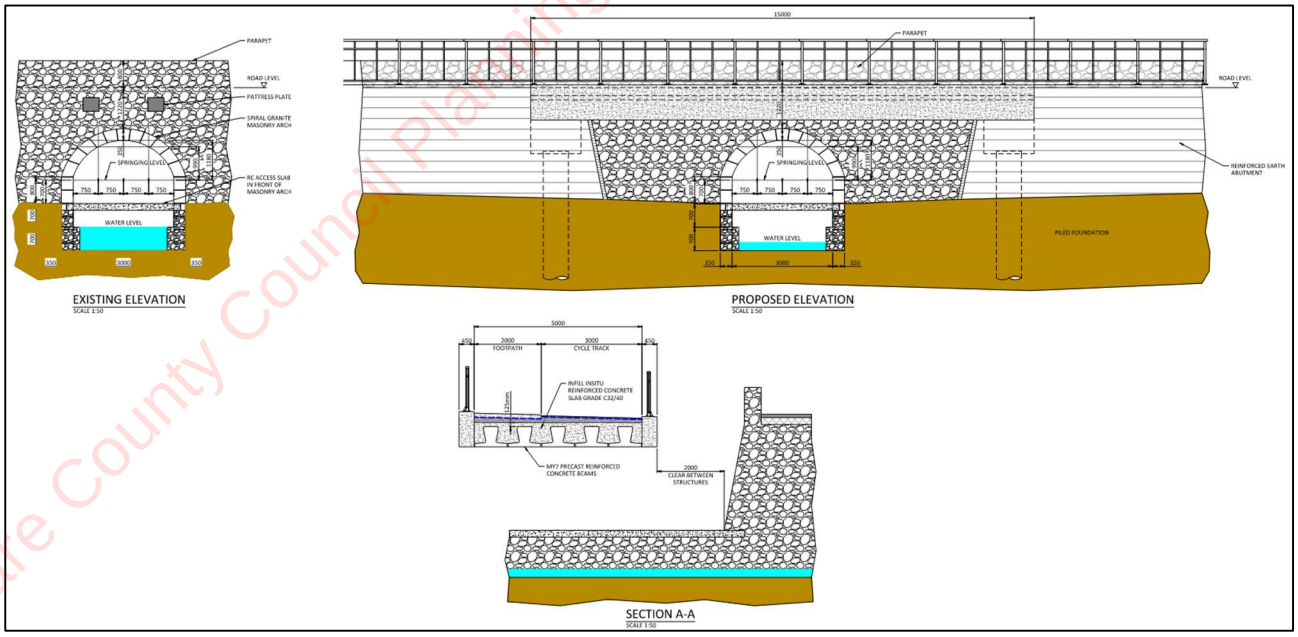

Figure 6: Pedestrian Bridge 1 Cross-Section and Elevation

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.

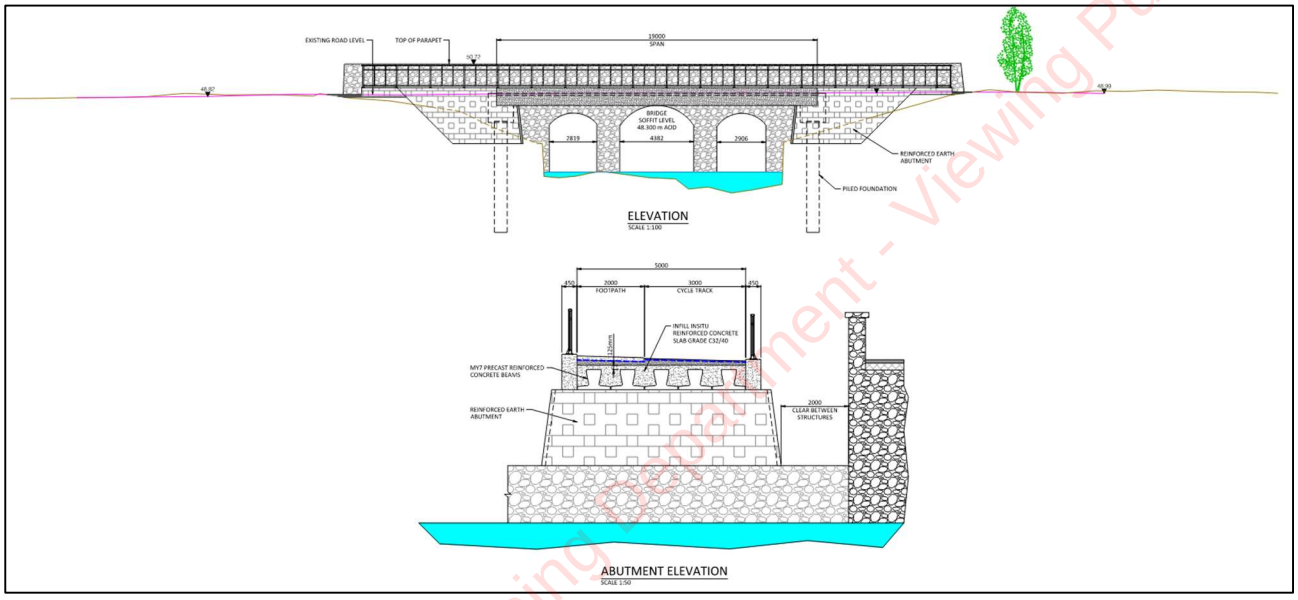

Figure 7: Pedestrian Bridge 2 Cross-Section and Elevation

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 / Moygaddy Stream, 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 Modgaddy 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 ridges 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.

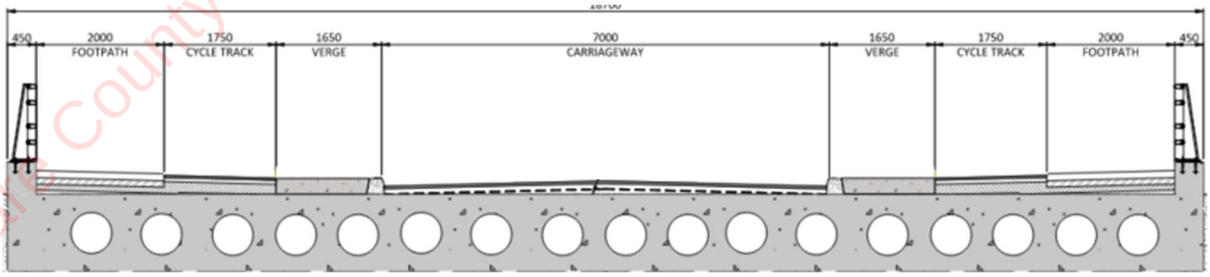

Figure 8: Reinforced Concrete In-situ Deck

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

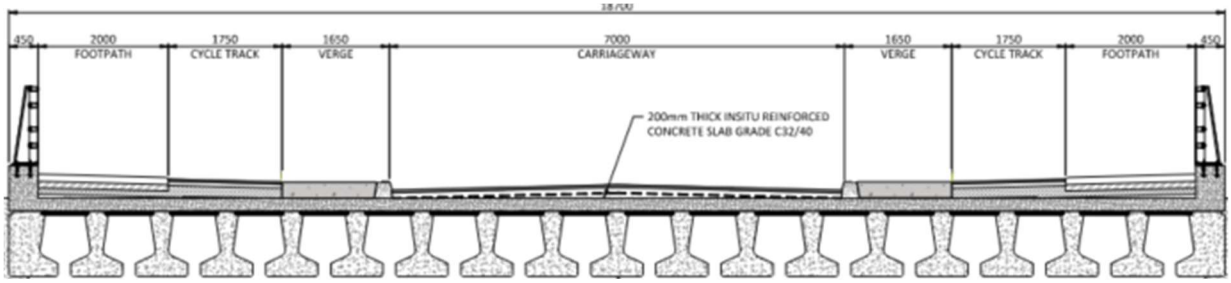

Figure 9: Precast Beams and In-situ Deck

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.

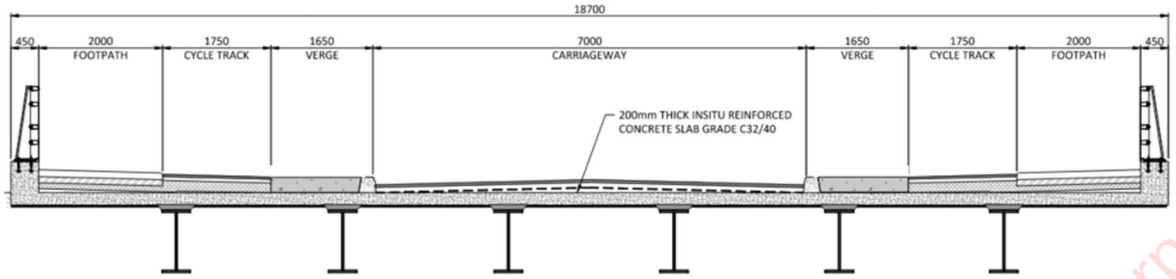

Figure 10: Composite Steel Girder and In-situ Deck

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 overweigh 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 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:

Gavin Mullins

Structural Engineer

O'Connor Sutton Cronin & Associates

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APPENDIX 4-7

LANDSCAPE MASTERPLAN

Moygaddy Castle SHD
Maynooth, Co. Meath

LANDSCAPE RATIONALE

Ronan Mac Diarmada & Associates

Landscape Architects & Consultants

August 2022

Location

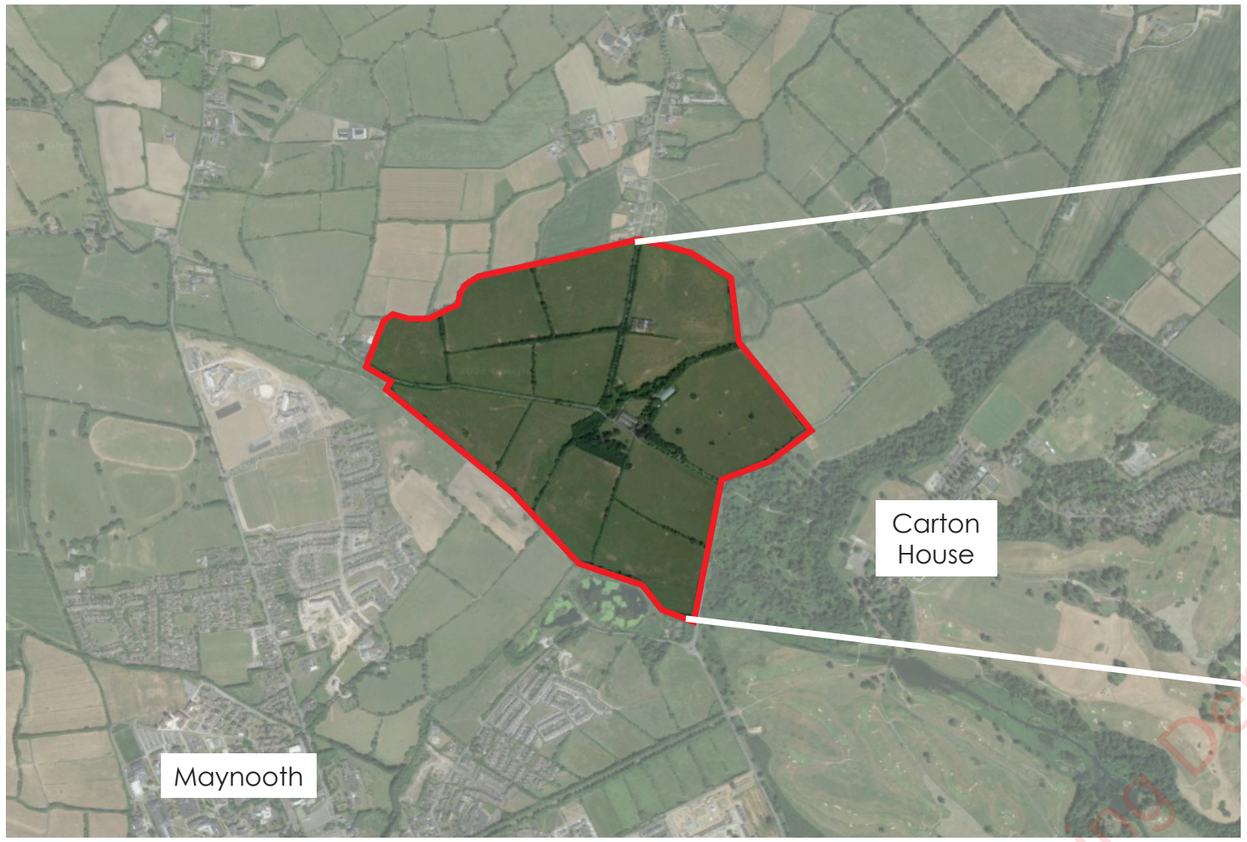


Figure 1

Moygaddy Future Development

The proposed development lands are situated in Moygaddy (Maigh Gadaí), County Meath, just north of Maynooth. The Applicant controls a land bank of circa 240 Acres, as shown in Figure 1, which is earmarked for major infrastructure upgrades and future mixed use development.

The largely greenfield site is bordered by mature trees and hedgerows, with many scenic vantage points which offer elevated views south to Maynooth and the surrounding hinterland. The location of proposed Strategic Housing, which is the subject of this application is shown in Figure 2.

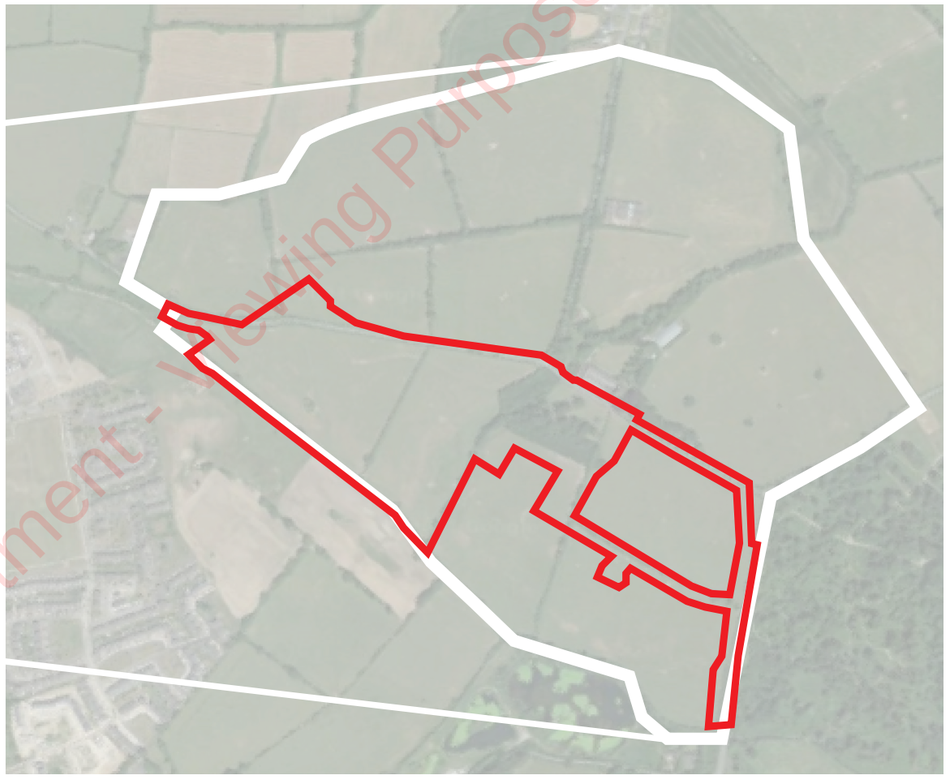


Figure 2

Proposed Site Location

Planning Permission is sought be Sky Castle Ltd. for the development of a site which extends to 19.52 hectares gross site area in the townland of Moygaddy, Maynooth Environs, Co. Meath. The net developable area equates to 7.89 hectares which equates to a residential density of 45.6 units per hectare.

Spatial Context / Open Space Hierarchy (per Meath County Development Plan)

Land Use Zonings:

- Subject Site
- Strategic Employment
- Tourism
- Community Infrastructure
- High Amenity - Future Public Park & Riverside Walks
- Proposed Residential
- Education (under construction)
- Lyreen Angling Centre

Masterplan Phasing

- Community Infrastructure Zone
- Residential
- Strategic Employment Zone
- Tourism Zone
- High Amenity Area
- Creche

Views

1. Moygaddy Castle - Tower house in ruins

2. View across lands of elevation change and mature specimen trees.

3. Typical agricultural boundary condition found throughout the lands

4. View across the Rye River

Habitat Retention & Creation

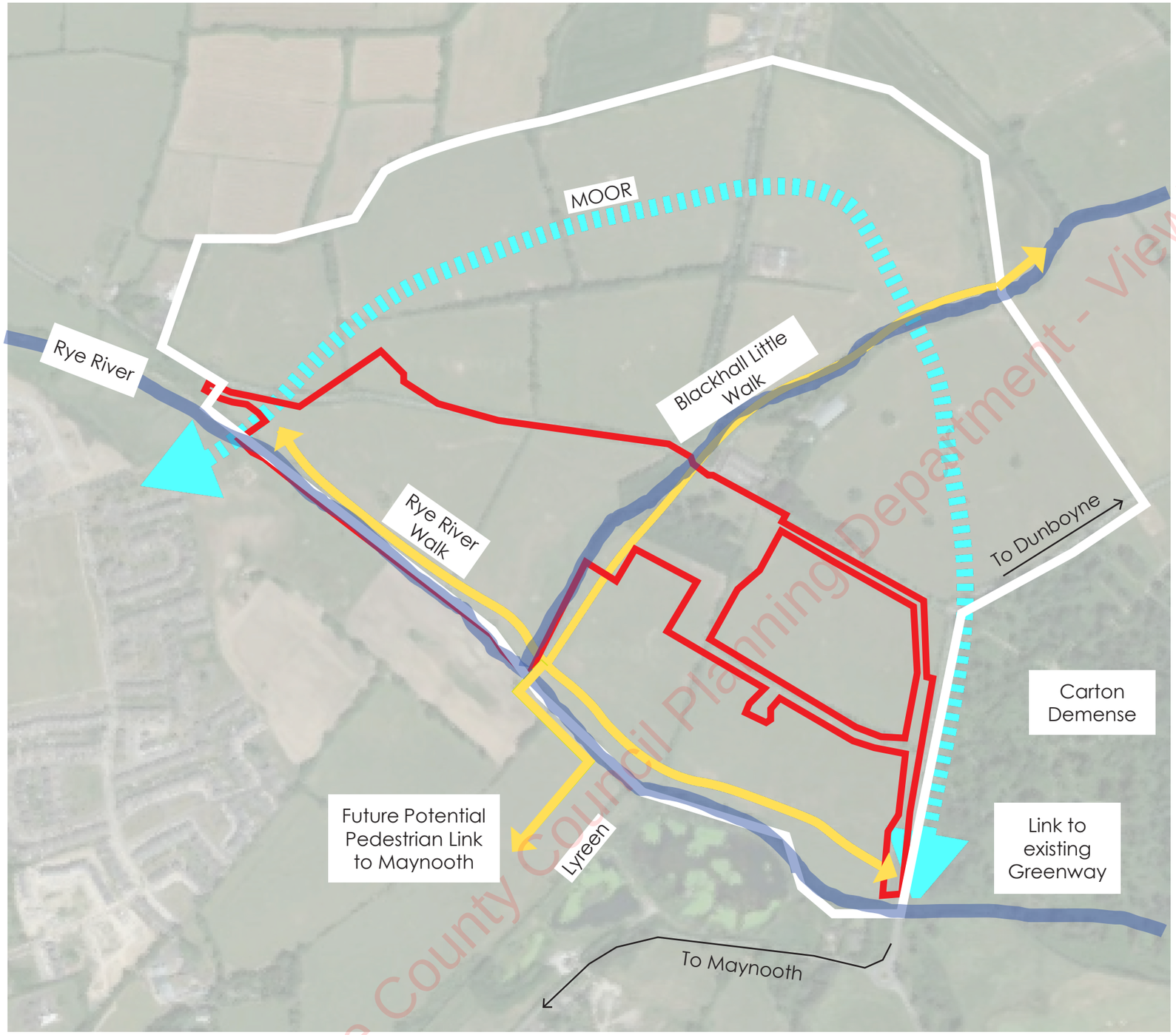
- Land Ownership
- Proposed Parkland
- Proposed Habitat Wetland
- Existing & Proposed Woodland
  Willow / Birch / Alder
- Retained Hedgerows
- Proposed Parkland Trees
  Oak , Horsechestnut, Pine, Larch

Existing Woodland

Rye River

RMDA
LANDSCAPE ARCHITECTS + CONSULTANTS

Development Connectivity Context



Riverside Walk

New Road Access / MOOR

Connectivity

A key objective of the design brief is to reduce car dependency by providing high quality pedestrian and cycle networks. The provision of green infrastructure and walking and cycle trails will integrate the new development into the existing landscape.

The design brief is to promote permeability throughout the entire masterplan area to facilitate the phased delivery of direct pedestrian and cycle linkages with the town of Maynooth and surrounding amenities and employment and medical zones.

As part of the wider masterplan, this Strategic Housing Development proposal will deliver a section of the Rye Riverside Walk and the Blackhall Little walk which will ultimately be linked to the future residential phases of the masterplan, located to the east. The Rye Riverside and Blackhall Little walks willl be delivered in an intergrated and phased manner.

DESIGN PROPOSAL

Landscape Masterplan

Overview

Homezone Shared Surface

LEGEND

Boundary Line

SOFT LANDSCAPE
Proposed Tree Planting
Street Trees / Front Garden 14-16cm
T1 Acer campestre 'Elsrijk'
T2 Carpinus betulus 'Fastigiata'
T3 Tilia cordata 'Greenspire'^
T4 Pyrus calleryana 'Chanticleer'
T5 Sorbus acuparia^

Front Garden 12-14cm
T6 Amelanchier lamarckii
T7 Viburnum opulus

Open Space 14-16cm / 20-25cm
T8 Betula pendula
T9 Alnus glutinosa
T10 Quercus robur
T11 Fagus sylvatica
T12 Pinus sylvestris,
T13 Quercus robur 'Koster'
T14 Aesculus hippocastanum^
T15 Prunus avium^

Mulitstemmed Trees 12-14cm
T16 Prunus avium 'Plena'
T17 Betula utilis var. jaquemontii
T18 Malus 'John Downie'^
T19 Betula pendula 'Multi-stem'

Existing Retained
Trees Retained
Hedgerows Retained
Hedgerows Removed
G1 Amenity Grass (300mm topsoil depth)
G2 Amenity Grass - Rear Gardens (300mm topsoil depth)
S1 - Shrub Planting 450mm topsoil depth
S2 - Shrub Planting: Public Areas 450mm topsoil depth
S3 - Residential Edging Buffer 450mm topsoil depth

HARD LANDSCAPE
Homezone Residential Roadway - Shared Surface
Tarmacadam, hot rolled with buff graphic chipping, with in-situ concrete kerbs
Main Roadway
Tarmacadam, with in-situ concrete kerbs
Concrete Footpath (to Engineer's Specification)
In-situ concrete. Brushed with trowel edge finish with PC concrete kerbs.
Feature Paving - Permeable Paving
Roadside Parking
Permeable tarmac, or similar approved
Own Curtilage Parking
Permeable Paving
Compacted Gravel Surface
Ballylusk or similar, as approved
Cycle Path
Tarmacadam, colour to be decided
Playground Surfacing
Wetpour Safety Surface

LANDSCAPE FURNITURE / FEATURES
Benchs
Hartecast HC2001S Bench or similar approved
Found Play Elements
Natural Play Elements - mounding, stepping stones, balance logs, vertical logs, as agreed prior to taking in charge
Structured Play Elements
Multi-age play Elements
Painted Games
Thermoplastic painted games on concrete

RMDA
LANDSCAPE ARCHITECTS + CONSULTANTS

Arboricultural Impact

EXISTING TREES

154no.

A total of 154 trees were identified and assessed.

the condition of trees is generally moderate to good, with the main concentration of higher quality trees located in the centre and north of the site.

CAT A
57.2%
88no.

CAT C
28.6%
44no.

CAT B
9.7%
15no.

CAT U
4.5%
7no.

% of the total number of the existing trees

Arboricultural Impact

RETAINED TREES

125no.

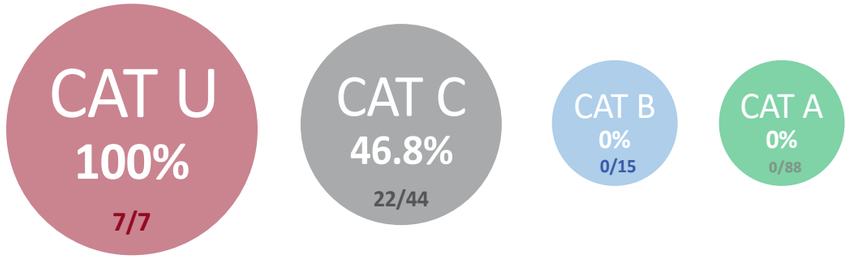
A total of 130 trees will be retained at the site

Tree protection and enhancement are a key tenet of the proposed design. The main concentration of retained trees are located on the northwest and southeast boundaries and within the proposed public park at Moygaddy Castle Towerhouse

% of the total in category

REMOVED TREES

29no.



% of the total in category

A total of 29 trees will be removed at the site, many of which have been highlighted for removal due to poor condition. The loss of these trees will be offset by new planting.

Arboricultural Impact

RETAINED TREES

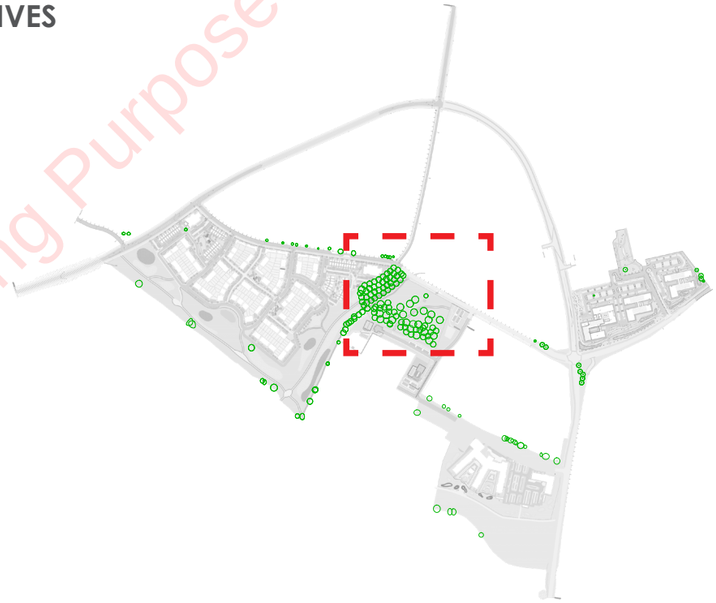
A total of 88 trees will be retained at the site

Tree protection and enhancement are a key tenet of the proposed design. The proposed public park integrates the existing woodland setting of the Moygaddy Castle & Tower House, retaining all of the existing trees.

MEATH CPP/MAYNOOTH ENVIRONS LAP OBJECTIVES

MAY OBJ 10
To require that any development in the Maynooth Environs respects the built and natural heritage of the area, its landscape quality, protected structures, historic demesne, archaeological heritage, natural heritage and general landscape character.

MAY OBJ 11
To ensure all development in the area has no negative impact on the Rye Water Valley/Carton SAC site or on the environmental characteristics of the area including woodland, rivers and tributaries.



Moygaddy Castle Tower House

Retained Trees & Hedgerows

Moygaddy Castle Tower House

Aerial View

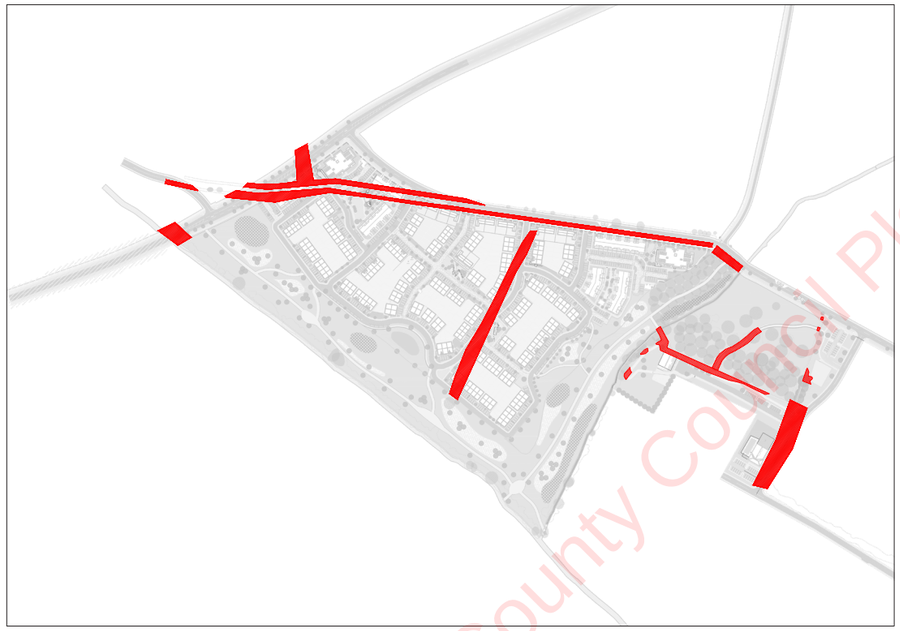
Hedgerow Impact

RETAINED HEDGEROWS

Existing Hedgerows to be retained, and augmented where necessary with native species

The landscape design proposal aims to preserve the former agricultural vernacular by retaining the existing landscape structure of field boundaries, and where possible, by maintaining existing hedges and boundary trees.

This includes the hedgerow along the southern boundary and most of the hedgerow that runs parelled to the Blackhall Little. Retention and protection of mature vegetation and established hedgerows will ensure there is minimal impacts on biodiversity and it will allow the existing hedgerows their continued function as a wildlife corridors for the area.



REMOVED HEDGEROWS

Existing Hedgerows to be removed to facilitate the proposed development and road infrastructure

Proposed Tree Planting

PROPOSED TREES

591no.

Total of 130 trees will be retained at the site.
Total trees proposed and retained: 731

Front Garden 12-14cm
Amelanchier lamarckii

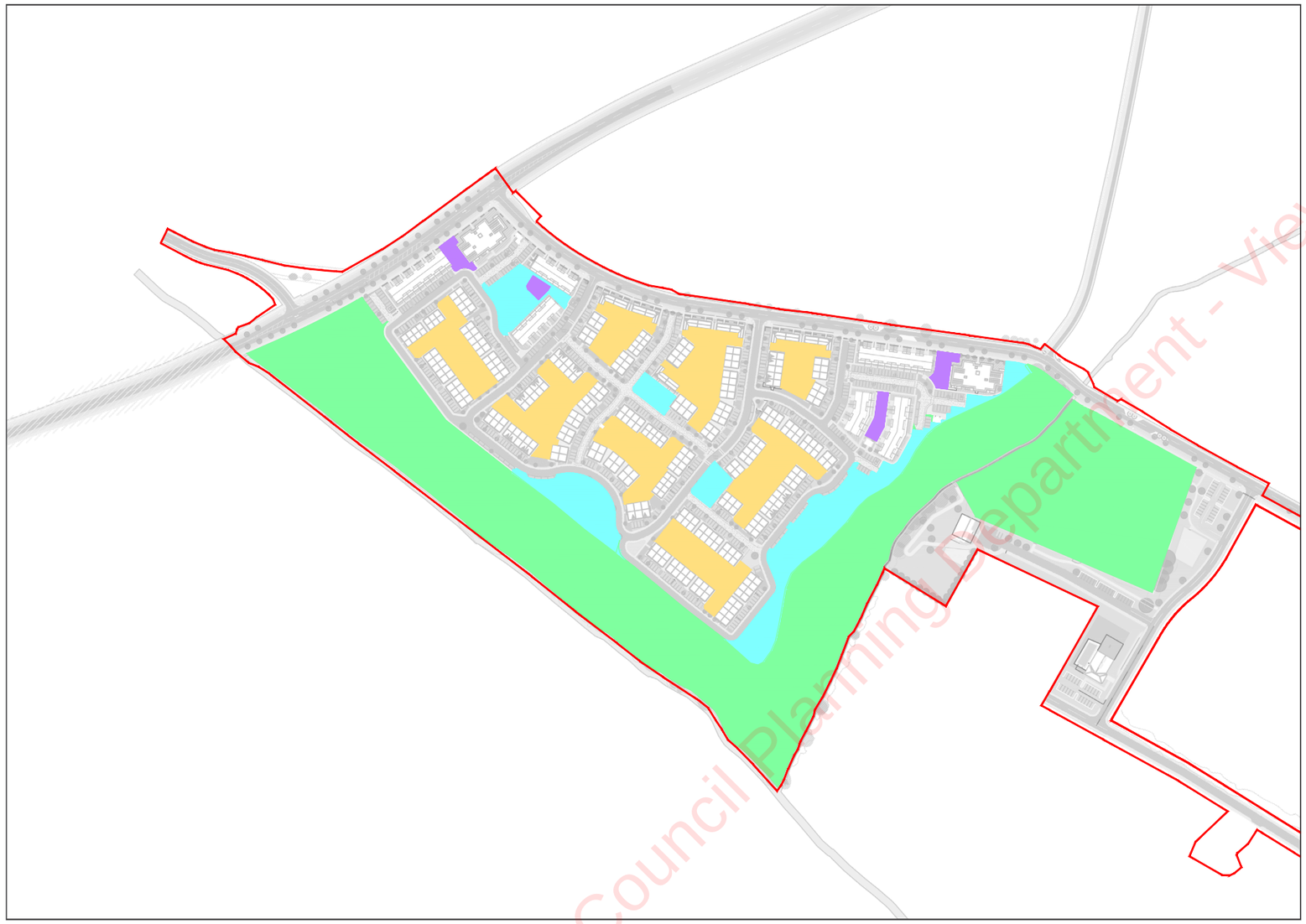
Street Trees / Front Garden 14-16cm
Tilia Tomentosa 'Brabant'
Carpinus betulus 'Fastigiata'
Tilia cordata 'Greenspire'^
Pyrus calleryana ‘Chanticleer’
Sorbus acuparia^

Mulitstemmed Trees 12-14cm
Prunus avium 'Plena'
Malus 'John Downie'^
Betula utilis var. jaquemontii

Open Space 14-16cm / 20-25cm

Betula pendula
Pinus sylvestris
Alnus glutinosa
Quercus robur
Quercus robur 'Koster'
Aesculus hippocastanum^
Fagus sylvatica
Prunus avium^

Open Space Categories



Site Area
79,843m²

A Parkland & Riverside Walks
60,030m²

B. Semi-Private Communal Open Space
1,204m²

C. Public Open Space
9,954m² - 12.6% of resi. site area

D. Private Gardens
15,196m²

Public Park / Open Spaces

The design brief is to promote a range of high quality Public Open Spaces which cater for the recreational and amenity requirements of future residents of all age groups within the Plan lands.

The Public Open Spaces have been developed with with an integrated path systems that link the new housing scheme with the river walks and ecological habitat areas and the new public park at Moygaddy Towerhouse. We have proposed native woodland tree planting, native transplants & a wild meadow mix to help protect and enhance the natural habitat area.

Enhanced Biodiversity

Proposed Shrub Planting

Proposed Hedgerow

Proposed Wetland / SUDS Areas

Retention and enhancement of biodiversity ensures that the natural, cultural, and health requirements of communities are integrated into the new development.

This green infrastructure strategy follows an overarching goal of protecting, creating, enhancing, and connecting the natural heritage and biodiversity value of the lands.

The provision of 585no. trees, along with shrub, wildflower, and bulb planting, spread throughout the built environment, connects the pocket parks with the larger parkland areas, maximising the environmental benefits and habitat creation.

Existing hedgerows are to be retained where possible, along the site boundary around which passive and active open space areas are arranged.

Site Links

Greenway

Primary Links

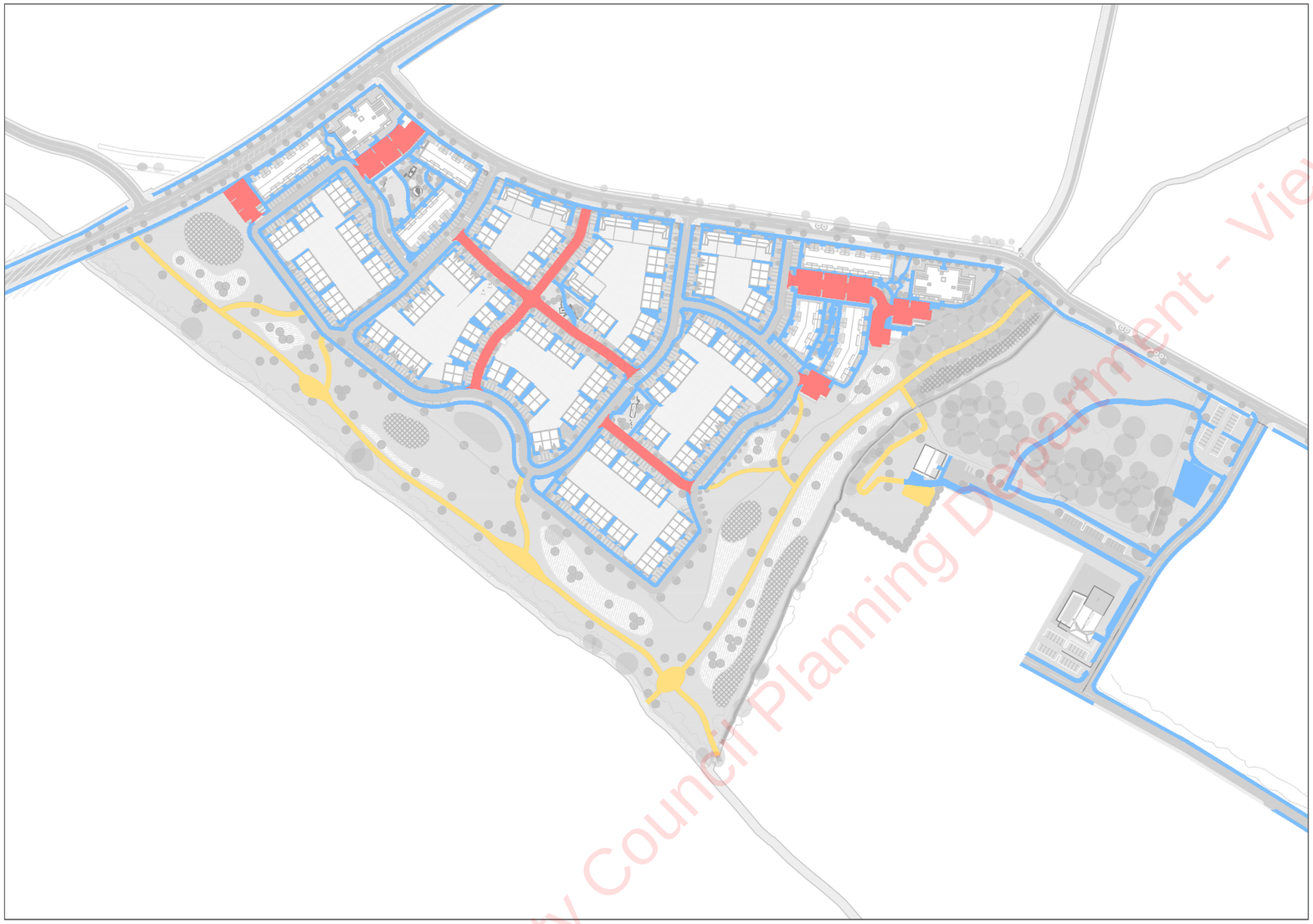
Secondary Links

The design brief is to develop and integrate public walkways that link the scheme with the existing woodlands and Rye River and Blackhall Little Stream routes that permeate the site.

The river walk park is envisaged as a leading example of sustainable development, that will provide opportunities for habitat management and conservation, recreation, tourism and education.

The primary design intent is for preservation, protection and ecological mitigation of the development, together with the creation of new breakout spaces in the park which will allow for interactions with the diverse landscape.

Site Circulation



Pedestrian Paths

Homezone Areas

Riverside Walk

Connectivity

The pedestrian and cycle network for the proposed development aims to facilitate legible and comfortable movement within the site and to surrounding opportunities with the wider parklands.

The river walk park is envisaged as a leading example of sustainable development, that will provide opportunities for habitat management and conservation, recreation, tourism and education.

The primary design intent is for preservation, protection and ecological mitigation of the development, together with the creation of new breakout spaces in the park which will allow for interactions with the diverse landscape.

Road Network

Primary - Main Link Street

Secondary - Local Street

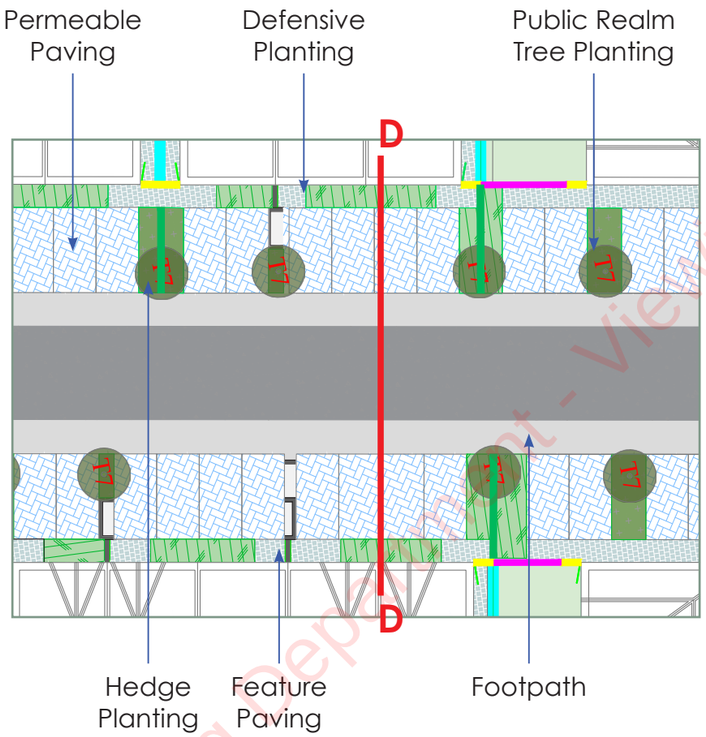
Tertiary - Homezone - Pedestrian Priority

Street Hierarchy

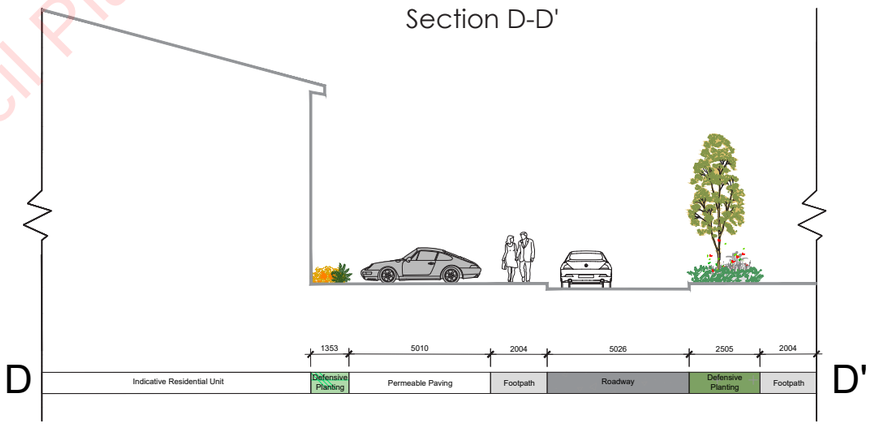
The street network for the proposed development aims to provide a permeable street layout that emphasises pedestrian and cyclist priority with a clearly defined hierarchy of street typologies.

Street trees and horizontal deflection will limit traffic speeds and increase pedestrian comfort, while defensive planting defines individual residential homes.

Main Link Street

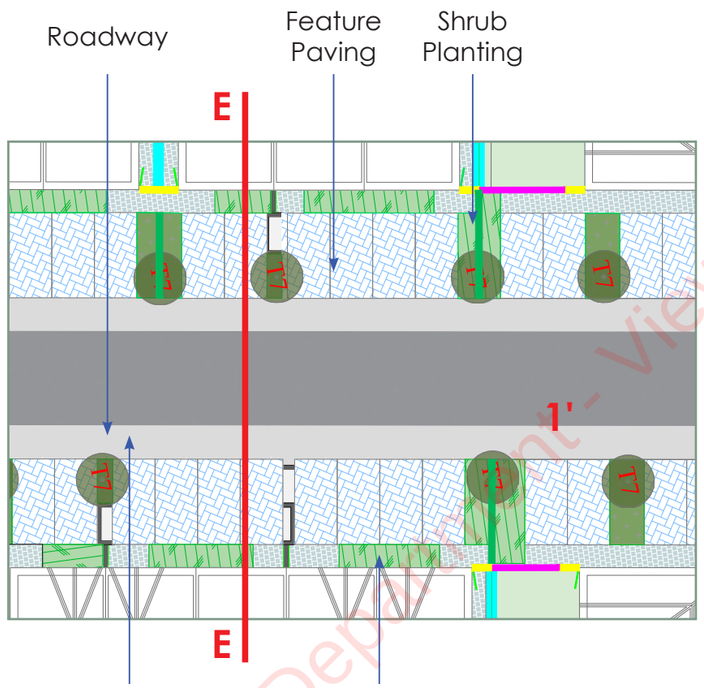


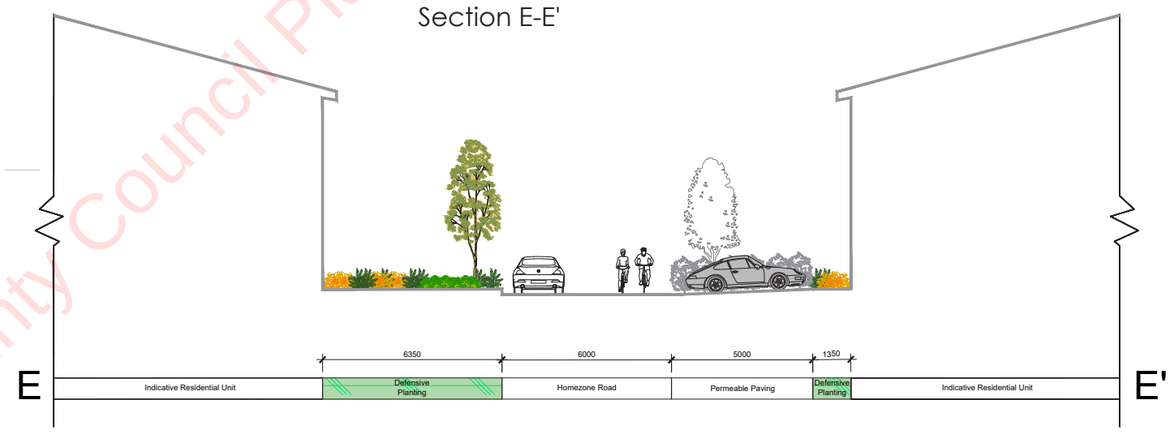
Primary - Main Link Street



- Public path On Both Sides
- Cyclepath/Route
- Public Trees
- Trees (house side) in Public Domain

Local Street





Local Street

- Public Path (on both sides of road)
- Public Realm Tree Planting

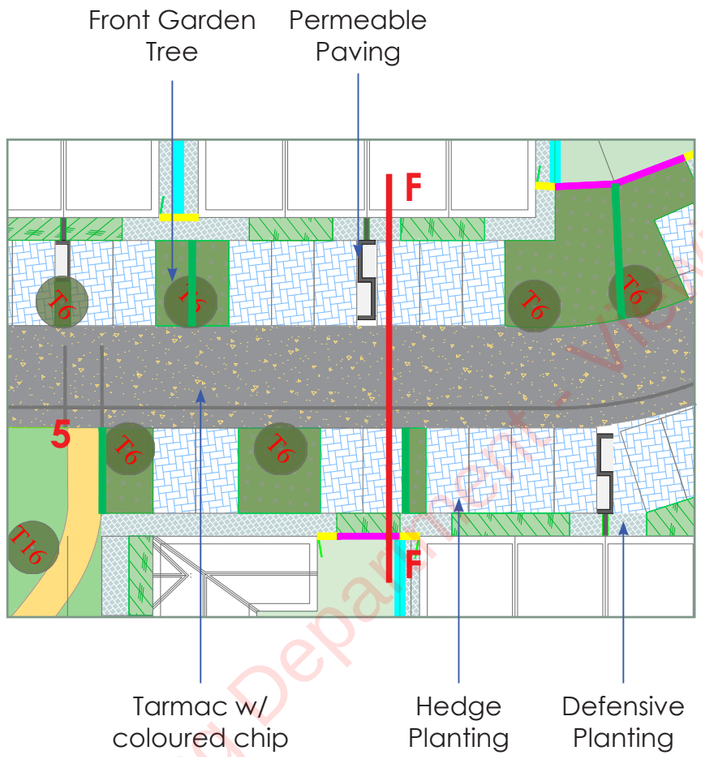
Homezone - Pedestrian Priority

Quieter streets are defined by a homogeneous shared surface providing pedestrian priority (6m width) with kerb delineation. Shared street provision: pedestrians and cyclist share carraigeway with vehicles in a low traffic speed and a low traffic volume environment.

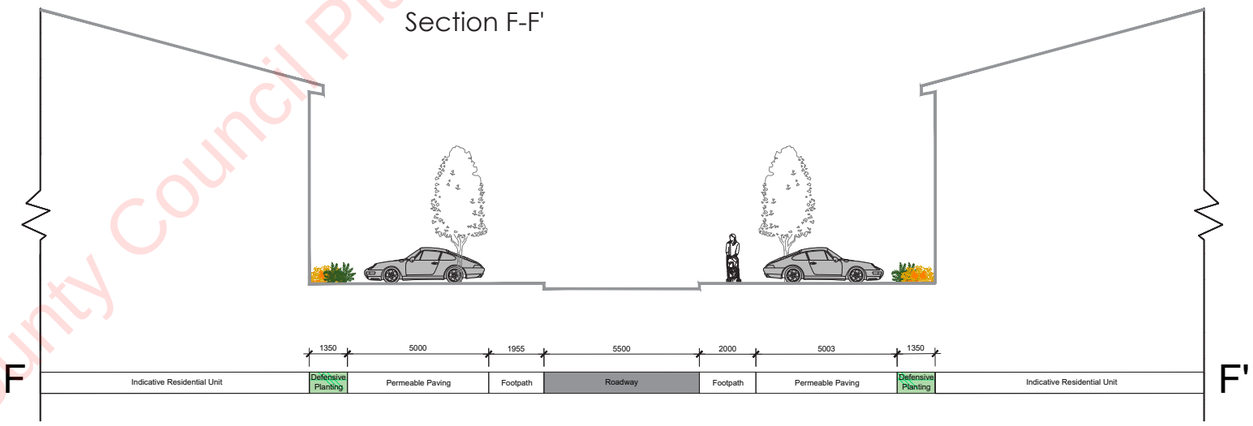
Proposed Planting to include front garden tree, public realm tree, boundary hedge, defensive shrub planting.

Homezone Shared Surface

Tarmac w/ coloured chip



Homezone
Pedestrian Priority



- Shared surface / Pedestrian priority
- Tree to Front Garden
- Coloured tarmac with stone chip
- Path in same material as road.

Boundary Treatment

Plan

BOUNDARY TREATMENT

Feature Wall (2m high)
Stone or Wet dash with block finish or similar approved

Residential Boundary Fence (1.8m high)
Timber panel & concrete post fence or similar approved

Steel Railing (1.2m high)
(3 Bar Powder Coated Black) or similar approved.

Gate Access to Back Gardens (1.8m high)
Solid Tongue and Groove Scandinavian Spruce Gate or similar approved

Structural Hedgerow (450mm topsoil depth / 100cm single row**)**

Species Name	Specification	Centres.
Prunus lusitanica	c/g 3L 100cm ht.	500mm

Timber Post and Tension Mesh Fence
To TII standard: SCD-00321 or similar approved

Structural Hedge Planting

Concrete Post & Wooden Panel Fence

Timber Post and Tension Mesh

Parkland Railing

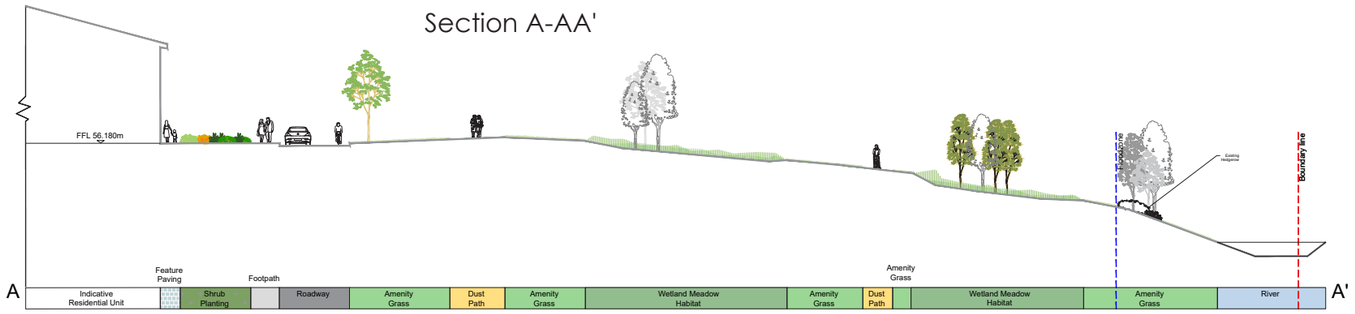
Stone Feature Wall

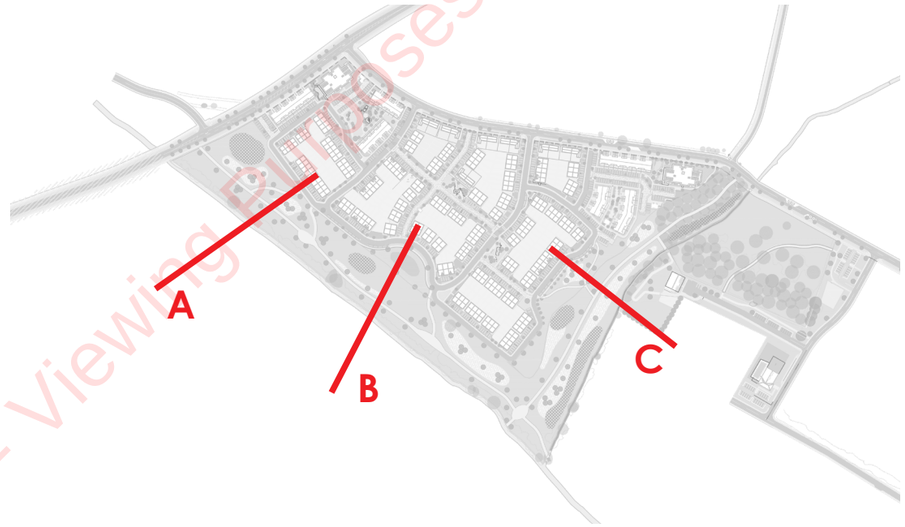
All-Ireland Pollinator Plan 2015-2020

RMDA LANDSCAPE ARCHITECTS + CONSULTANTS

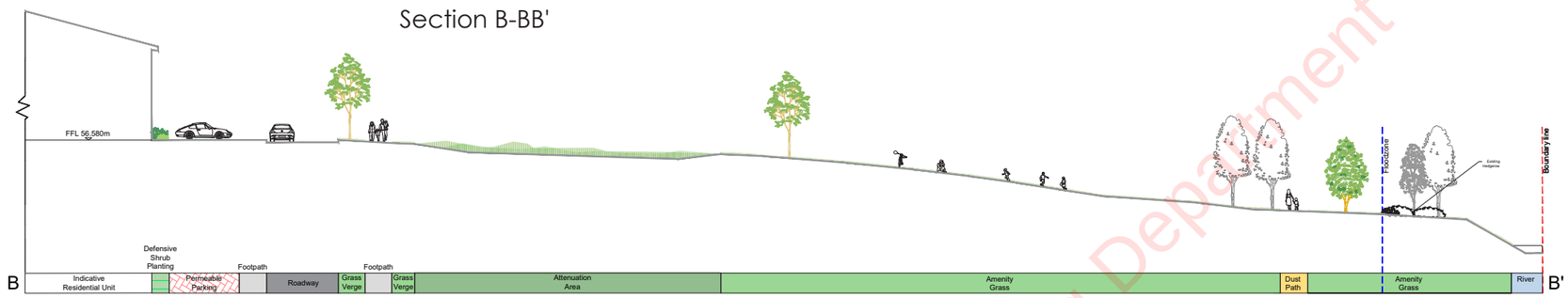
Site Boundary Sections

Section A-AA'

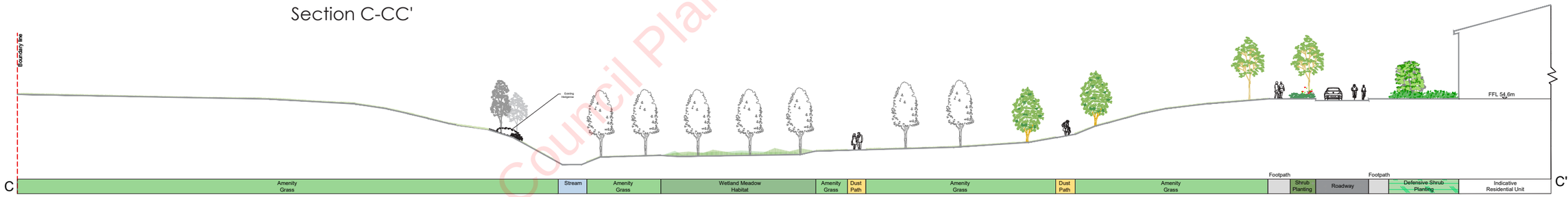




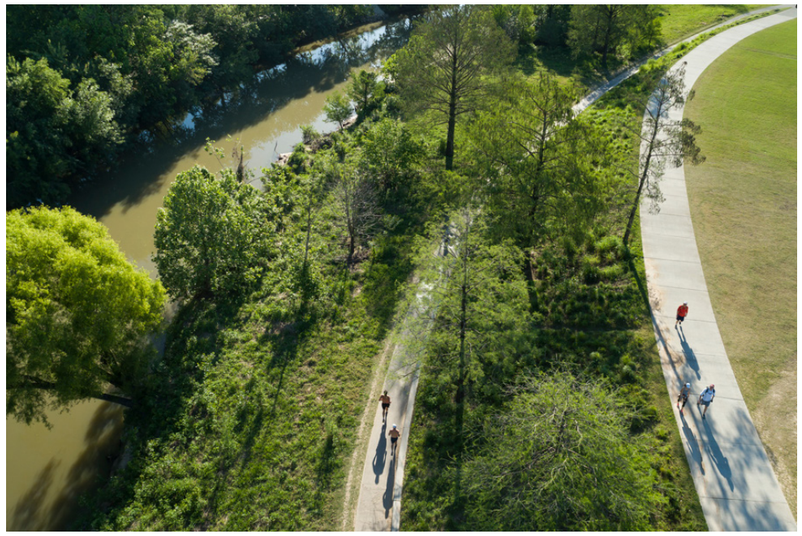
Section B-BB'



Section C-CC'

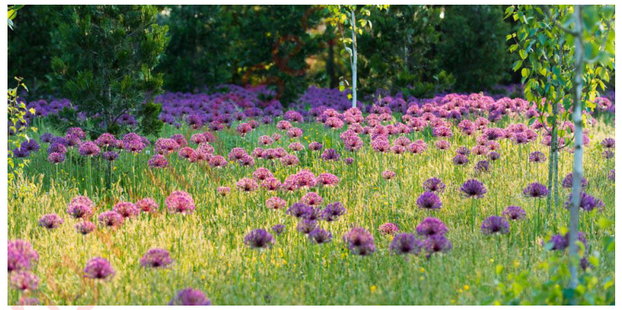


Parkland Mood Board



Flood-Resiliant Park with Riverside Walks

Seating



Wildflower Meadows

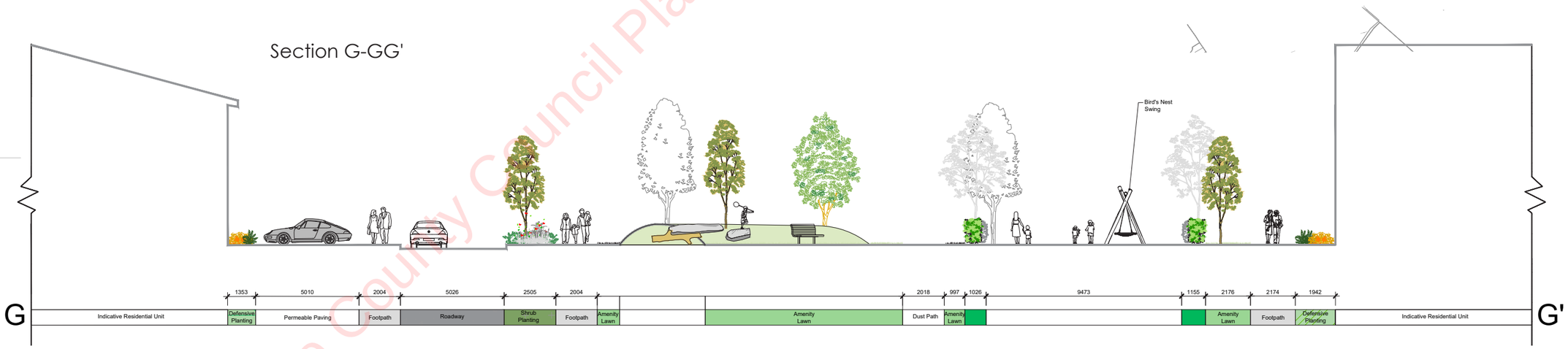
Natural Play Spaces

Park Entrance

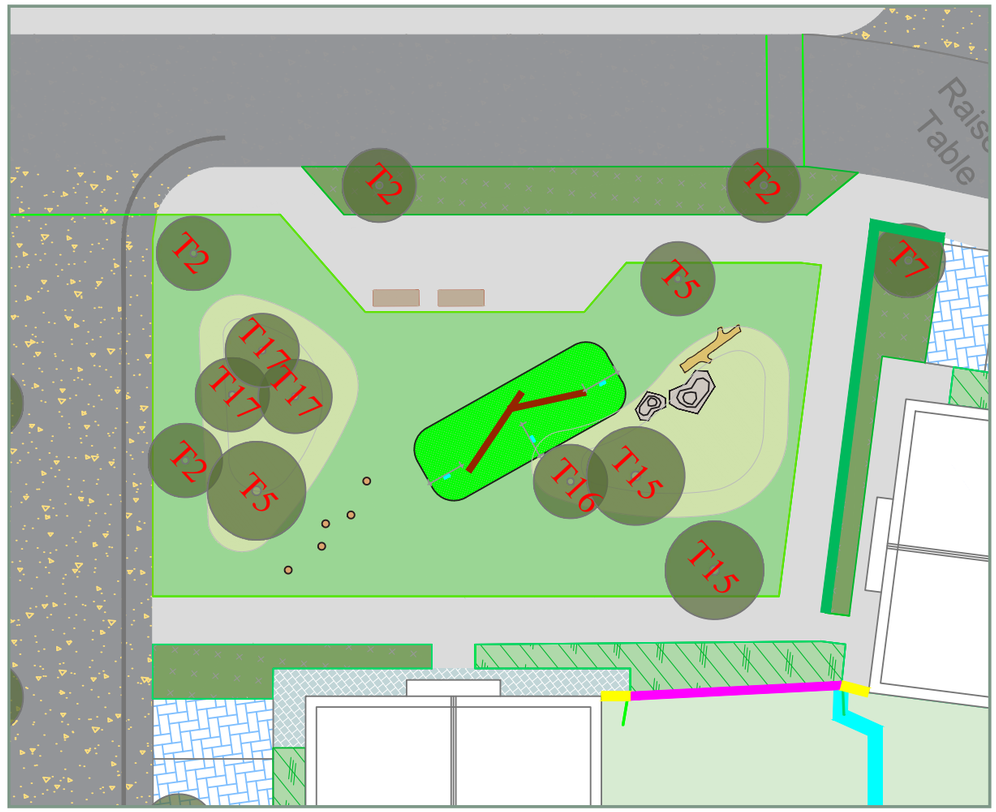
Seating Areas

Wetlands Bridge

Public Open Space - Pocket Park



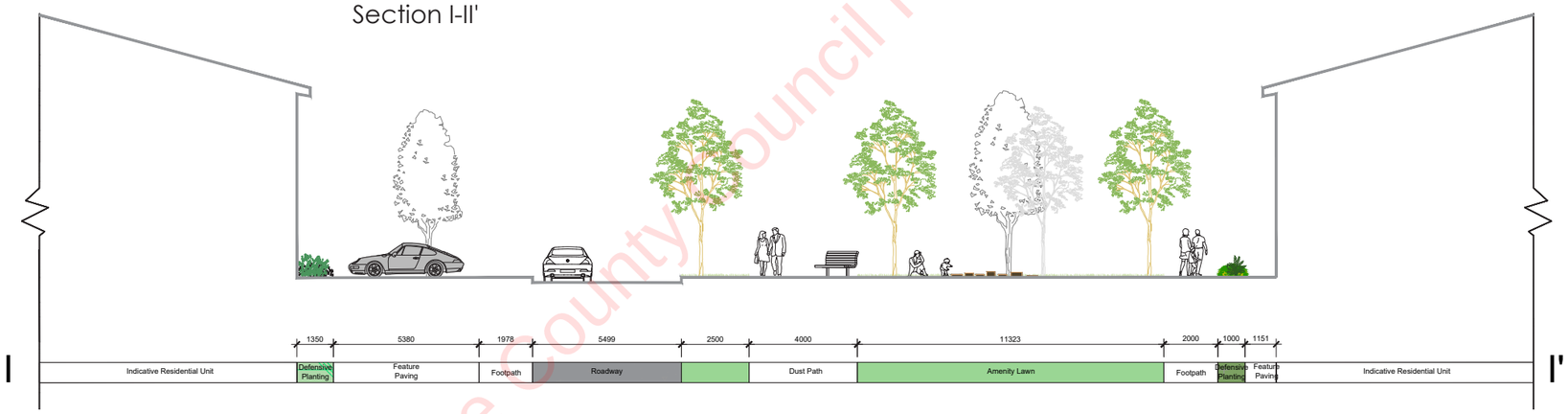
Public Open Space - Pocket Park



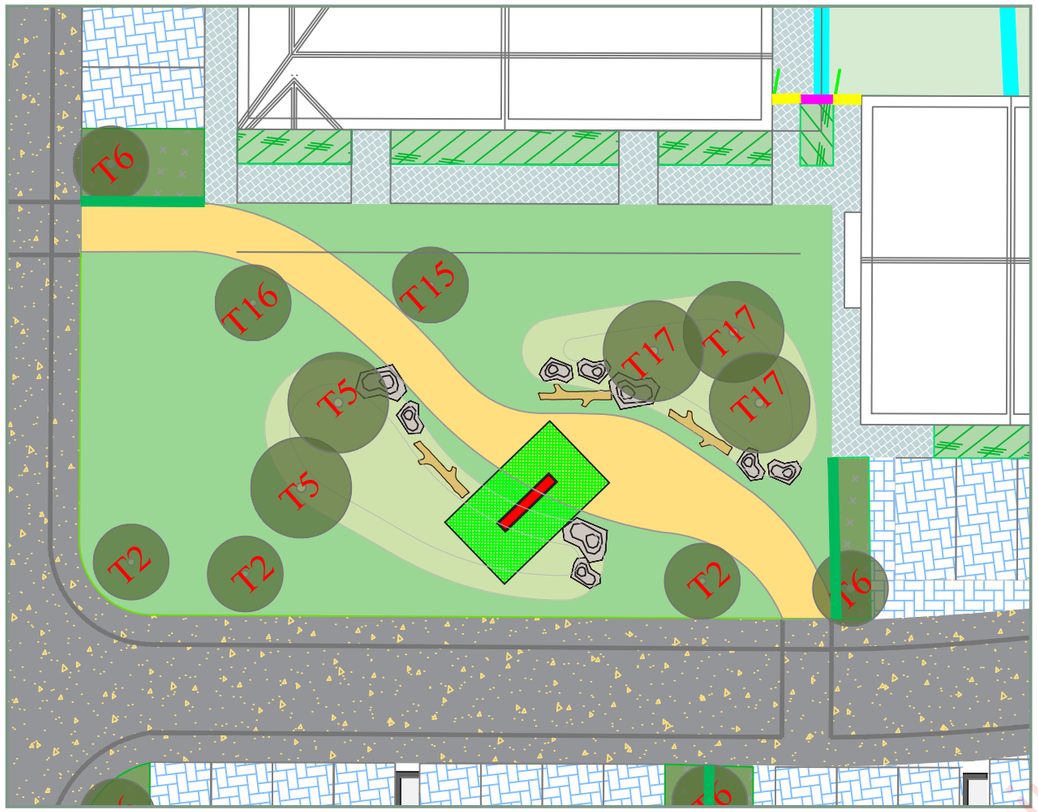
Location Plan

Natural Play

Section I-II'

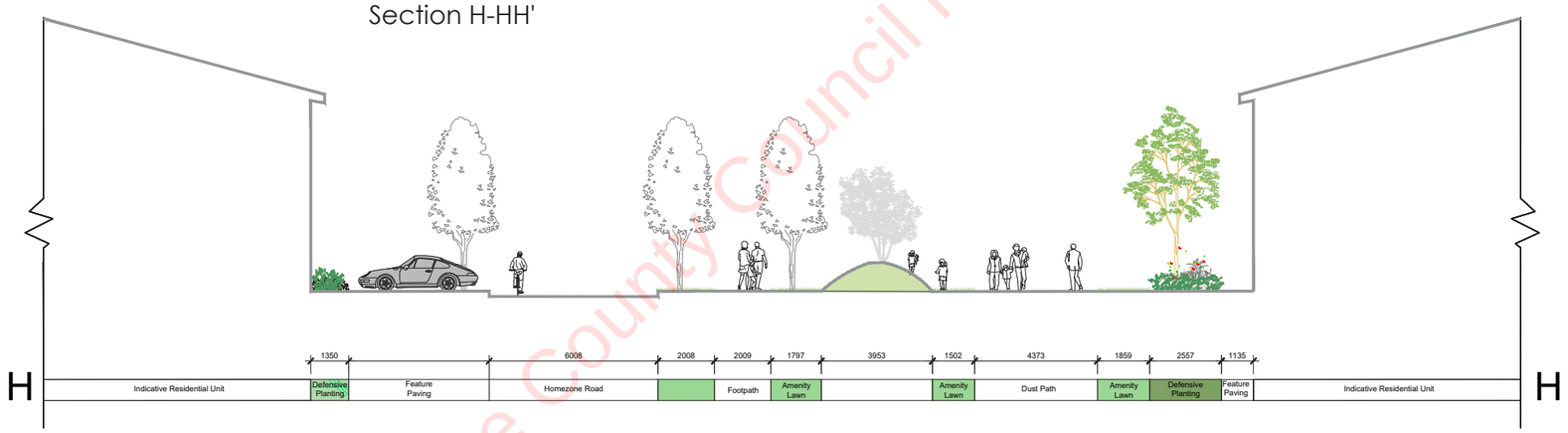


Communal Open Space



Natural Play

Section H-HH'



Play Spaces

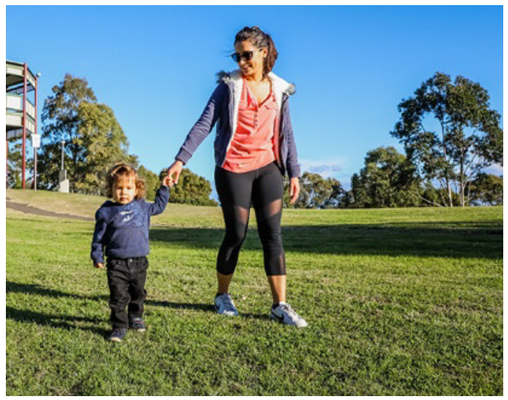
Calisthenic Street Workout Stations
- Dip Bench
- Decline Bench
- Incline Press
- Pull Up Station Pro
- Push Up Bars

Natural Play Area
- Grass Mounding
- Timber log
- Natural Stepping Stone
- Stepping logs
- Double Balancing Beam
- Embankment slide
- Seesaw
- Combi 4 Calisthenic Station

Structured Junior Play (3+ years)
- Timber log
- Climbing pyramid
- Bird's Nest Swing

Open Space - Playground

Natural Seating



Betula pendula

Playground Seating

Wood Fiber Playground Mulch
The fibres knit together to form a stable, Long-lasting, slip resistant surface, excellent impact absorption

Prunus ‘Otto luyken’

Lavandula angustifolia

Playground Bin

Movement
Tree planting and gentle grass mounding are ideal places to hide. These changes in levels are suitable for jumping and running down gentle hills.
Some Wooden seating areas could be suitable for climbing. Proposed playground located in the open space will accommodate climbing.

Stimulation of the five sense
Natural elements throughout open space and on podiums provide quiet places, dark and bright areas that appeals to a child senses. Sensory and textured plants planted throughout the spaces will appeals to the senses.

Experiencing change in the natural and built environment.
Experiencing the seasons The contrast between open space and paving provide opportunities to learn and play. Natural element in open space such as trees will allow Children to experience changes in seasons.

Social interactions
Meeting points and a number of seating areas will encourage social interaction. Kick about spaces also encourage interaction

Playing with identity
Role play, Places to hide in the natural elements of open space.

Experiencing a range of emotions
This bespoke designed open space will appeal and evoke children’s emotions.

Capabilities of play such as tumble ,chase game.
Extensive grass areas throughout the open space are ideal for kickabout and chasing games.

Varied and interesting physical environment.
A bespoke designed space that has gentle grass mounding thus providing a change in levels. This provides a varied and interesting physical play environment.

Swale SUDS

Swale provides temporary storage for storm water & reduces peak flows.

Suggested Wild-Flower Mix

Common knapweed *Centaura nigra*
Ribwort plantain *Plantago lanceolata*
Red clover *Trifolium pratense*
Bird's-foot trefoil *Lotus corniculatus*
Bulbous buttercup *Ranunculus bulbosus*
Meadow buttercup *Ranunculus acris*
Lady's-bedstraw *Galium verum*
Cowslip *Primula veris*
Oxeye daisy *Leucanthemum vulgaris*
Yellow rattle *Rhinanthus minor*
Common sorrel *Rumex acetosa*
Burnet saxifrage *Pimpinella saxifraga*
Autumn hawkbit *Leontodon autumnalis*
Rough hawkbit *Leontodon hispidus*

Suggested Lowland Meadow Grasses

Crested dog-tail *Cynosurus cristatus*
Common bent *Agrostis capillaris*
Sweet vernal-grass *Anthoxanthum odoratum*
Red fescue *Festuca rubra*
Smooth meadow-grass *Poa pratensis*

Typical swale in dry weather

We propose a new habitat to create a varied & interesting landscape. It shall take into account the current conditions & shall be implemented with native flora, ie. trees & plants & wildflower meadow.

Suggested Wetland/Marsh Mix

Marsh bedstraw *Galium palustre*
Greater bird's-foot trefoil *Lotus pedunculatus*
Sneezewort *Achillea ptarmica*
Valerian *Valeriana officinalis* (tall)
Purple loosestrife *Lythrum salicaria* (tall)
Hemp-agrimony *Eupatorium cannabinum* (tall)
Marsh violet *Viola palustris*
Angelica *Angelica sylvestris* (tall)
Water mint *Mentha aquatica*
Marsh marigold *Caltha palustris*
Ragged robin *Silene (Lychnis) flos-cuculi*
Gypsywort *Lycopus europaeus*
Meadowsweet *Filipendula ulmaria* (tall)

Typical swale in wet weather

PROPOSED MARGINAL PLANTING

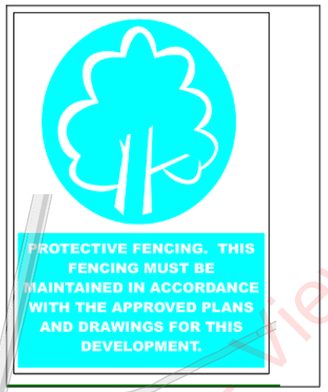
The following marginal plants are to be certified native origin, to be collected as either seed or rootstock from the wild & introduced into the wetland area Stream Area.

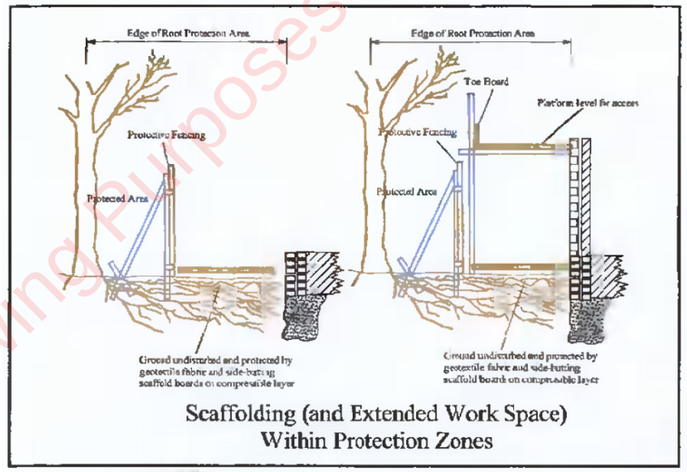
Yellow flag iris (Iris pseudacorus),
Marsh marigold (Caltha palustris),
Water plantain (Alisma plantago-aquatica),
Water forget-me-not (Myosotis scorpioides),
Brooklime (Veronica beccabunga),
Bogbean (Menyanthes trifoliata),
Ragged robin (Lychnis flos-cuculi).

Tree Protection & Detail

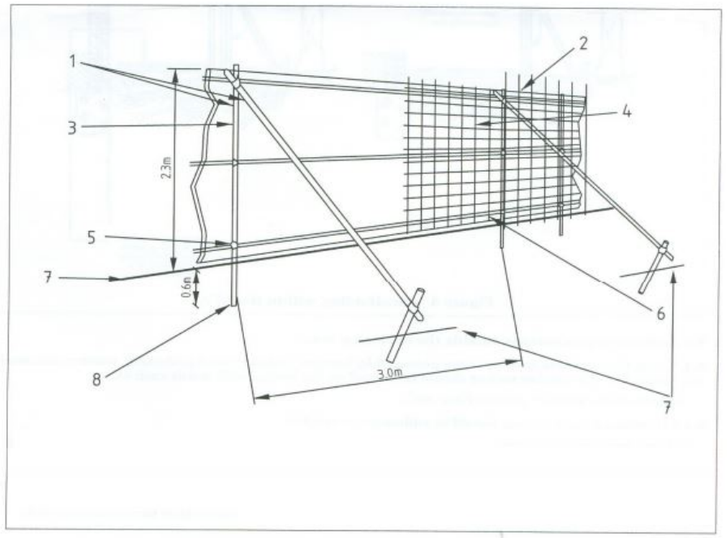
Existing Tree to be retained on site

Detail of signage





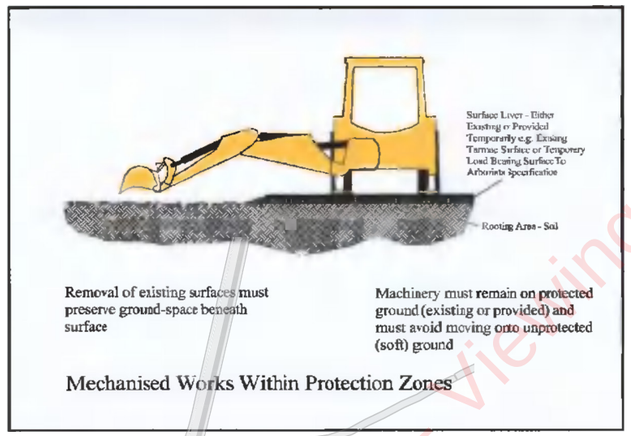
Appendix 1. - Protective Barrier



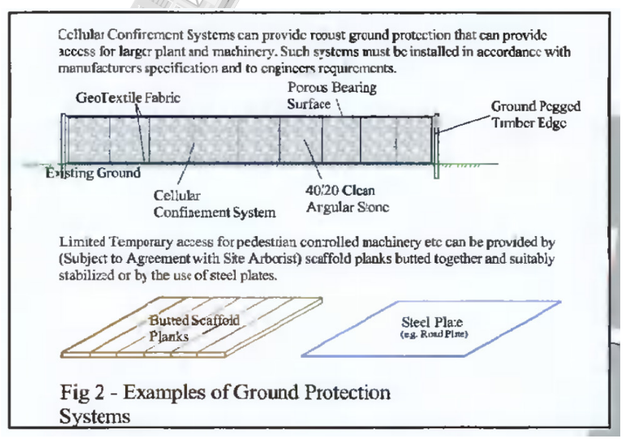
The above displays an example of a suitable protective barrier as recommended by *BS. 5837 2012 Trees in Relation to Construction*

1. **Standard scaffold poles**
2. **Uprights to be driven into the ground**
3. **Panels secured to uprights with wire ties and where necessary standard scaffold poles**
4. **Weld mesh wired to the uprights and horizontals**
5. **Standard clamps**
6. **Wire twisted and secured on the inside of fencing to avoid easy dismantling**
7. **Ground level**
8. **Approx. 0.6m driven into the ground**

Tree Protection & Detail



Existing Tree to be retained on site



The tree protection fencing is to be erected enclosing the root protection areas around the trees being retained as shown on this drawing and appendix 1. In some areas, the site hoarding may be sufficient to act as the protective fencing if the tree and its root zone are positioned outside and no works are envisaged within the area outside the site hoarding. This will need to be discussed and agreed at the initial site meeting.

Where tree protection fencing is needed, this will need to be 2.3m high and constructed in accordance with figure 2 of BS 5837 2012 (see detail on drawing & appendix 1) using vertical and horizontal scaffold bars or similar well braced together with the verticals spaced out at a maximum of 3m centres. Onto this, weld mesh panels (harris fecne panels) are to be securely fixed with wire or scaffold clamps.

Signs are to be attached to these fences warning people that this is a protective area and that the fencing must be maintained in good condition in accordance with the approved plans and drawings for this development.

Once the protective fence line is erected, then the main construction works can commence on site.

The following is a list of activities that are not allowed within the RPA or within the vicinity of the trees being retained.

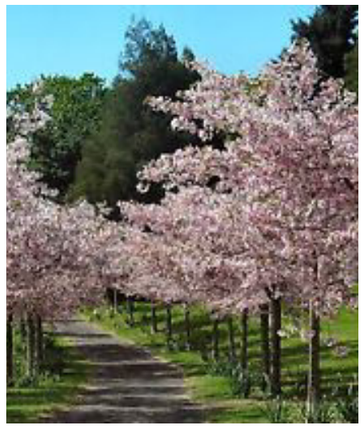
- Protect tree root systems from damage caused by runoff or spillage of noxious materials while mixing, placing, or storing construction materials.
- Protect root systems from ponding, eroding, or excessive wetting caused during construction operations.
- Do not store construction materials, debris, or excavated material inside tree protection zones. When excavating, place excavated soil on opposite side of trench away from the tree.
- Do not permit vehicles or foot traffic within tree protection zones; prevent soil compaction over root systems.
- Do not allow fires under or adjacent to remaining trees or other plants.
- Do not attach notice boards, cables or other services to any part of the tree.
- Do not use neighbouring trees as anchor points.
- Do not use high machinery such as Tele-porters, cranes or other equipment close to trees to avoid damage to the crown or any other parts.

During the construction works the following is required:

1. The main contractor or site manager is to brief all people working on site on the tree protection measures and the procedure if works need to be carried out within these areas.
2. Storage of Material, Work Yards and staff car parking– are to be identified on the work drawings prior to the construction works starting. These need to be positioned outside the root protection areas around the trees being retained.
3. The main contractor or site manager is to check the tree protective fencing daily and carry out any repairs required to ensure its stays upright and secure.
4. The main contractor or site manager is to liase with the project Arboriculturist if and when works are to be carried out close to or within the root protection areas around the trees.
5. Any works to occur within the protection areas such as landscaping is to be carried out manually with no machinery allowed. All soft and hard landscaping within the Root Protection Area (RPA) of the trees to be retained are to be carried out manually and the soil levels are not to be lowered or raised resulting in root damage to the trees. Recommendations of sections 8 of BS5837 2012 are to be adhered to during the landscaping within the RPA'S of the trees being retained.
6. The protective fencing around the trees is to stay in position until all the construction works are complete and are only to be removed following discussions and agreement with the project arborist.

Proposed Planting

Street and Open Space Trees

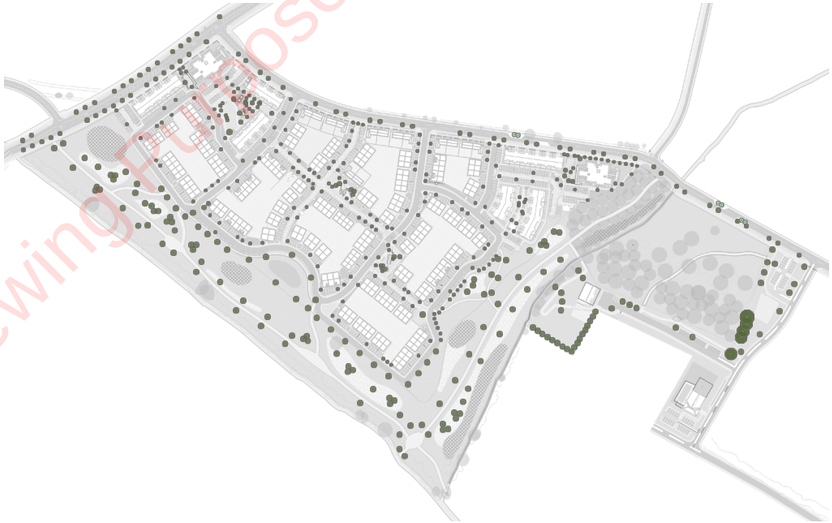


Prunus avium ‘Plena’

Acer griseum ‘Multi-stem’

Fagus sylvatica ‘Dawyck’

Betula jacquemontii
multi stem



Proposed Trees Location

Acer campestre ‘Elsrijk’
Underplanted with
Prunus ‘Otto luyken’

Betula pendula

Carpinus betulus ‘Frans fontaine’

Amelanchier lamerkii

Pyrus calleryana
‘Chanticleer’

Note: Planting shown throughout rationale are mature and are not indictive of size that shall be planted first.

Shrubs - To Private Spaces

Persicaria affine

Bergenia cordifolia

Libertia grandiflora

Aucuba japonica

Proposed Shrub Location

Prunus ‘Otto luyken’

Lavandula angustifolia

Hypericum hidcote

Astellia ‘Silver Spear’

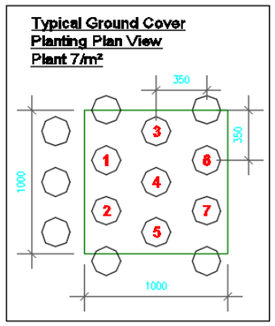
Miscanthus sinensis

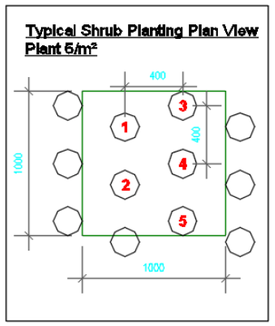
Agapanthus ‘Blue Giant’

Kniphofia ‘Royal standard’

Nerine bowdenii

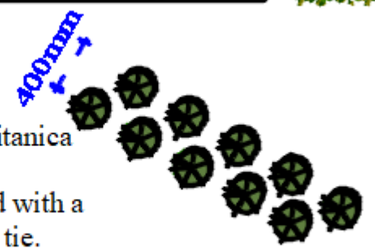
Sedum spectabile





Hedgerows

H1 - Hedgerow Planting Detail



Hedge mix
60-90mm

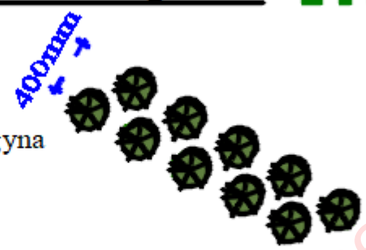
100% Prunus lusitanica

50 x 50 stake tied with a
single rubber gut tie.
2 rows @ 500mm centres -400mm
apart,

- Private Space Hedegrow
- Noise Barriers
- Property Boundary

Hedge Type 1 Mix
Prunus lusitanica Hedge

H2 - Hedgerow Planting Detail



Hedge mix
60-90mm

Crataegus monogyna
Prunus spinosa
Ilex aquifolium

50 x 50 stake tied with a
single rubber gut tie.
2 rows @ 500mm centres -400mm
apart,

- Public Park Hedgerow

Hedge Type 2 Mix - Crataegus monogyna

Hedge Type 2 Mix - Prunus spinosa

Hedge Type 2 Mix - Ilex aquifolium

Proposed Hedgerow Location

Wildflower Mix

Marsh Thistle
Cirsium palustre

Common Knapweed
Centaurea nigra

Sneezewort
Achillea ptarmica

Meadowsweet
Filipendula ulmaria

Proposed Wildflower Location

Common Bent
Agrostis capillaris

Meadow Foxtail
Alopecurus pratensis

Oval Sedge
Carex ovalis

Tufted Hair Grass
Deschampsia caespitosa

Red Fescue
Festuca rubra

Reed Canary Grass
Phalaris arundinacea

Smooth-stalked Meadow Grass - Poa pratensis

Devils-bit Scabious
Succisa pratensis

Native wildflower meadows are proposed and will provide a food source for local pollinators. The wildflower meadows will be managed in-line with the All-Ireland Pollinator Plan.

Note: The Wildflower Meadow will need to be cut once in Autumn (Late August/Early September) with a tractor and mower. Leave the mowings for a few days to allow seed to drop to the ground. Then it should be baled and bales removed.

Proposed Hard Landscape Elements

Elements Palette

Landscape Elements
Wooden seating element, some areas to incorporate lines of Yeats poems along side of bench

Hartecast HC2001S Bench
- 1950x540x450mm

Flush Slipform
Concrete Kerb

Sheffield Cycle Stands
- 1000mm x 1000mm

Tree Pit Grilles

Paving Palette

Feature Paving
Light coloured flags to maximum light within courtyards w/ contrasting paving blocks

Tobermore City Pavers
- Graphite 300x150x100mm

Tobermore City Pavers
- Silver 300x150x100mm

Traffic Area & Parking
Permeable Surface
dim. 200x100x60mm with contrasting parking dividers

Tobermore Hydropave
Pedesta Pavers - Bracken

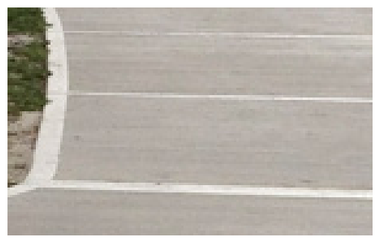
Tobermore Hydropave
Pedesta Pavers - Heather

Surface Palette

In-situ Surfaces

Coloured Tarmac
(Homezone)

Coloured tarmac
(cycle path)



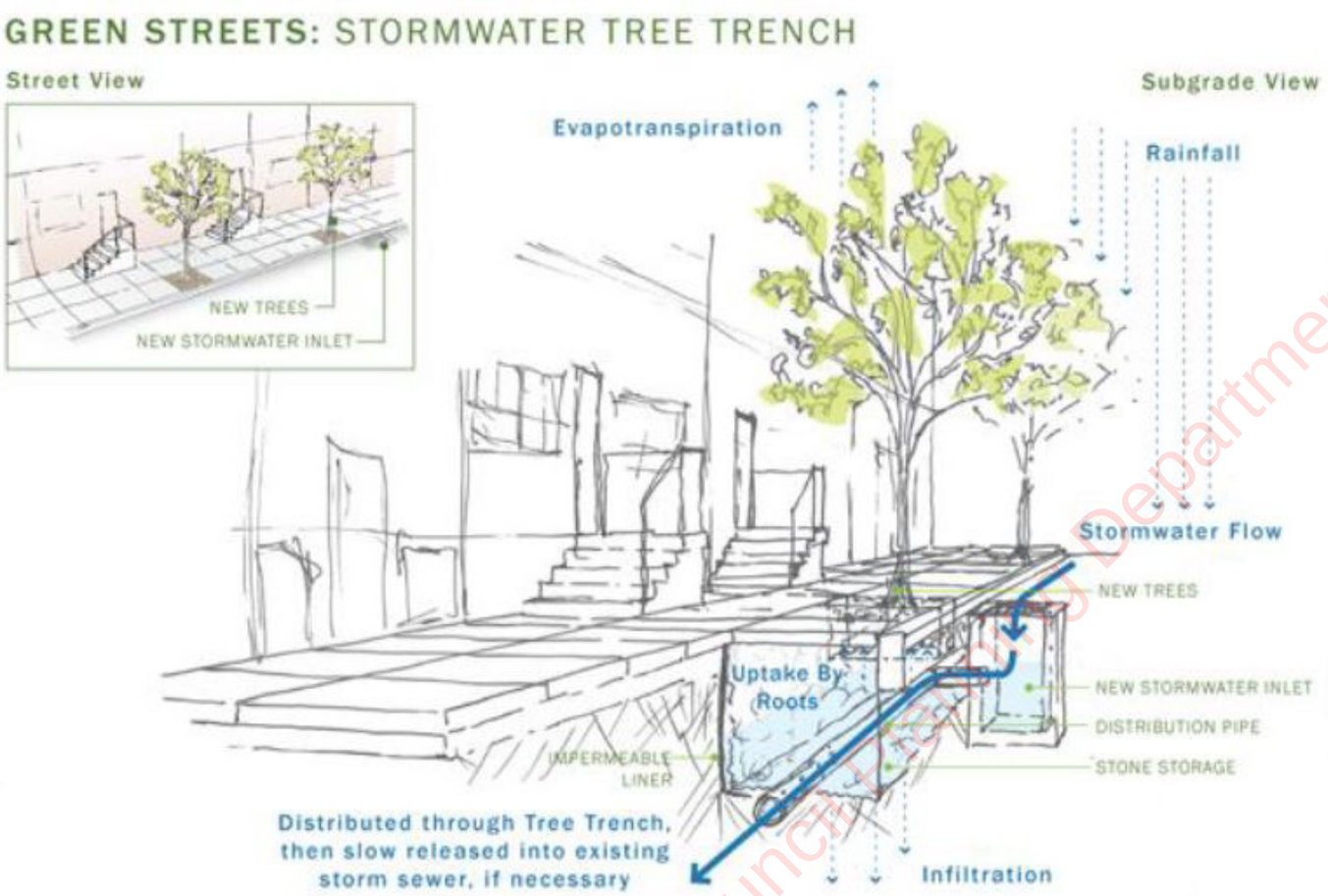
Brushed Concrete with
trowel edge finish (streets)

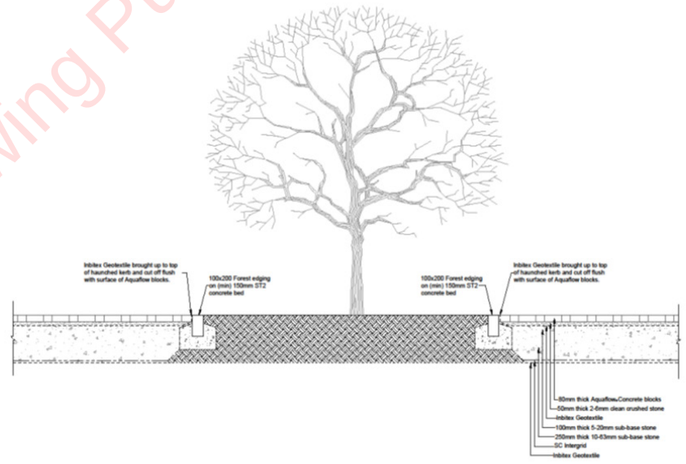
Resin Bond Paths
Resin-bound surfacing for high impact areas across the development

Ballylusk Dust Path
(pedestrian path)

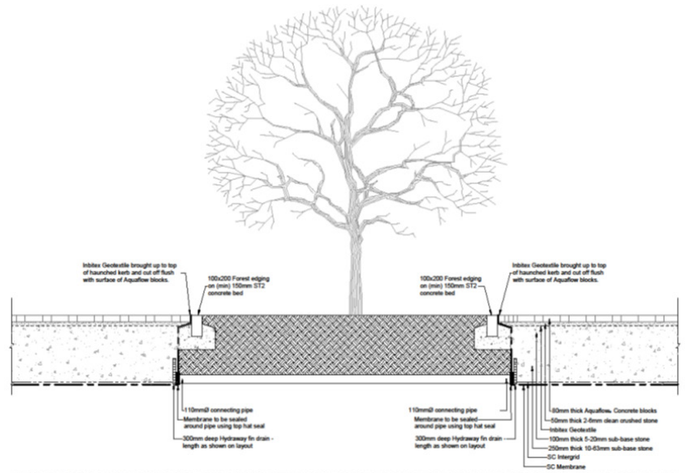
Coloured tarmac
(cycle path)

Individual Tree Pit for Public Realm



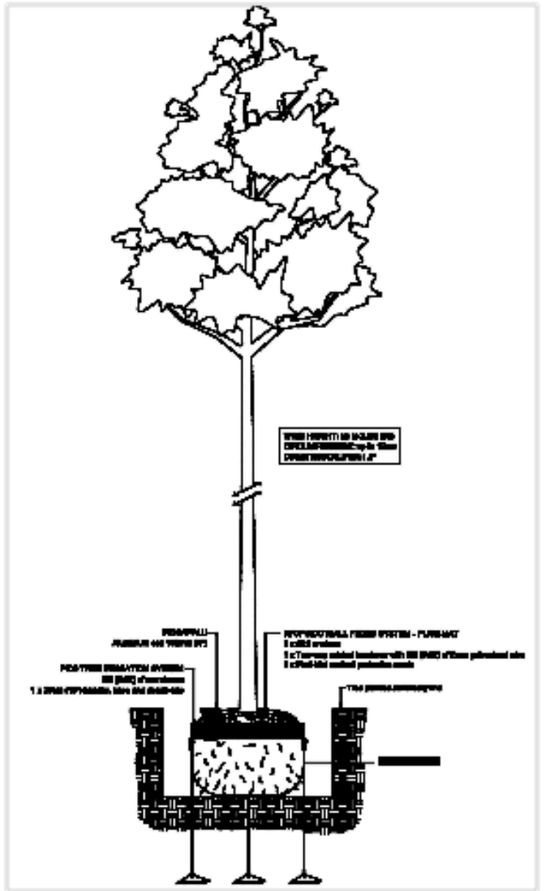


TYPICAL SECTION THROUGH FORMPAVE AQUAFLOW INFILTRATION SYSTEM INCORPORATING LANDSCAPED AREA

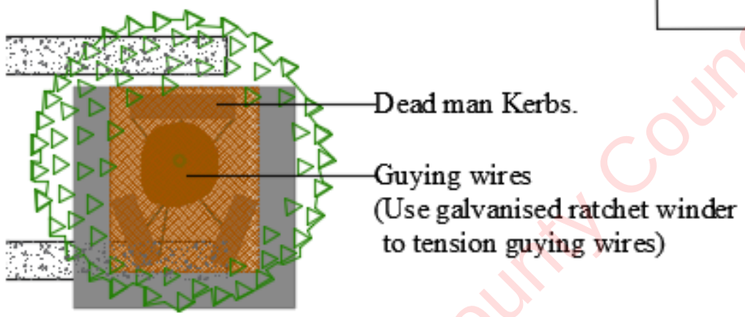


TYPICAL SECTION THROUGH FORMPAVE AQUAFLOW ATTENUATION SYSTEM INCORPORATING LANDSCAPED AREA AND CONNECTING PIPE

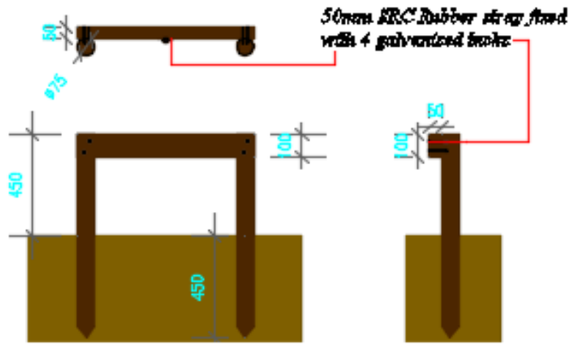
Plati-Mat Rootball Tree Anchoring Detail
(For Podium Planters)



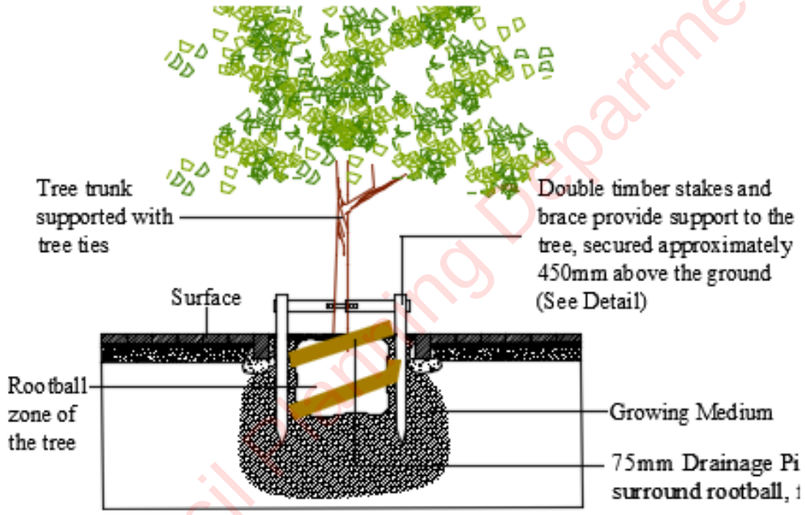
Plati-Mat Plan View ***Scale*** *(1:50)*



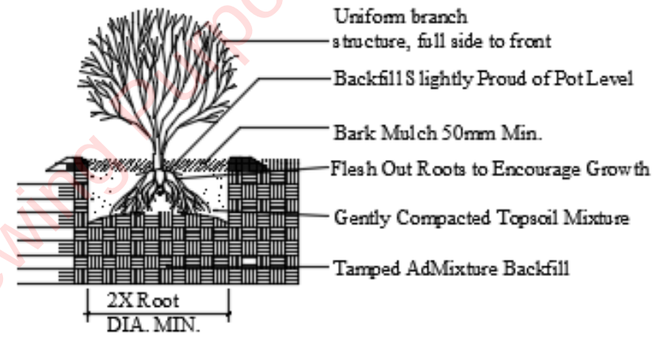
Typical Double Tree staking Detail ***Scale*** *(1:25)*

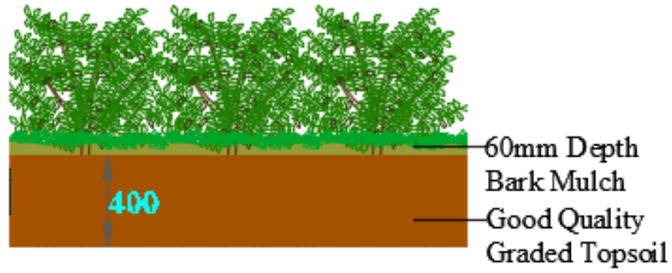


Tree Planting Detail, 12-14cm girth and greater - *(for trees outside Podium Area)*



Shrub Planting Detail





Shrub Planting Build-up Detail ***Scale*** *(1:25)*

PLANTING NOTES:

ALL TREES, SHRUBS AND HEDGEROW PLANTS SHALL COMPLY WITH BS 3936, SPECIFICATION FOR NURSERY STOCK. ALL PRE-PLANTING SITE PREPARATION, PLANTING AND POST PLANTING MAINTENANCE WORKS SHALL BE CARRIED OUT IN ACCORDANCE WITH THE REQUIREMENTS OF BS 4428 (1989) CODE OF PRACTICE FOR GENERAL LANDSCAPE OPERATIONS (EXCLUDING HARD SURFACES).

ALL NEW TREE PLANTING SHALL BE POSITIONED IN ACCORDANCE WITH THE REQUIREMENTS OF TABLE 3 OF BS 5837: 2005 TREE IN RELATION TO CONSTRUCTION: RECOMMENDATIONS, WHICH SPECIFIES MINIMUM DISTANCES BETWEEN NEW PLANTING AND STRUCTURES.

SCHEDULE OF IMPLEMENTATION:

1. ALL TREE AND HEDGEROW PLANTING IS TO BE CARRIED OUT DURING THE FIRST WINTER SEASON, I.E. NOVEMBER TO FEBRUARY INCLUSIVE.
2. ALL LAWN AREAS ARE TO BE PREPARED AND SEEDED DURING THE GROWING SEASON, I.E. APRIL TO OCTOBER INCLUSIVE.
3. ALL CONTAINERISED SHRUB PLANTING MAY BE CARRIED OUT AT ANY TIME OF WHEN SOIL IS NOT FROZEN, WATERLOGGED OR EXCESSIVELY DRY.

Ronan Mac Diarmada & Associates

Landscape Architects & Consultants

RMDA
LANDSCAPE ARCHITECTS + CONSULTANTS

APPENDIX 4-8

DMURS COMPLIANCE STATEMENT

DMURS COMPLIANCE STATEMENT

MOYGADDY CASTLE SHD

Sky Castle Ltd
S665
26 August 2022

OCSC
O'CONNOR | SUTTON | CRONIN
Multidisciplinary
Consulting Engineers

DMURS COMPLIANCE STATEMENT

Moygaddy Castle SHD

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NOTICE

DOCUMENT CONTROL & HISTORY

OCSC Job No.: S665	Project Code	Originator	Zone Volume	Level	File Type	Role Type	Number	Status / Suitability Code	Revision
	S665	OCSC	1C	XX	RP	C	0006	S4	P07

Rev.	Status	Authors	Checked	Authorised	Issue Date
P07	S4	JT	WM	AH	26/08/2022
P06	S4	JT	WM	AH	19/08/2022
P05	S4	JT	WM	AH	04/08/2022
P04	S4	SMG	AH	AH	07/12/2021
P03	S2	SMG	AH	AH	01/12/2021
P02	S2	SMG	AH	AH	15/10/2021
P01	S2	SMG	AH	AH	08/10/2021

O'Connor Sutton Cronin & Associates (OCSC) have been appointed by *DMURS ComplIance Statement* to carry out the design of the civil engineering services associated with the proposed 360nr. unit residential and crèche development at Moygaddy, Co. Meath, which is located northeast of the town of Maynooth, Co. Kildare.

Planning Permission is sought be Sky Castle Ltd. for the development of a site which extends to 19.52 hectares gross site area in the townland of Moygaddy, Maynooth Environs, Co. Meath. The net developable area equates to 7.89 hectares which equates to a residential density of 45.6 units per hectare.

The proposed development will consist of the following:

1. Construction of 360 no. residential units comprising:
   (i) 196 no houses (including 19 no. 2 beds, 156 no. 3 beds and 21 no. 4 beds).
   (ii) 102 no. duplexes (including 51 no. 1 beds and 51 no. 2 beds) set out in 6 no. blocks.
   (iii) 62 no. apartments (including 26 no. 1 beds and 36 no. 2 beds) set out in 2 no. blocks.
2. Provision of a public park and playground with associated 42 no. car parking spaces adjacent to Moygaddy Castle and pedestrian and cyclist links along the River Rye. The overall public open space (including the High Amenity Lands) equates to 7.98 hectares.
3. Provision of private open spaces in the form of balconies and terraces is provided to all individual apartments and duplexes to all elevations.
4. Development of a two-storey creche facility (514 sqm), outdoor play area and associated parking of 29 no. spaces.
5. 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.
6. Provision of 4 no. bridge structures comprising:
   (i) an integral single span bridge at Moyglare Hall over the River Rye Water to connect with existing road infrastructure in County Kildare and associated floodplain works and embankments.
   (ii) a new pedestrian and cyclist bridge at Kildare Bridge which will link the proposed site with the existing road network in County Kildare.

(iii) a new pedestrian and cycle bridge across Blackhall Little Stream on the L22143 adjacent to the existing unnamed bridge.

(iv) a new pedestrian and cycle bridge over the Moyglare Stream linking the proposed residential site with the proposed Childcare Facility, Scout Den and Moygaddy Castle Public Park.

7. 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.
8. Proposed road improvement and realignment works including:
   (i) realignment of a section of the existing L6219 local road, which will entail the demolition of an existing section of the road which extends to circa 2,500 sqm.
   (ii) Provision of pedestrian and cycle improvement measures along the L6219 and L22143 which abuts the boundary of Moygaddy House which is a Protected Structure (RPS ref 91558).
   (iii) Provision of pedestrian and cycle improvement measures along the R157 which abuts the Carton Demense Wall which is a Protected Structure (RPS Ref 91556).
9. Provision of 2 no. vehicular and pedestrian accesses from the L6219 local road, 1 no. vehicular and pedestrian entrance from the L22143 and an additional vehicular and pedestrian access from the R157 to the Childcare and Scout Den facilities.
10. The proposed development will provide 283 no. of bicycle parking spaces, of which 200 no. are long term spaces in secure bicycle stores and 83 no. are short term visitor bicycle parking spaces. 12 no. bicycle spaces are provided for the creche and 12 no. bicycle spaces are provided for the Scout Den.
11. 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.
12. Provision of site landscaping, public lighting, bin stores, 3 no. ESB unit substations, site services and all associated site development works.
13. A Natura Impact Statement (NIS) and Environmental Impact Assessment Report (EIAR) has been included with this application.

A separate application will be made to Kildare County Council for the provision of the section of MOOR south of the River Rye that ties into the already constructed section adjacent to Moyglare Hall that is within the Kildare County Council jurisdiction This overlap of applications will ensure unimpeded access to the proposed development lands for all modes of transport including vehicular and dedicated pedestrian and cyclists' facilities.

The proposed link roads and streets together with the junctions, footpaths and cycle facilities have been designed in accordance with the requirements of the Design Manual for Urban Roads and Streets (DMURS) and the National Cycle Manual (NCM). DMURS is the design philosophy used in the design of all new residential roads and urban streets and the key objective of DMURS is to achieve safe, attractive and vibrant streets by balancing the needs of all users and prioritising alternatives to car journeys. The subject site is fully consistent with this recommended approach and achieves a sense of place and residential amenity whilst also facilitating efficient and secure internal movement. The site layout encourages permeability through the site, connecting to the wider area via pedestrian links and cycleways and seeks to prioritise pedestrians and cyclists in accordance with the policies set out in DMURS.

The scheme complies with the following key DMURS Design Principles:

INTEGRATED STREET NETWORKS

The subject site will be linked to Maynooth Town Centra via the proposed section of the MOOR as part of this application and the Moyglare Road. New dedicated pedestrian and cyclist infrastructure will be provided along the proposed section of the Maynooth Outer Relief Road (MOOR) & within the internal development. All footpaths within the development will be a minimum of 1.80m wide and will run parallel to the proposed road infrastructure The SHD site will be serviced by way of two uncontrolled junctions that will access the L6219.

The provision of infrastructure on the MOOR will include a 7.0m carriageway,1. verge, footpath and also cycle tracks designed in accordance with the National Cycle Manual.

Pedestrian and cyclist infrastructure will also be provided along the L6219 and L22143 linking the residential lands to the creche and public parklands to the east.

Figure 1: Site Layout

MOVEMENT AND PLACE

The proposed development incorporates a permeable and legible street network that offers route choice and flexibility for managing movement. There is a fully integrated pedestrian network with all the main landscape spaces connected to a universally accessible route. In line with best practice, the design incorporates an orthogonal type street layout thus promoting legibility as well as connectivity.

The proposed network is structured and will draw future occupants toward focal points including green open space.

PERMEABILITY AND LEGIBILITY

Pedestrian and cyclist movement is prioritised by providing a layout that restricts the speed of vehicular movements by use of vertical and horizontal deflection and by use of shared streets. A high degree of pedestrian permeability throughout the site is created by providing footways that connect the spaces between each block with crossings located at each junction.

TRAFFIC MANAGEMENT

By assigning carriageway widths within the development of 6.0m link road access and where perpendicular parking occurs on both sides of the road and the remaining road will have a width of 5.0m local streets, along with variations in the horizontal alignment of the access road, a natural traffic calming effect is provided in both a physical and psychological sense, which will assist in self-regulating vehicular speeds. Gradients proposed to minimise the need for revving of engines and associated noise and emissions, while appropriate landscaping will absorb excessive sound. Pedestrian priority will be provided at some internal junctions in the form of raised entry treatments which also serve as a traffic calming measure. The location of the site will promote the use of public transport, walking and cycling thus contributing to reduced air emissions.

MOVEMENT, PLACE AND SPEED

High levels of pedestrian movement are catered for which supports vibrant and sustainable places. The segregation and exclusion of vehicular traffic and where appropriate the use of shared streets within the development also supports the sense of place.

Element	Consistency with DMURS
Streets and Link Roads	All Link roads and Streets within the development to have a Hierarchy of Widths to include 6.00m for the main link road and where perpendicular parking occurs and 5.0m for the minor roads. Maximum road gradient 1:12 with minimum gradient 1:100. Corner Radii to be 6.0m on external junctions and 3.0m on all internal junctions. Speed Limits to be 30.0 kph. The MOOR will be designed as an arterial route 7.0m wide and have a design speed of 60kph.
Footpaths	All footpaths provided will be a minimum of 1.8m in line with DMURS. Proposed footpath along MOOR will be 2.0m wide. New footpath links will be constructed to enhance connectivity.
Cycle Facilities	The cycle facilities proposed are a combination of dedicated 1.75m off road cycle tracks along the MOOR. In addition there will be on-road cycle facilities which are shared with vehicular traffic and acceptable for low traffic speed urban environments. The New cycle facilities that will be constructed along the MOOR will connect to the existing sections of MOOR already completed and connect on to the Moyglare Road.
Junctions	Both entrance junctions are priority junctions with pedestrian and cycle crossings where required. The MOOR will connect to the L6219 via additional priority junctions. All crossings to have appropriate tactile paving to aid vulnerable road users. Visibility standards maintained at all junctions.
Visibility	The internal development horizontal and vertical visibility to be maintained at all junctions and crossings in line with the 30 kph Design Speed. The MOOR will be design in accordance with a 60kph DMURS Design Speed.

CONCLUSION

As can be seen in the table above, it is considered that the design elements of the proposed street and link road in the development are in compliance with the objective of the Design Manual for Urban Roads and Streets (DMURS) which aims to provide safe, attractive and vibrant streets by balancing the needs of all users and prioritising alternatives to car journeys.

VERIFICATION

This report was compiled and verified by:

Joshua Tai BE, MIEI

Civil Engineer

O'Connor Sutton Cronin & Associates

OCSC

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APPENDIX 4-9

ENGINEERING SERVICES

REPORT

Engineering Services Report

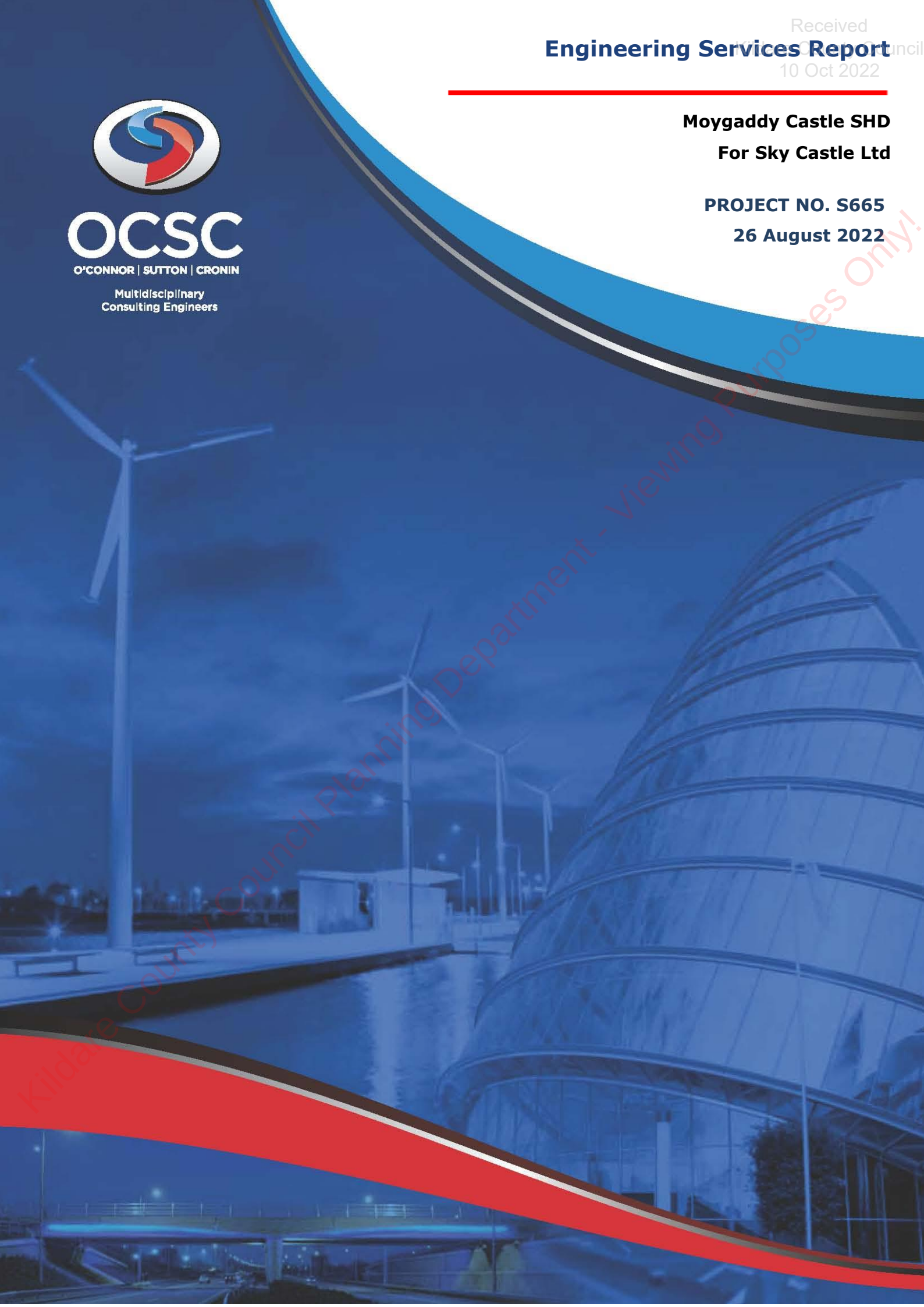
Moygaddy Castle SHD

For Sky Castle Ltd

PROJECT NO. S665

26 August 2022

OCSC
O'CONNOR | SUTTON | CRONIN
Multidisciplinary
Consulting Engineers



Engineering Services Report

Moygaddy Castle SHD

for Sky Castle Ltd

PROJECT NO. S665

26 August 2022

Engineering Services Report

for

Moygaddy Castle SHD,

at Moygaddy, Co. Meath.

OCSC
O'CONNOR | SUTTON | CRONIN
Multidisciplinary
Consulting Engineers

NOTICE

DOCUMENT CONTROL & HISTORY

OCSC Job No.: S665	Project Code	Originator	Zone Volume	Level	File Type	Role Type	Number	Status / Suitability Code	Revision
	S665	OCSC	1C	XX	RP	C	0002	S4	P08

Rev.	Status	Authors	Checked	Authorised	Issue Date
P08	**S4**	**MK**	**AH**	**AH**	**26.08.2022**
P07	S4	MK	AH	AH	25.08.2022
P06	S4	MK	AH	AH	19.08.2022
P05	S2	MK	AH	AH	10.08.2022
P04	S4	MK	AH	AH	07.12.2021
P03	S2	MK	AH	AH	01.12.2021
P02	S2	MK	AH	AH	18.10.2021
P01	S2	MK	AH	AH	08.10.2021

Engineering Services Report

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APPENDIX E. Site Investigation Report
APPENDIX F. Response to MCC Transportation Dept. Comments

1 INTRODUCTION

1.1 Appointment

O'Connor Sutton Cronin & Associates (OCSC) have been appointed by *Sky Castle Ltd* to carry out the design of the civil engineering services and infrastructure associated with the proposed 360nr. unit residential and crèche development at Moygaddy, Co. Meath, which is located north east from the town of Maynooth, Co. Kildare.

1.2 Administrative Jurisdiction

The proposed residential development is located in the jurisdiction of Meath County Council (MCC). It is noted that a section of a new bridge over the adjacent River Ryewater, and section of the proposed Maynooth Outer Orbital Road (MOOR) are located in lands within Kildare County Council's jurisdiction, as is the route required to provide connections to both wastewater and water connections. Therefore, the engineering services design was carried out with reference to the following:

- Meath County Development Plan (2021 – 2028);
- Kildare County Council Development Plan (2017 – 2023);
- Maynooth Environs Local Area Plan (MCC Dev Plan);
- Regional Spatial and Economic Strategy;
- Greater Dublin Strategic Drainage Study (GDSDS);
- The Planning System and Flood Risk Management Guidelines for Planning Authorities (Department of Environment, Heritage and Local Government and the Office of Public Works).

It is noted that this planning permission is being sought through An Bord Pleánala's (ABP) Strategic Housing Development (SHD) application process.

1.3 Site Location

The subject site is located on the southernmost extent of County Meath, aligning with the county boundary to Co. Kildare, and is approximately 1.5km

north from the town of Maynooth, Co. Kildare, as shown in **Figure 1.1 - Site Location**, and is immediately bound by:

- The Blackhall Little stream (as referenced by the EPA), to the east;
- Local Road, L6219, to the north;
- Agricultural lands to the west; and
- River Ryewater to the south.

Figure 1.1 - Site Location (www.myplan.ie)

1.4 Existing Site Overview

The overall gross site area that comprises this planning application (including offsite infrastructural works) is **c.19.52-hectares**, with c.7.89 ha of this zoned by Meath County Council for ***A2 - New Residential***. Other areas within the development boundary are zoned for High Amenity, or include public road and new infrastructure.

The site is currently greenfield and used for agricultural purposes, and can be accessed from the L6219 Road which aligns the northern boundary of the subject site. Ground levels across the site typically fall gently from north to

south, with a sharp decline at the southern and eastern boundaries, which align to the river Ryewater and the Blackhall Little stream respectively. Refer to *Section 3.4.2* for context of existing site levels.

1.5 Proposed Development Context

Planning Permission is sought be Sky Castle Ltd. for the development of a site which extends to 19.52 hectares gross site area in the townland of Moygaddy, Maynooth Environs, Co. Meath. The net developable area equates to 7.89 hectares which equates to a residential density of 45.6 units per hectare.

The proposed development will consist of the following:

1. Construction of 360 no. residential units comprising:
    i. 196 no houses (including 19 no. 2 beds, 156 no. 3 beds and 21 no. 4 beds).
    ii. 102 no. duplexes (including 51 no. 1 beds and 51 no. 2 beds) set out in 6 no. blocks.
    iii. 62 no. apartments (including 26 no. 1 beds and 36 no. 2 beds) set out in 2 no. blocks.
2. Provision of a public park and playground with associated 42 no. car parking spaces adjacent to Moygaddy Castle and pedestrian and cyclist links along the River Rye. The overall public open space (including the High Amenity Lands) equates to 7.98 hectares.
3. Provision of private open spaces in the form of balconies and terraces is provided to all individual apartments and duplexes to all elevations.
4. Development of a two-storey creche facility (514 sqm), outdoor play area and associated parking of 29 no. spaces.
5. 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.
6. Provision of 4 no. bridge structures comprising:
    i. an integral single span bridge at Moyglare Hall over the River Rye Water to connect with existing road infrastructure in County Kildare and associated floodplain works and embankments.

ii. a new pedestrian and cyclist bridge at Kildare Bridge which will link the proposed site with the existing road network in County Kildare.

iii. a new pedestrian and cycle bridge across Moyglare Stream on the L22148 adjacent to the existing unnamed bridge.

iv. a new pedestrian and cycle bridge over the Moyglare Stream linking the proposed residential site with the proposed Childcare Facility, Scout Den and Moygaddy Castle Public Park.

7. 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.
8. Proposed road improvement and realignment works including:
   i. realignment of a section of the existing L6219 local road, which will entail the demolition of an existing section of the road which extends to circa 2,500 sqm.
   ii. Provision of pedestrian and cycle improvement measures along the L6219 and L22148 which abuts the boundary of Moygaddy House which is a Protected Structure (RPS ref 91558).
   iii. Provision of pedestrian and cycle improvement measures along the R157 which abuts the Carton Demense Wall which is a Protected Structure (RPS Ref 91556).
9. Provision of 2 no. vehicular and pedestrian accesses from the L6219 local road, and 1no. vehicular and pedestrian entrance from the L22148 and an additional vehicular and pedestrian access from the R157 to the Childcare and Scout Den facilities.
10. The proposed development will provide 283 no. of bicycle parking spaces, of which 200 no. are long term spaces in secure bicycle stores and 83 no. are short term visitor bicycle parking spaces. 12 no. bicycle spaces are provided for the creche and 12 no. bicycle spaces are provided for the Scout Den.

11. 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.
12. Provision of site landscaping, public lighting, bin stores, 3 no. ESB unit substations, site services and all associated site development works.
13. A Natura Impact Statement (NIS) and Environmental Impact Assessment Report (EIAR) has been included with this application.

The proposed site layout is shown in **Figure 1.2**, with context to the wider Maynooth Environs area that is in the Applicant's ownership.

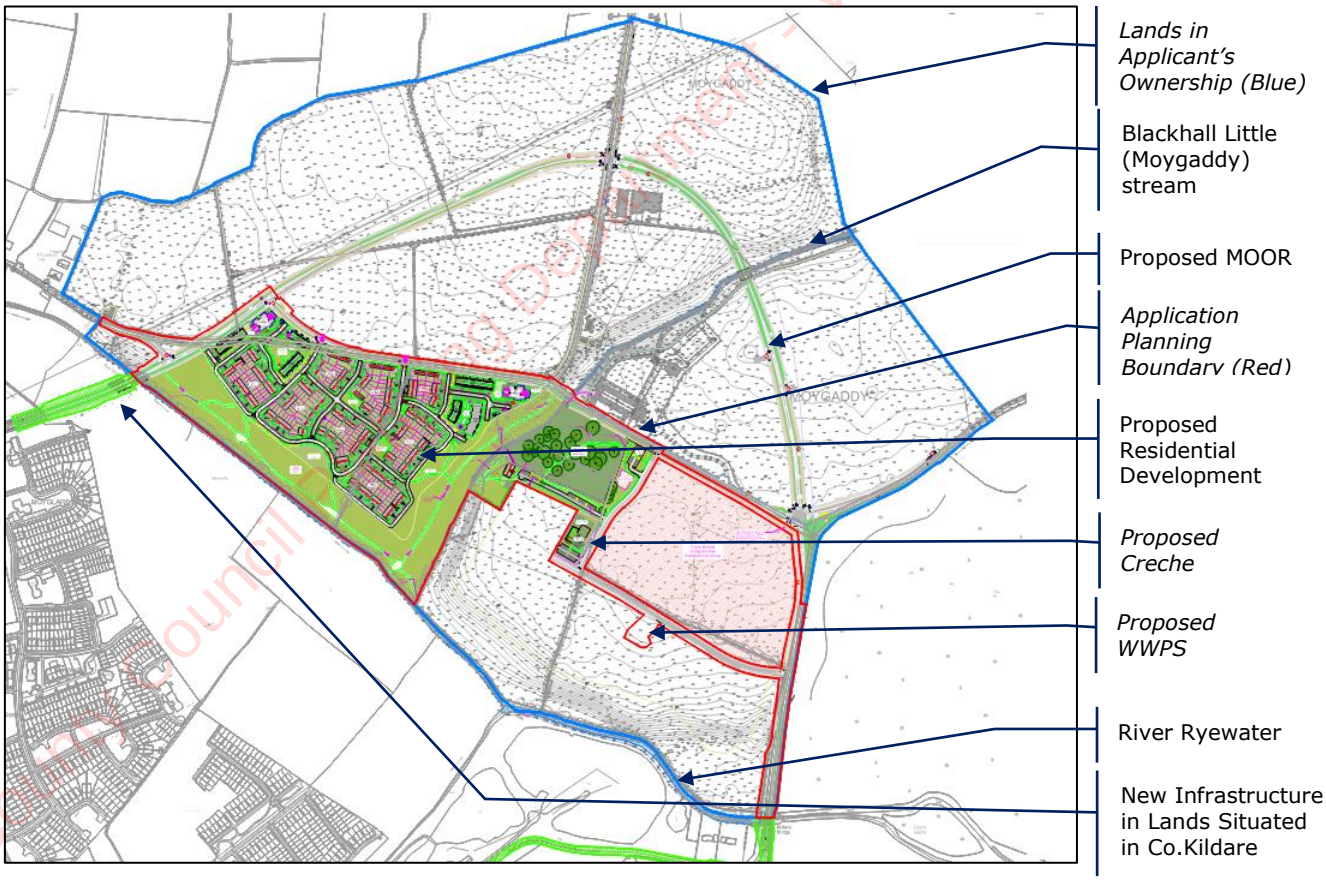

Figure 1.2 - Proposed Development Layout

1.6 Further Development Context

The developer has also committed to submitting a separate planning application to Meath County Council for the development of the Maynooth Outer Orbital Road (MOOR), which is routed from the northern corner of this proposed development, through the Moygaddy Environ's lands and around to meet the R157 road, north from the Kildare Bridge.

Additional planning applications will be simultaneously submitted to Kildare County Council for the following two infrastructural works, which complement both the proposed development and the delivery of the MOOR:

1. Moyglare Bridge i.e., new bridge structure at southwestern extent of MOOR, including associated water services for extension and connection to public infrastructure;
2. Kildare Bridge upgrade, and associated infrastructure connections i.e., addition of pedestrian and cycle link structure, adjacent to the Kildare Bridge.

The subject site is part of a larger land-holding, held by Sky Castle Ltd, which is zoned for Strategic Employment, Tourism, and Community Infrastructure. The applicant – Sky Castle Ltd – intends to submit separate planning applications for a Nursing Home, Primary Care Centre, and a Biomedical Office Campus. These projects are subject to separate, independent planning applications, which will be accompanied by site-specific Engineering Services reports, and associated design drawings.

2 SCOPE OF WATER SERVICES REPORT

The Outline Engineering Services Report was prepared by reviewing the available data from the Local Authority sources and national bodies *i.e.,* Meath County Council, Kildare County Council, Irish Water, The OPW, and the wider Design Team. The following services are addressed within this report, with respect to the proposed development:

- Surface Water Drainage;
- Wastewater Drainage;
- Potable Water Supply;
- Roads Infrastructure.

The proposed design for the above engineering services have been carried out in accordance with the following technical guidelines and information:

- Meath County Council Development Plan (2021 – 2027);
- Kildare County Development Plan (2017 – 2023);
- Maynooth Environs Local Area Plan (MCC);
- Greater Dublin Strategic Drainage Study (GDSDS);
- Greater Dublin Regional Code of Practice for Drainage Works (GDRCOP);
- Irish Water Code of Practice for Wastewater, IW-CDS-5030-03;
- Irish Water Code of Practice for Water Supply, IW-CDS-5020-03;
- The Building Regulations – Technical Guidance Document Part H;
- BE EN 752 – Drainage Outside Buildings;
- BS 7533-13 – Guide for Design of Permeable Pavements;
- CIRIA C753 – The SuDS Manual;
- The Office of Public Works, the Planning System and Flood Risk Management;
- Irish Water Drainage & Watermain Records.

3 SURFACE WATER DRAINAGE

3.1 Surface Water Design Overview

3.1.1 Design Guidelines Overview

Any planning permission sought on the subject lands are required to adhere to the Local Authority requirements *i.e.,* the Meath County Council Development Plan, the Maynooth Environs Local Area Plan, and as such, the Greater Dublin Strategic Drainage Study (2005).

New development must ensure that a comprehensive Sustainable Drainage System (SuDS), is incorporated into the development. SuDS requires that post development run-off rates be maintained at equivalent, or lower, levels than pre-development levels. Thus, the development must be able to retain, within its boundaries, surface water volumes from extreme rainfall events up to a 1 in 100-year rainfall event, more commonly expressed as a 1.0% AEP (Annual Exceedance Probability), *while also allowing for an additional climate change factor of* ***20%*** *increase in rainfall intensity*. Any new development must also have the physical capacity to retain surface water volumes as directed under the Greater Dublin Strategic Drainage Strategy (GDSDS) and, if necessary, release these attenuated surface water volumes to an outfall at a controlled flow rate, not greater than the greenfield runoff equivalent.

A further component of the SuDS protocol is to increase the overall water quality of surface water runoff before it enters a natural watercourse or a public sewer, which ultimately discharges to a water body. This is to ensure the highest possible standard of surface water quality.

The surface water strategy for the proposed development is to include a number of Sustainable Drainage Systems, prior to discharging an attenuated and treated flow to the existing watercourses that align to the southern and eastern boundaries of the main development site. Development discharge rates are to be restricted to less than the calculated greenfield runoff equivalent.

SuDS are designed in accordance with best practice and the CIRIA C753 (The SuDS Manual) guidance material.

3.2 Surface Water Management Strategy Overview

The proposed development is to be served by a gravity surface water drainage network that is to be divided into two main catchments as a result of the natural topography and other site constraints. The attenuated and treated surface water runoff that will be generated within the new development site is to discharge to the adjacent watercourses.

Sustainable Drainage Systems are to be provided across the site, wherever practicable, and these are discussed in more detail in *Section 3.4.3*, with discharge rates from site being restricted to less than the calculated greenfield equivalent runoff rate, for design rainfall events up to, and including, the 1% AEP, in accordance with the Meath County Development Plan and the GDSDS.

3.3 Consultation

The proposed strategy has been discussed in detail with Meath County Council's (MCC) Drainage Department prior to submission, including at the tripartite meeting with An Bord Pleanála (ABP), MCC, and the Applicant.

Further, MCC's drainage department issued an opinion report, as part of a response to the Stage 2 submission to ABP, with all comments discussed with MCC and addressed accordingly, as part of the design completion.

3.4 Existing Site Drainage

3.4.1 Existing Surface Water Drainage Infrastructure

There is currently no existing public surface water drainage infrastructure in the vicinity of the site that can serve the proposed development.

There are significant natural drainage routes along the southern and eastern boundaries of the site, namely the River Ryewater and the Blackhall Little stream (also known as the Moygaddy Stream), respectively. The site currently

drains naturally to these watercourses; refer to **Figure 3.1** for overview of existing natural watercourses in the vicinity of the proposed development.

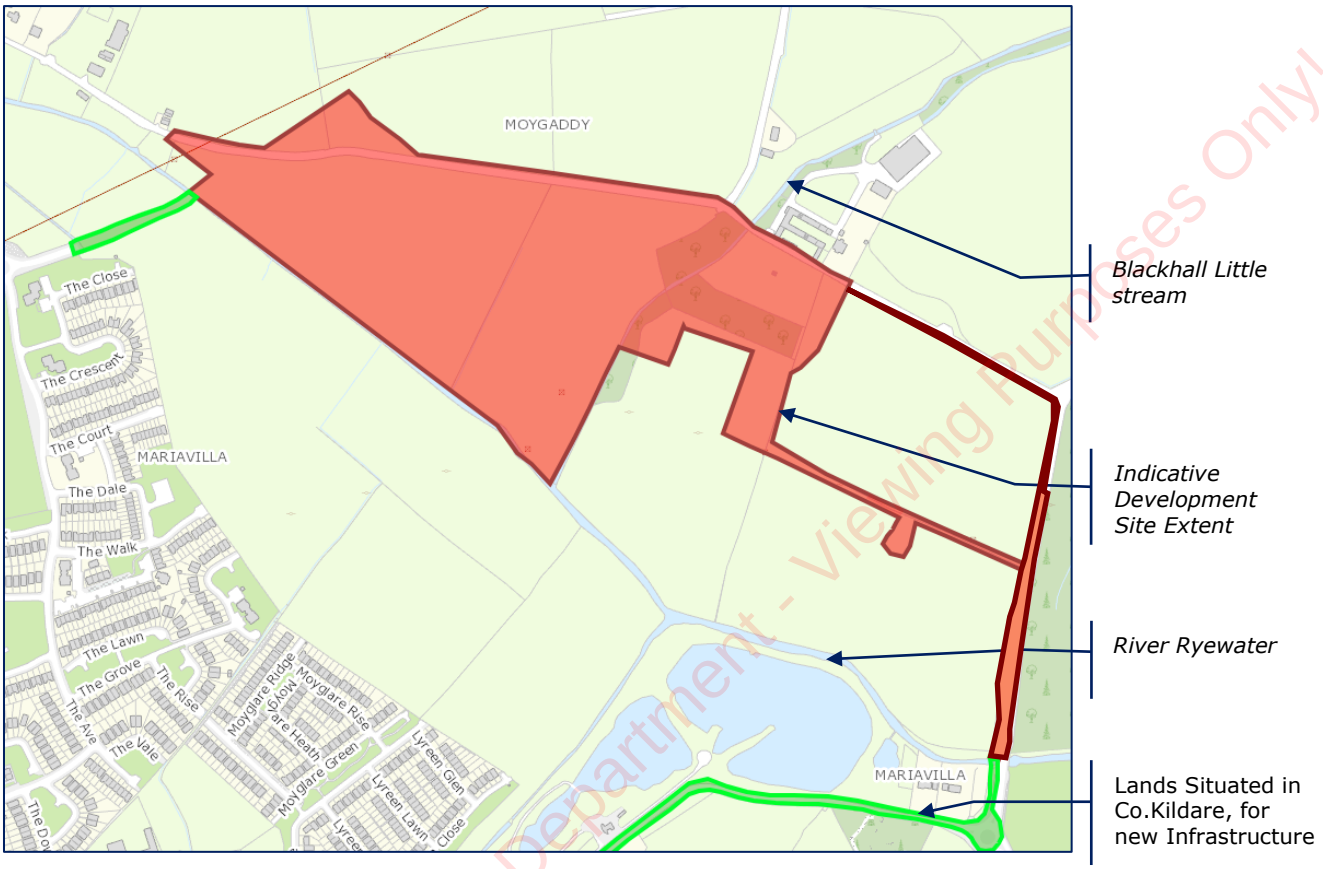

Figure 3.1 - Local Watercourses

3.4.2 Existing Site Catchment Areas

The main part of the overall development application, which is to contain the residential development site, has the existing L6219 road along its northern boundary that acts as a surface water catchment boundary. The entire site is then graded towards the river Ryewater, which aligns to its southern boundary, and the Blackhall Little stream, which aligns to the eastern boundary. There is also a shallow valley near the centre of the site, however, this is also graded towards the southern boundary. Refer to Figure 3.2 for overview of site contours, indicated at 0.25m interval.

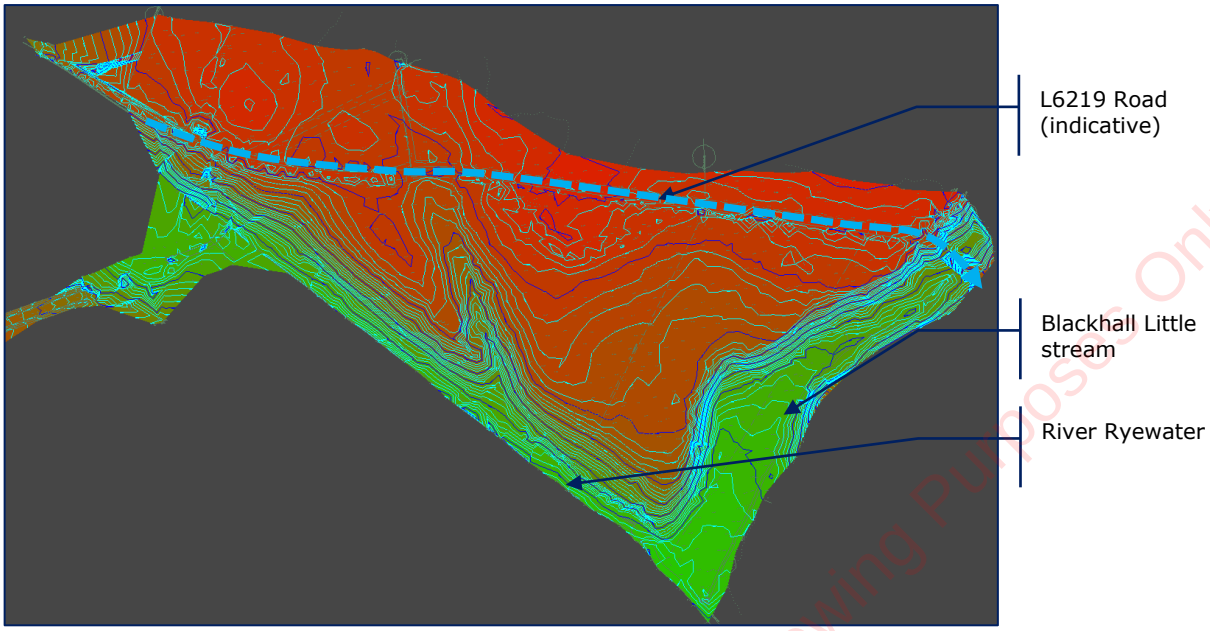

Figure 3.2 – Site Levels and Contour Overview of Residential Lands

Similarly, the area of land to the east of the Blackhall Little stream, which is to provide new creche facilities, Scout Den and public park, is graded gently towards the Blackhall Little stream, to its west.

3.4.3 Existing Site Rainfall Runoff

All surface water runoff, on the existing site, currently infiltrates to the ground or discharges excess runoff to the Blackhall Little stream or River Ryewater, which align the eastern and southern boundaries respectively. Refer to *Section 3.4.2* for further details of existing site catchment area context.

A Site investigation was carried out on site in July 2021, with 3nr. soakaway tests performed to BRE Digest 365 requirements, at locations in the vicinity of open space in the new development. All 3nr. tests failed, with little to no infiltration observed. The existing subsoil was determined to be of stiff clayey substance, consistently across the site. In addition, groundwater was struck at a depth of approximately 1.6m below ground level near the northern extent of the site but not observed elsewhere, notably not at location of SuDS structures, including attenuation systems.

A copy of the Site Investigation Report is provided in **Appendix E** of this ESR.

Therefore, as a result of the above, **Soil Type 4** has been assigned for rainfall runoff calculations, as discussed and agreed with Meath County Council.

The Standard Average Annual Rainfall (SAAR) value for the development site, as sourced from Met Éireann, is **799mm**.

Using the ICPSuDS Input, (Flood Studies Report, FSR) Method, the rainfall runoff discharging from the total greenfield site area that is to be developed has been estimated at $QBAR_{RURAL}$ **5.6 l/s/ha,** in its existing condition.

Refer to Figure 3.3 for an excerpt of the results from the MicroDrainage Runoff Calculator, which provides the calculated QBAR (*per hectare*) runoff rate, along with the discharge rate (*per hectare*) for varying Annual Recurrence Intervals (ARI).

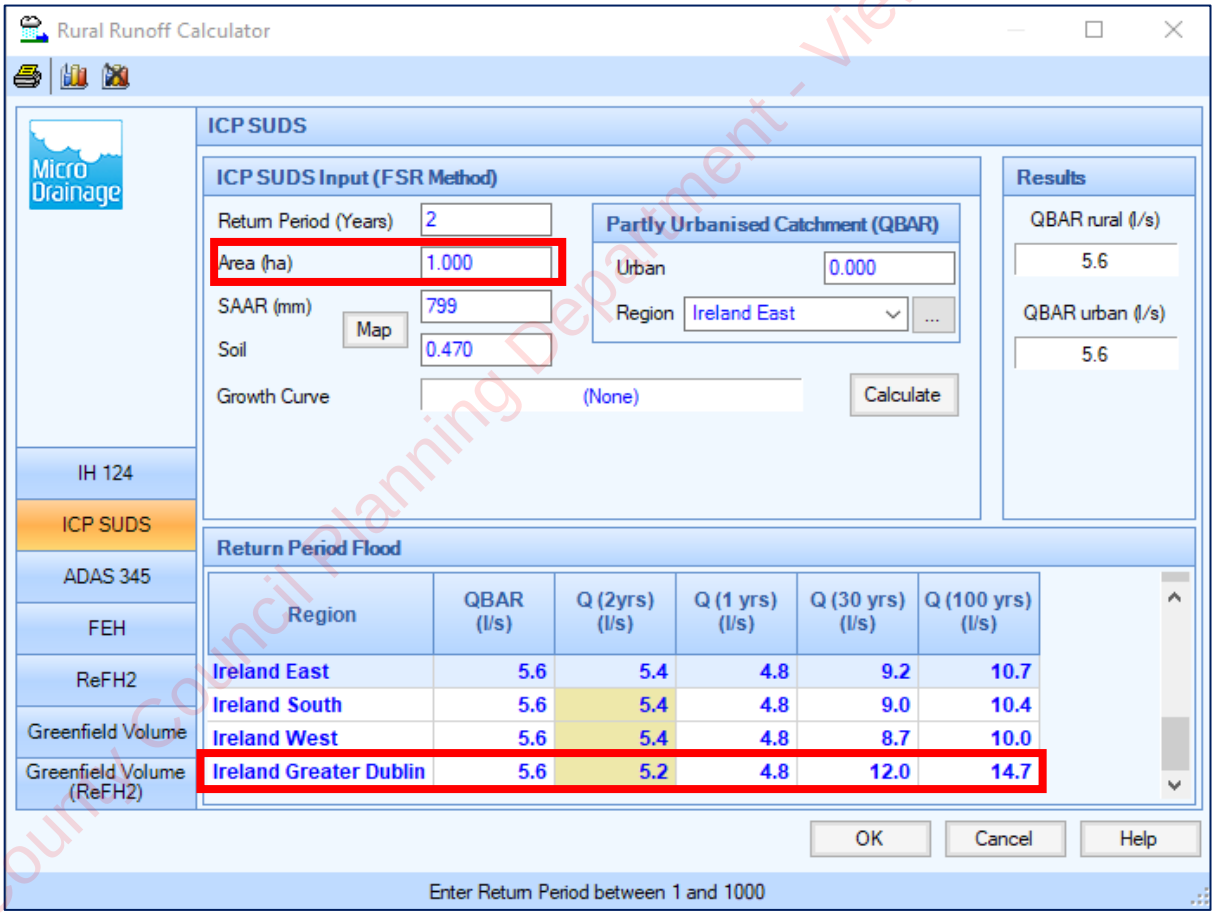

Figure 3.3 - Existing Site Runoff Calculator Results (MicroDrainage Excerpt)

3.5 Proposed Surface Water Drainage Design Strategy

3.5.1 Proposed Surface Water Strategy Overview

It is proposed to separate the surface water and wastewater drainage networks, which will serve the proposed development, and provide independent connections to the adjacent watercourse (for surface water only) and local wastewater sewer network respectively. Refer to *Section 4* for details of the proposed wastewater drainage design.

3.5.2 Climate Change Allowance

The proposed surface water network is yet to be designed to allow for an additional 20% increase in rainfall intensity, to allow for Climate Change projections, in accordance with the Meath County Development Plan and the GDSDS.

All discussion within this report, with regards to surface water network design calculation and results, include for the allowance of an increase of 20% in rainfall intensity, as required.

3.5.3 Proposed Surface Water Network Strategy

The proposed surface water network is to be split into two main catchment areas, in order to best integrate Sustainable Drainage Systems across the site and manage the surface water runoff. Each catchment area will look to provide treatment to the rainfall runoff, either at source or through site design. Infiltration systems are provided as part of the integrated SuDS network, however, as a results of the failed soakaway tests during site investigation, no infiltration is considered as part of the design. This will still allow for interception to be provided for the first rainfall events, and slow recharge of groundwater. Therefore, the main functions of the SuDS provided will be for interception and treatment of the rainfall runoff, in order to reduce the runoff volume and increase the runoff quality, prior to discharge from the new development.

The proposed crèche, being an isolated catchment area, is also to have its own independent surface water drainage network from above, with the local landscaping being utilised for sustainable drainage systems, in order to improve the quality and reduce the runoff to less than greenfield equivalent, prior to discharging to the adjacent Blackhall Little stream.

The proposed surface water networks are to typically comprise a gravity pipe network, with significant Sustainable Drainage Systems implemented, where practicable.

Attenuation systems are to be strategically located within public open space areas, and the design intent is to reduce the rainfall runoff from the proposed development to ***less than*** the greenfield runoff equivalent; thus, resulting in no adverse impact on the receiving watercourse.

The typical traditional and Sustainable Drainage Systems (SuDS) to be provided, all of which will be designed in accordance with CIRIA C753, the SuDS Manual, and the design guidance material listed in *Section 2* of this report, are listed and detailed in order of general sequence within the drainage network, as follows:

3.5.3.1 Rainwater Harvesting

Rainwater harvesting are to be considered at individual residential units in the form of 'Water Butts', which can re-use the collected rainwater for gardening and other domestic watering purposes. Rainwater Butts help to reduce the overall volume of rainfall runoff entering the surface water network.

Figure 3.4 - Example of Domestic Rainwater Harvesting Butt

3.5.3.2 *Pervious Paving*

Pervious pavements provide a pavement finish suitable for both pedestrian and vehicular traffic, while also allowing rainwater to infiltrate the surface layer and into the underlying pervious structural layers. Here, the rainwater is temporarily stored beneath the overlying finished surface before either infiltration to the ground or / and controlled discharge to the main surface water drainage network.

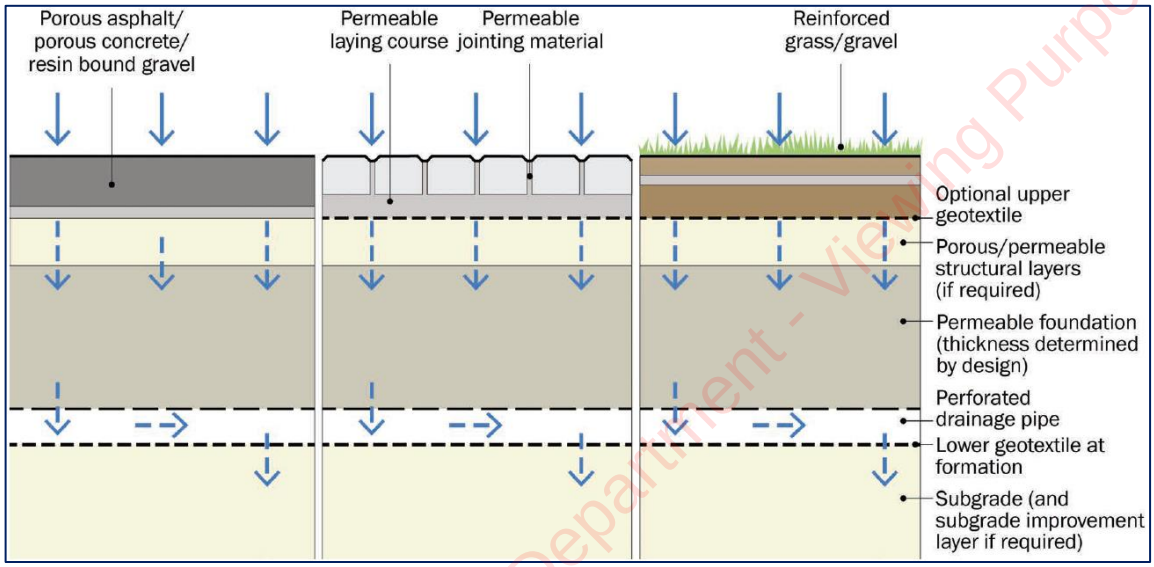

Figure 3.5 - Detail of Type B Pervious Paving (CIRIA C753)

Pervious paving systems are an efficient means of treating the rainwater at source by providing initial interception of the rainwater, reducing the volume and frequency of the runoff and improving the surface water quality by providing at source treatment of the rainfall runoff leaving the site. This is achieved by helping remove and retain pollutants prior to discharge to the drainage system and / or groundwater system.

Rainfall runoff from roof level of the proposed housing units can also discharge to the permeable base course of the pervious paving, via a diffuser unit. This will allow for initial interception of rainfall, along with attenuation for each individual house unit.

A **Type B** pervious paving, with a 300mm depth of open graded crushed rock as base course, is to be provided in all in-curtilage car parking spaces, within

the proposed development. An overflow pipe, from the base-course, will be provided to the drainage network, which will allow for interception of initial rainfall, groundwater discharge, with an attenuated outflow to the main network in extreme rainfall events.

Other on-street parking areas, such as those associated with the proposed duplexes, apartments, and crèche facilities are to comprise a porous asphalt type finish, or similar approved. However, pervious paving is not to be provided in any spaces or areas that are to be taken in charge by Meath County Council.

3.5.3.3 *Trapped Road Gullies*

All road gullies serving the proposed development are to be trapped, to help prevent sediment and gross pollutants from entering the surface water network, and thus improving the water quality discharging from site.

The grated covers are to have a minimum load classification of D400, for frequent vehicular traffic, and shall be lockable, as required by MCC, with 150mm outlet pipes.

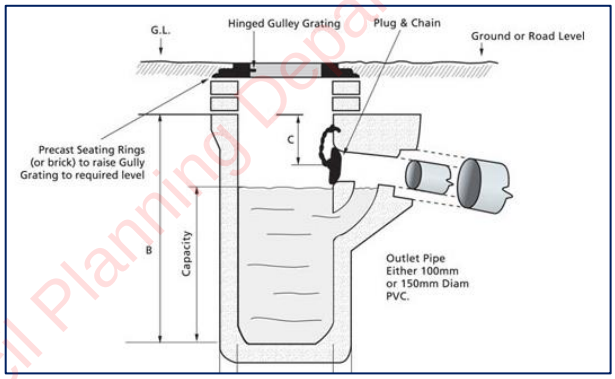

Figure 3.6 - Trapped Road Gully (Typical Detail)

3.5.3.4 *Underground Pipe Network*

A 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.

3.5.3.5 Silt Traps

All manholes upstream of attenuation systems are to contain a 600mm sump, below invert level of outlet pipe, in order to trap sediment and other gross pollutants, and prevent from entering the downstream watercourse; thus, improving the water quality discharging from site.

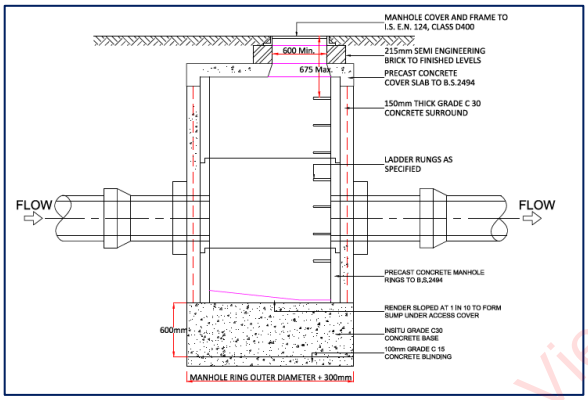

Figure 3.7 - Typical Detail of Silt Trap Manhole

3.5.3.6 Attenuation Storage Systems

Unlined proprietary poly-tunnel storage units (or similar approved) are to be provided, underground in proposed green-spaces, for the attenuation of rainfall runoff prior to discharge to the existing natural watercourses.

These systems are to provide sufficient temporary storage volume for rainfall events up to, and including, the design 1% AEP rainfall event (including climate change). Typical poly-tunnel storage systems comprise plastic arch-units with open-graded crushed rock bedding and surround. These units are arranged in rows, with an isolator row for efficient operation and maintenance.

These systems also allow for interception of initial rainfall to be provided at the base of the system, by elevating the outlet relative to the systems base.

Figure 3.8 –Typical Poly-Tunnel Installation Arrangement

3.5.3.7 Swales

Swales will be provided along the southern development road. These will typically be Type 2 Dry Swales in accordance with CIRIA C753 SuDS Manual. Swales will collect runoff from roads and will facilitate treatment and infiltration.

Figure 3.9 – Example Roadside Swale

3.5.3.8 Flow Control Device

Flow Control devices are to be provided immediately downstream of attenuation systems, in order to restrict the surface water discharge from site to a flow rate equivalent, or below, the natural greenfield runoff rate.

It is proposed to provide the Hydro-brake optimum vortex flow control unit (or similar approved by MCC), downstream of the attenuation systems.

Further, it is noted that the required aperture of the proposed flow control outlets have been designed to be greater than 150mm diameter, to mitigate the risk of blockage.

Each flow control chamber is to be fitted with a penstock valve at the inlet and a bypass lever at the outlet (if required), to allow for easy access and maintenance.

Figure 3.10 - Vortex Hydro-Brake Flow Control Unit (Hydro International)

3.5.3.9 Oil Separator

Oil separators are designed to separate gross amounts of oil and large (>250µm) suspended solids from the surface water, mainly through sedimentation process.

The proposed surface water network already provides sufficient mitigation measures, through the provisions listed previously (principally the pervious paving, filter drains, trapped road gullies and silt traps, and the attenuation interception layer). However, a Class 1 bypass fuel separator is to be provided as an additional and final mitigation measure, upstream of attenuation system, prior to surface water discharge to both the network and watercourse.

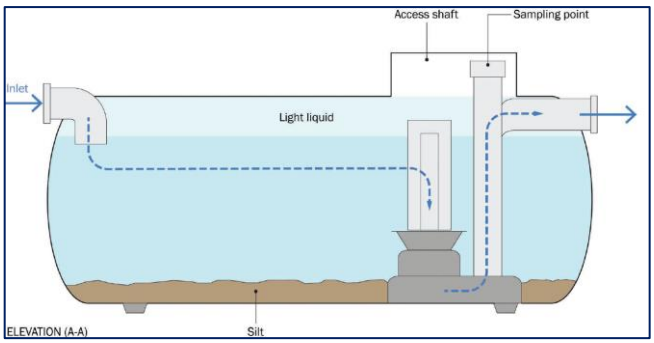

Figure 3.11 - Typical Section Detail of Fuel Separator (CIRIA C753)

The fuel separator is to be provided at a location upstream of attenuation system, as per Meath County Council requirements.

3.5.3.10 *Filter Drain*

A filter drain is an open graded stone filled trench, which can also include a perforated pipe to assist distribution and conveyance of rainfall runoff along its length. Rainfall runoff can be stored within the void content of the stone trench, which should be wrapped in a fine geotextile to prevent fine sediment from entering the structure.

It is proposed to provide a filter drain from the flow control device to the development's network outfall, in order to further reduce the volume of rainfall runoff discharging from site, subject to agreement with Meath County Council.

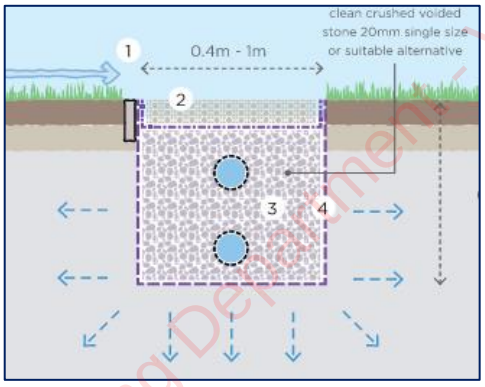

Figure 3.12 - Filter Drain Illustration

3.5.3.11 *Non-Return Valve*

The development levels, and as such the typical levels of the surface water drainage network are significantly above the water level of the receiving watercourse. Notwithstanding, a non-return valve is to be provided, fitted to the headwall, at each outlet to the receiving watercourse.

3.6 Proposed Surface Water Network Detailed Design

3.6.1 Software Design Criteria

The proposed surface water network is to be designed in accordance with the regulations and guidelines outlined in *Section 2*, using MicroDrainage Network Design package, by Innovyze Inc., which simulates the performance of the

integrated drainage network for varying rainfall return periods and storm durations.

The MicroDrainage Network Design software applies the Flood Studies Report (FSR) methodology for analysis of the rainfall profiles. However, the input design parameters that were used, as part of this design, were based on the available Flood Studies Update (FSU) data, *i.e.,* the return period rainfall depths for sliding durations, which determine the **$M_{5\text{-}60}$** and **R** values, and the standard annual average rainfall (SAAR); as sourced from Met Éireann.

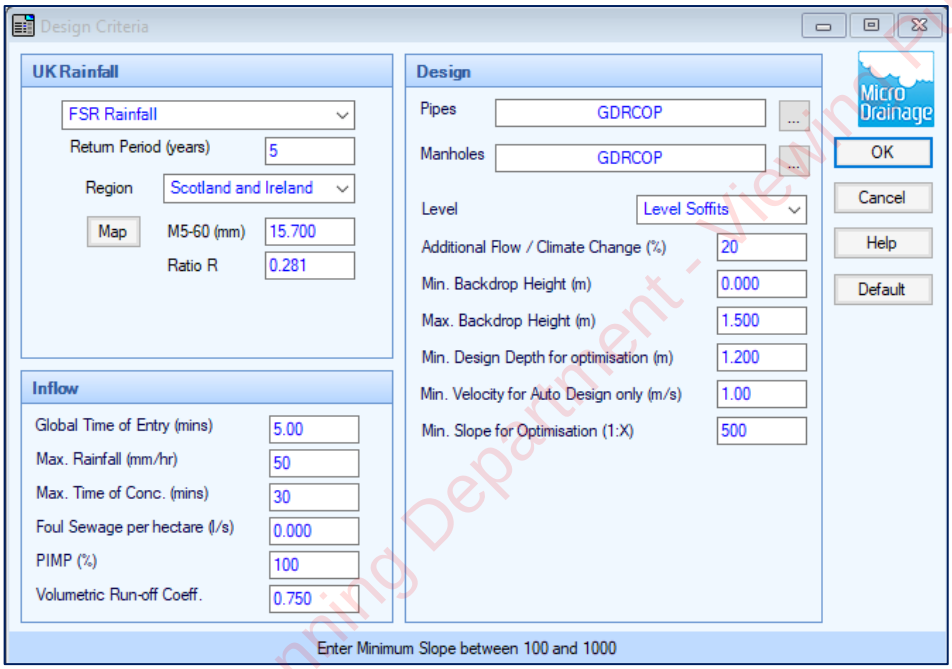

Figure 3.13 - Surface Water Network Design Criteria (MicroDrainage Excerpt)

3.6.2 Proposed Surface Water Catchment Areas

The proposed surface water network is to be split into a number of catchments, each with their own sub-catchments, in order to best integrate Sustainable Drainage Systems. Each sub-catchment area will look to provide treatment to the rainfall runoff, either at source or through site design, with all treated rainfall runoff being directed towards the river Ryewater, as is its natural course.

The discharge rate from each catchment area, have been designed to be restructured to 5.5 l/s/ha, which is less than the calculated greenfield equivalent.

Catchments B and C are both served by the same surface water drainage network, with the network discharging to the Blackhall Little stream. The rainfall runoff for sub-catchment B is treated and attenuated, prior to discharging to the network that serves sub-catchment C, in order to keep design flow rates low and consequently reduce required pipe sizes, and attenuation volume in sub-catchment C, prior to discharge to the Blackhall Little stream.

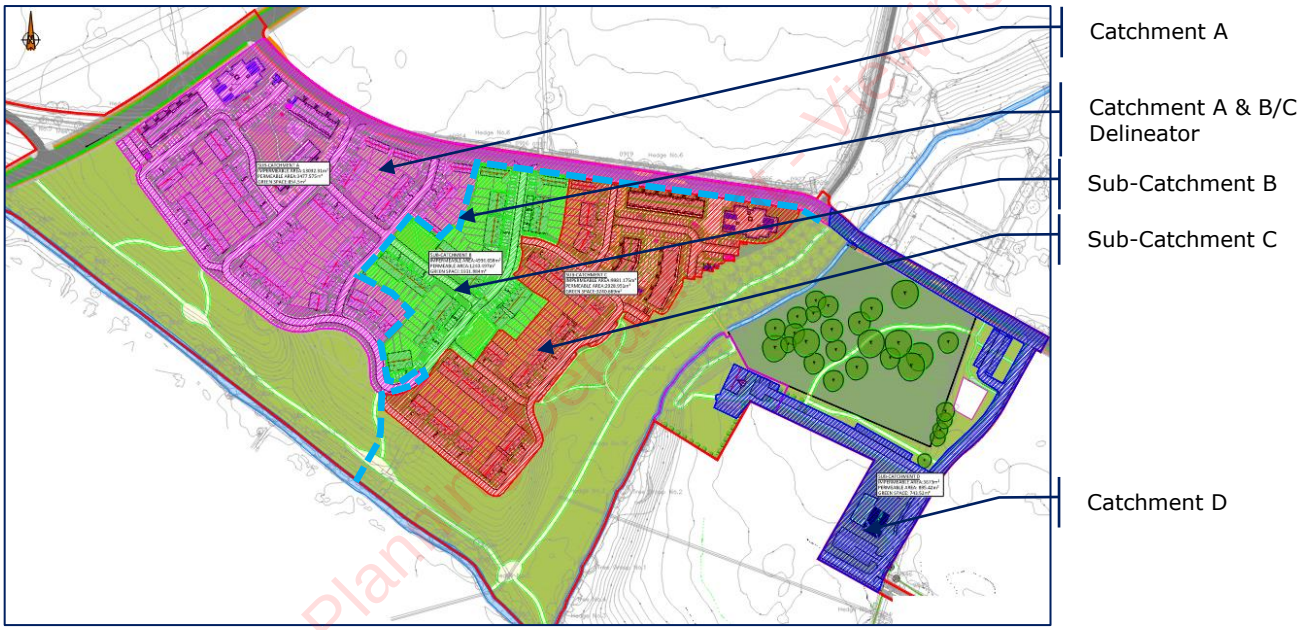

Figure 3.14 - Development Catchment Areas

Refer to OCSC drawing S665-OCSC-1C-XX-DR-C-0580 for breakdown of catchment areas, as per **Figure 3.14**.

3.6.3 Proposed Development Rainfall Runoff

It is proposed to reduce and restrict the rainfall runoff, discharging from the proposed development, to the greenfield equivalent, $QBAR_{RURAL}$, runoff rate, as per the FSR ICP SuDS method, which is based on the IH124 method for catchments smaller than 25km^2 in area.

This is to be achieved with the provision of a flow restrictor (Hydro-Brake Optimum by Hydro-International, or similar approved) prior to discharging to the existing watercourse at the south western corner of the site, with the appropriate measures of attenuation provided. Sub-catchment flow-control devices and associated attenuation are also to be strategically provided, in order to maximise SuDS benefits and avail of the central open space for preliminary attenuation.

Refer to Figure 3.3, in *Section 3.4.3*, for an excerpt from the results MicroDrainage Runoff Calculator for the development catchment area, which indicates the greenfield equivalent, $QBAR_{RURAL}$, value 5.6 l/s/ha, along with the calculated runoff for varying Average Recurrence Intervals (ARI).

The design intent is to reduce the rainfall runoff from the proposed development to a maximum of **5.5 l/s/ha**, which is ***less than*** the greenfield runoff equivalent; thus, resulting in no adverse impact on the receiving watercourse.

For the purpose of the surface water network design simulation, we have considered all external (roads, pavement, and roofs) areas as being 100% impermeable; giving a *winter* global runoff coefficient, C_v, of 0.84, in accordance with the HR Wallingford and Modified Rational Method for runoff. The proposed in-curtilage driveways, for each house-type, is to comprise pervious paving above a drainage layer base course. A reduced percentage impermeable factor of 80% has been applied for these locations, which conservatively accounts for initial interception from the pervious paving build-up.

3.6.4 Proposed Surface Water Pipe Network Design

The overall surface water drainage system, serving both catchments in the proposed development, is to consist of a gravity sewer network that will convey runoff from the roofs and paved areas to the outfall manhole.

The proposed piped-network has been designed in accordance with BS EN 752 and all new infrastructure is to be compliant with the requirements of the

GDSDS and the GDRCOP for Drainage Works, with minimum full-bore velocities of 1.0 m/s achieved throughout.

All main surface water carrier pipes have been sized to ensure no surcharging of the proposed drainage network for rainfall events up to, and including, the 1 in 5-year ARI event, with a projected climate change allowance of 20% increase in rainfall intensity, under normal flow conditions.

3.7 Proposed Surface Water Attenuation Storage

Attenuation systems are to be provided at strategic locations within the development in order to temporarily store excessive rainfall runoff, during significant rainfall events, due to the restricted discharge rates (to less than greenfield equivalent runoff rates) from the development outfalls.

This will be provided initially at individual residential units by provision of pervious paving for car parking areas, which is to comprise a pervious paving type surface, with a minimum 300mm depth drainage layer (open graded crushed rock).

The main development attenuation systems will be provided, typically comprising underground polytunnel systems (or similar approved), located at public open space areas. The main residential catchment's attenuation system will provide a polytunnel type system for the design rainfall events up to, and including, the 1-in-30-year ARI events; with additional volumes being temporarily attenuated above ground in the profiled landscaped areas, for more significant rainfall events up to, and including the 1-in-100-year ARI. This is to ensure that the public open space area can remain functional during less sever rainfall events. Refer to **Figure 3.15** for example of above ground detention basin.

Figure 3.15 - Example Detention Basin

Adequate drainage to the finished landscaping will be provided, in order to maintain functionality.

All other attenuation systems will be located completely underground, and shall comprise polytunnel systems, as previously described.

A layer of interception will also be provided under attenuation systems, in order to promote groundwater recharge during the initial 5 – 10mm rainfall periods, pending results of Site Investigation to confirm groundwater levels.

All polytunnel systems have been designed as on-line systems, and shall be provided with an isolator row, with a high level 225mm overflow / distributor pipe.

3.8 Surface Water Outfall Locations

The development is to discharge the treated and attenuated rainfall runoff to the existing watercourse along its southern and eastern boundaries, namely the river Ryewater and the Blackhall Little stream.

The discharge rates are to be restricted to a maximum flow rate of **5.5 l/s/ha**, which is ***less than*** the current greenfield equivalent runoff rate, as discussed in *Section 3.6.3*.

The above is to ensure that there is no increase in flow rates and volumes, from the development site, being discharged to the receiving infrastructure and waterbodies; thus, causing no adverse impact on adjoining and other downstream properties.

All outfalls are to be fitted with non-return valves.

3.9 Water Quality

The quality of the surface water discharging from site is to be improved through the following provisions, which are being considered as part of an integrated drainage network, and each of which is discussed in greater detail in 3.5.3:

- Rainwater Harvesting Butts at individual residential units;
- Pervious Paving in all private driveways and car parking spaces;
- Intensive landscaping, where practical;
- Swales and Filter Trenches, where allowable;
- Trapped road gullies on all road carriageways, to trap silt and gross pollutants;
- Silt traps to be provided on manholes immediately upstream of attenuation systems, as a further preventative measure to trap silt and other gross pollutants;
- Interception provisions at attenuation systems;
- Class 1 bypass fuel separator to be provided prior to discharging from site;
- Outlet pipe to comprise filter drain, for further interception of attenuated discharge.

3.10 Maintenance

The proposed surface water drainage network is to be carefully designed to minimise risk of blockage throughout the network, mainly through the following provisions that limit and restrict the size of pollutants entering the network:

- Pervious paving;
- Trapped road gullies;
- Silt trap manholes;

- Interception at attenuation systems;
- Flow controls greater than 150mm diameter.

Road gullies, silt traps, flow control devices and attenuation systems, should be inspected regularly and maintained, as appropriate and in accordance with manufacturer's recommendations and guidelines.

Items such as the flow controls and fuel separators shall be located so as to provide easy vehicular access for inspection and maintenance.

3.11 Surface Water Impact Assessment

The design criteria for the drainage system are established in *GDSDS-RDP Volume 2*, *Section 6.3.4* and explained further in *GDSDS-RDP Volume 2, Appendix E*. There are four design criteria, each of which has been considered for the subject site:

- River Water Quality Protection;
- River Regime Protection;
- Level of Service (flooding) for the site and;
- River Flood Protection.

3.11.1 Criterion 1 – River Water Quality Protection

It is proposed that the overall drainage system, serving this development, will contain a range of surface water treatment methods, as outlined previously in *Section 3.5.33.5,* which will improve the quality of surface water being discharged from the proposed development.

Gross pollutants, sediments, hydrocarbons, and other impurities, will be removed at source with the following provisions:

a) Bioretention systems in open spaces;
b) Intensive landscaping, where practicable;
c) Interception storage at attenuation systems;
d) All road gullies and linear channel drains are to be trapped;
e) Silt-trap prior to attenuation storage area.

3.11.2 Criterion 2 – River Regime Protection

Surface water discharge from the overall development will be restricted to a maximum flow rate of **5.5 l/s/ha**, which is less than the greenfield runoff equivalent. Refer to *Section 3.6.3* for further details of the proposed development rainfall runoff calculations.

This will be achieved with the provision of a flow control devices (Hydro-Brake Optimum, by Hydro-International, or similar approved) upstream of the outfall manhole.

3.11.3 Criterion 3 – Level of Service (Flooding) Site

There are four sub-criteria for the required level of service, for a new development; as set out in the *GDSDS Volume 2, Section 6.3.4 (Table 6.3).*

- No flooding on site except where planned (30-year high intensity rainfall event);
- No internal property flooding (100-year high intensity rainfall event);
- No internal property flooding (100-year river event and critical duration for site) and;
- No flood routing off site except where specifically planned. (100-year high intensity rainfall event).

3.11.3.1 Sub-Criterion 3.1

The surface water drainage systems, serving the proposed development, are yet to be designed to accommodate the 100-year return period rainfall event (including an allowance of 20% increase in rainfall intensity for climate change) without flooding. Therefore, the system has capacity for the 30-year return period rainfall event without flooding.

The performance of the proposed drainage system is yet to be analysed for design rainfall events up to, and including, the 1% AEP event (including 20% climate change allowance) using the *MicroDrainage Network Design Software*, by Innovyze Inc. Refer to **Appendix C** of this ESR for details of design criteria, calculations and results. The analyses indicate that no

flooding will occur for design rainfall events up to, and including, the 1% AEP.

3.11.3.2 Sub-Criterion 3.2

The surface water drainage systems, serving the proposed development, are yet to be designed to accommodate the 100-year return period rainfall event (including an allowance of 20% increase in rainfall intensity for climate change) without flooding.

The performance of the proposed drainage system in 100-year return period storm events (including 20% climate change allowance) is yet to be analysed – Refer **Appendix C** of this ESR for calculations. The analyses show that no flooding will occur in 100-year return period storm events.

3.11.3.3 Sub-Criterion 3.3

Details of the flood risk assessment associated with the proposed development is outlined in the Site-Specific Flood Risk Assessment (Document Nr. **S665-OCSC-1C-XX-RP-C-0009**), which is to be submitted under separate cover, as part of this application. Furthermore, a detailed flood study of the river Ryewater has been prepared by JBA Consulting, and submitted under separate cover, which assesses potential impact from development across the Applicant's wider land-holding, which makes up the masterplan area.

These documents confirm that there is no adverse flood risk impact on the subject development, and no adverse flood risk as a result of the subject development.

3.11.3.4 Sub-Criterion 3.4

The surface water drainage systems, serving the proposed development, are designed to accommodate the 100-year return period rainfall event (including an allowance of 20% increase in rainfall intensity for climate change) without flooding, so no flood routing off site will be experienced for such a rainfall event.

The performance of the proposed drainage system in 100-year return period storm events (including 20% climate change allowance) is analysed – Refer **Appendix C** of this ESR for calculations. The analyses show that no flooding will occur in 100-year return period storm events.

Details of the flood risk assessment associated with the proposed development is outlined in the Site-Specific Flood Risk Assessment (Document Nr. **S665-OCSC-1C-XX-RP-C-0009**), which is submitted under separate cover, as part of this application.

3.11.4 Criterion 4 – River Flood Protection

As outlined in *Section 3.11.2* (Criterion 2), the surface water runoff from the development's catchment will be limited to a maximum of **5.5 l/s/ha**, which is less than the calculated greenfield equivalent.

Refer to *Section 3.6.3* of this report for further details on the limiting discharge rates. The *GDSDS Volume 2, Appendix E* states that this practice ensures *"that sufficient stormwater runoff retention is achieved to protect the river during extreme events".*

Attenuation storage is to be provided for the 100-year return period rainfall event (including an increased 20% rainfall intensity; to allow for climate change). Discharge from site is to be achieved through the use of a vortex flow control device (e.g., Hydro-Brake Optimum, by Hydro-International, or similar approved), which will reduce the risk of blockage present with other flow devices.

Refer to **Appendix C** of this ESR for details of hydraulic modelling calculations of attenuation and flow control facilities, as carried out using MicroDrainage software by Innovyze Inc.

3.12 Taking in Charge

It is proposed that all new surface water infrastructure, **is** to be offered to be taken in charge by Meath County Council.

4 WASTEWATER DRAINAGE

4.1 Overview

All proposed wastewater sewer design is to be carried out in accordance with Irish Water's Code of Practice for Wastewater Infrastructure. The existing site is currently greenfield, with no existing wastewater infrastructure in the immediate vicinity.

4.2 Consultation

A Pre-Connection Enquiry Form has been submitted to Irish Water for review, for both the proposed development, as well as for the Applicant's wider land holding, which forms part of the masterplan development for the Maynooth Environs lands. Irish Water (IW) issued a Confirmation of Feasibility Letter (Refer Appendix D) for the proposed development, subject to upgrade works being carried out.

OCSC and the applicant have had continued correspondence and meetings with Irish Water with respect to required upgrade works, and have committed to working with Irish Water in order to provide a strategic Wastewater Pumping Station (WWPS) within the applicant owned lands, at Moygaddy. The provision of strategic WWPS, centralised on the Maynooth Environs lands, will allow for new development in this area to be served by wastewater infrastructure, and subsequently allow expansion in order to serve the entire Maynooth Environs lands, as future phasing of development is brought on board.

The strategy of providing a WWPS, as noted, includes provision of rising main infrastructure to specifically serve the subject development, and the pipe will be routed along the Dunboyne Road, and routed across the river Ryewater, adjacent to the Kildare Bridge, so that a connection to the gravity infrastructure upstream of the Maynooth municipal WWPS can be achieved.

Further consultation between the Applicant and Irish Water has been had in relation to Irish Water's Capital Project, which is for the provision of new high pressure rising main infrastructure to serve Maynooth Town from the Maynooth municipal WWPS, as far as Leixlip wastewater treatment plant. These ongoing

works are to greatly improve the performance and capacity of the municipal WWPS, with a section of the new pipeline infrastructure to be provided in Applicant-owned lands. This is discussed further in *Section 4.4*.

In addition to all of the above, the detailed network design was issued to Irish Water for review, with a Statement of Design Acceptance issued on 19th August 2022, which is included in **Appendix D** of this ESR.

4.3 Existing Wastewater Drainage

There is currently no existing wastewater infrastructure in the immediate vicinity of the site. Following detailed consultation with Irish Water, and returned Confirmation of Feasibility letter, it was confirmed that sections of the Maynooth Town's main wastewater infrastructure has capacity issues, most likely caused by surplus surface water connections to the network.

The Applicant and Irish Water have committed to extensively identify the proposed route to the south east, as shown in Figure 4.1, as an alternative connection route.

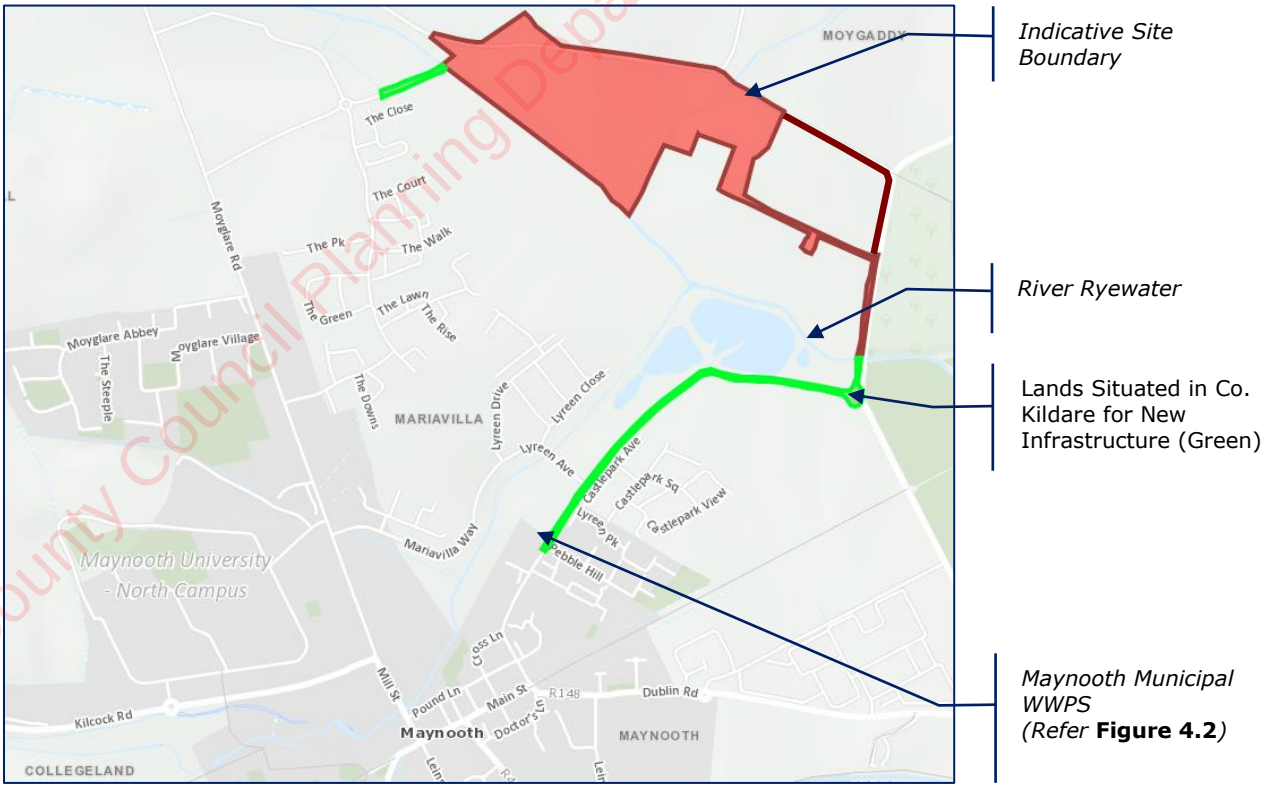

Figure 4.1 – Site Location Relative to Maynooth WWPS

Maynooth Town is served by a municipal WWPS, at its eastern extent, which discharges wastewater effluent to Leixlip Wastewater Treatment Plant. There is a gravity wastewater network on the Dunboyne Road, adjacent to the Maynooth WWPS.

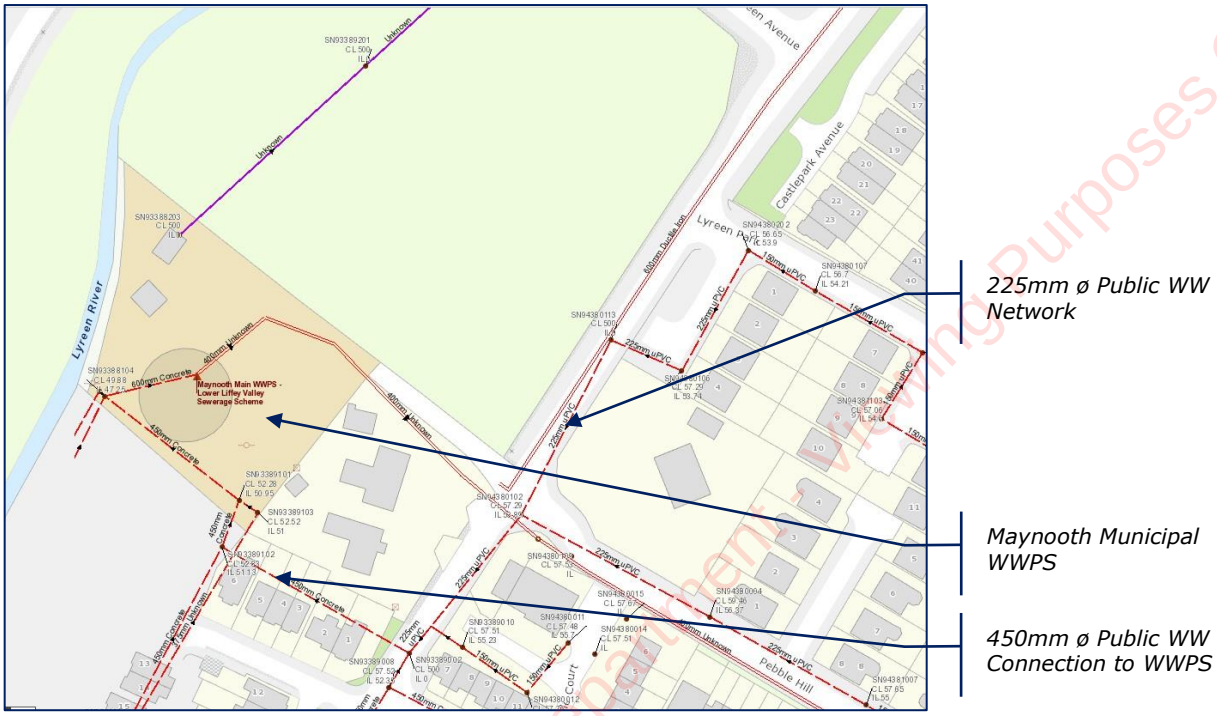

Figure 4.2 –Existing Wastewater Network and Pumping Station

4.4 New Irish Water Infrastructure

As part of Irish Water's Strategic Capital Investment Programme, Irish Water are currently undergoing design and construction of a new wastewater rising main that will improve the capacity and performance of the nearby Maynooth public Wastewater Pumping Station, and the associated capacity improvements will also serve the proposed development.

The proposed rising main is to be routed north and east, towards the public Wastewater Treatment Plant at Leixlip, with a section of the route located within the eastern part of the Moygaddy Environ's LAP lands that are owned by the Applicants as part of their wider land-holding.

The Developer has been in detailed consultation with Irish Water, for design development of the section of new rising main, in order to help accommodate the new strategic infrastructure within their lands.

The Section of infrastructure from the Maynooth WWPS as far as the river Ryewater has already been installed. From discussions with Irish Water, it is expected that the new infrastructure will be commissioned in 2025.

4.5 Proposed Wastewater Drainage Strategy

It is proposed to separate the wastewater and surface water drainage networks, which will serve the proposed development independently.

Refer to *Section 3* for details of the proposed surface water drainage design strategy.

The wastewater discharge from each dwelling is to connect, via a private outfall chamber, to the new development's gravity wastewater network, which has been designed in accordance with the Irish Water Code of Practice for Wastewater Infrastructure.

The overall strategy for the new residential (incl. crèche and scout's den) is to provide a gravity wastewater connection to a new underground strategic wastewater pumping station (WWPS), located in Applicant owned lands, east from the subject development site. From here, the new WWPS will discharge the new development's effluent, via pumped rising main, to the Maynooth Town municipal WWPS, located on the eastern extent of Maynooth. Refer *Section 4.3* for details of existing infrastructure.

In order to accommodate the above design solution, a gravity crossing is to be provided from the residential development, eastward across the Blackhall Little stream. This is to be achieved by utilising a new pedestrian bridge structure to secure the wastewater pipe, to its soffit, as it crosses the stream.

A gravity connection will be provided to the new Strategic WWPS, which shall be designed to accommodate for the new development, while also allowing for future expansion to serve the wider Maynooth Environs area, as future phases are brought on board. Refer to *Section 4.6* for further details.

The new WWPS shall discharge pumped effluent via rising main – with additional rising laid alongside to accommodate for greater loadings in future phases – as far as the gravity public infrastructure upstream of the Maynooth municipal WWPS. In order to achieve this, the rising main will need to cross the river Ryewater, adjacent to the new pedestrian / cycle bridge structure that is to be constructed adjacent to the Kildare Bridge. It is proposed that this rising main is to be routed under the river Ryewater, alongside the aforementioned new strategic high pressure rising mains that are to be installed by Irish Water to upgrade the Maynooth WWPS.

Refer to **Figure 4.3** for typical detail of a rising main crossing to the west of the Kildare Bridge structure, as per Irish Water Standard Detail Drawing Nr. STD-WW-24, details of which are to be agreed with Irish Water at connection offer stage. The construction methodology proposed is aligned with Irish Water's proposals for the separate Strategic Capital Programme rising main.

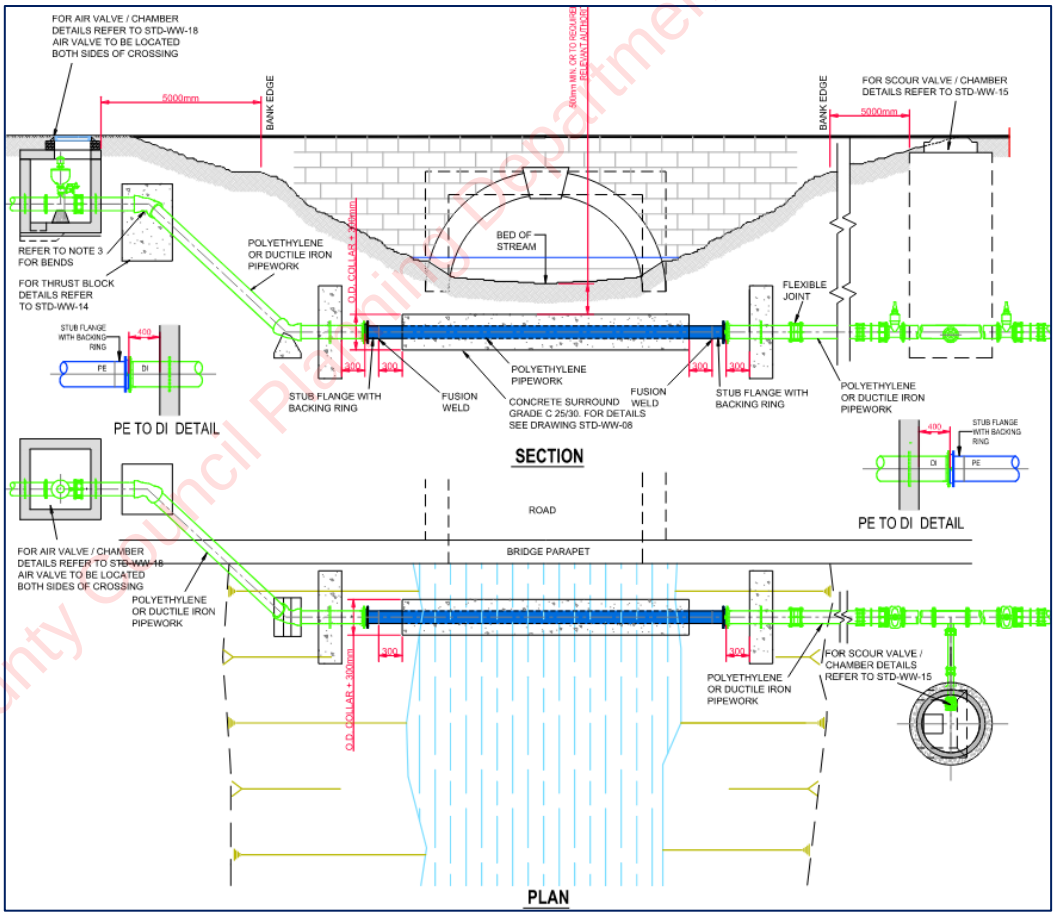

Figure 4.3 - Typical Detail of Rising Main Crossing at Bridge

Refer to OCSC Bridge Options Report, S665-OCSC-XX-XX-RP-C-0010, submitted separately to this ESR, for detailed discussion on the proposed bridges.

4.6 Wastewater Pumping Station

A new underground strategic wastewater pumping station (WWPS) is to be constructed on Applicant-owned lands, to the east of the proposed development site. Following discussions with Irish Water, the new WWPS has been sited at a location that is optimised for serving the wider Maynooth Environs lands, and is to be designed to allow for future expansion as additional development phases are brought through for planning and construction.

Design details of the new underground wastewater pumping station shall be agreed with Irish Water at new connection application stage, as required.

4.7 Taking In Charge

All new wastewater drainage infrastructure, installed to serve the proposed development **is** to be offered to Irish Water for to be taken-in-charge.

5 POTABLE WATER SUPPLY

5.1 Overview

All proposed potable water design has been carried out in accordance with Irish Water's Code of Practice for Water Infrastructure, IW-CDS-5020-03.

5.2 Consultation

A Pre-Connection Enquiry Form has been submitted to Irish Water for review, for both the proposed development, as well as the wider land holding, which forms part of the Maynooth Environs. Irish Water (IW) issued a Confirmation of Feasibility Letter (Refer Appendix D of this ESR) for the proposed development, subject to upgrade works being carried out.

OCSC and the applicant have continued correspondence with Irish Water with respect to proposed upgrade works, and have committed to working with Irish Water to resolve all infrastructure works in order to facilitate the proposed development.

In addition to all of the above, the detailed network design was issued to Irish Water for review, with a Statement of Design Acceptance issued on 19th August 2022, which is included in **Appendix D** of this ESR.

5.3 Connection to the Existing Network

It is proposed to provide an extension to the existing 200mm ductile iron watermain at Moyglare Close, with a metered 200mm high density polyethylene connection provided to serve the proposed development. This will require the new watermain to cross the river Ryewater by utilising the new bridge structure at Moyglare that is to be constructed as part of the new Maynooth Outer Orbital Road, a section of which is included within this application.

Internal distribution networks of 100mm and 150mm HDPE watermain will be provided to serve the proposed residential units. An extension from the proposed development's watermain will be provided to serve the proposed

crèche facility and scout's den, which are located to the east of the Blackhall Little stream, adjacent to the proposed public park.

Additional capped spurs are to be provided, in order to facilitate for future phasing of development within the wider Maynooth Environs lands.

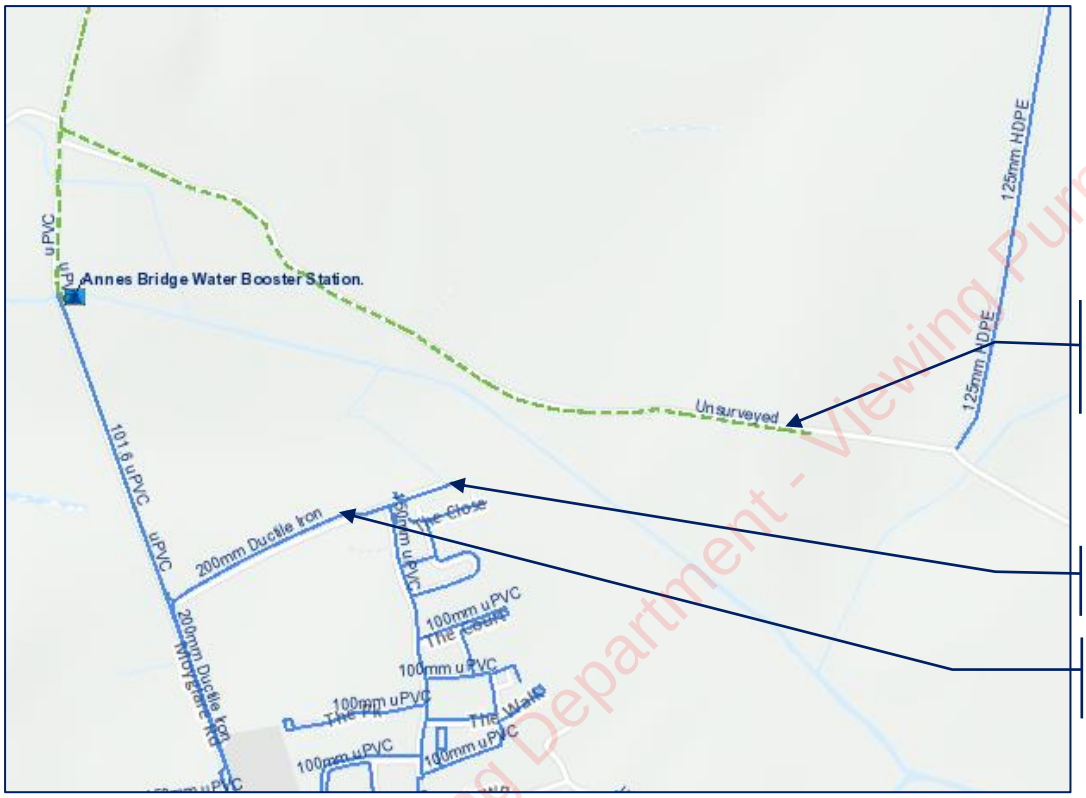

Figure 5.1 - Existing Public Water Infrastructure

5.4 Water Saving Devices

Water saving devices are to be considered for use within the proposed development units, in order to conserve the use of water, as part of the internal fit-out.

5.5 Water Meters

A bulk water meter is to be provided at the connection to the public watermain, at the development entrance, with individual boundary boxes and meters provided at the connection to each individual property and block of duplexes and apartments. All metering is to be provided in accordance with Irish Water's requirements.

5.6 Taking In Charge

All new watermain infrastructure, installed to serve the proposed development **is** to be offered to Irish Water for to be taken-in-charge.

6 ROADS AND TRAFFIC

6.7 Design Standards

The proposed development will incorporate a series of design measures, which will be detailed hereinafter, to promote more sustainable modes of transport and support vulnerable road users in line with the core principles of the Design Manual for Urban Roads and Streets (DMURS).

While DMURS is the principle design guideline for the road's elements of this project, the extended list of the main standard documents relied on is:

- National Cycle Manual;
- Traffic Signs Manual 2019;
- DN-PAV-03021: Pavement & Foundation Design;
- GE-STY-01024: Road Safety Audit;
- DN-GEO-03060: Geometric Design of Junctions;
- Traffic Management Guidelines
- NRA IAN 02/11 Interim Requirements for the Use of Eurocodes for the Design of Road Structures Amendment No. 1.
- Standards for Cycle Parking and associated Cycling Facilities for New Developments.

6.8 Proposed Road Network

The proposed development includes the creation of a new internal development road network and upgrading of the L6219 and L22143 and the provision of a section (c.500m) of the Maynooth Outer Orbital Route (MOOR) from the River Rye to the proposed residential lands. The proposed works also include a small section of realignment works to the L6219 to tie into the new section of the MOOR and the upgrade of the existing L6219 and L22143 from the residential lands to the creche and public park lands to the east. The upgrade of the L6219 and L22143 will include pedestrian and cycle infrastructure links. The portion of the MOOR as noted previously as part of this application also includes a section of new bridge over the adjacent River Rye that crosses into the jurisdiction of Kildare County Council.

A separate application will be made to Kildare County Council for the provision of the section of MOOR, south of the River Rye that ties into the already constructed section of the MOOR adjacent to Moyglare Hall that is within the Kildare County Council jurisdiction. This separate application will also include for the bridge crossing of the River Rye in Kildare County Council jurisdiction. This overlap of applications will ensure unimpeded access to the proposed development lands for all modes of transport including vehicular and dedicated pedestrian and cyclists' facilities.

The design of the MOOR will take cognisance of the already constructed section adjacent to Moyglare Hall and also ensure consistency with the recently granted Maynooth Eastern Ring Road planning reference P82019-08. The design will implement latest design standards in agreement with Meath County Council Transportation Section.

The development consists of a 5.00-5.50 m wide internal access roads and 6.00m wide roads where perpendicular parking is present in line with Section 4.4.9 of DMURS. The development will access off a new priority type junction on to the L6219. The proposed development entrance will take the form of a simple priority T-Junction. The design of the MOOR and the realignment of the L6219 local road will consist of a carriageway width of 7.0m. Segregated Pedestrian & cyclist infrastructure will be provided along the MOOR, L6219 and L22143.

The segregated pedestrian & cyclist infrastructure proposed along the frontage of the SHD development along the L6219 will provide access from the proposed SHD across the Blackhall Little Stream and provides access to the proposed crèche and public park to the east of the Blackhall Little Stream, tying into to further infrastructure at the junction with the R157. A new standalone pedestrian/cyclist bridge is proposed to be installed across the Blackhall Little Stream providing dedicated access for vulnerable road users. Due to the existing condition of the bridge over the Moygaddy stream this bridge is proposed to be a 3.0m wide standalone structure.

Refer to OCSC Bridge Options Report, S665-OCSC-XX-XX-RP-C-0010, submitted separately to this ESR, for detailed discussion on the proposed bridges.

All junctions will be assessed in detail within the final Traffic Impact Assessment submitted.

6.9 Road Classification

The proposed modifications to the L6219, L22143 and the sections of the MOOR are designed in accordance with the DMURS, with specific consideration given to the sections including:

- Section 4.3.1 Footways, Verges and Strips
- Section 4.3.2 Pedestrian Crossings
- Section 4.3.3 Corner Radii
- Section 4.3.5 Cycle Facilities
- Section 4.4.1 Carriageway Widths
- Section 4.4.2 Carriageway Surfaces
- Section 4.4.3 Junction Design
- Section 4.4.4 Forward Visibility
- Section 4.4.9 On-Street Parking and Loading

Table 3.1 of DMURS illustrates how this road hierarchy relates to other relevant documents. An extract of DMURS can be seen in Figure 6-1, following.

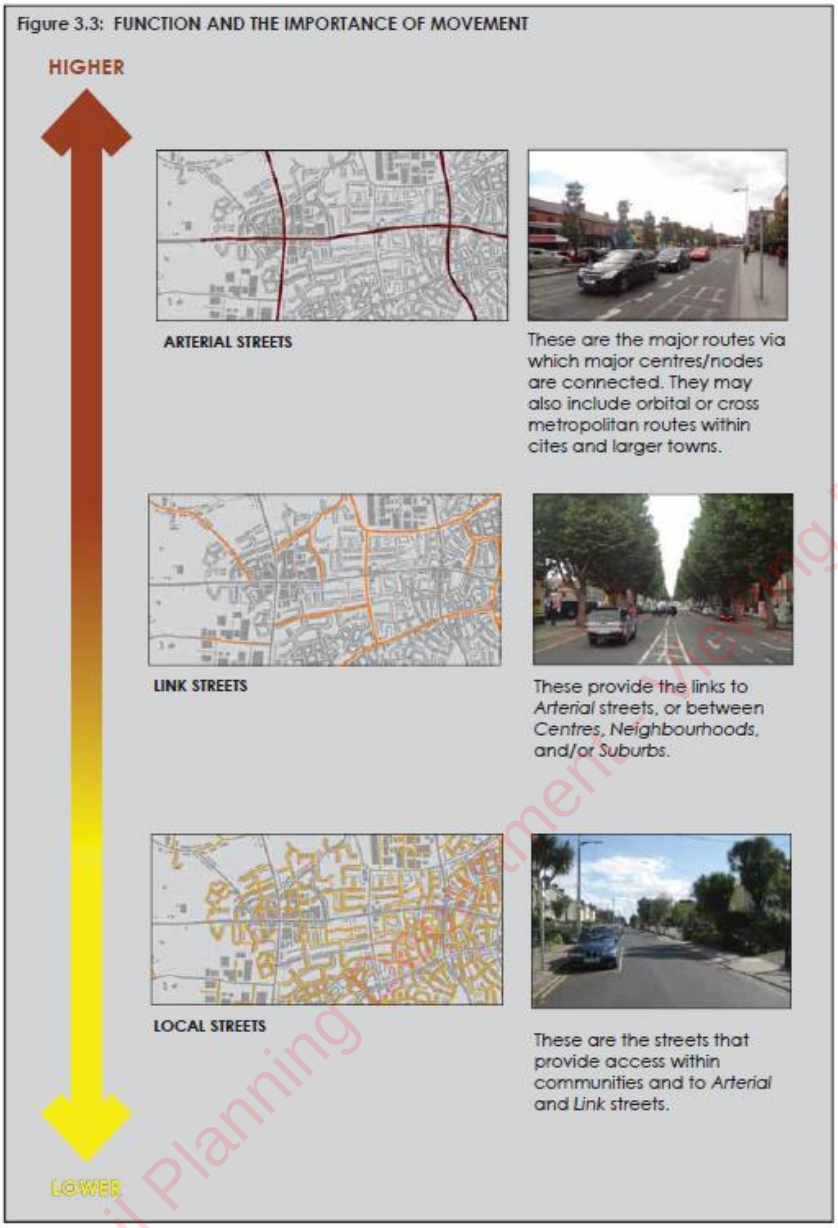

Figure 6-1: DMURS Street Classification

The MOOR has been designed as per the below Figure 6-2.

DMURS Description	Roads Act/NRA DMRB	Traffic Management Guidelines	National Cycle Manual
Arterial	National	Primary Distributor Roads	Distributor
Link	Regional (see note 1)	District Distributor Local Collector (see Notes 1 and 2)	Local Collector
Local	Local	Access	Access

Notes

Note 1: Larger Regional/District Distributors may fall into the category of *Arterial* where they are the main links between major centres (i.e. towns) or have an orbital function.

Note 2: Local Distributors may fall into the category of *Local* street where they are relatively short in length and simply link a neighbourhood to the broader street network.

Table 3.1: Terminology used within this Manual compared with other key publications.

Figure 6-2: DMURS Street Hierarchy

The internal road layout and L6219/L22143 modifications have been designed as per the below Figure 6-3.

DMURS Description	Roads Act/NRA DMRB	Traffic Management Guidelines	National Cycle Manual
Arterial	National	Primary Distributor Roads	Distributor
Link	Regional (see note 1)	District Distributor Local Collector (see Notes 1 and 2)	Local Collector
Local	Local	Access	Access

Notes

Note 1: Larger Regional/District Distributors may fall into the category of *Arterial* where they are the main links between major centres (i.e. towns) or have an orbital function.

Note 2: Local Distributors may fall into the category of *Local* street where they are relatively short in length and simply link a neighbourhood to the broader street network.

Table 3.1: Terminology used within this Manual compared with other key publications.

Figure 6-3: DMURS Street Hierarchy

6.10 Road Design Speeds

The MOOR (red) is envisaged to have a Design Speed of 60 kph. This design speed will tie into the recently approved wider strategic road network including the Maynooth Eastern Ring Road planning reference P82019-08 and will also have to be co-ordinated with the existing section of the MOOR already constructed west of the development site adjacent to Moyglare Hall.

It is noted that an additional section of the MOOR that will provide a connection from the works proposed as part of this application, to the section already constructed adjacent to Moyglare Hall will be submitted to Kildare County Council as this is within their jurisdiction.

The L6219/L22143 (green) has been designed to a Design Speed of 50 kph with geometric parameters chosen under DMURS. The internal road network (blue) has been designed to a Design Speed of 10-30 kph with geometric parameters chosen under DMURS. This is reflected in Figure 6-4 below extracted from DMURS, with the MOOR shown in red and the L6219/L22143 shown in green.

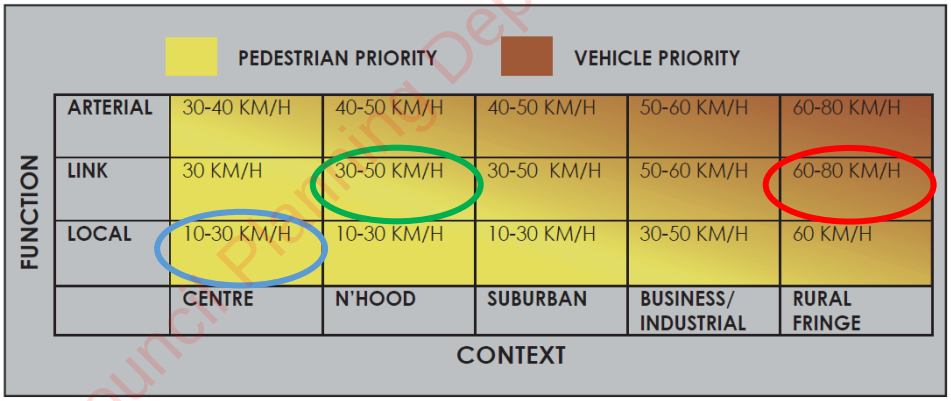

Table 4.1: Design speed selection matrix indicating the links between place, movement and speed that need to be taken into account in order to achieve effective and balanced design solutions.

Figure 6-4: DMURS Design Speeds

This proposed design speed ties into the existing speed limits of the surrounding road network.

6.11 Horizontal and Vertical Geometry

The road alignments will be designed so that the geometric elements, including horizontal and vertical curvature, superelevation and sight distance will be in line with DMURS, having values consistent with the design speeds.

The relevant horizontal and vertical geometric design values are shown in DMURS *Table 4.3* below shown below in Table 6-1. A standard carriageway cross fall of 2.5% will be adopted throughout, noting that adverse camber is allowable under DMURS designs in accordance with *Table 4.3*. A cross fall of 2.5% will also be used for footpaths and cycle facilities.

Table 6-1: DMURS Geometric Parameters

HORIZONTAL CURVATURE

Design Speed (km/h)	10	20	30	40	50	60
Minimum Radius with adverse camber of 2.5%	-	11	26	56	104	178
Minimum Radius with superelevation of 2.5 %	-	-	-	46	82	136

VERTICAL CURVATURE

Design Speed (km/h)	10	20	30	40	50	60
Crest Curve K Value	N/A	N/A	N/A	2.6	4.7	8.2
Sag Curve K Value	N/A	N/A	2.3	4.1	6.4	9.2

Table 4.3: Carriageway geometry parameters for horizontal and vertical curvature.

6.12 Road Cross Section

6.12.5 Carriageway

As mentioned previously, the internal road layout will consist of a 5.00-5.50m wide internal access roads and 6.00m wide roads where perpendicular parking is present within the proposed development in line with section 4.4.9 of DMURS. The proposed MOOR cross section will consist of a 7m carriageway, a 1.5m verge, a 1.75m cycle track and a 2m footpath on both sides of the road. The L6219/L22143 cross section will be similar to the MOOR, with the same dimensions. The only exception is that this footpath and cycle track will only be located on the southern part of the road, with the northern side to be

included in future developments. This has been designed in line with section 4.4.1 of DMURS.

6.12.6 Footpaths

The width of the footpaths has been determined with reference to DMURS *Section 4.3.1* with a minimum required width of 1.8 m based on the space needed for two wheelchairs to pass each other.

6.12.7 Cycle Facilities

The cycle lanes along the MOOR will be designed in accordance with the National Cycle Manual (NCM). Based on the Cycle Width Calculator in the NCM. The appropriate cycle path width will be a minimum of 1.75m giving room for a single file lane with overtaking room. The cycle paths will be separated from traffic by a kerb and verge and there will be a vertical separation on the inside, between the cycle path and footpath.

Within the development, cyclists are accommodated in shared spaces as well as on the roadway, as the speeds and the vehicular volumes are low, in line with the national cycle manual as shown below in figure below.

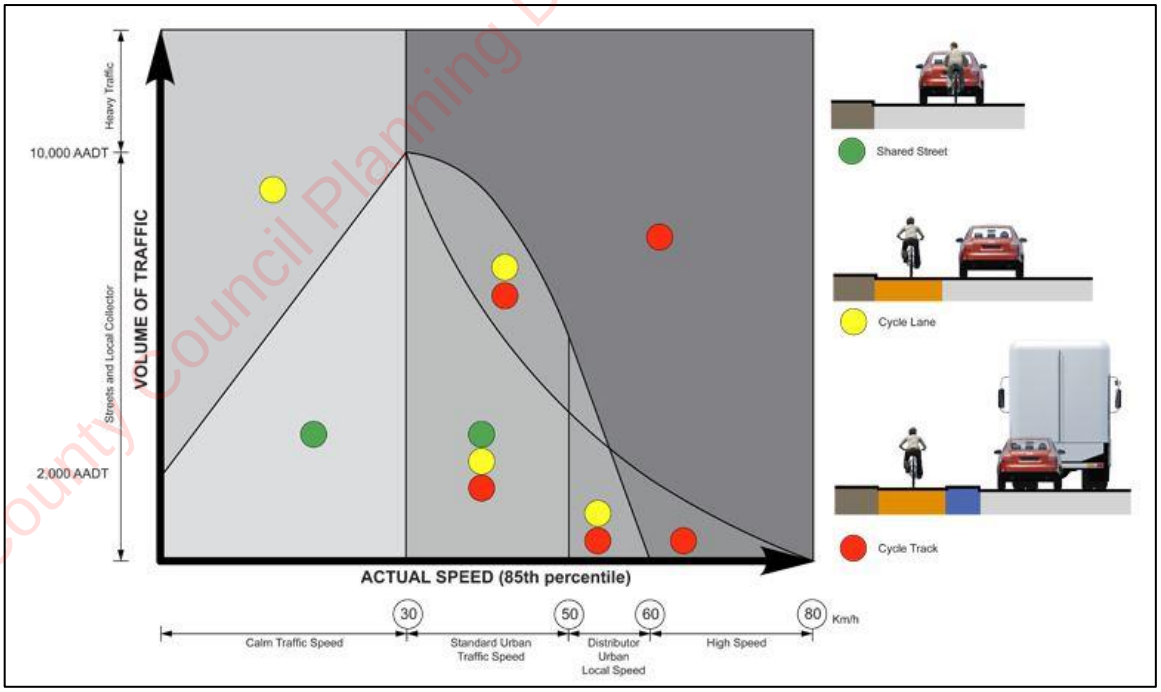

Figure 6-5: National Cycle Manual - Mixed or Separate

As discussed previously, the sections of the MOOR as well as the full L6219/L22143 will include segregated cycle tracks and footpaths, which will tie into infrastructure in Kildare County Council on both sides of the MOOR.

6.13 Road Junctions

New junctions where the MOOR and L6219 intersect have been designed as priority-controlled junctions with right-turn lanes for traffic management purposes. Access junctions to the development have also been designed as simple priority junctions with cycle track and footpath infrastructure in line with DMURS. These have been designed with the primary principle of providing safe and consistent layouts to present a uniformity of approach to drivers and other road users. In addition, the junctions have sufficient capacity to accommodate design year peak traffic flows thus optimising network capacity. The primary junction strategy objectives have been:

- To optimise road safety by ensuring adequate visibility and consistency;
- To ensure capacity for the design year;
- To function as traffic calming measures;
- To provide safe crossing facilities for pedestrians and cyclists;
- To provide busses with minimum delays.

6.14 Consultation

OCSC have had interactions with Kildare County Council and Meath County Council on this scheme in relation to the transportation related elements of the scheme, as detailed below:

- OCSC met with Meath County Council on 19 July 2021 to open preliminary discussions on the design of the MOOR. In attendance was Martin Murry (Director of Services for Infrastructure) and Nicholas Whyatt (Senior Engineer Transportation). Since this meeting, a Traffic Modelling Scoping Report has been issues to MCC.
- As noted previously, although the scheme is planned within the Meath County Council jurisdiction, a separate application will be made to KCC for infrastructure within the County. It is however noted that as the

largest nearby urban centre is within KCC jurisdiction, they have been consulted as a stakeholder. OCSC met with KCC on 9 August 2021, and 23 September 2021. In attendance was Brigette Rea, Daragh Conlan, George Willoughby, Jonathan Hennessy, and Lisa Kirwan, all from KCC. The same Traffic Modelling Scoping Report has also been issues to KCC.

- A submission was made on the Maynooth Transport Strategy as part of public consultation no. 1 on the 12th of November 2021. This submission outlines the proposed plans for the area and noted that it should be considered as part of the future Transport Strategy.
- A submission was made to BusConnects on the 15th of November 2021 noting the upcoming proposals as part of the MOOR that noted the BusConnects project should take cognisance of the upcoming works.

OCSC received a number of comments from Meath County Council's Transportation Department as part of their Opinion Report. Following this, further workshopping was done on the MOOR. A meeting was held on 14/07/2022 with various stakeholders at MCC, after which a number of comments were received. Subsequent to this, these comments have been incorporated into the design.

Appendix F of this ESR details the responses to the comments from the Opinion Report, as well as the comments received and addressed as part of the subsequent MOOR design meeting.

6.15 Traffic Impact

A Traffic Impact Assessment will be carried out which considers the current traffic flows and capacity in accordance with the Traffic and Transport Assessment Guidelines May 2014 from Transport Infrastructure Ireland. The Traffic Impact Assessment will be done by means of Vissim Micro-Simulation software at the request of Kildare County Council. More details of the TIA can be found in the TIA document submitted under separate cover.

6.16 Site Accessibility

The subject site will be linked to Maynooth Town Centra via the proposed section of the MOOR as part of this application and the Moyglare Road. New dedicated pedestrian and cyclist infrastructure will be provided along the proposed section of the Maynooth Outer Relief Road (MOOR) & within the internal development. All footpaths within the development will be a minimum of 1.80m wide and will run parallel to the proposed road infrastructure The SHD site will be serviced by way of two uncontrolled junctions that will access the L6219.

The provision of infrastructure on the MOOR will include a 7.0m carriageway, 1.5m verge, footpath and also cycle tracks designed per the National Cycle Manual.

Pedestrian and cyclist infrastructure will also be provided along the L6219/L22143 linking the residential lands to the creche and public parklands to the east.

Figure 6-6: Site Layout

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Consulting Engineers

APPENDIX A. Q_{BAR} Calculation and Rainfall Data

O'Connor Sutton Cronin		Page 1
9 Prussia Street Dublin 7 Ireland	Moygaddy Castle SHD	
Date 23/11/2021 09:40 File	Designed by RP Checked by MK	
XP Solutions	Source Control 2020.1	

ICP SUDS Mean Annual Flood

Input

Return Period (years)	2	Soil	0.470
Area (ha)	1.000	Urban	0.000
SAAR (mm)	799	Region Number	Ireland East

Results l/s

QBAR Rural	5.6
QBAR Urban	5.6
Q2 years	5.4
Q1 year	4.8
Q30 years	9.2
Q100 years	10.7

Met Eireann
Return Period Rainfall Depths for sliding Durations
Irish Grid: Easting: 294126, Northing: 239157,

	Interval		Years											
DURATION	6months,	1year,	2,	3,	4,	5,	10,	20,	30,	50,	75,	100,	150,	200,	250,	500,
5 mins	2.4,	3.4,	4.0,	4.9,	5.4,	5.9,	7.4,	9.2,	10.3,	12.0,	13.4,	14.6,	16.4,	17.8,	18.9,	N/A ,
10 mins	3.3,	4.8,	5.6,	6.8,	7.6,	8.2,	10.3,	12.8,	14.4,	16.7,	18.7,	20.3,	22.8,	24.8,	26.4,	N/A ,
15 mins	3.9,	5.6,	6.5,	8.0,	8.9,	9.7,	12.2,	15.0,	16.9,	19.6,	22.0,	23.9,	26.9,	29.1,	31.0,	N/A ,
30 mins	5.1,	7.3,	8.5,	10.2,	11.4,	12.3,	15.4,	18.8,	21.1,	24.3,	27.2,	29.4,	32.9,	35.6,	37.8,	N/A ,
1 hours	6.8,	9.5,	10.9,	13.1,	14.6,	15.7,	19.4,	23.6,	26.3,	30.2,	33.6,	36.2,	40.3,	43.4,	46.1,	N/A ,
2 hours	9.0,	12.3,	14.1,	16.8,	18.6,	20.0,	24.5,	29.5,	32.8,	37.4,	41.4,	44.6,	49.3,	53.0,	56.1,	N/A ,
3 hours	10.5,	14.4,	16.4,	19.5,	21.5,	23.0,	28.1,	33.7,	37.3,	42.4,	46.9,	50.3,	55.6,	59.6,	63.0,	N/A ,
4 hours	11.8,	16.1,	18.3,	21.6,	23.8,	25.5,	30.9,	37.0,	40.9,	46.4,	51.1,	54.8,	60.5,	64.8,	68.3,	N/A ,
6 hours	13.9,	18.7,	21.3,	25.0,	27.5,	29.4,	35.4,	42.2,	46.5,	52.6,	57.9,	61.9,	68.1,	72.8,	76.7,	N/A ,
9 hours	16.3,	21.9,	24.7,	28.9,	31.7,	33.8,	40.6,	48.1,	52.9,	59.6,	65.4,	69.9,	76.7,	81.9,	86.1,	N/A ,
12 hours	18.3,	24.4,	27.5,	32.1,	35.1,	37.4,	44.8,	52.8,	58.0,	65.2,	71.4,	76.2,	83.4,	88.9,	93.5,	N/A ,
18 hours	21.6,	28.4,	32.0,	37.1,	40.5,	43.1,	51.3,	60.3,	66.0,	73.9,	80.8,	86.0,	93.9,	100.0,	104.9,	N/A ,
24 hours	24.2,	31.7,	35.6,	41.2,	44.9,	47.7,	56.6,	66.2,	72.4,	80.8,	88.2,	93.8,	102.2,	108.6,	113.9,	131.9,
2 days	30.0,	38.5,	42.7,	48.8,	52.8,	55.8,	65.2,	75.3,	81.7,	90.3,	97.8,	103.4,	111.9,	118.3,	123.5,	141.2,
3 days	35.0,	44.2,	48.8,	55.3,	59.5,	62.7,	72.6,	83.2,	89.8,	98.8,	106.5,	112.2,	120.9,	127.4,	132.7,	150.5,
4 days	39.4,	49.2,	54.1,	61.0,	65.5,	68.9,	79.3,	90.3,	97.2,	106.4,	114.3,	120.3,	129.1,	135.8,	141.2,	159.3,
6 days	47.2,	58.3,	63.7,	71.3,	76.1,	79.8,	91.1,	102.9,	110.2,	120.0,	128.4,	134.6,	143.9,	150.8,	156.4,	175.2,
8 days	54.3,	66.4,	72.2,	80.4,	85.7,	89.6,	101.6,	114.1,	121.8,	132.2,	140.9,	147.4,	157.1,	164.3,	170.1,	189.5,
10 days	61.0,	73.9,	80.2,	88.9,	94.4,	98.6,	111.3,	124.4,	132.5,	143.3,	152.4,	159.1,	169.2,	176.6,	182.6,	202.6,
12 days	67.3,	81.0,	87.6,	96.8,	102.7,	107.0,	120.3,	134.1,	142.5,	153.7,	163.1,	170.1,	180.5,	188.2,	194.4,	214.9,
16 days	79.1,	94.3,	101.6,	111.7,	118.1,	122.8,	137.2,	152.0,	161.0,	173.0,	183.0,	190.4,	201.4,	209.5,	216.0,	237.6,
20 days	90.3,	106.8,	114.7,	125.6,	132.4,	137.5,	152.9,	168.5,	178.1,	190.8,	201.3,	209.1,	220.6,	229.1,	235.9,	258.4,
25 days	103.6,	121.6,	130.2,	141.9,	149.3,	154.7,	171.2,	187.9,	198.1,	211.5,	222.7,	230.9,	243.0,	251.9,	259.1,	282.6,

NOTES:
N/A Data not available
These values are derived from a Depth Duration Frequency (DDF) Model
For details refer to:
'Fitzgerald D. L. (2007), Estimates of Point Rainfall Frequencies, Technical Note No. 61, Met Eireann, Dublin',
Available for download at www.met.ie/climate/dataproducts/Estimation-of-Point-Rainfall-Frequencies_TN61.pdf

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APPENDIX B. Surface Water Design Criteria and Simulation Results

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Surface Water1

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - Scotland and Ireland

Return Period (years)	5	PIMP (%)	100
M5-60 (mm)	15.700	Add Flow / Climate Change (%)	20
Ratio R	0.281	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for Surface Water1

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
SC-1.000	70.155	0.286	245.0	0.103	4.00	0.0	0.600	o	300	Pipe/Conduit	
SC-1.001	67.531	0.276	245.0	0.085	0.00	0.0	0.600	o	300	Pipe/Conduit	
SC-1.002	67.531	0.276	245.0	0.084	0.00	0.0	0.600	o	300	Pipe/Conduit	
SC-1.003	53.294	0.218	245.0	0.067	0.00	0.0	0.600	o	300	Pipe/Conduit	
SC-2.000	31.976	0.188	170.0	0.051	4.00	0.0	0.600	o	225	Pipe/Conduit	
SC-2.001	15.169	0.089	170.0	0.018	0.00	0.0	0.600	o	225	Pipe/Conduit	
SC-2.002	45.442	0.267	170.0	0.062	0.00	0.0	0.600	o	225	Pipe/Conduit	
SC-2.003	19.940	0.199	100.0	0.025	0.00	0.0	0.600	o	225	Pipe/Conduit	
SC-2.004	48.265	0.541	89.2	0.060	0.00	0.0	0.600	o	225	Pipe/Conduit	
SC-1.004	11.618	0.036	325.0	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
SC-1.005	20.192	0.062	325.0	0.080	0.00	0.0	0.600	o	375	Pipe/Conduit	
SC-1.006	48.741	0.119	410.0	0.158	0.00	0.0	0.600	o	450	Pipe/Conduit	
SC-3.000	29.015	0.580	50.0	0.082	4.00	0.0	0.600	o	225	Pipe/Conduit	
SC-3.001	33.444	0.458	73.1	0.056	0.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
SC-1.000	50.00	5.17	55.461	0.103	0.0	0.0	2.8	1.00	70.7	16.7
SC-1.001	50.00	6.29	55.175	0.187	0.0	0.0	5.1	1.00	70.7	30.4
SC-1.002	50.00	7.42	54.899	0.271	0.0	0.0	7.3	1.00	70.7	44.1
SC-1.003	48.30	8.31	54.623	0.338	0.0	0.0	8.8	1.00	70.7	53.0
SC-2.000	50.00	4.53	55.766	0.051	0.0	0.0	1.4	1.00	39.8	8.3
SC-2.001	50.00	4.79	55.578	0.069	0.0	0.0	1.9	1.00	39.8	11.1
SC-2.002	50.00	5.54	55.489	0.131	0.0	0.0	3.5	1.00	39.8	21.2
SC-2.003	50.00	5.80	55.221	0.156	0.0	0.0	4.2	1.31	52.0	25.3
SC-2.004	50.00	6.38	55.022	0.216	0.0	0.0	5.8	1.39	55.1	35.1
SC-1.004	47.80	8.50	54.331	0.554	0.0	0.0	14.3	1.00	110.4	86.0
SC-1.005	46.96	8.84	54.295	0.634	0.0	0.0	16.1	1.00	110.4	96.7
SC-1.006	45.08	9.65	54.158	0.791	0.0	0.0	19.3	1.00	158.7	115.9
SC-3.000	50.00	4.26	55.302	0.082	0.0	0.0	2.2	1.85	73.7	13.4
SC-3.001	50.00	4.62	54.722	0.138	0.0	0.0	3.7	1.53	60.9	22.4

Network Design Table for Surface Water1

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
SC-1.007	14.851	0.036	410.0	0.032	0.00	0.0	0.600	o	450	Pipe/Conduit	
SC-1.008	20.551	0.050	410.0	0.037	0.00	0.0	0.600	o	450	Pipe/Conduit	
SC-1.009	22.255	0.045	495.0	0.060	0.00	0.0	0.600	o	525	Pipe/Conduit	
SC-1.010	16.582	0.033	495.0	0.037	0.00	0.0	0.600	o	525	Pipe/Conduit	
SC-4.000	67.465	0.452	149.3	0.178	4.00	0.0	0.600	o	225	Pipe/Conduit	
SC-5.000	14.655	0.100	146.5	0.000	4.00	0.0	0.600	o	225	Pipe/Conduit	
SC-5.001	35.729	0.285	125.4	0.247	0.00	0.0	0.600	o	225	Pipe/Conduit	
SC-5.002	10.336	0.042	245.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
SC-5.003	8.703	0.100	87.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
SC-5.004	64.785	0.368	176.0	0.252	0.00	0.0	0.600	o	300	Pipe/Conduit	
SC-6.000	25.481	0.303	84.1	0.041	4.00	0.0	0.600	o	225	Pipe/Conduit	
SC-5.005	15.327	0.047	325.0	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
SC-5.006	62.032	0.238	260.6	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
SC-5.007	15.019	0.046	325.0	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
SC-5.008	10.800	0.327	33.0	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
SC-4.001	12.337	0.047	262.5	0.006	0.00	0.0	0.600	o	375	Pipe/Conduit	
SC-7.000	15.581	0.180	86.6	0.088	4.00	0.0	0.600	o	225	Pipe/Conduit	
SC-7.001	24.294	0.206	117.9	0.097	0.00	0.0	0.600	o	225	Pipe/Conduit	
SC-7.002	43.183	0.797	54.2	0.119	0.00	0.0	0.600	o	225	Pipe/Conduit	
SC-8.000	7.990	0.054	148.0	0.071	4.00	0.0	0.600	o	225	Pipe/Conduit	
SC-8.001	10.787	0.068	158.6	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
SC-1.007	44.54	9.90	54.039	0.961	0.0	0.0	23.2	1.00	158.7	139.1
SC-1.008	43.82	10.24	54.003	0.998	0.0	0.0	23.7	1.00	158.7	142.1
SC-1.009	43.08	10.62	53.878	1.058	0.0	0.0	24.7	1.00	216.5	148.2
SC-1.010	42.55	10.89	53.833	1.095	0.0	0.0	25.2	1.00	216.5	151.4
SC-4.000	50.00	5.05	54.549	0.178	0.0	0.0	4.8	1.07	42.5	28.9
SC-5.000	50.00	4.23	55.651	0.000	0.0	0.0	0.0	1.08	42.9	0.0
SC-5.001	50.00	4.74	55.551	0.247	0.0	0.0	6.7	1.17	46.4	40.2
SC-5.002	50.00	4.91	55.191	0.247	0.0	0.0	6.7	1.00	70.7	40.2
SC-5.003	50.00	5.00	55.149	0.247	0.0	0.0	6.7	1.69	119.2	40.2
SC-5.004	50.00	5.91	55.049	0.500	0.0	0.0	13.5	1.18	83.5	81.2
SC-6.000	50.00	4.30	55.059	0.041	0.0	0.0	1.1	1.43	56.7	6.7
SC-5.005	50.00	6.16	54.606	0.541	0.0	0.0	14.7	1.00	110.4	87.9
SC-5.006	50.00	7.09	54.559	0.541	0.0	0.0	14.7	1.12	123.4	87.9
SC-5.007	50.00	7.34	54.321	0.541	0.0	0.0	14.7	1.00	110.4	87.9
SC-5.008	50.00	7.40	54.274	0.541	0.0	0.0	14.7	3.16	349.5	87.9
SC-4.001	50.00	7.58	53.947	0.725	0.0	0.0	19.6	1.11	123.0	117.8
SC-7.000	50.00	4.18	55.775	0.088	0.0	0.0	2.4	1.41	55.9	14.2
SC-7.001	50.00	4.52	55.595	0.185	0.0	0.0	5.0	1.20	47.8	30.0
SC-7.002	50.00	4.93	55.389	0.304	0.0	0.0	8.2	1.78	70.8	49.4
SC-8.000	50.00	4.12	55.175	0.071	0.0	0.0	1.9	1.07	42.6	11.5
SC-8.001	50.00	4.30	55.121	0.071	0.0	0.0	1.9	1.04	41.2	11.5

Network Design Table for Surface Water1

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
SC-8.002	10.702	0.069	155.1	0.165	0.00	0.0	0.600	o	225	Pipe/Conduit	
SC-8.003	27.783	0.200	138.9	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
SC-8.004	11.294	0.192	59.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
SC-7.003	17.586	0.054	325.0	0.081	0.00	0.0	0.600	o	375	Pipe/Conduit	
SC-7.004	46.359	0.489	94.8	0.039	0.00	0.0	0.600	o	375	Pipe/Conduit	
SC-4.002	10.027	0.058	172.9	0.147	0.00	0.0	0.600	o	525	Pipe/Conduit	
SC-4.003	46.290	2.007	23.1	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit	
SC-4.004	19.403	0.033	590.0	0.018	0.00	0.0	0.600	o	600	Pipe/Conduit	
SC-4.005	21.657	0.037	590.0	0.023	0.00	0.0	0.600	o	600	Pipe/Conduit	
SC-4.006	8.450	0.014	590.0	0.016	0.00	0.0	0.600	o	600	Pipe/Conduit	
SC-1.011	13.585	0.023	590.0	0.033	0.00	0.0	0.600	o	675	Pipe/Conduit	
SC-9.000	9.262	0.232	40.0	0.106	4.00	0.0	0.600	o	225	Pipe/Conduit	
SC-9.001	11.038	0.276	40.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
SC-9.002	7.827	0.196	40.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
SC-9.003	7.795	0.195	40.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
SC-9.004	9.559	0.239	40.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
SC-9.005	9.646	0.276	35.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
SC-9.006	14.497	0.362	40.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
SC-9.007	10.280	0.272	37.8	0.082	0.00	0.0	0.600	o	225	Pipe/Conduit	
SC-1.012	11.288	0.057	198.0	0.000	0.00	0.0	0.600	o	675	Pipe/Conduit	
SC-1.013	20.495	0.030	675.0	0.000	0.00	0.0	0.600	o	750	Pipe/Conduit	
SC-1.014	4.215	0.025	170.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
SC-1.015	37.359	0.220	170.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
SC-8.002	50.00	4.47	55.053	0.235	0.0	0.0	6.4	1.05	41.6	38.2
SC-8.003	50.00	4.89	54.984	0.235	0.0	0.0	6.4	1.11	44.0	38.2
SC-8.004	50.00	5.00	54.784	0.235	0.0	0.0	6.4	1.71	67.8	38.2
SC-7.003	50.00	5.29	54.442	0.620	0.0	0.0	16.8	1.00	110.4	100.8
SC-7.004	50.00	5.70	54.388	0.659	0.0	0.0	17.8	1.86	205.6	107.1
SC-4.002	50.00	7.68	53.749	1.531	0.0	0.0	41.5	1.70	368.1	248.7
SC-4.003	49.55	7.84	53.691	1.531	0.0	0.0	41.5	4.68	1012.7	248.7
SC-4.004	48.66	8.17	51.609	1.548	0.0	0.0	41.5	1.00	281.4	248.7
SC-4.005	47.72	8.53	51.576	1.571	0.0	0.0	41.5	1.00	281.4	248.7
SC-4.006	47.37	8.67	51.540	1.586	0.0	0.0	41.5	1.00	281.4	248.7
SC-1.011	42.15	11.10	51.450	2.714	0.0	0.0	62.0	1.07	383.5	371.8
SC-9.000	50.00	4.07	53.924	0.106	0.0	0.0	2.9	2.07	82.5	17.2
SC-9.001	50.00	4.16	53.692	0.106	0.0	0.0	2.9	2.07	82.5	17.2
SC-9.002	50.00	4.23	53.417	0.106	0.0	0.0	2.9	2.07	82.5	17.2
SC-9.003	50.00	4.29	53.221	0.106	0.0	0.0	2.9	2.07	82.5	17.2
SC-9.004	50.00	4.37	53.026	0.106	0.0	0.0	2.9	2.07	82.5	17.2
SC-9.005	50.00	4.44	52.787	0.106	0.0	0.0	2.9	2.22	88.2	17.2
SC-9.006	50.00	4.55	52.511	0.106	0.0	0.0	2.9	2.07	82.5	17.2
SC-9.007	50.00	4.63	52.149	0.188	0.0	0.0	5.1	2.13	84.9	30.6
SC-1.012	41.96	11.20	51.427	2.902	0.0	0.0	66.0	1.86	665.2	395.8
SC-1.013	41.38	11.52	51.295	2.902	0.0	0.0	66.0	1.07	472.5	395.8
SC-1.014	50.00	4.07	51.265	0.000	16.0	0.0	2.7	1.00	39.8	16.0
SC-1.015	50.00	4.69	51.240	0.000	16.0	0.0	3.2	1.00	39.8	19.2

Network Design Table for Surface Water1

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
SC-1.016	5.914	0.035	170.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
SC-1.017	31.965	0.188	170.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
SC-10.000	23.507	0.138	170.0	0.068	4.00	0.0	0.600	o	225	Pipe/Conduit	
SC-10.001	30.266	0.416	72.8	0.080	0.00	0.0	0.600	o	225	Pipe/Conduit	
SC-11.000	27.005	0.399	67.7	0.204	4.00	0.0	0.600	o	225	Pipe/Conduit	
SC-12.000	33.621	0.198	170.0	0.163	4.00	0.0	0.600	o	225	Pipe/Conduit	
SC-13.000	24.266	0.233	104.1	0.114	4.00	0.0	0.600	o	225	Pipe/Conduit	
SC-12.001	8.025	0.047	170.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
SC-12.002	61.170	0.250	245.0	0.089	0.00	0.0	0.600	o	300	Pipe/Conduit	
SC-11.001	20.547	0.063	325.0	0.071	0.00	0.0	0.600	o	375	Pipe/Conduit	
SC-11.002	22.078	0.188	117.2	0.117	0.00	0.0	0.600	o	375	Pipe/Conduit	
SC-10.002	28.229	0.494	57.1	0.060	0.00	0.0	0.600	o	375	Pipe/Conduit	
SC-10.003	11.091	0.167	66.4	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
SC-14.000	15.831	0.093	170.0	0.099	4.00	0.0	0.600	o	225	Pipe/Conduit	
SC-14.001	9.322	0.055	170.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
SC-10.004	22.717	0.076	300.0	0.033	0.00	0.0	0.600	o	450	Pipe/Conduit	
SC-10.005	12.876	0.043	300.0	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit	
SC-15.000	25.645	0.322	79.6	0.108	4.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
SC-1.016	50.00	4.79	51.020	0.000	16.0	0.0	3.2	1.00	39.8	19.2
SC-1.017	50.00	5.32	50.985	0.000	16.0	0.0	3.2	1.00	39.8	19.2
SC-10.000	50.00	4.39	54.862	0.068	0.0	0.0	1.8	1.00	39.8	11.0
SC-10.001	50.00	4.72	54.724	0.148	0.0	0.0	4.0	1.53	61.0	24.0
SC-11.000	50.00	4.28	55.348	0.204	0.0	0.0	5.5	1.59	63.3	33.1
SC-12.000	50.00	4.56	55.054	0.163	0.0	0.0	4.4	1.00	39.8	26.4
SC-13.000	50.00	4.32	55.089	0.114	0.0	0.0	3.1	1.28	50.9	18.6
SC-12.001	50.00	4.67	54.781	0.277	0.0	0.0	7.5	1.20	85.0	45.0
SC-12.002	50.00	5.69	54.734	0.366	0.0	0.0	9.9	1.00	70.7	59.4
SC-11.001	50.00	6.03	54.409	0.640	0.0	0.0	17.3	1.00	110.4	104.1
SC-11.002	50.00	6.25	54.346	0.757	0.0	0.0	20.5	1.67	184.8	123.0
SC-10.002	50.00	6.45	54.157	0.965	0.0	0.0	26.1	2.40	265.2	156.8
SC-10.003	50.00	6.52	53.588	0.965	0.0	0.0	26.1	2.50	397.2	156.8
SC-14.000	50.00	4.26	51.372	0.099	0.0	0.0	2.7	1.00	39.8	16.1
SC-14.001	50.00	4.42	51.279	0.099	0.0	0.0	2.7	1.00	39.8	16.1
SC-10.004	50.00	6.85	50.999	1.097	0.0	0.0	29.7	1.17	185.8	178.3
SC-10.005	50.00	7.01	50.848	1.097	0.0	0.0	29.7	1.29	278.8	178.3
SC-15.000	50.00	4.29	55.307	0.108	0.0	0.0	2.9	1.47	58.3	17.6

Network Design Table for Surface Water1

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
SC-15.001	34.082	0.434	78.5	0.058	0.00	0.0	0.600	o	225	Pipe/Conduit	
SC-15.002	23.116	0.176	131.2	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
SC-16.000	66.822	0.924	72.3	0.245	4.00	0.0	0.600	o	225	Pipe/Conduit	
SC-16.001	12.301	0.123	100.0	0.053	0.00	0.0	0.600	o	225	Pipe/Conduit	
SC-16.002	8.470	0.059	143.6	0.076	0.00	0.0	0.600	o	300	Pipe/Conduit	
SC-16.003	22.822	0.093	245.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
SC-15.003	5.386	0.022	246.5	0.036	0.00	0.0	0.600	o	375	Pipe/Conduit	
SC-15.004	30.715	0.368	83.6	0.080	0.00	0.0	0.600	o	375	Pipe/Conduit	
SC-17.000	13.131	0.089	148.3	0.061	4.00	0.0	0.600	o	225	Pipe/Conduit	
SC-15.005	8.299	0.020	410.0	0.053	0.00	0.0	0.600	o	450	Pipe/Conduit	
SC-15.006	3.254	0.008	410.0	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
SC-15.007	9.819	0.057	172.3	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
SC-15.008	3.273	0.019	170.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
SC-15.009	49.639	0.292	170.0	0.133	0.00	0.0	0.600	o	225	Pipe/Conduit	
SC-15.010	9.955	0.059	170.0	0.005	0.00	0.0	0.600	o	225	Pipe/Conduit	
SC-18.000	54.814	0.664	82.6	0.164	4.00	0.0	0.600	o	225	Pipe/Conduit	
SC-18.001	45.965	0.314	146.4	0.024	0.00	0.0	0.600	o	225	Pipe/Conduit	
SC-18.002	9.401	0.055	170.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
SC-18.003	47.583	0.194	245.0	0.139	0.00	0.0	0.600	o	300	Pipe/Conduit	
SC-18.004	22.556	0.092	245.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
SC-18.005	8.382	0.034	245.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
SC-15.011	50.333	0.123	410.0	0.194	0.00	0.0	0.600	o	450	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
SC-15.001	50.00	4.68	54.985	0.166	0.0	0.0	4.5	1.48	58.7	27.0
SC-15.002	50.00	5.01	54.551	0.166	0.0	0.0	4.5	1.14	45.3	27.0
SC-16.000	50.00	4.72	55.574	0.245	0.0	0.0	6.6	1.54	61.2	39.8
SC-16.001	50.00	4.88	54.650	0.298	0.0	0.0	8.1	1.31	52.0	48.5
SC-16.002	50.00	4.99	54.452	0.374	0.0	0.0	10.1	1.31	92.6	60.8
SC-16.003	50.00	5.37	54.393	0.374	0.0	0.0	10.1	1.00	70.7	60.8
SC-15.003	50.00	5.45	54.225	0.576	0.0	0.0	15.6	1.15	127.0	93.7
SC-15.004	50.00	5.70	54.203	0.656	0.0	0.0	17.8	1.98	219.0	106.6
SC-17.000	50.00	4.20	54.074	0.061	0.0	0.0	1.7	1.07	42.6	9.9
SC-15.005	50.00	5.84	53.760	0.770	0.0	0.0	20.8	1.00	158.7	125.1
SC-15.006	50.00	5.90	53.740	0.770	0.0	0.0	20.8	1.00	158.7	125.1
SC-15.007	50.00	6.00	53.732	0.770	0.0	0.0	20.8	1.55	245.9	125.1
SC-15.008	50.00	4.05	53.675	0.000	4.2	0.0	0.7	1.00	39.8	4.2
SC-15.009	50.00	4.88	53.656	0.133	4.2	0.0	4.4	1.00	39.8	26.7
SC-15.010	50.00	5.05	53.364	0.138	4.2	0.0	4.6	1.00	39.8	27.5
SC-18.000	50.00	4.63	53.560	0.164	0.0	0.0	4.4	1.44	57.3	26.7
SC-18.001	50.00	5.34	52.896	0.188	0.0	0.0	5.1	1.08	42.9	30.5
SC-18.002	50.00	5.50	52.582	0.188	0.0	0.0	5.1	1.00	39.8	30.5
SC-18.003	50.00	6.29	52.452	0.327	0.0	0.0	8.9	1.00	70.7	53.1
SC-18.004	50.00	6.67	52.257	0.327	0.0	0.0	8.9	1.00	70.7	53.1
SC-18.005	50.00	6.81	52.165	0.327	0.0	0.0	8.9	1.00	70.7	53.1
SC-15.011	50.00	7.65	51.981	0.659	4.2	0.0	18.7	1.00	158.7	112.2

Network Design Table for Surface Water1

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
SC-15.012	10.038	0.024	410.0	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
SC-10.006	13.342	1.767	7.6	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit	
SC-10.007	7.049	0.012	590.0	0.000	0.00	0.0	0.600	o	675	Pipe/Conduit	
SC-10.008	52.920	0.090	590.0	0.000	0.00	0.0	0.600	o	675	Pipe/Conduit	
SC-10.009	1.387	0.002	589.8	0.000	0.00	0.0	0.600	o	675	Pipe/Conduit	
SC-10.010	5.144	0.030	170.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
SC-10.011	40.116	0.236	170.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
SC-19.000	10.392	0.432	24.1	0.109	4.00	0.0	0.600	o	225	Pipe/Conduit	
SC-20.000	68.361	0.402	170.0	0.082	4.00	0.0	0.600	o	225	Pipe/Conduit	
SC-20.001	43.222	0.254	170.0	0.156	0.00	0.0	0.600	o	225	Pipe/Conduit	
SC-20.002	32.004	0.131	245.0	0.028	0.00	0.0	0.600	o	300	Pipe/Conduit	
SC-20.003	48.350	0.197	245.0	0.049	0.00	0.0	0.600	o	300	Pipe/Conduit	
SC-21.000	26.231	0.154	170.0	0.063	4.00	0.0	0.600	o	225	Pipe/Conduit	
SC-21.001	26.231	0.154	170.0	0.034	0.00	0.0	0.600	o	225	Pipe/Conduit	
SC-21.002	47.755	0.281	170.0	0.083	0.00	0.0	0.600	o	225	Pipe/Conduit	
SC-20.004	72.578	0.223	325.0	0.078	0.00	0.0	0.600	o	375	Pipe/Conduit	
SC-19.001	21.802	0.128	170.3	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
SC-19.002	43.313	0.255	170.0	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
SC-19.003	33.434	0.197	169.7	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
SC-19.004	18.452	0.109	170.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
SC-19.005	6.891	0.041	170.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
SC-15.012	49.62	7.82	51.858	0.659	4.2	0.0	18.7	1.00	158.7	112.2
SC-10.006	49.55	7.85	50.805	1.756	4.2	0.0	48.0	8.19	1772.1	287.9
SC-10.007	49.24	7.96	48.888	1.756	4.2	0.0	48.0	1.07	383.5	287.9
SC-10.008	47.11	8.78	48.876	1.756	4.2	0.0	48.0	1.07	383.5	287.9
SC-10.009	47.06	8.80	48.787	1.756	4.2	0.0	48.0	1.07	383.6	287.9
SC-10.010	50.00	4.09	48.784	0.000	9.7	0.0	1.6	1.00	39.8	9.7
SC-10.011	50.00	4.75	48.754	0.000	9.7	0.0	1.9	1.00	39.8	11.6
SC-19.000	50.00	4.06	53.886	0.109	0.0	0.0	2.9	2.68	106.5	17.7
SC-20.000	50.00	5.14	55.343	0.082	0.0	0.0	2.2	1.00	39.8	13.3
SC-20.001	50.00	5.86	54.941	0.238	0.0	0.0	6.4	1.00	39.8	38.6
SC-20.002	50.00	6.39	54.612	0.265	0.0	0.0	7.2	1.00	70.7	43.1
SC-20.003	50.00	7.20	54.481	0.314	0.0	0.0	8.5	1.00	70.7	51.1
SC-21.000	50.00	4.44	54.245	0.063	0.0	0.0	1.7	1.00	39.8	10.3
SC-21.001	50.00	4.87	54.091	0.097	0.0	0.0	2.6	1.00	39.8	15.7
SC-21.002	50.00	5.67	53.936	0.180	0.0	0.0	4.9	1.00	39.8	29.2
SC-20.004	48.04	8.41	53.505	0.572	0.0	0.0	14.9	1.00	110.4	89.3
SC-19.001	47.37	8.67	53.282	0.681	0.0	0.0	17.5	1.39	153.0	104.8
SC-19.002	46.12	9.19	53.154	0.681	0.0	0.0	17.5	1.39	153.2	104.8
SC-19.003	50.00	4.56	52.899	0.000	3.7	0.0	0.6	1.00	39.8	3.7
SC-19.004	50.00	4.86	52.702	0.000	3.7	0.0	0.7	1.00	39.8	4.4
SC-19.005	50.00	4.98	52.594	0.000	3.7	0.0	0.7	1.00	39.8	4.4

Area Summary for Surface Water1

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	As Zoned	Default	100	0.043	0.043	0.043
		Road	100	0.060	0.060	0.103
1.001	As Zoned	Default	100	0.035	0.035	0.035
		Road	100	0.049	0.049	0.085
1.002	As Zoned	Default	100	0.031	0.031	0.031
		Road	100	0.053	0.053	0.084
1.003	As Zoned	Default	100	0.028	0.028	0.028
		Road	100	0.039	0.039	0.067
2.000	As Zoned	Default	100	0.021	0.021	0.021
		Road	100	0.030	0.030	0.051
2.001	As Zoned	Default	100	0.008	0.008	0.008
		Road	100	0.010	0.010	0.018
2.002	As Zoned	Default	100	0.027	0.027	0.027
		Road	100	0.035	0.035	0.062
2.003	As Zoned	Default	100	0.011	0.011	0.011
		Road	100	0.015	0.015	0.025
2.004	As Zoned	Default	100	0.026	0.026	0.026
		Road	100	0.034	0.034	0.060
1.004	-	-	100	0.000	0.000	0.000
1.005	As Zoned	Default	100	0.023	0.023	0.023
		Building	100	0.037	0.037	0.060
		Road	100	0.011	0.011	0.071
		Parking	70	0.014	0.009	0.080
1.006	As Zoned	Default	100	0.064	0.064	0.064
		Building	100	0.050	0.050	0.114
		Road	100	0.028	0.028	0.142
		Parking	70	0.023	0.016	0.158
3.000	As Zoned	Default	100	0.006	0.006	0.006
		Building	100	0.033	0.033	0.040
		Road	100	0.033	0.033	0.073
		Parking	70	0.013	0.009	0.082
3.001	As Zoned	Default	100	0.018	0.018	0.018
		Road	100	0.038	0.038	0.056
		Parking	70	0.000	0.000	0.056
1.007	As Zoned	Road	100	0.029	0.029	0.029
		Parking	70	0.005	0.003	0.032
1.008	As Zoned	Building	100	0.014	0.014	0.014
		Road	100	0.035	0.035	0.049
		Parking	70	0.005	0.004	0.037
1.009	As Zoned	Default	100	0.014	0.014	0.014
		Building	100	0.027	0.027	0.041
		Road	100	0.013	0.013	0.054
		Parking	70	0.010	0.007	0.060
1.010	As Zoned	Default	100	0.012	0.012	0.012
		Building	100	0.016	0.016	0.028
		Road	100	0.009	0.009	0.037
		Parking	70	0.000	0.000	0.037
4.000	As Zoned	Default	100	0.033	0.033	0.033
		Building	100	0.033	0.033	0.067
		Road	100	0.031	0.031	0.098
		Parking	70	0.013	0.009	0.107
	As Zoned	Default	100	0.022	0.022	0.129
		Building	100	0.027	0.027	0.156
		Road	100	0.014	0.014	0.170
		Parking	70	0.011	0.008	0.178
5.000	-	-	100	0.000	0.000	0.000
5.001	As Zoned	Building	100	0.078	0.078	0.078
	As Zoned	Default	100	0.078	0.078	0.155
		Road	100	0.028	0.028	0.184
		Parking	70	0.029	0.020	0.126
	As Zoned	Default	100	0.014	0.014	0.217
		Building	100	0.030	0.030	0.247

Area Summary for Surface Water1

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
5.002	-	-	100	0.000	0.000	0.000
5.003	-	-	100	0.000	0.000	0.000
5.004	As Zoned	Default	100	0.103	0.103	0.103
		Building	100	0.089	0.089	0.192
		Road	100	0.035	0.035	0.226
		Parking	70	0.036	0.025	0.252
6.000	As Zoned	Default	100	0.041	0.041	0.041
5.005	-	-	100	0.000	0.000	0.000
5.006	-	-	100	0.000	0.000	0.000
5.007	-	-	100	0.000	0.000	0.000
5.008	-	-	100	0.000	0.000	0.000
4.001	As Zoned	Default	100	0.001	0.001	0.001
		Road	100	0.005	0.005	0.006
7.000	As Zoned	Default	100	0.035	0.035	0.035
		Building	100	0.038	0.038	0.072
		Road	100	0.010	0.010	0.082
		Parking	70	0.007	0.005	0.088
7.001	As Zoned	Default	100	0.022	0.022	0.022
		Building	100	0.046	0.046	0.068
		Road	100	0.013	0.013	0.081
		Parking	70	0.023	0.016	0.097
7.002	As Zoned	Default	100	0.053	0.053	0.053
		Building	100	0.040	0.040	0.093
		Road	100	0.021	0.021	0.114
		Parking	70	0.008	0.006	0.119
8.000	As Zoned	Default	100	0.071	0.071	0.071
8.001	-	-	100	0.000	0.000	0.000
8.002	As Zoned	Default	100	0.059	0.059	0.059
		Building	100	0.060	0.060	0.119
		Road	100	0.027	0.027	0.146
		Parking	70	0.026	0.018	0.165
8.003	-	-	100	0.000	0.000	0.000
8.004	-	-	100	0.000	0.000	0.000
7.003	As Zoned	Default	100	0.081	0.081	0.081
7.004	As Zoned	Default	100	0.018	0.018	0.018
		Road	100	0.021	0.021	0.039
4.002	As Zoned	Default	100	0.036	0.036	0.036
		Building	100	0.053	0.053	0.089
		Road	100	0.030	0.030	0.118
		Parking	70	0.019	0.013	0.132
	As Zoned	Default	100	0.015	0.015	0.147
		Road	100	0.000	0.000	0.147
4.003	-	-	100	0.000	0.000	0.000
4.004	As Zoned	Default	100	0.008	0.008	0.008
		Road	100	0.009	0.009	0.018
4.005	As Zoned	Default	100	0.012	0.012	0.012
		Road	100	0.010	0.010	0.023
4.006	As Zoned	Default	100	0.007	0.007	0.007
		Road	100	0.009	0.009	0.016
1.011	As Zoned	Default	100	0.009	0.009	0.009
		Building	100	0.016	0.016	0.025
		Road	100	0.004	0.004	0.029
		Parking	70	0.005	0.003	0.033
9.000	As Zoned	Default	100	0.045	0.045	0.045
		Building	100	0.024	0.024	0.069
		Road	100	0.033	0.033	0.102
		Parking	70	0.005	0.003	0.106
9.001	-	-	100	0.000	0.000	0.000
9.002	-	-	100	0.000	0.000	0.000
9.003	-	-	100	0.000	0.000	0.000
9.004	-	-	100	0.000	0.000	0.000
9.005	-	-	100	0.000	0.000	0.000

Area Summary for Surface Water1

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
9.006	-	-	100	0.000	0.000	0.000
9.007	As Zoned	Default	100	0.021	0.021	0.021
		Building	100	0.033	0.033	0.054
		Road	100	0.022	0.022	0.076
		Parking	70	0.010	0.007	0.082
1.012	-	-	100	0.000	0.000	0.000
1.013	-	-	100	0.000	0.000	0.000
1.014	-	-	100	0.000	0.000	0.000
1.015	-	-	100	0.000	0.000	0.000
1.016	-	-	100	0.000	0.000	0.000
1.017	-	-	100	0.000	0.000	0.000
10.000	As Zoned	Default	100	0.030	0.030	0.030
		Building	100	0.020	0.020	0.050
		Road	100	0.018	0.018	0.068
10.001	As Zoned	Default	100	0.020	0.020	0.020
		Building	100	0.034	0.034	0.054
		Road	100	0.017	0.017	0.071
		Parking	70	0.013	0.009	0.080
11.000	As Zoned	Default	100	0.063	0.063	0.063
		Building	100	0.094	0.094	0.157
		Road	100	0.013	0.013	0.170
		Hardstanding	100	0.020	0.020	0.190
		Parking	70	0.020	0.014	0.204
12.000	As Zoned	Default	100	0.048	0.048	0.048
		Building	100	0.078	0.078	0.126
		Road	100	0.017	0.017	0.143
		Hardstanding	100	0.015	0.015	0.158
		Parking	70	0.006	0.004	0.163
13.000	As Zoned	Road	100	0.021	0.021	0.021
		Parking	70	0.011	0.007	0.028
	As Zoned	Default	100	0.026	0.026	0.054
		Building	100	0.038	0.038	0.092
		Hardstanding	100	0.022	0.022	0.114
12.001	-	-	100	0.000	0.000	0.000
12.002	As Zoned	Default	100	0.029	0.029	0.029
		Road	100	0.040	0.040	0.069
		Hardstanding	100	0.003	0.003	0.072
		Parking	70	0.024	0.017	0.089
11.001	As Zoned	Default	100	0.023	0.023	0.023
		Building	100	0.008	0.008	0.031
		Road	100	0.008	0.008	0.039
		Hardstanding	100	0.032	0.032	0.071
		Parking	70	0.000	0.000	0.071
11.002	As Zoned	Building	100	0.020	0.020	0.020
		Road	100	0.010	0.010	0.030
		Hardstanding	100	0.112	0.112	0.142
		Parking	70	0.009	0.006	0.117
10.002	As Zoned	Default	100	0.021	0.021	0.021
		Building	100	0.013	0.013	0.034
		Road	100	0.015	0.015	0.049
		Hardstanding	100	0.000	0.000	0.049
		Parking	70	0.015	0.011	0.060
10.003	-	-	100	0.000	0.000	0.000
14.000	As Zoned	Default	100	0.019	0.019	0.019
		Road	100	0.000	0.000	0.019
		Parking	70	0.007	0.005	0.025
	As Zoned	Default	100	0.034	0.034	0.058
		Building	100	0.031	0.031	0.089
		Hardstanding	100	0.010	0.010	0.099
		Parking	70	0.000	0.000	0.099
14.001	-	-	100	0.000	0.000	0.000
10.004	As Zoned	Default	100	0.010	0.010	0.010

Area Summary for Surface Water1

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
		Road	100	0.019	0.019	0.029
		Parking	70	0.007	0.005	0.033
10.005	-	-	100	0.000	0.000	0.000
15.000	As Zoned	Default	100	0.021	0.021	0.021
		Building	100	0.044	0.044	0.066
		Road	100	0.032	0.032	0.098
		Parking	70	0.015	0.010	0.108
15.001	As Zoned	Default	100	0.013	0.013	0.013
		Building	100	0.027	0.027	0.040
		Road	100	0.014	0.014	0.054
		Parking	70	0.005	0.003	0.058
15.002	-	-	100	0.000	0.000	0.000
16.000	As Zoned	Default	100	0.089	0.089	0.089
		Building	100	0.095	0.095	0.184
		Road	100	0.033	0.033	0.217
		Parking	70	0.038	0.027	0.245
16.001	As Zoned	Default	100	0.014	0.014	0.014
		Building	100	0.020	0.020	0.035
		Road	100	0.013	0.013	0.047
		Parking	70	0.008	0.006	0.053
16.002	As Zoned	Default	100	0.015	0.015	0.015
		Building	100	0.041	0.041	0.056
		Road	100	0.010	0.010	0.066
		Parking	70	0.015	0.010	0.076
16.003	-	-	100	0.000	0.000	0.000
15.003	As Zoned	Default	100	0.013	0.013	0.013
		Building	100	0.014	0.014	0.026
		Road	100	0.007	0.007	0.033
		Parking	70	0.005	0.003	0.036
15.004	As Zoned	Default	100	0.016	0.016	0.016
		Building	100	0.027	0.027	0.043
		Road	100	0.033	0.033	0.076
		Parking	70	0.005	0.003	0.080
17.000	As Zoned	Default	100	0.017	0.017	0.017
		Building	100	0.020	0.020	0.037
		Road	100	0.017	0.017	0.054
		Parking	70	0.010	0.007	0.061
15.005	As Zoned	Default	100	0.012	0.012	0.012
		Building	100	0.020	0.020	0.033
		Road	100	0.013	0.013	0.046
		Parking	70	0.010	0.007	0.053
15.006	-	-	100	0.000	0.000	0.000
15.007	-	-	100	0.000	0.000	0.000
15.008	-	-	100	0.000	0.000	0.000
15.009	As Zoned	Default	100	0.028	0.028	0.028
		Building	100	0.065	0.065	0.093
		Road	100	0.025	0.025	0.118
		Parking	70	0.021	0.014	0.133
15.010	As Zoned	Road	100	0.005	0.005	0.005
18.000	As Zoned	Default	100	0.057	0.057	0.057
		Building	100	0.047	0.047	0.103
		Road	100	0.041	0.041	0.145
		Parking	70	0.028	0.020	0.164
18.001	As Zoned	Default	100	0.007	0.007	0.007
		Road	100	0.017	0.017	0.024
18.002	-	-	100	0.000	0.000	0.000
18.003	As Zoned	Default	100	0.034	0.034	0.034
		Building	100	0.054	0.054	0.088
		Road	100	0.036	0.036	0.123
		Parking	70	0.021	0.015	0.139
18.004	-	-	100	0.000	0.000	0.000
18.005	-	-	100	0.000	0.000	0.000

Area Summary for Surface Water1

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
15.011	As Zoned	Default	100	0.077	0.077	0.077
		Building	100	0.054	0.054	0.131
		Road	100	0.038	0.038	0.169
		Parking	70	0.035	0.025	0.194
15.012	-	-	100	0.000	0.000	0.000
10.006	-	-	100	0.000	0.000	0.000
10.007	-	-	100	0.000	0.000	0.000
10.008	-	-	100	0.000	0.000	0.000
10.009	-	-	100	0.000	0.000	0.000
10.010	-	-	100	0.000	0.000	0.000
10.011	-	-	100	0.000	0.000	0.000
19.000	As Zoned	Default	100	0.029	0.029	0.029
		Building	100	0.029	0.029	0.058
		Road	100	0.051	0.051	0.109
20.000	As Zoned	Road	100	0.163	0.163	0.082
20.001	As Zoned	Default	100	0.012	0.012	0.012
		Road	100	0.138	0.138	0.150
		Parking	70	0.007	0.005	0.156
20.002	As Zoned	Default	100	0.007	0.007	0.007
		Road	100	0.020	0.020	0.028
20.003	As Zoned	Default	100	0.010	0.010	0.010
		Road	100	0.039	0.039	0.049
21.000	As Zoned	Default	100	0.018	0.018	0.018
		Road	100	0.034	0.034	0.052
		Parking	70	0.000	0.000	0.052
	As Zoned	Road	100	0.000	0.000	0.052
		Parking	70	0.015	0.011	0.063
21.001	User	-	100	0.022	0.022	0.022
	As Zoned	Parking	70	0.016	0.011	0.034
21.002	As Zoned	Default	100	0.008	0.008	0.008
		Road	100	0.041	0.041	0.050
	As Zoned	Building	100	0.167	0.167	0.083
20.004	As Zoned	Default	100	0.023	0.023	0.023
		Road	100	0.041	0.041	0.064
		Parking	70	0.020	0.014	0.078
19.001	-	-	100	0.000	0.000	0.000
19.002	-	-	100	0.000	0.000	0.000
19.003	-	-	100	0.000	0.000	0.000
19.004	-	-	100	0.000	0.000	0.000
19.005	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				6.561	6.110	6.110

Free Flowing Outfall Details for Surface Water1

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
SC-1.017	SC-	53.244	50.797	47.150	0	0

Free Flowing Outfall Details for Surface Water1

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
SC-10.011	SC-OUTFALL	51.098	48.518	47.700	0	0

Free Flowing Outfall Details for Surface Water1

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
SC-19.005	SC-	53.000	52.553	49.110	0	0

Online Controls for Surface Water1

Hydro-Brake® Optimum Manhole: SC-MH-57, DS/PN: SC-1.014, Volume (m³): 16.9

Unit Reference	MD-SHE-0174-1600-1400-1600
Design Head (m)	1.400
Design Flow (l/s)	16.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	174
Invert Level (m)	51.265
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1500

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.400	16.0	Kick-Flo®	0.911	13.1
Flush-Flo™	0.416	16.0	Mean Flow over Head Range	-	13.8

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	6.2	0.800	14.6	2.000	19.0	4.000	26.4	7.000	34.6
0.200	14.7	1.000	13.6	2.200	19.8	4.500	28.0	7.500	35.8
0.300	15.7	1.200	14.9	2.400	20.7	5.000	29.4	8.000	36.9
0.400	16.0	1.400	16.0	2.600	21.5	5.500	30.8	8.500	38.0
0.500	15.9	1.600	17.0	3.000	23.0	6.000	32.1	9.000	39.1
0.600	15.7	1.800	18.0	3.500	24.8	6.500	33.4	9.500	40.1

Hydro-Brake® Optimum Manhole: SC-MH-89, DS/PN: SC-15.008, Volume (m³): 3.7

Unit Reference	MD-SHE-0194-2000-1350-2000
Design Head (m)	1.350
Design Flow (l/s)	20.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	194
Invert Level (m)	53.675
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1500

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.350	20.0	Kick-Flo®	0.907	16.6
Flush-Flo™	0.414	20.0	Mean Flow over Head Range	-	17.2

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	6.7	0.800	18.3	2.000	24.1	4.000	33.6	7.000	44.1
0.200	18.0	1.000	17.3	2.200	25.2	4.500	35.6	7.500	45.6
0.300	19.7	1.200	18.9	2.400	26.3	5.000	37.5	8.000	47.0
0.400	20.0	1.400	20.3	2.600	27.4	5.500	39.2	8.500	48.4
0.500	19.9	1.600	21.7	3.000	29.3	6.000	40.9	9.000	49.8
0.600	19.6	1.800	22.9	3.500	31.6	6.500	42.5	9.500	51.1

Hydro-Brake® Optimum Manhole: SC-MH-104, DS/PN: SC-10.010, Volume (m³): 2.7

Unit Reference	MD-SHE-0213-2410-1200-2410
Design Head (m)	1.200
Design Flow (l/s)	24.1
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	213
Invert Level (m)	48.784
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1500

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.200	24.1	Kick-Flo®	0.845	20.4
Flush-Flo™	0.390	24.1	Mean Flow over Head Range	-	20.5

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	7.2	0.800	21.4	2.000	30.8	4.000	43.0	7.000	56.3
0.200	20.7	1.000	22.1	2.200	32.2	4.500	45.5	7.500	58.3
0.300	23.8	1.200	24.1	2.400	33.6	5.000	47.9	8.000	60.1
0.400	24.1	1.400	25.9	2.600	34.9	5.500	50.1	8.500	61.9
0.500	23.9	1.600	27.6	3.000	37.4	6.000	52.3	9.000	63.7
0.600	23.4	1.800	29.3	3.500	40.3	6.500	54.3	9.500	65.4

Hydro-Brake® Optimum Manhole: SC-MH-119, DS/PN: SC-19.005, Volume (m³): 4.6

Unit Reference	MD-SHE-0078-3700-2000-3700
Design Head (m)	2.000
Design Flow (l/s)	3.7
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	78
Invert Level (m)	52.594
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.000	3.7	Kick-Flo®	0.701	2.3
Flush-Flo™	0.347	2.8	Mean Flow over Head Range	-	2.8

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	2.2	0.800	2.4	2.000	3.7	4.000	5.1	7.000	6.6
0.200	2.7	1.000	2.7	2.200	3.9	4.500	5.4	7.500	6.9
0.300	2.8	1.200	2.9	2.400	4.0	5.000	5.7	8.000	7.1
0.400	2.8	1.400	3.1	2.600	4.2	5.500	5.9	8.500	7.3
0.500	2.8	1.600	3.3	3.000	4.5	6.000	6.2	9.000	7.5
0.600	2.6	1.800	3.5	3.500	4.8	6.500	6.4	9.500	7.7

Storage Structures for Surface Water1

Cellular Storage Manhole: SC-MH-57, DS/PN: SC-1.014

Invert Level (m) 51.265 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.60
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	2525.0	0.0	1.200	2525.0	0.0	1.201	0.0	0.0

Cellular Storage Manhole: SC-MH-89, DS/PN: SC-15.008

Invert Level (m) 53.675 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.60
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	250.0	0.0	1.200	250.0	0.0	1.201	0.0	0.0

Cellular Storage Manhole: SC-MH-104, DS/PN: SC-10.010

Invert Level (m) 48.784 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.60
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	1650.0	0.0	1.200	1650.0	0.0	1.201	0.0	0.0

Cellular Storage Manhole: SC-MH-106, DS/PN: SC-19.000

Invert Level (m) 53.886 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	350.0	0.0	1.200	350.0	0.0	1.201	0.0	0.0

Infiltration Trench Manhole: SC-MH-119, DS/PN: SC-19.005

Infiltration Coefficient Base (m/hr)	0.00000	Trench Width (m)	0.6
Infiltration Coefficient Side (m/hr)	0.00000	Trench Length (m)	136.0
Safety Factor	2.0	Slope (1:X)	200.0
Porosity	0.30	Cap Volume Depth (m)	0.000
Invert Level (m)	52.594	Cap Infiltration Depth (m)	0.000

Summary of Critical Results by Maximum Level (Rank 1) for Surface Water1

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 4 Number of Storage Structures 5 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 15.700 Cv (Summer) 0.750
Region Scotland and Ireland Ratio R 0.278 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0
Analysis Timestep 2.5 Second Increment (Extended)
DTS Status ON
DVD Status OFF
Inertia Status OFF

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 100
Climate Change (%) 20

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flow / Cap.	Pipe Flow (l/s)	Status
SC-1.000	SC-MH-1	15 minute 100 year Winter I+20%	56.961	55.660	-0.101	0.56	37.6	OK
SC-1.001	SC-MH-2	15 minute 100 year Winter I+20%	57.542	55.621	0.147	0.81	54.6	SURCHARGED
SC-1.002	SC-MH-3	15 minute 100 year Winter I+20%	56.966	55.532	0.333	0.87	58.5	SURCHARGED
SC-1.003	SC-MH-4	15 minute 100 year Winter I+20%	57.156	55.344	0.421	1.02	68.3	SURCHARGED
SC-2.000	SC-MH-5	15 minute 100 year Winter I+20%	57.191	55.991	0.000	0.53	19.8	SURCHARGED
SC-2.001	SC-MH-6	15 minute 100 year Winter I+20%	57.496	55.960	0.157	0.58	20.3	SURCHARGED
SC-2.002	SC-MH-7	15 minute 100 year Winter I+20%	57.624	55.931	0.218	1.01	38.3	SURCHARGED
SC-2.003	SC-MH-8	15 minute 100 year Winter I+20%	57.399	55.757	0.311	0.86	40.2	SURCHARGED
SC-2.004	SC-MH-9	15 minute 100 year Winter I+20%	57.516	55.628	0.381	1.00	53.0	SURCHARGED
SC-1.004	SC-MH-10	15 minute 100 year Winter I+20%	57.611	55.100	0.394	1.52	122.4	SURCHARGED
SC-1.005	SC-MH-11	15 minute 100 year Winter I+20%	57.642	55.014	0.344	1.45	134.2	SURCHARGED
SC-1.006	SC-MH-12	15 minute 100 year Winter I+20%	57.417	54.890	0.282	1.11	159.3	SURCHARGED
SC-3.000	SC-MH-13	15 minute 100 year Winter I+20%	56.727	55.411	-0.116	0.47	32.5	OK
SC-3.001	SC-MH-14	15 minute 100 year Winter I+20%	56.999	55.012	0.066	0.89	50.8	SURCHARGED
SC-1.007	SC-MH-15	15 minute 100 year Winter I+20%	56.871	54.733	0.244	2.00	207.7	SURCHARGED
SC-1.008	SC-MH-16	15 minute 100 year Winter I+20%	56.704	54.597	0.145	1.66	214.3	SURCHARGED
SC-1.009	SC-MH-17	15 minute 100 year Winter I+20%	56.476	54.450	0.047	1.39	226.9	SURCHARGED
SC-1.010	SC-MH-18	15 minute 100 year Winter I+20%	56.213	54.369	0.011	1.76	234.3	SURCHARGED
SC-4.000	SC-MH-19	15 minute 100 year Winter I+20%	55.974	55.400	0.626	1.37	56.4	SURCHARGED
SC-5.000	SC-MH-20	15 minute 100 year Winter I+20%	57.076	56.917	1.041	0.15	5.5	FLOOD RISK
SC-5.001	SC-MH-21	15 minute 100 year Winter I+20%	56.976	56.927	1.151	1.50	65.6	FLOOD RISK
SC-5.002	SC-MH-22	15 minute 100 year Winter I+20%	56.691	56.266	0.775	1.21	67.3	SURCHARGED
SC-5.003	SC-MH-23	15 minute 100 year Winter I+20%	56.665	56.202	0.753	0.88	69.5	SURCHARGED
SC-5.004	SC-MH-24	15 minute 100 year Winter I+20%	56.549	56.156	0.807	1.66	132.2	SURCHARGED
SC-6.000	SC-MH-25	15 minute 100 year Winter I+20%	56.484	55.172	-0.112	0.31	16.3	OK
SC-5.005	SC-MH-26	15 minute 100 year Winter I+20%	56.181	55.158	0.177	1.52	131.1	SURCHARGED
SC-5.006	SC-MH-27	15 minute 100 year Winter I+20%	56.438	55.058	0.124	1.10	127.5	SURCHARGED
SC-5.007	SC-MH-28	15 minute 100 year Winter I+20%	55.895	54.779	0.083	1.51	128.6	SURCHARGED
SC-5.008	SC-MH-29	15 minute 100 year Winter I+20%	55.971	54.676	0.027	0.59	131.4	SURCHARGED
SC-4.001	SC-MH-30	15 minute 100 year Winter I+20%	55.522	54.579	0.257	1.74	164.5	SURCHARGED
SC-7.000	SC-MH-31	15 minute 100 year Winter I+20%	57.200	56.665	0.665	0.50	24.8	SURCHARGED
SC-7.001	SC-MH-32	15 minute 100 year Winter I+20%	57.020	56.620	0.800	1.18	52.1	SURCHARGED

Summary of Critical Results by Maximum Level (Rank 1) for Surface Water1

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flow / Cap.	Pipe Flow (l/s)	Status
SC-7.002	SC-MH-33	15 minute 100 year Winter I+20%	56.814	56.331	0.717	1.27	85.6	SURCHARGED
SC-8.000	SC-MH-34	15 minute 100 year Winter I+20%	56.600	56.097	0.697	0.62	20.4	SURCHARGED
SC-8.001	SC-MH-35	15 minute 100 year Winter I+20%	56.546	56.075	0.729	0.61	21.3	SURCHARGED
SC-8.002	SC-MH-36	15 minute 100 year Winter I+20%	56.478	56.049	0.771	1.95	68.4	SURCHARGED
SC-8.003	SC-MH-37	15 minute 100 year Winter I+20%	56.409	55.791	0.582	1.61	65.9	SURCHARGED
SC-8.004	SC-MH-38	15 minute 100 year Winter I+20%	56.209	55.278	0.269	1.14	65.6	SURCHARGED
SC-7.003	SC-MH-39	15 minute 100 year Winter I+20%	56.236	55.033	0.216	1.87	170.2	SURCHARGED
SC-7.004	SC-MH-40	15 minute 100 year Winter I+20%	56.031	54.844	0.081	0.94	177.7	SURCHARGED
SC-4.002	SC-MH-41	15 minute 100 year Winter I+20%	55.475	54.409	0.135	1.46	354.6	SURCHARGED
SC-4.003	SC-MH-42	15 minute 100 year Winter I+20%	55.416	53.921	-0.295	0.40	355.5	OK
SC-4.004	SC-MH-43	30 minute 100 year Winter I+20%	53.410	52.927	0.718	2.03	347.1	SURCHARGED
SC-4.005	SC-MH-44	30 minute 100 year Winter I+20%	55.819	52.827	0.651	1.90	350.9	SURCHARGED
SC-4.006	SC-MH-45	30 minute 100 year Winter I+20%	55.859	52.705	0.565	2.11	354.1	SURCHARGED
SC-1.011	SC-MH-46	30 minute 100 year Winter I+20%	56.064	52.588	0.463	3.23	582.8	SURCHARGED
SC-9.000	SC-MH-47	15 minute 100 year Winter I+20%	55.349	54.052	-0.097	0.62	42.0	OK
SC-9.001	SC-MH-48	15 minute 100 year Summer I+20%	55.303	53.819	-0.098	0.60	42.1	OK
SC-9.002	SC-MH-49	15 minute 100 year Summer I+20%	55.271	53.555	-0.087	0.68	42.2	OK
SC-9.003	SC-MH-50	15 minute 100 year Winter I+20%	55.313	53.356	-0.089	0.67	41.9	OK
SC-9.004	SC-MH-51	15 minute 100 year Winter I+20%	55.409	53.154	-0.097	0.61	41.8	OK
SC-9.005	SC-MH-52	15 minute 100 year Summer I+20%	55.563	52.911	-0.101	0.58	42.1	OK
SC-9.006	SC-MH-53	15 minute 100 year Summer I+20%	55.720	52.637	-0.100	0.59	42.3	OK
SC-9.007	SC-MH-54	30 minute 100 year Winter I+20%	55.980	52.468	0.094	0.79	56.2	SURCHARGED
SC-1.012	SC-MH-55	30 minute 100 year Winter I+20%	56.082	52.375	0.273	1.50	622.1	SURCHARGED
SC-1.013	SC-MH-56	960 minute 100 year Winter I+20%	53.245	52.250	0.205	0.35	91.9	SURCHARGED
SC-1.014	SC-MH-57	960 minute 100 year Winter I+20%	54.647	52.248	0.758	0.57	16.0	SURCHARGED
SC-1.015	SC-MH-58	2160 minute 100 year Summer I+20%	54.852	51.342	-0.123	0.42	16.0	OK
SC-1.016	SC-MH-59	7200 minute 100 year Winter I+20%	54.331	51.137	-0.108	0.53	16.0	OK
SC-1.017	SC-MH-60	7200 minute 100 year Winter I+20%	54.561	51.088	-0.122	0.43	16.0	OK
SC-10.000	SC-MH-61	15 minute 100 year Winter I+20%	56.287	55.049	-0.038	0.73	26.6	OK
SC-10.001	SC-MH-62	15 minute 100 year Winter I+20%	56.286	55.002	0.053	0.95	54.1	SURCHARGED
SC-11.000	SC-MH-63	15 minute 100 year Winter I+20%	56.773	55.849	0.276	1.26	74.0	SURCHARGED
SC-12.000	SC-MH-64	15 minute 100 year Winter I+20%	56.479	56.213	0.934	1.20	44.8	FLOOD RISK
SC-13.000	SC-MH-65	15 minute 100 year Winter I+20%	56.514	56.029	0.715	0.70	33.0	SURCHARGED
SC-12.001	SC-MH-66	15 minute 100 year Winter I+20%	56.727	55.929	0.848	1.22	74.9	SURCHARGED
SC-12.002	SC-MH-67	15 minute 100 year Winter I+20%	56.704	55.845	0.811	1.43	96.1	SURCHARGED
SC-11.001	SC-MH-68	15 minute 100 year Winter I+20%	56.374	55.323	0.539	1.92	178.4	SURCHARGED
SC-11.002	SC-MH-69	15 minute 100 year Winter I+20%	55.952	55.092	0.371	1.33	209.0	SURCHARGED
SC-10.002	SC-MH-70	15 minute 100 year Winter I+20%	55.733	54.748	0.216	1.16	269.8	SURCHARGED
SC-10.003	SC-MH-71	15 minute 100 year Winter I+20%	55.238	54.077	0.039	1.17	269.0	SURCHARGED
SC-14.000	SC-MH-72	15 minute 100 year Winter I+20%	52.797	51.875	0.278	0.95	33.4	SURCHARGED
SC-14.001	SC-MH-73	15 minute 100 year Winter I+20%	54.024	51.803	0.299	1.00	32.8	SURCHARGED
SC-10.004	SC-MH-74	15 minute 100 year Winter I+20%	55.072	51.761	0.312	1.98	303.7	SURCHARGED
SC-10.005	SC-MH-75	15 minute 100 year Winter I+20%	54.715	51.463	0.090	1.54	302.9	SURCHARGED
SC-15.000	SC-MH-76	15 minute 100 year Winter I+20%	56.732	55.632	0.100	0.74	39.7	SURCHARGED
SC-15.001	SC-MH-77	15 minute 100 year Winter I+20%	56.410	55.515	0.305	0.95	52.6	SURCHARGED
SC-15.002	SC-MH-78	15 minute 100 year Winter I+20%	55.976	55.164	0.388	1.17	48.4	SURCHARGED
SC-16.000	SC-MH-79	15 minute 100 year Winter I+20%	56.999	56.906	1.107	1.15	68.1	FLOOD RISK
SC-16.001	SC-MH-80	15 minute 100 year Winter I+20%	56.075	55.702	0.827	1.79	79.8	SURCHARGED
SC-16.002	SC-MH-81	15 minute 100 year Winter I+20%	55.952	55.307	0.555	1.57	96.1	SURCHARGED
SC-16.003	SC-MH-82	15 minute 100 year Winter I+20%	55.893	55.153	0.460	1.55	97.0	SURCHARGED
SC-15.003	SC-MH-83	180 minute 100 year Winter I+20%	55.821	54.973	0.373	0.75	59.6	SURCHARGED
SC-15.004	SC-MH-84	180 minute 100 year Winter I+20%	55.789	54.969	0.391	0.34	66.5	SURCHARGED
SC-17.000	SC-MH-85	180 minute 100 year Winter I+20%	55.499	54.960	0.661	0.15	5.6	SURCHARGED
SC-15.005	SC-MH-86	180 minute 100 year Winter I+20%	55.581	54.957	0.747	0.84	75.4	SURCHARGED
SC-15.006	SC-MH-87	180 minute 100 year Winter I+20%	55.469	54.953	0.763	0.61	74.8	SURCHARGED
SC-15.007	SC-MH-88	180 minute 100 year Winter I+20%	55.518	54.951	0.769	0.44	74.2	SURCHARGED
SC-15.008	SC-MH-89	180 minute 100 year Winter I+20%	55.336	54.946	1.046	0.76	20.0	SURCHARGED
SC-15.009	SC-MH-90	60 minute 100 year Summer I+20%	55.367	54.062	0.181	1.19	45.5	SURCHARGED
SC-15.010	SC-MH-91	60 minute 100 year Summer I+20%	54.847	53.635	0.046	1.40	46.4	SURCHARGED
SC-18.000	SC-MH-92	15 minute 100 year Winter I+20%	54.985	54.201	0.416	0.95	52.4	SURCHARGED

Summary of Critical Results by Maximum Level (Rank 1) for Surface Water1

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flow / Cap.	Pipe Flow (l/s)	Status
SC-18.001	SC-MH-93	15 minute 100 year Winter I+20%	54.321	53.730	0.609	1.26	51.8	SURCHARGED
SC-18.002	SC-MH-94	15 minute 100 year Winter I+20%	54.007	53.217	0.410	1.65	54.0	SURCHARGED
SC-18.003	SC-MH-95	15 minute 100 year Winter I+20%	54.025	53.085	0.334	1.27	84.1	SURCHARGED
SC-18.004	SC-MH-96	15 minute 100 year Winter I+20%	54.500	52.776	0.218	1.34	83.9	SURCHARGED
SC-18.005	SC-MH-97	15 minute 100 year Winter I+20%	54.743	52.610	0.145	1.58	84.3	SURCHARGED
SC-15.011	SC-MH-98	15 minute 100 year Winter I+20%	54.772	52.511	0.080	1.18	170.0	SURCHARGED
SC-15.012	SC-MH-99	15 minute 100 year Winter I+20%	54.345	52.323	0.015	1.79	169.1	SURCHARGED
SC-10.006	SC-MH-100	15 minute 100 year Winter I+20%	54.518	51.057	-0.274	0.46	473.1	OK
SC-10.007	SC-MH-101	600 minute 100 year Winter I+20%	50.313	49.812	0.249	0.41	99.2	SURCHARGED
SC-10.008	SC-MH-102	600 minute 100 year Winter I+20%	50.313	49.810	0.259	0.30	98.8	SURCHARGED
SC-10.009	SC-MH-103	600 minute 100 year Winter I+20%	50.313	49.806	0.344	0.32	96.4	SURCHARGED
SC-10.010	SC-MH-104	600 minute 100 year Winter I+20%	50.313	49.805	0.795	0.83	24.1	SURCHARGED
SC-10.011	SC-MH-105	480 minute 100 year Winter I+20%	50.313	48.885	-0.094	0.64	24.1	OK
SC-19.000	SC-MH-106	720 minute 100 year Winter I+20%	57.011	54.626	0.515	0.04	3.2	SURCHARGED
SC-20.000	SC-MH-107	15 minute 100 year Winter I+20%	56.768	56.147	0.579	0.65	25.1	SURCHARGED
SC-20.001	SC-MH-108	15 minute 100 year Winter I+20%	57.936	55.975	0.809	1.88	71.3	SURCHARGED
SC-20.002	SC-MH-109	15 minute 100 year Winter I+20%	57.574	55.073	0.161	1.15	74.5	SURCHARGED
SC-20.003	SC-MH-110	30 minute 100 year Summer I+20%	57.271	54.899	0.118	1.15	76.6	SURCHARGED
SC-21.000	SC-MH-111	30 minute 100 year Winter I+20%	55.670	54.955	0.485	0.50	18.3	SURCHARGED
SC-21.001	SC-MH-112	30 minute 100 year Winter I+20%	55.743	54.928	0.612	0.60	22.2	SURCHARGED
SC-21.002	SC-MH-113	30 minute 100 year Winter I+20%	56.115	54.885	0.723	1.07	40.8	SURCHARGED
SC-20.004	SC-MH-114	30 minute 100 year Winter I+20%	56.779	54.678	0.798	1.13	117.8	SURCHARGED
SC-19.001	SC-MH-115	720 minute 100 year Winter I+20%	56.579	54.625	0.968	0.08	10.1	SURCHARGED
SC-19.002	SC-MH-116	720 minute 100 year Winter I+20%	56.688	54.623	1.094	0.07	9.7	SURCHARGED
SC-19.003	SC-MH-117	720 minute 100 year Winter I+20%	56.070	54.620	1.496	0.25	9.4	SURCHARGED
SC-19.004	SC-MH-118	720 minute 100 year Winter I+20%	55.905	54.610	1.683	0.25	9.1	SURCHARGED
SC-19.005	SC-MH-119	720 minute 100 year Winter I+20%	56.054	54.603	1.784	0.12	3.7	SURCHARGED

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APPENDIX C. Wastewater Design Calculation and Network Details

FOUL SEWERAGE DESIGN

Design Criteria for Foul Network 1

Pipe Sizes STANDARD Manhole Sizes STANDARD

Industrial Flow (l/s/ha)	0.00	Add Flow / Climate Change (%)	0
Industrial Peak Flow Factor	0.00	Minimum Backdrop Height (m)	0.000
Flow Per Person (l/per/day)	222.00	Maximum Backdrop Height (m)	20.000
Persons per House	3.00	Min Design Depth for Optimisation (m)	1.200
Domestic (l/s/ha)	0.00	Min Vel for Auto Design only (m/s)	1.00
Domestic Peak Flow Factor	6.00	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for Foul Network 1

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Houses	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
WC-1.000	38.836	0.259	149.9	0.000	31	0.0	1.500	o	225	Pipe/Conduit	
WC-2.000	19.565	0.326	60.0	0.000	4	0.0	1.500	o	150	Pipe/Conduit	
WC-1.001	10.631	0.053	200.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
WC-1.002	76.391	0.382	200.0	0.000	27	0.0	1.500	o	225	Pipe/Conduit	
WC-1.003	83.504	0.418	199.8	0.000	9	0.0	1.500	o	225	Pipe/Conduit	
WC-1.004	14.929	0.075	200.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
WC-3.000	9.275	0.155	59.8	0.000	3	0.0	1.500	o	150	Pipe/Conduit	
WC-3.001	37.736	0.629	60.0	0.000	6	0.0	1.500	o	150	Pipe/Conduit	
WC-3.002	13.828	0.106	130.0	0.000	5	0.0	1.500	o	150	Pipe/Conduit	
WC-3.003	38.894	0.299	130.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
WC-3.004	6.409	0.049	130.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
WC-1.005	5.690	0.028	200.0	0.000	8	0.0	1.500	o	225	Pipe/Conduit	
WC-1.006	49.051	0.245	200.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
WC-1.007	19.441	0.097	200.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
WC-1.008	24.791	0.124	200.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ Base Flow (l/s)	Σ Hse	Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
WC-1.000	55.500	0.000	0.0	31	0.0	30	0.45	0.94	37.2	1.4
WC-2.000	55.200	0.000	0.0	4	0.0	11	0.34	1.13	20.0	0.2
WC-1.001	54.799	0.000	0.0	35	0.0	34	0.42	0.81	32.2	1.6
WC-1.002	54.746	0.000	0.0	62	0.0	45	0.50	0.81	32.2	2.9
WC-1.003	54.364	0.000	0.0	71	0.0	49	0.52	0.81	32.2	3.3
WC-1.004	53.946	0.000	0.0	71	0.0	49	0.52	0.81	32.2	3.3
WC-3.000	55.100	0.000	0.0	3	0.0	9	0.31	1.13	20.0	0.1
WC-3.001	54.945	0.000	0.0	9	0.0	15	0.44	1.13	20.0	0.4
WC-3.002	54.316	0.000	0.0	14	0.0	23	0.39	0.77	13.6	0.6
WC-3.003	54.210	0.000	0.0	14	0.0	23	0.39	0.77	13.6	0.6
WC-3.004	53.911	0.000	0.0	14	0.0	23	0.39	0.77	13.6	0.6
WC-1.005	53.786	0.000	0.0	93	0.0	56	0.56	0.81	32.2	4.3
WC-1.006	53.758	0.000	0.0	93	0.0	56	0.56	0.81	32.2	4.3
WC-1.007	53.513	0.000	0.0	93	0.0	56	0.56	0.81	32.2	4.3
WC-1.008	53.415	0.000	0.0	93	0.0	56	0.56	0.81	32.2	4.3

Network Design Table for Foul Network 1

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Houses	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
WC-4.000	24.542	0.409	60.0	0.000	4	0.0	1.500	o	150	Pipe/Conduit	
WC-4.001	22.768	0.379	60.1	0.000	4	0.0	1.500	o	150	Pipe/Conduit	
WC-4.002	9.987	0.166	60.2	0.000	2	0.0	1.500	o	150	Pipe/Conduit	
WC-4.003	6.593	0.110	60.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
WC-1.009	19.243	0.096	200.0	0.000	2	0.0	1.500	o	225	Pipe/Conduit	
WC-1.010	12.518	0.063	200.0	0.000	2	0.0	1.500	o	225	Pipe/Conduit	
WC-1.011	13.813	0.069	200.0	0.000	2	0.0	1.500	o	225	Pipe/Conduit	
WC-1.012	21.399	0.107	200.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
WC-1.013	7.893	0.039	200.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
WC-1.014	26.300	0.132	199.2	0.000	3	0.0	1.500	o	225	Pipe/Conduit	
WC-1.015	34.030	0.170	200.0	0.000	4	0.0	1.500	o	225	Pipe/Conduit	
WC-1.016	66.609	0.333	200.0	0.000	13	0.0	1.500	o	225	Pipe/Conduit	
WC-1.017	12.077	0.060	200.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
WC-5.000	89.000	1.483	60.0	0.000	10	0.0	1.500	o	225	Pipe/Conduit	
WC-5.001	51.424	0.396	129.9	0.000	8	0.0	1.500	o	225	Pipe/Conduit	
WC-5.002	23.594	0.181	130.4	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
WC-5.003	6.354	0.049	129.7	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
WC-1.018	55.328	0.277	200.0	0.000	8	0.0	1.500	o	225	Pipe/Conduit	
WC-1.019	19.442	0.097	200.0	0.000	3	0.0	1.500	o	225	Pipe/Conduit	
WC-1.020	29.522	0.148	200.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
WC-6.000	15.000	0.250	60.0	0.000	2	0.0	1.500	o	150	Pipe/Conduit	
WC-6.001	15.623	0.260	60.1	0.000	10	0.0	1.500	o	150	Pipe/Conduit	

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ Base Flow (l/s)	Σ Hse	Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
WC-4.000	55.400	0.000	0.0	4	0.0	11	0.34	1.13	20.0	0.2
WC-4.001	54.991	0.000	0.0	8	0.0	14	0.42	1.13	20.0	0.4
WC-4.002	54.612	0.000	0.0	10	0.0	16	0.46	1.13	20.0	0.5
WC-4.003	54.446	0.000	0.0	10	0.0	16	0.46	1.13	20.0	0.5
WC-1.009	53.291	0.000	0.0	105	0.0	59	0.58	0.81	32.2	4.9
WC-1.010	53.195	0.000	0.0	107	0.0	60	0.59	0.81	32.2	4.9
WC-1.011	53.133	0.000	0.0	109	0.0	60	0.59	0.81	32.2	5.0
WC-1.012	53.063	0.000	0.0	109	0.0	60	0.59	0.81	32.2	5.0
WC-1.013	52.956	0.000	0.0	109	0.0	60	0.59	0.81	32.2	5.0
WC-1.014	52.917	0.000	0.0	112	0.0	61	0.60	0.81	32.3	5.2
WC-1.015	52.785	0.000	0.0	116	0.0	62	0.60	0.81	32.2	5.4
WC-1.016	52.615	0.000	0.0	129	0.0	66	0.62	0.81	32.2	6.0
WC-1.017	52.282	0.000	0.0	129	0.0	66	0.62	0.81	32.2	6.0
WC-5.000	53.300	0.000	0.0	10	0.0	14	0.43	1.48	59.0	0.5
WC-5.001	51.817	0.000	0.0	18	0.0	23	0.40	1.01	40.0	0.8
WC-5.002	51.421	0.000	0.0	18	0.0	23	0.40	1.00	39.9	0.8
WC-5.003	51.240	0.000	0.0	18	0.0	23	0.40	1.01	40.1	0.8
WC-1.018	51.191	0.000	0.0	155	0.0	72	0.65	0.81	32.2	7.2
WC-1.019	50.914	0.000	0.0	158	0.0	73	0.65	0.81	32.2	7.3
WC-1.020	50.817	0.000	0.0	158	0.0	73	0.65	0.81	32.2	7.3
WC-6.000	55.500	0.000	0.0	2	0.0	8	0.27	1.13	20.0	0.1
WC-6.001	55.250	0.000	0.0	12	0.0	17	0.48	1.13	20.0	0.6

Network Design Table for Foul Network 1

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Houses	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
WC-7.000	29.021	0.484	60.0	0.000	8	0.0	1.500	o	150	Pipe/Conduit	
WC-6.002	67.572	0.338	200.0	0.000	5	0.0	1.500	o	150	Pipe/Conduit	
WC-8.000	53.545	0.892	60.0	0.000	13	0.0	1.500	o	150	Pipe/Conduit	
WC-6.003	87.136	0.436	199.9	0.000	14	0.0	1.500	o	225	Pipe/Conduit	
WC-9.000	27.037	0.451	59.9	0.000	12	0.0	1.500	o	150	Pipe/Conduit	
WC-6.004	22.144	0.111	200.0	0.000	8	0.0	1.500	o	225	Pipe/Conduit	
WC-6.005	17.225	0.086	200.3	0.000	5	0.0	1.500	o	225	Pipe/Conduit	
WC-6.006	19.346	0.097	200.0	0.000	3	0.0	1.500	o	225	Pipe/Conduit	
WC-10.000	34.582	0.576	60.0	0.000	12	0.0	1.500	o	150	Pipe/Conduit	
WC-6.007	16.863	0.084	200.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
WC-6.008	16.883	0.084	200.0	0.000	3	0.0	1.500	o	225	Pipe/Conduit	
WC-6.009	29.822	0.149	200.0	0.000	3	0.0	1.500	o	225	Pipe/Conduit	
WC-11.000	42.273	0.141	299.8	0.000	14	0.0	1.500	o	300	Pipe/Conduit	
WC-11.001	50.038	0.167	300.0	0.000	0	0.0	1.500	o	300	Pipe/Conduit	
WC-11.002	65.219	0.217	300.5	0.000	4	0.0	1.500	o	300	Pipe/Conduit	
WC-11.003	67.918	0.226	300.0	0.000	4	0.0	1.500	o	300	Pipe/Conduit	
WC-11.004	67.833	0.226	300.0	0.000	4	0.0	1.500	o	300	Pipe/Conduit	
WC-11.005	25.128	0.084	299.1	0.000	3	0.0	1.500	o	300	Pipe/Conduit	
WC-11.006	29.327	0.098	299.3	0.000	7	0.0	1.500	o	300	Pipe/Conduit	
WC-11.007	15.915	0.053	300.0	0.000	10	0.0	1.500	o	300	Pipe/Conduit	

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ Base Flow (l/s)	Σ Hse	Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
WC-7.000	54.900	0.000	0.0	8	0.0	14	0.42	1.13	20.0	0.4
WC-6.002	54.416	0.000	0.0	25	0.0	33	0.40	0.62	10.9	1.2
WC-8.000	56.100	0.000	0.0	13	0.0	18	0.50	1.13	20.0	0.6
WC-6.003	54.003	0.000	0.0	52	0.0	42	0.47	0.81	32.2	2.4
WC-9.000	54.200	0.000	0.0	12	0.0	17	0.48	1.13	20.0	0.6
WC-6.004	53.567	0.000	0.0	72	0.0	49	0.52	0.81	32.2	3.3
WC-6.005	53.456	0.000	0.0	77	0.0	51	0.53	0.81	32.2	3.6
WC-6.006	53.370	0.000	0.0	80	0.0	52	0.54	0.81	32.2	3.7
WC-10.000	55.400	0.000	0.0	12	0.0	17	0.48	1.13	20.0	0.6
WC-6.007	53.274	0.000	0.0	92	0.0	55	0.56	0.81	32.2	4.3
WC-6.008	53.189	0.000	0.0	95	0.0	56	0.57	0.81	32.2	4.4
WC-6.009	53.105	0.000	0.0	98	0.0	57	0.57	0.81	32.2	4.5
WC-11.000	55.600	0.000	0.0	14	0.0	23	0.26	0.80	56.5	0.6
WC-11.001	55.459	0.000	0.0	14	0.0	23	0.26	0.80	56.4	0.6
WC-11.002	55.292	0.000	0.0	18	0.0	26	0.28	0.80	56.4	0.8
WC-11.003	55.075	0.000	0.0	22	0.0	28	0.30	0.80	56.4	1.0
WC-11.004	54.849	0.000	0.0	26	0.0	31	0.32	0.80	56.4	1.2
WC-11.005	54.623	0.000	0.0	29	0.0	32	0.33	0.80	56.5	1.3
WC-11.006	54.539	0.000	0.0	36	0.0	35	0.35	0.80	56.5	1.7
WC-11.007	54.441	0.000	0.0	46	0.0	40	0.38	0.80	56.4	2.1

Network Design Table for Foul Network 1

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Houses	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
WC-11.008	9.755	0.033	300.0	0.000	0	0.0	1.500	o	300	Pipe/Conduit	
WC-6.010	36.776	0.184	200.0	0.000	5	0.0	1.500	o	300	Pipe/Conduit	
WC-1.021	33.360	0.111	300.0	0.000	0	0.0	1.500	o	300	Pipe/Conduit	
WC-1.022	39.596	0.132	300.0	0.000	0	0.0	1.500	o	300	Pipe/Conduit	
WC-12.000	29.875	0.199	150.1	0.000	31	0.0	1.500	o	225	Pipe/Conduit	
WC-13.000	49.373	0.823	60.0	0.000	22	0.0	1.500	o	150	Pipe/Conduit	
WC-13.001	6.719	0.112	60.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
WC-13.002	11.719	0.195	60.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
WC-12.001	21.261	0.106	200.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
WC-12.002	21.116	0.106	200.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
WC-1.023	41.441	0.138	300.0	0.000	0	0.0	1.500	o	300	Pipe/Conduit	
WC-1.024	35.967	0.120	300.0	0.000	0	0.0	1.500	o	300	Pipe/Conduit	
WC-1.025	10.346	0.034	300.0	0.000	0	0.0	1.500	o	300	Pipe/Conduit	
WC-1.026	63.670	0.212	300.0	0.000	0	0.0	1.500	o	300	Pipe/Conduit	
WC-1.027	81.329	0.271	300.0	0.000	0	0.0	1.500	o	300	Pipe/Conduit	
WC-1.028	45.613	0.152	300.0	0.000	0	0.0	1.500	o	300	Pipe/Conduit	
WC-1.029	45.613	0.152	300.0	0.000	0	0.0	1.500	o	300	Pipe/Conduit	
WC-1.030	77.721	0.259	300.0	0.000	0	0.0	1.500	o	300	Pipe/Conduit	
WC-1.031	49.653	0.166	300.0	0.000	0	0.0	1.500	o	300	Pipe/Conduit	
WC-1.032	21.087	0.070	300.0	0.000	0	0.0	1.500	o	300	Pipe/Conduit	
WC-1.033	13.893	0.046	300.0	0.000	0	0.0	1.500	o	300	Pipe/Conduit	
WC-1.034	9.217	0.031	300.0	0.000	0	0.0	1.500	o	300	Pipe/Conduit	

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ Base Flow (l/s)	Σ Hse	Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
WC-11.008	54.388	0.000	0.0	46	0.0	40	0.38	0.80	56.4	2.1
WC-6.010	52.881	0.000	0.0	149	0.0	64	0.63	0.98	69.2	6.9
WC-1.021	50.595	0.000	0.0	307	0.0	103	0.67	0.80	56.4	14.2
WC-1.022	50.483	0.000	0.0	307	0.0	103	0.67	0.80	56.4	14.2
WC-12.000	55.000	0.000	0.0	31	0.0	30	0.45	0.94	37.2	1.4
WC-13.000	55.000	0.000	0.0	22	0.0	23	0.58	1.13	20.0	1.0
WC-13.001	54.177	0.000	0.0	22	0.0	23	0.58	1.13	20.0	1.0
WC-13.002	54.065	0.000	0.0	22	0.0	23	0.58	1.13	20.0	1.0
WC-12.001	53.795	0.000	0.0	53	0.0	42	0.48	0.81	32.2	2.5
WC-12.002	53.688	0.000	0.0	53	0.0	42	0.48	0.81	32.2	2.5
WC-1.023	50.351	0.000	0.0	360	0.0	112	0.70	0.80	56.4	16.7
WC-1.024	50.213	0.000	0.0	360	0.0	112	0.70	0.80	56.4	16.7
WC-1.025	50.093	0.000	0.0	360	0.0	112	0.70	0.80	56.4	16.7
WC-1.026	50.059	0.000	0.0	360	0.0	112	0.70	0.80	56.4	16.7
WC-1.027	49.847	0.000	0.0	360	0.0	112	0.70	0.80	56.4	16.7
WC-1.028	49.576	0.000	0.0	360	0.0	112	0.70	0.80	56.4	16.7
WC-1.029	49.423	0.000	0.0	360	0.0	112	0.70	0.80	56.4	16.7
WC-1.030	49.271	0.000	0.0	360	0.0	112	0.70	0.80	56.4	16.7
WC-1.031	49.012	0.000	0.0	360	0.0	112	0.70	0.80	56.4	16.7
WC-1.032	48.847	0.000	0.0	360	0.0	112	0.70	0.80	56.4	16.7
WC-1.033	48.777	0.000	0.0	360	0.0	112	0.70	0.80	56.4	16.7
WC-1.034	48.730	0.000	0.0	360	0.0	112	0.70	0.80	56.4	16.7

Network Design Table for Foul Network 1

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Houses	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
WC-1.035	10.000	0.033	300.0	0.000	0	0.0	1.500	o	300	Pipe/Conduit	

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ Base Flow (l/s)	Σ Hse	Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
WC-1.035	48.700	0.000	0.0	360	0.0	112	0.70	0.80	56.4	16.7

OCSC
O'CONNOR | SUTTON | CRONIN
Multidisciplinary
Consulting Engineers

APPENDIX D. Irish Water Correspondence

Mark Killian

9 Prussia Street
Stoneybatter
Dublin 7
D07KT57

Uisce Éireann
Bosca OP 448
Oifig Sheachadta na
Cathrach Theas
Cathair Chorcaí

Irish Water
PO Box 448,
South City
Delivery Office,
Cork City.

www.water.ie

20 October 2021

Re: CDS21003384 pre-connection enquiry - Subject to contract | Contract denied

Connection for Housing Development of 390 unit(s) at Phase 1A, Moygaddy, Meath

Dear Sir/Madam,

Irish Water has reviewed your pre-connection enquiry in relation to a Water & Wastewater connection at Phase 1A, Moygaddy, Meath (the **Premises**). Based upon the details you have provided with your pre-connection enquiry and on our desk top analysis of the capacity currently available in the Irish Water network(s) as assessed by Irish Water, we wish to advise you that your proposed connection to the Irish Water network(s) can be facilitated at this moment in time.

SERVICE	**OUTCOME OF PRE-CONNECTION ENQUIRY** **THIS IS NOT A CONNECTION OFFER. YOU MUST APPLY FOR A CONNECTION(S) TO THE IRISH WATER NETWORK(S) IF YOU WISH TO PROCEED.**
Water Connection	There are water network capacity constraints in this catchment.
Wastewater Connection	There are wastewater network capacity constraints in this catchment.
SITE SPECIFIC COMMENTS	
Water Connection	In order to accommodate the proposed connection at this development, upgrade works are required to increase the capacity of the Irish Water network. Irish Water does not currently have any plans to carry out the works required to provide the necessary upgrade and capacity. Should you wish to have such upgrade works progressed, Irish Water will require you to provide a contribution of a relevant portion of the costs for the required upgrades, please contact Irish Water to discuss this further. 1. Connection main – Approx. 50m of new 250mm ID main to be laid to connect the site development (see yellow section below) to the new 300mm ID upgrade main. Connection main shown below (See green line in figure 1). 2. Trunk/Distribution main 1 – Approx. 950m of 300mm ID main to be laid to link connection main and new 350mm ID main (see red

	dashed line in figure 1). To service the lands a total of 3500m of 300mm ID main (seen as black line in figure 1) which links in with Mariavilla. 3. Trunk/Distribution main 2 – Approx. 1400m of new 350mm ID main to be laid to link new 300mm ID TM 1 and the existing 400mm AC main together. 4. Onsite storage required for commercial units, 24-hour storage at ADPW demand, storage units must also be able to be refilled from empty within 12-hour period IW currently have a project 'Maynooth East Ring Road' which is currently at design stage and on our current investment plan consisting of approx. 1400m of 350mm ID main (shown below (black dashed line in figure 2) and will be carried out in conjunction with Kildare County Councils 'Maynooth Eastern Ring Road' project.
Wastewater Connection	In order to accommodate the proposed connection at the Premises, upgrade works are required to increase the capacity of the Maynooth Wastewater Pump Station and Rising Main. Irish Water currently has a project on our current investment plan which will provide the necessary upgrade and capacity. This upgrade project is currently scheduled to be completed by Q4 2025 (this may be subject to change, as planning has yet to be granted in both Kildare and Meath and the appropriate consents for the project). The addition discharge would cause a back up of flows in the existing gravity network entering the pump station. Upgrade works would be required to increase the capacity of the wastewater network (upgrade of approx. 175m of network directly upstream of the Pump Station). Irish Water are currently reviewing these works which are not currently on the Capital Investment Plan. Please contact Irish Water to discuss this further. Where a connection is proposed in advance of the delivery of strategic solutions in this area, Irish water are willing to review Storm Sewer Separation proposals (from the combined network) in the Maynooth area, in order to provide additional wastewater capacity. This would require co-operation and agreement from Kildare County Council, as the storm drainage authority. Further measures are currently being investigated by Irish Water in this area via the Capital Maintenance Programme, including: - identifying and repairing areas of infiltration - control of pumping stations in the catchment - increasing local storage in the area
The design and construction of the Water & Wastewater pipes and related infrastructure to be installed in this development shall comply with the Irish Water Connections and Developer Services Standard Details and Codes of Practice that are available on the Irish Water website. Irish Water reserves the right to supplement these requirements with Codes of Practice and these will be issued with the connection agreement.	

The map included below outlines the current Irish Water infrastructure adjacent to your site:

Figure 1

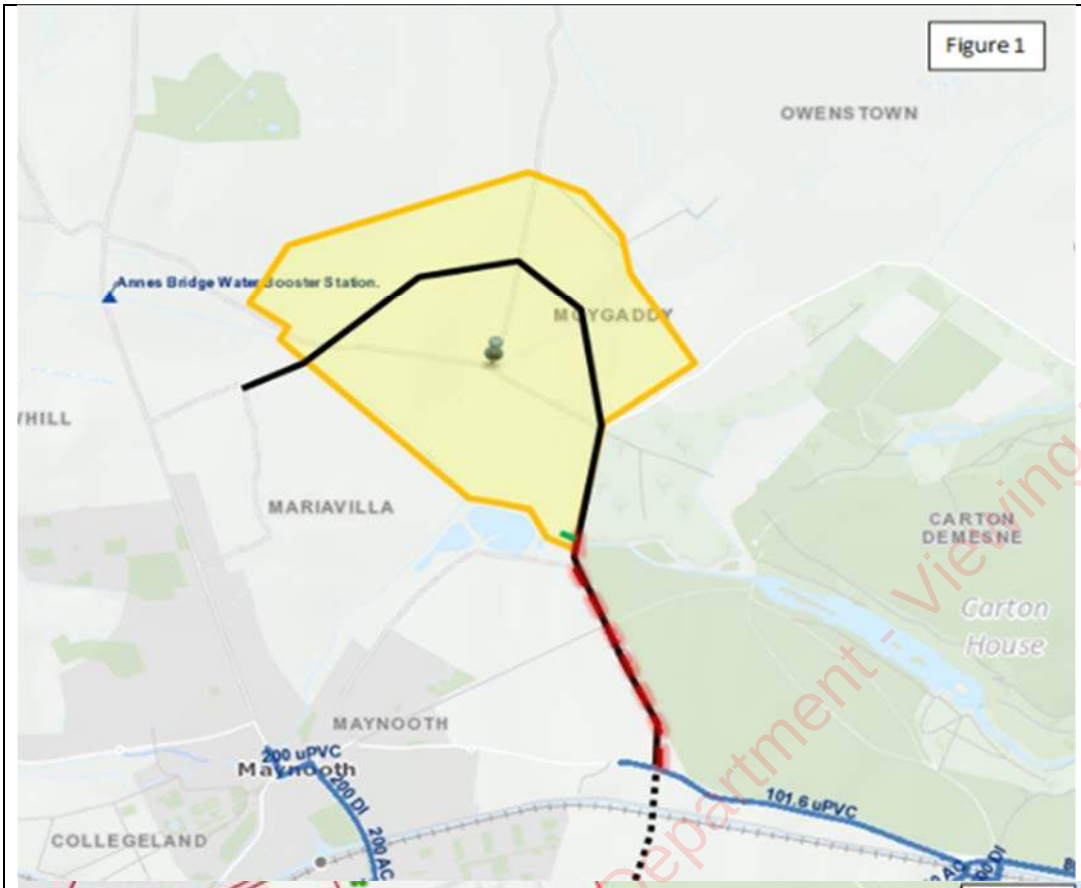
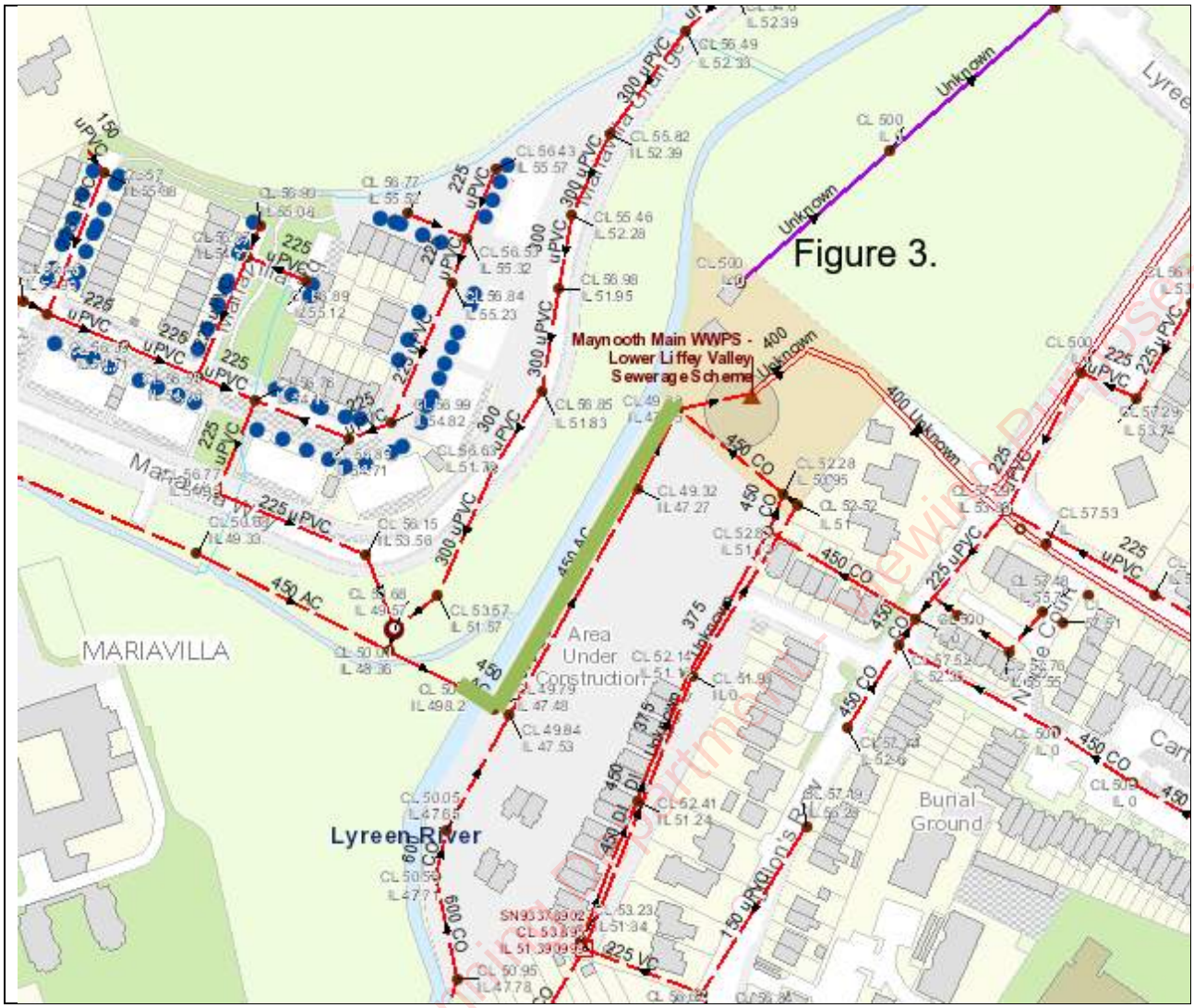


Figure 2



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Whilst every care has been taken in its compilation Irish Water gives this information as to the position of its underground network as a general guide only on the strict understanding that it is based on the best available information provided by each Local Authority in Ireland to Irish Water. Irish Water can assume no responsibility for and give no guarantees, undertakings or warranties concerning the accuracy, completeness or up to date nature of the information provided and does not accept any liability whatsoever arising from any errors or omissions. This information should not be relied upon in the event of excavations or any other works being carried out in the vicinity of the Irish Water underground network. The onus is on the parties carrying out excavations or any other works to ensure the exact location of the Irish Water underground network is identified prior to excavations or any other works being carried out. Service connection pipes are not generally shown but their presence should be anticipated.

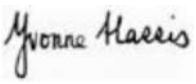
General Notes:

1) The initial assessment referred to above is carried out taking into account water demand and wastewater discharge volumes and infrastructure details on the date of the assessment. **The availability of capacity may change at any date after this assessment.**
2) This feedback does not constitute a contract in whole or in part to provide a connection to any Irish Water infrastructure. All feasibility assessments are subject to the constraints of the Irish Water Capital Investment Plan.

3) The feedback provided is subject to a Connection Agreement/contract being signed at a later date.
4) A Connection Agreement will be required to commencing the connection works associated with the enquiry this can be applied for at https://www.water.ie/connections/get-connected/
5) A Connection Agreement cannot be issued until all statutory approvals are successfully in place.
6) Irish Water Connection Policy/ Charges can be found at https://www.water.ie/connections/information/connection-charges/
7) Please note the Confirmation of Feasibility does not extend to your fire flow requirements.
8) Irish Water is not responsible for the management or disposal of storm water or ground waters. You are advised to contact the relevant Local Authority to discuss the management or disposal of proposed storm water or ground water discharges
9) To access Irish Water Maps email datarequests@water.ie
10) All works to the Irish Water infrastructure, including works in the Public Space, shall have to be carried out by Irish Water.

If you have any further questions, please contact Paul Lowry from the design team on 018230377 or email paullowr@water.ie For further information, visit **www.water.ie/connections.**

Yours sincerely,



Yvonne Harris

Head of Customer Operations

OCSC
O'CONNOR | SUTTON | CRONIN
Multidisciplinary
Consulting Engineers

APPENDIX E. Site Investigation Report

S.I. Ltd Contract No: 5863

Client: Sky Castle Ltd
Engineer: OCSC
Contractor: Site Investigations Ltd

Moygaddy,
Maynooth, Co. Meath
Site Investigation Report

Prepared by:

.....
Stephen Letch

Issue Date:	12/08/2021
Status	Final
Revision	2

Contents:

		Page No.
1.	Introduction	1
2.	Site Location	1
3.	Fieldwork	1
4.	Laboratory Testing	4
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6.	Recommendations and Conclusions	5

Appendices:

1. Cable Percussive Borehole Logs
2. Rotary Corehole Logs and Photographs
3. Trial Pit Logs and Photographs
4. Soakaway Test Results
5. Dynamic Probe Logs
6. Geotechnical Soil Laboratory Test Results
7. Geotechnical Rock Laboratory Test Results
8. Survey Data

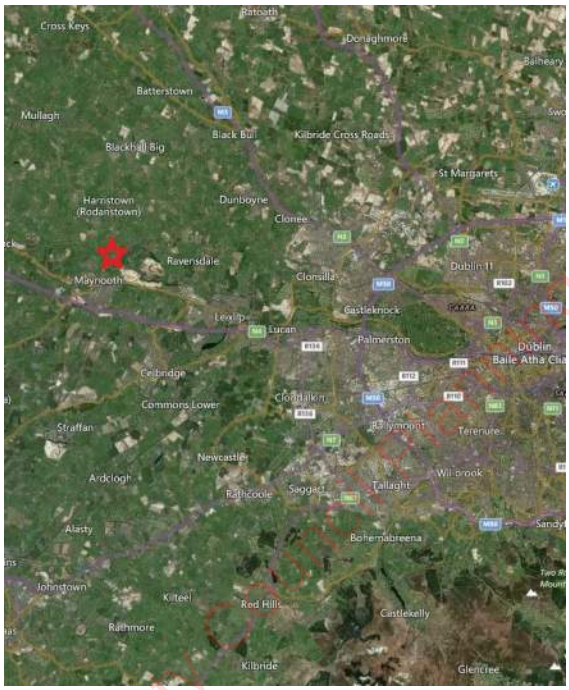
1. Introduction

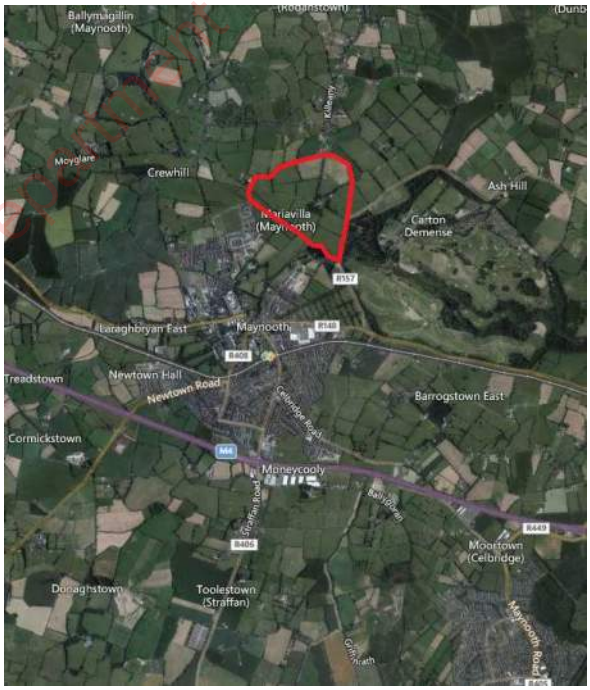
On the instructions of OCSC, Site Investigations Ltd (SIL) was appointed to complete a ground investigation at Moygaddy, Maynooth, Co. Meath. The investigation was completed for the residential development on the site and was completed on behalf of the Client, Sky Castle Ltd. The fieldworks were started in June and completed in July 2021.

This report presents the factual geotechnical data obtained from the field and laboratory testing with interpretation of the ground conditions discussed.

2. Site Location

The site is located to the north of Maynooth with the Kildare-Meath border running to the south of the site with Maynooth in Kildare and the site in Meath. Carton Demense is to the east of site with Dublin city further to the east. The first map below shows the location of the site to the east of Dublin and the second map shows the location of the site to the north of Maynooth town.





3. Fieldwork

The fieldworks comprised a programme of cable percussive boreholes, rotary coreholes, trial pits and dynamic probes. All fieldwork was carried out in accordance with BS 5930:2015, Engineers Ireland GI Specification and Related Document 2nd Edition 2016 and Eurocode 7: Geotechnical Design.

The fieldworks comprised of the following:

- 18 No. cable percussive boreholes
- 16 No. rotary coreholes
- 21 No. trial pits with soakaway tests
- 84 No. dynamic probes

3.1. Cable Percussive Boreholes with Rotary Coreholes

Cable percussion boring was undertaken at 18 No. locations using a Dando 150 rig and constructed 200mm diameter boreholes. The boreholes terminated at depths ranging from 3.00mbgl (BH10) to 6.80mbgl (BH15 and BH16) after 1.5hrs chiselling with no further progress. It was not possible to collect undisturbed samples due to the granular soils encountered so bulk disturbed samples were recovered at regular intervals.

To test the strength of the stratum, Standard Penetration Tests (SPT's) were performed at 1.00m intervals in accordance with BS 1377 (1990). In soils with high gravel and cobble content it is appropriate to use a solid cone (60°) (CPT) instead of the split spoon and this was used throughout the testing. The test is completed over 450mm and the cone is driven 150mm into the stratum to ensure that the test is conducted over an undisturbed zone. The cone is then driven the remaining 300mm and the blows recorded to report the N-Value. The report shows the N-Value with the 75mm incremental blows listed in brackets (e.g., BH01 at 2.00mbgl where N=16-(2,3/3,4,4,5)). Where refusal of 50 blows across the test zone was encountered was achieved during testing, the penetration depth is also reported (e.g., BH01 at 1.00mbgl where N=50-(3,4/50 for 85mm)).

The cable percussive borehole logs are presented in Appendix 1.

3.2. Rotary Coreholes

At 16 No. locations, rotary coreholes were completed to investigate the depth and type of bedrock. After the investigation started, RC01, RC02, RC03 and RC15 were cancelled but the numbering remained as scheduled so these numbers are missing in the sequence of rotary coreholes. The rotary drilling was carried out using a Sondeq SS71 top drive rig. Open hole drilling techniques were used to advance through the overburden where encountered and bedrock was recovered at 10 No. locations and the bedrock was then cored with the corehole terminated when 3m of core was recovered. At 6 No. locations, no bedrock was encountered when the corehole reached 8mbgl and the corehole was terminated and backfilled.

Once the coreholes were completed, the rock cores were returned to SIL, where they were logged and photographed by a SIL geotechnical engineer. Provided on the logs are engineering

geological descriptions of the rock cores with details of the bedding/discontinuities and mechanical indices for each core run, i.e., TCR, SCR, RQD and Fracture Index.

The rotary corehole logs and photographs are presented in Appendix 2.

3.3. Trial Pits with Soakaway Tests

21 No. trial pits were excavated using a wheeled excavator. The pits were logged and photographed by SIL geotechnical engineer and representative disturbed bulk samples were recovered as the pits were excavated, which were returned to the laboratory for geotechnical testing. Groundwater ingresses and pit wall stability were also recorded as the excavations progressed.

At the base of the trial pits, soakaway tests were completed and logged by SIL geotechnical engineer. BRE Special Digest 365 stipulates that the pit should be filled three times and that the final cycle is used to provide the infiltration rate. The time taken for the water level to fall from 75% volume to 25% volume is required to calculate the rate of infiltration. However, if the water level does not fall at a steady rate, then the test is deemed to have failed and the area is unsuitable for storm water drainage.

The trial pit logs and photographs are presented in Appendix 3 and soakaway test results are presented in Appendix 4.

3.4. Dynamic Probes

At 84 No. locations, dynamic probes were completed using a track mounted Competitor 130 machine. The testing complies with the requirements of BS1377: Part 9 (1990) and Eurocode 7: Part 3. The configuration utilised standard DPH (Heavy) probing method comprising a 50kg weight, 500mm drop height and a 50mm diameter (90°) cone. The number of blows required to drive the cone each 100mm increment into the sub soil is recorded in accordance with the standards. The dynamic probe provides no information regarding soil type or groundwater conditions.

The dynamic probe results can be used to analyse the strength of the soil strata encountered by the probe. 'Proceedings of the Trinity College Dublin Symposium of Field and Laboratory Testing of Soils for Foundations and Embankments' presents a paper by Foirbart that is most relevant to Irish soil conditions and within this paper the following equations were included:

Granular Soils: DPH N_{100} x 2.5 = SPT N value

Cohesive Soils: C_u = 15 x DPH N_{100} + 30 kN/m^2

These equations present a relationship between the probe N_{100} value and the SPT N value for granular soils and the undrained shear strength of cohesive soils.

The dynamic probe logs are presented in Appendix 5.

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3.5. Surveying

Following completion of all the fieldworks, a survey of the exploratory hole locations was completed using a GeoMax GPS Rover. The data is supplied on each individual log along with a site plan in Appendix 8.

4. Laboratory Testing

Geotechnical soil laboratory testing was completed on representative soil samples in accordance with BS 1377 (1990). Testing included:

- 10 No. moisture contents
- 10 No. Atterberg limits
- 10 No. particle size gradings
- 21 No. California Bearing Ratio tests
- 8 No. pH, sulphate and chloride content

Geotechnical rock testing was also completed on the core samples and consisted of the following:

- 20 No. point loads

The geotechnical soil laboratory test results are presented in Appendix 6 with the rock laboratory tests provided in Appendix 7.

5. Ground Conditions

5.1. Overburden

The natural ground conditions in the boreholes and trial pits are consistent with brown overlying black slightly sandy gravelly silty CLAY with cobbles and boulders. These natural soils are over-consolidated lodgment till which is encountered across the North Leinster region with several papers discussing the engineering characteristics of the soil. The brown and brown grey soils are the weathered surface of the underlying black clays and the gravel and cobbles are generally angular to subrounded and predominantly limestone in origin.

The SPT N-values range from 7 to 15 at 1.00mbgl and increase to between 12 and 21 at 2.00mbgl although BH14 did record a value of 7 at this depth. The values then continue to increase with depth as the very stiff black CLAY is encountered.

Laboratory tests of the shallow cohesive soils recorded CLAY soils with low and intermediate plasticity indices of 12% to 18% recorded. The particle size distribution curves were poorly sorted straight-line curves with 21 to 53% fines content.

5.2. Bedrock

Bedrock was recovered from depths ranging from 2.80mbgl (RC10) to 7.80mbgl (RC20) and was greater than 8m deep at 5 No. locations to the east of the site. The core recovered shows that bedrock is strong to very strong light grey fine grained argillaceous LIMESTONE interbedded with moderately strong dark grey calcareous MUDSTONE with pyrite crystals, occasional fossils and calcite veins. The core showed a fresh to slightly weathered state. The discontinuities are generally smooth to rough, planar to slightly undulating, tight to open, dip angles ranging from sub-horizontal to sub-vertical and the surfaces are clean with some grey stained, calcite crystals on the surface and some clay infill.

5.3. Groundwater

Groundwater details in the boreholes and trial pits during the fieldworks are noted on the logs in Appendices 1 and 2. Groundwater ingresses were recorded in five boreholes, at 1.90mbgl at BH07 and between 3.20mbgl and 3.60mbgl in BH05, BH14, BH16 and BH17. All ingresses were sealed off by the casing as the drilling advanced and therefore indicates perched water lenses. There were water ingresses into 10 No. trial pits across the site, at depths ranging from 1.50mbgl (TP12) to 2.60mbgl (TP21) with ingresses logged as seepages to medium rates

6. Recommendations and Conclusions

Please note the following caveats:

The recommendations given, and opinions expressed in this report are based on the findings as detailed in the exploratory hole records. Where an opinion is expressed on the material between the exploratory hole locations or below the final level of excavation, this is for guidance only and no liability can be accepted for its accuracy. No responsibility can be accepted for adjacent unexpected conditions that have not been revealed by the exploratory holes. It is further recommended that all bearing surfaces when excavated should be inspected by a suitably qualified Engineer to verify the information given in this report.

Excavated surfaces in clay strata should be kept dry to avoid softening prior to foundation placement. Foundations should always be taken to a minimum depth of 0.50mBGL to avoid the effects of frost action and possible seasonal shrinkage/swelling.

If it is intended that on-site materials are to be used as fill, then the necessary laboratory testing should be specified by the Client to confirm the suitability. Also, relevant lab testing should be specified where stability of side slopes to excavations is a concern, or where contamination may be an issue.

6.1. Shallow Foundations

Due to the unknown depth of foundation and no longer-term groundwater information, this analysis assumes the groundwater will not influence the construction or performance of these foundations.

The borehole encountered firm brown slightly sandy slightly gravelly silty CLAY at 1.00mbgl and the SPT N-value at this depth generally ranges from 9 to 15. Two holes, BH14 and BH17, recorded lower values of 7 and 8 respectively but the value of 9 has been chosen for analysis of the soils.

Using a correlation proposed by Stroud and Butler between SPT N-values and plasticity indices, the SPT N-value can be used to calculate the undrained shear strength. With the low to intermediate plasticity indexes recorded in the laboratory for the soils encountered on site, this correlation is C_u=6N. Therefore, using the lower value of 9, this indicates that the undrained shear strength of the CLAY is 54kN/m^2. This can be used to calculate the ultimate bearing capacity, and this has been calculated to be 295kN/m^2. Finally, a factor of safety is applied and with a factor of 3, an allowable bearing capacity of 100kN/m^2 would be anticipated using the lower SPT values.

The soils recorded values of 12 to 21 at 2.00mbgl. This SPT N-value of 12 indicates a C_u of 72kN/m^2, an ultimate bearing capacity of 405kN/m^2 and finally an allowable bearing capacity of 135kN/m^2.

The dynamic probes confirm that the soils are firm to stiff with values of 2 or greater recorded across the site and would correlate with the SPT N-values.

The following assumptions were made as part of these analyses. If any of these assumptions are not in accordance with detailed design or observations made during construction these recommendations should be re-evaluated.

- Foundations are to be constructed on a level formation of uniform material type (described above).
- The bulk unit weight of the material in this stratum has a minimum density of 19kN/m^3.
- All bearing capacity calculations allow for a settlement of 25mm.

The trial pits indicate that excavations in the cohesive soils should be stable for a short while at least although TP05 did record pit wall instability. Therefore, all slopes should be evaluated upon excavation and regular inspections should be completed during construction to ensure that all slopes are stable. Temporary support should be used on any excavation that will be left open for an extended period.

6.2. Groundwater

The caveats below relating to interpretation of groundwater levels should be noted:

There is always considerable uncertainty as to the likely rates of water ingress into excavations in clayey soil sites due to the possibility of localised unforeseen sand and gravel lenses acting as permeable conduits for unknown volumes of water.

Furthermore, water levels noted on the borehole and trial pit logs do not generally give an accurate indication of the actual groundwater conditions as the borehole or trial pit is rarely left open for sufficient time for the water level to reach equilibrium.

Also, during boring procedures, a permeable stratum may have been sealed off by the borehole casing, or water may have been added to aid drilling. Therefore, an extended period of groundwater monitoring using any constructed standpipes is required to provide more accurate information regarding groundwater conditions. Finally, groundwater levels vary with time of year, rainfall, nearby construction and tides.

Pumping tests would be required to determine likely seepage rates and persistence into excavations taken below the groundwater level. Deep trial pits also aid estimation of seepage rates.

As discussed previously, groundwater was encountered in five boreholes and ten trial pits at depths ranging from 1.50mbgl to 3.60mbgl.

There is always considerable uncertainty as to the likely rates of water ingress into excavations in cohesive soil sites due to the possibility of localised unforeseen sand and gravel lenses acting as permeable conduits for unknown volumes of water. Based on this information at the exploratory hole locations to date, it is considered likely that any shallow ingress (less than 2.00mbgl) into excavations of the CLAY will be slow to medium. If granular soils are encountered in shallow excavations, then the possibility of water ingressing into an excavation increase.

If groundwater is encountered during excavations then mechanical pumps will be required to remove the groundwater from sumps. Sumps should be carefully located and constructed to ensure that groundwater is efficiently removed from excavations and trenches.

6.3. Soakaway Tests

At 10 No. locations, the soakaway tests failed the specification as water ingressed into the pits. This indicates that the soils are already saturated and therefore, unsuitable for soakaway design.

At the remaining locations, the soakaway tests failed the specification as the water level did not fall sufficiently enough to complete the test. The BRE Digest stipulates that the pit should half empty within 24hrs, and extrapolation indicates this condition would not be satisfied. The tests were terminated at the end of the first (of a possible three) fill/empty cycle since further testing would give even slower fall rates due to increased soil saturation. The unsuitability of the soils for soakaways is further suggested by the soil descriptions of the materials in this area of the site where the soakaway was completed, i.e., well compacted clay soils.

6.4. Pavement Design

The CBR test results in Appendix 4 indicate CBR values ranging from 4.1% to 11.6%.

The CBR samples were recovered from 0.50mbgl and inspection of the formation strata should be completed prior to construction of the pavement. Once the exact formation levels are finalised then additional in-situ testing could be completed to assist with the detailed pavement design.

6.5. Aggressive Ground Conditions

The chemical test results in Appendix 4 indicate a general pH value between 8.59 and 8.80, which is close to neutral and below the level of 9, therefore no special precautions are required.

The maximum value obtained for water soluble sulphate was 127mg/l as SO_3. The BRE Special Digest 1:2005 – '*Concrete in Aggressive Ground*' guidelines require SO_4 values and after conversion ($SO_4 = SO_3 \times 1.2$), the maximum value of 152mg/l shows Class 1 conditions and no special precautions are required.

Appendix 1

Cable Percussive Borehole Logs

Contract No: 5863	**Cable Percussion Borehole Log**				Borehole No: **BH01**
Contract:	Moygaddy	Easting:	693986.514	Date Started:	30/06/2021
Location:	Maynooth, Co. Meath	Northing:	739217.399	Date Completed:	30/06/2021
Client:	Sky Castle Ltd	Elevation:	56.45	Drilled By:	G. Macken
Engineer:	OCSC	Borehole Diameter:	200mm	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples and Insitu Tests Depth	Type	Result	Water Strike	Backfill
0	0.20	TOPSOIL.			56.25					
0.5		Firm brown sandy slightly gravelly silty CLAY with low cobble content.		56.0						
1.0				55.5		1.00	B	GM75		
1.5						1.00	C	50 (3,4/50 for 85mm)		
	1.60			55.0	54.85					
2.0		Stiff brown sandy slightly gravelly silty CLAY with high cobble content.		54.5		2.00	B	GM76		
2.5						2.00	C	N=16 (2,3/3,4,4,5)		
	2.80			54.0	53.65					
3.0		Very stiff black slightly sandy gravelly silty CLAY with low cobble content.		53.5		3.00	B	GM77		
3.5						3.00	C	50 (8,11/50 for 200mm)		
4.0				53.0						
				52.5		4.00	B	GM78		
4.5						4.00	C	N=48 (12,13/11,14,12,11)		
5.0				52.0						
				51.5		5.00	B	GM79		
						5.00	C	50 (25 for 135mm/50 for 125mm)		
5.5	5.40			51.0	51.05					
	5.50	Obstruction - possible boulders.			50.95	5.50	C	50 (25 for 5mm/50 for 0mm)		
6.0		End of Borehole at 5.50m		50.5						
6.5				50.0						
7.0				49.5						
7.5				49.0						
8.0				48.5						
8.5				48.0						
9.0				47.5						
9.5				47.0						

Chiselling:

From:	To:	Time:
1.30	1.50	01:00
6.20	6.30	01:30

Water Strikes:

Strike:	Rose:	Depth Sealed

Water Details:

Date:	Hole Depth:	Water Depth:
20/07	5.50	Dry

Installation:

From:	To:	Pipe:

Backfill:

From:	To:	Type:
0.00	5.50	Arisings

Remarks:
Borehole terminated due to obstruction.

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

Contract No: 5863	**Cable Percussion Borehole Log**				Borehole No: **BH02**
Contract:	Moygaddy	Easting:	693926.010	Date Started:	29/06/2021
Location:	Maynooth, Co. Meath	Northing:	739294.840	Date Completed:	29/06/2021
Client:	Sky Castle Ltd	Elevation:	56.95	Drilled By:	G. Macken
Engineer:	OCSC	Borehole Diameter:	200mm	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples and Insitu Tests Depth	Type	Result	Water Strike	Backfill
0	0.20	TOPSOIL.		56.75						
0.5		Firm brown sandy slightly gravelly silty CLAY with low cobble content.		56.5						
1.0				56.0		1.00	B	GM70		
	1.20				55.75	1.00	C	N=9 (2,1/1,2,3,3)		
1.5		Stiff brown sandy slightly gravelly silty CLAY with high cobble content.		55.5						
2.0				55.0		2.00	B	GM71		
						2.00	C	N=21 (5,6/6,4,5,6)		
2.5	2.60			54.5	54.35					
3.0		Very stiff black slightly sandy gravelly silty CLAY with low cobble content.		54.0		3.00	B	GM72		
						3.00	C	N=47 (6,9/9,12,12,14)		
3.5				53.5						
4.0				53.0		4.00	B	GM73		
						4.00	C	N=50 (8,8/12,12,13,13)		
4.5				52.5						
5.0				52.0		5.00	B	GM74		
	5.20	Obstruction - possible boulders.			51.75	5.00	C	50 (25 for 95mm/50 for 10mm)		
5.5		End of Borehole at 5.20m		51.5		5.20	C	50 (25 for 5mm/50 for 5mm)		
6.0				51.0						
6.5				50.5						
7.0				50.0						
7.5				49.5						
8.0				49.0						
8.5				48.5						
9.0				48.0						
9.5				47.5						

Chiselling: From:	To:	Time:	Water Strikes: Strike:	Rose:	Depth Sealed	Water Details: Date:	Hole Depth:	Water Depth:	Installation: From:	To:	Pipe:	Backfill: From:	To:	Type:	Remarks:
3.70	3.80	00:45				19/07	5.20	Dry				0.00	5.20	Arisings	Borehole terminated due to obstruction.
5.20	5.20	01:30													

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

Contract No: 5863	**Cable Percussion Borehole Log**				Borehole No: **BH03**
Contract:	Moygaddy	Easting:	694117.023	Date Started:	22/07/2021
Location:	Maynooth, Co. Meath	Northing:	739155.527	Date Completed:	22/07/2021
Client:	Sky Castle Ltd	Elevation:	55.01	Drilled By:	G. Macken
Engineer:	OCSC	Borehole Diameter:	200mm	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples and Insitu Tests Depth	Type	Result	Water Strike	Backfill
0	0.20	TOPSOIL.		55	54.81					
0.5		Firm brown sandy slightly gravelly silty CLAY with low cobble content.		54.5						
1.0				54.0		1.00	B	GM66		
						1.00	C	N=10 (2,2/3,2,3,2)		
1.5	1.50			53.5	53.51					
2.0		Firm brown sandy slightly gravelly silty CLAY with high cobble content.		53.0		2.00	B	GM67		
						2.00	C	N=12 (4,5/3,3,3,3)		
2.5				52.5						
	2.80				52.21					
3.0		Very stiff black slightly sandy gravelly silty CLAY with low cobble content.		52.0		3.00	B	GM68		
						3.00	C	N=49 (6,6/11,12,13,13)		
3.5				51.5						
4.0				51.0		4.00	B	GM69		
						4.00	C	N=50 (8,11/50 for 255mm)		
4.5				50.5						
	4.90				50.11					
5.0	5.00	Obstruction - possible boulders.		50.0	50.01	5.00	C	50 (25 for 5mm/50 for 5mm)		
		End of Borehole at 5.00m								
5.5				49.5						
6.0				49.0						
6.5				48.5						
7.0				48.0						
7.5				47.5						
8.0				47.0						
8.5				46.5						
9.0				46.0						
9.5				45.5						

Chiselling: From:	To:	Time:	Water Strikes: Strike:	Rose:	Depth Sealed	Water Details: Date:	Hole Depth:	Water Depth:	Installation: From:	To:	Pipe:	Backfill: From:	To:	Type:	Remarks:
4.90	4.80	01:30				16/07	5.00	Dry				0.00	5.00	Arisings	Borehole terminated due to obstruction.

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

Contract No: 5863	**Cable Percussion Borehole Log**				Borehole No: **BH04**
Contract:	Moygaddy	Easting:	693732.812	Date Started:	02/07/2021
Location:	Maynooth, Co. Meath	Northing:	739457.539	Date Completed:	02/07/2021
Client:	Sky Castle Ltd	Elevation:	56.85	Drilled By:	G. Macken
Engineer:	OCSC	Borehole Diameter:	200mm	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples and Insitu Tests Depth	Type	Result	Water Strike	Backfill
0	0.20	TOPSOIL.		56.5	56.65					
0.5		Firm brown sandy slightly gravelly silty CLAY with low cobble content.				1.00	B	GM86		
1.0				56.0		1.00	C	N=15 (3,4/4,5,3,3)		
1.5	1.50	Stiff brown sandy slightly gravelly silty CLAY with high cobble content.		55.5	55.35					
2.0				55.0		2.00	B	GM87		
2.5						2.00	C	N=17 (4,4/3,5,5,4)		
3.0	3.10			54.5		3.00	B	GM88		
3.5		Very stiff black slightly sandy gravelly silty CLAY with low cobble content.		54.0	53.75	3.00	C	N=49 (5,8/8,12,14,15)		
4.0				53.5		4.00	B	GM89		
4.5						4.00	C	50 (9,12/50 for 200mm)		
5.0				53.0		5.00	B	GM90		
5.5				52.5		5.00	C	50 (12,13/50 for 110mm)		
6.0				52.0		6.00	B	GM91		
	6.20	Obstruction - possible boulders.		51.5	50.65	6.00	C	50 (15,10/50 for 100mm)		
6.5	6.30	End of Borehole at 6.30m		51.0	50.55	6.30	C	50 (25 for 5mm/50 for 5mm)		
7.0				50.5						
7.5				50.0						
8.0				49.5						
8.5				49.0						
9.0				48.5						
9.5				48.0						
				47.5						
				47.0						

Chiselling: From:	To:	Time:	Water Strikes: Strike:	Rose:	Depth Sealed	Water Details: Date:	Hole Depth:	Water Depth:	Installation: From:	To:	Pipe:	Backfill: From:	To:	Type:	Remarks:
6.20	6.30	01:30				22/07	6.30	Dry				0.00	6.30	Arisings	Borehole terminated due to obstruction.

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

Contract No: 5863	**Cable Percussion Borehole Log**				Borehole No: **BH05**
Contract:	Moygaddy	Easting:	693928.844	Date Started:	21/07/2021
Location:	Maynooth, Co. Meath	Northing:	739604.500	Date Completed:	21/07/2021
Client:	Sky Castle Ltd	Elevation:	58.72	Drilled By:	G. Macken
Engineer:	OCSC	Borehole Diameter:	200mm	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples and Insitu Tests Depth	Type	Result	Water Strike	Backfill
0	0.20	TOPSOIL.		58.5	58.52					
0.5		Brown sandy slightly gravelly silty CLAY with low cobble content.		58.0						
1.0	1.10					1.00	B	GM61		
		Firm becoming stiff brown sandy slightly gravelly silty CLAY with high cobble content.		57.5	57.62	1.00	C	N=9 (1,1/2,2,3,2)		
1.5				57.0						
2.0						2.00	B	GM62		
				56.5		2.00	C	N=20 (3,5/5,6,4,5)		
2.5										
	2.80			56.0	55.92					
3.0		Very stiff black slightly sandy gravelly silty CLAY with low cobble content.				3.00	B	GM63		
				55.5		3.00	C	N=43 (5,8/8,9,12,14)		
3.5				55.0						
4.0						4.00	B	GM64		
				54.5		4.00	C	N=48 (8,10/10,11,13,14)		
4.5				54.0						
5.0						5.00	B	GM65		
	5.10	Obstruction - possible boulders.		53.5	53.62	5.00	C	50 (25 for 60mm/50 for 15mm)		
	5.20	End of Borehole at 5.20m			53.52	5.20	C	50 (25 for 5mm/50 for 5mm)		
5.5				53.0						
6.0				52.5						
6.5				52.0						
7.0				51.5						
7.5				51.0						
8.0				50.5						
8.5				50.0						
9.0				49.5						
9.5				49.0						

Chiselling: From:	To:	Time:	Water Strikes: Strike:	Rose:	Depth Sealed	Water Details: Date:	Hole Depth:	Water Depth:	Installation: From:	To:	Pipe:	Backfill: From:	To:	Type:	Remarks:
5.10	5.20	01:30	3.20	2.90	3.60	15/07	5.20	Dry				0.00	5.20	Arisings	Borehole terminated due to obstruction.

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

Contract No: 5863	**Cable Percussion Borehole Log**				Borehole No: **BH06**
Contract:	Moygaddy	Easting:	693927.326	Date Started:	20/07/2021
Location:	Maynooth, Co. Meath	Northing:	739421.930	Date Completed:	20/07/2021
Client:	Sky Castle Ltd	Elevation:	57.55	Drilled By:	G. Macken
Engineer:	OCSC	Borehole Diameter:	200mm	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples and Insitu Tests Depth	Type	Result	Water Strike	Backfill
0	0.20	TOPSOIL.		57.0	57.35					
0.5		Firm brown sandy slightly gravelly silty CLAY with low cobble content.				1.00	B	GM57		
1.0				56.5		1.00	C	N=10 (1,2/2,2,3,3)		
1.5	1.40	Stiff brown sandy slightly gravelly silty CLAY with high cobble content.		56.0	56.15					
2.0				55.5		2.00	B	GM58		
2.5						2.00	C	N=20 (3,4/4,5,6,5)		
3.0	2.90	Very stiff black slightly sandy gravelly silty CLAY with low cobble content.		55.0	54.65					
3.5				54.5		3.00	B	GM59		
4.0				54.0		3.00	C	N=50 (6,8/9,12,14,15)		
4.5				53.5		4.00	B	GM60		
5.0	4.70			53.0	52.85	4.00	C	50 (9,12/50 for 210mm)		
5.5	4.80	Obstruction - possible boulders.		52.5	52.75	4.80	C	50 (25 for 5mm/50 for 5mm)		
6.0		End of Borehole at 4.80m		52.0						
6.5				51.5						
7.0				51.0						
7.5				50.5						
8.0				50.0						
8.5				49.5						
9.0				49.0						
9.5				48.5						
				48.0						

Chiselling: From:	To:	Time:	Water Strikes: Strike:	Rose:	Depth Sealed	Water Details: Date:	Hole Depth:	Water Depth:	Installation: From:	To:	Pipe:	Backfill: From:	To:	Type:	Remarks:
4.70	4.80	01:30				14/07	4.80	Dry				0.00	4.80	Arisings	Borehole terminated due to obstruction.

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

Contract No: 5863	**Cable Percussion Borehole Log**	Borehole No: **BH07**

Contract:	Moygaddy	Easting:	694241.270	Date Started:	19/07/2021
Location:	Maynooth, Co. Meath	Northing:	739411.796	Date Completed:	19/07/2021
Client:	Sky Castle Ltd	Elevation:	58.99	Drilled By:	G. Macken
Engineer:	OCSC	Borehole Diameter:	200mm	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples and Insitu Tests Depth	Type	Result	Water Strike	Backfill
0	0.20	TOPSOIL.		58.5	58.79					
0.5		Firm brown sandy slightly gravelly silty CLAY with low cobble content.								
1.0				58.0		1.00	B	GM53		
						1.00	C	N=11 (1,2/2,3,3,3)		
1.5	1.60			57.5	57.39					
2.0		Firm brown sandy slightly gravelly silty CLAY with high cobble content.		57.0		2.00	B	GM54		
						2.00	C	N=13 (2,3/3,4,3,3)		
2.5	2.60			56.5	56.39					
3.0		Very stiff black slightly sandy gravelly silty CLAY with low cobble content.		56.0		3.00	B	GM55		
						3.00	C	N=50 (8,8/50 for 255mm)		
3.5				55.5						
4.0				55.0		4.00	B	GM56		
						4.00	C	50 (11,11/50 for 200mm)		
4.5	4.40			54.5	54.59					
	4.50	Obstruction - possible boulders. End of Borehole at 4.50m			54.49	4.50	C	50 (25 for 5mm/50 for 0mm)		
5.0				54.0						
5.5				53.5						
6.0				53.0						
6.5				52.5						
7.0				52.0						
7.5				51.5						
8.0				51.0						
8.5				50.5						
9.0				50.0						
9.5				49.5						

Chiselling:

From:	To:	Time:
1.70	1.90	00:45
4.40	4.50	01:30

Water Strikes:

Strike:	Rose:	Depth Sealed
1.90	1.70	2.10

Water Details:

Date:	Hole Depth:	Water Depth:
13/07	4.50	Dry

Installation:

From:	To:	Pipe:

Backfill:

From:	To:	Type:
0.00	4.50	Arisings

Remarks: Borehole terminated due to obstruction.

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

Contract No: 5863	**Cable Percussion Borehole Log**				Borehole No: **BH08**
Contract:	Moygaddy	Easting:	694331.307	Date Started:	16/07/2021
Location:	Maynooth, Co. Meath	Northing:	739691.333	Date Completed:	16/07/2021
Client:	Sky Castle Ltd	Elevation:	61.30	Drilled By:	G. Macken
Engineer:	OCSC	Borehole Diameter:	200mm	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples and Insitu Tests Depth	Type	Result	Water Strike	Backfill
		TOPSOIL.		61.0	60.90					
0.5	0.40	Firm brown sandy slightly gravelly silty CLAY with low cobble content.		60.5		1.00	B	GM48		
1.0						1.00	C	N=11 (1,1/2,2,3,4)		
1.5				60.0						
	1.70	Stiff brown sandy slightly gravelly silty CLAY with high cobble content.		59.5	59.60					
2.0						2.00	B	GM49		
2.5				59.0		2.00	C	N=19 (3,3/4,6,5,4)		
	2.90	Very stiff black slightly sandy gravelly silty CLAY with low cobble content.		58.5	58.40					
3.0						3.00	B	GM50		
3.5				58.0		3.00	C	N=35 (5,6/8,8,10,9)		
4.0				57.5		4.00	B	GM51		
4.5						4.00	C	50 (10,11/50 for 225mm)		
5.0				57.0						
5.5				56.5		5.00	B	GM52		
	5.70				55.60	5.00	C	50 (25 for 125mm/50 for 100mm)		
6.0	5.80	Obstruction - possible boulders.		56.0	55.50					
		End of Borehole at 5.80m		55.5		5.80	C	50 (25 for 5mm/50 for 5mm)		
6.5				55.0						
7.0				54.5						
7.5				54.0						
8.0				53.5						
8.5				53.0						
9.0				52.5						
9.5				52.0						
				51.5						

Chiselling:

From:	To:	Time:
2.80	3.00	00:45
5.70	5.80	01:30

Water Strikes:

Strike:	Rose:	Depth Sealed

Water Details:

Date:	Hole Depth:	Water Depth:
12/07	5.80	Dry

Installation:

From:	To:	Pipe:

Backfill:

From:	To:	Type:
0.00	5.80	Arisings

Remarks:
Borehole terminated due to obstruction.

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

Contract No: 5863	**Cable Percussion Borehole Log**				Borehole No: **BH09**
Contract:	Moygaddy	Easting:	694598.661	Date Started:	14/07/2021
Location:	Maynooth, Co. Meath	Northing:	739652.377	Date Completed:	14/07/2021
Client:	Sky Castle Ltd	Elevation:	61.68	Drilled By:	G. Macken
Engineer:	OCSC	Borehole Diameter:	200mm	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples and Insitu Tests Depth	Type	Result	Water Strike	Backfill
0	0.20	TOPSOIL.		61.5	61.48					
0.5		Firm brown sandy slightly gravelly silty CLAY with low cobble content.		61.0		1.00	B	GM41		
1.0				60.5		1.00	C	N=10 (2,2/2,3,2,3)		
1.5				60.0						
2.0	1.80	Stiff brown sandy slightly gravelly silty CLAY with high cobble content.		59.5	59.88	2.00	B	GM42		
2.5						2.00	C	N=21 (3,3/4,5,5,7)		
3.0	2.70	Very stiff black slightly sandy gravelly silty CLAY with low cobble content.		59.0	58.98	3.00	B	GM43		
3.5				58.5		3.00	C	N=39 (4,7/9,9,11,10)		
4.0				58.0						
4.5				57.5		4.00	B	GM44		
5.0						4.00	C	50 (6,9/50 for 200mm)		
5.5	5.30	Obstruction - possible boulders.		57.0						
6.0	5.40	End of Borehole at 5.40m		56.5	56.38	5.00	B	GM45		
6.5					56.28	5.00	C	50 (9,12/50 for 100mm)		
7.0				56.0		5.40	C	50 (25 for 5mm/50 for 5mm)		
7.5				55.5						
8.0				55.0						
8.5				54.5						
9.0				54.0						
9.5				53.5						
				53.0						
				52.5						
				52.0						

Chiselling: From:	To:	Time:	Water Strikes: Strike:	Rose:	Depth Sealed	Water Details: Date:	Hole Depth:	Water Depth:	Installation: From:	To:	Pipe:	Backfill: From:	To:	Type:	Remarks:
5.30	5.40	01:30				08/07	5.40	Dry				0.00	5.40	Arisings	Borehole terminated due to obstruction.

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

Contract No: 5863	**Cable Percussion Borehole Log**				Borehole No: **BH10**
Contract:	Moygaddy	Easting:	694446.855	Date Started:	15/07/2021
Location:	Maynooth, Co. Meath	Northing:	739466.694	Date Completed:	15/07/2021
Client:	Sky Castle Ltd	Elevation:	59.25	Drilled By:	G. Macken
Engineer:	OCSC	Borehole Diameter:	200mm	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples and Insitu Tests Depth	Type	Result	Water Strike	Backfill
0	0.30	TOPSOIL.		59.0	58.95					
0.5		Firm brown sandy slightly gravelly silty CLAY with low cobble content.		58.5		1.00	B	GM46		
1.0						1.00	C	N=11 (2,2/3,3,3,2)		
1.5	1.50	Stiff brown sandy slightly gravelly silty CLAY with high cobble content.		58.0	57.75					
2.0				57.5		2.00	B	GM47		
2.5	2.40	Very stiff black slightly sandy gravelly silty CLAY with low cobble content.		57.0	56.85	2.00	C	N=20 (5,4/5,5,4,6)		
	2.80	Obstruction - possible boulders.		56.5	56.45					
3.0	3.00	End of Borehole at 3.00m		56.0	56.25	3.00	C	50 (25 for 5mm/50 for 0mm)		
3.5				55.5						
4.0				55.0						
4.5				54.5						
5.0				54.0						
5.5				53.5						
6.0				53.0						
6.5				52.5						
7.0				52.0						
7.5				51.5						
8.0				51.0						
8.5				50.5						
9.0				50.0						
9.5				49.5						

Chiselling: From:	To:	Time:	Water Strikes: Strike:	Rose:	Depth Sealed	Water Details: Date:	Hole Depth:	Water Depth:	Installation: From:	To:	Pipe:	Backfill: From:	To:	Type:	Remarks:
2.80	3.00	02:00				09/07	3.00	Dry				0.00	3.00	Arisings	Borehole terminated due to obstruction.

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

Contract No: 5863	**Cable Percussion Borehole Log**				Borehole No: **BH11**
Contract:	Moygaddy	Easting:	694790.229	Date Started:	13/07/2021
Location:	Maynooth, Co. Meath	Northing:	739307.430	Date Completed:	13/07/2021
Client:	Sky Castle Ltd	Elevation:	59.88	Drilled By:	G. Macken
Engineer:	OCSC	Borehole Diameter:	200mm	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples and Insitu Tests Depth	Type	Result	Water Strike	Backfill
0	0.20	TOPSOIL.		59.5	59.68					
0.5		Firm brown sandy slightly gravelly silty CLAY with low cobble content.		59.0		1.00	B	GM36		
1.0						1.00	C	N=13 (2,2/3,3,4,3)		
1.5	1.70			58.5	58.18					
2.0		Stiff brown sandy slightly gravelly silty CLAY with high cobble content.		58.0		2.00	B	GM37		
2.5				57.5		2.00	C	N=21 (4,4/5,5,6,5)		
3.0	2.90			57.0	56.98					
3.5		Very stiff black slightly sandy gravelly silty CLAY with low cobble content.		56.5		3.00	B	GM38		
4.0				56.0		3.00	C	N=43 (5,5/9,10,11,13)		
4.5				55.5		4.00	B	GM39		
5.0				55.0		4.00	C	N=50 (7,9/50 for 275mm)		
5.5				54.5		5.00	B	GM40		
6.0	5.70			54.0	54.18	5.00	C	50 (10,12/50 for 175mm)		
6.5	5.80	Obstruction - possible boulders.		53.5	54.08	5.80	C	50 (25 for 5mm/50 for 5mm)		
7.0		End of Borehole at 5.80m		53.0						
7.5				52.5						
8.0				52.0						
8.5				51.5						
9.0				51.0						
9.5				50.5						
				50.0						

Chiselling:

From:	To:	Time:
3.60	3.80	01:00
5.70	5.80	01:30

Water Strikes:

Strike:	Rose:	Depth Sealed

Water Details:

Date:	Hole Depth:	Water Depth:
07/07	5.80	Dry

Installation:

From:	To:	Pipe:

Backfill:

From:	To:	Type:
0.00	5.80	Arisings

Remarks:
Borehole terminated due to obstruction.

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

Contract No: 5863	**Cable Percussion Borehole Log**	Borehole No: **BH12**

Contract:	Moygaddy	Easting:	694615.966	Date Started:	12/07/2021
Location:	Maynooth, Co. Meath	Northing:	739002.198	Date Completed:	12/07/2021
Client:	Sky Castle Ltd	Elevation:	56.86	Drilled By:	G. Macken
Engineer:	OCSC	Borehole Diameter:	200mm	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples and Insitu Tests Depth	Type	Result	Water Strike	Backfill
0	0.20	TOPSOIL.		56.5	56.66					
0.5		Firm brown sandy slightly gravelly silty CLAY with low cobble content.		56.0		1.00	B	GM30		
1.0						1.00	C	N=10 (1,1/3,3,2,2)		
1.5	1.30	Stiff brown sandy slightly gravelly silty CLAY with high cobble content.		55.5	55.56					
2.0				55.0		2.00	B	GM31		
2.5						2.00	C	N=21 (3,5/5,6,5,5)		
3.0				54.5						
3.5	3.20	Very stiff black slightly sandy gravelly silty CLAY with low cobble content.		54.0		3.00	B	GM32		
4.0				53.5	53.66	3.00	C	N=47 (5,4/9,9,14,15)		
4.5				53.0		4.00	B	GM33		
5.0				52.5		4.00	C	50 (9,13/50 for 175mm)		
5.5				52.0		5.00	B	GM34		
6.0				51.5		5.00	C	N=50 (7,9/50 for 250mm)		
6.5	6.30	Obstruction - possible boulders.		51.0		6.00	B	GM35		
	6.40	End of Borehole at 6.40m		50.5	50.56	6.00	C	50 (10,13/50 for 140mm)		
7.0				50.0	50.46	6.40	C	50 (25 for 5mm/50 for 0mm)		
7.5				49.5						
8.0				49.0						
8.5				48.5						
9.0				48.0						
9.5				47.5						
				47.0						

Chiselling: From:	To:	Time:	Water Strikes: Strike:	Rose:	Depth Sealed	Water Details: Date:	Hole Depth:	Water Depth:	Installation: From:	To:	Pipe:	Backfill: From:	To:	Type:	Remarks:
6.30	6.40	01:30				06/07	6.40	Dry				0.00	6.40	Arisings	Borehole terminated due to obstruction.

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

Contract No: 5863	**Cable Percussion Borehole Log**				Borehole No: **BH13**
Contract:	Moygaddy	Easting:	694659.374	Date Started:	08/07/2021
Location:	Maynooth, Co. Meath	Northing:	738763.773	Date Completed:	08/07/2021
Client:	Sky Castle Ltd	Elevation:	52.09	Drilled By:	G. Macken
Engineer:	OCSC	Borehole Diameter:	200mm	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples and Insitu Tests Depth	Type	Result	Water Strike	Backfill
0	0.20	TOPSOIL.		52.0	51.89					
0.5		Firm brown sandy slightly gravelly silty CLAY with low cobble content.		51.5						
1.0				51.0		1.00 1.00	B C	GM18 N=9 (2,2/2,1,3,3)		
1.5	1.70			50.5	50.39					
2.0		Firm brown sandy slightly gravelly silty CLAY with high cobble content.		50.0		2.00 2.00	B C	GM19 N=14 (4,4/3,3,4,4)		
2.5	2.50			49.5	49.59					
3.0		Very stiff black slightly sandy gravelly silty CLAY with low cobble content.		49.0		3.00 3.00	B C	GM20 N=45 (8,8/11,11,10,13)		
3.5				48.5						
4.0				48.0		4.00 4.00	B C	GM21 N=41 (7,9/9,10,11,11)		
4.5				47.5						
5.0				47.0		5.00 5.00	B C	GM22 50 (8,10/50 for 210mm)		
5.5				46.5						
6.0	6.10			46.0	45.99	6.00 6.00	B C	GM23 50 (26 for 85mm/50 for 10mm)		
6.5	6.20	Obstruction - possible boulders. End of Borehole at 6.20m		45.5	45.89	6.20	C	50 (25 for 5mm/50 for 0mm)		
7.0				45.0						
7.5				44.5						
8.0				44.0						
8.5				43.5						
9.0				43.0						
9.5				42.5						

Chiselling: From:	To:	Time:	Water Strikes: Strike:	Rose:	Depth Sealed	Water Details: Date:	Hole Depth:	Water Depth:	Installation: From:	To:	Pipe:	Backfill: From:	To:	Type:	Remarks:
3.70	3.80	01:00				02/07	6.20	Dry				0.00	6.20	Arisings	Borehole terminated due to obstruction.
6.10	6.20	01:30													

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

Contract No: 5863	**Cable Percussion Borehole Log**				Borehole No: **BH14**
Contract:	Moygaddy	Easting:	694546.422	Date Started:	06/07/2021
Location:	Maynooth, Co. Meath	Northing:	738784.570	Date Completed:	06/07/2021
Client:	Sky Castle Ltd	Elevation:	53.46	Drilled By:	G. Macken
Engineer:	OCSC	Borehole Diameter:	200mm	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples and Insitu Tests Depth	Type	Result	Water Strike	Backfill
0	0.20	TOPSOIL.		53.26						
0.5		Soft brown sandy slightly gravelly silty CLAY with low cobble content.		53.0						
1.0				52.5		1.00	B	GM07		
1.5				52.0		1.00	C	N=7 (1,1/2,1,3,1)		
2.0	2.10			51.5	51.36	2.00	B	GM08		
2.5		Soft brown sandy slightly gravelly silty CLAY with high cobble content.		51.0		2.00	C	N=7 (2,1/2,1,1,3)		
3.0				50.5		3.00	B	GM09	▼	
3.5	3.20	Very stiff black slightly sandy gravelly silty CLAY with low cobble content.		50.0	50.26	3.00	C	N=48 (2,3/9,11,13,15)	▽	
4.0				49.5		4.00	B	GM10		
4.5				49.0		4.00	C	50 (9,9/50 for 225mm)		
5.0				48.5		5.00	B	GM11		
5.5				48.0		5.00	C	50 (7,10/50 for 210mm)		
6.0				47.5		6.00	B	GM12		
	6.20	Obstruction - possible boulders.			47.26	6.00	C	50 (8,10/50 for 175mm)		
6.5	6.30	End of Borehole at 6.30m		47.0	47.16	6.50	C	50 (25 for 5mm/50 for 5mm)		
7.0				46.5						
7.5				46.0						
8.0				45.5						
8.5				45.0						
9.0				44.5						
9.5				44.0						

Chiselling:

From:	To:	Time:
1.70	1.80	00:45
6.20	6.30	01:30

Water Strikes:

Strike:	Rose:	Depth Sealed
3.40	3.10	3.70

Water Details:

Date:	Hole Depth:	Water Depth:
30/06	6.30	Dry

Installation:

From:	To:	Pipe:

Backfill:

From:	To:	Type:
0.00	6.30	Arisings

Remarks: Borehole terminated due to obstruction.

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

Contract No: 5863	**Cable Percussion Borehole Log**	Borehole No: **BH15**

Contract:	Moygaddy	Easting:	694458.907	Date Started:	09/07/2021
Location:	Maynooth, Co. Meath	Northing:	738814.666	Date Completed:	09/07/2021
Client:	Sky Castle Ltd	Elevation:	54.44	Drilled By:	G. Macken
Engineer:	OCSC	Borehole Diameter:	200mm	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples and Insitu Tests Depth	Type	Result	Water Strike	Backfill
0.5	0.20	TOPSOIL.		54.0	54.24					
1.0		Firm brown sandy slightly gravelly silty CLAY with low cobble content.		53.5		1.00 1.00	B C	GM24 N=10 (2,2/3,2,2,3)		
1.5				53.0						
2.0	1.80	Firm brown sandy slightly gravelly silty CLAY with high cobble content.		52.5	52.64	2.00 2.00	B C	GM25 N=14 (3,2/4,3,3,4)		
2.5	2.30	Very stiff black slightly sandy gravelly silty CLAY with low cobble content.		52.0	52.14					
3.0				51.5		3.00 3.00	B C	GM26 N=50 (8,7/50 for 255mm)		
3.5				51.0						
4.0				50.5		4.00 4.00	B C	GM27 50 (11,13/50 for 210mm)		
4.5				50.0						
5.0				49.5		5.00 5.00	B C	GM28 50 (10,12/50 for 190mm)		
5.5				49.0						
6.0				48.5		6.00 6.00	B C	GM29 50 (11,13/50 for 140mm)		
6.5				48.0						
7.0	6.70 6.80	Obstruction - possible boulders. End of Borehole at 6.80m		47.5	47.74 47.64	6.80	C	50 (25 for 5mm/50 for 0mm)		
7.5				47.0						
8.0				46.5						
8.5				46.0						
9.0				45.5						
9.5				45.0						

Chiselling: From:	To:	Time:	Water Strikes: Strike:	Rose:	Depth Sealed	Water Details: Date:	Hole Depth:	Water Depth:	Installation: From:	To:	Pipe:	Backfill: From:	To:	Type:	Remarks:
2.80	2.90	01:00				05/07	6.80	Dry				0.00	6.80	Arisings	Borehole terminated due to obstruction.
6.70	6.80	01:30													

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

Contract No: 5863	**Cable Percussion Borehole Log**				Borehole No: **BH16**
Contract:	Moygaddy	Easting:	693655.329	Date Started:	01/07/2021
Location:	Maynooth, Co. Meath	Northing:	739258.288	Date Completed:	01/07/2021
Client:	Sky Castle Ltd	Elevation:	49.53	Drilled By:	G. Macken
Engineer:	OCSC	Borehole Diameter:	200mm	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples and Insitu Tests Depth	Type	Result	Water Strike	Backfill
0	0.20	TOPSOIL.		49.5	49.33					
0.5		Firm brown sandy slightly gravelly silty CLAY with low cobble content.		49.0		1.00	B	GM80		
1.0				48.5		1.00	C	N=9 (1,2/2,3,2,2)		
1.5				48.0						
2.0	1.80	Stiff brown sandy slightly gravelly silty CLAY with high cobble content.		47.5	47.73	2.00	B	GM81		
2.5	2.50			47.0		2.00	C	N=16 (2,3/3,5,4,4)		
3.0		Stiff becoming very stiff black slightly sandy gravelly silty CLAY with low cobble content.		46.5	47.03	3.00	B	GM82		
3.5				46.0		3.00	C	N=24 (4,4/5,6,6,7)	▼	
4.0				45.5		4.00	B	GM83		
4.5				45.0		4.00	C	N=34 (5,6/6,8,9,11)		
5.0				44.5		5.00	B	GM84		
5.5				44.0		5.00	C	N=48 (5,8/11,11,12,14)		
6.0				43.5		6.00	B	GM85		
6.5				43.0		6.00	C	N=50 (7,8/50 for 275mm)		
7.0	6.70	Obstruction - possible boulders.		42.5	42.83					
	6.80	End of Borehole at 6.80m			42.73	6.80	C	50 (25 for 5mm/50 for 5mm)		
7.5				42.0						
8.0				41.5						
8.5				41.0						
9.0				40.5						
9.5				40.0						

Chiselling:

From:	To:	Time:
2.80	2.90	01:00
6.70	6.80	01:30

Water Strikes:

Strike:	Rose:	Depth Sealed
3.60	3.40	4.00

Water Details:

Date:	Hole Depth:	Water Depth:
21/07	6.80	Dry

Installation:

From:	To:	Pipe:

Backfill:

From:	To:	Type:
0.00	6.80	Arisings

Remarks: Borehole terminated due to obstruction.

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

Contract No: 5863	**Cable Percussion Borehole Log**	Borehole No: **BH17**

Contract:	Moygaddy	Easting:	694518.865	Date Started:	05/07/2021
Location:	Maynooth, Co. Meath	Northing:	738836.591	Date Completed:	05/07/2021
Client:	Sky Castle Ltd	Elevation:	54.89	Drilled By:	G. Macken
Engineer:	OCSC	Borehole Diameter:	200mm	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples and Insitu Tests Depth	Type	Result	Water Strike	Backfill
	0.20	TOPSOIL.			54.69					
		Firm brown sandy slightly gravelly silty CLAY.		54.5						
0.5										
1.0				54.0		1.00	B	GM01		
						1.00	C	N=8 (1,2/2,1,2,3)		
1.5				53.5						
2.0				53.0		2.00	B	GM02		
	2.20				52.69	2.00	C	N=14 (2,5/3,3,4,4)		
		Stiff brown sandy slightly gravelly silty CLAY with low cobble content.		52.5						
2.5										
3.0				52.0		3.00	B	GM03		
						3.00	C	N=16 (3,3/3,4,5,4)		
3.5				51.5						
	3.80				51.09					
4.0		Very stiff black slightly sandy gravelly silty CLAY with low cobble content.		51.0		4.00	B	GM04		
						4.00	C	N=47 (8,6/9,10,13,15)		
4.5				50.5						
5.0				50.0		5.00	B	GM05		
						5.00	C	50 (7,13/18,32,,)		
5.5				49.5						
6.0				49.0		6.00	B	GM06		
						6.00	C	50 (25 for 100mm/50 for 20mm)		
6.5	6.50	Obstruction - possible boulders.		48.5	48.39	6.50	C	50 (25 for 5mm/50 for 5mm)		
		End of Borehole at 6.50m								
7.0				48.0						
7.5				47.5						
8.0				47.0						
8.5				46.5						
9.0				46.0						
9.5				45.5						
				45.0						

Chiselling: From:	To:	Time:	Water Strikes: Strike:	Rose:	Depth Sealed	Water Details: Date:	Hole Depth:	Water Depth:	Installation: From:	To:	Pipe:	Backfill: From:	To:	Type:	Remarks:
3.60	3.80	00:45	3.60	3.40	3.90	29/06	6.50	Dry				0.00	6.50	Arisings	Borehole terminated due to obstruction.
5.50	5.70	01:00													
6.50	6.50	01:30													

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

Contract No: 5863	**Cable Percussion Borehole Log**				Borehole No: **BH18**
Contract:	Moygaddy	Easting:	694562.423	Date Started:	07/07/2021
Location:	Maynooth, Co. Meath	Northing:	738770.148	Date Completed:	07/07/2021
Client:	Sky Castle Ltd	Elevation:	52.93	Drilled By:	G. Macken
Engineer:	OCSC	Borehole Diameter:	200mm	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples and Insitu Tests Depth	Type	Result	Water Strike	Backfill
0	0.20	TOPSOIL.		52.5	52.73					
0.5		Firm brown sandy slightly gravelly silty CLAY with low cobble content.		52.0		1.00	B	GM13		
1.0						1.00	C	N=9 (1,1/3,2,2,2)		
1.5				51.5						
2.0	1.80			51.0	51.13					
		Firm brown sandy slightly gravelly silty CLAY with high cobble content.				2.00	B	GM14		
2.5	2.50			50.5	50.43	2.00	C	N=13 (3,3/2,3,4,4)		
		Very stiff black slightly sandy gravelly silty CLAY with low cobble content.		50.0		3.00	B	GM15		
3.0						3.00	C	N=50 (8,8/50 for 250mm)		
3.5				49.5						
4.0				49.0		4.00	B	GM16		
						4.00	C	N=50 (8,9/50 for 230mm)		
4.5				48.5						
5.0				48.0		5.00	B	GM17		
						5.00	C	50 (10,13/50 for 135mm)		
5.5				47.5						
	5.70				47.23					
6.0	5.80	Obstruction - possible boulders.		47.0	47.13	5.80	C	50 (25 for 5mm/50 for 0mm)		
		End of Borehole at 5.80m								
6.5				46.5						
7.0				46.0						
7.5				45.5						
8.0				45.0						
8.5				44.5						
9.0				44.0						
9.5				43.5						
				43.0						

Chiselling:

From:	To:	Time:
4.70	4.80	01:00
5.70	5.80	01:30

Water Strikes:

Strike:	Rose:	Depth Sealed

Water Details:

Date:	Hole Depth:	Water Depth:
01/07	5.80	Dry

Installation:

From:	To:	Pipe:

Backfill:

From:	To:	Type:
0.00	5.80	Arisings

Remarks: Borehole terminated due to obstruction.

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

Appendix 2

Rotary Corehole Logs and Photographs

Contract No: 5863	**Rotary Corehole Log**				Corehole No: **RC04**
Contract:	Moygaddy	Easting:	693637.963	Date Started:	19/07/2021
Location:	Maynooth, Co. Meath	Northing:	739436.766	Date Completed:	19/07/2021
Client:	Sky Castle Ltd	Elevation:	56.84	Drilled By:	MEDL
Engineer:	OCSC	Rig Type:	Sondeq	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples	Rock Indices TCR/%	SCR/%	RQD/%	FI/m	Backfill
0.5		Open hole drilling - driller reports returns of sandy gravelly silty CLAY with cobbles.		56.5							
1.0				56.0							
1.5				55.5							
2.0				55.0							
2.5				54.5							
3.0				54.0							
3.5				53.5							
4.0				53.0							
4.5				52.5							
5.0				52.0							
5.5				51.5							
6.0				51.0							
6.5	6.70			50.5	50.14						
7.0		Strong to very strong light grey fine grained argillaceous LIMESTONE interbedded with moderately strong dark grey calcareous MUDSTONE with occasional fossils and calcite veins (2mm thick). Fresh to slightly weathered. *Discontinuities - smooth to rough, planar to slightly undulating, tight to open, sub-horizontal and 45° dip, clean with occasional grey staining and occasional clay infill.*		50.0		6.70 - 7.70	96	57	12	14	
7.5				49.5							
8.0				49.0		7.70 - 8.70	97	77	36		
8.5		*Discontinuities - smooth to rough, planar to undulating, tight to open, sub-horizontal and sub-vertical dip, clean with occasional grey staining and occasional clay infill.*		48.5							
9.0				48.0		8.70 - 9.70	97	68	0	19	
9.5				47.5							
	9.70	End of Corehole at 9.70m		47.0	47.14						

Installation: From:	To:	Pipe Type:	Backfill: From:	To:	Type:	Remarks:
			0.00	9.70	Bentonite	-

Contract No: 5863	**Rotary Corehole Log**				Corehole No: **RC05**
Contract:	Moygaddy	Easting:	693935.222	Date Started:	15/07/2021
Location:	Maynooth, Co. Meath	Northing:	739548.071	Date Completed:	15/07/2021
Client:	Sky Castle Ltd	Elevation:	58.60	Drilled By:	MEDL
Engineer:	OCSC	Rig Type:	Sondeq	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples	Rock Indices TCR/%	SCR/%	RQD/%	FI/m	Backfill
0.5		Open hole drilling - driller reports returns of sandy gravelly silty CLAY with cobbles.		58.5							
1.0				58.0							
1.5				57.5							
2.0				57.0							
2.5				56.5							
3.0				56.0							
3.5				55.5							
4.0				55.0							
4.5				54.5							
5.0				54.0							
5.5				53.5							
	5.70			53.0	52.90						
6.0		Strong to very strong light grey fine grained argillaceous LIMESTONE interbedded with moderately strong dark grey calcareous MUDSTONE with occasional fossils, pyrite crystals and calcite veins (2mm thick). Fresh to slightly weathered.		52.5		5.70 - 6.70	96	83	28	11	
6.5		*Discontinuities - smooth to rough, planar, tight to open, sub-horizontal dip, clean with occasional grey staining.*		52.0							
7.0		*Discontinuities - smooth to rough, planar to slightly undulating, tight to open, sub-horizontal and sub-vertical dip, clean with occasional grey staining.*		51.5		6.70 - 7.70	96	52	16	14	
7.5				51.0							
8.0		*Discontinuities - smooth to rough, planar, tight to open, sub-horizontal, occasional sub-vertical dip, clean with occasional grey staining.*		50.5		7.70 - 8.70	92	88	22	11	
8.5				50.0							
	8.70	End of Corehole at 8.70m			49.90						
9.0				49.5							
9.5				49.0							

Installation: From:	To:	Pipe Type:	Backfill: From:	To:	Type:	Remarks:
			0.00	8.70	Bentonite	-

Contract No: 5863	**Rotary Corehole Log**				Corehole No: **RC06**
Contract:	Moygaddy	Easting:	694016.492	Date Started:	15/07/2021
Location:	Maynooth, Co. Meath	Northing:	739390.864	Date Completed:	15/07/2021
Client:	Sky Castle Ltd	Elevation:	57.65	Drilled By:	MEDL
Engineer:	OCSC	Rig Type:	Sondeq	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples	Rock Indices TCR/%	SCR/%	RQD/%	FI/m	Backfill
0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0		Open hole drilling - driller reports returns of sandy gravelly silty CLAY with cobbles.		57.5 57.0 56.5 56.0 55.5 55.0 54.5 54.0 53.5 53.0 52.5							
5.5 6.0 6.5 7.0 7.5	5.30	Strong to very strong light grey fine grained argillaceous LIMESTONE interbedded with moderately strong dark grey calcareous MUDSTONE with occasional fossils and calcite veins (3mm thick). Fresh to slightly weathered. *Discontinuities - smooth to rough, planar to slightly undulating, tight to open, 10-20° and sub-vertical dip, clean with occasional grey staining and occasional clay infill.* *Discontinuities - smooth to rough, planar, tight to open, 10-20° and sub-horizontal dip, clean with occasional grey staining, calcite crystals and occasional clay infill.*		52.0 51.5 51.0 50.5	52.35	5.30 - 6.30 6.30 - 7.30	93 98	70 75	47 39	10 10	
8.0 8.5 9.0 9.5	7.50 8.30	Strong to very strong light grey fine grained argillaceous LIMESTONE interbedded with moderately strong dark grey calcareous MUDSTONE with frequent pyrite crystals, occasional fossils and calcite veins (3mm thick). Fresh to slightly weathered. End of Corehole at 8.30m		50.0 49.5 49.0 48.5 48.0	50.15 49.35	7.30 - 8.30	80	76	32		

Installation: From:	To:	Pipe Type:	Backfill: From:	To:	Type:	Remarks:
			0.00	8.30	Bentonite	-

Contract No: 5863	**Rotary Corehole Log**				Corehole No: **RC07**
Contract:	Moygaddy	Easting:	694142.350	Date Started:	14/07/2021
Location:	Maynooth, Co. Meath	Northing:	739365.230	Date Completed:	14/07/2021
Client:	Sky Castle Ltd	Elevation:	57.84	Drilled By:	MEDL
Engineer:	OCSC	Rig Type:	Sondeq	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples	Rock Indices TCR/%	SCR/%	RQD/%	FI/m	Backfill
0.5		Open hole drilling - driller reports returns of sandy gravelly silty CLAY with cobbles.		57.5							
1.0				57.0							
1.5				56.5							
2.0				56.0							
2.5				55.5							
3.0				55.0							
3.5				54.5							
4.0				54.0							
4.5				53.5							
5.0				53.0							
5.5	5.60			52.5	52.24						
6.0		Strong to very strong light grey fine grained argillaceous LIMESTONE interbedded with moderately strong dark grey calcareous MUDSTONE with occasional fossils and calcite veins (1mm thick). Fresh to slightly weathered. *Discontinuities - smooth, occasionally rough, planar, tight to open, sub-horizontal, occasional sub-vertical dip, clean with occasional grey staining.*		52.0		5.60 - 6.60	97	97	66	12	
6.5				51.5							
7.0		*Discontinuities - smooth to rough, planar to slightly undulating, tight to open, sub-horizontal and sub-vertical dip, clean with occasional grey staining and occasional clay infill.*		51.0		6.60 - 7.60	99	65	41	11	
7.5				50.5							
8.0		*Discontinuities - smooth to rough, planar, tight to open, sub-horizontal and sub-vertical dip, clean with occasional grey staining.*		50.0		7.60 - 8.60	90	75	53	8	
8.5	8.60	End of Corehole at 8.60m		49.5	49.24						
9.0				49.0							
9.5				48.5							
				48.0							

Installation: From:	To:	Pipe Type:	Backfill: From:	To:	Type:	Remarks:
			0.00	8.60	Bentonite	-

Contract No: 5863	**Rotary Corehole Log**				Corehole No: **RC08**
Contract:	Moygaddy	Easting:	694212.597	Date Started:	16/07/2021
Location:	Maynooth, Co. Meath	Northing:	739630.304	Date Completed:	16/07/2021
Client:	Sky Castle Ltd	Elevation:	60.48	Drilled By:	MEDL
Engineer:	OCSC	Rig Type:	Sondeq	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples	Rock Indices TCR/%	SCR/%	RQD/%	FI/m	Backfill
0.5		Open hole drilling - driller reports returns of sandy gravelly silty CLAY with cobbles.		60.0							
1.0				59.5							
1.5				59.0							
2.0				58.5							
2.5				58.0							
3.0				57.5							
3.5				57.0							
4.0				56.5							
4.5				56.0							
5.0				55.5							
5.5				55.0							
6.0				54.5							
6.5	6.60			54.0	53.88					Ni	
7.0		Strong to very strong light grey fine grained argillaceous LIMESTONE interbedded with moderately strong dark grey calcareous MUDSTONE with frequent calcite veins (3mm thick). Fresh to slightly weathered.		53.5		6.60 - 7.60	98	63	23	11	
7.5		*Discontinuities - non-intact.* *Discontinuities - smooth to rough, planar to undulating, tight to open, sub-horizontal and sub-vertical dip, clean with occasional grey staining, calcite crystals and occasional clay infill.*		53.0							
8.0		*Discontinuities - non-intact.*		52.5		7.60 - 8.60	100	69	32	Ni	
8.5		*Discontinuities - smooth to rough, planar to slightly undulating, tight to open, sub-horizontal and sub-vertical dip, clean with occasional grey staining, calcite crystals and occasional clay infill.* *Discontinuities - non-intact.*		52.0						13	
9.0		*Discontinuities - smooth to rough, planar to slightly undulating, tight to open, sub-horizontal and sub-vertical dip, clean with occasional grey staining, calcite crystals and occasional clay infill.*		51.5		8.60 - 9.60	98	75	21	Ni 17	
9.5	9.60	End of Corehole at 9.60m		51.0	50.88						

Installation: From:	To:	Pipe Type:	Backfill: From:	To:	Type:	Remarks:
			0.00	9.60	Bentonite	-

Contract No: 5863	**Rotary Corehole Log**				Corehole No: **RC09**
Contract:	Moygaddy	Easting:	694497.168	Date Started:	13/07/2021
Location:	Maynooth, Co. Meath	Northing:	739610.386	Date Completed:	13/07/2021
Client:	Sky Castle Ltd	Elevation:	61.10	Drilled By:	MEDL
Engineer:	OCSC	Rig Type:	Sondeq	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples	Rock Indices TCR/%	SCR/%	RQD/%	FI/m	Backfill
0.5		Open hole drilling - driller reports returns of sandy gravelly silty CLAY with cobbles.		61.0							
1.0				60.5							
1.5				60.0							
2.0				59.5							
2.5				59.0							
3.0				58.5							
3.5				58.0							
4.0				57.5							
4.5				57.0							
5.0				56.5							
5.5				56.0							
6.0				55.5							
	6.30	Strong to very strong light grey fine grained argillaceous LIMESTONE interbedded with moderately strong dark grey calcareous MUDSTONE with some pyrite crystals and calcite veins (2mm thick). Fresh to slightly weathered.		55.0	54.80						
6.5		*Discontinuities - smooth, occasionally rough, planar to undulating, tight to open, sub-horizontal, occasional sub-vertical dip, clean with occasional grey staining.*		54.5		6.30 - 7.30	94	85	50	9	
7.0				54.0							
7.5				53.5		7.30 - 8.30	95	69	33		
8.0		*Discontinuities - non-intact.*		53.0						Ni	
8.5		*Discontinuities - smooth to rough, planar to slightly undulating, tight to open, sub-horizontal and sub-vertical dip, clean with occasional grey staining and calcite crystals.*		52.5		8.30 - 9.30	99	75	12	14	
9.0				52.0							
	9.30	End of Corehole at 9.30m			51.80						
9.5				51.5							

Installation: From:	To:	Pipe Type:	Backfill: From:	To:	Type:	Remarks:
			0.00	9.30	Bentonite	-

Contract No: 5863	**Rotary Corehole Log**				Corehole No: **RC10**
Contract:	Moygaddy	Easting:	694428.449	Date Started:	13/07/2021
Location:	Maynooth, Co. Meath	Northing:	739378.834	Date Completed:	13/07/2021
Client:	Sky Castle Ltd	Elevation:	57.86	Drilled By:	MEDL
Engineer:	OCSC	Rig Type:	Sondeq	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples	Rock Indices TCR/%	SCR/%	RQD/%	FI/m	Backfill
0.5 1.0 1.5 2.0 2.5		Open hole drilling - driller reports returns of sandy gravelly silty CLAY with cobbles.		57.5 57.0 56.5 56.0 55.5							
3.0 3.5 4.0 4.5 5.0 5.5	2.80	Strong to very strong light grey fine grained argillaceous LIMESTONE interbedded with moderately strong dark grey calcareous MUDSTONE with occasional calcite veins (1mm thick). Fresh to slightly weathered. *Discontinuities - smooth, planar, occasionally stepped, tight to open, 10-30° dip, clean with occasional grey staining and occasional clay infill.* *Discontinuities - non-intact.* *Discontinuities - smooth, planar, occasionally stepped, tight to open, 10-20° dip, occasionally sub-vertical, clean with occasional grey staining and occasional clay infill.* *Discontinuities - non-intact.*		55.0 54.5 54.0 53.5 53.0 52.5	55.06	2.80 - 3.80 3.80 - 4.80 4.80 - 5.80	91 95 96	85 70 60	28 55 31	10 Ni 9 Ni	
6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5	5.80	End of Corehole at 5.80m		52.0 51.5 51.0 50.5 50.0 49.5 49.0 48.5 48.0	52.06						

Installation: From:	To:	Pipe Type:	Backfill: From:	To:	Type:	Remarks:
			0.00	5.80	Bentonite	-

Contract No: 5863	**Rotary Corehole Log**				Corehole No: **RC11**
Contract:	Moygaddy	Easting:	694711.726	Date Started:	12/07/2021
Location:	Maynooth, Co. Meath	Northing:	739248.236	Date Completed:	12/07/2021
Client:	Sky Castle Ltd	Elevation:	59.49	Drilled By:	MEDL
Engineer:	OCSC	Rig Type:	Sondeq	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples	Rock Indices TCR/%	SCR/%	RQD/%	FI/m	Backfill
0.5		Open hole drilling - driller reports returns of sandy gravelly silty CLAY with cobbles.		59.0							
1.0				58.5							
1.5				58.0							
2.0				57.5							
2.5				57.0							
3.0				56.5							
3.5				56.0							
4.0				55.5							
4.5				55.0							
5.0				54.5							
5.5				54.0							
6.0				53.5							
6.5	6.50	Strong to very strong light grey fine grained argillaceous LIMESTONE interbedded with moderately strong dark grey calcareous MUDSTONE with occasional calcite veins (2mm thick). Fresh to slightly weathered. *Discontinuities - smooth, planar to slightly undulating, tight to open, 40-50° dip, clean surfaces.*		53.0	52.99	6.50 - 7.50	97	83	43	9	
7.0				52.5							
7.5				52.0							
8.0	7.80	Strong to very strong light grey fine grained argillaceous LIMESTONE interbedded with moderately strong dark grey calcareous MUDSTONE with occasional calcite veins (1mm thick). Fresh to slightly weathered. *Discontinuities - smooth, planar to slightly undulating, tight to open, 30-50° dip, clean surfaces.*		51.5	51.69	7.50 - 8.50	97	89	50	7	
8.5				51.0							
9.0				50.5		8.50 - 9.50	95	91	71		
9.5	9.50	End of Corehole at 9.40m		50.0	49.99						

Installation: From:	To:	Pipe Type:	Backfill: From:	To:	Type:	Remarks:
			0.00	9.40	Bentonite	-

Contract No: 5863	**Rotary Corehole Log**				Corehole No: **RC12**
Contract:	Moygaddy	Easting:	694562.423	Date Started:	08/07/2021
Location:	Maynooth, Co. Meath	Northing:	738770.148	Date Completed:	08/07/2021
Client:	Sky Castle Ltd	Elevation:	52.93	Drilled By:	MEDL
Engineer:	OCSC	Rig Type:	Sondeq	Status:	FINAL

Depth (m)		Stratum Description	Legend	Level (mOD)		Samples	Rock Indices				Backfill
Scale	Depth			Scale	Depth		TCR/%	SCR/%	RQD/%	FI/m	
0.5		Open hole drilling - driller reports returns of sandy gravelly silty CLAY with cobbles.		52.5							
1.0				52.0							
1.5				51.5							
2.0				51.0							
2.5				50.5							
3.0				50.0							
3.5				49.5							
4.0				49.0							
4.5				48.5							
5.0				48.0							
5.5				47.5							
6.0				47.0							
6.5				46.5		50 (4,5/50 for 30mm)					
7.0				46.0							
7.5				45.5							
8.0	8.00	End of Corehole at 8.00m		45.0	44.93	N=41 (3,6/8,9,10,14)					
8.5				44.5							
9.0				44.0							
9.5				43.5							
				43.0							

Installation:			Backfill:			Remarks:
From:	To:	Pipe Type:	From:	To:	Type:	-
			0.00	8.00	Bentonite	

Contract No: 5863	**Rotary Corehole Log**				Corehole No: **RC13**
Contract:	Moygaddy	Easting:	694473.806	Date Started:	07/07/2021
Location:	Maynooth, Co. Meath	Northing:	738837.204	Date Completed:	07/07/2021
Client:	Sky Castle Ltd	Elevation:	55.00	Drilled By:	MEDL
Engineer:	OCSC	Rig Type:	Sondeq	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples	Rock Indices TCR/%	SCR/%	RQD/%	FI/m	Backfill
0.5		Open hole drilling - driller reports returns of sandy gravelly silty CLAY with cobbles.		54.5							
1.0				54.0							
1.5				53.5							
2.0				53.0							
2.5				52.5							
3.0				52.0							
3.5				51.5							
4.0				51.0							
4.5				50.5							
5.0				50.0							
5.5				49.5							
6.0				49.0							
6.5				48.5		50 (4,5/50 for 95mm)					
7.0				48.0							
7.5				47.5							
8.0	8.00	End of Corehole at 8.00m		47.0	47.00	N=39 (5,5/7,9,10,13)					
8.5				46.5							
9.0				46.0							
9.5				45.5							

Installation: From:	To:	Pipe Type:	Backfill: From:	To:	Type:	Remarks:
			0.00	8.00	Bentonite	-

Contract No: 5863	**Rotary Corehole Log**				Corehole No: **RC14**
Contract:	Moygaddy	Easting:	694269.076	Date Started:	07/07/2021
Location:	Maynooth, Co. Meath	Northing:	739051.513	Date Completed:	07/07/2021
Client:	Sky Castle Ltd	Elevation:	55.61	Drilled By:	MEDL
Engineer:	OCSC	Rig Type:	Sondeq	Status:	FINAL

Depth (m)		Stratum Description	Legend	Level (mOD)		Samples	Rock Indices				Backfill
Scale	Depth			Scale	Depth		TCR/%	SCR/%	RQD/%	FI/m	
0.5		Open hole drilling - driller reports returns of sandy gravelly silty CLAY with cobbles.		55.5							
1.0				55.0							
1.5				54.5							
2.0				54.0							
2.5				53.5							
3.0				53.0							
3.5				52.5							
4.0				52.0							
4.5				51.5							
5.0				51.0							
5.5				50.5							
6.0				50.0							
6.5				49.5							
7.0				49.0		N=39 (3,5/7,9,10,13)					
7.5				48.5							
8.0	8.00	End of Corehole at 8.00m		48.0	47.61	N=40 (3,4/6,10,10,14)					
8.5				47.5							
9.0				47.0							
9.5				46.5							
				46.0							

Installation:			Backfill:			Remarks:
From:	To:	Pipe Type:	From:	To:	Type:	-
			0.00	8.00	Bentonite	

Contract No: 5863	**Rotary Corehole Log**				Corehole No: **RC16**
Contract:	Moygaddy	Easting:	694648.959	Date Started:	08/07/2021
Location:	Maynooth, Co. Meath	Northing:	738608.023	Date Completed:	08/07/2021
Client:	Sky Castle Ltd	Elevation:	45.96	Drilled By:	MEDL
Engineer:	OCSC	Rig Type:	Sondeq	Status:	FINAL

Depth (m)		Stratum Description	Legend	Level (mOD)		Samples	Rock Indices				Backfill
Scale	Depth			Scale	Depth		TCR/%	SCR/%	RQD/%	FI/m	
		Open hole drilling - driller reports returns of sandy gravelly silty CLAY with cobbles.									
	8.00	End of Corehole at 8.00m			37.96	N=37 (3,3/5,8,11,13) N=43 (3,6/8,9,12,14)					

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5

45.5 45.0 44.5 44.0 43.5 43.0 42.5 42.0 41.5 41.0 40.5 40.0 39.5 39.0 38.5 38.0 37.5 37.0 36.5

Installation:			Backfill:			Remarks:
From:	To:	Pipe Type:	From:	To:	Type:	-
			0.00	8.00	Bentonite	

Contract No: 5863	**Rotary Corehole Log**				Corehole No: **RC17**
Contract:	Moygaddy	Easting:	693707.911	Date Started:	19/07/2021
Location:	Maynooth, Co. Meath	Northing:	739303.990	Date Completed:	19/07/2021
Client:	Sky Castle Ltd	Elevation:	54.78	Drilled By:	MEDL
Engineer:	OCSC	Rig Type:	Sondeq	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples	Rock Indices TCR/%	SCR/%	RQD/%	FI/m	Backfill
0.5		Open hole drilling - driller reports returns of sandy gravelly silty CLAY with cobbles.		54.5							
1.0				54.0							
1.5				53.5							
2.0				53.0							
2.5				52.5							
3.0				52.0							
3.5				51.5							
4.0				51.0							
4.5				50.5							
5.0				50.0							
5.5				49.5							
6.0				49.0							
6.5				48.5							
7.0	6.80	Strong to very strong light grey fine grained argillaceous LIMESTONE interbedded with moderately strong dark grey calcareous MUDSTONE with occasional calcite veins (2mm thick). Fresh to slightly weathered. *Discontinuities - non-intact.* *Discontinuities - smooth to rough, planar to slightly undulating, tight to open, 30-50° dip, occasionally sub-horizontal and sub-vertical, clean with occasional clay infill.*		48.0	47.98	6.80 - 7.80	98	57	45	Ni	
7.5				47.5							
8.0				47.0		7.80 - 8.80	98	66	43	9	
8.5				46.5							
9.0				46.0		8.80 - 9.80	97	69	59		
9.5				45.5							
	9.80	End of Corehole at 9.80m		45.0	44.98						

Installation: From:	To:	Pipe Type:	Backfill: From:	To:	Type:	Remarks:
			0.00	9.80	Bentonite	-

Contract No: 5863	**Rotary Corehole Log**				Corehole No: **RC18**
Contract:	Moygaddy	Easting:	693667.400	Date Started:	20/07/2021
Location:	Maynooth, Co. Meath	Northing:	739242.451	Date Completed:	20/07/2021
Client:	Sky Castle Ltd	Elevation:	49.86	Drilled By:	MEDL
Engineer:	OCSC	Rig Type:	Sondeq	Status:	FINAL

Depth (m)		Stratum Description	Legend	Level (mOD)		Samples	Rock Indices				Backfill
Scale	Depth			Scale	Depth		TCR/%	SCR/%	RQD/%	FI/m	
		Open hole drilling - driller reports returns of sandy gravelly silty CLAY with cobbles.		49.5							
0.5				49.0							
1.0				48.5							
1.5				48.0							
2.0				47.5							
2.5				47.0							
3.0				46.5							
3.5				46.0							
4.0				45.5							
4.5				45.0							
5.0				44.5							
5.5				44.0							
6.0				43.5							
6.5				43.0		N=45 (5,7/9,11,12,13)					
7.0				42.5							
7.5				42.0							
8.0	8.00	End of Corehole at 8.00m		41.5	41.86	N=45 (6,6/9,10,12,14)					
8.5				41.0							
9.0				40.5							
9.5				40.0							

Installation:			Backfill:			Remarks:
From:	To:	Pipe Type:	From:	To:	Type:	-
			0.00	8.00	Bentonite	

Contract No: 5863	**Rotary Corehole Log**				Corehole No: **RC19**
Contract:	Moygaddy	Easting:	694613.822	Date Started:	12/07/2021
Location:	Maynooth, Co. Meath	Northing:	739485.171	Date Completed:	12/07/2021
Client:	Sky Castle Ltd	Elevation:	58.39	Drilled By:	MEDL
Engineer:	OCSC	Rig Type:	Sondeq	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples	Rock Indices TCR/%	SCR/%	RQD/%	FI/m	Backfill
0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5		Open hole drilling - driller reports returns of sandy gravelly silty CLAY with cobbles.		58.0 57.5 57.0 56.5 56.0 55.5 55.0 54.5 54.0 53.5 53.0 52.5 52.0 51.5 51.0 50.5 50.0 49.5 49.0 48.5							
	5.10	Strong to very strong light grey fine grained argillaceous LIMESTONE interbedded with moderately strong dark grey calcareous MUDSTONE with occasional pyrite crystals and calcite veins (5mm thick). Fresh to slightly weathered. *Discontinuities - smooth to rough, planar, occasionally stepped, tight to open, sub-horizontal dip, occasionally 60° dip and sub-vertical, clean.*			53.29	5.10 - 6.10	98	97	45	11	
		Discontinuities - smooth to rough, planar, occasionally stepped, tight to open, sub-horizontal and sub-vertical dip, clean with occasional grey staining.				6.10 - 7.10	100	98	53	18	
						7.10 - 8.10	94	73	0		
	8.10	End of Corehole at 8.10m			50.29						

Installation: From:	To:	Pipe Type:	Backfill: From:	To:	Type:	Remarks:
			0.00	8.10	Bentonite	-

Contract No: 5863	**Rotary Corehole Log**				Corehole No: **RC20**
Contract:	Moygaddy	Easting:	694717.266	Date Started:	09/07/2021
Location:	Maynooth, Co. Meath	Northing:	739392.581	Date Completed:	09/07/2021
Client:	Sky Castle Ltd	Elevation:	59.02	Drilled By:	MEDL
Engineer:	OCSC	Rig Type:	Sondeq	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples	Rock Indices TCR/%	SCR/%	RQD/%	FI/m	Backfill
0.5		Open hole drilling - driller reports returns of sandy gravelly silty CLAY with cobbles.		58.5							
1.0				58.0							
1.5				57.5							
2.0				57.0							
2.5				56.5							
3.0				56.0							
3.5				55.5							
4.0				55.0							
4.5				54.5							
5.0				54.0							
5.5				53.5							
6.0				53.0							
6.5				52.5							
7.0				52.0							
7.5				51.5							
8.0	7.80	Open hole drilling - driller reports returns of limestone bedrock.		51.0	51.22						
8.5				50.5							
9.0				50.0							
9.5	9.30	End of Corehole at 9.30m		49.5	49.72						

Installation: From:	To:	Pipe Type:	Backfill: From:	To:	Type:	Remarks:
			0.00	9.30	Bentonite	-

RC04 Box 1 of 1

RC05 Box 1 of 1

RC06 Box 1 of 1

RC07 Box 1 of 1

RC08 Box 1 of 1

RC09 Box 1 of 1

RC10 Box 1 of 1

RC11 Box 1 of 1

RC17 Box 1 of 1

RC19 Box 1 of 1

Appendix 3

Trial Pit Logs and Photographs

Contract No: 5863	**Trial Pit Log**				Trial Pit No: **TP01**
Contract:	Moygaddy	Easting:	693958.608	Date:	16/06/2021
Location:	Maynooth, Co. Meath	Northing:	739151.571	Excavator:	JCB 3CX
Client:	Sky Castle Ltd	Elevation:	55.32	Logged By:	M. Kaliski
Engineer:	OCSC	Dimensions (LxWxD) (m):	4.30 x 0.60 x 2.10	Status:	FINAL

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples / Field Tests Depth	Type	Result	Water Strike
	0.10	TOPSOIL.			55.22				
0.5		Soft becoming firm brown sandy slightly gravelly silty CLAY with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.		55.0		0.50	ICBR	MK14	
1.0				54.5		1.00	B	MK15	
1.5				54.0					
	1.80			53.5	53.52				
2.0		Stiff grey brown slightly sandy slightly gravelly silty CLAY with high cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter).				2.00	B	MK16	
	2.10	Obstruction - boulders.			53.22				
2.5		**Pit terminated at 2.10m**		53.0					
3.0				52.5					
3.5				52.0					
				51.5					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - boulders.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5863	**Trial Pit Log**				Trial Pit No: **TP02**
Contract:	Moygaddy	Easting:	693988.420	Date:	16/06/2021
Location:	Maynooth, Co. Meath	Northing:	739286.118	Excavator:	JCB 3CX
Client:	Sky Castle Ltd	Elevation:	57.37	Logged By:	M. Kaliski
Engineer:	OCSC	Dimensions (LxWxD) (m):	4.00 x 0.60 x 3.00	Status:	FINAL

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples / Field Tests Depth	Type	Result	Water Strike
		TOPSOIL.			57.27				
	0.10	Soft brown slightly sandy slightly gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.		57.0		0.50	ICBR	MK07	
0.5									
	0.60	Firm grey brown slightly sandy slightly gravelly silty CLAY with high cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.			56.77				
1.0				56.5		1.00	B	MK08	
				56.0					
1.5	1.50	Firm becoming stiff grey brown slightly sandy slightly gravelly silty CLAY with high cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter).			55.87				
				55.5					
2.0						2.00	B	MK09	
				55.0					
2.5									
				54.5					
3.0	3.00	**Pit terminated at 3.00m**			54.37	3.00	B	MK10	
				54.0					
3.5									
				53.5					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Scheduled depth.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5863	**Trial Pit Log**				Trial Pit No: **TP03**
Contract:	Moygaddy	Easting:	693767.173	Date:	16/06/2021
Location:	Maynooth, Co. Meath	Northing:	739286.781	Excavator:	JCB 3CX
Client:	Sky Castle Ltd	Elevation:	55.26	Logged By:	M. Kaliski
Engineer:	OCSC	Dimensions (LxWxD) (m):	4.20 x 0.60 x 1.40	Status:	FINAL

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples / Field Tests Depth	Type	Result	Water Strike
		TOPSOIL.			55.16				
	0.10	Firm brown slightly sandy slightly gravelly silty CLAY with low cobble and boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 300mm diameter).		55.0		0.50	B	MK01	
0.5						0.50	ICBR	MK02	
				54.5					
	0.90	Firm brown slightly sandy slightly gravelly silty CLAY with high cobble and medium boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 300mm diameter).			54.36				
1.0						1.00	B	MK03	
				54.0					
	1.40	Obstruction - boulders.			53.86				
1.5		**Pit terminated at 1.40m**							
				53.5					
2.0									
				53.0					
2.5									
				52.5					
3.0									
				52.0					
3.5									
				51.5					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - boulders.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5863	**Trial Pit Log**				Trial Pit No: **TP04**
Contract:	Moygaddy	Easting:	693682.930	Date:	17/06/2021
Location:	Maynooth, Co. Meath	Northing:	739502.916	Excavator:	JCB 3CX
Client:	Sky Castle Ltd	Elevation:	56.95	Logged By:	M. Kaliski
Engineer:	OCSC	Dimensions (LxWxD) (m):	4.20 x 0.60 x 2.40	Status:	FINAL

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples / Field Tests Depth	Type	Result	Water Strike
	0.10	TOPSOIL.			56.85				
		Soft brown slightly sandy slightly gravelly silty CLAY with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.		56.5					
0.5	0.50	Firm grey brown slightly sandy slightly gravelly silty CLAY with high cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 500mm diameter).			56.45	0.50	ICBR	MK43	
1.0				56.0		1.00	B	MK44	
1.5				55.5					
2.0				55.0					▼
	2.30				54.65				
2.5	2.40	Stiff grey slightly sandy slightly gravelly silty CLAY with high cobble and medium boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 500mm diameter). Obstruction - boulders.		54.5	54.55	2.40	B	MK45	
		Pit terminated at 2.40m							
3.0				54.0					
3.5				53.5					
				53.0					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - boulders.	Pit walls stable.	2.00 Seepage	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5863	**Trial Pit Log**				Trial Pit No: **TP05**
Contract:	Moygaddy	Easting:	693971.792	Date:	17/06/2021
Location:	Maynooth, Co. Meath	Northing:	739656.168	Excavator:	JCB 3CX
Client:	Sky Castle Ltd	Elevation:	58.70	Logged By:	M. Kaliski
Engineer:	OCSC	Dimensions (LxWxD) (m):	3.90 x 0.60 x 2.60	Status:	FINAL

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples / Field Tests Depth	Type	Result	Water Strike
	0.10	TOPSOIL.		58.5	58.60				
0.5		Soft brown slightly sandy slightly gravelly silty CLAY with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.				0.50	ICBR	MK39	
	0.60	Firm brown slightly sandy slightly gravelly clayey SILT. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone.		58.0	58.10				
1.0						1.00	B	MK40	
				57.5					
1.5	1.50	Firm grey brown slightly sandy slightly gravelly silty CLAY with high cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 500mm diameter).			57.20				▼
2.0				57.0		2.00	B	MK41	
				56.5					
	2.40				56.30				
2.5		Stiff black slightly sandy slightly gravelly silty CLAY with high cobble and medium boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 500mm diameter).				2.50	B	MK42	
	2.60	Obstruction - boulders.			56.10				
		Pit terminated at 2.60m		56.0					
3.0									
				55.5					
3.5									
				55.0					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Pit wall instability.	Walls collapsing between 1.50mbgl and 2.40mbgl.	1.70 Slow	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5863	**Trial Pit Log**				Trial Pit No: **TP06**
Contract:	Moygaddy	Easting:	693989.839	Date:	17/06/2021
Location:	Maynooth, Co. Meath	Northing:	739437.563	Excavator:	JCB 3CX
Client:	Sky Castle Ltd	Elevation:	57.88	Logged By:	M. Kaliski
Engineer:	OCSC	Dimensions (LxWxD) (m):	4.40 x 0.60 x 2.50	Status:	FINAL

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples / Field Tests Depth	Type	Result	Water Strike
		TOPSOIL.			57.78				
	0.10	Soft brown slightly sandy slightly gravelly silty CLAY. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone.							
	0.30	Firm grey brown slightly sandy slightly gravelly silty CLAY with high cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 500mm diameter).			57.58				
0.5				57.5		0.50	ICBR	MK46	
1.0				57.0		1.00	B	MK47	
	1.30	Firm brown slightly sandy slightly gravelly clayey SILT with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.			56.58				
1.5				56.5		1.50	B	MK48	
2.0	2.00	Firm grey brown slightly sandy slightly gravelly silty CLAY with high cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 500mm diameter).		56.0	55.88				▼
	2.40	Stiff black slightly sandy slightly gravelly silty CLAY with high cobble and medium boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 500mm diameter).		55.5	55.48				
2.5	2.50	Obstruction - boulders.			55.38	2.20	B	MK49	
		Pit terminated at 2.50m				2.50	B	MK50	
3.0				55.0					
3.5				54.5					
				54.0					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - boulders.	Pit walls stable.	2.00 Seepage	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5863	**Trial Pit Log**				Trial Pit No: **TP07**
Contract:	Moygaddy	Easting:	694176.647	Date:	17/06/2021
Location:	Maynooth, Co. Meath	Northing:	739446.736	Excavator:	JCB 3CX
Client:	Sky Castle Ltd	Elevation:	58.93	Logged By:	M. Kaliski
Engineer:	OCSC	Dimensions (LxWxD) (m):	4.20 x 0.60 x 2.50	Status:	FINAL

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples / Field Tests Depth	Type	Result	Water Strike
		TOPSOIL.							
	0.10				58.83				
	0.20	Soft brown slightly sandy slightly gravelly silty CLAY. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone.			58.73				
0.5		Firm becoming stiff grey brown slightly sandy slightly gravelly silty CLAY with high cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter).		58.5		0.50	ICBR	MK51	
1.0				58.0		1.00	B	MK52	
1.5				57.5					
2.0				57.0					
	2.40				56.53				
2.5	2.50	Stiff black slightly sandy slightly gravelly silty CLAY with high cobble and medium boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 500mm diameter).		56.5	56.43	2.50	B	MK53	
		Obstruction - boulders.							
		Pit terminated at 2.50m							
3.0				56.0					
3.5				55.5					
				55.0					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - boulders.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5863	**Trial Pit Log**				Trial Pit No: **TP08**
Contract:	Moygaddy	Easting:	694199.733	Date:	17/06/2021
Location:	Maynooth, Co. Meath	Northing:	739712.642	Excavator:	JCB 3CX
Client:	Sky Castle Ltd	Elevation:	61.26	Logged By:	M. Kaliski
Engineer:	OCSC	Dimensions (LxWxD) (m):	3.80 x 0.60 x 1.40	Status:	FINAL

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples / Field Tests Depth	Type	Result	Water Strike
	0.10	TOPSOIL.			61.16				
0.5		Soft brown slightly sandy slightly gravelly silty CLAY with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.		61.0		0.50	ICBR	MK37	
	0.80			60.5	60.46				
1.0		Firm grey brown slightly sandy gravelly silty CLAY with high cobble and medium boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter).				1.00	B	MK38	
	1.40			60.0	59.86				
1.5		Obstruction - boulders.							
		Pit terminated at 1.40m		59.5					
2.0									
				59.0					
2.5									
				58.5					
3.0									
				58.0					
3.5									
				57.5					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - boulders.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5863	**Trial Pit Log**				Trial Pit No: **TP09**
Contract:	Moygaddy	Easting:	694508.798	Date:	17/06/2021
Location:	Maynooth, Co. Meath	Northing:	739701.821	Excavator:	JCB 3CX
Client:	Sky Castle Ltd	Elevation:	62.01	Logged By:	M. Kaliski
Engineer:	OCSC	Dimensions (LxWxD) (m):	4.00 x 0.60 x 1.60	Status:	FINAL

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples / Field Tests Depth	Type	Result	Water Strike
	0.10	TOPSOIL.			61.91				
0.5		Firm becoming stiff grey brown slightly sandy slightly gravelly silty CLAY with high cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter).		61.5		0.50	ICBR	MK60	
1.0				61.0					
						1.20	B	MK61	
1.5				60.5					
	1.60	Obstruction - boulders.			60.41				
		Pit terminated at 1.60m							
2.0				60.0					
2.5				59.5					
3.0				59.0					
3.5				58.5					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - boulders.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5863	**Trial Pit Log**				Trial Pit No: **TP10**
Contract:	Moygaddy	Easting:	694486.386	Date:	17/06/2021
Location:	Maynooth, Co. Meath	Northing:	739434.493	Excavator:	JCB 3CX
Client:	Sky Castle Ltd	Elevation:	58.96	Logged By:	M. Kaliski
Engineer:	OCSC	Dimensions (LxWxD) (m):	4.30 x 0.60 x 2.40	Status:	FINAL

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples / Field Tests Depth	Type	Result	Water Strike
	0.10	TOPSOIL.			58.86				
		Soft brown slightly sandy slightly gravelly silty CLAY with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.							
	0.40	Firm becoming stiff grey brown slightly sandy slightly gravelly silty CLAY with high cobble and medium boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter).			58.56				
0.5				58.5		0.50	ICBR	MK62	
1.0				58.0		1.00	B	MK63	
1.5				57.5					
2.0				57.0					▼
	2.40	Obstruction - boulders.			56.56	2.40	B	MK64	
2.5		**Pit terminated at 2.40m**		56.5					
3.0				56.0					
3.5				55.5					
				55.0					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - boulders.	Pit walls stable.	2.10 Seepage	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5863	**Trial Pit Log**				Trial Pit No: **TP11**
Contract:	Moygaddy	Easting:	694739.889	Date:	17/06/2021
Location:	Maynooth, Co. Meath	Northing:	739363.529	Excavator:	JCB 3CX
Client:	Sky Castle Ltd	Elevation:	59.42	Logged By:	M. Kaliski
Engineer:	OCSC	Dimensions (LxWxD) (m):	4.10 x 0.60 x 2.30	Status:	FINAL

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples / Field Tests Depth	Type	Result	Water Strike
	0.10	TOPSOIL.			59.32				
		Soft brown slightly sandy slightly gravelly silty CLAY. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone.		59.0					
0.5	0.50	Firm becoming stiff grey brown slightly sandy slightly gravelly silty CLAY with high cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter).			58.92	0.50	ICBR	MK57	
1.0				58.5					
1.5				58.0		1.50	B	MK58	▼
2.0				57.5					
	2.10	Stiff grey brown slightly sandy slightly gravelly silty CLAY with high cobble and boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter).			57.32				
2.5	2.30	Obstruction - boulders.		57.0	57.12	2.20	B	MK59	
		Pit terminated at 2.30m							
3.0				56.5					
				56.0					
3.5									
				55.5					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - boulders.	Pit walls stable.	1.80 Seepage	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5863	**Trial Pit Log**				Trial Pit No: **TP12**
Contract:	Moygaddy	Easting:	694471.269	Date:	17/06/2021
Location:	Maynooth, Co. Meath	Northing:	739060.502	Excavator:	JCB 3CX
Client:	Sky Castle Ltd	Elevation:	56.97	Logged By:	M. Kaliski
Engineer:	OCSC	Dimensions (LxWxD) (m):	3.70 x 0.60 x 2.30	Status:	FINAL

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples / Field Tests Depth	Type	Result	Water Strike
	0.10	TOPSOIL.			56.87				
		Soft brown slightly sandy slightly gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.							
0.5	0.50	Firm grey brown slightly sandy slightly gravelly silty CLAY with high cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter).		56.5	56.47	0.50	ICBR	MK34	
1.0				56.0		1.00	B	MK35	
1.5	1.50			55.5	55.47				▼
	1.60	Grey brown silty sandy fine to coarse, angular to subrounded GRAVEL of limestone with high cobble and low boulder content. Sand is fine to coarse. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter).			55.37				
		Firm grey brown slightly sandy slightly gravelly silty CLAY with high cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter).							
2.0				55.0		2.00	B	MK36	
	2.20				54.77				
	2.30	Stiff black slightly sandy slightly gravelly silty CLAY with high cobble and medium boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter).			54.67				
2.5		Obstruction - boulders.		54.5					
		Pit terminated at 2.30m							
3.0				54.0					
3.5				53.5					
				53.0					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - boulders.	Pit walls stable.	1.50 Seepage	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5863	**Trial Pit Log**				Trial Pit No: **TP13**
Contract:	Moygaddy	Easting:	694562.423	Date:	16/06/2021
Location:	Maynooth, Co. Meath	Northing:	738770.148	Excavator:	JCB 3CX
Client:	Sky Castle Ltd	Elevation:	52.93	Logged By:	M. Kaliski
Engineer:	OCSC	Dimensions (LxWxD) (m):	3.90 x 0.60 x 2.10	Status:	FINAL

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples / Field Tests Depth	Type	Result	Water Strike
	0.10	TOPSOIL.			52.83				
		Soft becoming firm brown slightly sandy slightly gravelly silty CLAY with high cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.		52.5		0.50	ICBR	MK27	
0.5									
1.0				52.0		1.00	B	MK28	
	1.20	Grey brown silty sandy fine to coarse, angular to subrounded GRAVEL of limestone with high cobble and low boulder content. Sand is fine to coarse. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter).			51.73				
1.5				51.5		1.50	B	MK29	
	1.60	Firm becoming stiff grey brown slightly sandy slightly gravelly silty CLAY with high cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter).			51.33				▼
2.0				51.0		2.00	B	MK30	
	2.10	Obstruction - boulders.			50.83				
		Pit terminated at 2.10m							
2.5				50.5					
3.0				50.0					
3.5				49.5					
				49.0					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - boulders.	Pit walls stable.	1.80 Seepage	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5863	**Trial Pit Log**				Trial Pit No: **TP14**
Contract:	Moygaddy	Easting:	694240.465	Date:	16/06/2021
Location:	Maynooth, Co. Meath	Northing:	739010.894	Excavator:	JCB 3CX
Client:	Sky Castle Ltd	Elevation:	55.01	Logged By:	M. Kaliski
Engineer:	OCSC	Dimensions (LxWxD) (m):	3.90 x 0.60 x 2.00	Status:	FINAL

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples / Field Tests Depth	Type	Result	Water Strike
	0.10	TOPSOIL.			54.91				
		Soft becoming firm brown slightly sandy slightly gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.							
0.5				54.5		0.50	ICBR	MK24	
1.0				54.0		1.00	B	MK25	
1.5				53.5					
	1.60	Stiff grey brown slightly sandy slightly gravelly silty CLAY with high cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter).			53.41	1.80	B	MK26	
2.0	2.00	Obstruction - boulders.		53.0	53.01				
		Pit terminated at 2.00m							
2.5				52.5					
3.0				52.0					
3.5				51.5					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - boulders.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5863	**Trial Pit Log**				Trial Pit No: **TP15**
Contract:	Moygaddy	Easting:	694131.238	Date:	16/06/2021
Location:	Maynooth, Co. Meath	Northing:	739202.931	Excavator:	JCB 3CX
Client:	Sky Castle Ltd	Elevation:	55.37	Logged By:	M. Kaliski
Engineer:	OCSC	Dimensions (LxWxD) (m):	4.20 x 0.60 x 1.60	Status:	FINAL

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples / Field Tests Depth	Type	Result	Water Strike
		TOPSOIL.			55.27				
	0.10	Soft brown slightly sandy slightly gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.		55.0					
0.5	0.50	Firm becoming stiff grey brown slightly sandy gravelly silty CLAY with high cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter).			54.87	0.50	ICBR	MK22	
				54.5					
1.0						1.00	B	MK23	
				54.0					
1.5	1.60	Obstruction - boulders.			53.77				▼
		Pit terminated at 1.60m							
				53.5					
2.0									
				53.0					
2.5									
				52.5					
3.0									
				52.0					
3.5									
				51.5					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - boulders.	Pit walls stable.	1.60 Medium	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5863	**Trial Pit Log**				Trial Pit No: **TP16**
Contract:	Moygaddy	Easting:	694580.524	Date:	17/06/2021
Location:	Maynooth, Co. Meath	Northing:	739205.916	Excavator:	JCB 3CX
Client:	Sky Castle Ltd	Elevation:	58.33	Logged By:	M. Kaliski
Engineer:	OCSC	Dimensions (LxWxD) (m):	4.10 x 0.60 x 2.20	Status:	FINAL

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples / Field Tests Depth	Type	Result	Water Strike
					58.23				
	0.10	TOPSOIL.							
		Firm becoming stiff grey brown slightly sandy slightly gravelly silty CLAY with high cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter).		58.0					
0.5						0.50	ICBR	MK54	
				57.5					
1.0						1.00	B	MK55	
				57.0					
1.5									
				56.5					
2.0									
	2.10				56.23				
	2.20	Stiff black slightly sandy slightly gravelly silty CLAY with high cobble and medium boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 500mm diameter).			56.13	2.20	B	MK56	
		Obstruction - boulders.		56.0					
2.5		**Pit terminated at 2.20m**							
				55.5					
3.0									
				55.0					
3.5									
				54.5					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - boulders.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5863	**Trial Pit Log**				Trial Pit No: **TP17**
Contract:	Moygaddy	Easting:	693968.747	Date:	16/06/2021
Location:	Maynooth, Co. Meath	Northing:	739114.742	Excavator:	JCB 3CX
Client:	Sky Castle Ltd	Elevation:	54.52	Logged By:	M. Kaliski
Engineer:	OCSC	Dimensions (LxWxD) (m):	4.20 x 0.60 x 1.70	Status:	FINAL

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples / Field Tests Depth	Type	Result	Water Strike
	0.10	TOPSOIL.			54.42				
0.5		Soft becoming firm brown slightly sandy slightly gravelly silty CLAY with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.		54.0		0.50	ICBR	MK17	
1.0				53.5		1.00	B	MK18	
1.5				53.0					
	1.70	Obstruction - boulders.			52.82				
		Pit terminated at 1.70m							
2.0				52.5					
2.5				52.0					
3.0				51.5					
3.5				51.0					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - boulders.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5863	**Trial Pit Log**				Trial Pit No: **TP18**
Contract:	Moygaddy	Easting:	693940.121	Date:	16/06/2021
Location:	Maynooth, Co. Meath	Northing:	739224.755	Excavator:	JCB 3CX
Client:	Sky Castle Ltd	Elevation:	55.98	Logged By:	M. Kaliski
Engineer:	OCSC	Dimensions (LxWxD) (m):	4.10 x 0.60 x 2.50	Status:	FINAL

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples / Field Tests Depth	Type	Result	Water Strike
	0.10	TOPSOIL.			55.88				
		Soft brown slightly sandy slightly gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.		55.5		0.50	ICBR	MK11	
	1.00	Firm becoming stiff grey brown slightly sandy slightly gravelly silty CLAY with high cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter).		55.0	54.98	1.00	B	MK12	
				54.5					
				54.0					
	2.50	Obstruction - boulders.		53.5	53.48	2.50	B	MK13	
		Pit terminated at 2.50m							
				53.0					
				52.5					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Strength of soil and boulders.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5863	**Trial Pit Log**				Trial Pit No: **TP19**
Contract:	Moygaddy	Easting:	693876.942	Date:	16/06/2021
Location:	Maynooth, Co. Meath	Northing:	739296.996	Excavator:	JCB 3CX
Client:	Sky Castle Ltd	Elevation:	55.71	Logged By:	M. Kaliski
Engineer:	OCSC	Dimensions (LxWxD) (m):	4.00 x 0.60 x 1.90	Status:	FINAL

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples / Field Tests Depth	Type	Result	Water Strike
	0.10	TOPSOIL.			55.61				
	0.20	Soft brown slightly sandy slightly gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.		55.5	55.51				
0.5		Firm grey brown slightly sandy slightly gravelly silty CLAY with high cobble and medium boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter).		55.0		0.50	ICBR	MK04	
1.0						1.00	B	MK05	
1.5				54.5					
	1.70			54.0	54.01				▼
	1.90	Stiff grey slightly sandy slightly gravelly silty CLAY with high cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter).			53.81	1.80	B	MK06	
2.0		Obstruction - boulders.		53.5					
		Pit terminated at 1.90m							
2.5				53.0					
3.0				52.5					
3.5				52.0					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - boulders.	Pit walls stable.	1.70 Seepage	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5863	**Trial Pit Log**				Trial Pit No: **TP20**
Contract:	Moygaddy	Easting:	694084.588	Date:	16/06/2021
Location:	Maynooth, Co. Meath	Northing:	739079.517	Excavator:	JCB 3CX
Client:	Sky Castle Ltd	Elevation:	55.01	Logged By:	M. Kaliski
Engineer:	OCSC	Dimensions (LxWxD) (m):	3.90 x 0.60 x 1.90	Status:	FINAL

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples / Field Tests Depth	Type	Result	Water Strike
	0.10	TOPSOIL.			54.91				
		Soft brown slightly sandy slightly gravelly silty CLAY. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone.							
	0.40				54.61				
0.5		Firm grey brown slightly sandy slightly gravelly silty CLAY with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.		54.5		0.50	ICBR	MK19	
1.0				54.0		1.00	B	MK20	
	1.30				53.71				
1.5		Firm becoming stiff grey brown slightly sandy slightly gravelly silty CLAY with high cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter).		53.5		1.50	B	MK21	
	1.90	Obstruction - boulders.			53.11				
2.0		**Pit terminated at 1.90m**		53.0					
2.5				52.5					
3.0				52.0					
3.5				51.5					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - boulders.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5863	**Trial Pit Log**				Trial Pit No: **TP21**
Contract:	Moygaddy	Easting:	694518.865	Date:	16/06/2021
Location:	Maynooth, Co. Meath	Northing:	738836.591	Excavator:	JCB 3CX
Client:	Sky Castle Ltd	Elevation:	54.89	Logged By:	M. Kaliski
Engineer:	OCSC	Dimensions (LxWxD) (m):	4.00 x 0.60 x 2.90	Status:	FINAL

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples / Field Tests Depth	Type	Result	Water Strike
	0.10	TOPSOIL.			54.79				
		Soft becoming firm brown slightly sandy slightly gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.		54.5		0.50	ICBR	MK31	
0.5									
				54.0		1.00	B	MK32	
1.0									
				53.5					
1.5									
	1.80				53.09				
		Stiff grey brown slightly sandy slightly gravelly silty CLAY with high cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter).		53.0		2.00	B	MK33	
2.0									
				52.5					▼
2.5									
	2.90	Obstruction - boulders.		52.0	51.99				▼
3.0		**Pit terminated at 2.90m**							
				51.5					
3.5									
				51.0					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - boulders.	Pit walls stable.	2.90 Medium	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

TP01 Sidewall

TP01 Spoil

TP02 Sidewall

TP02 Spoil

TP03 Sidewall

TP03 Spoil

TP04 Sidewall

TP04 Spoil

TP05 Sidewall

TP05 Spoil

TP06 Sidewall

TP06 Spoil

TP07 Sidewall

TP07 Spoil

TP08 Sidewall

TP08 Spoil

TP09 Sidewall

TP09 Spoil

TP10 Sidewall

TP10 Spoil

TP11 Sidewall

TP11 Spoil

TP12 Sidewall

TP12 Spoil

TP13 Sidewall

TP13 Spoil

TP14 Sidewall

TP14 Spoil

TP15 Sidewall

TP15 Spoil

TP16 Sidewall

TP16 Spoil

TP17 Sidewall

TP17 Spoil

TP18 Sidewall

TP18 Spoil

TP19 Sidewall

TP19 Spoil

TP20 Sidewall

TP20 Spoil

TP21 Sidewall

TP21 Spoil

Appendix 4

Soakaway Test Results

SOAKAWAY TEST

Project Reference:	5863
Contract name:	Moygaddy
Location:	Maynooth, Co. Meath
Test No:	TP01
Date:	16/06/2021

Ground Conditions

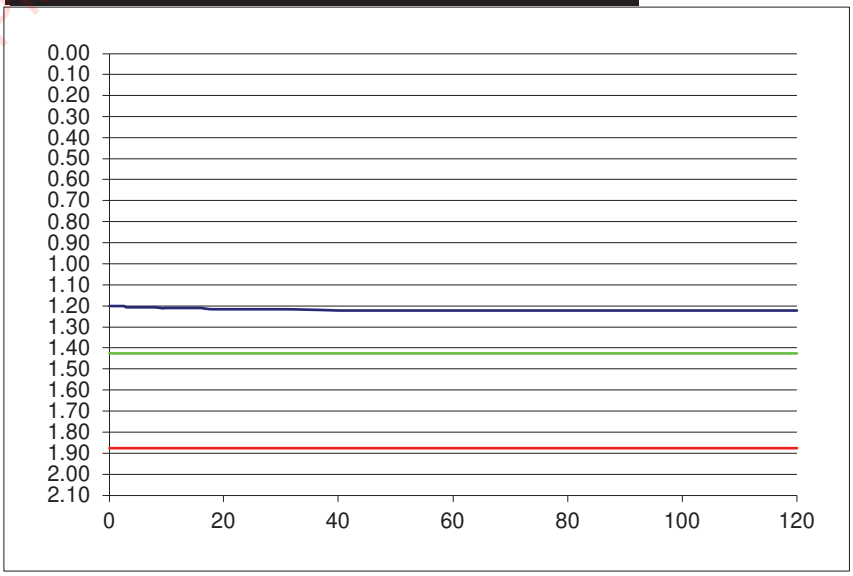
From	To	
0.00	0.10	TOPSOIL.
0.10	1.80	Soft becoming firm brown slightly sandy slightly gravelly silty CLAY with medium cobble content.
1.80	2.10	Stiff grey brown slightly sandy slightly gravelly silty CLAY with high cobble and low boulder content.

Remarks:

Obstruction at 2.10mbgl.

Elapsed Time (mins)	Fall of Water (m)
0	1.20
0.5	1.20
1	1.20
1.5	1.20
2	1.20
2.5	1.20
3	1.21
3.5	1.21
4	1.21
4.5	1.21
5	1.21
6	1.21
7	1.21
8	1.21
9	1.21
10	1.21
12	1.21
14	1.21
16	1.21
18	1.22
20	1.22
25	1.22
30	1.22
40	1.22
50	1.22
60	1.22
75	1.22
90	1.22
120	1.22

Pit Dimensions (m)		
Length (m)	4.30	m
Width (m)	0.60	m
Depth	2.10	m
Water		
Start Depth of Water	1.20	m
Depth of Water	0.90	m
75% Full	1.43	m
25% Full	1.88	m
75%-25%	0.45	m
Volume of water (75%-25%)	**1.16**	m3
Area of Drainage	**20.58**	m2
Area of Drainage (75%-25%)	**6.99**	m2
Time		
75% Full	N/A	min
25% Full	N/A	min
Time 75% to 25%	**N/A**	min
Time 75% to 25% (sec)	**N/A**	sec



f = **Fail** m/min or **Fail** m/s

SOAKAWAY TEST

Project Reference:	5863
Contract name:	Moygaddy
Location:	Maynooth, Co. Meath
Test No:	TP02
Date:	16/06/2021

Ground Conditions

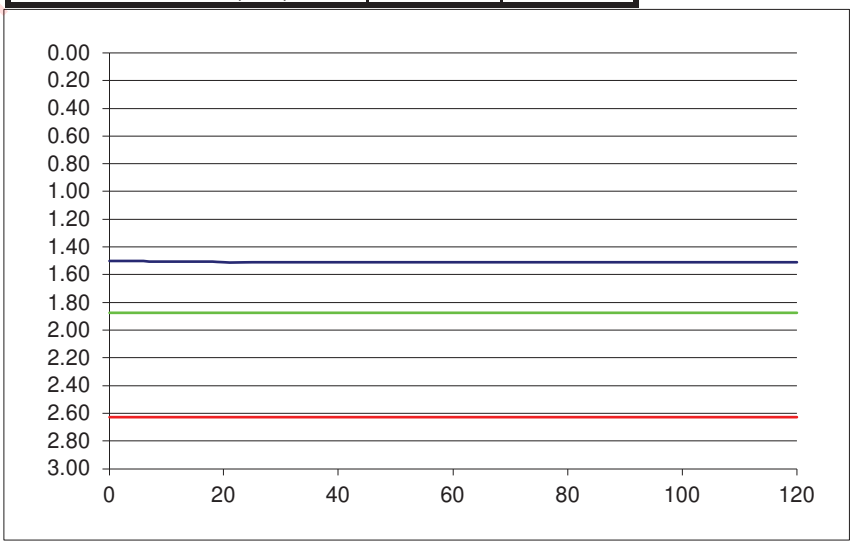
From	To	
0.00	0.10	TOPSOIL.
0.10	0.60	Soft brown slightly sandy slightly gravelly silty CLAY with low cobble content.
0.60	1.50	Firm grey brown slightly sandy slightly gravelly silty CLAY with high cobble content.
1.50	3.00	Firm becoming stiff grey brown slightly sandy slightly gravelly silty CLAY with high cobble and low boulder content.

Remarks:

Test completed at base of pit.

Elapsed Time (mins)	Fall of Water (m)
0	1.50
0.5	1.50
1	1.50
1.5	1.50
2	1.50
2.5	1.50
3	1.50
3.5	1.50
4	1.50
4.5	1.50
5	1.50
6	1.50
7	1.51
8	1.51
9	1.51
10	1.51
12	1.51
14	1.51
16	1.51
18	1.51
20	1.51
25	1.51
30	1.51
40	1.51
50	1.51
60	1.51
75	1.51
90	1.51
120	1.51

Pit Dimensions (m)		
Length (m)	4.00	m
Width (m)	0.60	m
Depth	3.00	m
Water		
Start Depth of Water	1.50	m
Depth of Water	1.50	m
75% Full	1.88	m
25% Full	2.63	m
75%-25%	0.75	m
Volume of water (75%-25%)	**1.80**	m3
Area of Drainage	**27.60**	m2
Area of Drainage (75%-25%)	**9.30**	m2
Time		
75% Full	N/A	min
25% Full	N/A	min
Time 75% to 25%	**N/A**	min
Time 75% to 25% (sec)	**N/A**	sec



f = **Fail** m/min or **Fail** m/s

SOAKAWAY TEST

Project Reference:	5863
Contract name:	Moygaddy
Location:	Maynooth, Co. Meath
Test No:	TP03
Date:	16/06/2021

Ground Conditions

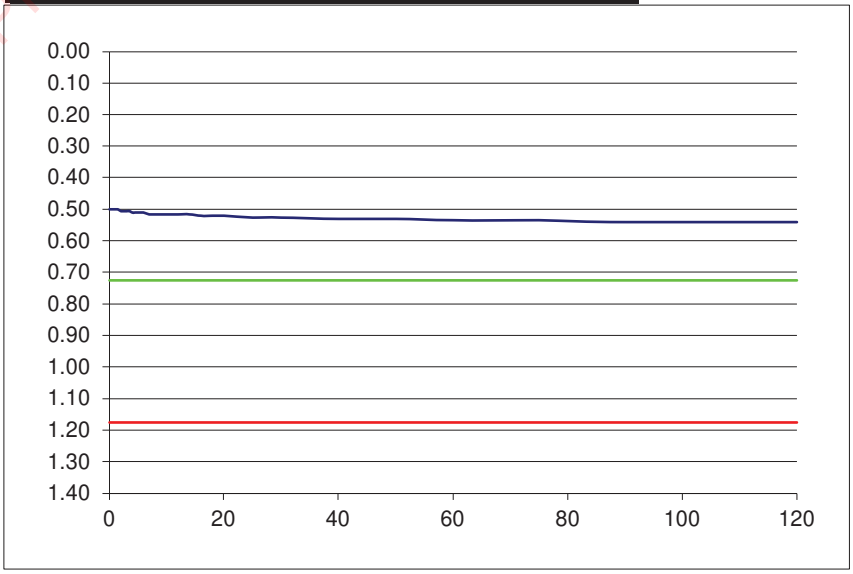
From	To	
0.00	0.10	TOPSOIL.
0.10	0.90	Firm brown slightly sandy slightly gravelly silty CLAY with low cobble and boulder content.
0.90	1.40	Firm brown slightly sandy slightly gravelly silty CLAY with high cobble and medium boulder content.

Remarks:

Obstructions at 1.40mbgl.

Elapsed Time (mins)	Fall of Water (m)
0	0.50
0.5	0.50
1	0.50
1.5	0.50
2	0.51
2.5	0.51
3	0.51
3.5	0.51
4	0.51
4.5	0.51
5	0.51
6	0.51
7	0.52
8	0.52
9	0.52
10	0.52
12	0.52
14	0.52
16	0.52
18	0.52
20	0.52
25	0.53
30	0.53
40	0.53
50	0.53
60	0.54
75	0.54
90	0.54
120	0.54

Pit Dimensions (m)		
Length (m)	4.20	m
Width (m)	0.60	m
Depth	1.40	m
Water		
Start Depth of Water	0.50	m
Depth of Water	0.90	m
75% Full	0.73	m
25% Full	1.18	m
75%-25%	0.45	m
Volume of water (75%-25%)	**1.13**	m3
Area of Drainage	**13.44**	m2
Area of Drainage (75%-25%)	**6.84**	m2
Time		
75% Full	N/A	min
25% Full	N/A	min
Time 75% to 25%	**N/A**	min
Time 75% to 25% (sec)	**N/A**	sec



f = **Fail** m/min or **Fail** m/s

SOAKAWAY TEST

Project Reference:	5863
Contract name:	Moygaddy
Location:	Maynooth, Co. Meath
Test No:	TP04
Date:	17/06/2021

Ground Conditions

From	To	
0.00	0.10	TOPSOIL.
0.10	0.50	Soft brown slightly sandy slightly gravelly silty CLAY with medium cobble content.
0.50	2.30	Firm grey brown slightly sandy slightly gravelly silty CLAY with high cobble and low boulder content.
2.30	2.40	Stiff grey slightly sandy slightly gravelly silty CLAY with high cobble and medium boulder content.

Remarks:

Obstruction at 2.40mbgl.
Water ingress at 2.00mbgl - soils saturated and unsuitable for soakaway design.

Elapsed Time (mins)	Fall of Water (m)
0	-
0.5	-
1	-
1.5	-
2	-
2.5	-
3	-
3.5	-
4	-
4.5	-
5	-
6	-
7	-
8	-
9	-
10	-
12	-
14	-
16	-
18	-
20	-
25	-
30	-
40	-
50	-
60	-
75	-
90	-
120	-

Pit Dimensions (m)		
Length (m)	4.20	m
Width (m)	0.60	m
Depth	2.40	m
Water		
Start Depth of Water	-	m
Depth of Water	-	m
75% Full	-	m
25% Full	-	m
75%-25%	-	m
Volume of water (75%-25%)	**-**	m3
Area of Drainage	**-**	m2
Area of Drainage (75%-25%)	**-**	m2
Time		
75% Full	N/A	min
25% Full	N/A	min
Time 75% to 25%	**N/A**	min
Time 75% to 25% (sec)	**N/A**	sec

f = Fail m/min or **Fail** m/s

SOAKAWAY TEST

Project Reference:	5863
Contract name:	Moygaddy
Location:	Maynooth, Co. Meath
Test No:	TP05
Date:	17/06/2021

Ground Conditions

From	To	
0.00	0.10	TOPSOIL.
0.10	0.60	Soft brown slightly sandy slightly gravelly silty CLAY with medium cobble content.
0.60	1.50	Firm brown slightly sandy slightly gravelly clayey SILT.
1.50	2.40	Firm grey brown slightly sandy slightly gravelly silty CLAY with high cobble and low boulder content.
2.40	2.60	Stiff black slightly sandy slightly gravelly silty CLAY with high cobble and medium boulder content.

Remarks:

Obstruction at 2.60mbgl.
Water ingress at 1.70mbgl - soils saturated and unsuitable for soakaway design.

Elapsed Time (mins)	Fall of Water (m)
0	-
0.5	-
1	-
1.5	-
2	-
2.5	-
3	-
3.5	-
4	-
4.5	-
5	-
6	-
7	-
8	-
9	-
10	-
12	-
14	-
16	-
18	-
20	-
25	-
30	-
40	-
50	-
60	-
75	-
90	-
120	-

Pit Dimensions (m)		
Length (m)	3.90	m
Width (m)	0.60	m
Depth	2.40	m
Water		
Start Depth of Water	-	m
Depth of Water	-	m
75% Full	-	m
25% Full	-	m
75%-25%	-	m
Volume of water (75%-25%)	**-**	m3
Area of Drainage	**-**	m2
Area of Drainage (75%-25%)	**-**	m2
Time		
75% Full	N/A	min
25% Full	N/A	min
Time 75% to 25%	**N/A**	min
Time 75% to 25% (sec)	**N/A**	sec

f = Fail m/min or **Fail** m/s

SOAKAWAY TEST

Project Reference:	5863
Contract name:	Moygaddy
Location:	Maynooth, Co. Meath
Test No:	TP06
Date:	17/06/2021

Ground Conditions

From	To	
0.00	0.10	TOPSOIL.
0.10	0.30	Soft brown slightly sandy slightly gravelly silty CLAY.
0.30	1.30	Firm grey brown slightly sandy slightly gravelly silty CLAY with high cobble and low boulder content.
1.30	2.00	Firm brown slightly sandy slightly gravelly clayey SILT with low cobble
2.00	2.40	Firm grey brown slightly sandy slightly gravelly silty CLAY with high cobble and low boulder content.
2.40	2.50	Stiff black slightly sandy slightly gravelly silty CLAY with high cobble and medium boulder content.

Remarks:

Obstruction at 2.50mbgl.
Water ingress at 2.00mbgl - soils saturated and unsuitable for soakaway design.

Elapsed Time (mins)	Fall of Water (m)
0	-
0.5	-
1	-
1.5	-
2	-
2.5	-
3	-
3.5	-
4	-
4.5	-
5	-
6	-
7	-
8	-
9	-
10	-
12	-
14	-
16	-
18	-
20	-
25	-
30	-
40	-
50	-
60	-
90	-
120	-

Pit Dimensions (m)		
Length (m)	4.40	m
Width (m)	0.60	m
Depth	2.50	m
Water		
Start Depth of Water	-	m
Depth of Water	-	m
75% Full	-	m
25% Full	-	m
75%-25%	-	m
Volume of water (75%-25%)	**-**	m3
Area of Drainage	**-**	m2
Area of Drainage (75%-25%)	**-**	m2
Time		
75% Full	N/A	min
25% Full	N/A	min
Time 75% to 25%	**N/A**	min
Time 75% to 25% (sec)	**N/A**	sec

f = Fail m/min or **Fail** m/s

SOAKAWAY TEST

Project Reference:	5863
Contract name:	Moygaddy
Location:	Maynooth, Co. Meath
Test No:	TP07
Date:	17/06/2021

Ground Conditions

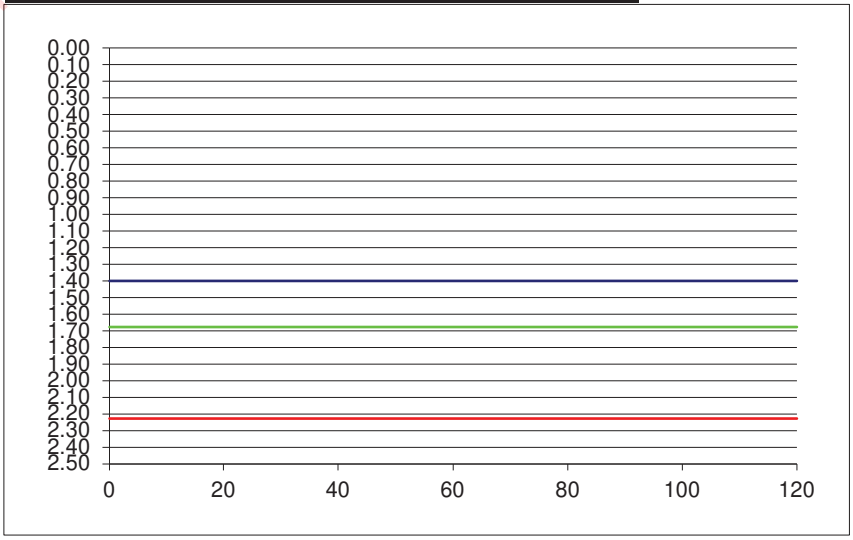
From	To	
0.00	0.10	TOPSOIL.
0.10	0.20	Soft brown slightly sandy slightly gravelly silty CLAY.
0.20	2.40	Firm becoming stiff grey brown slightly sandy slightly gravelly silty CLAY with high cobble and low boulder content.
2.40	2.50	Stiff black slightly sandy slightly gravelly silty CLAY with high cobble and medium boulder content.

Remarks:

Obstructions at 2.50mbgl.

Elapsed Time (mins)	Fall of Water (m)
0	1.40
0.5	1.40
1	1.40
1.5	1.40
2	1.40
2.5	1.40
3	1.40
3.5	1.40
4	1.40
4.5	1.40
5	1.40
6	1.40
7	1.40
8	1.40
9	1.40
10	1.40
12	1.40
14	1.40
16	1.40
18	1.40
20	1.40
25	1.40
30	1.40
40	1.40
50	1.40
60	1.40
75	1.40
90	1.40
120	1.40

Pit Dimensions (m)		
Length (m)	4.20	m
Width (m)	0.60	m
Depth	2.50	m
Water		
Start Depth of Water	1.40	m
Depth of Water	1.10	m
75% Full	1.68	m
25% Full	2.23	m
75%-25%	0.55	m
Volume of water (75%-25%)	**1.39**	m3
Area of Drainage	**24.00**	m2
Area of Drainage (75%-25%)	**7.80**	m2
Time		
75% Full	N/A	min
25% Full	N/A	min
Time 75% to 25%	**N/A**	min
Time 75% to 25% (sec)	**N/A**	sec



f = **Fail** m/min or **Fail** m/s

SOAKAWAY TEST

Project Reference:	5863
Contract name:	Moygaddy
Location:	Maynooth, Co. Meath
Test No:	TP08
Date:	17/06/2021

Ground Conditions

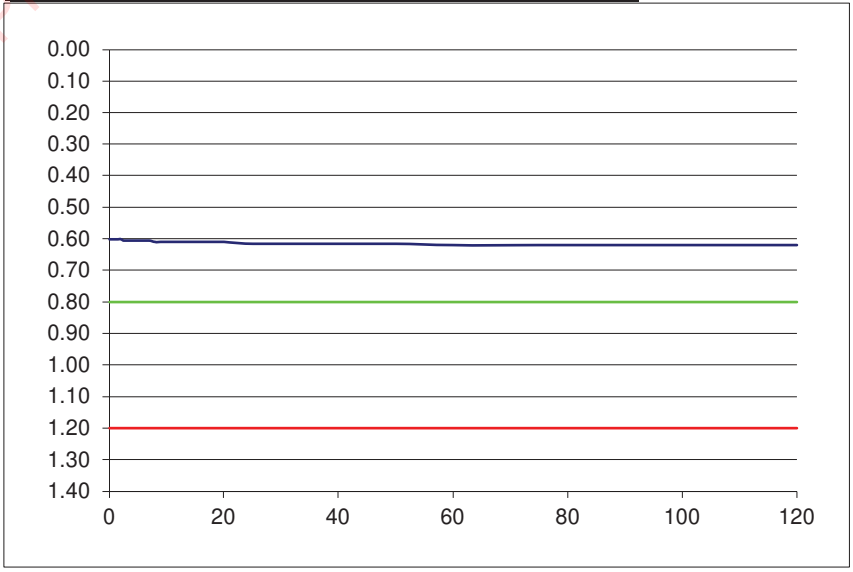
From	To	
0.00	0.10	TOPSOIL.
0.10	0.80	Soft brown slightly sandy slightly gravelly silty CLAY with medium cobble content.
0.80	1.40	Firm grey brown slightly sandy slightly gravelly silty CLAY with high cobble and medium boulder content.

Remarks:

Obstructions at 1.40mbgl.

Elapsed Time (mins)	Fall of Water (m)
0	0.60
0.5	0.60
1	0.60
1.5	0.60
2	0.60
2.5	0.61
3	0.61
3.5	0.61
4	0.61
4.5	0.61
5	0.61
6	0.61
7	0.61
8	0.61
9	0.61
10	0.61
12	0.61
14	0.61
16	0.61
18	0.61
20	0.61
25	0.62
30	0.62
40	0.62
50	0.62
60	0.62
75	0.62
90	0.62
120	0.62

Pit Dimensions (m)		
Length (m)	3.80	m
Width (m)	0.60	m
Depth	1.40	m
Water		
Start Depth of Water	0.60	m
Depth of Water	0.80	m
75% Full	0.80	m
25% Full	1.20	m
75%-25%	0.40	m
Volume of water (75%-25%)	**0.91**	m3
Area of Drainage	**12.32**	m2
Area of Drainage (75%-25%)	**5.80**	m2
Time		
75% Full	N/A	min
25% Full	N/A	min
Time 75% to 25%	**N/A**	min
Time 75% to 25% (sec)	**N/A**	sec



f = **Fail** **m/min** or **Fail** **m/s**

SOAKAWAY TEST

Project Reference:	5863
Contract name:	Moygaddy
Location:	Maynooth, Co. Meath
Test No:	TP09
Date:	17/06/2021

Ground Conditions

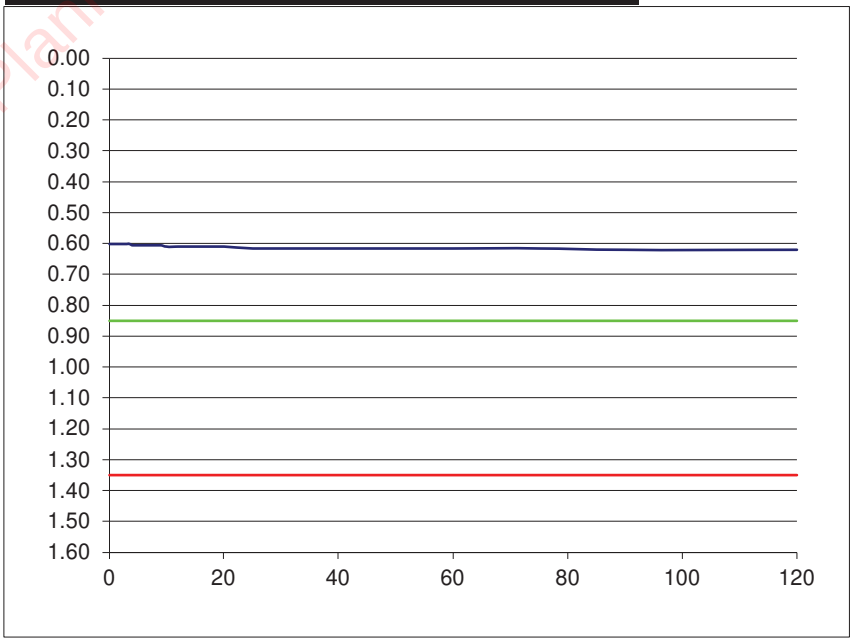
From	To	
0.00	0.10	TOPSOIL.
0.10	1.60	Firm becoming stiff grey brown slightly sandy slightly gravelly silty CLAY with high cobble and low boulder content.

Remarks:

Obstructions at 1.60mbgl.

Elapsed Time (mins)	Fall of Water (m)
0	0.60
0.5	0.60
1	0.60
1.5	0.60
2	0.60
2.5	0.60
3	0.60
3.5	0.60
4	0.61
4.5	0.61
5	0.61
6	0.61
7	0.61
8	0.61
9	0.61
10	0.61
12	0.61
14	0.61
16	0.61
18	0.61
20	0.61
25	0.62
30	0.62
40	0.62
50	0.62
60	0.62
75	0.62
90	0.62
120	0.62

Pit Dimensions (m)		
Length (m)	4.00	m
Width (m)	0.60	m
Depth	1.60	m
Water		
Start Depth of Water	0.60	m
Depth of Water	1.00	m
75% Full	0.85	m
25% Full	1.35	m
75%-25%	0.50	m
Volume of water (75%-25%)	**1.20**	m3
Area of Drainage	**14.72**	m2
Area of Drainage (75%-25%)	**7.00**	m2
Time		
75% Full	N/A	min
25% Full	N/A	min
Time 75% to 25%	**N/A**	min
Time 75% to 25% (sec)	**N/A**	sec



f = **Fail** m/min or **Fail** m/s

SOAKAWAY TEST

Project Reference:	5863
Contract name:	Moygaddy
Location:	Maynooth, Co. Meath
Test No:	TP10
Date:	17/06/2021

Ground Conditions

From	To	
0.00	0.10	TOPSOIL.
0.10	0.40	Soft brown slightly sandy slightly gravelly silty CLAY with medium cobble content.
0.40	2.40	Firm becoming stiff grey brown slightly sandy slightly gravelly silty CLAY with high cobble and medium boulder content.

Remarks:

Obstruction at 2.40mbgl.
Water ingress at 2.10mbgl - soils saturated and unsuitable for soakaway design.

Elapsed Time (mins)	Fall of Water (m)
0	-
0.5	-
1	-
1.5	-
2	-
2.5	-
3	-
3.5	-
4	-
4.5	-
5	-
6	-
7	-
8	-
9	-
10	-
12	-
14	-
16	-
18	-
20	-
25	-
30	-
40	-
50	-
60	-
90	-
120	-

Pit Dimensions (m)		
Length (m)	4.30	m
Width (m)	0.60	m
Depth	2.40	m
Water		
Start Depth of Water	-	m
Depth of Water	-	m
75% Full	-	m
25% Full	-	m
75%-25%	-	m
Volume of water (75%-25%)	**-**	m3
Area of Drainage	**-**	m2
Area of Drainage (75%-25%)	**-**	m2
Time		
75% Full	N/A	min
25% Full	N/A	min
Time 75% to 25%	**N/A**	min
Time 75% to 25% (sec)	**N/A**	sec

f = Fail m/min or **Fail m/s**

SOAKAWAY TEST

Project Reference:	5863
Contract name:	Moygaddy
Location:	Maynooth, Co. Meath
Test No:	TP11
Date:	17/06/2021

Ground Conditions

From	To	
0.00	0.10	TOPSOIL.
0.10	0.50	Soft brown slightly sandy slightly gravelly silty CLAY.
0.50	2.10	Firm becoming stiff grey brown slightly sandy slightly gravelly silty CLAY with high cobble and low boulder content.
2.10	2.30	Stiff grey brown slightly sandy slightly gravelly silty CLAY with high cobble and boulder content.

Remarks:

Obstruction at 2.30mbgl.
Water ingress at 1.80mbgl - soils saturated and unsuitable for soakaway design.

Elapsed Time (mins)	Fall of Water (m)
0	-
0.5	-
1	-
1.5	-
2	-
2.5	-
3	-
3.5	-
4	-
4.5	-
5	-
6	-
7	-
8	-
9	-
10	-
12	-
14	-
16	-
18	-
20	-
25	-
30	-
40	-
50	-
60	-
90	-
120	-

Pit Dimensions (m)		
Length (m)	4.10	m
Width (m)	0.60	m
Depth	2.30	m
Water		
Start Depth of Water	-	m
Depth of Water	-	m
75% Full	-	m
25% Full	-	m
75%-25%	-	m
Volume of water (75%-25%)	**-**	m3
Area of Drainage	**-**	m2
Area of Drainage (75%-25%)	**-**	m2
Time		
75% Full	N/A	min
25% Full	N/A	min
Time 75% to 25%	**N/A**	min
Time 75% to 25% (sec)	**N/A**	sec

f = Fail m/min or **Fail** m/s

SOAKAWAY TEST

Project Reference:	5863
Contract name:	Moygaddy
Location:	Maynooth, Co. Meath
Test No:	TP12
Date:	17/06/2021

Ground Conditions

From	To	
0.00	0.10	TOPSOIL.
0.10	0.50	Soft brown slightly sandy slightly gravelly silty CLAY with low cobble content.
0.50	1.50	Firm grey brown slightly sandy slightly gravelly silty CLAY with high cobble and low boulder content.
1.50	1.60	Grey brown silty sandy GRAVELwith high cobble and low boulder content.
1.60	2.20	Firm grey brown slightly sandy slightly gravelly silty CLAY with high cobble and low boulder content.
2.20	2.30	Stiff black slightly sandy slightly gravelly silty CLAY with high cobble and medium boulder content.

Remarks:

Obstruction at 2.30mbgl.
Water ingress at 1.50mbgl - soils saturated and unsuitable for soakaway design.

Elapsed Time (mins)	Fall of Water (m)
0	-
0.5	-
1	-
1.5	-
2	-
2.5	-
3	-
3.5	-
4	-
4.5	-
5	-
6	-
7	-
8	-
9	-
10	-
12	-
14	-
16	-
18	-
20	-
25	-
30	-
40	-
50	-
60	-
90	-
120	-

Pit Dimensions (m)		
Length (m)	3.70	m
Width (m)	0.60	m
Depth	2.30	m
Water		
Start Depth of Water	-	m
Depth of Water	-	m
75% Full	-	m
25% Full	-	m
75%-25%	-	m
Volume of water (75%-25%)	**-**	m3
Area of Drainage	**-**	m2
Area of Drainage (75%-25%)	**-**	m2
Time		
75% Full	N/A	min
25% Full	N/A	min
Time 75% to 25%	**N/A**	min
Time 75% to 25% (sec)	**N/A**	sec

f = Fail m/min or **Fail m/s**

SOAKAWAY TEST

Project Reference:	5863
Contract name:	Moygaddy
Location:	Maynooth, Co. Meath
Test No:	TP13
Date:	16/06/2021

Ground Conditions

From	To	
0.00	0.10	TOPSOIL.
0.10	1.20	Soft becoming firm brown slightly sandy slightly gravelly silty CLAY with high
1.20	1.60	Grey brown silty sandy GRAVEL with high cobble and low boulder content.
1.60	2.10	Firm becoming stiff grey brown slightly sandy slightly gravelly silty CLAY with high cobble and low boulder content.

Remarks:

Obstruction at 2.10mbgl.
Water ingress at 1.80mbgl - soils saturated and unsuitable for soakaway design.

Elapsed Time (mins)	Fall of Water (m)
0	-
0.5	-
1	-
1.5	-
2	-
2.5	-
3	-
3.5	-
4	-
4.5	-
5	-
6	-
7	-
8	-
9	-
10	-
12	-
14	-
16	-
18	-
20	-
25	-
30	-
40	-
50	-
60	-
90	-
120	-

Pit Dimensions (m)		
Length (m)	3.90	m
Width (m)	0.60	m
Depth	2.10	m
Water		
Start Depth of Water	-	m
Depth of Water	-	m
75% Full	-	m
25% Full	-	m
75%-25%	-	m
Volume of water (75%-25%)	**-**	m3
Area of Drainage	**-**	m2
Area of Drainage (75%-25%)	**-**	m2
Time		
75% Full	N/A	min
25% Full	N/A	min
Time 75% to 25%	**N/A**	min
Time 75% to 25% (sec)	**N/A**	sec

f = Fail m/min or **Fail m/s**

SOAKAWAY TEST

Project Reference:	5863
Contract name:	Moygaddy
Location:	Maynooth, Co. Meath
Test No:	TP14
Date:	17/06/2021

Ground Conditions

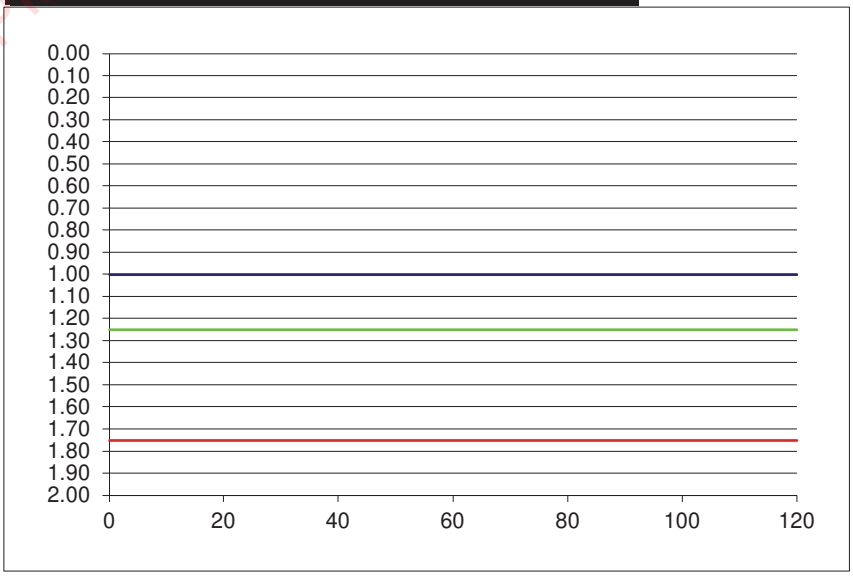
From	To	
0.00	0.10	TOPSOIL.
0.10	1.60	Soft becoming firm brown slightly sandy slightly gravelly silty CLAY with low cobble content.
1.60	2.00	Stiff grey brown slightly sandy slightly gravelly silty CLAY with high cobble and low boulder content.

Remarks:

Obstructions at 2.00mbgl.

Elapsed Time (mins)	Fall of Water (m)
0	1.00
0.5	1.00
1	1.00
1.5	1.00
2	1.00
2.5	1.00
3	1.00
3.5	1.00
4	1.00
4.5	1.00
5	1.00
6	1.00
7	1.00
8	1.00
9	1.00
10	1.00
12	1.00
14	1.00
16	1.00
18	1.00
20	1.00
25	1.00
30	1.00
40	1.00
50	1.00
60	1.00
75	1.00
90	1.00
120	1.00

Pit Dimensions (m)		
Length (m)	3.90	m
Width (m)	0.60	m
Depth	2.00	m
Water		
Start Depth of Water	1.00	m
Depth of Water	1.00	m
75% Full	1.25	m
25% Full	1.75	m
75%-25%	0.50	m
Volume of water (75%-25%)	**1.17**	m3
Area of Drainage	**18.00**	m2
Area of Drainage (75%-25%)	**6.84**	m2
Time		
75% Full	N/A	min
25% Full	N/A	min
Time 75% to 25%	**N/A**	min
Time 75% to 25% (sec)	**N/A**	sec



f = **Fail** m/min or **Fail** m/s

SOAKAWAY TEST

Project Reference:	5863
Contract name:	Moygaddy
Location:	Maynooth, Co. Meath
Test No:	TP15
Date:	16/06/2021

Ground Conditions

From	To	
0.00	0.10	TOPSOIL.
0.10	0.50	Soft brown slightly sandy slightly gravelly silty CLAY with low cobble content.
0.50	1.60	Firm becoming stiff grey brown slightly sandy slightly gravelly silty CLAY with high cobble and low boulder content.

Remarks:

Obstruction at 1.60mbgl.
Water ingress at 1.60mbgl - soils saturated and unsuitable for soakaway design.

Elapsed Time (mins)	Fall of Water (m)
0	-
0.5	-
1	-
1.5	-
2	-
2.5	-
3	-
3.5	-
4	-
4.5	-
5	-
6	-
7	-
8	-
9	-
10	-
12	-
14	-
16	-
18	-
20	-
25	-
30	-
40	-
50	-
60	-
90	-
120	-

Pit Dimensions (m)		
Length (m)	4.20	m
Width (m)	0.60	m
Depth	1.60	m
Water		
Start Depth of Water	-	m
Depth of Water	-	m
75% Full	-	m
25% Full	-	m
75%-25%	-	m
Volume of water (75%-25%)	**-**	m3
Area of Drainage	**-**	m2
Area of Drainage (75%-25%)	**-**	m2
Time		
75% Full	N/A	min
25% Full	N/A	min
Time 75% to 25%	**N/A**	min
Time 75% to 25% (sec)	**N/A**	sec

f = Fail m/min or **Fail** m/s

SOAKAWAY TEST

Project Reference:	5863
Contract name:	Moygaddy
Location:	Maynooth, Co. Meath
Test No:	TP16
Date:	17/06/2021

Ground Conditions

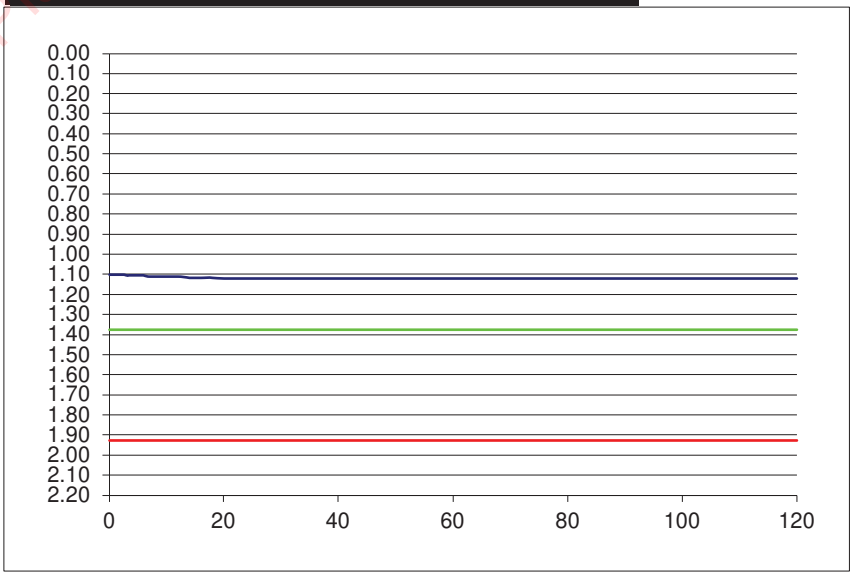
From	To	
0.00	0.10	TOPSOIL.
0.10	2.10	Firm becoming stiff grey brown slightly sandy slightly gravelly silty CLAY with high cobble and low boulder content.
2.10	2.20	Stiff black slightly sandy slightly gravelly silty CLAY with high cobble and medium boulder content.

Remarks:

Obstructions at 2.20mbgl.

Elapsed Time (mins)	Fall of Water (m)
0	1.10
0.5	1.10
1	1.10
1.5	1.10
2	1.10
2.5	1.10
3	1.11
3.5	1.11
4	1.11
4.5	1.11
5	1.11
6	1.11
7	1.11
8	1.11
9	1.11
10	1.11
12	1.11
14	1.12
16	1.12
18	1.12
20	1.12
25	1.12
30	1.12
40	1.12
50	1.12
60	1.12
75	1.12
90	1.12
120	1.12

Pit Dimensions (m)		
Length (m)	4.10	m
Width (m)	0.60	m
Depth	2.20	m
Water		
Start Depth of Water	1.10	m
Depth of Water	1.10	m
75% Full	1.38	m
25% Full	1.93	m
75%-25%	0.55	m
Volume of water (75%-25%)	**1.35**	m3
Area of Drainage	**20.68**	m2
Area of Drainage (75%-25%)	**7.63**	m2
Time		
75% Full	N/A	min
25% Full	N/A	min
Time 75% to 25%	**N/A**	min
Time 75% to 25% (sec)	**N/A**	sec



f = **Fail** m/min or **Fail** m/s

SOAKAWAY TEST

Project Reference:	5863
Contract name:	Moygaddy
Location:	Maynooth, Co. Meath
Test No:	TP17
Date:	16/06/2021

Ground Conditions

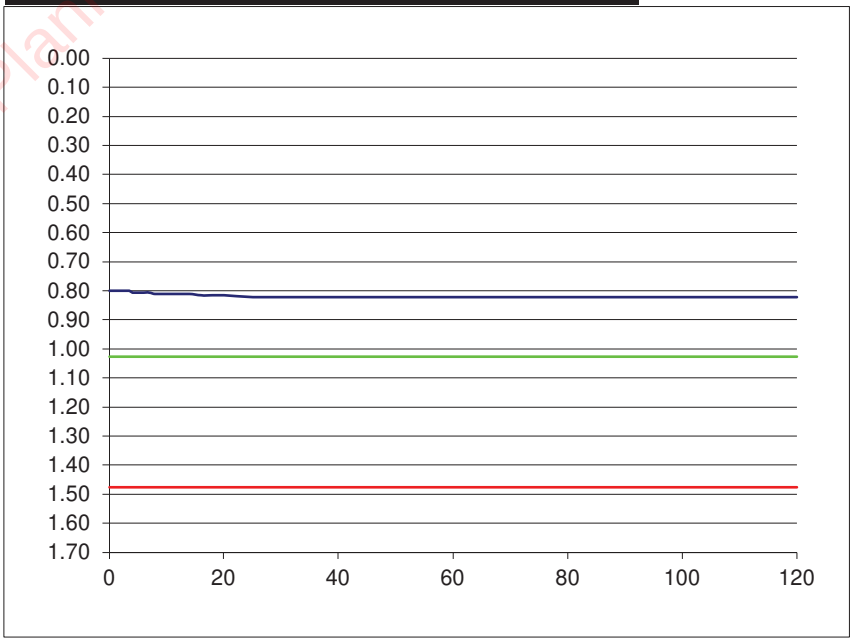
From	To	
0.00	0.10	TOPSOIL.
0.10	1.70	Soft becoming firm brown slightly sandy slightly gravelly silty CLAY with medium cobble content.

Remarks:

Obstructions at 1.70mbgl.

Elapsed Time (mins)	Fall of Water (m)
0	0.80
0.5	0.80
1	0.80
1.5	0.80
2	0.80
2.5	0.80
3	0.80
3.5	0.80
4	0.81
4.5	0.81
5	0.81
6	0.81
7	0.81
8	0.81
9	0.81
10	0.81
12	0.81
14	0.81
16	0.82
18	0.82
20	0.82
25	0.82
30	0.82
40	0.82
50	0.82
60	0.82
75	0.82
90	0.82
120	0.82

Pit Dimensions (m)		
Length (m)	4.20	m
Width (m)	0.60	m
Depth	1.70	m
Water		
Start Depth of Water	0.80	m
Depth of Water	0.90	m
75% Full	1.03	m
25% Full	1.48	m
75%-25%	0.45	m
Volume of water (75%-25%)	**1.13**	m3
Area of Drainage	**16.32**	m2
Area of Drainage (75%-25%)	**6.84**	m2
Time		
75% Full	N/A	min
25% Full	N/A	min
Time 75% to 25%	**N/A**	min
Time 75% to 25% (sec)	**N/A**	sec



f = **Fail** m/min or **Fail** m/s

SOAKAWAY TEST

Project Reference:	5863
Contract name:	Moygaddy
Location:	Maynooth, Co. Meath
Test No:	TP18
Date:	16/06/2021

Ground Conditions

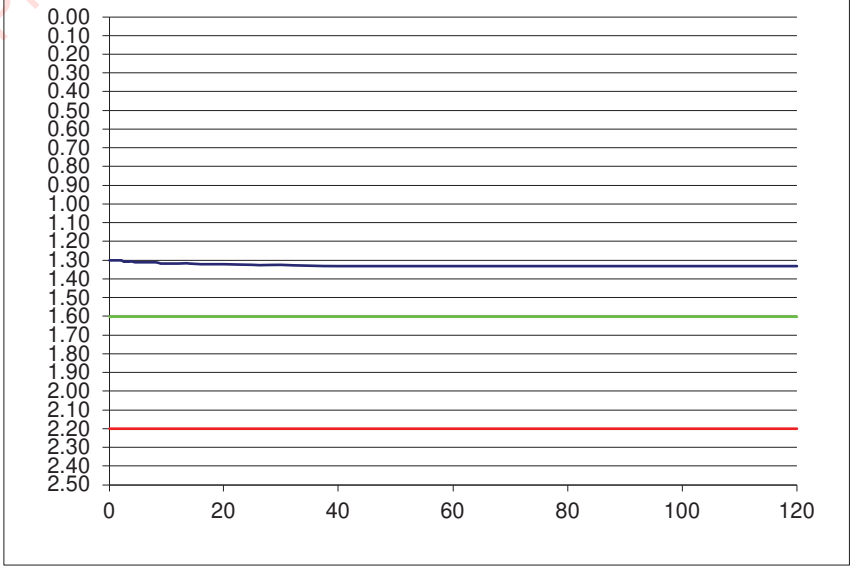
From	To	
0.00	0.10	TOPSOIL.
0.10	1.00	Soft brown slightly sandy slightly gravelly silty CLAY with low cobble content.
1.00	2.50	Firm becoming stiff grey brown slightly sandy slightly gravelly silty CLAY with high cobble and low boulder content.

Remarks:

Obstructions at 2.50mbgl.

Elapsed Time (mins)	Fall of Water (m)
0	1.30
0.5	1.30
1	1.30
1.5	1.30
2	1.30
2.5	1.31
3	1.31
3.5	1.31
4	1.31
4.5	1.31
5	1.31
6	1.31
7	1.31
8	1.31
9	1.32
10	1.32
12	1.32
14	1.32
16	1.32
18	1.32
20	1.32
25	1.33
30	1.33
40	1.33
50	1.33
60	1.33
75	1.33
90	1.33
120	1.33

Pit Dimensions (m)		
Length (m)	4.10	m
Width (m)	0.60	m
Depth	2.50	m
Water		
Start Depth of Water	1.30	m
Depth of Water	1.20	m
75% Full	1.60	m
25% Full	2.20	m
75%-25%	0.60	m
Volume of water (75%-25%)	**1.48**	m3
Area of Drainage	**23.50**	m2
Area of Drainage (75%-25%)	**8.10**	m2
Time		
75% Full	N/A	min
25% Full	N/A	min
Time 75% to 25%	**N/A**	min
Time 75% to 25% (sec)	**N/A**	sec



f = **Fail** m/min or **Fail** m/s

SOAKAWAY TEST

Project Reference:	5863
Contract name:	Moygaddy
Location:	Maynooth, Co. Meath
Test No:	TP19
Date:	16/06/2021

Ground Conditions

From	To	
0.00	0.10	TOPSOIL.
0.10	0.20	Soft brown slightly sandy slightly gravelly silty CLAY with low cobble content.
0.20	1.70	Firm grey brown slightly sandy slightly gravelly silty CLAY with high cobble and medium boulder content.
1.70	1.90	Stiff grey slightly sandy slightly gravelly silty CLAY with high cobble and low boulder content.

Remarks:

Obstruction at 1.90mbgl.
Water ingress at 1.70mbgl - soils saturated and unsuitable for soakaway design.

Elapsed Time (mins)	Fall of Water (m)
0	-
0.5	-
1	-
1.5	-
2	-
2.5	-
3	-
3.5	-
4	-
4.5	-
5	-
6	-
7	-
8	-
9	-
10	-
12	-
14	-
16	-
18	-
20	-
25	-
30	-
40	-
50	-
60	-
90	-
120	-

Pit Dimensions (m)		
Length (m)	4.00	m
Width (m)	0.60	m
Depth	1.90	m
Water		
Start Depth of Water	-	m
Depth of Water	-	m
75% Full	-	m
25% Full	-	m
75%-25%	-	m
Volume of water (75%-25%)	**-**	m3
Area of Drainage	**-**	m2
Area of Drainage (75%-25%)	**-**	m2
Time		
75% Full	N/A	min
25% Full	N/A	min
Time 75% to 25%	**N/A**	min
Time 75% to 25% (sec)	**N/A**	sec

f = Fail m/min or **Fail m/s**

SOAKAWAY TEST

Project Reference:	5863
Contract name:	Moygaddy
Location:	Maynooth, Co. Meath
Test No:	TP20
Date:	16/06/2021

Ground Conditions

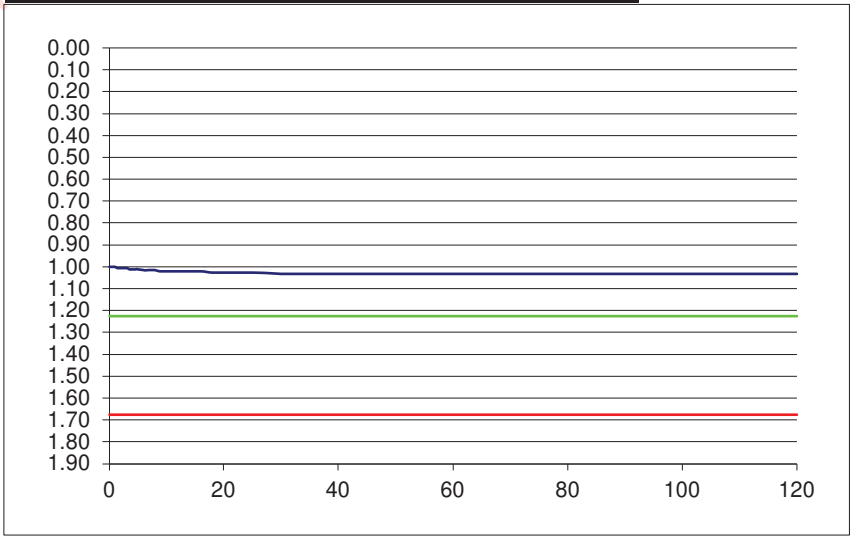
From	To	
0.00	0.10	TOPSOIL.
0.10	0.40	Soft brown slightly sandy slightly gravelly silty CLAY.
0.40	1.30	Firm grey brown slightly sandy slightly gravelly silty CLAY with medium cobble content.
1.30	1.90	Firm becoming stiff grey brown slightly sandy slightly gravelly silty CLAY with high cobble and low boulder content.

Remarks:

Obstructions at 1.90mbgl.

Elapsed Time (mins)	Fall of Water (m)
0	1.00
0.5	1.00
1	1.00
1.5	1.01
2	1.01
2.5	1.01
3	1.01
3.5	1.01
4	1.01
4.5	1.01
5	1.01
6	1.02
7	1.02
8	1.02
9	1.02
10	1.02
12	1.02
14	1.02
16	1.02
18	1.03
20	1.03
25	1.03
30	1.03
40	1.03
50	1.03
60	1.03
75	1.03
90	1.03
120	1.03

Pit Dimensions (m)		
Length (m)	3.90	m
Width (m)	0.60	m
Depth	1.90	m
Water		
Start Depth of Water	1.00	m
Depth of Water	0.90	m
75% Full	1.23	m
25% Full	1.68	m
75%-25%	0.45	m
Volume of water (75%-25%)	**1.05**	m3
Area of Drainage	**17.10**	m2
Area of Drainage (75%-25%)	**6.39**	m2
Time		
75% Full	N/A	min
25% Full	N/A	min
Time 75% to 25%	**N/A**	min
Time 75% to 25% (sec)	**N/A**	sec



f = **Fail** m/min or **Fail** m/s

SOAKAWAY TEST

Project Reference:	5863
Contract name:	Moygaddy
Location:	Maynooth, Co. Meath
Test No:	TP21
Date:	16/06/2021

Ground Conditions

From	To	
0.00	0.10	TOPSOIL.
0.10	1.80	Soft becoming firm brown slightly sandy slightly gravelly silty CLAY with low cobble content.
1.80	2.90	Stiff grey brown slightly sandy slightly gravelly silty CLAY with high cobble and low boulder content.

Remarks:

Obstruction at 2.90mbgl.
Water ingresses at 2.60mbgl and 2.90mbgl - soils saturated and unsuitable for soakaway design.

Elapsed Time (mins)	Fall of Water (m)
0	-
0.5	-
1	-
1.5	-
2	-
2.5	-
3	-
3.5	-
4	-
4.5	-
5	-
6	-
7	-
8	-
9	-
10	-
12	-
14	-
16	-
18	-
20	-
25	-
30	-
40	-
50	-
60	-
90	-
120	-

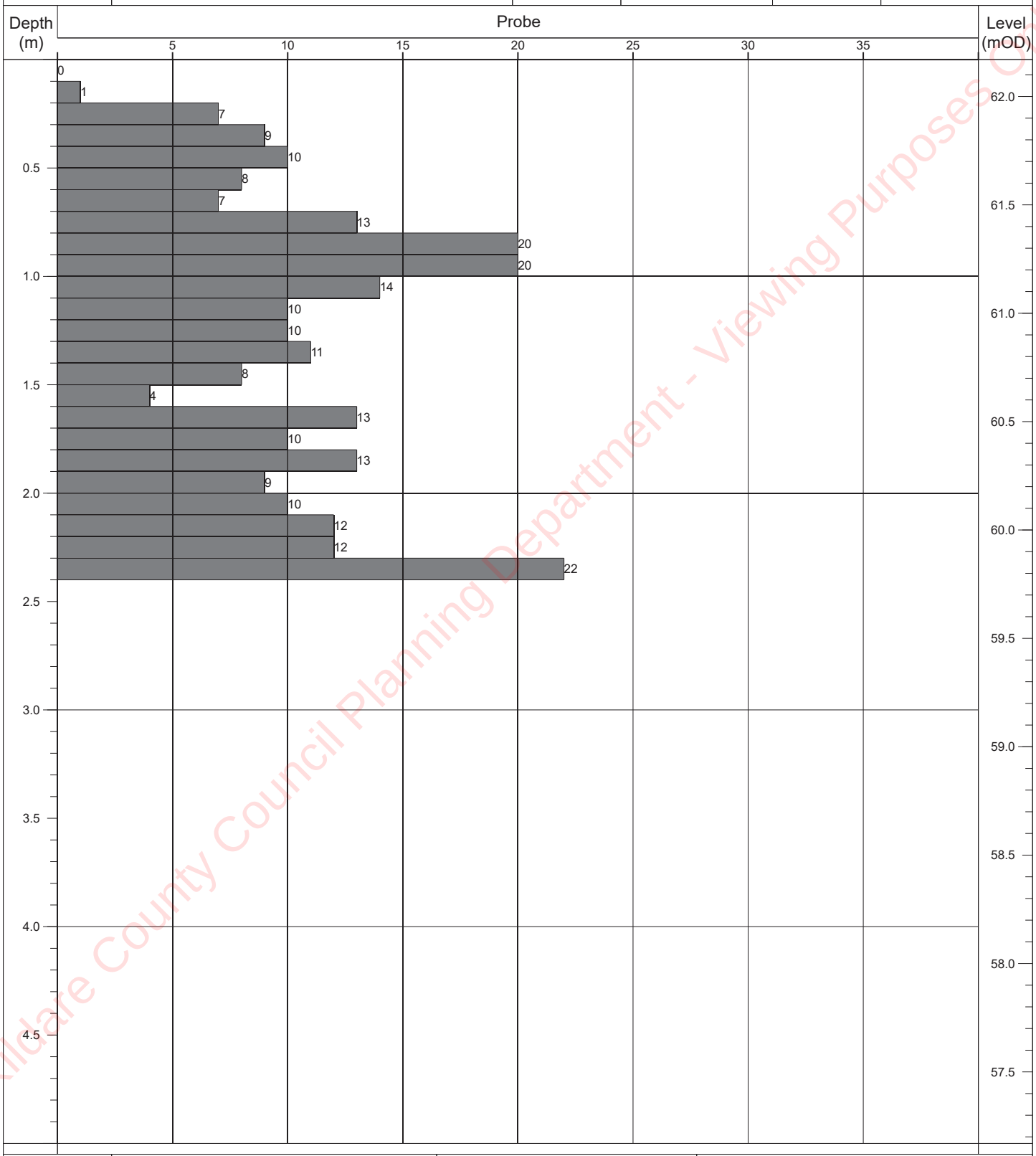
Pit Dimensions (m)		
Length (m)	4.00	m
Width (m)	0.60	m
Depth	2.90	m
Water		
Start Depth of Water	-	m
Depth of Water	-	m
75% Full	-	m
25% Full	-	m
75%-25%	-	m
Volume of water (75%-25%)	**-**	m3
Area of Drainage	**-**	m2
Area of Drainage (75%-25%)	**-**	m2
Time		
75% Full	N/A	min
25% Full	N/A	min
Time 75% to 25%	**N/A**	min
Time 75% to 25% (sec)	**N/A**	sec

f = Fail m/min or **Fail m/s**

Appendix 5

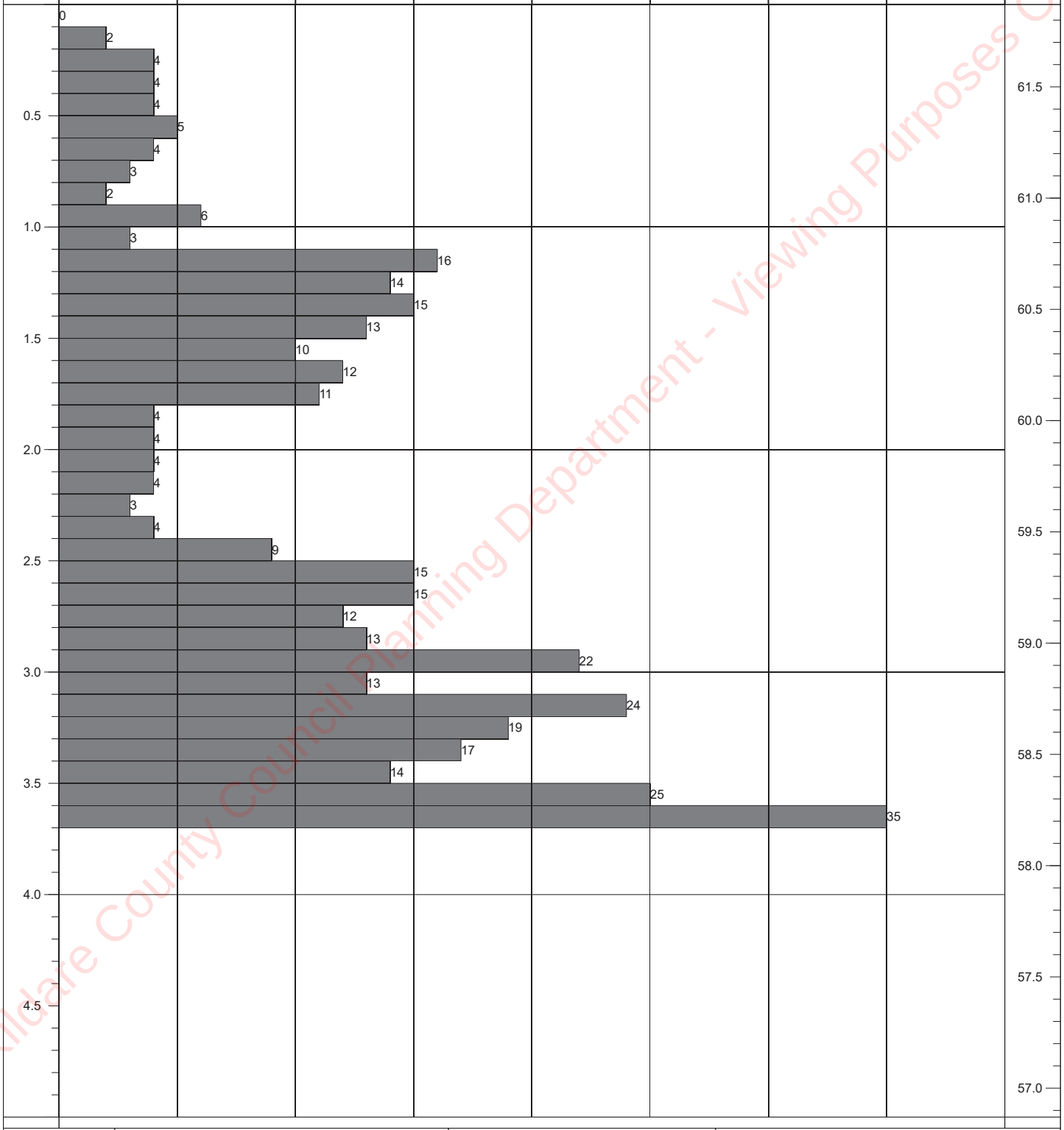
Dynamic Probe Logs

Contract No: 5863	**Dynamic Probe Log**				Probe No: **DP01**
Contract:	Moygaddy	Easting:	694395.693	Date Started:	21/06/2021
Location:	Maynooth, Co. Meath	Northing:	739790.416	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	62.17	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



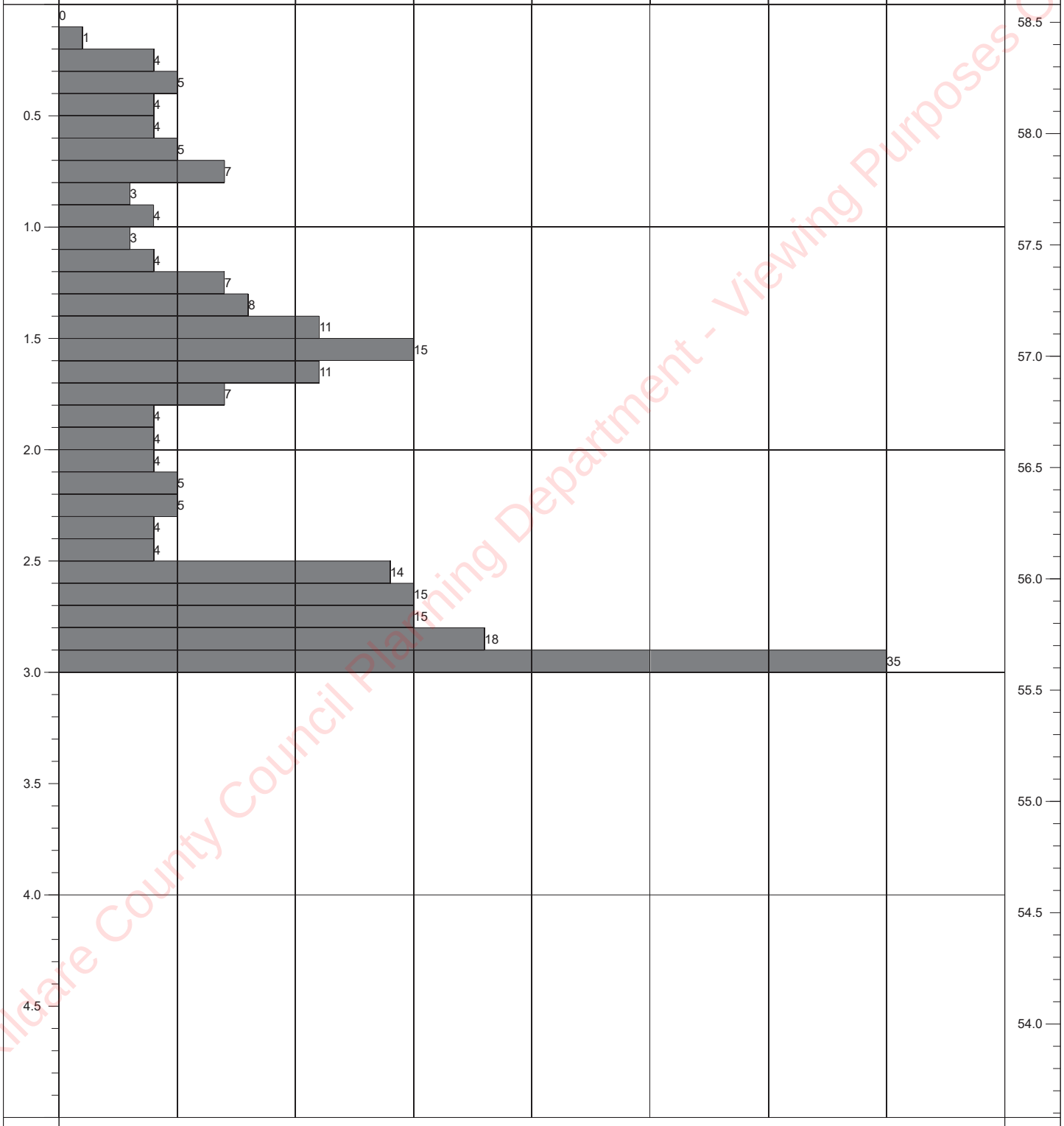
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
2.40m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	**Dynamic Probe Log**				Probe No: **DP02**
Contract:	Moygaddy	Easting:	694488.532	Date Started:	24/06/2021
Location:	Maynooth, Co. Meath	Northing:	739787.664	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	61.87	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



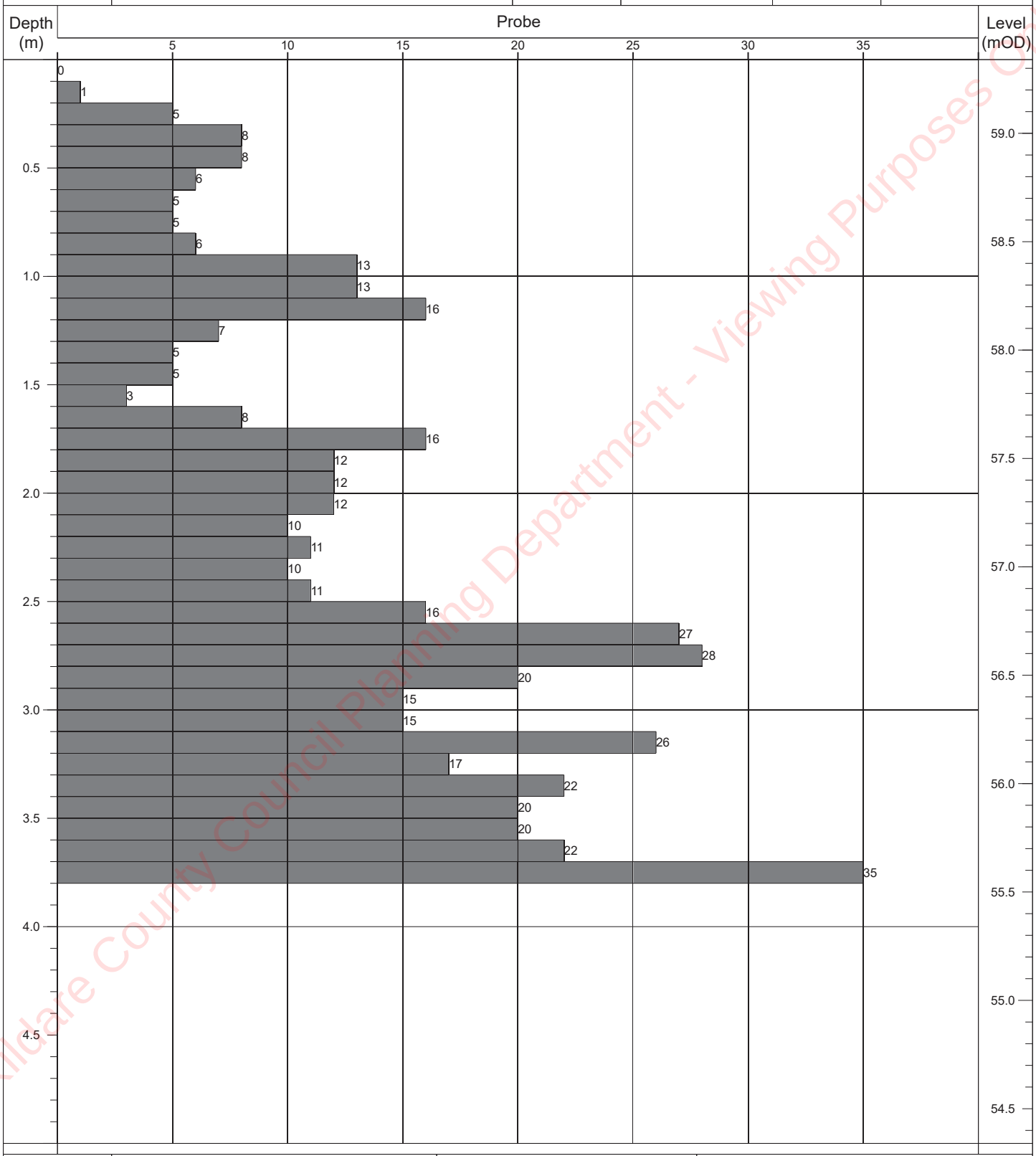
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
3.70m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	**Dynamic Probe Log**				Probe No: **DP03**
Contract:	Moygaddy	Easting:	693987.686	Date Started:	22/06/2021
Location:	Maynooth, Co. Meath	Northing:	739685.908	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	58.58	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



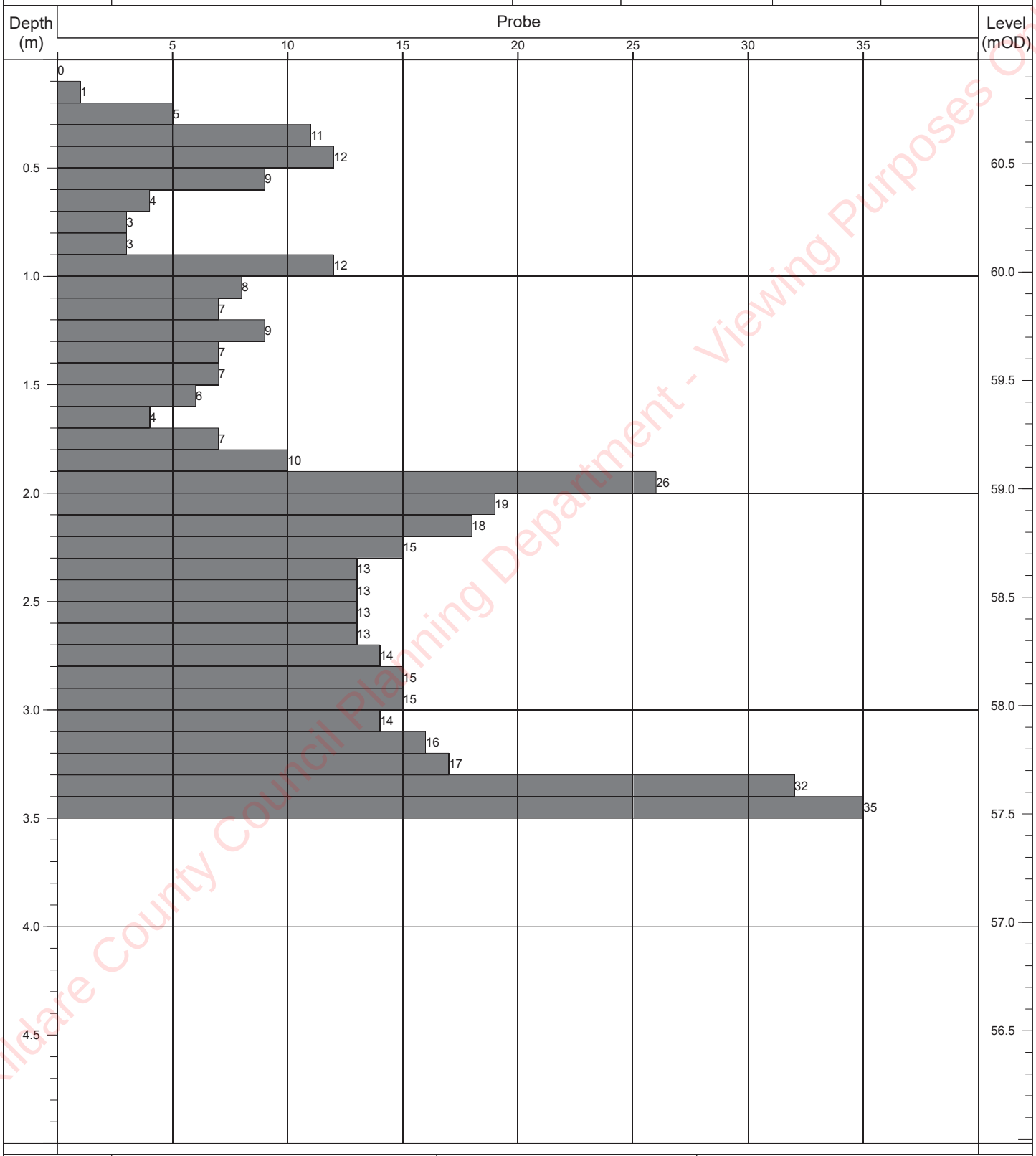
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
3.00m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	**Dynamic Probe Log**				Probe No: **DP04**
Contract:	Moygaddy	Easting:	694088.248	Date Started:	22/06/2021
Location:	Maynooth, Co. Meath	Northing:	739692.829	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	59.34	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



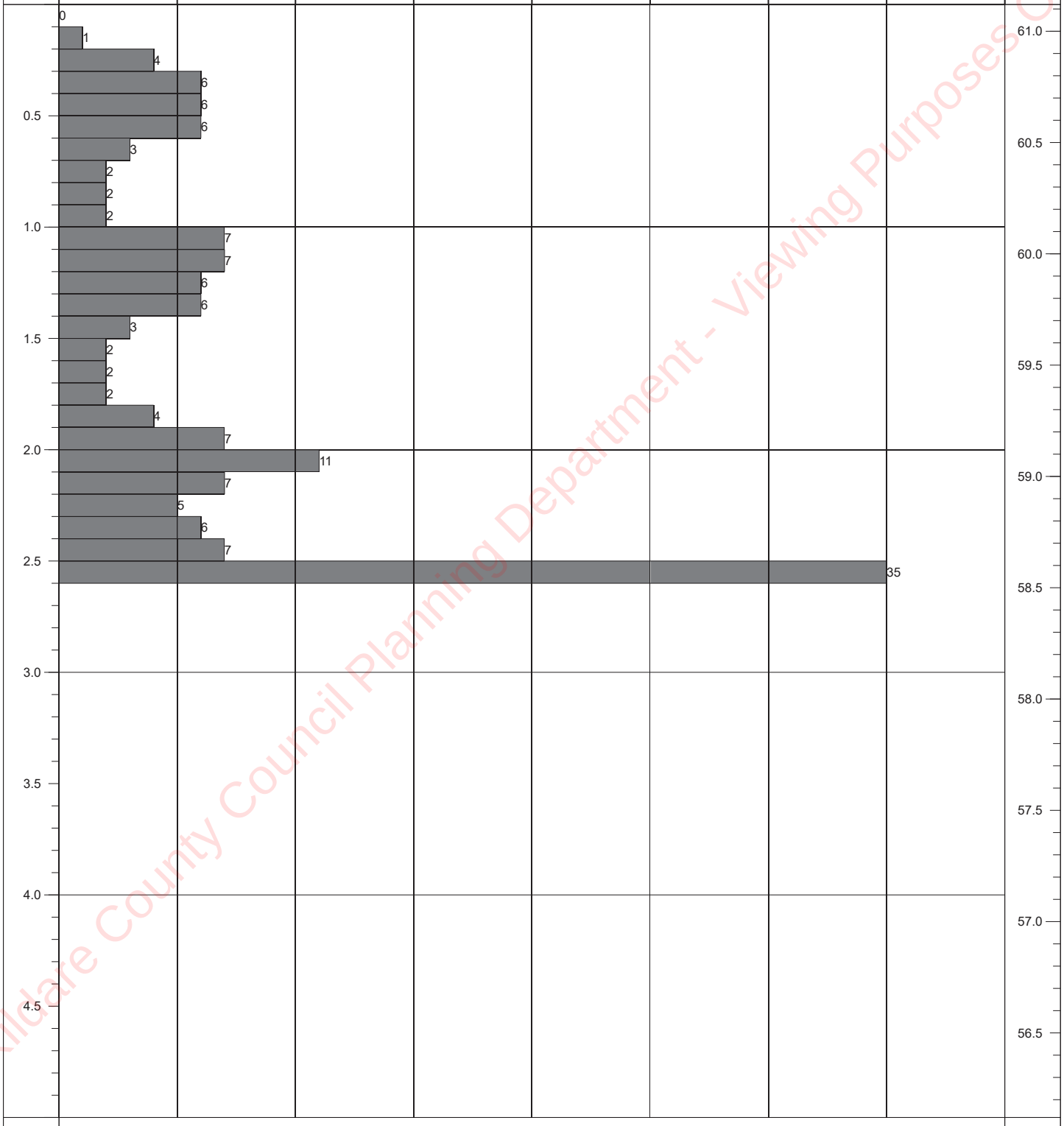
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
3.70m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	**Dynamic Probe Log**				Probe No: **DP05**
Contract:	Moygaddy	Easting:	694187.716	Date Started:	22/06/2021
Location:	Maynooth, Co. Meath	Northing:	739683.631	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	60.98	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



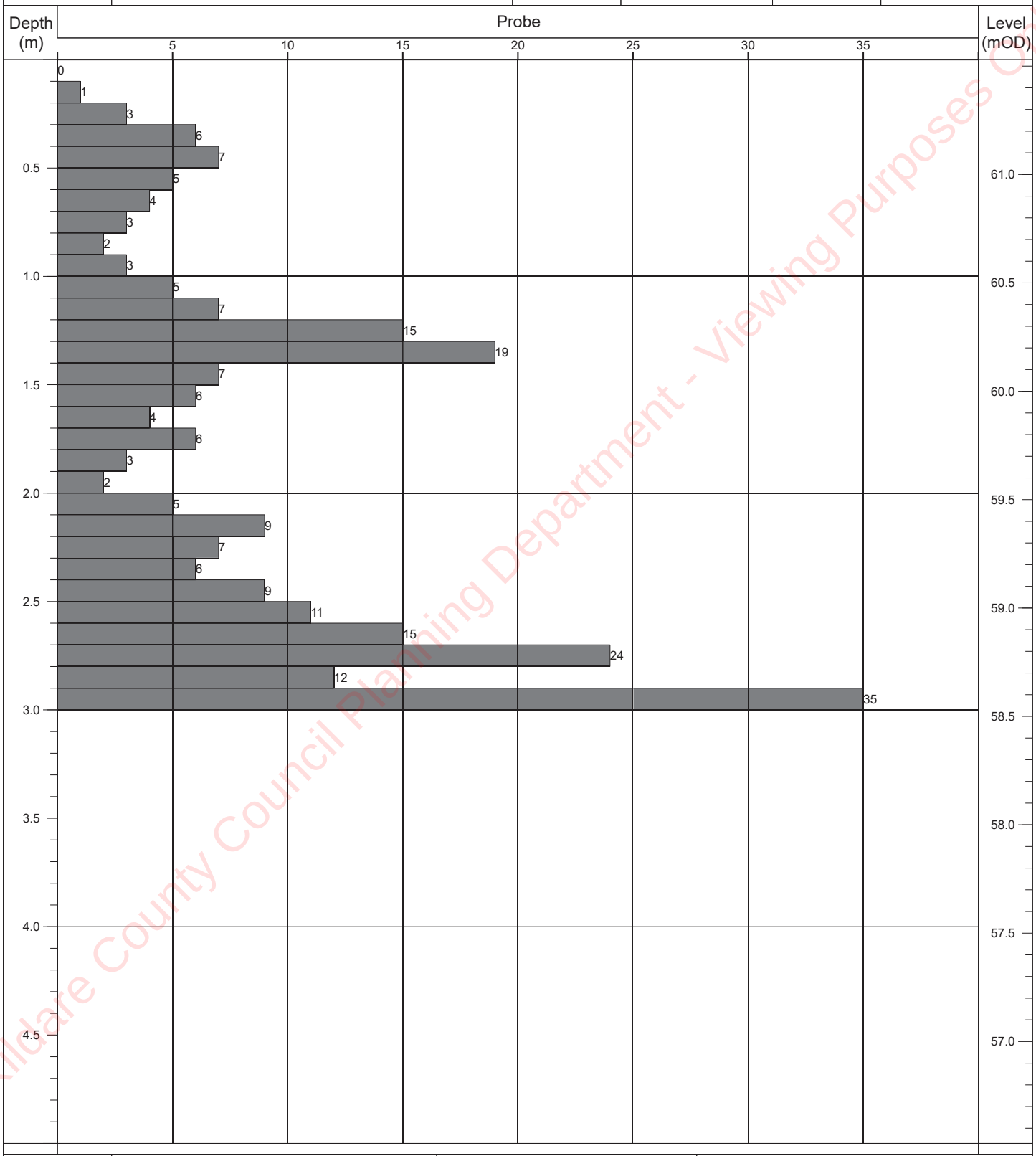
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
3.50m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	**Dynamic Probe Log**				Probe No: **DP06**
Contract:	Moygaddy	Easting:	694288.959	Date Started:	21/06/2021
Location:	Maynooth, Co. Meath	Northing:	739687.709	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	61.12	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



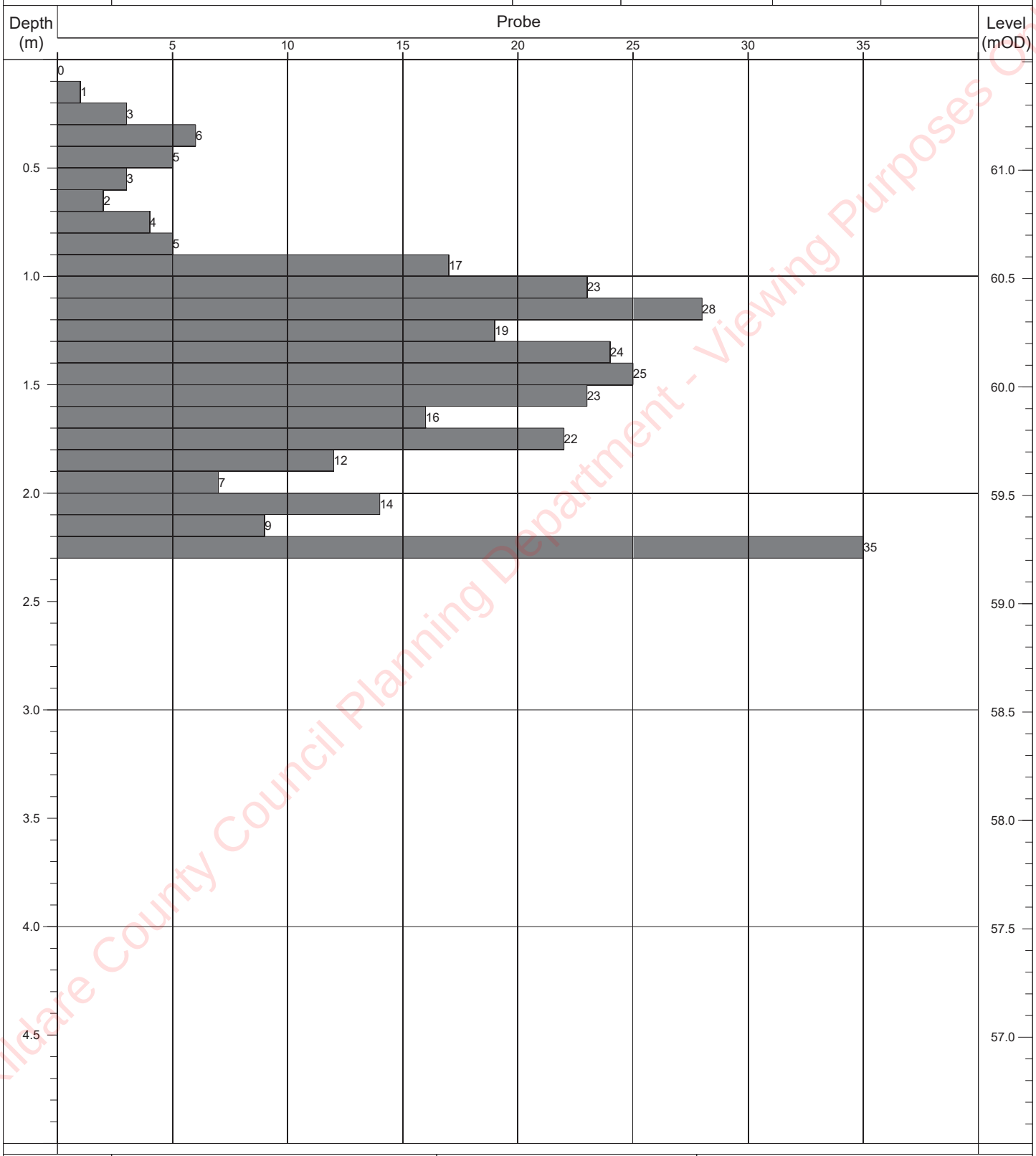
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
2.60m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	**Dynamic Probe Log**				Probe No: **DP07**
Contract:	Moygaddy	Easting:	694385.497	Date Started:	21/06/2021
Location:	Maynooth, Co. Meath	Northing:	739682.425	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	61.53	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



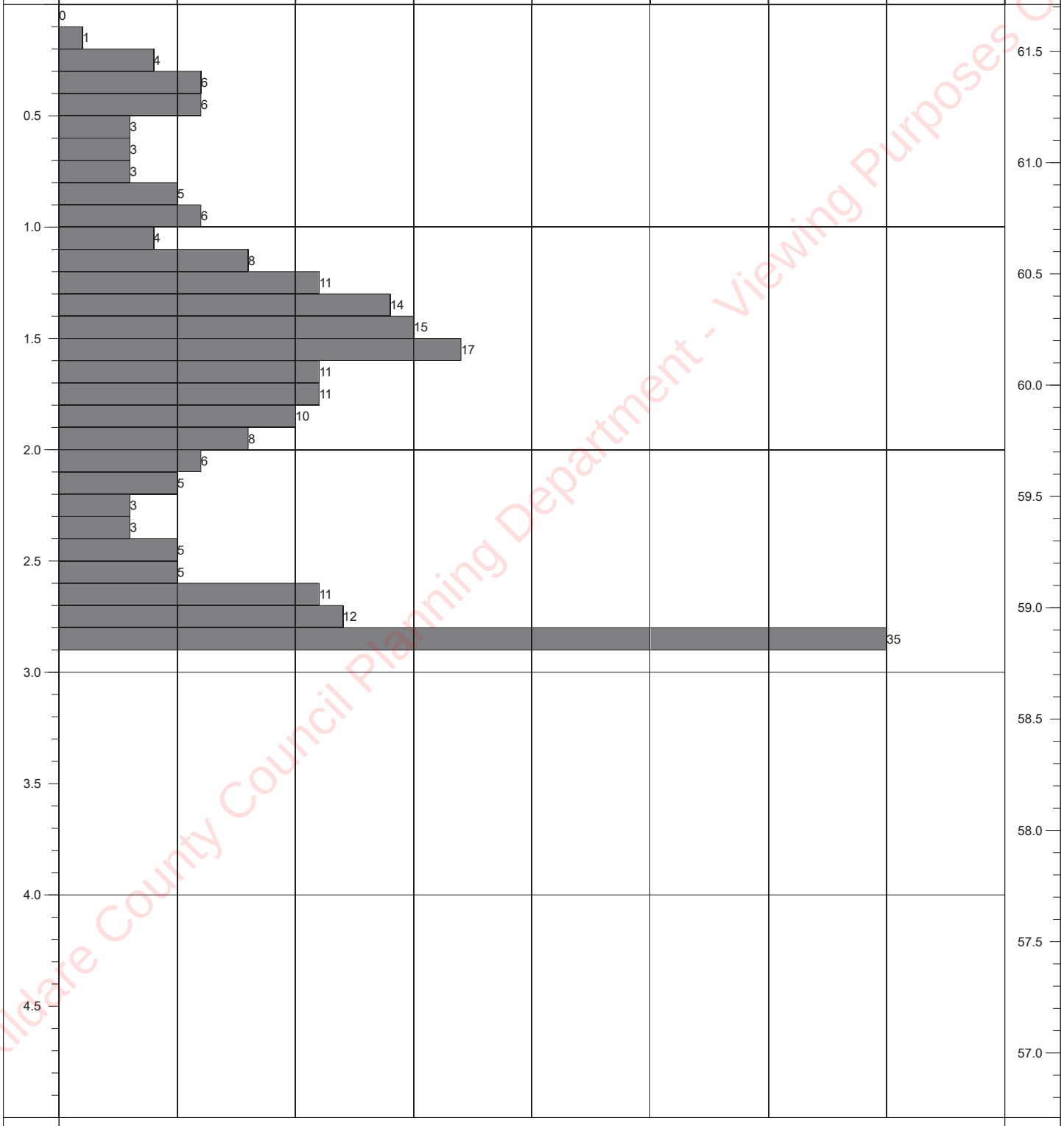
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
3.00m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	**Dynamic Probe Log**				Probe No: **DP08**
Contract:	Moygaddy	Easting:	694489.069	Date Started:	24/06/2021
Location:	Maynooth, Co. Meath	Northing:	739686.527	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	61.51	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



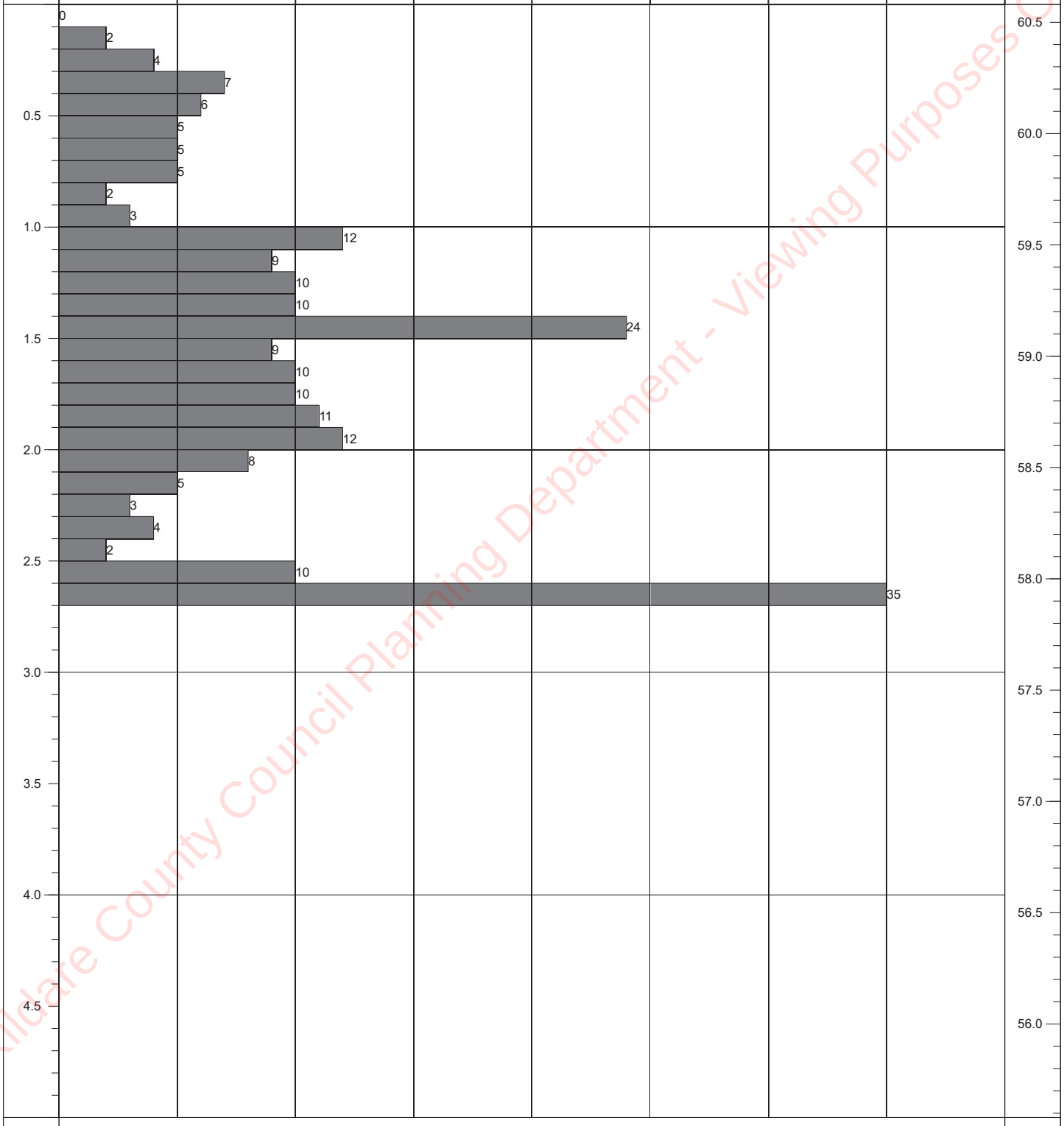
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
2.30m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	**Dynamic Probe Log**				Probe No: **DP09**
Contract:	Moygaddy	Easting:	694590.817	Date Started:	24/06/2021
Location:	Maynooth, Co. Meath	Northing:	739686.475	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	61.71	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



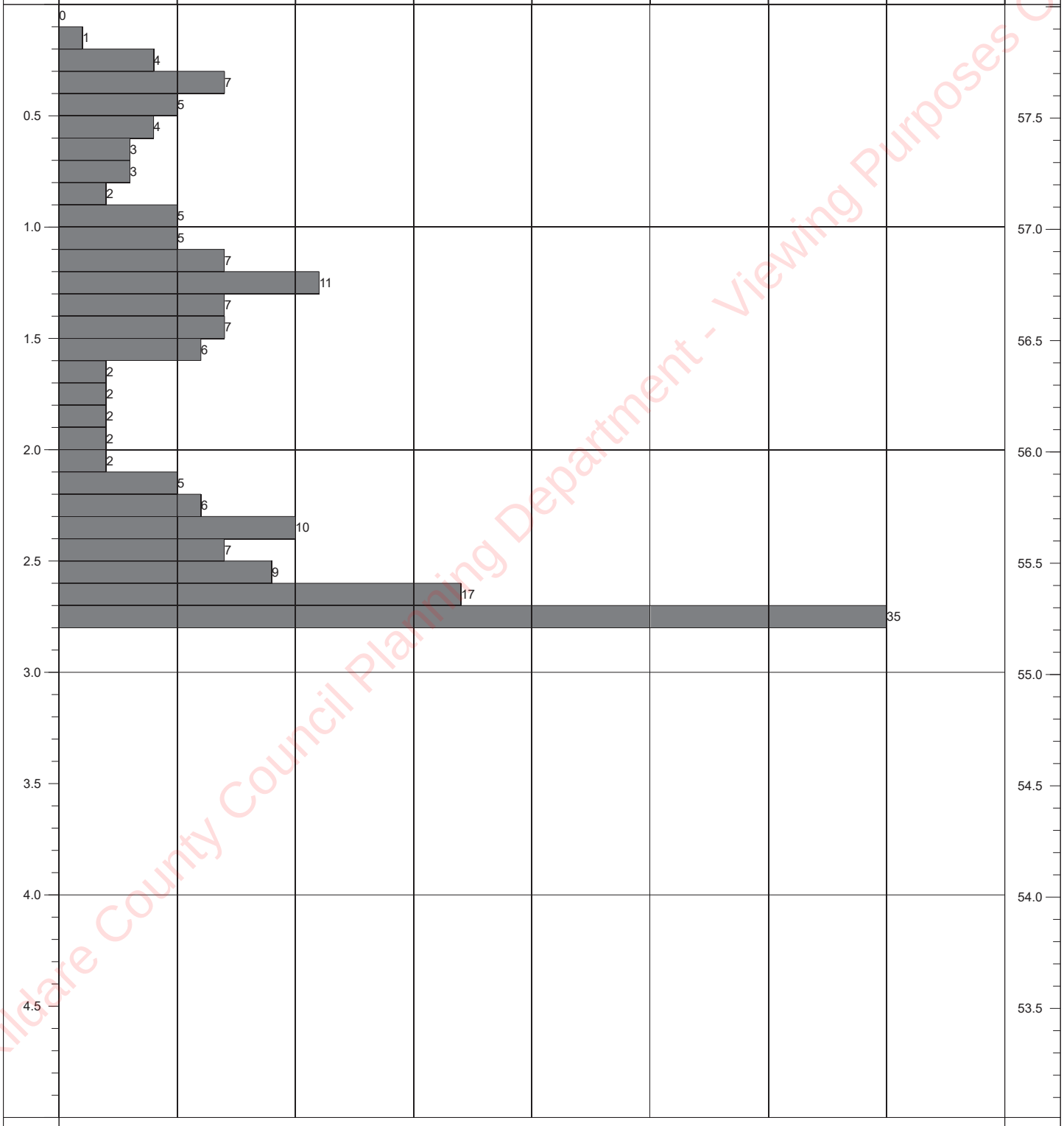
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
2.90m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	**Dynamic Probe Log**				Probe No: **DP10**
Contract:	Moygaddy	Easting:	694693.928	Date Started:	24/06/2021
Location:	Maynooth, Co. Meath	Northing:	739687.423	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	60.58	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



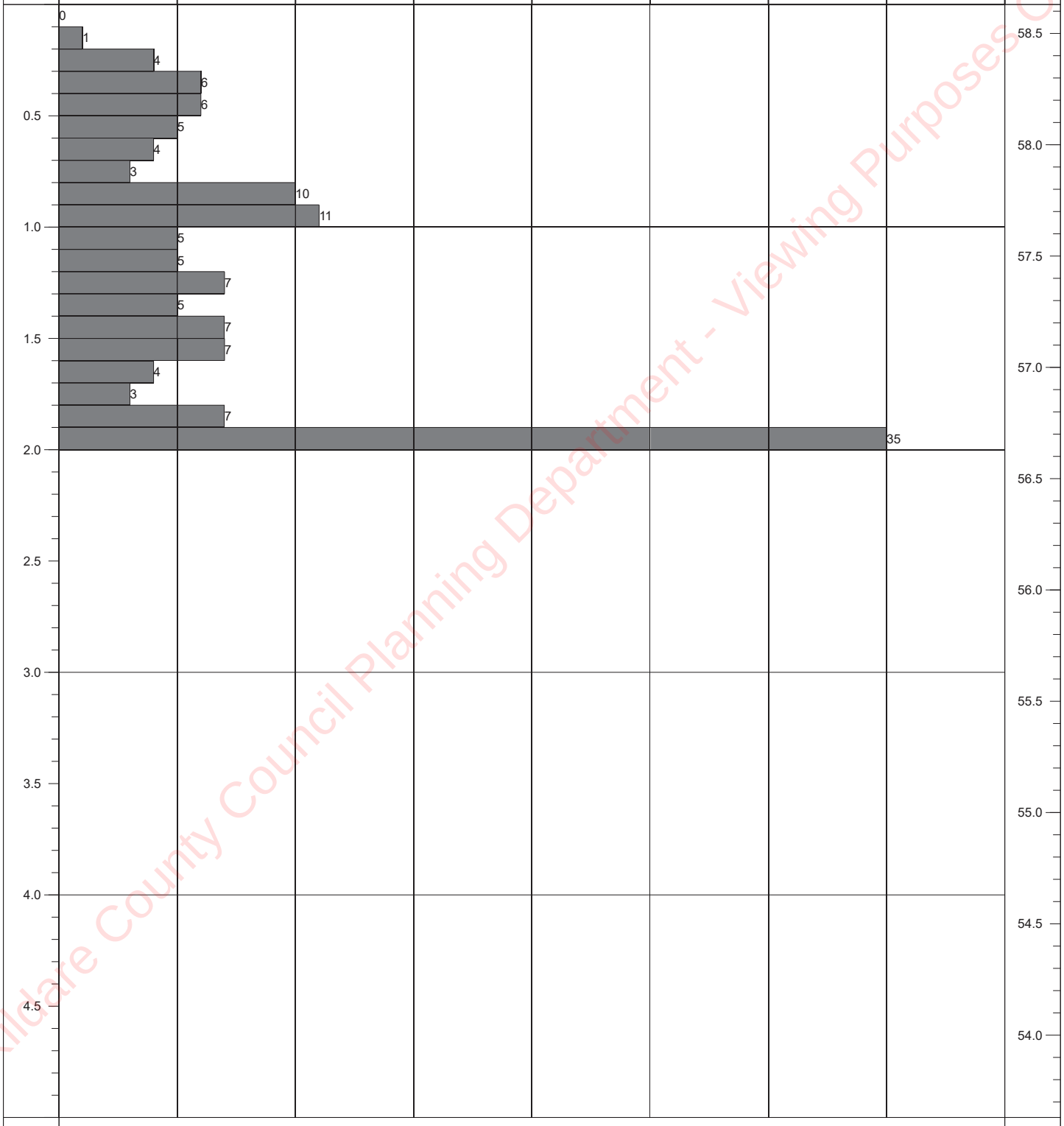
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
2.70m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	**Dynamic Probe Log**				Probe No: **DP11**
Contract:	Moygaddy	Easting:	693887.836	Date Started:	22/06/2021
Location:	Maynooth, Co. Meath	Northing:	739587.012	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	58.01	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



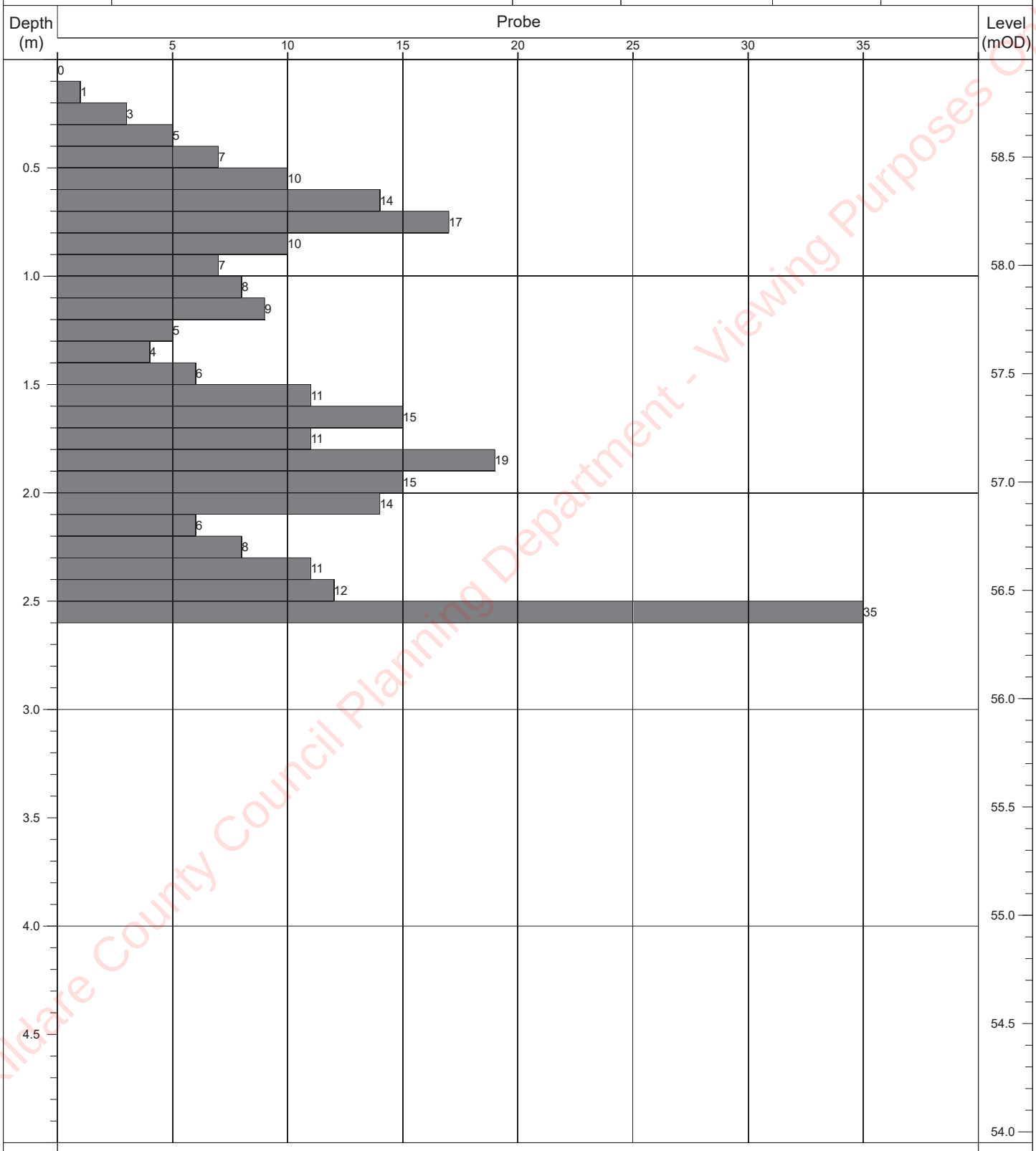
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
2.80m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	**Dynamic Probe Log**				Probe No: **DP12**
Contract:	Moygaddy	Easting:	693990.198	Date Started:	22/06/2021
Location:	Maynooth, Co. Meath	Northing:	739586.789	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	58.63	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



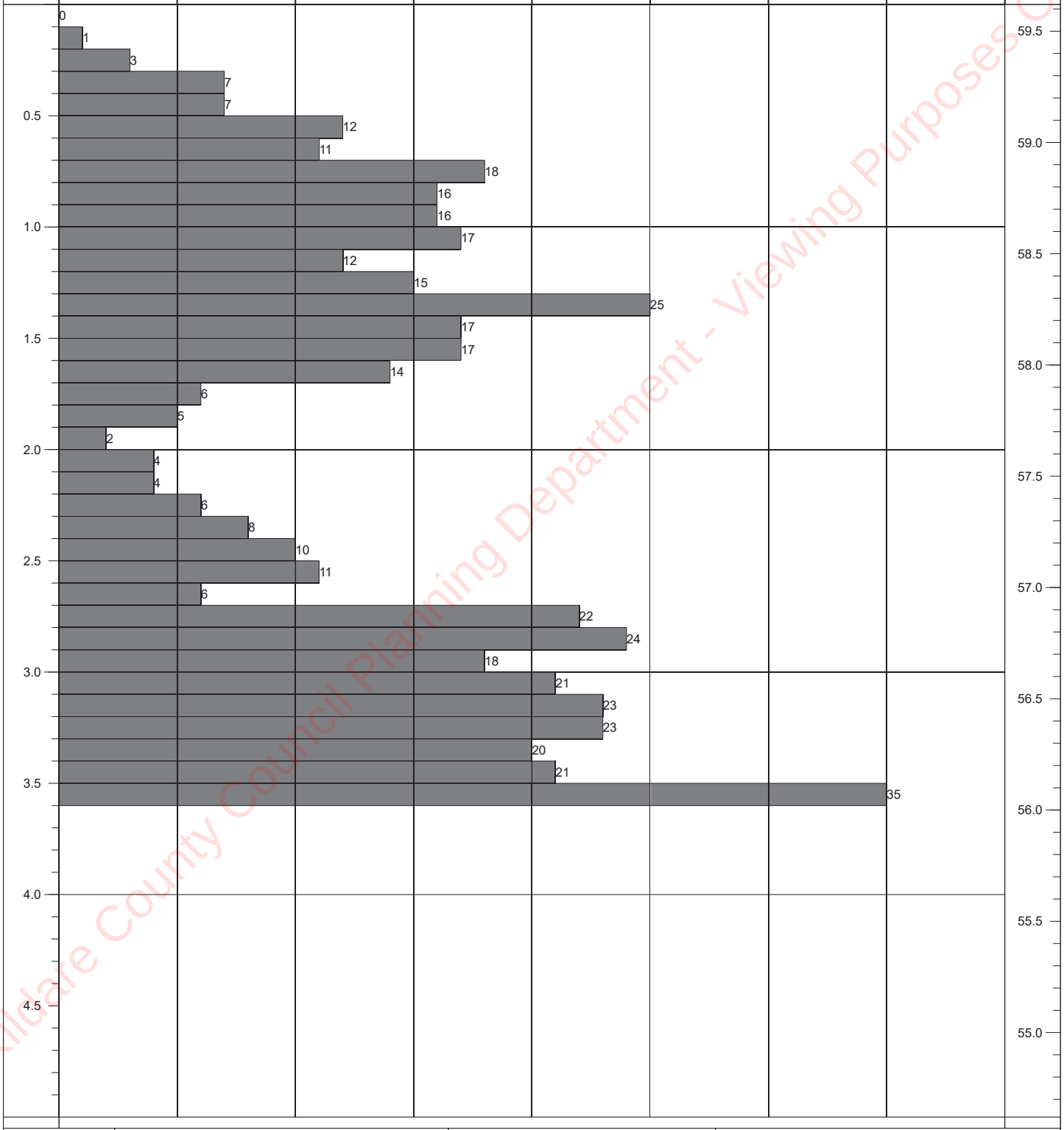
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
2.00m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	**Dynamic Probe Log**				Probe No: **DP13**
Contract:	Moygaddy	Easting:	694087.587	Date Started:	22/06/2021
Location:	Maynooth, Co. Meath	Northing:	739588.545	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	58.95	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



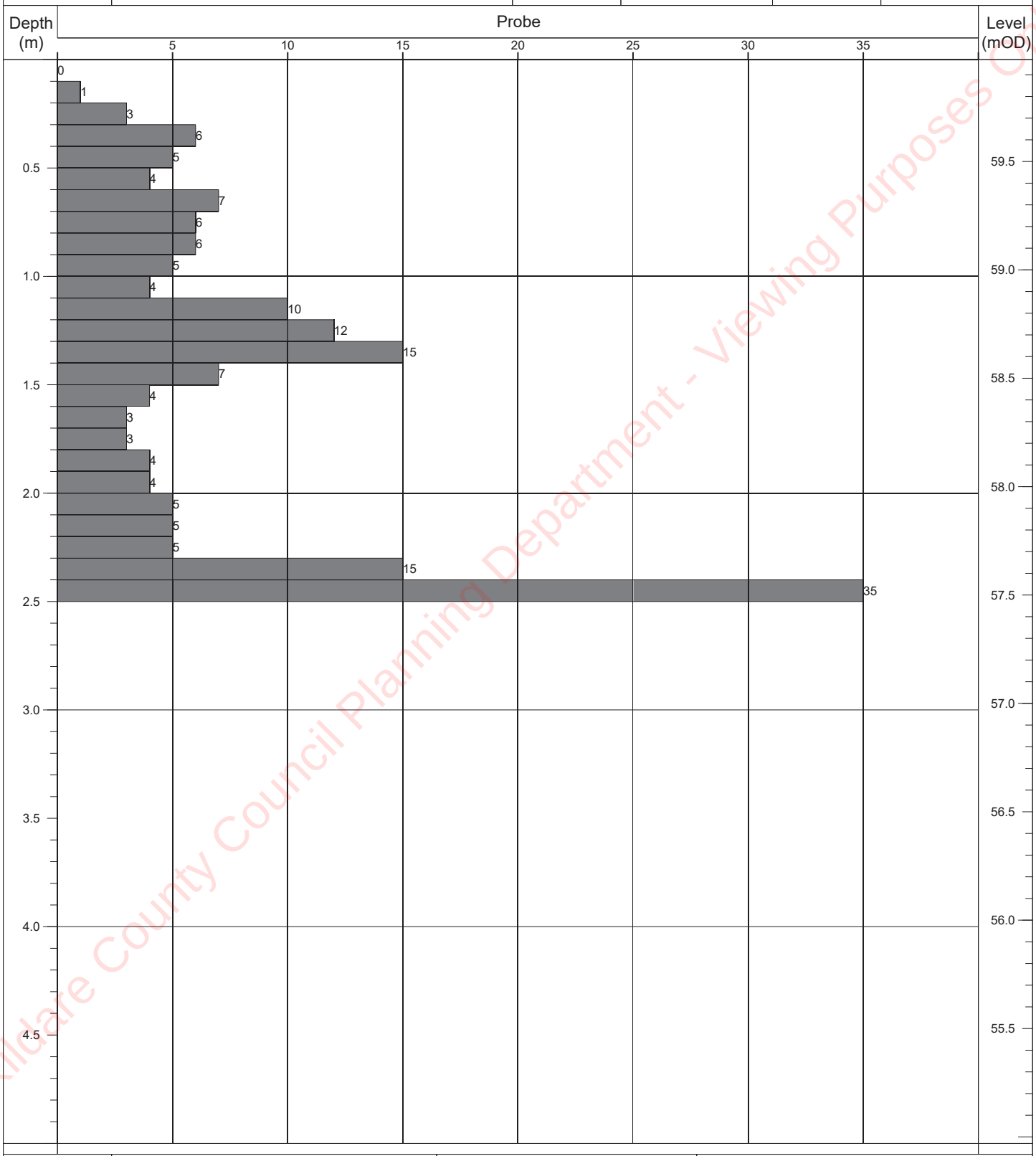
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
2.60m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	Dynamic Probe Log				Probe No: DP14
Contract:	Moygaddy	Easting:	694188.942	Date Started:	22/06/2021
Location:	Maynooth, Co. Meath	Northing:	739587.683	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	59.62	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



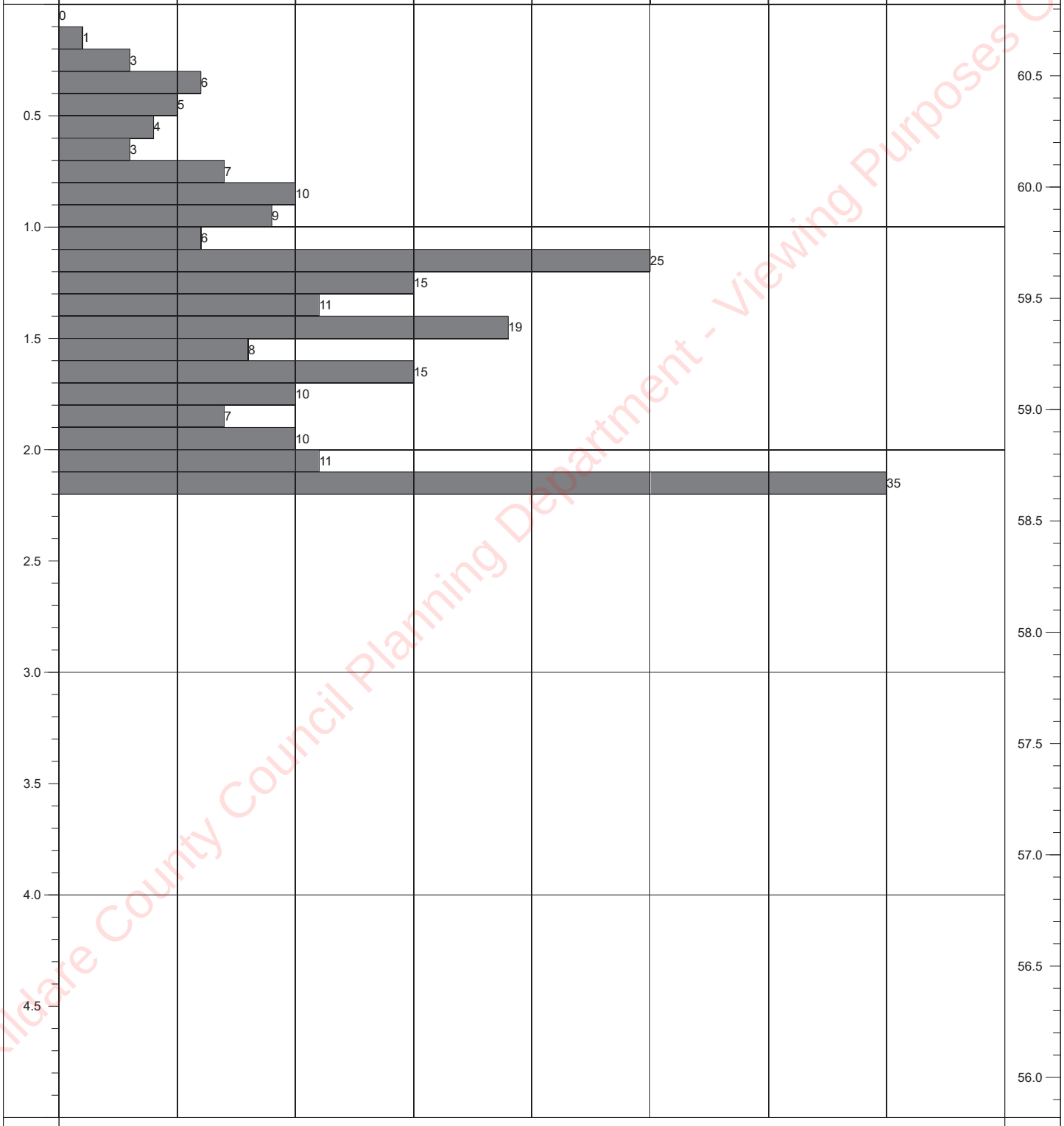
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
3.60m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	**Dynamic Probe Log**				Probe No: **DP15**
Contract:	Moygaddy	Easting:	694289.424	Date Started:	22/06/2021
Location:	Maynooth, Co. Meath	Northing:	739586.183	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	59.97	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



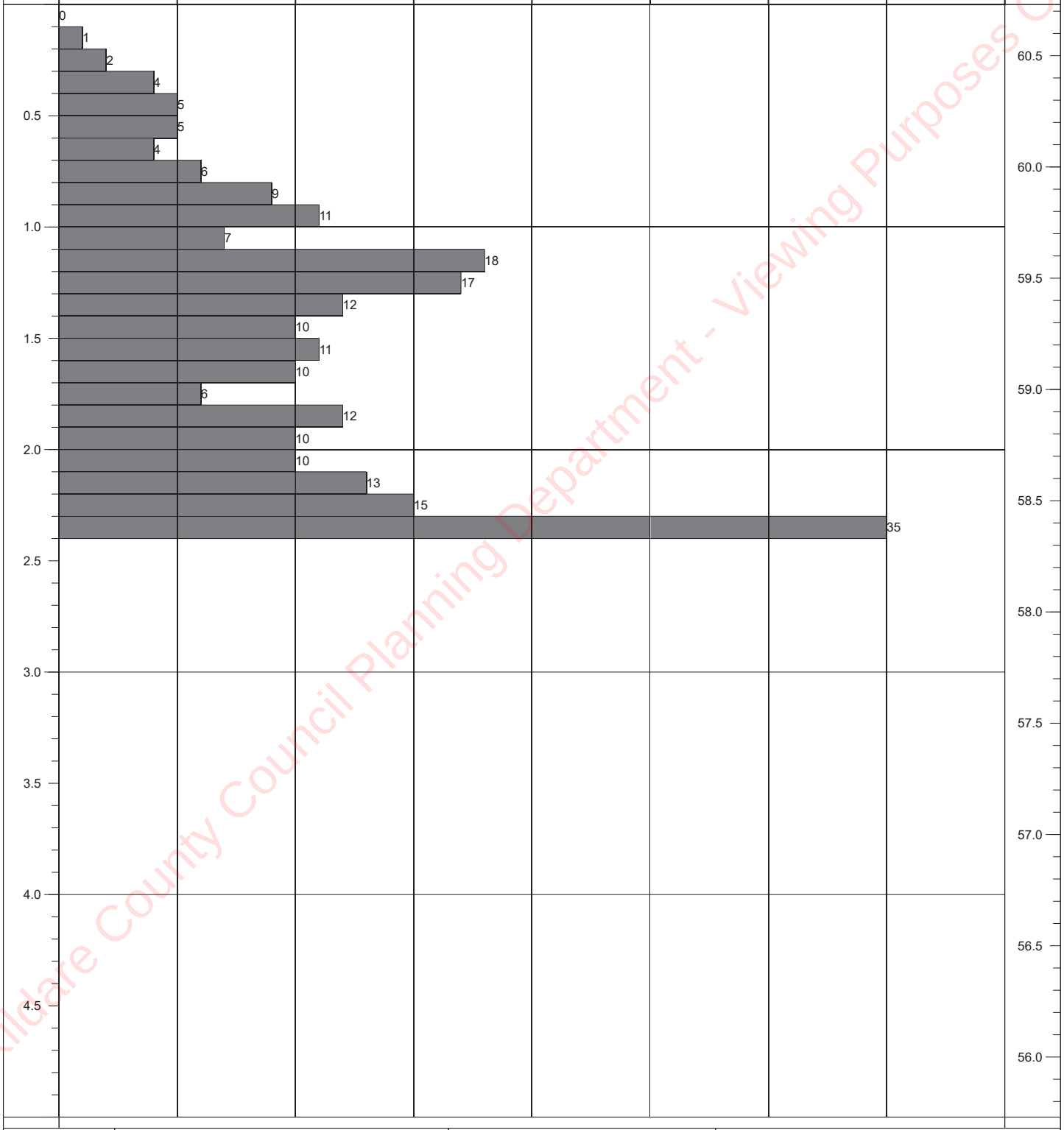
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
2.50m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	Dynamic Probe Log				Probe No: DP16
Contract:	Moygaddy	Easting:	694488.048	Date Started:	24/06/2021
Location:	Maynooth, Co. Meath	Northing:	739589.540	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	60.82	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



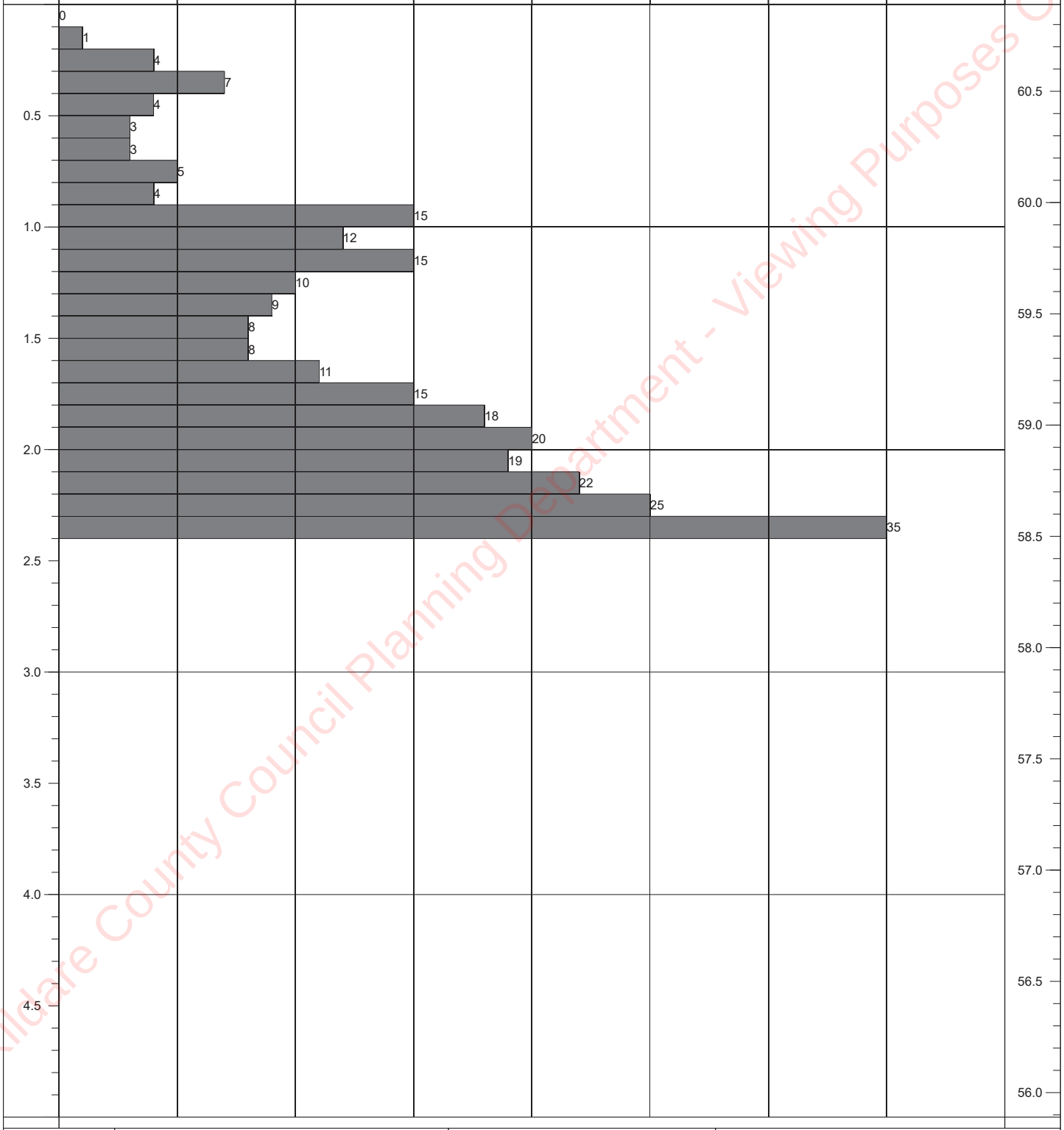
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
2.20m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	**Dynamic Probe Log**				Probe No: **DP17**
Contract:	Moygaddy	Easting:	694589.076	Date Started:	24/06/2021
Location:	Maynooth, Co. Meath	Northing:	739587.354	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	60.73	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



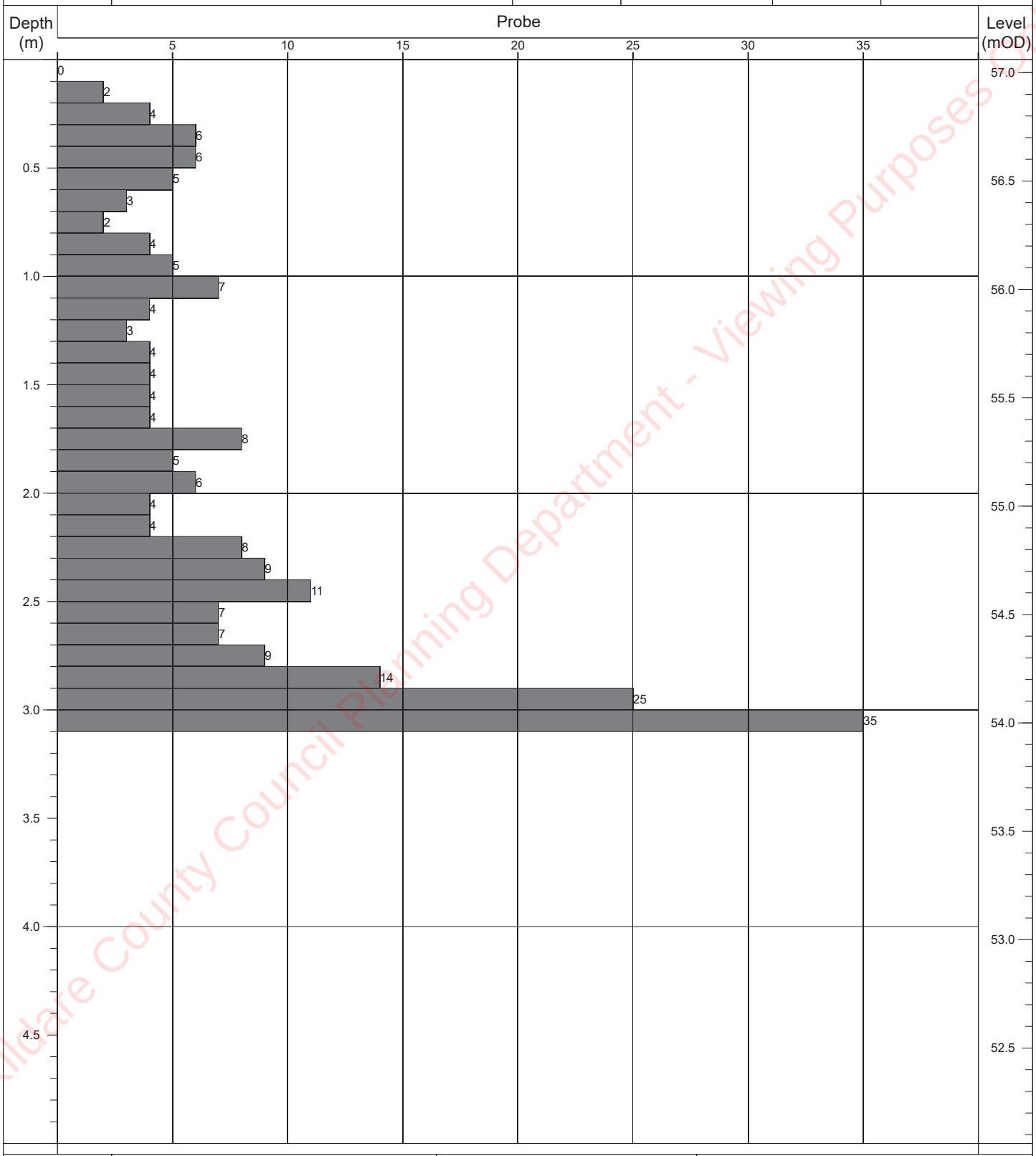
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
2.40m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	**Dynamic Probe Log**				Probe No: **DP18**
Contract:	Moygaddy	Easting:	694688.772	Date Started:	24/06/2021
Location:	Maynooth, Co. Meath	Northing:	739584.729	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	60.89	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



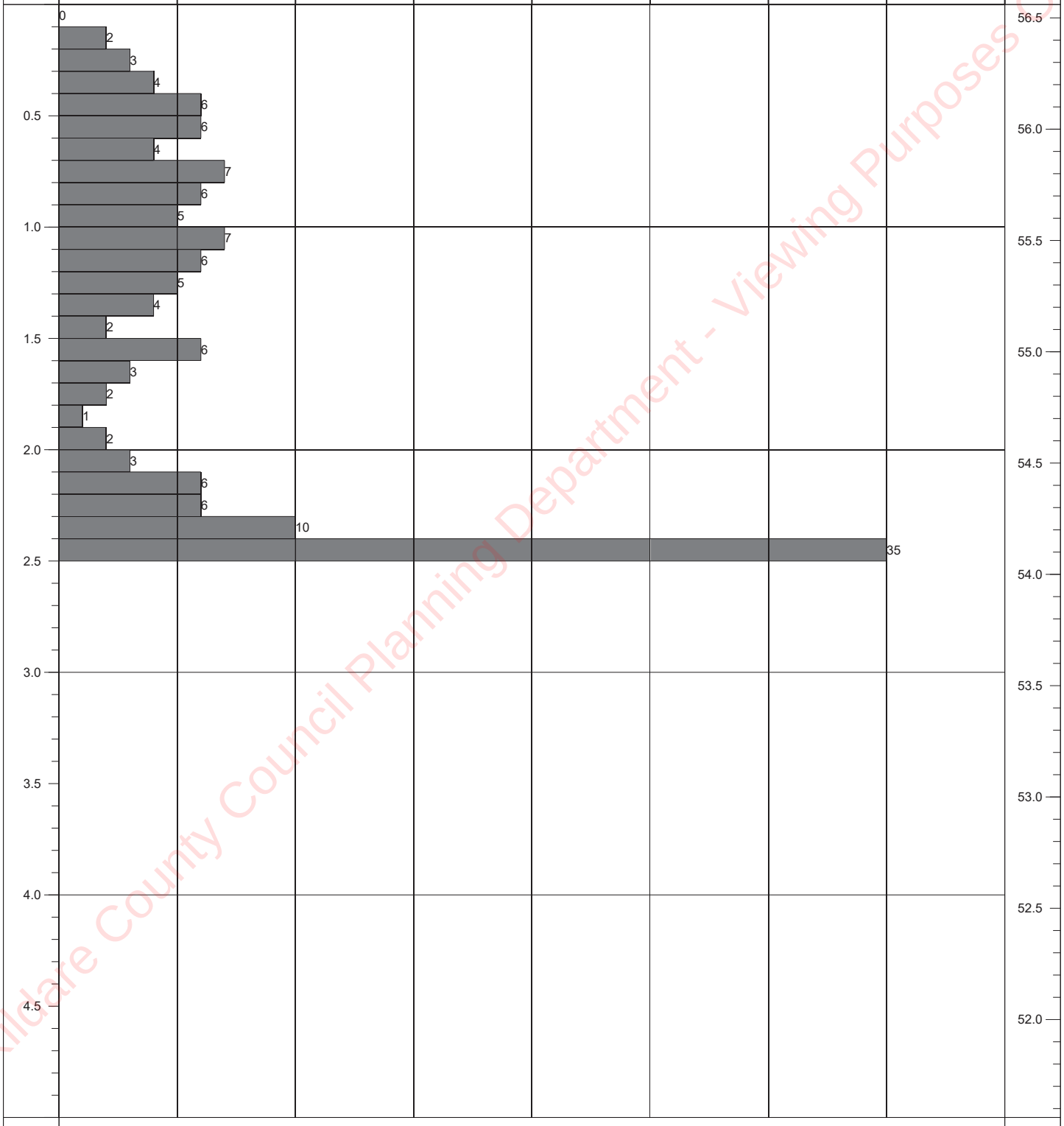
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
2.40m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	**Dynamic Probe Log**				Probe No: **DP19**
Contract:	Moygaddy	Easting:	693691.519	Date Started:	23/06/2021
Location:	Maynooth, Co. Meath	Northing:	739485.259	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	57.06	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



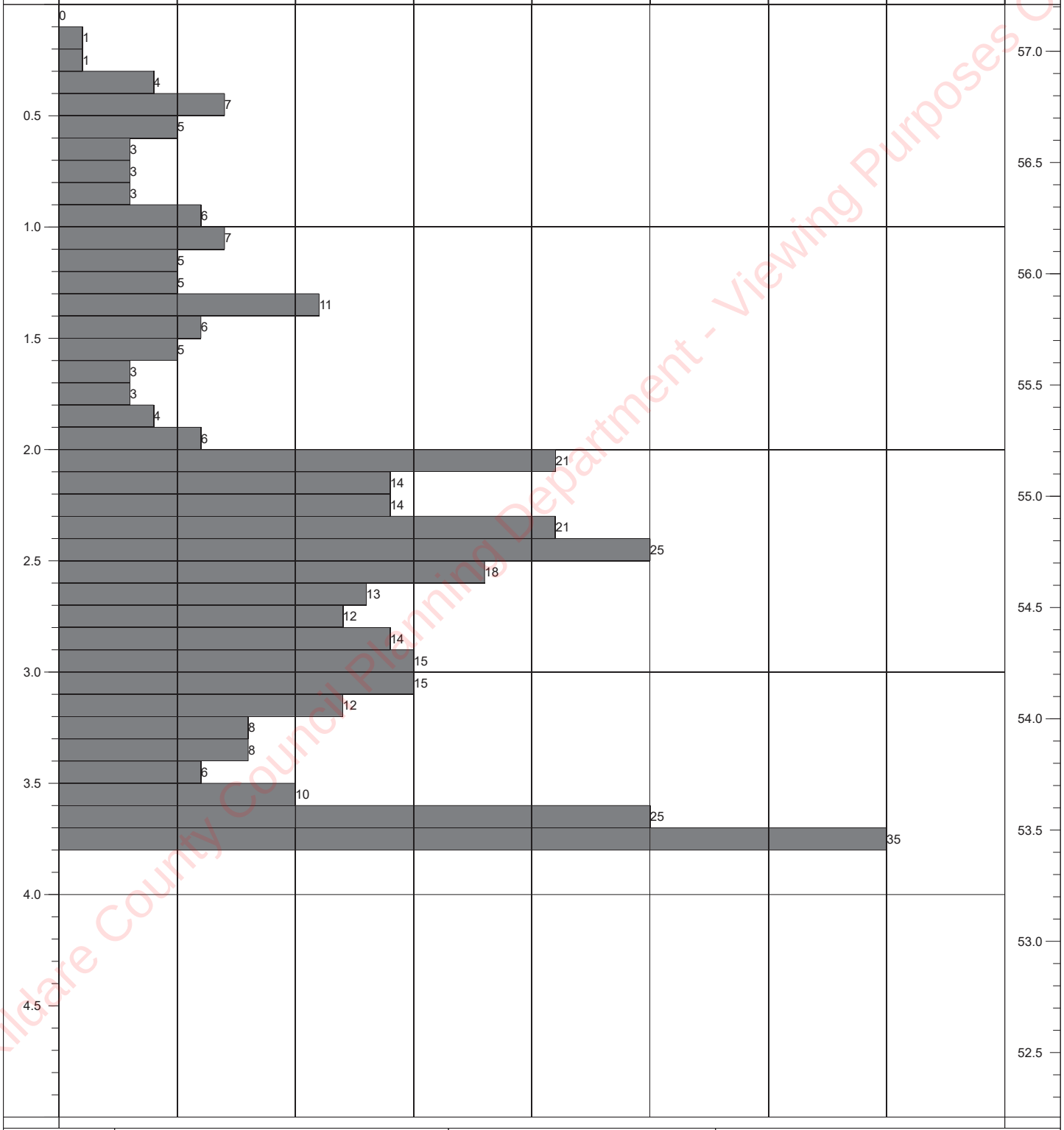
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
3.10m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	**Dynamic Probe Log**				Probe No: **DP20**
Contract:	Moygaddy	Easting:	693789.642	Date Started:	23/06/2021
Location:	Maynooth, Co. Meath	Northing:	739485.089	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	56.56	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



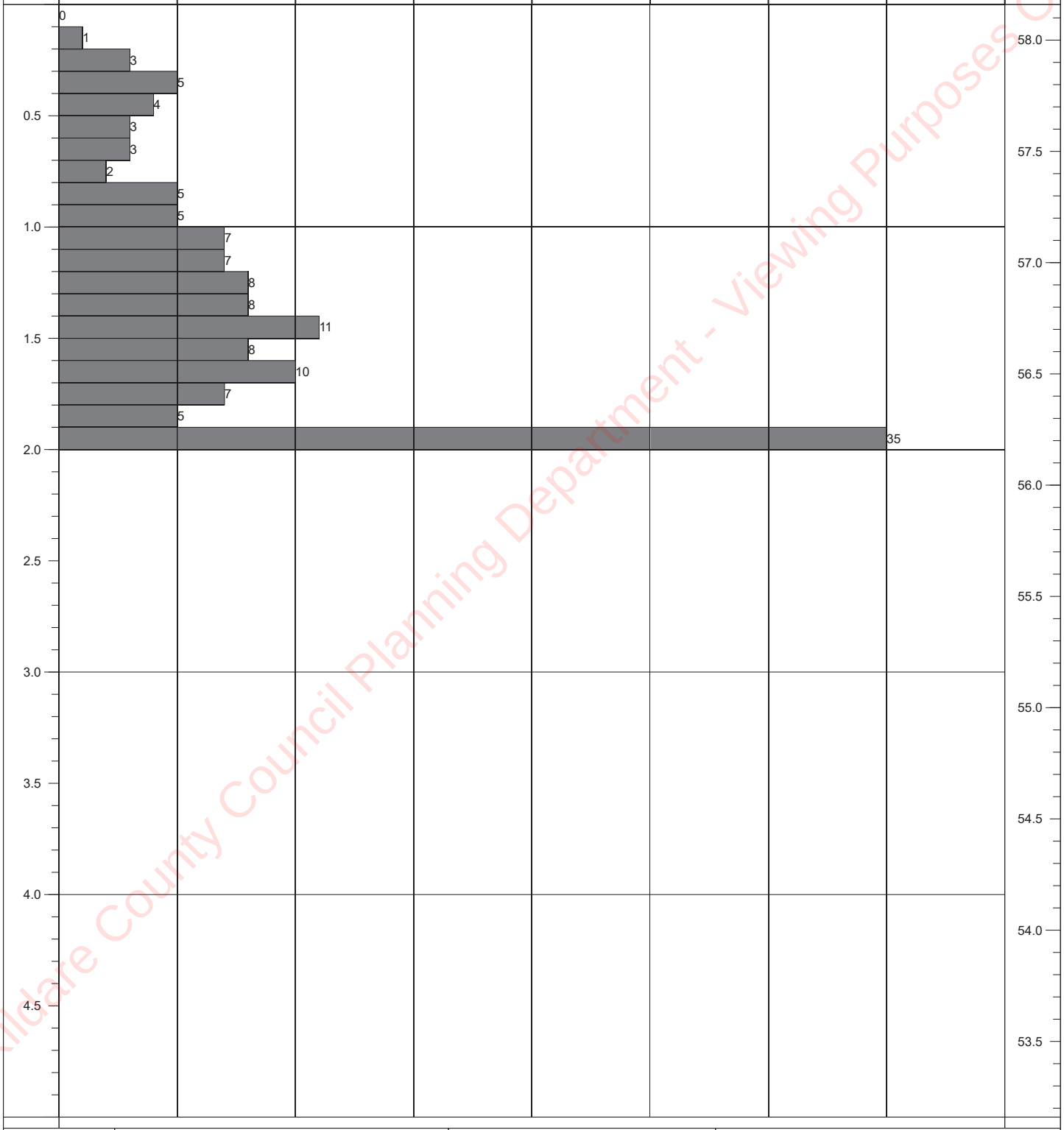
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
2.50m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	**Dynamic Probe Log**				Probe No: **DP21**
Contract:	Moygaddy	Easting:	693889.602	Date Started:	22/06/2021
Location:	Maynooth, Co. Meath	Northing:	739486.389	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	57.21	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



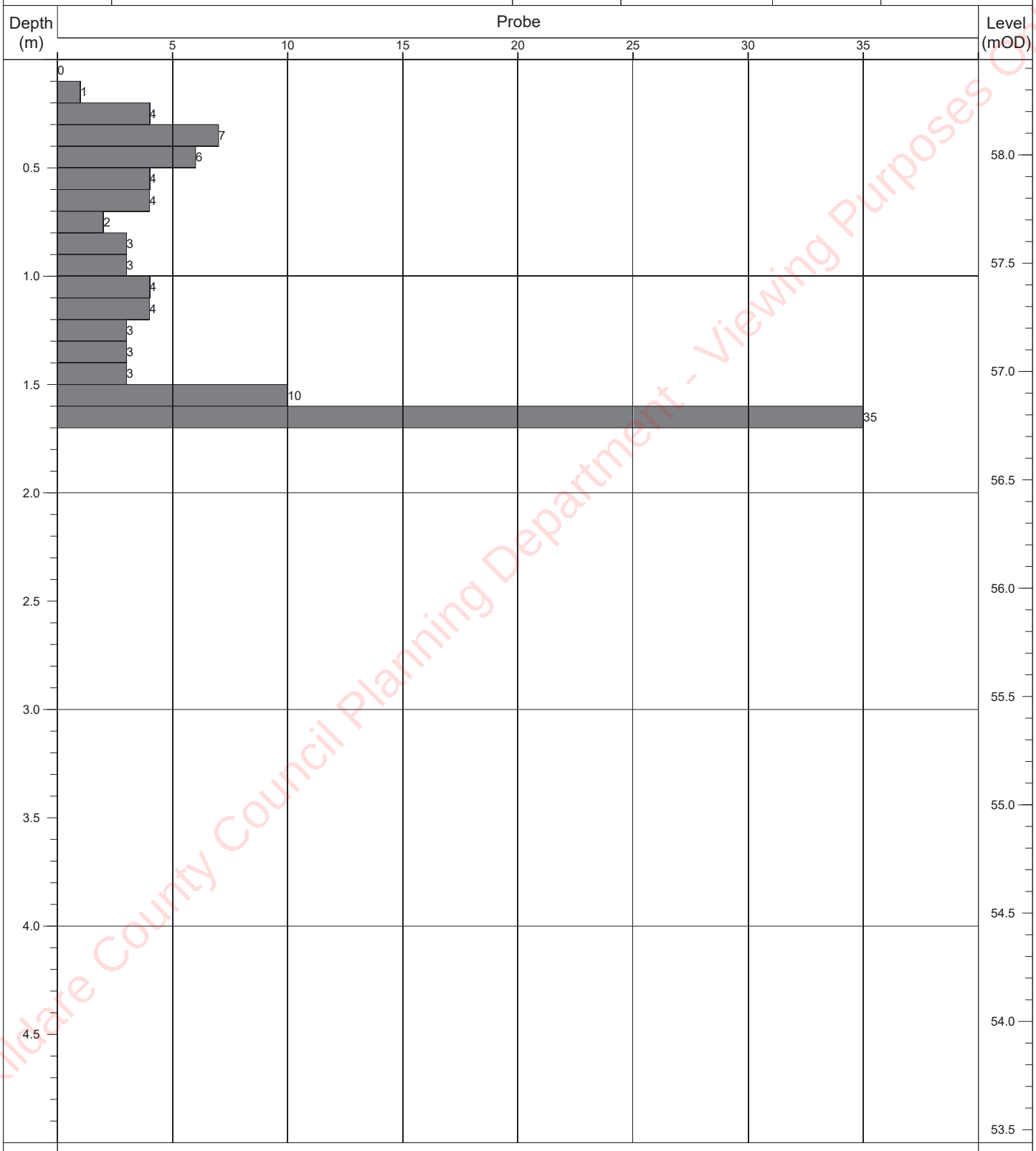
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
3.80m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	**Dynamic Probe Log**				Probe No: **DP22**
Contract:	Moygaddy	Easting:	693990.017	Date Started:	22/06/2021
Location:	Maynooth, Co. Meath	Northing:	739487.250	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	58.16	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



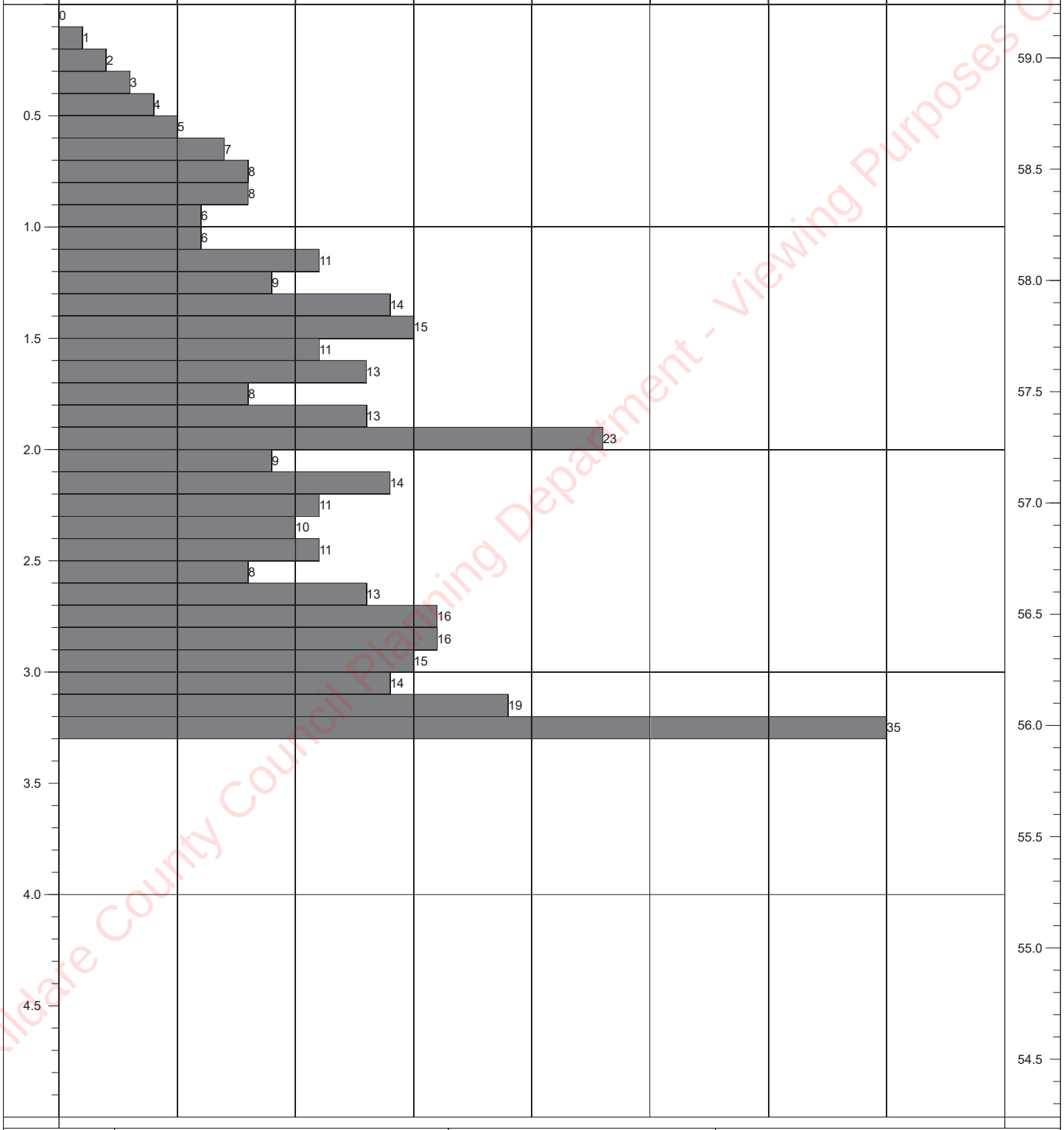
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
2.00m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	**Dynamic Probe Log**				Probe No: **DP23**
Contract:	Moygaddy	Easting:	694089.764	Date Started:	22/06/2021
Location:	Maynooth, Co. Meath	Northing:	739487.208	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	58.44	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



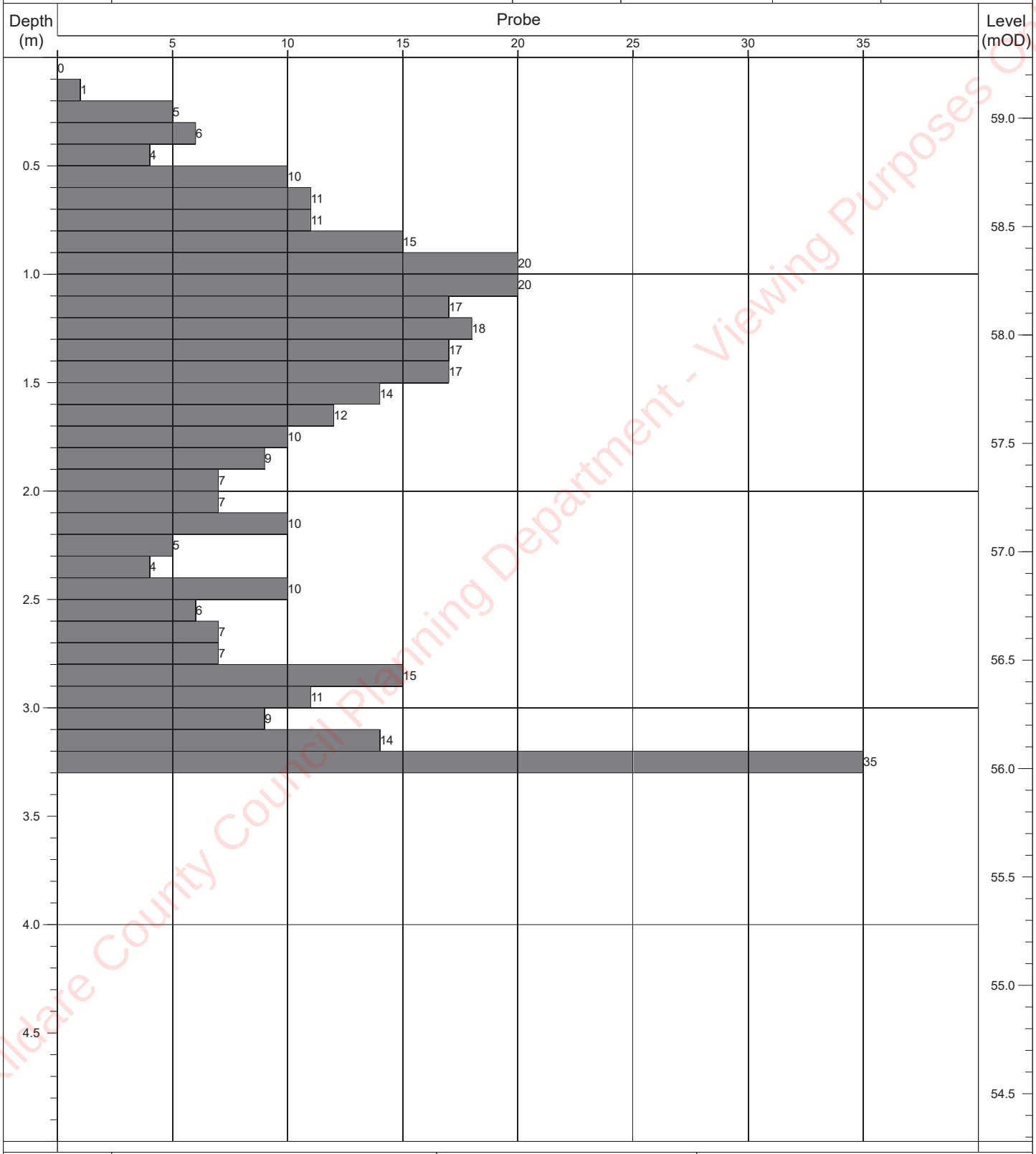
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
1.70m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	**Dynamic Probe Log**				Probe No: **DP24**
Contract:	Moygaddy	Easting:	694198.133	Date Started:	22/06/2021
Location:	Maynooth, Co. Meath	Northing:	739492.619	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	59.24	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



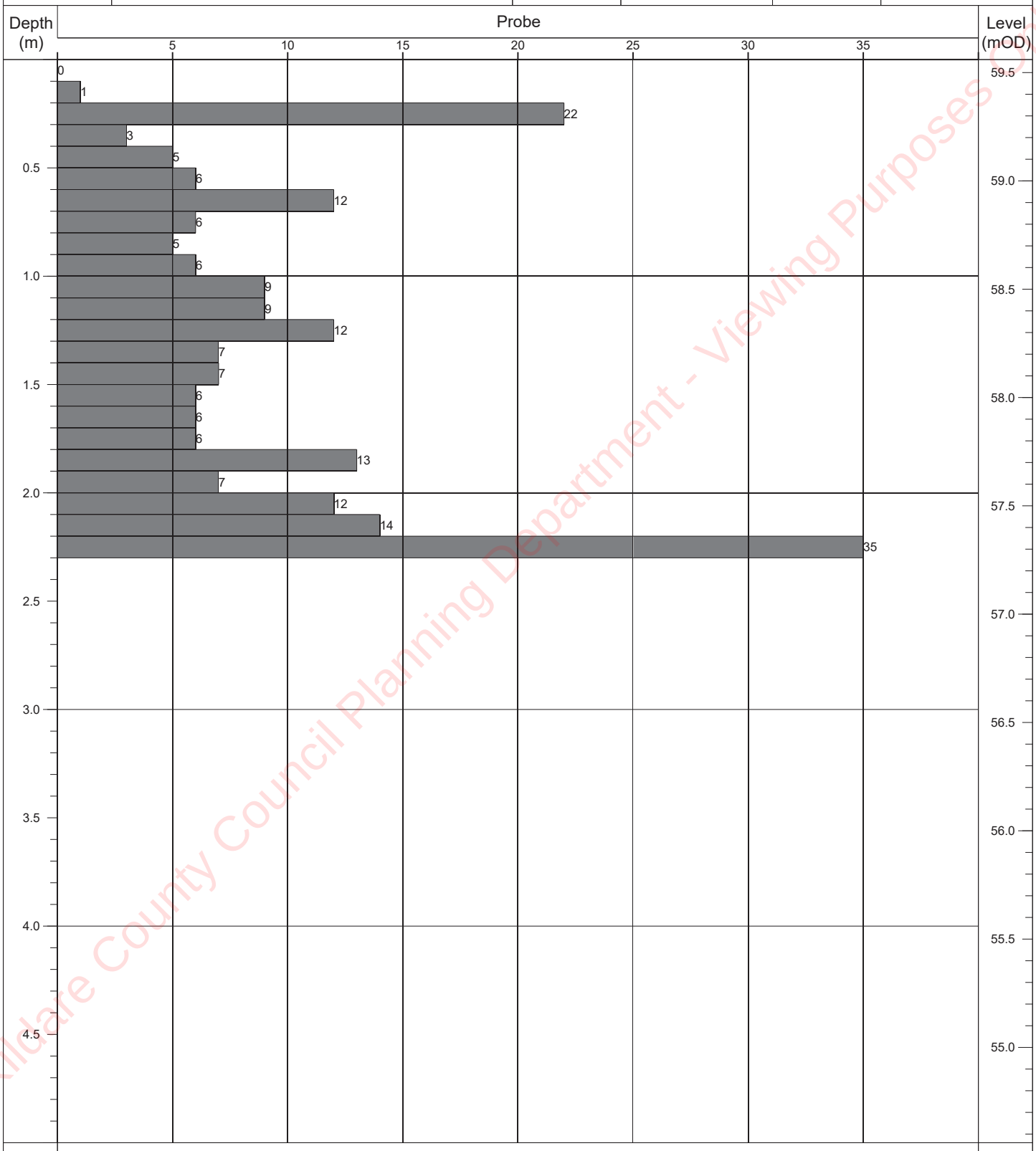
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
3.30m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	**Dynamic Probe Log**				Probe No: **DP25**
Contract:	Moygaddy	Easting:	694385.716	Date Started:	22/06/2021
Location:	Maynooth, Co. Meath	Northing:	739486.593	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	59.28	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



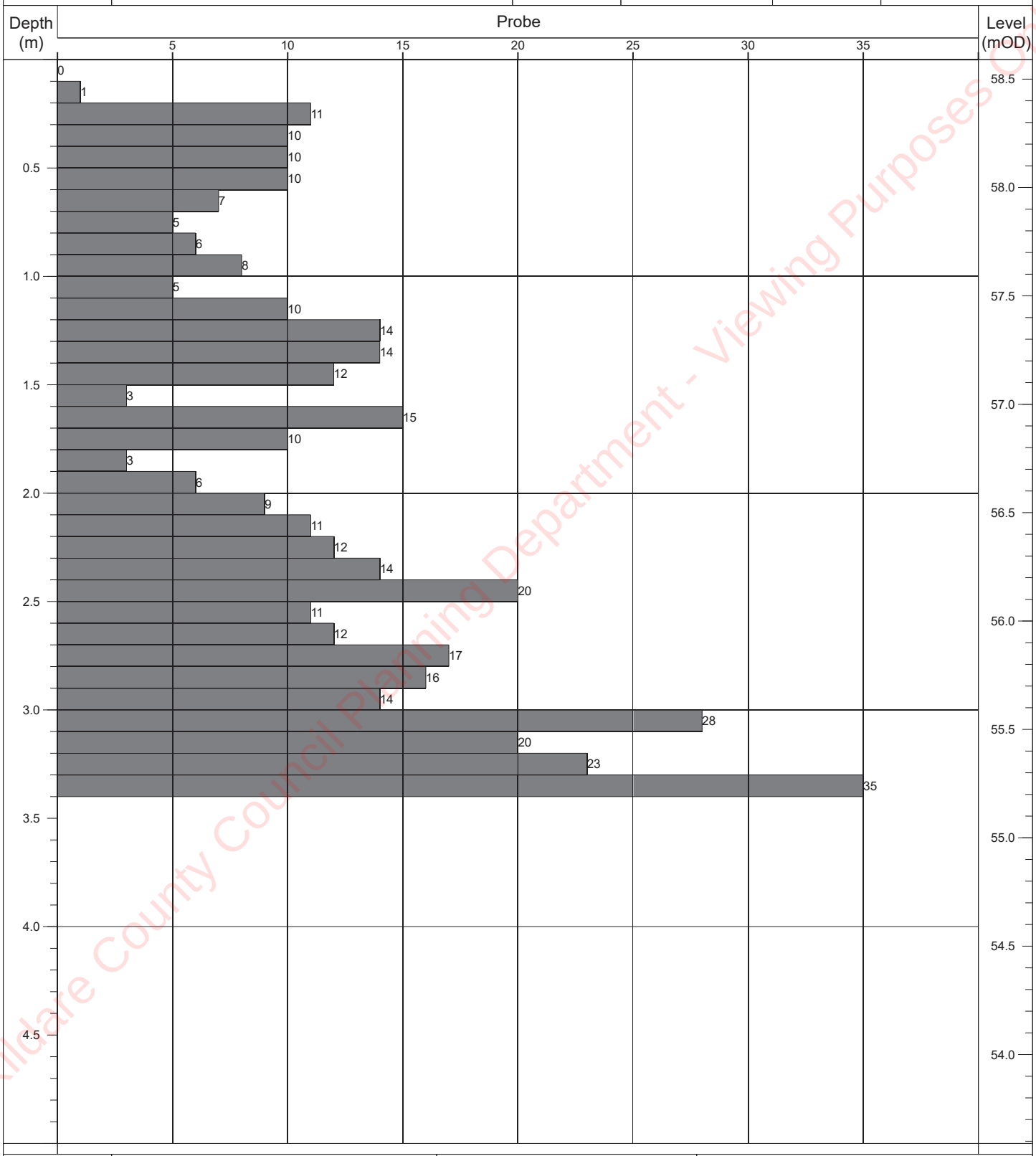
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
3.30m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	**Dynamic Probe Log**				Probe No: **DP26**
Contract:	Moygaddy	Easting:	694489.024	Date Started:	24/06/2021
Location:	Maynooth, Co. Meath	Northing:	739485.194	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	59.56	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



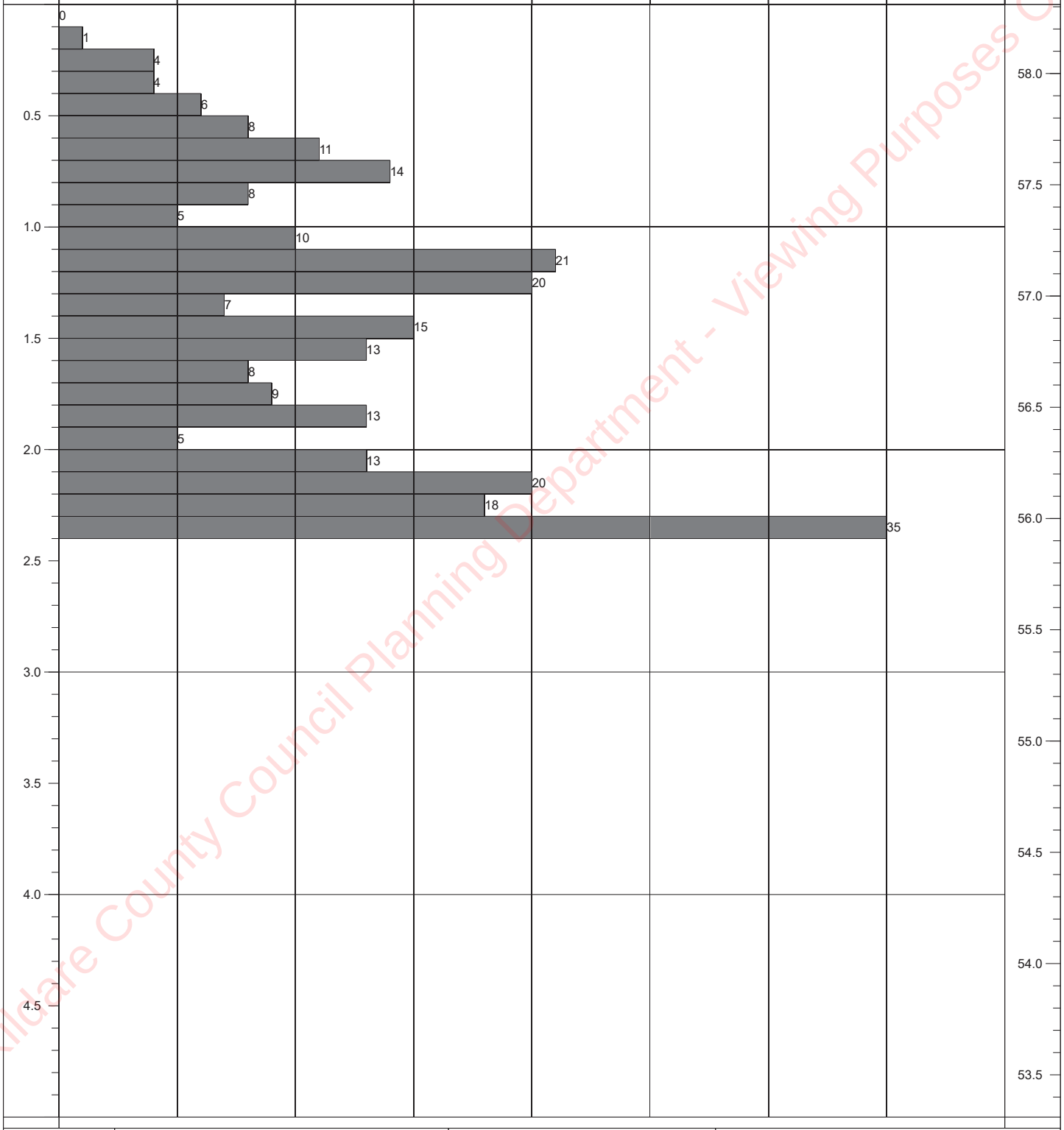
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
2.50m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	**Dynamic Probe Log**				Probe No: **DP27**
Contract:	Moygaddy	Easting:	694586.781	Date Started:	24/06/2021
Location:	Maynooth, Co. Meath	Northing:	739491.852	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	58.59	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



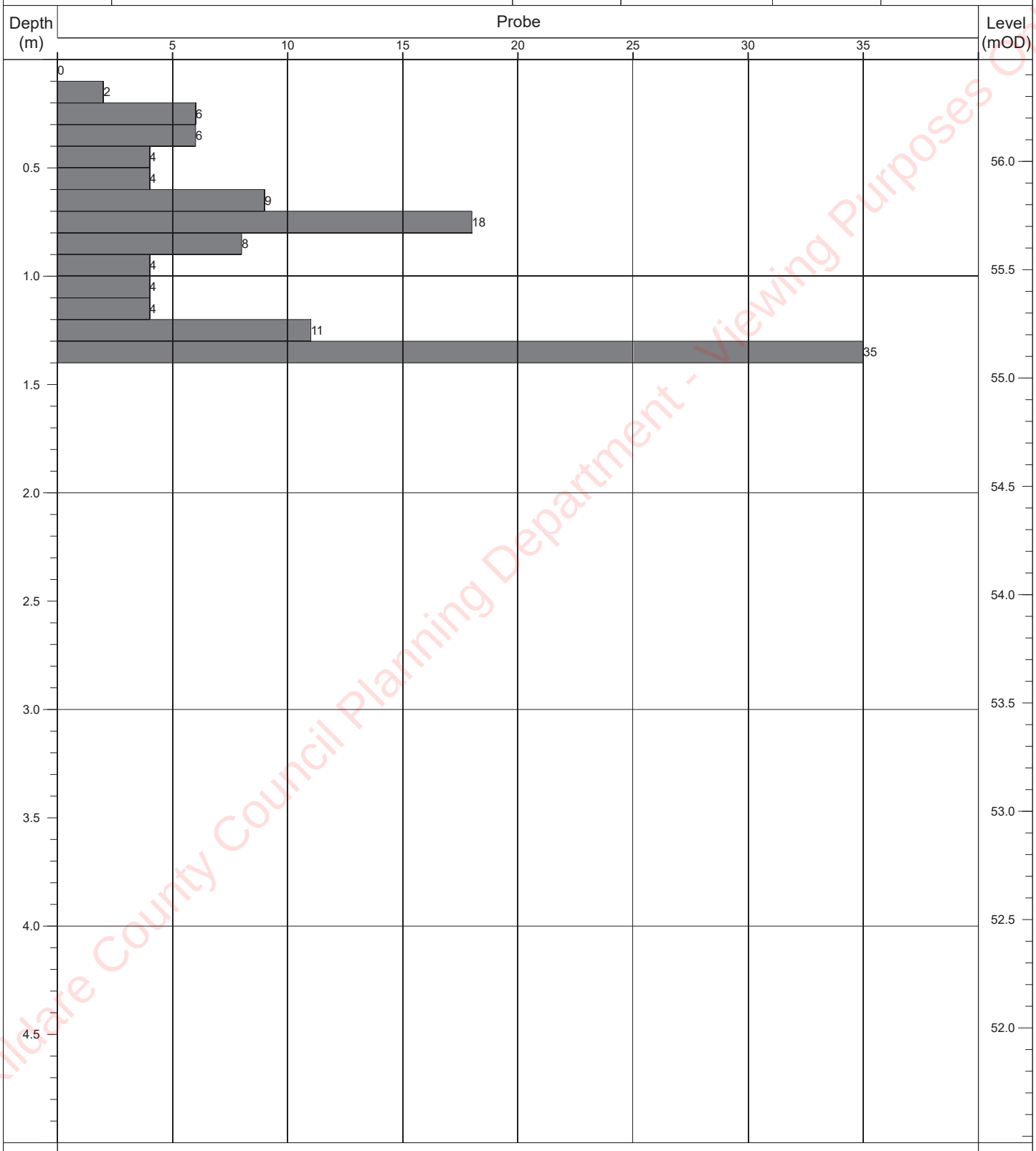
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
3.40m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	**Dynamic Probe Log**				Probe No: **DP28**
Contract:	Moygaddy	Easting:	694688.953	Date Started:	24/06/2021
Location:	Maynooth, Co. Meath	Northing:	739488.632	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	58.31	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



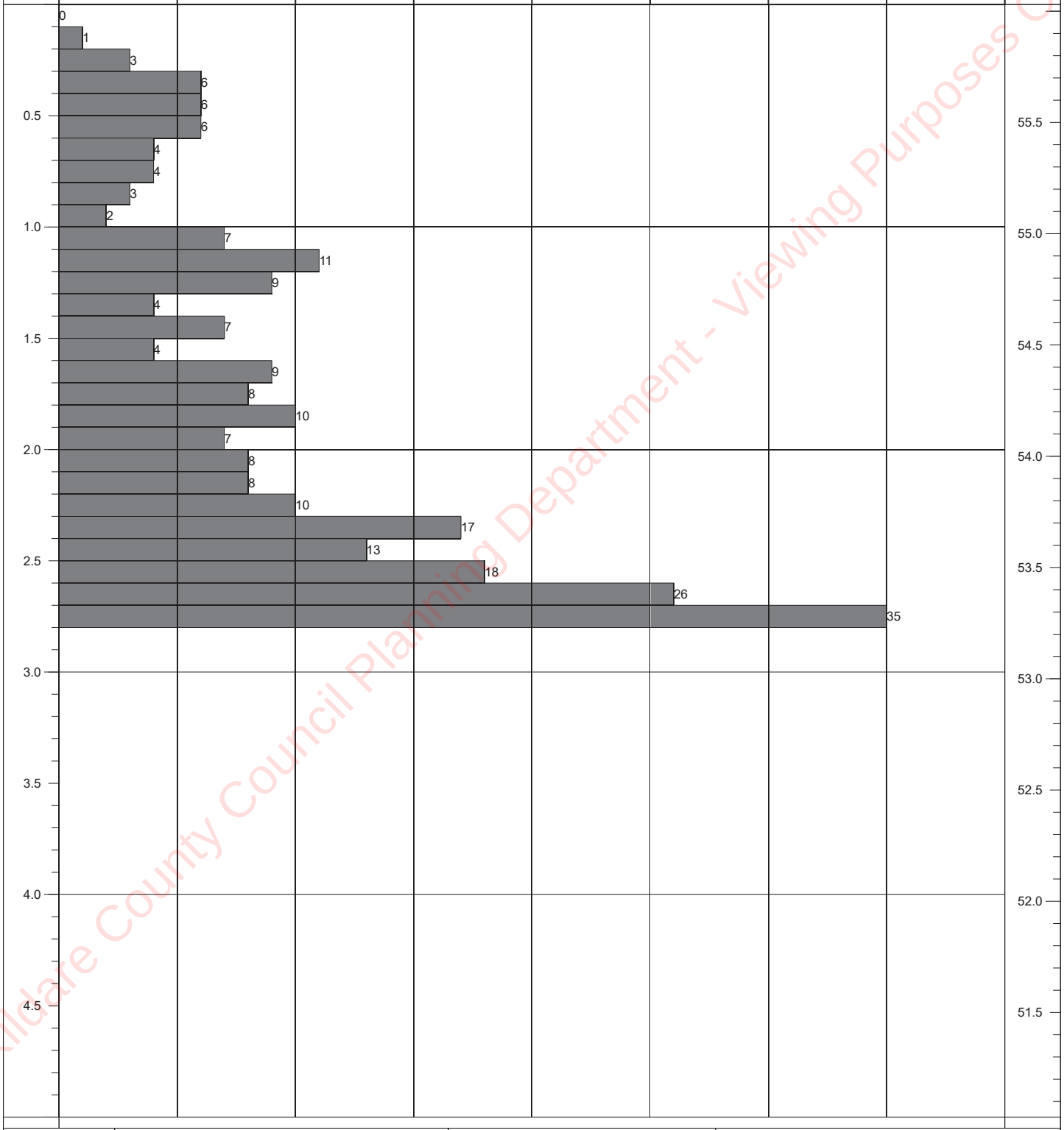
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
2.40m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	**Dynamic Probe Log**				Probe No: **DP29**
Contract:	Moygaddy	Easting:	694780.802	Date Started:	24/06/2021
Location:	Maynooth, Co. Meath	Northing:	739491.934	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	56.47	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



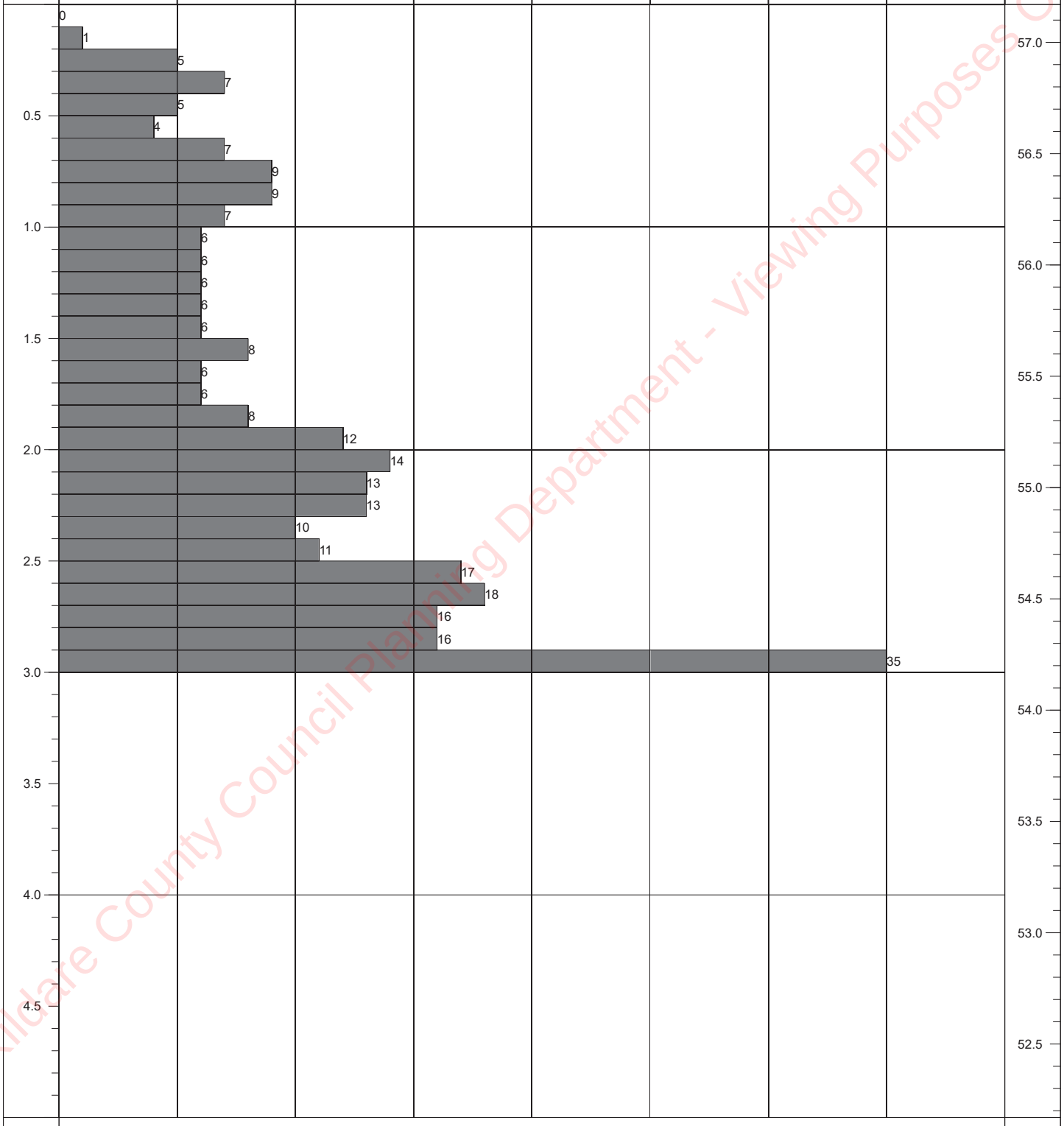
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
1.40m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	**Dynamic Probe Log**				Probe No: **DP30**
Contract:	Moygaddy	Easting:	693593.273	Date Started:	23/06/2021
Location:	Maynooth, Co. Meath	Northing:	739395.730	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	56.03	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



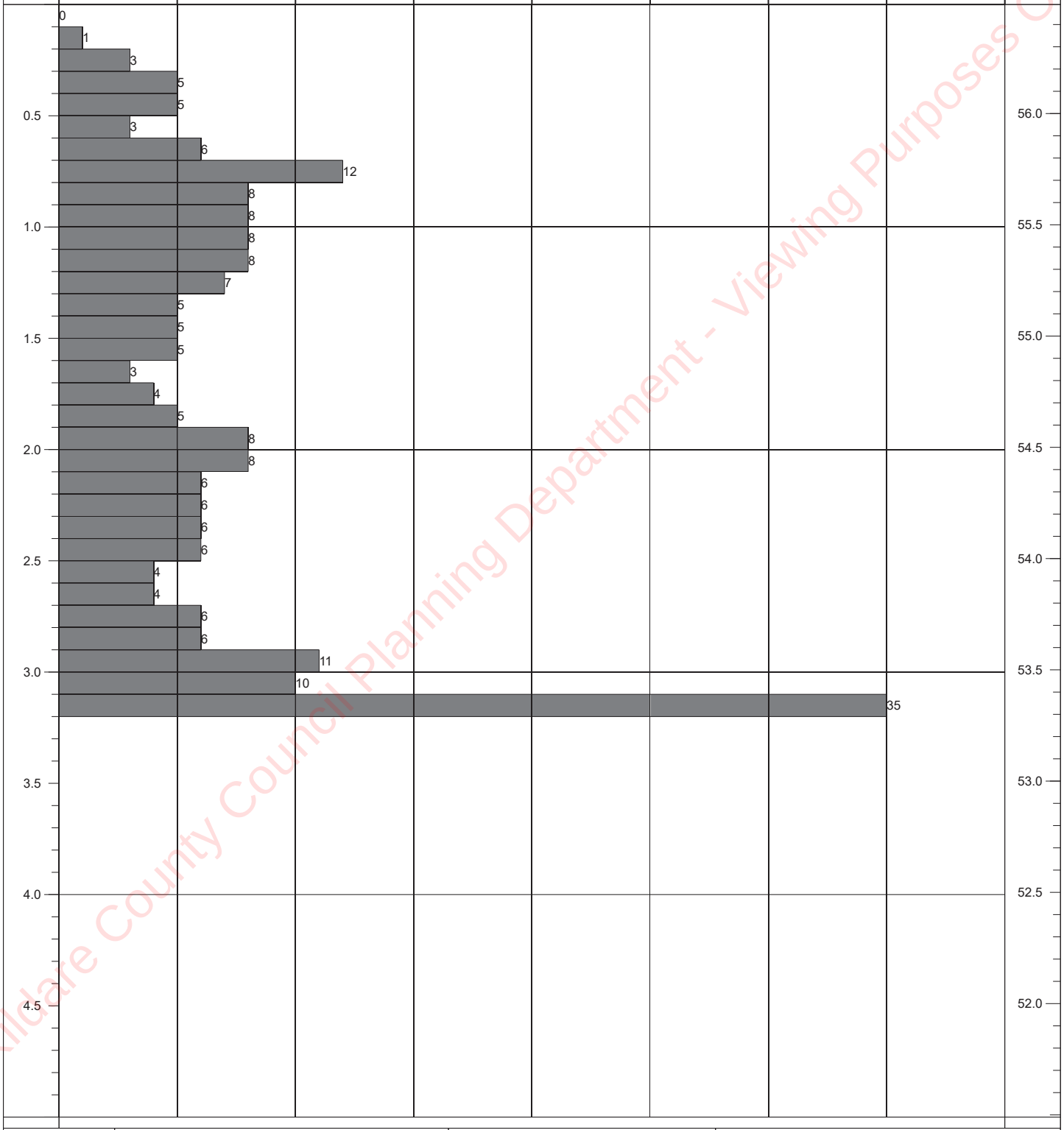
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
2.80m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	Dynamic Probe Log				Probe No: DP31
Contract:	Moygaddy	Easting:	693688.922	Date Started:	23/06/2021
Location:	Maynooth, Co. Meath	Northing:	739386.795	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	57.17	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



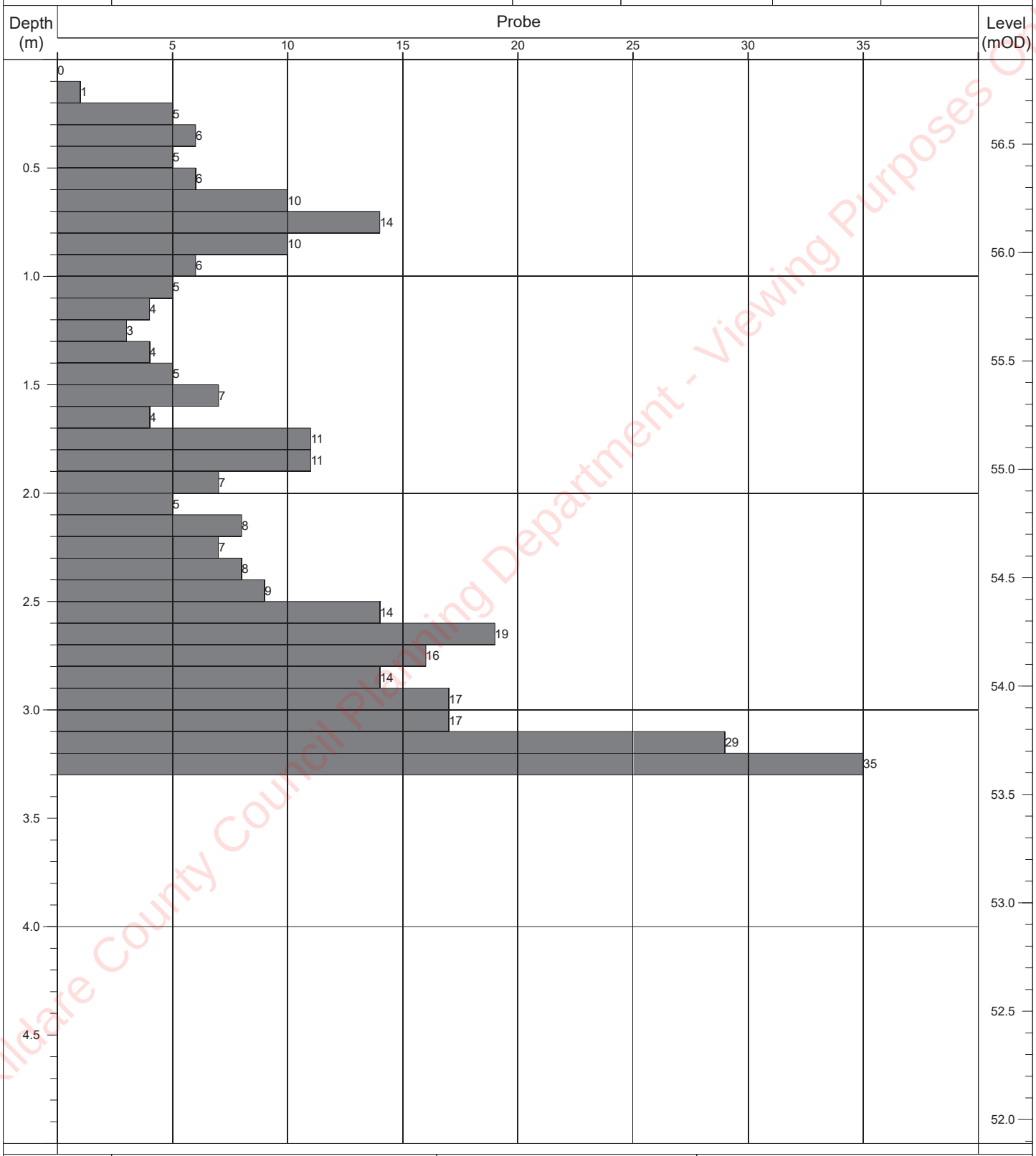
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
3.00m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	**Dynamic Probe Log**				Probe No: **DP32**
Contract:	Moygaddy	Easting:	693787.843	Date Started:	23/06/2021
Location:	Maynooth, Co. Meath	Northing:	739388.255	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	56.49	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



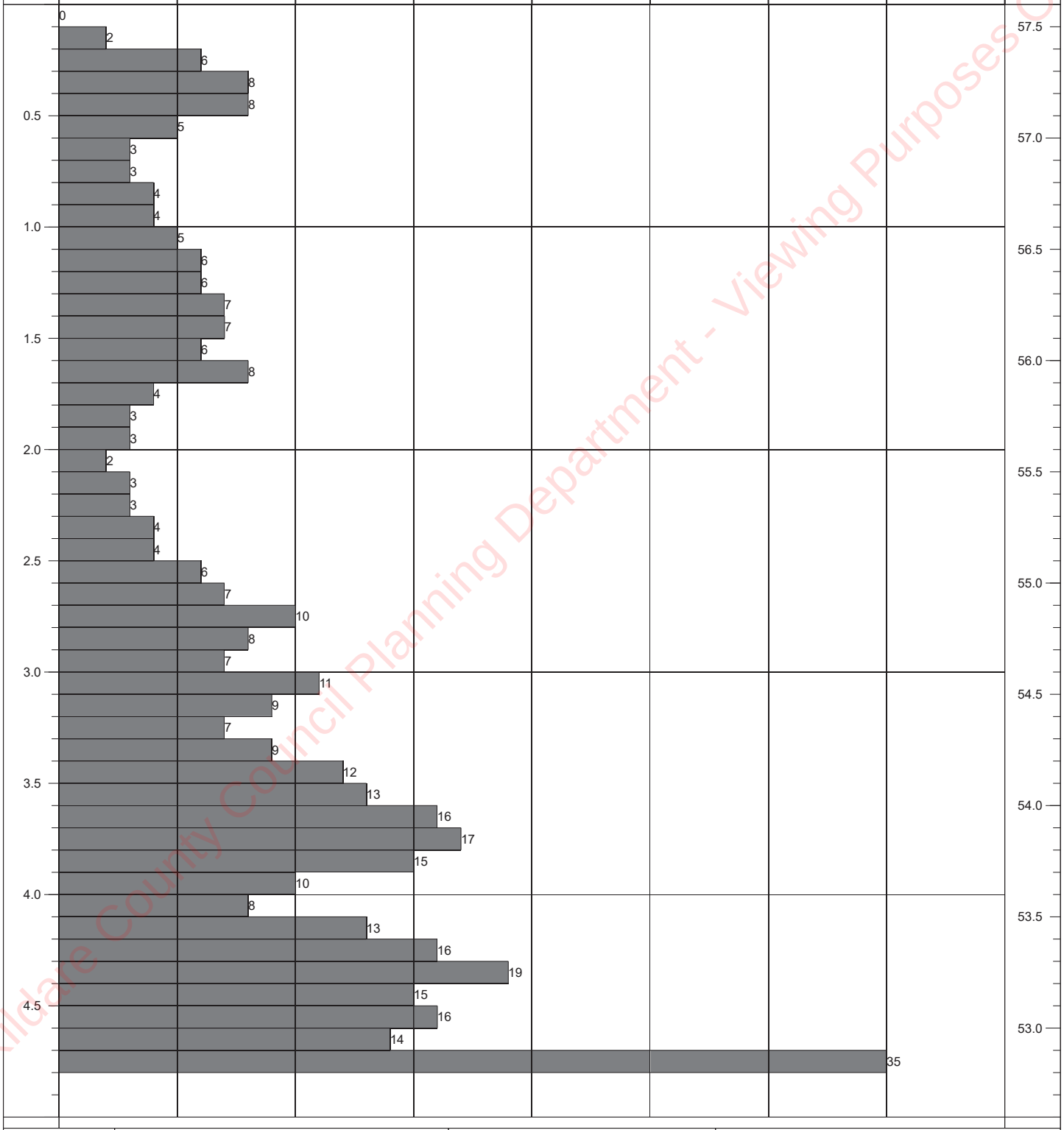
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
3.20m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	**Dynamic Probe Log**				Probe No: **DP33**
Contract:	Moygaddy	Easting:	693889.656	Date Started:	22/06/2021
Location:	Maynooth, Co. Meath	Northing:	739385.777	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	56.89	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



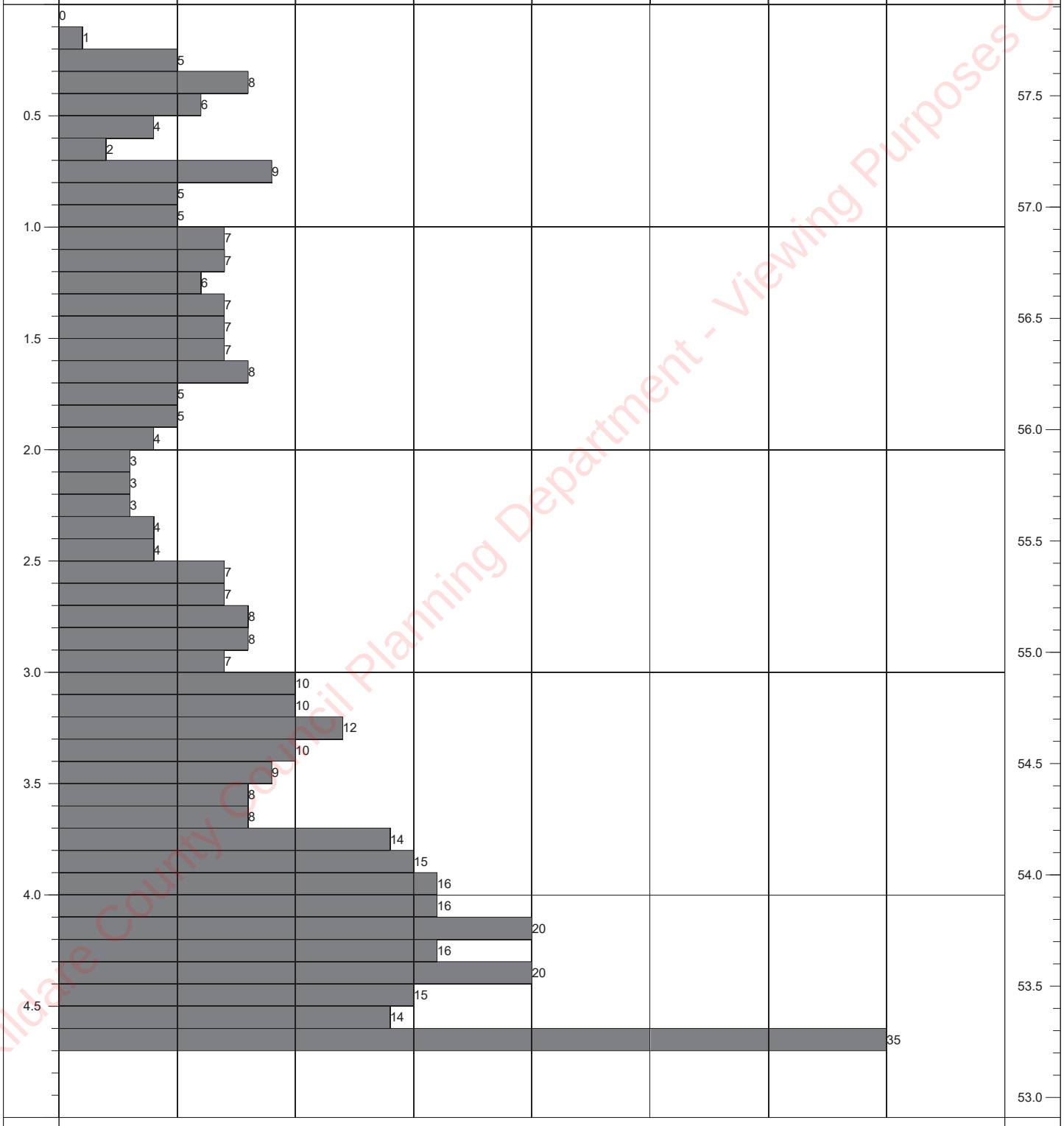
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
3.30m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	**Dynamic Probe Log**				Probe No: **DP34**
Contract:	Moygaddy	Easting:	693987.346	Date Started:	22/06/2021
Location:	Maynooth, Co. Meath	Northing:	739387.484	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	57.60	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



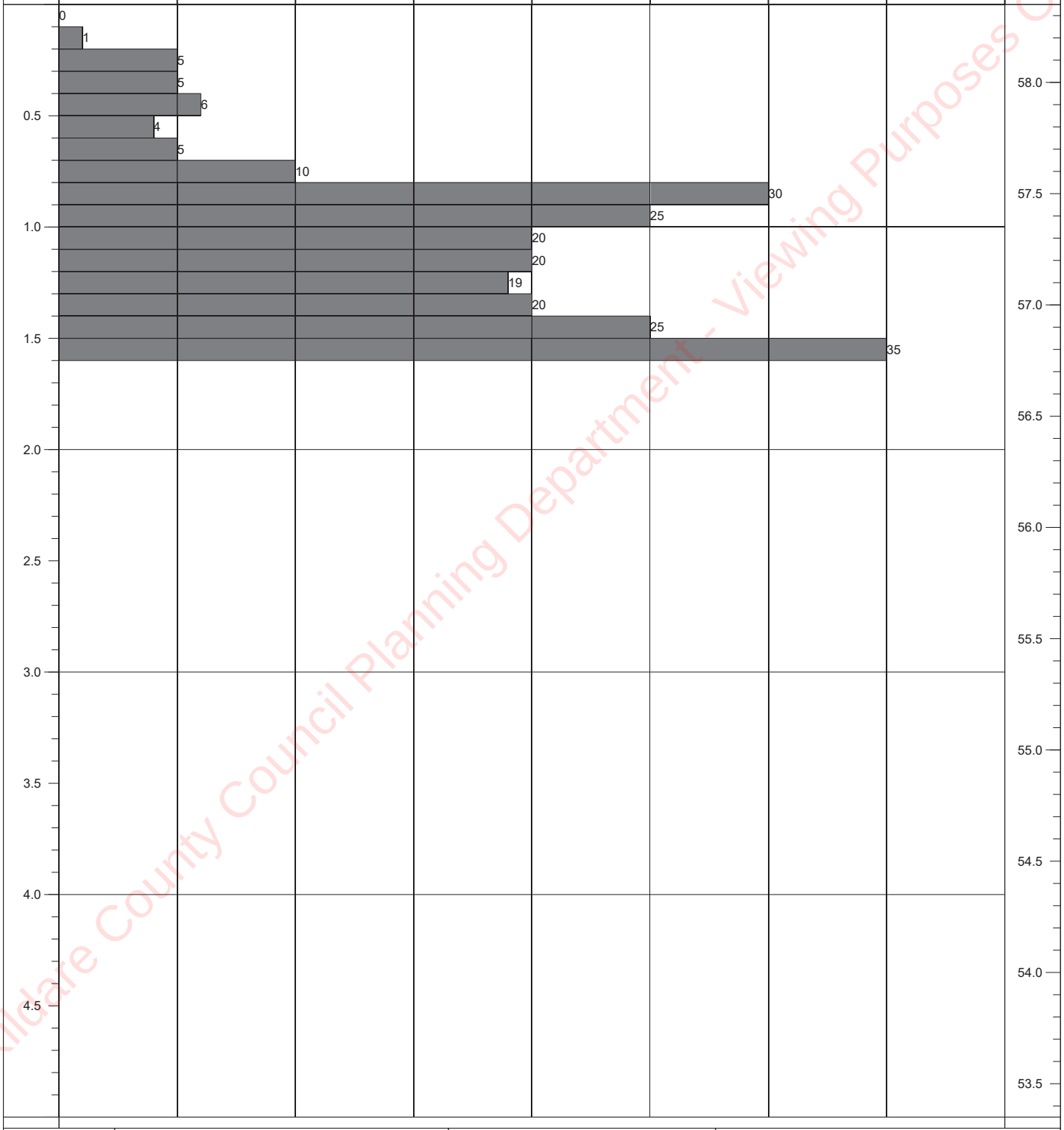
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
4.80m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	**Dynamic Probe Log**				Probe No: **DP35**
Contract:	Moygaddy	Easting:	694086.861	Date Started:	22/06/2021
Location:	Maynooth, Co. Meath	Northing:	739385.871	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	57.91	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



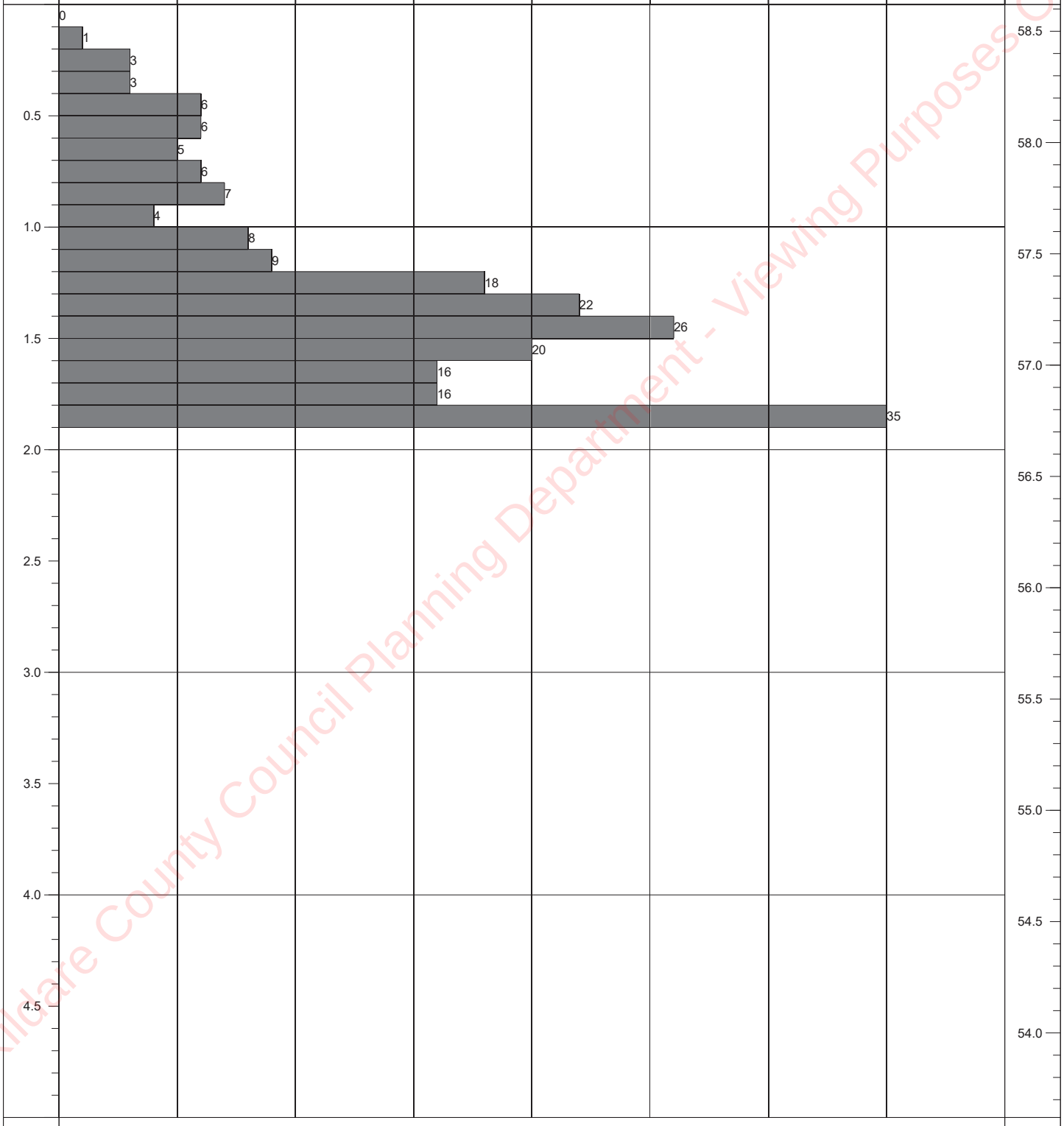
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
4.70m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	**Dynamic Probe Log**				Probe No: **DP36**
Contract:	Moygaddy	Easting:	694190.231	Date Started:	22/06/2021
Location:	Maynooth, Co. Meath	Northing:	739385.957	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	58.35	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



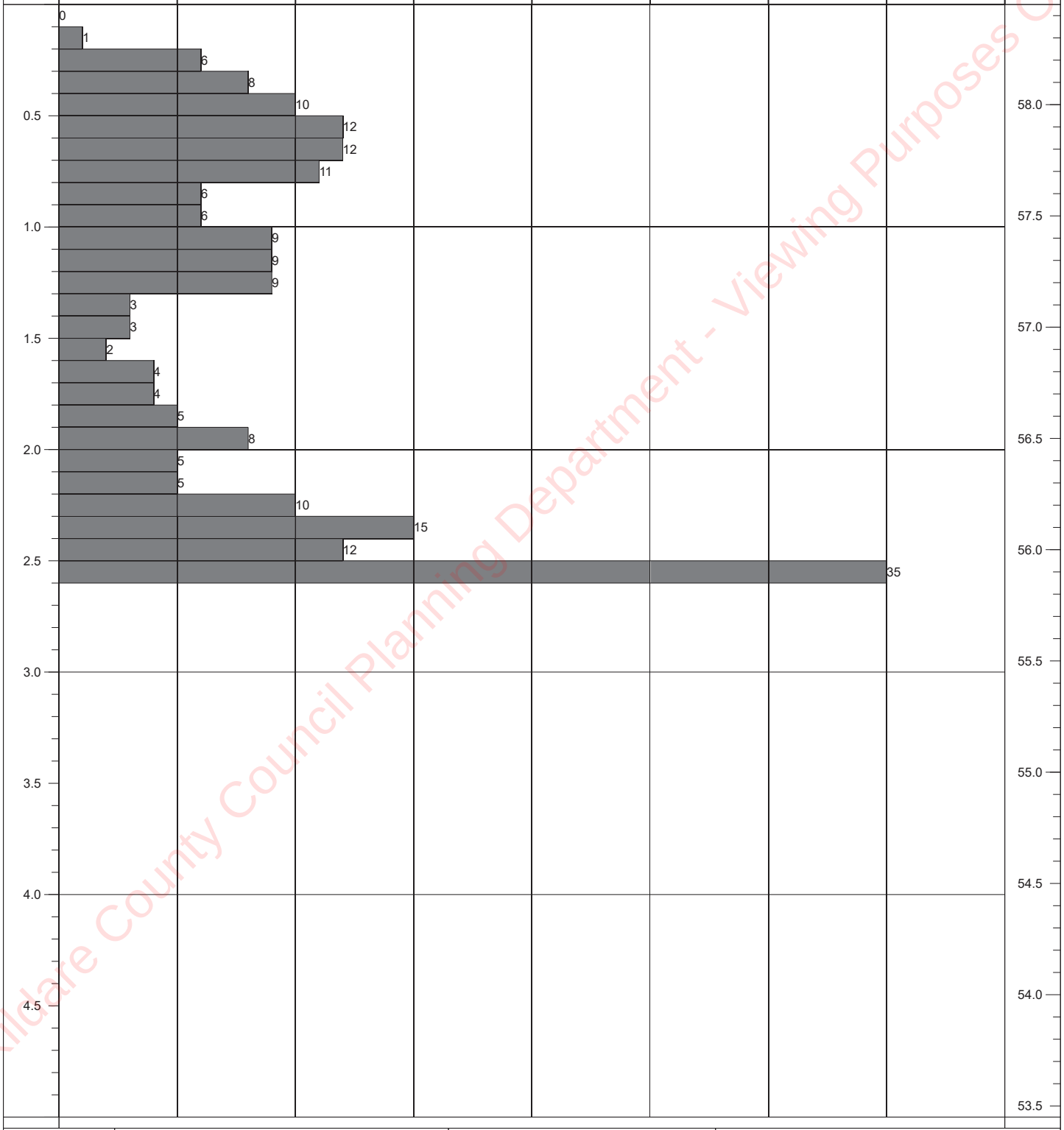
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
1.60m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	Dynamic Probe Log				Probe No: DP37
Contract:	Moygaddy	Easting:	694288.456	Date Started:	22/06/2021
Location:	Maynooth, Co. Meath	Northing:	739387.753	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	58.62	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



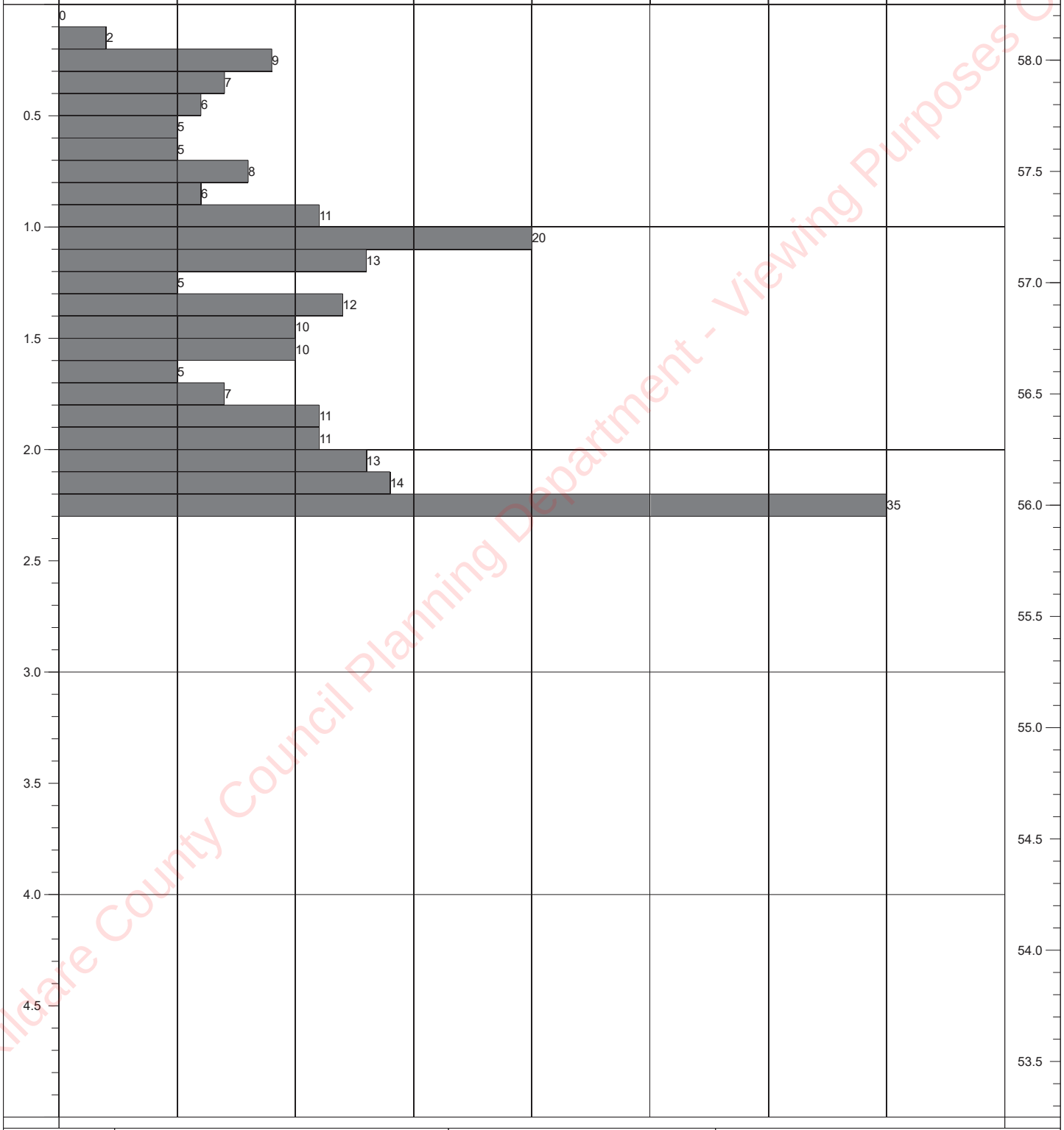
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
1.90m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	**Dynamic Probe Log**				Probe No: **DP38**
Contract:	Moygaddy	Easting:	694370.568	Date Started:	24/06/2021
Location:	Maynooth, Co. Meath	Northing:	739380.643	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	58.45	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



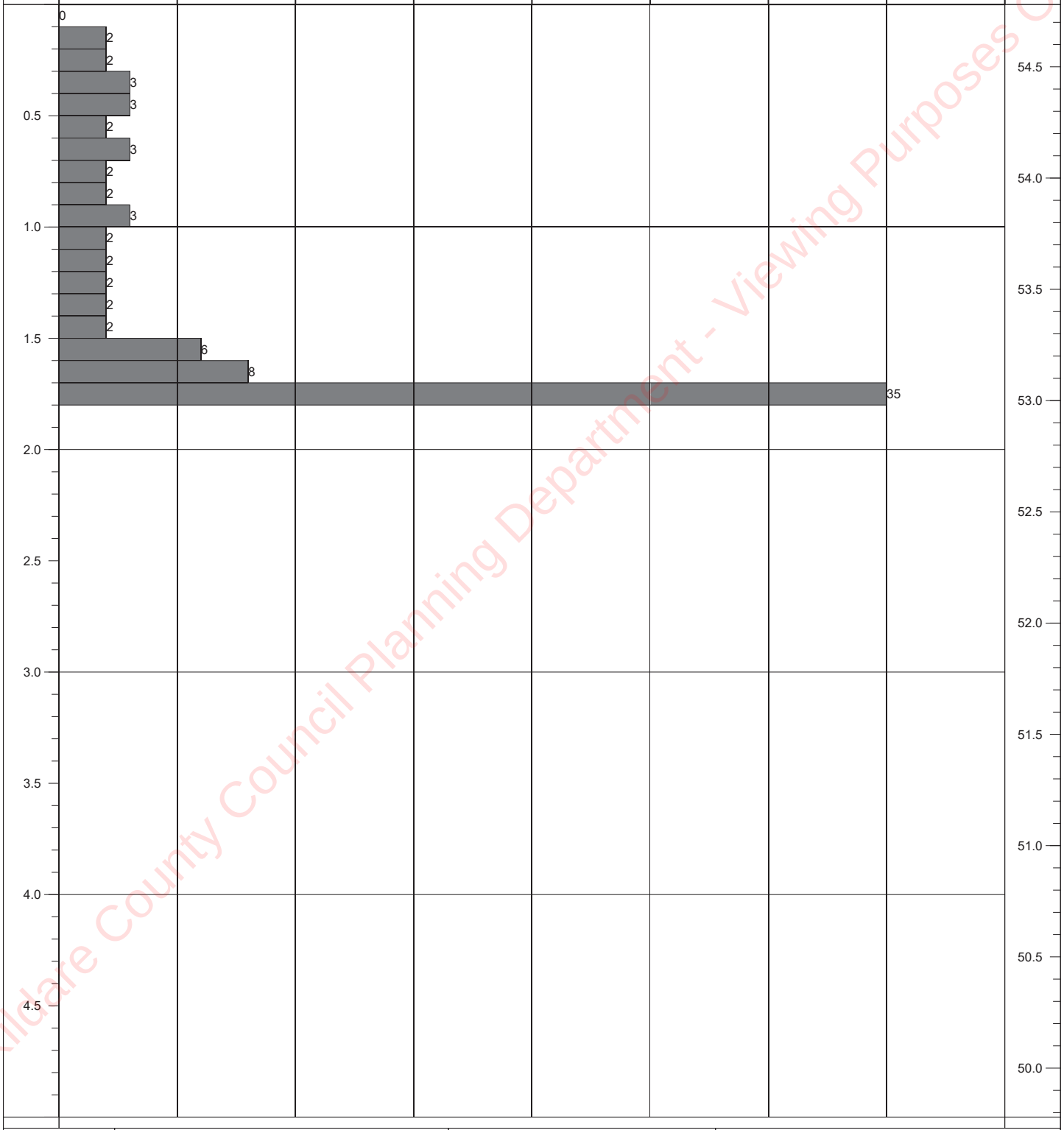
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
2.60m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	**Dynamic Probe Log**				Probe No: **DP39**
Contract:	Moygaddy	Easting:	694486.826	Date Started:	24/06/2021
Location:	Maynooth, Co. Meath	Northing:	739390.243	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	58.25	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



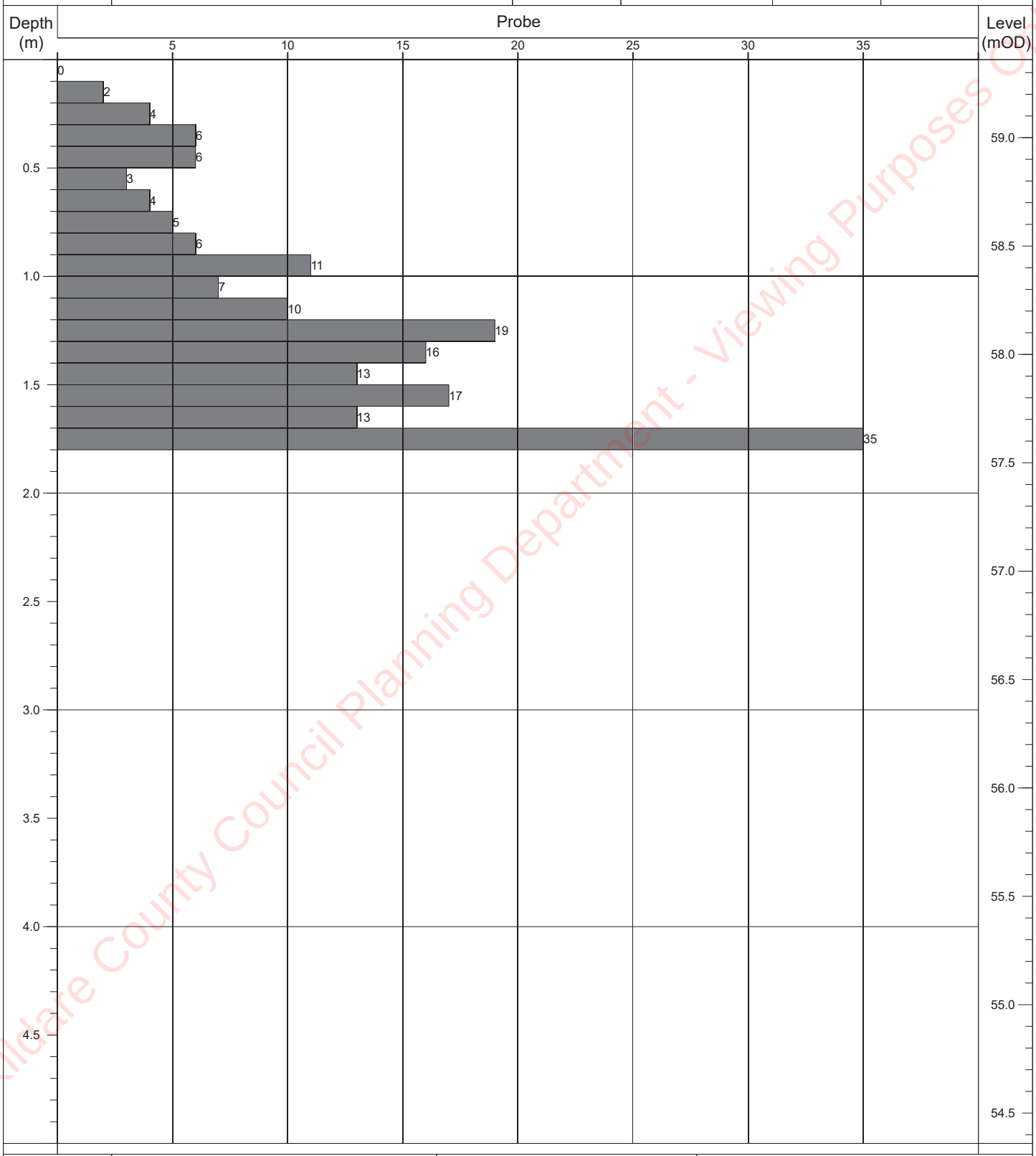
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
2.30m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	**Dynamic Probe Log**				Probe No: **DP40**
Contract:	Moygaddy	Easting:	694569.043	Date Started:	24/06/2021
Location:	Maynooth, Co. Meath	Northing:	739386.611	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	54.78	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



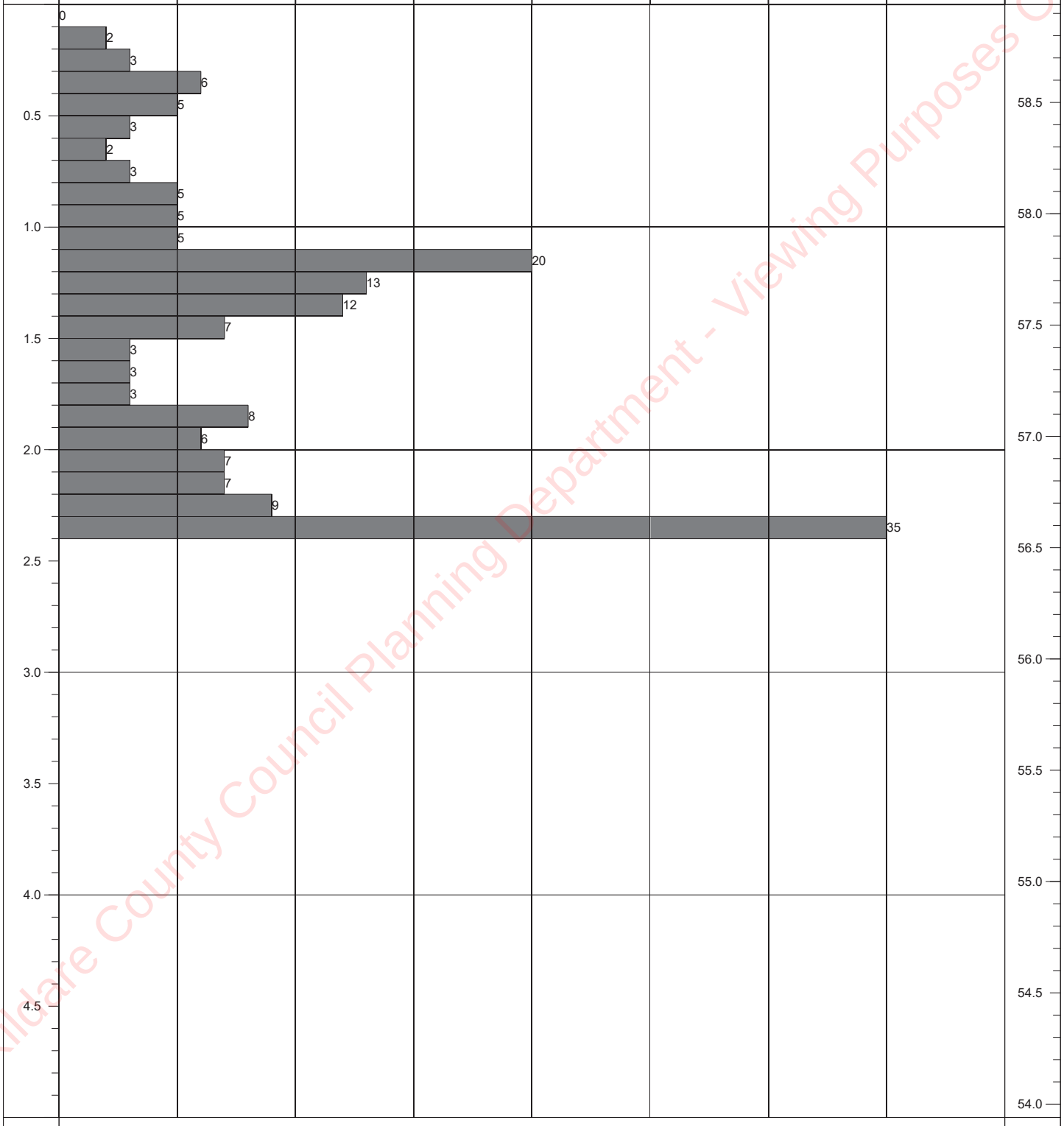
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
1.80m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	**Dynamic Probe Log**				Probe No: **DP41**
Contract:	Moygaddy	Easting:	694691.616	Date Started:	23/06/2021
Location:	Maynooth, Co. Meath	Northing:	739389.831	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	59.36	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



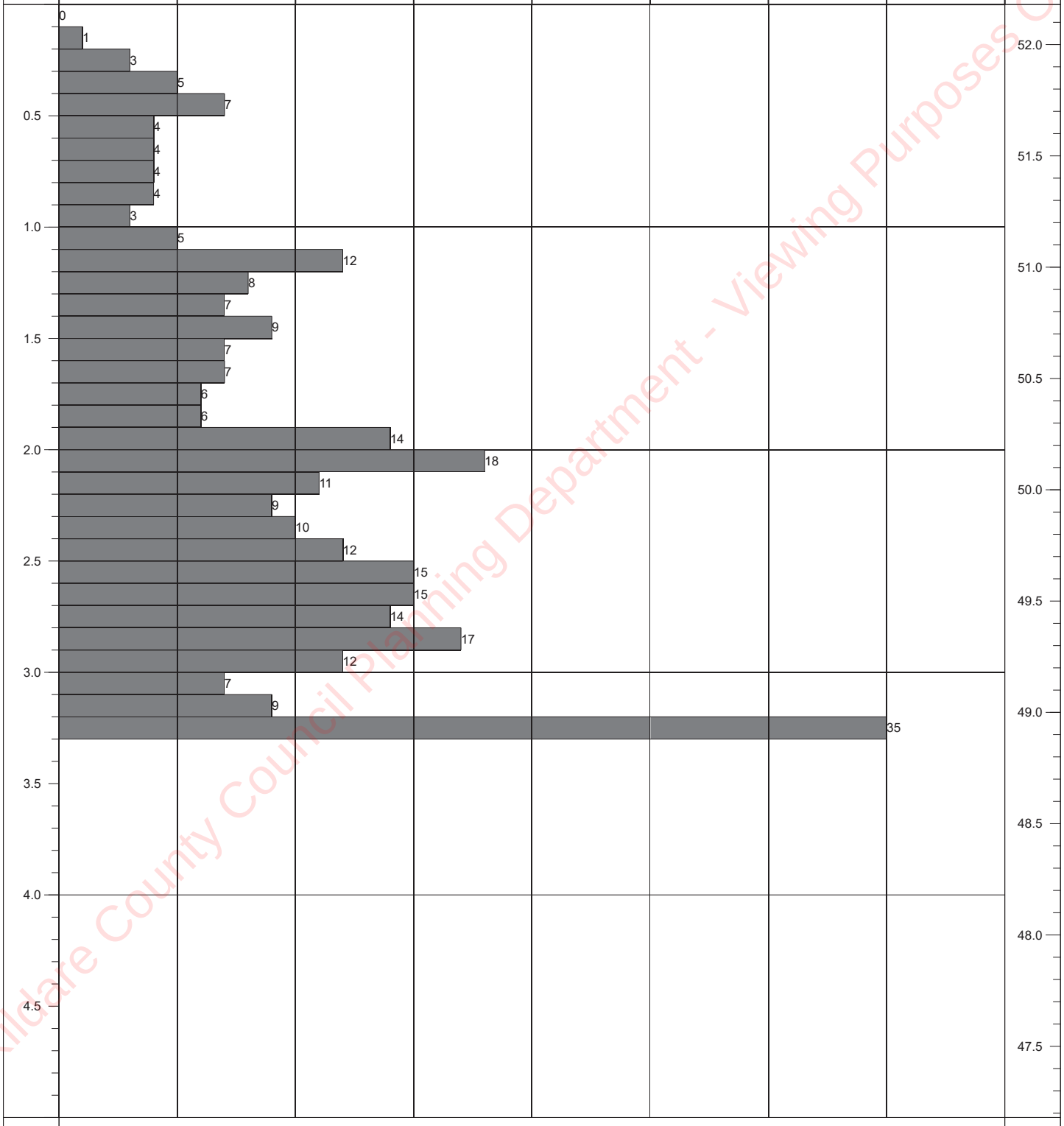
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
1.80m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	**Dynamic Probe Log**				Probe No: **DP42**
Contract:	Moygaddy	Easting:	694791.212	Date Started:	23/06/2021
Location:	Maynooth, Co. Meath	Northing:	739385.883	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	58.94	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



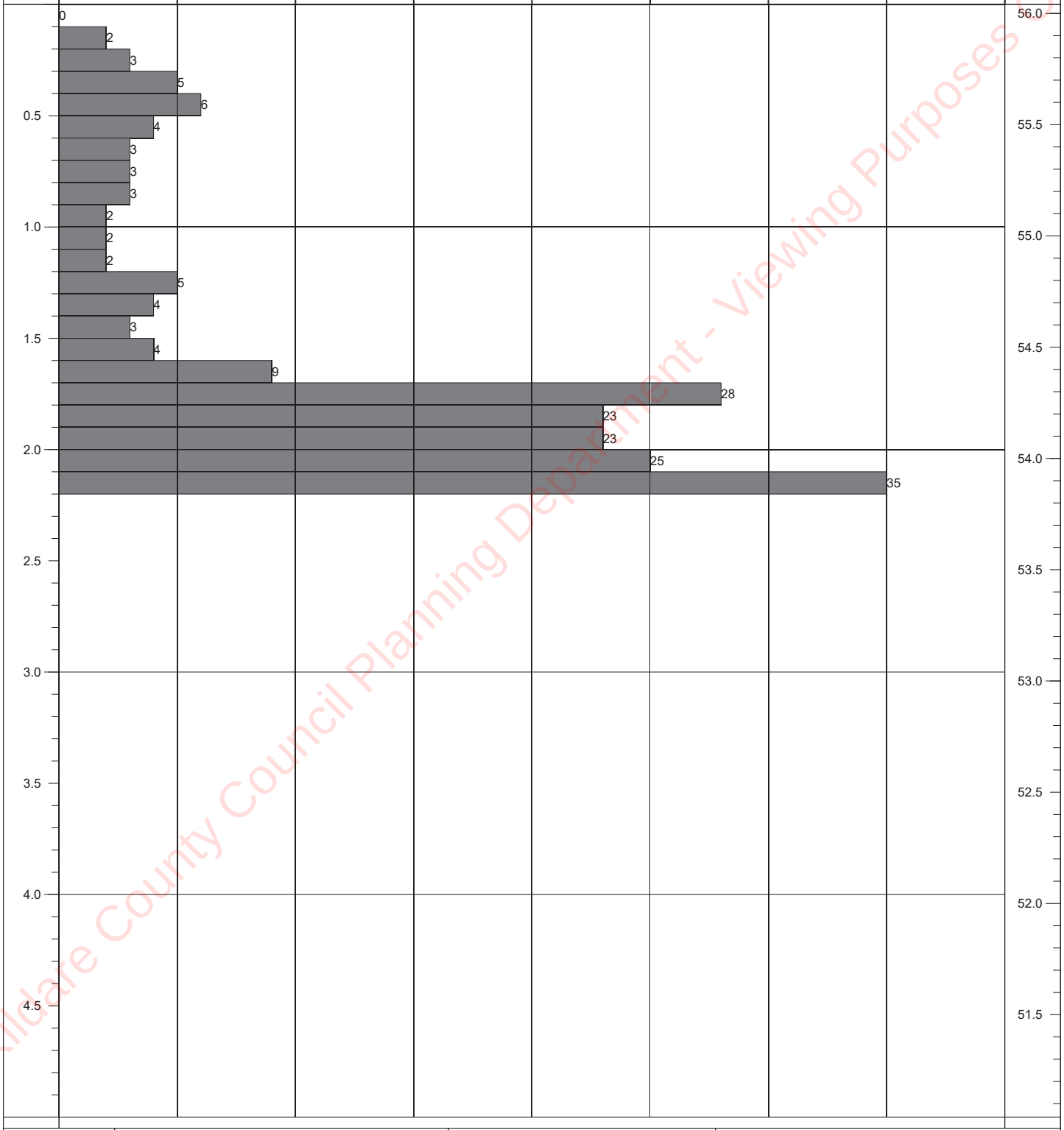
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
2.40m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	**Dynamic Probe Log**				Probe No: **DP43**
Contract:	Moygaddy	Easting:	693688.642	Date Started:	18/06/2021
Location:	Maynooth, Co. Meath	Northing:	739290.847	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	52.18	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



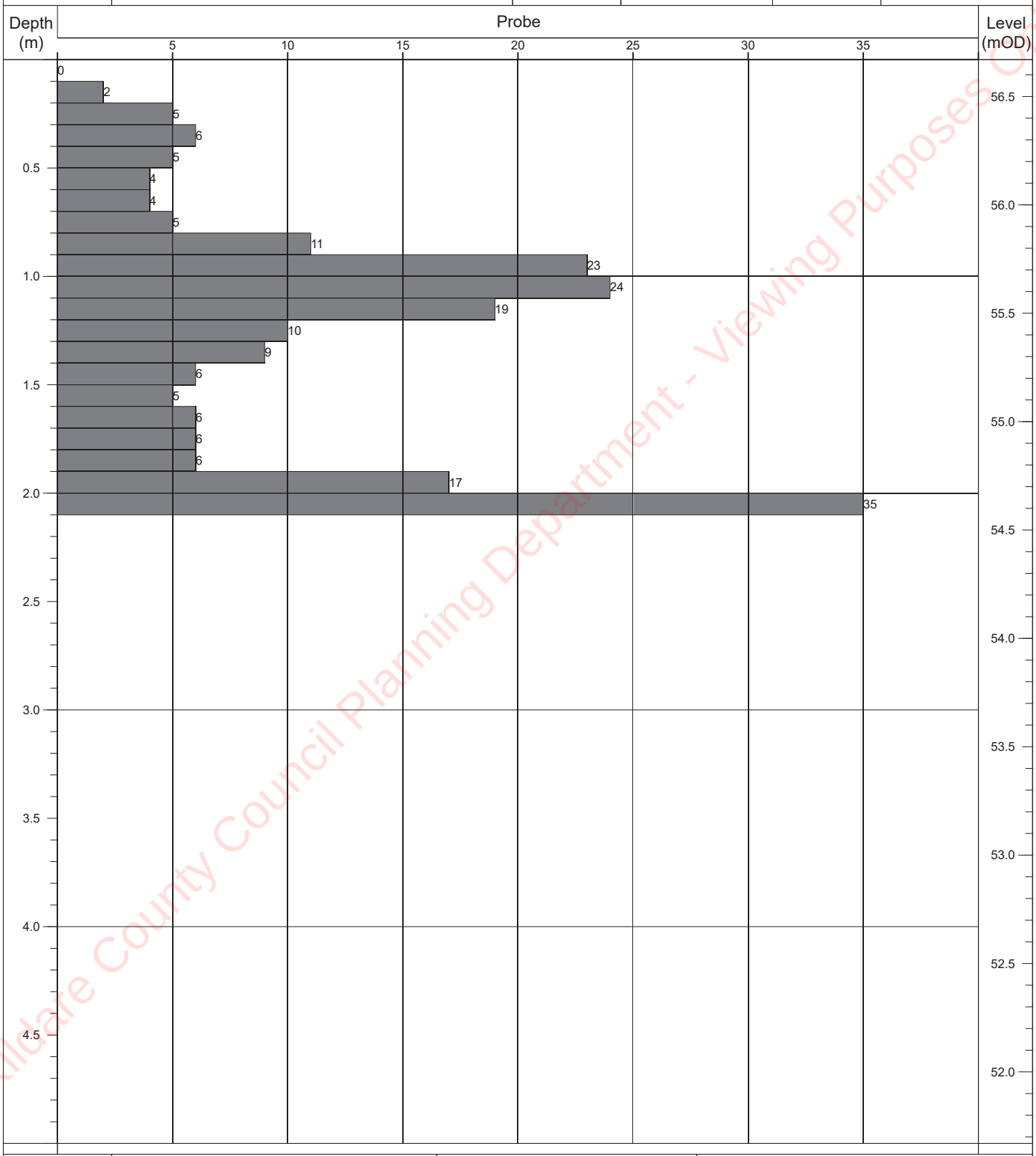
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
3.30m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	**Dynamic Probe Log**				Probe No: **DP44**
Contract:	Moygaddy	Easting:	693788.258	Date Started:	18/06/2021
Location:	Maynooth, Co. Meath	Northing:	739285.161	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	56.04	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



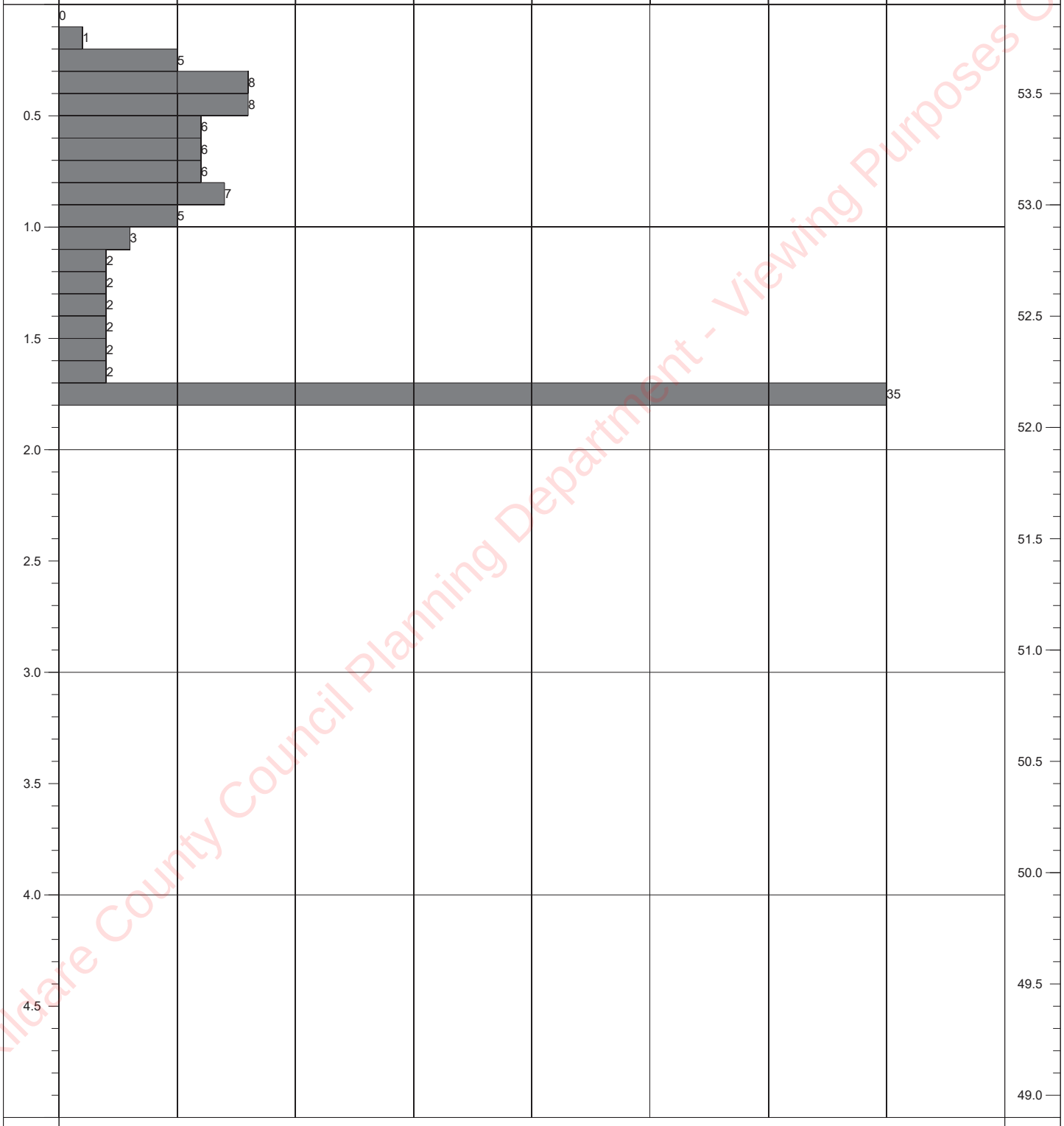
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
2.20m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	**Dynamic Probe Log**				Probe No: **DP45**
Contract:	Moygaddy	Easting:	694091.482	Date Started:	18/06/2021
Location:	Maynooth, Co. Meath	Northing:	739278.290	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	56.67	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



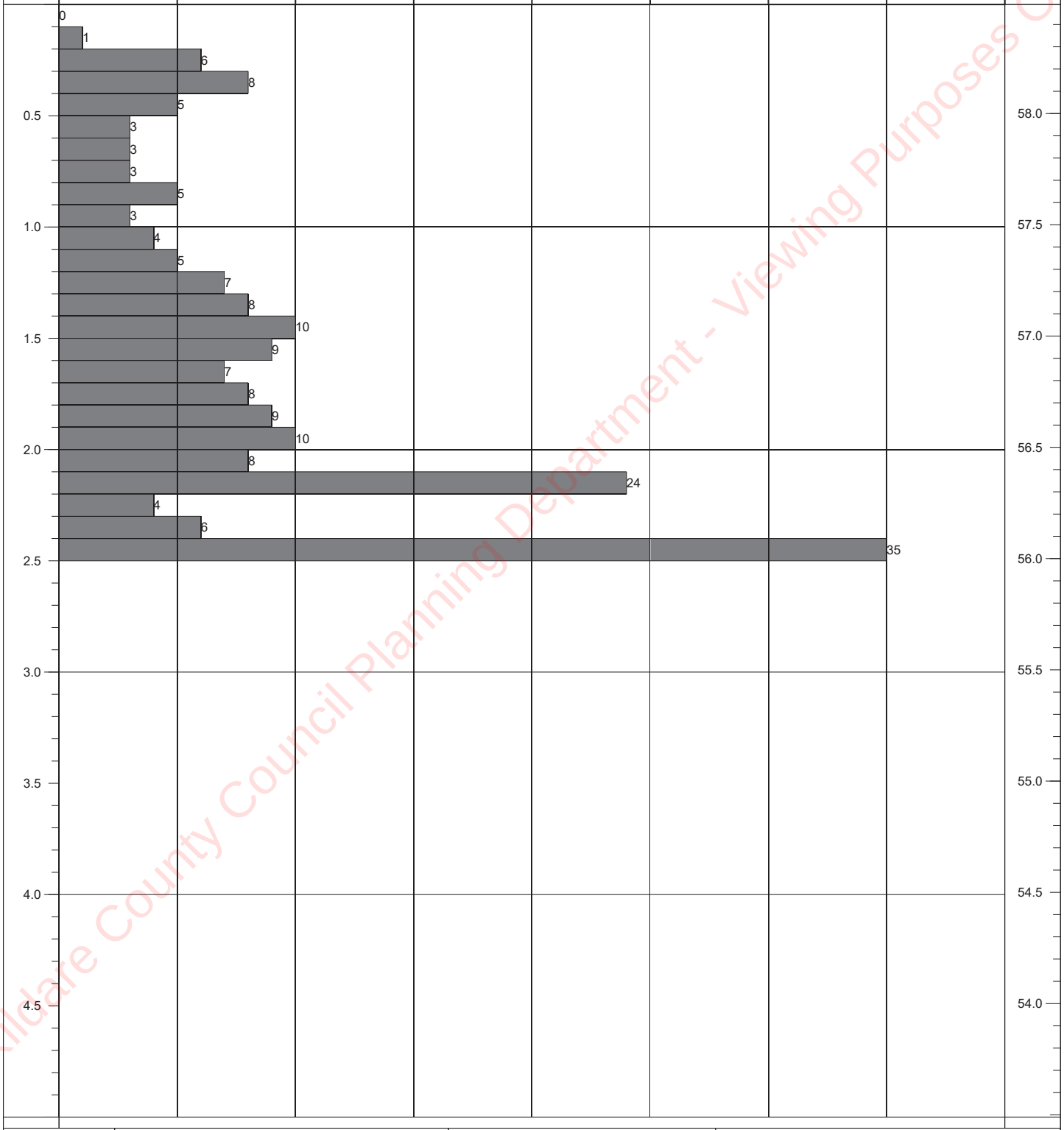
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
2.10m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	**Dynamic Probe Log**				Probe No: **DP46**
Contract:	Moygaddy	Easting:	694430.386	Date Started:	23/06/2021
Location:	Maynooth, Co. Meath	Northing:	739324.235	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	53.90	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



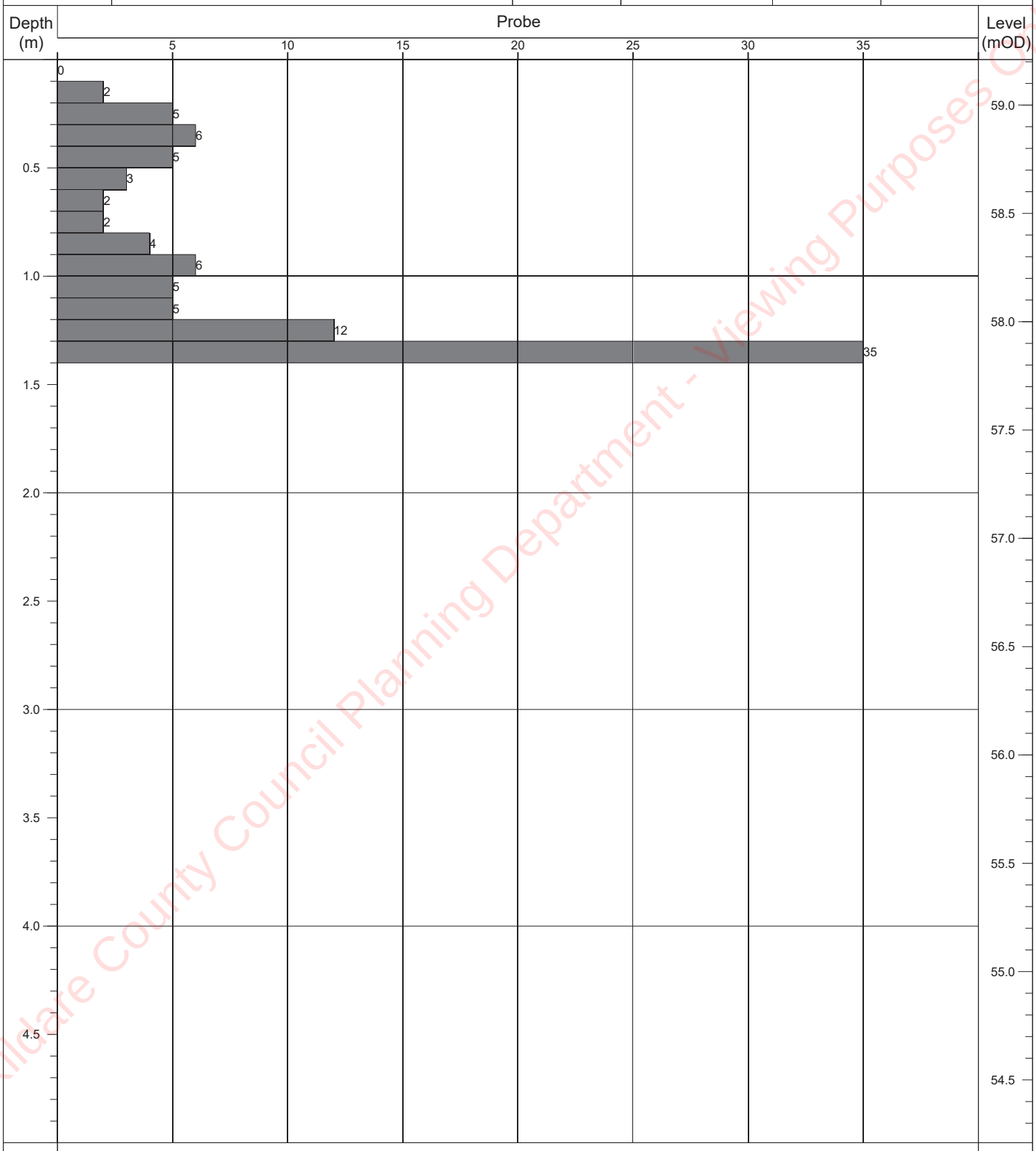
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
1.80m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	**Dynamic Probe Log**				Probe No: **DP47**
Contract:	Moygaddy	Easting:	694493.472	Date Started:	23/06/2021
Location:	Maynooth, Co. Meath	Northing:	739282.726	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	58.49	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



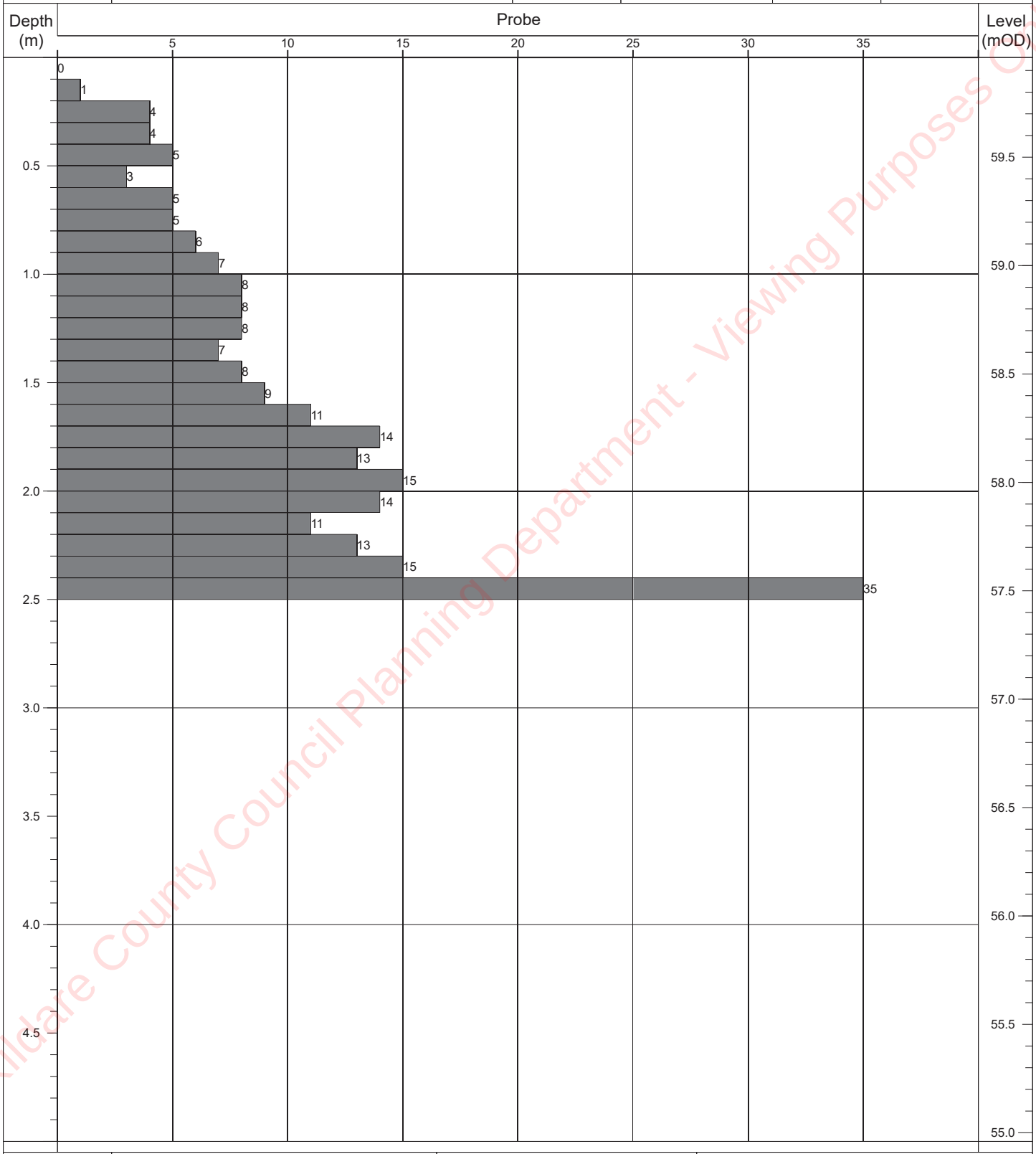
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
2.50m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	**Dynamic Probe Log**				Probe No: **DP48**
Contract:	Moygaddy	Easting:	694590.116	Date Started:	23/06/2021
Location:	Maynooth, Co. Meath	Northing:	739288.613	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	59.21	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



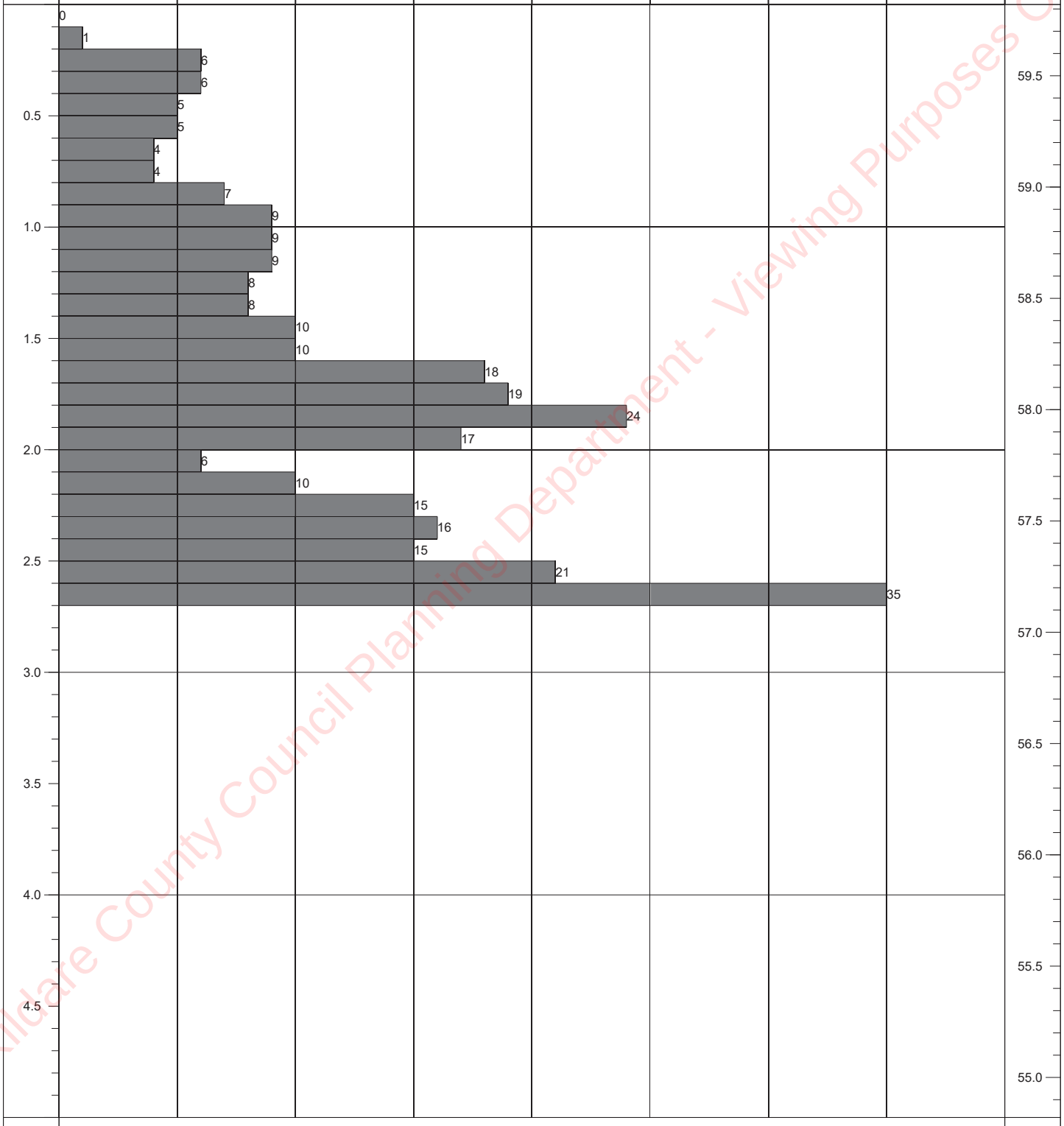
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
1.40m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	**Dynamic Probe Log**				Probe No: **DP49**
Contract:	Moygaddy	Easting:	694682.452	Date Started:	23/06/2021
Location:	Maynooth, Co. Meath	Northing:	739291.233	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	59.96	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



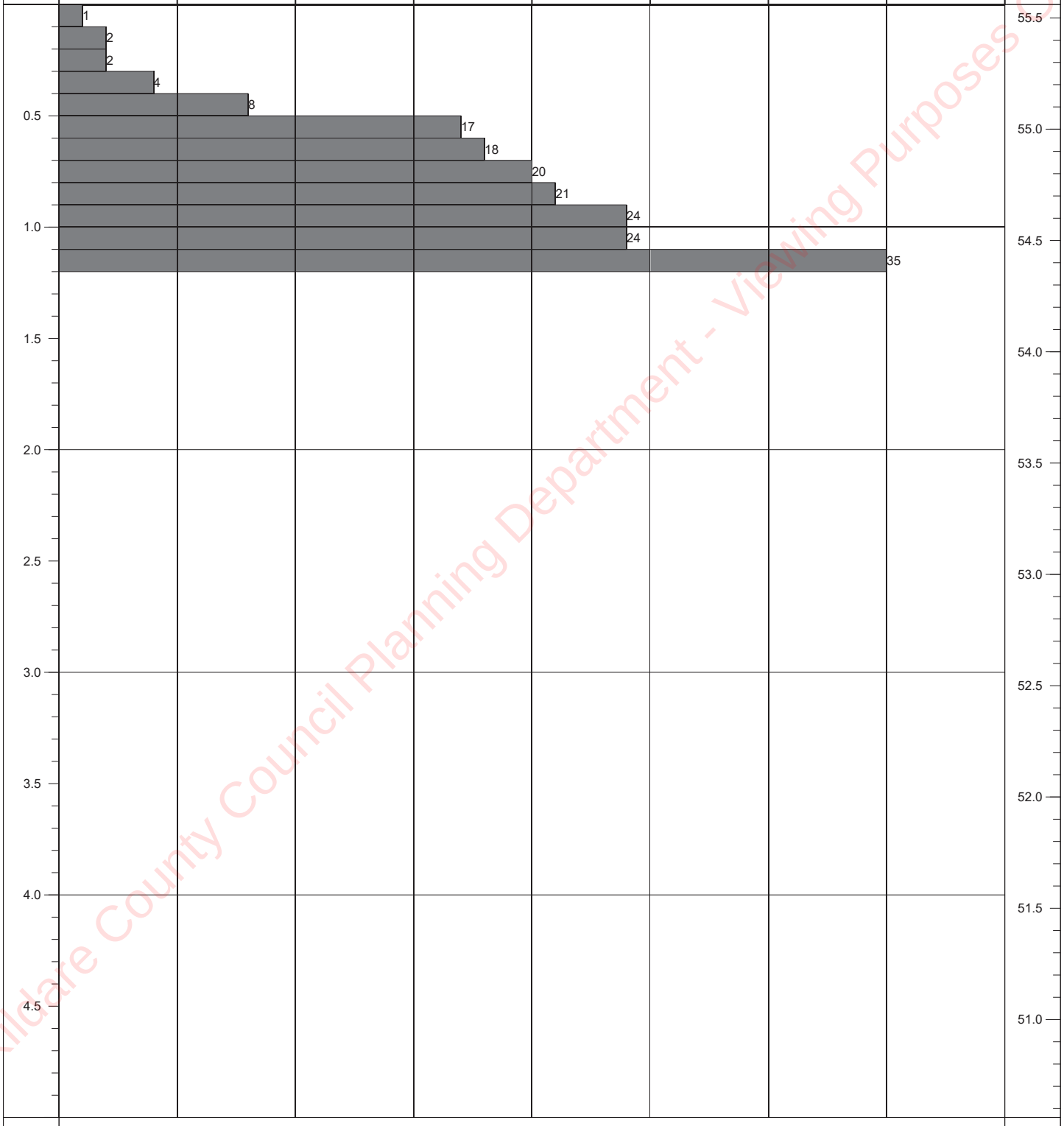
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
2.50m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	**Dynamic Probe Log**				Probe No: **DP50**
Contract:	Moygaddy	Easting:	694788.363	Date Started:	23/06/2021
Location:	Maynooth, Co. Meath	Northing:	739288.137	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	59.82	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



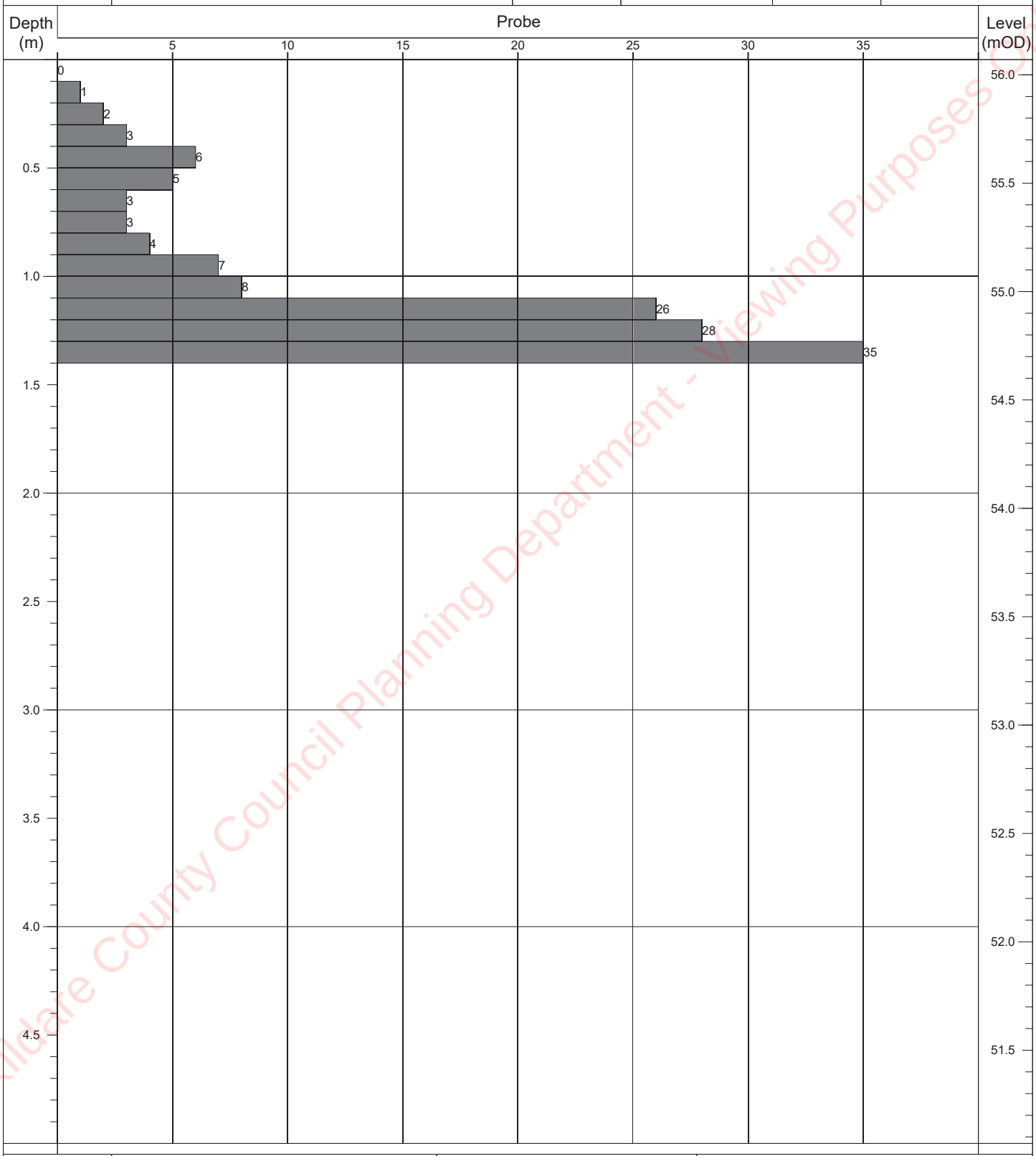
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
2.70m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	**Dynamic Probe Log**				Probe No: **DP51**
Contract:	Moygaddy	Easting:	693890.121	Date Started:	18/06/2021
Location:	Maynooth, Co. Meath	Northing:	739187.554	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	55.56	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



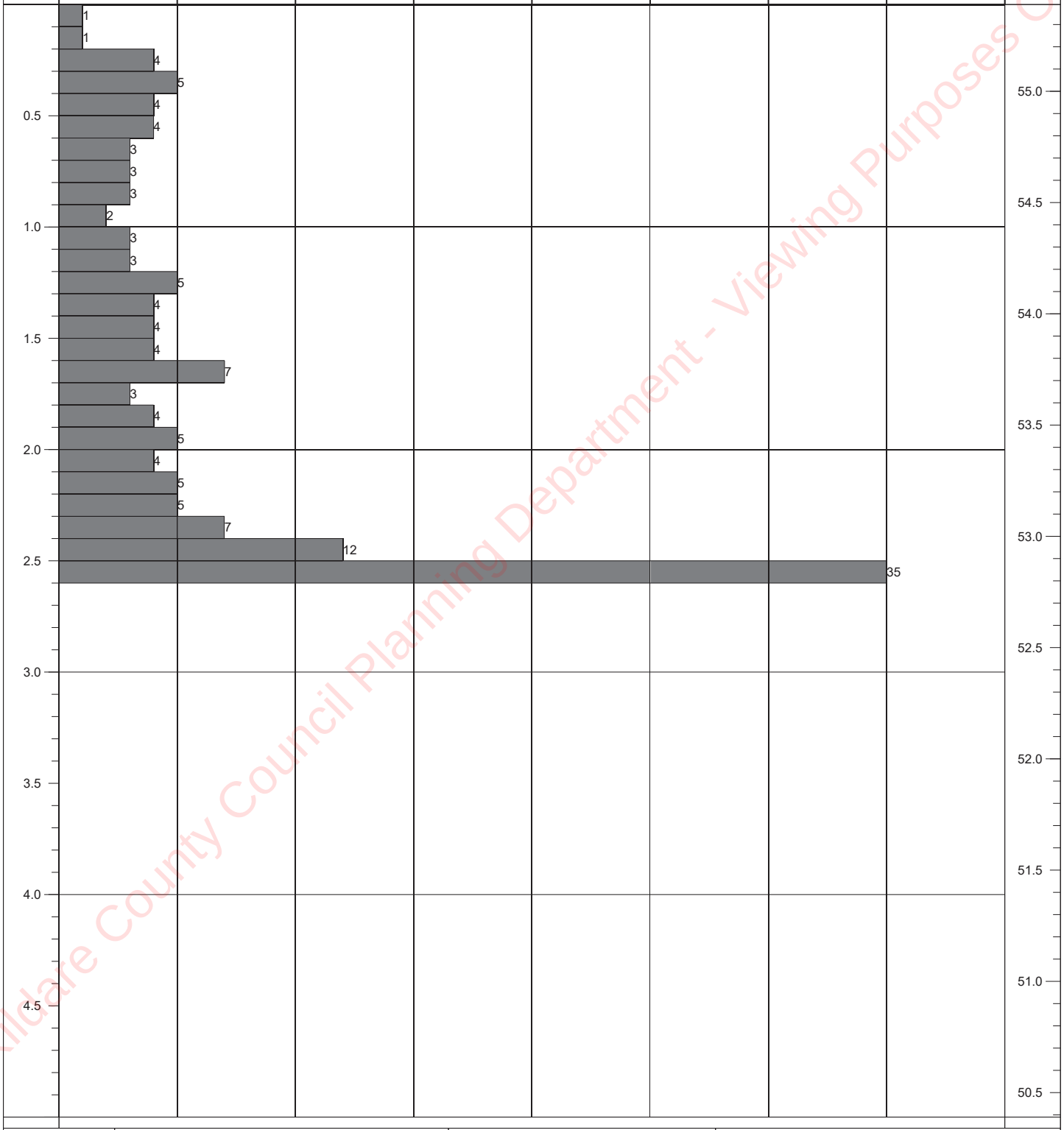
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
1.20m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	**Dynamic Probe Log**				Probe No: **DP52**
Contract:	Moygaddy	Easting:	693984.693	Date Started:	18/06/2021
Location:	Maynooth, Co. Meath	Northing:	739184.950	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	56.07	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



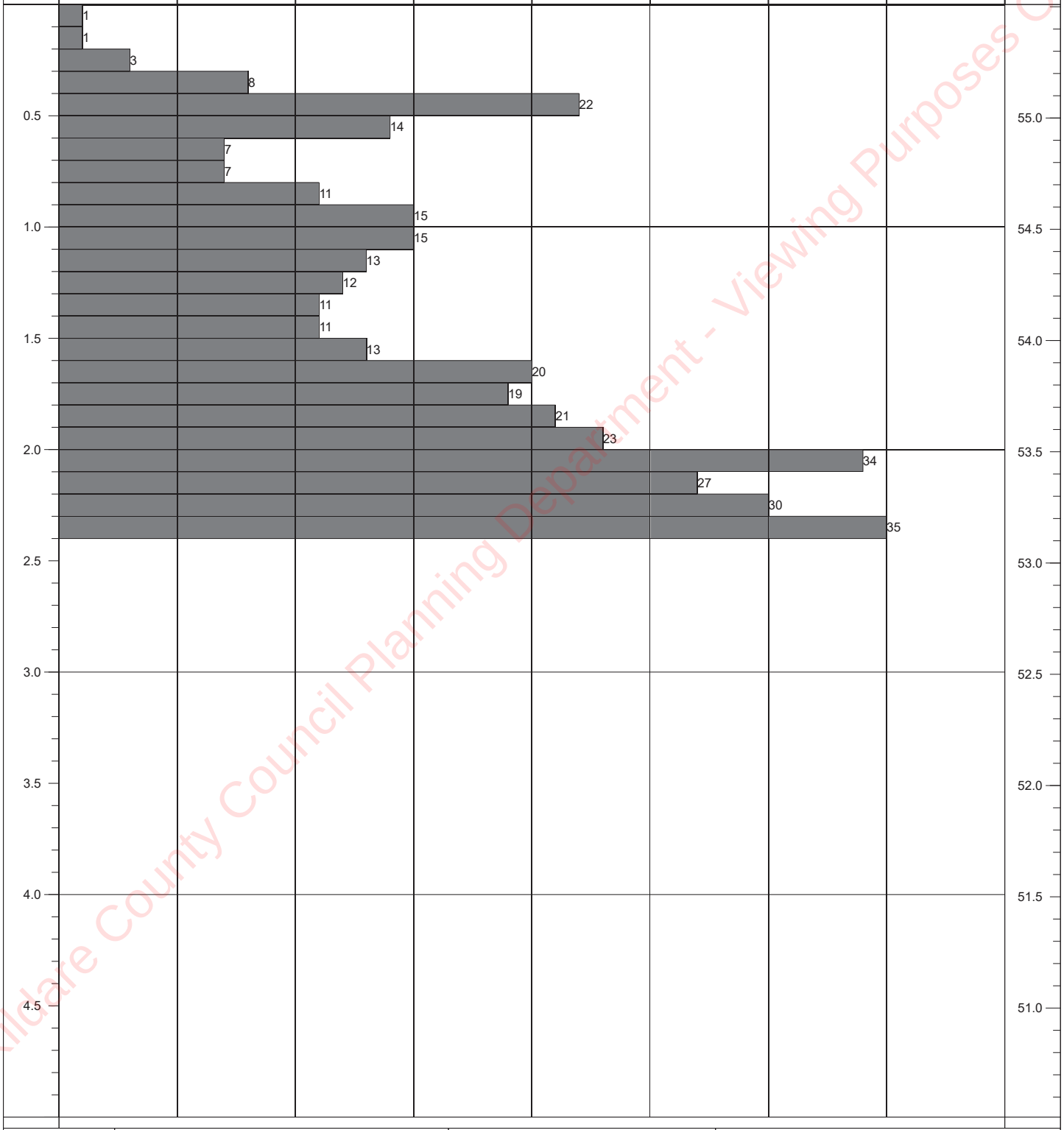
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
1.40m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	**Dynamic Probe Log**				Probe No: **DP53**
Contract:	Moygaddy	Easting:	694089.481	Date Started:	18/06/2021
Location:	Maynooth, Co. Meath	Northing:	739189.955	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	55.39	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



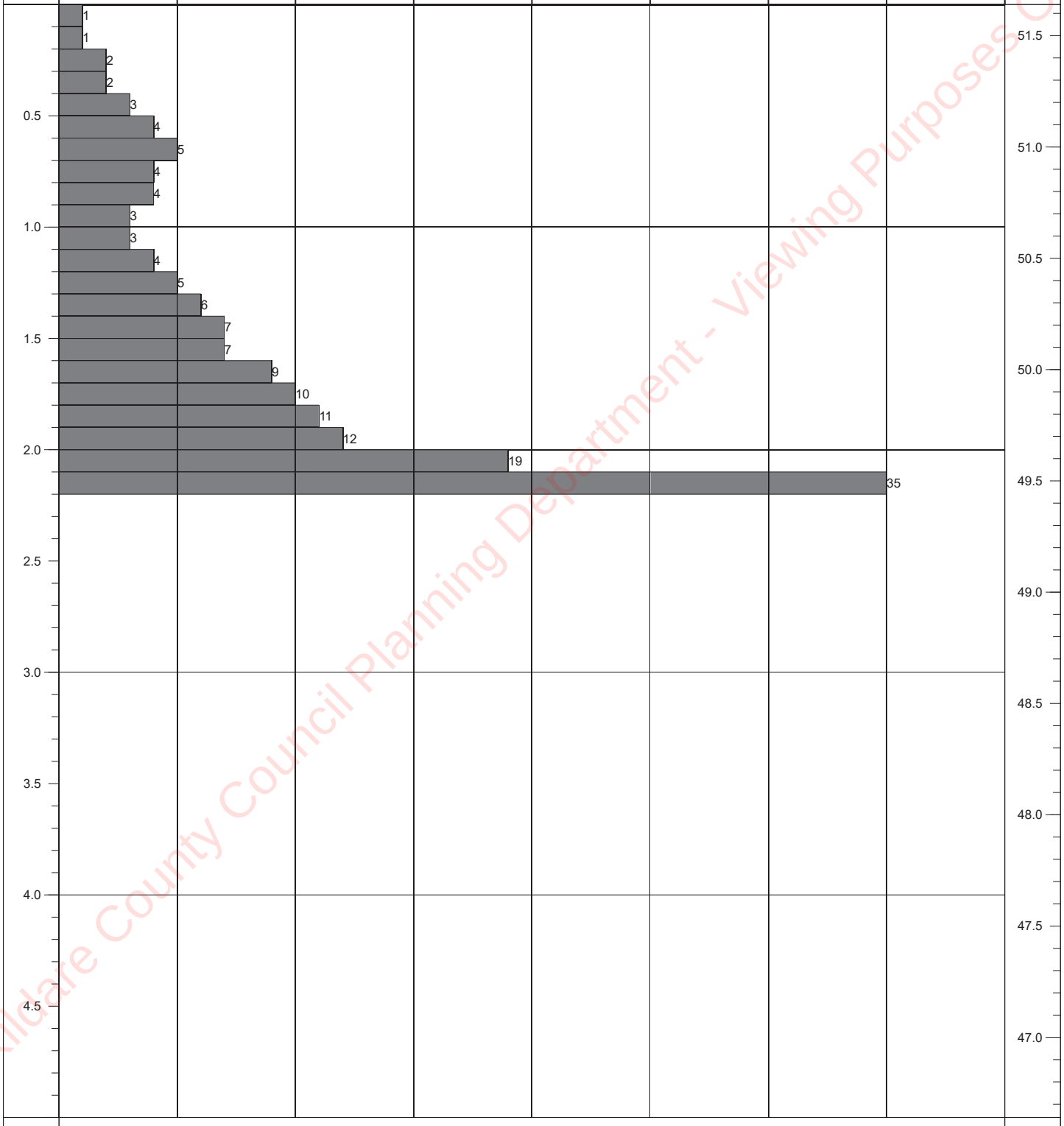
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
2.60m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	**Dynamic Probe Log**				Probe No: **DP54**
Contract:	Moygaddy	Easting:	694189.069	Date Started:	18/06/2021
Location:	Maynooth, Co. Meath	Northing:	739183.974	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	55.51	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



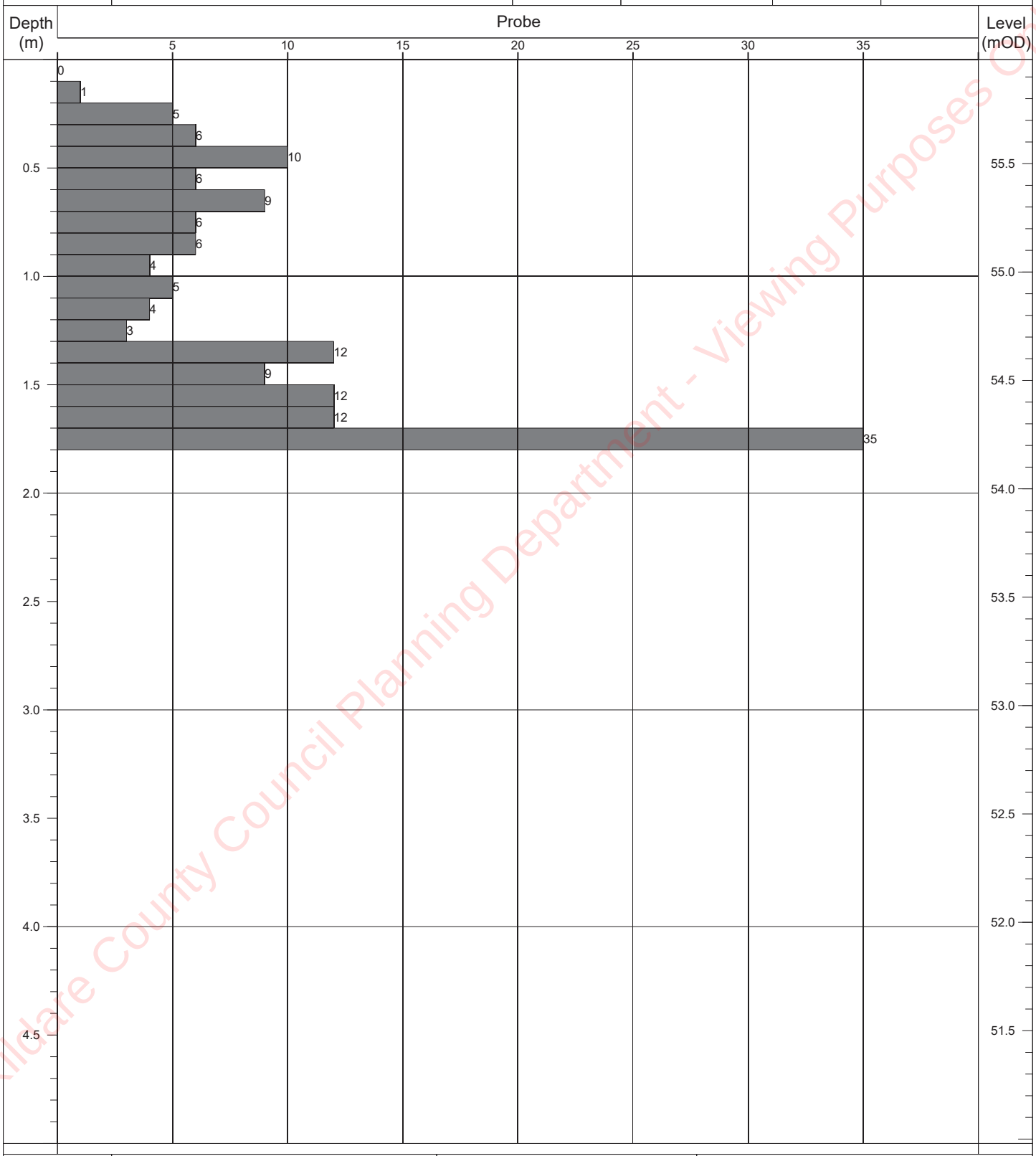
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
2.40m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	**Dynamic Probe Log**				Probe No: **DP55**
Contract:	Moygaddy	Easting:	694250.676	Date Started:	18/06/2021
Location:	Maynooth, Co. Meath	Northing:	739180.873	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	51.64	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



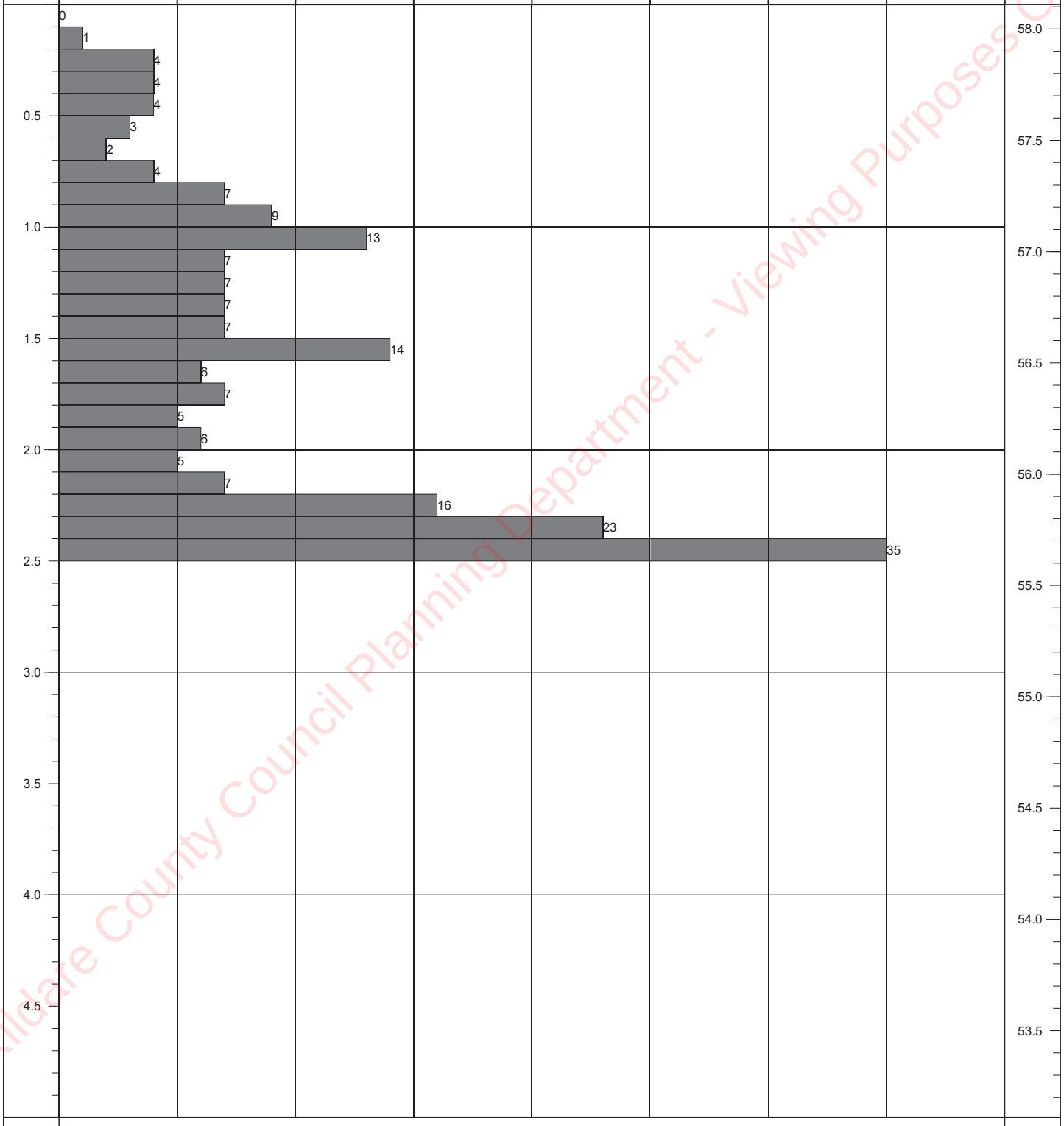
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
2.20m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	**Dynamic Probe Log**				Probe No: **DP56**
Contract:	Moygaddy	Easting:	694409.931	Date Started:	21/06/2021
Location:	Maynooth, Co. Meath	Northing:	739184.774	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	55.98	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



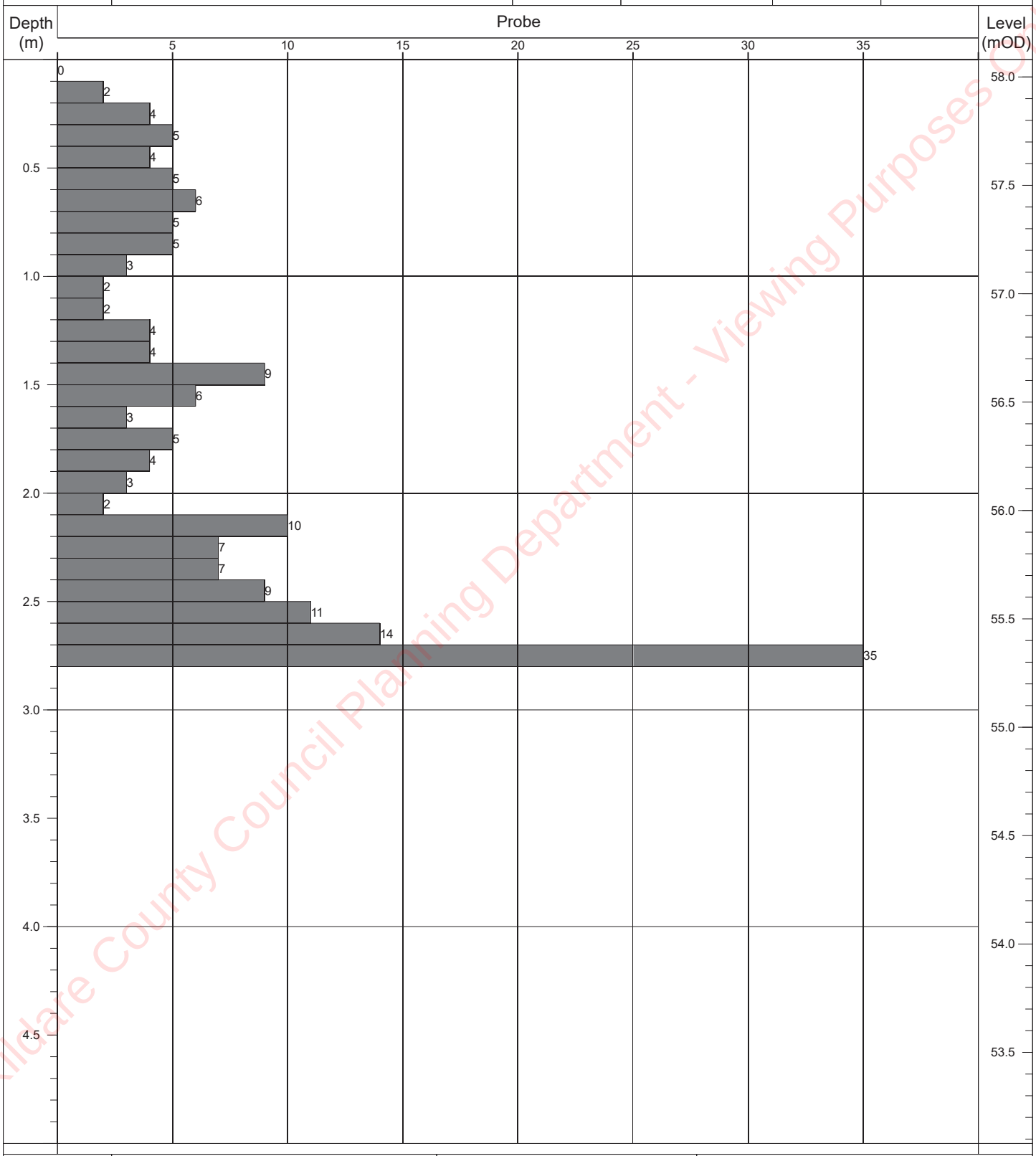
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
1.80m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	**Dynamic Probe Log**				Probe No: **DP57**
Contract:	Moygaddy	Easting:	694513.646	Date Started:	23/06/2021
Location:	Maynooth, Co. Meath	Northing:	739200.814	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	58.11	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



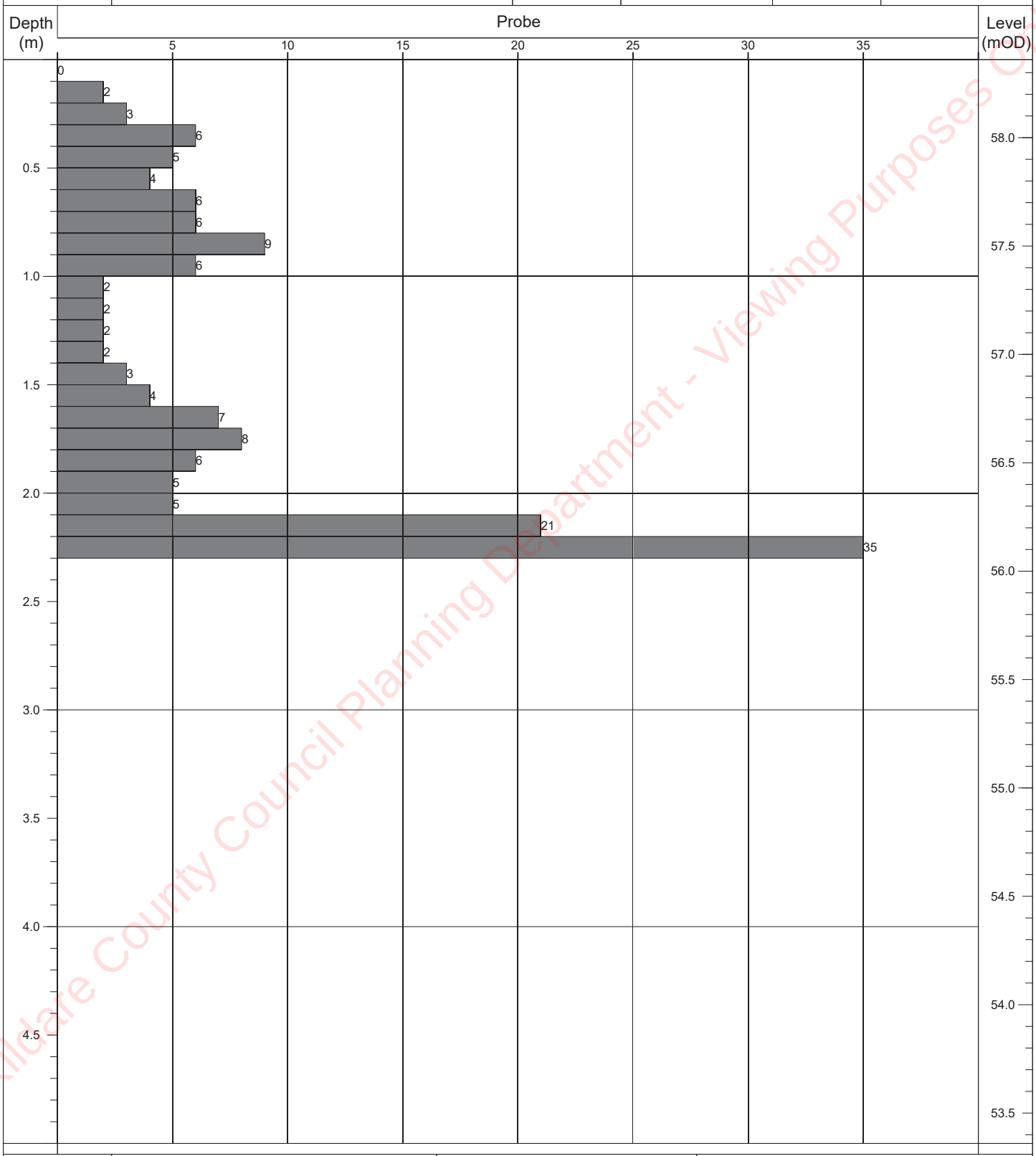
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
2.50m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	**Dynamic Probe Log**				Probe No: **DP58**
Contract:	Moygaddy	Easting:	694584.206	Date Started:	23/06/2021
Location:	Maynooth, Co. Meath	Northing:	739182.489	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	58.08	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



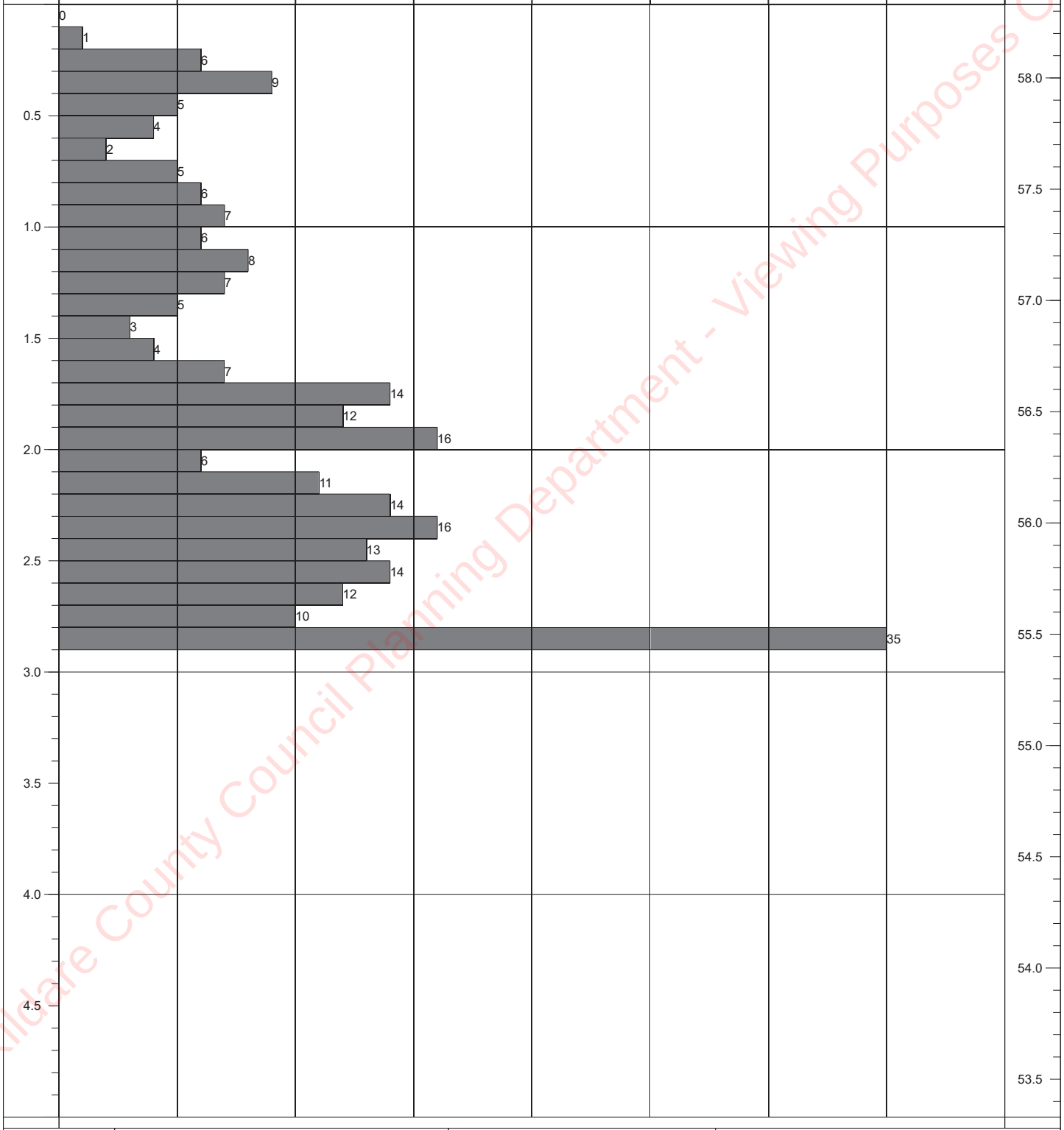
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
2.80m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	**Dynamic Probe Log**				Probe No: **DP59**
Contract:	Moygaddy	Easting:	694690.632	Date Started:	23/06/2021
Location:	Maynooth, Co. Meath	Northing:	739192.594	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	58.36	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



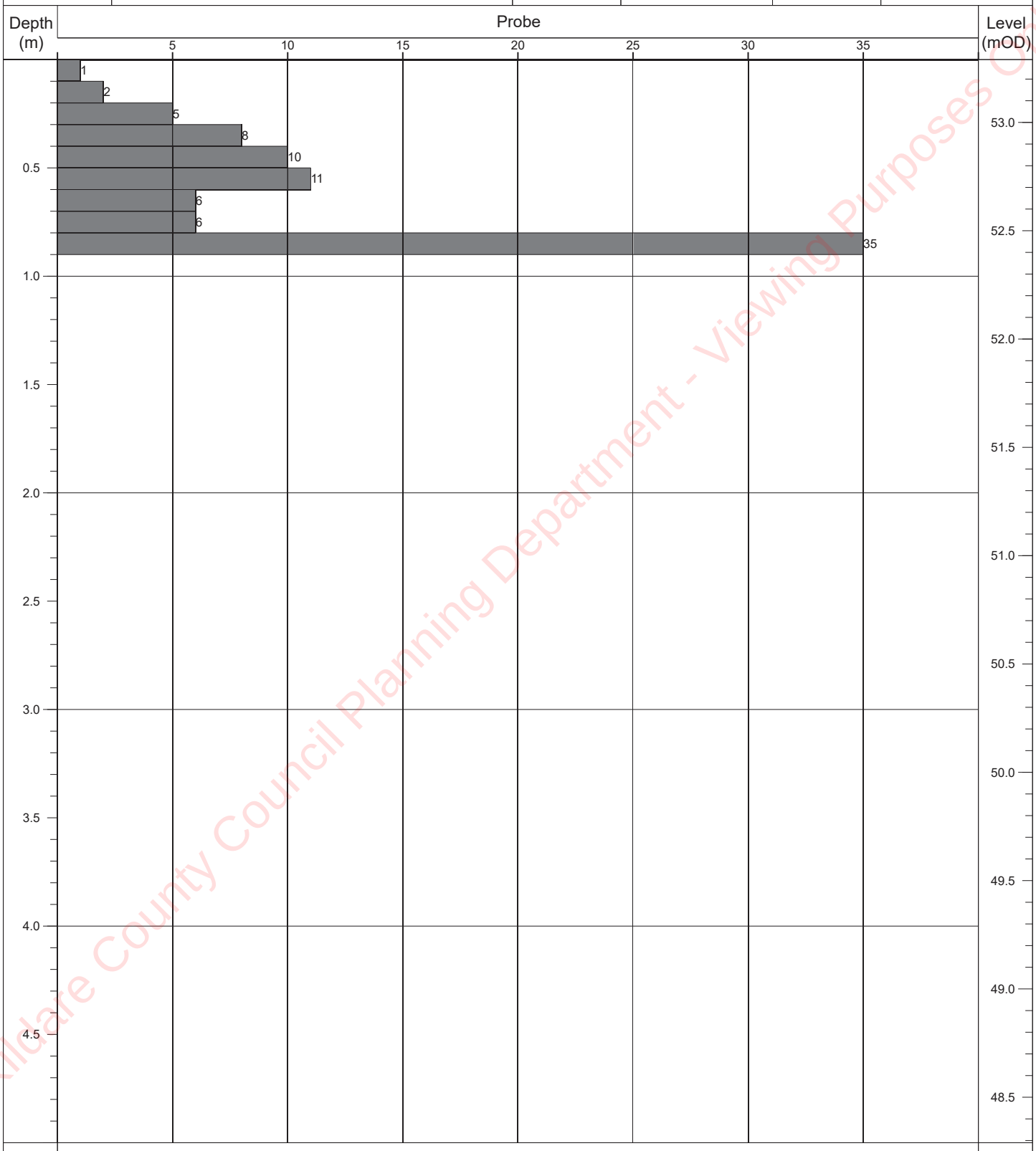
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
2.30m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	**Dynamic Probe Log**				Probe No: **DP60**
Contract:	Moygaddy	Easting:	694784.383	Date Started:	23/06/2021
Location:	Maynooth, Co. Meath	Northing:	739187.502	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	58.33	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



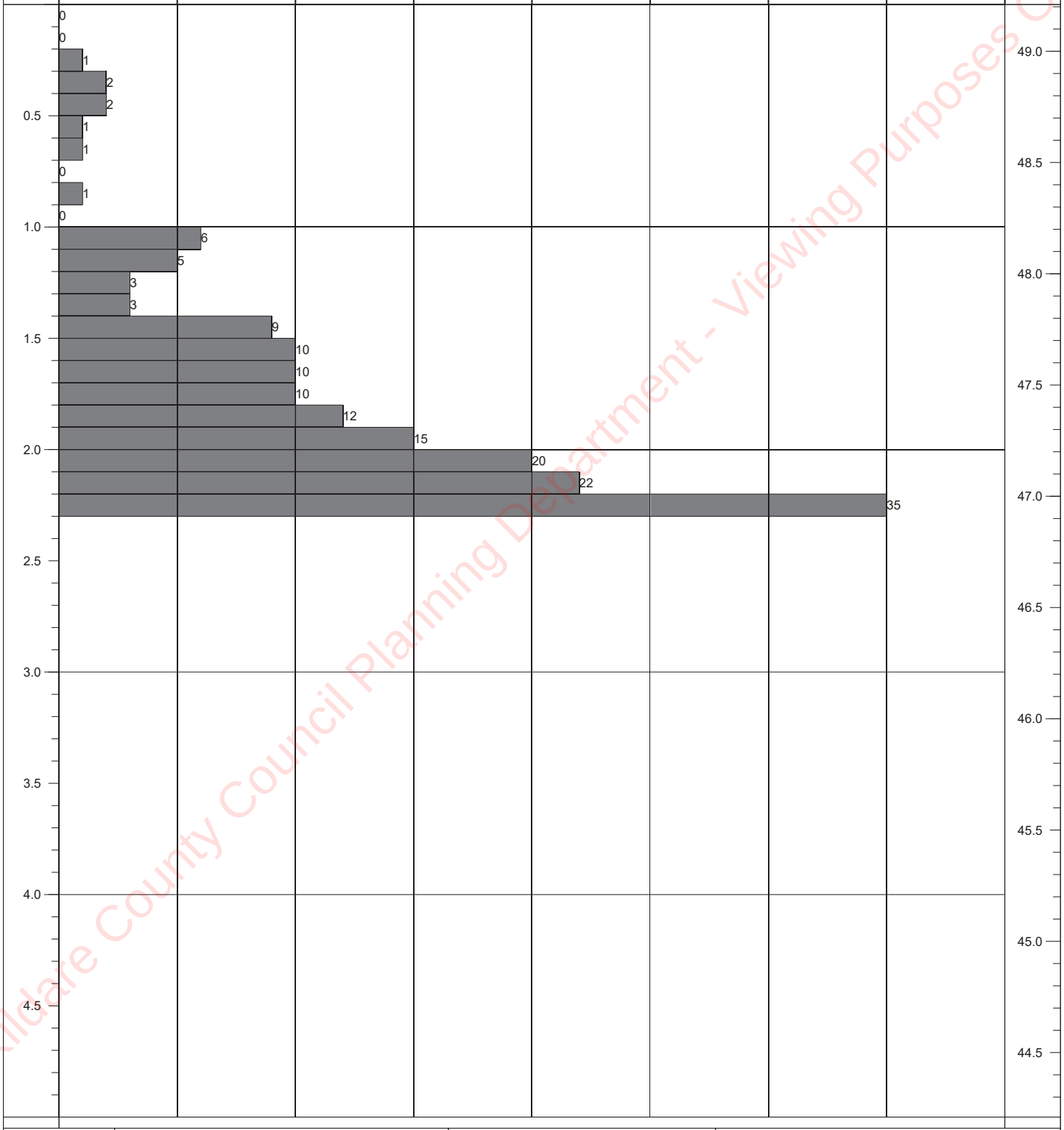
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
2.90m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	Dynamic Probe Log				Probe No: DP61
Contract:	Moygaddy	Easting:	693991.061	Date Started:	18/06/2021
Location:	Maynooth, Co. Meath	Northing:	739083.755	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	53.29	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



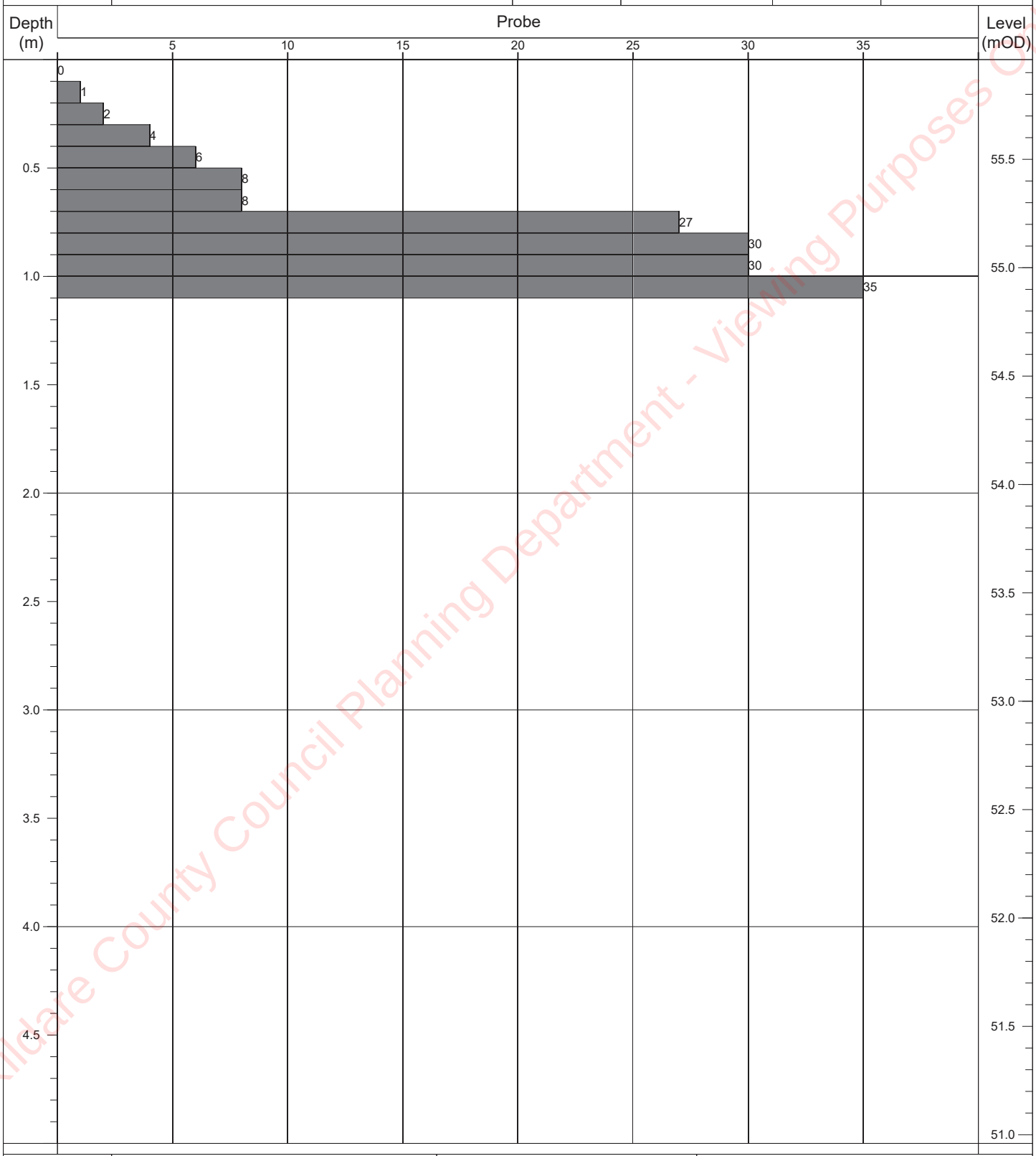
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
0.90m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	**Dynamic Probe Log**				Probe No: **DP62**
Contract:	Moygaddy	Easting:	694185.443	Date Started:	18/06/2021
Location:	Maynooth, Co. Meath	Northing:	739087.742	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	49.21	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



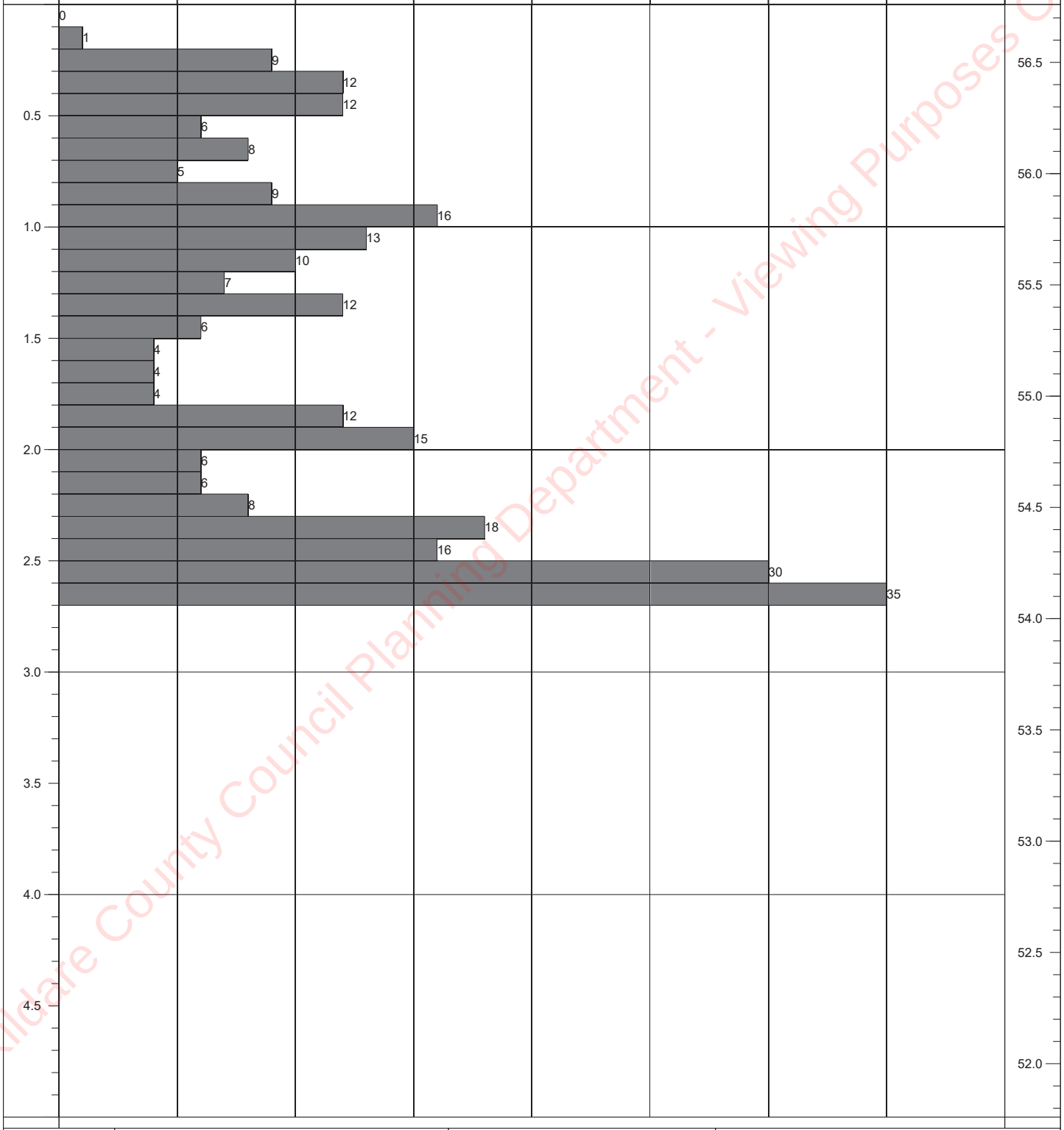
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
2.30m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	**Dynamic Probe Log**				Probe No: **DP63**
Contract:	Moygaddy	Easting:	694290.240	Date Started:	18/06/2021
Location:	Maynooth, Co. Meath	Northing:	739085.762	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	55.96	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



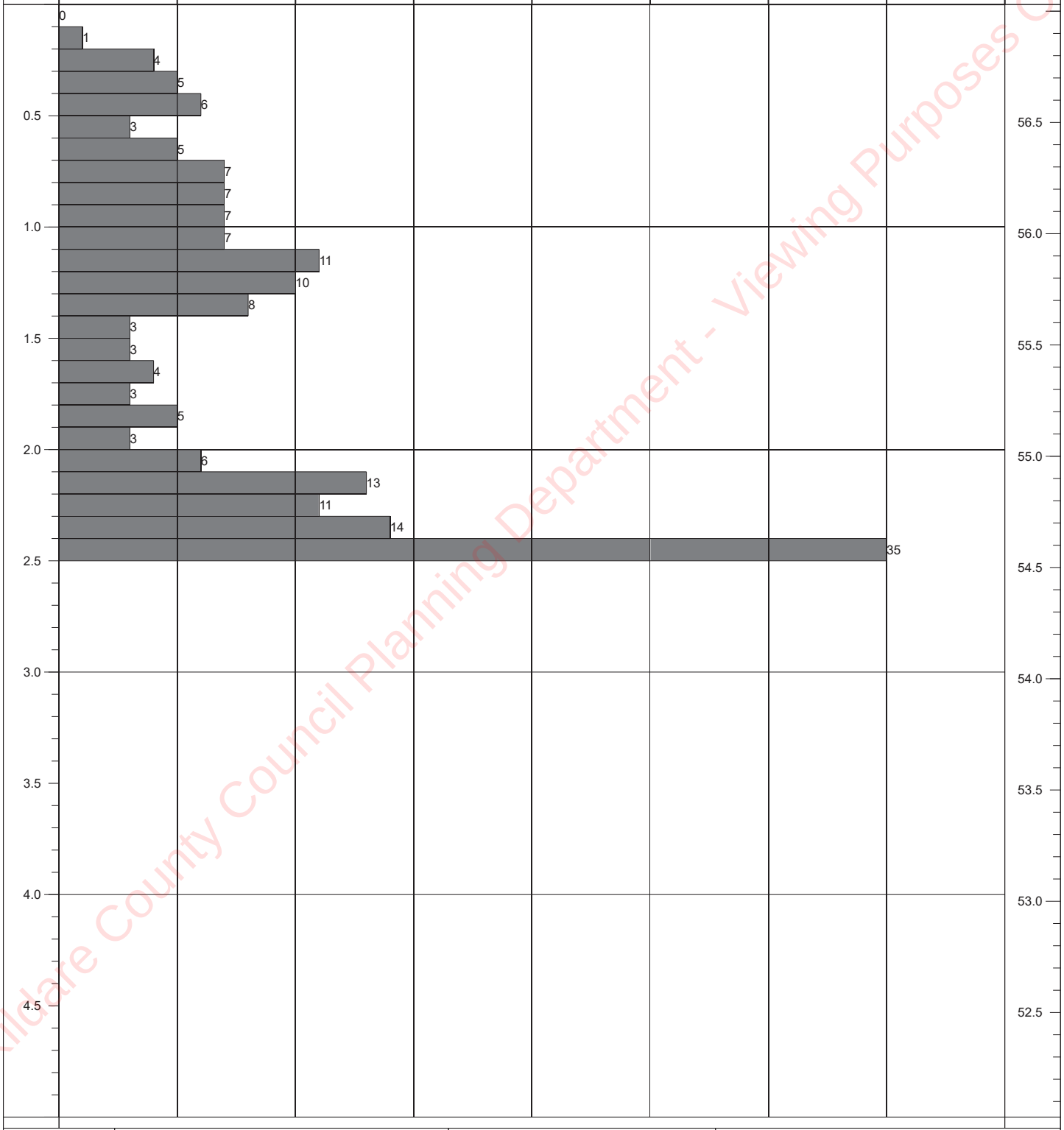
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
1.10m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	**Dynamic Probe Log**				Probe No: **DP64**
Contract:	Moygaddy	Easting:	694385.154	Date Started:	18/06/2021
Location:	Maynooth, Co. Meath	Northing:	739082.180	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	56.76	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



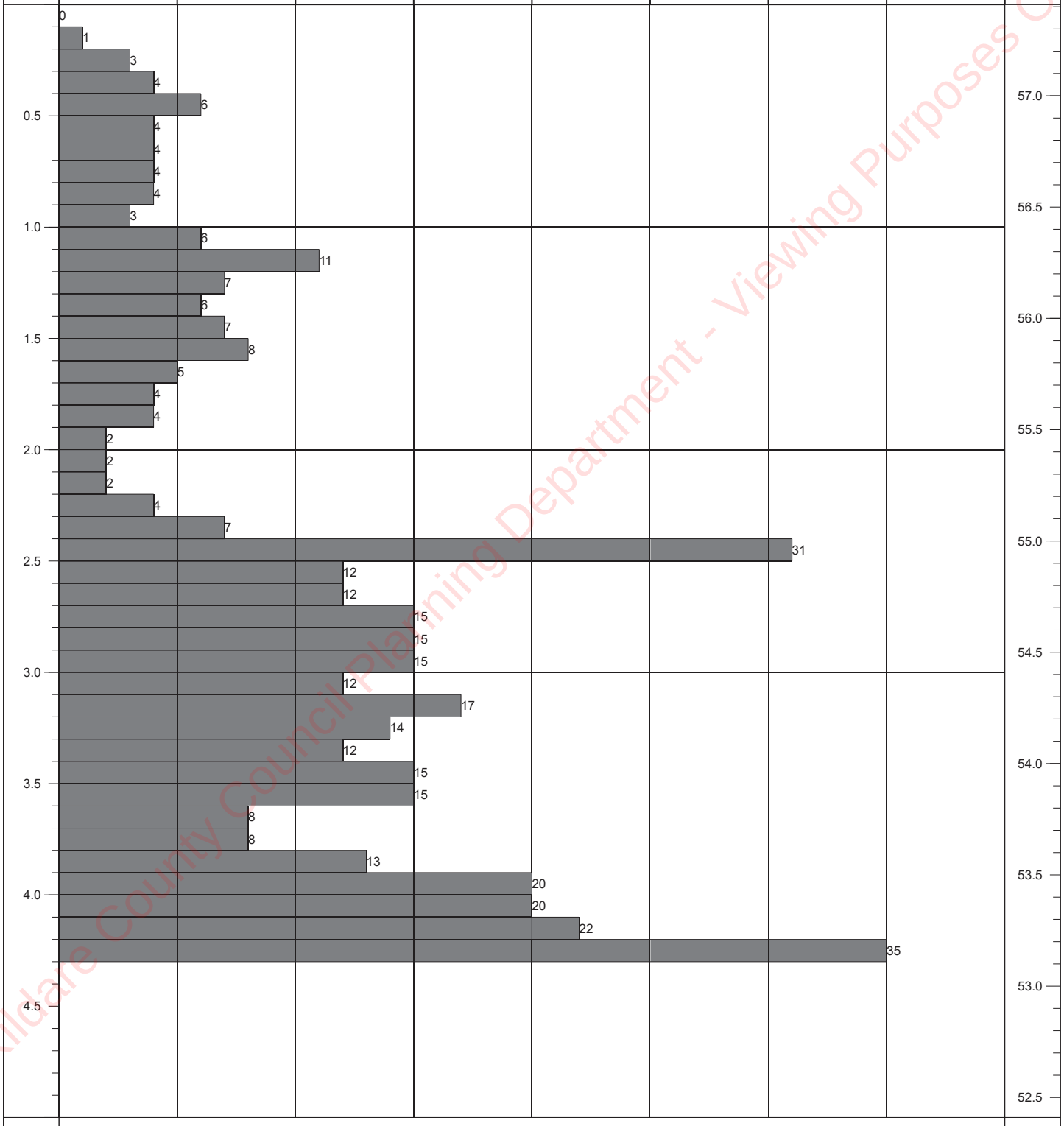
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
2.70m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	**Dynamic Probe Log**				Probe No: **DP65**
Contract:	Moygaddy	Easting:	694488.362	Date Started:	21/06/2021
Location:	Maynooth, Co. Meath	Northing:	739086.289	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	57.03	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



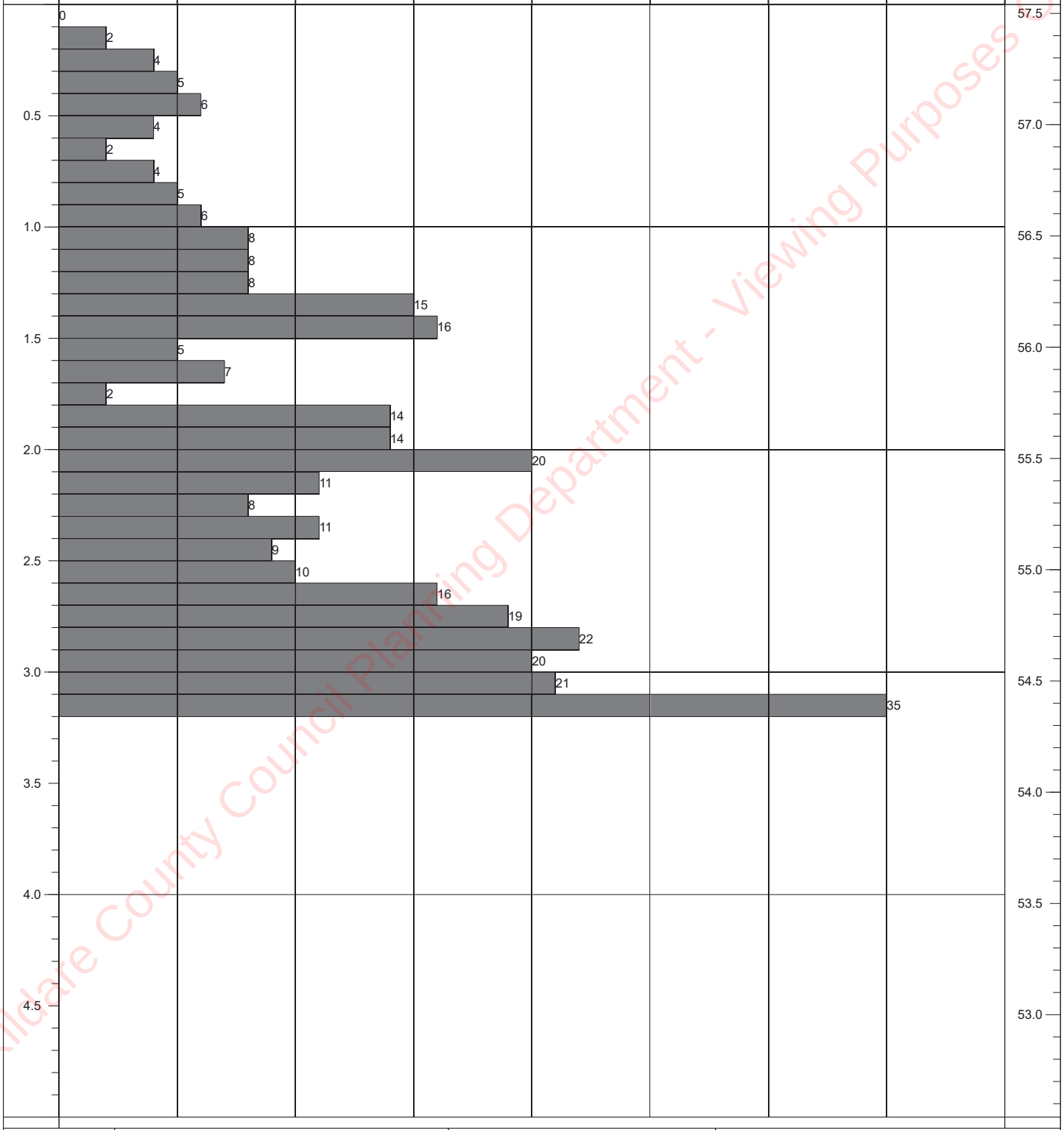
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
2.50m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	**Dynamic Probe Log**				Probe No: **DP66**
Contract:	Moygaddy	Easting:	694588.543	Date Started:	21/06/2021
Location:	Maynooth, Co. Meath	Northing:	739090.206	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	57.41	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



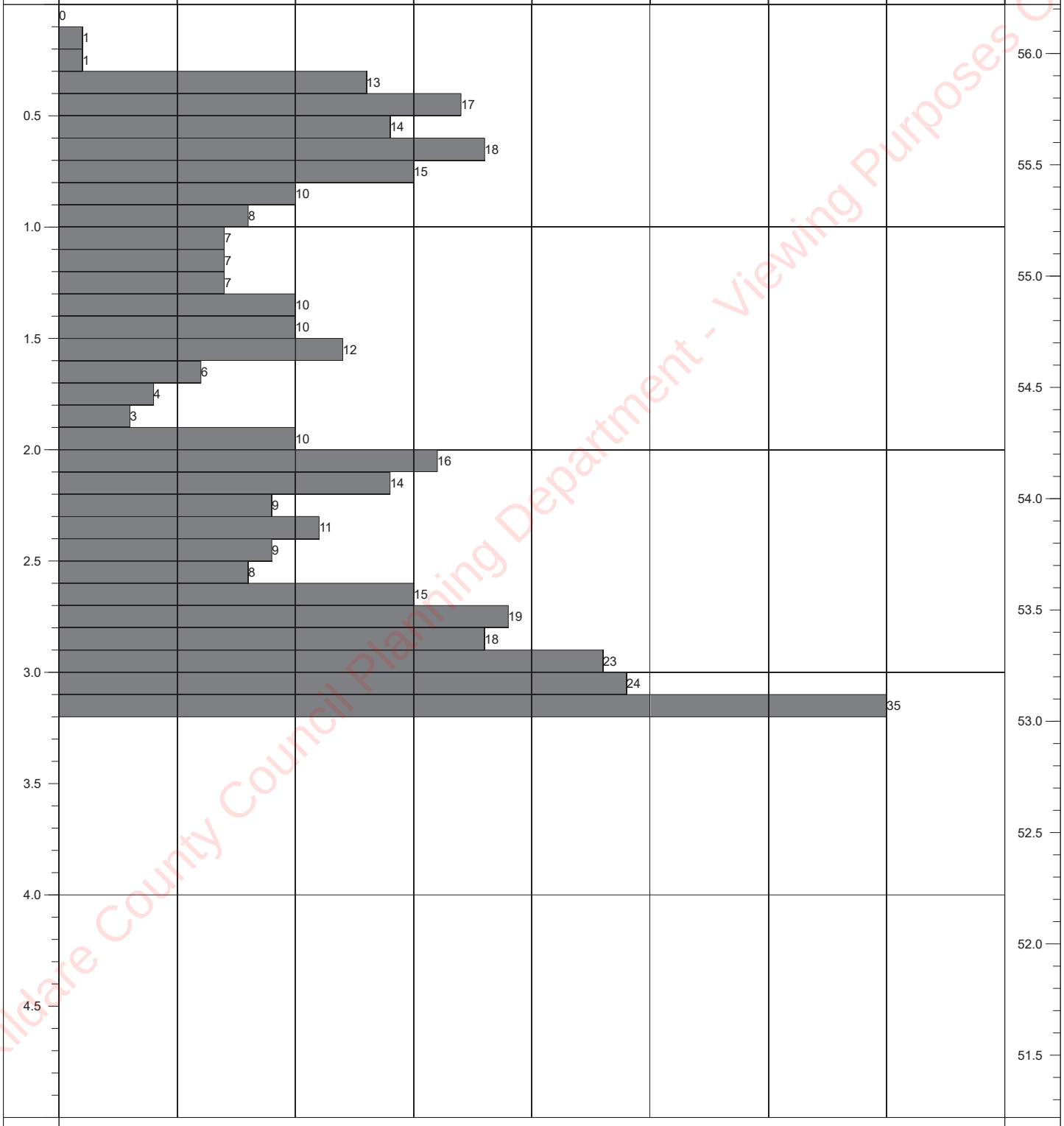
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
4.30m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	**Dynamic Probe Log**				Probe No: **DP67**
Contract:	Moygaddy	Easting:	694682.814	Date Started:	23/06/2021
Location:	Maynooth, Co. Meath	Northing:	739084.421	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	57.54	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



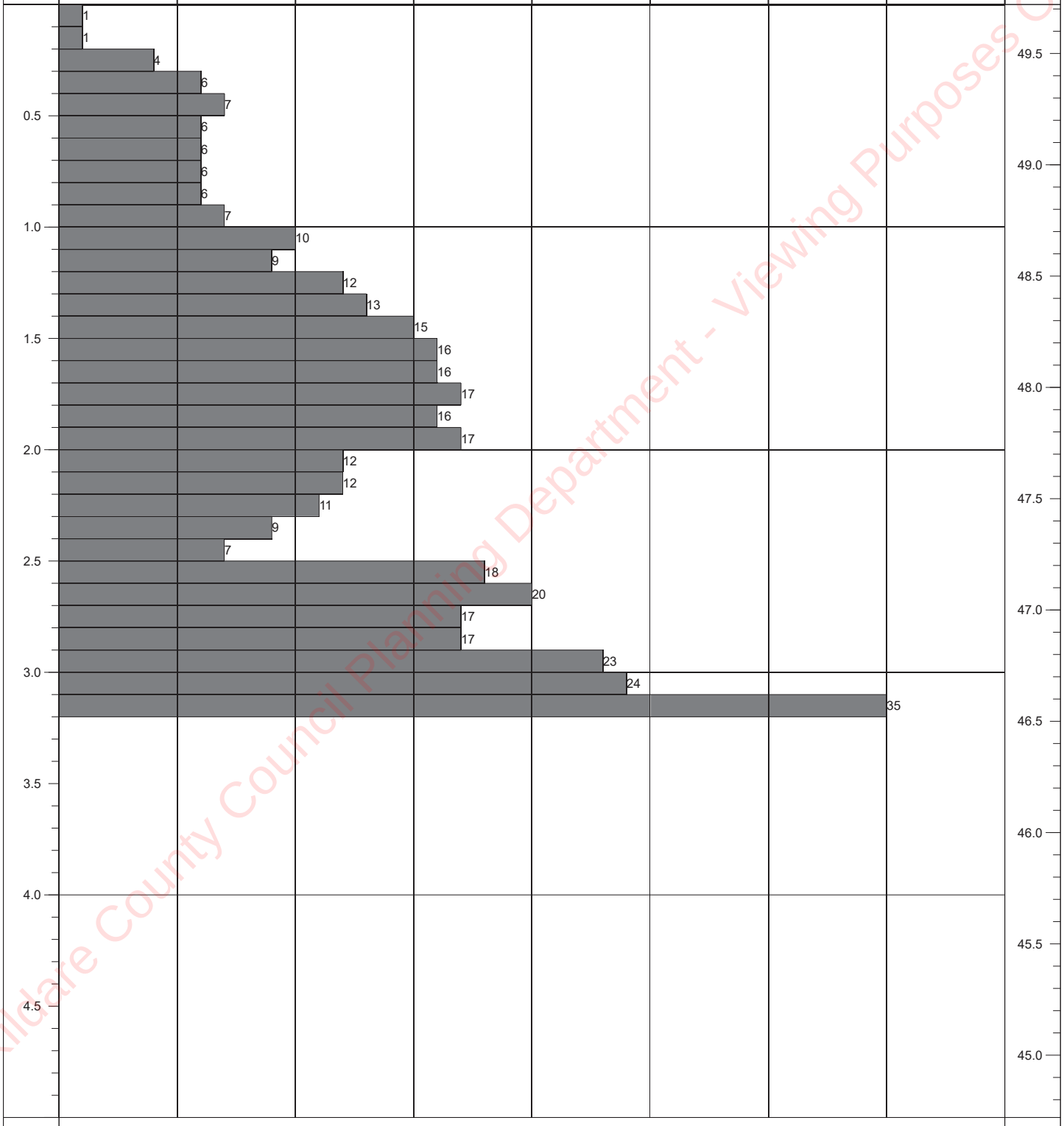
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
3.20m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	**Dynamic Probe Log**				Probe No: **DP68**
Contract:	Moygaddy	Easting:	694787.254	Date Started:	23/06/2021
Location:	Maynooth, Co. Meath	Northing:	739083.914	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	56.22	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



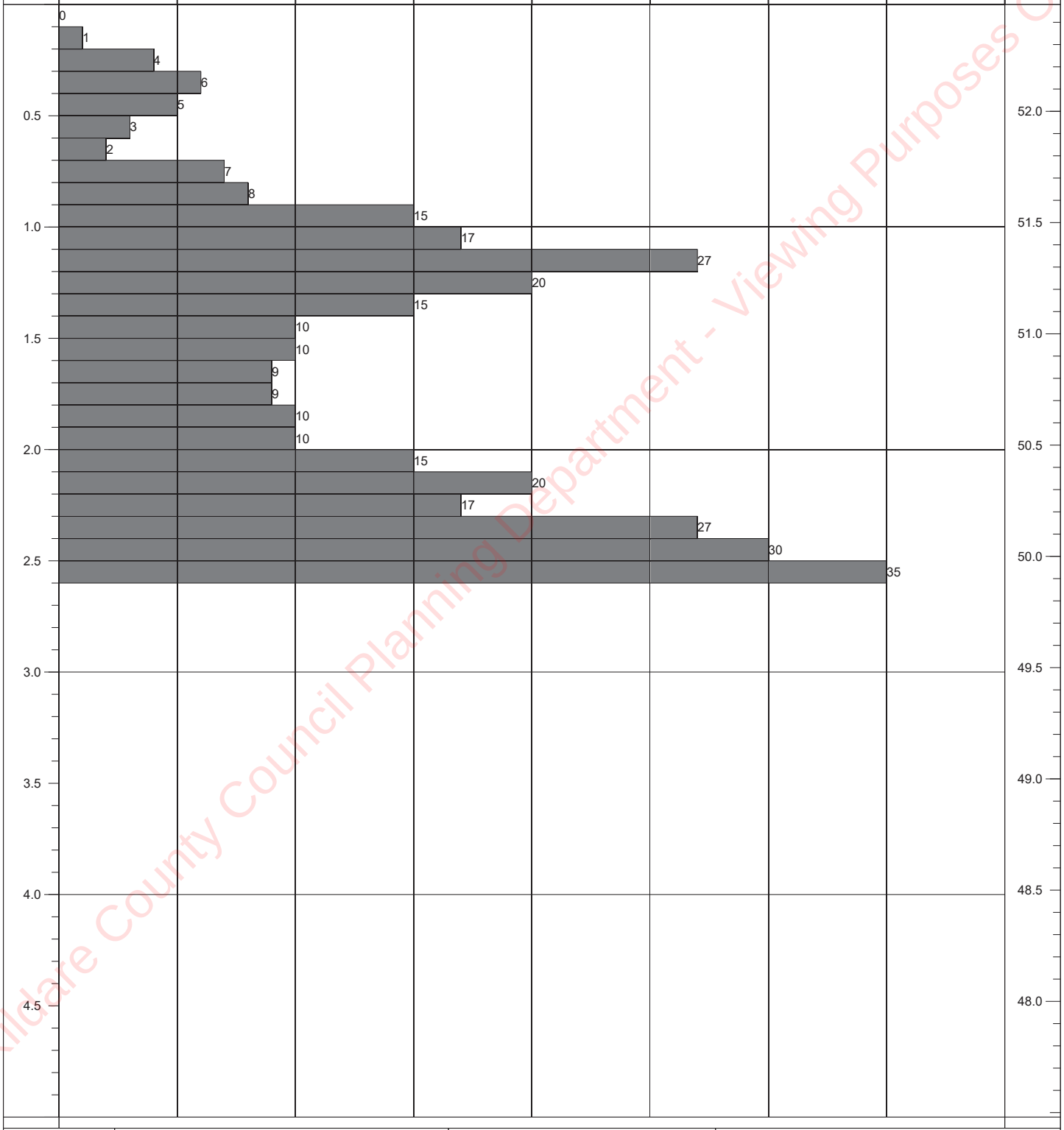
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
3.20m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	**Dynamic Probe Log**				Probe No: **DP69**
Contract:	Moygaddy	Easting:	694090.959	Date Started:	18/06/2021
Location:	Maynooth, Co. Meath	Northing:	738991.035	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	49.72	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



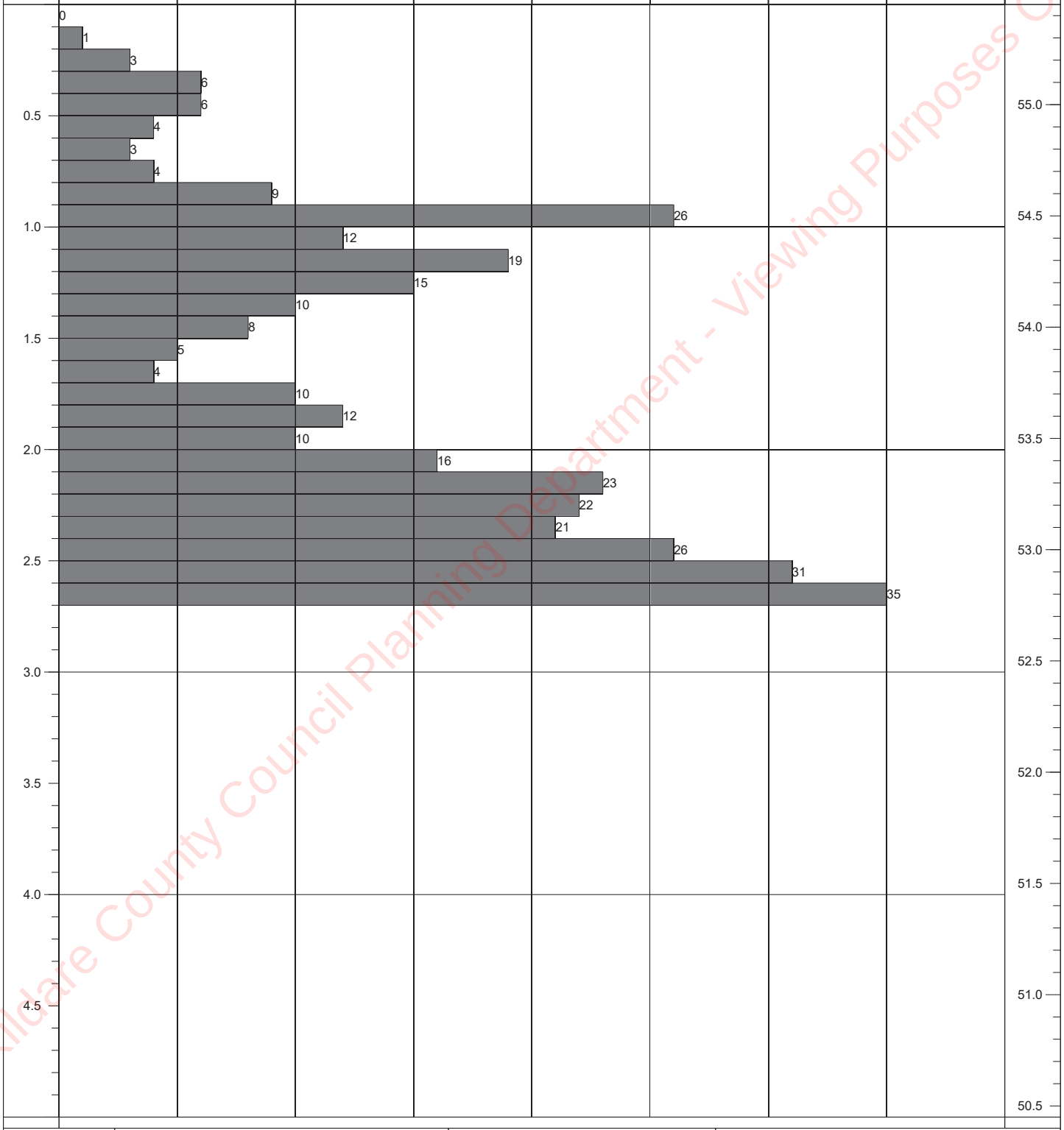
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
3.20m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	Dynamic Probe Log				Probe No: DP70
Contract:	Moygaddy	Easting:	694187.890	Date Started:	18/06/2021
Location:	Maynooth, Co. Meath	Northing:	738981.735	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	52.48	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



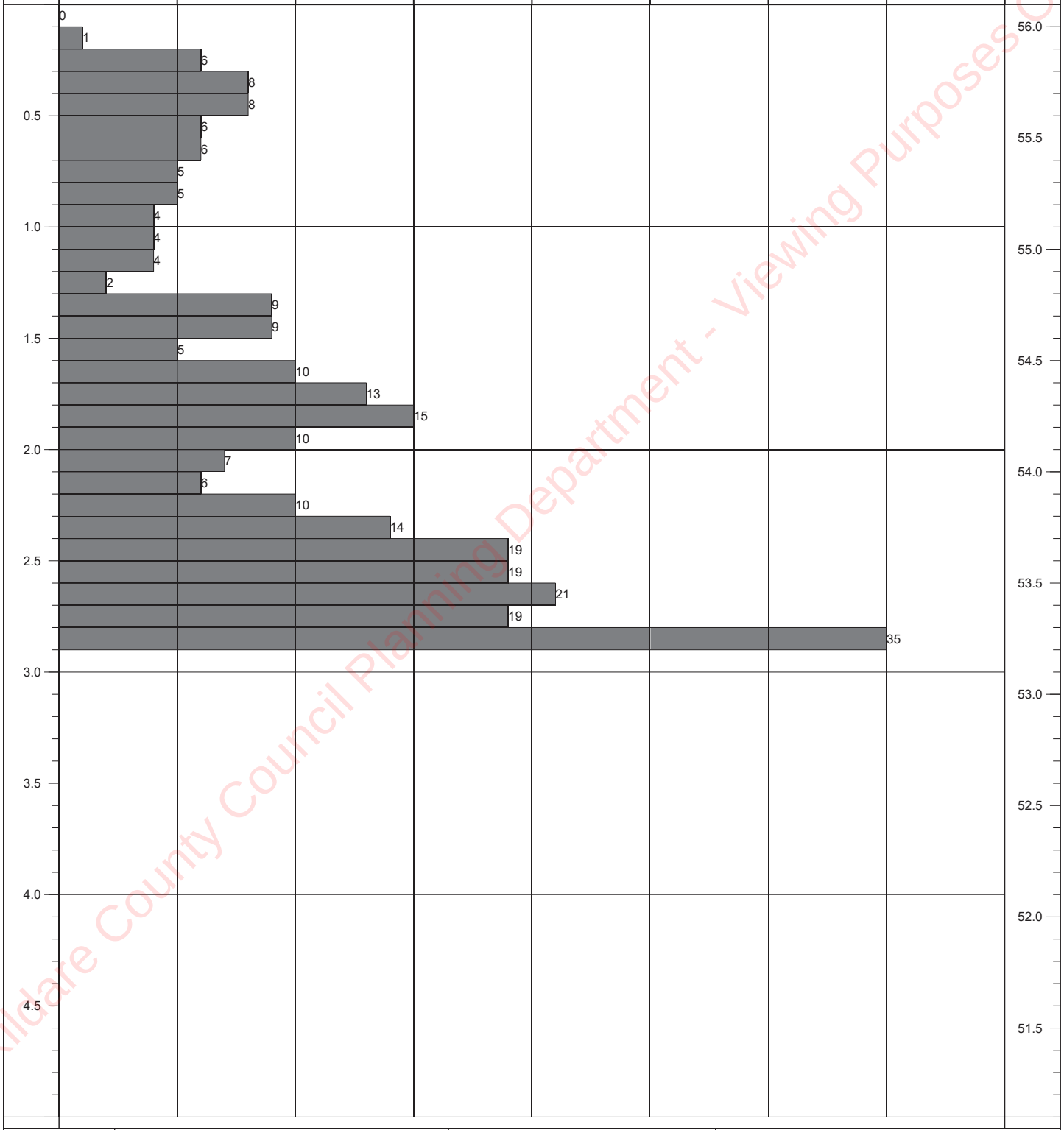
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
2.60m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	**Dynamic Probe Log**				Probe No: **DP71**
Contract:	Moygaddy	Easting:	694289.189	Date Started:	18/06/2021
Location:	Maynooth, Co. Meath	Northing:	738983.578	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	55.45	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



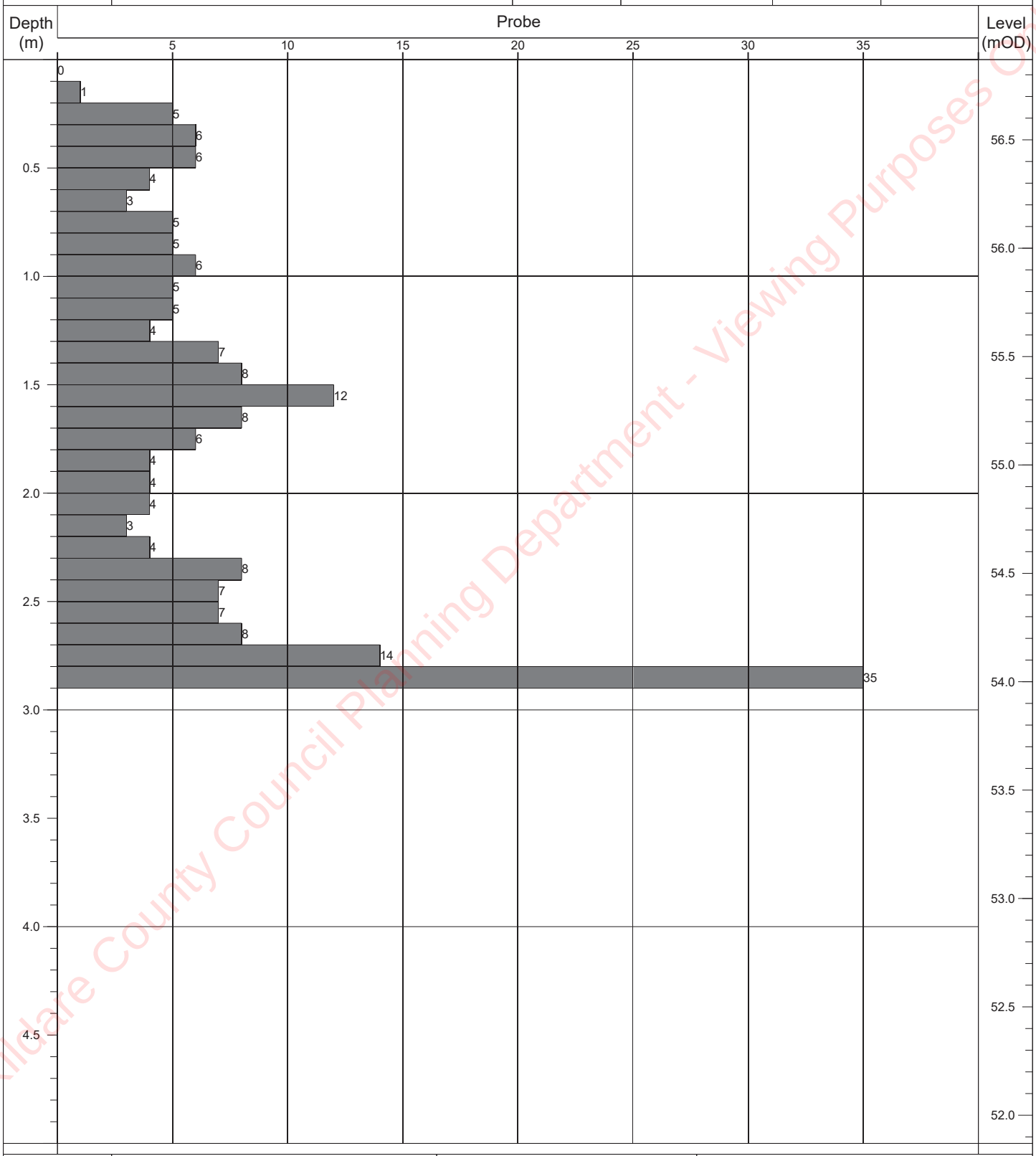
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
2.70m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	Dynamic Probe Log				Probe No: DP72
Contract:	Moygaddy	Easting:	694384.733	Date Started:	18/06/2021
Location:	Maynooth, Co. Meath	Northing:	738989.607	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	56.10	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



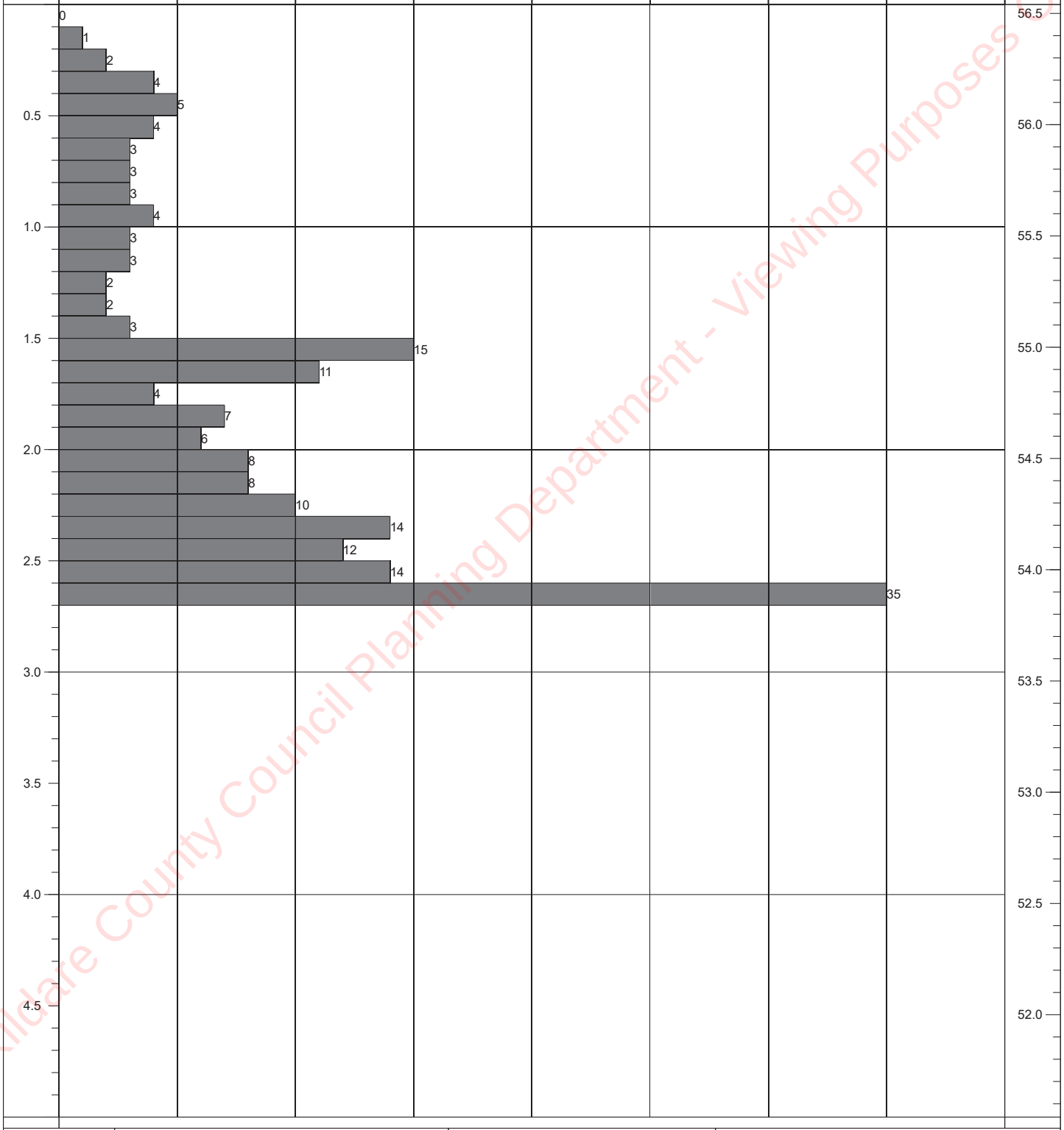
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
2.90m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	**Dynamic Probe Log**				Probe No: **DP73**
Contract:	Moygaddy	Easting:	694486.822	Date Started:	21/06/2021
Location:	Maynooth, Co. Meath	Northing:	738986.510	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	56.87	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



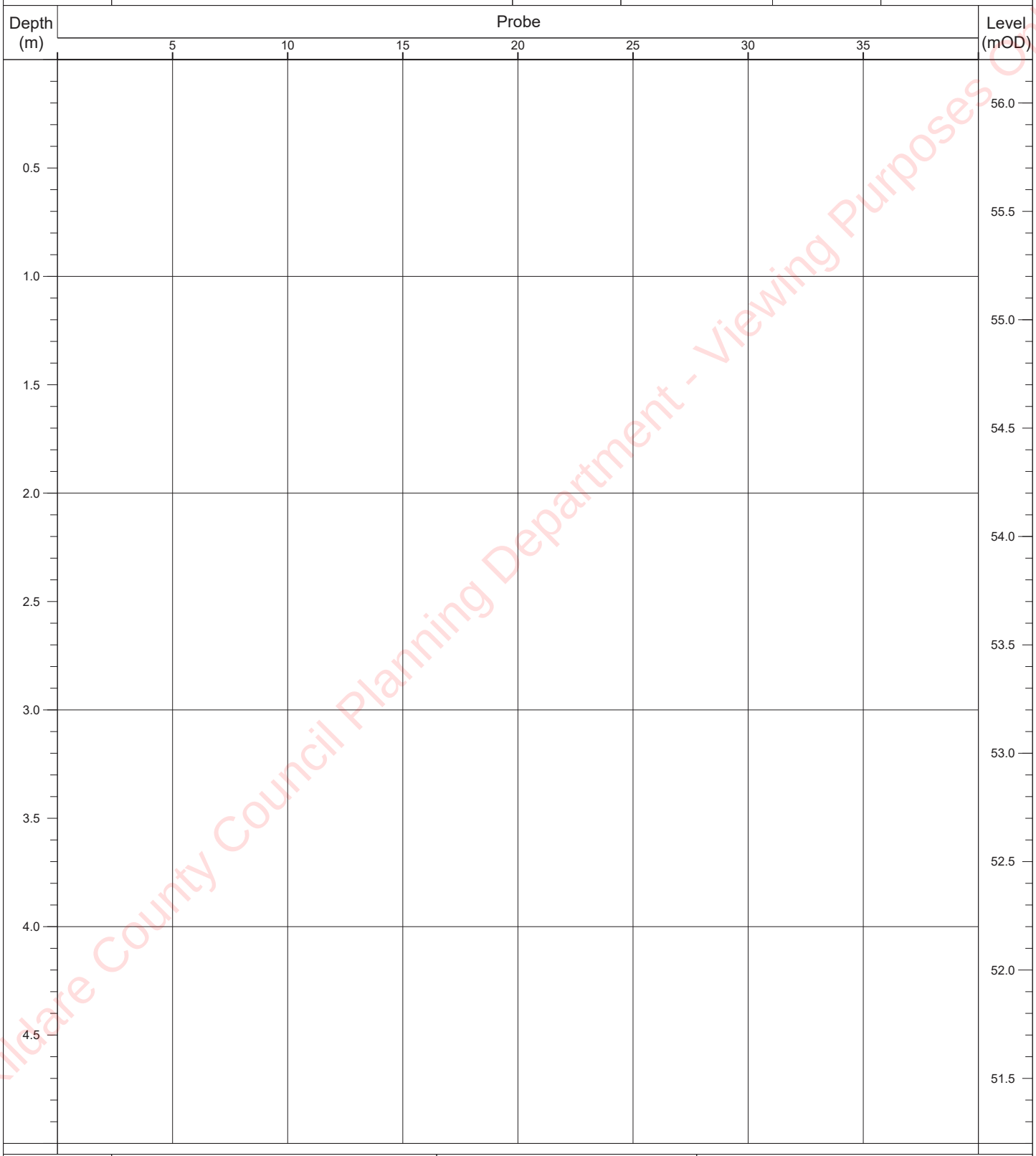
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
2.90m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	**Dynamic Probe Log**				Probe No: **DP74**
Contract:	Moygaddy	Easting:	694586.960	Date Started:	22/06/2021
Location:	Maynooth, Co. Meath	Northing:	738983.395	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	56.54	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



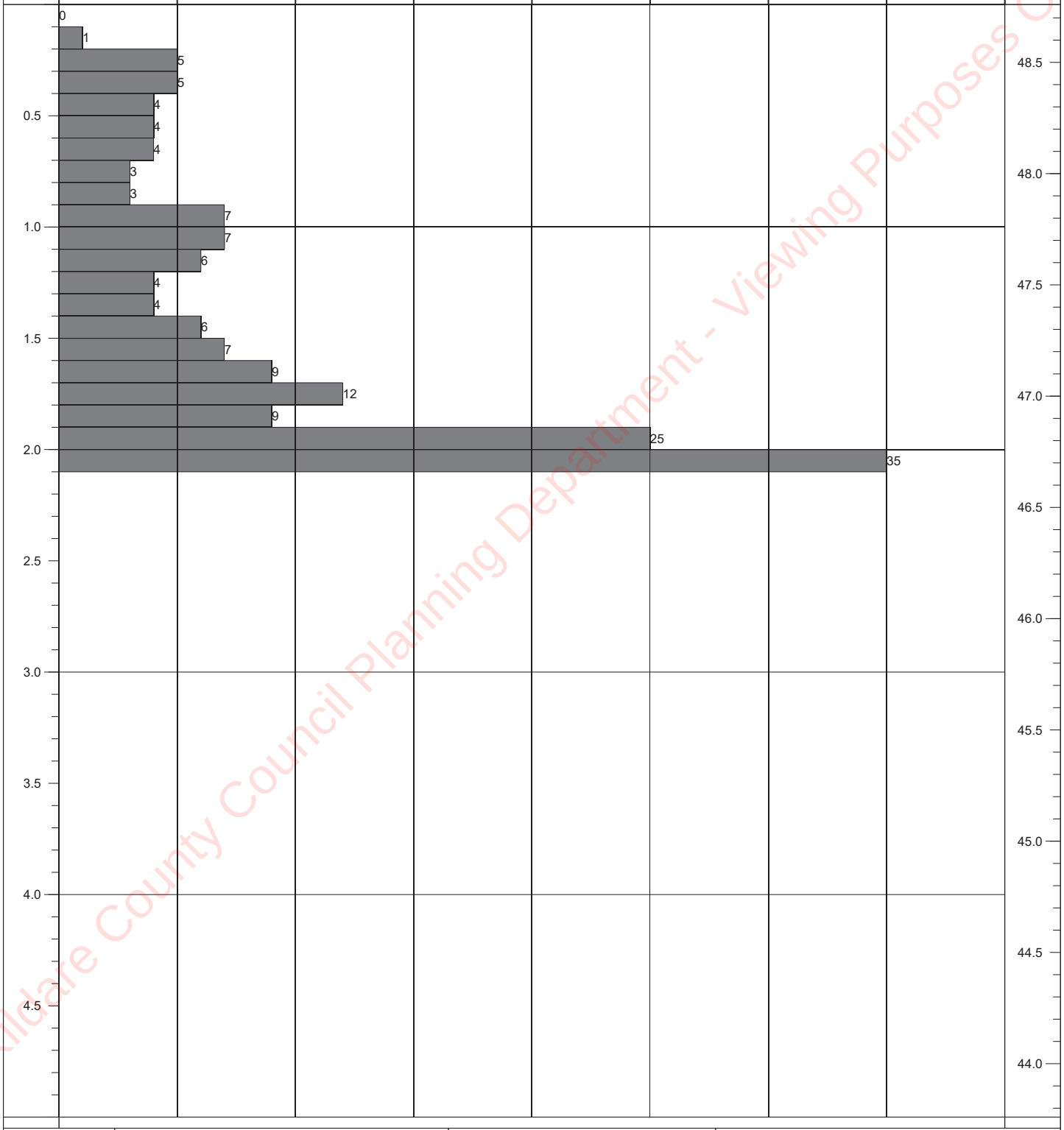
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
2.70m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	**Dynamic Probe Log**				Probe No: **DP75**
Contract:	Moygaddy	Easting:	694691.101	Date Started:	22/06/2021
Location:	Maynooth, Co. Meath	Northing:	738989.216	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	56.20	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



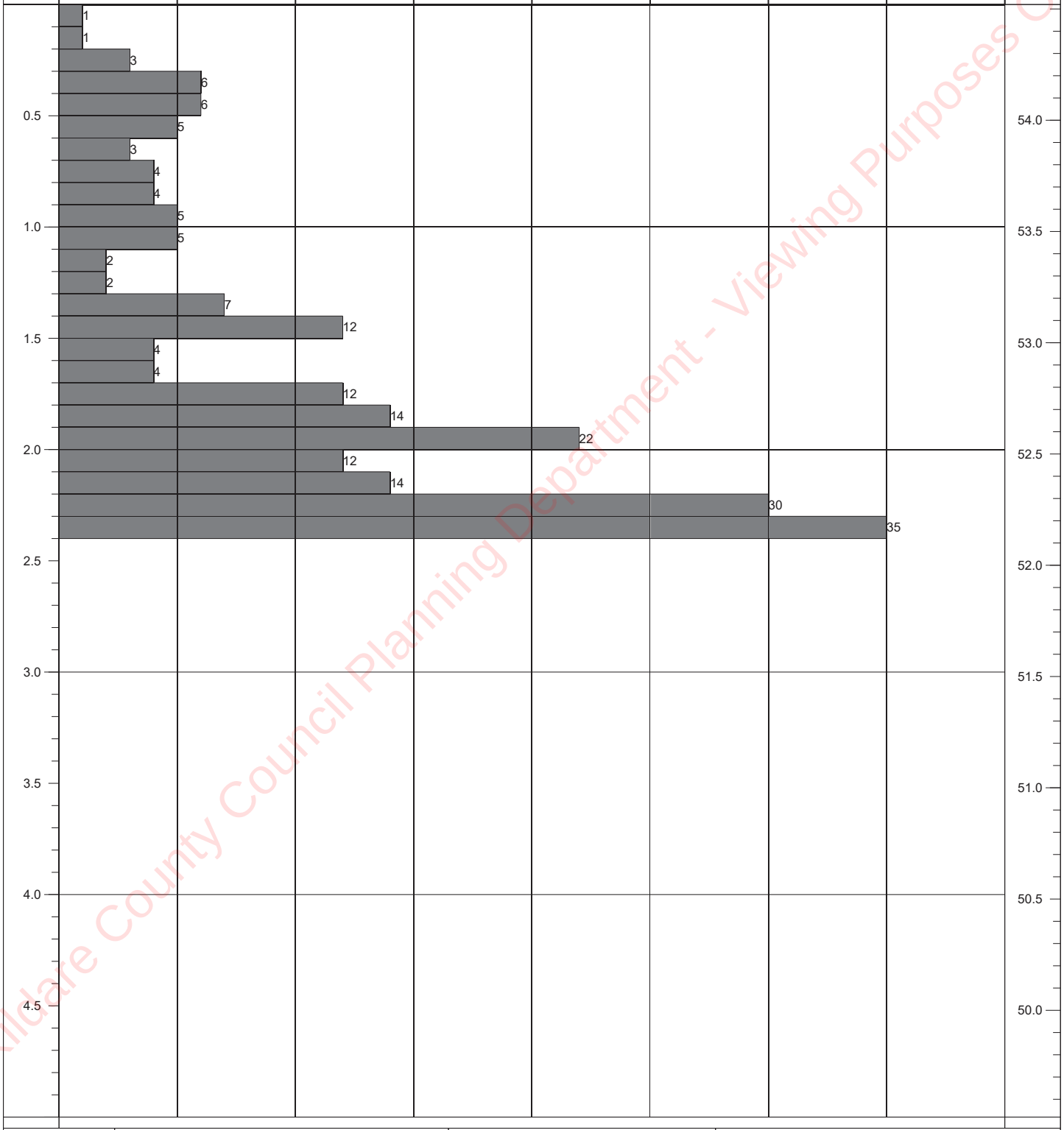
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
5.00m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	**Dynamic Probe Log**				Probe No: **DP76**
Contract:	Moygaddy	Easting:	694188.862	Date Started:	18/06/2021
Location:	Maynooth, Co. Meath	Northing:	738882.936	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	48.76	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



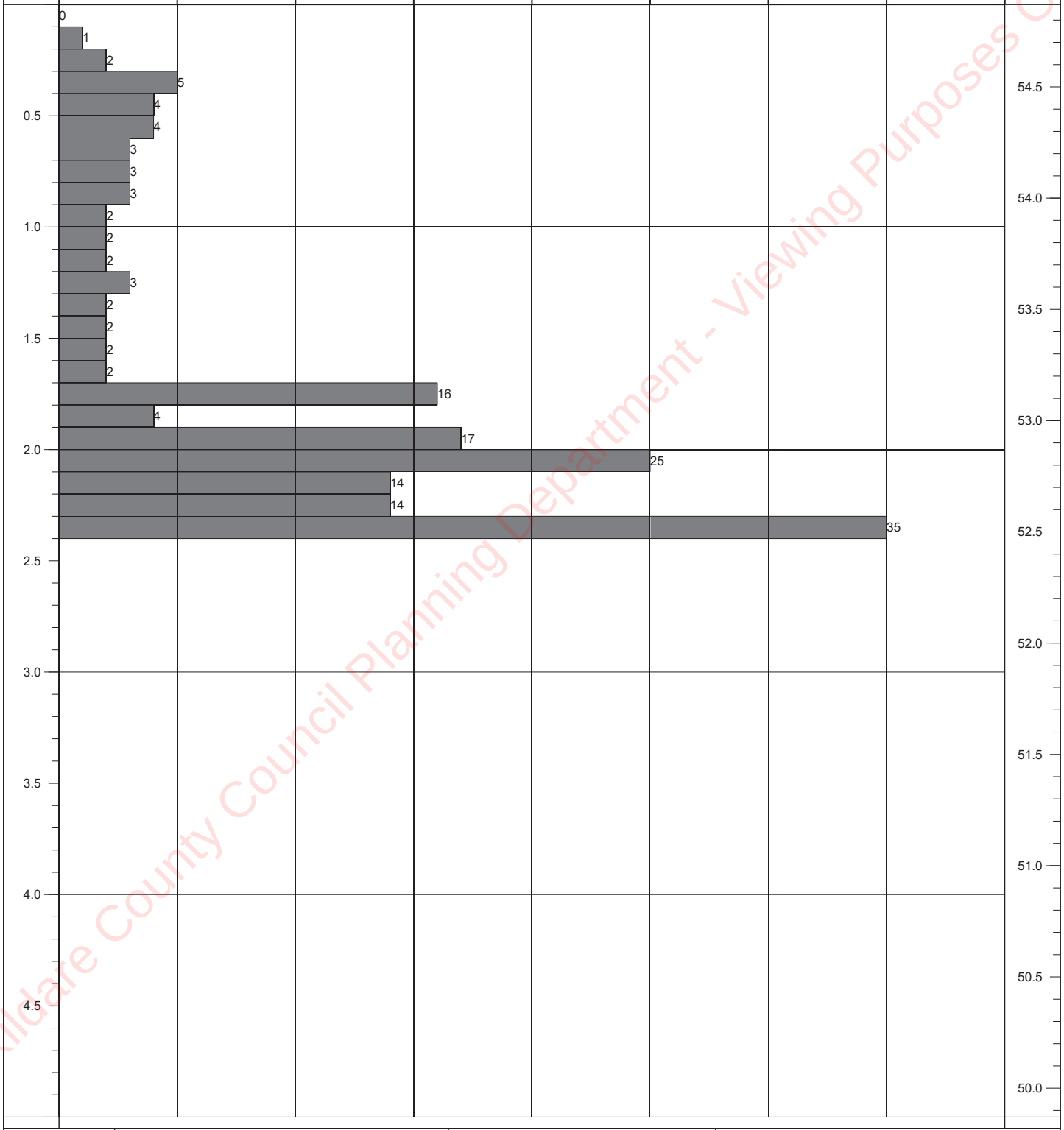
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
2.10m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	**Dynamic Probe Log**				Probe No: **DP77**
Contract:	Moygaddy	Easting:	694291.409	Date Started:	18/06/2021
Location:	Maynooth, Co. Meath	Northing:	738890.282	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	54.52	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



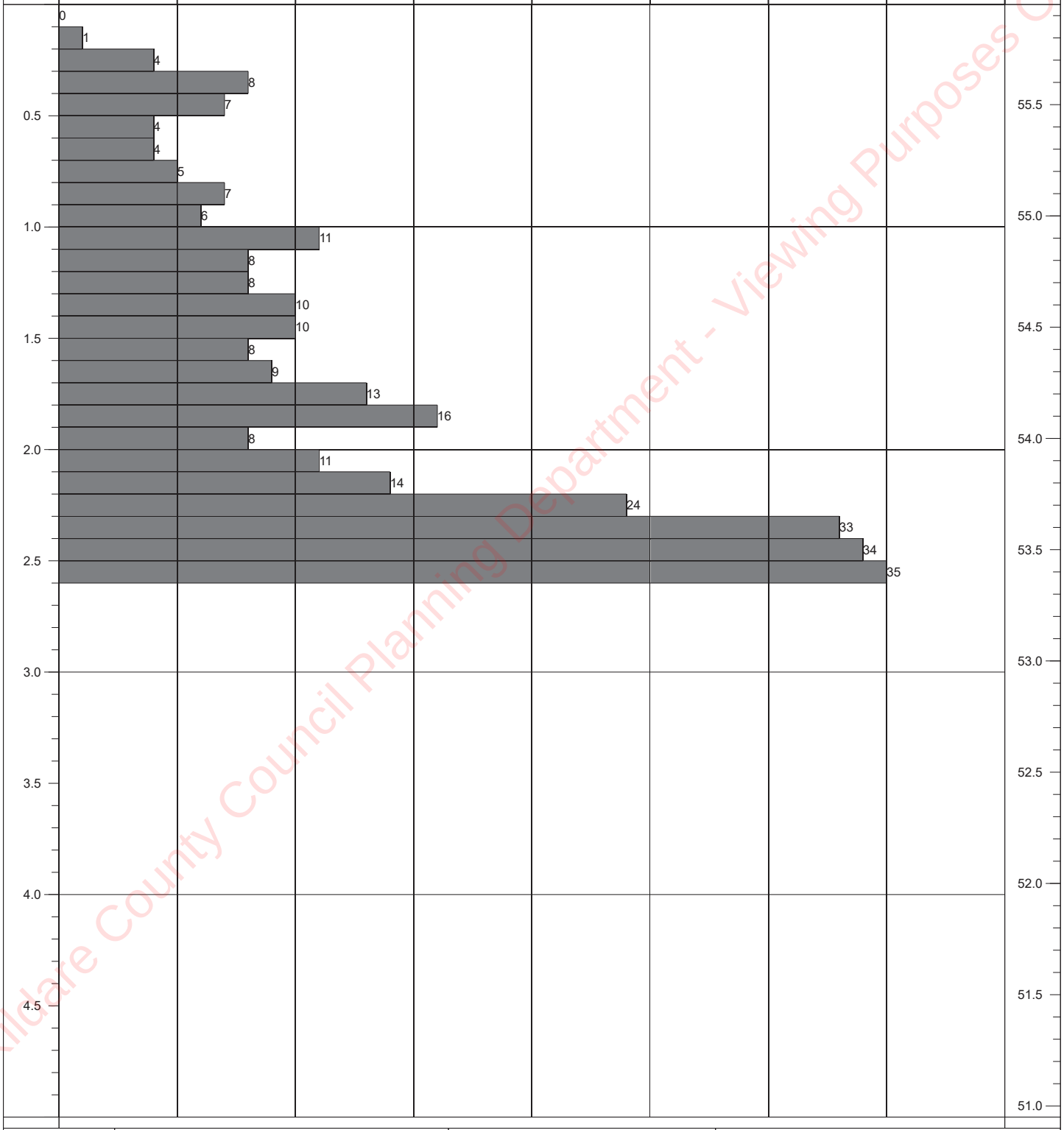
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
2.40m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	**Dynamic Probe Log**				Probe No: **DP78**
Contract:	Moygaddy	Easting:	694392.533	Date Started:	21/06/2021
Location:	Maynooth, Co. Meath	Northing:	738890.201	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	54.87	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



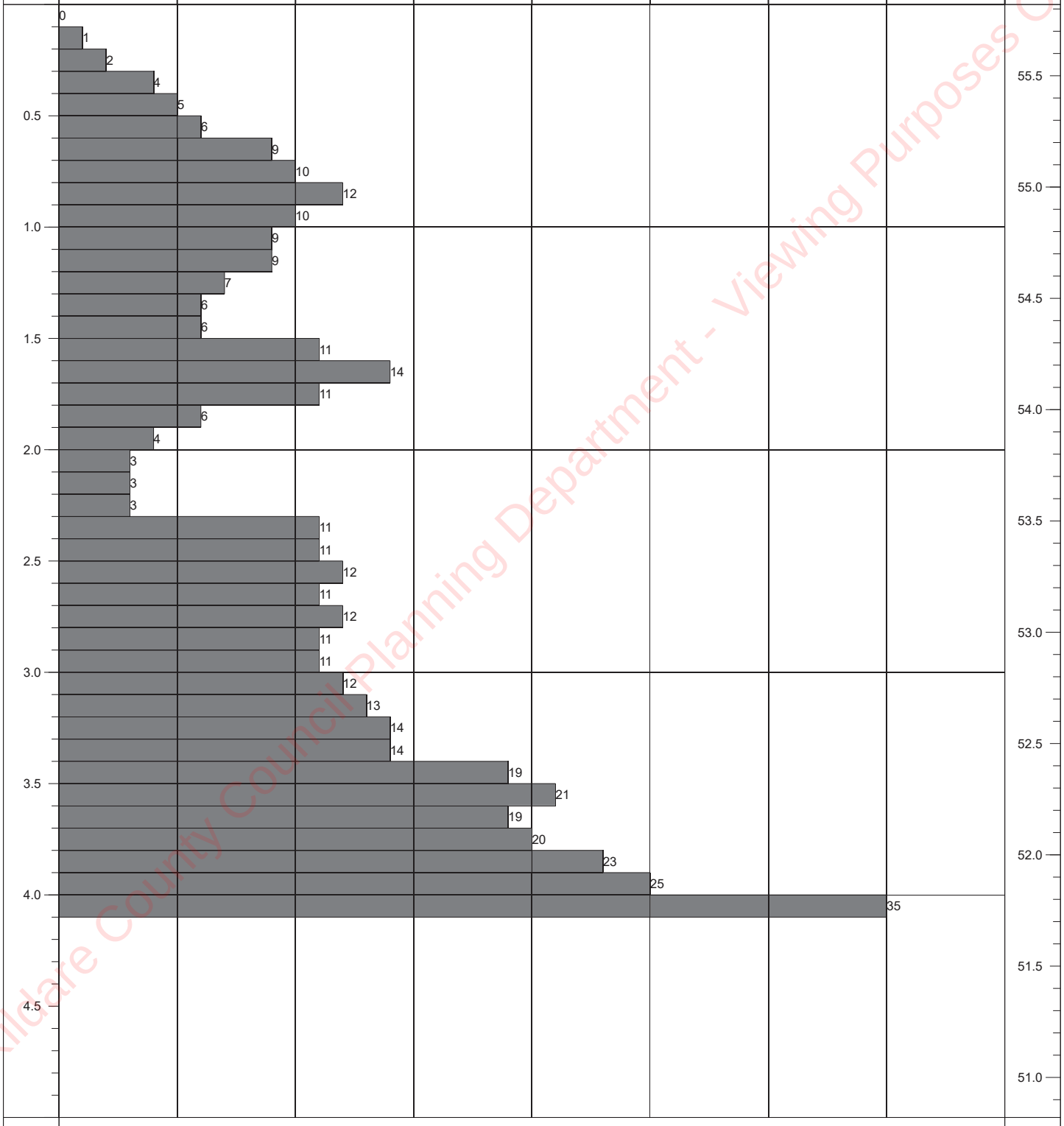
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
2.40m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	**Dynamic Probe Log**				Probe No: **DP79**
Contract:	Moygaddy	Easting:	694490.609	Date Started:	21/06/2021
Location:	Maynooth, Co. Meath	Northing:	738885.308	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	55.95	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



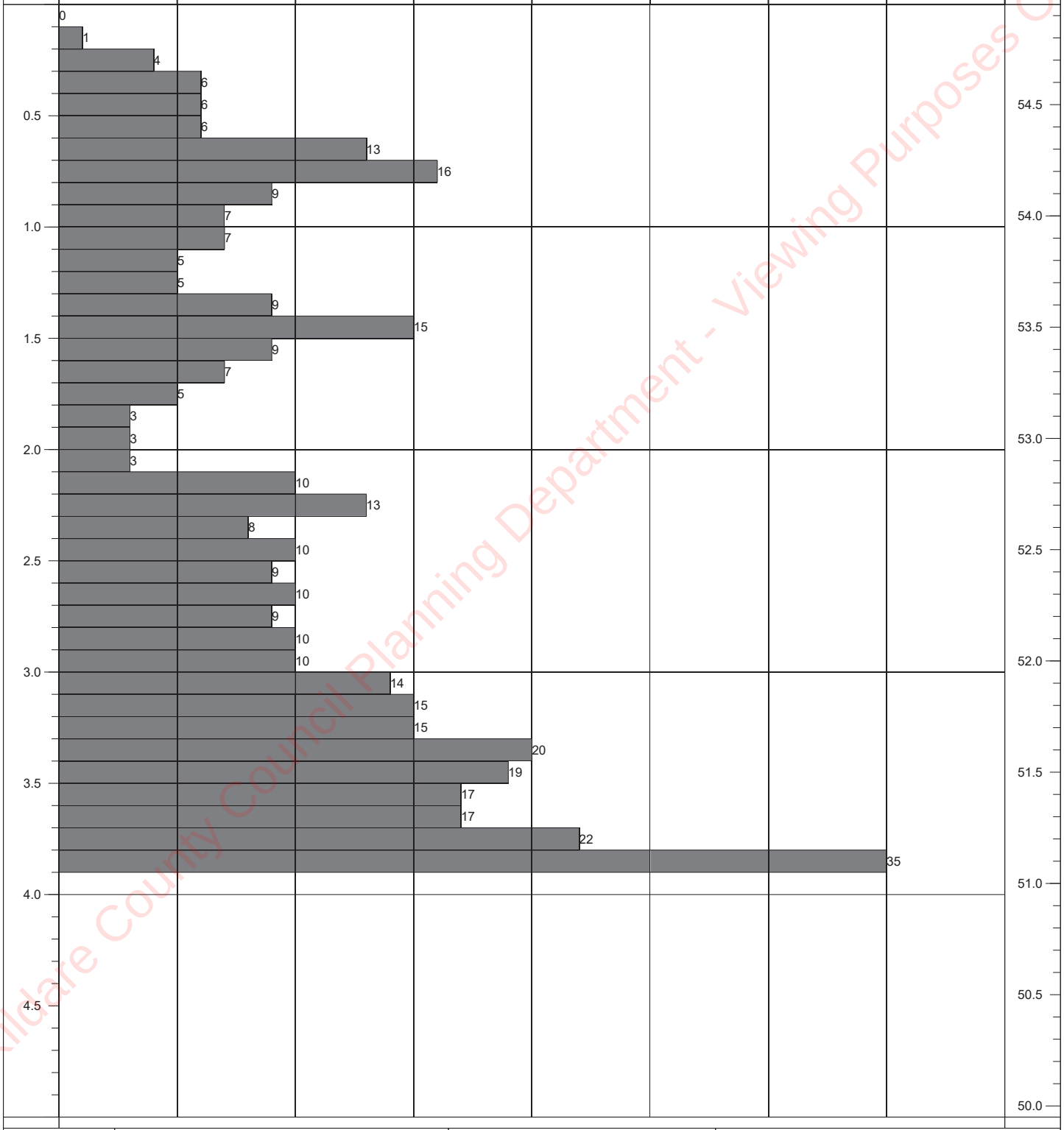
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
2.60m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	**Dynamic Probe Log**				Probe No: **DP80**
Contract:	Moygaddy	Easting:	694587.972	Date Started:	22/06/2021
Location:	Maynooth, Co. Meath	Northing:	738887.143	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	55.82	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



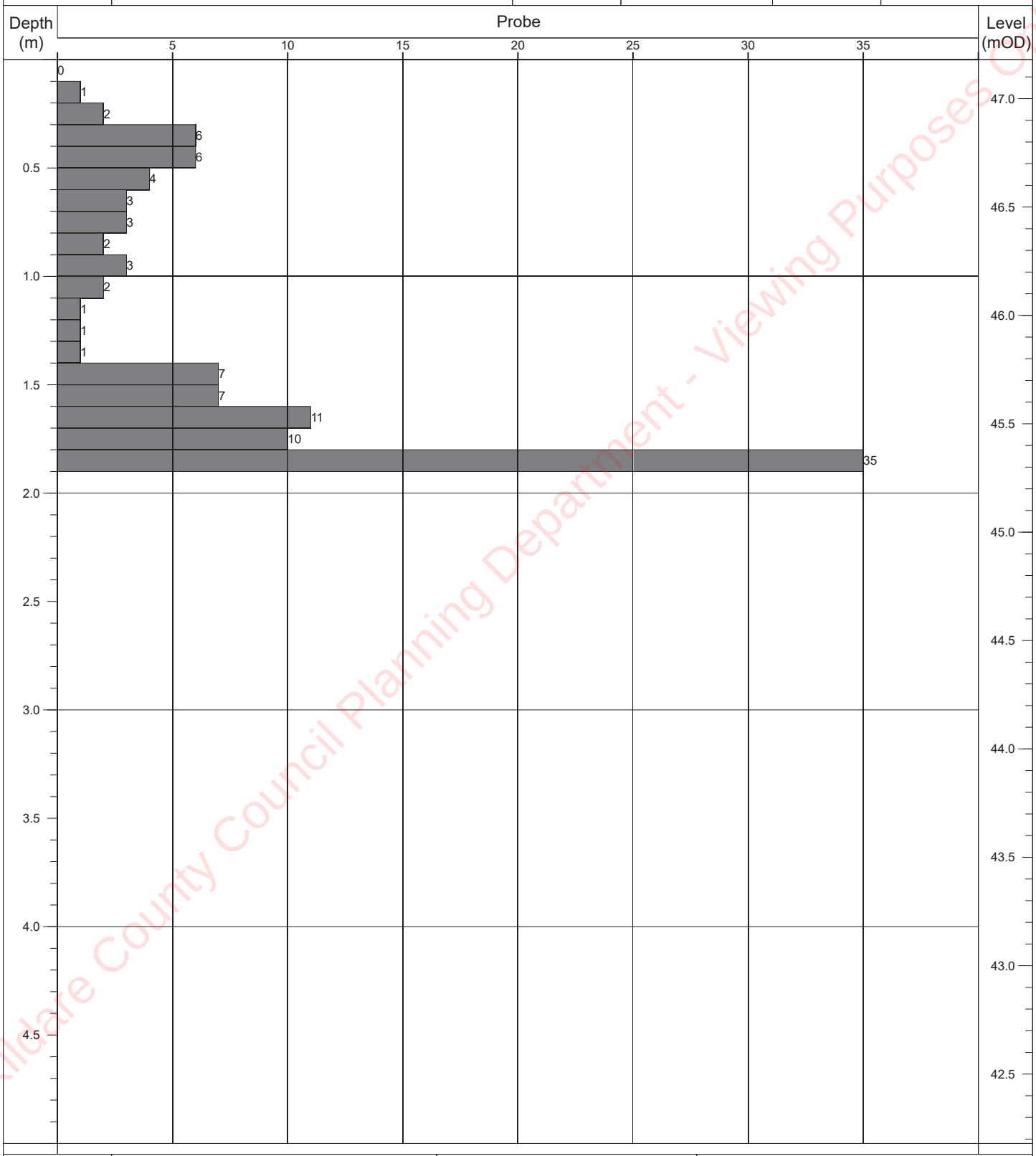
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
4.10m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	**Dynamic Probe Log**				Probe No: **DP81**
Contract:	Moygaddy	Easting:	694688.909	Date Started:	22/06/2021
Location:	Maynooth, Co. Meath	Northing:	738889.761	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	54.95	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



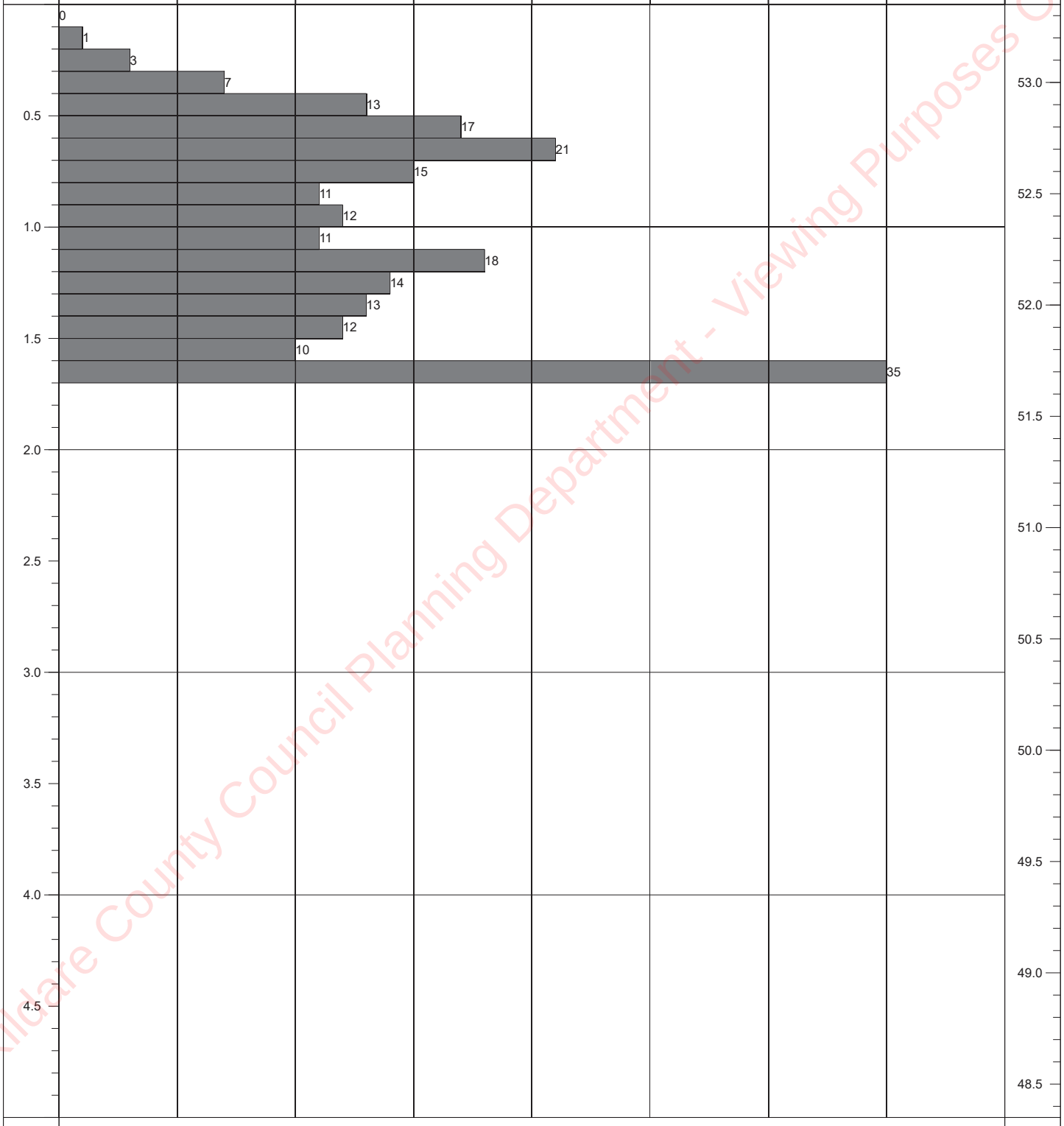
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
3.90m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	**Dynamic Probe Log**				Probe No: **DP82**
Contract:	Moygaddy	Easting:	694286.007	Date Started:	18/06/2021
Location:	Maynooth, Co. Meath	Northing:	738783.740	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	47.18	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



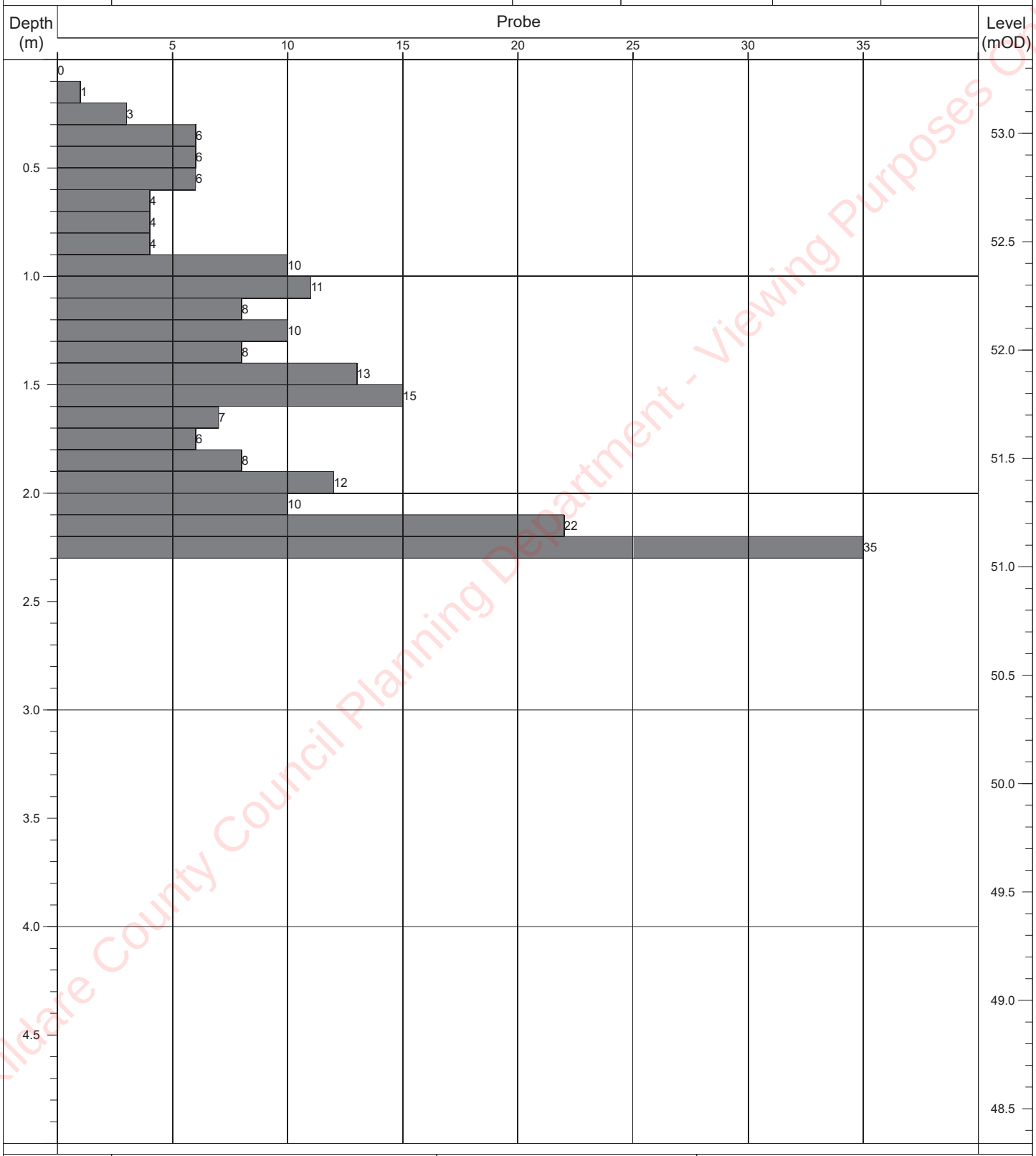
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
1.90m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	**Dynamic Probe Log**				Probe No: **DP83**
Contract:	Moygaddy	Easting:	694396.549	Date Started:	21/06/2021
Location:	Maynooth, Co. Meath	Northing:	738786.809	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	53.35	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
1.70m	Obstruction - boulders.	DPH	50kg	500mm	

Contract No: 5863	**Dynamic Probe Log**				Probe No: **DP84**
Contract:	Moygaddy	Easting:	694589.396	Date Started:	21/06/2021
Location:	Maynooth, Co. Meath	Northing:	738787.697	Logged By:	E. Magee
Client:	Sky Castle Ltd	Elevation:	53.34	Scale:	1:25
Engineer:	OCSC	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	
2.30m	Obstruction - boulders.	DPH	50kg	500mm	

Appendix 6

Geotechnical Soil Laboratory Test Results

Classification Tests in accordance with BS1377: Part 4

Client	Sky Castle Ltd.
Site	Moygaddy
S.I. File No	5863 / 21
Test Lab	Site Investigations Ltd., Carhugar The Grange, 12th Lock Rd., Lucan Co. Dublin. Tel (01) 6108768 Email info@siteinvestigations.ie
Report Date	12th July 2021

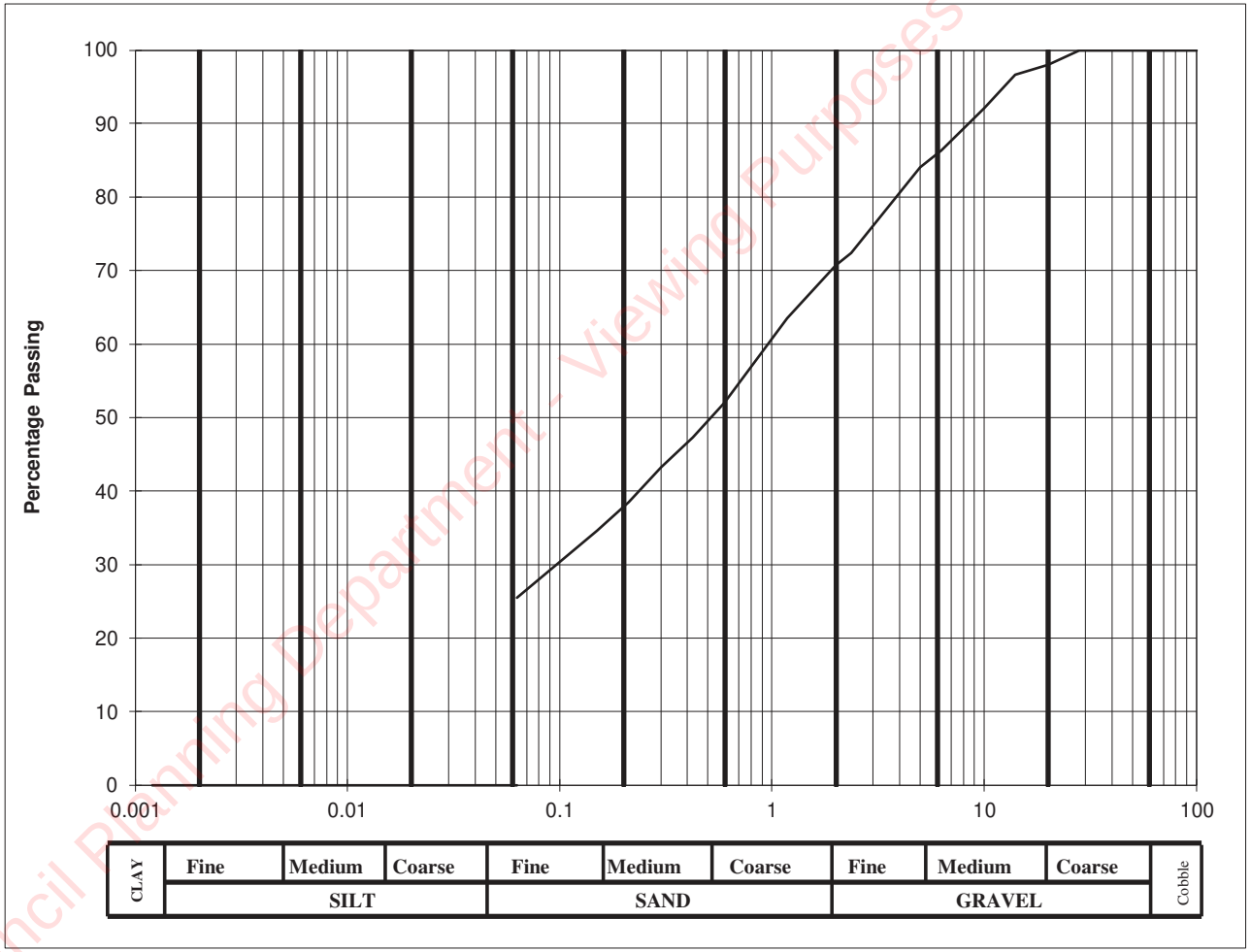
Hole ID	Depth	Sample No	Lab Ref No.	Sample Type	Natural Moisture Content %	Liquid Limit %	Plastic Limit %	Plastic Index %	Min. Dry Density Mg/m^3	Particle Density Mg/m^3	% passing 425um	Comments	**Remarks** **C**=Clay; **M**=Silt **Plasticity**: **L**=Low; **I**=Intermediate; **H**=High; **V**=Very High; **E**=Extremely High
TP01	1.00	MK15	21/856	B	17.6	32	18	14			47.3		CL
TP04	1.00	MK44	21/860	B	14.3	38	20	18			60.7		CI
TP06	1.00	MK47	21/863	B	15.6	37	20	17			63.5		CI
TP08	1.00	MK38	21/866	B	8.4	31	19	12			30.0		CL
TP10	1.00	MK63	21/869	B	14.6	35	18	17			55.7		CL/CI
TP11	1.00	MK58	21/871	B	18.0	34	18	16			62.3		CL
TP12	1.00	MK35	21/873	B	17.5	36	20	16			60.3		CI
TP13	1.50	MK29	21/875	B	11.5	32	18	14			37.9		CL
TP15	1.00	MK23	21/878	B	12.8	34	20	14			48.5		CL
TP19	1.00	MK05	21/883	B	12.2	34	19	15			51.9		CL

_____Paddy McGonagle
Site Investigations Ltd

BS 1377 Particle Size Analysis

Site Investigations Limited

BS Sieve size, mm	Percent passing	Hydrometer analysis	
		Diameter, mm	% passing
100	100	**0.0630**	
90	100	**0.0200**	
75	100	**0.0060**	
63	100	**0.0020**	
50	100		
37.5	100		
28	100		
20	98		
14	96.6		
10	92.1		
6.3	86.3		
5.0	84		
2.36	72.4		
2.00	70.7		
1.18	63.5		
0.600	52		
0.425	47.3		
0.300	43.2		
0.212	38.5		
0.150	34.6		
0.063	26		



Cobbles, %	0
Gravel, %	29
Sand, %	45
Clay / Silt, %	26

Client :	Sky Castle Ltd.
Project :	Moygaddy

Lab. No :	21/856
Sample No :	MK15

Hole ID :	TP 01
Depth, m :	1.00

Material description :	sandy slightly gravelly silty CLAY
Remarks :	Soils with clay or silt content between 15% - 35% can be classified as clay or silt depending on the field Engineers assessment of in-situ behaviour. Where material is for re-use and therefore disturbed, only soils with clay or silt >35% are classified as clay or silt

Printed 04/08/2021

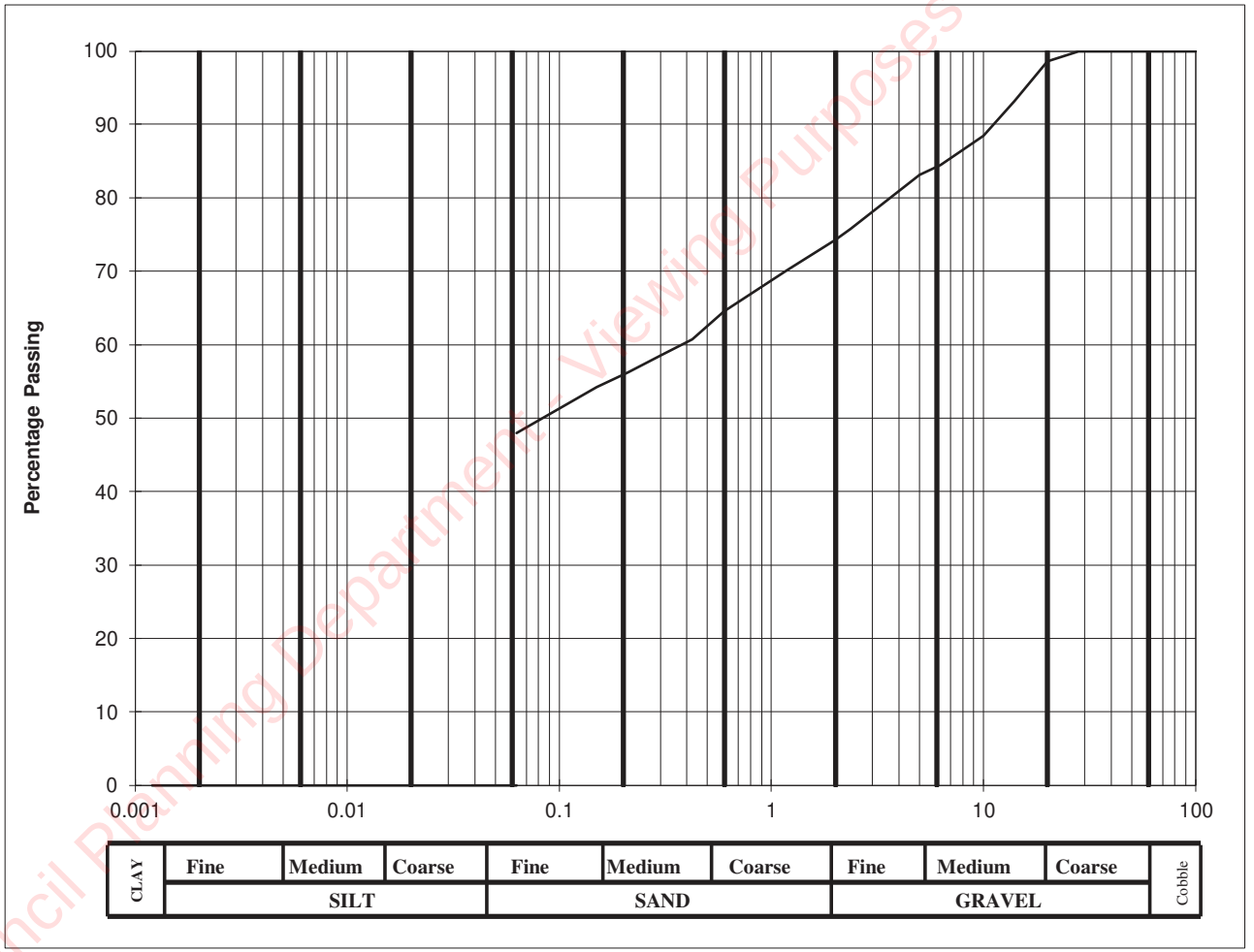
_____Paddy McGonagle
Site Investigations Ltd

BS 1377 Particle Size Analysis

Site Investigations Limited

BS Sieve size, mm	Percent passing	Hydrometer analysis	
		Diameter, mm	% passing
100	100	**0.0630**	
90	100	**0.0200**	
75	100	**0.0060**	
63	100	**0.0020**	
50	100		
37.5	100		
28	100		
20	98.6		
14	93.2		
10	88.4		
6.3	84.5		
5.0	83.1		
2.36	75.8		
2.00	74.2		
1.18	70.1		
0.600	64.5		
0.425	60.7		
0.300	58.5		
0.212	56.2		
0.150	54.2		
0.063	48		

Cobbles, %	0
Gravel, %	26
Sand, %	26
Clay / Silt, %	48



Client :	Sky Castle Ltd.
Project :	Moygaddy

Lab. No :	21/860
Sample No :	MK44

Hole ID :	TP 04
Depth, m :	1.00

Material description :	slightly sandy slightly gravelly silty CLAY
Remarks :	Soils with clay or silt content between 15% - 35% can be classified as clay or silt depending on the field Engineers assessment of in-situ behaviour. Where material is for re-use and therefore disturbed, only soils with clay or silt >35% are classified as clay or silt

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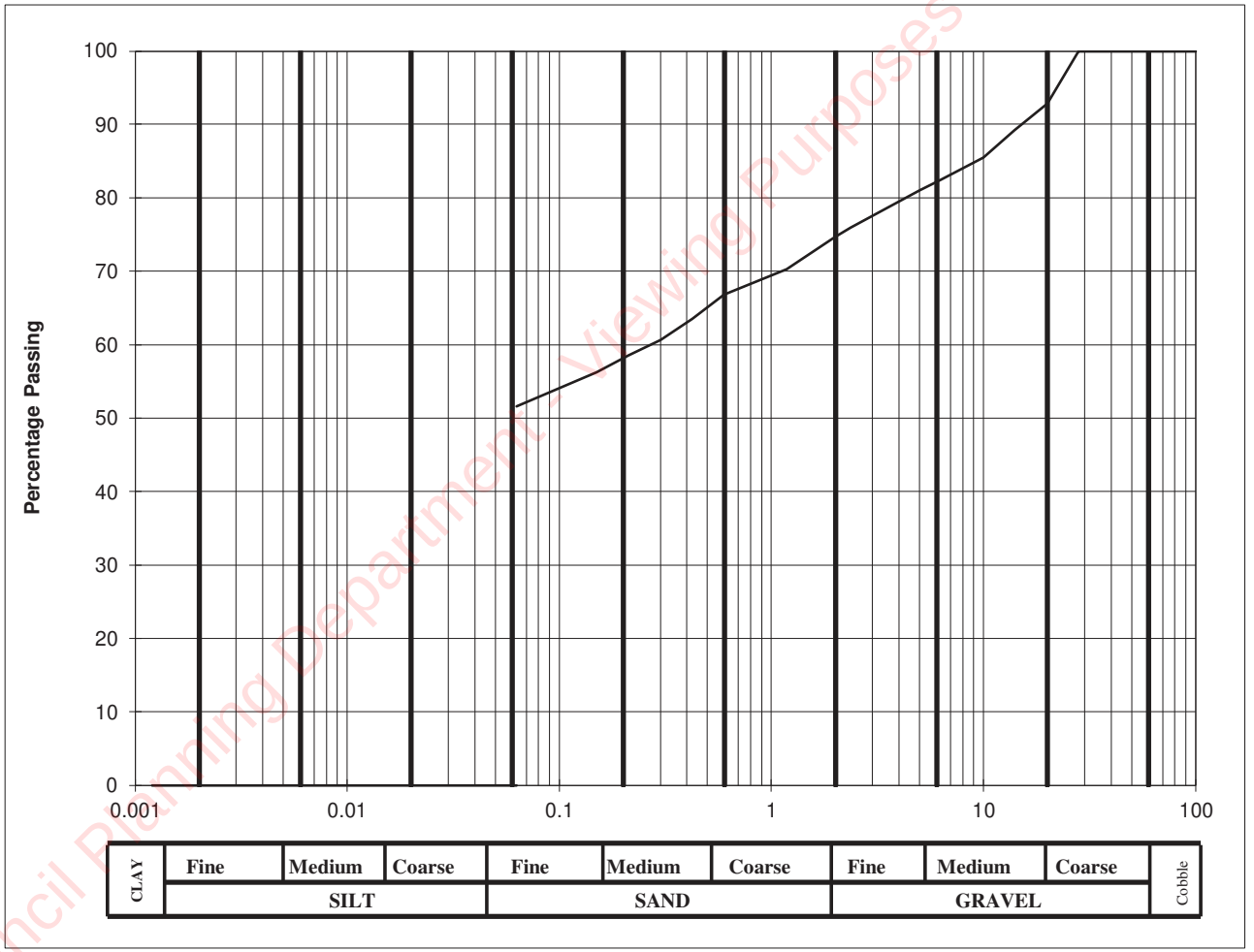
BS 1377 Particle Size Analysis

Site Investigations Limited

BS Sieve size, mm	Percent passing	Hydrometer analysis	
		Diameter, mm	% passing
100	100	**0.0630**	
90	100	**0.0200**	
75	100	**0.0060**	
63	100	**0.0020**	
50	100		
37.5	100		
28	100		
20	92.8		
14	89.2		
10	85.5		
6.3	82.4		
5.0	81		
2.36	75.9		
2.00	74.7		
1.18	70.3		
0.600	66.8		
0.425	63.5		
0.300	60.6		
0.212	58.5		
0.150	56.2		
0.063	52		

Cobbles, %	0
Gravel, %	25
Sand, %	23
Clay / Silt, %	52



Client :	Sky Castle Ltd.
Project :	Moygaddy

Lab. No :	21/863
Sample No :	MK47

Hole ID :	TP 06
Depth, m :	1.00

Material description :	slightly sandy slightly gravelly silty CLAY
Remarks :	Soils with clay or silt content between 15% - 35% can be classified as clay or silt depending on the field Engineers assessment of in-situ behaviour. Where material is for re-use and therefore disturbed, only soils with clay or silt >35% are classified as clay or silt

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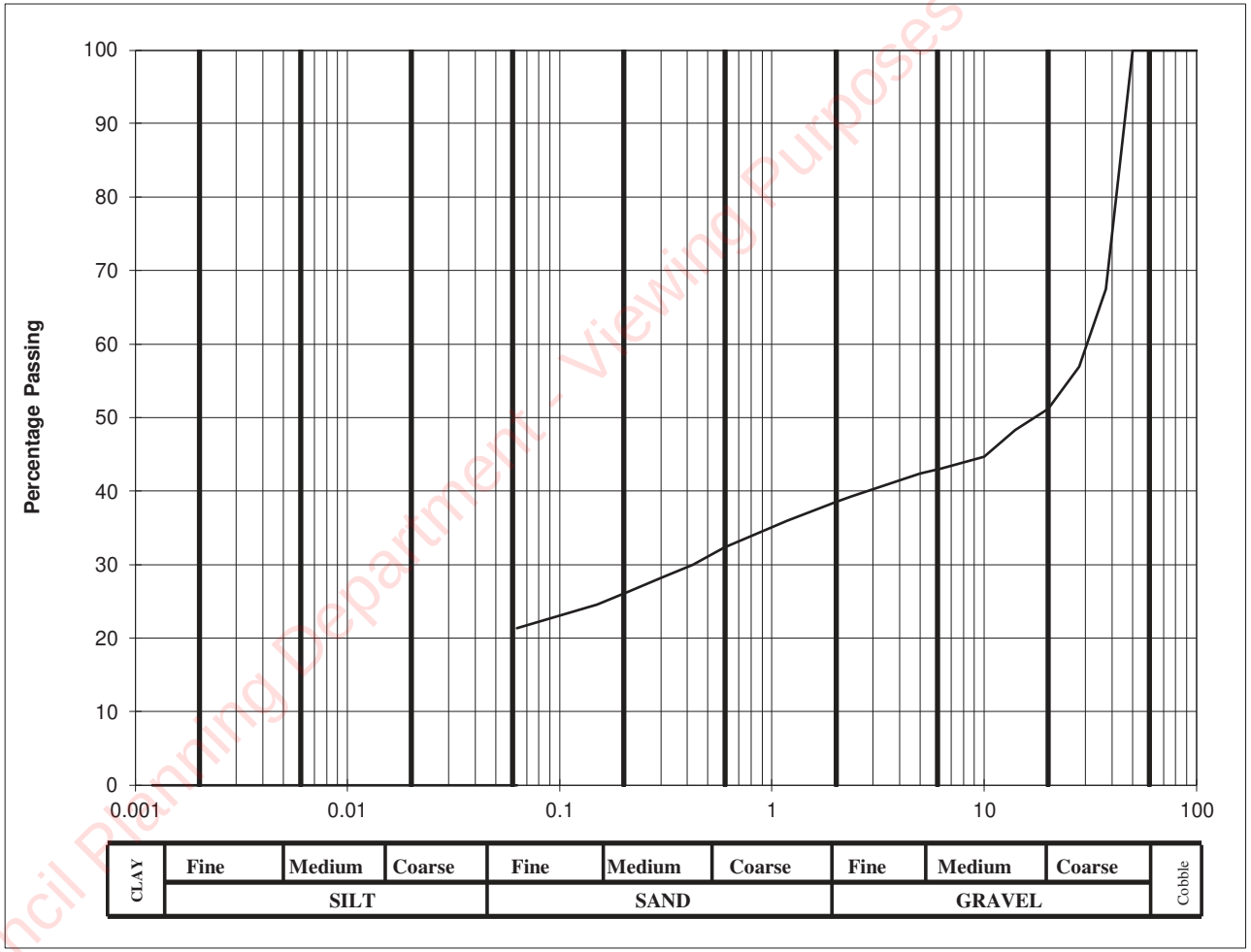
BS 1377 Particle Size Analysis

Site Investigations Limited

BS Sieve size, mm	Percent passing	Hydrometer analysis	
		Diameter, mm	% passing
100	100	**0.0630**	
90	100	**0.0200**	
75	100	**0.0060**	
63	100	**0.0020**	
50	100		
37.5	67.5		
28	56.9		
20	51.2		
14	48.3		
10	44.7		
6.3	43.1		
5.0	42.4		
2.36	39.3		
2.00	38.5		
1.18	36		
0.600	32.3		
0.425	30		
0.300	28.2		
0.212	26.3		
0.150	24.6		
0.063	21		



Cobbles, %	0
Gravel, %	62
Sand, %	18
Clay / Silt, %	21

Client :	Sky Castle Ltd.
Project :	Moygaddy

Lab. No :	21/866
Sample No :	MK38

Hole ID :	TP 08
Depth, m :	1.00

Material description :	slightly sandy gravelly silty CLAY
Remarks :	Soils with clay or silt content between 15% - 35% can be classified as clay or silt depending on the field Engineers assessment of in-situ behaviour. Where material is for re-use and therefore disturbed, only soils with clay or silt >35% are classified as clay or silt

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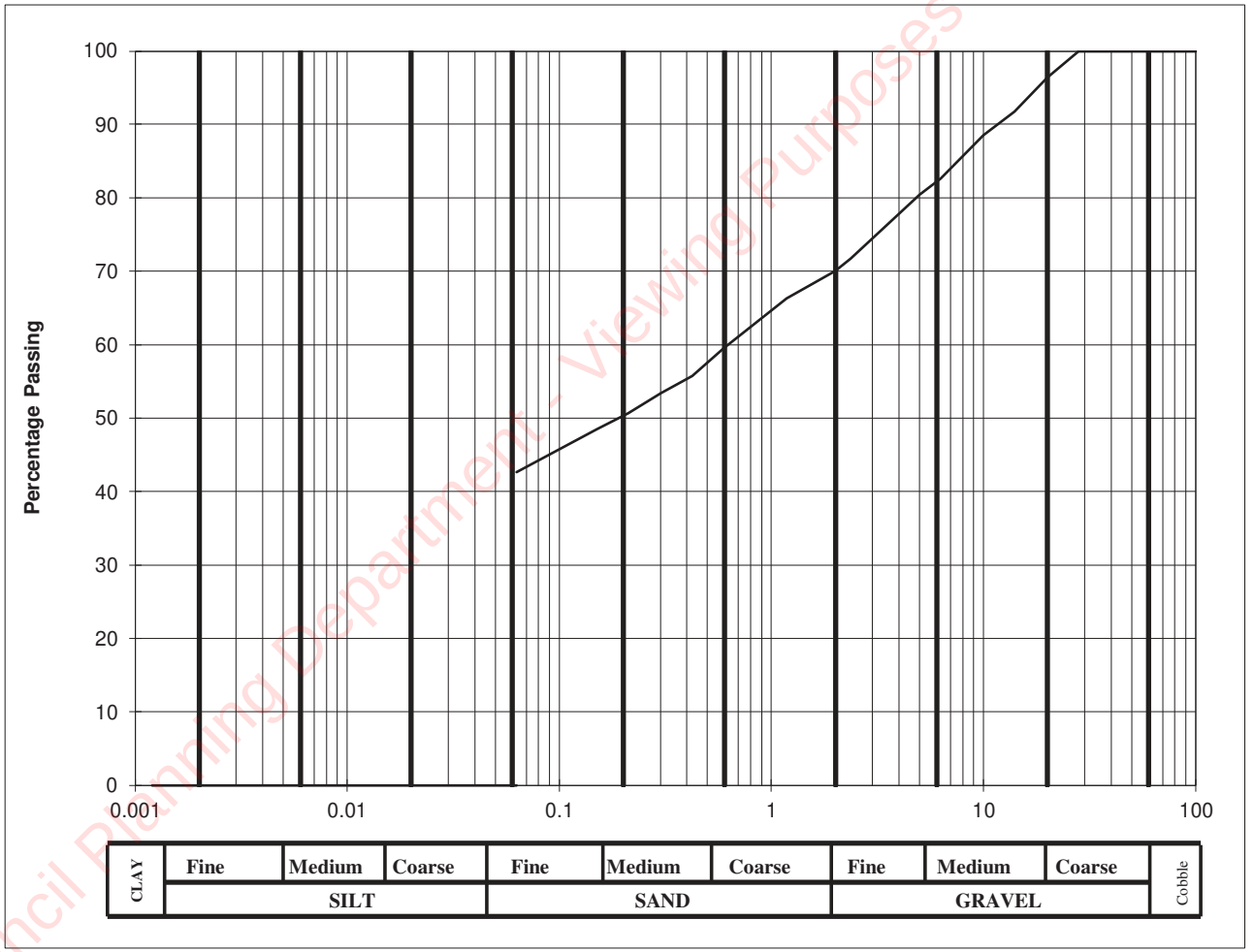
BS 1377 Particle Size Analysis

Site Investigations Limited

BS Sieve size, mm	Percent passing	Hydrometer analysis	
		Diameter, mm	% passing
100	100	**0.0630**	
90	100	**0.0200**	
75	100	**0.0060**	
63	100	**0.0020**	
50	100		
37.5	100		
28	100		
20	96.4		
14	91.7		
10	88.5		
6.3	82.6		
5.0	80.4		
2.36	71.7		
2.00	70		
1.18	66.3		
0.600	59.5		
0.425	55.7		
0.300	53.4		
0.212	50.7		
0.150	48.5		
0.063	43		

Cobbles, %	0
Gravel, %	30
Sand, %	27
Clay / Silt, %	43



Client :	Sky Castle Ltd.
Project :	Moygaddy

Lab. No :	21/869
Sample No :	MK63

Hole ID :	TP 10
Depth, m :	1.00

Material description :	slightly sandy slightly gravelly silty CLAY
Remarks :	Soils with clay or silt content between 15% - 35% can be classified as clay or silt depending on the field Engineers assessment of in-situ behaviour. Where material is for re-use and therefore disturbed, only soils with clay or silt >35% are classified as clay or silt

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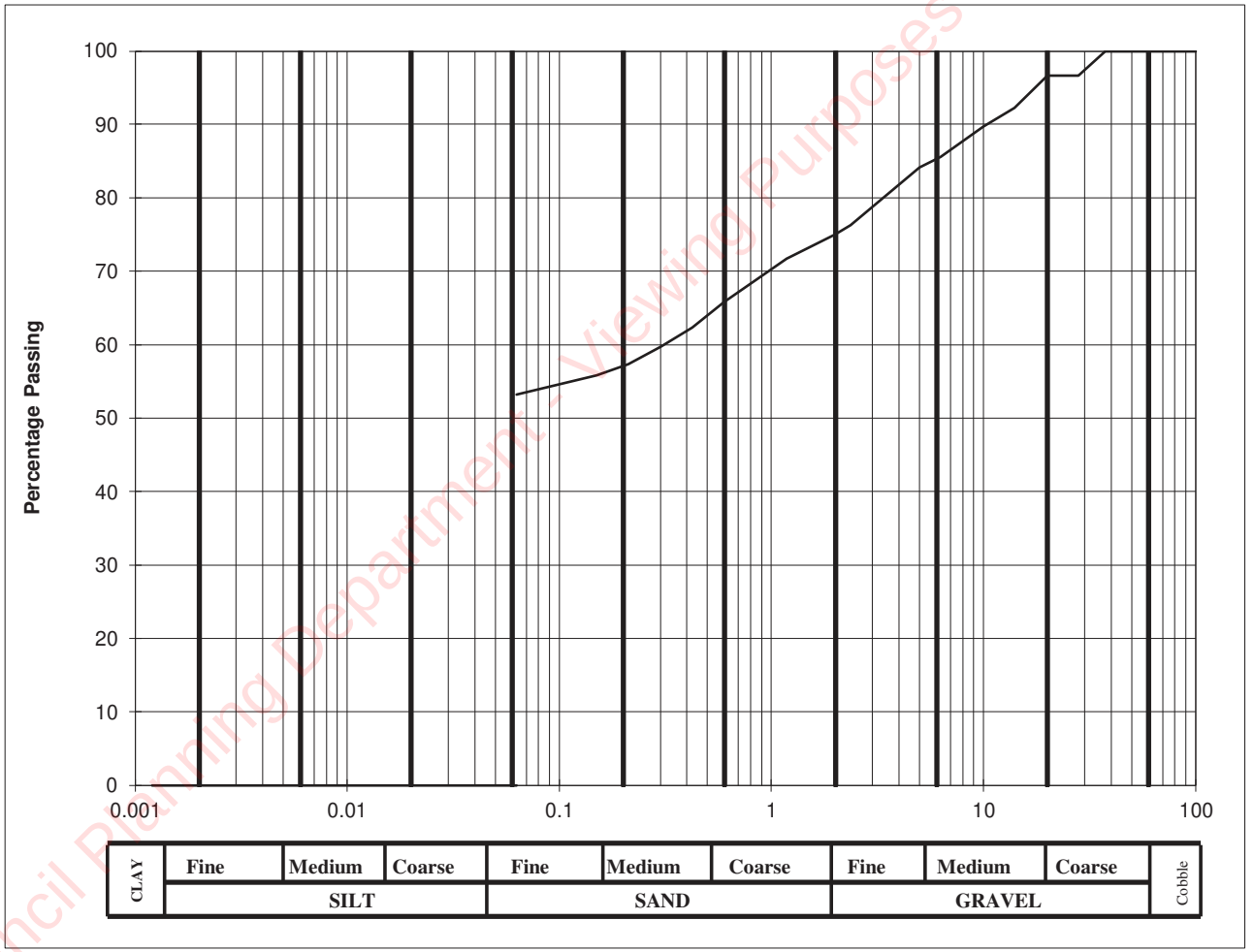
BS 1377 Particle Size Analysis

Site Investigations Limited

BS Sieve size, mm	Percent passing	Hydrometer analysis	
		Diameter, mm	% passing
100	100	**0.0630**	
90	100	**0.0200**	
75	100	**0.0060**	
63	100	**0.0020**	
50	100		
37.5	100		
28	96.6		
20	96.6		
14	92.2		
10	89.7		
6.3	85.6		
5.0	84.1		
2.36	76.3		
2.00	75		
1.18	71.7		
0.600	65.8		
0.425	62.3		
0.300	59.7		
0.212	57.3		
0.150	55.8		
0.063	53		

Cobbles, %	0
Gravel, %	25
Sand, %	22
Clay / Silt, %	53



Client :	Sky Castle Ltd.
Project :	Moygaddy

Lab. No :	21/871
Sample No :	MK58

Hole ID :	TP 11
Depth, m :	1.50

Material description :	slightly sandy slightly gravelly silty CLAY
Remarks :	Soils with clay or silt content between 15% - 35% can be classified as clay or silt depending on the field Engineers assessment of in-situ behaviour. Where material is for re-use and therefore disturbed, only soils with clay or silt >35% are classified as clay or silt

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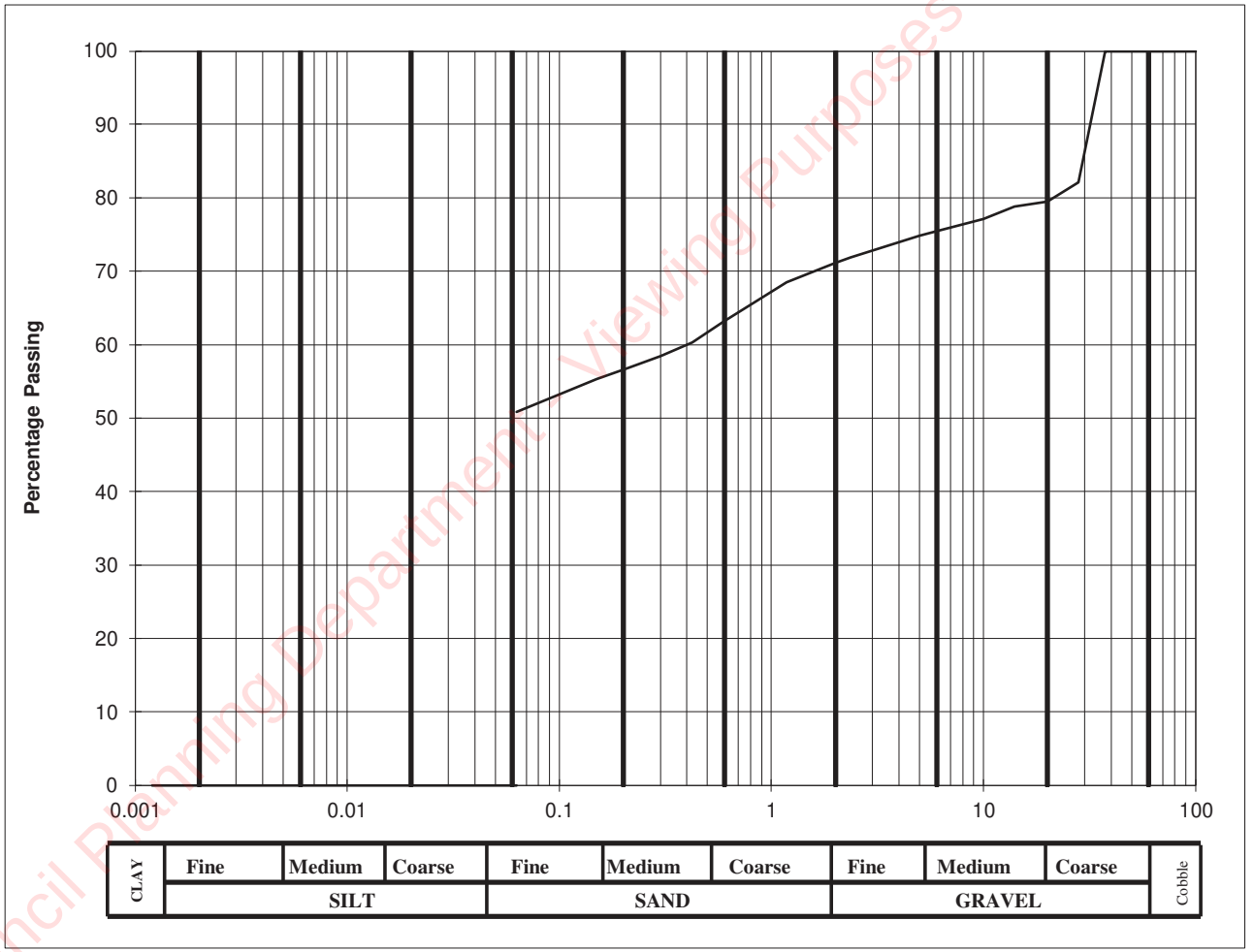
BS 1377 Particle Size Analysis

Site Investigations Limited

BS Sieve size, mm	Percent passing	Hydrometer analysis	
		Diameter, mm	% passing
100	100	**0.0630**	
90	100	**0.0200**	
75	100	**0.0060**	
63	100	**0.0020**	
50	100		
37.5	100		
28	82.1		
20	79.5		
14	78.8		
10	77.1		
6.3	75.6		
5.0	74.8		
2.36	71.9		
2.00	71.1		
1.18	68.5		
0.600	63.2		
0.425	60.3		
0.300	58.4		
0.212	56.8		
0.150	55.3		
0.063	51		



Cobbles, %	0
Gravel, %	29
Sand, %	20
Clay / Silt, %	51

Client :	Sky Castle Ltd.
Project :	Moygaddy

Lab. No :	21/873
Sample No :	MK35

Hole ID :	TP 12
Depth, m :	1.00

Material description :	slightly sandy slightly gravelly silty CLAY
Remarks :	Soils with clay or silt content between 15% - 35% can be classified as clay or silt depending on the field Engineers assessment of in-situ behaviour. Where material is for re-use and therefore disturbed, only soils with clay or silt >35% are classified as clay or silt

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BS 1377 Particle Size Analysis

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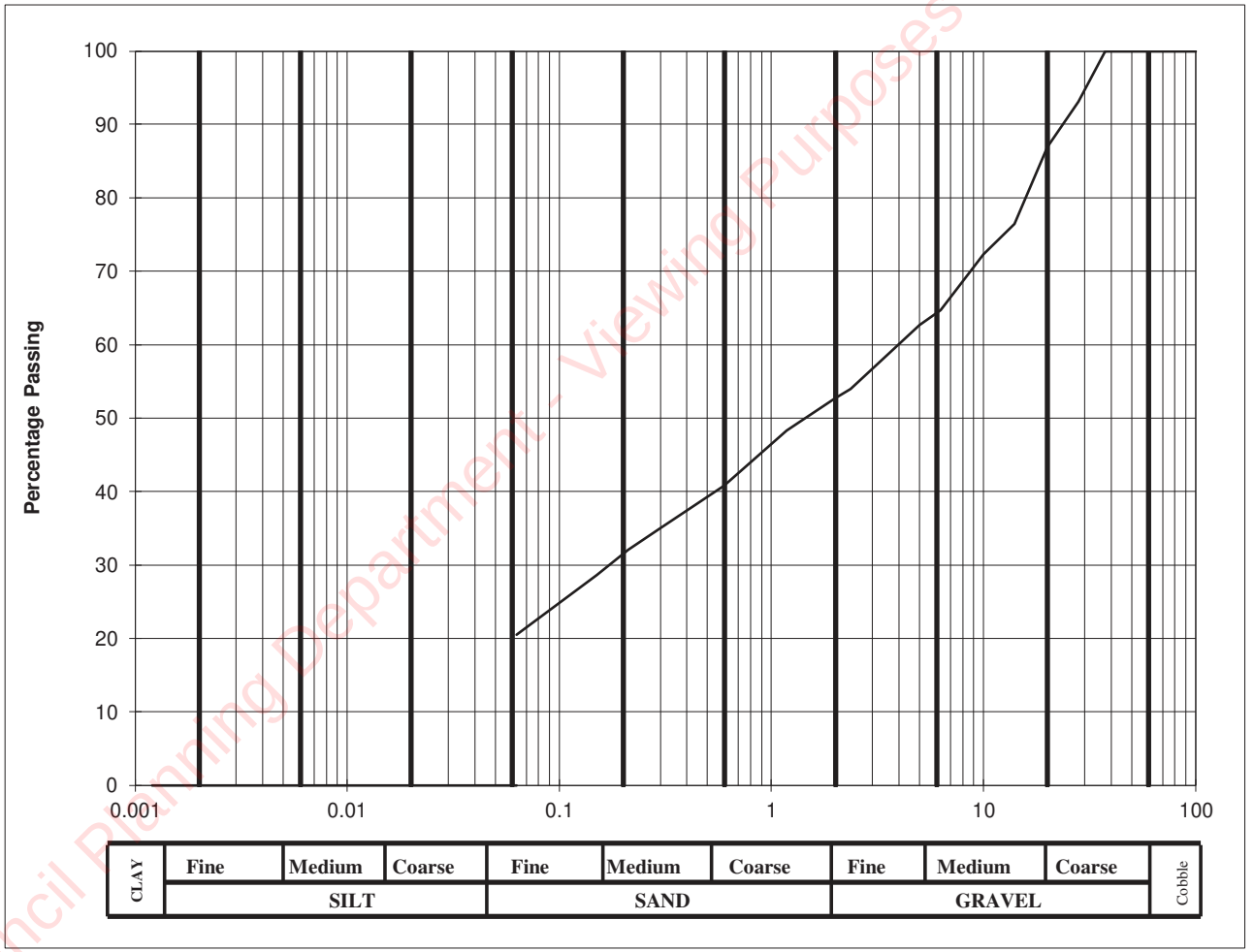
BS Sieve size, mm	Percent passing	Hydrometer analysis	
		Diameter, mm	% passing
100	100	**0.0630**	
90	100	**0.0200**	
75	100	**0.0060**	
63	100	**0.0020**	
50	100		
37.5	100		
28	93.1		
20	86.9		
14	76.4		
10	72.3		
6.3	64.7		
5.0	62.7		
2.36	54		
2.00	52.7		
1.18	48.3		
0.600	40.8		
0.425	37.9		
0.300	35		
0.212	32.1		
0.150	28.6		
0.063	21		



Cobbles, %	0
Gravel, %	47
Sand, %	32
Clay / Silt, %	21

Client :	Sky Castle Ltd.
Project :	Moygaddy

Lab. No :	21/875
Sample No :	MK29

Hole ID :	TP 13
Depth, m :	1.50

Material description :	slightly sandy gravelly silty CLAY
Remarks :	Soils with clay or silt content between 15% - 35% can be classified as clay or silt depending on the field Engineers assessment of in-situ behaviour. Where material is for re-use and therefore disturbed, only soils with clay or silt >35% are classified as clay or silt

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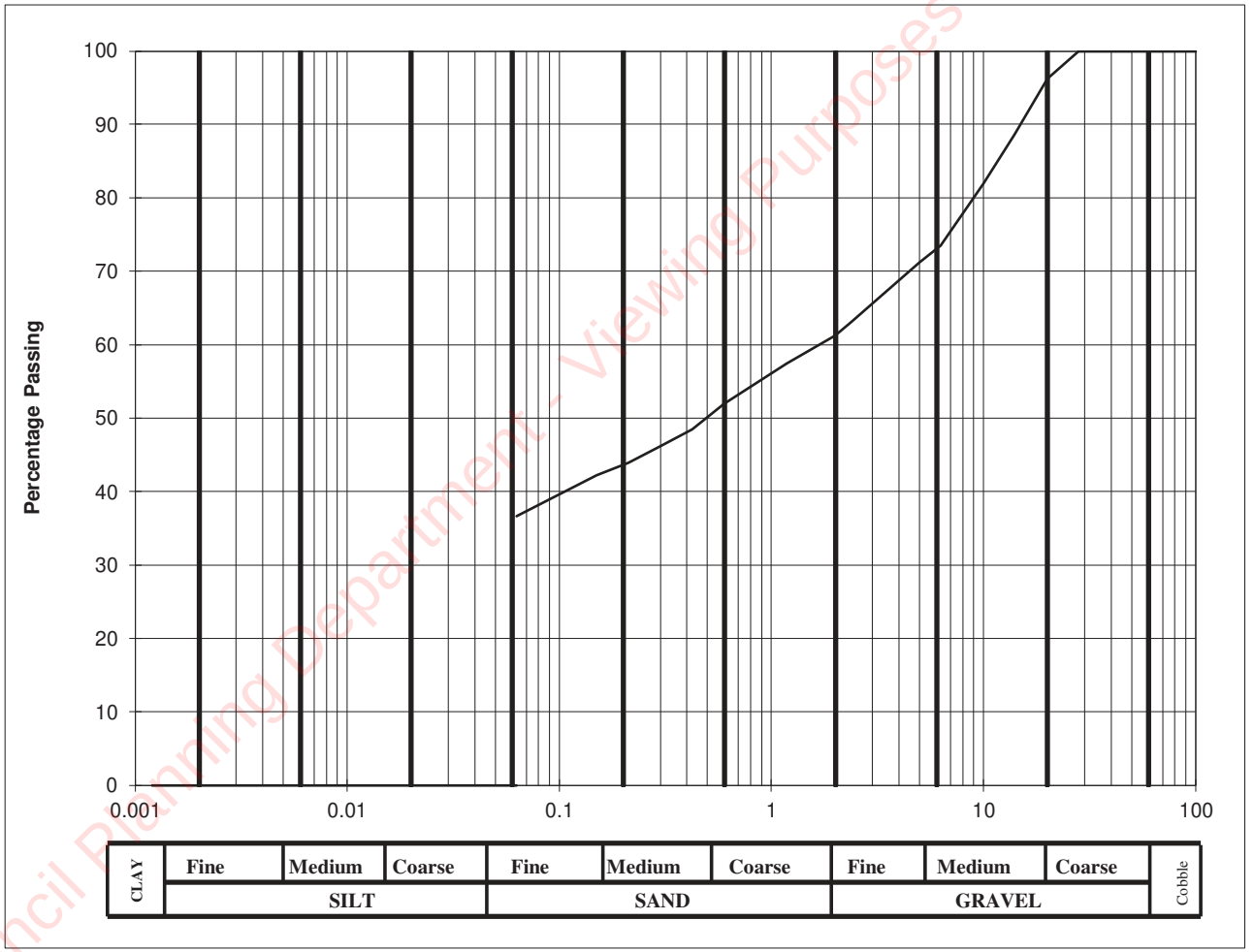
BS 1377 Particle Size Analysis

Site Investigations Limited

BS Sieve size, mm	Percent passing	Hydrometer analysis	
		Diameter, mm	% passing
100	100	**0.0630**	
90	100	**0.0200**	
75	100	**0.0060**	
63	100	**0.0020**	
50	100		
37.5	100		
28	100		
20	96.2		
14	88.6		
10	81.9		
6.3	73.5		
5.0	71.2		
2.36	63		
2.00	61.2		
1.18	57.4		
0.600	51.9		
0.425	48.5		
0.300	46.2		
0.212	43.9		
0.150	42.2		
0.063	37		

Cobbles, %	0
Gravel, %	39
Sand, %	24
Clay / Silt, %	37



Client :	Sky Castle Ltd.
Project :	Moygaddy

Lab. No :	21/878
Sample No :	MK23

Hole ID :	TP 15
Depth, m :	1.00

Material description :	slightly sandy gravelly silty CLAY
Remarks :	Soils with clay or silt content between 15% - 35% can be classified as clay or silt depending on the field Engineers assessment of in-situ behaviour. Where material is for re-use and therefore disturbed, only soils with clay or silt >35% are classified as clay or silt

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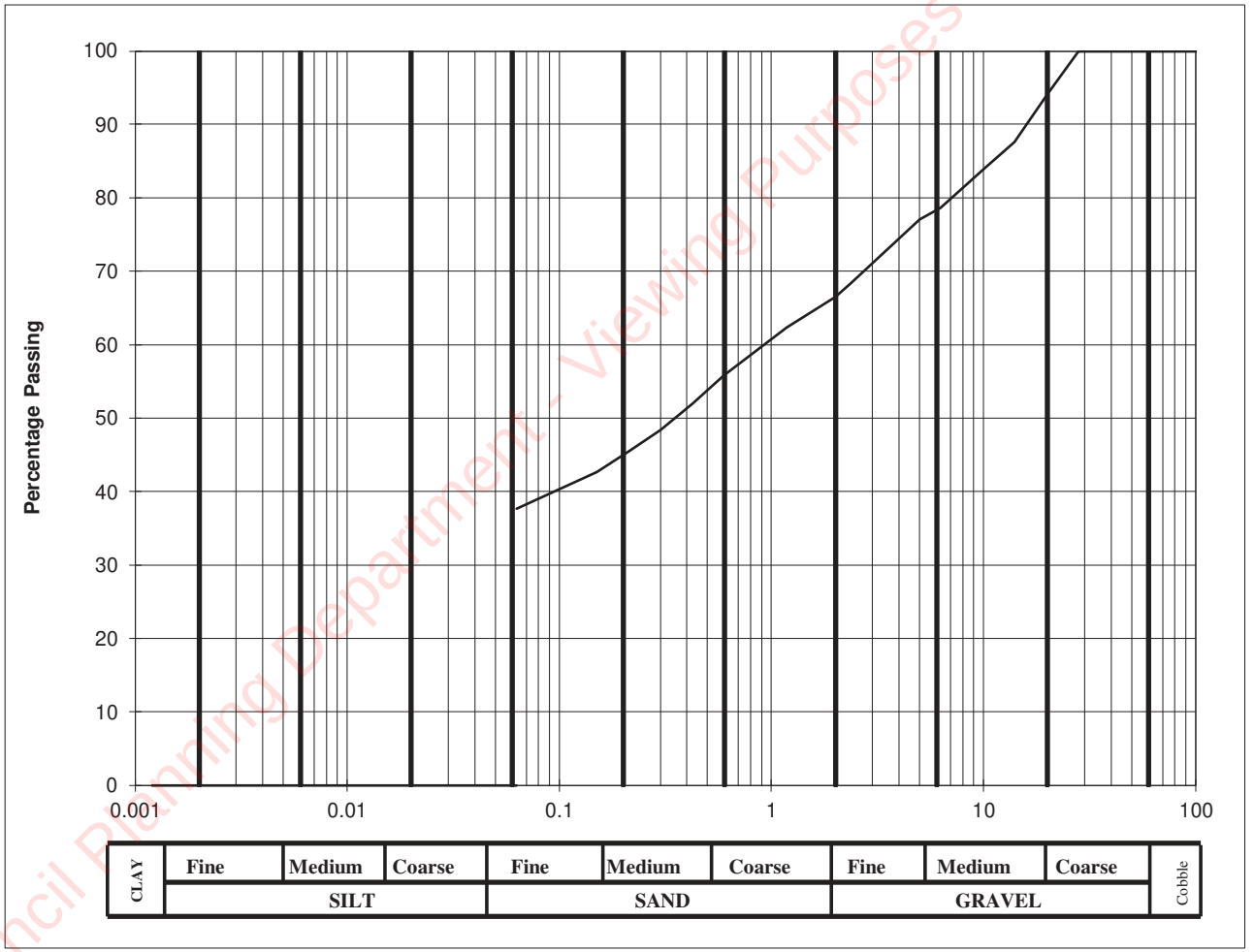
BS 1377 Particle Size Analysis

Site Investigations Limited

BS Sieve size, mm	Percent passing	Hydrometer analysis	
		Diameter, mm	% passing
100	100	**0.0630**	
90	100	**0.0200**	
75	100	**0.0060**	
63	100	**0.0020**	
50	100		
37.5	100		
28	100		
20	94.1		
14	87.6		
10	83.9		
6.3	78.6		
5.0	77		
2.36	68.3		
2.00	66.5		
1.18	62.3		
0.600	55.8		
0.425	51.9		
0.300	48.4		
0.212	45.4		
0.150	42.6		
0.063	38		

Cobbles, %	0
Gravel, %	34
Sand, %	29
Clay / Silt, %	38



Client :	Sky Castle Ltd.
Project :	Moygaddy

Lab. No :	21/883
Sample No :	MK05

Hole ID :	TP 19
Depth, m :	1.00

Material description :	slightly sandy slightly gravelly silty CLAY
Remarks :	Soils with clay or silt content between 15% - 35% can be classified as clay or silt depending on the field Engineers assessment of in-situ behaviour. Where material is for re-use and therefore disturbed, only soils with clay or silt >35% are classified as clay or silt

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California Bearing Ratio (CBR) In accordance with BS1377: Part 4: Method 7

Client	Sky Castle Ltd.
Site	Moygaddy
S.I. File No	5863 / 21
Test Lab	Site Investigations Ltd., Carhugar The Grange, 12th Lock Rd., Lucan Co. Dublin. Tel (01) 6108768 Email info@siteinvestigations.ie
Report Date	12th July 2021

CBR No	Depth (mBGL)	Sample No	Sample Type	Lab Ref	Moisture Content (%)	CBR Value (%)	Location / Remarks
TP01	0.50	MK14	CBR	21/855	10.3	7.5	
TP02	0.50	MK07	CBR	21/857	14.8	5.2	
TP03	0.50	MK02	CBR	21/858	16.5	5.2	
TP04	0.50	MK43	CBR	21/859	8.8	9.7	
TP05	0.50	MK39	CBR	21/861	12.3	8.2	
TP06	0.50	MK46	CBR	21/862	10.4	9.5	
TP07	0.50	MK51	CBR	21/864	12.9	8.8	
TP08	0.50	MK37	CBR	21/865	17.0	4.3	
TP09	0.50	MK60	CBR	21/867	15.3	7.4	
TP10	0.50	MK62	CBR	21/868	10.1	10.9	
TP11	0.50	MK57	CBR	21/870	17.5	5.0	
TP12	0.50	MK34	CBR	21/872	14.8	8.9	
TP13	0.50	MK27	CBR	21/874	12.1	11.2	
TP14	0.50	MK24	CBR	21/876	9.1	11.6	
TP15	0.50	MK22	CBR	21/877	17.9	4.1	
TP16	0.50	MK54	CBR	21/879	17.6	5.2	
TP17	0.50	MK17	CBR	21/880	12.7	6.8	
TP18	0.50	MK11	CBR	21/881	10.8	9.3	
TP19	0.50	MK04	CBR	21/882	15.7	5.3	
TP20	0.50	MK19	CBR	21/884	12.6	11.4	
TP21	0.50	MK31	CBR	21/885	10.8	10.3	

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Chemical Testing
In accordance with BS 1377: Part 3

Client	Sky Castle Ltd.
Site	Moygaddy
S.I. File No	5863 / 21
Test Lab	Site Investigations Ltd., Carhugar The Grange, 12th Lock Rd., Lucan Co. Dublin. Tel (01) 6108768 Email:info@siteinvestigations.ie
Report Date	12th July 2021

Hole Id	Depth (mBGL)	Sample No	Lab Ref	pH Value	Water Soluble Sulphate Content (2:1 Water-soil extract) (SO_3) g/L	Water Soluble Sulphate Content (2:1 Water-soil extract) (SO_3) %	Loss on Ignition (Organic Content) %	Chloride ion Content (water:soil ratio 2:1) %	% passing 2mm	Remarks
TP01	1.00	MK15	21/856	8.59	0.120	0.085		0.26	70.7	
TP04	1.00	MK44	21/860	8.75	0.126	0.093		0.21	74.2	
TP06	1.00	MK47	21/863	8.80	0.126	0.094		0.23	74.7	
TP08	1.00	MK38	21/866	8.73	0.117	0.045		0.22	38.5	
TP10	1.00	MK63	21/869	8.66	0.122	0.085		0.24	70.0	
TP12	1.00	MK35	21/873	8.71	0.127	0.090		0.24	71.1	
TP15	1.00	MK23	21/878	8.73	0.123	0.075		0.24	61.2	
TP19	1.00	MK05	21/883	8.67	0.120	0.080		0.26	66.5	

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Appendix 7

Geotechnical Rock Laboratory Test Results

Point Load Test Broch,E. & Franklin,J.A.,IRSM Point Load Test Method

Uniaxial Compressive Strength in accordance with BS1881

Client	Sky Castle Ltd.
Site	Moygaddy
S.I. File No	5863 / 19
Test Lab	Site Investigations Ltd., Carhugar The Grange, 12th Lock Rd., Lucan Co. Dublin. Tel (01) 6108768 Email:info@siteinvestigations.ie
Report Date	22nd July 2021

Hole ID	Depth (m)	Lab Ref No.	Sample Type	Diameter / Height (mm)	Test Type	Is (MN/m^2)	Compressive Strength (MPa)	Strength Designation	Approx. Equivalent UCS Value (MPa)	Remarks
RC04	6.78	21/931	C	65	PL	4.73		Very Strong	119.5	Tested Diametrically
RC04	8.47	21/932	C	65	PL	3.79		Strong	96.0	Tested Diametrically
RC05	6.20	21/933	C	65	PL	4.50		Very Strong	114.0	Tested Diametrically
RC05	8.17	21/934	C	65	PL	2.13		Strong	54.0	Tested Diametrically
RC06	5.45	21/935	C	65	PL	3.43		Strong	87.0	Tested Diametrically
RC06	6.96	21/936	C	65	PL	4.50		Very Strong	114.0	Tested Diametrically
RC07	6.20	21/937	C	65	PL	4.50		Very Strong	114.0	Tested Diametrically
RC07	7.10	21/938	C	65	PL	4.26		Very Strong	108.0	Tested Diametrically
RC08	7.07	21/939	C	65	PL	1.70		Moderately Strong	43.0	Tested Diametrically
RC08	8.24	21/940	C	65	PL	2.96		Strong	75.0	Tested Diametrically
RC09	6.40	21/941	C	65	PL	5.21		Very Strong	132.0	Tested Diametrically
RC09	7.00	21/942	C	65	PL	1.23		Moderately Strong	31.0	Tested Diametrically
RC10	3.27	21/943	C	65	PL	4.38		Very Strong	111.0	Tested Diametrically
RC10	4.10	21/944	C	65	PL	2.60		Strong	66.0	Tested Diametrically
RC11	6.80	21/945	C	65	PL	4.38		Very Strong	111.0	Tested Diametrically
RC11	8.90	21/946	C	65	PL	3.79		Strong	96.0	Tested Diametrically
RC17	8.35	21/947	C	65	PL	3.55		Strong	90.0	Tested Diametrically
RC17	8.29	21/948	C	65	PL	4.50		Very Strong	114.0	Tested Diametrically
RC19	5.50	21/949	C	65	PL	4.14		Very Strong	104.5	Tested Diametrically
RC19	6.80	21/950	C	65	PL	4.62		Very Strong	108.0	Tested Diametrically

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Appendix 8

Survey Data

Survey Data

Location	Irish Transverse Mercator		Elevation	Irish National Grid	
	Easting	Northing		Easting	Northing
Boreholes					
BH01	693986.514	739217.399	56.45	294056.159	239192.090
BH02	693926.010	739294.840	56.95	293995.641	239269.547
BH03	694117.023	739155.527	55.01	294186.696	239130.205
BH04	693732.812	739457.539	56.85	293802.400	239432.280
BH05	693928.844	739604.500	58.72	293998.473	239579.274
BH06	693927.326	739421.930	57.55	293996.956	239396.665
BH07	694241.270	739411.796	58.99	294310.968	239386.531
BH08	694331.307	739691.333	61.30	294401.022	239666.129
BH09	694598.661	739652.377	61.68	294668.434	239627.166
BH10	694446.855	739466.694	59.25	294516.597	239441.442
BH11	694790.229	739307.430	59.88	294860.046	239282.145
BH12	694615.966	739002.198	56.86	294685.748	238976.846
BH13	694659.374	738763.773	52.09	294729.167	238738.369
BH14	694546.422	738784.570	53.46	294616.190	238759.170
BH15	694458.907	738814.666	54.44	294528.656	238789.272
BH16	693655.329	739258.288	49.53	293724.902	239232.986
BH17	694518.865	738836.591	54.89	294588.627	238811.202
BH18	694562.423	738770.148	52.93	294632.195	238744.745
Rotary Coreholes					
RC04	693637.963	739436.766	56.84	293707.531	239411.502
RC05	693935.222	739548.071	58.60	294004.853	239522.833
RC06	694016.492	739390.864	57.65	294086.142	239365.593
RC07	694142.350	739365.230	57.84	294212.027	239339.954
RC08	694212.597	739630.304	60.48	294282.287	239605.086
RC09	694497.168	739610.386	61.10	294566.919	239585.165
RC10	694428.449	739378.834	57.86	294498.187	239353.562
RC11	694711.726	739248.236	59.49	294781.526	239222.938
RC12	694562.423	738770.148	52.93	294632.195	238744.745
RC13	694473.806	738837.204	55.00	294543.558	238811.815
RC14	694269.076	739051.513	55.61	294338.783	239026.170
RC16	694648.959	738608.023	45.96	294718.751	238582.586
RC17	693707.911	739303.990	54.78	293777.495	239278.698
RC18	693667.400	739242.451	49.86	293736.976	239217.145
RC19	694613.822	739485.171	58.39	294683.599	239459.924
RC20	694717.266	739392.581	59.02	294787.066	239367.314
Trial Pits					
TP01	693958.608	739151.571	55.32	294028.247	239126.247
TP02	693988.420	739286.118	57.37	294058.064	239260.824
TP03	693767.173	739286.781	55.26	293836.770	239261.486
TP04	693682.930	739502.916	56.95	293752.507	239477.667

Survey Data

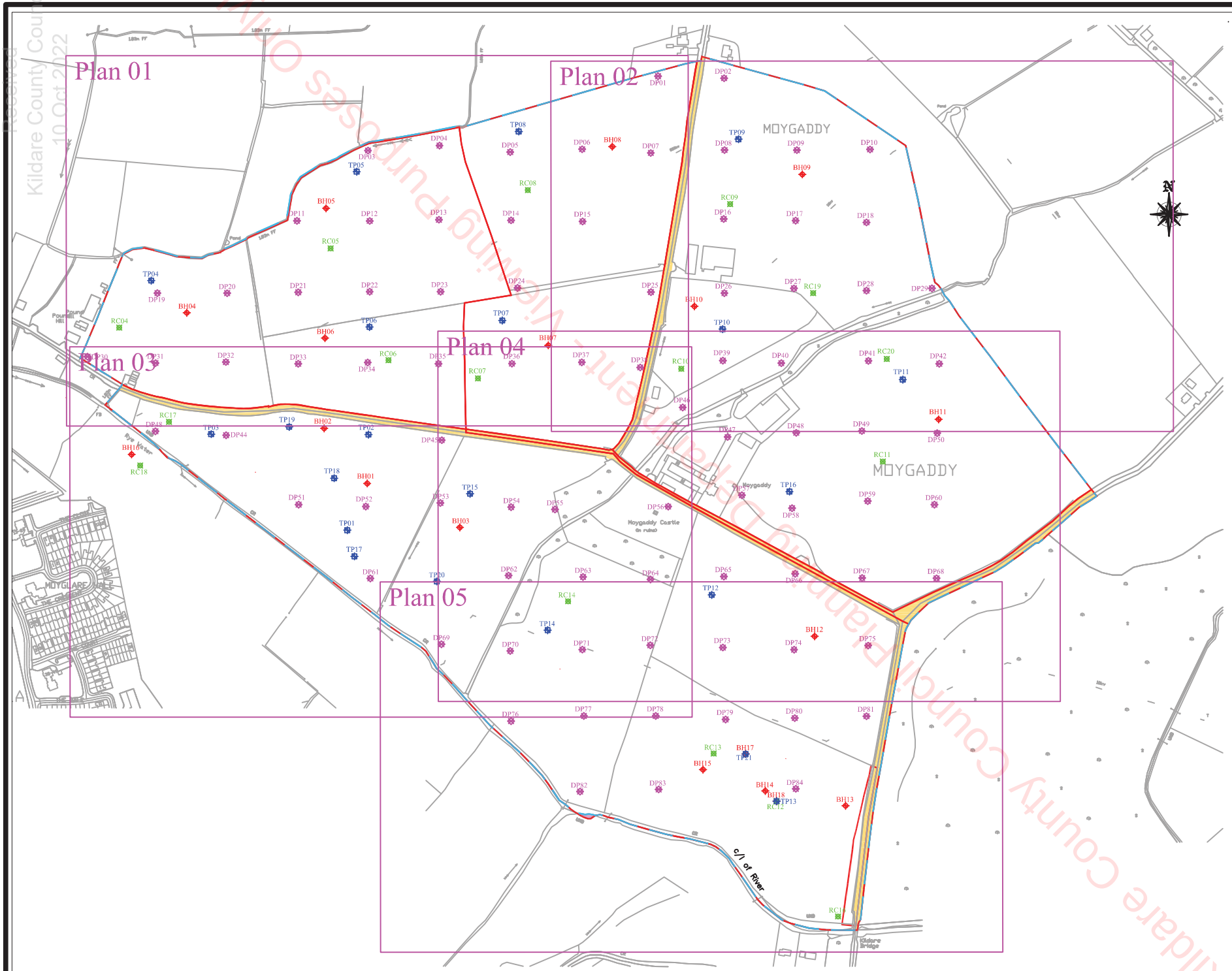
Location	Irish Transverse Mercator		Elevation	Irish National Grid	
	Easting	Northing		Easting	Northing
TP05	693971.792	739656.168	58.70	294041.430	239630.954
TP06	693989.839	739437.563	57.88	294059.483	239412.302
TP07	694176.647	739446.736	58.93	294246.331	239421.478
TP08	694199.733	739712.642	61.26	294269.420	239687.442
TP09	694508.798	739701.821	62.01	294578.551	239676.620
TP10	694486.386	739434.493	58.96	294556.136	239409.234
TP11	694739.889	739363.529	59.42	294809.695	239338.256
TP12	694471.269	739060.502	56.97	294541.019	239035.162
TP13	694562.423	738770.148	52.93	294632.195	238744.745
TP14	694240.465	739010.894	55.01	294310.166	238985.542
TP15	694131.238	739202.931	55.37	294200.914	239177.620
TP16	694580.524	739205.916	58.33	294650.296	239180.608
TP17	693968.747	739114.742	54.52	294038.389	239089.410
TP18	693940.121	739224.755	55.98	294009.756	239199.447
TP19	693876.942	739296.996	55.71	293946.562	239271.703
TP20	694084.588	739079.517	55.01	294154.255	239054.179
TP21	694518.865	738836.591	54.89	294588.627	238811.202
Dynamic Probes					
DP01	694395.693	739790.416	62.17	294465.421	239765.234
DP02	694488.532	739787.664	61.87	294558.280	239762.481
DP03	693987.686	739685.908	58.58	294057.327	239660.700
DP04	694088.248	739692.829	59.34	294157.911	239667.624
DP05	694187.716	739683.631	60.98	294257.400	239658.424
DP06	694288.959	739687.709	61.12	294358.665	239662.504
DP07	694385.497	739682.425	61.53	294455.224	239657.219
DP08	694489.069	739686.527	61.51	294558.818	239661.323
DP09	694590.817	739686.475	61.71	294660.588	239661.271
DP10	694693.928	739687.423	60.58	294763.721	239662.220
DP11	693887.836	739587.012	58.01	293957.456	239561.782
DP12	693990.198	739586.789	58.63	294059.841	239561.560
DP13	694087.587	739588.545	58.95	294157.250	239563.317
DP14	694188.942	739587.683	59.62	294258.627	239562.455
DP15	694289.424	739586.183	59.97	294359.131	239560.956
DP16	694488.048	739589.540	60.82	294557.798	239564.315
DP17	694589.076	739587.354	60.73	294658.847	239562.129
DP18	694688.772	739584.729	60.89	294758.565	239559.504
DP19	693691.519	739485.259	57.06	293761.098	239460.006
DP20	693789.642	739485.089	56.56	293859.242	239459.837
DP21	693889.602	739486.389	57.21	293959.224	239461.138
DP22	693990.017	739487.250	58.16	294059.660	239461.999
DP23	694089.764	739487.208	58.44	294159.429	239461.958

Survey Data

Location	Irish Transverse Mercator		Elevation	Irish National Grid	
	Easting	Northing		Easting	Northing
DP24	694198.133	739492.619	59.24	294267.821	239467.371
DP25	694385.716	739486.593	59.28	294455.444	239461.345
DP26	694489.024	739485.194	59.56	294558.775	239459.946
DP27	694586.781	739491.852	58.59	294656.553	239466.606
DP28	694688.953	739488.632	58.31	294758.747	239463.386
DP29	694780.802	739491.934	56.47	294850.615	239466.689
DP30	693593.273	739395.730	56.03	293662.832	239370.457
DP31	693688.922	739386.795	57.17	293758.501	239361.521
DP32	693787.843	739388.255	56.49	293857.444	239362.982
DP33	693889.656	739385.777	56.89	293959.278	239360.504
DP34	693987.346	739387.484	57.60	294056.989	239362.212
DP35	694086.861	739385.871	57.91	294156.526	239360.599
DP36	694190.231	739385.957	58.35	294259.918	239360.686
DP37	694288.456	739387.753	58.62	294358.164	239362.483
DP38	694370.568	739380.643	58.45	294440.294	239355.372
DP39	694486.826	739390.243	58.25	294556.577	239364.974
DP40	694569.043	739386.611	54.78	294638.812	239361.342
DP41	694691.616	739389.831	59.36	294761.411	239364.563
DP42	694791.212	739385.883	58.94	294861.028	239360.615
DP43	693688.642	739290.847	52.18	293758.222	239265.552
DP44	693788.258	739285.161	56.04	293857.859	239259.865
DP45	694091.482	739278.290	56.67	294161.149	239252.995
DP46	694430.386	739324.235	53.90	294500.125	239298.952
DP47	694493.472	739282.726	58.49	294563.225	239257.434
DP48	694590.116	739288.613	59.21	294659.890	239263.323
DP49	694682.452	739291.233	59.96	294752.246	239265.944
DP50	694788.363	739288.137	59.82	294858.180	239262.848
DP51	693890.121	739187.554	55.56	293959.745	239162.238
DP52	693984.693	739184.950	56.07	294054.337	239159.634
DP53	694089.481	739189.955	55.39	294159.148	239164.641
DP54	694189.069	739183.974	55.51	294258.757	239158.659
DP55	694250.676	739180.873	51.64	294320.378	239155.557
DP56	694409.931	739184.774	55.98	294479.667	239159.460
DP57	694513.646	739200.814	58.11	294583.404	239175.504
DP58	694584.206	739182.489	58.08	294653.979	239157.176
DP59	694690.632	739192.594	58.36	294760.428	239167.284
DP60	694784.383	739187.502	58.33	294854.199	239162.191
DP61	693991.061	739083.755	53.29	294060.708	239058.417
DP62	694185.443	739087.742	49.21	294255.131	239062.406
DP63	694290.240	739085.762	55.96	294359.951	239060.426
DP64	694385.154	739082.180	56.76	294454.885	239056.844

Survey Data

Location	Irish Transverse Mercator		Elevation	Irish National Grid	
	Easting	Northing		Easting	Northing
DP65	694488.362	739086.289	57.03	294558.116	239060.954
DP66	694588.543	739090.206	57.41	294658.318	239064.873
DP67	694682.814	739084.421	57.54	294752.609	239059.087
DP68	694787.254	739083.914	56.22	294857.072	239058.581
DP69	694090.959	738991.035	49.72	294160.628	238965.677
DP70	694187.890	738981.735	52.48	294257.580	238956.376
DP71	694289.189	738983.578	55.45	294358.901	238958.220
DP72	694384.733	738989.607	56.10	294454.465	238964.251
DP73	694486.822	738986.510	56.87	294556.576	238961.154
DP74	694586.960	738983.395	56.54	294656.736	238958.039
DP75	694691.101	738989.216	56.20	294760.899	238963.862
DP76	694188.862	738882.936	48.76	294258.553	238857.556
DP77	694291.409	738890.282	54.52	294361.122	238864.904
DP78	694392.533	738890.201	54.87	294462.268	238864.823
DP79	694490.609	738885.308	55.95	294560.365	238859.930
DP80	694587.972	738887.143	55.82	294657.749	238861.766
DP81	694688.909	738889.761	54.95	294758.707	238864.385
DP82	694286.007	738783.740	47.18	294355.719	238758.339
DP83	694396.549	738786.809	53.35	294466.285	238761.409
DP84	694589.396	738787.697	53.34	294659.174	238762.298



Legend:

- Cable Percussive Borehole
- Rotary Corehole
- Trial Pit
- Dynamic Probe

Client:	Sky Castle Ltd
Engineer:	OCSC
Project:	Moygaddy
Date:	04-08-2021
Description:	Site Investigation Plan
Drawing Number:	**SIL5863:Overall**
Scale:	NTS
Rev:	1
Drawn by:	SL

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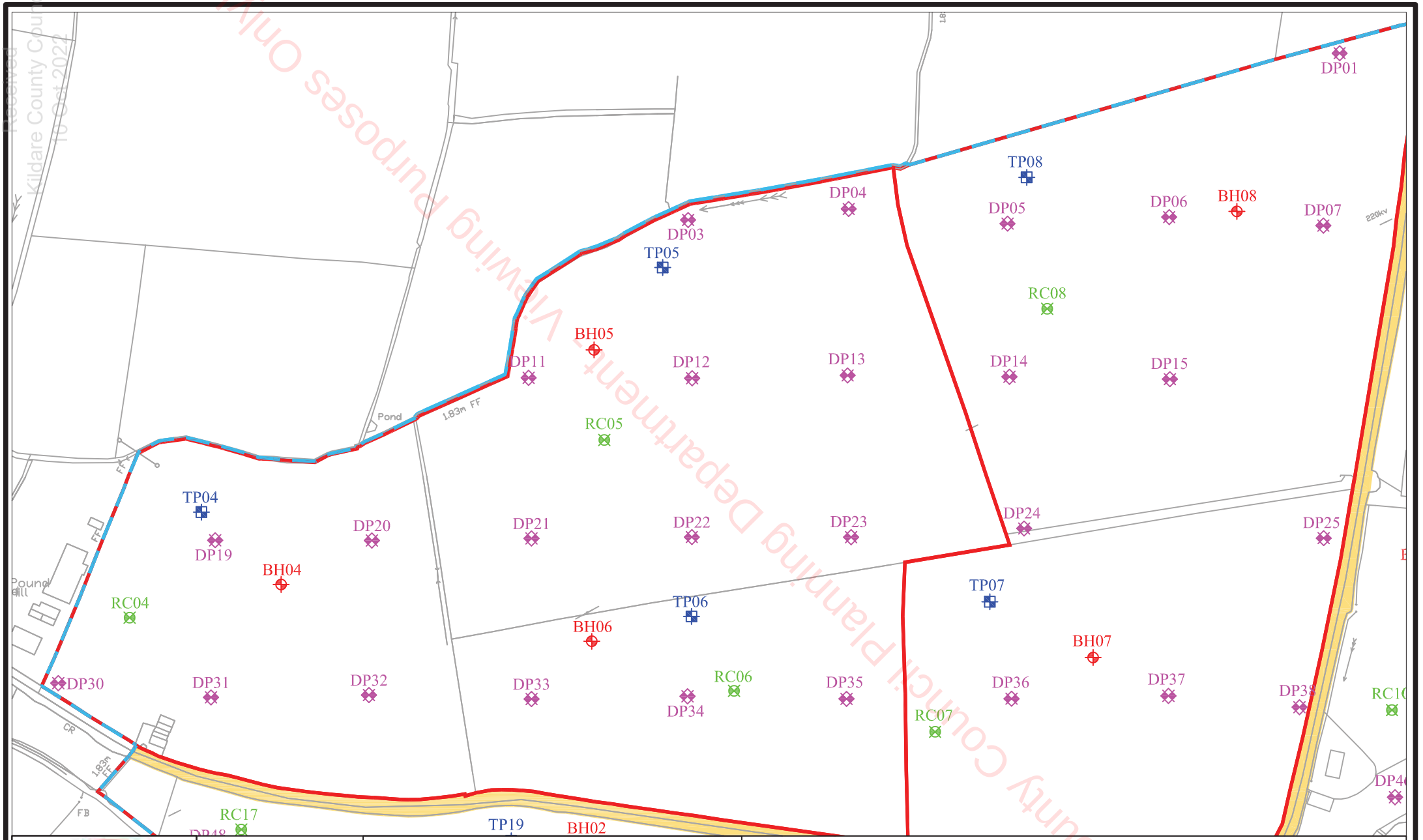

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Client :	Sky Castle Ltd		
Engineer :	OCSC		
Project :	Moygaddy		
Date :	04-08-2021	Scale :	Not to Scale
Description :	Site Investigation	Rev :	1
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Legend:

- Cable Percussion Borehole
- Rotary Corehole
- Trial Pit
- Dynamic Probe

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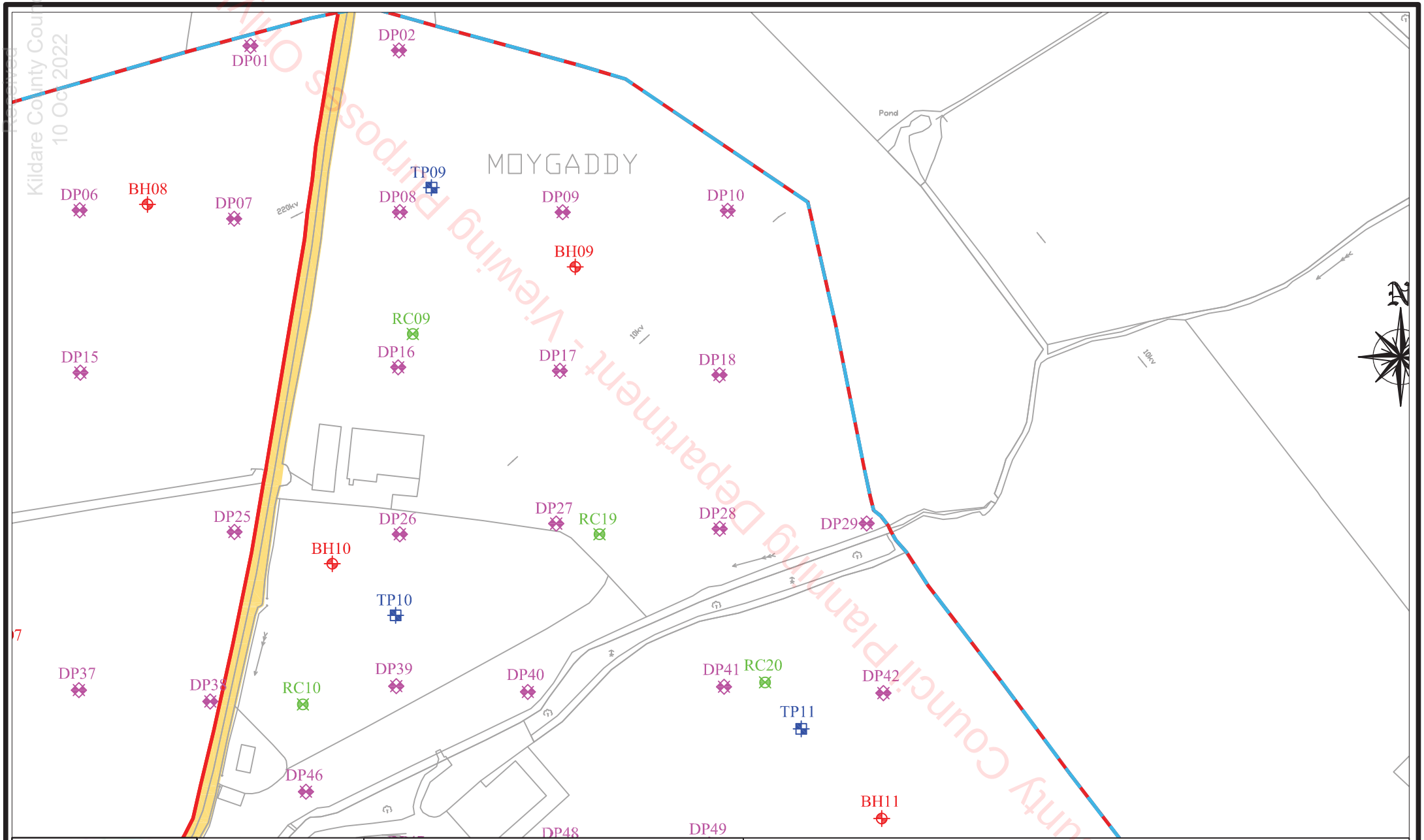

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Project :	Moygaddy		
Date :	04-08-2021	Scale :	Not to Scale
Description :	Site Investigation	Rev :	1
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Legend:

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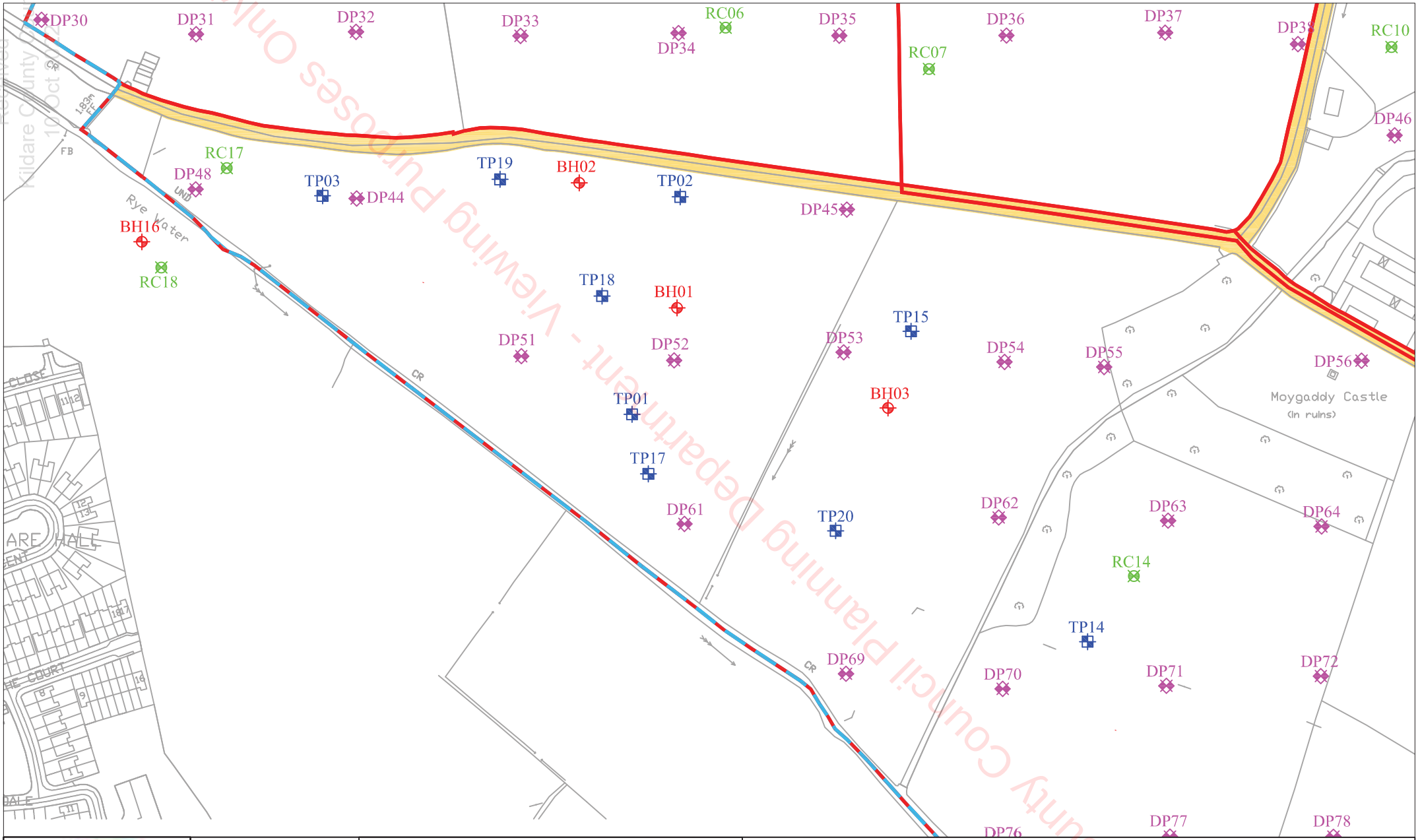
- Rotary Corehole
- Trial Pit
- Dynamic Probe



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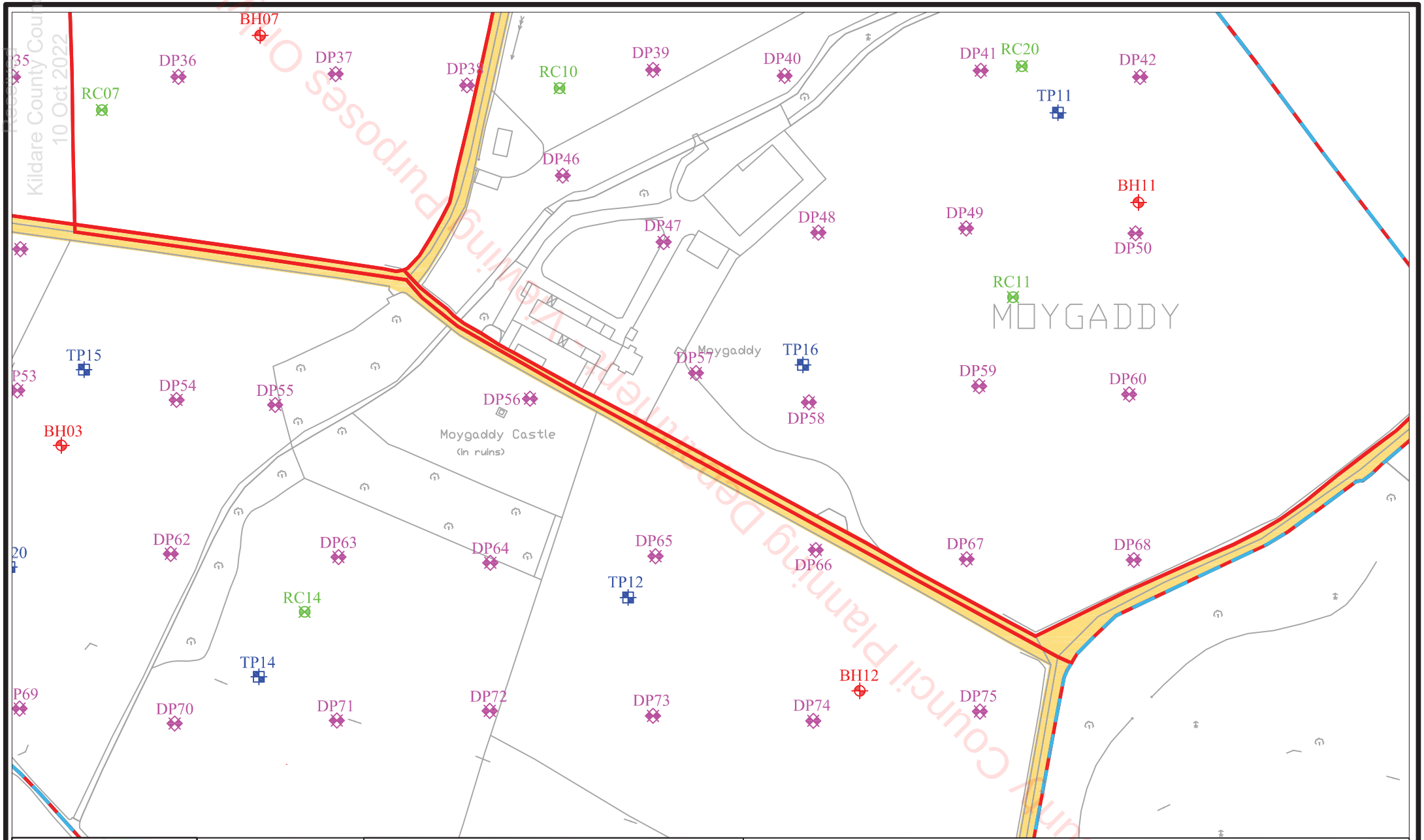
Engineer :	OCSC		
Project :	Moygaddy		
Date :	04-08-2021	**Scale :**	Not to Scale
Description :	Site Investigation	**Rev :**	1
Drawing	**SIL5863:03/05**	**Drawn by :**	SL

Legend:

- Cable Percussion Borehole
- Rotary Corehole
- Trial Pit
- Dynamic Probe

N



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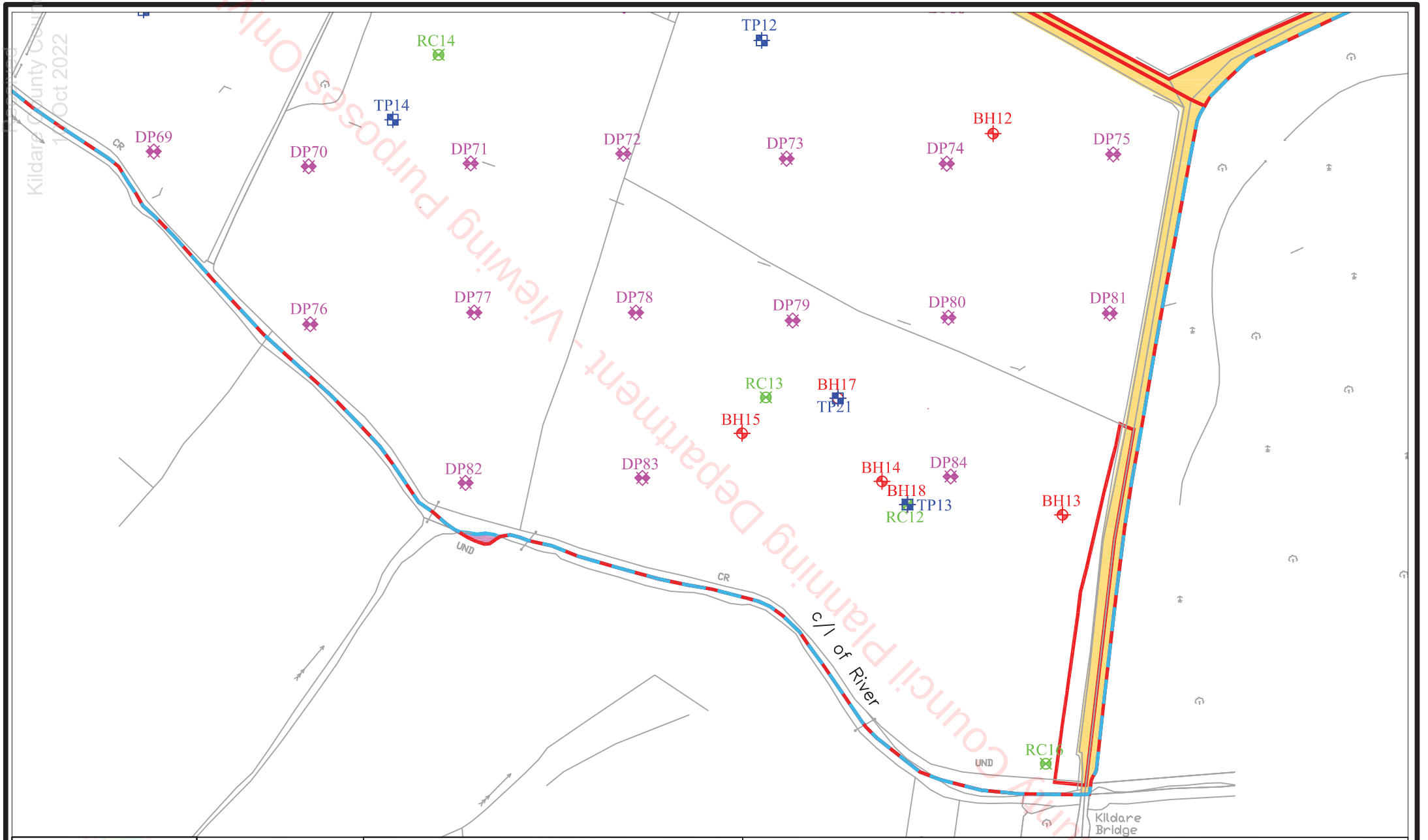
Project :	Moygaddy		
Date :	04-08-2021	**Scale :**	Not to Scale
Description :	Site Investigation	**Rev :**	1
Drawing	**SIL5863:04/05**	**Drawn by :**	SL

Legend:

- Cable Percussion Borehole
- Rotary Corehole
- Trial Pit
- Dynamic Probe

N



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Client :	Sky Castle Ltd		
Engineer :	OCSC		
Project :	Moygaddy		
Date :	04-08-2021	**Scale :**	Not to Scale
Description :	Site Investigation	**Rev :**	1
Drawing	**SIL5863:05/05**	**Drawn by :**	SL

Legend:

- Cable Percussion Borehole
- Rotary Corehole
- Trial Pit
- Dynamic Probe

N

S.I. Ltd Contract No: 5863A

Client: Sky Castle Ltd
Engineer: OCSC
Contractor: Site Investigations Ltd

Moygaddy,
Maynooth, Co. Meath
Additional Site Investigation Report

Prepared by:

.....
Stephen Letch

Issue Date:	06/08/2021
Status	Final
Revision	1

Contents:

		Page No.
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2.	Site Location	1
3.	Fieldwork	1
4.	Ground Conditions	2

Appendices:

1. Trial Pit Logs and Photographs
2. Survey Data

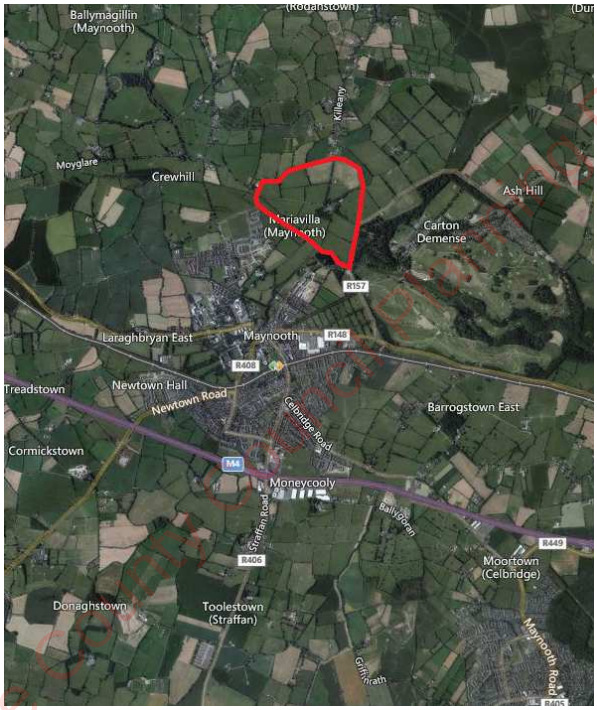
1. Introduction

On the instructions of OCSC, Site Investigations Ltd (SIL) was appointed to complete a ground investigation at Moygaddy, Maynooth, Co. Meath. The investigation was completed for the residential development on the site and was completed on behalf of the Client, Sky Castle Ltd. The fieldworks were started in June and completed in July 2021. Following completion of the initial fieldworks, the Client requested further investigatory works in one field on the site and this report covers those additional works.

This report presents the factual geotechnical data obtained from the field and laboratory testing with interpretation of the ground conditions discussed.

2. Site Location

The site is located to the north of Maynooth with the Kildare-Meath border running to the south of the site with Maynooth in Kildare and the site in Meath. Carton Demense is to the east of site with Dublin city further to the east. The first map below shows the location of the site to the north of Maynooth town and the second map shows the area of investigation (in red) within the site.



3. Fieldwork

The fieldworks comprised a programme of cable percussive boreholes, rotary coreholes, trial pits and dynamic probes. All fieldwork was carried out in accordance with BS 5930:2015, Engineers Ireland GI Specification and Related Document 2nd Edition 2016 and Eurocode 7: Geotechnical Design.

The fieldworks comprised of the following:

- 9 No. trial pits

3.1. Trial Pits

9 No. trial pits were excavated using a wheeled excavator. The pits were logged and photographed by SIL geotechnical engineer and were completed to try and identify the MADE GROUND within the area. Groundwater ingresses and pit wall stability were also recorded as the excavations progressed.

The trial pit logs and photographs are presented in Appendix 1.

3.2. Surveying

Following completion of all the fieldworks, a survey of the exploratory hole locations was completed using a GeoMax GPS Rover. The data is supplied on each individual log along with a site plan in Appendix 2.

4. Ground Conditions

MADE GROUND was encountered in TP23, TP25 and TP26 and therefore indicates that the area of fill material is quite small. No environmental testing was scheduled for analysis of the fill material.

Appendix 1

Trial Pit Logs and Photographs

Contract No: 5863A	**Trial Pit Log**				Trial Pit No: **TP22**
Contract:	Moygaddy	Easting:	694224.181	Date:	05/08/2021
Location:	Maynooth, Co. Meath	Northing:	739192.184	Excavator:	JCB 3CX
Client:	Sky Castle Ltd	Elevation:	55.19	Logged By:	M. Kaliski
Engineer:	OCSC	Dimensions (LxWxD) (m):	3.30 x 0.60 x 1.10	Status:	FINAL

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples / Field Tests Depth	Type	Result	Water Strike
0.5	0.20	TOPSOIL.		55.0	54.99				
		Grey brown silty sandy fine to coarse, angular to subrounded GRAVEL of limestone with high cobble content. Sand is fine to coarse. Cobbles are angular to subrounded of limestone.		54.5					
1.0	0.90				54.29				
	1.10	Firm grey slightly sandy slightly gravelly silty CLAY with high cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.			54.09				
1.5		Pit terminated as no fill material encountered.		54.0					
		Pit terminated at 1.10m		53.5					
2.0				53.0					
2.5				52.5					
3.0				52.0					
3.5				51.5					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Natural soils.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5863A	**Trial Pit Log**				Trial Pit No: **TP23**
Contract:	Moygaddy	Easting:	694171.219	Date:	05/08/2021
Location:	Maynooth, Co. Meath	Northing:	739144.288	Excavator:	JCB 3CX
Client:	Sky Castle Ltd	Elevation:	53.65	Logged By:	M. Kaliski
Engineer:	OCSC	Dimensions (LxWxD) (m):	3.50 x 0.60 x 1.80	Status:	FINAL

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples / Field Tests Depth	Type	Result	Water Strike
		TOPSOIL.		53.5	53.45				
	0.20	MADE GROUND: grey brown silty gravelly sand with high cobble content and trace of tarmacadam and plastic bags fragments.							
0.5				53.0	52.95				
	0.70	MADE GROUND: grey brown slightly sandy slightly gravelly silty clay with high cobble content and some plastic bag fragments.			52.75				
	0.90	MADE GROUND: dark grey slightly sandy slightly gravelly silty clay with medium cobble content and some steel wire and tree branch fragments.							
1.0				52.5					
1.5									
	1.60	Firm grey slightly sandy slightly gravelly silty CLAY with high cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.		52.0	52.05				
	1.80	Pit terminated as natural ground encountered.			51.85				
2.0		**Pit terminated at 1.80m**		51.5					
2.5				51.0					
3.0				50.5					
3.5				50.0					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Natural soils.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5863A	**Trial Pit Log**				Trial Pit No: **TP24**
Contract:	Moygaddy	Easting:	694195.767	Date:	05/08/2021
Location:	Maynooth, Co. Meath	Northing:	739169.748	Excavator:	JCB 3CX
Client:	Sky Castle Ltd	Elevation:	55.38	Logged By:	M. Kaliski
Engineer:	OCSC	Dimensions (LxWxD) (m):	3.20 x 0.60 x 1.10	Status:	FINAL

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples / Field Tests Depth	Type	Result	Water Strike
0.5	0.10	TOPSOIL.		55.0	55.28				
		Grey brown silty gravelly fine to coarse SAND with high cobble content. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.							
1.0	0.80	Firm grey slightly sandy slightly gravelly silty CLAY with high cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.		54.5	54.58				
	1.10	Pit terminated as no fill material encountered.			54.28				
1.5		**Pit terminated at 1.10m**		54.0					
2.0				53.5					
2.5				53.0					
3.0				52.5					
3.5				52.0					
				51.5					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Natural soils.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5863A	**Trial Pit Log**				Trial Pit No: **TP25**
Contract:	Moygaddy	Easting:	694150.929	Date:	05/08/2021
Location:	Maynooth, Co. Meath	Northing:	739121.930	Excavator:	JCB 3CX
Client:	Sky Castle Ltd	Elevation:	53.60	Logged By:	M. Kaliski
Engineer:	OCSC	Dimensions (LxWxD) (m):	3.40 x 0.60 x 3.10	Status:	FINAL

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples / Field Tests Depth	Type	Result	Water Strike
		TOPSOIL.							
	0.10	MADE GROUND: grey brown slightly sandy slightly gravelly silty clay with high cobble content and some scrap metal fragments.		53.5	53.50				
0.5									
	0.60	MADE GROUND: dark grey slightly sandy slightly gravelly silty clay with medium cobble content and some red brick, plastic bag, rag and tree branch fragments.		53.0	53.00				
1.0									
				52.5					
1.5									
				52.0					
2.0									
				51.5					
2.5									
				51.0					
	2.90				50.70				
3.0		Firm grey brown slightly sandy slightly gravelly silty CLAY with high cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.							
	3.10	Pit terminated as natural ground encountered.		50.5	50.50				
		Pit terminated at 3.10m							
3.5									
				50.0					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Natural soils.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5863A	**Trial Pit Log**				Trial Pit No: **TP26**
Contract:	Moygaddy	Easting:	694121.750	Date:	05/08/2021
Location:	Maynooth, Co. Meath	Northing:	739105.896	Excavator:	JCB 3CX
Client:	Sky Castle Ltd	Elevation:	53.76	Logged By:	M. Kaliski
Engineer:	OCSC	Dimensions (LxWxD) (m):	3.40 x 0.60 x 1.20	Status:	FINAL

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples / Field Tests Depth	Type	Result	Water Strike
	0.10	TOPSOIL.			53.66				
0.5		MADE GROUND: light grey brown silty gravelly sand with high cobble, medium boulder content and some red brick and plastic pipe fragments.		53.5					
	0.60	Firm brown slightly sandy slightly gravelly silty CLAY with high cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.		53.0	53.16				
1.0									
	1.20	Pit terminated as natural ground encountered. **Pit terminated at 1.20m**		52.5	52.56				
1.5									
				52.0					
2.0									
				51.5					
2.5									
				51.0					
3.0									
				50.5					
3.5									
				50.0					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Natural soils.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5863A	**Trial Pit Log**				Trial Pit No: **TP27**
Contract:	Moygaddy	Easting:	694111.948	Date:	05/08/2021
Location:	Maynooth, Co. Meath	Northing:	739071.753	Excavator:	JCB 3CX
Client:	Sky Castle Ltd	Elevation:	54.29	Logged By:	M. Kaliski
Engineer:	OCSC	Dimensions (LxWxD) (m):	3.30 x 0.60 x 1.00	Status:	FINAL

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples / Field Tests Depth	Type	Result	Water Strike
	0.10	TOPSOIL.			54.19				
		Firm grey brown slightly sandy slightly gravelly silty CLAY with high cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 300mm diameter).		54.0					
0.5				53.5					
1.0	1.00	Pit terminated as no fill material encountered.			53.29				
		Pit terminated at 1.00m		53.0					
1.5				52.5					
2.0				52.0					
2.5				51.5					
3.0				51.0					
3.5				50.5					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Natural soils.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5863A	**Trial Pit Log**				Trial Pit No: **TP28**
Contract:	Moygaddy	Easting:	694094.546	Date:	05/08/2021
Location:	Maynooth, Co. Meath	Northing:	739022.870	Excavator:	JCB 3CX
Client:	Sky Castle Ltd	Elevation:	53.10	Logged By:	M. Kaliski
Engineer:	OCSC	Dimensions (LxWxD) (m):	3.20 x 0.60 x 0.80	Status:	FINAL

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples / Field Tests Depth	Type	Result	Water Strike
0.5	0.10	TOPSOIL.		53.0	53.00				
		Firm grey brown slightly sandy slightly gravelly silty CLAY with high cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 300mm diameter).		52.5					
1.0	0.80	Pit terminated as no fill material encountered. **Pit terminated at 0.80m**		52.0	52.30				
1.5				51.5					
2.0				51.0					
2.5				50.5					
3.0				50.0					
3.5				49.5					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Natural soils.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5863A	**Trial Pit Log**				Trial Pit No: **TP29**
Contract:	Moygaddy	Easting:	694133.893	Date:	05/08/2021
Location:	Maynooth, Co. Meath	Northing:	739141.152	Excavator:	JCB 3CX
Client:	Sky Castle Ltd	Elevation:	54.69	Logged By:	M. Kaliski
Engineer:	OCSC	Dimensions (LxWxD) (m):	3.00 x 0.60 x 1.90	Status:	FINAL

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples / Field Tests Depth	Type	Result	Water Strike
	0.10	TOPSOIL.			54.59				
		Firm grey brown slightly sandy slightly gravelly silty CLAY with high cobble and low boulder content and occasional black clay bands. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 300mm diameter).		54.5					
0.5									
				54.0					
1.0									
				53.5					
1.5									
				53.0					
	1.90	Pit terminated as no fill material encountered.			52.79				
2.0		**Pit terminated at 1.90m**							
				52.5					
2.5									
				52.0					
3.0									
				51.5					
3.5									
				51.0					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Natural soils.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5863A	**Trial Pit Log**				Trial Pit No: **TP30**
Contract:	Moygaddy	Easting:	694152.911	Date:	05/08/2021
Location:	Maynooth, Co. Meath	Northing:	739157.856	Excavator:	JCB 3CX
Client:	Sky Castle Ltd	Elevation:	54.82	Logged By:	M. Kaliski
Engineer:	OCSC	Dimensions (LxWxD) (m):	3.10 x 0.60 x 1.10	Status:	FINAL

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples / Field Tests Depth	Type	Result	Water Strike
	0.10	TOPSOIL.			54.72				
	0.40	Firm grey brown slightly sandy slightly gravelly silty CLAY with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.		54.5	54.42				
0.5		Firm grey brown slightly sandy slightly gravelly silty CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 300mm diameter).		54.0					
1.0	1.10	Pit terminated as no fill material encountered. **Pit terminated at 1.10m**			53.72				
1.5				53.5					
				53.0					
2.0									
				52.5					
2.5									
				52.0					
3.0									
				51.5					
3.5									
				51.0					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Natural soils.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

TP22 Sidewall

TP22 Spoil

TP23 Sidewall

TP23 Spoil

TP24 Sidewall

TP24 Spoil

TP25 Sidewall

TP25 Spoil

TP26 Sidewall

TP26 Spoil

TP27 Sidewall

TP27 Spoil

TP28 Sidewall

TP28 Spoil

TP29 Sidewall

TP29 Spoil

TP30 Sidewall

TP30 Spoil

Appendix 2

Survey Data

Survey Data

Location	Irish Transverse Mercator		Elevation	Irish National Grid	
	Easting	Northing		Easting	Northing
Trial Pits					
TP22	694224.181	739192.184	55.19	294293.877	239166.871
TP23	694171.219	739144.288	53.65	294240.904	239118.964
TP24	694195.767	739169.748	55.38	294265.457	239144.430
TP25	694150.929	739121.930	53.60	294220.610	239096.601
TP26	694121.750	739105.896	53.76	294191.425	239080.563
TP27	694111.948	739071.753	54.29	294181.621	239046.413
TP28	694094.546	739022.870	53.10	294164.215	238997.519
TP29	694133.893	739141.152	54.69	294203.570	239115.827
TP30	694152.911	739157.856	54.82	294222.592	239132.535

Contract No:	5863A	Client:	Sky Castle Ltd	Legend Key
Contract:	Moygaddy	Engineer:	OCSC	Locations By Type - Empty
Location:	Maynooth, Co. Meath	Scale:	1:1000	Locations By Type - TP
Title:	Site Plan	Drawn By:	SL	

OCSC
O'CONNOR | SUTTON | CRONIN
Multidisciplinary
Consulting Engineers

APPENDIX F. Response to MCC Transportation Dept. Comments

Appendix F

This forms part of a response to the An Bord Pleanála Opinion Report Ref ABP-312213-21, regarding the proposed development at Moygaddy, Maynooth Environs, Co. Meath.

In this document, O'Connor Sutton Cronin (OCSC) has addressed items raised by the Meath County Council Transportation Planning Section in the Opinion Report, dated: 20th January 2022.

Accessibility and Integration

1)

The applicant is requested to upgrade the full extents of the L6219 towards its junction with the R157 and upgrade this junction to a Traffic Signal junction. All works are to be included in the redline site boundary. Details are to be agreed with MCC.

Response

The full extent of the L6219 will be upgraded with walkways and cycle lanes, which will tie into the junction and infrastructure of the R157. All of this will be included in the redline.

2)

The applicant is requested to provide a pedestrian and cycle path for the L6219/R157 junction to the Rye river Bridge on the R157 at the county boundary to create a joined-up pedestrian network. Details are to be agreed with MCC.

Response

A full pedestrian and cycle path has been included along the R157 with an independent pedestrian/cycle bridge crossing the rye river alongside the existing bridge structure.

3)

The applicant is requested to revise the design of the realigned L6219 to provide a suitable location for the future provision of a bus stop. Details are to be agreed with MCC.

Response

Details were discussed with MCC and it was noted that this provision of a bus stop will be made on the MOOR, and not the local road.

Access Junction

1)

The applicant should provide more details on the development access setting out which road users have priority at the junction. The Applicant should ensure that the stop line from the development access is located to the rear of the footpath along the L6219 and the junction is designed according to section 4.9 of the National Cycle Manual

Response

All access junctions have been updated to be compliant with DMURS and the National Cycle Manual.

Traffic Assessment

1)

The applicant is requested to provide the specific rates used for the growth calculation and to present the calculation in tabular format.

Response

This has been included in the Traffic Assessment.

2)

The applicant is requested to consider an Opening Year + 5 scenario (2028), in addition to the Opening Year and Opening Year + 15, as is the standard under the TII Traffic and Transport Assessment Guidelines.

Response

This has been included in the Traffic Assessment.

3)

The applicant is requested to include all land uses as set out in the masterplan in the Do Maximum scenario.

Response

All land uses which are expected to be operational by the Design Year (2040) have been included in the Do Maximum scenario.

4)

The applicant is requested to include all land uses as set out in the masterplan in the Do Maximum scenario.

Response

All land uses which are expected to be operational by the Design Year (2040) have been included in the Do Maximum scenario.

5)

The applicant should provide clarity in terms of the trip rates being applied, ensuring that they are taking full consideration of the location and proximity of the proposed development, and lack thereof, to convenient public transport.

Response

The Traffic Assessment has been updated to provide additional details regarding trip rates.

6)

The applicant is requested to provide the trip rates applied and trip generation estimated to the future land uses included for the do something and do maximum scenarios.

Response

The Traffic Assessment has been updated to provide additional details regarding trip rates and trip generation.

7)

The applicant is requested to state the assumptions made in the traffic distribution exercise and give a specific, proportional breakdown of the distribution and assignment of traffic to each junction.

Response

The Traffic Assessment has been updated to make use of a dynamically assigned Vissim micro-simulation model. The dynamic assignment automatically determines trip distribution based on user cost (delays, travel time/distance, etc.). Thus distribution is automated and it is not possible to provide diagrams based on a desktop study.

8)

The applicant's assessment indicates that a junction upgrade of Junction 4 is necessary for the opening year of the proposed development. The applicant is requested to extend the red line boundary to include this upgrade and to provide detailed layouts of the proposed upgrade to be agreed with MCC.

Response

The full MOOR has been workshopped with MCC and all their comments have been taken on board and agreed upon. Furthermore, the infrastructure to be included in the redline for the development has also been discussed with MCC and the junction upgrade will be included in a separate application specifically for the MOOR.

Road Safety

1)

The Applicant is requested to submit a Stage 1 Road Safety Audit.

Response

A road safety audit will be submitted as part of the requested quality audit.

2)

The Applicant should submit a Quality Audit that consists of an audit of walking facilities, cycling facilities and visual/mobility impaired accessibility facilities.

Response

This will be submitted.

Site Layout

1)

The Applicant should provide more details on the development access setting out which road users have priority at the junction. The Applicant should ensure that the stop line from the development access is located to the rear of the shared track along the L6219 and that the junction is designed according to section 4.9 of the National Cycle Manual.

Response

The development accesses have been designed in accordance with DMURS and the National Cycle Manual and workshopped with MCC.

2)

The Applicant should consider a solution where the realignment of the L6219 maintains the continuity and priority of the road. The Applicant should ensure the solution adheres to DMURS geometry guidelines with regard to horizontal radii such that it can be easily retrofitted to tie in with the MOOR should this requirement arise in the future.

Response

The design has been workshopped and agreed with MCC and designed in accordance with DMURS.

3)

The Applicant should undertake to ensure the bridge along the realigned and upgraded section of the L6219 is widened to facilitate the proposed road upgrade inclusive of any recommendations made on the footpath and cycle track provisions within this report.

Response

The bridge will be designed to accommodate footpaths and cycle tracks to ensure the continuity of the infrastructure.

4)

The Applicant should ensure that any junction that interacts with cycle track facilities is designed in accordance with the National Cycle Manual.

Response

This has been incorporated into the designs.

5)

The Applicant should provide a segregated footpath and cycle track on both sides of the realigned and upgraded section of the L6219 so that the road hierarchy is consistent. Pedestrian and cycle facilities on the north side of the L6219 will also serve future residential developments to the north. These facilities should extend for the full length of the realigned and upgraded section of the L6219 towards its junction with the R157.

Response

The facilities on the northern side of the L6219 will be constructed as part of further developments in that area. This has been agreed with MCC. The infrastructure on the L6219 will be extended to the R157.

6)

The Applicant should provide dropped kerbs and tactile paving on all arms of the internal junctions to facilitate all desired pedestrian movements.

Response

This has been incorporated into the designs.

7)

The Applicant should clarify the type of junction envisaged at this location and set out clearly how prioritisation will be handled.

Response

This has been incorporated into the designs.

8)

The Applicant should consider providing a turning head at the end of a 100m long home zone cut-de-sac located within the northeast section of the development so that refuse and emergency vehicles can undertake a turning movement at the end of the street.

Response

A turning head has been included in the development as suggested.

9)

The Applicant is requested to ensure that paths through the high amenity areas are of appropriate width to cater for both pedestrians and cyclists.

Response

This has been addressed by the architect.

10)

The Applicant should provide sight line analysis of all internal junctions and ensure that these are coordinated with any landscaping proposals.

Response

This has been incorporated into the drawings.

11)

The Applicant is requested to ensure that the materials specified within areas to be Taking in Charge are in accordance with MCC Taking In Charge (TIC) Policy document. The Applicant should liaise with the local authority in this regard.

Response

This has been addressed by the architect.

Further to the Opinion Report, a meeting was held with MCC on 14/07/2022 where the MOOR was workshopped. The table overleaf details the correspondence on various comments raised and how they were addressed.

MOOR			
Item No	**Meath Co Co Comment**	**OCSC Comment**	**Meath Co Co Comment**
1	General Comment: design speed overall to be raised to 60 km/hr from 50 km/hr which would still be a DMURS design	MOOR speed raised to 60km/h between junctions with L6219 on the east and western sides.	Local roads outside of MOOR including MOOR to be 60 km/hr is acceptable. It seems to have 80 km/hr signs up on the Kildare County Council side but further past carton house we have the R157 at 60km /hr. So 60 km/hr would be in line with our existing R157 speed limits for this length of road.
2	General Comment: Boundary Treatment details for all layouts to be shown	MOOR design completed. Currently busy with drawing pack. These will be included in drawings	Noted for future submissions
3	General Comment: tactile paving details missing for some junctions and areas, these should be shown	This has been addressed at all junctions	Ok Noted, We would like footpaths and cycleways to have tactile paving coming into shared areas etc. Any cycle route on the road to have appropriate line marking etc in line with the National Cycle manual also
4	General Comment: Public lighting details are missing on all layouts	MOOR design completed. Currently busy with drawing pack. These will be included in drawings	Noted for future submissions, all public lighting designs will have a condition that the MCC public lighting section will have to be approved prior to

MOOR			
Item No	**Meath Co Co Comment**	**OCSC Comment**	**Meath Co Co Comment**
			commencement of the development
5	General Comment: There should be a right turn lane for all junctions from the main MOOR road into the minor/other roads	The traffic model indicates that this is not required	MCC notes this but would require right-hand turning lanes for traffic management reasons, not capacity reasons.
6	General Comment: A stage 1/2 Road Safety Audit should accompany any planning application	RSA will be completed once the drawing pack has been finalised	Noted
7	Drawing 1001 minor road to join perpendicular to the main line	This has been addressed	Noted for future submissions, just to add that this will be 2 lanes normal traffic route.
8	Drawing 1002 Left and right-hand turns from the main road MOOR into the minor roads should be shown. Traffic lights should be shown as this junction is at the SHD housing estates entrance.	The traffic model indicates that no turning lanes are required, and traffic signals are also not required at this junction	MCC notes this but would require right-hand turning lanes for traffic management reasons, not capacity reasons.
9	Drawing 1003 Are traffic lights needed here? The pedestrian and cycle access should be maintained from the south (Kilcloon road junction) along with full road access.	This junction will be signalised with a dedicated pedestrian and cycling facility tying in from the south	Noted for future submissions

MOOR			
Item No	**Meath Co Co Comment**	**OCSC Comment**	**Meath Co Co Comment**
10	Drawing 1004 As per previous comments for general, Boundary Treatment, public lighting and tactile paving are to be shown.	MOOR design completed. Currently busy with drawing pack. These will be included in drawings	Noted for future submissions and answers for comments 2, 3 and 4
11	Drawing 1005 the traffic lights should be removed here. The design of the junction should be staggered. The MOOR road should be attractive for through traffic	A stagger has been introduced operating with priority-control	Noted for future submissions
12	Drawing 1006 the stop & traffic lights should be removed out at the Carton House entrance, a yellow box would suffice here. (question on whether this gate is actually used)	This has been addressed	Noted for future submissions
13	Drawing 1006 can the road layout no. 314 from the east be straightened up and come in perpendicular to the junction.	A redesign of this junction has been carried out, seeking to straighten the east-west axis as much as possible, while ensuring the quantum of land in front of the Carton Gate is minimised to discourage casual parking	Noted for future submissions
14	Drawing 1007 as previous comments for general, Boundary Treatment, public lighting and tactile paving to be shown.	MOOR design completed. Currently busy with drawing pack. These will be included in drawings	Noted for future submissions and answers for comments 2, 3 and 4

MOOR			
Item No	**Meath Co Co Comment**	**OCSC Comment**	**Meath Co Co Comment**
15	Drawing 1008 Drawings 1707 improved cross-section with the existing bridge for pedestrian bridge 2. As in show the exiting bridge details alongside.	MOOR design completed. Currently busy with drawing pack. These will be included in drawings	Noted for future submissions
16	Drawing 1009 The road should be 7m in line with DMURS, this road could eventually become used for active travel measures & service vehicles. 3.5m lane widths	The road has been designed as 7m wide, in line with DMURS	Noted for future submissions
17	Drawing 1010 There are some details missing from the internal road here, including pedestrian and cycle routes of 2m, 1.75m and grass verge 1.5m	This has been addressed	Noted for future submissions
18	In drawing 1011 further details showing the transition of the shared area onto the bridge from the existing road should be shown drawing 1705 is well separated from the main bridge structure. Barrier details etc to be clarified.	MOOR design completed. Currently busy with drawing pack. These will be included in drawings	Noted for future submissions

MOOR			
Item No	**Meath Co Co Comment**	**OCSC Comment**	**Meath Co Co Comment**
19	Bridge Drawings 1707 improved cross-section with the existing bridge for pedestrian bridge 2. As in show the exiting bridge details alongside. Position of the parapets etc for the existing and new bridge.	MOOR design completed. Currently busy with drawing pack. These will be included in drawings	Noted for future submissions
20	Keep the layout as simple as possible, 2 signalised junctions for now for the layout.	The current MOOR design only has two signalised junctions	Noted for future submissions and agreed as per each planning submission
21	Comment from email OCSC Lizmary Alfirs	Comment 1 is in relation to raising the overall speed of the MOOR to 60km/h. Our western tie-in, into Moyglare Hall Estate road, ties into a roadway that runs in front of the Maynooth Community College. Would you, therefore, be happy with us implementing a design speed of 40km/h until we reach the intersection leading to the SHD development (circled in red), to ensure the speed is sufficiently dropped before reaching the school.	50 km/hr in accordance with DMURS is fine outside the school unless there is a change from other departments for a special speed limit.

Yours sincerely

Wian Marais
For O'Connor Sutton Cronin