East Meath - North Dublin Grid Upgrade Environmental Impact Assessment Report (EIAR): Volume 3

Preface and Contents

EirGrid

March 2024

Preface

The structure of this Environmental Impact Assessment Report (EIAR) for the East Meath – North Dublin Grid Upgrade (hereafter referred to as the Proposed Development) is summarised as follows:

Volume 1: Non-Technical Summary

Volume 1 provides a non-technical summary of the information contained in Volume 2 of the EIAR.

Volume 2: Main Environmental Impact Assessment Report

Volume 2 provides a general introduction, outlines the environmental impact assessment process, describes the scope of the Proposed Development, presents the consideration of reasonable alternatives and describes the environmental impacts specific to the Proposed Development.

Volume 3: Appendices

Volume 3 provides documentation and data that is supplemental to the information provided in Volume 2 of the EIAR.

Volume 4: Figures

Volume 4 provides drawings and large format images (labelled as 'Figures') that illustrate the information detailed in Volume 2 of the EIAR.

Volume 5: Supporting Documents

Volume 5 provides supporting documentation that were produced during the development of the Proposed Development.

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Appendix A1.1 – Summary of Scoping Consultation Responses

EirGrid

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Appendix A1.1 – Summary of Scoping Consultation Responses

1. Introduction

Relevant stakeholders were contacted as part of the Scoping Process for the Environmental Impact Assessment Report (EIAR) for the East Meath – North Dublin Grid Upgrade (hereafter referred to as the Proposed Development). The stakeholders were contacted in November 2023 and were provided with an electronic copy of the Environmental Impact Assessment (EIA) Scoping Memo for the Proposed Development (refer to Table 1.1 for a list of the stakeholders). The stakeholders were invited to review the EIA Scoping Memo and make a submission related to its content or additional information or topics which they considered relevant to the development of the EIAR. A non-statutory consultation period of four weeks was provided for comment. However, responses were accepted post this consultation period.

Table 1.1: List of Prescribed Bodies

Prescribed Bodies	
Dublin Bus	The Heritage Council
Bus Éireann	daa
Iarnród Éireann	Health Service Executive (HSE)
Uisce Éireann	An Taisce
Gas Networks Ireland	Dublin City Council (DCC)
Environmental Protection Agency (EPA)	Fingal County Council (FCC)
Waterways Ireland	Meath County Council (MCC)
Electricity Supply Board (ESB)	Department of Housing, Local Government and Heritage
Commission for Railway Regulation	Department of Environment, Climate and Communications
Health and Safety Authority (HSA)	An Chomhairle Ealaíon
Irish Aviation Authority / Air Navigation Ireland	Failte Ireland
Teagasc	Department of Tourism, Culture, Arts, Gaeltacht, Sport and Media
Inland Fisheries Ireland (IFI)	Department of Transport
National Parks and Wildlife Service (NPWS)	The Commissioners of Public Work
National Transport Authority (NTA)	Eastern Midlands Regional Assembly (EMRA)
Office of Public Works (OPW)	Commission for Regulation of Utilities

1.1 Summary of Scoping Consultation Responses

A total of seven responses were received during the non-statutory scoping consultation process. A summary of the content of those responses and how the issues raised have been addressed in the EIAR, where applicable, is provided in Table 1.2.

Table 1.2: Summary of Scoping Consultation Responses from Prescribed Bodies

Stakeholder	Date Received	Summary of Submission	Response / How this is Addressed in the EIAR
Department of Housing, Local Government and Heritage	05.12.23	Section 3 of the National Monuments (Amendment) Act 1987 is the primary piece of legislation for the protection of underwater cultural heritage, including archaeological objects underwater, irrespective of age, and wrecks over 100 years old.	The Act is included in Section 13.2.1 of Chapter 13 (Archaeology, Architectural Heritage and Cultural Heritage) in Volume 2 of the EIAR.
		In light of the potential effects on underwater cultural heritage, as outlined above, we recommend that a programme of pre-development underwater archaeological assessment should be undertaken.	Underwater assessment is identified as pre-construction mitigation in Section 13.5 of Chapter 13 (Archaeology, Architectural Heritage and Cultural Heritage) in Volume 2 of the EIAR.
		Works should be carried out at the earliest possible stage to facilitate the embedding of any recommended further mitigation within the detailed design for the Proposed Development, in order to ensure the preservation in-situ of any identified underwater cultural heritage and to develop an informed archaeological strategy to be implemented in agreement with the National Monuments Service.	As identified in Section 13.5 of (Chapter 13 (Archaeology, Architectural Heritage and Cultural Heritage) in Volume 2 of the EIAR, mitigation will be undertaken post-consent but in advance of construction.
		Desktop assessment that addresses the underwater cultural heritage; include inventory, mapping and survey of underwater cultural heritage features and structures identified by fieldwork, cartographic analysis, historical research and prior archaeological investigations.	Underwater assessment is identified as pre-construction mitigation in Section 13.5 of Chapter 13 (Archaeology, Architectural Heritage and Cultural Heritage) in Volume 2 of the EIAR.
		Include a licensed dive/wade assessment accompanied by a hand-held metal detection survey. A Dive/Survey licence (Section 3 1987 National Monuments Act) and Detection Device consent (Section 2 1987 National Monuments Act) will be required for the dive / wade survey and metal detection.	Underwater assessment, comprising wade and metal detecting survey, is identified as pre-construction mitigation in Section 13.5 of Chapter 13 (Archaeology, Architectural Heritage and Cultural Heritage) in Volume 2 of the EIAR. All mitigation will be carried out by a suitably qualified archaeologist under Licence (where required).
		The archaeologist may, following consultation with the National Monuments Service, undertake targeted in-river pre-development archaeologist test-excavations within specific areas of the proposed development area. Licensed metal detection shall be undertaken in tandem with the test excavations.	Underwater assessment to inform the design of archaeological excavation and further underwater surveys is identified as pre-construction mitigation in Section 13.5 of Chapter 13 (Archaeology, Architectural Heritage and Cultural Heritage) in Volume 2 of the EIAR.
		The archaeologist shall submit a final written report to the NMS describing the results of the UAIA, the report shall include a comprehensive Archaeological Impact Statement (AIS). The AIS shall describe the potential impact(s) and assess any proposed additional site Investigation/Geotechnical impacts and potential secondary/indirect impacts.	As identified in Section 13.5 of Chapter 13 (Archaeology, Architectural Heritage and Cultural Heritage) in Volume 2 of the EIAR, reports on the results of all surveys and assessments undertaken will be prepared in accordance with the requirements of the Licence(s) granted by the National Monuments Service.
		Mitigation may include recommendations for redesign to allow for full or partial preservation in situ, the institution of archaeological exclusion zones, further wade/dive surveys, test-excavations, excavations ('preservation by record') and / or monitoring, as deemed appropriate.	Underwater assessment to inform the design of archaeological excavation and further underwater surveys is identified as pre-construction mitigation in Section 13.5 of Chapter 13 (Archaeology, Architectural Heritage and Cultural Heritage) in Volume 2 of the EIAR.

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		No construction works shall commence until after the UAIA has been submitted and reviewed.	As identified in Section 13.5 of Chapter 13 (Archaeology, Architectural Heritage and Cultural Heritage) in Volume 2 of the EIAR mitigation will be undertaken post-consent but in advance of construction.
Failte Ireland	22.11.23	The submission from Failte Ireland outlined the publication of the Guidelines for the Consideration of Tourism and Tourism Related Projects (July 2023) includes guidance for those conducting EIA and compiling and EIAR. These guidelines are non-statutory and act as supplementary advice to the EPA EIAR Guidelines.	The Guidelines for the Consideration of Tourism and Tourism Related Projects (July 2023) have been considered as part of Chapter 5 (Population) in Volume 2 of the EIAR.
IFI	15.12.23	The IFI submission noted that the Tolka River supports Lamprey (Habitats Directive Annex II species) and Brown Trout populations in addition to other fish species, the Ward River is an important salmonid system with Brown trout throughout and Salmon in the lower reaches, the Sluice River system supports a resident population of Brown trout, and the Mayne River is a non-salmonid system. However, IFI are currently assessing the viability of a salmonid reintroduction programme. The Mayne River system does however contain populations of European Eel again which are classified as critically endangered in the International Union for Conservation of Nature (IUCN) Red List of threatened species. While the eDNA sampling technique only found records of Trout in one waterbody, IFI can confirm that all the above systems contain Salmonids, are all on the WFD monitoring programme and therefore the precautionary principal should be applied in the protection of the site itself and downstream habitat. IFI strongly recommend directional drilling in crossing the Dunboyne, Tolka, Pinkeen and Ward rivers. Timing constraints do not apply to directional drilling which may take place at any time of year subject to agreement with IFI. All open cut crossing can only take place from July to September in line with the fisheries open season. IFI requested a meeting to facilitate a discussion.	A meeting with IFI and the Project Team took place on 9 January 2024. Following this meeting and the recommendations from IFI, appropriate methodologies and measures for the crossing of watercourses were agreed. These methodologies and measures are outlined in Chapter 4 (Proposed Development Description) and Chapter 12 (Hydrology) in Volume 2 of the EIAR.
MCC	11.12.23	The applicant is referred to the policies and objectives contained in Volume 1 of the Meath County Development Plan (MCDP) 2021-2027 and the Written Statements and Land Use Zoning Map contained in Volume 2 of the MCDP. Please refer to the associated maps and appendices for pertinent information, including land-use zoning maps.	The Planning Report, which is included as a standalone document in the planning application pack has considered the relevant policies and objectives contained in the latest Meath County Development Plan.
		The applicant's EIAR must ensure that aspects of 'entire project' (even if there are several components) are examined, i.e. there should be no 'project splitting' for the purposes of EIAR.	The Proposed Development in its entirety is described in Chapter 4 (Proposed Development Description) and all elements are fully assessed throughout the EIAR and Planing Report in the planning application pack.
		Public Participation - Demonstration of the effect of public participation on the development of the project is advised and how opinions and concerns of the public have been considered.	Public consultation is summarised in Chapter 1 (Introduction and the Environmental Impact Assessment Process) in Volume 2 of the EIAR.

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			Consultation reports from the various development stages of the Proposed Development are include in Volume 5 (Supporting Documents) of the EIAR.
		The applicant must ensure that the authors of the relevant components of the EIAR are competent experts, and a synopsis of relevant qualification, experience and knowledge should be provided to demonstrate this to An Bord Pleanála.	The details of the competent experts responsible for the environmental assessments and chapters completed for the EIAR are outlined in Table 1.4 in Chapter 1 (Introduction and the Environmental Impact Assessment Process) in Volume 2 of the EIAR.
		The applicant must prepare a Non-Technical Summary as part of the EIAR which should present a succinct and sufficient summary of the EIAR.	A Non-Technical Summary is included as Volume 1 of the EIAR.
		The applicant is advised to clarify the titles used in the EIAR so that the required environmental topics are addressed. For example, 'land and property' are identified under 'material assets' and 'agronomy and equine' topics, however the latter is not an environmental receptor listed under the EIA Directive/ Regulations. Similarly, 'traffic and transport' is not an EIAR heading – but could be included under 'material assets', etc. This must be clarified to meet legal requirements, to ensure all the relevant topics are covered, thus providing clarity to ABP and members of the public. The NTS should also address this issue if it is intended to use alternative headings/distinctions.	Table 1.1 in Chapter 1 (Introduction and the Environmental Impact Assessment Process) in Volume 2 of the EIAR details the information to be included in an EIAR, as outlined in Directive 2014/52/EU of the Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment (EIA Directive) and includes references out to where this information is contained in the EIAR.
		Population & Human Health – Population (land use) should include the effect of construction on 'biodiversity'.	Chapter 10 (Biodiversity) in Volume 2 of the EIAR includes a full assessment of the potential impacts of construction on biodiversity and proposes mitigation and monitoring measures to avoid or reduce these potential impacts.
		Biodiversity – As per the EIA Directive, this section requires particular attention to species and habitats protected under the Habitats and Birds Directives.	Chapter 10 (Biodiversity) in Volume 2 of the EIAR includes a full assessment of the relevant species and habitats protected under the Habitats and Birds Directives.
		Appropriate Assessment - Although the EIAR and Appropriate Assessment reports and processes are legally separate, it is important that baseline data from each report is integrated into the other as relevant.	The baseline data contained within the Appropriate Assessment and Chapter 10 (Biodiversity) in Volume 2 of the EIAR contain the same information.
		The Flood Risk Assessment (FRA) and other surveys should be integrated into the EIA to inform the overall design of the proposed development and to determine the likely significant effects of same, and if relevant any proposed mitigation. A specific Flood Risk Assessment should inform the 'Hydrology' section.	Each Chapter in Volume 2 of the EIAR details the desk-based assessments and field surveys that were carried out to inform the development of the EIAR and the design of the Proposed Development. A FRA was completed and is included as an appendix to Chapter 12 (Hydrology) (Appendix A12.1 in Volume 3 of the EIAR).
		It is acknowledged that the applicant is seeking to minimise the number of HDD trenches, however, the impact of vibration on fish/ other aquatic species due to HDD beneath surface water features should be considered. Inland Fisheries Ireland (IFI) should be included as a consultee for the protection of the fisheries resource.	IFI have been consulted as part of the development of the EIAR (see above scoping response from IFI). A meeting with IFI and the Project Team took place on 9 January 2024. Following this meeting and the recommendations from IFI, appropriate methodologies and measures for the crossing of watercourses were agreed. These methodologies and measures are outlined in Chapter 4 (Proposed

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			Development Description) and Chapter 12 (Hydrology) in Volume 2 of the EIAR.
		Secure fencing will be required along the route to prevent wildlife access to the trenches while construction work is ongoing. It is advised that a strategy for dealing with Invasive Species on-site or imported due to works associated with this project is provided as part of the application.	As outlined in Chapter 10 (Biodiversity) in Volume 2 of the EIAR, a 2m to 3 m high non-transparent screening barrier will be erected along the perimeter of the construction sites to block the construction works from wildlife. The screening barrier will have a mass per unit area exceeding 7 kg/m^2 (kilograms per metre squared) in accordance with the recommendations of BS 5228 Part 1:2009+A1:2014 Part B.4 and the installation and continued monitoring of the screening will be carried out by a qualified Ecological Clerk of Works. Appendix E of the CEMP, which is included as a standalone document in the planning application pack, contains the Invasive Species Management Plan for the Proposed Development. This Plan will be adapted and implemented by the appointed contractor for the Construction Phase.
		Landscape and Visual – Long term impacts from the loss of hedgerows and trees during construction and operation should be referenced in this section, considered and addressed.	Chapter 18 (Landscape and Visual) in Volume 2 of the EIAR considers and assesses the long-term impact of the removal of hedgerows and trees and proposes mitigation measures to reduce the level of impacts. An Arboricultural Impact Assessment was also completed and is included as Appendix A18.1.
		Soil - Should the removal of soil and stone be required; the applicant will have obligations under the Waste Management Directive.	Chapter 16 (Waste) in Volume 2 of the EIAR details the mitigation measures which will be applied for any removal of materials off site, which will be in line with all relevant waste management policy and guidance, including the Waste Framework Directive. A Construction Resource and Waste Management Plan has also been included as Appendix C of the CEMP, which is included as a standalone document in the planning application pack.
		Major Accidents - Where relevant the applicant may need to examine any risk of major accidents and/ or disasters associated with Seveso sites along/ adjoining the route.	Chapter 19 (Risk of Major Accidents and / or Disasters) in Volume 2 of the EIAR considered the potential for Seveso Sites in the study area. The assessment determined that the Proposed Development would not be in the consultation zone for any Seveso site.
		Climate - Where relevant, the 'Climate' section of the EIAR should be informed by the European Commission's "Technical guidance on the climate proofing of infrastructure in the period 2021-2027". The applicant is invited to discuss proposals to calculate the impact of the development on the climate and potential offset due to the connections of renewable energy; capacity of the proposed infrastructure to facilitate other types of new connections/ development.	The EIAR is informed by the Technical guidance on the climate proofing of infrastructure in the period 2021 to 2027 where practical, including a carbon calculation in Chapter 8 (Climate) in Volume 2 of the EIAR for the Proposed Development using an industry standard tool. There are too many difficulties, variables and unknowns to calculate the potential offset, including having regard to the meshed nature of the electricity grid. However, the role of the Proposed Development in facilitating the connection of renewable energy projects has been discussed.

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		Air Quality - Much of the mitigation required for the reduction of impacts on air quality will need to be included in a Construction Environment Management Plan including dust suppression during construction or maintenance works, etc.	Chapter 7 (Air Quality) in Volume 2 of the EIAR includes mitigation measures to avoid or reduce potential impacts on air quality as a result of the Proposed Development. These mitigation measures are also contained within the CEMP, which is included as a standalone document in the planning application pack.
		Cultural Heritage – e.g. bridges, etc. should be considered, in the event of a change to the proposed route. MCC's Archaeologist may have details of recent excavations along the route/ provide other recommendations.	Chapter 13 (Archaeology, Architectural Heritage and Cultural Heritage) in Volume 2 of the EIAR considers designated and non-designated cultural heritage identified from a range of sources (see Section 13.2.3) as well as previous excavations undertaken within the study area.
		Material Assets – The long-term impact of the 400kV lines in urban areas should be discussed, (e.g. at locations adjoining land identified for future or further residential/ commercial development etc. in Dunboyne). The likelihood of works preventing the development of such lands must be addressed.	Routing the cables primarily along roads, and careful routing in the off-road sections has sought to minimise impacts to existing and potential future land uses (as set out in the relevant development plans). However, a side discussion on the longer-term impact of 400kV lines in urban areas is considered outside of the scope of this EIAR.
TII	06.12.23	The TII submission noted that TII have been actively engaged in providing observations on the Proposed Development since the Step 4 consultation process, and that TII has consistently identified a number of significant implications for TII and road authorities in the management and maintenance of the strategic national road network resulting from the laying of high voltage electricity cabling in the national road reservation.	EirGrid notes TII concerns but highlights that the Proposed Development is not utilising national roads but rather regional or local roads. Chapter 4 (Traffic and Transport) in Volume 2 of this EIAR includes mitigation measures regarding the Construction and Operational Phases of the Proposed Development. This Chapter is also supported by the Construction Traffic Management Plan (CTMP) which is included as Appendix B of the Construction Environmental Management Plan (CEMP), which is included as a standalone document in the planning application pack.
		TII with EirGrid contribute to the national HV Interface Forum and nothing in this submission should be construed to contradict any accepted principles that guide or agreements that may result from that Forum.	EirGrid acknowledges the participation of TII and other key stakeholders on the HV Interface Forum and will continue to work with all parties for successful outcomes for all parties.
		TII outline that all motorway crossings should be undertaken using Horizontal Directional Drilling (HDD).	All motorway crossings will be undertaken using HDD, as outlined in Chapter 4 (Proposed Development Description) in Volume 2 of the EIAR.
		A third party seeking to cross a motorway will require Works Specific Deeds of Indemnities, arrangements for third party access or consent from TII in accordance with Section 53 of the Roads Act, 1993. Arrangements for third party access are also likely to be required. Contact should be made to 'thirdpartyworks@tii.ie' to progress this element when proposals for the crossings have been developed.	Noted and agreed
		Consultation with the relevant maintaining organisations (e.g. MMaRC Contractor and PPP Concession Company) should also be undertaken and any access requirements agreed with them through their 3rd party protocols.	Noted and agreed

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		Consultations should be had with the relevant Local Authority/National Roads Design Office with regard to locations of existing and future national road schemes in the area.	EirGrid has engaged with the relevant Local Authorities with respect to the Proposed Development and this engagement includes considering future schemes where known.
		TII recommends consultation with the NTA and the Metrolink Design Team in relation to the Metrolink Scheme.	EirGrid has had extensive engagement with both ESBN Metrolink and TII MetroLink to ensure all parties are aware of the Proposed Development and the interaction with other developments
		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.	A cumulative impact assessment of the Proposed Development with other developments (including road-related developments) was undertaken and is documented in Chapter 20 (Cumulative Impacts and Environmental Interactions) in Volume 2 of the EIAR and its associated appendix (Appendix A20.1) in Volume 3 of the EIAR.
		The developer, in preparing the 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), and TII Publications (formerly DMRB and the Manual of Contract Documents for Road Works).	The air quality assessment has taken into account the most recent guidance TII Publications, specifically TII Guidance Air Quality Assessment of Specified Infrastructure Projects – Overarching Technical Document (PE-ENV-01106), which supersedes the National Roads Authority guidance. As recommended by TII guidance (PE-ENV-01106), the assessment also follows the IAQM construction dust guidance.
		The EIAR 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; see Guidelines for the Treatment of Noise and Vibration in National Road Schemes (1st Rev., National Roads Authority 2004).	In terms of the Environmental Noise Regulations 2018, future noise action plans by the relevant competent authorities are not likely to be affected as they deal with managing the operational impacts from road, rail, air and industry noise sources. The Proposed Development is not likely to result in any significant increase in operational noise which would require noise management by the relevant authorities in the future.
		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 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, the Authority'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.	A detailed assessment of traffic is included in Chapter 14 (Traffic and Transport) in Volume 2 of the EIAR. No traffic increases as a result of construction traffic are deemed significant enough to warrant further investigation / assessment even during a maximum / worst-case scenario. All assessed locations show a negligible impact of significance for total traffic and only minor adverse or negligible significance of effect for all criteria at all assessed locations. Construction traffic will also look to avoid network peak times. Heavy Goods Vehicle traffic will be spread throughout the day. The operational traffic impact of the Proposed Development is negligible and there will be no permanent changes to the existing road network as a result.

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		The designers are asked to consult TII Publications to determine whether a Road Safety Audit is required.	There are no permanent changes to the layout of the national road network and therefore a Road Safety Audit (RSA) would not be required in line with TII Publication: TII GE-STY - 01024. Temporary accesses and construction associated infrastructure will be constructed on the roads maintained by Meath and Dublin County Councils. Although temporary, the requirement for RSA on these schemes will be determined with the respective authority through the design process. In addition, the requirement for accesses to serve permanent access tracks and any required RSA will be carried out at a later design stage once sufficient design information is available.
		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. In relation to national road structures, early engagement with TII Structures Section should be undertaken to ascertain requirements.	Chapter 4 (Proposed Development Description) in Volume 2 of the EIAR describes the construction methods and techniques, including the approach to temporary traffic management. This includes a description of the approach to motorway crossings, which will be undertaken using HDD.
		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.	An abnormal load assessment has been undertaken to provide an initial appraisal of the deliverability and logistics required to construct the Proposed Development. This is summarised in Chapter 4 (Proposed Development Description) in Volume 2 of the EIAR.
Uisce Éireann	14.12.23	The Uisce Éireann submission noted that Uisce Éireann do not have the capacity to advise on an individual project basis but provided general feedback, as follows.	Noted
		The applicant shall provide details of measures to be taken to ensure that there will be no negative impact to Uisce Éireann's Drinking Water Source(s) during the construction and operational phases of the development. Mitigation measures in relation to any of the above ensuring a zero risk to any Uisce Éireann drinking water sources.	No abstraction sources identified. Construction mitigation, as outlined in the CEMP which is included as a standalone document in the planning application pack, will be in place to mitigate any risk.
		Where the development proposes the backfilling of materials, the applicant is required to include a waste sampling strategy to ensure the material is inert.	Backfill materials (i.e. engineering fill, thermal sand, cement bound granular material), are likely to be imported to site and the Proposed Development is not expected to reuse excavated materials won in-situ. Where excavated materials are to be reused for backfill this will be subject to the results of testing, whereby representative samples will be retrieved from each material type (allow 1 per 100m3) submitted for laboratory analysis and the results of analysis assessed to assess whether it is inert. If material is not inert, it will be disposed of at a suitable facility in line with waste management legislation and guidance.

Stakeholder	Date Received	Summary of Submission	Response / How this is Addressed in the EIAR
		Mitigations should be proposed for any potential negative impacts on any water source(s) which may be in proximity and included in the environmental management plan and incident response.	Construction mitigation, as outlined in the CEMP which is included as a standalone document in the planning application pack, will be in place to mitigate any risk. The CEMP also includes an Environmental Incident Response Plan (Appendix A).
		Any and all potential impacts on the nearby reservoir as public water supply water source(s) are assessed, including any impact on hydrogeology and any groundwater/ surface water interactions.	No reservoirs were identified in the study area. A full ground water and surface water assessment has been completed as part of Chapter 11 (Soils, Geology and Hydrogeology) and Chapter 12 (Hydrology) in Volume 2 of the EIAR and these chapters include any mitigation and monitoring measures required to protect the groundwater and surface water receptors identified in the study area.
		Impacts of the development on the capacity of water services (i.e. do existing water services have the capacity to cater for the new development). This is confirmed by Uisce Éireann in the form of a Confirmation of Feasibility (COF).	The Proposed Development will not impact on the capacity of water services.
		If a development requires a connection to either a public water supply or sewage collection system, the developer is advised to submit a Pre-Connection Enquiry (PCE) enquiry to Uisce Éireann to determine the feasibility of connection to the Uisce Éireann network.	Noted and agreed
		The applicant shall identify any upgrading of water services infrastructure that would be required to accommodate the proposed development.	Noted and agreed
		Any upstream treatment or attenuation of discharges required prior to discharging to an Uisce Éireann collection network.	Noted and agreed
		Potential impact of surface water discharges to combined sewer networks and potential measures to minimise and or / stop surface waters from combined sewers.	Noted and agreed
		Determine the location of public water services assets, possible connection points from the applicant's site / lands to the public network and any drinking water abstraction catchments to ensure these are included and fully assessed in any pre-planning proposals.	Noted and agreed
		Potential impacts on the assimilative capacity of receiving waters in relation to Uisce Éireann discharge outfalls.	Noted and agreed
		Potential impact on the contributing catchment of water sources either in terms of water abstraction for the development (and resultant potential impact on the capacity of the source) or the potential of the development to influence / present a risk to the quality of the water abstracted by Uisce Éireann for public supply.	There are no known surface water abstractions within the study area of the Proposed Development and the Proposed Development will not require water abstraction. The assessment completed for Chapter 12 (Hydrology) in Volume 2 of the EIAR determined that no impacts to surface water supply are anticipated and

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			this was therefore scoped out of further assessment for both Construction and Operational Phases.
		Consideration as to whether the integrity of the site / conservation objectives of the site would be compromised should be identified within the report.	Chapter 10 (Biodiversity) in Volume 2 of the EIAR, and the Natura Impact Statement which is included as a standalone document in the planning application pack, includes a full assessment of designated sites and their conservation objectives. Based on the best available scientific information and professional judgement, it is considered that with the mitigation measures detailed in the Natura Impact Statement, there will be no adverse effects on the integrity of those European sites, alone or in-combination with other plans or projects in light of those site's conservation objectives.
		Uisce Éireann will not accept new surface water discharges to combined sewer networks.	Noted and the Proposed Development will not result in new discharges.
HSE	22.12.23	The HSE submission noted that the 2022 EPA Guidelines, 2003 EPA Advice Notes, the Guidelines for Planning Authorities and An Bord Pleanála (2018), EIA of projects Guidance on the preparation of the EIAR EU 2017 should be considered in the EIAR.	These guidelines have been considered and factored into the assessments completed as part of the EIAR, and are referenced, where relevant throughout Volume 2 of the EIAR.
		The HSE submission recommended that public consultation, population and human health, land, soil and geology, water and hydrology, air quality, climate change (mitigation and adaptation and opportunities for health gain, noise and vibration, material assets, traffic and transportation and cumulative impacts be included and assessed in the EIAR.	The EIAR addresses these topics, as follows: • Public consultation is summarised in Chapter 1 (Introduction and the Environmental Impact Assessment Process) in Volume 2 of the EIAR. Consultation reports from the various development stages of the Proposed Development are include in Volume 5 (Supporting Documents) of the EIAR; • Population and Human Health are assessed in Chapter 5 (Population) and Chapter 6 (Human Health) in Volume 2 of the EIAR; • Air quality is assessed in Chapter 7 (Air Quality) in Volume 2 of the EIAR; • Climate is assessed in Chapter 8 (Climate) in Volume 2 of the EIAR; • Noise and vibration are assessed in Chapter 9 (Noise and Vibration) in Volume 2 of the EIAR; • Land, soils and geology are assessed in Chapter 11 (Soils, Geology and Hydrogeology) in Volume 2 of the EIAR; • Water and hydrology are assessed in Chapter 11 (Soils, Geology and Hydrogeology) (for groundwater) and Chapter 12 (Hydrology) (for surface water) in Volume 2 of the EIAR;

Stakeholder	Date Received	Summary of Submission	Response / How this is Addressed in the EIAR
			• Traffic and transport are assessed in Chapter 14 (Traffic and Transport) in Volume 2 of the EIAR; • Material assets are assessed in Chapter 17 (Material Assets) in Volume 2 of the EIAR; and • Cumulative impacts are assessed in Chapter 20 (Cumulative Impacts and Environmental Interactions) in Volume 2 of the EIAR.
		The EIAR should demonstrate that a process of public consultation has taken place and that consent has been received from all interested parties. Sensitive receptors and other stakeholders should be identified to ensure all necessary and appropriate mitigation measures are put in place to avoid any complaints about the development, primarily during the construction phase. Similarly, the public should be consulted specifically on the public health aspects of the scheme by consulting on questions like 'what are the potential health benefits/challenges from the development' and 'what opportunities can the development deliver for health gain'. A feedback/complaint mechanism should be put in place to enable stakeholders engage with the developer, through online and offline means. A dedicated Community Liaison Officer should be appointed by the developer to act as formal point of contact for open communication between the developer/contractor and residents/community groups on matters of environmental performance and for the receipt of complaints regarding the construction of the proposed development. The Environmental Impact Assessment Report (EIAR) should clearly demonstrate the link between public consultations and how those consultations have influenced the decision-making process in the EIA.	How public consultation informed the project development process and the scoping of the EIAR is set out in Chapter 1 (Introduction and the Environmental Impact Assessment Process) and Chapter 3 (Consideration of Reasonable Alternatives) including public and stakeholder consultation undertaken during Steps 1 – 5 of EirGrid's Framework for Grid Development. A Summary of Engagement (Step 1-5) Report, which details consultation undertaken as part of the development of the Proposed Development is included in Volume 5 (Supporting Documents) of this EIAR. Issues such as the public health aspects of the scheme have been addressed when raised by members of the public throughout the project development process. EirGrid as a team of dedicated Community Liaison Officers (CLOs) who act as a formal point of contact for open communication between EirGrid and local residents / community groups on all matters relating to the project. CLOs will continue to undertake this role during the construction of the proposed development.
		The Environmental Health Service (EHS) recommends that the Construction Phase of the proposed development contains a Construction and Environmental Management Plan (CEMP) that details a comprehensive list of measures to be undertaken to mitigate potential harmful effects on sensitive receptors and engage in monitoring to ensure health protection standards are not exceeded.	A CEMP has been completed and is included as a standalone document in this planning application pack. The CEMP also details all construction-related mitigation measures included in Volume 2 of the EIAR. The CEMP and the mitigation measures within will be adopted and updated as necessary by the appoint contractor and measures will be implemented in full, along with any conditions attached to a grant of planning.
		The EHS recommends that the EIAR split the issue of climate into Mitigation and Adaptation headings. In the context of Mitigation the proposed development should aim to be a carbon neutral development and put forward climate actions that will deliver a climate neutral development. Typical actions may include green procurement of materials and the use of low emission vehicles during construction. The EIAR should clearly illustrate how the development contributes to obligations under the Climate Action and Low Carbon	The climate assessment contained in Chapter 8 (Climate) in Volume 2 of the EIAR is split into two parts: vulnerability to changes in climate and a greenhouse gas assessment. In this regard, mitigation and adaptation are presented separately. The vulnerability risk assessment presents design mitigations(i.e. adaptations that will increase the resilience of the Proposed Development to climate change). Carbon reduction opportunities (i.e. mitigation measures) have been proposed in Chapter 8 (Climate).

Stakeholder	Date Received	Summary of Submission	Response / How this is Addressed in the EIAR
		Development Act 2015 and amendment of 2021 and the most recent Climate Action Plans of 2023 and 2024 (only published on 20 December 2023). In the context of Adaptation and Resilience the development should be designed to limit exposure to potential hazards and reduce vulnerability. Floods, windstorms, heatwaves/higher temperatures and drought are the key hazards to protect the development from. The EHS recommends the proposed development look for ways to deliver health gain, perhaps in line with the Climate Action Plans of the local authorities covered by the proposed development. An example might be to seek ways in which active travel can be supported/integrated while construction alongside roads is being undertaken.	The Proposed Development is considered to be resilient to changes in climate in the near term (Construction Phase). Future climate projections and a vulnerability risk assessment for the Operational Phase are included in Chapter 8 (Climate). As it is primarily located underground, the development is considered to be resilient to key hazards that are present at the surface. The assessment included in Chapter 8 (Climate) has been completed in the context of the National carbon budgets for Ireland and the sectoral emissions ceiling for the electricity sector. By facilitating the decarbonisation of the energy network, the Proposed Development will have benefits for other sectors in terms of emission reductions. The latest Climate Action Plans are referenced in Chapter 8 (Climate). Health is addressed in Chapter 6 (Human Health) in Volume 2 of the EIAR.
		The EHS recommends that this report contain reference to the Circular Economy and Miscellaneous Provisions Act 2022 and that waste is addressed across all phases of the proposed development from construction to operations and decommissioning.	Chapter 16 (Waste) considers the Circular Economy and Miscellaneous Provisions Act 2022 and includes a full assessment of waste arising from the Proposed Development and details how the requirements of the Circular Economy will be factored into the lifecycle of the Proposed Development.
		The EHS recommends a wider Disaster Risk Reduction approach is undertaken applying the principles of the Sendai Framework for Disaster Risk Reduction 2015-2030. This will ensure all potential hazards are analysed and measures are put in place to prevent, mitigate, prepare for and respond to other hazards apart from floods.	Chapter 19 (Risk of Major Accidents and / or Disasters) in Volume 2 of the EIAR considers the potential significant impacts of the Proposed Development on the environment, deriving from its vulnerability to risks of major accidents and / or disasters during the Construction Phase and Operational Phase. This assessment has been carried out in line with relevant national and local level guidelines in relation to major accidents and / or disasters and EIA.
		The EIAR should include details of the on-site infrastructure covering items such as site office, fuel storage depot, sanitary accommodation and canteen, First Aid facilities, disposal of wastewater and the provision of a potable water supply.	A CEMP has been completed and is included as a standalone document in this planning application and includes details of the on-site infrastructure.
		The EIAR should include details of potential cumulative impacts associated with the Proposed Development.	A cumulative impact assessment of the Proposed Development with other developments was undertaken and is documented in Chapter 20 (Cumulative Impacts and Environmental Interactions) in Volume 2 of the EIAR and its associated appendix (Appendix A20.1) in Volume 3 of the EIAR.

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Appendix A1.2 – Likely Evolution of the Baseline

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Appendix A1.2 – Likely Evolution of the Baseline

1. Introduction

Annex IV to Directive 2014/52/EU of the Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment (hereafter referred to as the EIA Directive) specifies the information to be contained in an Environmental Impact Assessment Report (EIAR), in relation to the East Meath – North Dublin Grid Upgrade (hereafter referred to as the Proposed Development). One of the requirements is to include:

> "*A description of the relevant aspects of the current state of the environment (baseline scenario) and an outline of the likely evolution thereof without implementation of the project as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge.*"

Table 1.1: Summary of the Likely Evolution of the Baseline in the Absence of the Proposed Development includes a summary of the likely evolution of the baseline environment (in the absence of the Proposed Development) that can be determined with 'reasonable effort on the basis of the availability of environmental information and scientific knowledge'.

Table 1.1: Summary of the Likely Evolution of the Baseline in the Absence of the Proposed Development

EIAR Chapter	Likely Evolution of the Baseline in the Absence of the Proposed Development
Chapter 5 (Population)	In the absence of the Proposed Development, rural and urban areas will continue to evolve. The existing rural land and amenity uses surrounding the Proposed Development are likely to remain relatively unchanged. However, existing zoned land will be developed, and development will be consolidated within and around existing urban settlements in line with national planning policies for compact growth. This will result in a further concentration of development around transport nodes (e.g., Dunboyne). The economy outlook is positive in the short to medium-term because of a resilient labour market, decelerating inflation, and rising real incomes. Necessary adjustments to the economy for long-term sustainable growth will be influenced / facilitated by public policy. The latest Census was undertaken in 2022 and the summary results published by the Central Statistics Office (CSO) show that over 2 million people, or just over 40% of the population of Ireland, now live in the Greater Dublin Area (GDA) which includes the counties of Dublin, Meath, Kildare, and Wicklow (CSO 2023). By 2031, the population of the GDA is projected to reach 2.2 million which represents continued growth in the GDA into the future.
Chapter 6 (Human Health)	In the absence of the Proposed Development, the health status of the population would be expected to change with time, in accordance with current trends across Ireland, as set out in Health In Ireland: Key Trends (Department of Health 2022) including: • Increases in the proportion of the population aged over 65; • Reductions in mortality rates from respiratory diseases and circulatory system diseases; and • Reductions in suicide rates.
Chapter 7 (Air Quality)	In the absence of the Proposed Development, there are a number of relevant factors that could influence the evolution of the air quality baseline, such as other committed developments, climate change, general trends in air quality and fleet composition. However, it is not possible to quantify the potential impact of these future changes, but it is likely that the future baseline will remain largely unchanged. Construction activities will continue in existing urban areas and at Dublin Airport which could lead to short-term and long-term concentrations of fine particulate matter. Current trends in road traffic emissions will continue in the short-term, however, increased numbers of electric vehicles will reduce associated air pollutants in the longer-term.
Chapter 8 (Climate)	In the absence of the Proposed Development, it is anticipated that climate conditions will remain broadly the same. Future climate effects will be influenced by structural and behavioural change to enable the transition to a climate neutral, climate-resilient country consistent with the overarching government's Climate Action Plans, as filtered down to regional plans and policies.
Chapter 9 (Noise and Vibration)	In the absence of the Proposed Development, noise levels are expected to increase through natural traffic growth and an increase in airport noise due to the expected expansion of Dublin Airport. This would result in an increase in noise levels over and above the current baseline scenario.
Chapter 10 (Biodiversity)	In the absence of the Proposed Development, the rural and urban areas will continue to evolve. The existing rural land uses surrounding are likely to remain relatively unchanged. However, existing zoned land will be developed. Current biodiversity trends are likely to continue for pasture and arable agricultural lands. Any effects on biodiversity are likely to be moderated by the environmental and biodiversity policies of the existing and future County Development Plans, Biodiversity Plans, and the overarching pollution control objectives of River Basin Management Plans: • Designated Sites for Nature Conservation: Designated sites within the zone of influence (ZoI) of the Proposed Development would likely remain as described in the baseline outlined in Chapter 10 (Biodiversity) in Volume 2 of the EIAR into the medium-term future. The current pressures and threats affecting these sites would remain in the absence of the Proposed Development; • Habitats and Flora: Habitats within the ZoI of the Proposed Development would likely remain as described in the baseline outlined in Chapter 10 (Biodiversity) in Volume 2 of the EIAR into the medium-term future. The current pressures and threats affecting these habitats would remain in the absence of the Proposed Development; and • Fauna: Fauna within the ZoI of the Proposed Development would likely remain as described in the baseline outlined in Chapter 10 (Biodiversity) in Volume 2 of the EIAR into the medium-term future. The current pressures and threats affecting these species would remain in the absence of the Proposed Development.

EIAR Chapter	Likely Evolution of the Baseline in the Absence of the Proposed Development
Chapter 11 (Soils, Geology and Hydrogeology)	In the absence of the Proposed Development, the current soils, geological and hydrogeology profiles within the study area are not expected to change. In the absence of the Proposed Development, other developments may still go ahead which could impact baseline conditions. Baseline conditions will continue to be impacted by the pressures on groundwater bodies in the area.
Chapter 12 (Hydrology)	In the absence of the Proposed Development, other developments may still go ahead which could impact baseline conditions. Baseline conditions will continue to be impacted by the pressures on each water body, as listed in Section 12.3 of Chapter 12 (Hydrology) in Volume 2 of the EIAR, such as agriculture, domestic wastewater, urban wastewater, hydromorphology and urban runoff pressures. The water bodies in the area surrounding the Proposed Development are expected to maintain their current water quality, pressures and ecological status designations. They may see improvement overtime due to inter alia: • Local government planning polices such implementation of Sustainable Drainage Systems (SuDS) features in the Development Plans; and • Improved wastewater management infrastructure along with future strategic infrastructure identified by Uisce Éireann. However, while these are positive projects which should improve the overall water quality and ecological status of water bodies, it is premature to rely on their complete implementation. Future climate change is predicted to give rise to an increased risk of flooding through rising sea levels and an increase in river flows and the frequency and intensity of extreme rainfall (discussed further in Appendix A12.1 (Flood Risk Assessment) in Volume 3 of the EIAR).
Chapter 13 (Archaeology, Architectural Heritage and Cultural Heritage)	In the absence of the Proposed Development, other developments requiring road alteration or development in the off-road sections will take place. These other developments may impact below or above ground archaeological, architectural heritage, or cultural heritage assets.
Chapter 14 (Traffic and Transport)	In the absence of the Proposed Development, traffic volumes are expected to increase along existing roads due to natural traffic growth. Future traffic volumes have been forecast using growth rates from Table 7.4 of the National Transport Model Update - Travel Demand Forecasting Report (Transport Infrastructure Ireland 2019) and are discussed in Chapter 14 (Traffic and Transport) in Volume 2 of the EIAR.
Chapter 15 (Agronomy and Equine)	In the absence of the Proposed Development, agricultural practices by their nature change over time. In the last one hundred years there have been considerable changes in farming in Ireland, with average farm sizes increasing while the numbers of people involved directly with farming has decreased. This trend is likely to continue. In addition, the area farmed in the country had decreased in the last 100 years from 216,000 hectares (ha) in 1915 to 197,450 ha in 2020. This is due to development of the various towns and villages in the country, but also due to the development of infrastructure. In the absence of the Proposed Development, these trends are likely to continue. In the absence of the Proposed Development, impacts are likely to arise from other developments that will be progressed within the study area over time. In the agricultural baseline environment within the study area there are pressures on agricultural land from developments for housing, industry and infrastructural projects (e.g. Greater Dublin Drainage Project).
Chapter 16 (Waste)	In the absence of the Proposed Development, available capacity in waste management facilities will continue to be used by new developments and infrastructure, in line with planning commitments but guided by the existing and future National Waste Management Plans. Additional waste management facilities may also open in the future.
Chapter 17 (Material Assets)	In the absence of the Proposed Development, the current utilities and services identified will continue to exist and planned / permitted infrastructure will be built, subject to planning (such as the Greater Dublin Drainage Project and the MetroLink Cables Project). General improvements and changes will continue to occur, such as new connections to the various services driven by legislative and local policy measures, as well as new service lines / connections associated with new development. In the absence of the Proposed Development, EirGrid will implement the permitted developments at Woodland Substation under planning reference number 221550 which was submitted to Meath County Council, and application reference number PC001 submitted to An Bord Pleanála. EirGrid will also implement the permitted development at Belcamp Substation under planning reference number 23A/0040, submitted to Fingal County Council. In the event that planning is granted, EirGrid will

EIAR Chapter	Likely Evolution of the Baseline in the Absence of the Proposed Development
	also implement the Kildare - Meath Grid Upgrade Project (An Bord Pleanála planning application reference number 316372). EirGrid will continue to develop the electricity grid in line with its statutory function which will include future transmission infrastructure developments in County Meath and Fingal and the wider Dublin area.
Chapter 18 (Landscape and Visual)	It is noted that the area surrounding the Proposed Development is likely to remain predominantly agricultural in the vicinity of Woodland Substation but continue to experience increases in infrastructure projects (for example solar farms) and increases in pressure from encroaching urban development. In terms of strategic future development around Belcamp Substation, the East-West Distributor Road is a planned project to the north of the Proposed Development. The IDA lands on the southern side of that road are zoned for business park development, and residential development is zoned a short distance to the south-east. In addition, a planning application for a Wastewater Treatment Plant to the north of Belcamp Substation has been submitted for planning (An Bord Pleanála reference number 312131). For these reasons, the rural character of the site and its immediate surrounds are very likely to transition into that of a peri-urban landscape within the next five to 10 years, regardless of whether the Proposed Development should proceed.

2. References

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Appendix A4.1 – Utility Crossings

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Appendix A4.1 – Utility Crossings

1. Utility Crossings

1.1 Utility Crossings

The following tables identify the crossings of existing known utilities based on the existing utility information available at this stage of the Proposed Development and the proposed cable route outlined in Chapter 4 (Proposed Development Description) in Volume 2 of this Environmental Impact Assessment Report (EIAR). Also refer to Chapter 17 (Material Assets) in Volume 2 of the EIAR for further details on utilities). Grid co-ordinates are based on the Irish Transverse Mercator (ITM). Further surveys and assessment will be undertaken pre-construction, subject to granting of planning permission.

1.1.1 Uisce Éireann

Table 1.1: Uisce Éireann (UÉ) Crossings

Crossing ID	Approximate Crossing Location (Irish Grid Coordinates)		Chainage (m)	UÉ Asset Type (Water / Wastewater)	UÉ Asset Diameter (mm)	UÉ Asset Material
	X	Y				
1	694086	745176	3,635	Water	125	High Density Polyethylene (HDPE)
2	695538	744532	5,371	Water	125	HDPE
3	697063	744042	7,038	Water	0	Unsurveyed
4	698558	743535	8,705	Water	150	HDPE
5	699681	743102	9,934	Water	100	Unplasticised Polyvinyl Chloride (uPVC)
6	699681	743102	9,934	Water	150	HDPE
7	699734	743073	9,997	Water	0	Unsurveyed
8	699846	742976	10,145	Water	0	Unsurveyed
9	699915	742915	10,237	Water	0	Unsurveyed
10	699972	742875	10,306	Water	0	Unsurveyed
11	700447	742695	10,830	Water	100	uPVC
12	700450	742696	10,834	Water	150	HDPE
13	700518	742748	10,921	Water	0	Unsurveyed
14	701715	744439	13,227	Wastewater	140	HDPE
15	701715	744445	13,231	Water	355	HDPE
16	701668	744762	13,619	Water	180	HDPE
17	702767	744622	14,742	Water	25	HDPE
18	703518	744765	15,623	Water	0	Unsurveyed
19	703640	744970	15,864	Water	75	uPVC
20	704151	745077	16,574	Water	75	uPVC
21	704382	745089	16,806	Water	75	uPVC
22	706502	745692	19,199	Water	100	uPVC
23	706805	745435	19,645	Wastewater	350	Ductile Iron (DI)
24	706851	745367	19,725	Wastewater	350	DI
25	706870	745335	19,771	Wastewater	350	DI
26	707138	744877	20,300	Water	100	uPVC
27	707237	744702	20,502	Wastewater	350	DI
28	707271	744644	20,586	Wastewater	350	DI
29	709176	744165	23,195	Water	50.8	uPVC

Crossing ID	Approximate Crossing Location (Irish Grid Coordinates)		Chainage (m)	UÉ Asset Type (Water / Wastewater)	UÉ Asset Diameter (mm)	UÉ Asset Material
	X	Y				
30	709252	744258	23,316	Water	101.6	uPVC
31	709458	744524	23,666	Water	101.6	uPVC
32	709757	744883	24,140	Water	450	DI
33	709761	744883	24,143	Water	450	DI
34	709763	744886	24,146	Abandoned Water	Unknown	Unknown
35	710041	745067	24,478	Water	450	DI
36	710041	745067	24,478	Water	450	DI
37	710054	745076	24,494	Water	90	Molecular-oriented Polyvinyl Chloride (MOPVC)
38	710078	745096	24,527	Abandoned Water	Unknown	Unknown
39	710156	745146	24,619	Water	203.2	Asbestos Cement (AC)
40	710174	745149	24,638	Wastewater	0	PE
41	710174	745149	24,638	Wastewater	200	PE
42	710189	745160	24,657	Water	177.8	AC
43	710295	745229	24,785	Water	250	High performance polyethylene **(**HPPE)
44	710321	745246	24,816	Water	50.8	uPVC
45	710459	745334	24,980	Water	25	Medium density polyethylene **(**MDPE)
46	710800	745557	25,387	Water	125	HPPE
47	710846	745586	25,442	Water	25	MDPE
48	710847	745587	25,443	Water	25	MDPE
49	710959	745646	25,571	Water	25	MDPE
50	711128	745687	25,754	Water	25	Unknown
51	711444	745770	26,080	Water	25	Unknown
52	711554	745821	26,203	Water	177.8	AC
53	711616	745815	26,267	Water	177.8	AC
54	711835	745832	26,509	Water	25	Unknown
55	711895	745849	26,572	Water	25	Unknown
56	712303	745785	27,005	Water	200	DI
57	712338	745791	27,041	Water	50	MDPE
58	712342	745792	27,044	Water	50.8	uPVC
59	712371	745786	27,076	Water	101.6	uPVC
60	712398	745701	27,166	Water	101.6	uPVC
61	712470	745616	27,283	Water	101.6	uPVC
62	712651	745218	27,724	Water	101.6	uPVC
63	712715	745161	27,809	Water	101.6	uPVC
64	713009	744751	28,326	Water	101.6	uPVC
65	713301	744711	28,625	Water	1200	DI
66	713412	744691	28,739	Water	914.4	CO
67	715344	744634	30,713	Water	101.6	uPVC
68	715356	744648	30,731	Water	300	AC
69	717168	744352	32,679	Water	254	AC

Crossing ID	Approximate Crossing Location (Irish Grid Coordinates)		Chainage (m)	UÉ Asset Type (Water / Wastewater)	UÉ Asset Diameter (mm)	UÉ Asset Material
	X	Y				
70	717189	744340	32,703	Water	609.6	AC
71	717675	744120	33,273	Water	225	MOPVC
72	717692	744102	33,300	Water	152.4	AC
73	719022	743172	35,487	Water	125	HPPE

1.1.2 Overhead Lines and Underground Cables

Table 1.2: Overhead Line (OHL) and Underground Cable (UGC) crossings

Crossing ID	Approximate Crossing Location (Irish Grid Coordinates)		Chainage	Voltage or kV	Overhead Line (OHL) / Underground Cable (UGC)
	X	Y			
1	694999	747951	13	MV	UGC
2	694827	747945	223	400	UGC
3	694810	747953	242	MV	OHL
4	694765	747984	299	MV	OHL
5	694657	747836	562	MV	OHL
6	694430	746865	1,731	MV	OHL
7	694119	745271	3,533	MV	OHL
8	694477	745085	4,039	LV	OHL
9	694492	745082	4,055	LV	OHL
10	694721	745021	4,291	LV	OHL
11	694778	745012	4,349	MV	OHL
12	694855	745009	4,427	LV	OHL
13	695426	744774	5,087	LV	OHL
14	695443	744758	5,110	LV	OHL
15	695530	744652	5,249	110	OHL
16	695690	744432	5,564	LV	OHL
17	695717	744425	5,592	MV	OHL
18	696186	744373	6,093	LV	OHL
19	696215	744359	6,127	LV	OHL
20	696271	744333	6,189	MV	OHL
21	696343	744300	6,268	LV	OHL
22	696480	744246	6,415	LV	OHL
23	696670	744159	6,626	MV	OHL
24	697034	744048	7,009	LV	UGC
25	697039	744047	7,013	LV	OHL
26	697069	744041	7,044	LV	OHL
27	697196	744038	7,171	LV	OHL
28	697211	744037	7,186	MV	OHL
29	697382	744034	7,357	110	OHL
30	697829	744027	7,804	LV	OHL
31	697912	744019	7,888	220	OHL
32	697919	744016	7,896	220	OHL
33	697982	743980	7,969	MV	OHL
34	698341	743708	8,421	110	OHL

Crossing ID	Approximate Crossing Location (Irish Grid Coordinates)		Chainage	Voltage or kV	Overhead Line (OHL) / Underground Cable (UGC)
	X	Y			
35	698744	743467	8,907	LV	OHL
36	698776	743460	8,940	LV	OHL
37	698973	743390	9,162	MV	OHL
38	699035	743338	9,243	MV	OHL
39	699102	743311	9,316	LV	OHL
40	699140	743297	9,356	LV	OHL
41	699165	743287	9,383	LV	OHL
42	699319	743231	9,547	LV	OHL
43	699366	743213	9,597	LV	UGC
44	699439	743186	9,675	LV	OHL
45	699588	743130	9,834	MV	OHL
46	699833	742987	10,128	LV	OHL
47	700037	742832	10,385	LV	OHL
48	700064	742812	10,418	LV	OHL
49	700113	742777	10,478	LV	OHL
50	700197	742756	10,566	LV	OHL
51	700283	742750	10,652	LV	OHL
52	700525	742754	10,930	MV	UGC
53	700694	742915	11,164	110	OHL
54	700934	743153	11,502	MV	UGC
55	701535	743988	12,545	MV	UGC
56	701612	744750	13,557	MV	UGC
57	701927	744714	13,883	LV	OHL
58	701973	744702	13,930	LV	OHL
59	702005	744693	13,963	LV	OHL
60	702058	744674	14,020	LV	OHL
61	702076	744668	14,039	LV	OHL
62	702142	744665	14,106	MV	OHL
63	702215	744668	14,179	220	OHL
64	702518	744626	14,493	MV	OHL
65	702812	744615	14,787	LV	OHL
66	702852	744608	14,842	LV	OHL
67	703398	744658	15,458	MV	OHL
68	703433	744677	15,498	MV	OHL
69	703576	744857	15,733	LV	OHL
70	703862	745047	16,136	MV	OHL
71	704048	745068	16,471	MV	OHL
72	704115	745075	16,538	LV	OHL
73	704150	745077	16,574	MV	OHL
74	704389	745089	16,812	LV	OHL
75	704875	745008	17,326	LV	OHL
76	705159	745292	17,755	110	OHL
77	705358	745367	17,975	MV	OHL
78	705620	745459	18,270	MV	OHL

Crossing ID	Approximate Crossing Location (Irish Grid Coordinates)		Chainage	Voltage or kV	Overhead Line (OHL) / Underground Cable (UGC)
	X	Y			
79	706630	745625	19,378	MV	OHL
80	706657	745617	19,410	MV	OHL
81	706880	745320	19,789	LV	UGC
82	707127	744898	20,278	LV	OHL
83	707166	744831	20,355	LV	OHL
84	707238	744700	20,504	MV	OHL
85	707459	744325	20,959	LV	OHL
86	707658	744037	21,317	MV	OHL
87	707885	743971	21,566	MV	OHL
88	707890	743972	21,570	MV	OHL
89	709073	744039	23,032	LV	OHL
90	709089	744054	23,053	LV	OHL
91	709104	744067	23,073	LV	OHL
92	709171	744159	23,187	LV	OHL
93	709183	744174	23,207	110	OHL
94	709187	744179	23,213	110	OHL
95	709242	744249	23,302	MV	OHL
96	709741	744874	24,121	LV	OHL
97	709911	744982	24,323	38	OHL
98	710092	745107	24,543	LV	OHL
99	710294	745229	24,784	MV	OHL
100	710307	745236	24,799	LV	OHL
101	710791	745551	25,376	LV	UGC
102	710901	745622	25,508	LV	OHL
103	710976	745662	25,594	LV	OHL
104	711188	745703	25,816	LV	OHL
105	711310	745734	25,941	LV	OHL
106	711380	745753	26,014	LV	OHL
107	711446	745771	26,082	LV	OHL
108	711601	745822	26,249	110	OHL
109	711715	745780	26,377	LV	OHL
110	711859	745842	26,535	LV	OHL
111	711875	745845	26,551	LV	OHL
112	712289	745785	26,992	MV	OHL
113	712455	745634	27,254	MV	OHL
114	712460	745628	27,262	LV	OHL
115	712582	745335	27,583	LV	OHL
116	712713	745163	27,806	LV	OHL
117	712729	745149	27,828	MV	OHL
118	712829	745051	27,971	LV	OHL
119	715785	744706	31,191	MV	UGC
120	715785	744705	31,192	MV	UGC
121	716022	744563	31,473	MV	UGC
122	716115	744495	31,589	MV	UGC

Crossing ID	Approximate Crossing Location (Irish Grid Coordinates)		Chainage	Voltage or kV	Overhead Line (OHL) / Underground Cable (UGC)
	X	Y			
123	717190	744340	32,704	LV	OHL
124	717311	744303	32,832	LV	UGC
125	717832	744050	33,455	MV	OHL
126	718786	743570	34,853	MV	OHL
127	718925	743546	35,012	MV	OHL
128	719041	743518	35,140	MV	OHL
129	718756	742490	36,297	38	OHL
130	718827	742427	36,411	38	OHL
131	719053	742240	36,748	MV	UGC
132	719058	742214	36,774	38	OHL
133	718925	741785	37,237	220	UGC

1.1.3 Gas Networks Ireland

Table 1.3: Gas Networks Ireland crossings

Crossing ID	Approximate Crossing Location (Irish Grid Coordinates)		Chainage	Pressure
	X	Y		
1	701715	744439	13,227	4 bar (Medium Pressure)
2	712346	745793	27,049	70 bar (High Pressure)
3	712451	745640	27,247	70 bar (High Pressure)
4	717737	744103	33,347	4 bar (Medium Pressure)
5	719022	743172	35,487	4 bar (Medium Pressure)

1.1.4 20kV MSD BioNX Corduff Circuit

Table 1.4: 20kV MSD BioNX Corduff Circuit Crossings

Crossing ID	Approximate Crossing Location (Irish Grid Coordinates)		Chainage
	X	Y	
1	701884	744723	13,839
2	703148	744485	15,152
3	703174	744493	15,180
4	703635	744968	15,857
5	705563	745441	18,200

1.1.5 DAA Landing Lights

Table 1.5: DAA Landing Lights Crossings

Crossing ID	Approximate Crossing Location (Irish Grid Coordinates)		Chainage
	X	Y	
1	715359	744652	30,737

1.1.6 AirNav

Table 1.6: AirNav Crossings

Crossing ID	Approximate Crossing	
	Townland	Road
1	Forrest Great	Naul Road

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Appendix A6.1 – Human Health Scoping

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Appendix A6.1 – Human Health Scoping Assessment

1. Scope of Human Health Assessment

1.1 Scoping of Health Determinants

Table 1.1 sets out the scope of the human health assessment based on the determinants identified in Institute of Environmental Management and Assessment (IEMA) Guide to: Effective Scoping of Human Health In Environmental Impact Assessment (IEMA 2022).

Table 1.1: Scoping of Health Determinants

Wider Determinant of Health	Scoped In or Out of Assessment	Justification for Scoping Assessment
Health Related Behaviours		
Physical activity	Out	As identified under 'Open space, leisure and play' and 'Transport modes, access and connections', there is the potential for disruption in access to community facilities used for recreational physical activity and walking and cycling routes which provide opportunities for physical activity through active travel. As these are the only two potential pathways to impacts on health outcomes associated with changes in physical activity levels, potential impacts will therefore be considered under the 'Open space, leisure and play' and 'Transport modes, access and connections' determinants.
Risk taking behaviour	Out	No potential pathway for a potential impact between this determinant and the Proposed Development has been identified.
Diet and nutrition	Out	No potential pathway for a potential impact between this determinant and the Proposed Development has been identified.
Social Environment		
Housing	Out	No demolition or land take from residential facilities is anticipated, and therefore, there is no potential pathway for a potential impact between these two determinants and the Proposed Development.
Relocation		
Open space, leisure and play	In	There are off-road sections of the proposed underground cable that will be located within or adjacent to settlements, for example at Hollystown and within Dublin. There is the potential for temporary disruption in access to areas of open space and recreational facilities during the Construction Phase, both where the proposed cable route will intersect such facilities, and if lane or road closures hinder access. There is also the potential for permanent disruption to access where easements will be required along the proposed cable route, although only infrequent maintenance access is likely to be required during the Operational Phase.
Transport modes, access and connections	In	Approximately 26km of the proposed underground cable will be routed along public roads (termed in-road), and the activities required to facilitate this during the Construction Phase may require the temporary closure or diversion of routes used by motorised vehicles, cyclists and walkers, affecting access to places of employment or study, community facilities such as shops, post offices, banks and medical facilities or transport connections such as bus stops and railway stations. Whilst it is anticipated that periodic access to the proposed underground cables for maintenance or testing may be needed during the Operational Phase, this is not considered likely to be sufficiently frequent in nature, or lengthy in duration, to result in a population level health effect.
Community safety	Out	The Proposed Development is not considered likely to affect risk of crime or perceived risk of crime. There are potential injury risks to the construction workers and members of the public associated with the Construction Phase. However, it is anticipated that these will be fully mitigated through compliance with S.I. No. 528/2021 - Safety, Health and Welfare at Work (Construction) (Amendment) Regulations 2021 and the implementation of standard good construction practice measures.
Community identity, culture, resilience and influence	Out	No potential pathway for potential impacts between these determinants and the Proposed Development has been identified. Whilst the Proposed Development may result in temporary severance of transport routes or community facilities during the Construction Phase, this will be assessed under the 'Transport modes, access and connections' and 'Open space, leisure and play' determinants.
Social participation, interaction and support		

Wider Determinant of Health	Scoped In or Out of Assessment	Justification for Scoping Assessment
Economic Environment		
Education and training	Out	Due to the specialised nature of the construction workforce required for Proposed Development, opportunities for vocational training are anticipated to be very limited. Temporary disruption to transport routes have the potential to affect access to places of study. However, this will be considered under the 'Transport, access and connections' determinant. No effects during the Operational Phase are anticipated.
Employment and income	In	Temporary and permanent land take from commercial facilities, predominantly agricultural land holdings, will be required during the Construction Phase. Depending on the extent and nature of these requirements, local employment opportunities within certain sectors has the potential to be affected. No effects during the Operational Phase are anticipated.
Biophysical Environment		
Climate change and adaptation	Out	Whilst the Proposed Development will result in construction carbon emissions (embodied carbon and relating to plant emissions), the magnitude of these emissions is not considered likely to be sufficient to contribute to localised changes in climate with the potential for significant impacts on public health. In addition, once operational, the Proposed Development will support increased contributions from renewable electricity generation sources. The Proposed Development will not offer opportunities to contribute to climate change resilience or adaptation as the majority of the proposed new infrastructure is located underground (with the exception of works to Woodland Substation and Belcamp Substation). No pathway for impact between this determinant and the Proposed Development has been identified.
Air quality	In	Construction works required to facilitate the Proposed Development will generate dust and air pollutant emissions from construction plant. Traffic re-routing due to lane or road closures during construction has the potential to also change traffic patterns locally. However, these changes are not thought likely to be sufficient to trigger the assessment threshold for air quality assessment (see Section 7.4.1 of Chapter 7 (Air Quality) in Volume 2 of this Environmental Impact Assessment Report (EIAR)), and therefore, no population level health effects are considered likely. Similarly, the number of traffic movements associated with maintenance of the proposed underground cables and substations would be very low (below the threshold for air quality assessment (see Section 7.4.2 of Chapter 7 (Air Quality) in Volume 2 of this of this EIAR) and no population level human health effects are considered likely.
Water quality or availability	Out	Chapter 10 (Soils, Geology and Hydrogeology) of Volume 2 of this EIAR identifies private and public water supplies that have the potential to be affected by the Proposed Development. However, all identified potential pollutant pathway linkages would be broken through the use of standard good practice mitigation, and therefore no significant human health impact are considered likely.
Flood Risk*	Out	The Flood Risk Assessment (FRA) for the Proposed Development, which is included as Appendix A12.1 in Volume 3 of this EIAR, concludes that no impact on coastal, groundwater, fluvial or pluvial flooding is anticipated.
Land quality	Out	Chapter 10 (Soils, Geology and Hydrogeology) of Volume 2 of this EIAR identifies potential sources of land contamination within the footprint of the Proposed Development. However, all identified potential pollutant pathway linkages would be broken through the use of standard good practice mitigation, and therefore no significant human health impacts are considered likely.
Noise and vibration	In (noise only)	Activities required during the Construction Phase to facilitate the Proposed Development will generate noise and vibration. Noise will be emitted from the new transformer and compensation reactor installed at Belcamp Substation, and therefore, effects during the Operational Phase associated with noise emissions from Belcamp Substation for residents of the three small areas which fall within 300 metres of the facility are also scoped into assessment. While vibration can cause annoyance, there is limited scientific literature to suggest vibration from construction activities poses a significant health risk to the general public, and therefore it is scoped out.
Radiation	Out	Electromagnetic Fields (EMFs) surround any object that is generating, transmitting or using electricity, including appliances, wiring, office equipment, batteries and any other electrical devices. Therefore, EMFs are common in modern life. EMFs are invisible and cannot be felt or heard. In many cases, domestic electrical appliances and tools can

Wider Determinant of Health	Scoped In or Out of Assessment	Justification for Scoping Assessment
		generate much higher magnetic and electric fields, if in close proximity to a sensitive receptor, than transmission lines at standard separation distances. EirGrid designs, develops and operates the transmission grid in accordance with stringent safety recommendations which are made by national and international agencies. Several of these recommendations come from the International Council on Non-Ionising Radiation Protection (ICNIRP). This is an independent body, funded by public health authorities around the world. ICNIRP has reviewed the safety of EMFs and recommended limits on exposure that are far below levels where adverse effects might occur. Electricity cables have been placed underground in Ireland since the 1960s. There are currently approximately 320 kilometres of underground transmission cables in Ireland, with multiples of this figure of underground cabling associated with the lower-voltage distribution system. Given that EirGrid design standards require all electricity infrastructure to operate under existing public exposure guidelines from ICNIRP, there would be no direct impact on human health from EMF. As a result, they are scoped out of further assessment within this health assessment, as no significant impacts on health as a result of exposure to EMF are considered likely.
Institutional and Built Environment		
Health and social care services	Out	There is the potential for a temporary reduction in access to health and social care facilities as a result of lane or road closures during the Construction Phase to facilitate the installation of the proposed underground cables, which may necessitate diversion or closure of pedestrian and cyclist routes and relocation of bus stops. However, as this is the only potential pathway for impacts on health and social care services identified, potential impacts on health outcomes will be considered under the 'Transport, access, and connections' determinant.
Built environment	Out	Additional infrastructure required at Woodland Substation and Belcamp Substation will be constructed within the existing footprint of Woodland Substation and within the extended footprint of Belcamp Substation which is being facilitated by a separate permitted development (planning application reference F23A/0040) and would not be particularly noticeable in context of the existing substation environments. No potential pathway for impact between this determinant and the Proposed Development has been identified.
Wider societal infrastructure and resources	Out	Once operational, the Proposed Development will contribute to maintaining and improving electricity provision in the east of Meath and north of Dublin which is essential for many aspects of daily life that promote good health as well as the provision of health services. However, the effect of this Proposed Development in isolation is not considered significant, and therefore, this determinant is scoped out of further assessment.
*Flood risk is not included as a health determinant in the Guide to: Effective Scoping of Human Health In Environmental Impact Assessment (IEMA 2022), but has been considered as part of the scoping assessment as new infrastructure projects frequently have potential to affect flood risk.		

1.2 References

IEMA (2022). Guide to: Effective Scoping of Human Health In Environmental Impact Assessment.

Directives and Legislation

S.I. No. 528/2021 - Safety, Health and Welfare at Work (Construction) (Amendment) Regulations 2021

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Appendix A7.1 – Construction Dust Risk Assessment Methodology

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Appendix A7.1 – Construction Dust Risk Methodology

7.1 Introduction

Emissions of dust to air can occur from works associated with the preparation of land (e.g., demolition, land clearing or grading, earth moving and excavation) and during construction. This Appendix sets out the assessment of dust, which could potentially be emitted to air from construction activities associated with the East Meath - North Dublin Grid Upgrade (hereafter referred to as the Proposed Development).

This Appendix supports Chapter 7 (Air Quality) in Volume 2 of the Environmental Impact Assessment Report (EIAR) for the Proposed Development, and outlines a procedure developed by the Institute of Air Quality Management (IAQM) in their Guidance on the Assessment of Dust from Demolition and Construction (hereafter referred to as IAQM Guidance) (IAQM 2023) for the assessment of dust-related air quality impacts arising from construction activities associated with the Proposed Development.

The IAQM Guidance was produced by air quality professionals and regulators, and although aimed at developments in the United Kingdom, the process and principles of the assessment set out in the IAQM Guidance are applicable for other geographical locations and construction projects. It is also the approach recommended by Transport Infrastructure Ireland (TII) in the Air Quality Assessment of Specified Infrastructure Projects – Overarching Technical Document PE-ENV-01106 (TII 2022), and therefore considered best practice in Ireland.

7.2 IAQM Methodology

The methodology for the assessment of the construction impacts is based on a five-step approach, as set out in Image 1.

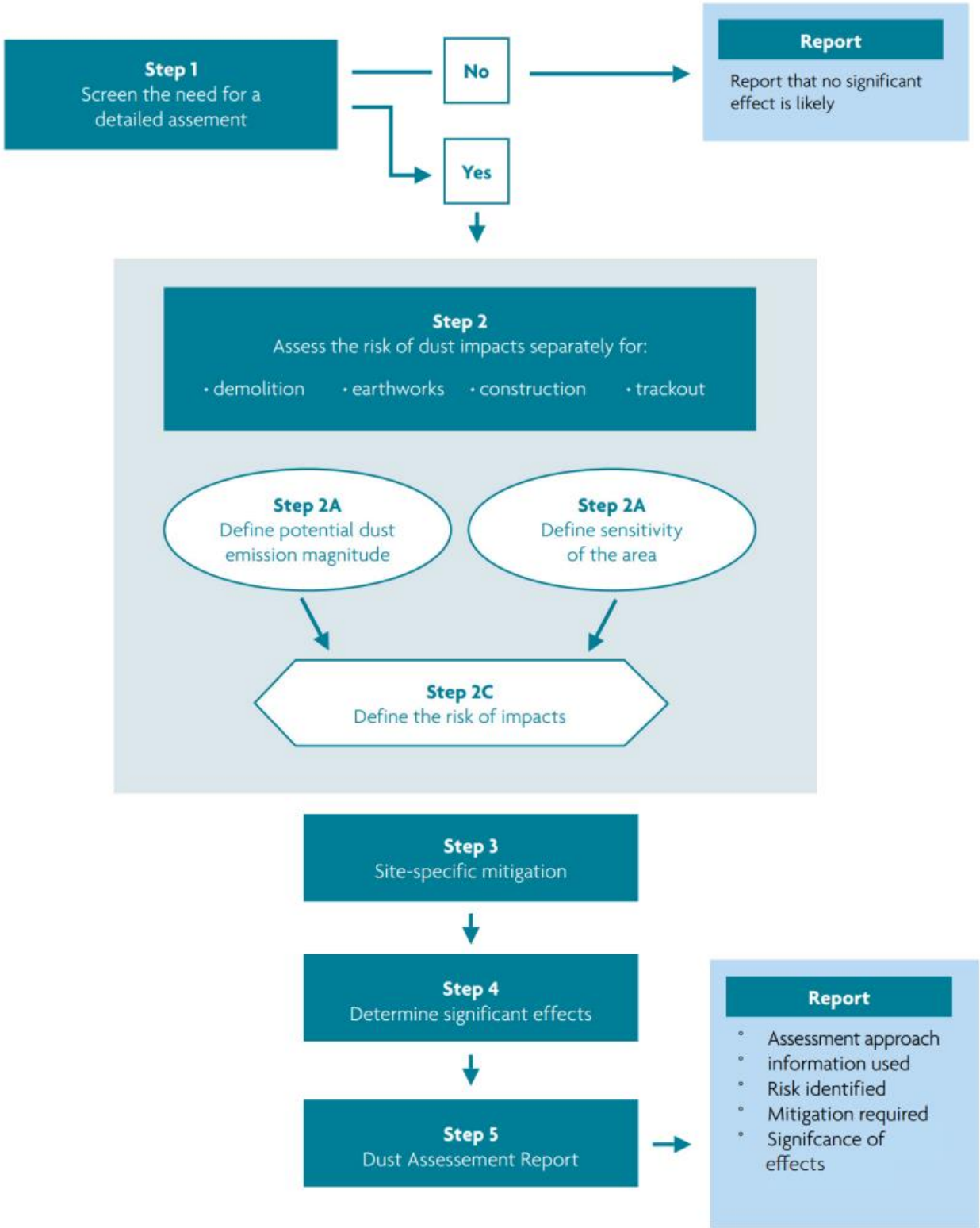

Image 1: Structure of the Dust Risk Assessment (IAQM 2023)

7.2.1 Step 1 – Identify the Need for a Detailed Assessment

An assessment would normally be required based on the following criteria:

- A human receptor within 250 metres (m) of the works area(s) associated with the Proposed Development and / or within 50m of the proposed access route(s) used by construction vehicles on the public highway, up to 50m from the study area site exit(s) for small sites, up to 200m from the study area site exit(s) for medium sites and up to 500 m from the study area site exit(s) for large sites; and / or
- An ecological receptor within 50m of the works area(s) associated with the Proposed Development and / or within 50m of the proposed access route(s) used by construction vehicles on the public highway, up to 250m from the study area site exit(s).

The requirement for a dust risk assessment can be screened out where the above criteria are not met. Therefore, it can be concluded that the level of risk is negligible and any impacts would be 'Not Significant'. If there are human or ecological receptors within the distance criteria set out in Step 1, then Steps 2 to 4 should be undertaken, as shown in Image 1.

7.2.2 Step 2 – Assess the Risk of Dust Impacts

A site is allocated to a risk category based on the scale and nature of the works (Step 2A – Define potential dust emission magnitude) and the sensitivity of the area to dust impacts (Step 2B – Define sensitivity of the area). These two factors are combined (Step 2C – Define the risk of dust impacts) to determine the risk of dust impacts before the implementation of mitigation measures. Risks are described in terms of there being a low, medium or high risk of dust impacts for each of four separate potentially dust emitting activities (i.e., demolition, construction, earthworks and trackout). Site-specific mitigation would be required, proportionate to the level of risk identified.

7.2.2.1 Step 2A - Define the Potential Dust Emission Magnitude

The potential dust emission magnitude is based on the scale of the anticipated works and is classified as small, medium or large. Table 1 presents the dust emission criteria outlined for each construction activity.

Table 1: Potential Dust Emission Magnitude.

Construction Activity	Large	Medium	Small
Demolition	Total building volume >75,000m^3 (metres cubed) potentially dusty construction material (e.g. concrete), on-site crushing and screening, demolition activities >12m above ground level.	Total building volume 12,000m^3 – 75,000m^3, potentially dusty construction material, demolition activities 6m-12 m above ground level.	Total building volume <12,000m^3, construction material with low potential for dust release (e.g. metal cladding or timber), demolition activities <6m above ground, demolition during wetter months.
Earthworks	Total site area >110,000m^2 (metres squared), potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size), >10 heavy earth moving vehicles active at any one time, formation of bunds >6 m in height.	Total site area 18,000m^2 – 110,000m^2, moderately dusty soil type (e.g. silt), 5 -10 heavy earth moving vehicles active at any one time, formation of bunds 3m – 6m in height.	Total site area <18,000m^2, soil type with large grain size (e.g. sand), <5 heavy earth moving vehicles active at any one time, formation of bunds <4m in height.
Construction	Total building volume >75,000m^3, on site concrete batching, sandblasting.	Total building volume 12,000m^3 – 75,000m^3, potentially dusty construction material (e.g. concrete), on site concrete batching.	Total building volume <12,000m^3, construction material with low potential for dust release (e.g. metal cladding or timber).
Trackout	>50 Heavy Duty Vehicles (HDV) (>3.5 tonnes) outward movements[1] in any one day[2], potentially dusty surface material (e.g. high clay content), unpaved road length >100m.	20-50 HDV (>3.5 tonnes) outward movements[1] in any one day[2], moderately dusty surface material (e.g. high clay content), unpaved road length 50m – 100m.	<20 HDV (3.5 tonnes) outward movements[1] in any one day[2], surface material with low potential for dust release, unpaved road length <50m.
Note 1: A vehicle movement is a one-way journey. i.e. from A to B and excludes the return journey. Note 2: HDV movements during a construction project vary over its lifetime, and the number of movements is the maximum not the average.			

7.2.2.2 Step 2B – Define the Sensitivity of the Area

The sensitivity of the area is described as low, medium or high and takes a number of factors into account:

- The specific sensitivities of receptors in the area;
- The proximity and number of those receptors;
- The local background particulate matter (PM_{10}) concentrations; and
- Site-specific factors, such as whether there are natural shelters, such as trees, to reduce the risk of wind-blown dust.

Table 2 presents indicative examples of classification groups for the varying sensitivities of people to dust soiling impacts, to the health impacts of PM_{10} and the sensitivities of receptors to ecological impacts. Professional judgement is made at the site-specific level where sensitivities may be higher or lower, for example a soft fruit business may be more sensitive to soiling than an alternative industry, such as coal mining, in the same location. Section 7.3 within the IAQM Guidance (IAQM 2023) outlines more detailed parameters for defining sensitivity.

Table 2: Indicative Examples of the Sensitivity of Different Types of Receptors.

Sensitivity of Receptor	Sensitivities of People and Ecological Receptors		
	Dust soiling activities impacts[1]	Heath impacts of PM_{10}[2]	Ecological impacts[3]
High	Dwellings, museums and other culturally important collections, medium and long-term car parks and car showrooms.	Residential properties, hospitals, schools and residential care homes.	Locations with an international or national designation and the designated features may be affected by dust soiling (e.g. Special Area of Conservation (SAC) / Special Protection Area (SPA) / Ramsar site). Locations where there is a community of a particular dust sensitive species such as vascular plant species included in the Red Data list for Great Britain (Cheffings et al. 2005)
Medium	Parks, places of work.	Office and shop workers not occupationally exposed to PM_{10}.	Locations where there is a particularly important plant species, where dust sensitivity is uncertain or unknown. Locations with a national designation where the features may be affected by dust deposition (e.g. Natural Heritage Area (NHA)).
Low	Playing fields, farmland, footpaths, short-term car parks and roads.	Public footpaths, playing fields, parks and shopping streets.	Locations with a local designation where the features may be affected by dust deposition.
Note 1: People's expectations would vary depending on the existing dust deposition in the area. Note 2: This follows the Department for Environment, Food and Rural Affairs (Defra) (Defra 2022) guidance as set out in Local Air Quality Management Technical Guidance (LAQM.TG (22)). Note 3: A Habitat Regulation Assessment of the site may be required as part of the planning process if the site lies close to an internationally designated site (i.e. SACs/SPAs) designated under the Habitats Directive (92/43/EEC) and Ramsar sites.			

The receptor sensitivity and distance are then used to determine the potential dust risk for each dust effect for each construction activity, as shown in Table 3, Table 4: Table 4 and Table 5. It is noted that distances are between the dust source to the nearest receptor so a different area may be affected by trackout than by on-site works.

For trackout, the distances should be measured from the side of the roads used by construction traffic. Without site specific mitigation, trackout may occur from roads up to 500m from large sites, 200m from medium sized sites and 50m from small sites, as measured from the site exit(s). The impact declines with distance from the site, and it is only necessary to consider trackout impacts up to 50m from the edge of the road.

Table 3: Criteria for the Sensitivity of the Area to Dust Soiling Effects on People and Property.

Receptor Sensitivity	Number of Receptors	Distance from the Source (m)			
		<20	<50	<100	<250
High	>100	High	High	Medium	Low
	10-100	High	Medium	Low	Low
	1-10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

Table 4: Criteria for the Sensitivity of the Area to Human Health.

Receptor Sensitivity	Annual Mean PM_{10} Concentration (micrograms per metre cubed (m^3))	Number of Receptors	Distance from the Source (m)			
			<20	<50	<100	<250
High	>32 µg/m^3	>100	High	High	High	Medium
		10-100	High	High	Medium	Low
		1-10	High	Medium	Low	Low
	28 – 32 µg/m^3	>100	High	High	Medium	Low
		10-100	High	Medium	Low	Low
		1-10	High	Medium	Low	Low
	24 – 28 µg/m^3	>100	High	Medium	Low	Low
		10-100	High	Medium	Low	Low
		1-10	Medium	Low	Low	Low
	<24 µg/m^3	>100	Medium	Low	Low	Low
		10-100	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
Medium	>32 µg/m^3	>10	High	Medium	Low	Low
		1-10	Medium	Low	Low	Low
	28 – 32 µg/m^3	>10	Medium	Low	Low	Low
		1-10	Low	Low	Low	Low
	24 – 28 µg/m^3	>10	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
	<24 µg/m^3	>10	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
Low	-	>1	Low	Low	Low	Low

Table 5: Criteria for the Sensitivity of the Area to Ecological Impact

Receptor Sensitivity	Distance from the Source (m)	
	<20	<50
High	High	Medium
Medium	Medium	Low
Low	Low	Low

7.2.2.3 Step 2C – Define the Risk of Impacts

The dust emission magnitude is then combined with the sensitivity of the area to determine the overall risk of impacts with no mitigation measures applied. The matrices in Table 6 provide a method of assigning the level of risk for each activity. These can then be used to determine the level of mitigation that is required.

Table 6: Determination of Risk of Dust Impacts.

Sensitivity of the Area	Dust Emission Magnitude		
	Large	Medium	Small
Demolition			
High	High risk	Medium risk	Medium risk
Medium	High risk	Medium risk	Low risk
Low	Medium risk	Low risk	Negligible risk
Earthworks			
High	High risk	Medium risk	Low risk
Medium	Medium risk	Medium risk	Low risk
Low	Low risk	Low risk	Negligible risk
Construction			
High	High risk	Medium risk	Low risk
Medium	Medium risk	Medium risk	Low risk
Low	Low risk	Low risk	Negligible risk
Trackout			
High	High risk	Medium risk	Low risk
Medium	Medium risk	Medium risk	Low risk
Low	Low risk	Low risk	Negligible risk

7.2.3 Step 3 – Site Specific Mitigation

During the Construction Phase, it would be important to control dust levels for high, medium and low risk construction activities. To avoid significant impacts from dust during the Construction Phase, suitable mitigation measures should be adopted. Following the identification of the overall risk category for the demolition, earthworks, construction and trackout activities based on Table 6, appropriate mitigation measures can be identified for the Proposed Development. Activities identified as a high risk would require a greater level of mitigation than those identified as low risk.

A selection of these measures has been specified for low risk to high risk sites in the IAQM Guidance (IAQM 2023), as measures suitable to mitigate dust emissions from activities such as those that will be undertaken during the construction of the Proposed Development.

7.2.4 Step 4 - Determine Significant Impacts

Following Step 2 (determining the risk of dust impacts for each activity) and Step 3 (identification of appropriate site-specific mitigation), the significance of the potential dust impacts can be determined. The recommended mitigation measures are considered to be sufficient to reduce emissions of dust based on the successful application of these measures at other large construction sites, such that a significant impact would not occur at off site receptors.

The approach in Step 4 of the IAQM Guidance (IAQM 2023) (determine significant impacts) has been adopted to determine the significance of impacts with regard to dust emissions. The guidance states the following:

> *"For almost all construction activity, the aim should be to prevent significant impacts on receptors through the use of effective mitigation. Experience shows that this is normally possible. Hence the residual effect will normally be 'not significant'".*

The IAQM Guidance also states that:

> *"Even with a rigorous DMP [Dust Management Plan] in place, it is not possible to guarantee that the dust mitigation measures will be effective all the time, and if, for example, dust emissions occur under adverse weather conditions, or there is an interruption to the water supply used for dust suppression, the local community may experience occasional, short-term dust annoyance. The likely scale of this would not normally be considered sufficient to change the conclusion that, with mitigation, the impacts will be 'not significant'".*

Step 4 of IAQM Guidance recognises that the key to the above approach is that it assumes that the regulators ensure that the proposed mitigation measures are implemented. The management plan would include the necessary systems and procedures to enable on-going checking by the regulators to ensure that mitigation is being delivered, and that it is effective in reducing any residual impact to 'Not Significant' in line with the IAQM Guidance.

7.3 References

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Appendix A8.1 – Glossary of Climate Terms

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Appendix A8.1 – Glossary of Climate Terms

Term	Definition
Carbon budgets	Ireland's first carbon budget programme, comprising three 5-year economy-wide carbon budgets, was approved by the Government on 22 February 2022. The budgets were laid before the Houses of the Oireachtas on 24 February. The carbon budgets were approved by both Houses of the Oireachtas (the Dáil and Seanad) in April 2022.
Carbon dioxide equivalent (CO_2e)	Carbon dioxide equivalent (abbreviated as CO2e) is a metric used to compare the emissions of various greenhouse gases, based on their global-warming potential (GWP), by converting amounts of other gases to the equivalent amount of CO2 with the same GWP. For example, the GWP for methane (CH4) is 25, and for nitrous oxide (N2O) it is 298. This means that an emission of 1 tonne of CH4 is equivalent to an emission of 25 tonnes of CO2 and an emission of 1 tonne of N2O is equivalent to 298 tonnes of CO2.
Carbon emissions	Shorthand for emissions of any of the seven GHGs that contribute to climate change under the Kyoto Protocol, namely carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulphur hexafluoride (SF6) and nitrogen trifluoride (NF3).
Climate	Long-term weather conditions prevailing over a region.
Embodied carbon	Carbon (GHG) emissions associated with energy consumption and chemical processes during the extraction, transport and/or manufacture of construction materials or products.
Greenhouse gases (GHGs)	A gaseous compound that absorbs infrared radiation and traps heat in the atmosphere. Greenhouse gases are usually expressed in terms of carbon dioxide equivalent (CO2e).
Life cycle stage	PAS 2080:2023 proposes a modular approach for the quantification of infrastructure related GHG emissions over a number of stages over the 'life cycle' of a project, namely 'before use (A)', 'use (B)' and 'end of life (C)'. These stages are further disaggregated into modules (e.g. product stage (A1–A3) and construction process stage (A4–A5)).
Net zero	Net zero means any emissions would be balanced by schemes to offset an equivalent amount of greenhouse gases from the atmosphere, such as planting trees or using technology like carbon capture and storage.
PAS 2080	PAS 2080:2023 'Carbon Management in Buildings and Infrastructure' specifies requirements for the management of whole-life carbon in buildings and infrastructure.
Vulnerability	The degree to which a system/asset is exposed and resilient to adverse effects of climate change.

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Appendix A8.2 – European, National and Local Policy

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Appendix A8.2 – European, National and Local Policy

Table 1: European Union and International Policy

Policy Document	Summary
European Green Deal, 2019 and EU 'Fit for 55', 2023	In December 2019, the European Commission (the Commission) published a Communication on a European Green Deal (EGD), setting out its increased ambition on climate action. It presents an initial roadmap of key policies and measures needed to achieve the ambition of becoming the first climate neutral bloc in the world by 2050. This will require a transformation of the EU's economy, with sectors such as transport, buildings, agriculture, and energy production all having key roles to play. As well as setting out the policy and legislative programme for all key economic sectors to deliver on the EU's climate ambition, the EGD also addresses the EU's overall ambition on climate targets. It proposes increasing the EU's emissions reduction targets for 2030 from 40% to at least 50% and towards 55% compared with 1990 levels. In December 2020, EU leaders agreed to reduce GHG emissions by at least 55% by 2030 compared to 1990 levels. The European Climate Law (July 2021) writes the goal to become climate-neutral by 2050 into law and sets the 55% reduction by 2030 as an intermediate target towards this goal. Achievement of the EU-wide target is facilitated through the European Union 'Fit for 55' legislative package, which aims to make all sectors of the EU's economy fit to meet the 55% reduction target. The package includes the Emissions Trading System (ETS) and Effort Sharing Regulation (ESR). The ETS was established by the EU for high-emitting sectors and sets separate legally binding national targets for emissions reductions in non-ETS sectors. For Non-ETS sectors, the nationally binding targets for Member States for 2021 to 2030 are set by the Effort Sharing Regulation. The ESR requires Ireland to reduce its emissions from these sectors by 42% by 2030, relative to 2005 levels.
The Paris Agreement, 2015	Superseding the 2005 Kyoto Protocol, the 2015 Paris Agreement within the United Nations Framework Convention on Climate Change (UNFCCC), addresses greenhouse gas emissions mitigation, adaptation and finance starting in the year 2020, which aims to keep the global average temperature rise this century to below two degrees Celsius above pre-industrial levels and to pursue efforts to limit the temperature increase even further to 1.5 degrees Celsius. The Conference of the Parties (COP) meet annually to assess the progress made in achieving this aim. At COP26 in Glasgow (2021), the Glasgow Climate Pact was adopted, which included the finalisation of the 'Paris Agreement rulebook'. This set of rules lays out how countries are held accountable for delivering on their climate action promises and self-targets under their Nationally Determined Contributions (NDCs). A key outcome of COP28 in Dubai (2023), was the adoption of a fossil fuel phase-out agreement, committing the parties to transition away from fossil fuels in energy systems in order to achieve net-zero emissions by 2050. The agreement also included a pledge to triple renewable energy capacity globally by 2030.
Recast Renewable Energy Directive (RED III)	The ambition set out in the Paris Agreement, as well as technological developments including cost reductions for investments in renewable energy, led to new objectives being set in the recast Renewable Energy Directive 2018/2001 (known as RED II). In October 2023, Directive (EU) 2023/2413 ("RED III") was published to amend and update on RED II. RED II established a binding target of at least 32% of renewable energy for the EU by 2030. The renewable energy target set under RED II has been reviewed upwards under RED III to 42.5%. RED III also introduces a requirement on Member States to aim to increase their renewable energy share to 45% by 2030. Member States are required to establish their contribution to the achievement of that target as part of their integrated national energy and climate plans. The Commission also encouraged investments in new, flexible and clean technologies.
Europe 2030 Climate and Energy Framework	EU leaders agreed in October 2014 on new climate and energy objectives for 2030 following a proposal put forward by the European Commission. The 2030 framework aims to make the EU's economy and energy system more competitive, secure and sustainable. A centrepiece of the 2030 framework is the binding domestic target to reduce greenhouse gas emissions by 40% below 1990 levels by 2030, which has now been updated under the 'EU Fit for 55' package to 55% below 1990 levels by 2030. The aim of this target is to put the EU on the most cost-effective path towards its agreed objective of an 80-95% reduction by 2050. EU leaders also agreed on raising the share of renewable energy to at least 27%.
Energy Roadmap 2050	The Energy Roadmap 2050 was published by the European Commission in 2011 and explores the transition of the energy system in ways that would be compatible with the greenhouse gas reductions targets while also increasing competitiveness and security of supply. To achieve these goals, the Roadmap states that significant investments need to be made in new low-carbon technologies, renewable energy, energy efficiency, and grid infrastructure. Four main routes are identified to achieve a more sustainable, competitive and secure energy system in 2050: • Energy efficiency; • Renewable energy; • Nuclear energy; and

Policy Document	Summary
	• Carbon capture and storage. The Roadmap combined these routes in different ways to create and analyse seven possible scenarios for 2050. The analysis found that decarbonising the energy system is technically and economically feasible. Each of the scenarios assumes in the analysis that increasing the share of renewable energy and using energy more efficiently are crucial, irrespective of the particular energy mix chosen. An important component of this energy mix is grid infrastructure, with the Roadmap stating: "With electricity trade and renewables' penetration growing under almost any scenario up to 2050, and particularly in the high renewables scenario, adequate infrastructure at distribution, interconnection and long-distance transmission becomes a matter of urgency. By 2020 interconnection capacity needs to expand at least in line with current development plans. An overall increase of interconnection capacity by 40% up to 2020 will be needed, with further integration after this point."

Table 2: Detailed National Policy Appraisal

Policy Document	Summary
Project Ireland 2040 - National Planning Framework (NPF)	Project Ireland 2040 National Planning Framework (hereafter referred to as the NPF) is the Government's high-level strategic plan for shaping the future growth and development of Ireland to the year 2040 and marks the highest tier of Ireland's spatial plans. The National Strategic Outcomes (NSOs), the main policy principles of the NPF, support and strengthen the economy and a transition to a low carbon, climate resilient society (NSO 3, 6 and 8), provide access to quality services (4, 7, and 10) and achieve sustainable growth of settlements and manage environmental resources (NSO 1 and 9). The NPF states that Ireland's National Energy Policy is focused on three pillars: • Sustainability; • Security of Supply; and • Competitiveness. In line with these principles, NSO 8: 'Transition to Sustainable Energy' notes that in creating Ireland's future energy landscape, new energy systems and transmission grids will be necessary to enable a more distributed energy generation system which connects established and emerging energy sources to the major sources of demand. NSO 8 aims to "Reinforce the distribution and transmission network to facilitate planned growth and distribution of a more renewables focused source of energy across the major demand centres" (p. 147). In addition, it contains, in National Policy Objective 42, the following commitment to transmission network reinforcement: "to support, within the context of the Offshore Renewable Energy Development Plan (OREDP) and its successors, the progressive development of Ireland's offshore renewable energy potential, including domestic and international grid connectivity enhancements" (p. 104). County Meath and Fingal, North County Dublin are located in the Mid-East Region as set out within the NPF, which states that, "The Mid-East has experienced high levels of population growth in recent decades, at more than twice the national growth rate. Managing the challenges of future growth is critical to this regional area. A more balanced and sustainable pattern of development, with a greater focus on addressing employment creation, local infrastructure needs and addressing the legacy of rapid growth, must be prioritised." (p.33)
The National Development Plan (NDP) 2021-2030	The NDP is the national capital investment strategy plan that is integrated and aligned with the NPF. Its sets out the framework of expenditure commitments to secure the Strategic Investment Priorities to the year 2030 and supports the delivery of the ten NSOs identified in the NPF. One of the core strategic investment priorities identified within the NDP, is a focus on decarbonizing energy, stating: 'We need to plan our energy system as a whole to create greater links between different energy carriers (such as electricity and hydrogen); infrastructures; and consumption sectors (such as transport and heating). The long-term objective is to transition to a net-zero carbon, reliable, secure, flexible and resource-efficient energy services at the least possible cost for society by mid-century.' (p.123) The NDP states that doing so requires a coordinated programme of investment in, among other things, 'an expanded and strengthened electricity transmission and distribution network' (p.123), in order to support an increase in both renewable and conventional electricity generation. The NDP provides for the collaboration in the energy sector, driven by the single electricity market. The need for a new interconnector between the electricity grids of Northern Ireland and Ireland has been identified by the Irish Government and Northern Ireland Executive as a project of common interest. Ireland is also working with other countries such as France to explore potential for electricity interconnection and will continue to support relationships with our European neighbours to enhance our international connectivity. The 'Government Policy Statement on the Strategic Importance of Transmission and Other Energy Infrastructure' of 2012 recognises the importance of the need for the upgrading and development of the electricity network to meet existing and future energy demands by fully supporting EirGrid's 'Grid 25 Programme' and the investment required. Within the Policy statement the Government "endorses the major investment underway in the high voltage electricity transmission system under EirGrid's Grid 25 Programme." It states, "Grid 25 is the most important investment in Irelands transmission system for several generations and will position our energy system for decades to come" (p.1).
National Energy and Climate Plan (NECP) 2021-2030	The National Energy and Climate Plan (hereafter referred to as the NECP) is a ten-year plan mandated by the EU to each of its member states, in order for the EU to meet its overall greenhouse gas emissions targets. The plan establishes key measures to address the five dimensions of the EU Energy Union: decarbonisation, energy efficiency, energy security, internal energy markets and research, innovation and competitiveness. The NECP takes into account energy and climate policies developed to date, the levels of demographic and economic growth identified in the NPF and includes all of the climate and energy measures set out in the NDP.
Government White Paper – Ireland's Transition to a	The Government White Paper sets out a framework to guide Ireland's energy policy development. The White Paper acknowledges that an uninterrupted supply of energy is vital to the functioning of Irish society and economy. It establishes the need for the 'development and renewal' of energy networks to meet

Policy Document	Summary
Low Carbon Energy Future 2015-2030	economic and social goals. The Proposed Development is considered to be an 'enhanced and extended energy infrastructure' development, which will be critical for economic development, regional development and the secure provision of energy and other services for the Irish society and economy.
Climate Action and Low Carbon Development (Amendment) Act 2021 and Climate Action Plan (CAP) 2023 & 2024	The Climate Action and Low Carbon Development (Amendment) Act was published in 2021 and commits to achieving 51% reduction in overall greenhouse gas emissions by 2030 and setting Ireland on a path to reach net-zero by no later than 2050. Climate Action Plan 2021 aimed to increase the proportion of renewable electricity to up to 80% by 2030. The decarbonisation pathway for the electricity sector is challenging given the rapid growth in demand for power, as well as the need to ensure security of supply through the decarbonisation journey. The Climate Action Plan 2024 (CAP24) is the third annual update to Ireland's Climate Action 2019 with the aim of reaching net zero no later than 2050, as committed to in the Programme for Government. The CAP24 builds on the measures and actions identified in the Climate Action Plan 2023 (CAP23), setting out how Ireland can accelerate the actions that are required to respond to the climate crisis, putting climate solutions at the centre of Ireland's social and economic development. Under 'Key Messages' for the Electricity Sector, the CAP24 states (Page 147): "The deployment rates of renewable energy and grid infrastructure required to meet the carbon budget programme for electricity is unprecedented and requires urgent action across all actors to align with the national targets". The CAP24 reiterates the following measures relevant to the Proposed Development to meet the required emission reductions: ▪ To reach 80% of electricity demand from renewable sources; ▪ Target 6 GW of onshore wind and up to 5GW of solar by 2025; and ▪ Target 9 GW onshore wind, 8 GW solar, and at least 5 GW of offshore wind by 2030 CAP24 acknowledges that infrastructural actions would first be needed, for example, to reinforce and transform the electricity grid and that these actions would have a less immediate impact on sector emissions but would facilitate increasing emissions reductions in the longer term. EirGrid has delivered on the CAP23 measure to update our Shaping Our Electricity Future pathway to align with CAP23 and the carbon budget programme. The update was published in July 2023.

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Appendix A10.2 – Desk Study and Field Data Collection Methodologies

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Appendix A10.2 – Desk Study and Field Survey Collection Methodologies

1. Desk-Based Study

A desk-based study was carried out to inform the scope of the field surveys for the baseline. The desktop study involved collection and review of relevant published and unpublished sources of data, collation of existing ecological information and consultation with relevant statutory bodies.

The following sources were consulted during the desk study to inform the scope of the ecological surveys:

- Online data available on European sites ('European site' replaced the term 'Natura 2000 site' under S.I. No. 473/2011 – European Union (Environmental Impact Assessment and Habitats) Regulations 2011) (as amended), and nationally designated sites (nationally designated sites are Natural Heritage Areas (NHAs) or proposed Natural Heritage Areas (pNHAs)), as held by the National Parks and the National Parks and Wildlife Service (NPWS 2023);
- Online data records available on National Biodiversity Data Centre Database (NBDC 2023);
- Ordnance Survey Ireland (OSI) mapping and aerial photography utilised for desk review of potential habitats within the subject lands and their surroundings (OSI 2023);
- Irish Wetland Bird Survey (I-WeBS) data available on Birdwatch Ireland I-WeBS section (Birdwatch Ireland 2019);
- Records of rare and protected species for 2km around the study area, held by the NPWS (NPWS 2023);
- Habitat and species GIS datasets provided by the NPWS (NPWS 2023);
- Bat records from Bat Conservation Ireland's (BCI) database (BCI 2023);
- Records from the Botanical Society of Britain & Ireland (BSBI) (BSBI 2023);
- Information on Lowland Hay Meadows from BSBI Ireland Annex I Grassland Resources (BSBI 2020); and
- Environmental information / data for the area available from the Environmental Protection Agency website (EPA 2023).

2. Field Survey Methods

2.1 Habitat Survey

Habitat surveys were undertaken between January 2023 and August 2023. All habitats were mapped and classified using A Guide to Habitats in Ireland (The Heritage Council 2000). This classification is used to rapidly record habitats and the main species present. Plant species that were either representative of a habitat or considered to be of conservation interest were recorded, along with their relative abundances using the 'DAFOR' scale (i.e. dominant/abundant/frequent/occasional rare), although note this scale has no agreed quantitative meaning (Rodwell, 2006). The extent of habitat was mapped onto a tablet with Global Positioning System (GPS) and aerial imagery. Target notes are included in the habitat map to indicate any points of interest within the study area (e.g. describing a habitat in more detail, information on conservation interests or information on land use practices etc.). Vascular plant nomenclature follows that of the New Flora of the British Isles 3rd Edition (Stace 2010).

2.2 Aquatic Habitats

Aquatic habitats such as drainage ditches and water body crossing points and a minimum distance along waterbodies of 100m to either side of crossing points were visually assessed for their suitability to support aquatic flora and fauna species. Condition of aquatic habitats including substrate make-up, flow rates and notable species were recorded. These surveys were carried out between January 2023 and August 2023.

2.3 Invasive Plants

The presence of invasive plant species was recorded during initial ecological walkover surveys and during subsequent habitat surveys. Particular focus was placed on the species listed on the Third Schedule of S.I. No. 477/2011 - European Communities (Birds and Natural Habitats) Regulations 2011 (e.g. Japanese knotweed, Himalayan balsam) with further non-native plant species not included on the Third Schedule recorded in line with Guidelines on the Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads (National Roads Authority (NRA) 2010) (e.g., *Buddleja davidii* and winter heliotrope). Presence of invasive plant species was recorded between January 2023 and August 2023.

2.4 Habitat Suitability: Fish and White-Clawed Crayfish

Water body crossing points and a minimum distance along water bodies of 100m to either side of crossing points were visually assessed for their potential to support fish of conservation interest and white-clawed crayfish. Assessments identified sites that had appropriate fish spawning habitat and juvenile nursery areas including instream features such as substrates and flows (Hendry and Cragg-Hine 2003; Maitland 2003). White clawed crayfish habitat was assessed for features that provide suitable refuge such as substrates large enough to provide cover and not armoured. Other features favourable for white clawed crayfish included tree roots, woody debris and suitable flows as outlined in the Ecology of the White-clawed Crayfish (Holdich 2003). Sites identified as having appropriate habitat were selected for eDNA surveys to determine their presence or likely absence within each watercourse. The presence of macrophytes were also noted where present. This was carried out during the multi-disciplinary walkover undertaken between January 2023 and August 2023.

2.5 Amphibian- Smooth Newt, Freshwater Fish and White-Clawed Crayfish eDNA

Fourteen waterbodies within the study area were assessed for the presence / likely absence of smooth newt, freshwater fish and white-clawed crayfish using the standard eDNA methodology. This included collecting 20 water samples from around the perimeter of the watercourse using a 40ml (millilitres) ladle, focusing on

areas most likely to be used by smooth newt. The water samples were then transferred into a whirl Pak bag. Before each sample was taken, the water was gently stirred using the ladle. This is because eDNA will often be present in larger quantities at the bottom of the watercourse as it tends to sink in water.

The whirl Pak bag was then gently shaken to mix eDNA across the whole water sample. A pipette was then used to transfer 15ml of water from the whirl Pak bag into each of the six conical tubes containing a preserving fluid. Each conical tube was then vigorously shaken for 10 seconds to mix the water sample and the preservative. The six conical tubes were then labelled and sent to the Sure Screen Scientifics lab for analysis.

2.6 Mammal Survey (Other Than Bats)

Surveys for large mammals (e.g., badger *Meles meles* and otter *Lutra lutra*) were carried out as part of the multi-disciplinary walkover survey undertaken between January 2023 and August 2023. Otter and badger were surveyed through the detection of field signs including resting sites (holts and setts) as well as mammal tracks, markings, feeding signs, and droppings.

Species-specific surveys were not undertaken for other protected mammal species which are harder to detect through field signs such as red squirrel (*Sciurus vulgaris*), hedgehog (*Erinaceus europaeus)*, Irish stoat (*Mustela erminea hibernica)* or pine marten (*Martes martes)*. Nevertheless, during all surveys, searches for any signs of these species such as footprints in soft muds and or droppings was carried out. Potential presence of these species within the study area was noted based on the species distribution and habitat preferences (Marnell *et al*., 2009).

2.7 Bats

All trees with potential roost features within the study area were visually assessed. Structures / trees not directly impacted were not subjected to survey. Only structures / trees to be directly impacted were subject to survey. A daytime ground assessment of trees determined their bat roost potential, and those with low, medium, or high potential were subject to emergence surveys. Where possible individual trees as well as tree lines were subject to dusk surveys. Additionally, static detectors were deployed along these tree lines. Further details are provided below. All bat surveys were designed taking into consideration the guidance set out in the Bat Surveys for Professional Ecologists. Good Practice Guidelines (Collins 2016) and the interim guidance provided by Bat Conservation Trust (BCT) (BCT 2022), which was the most up-to-date guidance at the time of survey, which is summarised in Table 1.

2.7.1 Bats: Assessment of Potential Roost Features (Initial Daytime Assessment)

Preliminary roost assessment surveys for trees and buildings within the study area were undertaken between January and April 2023 to identify their potential to support roosting bats. This daytime assessment comprised a ground level, external inspection of trees and buildings to identify potential roost features (PRFs) or signs of bat presence (bat droppings, insect remains etc.) using a pair of binoculars and a one million candle power torch. Each tree or building was assigned a roosting potential (high/moderate/low/negligible) according to good practice guidance, as described below (Collins, 2016; BCI 2022). Where possible, individual trees as well as treelines were subject to dawn and dusk surveys as the survey effort recommended by good practice guidelines.

PRFs of note included:

- Knot holes (cavities with a collar resulting from natural branch loss and fungal infection);
- Hazard beams (split spanning the limb/stem completely forming an elongated crevice that narrows at both ends);
- Thick ivy *Hedera helix* cover potentially obscuring PRFs beneath;

- Lifting bark (substantial areas of lifted bark typically resulting from fungal infection); and
- Tear outs (cavities within an inverted tear shape wound created when a limb was torn from the main stem or other limb).

Table 1: Assessing the Value of Trees and Buildings to Roosting Bats (Collins 2016; BCT 2022)

Category	Description	Recommended No. of Survey Visits*	Recommended Survey Timings**
High **Trees / buildings that are suitable for use by large numbers of bats on a regular basis.**	PRFs in trees include but are not limited to knotholes, wounds, frost cracks or split limbs (further detailed information on the type of PRFs found in trees is detailed in the Bat Tre Habitat Key – Database Report 2016 (Andrews 2016), that provide voids and/or crevices suitable for bats. In buildings, examples include eaves, barge boards, gable ends and corners of adjoining beams, ridge and hanging tiles, behind roofing felt or within cavity walls. Further survey is required to determine whether or not bats are present and if so, the bat species present. Appropriate mitigation and potentially licensing requirements may then be determined. Seasonal constraints may apply.	Buildings / trees – Three separate visits. Three dusk emergence surveys. NB. Multiple survey visits will be spread out as much as possible, with surveys at least two weeks apart, preferably more.	Buildings / trees – May to September (with at least two of the surveys between May and August).
Moderate **Moderate potential is assigned to trees / structures with potential to support bat roosts but supports fewer features than a high potential building / tree and is unlikely to support a roost of high conservation value.**	From the ground, building / tree appears to have features that may provide suitable roosting opportunity for bats. However, owing to the characteristics of the feature, they are deemed to be sub-optimal for large numbers of roosting bats. Further survey is required to determine whether or not bats are present and if so, the bat species present. Appropriate mitigation and potentially licensing requirements may then be determined. Seasonal constraints may apply.	Buildings / trees – Two separate visits. Two dusk emergence surveys. NB. Multiple survey visits will be spread out as much as possible, with surveys at least two weeks apart, preferably more.	Buildings / trees – May to September (with at least two of the surveys between May and August).
Low **Low potential is assigned to structures and trees with features that could support individual bats opportunistically.**	If no features are visible but owing to the size and age and structure, hidden features, sub-optimal for roosting bats may occur that only and elevated inspection may reveal. In respect of ivy cover this could be hiding a PRF. Further survey may be required for buildings only or works may proceed using reasonable precautions (e.g. controlled working methods, under licence or supervision of a bat worker. Seasonal constraints may apply.	Buildings– One survey visit. One dusk emergence survey. Trees – No further surveys required.	Buildings / trees – May to September (with at least two of the surveys between May and August).

Category	Description	Recommended No. of Survey Visits*	Recommended Survey Timings**
Negligible	Negligible habitat features on site likely to be used by roosting bats.	No further surveys required.	N/A

2.7.2 Bats: Transect Surveys

Transect surveys were not considered appropriate for the Proposed Development and no bat transects were done since the majority of linear features that will be impacted are located along existing roads (i.e., treelines / hedgerows). At off-road locations, the proposed cable route will punch through existing treelines. It is assumed that these features will be used by foraging and commuting bats. Static detector data was collected at 12 sites consisting of suitable habitat spread along the Proposed Development to provide a sufficient species assemblage for the area. As such, transect surveys were not considered appropriate.

2.7.3 Bats: Static Detector surveys

Eight static monitoring locations were selected along the Proposed Development aiming to provide a representative species assemblage for the area. Locations were chosen using the results from the ground-based habitat assessments to determine areas with the most suitable habitat and roosting opportunities for bats. Song Meter 2 (SM2) and Song Meter 4 Bat (SM4) detectors were positioned in the predetermined locations along the Proposed Development. They were set to record from half an hour before sunset until half an hour after sunrise for a minimum of five consecutive nights, with two deployments between May and July to capture seasonal changes in behaviour and habitat use along the route. Both detector types were set to record in full spectrum (an audio recording that includes time, frequency and amplitude).

2.7.4 Bats: Dusk Emergence and Dawn Re-entry Surveys

Dusk emergence and dawn re-entry surveys were undertaken using handheld bat detectors on a selection of the trees that were identified as having potential to support roosting bats. The aim of these surveys was to confirm the presence or likely absence of roosting bats. Surveys were completed at 11 locations, with Location 1being the furthest south, Location 10 being the furthest north and Location 11 approximately in the middle. The survey locations are shown on Figure 10.6 in Volume 4 of this EIAR.

Trees were surveyed by experienced ecologists in teams of two or four surveyors depending on the number of trees to be surveyed. At least two surveyors were present at each location with four surveyors being at one location where there was a very long linear feature. Surveyors were positioned at potential roost access / egress point to identify any bats emerging from or returning to roost. Surveyors recorded bat activity using full spectrum SM4 bat detectors and made notes on bat activity including time of observation, bat behaviours and species recorded. Dusk emergence surveys commenced approximately 15 minutes before sunset and continued for approximately one and a half hours after sunset. Dawn re-entry surveys commenced 1.5 hours before sunrise and finished at 15 minutes after sunrise. Details of the dates, times and weather conditions for each survey are provided in Table 2.

Table 2: Details of Bat Emergence Surveys

Bat Survey Location	Date	Survey Type	Weather	Sunset Time	Survey Times
Location 1	23.05.2023	Dusk	11°C, light rain, light breeze, >50% cloud cover.	21:32	21:17 – 23:02
	19.06.2022	Dusk	18 °C, no rain, no wind, >10% cloud cover.	21:57	21:45 – 23:30
Location 2	22.05.2023	Dusk	15°C, no rain, light breeze, <50% cloud cover.	21:30	21:15-23:00
	19.06.2023	Dusk	14°C, no rain, light breeze, <30% cloud cover.	21:56	21:41 – 23:26
	03.07.2023	Dusk	11°C, light rain, light breeze, <80% cloud cover.	21:55	21:40-23:25
Location 3	23.05.2023	Dusk	11°C, light rain, light breeze, >50% cloud cover.	21:32	21:17 – 23:02
	20.06.2023	Dusk	13°C, no rain, light breeze, <30% cloud cover.	21:57	21:42-23:27
	04.07.2023	Dusk	8°C, no rain, no wind, >80% cloud cover.	21:55	21:40-23:25
Location 4	24.05.2023	Dusk	7°C, no rain, no wind, >50% cloud cover.	21:33	21:18 – 23:03
	20.06.2023	Dusk	13°C, no rain, light breeze, <30% cloud cover.	21:57	21:42-23:27
	05.07.2023	Dusk	9°C, light rain, moderate wind, >60% cloud cover.	21:54	21:39-23:24
Location 5	24.05.2023	Dusk	7°C, no rain, no wind, >50% cloud cover.	21:33	21:18 – 23:03
	21.06.2023	Dusk	12°C, no rain, light breeze, <10% cloud cover.	21:57	21:42-23:27
Location 6	25.05.2023	Dusk	8°C, no rain, strong breeze, 75% cloud cover.	21:34	21:19 – 23:04
	21.06.2023	Dusk	12°C, no rain, light breeze, <10% cloud cover.	21:57	21:42-23:27
	06.07.2023	Dusk	12°C, light to moderate rain, moderate wind, >80% cloud cover.	21:54	21:39-23:24
Location 7	22.05.2023	Dusk	11°C, light rain, light breeze, >50% cloud cover.	21:32	21:17 – 23:02
	22.06.2023	Dusk	10°C, no rain, light breeze, <20% cloud cover.	21:57	21:47-23:27
Location 8	25.05.2023	Dusk	8°C, no rain, strong breeze, 75% cloud cover.	21:34	21:19 – 23:04
	22.06.2023	Dusk	10°C, no rain, light breeze, <20% cloud cover.	21:57	21:47-23:27

2.7.5 Bats: Call Analysis

Bat call analysis was undertaken using Kaleidoscope software. Bat species identification was interpreted using known bat call parameters (Russ 2012) and existing literature on the ecology of Irish and UK bat species, including distribution, range, habitat associations and behavioural characteristics, in addition to professional judgement. Every attempt was made to identify bats to species level. However, bats in the genus *Myotis* have calls with peak frequencies which can overlap. Their calls cannot reliably be distinguished from each other without reference to specialist technology and expertise which was not readily available or deemed necessary for a robust assessment. Therefore, *Myotis* calls were not identified to species level and have been labelled Myotis *sp*. This limitation will not affect the assessment within this EIAR as impacts on all *Myotis* species are mitigated in the same way.

2.7.6 Bats: Static Detector Analysis

The data recorded on the static detectors was standardised as the average number of bat passes per night for each static deployment as an index of activity.

2.8 Fish and White-Clawed Crayfish: eDNA Sampling

Non-invasive environmental DNA (eDNA) surveys were used to detect the presence / probable absence of Atlantic salmon (*Salmo salar*), European Eel (*Anguila anguila*) and White clawed crayfish (*Austropotamobius pallipes*) from 14 watercourses within the study area as follows:

- WB03
- WB04
- WB05
- WB06
- WB07
- WB10
- WB11
- WB12
- WB13
- WB16
- WB19
- WB22
- WB23
- DD26

eDNA sampling provides a tool for surveying aquatic communities without the need to catch the animals themselves. It has been shown to be effective in a wide variety of aquatic ecosystems (ponds, lakes, streams, rivers, estuaries and oceans) and can be used either to detect the presence of particular species, or to survey whole communities of organisms. Samples were collected on 9 August 2023 and 10 August 2023 and sent to Nature Metrics for subsequent analysis. This sampling was undertaken inside the optimal survey period for these species which is taken to be April to October inclusive.

2.9 Birds

2.9.1 Wintering Birds

Wintering bird surveys were undertaken over two - three consecutive days each month during October, November and December 2022 and January, February, March, and April 2023. The survey area ('buffer') extended to 800m either side of the red line boundary. This survey buffer ensured that the disturbance distances of the wariest bird species likely to be encountered in the area was sufficiently covered.

In general, the approach was a 'look-see' methodology as per the Wetland Bird Survey (WeBS) core count methodology (Gilbert et al. 1998; Bibby et al., 2000). All birds present within the study area were identified with reference to Collins Bird Guide (Svensson 2009) to confirm identification (where necessary) and species were recorded using the BTO species codes. The total flock size of birds present, their general location within the site and any activity exhibited were also recorded. Surveys involved non-intrusive, visual recordings of

wintering birds with the aid of binoculars and a spotting telescope and recorded and mapped using a digital tablet. Surveys were undertaken during daylight hours and in weather conditions that were mostly favourable with good visibility. Following a comprehensive desk study and the initial site visit, a list of 'Target species' likely to occur at the site was compiled. The survey work carried out on the site was specifically designed to survey for these identified target species. The target species list was drawn from:

- Annex I of the Birds Directive;
- Special Conservation Interests (SCI) of Special Protection Areas (SPA) within the zone of likely significant effects;
- Red listed birds of Conservation Concern in Ireland; and
- Species with the potential to be impacted by this type of development.

All species within these categories were considered as target species for the purpose of these surveys.

Within the 800m buffer from the Proposed Development boundary, all wetland and water bodies were noted and assessed for their suitability to supporting wintering birds. Where the sites were deemed as suitable, they were visited each month during the surveys.

Following the initial scoping survey, unsuitable habitat (woodland, dense vegetation, steep fields etc.) and urban areas were assessed and discounted where necessary to allow a focus to be placed on suitable habitats for Target Species birds including agricultural grassland fields, arable fields, flooded land and wetlands. In addition, several wetland/waterbodies outside of the survey area were surveyed to check for the presence of Target Species potentially within commuting distance of the survey area. Monthly visits were timed to be at least three weeks apart. Surveys consisted of drive-overs with short stops at suitable vantage points. Surveys remained flexible allowing surveyors to react to conditions within the survey area, including notable observations of bird behaviour. Where vantage points were used, they were selected to provide the least obstructed view of the entire survey area. Two surveyors (one driving and one experienced ornithologist) drove along the available roads within the survey area while scanning for flocks of foraging waders and wildfowl. Upon observing waders and/or wildfowl, surveyors stopped in a safe location to record and map flock sizes and behaviour. Surveyors also stopped at locations that provided good views over wide areas of suitable habitat to observe for any birds which were not observed during the drive-by survey. Meteorological data was also recorded on each day of survey.

Bird data parameters recorded during surveys included the following:

- Surveyor;
- Date;
- Time;
- BTO code of recorded species;
- Common name of species;
- Number of individual recorded;
- Behaviour;
- Weather;
- Habitat; and
- Other notes.

Winter bird data survey results were captured and digitised onto a digital tablet using point, polyline, and polygon shapefiles. Survey dates are provided in Table 3.

Table 3: Wintering Bird Survey Dates and Surveyors

Survey Number	Survey Dates	Surveyors
1	24, 25 and 27 October 2022	EW/MH/LON
2	21, 22 and 24 November 2022	RW/LP
3	12, 13 and 15 December 2022	LP/LON/CK
4	23, 24 and 26 January 2023	RW/MH
5	20, 21 and 23 February 2023	EW/CK
6	20, 21 and 23 March 2023	SC, CK

2.9.2 Breeding Birds

Breeding bird surveys were conducted over three visits between March and June 2023 using a methodology adapted from the Breeding Bird Survey (Gilbert *et al.* 1998) combined with the Common Bird Census (CBS) survey methodology (Marchant, J.H. 1983). These survey methods target potential breeding territories of raptors, waterbirds and passerines of conservation concern (e.g. waders and red / amber-listed species). Other species of note were also recorded to assess the importance of the study area for breeding bird species. Seventeen transects routes were carried out on each visit. Transect routes were chosen to sample suitable breeding bird habitat representative of the habitat types present along and adjacent to the entire footprint of the Proposed Development and in surrounding areas predominantly within 250m of it. Transect routes occasionally went beyond 250m to include suitable habitats of interest or because transects along the Proposed Development were unsafe. Transects were distributed along the length of the Proposed Development. Transects were walked slowly in a manner allowing the surveyor to come within 50m of all habitat features. Bird species were identified by sight and sound, and general location and activity were recorded using the British Trust for Ornithology (BTO 2023) species and activity codes.

On 16 June 2023, a kingfisher survey was performed along the TOLKA_20 watercourses to be crossed were assessed for their suitability to support nesting kingfisher. Where possible, watercourses were walked for approximately 500m either side of river crossing or alternatively viewed for a short period from a pre-selected vantage point and signs of kingfisher / riparian bird species including burrow entrances were searched for.

Meteorological data was also recorded on each day of survey. The conservation status of the bird species was recorded as per:

- Birds of Conservation Concern in Ireland (BoCCI): Red List contains birds of high conservation concern; Amber List contains birds of medium conservation concern;
- Bird species listed on Annex I of Council Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds; and
- Special Conservation Interest (SCI) species of Special Protection Areas (SPAs) within the ZoI of the Proposed Development.

Bird data parameters recorded during surveys included the following:

- Surveyor;
- Date;
- Time;
- Transect no.;
- Map no.;
- BTO code of recorded species;
- Common name of species;
- Number of individual recorded;
- Gender;
- Behaviour / breeding evidence;

- Weather;
- Habitat; and
- Other notes.

Breeding bird data survey results were captured and recorded on sperate field maps and recording forms. Survey dates are provided in Table 4.

Table 4: Bird Survey Dates and Surveyors

Survey Number	Survey Dates	Surveyors	Transect No.	Survey Time
1	04/04/2023	LP, HC	T1	07:08 – 08:25
1	04/04/2023	LP, HC	T2	08:33 – 09:04
1	04/04/2023	LP, HC	T3	09:33 – 10:00
1	05/04/2023	LP, HC	T5	07:17 – 08:04
1	05/04/2023	LP, HC	T9	08:35 – 10:55
1	05/04/2023	LP, HC	T10	09:44 – 10:38
1	04/05/2023	LP, HC	T4	06:27 – 07:26
1	05/05/2023	LP, HC	T7	06:28 – 07:20
1	08/05/2023	LP, MH	T11	08:29 – 09:39
2	03/05/2023	LP, HC	T1	06:27 – 07:30
2	03/05/2023	LP, HC	T2	07:54 – 08:26
2	03/05/2023	LP, HC	T3	08:51 – 09:12
2	04/05/2023	LP, HC	T5	07:55 – 08:20
2	05/05/2023	LP, HC	T9	08:02 – 08:37
2	08/05/2023	LP, MH	T10	06:08 – 06:56
2	13/06/2023	LP, HC	T4	07:17 – 07:49
2	14/06/2023	LP HC	T7	06:14 – 06:50
2	15/06/2023	LP, HC	T11	08:50 – 09:36
3	12/06/2023	LP, HC	T1	08:05 – 08:47
3	12/06/2023	LP, HC	T2	07:13 – 07:47
3	12/06/2023	LP, HC	T3	06:15 – 06:52
3	13/06/2023	LP, HC	T5	06:33 – 06:58
3	14/06/2023	LP, HC	T9	07:26 – 07:50
3	15/06/2023	LP, HC	T10	06:27 – 07:03

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S.I. No. 477/2011 - European Communities (Birds and Natural Habitats) Regulations 2011.

East Meath - North Dublin Grid Upgrade Environmental Impact Assessment Report (EIAR): Volume 3

Appendix A10.3 – Watercourse Data

EirGrid

March 2024

Contents

Appendix A10.3 – Watercourse Data

1. Aquatic Habitats

Aquatic habitats such as drainage ditches and water body crossing points and a minimum distance along waterbodies of 100m to either side of crossing points were visually assessed for their suitability to support aquatic flora and fauna species. Condition of aquatic habitats including substrate make-up, flow rates and notable species were recorded. These surveys were carried out between January 2023 and August 2023.

1.1 Water Bodies Field Data

Table 1: Water Bodies Within and Adjacent to the Proposed Development

EIAR Naming Convention	Water Body Name	Approximate Chainage	Location NGR	XY Coordinates (ITM)	Lat and Long	WFD Status	Field Survey Visual Assessment	Ecological Sensitivity Category	Survey	eDNA Survey Notes	eDNA Results	Aquatic Invasives
WB01	TOLKA_020	1,250	N 94742 47221	694685, 747244	53.466729, -6.5739546	Moderate	Potential for eel. Trout (sub-optimal), brook lamprey (possible) and WCC. No spawning gravels. Associated ditch crosses road. Downstream section ditch runs to the left of the road. Overdeep, approx. 30cm wide and 5cm deep. Likely ephemeral. No outfall seen. No fish (salmon, trout) likely. No WCC likely. Upstream section more ditch like than downstream and less likely to host fish.	Local (Higher Value)	no eDNA surveys carried out	N/A	N/A	None
WB02	DUNBOYNE STREAM_010	2,175	N 94483 46404	694426 746427	53.459436, -6.5780991	Poor	Watercourse width about 1.5m overall with mixed flows and substrates and depths. Highly polluted. Mostly shaded over length and no macrophytes seen. Potential for invertebrates and WCC. Otter possible but unlikely due to pollution. Culvert/bridge apron unpassable for all fish.	Local (Higher Value)	no eDNA surveys carried out	N/A	N/A	None
DD01	Drainage ditch	3,610	N 94119 45154	694062, 745177	53.448273 --6.5839517	N/A	Located behind hedge, 1m wide, at least 15cm water depth, water very cloudy, bank 1m high, lined with hedgerow, full of organic matter and some kind of runoff, no flow, scum on the water surface, no ecological value.	Local (Higher Value)	no eDNA surveys carried out	N/A	N/A	None
DD02	Drainage ditch	4,900	N 95370 44885	695313, 744908	53.445631 --6.5652081	N/A	Dry ditch on south side of road: Overgrown, 0.5m wide, bank height 1m.	Local (Lower Value)	no eDNA surveys carried out	N/A	N/A	None
DD03	Drainage ditch	5,800	N 96003 44375	695946, 744398	53.440935 --6.5558387	N/A	Both sides of the road, low ecological value. Ponded, some amphibious potential, 1-3m wide, duckweed and algae covering entire surface.	Local (Higher Value)	no eDNA surveys carried out	N/A	N/A	None
DD04	Drainage ditch	6,925	N 97051 44032	696994, 744055	53.437662 --6.5401770	N/A	Ditch on north side of road, not possible to visually assess due to H&S considerations.	Local (Higher Value)	no eDNA surveys carried out	N/A	N/A	None
DD05	Drainage ditch	9,100	N 99022 43376	698964, 743399	53.431403 --6.5107316	N/A	Shallow, overgrown, shadowed by vegetation, dry, not possible not possible to visually assess due to H&S considerations.	Local (Lower Value)	no eDNA surveys carried out	N/A	N/A	None
WB03	DUNBOYNE STREAM_010	10,800	O 00537 42674	700479, 742698	53.424811, -6.4881675	Poor	Approx 3m wide, 0.5m deep but hard to see clearly from road, little overhanging vegetation moderate flow, culverted under roundabout. Description from slightly upstream: River: 3m wide, moderate flow, deep (can't see bottom), riparian vegetation: bramble, canary reed grass, Hawthorn, thistle, ash, nettles. Description from 170m upstream: no turbidity, 15% run, 5% riffle, 60% glide, 20% pool, bank Covered in vegetation, lined by treeline and hedgerow, mostly ivy and mosses on banks. Roots visible. Water cress present. Algae on rocks, mosses. Bank height 250cm, undercutting and erosion present, 20% silt, 5% sand, 10% gravel, 30% pebble, 15% cobble, 5% boulder, 15% overlying silt, channel width 550cm, wet width 500cm, >75% shading, gradient channel.	Local (Higher Value)	eDNA survey carried out	Sample taken 09.08.2023 Sample ID: CP1021WC3 Sample Location: 53.4269009, -6.4901190	Minnow, three-spined stickleback No WCC	None
WB04	TOLKA_020	11,640	O 01119 43261	701061, 743285	53.429973, -6.4792265	Moderate	Need access on other side of bypass to see all of it. Only surveyed north of bypass. 10cm water depth, 2.5m bank height, 2.5m channel width, 2m wet width, predominantly silt substrate composition with organic matter present, no turbidity, mainly glide and pool composition, heavily shaded by trees and scrub, no floodplain connectivity, minimal undercutting present, no erosion seen, ivy and tree roots visible. Adjacent to sheep grazing field. 10% run, 65% glide, 25% pool. 60% silt, 20% sand, 5% gravel, 15% overlying silt, >75% shading.	Local (Higher Value)	eDNA survey carried out	Sample taken 09.08.2023 Sample ID: CP1021WC4 Sample Location: 53.4308718, -6.4799618	Three-spined stickleback No WCC	None
WB05	TOLKA_020	12,550	O 01655 43968	701597, 743991	53.436221, -6.4709366	Moderate	Accessed from field to south of watercourse, not visible from rail carpark north of watercourse due to fencing. 50cm water depth, 2m bank height, 4.5m channel width, 4m wet width, predominantly silt substrate composition with some gravel, pebble, and organic matter present, some turbidity, mainly glide with some pools and runs, heavily shaded by trees and scrub in most parts but some open sections, no floodplain connectivity, undercutting present, no erosion seen, tree roots	Local (Higher Value)	eDNA survey carried out	Sample taken 09.08.2023 Sample ID: CP1021WC5 Sample Location:	Minnow, stone loach, three-spined stickleback, trout, lamprey spp. (river or brook)	None

EIAR Naming Convention	Water Body Name	Approximate Chainage	Location NGR	XY Coordinates (ITM)	Lat and Long	WFD Status	Field Survey Visual Assessment	Ecological Sensitivity Category	Survey	eDNA Survey Notes	eDNA Results	Aquatic Invasives
							visible. Adjacent to sheep grazing field, poaching by sheep evident. 500mm depth, turbidity present, 25% run, 55% glide, 20% pool, bank height 200cm, tree roots exposed, 50% silt, 5% sand, 10% gravel, 10% pebble, 5% cobble, 5% artificial, 15% overlying silt. 50-75% shading, straightened channel type. Low fish potential due to shading.			53.4367790, -6.4721073	No WCC	
DD06	Drainage ditch	14,070	O 02215 44644	702157, 744667	53.442185, -6.4622932	N/A	0.5-1m wide, water depth 5cm, bank height 3m, full of organic matter, orange-red tinge to water, ivy cover, sheltered by treeline and scrub, no flow, litter present, low ecological value.	Local (Higher Value)	no eDNA surveys carried out	N/A	N/A	None
DD07	Drainage ditch	14,360	O 02489 44598	702431, 744621	53.441719, -6.4581858	N/A	Dry. 1m wide, bank height 2m, overgrown by ivy, damp, organic matter, low ecological value.	Local (Lower Value)	no eDNA surveys carried out	N/A	N/A	None
DD08	Drainage ditch	14,425	O 02566 44599	702508, 744622	53.441713, -6.4570271	N/A	Watercourse flows south under road and into ditch on south side of road, 1m wide, moderate flow, bank height 1.5m high, covered by scrub further upstream, 5cm deep.	Local (Higher Value)	no eDNA surveys carried out	N/A	N/A	None
DD09	Drainage ditch	14,775	O 02922 44609	702864, 744632	53.441733, -6.4516678	N/A	On north side of road, 1m wide, bank height 3m, dry, overgrown. On south side of road: 1.5m wide, bank height 3m, 10cm water, slow flow, organic material in water, flowing west, overshadowed by vegetation, low ecological value.	Local (Higher Value)	no eDNA surveys carried out	N/A	N/A	None
DD10	Drainage ditch	14,950	O 03051 44509	702993, 744532	53.440810, -6.4497597	N/A	North side of road: 0.5m wide, organic matter, bank height 1m.	Local (Higher Value)	no eDNA surveys carried out	N/A	N/A	None
DD11	Drainage ditch	15,000	O 03114 44494	703056, 744517	53.440663, -6.4488168	N/A	North side of road: 40cm wide, 1m bank height, dry, overgrown, hedgerow and grassy verge, low ecological value.	Local (Lower Value)	no eDNA surveys carried out	N/A	N/A	None
DD12	Drainage ditch	15,000	O 03114 44494	703056, 744517	53.440663, -6.4488168	N/A	South side of road: 2m wide, 15cm deep, bank height 2m, overshadowed by vegetation, no flow, low - moderate ecological value.	Local (Higher Value)	no eDNA surveys carried out	N/A	N/A	None
DD13	Drainage ditch	15,125	O 03228 44468	703170, 744491	53.440404, -6.4471096	N/A	Dry. 0.5m wide, bank height 0.5m, overgrown.	Local (Lower Value)	no eDNA surveys carried out	N/A	N/A	None
DD14	Drainage ditch	15,490	O 03522 44671	703464, 744694	53.442173, -6.4426206	N/A	Dry. Approx 1m deep, 0.5m wide, filled with vegetation.	Local (Lower Value)	no eDNA surveys carried out	N/A	N/A	None
DD15	Drainage ditch	15,640	O 03609 44793	703551, 744816	53.443252, -6.4412715	N/A	0.5m wide, overgrown m bank height 0.5m, dry, low ecological value. Same on opposite side of road.	Local (Lower Value)	no eDNA surveys carried out	N/A	N/A	None
DD16	Drainage ditch	15,780	O 03677 44919	703619, 744942	53.444370, -6.4402070	N/A	Ditch runs behind hedgerow for most of this section of road but is present on the road side of the hedgerow in this mapped section. Completely dry, overgrown, grassy verge and hedgerow either side, 0.5m wide, 1m deep, low ecological value.	Local (Lower Value)	no eDNA surveys carried out	N/A	N/A	None
WB06	PINKEEN_010	16,100	O 03952 45039	703894, 745062	53.445394, -6.4360298	Moderate	Viewed from field to north of watercourse however view there obstructed by scrub, accessed via garden south of it. 25cm water depth, 2m bank height, 2m average channel width but widens up to approx. 5m at points, 1.7m average wet width, predominantly silt substrate composition with pebble as well as small amounts of sand, gravel, cobble, boulder, and organic matter present, no turbidity, mainly glide with some pools and runs, heavily shaded by trees, scrub and herbaceous vegetation but some open sections, no floodplain connectivity, minimal undercutting present, no erosion seen, tree and ivy roots visible. Landowner said river name came from "Pinkeen" fish being present in it previously. Pinkeens are small fish such as minnow and stickleback. 15% run, 65% glide, 20% pool. 55% silt, 5% sand, 5% gravel, 20% pebble, 5% cobble, 5% boulder, 5% overlying silt, 50-75% shading. BRP in cracks in bridge in garden.	Local (Higher Value)	eDNA survey carried out	Sample taken 09.08.2023 Sample ID: CP1021WC6 Sample Location: 53.4454301, -6.4359310	Three-spined stickleback, otter No WCC	None
DD17	Drainage ditch	16,225	O 04019 45043	703961, 745066	53.445417, -6.4350204	N/A	Damp, 0.5m wide, bank height 1.5m, overgrown, overshadowed by hedgerow in parts, low ecological value.	Local (Higher Value)	no eDNA surveys carried out	N/A	N/A	None
WB07	PINKEEN_010	16,350	O 04095 44965	704027, 745069	53.445431, -6.4340264	Moderate	Viewed from fields both north and south of crossing point Flowing south, 30cm water depth, 2.5m bank height, 3m channel width, 2.5m average wet width, predominantly silt substrate composition with some gravel, pebble, cobble and artificial substrate present too, organic matter present, no	Local (Higher Value)	eDNA survey carried out	Sample taken 09.08.2023 Sample ID: CP1021WC7	Three-spined stickleback No WCC	None

EIAR Naming Convention	Water Body Name	Approximate Chainage	Location NGR	XY Coordinates (ITM)	Lat and Long	WFD Status	Field Survey Visual Assessment	Ecological Sensitivity Category	Survey	eDNA Survey Notes	eDNA Results	Aquatic Invasives
							turbidity, mainly glide with a significant amount of pools and runs, heavily shaded by trees including conifer plantation, scrub and herbaceous vegetation with some aquatic vegetation present, no floodplain connectivity, slight undercutting present, no erosion seen, tree and ivy roots visible. Droppings, likely otter spraint, found on boulder within water so likely using this watercourse. See target note. 30% run, 5% riffle, 40% glide, 25% pool. 50% silt, 5% sand, 10% gravel, 10% pebble, 10% cobble, 5% artificial, 10% overlying silt. >75% shaded.			Sample Location: 53.4452923, -6.4339589		
DD18	Drainage ditch	16,550	O 04226 45056	704168, 745079	53.445492, -6.4319016	N/A	0.5m, bank height 2.5m, overgrown, dry, hedgerow on one side, grassy verge on other, low ecological value.	Local (Lower Value)	no eDNA surveys carried out	N/A	N/A	None
DD19	Drainage ditch	17,190	O 04847 44989	704789, 745012	53.444768, -6.4225803	N/A	Dry. Overgrown, shallow, hedgerow adjacent, low ecological value.	Local (Lower Value)	no eDNA surveys carried out	N/A	N/A	None
DD20	Drainage ditch	17,400	O 05003 45089	704945, 745112	53.445635, -6.4201998	N/A	Dry, 0.5m wide, 1m bank height, organic matter in ditch, hedgerow one side, grassy verge the other, low ecological value.	Local (Lower Value)	no eDNA surveys carried out	N/A	N/A	None
DD21	Drainage ditch	17,550	O 05084 45192	705026, 745215	53.446544, -6.4189467	N/A	0.5m wide, 0.5m bank height, overgrown, grassy verge on road side, hedgerow on other side, low ecological value.	Local (Lower Value)	no eDNA surveys carried out	N/A	N/A	None
DD22	Drainage ditch	17,610	O 05121 45242	705063, 745265	53.446986, -6.4183733	N/A	Ditch starts on south side of road, slightly damp, overgrown, 0.5m wide, bank height 0.5m, low ecological value. Ditch deepens slightly on north side of road, damp, overgrown, width 0.5m, bank height 0.5m, low ecological value.	Local (Lower Value)	no eDNA surveys carried out	N/A	N/A	None
WB08	WARD_020	17,750	O 05260 45264	705202, 745287	53.447156, -6.4162745	Moderate	Is crossing red route but not really a watercourse, more of a damp drainage ditch but may run into Ward River. Ditch running along an arable field, is up to 2m deep in places, but 0.5m deep elsewhere, water approx. 15cm deep at points but much shallower and dry in some sections, 0.5m wide, very overgrown with bramble and scrub, heavily shaded, grassy verge on one side and scrub/hedgerow/treeline on other side, low ecological potential, but some sections of ditch within field could potentially be used by amphibians, no spawn visible during visit.	Local (Higher Value)	eDNA survey carried out	Attempted to sample on 09.08.2023 but could not as vegetation was too overgrown to access water. Had amphibian breeding potential when initially surveyed in February 2023.	Could not sample, vegetation too overgrown	None
DD23	Drainage ditch	17,860	O 05350 45321	705292, 745344	53.447650, -6.4149013	N/A	0.5m wide, dry, heavily overgrown, hedgerow on one side, grassy verge on other, bank height 0.5m at deepest point, shallow dip on south side of road, also overgrown and dry. Low ecological value, no aquatic or amphibian potential.	Local (Lower Value)	no eDNA surveys carried out	N/A	N/A	None
WB09	WARD_010	18,200	O 05634 45422	305634, 245422	53.4485, -6.4106	Poor	Watercourse is mapped on EPA mapper but was not visible during field surveys. Likely culverted under road at this point. Further north of the crossing point seemed to be linked to ditch along field. Further south of crossing point it links up with Watercourse 9b which then flows towards Watercourse 10. Ditch north of crossing point completely filled with vegetation and dry, 1m wide, 2m bank height, lined by cut back hedgerow and bare ground, no flow, filled with organic matter and cuttings, no ecological value. Ditch south of crossing.	Local (Lower Value)	no eDNA surveys carried out	N/A	N/A	None
WB10	WARD_010	18,200	O 05653 45452	705594, 745475	53.448766, -6.4103043	Poor	Viewed from woodland north of crossing point 25cm water depth, 5m bank height, 3m channel width, 2.8m wet width, predominantly silt and pebble substrate composition with gravel and cobble substrate present too, some organic matter present, no turbidity, mainly glide with a significant amount of riffles and runs, moderate flow, heavily shaded by trees as within woodland, as well as scrub, no floodplain connectivity, undercutting present, low amounts of erosion seen, tree and ivy roots visible. 30% run, 25% riffle, 40% glide, 5% pool. 25% silt, 5% sand, 15% gravel, 25% pebble, 15% cobble, 5% artificial, 10% overlying silt. >75% shading Rhododendron recorded along watercourse. Bridge with BRP within watercourse	Local (Higher Value)	eDNA survey carried out	Sample taken 09.08.2023 Sample ID: CP1021WC9 Sample Location: 53.4490245, -6.4098697	Three-spined stickleback No WCC	None

EIAR Naming Convention	Water Body Name	Approximate Chainage	Location NGR	XY Coordinates (ITM)	Lat and Long	WFD Status	Field Survey Visual Assessment	Ecological Sensitivity Category	Survey	eDNA Survey Notes	eDNA Results	Aquatic Invasives
DD24	Drainage ditch	18,800	O 06234 45523	706176, 745546	53.449287, -6.4015319	N/A	Narrow road, lined with hedges and trees, ditch on one side, 0.5m wide, 0.5m bank height, approx. 5cm water depth, filled with hedge cuttings, some litter, algae, no flow, some amphibian breeding potential.	Local (Higher Value)	no eDNA surveys carried out	N/A	N/A	None
WB11	WARD_010	19,240	O 06599 45597	706541, 745620	53.449878, -6.3960147	Poor	Route moved so now crossing here. Very overgrown so poor visibility and access. Assessed upstream at another end of this field. See habitat assessment point upstream. More of a ditch here anyway. 2m wide, shaded, banks 2m high heavily vegetated see treeline and grassy bund, slow flow, sandy/silty substrate 70%, small cobbles 30% substrate, aquatic vegetation, water mint, meadow sweet and water cress. Otter commute and amphibian potential.	Local (Higher Value)	eDNA survey carried out	Sample taken 09.08.2023 Sample ID: CP1021WC10 Sample Location: 53.4500112, -6.3947424	Three-spined stickleback No WCC	None
WB12	WARD_020	20,450	O 07317 44650	707259, 744673	53.441226, -6.3855333	Moderate	Land access needed. Crossed by route 3 times in 350m. Water depth 10cm, no turbidity, 0% run, 0% riffle, 25% glide, 75% pool, 0% torrent, 0% cascade, 0% slack, bank lined by trees, scrub, herbaceous vegetation, ivy creeping in, quite bare. 200cm bank height, no floodplain connectivity, no undercutting, no erosion, roots present, overhanging vegetation present (trees, scrub), 50% silt, 10% sand, 10% gravel, 5% pebble, 25% overlying silt. Channel width 350cm, wet width 150cm, >75% shading.	Local (Higher Value)	eDNA survey carried out (where 11a/b/c meet)	Meeting point: Sample taken 10.08.2023 Sample ID: CP1021WC11 Location: 53.4415688, -6.3820998	Results of sample at meeting point: Three-spined stickleback No WCC	None
WB13	WARD_020	20,650	O 07378 44541	707320, 744564	53.440235, -6.3846528	Moderate	Low flow, 2-3m wide, sheltered by overhanging vegetation, no amphibian potential but moderate ecological potential (commuting otter potential). Depth 30-40cm.	Local (Higher Value)	eDNA survey carried out (2 samples - at 11b and where 11a/b/c meet)	Sample taken 10.08.2023 Sample ID: CP1021WC11b Sample Location: 53.4404226, -6.3846911 Meeting point: Sample taken 10.08.2023 Sample ID: CP1021WC11 Location: 53.4415688, -6.3820998	Three-spined stickleback No WCC Results of sample at meeting point: Three-spined stickleback No WCC	None
WB14	WARD_020	20,850	O 07489 44351	707431, 744374	53.438505, -6.3830477	Moderate	Assessed on both sides of route, not a watercourse, a ditch with no ecological value. North of route description: Dry ditch, mostly inaccessible due to dense hedgerow. 2.5m drop, littered with leaves and little veg. Entirely shaded, 1.5m wide. No flow, no ecological potential. South of route description: Not visible, approx. 1.5m high, 1m wide, likely dry, completely covered by vegetation, likely contains runoff from field, low ecological value.	Local (Lower Value)	eDNA survey carried out (where 11a/b/c meet)	Meeting point: Sample taken 10.08.2023 Sample ID: CP1021WC11 Location: 53.4415688, -6.3820998	Results of sample at meeting point: Three-spined stickleback No WCC	None
DD25	Drainage ditch	21,300	O 07758 44011	707700, 744034	53.435396, -6.3791174	N/A	Approx 2-3m height, slightly damp, wet depth approx. 5cm, 1m wide, overshadowed by hedgerow, no flow visible, dumping present, organic matter, low ecological potential. Contains watercress and greater willowherb, duckweed, water starwort. Potential to be amphibian breeding habitat.	Local (Higher Value)	eDNA survey carried out	Attempted to sample on 10.08.2023 but could not as vegetation was too overgrown to access water. Had amphibian breeding potential	Could not sample, vegetation too overgrown	None

EIAR Naming Convention	Water Body Name	Approximate Chainage	Location NGR	XY Coordinates (ITM)	Lat and Long	WFD Status	Field Survey Visual Assessment	Ecological Sensitivity Category	Survey	eDNA Survey Notes	eDNA Results	Aquatic Invasives
										when initially surveyed in April 2023.		
DD26	Drainage ditch	21,550	O 07977 43950	707919, 743973	53.434804, -6.3758440	N/A	2m wide, slow flow, bank height 1.5m on one side, 2.5m on the other, overshadowed by vegetation, ivy bank and scrub on banks, duckweed growing, low ecological potential, possible amphibian breeding site.	Local (Higher Value)	eDNA survey carried out	Sample taken 10.08.2023 Sample ID: CP1021D72 Sample Location: 53.4346970, -6.3757832	Three-spined stickleback No WCC	None
DD27	Drainage ditch	21,720	O 08141 43941	708083, 743964	53.434689, -6.3733803	N/A	Wet, bank height 4m, width 1m, no flow, covered by vegetation, no to low ecological value.	Local (Higher Value)	no eDNA surveys carried out	N/A	N/A	None
WB15	WARD_030	23,625	O 09528 44520	709469, 744543	53.439604, -6.3523162	Moderate	Accessed via field south of red route crossing point. Is a wet drainage ditch. Culverted under road so not visible where route meets it. Further into field some visibility but very overgrown and little water. Is a drainage ditch for adjacent fields. 2.5m deep, water shallow but unable to give depth, completely overshadowed by hedgerow, trees, scrub and grasses, no flow visible, low ecological value.	Local (Higher Value)	no eDNA surveys carried out	N/A	N/A	None
WB16	WARD_030	24,600	O 10245 45153	710186, 745176	53.445141, -6.3413086	Moderate	Route crosses here but watercourse is culverted under road at this section so no visibility here. Assessment carried out from section of watercourse in fields north of crossing point. 30cm water depth, 4m bank height, 4.5m channel width, 4m wet width, predominantly pebble, gravel and silt substrate present, no turbidity, mainly glide and runs, highly shaded by scrub, trees and grassy vegetation, no floodplain connectivity, low amount of undercutting present, no erosion seen, tree roots visible.	Local (Higher Value)	eDNA survey carried out	Sample taken 09.08.2023 Sample ID: CP1021WC13 Sample Location: 53.4490726, -6.3437609	Three-spined stickleback No WCC	None
WB17	WARD_030	24,750	O 10370 45217	710311, 745240	53.445689, -6.3394056	Moderate	Ditch running adjacent to field. Some flow out of outlet. 0.5m wide, 1m deep, 5cm water depth, vegetation within ditch, lined by grassy verge and recently cut hedgerow, dumping and organic matter present, low ecological value. Dries up further along. Cuts in under road where route runs through.	Local (Higher Value)	no eDNA surveys carried out	N/A	N/A	None
WB18	WARD_030	25,310	O 10840 45522	710781, 745545	53.448330, -6.3322269	Moderate	2m wide, 1m bank height, water depth 5-10cm, slow flow, covered by vegetation, organic matter present, low ecological value. Cuts under road and comes out other side, lined by sheet metal in parts.	Local (Higher Value)	no eDNA surveys carried out	N/A	N/A	None
DD28	Drainage ditch	25,775	O 11253 45682	711194, 745705	53.449680, -6.3259563	N/A	Ditches line road as well as hedgerows.	Local (Higher Value)	no eDNA surveys carried out	N/A	N/A	None
WB19	WARD_030	26,180	O 11650 45815	711591, 745838	53.450791, -6.3199355	Moderate	water depth 15cm, no turbidity, 25% run, 20% riffle, 35% glide, 20% pool, 5% cascade, bank composition: Trees and scrub mainly on north side. Mostly herbaceous to south, Brambles and hawthorn and other scrub species growing into it. Hair algae within anchored to ground. 200cm bank height, Minimal undercutting visible, likely more, some seen, erosion not visible but is possible, scrub roots visible, lots of overhanging vegetation (trees, scrub), 15% silt, 10% gravel, 35% pebble, 15% cobble, 10% boulder, 5% artificial, 10% overlying silt, 150cm channel and wet width, >75% shading, over deepened.	Local (Higher Value)	eDNA survey carried out	Sample taken 10.08.2023 Sample ID: CP1021WC16 Sample Location: 53.4508532, -6.3198829	Three-spined stickleback No WCC	None
DD29	Drainage ditch	26,925	O 12342 45762	712283, 745785	53.450168, -6.3095419	N/A	Ditches and hedgerows line road, narrow road and deep ditches. 0.5m wide, filled with vegetation, shaded by hedgerow, damp, no to low ecological potential.	Local (Higher Value)	no eDNA surveys carried out	N/A	N/A	None
DD30	Drainage ditch	27,460	O 12618 45377	712559, 745400	53.446651, -6.3055267	N/A	Ditches on either side of road. 0.5m wide, 1m deep, mainly dry, damp in places, lined by hedgerows and grassy verges. Vegetation growing within ditches, organic matter present, low ecological value. Draining adjacent fields.	Local (Lower Value)	no eDNA surveys carried out	N/A	N/A	None
WB20	WARD_030	28,350	O 13141 44724	713082, 744747	53.440674, -6.2978924	Moderate	No access due to DAA land. Watercourse running through fields, cuts under road. Flowing north, 1.5m wide, bank 2.5m	Local (Higher Value)	no eDNA surveys carried out	N/A	N/A	None

EIAR Naming Convention	Water Body Name	Approximate Chainage	Location NGR	XY Coordinates (ITM)	Lat and Long	WFD Status	Field Survey Visual Assessment	Ecological Sensitivity Category	Survey	eDNA Survey Notes	eDNA Results	Aquatic Invasives
							high, 15cm deep from our view, moderate flow, vegetation within water, lined by grassy bank and scrub, draining adjacent fields, low to moderate ecological potential. Continues on from across road after cutting under road. Cannot access. Flooded field adjacent to it.					
WB21	WARD_030	29,280	O 14066 44606	714007, 744629	53.439415, -6.2840201	Moderate	Heavily vegetated, low water level >5cm, overhanging vegetation, lined by scrub. 0.5m wide, 1m bank height. Could not access to survey thoroughly, no permission.	Local (Lower Value)	no eDNA surveys carried out	N/A	N/A	None
DD31	Drainage ditch	30,500	O 15276 44526	715217, 744549	53.438434, -6.2658477	N/A	Both sides of road, nearly dry, few wet patches, 40cm wide, grassy verge either side.	Local (Lower Value)	no eDNA surveys carried out	N/A	N/A	None
DD32	Drainage ditch	31,040	O 15747 44696	715688, 744719	53.439858, -6.2587003	N/A	both sides of road, >0.5m wide, vegetated banks.	Local (Higher Value)	no eDNA surveys carried out	N/A	N/A	None
WB22	SLUICE_010	31,780	O 16415 44423	716356, 744446	53.437259, -6.2487527	Poor	Surveyed downstream but not at crossing point (looks to be culverted under road). Downstream description: width 1m, depth >0.5m, slow current, moderate pollution (on golf course), Majority in woodland, shaded by vegetation, juvenile stickleback, fine gravel substrate so poor for spawning, approx. 50cm wet width, sand gravel pebble with small number of cobbles. Stepped at artificial pond so would impede fish movement. It was 80% silt, 5% overlying silt and 5% sand. 20% pool and 80% glide. It was 95% shaded with bramble, ash, hawthorn, winter heliotrope, nettle and male fern.	Local (Higher Value)	eDNA survey carried out	Sample taken 10.08.2023 Sample ID: CP1021WC23 Sample Location: 53.4376308, -6.2364498	European eel, three-spined stickleback No WCC	None
DD33	Drainage ditch	32,500	O 17094 44413	717035, 744436	53.437019, -6.2385431	N/A	South ditch definitely wet, north ditch couldn't be seen into, couldn't survey due to H&S, >0.5m wide, grassy verges, low ecological value.	Local (Higher Value)	no eDNA surveys carried out	N/A	N/A	None
DD34	Drainage ditch	35,150	O 19201 43400	719142, 743424	53.427449, -6.2072339	N/A	1m wide, low flow, overshadowed by vegetation, bank height 2m, low ecological value, water depth 15cm.	Local (Higher Value)	no eDNA surveys carried out	N/A	N/A	None
DD35	Drainage ditch	35,950	O 18860 42755	718801, 742779	53.421732, -6.2126050	N/A	Low fish potential. Low flow, 30cm depth, 2.5m wide, muddy substrate with occasional stones, manmade debris in there and dumped rubbish, some macrophytic growth. Some potential for small fish and potentially breeding habitat for amphibians.	Local (Higher Value)	eDNA survey carried out	Attempted to sample on 10.08.2023 but could not as access to land was not granted. Had amphibian breeding potential and some potential for small fish species when initially surveyed in June 2023.	Could not sample, no access	None
WB23	MAYNE_010	36,825	O 19003 42112	718944, 742136	53.415925, -6.2106973	Poor	Viewed from field to north of watercourse. 20cm water depth, 2.5m bank height, 2m average channel width, 1.75m average wet width, predominantly sand, silt and pebble substrate composition, no turbidity, mainly glide with some pools and runs, highly shaded by trees, scrub and herbaceous vegetation, no floodplain connectivity, undercutting present, slight erosion seen, roots visible. Winter heliotrope present on banks.	Local (Higher Value)	eDNA survey carried out	Sample taken 10.08.2023 Sample ID: CP1021WC24 Sample Location: 53.4156820, -6.2089129	No WCC	None

1.2 Photographs of Water Bodies Within Study Area

Table 2: Photographs of Water Bodies Within the Study Area (Descriptions of Each Waterbody is Provided in Table 1)

EIAR Naming Convention	Waterbody Name	
WB01	TOLKA_020	
WB02	DUNBOYNE STREAM_010	 

EIAR Naming Convention	Waterbody Name	
DD01	Drainage ditch	
DD02	Drainage ditch	

EIAR Naming Convention	Waterbody Name	
DD03	Drainage ditch	
DD04	Drainage ditch	Not available.
DD05	Drainage ditch	Not available.

EIAR Naming Convention	Waterbody Name	
WB03	DUNBOYNE STREAM_010	   

EIAR Naming Convention	Waterbody Name	
WB04	TOLKA_020	   

EIAR Naming Convention	Waterbody Name	
WB05	TOLKA_020	   

EIAR Naming Convention	Waterbody Name	
DD06	Drainage ditch	 
DD07	Drainage ditch	 

EIAR Naming Convention	Waterbody Name	
DD08	Drainage ditch	 
DD09	Drainage ditch	 

EIAR Naming Convention	Waterbody Name	
DD10	Drainage ditch	
DD11	Drainage ditch	

EIAR Naming Convention	Waterbody Name	
DD12	Drainage ditch	
DD13	Drainage ditch	
DD14	Drainage ditch	

EIAR Naming Convention	Waterbody Name	
DD15	Drainage ditch	  
DD16	Drainage ditch	

EIAR Naming Convention	Waterbody Name	
WB06	PINKEEN_010	  

EIAR Naming Convention	Waterbody Name	
DD17	Drainage ditch	
WB07	PINKEEN_010	

EIAR Naming Convention	Waterbody Name	
		 
DD18	Drainage ditch	 

EIAR Naming Convention	Waterbody Name	
DD19	Drainage ditch	
DD20	Drainage ditch	
DD21	Drainage ditch	

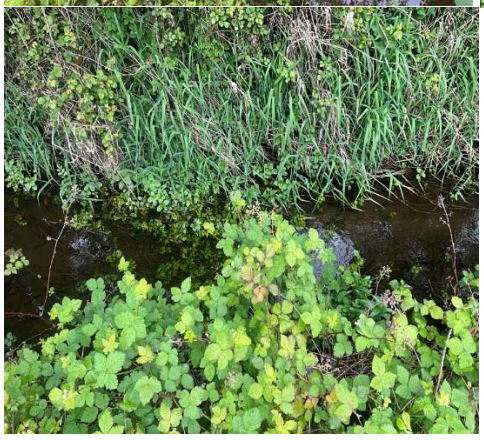
EIAR Naming Convention	Waterbody Name	
DD22	Drainage ditch	

EIAR Naming Convention	Waterbody Name	
WB08	WARD_020	   

EIAR Naming Convention	Waterbody Name	
DD23	Drainage ditch	  

EIAR Naming Convention	Waterbody Name	
WB09	WARD_010	
WB10	WARD_010	 

EIAR Naming Convention	Waterbody Name	
		  

EIAR Naming Convention	Waterbody Name	
DD24	Drainage ditch	 
WB11	WARD_010	   

EIAR Naming Convention	Waterbody Name	
WB12	WARD_020	  

EIAR Naming Convention	Waterbody Name	
WB13	WARD_020	 
WB14	WARD_020	
DD25	Drainage ditch	 

EIAR Naming Convention	Waterbody Name	
DD26	Drainage ditch	 
DD27	Drainage ditch	

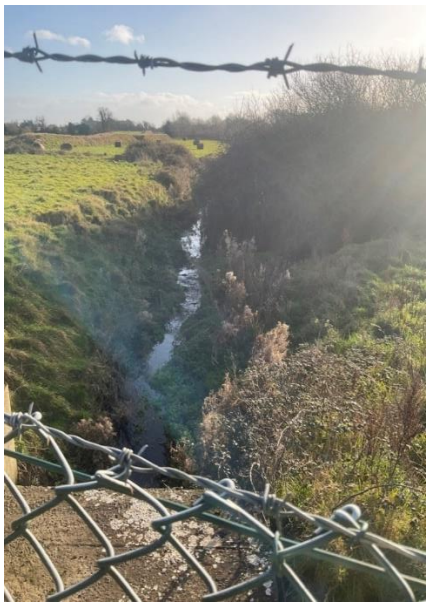
EIAR Naming Convention	Waterbody Name	
WB15	WARD_030	   

EIAR Naming Convention	Waterbody Name	
WB16	WARD_030	   

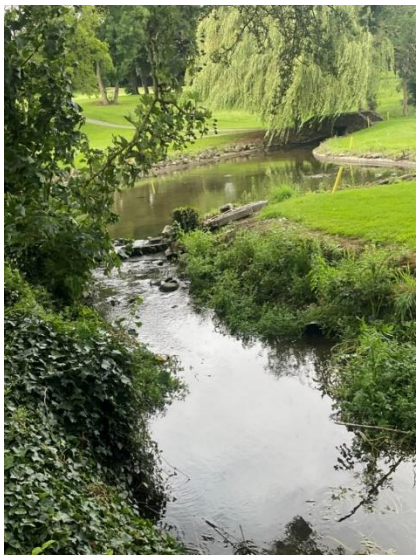
EIAR Naming Convention	Waterbody Name	
WB17	WARD_030	  
WB18	WARD_030	 

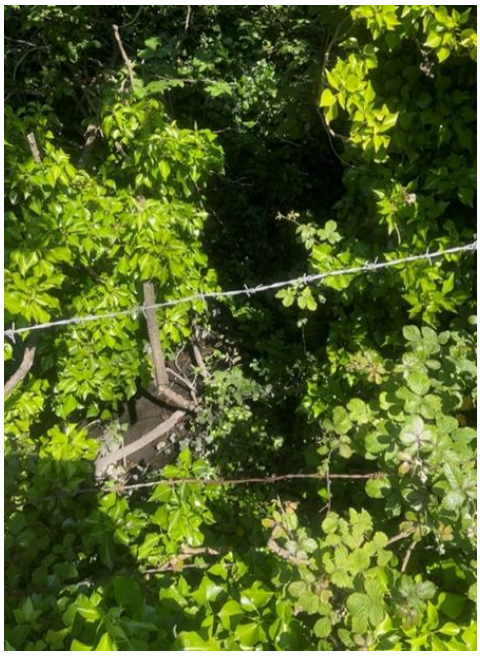
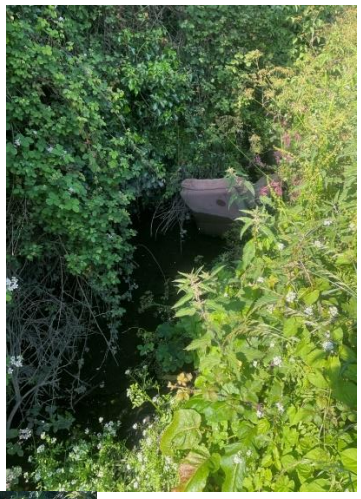
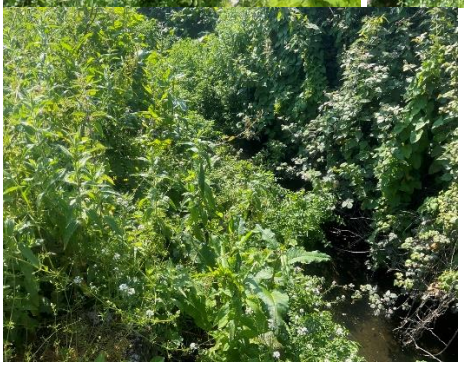
EIAR Naming Convention	Waterbody Name	
DD28	Drainage ditch	
WB19	WARD_030	   

EIAR Naming Convention	Waterbody Name	
DD29	Drainage ditch	 
DD30	Drainage ditch	  

EIAR Naming Convention	Waterbody Name	
WB20	WARD_030	 
WB21	WARD_030	
DD31	Drainage ditch	 

EIAR Naming Convention	Waterbody Name	
DD32	Drainage ditch	
WB22	SLUICE_010	 

EIAR Naming Convention	Waterbody Name	
		  
DD33	Drainage ditch	

EIAR Naming Convention	Waterbody Name	
DD34	Drainage ditch	 
DD35	Drainage ditch	  

EIAR Naming Convention	Waterbody Name	
WB23	MAYNE_010	   

1.3 eDNA Sample Results

Table 3: Results of the eDNA Sampling Surveys

Unique Sample ID	Date	Co-ordinates	EIAR Naming Convention (WC Spreadsheet)	Notes	eDNA Results
CP1021WC3	09/08/2023	53.4269009, -6.4901190	WB03	N/A	Minnow, three-spined stickleback, *Columbidae* (pigeon, dove spp.), red deer, brown rat
CP1021WC4	09/08/2023	53.4308718, -6.4799618	WB04	N/A	Three-spined stickleback, brown rat
CP1021WC5	09/08/2023	53.4367790, -6.4721073	WB05	N/A	Minnow, stone loach, three-spined stickleback, trout, *Columbidae* (pigeon, dove spp.), corvid spp., thrush spp. (blackbird, thrush, fieldfare), lamprey spp. (river or brook), brown rat
CP1021WC6	09/08/2023	53.4454301, -6.4359310	WB06	N/A	Three-spined stickleback, *Columbidae* (pigeon, dove spp.), otter, rabbit
CP1021WC7	09/08/2023	53.4452923, -6.4339589	WB07	N/A	Three-spined stickleback, *anatidae* (ducks, geese, swan spp.), thrush spp. (blackbird, thrush, fieldfare)
CP1021WC9	09/08/2023	53.4490245, -6.4098697	WB10	N/A	Three-spined stickleback
CP1021WC10	09/08/2023	53.4500112, -6.3947424	WB11	N/A	Three-spined stickleback
CP1021WC11	10/08/2023	53.4415688, -6.3820998	WB12/WB13/WB14	Not in watercourse spreadsheet, is point where 3 crossing points meet. Marked as watercourse 11 on mapper.	Three-spined stickleback, *Columbidae* (pigeon, dove spp.), moorhen, rabbit, brown rat
CP1021WC11b	10/08/2023	53.4404226, -6.3846911	WB13	One of the crossing points for watercourse 11	Three-spined stickleback, *Columbidae* (pigeon, dove spp.), corvid spp., robin, tit spp., warbler spp., wren, song thrush, thrush spp. (blackbird, thrush, fieldfare), brown rat

Unique Sample ID	Date	Co-ordinates	EIAR Naming Convention (WC Spreadsheet)	Notes	eDNA Results
CP1021WC13	09/08/2023	53.4490726, -6.3437609	WB16	N/A	Three-spined stickleback, blackcap, brown rat
CP1021WC16	10/08/2023	53.4508532, -6.3198829	WB19	N/A	Three-spined stickleback, *Columbidae* (pigeon, dove spp.)
CP1021WC23	10/08/2023	53.4376308, -6.2364498	WB22	N/A	European eel, three-spined stickleback, *anatidae* (ducks, geese, swan spp.), egret
CP1021WC24	10/08/2023	53.4156820, -6.2089129	WB23	N/A	*Columbidae* (pigeon, dove spp.)
CP1021D72	10/08/2023	53.4346970, -6.3757832	DD26	Is a ditch	Three-spined stickleback

East Meath - North Dublin Grid Upgrade Environmental Impact Assessment Report (EIAR): Volume 3

Appendix A11.1 Contaminated Land Assessment

EirGrid

March 2024

1.1 Preliminary Conceptual Site Model (CSM)

Table 1: Preliminary CSM

Source	Receptor	Pathway	Pollutant Linkage
Construction Phase			
Contaminants within soil and groundwater	Human health (construction workers)	Dermal contact, ingestion and inhalation of impacted soil, dust, fibres (asbestos) and waters.	PL1
		Migration of ground gases and vapours to shallow pits or enclosed spaces.	PL2
	Human health (adjacent residents / workers, transient foot traffic)	Dermal contact, ingestion and inhalation of windblown soil, dust, fibres (asbestos) during construction.	PL3
		Migration of ground gases into homes or workplaces via preferential pathways during construction.	PL4
	Groundwater	Leaching and migration of surface contaminants through natural deposits and made ground.	PL5
		Surface water runoff from stockpiled excavated material.	PL6
		Leaks and spills from site plant and materials storage.	PL7
		Discharge of intercepted contaminated groundwater during passive or active dewatering.	PL8
	Surface water, ecological receptors	Migration / mobilisation of contaminated shallow groundwater through drift deposits.	PL9
		Surface water runoff from stockpiled excavated material.	PL10
		Leaks and spills from site plant and materials storage.	PL11
		Discharge of intercepted contaminated groundwater during passive or active dewatering.	PL12
	Property	Direct contact with sub-surface materials including reduced quality made ground.	PL13
		Migration of ground gases into property through preferential pathways posing a potential explosion risk from ignition of explosive gases.	PL14
Operational Phase			
Contaminants within soil and groundwater	Human health (maintenance workers)	Dermal contact, ingestion and inhalation of soil, dust, fibres (asbestos) and waters during routine maintenance.	PL15
		Migration of ground gases and vapours to enclosed spaces.	PL16
	Human health (end users, adjacent residents, workers)	Dermal contact, ingestion and inhalation of windblown soil, dust, fibres (asbestos) from retained surface soils.	PL17
		Migration and accumulation of ground gases into homes or workplaces via preferential pathways created during construction.	PL18
	Groundwater	Leaching and migration of contaminants.	PL19
		Surface water runoff from placed excavated material.	PL20
		Migration of contaminated shallow groundwater through drainage channels and associated granular bedding materials.	PL21
		Discharge of intercepted contaminated groundwater.	PL22
		Leaks / spills from operational plant.	PL23
	Surface water, ecological receptors	Leaching and migration of contaminants.	PL24
		Surface water runoff from placed excavated material.	PL25
		Migration of contaminated shallow groundwater through drainage channels and associated granular bedding materials.	PL26
		Discharge of intercepted contaminated groundwater.	PL27
		Leaks / spills from operational plant.	PL28
	Property	Direct contact with sub-surface materials including made ground.	PL29
		Migration of ground gases into property through preferential pathways posing a potential explosion risk from ignition of explosive gases.	PL30

1.2 List of Sources and Screening Assessment

Table 2: List of Sources and Screening Assessment

Source No.	Source	Nearest Approximate Chainage	Distance from Planning Application Boundary (m)	Information and Assessment Summary	Severity	Construction Likelihood	Construction Risk	Operation Likelihood	Operation Risk
C01	Section 4 discharge	7,400	155m	Trade effluent discharge for Dunboyne Nursing home. At a distance from the Planning Application Boundary, unlikely to be disturbed by construction activities.	Mild	Unlikely	Negligible	Unlikely	Negligible
C02	Licensed Materials Recovery Facility	11,425	80m east	At distance from the Planning Application Boundary, potential for contamination. Not specifically targeted by ground investigation. Unlikely to be disturbed by construction.	Mild	Unlikely	Negligible	Unlikely	Negligible
C03Z	Historical Marl Pit	11,675	140m west	Small area at a distance from the Planning Application Boundary, unknown fill type. Potential for contamination. At a distance from the Planning Application Boundary unlikely to be disturbed by construction activities.	Mild	Unlikely	Negligible	Unlikely	Negligible
C04	Railway	12,950	Within Planning Application Boundary	Within Planning Application Boundary. . Potential for contamination.	Mild	Likely	Moderate / Low	Unlikely	Negligible
C05	Section 4 discharge	13,275	40m east	Trade effluent discharge license for Garden works Dunboyne. At a distance from the Planning Application Boundary, unlikely to be disturbed by construction.	Mild	Unlikely	Negligible	Unlikely	Negligible
C06	Historical Gravel Pit	18,150	175m south	At a distance from the Planning Application Boundary, unknown fill type. Potential for contamination within unknown fill. At a distance from the Planning Application Boundary unlikely	Mild	Unlikely	Negligible	Unlikely	Negligible

Source No.	Source	Nearest Approximate Chainage	Distance from Planning Application Boundary (m)	Information and Assessment Summary	Severity	Construction Likelihood	Construction Risk	Operation Likelihood	Operation Risk
				to be disturbed by construction activities.					
C07	Historical Gravel Pit	18,525	130m north	Unknown fill type. Potential for contamination within unknown fill. At a distance from the Planning Application Boundary unlikely to be disturbed by construction activities.	Mild	Unlikely	Negligible	Unlikely	Negligible
C08	Top Oil Kilbride Service Station	19,200	90m east of the Planning Application Boundary	Current potential contamination source with possibility of fuel leaks / spills. At a distance from the Planning Application Boundary, unlikely to be disturbed by construction.	Medium	Unlikely	Low	Unlikely	Negligible
C09	Section 4 discharge	19,350	100m east	Trade effluent discharge license for Kilbride National School. At a distance from the Planning Application Boundary, unlikely to be disturbed by construction.	Mild	Unlikely	Negligible	Unlikely	Negligible
C10	Historical Smithy	20,000	150m west	Small area 150m west of the Planning Application Boundary. Potential for contamination. However, unlikely to be disturbed by construction activities.	Mild	Unlikely	Negligible	Unlikely	Negligible
C11	Historical Quarry	22,050	Within planning application boundary	Small area within Planning Application Boundary. Potentially infilled with unknown fill type.	Mild	Likely	Moderate / Low	Unlikely	Negligible
C12	Industrial Depot	22,600	10m south of the Planning Application Boundary	Industrial depot. Unlikely to be disturbed by construction activities.	Mild	unlikely	Negligible	Unlikely	Negligible
C13	Historical Quarry	23,100	200m east of Planning Application Boundary	Small area 200m east of the Planning Application Boundary, potentially infilled with unknown fill type. However,	Mild	Unlikely	Negligible	Unlikely	Negligible

Source No.	Source	Nearest Approximate Chainage	Distance from Planning Application Boundary (m)	Information and Assessment Summary	Severity	Construction Likelihood	Construction Risk	Operation Likelihood	Operation Risk
				unlikely to be disturbed by construction activities.					
C14	Graveyard	23,950	10m west of the Planning Application Boundary	The ward graveyard. Moderate area, potential for emissions to groundwater from decomposition. Close to Planning Application Boundary, unlikely to be disturbed by or interact with construction activities.	Mild	Low Likelihood	Low	Unlikely	Negligible
C15	Historical quarry	24,050	15m east of the Planning Application Boundary	Small area 15m south of the Planning Application Boundary, potentially infilled with unknown fill type. However, unlikely to be disturbed by construction activities.	Mild	Low likelihood	Low	Unlikely	Negligible
C16	Section 4 Discharge	25,400	110m north	Trade effluent discharge license for New Park Nursing Home. At a distance from the Planning Application Boundary, unlikely to be disturbed by construction activities.	Mild	Unlikely	Negligible	Unlikely	Negligible
C17	Historical Gravel Pit	25,450	111m south of the Planning Application Boundary	At a distance from the Planning Application Boundary, unknown fill type. Potential for contamination within unknown fill. At a distance from the Planning Application Boundary unlikely to be disturbed by construction activities.	Mild	Unlikely	Negligible	Unlikely	Negligible
C18	Car mechanic	25,500	10m south of the Planning Application Boundary	Car mechanic works. Unlikely to be disturbed by construction activities.	Mild	Unlikely	Negligible	Unlikely	Negligible
C19	Historical quarry	25,700	60m north-east of the Planning Application Boundary	Small area 65m northeast of the Planning Application Boundary, potentially infilled with unknown fill	Mild	Unlikely	Negligible	Unlikely	Negligible

Source No.	Source	Nearest Approximate Chainage	Distance from Planning Application Boundary (m)	Information and Assessment Summary	Severity	Construction Likelihood	Construction Risk	Operation Likelihood	Operation Risk
				type. However, unlikely to be disturbed by construction activities.					
C20	Historical graveyard	26,850	Adjacent to Planning Application Boundary	Moderate area, potential for emissions to groundwater from decomposition. Close to the Planning Application Boundary, however, unlikely to be disturbed by or interact with construction activities.	Mild	Low likelihood	Low	Unlikely	Negligible
C21	Historical sandpit	26,950	90m north of the Planning Application Boundary	Moderate area, unknown fill type. Potential for contamination within unknown fill. At a distance from the Planning Application Boundary unlikely to be disturbed by construction activities.	Mild	Low likelihood	Low	Unlikely	Negligible
C22	Historical quarry	29,700	225m north-west of the Planning Application Boundary	Small area 225m north-west of the Planning Application Boundary, potential for contamination with unknown fill type.	Mild	Unlikely	Negligible	Unlikely	Negligible
C23	Historical quarry	30,600	250m north-west to the Planning Application Boundary	Small area 185m north-west of the Planning Application Boundary, potentially infilled with unknown fill type. However, unlikely to be disturbed by construction activities.	Mild	Unlikely	Negligible	Unlikely	Negligible
C24	Airport Lands	30,800 – 33,200	25m south of the Planning Application Boundary	Moderate to extensive area. Airport lands represent a potential source for fuels and Per- and Polyfluorinated Substances (PFAS) contamination.	Medium	Low Likelihood	Moderate / Low	Unlikely	Negligible
C25	Historical quarry	30,800	145m north-west to the Planning Application Boundary	Small area 200m northwest of the Planning Application Boundary, potentially infilled with unknown fill type, However, unlikely to be disturbed by construction activities.	Mild	Unlikely	Negligible	Unlikely	Negligible

Source No.	Source	Nearest Approximate Chainage	Distance from Planning Application Boundary (m)	Information and Assessment Summary	Severity	Construction Likelihood	Construction Risk	Operation Likelihood	Operation Risk
C26	Historical quarry	30,825	240 north -west	Small area 240m north-west of the Planning Application Boundary, potentially infilled with unknown fill type. However, unlikely to be disturbed by construction activities.	Mild	Unlikely	Negligible	Unlikely	Negligible
C27	Historical Quarry	30,900	150m north	Small area 150m north of the Planning Application Boundary, potentially infilled with unknown fill type. However, unlikely to be disturbed by construction activities.	Mild	Unlikely	Negligible	Unlikely	Negligible
C28	Historical Smithy	33,350	5m north	Small area 150m north of the Planning Application Boundary, potentially infilled with unknown fill type. However, unlikely to be disturbed by construction activities.	Mild	Unlikely	Negligible	Unlikely	Negligible
C29	IPC license	33,400	100m north of the Planning Application Boundary	Integrated Pollution Control (IPC) Licence for Anglo Beef Processors. Meat processing site, unlikely to interact with construction activities given distance from route.	Mild	Unlikely	Negligible	Unlikely	Negligible
C30	Historical Lead mine	33,400	80m south of the Planning Application Boundary	Small area 80m south of the Planning Application Boundary, potentially infilled with unknown fill type. However, unlikely to be disturbed by construction activities.	Medium	Unlikely	Low	Unlikely	Negligible
C31	Limepark	33,400	50m south of the Planning Application Boundary	Small area 50m south of the Planning Application Boundary, potentially infilled within unknown fill type. However, unlikely to be disturbed by construction activities.	Mild	Unlikely	Negligible	Unlikely	Negligible
C32	Unlicensed Landfill	37,200	245m south of the Planning Application Boundary	Unlicensed landfill 245m south of the Planning Application Boundary. Infilled with unknown fill type. However, unlikely to be disturbed by construction activities	Mild	Unlikely	Low	Unlikely	Negligible

1.3 Updated CSM

Note: Hydrogeological and hydrological risks are assessed separately.

Table 3: Updated CSM

Source	Receptor	Pathway	Pollutant Linkage (PL)	Severity	Likelihood	Risk
Construction Phase						
Contaminants within soil and groundwater	Human health (construction workers)	Dermal contact, ingestion and inhalation of impacted soil, dust, fibres (asbestos) and waters.	PL1	**Medium** Potential sources of contaminated land identified including made ground, a graveyard within 10m from the Planning Application Boundary, a historical quarry within the Planning Application Boundary and a historical lead mine c. 80m south of the Planning Application Boundary. Ground investigation has generally indicated no elevated levels of contaminants are present at locations investigated; however, asbestos identified in made ground at one location.	**Likely** Any made ground and ground in the vicinity of these source areas will be excavated during construction. Construction workers will come into direct contact with excavated material.	Moderate
		Migration of ground gases and vapours to shallow pits or enclosed spaces.	PL2	**Medium** Ground gas may be generated by areas of infill in former quarries and natural superficial deposits with high organic content. No gas monitoring results available at time of reporting and potential for generation exists.	**Low Likelihood** Construction will involve excavation of pits and trenches. In some areas gas may be present and could build up to potentially hazardous concentrations, into which construction workers will enter.	Moderate / Low
	Human health (adjacent residents / workers, transient foot traffic)	Dermal contact, ingestion and inhalation of windblown soil, dust, fibres (asbestos) during construction.	PL3	**Medium** Potential sources of contaminated land identified including made ground, a graveyard within 10m from the Planning Application Boundary, a historical quarry within the Planning Application Boundary and a historical lead mine c. 80m south of the Planning Application Boundary. Ground investigation has generally indicated no elevated levels of contaminants are present at locations investigated. However, asbestos identified in made ground at one location.	**Low Likelihood** While areas of made ground will be subject to excavation / disturbance where they intersect the proposed route, receptors (i.e., local residents, workers and transient foot traffic) are not present in much of the study area given the agricultural land use.	Moderate / Low
		Migration of ground gases into homes or workplaces via	PL4	**Medium**	**Low Likelihood**	Moderate / Low

Source	Receptor	Pathway	Pollutant Linkage (PL)	Severity	Likelihood	Risk
		preferential pathways during construction.		Ground gas may be generated by areas of infill in former quarries and natural superficial deposits with high organic content. No gas monitoring results available at time of reporting and potential for generation exists.	While the majority of the study area comprises farmland with no receptors a potentially complete pollutant linkage could be present where a building is present in more built-up areas of the route near an area of higher gas potential where construction could alter gas migration dynamics.	
	Property	Direct contact with sub-surface materials including made ground.	PL13	**Mild** Chemical attack / aggressive ground conditions resulting in damage and degradations to sub surface structures.	**Likely** Direct contact of construction materials with sub-surface likely.	Moderate / Low
		Migration of ground gases into property through preferential pathways posing a potential explosion risk from ignition of explosive gases.	PL14	**Mild** Ground gas may be generated by areas of infill in former quarries and natural superficial deposits with high organic content. No gas monitoring results available at time of reporting and potential for generation exists.	**Unlikely** Study Area is mainly agricultural with few receptors (buildings) present, and considering shallow depths of excavation, off site locations are not considered likely to be affected by off-site migration.	Negligible
Operational Phase						
Contaminants within soil and groundwater	Human health (Maintenance workers)	Dermal contact, ingestion and inhalation of impacted soil, dust, fibres (asbestos) and waters.	PL15	**Medium** Potential sources of contaminated land identified including made ground, a graveyard within 10m from the Planning Application Boundary, a historical quarry within the Planning Application Boundary and a historical lead mine c. 80m south of the Planning Application Boundary. Ground investigation has generally indicated no elevated levels of contaminants are present at locations investigated; however, asbestos identified in made ground at one location.	**Unlikely** Exposure to sub-surface materials will be limited post-construction. Maintenance workers may access service runs however unlikely to come into contact with soils.	Low
		Migration of ground gases and vapours to shallow pits or enclosed spaces.	PL16	**Medium** Ground gas may be generated by areas of infill in former quarries and natural superficial deposits with high organic content. No gas monitoring results available at time of reporting and potential for generation exists.	**Low Likelihood** There is the potential for the buildup of ground gas within enclosed spaces such as service runs and inspection chambers. However access to such spaces is not likely to be required often.	Moderate / Low

Source	Receptor	Pathway	Pollutant Linkage (PL)	Severity	Likelihood	Risk
	Human health (adjacent residents / transient foot traffic)	Dermal contact, ingestion and inhalation of windblown soil, dust, fibres (asbestos) during operation.	PL17	**Medium** Potential sources of contaminated land identified including made ground, a graveyard within 10m from the Planning Application Boundary, a historical quarry within the Planning Application Boundary and a historical lead mine c. 80m south of the Planning Application Boundary. Ground investigation has generally indicated no elevated levels of contaminants are present at locations investigated. However, asbestos identified in made ground at one location.	**Unlikely** Post construction little contact will be possible with sub-surface by nearby site users, and windblown dust will be minimal once construction is complete.	Low
		Migration of ground gases into homes or workplaces via preferential pathways during operation.	PL18	**Medium** Ground gas may be generated by areas of infill in former quarries and natural superficial deposits with high organic content. No gas monitoring results available at time of reporting and potential for generation exists.	**Unlikely** While contaminated land sources have been identified in some locations the majority of the Study Area comprises of farmland. Alterations to gas migration dynamics are unlikely on completion of construction.	Low
	Property	Direct contact with sub-surface materials including made ground.	PL29	**Mild** Chemical attack / aggressive ground conditions resulting in damage and degradation to sub surface structures.	**Unlikely** Risks addressed at construction stage.	Negligible
		Migration of ground gases into property through preferential pathways posing a potential explosion risk from ignition of explosive gases.	PL30	**Mild** Ground gas may be generated by areas of infill in former quarries and natural superficial deposits with high organic content. No gas monitoring results available at time of reporting and potential for generation exists.	**Unlikely** Study Area is mainly agricultural with few receptors (buildings) present, and considering shallow depths of excavation, off site locations are not considered likely to be affected by off-site migration from works.	Negligible

East Meath - North Dublin Grid Upgrade Environmental Impact Assessment Report (EIAR): Volume 3

Appendix A11.2 - Ground Investigation Environmental Laboratory Certificates

EirGrid

March 2024

Certificate of Analysis

Certificate Number	23-18274	*Issued:*	17-Aug-23

Client Causeway Geotech
Unit 1 Fingal House
Stephenstown Industrial Estate
Balbriggan
Co. Dublin
K32 VR66

Our Reference	23-18274
Client Reference	23-0361
Order No	(not supplied)
Contract Title	EAST MEATH NORTH DUBLIN GRID UPGRADE
Description	1 Soil sample, 1 Leachate sample.
Date Received	01-Aug-23
Date Started	01-Aug-23
Date Completed	17-Aug-23
Test Procedures	Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Kirk Bridgewood
General Manager

2139

Summary of Chemical Analysis
Soil Samples

Our Ref 23-18274
Client Ref 23-0361
Contract Title EAST MEATH NORTH DUBLIN GRID UPGRADE

Lab No	2211687
.Sample ID	BHA25
Depth	0.50
Other ID	1
Sample Type	ES
Sampling Date	25/07/2023
Sampling Time	n/s

Test	Method	LOD	Units	
Metals				
Arsenic	DETSC 2301#	0.2	mg/kg	15
Boron, Water Soluble (2.5:1)	DETSC 2311#	0.2	mg/kg	< 0.2
Cadmium	DETSC 2301#	0.1	mg/kg	1.2
Chromium	DETSC 2301#	0.15	mg/kg	13
Copper	DETSC 2301#	0.2	mg/kg	29
Lead	DETSC 2301#	0.3	mg/kg	31
Mercury	DETSC 2325#	0.05	mg/kg	0.06
Nickel	DETSC 2301#	1	mg/kg	30
Zinc	DETSC 2301#	1	mg/kg	83
Inorganics				
pH	DETSC 2008#		pH	8.3
Cyanide, Total	DETSC 2130#	0.1	mg/kg	< 0.1
Organic matter	DETSC 2002#	0.1	%	1.3
Sulphate Aqueous Extract as SO4 (2:1)	DETSC 2076#	10	mg/l	99
Petroleum Hydrocarbons				
Aliphatic C5-C6: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01
Aliphatic C6-C8: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01
Aliphatic C8-C10: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01
Aliphatic C10-C12: EH_CU_1D_AL	DETSC 3072#	1.5	mg/kg	< 1.5
Aliphatic C12-C16: EH_CU_1D_AL	DETSC 3072#	1.2	mg/kg	< 1.2
Aliphatic C16-C21: EH_CU_1D_AL	DETSC 3072#	1.5	mg/kg	< 1.5
Aliphatic C21-C35: EH_CU_1D_AL	DETSC 3072#	3.4	mg/kg	< 3.4
Aliphatic C5-C35: EH_CU+HS_1D_AL	DETSC 3072*	10	mg/kg	< 10
Aromatic C5-C7: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01
Aromatic C7-C8: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01
Aromatic C8-C10: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01
Aromatic C10-C12: EH_CU_1D_AR	DETSC 3072#	0.9	mg/kg	< 0.9
Aromatic C12-C16: EH_CU_1D_AR	DETSC 3072#	0.5	mg/kg	< 0.5
Aromatic C16-C21: EH_CU_1D_AR	DETSC 3072#	0.6	mg/kg	< 0.6
Aromatic C21-C35: EH_CU_1D_AR	DETSC 3072#	1.4	mg/kg	< 1.4
Aromatic C5-C35: EH_CU+HS_1D_AR	DETSC 3072*	10	mg/kg	< 10
TPH Ali/Aro Total C5-C35: EH_CU+HS_1D_Total	DETSC 3072*	10	mg/kg	< 10
Benzene	DETSC 3321#	0.01	mg/kg	< 0.01
Ethylbenzene	DETSC 3321#	0.01	mg/kg	< 0.01
Toluene	DETSC 3321#	0.01	mg/kg	< 0.01
Xylene	DETSC 3321#	0.01	mg/kg	< 0.01
PAHs				
Naphthalene	DETSC 3301	0.1	mg/kg	< 0.1
Acenaphthylene	DETSC 3301	0.1	mg/kg	< 0.1
Acenaphthene	DETSC 3301	0.1	mg/kg	< 0.1

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 23-18274
Client Ref 23-0361
Contract Title EAST MEATH NORTH DUBLIN GRID UPGRADE

Lab No	2211687
.Sample ID	BHA25
Depth	0.50
Other ID	1
Sample Type	ES
Sampling Date	25/07/2023
Sampling Time	n/s

Test	Method	LOD	Units	
Fluorene	DETSC 3301	0.1	mg/kg	< 0.1
Phenanthrene	DETSC 3301	0.1	mg/kg	< 0.1
Anthracene	DETSC 3301	0.1	mg/kg	< 0.1
Fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1
Pyrene	DETSC 3301	0.1	mg/kg	< 0.1
Benzo(a)anthracene	DETSC 3301	0.1	mg/kg	< 0.1
Chrysene	DETSC 3301	0.1	mg/kg	< 0.1
Benzo(b)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1
Benzo(k)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1
Benzo(a)pyrene	DETSC 3301	0.1	mg/kg	< 0.1
Indeno(1,2,3-c,d)pyrene	DETSC 3301	0.1	mg/kg	< 0.1
Dibenzo(a,h)anthracene	DETSC 3301	0.1	mg/kg	< 0.1
Benzo(g,h,i)perylene	DETSC 3301	0.1	mg/kg	< 0.1
Coronene	DETSC 3301*	0.1	mg/kg	< 0.1
PAH 16 Total	DETSC 3301	1.6	mg/kg	< 1.6
Phenols				
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3
VOCs				
Vinyl Chloride	DETSC 3431	0.01	mg/kg	< 0.01
1,1 Dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
Trans-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
1,1-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Cis-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
2,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
Bromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01
Chloroform	DETSC 3431	0.01	mg/kg	< 0.01
1,1,1-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
1,1-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01
Carbon tetrachloride	DETSC 3431	0.01	mg/kg	< 0.01
Benzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Trichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
Dibromomethane	DETSC 3431	0.01	mg/kg	< 0.01
Bromodichloromethane	DETSC 3431	0.01	mg/kg	< 0.01
cis-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01
Toluene	DETSC 3431	0.01	mg/kg	< 0.01
trans-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01
1,1,2-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Tetrachloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
1,3-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
Dibromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 23-18274
Client Ref 23-0361
Contract Title EAST MEATH NORTH DUBLIN GRID UPGRADE

Lab No	2211687
.Sample ID	BHA25
Depth	0.50
Other ID	1
Sample Type	ES
Sampling Date	25/07/2023
Sampling Time	n/s

Test	Method	LOD	Units	
1,2-dibromoethane	DETSC 3431	0.01	mg/kg	< 0.01
Chlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,1,1,2-tetrachloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Ethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
m+p-Xylene	DETSC 3431	0.01	mg/kg	< 0.01
o-Xylene	DETSC 3431	0.01	mg/kg	< 0.01
Styrene	DETSC 3431*	0.01	mg/kg	< 0.01
Bromoform	DETSC 3431	0.01	mg/kg	< 0.01
Isopropylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
Bromobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2,3-trichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
n-propylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
2-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01
1,3,5-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
4-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01
Tert-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2,4-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
sec-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
p-isopropyltoluene	DETSC 3431	0.01	mg/kg	< 0.01
1,3-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,4-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
n-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dibromo-3-chloropropane	DETSC 3431	0.01	mg/kg	< 0.01
1,2,4-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
Hexachlorobutadiene	DETSC 3431	0.01	mg/kg	< 0.01
1,2,3-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
MTBE	DETSC 3431*	0.01	mg/kg	< 0.01

WASTE ACCEPTANCE CRITERIA TESTING ANALYTICAL REPORT

Our Ref 23-18274
Client Ref 23-0361
Contract Title EAST MEATH NORTH DUBLIN GRID UPGRADE
Sample Id BHA25 1 0.50
Sample Numbers 2211687 2211688
Date Analysed 17/08/2023

Test Results On Waste

Determinand and Method Reference	Units	Result	WAC Limit Values Inert Waste	SNRHW	Hazardous Waste
DETSC 2084# Total Organic Carbon	%	1.2	3	5	6
DETSC 2003# Loss On Ignition	%	1.7	n/a	n/a	10
DETSC 3321# BTEX	mg/kg	< 0.04	6	n/a	n/a
DETSC 3401# PCBs (7 congeners)	mg/kg	< 0.01	1	n/a	n/a
DETSC 3311# EPH (C10 - C40): EH_1D_Total	mg/kg	< 10	500	n/a	n/a
DETSC 3301 PAHs	mg/kg	< 1.6	100	n/a	n/a
DETSC 2008# pH	pH Units	8.3	n/a	>6	n/a
DETSC 2073* Acid Neutralisation Capacity (pH4)	mol/kg	< 1.0	n/a	TBE	TBE
DETSC 2073* Acid Neutralisation Capacity (pH7)	mol/kg	< 1.0	n/a	TBE	TBE

Test Results On Leachate

Determinand and Method Reference	Conc in Eluate ug/l 10:1	Amount Leached* mg/kg LS10	WAC Limit Values (Limit values for LS10 Leachate) Inert Waste	SNRHW	Hazardous Waste
DETSC 2306 Arsenic as As	0.28	< 0.01	0.5	2	25
DETSC 2306 Barium as Ba	7.1	< 0.1	20	100	300
DETSC 2306 Cadmium as Cd	< 0.030	< 0.02	0.04	1	5
DETSC 2306 Chromium as Cr	< 0.25	< 0.1	0.5	10	70
DETSC 2306 Copper as Cu	0.95	< 0.02	2	50	100
DETSC 2306 Mercury as Hg	< 0.010	< 0.002	0.01	0.2	2
DETSC 2306 Molybdenum as Mo	1.7	< 0.1	0.5	10	30
DETSC 2306 Nickel as Ni	< 0.50	< 0.1	0.4	10	40
DETSC 2306 Lead as Pb	< 0.090	< 0.05	0.5	10	50
DETSC 2306 Antimony as Sb	< 0.17	< 0.05	0.06	0.7	5
DETSC 2306 Selenium as Se	1.2	< 0.03	0.1	0.5	7
DETSC 2306 Zinc as Zn	< 1.3	< 0.01	4	50	200
DETSC 2055 Chloride as Cl	1000	< 100	800	15,000	25,000
DETSC 2055* Fluoride as F	250	2.5	10	150	500
DETSC 2055 Sulphate as SO4	22000	220	1000	20,000	50,000
DETSC 2009* Total Dissolved Solids	68000	680	4000	60,000	100,000
DETSC 2130 Phenol Index	< 100	< 1	1	n/a	n/a
DETSC 2085 Dissolved Organic Carbon	< 2000	< 50	500	800	1000

TBE - To Be Evaluated
SNRHW - Stable Non-Reactive Hazardous Waste

Additional Information

DETSC 2008 pH	6.9
DETSC 2009 Conductivity uS/cm	97.8
* Temperature*	19.0

Mass of Sample Kg*	0.110
Mass of dry Sample Kg*	0.098

Stage 1

Volume of Leachant L2*	0.968
Volume of Eluate VE1*	0.91

Disclaimer: *The WAC limit values are provided for guidance only. DETS does not accept responsibility for errors or omissions. Values are correct at time of issue.*

V.2.06 ** DETS are accredited for the testing of leachates and not the leachate preparation stage which is unaccredited.*

Summary of Asbestos Analysis
Soil Samples

Our Ref 23-18274
Client Ref 23-0361
Contract Title EAST MEATH NORTH DUBLIN GRID UPGRADE

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
2211687	BHA25 1 0.50	SOIL	NAD	none	Michael Kay

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * - not included in laboratory scope of accreditation.

Information in Support of the Analytical Results

Our Ref 23-18274
Client Ref 23-0361
Contract EAST MEATH NORTH DUBLIN GRID UPGRADE

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
2211687	BHA25 0.50 SOIL	25/07/23	GJ 250ml, PT 1L x2		BTEX / C5-C10, VOC
2211688	BHA25 0.50 LEACHATE	25/07/23	GJ 250ml, PT 1L x2		

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Information in Support of the Analytical Results

List of HWOL Acronyms and Operators

Acronym	Description
HS	Headspace analysis
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent
CU	Clean-up - e.g. by florisil, silica gel
1D	GC - Single coil gas chromatography
2D	GC-GC - Double coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative eg. EH+HS_Total or EH_CU+HS_Total

Det	Acronym
Aliphatic C5-C6	HS_1D_AL
Aliphatic C6-C8	HS_1D_AL
Aliphatic C8-C10	HS_1D_AL
Aliphatic C10-C12	EH_CU_1D_AL
Aliphatic C12-C16	EH_CU_1D_AL
Aliphatic C16-C21	EH_CU_1D_AL
Aliphatic C21-C35	EH_CU_1D_AL
Aliphatic C5-C35	EH_CU+HS_1D_AL
Aromatic C5-C7	HS_1D_AR
Aromatic C7-C8	HS_1D_AR
Aromatic C8-C10	HS_1D_AR
Aromatic C10-C12	EH_CU_1D_AR
Aromatic C12-C16	EH_CU_1D_AR
Aromatic C16-C21	EH_CU_1D_AR
Aromatic C21-C35	EH_CU_1D_AR
Aromatic C5-C35	EH_CU+HS_1D_AR
TPH Ali/Aro Total C5-C35	EH_CU+HS_1D_Total
TPH (C10-C40)	EH_1D_Total

End of Report

Certificate of Analysis

Certificate Number	23-18275	*Issued:*	17-Aug-23

Client Causeway Geotech
Unit 1 Fingal House
Stephenstown Industrial Estate
Balbriggan
Co. Dublin
K32 VR66

Our Reference	23-18275
Client Reference	23-0361
Order No	(not supplied)
Contract Title	EAST MEATH NORTH DUBLIN GRID UPGRADE
Description	1 Soil sample, 1 Leachate sample.
Date Received	01-Aug-23
Date Started	01-Aug-23
Date Completed	17-Aug-23
Test Procedures	Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Kirk Bridgewood
General Manager

2139

Summary of Chemical Analysis
Soil Samples

Our Ref 23-18275
Client Ref 23-0361
Contract Title EAST MEATH NORTH DUBLIN GRID UPGRADE

Lab No	2211689
.Sample ID	BHC21
Depth	0.50
Other ID	1
Sample Type	ES
Sampling Date	25/07/2023
Sampling Time	n/s

Test	Method	LOD	Units	
Metals				
Arsenic	DETSC 2301#	0.2	mg/kg	9.7
Boron, Water Soluble (2.5:1)	DETSC 2311#	0.2	mg/kg	< 0.2
Cadmium	DETSC 2301#	0.1	mg/kg	1.7
Chromium	DETSC 2301#	0.15	mg/kg	15
Copper	DETSC 2301#	0.2	mg/kg	27
Lead	DETSC 2301#	0.3	mg/kg	14
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05
Nickel	DETSC 2301#	1	mg/kg	32
Zinc	DETSC 2301#	1	mg/kg	59
Inorganics				
pH	DETSC 2008#		pH	8.2
Cyanide, Total	DETSC 2130#	0.1	mg/kg	< 0.1
Organic matter	DETSC 2002#	0.1	%	1.0
Sulphate Aqueous Extract as SO4 (2:1)	DETSC 2076#	10	mg/l	< 10
Petroleum Hydrocarbons				
Aliphatic C5-C6: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01
Aliphatic C6-C8: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01
Aliphatic C8-C10: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01
Aliphatic C10-C12: EH_CU_1D_AL	DETSC 3072#	1.5	mg/kg	< 1.5
Aliphatic C12-C16: EH_CU_1D_AL	DETSC 3072#	1.2	mg/kg	< 1.2
Aliphatic C16-C21: EH_CU_1D_AL	DETSC 3072#	1.5	mg/kg	< 1.5
Aliphatic C21-C35: EH_CU_1D_AL	DETSC 3072#	3.4	mg/kg	< 3.4
Aliphatic C5-C35: EH_CU+HS_1D_AL	DETSC 3072*	10	mg/kg	< 10
Aromatic C5-C7: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01
Aromatic C7-C8: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01
Aromatic C8-C10: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01
Aromatic C10-C12: EH_CU_1D_AR	DETSC 3072#	0.9	mg/kg	< 0.9
Aromatic C12-C16: EH_CU_1D_AR	DETSC 3072#	0.5	mg/kg	< 0.5
Aromatic C16-C21: EH_CU_1D_AR	DETSC 3072#	0.6	mg/kg	< 0.6
Aromatic C21-C35: EH_CU_1D_AR	DETSC 3072#	1.4	mg/kg	< 1.4
Aromatic C5-C35: EH_CU+HS_1D_AR	DETSC 3072*	10	mg/kg	< 10
TPH Ali/Aro Total C5-C35: EH_CU+HS_1D_Total	DETSC 3072*	10	mg/kg	< 10
Benzene	DETSC 3321#	0.01	mg/kg	< 0.01
Ethylbenzene	DETSC 3321#	0.01	mg/kg	< 0.01
Toluene	DETSC 3321#	0.01	mg/kg	< 0.01
Xylene	DETSC 3321#	0.01	mg/kg	< 0.01
PAHs				
Naphthalene	DETSC 3301	0.1	mg/kg	< 0.1
Acenaphthylene	DETSC 3301	0.1	mg/kg	< 0.1
Acenaphthene	DETSC 3301	0.1	mg/kg	< 0.1

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 23-18275
Client Ref 23-0361
Contract Title EAST MEATH NORTH DUBLIN GRID UPGRADE

Lab No	2211689
.Sample ID	BHC21
Depth	0.50
Other ID	1
Sample Type	ES
Sampling Date	25/07/2023
Sampling Time	n/s

Test	Method	LOD	Units	
Fluorene	DETSC 3301	0.1	mg/kg	< 0.1
Phenanthrene	DETSC 3301	0.1	mg/kg	< 0.1
Anthracene	DETSC 3301	0.1	mg/kg	< 0.1
Fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1
Pyrene	DETSC 3301	0.1	mg/kg	< 0.1
Benzo(a)anthracene	DETSC 3301	0.1	mg/kg	< 0.1
Chrysene	DETSC 3301	0.1	mg/kg	< 0.1
Benzo(b)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1
Benzo(k)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1
Benzo(a)pyrene	DETSC 3301	0.1	mg/kg	< 0.1
Indeno(1,2,3-c,d)pyrene	DETSC 3301	0.1	mg/kg	< 0.1
Dibenzo(a,h)anthracene	DETSC 3301	0.1	mg/kg	< 0.1
Benzo(g,h,i)perylene	DETSC 3301	0.1	mg/kg	< 0.1
Coronene	DETSC 3301*	0.1	mg/kg	< 0.1
PAH 16 Total	DETSC 3301	1.6	mg/kg	< 1.6
Phenols				
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3
VOCs				
Vinyl Chloride	DETSC 3431	0.01	mg/kg	< 0.01
1,1 Dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
Trans-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
1,1-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Cis-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
2,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
Bromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01
Chloroform	DETSC 3431	0.01	mg/kg	< 0.01
1,1,1-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
1,1-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01
Carbon tetrachloride	DETSC 3431	0.01	mg/kg	< 0.01
Benzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Trichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
Dibromomethane	DETSC 3431	0.01	mg/kg	< 0.01
Bromodichloromethane	DETSC 3431	0.01	mg/kg	< 0.01
cis-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01
Toluene	DETSC 3431	0.01	mg/kg	< 0.01
trans-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01
1,1,2-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Tetrachloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
1,3-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
Dibromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 23-18275
Client Ref 23-0361
Contract Title EAST MEATH NORTH DUBLIN GRID UPGRADE

Lab No	2211689
.Sample ID	BHC21
Depth	0.50
Other ID	1
Sample Type	ES
Sampling Date	25/07/2023
Sampling Time	n/s

Test	Method	LOD	Units	
1,2-dibromoethane	DETSC 3431	0.01	mg/kg	< 0.01
Chlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,1,1,2-tetrachloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Ethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
m+p-Xylene	DETSC 3431	0.01	mg/kg	< 0.01
o-Xylene	DETSC 3431	0.01	mg/kg	< 0.01
Styrene	DETSC 3431*	0.01	mg/kg	< 0.01
Bromoform	DETSC 3431	0.01	mg/kg	< 0.01
Isopropylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
Bromobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2,3-trichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
n-propylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
2-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01
1,3,5-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
4-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01
Tert-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2,4-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
sec-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
p-isopropyltoluene	DETSC 3431	0.01	mg/kg	< 0.01
1,3-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,4-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
n-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dibromo-3-chloropropane	DETSC 3431	0.01	mg/kg	< 0.01
1,2,4-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
Hexachlorobutadiene	DETSC 3431	0.01	mg/kg	< 0.01
1,2,3-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
MTBE	DETSC 3431*	0.01	mg/kg	< 0.01

WASTE ACCEPTANCE CRITERIA TESTING ANALYTICAL REPORT

Our Ref 23-18275
Client Ref 23-0361
Contract Title EAST MEATH NORTH DUBLIN GRID UPGRADE
Sample Id BHC21 1 0.50
Sample Numbers 2211689 2211690
Date Analysed 17/08/2023

Test Results On Waste

Determinand and Method Reference	Units	Result
DETSC 2084# Total Organic Carbon	%	2.5
DETSC 2003# Loss On Ignition	%	2.2
DETSC 3321# BTEX	mg/kg	< 0.04
DETSC 3401# PCBs (7 congeners)	mg/kg	< 0.01
DETSC 3311# EPH (C10 - C40): EH_1D_Total	mg/kg	< 10
DETSC 3301 PAHs	mg/kg	< 1.6
DETSC 2008# pH	pH Units	8.2
DETSC 2073* Acid Neutralisation Capacity (pH4)	mol/kg	< 1.0
DETSC 2073* Acid Neutralisation Capacity (pH7)	mol/kg	< 1.0

WAC Limit Values		
Inert Waste	SNRHW	Hazardous Waste
3	5	6
n/a	n/a	10
6	n/a	n/a
1	n/a	n/a
500	n/a	n/a
100	n/a	n/a
n/a	>6	n/a
n/a	TBE	TBE
n/a	TBE	TBE

Test Results On Leachate

Determinand and Method Reference	Conc in Eluate ug/l	Amount Leached* mg/kg
	10:1	LS10
DETSC 2306 Arsenic as As	0.31	< 0.01
DETSC 2306 Barium as Ba	0.9	< 0.1
DETSC 2306 Cadmium as Cd	< 0.030	< 0.02
DETSC 2306 Chromium as Cr	< 0.25	< 0.1
DETSC 2306 Copper as Cu	0.52	< 0.02
DETSC 2306 Mercury as Hg	< 0.010	< 0.002
DETSC 2306 Molybdenum as Mo	< 1.1	< 0.1
DETSC 2306 Nickel as Ni	< 0.50	< 0.1
DETSC 2306 Lead as Pb	0.25	< 0.05
DETSC 2306 Antimony as Sb	< 0.17	< 0.05
DETSC 2306 Selenium as Se	< 0.25	< 0.03
DETSC 2306 Zinc as Zn	< 1.3	< 0.01
DETSC 2055 Chloride as Cl	820	< 100
DETSC 2055* Fluoride as F	< 100	< 0.1
DETSC 2055 Sulphate as SO4	1400	< 100
DETSC 2009* Total Dissolved Solids	53000	530
DETSC 2130 Phenol Index	< 100	< 1
DETSC 2085 Dissolved Organic Carbon	2700	< 50

WAC Limit Values Limit values for LS10 Leachate		
Inert Waste	SNRHW	Hazardous Waste
0.5	2	25
20	100	300
0.04	1	5
0.5	10	70
2	50	100
0.01	0.2	2
0.5	10	30
0.4	10	40
0.5	10	50
0.06	0.7	5
0.1	0.5	7
4	50	200
800	15,000	25,000
10	150	500
1000	20,000	50,000
4000	60,000	100,000
1	n/a	n/a
500	800	1000

TBE - To Be Evaluated
SNRHW - Stable Non-Reactive Hazardous Waste

Additional Information

DETSC 2008 pH	6.8
DETSC 2009 Conductivity uS/cm	76.1
* Temperature*	19.0

Mass of Sample Kg*	0.110
Mass of dry Sample Kg*	0.097

Stage 1

Volume of Leachant L2*	0.955
Volume of Eluate VE1*	0.9

Disclaimer: *The WAC limit values are provided for guidance only. DETS does not accept responsibility for errors or omissions. Values are correct at time of issue.*

V.2.06 ** DETS are accredited for the testing of leachates and not the leachate preparation stage which is unaccredited.*

Summary of Asbestos Analysis
Soil Samples

Our Ref 23-18275
Client Ref 23-0361
Contract Title EAST MEATH NORTH DUBLIN GRID UPGRADE

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
2211689	BHC21 1 0.50	SOIL	NAD	none	Michael Kay

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * - not included in laboratory scope of accreditation.

Information in Support of the Analytical Results

Our Ref 23-18275
Client Ref 23-0361
Contract EAST MEATH NORTH DUBLIN GRID UPGRADE

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
2211689	BHC21 0.50 SOIL	25/07/23	GJ 250ml, PT 1L x2		BTEX / C5-C10, VOC
2211690	BHC21 0.50 LEACHATE	25/07/23	GJ 250ml, PT 1L x2		

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Information in Support of the Analytical Results

List of HWOL Acronyms and Operators

Acronym	Description
HS	Headspace analysis
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent
CU	Clean-up - e.g. by florisil, silica gel
1D	GC - Single coil gas chromatography
2D	GC-GC - Double coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative eg. EH+HS_Total or EH_CU+HS_Total

Det	Acronym
Aliphatic C5-C6	HS_1D_AL
Aliphatic C6-C8	HS_1D_AL
Aliphatic C8-C10	HS_1D_AL
Aliphatic C10-C12	EH_CU_1D_AL
Aliphatic C12-C16	EH_CU_1D_AL
Aliphatic C16-C21	EH_CU_1D_AL
Aliphatic C21-C35	EH_CU_1D_AL
Aliphatic C5-C35	EH_CU+HS_1D_AL
Aromatic C5-C7	HS_1D_AR
Aromatic C7-C8	HS_1D_AR
Aromatic C8-C10	HS_1D_AR
Aromatic C10-C12	EH_CU_1D_AR
Aromatic C12-C16	EH_CU_1D_AR
Aromatic C16-C21	EH_CU_1D_AR
Aromatic C21-C35	EH_CU_1D_AR
Aromatic C5-C35	EH_CU+HS_1D_AR
TPH Ali/Aro Total C5-C35	EH_CU+HS_1D_Total
TPH (C10-C40)	EH_1D_Total

End of Report

Certificate of Analysis

Certificate Number	23-18357	*Issued:*	21-Aug-23

Client Causeway Geotech
Unit 1 Fingal House
Stephenstown Industrial Estate
Balbriggan
Co. Dublin
K32 VR66

Our Reference	23-18357
Client Reference	23-0361
Order No	(not supplied)
Contract Title	East Meath North Dublin Grid Upgrade
Description	1 Soil sample, 1 Leachate sample.
Date Received	02-Aug-23
Date Started	02-Aug-23
Date Completed	21-Aug-23
Test Procedures	Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Kirk Bridgewood
General Manager

2139

Summary of Chemical Analysis
Soil Samples

Our Ref 23-18357
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade

Lab No	2212101
.Sample ID	BH07A
Depth	0.50
Other ID	1
Sample Type	ES
Sampling Date	10/07/2023
Sampling Time	n/s

Test	Method	LOD	Units	
Metals				
Arsenic	DETSC 2301#	0.2	mg/kg	10
Boron, Water Soluble (2.5:1)	DETSC 2311#	0.2	mg/kg	0.3
Cadmium	DETSC 2301#	0.1	mg/kg	0.1
Chromium	DETSC 2301#	0.15	mg/kg	30
Copper	DETSC 2301#	0.2	mg/kg	31
Lead	DETSC 2301#	0.3	mg/kg	28
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05
Nickel	DETSC 2301#	1	mg/kg	35
Zinc	DETSC 2301#	1	mg/kg	47
Inorganics				
pH	DETSC 2008#		pH	7.1
Cyanide, Total	DETSC 2130#	0.1	mg/kg	0.2
Organic matter	DETSC 2002#	0.1	%	1.7
Sulphate Aqueous Extract as SO4 (2:1)	DETSC 2076#	10	mg/l	27
Petroleum Hydrocarbons				
Aliphatic C5-C6: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01
Aliphatic C6-C8: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01
Aliphatic C8-C10: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01
Aliphatic C10-C12: EH_CU_1D_AL	DETSC 3072#	1.5	mg/kg	< 1.5
Aliphatic C12-C16: EH_CU_1D_AL	DETSC 3072#	1.2	mg/kg	< 1.2
Aliphatic C16-C21: EH_CU_1D_AL	DETSC 3072#	1.5	mg/kg	< 1.5
Aliphatic C21-C35: EH_CU_1D_AL	DETSC 3072#	3.4	mg/kg	< 3.4
Aliphatic C5-C35: EH_CU+HS_1D_AL	DETSC 3072*	10	mg/kg	< 10
Aromatic C5-C7: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01
Aromatic C7-C8: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01
Aromatic C8-C10: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01
Aromatic C10-C12: EH_CU_1D_AR	DETSC 3072#	0.9	mg/kg	< 0.9
Aromatic C12-C16: EH_CU_1D_AR	DETSC 3072#	0.5	mg/kg	< 0.5
Aromatic C16-C21: EH_CU_1D_AR	DETSC 3072#	0.6	mg/kg	< 0.6
Aromatic C21-C35: EH_CU_1D_AR	DETSC 3072#	1.4	mg/kg	< 1.4
Aromatic C5-C35: EH_CU+HS_1D_AR	DETSC 3072*	10	mg/kg	< 10
TPH Ali/Aro Total C5-C35: EH_CU+HS_1D_Total	DETSC 3072*	10	mg/kg	< 10
Benzene	DETSC 3321#	0.01	mg/kg	< 0.01
Ethylbenzene	DETSC 3321#	0.01	mg/kg	< 0.01
Toluene	DETSC 3321#	0.01	mg/kg	< 0.01
Xylene	DETSC 3321#	0.01	mg/kg	< 0.01
PAHs				
Naphthalene	DETSC 3301	0.1	mg/kg	< 0.1
Acenaphthylene	DETSC 3301	0.1	mg/kg	0.1
Acenaphthene	DETSC 3301	0.1	mg/kg	< 0.1

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 23-18357
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade

Lab No	2212101
.Sample ID	BH07A
Depth	0.50
Other ID	1
Sample Type	ES
Sampling Date	10/07/2023
Sampling Time	n/s

Test	Method	LOD	Units	
Fluorene	DETSC 3301	0.1	mg/kg	< 0.1
Phenanthrene	DETSC 3301	0.1	mg/kg	0.1
Anthracene	DETSC 3301	0.1	mg/kg	< 0.1
Fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1
Pyrene	DETSC 3301	0.1	mg/kg	< 0.1
Benzo(a)anthracene	DETSC 3301	0.1	mg/kg	< 0.1
Chrysene	DETSC 3301	0.1	mg/kg	< 0.1
Benzo(b)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1
Benzo(k)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1
Benzo(a)pyrene	DETSC 3301	0.1	mg/kg	< 0.1
Indeno(1,2,3-c,d)pyrene	DETSC 3301	0.1	mg/kg	< 0.1
Dibenzo(a,h)anthracene	DETSC 3301	0.1	mg/kg	< 0.1
Benzo(g,h,i)perylene	DETSC 3301	0.1	mg/kg	< 0.1
Coronene	DETSC 3301*	0.1	mg/kg	< 0.1
PAH 16 Total	DETSC 3301	1.6	mg/kg	< 1.6
Phenols				
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3
VOCs				
Vinyl Chloride	DETSC 3431	0.01	mg/kg	< 0.01
1,1 Dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
Trans-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
1,1-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Cis-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
2,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
Bromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01
Chloroform	DETSC 3431	0.01	mg/kg	< 0.01
1,1,1-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
1,1-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01
Carbon tetrachloride	DETSC 3431	0.01	mg/kg	< 0.01
Benzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Trichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
Dibromomethane	DETSC 3431	0.01	mg/kg	< 0.01
Bromodichloromethane	DETSC 3431	0.01	mg/kg	< 0.01
cis-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01
Toluene	DETSC 3431	0.01	mg/kg	< 0.01
trans-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01
1,1,2-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Tetrachloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
1,3-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
Dibromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 23-18357
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade

Lab No	2212101
.Sample ID	BH07A
Depth	0.50
Other ID	1
Sample Type	ES
Sampling Date	10/07/2023
Sampling Time	n/s

Test	Method	LOD	Units	
1,2-dibromoethane	DETSC 3431	0.01	mg/kg	< 0.01
Chlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,1,1,2-tetrachloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Ethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
m+p-Xylene	DETSC 3431	0.01	mg/kg	< 0.01
o-Xylene	DETSC 3431	0.01	mg/kg	< 0.01
Styrene	DETSC 3431*	0.01	mg/kg	< 0.01
Bromoform	DETSC 3431	0.01	mg/kg	< 0.01
Isopropylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
Bromobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2,3-trichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
n-propylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
2-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01
1,3,5-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
4-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01
Tert-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2,4-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
sec-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
p-isopropyltoluene	DETSC 3431	0.01	mg/kg	< 0.01
1,3-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,4-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
n-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dibromo-3-chloropropane	DETSC 3431	0.01	mg/kg	< 0.01
1,2,4-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
Hexachlorobutadiene	DETSC 3431	0.01	mg/kg	< 0.01
1,2,3-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
MTBE	DETSC 3431*	0.01	mg/kg	< 0.01

WASTE ACCEPTANCE CRITERIA TESTING ANALYTICAL REPORT

Our Ref 23-18357
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade
Sample Id BH07A 1 0.50
Sample Numbers 2212101 2212102
Date Analysed 21/08/2023

Test Results On Waste

Determinand and Method Reference	Units	Result	WAC Limit Values: Inert Waste	SNRHW	Hazardous Waste
DETSC 2084# Total Organic Carbon	%	2.0	3	5	6
DETSC 2003# Loss On Ignition	%	4.0	n/a	n/a	10
DETSC 3321# BTEX	mg/kg	< 0.04	6	n/a	n/a
DETSC 3401# PCBs (7 congeners)	mg/kg	< 0.01	1	n/a	n/a
DETSC 3311# EPH (C10 - C40): EH_1D_Total	mg/kg	< 10	500	n/a	n/a
DETSC 3301 PAHs	mg/kg	< 1.6	100	n/a	n/a
DETSC 2008# pH	pH Units	7.1	n/a	>6	n/a
DETSC 2073* Acid Neutralisation Capacity (pH4)	mol/kg	< 1.0	n/a	TBE	TBE
DETSC 2073* Acid Neutralisation Capacity (pH7)	mol/kg	< 1.0	n/a	TBE	TBE

Test Results On Leachate

Determinand and Method Reference	Conc in Eluate ug/l 10:1	Amount Leached* mg/kg LS10	WAC Limit Values (Limit values for LS10 Leachate): Inert Waste	SNRHW	Hazardous Waste
DETSC 2306 Arsenic as As	0.26	< 0.01	0.5	2	25
DETSC 2306 Barium as Ba	0.83	< 0.1	20	100	300
DETSC 2306 Cadmium as Cd	< 0.030	< 0.02	0.04	1	5
DETSC 2306 Chromium as Cr	0.26	< 0.1	0.5	10	70
DETSC 2306 Copper as Cu	0.82	< 0.02	2	50	100
DETSC 2306 Mercury as Hg	< 0.010	< 0.002	0.01	0.2	2
DETSC 2306 Molybdenum as Mo	< 1.1	< 0.1	0.5	10	30
DETSC 2306 Nickel as Ni	< 0.50	< 0.1	0.4	10	40
DETSC 2306 Lead as Pb	0.35	< 0.05	0.5	10	50
DETSC 2306 Antimony as Sb	< 0.17	< 0.05	0.06	0.7	5
DETSC 2306 Selenium as Se	< 0.25	< 0.03	0.1	0.5	7
DETSC 2306 Zinc as Zn	< 1.3	< 0.01	4	50	200
DETSC 2055 Chloride as Cl	570	< 100	800	15,000	25,000
DETSC 2055* Fluoride as F	210	2.1	10	150	500
DETSC 2055 Sulphate as SO4	1400	< 100	1000	20,000	50,000
DETSC 2009* Total Dissolved Solids	15000	150	4000	60,000	100,000
DETSC 2130 Phenol Index	< 100	< 1	1	n/a	n/a
DETSC 2033* Dissolved Organic Carbon	4100	< 50	500	800	1000

TBE - To Be Evaluated
SNRHW - Stable Non-Reactive Hazardous Waste

Additional Information

DETSC 2008 pH	8.0
DETSC 2009 Conductivity uS/cm	20.9
* Temperature*	19.0

Mass of Sample Kg*	0.120
Mass of dry Sample Kg*	0.101

Stage 1

Volume of Leachant L2*	0.993
Volume of Eluate VE1*	0.94

Disclaimer: *The WAC limit values are provided for guidance only. DETS does not accept responsibility for errors or omissions. Values are correct at time of issue.*

V.2.06 ** DETS are accredited for the testing of leachates and not the leachate preparation stage which is unaccredited.*

Summary of Asbestos Analysis
Soil Samples

Our Ref 23-18357
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
2212101	BH07A 1 0.50	SOIL	NAD	none	D Wilkinson

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * - not included in laboratory scope of accreditation.

Information in Support of the Analytical Results

Our Ref 23-18357
Client Ref 23-0361
Contract East Meath North Dublin Grid Upgrade

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
2212101	BH07A 0.50 SOIL	10/07/23	GJ 250ml, GJ 60ml x2, PT 500ml x3	Aliphatics/Aromatics (14 days), BTEX / C5-C10 (14 days), Naphthalene (14 days), PAH FID (14 days), pH + Conductivity (7 days), Cyanide/Mono pHoh (14 days), EPH/TPH (14 days), VOC (7 days)	
2212102	BH07A 0.50 LEACHATE	10/07/23	GJ 250ml, GJ 60ml x2, PT 500ml x3		

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Information in Support of the Analytical Results

List of HWOL Acronyms and Operators

Acronym	Description
HS	Headspace analysis
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent
CU	Clean-up - e.g. by florisil, silica gel
1D	GC - Single coil gas chromatography
2D	GC-GC - Double coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative eg. EH+HS_Total or EH_CU+HS_Total

Det	Acronym
Aliphatic C5-C6	HS_1D_AL
Aliphatic C6-C8	HS_1D_AL
Aliphatic C8-C10	HS_1D_AL
Aliphatic C10-C12	EH_CU_1D_AL
Aliphatic C12-C16	EH_CU_1D_AL
Aliphatic C16-C21	EH_CU_1D_AL
Aliphatic C21-C35	EH_CU_1D_AL
Aliphatic C5-C35	EH_CU+HS_1D_AL
Aromatic C5-C7	HS_1D_AR
Aromatic C7-C8	HS_1D_AR
Aromatic C8-C10	HS_1D_AR
Aromatic C10-C12	EH_CU_1D_AR
Aromatic C12-C16	EH_CU_1D_AR
Aromatic C16-C21	EH_CU_1D_AR
Aromatic C21-C35	EH_CU_1D_AR
Aromatic C5-C35	EH_CU+HS_1D_AR
TPH Ali/Aro Total C5-C35	EH_CU+HS_1D_Total
TPH (C10-C40)	EH_1D_Total

End of Report

Certificate of Analysis

Certificate Number	23-18358	*Issued:*	21-Aug-23

Client Causeway Geotech
Unit 1 Fingal House
Stephenstown Industrial Estate
Balbriggan
Co. Dublin
K32 VR66

Our Reference	23-18358
Client Reference	23-0361
Order No	(not supplied)
Contract Title	East Meath North Dublin Grid Upgrade
Description	1 Soil sample, 1 Leachate sample.
Date Received	02-Aug-23
Date Started	02-Aug-23
Date Completed	21-Aug-23
Test Procedures	Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Kirk Bridgewood
General Manager

2139

Summary of Chemical Analysis
Soil Samples

Our Ref 23-18358
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade

Lab No	2212103
.Sample ID	BHA24
Depth	1.00
Other ID	
Sample Type	ES
Sampling Date	13/07/2023
Sampling Time	n/s

Test	Method	LOD	Units	
Metals				
Arsenic	DETSC 2301#	0.2	mg/kg	9.0
Boron, Water Soluble (2.5:1)	DETSC 2311#	0.2	mg/kg	< 0.2
Cadmium	DETSC 2301#	0.1	mg/kg	1.8
Chromium	DETSC 2301#	0.15	mg/kg	9.1
Copper	DETSC 2301#	0.2	mg/kg	26
Lead	DETSC 2301#	0.3	mg/kg	9.6
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05
Nickel	DETSC 2301#	1	mg/kg	28
Zinc	DETSC 2301#	1	mg/kg	53
Inorganics				
pH	DETSC 2008#		pH	8.4
Cyanide, Total	DETSC 2130#	0.1	mg/kg	< 0.1
Organic matter	DETSC 2002#	0.1	%	0.8
Sulphate Aqueous Extract as SO4 (2:1)	DETSC 2076#	10	mg/l	11
Petroleum Hydrocarbons				
Aliphatic C5-C6: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01
Aliphatic C6-C8: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01
Aliphatic C8-C10: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01
Aliphatic C10-C12: EH_CU_1D_AL	DETSC 3072#	1.5	mg/kg	< 1.5
Aliphatic C12-C16: EH_CU_1D_AL	DETSC 3072#	1.2	mg/kg	< 1.2
Aliphatic C16-C21: EH_CU_1D_AL	DETSC 3072#	1.5	mg/kg	< 1.5
Aliphatic C21-C35: EH_CU_1D_AL	DETSC 3072#	3.4	mg/kg	< 3.4
Aliphatic C5-C35: EH_CU+HS_1D_AL	DETSC 3072*	10	mg/kg	< 10
Aromatic C5-C7: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01
Aromatic C7-C8: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01
Aromatic C8-C10: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01
Aromatic C10-C12: EH_CU_1D_AR	DETSC 3072#	0.9	mg/kg	< 0.9
Aromatic C12-C16: EH_CU_1D_AR	DETSC 3072#	0.5	mg/kg	< 0.5
Aromatic C16-C21: EH_CU_1D_AR	DETSC 3072#	0.6	mg/kg	< 0.6
Aromatic C21-C35: EH_CU_1D_AR	DETSC 3072#	1.4	mg/kg	< 1.4
Aromatic C5-C35: EH_CU+HS_1D_AR	DETSC 3072*	10	mg/kg	< 10
TPH Ali/Aro Total C5-C35: EH_CU+HS_1D_Total	DETSC 3072*	10	mg/kg	< 10
Benzene	DETSC 3321#	0.01	mg/kg	< 0.01
Ethylbenzene	DETSC 3321#	0.01	mg/kg	< 0.01
Toluene	DETSC 3321#	0.01	mg/kg	< 0.01
Xylene	DETSC 3321#	0.01	mg/kg	< 0.01
PAHs				
Naphthalene	DETSC 3301	0.1	mg/kg	< 0.1
Acenaphthylene	DETSC 3301	0.1	mg/kg	< 0.1
Acenaphthene	DETSC 3301	0.1	mg/kg	< 0.1

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 23-18358
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade

Lab No	2212103
.Sample ID	BHA24
Depth	1.00
Other ID	
Sample Type	ES
Sampling Date	13/07/2023
Sampling Time	n/s

Test	Method	LOD	Units	
Fluorene	DETSC 3301	0.1	mg/kg	0.2
Phenanthrene	DETSC 3301	0.1	mg/kg	0.1
Anthracene	DETSC 3301	0.1	mg/kg	< 0.1
Fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1
Pyrene	DETSC 3301	0.1	mg/kg	< 0.1
Benzo(a)anthracene	DETSC 3301	0.1	mg/kg	< 0.1
Chrysene	DETSC 3301	0.1	mg/kg	< 0.1
Benzo(b)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1
Benzo(k)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1
Benzo(a)pyrene	DETSC 3301	0.1	mg/kg	< 0.1
Indeno(1,2,3-c,d)pyrene	DETSC 3301	0.1	mg/kg	< 0.1
Dibenzo(a,h)anthracene	DETSC 3301	0.1	mg/kg	< 0.1
Benzo(g,h,i)perylene	DETSC 3301	0.1	mg/kg	< 0.1
Coronene	DETSC 3301*	0.1	mg/kg	< 0.1
PAH 16 Total	DETSC 3301	1.6	mg/kg	< 1.6
Phenols				
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3
VOCs				
Vinyl Chloride	DETSC 3431	0.01	mg/kg	< 0.01
1,1 Dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
Trans-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
1,1-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Cis-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
2,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
Bromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01
Chloroform	DETSC 3431	0.01	mg/kg	< 0.01
1,1,1-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
1,1-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01
Carbon tetrachloride	DETSC 3431	0.01	mg/kg	< 0.01
Benzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Trichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
Dibromomethane	DETSC 3431	0.01	mg/kg	< 0.01
Bromodichloromethane	DETSC 3431	0.01	mg/kg	< 0.01
cis-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01
Toluene	DETSC 3431	0.01	mg/kg	< 0.01
trans-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01
1,1,2-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Tetrachloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
1,3-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
Dibromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 23-18358
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade

Lab No	2212103
.Sample ID	BHA24
Depth	1.00
Other ID	
Sample Type	ES
Sampling Date	13/07/2023
Sampling Time	n/s

Test	Method	LOD	Units	
1,2-dibromoethane	DETSC 3431	0.01	mg/kg	< 0.01
Chlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,1,1,2-tetrachloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Ethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
m+p-Xylene	DETSC 3431	0.01	mg/kg	< 0.01
o-Xylene	DETSC 3431	0.01	mg/kg	< 0.01
Styrene	DETSC 3431*	0.01	mg/kg	< 0.01
Bromoform	DETSC 3431	0.01	mg/kg	< 0.01
Isopropylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
Bromobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2,3-trichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
n-propylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
2-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01
1,3,5-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
4-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01
Tert-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2,4-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
sec-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
p-isopropyltoluene	DETSC 3431	0.01	mg/kg	< 0.01
1,3-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,4-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
n-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dibromo-3-chloropropane	DETSC 3431	0.01	mg/kg	< 0.01
1,2,4-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
Hexachlorobutadiene	DETSC 3431	0.01	mg/kg	< 0.01
1,2,3-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
MTBE	DETSC 3431*	0.01	mg/kg	< 0.01

WASTE ACCEPTANCE CRITERIA TESTING ANALYTICAL REPORT

Our Ref 23-18358
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade
Sample Id BHA24 1.00
Sample Numbers 2212103 2212104
Date Analysed 21/08/2023

Test Results On Waste

Determinand and Method Reference	Units	Result	WAC Limit Values: Inert Waste	SNRHW	Hazardous Waste
DETSC 2084# Total Organic Carbon	%	2.3	3	5	6
DETSC 2003# Loss On Ignition	%	1.9	n/a	n/a	10
DETSC 3321# BTEX	mg/kg	< 0.04	6	n/a	n/a
DETSC 3401# PCBs (7 congeners)	mg/kg	< 0.01	1	n/a	n/a
DETSC 3311# EPH (C10 - C40): EH_1D_Total	mg/kg	< 10	500	n/a	n/a
DETSC 3301 PAHs	mg/kg	< 1.6	100	n/a	n/a
DETSC 2008# pH	pH Units	8.4	n/a	>6	n/a
DETSC 2073* Acid Neutralisation Capacity (pH4)	mol/kg	< 1.0	n/a	TBE	TBE
DETSC 2073* Acid Neutralisation Capacity (pH7)	mol/kg	< 1.0	n/a	TBE	TBE

Test Results On Leachate

Determinand and Method Reference	Conc in Eluate ug/l 10:1	Amount Leached* mg/kg LS10	WAC Limit Values (Limit values for LS10 Leachate): Inert Waste	SNRHW	Hazardous Waste
DETSC 2306 Arsenic as As	0.28	< 0.01	0.5	2	25
DETSC 2306 Barium as Ba	6.6	< 0.1	20	100	300
DETSC 2306 Cadmium as Cd	0.032	< 0.02	0.04	1	5
DETSC 2306 Chromium as Cr	< 0.25	< 0.1	0.5	10	70
DETSC 2306 Copper as Cu	0.44	< 0.02	2	50	100
DETSC 2306 Mercury as Hg	< 0.010	< 0.002	0.01	0.2	2
DETSC 2306 Molybdenum as Mo	6.5	< 0.1	0.5	10	30
DETSC 2306 Nickel as Ni	< 0.50	< 0.1	0.4	10	40
DETSC 2306 Lead as Pb	< 0.090	< 0.05	0.5	10	50
DETSC 2306 Antimony as Sb	< 0.17	< 0.05	0.06	0.7	5
DETSC 2306 Selenium as Se	0.61	< 0.03	0.1	0.5	7
DETSC 2306 Zinc as Zn	< 1.3	< 0.01	4	50	200
DETSC 2055 Chloride as Cl	980	< 100	800	15,000	25,000
DETSC 2055* Fluoride as F	310	3.1	10	150	500
DETSC 2055 Sulphate as SO4	2400	< 100	1000	20,000	50,000
DETSC 2009* Total Dissolved Solids	46000	460	4000	60,000	100,000
DETSC 2130 Phenol Index	< 100	< 1	1	n/a	n/a
DETSC 2033* Dissolved Organic Carbon	2500	< 50	500	800	1000

TBE - To Be Evaluated
SNRHW - Stable Non-Reactive Hazardous Waste

Additional Information

DETSC 2008 pH	7.9
DETSC 2009 Conductivity uS/cm	65.6
* Temperature*	18.0

Mass of Sample Kg*	0.100
Mass of dry Sample Kg*	0.092

Stage 1

Volume of Leachant L2*	0.913
Volume of Eluate VE1*	0.86

Disclaimer: *The WAC limit values are provided for guidance only. DETS does not accept responsibility for errors or omissions. Values are correct at time of issue.*

V.2.06 ** DETS are accredited for the testing of leachates and not the leachate preparation stage which is unaccredited.*

Summary of Asbestos Analysis
Soil Samples

Our Ref 23-18358
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
2212103	BHA24 1.00	SOIL	NAD	none	D Wilkinson

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * - not included in laboratory scope of accreditation.

Information in Support of the Analytical Results

Our Ref 23-18358
Client Ref 23-0361
Contract East Meath North Dublin Grid Upgrade

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
2212103	BHA24 1.00 SOIL	13/07/23	GJ 250ml, GJ 60ml, PT 1L	Aliphatics/Aromatics (14 days), BTEX / C5-C10 (14 days), Naphthalene (14 days), PAH FID (14 days), pH + Conductivity (7 days), Cyanide/Mono pHoh (14 days), EPH/TPH (14 days), VOC (7 days)	
2212104	BHA24 1.00 LEACHATE	13/07/23	GJ 250ml, GJ 60ml, PT 1L		

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Information in Support of the Analytical Results

List of HWOL Acronyms and Operators

Acronym	Description
HS	Headspace analysis
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent
CU	Clean-up - e.g. by florisil, silica gel
1D	GC - Single coil gas chromatography
2D	GC-GC - Double coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative eg. EH+HS_Total or EH_CU+HS_Total

Det	Acronym
Aliphatic C5-C6	HS_1D_AL
Aliphatic C6-C8	HS_1D_AL
Aliphatic C8-C10	HS_1D_AL
Aliphatic C10-C12	EH_CU_1D_AL
Aliphatic C12-C16	EH_CU_1D_AL
Aliphatic C16-C21	EH_CU_1D_AL
Aliphatic C21-C35	EH_CU_1D_AL
Aliphatic C5-C35	EH_CU+HS_1D_AL
Aromatic C5-C7	HS_1D_AR
Aromatic C7-C8	HS_1D_AR
Aromatic C8-C10	HS_1D_AR
Aromatic C10-C12	EH_CU_1D_AR
Aromatic C12-C16	EH_CU_1D_AR
Aromatic C16-C21	EH_CU_1D_AR
Aromatic C21-C35	EH_CU_1D_AR
Aromatic C5-C35	EH_CU+HS_1D_AR
TPH Ali/Aro Total C5-C35	EH_CU+HS_1D_Total
TPH (C10-C40)	EH_1D_Total

End of Report

Certificate of Analysis

Certificate Number	23-18359	*Issued:*	21-Aug-23

Client Causeway Geotech
Unit 1 Fingal House
Stephenstown Industrial Estate
Balbriggan
Co. Dublin
K32 VR66

Our Reference	23-18359
Client Reference	23-0361
Order No	(not supplied)
Contract Title	East Meath North Dublin Grid Upgrade
Description	2 Soil samples, 2 Leachate samples.
Date Received	02-Aug-23
Date Started	02-Aug-23
Date Completed	21-Aug-23
Test Procedures	Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Kirk Bridgewood
General Manager

2139

Summary of Chemical Analysis
Soil Samples

Our Ref 23-18359
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade

			Lab No	2212105	2212106
			.Sample ID	BHB11	BHB11
			Depth	0.50	1.00
			Other ID	1	2
			Sample Type	ES	ES
			Sampling Date	20/07/2023	20/07/2023
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
Metals					
Arsenic	DETSC 2301#	0.2	mg/kg	16	12
Boron, Water Soluble (2.5:1)	DETSC 2311#	0.2	mg/kg	0.4	0.5
Cadmium	DETSC 2301#	0.1	mg/kg	2.4	2.8
Chromium	DETSC 2301#	0.15	mg/kg	13	15
Copper	DETSC 2301#	0.2	mg/kg	32	33
Lead	DETSC 2301#	0.3	mg/kg	120	20
Mercury	DETSC 2325#	0.05	mg/kg	0.07	0.07
Nickel	DETSC 2301#	1	mg/kg	38	37
Zinc	DETSC 2301#	1	mg/kg	84	78
Inorganics					
pH	DETSC 2008#		pH	7.4	7.6
Cyanide, Total	DETSC 2130#	0.1	mg/kg	0.1	0.2
Organic matter	DETSC 2002#	0.1	%	1.8	2.0
Sulphate Aqueous Extract as SO4 (2:1)	DETSC 2076#	10	mg/l	730	130
Petroleum Hydrocarbons					
Aliphatic C5-C6: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aliphatic C6-C8: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aliphatic C8-C10: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aliphatic C10-C12: EH_CU_1D_AL	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5
Aliphatic C12-C16: EH_CU_1D_AL	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2
Aliphatic C16-C21: EH_CU_1D_AL	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5
Aliphatic C21-C35: EH_CU_1D_AL	DETSC 3072#	3.4	mg/kg	< 3.4	< 3.4
Aliphatic C5-C35: EH_CU+HS_1D_AL	DETSC 3072*	10	mg/kg	< 10	< 10
Aromatic C5-C7: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aromatic C7-C8: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aromatic C8-C10: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aromatic C10-C12: EH_CU_1D_AR	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9
Aromatic C12-C16: EH_CU_1D_AR	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5
Aromatic C16-C21: EH_CU_1D_AR	DETSC 3072#	0.6	mg/kg	< 0.6	< 0.6
Aromatic C21-C35: EH_CU_1D_AR	DETSC 3072#	1.4	mg/kg	< 1.4	< 1.4
Aromatic C5-C35: EH_CU+HS_1D_AR	DETSC 3072*	10	mg/kg	< 10	< 10
TPH Ali/Aro Total C5-C35: EH_CU+HS_1D_Total	DETSC 3072*	10	mg/kg	< 10	< 10
Benzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01
Ethylbenzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01
Toluene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01
Xylene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01
PAHs					
Naphthalene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Acenaphthylene	DETSC 3301	0.1	mg/kg	0.2	0.2
Acenaphthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 23-18359
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade

			Lab No	2212105	2212106
			.Sample ID	BHB11	BHB11
			Depth	0.50	1.00
			Other ID	1	2
			Sample Type	ES	ES
			Sampling Date	20/07/2023	20/07/2023
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
Fluorene	DETSC 3301	0.1	mg/kg	0.1	0.1
Phenanthrene	DETSC 3301	0.1	mg/kg	0.2	0.2
Anthracene	DETSC 3301	0.1	mg/kg	0.3	0.2
Fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Benzo(a)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Chrysene	DETSC 3301	0.1	mg/kg	< 0.1	0.4
Benzo(b)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Benzo(k)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Benzo(a)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Indeno(1,2,3-c,d)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Dibenzo(a,h)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Benzo(g,h,i)perylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Coronene	DETSC 3301*	0.1	mg/kg	< 0.1	< 0.1
PAH 16 Total	DETSC 3301	1.6	mg/kg	< 1.6	< 1.6
Phenols					
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3
VOCs					
Vinyl Chloride	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1 Dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Trans-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Cis-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
2,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Bromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Chloroform	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1,1-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Carbon tetrachloride	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Benzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Trichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Dibromomethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Bromodichloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
cis-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Toluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
trans-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1,2-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Tetrachloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,3-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Dibromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 23-18359
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade

			Lab No	2212105	2212106
			.Sample ID	BHB11	BHB11
			Depth	0.50	1.00
			Other ID	1	2
			Sample Type	ES	ES
			Sampling Date	20/07/2023	20/07/2023
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
1,2-dibromoethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Chlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1,1,2-tetrachloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Ethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
m+p-Xylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
o-Xylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Styrene	DETSC 3431*	0.01	mg/kg	< 0.01	< 0.01
Bromoform	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Isopropylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Bromobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2,3-trichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
n-propylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
2-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,3,5-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
4-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Tert-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2,4-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
sec-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
p-isopropyltoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,3-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,4-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
n-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2-dibromo-3-chloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2,4-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Hexachlorobutadiene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2,3-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
MTBE	DETSC 3431*	0.01	mg/kg	< 0.01	< 0.01

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

WASTE ACCEPTANCE CRITERIA TESTING ANALYTICAL REPORT

Our Ref 23-18359
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade
Sample Id BHB11 1 0.50
Sample Numbers 2212105 2212107
Date Analysed 21/08/2023

Test Results On Waste

Determinand and Method Reference	Units	Result	WAC Limit Values: Inert Waste	SNRHW	Hazardous Waste
DETSC 2084# Total Organic Carbon	%	1.3	3	5	6
DETSC 2003# Loss On Ignition	%	3.9	n/a	n/a	10
DETSC 3321# BTEX	mg/kg	< 0.04	6	n/a	n/a
DETSC 3401# PCBs (7 congeners)	mg/kg	< 0.01	1	n/a	n/a
DETSC 3311# EPH (C10 - C40): EH_1D_Total	mg/kg	< 10	500	n/a	n/a
DETSC 3301 PAHs	mg/kg	< 1.6	100	n/a	n/a
DETSC 2008# pH	pH Units	7.4	n/a	>6	n/a
DETSC 2073* Acid Neutralisation Capacity (pH4)	mol/kg	< 1.0	n/a	TBE	TBE
DETSC 2073* Acid Neutralisation Capacity (pH7)	mol/kg	< 1.0	n/a	TBE	TBE

Test Results On Leachate

Determinand and Method Reference	Conc in Eluate ug/l 10:1	Amount Leached* mg/kg LS10	WAC Limit Values (Limit values for LS10 Leachate): Inert Waste	SNRHW	Hazardous Waste
DETSC 2306 Arsenic as As	0.28	< 0.01	0.5	2	25
DETSC 2306 Barium as Ba	24	0.24	20	100	300
DETSC 2306 Cadmium as Cd	< 0.030	< 0.02	0.04	1	5
DETSC 2306 Chromium as Cr	0.31	< 0.1	0.5	10	70
DETSC 2306 Copper as Cu	0.71	< 0.02	2	50	100
DETSC 2306 Mercury as Hg	< 0.010	< 0.002	0.01	0.2	2
DETSC 2306 Molybdenum as Mo	2.1	< 0.1	0.5	10	30
DETSC 2306 Nickel as Ni	< 0.50	< 0.1	0.4	10	40
DETSC 2306 Lead as Pb	0.96	< 0.05	0.5	10	50
DETSC 2306 Antimony as Sb	0.42	< 0.05	0.06	0.7	5
DETSC 2306 Selenium as Se	2.3	< 0.03	0.1	0.5	7
DETSC 2306 Zinc as Zn	< 1.3	< 0.01	4	50	200
DETSC 2055 Chloride as Cl	1500	< 100	800	15,000	25,000
DETSC 2055* Fluoride as F	140	1.4	10	150	500
DETSC 2055 Sulphate as SO4	160000	1600	1000	20,000	50,000
DETSC 2009* Total Dissolved Solids	250000	2500	4000	60,000	100,000
DETSC 2130 Phenol Index	< 100	< 1	1	n/a	n/a
DETSC 2033* Dissolved Organic Carbon	2200	< 50	500	800	1000

TBE - To Be Evaluated
SNRHW - Stable Non-Reactive Hazardous Waste

Additional Information

DETSC 2008 pH	7.3
DETSC 2009 Conductivity uS/cm	361.0
* Temperature*	18.0

Mass of Sample Kg*	0.110
Mass of dry Sample Kg*	0.096

Stage 1

Volume of Leachant L2*	0.943
Volume of Eluate VE1*	0.89

Disclaimer: *The WAC limit values are provided for guidance only. DETS does not accept responsibility for errors or omissions. Values are correct at time of issue.*

V.2.06 ** DETS are accredited for the testing of leachates and not the leachate preparation stage which is unaccredited.*

WASTE ACCEPTANCE CRITERIA TESTING ANALYTICAL REPORT

Our Ref 23-18359
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade
Sample Id BHB11 2 1.00
Sample Numbers 2212106 2212108
Date Analysed 21/08/2023

Test Results On Waste

Determinand and Method Reference	Units	Result	WAC Limit Values Inert Waste	SNRHW	Hazardous Waste
DETSC 2084# Total Organic Carbon	%	1.6	3	5	6
DETSC 2003# Loss On Ignition	%	4.1	n/a	n/a	10
DETSC 3321# BTEX	mg/kg	< 0.04	6	n/a	n/a
DETSC 3401# PCBs (7 congeners)	mg/kg	< 0.01	1	n/a	n/a
DETSC 3311# EPH (C10 - C40): EH_1D_Total	mg/kg	< 10	500	n/a	n/a
DETSC 3301 PAHs	mg/kg	< 1.6	100	n/a	n/a
DETSC 2008# pH	pH Units	7.6	n/a	>6	n/a
DETSC 2073* Acid Neutralisation Capacity (pH4)	mol/kg	< 1.0	n/a	TBE	TBE
DETSC 2073* Acid Neutralisation Capacity (pH7)	mol/kg	< 1.0	n/a	TBE	TBE

Test Results On Leachate

Determinand and Method Reference	Conc in Eluate ug/l 10:1	Amount Leached* mg/kg LS10	WAC Limit Values (Limit values for LS10 Leachate) Inert Waste	SNRHW	Hazardous Waste
DETSC 2306 Arsenic as As	0.34	< 0.01	0.5	2	25
DETSC 2306 Barium as Ba	10	0.1	20	100	300
DETSC 2306 Cadmium as Cd	< 0.030	< 0.02	0.04	1	5
DETSC 2306 Chromium as Cr	< 0.25	< 0.1	0.5	10	70
DETSC 2306 Copper as Cu	0.85	< 0.02	2	50	100
DETSC 2306 Mercury as Hg	< 0.010	< 0.002	0.01	0.2	2
DETSC 2306 Molybdenum as Mo	1.2	< 0.1	0.5	10	30
DETSC 2306 Nickel as Ni	< 0.50	< 0.1	0.4	10	40
DETSC 2306 Lead as Pb	< 0.090	< 0.05	0.5	10	50
DETSC 2306 Antimony as Sb	0.23	< 0.05	0.06	0.7	5
DETSC 2306 Selenium as Se	0.66	< 0.03	0.1	0.5	7
DETSC 2306 Zinc as Zn	< 1.3	< 0.01	4	50	200
DETSC 2055 Chloride as Cl	1500	< 100	800	15,000	25,000
DETSC 2055* Fluoride as F	160	1.6	10	150	500
DETSC 2055 Sulphate as SO4	33000	330	1000	20,000	50,000
DETSC 2009* Total Dissolved Solids	93000	930	4000	60,000	100,000
DETSC 2130 Phenol Index	< 100	< 1	1	n/a	n/a
DETSC 2033* Dissolved Organic Carbon	3500	< 50	500	800	1000

TBE - To Be Evaluated
SNRHW - Stable Non-Reactive Hazardous Waste

Additional Information

DETSC 2008 pH	7.4
DETSC 2009 Conductivity uS/cm	133.0
* Temperature*	18.0

Mass of Sample Kg*	0.110
Mass of dry Sample Kg*	0.094

Stage 1

Volume of Leachant L2*	0.925
Volume of Eluate VE1*	0.87

Disclaimer: *The WAC limit values are provided for guidance only. DETS does not accept responsibility for errors or omissions. Values are correct at time of issue.*

V.2.06 ** DETS are accredited for the testing of leachates and not the leachate preparation stage which is unaccredited.*

Summary of Asbestos Analysis
Soil Samples

Our Ref 23-18359
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
2212105	BHB11 1 0.50	SOIL	NAD	none	Michael Kay
2212106	BHB11 2 1.00	SOIL	NAD	none	Michael Kay

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * - not included in laboratory scope of accreditation.

Information in Support of the Analytical Results

Our Ref 23-18359
Client Ref 23-0361
Contract East Meath North Dublin Grid Upgrade

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
2212105	BHB11 0.50 SOIL	20/07/23	GJ 250ml, GJ 60ml, PT 1L x2	pH + Conductivity (7 days), VOC (7 days)	
2212106	BHB11 1.00 SOIL	20/07/23	GJ 250ml, GJ 60ml, PT 1L x2	pH + Conductivity (7 days), VOC (7 days)	
2212107	BHB11 0.50 LEACHATE	20/07/23	GJ 250ml, GJ 60ml, PT 1L x2		
2212108	BHB11 1.00 LEACHATE	20/07/23	GJ 250ml, GJ 60ml, PT 1L x2		

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Information in Support of the Analytical Results

List of HWOL Acronyms and Operators

Acronym	Description
HS	Headspace analysis
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent
CU	Clean-up - e.g. by florisil, silica gel
1D	GC - Single coil gas chromatography
2D	GC-GC - Double coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative eg. EH+HS_Total or EH_CU+HS_Total

Det	Acronym
Aliphatic C5-C6	HS_1D_AL
Aliphatic C6-C8	HS_1D_AL
Aliphatic C8-C10	HS_1D_AL
Aliphatic C10-C12	EH_CU_1D_AL
Aliphatic C12-C16	EH_CU_1D_AL
Aliphatic C16-C21	EH_CU_1D_AL
Aliphatic C21-C35	EH_CU_1D_AL
Aliphatic C5-C35	EH_CU+HS_1D_AL
Aromatic C5-C7	HS_1D_AR
Aromatic C7-C8	HS_1D_AR
Aromatic C8-C10	HS_1D_AR
Aromatic C10-C12	EH_CU_1D_AR
Aromatic C12-C16	EH_CU_1D_AR
Aromatic C16-C21	EH_CU_1D_AR
Aromatic C21-C35	EH_CU_1D_AR
Aromatic C5-C35	EH_CU+HS_1D_AR
TPH Ali/Aro Total C5-C35	EH_CU+HS_1D_Total
TPH (C10-C40)	EH_1D_Total

End of Report

Certificate of Analysis

Certificate Number	23-18360	*Issued:*	21-Aug-23

Client Causeway Geotech
Unit 1 Fingal House
Stephenstown Industrial Estate
Balbriggan
Co. Dublin
K32 VR66

Our Reference	23-18360
Client Reference	23-0361
Order No	(not supplied)
Contract Title	East Meath North Dublin Grid Upgrade
Description	3 Soil samples, 3 Leachate samples.
Date Received	02-Aug-23
Date Started	02-Aug-23
Date Completed	21-Aug-23
Test Procedures	Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Kirk Bridgewood
General Manager

2139

Summary of Chemical Analysis
Soil Samples

Our Ref 23-18360
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade

	Lab No	2212109	2212110	2212111
	.Sample ID	BHA09a	BHB10	BHA24
	Depth	0.50	0.50	0.50
	Other ID			
	Sample Type	SOIL	SOIL	SOIL
	Sampling Date	12/07/2023	12/07/2023	13/07/2023
	Sampling Time	n/s	n/s	n/s

Test	Method	LOD	Units			
Metals						
Arsenic	DETSC 2301#	0.2	mg/kg	13	14	8.0
Boron, Water Soluble (2.5:1)	DETSC 2311#	0.2	mg/kg	< 0.2	< 0.2	< 0.2
Cadmium	DETSC 2301#	0.1	mg/kg	2.5	2.0	1.9
Chromium	DETSC 2301#	0.15	mg/kg	11	12	9.3
Copper	DETSC 2301#	0.2	mg/kg	36	32	23
Lead	DETSC 2301#	0.3	mg/kg	15	11	9.5
Mercury	DETSC 2325#	0.05	mg/kg	0.05	< 0.05	< 0.05
Nickel	DETSC 2301#	1	mg/kg	34	35	26
Zinc	DETSC 2301#	1	mg/kg	69	83	52
Inorganics						
pH	DETSC 2008#		pH	8.3	8.1	8.3
Cyanide, Total	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Organic matter	DETSC 2002#	0.1	%	0.8	1.0	0.7
Sulphate Aqueous Extract as SO4 (2:1)	DETSC 2076#	10	mg/l	15	110	12
Petroleum Hydrocarbons						
Aliphatic C5-C6: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Aliphatic C6-C8: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Aliphatic C8-C10: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Aliphatic C10-C12: EH_CU_1D_AL	DETSC 3072#	1.5	mg/kg	21	< 1.5	< 1.5
Aliphatic C12-C16: EH_CU_1D_AL	DETSC 3072#	1.2	mg/kg	9.6	< 1.2	< 1.2
Aliphatic C16-C21: EH_CU_1D_AL	DETSC 3072#	1.5	mg/kg	6.3	< 1.5	< 1.5
Aliphatic C21-C35: EH_CU_1D_AL	DETSC 3072#	3.4	mg/kg	4.4	< 3.4	< 3.4
Aliphatic C5-C35: EH_CU+HS_1D_AL	DETSC 3072*	10	mg/kg	41	< 10	< 10
Aromatic C5-C7: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Aromatic C7-C8: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Aromatic C8-C10: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Aromatic C10-C12: EH_CU_1D_AR	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9	< 0.9
Aromatic C12-C16: EH_CU_1D_AR	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Aromatic C16-C21: EH_CU_1D_AR	DETSC 3072#	0.6	mg/kg	< 0.6	< 0.6	< 0.6
Aromatic C21-C35: EH_CU_1D_AR	DETSC 3072#	1.4	mg/kg	< 1.4	< 1.4	< 1.4
Aromatic C5-C35: EH_CU+HS_1D_AR	DETSC 3072*	10	mg/kg	< 10	< 10	< 10
TPH Ali/Aro Total C5-C35: EH_CU+HS_1D_Total	DETSC 3072*	10	mg/kg	41	< 10	< 10
Benzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Ethylbenzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Toluene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Xylene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01
PAHs						
Naphthalene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Acenaphthylene	DETSC 3301	0.1	mg/kg	0.1	0.1	< 0.1
Acenaphthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 23-18360
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade

			Lab No	2212109	2212110	2212111
			.Sample ID	BHA09a	BHB10	BHA24
			Depth	0.50	0.50	0.50
			Other ID			
			Sample Type	SOIL	SOIL	SOIL
			Sampling Date	12/07/2023	12/07/2023	13/07/2023
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
Fluorene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Phenanthrene	DETSC 3301	0.1	mg/kg	0.1	0.1	0.1
Anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Benzo(a)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Chrysene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Benzo(b)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Benzo(k)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Benzo(a)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Indeno(1,2,3-c,d)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Dibenzo(a,h)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Benzo(g,h,i)perylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Coronene	DETSC 3301*	0.1	mg/kg	< 0.1	< 0.1	< 0.1
PAH 16 Total	DETSC 3301	1.6	mg/kg	< 1.6	< 1.6	< 1.6
Phenols						
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	1.1
VOCs						
Vinyl Chloride	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01
1,1 Dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Trans-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01
1,1-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Cis-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01
2,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Bromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Chloroform	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01
1,1,1-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01
1,1-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Carbon tetrachloride	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Benzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01
1,2-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Trichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01
1,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Dibromomethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Bromodichloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01
cis-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Toluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01
trans-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01
1,1,2-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Tetrachloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01
1,3-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Dibromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 23-18360
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade

			Lab No	2212109	2212110	2212111
			.Sample ID	BHA09a	BHB10	BHA24
			Depth	0.50	0.50	0.50
			Other ID			
			Sample Type	SOIL	SOIL	SOIL
			Sampling Date	12/07/2023	12/07/2023	13/07/2023
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
1,2-dibromoethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Chlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01
1,1,1,2-tetrachloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Ethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01
m+p-Xylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01
o-Xylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Styrene	DETSC 3431*	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Bromoform	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Isopropylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Bromobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01
1,2,3-trichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01
n-propylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01
2-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01
1,3,5-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01
4-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Tert-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01
1,2,4-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01
sec-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01
p-isopropyltoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01
1,3-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01
1,4-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01
n-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01
1,2-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01
1,2-dibromo-3-chloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01
1,2,4-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Hexachlorobutadiene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01
1,2,3-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01
MTBE	DETSC 3431*	0.01	mg/kg	< 0.01	< 0.01	< 0.01

WASTE ACCEPTANCE CRITERIA TESTING ANALYTICAL REPORT

Our Ref 23-18360
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade
Sample Id BHA09a 0.50
Sample Numbers 2212109 2212112
Date Analysed 21/08/2023

Test Results On Waste

Determinand and Method Reference	Units	Result	WAC Limit Values: Inert Waste	SNRHW	Hazardous Waste
DETSC 2084# Total Organic Carbon	%	1.4	3	5	6
DETSC 2003# Loss On Ignition	%	3.0	n/a	n/a	10
DETSC 3321# BTEX	mg/kg	< 0.04	6	n/a	n/a
DETSC 3401# PCBs (7 congeners)	mg/kg	< 0.01	1	n/a	n/a
DETSC 3311# EPH (C10 - C40): EH_1D_Total	mg/kg	< 10	500	n/a	n/a
DETSC 3301 PAHs	mg/kg	< 1.6	100	n/a	n/a
DETSC 2008# pH	pH Units	8.3	n/a	>6	n/a
DETSC 2073* Acid Neutralisation Capacity (pH4)	mol/kg	< 1.0	n/a	TBE	TBE
DETSC 2073* Acid Neutralisation Capacity (pH7)	mol/kg	< 1.0	n/a	TBE	TBE

Test Results On Leachate

Determinand and Method Reference	Conc in Eluate ug/l 10:1	Amount Leached* mg/kg LS10	WAC Limit Values (Limit values for LS10 Leachate): Inert Waste	SNRHW	Hazardous Waste
DETSC 2306 Arsenic as As	0.28	< 0.01	0.5	2	25
DETSC 2306 Barium as Ba	1.7	< 0.1	20	100	300
DETSC 2306 Cadmium as Cd	< 0.030	< 0.02	0.04	1	5
DETSC 2306 Chromium as Cr	< 0.25	< 0.1	0.5	10	70
DETSC 2306 Copper as Cu	< 0.40	< 0.02	2	50	100
DETSC 2306 Mercury as Hg	< 0.010	< 0.002	0.01	0.2	2
DETSC 2306 Molybdenum as Mo	3.3	< 0.1	0.5	10	30
DETSC 2306 Nickel as Ni	< 0.50	< 0.1	0.4	10	40
DETSC 2306 Lead as Pb	< 0.090	< 0.05	0.5	10	50
DETSC 2306 Antimony as Sb	< 0.17	< 0.05	0.06	0.7	5
DETSC 2306 Selenium as Se	< 0.25	< 0.03	0.1	0.5	7
DETSC 2306 Zinc as Zn	< 1.3	< 0.01	4	50	200
DETSC 2055 Chloride as Cl	900	< 100	800	15,000	25,000
DETSC 2055* Fluoride as F	100	1	10	150	500
DETSC 2055 Sulphate as SO4	2000	< 100	1000	20,000	50,000
DETSC 2009* Total Dissolved Solids	38000	380	4000	60,000	100,000
DETSC 2130 Phenol Index	< 100	< 1	1	n/a	n/a
DETSC 2033* Dissolved Organic Carbon	2700	< 50	500	800	1000

TBE - To Be Evaluated
SNRHW - Stable Non-Reactive Hazardous Waste

Additional Information

DETSC 2008 pH	8.0
DETSC 2009 Conductivity uS/cm	53.7
* Temperature*	18.0

Mass of Sample Kg*	0.110
Mass of dry Sample Kg*	0.096

Stage 1

Volume of Leachant L2*	0.949
Volume of Eluate VE1*	0.9

Disclaimer: *The WAC limit values are provided for guidance only. DETS does not accept responsibility for errors or omissions. Values are correct at time of issue.*

V.2.06 ** DETS are accredited for the testing of leachates and not the leachate preparation stage which is unaccredited.*

WASTE ACCEPTANCE CRITERIA TESTING ANALYTICAL REPORT

Our Ref 23-18360
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade
Sample Id BHB10 0.50
Sample Numbers 2212110 2212113
Date Analysed 21/08/2023

Test Results On Waste

Determinand and Method Reference	Units	Result	WAC Limit Values: Inert Waste	SNRHW	Hazardous Waste
DETSC 2084# Total Organic Carbon	%	1.2	3	5	6
DETSC 2003# Loss On Ignition	%	2.2	n/a	n/a	10
DETSC 3321# BTEX	mg/kg	< 0.04	6	n/a	n/a
DETSC 3401# PCBs (7 congeners)	mg/kg	< 0.01	1	n/a	n/a
DETSC 3311# EPH (C10 - C40): EH_1D_Total	mg/kg	< 10	500	n/a	n/a
DETSC 3301 PAHs	mg/kg	< 1.6	100	n/a	n/a
DETSC 2008# pH	pH Units	8.1	n/a	>6	n/a
DETSC 2073* Acid Neutralisation Capacity (pH4)	mol/kg	< 1.0	n/a	TBE	TBE
DETSC 2073* Acid Neutralisation Capacity (pH7)	mol/kg	< 1.0	n/a	TBE	TBE

Test Results On Leachate

Determinand and Method Reference	Conc in Eluate ug/l 10:1	Amount Leached* mg/kg LS10	WAC Limit Values (Limit values for LS10 Leachate): Inert Waste	SNRHW	Hazardous Waste
DETSC 2306 Arsenic as As	0.25	< 0.01	0.5	2	25
DETSC 2306 Barium as Ba	5.2	< 0.1	20	100	300
DETSC 2306 Cadmium as Cd	< 0.030	< 0.02	0.04	1	5
DETSC 2306 Chromium as Cr	< 0.25	< 0.1	0.5	10	70
DETSC 2306 Copper as Cu	< 0.40	< 0.02	2	50	100
DETSC 2306 Mercury as Hg	< 0.010	< 0.002	0.01	0.2	2
DETSC 2306 Molybdenum as Mo	2.9	< 0.1	0.5	10	30
DETSC 2306 Nickel as Ni	< 0.50	< 0.1	0.4	10	40
DETSC 2306 Lead as Pb	< 0.090	< 0.05	0.5	10	50
DETSC 2306 Antimony as Sb	< 0.17	< 0.05	0.06	0.7	5
DETSC 2306 Selenium as Se	< 0.25	< 0.03	0.1	0.5	7
DETSC 2306 Zinc as Zn	< 1.3	< 0.01	4	50	200
DETSC 2055 Chloride as Cl	1100	< 100	800	15,000	25,000
DETSC 2055* Fluoride as F	110	1.1	10	150	500
DETSC 2055 Sulphate as SO4	13000	130	1000	20,000	50,000
DETSC 2009* Total Dissolved Solids	67000	670	4000	60,000	100,000
DETSC 2130 Phenol Index	< 100	< 1	1	n/a	n/a
DETSC 2033* Dissolved Organic Carbon	2200	< 50	500	800	1000

TBE - To Be Evaluated
SNRHW - Stable Non-Reactive Hazardous Waste

Additional Information

DETSC 2008 pH	7.8
DETSC 2009 Conductivity uS/cm	95.5
* Temperature*	18.0

Mass of Sample Kg*	0.110
Mass of dry Sample Kg*	0.097

Stage 1

Volume of Leachant L2*	0.955
Volume of Eluate VE1*	0.9

Disclaimer: *The WAC limit values are provided for guidance only. DETS does not accept responsibility for errors or omissions. Values are correct at time of issue.*

V.2.06 ** DETS are accredited for the testing of leachates and not the leachate preparation stage which is unaccredited.*

WASTE ACCEPTANCE CRITERIA TESTING ANALYTICAL REPORT

Our Ref 23-18360
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade
Sample Id BHA24 0.50
Sample Numbers 2212111 2212114
Date Analysed 21/08/2023

Test Results On Waste

Determinand and Method Reference	Units	Result	WAC Limit Values: Inert Waste	SNRHW	Hazardous Waste
DETSC 2084# Total Organic Carbon	%	1.5	3	5	6
DETSC 2003# Loss On Ignition	%	2.1	n/a	n/a	10
DETSC 3321# BTEX	mg/kg	< 0.04	6	n/a	n/a
DETSC 3401# PCBs (7 congeners)	mg/kg	< 0.01	1	n/a	n/a
DETSC 3311# EPH (C10 - C40): EH_1D_Total	mg/kg	< 10	500	n/a	n/a
DETSC 3301 PAHs	mg/kg	< 1.6	100	n/a	n/a
DETSC 2008# pH	pH Units	8.3	n/a	>6	n/a
DETSC 2073* Acid Neutralisation Capacity (pH4)	mol/kg	< 1.0	n/a	TBE	TBE
DETSC 2073* Acid Neutralisation Capacity (pH7)	mol/kg	< 1.0	n/a	TBE	TBE

Test Results On Leachate

Determinand and Method Reference	Conc in Eluate ug/l 10:1	Amount Leached* mg/kg LS10	WAC Limit Values (Limit values for LS10 Leachate): Inert Waste	SNRHW	Hazardous Waste
DETSC 2306 Arsenic as As	0.18	< 0.01	0.5	2	25
DETSC 2306 Barium as Ba	4	< 0.1	20	100	300
DETSC 2306 Cadmium as Cd	< 0.030	< 0.02	0.04	1	5
DETSC 2306 Chromium as Cr	< 0.25	< 0.1	0.5	10	70
DETSC 2306 Copper as Cu	0.49	< 0.02	2	50	100
DETSC 2306 Mercury as Hg	< 0.010	< 0.002	0.01	0.2	2
DETSC 2306 Molybdenum as Mo	2.6	< 0.1	0.5	10	30
DETSC 2306 Nickel as Ni	< 0.50	< 0.1	0.4	10	40
DETSC 2306 Lead as Pb	< 0.090	< 0.05	0.5	10	50
DETSC 2306 Antimony as Sb	< 0.17	< 0.05	0.06	0.7	5
DETSC 2306 Selenium as Se	< 0.25	< 0.03	0.1	0.5	7
DETSC 2306 Zinc as Zn	< 1.3	< 0.01	4	50	200
DETSC 2055 Chloride as Cl	1400	< 100	800	15,000	25,000
DETSC 2055* Fluoride as F	140	1.4	10	150	500
DETSC 2055 Sulphate as SO4	2600	< 100	1000	20,000	50,000
DETSC 2009* Total Dissolved Solids	49000	490	4000	60,000	100,000
DETSC 2130 Phenol Index	< 100	< 1	1	n/a	n/a
DETSC 2033* Dissolved Organic Carbon	3100	< 50	500	800	1000

TBE - To Be Evaluated
SNRHW - Stable Non-Reactive Hazardous Waste

Additional Information

DETSC 2008 pH	8.0
DETSC 2009 Conductivity uS/cm	70.3
* Temperature*	18.0

Mass of Sample Kg*	0.110
Mass of dry Sample Kg*	0.098

Stage 1

Volume of Leachant L2*	0.969
Volume of Eluate VE1*	0.91

Disclaimer: *The WAC limit values are provided for guidance only. DETS does not accept responsibility for errors or omissions. Values are correct at time of issue.*

V.2.06 ** DETS are accredited for the testing of leachates and not the leachate preparation stage which is unaccredited.*

Summary of Asbestos Analysis
Soil Samples

Our Ref 23-18360
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
2212109	BHA09a 0.50	SOIL	NAD	none	Steven Lambert
2212110	BHB10 0.50	SOIL	NAD	none	Steven Lambert
2212111	BHA24 0.50	SOIL	NAD	none	Steven Lambert

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * - not included in laboratory scope of accreditation.

Information in Support of the Analytical Results

Our Ref 23-18360
Client Ref 23-0361
Contract East Meath North Dublin Grid Upgrade

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
2212109	BHA09a 0.50 SOIL	12/07/23	GJ 250ml, GJ 60ml, PT 1L	Aliphatics/Aromatics (14 days), BTEX / C5-C10 (14 days), Naphthalene (14 days), PAH FID (14 days), pH + Conductivity (7 days), Cyanide/Mono pHoh (14 days), EPH/TPH (14 days), VOC (7 days)	
2212110	BHB10 0.50 SOIL	12/07/23	GJ 250ml, GJ 60ml, PT 1L x3	Aliphatics/Aromatics (14 days), BTEX / C5-C10 (14 days), Naphthalene (14 days), PAH FID (14 days), pH + Conductivity (7 days), Cyanide/Mono pHoh (14 days), EPH/TPH (14 days), VOC (7 days)	
2212111	BHA24 0.50 SOIL	13/07/23	GJ 250ml, GJ 60ml, PT 1L	Aliphatics/Aromatics (14 days), BTEX / C5-C10 (14 days), Naphthalene (14 days), PAH FID (14 days), pH + Conductivity (7 days), Cyanide/Mono pHoh (14 days), EPH/TPH (14 days), VOC (7 days)	
2212112	BHA09a 0.50 LEACHATE	12/07/23	GJ 250ml, GJ 60ml, PT 1L		
2212113	BHB10 0.50 LEACHATE	12/07/23	GJ 250ml, GJ 60ml, PT 1L x3		
2212114	BHA24 0.50 LEACHATE	13/07/23	GJ 250ml, GJ 60ml, PT 1L		

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Information in Support of the Analytical Results

List of HWOL Acronyms and Operators

Acronym	Description
HS	Headspace analysis
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent
CU	Clean-up - e.g. by florisil, silica gel
1D	GC - Single coil gas chromatography
2D	GC-GC - Double coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative eg. EH+HS_Total or EH_CU+HS_Total

Det	Acronym
Aliphatic C5-C6	HS_1D_AL
Aliphatic C6-C8	HS_1D_AL
Aliphatic C8-C10	HS_1D_AL
Aliphatic C10-C12	EH_CU_1D_AL
Aliphatic C12-C16	EH_CU_1D_AL
Aliphatic C16-C21	EH_CU_1D_AL
Aliphatic C21-C35	EH_CU_1D_AL
Aliphatic C5-C35	EH_CU+HS_1D_AL
Aromatic C5-C7	HS_1D_AR
Aromatic C7-C8	HS_1D_AR
Aromatic C8-C10	HS_1D_AR
Aromatic C10-C12	EH_CU_1D_AR
Aromatic C12-C16	EH_CU_1D_AR
Aromatic C16-C21	EH_CU_1D_AR
Aromatic C21-C35	EH_CU_1D_AR
Aromatic C5-C35	EH_CU+HS_1D_AR
TPH Ali/Aro Total C5-C35	EH_CU+HS_1D_Total
TPH (C10-C40)	EH_1D_Total

End of Report

Certificate of Analysis

Certificate Number 23-19631 *Issued:* 07-Sep-23

Client Causeway Geotech
Unit 1 Fingal House
Stephenstown Industrial Estate
Balbriggan
Co. Dublin
K32 VR66

Our Reference 23-19631

Client Reference 23-0361

Order No (not supplied)

Contract Title East Meath North Dublin Grid Upgrade

Description 1 Soil sample, 1 Leachate sample.

Date Received 17-Aug-23

Date Started 17-Aug-23

Date Completed 07-Sep-23

Test Procedures Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Kirk Bridgewood
General Manager

2139

Summary of Chemical Analysis
Soil Samples

Our Ref 23-19631
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade

Lab No	2219903
.Sample ID	BHB43
Depth	1.00
Other ID	
Sample Type	ES
Sampling Date	09/08/2023
Sampling Time	n/s

Test	Method	LOD	Units	
Metals				
Arsenic	DETSC 2301#	0.2	mg/kg	16
Boron, Water Soluble (2.5:1)	DETSC 2311#	0.2	mg/kg	0.2
Cadmium	DETSC 2301#	0.1	mg/kg	1.6
Chromium	DETSC 2301#	0.15	mg/kg	13
Copper	DETSC 2301#	0.2	mg/kg	27
Lead	DETSC 2301#	0.3	mg/kg	19
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05
Nickel	DETSC 2301#	1	mg/kg	27
Zinc	DETSC 2301#	1	mg/kg	67
Inorganics				
pH	DETSC 2008#		pH	8.5
Cyanide, Total	DETSC 2130#	0.1	mg/kg	0.1
Organic matter	DETSC 2002#	0.1	%	1.0
Sulphate Aqueous Extract as SO4 (2:1)	DETSC 2076#	10	mg/l	30
Petroleum Hydrocarbons				
Aliphatic C5-C6: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01
Aliphatic C6-C8: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01
Aliphatic C8-C10: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01
Aliphatic C10-C12: EH_CU_1D_AL	DETSC 3072#	1.5	mg/kg	< 1.5
Aliphatic C12-C16: EH_CU_1D_AL	DETSC 3072#	1.2	mg/kg	< 1.2
Aliphatic C16-C21: EH_CU_1D_AL	DETSC 3072#	1.5	mg/kg	< 1.5
Aliphatic C21-C35: EH_CU_1D_AL	DETSC 3072#	3.4	mg/kg	< 3.4
Aliphatic C5-C35: EH_CU+HS_1D_AL	DETSC 3072*	10	mg/kg	< 10
Aromatic C5-C7: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01
Aromatic C7-C8: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01
Aromatic C8-C10: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01
Aromatic C10-C12: EH_CU_1D_AR	DETSC 3072#	0.9	mg/kg	< 0.9
Aromatic C12-C16: EH_CU_1D_AR	DETSC 3072#	0.5	mg/kg	< 0.5
Aromatic C16-C21: EH_CU_1D_AR	DETSC 3072#	0.6	mg/kg	< 0.6
Aromatic C21-C35: EH_CU_1D_AR	DETSC 3072#	1.4	mg/kg	< 1.4
Aromatic C5-C35: EH_CU+HS_1D_AR	DETSC 3072*	10	mg/kg	< 10
TPH Ali/Aro Total C5-C35: EH_CU+HS_1D_Total	DETSC 3072*	10	mg/kg	< 10
Benzene	DETSC 3321#	0.01	mg/kg	< 0.01
Ethylbenzene	DETSC 3321#	0.01	mg/kg	< 0.01
Toluene	DETSC 3321#	0.01	mg/kg	< 0.01
Xylene	DETSC 3321#	0.01	mg/kg	< 0.01
PAHs				
Naphthalene	DETSC 3301	0.1	mg/kg	< 0.1
Acenaphthylene	DETSC 3301	0.1	mg/kg	< 0.1
Acenaphthene	DETSC 3301	0.1	mg/kg	< 0.1

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 23-19631
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade

Lab No	2219903
.Sample ID	BHB43
Depth	1.00
Other ID	
Sample Type	ES
Sampling Date	09/08/2023
Sampling Time	n/s

Test	Method	LOD	Units	
Fluorene	DETSC 3301	0.1	mg/kg	< 0.1
Phenanthrene	DETSC 3301	0.1	mg/kg	< 0.1
Anthracene	DETSC 3301	0.1	mg/kg	< 0.1
Fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1
Pyrene	DETSC 3301	0.1	mg/kg	< 0.1
Benzo(a)anthracene	DETSC 3301	0.1	mg/kg	< 0.1
Chrysene	DETSC 3301	0.1	mg/kg	< 0.1
Benzo(b)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1
Benzo(k)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1
Benzo(a)pyrene	DETSC 3301	0.1	mg/kg	< 0.1
Indeno(1,2,3-c,d)pyrene	DETSC 3301	0.1	mg/kg	< 0.1
Dibenzo(a,h)anthracene	DETSC 3301	0.1	mg/kg	< 0.1
Benzo(g,h,i)perylene	DETSC 3301	0.1	mg/kg	< 0.1
Coronene	DETSC 3301*	0.1	mg/kg	< 0.1
PAH 16 Total	DETSC 3301	1.6	mg/kg	< 1.6
Phenols				
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3
VOCs				
Vinyl Chloride	DETSC 3431	0.01	mg/kg	< 0.01
1,1 Dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
Trans-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
1,1-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Cis-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
2,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
Bromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01
Chloroform	DETSC 3431	0.01	mg/kg	< 0.01
1,1,1-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
1,1-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01
Carbon tetrachloride	DETSC 3431	0.01	mg/kg	< 0.01
Benzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Trichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
Dibromomethane	DETSC 3431	0.01	mg/kg	< 0.01
Bromodichloromethane	DETSC 3431	0.01	mg/kg	< 0.01
cis-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01
Toluene	DETSC 3431	0.01	mg/kg	< 0.01
trans-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01
1,1,2-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Tetrachloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
1,3-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
Dibromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 23-19631
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade

Lab No	2219903
.Sample ID	BHB43
Depth	1.00
Other ID	
Sample Type	ES
Sampling Date	09/08/2023
Sampling Time	n/s

Test	Method	LOD	Units	
1,2-dibromoethane	DETSC 3431	0.01	mg/kg	< 0.01
Chlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,1,1,2-tetrachloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Ethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
m+p-Xylene	DETSC 3431	0.01	mg/kg	< 0.01
o-Xylene	DETSC 3431	0.01	mg/kg	< 0.01
Styrene	DETSC 3431*	0.01	mg/kg	< 0.01
Bromoform	DETSC 3431	0.01	mg/kg	< 0.01
Isopropylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
Bromobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2,3-trichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
n-propylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
2-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01
1,3,5-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
4-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01
Tert-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2,4-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
sec-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
p-isopropyltoluene	DETSC 3431	0.01	mg/kg	< 0.01
1,3-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,4-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
n-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dibromo-3-chloropropane	DETSC 3431	0.01	mg/kg	< 0.01
1,2,4-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
Hexachlorobutadiene	DETSC 3431	0.01	mg/kg	< 0.01
1,2,3-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
MTBE	DETSC 3431*	0.01	mg/kg	< 0.01

WASTE ACCEPTANCE CRITERIA TESTING ANALYTICAL REPORT

Our Ref 23-19631
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade
Sample Id BHB43 1.00
Sample Numbers 2219903 2219904
Date Analysed 07/09/2023

Test Results On Waste

Determinand and Method Reference	Units	Result	WAC Limit Values Inert Waste	SNRHW	Hazardous Waste
DETSC 2084# Total Organic Carbon	%	1.4	3	5	6
DETSC 2003# Loss On Ignition	%	1.8	n/a	n/a	10
DETSC 3321# BTEX	mg/kg	< 0.04	6	n/a	n/a
DETSC 3401# PCBs (7 congeners)	mg/kg	< 0.01	1	n/a	n/a
DETSC 3311# EPH (C10 - C40): EH_1D_Total	mg/kg	< 10	500	n/a	n/a
DETSC 3301 PAHs	mg/kg	< 1.6	100	n/a	n/a
DETSC 2008# pH	pH Units	8.5	n/a	>6	n/a
DETSC 2073* Acid Neutralisation Capacity (pH4)	mol/kg	< 1.0	n/a	TBE	TBE
DETSC 2073* Acid Neutralisation Capacity (pH7)	mol/kg	< 1.0	n/a	TBE	TBE

Test Results On Leachate

Determinand and Method Reference	Conc in Eluate ug/l 10:1	Amount Leached* mg/kg LS10	WAC Limit Values (Limit values for LS10 Leachate) Inert Waste	SNRHW	Hazardous Waste
DETSC 2306 Arsenic as As	0.7	< 0.01	0.5	2	25
DETSC 2306 Barium as Ba	8.3	< 0.1	20	100	300
DETSC 2306 Cadmium as Cd	0.088	< 0.02	0.04	1	5
DETSC 2306 Chromium as Cr	0.68	< 0.1	0.5	10	70
DETSC 2306 Copper as Cu	1.4	< 0.02	2	50	100
DETSC 2306 Mercury as Hg	0.02	< 0.002	0.01	0.2	2
DETSC 2306 Molybdenum as Mo	5.3	< 0.1	0.5	10	30
DETSC 2306 Nickel as Ni	0.64	< 0.1	0.4	10	40
DETSC 2306 Lead as Pb	1.2	< 0.05	0.5	10	50
DETSC 2306 Antimony as Sb	0.31	< 0.05	0.06	0.7	5
DETSC 2306 Selenium as Se	1.5	< 0.03	0.1	0.5	7
DETSC 2306 Zinc as Zn	1.5	0.015	4	50	200
DETSC 2055 Chloride as Cl	740	< 100	800	15,000	25,000
DETSC 2055* Fluoride as F	< 100	< 0.1	10	150	500
DETSC 2055 Sulphate as SO4	2500	< 100	1000	20,000	50,000
DETSC 2009* Total Dissolved Solids	34000	340	4000	60,000	100,000
DETSC 2130 Phenol Index	< 100	< 1	1	n/a	n/a
DETSC 2033* Dissolved Organic Carbon	< 2000	< 50	500	800	1000

TBE - To Be Evaluated
SNRHW - Stable Non-Reactive Hazardous Waste

Additional Information

DETSC 2008 pH	8.5
DETSC 2009 Conductivity uS/cm	47.9
* Temperature*	19.0

Mass of Sample Kg*	0.110
Mass of dry Sample Kg*	0.100

Stage 1

Volume of Leachant L2*	0.987
Volume of Eluate VE1*	0.932

Disclaimer: *The WAC limit values are provided for guidance only. DETS does not accept responsibility for errors or omissions. Values are correct at time of issue.*

V.2.06 ** DETS are accredited for the testing of leachates and not the leachate preparation stage which is unaccredited.*

Summary of Asbestos Analysis
Soil Samples

Our Ref 23-19631
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
2219903	BHB43 1.00	SOIL	NAD	none	Michael Kay

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * - not included in laboratory scope of accreditation.

Information in Support of the Analytical Results

Our Ref 23-19631
Client Ref 23-0361
Contract East Meath North Dublin Grid Upgrade

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
2219903	BHB43 1.00 SOIL	09/08/23	GJ 250ml, GJ 60ml, PT 1L x2	pH + Conductivity (7 days), VOC (7 days)	
2219904	BHB43 1.00 LEACHATE	09/08/23	GJ 250ml, GJ 60ml, PT 1L x2		

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Information in Support of the Analytical Results

List of HWOL Acronyms and Operators

Acronym	Description
HS	Headspace analysis
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent
CU	Clean-up - e.g. by florisil, silica gel
1D	GC - Single coil gas chromatography
2D	GC-GC - Double coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative eg. EH+HS_Total or EH_CU+HS_Total

Det	Acronym
Aliphatic C5-C6	HS_1D_AL
Aliphatic C6-C8	HS_1D_AL
Aliphatic C8-C10	HS_1D_AL
Aliphatic C10-C12	EH_CU_1D_AL
Aliphatic C12-C16	EH_CU_1D_AL
Aliphatic C16-C21	EH_CU_1D_AL
Aliphatic C21-C35	EH_CU_1D_AL
Aliphatic C5-C35	EH_CU+HS_1D_AL
Aromatic C5-C7	HS_1D_AR
Aromatic C7-C8	HS_1D_AR
Aromatic C8-C10	HS_1D_AR
Aromatic C10-C12	EH_CU_1D_AR
Aromatic C12-C16	EH_CU_1D_AR
Aromatic C16-C21	EH_CU_1D_AR
Aromatic C21-C35	EH_CU_1D_AR
Aromatic C5-C35	EH_CU+HS_1D_AR
TPH Ali/Aro Total C5-C35	EH_CU+HS_1D_Total
TPH (C10-C40)	EH_1D_Total

End of Report

Certificate of Analysis

Certificate Number	23-19634	*Issued:*	07-Sep-23

Client Causeway Geotech
Unit 1 Fingal House
Stephenstown Industrial Estate
Balbriggan
Co. Dublin
K32 VR66

Our Reference	23-19634
Client Reference	23-0361
Order No	(not supplied)
Contract Title	East Meath North Dublin Grid Upgrade
Description	1 Soil sample, 1 Leachate sample.
Date Received	17-Aug-23
Date Started	17-Aug-23
Date Completed	07-Sep-23
Test Procedures	Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Kirk Bridgewood
General Manager

2139

Summary of Chemical Analysis
Soil Samples

Our Ref 23-19634
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade

Lab No	2219913
.Sample ID	BHA05
Depth	1.00
Other ID	
Sample Type	ES
Sampling Date	10/08/2023
Sampling Time	n/s

Test	Method	LOD	Units	
Metals				
Arsenic	DETSC 2301#	0.2	mg/kg	5.9
Boron, Water Soluble (2.5:1)	DETSC 2311#	0.2	mg/kg	0.3
Cadmium	DETSC 2301#	0.1	mg/kg	0.5
Chromium	DETSC 2301#	0.15	mg/kg	9.0
Copper	DETSC 2301#	0.2	mg/kg	15
Lead	DETSC 2301#	0.3	mg/kg	270
Mercury	DETSC 2325#	0.05	mg/kg	0.09
Nickel	DETSC 2301#	1	mg/kg	10
Zinc	DETSC 2301#	1	mg/kg	190
Inorganics				
pH	DETSC 2008#		pH	8.0
Cyanide, Total	DETSC 2130#	0.1	mg/kg	< 0.1
Organic matter	DETSC 2002#	0.1	%	1.1
Sulphate Aqueous Extract as SO4 (2:1)	DETSC 2076#	10	mg/l	< 10
Petroleum Hydrocarbons				
Aliphatic C5-C6: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01
Aliphatic C6-C8: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01
Aliphatic C8-C10: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01
Aliphatic C10-C12: EH_CU_1D_AL	DETSC 3072#	1.5	mg/kg	< 1.5
Aliphatic C12-C16: EH_CU_1D_AL	DETSC 3072#	1.2	mg/kg	< 1.2
Aliphatic C16-C21: EH_CU_1D_AL	DETSC 3072#	1.5	mg/kg	< 1.5
Aliphatic C21-C35: EH_CU_1D_AL	DETSC 3072#	3.4	mg/kg	< 3.4
Aliphatic C5-C35: EH_CU+HS_1D_AL	DETSC 3072*	10	mg/kg	< 10
Aromatic C5-C7: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01
Aromatic C7-C8: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01
Aromatic C8-C10: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01
Aromatic C10-C12: EH_CU_1D_AR	DETSC 3072#	0.9	mg/kg	< 0.9
Aromatic C12-C16: EH_CU_1D_AR	DETSC 3072#	0.5	mg/kg	< 0.5
Aromatic C16-C21: EH_CU_1D_AR	DETSC 3072#	0.6	mg/kg	< 0.6
Aromatic C21-C35: EH_CU_1D_AR	DETSC 3072#	1.4	mg/kg	< 1.4
Aromatic C5-C35: EH_CU+HS_1D_AR	DETSC 3072*	10	mg/kg	< 10
TPH Ali/Aro Total C5-C35: EH_CU+HS_1D_Total	DETSC 3072*	10	mg/kg	< 10
Benzene	DETSC 3321#	0.01	mg/kg	< 0.01
Ethylbenzene	DETSC 3321#	0.01	mg/kg	< 0.01
Toluene	DETSC 3321#	0.01	mg/kg	< 0.01
Xylene	DETSC 3321#	0.01	mg/kg	< 0.01
PAHs				
Naphthalene	DETSC 3301	0.1	mg/kg	< 0.1
Acenaphthylene	DETSC 3301	0.1	mg/kg	< 0.1
Acenaphthene	DETSC 3301	0.1	mg/kg	< 0.1

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 23-19634
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade

Lab No	2219913
.Sample ID	BHA05
Depth	1.00
Other ID	
Sample Type	ES
Sampling Date	10/08/2023
Sampling Time	n/s

Test	Method	LOD	Units	
Fluorene	DETSC 3301	0.1	mg/kg	< 0.1
Phenanthrene	DETSC 3301	0.1	mg/kg	< 0.1
Anthracene	DETSC 3301	0.1	mg/kg	< 0.1
Fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1
Pyrene	DETSC 3301	0.1	mg/kg	< 0.1
Benzo(a)anthracene	DETSC 3301	0.1	mg/kg	< 0.1
Chrysene	DETSC 3301	0.1	mg/kg	< 0.1
Benzo(b)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1
Benzo(k)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1
Benzo(a)pyrene	DETSC 3301	0.1	mg/kg	< 0.1
Indeno(1,2,3-c,d)pyrene	DETSC 3301	0.1	mg/kg	< 0.1
Dibenzo(a,h)anthracene	DETSC 3301	0.1	mg/kg	< 0.1
Benzo(g,h,i)perylene	DETSC 3301	0.1	mg/kg	< 0.1
Coronene	DETSC 3301*	0.1	mg/kg	< 0.1
PAH 16 Total	DETSC 3301	1.6	mg/kg	< 1.6
Phenols				
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3
VOCs				
Vinyl Chloride	DETSC 3431	0.01	mg/kg	< 0.01
1,1 Dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
Trans-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
1,1-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Cis-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
2,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
Bromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01
Chloroform	DETSC 3431	0.01	mg/kg	< 0.01
1,1,1-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
1,1-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01
Carbon tetrachloride	DETSC 3431	0.01	mg/kg	< 0.01
Benzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Trichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
Dibromomethane	DETSC 3431	0.01	mg/kg	< 0.01
Bromodichloromethane	DETSC 3431	0.01	mg/kg	< 0.01
cis-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01
Toluene	DETSC 3431	0.01	mg/kg	< 0.01
trans-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01
1,1,2-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Tetrachloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
1,3-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
Dibromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 23-19634
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade

Lab No	2219913
.Sample ID	BHA05
Depth	1.00
Other ID	
Sample Type	ES
Sampling Date	10/08/2023
Sampling Time	n/s

Test	Method	LOD	Units	
1,2-dibromoethane	DETSC 3431	0.01	mg/kg	< 0.01
Chlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,1,1,2-tetrachloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Ethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
m+p-Xylene	DETSC 3431	0.01	mg/kg	< 0.01
o-Xylene	DETSC 3431	0.01	mg/kg	< 0.01
Styrene	DETSC 3431*	0.01	mg/kg	< 0.01
Bromoform	DETSC 3431	0.01	mg/kg	< 0.01
Isopropylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
Bromobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2,3-trichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
n-propylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
2-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01
1,3,5-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
4-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01
Tert-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2,4-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
sec-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
p-isopropyltoluene	DETSC 3431	0.01	mg/kg	< 0.01
1,3-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,4-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
n-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dibromo-3-chloropropane	DETSC 3431	0.01	mg/kg	< 0.01
1,2,4-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
Hexachlorobutadiene	DETSC 3431	0.01	mg/kg	< 0.01
1,2,3-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
MTBE	DETSC 3431*	0.01	mg/kg	< 0.01

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

WASTE ACCEPTANCE CRITERIA TESTING ANALYTICAL REPORT

Our Ref 23-19634
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade
Sample Id BHA05 1.00
Sample Numbers 2219913 2219914
Date Analysed 07/09/2023

Test Results On Waste

Determinand and Method Reference	Units	Result	WAC Limit Values Inert Waste	SNRHW	Hazardous Waste
DETSC 2084# Total Organic Carbon	%	0.9	3	5	6
DETSC 2003# Loss On Ignition	%	5.0	n/a	n/a	10
DETSC 3321# BTEX	mg/kg	< 0.04	6	n/a	n/a
DETSC 3401# PCBs (7 congeners)	mg/kg	< 0.01	1	n/a	n/a
DETSC 3311# EPH (C10 - C40): EH_1D_Total	mg/kg	< 10	500	n/a	n/a
DETSC 3301 PAHs	mg/kg	< 1.6	100	n/a	n/a
DETSC 2008# pH	pH Units	8.0	n/a	>6	n/a
DETSC 2073* Acid Neutralisation Capacity (pH4)	mol/kg	< 1.0	n/a	TBE	TBE
DETSC 2073* Acid Neutralisation Capacity (pH7)	mol/kg	< 1.0	n/a	TBE	TBE

Test Results On Leachate

Determinand and Method Reference	Conc in Eluate ug/l 10:1	Amount Leached* mg/kg LS10	WAC Limit Values (Limit values for LS10 Leachate) Inert Waste	SNRHW	Hazardous Waste
DETSC 2306 Arsenic as As	0.22	< 0.01	0.5	2	25
DETSC 2306 Barium as Ba	8.8	< 0.1	20	100	300
DETSC 2306 Cadmium as Cd	< 0.030	< 0.02	0.04	1	5
DETSC 2306 Chromium as Cr	< 0.25	< 0.1	0.5	10	70
DETSC 2306 Copper as Cu	0.96	< 0.02	2	50	100
DETSC 2306 Mercury as Hg	< 0.010	< 0.002	0.01	0.2	2
DETSC 2306 Molybdenum as Mo	1.8	< 0.1	0.5	10	30
DETSC 2306 Nickel as Ni	< 0.50	< 0.1	0.4	10	40
DETSC 2306 Lead as Pb	0.44	< 0.05	0.5	10	50
DETSC 2306 Antimony as Sb	< 0.17	< 0.05	0.06	0.7	5
DETSC 2306 Selenium as Se	0.39	< 0.03	0.1	0.5	7
DETSC 2306 Zinc as Zn	1.6	0.016	4	50	200
DETSC 2055 Chloride as Cl	1100	< 100	800	15,000	25,000
DETSC 2055* Fluoride as F	180	1.8	10	150	500
DETSC 2055 Sulphate as SO4	2200	< 100	1000	20,000	50,000
DETSC 2009* Total Dissolved Solids	58000	580	4000	60,000	100,000
DETSC 2130 Phenol Index	< 100	< 1	1	n/a	n/a
DETSC 2033* Dissolved Organic Carbon	3700	< 50	500	800	1000

TBE - To Be Evaluated
SNRHW - Stable Non-Reactive Hazardous Waste

Additional Information

DETSC 2008 pH	7.6
DETSC 2009 Conductivity uS/cm	83.0
* Temperature*	19.0

Mass of Sample Kg*	0.120
Mass of dry Sample Kg*	0.097

Stage 1

Volume of Leachant L2*	0.946
Volume of Eluate VE1*	0.895

Disclaimer: *The WAC limit values are provided for guidance only. DETS does not accept responsibility for errors or omissions. Values are correct at time of issue.*

V.2.06 ** DETS are accredited for the testing of leachates and not the leachate preparation stage which is unaccredited.*

Summary of Asbestos Analysis
Soil Samples

Our Ref 23-19634
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
2219913	BHA05 1.00	SOIL	NAD	none	Michael Kay

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * - not included in laboratory scope of accreditation.

Information in Support of the Analytical Results

Our Ref 23-19634
Client Ref 23-0361
Contract East Meath North Dublin Grid Upgrade

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
2219913	BHA05 1.00 SOIL	10/08/23	GJ 250ml, GJ 60ml, PT 1L x3		
2219914	BHA05 1.00 LEACHATE	10/08/23	GJ 250ml, GJ 60ml, PT 1L x3		

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Information in Support of the Analytical Results

List of HWOL Acronyms and Operators

Acronym	Description
HS	Headspace analysis
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent
CU	Clean-up - e.g. by florisil, silica gel
1D	GC - Single coil gas chromatography
2D	GC-GC - Double coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative eg. EH+HS_Total or EH_CU+HS_Total

Det	Acronym
Aliphatic C5-C6	HS_1D_AL
Aliphatic C6-C8	HS_1D_AL
Aliphatic C8-C10	HS_1D_AL
Aliphatic C10-C12	EH_CU_1D_AL
Aliphatic C12-C16	EH_CU_1D_AL
Aliphatic C16-C21	EH_CU_1D_AL
Aliphatic C21-C35	EH_CU_1D_AL
Aliphatic C5-C35	EH_CU+HS_1D_AL
Aromatic C5-C7	HS_1D_AR
Aromatic C7-C8	HS_1D_AR
Aromatic C8-C10	HS_1D_AR
Aromatic C10-C12	EH_CU_1D_AR
Aromatic C12-C16	EH_CU_1D_AR
Aromatic C16-C21	EH_CU_1D_AR
Aromatic C21-C35	EH_CU_1D_AR
Aromatic C5-C35	EH_CU+HS_1D_AR
TPH Ali/Aro Total C5-C35	EH_CU+HS_1D_Total
TPH (C10-C40)	EH_1D_Total

End of Report

Certificate of Analysis

Certificate Number	23-19637	*Issued:*	07-Sep-23

Client Causeway Geotech
Unit 1 Fingal House
Stephenstown Industrial Estate
Balbriggan
Co. Dublin
K32 VR66

Our Reference	23-19637
Client Reference	23-0361
Order No	(not supplied)
Contract Title	East Meath North Dublin Grid Upgrade
Description	2 Soil samples, 2 Leachate samples.
Date Received	17-Aug-23
Date Started	17-Aug-23
Date Completed	07-Sep-23
Test Procedures	Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Kirk Bridgewood
General Manager

2139

Summary of Chemical Analysis
Soil Samples

Our Ref 23-19637
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade

			Lab No	2219916	2219917
			.Sample ID	BHB46	BHB46
			Depth	0.50	1.00
			Other ID		
			Sample Type	ES	ES
			Sampling Date	26/07/2023	26/07/2023
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
Metals					
Arsenic	DETSC 2301#	0.2	mg/kg	14	5.4
Boron, Water Soluble (2.5:1)	DETSC 2311#	0.2	mg/kg	0.3	0.4
Cadmium	DETSC 2301#	0.1	mg/kg	2.4	0.3
Chromium	DETSC 2301#	0.15	mg/kg	17	2.4
Copper	DETSC 2301#	0.2	mg/kg	38	3.4
Lead	DETSC 2301#	0.3	mg/kg	25	1.5
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	< 0.05
Nickel	DETSC 2301#	1	mg/kg	39	< 1.0
Zinc	DETSC 2301#	1	mg/kg	91	15
Inorganics					
pH	DETSC 2008#		pH	8.3	8.0
Cyanide, Total	DETSC 2130#	0.1	mg/kg	< 0.1	0.4
Organic matter	DETSC 2002#	0.1	%	0.8	2.3
Sulphate Aqueous Extract as SO4 (2:1)	DETSC 2076#	10	mg/l	< 10	< 10
Petroleum Hydrocarbons					
Aliphatic C5-C6: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aliphatic C6-C8: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aliphatic C8-C10: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aliphatic C10-C12: EH_CU_1D_AL	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5
Aliphatic C12-C16: EH_CU_1D_AL	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2
Aliphatic C16-C21: EH_CU_1D_AL	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5
Aliphatic C21-C35: EH_CU_1D_AL	DETSC 3072#	3.4	mg/kg	< 3.4	< 3.4
Aliphatic C5-C35: EH_CU+HS_1D_AL	DETSC 3072*	10	mg/kg	< 10	< 10
Aromatic C5-C7: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aromatic C7-C8: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aromatic C8-C10: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aromatic C10-C12: EH_CU_1D_AR	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9
Aromatic C12-C16: EH_CU_1D_AR	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5
Aromatic C16-C21: EH_CU_1D_AR	DETSC 3072#	0.6	mg/kg	< 0.6	< 0.6
Aromatic C21-C35: EH_CU_1D_AR	DETSC 3072#	1.4	mg/kg	< 1.4	< 1.4
Aromatic C5-C35: EH_CU+HS_1D_AR	DETSC 3072*	10	mg/kg	< 10	< 10
TPH Ali/Aro Total C5-C35: EH_CU+HS_1D_Total	DETSC 3072*	10	mg/kg	< 10	< 10
Benzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01
Ethylbenzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01
Toluene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01
Xylene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01
PAHs					
Naphthalene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Acenaphthylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Acenaphthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 23-19637
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade

			Lab No	2219916	2219917
			.Sample ID	BHB46	BHB46
			Depth	0.50	1.00
			Other ID		
			Sample Type	ES	ES
			Sampling Date	26/07/2023	26/07/2023
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
Fluorene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Phenanthrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Benzo(a)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Chrysene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Benzo(b)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Benzo(k)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Benzo(a)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Indeno(1,2,3-c,d)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Dibenzo(a,h)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Benzo(g,h,i)perylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Coronene	DETSC 3301*	0.1	mg/kg	< 0.1	< 0.1
PAH 16 Total	DETSC 3301	1.6	mg/kg	< 1.6	< 1.6
Phenols					
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	1.4	0.7
VOCs					
Vinyl Chloride	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1 Dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Trans-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Cis-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
2,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Bromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Chloroform	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1,1-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Carbon tetrachloride	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Benzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Trichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Dibromomethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Bromodichloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
cis-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Toluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
trans-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1,2-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Tetrachloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,3-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Dibromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 23-19637
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade

			Lab No	2219916	2219917
			.Sample ID	BHB46	BHB46
			Depth	0.50	1.00
			Other ID		
			Sample Type	ES	ES
			Sampling Date	26/07/2023	26/07/2023
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
1,2-dibromoethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Chlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1,1,2-tetrachloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Ethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
m+p-Xylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
o-Xylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Styrene	DETSC 3431*	0.01	mg/kg	< 0.01	< 0.01
Bromoform	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Isopropylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Bromobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2,3-trichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
n-propylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
2-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,3,5-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
4-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Tert-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2,4-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
sec-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
p-isopropyltoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,3-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,4-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
n-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2-dibromo-3-chloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2,4-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Hexachlorobutadiene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2,3-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
MTBE	DETSC 3431*	0.01	mg/kg	< 0.01	< 0.01

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

WASTE ACCEPTANCE CRITERIA TESTING ANALYTICAL REPORT

Our Ref 23-19637
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade
Sample Id BHB46 0.50
Sample Numbers 2219916 2219918
Date Analysed 07/09/2023

Test Results On Waste

Determinand and Method Reference	Units	Result	WAC Limit Values: Inert Waste	SNRHW	Hazardous Waste
DETSC 2084# Total Organic Carbon	%	0.9	3	5	6
DETSC 2003# Loss On Ignition	%	2.9	n/a	n/a	10
DETSC 3321# BTEX	mg/kg	< 0.04	6	n/a	n/a
DETSC 3401# PCBs (7 congeners)	mg/kg	< 0.01	1	n/a	n/a
DETSC 3311# EPH (C10 - C40): EH_1D_Total	mg/kg	< 10	500	n/a	n/a
DETSC 3301 PAHs	mg/kg	< 1.6	100	n/a	n/a
DETSC 2008# pH	pH Units	8.3	n/a	>6	n/a
DETSC 2073* Acid Neutralisation Capacity (pH4)	mol/kg	< 1.0	n/a	TBE	TBE
DETSC 2073* Acid Neutralisation Capacity (pH7)	mol/kg	< 1.0	n/a	TBE	TBE

Test Results On Leachate

Determinand and Method Reference	Conc in Eluate ug/l 10:1	Amount Leached* mg/kg LS10	WAC Limit Values (Limit values for LS10 Leachate): Inert Waste	SNRHW	Hazardous Waste
DETSC 2306 Arsenic as As	0.2	< 0.01	0.5	2	25
DETSC 2306 Barium as Ba	6.5	< 0.1	20	100	300
DETSC 2306 Cadmium as Cd	0.44	< 0.02	0.04	1	5
DETSC 2306 Chromium as Cr	< 0.25	< 0.1	0.5	10	70
DETSC 2306 Copper as Cu	0.91	< 0.02	2	50	100
DETSC 2306 Mercury as Hg	< 0.010	< 0.002	0.01	0.2	2
DETSC 2306 Molybdenum as Mo	1.5	< 0.1	0.5	10	30
DETSC 2306 Nickel as Ni	< 0.50	< 0.1	0.4	10	40
DETSC 2306 Lead as Pb	0.27	< 0.05	0.5	10	50
DETSC 2306 Antimony as Sb	< 0.17	< 0.05	0.06	0.7	5
DETSC 2306 Selenium as Se	0.26	< 0.03	0.1	0.5	7
DETSC 2306 Zinc as Zn	3.2	0.032	4	50	200
DETSC 2055 Chloride as Cl	1000	< 100	800	15,000	25,000
DETSC 2055* Fluoride as F	320	3.2	10	150	500
DETSC 2055 Sulphate as SO4	1300	< 100	1000	20,000	50,000
DETSC 2009* Total Dissolved Solids	52000	520	4000	60,000	100,000
DETSC 2130 Phenol Index	< 100	< 1	1	n/a	n/a
DETSC 2033* Dissolved Organic Carbon	4700	< 50	500	800	1000

TBE - To Be Evaluated
SNRHW - Stable Non-Reactive Hazardous Waste

Additional Information

DETSC 2008 pH	7.3
DETSC 2009 Conductivity uS/cm	74.9
* Temperature*	19.0

Mass of Sample Kg*	0.110
Mass of dry Sample Kg*	0.097

Stage 1

Volume of Leachant L2*	0.956
Volume of Eluate VE1*	0.901

Disclaimer: *The WAC limit values are provided for guidance only. DETS does not accept responsibility for errors or omissions. Values are correct at time of issue.*

V.2.06 ** DETS are accredited for the testing of leachates and not the leachate preparation stage which is unaccredited.*

WASTE ACCEPTANCE CRITERIA TESTING ANALYTICAL REPORT

Our Ref 23-19637
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade
Sample Id BHB46 1.00
Sample Numbers 2219917 2219919
Date Analysed 07/09/2023

Test Results On Waste

Determinand and Method Reference	Units	Result	WAC Limit Values Inert Waste	SNRHW	Hazardous Waste
DETSC 2084# Total Organic Carbon	%	1.5	3	5	6
DETSC 2003# Loss On Ignition	%	5.2	n/a	n/a	10
DETSC 3321# BTEX	mg/kg	< 0.04	6	n/a	n/a
DETSC 3401# PCBs (7 congeners)	mg/kg	< 0.01	1	n/a	n/a
DETSC 3311# EPH (C10 - C40): EH_1D_Total	mg/kg	< 10	500	n/a	n/a
DETSC 3301 PAHs	mg/kg	< 1.6	100	n/a	n/a
DETSC 2008# pH	pH Units	8.0	n/a	>6	n/a
DETSC 2073* Acid Neutralisation Capacity (pH4)	mol/kg	< 1.0	n/a	TBE	TBE
DETSC 2073* Acid Neutralisation Capacity (pH7)	mol/kg	< 1.0	n/a	TBE	TBE

Test Results On Leachate

Determinand and Method Reference	Conc in Eluate ug/l 10:1	Amount Leached* mg/kg LS10	WAC Limit Values (Limit values for LS10 Leachate) Inert Waste	SNRHW	Hazardous Waste
DETSC 2306 Arsenic as As	0.43	< 0.01	0.5	2	25
DETSC 2306 Barium as Ba	5	< 0.1	20	100	300
DETSC 2306 Cadmium as Cd	0.059	< 0.02	0.04	1	5
DETSC 2306 Chromium as Cr	< 0.25	< 0.1	0.5	10	70
DETSC 2306 Copper as Cu	1.1	< 0.02	2	50	100
DETSC 2306 Mercury as Hg	< 0.010	< 0.002	0.01	0.2	2
DETSC 2306 Molybdenum as Mo	< 1.1	< 0.1	0.5	10	30
DETSC 2306 Nickel as Ni	< 0.50	< 0.1	0.4	10	40
DETSC 2306 Lead as Pb	0.21	< 0.05	0.5	10	50
DETSC 2306 Antimony as Sb	0.21	< 0.05	0.06	0.7	5
DETSC 2306 Selenium as Se	0.39	< 0.03	0.1	0.5	7
DETSC 2306 Zinc as Zn	1.4	0.014	4	50	200
DETSC 2055 Chloride as Cl	1100	< 100	800	15,000	25,000
DETSC 2055* Fluoride as F	370	3.7	10	150	500
DETSC 2055 Sulphate as SO4	3300	< 100	1000	20,000	50,000
DETSC 2009* Total Dissolved Solids	48000	480	4000	60,000	100,000
DETSC 2130 Phenol Index	< 100	< 1	1	n/a	n/a
DETSC 2033* Dissolved Organic Carbon	2900	< 50	500	800	1000

TBE - To Be Evaluated
SNRHW - Stable Non-Reactive Hazardous Waste

Additional Information

DETSC 2008 pH	7.2
DETSC 2009 Conductivity uS/cm	68.2
* Temperature*	19.0

Mass of Sample Kg*	0.120
Mass of dry Sample Kg*	0.095

Stage 1

Volume of Leachant L2*	0.926
Volume of Eluate VE1*	0.971

Disclaimer: *The WAC limit values are provided for guidance only. DETS does not accept responsibility for errors or omissions. Values are correct at time of issue.*

V.2.06 ** DETS are accredited for the testing of leachates and not the leachate preparation stage which is unaccredited.*

Summary of Asbestos Analysis
Soil Samples

Our Ref 23-19637
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
2219916	BHB46 0.50	SOIL	NAD	none	Michael Kay
2219917	BHB46 1.00	SOIL	NAD	none	Michael Kay

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * - not included in laboratory scope of accreditation.

Information in Support of the Analytical Results

Our Ref 23-19637
Client Ref 23-0361
Contract East Meath North Dublin Grid Upgrade

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
2219916	BHB46 0.50 SOIL	26/07/23	GJ 250ml, PT 1L	Aliphatics/Aromatics (14 days), BTEX / C5-C10 (14 days), Naphthalene (14 days), PAH FID (14 days), pH + Conductivity (7 days), Cyanide/Mono pHoh (14 days), EPH/TPH (14 days), VOC (7 days)	BTEX / C5-C10, VOC
2219917	BHB46 1.00 SOIL	26/07/23	GJ 250ml, PT 1L	Aliphatics/Aromatics (14 days), BTEX / C5-C10 (14 days), Naphthalene (14 days), PAH FID (14 days), pH + Conductivity (7 days), Cyanide/Mono pHoh (14 days), EPH/TPH (14 days), VOC (7 days)	BTEX / C5-C10, VOC
2219918	BHB46 0.50 LEACHATE	26/07/23	GJ 250ml, PT 1L		
2219919	BHB46 1.00 LEACHATE	26/07/23	GJ 250ml, PT 1L		

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Information in Support of the Analytical Results

List of HWOL Acronyms and Operators

Acronym	Description
HS	Headspace analysis
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent
CU	Clean-up - e.g. by florisil, silica gel
1D	GC - Single coil gas chromatography
2D	GC-GC - Double coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative eg. EH+HS_Total or EH_CU+HS_Total

Det	Acronym
Aliphatic C5-C6	HS_1D_AL
Aliphatic C6-C8	HS_1D_AL
Aliphatic C8-C10	HS_1D_AL
Aliphatic C10-C12	EH_CU_1D_AL
Aliphatic C12-C16	EH_CU_1D_AL
Aliphatic C16-C21	EH_CU_1D_AL
Aliphatic C21-C35	EH_CU_1D_AL
Aliphatic C5-C35	EH_CU+HS_1D_AL
Aromatic C5-C7	HS_1D_AR
Aromatic C7-C8	HS_1D_AR
Aromatic C8-C10	HS_1D_AR
Aromatic C10-C12	EH_CU_1D_AR
Aromatic C12-C16	EH_CU_1D_AR
Aromatic C16-C21	EH_CU_1D_AR
Aromatic C21-C35	EH_CU_1D_AR
Aromatic C5-C35	EH_CU+HS_1D_AR
TPH Ali/Aro Total C5-C35	EH_CU+HS_1D_Total
TPH (C10-C40)	EH_1D_Total

End of Report

Certificate of Analysis

Certificate Number 23-21251 *Issued:* 22-Sep-23

Client Causeway Geotech
8 Drumahiskey Road
Ballymoney
County Antrim
BT53 7QL

Our Reference 23-21251

Client Reference 23-0361

Order No (not supplied)

Contract Title East Meath North Dublin Grid Upgrade

Description 9 Soil samples, 9 Leachate samples.

Date Received 07-Sep-23

Date Started 07-Sep-23

Date Completed 22-Sep-23

Test Procedures Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Kirk Bridgewood
General Manager

2139

Summary of Chemical Analysis
Soil Samples

Our Ref 23-21251
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade

			Lab No	2229714	2229715	2229716	2229717	2229718	2229719	2229720
			.Sample ID	IP95	IP99	IP99	IP94	IP70	IP96	IP94
			Depth	0.50	0.50	1.00	0.50	0.50	0.50	1.00
			Other ID	1	1	2	1	1	1	2
			Sample Type	ES	ES	ES	ES	ES	ES	ES
			Sampling Date	29/08/2023	30/08/2023	30/08/2023	30/08/2023	30/08/2023	30/08/2023	29/08/2023
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**							
Metals										
Arsenic	DETSC 2301#	0.2	mg/kg	10	14	12	14	19	20	8.8
Boron, Water Soluble (2.5:1)	DETSC 2311#	0.2	mg/kg	0.4	0.2	< 0.2	0.8	0.3	0.3	< 0.2
Cadmium	DETSC 2301#	0.1	mg/kg	1.4	2.2	2.2	1.4	2.6	2.8	2.0
Chromium	DETSC 2301#	0.15	mg/kg	20	14	11	19	17	20	9.6
Copper	DETSC 2301#	0.2	mg/kg	23	37	29	38	36	45	22
Lead	DETSC 2301#	0.3	mg/kg	23	24	17	48	35	42	13
Mercury	DETSC 2325#	0.05	mg/kg	0.10	0.07	< 0.05	0.18	0.07	0.16	< 0.05
Nickel	DETSC 2301#	1	mg/kg	31	46	37	29	41	54	27
Zinc	DETSC 2301#	1	mg/kg	79	86	71	97	120	99	70
Inorganics										
pH	DETSC 2008#		pH	7.9	8.1	8.2	7.8	7.7	7.6	8.1
Cyanide, Total	DETSC 2130#	0.1	mg/kg	0.2	< 0.1	< 0.1	0.2	0.2	0.1	< 0.1
Organic matter	DETSC 2002#	0.1	%	< 0.1	3.1	1.1	2.6	0.5	2.4	0.2
Sulphate Aqueous Extract as SO4 (2:1)	DETSC 2076#	10	mg/l	< 10	11	18	19	< 10	< 10	< 10
Petroleum Hydrocarbons										
Aliphatic C5-C6: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C6-C8: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C8-C10: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C10-C12: EH_CU_1D_AL	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C12-C16: EH_CU_1D_AL	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
Aliphatic C16-C21: EH_CU_1D_AL	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C21-C35: EH_CU_1D_AL	DETSC 3072#	3.4	mg/kg	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4
Aliphatic C5-C35: EH_CU+HS_1D_AL	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Aromatic C5-C7: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C7-C8: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C8-C10: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C10-C12: EH_CU_1D_AR	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	2.1	2.1
Aromatic C12-C16: EH_CU_1D_AR	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	2.6	2.6
Aromatic C16-C21: EH_CU_1D_AR	DETSC 3072#	0.6	mg/kg	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	0.9
Aromatic C21-C35: EH_CU_1D_AR	DETSC 3072#	1.4	mg/kg	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
Aromatic C5-C35: EH_CU+HS_1D_AR	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro Total C5-C35: EH_CU+HS_1D_Total	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Benzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Ethylbenzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Toluene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Xylene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PAHs										
Naphthalene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 23-21251
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade

			Lab No	2229714	2229715	2229716	2229717	2229718	2229719	2229720
			.Sample ID	IP95	IP99	IP99	IP94	IP70	IP96	IP94
			Depth	0.50	0.50	1.00	0.50	0.50	0.50	1.00
			Other ID	1	1	2	1	1	1	2
			Sample Type	ES	ES	ES	ES	ES	ES	ES
			Sampling Date	29/08/2023	30/08/2023	30/08/2023	30/08/2023	30/08/2023	30/08/2023	29/08/2023
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**							
Fluorene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Chrysene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(b)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(k)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Indeno(1,2,3-c,d)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dibenzo(a,h)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(g,h,i)perylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Coronene	DETSC 3301*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
PAH 16 Total	DETSC 3301	1.6	mg/kg	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6
Phenols										
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	0.5	< 0.3	< 0.3	0.6	0.7	< 0.3	< 0.3
VOCs										
Vinyl Chloride	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1 Dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Trans-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Cis-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
2,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Bromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chloroform	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1,1-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Carbon tetrachloride	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Trichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibromomethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Bromodichloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
cis-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Toluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
trans-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1,2-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Tetrachloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,3-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 23-21251
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade

			Lab No	2229714	2229715	2229716	2229717	2229718	2229719	2229720
			.Sample ID	IP95	IP99	IP99	IP94	IP70	IP96	IP94
			Depth	0.50	0.50	1.00	0.50	0.50	0.50	1.00
			Other ID	1	1	2	1	1	1	2
			Sample Type	ES	ES	ES	ES	ES	ES	ES
			Sampling Date	29/08/2023	30/08/2023	30/08/2023	30/08/2023	30/08/2023	30/08/2023	29/08/2023
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**							
1,2-dibromoethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1,1,2-tetrachloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Ethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
m+p-Xylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
o-Xylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Styrene	DETSC 3431*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Bromoform	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Isopropylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Bromobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2,3-trichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
n-propylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
2-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,3,5-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
4-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Tert-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2,4-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
sec-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
p-isopropyltoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,3-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,4-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
n-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dibromo-3-chloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2,4-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Hexachlorobutadiene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2,3-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
MTBE	DETSC 3431*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 23-21251
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade

			Lab No	2229721	2229722
			.Sample ID	IP70	IP96
			Depth	1.00	1.00
			Other ID	2	2
			Sample Type	ES	ES
			Sampling Date	29/08/2023	30/08/2023
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
Metals					
Arsenic	DETSC 2301#	0.2	mg/kg	14	13
Boron, Water Soluble (2.5:1)	DETSC 2311#	0.2	mg/kg	< 0.2	< 0.2
Cadmium	DETSC 2301#	0.1	mg/kg	1.9	2.2
Chromium	DETSC 2301#	0.15	mg/kg	10	12
Copper	DETSC 2301#	0.2	mg/kg	30	34
Lead	DETSC 2301#	0.3	mg/kg	19	19
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	< 0.05
Nickel	DETSC 2301#	1	mg/kg	34	40
Zinc	DETSC 2301#	1	mg/kg	83	73
Inorganics					
pH	DETSC 2008#		pH	8.2	8.2
Cyanide, Total	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1
Organic matter	DETSC 2002#	0.1	%	0.2	0.1
Sulphate Aqueous Extract as SO4 (2:1)	DETSC 2076#	10	mg/l	< 10	< 10
Petroleum Hydrocarbons					
Aliphatic C5-C6: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aliphatic C6-C8: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aliphatic C8-C10: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aliphatic C10-C12: EH_CU_1D_AL	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5
Aliphatic C12-C16: EH_CU_1D_AL	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2
Aliphatic C16-C21: EH_CU_1D_AL	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5
Aliphatic C21-C35: EH_CU_1D_AL	DETSC 3072#	3.4	mg/kg	< 3.4	< 3.4
Aliphatic C5-C35: EH_CU+HS_1D_AL	DETSC 3072*	10	mg/kg	< 10	< 10
Aromatic C5-C7: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aromatic C7-C8: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aromatic C8-C10: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aromatic C10-C12: EH_CU_1D_AR	DETSC 3072#	0.9	mg/kg	1.7	3.6
Aromatic C12-C16: EH_CU_1D_AR	DETSC 3072#	0.5	mg/kg	1.9	4.6
Aromatic C16-C21: EH_CU_1D_AR	DETSC 3072#	0.6	mg/kg	0.9	1.7
Aromatic C21-C35: EH_CU_1D_AR	DETSC 3072#	1.4	mg/kg	< 1.4	< 1.4
Aromatic C5-C35: EH_CU+HS_1D_AR	DETSC 3072*	10	mg/kg	< 10	< 10
TPH Ali/Aro Total C5-C35: EH_CU+HS_1D_Total	DETSC 3072*	10	mg/kg	< 10	< 10
Benzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01
Ethylbenzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01
Toluene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01
Xylene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01
PAHs					
Naphthalene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Acenaphthylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Acenaphthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1

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Summary of Chemical Analysis
Soil Samples

Our Ref 23-21251
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade

			Lab No	2229721	2229722
			.Sample ID	IP70	IP96
			Depth	1.00	1.00
			Other ID	2	2
			Sample Type	ES	ES
			Sampling Date	29/08/2023	30/08/2023
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
Fluorene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Phenanthrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Benzo(a)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Chrysene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Benzo(b)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Benzo(k)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Benzo(a)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Indeno(1,2,3-c,d)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Dibenzo(a,h)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Benzo(g,h,i)perylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Coronene	DETSC 3301*	0.1	mg/kg	< 0.1	< 0.1
PAH 16 Total	DETSC 3301	1.6	mg/kg	< 1.6	< 1.6
Phenols					
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3
VOCs					
Vinyl Chloride	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1 Dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Trans-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Cis-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
2,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Bromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Chloroform	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1,1-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Carbon tetrachloride	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Benzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Trichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Dibromomethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Bromodichloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
cis-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Toluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
trans-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1,2-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Tetrachloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,3-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Dibromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01

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Summary of Chemical Analysis
Soil Samples

Our Ref 23-21251
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade

			Lab No	2229721	2229722
			.Sample ID	IP70	IP96
			Depth	1.00	1.00
			Other ID	2	2
			Sample Type	ES	ES
			Sampling Date	29/08/2023	30/08/2023
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
1,2-dibromoethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Chlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1,1,2-tetrachloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Ethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
m+p-Xylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
o-Xylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Styrene	DETSC 3431*	0.01	mg/kg	< 0.01	< 0.01
Bromoform	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Isopropylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Bromobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2,3-trichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
n-propylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
2-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,3,5-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
4-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Tert-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2,4-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
sec-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
p-isopropyltoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,3-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,4-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
n-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2-dibromo-3-chloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2,4-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Hexachlorobutadiene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2,3-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
MTBE	DETSC 3431*	0.01	mg/kg	< 0.01	< 0.01

WASTE ACCEPTANCE CRITERIA TESTING ANALYTICAL REPORT

Our Ref 23-21251
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade
Sample Id IP95 1 0.50
Sample Numbers 2229714 2229723
Date Analysed 20/09/2023

Test Results On Waste

Determinand and Method Reference	Units	Result	WAC Limit Values Inert Waste	SNRHW	Hazardous Waste
DETSC 2084# Total Organic Carbon	%	1.0	3	5	6
DETSC 2003# Loss On Ignition	%	4.9	n/a	n/a	10
DETSC 3321# BTEX	mg/kg	< 0.04	6	n/a	n/a
DETSC 3401# PCBs (7 congeners)	mg/kg	< 0.01	1	n/a	n/a
DETSC 3311# EPH (C10 - C40): EH_1D_Total	mg/kg	< 10	500	n/a	n/a
DETSC 3301 PAHs	mg/kg	< 1.6	100	n/a	n/a
DETSC 2008# pH	pH Units	7.9	n/a	>6	n/a
DETSC 2073* Acid Neutralisation Capacity (pH4)	mol/kg	< 1.0	n/a	TBE	TBE
DETSC 2073* Acid Neutralisation Capacity (pH7)	mol/kg	< 1.0	n/a	TBE	TBE

Test Results On Leachate

Determinand and Method Reference	Conc in Eluate ug/l 10:1	Amount Leached* mg/kg LS10	WAC Limit Values (Limit values for LS10 Leachate) Inert Waste	SNRHW	Hazardous Waste
DETSC 2306 Arsenic as As	0.24	< 0.01	0.5	2	25
DETSC 2306 Barium as Ba	6.8	< 0.1	20	100	300
DETSC 2306 Cadmium as Cd	< 0.030	< 0.02	0.04	1	5
DETSC 2306 Chromium as Cr	< 0.25	< 0.1	0.5	10	70
DETSC 2306 Copper as Cu	1.3	< 0.02	2	50	100
DETSC 2306 Mercury as Hg	< 0.010	< 0.002	0.01	0.2	2
DETSC 2306 Molybdenum as Mo	1.1	< 0.1	0.5	10	30
DETSC 2306 Nickel as Ni	< 0.50	< 0.1	0.4	10	40
DETSC 2306 Lead as Pb	< 0.090	< 0.05	0.5	10	50
DETSC 2306 Antimony as Sb	< 0.17	< 0.05	0.06	0.7	5
DETSC 2306 Selenium as Se	< 0.25	< 0.03	0.1	0.5	7
DETSC 2306 Zinc as Zn	< 1.3	< 0.01	4	50	200
DETSC 2055 Chloride as Cl	1600	< 100	800	15,000	25,000
DETSC 2055* Fluoride as F	370	3.7	10	150	500
DETSC 2055 Sulphate as SO4	2100	< 100	1000	20,000	50,000
DETSC 2009* Total Dissolved Solids	41000	410	4000	60,000	100,000
DETSC 2130 Phenol Index	< 100	< 1	1	n/a	n/a
DETSC 2085 Dissolved Organic Carbon	2600	< 50	500	800	1000

TBE - To Be Evaluated
SNRHW - Stable Non-Reactive Hazardous Waste

Additional Information

DETSC 2008 pH	7.7
DETSC 2009 Conductivity uS/cm	58.8
* Temperature*	18.0

Mass of Sample Kg*	0.120
Mass of dry Sample Kg*	0.097

Stage 1

Volume of Leachant L2*	0.952
Volume of Eluate VE1*	0.9

Disclaimer: *The WAC limit values are provided for guidance only. DETS does not accept responsibility for errors or omissions. Values are correct at time of issue.*

V.2.06 ** DETS are accredited for the testing of leachates and not the leachate preparation stage which is unaccredited.*

WASTE ACCEPTANCE CRITERIA TESTING ANALYTICAL REPORT

Our Ref 23-21251
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade
Sample Id IP99 1 0.50
Sample Numbers 2229715 2229724
Date Analysed 20/09/2023

Test Results On Waste

Determinand and Method Reference	Units	Result	WAC Limit Values Inert Waste	SNRHW	Hazardous Waste
DETSC 2084# Total Organic Carbon	%	1.5	3	5	6
DETSC 2003# Loss On Ignition	%	3.3	n/a	n/a	10
DETSC 3321# BTEX	mg/kg	< 0.04	6	n/a	n/a
DETSC 3401# PCBs (7 congeners)	mg/kg	< 0.01	1	n/a	n/a
DETSC 3311# EPH (C10 - C40): EH_1D_Total	mg/kg	< 10	500	n/a	n/a
DETSC 3301 PAHs	mg/kg	< 1.6	100	n/a	n/a
DETSC 2008# pH	pH Units	8.1	n/a	>6	n/a
DETSC 2073* Acid Neutralisation Capacity (pH4)	mol/kg	< 1.0	n/a	TBE	TBE
DETSC 2073* Acid Neutralisation Capacity (pH7)	mol/kg	< 1.0	n/a	TBE	TBE

Test Results On Leachate

Determinand and Method Reference	Conc in Eluate ug/l 10:1	Amount Leached* mg/kg LS10	WAC Limit Values (Limit values for LS10 Leachate) Inert Waste	SNRHW	Hazardous Waste
DETSC 2306 Arsenic as As	0.28	< 0.01	0.5	2	25
DETSC 2306 Barium as Ba	5	< 0.1	20	100	300
DETSC 2306 Cadmium as Cd	< 0.030	< 0.02	0.04	1	5
DETSC 2306 Chromium as Cr	< 0.25	< 0.1	0.5	10	70
DETSC 2306 Copper as Cu	1.2	< 0.02	2	50	100
DETSC 2306 Mercury as Hg	< 0.010	< 0.002	0.01	0.2	2
DETSC 2306 Molybdenum as Mo	< 1.1	< 0.1	0.5	10	30
DETSC 2306 Nickel as Ni	< 0.50	< 0.1	0.4	10	40
DETSC 2306 Lead as Pb	< 0.090	< 0.05	0.5	10	50
DETSC 2306 Antimony as Sb	< 0.17	< 0.05	0.06	0.7	5
DETSC 2306 Selenium as Se	< 0.25	< 0.03	0.1	0.5	7
DETSC 2306 Zinc as Zn	< 1.3	< 0.01	4	50	200
DETSC 2055 Chloride as Cl	1400	< 100	800	15,000	25,000
DETSC 2055* Fluoride as F	230	2.3	10	150	500
DETSC 2055 Sulphate as SO4	4200	< 100	1000	20,000	50,000
DETSC 2009* Total Dissolved Solids	47000	470	4000	60,000	100,000
DETSC 2130 Phenol Index	< 100	< 1	1	n/a	n/a
DETSC 2085 Dissolved Organic Carbon	2800	< 50	500	800	1000

TBE - To Be Evaluated
SNRHW - Stable Non-Reactive Hazardous Waste

Additional Information

DETSC 2008 pH	8.3
DETSC 2009 Conductivity uS/cm	67.6
* Temperature*	18.0

Mass of Sample Kg*	0.110
Mass of dry Sample Kg*	0.096

Stage 1

Volume of Leachant L2*	0.949
Volume of Eluate VE1*	0.89

Disclaimer: *The WAC limit values are provided for guidance only. DETS does not accept responsibility for errors or omissions. Values are correct at time of issue.*

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WASTE ACCEPTANCE CRITERIA TESTING ANALYTICAL REPORT

Our Ref 23-21251
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade
Sample Id IP99 2 1.00
Sample Numbers 2229716 2229725
Date Analysed 20/09/2023

Test Results On Waste

Determinand and Method Reference	Units	Result	WAC Limit Values Inert Waste	SNRHW	Hazardous Waste
DETSC 2084# Total Organic Carbon	%	2.1	3	5	6
DETSC 2003# Loss On Ignition	%	2.3	n/a	n/a	10
DETSC 3321# BTEX	mg/kg	< 0.04	6	n/a	n/a
DETSC 3401# PCBs (7 congeners)	mg/kg	< 0.01	1	n/a	n/a
DETSC 3311# EPH (C10 - C40): EH_1D_Total	mg/kg	< 10	500	n/a	n/a
DETSC 3301 PAHs	mg/kg	< 1.6	100	n/a	n/a
DETSC 2008# pH	pH Units	8.2	n/a	>6	n/a
DETSC 2073* Acid Neutralisation Capacity (pH4)	mol/kg	< 1.0	n/a	TBE	TBE
DETSC 2073* Acid Neutralisation Capacity (pH7)	mol/kg	< 1.0	n/a	TBE	TBE

Test Results On Leachate

Determinand and Method Reference	Conc in Eluate ug/l 10:1	Amount Leached* mg/kg LS10	WAC Limit Values (Limit values for LS10 Leachate) Inert Waste	SNRHW	Hazardous Waste
DETSC 2306 Arsenic as As	< 0.16	< 0.01	0.5	2	25
DETSC 2306 Barium as Ba	3.8	< 0.1	20	100	300
DETSC 2306 Cadmium as Cd	< 0.030	< 0.02	0.04	1	5
DETSC 2306 Chromium as Cr	< 0.25	< 0.1	0.5	10	70
DETSC 2306 Copper as Cu	0.63	< 0.02	2	50	100
DETSC 2306 Mercury as Hg	< 0.010	< 0.002	0.01	0.2	2
DETSC 2306 Molybdenum as Mo	3	< 0.1	0.5	10	30
DETSC 2306 Nickel as Ni	< 0.50	< 0.1	0.4	10	40
DETSC 2306 Lead as Pb	< 0.090	< 0.05	0.5	10	50
DETSC 2306 Antimony as Sb	< 0.17	< 0.05	0.06	0.7	5
DETSC 2306 Selenium as Se	< 0.25	< 0.03	0.1	0.5	7
DETSC 2306 Zinc as Zn	< 1.3	< 0.01	4	50	200
DETSC 2055 Chloride as Cl	1400	< 100	800	15,000	25,000
DETSC 2055* Fluoride as F	150	1.5	10	150	500
DETSC 2055 Sulphate as SO4	6400	< 100	1000	20,000	50,000
DETSC 2009* Total Dissolved Solids	60000	600	4000	60,000	100,000
DETSC 2130 Phenol Index	< 100	< 1	1	n/a	n/a
DETSC 2085 Dissolved Organic Carbon	8900	89	500	800	1000

TBE - To Be Evaluated
SNRHW - Stable Non-Reactive Hazardous Waste

Additional Information

DETSC 2008 pH	8.5
DETSC 2009 Conductivity uS/cm	86.1
* Temperature*	18.0

Mass of Sample Kg*	0.110
Mass of dry Sample Kg*	0.098

Stage 1

Volume of Leachant L2*	0.972
Volume of Eluate VE1*	0.92

Disclaimer: *The WAC limit values are provided for guidance only. DETS does not accept responsibility for errors or omissions. Values are correct at time of issue.*

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WASTE ACCEPTANCE CRITERIA TESTING ANALYTICAL REPORT

Our Ref 23-21251
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade
Sample Id IP94 1 0.50
Sample Numbers 2229717 2229726
Date Analysed 20/09/2023

Test Results On Waste

Determinand and Method Reference	Units	Result	WAC Limit Values: Inert Waste	SNRHW	Hazardous Waste
DETSC 2084# Total Organic Carbon	%	3.0	3	5	6
DETSC 2003# Loss On Ignition	%	6.2	n/a	n/a	10
DETSC 3321# BTEX	mg/kg	< 0.04	6	n/a	n/a
DETSC 3401# PCBs (7 congeners)	mg/kg	< 0.01	1	n/a	n/a
DETSC 3311# EPH (C10 - C40): EH_1D_Total	mg/kg	< 10	500	n/a	n/a
DETSC 3301 PAHs	mg/kg	< 1.6	100	n/a	n/a
DETSC 2008# pH	pH Units	7.8	n/a	>6	n/a
DETSC 2073* Acid Neutralisation Capacity (pH4)	mol/kg	< 1.0	n/a	TBE	TBE
DETSC 2073* Acid Neutralisation Capacity (pH7)	mol/kg	< 1.0	n/a	TBE	TBE

Test Results On Leachate

Determinand and Method Reference	Conc in Eluate ug/l 10:1	Amount Leached* mg/kg LS10	WAC Limit Values (Limit values for LS10 Leachate): Inert Waste	SNRHW	Hazardous Waste
DETSC 2306 Arsenic as As	0.23	< 0.01	0.5	2	25
DETSC 2306 Barium as Ba	3.1	< 0.1	20	100	300
DETSC 2306 Cadmium as Cd	< 0.030	< 0.02	0.04	1	5
DETSC 2306 Chromium as Cr	< 0.25	< 0.1	0.5	10	70
DETSC 2306 Copper as Cu	1.8	< 0.02	2	50	100
DETSC 2306 Mercury as Hg	< 0.010	< 0.002	0.01	0.2	2
DETSC 2306 Molybdenum as Mo	1.3	< 0.1	0.5	10	30
DETSC 2306 Nickel as Ni	0.52	< 0.1	0.4	10	40
DETSC 2306 Lead as Pb	< 0.090	< 0.05	0.5	10	50
DETSC 2306 Antimony as Sb	0.24	< 0.05	0.06	0.7	5
DETSC 2306 Selenium as Se	0.31	< 0.03	0.1	0.5	7
DETSC 2306 Zinc as Zn	< 1.3	< 0.01	4	50	200
DETSC 2055 Chloride as Cl	2200	< 100	800	15,000	25,000
DETSC 2055* Fluoride as F	250	2.5	10	150	500
DETSC 2055 Sulphate as SO4	4500	< 100	1000	20,000	50,000
DETSC 2009* Total Dissolved Solids	38000	380	4000	60,000	100,000
DETSC 2130 Phenol Index	< 100	< 1	1	n/a	n/a
DETSC 2085 Dissolved Organic Carbon	9500	95	500	800	1000

TBE - To Be Evaluated
SNRHW - Stable Non-Reactive Hazardous Waste

Additional Information

DETSC 2008 pH	7.6
DETSC 2009 Conductivity uS/cm	53.7
* Temperature*	18.0

Mass of Sample Kg*	0.130
Mass of dry Sample Kg*	0.098

Stage 1

Volume of Leachant L2*	0.943
Volume of Eluate VE1*	0.89

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WASTE ACCEPTANCE CRITERIA TESTING ANALYTICAL REPORT

Our Ref 23-21251
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade
Sample Id IP70 1 0.50
Sample Numbers 2229718 2229727
Date Analysed 22/09/2023

Test Results On Waste

Determinand and Method Reference	Units	Result	WAC Limit Values: Inert Waste	SNRHW	Hazardous Waste
DETSC 2084# Total Organic Carbon	%	3.2	3	5	6
DETSC 2003# Loss On Ignition	%	8.1	n/a	n/a	10
DETSC 3321# BTEX	mg/kg	< 0.04	6	n/a	n/a
DETSC 3401# PCBs (7 congeners)	mg/kg	< 0.01	1	n/a	n/a
DETSC 3311# EPH (C10 - C40): EH_1D_Total	mg/kg	< 10	500	n/a	n/a
DETSC 3301 PAHs	mg/kg	< 1.6	100	n/a	n/a
DETSC 2008# pH	pH Units	7.7	n/a	>6	n/a
DETSC 2073* Acid Neutralisation Capacity (pH4)	mol/kg	< 1.0	n/a	TBE	TBE
DETSC 2073* Acid Neutralisation Capacity (pH7)	mol/kg	< 1.0	n/a	TBE	TBE

Test Results On Leachate

Determinand and Method Reference	Conc in Eluate ug/l 10:1	Amount Leached* mg/kg LS10	WAC Limit Values (Limit values for LS10 Leachate): Inert Waste	SNRHW	Hazardous Waste
DETSC 2306 Arsenic as As	0.58	< 0.01	0.5	2	25
DETSC 2306 Barium as Ba	2.7	< 0.1	20	100	300
DETSC 2306 Cadmium as Cd	0.035	< 0.02	0.04	1	5
DETSC 2306 Chromium as Cr	< 0.25	< 0.1	0.5	10	70
DETSC 2306 Copper as Cu	1.7	< 0.02	2	50	100
DETSC 2306 Mercury as Hg	< 0.010	< 0.002	0.01	0.2	2
DETSC 2306 Molybdenum as Mo	< 1.1	< 0.1	0.5	10	30
DETSC 2306 Nickel as Ni	1	< 0.1	0.4	10	40
DETSC 2306 Lead as Pb	0.3	< 0.05	0.5	10	50
DETSC 2306 Antimony as Sb	< 0.17	< 0.05	0.06	0.7	5
DETSC 2306 Selenium as Se	< 0.25	< 0.03	0.1	0.5	7
DETSC 2306 Zinc as Zn	2.1	0.021	4	50	200
DETSC 2055 Chloride as Cl	1100	< 100	800	15,000	25,000
DETSC 2055* Fluoride as F	250	2.5	10	150	500
DETSC 2055 Sulphate as SO4	4000	< 100	1000	20,000	50,000
DETSC 2009* Total Dissolved Solids	45000	450	4000	60,000	100,000
DETSC 2130 Phenol Index	< 100	< 1	1	n/a	n/a
DETSC 2085 Dissolved Organic Carbon	9700	97	500	800	1000

TBE - To Be Evaluated
SNRHW - Stable Non-Reactive Hazardous Waste

Additional Information

DETSC 2008 pH	8.1
DETSC 2009 Conductivity uS/cm	64.5
* Temperature*	18.0

Mass of Sample Kg*	0.120
Mass of dry Sample Kg*	0.099

Stage 1

Volume of Leachant L2*	0.966
Volume of Eluate VE1*	0.91

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WASTE ACCEPTANCE CRITERIA TESTING ANALYTICAL REPORT

Our Ref 23-21251
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade
Sample Id IP96 1 0.50
Sample Numbers 2229719 2229728
Date Analysed 22/09/2023

Test Results On Waste

Determinand and Method Reference	Units	Result	WAC Limit Values: Inert Waste	SNRHW	Hazardous Waste
DETSC 2084# Total Organic Carbon	%	2.4	3	5	6
DETSC 2003# Loss On Ignition	%	5.2	n/a	n/a	10
DETSC 3321# BTEX	mg/kg	< 0.04	6	n/a	n/a
DETSC 3401# PCBs (7 congeners)	mg/kg	< 0.01	1	n/a	n/a
DETSC 3311# EPH (C10 - C40): EH_1D_Total	mg/kg	< 10	500	n/a	n/a
DETSC 3301 PAHs	mg/kg	< 1.6	100	n/a	n/a
DETSC 2008# pH	pH Units	7.6	n/a	>6	n/a
DETSC 2073* Acid Neutralisation Capacity (pH4)	mol/kg	< 1.0	n/a	TBE	TBE
DETSC 2073* Acid Neutralisation Capacity (pH7)	mol/kg	< 1.0	n/a	TBE	TBE

Test Results On Leachate

Determinand and Method Reference	Conc in Eluate ug/l 10:1	Amount Leached* mg/kg LS10	WAC Limit Values (Limit values for LS10 Leachate): Inert Waste	SNRHW	Hazardous Waste
DETSC 2306 Arsenic as As	0.23	< 0.01	0.5	2	25
DETSC 2306 Barium as Ba	3.7	< 0.1	20	100	300
DETSC 2306 Cadmium as Cd	< 0.030	< 0.02	0.04	1	5
DETSC 2306 Chromium as Cr	< 0.25	< 0.1	0.5	10	70
DETSC 2306 Copper as Cu	1.3	< 0.02	2	50	100
DETSC 2306 Mercury as Hg	< 0.010	< 0.002	0.01	0.2	2
DETSC 2306 Molybdenum as Mo	< 1.1	< 0.1	0.5	10	30
DETSC 2306 Nickel as Ni	< 0.50	< 0.1	0.4	10	40
DETSC 2306 Lead as Pb	0.11	< 0.05	0.5	10	50
DETSC 2306 Antimony as Sb	< 0.17	< 0.05	0.06	0.7	5
DETSC 2306 Selenium as Se	< 0.25	< 0.03	0.1	0.5	7
DETSC 2306 Zinc as Zn	< 1.3	< 0.01	4	50	200
DETSC 2055 Chloride as Cl	990	< 100	800	15,000	25,000
DETSC 2055* Fluoride as F	260	2.6	10	150	500
DETSC 2055 Sulphate as SO4	3000	< 100	1000	20,000	50,000
DETSC 2009* Total Dissolved Solids	50000	500	4000	60,000	100,000
DETSC 2130 Phenol Index	< 100	< 1	1	n/a	n/a
DETSC 2085 Dissolved Organic Carbon	12000	120	500	800	1000

TBE - To Be Evaluated
SNRHW - Stable Non-Reactive Hazardous Waste

Additional Information

DETSC 2008 pH	7.5
DETSC 2009 Conductivity uS/cm	71.6
* Temperature*	18.0

Mass of Sample Kg*	0.120
Mass of dry Sample Kg*	0.100

Stage 1

Volume of Leachant L2*	0.978
Volume of Eluate VE1*	0.92

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WASTE ACCEPTANCE CRITERIA TESTING ANALYTICAL REPORT

Our Ref 23-21251
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade
Sample Id IP94 2 1.00
Sample Numbers 2229720 2229729
Date Analysed 22/09/2023

Test Results On Waste

Determinand and Method Reference	Units	Result	WAC Limit Values Inert Waste	SNRHW	Hazardous Waste
DETSC 2084# Total Organic Carbon	%	1.6	3	5	6
DETSC 2003# Loss On Ignition	%	2.3	n/a	n/a	10
DETSC 3321# BTEX	mg/kg	< 0.04	6	n/a	n/a
DETSC 3401# PCBs (7 congeners)	mg/kg	< 0.01	1	n/a	n/a
DETSC 3311# EPH (C10 - C40): EH_1D_Total	mg/kg	< 10	500	n/a	n/a
DETSC 3301 PAHs	mg/kg	< 1.6	100	n/a	n/a
DETSC 2008# pH	pH Units	8.1	n/a	>6	n/a
DETSC 2073* Acid Neutralisation Capacity (pH4)	mol/kg	< 1.0	n/a	TBE	TBE
DETSC 2073* Acid Neutralisation Capacity (pH7)	mol/kg	< 1.0	n/a	TBE	TBE

Test Results On Leachate

Determinand and Method Reference	Conc in Eluate ug/l 10:1	Amount Leached* mg/kg LS10	WAC Limit Values (Limit values for LS10 Leachate) Inert Waste	SNRHW	Hazardous Waste
DETSC 2306 Arsenic as As	0.21	< 0.01	0.5	2	25
DETSC 2306 Barium as Ba	2.7	< 0.1	20	100	300
DETSC 2306 Cadmium as Cd	< 0.030	< 0.02	0.04	1	5
DETSC 2306 Chromium as Cr	< 0.25	< 0.1	0.5	10	70
DETSC 2306 Copper as Cu	1.2	< 0.02	2	50	100
DETSC 2306 Mercury as Hg	< 0.010	< 0.002	0.01	0.2	2
DETSC 2306 Molybdenum as Mo	1.4	< 0.1	0.5	10	30
DETSC 2306 Nickel as Ni	< 0.50	< 0.1	0.4	10	40
DETSC 2306 Lead as Pb	< 0.090	< 0.05	0.5	10	50
DETSC 2306 Antimony as Sb	< 0.17	< 0.05	0.06	0.7	5
DETSC 2306 Selenium as Se	< 0.25	< 0.03	0.1	0.5	7
DETSC 2306 Zinc as Zn	< 1.3	< 0.01	4	50	200
DETSC 2055 Chloride as Cl	1200	< 100	800	15,000	25,000
DETSC 2055* Fluoride as F	180	1.8	10	150	500
DETSC 2055 Sulphate as SO4	2200	< 100	1000	20,000	50,000
DETSC 2009* Total Dissolved Solids	43000	430	4000	60,000	100,000
DETSC 2130 Phenol Index	< 100	< 1	1	n/a	n/a
DETSC 2085 Dissolved Organic Carbon	10000	100	500	800	1000

TBE - To Be Evaluated
SNRHW - Stable Non-Reactive Hazardous Waste

Additional Information

DETSC 2008 pH	8.6
DETSC 2009 Conductivity uS/cm	61.3
* Temperature*	18.0

Mass of Sample Kg*	0.110
Mass of dry Sample Kg*	0.098

Stage 1

Volume of Leachant L2*	0.973
Volume of Eluate VE1*	0.92

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WASTE ACCEPTANCE CRITERIA TESTING ANALYTICAL REPORT

Our Ref 23-21251
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade
Sample Id IP70 2 1.00
Sample Numbers 2229721 2229730
Date Analysed 22/09/2023

Test Results On Waste

Determinand and Method Reference	Units	Result	WAC Limit Values: Inert Waste	SNRHW	Hazardous Waste
DETSC 2084# Total Organic Carbon	%	1.5	3	5	6
DETSC 2003# Loss On Ignition	%	2.0	n/a	n/a	10
DETSC 3321# BTEX	mg/kg	< 0.04	6	n/a	n/a
DETSC 3401# PCBs (7 congeners)	mg/kg	< 0.01	1	n/a	n/a
DETSC 3311# EPH (C10 - C40): EH_1D_Total	mg/kg	< 10	500	n/a	n/a
DETSC 3301 PAHs	mg/kg	< 1.6	100	n/a	n/a
DETSC 2008# pH	pH Units	8.2	n/a	>6	n/a
DETSC 2073* Acid Neutralisation Capacity (pH4)	mol/kg	< 1.0	n/a	TBE	TBE
DETSC 2073* Acid Neutralisation Capacity (pH7)	mol/kg	< 1.0	n/a	TBE	TBE

Test Results On Leachate

Determinand and Method Reference	Conc in Eluate ug/l 10:1	Amount Leached* mg/kg LS10	WAC Limit Values (Limit values for LS10 Leachate): Inert Waste	SNRHW	Hazardous Waste
DETSC 2306 Arsenic as As	0.37	< 0.01	0.5	2	25
DETSC 2306 Barium as Ba	2	< 0.1	20	100	300
DETSC 2306 Cadmium as Cd	0.044	< 0.02	0.04	1	5
DETSC 2306 Chromium as Cr	< 0.25	< 0.1	0.5	10	70
DETSC 2306 Copper as Cu	1.3	< 0.02	2	50	100
DETSC 2306 Mercury as Hg	< 0.010	< 0.002	0.01	0.2	2
DETSC 2306 Molybdenum as Mo	< 1.1	< 0.1	0.5	10	30
DETSC 2306 Nickel as Ni	< 0.50	< 0.1	0.4	10	40
DETSC 2306 Lead as Pb	0.11	< 0.05	0.5	10	50
DETSC 2306 Antimony as Sb	< 0.17	< 0.05	0.06	0.7	5
DETSC 2306 Selenium as Se	< 0.25	< 0.03	0.1	0.5	7
DETSC 2306 Zinc as Zn	2.7	0.027	4	50	200
DETSC 2055 Chloride as Cl	870	< 100	800	15,000	25,000
DETSC 2055* Fluoride as F	130	1.3	10	150	500
DETSC 2055 Sulphate as SO4	5500	< 100	1000	20,000	50,000
DETSC 2009* Total Dissolved Solids	46000	460	4000	60,000	100,000
DETSC 2130 Phenol Index	< 100	< 1	1	n/a	n/a
DETSC 2085 Dissolved Organic Carbon	9200	92	500	800	1000

TBE - To Be Evaluated
SNRHW - Stable Non-Reactive Hazardous Waste

Additional Information

DETSC 2008 pH	8.6
DETSC 2009 Conductivity uS/cm	66.2
* Temperature*	18.0

Mass of Sample Kg*	0.110
Mass of dry Sample Kg*	0.099

Stage 1

Volume of Leachant L2*	0.977
Volume of Eluate VE1*	0.92

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WASTE ACCEPTANCE CRITERIA TESTING ANALYTICAL REPORT

Our Ref 23-21251
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade
Sample Id IP96 2 1.00
Sample Numbers 2229722 2229731
Date Analysed 22/09/2023

Test Results On Waste

Determinand and Method Reference	Units	Result	WAC Limit Values Inert Waste	SNRHW	Hazardous Waste
DETSC 2084# Total Organic Carbon	%	1.6	3	5	6
DETSC 2003# Loss On Ignition	%	2.5	n/a	n/a	10
DETSC 3321# BTEX	mg/kg	< 0.04	6	n/a	n/a
DETSC 3401# PCBs (7 congeners)	mg/kg	< 0.01	1	n/a	n/a
DETSC 3311# EPH (C10 - C40): EH_1D_Total	mg/kg	< 10	500	n/a	n/a
DETSC 3301 PAHs	mg/kg	< 1.6	100	n/a	n/a
DETSC 2008# pH	pH Units	8.2	n/a	>6	n/a
DETSC 2073* Acid Neutralisation Capacity (pH4)	mol/kg	< 1.0	n/a	TBE	TBE
DETSC 2073* Acid Neutralisation Capacity (pH7)	mol/kg	< 1.0	n/a	TBE	TBE

Test Results On Leachate

Determinand and Method Reference	Conc in Eluate ug/l 10:1	Amount Leached* mg/kg LS10	WAC Limit Values (Limit values for LS10 Leachate) Inert Waste	SNRHW	Hazardous Waste
DETSC 2306 Arsenic as As	0.4	< 0.01	0.5	2	25
DETSC 2306 Barium as Ba	6.4	< 0.1	20	100	300
DETSC 2306 Cadmium as Cd	0.13	< 0.02	0.04	1	5
DETSC 2306 Chromium as Cr	0.27	< 0.1	0.5	10	70
DETSC 2306 Copper as Cu	1.1	< 0.02	2	50	100
DETSC 2306 Mercury as Hg	0.015	< 0.002	0.01	0.2	2
DETSC 2306 Molybdenum as Mo	3.5	< 0.1	0.5	10	30
DETSC 2306 Nickel as Ni	0.58	< 0.1	0.4	10	40
DETSC 2306 Lead as Pb	0.56	< 0.05	0.5	10	50
DETSC 2306 Antimony as Sb	0.21	< 0.05	0.06	0.7	5
DETSC 2306 Selenium as Se	1.1	< 0.03	0.1	0.5	7
DETSC 2306 Zinc as Zn	< 1.3	< 0.01	4	50	200
DETSC 2055 Chloride as Cl	1100	< 100	800	15,000	25,000
DETSC 2055* Fluoride as F	150	1.5	10	150	500
DETSC 2055 Sulphate as SO4	1800	< 100	1000	20,000	50,000
DETSC 2009* Total Dissolved Solids	37000	370	4000	60,000	100,000
DETSC 2130 Phenol Index	< 100	< 1	1	n/a	n/a
DETSC 2085 Dissolved Organic Carbon	8500	85	500	800	1000

TBE - To Be Evaluated
SNRHW - Stable Non-Reactive Hazardous Waste

Additional Information

DETSC 2008 pH	8.5
DETSC 2009 Conductivity uS/cm	52.5
* Temperature*	18.0

Mass of Sample Kg*	0.110
Mass of dry Sample Kg*	0.099

Stage 1

Volume of Leachant L2*	0.98
Volume of Eluate VE1*	0.93

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Summary of Asbestos Analysis
Soil Samples

Our Ref 23-21251
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
2229714	IP95 1 0.50	SOIL	NAD	none	Pierce Booth
2229715	IP99 1 0.50	SOIL	NAD	none	Pierce Booth
2229716	IP99 2 1.00	SOIL	NAD	none	Pierce Booth
2229717	IP94 1 0.50	SOIL	NAD	none	Pierce Booth
2229718	IP70 1 0.50	SOIL	NAD	none	Pierce Booth
2229719	IP96 1 0.50	SOIL	NAD	none	Pierce Booth
2229720	IP94 2 1.00	SOIL	NAD	none	Pierce Booth
2229721	IP70 2 1.00	SOIL	NAD	none	Pierce Booth
2229722	IP96 2 1.00	SOIL	NAD	none	Pierce Booth

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * - not included in laboratory scope of accreditation.

Information in Support of the Analytical Results

Our Ref 23-21251
Client Ref 23-0361
Contract East Meath North Dublin Grid Upgrade

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
2229714	IP95 0.50 SOIL	29/08/23	GJ 250ml, GJ 60ml, PT 1L x2	pH + Conductivity (7 days), VOC (7 days)	
2229715	IP99 0.50 SOIL	30/08/23	GJ 250ml, GJ 60ml, PT 1L x2	pH + Conductivity (7 days), VOC (7 days)	
2229716	IP99 1.00 SOIL	30/08/23	GJ 250ml, GJ 60ml, PT 1L x2	pH + Conductivity (7 days), VOC (7 days)	
2229717	IP94 0.50 SOIL	30/08/23	GJ 250ml, GJ 60ml, PT 1L x3	pH + Conductivity (7 days), VOC (7 days)	
2229718	IP70 0.50 SOIL	30/08/23	GJ 250ml, GJ 60ml, PT 1L x2	pH + Conductivity (7 days), VOC (7 days)	
2229719	IP96 0.50 SOIL	30/08/23	GJ 250ml, GJ 60ml, PT 1L x2	pH + Conductivity (7 days), VOC (7 days)	
2229720	IP94 1.00 SOIL	29/08/23	GJ 250ml, GJ 60ml, PT 1L	pH + Conductivity (7 days), VOC (7 days)	
2229721	IP70 1.00 SOIL	29/08/23	GJ 250ml, GJ 60ml, PT 1L x2	pH + Conductivity (7 days), VOC (7 days)	
2229722	IP96 1.00 SOIL	30/08/23	GJ 250ml, GJ 60ml, PT 1L x2	pH + Conductivity (7 days), VOC (7 days)	
2229723	IP95 0.50 LEACHATE	29/08/23	GJ 250ml, GJ 60ml, PT 1L x2		
2229724	IP99 0.50 LEACHATE	30/08/23	GJ 250ml, GJ 60ml, PT 1L x2		
2229725	IP99 1.00 LEACHATE	30/08/23	GJ 250ml, GJ 60ml, PT 1L x2		
2229726	IP94 0.50 LEACHATE	30/08/23	GJ 250ml, GJ 60ml, PT 1L x3		
2229727	IP70 0.50 LEACHATE	30/08/23	GJ 250ml, GJ 60ml, PT 1L x2		
2229728	IP96 0.50 LEACHATE	30/08/23	GJ 250ml, GJ 60ml, PT 1L x2		
2229729	IP94 1.00 LEACHATE	29/08/23	GJ 250ml, GJ 60ml, PT 1L		
2229730	IP70 1.00 LEACHATE	29/08/23	GJ 250ml, GJ 60ml, PT 1L x2		
2229731	IP96 1.00 LEACHATE	30/08/23	GJ 250ml, GJ 60ml, PT 1L x2		

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Information in Support of the Analytical Results

List of HWOL Acronyms and Operators

Acronym	Description
HS	Headspace analysis
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent
CU	Clean-up - e.g. by florisil, silica gel
1D	GC - Single coil gas chromatography
2D	GC-GC - Double coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative eg. EH+HS_Total or EH_CU+HS_Total

Det	Acronym
Aliphatic C5-C6	HS_1D_AL
Aliphatic C6-C8	HS_1D_AL
Aliphatic C8-C10	HS_1D_AL
Aliphatic C10-C12	EH_CU_1D_AL
Aliphatic C12-C16	EH_CU_1D_AL
Aliphatic C16-C21	EH_CU_1D_AL
Aliphatic C21-C35	EH_CU_1D_AL
Aliphatic C5-C35	EH_CU+HS_1D_AL
Aromatic C5-C7	HS_1D_AR
Aromatic C7-C8	HS_1D_AR
Aromatic C8-C10	HS_1D_AR
Aromatic C10-C12	EH_CU_1D_AR
Aromatic C12-C16	EH_CU_1D_AR
Aromatic C16-C21	EH_CU_1D_AR
Aromatic C21-C35	EH_CU_1D_AR
Aromatic C5-C35	EH_CU+HS_1D_AR
TPH Ali/Aro Total C5-C35	EH_CU+HS_1D_Total
TPH (C10-C40)	EH_1D_Total

End of Report

Certificate of Analysis

Certificate Number 23-21330 *Issued:* 22-Sep-23

Client Causeway Geotech
Unit 1 Fingal House
Stephenstown Industrial Estate
Balbriggan
Co. Dublin
K32 VR66

Our Reference 23-21330

Client Reference 23-0361

Order No (not supplied)

Contract Title EAST MEATH NORTH DUBLIN GRID UPGRADE

Description 2 Soil samples, 2 Leachate samples.

Date Received 07-Sep-23

Date Started 07-Sep-23

Date Completed 22-Sep-23

Test Procedures Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Kirk Bridgewood
General Manager

2139

Summary of Chemical Analysis
Soil Samples

Our Ref 23-21330
Client Ref 23-0361
Contract Title EAST MEATH NORTH DUBLIN GRID UPGRADE

			Lab No	2230099	2230100
			.Sample ID	WS75	WS75
			Depth	0.50	1.00
			Other ID		
			Sample Type	ES	ES
			Sampling Date	31/08/2023	31/08/2023
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
Metals					
Arsenic	DETSC 2301#	0.2	mg/kg	14	14
Boron, Water Soluble (2.5:1)	DETSC 2311#	0.2	mg/kg	0.4	< 0.2
Cadmium	DETSC 2301#	0.1	mg/kg	1.4	2.1
Chromium	DETSC 2301#	0.15	mg/kg	18	11
Copper	DETSC 2301#	0.2	mg/kg	36	29
Lead	DETSC 2301#	0.3	mg/kg	48	35
Mercury	DETSC 2325#	0.05	mg/kg	0.25	< 0.05
Nickel	DETSC 2301#	1	mg/kg	33	35
Zinc	DETSC 2301#	1	mg/kg	110	87
Inorganics					
pH	DETSC 2008#		pH	8.5	8.7
Cyanide, Total	DETSC 2130#	0.1	mg/kg	0.2	< 0.1
Organic matter	DETSC 2002#	0.1	%	0.1	< 0.1
Sulphate Aqueous Extract as SO4 (2:1)	DETSC 2076#	10	mg/l	< 10	< 10
Petroleum Hydrocarbons					
Aliphatic C5-C6: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aliphatic C6-C8: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aliphatic C8-C10: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aliphatic C10-C12: EH_CU_1D_AL	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5
Aliphatic C12-C16: EH_CU_1D_AL	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2
Aliphatic C16-C21: EH_CU_1D_AL	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5
Aliphatic C21-C35: EH_CU_1D_AL	DETSC 3072#	3.4	mg/kg	< 3.4	< 3.4
Aliphatic C5-C35: EH_CU+HS_1D_AL	DETSC 3072*	10	mg/kg	< 10	< 10
Aromatic C5-C7: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aromatic C7-C8: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aromatic C8-C10: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aromatic C10-C12: EH_CU_1D_AR	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9
Aromatic C12-C16: EH_CU_1D_AR	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5
Aromatic C16-C21: EH_CU_1D_AR	DETSC 3072#	0.6	mg/kg	< 0.6	< 0.6
Aromatic C21-C35: EH_CU_1D_AR	DETSC 3072#	1.4	mg/kg	< 1.4	< 1.4
Aromatic C5-C35: EH_CU+HS_1D_AR	DETSC 3072*	10	mg/kg	< 10	< 10
TPH Ali/Aro Total C5-C35: EH_CU+HS_1D_Total	DETSC 3072*	10	mg/kg	< 10	< 10
Benzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01
Ethylbenzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01
Toluene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01
Xylene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01
PAHs					
Naphthalene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Acenaphthylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Acenaphthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 23-21330
Client Ref 23-0361
Contract Title EAST MEATH NORTH DUBLIN GRID UPGRADE

			Lab No	2230099	2230100
			.Sample ID	WS75	WS75
			Depth	0.50	1.00
			Other ID		
			Sample Type	ES	ES
			Sampling Date	31/08/2023	31/08/2023
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
Fluorene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Phenanthrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Benzo(a)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Chrysene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Benzo(b)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Benzo(k)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Benzo(a)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Indeno(1,2,3-c,d)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Dibenzo(a,h)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Benzo(g,h,i)perylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Coronene	DETSC 3301*	0.1	mg/kg	< 0.1	< 0.1
PAH 16 Total	DETSC 3301	1.6	mg/kg	< 1.6	< 1.6
Phenols					
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	0.6	< 0.3
VOCs					
Vinyl Chloride	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1 Dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Trans-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Cis-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
2,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Bromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Chloroform	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1,1-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Carbon tetrachloride	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Benzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Trichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Dibromomethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Bromodichloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
cis-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Toluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
trans-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1,2-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Tetrachloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,3-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Dibromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 23-21330
Client Ref 23-0361
Contract Title EAST MEATH NORTH DUBLIN GRID UPGRADE

			Lab No	2230099	2230100
			.Sample ID	WS75	WS75
			Depth	0.50	1.00
			Other ID		
			Sample Type	ES	ES
			Sampling Date	31/08/2023	31/08/2023
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
1,2-dibromoethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Chlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1,1,2-tetrachloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Ethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
m+p-Xylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
o-Xylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Styrene	DETSC 3431*	0.01	mg/kg	< 0.01	< 0.01
Bromoform	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Isopropylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Bromobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2,3-trichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
n-propylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
2-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,3,5-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
4-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Tert-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2,4-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
sec-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
p-isopropyltoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,3-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,4-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
n-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2-dibromo-3-chloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2,4-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Hexachlorobutadiene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2,3-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
MTBE	DETSC 3431*	0.01	mg/kg	< 0.01	< 0.01

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

WASTE ACCEPTANCE CRITERIA TESTING ANALYTICAL REPORT

Our Ref 23-21330
Client Ref 23-0361
Contract Title EAST MEATH NORTH DUBLIN GRID UPGRADE
Sample Id WS75 0.50
Sample Numbers 2230099 2230101
Date Analysed 22/09/2023

Test Results On Waste

Determinand and Method Reference	Units	Result	WAC Limit Values Inert Waste	SNRHW	Hazardous Waste
DETSC 2084# Total Organic Carbon	%	2.3	3	5	6
DETSC 2003# Loss On Ignition	%	6.9	n/a	n/a	10
DETSC 3321# BTEX	mg/kg	< 0.04	6	n/a	n/a
DETSC 3401# PCBs (7 congeners)	mg/kg	< 0.01	1	n/a	n/a
DETSC 3311# EPH (C10 - C40): EH_1D_Total	mg/kg	230.0	500	n/a	n/a
DETSC 3301 PAHs	mg/kg	< 1.6	100	n/a	n/a
DETSC 2008# pH	pH Units	8.5	n/a	>6	n/a
DETSC 2073* Acid Neutralisation Capacity (pH4)	mol/kg	< 1.0	n/a	TBE	TBE
DETSC 2073* Acid Neutralisation Capacity (pH7)	mol/kg	< 1.0	n/a	TBE	TBE

Test Results On Leachate

Determinand and Method Reference	Conc in Eluate ug/l 10:1	Amount Leached* mg/kg LS10	WAC Limit Values (Limit values for LS10 Leachate) Inert Waste	SNRHW	Hazardous Waste
DETSC 2306 Arsenic as As	1.3	0.013	0.5	2	25
DETSC 2306 Barium as Ba	4.3	< 0.1	20	100	300
DETSC 2306 Cadmium as Cd	5.9	0.059	0.04	1	5
DETSC 2306 Chromium as Cr	12	0.12	0.5	10	70
DETSC 2306 Copper as Cu	4.2	0.042	2	50	100
DETSC 2306 Mercury as Hg	< 0.010	< 0.002	0.01	0.2	2
DETSC 2306 Molybdenum as Mo	3.8	< 0.1	0.5	10	30
DETSC 2306 Nickel as Ni	2.2	< 0.1	0.4	10	40
DETSC 2306 Lead as Pb	1.2	< 0.05	0.5	10	50
DETSC 2306 Antimony as Sb	0.47	< 0.05	0.06	0.7	5
DETSC 2306 Selenium as Se	0.45	< 0.03	0.1	0.5	7
DETSC 2306 Zinc as Zn	5.7	0.057	4	50	200
DETSC 2055 Chloride as Cl	1100	< 100	800	15,000	25,000
DETSC 2055* Fluoride as F	240	2.4	10	150	500
DETSC 2055 Sulphate as SO4	2000	< 100	1000	20,000	50,000
DETSC 2009* Total Dissolved Solids	59000	590	4000	60,000	100,000
DETSC 2130 Phenol Index	< 100	< 1	1	n/a	n/a
DETSC 2085 Dissolved Organic Carbon	15000	150	500	800	1000

TBE - To Be Evaluated
SNRHW - Stable Non-Reactive Hazardous Waste

Additional Information

DETSC 2008 pH	8.6
DETSC 2009 Conductivity uS/cm	84.6
* Temperature*	18.0

Mass of Sample Kg*	0.120
Mass of dry Sample Kg*	0.099

Stage 1

Volume of Leachant L2*	0.969
Volume of Eluate VE1*	0.91

Disclaimer: *The WAC limit values are provided for guidance only. DETS does not accept responsibility for errors or omissions. Values are correct at time of issue.*

V.2.06 ** DETS are accredited for the testing of leachates and not the leachate preparation stage which is unaccredited.*

WASTE ACCEPTANCE CRITERIA TESTING ANALYTICAL REPORT

Our Ref 23-21330
Client Ref 23-0361
Contract Title EAST MEATH NORTH DUBLIN GRID UPGRADE
Sample Id WS75 1.00

Sample Numbers 2230100 2230102
Date Analysed 22/09/2023

Test Results On Waste

Determinand and Method Reference	Units	Result	WAC Limit Values: Inert Waste	SNRHW	Hazardous Waste
DETSC 2084# Total Organic Carbon	%	0.9	3	5	6
DETSC 2003# Loss On Ignition	%	2.4	n/a	n/a	10
DETSC 3321# BTEX	mg/kg	< 0.04	6	n/a	n/a
DETSC 3401# PCBs (7 congeners)	mg/kg	< 0.01	1	n/a	n/a
DETSC 3311# EPH (C10 - C40): EH_1D_Total	mg/kg	< 10	500	n/a	n/a
DETSC 3301 PAHs	mg/kg	< 1.6	100	n/a	n/a
DETSC 2008# pH	pH Units	8.7	n/a	>6	n/a
DETSC 2073* Acid Neutralisation Capacity (pH4)	mol/kg	< 1.0	n/a	TBE	TBE
DETSC 2073* Acid Neutralisation Capacity (pH7)	mol/kg	< 1.0	n/a	TBE	TBE

Test Results On Leachate

Determinand and Method Reference	Conc in Eluate ug/l 10:1	Amount Leached* mg/kg LS10	WAC Limit Values (Limit values for LS10 Leachate): Inert Waste	SNRHW	Hazardous Waste
DETSC 2306 Arsenic as As	0.32	< 0.01	0.5	2	25
DETSC 2306 Barium as Ba	4.1	< 0.1	20	100	300
DETSC 2306 Cadmium as Cd	0.043	< 0.02	0.04	1	5
DETSC 2306 Chromium as Cr	< 0.25	< 0.1	0.5	10	70
DETSC 2306 Copper as Cu	0.88	< 0.02	2	50	100
DETSC 2306 Mercury as Hg	< 0.010	< 0.002	0.01	0.2	2
DETSC 2306 Molybdenum as Mo	3.7	< 0.1	0.5	10	30
DETSC 2306 Nickel as Ni	< 0.50	< 0.1	0.4	10	40
DETSC 2306 Lead as Pb	0.17	< 0.05	0.5	10	50
DETSC 2306 Antimony as Sb	< 0.17	< 0.05	0.06	0.7	5
DETSC 2306 Selenium as Se	< 0.25	< 0.03	0.1	0.5	7
DETSC 2306 Zinc as Zn	< 1.3	< 0.01	4	50	200
DETSC 2055 Chloride as Cl	3100	< 100	800	15,000	25,000
DETSC 2055* Fluoride as F	210	2.1	10	150	500
DETSC 2055 Sulphate as SO4	1500	< 100	1000	20,000	50,000
DETSC 2009* Total Dissolved Solids	44000	440	4000	60,000	100,000
DETSC 2130 Phenol Index	< 100	< 1	1	n/a	n/a
DETSC 2085 Dissolved Organic Carbon	7600	76	500	800	1000

TBE - To Be Evaluated
SNRHW - Stable Non-Reactive Hazardous Waste

Additional Information

DETSC 2008 pH	7.3
DETSC 2009 Conductivity uS/cm	63.4
* Temperature*	19.0

Mass of Sample Kg*	0.110
Mass of dry Sample Kg*	0.100

Stage 1

Volume of Leachant L2*	0.985
Volume of Eluate VE1*	0.93

Disclaimer: *The WAC limit values are provided for guidance only. DETS does not accept responsibility for errors or omissions. Values are correct at time of issue.*

V.2.06 ** DETS are accredited for the testing of leachates and not the leachate preparation stage which is unaccredited.*

Summary of Asbestos Analysis
Soil Samples

Our Ref 23-21330
Client Ref 23-0361
Contract Title EAST MEATH NORTH DUBLIN GRID UPGRADE

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
2230099	WS75 0.50	SOIL	NAD	none	Michael Kay
2230100	WS75 1.00	SOIL	NAD	none	Michael Kay

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * - not included in laboratory scope of accreditation.

Information in Support of the Analytical Results

Our Ref 23-21330
Client Ref 23-0361
Contract EAST MEATH NORTH DUBLIN GRID UPGRADE

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
2230099	WS75 0.50 SOIL	31/08/23	GJ 250ml, GJ 60ml, PT 1L		
2230100	WS75 1.00 SOIL	31/08/23	GJ 250ml, GJ 60ml, PT 1L		
2230101	WS75 0.50 LEACHATE	31/08/23	GJ 250ml, GJ 60ml, PT 1L		
2230102	WS75 1.00 LEACHATE	31/08/23	GJ 250ml, GJ 60ml, PT 1L		

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Information in Support of the Analytical Results

List of HWOL Acronyms and Operators

Acronym	Description
HS	Headspace analysis
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent
CU	Clean-up - e.g. by florisil, silica gel
1D	GC - Single coil gas chromatography
2D	GC-GC - Double coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative eg. EH+HS_Total or EH_CU+HS_Total

Det	Acronym
Aliphatic C5-C6	HS_1D_AL
Aliphatic C6-C8	HS_1D_AL
Aliphatic C8-C10	HS_1D_AL
Aliphatic C10-C12	EH_CU_1D_AL
Aliphatic C12-C16	EH_CU_1D_AL
Aliphatic C16-C21	EH_CU_1D_AL
Aliphatic C21-C35	EH_CU_1D_AL
Aliphatic C5-C35	EH_CU+HS_1D_AL
Aromatic C5-C7	HS_1D_AR
Aromatic C7-C8	HS_1D_AR
Aromatic C8-C10	HS_1D_AR
Aromatic C10-C12	EH_CU_1D_AR
Aromatic C12-C16	EH_CU_1D_AR
Aromatic C16-C21	EH_CU_1D_AR
Aromatic C21-C35	EH_CU_1D_AR
Aromatic C5-C35	EH_CU+HS_1D_AR
TPH Ali/Aro Total C5-C35	EH_CU+HS_1D_Total
TPH (C10-C40)	EH_1D_Total

End of Report

Certificate of Analysis

Certificate Number	23-21331	*Issued:*	22-Sep-23

Client Causeway Geotech
Unit 1 Fingal House
Stephenstown Industrial Estate
Balbriggan
Co. Dublin
K32 VR66

Our Reference	23-21331
Client Reference	23-0361
Order No	(not supplied)
Contract Title	EAST MEATH NORTH DUBLIN GRID UPGRADE
Description	4 Soil samples, 4 Leachate samples.
Date Received	07-Sep-23
Date Started	07-Sep-23
Date Completed	22-Sep-23
Test Procedures	Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Kirk Bridgewood
General Manager

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Summary of Chemical Analysis
Soil Samples

Our Ref 23-21331
Client Ref 23-0361
Contract Title EAST MEATH NORTH DUBLIN GRID UPGRADE

			Lab No	2230103	2230104	2230105	2230106
			.Sample ID	WS74	WS74	WS76	WS76
			Depth	0.50	1.00	0.50	1.00
			Other ID				
			Sample Type	ES	ES	ES	ES
			Sampling Date	31/08/2023	31/08/2023	31/08/2023	31/08/2023
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
Metals							
Arsenic	DETSC 2301#	0.2	mg/kg	11	12	16	16
Boron, Water Soluble (2.5:1)	DETSC 2311#	0.2	mg/kg	< 0.2	< 0.2	< 0.2	0.4
Cadmium	DETSC 2301#	0.1	mg/kg	1.9	2.1	1.8	1.3
Chromium	DETSC 2301#	0.15	mg/kg	12	11	21	17
Copper	DETSC 2301#	0.2	mg/kg	29	30	41	24
Lead	DETSC 2301#	0.3	mg/kg	19	16	38	48
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	< 0.05	0.09	0.16
Nickel	DETSC 2301#	1	mg/kg	34	39	38	27
Zinc	DETSC 2301#	1	mg/kg	63	72	140	130
Inorganics							
pH	DETSC 2008#		pH	8.2	8.2	8.7	8.5
Cyanide, Total	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1	0.1	0.1
Organic matter	DETSC 2002#	0.1	%	< 0.1	2.5	0.6	1.1
Sulphate Aqueous Extract as SO4 (2:1)	DETSC 2076#	10	mg/l	92	< 10	< 10	< 10
Petroleum Hydrocarbons							
Aliphatic C5-C6: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C6-C8: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C8-C10: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C10-C12: EH_CU_1D_AL	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C12-C16: EH_CU_1D_AL	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2	< 1.2	< 1.2
Aliphatic C16-C21: EH_CU_1D_AL	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C21-C35: EH_CU_1D_AL	DETSC 3072#	3.4	mg/kg	< 3.4	< 3.4	< 3.4	< 3.4
Aliphatic C5-C35: EH_CU+HS_1D_AL	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10
Aromatic C5-C7: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C7-C8: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C8-C10: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C10-C12: EH_CU_1D_AR	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9	< 0.9	< 0.9
Aromatic C12-C16: EH_CU_1D_AR	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Aromatic C16-C21: EH_CU_1D_AR	DETSC 3072#	0.6	mg/kg	< 0.6	< 0.6	< 0.6	< 0.6
Aromatic C21-C35: EH_CU_1D_AR	DETSC 3072#	1.4	mg/kg	< 1.4	< 1.4	< 1.4	< 1.4
Aromatic C5-C35: EH_CU+HS_1D_AR	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10
TPH Ali/Aro Total C5-C35: EH_CU+HS_1D_Total	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10
Benzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Ethylbenzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Toluene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Xylene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
PAHs							
Naphthalene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 23-21331
Client Ref 23-0361
Contract Title EAST MEATH NORTH DUBLIN GRID UPGRADE

			Lab No	2230103	2230104	2230105	2230106
			.Sample ID	WS74	WS74	WS76	WS76
			Depth	0.50	1.00	0.50	1.00
			Other ID				
			Sample Type	ES	ES	ES	ES
			Sampling Date	31/08/2023	31/08/2023	31/08/2023	31/08/2023
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
Fluorene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Chrysene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(b)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(k)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Indeno(1,2,3-c,d)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Dibenzo(a,h)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(g,h,i)perylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Coronene	DETSC 3301*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
PAH 16 Total	DETSC 3301	1.6	mg/kg	< 1.6	< 1.6	< 1.6	< 1.6
Phenols							
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	0.3	0.5
VOCs							
Vinyl Chloride	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,1 Dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Trans-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,1-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Cis-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
2,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Bromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Chloroform	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,1,1-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,1-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Carbon tetrachloride	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Benzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Trichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Dibromomethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Bromodichloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
cis-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Toluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
trans-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,1,2-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Tetrachloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,3-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Dibromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01

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Summary of Chemical Analysis
Soil Samples

Our Ref 23-21331
Client Ref 23-0361
Contract Title EAST MEATH NORTH DUBLIN GRID UPGRADE

			Lab No	2230103	2230104	2230105	2230106
			.Sample ID	WS74	WS74	WS76	WS76
			Depth	0.50	1.00	0.50	1.00
			Other ID				
			Sample Type	ES	ES	ES	ES
			Sampling Date	31/08/2023	31/08/2023	31/08/2023	31/08/2023
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
1,2-dibromoethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Chlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,1,1,2-tetrachloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Ethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
m+p-Xylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
o-Xylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Styrene	DETSC 3431*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Bromoform	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Isopropylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Bromobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,2,3-trichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
n-propylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
2-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,3,5-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
4-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Tert-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,2,4-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
sec-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
p-isopropyltoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,3-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,4-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
n-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dibromo-3-chloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,2,4-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Hexachlorobutadiene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,2,3-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
MTBE	DETSC 3431*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

WASTE ACCEPTANCE CRITERIA TESTING ANALYTICAL REPORT

Our Ref 23-21331
Client Ref 23-0361
Contract Title EAST MEATH NORTH DUBLIN GRID UPGRADE
Sample Id WS74 0.50
Sample Numbers 2230103 2230107
Date Analysed 22/09/2023

Test Results On Waste

Determinand and Method Reference	Units	Result	WAC Limit Values Inert Waste	SNRHW	Hazardous Waste
DETSC 2084# Total Organic Carbon	%	1.7	3	5	6
DETSC 2003# Loss On Ignition	%	0.94	n/a	n/a	10
DETSC 3321# BTEX	mg/kg	< 0.04	6	n/a	n/a
DETSC 3401# PCBs (7 congeners)	mg/kg	< 0.01	1	n/a	n/a
DETSC 3311# EPH (C10 - C40): EH_1D_Total	mg/kg	< 10	500	n/a	n/a
DETSC 3301 PAHs	mg/kg	< 1.6	100	n/a	n/a
DETSC 2008# pH	pH Units	8.2	n/a	>6	n/a
DETSC 2073* Acid Neutralisation Capacity (pH4)	mol/kg	< 1.0	n/a	TBE	TBE
DETSC 2073* Acid Neutralisation Capacity (pH7)	mol/kg	< 1.0	n/a	TBE	TBE

Test Results On Leachate

Determinand and Method Reference	Conc in Eluate ug/l 10:1	Amount Leached* mg/kg LS10	WAC Limit Values (Limit values for LS10 Leachate) Inert Waste	SNRHW	Hazardous Waste
DETSC 2306 Arsenic as As	0.23	< 0.01	0.5	2	25
DETSC 2306 Barium as Ba	18	0.18	20	100	300
DETSC 2306 Cadmium as Cd	0.055	< 0.02	0.04	1	5
DETSC 2306 Chromium as Cr	< 0.25	< 0.1	0.5	10	70
DETSC 2306 Copper as Cu	0.72	< 0.02	2	50	100
DETSC 2306 Mercury as Hg	< 0.010	< 0.002	0.01	0.2	2
DETSC 2306 Molybdenum as Mo	6.6	< 0.1	0.5	10	30
DETSC 2306 Nickel as Ni	< 0.50	< 0.1	0.4	10	40
DETSC 2306 Lead as Pb	< 0.090	< 0.05	0.5	10	50
DETSC 2306 Antimony as Sb	0.25	< 0.05	0.06	0.7	5
DETSC 2306 Selenium as Se	1.2	< 0.03	0.1	0.5	7
DETSC 2306 Zinc as Zn	< 1.3	< 0.01	4	50	200
DETSC 2055 Chloride as Cl	1100	< 100	800	15,000	25,000
DETSC 2055* Fluoride as F	260	2.6	10	150	500
DETSC 2055 Sulphate as SO4	37000	370	1000	20,000	50,000
DETSC 2009* Total Dissolved Solids	69000	690	4000	60,000	100,000
DETSC 2130 Phenol Index	< 100	< 1	1	n/a	n/a
DETSC 2085 Dissolved Organic Carbon	16000	160	500	800	1000

TBE - To Be Evaluated
SNRHW - Stable Non-Reactive Hazardous Waste

Additional Information

DETSC 2008 pH	7.1
DETSC 2009 Conductivity uS/cm	99.1
* Temperature*	18.0

Mass of Sample Kg*	0.110
Mass of dry Sample Kg*	0.100

Stage 1

Volume of Leachant L2*	0.989
Volume of Eluate VE1*	0.93

Disclaimer: *The WAC limit values are provided for guidance only. DETS does not accept responsibility for errors or omissions. Values are correct at time of issue.*

V.2.06 ** DETS are accredited for the testing of leachates and not the leachate preparation stage which is unaccredited.*

WASTE ACCEPTANCE CRITERIA TESTING ANALYTICAL REPORT

Our Ref 23-21331
Client Ref 23-0361
Contract Title EAST MEATH NORTH DUBLIN GRID UPGRADE
Sample Id WS74 1.00
Sample Numbers 2230104 2230108
Date Analysed 22/09/2023

Test Results On Waste

Determinand and Method Reference	Units	Result	WAC Limit Values Inert Waste	SNRHW	Hazardous Waste
DETSC 2084# Total Organic Carbon	%	1.2	3	5	6
DETSC 2003# Loss On Ignition	%	2.2	n/a	n/a	10
DETSC 3321# BTEX	mg/kg	< 0.04	6	n/a	n/a
DETSC 3401# PCBs (7 congeners)	mg/kg	< 0.01	1	n/a	n/a
DETSC 3311# EPH (C10 - C40): EH_1D_Total	mg/kg	< 10	500	n/a	n/a
DETSC 3301 PAHs	mg/kg	< 1.6	100	n/a	n/a
DETSC 2008# pH	pH Units	8.2	n/a	>6	n/a
DETSC 2073* Acid Neutralisation Capacity (pH4)	mol/kg	< 1.0	n/a	TBE	TBE
DETSC 2073* Acid Neutralisation Capacity (pH7)	mol/kg	< 1.0	n/a	TBE	TBE

Test Results On Leachate

Determinand and Method Reference	Conc in Eluate ug/l 10:1	Amount Leached* mg/kg LS10	WAC Limit Values (Limit values for LS10 Leachate) Inert Waste	SNRHW	Hazardous Waste
DETSC 2306 Arsenic as As	0.18	< 0.01	0.5	2	25
DETSC 2306 Barium as Ba	7.6	< 0.1	20	100	300
DETSC 2306 Cadmium as Cd	0.034	< 0.02	0.04	1	5
DETSC 2306 Chromium as Cr	< 0.25	< 0.1	0.5	10	70
DETSC 2306 Copper as Cu	0.67	< 0.02	2	50	100
DETSC 2306 Mercury as Hg	< 0.010	< 0.002	0.01	0.2	2
DETSC 2306 Molybdenum as Mo	6.4	< 0.1	0.5	10	30
DETSC 2306 Nickel as Ni	< 0.50	< 0.1	0.4	10	40
DETSC 2306 Lead as Pb	< 0.090	< 0.05	0.5	10	50
DETSC 2306 Antimony as Sb	< 0.17	< 0.05	0.06	0.7	5
DETSC 2306 Selenium as Se	< 0.25	< 0.03	0.1	0.5	7
DETSC 2306 Zinc as Zn	< 1.3	< 0.01	4	50	200
DETSC 2055 Chloride as Cl	600	< 100	800	15,000	25,000
DETSC 2055* Fluoride as F	160	1.6	10	150	500
DETSC 2055 Sulphate as SO4	1700	< 100	1000	20,000	50,000
DETSC 2009* Total Dissolved Solids	41000	410	4000	60,000	100,000
DETSC 2130 Phenol Index	< 100	< 1	1	n/a	n/a
DETSC 2085 Dissolved Organic Carbon	9500	95	500	800	1000

TBE - To Be Evaluated
SNRHW - Stable Non-Reactive Hazardous Waste

Additional Information

DETSC 2008 pH	7.8
DETSC 2009 Conductivity uS/cm	58.6
* Temperature*	18.0

Mass of Sample Kg*	0.110
Mass of dry Sample Kg*	0.100

Stage 1

Volume of Leachant L2*	0.986
Volume of Eluate VE1*	0.93

Disclaimer: *The WAC limit values are provided for guidance only. DETS does not accept responsibility for errors or omissions. Values are correct at time of issue.*

V.2.06 ** DETS are accredited for the testing of leachates and not the leachate preparation stage which is unaccredited.*

WASTE ACCEPTANCE CRITERIA TESTING ANALYTICAL REPORT

Our Ref 23-21331
Client Ref 23-0361
Contract Title EAST MEATH NORTH DUBLIN GRID UPGRADE
Sample Id WS76 0.50
Sample Numbers 2230105 2230109
Date Analysed 22/09/2023

Test Results On Waste

Determinand and Method Reference	Units	Result	WAC Limit Values Inert Waste	SNRHW	Hazardous Waste
DETSC 2084# Total Organic Carbon	%	1.3	3	5	6
DETSC 2003# Loss On Ignition	%	4.5	n/a	n/a	10
DETSC 3321# BTEX	mg/kg	< 0.04	6	n/a	n/a
DETSC 3401# PCBs (7 congeners)	mg/kg	< 0.01	1	n/a	n/a
DETSC 3311# EPH (C10 - C40): EH_1D_Total	mg/kg	< 10	500	n/a	n/a
DETSC 3301 PAHs	mg/kg	< 1.6	100	n/a	n/a
DETSC 2008# pH	pH Units	8.7	n/a	>6	n/a
DETSC 2073* Acid Neutralisation Capacity (pH4)	mol/kg	< 1.0	n/a	TBE	TBE
DETSC 2073* Acid Neutralisation Capacity (pH7)	mol/kg	< 1.0	n/a	TBE	TBE

Test Results On Leachate

Determinand and Method Reference	Conc in Eluate ug/l 10:1	Amount Leached* mg/kg LS10	WAC Limit Values (Limit values for LS10 Leachate) Inert Waste	SNRHW	Hazardous Waste
DETSC 2306 Arsenic as As	0.95	< 0.01	0.5	2	25
DETSC 2306 Barium as Ba	5.4	< 0.1	20	100	300
DETSC 2306 Cadmium as Cd	0.049	< 0.02	0.04	1	5
DETSC 2306 Chromium as Cr	< 0.25	< 0.1	0.5	10	70
DETSC 2306 Copper as Cu	1.6	< 0.02	2	50	100
DETSC 2306 Mercury as Hg	< 0.010	< 0.002	0.01	0.2	2
DETSC 2306 Molybdenum as Mo	2.8	< 0.1	0.5	10	30
DETSC 2306 Nickel as Ni	< 0.50	< 0.1	0.4	10	40
DETSC 2306 Lead as Pb	0.5	< 0.05	0.5	10	50
DETSC 2306 Antimony as Sb	0.38	< 0.05	0.06	0.7	5
DETSC 2306 Selenium as Se	< 0.25	< 0.03	0.1	0.5	7
DETSC 2306 Zinc as Zn	1.8	0.018	4	50	200
DETSC 2055 Chloride as Cl	1200	< 100	800	15,000	25,000
DETSC 2055* Fluoride as F	210	2.1	10	150	500
DETSC 2055 Sulphate as SO4	1700	< 100	1000	20,000	50,000
DETSC 2009* Total Dissolved Solids	57000	570	4000	60,000	100,000
DETSC 2130 Phenol Index	< 100	< 1	1	n/a	n/a
DETSC 2085 Dissolved Organic Carbon	12000	120	500	800	1000

TBE - To Be Evaluated
SNRHW - Stable Non-Reactive Hazardous Waste

Additional Information

DETSC 2008 pH	7.5
DETSC 2009 Conductivity uS/cm	81.1
* Temperature*	18.0

Mass of Sample Kg*	0.110
Mass of dry Sample Kg*	0.095

Stage 1

Volume of Leachant L2*	0.934
Volume of Eluate VE1*	0.88

Disclaimer: *The WAC limit values are provided for guidance only. DETS does not accept responsibility for errors or omissions. Values are correct at time of issue.*

V.2.06 ** DETS are accredited for the testing of leachates and not the leachate preparation stage which is unaccredited.*

WASTE ACCEPTANCE CRITERIA TESTING ANALYTICAL REPORT

Our Ref 23-21331
Client Ref 23-0361
Contract Title EAST MEATH NORTH DUBLIN GRID UPGRADE
Sample Id WS76 1.00
Sample Numbers 2230106 2230110
Date Analysed 22/09/2023

Test Results On Waste

Determinand and Method Reference	Units	Result	WAC Limit Values: Inert Waste	SNRHW	Hazardous Waste
DETSC 2084# Total Organic Carbon	%	1.6	3	5	6
DETSC 2003# Loss On Ignition	%	5.2	n/a	n/a	10
DETSC 3321# BTEX	mg/kg	< 0.04	6	n/a	n/a
DETSC 3401# PCBs (7 congeners)	mg/kg	< 0.01	1	n/a	n/a
DETSC 3311# EPH (C10 - C40): EH_1D_Total	mg/kg	< 10	500	n/a	n/a
DETSC 3301 PAHs	mg/kg	< 1.6	100	n/a	n/a
DETSC 2008# pH	pH Units	8.5	n/a	>6	n/a
DETSC 2073* Acid Neutralisation Capacity (pH4)	mol/kg	< 1.0	n/a	TBE	TBE
DETSC 2073* Acid Neutralisation Capacity (pH7)	mol/kg	< 1.0	n/a	TBE	TBE

Test Results On Leachate

Determinand and Method Reference	Conc in Eluate ug/l 10:1	Amount Leached* mg/kg LS10	WAC Limit Values (Limit values for LS10 Leachate): Inert Waste	SNRHW	Hazardous Waste
DETSC 2306 Arsenic as As	0.33	< 0.01	0.5	2	25
DETSC 2306 Barium as Ba	5.2	< 0.1	20	100	300
DETSC 2306 Cadmium as Cd	0.037	< 0.02	0.04	1	5
DETSC 2306 Chromium as Cr	< 0.25	< 0.1	0.5	10	70
DETSC 2306 Copper as Cu	0.83	< 0.02	2	50	100
DETSC 2306 Mercury as Hg	< 0.010	< 0.002	0.01	0.2	2
DETSC 2306 Molybdenum as Mo	< 1.1	< 0.1	0.5	10	30
DETSC 2306 Nickel as Ni	< 0.50	< 0.1	0.4	10	40
DETSC 2306 Lead as Pb	0.17	< 0.05	0.5	10	50
DETSC 2306 Antimony as Sb	0.17	< 0.05	0.06	0.7	5
DETSC 2306 Selenium as Se	< 0.25	< 0.03	0.1	0.5	7
DETSC 2306 Zinc as Zn	< 1.3	< 0.01	4	50	200
DETSC 2055 Chloride as Cl	900	< 100	800	15,000	25,000
DETSC 2055* Fluoride as F	190	1.9	10	150	500
DETSC 2055 Sulphate as SO4	1600	< 100	1000	20,000	50,000
DETSC 2009* Total Dissolved Solids	41000	410	4000	60,000	100,000
DETSC 2130 Phenol Index	< 100	< 1	1	n/a	n/a
DETSC 2085 Dissolved Organic Carbon	9300	93	500	800	1000

TBE - To Be Evaluated
SNRHW - Stable Non-Reactive Hazardous Waste

Additional Information

DETSC 2008 pH	7.4
DETSC 2009 Conductivity uS/cm	58.4
* Temperature*	18.0

Mass of Sample Kg*	0.110
Mass of dry Sample Kg*	0.094

Stage 1

Volume of Leachant L2*	0.928
Volume of Eluate VE1*	0.87

Disclaimer: *The WAC limit values are provided for guidance only. DETS does not accept responsibility for errors or omissions. Values are correct at time of issue.*

V.2.06 ** DETS are accredited for the testing of leachates and not the leachate preparation stage which is unaccredited.*

Summary of Asbestos Analysis
Soil Samples

Our Ref 23-21331
Client Ref 23-0361
Contract Title EAST MEATH NORTH DUBLIN GRID UPGRADE

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
2230103	WS74 0.50	SOIL	NAD	none	Lee Kerridge
2230104	WS74 1.00	SOIL	NAD	none	Lee Kerridge
2230105	WS76 0.50	SOIL	NAD	none	Lee Kerridge
2230106	WS76 1.00	SOIL	NAD	none	Lee Kerridge

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * - not included in laboratory scope of accreditation.

Information in Support of the Analytical Results

Our Ref 23-21331
Client Ref 23-0361
Contract EAST MEATH NORTH DUBLIN GRID UPGRADE

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
2230103	WS74 0.50 SOIL	31/08/23	GJ 250ml, GJ 60ml, PT 1L		
2230104	WS74 1.00 SOIL	31/08/23	GJ 250ml, GJ 60ml, PT 1L		
2230105	WS76 0.50 SOIL	31/08/23	GJ 250ml, GJ 60ml, PT 1L		
2230106	WS76 1.00 SOIL	31/08/23	GJ 250ml, GJ 60ml, PT 1L		
2230107	WS74 0.50 LEACHATE	31/08/23	GJ 250ml, GJ 60ml, PT 1L		
2230108	WS74 1.00 LEACHATE	31/08/23	GJ 250ml, GJ 60ml, PT 1L		
2230109	WS76 0.50 LEACHATE	31/08/23	GJ 250ml, GJ 60ml, PT 1L		
2230110	WS76 1.00 LEACHATE	31/08/23	GJ 250ml, GJ 60ml, PT 1L		

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Information in Support of the Analytical Results

List of HWOL Acronyms and Operators

Acronym	Description
HS	Headspace analysis
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent
CU	Clean-up - e.g. by florisil, silica gel
1D	GC - Single coil gas chromatography
2D	GC-GC - Double coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative eg. EH+HS_Total or EH_CU+HS_Total

Det	Acronym
Aliphatic C5-C6	HS_1D_AL
Aliphatic C6-C8	HS_1D_AL
Aliphatic C8-C10	HS_1D_AL
Aliphatic C10-C12	EH_CU_1D_AL
Aliphatic C12-C16	EH_CU_1D_AL
Aliphatic C16-C21	EH_CU_1D_AL
Aliphatic C21-C35	EH_CU_1D_AL
Aliphatic C5-C35	EH_CU+HS_1D_AL
Aromatic C5-C7	HS_1D_AR
Aromatic C7-C8	HS_1D_AR
Aromatic C8-C10	HS_1D_AR
Aromatic C10-C12	EH_CU_1D_AR
Aromatic C12-C16	EH_CU_1D_AR
Aromatic C16-C21	EH_CU_1D_AR
Aromatic C21-C35	EH_CU_1D_AR
Aromatic C5-C35	EH_CU+HS_1D_AR
TPH Ali/Aro Total C5-C35	EH_CU+HS_1D_Total
TPH (C10-C40)	EH_1D_Total

End of Report

Certificate of Analysis

Certificate Number	23-21919	*Issued:*	28-Sep-23

Client Causeway Geotech
Unit 1 Fingal House
Stephenstown Industrial Estate
Balbriggan
Co. Dublin
K32 VR66

Our Reference	23-21919
Client Reference	23-0361
Order No	(not supplied)
Contract Title	East Meath North Dublin Grid Upgrade
Description	2 Soil samples, 2 Leachate samples.
Date Received	14-Sep-23
Date Started	14-Sep-23
Date Completed	28-Sep-23
Test Procedures	Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Kirk Bridgewood
General Manager

2139

Summary of Chemical Analysis
Soil Samples

Our Ref 23-21919
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade

			Lab No	2233845	2233846
			.Sample ID	BH57	BH48
			Depth	0.50	0.50
			Other ID	1	1
			Sample Type	ES	ES
			Sampling Date	05/09/2023	05/09/2023
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
Metals					
Arsenic	DETSC 2301#	0.2	mg/kg	15	17
Boron, Water Soluble (2.5:1)	DETSC 2311#	0.2	mg/kg	0.3	< 0.2
Cadmium	DETSC 2301#	0.1	mg/kg	1.6	2.3
Chromium	DETSC 2301#	0.15	mg/kg	18	18
Copper	DETSC 2301#	0.2	mg/kg	22	34
Lead	DETSC 2301#	0.3	mg/kg	26	31
Mercury	DETSC 2325#	0.05	mg/kg	0.07	0.07
Nickel	DETSC 2301#	1	mg/kg	30	45
Zinc	DETSC 2301#	1	mg/kg	67	70
Inorganics					
pH	DETSC 2008#		pH	8.0	8.0
Cyanide, Total	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1
Organic matter	DETSC 2002#	0.1	%	1.1	1.5
Sulphate Aqueous Extract as SO4 (2:1)	DETSC 2076#	10	mg/l	14	< 10
Petroleum Hydrocarbons					
Aliphatic C5-C6: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aliphatic C6-C8: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aliphatic C8-C10: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aliphatic C10-C12: EH_CU_1D_AL	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5
Aliphatic C12-C16: EH_CU_1D_AL	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2
Aliphatic C16-C21: EH_CU_1D_AL	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5
Aliphatic C21-C35: EH_CU_1D_AL	DETSC 3072#	3.4	mg/kg	< 3.4	< 3.4
Aliphatic C5-C35: EH_CU+HS_1D_AL	DETSC 3072*	10	mg/kg	< 10	< 10
Aromatic C5-C7: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aromatic C7-C8: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aromatic C8-C10: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aromatic C10-C12: EH_CU_1D_AR	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9
Aromatic C12-C16: EH_CU_1D_AR	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5
Aromatic C16-C21: EH_CU_1D_AR	DETSC 3072#	0.6	mg/kg	< 0.6	< 0.6
Aromatic C21-C35: EH_CU_1D_AR	DETSC 3072#	1.4	mg/kg	< 1.4	< 1.4
Aromatic C5-C35: EH_CU+HS_1D_AR	DETSC 3072*	10	mg/kg	< 10	< 10
TPH Ali/Aro Total C5-C35: EH_CU+HS_1D_Total	DETSC 3072*	10	mg/kg	< 10	< 10
Benzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01
Ethylbenzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01
Toluene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01
Xylene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01
PAHs					
Naphthalene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Acenaphthylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Acenaphthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 23-21919
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade

			Lab No	2233845	2233846
			.Sample ID	BH57	BH48
			Depth	0.50	0.50
			Other ID	1	1
			Sample Type	ES	ES
			Sampling Date	05/09/2023	05/09/2023
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
Fluorene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Phenanthrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Benzo(a)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Chrysene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Benzo(b)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Benzo(k)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Benzo(a)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Indeno(1,2,3-c,d)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Dibenzo(a,h)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Benzo(g,h,i)perylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Coronene	DETSC 3301*	0.1	mg/kg	< 0.1	< 0.1
PAH 16 Total	DETSC 3301	1.6	mg/kg	< 1.6	< 1.6
Phenols					
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	0.4
VOCs					
Vinyl Chloride	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1 Dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Trans-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Cis-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
2,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Bromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Chloroform	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1,1-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Carbon tetrachloride	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Benzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Trichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Dibromomethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Bromodichloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
cis-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Toluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
trans-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1,2-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Tetrachloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,3-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Dibromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 23-21919
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade

			Lab No	2233845	2233846
			.Sample ID	BH57	BH48
			Depth	0.50	0.50
			Other ID	1	1
			Sample Type	ES	ES
			Sampling Date	05/09/2023	05/09/2023
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
1,2-dibromoethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Chlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1,1,2-tetrachloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Ethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
m+p-Xylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
o-Xylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Styrene	DETSC 3431*	0.01	mg/kg	< 0.01	< 0.01
Bromoform	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Isopropylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Bromobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2,3-trichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
n-propylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
2-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,3,5-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
4-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Tert-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2,4-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
sec-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
p-isopropyltoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,3-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,4-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
n-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2-dibromo-3-chloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2,4-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Hexachlorobutadiene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2,3-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
MTBE	DETSC 3431*	0.01	mg/kg	< 0.01	< 0.01

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

WASTE ACCEPTANCE CRITERIA TESTING ANALYTICAL REPORT

Our Ref 23-21919
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade
Sample Id BH57 1 0.50

Sample Numbers 2233845 2233847
Date Analysed 28/09/2023

Test Results On Waste

Determinand and Method Reference	Units	Result	WAC Limit Values: Inert Waste	SNRHW	Hazardous Waste
DETSC 2084# Total Organic Carbon	%	1.0	3	5	6
DETSC 2003# Loss On Ignition	%	3.5	n/a	n/a	10
DETSC 3321# BTEX	mg/kg	< 0.04	6	n/a	n/a
DETSC 3401# PCBs (7 congeners)	mg/kg	< 0.01	1	n/a	n/a
DETSC 3311# EPH (C10 - C40): EH_1D_Total	mg/kg	< 10	500	n/a	n/a
DETSC 3301 PAHs	mg/kg	< 1.6	100	n/a	n/a
DETSC 2008# pH	pH Units	8.0	n/a	>6	n/a
DETSC 2073* Acid Neutralisation Capacity (pH4)	mol/kg	< 1.0	n/a	TBE	TBE
DETSC 2073* Acid Neutralisation Capacity (pH7)	mol/kg	< 1.0	n/a	TBE	TBE

Test Results On Leachate

Determinand and Method Reference	Conc in Eluate ug/l 10:1	Amount Leached* mg/kg LS10	WAC Limit Values (Limit values for LS10 Leachate): Inert Waste	SNRHW	Hazardous Waste
DETSC 2306 Arsenic as As	0.35	< 0.01	0.5	2	25
DETSC 2306 Barium as Ba	4.6	< 0.1	20	100	300
DETSC 2306 Cadmium as Cd	0.048	< 0.02	0.04	1	5
DETSC 2306 Chromium as Cr	< 0.25	< 0.1	0.5	10	70
DETSC 2306 Copper as Cu	1.3	< 0.02	2	50	100
DETSC 2306 Mercury as Hg	< 0.010	< 0.002	0.01	0.2	2
DETSC 2306 Molybdenum as Mo	< 1.1	< 0.1	0.5	10	30
DETSC 2306 Nickel as Ni	< 0.50	< 0.1	0.4	10	40
DETSC 2306 Lead as Pb	1.2	< 0.05	0.5	10	50
DETSC 2306 Antimony as Sb	< 0.17	< 0.05	0.06	0.7	5
DETSC 2306 Selenium as Se	0.26	< 0.03	0.1	0.5	7
DETSC 2306 Zinc as Zn	2.4	0.024	4	50	200
DETSC 2055 Chloride as Cl	34000	340	800	15,000	25,000
DETSC 2055* Fluoride as F	110	1.1	10	150	500
DETSC 2055 Sulphate as SO4	4000	< 100	1000	20,000	50,000
DETSC 2009* Total Dissolved Solids	37000	370	4000	60,000	100,000
DETSC 2130 Phenol Index	< 100	< 1	1	n/a	n/a
DETSC 2085 Dissolved Organic Carbon	3800	< 50	500	800	1000

TBE - To Be Evaluated
SNRHW - Stable Non-Reactive Hazardous Waste

Additional Information

DETSC 2008 pH	7.4
DETSC 2009 Conductivity uS/cm	52.6
* Temperature*	18.0

Mass of Sample Kg*	0.110
Mass of dry Sample Kg*	0.099

Stage 1

Volume of Leachant L2*	0.976
Volume of Eluate VE1*	0.92

Disclaimer: *The WAC limit values are provided for guidance only. DETS does not accept responsibility for errors or omissions. Values are correct at time of issue.*

V.2.06 ** DETS are accredited for the testing of leachates and not the leachate preparation stage which is unaccredited.*

WASTE ACCEPTANCE CRITERIA TESTING ANALYTICAL REPORT

Our Ref 23-21919
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade
Sample Id BH48 1 0.50

Sample Numbers 2233846 2233848
Date Analysed 28/09/2023

Test Results On Waste

Determinand and Method Reference	Units	Result	WAC Limit Values Inert Waste	SNRHW	Hazardous Waste
DETSC 2084# Total Organic Carbon	%	1.2	3	5	6
DETSC 2003# Loss On Ignition	%	5.0	n/a	n/a	10
DETSC 3321# BTEX	mg/kg	< 0.04	6	n/a	n/a
DETSC 3401# PCBs (7 congeners)	mg/kg	< 0.01	1	n/a	n/a
DETSC 3311# EPH (C10 - C40): EH_1D_Total	mg/kg	< 10	500	n/a	n/a
DETSC 3301 PAHs	mg/kg	< 1.6	100	n/a	n/a
DETSC 2008# pH	pH Units	8.0	n/a	>6	n/a
DETSC 2073* Acid Neutralisation Capacity (pH4)	mol/kg	< 1.0	n/a	TBE	TBE
DETSC 2073* Acid Neutralisation Capacity (pH7)	mol/kg	< 1.0	n/a	TBE	TBE

Test Results On Leachate

Determinand and Method Reference	Conc in Eluate ug/l 10:1	Amount Leached* mg/kg LS10	WAC Limit Values (Limit values for LS10 Leachate) Inert Waste	SNRHW	Hazardous Waste
DETSC 2306 Arsenic as As	0.23	< 0.01	0.5	2	25
DETSC 2306 Barium as Ba	5.2	< 0.1	20	100	300
DETSC 2306 Cadmium as Cd	0.32	< 0.02	0.04	1	5
DETSC 2306 Chromium as Cr	< 0.25	< 0.1	0.5	10	70
DETSC 2306 Copper as Cu	0.94	< 0.02	2	50	100
DETSC 2306 Mercury as Hg	< 0.010	< 0.002	0.01	0.2	2
DETSC 2306 Molybdenum as Mo	< 1.1	< 0.1	0.5	10	30
DETSC 2306 Nickel as Ni	< 0.50	< 0.1	0.4	10	40
DETSC 2306 Lead as Pb	1.5	< 0.05	0.5	10	50
DETSC 2306 Antimony as Sb	< 0.17	< 0.05	0.06	0.7	5
DETSC 2306 Selenium as Se	< 0.25	< 0.03	0.1	0.5	7
DETSC 2306 Zinc as Zn	1.7	0.017	4	50	200
DETSC 2055 Chloride as Cl	2100	< 100	800	15,000	25,000
DETSC 2055* Fluoride as F	250	2.5	10	150	500
DETSC 2055 Sulphate as SO4	1300	< 100	1000	20,000	50,000
DETSC 2009* Total Dissolved Solids	46000	460	4000	60,000	100,000
DETSC 2130 Phenol Index	< 100	< 1	1	n/a	n/a
DETSC 2085 Dissolved Organic Carbon	4300	< 50	500	800	1000

TBE - To Be Evaluated
SNRHW - Stable Non-Reactive Hazardous Waste

Additional Information

DETSC 2008 pH	7.6
DETSC 2009 Conductivity uS/cm	65.8
* Temperature*	18.0

Mass of Sample Kg*	0.120
Mass of dry Sample Kg*	0.098

Stage 1

Volume of Leachant L2*	0.957
Volume of Eluate VE1*	0.9

Disclaimer: *The WAC limit values are provided for guidance only. DETS does not accept responsibility for errors or omissions. Values are correct at time of issue.*

V.2.06 ** DETS are accredited for the testing of leachates and not the leachate preparation stage which is unaccredited.*

Summary of Asbestos Analysis
Soil Samples

Our Ref 23-21919
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
2233845	BH57 1 0.50	SOIL	NAD	none	Vicky Convery
2233846	BH48 1 0.50	SOIL	NAD	none	Vicky Convery

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * - not included in laboratory scope of accreditation.

Information in Support of the Analytical Results

Our Ref 23-21919
Client Ref 23-0361
Contract East Meath North Dublin Grid Upgrade

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
2233845	BH57 0.50 SOIL	05/09/23	GJ 250ml, GJ 60ml, PT 1L x2	pH + Conductivity (7 days), VOC (7 days)	
2233846	BH48 0.50 SOIL	05/09/23	GJ 250ml, GJ 60ml, PT 1L x2	pH + Conductivity (7 days), VOC (7 days)	
2233847	BH57 0.50 LEACHATE	05/09/23	GJ 250ml, GJ 60ml, PT 1L x2		
2233848	BH48 0.50 LEACHATE	05/09/23	GJ 250ml, GJ 60ml, PT 1L x2		

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Information in Support of the Analytical Results

List of HWOL Acronyms and Operators

Acronym	Description
HS	Headspace analysis
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent
CU	Clean-up - e.g. by florisil, silica gel
1D	GC - Single coil gas chromatography
2D	GC-GC - Double coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative eg. EH+HS_Total or EH_CU+HS_Total

Det	Acronym
Aliphatic C5-C6	HS_1D_AL
Aliphatic C6-C8	HS_1D_AL
Aliphatic C8-C10	HS_1D_AL
Aliphatic C10-C12	EH_CU_1D_AL
Aliphatic C12-C16	EH_CU_1D_AL
Aliphatic C16-C21	EH_CU_1D_AL
Aliphatic C21-C35	EH_CU_1D_AL
Aliphatic C5-C35	EH_CU+HS_1D_AL
Aromatic C5-C7	HS_1D_AR
Aromatic C7-C8	HS_1D_AR
Aromatic C8-C10	HS_1D_AR
Aromatic C10-C12	EH_CU_1D_AR
Aromatic C12-C16	EH_CU_1D_AR
Aromatic C16-C21	EH_CU_1D_AR
Aromatic C21-C35	EH_CU_1D_AR
Aromatic C5-C35	EH_CU+HS_1D_AR
TPH Ali/Aro Total C5-C35	EH_CU+HS_1D_Total
TPH (C10-C40)	EH_1D_Total

End of Report

Certificate of Analysis

Certificate Number	23-21921-1	*Issued:*	22-Jan-24

Client Causeway Geotech
Unit 1 Fingal House
Stephenstown Industrial Estate
Balbriggan
Co. Dublin
K32 VR66

Our Reference	23-21921-1
Client Reference	23-0361
Order No	(not supplied)
Contract Title	East Meath North Dublin Grid Upgrade
Description	4 Soil samples, 4 Leachate prepared by DETS samples.
Date Received	14-Sep-23
Date Started	14-Sep-23
Date Completed	22-Jan-24
Test Procedures	Identified by prefix DETSn (details on request).

Notes **This report supersedes 23-21921, amendments made.**
Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Kirk Bridgewood
General Manager

ilac-MRA

UKAS TESTING
2139

Summary of Chemical Analysis
Soil Samples

Our Ref 23-21921-1
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade

			Lab No	2233850	2233851	2233852	2233853
			.Sample ID	BH32	BH32	WS053	WS054
			Depth	0.50	1.00	1.00	0.50
			Other ID	1	2	2	1
			Sample Type	ES	ES	ES	ES
			Sampling Date	08/09/2023	08/09/2023	08/09/2023	08/09/2023
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
Metals							
Arsenic	DETSC 2301#	0.2	mg/kg	10	11	2.4	7.5
Boron, Water Soluble (2.5:1)	DETSC 2311#	0.2	mg/kg	0.2	0.2	0.3	< 0.2
Cadmium	DETSC 2301#	0.1	mg/kg	1.8	1.8	0.7	1.8
Chromium	DETSC 2301#	0.15	mg/kg	10	11	6.3	9.1
Copper	DETSC 2301#	0.2	mg/kg	23	24	8.5	21
Lead	DETSC 2301#	0.3	mg/kg	15	14	6.4	10
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Nickel	DETSC 2301#	1	mg/kg	31	31	5.8	24
Zinc	DETSC 2301#	1	mg/kg	67	58	26	48
Inorganics							
pH	DETSC 2008#		pH	8.4	8.2	8.9	8.5
Cyanide, Total	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Organic matter	DETSC 2002#	0.1	%	0.8	0.8	0.4	1.0
Sulphate Aqueous Extract as SO4 (2:1)	DETSC 2076#	10	mg/l	22	21	37	17
Petroleum Hydrocarbons							
Aliphatic C5-C6: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C6-C8: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C8-C10: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C10-C12: EH_CU_1D_AL	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C12-C16: EH_CU_1D_AL	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2	< 1.2	< 1.2
Aliphatic C16-C21: EH_CU_1D_AL	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C21-C35: EH_CU_1D_AL	DETSC 3072#	3.4	mg/kg	< 3.4	< 3.4	< 3.4	< 3.4
Aliphatic C5-C35: EH_CU+HS_1D_AL	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10
Aromatic C5-C7: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C7-C8: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C8-C10: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C10-C12: EH_CU_1D_AR	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9	< 0.9	< 0.9
Aromatic C12-C16: EH_CU_1D_AR	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Aromatic C16-C21: EH_CU_1D_AR	DETSC 3072#	0.6	mg/kg	< 0.6	< 0.6	< 0.6	< 0.6
Aromatic C21-C35: EH_CU_1D_AR	DETSC 3072#	1.4	mg/kg	< 1.4	< 1.4	< 1.4	< 1.4
Aromatic C5-C35: EH_CU+HS_1D_AR	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10
TPH Ali/Aro Total C5-C35: EH_CU+HS_1D_Total	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10
Benzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Ethylbenzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Toluene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Xylene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
PAHs							
Naphthalene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 23-21921-1
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade

			Lab No	2233850	2233851	2233852	2233853
			.Sample ID	BH32	BH32	WS053	WS054
			Depth	0.50	1.00	1.00	0.50
			Other ID	1	2	2	1
			Sample Type	ES	ES	ES	ES
			Sampling Date	08/09/2023	08/09/2023	08/09/2023	08/09/2023
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
Fluorene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Chrysene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(b)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(k)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Indeno(1,2,3-c,d)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Dibenzo(a,h)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(g,h,i)perylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Coronene	DETSC 3301*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
PAH 16 Total	DETSC 3301	1.6	mg/kg	< 1.6	< 1.6	< 1.6	< 1.6
Phenols							
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
VOCs							
Vinyl Chloride	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,1 Dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Trans-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,1-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Cis-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
2,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Bromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Chloroform	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,1,1-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,1-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Carbon tetrachloride	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Benzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Trichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Dibromomethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Bromodichloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
cis-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Toluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
trans-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,1,2-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Tetrachloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,3-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Dibromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 23-21921-1
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade

			Lab No	2233850	2233851	2233852	2233853
			.Sample ID	BH32	BH32	WS053	WS054
			Depth	0.50	1.00	1.00	0.50
			Other ID	1	2	2	1
			Sample Type	ES	ES	ES	ES
			Sampling Date	08/09/2023	08/09/2023	08/09/2023	08/09/2023
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
1,2-dibromoethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Chlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,1,1,2-tetrachloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Ethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
m+p-Xylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
o-Xylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Styrene	DETSC 3431*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Bromoform	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Isopropylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Bromobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,2,3-trichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
n-propylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
2-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,3,5-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
4-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Tert-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,2,4-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
sec-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
p-isopropyltoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,3-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,4-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
n-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dibromo-3-chloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,2,4-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Hexachlorobutadiene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,2,3-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
MTBE	DETSC 3431*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01

WASTE ACCEPTANCE CRITERIA TESTING ANALYTICAL REPORT

Our Ref 23-21921-1
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade
Sample Id BH32 2 1.00
Sample Numbers 2233851 2233855
Date Analysed 28/09/2023

Test Results On Waste

Determinand and Method Reference	Units	Result	WAC Limit Values Inert Waste	SNRHW	Hazardous Waste
DETSC 2084# Total Organic Carbon	%	2.7	3	5	6
DETSC 2003# Loss On Ignition	%	2.1	n/a	n/a	10
DETSC 3321# BTEX	mg/kg	< 0.04	6	n/a	n/a
DETSC 3401# PCBs (7 congeners)	mg/kg	< 0.01	1	n/a	n/a
DETSC 3311# EPH (C10 - C40): EH_1D_Total	mg/kg	< 10	500	n/a	n/a
DETSC 3301 PAHs	mg/kg	< 1.6	100	n/a	n/a
DETSC 2008# pH	pH Units	8.2	n/a	>6	n/a
DETSC 2073* Acid Neutralisation Capacity (pH4)	mol/kg	2.6	n/a	TBE	TBE
DETSC 2073* Acid Neutralisation Capacity (pH7)	mol/kg	< 1.0	n/a	TBE	TBE

Test Results On Leachate

Determinand and Method Reference	Conc in Eluate ug/l 10:1	Amount Leached* mg/kg LS10	WAC Limit Values (Limit values for LS10 Leachate) Inert Waste	SNRHW	Hazardous Waste
DETSC 2306 Arsenic as As	< 0.16	< 0.01	0.5	2	25
DETSC 2306 Barium as Ba	8.4	< 0.1	20	100	300
DETSC 2306 Cadmium as Cd	< 0.030	< 0.02	0.04	1	5
DETSC 2306 Chromium as Cr	< 0.25	< 0.1	0.5	10	70
DETSC 2306 Copper as Cu	1	< 0.02	2	50	100
DETSC 2306 Mercury as Hg	< 0.010	< 0.002	0.01	0.2	2
DETSC 2306 Molybdenum as Mo	9.3	< 0.1	0.5	10	30
DETSC 2306 Nickel as Ni	< 0.50	< 0.1	0.4	10	40
DETSC 2306 Lead as Pb	< 0.090	< 0.05	0.5	10	50
DETSC 2306 Antimony as Sb	< 0.17	< 0.05	0.06	0.7	5
DETSC 2306 Selenium as Se	0.45	< 0.03	0.1	0.5	7
DETSC 2306 Zinc as Zn	2.2	0.022	4	50	200
DETSC 2055 Chloride as Cl	650	< 100	800	15,000	25,000
DETSC 2055* Fluoride as F	150	1.5	10	150	500
DETSC 2055 Sulphate as SO4	1400	< 100	1000	20,000	50,000
DETSC 2009* Total Dissolved Solids	48000	480	4000	60,000	100,000
DETSC 2130 Phenol Index	< 100	< 1	1	n/a	n/a
DETSC 2085 Dissolved Organic Carbon	2800	< 50	500	800	1000

TBE - To Be Evaluated
SNRHW - Stable Non-Reactive Hazardous Waste

Additional Information

DETSC 2008 pH	8.2
DETSC 2009 Conductivity uS/cm	69.0
* Temperature*	18.0

Mass of Sample Kg*	0.110
Mass of dry Sample Kg*	0.099

Stage 1

Volume of Leachant L2*	0.984
Volume of Eluate VE1*	0.93

Disclaimer: *The WAC limit values are provided for guidance only. DETS does not accept responsibility for errors or omissions. Values are correct at time of issue.*

V.2.06 ** DETS are accredited for the testing of leachates and not the leachate preparation stage which is unaccredited.*

WASTE ACCEPTANCE CRITERIA TESTING ANALYTICAL REPORT

Our Ref 23-21921-1
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade
Sample Id WS053 2 0.50
Sample Numbers 2233852 2233856
Date Analysed 28/09/2023

Test Results On Waste

Determinand and Method Reference	Units	Result	WAC Limit Values: Inert Waste	SNRHW	Hazardous Waste
DETSC 2084# Total Organic Carbon	%	3.2	3	5	6
DETSC 2003# Loss On Ignition	%	1.5	n/a	n/a	10
DETSC 3321# BTEX	mg/kg	< 0.04	6	n/a	n/a
DETSC 3401# PCBs (7 congeners)	mg/kg	< 0.01	1	n/a	n/a
DETSC 3311# EPH (C10 - C40): EH_1D_Total	mg/kg	21.0	500	n/a	n/a
DETSC 3301 PAHs	mg/kg	< 1.6	100	n/a	n/a
DETSC 2008# pH	pH Units	8.9	n/a	>6	n/a
DETSC 2073* Acid Neutralisation Capacity (pH4)	mol/kg	2.6	n/a	TBE	TBE
DETSC 2073* Acid Neutralisation Capacity (pH7)	mol/kg	< 1.0	n/a	TBE	TBE

Test Results On Leachate

Determinand and Method Reference	Conc in Eluate ug/l 10:1	Amount Leached* mg/kg LS10	WAC Limit Values (Limit values for LS10 Leachate): Inert Waste	SNRHW	Hazardous Waste
DETSC 2306 Arsenic as As	0.74	< 0.01	0.5	2	25
DETSC 2306 Barium as Ba	7.2	< 0.1	20	100	300
DETSC 2306 Cadmium as Cd	0.082	< 0.02	0.04	1	5
DETSC 2306 Chromium as Cr	< 0.25	< 0.1	0.5	10	70
DETSC 2306 Copper as Cu	1.4	< 0.02	2	50	100
DETSC 2306 Mercury as Hg	< 0.010	< 0.002	0.01	0.2	2
DETSC 2306 Molybdenum as Mo	< 1.1	< 0.1	0.5	10	30
DETSC 2306 Nickel as Ni	0.69	< 0.1	0.4	10	40
DETSC 2306 Lead as Pb	0.26	< 0.05	0.5	10	50
DETSC 2306 Antimony as Sb	0.18	< 0.05	0.06	0.7	5
DETSC 2306 Selenium as Se	0.31	< 0.03	0.1	0.5	7
DETSC 2306 Zinc as Zn	4	0.04	4	50	200
DETSC 2055 Chloride as Cl	740	< 100	800	15,000	25,000
DETSC 2055* Fluoride as F	< 100	< 0.1	10	150	500
DETSC 2055 Sulphate as SO4	2000	< 100	1000	20,000	50,000
DETSC 2009* Total Dissolved Solids	22000	220	4000	60,000	100,000
DETSC 2130 Phenol Index	< 100	< 1	1	n/a	n/a
DETSC 2085 Dissolved Organic Carbon	< 2000	< 50	500	800	1000

TBE - To Be Evaluated
SNRHW - Stable Non-Reactive Hazardous Waste

Additional Information

DETSC 2008 pH	8.6
DETSC 2009 Conductivity uS/cm	31.8
* Temperature*	18.0

Mass of Sample Kg*	0.100
Mass of dry Sample Kg*	0.095

Stage 1

Volume of Leachant L2*	0.948
Volume of Eluate VE1*	0.9

Disclaimer: *The WAC limit values are provided for guidance only. DETS does not accept responsibility for errors or omissions. Values are correct at time of issue.*

V.2.06 ** DETS are accredited for the testing of leachates and not the leachate preparation stage which is unaccredited.*

WASTE ACCEPTANCE CRITERIA TESTING ANALYTICAL REPORT

Our Ref 23-21921-1
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade
Sample Id WS054 1 0.50
Sample Numbers 2233853 2233857
Date Analysed 28/09/2023

Test Results On Waste

Determinand and Method Reference	Units	Result	WAC Limit Values Inert Waste	SNRHW	Hazardous Waste
DETSC 2084# Total Organic Carbon	%	1.2	3	5	6
DETSC 2003# Loss On Ignition	%	1.5	n/a	n/a	10
DETSC 3321# BTEX	mg/kg	< 0.04	6	n/a	n/a
DETSC 3401# PCBs (7 congeners)	mg/kg	< 0.01	1	n/a	n/a
DETSC 3311# EPH (C10 - C40): EH_1D_Total	mg/kg	< 10	500	n/a	n/a
DETSC 3301 PAHs	mg/kg	< 1.6	100	n/a	n/a
DETSC 2008# pH	pH Units	8.5	n/a	>6	n/a
DETSC 2073* Acid Neutralisation Capacity (pH4)	mol/kg	2.7	n/a	TBE	TBE
DETSC 2073* Acid Neutralisation Capacity (pH7)	mol/kg	< 1.0	n/a	TBE	TBE

Test Results On Leachate

Determinand and Method Reference	Conc in Eluate ug/l 10:1	Amount Leached* mg/kg LS10	WAC Limit Values (Limit values for LS10 Leachate) Inert Waste	SNRHW	Hazardous Waste
DETSC 2306 Arsenic as As	0.57	< 0.01	0.5	2	25
DETSC 2306 Barium as Ba	5.2	< 0.1	20	100	300
DETSC 2306 Cadmium as Cd	0.051	< 0.02	0.04	1	5
DETSC 2306 Chromium as Cr	0.62	< 0.1	0.5	10	70
DETSC 2306 Copper as Cu	1.9	< 0.02	2	50	100
DETSC 2306 Mercury as Hg	< 0.010	< 0.002	0.01	0.2	2
DETSC 2306 Molybdenum as Mo	< 1.1	< 0.1	0.5	10	30
DETSC 2306 Nickel as Ni	1.4	< 0.1	0.4	10	40
DETSC 2306 Lead as Pb	0.44	< 0.05	0.5	10	50
DETSC 2306 Antimony as Sb	< 0.17	< 0.05	0.06	0.7	5
DETSC 2306 Selenium as Se	< 0.25	< 0.03	0.1	0.5	7
DETSC 2306 Zinc as Zn	4.6	0.046	4	50	200
DETSC 2055 Chloride as Cl	1200	< 100	800	15,000	25,000
DETSC 2055* Fluoride as F	150	1.5	10	150	500
DETSC 2055 Sulphate as SO4	1700	< 100	1000	20,000	50,000
DETSC 2009* Total Dissolved Solids	38000	380	4000	60,000	100,000
DETSC 2130 Phenol Index	< 100	< 1	1	n/a	n/a
DETSC 2085 Dissolved Organic Carbon	2100	< 50	500	800	1000

TBE - To Be Evaluated
SNRHW - Stable Non-Reactive Hazardous Waste

Additional Information

DETSC 2008 pH	8.5
DETSC 2009 Conductivity uS/cm	54.2
* Temperature*	18.0
Mass of Sample Kg*	0.100
Mass of dry Sample Kg*	0.093
Stage 1	
Volume of Leachant L2*	0.925
Volume of Eluate VE1*	0.87

Disclaimer: *The WAC limit values are provided for guidance only. DETS does not accept responsibility for errors or omissions. Values are correct at time of issue.*

V.2.06 ** DETS are accredited for the testing of leachates and not the leachate preparation stage which is unaccredited.*

Summary of Asbestos Analysis
Soil Samples

Our Ref 23-21921-1
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
2233850	BH32 1 0.50	SOIL	NAD	none	Josh Best
2233851	BH32 2 1.00	SOIL	NAD	none	Josh Best
2233852	WS053 2 1.00	SOIL	NAD	none	Josh Best
2233853	WS054 1 0.50	SOIL	NAD	none	Josh Best

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * - not included in laboratory scope of accreditation.

Information in Support of the Analytical Results

Our Ref 23-21921-1
Client Ref 23-0361
Contract East Meath North Dublin Grid Upgrade

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
2233850	BH32 0.50 SOIL	08/09/23	GJ 250ml, GJ 60ml, PT 1L x2		
2233851	BH32 1.00 SOIL	08/09/23	GJ 250ml, GJ 60ml, PT 1L x2		
2233852	WS053 1.00 SOIL	08/09/23	GJ 250ml, GJ 60ml, PT 1L		
2233853	WS054 0.50 SOIL	08/09/23	GJ 250ml, GJ 60ml, PT 1L		
2233854	BH32 0.50 LEACHATE	08/09/23	GJ 250ml, GJ 60ml, PT 1L x2		
2233855	BH32 1.00 LEACHATE	08/09/23	GJ 250ml, GJ 60ml, PT 1L x2		
2233856	WS053 1.00 LEACHATE	08/09/23	GJ 250ml, GJ 60ml, PT 1L		
2233857	WS054 0.50 LEACHATE	08/09/23	GJ 250ml, GJ 60ml, PT 1L		

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Information in Support of the Analytical Results

List of HWOL Acronyms and Operators

Acronym	Description
HS	Headspace analysis
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent
CU	Clean-up - e.g. by florisil, silica gel
1D	GC - Single coil gas chromatography
2D	GC-GC - Double coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative eg. EH+HS_Total or EH_CU+HS_Total

Det	Acronym
Aliphatic C5-C6	HS_1D_AL
Aliphatic C6-C8	HS_1D_AL
Aliphatic C8-C10	HS_1D_AL
Aliphatic C10-C12	EH_CU_1D_AL
Aliphatic C12-C16	EH_CU_1D_AL
Aliphatic C16-C21	EH_CU_1D_AL
Aliphatic C21-C35	EH_CU_1D_AL
Aliphatic C5-C35	EH_CU+HS_1D_AL
Aromatic C5-C7	HS_1D_AR
Aromatic C7-C8	HS_1D_AR
Aromatic C8-C10	HS_1D_AR
Aromatic C10-C12	EH_CU_1D_AR
Aromatic C12-C16	EH_CU_1D_AR
Aromatic C16-C21	EH_CU_1D_AR
Aromatic C21-C35	EH_CU_1D_AR
Aromatic C5-C35	EH_CU+HS_1D_AR
TPH Ali/Aro Total C5-C35	EH_CU+HS_1D_Total
TPH (C10-C40)	EH_1D_Total

End of Report

Certificate of Analysis

Certificate Number	23-21922	*Issued:*	28-Sep-23

Client Causeway Geotech
Unit 1 Fingal House
Stephenstown Industrial Estate
Balbriggan
Co. Dublin
K32 VR66

Our Reference	23-21922
Client Reference	23-0361
Order No	(not supplied)
Contract Title	East Meath North Dublin Grid Upgrade
Description	1 Soil sample, 1 Leachate sample.
Date Received	14-Sep-23
Date Started	14-Sep-23
Date Completed	28-Sep-23
Test Procedures	Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Kirk Bridgewood
General Manager

2139

Summary of Chemical Analysis
Soil Samples

Our Ref 23-21922
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade

Lab No	2233858
.Sample ID	WS085
Depth	1.00
Other ID	2
Sample Type	ES
Sampling Date	04/09/2023
Sampling Time	n/s

Test	Method	LOD	Units	
Metals				
Arsenic	DETSC 2301#	0.2	mg/kg	7.4
Boron, Water Soluble (2.5:1)	DETSC 2311#	0.2	mg/kg	0.7
Cadmium	DETSC 2301#	0.1	mg/kg	1.5
Chromium	DETSC 2301#	0.15	mg/kg	8.0
Copper	DETSC 2301#	0.2	mg/kg	23
Lead	DETSC 2301#	0.3	mg/kg	16
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05
Nickel	DETSC 2301#	1	mg/kg	21
Zinc	DETSC 2301#	1	mg/kg	90
Inorganics				
pH	DETSC 2008#		pH	8.8
Cyanide, Total	DETSC 2130#	0.1	mg/kg	< 0.1
Organic matter	DETSC 2002#	0.1	%	0.8
Sulphate Aqueous Extract as SO4 (2:1)	DETSC 2076#	10	mg/l	29
Petroleum Hydrocarbons				
Aliphatic C5-C6: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01
Aliphatic C6-C8: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01
Aliphatic C8-C10: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01
Aliphatic C10-C12: EH_CU_1D_AL	DETSC 3072#	1.5	mg/kg	< 1.5
Aliphatic C12-C16: EH_CU_1D_AL	DETSC 3072#	1.2	mg/kg	< 1.2
Aliphatic C16-C21: EH_CU_1D_AL	DETSC 3072#	1.5	mg/kg	< 1.5
Aliphatic C21-C35: EH_CU_1D_AL	DETSC 3072#	3.4	mg/kg	< 3.4
Aliphatic C5-C35: EH_CU+HS_1D_AL	DETSC 3072*	10	mg/kg	< 10
Aromatic C5-C7: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01
Aromatic C7-C8: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01
Aromatic C8-C10: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01
Aromatic C10-C12: EH_CU_1D_AR	DETSC 3072#	0.9	mg/kg	< 0.9
Aromatic C12-C16: EH_CU_1D_AR	DETSC 3072#	0.5	mg/kg	< 0.5
Aromatic C16-C21: EH_CU_1D_AR	DETSC 3072#	0.6	mg/kg	< 0.6
Aromatic C21-C35: EH_CU_1D_AR	DETSC 3072#	1.4	mg/kg	< 1.4
Aromatic C5-C35: EH_CU+HS_1D_AR	DETSC 3072*	10	mg/kg	< 10
TPH Ali/Aro Total C5-C35: EH_CU+HS_1D_Total	DETSC 3072*	10	mg/kg	< 10
Benzene	DETSC 3321#	0.01	mg/kg	< 0.01
Ethylbenzene	DETSC 3321#	0.01	mg/kg	< 0.01
Toluene	DETSC 3321#	0.01	mg/kg	< 0.01
Xylene	DETSC 3321#	0.01	mg/kg	< 0.01
PAHs				
Naphthalene	DETSC 3301	0.1	mg/kg	< 0.1
Acenaphthylene	DETSC 3301	0.1	mg/kg	< 0.1
Acenaphthene	DETSC 3301	0.1	mg/kg	< 0.1

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 23-21922
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade

Lab No	2233858
.Sample ID	WS085
Depth	1.00
Other ID	2
Sample Type	ES
Sampling Date	04/09/2023
Sampling Time	n/s

Test	Method	LOD	Units	
Fluorene	DETSC 3301	0.1	mg/kg	< 0.1
Phenanthrene	DETSC 3301	0.1	mg/kg	< 0.1
Anthracene	DETSC 3301	0.1	mg/kg	< 0.1
Fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1
Pyrene	DETSC 3301	0.1	mg/kg	< 0.1
Benzo(a)anthracene	DETSC 3301	0.1	mg/kg	< 0.1
Chrysene	DETSC 3301	0.1	mg/kg	< 0.1
Benzo(b)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1
Benzo(k)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1
Benzo(a)pyrene	DETSC 3301	0.1	mg/kg	< 0.1
Indeno(1,2,3-c,d)pyrene	DETSC 3301	0.1	mg/kg	< 0.1
Dibenzo(a,h)anthracene	DETSC 3301	0.1	mg/kg	< 0.1
Benzo(g,h,i)perylene	DETSC 3301	0.1	mg/kg	< 0.1
Coronene	DETSC 3301*	0.1	mg/kg	< 0.1
PAH 16 Total	DETSC 3301	1.6	mg/kg	< 1.6
Phenols				
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3
VOCs				
Vinyl Chloride	DETSC 3431	0.01	mg/kg	< 0.01
1,1 Dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
Trans-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
1,1-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Cis-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
2,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
Bromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01
Chloroform	DETSC 3431	0.01	mg/kg	< 0.01
1,1,1-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
1,1-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01
Carbon tetrachloride	DETSC 3431	0.01	mg/kg	< 0.01
Benzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Trichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
Dibromomethane	DETSC 3431	0.01	mg/kg	< 0.01
Bromodichloromethane	DETSC 3431	0.01	mg/kg	< 0.01
cis-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01
Toluene	DETSC 3431	0.01	mg/kg	< 0.01
trans-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01
1,1,2-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Tetrachloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
1,3-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
Dibromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 23-21922
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade

Lab No	2233858
.Sample ID	WS085
Depth	1.00
Other ID	2
Sample Type	ES
Sampling Date	04/09/2023
Sampling Time	n/s

Test	Method	LOD	Units	
1,2-dibromoethane	DETSC 3431	0.01	mg/kg	< 0.01
Chlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,1,1,2-tetrachloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Ethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
m+p-Xylene	DETSC 3431	0.01	mg/kg	< 0.01
o-Xylene	DETSC 3431	0.01	mg/kg	< 0.01
Styrene	DETSC 3431*	0.01	mg/kg	< 0.01
Bromoform	DETSC 3431	0.01	mg/kg	< 0.01
Isopropylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
Bromobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2,3-trichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
n-propylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
2-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01
1,3,5-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
4-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01
Tert-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2,4-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
sec-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
p-isopropyltoluene	DETSC 3431	0.01	mg/kg	< 0.01
1,3-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,4-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
n-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dibromo-3-chloropropane	DETSC 3431	0.01	mg/kg	< 0.01
1,2,4-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
Hexachlorobutadiene	DETSC 3431	0.01	mg/kg	< 0.01
1,2,3-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
MTBE	DETSC 3431*	0.01	mg/kg	< 0.01

WASTE ACCEPTANCE CRITERIA TESTING ANALYTICAL REPORT

Our Ref 23-21922
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade
Sample Id WS085 2 1.00

Sample Numbers 2233858 2233859
Date Analysed 27/09/2023

Test Results On Waste

Determinand and Method Reference	Units	Result	WAC Limit Values: Inert Waste	SNRHW	Hazardous Waste
DETSC 2084# Total Organic Carbon	%	1.5	3	5	6
DETSC 2003# Loss On Ignition	%	1.2	n/a	n/a	10
DETSC 3321# BTEX	mg/kg	< 0.04	6	n/a	n/a
DETSC 3401# PCBs (7 congeners)	mg/kg	< 0.01	1	n/a	n/a
DETSC 3311# EPH (C10 - C40): EH_1D_Total	mg/kg	< 10	500	n/a	n/a
DETSC 3301 PAHs	mg/kg	< 1.6	100	n/a	n/a
DETSC 2008# pH	pH Units	8.8	n/a	>6	n/a
DETSC 2073* Acid Neutralisation Capacity (pH4)	mol/kg	< 1.0	n/a	TBE	TBE
DETSC 2073* Acid Neutralisation Capacity (pH7)	mol/kg	< 1.0	n/a	TBE	TBE

Test Results On Leachate

Determinand and Method Reference	Conc in Eluate ug/l 10:1	Amount Leached* mg/kg LS10	WAC Limit Values (Limit values for LS10 Leachate): Inert Waste	SNRHW	Hazardous Waste
DETSC 2306 Arsenic as As	0.37	< 0.01	0.5	2	25
DETSC 2306 Barium as Ba	8.8	< 0.1	20	100	300
DETSC 2306 Cadmium as Cd	0.047	< 0.02	0.04	1	5
DETSC 2306 Chromium as Cr	0.67	< 0.1	0.5	10	70
DETSC 2306 Copper as Cu	1.2	< 0.02	2	50	100
DETSC 2306 Mercury as Hg	< 0.010	< 0.002	0.01	0.2	2
DETSC 2306 Molybdenum as Mo	1.9	< 0.1	0.5	10	30
DETSC 2306 Nickel as Ni	0.53	< 0.1	0.4	10	40
DETSC 2306 Lead as Pb	0.41	< 0.05	0.5	10	50
DETSC 2306 Antimony as Sb	< 0.17	< 0.05	0.06	0.7	5
DETSC 2306 Selenium as Se	< 0.25	< 0.03	0.1	0.5	7
DETSC 2306 Zinc as Zn	4.3	0.043	4	50	200
DETSC 2055 Chloride as Cl	1100	< 100	800	15,000	25,000
DETSC 2055* Fluoride as F	110	1.1	10	150	500
DETSC 2055 Sulphate as SO4	2300	< 100	1000	20,000	50,000
DETSC 2009* Total Dissolved Solids	36000	360	4000	60,000	100,000
DETSC 2130 Phenol Index	< 100	< 1	1	n/a	n/a
DETSC 2085 Dissolved Organic Carbon	< 2000	< 50	500	800	1000

TBE - To Be Evaluated
SNRHW - Stable Non-Reactive Hazardous Waste

Additional Information

DETSC 2008 pH	8.6
DETSC 2009 Conductivity uS/cm	51.3
* Temperature*	18.0

Mass of Sample Kg*	0.100
Mass of dry Sample Kg*	0.094

Stage 1

Volume of Leachant L2*	0.929
Volume of Eluate VE1*	0.87

Disclaimer: *The WAC limit values are provided for guidance only. DETS does not accept responsibility for errors or omissions. Values are correct at time of issue.*

V.2.06 ** DETS are accredited for the testing of leachates and not the leachate preparation stage which is unaccredited.*

Summary of Asbestos Analysis
Soil Samples

Our Ref 23-21922
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
2233858	WS085 2 1.00	SOIL	NAD	none	Keith Wilson

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * - not included in laboratory scope of accreditation.

Information in Support of the Analytical Results

Our Ref 23-21922
Client Ref 23-0361
Contract East Meath North Dublin Grid Upgrade

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
2233858	WS085 1.00 SOIL	04/09/23	GJ 250ml, GJ 60ml, PT 1L	pH + Conductivity (7 days), VOC (7 days)	
2233859	WS085 1.00 LEACHATE	04/09/23	GJ 250ml, GJ 60ml, PT 1L		

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Information in Support of the Analytical Results

List of HWOL Acronyms and Operators

Acronym	Description
HS	Headspace analysis
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent
CU	Clean-up - e.g. by florisil, silica gel
1D	GC - Single coil gas chromatography
2D	GC-GC - Double coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative eg. EH+HS_Total or EH_CU+HS_Total

Det	Acronym
Aliphatic C5-C6	HS_1D_AL
Aliphatic C6-C8	HS_1D_AL
Aliphatic C8-C10	HS_1D_AL
Aliphatic C10-C12	EH_CU_1D_AL
Aliphatic C12-C16	EH_CU_1D_AL
Aliphatic C16-C21	EH_CU_1D_AL
Aliphatic C21-C35	EH_CU_1D_AL
Aliphatic C5-C35	EH_CU+HS_1D_AL
Aromatic C5-C7	HS_1D_AR
Aromatic C7-C8	HS_1D_AR
Aromatic C8-C10	HS_1D_AR
Aromatic C10-C12	EH_CU_1D_AR
Aromatic C12-C16	EH_CU_1D_AR
Aromatic C16-C21	EH_CU_1D_AR
Aromatic C21-C35	EH_CU_1D_AR
Aromatic C5-C35	EH_CU+HS_1D_AR
TPH Ali/Aro Total C5-C35	EH_CU+HS_1D_Total
TPH (C10-C40)	EH_1D_Total

End of Report

Certificate of Analysis

Certificate Number	23-22336	*Issued:*	03-Oct-23

Client Causeway Geotech
Unit 1 Fingal House
Stephenstown Industrial Estate
Balbriggan
Co. Dublin
K32 VR66

Our Reference	23-22336
Client Reference	23-0361
Order No	(not supplied)
Contract Title	East Meath North Dublin Grid Update
Description	2 Soil samples, 2 Leachate samples.
Date Received	19-Sep-23
Date Started	19-Sep-23
Date Completed	03-Oct-23
Test Procedures	Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Kirk Bridgewood
General Manager

2139

Summary of Chemical Analysis
Soil Samples

Our Ref 23-22336
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Update

			Lab No	2236258	2236259
			.Sample ID	WS42	WS71
			Depth	0.50	0.50
			Other ID	1	1
			Sample Type	ES	ES
			Sampling Date	11/09/2023	11/09/2023
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
Asbestos Quantification	DETSC 1102	0.001	%	< 0.001	
Metals					
Arsenic	DETSC 2301#	0.2	mg/kg	12	12
Boron, Water Soluble (2.5:1)	DETSC 2311#	0.2	mg/kg	< 0.2	0.2
Cadmium	DETSC 2301#	0.1	mg/kg	0.8	1.8
Chromium	DETSC 2301#	0.15	mg/kg	16	12
Copper	DETSC 2301#	0.2	mg/kg	23	21
Lead	DETSC 2301#	0.3	mg/kg	19	17
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	< 0.05
Nickel	DETSC 2301#	1	mg/kg	45	33
Zinc	DETSC 2301#	1	mg/kg	78	56
Inorganics					
pH	DETSC 2008#		pH	9.5	8.1
Cyanide, Total	DETSC 2130#	0.1	mg/kg	< 0.1	0.3
Organic matter	DETSC 2002#	0.1	%	0.9	1.1
Sulphate Aqueous Extract as SO4 (2:1)	DETSC 2076#	10	mg/l	40	32
Petroleum Hydrocarbons					
Aliphatic C5-C6: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aliphatic C6-C8: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aliphatic C8-C10: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aliphatic C10-C12: EH_CU_1D_AL	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5
Aliphatic C12-C16: EH_CU_1D_AL	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2
Aliphatic C16-C21: EH_CU_1D_AL	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5
Aliphatic C21-C35: EH_CU_1D_AL	DETSC 3072#	3.4	mg/kg	< 3.4	< 3.4
Aliphatic C5-C35: EH_CU+HS_1D_AL	DETSC 3072*	10	mg/kg	< 10	< 10
Aromatic C5-C7: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aromatic C7-C8: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aromatic C8-C10: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aromatic C10-C12: EH_CU_1D_AR	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9
Aromatic C12-C16: EH_CU_1D_AR	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5
Aromatic C16-C21: EH_CU_1D_AR	DETSC 3072#	0.6	mg/kg	< 0.6	< 0.6
Aromatic C21-C35: EH_CU_1D_AR	DETSC 3072#	1.4	mg/kg	< 1.4	< 1.4
Aromatic C5-C35: EH_CU+HS_1D_AR	DETSC 3072*	10	mg/kg	< 10	< 10
TPH Ali/Aro Total C5-C35: EH_CU+HS_1D_Total	DETSC 3072*	10	mg/kg	< 10	< 10
Benzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01
Ethylbenzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01
Toluene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01
Xylene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01
PAHs					
Naphthalene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Acenaphthylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 23-22336
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Update

			Lab No	2236258	2236259
			.Sample ID	WS42	WS71
			Depth	0.50	0.50
			Other ID	1	1
			Sample Type	ES	ES
			Sampling Date	11/09/2023	11/09/2023
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
Acenaphthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Fluorene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Phenanthrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Benzo(a)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Chrysene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Benzo(b)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Benzo(k)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Benzo(a)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Indeno(1,2,3-c,d)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Dibenzo(a,h)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Benzo(g,h,i)perylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Coronene	DETSC 3301*	0.1	mg/kg	< 0.1	< 0.1
PAH 16 Total	DETSC 3301	1.6	mg/kg	< 1.6	< 1.6
Phenols					
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3
VOCs					
Vinyl Chloride	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1 Dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Trans-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Cis-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
2,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Bromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Chloroform	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1,1-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Carbon tetrachloride	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Benzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Trichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Dibromomethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Bromodichloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
cis-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Toluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
trans-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1,2-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Tetrachloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,3-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 23-22336
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Update

			Lab No	2236258	2236259
			.Sample ID	WS42	WS71
			Depth	0.50	0.50
			Other ID	1	1
			Sample Type	ES	ES
			Sampling Date	11/09/2023	11/09/2023
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
Dibromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2-dibromoethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Chlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1,1,2-tetrachloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Ethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
m+p-Xylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
o-Xylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Styrene	DETSC 3431*	0.01	mg/kg	< 0.01	< 0.01
Bromoform	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Isopropylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Bromobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2,3-trichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
n-propylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
2-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,3,5-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
4-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Tert-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2,4-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
sec-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
p-isopropyltoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,3-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,4-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
n-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2-dibromo-3-chloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2,4-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Hexachlorobutadiene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2,3-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
MTBE	DETSC 3431*	0.01	mg/kg	< 0.01	< 0.01

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

WASTE ACCEPTANCE CRITERIA TESTING ANALYTICAL REPORT

Our Ref 23-22336
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Update
Sample Id WS42 1 0.50
Sample Numbers 2236258 2236260
Date Analysed 03/10/2023

Test Results On Waste

Determinand and Method Reference	Units	Result	WAC Limit Values: Inert Waste	SNRHW	Hazardous Waste
DETSC 2084# Total Organic Carbon	%	1.3	3	5	6
DETSC 2003# Loss On Ignition	%	2.5	n/a	n/a	10
DETSC 3321# BTEX	mg/kg	< 0.04	6	n/a	n/a
DETSC 3401# PCBs (7 congeners)	mg/kg	< 0.01	1	n/a	n/a
DETSC 3311# EPH (C10 - C40): EH_1D_Total	mg/kg	< 10	500	n/a	n/a
DETSC 3301 PAHs	mg/kg	< 1.6	100	n/a	n/a
DETSC 2008# pH	pH Units	9.5	n/a	>6	n/a
DETSC 2073* Acid Neutralisation Capacity (pH4)	mol/kg	< 1.0	n/a	TBE	TBE
DETSC 2073* Acid Neutralisation Capacity (pH7)	mol/kg	< 1.0	n/a	TBE	TBE

Test Results On Leachate

Determinand and Method Reference	Conc in Eluate ug/l 10:1	Amount Leached* mg/kg LS10	WAC Limit Values (Limit values for LS10 Leachate): Inert Waste	SNRHW	Hazardous Waste
DETSC 2306 Arsenic as As	0.22	< 0.01	0.5	2	25
DETSC 2306 Barium as Ba	5.5	< 0.1	20	100	300
DETSC 2306 Cadmium as Cd	0.12	< 0.02	0.04	1	5
DETSC 2306 Chromium as Cr	< 0.25	< 0.1	0.5	10	70
DETSC 2306 Copper as Cu	0.97	< 0.02	2	50	100
DETSC 2306 Mercury as Hg	< 0.010	< 0.002	0.01	0.2	2
DETSC 2306 Molybdenum as Mo	< 1.1	< 0.1	0.5	10	30
DETSC 2306 Nickel as Ni	< 0.50	< 0.1	0.4	10	40
DETSC 2306 Lead as Pb	0.095	< 0.05	0.5	10	50
DETSC 2306 Antimony as Sb	< 0.17	< 0.05	0.06	0.7	5
DETSC 2306 Selenium as Se	< 0.25	< 0.03	0.1	0.5	7
DETSC 2306 Zinc as Zn	< 1.3	< 0.01	4	50	200
DETSC 2055 Chloride as Cl	770	< 100	800	15,000	25,000
DETSC 2055* Fluoride as F	240	2.4	10	150	500
DETSC 2055 Sulphate as SO4	3300	< 100	1000	20,000	50,000
DETSC 2009* Total Dissolved Solids	45000	450	4000	60,000	100,000
DETSC 2130 Phenol Index	< 100	< 1	1	n/a	n/a
DETSC 2085 Dissolved Organic Carbon	2300	< 50	500	800	1000

TBE - To Be Evaluated
SNRHW - Stable Non-Reactive Hazardous Waste

Additional Information

DETSC 2008 pH	7.9
DETSC 2009 Conductivity uS/cm	63.8
* Temperature*	18.0

Mass of Sample Kg*	0.110
Mass of dry Sample Kg*	0.099

Stage 1

Volume of Leachant L2*	0.98
Volume of Eluate VE1*	0.93

Disclaimer: *The WAC limit values are provided for guidance only. DETS does not accept responsibility for errors or omissions. Values are correct at time of issue.*

V.2.06 ** DETS are accredited for the testing of leachates and not the leachate preparation stage which is unaccredited.*

WASTE ACCEPTANCE CRITERIA TESTING ANALYTICAL REPORT

Our Ref 23-22336
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Update
Sample Id WS71 1 0.50
Sample Numbers 2236259 2236261
Date Analysed 03/10/2023

Test Results On Waste

Determinand and Method Reference	Units	Result	WAC Limit Values Inert Waste	SNRHW	Hazardous Waste
DETSC 2084# Total Organic Carbon	%	1.1	3	5	6
DETSC 2003# Loss On Ignition	%	2.9	n/a	n/a	10
DETSC 3321# BTEX	mg/kg	< 0.04	6	n/a	n/a
DETSC 3401# PCBs (7 congeners)	mg/kg	< 0.01	1	n/a	n/a
DETSC 3311# EPH (C10 - C40): EH_1D_Total	mg/kg	< 10	500	n/a	n/a
DETSC 3301 PAHs	mg/kg	< 1.6	100	n/a	n/a
DETSC 2008# pH	pH Units	8.1	n/a	>6	n/a
DETSC 2073* Acid Neutralisation Capacity (pH4)	mol/kg	< 1.0	n/a	TBE	TBE
DETSC 2073* Acid Neutralisation Capacity (pH7)	mol/kg	< 1.0	n/a	TBE	TBE

Test Results On Leachate

Determinand and Method Reference	Conc in Eluate ug/l 10:1	Amount Leached* mg/kg LS10	WAC Limit Values (Limit values for LS10 Leachate) Inert Waste	SNRHW	Hazardous Waste
DETSC 2306 Arsenic as As	0.34	< 0.01	0.5	2	25
DETSC 2306 Barium as Ba	5.5	< 0.1	20	100	300
DETSC 2306 Cadmium as Cd	0.039	< 0.02	0.04	1	5
DETSC 2306 Chromium as Cr	< 0.25	< 0.1	0.5	10	70
DETSC 2306 Copper as Cu	1.6	< 0.02	2	50	100
DETSC 2306 Mercury as Hg	< 0.010	< 0.002	0.01	0.2	2
DETSC 2306 Molybdenum as Mo	< 1.1	< 0.1	0.5	10	30
DETSC 2306 Nickel as Ni	< 0.50	< 0.1	0.4	10	40
DETSC 2306 Lead as Pb	0.64	< 0.05	0.5	10	50
DETSC 2306 Antimony as Sb	< 0.17	< 0.05	0.06	0.7	5
DETSC 2306 Selenium as Se	< 0.25	< 0.03	0.1	0.5	7
DETSC 2306 Zinc as Zn	< 1.3	< 0.01	4	50	200
DETSC 2055 Chloride as Cl	2000	< 100	800	15,000	25,000
DETSC 2055* Fluoride as F	210	2.1	10	150	500
DETSC 2055 Sulphate as SO4	6900	< 100	1000	20,000	50,000
DETSC 2009* Total Dissolved Solids	45000	450	4000	60,000	100,000
DETSC 2130 Phenol Index	< 100	< 1	1	n/a	n/a
DETSC 2085 Dissolved Organic Carbon	5500	55	500	800	1000

TBE - To Be Evaluated
SNRHW - Stable Non-Reactive Hazardous Waste

Additional Information

DETSC 2008 pH	7.5
DETSC 2009 Conductivity uS/cm	64.6
* Temperature*	18.0

Mass of Sample Kg*	0.110
Mass of dry Sample Kg*	0.096

Stage 1

Volume of Leachant L2*	0.946
Volume of Eluate VE1*	0.89

Disclaimer: *The WAC limit values are provided for guidance only. DETS does not accept responsibility for errors or omissions. Values are correct at time of issue.*

V.2.06 ** DETS are accredited for the testing of leachates and not the leachate preparation stage which is unaccredited.*

Summary of Asbestos Analysis
Soil Samples

Our Ref 23-22336
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Update

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
2236258	WS42 1 0.50	SOIL	Chrysotile	Chrysotile present as fibre bundles	Barry Kelly
2236259	WS71 1 0.50	SOIL	NAD	none	Barry Kelly

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * -not included in laboratory scope of accreditation.

Summary of Asbestos Quantification Analysis
Soil Samples

Our Ref 23-22336
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Update

Lab No	2236258
.Sample ID	WS42
Depth	0.50
Other ID	1
Sample Type	ES
Sampling Date	11/09/2023
Sampling Time	

Test	**Method**	**Units**	
Total Mass% Asbestos (a+b+c)	DETSC 1102	Mass %	**< 0.001**
Gravimetric Quantification (a)	DETSC 1102	Mass %	na
Detailed Gravimetric Quantification (b)	DETSC 1102	Mass %	<0.001
Quantification by PCOM (c)	DETSC 1102	Mass %	na
Potentially Respirable Fibres (d)	DETSC 1102	Fibres/g	na
Breakdown of Gravimetric Analysis (a)			
Mass of Sample		g	583.68
ACMs present*		type	
Mass of ACM in sample		g	
% ACM by mass		%	
% asbestos in ACM		%	
% asbestos in sample		%	
Breakdown of Detailed Gravimetric Analysis (b)			
% Amphibole bundles in sample		Mass %	na
% Chrysotile bundles in sample		Mass %	<0.001
Breakdown of PCOM Analysis (c)			
% Amphibole fibres in sample		Mass %	na
% Chrysotile fibres in sample		Mass %	na
Breakdown of Potentially Respirable Fibre Analysis (d)			
Amphibole fibres		Fibres/g	na
Chrysotile fibres		Fibres/g	na

* Denotes test or material description outside of UKAS accreditation.
% asbestos in Asbestos Containing Materials (ACMs) is determined by
by reference to HSG 264.
Recommended sample size for quantification is approximately 1kg
# denotes deviating sample

Information in Support of the Analytical Results

Our Ref 23-22336
Client Ref 23-0361
Contract East Meath North Dublin Grid Update

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
2236258	WS42 0.50 SOIL	11/09/23	GJ 250ml, GJ 60ml, PT 1L	pH + Conductivity (7 days), VOC (7 days)	
2236259	WS71 0.50 SOIL	11/09/23	GJ 250ml, GJ 60ml, PT 1L	pH + Conductivity (7 days), VOC (7 days)	
2236260	WS42 0.50 LEACHATE	11/09/23	GJ 250ml, GJ 60ml, PT 1L		
2236261	WS71 0.50 LEACHATE	11/09/23	GJ 250ml, GJ 60ml, PT 1L		

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Information in Support of the Analytical Results

List of HWOL Acronyms and Operators

Acronym	Description
HS	Headspace analysis
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent
CU	Clean-up - e.g. by florisil, silica gel
1D	GC - Single coil gas chromatography
2D	GC-GC - Double coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative eg. EH+HS_Total or EH_CU+HS_Total

Det	Acronym
Aliphatic C5-C6	HS_1D_AL
Aliphatic C6-C8	HS_1D_AL
Aliphatic C8-C10	HS_1D_AL
Aliphatic C10-C12	EH_CU_1D_AL
Aliphatic C12-C16	EH_CU_1D_AL
Aliphatic C16-C21	EH_CU_1D_AL
Aliphatic C21-C35	EH_CU_1D_AL
Aliphatic C5-C35	EH_CU+HS_1D_AL
Aromatic C5-C7	HS_1D_AR
Aromatic C7-C8	HS_1D_AR
Aromatic C8-C10	HS_1D_AR
Aromatic C10-C12	EH_CU_1D_AR
Aromatic C12-C16	EH_CU_1D_AR
Aromatic C16-C21	EH_CU_1D_AR
Aromatic C21-C35	EH_CU_1D_AR
Aromatic C5-C35	EH_CU+HS_1D_AR
TPH Ali/Aro Total C5-C35	EH_CU+HS_1D_Total
TPH (C10-C40)	EH_1D_Total

End of Report

Certificate of Analysis

Certificate Number	23-22338	*Issued:*	02-Oct-23

Client Causeway Geotech
Unit 1 Fingal House
Stephenstown Industrial Estate
Balbriggan
Co. Dublin
K32 VR66

Our Reference	23-22338
Client Reference	23-0361
Order No	(not supplied)
Contract Title	East Meath North Dublin Grid Update
Description	2 Soil samples, 2 Leachate samples.
Date Received	19-Sep-23
Date Started	19-Sep-23
Date Completed	02-Oct-23
Test Procedures	Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Kirk Bridgewood
General Manager

2139

Summary of Chemical Analysis
Soil Samples

Our Ref 23-22338
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Update

			Lab No	2236265	2236266
			.Sample ID	BH56	BH56
			Depth	0.50	1.00
			Other ID	1	2
			Sample Type	ES	ES
			Sampling Date	12/09/2023	12/09/2023
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
Metals					
Arsenic	DETSC 2301#	0.2	mg/kg	12	8.3
Boron, Water Soluble (2.5:1)	DETSC 2311#	0.2	mg/kg	< 0.2	0.4
Cadmium	DETSC 2301#	0.1	mg/kg	1.6	0.4
Chromium	DETSC 2301#	0.15	mg/kg	13	11
Copper	DETSC 2301#	0.2	mg/kg	42	14
Lead	DETSC 2301#	0.3	mg/kg	29	12
Mercury	DETSC 2325#	0.05	mg/kg	0.06	< 0.05
Nickel	DETSC 2301#	1	mg/kg	34	15
Zinc	DETSC 2301#	1	mg/kg	76	46
Inorganics					
pH	DETSC 2008#		pH	8.0	11.9
Cyanide, Total	DETSC 2130#	0.1	mg/kg	0.2	< 0.1
Organic matter	DETSC 2002#	0.1	%	1.6	0.5
Sulphate Aqueous Extract as SO4 (2:1)	DETSC 2076#	10	mg/l	15	25
Petroleum Hydrocarbons					
Aliphatic C5-C6: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aliphatic C6-C8: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aliphatic C8-C10: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aliphatic C10-C12: EH_CU_1D_AL	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5
Aliphatic C12-C16: EH_CU_1D_AL	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2
Aliphatic C16-C21: EH_CU_1D_AL	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5
Aliphatic C21-C35: EH_CU_1D_AL	DETSC 3072#	3.4	mg/kg	< 3.4	< 3.4
Aliphatic C5-C35: EH_CU+HS_1D_AL	DETSC 3072*	10	mg/kg	< 10	< 10
Aromatic C5-C7: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aromatic C7-C8: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aromatic C8-C10: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aromatic C10-C12: EH_CU_1D_AR	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9
Aromatic C12-C16: EH_CU_1D_AR	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5
Aromatic C16-C21: EH_CU_1D_AR	DETSC 3072#	0.6	mg/kg	< 0.6	< 0.6
Aromatic C21-C35: EH_CU_1D_AR	DETSC 3072#	1.4	mg/kg	< 1.4	< 1.4
Aromatic C5-C35: EH_CU+HS_1D_AR	DETSC 3072*	10	mg/kg	< 10	< 10
TPH Ali/Aro Total C5-C35: EH_CU+HS_1D_Total	DETSC 3072*	10	mg/kg	< 10	< 10
Benzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01
Ethylbenzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01
Toluene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01
Xylene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01
PAHs					
Naphthalene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Acenaphthylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Acenaphthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 23-22338
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Update

			Lab No	2236265	2236266
			.Sample ID	BH56	BH56
			Depth	0.50	1.00
			Other ID	1	2
			Sample Type	ES	ES
			Sampling Date	12/09/2023	12/09/2023
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
Fluorene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Phenanthrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Benzo(a)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Chrysene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Benzo(b)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Benzo(k)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Benzo(a)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Indeno(1,2,3-c,d)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Dibenzo(a,h)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Benzo(g,h,i)perylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Coronene	DETSC 3301*	0.1	mg/kg	< 0.1	< 0.1
PAH 16 Total	DETSC 3301	1.6	mg/kg	< 1.6	< 1.6
Phenols					
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3
VOCs					
Vinyl Chloride	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1 Dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Trans-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Cis-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
2,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Bromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Chloroform	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1,1-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Carbon tetrachloride	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Benzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Trichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Dibromomethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Bromodichloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
cis-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Toluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
trans-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1,2-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Tetrachloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,3-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Dibromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 23-22338
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Update

			Lab No	2236265	2236266
			.Sample ID	BH56	BH56
			Depth	0.50	1.00
			Other ID	1	2
			Sample Type	ES	ES
			Sampling Date	12/09/2023	12/09/2023
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
1,2-dibromoethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Chlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1,1,2-tetrachloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Ethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
m+p-Xylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
o-Xylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Styrene	DETSC 3431*	0.01	mg/kg	< 0.01	< 0.01
Bromoform	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Isopropylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Bromobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2,3-trichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
n-propylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
2-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,3,5-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
4-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Tert-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2,4-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
sec-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
p-isopropyltoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,3-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,4-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
n-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2-dibromo-3-chloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2,4-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Hexachlorobutadiene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2,3-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
MTBE	DETSC 3431*	0.01	mg/kg	< 0.01	< 0.01

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

WASTE ACCEPTANCE CRITERIA TESTING ANALYTICAL REPORT

Our Ref 23-22338
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Update
Sample Id BH56 1 0.50
Sample Numbers 2236265 2236267
Date Analysed 02/10/2023

Test Results On Waste

Determinand and Method Reference	Units	Result	WAC Limit Values: Inert Waste	SNRHW	Hazardous Waste
DETSC 2084# Total Organic Carbon	%	1.4	3	5	6
DETSC 2003# Loss On Ignition	%	3.1	n/a	n/a	10
DETSC 3321# BTEX	mg/kg	< 0.04	6	n/a	n/a
DETSC 3401# PCBs (7 congeners)	mg/kg	< 0.01	1	n/a	n/a
DETSC 3311# EPH (C10 - C40): EH_1D_Total	mg/kg	< 10	500	n/a	n/a
DETSC 3301 PAHs	mg/kg	< 1.6	100	n/a	n/a
DETSC 2008# pH	pH Units	8.0	n/a	>6	n/a
DETSC 2073* Acid Neutralisation Capacity (pH4)	mol/kg	< 1.0	n/a	TBE	TBE
DETSC 2073* Acid Neutralisation Capacity (pH7)	mol/kg	< 1.0	n/a	TBE	TBE

Test Results On Leachate

Determinand and Method Reference	Conc in Eluate ug/l 10:1	Amount Leached* mg/kg LS10	WAC Limit Values (Limit values for LS10 Leachate): Inert Waste	SNRHW	Hazardous Waste
DETSC 2306 Arsenic as As	0.45	< 0.01	0.5	2	25
DETSC 2306 Barium as Ba	7.9	< 0.1	20	100	300
DETSC 2306 Cadmium as Cd	< 0.030	< 0.02	0.04	1	5
DETSC 2306 Chromium as Cr	< 0.25	< 0.1	0.5	10	70
DETSC 2306 Copper as Cu	2	0.02	2	50	100
DETSC 2306 Mercury as Hg	< 0.010	< 0.002	0.01	0.2	2
DETSC 2306 Molybdenum as Mo	5.7	< 0.1	0.5	10	30
DETSC 2306 Nickel as Ni	< 0.50	< 0.1	0.4	10	40
DETSC 2306 Lead as Pb	0.35	< 0.05	0.5	10	50
DETSC 2306 Antimony as Sb	0.28	< 0.05	0.06	0.7	5
DETSC 2306 Selenium as Se	0.62	< 0.03	0.1	0.5	7
DETSC 2306 Zinc as Zn	< 1.3	< 0.01	4	50	200
DETSC 2055 Chloride as Cl	1200	< 100	800	15,000	25,000
DETSC 2055* Fluoride as F	230	2.3	10	150	500
DETSC 2055 Sulphate as SO4	3500	< 100	1000	20,000	50,000
DETSC 2009* Total Dissolved Solids	53000	530	4000	60,000	100,000
DETSC 2130 Phenol Index	< 100	< 1	1	n/a	n/a
DETSC 2085 Dissolved Organic Carbon	3600	< 50	500	800	1000

TBE - To Be Evaluated
SNRHW - Stable Non-Reactive Hazardous Waste

Additional Information

DETSC 2008 pH	8.1
DETSC 2009 Conductivity uS/cm	75.5
* Temperature*	18.0
Mass of Sample Kg*	0.110
Mass of dry Sample Kg*	0.097
Stage 1	
Volume of Leachant L2*	0.957
Volume of Eluate VE1*	0.9

Disclaimer: *The WAC limit values are provided for guidance only. DETS does not accept responsibility for errors or omissions. Values are correct at time of issue.*

V.2.06 ** DETS are accredited for the testing of leachates and not the leachate preparation stage which is unaccredited.*

WASTE ACCEPTANCE CRITERIA TESTING ANALYTICAL REPORT

Our Ref 23-22338
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Update
Sample Id BH56 2 1.00

Sample Numbers 2236266 2236268
Date Analysed 02/10/2023

Test Results On Waste

Determinand and Method Reference	Units	Result	WAC Limit Values: Inert Waste	SNRHW	Hazardous Waste
DETSC 2084# Total Organic Carbon	%	1.4	3	5	6
DETSC 2003# Loss On Ignition	%	2.7	n/a	n/a	10
DETSC 3321# BTEX	mg/kg	< 0.04	6	n/a	n/a
DETSC 3401# PCBs (7 congeners)	mg/kg	< 0.01	1	n/a	n/a
DETSC 3311# EPH (C10 - C40): EH_1D_Total	mg/kg	< 10	500	n/a	n/a
DETSC 3301 PAHs	mg/kg	< 1.6	100	n/a	n/a
DETSC 2008# pH	pH Units	11.9	n/a	>6	n/a
DETSC 2073* Acid Neutralisation Capacity (pH4)	mol/kg	< 1.0	n/a	TBE	TBE
DETSC 2073* Acid Neutralisation Capacity (pH7)	mol/kg	< 1.0	n/a	TBE	TBE

Test Results On Leachate

Determinand and Method Reference	Conc in Eluate ug/l 10:1	Amount Leached* mg/kg LS10	WAC Limit Values (Limit values for LS10 Leachate): Inert Waste	SNRHW	Hazardous Waste
DETSC 2306 Arsenic as As	7.4	0.074	0.5	2	25
DETSC 2306 Barium as Ba	10	0.1	20	100	300
DETSC 2306 Cadmium as Cd	< 0.030	< 0.02	0.04	1	5
DETSC 2306 Chromium as Cr	6.2	< 0.1	0.5	10	70
DETSC 2306 Copper as Cu	12	0.12	2	50	100
DETSC 2306 Mercury as Hg	< 0.010	< 0.002	0.01	0.2	2
DETSC 2306 Molybdenum as Mo	5.9	< 0.1	0.5	10	30
DETSC 2306 Nickel as Ni	1.8	< 0.1	0.4	10	40
DETSC 2306 Lead as Pb	0.1	< 0.05	0.5	10	50
DETSC 2306 Antimony as Sb	0.33	< 0.05	0.06	0.7	5
DETSC 2306 Selenium as Se	2.5	< 0.03	0.1	0.5	7
DETSC 2306 Zinc as Zn	< 1.3	< 0.01	4	50	200
DETSC 2055 Chloride as Cl	810	< 100	800	15,000	25,000
DETSC 2055* Fluoride as F	150	1.5	10	150	500
DETSC 2055 Sulphate as SO4	5500	< 100	1000	20,000	50,000
DETSC 2009* Total Dissolved Solids	150000	1500	4000	60,000	100,000
DETSC 2130 Phenol Index	< 100	< 1	1	n/a	n/a
DETSC 2085 Dissolved Organic Carbon	4500	< 50	500	800	1000

TBE - To Be Evaluated
SNRHW - Stable Non-Reactive Hazardous Waste

Additional Information

DETSC 2008 pH	11.0
DETSC 2009 Conductivity uS/cm	216.0
* Temperature*	18.0

Mass of Sample Kg*	0.100
Mass of dry Sample Kg*	0.094

Stage 1

Volume of Leachant L2*	0.935
Volume of Eluate VE1*	0.88

Disclaimer: *The WAC limit values are provided for guidance only. DETS does not accept responsibility for errors or omissions. Values are correct at time of issue.*

V.2.06 ** DETS are accredited for the testing of leachates and not the leachate preparation stage which is unaccredited.*

Summary of Asbestos Analysis
Soil Samples

Our Ref 23-22338
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Update

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
2236265	BH56 1 0.50	SOIL	NAD	none	Robertas Ciparis
2236266	BH56 2 1.00	SOIL	NAD	none	Robertas Ciparis

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * - not included in laboratory scope of accreditation.

Information in Support of the Analytical Results

Our Ref 23-22338
Client Ref 23-0361
Contract East Meath North Dublin Grid Update

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
2236265	BH56 0.50 SOIL	12/09/23	GJ 250ml, GJ 60ml, PT 1L		
2236266	BH56 1.00 SOIL	12/09/23	GJ 250ml, GJ 60ml, PT 1L		
2236267	BH56 0.50 LEACHATE	12/09/23	GJ 250ml, GJ 60ml, PT 1L		
2236268	BH56 1.00 LEACHATE	12/09/23	GJ 250ml, GJ 60ml, PT 1L		

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Information in Support of the Analytical Results

List of HWOL Acronyms and Operators

Acronym	Description
HS	Headspace analysis
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent
CU	Clean-up - e.g. by florisil, silica gel
1D	GC - Single coil gas chromatography
2D	GC-GC - Double coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative eg. EH+HS_Total or EH_CU+HS_Total

Det	Acronym
Aliphatic C5-C6	HS_1D_AL
Aliphatic C6-C8	HS_1D_AL
Aliphatic C8-C10	HS_1D_AL
Aliphatic C10-C12	EH_CU_1D_AL
Aliphatic C12-C16	EH_CU_1D_AL
Aliphatic C16-C21	EH_CU_1D_AL
Aliphatic C21-C35	EH_CU_1D_AL
Aliphatic C5-C35	EH_CU+HS_1D_AL
Aromatic C5-C7	HS_1D_AR
Aromatic C7-C8	HS_1D_AR
Aromatic C8-C10	HS_1D_AR
Aromatic C10-C12	EH_CU_1D_AR
Aromatic C12-C16	EH_CU_1D_AR
Aromatic C16-C21	EH_CU_1D_AR
Aromatic C21-C35	EH_CU_1D_AR
Aromatic C5-C35	EH_CU+HS_1D_AR
TPH Ali/Aro Total C5-C35	EH_CU+HS_1D_Total
TPH (C10-C40)	EH_1D_Total

End of Report

Certificate of Analysis

Certificate Number 23-23052 *Issued:* 06-Oct-23

Client Causeway Geotech
Unit 1 Fingal House
Stephenstown Industrial Estate
Balbriggan
Co. Dublin
K32 VR66

Our Reference 23-23052

Client Reference 23-0361

Order No (not supplied)

Contract Title EAST MEATH NORTH DUBLIN GRID UPGRADE

Description 2 Soil samples, 2 Leachate samples.

Date Received 27-Sep-23

Date Started 27-Sep-23

Date Completed 06-Oct-23

Test Procedures Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Kirk Bridgewood
General Manager

2139

Summary of Chemical Analysis
Soil Samples

Our Ref 23-23052
Client Ref 23-0361
Contract Title EAST MEATH NORTH DUBLIN GRID UPGRADE

			Lab No	2239890	2239891
			.Sample ID	BHA50	BHA50
			Depth	0.50	1.00
			Other ID	1	2
			Sample Type	ES	ES
			Sampling Date	21/09/2023	21/09/2023
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
Metals					
Arsenic	DETSC 2301#	0.2	mg/kg	14	16
Boron, Water Soluble (2.5:1)	DETSC 2311#	0.2	mg/kg	< 0.2	< 0.2
Cadmium	DETSC 2301#	0.1	mg/kg	0.7	0.6
Chromium	DETSC 2301#	0.15	mg/kg	6.0	6.4
Copper	DETSC 2301#	0.2	mg/kg	18	20
Lead	DETSC 2301#	0.3	mg/kg	13	16
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	< 0.05
Nickel	DETSC 2301#	1	mg/kg	33	32
Zinc	DETSC 2301#	1	mg/kg	35	44
Inorganics					
pH	DETSC 2008#		pH	8.3	8.2
Cyanide, Total	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1
Organic matter	DETSC 2002#	0.1	%	0.3	0.3
Sulphate Aqueous Extract as SO4 (2:1)	DETSC 2076#	10	mg/l	23	26
Petroleum Hydrocarbons					
Aliphatic C5-C6: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aliphatic C6-C8: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aliphatic C8-C10: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aliphatic C10-C12: EH_CU_1D_AL	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5
Aliphatic C12-C16: EH_CU_1D_AL	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2
Aliphatic C16-C21: EH_CU_1D_AL	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5
Aliphatic C21-C35: EH_CU_1D_AL	DETSC 3072#	3.4	mg/kg	< 3.4	< 3.4
Aliphatic C5-C35: EH_CU+HS_1D_AL	DETSC 3072*	10	mg/kg	< 10	< 10
Aromatic C5-C7: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aromatic C7-C8: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aromatic C8-C10: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aromatic C10-C12: EH_CU_1D_AR	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9
Aromatic C12-C16: EH_CU_1D_AR	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5
Aromatic C16-C21: EH_CU_1D_AR	DETSC 3072#	0.6	mg/kg	< 0.6	< 0.6
Aromatic C21-C35: EH_CU_1D_AR	DETSC 3072#	1.4	mg/kg	< 1.4	< 1.4
Aromatic C5-C35: EH_CU+HS_1D_AR	DETSC 3072*	10	mg/kg	< 10	< 10
TPH Ali/Aro Total C5-C35: EH_CU+HS_1D_Total	DETSC 3072*	10	mg/kg	< 10	< 10
Benzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01
Ethylbenzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01
Toluene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01
Xylene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01
PAHs					
Naphthalene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Acenaphthylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Acenaphthene	DETSC 3301	0.1	mg/kg	0.6	< 0.1

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 23-23052
Client Ref 23-0361
Contract Title EAST MEATH NORTH DUBLIN GRID UPGRADE

			Lab No	2239890	2239891
			.Sample ID	BHA50	BHA50
			Depth	0.50	1.00
			Other ID	1	2
			Sample Type	ES	ES
			Sampling Date	21/09/2023	21/09/2023
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
Fluorene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Phenanthrene	DETSC 3301	0.1	mg/kg	3.2	< 0.1
Anthracene	DETSC 3301	0.1	mg/kg	0.9	< 0.1
Fluoranthene	DETSC 3301	0.1	mg/kg	6.1	< 0.1
Pyrene	DETSC 3301	0.1	mg/kg	5.1	< 0.1
Benzo(a)anthracene	DETSC 3301	0.1	mg/kg	1.9	< 0.1
Chrysene	DETSC 3301	0.1	mg/kg	2.7	< 0.1
Benzo(b)fluoranthene	DETSC 3301	0.1	mg/kg	1.9	< 0.1
Benzo(k)fluoranthene	DETSC 3301	0.1	mg/kg	2.1	< 0.1
Benzo(a)pyrene	DETSC 3301	0.1	mg/kg	2.8	< 0.1
Indeno(1,2,3-c,d)pyrene	DETSC 3301	0.1	mg/kg	1.5	< 0.1
Dibenzo(a,h)anthracene	DETSC 3301	0.1	mg/kg	0.8	< 0.1
Benzo(g,h,i)perylene	DETSC 3301	0.1	mg/kg	1.4	< 0.1
Coronene	DETSC 3301*	0.1	mg/kg	< 0.1	< 0.1
PAH 16 Total	DETSC 3301	1.6	mg/kg	31	< 1.6
Phenols					
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3
VOCs					
Vinyl Chloride	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1 Dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Trans-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Cis-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
2,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Bromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Chloroform	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1,1-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Carbon tetrachloride	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Benzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Trichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Dibromomethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Bromodichloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
cis-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Toluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
trans-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1,2-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Tetrachloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,3-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Dibromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 23-23052
Client Ref 23-0361
Contract Title EAST MEATH NORTH DUBLIN GRID UPGRADE

			Lab No	2239890	2239891
			.Sample ID	BHA50	BHA50
			Depth	0.50	1.00
			Other ID	1	2
			Sample Type	ES	ES
			Sampling Date	21/09/2023	21/09/2023
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
1,2-dibromoethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Chlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1,1,2-tetrachloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Ethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
m+p-Xylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
o-Xylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Styrene	DETSC 3431*	0.01	mg/kg	< 0.01	< 0.01
Bromoform	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Isopropylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Bromobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2,3-trichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
n-propylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
2-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,3,5-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
4-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Tert-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2,4-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
sec-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
p-isopropyltoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,3-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,4-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
n-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2-dibromo-3-chloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2,4-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Hexachlorobutadiene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2,3-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
MTBE	DETSC 3431*	0.01	mg/kg	< 0.01	< 0.01

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

WASTE ACCEPTANCE CRITERIA TESTING ANALYTICAL REPORT

Our Ref 23-23052
Client Ref 23-0361
Contract Title EAST MEATH NORTH DUBLIN GRID UPGRADE
Sample Id BHA50 1 0.50
Sample Numbers 2239890 2239892
Date Analysed 06/10/2023

Test Results On Waste

Determinand and Method Reference	Units	Result	WAC Limit Values Inert Waste	SNRHW	Hazardous Waste
DETSC 2084# Total Organic Carbon	%	1.4	3	5	6
DETSC 2003# Loss On Ignition	%	1.4	n/a	n/a	10
DETSC 3321# BTEX	mg/kg	< 0.04	6	n/a	n/a
DETSC 3401# PCBs (7 congeners)	mg/kg	< 0.01	1	n/a	n/a
DETSC 3311# EPH (C10 - C40): EH_1D_Total	mg/kg	460.0	500	n/a	n/a
DETSC 3301 PAHs	mg/kg	31.0	100	n/a	n/a
DETSC 2008# pH	pH Units	8.3	n/a	>6	n/a
DETSC 2073* Acid Neutralisation Capacity (pH4)	mol/kg	< 1.0	n/a	TBE	TBE
DETSC 2073* Acid Neutralisation Capacity (pH7)	mol/kg	< 1.0	n/a	TBE	TBE

Test Results On Leachate

Determinand and Method Reference	Conc in Eluate ug/l 10:1	Amount Leached* mg/kg LS10	WAC Limit Values (Limit values for LS10 Leachate) Inert Waste	SNRHW	Hazardous Waste
DETSC 2306 Arsenic as As	0.32	< 0.01	0.5	2	25
DETSC 2306 Barium as Ba	17	0.17	20	100	300
DETSC 2306 Cadmium as Cd	< 0.030	< 0.02	0.04	1	5
DETSC 2306 Chromium as Cr	0.46	< 0.1	0.5	10	70
DETSC 2306 Copper as Cu	0.78	< 0.02	2	50	100
DETSC 2306 Mercury as Hg	< 0.010	< 0.002	0.01	0.2	2
DETSC 2306 Molybdenum as Mo	< 1.1	< 0.1	0.5	10	30
DETSC 2306 Nickel as Ni	< 0.50	< 0.1	0.4	10	40
DETSC 2306 Lead as Pb	2.6	< 0.05	0.5	10	50
DETSC 2306 Antimony as Sb	< 0.17	< 0.05	0.06	0.7	5
DETSC 2306 Selenium as Se	< 0.25	< 0.03	0.1	0.5	7
DETSC 2306 Zinc as Zn	< 1.3	< 0.01	4	50	200
DETSC 2055 Chloride as Cl	1300	< 100	800	15,000	25,000
DETSC 2055* Fluoride as F	120	1.2	10	150	500
DETSC 2055 Sulphate as SO4	3700	< 100	1000	20,000	50,000
DETSC 2009* Total Dissolved Solids	41000	410	4000	60,000	100,000
DETSC 2130 Phenol Index	< 100	< 1	1	n/a	n/a
DETSC 2085 Dissolved Organic Carbon	< 2000	< 50	500	800	1000

TBE - To Be Evaluated
SNRHW - Stable Non-Reactive Hazardous Waste

Additional Information

DETSC 2008 pH	8.9
DETSC 2009 Conductivity uS/cm	58.5
* Temperature*	18.0

Mass of Sample Kg*	0.110
Mass of dry Sample Kg*	0.097

Stage 1

Volume of Leachant L2*	0.954
Volume of Eluate VE1*	0.9

Disclaimer: *The WAC limit values are provided for guidance only. DETS does not accept responsibility for errors or omissions. Values are correct at time of issue.*

V.2.06 ** DETS are accredited for the testing of leachates and not the leachate preparation stage which is unaccredited.*

WASTE ACCEPTANCE CRITERIA TESTING ANALYTICAL REPORT

Our Ref 23-23052
Client Ref 23-0361
Contract Title EAST MEATH NORTH DUBLIN GRID UPGRADE
Sample Id BHA50 2 1.00
Sample Numbers 2239891 2239893
Date Analysed 06/10/2023

Test Results On Waste

Determinand and Method Reference	Units	Result	WAC Limit Values: Inert Waste	SNRHW	Hazardous Waste
DETSC 2084# Total Organic Carbon	%	1.2	3	5	6
DETSC 2003# Loss On Ignition	%	3.1	n/a	n/a	10
DETSC 3321# BTEX	mg/kg	< 0.04	6	n/a	n/a
DETSC 3401# PCBs (7 congeners)	mg/kg	< 0.01	1	n/a	n/a
DETSC 3311# EPH (C10 - C40): EH_1D_Total	mg/kg	240.0	500	n/a	n/a
DETSC 3301 PAHs	mg/kg	< 1.6	100	n/a	n/a
DETSC 2008# pH	pH Units	8.2	n/a	>6	n/a
DETSC 2073* Acid Neutralisation Capacity (pH4)	mol/kg	< 1.0	n/a	TBE	TBE
DETSC 2073* Acid Neutralisation Capacity (pH7)	mol/kg	< 1.0	n/a	TBE	TBE

Test Results On Leachate

Determinand and Method Reference	Conc in Eluate ug/l 10:1	Amount Leached* mg/kg LS10	WAC Limit Values (Limit values for LS10 Leachate): Inert Waste	SNRHW	Hazardous Waste
DETSC 2306 Arsenic as As	0.48	< 0.01	0.5	2	25
DETSC 2306 Barium as Ba	5	< 0.1	20	100	300
DETSC 2306 Cadmium as Cd	< 0.030	< 0.02	0.04	1	5
DETSC 2306 Chromium as Cr	0.42	< 0.1	0.5	10	70
DETSC 2306 Copper as Cu	0.68	< 0.02	2	50	100
DETSC 2306 Mercury as Hg	< 0.010	< 0.002	0.01	0.2	2
DETSC 2306 Molybdenum as Mo	< 1.1	< 0.1	0.5	10	30
DETSC 2306 Nickel as Ni	< 0.50	< 0.1	0.4	10	40
DETSC 2306 Lead as Pb	< 0.090	< 0.05	0.5	10	50
DETSC 2306 Antimony as Sb	< 0.17	< 0.05	0.06	0.7	5
DETSC 2306 Selenium as Se	< 0.25	< 0.03	0.1	0.5	7
DETSC 2306 Zinc as Zn	< 1.3	< 0.01	4	50	200
DETSC 2055 Chloride as Cl	1100	< 100	800	15,000	25,000
DETSC 2055* Fluoride as F	140	1.4	10	150	500
DETSC 2055 Sulphate as SO4	4200	< 100	1000	20,000	50,000
DETSC 2009* Total Dissolved Solids	46000	460	4000	60,000	100,000
DETSC 2130 Phenol Index	< 100	< 1	1	n/a	n/a
DETSC 2085 Dissolved Organic Carbon	< 2000	< 50	500	800	1000

TBE - To Be Evaluated
SNRHW - Stable Non-Reactive Hazardous Waste

Additional Information

DETSC 2008 pH	8.8
DETSC 2009 Conductivity uS/cm	66.1
* Temperature*	18.0

Mass of Sample Kg*	0.120
Mass of dry Sample Kg*	0.101

Stage 1

Volume of Leachant L2*	0.986
Volume of Eluate VE1*	0.93

Disclaimer: *The WAC limit values are provided for guidance only. DETS does not accept responsibility for errors or omissions. Values are correct at time of issue.*

V.2.06 ** DETS are accredited for the testing of leachates and not the leachate preparation stage which is unaccredited.*

Summary of Asbestos Analysis
Soil Samples

Our Ref 23-23052
Client Ref 23-0361
Contract Title EAST MEATH NORTH DUBLIN GRID UPGRADE

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
2239890	BHA50 1 0.50	SOIL	NAD	none	Vicky Convery
2239891	BHA50 2 1.00	SOIL	NAD	none	Vicky Convery

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * - not included in laboratory scope of accreditation.

Information in Support of the Analytical Results

Our Ref 23-23052
Client Ref 23-0361
Contract EAST MEATH NORTH DUBLIN GRID UPGRADE

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
2239890	BHA50 0.50 SOIL	21/09/23	GJ 250ml, GJ 60ml, PT 1L x2		
2239891	BHA50 1.00 SOIL	21/09/23	GJ 250ml, GJ 60ml, PT 1L x2		
2239892	BHA50 0.50 LEACHATE	21/09/23	GJ 250ml, GJ 60ml, PT 1L x2		
2239893	BHA50 1.00 LEACHATE	21/09/23	GJ 250ml, GJ 60ml, PT 1L x2		

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Information in Support of the Analytical Results

List of HWOL Acronyms and Operators

Acronym	Description
HS	Headspace analysis
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent
CU	Clean-up - e.g. by florisil, silica gel
1D	GC - Single coil gas chromatography
2D	GC-GC - Double coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative eg. EH+HS_Total or EH_CU+HS_Total

Det	Acronym
Aliphatic C5-C6	HS_1D_AL
Aliphatic C6-C8	HS_1D_AL
Aliphatic C8-C10	HS_1D_AL
Aliphatic C10-C12	EH_CU_1D_AL
Aliphatic C12-C16	EH_CU_1D_AL
Aliphatic C16-C21	EH_CU_1D_AL
Aliphatic C21-C35	EH_CU_1D_AL
Aliphatic C5-C35	EH_CU+HS_1D_AL
Aromatic C5-C7	HS_1D_AR
Aromatic C7-C8	HS_1D_AR
Aromatic C8-C10	HS_1D_AR
Aromatic C10-C12	EH_CU_1D_AR
Aromatic C12-C16	EH_CU_1D_AR
Aromatic C16-C21	EH_CU_1D_AR
Aromatic C21-C35	EH_CU_1D_AR
Aromatic C5-C35	EH_CU+HS_1D_AR
TPH Ali/Aro Total C5-C35	EH_CU+HS_1D_Total
TPH (C10-C40)	EH_1D_Total

End of Report

Certificate of Analysis

Certificate Number	23-23756	*Issued:*	18-Oct-23

Client Causeway Geotech
Unit 1 Fingal House
Stephenstown Industrial Estate
Balbriggan
Co. Dublin
K32 VR66

Our Reference	23-23756
Client Reference	23-0361
Order No	(not supplied)
Contract Title	East Meath North Dublin Grid Upgrade
Description	1 Soil sample, 1 Leachate sample.
Date Received	05-Oct-23
Date Started	06-Oct-23
Date Completed	18-Oct-23
Test Procedures	Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Kirk Bridgewood
General Manager

2139

Summary of Chemical Analysis
Soil Samples

Our Ref 23-23756
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade

Lab No	2244045
.Sample ID	WS20
Depth	0.50
Other ID	
Sample Type	ES
Sampling Date	29/09/2023
Sampling Time	n/s

Test	Method	LOD	Units	
Metals				
Arsenic	DETSC 2301#	0.2	mg/kg	11
Boron, Water Soluble (2.5:1)	DETSC 2311#	0.2	mg/kg	0.8
Cadmium	DETSC 2301#	0.1	mg/kg	2.9
Chromium	DETSC 2301#	0.15	mg/kg	21
Copper	DETSC 2301#	0.2	mg/kg	38
Lead	DETSC 2301#	0.3	mg/kg	36
Mercury	DETSC 2325#	0.05	mg/kg	0.11
Nickel	DETSC 2301#	1	mg/kg	36
Zinc	DETSC 2301#	1	mg/kg	170
Inorganics				
pH	DETSC 2008#		pH	8.0
Cyanide, Total	DETSC 2130#	0.1	mg/kg	0.4
Organic matter	DETSC 2002#	0.1	%	5.0
Sulphate Aqueous Extract as SO4 (2:1)	DETSC 2076#	10	mg/l	14
Petroleum Hydrocarbons				
Aliphatic C5-C6: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01
Aliphatic C6-C8: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01
Aliphatic C8-C10: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01
Aliphatic C10-C12: EH_CU_1D_AL	DETSC 3072#	1.5	mg/kg	< 1.5
Aliphatic C12-C16: EH_CU_1D_AL	DETSC 3072#	1.2	mg/kg	< 1.2
Aliphatic C16-C21: EH_CU_1D_AL	DETSC 3072#	1.5	mg/kg	< 1.5
Aliphatic C21-C35: EH_CU_1D_AL	DETSC 3072#	3.4	mg/kg	< 3.4
Aliphatic C5-C35: EH_CU+HS_1D_AL	DETSC 3072*	10	mg/kg	< 10
Aromatic C5-C7: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01
Aromatic C7-C8: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01
Aromatic C8-C10: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01
Aromatic C10-C12: EH_CU_1D_AR	DETSC 3072#	0.9	mg/kg	< 0.9
Aromatic C12-C16: EH_CU_1D_AR	DETSC 3072#	0.5	mg/kg	< 0.5
Aromatic C16-C21: EH_CU_1D_AR	DETSC 3072#	0.6	mg/kg	< 0.6
Aromatic C21-C35: EH_CU_1D_AR	DETSC 3072#	1.4	mg/kg	< 1.4
Aromatic C5-C35: EH_CU+HS_1D_AR	DETSC 3072*	10	mg/kg	< 10
TPH Ali/Aro Total C5-C35: EH_CU+HS_1D_Total	DETSC 3072*	10	mg/kg	< 10
Benzene	DETSC 3321#	0.01	mg/kg	< 0.01
Ethylbenzene	DETSC 3321#	0.01	mg/kg	< 0.01
Toluene	DETSC 3321#	0.01	mg/kg	< 0.01
Xylene	DETSC 3321#	0.01	mg/kg	< 0.01
PAHs				
Naphthalene	DETSC 3301	0.1	mg/kg	< 0.1
Acenaphthylene	DETSC 3301	0.1	mg/kg	< 0.1
Acenaphthene	DETSC 3301	0.1	mg/kg	< 0.1

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 23-23756
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade

Lab No	2244045
.Sample ID	WS20
Depth	0.50
Other ID	
Sample Type	ES
Sampling Date	29/09/2023
Sampling Time	n/s

Test	Method	LOD	Units	
Fluorene	DETSC 3301	0.1	mg/kg	< 0.1
Phenanthrene	DETSC 3301	0.1	mg/kg	< 0.1
Anthracene	DETSC 3301	0.1	mg/kg	< 0.1
Fluoranthene	DETSC 3301	0.1	mg/kg	0.7
Pyrene	DETSC 3301	0.1	mg/kg	0.8
Benzo(a)anthracene	DETSC 3301	0.1	mg/kg	< 0.1
Chrysene	DETSC 3301	0.1	mg/kg	< 0.1
Benzo(b)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1
Benzo(k)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1
Benzo(a)pyrene	DETSC 3301	0.1	mg/kg	< 0.1
Indeno(1,2,3-c,d)pyrene	DETSC 3301	0.1	mg/kg	< 0.1
Dibenzo(a,h)anthracene	DETSC 3301	0.1	mg/kg	< 0.1
Benzo(g,h,i)perylene	DETSC 3301	0.1	mg/kg	< 0.1
Coronene	DETSC 3301*	0.1	mg/kg	< 0.1
PAH 16 Total	DETSC 3301	1.6	mg/kg	< 1.6
Phenols				
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3
VOCs				
Vinyl Chloride	DETSC 3431	0.01	mg/kg	< 0.01
1,1 Dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
Trans-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
1,1-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Cis-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
2,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
Bromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01
Chloroform	DETSC 3431	0.01	mg/kg	< 0.01
1,1,1-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
1,1-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01
Carbon tetrachloride	DETSC 3431	0.01	mg/kg	< 0.01
Benzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Trichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
Dibromomethane	DETSC 3431	0.01	mg/kg	< 0.01
Bromodichloromethane	DETSC 3431	0.01	mg/kg	< 0.01
cis-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01
Toluene	DETSC 3431	0.01	mg/kg	< 0.01
trans-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01
1,1,2-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Tetrachloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
1,3-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
Dibromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 23-23756
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade

Lab No	2244045
.Sample ID	WS20
Depth	0.50
Other ID	
Sample Type	ES
Sampling Date	29/09/2023
Sampling Time	n/s

Test	Method	LOD	Units	
1,2-dibromoethane	DETSC 3431	0.01	mg/kg	< 0.01
Chlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,1,1,2-tetrachloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Ethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
m+p-Xylene	DETSC 3431	0.01	mg/kg	< 0.01
o-Xylene	DETSC 3431	0.01	mg/kg	< 0.01
Styrene	DETSC 3431*	0.01	mg/kg	< 0.01
Bromoform	DETSC 3431	0.01	mg/kg	< 0.01
Isopropylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
Bromobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2,3-trichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
n-propylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
2-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01
1,3,5-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
4-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01
Tert-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2,4-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
sec-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
p-isopropyltoluene	DETSC 3431	0.01	mg/kg	< 0.01
1,3-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,4-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
n-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dibromo-3-chloropropane	DETSC 3431	0.01	mg/kg	< 0.01
1,2,4-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
Hexachlorobutadiene	DETSC 3431	0.01	mg/kg	< 0.01
1,2,3-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
MTBE	DETSC 3431*	0.01	mg/kg	< 0.01

WASTE ACCEPTANCE CRITERIA TESTING ANALYTICAL REPORT

Our Ref 23-23756
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade
Sample Id WS20 0.50
Sample Numbers 2244045 2244046
Date Analysed 18/10/2023

Test Results On Waste

Determinand and Method Reference	Units	Result	WAC Limit Values: Inert Waste	SNRHW	Hazardous Waste
DETSC 2084# Total Organic Carbon	%	3.5	3	5	6
DETSC 2003# Loss On Ignition	%	8.3	n/a	n/a	10
DETSC 3321# BTEX	mg/kg	< 0.04	6	n/a	n/a
DETSC 3401# PCBs (7 congeners)	mg/kg	< 0.01	1	n/a	n/a
DETSC 3311# EPH (C10 - C40): EH_1D_Total	mg/kg	180.0	500	n/a	n/a
DETSC 3301 PAHs	mg/kg	< 1.6	100	n/a	n/a
DETSC 2008# pH	pH Units	8.0	n/a	>6	n/a
DETSC 2073* Acid Neutralisation Capacity (pH4)	mol/kg	< 1.0	n/a	TBE	TBE
DETSC 2073* Acid Neutralisation Capacity (pH7)	mol/kg	< 1.0	n/a	TBE	TBE

Test Results On Leachate

Determinand and Method Reference	Conc in Eluate ug/l 10:1	Amount Leached* mg/kg LS10	WAC Limit Values (Limit values for LS10 Leachate): Inert Waste	SNRHW	Hazardous Waste
DETSC 2306 Arsenic as As	0.53	< 0.01	0.5	2	25
DETSC 2306 Barium as Ba	5.1	< 0.1	20	100	300
DETSC 2306 Cadmium as Cd	< 0.030	< 0.02	0.04	1	5
DETSC 2306 Chromium as Cr	0.38	< 0.1	0.5	10	70
DETSC 2306 Copper as Cu	1.9	< 0.02	2	50	100
DETSC 2306 Mercury as Hg	< 0.010	< 0.002	0.01	0.2	2
DETSC 2306 Molybdenum as Mo	< 1.1	< 0.1	0.5	10	30
DETSC 2306 Nickel as Ni	0.68	< 0.1	0.4	10	40
DETSC 2306 Lead as Pb	1.8	< 0.05	0.5	10	50
DETSC 2306 Antimony as Sb	< 0.17	< 0.05	0.06	0.7	5
DETSC 2306 Selenium as Se	1.2	< 0.03	0.1	0.5	7
DETSC 2306 Zinc as Zn	2.2	0.022	4	50	200
DETSC 2055 Chloride as Cl	870	< 100	800	15,000	25,000
DETSC 2055* Fluoride as F	120	1.2	10	150	500
DETSC 2055 Sulphate as SO4	2300	< 100	1000	20,000	50,000
DETSC 2009* Total Dissolved Solids	36000	360	4000	60,000	100,000
DETSC 2130 Phenol Index	< 100	< 1	1	n/a	n/a
DETSC 2085 Dissolved Organic Carbon	2900	< 50	500	800	1000

TBE - To Be Evaluated
SNRHW - Stable Non-Reactive Hazardous Waste

Additional Information

DETSC 2008 pH	8.9
DETSC 2009 Conductivity uS/cm	51.8
* Temperature*	19.0

Mass of Sample Kg*	0.120
Mass of dry Sample Kg*	0.098

Stage 1

Volume of Leachant L2*	0.962
Volume of Eluate VE1*	0.91

Disclaimer: *The WAC limit values are provided for guidance only. DETS does not accept responsibility for errors or omissions. Values are correct at time of issue.*

V.2.06 ** DETS are accredited for the testing of leachates and not the leachate preparation stage which is unaccredited.*

Summary of Asbestos Analysis
Soil Samples

Our Ref 23-23756
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
2244045	WS20 0.50	SOIL	NAD	none	Michael Kay

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * - not included in laboratory scope of accreditation.

Information in Support of the Analytical Results

Our Ref 23-23756
Client Ref 23-0361
Contract East Meath North Dublin Grid Upgrade

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
2244045	WS20 0.50 SOIL	29/09/23	GJ 250ml, GJ 60ml, PT 1L		
2244046	WS20 0.50 LEACHATE	29/09/23	GJ 250ml, GJ 60ml, PT 1L		

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Information in Support of the Analytical Results

List of HWOL Acronyms and Operators

Acronym	Description
HS	Headspace analysis
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent
CU	Clean-up - e.g. by florisil, silica gel
1D	GC - Single coil gas chromatography
2D	GC-GC - Double coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative eg. EH+HS_Total or EH_CU+HS_Total

Det	Acronym
Aliphatic C5-C6	HS_1D_AL
Aliphatic C6-C8	HS_1D_AL
Aliphatic C8-C10	HS_1D_AL
Aliphatic C10-C12	EH_CU_1D_AL
Aliphatic C12-C16	EH_CU_1D_AL
Aliphatic C16-C21	EH_CU_1D_AL
Aliphatic C21-C35	EH_CU_1D_AL
Aliphatic C5-C35	EH_CU+HS_1D_AL
Aromatic C5-C7	HS_1D_AR
Aromatic C7-C8	HS_1D_AR
Aromatic C8-C10	HS_1D_AR
Aromatic C10-C12	EH_CU_1D_AR
Aromatic C12-C16	EH_CU_1D_AR
Aromatic C16-C21	EH_CU_1D_AR
Aromatic C21-C35	EH_CU_1D_AR
Aromatic C5-C35	EH_CU+HS_1D_AR
TPH Ali/Aro Total C5-C35	EH_CU+HS_1D_Total
TPH (C10-C40)	EH_1D_Total

End of Report

Certificate of Analysis

Certificate Number	23-24452	*Issued:*	20-Oct-23

Client Causeway Geotech
Unit 1 Fingal House
Stephenstown Industrial Estate
Balbriggan
Co. Dublin
K32 VR66

Our Reference	23-24452
Client Reference	23-0361
Order No	(not supplied)
Contract Title	EAST MEATH NORTH DUBLIN UPGRADE GI
Description	3 Soil samples.
Date Received	14-Oct-23
Date Started	16-Oct-23
Date Completed	20-Oct-23
Test Procedures	Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Kirk Bridgewood
General Manager

2139

Summary of Chemical Analysis
Soil Samples

Our Ref 23-24452
Client Ref 23-0361
Contract Title EAST MEATH NORTH DUBLIN UPGRADE GI

				Lab No	2248119	2248120	2248121
				.Sample ID	BHB21	BHB57	BHB58
				Depth	10.80	9.00	11.80
				Other ID			
				Sample Type	SOIL	SOIL	SOIL
				Sampling Date	13/10/2023	13/10/2023	13/10/2023
				Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
Inorganics							
pH	DETSC 2008#		pH	8.4	8.6	8.7
Sulphate Aqueous Extract as SO4 (2:1)	DETSC 2076#	10	mg/l	440	92	66
Sulphur as S, Total	DETSC 2320	0.01	%	0.13	0.13	0.08
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.14	0.12	0.04

Key: # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Information in Support of the Analytical Results

Our Ref 23-24452
Client Ref 23-0361
Contract EAST MEATH NORTH DUBLIN UPGRADE GI

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
2248119	BHB21 10.80 SOIL	13/10/23	PT 1L		
2248120	BHB57 9.00 SOIL	13/10/23	PT 1L		
2248121	BHB58 11.80 SOIL	13/10/23	PT 1L		

Key: P-Plastic T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.
Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.
The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-
Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

End of Report

Certificate of Analysis

Certificate Number	23-24669	*Issued:*	30-Oct-23

Client Causeway Geotech
Unit 1 Fingal House
Stephenstown Industrial Estate
Balbriggan
Co. Dublin
K32 VR66

Our Reference	23-24669
Client Reference	23-0361
Order No	(not supplied)
Contract Title	East Meath North Dublin Grid Upgrade
Description	1 Soil sample, 1 Leachate sample.
Date Received	18-Oct-23
Date Started	18-Oct-23
Date Completed	30-Oct-23
Test Procedures	Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Kirk Bridgewood
General Manager

2139

Summary of Chemical Analysis
Soil Samples

Our Ref 23-24669
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade

Lab No	2249372
.Sample ID	BHCO18
Depth	0.50
Other ID	1
Sample Type	ES
Sampling Date	04/10/2023
Sampling Time	n/s

Test	Method	LOD	Units	
Metals				
Arsenic	DETSC 2301#	0.2	mg/kg	8.6
Boron, Water Soluble (2.5:1)	DETSC 2311#	0.2	mg/kg	1.7
Cadmium	DETSC 2301#	0.1	mg/kg	1.5
Chromium	DETSC 2301#	0.15	mg/kg	14
Copper	DETSC 2301#	0.2	mg/kg	28
Lead	DETSC 2301#	0.3	mg/kg	18
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05
Nickel	DETSC 2301#	1	mg/kg	24
Zinc	DETSC 2301#	1	mg/kg	76
Inorganics				
pH	DETSC 2008#		pH	8.2
Cyanide, Total	DETSC 2130#	0.1	mg/kg	0.1
Organic matter	DETSC 2002#	0.1	%	0.8
Sulphate Aqueous Extract as SO4 (2:1)	DETSC 2076#	10	mg/l	23
Petroleum Hydrocarbons				
Aliphatic C5-C6: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01
Aliphatic C6-C8: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01
Aliphatic C8-C10: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01
Aliphatic C10-C12: EH_CU_1D_AL	DETSC 3072#	1.5	mg/kg	< 1.5
Aliphatic C12-C16: EH_CU_1D_AL	DETSC 3072#	1.2	mg/kg	< 1.2
Aliphatic C16-C21: EH_CU_1D_AL	DETSC 3072#	1.5	mg/kg	< 1.5
Aliphatic C21-C35: EH_CU_1D_AL	DETSC 3072#	3.4	mg/kg	< 3.4
Aliphatic C5-C35: EH_CU+HS_1D_AL	DETSC 3072*	10	mg/kg	< 10
Aromatic C5-C7: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01
Aromatic C7-C8: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01
Aromatic C8-C10: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01
Aromatic C10-C12: EH_CU_1D_AR	DETSC 3072#	0.9	mg/kg	< 0.9
Aromatic C12-C16: EH_CU_1D_AR	DETSC 3072#	0.5	mg/kg	< 0.5
Aromatic C16-C21: EH_CU_1D_AR	DETSC 3072#	0.6	mg/kg	< 0.6
Aromatic C21-C35: EH_CU_1D_AR	DETSC 3072#	1.4	mg/kg	< 1.4
Aromatic C5-C35: EH_CU+HS_1D_AR	DETSC 3072*	10	mg/kg	< 10
TPH Ali/Aro Total C5-C35: EH_CU+HS_1D_Total	DETSC 3072*	10	mg/kg	< 10
Benzene	DETSC 3321#	0.01	mg/kg	< 0.01
Ethylbenzene	DETSC 3321#	0.01	mg/kg	< 0.01
Toluene	DETSC 3321#	0.01	mg/kg	< 0.01
Xylene	DETSC 3321#	0.01	mg/kg	< 0.01
PAHs				
Naphthalene	DETSC 3301	0.1	mg/kg	< 0.1
Acenaphthylene	DETSC 3301	0.1	mg/kg	< 0.1
Acenaphthene	DETSC 3301	0.1	mg/kg	< 0.1

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 23-24669
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade

Lab No	2249372
.Sample ID	BHCO18
Depth	0.50
Other ID	1
Sample Type	ES
Sampling Date	04/10/2023
Sampling Time	n/s

Test	Method	LOD	Units	
Fluorene	DETSC 3301	0.1	mg/kg	< 0.1
Phenanthrene	DETSC 3301	0.1	mg/kg	< 0.1
Anthracene	DETSC 3301	0.1	mg/kg	< 0.1
Fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1
Pyrene	DETSC 3301	0.1	mg/kg	< 0.1
Benzo(a)anthracene	DETSC 3301	0.1	mg/kg	< 0.1
Chrysene	DETSC 3301	0.1	mg/kg	< 0.1
Benzo(b)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1
Benzo(k)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1
Benzo(a)pyrene	DETSC 3301	0.1	mg/kg	< 0.1
Indeno(1,2,3-c,d)pyrene	DETSC 3301	0.1	mg/kg	< 0.1
Dibenzo(a,h)anthracene	DETSC 3301	0.1	mg/kg	< 0.1
Benzo(g,h,i)perylene	DETSC 3301	0.1	mg/kg	< 0.1
Coronene	DETSC 3301*	0.1	mg/kg	< 0.1
PAH 16 Total	DETSC 3301	1.6	mg/kg	< 1.6
Phenols				
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3
VOCs				
Vinyl Chloride	DETSC 3431	0.01	mg/kg	< 0.01
1,1 Dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
Trans-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
1,1-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Cis-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
2,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
Bromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01
Chloroform	DETSC 3431	0.01	mg/kg	< 0.01
1,1,1-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
1,1-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01
Carbon tetrachloride	DETSC 3431	0.01	mg/kg	< 0.01
Benzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Trichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
Dibromomethane	DETSC 3431	0.01	mg/kg	< 0.01
Bromodichloromethane	DETSC 3431	0.01	mg/kg	< 0.01
cis-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01
Toluene	DETSC 3431	0.01	mg/kg	< 0.01
trans-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01
1,1,2-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Tetrachloroethylene	DETSC 3431	0.01	mg/kg	< 0.01
1,3-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
Dibromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 23-24669
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade

Lab No	2249372
.Sample ID	BHCO18
Depth	0.50
Other ID	1
Sample Type	ES
Sampling Date	04/10/2023
Sampling Time	n/s

Test	Method	LOD	Units	
1,2-dibromoethane	DETSC 3431	0.01	mg/kg	< 0.01
Chlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,1,1,2-tetrachloroethane	DETSC 3431	0.01	mg/kg	< 0.01
Ethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
m+p-Xylene	DETSC 3431	0.01	mg/kg	< 0.01
o-Xylene	DETSC 3431	0.01	mg/kg	< 0.01
Styrene	DETSC 3431*	0.01	mg/kg	< 0.01
Bromoform	DETSC 3431	0.01	mg/kg	< 0.01
Isopropylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
Bromobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2,3-trichloropropane	DETSC 3431	0.01	mg/kg	< 0.01
n-propylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
2-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01
1,3,5-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
4-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01
Tert-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2,4-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
sec-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
p-isopropyltoluene	DETSC 3431	0.01	mg/kg	< 0.01
1,3-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,4-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
n-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
1,2-dibromo-3-chloropropane	DETSC 3431	0.01	mg/kg	< 0.01
1,2,4-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
Hexachlorobutadiene	DETSC 3431	0.01	mg/kg	< 0.01
1,2,3-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01
MTBE	DETSC 3431*	0.01	mg/kg	< 0.01

WASTE ACCEPTANCE CRITERIA TESTING ANALYTICAL REPORT

Our Ref 23-24669
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade
Sample Id BHCO18 1 0.50
Sample Numbers 2249372 2249373
Date Analysed 30/10/2023

Test Results On Waste

Determinand and Method Reference	Units	Result	WAC Limit Values: Inert Waste	SNRHW	Hazardous Waste
DETSC 2084# Total Organic Carbon	%	0.7	3	5	6
DETSC 2003# Loss On Ignition	%	3.3	n/a	n/a	10
DETSC 3321# BTEX	mg/kg	< 0.04	6	n/a	n/a
DETSC 3401# PCBs (7 congeners)	mg/kg	< 0.01	1	n/a	n/a
DETSC 3311# EPH (C10 - C40): EH_1D_Total	mg/kg	< 10	500	n/a	n/a
DETSC 3301 PAHs	mg/kg	< 1.6	100	n/a	n/a
DETSC 2008# pH	pH Units	8.2	n/a	>6	n/a
DETSC 2073* Acid Neutralisation Capacity (pH4)	mol/kg	< 1.0	n/a	TBE	TBE
DETSC 2073* Acid Neutralisation Capacity (pH7)	mol/kg	< 1.0	n/a	TBE	TBE

Test Results On Leachate

Determinand and Method Reference	Conc in Eluate ug/l 10:1	Amount Leached* mg/kg LS10	WAC Limit Values (Limit values for LS10 Leachate): Inert Waste	SNRHW	Hazardous Waste
DETSC 2306 Arsenic as As	0.23	< 0.01	0.5	2	25
DETSC 2306 Barium as Ba	10	0.1	20	100	300
DETSC 2306 Cadmium as Cd	0.1	< 0.02	0.04	1	5
DETSC 2306 Chromium as Cr	< 0.25	< 0.1	0.5	10	70
DETSC 2306 Copper as Cu	2.1	0.021	2	50	100
DETSC 2306 Mercury as Hg	< 0.010	< 0.002	0.01	0.2	2
DETSC 2306 Molybdenum as Mo	1.9	< 0.1	0.5	10	30
DETSC 2306 Nickel as Ni	10	0.1	0.4	10	40
DETSC 2306 Lead as Pb	4.9	< 0.05	0.5	10	50
DETSC 2306 Antimony as Sb	< 0.17	< 0.05	0.06	0.7	5
DETSC 2306 Selenium as Se	0.59	< 0.03	0.1	0.5	7
DETSC 2306 Zinc as Zn	37	0.37	4	50	200
DETSC 2055 Chloride as Cl	800	< 100	800	15,000	25,000
DETSC 2055* Fluoride as F	260	2.6	10	150	500
DETSC 2055 Sulphate as SO4	5900	< 100	1000	20,000	50,000
DETSC 2009* Total Dissolved Solids	63000	630	4000	60,000	100,000
DETSC 2130 Phenol Index	< 100	< 1	1	n/a	n/a
DETSC 2085 Dissolved Organic Carbon	< 2000	< 50	500	800	1000

TBE - To Be Evaluated
SNRHW - Stable Non-Reactive Hazardous Waste

Additional Information

DETSC 2008 pH	7.0
DETSC 2009 Conductivity uS/cm	89.6
* Temperature*	17.0

Mass of Sample Kg*	0.120
Mass of dry Sample Kg*	0.100

Stage 1

Volume of Leachant L2*	0.984
Volume of Eluate VE1*	0.93

Disclaimer: *The WAC limit values are provided for guidance only. DETS does not accept responsibility for errors or omissions. Values are correct at time of issue.*

V.2.06 ** DETS are accredited for the testing of leachates and not the leachate preparation stage which is unaccredited.*

Summary of Asbestos Analysis
Soil Samples

Our Ref 23-24669
Client Ref 23-0361
Contract Title East Meath North Dublin Grid Upgrade

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
2249372	BHCO18 1 0.50	SOIL	NAD	none	Michael Kay

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * - not included in laboratory scope of accreditation.

Information in Support of the Analytical Results

Our Ref 23-24669
Client Ref 23-0361
Contract East Meath North Dublin Grid Upgrade

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
2249372	BHCO18 0.50 SOIL	04/10/23	GJ 250ml x2, PT 1L	pH + Conductivity (7 days), VOC (7 days)	BTEX / C5-C10, VOC
2249373	BHCO18 0.50 LEACHATE	04/10/23	GJ 250ml x2, PT 1L		

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Information in Support of the Analytical Results

List of HWOL Acronyms and Operators

Acronym	Description
HS	Headspace analysis
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent
CU	Clean-up - e.g. by florisil, silica gel
1D	GC - Single coil gas chromatography
2D	GC-GC - Double coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative eg. EH+HS_Total or EH_CU+HS_Total

Det	Acronym
Aliphatic C5-C6	HS_1D_AL
Aliphatic C6-C8	HS_1D_AL
Aliphatic C8-C10	HS_1D_AL
Aliphatic C10-C12	EH_CU_1D_AL
Aliphatic C12-C16	EH_CU_1D_AL
Aliphatic C16-C21	EH_CU_1D_AL
Aliphatic C21-C35	EH_CU_1D_AL
Aliphatic C5-C35	EH_CU+HS_1D_AL
Aromatic C5-C7	HS_1D_AR
Aromatic C7-C8	HS_1D_AR
Aromatic C8-C10	HS_1D_AR
Aromatic C10-C12	EH_CU_1D_AR
Aromatic C12-C16	EH_CU_1D_AR
Aromatic C16-C21	EH_CU_1D_AR
Aromatic C21-C35	EH_CU_1D_AR
Aromatic C5-C35	EH_CU+HS_1D_AR
TPH Ali/Aro Total C5-C35	EH_CU+HS_1D_Total
TPH (C10-C40)	EH_1D_Total

End of Report

East Meath - North Dublin Grid Upgrade Environmental Impact Assessment Report (EIAR): Volume 3

Appendix A12.1 – Flood Risk Assessment

EirGrid

March 2024

Contents

Appendix A12.1 – Flood Risk Assessment

1. Introduction

1.1 Development Background

The East Meath – North Dublin Grid Upgrade (hereafter referred to as the Proposed Development) includes approximately 37.5 kilometres (km) of new 400 kilovolt (kV) underground cable circuit (also referred to as the proposed cable route) between the existing Woodland Substation in the townland of Woodland, near Batterstown, County Meath and the existing Belcamp Substation in the townlands of Clonshagh and Belcamp in Fingal, County Dublin (as shown in Image 1.1). The Proposed Development will also involve works in the substations to facilitate the connection of the underground cable circuit to the electrical grid.

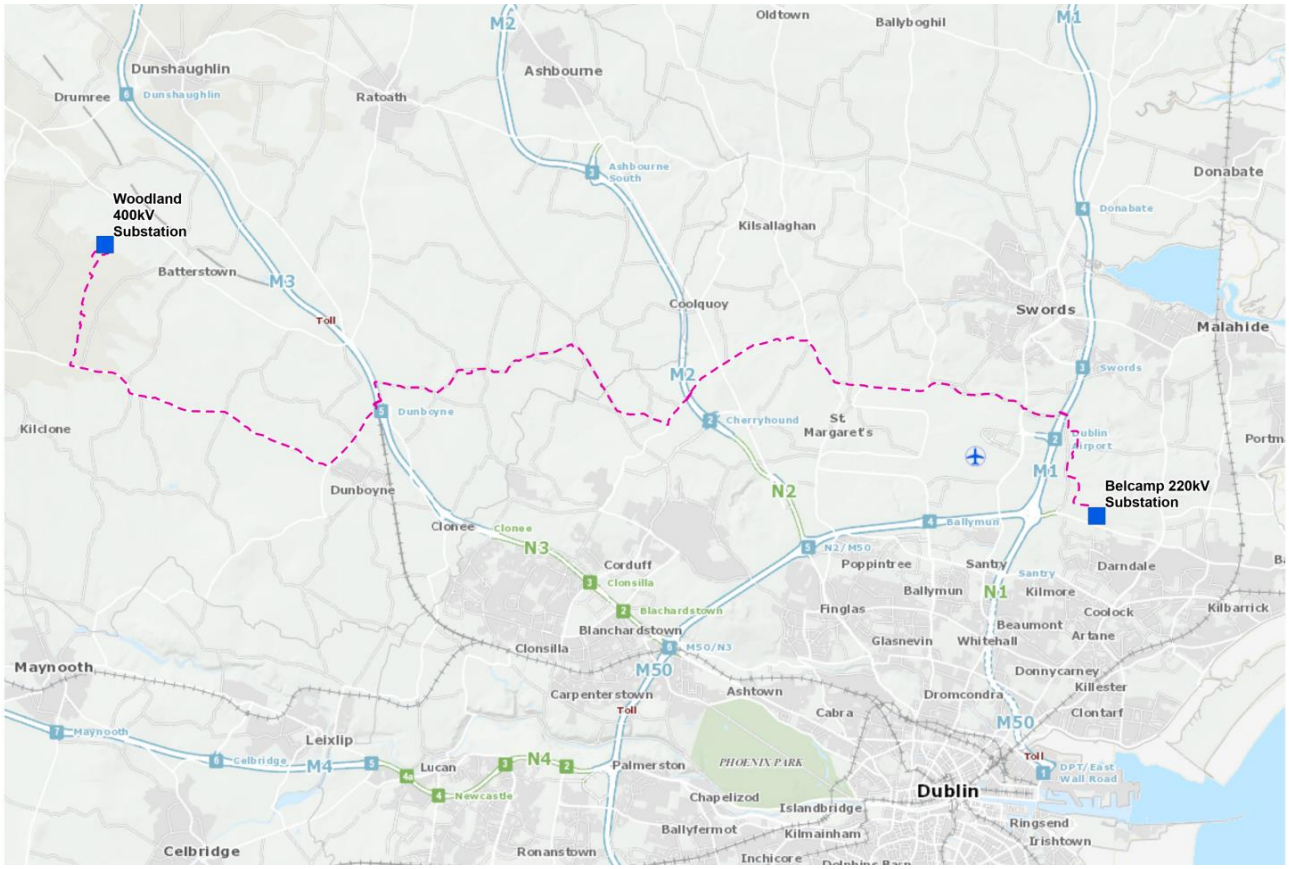

Image 1.1: Location of the Proposed Development

A full description of the Proposed Development is presented in Chapter 4 (Proposed Development Description) in Volume 2 of this Environmental Impact Assessment Report (EIAR).

This Flood Risk Assessment (FRA) Report provides an assessment of the baseline flood risk and the assessment of future flood risk within the Proposed Development infrastructure / sites.

1.2 Structure of this Report

Table 1.1 outlines the structure of this FRA Report.

Table 1.1: FRA Report Structure

Section	Overview
Section 1 (Introduction)	An outline of the Report, a description of the Proposed Development; information on the approach to its development, as well as information on sustainability relevant to the Proposed Development.
Section 2 (Planning Guidelines)	Contains a list of Planning Guidelines that have been considered.
Section 3 (Flood Risk Assessment)	Sets out the Flood Risk Assessment Methodology.
Section 4 (Stage 1 Flood Risk Identification)	Includes the findings of the Stage 1 Flood Risk Assessment.
Section 5 (Stage 2 Initial Flood Risk Assessment)	Presents the findings of the Stage 2 Flood Risk Assessment.
Section 6 (Stage 2: Potential Flood Risk Impacts from Proposed Development)	Details the potential flood risk implications arising from the Proposed Development and the proposed mitigation measures.
Section 7 (Flood Risk Management and Evaluation)	Assesses the Proposed Development in accordance with the Justification Test.
Section 8 (Conclusions and Recommendations)	Presents the conclusions and recommendations.

2. Planning Guidelines

2.1 The Planning System and Flood Risk Management Guidelines for Planning Authorities

The Department of the Environment, Heritage and Local Government (DEHLG) and the Office of Public Works (OPW) Planning System and Flood Risk Management, Guidelines for Planning Authorities (hereafter referred to as the Flood Risk Guidelines) introduce comprehensive mechanisms for the incorporation of flood risk identification, assessment and management into the planning process (DEHLG and OPW 2009).

The Flood Risk Guidelines set out the methodology to be used for the FRA, which require the planning system at national, regional and local levels to:

- Avoid development in areas at risk from flooding, particularly floodplains, unless there are proven wider sustainability grounds that justify development. Where this is the case, development must be appropriate and flood risks must be effectively managed to reduce the level of risk;
- Adopt a sequential approach to flood risk management when assessing the locations for new development based on avoidance, reduction, and mitigation of flood risk; and
- Incorporate FRA into planning application decisions and appeals.

2.2 The European Union Floods Directive, Water Framework Directive and River Basin Management Plans

Implementation of the Flood Risk Guidelines (DEHLG and OPW 2009) will also rely on the ongoing integration with existing European Union (EU) Directives:

- Directive 2007/ 60/ EC of the European Parliament and of the Council of 23 October 2007 on the assessment and management of flood risk (hereafter referred to as the EU Floods Directive) requires Member States to undertake preliminary FRAs on a national scale, to identify possible future areas of flooding. Member states are also required to prepare Flood Risk Management Plans (FRMPs) per catchment, in order to set out local flood risk management goals and measures. The OPW is responsible for undertaking this role in Ireland. Under this Directive, the

EU recognises the importance of land use management as a key tool in managing flood risk as well; and

- Council Directive 2000/ 60/ EC of 23 October 2000 establishing a framework for Community action in the field of water policy (hereafter referred to as the Water Framework Directive (WFD)) introduces the concept of River Basin Management Plans (RBMPs), so that all rivers and coastal waters may achieve good ecological status by 2027. As of today, River Basin Districts have been established, and relevant management plans are available.

2.3 Greater Dublin Strategic Drainage Study

The Greater Dublin Strategic Drainage Study (GDSDS) (Dublin Drainage Consultancy 2005) was commissioned to analyse existing foul and surface water drainage systems in the local authority areas of Dublin City, Fingal, South Dublin and Dun Laoghaire – Rathdown and the adjacent catchments in Counties Meath, Kildare and Wicklow. With respect to the Proposed Development, the applicable objectives of the study can be summarised as follows:

- To develop an environmentally sustainable drainage strategy for the region consistent with the WFD;
- To provide a consistent policy framework and standards which will apply throughout the region;
- To develop tools for the effective management of the drainage systems including Geographical Information Systems (GIS), network models and digital mapping; and
- To develop the optimum drainage solution from a range of alternative scenarios having regard to the whole-life cost and environmental performance, the solution to be broken down into a set of implementation projects which can be prioritised and put in place.

2.4 Strategic Flood Risk Assessment for the Meath County Development Plan

JBA Consulting was commissioned by Meath County Council (MCC) to provide assistance in the preparation of the Strategic Flood Risk Assessment (SFRA) incorporated into the Meath County Development Plan 2021-2027 (hereafter referred to as the MCDP) (MCC 2021).

The Flood Risk Guidelines (DEHLG and OPW 2009) recommend a sequential approach to spatial planning, promoting avoidance rather than justification and subsequent mitigation of risk. The implementation of the Planning Guidelines on a settlement basis is achieved through the application of the policies and objectives contained within the MCDP. The use and application of the policies and guidelines constitutes the formal plan for flood risk management in County Meath. This approach has been captured in the settlements contained within the MCDP and covered in the SFRA. The objectives contained within Chapter 6 of the MCDP are presented in Table 2.1.

Table 2.1: Objectives and Recommendations MCDP 2021-2027

SFRA Objective / Policy Action Code	Objective
INF OBJ 20	To implement the Planning System and Flood Risk Management-Guidelines for Planning Authorities (DoEHLG/OPW 2009) or any updated guidelines. A site-specific Flood Risk Assessment should be submitted where appropriate.
INF OBJ 21	To restrict new development within floodplains other than development which satisfies the Justification Test, as outlined in the Planning System and Flood Risk Management Guidelines 2009 for Planning Authorities (or any updated guidelines).
INF OBJ 23	To protect and enhance the County's floodplains, wetlands and coastal areas subject to flooding as "green infrastructure" which provide space for storage and conveyance of floodwater and ensure that development does not impact on important wetland sites within river/stream catchments.
INF OBJ 24	To identify existing surface water drainage systems vulnerable to flooding and develop proposals to alleviate flooding in the areas served by these systems in conjunction with the Office of Public Works.

2.5 Strategic Flood Risk Assessment for Fingal Development Plan

Fingal County Council's (FCC's) SFRA provides "*an area wide assessment of all types of significant flood risk to inform strategic land use planning decisions.*" The SFRA forms part of the Fingal Development Plan 2023 – 2029 (hereafter referred to as the FDP) (FCC 2023).

The SFRA presents the key flood management policies and objectives that must be followed by all new developments. It identifies sites within Flood Zones A and B and covers acceptable grounds for justification tests for development plans within each site. Where the Proposed Development is within or proximate to these sites, further detail is provided within this report.

Furthermore, the FDP outlines surface water and flood risk management policies which have been strengthened and improved upon since the previous Fingal Development Plan 2016 – 2022 (FCC 2016). These have also been updated based on the information provided in the SFRA process.

The Proposed Development will need to demonstrate compliance with the overarching objectives and recommendations of the SFRA stated in Table 2.2.

Table 2.2: Objectives and Recommendations of the FCC SFRA

SFRA Objective / Policy Action Code	Objective
Policy IUP12 – Flood Risk Management	Ensure the continued incorporation of Flood Risk Management into the spatial planning of the County of Fingal, to meet the requirements of the EU Floods Directive and the EU Water Framework Directive and to promote a climate resilient County.
Policy IUP13 – Protection of Fingal's Floodplains, Wetlands and Coastal Areas	Protect and enhance the County's floodplains, wetlands and coastal areas subject to flooding as vital green infrastructure which provides space for storage and conveyance of floodwater, enabling flood risk to be more effectively managed and reducing the need to provide flood defences in the future.
Policy IUP14 – OPW	Continue to support and assist the OPW in implementing and delivering the relevant Flood Risk Management Plans for rivers, coastlines and estuaries within Fingal.
Objective IUO16 – OPW Flood Risk Management Guidelines	Have regard to the OPW Flood Risk Management Guidelines 2009, as revised by Circular PL 2/2014, when assessing planning applications and in the preparation of statutory and non-statutory plans and to require site specific flood risk assessments are to be considered for all new developments within the County. All development must prepare a Stage 1 Flood Risk Analysis and if the flooding risk is not screened out, they must prepare a Site-Specific Flood Risk Assessment (SSFRA) for the development, where appropriate.
Objective IUO17 –Strategic Flood Risk Assessment	Implement and comply fully with the recommendations of the Strategic Flood Risk Assessment prepared as part of the Fingal Development Plan 2023–2029.
Objective IUO18 – SFRA Recommendations	All Flood Risk Assessments must comply with the recommendations from the SFRA report.
Objective IUO19 – Medium Range Future Scenario Climate Change Predictions	Surface water designs must include 'Medium Range Future Scenario Climate Change Predictions'.
Objective IUO20 – Tolka River Flood Study Maps	Prepare a flood map using data from both the River Tolka Flood Study extents and recently provided National Indicative Fluvial Mapping as well as site specific modelling to ensure the most up-to-date flood maps for Tolka River are available, within 1 year of making this Development Plan.
Objective IUO21 – Precautionary Principle in OPW Guidelines	Require all developments in the County to be designed and constructed in accordance with the 'Precautionary Principle' as detailed in the OPW Guidelines and to minimise the flood risk in Fingal from all potential sources of flooding as far as is practicable, including coastal, pluvial, fluvial, reservoirs and dams, and the piped water system.
Objective IUO22 – Flood Alleviation Measures	Support and facilitate the provision of new or upgrading of existing flood alleviation measures where appropriate.
Objective IUO23 – Protection of Rivers, Streams and Watercourses	Ensure that where flood protection or alleviation works take place that the natural and cultural heritage of rivers, streams and watercourses are protected and enhanced to the greatest extent possible.
Objective IUO24 – Cross-Boundary Flood Management	Work with neighbouring Local Authorities when developing cross-boundary flood management work programmes and when considering cross-boundary development.

3. Flood Risk Assessment

The Flood Risk Guidelines (DEHLG and OPW 2009) outline the key principles that should be used for assessing flood risk to the Proposed Development. Planning authorities (both elected members and officials) must implement these Flood Risk Guidelines in ensuring that, where relevant, flood risk is a key consideration in preparing development plans and local area plans and in the assessment of planning applications. These Flood Risk Guidelines are being issued by the Minister of the Environment, Heritage and Local Government

under Section 28 of Number 30 of 2000 – Planning and Development Act, 2000 (as amended). Planning authorities and An Bord Pleanála are required to have regard to the Flood Risk Guidelines in carrying out their functions under the Planning Acts. These Flood Risk Guidelines supersede previous interim guidance on flooding in Appendix E to the Development Plan Guidelines in 2007.

The core objectives of the Flood Risk Guidelines are to:

- Avoid inappropriate development in areas at risk of flooding;
- Avoid new developments increasing flood risk elsewhere, including that which may arise from surface water runoff;
- Ensure effective management of residual risks for development permitted in floodplains;
- Avoid unnecessary restriction of national, regional or local economic and social growth;
- Improve the understanding of flood risk among relevant stakeholders; and
- Ensure that the requirements of EU and national law in relation to the natural environment and nature conservation are complied with at all stages of flood risk management.

The assessment of flood risk requires an understanding of where the water comes from (i.e. the source), how and where it flows (i.e. the pathways) and the people and assets affected by it (i.e. the receptors). All three elements must be examined as part of the FRA including the vulnerability and exposure of receptors to determine its potential consequences. The planning process is primarily concerned with the location of receptors, taking appropriate account of potential sources and pathways that might put those receptors at risk. The Flood Risk Guidelines recommend that a staged approach should be adopted.

The stages of appraisal and assessment are as follows:

- **Stage 1: Flood risk identification** – This stage identifies any issues (flooding or surface water management) related to the Proposed Development;
- **Stage 2: Initial flood risk assessment** – This stage seeks to confirm the sources of flooding identified in Stage 1. All existing information is reviewed in detail and extent of the flood risk associated with the Proposed Development established; and
- **Stage 3: Detailed flood risk assessment** – Where required, this stage will assess flood risk issues in sufficient detail to provide a quantitative appraisal of potential flood risk to a new or existing development, of its potential impacts on flood risk elsewhere and of the effectiveness of any Proposed mitigation measures. This will typically involve use of an existing or construction of a hydraulic model across a wide enough area to appreciate the catchment wide impacts and hydrological process involved.

Due to the nature, design, and location of the Proposed Development, this FRA will progress up to Stage 2, as there are no specific locations or elements of the design that require a detailed flood risk analysis.

3.1 Flood Zones

Flood zones are geographical areas within which the likelihood of flooding is in a particular range, and they are a key tool in flood risk management within the planning process as well as in flood warning and emergency planning. The Flood Risk Guidelines (DEHLG and OPW 2009) define the following three flood zones:

- **Flood Zone A** – Where the probability of flooding from rivers and the sea is highest (greater than 1% annually or 1 in 100 years for river flooding or 0.5% annually or 1 in 200 years for coastal flooding). Development in this zone should be avoided and/or only considered in exceptional circumstances, such as essential infrastructure that cannot be located elsewhere, and where the Justification Test has been applied;
- **Flood Zone B** - Where the probability of flooding from rivers and the sea is moderate (between 0.1% or 1 in 1000 years and 1% annually or 1 in 100 for river flooding and between 0.1% annually or 1 in 1000 years and 0.5% annually or 1 in 200 for coastal flooding); and

- **Flood Zone C** – Where the probability of flooding from rivers and the sea is low (less than 0.1% annually or 1 in 1000 years for both river and coastal flooding (Flood Zone C covers all areas of the plan that are not in zones A or B). Development in this zone is appropriate from a flood risk perspective (subject to assessment of flood hazard from sources other than rivers and the coast) but would need to meet the normal range of other proper planning and sustainable development considerations.

These flood zones are used to assess the suitability of the location for a Proposed Development with respect to its vulnerability to flooding.

Furthermore, climate change is expected to increase flood risk. It could lead to more frequent flooding and increase the depth and extent of flooding. Due to the uncertainty surrounding the potential effects of climate change a precautionary approach is recommended to:

- Recognise that significant changes in the flood extent may result from an increase in rainfall or tide events and accordingly adopt a cautious approach to zoning land in these potential transitional areas;
- Ensure that the levels of structures designed to protect against flooding, such as flood defences, land raising or raised floor levels are sufficient to cope with the effects of climate change over the lifetime of the development they are designed to protect; and
- Ensure that structures to protect against flooding and the development protected are capable of adaptation to the effects of climate change when there is more certainty about the effects and still time for such adaptation to be effective.

3.2 Vulnerability of the Proposed Development

The vulnerability of a development to flooding depends on the nature of the development, its occupation and the construction methods used. The classification of different land uses and types of development as highly vulnerable, less vulnerable and water-compatible is influenced primarily by the ability to manage the safety of people in flood events and the long-term implications for recovery of the function and structure of buildings. The vulnerability of the Proposed Development is high given it will be located underground and is considered to be critical infrastructure. The Proposed Development would be more likely to be at risk of flooding during the Construction Phase, due to its exposure at the surface.

With reference to Section 3.1 of the Flood Risk Guidelines (DEHLG and OPW 2009), the Proposed Development is assessed as "*essential infrastructure as electricity generating power stations and substations*" and therefore, classed as a "*highly vulnerable development*".

The Flood Risk Guidelines require that a Justification Test be completed for any highly vulnerable developments that are located within Flood Zone A or Flood Zone B, and this would include elements of the Proposed Development, specifically in the crossing with different watercourses.

4. Stage 1: Flood Risk Identification

4.1 Historic Flood Events

The OPW National Flood Hazard Mapping website (OPW 2024) was used to any identify historical flooding in the area of the Proposed Development. Image 4.1 below indicates a number of past and reoccurring floods in the area, at Dunboyne, Black Bull, Piercetown, Kilbridge, Coolquay Ward Road, and Stockhole Lane respectively. The available information and approximate distance from the Proposed Development for each historic flood is presented in Table 4.1.

Table 4.1: Flood Events Identified On or Near the Proposed Development

Location	Approximate Chainage	Type	Date	Description
1. Tolka Dunboyne – approx. 700m south-east of route	11,500	Fluvial – River Tolka	Nov 2000	River Tolka flood event. 
2. Tolka Woodpark, Black Bull Br to Pace – approx. 1km north-west of route	13,500	Fluvial – River Tolka	Recurring	Woodpark, Black Bull Bridge to Pace – Flood plain of River Tolka. Extensive area after heavy rain.
3. Piercetown Black Bull – approx. 1.2km north-west of route	13,500	Fluvial – River Tolka tributary	Recurring annually	Piercetown – Stream overflows its banks and floods road after heavy rain every year. One property is affected.
4. Kilbridge – on Proposed Development route	19,600	Unknown – possibly fluvial	Recurring annually	Blocked drains and floods every year after heavy rain.
5. N2 at Coolquay Ward Road – approx. 1.5km north of route	24,200	Unknown – possibly pluvial	Nov 2000	Road and property flooding.
6. Stockhole Lane (near Airport) – approx. 350m west of route	35,700	Pluvial - Low lying lands	Recurring	Road flooding

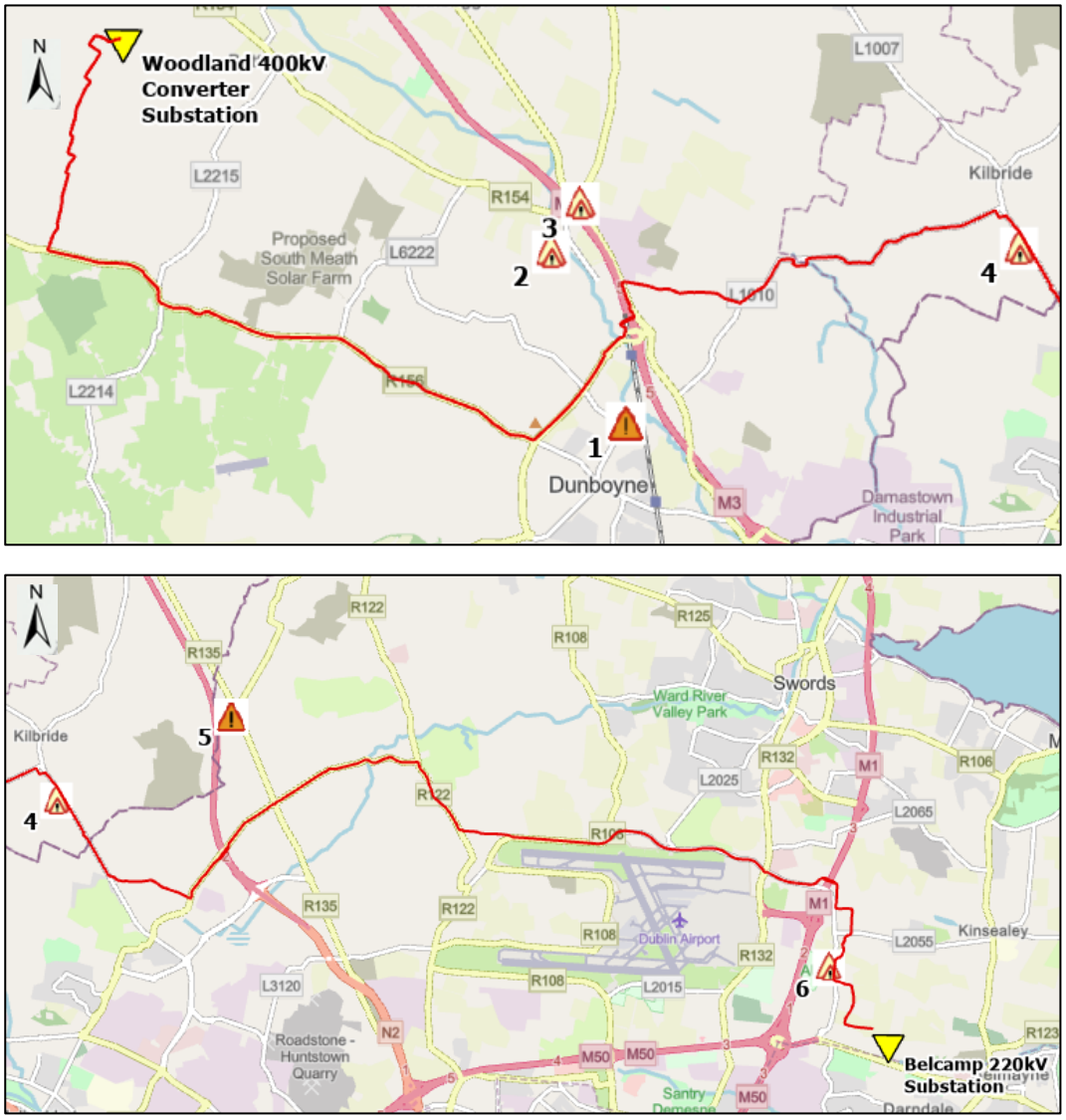

Image 4.1: Extract of Past Flood Events Near the Proposed Development. Source: OPW National Flood Hazard Mapping website (OPW 2024)

4.2 Nearby Watercourses and Notable Crossings

The Environmental Protection Agency (EPA) maintain data of watercourses throughout Ireland. The Proposed Development will cross a number a rivers and streams along its route, a summary of those to be crossed is available below, together with the proposed method of crossing (see Table 4.2).

Table 4.2: Proposed Watercourse Crossings Along the Proposed Development

Code	Waterbody Name (EPA)	Approximate Chainage	Proposed Crossing
WB01	Dunboyne Stream	2,165	Open Cut Trenching
WB02	Dunboyne Stream	10,805	Within Road Structure
WB03	Naulswood	11,640	Within Road Structure
WB04	Tolka	12,540	Open Cut Trenching
WB05	Pinkeen	16,340	Open Cut Trenching
WB06	Ward	14,750	Within Road Structure
WB07	Ballymacoll Little	18,155	Within Road Structure
WB08	Ward	18,200	Open Cut Trenching
WB09	Ward	19,235	Open Cut Trenching
WB10	Priest Town	20,460	Open Cut Trenching
WB11	Court 08	20,640	Open Cut Trenching
WB12	Gallanstown	20,855	Within Road Structure
WB13	Ward	23,635	Open Cut Trenching
WB14	Ward	24,750	Within Road Structure
WB15	Shallon	26,190	Open Cut Trenching
WB16	Huntstown 08	28,350	Open Cut Trenching
WB17	Barberstown 08	29,285	Within Road Structure
WB18	Ward	29,900	Within Road Structure
WB19	Sluice	30,435	Within Road Structure
WB20	Sluice	31,785	Within Road Structure
WB21	N/A	35,150	Open Cut Trenching
WB22	N/A	35,950	Open Cut Trenching
WB23	Cuckoo Stream	36,820	Open Cut Trenching

Of these, the most notable crossings for the Proposed Development are:

- River Tolka (WB04) – open cut trenching; and
- Sluice River (WB19 and WB20) – within road structure.

4.3 OPW PFRA and CFRAM Study Mapping

4.3.1 Fluvial & Coastal Flood Risk

The present-day fluvial and coastal flood risk in the area of the Proposed Development was assessed against the OPW Preliminary Flood Risk Assessment Study (PFRA) Eastern Catchment Flood Risk Assessment and Management (CFRAM) Study. The Eastern CFRAM Study and PFRA Flood Extent and Depth Maps for Coastal Flood Risk are available online (OPW 2024). Image 4.3 shows the Proposed Development is largely not at risk of fluvial flooding from these river crossings, as the Proposed Development will be running underground. The only watercourse crossing which could be subject to fluvial flood risk is located at approximate Chainage 10,805 with Dunboyne Stream, where there is a permanent access track which runs parallel to the proposed cable route (Image 4.2).

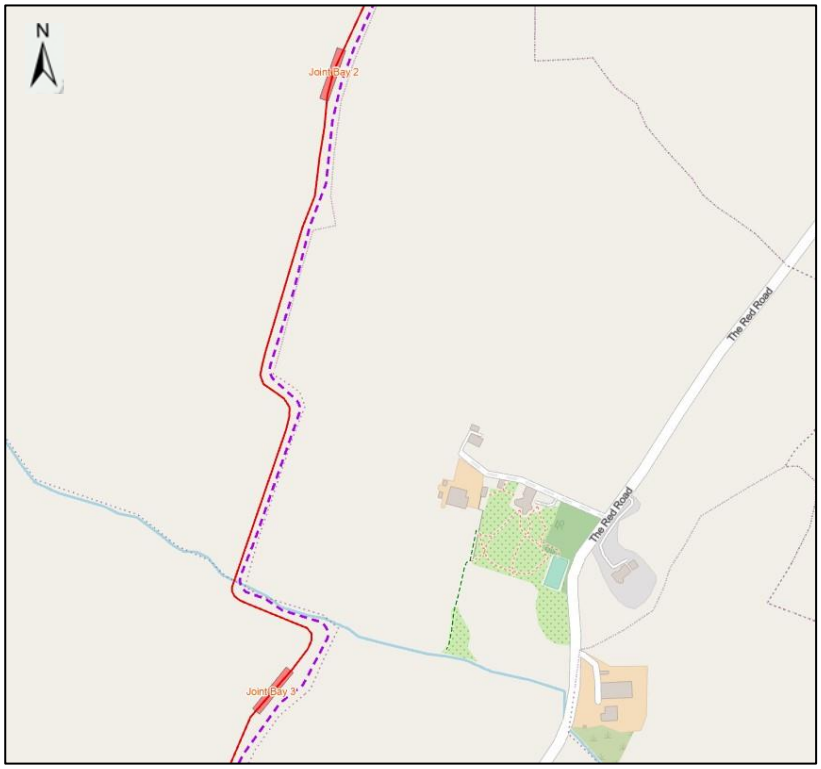

Image 4.2: Permanent Access Track which Intersects Dunboyne Stream

In locations where detailed CFRAM maps are not available, PFRA mapping is used supplementarily (see Image 4.6).

The Proposed Development will be located approximately 6km west of the coast at an elevation of approximately 40-100m AOD (metres above Ordnance Datum). Therefore, the Proposed Development is not at risk of coastal flooding.

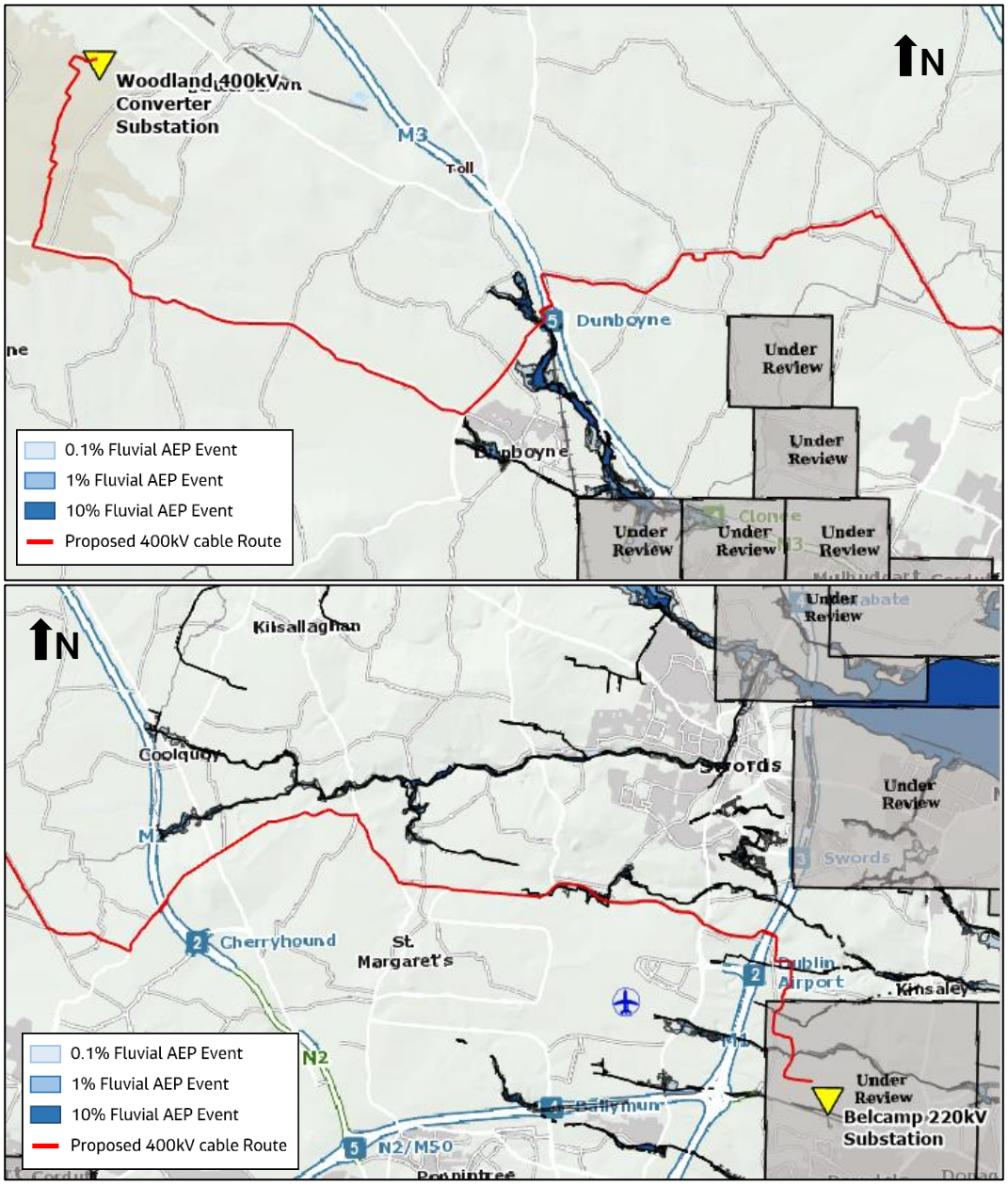

Image 4.3: Extract of Fluvial Flood Mapping from Eastern CFRAM Study for the Proposed Development, from Woodland Substation to Belcamp Substation (OPW 2024)

Of all the watercourse crossings detailed above, some will be located in flood risk areas and are presented in more detail below.

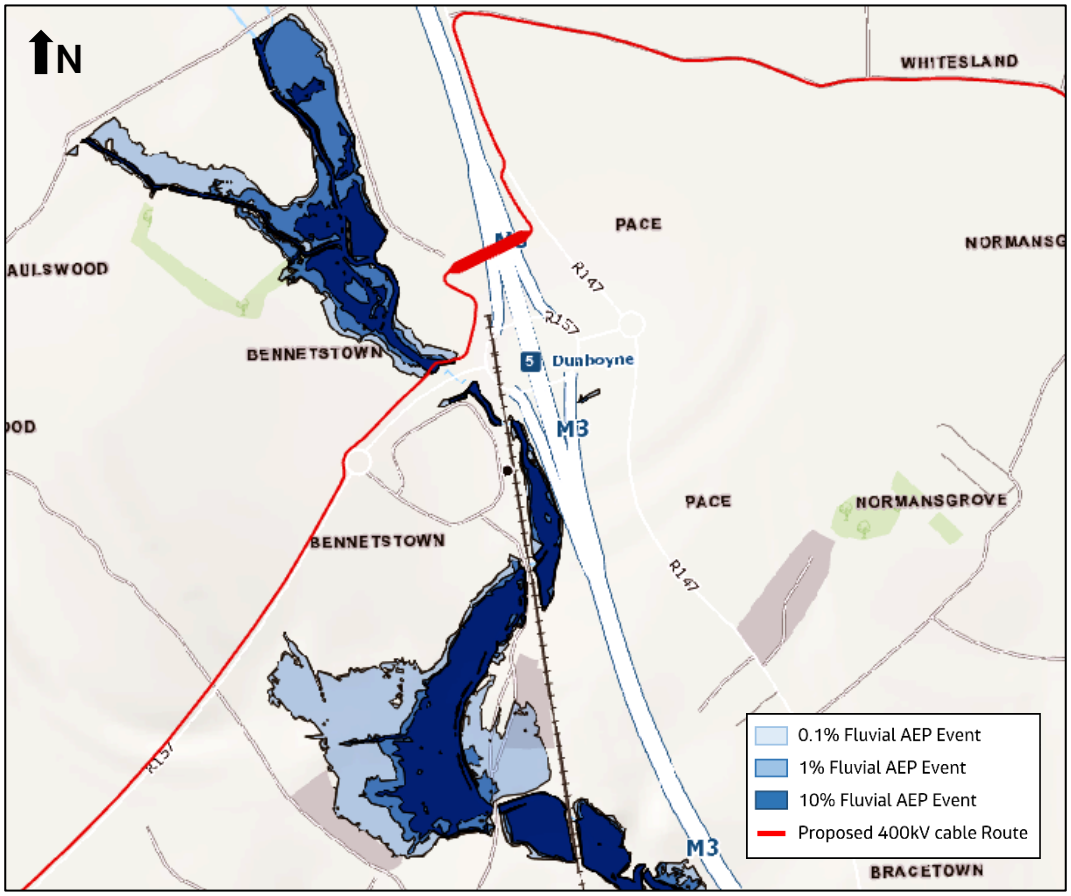

Image 4.4: Extract of CFRAM Fluvial Flood Mapping on Crossing with River Tolka (WB04)

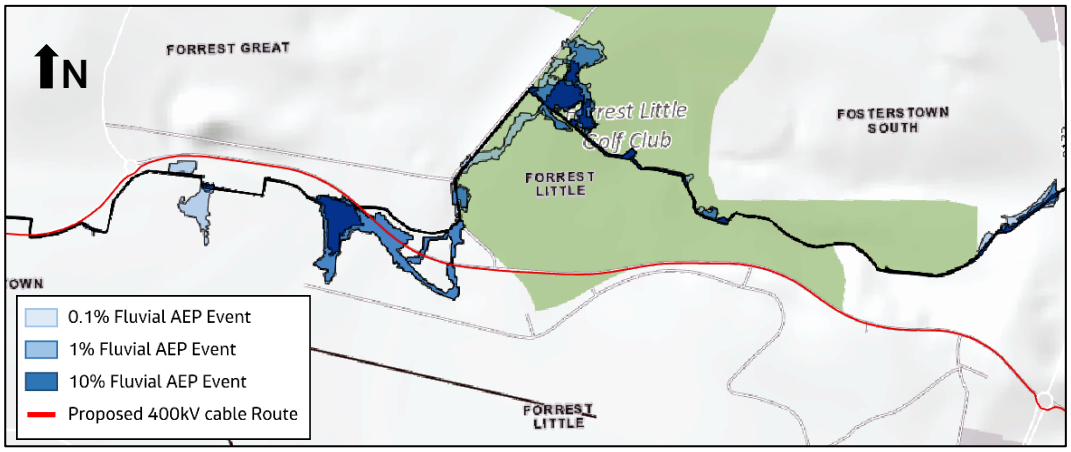

Image 4.5: Extract of CFRAM Fluvial Flood Mapping on Crossing with Sluice River (WB15 and WB16)

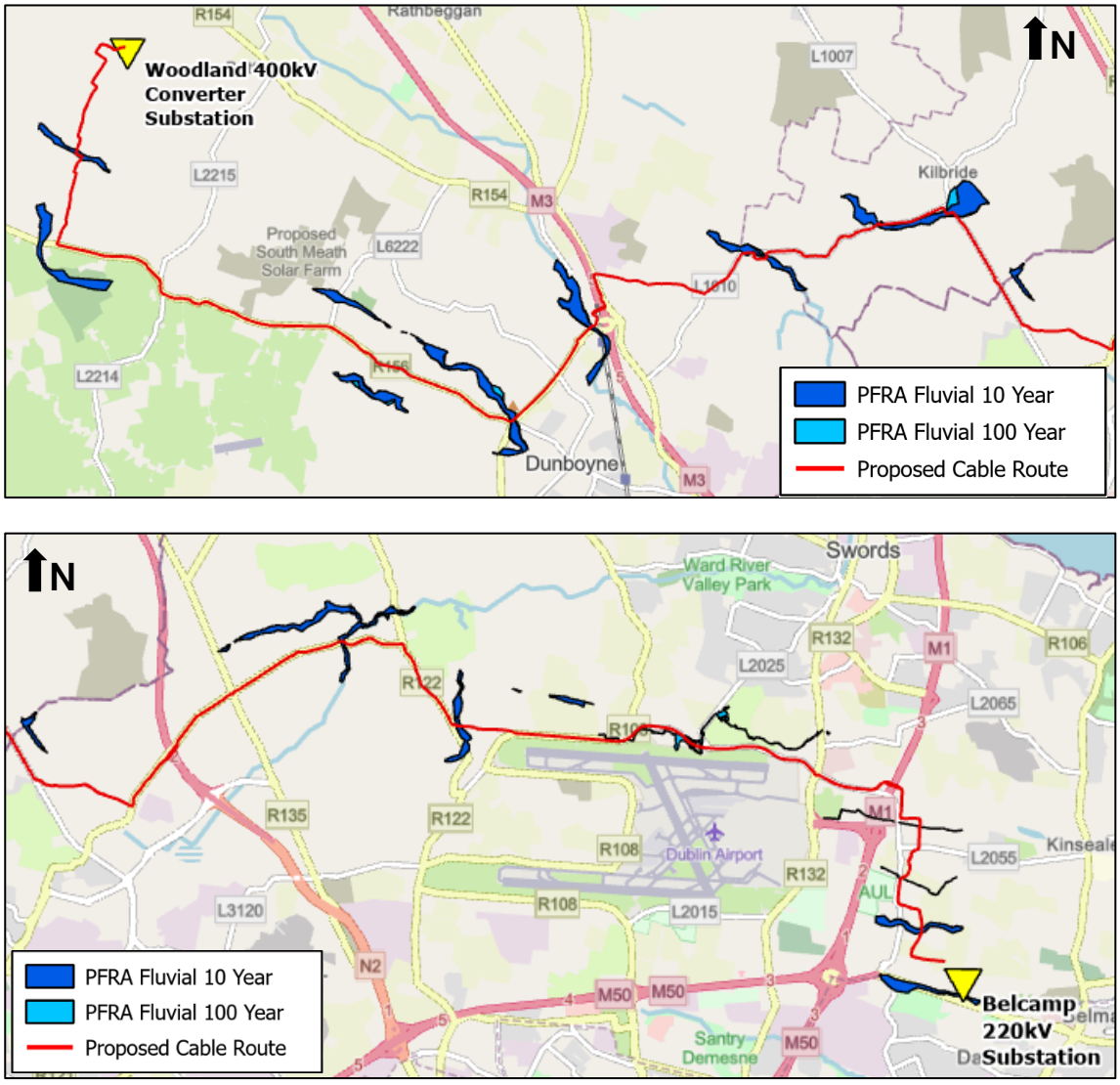

Image 4.6: Extract of Preliminary Flood Risk Assessment PFRA Study for the Proposed Development, from Woodland Substation to Belcamp Substation.

4.3.2 Rainfall / Pluvial Flood Risk

Pluvial flooding occurs during periods of heavy rainfall, when the rainfall rate is greater than the infiltration capacity. It is usually associated with high intensity rainfall events (typically >30mm/h) resulting in overland flow and ponding in depressions in the topography. In urban situations underground sewerage / drainage systems and surface watercourses may be completely overwhelmed.

Pluvial flood extents are available for areas of County Dublin and County Meath and provide an indication of the level of risk. The flood mapping considered flood risk in 10%, 1% and 0.5% Annual Exceedance Probability (AEP) rainfall events. The rainfall flood extents at the area of interest were reviewed using a QGIS shapefile, based on data from the OPW Flood info website (OPW 2024), as well as an extract of PFRA pluvial mapping.

There is a low risk of pluvial flooding to the Proposed Development overall based on the available pluvial mapping. However, there are a few areas where the Proposed Development will cross pluvial flood zones (see Table 4.3 and Image 4.6 to Image 4.11 for details).

Table 4.3: Locations of Possible Pluvial Flood Risk Along the Proposed Cable Route.

Approximate Chainages	Location / Description
350	Close to Woodland Substation
13,250	Along M3 at Dunboyne
14,750 – 15,050	At Portmanna
22,200	At Hollystown
28,700	Close to Kingstown

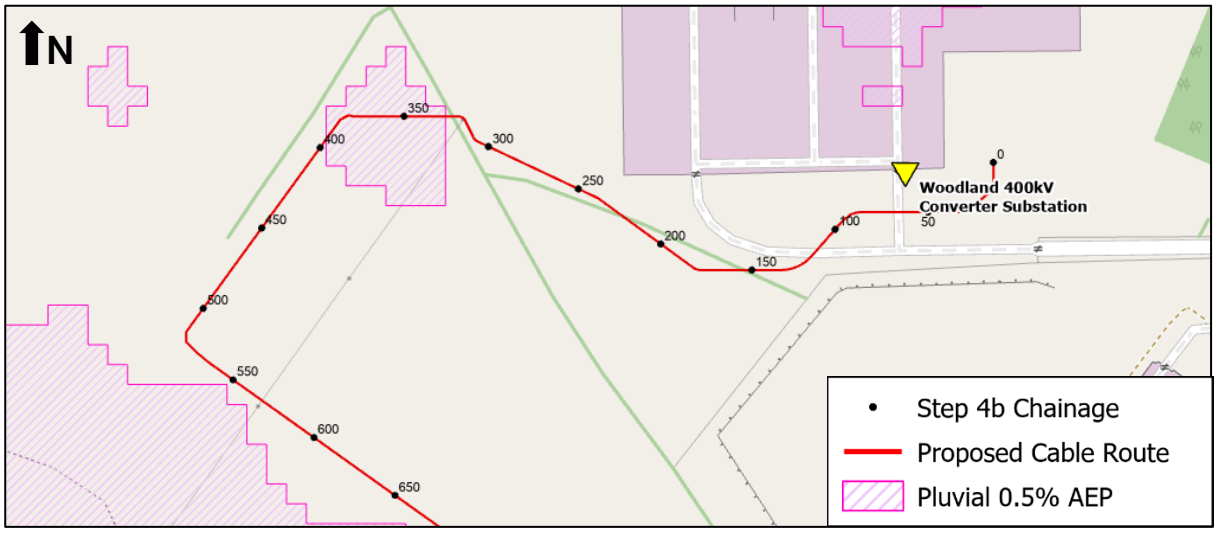

Image 4.7: Extract of Pluvial PFRA Mapping (0.5% AEP) along the Proposed Development (Chainage 350).

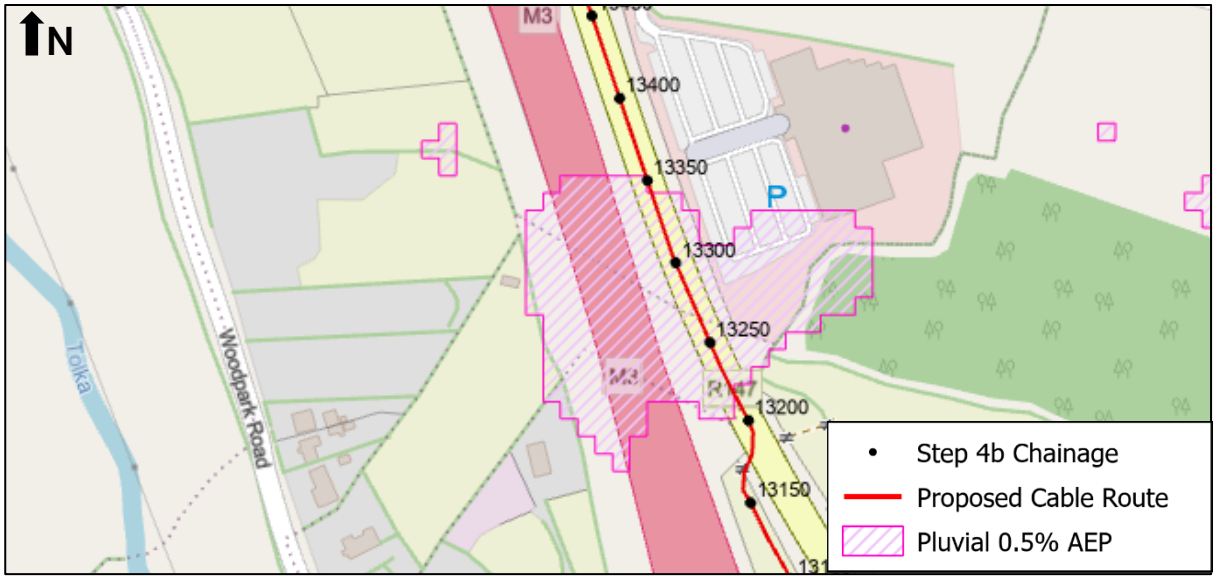

Image 4.8: Extract of Pluvial PFRA Mapping (0.5% AEP) along the Proposed Development (Chainage 13,250).

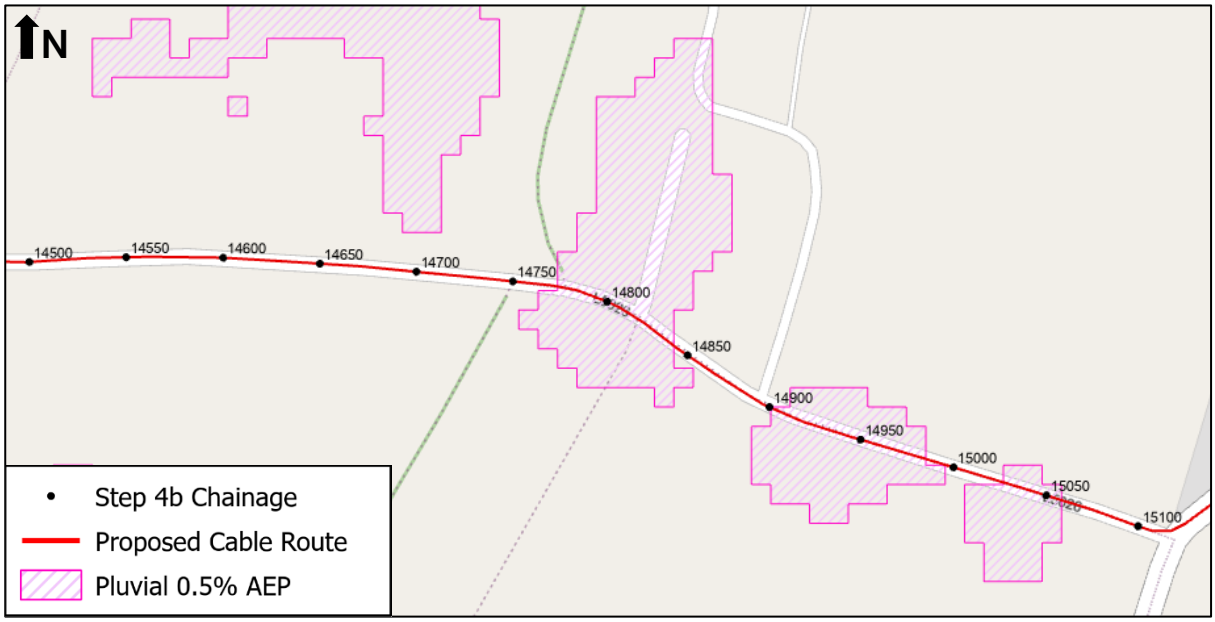

Image 4.9: Extract of Pluvial PFRA Mapping (0.5% AEP) along the Proposed Development (Chainage 14,750 to Chainage 15,050).

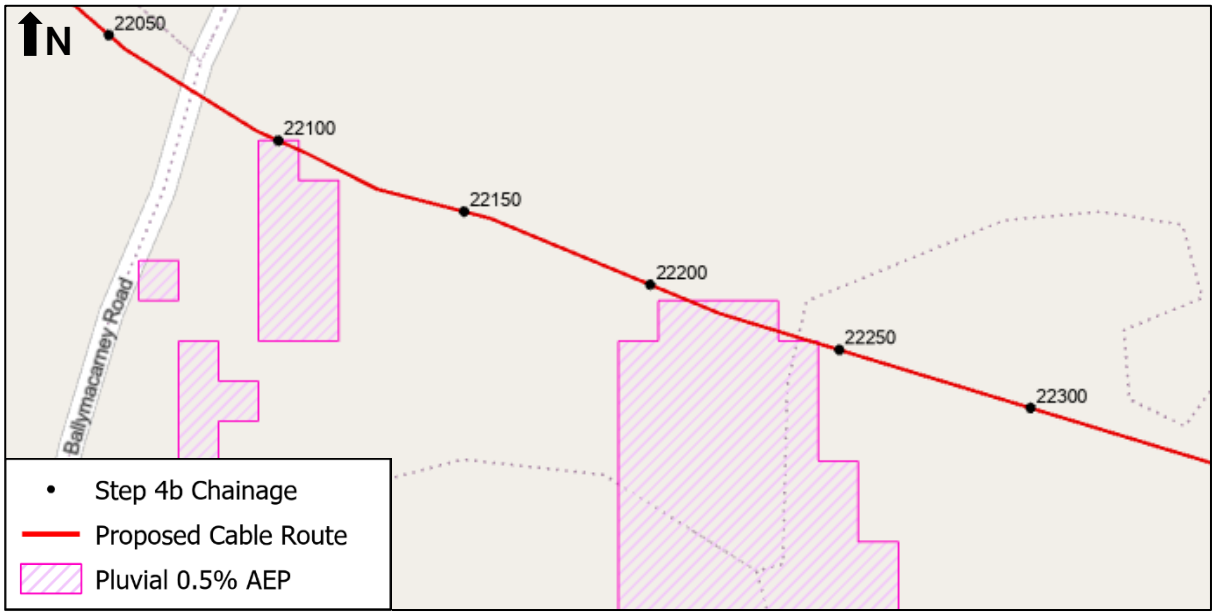

Image 4.10: Extract of Pluvial PFRA Mapping (0.5% AEP) along the Proposed Development (Chainage 22,200).

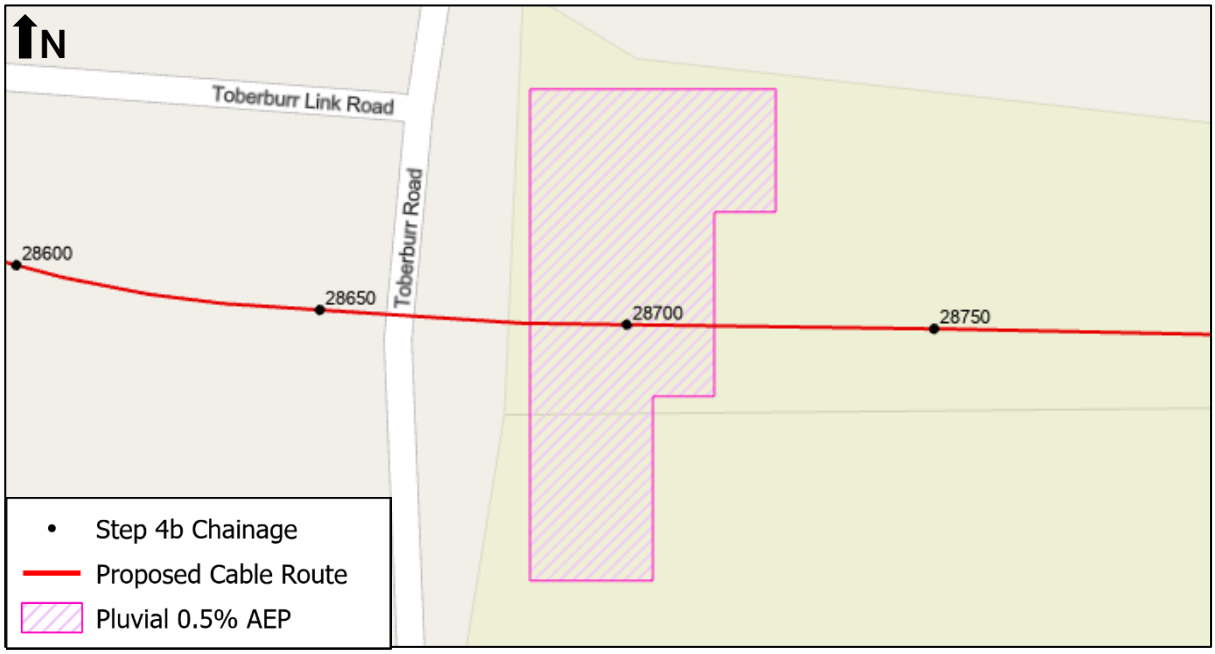

Image 4.11: Extract of Pluvial PFRA Mapping (0.5% AEP) along the Proposed Development (Chainage 28,700).

4.4 National Indicative Fluvial Mapping (NIFM)

The National Indicative Flood Mapping (NIFM) data (OPW 2024) was produced for all catchments greater than 5km^2 (squared kilometres) that were not covered by the National CFRAM Programme. The images presented below are extracted from maps available online (OPW 2024).

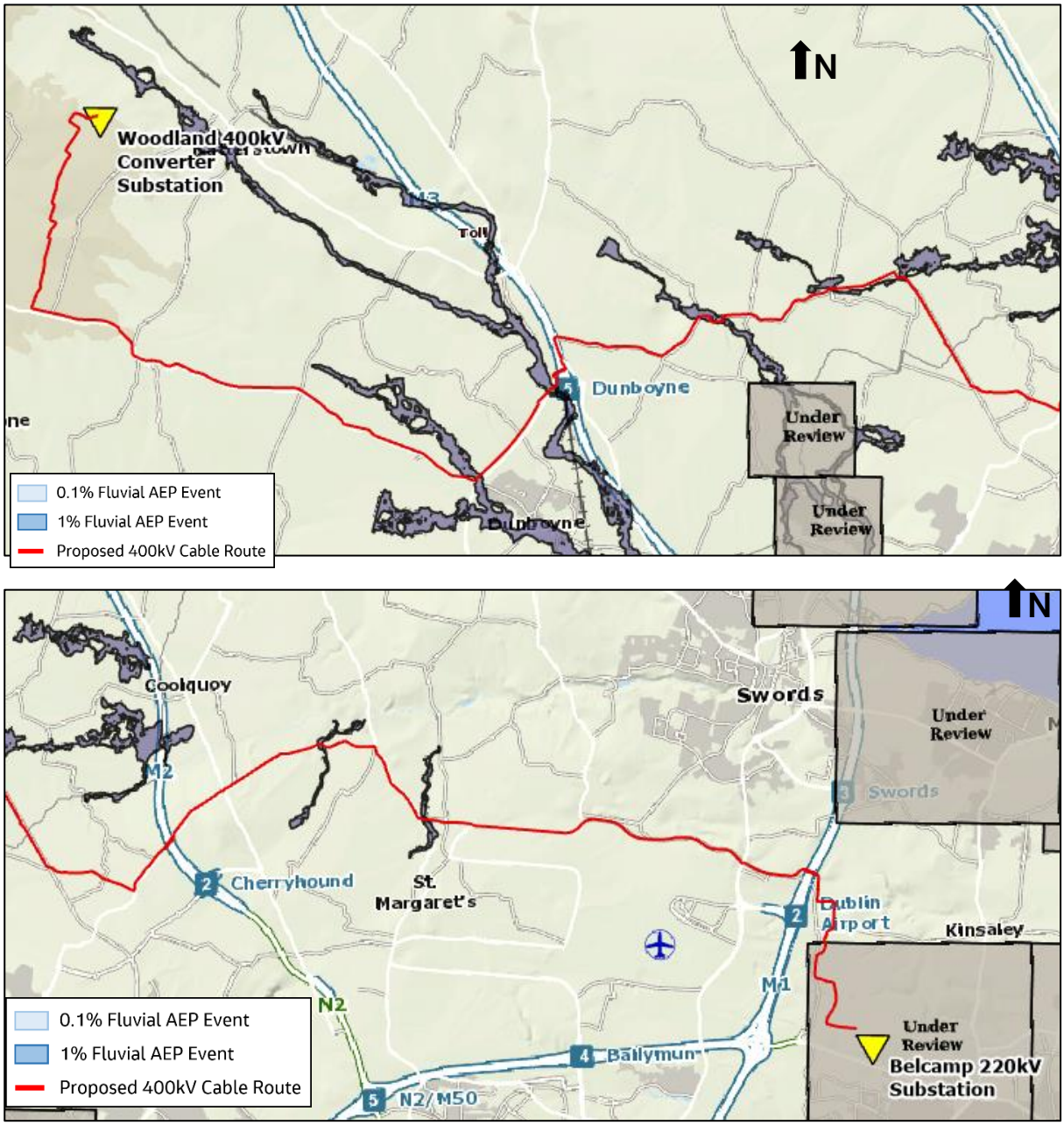

Image 4.12: Extract of Fluvial Flood Mapping from NIFM for the Proposed Development, from Woodland Substation to Belcamp Substation.

As shown in Image 4.12, the risk of fluvial flooding to the Proposed Development is generally low. In some key areas where watercourses identified by the NIFM will be crossed, the Proposed Development will cross within the 0.1% and 1% AEP fluvial flood risk areas. As the Proposed Development will be underground, there is a low risk of flooding at these areas only during construction (refer to Stage 2 of this FRA in Section 6.7 for proposed mitigation measures).

4.5 Groundwater Flood Risk

Groundwater flooding occurs when the level of water stored in the ground rises as a result of prolonged rainfall to meet the ground surface and flows out over it (i.e., when the capacity of this underground reservoir is exceeded). Groundwater flooding tends to be very local and results from interactions of site-specific factors such as tidal variations. While water levels may rise slowly, it may be in place for extended periods of time.

Hence, such flooding may often result in significant damage to property rather than be a potential risk to life. The OPW National Flood Hazard Mapping website (OPW 2024) was used to assess the risk of groundwater flooding. Based on the OPW groundwater maps, there is no risk of groundwater flooding to the Proposed Development.

Regarding potential seepage of groundwater into the proposed open cut trenching during construction, existing groundwater protection scheme report for County Meath (Geological Survey Ireland (GSI) 2018) reveals no significant shallow deposits of groundwater in the area of the Proposed Development. Local borehole testing would reveal the water table level and any potential seepage. Furthermore, GSI maps (GSI 2024) reveal soil permeability along the Proposed Development. As shown in Image 4.13, soil permeability is generally "Low" around all the area of the Proposed Development.

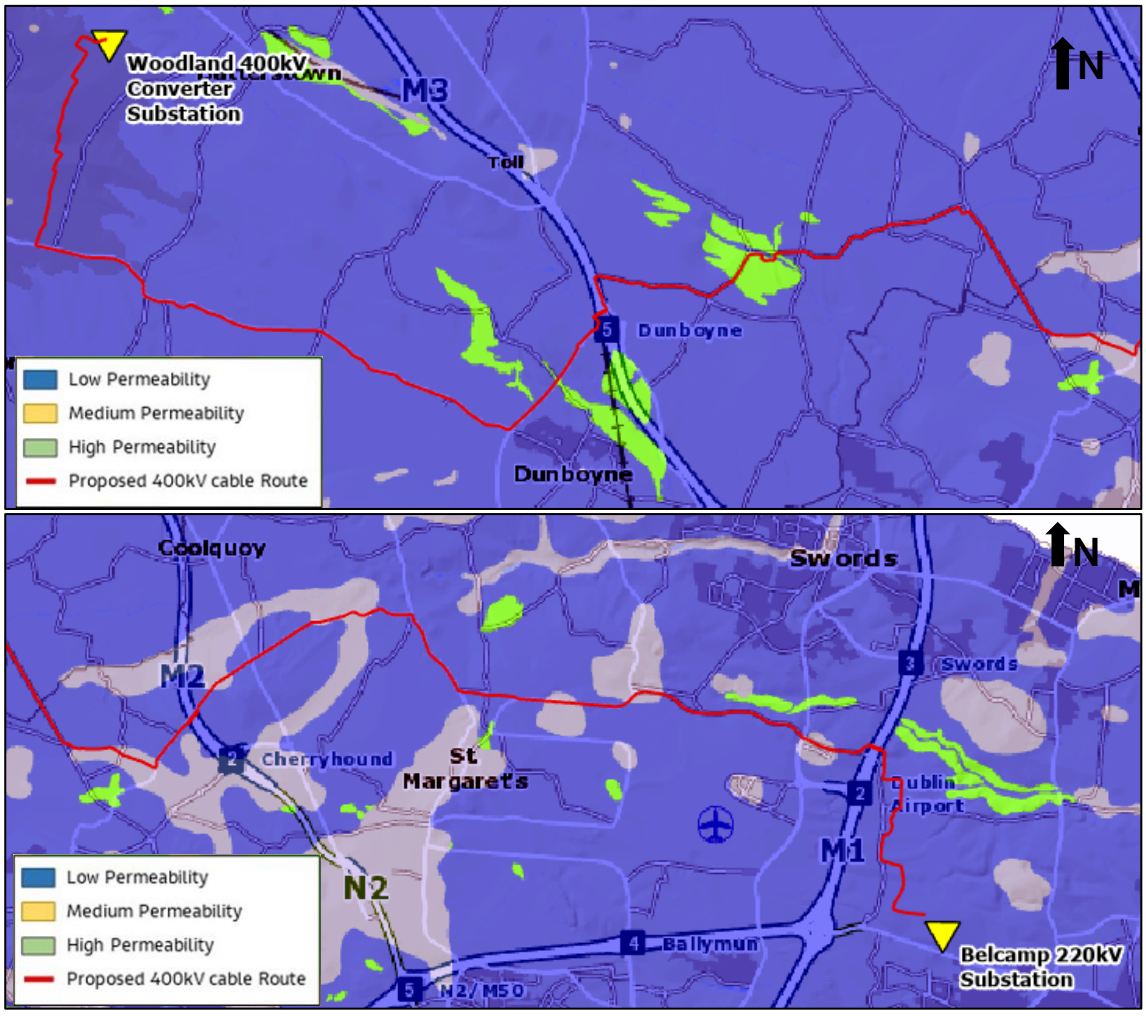

Image 4.13: Extract of Subsoil Permeability Mapping from the GSI Groundwater Data Viewer Mapping at the Proposed Development and Surrounding Area (GSI 2024).

In the event that groundwater seepage into the trenching of the Proposed Development is detected, potential mitigation measures that will be implemented are detailed below:

- Dewatering: This method involves pumping out groundwater from the trench, with the aim of lowering the water table and allow for a dry working area. This will be achieved by creating local well points around the trench and extracting the groundwater using pumps; and
- Trench boxes: Trench boxes are metal or plastic structures placed in the open cut trench to support it and prevent collapse by creating a water tight seal around its perimeter. However,

this method also increases water pressure on the sides of the trench, so dewatering must be carried out first.

4.6 Strategic Flood Risk Assessments (SFRA)

4.6.1 SFRA for Meath County Development Plan

As mentioned in Section 2.4, JBA Consulting was commissioned by Meath County Council in November 2011 to undertake a SFRA. This study informed the MCDP (MCC 2021). As depicted in Image 4.14, the majority of the Proposed Development will be located in Flood Zone C (as defined in Section 3.1), except for local crossings with Flood Zone B and A sites.

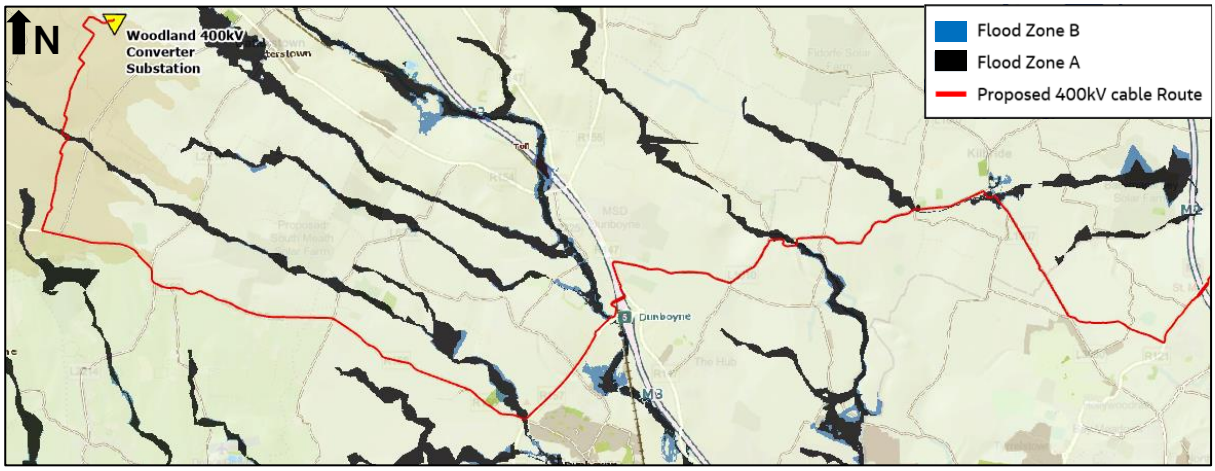

Image 4.14: Extract of Flood Zones A and B from MCDP (MCC 2021)

4.6.2 SFRA for Fingal Development Plan

As outlined in Section 2.5, the SFRA of Fingal has been carried out to support the Strategic Environmental Assessment of the FDP (FCC 2023). The assessment was carried out in accordance with the requirements of the Flood Risk Management Guidelines (DEHLG and OPW 2009) and the WFD. This study informed the FDP for the period of 2023 to 2029.

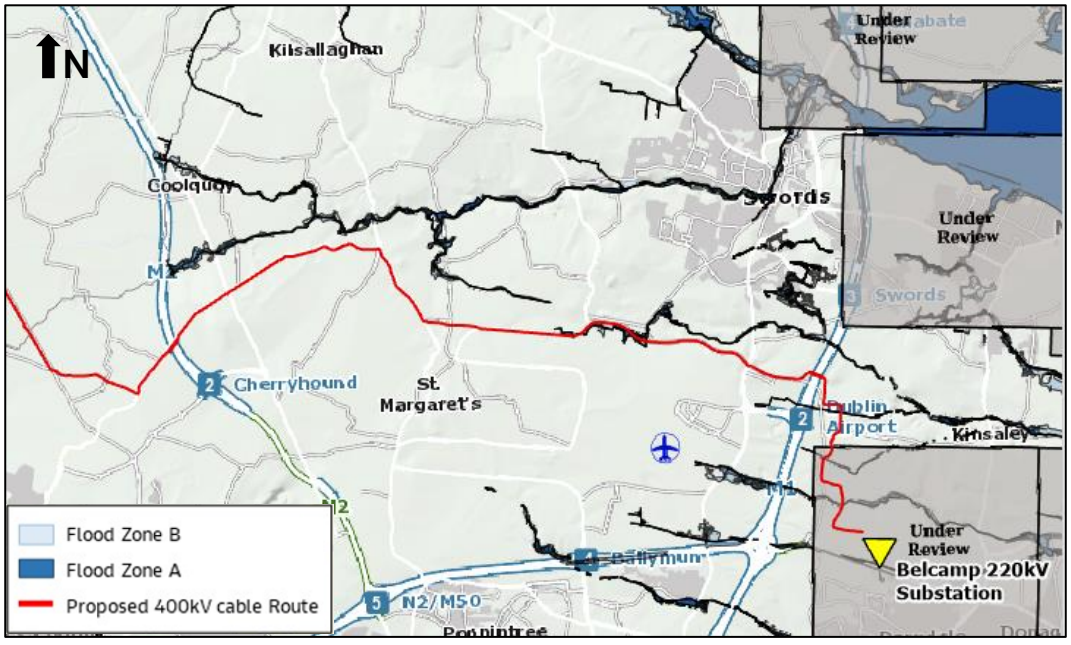

Image 4.15: Extract of Flood Zones A and B for Fingal from OPW (OPW 2024)

As depicted in Image 4.15, the majority of the Proposed Development will be located in Flood Zone C (as defined in Section 3.1), except for local crossings with Flood Zone B and A sites.

5. Stage 2: Initial Flood Risk Assessment

This Section assesses the risk of flooding to the Proposed Development once the works are complete from a range of different sources, which is then used to develop a broader understanding of the risk characteristics to the Proposed Development.

5.1 Potential Sources of Flooding

Based on the online information provided by the OPW (OPW 2024), the Stage 1 assessment identified a low risk for fluvial and pluvial flooding in certain locations. These have been identified from available mapping in Stage 1, and further mitigation measures, where necessary, are proposed. There is no known risk for coastal or groundwater flooding.

5.2 Artificial Drainage Systems

Care must be taken during construction, so that the Proposed Development does not impact surface water or artificial drainage systems following construction. The 400kV proposed cable circuit will be laid at a lower depth (approximately 1.3m (metres) in the public road and 1.8m in private lands) than that expected for drainage systems (0.7m to 1.2m), so chances of crossing with the existing networks are low. However, there is risk of undermining existing drainage infrastructure when trenching for the Proposed Development, therefore care must be taken to maintain appropriate clearance levels.

5.3 Flood Risk due to Climate Change

Future climate change is predicted to give rise to an increased risk of flooding through rising sea levels and an increase in river flows and the frequency and intensity of extreme rainfall. The OPW has identified two potential scenarios for the impacts of climate change that are known as the Mid-Range Future Scenario (MRFS) and High-End Future Scenario (HEFS).

Table 5.1 summarises the predicted impacts of both scenarios on predicted sea levels, river flows and rainfall depths over the next 100-years.

Table 5.1: Climate Change Forecast

Parameter	Mid-range Future Scenario (MRFS)	High-End Future Scenario (HRFS)
Mean Sea Level Rise	+500mm	+1000mm
River Flows	+20%	+30%
Extreme Rainfall Depths	+20%	+30%

The MRFS scenario is intended to represent the 'likely' future scenario based on a range of forecasts. The HEFS represents a more extreme forecast that is at the upper end of accepted projections.

Fluvial flood extent maps for the CFRAM and NIFM future scenarios are available below.

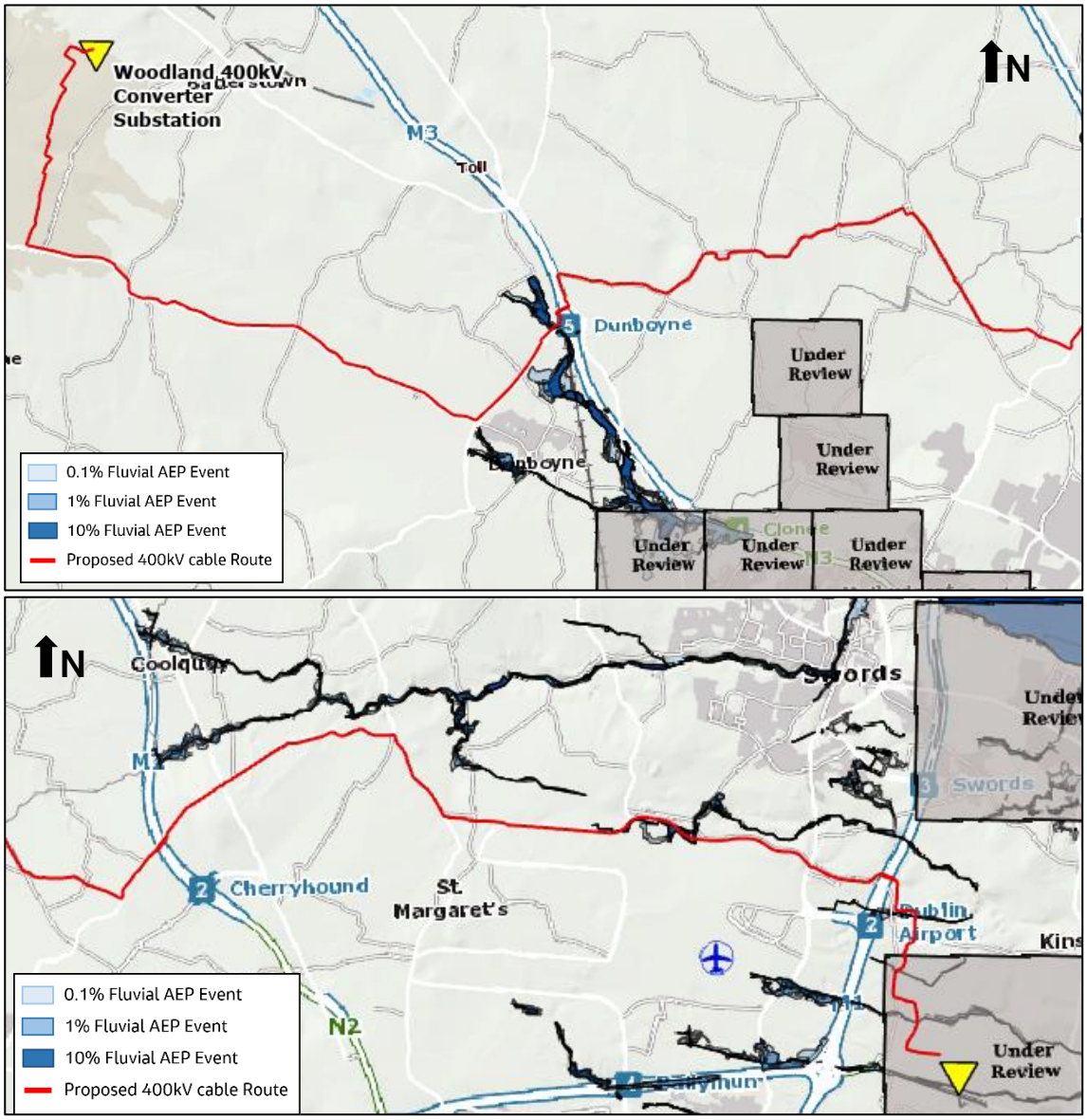

Image 5.1: Extract from CFRAM Study Fluvial Flood Mapping, Mid-Range Future Scenario, Woodland Substation to Belcamp Substation (OPW 2024)

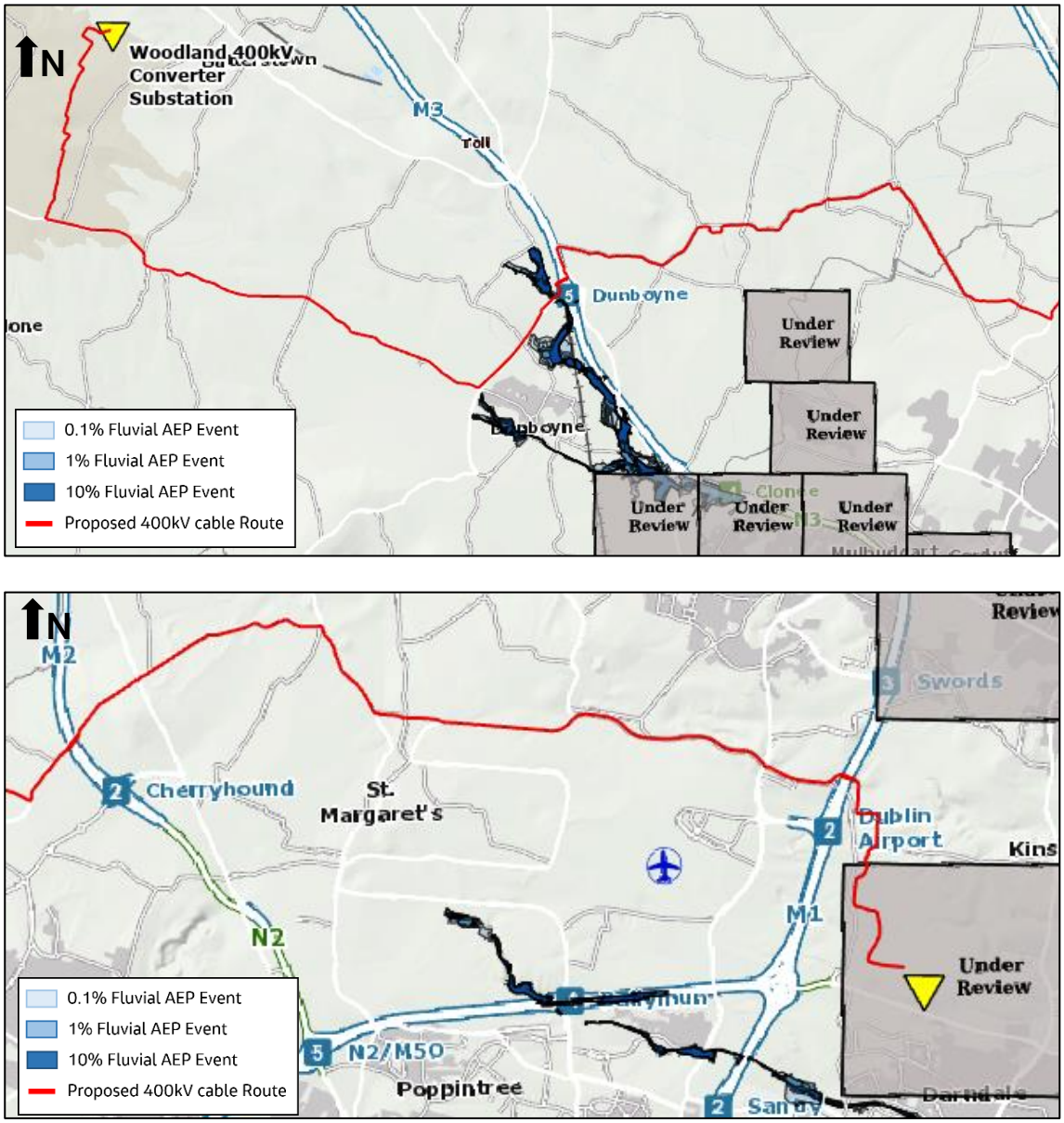

Image 5.2: Extract from CFRAM Study Fluvial Flood Mapping, High-End Future Scenario, Woodland Substation to Belcamp Substation (OPW 2024)

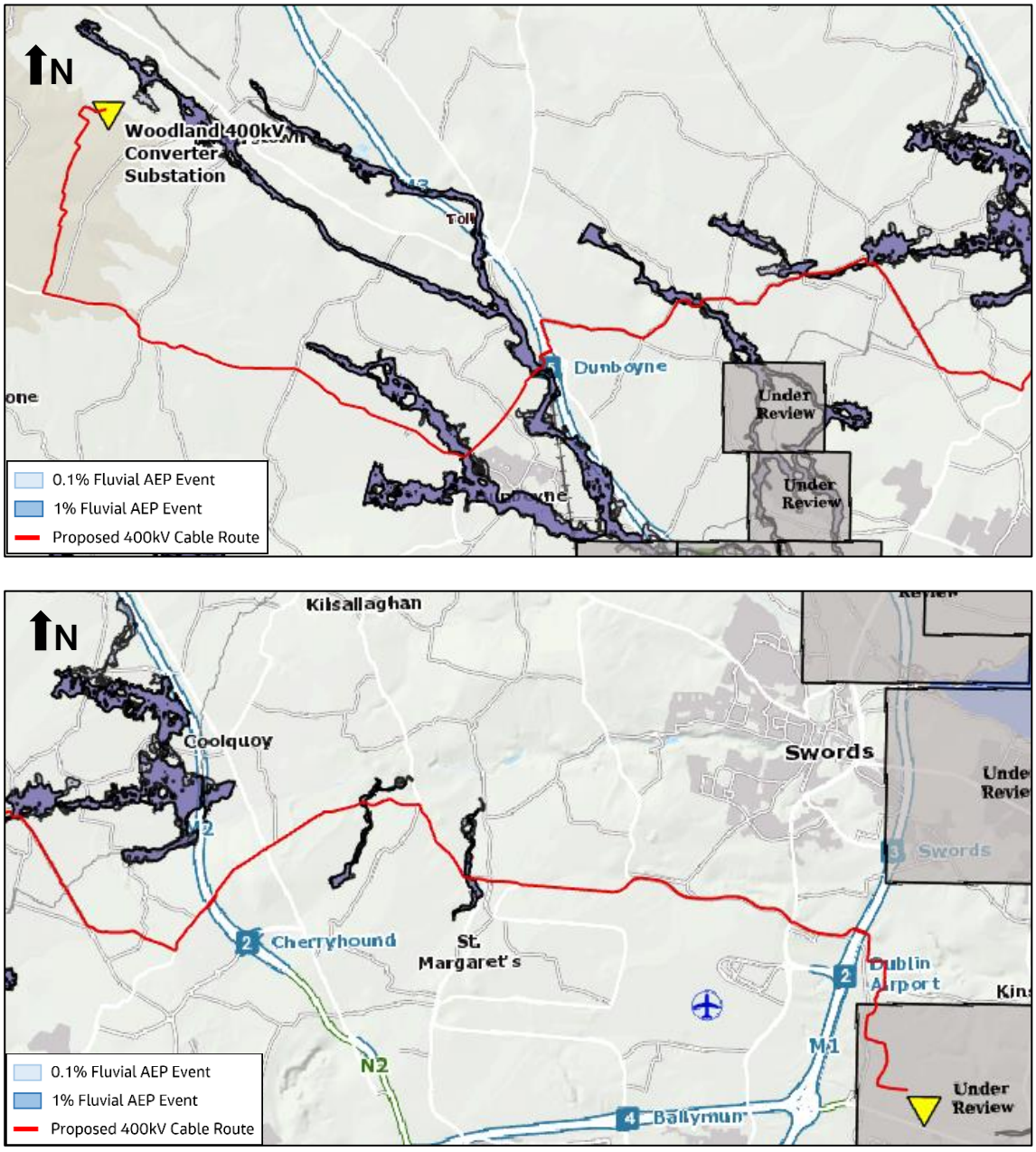

Image 5.3: Extract from NIFM Flood Extents for the Mid-Range Future Scenario (OPW 2024)

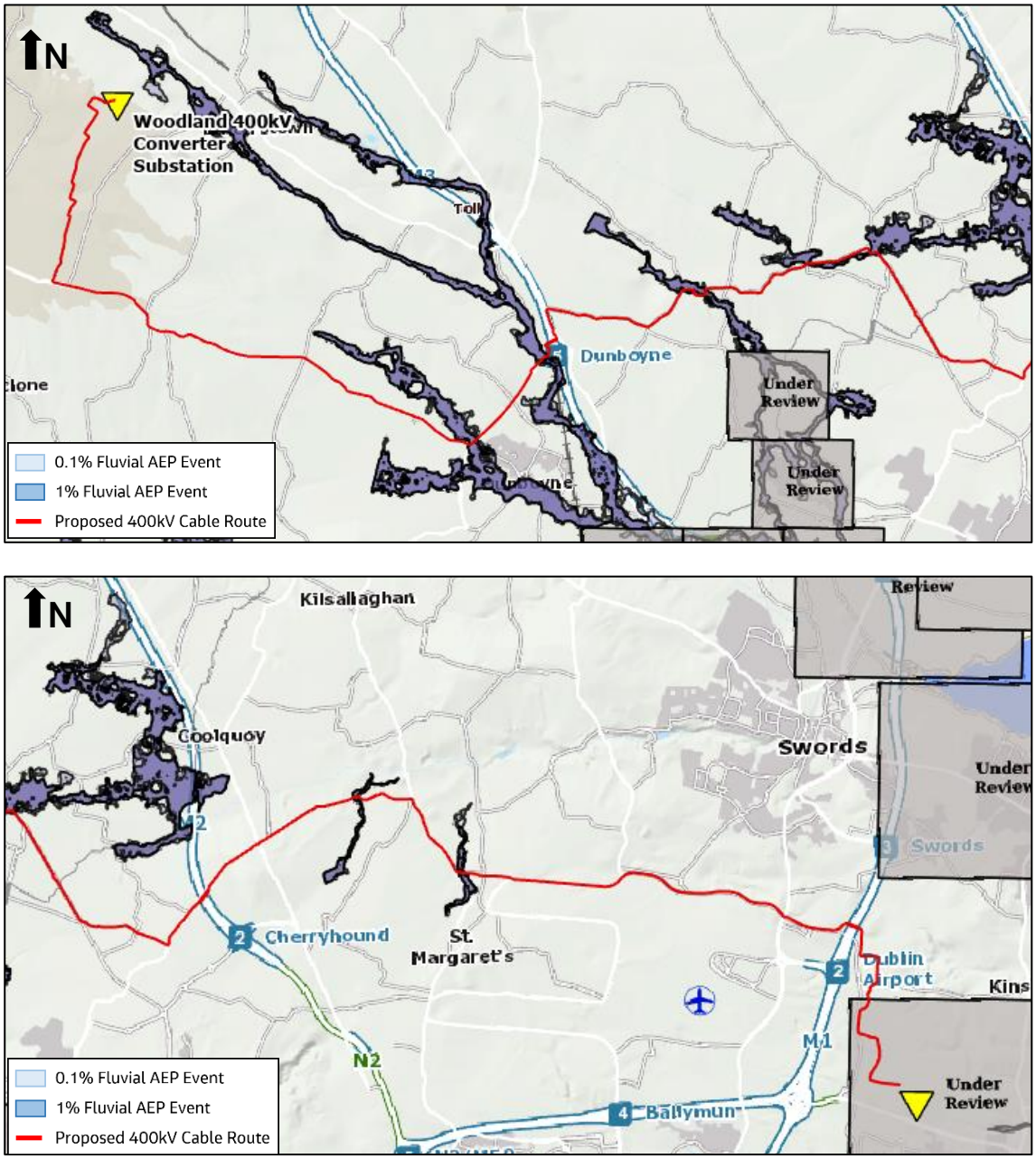

Image 5.4: Extract from NIFM Flood Extents for the High-End Future Scenario (OPW 2024)

For the purposes of this FRA, the potential impact of climate change on flood risk to the Proposed Development has been made relative to the MRFS scenario. Table 5.2 summarises the potential flood risk impacts due to climate change on the Proposed Development.

Table 5.2 Climate Change Impact

Source of Flooding	Likely Impacts of Climate Change	Discussion
Coastal	N/A	There is no known existing risk of Coastal Flooding to the Proposed Development and climate change will not result in potential flooding of the Proposed Development from coastal sources.
Fluvial	No change	There is only a temporary risk of flooding during construction. Future climate change will not affect this conclusion, apart from the access track crossing with Dunboyne stream. For the detailed design of the crossing structure, climate change will be considered.
Estuarine	No change	There is no known risk of estuarine flooding to the Proposed Development. This conclusion is not changed by the impact of climate change.
Pluvial	No change	There is only a temporary risk of flooding during construction. Future climate change will not affect this conclusion.
Artificial Drainage Systems	No change	The Proposed Development will have no identified impact on surface water or artificial drainage systems as it is underground, built at a lower depth. Any new impermeable surfaces associated with the Proposed Development will be catered for in additional stormwater infrastructure ensuring any additional runoff will not compromise the capacity or performance of the existing drainage systems. All additional stormwater drainage required will be designed to cater for the effects of future climate change.
Groundwater	No change	The Proposed Development is not at risk from groundwater flooding, based on online information provided by OPW (OPW 2024). Future climate change will not affect this conclusion.

5.4 Temporary Construction Compounds / HDD Compounds

During the Construction Phase there will be seven Temporary Construction Compounds (TCCs), and six HDD Compounds, which may be at risk of flooding from any of the sources mentioned above. These locations are:

Temporary Construction Compounds:

- TCC0: Chainage 0;
- TCC1: Chainage 3,350;
- TCC2: Chainage 10,600;
- TCC3: Chainage 21,600;
- TCC4: Chainage 26,850;
- TCC5: Chainage 34,700; and
- TCC6: Chainage 37,700.

These locations are shown on Image 5.5.

HDD Compounds:

- HDD 1a: Chainage 12,850;
- HDD 1b: Chainage 13,050;
- HDD 2a: Chainage 23,400;
- HDD 2b: Chainage 23,600;
- HDD 3a: Chainage 34,250; and
- HDD 3b: Chainage 34,450.

These locations are shown on Image 5.6.

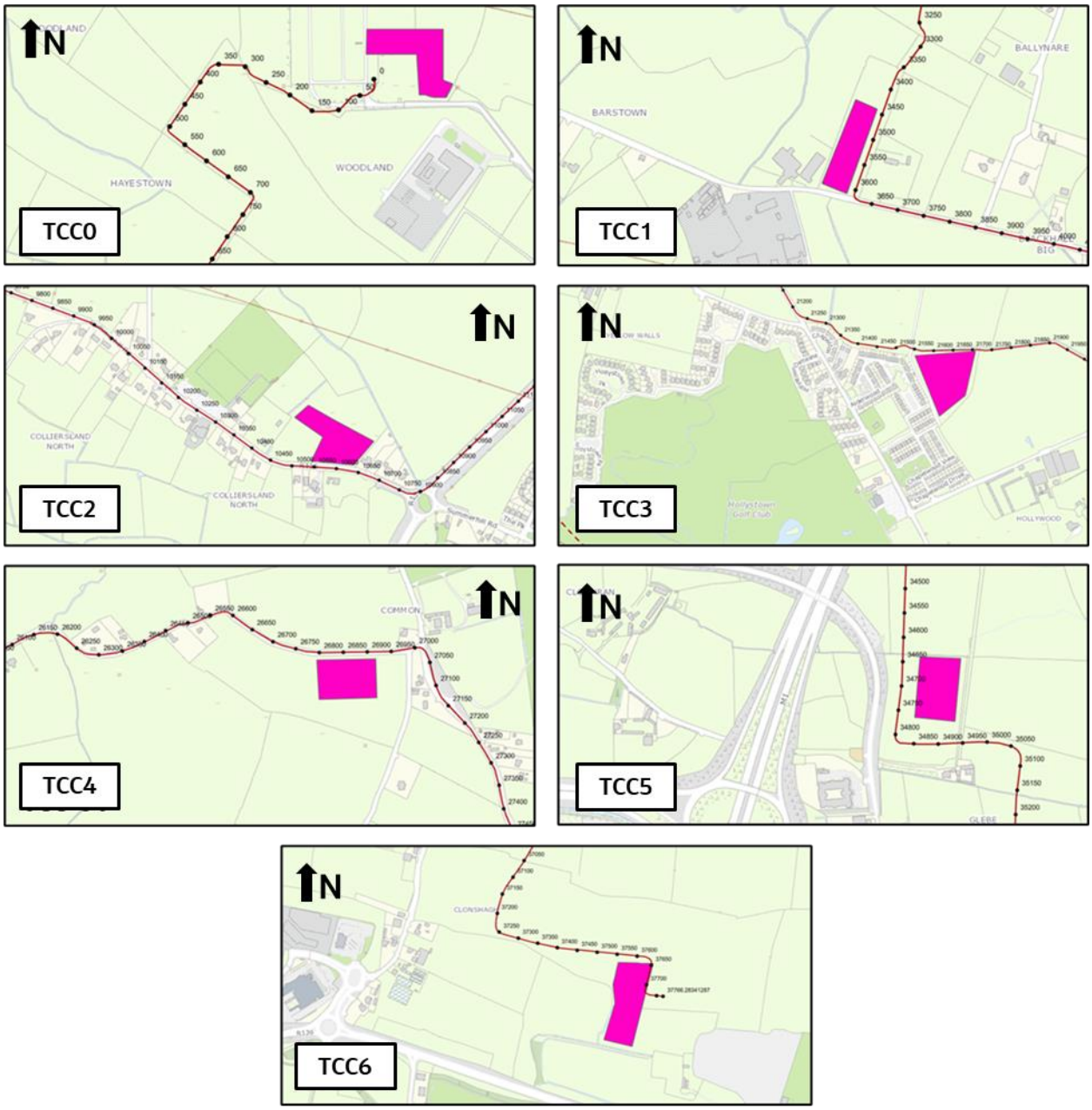

Image 5.5: TCC Locations

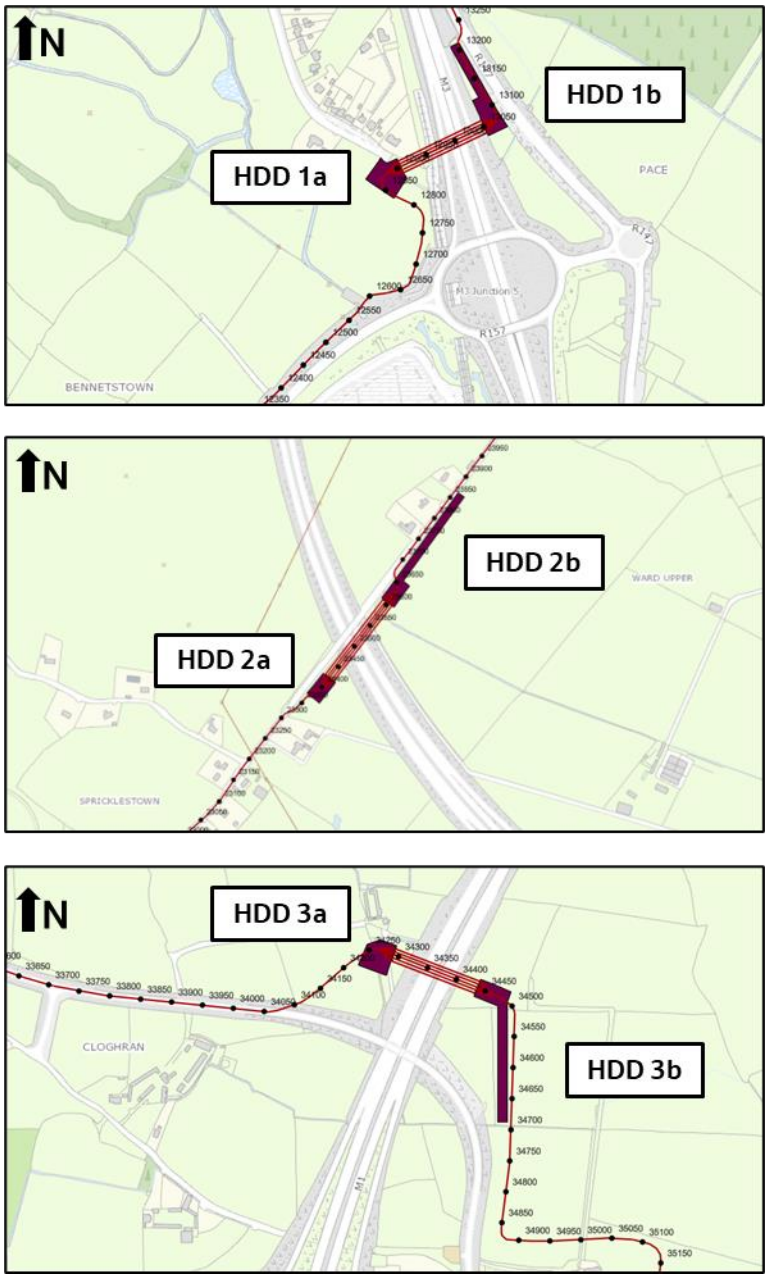

Image 5.6: HDD Compounds Locations

These locations were assessed for any potential risk of flooding from any of the above sources, the findings are detailed below.

Table 5.3: Summary of Flood Risk to TCCs / HDD Compounds

Flood Risk	Summary of Impact	Notes
Coastal	Low	There is no risk of coastal flood risk.
Fluvial	Low	There is low flood risk over the TCCs / HDD Compounds according to the current CFRAM and PFRA fluvial flood risk maps (OPW 2024). However, TCC2, located near the Dunboyne Stream, presents a flood risk based on the NIFM future climate change scenarios maps. The current NIFM scenario maps for this location are under review. While it is considered unlikely for a fluvial flood risk to occur on the site due to its temporary nature, some mitigation measures will be considered for this location. Therefore, it is recommended to be aware of the weather forecast in order to avoid any person working in this location in the case of an extreme storm.
Estuarine	Low	There is no risk of estuarine flooding.
Pluvial	Low	PFRA 0.5%APE maps do not show any pluvial flood risk where the compounds are located. Therefore, the risk of pluvial flooding is low.
Artificial Drainage Systems	Low	The risk of flooding from artificial drainage systems is low.
Groundwater	Low	There is no documented risk of groundwater flooding in the areas close to the TCCs / HDD Compounds.

5.5 Summary of Flood Risk

The flood risk to the Proposed Development is summarised in Table 5.4.

Table 5.4: Summary of Flood Risk to Proposed Development

Flood Risk	Summary of Impact	Notes
Coastal	N/A	Based on the information provided online there is no known risk of coastal flooding to the Proposed Development.
Fluvial	Low	The CFRAM fluvial flood extents (OPW 2024) highlight that there is a low risk of flooding from local watercourses during construction, in key areas where a watercourse will be crossed. Proposed methods of watercourse crossing include HDD, trench crossings and in-road crossings. The watercourse crossing structure in the access track over Dunboyne stream will be designed considering the existing flood risk over it, defining the proper size and height of the structure and the road.
Estuarine	No change	There is no known risk of estuarine flooding to the Proposed Development based on the information provided.
Pluvial	Low	The CFRAM pluvial flood extents highlight that there is a low risk of pluvial flooding during construction at certain areas along the Proposed Development. As the method of cable laying here will be open trenching, there is a low impact of pluvial flooding on the Proposed Development during construction.
Artificial Drainage Systems	No change	There is no known risk of flooding from artificial drainage systems to the Proposed Development based on the information provided.
Groundwater	Low	There is no known risk of flooding from groundwater to the Proposed Development based on the information provided.

6. Stage 2: Potential Flood Risk Impacts from Proposed Development

Section 5 considered the flood risk to the Proposed Development. This Section will consider the potential change in flood risk to the surrounding areas from the Proposed Development for each source of flooding during the Construction and Operational Phase.

6.1 Impacts on Coastal Flooding

The Proposed Development is not at risk from coastal flooding during the Construction or Operational Phases. The Proposed Development will have no known impact on coastal flood risk based on online information provided by the OPW (OPW 2024).

6.2 Impacts on Fluvial Flooding

The Proposed Development is at low risk from fluvial flooding during construction. Any works at watercourses (e.g., open cut trenching for crossings) will be designed to maintain waterflows and allow the discharge of water without affecting flood risk.

Once construction is complete, the Proposed Development is expected to slightly increase existing impermeable areas at the locations where off-road Joint Bays are proposed. This is due to the proposed localised hardstanding areas and permanent access tracks for some of the Joint Bays. The typical design for the permanent access tracks which are largely made up of course materials is discussed in Chapter 4 (Proposed Development Description) in Volume 2 of the EIAR. The only watercourse crossing which could be subject to fluvial flood risk comprises a permanent access track crossing Dunboyne Stream. At this crossing, the structure will be designed to not increase the fluvial flood risk over the adjacent areas. The hardstanding areas around the off-road Joint Bays will be similarly constructed to not increase fluvial flood risk. All Joint Bays and link boxes are designed with watertight connections as standard. Drainage sumps are proposed for the Joint Bays, to provide for additional drainage.

It is considered that the hardstanding areas, Joint Bays, and permanent access tracks will not result in any significant loss of floodplain and will not increase the risk of flooding. Also, for TCC2, the grading of the existing terrain will not be increased, and any physical barriers that could contribute to an increase in flood risk to adjacent properties will not be raised.

The Proposed Development will have no known impact on fluvial flood risk based on online information provided by the OPW (OPW 2024).

6.3 Impacts on Estuarine Flooding

The Proposed Development is not at risk from estuarine flooding. The Proposed Development will have no known impact on estuarine flood risk based on online information (OPW 2024).

6.4 Impacts on Pluvial Flooding

In order to assess the increase in pluvial flood risk, the following points need to be considered:

- Will the Proposed Development increase the rainfall runoff rate; and
- Will the Proposed Development alter existing flow or drainage paths.

The Proposed Development will result in a slight increase in the area of hardstanding surfaces (see Chapter 4 (Proposed Development Description) in Volume 2 of the EIAR for details of the hardstanding areas, Joint Bays, and permanent access tracks). The unbound permanent access tracks materials will be water permeable

to a degree but there will be a change from the current greenfield conditions. However, there will be no significant change in runoff as a result of the hardstanding areas, Joint Bays, and permanent access tracks. On the off-road sections, these areas will runoff to the adjacent greenfield areas. There will be a low impact on surrounding areas from pluvial flooding, due to proposed additional hardstanding areas and access tracks around off-road Joint Bays. Additional drainage sumps will be provided at the Joint Bays to offset this.

6.5 Impacts on Groundwater Flooding

The Proposed Development involves new works below existing ground levels, but it is unlikely that this would contribute to groundwater flooding, based on available online information from the OPW and GSI (OPW 2024).

6.6 Impacts on Artificial Drainage Systems

The Proposed Development is not expected to cross any existing artificial drainage systems, as the intended route will be significantly deeper than the expected level of existing drainage networks. During the Operational Phase, the Proposed Development is also expected to have no impact on artificial drainage systems.

6.7 Summary of Potential Flood Risk Impacts from Proposed Development

The flood risk impacts from the Proposed Development are summarised in Table 6.1.

Table 6.1: Summary of Potential Flood Risk Impacts on Surrounding Areas as a Result of the Proposed Development

Flood Risk	Potential Impact	Discussion and Mitigation (where Required)	Residual Impact (with Mitigation)
Coastal	No Impact	No known impact as the Proposed Development is not at risk of coastal flooding.	No impact
Fluvial	Low	Low impact on surrounding areas from fluvial flooding, due to proposed additional localised hard standing and access tracks around off-road Joint Bays. Additional drainage sumps will be provided at the Joint Bays to offset this. In the crossing with Dunboyne stream, the structure will be designed to not increase the fluvial flood risk over the adjacent areas. The TCC2, located nearby this stream, will not present any barrier or element that could increase the flood risk to the adjacent properties.	No Impact
Estuarine	No impact	No known impact on surrounding areas due to estuarine flooding.	No impact
Pluvial	Low	Low impact on surrounding areas due to pluvial flooding, due to proposed additional localised hard standing and access tracks around off-road Joint Bays and TCCs / HDD Compounds. Additional drainage sumps will be provided at the joint bays to offset this.	No impact
Artificial Drainage Systems	No impact	The Proposed Development is not at known risk of surface flooding / impacting artificial drainage systems.	No impact
Groundwater	No impact	Below-ground elements of the works are localised and are unlikely to impact ground water movements.	No impact

7. Flood Risk Management and Evaluation

7.1 Justification Test for the Proposed Development

As defined in Section 4.3, the Proposed Development will be located in Flood Zone C, apart from minor local areas. For the specific areas where the works are located in Flood Zones A and / or B, these require a Justification Test, as illustrated in Image 7.1.

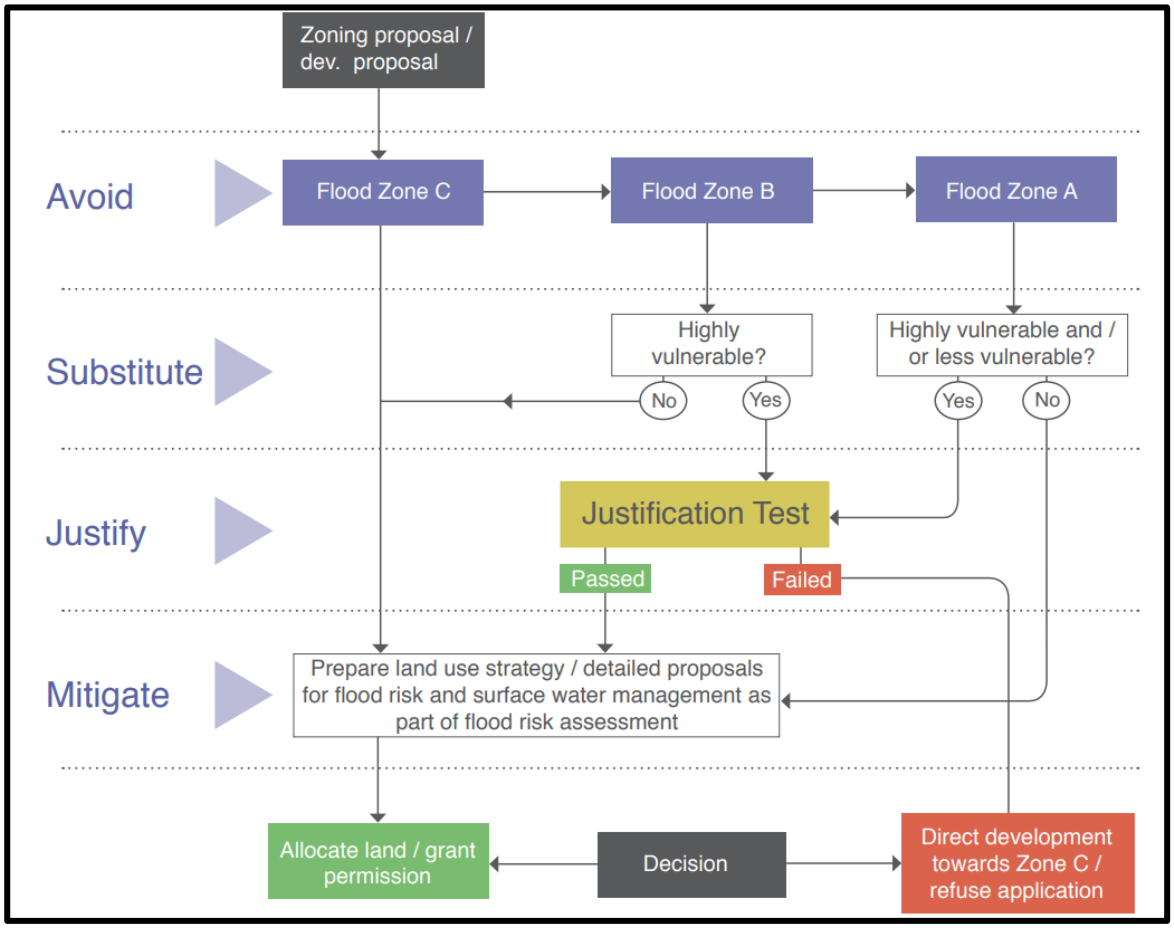

Image 7.1: Justification Test

Section 5.15, Box 5.1 of the Flood Risk Guidelines sets out the criteria for the Justification Test and is replicated in Image 7.2 (DEHLG and OPW 2009). An assessment of the Proposed Development against these criteria is presented in Table 7.1 and Table 7.2.

When considering proposals for development, which may be vulnerable to flooding, and that would generally be inappropriate as set out in Table 3.2, the following criteria must be satisfied:

1. The subject lands have been zoned or otherwise designated for the particular use or form of development in an operative development plan, which has been adopted or varied taking account of these Guidelines.
2. The proposal has been subject to an appropriate flood risk assessment that demonstrates:
   (i) The development proposed will not increase flood risk elsewhere and, if practicable, will reduce overall flood risk.
   (ii) The development proposal includes measures to minimise flood risk to people, property, the economy and the environment as far as reasonably possible.
   (iii) The development proposal includes measures to ensure that residual risks to the area and/or development can be managed to an acceptable level as regards the adequacy of existing flood protection measures or the design, implementation and funding of any future flood risk management measures and provisions for emergency services access; and
   (iv) The development proposed addresses the above in a manner that is also compatible with the achievement of wider planning objectives in relation to development of good urban design and vibrant and active streetscapes.

The acceptability or otherwise of levels of residual risk should be made with consideration of the type and foreseen use of the development and the local development context.

Note: See section 5.27 in relation to major development on zoned lands where sequential approach has not been applied in the operative development plan.

Refer to section 5.28 in relation to minor and infill developments.

Image 7.2: Justification Test for Development Management to be Submitted by the Applicant

Table 7.1 Assessment Against Justification Test criteria - Fluvial Flood Risk

Criteria to be Satisfied	Justification	Criteria Met
The subject lands have been zoned or otherwise designated for the particular use or form of development in an operative development plan, which has been adopted or varied taking account of these Guidelines.	The Proposed Development forms a key part of wider development proposals for the upgrade of the Client's cable network, such as the Grid Implementation Plan 2017-2022 (EirGrid 2017).	Yes
The development will not increase flood risk elsewhere, and, if practicable, will reduce overall flood risk.	As shown in Sections 4, 5, and 6, the Proposed Development will not increase flood risk from any watercourse that is crossed by the Proposed Development.	Yes
The development proposal includes measures to minimise flood risk to people, property, the economy and the environment as far as reasonably practicable.	The Proposed Development is designed to be resilient to the 0.1% AEP fluvial flood.	Yes
The development proposed includes measures to ensure that residual risks to the area and/or development can be managed to an acceptable level as regards the adequacy of existing flood protection measures or the design, implementation and funding of any future flood risk management measures and provisions for emergency services access.	The Proposed Development is designed to be resilient to the 0.1% AEP fluvial flood. The Proposed Development has no impact on the performance of any existing Flood Relief Schemes.	Yes
The development proposed addresses the above in a manner that is also compatible with the achievement of wider planning objectives in relation to development of good urban design and vibrant and active streetscapes.	The Proposed Development meets the objectives set out in the Meath County Development Plan 2021-2027 (MCC 2021) and the Fingal Development Plan 2023 – 2029 (FCC 2023), as a robust electricity network is essential infrastructure for the expecting increase in population.	Yes

Table 7.2: Assessment Against Justification Test Criteria - Pluvial Flood Risk and Surface Water Drainage

Criteria to be Satisfied	Justification	Criteria Met
The subject lands have been zoned or otherwise designated for the particular use or form of development in an operative development plan, which has been adopted or varied taking account of these Guidelines.	The Proposed Development forms a key part of wider development proposals for the upgrade of the Client's cable network, such as the Grid Implementation Plan 2017-2022.	Yes
The development will not increase flood risk elsewhere, and, if practicable, will reduce overall flood risk.	As shown in Sections 4 and 5, the Proposed Development will not increase pluvial flood risk from any receiving watercourse or existing drainage network.	Yes
The development proposal includes measures to minimise flood risk to people, property, the economy and the environment as far as reasonably practicable.	The Proposed Development is designed to be resilient to the 0.1% AEP pluvial flood.	Yes
The development proposed includes measures to ensure that residual risks to the area and/or development can be managed to an acceptable level as regards the adequacy of existing flood protection measures or the design, implementation and funding of any future flood risk management measures and provisions for emergency services access.	The Proposed Development has no impact on the performance of any drainage networks as there is no change in existing runoff rates.	Yes
The development proposed addresses the above in a manner that is also compatible with the achievement of wider planning objectives in relation to development of good urban design and vibrant and active streetscapes.	The Proposed Development meets the objectives set out in the Meath County Development Plan 2021-2027 and in the Fingal Development Plan 2023 – 2029, as it forms a key part of achieving a robust electricity network for the expecting increase in population.	Yes

8. Conclusions and Recommendations

This FRA Report is a FRA of the Proposed Development. The assessment included desk-based investigations into the potential flood risks and an assessment of the potential impacts the Proposed Development will have on flood risk in the surrounding areas.

8.1 Flood Risk to the Proposed Development

The Proposed Development will be located in Flood Zone C, apart from minor local areas in close proximity to watercourses. Given the Proposed Development will be located underground, there is no risk of flooding to it once the works have been completed.

The only element of the design which is subject to fluvial flood risk is the crossing of Dunboyne Stream with a permanent access track. The watercourse crossing structure will be defined during detailed design, taking into account that is should not be vulnerable to fluvial flood risk.

The Proposed Development also includes some additions in Woodland and Belcamp Substations. Specifically, in Belcamp Substation a new GIS Hall is planned. Following the FRA, it is concluded that there is no flood risk at the substations, and therefore, these upgrade works will not be affected by flood risk, and they will not result in a flood risk increase in adjacent areas.

During the Construction Phase, measures have been incorporated into the Construction Environmental Management Plan (included as a standalone document to this planning application pack) to minimise risks during flooding events.

8.2 Flood Risk Impacts from the Proposed Development

The Proposed Development is not at risk of flooding, nor at risk of impacting flooding in the area based on the online information provided (OPW 2024). It is therefore concluded that a Stage 3 Detailed Risk Assessment, including site specific hydraulic modelling, is not required.

In the permanent access track crossing with Dunboyne Stream, the hydraulic structure will be designed so that there is not any increase over the adjacent areas.

9. References

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Directives and Legislation

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Directive 2007/ 60/ EC of the European Parliament and of the Council of 23 October 2007 on the assessment and management of flood risk: Official Journal L288/ 27-34.

Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment

Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment.

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Planning and Development Act 2000 (No. 30 of 2000) (as amended).

Planning and Development Regulations 2001 (S.I. No. 600 of 2001) (as amended).

Appendix A. Information Sources Checklist

No.	Information Source	Status	Reference/Comments
1	OPW Preliminary Flood Risk Assessment indicative fluvial flood maps	✓	Provided by OPW (www.floodinfo.ie)
2	National Coastal Protection Strategy Study flood and coastal erosion risk maps.	X	
3	Predictive and historic flood maps, and Benefiting Lands Map	✓	Flooding History was provided by OPW floodinfo.ie
4	Predictive flood maps produced under the CFRAM studies	✓	CFRAM maps are available and have been used.
5	River Basin Management Plans and reports	✓	River Basin Management Plan for Ireland (2018-2021)
6	Indicative assessment of existing flood risk under Preliminary Flood Risk Assessment	X	
7	Previous Strategic Flood Risk Assessments	✓	Strategic Flood Risk Assessment for Meath County Development Plan 2021-2027 Strategic Flood Risk Assessment for Fingal Development Plan 2023-2029
8	Expert advice from OPW who may be able to provide reports containing the results of detailed modelling and flood-mapping studies including critical damage areas, and information on historic flood events and local studies etc.	X	
9	Topographical maps, in particular digital elevation models produced by aerial survey or ground survey techniques.	X	
10	Information on flood defence condition and performance	N/A	
11	Alluvial deposit maps	N/A	
12	'Liable to Flood' markings on the old 6" Inch Map	X	
13	Local Libraries and newspaper reports	✓	Adequate information on Flooding History was provided by OPW floodmaps.ie
14	Interviews with local people, local history/ natural history societies etc.	X	
15	Walkover survey to assess potential sources of flooding, likely routes for flood water and the site's key features, including flood defences, and their condition	X	

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Appendix A12.2 – Field Walkover Survey Notes

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Appendix A12.2 – Field Walkover Survey Notes

Table 1: Field Walkover Survey Notes

Water Body Crossing Reference	WFD Water Body Name	Visual Flow	Bank Stability	Bed Observations	Riparian Vegetation	Discharge	Modifications and Structures Present
WCP01	Dunboynestream_010	Low velocity smooth and rippled flow.	Stable, evidence of historic erosion and minor undercutting. Poaching evidence along right bank top.	Predominately silt and fine sand with rare gravels. Presence of riffles downstream from crossing location.	Overhanging shrubs, and mature deciduous vegetation.	Yes. Discharge pipes present along bank adjacent to field. Likely field drainage.	Masonry bridge. Rathregan Court.
WCP02	Dunboynestream_010	Low velocity smooth flow.	Concrete banks at crossing structure. Heavily vegetated banks out with crossing.	Predominantly silt to fine sands with rare gravels. Trapezoidal channel shape with approximately 40° (degree) banks. No distinct bedforms observed.	Dense vegetation consisting of herbaceous grasses and shrubs.	N/A	Box culvert. Summerhill Road (L228).
WCP03	Tolka_020	Low velocity smooth flow where visible.	Where visible, appears stable. Heavily vegetated right and left bank.	Bed not visible due to dense vegetation.	Dense riparian vegetation consisting of herbaceous grasses, shrubs brambles and deciduous trees which overhang the channel from both banks.	Concrete right bank.	Pipe culvert. R157.
WCP04	Tolka_020	Generally smooth, although chute flow present where 20cm (centimetre) drop in bed level occurs downstream of crossing location.	Appear stable and heavily vegetated. Minor left bank undercutting adjacent to and downstream of hardpoints.	Step formed from boulders approximately 20m downstream of crossing location. No other bed forms were visible on the day of survey.	Dense herbaceous grasses covering the upper bank face and top. Deciduous trees on the bank top and within the floodplain.	Discharge pipe used for outflow	Twin box culvert below Dunboyne Bypass.
WCP05	Pinkeen_010	Generally smooth and rippled flow.	Steep with bank angles ranging between 35° – 60°. Banks heavily vegetated with herbaceous and water-based grasses, nettles, brambles, and shrubs.	Mixture of sand and gravel bed substrate with fines intervening. Coarse bed substrate appears to be smothered with fine material. In channel vegetation noted. downstream of existing crossing causing flow to pond.	Mixtures of grasses, nettles, shrubs, and brambles with dense matures, deciduous trees downstream of the existing crossing location.	N/A	Masonry bridge. L1010.
WCP06	Ward_020	Smooth flow where visible.	Steep with bank angles ranging between 50° – 80°. Banks heavily vegetated with herbaceous and water-based grasses, shrubs and deciduous	Not visible due to bankside vegetation.	Dense vegetation consisting of herbaceous, and water-based grasses, shrubs and deciduous trees which overhang the channel. Within the wider floodplain	N/A	N/A

Water Body Crossing Reference	WFD Water Body Name	Visual Flow	Bank Stability	Bed Observations	Riparian Vegetation	Discharge	Modifications and Structures Present
			trees which overhang the channel.		riparian vegetation is of managed grassed fields.		
WCP07	Ward_010	Predominantly smooth flow.	Steep with bank angles of approximately 75°. Banks heavily vegetated with shrubs and deciduous trees which overhang the channel.	Predominantly silt – fine sand with rare gravels which are observed to be smothered in finer sediments. No distinct bedforms observed.	Dense vegetation consisting of shrubs and deciduous trees which overhang the channel.	Discharge pipe likely associated with adjacent field drainage.	Masonry Bridge, Priest Town Road.
WCP08	Ward_010	Predominately smooth flow with occasional rippled flow.	Steep with bank angles of approximately 75°. Banks heavily vegetated with shrubs and deciduous trees which overhang the channel.	Predominantly silt – fine sand with occasional gravels. No distinct bedforms observed. Woody debris in channel.	Dense vegetation consisting of shrubs and deciduous trees which overhang the channel.	Discharge pipe present 50m downstream.	Wire fences which cross the channel.
WCP09	Ward_020	Low velocity smooth and rippled flow.	Steep with bank angles of approximately 75°. Banks heavily vegetated with shrubs and deciduous trees which overhang the channel.	Trapezoidal channel shape with predominantly silt – fine sand with rare gravels. No distinct bedforms observed. Woody debris in channel.	Dense vegetation consisting of shrubs and deciduous trees which overhang the channel.	Drainage ditch – left bank.	Masonry Arch bridge. Kilbride Road.
WCP10	Ward_020	Low velocity smooth and ponded flow	Steep with bank angles of approximately 75°. Banks heavily vegetated with grasses and shrubs which overhang the channel.	Trapezoidal channel shape with predominantly silt – fine sand. Where flow ponds, green algae type matter was observed on the water surface. No distinct bedforms observed.	Dense vegetation consisting of grasses shrubs and deciduous trees which overhang the channel. Wider floodplain consists of managed grasses within fielded areas.	N/A	Pipe Culvert. Kilbride Road.
WCP11	Ward_020	Waterbody crossing locations not visible on the day of survey due to dense vegetation which restricted safe access.					
WCP12	Ward_030	Not accessible due to landowner constraints					
WCP13							
WCP14	Ward_030	Low velocity smooth and ponded flow.	Steep with bank angles of approximately 75°. Banks heavily vegetated with grasses and shrubs which overhang the channel. Masonry wall occupies the	Trapezoidal channel shape with predominantly silt – fine sand bed material. No distinct bedforms observed.	Dense vegetation consisting of grasses shrubs and deciduous trees which overhang the channel. Wider floodplain consists of	Discharge outlet from agricultural fields adjacent to the river	Pipe culvert. R121 (Newpark Road).

Water Body Crossing Reference	WFD Water Body Name	Visual Flow	Bank Stability	Bed Observations	Riparian Vegetation	Discharge	Modifications and Structures Present
			bank top adjacent to existing road crossing location.		managed grasses within fielded areas		
WCP15	Ward_030	Low velocity smooth and ponded flow.	Steep with bank angles ranging from 50° - 75°. Banks heavily vegetated with grasses and shrubs and deciduous trees which overhang the channel.	Predominantly silt – fine sand bed material where visible. No distinct bedforms observed. Man-made debris including tarpaulin within channel.	Dense vegetation consisting of grasses shrubs and deciduous trees which overhang the channel. Wider floodplain consists of managed grass fields and hedgerows which separate the bank tops from existing road infrastructure.	Manhole on riverbank.	Pipe culvert. R121 (Newpark Road).
WCP16	Ward_030	Predominately rippled flow and occasional unbroken standing waves.	Steep with bank angles of approximately 45° - 75°. Banks heavily vegetated with grasses and shrubs which overhang the channel margins. Right bank adjacent to the field appear to have been regraded to a 45° slope. Vegetation on the bank face is absent here with soil exposed	Water depth was too deep to observe bed material and therefore no distinct bedforms were observed. Flow types give some indication that bedforms may be present during lower flows.	Dense vegetation consisting of grasses shrubs and deciduous trees which overhang the channel. Wider floodplain consists of managed grasses within fielded areas.	Drainage outlet from agricultural field on the right bank.	Masonry Arch Culvert. R121 (Newpark Road).
WCP 17	Ward_030	Not accessible due to landowner constraints					
WCP 18							
WCP 19							
WCP 20	Sluice_010	Alternating smooth and rippled.	Steep with bank angles of approximately 45° - 70°. Banks heavily vegetated with grasses and shrubs which overhang the channel margins.	Bed material consists of silts, fine sands, coarse gravel with occasional cobbles. The silt was observed to smother the coarser bed material and some woody debris was noted on the channel bed.	Riparian vegetation was observed to be dense consisting of grasses, shrubs, hedges and deciduous trees which overhand the channel.	Discharge pipe located downstream of the crossing location	Multiple infrastructure crossings.
WCP21	Mayne_010	Alternating smooth and rippled flow with unbroken standing	Masonry wall forms the full left bank downstream of existing crossing	The channel bed below the existing crossing structure is formed of concrete. At the end of	Dense vegetation consisting of grasses shrubs, hedges and deciduous trees which	Discharge pipe present located	Multiple infrastructure crossings.

Water Body Crossing Reference	WFD Water Body Name	Visual Flow	Bank Stability	Bed Observations	Riparian Vegetation	Discharge	Modifications and Structures Present
		waves in rippled sections.	structure. A low inset vegetated berm has formed along the bank toe adjacent to masonry wall. Right bank appears to have been regraded to a 45° slope. The right bank toe appears vegetated with grasses above which soil is exposed.	the concrete bed, protection a small step has formed. Bed material out with the modified section consists of sands, gravels, and cobbles with rare boulders. Coarse sediment appears mobile forming riffles upstream of the existing crossing location where channel bed gradient steepens locally.	overhang the channel margins along the left bank. Where a masonry wall is present, riparian vegetation is absent.	downstream from the crossing.	

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Appendix A13.1 - Inventory of Archaeology, Architectural Heritage, and Cultural Heritage

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Appendix A13.1 Inventory of Archaeology, Architectural Heritage, and Cultural Heritage

1. Inventory of Archaeological Assets

Unique Reference Number	AY_07	**Reference Number(s)**	ME050-030
Figure Number	Figure 13.1 in Volume 4	**Legal Status**	-
Townland	Dunboyne	**Site Type**	Field system
Easting / Northing	700971 / 743204	**Distance from Proposed Development**	0m
Significance	Low		
Description	Situated on a fairly level landscape. Aerial photographs by L. Swan (LS_AS_67BWN_00132) from the early 1970s record elements of a rectangular field system covering an extensive area (dims c. 220m NW-SE; c. 220m NE-SW) between the large enclosure (ME050-027----) to the SE and the possible church site (ME050-029----) to the NW, but not connected directly with either and different in character to both. The fields are large and rectangular (dims c. 60-120m (metres) x c. 30-50m), and appear to be defined by single ditches that correspond closely to features represented on the Down Survey (1656-8) barony and parish maps. They also run generally parallel with the current boundaries but are probably medieval in date. The area was subject to a partial magnetic gradiometer and earth resistance survey (00R0014) by I. Elliot (2000) where the features recorded in the aerial photographs are confirmed. Elliott's results suggest that the enclosing elements consisted primarily of hedges. The NE-SW by-pass road (R157) for Dunboyne cut through the area, and centre-line testing (04E0487) by R. O'Hara (2004, 10-11) noted four of these ditches of uniform character (Wth c. 1.2m; D 0.5m) with homogenous fills from which nothing was recovered except some snail shells (excavations.ie 2004:1229). Further excavation (E003024) by R. Elliott (excavations.ie 2004:1554) of Dunboyne 4 recorded the drain features in detail and recovered post-medieval and modern ceramics from them. The long structure (ME050-062001-) and its associated possible kiln (ME050-062002-) were also identified and excavated but they are unrelated to the fields (Elliott 2008). [1] GoogleEarth 05/2013 - large circular enclosure (ME050-029) to north of field (outside study area), with linear features, interpreted as former field boundaries forming a field system. 07/2013 - Possible former field boundaries visible across field (also in field to the south-west; LI_67). 05/2017 - enclosure and former field boundaries visible. 03/2022 - Circular enclosure vaguely perceptible in northern portion of field. [2] Also visible on Digital Globe Aerial Imagery as straight sided fields. [3] Single fill ditches and drains containing post-medieval and modern ceramics. [4]		
Sources	1. Archaeological Survey of Ireland SMR 2. GoogleEarth, various 3. Digital Globe Aerial Imagery 4. Elliott, R. and V. Ginn (2008). M3 Clonee-North of Kells Contract 1 Clonee – Dunshaughlin Report on the Archaeological Excavation of Dunboyne 4, Co. Meath. Ministerial Directions No. A017/002 E3024.		

Unique Reference Number	AY_08	**Reference Number(s)**	ME050-062001
Figure Number	Figure 13.1 in Volume 4	**Legal Status**	-
Townland	Dunboyne	**Site Type**	Structure (site of)
Easting / Northing	701066 / 743342	**Distance from Proposed Development**	0m
Significance	Very Low / Negligible		
Description	Situated on a slight rise in a generally level landscape. Archaeological testing (04E0487) by R. O'Hara on the link-road (R157) for Dunboyne set aside this area for resolution as Dunboyne 4 (excavations. ie 2004:1229). Archaeological excavation (E003024) by R. Elliott (excavations.ie 2004:1554) recorded elements of the field system (ME050-030----) as well as this prehistoric structure and the possible kiln (ME050-062002-). Nineteenth century quarrying, the importation of soils and subsequent ploughing severely truncated most of the archaeological features. Thirty one stake and post-holes were recorded in one area, and twenty three of these create a long narrow structure (dims 13m plus ENE-WSW; 3.5m NNW-SSE) extending outside the road-take to the WSW. A strictly regular pattern is not discernible but two post-holes just outside the S line towards the E end have ramps from the S, and a C14 date of 2117-1779 cal. BC was returned from one of these. A large post-hole at the E edge also has a ramp at the E edge. This produced two sherds of Middle-Late Bronze Age pottery together with cremated bone, from which a C14 date of 971-804 cal. BC was returned. A sample of charcoal from another post-hole yielded a date of 1115-853 cal. BC. The nature of this structure is uncertain, but it has neither slot-trenches nor a hearth, and the fairly even distribution of the post-holes suggests that it could be a post-alignment, except that its scale is reduced. [1] [2]		
Sources	1. Archaeological Survey of Ireland SMR 2. https://excavations.ie/report/2004/Meath/0012351/ [Accessed April 2023]		

Unique Reference Number	AY_09	**Reference Number(s)**	ME050-062002
Figure Number	Figure 13.1 in Volume 4	**Legal Status**	-
Townland	Dunboyne	**Site Type**	Kiln (site of)
Easting / Northing	701098 / 743314	**Distance from Proposed Development**	0m
Significance	Very Low / Negligible		
Description	Situated on a slight rise in a generally level landscape. Archaeological testing (04E0487) by R. O'Hara on the link-road (R157) for Dunboyne set aside this area for resolution as Dunboyne 4 (excavations. ie 2004:1229). Archaeological excavation (E003024) by R. Elliott (excavations.ie 2004:1554) recorded elements of the field system (ME050-030----) as well as this structure that is interpreted as a kiln and the prehistoric structure (ME050-062001-). This consists of a large sub-oval pit (max. dims 3.35m N-S; 1.3m E-W; D 0.43m) with a clay lining. It has two bowls with a connecting flue but many of the fills contained burnt stone. Some uncharred grain was recovered, but a sample of hazel charcoal from a basal fill yielded a C14 determination of 2117-1779 cal. BC. This sample must have been contaminated somehow. A subrectangular cut (dims 1.9m x 1.35m; D 0.17m) for a bellows was connected to the S bowl by a narrow channel, but much of the bellows pit was damaged by a large modern quarry to its S. (Elliott 2008, 3-4). [1] [2] While this site provides an indication of possible activity in this location, given it has been removed and developed, it is no longer an asset. [3]		
Sources	1. Archaeological Survey of Ireland SMR 2. https://excavations.ie/report/2004/Meath/0012351/ [Accessed April 2023]. 3. Jacobs July 2023		

Unique Reference Number	AY_11	**Reference Number(s)**	ME050-057
Figure Number	Figure 13.1 in Volume 4	**Legal Status**	-
Townland	Bennetstown	**Site Type**	Excavation – miscellaneous
Easting / Northing	701490 / 743915	**Distance from Proposed Development**	0m
Significance	Very Low / Negligible		
Description	Situated on the E-facing slope of a rise in a fairly level landscape. Centre-line testing (04E0488) by R. O'Hara on the Dunboyne link road (R157) to the M3 (excavations.ie 2004:1183) identified archaeological features that were fully excavated (E003027) by R. Elliott in February and March 2006 as Bennetstown 3 (excavations.ie 2006:1509). A group of eight post-holes (diam. 0.2-0.6m; D 0.2-0.66m) from which most of the posts had been removed rather than being burnt or left to rot form a rough rectangular structure (max. int. dims 4.3m NE-SW; 2.6m NW-SE) that might have been open (Wth c. 1.1m) on the NW side. Two small pits (dims 0.67m x 0.32m; D 0.16m: diam. 0.37-0.39m; D 0.13m) were just to the W and two patches of burnt clay (dims 1.2m x 0.7m; T 0.1m: 0.63m x 0.24m; T 0.07m) 11m to the NW may be the remains of hearths. There were four other pits (dims 0.69m x 0.41m; D 0.3m to 1.15m x 1.04m; D 0.17m) c. 20m to the W, some with charcoal and burnt bone inclusions, and a curving trench (dims 2m x 0.5m; D 0.09m) could represent a slot-trench for a hut-site but there is no further evidence of it. A charcoal sample from its fill produced a C14 date of 1490-1310 cal. BC, which accords well with a sherd of coarse pottery from the same context. (Elliott and Ginn 2008). [1] [2] While this site provides an indication of possible activity in this locations, given it has been removed and developed, it is no longer an asset. [3]		
Sources	1. Archaeological Survey of Ireland SMR 2. https://excavations.ie/report/2004/Meath/0012305/ [Accessed April 2023] 3. Jacobs July 2023		

Unique Reference Number	AY_12	**Reference Number(s)**	ME050-058
Figure Number	Figure 13.1 in Volume 4	**Legal Status**	-
Townland	Bennetstown	**Site Type**	Burnt mound (site of)
Easting / Northing	701594 / 743995	**Distance from Proposed Development**	14m to the south-east of the Proposed Development
Significance	Very Low / Negligible		
Description	Situated in the valley of the N-S Tolka or Tullaghanoge River, with a canalised NW-SE section of the stream just to the NE, although the original meandering stream is c. 50m to the NE. Centre-line testing (04E0488) by R. O'Hara on the Dunboyne link road (R157) to the M3 (excavations.ie 2004:1183) identified a spread of dark soil that was partially excavated (E003026) by R. Elliott in January 2006 as Bennetstown 2 (excavations.ie 2006:1508). It consisted of a spread (dims 11.5m N-S; 4.5m E-W; T 0.2m plus) of black silty clay with burnt and broken stones that extended outside the excavated area to the NW. It was over a black/brown clay peat, into which a small pit (dims 0.4m x 0.34m; D 0.12m) had been cut, and it was covered by alluvial layers of silt. A rectangular pit (dims c. 1.7m x c. 0.5m plus; D 0.23) that cut into the top of the burnt mound was modern, and a sample of charcoal from the mound produced a C14 date of 2460-2200 cal. BC. No trough was recognised but much of the monument lies outside the excavated area to the NW. (Elliott and Ginn 2008) [1] [2] While this site provides an indication of possible activity in this location, given it has been removed and developed, it is no longer an asset. [3]		
Sources	1. Archaeological Survey of Ireland SMR 2. https://excavations.ie/report/2004/Meath/0012305/ [Accessed April 2023]. 3. Jacobs July 2023		

Unique Reference Number	AY_18	**Reference Number(s)**	ME051-002
Figure Number	Figure 13.1 in Volume 4	**Legal Status**	Recorded Monument
Townland	Ballintry	**Site Type**	Enclosure
Easting / Northing	704748 / 744981	**Distance from Proposed Development**	28m to the south of the Proposed Development
Significance	Medium		
Description	Located on a fairly level landscape with an E-W road just to the N. The faint cropmark of a circular enclosure (diam. c. 50m) defined by a single fosse is visible on oblique aerial photographs (CUCAP: BDK006-007) from 1970. A gradiometer survey (18R01789) by J. Leigh proved inconclusive, and archaeological testing (18E0445) by F. O'Carroll in a trench parallel with the road bank and probably just N of the enclosure produced no evidence of it, although an area of burning did come to light and is preserved in situ. (O'Carroll 2019). [1] Not depicted on historic mapping. [2] [3] Likely construction of a modern house has truncated the enclosure; however, the south-eastern portion may remain in the pasture field to the east of the house and garden. [1995] [4] Actual location of the enclosure is in the pasture field to the south of Belgree Lane [5] Adjacent to a field named 'Raheens' meaning 'The Little Rath'. [6] Archaeological investigations to the north of the enclosure identified deposits that were preserved in situ. [7]		
Sources	1. NMS, 1996, Record of Monuments and Places (County Meath) 2. Ordnance Survey 6" (1837) MH051 3. Ordnance Survey 25" (1911) MH051-01 4. OSi Aerial Imagery, 1995 5. https://www.cambridgeairphotos.com/location/bdk006/ and https://www.cambridgeairphotos.com/location/bdk007/ [Accessed August 2022] 6. Meath Field Names Project (n.d.). Meath Field Names Project. [Online] Available from: https://meathfieldnames.com/ [Accessed April 2023]. 7. O'Carroll, F. 2019 Final Report on Archaeological Pre-Development Testing at Ballintry, Kilbride, Co. Meath. Licence: 18E0445		

Unique Reference Number	AY_21	**Reference Number(s)**	DU011-091
Figure Number	Figure 13.1 in Volume 4	**Legal Status**	-
Townland	Ward Upper	**Site Type**	Habitation site (site of)
Easting / Northing	709410 / 744364	**Distance from Proposed Development**	17m to the south-east of the Proposed Development
Significance	Very Low / Negligible		
Description	Excavations in advance of the N2 Finglas-Ashbourne Road Scheme in 2004 revealed a random grouping of features including a small burnt pit, a linear feature and a small pit or cremation (03E1358). The pit (diam 1.65m, D 0.65m) produced 280 pieces of prehistoric pottery of Late date (NRA). [1] While this site provides an indication of possible activity in this location, given it has been removed and developed, it is no longer an asset. [2]		
Sources	1. Archaeological Survey of Ireland SMR 2. Jacobs July 2023		

Unique Reference Number	AY_23	**Reference Number(s)**	DU011-039001
Figure Number	Figure 13.1 in Volume 4	**Legal Status**	Recorded Monument (also AH_06; a Protected Structure)
Townland	Ward Lower	**Site Type**	Church
Easting / Northing	709652 / 744834	**Distance from Proposed Development**	23m to the north-west of the Proposed Development
Significance	High		
Description	Dedicated to St Brigid the church fell into ruin between 1630 and 1650 (Fingal Historic Graves Project 2008). This site was described as the walls of an old church in the Civil survey (1654-6) (Simington 1945, 235). The foundations of the medieval parish church can be traced within a raised, walled graveyard. In the 1992 report they appeared as a low rectangular mound, aligned WNW-ESE (dims. L 14m, Wth 8-9m, H.1m). The church has since undergone 'improvement'. It is defined by a rectilinear stone wall with a grass ramp built into south wall and return in north wall with a stone built concrete roofed alcove in east wall. The alcove contains a statute of the Blessed Virgin Mary. Wall stands to 0.75m-1m in height and is extensively ribbon pointed. Presumed enclosure of original mound remains. A fragment of a limestone window jamb of late medieval date has been re-used as a headstone east of the church. [1] Depicted on Rocque 1860 as 'the old church'. [2] LI_43: - A sub-circular area, truncated by the R121 to the south-east, measuring approximately 60m by 45m across. Includes a church building (in ruins) and monuments laid out in rows across the church yard. - Depicted on historic Ordnance Survey mapping as 'Church' and 'Grave Yd.', with the church identified as 'in ruins' on later editions. - Visible on aerial imagery. [3] Slightly elevated position, enclosed in an oval walled graveyard. Wall roughly coursed, rubblestone with a dressed cope. Modern roadside shrine, and shrine installed at the footings of the medieval parish church. Views are across flat agricultural fields to the north, west and south and across the busy road (R121) towards houses to the east. [4] 13km from Dublin at the side of the road which runs from Mulhuddart to the road between Finglas and Ashbain. 'Pleasant rural setting' surrounded on three sides by fields of barley and to the east by the road. Limestone wall encloses the entire site. Higher than surrounding land indicating use as a graveyard for a very long period of time. At the centre there are the foundations on an ancient church which, although in 'good repair' do not extend higher than 1m at any point. At the eastern end of the ruins a small 'grotto' has been 'tastefully' erected by Dublin County Council. Few old headstones on the south side of the church ruins. The oldest date - Lacy #59 - 15 May 1720 (oldest stone recorded), a limestone Maltese Cross on IHS in narrow starburst. Presently in use and well kept by Dublin County Council. [5]		
Sources	1. NMS, 1998, Record of Monuments and Places (County of Fingal) 2. https://www.lbrowncollection.com/dublin-parishes-composite-maps-1865/ [Accessed April 2023] 3. Appendix A13.2 (LiDAR Review for CP1021: East Meath to North Dublin Grid Upgrade) in Volume 3 of this EIAR 4. Jacobs site inspection and walkover survey, June 2023 5. Egan, M. J. S. (1991). Dublin City and County Graveyards. Ireland Branch of the Irish Genealogical Research Society. Dublin.		

Unique Reference Number	AY_24	**Reference Number(s)**	DU011-039002
Figure Number	Figure 13.1 in Volume 4	**Legal Status**	Recorded Monument (also AH_06; a Protected Structure)
Townland	Ward Lower	**Site Type**	Graveyard
Easting / Northing	709652 / 744825	**Distance from Proposed Development**	3m to the north-west of the Proposed Development
Significance	High		
Description	A raised, roughly oval, walled graveyard (L 70m, Wth 50m) which encloses the foundations of the medieval parish church (DU011-039001-). Fragment of a limestone window jamb of late medieval date is used as gravemarker in the graveyard E of church. The memorials are 19th/20th century in date. The site was formerly surveyed (Egan 1992). Still in use. [1] Depicted on Rocque 1960 as 'the old church'. [2] LI_43: - A sub-circular area, truncated by the R121 to the south-east, measuring approximately 60m by 45m across. Includes a church building (in ruins) and monuments laid out in rows across the church yard. - Depicted on historic Ordnance Survey mapping as 'Church' and 'Grave Yd.', with the church identified as 'in ruins' on later editions. - Visible on aerial imagery. [3] Slightly elevated position, enclosed in an oval walled graveyard. Wall roughly coursed, rubblestone with a dressed cope. Modern roadside shrine, and shrine installed at the footings of the medieval parish church. Views are across flat agricultural fields to the north, west and south and across the busy road (R121) towards houses to the east. [4] 13km from Dublin at the side of the road which runs from Mulhuddart to the road between Finglas and Ashbain. 'Pleasant rural setting' surrounded on three sides by fields of barley and to the east by the road. Limestone wall encloses the entire site. Higher than surrounding land indicating use as a graveyard for a very long period of time. At the centre there are the foundations on an ancient church which, although in 'good repair' do not extend higher than 1m at any point. At the eastern end of the ruins a small 'grotto' has been 'tastefully' erected by Dublin County Council. Few old headstones on the south side of the church ruins. The oldest date - Lacy #59 - 15 May 1720 (oldest stone recorded), a limestone Maltese Cross on IHS in narrow starburst. Presently in use and well kept by Dublin County Council. [5]		
Sources	1. NMS, 1998, Record of Monuments and Places (County of Fingal) 2. https://www.lbrowncollection.com/dublin-parishes-composite-maps-1865/ [Accessed April 2023] 3. Appendix A13.2 (LiDAR Review for CP1021: East Meath to North Dublin Grid Upgrade) in Volume 3 of this EIAR 4. Jacobs site inspection and walkover survey, June 2023 5. Egan, M. J. S. (1991). Dublin City and County Graveyards. Ireland Branch of the Irish Genealogical Research Society. Dublin.		

Unique Reference Number	AY_25	**Reference Number(s)**	DU011-068
Figure Number	Figure 13.1 in Volume 4	**Legal Status**	Recorded Monument
Townland	Ward Upper	**Site Type**	Castle - unclassified
Easting / Northing	710002 / 745096	**Distance from Proposed Development**	36m to the north of the Proposed Development
Significance	Medium		
Description	The Civil survey (1654-6) describes the walls of an old castle at the Ward, held by Sir James Ware (Simington 1945, 235). This may have been formerly located where Ward House is situated just NE of the medieval parish church (DU011-039----). Austin Cooper's in 1779 describes the remains of an 'old castle. It is nothing more than the lower storey....built of small flat stones and is in a ruinous condition. The door is at one end opposite a window and the left corner as you enter a Gothic door which leads to the Orchard where there are pieces of other stone walls'. There are remains of an orchard to the rear of the present Ward House but no visible remains of a castle. [1] A ruined church is depicted on historic mapping, no castle is depicted. [2] [3] [4] Described as 'the walls of an olde castle'. Part of a holding with other buildings including the ruins of an old church [AY_23]. [5] The first proprietor of the Ward after the English invasion caused to be here constructed a large fosse called "Halfpenny Trench… At the close of the sixteenth century a castle was garrisoned here". [6] Not visible from the road. High stone boundary wall. [7]		
Sources	1. NMS, 1998, Record of Monuments and Places (County of Fingal) 2. https://www.lbrowncollection.com/dublin-parishes-composite-maps-1865/ [Accessed April 2023] 3. http://www.dublinhistoricmaps.ie/maps/1600-1799/index.html [Accessed August 2022] 4. https://iiif.lib.harvard.edu/manifests/view/ids:10653105 [Accessed August 2022] 5. https://www.irishmanuscripts.ie/digital/The Civil Survey AD 1654-56 Vol VII County of Dublin/The Civil Survey AD 1654-56 Vol VII County of Dublin.pdf [Accessed August 2022] 6. D'Alton, J. (1838). The History of the County of Dublin. Hodges and Smith, College-Green. Dublin. 7. Jacobs site inspection and walkover survey, June 2023		

Unique Reference Number	AY_29	**Reference Number(s)**	DU011-023001
Figure Number	Figure 13.1 in Volume 4	**Legal Status**	Recorded Monument
Townland	Common	**Site Type**	Ringfort - unclassified
Easting / Northing	712321 / 745846	**Distance from Proposed Development**	50m to the north of the Proposed Development
Significance	Medium		
Description	Located in a field of low-lying pasture. The 1837 OS 6-inch map shows an oval enclosure (50m N-S; 30m E-W). The depiction of the site on the current OS 6-inch map suggests that it was a ringfort. An archaeological assessment of the site in the winter of 1999 revealed no archaeological evidence for the monument. A dwelling had been constructed on the site (Conway, 2000, 57-8). [1] An oval enclosure is depicted nearby on historic mapping but is not depicted on later mapping. [2] [3] This location has been developed. Archaeological testing in advance of proposed residential development in this location did not identify any features of archaeological significance or relating to this asset. [4]		
Sources	1. NMS, 1998, Record of Monuments and Places (County of Fingal) 2. Ordnance Survey 6" (1837) MH051 3. Ordnance Survey 25" (1908) DN011-10 4. https://excavations.ie/report/1999/Dublin/0004056/ [Accessed August 2022]		

Unique Reference Number	AY_41	**Reference Number(s)**	DU011-043
Figure Number	Figure 13.1 in Volume 4	**Legal Status**	Recorded Monument
Townland	Forrest Great	**Site Type**	Ringfort - unclassified
Easting / Northing	715314 / 744668	**Distance from Proposed Development**	10m to the north-west of the Proposed Development
Significance	Medium		
Description	Situated on level grassland. This site was formerly a platform type ringfort (diam. c. 50m) with a waterlogged external fosse (Healy 1975, 23). It's southeastern quadrant has been truncated by works associated with Dublin Airport but the majority of the ringfort is visible as a crop mark on the Bird's Eye viewer of Bing. [1] Depicted on First Edition Ordnance Survey mapping. [2] LI_52: - A circular feature measuring approximately 80m in diameter, truncated by a roundabout on the R108. - Corresponds with a ringfort identified on the RMP (AY_41; DU011-043). - The 'fort' is depicted on historic Ordnance Survey mapping (1843, 1908). - This feature is also visible on aerial imagery (GoogleEarth, various; https://ncap.org.uk/frame/11-1-2-76-41, https://ncap.org.uk/frame/11-1-2-76-42). [3] Located within an arable field to the north of the R108. The site has been interpreted as a platform-type ringfort with a waterlogged external fosse (ditch). Modern infrastructure, including airport lighting, form part of this asset's setting, along with traffic / plane noise. Visible as a very low rise to the south-east of the field, a ditch is vaguely perceptible in sections in the grass. [4]		
Sources	1. NMS, 1998, Record of Monuments and Places (County of Fingal) 2. Ordnance Survey 6" (1843) DN011 3. Appendix A13.2 (LiDAR Review for CP1021: East Meath to North Dublin Grid Upgrade) in Volume 3 of this EIAR 4. Jacobs site inspection and walkover survey, June 2023		

Unique Reference Number	AY_43	**Reference Number(s)**	DU011-046
Figure Number	Figure 13.1 in Volume 4	**Legal Status**	Recorded Monument
Townland	Cloghran	**Site Type**	Ringfort - unclassified
Easting / Northing	717244 / 744290	**Distance from Proposed Development**	14m to the south of the Proposed Development
Significance	Medium		
Description	Named 'fort' on the 1837 OS 6-inch map. It was partly demolished in 1822 and cleared away in 1873 (Healy 1975, 24). The area has been incorporated into an extension to the recently constructed runway at Dublin Airport. Not visible at ground level. [1] Comprises a 'fort' depicted on First Edition Ordnance Survey mapping (1837 – 1842) and has since been redeveloped as part of Dublin Airport. [2]		
Sources	1. NMS, 1998, Record of Monuments and Places (County of Fingal) 2. Ordnance Survey 6" (1843) DN011		

Unique Reference Number	AY_47	**Reference Number(s)**	DU015-001
Figure Number	Figure 13.1 in Volume 4	**Legal Status**	Recorded Monument
Townland	Cloghran	**Site Type**	Mound
Easting / Northing	718868 / 743533	**Distance from Proposed Development**	0m
Significance	Medium		
Description	In field of pasture N of farm house. An aerial photograph (FSI 453/2) taken in 1971 shows evidence for an earthen mound (diam. c. 15m). Not visible at ground level. [1] Not depicted on historic mapping. [2] [3] Not visible on aerial imagery, including 1970s aerial photographs or available GoogleEarth epochs. [4] [5] Not visible on the ground (located within an arable field). [6] The RMP file for the site states that an aerial photograph from the Fairey Survey of Ireland, 453/2 in 1971 shows evidence for an earthen mound c.15m in diameter. The copy of the photograph from the Fairey Survey which is in the RMP file clearly shows the circular site, located c.50m north-west of the existing farmhouse, and c.30m west of the eastern hedgerow of the field. The file notes, which were compiled in 1993, state that this in no longer visible. The condition of the monument is recorded in the file as "no visible trace". A field inspection of this field failed to find any evidence of the monument. [7] [8]		
Sources	1. NMS, 1998, Record of Monuments and Places (County of Fingal) 2. Ordnance Survey 6" (1843) DN015 3. Ordnance Survey 25" (1909) DN015-01 4. https://ncap.org.uk/frame/11-1-2-76-8?pos=0 [Accessed April 2023] 5. Google Earth, various 6. Jacobs site inspection and walkover survey, June 2023 7. Duffy, C., 2008, Archaeological Assessment including Test Trenching of a Site at Stockhole Lane, Cloghran, Co. Dublin. https://heritagemaps.ie/documents/Therefore_ArchaeologyReports/08E0333.pdf [Accessed October 2023]. 8. National Monuments Service Archive, ASI Record [provided November 2023]		

2. Inventory of Architectural Heritage Assets

Unique Reference Number	AH_06	**Reference Number(s)**	RPS 660
Figure Number	Figure 13.2 in Volume 4	**Legal Status**	Protected Structure (Also AY_23 and AY_24; Recorded Monuments)
Townland	Ward Lower	**Site Type**	Church in ruins
Easting / Northing	709654 / 744837	**Distance from Proposed Development**	3 - 23m to the north-west of the Proposed Development
Significance	High		
Description	St. Brigid's Church & Graveyard (in ruins) Remains of foundations of medieval parish church within raised, walled graveyard. [1] A ruined church is depicted on Rocque's map (1760) and a map of the environs of Dublin (1853). [2] [3] A church and graveyard are depicted on historic Ordnance Survey mapping, with a 'Church Well' to the south, opposite an 'Old Quarry'. Later mapping depicts the church 'in ruins'. [4] [5] Graveyard remains in use. [6] A modern roadside shrine and a "grotto" to the east of the church have been installed. The elevated interior of the site suggests the graveyard has been in use for a long period of time and the oldest headstone recorded dates to 1720. [7] Located immediately adjacent to the R121. Views to the west are open over the surrounding fields; however, are limited to the east and north by buildings and to the south by established trees. Views east are across the busy R121 towards a house. [8]		
Sources	1. https://www.fingal.ie/sites/default/files/2019-04/2017-2023_dev_plan_record_of_protected_structures.pdf [Accessed August 2022] 2. http://www.dublinhistoricmaps.ie/maps/1600-1799/index.html [Accessed August 2022] 3. https://iiif.lib.harvard.edu/manifests/view/ids:10653105 [Accessed August 2022] 4. Ordnance Survey 6" (18137) MH051 5. Ordnance Survey 25" (1908) DN011-13 6. https://buried.fingal.ie/burial-ground-locations/the-ward/ [Accessed April 2023] 7. Egan, M. J. S. (1991). Dublin City and County Graveyards. Ireland Branch of the Irish Genealogical Research Society. Dublin. 8. Jacobs site inspection and walkover survey, June 2023		

Unique Reference Number	AH_10	**Reference Number(s)**	RPS 608
Figure Number	Figure 13.2 in Volume 4	**Legal Status**	Protected Structure
Townland	Swords Glebe (part of)	**Site Type**	Enclosed stone well at base of steps under tree in field
Easting / Northing	718010 / 744000	**Distance from Proposed Development**	14m to the north of the Proposed Development
Significance	Medium		
Description	Enclosed stone well at base of steps under tree in field. Identified as a holy well in Development Plan. [1] The well is not depicted on First Edition Ordnance Survey mapping (1837 – 1842); however, is shown on later mapping (Ordnance Survey 25", 1888-1913) at the end of a trackway at the corner of a pair of field boundaries. [2] [3] The well is located north of Stockhole Lane, within an area of established vegetation. Very overgrown. A course of stones were visible in the undergrowth, likely forming part of this asset. Located within an established field boundary beneath a mature tree to the north of Stockhole Lane. [4]		
Sources	1. https://www.fingal.ie/sites/default/files/2019-04/2017-2023_dev_plan_record_of_protected_structures.pdf [Accessed August 2022] 2. Ordnance Survey 6" (1843) DN014 3. Ordnance Survey 25" (1909) DN014-04 4. Jacobs site inspection and walkover survey, June 2023		

Unique Reference Number	AH_13	**Reference Number(s)**	NIAH 11349005
Figure Number	Figure 13.2 in Volume 4	**Legal Status**	NIAH - Regional
Townland	Belcamp	**Site Type**	Country house
Easting / Northing	719398 / 741439	**Distance from Proposed Development**	14m to the north of the Proposed Development
Significance	Low		
Description	Detached three-bay two-storey house, c.1840, with central portico. ROOF: M-profile double pitched slate roof; rendered chimney stacks; terracotta pots. WALLS: Pebble dashed; nap rendered plinth course. OPENINGS: Ionic columns to portico; square headed openings; stone cills; uPVC casements. The house has been demolished. [1] 'Belcamp' is depicted on First Edition Ordnance Survey mapping (1837 – 1842) in its demesne (DL_17), with ancilliary buildings depicted to the north and a formal garden laid out to the north-west of the house. Later mapping shows the same layout. [2] [3]		
Sources	1. https://www.fingal.ie/sites/default/files/2019-04/2017-2023_dev_plan_record_of_protected_structures.pdf [Accessed August 2022] 2. Ordnance Survey 6" (1843) DN015 3. Ordnance Survey 25" (1909) DN015-05		

3. Inventory of Gardens and Designed Landscapes

Unique Reference Number	DL_04	**Reference Number(s)**	NIAH 5156
Figure Number	Figure 13.3 in Volume 4	**Legal Status**	-
Townland	Priest Town	**Site Type**	GDL
Easting / Northing	705834 / 745825	**Distance from Proposed Development**	0m
Significance	Medium		
Description	Priest Town House - Building indicated, area labelled Priest Town. [1] House and ancillary buildings depicted on historic Ordnance Survey mapping. Parkland woodland, and original driveways and entrances remain extant. Boundary along Belgree Lane formed of hedgerows and 'Crockanee' woodland. [2] Crockanee Wood and the established hedgerows form a dense screen adjacent to the road. [3] Extant landscape features: external boundary, areas of woodland, internal boundaries, entrances, driveway, principal building, parkland; some modern development / some features vaguely perceptible - driveway, garden areas. [4]		
Sources	1. https://www.buildingsofireland.ie/buildings-search/site/5156/priest-town-house-kilbride-co-meath [Accessed August 2022] 2. Ordnance Survey 6" (1837) MH051 3. Google StreetView 4. Jacobs July 2023		

Unique Reference Number	DL_05	**Reference Number(s)**	NIAH 2267
Figure Number	Figure 13.3 in Volume 4	**Legal Status**	-
Townland	Hollystown; Hollywood; Hollywoodrath; Spricklestown	**Site Type**	GDL
Easting / Northing	708289 / 743285	**Distance from Proposed Development**	0m
Significance	Medium		
Description	Hollywoodrath - Buildings indicated, area labelled Hollywood. [1] House, garden and ancillary buildings depicted on historic Ordnance Survey mapping. [2] [3] Some development within the footprint of the site, including the golf course to the west. A section of roadside rubblestone boundary wall remains extant to the south of the site along the road that bisects the demesne. [4] Established hedgerow (including trees) and a ditch along north boundary of the demesne. Extant roadside wall to south, roughly coursed, squared stones with alternate horizontal and vertical cope stones (continue south of entrance and round onto R121). Large Entrance, with low rendered walls, cast iron railings on top, with large gatepiers (with modern lights on top) and pair of cast iron gates. Single storey lodge located inside the entrance, adjacent to drive, with views across entrance and road. [5] Extant landscape features: partial external / internal boundaries, principal house, gate lodge and exntrance (Golf course and housing in parkland area to the west); drive (although altered).[6]		
Sources	1. https://www.buildingsofireland.ie/buildings-search/site/2267/hollywoodrath-mulhuddart-co-dublin [Accessed August 2022] 2. Ordnance Survey 6" (1837) MH051 3. Ordnance Survey 25" (1909) DN013-04 4. Google StreetView 5. Jacobs site inspection and walkover survey, June 2023 6. Jacobs July 2023		

Unique Reference Number	DL_07	**Reference Number(s)**	-
Figure Number	Figure 13.3 in Volume 4	**Legal Status**	-
Townland	Ward Lower	**Site Type**	GDL
Easting / Northing	710057 / 745171	**Distance from Proposed Development**	0m
Significance	Very Low / Negligible		
Description	Ward House - Identified from historic Ordnance Survey mapping as 'Ward House'. [1] Located on the crossroads between the R135 and R121. The area has been redeveloped, including a new high roadside boundary wall. The house and two adjoining agricultural ranges remain extant. Alignment of one driveway also perceptible; however, majority of other demesne features have been removed. A complex of modern agricultural buildings are located on the western boundary and a new bungalow to the north-east. Two storey house with views across gardens and fields to the north-east (and the road beyond) and towards the farm to the west. High stone roadside boundary wall, some sections have been replaced adjacent to the R121. Northern boundary to the demesne has been removed. [2] Modern development includes farm buildings, a bungalow, the R121, and 'The Ward Cross' roundabout. [3] Extant landscape features: driveway and house / agricultural ranges (footprint no longer legible). This demesne is no longer legible in the landscape given the removal of the boundaries and replacement with modern roadside walls. Modern development has also encroached on the site and, while the house and original agricultural ranges remain extant, the features of the demesne have largely been removed. [4]		
Sources	1. Ordnance Survey 6" (1837) MH051 2. Google StreetView 3. Jacobs site inspection and walkover survey, June 2023 4. Jacobs July 2023		

Unique Reference Number	DL_08	**Reference Number(s)**	-
Figure Number	Figure 13.3 in Volume 4	**Legal Status**	-
Townland	Newpark	**Site Type**	GDL
Easting / Northing	711071 / 745492	**Distance from Proposed Development**	0m
Significance	Very Low / Negligible		
Description	Newpark House - Identified from historic Ordnance Survey mapping as 'Newpark House'. [1] Located to the south of the R121. Redeveloped as a commercial complex, including a concrete block boundary wall. Original buildings as depicted on 6" OS mapping appear to have been removed and the area redeveloped as a commercial premises. [2] [3] Extant landscape features: pond, some external boundaries, largely developed. [4]		
Sources	1. Ordnance Survey 6" (1837) MH051 2. Google StreetView 3. Jacobs site inspection and walkover survey, June 2023 4. Jacobs July 2023		

Unique Reference Number	DL_09	**Reference Number(s)**	-
Figure Number	Figure 13.3 in Volume 4	**Legal Status**	-
Townland	Kingstown	**Site Type**	GDL
Easting / Northing	713279 / 744623	**Distance from Proposed Development**	0m
Significance	Very Low / Negligible		
Description	Kingstown House - Identified from historic Ordnance Survey mapping as 'Kingstown House'. Roadside boundaries reflect those depicted. House and associated buildings have been removed and the entrance replaced. [1] Boundary features along Kilreesk Road include a ditch and established boundary (trees and hedgerow), as well as a modern post and rail fence. Established boundary with overgrown driveway to cleared area (former location of house). [2] [3] Extant landscape features: exterior boundary, driveway (overgrown), site of buildings. While legible, this demesne retains limited original landscape features. [4]		
Sources	1. Ordnance Survey 6" (1843) DN011 2. Google StreetView 3. Jacobs site inspection and walkover survey, June 2023 4. Jacobs July 2023		

Unique Reference Number	DL_11	**Reference Number(s)**	NIAH 5726
Figure Number	Figure 13.3 in Volume 4	**Legal Status**	-
Townland	Cloghran	**Site Type**	GDL
Easting / Northing	717559 / 743989	**Distance from Proposed Development**	30m to the south-west of the Proposed Development
Significance	Low		
Description	Castle Mount - Identified from historic Ordnance Survey mapping as 'Castle Mount'. [1] The principal building remains extant (RPS 611); however, the area has been developed. The boundary depicted on historic mapping (Ordnance Survey 6", 1837 – 1842) is vaguely perceptible in places as hedgerows. The boundary on the R132 appears to have been replaced with a new wall. [2] Extant landscape features: some boundaries, driveway. Remains partially perceptible in the landscape. [4]		
Sources	1. Ordnance Survey 6" (1843) DN014 2. Google StreetView 3. Jacobs July 2023		

Unique Reference Number	DL_13	**Reference Number(s)**	-
Figure Number	Figure 13.3 in Volume 4	**Legal Status**	-
Townland	Cloghran	**Site Type**	GDL
Easting / Northing	718057 / 743892	**Distance from Proposed Development**	0m
Significance	Very Low / Negligible		
Description	Limepark - Identified from historic Ordnance Survey mapping as 'Limepark'. [1] House appears to have been demolished and the majority of the boundaries are no longer present apart from some sections of hedgerow. Bisected by Stockhole Lane. Part of the northern boundary, driveway and Glebe House to the south-east remain extant; however, this demesne has been bisected by a local access road from Stockhole lane to Old Stockhole Lane, as well as Stockhole Lane. [2] [3] Extant landscape features: Glebe House, some boundaries, driveway. Remains partially perceptible in the landscape; however, has been bisected by Stockhole Lane. [4]		
Sources	1. Ordnance Survey 6" (1843) DN014 2. Google StreetView 3. Jacobs site inspection and walkover survey, June 2023 4. Jacobs July 2023		

Unique Reference Number	DL_15	**Reference Number(s)**	-
Figure Number	Figure 13.3 in Volume 4	**Legal Status**	-
Townland	Middletown	**Site Type**	GDL
Easting / Northing	718864 / 742282	**Distance from Proposed Development**	0m
Significance	Very Low / Negligible		
Description	Upper Middletown - Identified from historic Ordnance Survey mapping as 'Upper Middletown'. [1] The house, driveway and 'Turret' are no longer extant. The gate lodge to the east of Stockhole Lane has been redeveloped as modern dwellings. The site boundary remains extant as established hedgerows with former sub-divisions visible as cropmarks on aerial imagery. [2] The footings of a roadside range, or boundary wall, were identified during the site inspection and walkover survey and are visible as an area of disturbance on aerial imagery and LiDAR data (CH_34). [3] [4] Extant landscape features: Partial external boundary, one internal boundary, footings / walls of Upper Middleton to north. [5]		
Sources	1. Ordnance Survey 6" (1843) DN014 & DN015 2. Google StreetView 3. Jacobs site inspection and walkover survey, June 2023 4. Appendix A13.2 (LiDAR Review for CP1021: East Meath to North Dublin Grid Upgrade) in Volume 3 of this EIAR 5. Jacobs July 2023		

Unique Reference Number	DL_16	**Reference Number(s)**	-
Figure Number	Figure 13.3 in Volume 4 of this EIAR	**Legal Status**	-
Townland	Glebe	**Site Type**	GDL
Easting / Northing	718945 / 743380	**Distance from Proposed Development**	0m
Significance	Low		
Description	Glebe House - Identified from historic Ordnance Survey mapping as 'Glebe House'. [1] House has been replaced with modern dwellings; however, the boundary and sub-divisions reflect those depicted on historic Ordnance Survey mapping. The site boundary comprises established hedgerows, including trees, some of which have modern fence running parallel. [2] Extant landscape features: external boundary and some internal, house and drive no longer extant. [3]		
Sources	1. Ordnance Survey 6" (1843) DN014 & DN015 2. Google StreetView 3. Jacobs July 2023		

Unique Reference Number	DL_17	**Reference Number(s)**	NIAH 2455
Figure Number	Figure 13.3 in Volume 4 of this EIAR	**Legal Status**	-
Townland	Belcamp	**Site Type**	GDL
Easting / Northing	719160 / 741169	**Distance from Proposed Development**	0m
Significance	Very Low / Negligible		
Description	Belcamp - Identified from historic Ordnance Survey mapping as 'Belcamp'. [1] House has been demolished (AH_13); however, the boundary and interal divisions reflect those depicted on historic Ordnance Survey mapping. [2] Extant landscape features: external boundary and some internal divisions including the formal garden, the bridge and weir are also perceptible. House and ancillary buildings no longer extant. The access track to Belcamp substation bisects the demsene. [3]		
Sources	1. Ordnance Survey 6" (1843) DN014 & DN015 2. MapGenie, 2013 - 2018 3. Jacobs July 2023		

4. Inventory of Cultural Heritage Assets

Unique Reference Number	CH_01	**Reference Number(s)**	-
Figure Number	Figure 13.4 in Volume 4	**Legal Status**	-
Townland	Blackhall Big	**Site Type**	Roadside house
Easting / Northing	694847 / 744987	**Distance from Proposed Development**	10m to the south of the Proposed Development
Significance	Low		
Description	An 'L'-shaped, single storey roadside cottage depicted on historic Ordnance Survey mapping. Rendered with central stack. [1] Located within a walled (low coursed, squared stone) plot, set at an angle with the road (R156), with an unenclosed drive to the north. Views are over the R156 towards the fields to the north. Single storey rendered house, with slate roof. Plot bounded by a low squared, rubblestone wall. Views across R156 towards established hedgerows and pasture field beyond. Appears to have later additions / some modernisation. [2] Large gravel driveway between road and boundary wall. Established roadside boundaries to east and west; however, view largely across road immediately to the north towards fields. [3]		
Sources	1. Ordnance Survey 25" (1911) MH050-01 2. Google StreetView 3. Jacobs site inspection and walkover survey, June 2023		

Unique Reference Number	CH_04	**Reference Number(s)**	-
Figure Number	Figure 13.4 in Volume 4	**Legal Status**	-
Townland	Staffordstown Little	**Site Type**	Roadside house
Easting / Northing	696345 / 744282	**Distance from Proposed Development**	7m to the south-west of the Proposed Development
Significance	Very Low / Negligible		
Description	A house depicted on historic Ordnance Survey mapping. [1] The house is positioned perpendicular to the R156, and comprises a single storey rendered structure with tile roof and central stack, with a high walled garden / yard to the south. Appears abandoned and plot is overgrown. A single storey house, with tile roof and central stack. Roof appears to have collapsed and the house is no longer in use. [2] Within a small overgrown plot in a large agricultural field. [3]		
Sources	1. Ordnance Survey 25" (1911) MH050-06 2. Google StreetView, June 2021 3. Jacobs site inspection and walkover survey, June 2023		

Unique Reference Number	CH_12	**Reference Number(s)**	-
Figure Number	Figure 13.4 in Volume 4	**Legal Status**	-
Townland	Ballymagillin	**Site Type**	Courtyard farm
Easting / Northing	702502 / 744660	**Distance from Proposed Development**	3m to the north of the Proposed Development
Significance	Low		
Description	A group of farm buildings arranged in a courtyard plan depicted on historic Ordnance Survey mapping. Single and two-storey rendered stone ranges remain extant with some modern additions forming part of the farm complex. [1] [2] Views are internal across the farmyard with views out limited by a high stone wall. The farm is positioned immediately to the north of the L5026. [3] Rendered and painted roadside (L5026) agricultural ranges, arranged in a courtyard plan. Some modern replacement, including concrete block buildings, corugated sheet roofing and modern hay barn. An entrance to modern housing to the north is also located adjacent to the farm (to the west). Remnants of a rubblestone wall was also noted to the east of the roadside range. Views are internal, across the yard. Pasture fields surround the farm on three sides, with modern bungalows located to the north. [3] [4]		
Sources	1. Ordnance Survey 6" (1837) MH050 2. Ordnance Survey 25" (1911) MH050-08 3. Google StreetView 4. Jacobs site inspection and walkover survey, June 2023		

Unique Reference Number	CH_13	**Reference Number(s)**	-
Figure Number	Figure 13.4 in Volume 4	**Legal Status**	-
Townland	Whitesland	**Site Type**	House
Easting / Northing	702660 / 744657	**Distance from Proposed Development**	4m to the north of the Proposed Development
Significance	Low		
Description	A house depicted on historic Ordnance Survey mapping comprising a roughly coursed rubble stone construction. [1] Appears to have been altered and includes modern extensions. The house is located within a low stone walled garden and is positioned perpendicular to the L5026. Views outward are filtered by the surrounding established grounds. [2] A two storey roadside house, positioned at an angle with the carriageway within a walled private garden. Views are orientated east, across the garden towards neighbouring properties, and west across the garden to fields beyond. While the house is located close to the road, views are filtered by established trees lining the verge. [3]		
Sources	1. Ordnance Survey 25" (1911) MH050-08 2. Google StreetView 3. Jacobs site inspection and walkover survey, June 2023		

Unique Reference Number	CH_15	**Reference Number(s)**	-
Figure Number	Figure 13.4 in Volume 4	**Legal Status**	-
Townland	Belgree	**Site Type**	Road bridge
Easting / Northing	705608 / 745439	**Distance from Proposed Development**	0m
Significance	Low		
Description	A stone road bridge depicted on historic Ordnance Survey mapping. [1] The bridge includes a pair of low coursed rubblestone parapets with squared ends and horizontal copes. A footway is present inside both parapets. The bridge appears to have been refurbished. The bridge carries Belgree Lane across the Ward River. [2] Squared roughly hewn rubblestone parapets, located either side of Belgree Lane, forming part of the bridge crossing the Ward River. Large squared copes with smaller squared roughly coursed masonry below, and a modern footway added either side. [3]		
Sources	1. Ordnance Survey 6" (1837) MH051 2. Google StreetView, June 2021 3. Jacobs site inspection and walkover survey, June 2023		

Unique Reference Number	CH_24	**Reference Number(s)**	-
Figure Number	Figure 13.4 in Volume 4	**Legal Status**	-
Townland	Ward Upper	**Site Type**	House
Easting / Northing	710160 / 745108	**Distance from Proposed Development**	16m to the south-east of the Proposed Development
Significance	Low		
Description	'Six Mile House' depicted on historic Ordnance Survey mapping. [1] The house comprises a single storey, brick and rendered building with a slate roof and gable stack. Original house appears to have been extended. [2] The house is located on the roadside on the junction between the R121 and the R135. Views out are limited by hedges, a wall, and outbuildings; however, to the north and east views are across the roundabout and roads. [3]		
Sources	1. Ordnance Survey 6" (1837) MH051 2. Google StreetView, July 2021 3. Jacobs site inspection and walkover survey, June 2023		

Unique Reference Number	CH_25	**Reference Number(s)**	-
Figure Number	Figure 13.4 in Volume 4	**Legal Status**	-
Townland	Newpark	**Site Type**	Agricultural ranges
Easting / Northing	710338 / 745269	**Distance from Proposed Development**	0m
Significance	Low		
Description	A group of roadside agricultural buildings, forming a courtyard, depicted on historic Ordnance Survey mapping. [1] [2] The buildings comprise one and two-storey structures, constructed with stone and brick. Views are across the farmyard with views out limited by a wall. The farm is positioned immediately to the north of the R121. [3] Yard expanded by 1940 to include a house and further ranges (OS). [4] Roadside farm, as described. Views are internal across a yard. With a range and boundary wall lining the R121. [5]		
Sources	1. Ordnance Survey 6" (1837) MH051 2. Ordnance Survey 25" (1908) DN011-13 3. Google StreetView 4. Ordnance Survey 6" (1941) DN011 5. Jacobs site inspection and walkover survey, June 2023		

Unique Reference Number	CH_29	**Reference Number(s)**	-
Figure Number	Figure 13.4 in Volume 4	**Legal Status**	-
Townland	Ballystrahan	**Site Type**	House
Easting / Northing	712626 / 745191	**Distance from Proposed Development**	7m to the south-west of the Proposed Development
Significance	Low		
Description	A roadside house depicted on historic Ordnance Survey mapping. [1] [2] The house comprises a single storey rendered five-bay structure with an off-centre stack and tile roof. Farm buildings, some of which are depicted on later mapping are located to the south and west. The house is located adjacent to R122 within a plot enclosed by a low rendered boundary wall. [3] A single storey, white rendered house with tile roof and later projecting porch. Set back from road, at an angle, with a low rendered stone boundary wall and set of gates / gate piers. Views are actoss the drive adjacent to the house, across the busy R122, towards a pasture field beyond. [4]		
Sources	1. Ordnance Survey 6" (1836) DN011 2. Ordnance Survey 25" (1908) DN011-14 3. Google StreetView 4. Jacobs site inspection and walkover survey, June 2023		

Unique Reference Number	CH_32	**Reference Number(s)**	-
Figure Number	Figure 13.4 in Volume 4	**Legal Status**	-
Townland	Clonshaugh	**Site Type**	Field system
Easting / Northing	719193 / 741776	**Distance from Proposed Development**	0m
Significance	Low		
Description	A network of linear cropmarks visible on aerial imagery. [1] These cropmarks correspond with former field boundaries depicted on historic Ordnance Survey mapping that have since been removed. [2]		
Sources	1. Digital Globe 2. Ordnance Survey 6" (1843) DN015		

Unique Reference Number	CH_33	**Reference Number(s)**	-
Figure Number	Figure 13.4 in Volume 4	**Legal Status**	-
Townland	Cloghran	**Site Type**	Farm
Easting / Northing	718928 / 743480	**Distance from Proposed Development**	15m to the south of the Proposed Development
Significance	Low		
Description	A courtyard farm depicted on historic Ordnance Survey mapping. [1] The farm comprises an 'L'-shaped range and farmhouse on Stockhole Lane. The farm is positioned at the end of a drive within large rectangular fields. Modern agricultural buildings form part of the yard. Views are internal across the farmyard with views out limited by buildings and established field boundaries. [2] Set back from Stockhole Lane. Internal facing, courtyard plan. Set within agricultural fields. Car park to rear. [3]		
Sources	1. Ordnance Survey 6" (1843) DN015 2. Google StreetView 3. Jacobs site inspection and walkover survey, June 2023		

Unique Reference Number	CH_34	**Reference Number(s)**	-
Figure Number	Figure 13.4 in Volume 4	**Legal Status**	-
Townland	Middletown	**Site Type**	House (site of)
Easting / Northing	718996 / 742340	**Distance from Proposed Development**	0m
Significance	Very Low / Negligible		
Description	Upper Middletown', a farm/house, depicted on historic Ordnance Survey mapping. [1] The buildings have been demolished. However, earthworks are visible in this location on aerial imagery and may indicate the site of the footings of the buildings. [2] [3] LI_59: - An irregular area of disturbance to the south of the road measuring approximately 45m by 33m. - Visible as an overgrown area adjacent to the road on aerial imagery. - 'Upper Middleton' (CH_34) is depicted in this location on historic Ordnance Survey mapping (1843); however, is reduced to one building (1909) on later editions. - Interpreted as the location of Upper Middle farm buildings. [4] Extant rubblestone walls noted adjacent to the lane. Could be the remains of a laneside building or boundary wall. [5]		
Sources	1. Ordnance Survey 6" (1843) DN015 2. Google StreetView 3. Digital Globe 4. Appendix A13.2 (LiDAR Review for CP1021: East Meath to North Dublin Grid Upgrade) in Volume 3 of this EIAR 5. Jacobs site inspection and walkover survey, June 2023		

Unique Reference Number	CH_53	**Reference Number(s)**	-
Figure Number	Figure 13.4 in Volume 4	**Legal Status**	-
Townland	Gallanstown	**Site Type**	Quarry
Easting / Northing	708417 / 743907	**Distance from Proposed Development**	3m to the north-east of the Proposed Development
Significance	Very Low / Negligible		
Description	A 'Quarry' depicted on historic Ordnance Survey mapping. Located in an arable field to the west of a local road. [1] [2] LI_39: - A small rectangular area measuring approximately 16m by 12m to the east of a local road. - Not depicted on historic Ordnance Survey mapping; however, located opposite a quarry identified on earlier editions (1843). - Vaguely perceptible on aerial imagery as a small area of disturbance in the corner of a pasture field. - Tentatively interpreted as a possible quarry of unknown date; however, could equally be modern disturbance. [3] No remains visible above ground. [4]		
Sources	1. Ordnance Survey 6" (1843) DN013 2. Ordnance Survey 25" (1909) DN013-04 3. Appendix A13.2 (LiDAR Review for CP1021: East Meath to North Dublin Grid Upgrade) in Volume 3 of this EIAR 4. Jacobs site inspection and walkover survey, June 2023		

Unique Reference Number	CH_58	**Reference Number(s)**	-
Figure Number	Figure 13.4 in Volume 4	**Legal Status**	-
Townland	Spicklestown	**Site Type**	Enclosure
Easting / Northing	708604 / 743762	**Distance from Proposed Development**	10m to the south of the Proposed Development
Significance	Medium		
Description	An ephemeral circular enclosure, comprising a single narrow ditch measuring approximately 42m in diameter, visible as a cropmark on aerial imagery (GoogleEath, 07/2013) in a small arable field. [1] This asset comprises a previously unrecorded possible univallate enclosure of unknown date, and may contribute to the understanding of rural settlement, the pattern and relationship between enclosures, and the local pastoral economy. [2]		
Sources	1. GoogleEarth, 07/2013 2. Jacobs July 2023		

Unique Reference Number	CH_59	**Reference Number(s)**	-
Figure Number	Figure 13.4 in Volume 4	**Legal Status**	-
Townland	Culcommon; Barstown	**Site Type**	Field system
Easting / Northing	694219 / 745068	**Distance from Proposed Development**	0m
Significance	Low		
Description	Linear features visible on aerial imagery (GoogleEarth, various) comprising a sinuous linear orientated approximately east-west and a perpendicular linear orientated north-south. [1] Reflects two field boundaries depicted on historic Ordnance Survey mapping. [2] [3]		
Sources	1. GoogleEarth, various 2. Ordnance Survey 6" (1837) MH050 3. Ordnance Survey 25" (1911) MH050-01		

Unique Reference Number	CH_60	**Reference Number(s)**	-
Figure Number	Figure 13.4 in Volume 4	**Legal Status**	-
Townland	Forrest Great	**Site Type**	Building
Easting / Northing	715563 / 744793	**Distance from Proposed Development**	30m to the north of the Proposed Development
Significance	Very Low / Negligible		
Description	A roadside building depicted on historic mapping. [1] [2] Possibly associated with Forrest House which is identified as 'in ruins' on later mapping. [3] Depicted on Ordnance Survey mapping (1843), with additional ranges depicted on later additions, including a roadside range (1908; 1941). [4] [5] Buildings are in poor condition, roofless and overgrown. Two gables of the single storey roadside range were identified, comprising rubblestone construction with some areas of render noted. A roadside cast iron gate with stone gate pier and dressed cope, was also identified. [6]		
Sources	1. Rocque, 1760, Dublin County 2. Taylor & Skinner Dublin to Swords, 1778 3. Taylor's Environs of Dublin, 1816 4. Ordnance Survey 6" (1843) DN011 5. Ordnance Survey 25" (1908) DN011-15 6. Jacobs site inspection and walkover survey, June 2023		

Unique Reference Number	CH_61	**Reference Number(s)**	-
Figure Number	Figure 13.4 in Volume 4	**Legal Status**	-
Townland	Woodland	**Site Type**	Ring ditches
Easting / Northing	694544 / 747983	**Distance from Proposed Development**	0m
Significance	Medium		
Description	A group of small circular cropmarks measuring between approximately 3m and 9m in diameter. Interpreted as a group of ring-ditches - possibly the remains of a barrow cemetery or group of roundhouses of prehistoric date. [1]		
Sources	1. BlueSky, 2022		

Unique Reference Number	CH_62	**Reference Number(s)**	-
Figure Number	Figure 13.4 in Volume 4	**Legal Status**	-
Townland	Woodland	**Site Type**	Ring ditches
Easting / Northing	694774 / 747813	**Distance from Proposed Development**	0m
Significance	Medium		
Description	A group of approximately 14 circular cropmarks measuring between approximately 4m and 20m in diameter. Interpreted as a group of ring-ditches - possibly the remains of a barrow cemetery or group of roundhouses of prehistoric date. [1] Locally undulating / tussock-y pasture field, irregular in shape with established hedgerow boundaries (including mature trees, scrub & ditches). Existing substation(s) visible from field, low humming from substation also perceptible. No remains of the ring-ditches were visible above ground. Some variation in grass; however, not discernible with any confidence as cropmarks identified from aerial imagery. [2]		
Sources	1. BlueSky, 2022 2. Walkover and site inspection, January 2023 [CP966]		

Unique Reference Number	CH_63	**Reference Number(s)**	-
Figure Number	Figure 13.4 in Volume 4	**Legal Status**	-
Townland	Piercetown	**Site Type**	Pump
Easting / Northing	702008 / 744698	**Distance from Proposed Development**	1m to the north of the Proposed Development
Significance	Low		
Description	A cast-iron pump in a concrete roadside recess. Set slightly back from the road (L5026) adjacent to a private driveway and modern telephone pole. A large covered plastic crate (on concrete blocks) is positioned in front of the pump. [1] Not depicted on historic Ordnance Survey mapping; however a pump is depicted further to the east outside a roadside farm (CH_12). The pump may not be in its original location. [2] [3] [4]		
Sources	1. Jacobs site inspection and walkover survey, June 2023 2. Ordnance Survey 6" (1837) MH050 3. Ordnance Survey 25" (1911) MH050-08 4. Ordnance Survey 6" (1912) MH050		

Unique Reference Number	CH_64	**Reference Number(s)**	-
Figure Number	Figure 13.4 in Volume 4	**Legal Status**	-
Townland	Cullendragh	**Site Type**	Building misc.
Easting / Northing	694115 / 745455	**Distance from Proposed Development**	9m to the north of the Proposed Development
Significance	Very Low / Negligible		
Description	The site of a small roofless rectangular building depicted on historic Ordnance Survey mapping in an irregular field. Not depicted on later mapping. [1] [2] Not visible on aerial imagery; however, a parchmark in this approximate location is visible (GoogleEarth, 2013). However, this could be the result of modern agricultural activity in this location. [3]		
Sources	1. Ordnance Survey 6" (1837) MH050 2. Ordnance Survey 25" (1911) MH050-01 3. GoogleEarth Jul' 2022		

Unique Reference Number	CH_65	**Reference Number(s)**	-
Figure Number	Figure 13.4 in Volume 4	**Legal Status**	-
Townland	Woodland	**Site Type**	Ring ditches
Easting / Northing	694697 / 747437	**Distance from Proposed Development**	0m
Significance	Medium		
Description	A group of small circular cropmarks measuring up to approximately 7m in diameter. Interpreted as a group of ring-ditches - possibly the remains of a barrow cemetery or group of roundhouses of prehistoric date. [1]		
Sources	1. BlueSky, 2022		

Unique Reference Number	CH_66	**Reference Number(s)**	-
Figure Number	Figure 13.4 in Volume 4	**Legal Status**	-
Townland	Cullendragh	**Site Type**	Enclosure
Easting / Northing	694419 / 746515	**Distance from Proposed Development**	0m
Significance	Medium		
Description	A faint circular enclosure visible as a cropmark on aerial imagery. Measuring approximately 6m in diameter. Tentatively interpreted as a possible enclosure of unknown date. [1]		
Sources	1. BlueSky, 2022		

Unique Reference Number	CH_67	**Reference Number(s)**	-
Figure Number	Figure 13.4 in Volume 4	**Legal Status**	-
Townland	Cullendragh	**Site Type**	Ring-ditches
Easting / Northing	694195 / 745582	**Distance from Proposed Development**	0m
Significance	Medium		
Description	A group of five ephemeral curvi-linear cropmarks visible on aerial imagery. Interpreted as a group of ring-ditches - possibly the remains of a barrow cemetery or group of roundhouses of prehistoric date. [1]		
Sources	1. BlueSky, 2022		

Unique Reference Number	CH_68	**Reference Number(s)**	-
Figure Number	Figure 13.4 in Volume 4	**Legal Status**	-
Townland	Cullendragh	**Site Type**	Field boundary
Easting / Northing	694111 / 745336	**Distance from Proposed Development**	0m
Significance	Very Low / Negligible		
Description	A linear feature measuring approximately 74m in length, orientation east-west visible on aerial imagery. A field boundary is depicted on historic OS mapping (25") in this location. [1] [2]		
Sources	1. BlueSky, 2022 2. Ordnance Survey 25" (1911) MH050-01		

Unique Reference Number	CH_69	**Reference Number(s)**	-
Figure Number	Figure 13.4 in Volume 4	**Legal Status**	-
Townland	Woodland	**Site Type**	Field boundaries
Easting / Northing	694632 / 748157	**Distance from Proposed Development**	0m
Significance	Low		
Description	Linear features in a field to the west of Woodland substation identified form aerial imagery. [1] [2] Corresponds with field boundaries depicted on historic OS mapping. [3] [4]		
Sources	1. Digital Globe Aerial Imagery 2. GoogleEarth, various dates 3. Ordnance Survey 6" (1837) MH044 4. Ordnance Survey 25" (1911) MH044-09		

Unique Reference Number	CH_70	**Reference Number(s)**	-
Figure Number	Figure 13.4 in Volume 4	**Legal Status**	-
Townland	Creemore	**Site Type**	Field boundaries
Easting / Northing	694994 / 748574	**Distance from Proposed Development**	0m
Significance	Low		
Description	Linear features in a field to the north of Woodland substation, as well as a circular feature measuring approximately 40m in diameter, identified form aerial imagery. [1] [2] Some correspond with field boundaries depicted on historic OS mapping; however, the field system and circular feature could be earlier in date. A ringfort (ME044-017; outwith the study area) is located approximately 100m to the west of the circular feature. [3] [4]		
Sources	1. Digital Globe Aerial Imagery 2. GoogleEarth, various dates 3. Ordnance Survey 6" (1837) MH044 4. Ordnance Survey 25" (1911) MH044-09		

Unique Reference Number	CH_71	**Reference Number(s)**	-
Figure Number	Figure 13.4 in Volume 4	**Legal Status**	-
Townland	Dunboyne	**Site Type**	House
Easting / Northing	700273 / 742738	**Distance from Proposed Development**	5m to the south of the Proposed Development
Significance	Low		
Description	Two roadside buildings depicted on historic Ordnance Survey mapping as 'Dispy.' [1] The house is located adjacent to R156 Regional Road within a plot enclosed by a low rendered boundary wall. Views from the house are limited by established vegeation and mature trees along the boundaries. [2]		
Sources	1. Ordnance Survey 25" (1911) MH050-12 2. Google StreetView		

Unique Reference Number	CH_72	**Reference Number(s)**	-
Figure Number	Figure 13.4 in Volume 4	**Legal Status**	-
Townland	Dunboyne	**Site Type**	Palaeochannel
Easting / Northing	700313 / 742839	**Distance from Proposed Development**	0m
Significance	Medium		
Description	An ephemeral sinuous meandering channel visible on aerial imagery. [1] Not depicted on historic mapping; however, located to the west of a straight watercourse. [2] [3]		
Sources	1. MapGenie Imagery, varous dates 2. Ordnance Survey 6" (1837) MH050 3. Ordnance Survey 25" (1911) MH050-12		

Unique Reference Number	CH_73	**Reference Number(s)**	-
Figure Number	Figure 13.4 in Volume 4	**Legal Status**	-
Townland	Pace	**Site Type**	Railway
Easting / Northing	701674 / 744212	**Distance from Proposed Development**	0m
Significance	Low		
Description	The Dublin & Navan Branch of the Midland Great Western Railway depicted on historic Ordnance Survey mapping. [1] The railway corridor remains perceptible in the landscape on aerial imagery, and a section remains in operation. [2] [3] The railway was closed to passengers in 1947; however, a section was reopened (terminating at the M3 Parkway) in 2010. [4]		
Sources	1. Ordnance Survey 25" (1911) MH050-08 2. MapGenie, 1995 3. MapGenie, 2013 – 2018 4. https://www.railscot.co.uk/companies/D/Dublin_and_Meath_Railway/ [Accessed October 2023		

Unique Reference Number	CH_74	**Reference Number(s)**	-
Figure Number	Figure 13.4 in Volume 4	**Legal Status**	-
Townland	Priest Town	**Site Type**	Road bridge
Easting / Northing	705579 / 745531	**Distance from Proposed Development**	25m to the north of the Proposed Development
Significance	Low		
Description	A stone road bridge depicted on historic Ordnance Survey mapping. [1] [2] The bridge includes a pair of parallel unmatching rubblestone parapets with squared ends. One includes curved concrete copes, the other horizontal stone copes. The bridge carries a local road across the Ward River. [3]		
Sources	1. Ordnance Survey 6" (1837) MH051 2. Ordnance Survey 25" (1911) MH051-02 3. Google StreetView, April 2023		

Unique Reference Number	CH_75	**Reference Number(s)**	-
Figure Number	Figure 13.4 in Volume 4	**Legal Status**	-
Townland	Shallon	**Site Type**	Enclosure
Easting / Northing	712232 / 745693	**Distance from Proposed Development**	0m
Significance	Medium		
Description	A faint circular enclosure visible as a cropmark on aerial imagery. Measuring approximately 70m in diameter (external) with linear features to the west; tentatively interpreted as a possible enclosure of unknown date. [1] Not depicted on historic Ordnance Survey mapping; however, one of the linear features corresponds with a former field boundary. [2] [3]		
Sources	1. DigitalGlobe, 2011 – 2013 2. Ordnance Survey 6" (1843) DN011 3. Ordnance Survey 25" (1908) DN011-10		

Unique Reference Number	CH_76	**Reference Number(s)**	-
Figure Number	Figure 13.4 in Volume 4	**Legal Status**	-
Townland	Forrest Great	**Site Type**	Enclosure
Easting / Northing	715450 / 744655	**Distance from Proposed Development**	41m to the south-east of the Proposed Development
Significance	Medium		
Description	A sub-circular area of rough ground and overgrown with vegetation. Measuring approximately 30m in diameter, with a field boundary to the east. Interpreted as a possible enclosure. [1] No depicted on historic Ordnance Survey mapping. [2] [3] LI_53: - A sub-circular area of rough ground measuring approximately 30m across south of Naul Road. A possible section of bank is located to the north and west. Appears to have been truncated to the south. - Not depicted on historic Ordnance Survey mapping. - Visible on aerial imagery (and Google Street View) as a slightly raised area of rough ground. Tentatively interpreted as a possible enclosure of unknown date and function. [4]		
Sources	1. DigitalGlobe, 2011 – 2013 2. Ordnance Survey 6" (1843) DN011 3. Ordnance Survey 25" (1908) DN011-15 4. Appendix A13.2 (LiDAR Review for CP1021: East Meath to North Dublin Grid Upgrade) in Volume 3 of this EIAR		

Unique Reference Number	CH_77	**Reference Number(s)**	-
Figure Number	Figure 13.4 in Volume 4	**Legal Status**	-
Townland	Cloghran	**Site Type**	Enclosure
Easting / Northing	718811 / 744000	**Distance from Proposed Development**	18m to the north of the Proposed Development
Significance	Medium		
Description	A sub-circular area of rough ground. Measuring approximately 55m in diameter. Interpreted as a possible enclosure. [1] Not depicted on historic Ordnance Survey mapping. [2] [3]		
Sources	1. DigitalGlobe, 2011 – 2013 2. Ordnance Survey 6" (1843) DN014 3. Ordnance Survey 25" (1909) DN014-04		

Unique Reference Number	CH_78	**Reference Number(s)**	-
Figure Number	Figure 13.4 in Volume 4	**Legal Status**	-
Townland	Stockhole	**Site Type**	Ring ditches
Easting / Northing	718875 / 742865	**Distance from Proposed Development**	0m
Significance	Medium		
Description	Three small circular cropmarks measuring up to approximately 10m in diameter. Interpreted as a group of ring-ditches - possibly the remains of a barrow cemetery or group of roundhouses of prehistoric date. [1]		
Sources	1. MapGenie, 2013 - 2018		

Unique Reference Number	CH_79	**Reference Number(s)**	-
Figure Number	Figure 13.4 in Volume 4	**Legal Status**	-
Townland	Stockhole	**Site Type**	Enclosure
Easting / Northing	718813 / 742566	**Distance from Proposed Development**	18m to the east of the Proposed Development
Significance	Medium		
Description	Two ephemeral curvi-linear features, interpreted as a possible sub-circular enclosure measuring approximately 40m in diameter. [1] Not depicted on historic Ordnance Survey mapping. [2] [3]		
Sources	1. DigitalGlobe, 2011 – 2013 2. Ordnance Survey 6" (1843) DN014 3. Ordnance Survey 25" (1909) DN014-08		

Unique Reference Number	CH_80	**Reference Number(s)**	-
Figure Number	Figure 13.4 in Volume 4	**Legal Status**	-
Townland	Stockhole	**Site Type**	House (site of)
Easting / Northing	718861 / 742416	**Distance from Proposed Development**	0m
Significance	Very Low / Negligible		
Description	'Stockhole House', a farm/house, depicted on historic Ordnance Survey mapping. [1] [2] The footprint of the building plot remains perceptible on aerial imagery. [3]		
Sources	1. Ordnance Survey 6" (1843) DN014 2. Ordnance Survey 25" (1909) DN014-08, DN015-05 3. MapGenie, 2013 - 2018		

Unique Reference Number	CH_81	**Reference Number(s)**	-
Figure Number	Figure 13.4 in Volume 4	**Legal Status**	-
Townland	Woodland	**Site Type**	Ditch
Easting / Northing	694685 / 747933	**Distance from Proposed Development**	0m
Significance	Very Low / Negligible		
Description	- Shallow, negative linear feature, c.197m in length, orientated approximately north-south running between two extant field boundaries. - No corresponding features on historic Ordnance Survey mapping. - Vaguely perceptible on aerial imagery. - No modern utilities noted; however, south-west of Woodland 400kV Converter Substation and parallel to overhead service (identified from DSM). Interpreted as a possible modern utility or drainage ditch. [1] Ditch appears to be overlain by circular cropmarks visible on aerial imagery (BlueSky Aerial, 2022) which may indicate an earlier date. [2] Locally undulating / tussock-y pasture field, irregular in shape with established hedgerow boundaries (including mature trees, scrub & ditches). Existing substation(s) visible from field, low humming from substation also perceptible. Very faint negative linear feature visible running roughly north-south parallel to the field boundary to the west of the field. [3]		
Sources	1. Appendix 13.1 (Inventory of Archaeology, Architectural Heritage and Cultural Heritage) for the Kildare-Meath Grid Upgrade (CP966).		

Unique Reference Number	CH_82	**Reference Number(s)**	-
Figure Number	Figure 13.4 in Volume 4	**Legal Status**	-
Townland	Gaulstown	**Site Type**	Ditch
Easting / Northing	694270 / 746590	**Distance from Proposed Development**	0m
Significance	Very Low / Negligible		
Description	- A negative linear feature, orientated west-east, measuring c. 250m in length (extends beyond 100m Study Area). - No corresponding features on historic Ordnance Survey mapping. Possibly modern drainage. - Visible on aerial imagery. - Located parallel to a minor watercourse. Interpreted as a ditch of unknown date, possibly modern drainage. [1]		
Sources	1. Appendix 13.1 (Inventory of Archaeology, Architectural Heritage and Cultural Heritage) for the Kildare-Meath Grid Upgrade (CP966).		

Unique Reference Number	CH_83	**Reference Number(s)**	-
Figure Number	Figure 13.4 in Volume 4	**Legal Status**	-
Townland	Cullendragh	**Site Type**	Ditch
Easting / Northing	694304 / 746431	**Distance from Proposed Development**	0m
Significance	Very Low / Negligible		
Description	- A negative 'L'-shaped linear feature, measuring c.53m x c.168m. - No corresponding features on historic Ordnance Survey mapping. - To the south of a minor watercourse. Interpreted as a ditch of unknown date. Section orientated roughly east-west perceptible running across the field. Located within a large tussock-y pasture field, south of a watercourse. [1]		
Sources	1. Appendix 13.1 (Inventory of Archaeology, Architectural Heritage and Cultural Heritage) for the Kildare-Meath Grid Upgrade (CP966).		

5. Inventory of LiDAR Assets

Unique Reference Number	LI_01	**Reference Number(s)**	-
Figure Number	Figure 13.5 in Volume 4	**Legal Status**	-
Townland	Woodland	**Site Type**	Boundary
Easting / Northing	694807 / 747856	**Distance from Proposed Development**	0m
Significance	Very Low / Negligible		
Description	- Negative linear features forming a rectilinear area, c.80m x 48m, abutting a field boundary to the north-east. Area within boundary disturbed. - Corresponds with a farmstead including a 'U'-shaped cluster of buildings within a sub-rectangular plot, depicted on historic Ordnance Survey mapping (1837, 1911). - Faintly perceptible on aerial imagery. - Interpreted as the boundary of a post-medieval farmstead. [1]		
Sources	1. Appendix A13.2 (LiDAR Review for CP1021: East Meath to North Dublin Grid Upgrade) in Volume 3 of this EIAR		

Unique Reference Number	LI_02	**Reference Number(s)**	-
Figure Number	Figure 13.5 in Volume 4	**Legal Status**	-
Townland	Woodland	**Site Type**	Field boundary(ies)
Easting / Northing	694585 / 747832	**Distance from Proposed Development**	0m
Significance	Very Low / Negligible		
Description	- Shallow negative linear feature, c.73m in length, orientated approximately north-south abutting townland boundary (to south) and an extant field boundary to the north. - Perceptible on aerial imagery. - Corresponds with a field boundary on historic Ordnance Survey mapping (1837, 1911). - Interpreted as a post-medieval field boundary. [1]		
Sources	1. Appendix A13.2 (LiDAR Review for CP1021: East Meath to North Dublin Grid Upgrade) in Volume 3 of this EIAR		

Unique Reference Number	LI_03	**Reference Number(s)**	-
Figure Number	Figure 13.5 in Volume 4	**Legal Status**	-
Townland	Woodland	**Site Type**	Field boundary(ies)
Easting / Northing	694814 / 747782	**Distance from Proposed Development**	0m
Significance	Very Low / Negligible		
Description	- An ephemeral negative linear feature, c.107m in length, orientated approximately north-south abutting extant field boundaries (to north and south). - Corresponds with a field boundary on historic Ordnance Survey mapping (1837, 1911). - Associated with (LI_02). - Interpreted as a post-medieval field boundary. [1]		
Sources	1. Appendix A13.2 (LiDAR Review for CP1021: East Meath to North Dublin Grid Upgrade) in Volume 3 of this EIAR		

Unique Reference Number	LI_05	**Reference Number(s)**	-
Figure Number	Figure 13. in Volume 4	**Legal Status**	-
Townland	Gaulstown; Culcommon	**Site Type**	Field system
Easting / Northing	694445 / 747206	**Distance from Proposed Development**	0m
Significance	Very Low / Negligible		
Description	- A network of negative linear features and cultivation patterns. - Some linear features correspond with field boundaries on historic Ordnance Survey mapping (1837, 1911). - Some field boundaries remain extant as hedgerows and others are visible as cropmarks on aerial imagery. - Interpreted as a post-medieval field system. [1]		
Sources	1. Appendix A13.2 (LiDAR Review for CP1021: East Meath to North Dublin Grid Upgrade) in Volume 3 of this EIAR		

Unique Reference Number	LI_06	**Reference Number(s)**	-
Figure Number	Figure 13.5 in Volume 4	**Legal Status**	-
Townland	Culcommon	**Site Type**	Field boundary(ies)
Easting / Northing	694531 / 746903	**Distance from Proposed Development**	8m to the east of the Proposed Development
Significance	Very Low / Negligible		
Description	- An ephemeral linear feature orientated approximately east-west, measuring c.140m in length. Runs between an extant field boundary and townland boundary. - Corresponds with a field boundary on historic Ordnance Survey mapping (1837, 1911). - Interpreted as a post-medieval field boundary. [1]		
Sources	1. Appendix A13.2 (LiDAR Review for CP1021: East Meath to North Dublin Grid Upgrade) in Volume 3 of this EIAR		

Unique Reference Number	LI_07	**Reference Number(s)**	-
Figure Number	Figure 13.5 in Volume 4	**Legal Status**	-
Townland	Culcommon	**Site Type**	Field system
Easting / Northing	694570 / 746304	**Distance from Proposed Development**	3m to the east of the Proposed Development
Significance	Low		
Description	- A network of ephemeral negative linear features, located between two townland boundaries, including a pair of north-south orientated linear features, a triangular area, and irregular southern boundary. Appear to be overlain by later uniform cultivation patterns. A number of circular features were also noted (likely the result of the wear pattern around modern animal feeding stations). - Some features correspond with historic Ordnance Survey mapping (1911). - Northern boundary is a minor watercourse. - The location of a large circular enclosure (ME050-001), identified as a 'Fort' on historic Ordnance Survey mapping, is c.600m to the south-east. - Tentatively interpreted as field boundaries and field drains forming part of a field system of pre-19th century date. Later agricultural activity is also noted. [1]		
Sources	1. Appendix A13.2 (LiDAR Review for CP1021: East Meath to North Dublin Grid Upgrade) in Volume 3 of this EIAR		

Unique Reference Number	LI_08	**Reference Number(s)**	-
Figure Number	Figure 13.5 in Volume 4	**Legal Status**	-
Townland	Cullendragh	**Site Type**	Buildings
Easting / Northing	694329 / 746085	**Distance from Proposed Development**	0m
Significance	Low		
Description	- Three positive rectangular features: 1) c.8mx6m, 2) c.9mx4m, and 3) c.12mx6m between a negative linear feature and townland boundary. - North of a possible field system (LI_09). - No corresponding features on historic Ordnance Survey mapping and not visible on aerial imagery. - Interpreted as the site of a group of buildings (likely agricultural) of unknown date. [1]		
Sources	1. Appendix A13.2 (LiDAR Review for CP1021: East Meath to North Dublin Grid Upgrade) in Volume 3 of this EIAR		

Unique Reference Number	LI_09	**Reference Number(s)**	-
Figure Number	Figure 13.5 in Volume 4	**Legal Status**	-
Townland	Cullendragh	**Site Type**	Field system
Easting / Northing	694186 / 746004	**Distance from Proposed Development**	0m
Significance	Low		
Description	- A network of negative linear features between two existing field boundaries and a townland boundary. Majority orientated approximately north-south (including one parallel to townland boundary); however, some run perpendicular forming small irregular enclosures. - Possible associated buildings to the north (LI_08). - No corresponding features on historic Ordnance Survey mapping, although the area outline is depicted on historic Ordnance Survey mapping (1911). - Interpreted as a field system of unknown date. [1]		
Sources	1. Appendix A13.2 (LiDAR Review for CP1021: East Meath to North Dublin Grid Upgrade) in Volume 3 of this EIAR		

Unique Reference Number	LI_10	**Reference Number(s)**	-
Figure Number	Figure 13.5 in Volume 4	**Legal Status**	-
Townland	Culcommon	**Site Type**	Field system
Easting / Northing	694403 / 745767	**Distance from Proposed Development**	0m
Significance	Low		
Description	- A network of negative linear features, forming irregular fields within a larger area. - Linear features to the south correspond with field boundaries depicted on historic Ordnance Survey mapping (1837). Only triangular area of trees depicted on later Ordnance Survey mapping (1911). - Some linear features perceptible on aerial imagery as well as triangular area of trees. - Interpreted as part of a field system of unknown date. [1]		
Sources	1. Appendix A13.2 (LiDAR Review for CP1021: East Meath to North Dublin Grid Upgrade) in Volume 3 of this EIAR		

Unique Reference Number	LI_11	**Reference Number(s)**	-
Figure Number	Figure 13.5 in Volume 4	**Legal Status**	-
Townland	Cullendragh	**Site Type**	Field system
Easting / Northing	694096 / 745609	**Distance from Proposed Development**	0m
Significance	Low		
Description	- A network of negative linear features and cultivation patterns. Some parallel and evenly spaced straight features. - Some linear features correspond with field boundaries on historic Ordnance Survey mapping. - Vaguely perceptible on aerial imagery. - Minor watercourse runs through the centre. - Interpreted as a field system of unknown date, including field drainage. [1]		
Sources	1. Appendix A13.2 (LiDAR Review for CP1021: East Meath to North Dublin Grid Upgrade) in Volume 3 of this EIAR		

Unique Reference Number	LI_13	**Reference Number(s)**	-
Figure Number	Figure 13.5 in Volume 4	**Legal Status**	-
Townland	Culcommon	**Site Type**	Boundary
Easting / Northing	694123 / 745200	**Distance from Proposed Development**	0m
Significance	Very Low / Negligible		
Description	-A linear feature measuring approximately 39m in length, running roughly east-west. - Vaguely perceptible on aerial imagery (GoogleEarth, 03/2022) in a private garden to the north of the R156. - Possibly the remains of a former boundary feature depicted on historic Ordnance Survey mapping (1837, 1911) surrounding a small group of roadside buildings. [1]		
Sources	1. Appendix A13.2 (LiDAR Review for CP1021: East Meath to North Dublin Grid Upgrade) in Volume 3 of this EIAR		

Unique Reference Number	LI_14	**Reference Number(s)**	-
Figure Number	Figure 13.5 in Volume 4	**Legal Status**	-
Townland	Culcommon	**Site Type**	Police station
Easting / Northing	694356 / 745131	**Distance from Proposed Development**	0m
Significance	Low		
Description	- A rectangular feature measuring approximately 12m by 6m set back from the R156, with a larger former boundary feature also noted. - Visible on aerial imagery (GoogleEarth, various) as an overgrown rectangular area at the junction between the R156 and a local road. - Corresponds with the location of a building set back from the road on historic Ordnance Survey mapping, including First Edition 6" (1837) which identifies the building as a 'Police Station'. [1]		
Sources	1. Appendix A13.2 (LiDAR Review for CP1021: East Meath to North Dublin Grid Upgrade) in Volume 3 of this EIAR		

Unique Reference Number	LI_15	**Reference Number(s)**	-
Figure Number	Figure 13.5 in Volume 4	**Legal Status**	-
Townland	Blackhall Big	**Site Type**	Boundary
Easting / Northing	695643 / 744416	**Distance from Proposed Development**	3m to the south of the Proposed Development
Significance	Very Low / Negligible		
Description	- An ephemeral sub-rectangular feature measuring approximately 32m in with to the south of the R156. Other linear features were noted adjacent to the feature. - Not visible on aerial imagery. - A small group of roadside buildings and a boundary feature are depicted on historic Ordnance Survey mapping in this location (1837). The buildings and boundaries are not depicted on later mapping (1911). - Interpreted as a post-medieval boundary. [1]		
Sources	1. Appendix A13.2 (LiDAR Review for CP1021: East Meath to North Dublin Grid Upgrade) in Volume 3 of this EIAR		

Unique Reference Number	LI_16	**Reference Number(s)**	-
Figure Number	Figure 13.5 in Volume 4	**Legal Status**	-
Townland	Staffordstown Little	**Site Type**	Field system
Easting / Northing	696120 / 744277	**Distance from Proposed Development**	0m
Significance	Low		
Description	- A network of linear features, defining a large area, with some ephemeral linear features within. - Visible on aerial imagery (GoogleEarth 03/2022) to the south of the R156. - Correspond with field boundaries depicted on historic Ordnance Survey mapping (1837, 1911). - Interpreted as former field boundaries forming part of a post-medieval field system. [1]		
Sources	1. Appendix A13.2 (LiDAR Review for CP1021: East Meath to North Dublin Grid Upgrade) in Volume 3 of this EIAR		

Unique Reference Number	LI_17	**Reference Number(s)**	-
Figure Number	Figure 13.5 in Volume 4	**Legal Status**	-
Townland	Staffordstown Little	**Site Type**	Driveway
Easting / Northing	696294 / 744156	**Distance from Proposed Development**	6m to the south of the Proposed Development
Significance	Very Low / Negligible		
Description	- A pair of ephemeral parallel linear features, orientated roughly north-south running from a roadside building (CH_04) to the south. - Visible on aerial imagery (GoogleEarth, 03/2022). - Corresponds with a driveway leading to a pair of rectangular buildings (located outside the Study Area; no longer extant) depicted on historic Ordnance Survey mapping (1837), and later mapping depicts the driveway connected to the roadside building plot (1911). [1]		
Sources	1. Appendix A13.2 (LiDAR Review for CP1021: East Meath to North Dublin Grid Upgrade) in Volume 3 of this EIAR		

Unique Reference Number	LI_18	**Reference Number(s)**	-
Figure Number	Figure 13.5 in Volume 4	**Legal Status**	-
Townland	Harlockstown	**Site Type**	Field system / palaeochannel
Easting / Northing	696942 / 744183	**Distance from Proposed Development**	0m
Significance	Medium		
Description	- A network of linear features, including two orientated north- south (extending outside the Study Area) with cultivation patterns and possible drainage. A wide (approximately 12m) channel, orientated north-south was also identified as a possible palaeochannel. - Not depicted on historic Ordinance Survey mapping. - Visible on aerial imagery. - Interpreted as a possible field boundaries forming a field system of unknown date. [1]		
Sources	1. Appendix A13.2 (LiDAR Review for CP1021: East Meath to North Dublin Grid Upgrade) in Volume 3 of this EIAR		

Unique Reference Number	LI_19	**Reference Number(s)**	-
Figure Number	Figure 13.5 in Volume 4	**Legal Status**	-
Townland	Harlockstown	**Site Type**	Field boundary(ies)
Easting / Northing	697281 / 744100	**Distance from Proposed Development**	7m to the north of the Proposed Development
Significance	Very Low / Negligible		
Description	- Five negative linear features orientated north-south, running between a local road to the R156. - Visible on aerial imagery (GoogleEarth, various). - Some of the linear features correspond with field boundaries depicted on historic Ordnance Survey mapping (1837, 1911). - Interpreted as post-medieval former field boundaries. [1]		
Sources	1. Appendix A13.2 (LiDAR Review for CP1021: East Meath to North Dublin Grid Upgrade) in Volume 3 of this EIAR		

Unique Reference Number	LI_20	**Reference Number(s)**	-
Figure Number	Figure 13.5 in Volume 4	**Legal Status**	-
Townland	Baytownpark	**Site Type**	Pit
Easting / Northing	698650 / 743467	**Distance from Proposed Development**	11m to the south of the Proposed Development
Significance	Medium		
Description	- A circular feature measuring approximately 7m in diameter, with two small circular features adjacent (c.3m in diameter each). - Visible on aerial imagery (GoogleEarth, 10/2009, 06/2020, 04/2021). - No corresponding features on historic Ordnance Survey mapping. - Tentatively interpreted as a possible pits of unknown date; however, equally could be the location of a modern animal feeder. [1]		
Sources	1. Appendix A13.2 (LiDAR Review for CP1021: East Meath to North Dublin Grid Upgrade) in Volume 3 of this EIAR		

Unique Reference Number	LI_21	**Reference Number(s)**	-
Figure Number	Figure 13.5 in Volume 4	**Legal Status**	-
Townland	Baytownpark	**Site Type**	Field system
Easting / Northing	698953 / 743499	**Distance from Proposed Development**	0m
Significance	Low		
Description	- A network of linear features forming a series of possible fields, including cultivation patterns. Drainage (likely later in date) was also noted. - No corresponding features are depicted on historic Ordnance Survey mapping. - Visible on aerial imagery (GoogleEarth, 03/2022). - Interpreted as a possible field system of unknown date. [1]		
Sources	1. Appendix A13.2 (LiDAR Review for CP1021: East Meath to North Dublin Grid Upgrade) in Volume 3 of this EIAR		

Unique Reference Number	LI_23	**Reference Number(s)**	-
Figure Number	Figure 13.5 in Volume 4	**Legal Status**	-
Townland	Colliersland North	**Site Type**	Field boundary(ies)
Easting / Northing	699979 / 742741	**Distance from Proposed Development**	48m to the south-west of the Proposed Development
Significance	Very Low / Negligible		
Description	- A series of linear features, oriented east-west, and one roughly north-south, within an agricultural field. - Not depicted on historic Ordnance Survey mapping. - Visible on aerial imagery. - Interpreted as former field boundaries of unknown date (possibly modern). [1]		
Sources	1. Appendix A13.2 (LiDAR Review for CP1021: East Meath to North Dublin Grid Upgrade) in Volume 3 of this EIAR		

Unique Reference Number	LI_24	**Reference Number(s)**	-
Figure Number	Figure 13.5 in Volume 4	**Legal Status**	-
Townland	Dunboyne	**Site Type**	Palaeochannel
Easting / Northing	700255 / 742872	**Distance from Proposed Development**	0m
Significance	Medium		
Description	- A series of linear features forming fields, with cultivation patterning, and a wide (approximately 23m) channel. - Not depicted on historic Ordnance Survey mapping. - Visible on aerial imagery. - Interpreted as possible field system of unknown date and possible palaeochannel. [1]		
Sources	1. Appendix A13.2 (LiDAR Review for CP1021: East Meath to North Dublin Grid Upgrade) in Volume 3 of this EIAR		

Unique Reference Number	LI_25	**Reference Number(s)**	-
Figure Number	Figure 13.5 in Volume 4	**Legal Status**	-
Townland	Dunboyne	**Site Type**	Ditch
Easting / Northing	701300 / 743510	**Distance from Proposed Development**	0m
Significance	Low		
Description	- A curvi-linear feature measuring approximately 118m in length, extends from south-north before turning west - possibly truncated by the R157 (may continue in fields to the north). - Vaguely perceptible on aerial imagery (GoogleEarth, 01/2017, 03/2021). - No corresponding features are depicted on historic Ordnance Survey mapping (1837, 1911). - Tentatively interpreted as a possible ditch of unknown date and function. [1]		
Sources	1. Appendix A13.2 (LiDAR Review for CP1021: East Meath to North Dublin Grid Upgrade) in Volume 3 of this EIAR		

Unique Reference Number	LI_26	**Reference Number(s)**	-
Figure Number	Figure 13.5 in Volume 4	**Legal Status**	-
Townland	Bennettstown	**Site Type**	Field boundary(ies)
Easting / Northing	701312 / 743773	**Distance from Proposed Development**	2m to the west of the Proposed Development
Significance	Very Low / Negligible		
Description	- A linear feature measuring approximately 276m in length and orientated routh north-south between two extant field boundaries. - A field boundary is depicted on historic Ordnance Survey mapping in this location. - Visible on aerial imagery. - Interpreted as a post-medieval former field boundary. [1]		
Sources	1. Appendix A13.2 (LiDAR Review for CP1021: East Meath to North Dublin Grid Upgrade) in Volume 3 of this EIAR		

Unique Reference Number	LI_27	**Reference Number(s)**	-
Figure Number	Figure 13.5 in Volume 4	**Legal Status**	-
Townland	Pace	**Site Type**	Palaeochannel
Easting / Northing	701933 / 744352	**Distance from Proposed Development**	10m to the east of the Proposed Development
Significance	Medium		
Description	- A curvilinear channel measuring up to approximately 50m in width. Cultivation patterns noted overlying the feature. - Located near a late bronze age site (http://excavations.ie/report/2005/Meath/0014235/) and a circular feature is located outside Study Area on a more elevated location near channel which may evidence early human activity. - Visible on aerial imagery. - Not depicted on historic Ordnance Survey mapping. - Field known as 'Slang' and 'Big Field'. Three Archaeological sites (one minor, second thought to be a site for butchering and skinning near the stream, third - old farmhouse brick, cobbled yard, small sheds mid 1700's). Pace - pass or route between soft ground via glacial ridges, long before field ditches were dug. See field 20 for notes on laneway. The lake here is more of a pond. (Meath Field Names Project, 2019). - Located near a channel of alluvium (Geological Survey of Ireland, n.d.) - Tentatively interpreted as a possible palaeochannel (possibly a former tributary of the River Tolka). [1]		
Sources	1. Appendix A13.2 (LiDAR Review for CP1021: East Meath to North Dublin Grid Upgrade) in Volume 3 of this EIAR		

Unique Reference Number	LI_28	**Reference Number(s)**	-
Figure Number	Figure 13.5 in Volume 4	**Legal Status**	-
Townland	Pace	**Site Type**	Field boundary(ies)
Easting / Northing	702086 / 744592	**Distance from Proposed Development**	12m to the south of the Proposed Development
Significance	Very Low / Negligible		
Description	- A linear feature measuring approximately 157m (extending outside the Study Area) and orientated north-south in an agricultural field to the south of the L5026. - Field known as 'Burns Field' (Meath Field Names Project, 2019). Visible on aerial imagery. - Corresponds with a field boundary depicted on historic Ordnance Survey mapping (1837). - Interpreted as a section of former field boundary. [1]		
Sources	1. Appendix A13.2 (LiDAR Review for CP1021: East Meath to North Dublin Grid Upgrade) in Volume 3 of this EIAR		

Unique Reference Number	LI_29	**Reference Number(s)**	-
Figure Number	Figure 13.5 in Volume 4	**Legal Status**	-
Townland	Stokestown	**Site Type**	Field boundary(ies)
Easting / Northing	703060 / 744617	**Distance from Proposed Development**	0m
Significance	Very Low / Negligible		
Description	- A linear feature measuring approximately 198m in length (extends outside the Study Area), orientated north-south, extending from the road to an extant field boundary. - Visible on aerial imagery (GoogleEarth, 01/2017). - Field known as 'Daisy Field' (Meath Field Names Project, 2019). - Corresponds with a former field boundary depicted on later historic Ordnance Survey mapping (1911). [1]		
Sources	1. Appendix A13.2 (LiDAR Review for CP1021: East Meath to North Dublin Grid Upgrade) in Volume 3 of this EIAR		

Unique Reference Number	LI_30	**Reference Number(s)**	-
Figure Number	Figure 13.5 in Volume 4	**Legal Status**	-
Townland	Stokestown	**Site Type**	Gravel pit
Easting / Northing	703082 / 744602	**Distance from Proposed Development**	30m to the north of the Proposed Development
Significance	Very Low / Negligible		
Description	- An irregular area measuring approximately 32m across, with narrow linear features running from it. Located in a pasture field to the north of the road through Stokestown. - Not depicted on historic Ordnance Survey mapping. - Field known as 'Daisy Field' (Meath Field Names Project, 2019). - Visible on aerial imagery. - Tentatively interpreted as a possible gravel pit of unknown date; however, could equally be the result of modern disturbance or drainage. [1]		
Sources	1. Appendix A13.2 (LiDAR Review for CP1021: East Meath to North Dublin Grid Upgrade) in Volume 3 of this EIAR		

Unique Reference Number	LI_31	**Reference Number(s)**	-
Figure Number	Figure 13.5 in Volume 4	**Legal Status**	-
Townland	Kinoristown	**Site Type**	Enclosure
Easting / Northing	703318 / 744520	**Distance from Proposed Development**	46m to the south-east of the Proposed Development
Significance	Medium		
Description	- An ephemeral circular area approximately 30m in diameter. - Not depicted on historic mapping (1837, 1911). - Field known as 'Pillar Field' (Meath Field Names Project, 2019). - Visible on aerial imagery as a circular feature within a pasture field adjacent to the road (e.g. GoogleEarth, 06/2020). - Tentatively interpreted as a possible enclosure of unknown date. [1] This asset comprises a previously unrecorded possible univallate enclosure, and may contribute to the understanding of rural settlement, the pattern and relationship between enclosures, and the local pastoral economy. [2]		
Sources	1. Appendix A13.2 (LiDAR Review for CP1021: East Meath to North Dublin Grid Upgrade) in Volume 3 of this EIAR 2. Jacobs July 2023		

Unique Reference Number	LI_32	**Reference Number(s)**	-
Figure Number	Figure 13.5 in Volume 4	**Legal Status**	-
Townland	Kinoristown	**Site Type**	Field boundary(ies)
Easting / Northing	703386 / 744557	**Distance from Proposed Development**	6m to the south-east of the Proposed Development
Significance	Very Low / Negligible		
Description	- A linear feature measuring approximately 147m in length orientated roughly north-west to south-east. - Visible on aerial imagery (GoogleEarth, various). - Field known as 'Pillar Field' (Meath Field Names Project, 2019). - Corresponds with a former field boundary depicted on historic Ordnance Survey mapping (1837), with later mapping showing the feature as a drainage ditch. [1]		
Sources	1. Appendix A13.2 (LiDAR Review for CP1021: East Meath to North Dublin Grid Upgrade) in Volume 3 of this EIAR		

Unique Reference Number	LI_33	**Reference Number(s)**	-
Figure Number	Figure 13.5 in Volume 4	**Legal Status**	-
Townland	Kinoristown	**Site Type**	Gravel pit
Easting / Northing	703648 / 744879	**Distance from Proposed Development**	0m
Significance	Very Low / Negligible		
Description	- A large irregular area measuring approximately 90m across located in an agricultural field adjacent to an extant field boundary. - Vaguely perceptible on aerial imagery. - Extractive activity is depicted in this location on historic Ordnance Survey mapping (1911). [1] Not visible during site inspection and walkover (June 2023). [2]		
Sources	1. Appendix A13.2 (LiDAR Review for CP1021: East Meath to North Dublin Grid Upgrade) in Volume 3 of this EIAR 2. Jacobs site inspection and walkover survey, June 2023		

Unique Reference Number	LI_34	**Reference Number(s)**	-
Figure Number	Figure 13.5 in Volume 4	**Legal Status**	-
Townland	Stokestown	**Site Type**	Enclosure
Easting / Northing	703612 / 745032	**Distance from Proposed Development**	17m to the west of the Proposed Development
Significance	Medium		
Description	- A curvi-linear feature measuring approximately 41m in diameter. Truncated by a later drainage ditch. - Vaguely perceptible on aerial imagery. - Not depicted on historic Ordnance Survey mapping. - Tentatively interpreted as part of a circular enclosure; however, could equally be modern disturbance. [1] This asset comprises a previously unrecorded possible univallate enclosure, and may contribute to the understanding of rural settlement, the pattern and relationship between enclosures, and the local pastoral economy. [2]		
Sources	1. Appendix A13.2 (LiDAR Review for CP1021: East Meath to North Dublin Grid Upgrade) in Volume 3 of this EIAR 2. Jacobs July 2023		

Unique Reference Number	LI_35	**Reference Number(s)**	-
Figure Number	Figure 13.5 in Volume 4	**Legal Status**	-
Townland	Stokestown	**Site Type**	Field boundary(ies)
Easting / Northing	703570 / 745029	**Distance from Proposed Development**	0m
Significance	Very Low / Negligible		
Description	- A curvi-linear feature measuring approximately 164m in length (extends beyond the Study Area). Cultivation patterns and ephemeral linear features running parallel interpreted as drainage were also noted. - Visible on aerial imagery (GoogleEarth, various). - Corresponds with a field boundary depicted on historic Ordnance Survey mapping (1837, 1911). [1]		
Sources	1. Appendix A13.2 (LiDAR Review for CP1021: East Meath to North Dublin Grid Upgrade) in Volume 3 of this EIAR		

Unique Reference Number	LI_36	**Reference Number(s)**	-
Figure Number	Figure 13.5 in Volume 4	**Legal Status**	-
Townland	Nuttstown	**Site Type**	Palaeochannel
Easting / Northing	704173 / 745029	**Distance from Proposed Development**	0m
Significance	Medium		
Description	- A meandering linear feature located in a pasture field to the north of an extant watercourse (Pinkeen River). - Not depicted on historic Ordnance Survey mapping; however located in an area adjacent to the current channel of the Pinkeen River. - Located near a channel of alluvium (Geological Survey of Ireland, n.d.). - Visible on aerial imagery. - Tentatively interpreted as a possible palaeochannel, or river terrace, associated with the Pinkeen River. [1]		
Sources	1. Appendix A13.2 (LiDAR Review for CP1021: East Meath to North Dublin Grid Upgrade) in Volume 3 of this EIAR		

Unique Reference Number	LI_37	**Reference Number(s)**	-
Figure Number	Figure 13.5 in Volume 4	**Legal Status**	-
Townland	Preist Town	**Site Type**	Gravel pit
Easting / Northing	705675 / 745507	**Distance from Proposed Development**	0m
Significance	Very Low / Negligible		
Description	- An irregular area on a localised mound within an area of established woodland. - The area is depicted as woodland, 'Crockanee', on historic Ordnance Survey mapping on the southern boundary of the Priest Town House demesne (DL_04). A track is shown into the woodland from the road to the south. To the north-east, an area of woodland is the location of a gravel pit. Later mapping shows this area as mixed woodland. - Not visible on aerial imagery. - Located adjacent to the Ward River, in an area of till derived from limestones. - Interpreted as a possible post-medieval gravel pit. [1]		
Sources	1. Appendix A13.2 (LiDAR Review for CP1021: East Meath to North Dublin Grid Upgrade) in Volume 3 of this EIAR		

Unique Reference Number	LI_38	**Reference Number(s)**	-
Figure Number	Figure 13.5 in Volume 4	**Legal Status**	-
Townland	Court	**Site Type**	Field boundary(ies)
Easting / Northing	707407 / 744527	**Distance from Proposed Development**	12m to the east of the Proposed Development
Significance	Very Low / Negligible		
Description	- A linear feature measuring approximately 134m in length and orientated roughly north-west to south-east. - Visible on aerial imagery located within a small irregular field between a watercourse and an extant field boundary. - Corresponds with a former field boundary depicted on historic Ordnance Survey mapping (1843, 1908). [1]		
Sources	1. Appendix A13.2 (LiDAR Review for CP1021: East Meath to North Dublin Grid Upgrade) in Volume 3 of this EIAR		

Unique Reference Number	LI_40	**Reference Number(s)**	-
Figure Number	Figure 13.5 in Volume 4	**Legal Status**	-
Townland	Irishtown	**Site Type**	Enclosure
Easting / Northing	708484 / 743851	**Distance from Proposed Development**	0m
Significance	Medium		
Description	- A curved feature measuring approximately 88m in diameter, located in an agricultural field with an extant field boundary running across it from west-east and track. Comprises a raised interior with a circular enclosing ditch (continuing into the field to the north) and very ephemeral interior bank. A circular wear pattern around a modern animal feeder is also visible within the enclosure. - Not depicted on historic Ordnance Survey mapping. - Vaguely perceptible on aerial imagery (GoogleEarth, 01/2017, 02/2021). - Tentatively interpreted as a possible large enclosure of unknown date; however could equally be a natural rise or modern disturbance. [1] This asset comprises a previously unrecorded possible univallate enclosure, and may contribute to the understanding of rural settlement, the pattern and relationship between enclosures, and the local pastoral economy. [2]		
Sources	1. Appendix A13.2 (LiDAR Review for CP1021: East Meath to North Dublin Grid Upgrade) in Volume 3 of this EIAR 2. Jacobs July 2023		

Unique Reference Number	LI_41	**Reference Number(s)**	-
Figure Number	Figure 13.5 in Volume 4	**Legal Status**	-
Townland	Irishtown	**Site Type**	Designed landscape feature
Easting / Northing	708541 / 743797	**Distance from Proposed Development**	15m to the south of the Proposed Development
Significance	Very Low / Negligible		
Description	- An irregular area measuring approximately 15m across. - Not visible on aerial imagery. - Corresponds with the location of a 'pond' within the Hollywoodrath demesne (DL_05) depicted on historic Ordnance Survey mapping (1843, 1909). - Interpreted as an infilled pond; however, could equally be modern disturbance. [1]		
Sources	1. Appendix A13.2 (LiDAR Review for CP1021: East Meath to North Dublin Grid Upgrade) in Volume 3 of this EIAR		

Unique Reference Number	LI_42	**Reference Number(s)**	-
Figure Number	Figure 13.5 in Volume 4	**Legal Status**	-
Townland	Spicklestown	**Site Type**	Ditch
Easting / Northing	708615 / 743823	**Distance from Proposed Development**	0m
Significance	Low		
Description	- A linear feature measuring approximately 60m in length orientated roughly east-west within an area of trees. A number of extant drainage ditches are located in this area. - No corresponding feature is depicted on historic Ordnance Survey mapping; however, an area of woodland is depicted on later editions. - Not visible on aerial imagery. - Tentatively interpreted as a ditch of unknown date. [1]		
Sources	1. Appendix A13.2 (LiDAR Review for CP1021: East Meath to North Dublin Grid Upgrade) in Volume 3 of this EIAR		

Unique Reference Number	LI_44	**Reference Number(s)**	-
Figure Number	Figure 13.5 in Volume 4	**Legal Status**	-
Townland	Ward Lower	**Site Type**	Building
Easting / Northing	710297 / 745265	**Distance from Proposed Development**	14m to the north-west of the Proposed Development
Significance	Low		
Description	- A rectangular feature measuring approximately 14m by 18m located in the corner of an agricultural field adjacent to the R121. - Two buildings and a number of boundary features are depicted in this location on historic Ordnance Survey mapping (1843); however, these are no longer shown on later editions (1908). - Vaguely perceptible on aerial imagery. - Tentatively interpreted as the site of two demolished post-medieval buildings; however, could equally likely be modern disturbance. [1]		
Sources	1. Appendix A13.2 (LiDAR Review for CP1021: East Meath to North Dublin Grid Upgrade) in Volume 3 of this EIAR		

Unique Reference Number	LI_45	**Reference Number(s)**	-
Figure Number	Figure 13.5 in Volume 4	**Legal Status**	-
Townland	Newpark	**Site Type**	Field boundary(ies)
Easting / Northing	710545 / 745302	**Distance from Proposed Development**	37m to the south-east of the Proposed Development
Significance	Very Low / Negligible		
Description	- An irregular linear feature orientated roughly north-south, measuring approximately 110m (extends outside the Study Area). - Visible on aerial imagery. - Corresponds with a field boundary depicted on historic Ordnance Survey mapping. [1]		
Sources	1. Appendix A13.2 (LiDAR Review for CP1021: East Meath to North Dublin Grid Upgrade) in Volume 3 of this EIAR		

Unique Reference Number	LI_46	**Reference Number(s)**	-
Figure Number	Figure 13.5 in Volume 4	**Legal Status**	-
Townland	Newpark	**Site Type**	Field boundary(ies)
Easting / Northing	710680 / 745350	**Distance from Proposed Development**	0m
Significance	Very Low / Negligible		
Description	- An irregular linear feature orientated roughly north-south, measuring approximately >195m (extends outside the Study Area and extent of LiDAR data coverage). - Visible on aerial imagery. - Corresponds with a field boundary depicted on historic Ordnance Survey mapping. [1]		
Sources	1. Appendix A13.2 (LiDAR Review for CP1021: East Meath to North Dublin Grid Upgrade) in Volume 3 of this EIAR		

Unique Reference Number	LI_47	**Reference Number(s)**	-
Figure Number	Figure 13.5 in Volume 4	**Legal Status**	-
Townland	Newpark	**Site Type**	Gravel pit
Easting / Northing	711033 / 745741	**Distance from Proposed Development**	15m to the north of the Proposed Development
Significance	Very Low / Negligible		
Description	- An irregular area measuring approximately 60m across located in an agricultural field to the north of the R121. - No corresponding features on historic Ordnance Survey mapping; however, areas of extraction are depicted on later editions (1908) to the north-east. - Located in an area identified as 'gravels' (Geological Survey of Ireland, n.d.). - Interpreted as a possible gravel pit of unknown date. [1]		
Sources	1. Appendix A13.2 (LiDAR Review for CP1021: East Meath to North Dublin Grid Upgrade) in Volume 3 of this EIAR		

Unique Reference Number	LI_48	**Reference Number(s)**	-
Figure Number	Figure 13.5 in Volume 4	**Legal Status**	-
Townland	Shallon	**Site Type**	Field boundary(ies)
Easting / Northing	711649 / 745855	**Distance from Proposed Development**	30m to the north-east of the Proposed Development
Significance	Very Low / Negligible		
Description	- A curvi-linear feature measuring approximately 70m in length, extending from the Ward River (to the north) before curving to the east. - Depicted on historic Ordnance Survey mapping bounding an area of trees. - Visible on aerial imagery. - Interpreted as a former post-medieval field boundary. [1]		
Sources	1. Appendix A13.2 (LiDAR Review for CP1021: East Meath to North Dublin Grid Upgrade) in Volume 3 of this EIAR		

Unique Reference Number	LI_49	**Reference Number(s)**	-
Figure Number	Figure 13.5 in Volume 4	**Legal Status**	-
Townland	Corrstown	**Site Type**	Ditch
Easting / Northing	711925 / 745900	**Distance from Proposed Development**	8m to the north of the Proposed Development
Significance	Low		
Description	- A very ephemeral negative linear feature with possible bank, measuring approximately 46m in length, and orientated roughly north-south. - No corresponding features are depicted on historic Ordnance Survey mapping. - Faintly perceptible on aerial photography. - Tentatively interpreted as a possible bank and ditch of unknown date. [1]		
Sources	1. Appendix A13.2 (LiDAR Review for CP1021: East Meath to North Dublin Grid Upgrade) in Volume 3 of this EIAR		

Unique Reference Number	LI_50	**Reference Number(s)**	-
Figure Number	Figure 13.5 in Volume 4	**Legal Status**	-
Townland	Corrstown	**Site Type**	Field boundary(ies)
Easting / Northing	712144 / 745847	**Distance from Proposed Development**	6m to the north of the Proposed Development
Significance	Very Low / Negligible		
Description	- A linear feature that extends outside the Study Area, measuring approximately 122m before turning east and north. - Visible on aerial imagery (GoogleEarth, 05/2017). - Corresponds with a field boundary depicted on historic Ordnance Survey mapping (1843; 1908). [1]		
Sources	1. Appendix A13.2 (LiDAR Review for CP1021: East Meath to North Dublin Grid Upgrade) in Volume 3 of this EIAR		

Unique Reference Number	LI_51	**Reference Number(s)**	-
Figure Number	Figure 13.5 in Volume 4	**Legal Status**	-
Townland	Skephubble	**Site Type**	Field boundary(ies)
Easting / Northing	712584 / 745451	**Distance from Proposed Development**	0m
Significance	Very Low / Negligible		
Description	- A curvi-linear feature measuring approximately 78m in length extending between two extant field boundaries. - Visible on aerial imagery. - Corresponds with a field boundary on historic Ordnance Survey mapping (1843), and later editions depicted the feature as a ditch (1908). The boundary has been removed by the last edition (1941). [1]		
Sources	1. Appendix A13.2 (LiDAR Review for CP1021: East Meath to North Dublin Grid Upgrade) in Volume 3 of this EIAR		

Unique Reference Number	LI_54	**Reference Number(s)**	-
Figure Number	Figure 13.5 in Volume 4	**Legal Status**	-
Townland	Cloghran	**Site Type**	Enclosure
Easting / Northing	718228 / 743875	**Distance from Proposed Development**	0m
Significance	Medium		
Description	- A group of features including a large sub-circular enclosing feature measuring approximately 76m by 64m and a circular feature measuring approximately 10m in diameter, in a pasture field to the south of Stockhole Lane. A more recent circular feature is also located to the south-east overlying the enclosing feature. - Visible on aerial imagery. - Not depicted on historic Ordnance Survey mapping. - Tentatively interpreted as a possible large enclosure with internal feature; however, could equally be a modern animal exercising arena and associated disturbance. [1]		
Sources	1. Appendix A13.2 (LiDAR Review for CP1021: East Meath to North Dublin Grid Upgrade) in Volume 3 of this EIAR		

Unique Reference Number	LI_55	**Reference Number(s)**	-
Figure Number	Figure 13.5 in Volume 4	**Legal Status**	-
Townland	Cloghran	**Site Type**	Road
Easting / Northing	718232 / 743855	**Distance from Proposed Development**	31m to the south of the Proposed Development
Significance	Very Low / Negligible		
Description	- A linear feature measuring approximately 80m in length running through an agricultural field from an extant driveway to an area of rough ground. - The alignment of the road is depicted in this location on historic Ordnance Survey mapping (1843) in this location through Glebe House and farm. The alignment of the road is depicted as straightened on later mapping (1909). - Visible on aerial imagery. - Interpreted as the former alignment of the road. [1]		
Sources	1. Appendix A13.2 (LiDAR Review for CP1021: East Meath to North Dublin Grid Upgrade) in Volume 3 of this EIAR		

Unique Reference Number	LI_56	**Reference Number(s)**	-
Figure Number	Figure 13.5 in Volume 4	**Legal Status**	-
Townland	Cloghran	**Site Type**	Field boundary(ies)
Easting / Northing	718467 / 743815	**Distance from Proposed Development**	28m to the south of the Proposed Development
Significance	Very Low / Negligible		
Description	- A linear feature measuring approximately 230m located within an agricultural field to the south of Stockhole Lane and west of the M1 motorway. Cultivation patterns and possible disturbance was also noted. - Visible on aerial imagery. - Corresponds with a former field drain depicted on historic Ordnance Survey mapping (1843). [1]		
Sources	1. Appendix A13.2 (LiDAR Review for CP1021: East Meath to North Dublin Grid Upgrade) in Volume 3 of this EIAR		

Unique Reference Number	LI_57	**Reference Number(s)**	-
Figure Number	Figure 13.5 in Volume 4	**Legal Status**	-
Townland	Cloghran	**Site Type**	Field boundary(ies)
Easting / Northing	718741 / 743816	**Distance from Proposed Development**	0m
Significance	Very Low / Negligible		
Description	- A linear feature measuring approximately 40m located within an area of rough ground to the east of the M1 motorway. Appears to be a continuation of LI_084. - Visible on aerial imagery. - Corresponds with a former field drain depicted on historic Ordnance Survey mapping (1843). [1]		
Sources	1. Appendix A13.2 (LiDAR Review for CP1021: East Meath to North Dublin Grid Upgrade) in Volume 3 of this EIAR		

Unique Reference Number	LI_58	**Reference Number(s)**	-
Figure Number	Figure 13.5 in Volume 4	**Legal Status**	-
Townland	Cloghran	**Site Type**	Palaeochannel
Easting / Northing	719099 / 743483	**Distance from Proposed Development**	0m
Significance	Medium		
Description	- A 43m wide channel located within a narrow pasture field north of a watercourse. - Visible on aerial imagery. - Not depicted on historic Ordnance Survey mapping; however, a stream is depicted on later editions (1909) as a field boundary. - Tentatively interpreted as a possible palaeochannel or river terraces. [1]		
Sources	1. Appendix A13.2 (LiDAR Review for CP1021: East Meath to North Dublin Grid Upgrade) in Volume 3 of this EIAR		

Unique Reference Number	LI_60	**Reference Number(s)**	-
Figure Number	Figure 13.5 in Volume 4	**Legal Status**	-
Townland	Clonshaugh	**Site Type**	Field boundary(ies)
Easting / Northing	719034 / 742029	**Distance from Proposed Development**	0m
Significance	Very Low / Negligible		
Description	- A narrow linear feature measuring approximately 150m in length and orientated north-south located within an agricultural field, running between two extant field boundaries. - Visible on aerial imagery (GoogleEarth, 06/2018). - Corresponds with a field boundary depicted on historic Ordnance Survey mapping (1837; 1911). [1]		
Sources	1. Appendix A13.2 (LiDAR Review for CP1021: East Meath to North Dublin Grid Upgrade) in Volume 3 of this EIAR		

Unique Reference Number	LI_61	**Reference Number(s)**	-
Figure Number	Figure 13.5 in Volume 4	**Legal Status**	-
Townland	Lynaghstown	**Site Type**	Field boundary(ies)
Easting / Northing	694594 / 744981	**Distance from Proposed Development**	4m to the south of the Proposed Development
Significance	Very Low / Negligible		
Description	- A linear feature measuring approximately 118m in length and orientated north-south located within a field currently in use for plantation, south of the R156. - Visible on aerial imagery. - Corresponds with a field boundary depicted on historic Ordnance Survey mapping (1837; 1911). [1]		
Sources	1. Appendix A13.2 (LiDAR Review for CP1021: East Meath to North Dublin Grid Upgrade) in Volume 3 of this EIAR		

Unique Reference Number	LI_62	**Reference Number(s)**	-
Figure Number	Figure 13.5 in Volume 4	**Legal Status**	-
Townland	Blackhall Big	**Site Type**	Boundary
Easting / Northing	695757 / 744397	**Distance from Proposed Development**	3m to the south of the Proposed Development
Significance	Very Low / Negligible		
Description	- A negative rectangular feature measuring approximately 31m by 28m located within a field, south of the R156. - Faintly perceptible on aerial imagery (GoogleEarth, 10/2009, 05/2017). - Corresponds with a boundary depicted on historic Ordnance Survey mapping (1837; 1911). [1]		
Sources	1. Appendix A13.2 (LiDAR Review for CP1021: East Meath to North Dublin Grid Upgrade) in Volume 3 of this EIAR		

Unique Reference Number	LI_63	**Reference Number(s)**	
Figure Number	Figure 13.5 in Volume 4	**Legal Status**	
Townland	Harlockstown	**Site Type**	Enclosure
Easting / Northing	696778 / 744130	**Distance from Proposed Development**	2m to the north of the Proposed Development
Significance	Low		
Description	- A negative rectangular feature measuring approximately 18m by 10m located within a field, north of the R156. Two adjoining linear features are visible extending from the corners of the enclosure suggesting it may be part of a larger complex. - Visible on aerial imagery. - No corresponding features on historic Ordnance Survey mapping. - Tentatively interpreted as a small rectangular enclosure of unknown date. [1]		
Sources	1. Appendix A13.2 (LiDAR Review for CP1021: East Meath to North Dublin Grid Upgrade) in Volume 3 of this EIAR		

Unique Reference Number	LI_65	**Reference Number(s)**	
Figure Number	Figure 13.5 in Volume 4	**Legal Status**	
Townland	Vesingtown	**Site Type**	Enclosure
Easting / Northing	697728 / 744108	**Distance from Proposed Development**	48m to the north of the Proposed Development
Significance	Medium		
Description	- An ephemeral circular feature measuring approximately 17m in diameter, located within an agricultural field to the north of the R156. - Not visible on aerial imagery. - No corresponding features on historic Ordnance Survey mapping. - Tentatively interpreted as a possible enclosure of unknown date. [1]		
Sources	1. Appendix A13.2 (LiDAR Review for CP1021: East Meath to North Dublin Grid Upgrade) in Volume 3 of this EIAR		

Unique Reference Number	LI_66	**Reference Number(s)**	-
Figure Number	Figure 13.5 in Volume 4	**Legal Status**	-
Townland	Cushinstown	**Site Type**	Track
Easting / Northing	699779 / 743165	**Distance from Proposed Development**	3m to the north-east of the Proposed Development
Significance	Very Low / Negligible		
Description	- A pair of parallel linear features measuring approximately 180m in length, orientated roughly north-south located within an agricultural field. - Visible on aerial imagery. - No corresponding features on historic Ordnance Survey mapping. - Interpreted as a possible track of unknown date. [1]		
Sources	1. Appendix A13.2 (LiDAR Review for CP1021: East Meath to North Dublin Grid Upgrade) in Volume 3 of this EIAR		

Unique Reference Number	LI_67	**Reference Number(s)**	-
Figure Number	Figure 13.5 in Volume 4	**Legal Status**	-
Townland	Dunboyne	**Site Type**	Boundary
Easting / Northing	700710 / 743081	**Distance from Proposed Development**	0m
Significance	Very Low / Negligible		
Description	- A pair of parallel linear features measuring approximately >185m in length (extending outside the Study Area), orientated roughly north-west to south-east located within an agricultural field. - Field known as 'Weld Fields / Wild Fields' (Meath Field Names Project, 2019). - Visible on aerial imagery. - Correspond with a boundary feature on historic Ordnance Survey mapping (1837), with later mapping showing the boundary as a belt of trees (1911). [1] Possibly continues into fields to the south of the road (DigitalGlobe). Former field boundaries are also visible in the fields in this area. [2]		
Sources	1. Appendix A13.2 (LiDAR Review for CP1021: East Meath to North Dublin Grid Upgrade) in Volume 3 of this EIAR 2. Digital Globe Aerial Imagery		

Unique Reference Number	LI_68	**Reference Number(s)**	-
Figure Number	Figure 13.5 in Volume 4	**Legal Status**	-
Townland	Dunboyne	**Site Type**	Gravel pit
Easting / Northing	701057 / 743391	**Distance from Proposed Development**	19m to the west of the Proposed Development
Significance	Very Low / Negligible		
Description	- An irregular area measuring approximately 16m across located in an area of rough ground south of Kennedy Road. - A possible gravel pit is depicted on historic Ordnance Survey mapping (1837, 1911). - Interpreted as a possible post-medieval gravel pit. [1]		
Sources	1. Appendix A13.2 (LiDAR Review for CP1021: East Meath to North Dublin Grid Upgrade) in Volume 3 of this EIAR		

Unique Reference Number	LI_69	**Reference Number(s)**	-
Figure Number	Figure 13.5 in Volume 4	**Legal Status**	-
Townland	Pace	**Site Type**	Palaeochannel
Easting / Northing	701568 / 744101	**Distance from Proposed Development**	15m to the north of the Proposed Development
Significance	Medium		
Description	- A narrow sinuous curvi-linear feature within an area of rough ground north-east of the River Tolka. - Not visible on aerial imagery. - Located within an area of alluvium (Geological Survey of Ireland, n.d.). - The meandering course of the river is depicted on historic Ordnance Survey mapping (1837), then later shown as straightened (1911) with the former channel still depicted. - Interpreted as the former channel of the River Tolka. [1] Channel not visible at ground level; however, pasture field with some wetland-type grasses noted (walkover and site inspection, June 2023). [2]		
Sources	1. Appendix A13.2 (LiDAR Review for CP1021: East Meath to North Dublin Grid Upgrade) in Volume 3 of this EIAR 2. Jacobs site inspection and walkover survey, June 2023		

Unique Reference Number	LI_70	**Reference Number(s)**	-
Figure Number	Figure 13.5 in Volume 4	**Legal Status**	-
Townland	Spicklestown	**Site Type**	Ditch
Easting / Northing	708628 / 743753	**Distance from Proposed Development**	28m to the south of the Proposed Development
Significance	Low		
Description	- A negative curvi-linear feature measuring approximately 103m in length, within an agricultural field in DL_05. - Visible on aerial imagery. - No corresponding features on historic Ordnance Survey mapping. - Tentatively interpreted as a possible ditch of unknown date. [1]		
Sources	1. Appendix A13.2 (LiDAR Review for CP1021: East Meath to North Dublin Grid Upgrade) in Volume 3 of this EIAR		

6. Inventory of Townland Boundaries

Townland Boundary Reference Number	Townland Names	Description	Significance
TB_01	Woodland - Gaulstown	Field boundary - an established hedgerow and ditch (drainage) within an area of agricultural fields	Medium
TB_02	Woodland - Culcommon	Field boundary - an established hedgerow and ditch (drainage) within an area of agricultural fields	Low
TB_03	Gaulstown - Culcommon	Field boundary - an established hedgerow and ditch within an area of agricultural fields	Low
TB_04	Gaulstown - Cullendraugh	Field boundary - an established hedgerow and ditch (drainage) within an area of agricultural fields	Medium
TB_05	Culcommon - Cullendraugh	Field boundary - an established hedgerow within an area of agricultural fields	Low
TB_06	Culcommon - Barstown	Visible as a cropmark in the large irregular field to the south of the R156 (former field boundary; CH_59)	Low
TB_07	Barstown - Lynaghstown	Field boundary - an established hedgerow	Low
TB_08	Culcommon - Ballymaglassan	Field boundary - an established hedgerow	Low
TB_09	Lynaghstown - Blackhall Big	The alignment of the R156 and a property boundary	Very Low / Negligible
TB_10	Blackhall Big - Staffordstown Little	The alignment of the R156 and a local lane	Very Low / Negligible
TB_11	Blackhall Big - Harlockstown	Alignment of a former field boundary (now removed); modern replacement north of the R156	Very Low / Negligible
TB_12	Staffordstown Little - Harlockstown	Alignment of the R156 Regional Road	Very Low / Negligible
TB_13	Staffordstown Little - Waynestown	Field boundary - an established hedgerow	Low
TB_14	Harlockstown - Waynestown	Alignment of the R156 Regional Road and a section of extant field boundary, to the south of the road	Low
TB_15	Harlockstown - Vesingstown	Field boundary - an established hedgerow (bisected by the R156 Regional Road)	Low
TB_16	Vesington - Baytownpark	Lane / local road crossed by the R156 Regional Road	Very Low / Negligible
TB_17	Baytownpark - Sarney	Alignment of the R156 Regional Road and an extant field boundary running south, perpendicular from the road	Low
TB_18	Baytownpark - Cushingtown	Field boundary - an established hedgerow	Low
TB_19	Sarney - Cushinstown	Alignment of the R156 Regional Road, modern garden boundaries and an established field boundary	Low
TB_20	Cushinstown - Colliersland North	Alignment of the R156 Regional Road and local access road	Very Low / Negligible
TB_21	Cushinstown - Dunboyne	Property boundary	Very Low / Negligible
TB_22	Colliersland North - Dunboyne	Alignment of the R156 Regional Road and a property boundary	Very Low / Negligible
TB_23	Dunboyne - Bennetstown	Established field boundary (bisected by the R157 Regional Road)	Low
TB_24	Bennetstown - Pace	Established field boundary (partially removed by the R157 Regional Road)	Very Low / Negligible

Townland Boundary Reference Number	Townland Names	Description	Significance
TB_25	Woodpark - Pace	Removed by M3 Motorway	Very Low / Negligible
TB_26	Woodpark - Piercetown	Removed by M3 Motorway	Very Low / Negligible
TB_27	Piercetown - Pace	Sections of established field boundary / property boundaries, alignment of the L5026 Local Road	Very Low / Negligible
TB_28	Piercetown - Ballymagillin	Local commercial access track north of the L5026 Local Road	Very Low / Negligible
TB_29	Ballymagillin - Pace	Alignment of the L5026 Local Road	Very Low / Negligible
TB_30	Whitesland - Ballymagillin	An established hedgerow and ditch (drainage) adjacent to a farm complex (CH_12)	Low
TB_31	Pace - Whitesland	Field boundary - an established hedgerow within an area of agricultural fields	Low
TB_32	Whitesland - Pace	Field boundary - an established hedgerow within an area of agricultural fields and the alignment of the L5026 Local Road	Low
TB_33	Whitesland - Stokestown	Established field boundary	Low
TB_34	Pace - Stokestown	Alignment of the L5026 Local Road	Very Low / Negligible
TB_35	Pace - Normansgrove	Visible as a cropmark in the large agricultural field to the south of the L5026 Local Road	Low
TB_36	Normansgrove - Stokestown	Alignment of the L5026 Local Road and local lane	Very Low / Negligible
TB_37	Kinoristown - Stokestown	Alignment of the L5026 Local Road and extant field boundaries	Low
TB_38	Stokestown - Rowan	Established field boundary and section of watercourse (Pinkeen River)	Medium
TB_39	Rowan - Nuttstown	Pinkeen River	Medium
TB_40	Nuttstown - Ballintry	Alignment of Belgree Lane	Very Low / Negligible
TB_41	Ballintry - Belgree	Modern property boundary	Very Low / Negligible
TB_42	Nuttstown - Belgree	Alignment of Belgree Lane	Very Low / Negligible
TB_43	Nuttstown - Priest Town	Established field boundary	Low
TB_44	Priest Town - Belgree	River Ward	Medium
TB_45	Ballymacarney - Belgree	Alignment of a local lane and extant field boundary (bisected by Kilbride Road)	Low
TB_46	Belgree - Ballymacarney	Extant field boundary	Low
TB_47	Belgree - Court	Extant field boundary (ditch)	Low
TB_48	Ballymacarney - Court	Extant field boundary (bisected by Kilbride Road)	Low
TB_49	Court - Court	Established field boundary (bisected by Kilbride Road)	Low
TB_50	Court - Gallanstown	Extant field boundary (bisected by Kilbride Road)	Low

Townland Boundary Reference Number	Townland Names	Description	Significance
TB_51	Gallanstown - Yellow Walls	Extant field boundary (modern residential development has removed some)	Low
TB_52	Yellow Walls - Hollystown	Established field boundary (hedgerow)	Low
TB_53	Gallanstown - Hollystown	Extant field boundary	Low
TB_54	Hollystown - Irishtown	Local lane (Hollywood)	Very Low / Negligible
TB_55	Gallanstown - Irishtown	Local lane (Hollywood)	Very Low / Negligible
TB_56	Hollywood - Irishtown	Extant field boundary	Low
TB_57	Irishtown - Spicklestown	Extant field boundary (some sections missing)	Low
TB_58	Spicklestown - Killamonan	Alignment of the R121 Regional Road and a property boundary	Very Low / Negligible
TB_59	Spicklestown - Ward Lower	Property access and boundary	Very Low / Negligible
TB_60	Spicklestown - Cherryhound	Property boundary (disturbed)	Very Low / Negligible
TB_61	Ward Lower - Cherryhound	Alignment of the R121 Regional Road	Very Low / Negligible
TB_62	Cherryhound - Ward Upper	Property boundary / access track	Very Low / Negligible
TB_63	Ward Lower - Ward Upper	Alignment of the R121 Regional Road	Very Low / Negligible
TB_64	Ward Lower - Newpark	Alignment of a local road (Newpark) adjacent to a farm complex (CH_25)	Very Low / Negligible
TB_65	Ward Upper - Newpark	Alignment of a local road (Newpark)	Very Low / Negligible
TB_66	Newpark - Shallon	Property boundary, road (R121 Regional Road), field boundary	Very Low / Negligible
TB_67	Shallon - Shallon	Watercourse (crossed by the R121 Regional Road)	Medium
TB_68	Newpark - Shallon	Watercourse	Medium
TB_69	Corrstown - Shallon	Alignment of the R121 Regional Road. Boundary not visible in fields to the north of the road	Very Low / Negligible
TB_70	Corrstown - Shallon	Alignment of the R121 Regional Road. Boundary not visible in fields to the north of the road	Very Low / Negligible
TB_71	Shallon - Ballystrahan	Alignment of a local lane south of the R121 Regional Road	Very Low / Negligible
TB_72	Corrstown - Ballystrahan	Alignment of the R121 Regional Road	Very Low / Negligible
TB_73	Corrstown - Skephubble	Alignment of the R122 Regional Road	Very Low / Negligible
TB_74	Ballystrahan - Skephubble	Alignment of the R122 Regional Road	Very Low / Negligible
TB_75	Kilreesk - Ballystrahan	Alignment of the R122 Regional Road with and extant field boundary running perpendicular to the road to the east and a property boundary to the west	Very Low / Negligible
TB_76	Kilreesk - Kingstown	Extant field boundary, bisected by road (Kilreesk Lane)	Low

Townland Boundary Reference Number	Townland Names	Description	Significance
TB_77	Kingstown - Barberstown	Extant field boundary (bisected by road; R108 Regional Road)	Low
TB_78	Barberstown - Pickardstown	Extant field boundary (bisected by road; R108 Regional Road)	Low
TB_79	Pickardstown - Forrest Great	Extant field boundary (bisected by road; R108 Regional Road)	Low
TB_80	Forrest Great - Forrest Little	Extant field boundary (bisected by road; Naul Road)	Very Low / Negligible
TB_81	Forrest Little - Cloghran	Extant field boundary (bisected by road; Naul Road)	Low
TB_82	Cloghran - Glebe	Extant field boundary (hedgerow)	Low
TB_83	Glebe - Baskin	Extant Field boundary	Low
TB_85	Stockhole - Middleton	Local lane	Low
TB_86	Middleton - Clonshaugh	Extant field boundary and section of R122 Regional Road	Low
TB_87	Clonshaugh - Belcamp	Extant field boundary	Low
TB_88	Creemore - Woodland	Watercourse	Medium
TB_89	Creemore - Portan	Watercourse	Medium
TB_90	Woodland - Portan	Extant field boundary (some removed)	Low
TB_91	Stokestown - Nuttstown	Pinkeen River	Medium
TB_92	Hollystown - Yellow Walls	No longer extant	Very Low / Negligible
TB_93	Hollystown - Hollywood	Property boundary	Very Low / Negligible
TB_94	Nevinstown East - Cloghran	Field boundary - an established hedgerow within an area of agricultural fields	Low
TB_95	Stockhole - Glebe	Field boundary - an established hedgerow within an area of agricultural fields	Low
TB_96	Glebe - Baskin	Field boundary - an established hedgerow within an area of agricultural fields	Low
TB_97	Stockhole - Baskin	Field boundary - an established hedgerow	Low
TB_98	Stockhole - Clonshagh	Alignment of the R122 Regional Road	Very Low / Negligible
TB_99	Belcamp	Watercourse	Medium

East Meath to North Dublin Grid Upgrade
Environmental Impact Assessment Report (EIAR): Volume 3 (Appendices)

Appendix A13.2 - LiDAR Review for the East Meath - North Dublin Grid Upgrade

EirGrid

March 2024

Executive Summary

Jacobs were commissioned by EirGrid to undertake a review of Light Detection and Ranging (LiDAR) data captured for the East Meath to North Dublin Grid Upgrade Project (hereafter referred to as the Proposed Development). The aim of the review was to inform the archaeology, architectural heritage and cultural heritage baseline for the Environmental Impact Assessment Report (EIAR) for the Proposed Development by gathering additional information on the form, extent and condition of known archaeological constraints and identifying, mapping and interpreting any previously unrecorded potential archaeological constraints. This Appendix report presents the results of the review of the LiDAR data.

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linear features, possible ditches, are visible extending from the corners of the enclosure suggesting it may be part of a larger complex.

Image 4.8: A very ephemeral circular feature (LI_65), defined by a possible circular enclosing ditch, measuring approximately 17m in diameter and interpreted as a possible enclosure in Vesingtown.

Image 4.9: A circular area in Ballystrahan measuring approximately 27m in diameter, with a possible enclosing ditch perceptible to the north-east, and interpreted as a possible enclosure (LI_71).

Image 4.10: A network of linear features in Baytownpark (LI_21) interpreted as possible former field boundaries forming a field system of unknown date (extends to the north beyond the extent of the Study Area). Areas of more ephemeral narrow parallel linear features, interpreted as drainage (likely later in date), were also noted.

Image 4.11: Linear features forming the boundaries of a sub-rectangular enclosure (LI_15) in Blackhall Big, with other linear features noted adjoining the feature. Interpreted as the boundary to a plot depicted on historic Ordnance Survey mapping (1837) surrounding a small group of roadside buildings.

Image 4.12: A cluster of rectangular features in Cullendragh (LI_08). These features are not depicted on historic Ordnance Survey mapping but are similar to other buildings visible on historic Ordnance Survey mapping.

Image 4.13: The rectangular footings of a possible roadside building (LI_14) along with an ephemeral boundary feature that correspond with a building depicted on historic Ordnance Survey mapping (1837) identified as a 'Police Station' in Culcommon.

Image 4.14: St. Brigid's Church & Graveyard (LI_43; Also AY_23, AY_24 and AH_06; DU011-039001, DU011-039002 and RPS 660) in Ward Lower comprising a raised sub-circular enclosed church yard, with memorials, surrounding a rectangular church building.

Image 4.15: An irregular area, within an area of established woodland in Priest Town, interpreted as a possible gravel pit (LI_37). A track was noted to the south and the Ward River is located to the north. Another area of woodland located to the north-east, is the location of a gravel pit depicted on historic Ordnance Survey mapping (1837).

Image 4.16: A wide curvi-linear channel (LI_27) in Pace, interpreted as a possible palaeochannel, located near the River Tolka; however, not depicted on historic or modern mapping.

Image 4.17: A narrow irregular channel to the north-east of the River Tolka in Pace (LI_69). Corresponds with the meandering course of the river depicted on First Edition Ordnance Survey mapping (1837) then as the former channel on later editions (1911).

Appendix A13.2 LiDAR Review for the East Meath to North Dublin Grid Upgrade

1. Introduction

Jacobs were commissioned by EirGrid to undertake a review of Light Detection and Ranging (LiDAR) data captured for the East Meath - North Dublin Grid Upgrade Project (hereafter referred to as the Proposed Development) to identify previously unrecorded potential archaeological constraints and gather additional information on known archaeological constraints. High-resolution LiDAR data was captured for the Step 4b Route which extends approximately 37km (kilometres) from Woodland Substation, near Batterstown in County Meath, to Belcamp Substation, near Belcamp in County Dublin (refer to Figure 1).

This Appendix presents the results of the review of the LiDAR data.

Section 1 of this Appendix presents the aims and objectives of the review. Section 2 provides the background to the review of the LiDAR data as well as a summary of the baseline environment, including topographical and geological background. Section 3 outlines the method used for the review of the LiDAR data, including supplementary sources of information consulted to verify the interpretations of archaeological constraints. Section 4 presents a summary of the results of the review of the LiDAR data and Section 5 discusses the results. An inventory identifying all archaeological constraints identified during the review of the LiDAR data is also provided (Appendix A) and an overview of the locations of archaeological constraints is shown on Figure 1.

1.1 Aims and Objectives

The aim of the review of the LiDAR data was to inform the archaeology, architectural heritage and cultural heritage Chapter for the Environmental Impact Assessment Report (EIAR) (refer to Chapter 12 (Archaeological, Architectural Heritage and Cultural Heritage) in Volume 2 of this EIAR) for the Proposed Development by gathering additional information on the form, extent and condition of known archaeological constraints and identifying, mapping and interpreting any previously unrecorded potential archaeological constraints within the study area (see Section 3).

This was achieved through:

- Processing and visualising the LiDAR data acquired for the Proposed Development;
- Undertaking a review of the visualisations to identify, map and interpret any previously unrecorded potential archaeological constraints and gather additional information on known archaeological constraints ;
- Verifying the results against other sources (see below); and
- The production of a shapefile and inventory of the results of the review of the LiDAR data, as well as this report summarising the results.

2. Baseline Environment

2.1 Location, Topography and Geology

The Step 4b Route extends south from Woodland in County Meath to Belcamp in County Dublin (refer to Figure 1). While the Step 4b Route is located within a largely rural landscape, within the existing carriageways of regional and local roads, the route also includes a number of offline sections. It passes through rural roadside settlements characterised by clusters of houses, farms and commercial facilities. More recent development includes the M1, M2 and M3 Motorways, as well as Dublin Airport. The Step 4b Route also crosses the River Tolka, River Pinkeen and River Ward, as well as a number of minor watercourses.

The underlying geology is largely limestone and shale, with outcropping bedrock noted along the Step 4b Route in the townlands of Cullendragh, Spricklestown, Killamonan, Ward Upper, Corrstown, Shallon, Barberstown, and Forrest Great (Geological Survey of Ireland n.d.). Superficial deposits comprise till, alluvium, lacustrine sediments, and gravels (Geological Survey of Ireland n.d.).

2.2 Archaeology, Architectural Heritage, and Cultural Heritage

A summary of archaeology, architectural heritage, and cultural heritage constraints identified at Step 4A along with a discussion on the general character and nature of the constraints present is presented in Appendix B (Step 4A Archaeology, Architectural Heritage, and Cultural Heritage Baseline Information) of the CP1021 East Meath - North Dublin Grid Upgrade Step 4A Report - Analysis of Route Options report (Jacobs 2023) and has not been duplicated here.

A total of 23 known archaeological constraints have been identified within the study area (see Section 3) from the Record of Monuments and Place (RMP) and / or Sites and Monuments Record (SMR) (including seven excavated sites (five of these are included under their classifications in Table 1 with 'site of' added as these have been excavated; refer to Table 1)). These largely comprise ringforts and enclosures of unknown date, religious sites dating from the medieval period (5th to 16th Centuries AD (Anno Domini)) onwards, and evidence of domestic and agricultural activity dating from the prehistoric to post-medieval periods.

Table 1: Known Archaeological Constraints Within the Study Area Identified from the RMP and / or SMR.

Type	Count
Burnt mound (site of)	1
Castle - unclassified	1
Church	1
Enclosure	4
Excavation - miscellaneous	2
Field system	1
Graveyard	2
Habitation site (site of)	1
House - 16th/17th century	1
House - 18th/19th century	1
Kiln (site of)	2
Mound	1
Ringfort - unclassified	3
Ritual site - holy well	1
Structure (site of)	1

3. Method

LiDAR is a remote sensing technique for determining three-dimensional data points through "*the use of laser light to determine distance to an object or surface*" (Historic Environment Scotland 2018). The resulting data provides accurate topographic information which can aid the identification of archaeological remains, even very indistinct earthworks, including within areas of thick vegetation (Lambrick 2008).

High resolution LiDAR data for the Proposed Development was acquired by Bluesky on behalf of EirGrid. The LiDAR was captured on 14 February 2023 at 0.25m (metres) lateral resolution and accurate to +/- 0.05m vertical resolution. Digital Elevation Models (DEMs), both a Digital Surface Model (DSM) and a Digital Terrain Model (DTM), were provided. A DSM is a model that "*contains elevations of natural terrain features including objects on it, i.e. vegetation and cultural features such as buildings*", whereas a DTM "*represents the elevation of 'bare earth', i.e. the shape of terrain without any objects on it*" (Kokalj and Hesse 2017). Data were tied to Irish Transverse Mercator (ITM).

The LiDAR data were converted from ASCII (plain text files) to raster format using ArcGIS 10.6.1. A mosaic of the converted data was created and used to produce visualisations using the ArcToolbox and the methodologies in Processing and Working with LiDAR Data in ArcGIS: A Practical Guide for Archaeologists (Davis 2012) and *LiDAR-derived Local Relief Models – a new tool for archaeological prospection* (Hesse 2010).

A number of complementary visualisations were created to review the LiDAR data. These comprised:

- Single direction hillshades – a technique based on the "*hypothetical illumination of a surface… to show subtle changes in the topography of DEMs with the use of shadow"* (Historic England 2018). Hillshade models of the DEMs were produced using various azimuths to allow for comparison and the identification of features which may be imperceptible when lit from certain angles (i.e. linear earthworks);
- Multi-directional hillshade – a technique that produces a composite of a number of single direction hillshades lit from different directions (commonly 16 directions) containing information from all the separate elements. This technique can be used to counter the issue of certain features being imperceptible when lit from certain angles. However, features may become 'washed out' as a result of over exposed areas; and
- Simple Local Relief Model (LRM) – a technique that "*separates local small-scale features from large scale landscape forms*" which enhances the visibility of shallow topographic features irrespective of the illumination (Kokalj and Hesse 2017; Hesse 2010). Local relief can be presented in simple colours which enhance the readability of the model.

For the review of the LiDAR data, a study area comprising the Step 4b Route and an area extending 100m to either side of it was defined and overlaid on each visualisation (see above). To facilitate the review, the study area was also divided into 1km (kilometre) grid squares.

For each grid square, the visualisations produced from the LiDAR data were visually inspected and the extents of previously unrecorded potential archaeological constraints were digitised. In addition, the locations of known archaeological constraints identified from the SMR and / or RMP were reviewed to gather additional information about the form, extent and condition of these constraints, including digitising any visible features.

For each identified archaeological constraint the following sources of information were also consulted:

- Aerial imagery available online, including GoogleEarth and BlueSky aerial imagery via Project Mapper;

- Historic aerial photographs available online via the Cambridge University Collection of Aerial Photography (CUCAP; 2023) and National Collection of Aerial Photography (NCAP; n.d.);
- Publicly accessible historic Ordnance Survey mapping (6" to 1 mile, 1837 – 1842, and 25" to 1 mile, 1888-1913);
- Modern mapping, including Google Street View; and
- Known archaeological constraints identified as part of the Step 4A Report (Appendix B: Archaeology, Architectural Heritage, and Cultural Heritage Baseline Information (Jacobs 2023).

A shapefile of the results was created which captured the following information for each archaeological constraint:

- 1km grid square number – the unique reference given to the 1km^2 (kilometres squared) grid square the archaeological constraint is located within or, where an archaeological constraint overlaps grid squares, the grid square the majority of the archaeological constraint is located within;
- Unique Reference Number – the unique reference number, prefixed with 'LI', ascribed to all archaeological constraints identified, including previously recorded archaeological constraints;
- Associated known constraint reference (if applicable) – the unique reference for the known archaeology, architectural heritage and cultural heritage constraint, or known constraint located in proximity to the previously unrecorded potential archaeological constraint that may be associated with it;
- National dataset reference (if relevant) – the corresponding RMP or SMR reference number for the archaeological constraint;
- Easting and Northing – ITM coordinates of the centroid of the archaeological constraint;
- Townland – the name of the townland within which the archaeological constraint is located;
- Sources – the sources which were referred to inform and verify the interpretation of the archaeological constraint;
- Confidence:
    - High – strong possibility the archaeological constraint is as interpreted;
    - Medium – the archaeological constraint is tentatively interpreted; and
    - Low – limited possibility the archaeological constraint is as interpreted.
- Site type – the type of site based on the interpretation of the archaeological constraint.

Some potential archaeological constraints identified from the LiDAR data were found to be non-archaeological following review against other sources (see above), such as the circular wear patterns around modern animal feeders, mounds of modern material and field drainage. These were not recorded and are not discussed further below.

A summary of the results is presented in Section 4. Full details for the archaeological constraints identified are provided in Appendix A (Inventory of Archaeological Constraints) and the locations of archaeological constraints are shown on Figure 1.

3.1 Limitations

While processing the LiDAR data in the Geographic Information System (GIS) enables the visualisation and analysis of the data, the use of raster surfaces can result in the loss of some original data during processing.

LiDAR provides topographic information which can aid the identification of potential archaeological constraints. However, many archaeological constraints do not have above ground features and therefore not all archaeological constraints that may be present can be identified from LiDAR. There is therefore the

potential for further previously unrecorded underground archaeological features to be present within the study area.

4. Results

This Section presents a summary of the results of the review of LiDAR data. Further details for the archaeological constraints identified are provided in Appendix A (Inventory of Archaeological Constraints) and the locations of archaeological constraints are shown on Figure 1.

4.1 Overview

The review of the LiDAR data has identified 71 archaeological constraints within the study area (refer to Table 2 and see Figure 1). Of these, six were interpreted as being associated with known constraints within the Study Area including those identified from the SMR and/or RMP (such as LI_078 (AY_41; DU011-043); Image 4.1) with the remaining 65 being previously unrecorded.

Table 2: Summary Classification of Archaeological Constraints Identified within the Study Area.

Type	Count
Boundary	5
Building(s) (Site of)	4
Church / churchyard	1
Designed landscape feature	1
Ditch	4
Driveway	1
Enclosure	8
Farm (Site of)	1
Field boundary(ies)	22
Field system	10
Gravel pit / quarry	6
Palaeochannel	4
Pit	1
Ringfort	1
Road	1
Track	1

A ringfort recorded on the RMP (DU011-043) was identified at Step 4 (AY_41). It comprises a large circular earthwork depicted on First Edition Ordnance Survey mapping (1837 – 1842) located within an arable field to the north of the R108 Regional Road. The site has been interpreted as a platform-type ringfort with a waterlogged external fosse (ditch). The ringfort, which is approximately 80m in diameter, was visible on the LiDAR data (see Image 4.1). It has been truncated to the east and south-east by the R108 Regional Road and to the north by airport infrastructure (lighting).

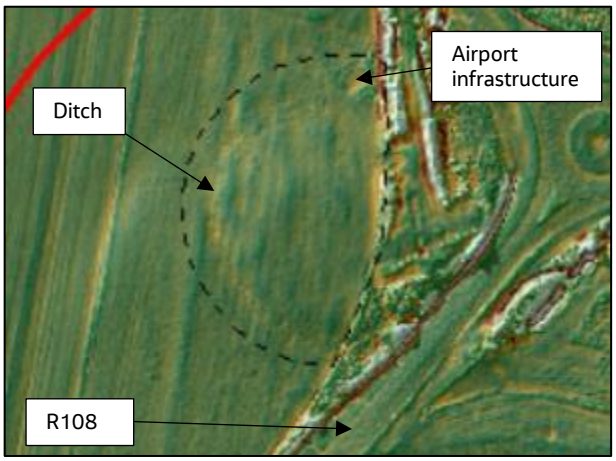

Image 4.1: A ringfort in the townland of Forest Great (LI_52; AY_41; DU011-043) of possible early medieval date recorded on the RMP (DU011-043). The ringfort has been truncated to the east and south-east by the R108 Regional Road. However, the outer ditch remains perceptible in a pasture field west of the road.

Simple Local Relief Model (50% transparency) over Single Direction Hillshade Model: DTM azimuth 315° and altitude 10°.

Eight possible previously unrecorded enclosures (LI_31 (Image 4.2), LI_34 (Image 4.3), LI_40 (Image 4.4), LI_53 (Image 4.5), LI_54 (Image 4.6), LI_63 (Image 4.7) LI_65 (Image 4.8), and LI_71 (Image 4.9)) were also identified from the LiDAR data in the townlands of Kinoristown, Stokestown, Irishtown, Forest Great, Cloghran, Vesingtown, Harlockstown and Ballystrahan. The enclosures identified within the study area are circular in shape and defined by ditches, banks, or a combination of ditches and banks, and range in diameter from approximately 17m to 88m. LI_63 in Harlockstown (Figure 8) is a rectangular enclosure, measuring approximately 18m by 10m .

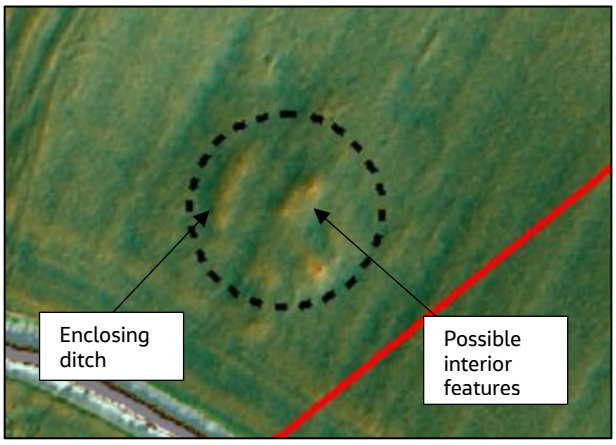

Image 4.2: An ephemeral circular feature in the townland of Kinoristown tentatively interpreted as a possible enclosure (LI_31), approximately 30m in diameter, comprising a portion of a sub-circular enclosing ditch with possible interior features.

Simple Local Relief Model (50% transparency) over Single Direction Hillshade Model: DTM azimuth 315° and altitude 10°.

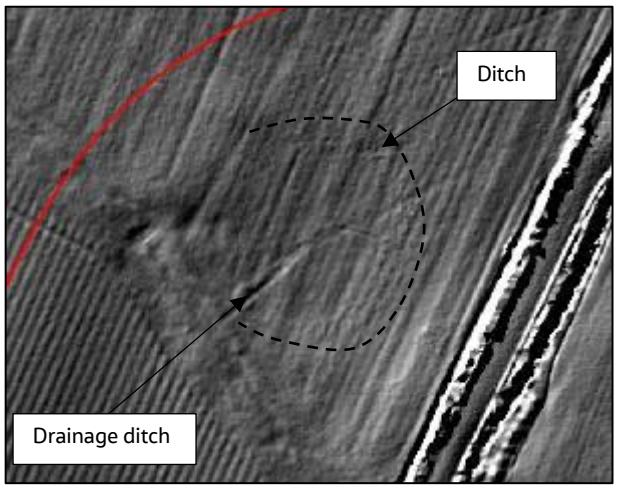

Image 4.3: An ephemeral circular feature in the townland of Stokestown tentatively interpreted as a possible enclosure (LI_34) comprising a circular enclosing ditch surrounding an area approximately 41m in diameter. It has been partially truncated by a later drainage ditch.

Single Direction Hillshade Model: DTM azimuth 315° and altitude 10°.

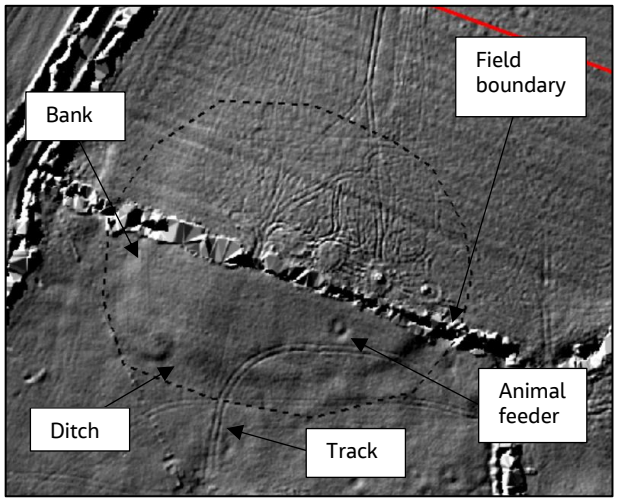

Image 4.4: A possible enclosure (LI_40) in the townland of Irishtown comprising a raised interior with a sub-circular enclosing ditch (continuing into the field to the north) and very ephemeral possible interior bank. Partially truncated by a field boundary and track. North-eastern portion not perceptible. A circular wear pattern around a modern animal feeder is also visible within the enclosure.

Single Direction Hillshade Model: DTM azimuth 315° and altitude 10°.

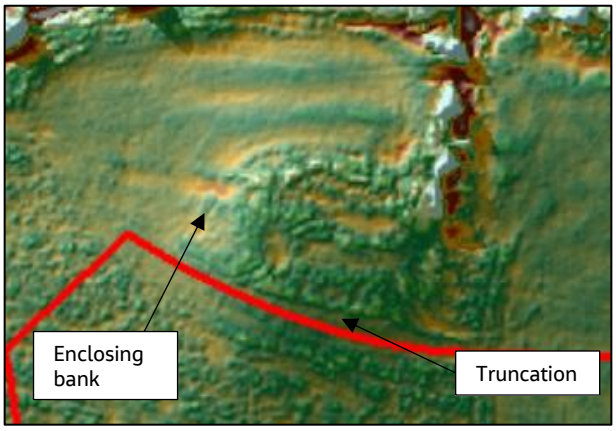

Image 4.5: A sub-circular area of rough ground in the townland of Forest Great interpreted as a possible enclosure (LI_53), approximately 30m in diameter, including a possible section of enclosing bank. Appears to have been truncated to the south and east.

Simple Local Relief Model (50% transparency) over Single Direction Hillshade Model: DTM azimuth 315° and altitude 10°.

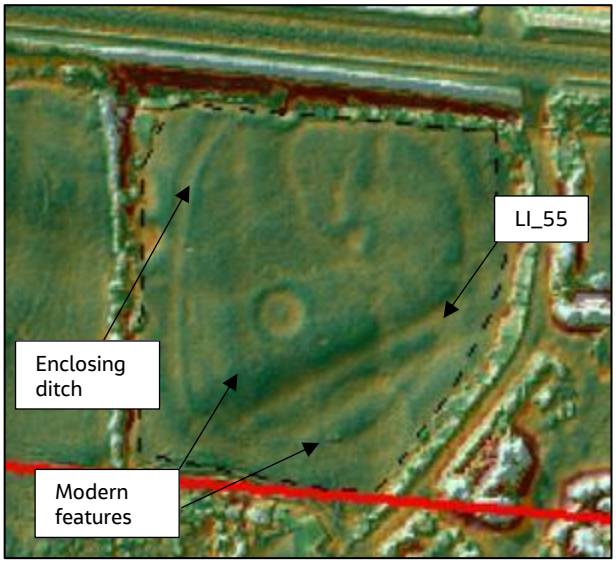

Image 4.6: A possible large sub-circular enclosure (LI_54), in the townland of Cloghran, measuring approximately 76m by 64m, with possible interior features including a circular feature measuring approximately 10m in diameter. Modern features were also noted and the enclosure appear to have been truncated by the Stockhole Lane to the north and bisected by a former road (LI_55).

Simple Local Relief Model (50% transparency) over Single Direction Hillshade Model: DTM azimuth 315° and altitude 10°.

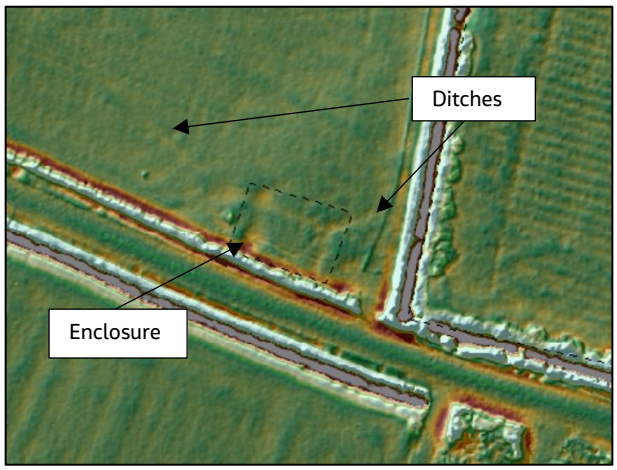

Image 4.7: A rectangular feature (LI_63), defined by an enclosing ditch, measuring approximately 18m by 10m. Interpreted as a small rectangular enclosure of unknown date in the townland of Harlockstown. Two adjoining linear features, possible ditches, are visible extending from the corners of the enclosure suggesting it may be part of a larger complex.

Simple Local Relief Model (50% transparency) over Single Direction Hillshade Model: DTM azimuth 315° and altitude 10°.

Image 4.8: A very ephemeral circular feature (LI_65), defined by a possible circular enclosing ditch, measuring approximately 17m in diameter and interpreted as a possible enclosure in the townland of Vesingtown.

Simple Local Relief Model (50% transparency) over Single Direction Hillshade Model: DTM azimuth 315° and altitude 10°.

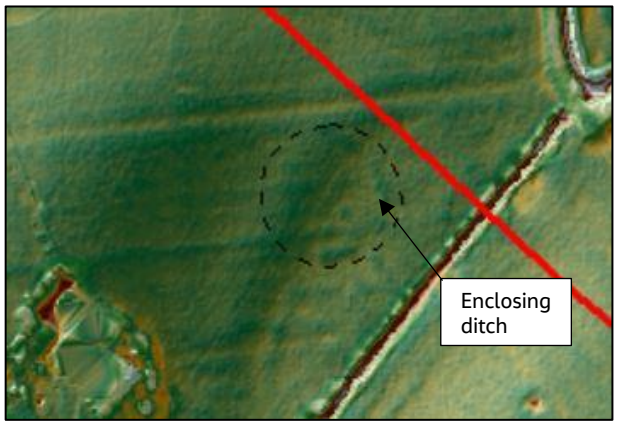

Image 4.9: A circular area in Ballystrahan measuring approximately 27m in diameter, with a possible enclosing ditch perceptible to the north-east, and interpreted as a possible enclosure (LI_71).

Simple Local Relief Model (50% transparency) over Single Direction Hillshade Model: DTM azimuth 315° and altitude 10°.

A total of 22 former field boundaries (LI_02, LI_03, LI_06, LI_12, LI_19, LI_22, LI_23, LI_26, LI_28, LI_29, LI_32, LI_35, LI_38, LI_45, LI_46, LI_48, LI_50, LI_51, LI_56, LI_57, LI_60, and LI_61) and 10 field systems (LI_04, LI_05, LI_07, LI_09, LI_10, LI_11, LI_16, LI_18, LI_21 (Image 4.10), and LI_24) were identified from the LiDAR data. While 24 of these reflect the boundaries and field pattern depicted on First Edition Ordnance Survey mapping (6" to 1 mile, 1837 – 1842), eight (LI_04, LI_07, LI_09, LI_11, LI_18, LI_21 (Image 4.10), LI_23 and LI_24) are not depicted on First Edition Ordnance Survey mapping (6" to 1 mile, 1837 – 1842) or on subsequent editions which suggests they could be earlier in date than the First Edition. In addition, five boundaries (LI_01, LI_13, LI_15 (Image 4.11), LI_62, and LI_67) associated with buildings depicted on Ordnance Survey mapping (6" to 1 mile, 1837 – 1842, and 25" to 1 mile, 1888-1913) were also identified.

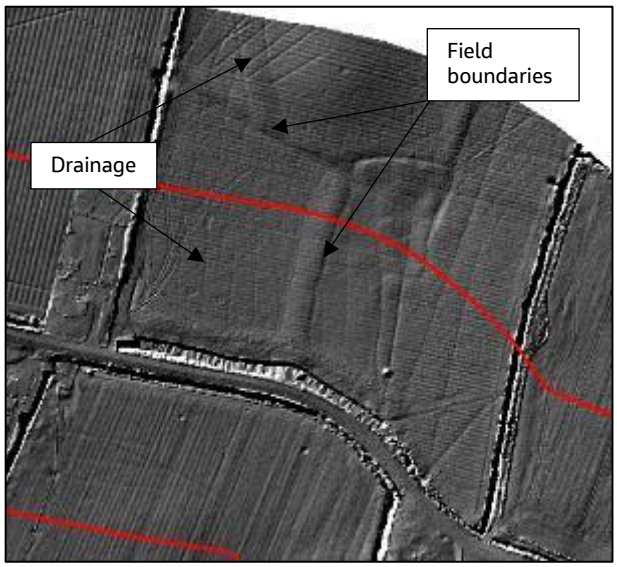

Image 4.10: A network of linear features in Baytownpark (LI_21) interpreted as possible former field boundaries forming a field system of unknown date (extends to the north beyond the extent of the Study Area). Areas of more ephemeral narrow parallel linear features, interpreted as drainage (likely later in date), were also noted.

Single Direction Hillshade Model: DTM azimuth 315° and altitude 10°.

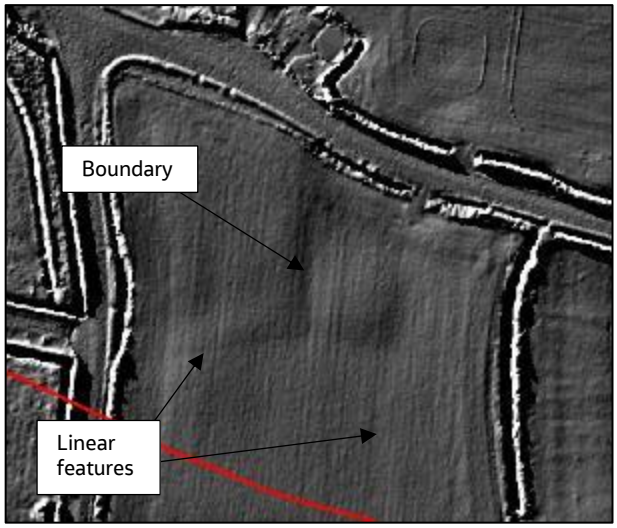

Image 4.11: Linear features forming the boundaries of a sub-rectangular enclosure (LI_15) in Blackhall Big, with other linear features noted adjoining the feature. Interpreted as the boundary to a plot depicted on historic Ordnance Survey mapping (1837) surrounding a small group of roadside buildings.

Single Direction Hillshade Model: DTM azimuth 315° and altitude 10

Four sites of previously unrecorded buildings were identified from the LiDAR data (LI_08 (Image 4.12), LI_14 (Image 4.13), LI_44, and LI_64). These are characterised by individual or small groups of rectangular features, often with linear features interpreted as associated boundaries. While two (LI_14 (Image 4.13and LI_44) correspond with buildings depicted on historic Ordnance Survey mapping, LI_08 (Image 4.12) and LI_64 are not depicted on First Edition Ordnance Survey mapping (6" to 1 mile, 1837 – 1842) or on subsequent editions and therefore may pre-date the First Edition.

In addition, the site of a farm in Upper Middleton (LI_59; also CH_34) was also identified from LiDAR data. LI_59 comprises an irregular area of disturbance that corresponds with 'Upper Middleton' on historic Ordnance Survey mapping (1843).

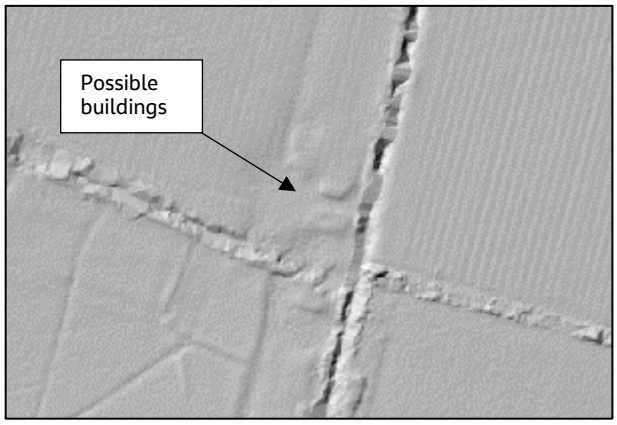

Image 4.12: A cluster of rectangular features in Cullendragh (LI_08). These features are not depicted on historic Ordnance Survey mapping but are similar to other buildings visible on historic Ordnance Survey mapping.

Single Direction Hillshade Model: DTM azimuth 315° and altitude 45°.

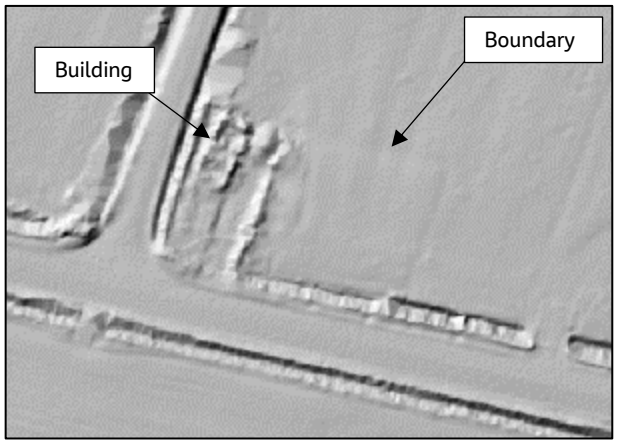

Image 4.13: The rectangular footings of a possible roadside building (LI_14) along with an ephemeral boundary feature that correspond with a building depicted on historic Ordnance Survey mapping (1837) identified as a 'Police Station' in Culcommon.

Single Direction Hillshade Model: DTM azimuth 315° and altitude 45°.

St. Brigid's Church and Graveyard (LI_43; Image 4.14) is recorded on the RMP (DU011-039001 and DU011-039001) and the Record of Protected Structures (RPS) (RPS 660) and was identified at Step 4 (AY_23, AY_24 and AH_07). Surrounded by a wall, the church yard comprises a raised sub-circular area surrounding the ruins of a rectangular medieval parish church with rows of headstones dating to the 19th and 20th Centuries. Both the church yard, headstones and footings of the church were visible on the LiDAR data (Image 4.14).

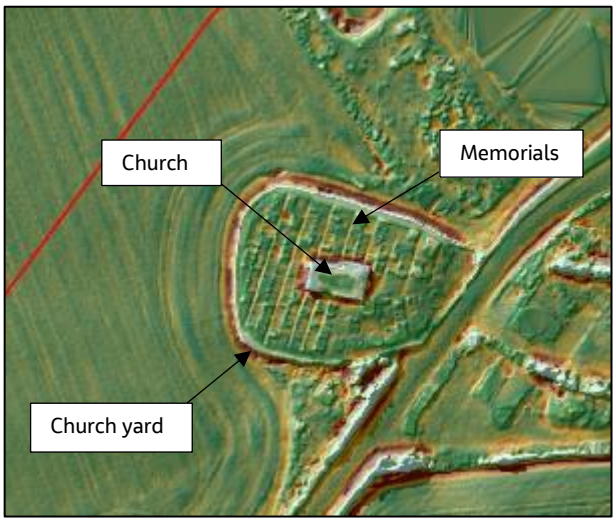

Image 4.14: St. Brigid's Church & Graveyard (LI_43; Also AY_23, AY_24 and AH_06; DU011-039001, DU011-039002 and RPS 660) in Ward Lower comprising a raised sub-circular enclosed church yard, with memorials, surrounding a rectangular church building.

Simple Local Relief Model (50% transparency) over Single Direction Hillshade Model: DTM azimuth 315° and altitude 10°.

A possible pit (LI_20), approximately 7m in diameter, with two smaller (approximately 3m in diameter) features located adjacent, was also identified in the townland of Baytownpark. However, this interpretation is tentative, and this feature may comprise evidence of agricultural activity or be natural in origin.

A potential archaeological constraint associated Hollywoodrath Garden and Designed Landscape (GDL) (NIAH 2267; DL_05), was also identified from the LiDAR data (LI_41). This comprises an irregular area measuring approximately 15m across in the location of a pond depicted on First Edition Ordnance Survey mapping (1843; 1909). In addition, a driveway (LI_17) comprising a pair of parallel linear features was also identified from LiDAR data. It corresponds with a driveway depicted on historic Ordnance Survey mapping (1837) associated with an unnamed house.

A total of four linear features, interpreted as ditches, were identified from the LiDAR data (LI_25, LI_42, LI_49 and LI_70). LI_42 is located within demesne lands (DL_05). However, there are no corresponding features depicted on First Edition Ordnance Survey mapping (6" to 1 mile, 1837 – 1842) suggesting they may be earlier in date than the First Edition. The remaining ditches comprise individual linear features with no diagnostic features and therefore the date and function of these are unknown.

A total of six gravel pits and quarries (LI_30, LI_33, LI_37 (Image 4.15), LI_39, LI_47, and LI_68) were identified from the LiDAR data. These are characterised by areas of disturbance that correspond with sites depicted on historic Ordnance Survey mapping, or those located near to known areas of extraction (such as LI_37; Image 4.15).

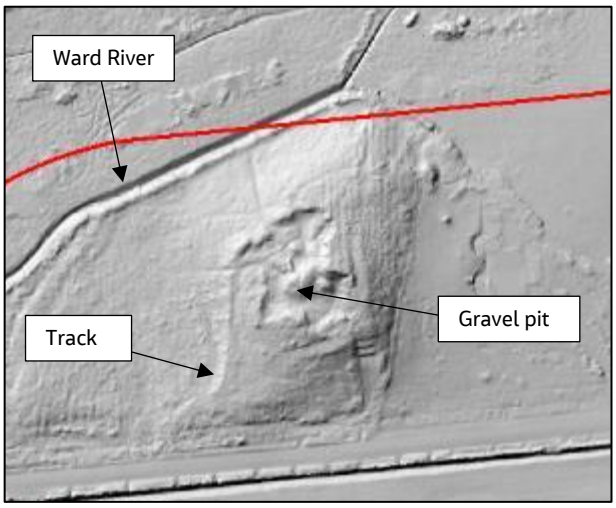

Image 4.15: An irregular area, within an area of established woodland in Priest Town, interpreted as a possible gravel pit (LI_37). A track was noted to the south and the Ward River is located to the north. Another area of woodland located to the north-east, is the location of a gravel pit depicted on historic Ordnance Survey mapping (1837).

Single Direction Hillshade Model: DTM azimuth 315° and altitude 45°.

The former alignments of a road (LI_55) and a track (LI_66) were identified from LiDAR data. The road comprises a linear feature in Cloghran and corresponds to the alignment of the road depicted on historic Ordnance Survey mapping (1843). LI_66 comprises a pair of parallel linear features and was tentatively interpreted as a possible track of unknown date in Cushinstown.

Six possible palaeochannels (LI_18, LI_24, LI_27 (Image 4.16), LI_36, LI_58, and LI_69 (Image 4.17)) were also identified from LiDAR data. These constraints comprise channels of former watercourses, including possible river terraces and levees. While LI_69 (Image 4.17) is depicted on historic Ordnance Survey mapping (1837) as the meandering channel of the River Tolka prior to the channel being straightened, the others do not reflect the channels of known watercourses shown on historic or modern mapping and therefore are likely to be former watercourses that have been filled or buried.

Image 4.16: A wide curvi-linear channel (LI_27) in Pace, interpreted as a possible palaeochannel, located near the River Tolka; however, not depicted on historic or modern mapping.

Single Direction Hillshade Model: DTM azimuth 315° and altitude 45°.

Image 4.17: A narrow irregular channel to the north-east of the River Tolka in Pace (LI_69). Corresponds with the meandering course of the river depicted on First Edition Ordnance Survey mapping (1837) then as the former channel on later editions (1911).

Simple Local Relief Model (50% transparency) over Single Direction Hillshade Model: DTM azimuth 315° and altitude 10°.

Further information on the archaeological constraints including known archaeological constraints identified during the review of the LiDAR data is presented in Appendix A (Inventory of Archaeological Constraints) and the locations of archaeological constraints is shown on Figure 1.

4.2 Summary of Findings

Table 2 in Section 4.1 provides a summary of the classification of archaeological constraints identified within the study area. A summary of the main site types is provided below, and a detailed inventory is presented in Appendix A.

4.2.1 Agricultural Activity

The majority of the archaeological constraints identified were interpreted as evidence of agricultural activity. A total of 10 field systems (fields that form a coherent group) and 22 field boundaries were identified within the study area.

While 22 of these former field boundaries and field systems correspond with the field pattern depicted on historic Ordnance Survey mapping (for example, LI_28 in Pace), possible earlier examples were also identified comprising groups of smaller and more irregular field shapes, such as LI_21 in Baytownpark (Image 4.10). Given that these field systems are not depicted on historic Ordnance Survey mapping, they may be of earlier date than the First Edition.

A further four linear features interpreted as ditches were also identified from LiDAR data. However, given the lack of diagnostic information it was not possible to attribute a date or function to these constraints from the sources identified in Section 3.

4.2.2 Enclosures

LI_52 (Image 4.1) is a platform ringfort recorded on the RMP (DU011-043). Ringforts comprise roughly circular or oval areas surrounded by an earth bank with an external ditch, with platform ringforts typically constructed by scarping a natural knoll or drumlin (O'Sullivan *et al*. 2021). They are likely to have been farmsteads and broadly date to the Early Medieval period (c. AD 500 to AD 1000).

In addition, eight possible enclosures were identified during the review of the LiDAR data. These largely comprise circular and curvi-linear features interpreted as enclosing ditches. While these constraints could be the remains of ringforts, their interpretation is tentative and they may equally be natural features or the result of more recent disturbance.

4.2.3 Buildings and their Environs

Four possible buildings and five boundaries were identified within the study area. Seven of these correspond with buildings and plots depicted on historic Ordnance Survey mapping (6" to 1 mile, 1837 – 1842, and 25" to 1 mile, 1888-1913), such as LI_14 in Culcommon (Image 4.13). However, two (LI_08 in Cullendraugh (Image 4.12) and LI_64 in Waynestown) comprise similar constraints that are not depicted on historic mapping and therefore may be earlier in date than First Edition Ordnance Survey mapping (6" to 1 mile, 1837 – 1842). In addition, landscape features associated with houses and farms were identified such as a driveway (LI_17 in Staffordstown Little), a pond (LI_41 in Irishtown), and the former alignments of roads and trackways (LI_55 and LI_66 in Cloghran and Cushinstown respectively).

In addition, the remains of a medieval parish church and associated walled church yard (LI_43; Image 4.14) in Ward Lower were identified within the study area. LI_43 is a Recorded Monument (DU011-039001 and DU011-039002) and Protected Structure (RPS 660), and is depicted on historic Ordnance Survey mapping (1908) as 'in ruins'.

4.2.4 Mineral Extraction

A total of six quarries and gravel pits, evidencing post-medieval mineral extraction, were identified within the study area. These constraints, comprising irregular areas, largely correspond with or are located near to the location of quarries and gravel pits depicted on First Edition Ordnance Survey mapping (6" to 1 mile, 1837 – 1842) such as the gravel pits in the townlands of Priest Town (LI_37; Image 4.15) and Dunboyne (LI_68).

4.2.5 Palaeochannels

A total of six possible palaeochannels (LI_18, LI_24, LI_27 (Figure 17), LI_36, LI_58, and LI_69 (Image 4.17)) were identified within the study area. These areas may comprise locations of higher archaeological potential as watercourses were often the focus of human activity and there is the potential for votive offerings, objects apparently deposited for religious reasons, in rivers, and areas of alluvium have the potential to preserve previously unknown archaeological remains, including paleoenvironmental and organic materials.

4.2.6 Miscellaneous

A small group of possible pits (LI_20), was identified in Baytownpark. However, given the lack of diagnostic information this interpretation is tentative and these constraints may equally evidence more recent agricultural activity or be natural in origin.

5. Discussion

The review of the LiDAR data for the Proposed Development identified 71 archaeological constraints within the study area, six of which are possibly associated with known constraints (AY_23, AY_24 and AH_06 (DU011-039001, DU011-039002 and RPS 660), CH_34, DL_04 and DL_05). The interpretations of the archaeological constraints identified was informed by information gathered from the sources listed in Section 3.

Of the 71 archaeological constraints identified, 14 may be of some significance comprising:

- Eight possible enclosures (LI_31 (Image 4.2), LI_34 (Image 4.3), LI_40 (Image 4.4), LI_53 (Image 4.5), LI_54 (Image 4.6), LI_63 (Image 4.7), LI_65 (Image 4.8), and LI_71 (Image 4.9)) of unknown date and function; and
- Six possible palaeochannels in Harlockstown (LI_18), Dunboyne (LI_24), Pace (LI_27 (Image 4.16) and LI_69 (Image 4.17)), Nuttstown (LI_36), and Cloghran (LI_58).

6. References

Directives and Legislation

National Monuments Acts 1930-2004

Maps

Ordnance Survey 6", 1837 – 1842

Ordnance Survey 25", 1888-1913

Aerial Photographs

Sortie	Frame	Date	Type	Source
FSL/7196/03	3488	02 October 1971	Vertical	https://ncap.org.uk/frame/11-1-2-76-42
FSL/7196/03	3487	02 October 1971	Vertical	https://ncap.org.uk/frame/11-1-2-76-41

Sources

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Davis, O. (2012). Processing and Working with LiDAR Data in ArcGIS: A Practical Guide for Archaeologists.

Department of Housing, Local Government and Heritage (2003). Database of Irish Excavation Reports. [Online] Available from: https://excavations.ie/ [Accessed May 2023].

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Geological Survey of Ireland (n.d.). Geological Survey Ireland Spatial Resources: Public Data Viewer Series. [Online] Available from: https://dcenr.maps.arcgis.com/apps/MapSeries/index.html?appid=a30af518e87a4c0ab2fbde2aaac3c228 [Accessed May 2023].

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Historic England (2018). Using Airbourne Lidar in Archaeological Survey: The Light Fantastic.

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Kokalj, Ž., and R. Hesse (2017). Airborne Laser Scanning Raster Data Visualisation: A Guide to Good Practice. Založba ZRC.

Lambrick, G. (2008). Air and Earth: Aerial Archaeology in Ireland – A Review for the Heritage Council. [Online] Available from: https://www.heritagecouncil.ie/content/files/air_earth_aerial_archaeology_2008_3mb.pdf [Accessed May 2023].

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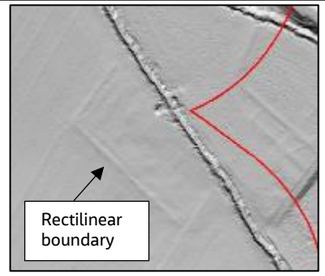
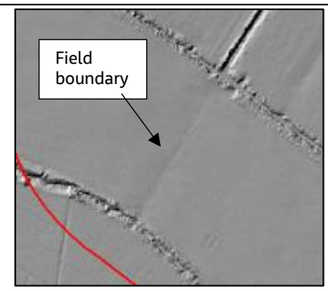
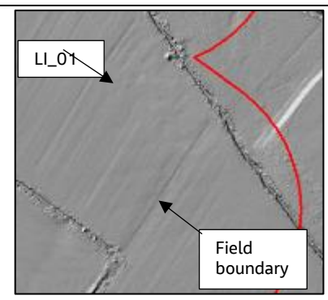
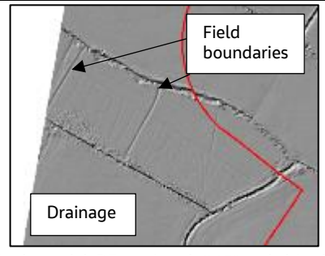
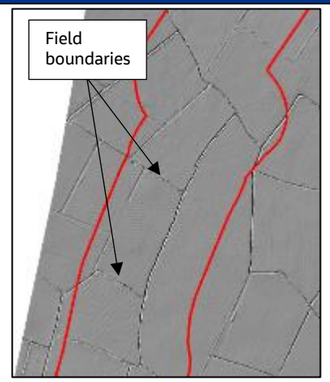
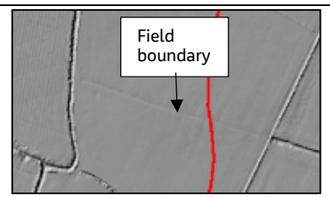
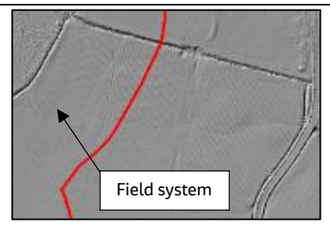
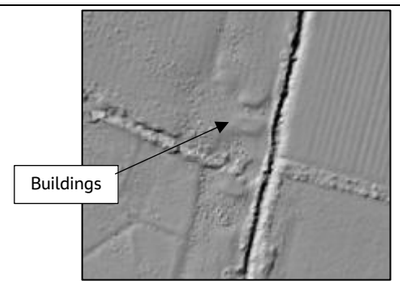
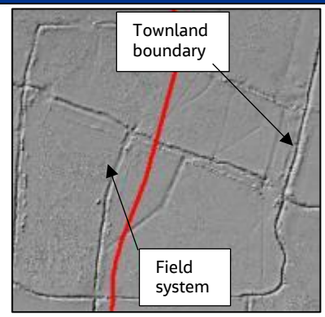
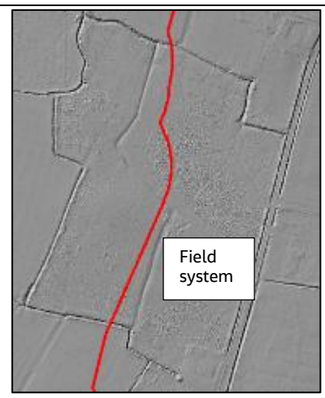
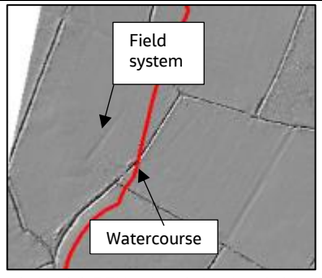
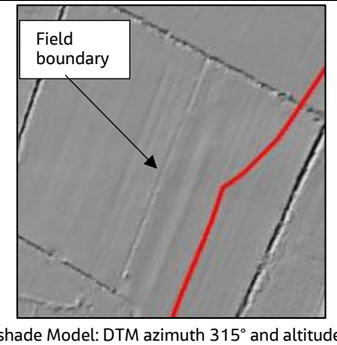
National Collection of Aerial Photography (NCAP) (n.d.). National Collection of Aerial Photography. [Online] Available from: https://ncap.org.uk/ [Accessed May 2023].

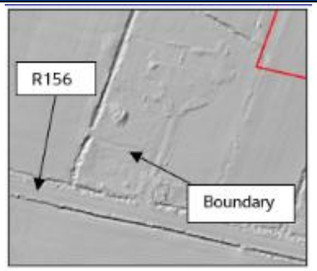
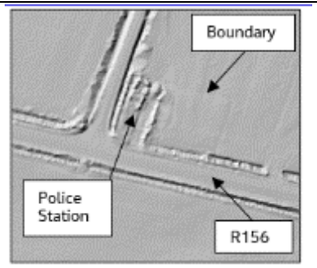
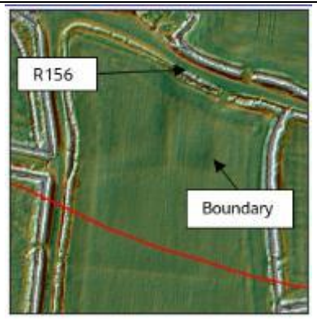
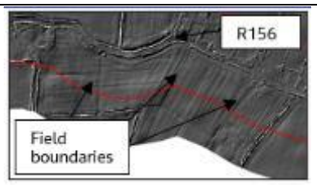
O'Sullivan, A., F. McCormick, T. R. Kerr, and L. Harney (2021). Early Medieval Ireland, AD 400-1100: The evidence from archaeological excavations. Royal Irish Academy.

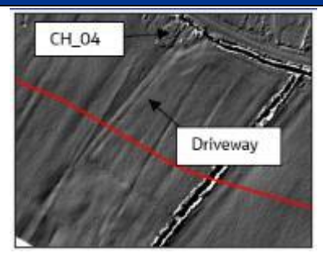
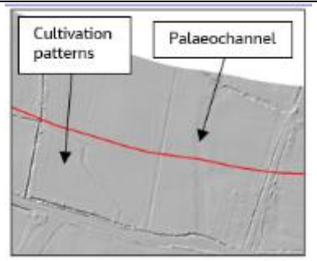
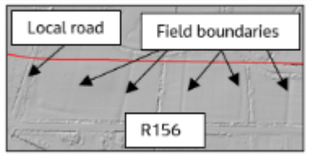
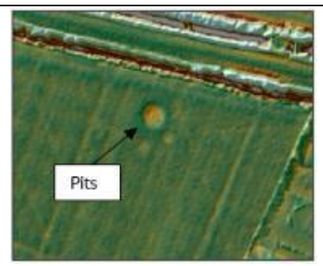
Appendix A. Inventory of Archaeological Constraints

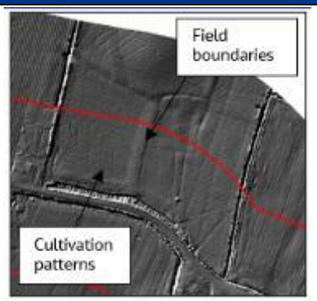
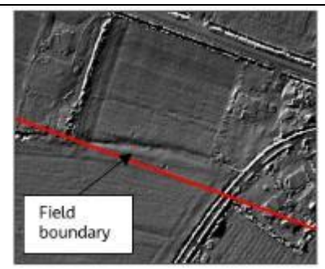
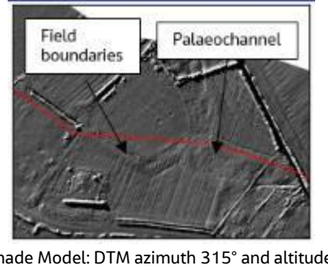
Unique Reference Number	Easting / Northing	Townland	Site Type	Summary Description	Constraint Reference Number (if applicable)	Confidence Rating	Figure
LI_01	694807 / 747856	Woodland	Boundary	- Negative linear features forming a rectilinear area, c.80m x 48m, abutting a field boundary to the north-east. Area within boundary disturbed. - Corresponds with a farmstead including a 'U'-shaped cluster of buildings within a sub-rectangular plot, depicted on historic Ordnance Survey mapping (1837, 1911). - Faintly perceptible on aerial imagery. - Interpreted as the boundary of a post-medieval farmstead.	-	High	 Single Direction Hillshade Model: DTM azimuth 180° and altitude 45°.
LI_02	694585 / 747832	Woodland	Field Boundary	- Shallow negative linear feature, c.73m in length, orientated approximately north-south abutting townland boundary (to south) and an extant field boundary to the north. - Perceptible on aerial imagery. - Corresponds with a field boundary on historic Ordnance Survey mapping (1837, 1911). - Interpreted as a post-medieval field boundary.	-	High	 Single Direction Hillshade Model: DTM azimuth 315° and altitude 35°.
LI_03	694814 / 747782	Woodland	Field Boundary	- An ephemeral negative linear feature, c.107m in length, orientated approximately north-south abutting extant field boundaries (to north and south). - Corresponds with a field boundary on historic Ordnance Survey mapping (1837, 1911). - Associated with (LI_002). - Interpreted as a post-medieval field boundary.	-	High	 Single Direction Hillshade Model: DTM azimuth 315° and altitude 35°.
LI_04	694485 / 747791	Hayestown	Field system	- A network of narrow negative linear features immediately to the south of a townland boundary. A number of more pronounced linear features, orientated approximately north-south, with more ephemeral linear features running perpendicular across the area. Smaller subdivisions are also apparent. - Visible on aerial imagery. - No corresponding features on historic Ordnance Survey mapping although area boundaries are depicted on historic Ordnance Survey mapping (1837, 1911). - Northern and eastern boundaries are a small watercourse (townland boundary). - Interpreted as field boundaries and field drains forming a field system of unknown date.	-	Medium	 Single Direction Hillshade Model: DTM azimuth 315° and altitude 35°.

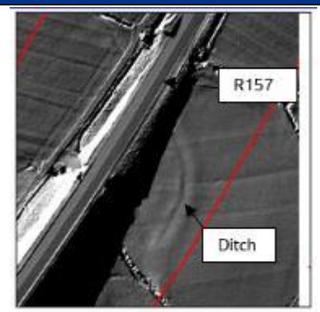
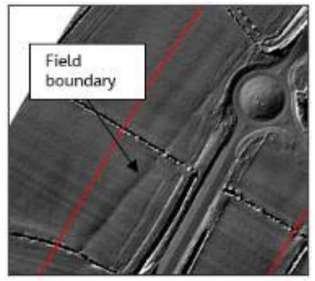
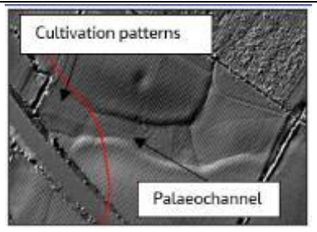
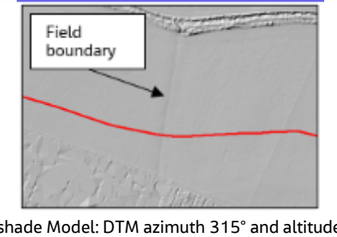
Unique Reference Number	Easting / Northing	Townland	Site Type	Summary Description	Constraint Reference Number (if applicable)	Confidence Rating	Figure
LI_05	694445 / 747206	Gaulstown; Culcommon	Field system	- A network of negative linear features and cultivation patterns. - Some linear features correspond with field boundaries on historic Ordnance Survey mapping (1837, 1911). - Some field boundaries remain extant as hedgerows and others are visible as cropmarks on aerial imagery. - Interpreted as a post-medieval field system.	-	High	 Single Direction Hillshade Model: DTM azimuth 315° and altitude 35°.
LI_06	694531 / 746903	Culcommon	Field Boundary	- An ephemeral linear feature orientated approximately east-west, measuring c.140m in length. Runs between an extant field boundary and townland boundary. - Corresponds with a field boundary on historic Ordnance Survey mapping (1837, 1911). - Interpreted as a post-medieval field boundary.	-	High	 Single Direction Hillshade Model: DTM azimuth 315° and altitude 35°.
LI_07	694570 / 746304	Culcommon	Field System	- A network of ephemeral negative linear features, located between two townland boundaries, including a pair of north-south orientated linear features, a triangular area, and irregular southern boundary. Appear to be overlain by later uniform cultivation patterns. A number of circular features were also noted (likely the result of the wear pattern around modern animal feeding stations). - Some features correspond with historic Ordnance Survey mapping (1911). - Northern boundary is a minor watercourse. - The location of a large circular enclosure (ME050-001), identified as a 'Fort' on historic Ordnance Survey mapping, is c.600m to the south-east. - Tentatively interpreted as field boundaries and field drains forming part of a field system of pre-19th century date. Later agricultural activity is also noted.	-	High	 Single Direction Hillshade Model: DTM azimuth 315° and altitude 35°.
LI_08	694329 / 746085	Cullendragh	Buildings	- Three positive rectangular features: 1) c.8mx6m, 2) c.9mx4m, and 3) c.12mx6m between a negative linear feature and townland boundary. - North of a possible field system (LI_015). - No corresponding features on historic Ordnance Survey mapping and not visible on aerial imagery. - Interpreted as the site of a group of buildings (likely agricultural) of unknown date.	-	Medium	 Single Direction Hillshade Model: DTM azimuth 315° and altitude 35°.

Unique Reference Number	Easting / Northing	Townland	Site Type	Summary Description	Constraint Reference Number (if applicable)	Confidence Rating	Figure
LI_09	694186 / 746004	Cullendragh	Field System	- A network of negative linear features between two existing field boundaries and a townland boundary. Majority orientated approximately north-south (including one parallel to townland boundary); however, some run perpendicular forming small irregular enclosures. - Possible associated buildings to the north (LI_014). - No corresponding features on historic Ordnance Survey mapping, although the area outline is depicted on historic Ordnance Survey mapping (1911). - Interpreted as a field system of unknown date.	-	Medium	 Single Direction Hillshade Model: DTM azimuth 315° and altitude 35°.
LI_10	694403 / 745767	Culcommon	Field System	- A network of negative linear features, forming irregular fields within a larger area. - Linear features to the south correspond with field boundaries depicted on historic Ordnance Survey mapping (1837). Only triangular area of trees depicted on later Ordnance Survey mapping (1911). - Some linear features perceptible on aerial imagery as well as triangular area of trees. - Interpreted as part of a post-medieval field system.	-	Medium	 Single Direction Hillshade Model: DTM azimuth 315° and altitude 35°.
LI_11	694096 / 745609	Cullendraugh	Field system	- A network of negative linear features and cultivation patterns. Some parallel and evenly spaced straight features. - Some linear features correspond with field boundaries on historic Ordnance Survey mapping. - Vaguely perceptible on aerial imagery. - Minor watercourse runs through the centre. - Interpreted as a field system of unknown date, including field drainage.	-	Medium	 Single Direction Hillshade Model: DTM azimuth 315° and altitude 35°.
LI_12	694223 / 745325	Cullendragh	Field Boundary	- A negative linear feature, orientated approximately north-south, running between two extant field boundaries, c. 124m in length. - Corresponds with a field boundary on later Ordnance Survey mapping (1911). - Aerial imagery shows a small number of trees along this alignment. - Interpreted as a post-medieval field boundary.	-	High	 Single Direction Hillshade Model: DTM azimuth 315° and altitude 35°.

Unique Reference Number	Easting / Northing	Townland	Site Type	Summary Description	Constraint Reference Number (if applicable)	Confidence Rating	Figure
LI_13	694123 / 745200	Culcommon	Boundary	-A linear feature measuring approximately 39m in length, running roughly east-west. - Vaguely perceptible on aerial imagery (GoogleEarth, 03/2022) in a private garden to the north of the R156. - Possibly the remains of a former boundary feature depicted on historic Ordnance Survey mapping (1837, 1911) surrounding a small group of roadside buildings.	-	Medium	 Single Direction Hillshade Model: DTM azimuth 315° and altitude 45°.
LI_14	694356 / 745131	Culcommon	Police Station	- A rectangular feature measuring approximately 12m by 6m set back from the R156, with a larger former boundary feature also noted. - Visible on aerial imagery (GoogleEarth, various) as an overgrown rectangular area at the junction between the R156 and a local road. - Corresponds with the location of a building set back from the road on historic Ordnance Survey mapping, including First Edition 6" (1837) which identifies the building as a 'Police Station'.	-	Medium	 Single Direction Hillshade Model: DTM azimuth 315° and altitude 45°.
LI_15	695646 / 744405	Blackhall Big	Boundary	- An ephemeral sub-rectangular feature measuring approximately 32m in with to the south of the R156. Other linear features were noted adjacent to the feature. - Not visible on aerial imagery. - A small group of roadside buildings and a boundary feature are depicted on historic Ordnance Survey mapping in this location (1837). The buildings and boundaries are not depicted on later mapping (1911). - Interpreted as a post-medieval boundary.		Medium	 Simple Local Relief Model (50% transparency) over Single Direction Hillshade Model: DTM azimuth 315° and altitude 10°.
LI_16	696120 / 744277	Staffordstown Little	Field system	- A network of linear features, defining a large area, with some ephemeral linear features within. - Visible on aerial imagery (GoogleEarth 03/2022) to the south of the R156. - Correspond with field boundaries depicted on historic Ordnance Survey mapping (1837, 1911). - Interpreted as former field boundaries forming part of a post-medieval field system.	-	High	 Single Direction Hillshade Model: DTM azimuth 315° and altitude 10°.

Unique Reference Number	Easting / Northing	Townland	Site Type	Summary Description	Constraint Reference Number (if applicable)	Confidence Rating	Figure
LI_17	696327 / 744186	Staffordstown Little	Driveway	- A pair of ephemeral parallel linear features, orientated roughly north-south running from a roadside building (CH_04) to the south. - Visible on aerial imagery (GoogleEarth, 03/2022). - Corresponds with a driveway leading to a pair of rectangular buildings (located outside the Study Area; no longer extant) depicted on historic Ordnance Survey mapping (1837), and later mapping depicts the driveway connected to the roadside building plot (1911).	-	High	 Single Direction Hillshade Model: DTM azimuth 315° and altitude 10°.
LI_18	696942 / 744183	Harlockstown	Field system / palaeochannel	- A network of linear features, including two orientated north- south (extending outside the Study Area) with cultivation patterns and possible drainage. A wide (approximately 12m) channel, orientated north-south was also identified as a possible palaeochannel. - Not depicted on historic Ordinance Survey mapping. - Visible on aerial imagery. - Interpreted as a possible field boundaries forming a field system of unknown date.	-	Medium	 Single Direction Hillshade Model: DTM azimuth 315° and altitude 45°.
LI_19	697281 / 744100	Harlockstown	Field boundaries	- Five negative linear features orientated north-south, running between a local road to the R156. - Visible on aerial imagery (GoogleEarth, various). - Some of the linear features correspond with field boundaries depicted on historic Ordnance Survey mapping (1837, 1911). - Interpreted as post-medieval former field boundaries.	-	High	 Single Direction Hillshade Model: DTM azimuth 315° and altitude 45°.
LI_20	698650 / 743467	Baytownpark	Pit	- A circular feature measuring approximately 7m in diameter, with two small circular features adjacent (c.3m in diameter each). - Visible on aerial imagery (GoogleEarth, 10/2009, 06/2020, 04/2021). - No corresponding features on historic Ordnance Survey mapping. - Tentatively interpreted as a possible pits of unknown date; however, equally could be the location of a modern animal feeder.	-	Low	 Simple Local Relief Model (50% transparency) over Single Direction Hillshade Model: DTM azimuth 315° and altitude 10°.

Unique Reference Number	Easting / Northing	Townland	Site Type	Summary Description	Constraint Reference Number (if applicable)	Confidence Rating	Figure
LI_21	698953 / 743499	Baytownpark	Field system	- A network of linear features forming a series of possible fields, including cultivation patterns. Drainage (likely later in date) was also noted. - No corresponding features are depicted on historic Ordnance Survey mapping. - Visible on aerial imagery (GoogleEarth, 03/2022). - Interpreted as a possible field system of unknown date.	-	Medium	 Single Direction Hillshade Model: DTM azimuth 315° and altitude 10°.
LI_22	699510 / 743064	Cushinstown	Field Boundary	- A linear feature measuring approximately 100m in length, orientated east-west. - Visible on aerial imagery (GoogleEarth, various). - Corresponds with a former field boundary depicted on historic Ordnance Survey mapping (1843, 1911).	-	High	 Single Direction Hillshade Model: DTM azimuth 315° and altitude 10°.
LI_23	699979 / 742741	Colliersland North	Field boundary	- A series of linear features, oriented east-west, and one roughly north-south, within an agricultural field. - Not depicted on historic Ordnance Survey mapping. - Visible on aerial imagery. - Interpreted as former field boundaries of unknown date (possibly modern).	-	Medium	 Single Direction Hillshade Model: DTM azimuth 315° and altitude 10°.
LI_24	700255 / 742872	Dunboyne	Field system / palaeochannel	- A series of linear features forming fields, with cultivation patterning, and a wide (approximately 23m) channel. - Not depicted on historic Ordnance Survey mapping. - Visible on aerial imagery. - Interpreted as possible field system of unknown date and possible palaeochannel.	-	Medium	 Single Direction Hillshade Model: DTM azimuth 315° and altitude 10°.

Unique Reference Number	Easting / Northing	Townland	Site Type	Summary Description	Constraint Reference Number (if applicable)	Confidence Rating	Figure
LI_25	701300 / 743510	Dunboyne	Ditch	- A curvi-linear feature measuring approximately 118m in length, extends from south-north before turning west - possibly truncated by the R157 (may continue in fields to the north). - Vaguely perceptible on aerial imagery (GoogleEarth, 01/2017, 03/2021). - No corresponding features are depicted on historic Ordnance Survey mapping (1837, 1911). - Tentatively interpreted as a possible ditch of unknown date and function.	-	Low	 Single Direction Hillshade Model: DTM azimuth 315° and altitude 10°.
LI_26	701312 / 743773	Bennettstown	Field boundary	- A linear feature measuring approximately 276m in length and orientated routh north-south between two extant field boundaries. - A field boundary is depicted on historic Ordnance Survey mapping in this location. - Visible on aerial imagery. - Interpreted as a post-medieval former field boundary.	-	High	 Single Direction Hillshade Model: DTM azimuth 315° and altitude 10°.
LI_27	701933 / 744352	Pace	Palaeochannel	- A curvilinear channel measuring up to approximately 50m in width. Cultivation patterns noted overlying the feature. - Located near a late bronze age site (http://excavations.ie/report/2005/Meath/0014235/) and a circular feature is located outside Study Area on a more elevated location near channel which may evidence early human activity. - Visible on aerial imagery. - Not depicted on historic Ordnance Survey mapping. - Field known as 'Slang' and 'Big Field'. Three Archaeological sites (one minor, second thought to be a site for butchering and skinning near the stream, third - old farmhouse brick, cobbled yard, small sheds mid 1700's). Pace - pass or route between soft ground via glacial ridges, long before field ditches were dug. See field 20 for notes on laneway. The lake here is more of a pond. (Meath Field Names Project, 2019). - Located near a channel of alluvium (Geological Survey of Ireland, n.d.) - Tentatively interpreted as a possible palaeochannel (possibly a former tributary of the River Tolka).	-	Low	 Single Direction Hillshade Model: DTM azimuth 315° and altitude 10°.
LI_28	702086 / 744592	Pace	Field boundary	- A linear feature measuring approximately 157m (extending outside the Study Area) and orientated north-south in an agricultural field to the south of the L5026. - Field known as 'Burns Field' (Meath Field Names Project, 2019). Visible on aerial imagery. - Corresponds with a field boundary depicted on historic Ordnance Survey mapping (1837). - Interpreted as a section of former field boundary.	-	High	 Single Direction Hillshade Model: DTM azimuth 315° and altitude 45°.

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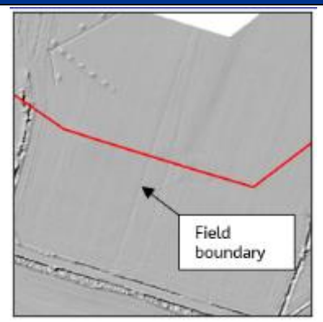
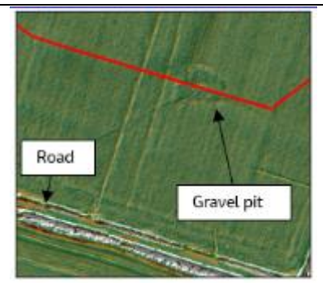
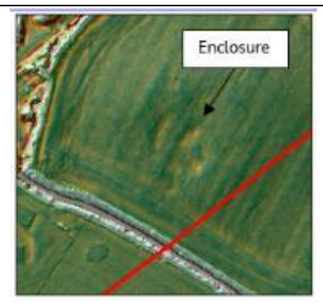
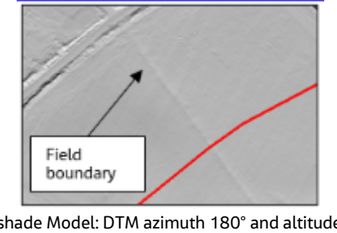
LI_29	703060 / 744617	Stokestown	Field boundary	- A linear feature measuring approximately 198m in length (extends outside the Study Area), orientated north-south, extending from the road to an extant field boundary. - Visible on aerial imagery (GoogleEarth, 01/2017). - Field known as 'Daisy Field' (Meath Field Names Project, 2019). - Corresponds with a former field boundary depicted on later historic Ordnance Survey mapping (1911).	-	High	 Single Direction Hillshade Model: DTM azimuth 315° and altitude 45°.
LI_30	703082 / 744602	Stokestown	Gravel pit	- An irregular area measuring approximately 32m across, with narrow linear features running from it. Located in a pasture field to the north of the road through Stokestown. - Not depicted on historic Ordnance Survey mapping. - Field known as 'Daisy Field' (Meath Field Names Project, 2019). - Visible on aerial imagery. - Tentatively interpreted as a possible gravel pit of unknown date; however, could equally be the result of modern disturbance or drainage.	-	Low	 Simple Local Relief Model (50% transparency) over Single Direction Hillshade Model: DTM azimuth 315° and altitude 10°.
LI_31	703318 / 744520	Kinoristown	Enclosure	- An ephemeral circular area approximately 30m in diameter, defined by a portion of sub-circular enclosing ditch to the south and west with possible interior features. - Not depicted on historic mapping (1837, 1911). - Field known as 'Pillar Field' (Meath Field Names Project, 2019). - Visible on aerial imagery as a circular feature within a pasture field adjacent to the road (e.g. GoogleEarth, 06/2020). - Tentatively interpreted as a possible enclosure of unknown date.	-	Low	 Simple Local Relief Model (50% transparency) over Single Direction Hillshade Model: DTM azimuth 315° and altitude 10°.
LI_32	703386 / 744557	Kinoristown	Field boundary	- A linear feature measuring approximately 147m in length orientated roughly north-west to south-east. - Visible on aerial imagery (GoogleEarth, various). - Field known as 'Pillar Field' (Meath Field Names Project, 2019). - Corresponds with a former field boundary depicted on historic Ordnance Survey mapping (1837), with later mapping showing the feature as a drainage ditch.	-	High	 Single Direction Hillshade Model: DTM azimuth 180° and altitude 45°.

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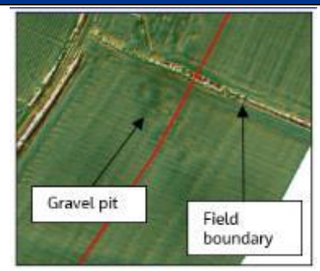
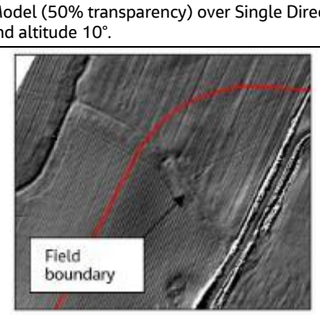
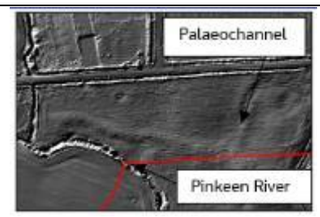
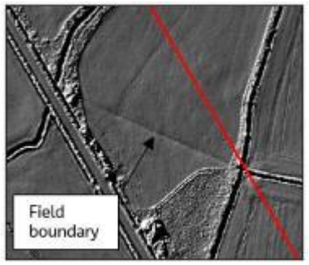
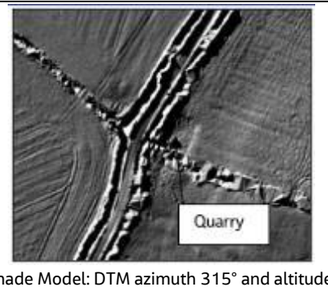
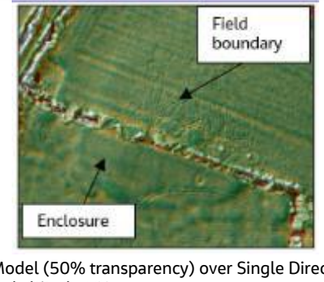
LI_33	703647 / 744789	Kinoristown	Gravel pit	- A large irregular area measuring approximately 90m across located in an agricultural field adjacent to an extant field boundary. - Vaguely perceptible on aerial imagery. - Extractive activity is depicted in this location on historic Ordnance Survey mapping (1911).	-	High	 Simple Local Relief Model (50% transparency) over Single Direction Hillshade Model: DTM azimuth 315° and altitude 10°.
LI_34	703612 / 745032	Stokestown	Enclosure	- A curvi-linear feature measuring approximately 41m in diameter. Truncated by a later drainage ditch. - Vaguely perceptible on aerial imagery. - Not depicted on historic Ordnance Survey mapping. - Tentatively interpreted as part of a circular enclosure; however, could equally be modern disturbance.	-	Low	 Simple Local Relief Model (50% transparency) over Single Direction Hillshade Model: DTM azimuth 315° and altitude 10°.
LI_35	703570 / 745029	Stokestown	Field boundary	- A curvi-linear feature measuring approximately 164m in length (extends beyond the Study Area). Cultivation patterns and ephemeral linear features running parallel interpreted as drainage were also noted. - Visible on aerial imagery (GoogleEarth, various). - Corresponds with a field boundary depicted on historic Ordnance Survey mapping (1837, 1911).	-	High	 Single Direction Hillshade Model: DTM azimuth 315° and altitude 10°.
LI_36	704173 / 745029	Nuttstown	Palaeochannel	- A meandering linear feature located in a pasture field to the north of an extant watercourse (Pinkeen River). - Not depicted on historic Ordnance Survey mapping; however located in an area adjacent to the current channel of the Pinkeen River. - Located near a channel of alluvium (Geological Survey of Ireland, n.d.). - Visible on aerial imagery. - Tentatively interpreted as a possible palaeochannel, or river terrace, associated with the Pinkeen River.	-	Low	 Single Direction Hillshade Model: DTM azimuth 315° and altitude 10°.

Unique Reference Number	Easting / Northing	Townland	Site Type	Summary Description	Constraint Reference Number (if applicable)	Confidence Rating	Figure
LI_37	705675 / 745507	Priest Town	Gravel pit	- An irregular area on a localised mound within an area of established woodland. - The area is depicted as woodland, 'Crockanee', on historic Ordnance Survey mapping on the southern boundary of the Priest Town House demesne (DL_04). A track is shown into the woodland from the road to the south. To the north-east, an area of woodland is the location of a gravel pit. Later mapping shows this area as mixed woodland. - Not visible on aerial imagery. - Located adjacent to the Ward River, in an area of till derived from limestones. - Interpreted as a possible post-medieval gravel pit.	DL_04	Medium	 Simple Local Relief Model (50% transparency) over Single Direction Hillshade Model: DTM azimuth 315° and altitude 10°.
LI_38	707407 / 744527	Court	Field boundary	- A linear feature measuring approximately 134m in length and orientated roughly north-west to south-east. - Visible on aerial imagery located within a small irregular field between a watercourse and an extant field boundary. - Corresponds with a former field boundary depicted on historic Ordnance Survey mapping (1843, 1908).	-	High	 Single Direction Hillshade Model: DTM azimuth 315° and altitude 10°.
LI_39	708436 / 743900	Irishtown	Quarry	- A small rectangular area measuring approximately 16m by 12m to the east of a local road. - Not depicted on historic Ordnance Survey mapping; however, located opposite a quarry identified on earlier editions (1843). - Vaguely perceptible on aerial imagery as a small area of disturbance in the corner of a pasture field. - Tentatively interpreted as a possible quarry of unknown date; however, could equally be modern disturbance.	-	Low	 Single Direction Hillshade Model: DTM azimuth 315° and altitude 10°.
LI_40	708484 / 743851	Irishtown	Enclosure	- A curved feature measuring approximately 88m in diameter, located in an agricultural field with an extant field boundary running across it from west-east and track. Comprises a raised interior with a sub-circular enclosing ditch (continuing into the field to the north, north-eastern portion not perceptible) and very ephemeral interior bank. A circular wear pattern around a modern animal feeder is also visible within the enclosure. - Not depicted on historic Ordnance Survey mapping. - Vaguely perceptible on aerial imagery (GoogleEarth, 01/2017, 02/2021). - Tentatively interpreted as a possible large enclosure of unknown date; however could equally be a natural rise or modern disturbance.	-	Low	 Simple Local Relief Model (50% transparency) over Single Direction Hillshade Model: DTM azimuth 315° and altitude 10°.

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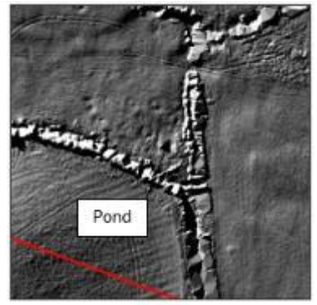
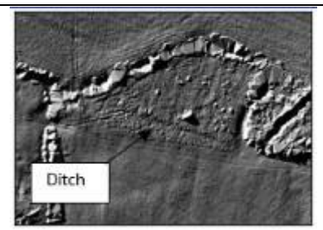
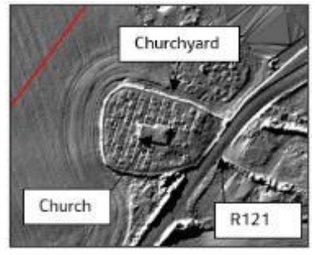
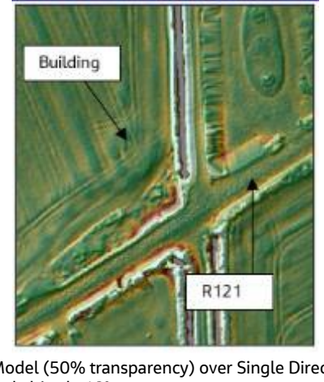
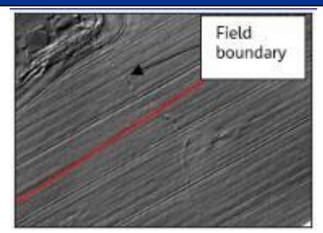
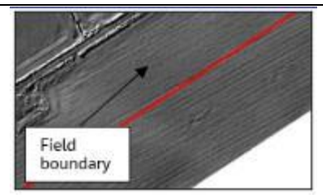
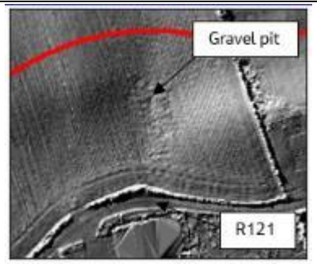
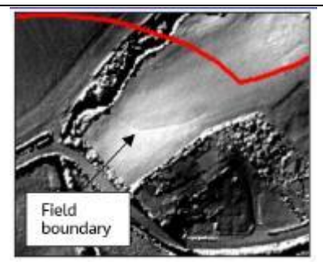
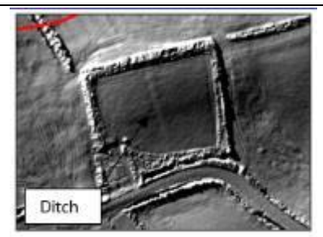
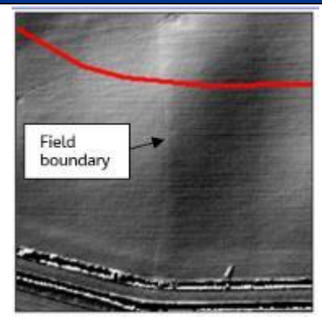
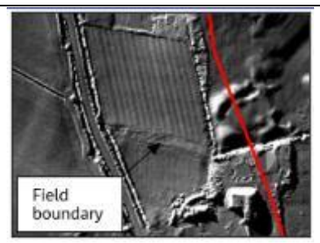
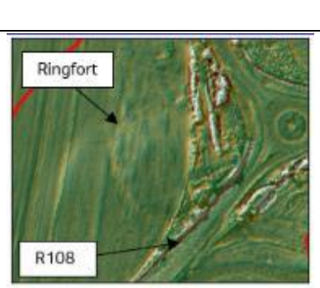
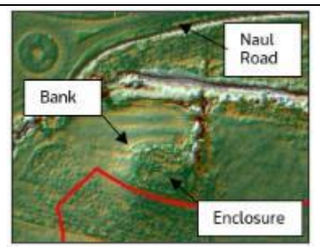
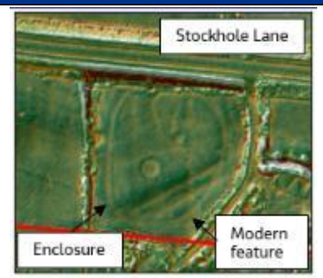
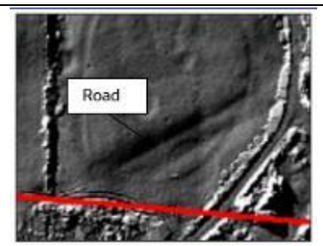
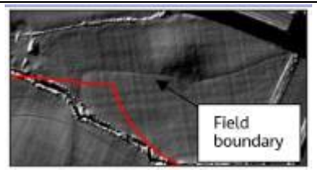
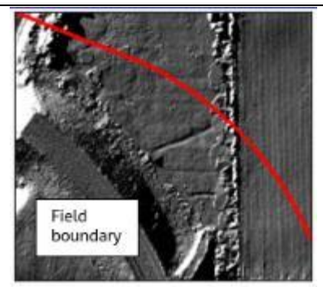
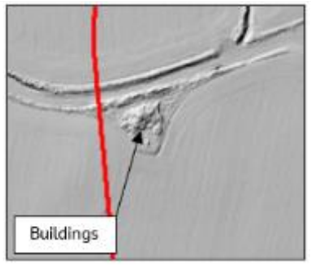
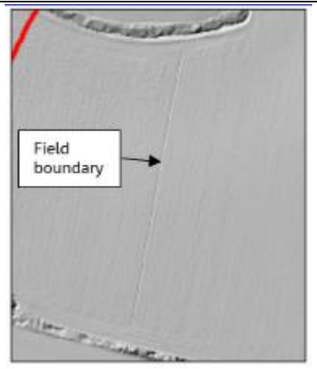
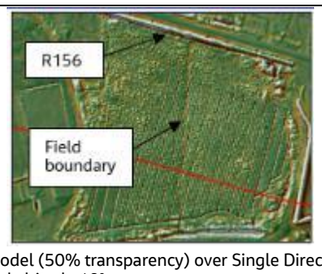
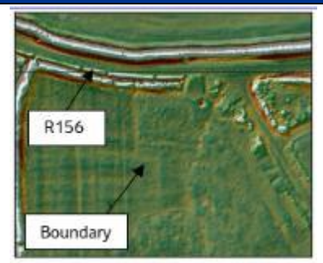
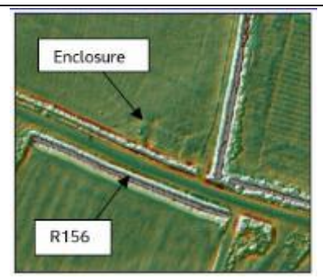
LI_41	708541 / 743797	Irishtown	Designed Landscape Feature	- A irregular area measuring approximately 15m across. - Not visible on aerial imagery. - Corresponds with the location on a 'pond' within the Hollywoodrath demesne (DL_05) depicted on historic Ordnance Survey mapping (1843, 1909). - Interpreted as an infilled pond; however, could equally be modern disturbance.	DL_05	Medium	 Single Direction Hillshade Model: DTM azimuth 315° and altitude 10°.
LI_42	708615 / 743823	Spicklestown	Ditch	- A linear feature measuring approximately 60m in length orientated roughly east-west within an area of trees. A number of extant drainage ditches are located in this area. - No corresponding feature is depicted on historic Ordnance Survey mapping; however, an area of woodland is depicted on later editions. - Not visible on aerial imagery. - Tentatively interpreted as a ditch of unknown date.	DL_05	Low	 Single Direction Hillshade Model: DTM azimuth 315° and altitude 10°.
LI_43	709651 / 744836	Ward Lower	Church	- A sub-circular area, truncated by the R121 to the south-east, measuring approximately 60m by 45m across. Includes a church building (in ruins) and monuments laid out in rows across the church yard. - Depicted on historic Ordnance Survey mapping as 'Church' and 'Grave Yd.', with the church identified as 'in ruins' on later editions. - Visible on aerial imagery.	AY_23, AY_24, AH_06 (DU011-039001, DU011-039002 and RPS 660)	High	 Single Direction Hillshade Model: DTM azimuth 315° and altitude 10°.
LI_44	710297 / 745265	Ward Lower	Buildings	- A rectangular feature measuring approximately 14m by 18m located in the corner of an agricultural field adjacent to the R121. - Two buildings and a number of boundary features are depicted in this location on historic Ordnance Survey mapping (1843); however, these are no longer shown on later editions (1908). - Vaguely perceptible on aerial imagery. - Tentatively interpreted as the site of two demolished post-medieval buildings; however, could equally likely be modern disturbance.	-	Low	 Simple Local Relief Model (50% transparency) over Single Direction Hillshade Model: DTM azimuth 315° and altitude 10°.

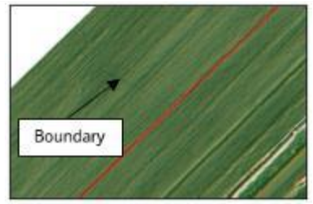
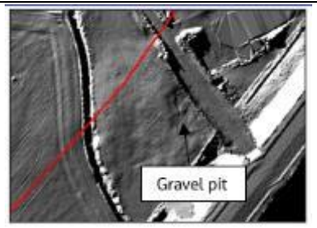
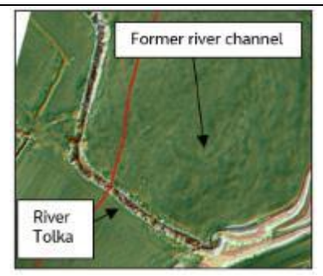
Unique Reference Number	Easting / Northing	Townland	Site Type	Summary Description	Constraint Reference Number (if applicable)	Confidence Rating	Figure
LI_45	710545 / 745302	Newpark	Field boundary	- An irregular linear feature orientated roughly north-south, measuring approximately 110m (extends outside the Study Area). - Visible on aerial imagery. - Corresponds with a field boundary depicted on historic Ordnance Survey mapping.	-	High	 Single Direction Hillshade Model: DTM azimuth 315° and altitude 10°.
LI_46	710680 / 745350	Newpark	Field boundary	- An irregular linear feature orientated roughly north-south, measuring approximately >195m (extends outside the Study Area and extent of LiDAR data coverage). - Visible on aerial imagery. - Corresponds with a field boundary depicted on historic Ordnance Survey mapping.	-	High	 Single Direction Hillshade Model: DTM azimuth 315° and altitude 10°.
LI_47	711033 / 745741	Newpark	Gravel pit	- An irregular area measuring approximately 60m across located in an agricultural field to the north of the R121. - No corresponding features on historic Ordnance Survey mapping; however, areas of extraction are depicted on later editions (1908) to the north-east. - Located in an area identified as 'gravels' (Geological Survey of Ireland, n.d.). - Interpreted as a possible gravel pit of unknown date.	-	Medium	 Single Direction Hillshade Model: DTM azimuth 315° and altitude 10°.
LI_48	711649 / 745855	Shallon	Field boundary	- A curvi-linear feature measuring approximately 70m in length, extending from the Ward River (to the north) before curving to the east. - Depicted on historic Ordnance Survey mapping bounding an area of trees. - Visible on aerial imagery. - Interpreted as a former post-medieval field boundary.	-	High	 Single Direction Hillshade Model: DTM azimuth 315° and altitude 10°.
LI_49	711925 / 745900	Corrstown	Ditch	- A very ephemeral negative linear feature with possible bank, measuring approximately 46m in length, and orientated roughly north-south. - No corresponding features are depicted on historic Ordnance Survey mapping. - Faintly perceptible on aerial photography. - Tentatively interpreted as a possible bank and ditch of unknown date.	-	Low	 Single Direction Hillshade Model: DTM azimuth 315° and altitude 10°.

Unique Reference Number	Easting / Northing	Townland	Site Type	Summary Description	Constraint Reference Number (if applicable)	Confidence Rating	Figure
LI_50	712144 / 745847	Corrstown	Field boundary	- A linear feature that extends outside the Study Area, measuring approximately 122m before turning east and north. - Visible on aerial imagery (GoogleEarth, 05/2017). - Corresponds with a field boundary depicted on historic Ordnance Survey mapping (1843; 1908).	-	High	 Single Direction Hillshade Model: DTM azimuth 315° and altitude 10°.
LI_51	712584 / 745451	Skephubble	Field boundary	- A curvi-linear feature measuring approximately 78m in length extending between two extant field boundaries. - Visible on aerial imagery. - Corresponds with a field boundary on historic Ordnance Survey mapping (1843), and later editions depicted the feature as a ditch (1908). The boundary has been removed by the last edition (1941).	-	High	 Single Direction Hillshade Model: DTM azimuth 315° and altitude 10°.
LI_52	715306 / 744689	Forest Great	Ringfort	- A circular feature measuring approximately 80m in diameter, truncated by a roundabout on the R108. - Corresponds with a ringfort identified on the RMP (AY_41; DU011-043). - The 'fort' is depicted on historic Ordnance Survey mapping (1843, 1908). - This feature is also visible on aerial imagery (GoogleEarth, various; https://ncap.org.uk/frame/11-1-2-76-41, https://ncap.org.uk/frame/11-1-2-76-42).	AY_41 (DU011-043)	High	 Simple Local Relief Model (50% transparency) over Single Direction Hillshade Model: DTM azimuth 315° and altitude 10°.
LI_53	715459 / 744655	Forest Great	Enclosure	- A sub-circular area of rough ground measuring approximately 30m across south of Naul Road. A possible section of bank is located to the north and west. Appears to have been truncated to the south. - Not depicted on historic Ordnance Survey mapping. - Visible on aerial imagery (and Google Street View) as a slightly raised area of rough ground. - Tentatively interpreted as a possible enclosure of unknown date and function.	-	Low	 Simple Local Relief Model (50% transparency) over Single Direction Hillshade Model: DTM azimuth 315° and altitude 10°.

Unique Reference Number	Easting / Northing	Townland	Site Type	Summary Description	Constraint Reference Number (if applicable)	Confidence Rating	Figure
LI_54	718228 / 743875	Cloghran	Enclosure	- A group of features including a large sub-circular enclosing feature measuring approximately 76m by 64m and a circular feature measuring approximately 10m in diameter, in a pasture field to the south of Stockhole Lane. A more recent circular feature is also located to the south-east overlying the enclosing feature. - Visible on aerial imagery. - Not depicted on historic Ordnance Survey mapping. - Tentatively interpreted as a possible large enclosure with internal feature; however, could equally be a modern animal exercising arena and associated disturbance.	-	Low	 Simple Local Relief Model (50% transparency) over Single Direction Hillshade Model: DTM azimuth 315° and altitude 10°.
LI_55	718232 / 743855	Cloghran	Road	- A linear feature measuring approximately 80m in length running through an agricultural field from an extant driveway to an area of rough ground. - The alignment of the road is depicted in this location on historic Ordnance Survey mapping (1843) in this location through Glebe House and farm. The alignment of the road is depicted as straightened on later mapping (1909). - Visible on aerial imagery. - Interpreted as the former alignment of the road.	-	High	 Single Direction Hillshade Model: DTM azimuth 315° and altitude 10°.
LI_56	718467 / 743815	Cloghran	Field boundary	- A linear feature measuring approximately 230m located within an agricultural field to the south of Stockhole Lane and west of the M1 motorway. Cultivation patterns and possible disturbance was also noted. - Visible on aerial imagery. - Corresponds with a former field drain depicted on historic Ordnance Survey mapping (1843).	-	High	 Single Direction Hillshade Model: DTM azimuth 315° and altitude 10°.
LI_57	718741 / 743816	Cloghran	Field boundary	- A linear feature measuring approximately 40m located within an area of rough ground to the east of the M1 motorway. Appears to be a continuation of LI_084. - Visible on aerial imagery. - Corresponds with a former field drain depicted on historic Ordnance Survey mapping (1843).	-	High	 Single Direction Hillshade Model: DTM azimuth 315° and altitude 10°.

Unique Reference Number	Easting / Northing	Townland	Site Type	Summary Description	Constraint Reference Number (if applicable)	Confidence Rating	Figure
LI_58	719099 / 743483	Cloghran	Paleochannel	- A 43m wide channel located within a narrow pasture field north of a watercourse. - Visible on aerial imagery. - Not depicted on historic Ordnance Survey mapping; however, a stream is depicted on later editions (1909) as a field boundary. - Tentatively interpreted as a possible palaeochannel or river terraces.	-	Low	 Single Direction Hillshade Model: DTM azimuth 315° and altitude 10°.
LI_59	718989 / 742342	Middleton	Farm	- An irregular area of disturbance to the south of the road measuring approximately 45m by 33m. - Visible as an overgrown area adjacent to the road on aerial imagery. - 'Upper Middleton' farm (CH_34) is depicted in this location on historic Ordnance Survey mapping (1843); however, is reduced to one building (1909) on later editions. - Interpreted as the location of Upper Middle farm buildings.	CH_34	Medium	 Single Direction Hillshade Model: DTM azimuth 315° and altitude 45°.
LI_60	719034 / 742029	Clonshaugh	Field boundary	- A narrow linear feature measuring approximately 150m in length and orientated north-south located within an agricultural field, running between two extant field boundaries. - Visible on aerial imagery (GoogleEarth, 06/2018). - Corresponds with a field boundary depicted on historic Ordnance Survey mapping (1837; 1911).	-	High	 Single Direction Hillshade Model: DTM azimuth 315° and altitude 45°.
LI_61	694594 / 744981	Lynaghstown	Field boundary	- A linear feature measuring approximately 118m in length and orientated north-south located within a field currently in use for plantation, south of the R156. - Visible on aerial imagery. - Corresponds with a field boundary depicted on historic Ordnance Survey mapping (1837; 1911).	-	High	 Simple Local Relief Model (50% transparency) over Single Direction Hillshade Model: DTM azimuth 315° and altitude 10°.

Unique Reference Number	Easting / Northing	Townland	Site Type	Summary Description	Constraint Reference Number (if applicable)	Confidence Rating	Figure
LI_62	695757 / 744397	Blackhall Big	Boundary	- A negative rectangular feature measuring approximately 31m by 28m located within a field, south of the R156. - Faintly perceptible on aerial imagery (GoogleEarth, 10/2009, 05/2017). - Corresponds with a boundary depicted on historic Ordnance Survey mapping (1837; 1911).	-	High	 Simple Local Relief Model (50% transparency) over Single Direction Hillshade Model: DTM azimuth 315° and altitude 10°.
LI_63	696778 / 744130	Harlockstown	Enclosure	- A negative rectangular feature measuring approximately 18m by 10m located within a field, north of the R156. Two adjoining linear features are visible extending from the corners of the enclosure suggesting it may be part of a larger complex. - Visible on aerial imagery. - No corresponding features on historic Ordnance Survey mapping. - Tentatively interpreted as a small rectangular enclosure of unknown date.	-	Low	 Simple Local Relief Model (50% transparency) over Single Direction Hillshade Model: DTM azimuth 315° and altitude 10°.
LI_64	697200 / 743953	Waynestown	Building	- A small sub-rectangular feature, orientated roughly north-south, measuring approximately 14m by 5m. - Vaguely perceptible on aerial imagery (GoogleEarth, 06/2018). - No corresponding features on historic Ordnance Survey mapping. - Tentatively interpreted as a possible building of unknown date; however, could equally be modern disturbance.	-	Low	 Simple Local Relief Model (50% transparency) over Single Direction Hillshade Model: DTM azimuth 315° and altitude 10°.
LI_65	697728 / 744108	Vesingtown	Enclosure	- An ephemeral circular feature measuring approximately 17m in diameter, located within an agricultural field to the north of the R156. - Not visible on aerial imagery. - No corresponding features on historic Ordnance Survey mapping. - Tentatively interpreted as a possible enclosure of unknown date.	-	Low	 Simple Local Relief Model (50% transparency) over Single Direction Hillshade Model: DTM azimuth 315° and altitude 10°.

Unique Reference Number	Easting / Northing	Townland	Site Type	Summary Description	Constraint Reference Number (if applicable)	Confidence Rating	Figure
LI_66	699779 / 743165	Cushinstown	Track	- A pair of parallel linear features measuring approximately 180m in length, orientated roughly north-south located within an agricultural field. - Visible on aerial imagery. - No corresponding features on historic Ordnance Survey mapping. - Interpreted as a possible track of unknown date.	-	Medium	 Simple Local Relief Model (50% transparency) over Single Direction Hillshade Model: DTM azimuth 315° and altitude 10°.
LI_67	700753 / 743052	Dunboyne	Boundary	- A pair of parallel linear features measuring approximately >185m in length (extending outside the Study Area), orientated roughly north-west to south-east located within an agricultural field. - Field known as 'Weld Fields / Wild Fields' (Meath Field Names Project, 2019). - Visible on aerial imagery. - Correspond with a boundary feature on historic Ordnance Survey mapping (1837), with later mapping showing the boundary as a belt of trees (1911).	-	High	 Simple Local Relief Model (50% transparency) over Single Direction Hillshade Model: DTM azimuth 315° and altitude 10°.
LI_68	701057 / 743391	Dunboyne	Gravel pit	- An irregular area measuring approximately 16m across located in an area of rough ground south of Kennedy Road. - A possible gravel pit is depicted on historic Ordnance Survey mapping (1837, 1911). - Interpreted as a possible post-medieval gravel pit.	-	Medium	 Single Direction Hillshade Model: DTM azimuth 315° and altitude 10°.
LI_69	701568 / 744101	Pace	Palaeochannel	- A narrow sinuous curvi-linear feature within an area of rough ground north-east of the River Tolka. - Not visible on aerial imagery. - Located within an area of alluvium (Geological Survey of Ireland, n.d.). - The meandering course of the river is depicted on historic Ordnance Survey mapping (1837), then later shown as straightened (1911) with the former channel still depicted. - Interpreted as the former channel of the River Tolka.	-	High	 Simple Local Relief Model (50% transparency) over Single Direction Hillshade Model: DTM azimuth 315° and altitude 10°.

Unique Reference Number	Easting / Northing	Townland	Site Type	Summary Description	Constraint Reference Number (if applicable)	Confidence Rating	Figure
LI_70	708628 / 743753	Spicklestown	Ditch	- A negative curvi-linear feature measuring approximately 103m in length, within an agricultural field in DL_05. - Visible on aerial imagery. - No corresponding features on historic Ordnance Survey mapping. - Tentatively interpreted as a possible ditch of unknown date.	-	Low	 Simple Local Relief Model (50% transparency) over Single Direction Hillshade Model: DTM azimuth 315° and altitude 10°.
LI_71	712750 / 745244	Ballystrahan	Enclosure	- A circular area with possible enclosing ditch to north-east. Measuring approximately 27m in diameter, within an agricultural field. - Not visible on aerial imagery. - No corresponding features on historic Ordnance Survey mapping. - Tentatively interpreted as a possible enclosure of unknown date.	-	Low	 Simple Local Relief Model (50% transparency) over Single Direction Hillshade Model: DTM azimuth 315° and altitude 10°.

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Appendix A13.3 - Archaeology, Architectural Heritage, and Cultural Heritage Impact Assessment

EirGrid

March 2024

Appendix A13.3 Archaeology, Architectural Heritage, and Cultural Heritage Impact Assessment

This Appendix contains the following impact assessment tables:

- Table 1: Impacts on Archaeology During Construction;
- Table 2: Impacts on Architectural Heritage during Construction;
- Table 3: Impacts on GDLs during Construction;
- Table 4: Impacts on Cultural Heritage during Construction;
- Table 5: Impacts on LiDAR Assets during Construction;
- Table 6: Impacts on Townland Boundaries during Construction; and
- Table 7: Impacts on GDLs during Operation.

Table 1: Impacts on Archaeology During Construction

Route Section	Townland	County	Unique Reference Number	Legal Status	Reference Number	Type	Significance	Impact	Impact Description	Magnitude of Impact	Significance of Impact	Mitigation	Residual Magnitude	Residual Significance of Impact
On-road	Ballintry	Meath	AY_18	Recorded Monument	ME051-002	Enclosure	Medium	Direct Negative Permanent	The Proposed Development is located within the Zone of Notification of this Recorded Monument (AY_18). While the Proposed Development is within the existing roadline in this location, which is likely to have removed or truncated any archaeological remains associated with this monument that may have been present, construction would have a direct impact on any archaeological remains that may survive.	Low	Slight	Archaeological monitoring of work within the Zone of Notification during construction.	Very Low / Negligible	Not significant
On-road	Ward Lower	Dublin	AY_23	Recorded Monument; Protected Structure	DU011-039001	Church	High	Direct Negative Permanent	The Proposed Development is located within the Zone of Notification of this Recorded Monument (AY_23). While the Proposed Development is within the existing roadline in this location, which is likely to have removed or truncated any archaeological remains associated with this monument that may have been present, construction would have a direct impact on any archaeological remains that may survive.	Low	Slight	Archaeological monitoring of work within the Zone of Notification during construction.	Very Low / Negligible	Not significant
								Indirect Negative Temporary	The movement and operation of plant during construction of the Proposed Development would introduce a source of temporary (lasting the duration of construction in this location) noise and visual intrusion into the setting of this asset. This asset's key cultural heritage characteristics (its physical remains, location within and relationship with the surrounding church yard/memorials, its association with a churchyard in continued use, and roadside and rural location) would remain unaffected.	Low	Slight	None	Low	Slight
On-road	Ward Lower	Dublin	AY_24	Recorded Monument; Protected Structure	DU011-039002	Graveyard	High	Direct Negative Permanent	The Proposed Development is located within the Zone of Notification of this Recorded Monument (AY_24). While the Proposed Development is within the existing roadline in this location, which is likely to have removed or truncated any archaeological remains associated with this monument that may have been present, construction would have a direct impact on any archaeological remains that may survive.	Low	Slight	Archaeological monitoring of work within the Zone of Notification during construction.	Very Low / Negligible	Not significant
									In addition, there is the potential for accidental damage to the boundary wall forming part of this asset given its location adjacent to the R121.	High	Very Significant	Protection during construction.	Low	Slight
								Indirect Negative Temporary	The movement and operation of plant during construction of the Proposed Development would introduce a source of temporary (lasting the duration of construction in this location) noise and visual intrusion into the setting of this asset. However, this asset's key cultural heritage characteristics including the relationship between the church and graveyard, roadside and rural location, and the graveyards continued use would remain unaffected.	Low	Slight	None	Low	Slight
On-road	Ward Upper	Dublin	AY_25	Recorded Monument	DU011-068	Castle - unclassified	Medium	Direct Negative Permanent	The Proposed Development is located within the Zone of Notification of this Recorded Monument (AY_25). While the Proposed Development is within the existing roadline in this location, which is likely to have removed or truncated any archaeological remains associated with this monument that may have been present, construction would have a direct impact on any archaeological remains that may survive.	Low	Slight	Archaeological monitoring of work within the Zone of Notification during construction.	Very Low / Negligible	Not significant
On-road	Common	Dublin	AY_29	Recorded Monument	DU011-023001	Ringfort - unclassified	Medium	Direct Negative Permanent	The Proposed Development is located within the Zone of Notification of this Recorded Monument (AY_29). While the Proposed Development is within the existing roadline in this location, which is likely to have removed or truncated any archaeological remains associated with this monument that may have been present, construction would have a direct impact on any archaeological remains that may survive.	Low	Slight	Archaeological monitoring of work within the Zone of Notification during construction.	Very Low / Negligible	Not significant
HDD launch pit	Forrest Great	Dublin	AY_41	Recorded Monument	DU011-043	Ringfort - unclassified	Medium	Direct Negative Permanent	The Proposed Development is located within the Zone of Notification of this Recorded Monument (AY_41). While the Proposed Development is within the existing roadline in this location, which is likely to have removed or truncated any archaeological remains associated with this monument that may have been present, construction would have a direct impact on any archaeological remains that may survive.	Low	Slight	Archaeological monitoring of work within the Zone of Notification during construction.	Very Low / Negligible	Not significant
On-road	Cloghran	Dublin	AY_43	Recorded Monument	DU011-046	Ringfort - unclassified	Medium	Direct Negative Permanent	The Proposed Development is located within the Zone of Notification of this Recorded Monument (AY_43). While the Proposed Development is within the existing roadline in this location, which is likely to have removed or truncated any archaeological remains associated with this monument that may have been present, construction would have a direct impact on any archaeological remains that may survive.	Low	Slight	Archaeological monitoring of work within the Zone of Notification during construction.	Very Low / Negligible	Not significant
Off-road	Cloghran	Dublin	AY_47	Recorded Monument	DU015-001	Mound	Medium	Direct Negative Permanent	Construction of the Proposed Development between Chainage 34850 and Chainage 34950 would remove any archaeological remains associated with this asset.	Very High	Very Significant	Archaeological excavation. This would be informed by archaeological geophysical	Medium	Moderate

Route Section	Townland	County	Unique Reference Number	Legal Status	Reference Number	Type	Significance	Impact	Impact Description	Magnitude of Impact	Significance of Impact	Mitigation	Residual Magnitude	Residual Significance of Impact
												survey and archaeological test excavation.		

Table 2: Impacts on Architectural Heritage during Construction

No direct or indirect impacts were identified for architectural heritage during construction of the Proposed Development.

Table 3: Impacts on GDLs during Construction

Route Section	Townland	County	Unique Reference Number	Legal Status	Reference Number	Type	Significance	Impact	Impact Description	Magnitude of Impact	Significance of Impact	Mitigation	Residual Magnitude	Residual Significance of Impact
Watercourse crossing	Priest Town	Dublin	DL_04	None	NIAH 5156	GDL	Medium	Direct Negative Permanent	Construction of the watercourse crossing at Chainage 18,200 would remove an area of woodland and c.120m of boundary associated with this demesne.	Medium	Moderate	Photographic and written record of the impacted elements of GDLs	Low	Slight
								Indirect Negative Temporary	The movement and operation of plant during construction of the Proposed Development would introduce a source of temporary (lasting the duration of construction in this location) noise and visual intrusion into this asset.	Low	Slight	None	Low	Slight
Off-road	Hollystown; Hollywood; Hollywoodrath; Spricklestown	Dublin	DL_05	None	NIAH 2267	GDL	Medium	Direct Negative Permanent	Construction of the Proposed Development between Chainage 21550 and Chainage 22550, including Joint Bays 29 and 30, would remove sections of four extant boundaries associated with this demesne.	Low	Slight	Photographic and written record of the impacted elements of GDLs	Very Low / Negligible	Not significant
								Indirect Negative Temporary	The movement and operation of plant during construction of the Proposed Development would introduce a source of temporary (lasting the duration of construction in this location) noise and visual intrusion into this asset.	Low	Slight	None	Low	Slight
Off-road	Middletown	Dublin	DL_15	None	-	GDL	Very Low / Negligible	Direct Negative Permanent	Construction of the Proposed Development between Chainage 36550 and Chainage 36825 would remove sections of two extant external boundaries and one remaining internal boundary associated with this demesne.	Low	Slight	Photographic and written record of the impacted elements of GDLs	Very Low / Negligible	Imperceptible
								Indirect Negative Temporary	The movement and operation of plant during construction of the Proposed Development would introduce a source of temporary (lasting the duration of construction in this location) noise and visual intrusion into this asset.	Low	Slight	None	Low	Slight
Off-road	Glebe	Dublin	DL_16	None	-	GDL	Low	Direct Negative Permanent	Construction of the Proposed Development between Chainage 35150 and Chainage 35425 would remove sections of two extant boundaries associated with this demesne. However, the overall legibility of this demesne would be unaffected.	Low	Not Significant	Photographic and written record of the impacted elements of GDLs	Very Low / Negligible	Imperceptible
								Indirect Negative Temporary	The movement and operation of plant during construction of the Proposed Development would introduce a source of temporary (lasting the duration of construction in this location) noise and visual intrusion into this asset.	Low	Slight	None	Low	Slight

Table 4: Impacts on Cultural Heritage during Construction

Route Section	Townland	County	Unique Reference Number	Legal Status	Reference Number	Type	Significance	Impact	Impact Description	Magnitude of Impact	Significance of Impact	Mitigation	Residual Magnitude	Residual Significance of Impact
On-road	Blackhall Big	Meath	CH_01	None	-	Roadside house	Low	Indirect Negative Temporary	The movement and operation of plant during construction of the Proposed Development would introduce a source of temporary (lasting the duration of construction in this location) noise and visual intrusion into the setting of this asset. However, it is anticipated any intrusion would be temporary (lasting the duration of construction in each location) and this asset's key characteristics (its historic fabric, limited architectural interest and roadside location) would remain unaffected.	Low	Slight	None	Low	Slight
On-road	Staffordstown Little	Meath	CH_04	None	-	Roadside house	Very Low / Negligible	Indirect Negative Temporary	The movement and operation of plant during construction of the Proposed Development would introduce a source of temporary (lasting the duration of construction in this location) noise and visual intrusion into the setting of this asset. However, it is anticipated any intrusion would be temporary (lasting the duration of construction in each location) and this asset's key characteristics (its historic fabric, limited architectural interest and roadside location) would remain unaffected.	Low	Not Significant	None	Low	Not Significant
On-road	Ballymagillin	Meath	CH_12	None	-	Courtyard farm	Low	Indirect Negative Temporary	The movement and operation of plant during construction of the Proposed Development would introduce a source of temporary (lasting the duration of construction in this location) noise and visual intrusion into the setting of this asset. However, it is anticipated any intrusion would be temporary (lasting the duration of construction in each location) and this asset's key characteristics (its historic fabric, limited architectural interest and roadside location) would remain unaffected.	Very Low / Negligible	Not Significant	None	Very Low / Negligible	Not Significant
On-road	Whitesland	Meath	CH_13	None	-	House	Low	Indirect Negative Temporary	The movement and operation of plant during construction of the Proposed Development would introduce a source of temporary (lasting the duration of construction in this location) noise and visual intrusion into the setting of this asset. However, it is anticipated any intrusion would be temporary (lasting the duration of construction in each location) and this asset's key characteristics (its historic fabric, limited architectural interest and roadside location) would remain unaffected.	Low	Slight	None	Low	Slight
Watercourse crossing	Belgree	Meath	CH_15	None	-	Road bridge	Low	Direct Negative Permanent	While the road bridge (CH_15) in Belgree would be avoided for the watercourse crossing at Chainage 18200 there is the potential for accidental damage to this structure during construction.	High	Slight	Protection during construction.	Very Low / Negligible	Imperceptible
On-road	Ward Upper	Dublin	CH_24	None	-	House	Low	Indirect Negative Temporary	The movement and operation of plant during construction of the Proposed Development would introduce a source of temporary (lasting the duration of construction in this location) noise and visual intrusion into the setting of this asset. However, it is anticipated any intrusion would be temporary (lasting the duration of construction in each location) and largely screened by the existing boundaries. This asset's key characteristics (its historic fabric, limited architectural interest and roadside location) would remain unaffected.	Low	Slight	None	Low	Slight
On-road	Newpark	Dublin	CH_25	None	-	Agricultural ranges	Low	Indirect Negative Temporary	The movement and operation of plant during construction of the Proposed Development would introduce a source of temporary (lasting the duration of construction in this location) noise and visual intrusion into the setting of this asset. However, it is anticipated any intrusion would be temporary (lasting the duration of construction in each location) and this asset's key characteristics (its historic fabric, limited architectural interest, roadside location, and continued use as a farm) would remain unaffected.	Very Low / Negligible	Not Significant	None	Very Low / Negligible	Not Significant
On-road	Ballystrahan	Dublin	CH_29	None	-	House	Low	Indirect Negative Temporary	The movement and operation of plant during construction of the Proposed Development would introduce a source of temporary (lasting the duration of construction in this location) noise and visual intrusion into the setting of this asset. However, it is anticipated any intrusion would be temporary (lasting the duration of construction in each location) and this asset's key characteristics (its historic fabric, limited architectural interest and roadside location) would remain unaffected.	Low	Slight	None	Low	Slight
Off-road	Clonshaugh	Dublin	CH_32	None	-	Field system	Low	Direct Negative Permanent	Construction of the Proposed Development between Chainage 37,000 to Chainage 37,600 would remove approximately half of this asset.	Medium	Slight	Archaeological excavation. This would be informed by archaeological geophysical survey and archaeological test excavation.	Very Low / Negligible	Imperceptible
Off-road	Cloghran	Dublin	CH_33	None	-	Farm	Low	Indirect Negative Temporary	The movement and operation of plant during construction of the Proposed Development would introduce a source of temporary (lasting the duration of construction in this location) noise and visual intrusion into the setting of this asset. However, it is anticipated any intrusion would be temporary (lasting the duration of construction in each location) and this asset's key characteristics (its historic fabric, limited architectural interest, roadside location and continued use as a farm) would remain unaffected.	Very Low / Negligible	Not Significant	None	Very Low / Negligible	Not Significant
Off-road	Middletown	Dublin	CH_34	None	-	House (site of)	Very Low / Negligible	Direct Negative	Construction of the Proposed Development between Chainage 36,550 and Chainage 36,600 would remove this asset.	High	Not significant	Archaeological monitoring during construction.	Medium	Imperceptible

Route Section	Townland	County	Unique Reference Number	Legal Status	Reference Number	Type	Significance	Impact	Impact Description	Magnitude of Impact	Significance of Impact	Mitigation	Residual Magnitude	Residual Significance of Impact
								Permanent						
Off-road	Gallanstown	Dublin	CH_53	None	-	Quarry	Very Low / Negligible	Direct Negative Permanent	Construction of the Proposed Development at Chainage 22,050 would wholly remove this asset.	High	Not Significant	Archaeological monitoring during construction.	Medium	Imperceptible
On-road	Culcommon	Meath	CH_59	None	-	Field system	Low	Direct Negative Permanent	Construction of the Proposed Development between Chainage 3,725 and Chainage 2,850, including the Passing Bay for Joint Bay 5, would remove a short section of former field boundary forming part of this asset.	Low	Slight	Archaeological excavation. This would be informed by archaeological geophysical survey and archaeological test excavation.	Very Low / Negligible	Imperceptible
Off-road	Woodland	Meath	CH_62	None	-	Ring ditches	Medium	Direct Negative Permanent	Construction of the off-road section between ch.325 - ch.725 would remove ring-ditches forming part of this asset.	Very High	Very Significant	Archaeological excavation. This would be informed by archaeological geophysical survey and archaeological test excavation.	Medium	Slight
On-road	Piercetown	Meath	CH_63	None	-	Pump	Low	Direct Negative Permanent	While the roadside pump (CH_63) in Piercetown would be retained there is the potential for accidental damage to this structure during construction given location approximately 4m to the north of the Proposed Development (Chainage 13,920).	High	Slight	Protection during construction.	Very Low / Negligible	Imperceptible
Off-road	Cullendragh	Meath	CH_67	None	-	Ring ditches	Medium	Direct Negative Permanent	Construction of the off-road section between ch.3,100 - ch.3,300 would remove curvi-linear features forming part of this asset.	High	Significant	Archaeological excavation. This would be informed by archaeological geophysical survey and archaeological test excavation.	Medium	Slight
Off-road	Cullendragh	Meath	CH_68	None	-	Field boundary	Very Low / Negligible	Direct Negative Permanent	Construction of the off-road section at ch.3,450 would remove this asset.	High	Not Significant	Archaeological monitoring during construction.	Low	Imperceptible
On-road; TCC5	Dunboyne	Meath	CH_71	None	-	House	Low	Indirect Negative Temporary	Construction activities would have an indirect impact on the setting of this cultural heritage asset. However, it is anticipated any intrusion would be temporary (lasting the duration of construction in each location).	Low	Not Significant	None	Low	Not Significant
TCC4	Shallon	Dublin	CH_75	None	-	Enclosure	Medium	Direct Negative Permanent	Construction of the TCC4 between Chainage 26,800 and Chainage 26,925 would remove half of this asset.	High	Significant	Archaeological excavation. This would be informed by archaeological geophysical survey and archaeological test excavation.	Medium	Slight
								Indirect Negative Temporary	Construction activities would have an indirect impact on the setting of this cultural heritage asset. However, it is anticipated any intrusion would be temporary (lasting the duration of construction in each location).	Low	Slight	None	Low	Slight
Off-road	Stockhole	Dublin	CH_78	None	-	Ring ditches	Medium	Direct Negative Permanent	Construction of the Proposed Development between Chainage 35,750 and Chainage 35,950 would wholly remove this asset.	Very High	Very Significant	Archaeological excavation. This would be informed by archaeological geophysical survey and archaeological test excavation.	Medium	Slight
Off-road	Stockhole	Dublin	CH_80	None	-	House (Site of)	Very Low / Negligible	Direct Negative Permanent	Construction of the Proposed Development between Chainage 36,350 and Chainage 36,400 would remove this asset.	High	Not Significant	Archaeological monitoring during construction.	Low	Imperceptible
Off-road	Woodland	Meath	CH_81	None	-	Ditch	Very Low / Negligible	Direct Negative Permanent	Construction of the off-road section between Chainage 300 and Chainage 500 would remove this asset.	High	Not Significant	Archaeological monitoring during construction.	Low	Imperceptible
Off-road	Gaulstown	Meath	CH_82	None	-	Ditch	Very Low / Negligible	Direct Negative Permanent	Construction of the off-road section at Chainage 2,100 would remove approximately 28m of this ditch.	High	Not Significant	Archaeological monitoring during construction.	Low	Imperceptible
Off-road	Cullendraugh	Meath	CH_83	None	-	Ditch	Very Low / Negligible	Direct Negative Permanent	Construction of the off-road section at Chainage 2,200 would remove approximately 32m of this ditch.	High	Not Significant	Archaeological monitoring during construction.	Low	Imperceptible

Table 5: Impacts on LiDAR Assets during Construction

Route Section	Townland	County	Unique Reference Number	Legal Status	Reference Number	Type	Significance	Impact	Impact Description	Magnitude of Impact	Significance of Impact	Mitigation	Residual Magnitude	Residual Significance of Impact
Off-road	Gaulstown; Culcommon	Meath	LI_05	None	-	Field system	Low	Direct Negative	Construction of the off-road section between ch.1,050m - ch.1,750, including Joint Bay 2, would remove former field boundaries and areas of cultivation patterns associated with this asset.	Medium	Slight	Archaeological excavation. This would be informed by archaeological geophysical survey and archaeological test excavation.	Low	Imperceptible
Off-road	Cullendragh	Meath	LI_08	None	-	Buildings (site of)	Low	Direct Negative	Construction of the off-road section at ch.2,650 would remove this asset.	Very High	Very Significant	Topographical survey (written, photographic and drawn survey). Archaeological excavation. This would be informed by archaeological geophysical survey and archaeological test excavation.	Medium	Slight
Off-road	Cullendragh	Meath	LI_09	None	-	Field system	Low	Direct Negative	Construction of the off-road section between ch.2,675 to 2,850 would remove a linear feature and cultivation patterns associated with this asset.	Medium	Slight	Archaeological excavation. This would be informed by archaeological geophysical survey and archaeological test excavation.	Low	Imperceptible
Off-road	Cullendragh	Meath	LI_11	None	-	Field system	Low	Direct Negative	Construction of the off-road section between ch.3,100 - ch.3,300 would remove a linear feature and field drainage associated with this asset.	Low	Slight	Archaeological excavation. This would be informed by archaeological geophysical survey and archaeological test excavation.	Very Low / Negligible	Imperceptible
TCC2	Dunboyne	Meath	LI_24	None	-	Palaeochannel	Medium	Direct Negative Permanent	Establishment of the TCC2 between Chainage 10,450 and Chainage 10,650 would remove linear features and the possible palaeochannel associated with this asset.	Medium	Moderate	Palaeoenvironmental assessment and analysis. Archaeological excavation. This would be informed by archaeological geophysical survey and archaeological test excavation.	Low	Slight
Off-road; Watercourse crossing	Nuttstown	Meath	LI_36	None	-	Palaeochannel	Medium	Direct Negative Permanent	Construction of the off-road section between Chainage 16,350 and Chainage 16,425 would remove a section through the palaeochannel adjacent to the Pinkeen River.	Medium	Moderate	Palaeoenvironmental assessment and analysis. Archaeological excavation. This would be informed by archaeological geophysical survey and archaeological test excavation.	Low	Slight
Watercourse crossing	Irishtown	Dublin	LI_37	None	-	Gravel pit	Very Low / Negligible	Direct Negative Permanent	Construction of the watercourse crossing at Chainage 18,200 would remove approximately one third of this asset.	Low	Imperceptible	Archaeological monitoring during construction.	Very Low / Negligible	Imperceptible
Off-road	Irishtown	Dublin	LI_40	None	-	Enclosure	Medium	Direct Negative Permanent	Construction of the Proposed Development between Chainage 22,100 and Chainage 22,200 would bisect this asset, removing the majority of this asset.	Very High	Very Significant	Archaeological excavation. This would be informed by archaeological geophysical survey and archaeological test excavation.	Medium	Slight
								Indirect Negative Temporary	Construction activities would have an indirect impact on the setting of this cultural heritage asset. However, it is anticipated any intrusion would be temporary (lasting the duration of construction in each location).	Low	Slight	None	Low	Slight
HDD reception pit	Cloghran	Dublin	LI_57	None	-	Field boundary(ies)	Very Low / Negligible	Direct Negative Permanent	Construction of the Proposed Development between Chainage 34,350 and Chainage 34,600 would remove this asset.	High	Not Significant	Archaeological monitoring during construction.	Low	Imperceptible
Off-road	Cloghran	Dublin	LI_58	None	-	Palaeochannel	Medium	Direct Negative Permanent	Construction of the off-road section between Chainage 34,950 and Chainage 35,150 would remove deposits of the palaeochannel.	Medium	Moderate	Palaeoenvironmental assessment and analysis. Archaeological excavation. This would be informed by archaeological geophysical survey and archaeological test excavation.	Low	Slight
Off-road	Clonshaugh	Dublin	LI_60	None	-	Field boundary(ies)	Very Low / Negligible	Direct Negative Permanent	Construction of the Proposed Development between Chainage 36,850 and Chainage 37,000, including Joint Bay 49, would remove the majority of this asset.	High	Not Significant	Archaeological monitoring during construction.	Low	Imperceptible

Table 6: Impacts on Townland Boundaries during Construction

Route Section	Townland	County	Unique Reference Number	Legal Status	Reference Number	Type	Significance	Impact	Impact Description	Magnitude of Impact	Significance of Impact	Mitigation	Residual Magnitude	Residual Significance of Impact
Off-road	Woodland - Gaulstown	Meath	TB_01	None	-	Townland boundary	Medium	Direct Negative	Construction of the off-road section at ch.1,050 would remove c. 37m of this asset.	Medium	Moderate	Townland boundary survey. Underwater assessments, including wade and metal detecting survey.	Low	Slight
Off-road	Gaulstown - Cullendraugh	Meath	TB_04	None	-	Townland boundary	Medium	Direct Negative	Construction of the off-road section at ch.2,150 would remove c. 30m of this asset.	Medium	Moderate	Townland boundary survey. Underwater assessments, including wade and metal detecting survey.	Low	Slight
Off-road	Stokestown - Rowan	Meath	TB_38	None	-	Townland boundary	Medium	Direct Negative Permanent	Construction of the off-road section at Chainage 16,200 would remove c. 22m of this asset.	Low	Slight	Townland boundary survey.	Very Low / Negligible	Not significant
Off-road; Watercourse crossing	Rowan - Nuttstown	Meath	TB_39	None	-	Townland boundary	Medium	Direct Negative Permanent	Construction of the off-road section at Chainage 16,350 would remove c. 35m of this asset.	Medium	Moderate	Townland boundary survey.	Low	Slight
Off-road; Watercourse crossing	Priest Town - Belgree	Meath	TB_44	None	-	Townland boundary	Medium	Direct Negative Permanent	Construction of the watercourse crossing at Chainage 19,225 would remove c. 52m of this asset.	Medium	Moderate	Townland boundary survey.	Low	Slight
Off-road	Gallanstown - Yellow Walls	Dublin	TB_51	None	-	Townland boundary	Low	Direct Negative Permanent	Construction of the off-road section at Chainage 21,550 would remove c. 30m of this asset.	Low	Not Significant	Townland boundary survey.	Very Low / Negligible	Imperceptible
Off-road	Yellow Walls – Hollystown	Dublin	TB_52	None	-	Townland boundary	Low	Direct Negative Permanent	Construction of the off-road section at Chainage 21,725 would remove c. 50m (in two sections) of this asset.	Medium	Slight	Townland boundary survey.	Low	Imperceptible
Off-road	Hollystown – Irishtown	Dublin	TB_54	None	-	Townland boundary	Very Low / Negligible	Direct Negative Permanent	Construction of the off-road section at Chainage 22,050 would remove c. 20m of this asset.	Low	Imperceptible	Townland boundary survey.	Very Low / Negligible	Imperceptible
Off-road	Irishtown - Spicklestown	Dublin	TB_57	None	-	Townland boundary	Low	Direct Negative Permanent	Construction of the off-road section at Chainage 22,225 would remove c. 36m of this asset.	Low	Not Significant	Townland boundary survey.	Very Low / Negligible	Imperceptible
Watercourse crossing	Shallon - Shallon	Dublin	TB_67	None	-	Townland boundary	Medium	Direct Negative Permanent	Construction of the watercourse crossing between Chainage 26,150 and Chainage 26,200 would remove c. 50m of this asset.	Medium	Moderate	Townland boundary survey.	Low	Slight
Off-road	Kilreesk - Kingstown	Dublin	TB_76	None	-	Townland boundary	Low	Direct Negative Permanent	Construction of the off-road section at Chainage 28,400 would remove c. 30m of this asset.	Low	Not Significant	Townland boundary survey.	Very Low / Negligible	Imperceptible
Off-road	Barberstown - Pickardstown	Dublin	TB_78	None	-	Townland boundary	Low	Direct Negative Permanent	Construction of the off-road section at Chainage 30,100 would remove c. 7m of this asset.	Very Low / Negligible	Not Significant	Townland boundary survey.	Very Low / Negligible	Imperceptible
Off-road	Cloghran - Glebe	Dublin	TB_82	None	-	Townland boundary	Low	Direct Negative Permanent	Construction would remove c. 53m of this asset at Chainage 35,150.	Medium	Slight	Townland boundary survey.	Low	Imperceptible
Off-road	Stockhole - Middleton	Dublin	TB_85	None	-	Townland boundary	Low	Direct Negative Permanent	Construction would remove c. 70m of this asset at Chainage 36,550.	Medium	Slight	Townland boundary survey.	Low	Imperceptible
Off-road	Middleton - Clonshaugh	Dublin	TB_86	None	-	Townland boundary	Low	Direct Negative Permanent	Construction would remove c. 70m of this asset at Chainage 36,825.	Medium	Slight	Townland boundary survey.	Low	Imperceptible
Off-road	Clonshaugh - Belcamp	Dublin	TB_87	None	-	Townland boundary	Low	Direct Negative Permanent	Construction would remove c. 230m of this asset at Chainage 36,825.	Medium	Moderate	Townland boundary survey.	Low	Slight
Off-road	Glebe - Baskin	Dublin	TB_96	None	-	Townland boundary	Low	Direct Negative Permanent	Construction would remove c. 70m of this asset at Chainage 35,300.	Medium	Slight	Townland boundary survey.	Low	Imperceptible
Off-road	Stockhole - Baskin	Dublin	TB_97	None	-	Townland boundary	Low	Direct Negative Permanent	Construction would remove c. 55m of this asset at Chainage 35,750.	Medium	Slight	Townland boundary survey.	Low	Imperceptible

Table 7: Impacts on GDLs during Operation

Route Section	Townland	County	Unique Reference Number	Legal Status	Reference Number	Type	Significance	Impact	Impact Description	Magnitude of Impact	Significance of Impact	Mitigation	Residual Magnitude	Residual Significance of Impact
Watercourse crossing	Priest Town	Dublin	DL_04	None	NIAH 5156	GDL	Medium	Indirect Negative Permanent	The watercourse crossing within a former area of woodland in this demesne would remain visible further reducing its legibility.	Low	Slight	None	Low	Slight
Off-road	Hollystown; Hollywood; Hollywoodrath; Spricklestown	Dublin	DL_05	None	NIAH 2267	GDL	Medium	Indirect Negative Permanent	While hedgerows would be reinstated, access tracks and joint bay covers would remain visible in this demesne further reducing its legibility.	Low	Slight	None	Low	Slight

No impacts were identified for archaeology and cultural heritage, including LiDAR assets and townland boundaries, during operation.

East Meath - North Dublin Grid Upgrade Environmental Impact Assessment Report (EIAR): Volume 3

Appendix A15.1 – Assessment of Agricultural and Equine Land Parcels

EirGrid

March 2024

Contents

Appendix A15.1 Assessment of Agricultural and Equine Land Parcels

Table 1: Assessment of Agricultural and Equine Land Parcels

Ref Number (Approximate Chainage)	Description of Land Parcel	Area of Land Parcel (hectares(ha))	Description of Impacts	Temporary Works Area (ha) (%)	Permanent Easement and Land Take Area (ha) (%)	Construction Phase Impact (Pre-Mitigation)	Construction Phase Residual Impact (Post-Mitigation)	Operational Impact (Pre-Mitigation)	Operational Phase Residual Impact (Post-Mitigation)
1 (300)	Grassland plot grazed by sheep and beef cattle. Medium sensitivity.	61.8	Impact at edge of farm. Permanent 15m wide easement on land. Temporary land take for working area. 1.3ha required for the temporary working area which is 2.1% of the affected land parcel along with 0.6ha of permanent easement which is 1% of the affected land parcel.	1.3 ha (2.1%)	0.6 ha (1%)	Not Significant	Not Significant	Not Significant	Not Significant
2 (750)	Grassland plot grazed by beef cattle. Medium sensitivity.	29.6	Impact at edge of farm. Permanent 15m wide easement on land. Temporary land take required to construct Joint Bay No 1 located on land. 1.1ha required for the temporary working area which is 3.7% of the affected land parcel along with 0.6ha of permanent easement, cover of Joint Bay and 0.15ha for access track which is 1% of the affected land parcel.	1.1 ha (3.7%)	0.6 ha (2%)	Not Significant	Not Significant	Not Significant	Not Significant
3 (1,100)	Grassland plot grazed by sheep and beef cattle. Medium sensitivity.	66.3	Impact at edge of farm. Permanent 15m wide easement on land. Temporary land take required to construct Joint Bay No 2 located on land. 3.3ha required for the temporary working area which is 5% of the affected land parcel along with 2.1ha of permanent easement, cover of Joint Bay and 0.44ha for access tracks which is 3.2% of the affected land parcel.	3.3 ha (5%)	2.1 ha (3.2%)	Not Significant	Not Significant	Slight Adverse	Slight Adverse

Ref Number (Approximate Chainage)	Description of Land Parcel	Area of Land Parcel (hectares(ha))	Description of Impacts	Temporary Works Area (ha) (%)	Permanent Easement and Land Take Area (ha) (%)	Construction Phase Impact (Pre-Mitigation)	Construction Phase Residual Impact (Post-Mitigation)	Operational Impact (Pre-Mitigation)	Operational Phase Residual Impact (Post-Mitigation)
4 (2,200)	Grassland plot grazed by sheep and beef cattle. Medium sensitivity.	74.6	Impact at edge of farm. Permanent 15m wide easement on land. Temporary land take required for Temporary Construction Compound (TCC) (TCC1) and to construct Joint Bays No 3 and 4 located on land. 5.4ha required for the temporary working area which is 7.2% of the affected land parcel along with 2.8ha of permanent easement, cover of Joint Bays and 0.6ha of access tracks which is 3.8% of the affected land parcel. Southern part of the land parcel is severed during the Construction Phase (9ha – 12%).	5.4 ha (7.2%)	2.8 ha (3.8%)	Slight Adverse	Not Significant	Slight Adverse	Slight Adverse
5 (3,750)	Grassland plot for silage and grazed by beef cattle. Medium sensitivity.	24.5	Impact at edge of farm. Temporary land take required for Passing Bay located at Joint Bay No 5. 0.13ha required for the temporary working area which is 0.5% of the affected land parcel.	0.13 ha (0.5%)	-	Not Significant	Not Significant	Not Significant	Not Significant
6 (5,950)	Grassland plot grazed by beef cattle. Medium sensitivity.	12.0	Impact at edge of farm. Temporary land take required for construction platform located at Joint Bay No 8. 0.16ha required for the temporary working area which is 1.3% of the affected land parcel.	0.16 ha (1.3%)	-	Not Significant	Not Significant	Not Significant	Not Significant
7 (7,550)	Grassland plot for hay/silage and grazed by sheep. Medium sensitivity.	2.9	Impact at edge of farm. Temporary land take required for Passing Bay located at Joint Bay No 10. 0.21ha required for the temporary working area which is 7.3% of the affected land parcel.	0.21 ha (7.3%)	-	Slight Adverse	Not Significant	Not Significant	Not Significant
8 (9,800)	Grassland plot for hay/silage. Medium sensitivity.	9.2	Impact at edge of farm. Temporary land take required for construction platform located at Joint Bay No 13. 0.08ha required for the temporary working area which is 0.9% of the affected land parcel.	0.08 ha (0.9%)	-	Not Significant	Not Significant	Not Significant	Not Significant

Ref Number (Approximate Chainage)	Description of Land Parcel	Area of Land Parcel (hectares(ha))	Description of Impacts	Temporary Works Area (ha) (%)	Permanent Easement and Land Take Area (ha) (%)	Construction Phase Impact (Pre-Mitigation)	Construction Phase Residual Impact (Post-Mitigation)	Operational Impact (Pre-Mitigation)	Operational Phase Residual Impact (Post-Mitigation)
9 (10,550)	Grassland plot for hay/silage and grazed by beef cattle. Medium sensitivity.	8.8	Temporary land take required for TCC2. 1.4ha required for the temporary working area which is 15.9% of the affected land parcel. Access to the northern part of land parcel severed by TCC2.	1.4 ha (15.9%)	-	Moderate Adverse	Slight Adverse	Slight Adverse	Slight Adverse
10 (12,550)	Grassland plot grazed by sheep. Medium sensitivity.	3.6	Impact at edge of farm. Permanent 5m wide easement on land. 0.85ha required for the temporary working area and Horizontal Directional Drilling (HDD) compound (M3 Motorway crossing) which is 24% of the affected land parcel along with 0.2ha of permanent easement which is 5.6% of the affected land parcel.	0.85ha (24%)	0.2 ha (5.6%)	Not Significant	Not Significant	Not Significant	Not Significant
11 (13,000)	Grassland plot grazed by beef cattle. Medium sensitivity.	60.4	Impact at edge of farm. Permanent 5m wide easement on land. Temporary land take required to construct Joint Bay No 17 located on land. 0.5ha required for the temporary working area and HDD compound (M3 Motorway crossing) which is 0.8% of the affected land parcel along with 0.12ha of permanent easement, cover of Joint Bay and 0.02ha of access tracks which is 0.2% of the affected land parcel.	0.5 ha (0.8%)	0.12 ha (0.2%)	Not Significant	Not Significant	Not Significant	Not Significant
12 (15,200)	Grassland plot grazed by sheep. Medium sensitivity.	40.0	Impact at edge of farm. Permanent 5m wide easement on land. Temporary land take required to construct Joint Bay No 21 located on land. 0.76ha required for the temporary working area which is 1.9% of the affected land parcel along with 0.2ha of permanent easement, cover of Joint Bay and 0.01ha of access tracks which is 0.5% of the affected land parcel.	0.76 ha (1.9%)	0.2 ha (0.5%)	Slight Adverse	Not Significant	Not Significant	Not Significant

Ref Number (Approximate Chainage)	Description of Land Parcel	Area of Land Parcel (hectares(ha))	Description of Impacts	Temporary Works Area (ha) (%)	Permanent Easement and Land Take Area (ha) (%)	Construction Phase Impact (Pre-Mitigation)	Construction Phase Residual Impact (Post-Mitigation)	Operational Impact (Pre-Mitigation)	Operational Phase Residual Impact (Post-Mitigation)
13 (16,250)	Tillage plot. Medium sensitivity.	33.6	Impact at edge of farm. Permanent 5m wide easement on land. Temporary land take for working area. 0.77ha required for the temporary working area which is 2.3% of the affected land parcel along with 0.1ha of permanent easement which is 0.3% of the affected land parcel. Small area (1%) of land parcel severed by working area during Construction Phase.	0.77 ha (2.3%)	0.1 ha (0.3%)	Slight Adverse	Not Significant	Not Significant	Not Significant
14 (16,450)	Tillage plot. Medium sensitivity.	104.0	Impact at edge of farm. Permanent 5m wide easement on land. Temporary land take for working area. 0.26ha required for the temporary working area which is 0.2% of the affected land parcel along with 0.04ha of permanent easement which is 0.04% of the affected land parcel.	0.26 ha (0.2%)	0.04 ha (0.04%)	Not Significant	Not Significant	Not Significant	Not Significant
15 (18,150)	Tillage plot. Medium sensitivity.	129.5	Impact at edge of farm. Permanent 5m wide easement on land. Temporary land take required to construct Joint Bay No 24 and 25 located in road. 0.95ha required for the temporary working area and two Passing Bays which is 0.7% of the affected land parcel along with 0.1ha of permanent easement and cover of Joint Bays which is 0.08% of the affected land parcel. Small area (<1% of land parcel) severed by working area during the Construction Phase.	0.95 ha (0.7%)	0.1 ha (0.08%)	Not Significant	Not Significant	Not Significant	Not Significant
16 (18,200)	Tillage plot. Medium sensitivity.	28.9	Impact at edge of farm. Permanent 5m wide easement on land. Temporary land take for working area. 0.46ha required for the temporary working area which is 1.6% of the affected land parcel along with 0.1ha of permanent easement which is 0.3% of the affected land parcel.	0.46 ha (1.6%)	0.1 ha (0.3%)	Not Significant	Not Significant	Not Significant	Not Significant

Ref Number (Approximate Chainage)	Description of Land Parcel	Area of Land Parcel (hectares(ha))	Description of Impacts	Temporary Works Area (ha) (%)	Permanent Easement and Land Take Area (ha) (%)	Construction Phase Impact (Pre-Mitigation)	Construction Phase Residual Impact (Post-Mitigation)	Operational Impact (Pre-Mitigation)	Operational Phase Residual Impact (Post-Mitigation)
17 (19,750)	Tillage plot. Medium sensitivity.	5.2	Impact at edge of farm. Temporary land take required for construction platform located at Joint Bay No 26. 0.12ha required for the temporary working area which is 2.3% of the affected land parcel along with 0.02ha of permanent easement which is 0.4% of the affected land parcel.	0.12 ha (2.3%)	0.02 ha (0.4%)	Not Significant	Not Significant	Not Significant	Not Significant
18 (20,350)	Tillage plot. Medium sensitivity.	7.3	Impact at edge of farm. Permanent 5m wide easement on land. Temporary land take for working area. 0.11ha required for the temporary working area which is 1.5% of the affected land parcel along with 0.02ha of permanent easement which is 0.3% of the affected land parcel.	0.11 ha (1.5%)	0.02 ha (0.3%)	Not Significant	Not Significant	Not Significant	Not Significant
19 (20,550)	Grassland plot grazed by beef cattle. Medium sensitivity.	9.0	Impact at edge of farm. Permanent 5m wide easement on land. 0.16ha required for the temporary working area, including Passing Bay at Joint Bay No 27, which is 1.8% of the affected land parcel along with 0.02ha of permanent easement which is 0.2% of the affected land parcel.	0.16 ha (1.8%)	0.02 ha (0.2%)	Not Significant	Not Significant	Not Significant	Not Significant
20 (20,900)	Tillage plot. Medium sensitivity.	78.6	Impact at edge of farm. Permanent 5m wide easement on land. Temporary land take required to construct Joint Bay No 28 and 29 located on land. 2ha required for the temporary working area which is 2.5% of the affected land parcel along with 0.4ha of permanent easement, cover of Joint Bay and 0.1ha of access tracks which is 0.5% of the affected land parcel. 9.5ha field severed during the Construction Phase (12% of land parcel).	2 ha (2.5%)	0.4 ha (0.5%)	Slight Adverse	Not Significant	Not Significant	Not Significant
21 (21,600)	Scrub. Low sensitivity.	2.2	Land parcel used for TCC3. Permanent 5m wide easement on land. 2.2ha required for the temporary working area which is 100% of the affected land parcel along with 0.1ha of permanent easement which is 4.6% of the affected land parcel.	2.2 ha (100%)	0.1 ha (4.6%)	Slight Adverse	Slight Adverse	Slight Adverse	Slight Adverse

Ref Number (Approximate Chainage)	Description of Land Parcel	Area of Land Parcel (hectares(ha))	Description of Impacts	Temporary Works Area (ha) (%)	Permanent Easement and Land Take Area (ha) (%)	Construction Phase Impact (Pre-Mitigation)	Construction Phase Residual Impact (Post-Mitigation)	Operational Impact (Pre-Mitigation)	Operational Phase Residual Impact (Post-Mitigation)
22 (22,150)	Grassland plot grazed by beef cattle and horses. High sensitivity.	16.5	Impact at edge of farm. Permanent 5m wide easement on land. Temporary land take required to construct Joint Bay No 30 located on land. 1.5ha required for the temporary working area which is 6.8% of the affected land parcel along with 0.4ha of permanent easement, cover of Joint Bay and access track which is 2.4% of the affected land parcel.	1.5 ha (9.1%)	0.4 ha (2.4%)	Slight Adverse	Slight Adverse	Slight Adverse	Slight Adverse
23 (23,200)	Tillage plot. Medium sensitivity.	97.4	Impact at edge of farm. Permanent 5m wide easement on land. Temporary land take required to construct Joint Bay No 31 located on land. 0.5ha required for the temporary working area and HDD compound (M2 Crossing) which is 0.5% of the affected land parcel along with 0.1ha of permanent easement, cover of Joint Bay and 0.02ha of access tracks which is 0.1% of the affected land parcel.	0.5 ha (0.5%)	0.12 ha (0.1%)	Not Significant	Not Significant	Not Significant	Not Significant
24 (23,550)	Tillage plot. Medium sensitivity.	30.2	Impact at edge of farm. Permanent 5m wide easement on land. Temporary land take required for HDD compound (M2 Crossing). 0.8ha required for the temporary working area which is 2.6% of the affected land parcel along with 0.2ha of permanent easement which is 0.7% of the affected land parcel.	0.8 ha (2.6%)	0.2 ha (0.7%)	Slight Adverse	Not Significant	Not Significant	Not Significant
25 (24,800)	Tillage plot. Medium sensitivity.	12.8	Impact at edge of farm. Temporary land take required for passing bay located at Joint Bay No 33. 0.14ha required for the temporary working area which is 1.1% of the affected land parcel.	0.14 ha (1.1%)	-	Not Significant	Not Significant	Not Significant	Not Significant
26 (25,800)	Grassland plot grazed by beef cattle. Medium sensitivity.	5.1	Impact at edge of farm. Temporary land take required for passing bay located at Joint Bay No 34. 0.14ha required for the temporary working area which is 2.7% of the affected land parcel.	0.14 ha (2.7%)	-	Slight Adverse	Not Significant	Not Significant	Not Significant

Ref Number (Approximate Chainage)	Description of Land Parcel	Area of Land Parcel (hectares(ha))	Description of Impacts	Temporary Works Area (ha) (%)	Permanent Easement and Land Take Area (ha) (%)	Construction Phase Impact (Pre-Mitigation)	Construction Phase Residual Impact (Post-Mitigation)	Operational Impact (Pre-Mitigation)	Operational Phase Residual Impact (Post-Mitigation)
27 (26,050)	Tillage plot. Medium sensitivity.	75.9	Impact at edge of farm. Permanent 5m wide easement on land. Temporary land take required for TCC4. 1.6ha required for the temporary working area which is 2.1% of the affected land parcel along with 0.05ha of permanent easement which is 0.07% of the affected land parcel.	1.6 ha (2.1%)	0.05 ha (0.07%)	Not Significant	Not Significant	Not Significant	Not Significant
28 (26,250)	Grassland plot grazed by beef cattle. Medium sensitivity.	20.3	Impact at edge of farm. Temporary land take required for Passing Bay located at Joint Bay No 35. 0.19ha required for the temporary working area which is 0.9% of the affected land parcel.	0.19 ha (0.9%)	-	Not Significant	Not Significant	Not Significant	Not Significant
29 (27,750)	Dairy farm. High sensitivity.	11.8	Impact at edge of farm. Temporary land take required for construction platform located at Joint Bay No 37. 0.1ha required for the temporary working area which is 0.7% of the affected land parcel.	0.1 ha (0.8%)	-	Not Significant	Not Significant	Not Significant	Not Significant
30 (32,400)	Rough grazing. Low sensitivity.	2.4	Impact at edge of farm. Temporary land take required for passing bay located at Joint Bay No 43. 0.14ha required for the temporary working area which is 5.8% of the affected land parcel.	0.14 ha (5.8%)	-	Not Significant	Not Significant	Not Significant	Not Significant
31 (33,900)	Grassland plot grazed by horses. Low - Medium sensitivity. (daa land).	14.1	Impact at edge of farm. Permanent 30m wide easement on land. Temporary land take required for HDD compound (M1 Crossing). Passing Bay required for Joint Bay No 45 located in-road. 2ha required for the temporary working area which is 14.1% of the affected land parcel along with 0.2ha of permanent easement which is 1.4% of the affected land parcel.	2 ha (14.1%)	0.9 ha (6.4%)	Not Significant	Not Significant	Not Significant	Not Significant
32 (34,400)	Grassland plot grazed by horses. Low - Medium sensitivity. (daa land).	7.9	Impact at edge of farm. Temporary land take for working area. 1.1ha required for the temporary working area which is 13.9% of the affected land parcel.	1.1 ha (13.9%)	-	Slight Adverse	Not Significant	Not Significant	Not Significant

Ref Number (Approximate Chainage)	Description of Land Parcel	Area of Land Parcel (hectares(ha))	Description of Impacts	Temporary Works Area (ha) (%)	Permanent Easement and Land Take Area (ha) (%)	Construction Phase Impact (Pre-Mitigation)	Construction Phase Residual Impact (Post-Mitigation)	Operational Impact (Pre-Mitigation)	Operational Phase Residual Impact (Post-Mitigation)
33 (34,550)	Grassland plot grazed by beef cattle and horses. Medium sensitivity.	22.5	Impact will cause a high level of disturbance during Construction Phase. Farmyard will be separated from retained lands. Temporary land take required for TCC5 and to construct Joint Bay No 46 located on land. 5.5ha required for the temporary working area and HDD compound (M1 Motorway Crossing) which is 24.5% of the affected land parcel along with 0.4ha of permanent easement, cover of Joint Bay and 0.1ha of access tracks which is 2.2% of the affected land parcel. Access from yard to the remainder of the land parcel is severed by compound.	5.5 ha (24.5%)	2.1 ha (9.3%)	Significant Adverse	Moderate Adverse (impact reduced by allowing continuous access from farmyard)	Moderate Adverse	Moderate Adverse
34 (35,250)	Tillage plot. Medium sensitivity.	28.2	Farm will be severed by the working area during Construction Phase. Permanent 30m wide easement on land. Temporary land take required to construct Joint Bay No 47 located on land. 1.6ha required for the temporary working area which is 5.7% of the affected land parcel along with 0.1ha of permanent easement, cover of Joint Bay and access track which is 0.4% of the affected land parcel. 3ha severed by working area during construction.	1.6 ha (5.7%)	0.8 ha (2.8%)	Slight Adverse	Not Significant	Not Significant	Not Significant
35 (35,500)	Tillage plot. Medium sensitivity.	7.3	Impact at edge of farm. Permanent 30m wide easement on land. Temporary land take for working area. 2.15ha required for the temporary working area which is 29.6% of the affected land parcel along with 0.2ha of permanent easement which is 2.8% of the affected land parcel.	2.15 ha (29.6%)	1 ha (13.8%)	Moderate Adverse	Slight Adverse	Slight Adverse	Slight Adverse
36 (35,850)	Tillage plot. Medium sensitivity.	8.3	Impact at edge of farm. Permanent 30m wide easement on land. Temporary land take for working area. 1.3ha required for the temporary working area which is 15.6% of the affected land parcel along with 0.1ha of permanent easement which is 1.2% of the affected land parcel. Access to plot severed by working area during Construction Phase.	1.3 ha (15.6%)	0.6 ha (7.2%)	Moderate Adverse	Not Significant	Not Significant	Not Significant

Ref Number (Approximate Chainage)	Description of Land Parcel	Area of Land Parcel (hectares(ha))	Description of Impacts	Temporary Works Area (ha) (%)	Permanent Easement and Land Take Area (ha) (%)	Construction Phase Impact (Pre-Mitigation)	Construction Phase Residual Impact (Post-Mitigation)	Operational Impact (Pre-Mitigation)	Operational Phase Residual Impact (Post-Mitigation)
37 (36,000)	Tillage plot. Medium sensitivity.	11.9	Impact at edge of farm. Permanent 30m wide easement on land. Temporary land take required to construct Joint Bay No 48 located on land. 3.3ha required for the temporary working area which is 27.7% of the affected land parcel along with 0.3ha of permanent easement, cover of Joint Bay and 0.12ha of access tracks which is 3.5% of the affected land parcel Access to land is severed by working area during Construction Phase.	3.3 ha (27.7%)	1.8 ha (15.1%)	Moderate Adverse	Slight Adverse	Slight Adverse	Slight Adverse
38 (38,650)	Tillage plot. Medium sensitivity.	59.6	Farm will be severed by the working area during Construction Phase. Permanent 30m wide easement on land. Temporary land take for working area. 1.6ha required for the temporary working area which is 2.7% of the affected land parcel along with 0.1ha of permanent easement which is 0.2% of the affected land parcel. Access to land and farmyard is severed by working area during Construction Phase.	1.6 ha (2.7%)	0.8 ha (1.3%)	Moderate Adverse	Not Significant	Not Significant	Not Significant
39 (36,900)	Tillage plot. Medium sensitivity.	22.2	Farm will be severed by the working area during Construction Phase. Permanent 30m wide easement on land. Temporary land take required to construct Joint Bay No 49 located on land. 1ha required for the temporary working area which is 4.5% of the affected land parcel along with 0.1ha of permanent easement, cover of Joint Bay and 0.05ha of access tracks which is 0.7% of the affected land parcel. Access to land is severed by working area during Construction Phase.	1 ha (4.5%)	0.5 ha (2.3%)	Slight Adverse	Not Significant	Not Significant	Not Significant

Ref Number (Approximate Chainage)	Description of Land Parcel	Area of Land Parcel (hectares(ha))	Description of Impacts	Temporary Works Area (ha) (%)	Permanent Easement and Land Take Area (ha) (%)	Construction Phase Impact (Pre-Mitigation)	Construction Phase Residual Impact (Post-Mitigation)	Operational Impact (Pre-Mitigation)	Operational Phase Residual Impact (Post-Mitigation)
40 (37,100)	Tillage and grassland (IDA land). Low sensitivity because land designated for industrial use.	30.9	Farm will be severed by the working area during Construction Phase. Permanent 30m wide easement on land. 11.5ha required for the temporary working area and construction compound (TCC6) which is 37.3% of the affected land parcel. 0.3ha of permanent easement and 0.15ha of access tracks which is 1.5% of the affected land parcel. Access to land is severed by working area during Construction Phase.	11.5 ha (37.3%)	1.9 ha (6.2%)	Moderate Adverse	Moderate Adverse	Moderate Adverse	Moderate Adverse

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LVIA PHOTOMONTAGES

Proposed East Meath - North Dublin Grid Upgrade
Appendix A18.1

This book contains imagery for the viewpoints chosen for the LVIA study

March 2024

LVIA I TVIA I Landscape Design I Visibility Analysis I Glint and Glare I Verified Photomontages I CGI I Shadow Flicker Analysis

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*** There is no Montage for this viewpoint as the proposed development completely screened by existing buildings/vegetation and/or terrain**

LVIA viewpoint locations selected for the East Meath - North Dublin Grid Upgrade Development

East Meath - North Dublin Grid Upgrade

Imagery depicting the view towards the site (Existing and Outline)

Local road, Clonshaugh VP1

These are 80° panoramic montages captured and presented in accordance with the guidance set by the British Landscape Institute 2011 - Advice Note 01/11.

To view these panoramas on a flat surface one must move from left to right along its length whilst maintaining a perpendicular viewing direction and the specified correct viewing distance of 30cm. To see this entire panoramic scene in reality would necessitate turning one's head through 40°.

Easting (ITM):	718752	Lens:	50mm / Full Frame Sensor	Date:	29/05/2023
Northing (ITM):	741995	Camera:	Canon 1-D Mark II digital SLR	Time:	10:07
Direction of View 114°	E of Grid North	Camera Height:	1.7m Above Ground Level		
Angle of View:	80°				

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East Meath - North Dublin Grid Upgrade

Imagery depicting the view towards the site (Montage)

Local road, Clonshaugh VP1

These are 80° panoramic montages captured and presented in accordance with the guidance set by the British Landscape Institute 2011 - Advice Note 01/11.

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Northing (ITM):	741995	Camera:	Canon 1-D Mark II digital SLR	Time:	10:07
Direction of View 114°	E of Grid North	Camera Height:	1.7m Above Ground Level		
Angle of View:	80°				

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East Meath - North Dublin Grid Upgrade

Imagery depicting the view towards the site (Existing and Outline)

R139 regional road, Clonshaugh VP2

These are 80° panoramic montages captured and presented in accordance with the guidance set by the British Landscape Institute 2011 - Advice Note 01/11.

To view these panoramas on a flat surface one must move from left to right along its length whilst maintaining a perpendicular viewing direction and the specified correct viewing distance of 30cm. To see this entire panoramic scene in reality would necessitate turning one's head through 40°.

Easting (ITM):	719245	Lens:	50mm / Full Frame Sensor	Date:	29/05/2023
Northing (ITM):	741302	Camera:	Canon 1-D Mark II digital SLR	Time:	10:19
Direction of View	23° E of Grid North	Camera Height:	1.7m Above Ground Level		
Angle of View:	80°				

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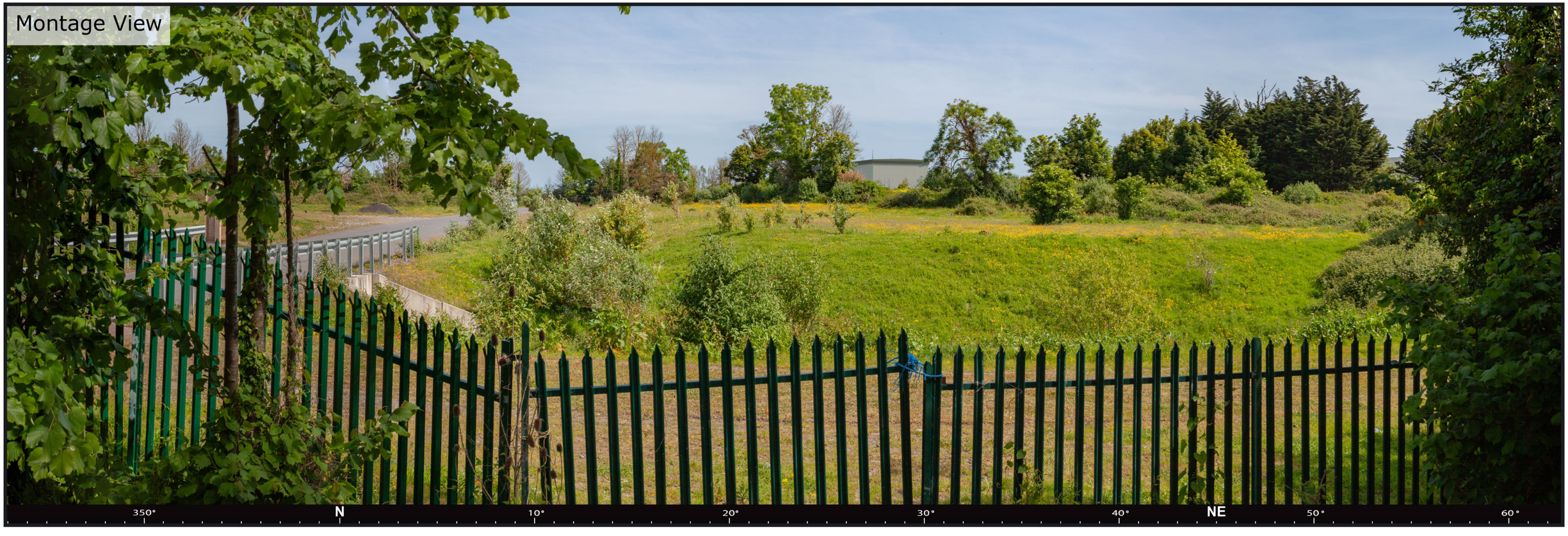
East Meath - North Dublin Grid Upgrade

Imagery depicting the view towards the site (Montage)

R139 regional road, Clonshaugh VP2



These are 80° panoramic montages captured and presented in accordance with the guidance set by the British Landscape Institute 2011 - Advice Note 01/11.

To view these panoramas on a flat surface one must move from left to right along its length whilst maintaining a perpendicular viewing direction and the specified correct viewing distance of 30cm. To see this entire panoramic scene in reality would necessitate turning one's head through 40°.

Easting (ITM):	719245	Lens:	50mm / Full Frame Sensor	Date:	29/05/2023
Northing (ITM):	741302	Camera:	Canon 1-D Mark II digital SLR	Time:	10:19
Direction of View	23° E of Grid North	Camera Height:	1.7m Above Ground Level		
Angle of View:	80°				

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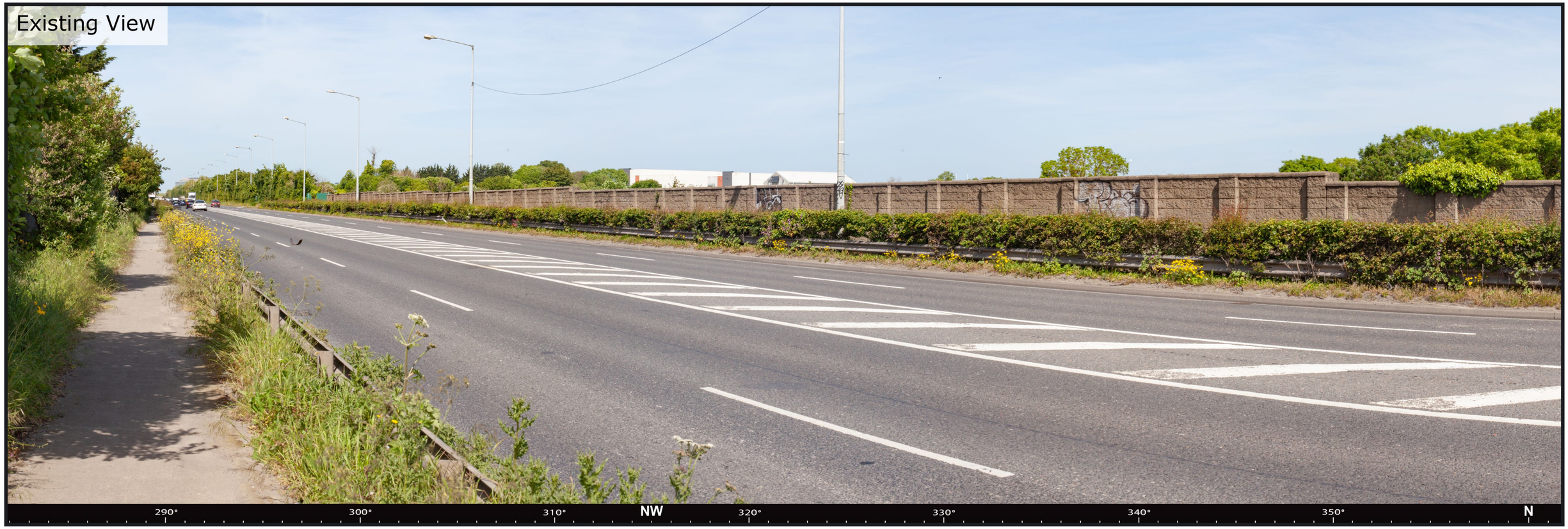
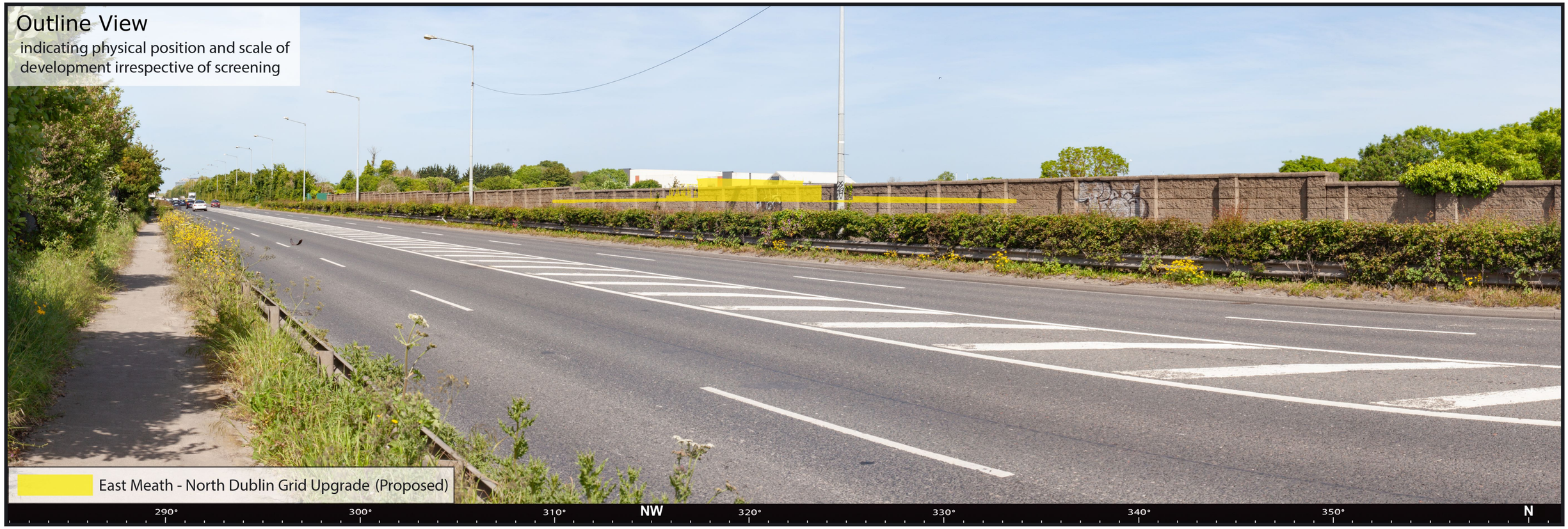
East Meath - North Dublin Grid Upgrade

Imagery depicting the view towards the site (Existing and Outline)

R139 regional road, Belcamp VP3





These are 80° panoramic montages captured and presented in accordance with the guidance set by the British Landscape Institute 2011 - Advice Note 01/11.

To view these panoramas on a flat surface one must move from left to right along its length whilst maintaining a perpendicular viewing direction and the specified correct viewing distance of 30cm. To see this entire panoramic scene in reality would necessitate turning one's head through 40°.

Easting (ITM):	719850	Lens:	50mm / Full Frame Sensor	Date:	29/05/2023
Northing (ITM):	741076	Camera:	Canon 1-D Mark II digital SLR	Time:	10:31
Direction of View	38° E of Grid North	Camera Height:	1.7m Above Ground Level		
Angle of View:	80°				

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East Meath - North Dublin Grid Upgrade

Imagery depicting the view towards the site (Existing and Outline) Sports Ground adjacent to N32 (Craobh Chiarain Hurling and Football Club) VP4

These are 80° panoramic montages captured and presented in accordance with the guidance set by the British Landscape Institute 2011 - Advice Note 01/11.

To view these panoramas on a flat surface one must move from left to right along its length whilst maintaining a perpendicular viewing direction and the specified correct viewing distance of 30cm. To see this entire panoramic scene in reality would necessitate turning one's head through 40°.

Easting (ITM):	719690	Lens:	50mm / Full Frame Sensor	Date:	12/06/2018
Northing (ITM):	741270	Camera:	Canon 1-D Mark II digital SLR	Time:	10:26
Direction of View	23° E of Grid North	Camera Height:	1.7m Above Ground Level		
Angle of View:	80°				

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East Meath - North Dublin Grid Upgrade Environmental Impact Assessment Report (EIAR): Volume 3

Appendix A18.2 – Arboricultural Assessment

EirGrid

March 2024

Contents

Appendix A18.2 – Arboricultural Assessment

1. Introduction

This Appendix presents the likely impacts of the East Meath - North Dublin Grid Upgrade (hereafter referred to as the Proposed Development) with respect to arboriculture, including the impact on trees, groups of trees and woodland. Hedgerows and associated potential impacts is considered in Chapter 10 (Biodiversity) in Volume 2 of this Environmental Impact Assessment Report (EIAR). The assessment should be read in conjunction with Chapter 4 (Proposed Development Description) in Volume 2 of this EIAR, with reference to the glossary of arboricultural terms included in Appendix A of this Appendix. This assessment should also be read in conjunction with Figure 18.2 to Figure 18.5 in Volume 4 of this EIAR.

Owing to the size of the survey area and the number of trees within it, and the anticipated low risk of impacts to many of those trees due to works taking place within the existing public road network, a proportional and focused assessment of the existing tree population was conducted. The assessment used a combination of a baseline dataset illustrating tree cover (based on Lidar and aerial imagery via the National Tree Map (NTM), provided by BlueSky International Ltd (2023)), and targeted site survey work to address limitations which could arise from sole reliance on using the data set in this way.

No topographical survey is currently available and therefore all tree locations have been located using Global Positioning System (GPS) and Lidar data, obtained from the NTM data. Stem location is based on the centre of an indicative circular canopy spread, so stem location is also subject to variation.

Land access was available for the majority of the proposed cable route during the ground truthing surveys. Where land was inaccessible and not visible from surrounding accessible vantage points total reliance on the NTM data has been required. Such areas were isolated and small in size and this is consistent with other large scale infrastructure projects where total land access is not fully available. Where areas of land could not be accessed during the walkover survey due to site conditions, lack of access points etc., trees were observed from adjacent accessible land.

The assessment of arboricultural impacts has been based on GIS data analysis using a range of assumptions and filters. As such, the assessment represents the likely potential impacts whilst adopting a precautionary approach. Some trees identified for removal may be able to be retained when further site-based detailed design is carried out. An example of this may be that trees shown as removed are located on a ditch feature that safely separates them from activities during the Construction Phase.

2. Methodology

2.1.1 Study Area

NTM data was purchased for a wide area of the Proposed Development. This represents a very large dataset which is useful to give context to the surrounding area when making route decisions. The specific NTM data analysis can be undertaken on any specific area of trees within the larger project area but to reduce data analysis effort for the purposes of this assessment, the study area was restricted to 30m (metres) on either side of the Planning Application Boundary which includes Temporary Construction Compounds, Horizontal Direction Drilling (HDD) Compounds, access points, permanent Joint Bays and temporary Passing Bays.

An overview of the Proposed Development including its routing and construction methodologies is included in Chapter 4 (Proposed Development Description) in Volume 2 of this EIAR.

A minimum buffer of 30m has been applied to all compound boundaries and the Planning Application Boundary to allow for the capture of any potential veteran trees which can have an uncapped root protection area (RPA) as per the British Standards Institution (BSI) British Standard (BS) 5837:2012 Trees in relation to design, demolition and construction – Recommendations (BSI 2012), and using the Ancient Tree Inventory (Woodland Trust 2021) of a stem diameter multiplier of 15 as opposed to the standard 12. For a veteran to have an RPA of 30m, it would have a diameter at breast height of 2m. Identifying a tree any larger than this is considered unlikely, therefore resulting in the 30m cap.

2.1.2 Relevant Guidelines, Policy and Legislation

The following legislation was considered:

- Number 30 of 2000 - Planning and Development Act, 2000 (as amended) - Provides for the making of Tree Preservation Orders (TPOs) by the Planning Authority where it is considered desirable to preserve trees on amenity grounds. This prevents the cutting down, topping, lopping or willful destruction of trees without the specific consent of the Planning Authority. Such TPOs do not apply to the cutting of trees which are dead or dying or have become dangerous, or to the cutting of trees in compliance with statutory obligations to prevent or abate nuisance; and
- Number 31 of 2014 - Forestry Act 2014 - Contains the main provisions for the felling of trees. Under this act it is an offence for any person to uproot or cut down any tree unless the owner has obtained permission in the form of a felling licence from the Forest Service, unless a relevant exemption exists.

The following policy was considered:

- Fingal County Council (FCC)Forest of Fingal, A Tree Strategy for Fingal – This document defines FCC's strategy for sustainable management of trees within Fingal County. It includes County specific guidance for how trees should be considered and protected during development (FCC 2023).

The following technical guidance was considered:

- BS5837:2012 Trees in relation to design, demolition and construction – Recommendations – Details the steps that should be taken to ensure that trees are appropriately and successfully retained when a development takes place (BSI 2012);
- National Joint Utilities Group (NJUG), Vol 4 Issue 2 – Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees – Technical guidance to guide the installation of underground services and allow them to co-exist with trees (NJUG 2007);
- BS3998:2010 Tree Work – Recommendations – Gives general recommendations for tree work. It gives guidance on management options for established trees (including soil care and tree felling) and overgrown hedges (BSI 2010);

- Ancient and other veteran trees: Further guidance on good management – Guidance for veteran tree classification and assessment (Ancient Tree Forum 2013);
- A guide for landowners to managing roadside trees – Guidance on the management of roadside trees in Ireland and the relevant legislation (Department of Agriculture, Food and the Marine and Tree Council of Ireland 2021);
- National Park and Wildlife Service (NPWS) – A Inventory of Ancient and Long-Established Woodland in Ireland – Gives details on the identification of veteran trees in Ireland using species and girth, which gives a specific Irish context to the application of the Ancient Tree Inventory Classification system (NPWS 2010);
- Tree Root Systems – Technical advice paper which considers the various factor influencing tree root growth (Arboricultural Advisory and Information Service 2015);
- The Influence of Soils and Species on Tree Root Depth, Information Note, Peter Crow – Technical advice paper which considers factor influencing tree root depth which is of relevance to buried utilities (Forestry Commission 2005);
- The Root Atlas, Central European forest trees and shrubs, Stocker – European study of tree species rooting depth and spread (Lore Kutschera, Erwin Lichtenegger 2002); and
- The Landscape Below Ground, Proceedings of an International Workshop on Tree Root Development in Urban Soils, International Society of Arboriculture P54-61- A Selection of technical papers which discuss tree root development and environmental influences on tree development (Watson and Neely 1995).

2.1.3 Appraisal Method for the Assessment of Impacts

2.1.3.1 Introduction

Data for the appraisal was collected via a two-stage process. Initially data was gathered from GIS datasets and other publicly available sources and subject to detailed GIS analysis. The analysed data was then subjected to ground truthing surveys by qualified arboriculturalists to check for accuracy and provide information which cannot be wholly gathered from desk-based work (in particular the identification of 'significant trees').

2.1.3.2 Desk-Based Assessment

Using NTM data as a baseline dataset, a desk-based GIS analysis was conducted. Several filters were applied to the data to categorise the existing tree stock within the study area. The NTM dataset contains a range of metadata that allowed this approach. For each individual tree record the NTM records:

- Location as co-ordinates;
- Maximum tree height;
- Canopy area as both an indicative circular canopy and as an actual canopy outline; and
- Approximate stem location based on maximum height.

Using the Jacobs Project Mapper GIS database, each NTM record was created as a unique item with an individual reference number. Tree height and tree canopy sizes were banded in size ranges commonly applied to tree inventory databases (Table 2.1 and Table 2.2). Each band was assigned a colour and a score. The combination of both score for height and canopy size was combined to give a total weighting score, which was also assigned appropriate colour scores (Table 2.3).

To keep the combined weighting score consistent with the preceding scoring bands, once added together, the combined score was divided by two to give an average and maintain a five tier banding structure using the same colour symbology.

Table 2.1: Tree Height Banding

Height Range	Weighting
<5m	1
5-10m	2
10-15m	3
15-20m	4
>20m	5

Table 2.2: Tree Canopy Size Banding

	Range (m^2)		
Radius (m)	Bottom	Top	Weighting
1 to 3	0	28.2743	1
3 to 6	28.2744	113.097	2
6 to 9	113.098	254.47	3
9 to 12	254.48	452.39	4
12+	452.4	upwards	5

Table 2.3: Combined Weighting Banding

Combined Score	Colour
1	
2	
3	
4	
5	

This produced a series of heat maps of trees based on height, canopy size and a combined weighting of both. This gives an indication of the location of the 'important' trees in the study area based on the assumption that taller and larger canopied trees will be the most valuable trees in terms amenity / biodiversity / carbon absorption and storm water interception (collectively referred to as ecosystem services, of which there are numerous) and also that taller, larger canopied trees, in general, are older trees (with some species related exceptions). On all the heat mapping plans, trees in the 'darkest' colours are likely to be trees of greatest importance in the study area.

There is a risk that when using this methodology, a very tall tree with a small canopy or a short tree with very large canopy is underrepresented. While such trees would be very unusual, a review of the data indicated that no records fell into either category after scoring was completed.

2.1.3.3 Root Protection Area Mapping

The RPA of any given tree is the area of ground around that tree which should not be disturbed by excavation, compaction, changes in level or other construction / demolition operations. The extent of the RPA is calculated in accordance with BS5837:2012 Trees in relation to design, demolition and construction – Recommendation (BSI 2012), and is an important metric for understanding the impact a proposal will have on tree removal and retention and how to protect those trees retained.

It is well known that there is a strong relationship between tree height and stem diameter. While this can be influenced by many factors including climate and soils, for the purpose of the desk-based assessment, a ratio of 0.65 was selected. Using this, all trees in the dataset for the study area were assigned an approximate / indicative RPA as calculated as per BS5837:2012 Trees in relation to design, demolition and construction – Recommendation (which is 12 x stem diameter measured at 1.5m from ground level). The majority of available studies on the relationship between tree height and stem diameter have been carried out in the United States of America on forestry trees. Therefore, the RPA generated in this way is likely to underestimate the stem diameter of an open grown tree in Ireland. To allow for this, a second RPA was applied to the NTM indicative circular tree canopies. This was applied as a 2m buffer on the outside of the canopy.

It is a common misconception that tree roots are confined to the canopy drip line of the tree. Numerous studies, as well as in the BS5837:2012 Trees in relation to design, demolition and construction – Recommendation guidance, make it clear that this is not always the case. By applying a 2m buffer, it is considered reasonable that the majority of average tree RPAs will be represented. Tree root morphology is complicated, and few trees grow perfectly circular root systems as calculated by BS5837:2012 Trees in relation to design, demolition and construction – Recommendation. An RPA provides a notional circular buffer around a given stem based on the stem diameter taken at 1.5m. However, this is not necessarily representative of a tree root system, for example, the roots may extend beyond the RPA boundary on one side and remain inside it on the opposite. The root network extent is dependent on many factors including species, age, soil conditions, topography and exposure etc. The assessment has not taken consideration of these above and shows RPAs as an indicative circular form. The two RPAs applied to the individual trees represent what would be reasonably expected to be a maximum and minimum RPA of the trees, with a few notable exceptions, which are discussed in Section 2.1.3.4.

Trees have a finite reserve of energy, produced (and excess stored) each year, throughout the spring / summer seasons, which is utilised for biological processes such as growth and defence against pests or diseases.

Any scheme in proximity to trees has the potential to cause harm to those trees unless control measures are identified and acted upon. As such, it is essential to consider the relationship between the Proposed Development and the retained trees to identify what precautions are necessary and proportionate. The Proposed Development has the potential to impact upon the above ground (canopy, stems and branches) and below ground (rooting environment) parts of the trees.

Whilst some clear and obvious physical damage can occur to trees during the Construction Phase, such as to stems and branches, other impacts are not always so immediately evident, such as damage to the soil structure by compaction and / or changes in ground levels causing root damage, altering the water table and affecting moisture availability.

This assessment recognises that activities during the Construction Phase pose a real and significant threat and assesses the likely impacts of the proposals on the tree stock and, where appropriate, provides mitigation with the view of achieving a harmonious relationship between the trees and the built form.

2.1.3.4 Identifying trees of Significance

Using the weighting system, 'significant' trees are identified through colour coding. However, a desk-based survey runs a high risk of missing 'significant' trees when the assessment criteria is based purely on size metrics.

A significant tree is considered to be:

- An ancient, veteran or notable tree, assessed as per Ancient Tree Inventory (Woodland Trust 2021) (that is a tree of great age for the species, of great girth for the species and exhibiting veteran tree features.);
- Large mature tree (or cohesive groups of trees, and woodland) which would be considered A category under BS5837:2012 Trees in relation to design, demolition and construction – Recommendation (BSI 2012) (Appendix B contains BS5837:2012 categorisation description);
- A tree notable for its ecological / cultural or historical significance, these are likely (but not exclusively) to be found on townland boundaries;
- Ecologically important trees; and
- Trees covered by TPOs.

A TPO check was conducted in County Meath (Meath County Council (MCC) 2021) and Fingal (FCC 2021) and no TPOs were identified in the study area.

The Woodland Trust maintains the Ancient Tree Inventory which is an online resource which records notable veteran and ancient trees across the United Kingdom and Ireland. This inventory was checked and no records were identified in the study area (Woodland Trust 2021). The Heritage Trees of Ireland was checked for any records within the study area and none were found (National Biodiversity Data Centre 2023). Neither database is a definitive record and a lack of records on either database does not necessarily mean no veteran trees are within the study area.

A desk-based only tree survey has a number of inherent risks. One of the greatest risks is missing veteran trees, as the application of the above filters would potentially miss veteran trees which often have very large stems but can have small canopies due to crown retrenchment and senescence caused by great age. There is also a more general risk across the study area that for whatever reason a tree has a large stem diameter but is low in height.

Townland boundaries are some of the oldest features in the Irish countryside. They are based on the Gaelic landholding system which predated the Anglo Norman period (11th century AD onwards). Many townland boundaries incorporate earlier topographical and landscape features. Therefore, it is feasible that these features may contain trees of significant age. Townland boundaries are included in the Ordnance Survey Ireland Prime2 dataset. The townland data set was added to the GIS database to help inform ground truthing survey works.

Due to the timing of the assessment works, significant ecological surveying had been carried out prior to the arboricultural assessments being undertaken (see Chapter 10 (Biodiversity) in Volume 2 of this EIAR). Of particular relevance were bat surveys which recorded tree roost features. Tree bat roost features are commonly found on older trees and importantly veteran trees. Bat tree roost data was overlaid upon the arboricultural survey area data to look for overlapping features which could indicate veteran or other 'significant' trees.

2.1.3.5 Ground Truthing Survey

Ground truthing walkover surveys were carried out by qualified Jacobs arboriculturalists between 16 August 2023 and 19 August 2023. The purpose of this survey was to check the whole study area for 'significant' trees which may have been missed due to the limitations of the desk-based survey.

The arboriculturalists based their assessment of potential veteran (ancient and notable) trees on the guidance provided by the Ancient Tree Forum and the Woodland Trust, specifically the document Practical Guidance, Ancient Tree Guide 4: What are ancient, veteran, and other trees of special interest, November 2008, Woodland Trust (Woodland Trust 2008) and the species-specific guidance on the Ancient Tree Inventory website (Woodland Trust 2023).

Field surveys were conducted using mobile data collection apps generated using ESRI Field Maps. Data was geo-located using the smart devices internal GPS and cross-referenced against the NTM which was displayed as a reference layer in the data-driven map. Using this information, individual 'significant' trees were surveyed as well as a small sample of NTM trees to check the accuracy of the data contained in that data base. The information was then analysed and visualised in ArcGIS Pro. Survey data was handled in accordance with Jacobs Geospatial Information Management Plan standards. Target notes were used to identify areas of significant arboricultural features or arboricultural considerations for the Proposed Development. The ground truthing element found that the desk-based analysis and the underlying NTM data was reliable.

3. Baseline Environment

No TPOs were identified in the study area.

The survey area is predominantly rural with the majority of the trees confined to boundary features and occasional small copses. The most dominant tree species is ash (*Fraxinus excelsior*) which make up in the region of 80% of all the trees in the study area. Beech (*Fagus sylvatica*) is found in limited numbers (in the region of 10%), significantly often associated with townland boundaries and roadside planting. The remaining 10% of tree species is a mix of willows (*Salix spp.*), oak (*Quercus spp.)*, alder (*Alnus spp.*) and occasional other broadleaved and conifer species.

Few large mature trees were encountered within the study area and in general the tree stock is mid-aged trees, with some younger material growing within the hedges. Due to the dominance of ash trees within the study area, tree health was noticeably poor with large swathes of the trees infected with Ash Die Back (ADB).

ADB also known as Chalara or Chalara dieback of ash, is a disease of ash trees caused by a fungus called *Hymenoscyphus fraxineus*. ADB causes leaf loss, crown dieback and bark lesions in affected trees. Once a tree is infected the disease is usually fatal, either directly or indirectly by weakening the tree to the point where it succumbs more readily to attacks by other pests or pathogens, especially *Armillaria* fungi, or honey fungus.

It has caused widespread damage to ash populations in continental Europe, where experience indicates that it can kill young ash trees quite quickly, while older trees can resist it for some time, until prolonged exposure or another pest or pathogen attacking them in their weakened state, eventually causes them to succumb.

Evidence from other parts of Europe and the United Kingdom suggest that infected trees rapidly lose structural integrity and are more prone to branch shedding and total collapse. Furthermore, ash, as a species is known for its inability to retain even small deadwood, which it sheds regularly as it appears in the crown. Storm Betty passed through the study area on 19 August 2023, during the site survey work, and it was noticeable how much damage was sustained by the infected roadside trees, with a huge amount of material down on roads throughout the area.

The Tree Council has produced a document giving guidance on how to deal with ADB to tree owners and managers, 'Ash dieback: an Action Plan Toolkit (Summer 2019)' (The Tree Council 2019). This excellent document gives guidance on assessing the danger posed by the trees infected by ADB. As suggested in the document, the Suffolk County Council Ash Health Assessment System has been adopted. The system categorises ash trees with the symptoms in four categories:

- Ash Health Class (AHC) 1 – 100 – 75% Canopy healthy (Vitality Class 0);
- Ash Health Class (AHC) 2 – 75% -50% Canopy healthy (Vitality Class 1);
- Ash Health Class (AHC) 3 – 50% - 25% Canopy healthy (Vitality Class 2); and
- Ash Health Class (AHC) 4 – 25% - 0% Canopy healthy (Vitality Class 3).

The above system has been used in target notes for the survey, but in general almost all the trees were at least AHC2.

Many of the large individual trees recorded within this survey, as well as groups and woodlands are located within areas of farmland which is subjected to a range of agricultural practices. Regular ploughing and associated sub-soiling are common practice in many areas, and this often occurs close to the stems of large established trees, well within the theoretical RPA calculated by BS5837:2012. Some sub-soilers operate at depth of up to 60cm below the surface, regular ploughs in the region of 12 to 35cm. There is little research done on the impact of such practices on tree root profile, but in many cases the trees affected appear to suffer few adverse impacts. It can be assumed that regular ploughing and sub soiling leads to a deeper rooting profile, and that the rhizosphere is much better adapted to the effects of trafficking from heavy vehicles and equipment. Field trees are generally also significantly crown lifted to allow large farm machinery

to pass below them. This has been taken into consideration when assessing the requirement for tree removals and protection for such trees.

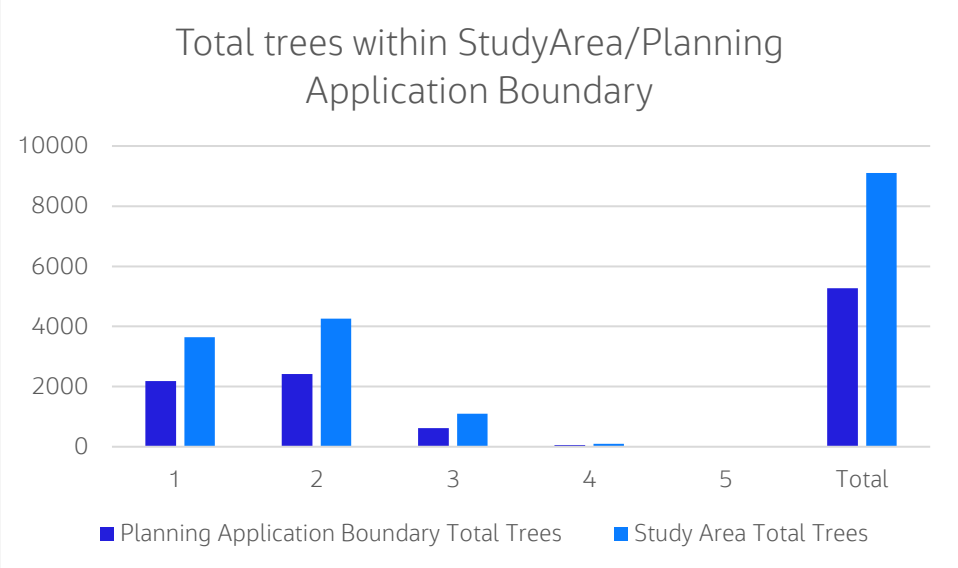
Deep ditches, both dry and carrying water, are also a significant feature of the survey area. Such ditches create an effective root barrier to any trees growing alongside them, and it would not be expected to encounter tree roots on the opposite side of a ditch to which the tree is growing.

Much of the proposed cable route is along surfaced roads. Tree roots need uncompacted soils to grow within and survive, and important element being access to oxygen. Forestry Commission research has found that tree roots do not occur in significant quantities at substantial depths (e.g. more than 2m) in the soil profile (Forestry Commission 2005). There are cases where isolated roots have been found at depths much greater than this, in deep and loose soils (Gilman 1990). However typically between 90 and 99% of a tree's total root length occurs in the upper 1m of soil. All the roads in the study area appears to be of substantial construction and it is considered unlikely they will contain significant rooting from roadside trees, due to the harsh rooting environment they represent.

Table 3.1 and Graph 3.1 show the number of the trees by weighting in both the study area and the Planning Application Boundary.

Table 3.1: Total Trees Within Study Area/Planning Application Boundary

Combined Score	Planning Application Boundary Total Trees	Study Area Total Trees
1	2181	3644
2	2422	4259
3	618	1099
4	50	99
5	1	2
Total	5272	9103



Graph 3.1: Total Trees Within Study Area / Planning Application Boundary

Figures are included in Volume 4 of the EIAR. Figure 18.2 presents trees graded by canopy size, Figure 18.3 presents trees graded by height, and Figure 18.4 presents trees by combined score weighting.

Generally speaking, the higher scoring trees can be considered the most important due to the numerous benefits they deliver increasing with size. Trees with the lower scores are conversely less important in terms of ecosystem and amenity benefits but in most cases represent younger trees which are an essential cohort of

any tree population as they provide the replacement trees as the upper age classes of the population age and die. As such, it is difficult to attribute an arbitrary level at which loss of certain trees of a weighting score of a set amount are less significant than others. Younger trees can more easily be replaced than older trees, as can 'smaller' trees than 'bigger' trees in so far as it takes less time to replace a 10 year old tree than a hundred year old tree. As a generalisation, the loss of trees with a score of 2 or less is of less significance than the higher scoring trees.

Assessing the impact of larger schemes is therefore better considered as canopy area loss rather than individual trees, as the importance of the collective often far outweighs the importance of the individual.

Significant Trees

The features detailed in Table 3.2 were highlighted as 'significant', during the site survey walk over survey.

Table 3.2: Significant Tree Features

Approximate Chainage	Target Note/ Area Reference	Feature Description	Notes
1,000	TN1	Three large mature trees in hedgerow, tree furthest south is on a townland boundary.	2 beech trees and 1 ash all with stem diameters of 800mm plus (southernmost beech 1000mm). Significant mature trees growing in a hedgerow, all in good health and condition. Would be considered A category in BS5837:2012 (BSI 2012).
1,550	TN2	Hedgerow along ditch with larger mature trees.	Hedgerow recently reduced significantly. Mature as in poor condition AHC2/3. Beech trees growing from very large coppiced stools within bank, which suggest considerable age.
2,400	TN3	Linear row of mature beech trees.	Growing on the east side of a deep TLB ditch a row of mature beech trees in good condition and health, reasonable to age at 100 years+, possibly regrowth from previously cut stumps. Would be considered A category in BS5837:2012.
3,050	TN4	Linear feature of large ash trees.	Large ash trees (600mm dbh) mainly growing on east of ditch. Significant trees, but all suffering from advanced ADH (AHC 3/4).
28,700	TN5	Linear feature of roadside beech.	4 large roadside beech (average 600mm dbh) in prominent location. Trees in good health and vigour. Would be considered A category in BS5837:2012 (BSI 2012).

Canopy Area

Canopy area is an important metric and one used by Governments to set targets for both tree planting and to limit deforestation. The Department of Agriculture, Food and the Marine Forest Statistics calculated that 11% of the total land area of Ireland is forestry (which includes some open land but is used here to represent canopy cover) (The Department of Agriculture, Food and the Marine 2022). This compares with an average 33.5% at European Union (EU) level and 30% globally.

The same report also calculated canopy cover of 'hedgerows and trees outside of the forest (HSW)'. This concluded that these features made up 6.4% of land coverage (and excluded open areas, so are more representative of canopy cover). The study area contained little 'forestry' or 'woodland', therefore, the HSW figures are considered the most relevant when considering canopy cover and impact in this assessment.

Within Meath HSW covered 14,000ha (of land area) or 8.3% and within Dublin 5,000ha (of land area) or 5.4% (it is assumed that Dublin in Table 2 of the Forest Statistics Report can be substituted for Fingal, which does not appear in the table). Therefore, the proposed cable route will pass through two counties with above average and below average canopy cover (of HSW).

Canopy area was calculated for the study area by merging all overlapping canopies of trees only to give a combined canopy area of 46ha (See Table 3.3). This equates to a canopy cover of 12% of land area within the study area. 12% is higher than both the county results in the Forestry Statistics, and is higher than the national average (noting that this figure may have been calculated using a different methodology to the Forest Statistics figure as is disregards 'hedgerows').

Table 3.3: Canopy Areas

County	Land Area within Planning Application Boundary (ha)	Canopy Area Within Planning Application Boundary (ha)	Canopy Cover of Planning Application Boundary (as % of Land Area)	Land Area Within the Study Area (ha)	Canopy Area Within the Study Area (ha)	Canopy Cover of the Study Area (as % of Land Area)
Meath	70.56	15.72	22%	201.13	25.70	12.7%
Fingal	71.44	11.60	16%	182.06	20.28	11.1%
Total	141.99	27.32	19%	383.2	46	12%

4. Potential Impacts

4.1.1 Construction Phase

Due to the scale of the Proposed Development and the current stage of design maturity, certain assumptions have been made to assess the impact on trees within the study area. It should be noted that there are many variables which will need to be considered when deciding on the actual removals required. Therefore, the figures presented in this Section represent a precautionary approach (where all at risk trees will require removal), and with further design work could be reduced.

Assumptions for the assessment of removals:

- The 2m indicative maximum RPA was used for the initial assessment. The initial assessment was reassessed through an iterative process of specialist review, which used a combination of site survey target notes, the maximum and minimum RPAs and imagery;
- In off-road sections, a 15m construction corridor is required either side of the proposed cable route and any trees within this corridor will require removal;
- Trees located within the Planning Application Boundary will require removal to facilitate construction activities. The exception to this is where trees are located parallel to the construction corridor, where it is likely that the Construction Phase activities can be undertaken in such a manner that impacts on the trees are limited. When a tree is located outside of the Planning Application Boundary but with more than 20% of the RPA located within the Planning Application Boundary, it will require assessment by an arboriculturalist to determine if it can be retained. Previous iterations of BS5837:2012 Trees in relation to design, demolition and construction – Recommendation (BSI 2012) accepted that in the region of 20% of a tree's RPA could be removed with minimal impacts and the severity of the root damage. The arboriculturalist will need to assess severity of root damage, health of the tree, and potential working practices to determine if a tree can be safely retained or requires removal. These trees have been recorded as 'at-risk' in the assessment;
- Unless trees are located centrally within a Temporary Construction Compound / Horizontal Directional Drilling (HDD) Compound, suitable offsets can be maintained, and trees retained. For each Temporary Construction Compound, a site access will be required, which may require tree removals. Temporary Construction Compound access planning has not been completed at this stage, so indicative removals have been included in the figures;
- On in-road sections, if the proposed cable route and Joint Bay is located within 'blacktop' (the bitumen sealed running surface of the road) then there will be no impact on surrounding trees for the reasons previously discussed;
- Where the proposed cable route leaves the blacktop and moves into the verge, then the same filters applied to the off-road sections have been used. Total loss within Passing Bays has been assumed;
- In off-road sections, where the Proposed Development crosses a hedgerow, the construction activity will be carried out in such a manner that a reduced working width is utilised, minimising tree and hedgerow loss;

- Where access track routing information is available, this has been used to inform removals. Current design guidance is for a 15m clear strip to be applied; and
- In off-road sections, ditches form important tree protection barriers from construction activity. Where possible, removals have been adjusted to take account of physical root barriers which mean the Construction Phase will have minimal impact on trees.

Based on these assumptions, a GIS desk-based assessment (with iterative refinements) was made on the removals required to deliver the Construction Phase of the Proposed Development. The numbers of trees, by weight banding are presented in Table 4.1 and also indicated on the Tree Removal and Retention Plans (Figure 18.5 in Volume 4 in this EIAR). These have been produced at this stage for illustrative purposes to visually demonstrate a precautionary scenario of potential tree removals required to deliver the Construction Phase of the Proposed Development. These are not definitive vegetation removal plans and will require further refinement.

Out of a total of 9,103 trees within the study area, 512 will be required to be removed (5% of all the trees). A further 662 trees are at-risk in the study area (7% of all trees). In a precautionary scenario, where all at-risk trees will be required to be removed, 1,174 trees will need to be felled, representing 12% of the total trees within the study area.

Table 4.1: Tree Loss by Accumulated Weight

Accumulated Weight	Trees at-risk	Trees Removed	Trees Retained	Grand Total
1	297	222	3,125	3,644
2	314	244	3,701	4,259
3	49	41	1,009	1,099
4	2	5	92	99
5	0	0	2	2
Grand Total	662	512	7,929	9,103

While Table 4.1 presents the impacts as numbers of trees, a more useful metric for considering tree loss on a project of this scale is canopy cover. Table 4.2 shows canopy loss within the study area (as some removals may fall outside of the Planning Application Boundary). Based on the above removal calculations, 2.63ha of canopy cover will be lost in the study area, with a further 3.26ha at-risk. In a precautionary scenario, if all the at-risk trees have to be removed, 5.89ha of canopy will be lost. The resulting canopy cover in the study area will be 10% (from its current 12%). If all of the at-risk trees could be retained, the resulting canopy cover of the study area would be 11%.

Table 4.2: Canopy Loss

	Canopy Area Lost Within Study Area	Remaining Canopy Area Within Study Area	Canopy Area 'At Risk' in Study Area
Area in Ha	2.63	43.35	3.26

The precautionary scenario for canopy cover removal (i.e., all of the at-risk trees are removed) would still leave the canopy cover of the study area (10%) higher than the canopy area of both Meath (5.9%) and Fingal (Dublin) (6.5%) as reported in the 2022 Forest Statistics Report, though lower than the national average of 11% (The Department of Agriculture, Food and the Marine 2022).

The impact on significant trees is summarised in Table 4.3.

Table 4.3: Impact on Significant Trees

Chainage	Target Note/ Area reference	Feature Description	Impact from Proposed Development
1000	1	Three large mature trees in hedgerow, tree furthest south is on a TLB.	At-risk, likely to be able to be retained with protective measures and adoption of Arboricultural Method Statement.
1550	2	Hedgerow along ditch with larger mature trees.	At-risk, but damage unlikely due to presence of ditch. Potentially some pruning may be required, but unlikely.
2400	3	Linear row of mature beech trees.	Retained.
3050	4	Linear feature of large ash trees.	At-risk, with some removals required of trees on works (west) side of ditch.
28700	5	Linear feature of roadside beech.	One tree removed and three retained, with protective measures.

4.1.2 Operational Phase

Once the Construction Phase is complete, there should be no direct further requirements for the removal of trees during the Operational Phase of the Proposed Development. A permanent easement of 5m will generally be required above the area of the proposed cable trench. This will be increased on certain land holdings for proposed permanent access tracks and Joint Bays and the section of the proposed cable route between Woodland Substation and the R156 Road and the section of the proposed cable route between the M1 Motorway and Belcamp Substation, or other infrastructure features that require permanent surfaced access. There will be limited opportunity for the replacement of trees lost, therefore the losses identified in the Construction Phase are considered permanent.

An indirect need to fell additional trees may be created by the prevalence of infected ash trees within the study area. As the current tree stock declines further due to the effects of the disease, felling of dead and dangerous trees may be required to ensure the safety of personnel accessing elements of the new infrastructure. This felling will be the responsibility of the landowner upon which the trees are located and is necessary as part of their duty of care to persons on their land and neighbours.

5. Mitigation and Monitoring Measures

5.1.1 Construction Phase

The early desk-based GIS analysis of the existing tree stock, including the generation of indicative RPAs and subsequent site surveys to identify significant trees has fed into iterations of the development of the proposed cable route and its various elements. This means there has been an effort at this current design phase to design out impacts on trees, where possible. Figure 18.5 included in Volume 4 of this EIAR presents a Tree Removal and Retention Plan.

The main element of any AMS is the protection of unmade (that is not protected by a loadbearing surface) RPAs by suitable buffers protected by suitably robust tree protection fencing or other barriers. On linear infrastructure schemes such barriers can often be formed by soil berms. Such schemes often require the pruning of retained trees, and such pruning schedules and specifications will be produced by a qualified arboriculturalist, in line with BS 3998:2010. Trees Work – Recommendations (BSI 2010), and carried out by qualified arboricultural contractors. In this way, any tree pruning will not have a detrimental impact on the trees.

Appendix C of this Appendix contains a Generic AMS which sets out the general principles of the methodology that will be adopted on the Proposed Development, where appropriate. The Generic AMS specifies generic tree protection measures to protect retained trees on-site.

The following mitigation measures will be implemented during the detailed design stage:

- A Project Arboriculturalist will be appointed by the Electricity Supply Board (ESB) to provide relevant additional input to be addressed at appropriate points;

- The Generic AMS (Appendix C of this Appendix) will be reviewed and updated into a site-specific AMS to provide appointed contractors with details on how specific operations need to be performed to protect trees including use of exclusion zones and ground protection; and
- A Tree Protection Plan will be produced providing schematic details of how protective fencing will be installed and any other pre-planned targeted tree protection measures.

In addition, at the detailed design stage, a locally reduced separation between adjacent cable circuits (CP0966 development, under An Bord Pleanála planning reference number 316372, and the Proposed Development) will be considered at the following key locations to reduce the potential impact on adjacent trees:

- Chainage 0,950 to Chainage 1,100;
- Chainage 1,450 to Chainage 1,650;
- Chainage 2,350 to Chainage 2,500; and
- Chainage 3,050 to Chainage 3,150.

This will allow a greater setback between the Proposed Development cable circuit and the adjacent field boundary. Areas of land between the cable circuit and field boundary will also be fenced off and will not be trafficked by heavy plant or machinery.

The following mitigation measures will be implemented during the Construction Phase:

- The site-specific AMS and Tree Protection Plan will be implemented as soon as works begin on-site;
- As far is reasonably practicable, all cable installation works, particularly in the existing road surfaces will adhere to Volume 4 of the Guidance for The Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees is a widely adopted document within the utilities sector (NJUG 2007);
- The Project Arboriculturalist will be retained to advise and resolve any unforeseen tree related issues which might occur and to provide general tree related advice; and
- On-site monitoring will be undertaken at agreed intervals before and during the Construction Phase (this will be achieved through a combined effort between the ESB and the appointed contractor) to ensure protection measures and the site-specific AMS are being implemented correctly.

EirGrid has identified precedence from Germany and the Netherlands, and for safely planting certain shrubs over High Voltage (HV) underground cables, EirGrid has engaged closely with the ESB, and relevant Dutch and German Transmission System Operators across Europe, to understand feasibility of planting over HV underground cables in Ireland. A Draft Over Cable Planting Strategy is in advance development in consultation with the ESB, for which the Design Risk Assessment was ongoing at time of writing (including calculations to assess a possible cable de-rating). The draft strategy combines the requirement for a minimum cable burial depth of 1m (to top of Cement Bound Granular Mixture in the cable trench), use of a high performing Root Barrier Membrane, and a strictly defined shrub species list with known maximum root depths less than 1m. It is possible the Design Risk Assessment may conclude that over cable planting cannot be delivered while guaranteeing cable performance and security. There are also risks that the strictly defined shrub species list is not compatible with landowner farm boundary requirements and / or agricultural farm payments. As such, applying a precautionary principle, in this assessment off-site compensatory planting is assumed for all permanent losses within the easement.

Subject to consent, the compensatory planting will commence in advance of, or in parallel with, the Construction Phase. EirGrid has identified candidate sites in County Meath and Dublin in consultation with a charity partner, who provides compensatory planting options on third-party lands. Whether these candidate sites or other sites are used for compensatory planting, there will be no planting in semi-natural habitats of significant ecological value, which will be verified by the Ecologist employed by the compensation supplier. The off-site compensatory planting will be entirely outside the Planning Application Boundary. A minimum of

130% off site compensatory planting will be delivered by the Developer (ESB), in consultation with EirGrid. The surplus will deliver an overall biodiversity net gain.

5.1.2 Operational Phase

There are no anticipated direct impacts on the retained trees along the route of the Proposed Development during the Operational Phase, and therefore, no specific mitigation is identified.

6. Residual Impacts

6.1.1 Construction Phase

Potential tree removals required to deliver the Construction Phase of the Proposed Development are discussed in Section 4.1.1 and shown on Figure 18.5 in Volume 4 in this EIAR. Out of a total of 9,103 trees within the study area, 512 will be required to be removed (5% of all the trees). A further 662 trees are at-risk in the study area (7% of all trees). In a precautionary scenario, where all at-risk trees will be required to be removed, 1,174 trees will need to be felled, representing 12% of the total trees within the study area. Of the five significant tree 'features' identified during the survey, one can be retained, three are at-risk, and one requires partial removal. It is expected to be able to retain the at-risk 'features' with the implementation of mitigation measures during the Construction Phase. There will be limited opportunity for the replacement of trees lost, and therefore, the losses identified in the Construction Phase are considered permanent.

The new proposed cable route will require specific easements for the safe operation of the cable and for future maintenance. A permanent easement of 5m will generally be required above the area of the proposed cable trench. This will be increased on certain land holdings for proposed permanent access tracks and Joint Bays and the section of the proposed cable route between Woodland Substation and the R156 Road and the section of the proposed cable route between the M1 Motorway and Belcamp Substation, or other infrastructure features that require permanent surfaced access.

At the time of writing, The EirGrid Functional Specification for Underground Cables (EirGrid 2021) stated:

> "*The easement area shall be cleared, and kept clear, of trees and other vegetation with deep root systems as these may damage the cable*".

All planting from the edges of the easement to the edges of the Planning Application Boundary will be replanted.

A Draft Over Cable Planting Strategy is under development for restricted low shrub planting within the cable easement, including the use of a high performing Root Barrier Membrane. This Draft Planting Strategy is undergoing Risk Assessment, in conjunction with a review of international best practice. If approved, by EirGrid and the ESB, the Draft Planting Strategy would complement the commitment to off site compensatory planting for permanent hedgerow loses within the footprint of permanent surfaced areas. The risk assessment may conclude that easement planting cannot be delivered while guaranteeing cable performance and security. Therefore, applying a precautionary principle in this assessment, off site compensatory planting is assumed for all permanent losses within the easement (refer to Section 10.5 in Chapter 10 (Biodiversity) in Volume 2 of this EIAR.

Any residual impact will be distributed across the proposed cable route within Fingal and Meath.

6.1.2 Operational Phase

No residual impacts have been identified during the Operational Phase.

7. Conclusion

The Proposed Development will require the removal of 2.63ha of canopy area, with a further 3.26ha of canopy at-risk of removal. This would lead to a reduction of the canopy area within the study area from its present 12% to 11% if all at-risk trees can be retained, or to 10% if all at-risk trees are removed.

Out of a total of 9,103 trees within the study area, 512 will be required to be removed (5% of all the trees). A further 662 trees are at-risk in the study area (7% of all trees). In a scenario where all at-risk trees are required to be removed, 1,174 trees will need to be felled, representing 12% of the total trees within the study area. Of the five significant tree 'features' identified during the survey, one can be retained, three are at-risk, and one requires partial removal. It is expected to be able to retain the at-risk 'features' with the implementation of mitigation measures during the Construction Phase.

The implementation of a site-specific AMS and associated Tree Protection Plans will minimise any impact on retained trees and significantly reduce the number of at-risk trees which require removal.

Due to the easement requirements of the proposed cable trench and other aspects (including new permanent access tracks and off-road Joint Bays), the tree loss identified above is permanent.

EirGrid has identified precedence from Germany and the Netherlands, and for safely planting certain shrubs over HV underground cables, EirGrid has engaged closely with the ESB, and relevant Dutch and German Transmission System Operators across Europe, to understand feasibility of planting over HV underground cables in Ireland. A Draft Over Cable Planting Strategy is in advance development in consultation with the ESB, for which the Design Risk Assessment was ongoing at time of writing (including calculations to assess a possible cable de-rating). If adopted, the Draft Over Cable Planting Strategy would allow more planting and reduce the loss of hedgerows.

EirGrid has identified candidate sites in County Meath and County Dublin in consultation with a charity partner, who provides compensatory planting options on third-party lands. A minimum of 130% compensatory off site planting will be delivered by the Developer (ESB), in consultation with EirGrid. The surplus will deliver an overall biodiversity net gain.

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Directives and Legislation

Number 30 of 2000 - Planning and Development Act, 2000 (as amended)

Number 31 of 2014 - Forestry Act 2014

Appendix A. Comprehensive Glossary of Arboricultural Terms

- Ancient tree: An ancient tree is exceptionally valuable attributed with great age/size/cultural heritage/biodiversity value as a result of significant wood decay and the habitat created from the ageing process. All ancient trees are veteran trees with very few trees of any species reaching the ancient life-stage.
- Bark: A term usually applied to all the tissues of a woody plant lying outside the vascular cambium.
- Buttress zone: The region at the base of a tree where the major lateral roots join the stem, with buttress-like formations on the upper side of their junction.
- Canker: A lesion formed by the death of bark and cambium often due to fungal or bacterial infection.
- Condition: An indication of the physiological vitality of the tree. Where the term 'condition' is used in a report, it should not be taken as an indication of the stability of the tree.
- Construction exclusion zone: Area based on the Root Protection Area (in square metres) to be protected during development, by the use of barriers and/or ground protection.
- Crown/Canopy: The main foliage bearing section of the tree.
- Crown lifting: A term used to describe the removal of limbs and small branches to a specified height above ground level.
- Deadwood: Branch or stem wood bearing no live tissues. Retention of deadwood provides valuable habitat for a wide range of species and seldom represents a threat to the health of the tree. Removal of deadwood can result in the ingress of decay to otherwise sound tissues and climbing operations to access deadwood can cause significant damage to a tree. Removal of deadwood is generally recommended only where it represents an unacceptable level of hazard.
- Dieback: The death of parts of a woody plant, starting at shoot-tips or root-tips.
- Diameter at Breast Height (DBH): Stem diameter measured at a height of 1.5 metres (UK) or the nearest measurable point. Where measurement at a height of 1.5 metres is not possible, another height may be specified.
- Habit: The overall growth characteristics, shape of the tree and branch structure.
- Hazard beam: An upwardly curved part of a tree in which strong internal stresses may occur without being reduced by adaptive growth; prone to longitudinal splitting.
- Minor deadwood: Dead wood of a diameter less than 25mm and or unlikely to cause significant harm or damage upon impact with a target beneath the tree.
- Notable: Notable trees are usually mature trees which may stand out in the local environment because they are large in comparison with other trees around them
- Pollarding: is the removal of the tree canopy, back to the stem or primary branches. Pollarding may involve the removal of the entire canopy in one operation or may be phased over several years. The period of safe retention of trees having been pollarded varies with species and individuals. It is usually necessary to re-pollard on a regular basis, annually in the case of some species.
- Primary branch: A major branch, generally having a basal diameter greater than 0.25 x stem diameter.
- Pruning: The removal or cutting back of twigs or branches, sometimes applied to twigs or small branches only, but often used to describe most activities involving the cutting of trees or shrubs.
- Root protection area (RPA): An area of ground surrounding a tree that contains sufficient rooting volume to ensure the tree's survival, calculated with reference to Table 2 of BS5837 (2005).
- Snag/stub: In woody plants, a portion of a cut or broken stem, branch or root which extends beyond any growing-point or dormant bud; a snag usually tends to die back to the nearest growing point.
- Stem/s: The main supporting structure/s, from ground level up to the first major division into branches.
- Topping: In arboriculture it is the removal of the crown of a tree, or of a major proportion of it.
- Tree Preservation Order (TPO): Is an order made by the local authority and placed upon individual trees, groups of trees or areas of trees. The local authority must usually grant permission prior to any works undertaken to affected trees.
- Veteran tree: A loosely defined term for an old specimen that is of interest biologically, culturally or aesthetically because of its age, size or condition and which has usually lived longer than the typical upper age range for the species concerned.

Appendix B. BS5837:2012 Table 1 Cascade Chart for Tree Quality Assessment

Extract from BS5837:2012 Trees in relation to design, demolition, and construction – Recommendations

Table 1 **Cascade chart for tree quality assessment**

Category and definition	Criteria (including subcategories where appropriate)			Identification on plan
Trees unsuitable for retention (see Note)				
Category U Those in such a condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years	• Trees that have a serious, irremediable, structural defect, such that their early loss is expected due to collapse, including those that will become unviable after removal of other category U trees (e.g. where, for whatever reason, the loss of companion shelter cannot be mitigated by pruning) • Trees that are dead or are showing signs of significant, immediate, and irreversible overall decline • Trees infected with pathogens of significance to the health and/or safety of other trees nearby, or very low quality trees suppressing adjacent trees of better quality *NOTE Category U trees can have existing or potential conservation value which it might be desirable to preserve; see **4.5.7**.*			See Table 2
	1 Mainly arboricultural qualities	**2 Mainly landscape qualities**	**3 Mainly cultural values, including conservation**	
Trees to be considered for retention				
Category A **Trees of high quality** with an estimated remaining life expectancy of at least 40 years	Trees that are particularly good examples of their species, especially if rare or unusual; or those that are essential components of groups or formal or semi-formal arboricultural features (e.g. the dominant and/or principal trees within an avenue)	Trees, groups or woodlands of particular visual importance as arboricultural and/or landscape features	Trees, groups or woodlands of significant conservation, historical, commemorative or other value (e.g. veteran trees or wood-pasture)	See Table 2
Category B **Trees of moderate quality** with an estimated remaining life expectancy of at least 20 years	Trees that might be included in category A, but are downgraded because of impaired condition (e.g. presence of significant though remediable defects, including unsympathetic past management and storm damage), such that they are unlikely to be suitable for retention for beyond 40 years; or trees lacking the special quality necessary to merit the category A designation	Trees present in numbers, usually growing as groups or woodlands, such that they attract a higher collective rating than they might as individuals; or trees occurring as collectives but situated so as to make little visual contribution to the wider locality	Trees with material conservation or other cultural value	See Table 2
Category C **Trees of low quality** with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter below 150 mm	Unremarkable trees of very limited merit or such impaired condition that they do not qualify in higher categories	Trees present in groups or woodlands, but without this conferring on them significantly greater collective landscape value; and/or trees offering low or only temporary/transient landscape benefits	Trees with no material conservation or other cultural value	See Table 2

Appendix C. Arboricultural Method Statement

Jacobs

Generic Arboricultural Method Statement

Date:	March 2024
Project name:	East Meath - North Dublin Grid Upgrade
Project no:	321084AJ
Prepared by:	Jacobs
Document no:	321084AJ-JAC-XX-XX-FN-Z-3182C

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1.1 Introduction

Jacobs has prepared a Generic Arboricultural Method Statement (AMS) for the East Meath - North Dublin Grid Upgrade (hereafter referred to as the Proposed Development). This is presented in Section 1.2 onwards. The Generic AMS specifies generic tree protection measures to protect retained trees on-site. Once full construction detail and phasing is fixed during the detailed design stage, this document will be reviewed and updated to make the details it contains specific, and a Tree Protection Plan will be produced, and both will be implemented as soon as works begin on-site.

The services of a competent arboriculturist (the Project Arboriculturalist) will be retained during the detailed design stage for relevant additional input at appropriate points. This Project Arboriculturalist will also be retained during the Construction Phase to advise and resolve any unforeseen tree related issue which might occur and to provide general tree related advice.

Additional visits are recommended, post the Construction Phase, to identify any physiological and / or structural defect that may have been caused by the works. This timing of these visits will be agreed with the Project Arboriculturalist.

1.1.1 Arboricultural Actions Required - Next Steps

Table 1 lists the standard elements, as referenced in the British Standards Institution (BSI) British Standard (BS) 5837:2012 Trees in relation to design, demolition and construction – Recommendations (BSI 2012), recommended to satisfy planning considerations for this Proposed Development and to ensure appropriate tree protection is considered and applied throughout the duration of the works.

Table 1: Follow Up Arboricultural Input Relating to this Proposed Development

Recommended Arboricultural Input	Purpose	Timing	By Whom
Project Arboriculturalist	To provide relevant additional input to be addressed at appropriate points.	As part of the detailed design stage. Also retained during the Construction Phase to advise and resolve any unforeseen tree related issue which might occur and to provide general tree related advice.	The Electricity Supply Board (ESB)
Site-specific AMS	Work information package designed to provide contractors with details on how specific operations need to be performed to protect trees including use of exclusion zones and ground protection.	As part of the detailed design stage.	Combined effort between the ESB and appointed contractor
Tree Protection Plan	To provide schematic details of how protective fencing will be installed and any other pre-planned targeted tree protection measures.	As part of the detailed design stage, in conjunction with the site-specific AMS.	Combined effort between the ESB and appointed contractor
On-site monitoring	To ensure protection measures and the site-specific AMS are being implemented correctly.	At agreed intervals before and during the Construction Phase of the Proposed Development.	The ESB

Impacts to the trees, as outlined within the body of this General AMS, have the potential to alter with any changes to the current design proposals. Tree impacts will therefore be reviewed as the design process progresses with all relevant parties informed of the changes, where appropriate.

1.2 Arboricultural Method Statement

1.2.1 Introduction

The most important and effective process, in terms of preventing damage to trees on a construction site, is the timely erection of tree protection fencing. This will be erected as the first operation on-site, for example, before access track construction, before the appointed contractor's site cabins, and before trenching for service runs.

However, it is noted that the fencing provides an unnecessary and potentially dangerous restriction to essential tree works, and therefore, tree works can be carried out before fencing is erected.

To protect retained trees and hedges correctly throughout the Construction Phase, tree protection measures will be removed in the exact opposite order and methodology they were installed so that one of the last actions on-site is the removal of the tree protection measures.

1.2.2 General

This AMS is generic, and once the final development plans are finalised, it will be reviewed so that it is tailored specifically to the final Proposed Development. An AMS will always be supported by a detailed Tree Protection Plan, which will indicate the alignment of Tree Protection Fencing, Construction Exclusion Zones and other specific site methodologies.

1.2.2.1 Phasing

An indicative phasing programme is detailed below which must be followed by the contractor throughout the life of the Proposed Development to ensure that trees are protected in accordance with the AMS.

1.2.2.1.1 Phase 1 – Enabling Works

- Install Tree Protection Fencing as required;
- Install ground protection measures as required; and
- Carry out approved tree removal and pruning.

1.2.2.1.2 Phase 2 – Development / Construction Phase

- Establish site compound - location for cabins, car park and the storage of materials;
- Carry out initial ground works and services installations; and
- Undertake main development construction.

1.2.2.1.3 Phase 3 – Post-Development

- Carry out soft landscaping (e.g. proposed replanting, grass reinstatement etc.);
- Remove protective fencing as required;
- Remove ground protection as required; and
- Carry out ground decompaction and reinstatement.

1.2.3 Pre-Commencement

A Pre-Commencement Site Meeting will be held with contractors who are responsible for operating machinery on-site. The meeting will firstly highlight the potential for damage occurring to tree crowns, but thereafter ensure that extra care is applied when manoeuvring any machinery within close proximity of retained trees to prevent any contact with the tree and consequent damage to crown, stem or roots.

For clarity, prior to any construction or development work proceeding, the alignment of the protective fencing and the RPAs of any individual trees to be retained which are not able to be protected by fencing will be marked out using the distances provided by the Project Arboriculturalist. Marking out will be completed or approved by a person with arboricultural expertise, as individual trees will have root zones that may be affected by local conditions, and allowances will need to be made to accommodate this.

1.2.4 Access Facilitation Pruning

It is expected necessary to operate a wide or tall load, plant bearing booms, jibs and counterweights or other such equipment, as part of construction works and / or traffic on the construction access tracks. Such equipment has the potential to cause injurious contact with crown material (i.e., low branches and limbs, of retained trees within, or without, the Root Protection Area (RPA) fencing). It is best advised that appropriate, but limited tree pruning, be carried out beforehand to remove any obvious problem branches. This is classed as 'Facilitation Pruning' within BS 5837:2012 Trees in relation to design, demolition and construction – Recommendations (BSI 2012).

The Facilitation Pruning Works specification will be prepared by an arboriculturalist and submitted to the Local Planning Authority for approval before construction or fencing operations commence on-site.

All tree works will be carried out in accordance with BS 3998:2010 Tree Works- Recommendations (BSI 2010).

The Facilitation Pruning will be carried out on site by a suitably qualified and experienced arborist before construction operations commence on-site. The Facilitation Pruning can run concurrently with operations to erect tree protection fencing, as long as this can be co-ordinated, such that neither presents a hazard to the other.

Trees on-site which are not to be retained can be removed as part of the Facilitation Pruning (or earlier if the appropriate planning consent is confirmed). To avoid mistakes, the individual trees to be removed will be identified and marked by a person with arboricultural expertise.

Any access facilitation pruning will not have a significant adverse impact on the tree's physiology or amenity value. In some cases, a suitable working space may be provided by temporarily tying back tree branches.

Pruning will generally occur after the leaves have 'flushed' and hardened (i.e., late spring through summer). There are some exceptions, however, as some species such as Birch, Walnut and Maples, will 'bleed' sap and risk losing valuable sugars in the process if pruned in early spring. Therefore, the pruning of these trees will be carried out when this risk is low (i.e., summer or mid-winter).

Hornbeam trees have two growth phases each year. One during the spring and the other in summer. The best time to prune them is therefore in September after the summer flush and before the leaves change colour and drop. This is also outside of the bird nesting season which usually runs from March to August (inclusive). Alternatively, they can be pruned in mid-winter.

Species belonging to the genus Prunus, such as Cherry, partially rely on the production of a resin or gum to aid in the defence against wound related pathogens, and therefore, pruning will occur in the summer. In general, pruning will avoid periods where the exposed wood will be left open to severe conditions such as drought, frost, and periods of fungal sporulation (autumn).

Any tree works undertaken must take account of all protected species of flora and fauna and comply with all appropriate legislation. This includes Number 39 of 1976 - Wildlife Act, 1976 (as amended) and S.I. No. 477/2011 - European Communities (Birds and Natural Habitats) Regulations 2011 (as amended) which provides statutory protection to birds, bats and other species that inhabit trees. All tree work operations are covered by these provisions and advice from an ecologist will be obtained before undertaking any works that might constitute an offence.

It is recommended that any trees that require removal or significant canopy works, will be checked in advance of works by an ecologist to ensure that there is no possibility of any disturbance to nesting birds or roosting bats.

1.2.5 Tree Protection Fencing and the Construction Exclusion Zone

The development design prepared for the site indicates that a number of trees within the Planning Application Boundary are being retained. In addition, there are numerous trees within influencing distance of the construction activity. The majority of these trees will need to be protected from all construction operations by a protective barrier which creates a sacrosanct Construction Exclusion Zone (CEZ).

The alignment of the protective barrier is based on the calculated extent of the RPA which has been generated as a maximum and minimum based on spatial measurements taken from the National Tree Map (BlueSky International dataset (Bluesky International Ltd. 2023) and in accordance with BS 5837:2012 Trees in relation to design, demolition and construction – Recommendations (BSI 2012). The detailed alignment of tree protection fencing will be decided by the Project Arboriculturalist and indicated on a Tree Protection Plan.

In principle, protective fencing will be erected before any construction operations start on-site and will be removed only on completion of all construction works on-site. In a phased development, there may be a need to alter or remove / reposition fencing as the project progresses. The planning of these works will be carried out in consultation with the Project Arboriculturalist and no tree will be left unprotected during the Construction Phase.

Site hoarding is an acceptable alternative. It may be appropriate on some sites to use temporary site offices as components of the protection barriers, on the understanding that they will remain in-situ for the duration of the construction works and their removal will be planned to ensure that the appointed contractor's co-ordinated withdrawal from site away from the trees rather than towards them.

Clause 6.2.2.3 of BS 5837:2012 Trees in relation to design, demolition and construction – Recommendations specifies an alternative protective barrier where site circumstances and associated risk of damage incursion into the RPA do not necessitate the default level of protection. In this Proposed Development, it is proposed that the construction corridor easement fencing will provide the tree protection fencing. In places, this will consist of agricultural stockproof fencing. Elsewhere, the corridor will be delineated by wooden posts with a topping rope. Where this corresponds with the need to indicate the CEZ, the posts will have high viability orange site netting attached. If there is no post and rope fencing (for example in an area behind the earth bund), the orange netting will be mounted on wooden posts. This fencing will be erected before construction activities commence.

All weather notices will be placed on fencing to indicate that operations are not permitted within the high visibility fenced area, for example 'CONSTRUCTION EXCLUSION ZONE – NO ACCESS', or similar.

Once set up, fences will not be removed or altered without prior consultation with the Project Arboriculturalist.

The presence of long grass and other vegetation in the 'Construction Exclusion Zone' is a welcome indicator that the protected area has been left undisturbed. However, on occasion, and certainly towards the end of the Construction Phase, it is acceptable to cut the vegetation by handheld strimmer or scythe taking care not to work within 300mm (millimetres) of the tree trunk (to avoid damaging the bark). Vegetation within 300mm of the trunk can be cut with non-mechanised shears.

1.2.6 Temporary Ground Protection

Where unmade ground within the RPA of trees, but outside the protective barrier, is exposed to construction damage and / or soil compaction, temporary ground protection will be installed immediately following the erection of tree protection fencing and prior to starting work on-site.

The ground protection will be capable of supporting any traffic entering or using the site without being distorted or causing compaction of underlying soil.

BS 5837:2012 Trees in relation to design, demolition and construction – Recommendations (BSI 2012) suggests temporary ground protection will comprise one of the following:

A) For pedestrian movements only, a single thickness of scaffold boards placed either on top of a driven scaffold frame, so as to form a suspended walkway, or on top of a compression-resistant frame, so as to form a suspended walkway, or on top of a compression-resistant layer (e.g., 100 mm depth of woodchip), laid onto a geotextile membrane;

B) For pedestrian-operated plant up to a gross weight of 2t (tonnes), proprietary (EuroMat or similar), interlinked ground protection boards placed on top of a compression-resistant layer (e.g., 150mm depth of woodchip) laid onto a geotextile membrane; and

C) For wheeled or tracked construction traffic exceeding 2 tonnes gross weight, an alternative system (e.g. proprietary systems or pre-cast reinforced concrete slabs) to an engineering specification designed in conjunction with arboricultural advice, to accommodate the likely loading to which it will be subjected. It may be that a cellular confinement system, such as Presto Geoweb or similar, laid on geotextile membrane and over filled with angular clean stone is more appropriate.

Existing hard surfaces offer good ground protection, and as far as possible, will remain in-situ as temporary ground protection during site works. Upon completion of works, the surface can be carefully lifted if not required or used as a sub-base as appropriate.

Following completion of construction works, the ground protection will be removed and the ground reinstated without soil disturbance.

1.2.7 Installation of Power Supply and Services

This Section refers to the need to run temporary utilities to compounds, ancillary structures etc., and not the main cable installation.

Any underground power supplies and services routed through the RPA will be installed in accordance with Clause 7.7.2 of BS 5837:2012 Trees in relation to design, demolition and construction – Recommendations (BSI 2012) and National Joint Utilities Group (NJUG) Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees (NJUG 2007). The preference is for all excavations to be completed by hand within an RPA. If this is not possible, then the smallest toothless bucket will be utilised removing small amounts of soil at each pass. If a root is encountered, then it will be exposed by hand and a suitable course of action agreed with the Project Arboriculturalist.

When roots between 10mm to 25mm in diameter are encountered, these will be retained undamaged wherever possible, and protected from desiccation / frost by damp hessian sacking or a similar protective material until the excavation is back filled. Roots below 10mm in diameter may be trimmed back neatly in line with the edge of the excavation trench using secateurs.

1.2.8 Construction Within RPA

The delivery, storage, mixing and discharge of concrete and all other cement-based materials will be carried out so that there is no runoff and spillage near the RPAs of retained trees. No substances that are potentially injurious to plant tissue (including diesel, bitumen, concrete, mortar and other phyto-toxic materials) will be stored, discharged, prepared or used, where direct contact, infiltration or runoff might reasonably be considered liable to harmfully affect existing root growth or other parts of retained trees.

Where chemicals are stored, it is now standard practice to have emergency spillage kits available to minimise the impacts of any accidental spillages to the local environment. All cement mixing, vehicle washing or any other activity where toxic chemicals are used will have the provision to contain any accidental spillage. This will be achieved using suitable soil bunding or using a supporting timber framework sealed with heavy duty plastic sheeting.

1.2.9 Excavation Within RPA

In areas where excavation is required within the root protection zone of retained trees located outside of the Planning Application Boundary, the use of vacuum excavation will be considered. The feasibility of use and specific methodology will be advised by the Project Arboriculturist, as appropriate. Where high pressure water is used to break up the soil prior to extraction, care will be taken to avoid high pressure water damage to significant roots as they are exposed. Any machinery used to carry out the process of excavation will be sited outside of the RPA, or will be located on suitable loadbearing temporary ground protection specified to avoid excessive ground compaction. Works will be carried out under appropriate supervision.

When roots between 10mm to 25mm in diameter may be encountered, these will be retained undamaged wherever possible, and protected from desiccation / frost by damp hessian sacking or a similar protective material until the excavation is back filled. Roots below 10mm in diameter may be trimmed back neatly in line with the edge of the excavation trench using secateurs. Once construction work commences on the Proposed Development, the implementation of specific methodologies that may be required around trees will be implemented to protect retained trees. This information will be contained within a site-specific AMS which will be compiled by a qualified arboriculturalist and will provide detailed measures, where required, once the detailed design is suitably mature.

1.2.10 Fence Construction Within RPAs

Where fence posts need to be installed within RPAs, excavations will be minimal and carried out using handheld tools. Fence posts will be erected at least 1m (metre) from trees and using metal post support spikes, or if using concrete mix, post holes will be lined with an impermeable membrane to prevent contact between tree roots and potentially damaging chemicals in the concrete.

The proposed fence alignment will allow for a minimum distance of 500mm between the tree stems and the fence, providing sufficient room for the future increase of the stem diameter and minimising the risk of potential conflicts between the fence structure and the tree stem.

1.2.11 Root Pruning

The specific need for root pruning has not been identified in any areas of the Proposed Development, though a number of retained trees have minor incursions into their theoretical RPA which means root severance may be required. In most cases, if tree roots are uncovered during excavation works, then they are most likely to belong to trees removed during the site clearance. If it is clear that an uncovered root is associated with a retained tree, then the following steps will be taken.

Minor roots (less than 25mm in diameter) will be cleanly severed with a sharp pruning saw, leaving as small a final cut wound as possible. Roots larger than 25mm diameter will be carefully exposed by hand. Once exposed the Environmental Clerk of Works or the Project Arboriculturalist will be contacted for advice on how to proceed. If it is considered that the removal of the root will not have a destabilising, or detrimental impact on the parent tree, then it can be cleanly severed with a sharp pruning saw. A photographic record of any root pruning will be taken, along with its location marked clearly on a site plan.

If it is considered an unacceptable risk to sever the root, then it will be reburied or wrapped in damp hessian to prevent desiccation, whilst the appointed contractor team work through options for dealing with the situation. In certain cases, this may require the removal of the parent tree.

1.2.12 Changes of Level Within RPAs

Generally, the levels within the RPA or protected area will not be changed. Typically between 90% and 99% of a tree's total root length occurs in the upper 1m of soil. Any excavation into this will remove part of the root system and will potentially affect the vigour or stability of the tree. Conversely, any additional material built up above ground level will compact the soil beneath it, potentially compacting all the air pores in the 600mm depth of soil that most roots are in, effectively suffocating the roots and affecting the vigour or stability of the tree.

On occasion, additional soil may be gently spread by hand within the RPA /protected area, for example, to marry levels in small areas between raised levels of no-dig construction and the existing levels. The maximum depth of this would be to 150mm, reducing to nil. However, it is not generally acceptable in large areas of the RPA / protected area to raise the level as a blanket. Any areas which will need to be raised will be agreed with the Local Planning Authority prior to the Construction Phase. Specifically, there will be no mechanical equipment within the RPA / protected area to spread, compact, or level out soil levels as this would compact the soil.

1.2.13 Permanent Surfacing (No-Dig Construction) in RPA

After scraping off the above soil vegetation layer, a geotextile will be laid out on top of the existing ground, and subsequently a three-dimensional Cellular Confinement System (CCS) will be pegged out, and infilled as manufacturer's recommendations. Infill materials will be no-fines aggregate (granular) which will interlock and will be free draining and allow gaseous exchange. When infilled, this structure will act as the sub-base. A separation geotextile

will be laid on top of this construction before any final wearing course is installed (unless machine laid bounded surface), or overfill by 40mm to 60mm to provide the wearing course.

The wearing course will be a permeable surface allowing gaseous exchange and the infiltration of water into the root zone.

Where existing hard surfaces are retained as temporary ground protection, new permanent hard surfacing will be built using the existing sub-base, and therefore, avoiding any excavations and changes in level. This will be carried out only on completion of the surrounding construction work.

Roots smaller than 25mm diameter may be pruned back, making a clean cut with a suitable sharp tool except where they occur in clumps. Roots occurring in clumps or of 25mm diameter and over will be severed only following consultation with an arboriculturalist, as such roots might be essential to the tree's health and stability.

Kerbs and edgings that require excavations will not be used. Where kerbing is required for light structures, above-ground peg and board edging might be acceptable. Where the use of standard kerbs is unavoidable in areas used by vehicular traffic, foundations will not be continuous where this would require cutting or severing of roots larger than 25mm diameter. Instead, the kerbs will be 'bridged' over the roots, leaving space that allows for future increase of the root diameter.

1.2.14 Excavations for Soft Landscaping

Where soft landscaping is proposed within the RPA of retained trees, excavations will be kept to the minimum depth required to provide adequate conditions for the establishment of new shrubs and trees. Excavations will be carried out carefully and by hand, avoiding the severance of any roots larger than 25mm diameter.

1.2.15 Removal of Existing Hard Standing

Where soft landscaping is proposed within the RPA in existing hard surfaces, the wearing course and its sub-base will be carefully lifted using handheld tools. If any roots are exposed in the process, they will be immediately wrapped or covered to prevent desiccation and to protect them from rapid temperature changes. Any wrapping will be removed prior to backfilling, which will take place as soon as possible.

Prior to backfilling, retained roots will be surrounded with topsoil or uncompacted sharp sand (other than builders' sand), or other loose inert granular fill, before soil or other suitable material is replaced.

1.2.16 Soil Improvements and Mulching

To compensate for root damage and stress caused by construction activities, it is recommended that the RPA of retained trees on-site will be mulched, where possible. The materials that may be used for mulching include coarsely divided plant matter, such as wood chip, pulverised bark, or leaf mould, any of which may be combined with well-rotted animal manure. The mulched area will extend over as much of the root system as can be allowed by other site-usage requirements. The depth of an organic mulch will not be so much as to inhibit aeration of the root system or to cause overheating of uncomposted material (normally no more than 80mm to 100mm). The mulch will be periodically replenished as it decomposes, so that it does not become depleted.

1.3 Arboricultural Site Supervision

Tree protection on development sites is an iterative process which does not end with the finalisation of Arboricultural reports.

The ESB will appoint an Arboricultural Clerk of Works (ACoW), also known as the Project Arboriculturalist. Their role is to adapt and update the AMS and Tree Protection Plan as the Proposed Development is delivered to provide pragmatic and deliverable tree protection on-site. As such, the AMS and Tree Protection Plan will be seen as live documents, which are subject to continual revision.

The Project Arboriculturalist will arrange to make regular visits to the site to attend pre-commencement meetings, at key stages of the development (such as checking the erection of tree protection fencing) and to resolve any issues arising on-site.

Records of any visits will be kept in the site diary and as brief site report documents. If requested, details of site visits will be made available to the Local Planning Authority.

If non-compliance is observed during site visits, the Project Arboriculturalist will have the ability to halt work until the issues can be rectified, and the relevant persons informed.

1.4 References

BlueSky International Ltd (2023). Purchased dataset from National Tree Map (NTM).

BSI (2010). BS 3998:2010. Trees Work – Recommendations. London: British Standards Institution. 3rd ed. [hard copy] London: British Standards Institution [Accessed 1 September 2023].

BSI (2012). BS 5837:2012. Trees in relation to design, demolition and construction – Recommendations. 4th ed. [ebook] London: British Standards Institution. [Online] Available at: https://beta.bathnes.gov.uk/sites/default/files/2020-01/BS5837%202012%20Trees.pdf [Accessed 1 September 2023].

NJUG (2007). Vol 4 Issue 2 – Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees [Accessed 1 September 2023].

Directives and Legislation

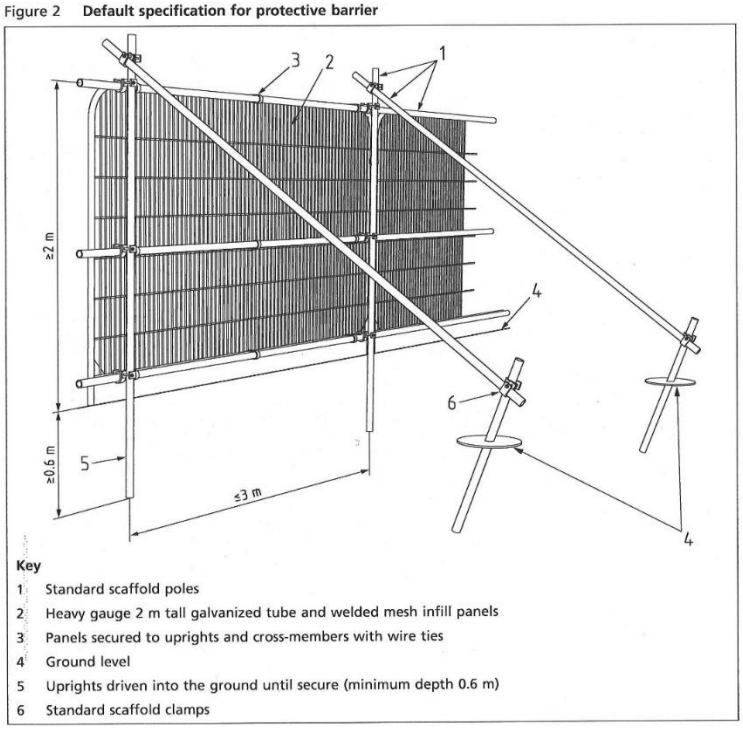
Number 39 of 1976 - Wildlife Act, 1976 (as amended)

S.I. No. 477/2011 - European Communities (Birds and Natural Habitats) Regulations 2011 (as amended)

Appendix A. Suggested Tree Protection Specification

Default Tree Protection Specifications (taken from pages 20-21 of BS5837:2012 (BSI 2012)

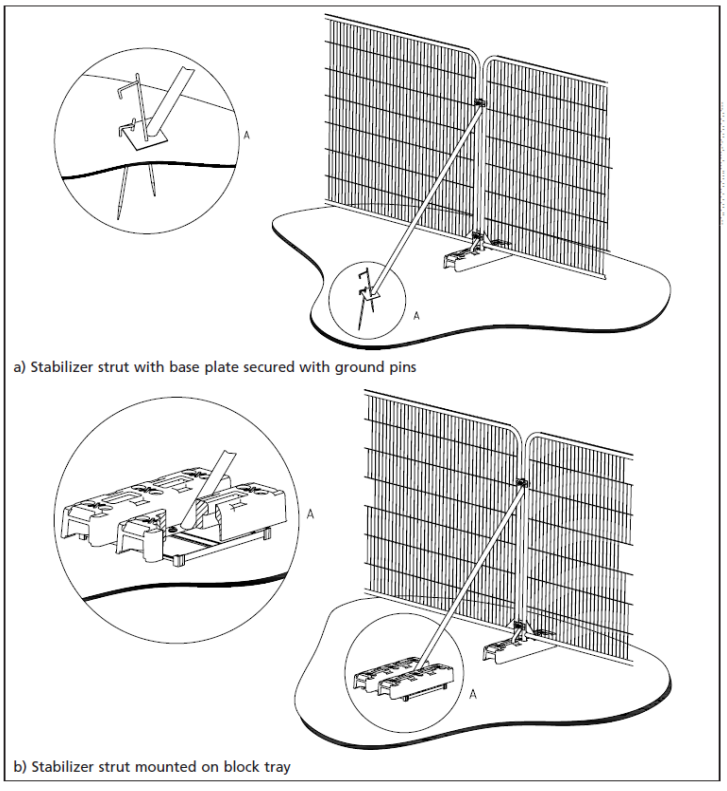
Figure 2 **Default specification for protective barrier**



Key

1 Standard scaffold poles
2 Heavy gauge 2 m tall galvanized tube and welded mesh infill panels
3 Panels secured to uprights and cross-members with wire ties
4 Ground level
5 Uprights driven into the ground until secure (minimum depth 0.6 m)
6 Standard scaffold clamps

Figure 3 **Examples of above-ground stabilizing systems**



a) Stabilizer strut with base plate secured with ground pins

b) Stabilizer strut mounted on block tray

Appendix B. Suggested Tree Protection Signage

East Meath - North Dublin Grid Upgrade Environmental Impact Assessment Report (EIAR): Volume 3

Appendix A19.1 – Hazard Identification Record

EirGrid

March 2024

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Appendix A19.1 – Hazard Identification Record

Table 1: Hazard Identification Record

Risk Event	Source and / or Pathway	Receptor	Source Document	Reasonable Worst-Case Consequence (If Even Did Occur)	Primary / Tertiary Mitigation	Could this Lead to a Major Accident and / or Disaster with Existing Mitigation in Place?	Is the Reasonable Worst-Case Consequence Managed to an Acceptable Level with Existing Mitigation in Place?	If No, What Secondary Mitigation is Required to Reach an Acceptable Level?
Construction Phase								
Ground Collapse	Trench / excavation collapse Encountering soft ground Unforeseen ground conditions encountered during construction works Extreme weather event (e.g. storm-triggered landslide)	Members of the public / Construction site personnel	Design Risk Assessment and Hazard Elimination and Risk Reduction Register Chapter 11 (Soils, Geology and Hydrogeology) Chapter 8 (Climate)	Fatality / injury Disruption to community services or infrastructure	Managed via Concept Design Stage Preliminary Safety and Health Plan and Construction Environmental Management Plan Ground Investigation and topographical surveys to confirm ground conditions Trench / excavation depths to be limited Design developed to facilitate safe methods of work, including provision of sufficient working space. Safe methods of work to be developed by the Designer	Yes	Yes - Considered to be managed to an acceptable level if all mitigation measures outlined are correctly implemented	N/A
Contamination Event – Encountering / Release of Chemical or Biological Substances	Encountering contaminated material during excavation (e.g. soil, asbestos pipes) Electricity Supply Board (ESB) cables Non-Native, invasive or poisonous plant species (e.g. Japanese Knotweed) Dust, vapours, and fumes Sediment mobilisation	Watercourses Groundwater Ecological receptors	Design Risk Assessment and Hazard Elimination and Risk Reduction Register Chapter 12 (Hydrology) Chapter 11 (Soils, Geology and Hydrogeology)	Fatality / injury Contamination to environmental receptor	Managed via Concept Design Stage Preliminary Safety and Health Plan and Construction Environmental Management Plan Pre-construction checks confirm presence of contaminated ground Utility survey to confirm presence of asbestos pipes Environmental surveys to confirm presence of invasive or poisonous plant species Safe methods of work to be developed by the appointed contractor(s) Where encountered, contaminated materials to be managed appropriately Materials and substances specified by the Designer / appointed contractor(s) to be used during the Construction Phase could present health and safety hazards. Materials and substances to be carefully considered and managed	Yes	Yes - Considered to be managed to an acceptable level if all mitigation measures outlined are correctly implemented	N/A
Contact with / Damage to High Voltage Power Lines (Overhead or Buried)	Strike of buried power lines during excavation works Strike of overhead power lines (including Luas, railway) during works	Members of the public / Construction site personnel	Design Risk Assessment and Hazard Elimination and Risk Reduction Register	Fatality / injury Fire / explosion Disruption to community services or infrastructure	Utility surveys to confirm location of electricity cables Safe methods of work to be developed by the appointed contractor(s) for working in the vicinity of overhead services as per the ESB Code of Practice for Avoiding Danger from Overhead Electricity Lines	Yes	Yes - Considered to be managed to an acceptable level if all mitigation measures outlined are correctly implemented	N/A
Contact with / Damage to Low Voltage Power Lines, Telecom Services and / or Fibre Optic Cables	Strike of buried services / cables during excavation works	Members of the public / Construction site personnel	Design Risk Assessment and Hazard Elimination and Risk Reduction Register	Fatality / injury Disruption to community services	Managed via Concept Design Stage Preliminary Safety and Health Plan and Construction Environmental Management Plan	Yes	Yes - Considered to be managed to an acceptable level if all mitigation measures outlined are correctly implemented	N/A

Risk Event	Source and / or Pathway	Receptor	Source Document	Reasonable Worst-Case Consequence (If Even Did Occur)	Primary / Tertiary Mitigation	Could this Lead to a Major Accident and / or Disaster with Existing Mitigation in Place?	Is the Reasonable Worst-Case Consequence Managed to an Acceptable Level with Existing Mitigation in Place?	If No, What Secondary Mitigation is Required to Reach an Acceptable Level?
					Utility surveys to confirm location of telecom and fibre optic cables Safe methods of work to be developed by the Designer for working in the vicinity of services			
Gas Explosion	Strike of buried gas mains during excavation works	Members of the public / Construction site personnel Environmental receptors (ecological site, heritage assets etc.)	Design Risk Assessment and Hazard Elimination and Risk Reduction Register	Fatality / injury Fire / explosion Disruption to community services or infrastructure, including structural damage Irreversible damage to environmental receptors	Managed via Concept Design Stage Preliminary Safety and Health Plan and Construction Environmental Management Plan Utility surveys to confirm location of gas mains Ground Penetrating Radar surveys to be undertaken Safe methods of work to be developed by the Designer for working in the vicinity of services	Yes	Yes - Considered to be managed to an acceptable level if all mitigation measures outlined are correctly implemented	N/A
Contact with / Damage to Combined Sewers	Strike of combined sewers during excavation works	Members of the public / Construction site personnel Environmental receptors (watercourses, groundwater, ecological site)	Design Risk Assessment and Hazard Elimination and Risk Reduction Register	Injury Contamination of environmental receptor from wastewater Disruption to community services or infrastructure (localised flooding)	Managed via Concept Design Stage Preliminary Safety and Health Plan and Construction Environmental Management Plan Utility surveys to confirm location of sewers Ground Penetrating Radar surveys to be undertaken Safe methods of work to be developed by the Designer for working in the vicinity of services	Yes	Yes - Considered to be managed to an acceptable level if all mitigation measures outlined are correctly implemented	N/A
Contact with / Damage to Mains Water Supply	Strike of water mains during excavation works	Members of the public / Construction site personnel	Design Risk Assessment and Hazard Elimination and Risk Reduction Register	Injury Disruption to community services or infrastructure (localised flooding)	Managed via Concept Design Stage Preliminary Safety and Health Plan and Construction Environmental Management Plan Utility surveys to confirm location of water mains Ground Penetrating Radar surveys to be undertaken Safe methods of work to be developed by the Designer for working in the vicinity of services	Yes	Yes - Considered to be managed to an acceptable level if all mitigation measures outlined are correctly implemented	N/A
Road Traffic Related Incident	Works alongside live (including high-speed) traffic Errant vehicles entering works area Collision between construction vehicles and public vehicles at site entrances and exits Restricted visibility at junctions and property entrances	Members of the public / Construction site personnel	Design Risk Assessment and Hazard Elimination and Risk Reduction Register National Risk Assessment for Ireland 2023 (Government of Ireland 2023) Chapter 14 (Traffic and Transport)	Fatality / injury Vehicle fire Pollution of groundwater/surface water receptors due to fuel spillages, fire water runoff Disruption to community services or infrastructure	Managed via Concept Design Stage Preliminary Safety and Health Plan and Construction Environmental Management Plan Construction Traffic Management Plan to be implemented including appropriate speed restrictions. Traffic management planned in accordance with Regulations Physical segregation of traffic and pedestrians from the works including partial closing of roads and footpaths Placement of warning signs Trafficked lanes to be swept regularly	Yes	Yes - Considered to be managed to an acceptable level if all mitigation measures outlined are correctly implemented	N/A

Risk Event	Source and / or Pathway	Receptor	Source Document	Reasonable Worst-Case Consequence (If Even Did Occur)	Primary / Tertiary Mitigation	Could this Lead to a Major Accident and / or Disaster with Existing Mitigation in Place?	Is the Reasonable Worst-Case Consequence Managed to an Acceptable Level with Existing Mitigation in Place?	If No, What Secondary Mitigation is Required to Reach an Acceptable Level?
	Contact of construction cyclists, pedestrians and those with mobility impairment with the works, or slipping on uneven ground during works on the footpath				Designer to minimise night work Safe access to houses, businesses, schools, churches, hospitals, shopping centers, major car parks etc. to be maintained during working hours			
Aircraft Related Incident	Flight paths to / from Dublin Airport	Members of the public / Construction site personnel	National Risk Assessment for Ireland 2023 (Government of Ireland 2023)	Fatality/injury Fire / explosion Pollution of groundwater / surface water receptors due to fuel spillages, fire water run off Disruption to community services or infrastructure	Risk associated with air travel is extensively modelled, regulated and managed closely The Irish Aviation Authority (IAA) ensures that Irish civil aviation operates to international and European safety standards and systems in accordance with international agreements	Yes	Yes - Considered to be managed to an acceptable level if all mitigation measures outlined are correctly implemented	N/A
Structural Damage / Collapse	Works to existing structures / construction of new structures Strike of structures by construction vehicles/plant Vibration from construction activities	Members of the public / Construction site personnel Environmental receptors (heritage assets etc.)	Design Risk Assessment and Hazard Elimination and Risk Reduction Register Chapter 9 (Noise and Vibration)	Fatality / injury Disruption to community services or infrastructure, including structural damage Irreversible damage to environmental receptors	Structural assessment of existing structures will be carried out to determine their suitability for the intended use and where modifications / repairs to the structure are required Design developed to facilitate safe methods of work, including provision of sufficient working space. Safe methods of work to be developed by the designer / appointed contractor(s) Structures designed in accordance with relevant standards Vibration assessment undertaken	Yes	Yes - Considered to be managed to an acceptable level if all mitigation measures outlined are correctly implemented	N/A
Extreme Weather (Including Snow / Low Temperatures, Storms, Flooding, Drought, High Temperatures)	Localised flooding Ground collapse/landslides Poor weather conditions resulting in traffic accidents Fallen trees Disruption to services (e.g. trees striking overhead cables)	Members of the public / Construction site personnel	National Risk Assessment for Ireland 2023 (Government of Ireland 2023) Chapter 8 (Climate)	Fatality / injury Contamination of environmental receptor from wastewater (flooding) Disruption to community services or infrastructure	Flood Risk Assessment undertaken to inform design	Yes	Yes - Considered to be managed to an acceptable level if all mitigation measures by design outlined are correctly implemented	N/A
Fire	Vehicle fire (due to road traffic incident) Wildfire (due to extreme weather event)	Members of the public / Construction site personnel Environmental receptors	National Risk Assessment for Ireland 2023 (Government of Ireland 2023)	Fatality / injury Disruption to community services or infrastructure, including structural damage	Managed via Concept Design Stage Preliminary Safety and Health Plan and Construction Environmental Management Plan Utility surveys to confirm location of gas mains	Yes	Yes - Considered to be managed to an acceptable level if all mitigation measures outlined are correctly implemented	N/A

Risk Event	Source and / or Pathway	Receptor	Source Document	Reasonable Worst-Case Consequence (If Even Did Occur)	Primary / Tertiary Mitigation	Could this Lead to a Major Accident and / or Disaster with Existing Mitigation in Place?	Is the Reasonable Worst-Case Consequence Managed to an Acceptable Level with Existing Mitigation in Place?	If No, What Secondary Mitigation is Required to Reach an Acceptable Level?
	Arson Gas explosion (utility strike during excavation works)	(heritage assets etc.)		Pollution of groundwater / surface water receptors due fire water run off Irreversible damage to environmental receptor	Ground Penetrating Radar surveys to be undertaken Safe methods of work to be developed by the designer / appointed contractor(s) for working in the vicinity of services			
Industrial Accidents	Seveso sites Impact on personnel in the event of an incident occurring at a Seveso site that is located within close proximity to works Disruption to emergency response due to Proposed Development construction works (incl. traffic delays and diversions)	Members of the public / Construction site personnel Environmental receptors (ecological site, heritage assets etc.)	National Risk Assessment for Ireland 2023 (Government of Ireland 2023)	Fatality / injury Fire / explosion Pollution of groundwater / surface water receptors due to fuel spillages, fire water run off Disruption / damage to community services or infrastructure Irreversible damage to environmental receptors	Seveso sites managed in accordance with S.I. No. 209/2015 – Chemicals Act (Control of Major Accident Hazards Involving Dangerous Substances) Regulations 2015 Applicant to consult with Health Service Authority (HSA) where Proposed Development falls within the consultation zone of a Seveso site Construction Traffic Management Plan to be implemented to minimise disruption to emergency response vehicles	Yes	Yes - Considered to be managed to an acceptable level if all mitigation measures outlined are correctly implemented	N/A
Disruption to Emergency Response Vehicles (Fire, Ambulance and An Garda Síochána)	Traffic diversions and / or delays associated with the construction works for the Proposed Development	Members of the public Environmental receptors	Design Risk Assessment and Hazard Elimination and Risk Reduction Register	Fatality / injury Disruption to community services or infrastructure Irreversible damage to environmental receptors	Construction Traffic Management Plan to be implemented to minimise disruption to emergency response vehicles	Yes	Yes - Considered to be managed to an acceptable level if all mitigation measures outlined are correctly implemented	N/A
Operational Phase								
Aircraft Related Incident	Flight paths to / from Dublin Airport	Members of the public / Maintenance site personnel	National Risk Assessment for Ireland 2023 (Government of Ireland 2023)	Fatality / injury Fire / explosion Disruption / damage to community services or infrastructure	Risk associated with air travel is extensively modelled, regulated and managed closely The Irish Aviation Authority (IAA) ensures that Irish civil aviation operates to international and European safety standards and systems in accordance with international agreements	Yes	Yes - Considered to be managed to an acceptable level if all mitigation measures outlined are correctly implemented	N/A
Extreme Weather (Including Snow / Low Temperatures, Storms, Flooding, Drought, High Temperatures)	Localised flooding Ground collapse/landslides Poor weather conditions resulting in traffic accidents Fallen trees	Members of the public / Maintenance site personnel	National Risk Assessment for Ireland 2023 (Government of Ireland 2023) Chapter 8 (Climate)	Fatality / injury Disruption to community services or infrastructure	Proposed Development design developed in accordance with standards, including climate change allowances	Yes	Yes - Considered to be managed to an acceptable level if all mitigation measures outlined are correctly implemented	N/A
Risk Events Managed by Health and Safety Legislation								
Working on, or nearby, live electrical infrastructure	Live electricity infrastructure (particularly at existing operational Woodland	Construction site personnel	Design Risk Assessment and Hazard Elimination	Fatality / injury	Managed via Concept Design Stage Preliminary Safety and Health Plan	No	Yes - Considered to be managed to an acceptable level if all mitigation measures outlined are correctly implemented	N/A

Risk Event	Source and / or Pathway	Receptor	Source Document	Reasonable Worst-Case Consequence (If Even Did Occur)	Primary / Tertiary Mitigation	Could this Lead to a Major Accident and / or Disaster with Existing Mitigation in Place?	Is the Reasonable Worst-Case Consequence Managed to an Acceptable Level with Existing Mitigation in Place?	If No, What Secondary Mitigation is Required to Reach an Acceptable Level?
	and Belcamp Substations)		and Risk Reduction Register		Design developed to facilitate safe methods of work, including provision of sufficient working space Safe methods of work to be developed by the Designer for working on or nearby to live electrical infrastructure Relevant site personnel to have appropriate training and Safe Pass certification			
Falling from Height	Excavations Embankments Structures e.g. bridges, gantries Signs, poles, and lightning columns	Construction site personnel	Design Risk Assessment and Hazard Elimination and Risk Reduction Register	Fatality / injury	Managed via Concept Design Stage Preliminary Safety and Health Plan Design developed to facilitate safe methods of work, including provision of sufficient working space Ground Investigation survey to confirm absence of soft ground Relevant site personnel to have appropriate training and Safe Pass certification	No	Yes - Considered to be managed to an acceptable level if all mitigation measures outlined are correctly implemented	N/A
Drowning	Work close to watercourses (e.g. Royal Canal, grand Canal, River Liffey etc.)	Construction site personnel	Design Risk Assessment and Hazard Elimination and Risk Reduction Register	Fatality / injury	Managed via Concept Design Stage Preliminary Safety and Health Plan Safe methods of work to be developed by the Designer for working close/adjacent to watercourses Relevant site personnel to have appropriate training and Safe Pass certification	No	Yes - Considered to be managed to an acceptable level if all mitigation measures outlined are correctly implemented	N/A
Assembly or Dismantling of Heavy Prefabricated Components	Contact with moving plant, machinery and prefabricated components Demolition activities	Construction site personnel Members of the public	Design Risk Assessment and Hazard Elimination and Risk Reduction Register	Fatality / injury	Managed via Concept Design Stage Preliminary Safety and Health Plan Design developed to facilitate safe methods of work, including provision of sufficient working space Heavy prefabricated components minimised through design Relevant site personnel to have appropriate training and Safe Pass certification	No	Yes - Considered to be managed to an acceptable level if all mitigation measures outlined are correctly implemented	N/A
Contact with Heavy Machinery	Movement of heavy machinery Demolition activities	Construction site personnel	Design Risk Assessment and Hazard Elimination and Risk Reduction Register	Fatality / injury	Managed via Concept Design Stage Preliminary Safety and Health Plan Design developed to facilitate safe methods of work, including provision of sufficient working space Relevant site personnel to have appropriate training and Safe Pass certification	No	Yes - Considered to be managed to an acceptable level if all mitigation measures outlined are correctly implemented	N/A
Demolition and Felling Activities	Dust generation and exposure	Construction site personnel	Design Risk Assessment and Hazard Elimination and Risk Reduction Register	Fatality / injury	Managed via Concept Design Stage Preliminary Safety and Health Plan Tree surveys to be undertaken	No	Yes - Considered to be managed to an acceptable level if all mitigation measures outlined are correctly implemented	N/A

Risk Event	Source and / or Pathway	Receptor	Source Document	Reasonable Worst-Case Consequence (If Even Did Occur)	Primary / Tertiary Mitigation	Could this Lead to a Major Accident and / or Disaster with Existing Mitigation in Place?	Is the Reasonable Worst-Case Consequence Managed to an Acceptable Level with Existing Mitigation in Place?	If No, What Secondary Mitigation is Required to Reach an Acceptable Level?
	Falling debris, trees / branches	Members of the public			Number of trees to be removed to be minimised Safe system of work to be implemented, including implementation and management of exclusion zones Relevant site personnel to have appropriate training and Safe Pass certification			
Work which puts Persons at Risk from Chemical or Biological Substances Constituting a Particular Danger to the Safety and Health of Such Persons or Involving a Statutory Requirement for Health Monitoring	Zoonoses (e.g. Weil's disease) Construction chemicals including bitumen, cement, road marking paints, fuel, oils, etc. Exposure to dust, vapors, and fumes	Construction site personnel	Design Risk Assessment and Hazard Elimination and Risk Reduction Register	Ill-health	Managed via Concept Design Stage Preliminary Safety and Health Plan and Construction Environmental Management Plan Relevant site personnel to have appropriate training and Safe Pass certification	No	Yes - Considered to be managed to an acceptable level if all mitigation measures outlined are correctly implemented	N/A

East Meath - North Dublin Grid Upgrade Environmental Impact Assessment Report (EIAR): Volume 3

Appendix A20.1 Cumulative Impact Assessment Tables

EirGrid

March 2024

Contents

Appendix A20.1 – Cumulative Impact Assessment Tables

Table 1: Long List of Other Developments (Stage 1 and Stage 2)

'Other Development' Details						Stage 1		Stage 2		
Application Reference	**Planning Body**	**Applicant for 'Other Development' and Brief Description**	**Approximate Distance from Proposed Development (at Nearest Point to the Planning Application Boundary)**	**Status**	**Tier**	**Within Zone of Influence?**	**Progress to Stage 2?**	**Overlap in Temporal Scope?**	**Scale and Nature (NOTE 1) of Development Likely to Have a Significant Effect?**	**Progress to Stage 3/4?**
N/A Exempted Development	N/A Exempted Development	EirGrid CP0984 Belcamp - Shellybanks 220 kilovolt (kV) New Cable	Overlaps with the Proposed Development Planning Application Boundary at Belcamp Substation	Under construction. Due to be energised in Q3 2024	1	Yes	Yes	Construction of CP0984 will be completed before the Construction Phase for the Proposed Development is due to commence. There is no potential for Construction Phases to overlap, but Operational Phases will coincide.	Considering the nature, scale and location of this development, there is no potential for Operational Phase to result in cumulative impacts with the Proposed Development.	No
N/A Exempted Development	N/A Exempted Development	EirGrid CP0869 Maynooth - Woodland 220kV Line Uprate	Overlaps with the Proposed Development Planning Application Boundary at Woodland Substation	Construction commenced in 2021 and is due to be completed by 2024. CP0869 is due to be energised by Q4 2024.	1	Yes	Yes	Construction commenced in 2021 and is due to be completed by 2024. CP0869 is due to be energised by Q4 2024. Therefore, it is not likely that Construction Phases will overlap, but Operational Phases will coincide.	Considering the nature, scale and location of this development, there is no potential for Operational Phase to result in cumulative impacts with the Proposed Development.	No
N/A Exempted Development	N/A Exempted Development	EirGrid CP1110 Woodland Station 400kV – 220kV Protection Upgrade, comprising the replacement of Protection Relays on 400kV / 220kV T4201 and T4202 Traffo's bays and the 400kV and 220kV Coupler bays.	Overlaps with the Proposed Development Planning Application Boundary at Woodland Substation	Construction underway	1	Yes	Yes	Construction is currently underway and there is therefore no potential for Construction Phases to overlap. Operational Phases will coincide.	Considering the nature, scale and location of this development, there is no potential for Operational Phase to result in cumulative impacts with the Proposed Development.	No
PCI0001	An Bord Pleanála (ABP)	EirGrid CP0466 North South Interconnector This project involves a second, higher-capacity interconnector being added, to connect the electricity grids of Ireland and Northern Ireland. It will connect to the network in Northern Ireland in Co Tyrone, cross the border between Armagh and Monaghan, and then join the network in Ireland at an existing substation in County Meath.	Overlaps with the Proposed Development Planning Application Boundary at Woodland Substation	Permitted. Construction is due to commence in Q1 2025 and be completed by 2027.	1	Yes	Yes	Construction is due to commence in Q1 2025 and be completed by 2027. There is therefore the potential for Construction Phases to overlap. Operational Phases will coincide.	Considering the nature, scale and location of this development, there is potential for cumulative impacts if Construction Phases were to overlap which are required to be further assessed.	Yes
2360296	Meath County Council (MCC)	EirGrid CP1235 Louth - Woodland 220 kV Uprate.	Overlaps with the Proposed Development Planning Application Boundary at Woodland Substation	Permitted. Construction due to commence in Q1 2025, and be complete by Q4 2029. Due to be energised in 2029.	1	Yes	Yes	Construction due to commence in Q1 2025, and be complete by Q4 2029. There is therefore the potential for Construction Phases to overlap. Operational Phases will coincide.	Considering the nature, scale and location of this project (i.e., uprating an existing overhead line), there is no potential for cumulative impacts to occur.	No
316372	ABP	EirGrid CP0966 Kildare Meath Grid Upgrade Development of a 400 kV underground cable between Dunstown 400 kV substation in the townland of Dunnstown, Co. Kildare and Woodland 400 kV substation in the townland of Woodland, Co. Meath.	Overlaps with the Proposed Development Planning Application Boundary at Woodland Substation and along the 'Woodland Corridor' between Woodland	Submitted to ABP. Currently upgrading planning application to an EIAR - level. Due for re-submission in Q1 2024. Construction Phase of CP0966	1	Yes	Yes	Construction Phase of CP0966 is estimated to commence in Q2 2026 and be completed by Q3 2028. There is therefore the potential for Construction Phases to overlap. Operational Phases will coincide.	Considering the nature, scale and location of this development, there is potential for cumulative impacts if Construction Phases were to overlap which are required to be further assessed.	Yes

'Other Development' Details						Stage 1		Stage 2		
Application Reference	**Planning Body**	**Applicant for 'Other Development' and Brief Description**	**Approximate Distance from Proposed Development (at Nearest Point to the Planning Application Boundary)**	**Status**	**Tier**	**Within Zone of Influence?**	**Progress to Stage 2?**	**Overlap in Temporal Scope?**	**Scale and Nature (NOTE 1) of Development Likely to Have a Significant Effect?**	**Progress to Stage 3/4?**
			Substation and the R156 Regional Road (see Figure 20.2 in Volume 4 of the EIAR)	is estimated to commence in Q2 2026 and be completed by Q3 2028.						
N/A Future Planned Project as part of the Transmission Development Plan (TDP) 2023 - 2032	N/A	EirGrid CP1100 Finglas – North Wall 220kV Cable Replacement. This project will involve replacing existing fluid filled 220kV underground cables with higher capacity and up-to-date underground cable technology.	2.9km from Planning Application Boundary for the proposed cable route	Future Planned Project as part of TDP 2023 - 2032	2	No	No	N/A	N/A	N/A
N/A Future Planned Project as part of the TDP 2023 - 2032	N/A	EirGrid CP1146 Carrickmines - Poolbeg 220 kV Cable Replacement. This project will involve replacing existing fluid filled 220kV underground cables with higher capacity and up-to-date underground cable technology.	7.8km from Planning Application Boundary at Belcamp Substation	Future Planned Project as part of TDP 2023 - 2032	2	No	No	N/A	N/A	N/A
N/A Future Planned Project as part of the TDP 2023 - 2032	N/A	EirGrid CP1150 Inchicore – Poolbeg No. 2 220 kV Cable Replacement. This project will involve replacing existing fluid filled 220kV underground cables with higher capacity and up-to-date underground cable technology.	7.8km from Planning Application Boundary at Belcamp Substation	Future Planned Project as part of TDP 2023 - 2032	2	No	No	N/A	N/A	N/A
N/A Future Planned Project as part of the TDP 2023 - 2032	N/A	EirGrid CP1157 Inchicore – Poolbeg No.1 220 kV Cable Replacement. This project will involve replacing existing fluid filled 220kV underground cables with higher capacity and up-to-date underground cable technology.	7.8km from Planning Application Boundary at Belcamp Substation	Future Planned Project as part of TDP 2023 - 2032	2	No	No	N/A	N/A	N/A
N/A Future Planned Project as part of the TDP 2023 - 2032	N/A	EirGrid CP1216 Poolbeg – North Wall 220 kV Cable Replacement. This project will involve replacing existing fluid filled 220kV underground cables with higher capacity and up-to-date underground cable technology.	6.8km from Planning Application Boundary at Belcamp Substation	Future Planned Project as part of TDP 2023 - 2032	2	No	No	N/A	N/A	N/A
N/A Future Planned Project as part of the TDP 2023 - 2032	N/A	EirGrid CP1190 Poolbeg 220kV Station Replacement. This project will involve replacing the existing Poolbeg 220 kV station.	7.8km from Planning Application Boundary at Belcamp Substation	Future Planned Project as part of TDP 2023 - 2032	2	No	No	N/A	N/A	N/A
N/A Future Planned Project as part of the TDP 2023 - 2032	N/A	EirGrid CP1214 North County Dublin Bulk Supply Point. Bulk Supply Points are interface points between the Transmission System and Distribution System.	Exact location and detail unknown at this early development stage of the other project	Future Planned Project as part of TDP 2023 - 2032	2	Unknown. Other project at early development stage and there is therefore insufficient	No	N/A	N/A	N/A

'Other Development' Details						Stage 1		Stage 2		
Application Reference	Planning Body	Applicant for 'Other Development' and Brief Description	Approximate Distance from Proposed Development (at Nearest Point to the Planning Application Boundary)	Status	Tier	Within Zone of Influence?	Progress to Stage 2?	Overlap in Temporal Scope?	Scale and Nature (NOTE 1) of Development Likely to Have a Significant Effect?	Progress to Stage 3/4?
						information to assess				
N/A Future Planned Project as part of the TDP 2023 - 2032	N/A	EirGrid CP1218 West County Dublin Bulk Supply Point. Bulk Supply Points are interface points between the Transmission System and Distribution System.	Exact location and detail unknown at this early development stage of the other project	Future Planned Project as part of TDP 2023 - 2032	2	Unknown. Other project at early development stage and there is therefore insufficient information to assess	No	N/A	N/A	N/A
N/A Future Planned Project as part of the TDP 2023 - 2032	N/A	EirGrid CP1273 Dublin Central Bulk Supply Point. Bulk Supply Points are interface points between the Transmission System and Distribution System.	Exact location and detail unknown at this early development stage of the other project	Future Planned Project as part of TDP 2023 - 2032	2	Unknown. Other project at early development stage and there is therefore insufficient information to assess	No	N/A	N/A	N/A
N/A Future Planned Project as part of the TDP 2023 - 2032	N/A	EirGrid CP1251 North Wall Station Refurbishment. This project will involve extending the life of the existing North Wall 220kV station.	6.8km from Planning Application Boundary at Belcamp Substation	Future Planned Project as part of TDP 2023 - 2032	2	No	No	N/A	N/A	N/A
N/A Future Planned Project as part of the TDP 2023 - 2032	N/A	EirGrid CP1241 Belcamp Bulk Supply Transfer.	Will overlap with the Proposed Development Planning Application Boundary at Belcamp Substation	Future Planned Project as part of TDP 2023 - 2032	2	Yes	Yes	Construction timeline unknown but scheduled for energisation in Q2 2025. Potential for Construction Phases to overlap. Operational Phases will coincide.	Considering the nature, scale and location of this development, there is no potential for the Construction and Operational Phase to result in cumulative impacts with the Proposed Development.	No
312131	ABP	Uisce Éireann Greater Dublin Drainage Project. This project consists of a new wastewater treatment plant in Clonshagh and co-located sludge hub centre, an orbital sewer, outfall pipeline and regional biosolids storage facility.	Proposed orbital sewer will overlap with the Planning Application Boundary for the proposed cable route on approach to Belcamp Substation	Lodged 20 June 2018 under 301908, and reactivated on 7 December 2021 – no determination as of yet	1	Yes	Yes	Construction is estimated to commence in Q4 2025 and be completed by Q4 2028, with commissioning to take place through to Q4 2029. Potential for Construction Phases to overlap. Operational Phases will coincide.	Considering the nature, scale and location of this development, there is potential for cumulative impacts if Construction Phases were to overlap which are required to be further assessed.	Yes
314724	ABP	Transport Infrastructure Ireland. MetroLink from Swords (Estuary) to Charlemont via Dublin City Centre	Overlaps with the Planning Application Boundary for the proposed cable route	Lodged 30 September 2022– no determination as of yet	1	Yes	Yes	Proposed to deliver MetroLink by 2035 (subject to planning approval), with a 9.25 year construction programme indicated. Potential for Construction Phases to overlap. Operational Phases will coincide.	Considering the nature, scale and location of this development, there is potential for cumulative impacts if Construction Phases were to overlap which are required to be further assessed.	Yes
314232	ABP	Transport Infrastructure Ireland. Dart+ West – electrification and re-signaling of Maynooth and M3 Parkway Line, capacity enhancements at Connolly station, new Spencer Dock station, level crossing closures, new Dart depot west of Maynooth etc.	Directly adjacent to the Planning Application Boundary for the proposed cable route	Lodged 29 July 2022 – no determination as of yet	1	Yes	Yes	Originally proposed to commence construction in the second half of 2023 (subject to planning approval) but planning has not been granted as of February 2024. A 47 month construction programme indicated and there is therefore potential for Construction Phases to overlap. Operational Phases will coincide.	Considering the nature, scale and location of this development, there is potential for cumulative impacts if Construction Phases were to overlap which are required to be further assessed.	Yes

'Other Development' Details						Stage 1		Stage 2		
Application Reference	**Planning Body**	**Applicant for 'Other Development' and Brief Description**	**Approximate Distance from Proposed Development (at Nearest Point to the Planning Application Boundary)**	**Status**	**Tier**	**Within Zone of Influence?**	**Progress to Stage 2?**	**Overlap in Temporal Scope?**	**Scale and Nature (NOTE 1) of Development Likely to Have a Significant Effect?**	**Progress to Stage 3/4?**
313892	ABP	National Transport Authority (NTA) BusConnects – Blanchardstown to City Centre Core Bus Corridor Scheme	3.8km from the Planning Application Boundary for the proposed cable route	Lodged 24 June 2022 – no determination as of yet	1	No	No	N/A	N/A	N/A
314610	ABP	NTA BusConnects – Ballymun / Finglas to City Centre Core Bus Corridor Scheme	3.4km from the Planning Application Boundary for the proposed cable route	Lodged 9 September 2022 – no determination as of yet	1	No	No	N/A	N/A	N/A
313182	ABP	NTA BusConnects – Clongriffin to City Centre Core Bus Corridor Scheme	1.5km from Planning Application Boundary at Belcamp Substation	Granted	1	No	No	N/A	N/A	N/A
317121	ABP	NTA BusConnects - Swords to City Centre Core Bus Corridor Scheme	Overlaps with the Planning Application Boundary proposed cable route along the R132 Regional Road	Lodged 12 May 2023 – no determination as of yet	1	Yes	Yes	Proposed to deliver the BusConnects schemes over the period 2023 to 2028 (subject to planning approval), with a 36 month construction programme indicated. Potential for Construction Phases to overlap. Operational Phases will coincide.	Considering the nature, scale and location of this development, there is potential for cumulative impacts if Construction Phases were to overlap which are required to be further assessed.	Yes
312060 / F21A/0401	ABP / FCC	Gannon Properties Construction of 78 residential units comprising 58 houses, 20 apartment/duplex/triplex units and associated works at Belcamp Hall, Malahide Road, Dublin 17	1km from Planning Application Boundary at Belcamp Substation	Granted	1	Yes	Yes	Timeline for other development unknown. Potential for Construction Phases to overlap. Operational Phases will coincide.	Considering the nature, scale and location of this development, there is potential for cumulative impacts if Construction Phases were to overlap which are required to be further assessed.	Yes
314169 / F22A/0136	ABP / FCC	Gerard Gannon Properties Construction of 40 residential units in one block, including a childcare facility and café at Belcamp Hall, Malahide Road, Dublin 17	695m from Planning Application Boundary at Belcamp Substation	Granted	1	Yes	Yes	Timeline for other development unknown. Potential for Construction Phases to overlap. Operational Phases will coincide.	Considering the nature, scale and location of this development, there is potential for cumulative impacts if Construction Phases were to overlap which are required to be further assessed.	Yes
303687	ABP	Amazon Data Services Ireland Ltd. Provision of a double circuit 110kV underground transmission line between the Belcamp 220kV and 110kV substation and the Darndale 110kV substation covering a distance of approximately two kilometres.	Overlaps with the Proposed Development at Belcamp Substation	Granted	1	Yes	Yes	Timeline for other development unknown. Construction works, testing and reinstatement will take approximately 19 weeks. Limited potential for Construction Phases to overlap. Operational Phases will coincide.	Considering the nature, scale and location of this development, there is no potential for the Construction and Operational Phase to result in cumulative impacts with the Proposed Development.	No
308130	ABP	Enginenode Limited 220kV substation with 2 underground transmission cables between Pace and Bracetown	3m from the Planning Application Boundary for the proposed cable route	Granted	1	Yes	Yes	Timeline for other development unknown. Potential for Construction Phases to overlap. Operational Phases will coincide.	Considering the nature, scale and location of this development, there is potential for cumulative impacts if Construction Phases were to overlap which are required to be further assessed.	Yes
309833 / FW21A/0003	ABP / FCC	Montague Ventures Limited Residential development on site of c.1.7 hectares consisting of construction of 52 no. residential units, refurbishment of existing former barracks building on site, carparking spaces, bicycle parking spaces and all associated site works.	237m from the Planning Application Boundary for the proposed cable route	Granted	1	Yes	Yes	Timeline for other development unknown. Potential for Construction Phases to overlap. Operational Phases will coincide.	Considering the nature, scale and location of this development, there is potential for cumulative impacts if Construction Phases were to overlap which are required to be further assessed.	Yes

'Other Development' Details						Stage 1		Stage 2		
Application Reference	Planning Body	Applicant for 'Other Development' and Brief Description	Approximate Distance from Proposed Development (at Nearest Point to the Planning Application Boundary)	Status	Tier	Within Zone of Influence?	Progress to Stage 2?	Overlap in Temporal Scope?	Scale and Nature (NOTE 1) of Development Likely to Have a Significant Effect?	Progress to Stage 3/4?
312271	ABP	Glenveagh Homes Limited Demolition of an existing shed, construction of 548 no. residential units (401 no. houses, 147 no. apartments), 2 no. creches and associated site works.	184m from the Planning Application Boundary for the proposed cable route	Granted	1	Yes	Yes	Timeline for other development unknown. Construction is estimated to take approximately 36 months. Potential for Construction Phases to overlap. Operational Phases will coincide.	Considering the nature, scale and location of this development, there is potential for cumulative impacts if Construction Phases were to overlap which are required to be further assessed.	Yes
312848 / F21A/0488	ABP / FCC	Gerard Gannon Properties Construction of 77 residential units across 2 no. apartment blocks at Belcamp Hall, Malahide Road, Dublin 17	961m from Planning Application Boundary at Belcamp Substation	Granted	1	Yes	Yes	Timeline for other development unknown. Construction estimated to take 24 months. Potential for Construction Phases to overlap. Operational Phases will coincide.	Considering the nature, scale and location of this development, there is potential for cumulative impacts if Construction Phases were to overlap which are required to be further assessed.	Yes
314894	ABP	Kilshane Energy Ltd. Proposed development of a 220kV Gas Insulated Switchgear (GIS) substation on lands at Kilshane Road, and an underground 220kV transmission line connection to the existing Cruiserath 220kV substation.	557m from the Planning Application Boundary for the proposed cable route	Granted	1	Yes	Yes	Timeline for other development unknown. Potential for Construction Phases to overlap. Operational Phases will coincide.	Considering the nature, scale and location of this development, there is potential for cumulative impacts if Construction Phases were to overlap which are required to be further assessed.	Yes
F21A/0147 / F23A/0006	Fingal County Council (FCC)	Genvest ULC. 2 no single storey light industrial buildings (total floor area of 3,333 sq.m) accommodating 3 units including ancillary office space at site west of Stockhole Lane/Clonshaugh Road, Clonshaugh, Co. Dublin.	121m from the Planning Application Boundary for the proposed cable route	Granted	1	Yes	Yes	Timeline for other development unknown. Potential for Construction Phases to overlap. Operational Phases will coincide.	Considering the nature, scale and location of this development, there is potential for cumulative impacts if Construction Phases were to overlap which are required to be further assessed.	Yes
F20A/0550	FCC	DAA PLC Full planning permission to extend the North Apron in the Airfield at Dublin Airport, Co Dublin to facilitate the provision of twelve aircraft stands and a ground servicing equipment area on a site of 19.2ha.	448m from the Planning Application Boundary for the proposed cable route	Granted	1	Yes	Yes	Timeline for other development unknown. Potential for Construction Phases to overlap. Operational Phases will coincide.	Considering the nature, scale and location of this development, there is potential for cumulative impacts if Construction Phases were to overlap which are required to be further assessed.	Yes
F21A/0681 / 3041/22	FCC / DCC	Mayne Stability Limited Development of access to the Synchronous Compensator Development (Grid Stabilisation Facility) on the site of a c 0.94 ha. at lands south of Belcamp 220KV substation, Belcamp Dublin 17 .	4m from the Planning Application Boundary at Belcamp Substation	Granted	1	Yes	Yes	Timeline for other development unknown. Construction Phase is estimated to take approximately 12 months. Potential for Construction Phases to overlap. Operational Phases will coincide.	Considering the nature, scale and location of this development, there is potential for cumulative impacts if Construction Phases were to overlap which are required to be further assessed.	Yes
FW22A/0167	FCC	IPUT plc Provision of c. 72,753sq.m of logistics and associated office uses across 5 no. buildings on lands comprising c. 26.8ha to the north of the Cherryhound, Tyrrelstown M2/M3 Link Road and south of the R121, Cherryhound, Spricklestown and Killamonan, The Ward, Dublin.	Approximately 500m from the Planning Application Boundary for the proposed cable route	Granted	1	Yes	Yes	Timeline for other development unknown. But construction will take place on a phased basis. Potential for Construction Phases to overlap. Operational Phases will coincide.	Considering the nature, scale and location of this development, there is potential for cumulative impacts if Construction Phases were to overlap which are required to be further assessed.	Yes
FW19A/0177	FCC	ESB Engineering & Major Projects Proposed underground cable route originating from the existing Macetown ESB station (on Damastown Avenue in the townland of Macetown Middle) , running in an easterly direction along Damastown Avenue and the	1km from the Planning Application Boundary for the proposed cable route	Granted	1	Yes	Yes	Timeline for other development unknown. Construction works, testing and reinstatement will take approximately 19 weeks. Potential for Construction Phases to overlap. Operational Phases will coincide.	Considering the nature, scale and location of this development, there is potential for cumulative impacts if Construction Phases were to overlap which are required to be further assessed.	Yes

'Other Development' Details						Stage 1		Stage 2		
Application Reference	Planning Body	Applicant for 'Other Development' and Brief Description	Approximate Distance from Proposed Development (at Nearest Point to the Planning Application Boundary)	Status	Tier	Within Zone of Influence?	Progress to Stage 2?	Overlap in Temporal Scope?	Scale and Nature [NOTE 1] of Development Likely to Have a Significant Effect?	Progress to Stage 3/4?
		R121 (in the townlands of Macetown Middle, Macetown South, Tyrrelstown, Cruiserath and Buzzardstown), to a permitted medium voltage (MV) substation located within a permitted data storage facility in the townlands of Cruiserath and Tyrrelstown								
F18A/0306	FCC	Clarke Family Partnership Permission for the construction of 36 residential units consisting of 30 two storey houses (23 three bedroom type, 7 four bedroom type) and 6 number two bedroom apartments in a three storey block, with ancillary open spaces, boundary treatment and site works at Fosterstown North.	1km from the Planning Application Boundary for the proposed cable route	Granted	1	Yes	Yes	Timeline for other development unknown. Potential for Construction Phases to overlap. Operational Phases will coincide.	Considering the nature, scale and location of this development, there is potential for cumulative impacts if Construction Phases were to overlap which are required to be further assessed.	Yes
FW22A/0156	FCC	Earlstand Corporation Unlimited Company Construction of 6 no. warehouses/logistics units including ancillary office/administration use and entrance/reception areas over two levels (Units 1-6) with a combined total floor gross area (GFA) of 50,934 sq.m at Mooretown and Northwest Logistics Park, Ballycoolin, Dublin 15	1km from the Planning Application Boundary for the proposed cable route	Granted	1	Yes	Yes	Timeline for other development unknown. Potential for Construction Phases to overlap. Operational Phases will coincide.	Considering the nature, scale and location of this development, there is potential for cumulative impacts if Construction Phases were to overlap which are required to be further assessed.	Yes
FW21A/0042	FCC	Glenveagh Homes Ltd The proposed development will consist of 69 no. houses comprising 52 no. 2-storey houses and 17 no. 3-storey houses (13 no. 2-bed units, 39 no. 3-bed units, 17 no. 4-bed units), private open spaces, carports and all associated roads, services, visitor parking.	756m from the Planning Application Boundary for the proposed cable route	Granted	1	Yes	Yes	Timeline for other development unknown. Potential for Construction Phases to overlap. Operational Phases will coincide.	Considering the nature, scale and location of this development, there is potential for cumulative impacts if Construction Phases were to overlap which are required to be further assessed.	Yes
F22A/0682	FCC	Fingleton White The development will consist of alterations to the Dublin Port to Dublin Airport fuel pipeline previously approved under Reg. Ref. F15A/0141. The proposed alterations, in the Athletic Union League/FAI sports grounds, M1 and Dublin Airport, are located within the townlands of Toberbunny and Stockhole, Co. Dublin. Permission is sought to amend the route of the pipeline as follows: It is now proposed to reroute the approved pipeline from Clonshaugh Road North along the southern boundary of Athletic Union League/FAI sports grounds, under the M1 Motorway, into Dublin Airport lands.	Overlaps with the Planning Application Boundary for the proposed cable route	Granted	1	Yes	Yes	Timeline for other development unknown. Potential for Construction Phases to overlap. Operational Phases will coincide.	Considering the nature, scale and location of this development, there is potential for cumulative impacts if Construction Phases were to overlap which are required to be further assessed.	Yes
F23A/0040	FCC	EirGrid CP1213 Belcamp 220kV Extension [NOTE 2] The development will consist of the provision of new electricity transmission infrastructure at the existing ESB Belcamp 220 kV substation	Overlaps with the Planning Application Boundary at Belcamp Substation	Granted	1	Yes	Yes	Timeline for other development unknown. Potential for Construction Phases to overlap. Operational Phases will coincide.	Considering the nature, scale and location of this development, there is potential for cumulative impacts if Construction Phases were to overlap which are required to be further assessed.	Yes

'Other Development' Details						Stage 1		Stage 2		
Application Reference	**Planning Body**	**Applicant for 'Other Development' and Brief Description**	**Approximate Distance from Proposed Development (at Nearest Point to the Planning Application Boundary)**	**Status**	**Tier**	**Within Zone of Influence?**	**Progress to Stage 2?**	**Overlap in Temporal Scope?**	**Scale and Nature (NOTE 1) of Development Likely to Have a Significant Effect?**	**Progress to Stage 3/4?**
F22A/0687	FCC	Clondev Properties Limited The development will consist of 1. Demolition of existing residential dwelling Hollytree House (c. 449.2 sqm). 2. Construction of 85 no. residential apartments (35 no. 1-bed, 37 no. 2-bed units and 13 no. 3 bed units) within a 5 - 8 no. storey (over undercroft) building, with all apartments served by private terrace or balcony.	1km from the Planning Application Boundary for the proposed cable route	Granted	1	Yes	Yes	Timeline for other development unknown. Potential for Construction Phases to overlap. Operational Phases will coincide.	Considering the nature, scale and location of this development, there is potential for cumulative impacts if Construction Phases were to overlap which are required to be further assessed.	Yes
3803/20	Dublin City Council (DCC)	Mullins Developments LLC. 2 no. 2 storey data centre buildings (each 16,576 sqm) at Clonshaugh Business & Technology Park, Dublin 17	739m from the Planning Application Boundary at Belcamp Substation	Granted	1	Yes	Yes	Works have commenced (amended by 3875/21). Not likely for Construction Phases to overlap, but Operational Phases will coincide.	Considering the nature, scale and location of this development, there is no potential for Operational Phase to result in cumulative impacts with the Proposed Development.	No
4367/19	DCC	The Electricity Supply Board (ESB) 200m long medium/low voltage (MV/LV) underground cable (UGC), to be installed in underground cable ducting in a c. 1m wide trench of depth c. 1m within an area of c.200sq.m., connecting the existing ESB network within the former Diamond Innovations site to the existing ESB Darndale substation.	1km from the Planning Application Boundary at Belcamp Substation	Granted	1	Yes	Yes	Timeline for other development unknown. Potential for Construction Phases to overlap. Operational Phases will coincide.	Considering the nature, scale and location of this development, there is potential for cumulative impacts if Construction Phases were to overlap which are required to be further assessed.	Yes
2360290	MCC	Marina Quarter Ltd. Large-Scale Residential Development consisting of 267 no. residential units comprising 145 no. dwelling houses and 122 no. apartments/duplexes providing a mix of 1, 2, 3 and 4-bed units at Bennetstown (townland) to the south of the M3 Parkway park and ride and rail station, and also extending into Pace & Dunboyne (townlands), Dunboyne North, Co. Meath	315m from the Planning Application Boundary for the proposed cable route	Lodged with MCC on 21 September 2023. Request for Further Information by MCC on 15 November 2023 – no decision as of yet	1	Yes	Yes	Timeline unknown but construction is estimated to take 3 years. Potential for Construction Phases to overlap. Operational Phases will coincide.	Considering the nature, scale and location of this development, there is potential for cumulative impacts if Construction Phases were to overlap which are required to be further assessed.	Yes
22837 / 23136	MCC	GDA Energy 4 Ltd Proposed development constitutes a new battery energy storage facility & synchronous condenser, with associated change of use on lands currently in agricultural use. The proposed development will comprise of rechargeable battery units with grid forming inverters contained within 253 no. 40 foot containers on site at Woodland, County Meath.	160m from the Planning Application Boundary at Woodland Substation	Granted	1	Yes	Yes	Timeline unknown but construction is estimated to take 10 years. Potential for Construction Phases to overlap. Operational Phases will coincide.	Considering the nature, scale and location of this development, there is potential for cumulative impacts if Construction Phases were to overlap which are required to be further assessed.	Yes
RA170873 / 23787	MCC	South Meath Solar Farm Limited Solar farm including photovoltaic panels on ground mounted frames, inverter stations, 1 No. 110KV 4 Bay Electrical Substation at a site in the townlands of Vesingstown, Polleban and Harlockstown, Dunboyne, County Meath.	660m from the Planning Application Boundary for the proposed cable route	Granted	1	Yes	Yes	Timeline for other development unknown. Potential for Construction Phases to overlap. Operational Phases will coincide.	Considering the nature, scale and location of this development, there is potential for cumulative impacts if Construction Phases were to overlap which are required to be further assessed.	Yes
221550	MCC	EirGrid PLC	Overlaps with the Planning Application	Permitted.	1	Yes	Yes	CP1194 is due to commence construction in Q2 2025 and be complete by Q4 2028. There	Considering the nature, scale and location of this development, there is potential for cumulative impacts if	Yes

'Other Development' Details						Stage 1		Stage 2		
Application Reference	Planning Body	Applicant for 'Other Development' and Brief Description	Approximate Distance from Proposed Development (at Nearest Point to the Planning Application Boundary)	Status	Tier	Within Zone of Influence?	Progress to Stage 2?	Overlap in Temporal Scope?	Scale and Nature (NOTE 1) of Development Likely to Have a Significant Effect?	Progress to Stage 3/4?
		CP1194 Woodland Station 400kV Station Redevelopment. The development will consist of 1. Installation of outdoor Air Insulated Switchgear (AIS) electrical apparatus, including an associated extension to the hardstand compound (approximately 4 hectares) to facilitate same.	Boundary at Woodland Substation	Due to commence construction in Q2 2025 and be complete by Q4 2028.				is therefore the potential for Construction Phases to overlap. Operational Phases will coincide.	Construction Phases were to overlap which are required to be further assessed.	
N/A	N/A	Uisce Éireann Trunk Water Mains Replacement – construction of a new trunk watermain to serve parts of Dublin North City and North County Dublin.	Within the Planning Application Boundary for the proposed cable route along Kilreesk Road (north-west of Dublin Airport)	Works in progress	1	Yes	Yes	Project in progress. Construction Phases not likely to overlap as this project is nearing completion. Operational Phases will coincide.	Considering the nature, scale and location of this development, there is no potential for Operational Phase to result in cumulative impacts with the Proposed Development.	No
N/A	N/A	Transport Infrastructure Ireland (TII) N2 Rath Roundabout to Kilmoon Cross (Transportation Corridor). 6km scheme located to the north of Ashbourne. Project on hold due to funding constraints.	2.3km from the Planning Application Boundary for the proposed cable route	Design and Evaluation Stage. Listed under the Major Roads and Greenways Projects Active List	2	No	No	N/A	N/A	N/A
N/A	N/A	TII N2 Slane Bypass and Public Realm Enhancement Scheme. The proposed project is 3.4km in length and is envisaged to run east of Slane Village on the N2, addressing a significant substandard section of the existing route. The project will also encompass traffic management measures within Slane village, together with works on the N51 route	30km from the Planning Application Boundary for the proposed cable route	Design and Evaluation Stage. Listed under the Major Roads and Greenways Projects Active List	2	No	No	N/A	N/A	N/A
N/A	N/A	TII N3 M50 to Clonee (Transportation Corridor). This project may include online-improvements to both the mainline and junctions, and the development of bus lanes.	6km from the Planning Application Boundary for the proposed cable route	Design and Evaluation Stage. Listed under the Major Roads and Greenways Projects Active List	2	No	No	N/A	N/A	N/A
N/A	N/A	TII N3 Virginia Bypass. The proposed project is 16.5km in length and will extend from the end of the existing N3 dual carriageway at the Cavan/Meath border at Edenburt to Lisgrea in Cavan.	50km from the Planning Application Boundary for the proposed cable route	Options Selection Stage. Listed under the Major Roads and Greenways Projects Active List	2	No	No	N/A	N/A	N/A
N/A	N/A	NTA Navan Rail Line Project. It is proposed to extend the rail system from the M3 Parkway terminus station (just west of Dunboyne) to	225m from the Planning Application Boundary for the proposed cable route	Options Selection Stage. Listed as a 'Medium-Term' project (2031 – 2036) under the	2	Yes	No	The Navan Rail Line Project is listed for delivery in the medium-term category under the Greater Dublin Area Transport Strategy 2022 – 2042. Projects under this category are likely to be delivered between 2031 and 2036.	Considering the nature, scale and location of this development, there is no potential for Operational Phase to result in cumulative impacts with the Proposed Development.	No

'Other Development' Details						Stage 1		Stage 2		
Application Reference	**Planning Body**	**Applicant for 'Other Development' and Brief Description**	**Approximate Distance from Proposed Development (at Nearest Point to the Planning Application Boundary)**	**Status**	**Tier**	**Within Zone of Influence?**	**Progress to Stage 2?**	**Overlap in Temporal Scope?**	**Scale and Nature (NOTE 1) of Development Likely to Have a Significant Effect?**	**Progress to Stage 3/4?**
		Navan town, serving Dunshaughlin and Kilmessan along its route.		Greater Dublin Area Transport Strategy 2022 – 2042				There is therefore no potential for the Construction Phases to overlap. The Operational Phases will coincide.		
N/A	N/A	NTA Leinster Orbital Route comprises an orbital road proposal extending from Drogheda to the Naas/Newbridge area with intermediate links to Navan and other towns.	Exact distance is not known at this stage as there is no defined route for this other project	Feasibility stage. Listed under the Greater Dublin Area Transport Strategy 2022 – 2042	2	No	No	N/A	N/A	N/A
N/A	N/A	NTA Emergency Diversion Routes (M50). Road link between the N3 and N4 national roads, which could provide critical infrastructure resilience in the event of incidents arising on the M50 between Junctions 6 and 7, in addition to providing potential orbital public transport corridor.	Exact distance is not known at this early development stage, as there is no defined route for this other project	Feasibility stage. Listed under the Greater Dublin Area Transport Strategy 2022 – 2042	2	No	No	N/A	N/A	N/A

NOTE 1: The scale refers to the size of the development, and the nature refers to the type of development and the works required to construct / operate that development

NOTE 2: In order to facilitate the connection, works will be required within the extension to the hardstand compound at Belcamp Substation permitted under Planning Reg. Ref. F23A/0040 . These works (Belcamp Substation Extension Modification) will be the subject of a separate application and comprise the following:

- The movement of northern boundary of the hardstanding area further to the north and reconfiguration of same (extending the hardstanding area).
- Modification to the internal access road (moving it further to the north)
- Reduction in the area intended for spreading of material from development site (to the north outside of the extended compound).

These known modifications have been accounted for in the cumulative impact assessment.

Table 2: Stage 4 Assessment

Tier	Application Reference / Planning Body	Applicant for 'Other Development' and Brief Description	Approximate Distance from Proposed Development Infrastructure (at Nearest Point to the Planning Application Boundary)	Assessment of Cumulative Impact with Proposed Development	Proposed Mitigation Measures	Residual Cumulative Impact
1	PCI0001 - ABP	EirGrid CP0466 North South Interconnector This project involves a second, higher-capacity interconnector being added, to connect the electricity grids of Ireland and Northern Ireland. It will connect to the network in Northern Ireland in Co Tyrone, cross the border between Armagh and Monaghan, and then join the network in Ireland at an existing substation in County Meath.	Overlaps with the Proposed Development at Woodland Substation	Population: There is no potential for cumulative impacts during the Construction and Operational Phases, as while both developments will share a portion of the same study area, there are no sensitive receptors located within this area.	Population: None required	Population: None
				Human Health: There is no potential for cumulative impacts during the Construction and Operational Phases, as while both developments will share a portion of the same study area, there are no sensitive receptors located within this area. During the Operational Phase, both projects have been designed to comply with ICIRIP Guidelines on Limiting Exposure to Electromagnetic Fields (EMF) and so there will be no cumulative EMF impacts. There is no potential for other cumulative impacts during the Operational Phases.	Human Health: None required	Human Health: None
				Air Quality: There is a Negligible to Medium risk of dust impacts as a result of the Proposed Development which is assessed as a Not Significant impact. Therefore, the potential impact of the two developments, in the event of Construction Phases overlapping is assessed as Negative, Not Significant and Short-Term. There is no potential for cumulative impacts during the Operational Phases.	Air Quality: Although there is no potential for significant cumulative impacts, the mitigation measures outlined in Chapter 7 (Air Quality) in Volume 2 of the EIAR and also outlined in the Construction Environmental Management Plan (CEMP) (included as a standalone document in the planning application pack) will ensure that dust and particulate matter emissions are minimised. No additional mitigation measures are required.	Air Quality: Construction Phase: Negative, Not Significant and Short-Term Operational Phase: None
				Noise and Vibration: Although there is an overlap with CP0466 at Woodland Substation, there is unlikely to be cumulative noise and vibration impacts during the Construction Phases because there are no sensitive receptors in this area. There is no potential for a cumulative noise and vibration impact during the Operational Phase of both developments.	Noise and Vibration: None required	Noise and Vibration: None
				Biodiversity: In considering the nature of the works, there is no potential for significant cumulative impacts on biodiversity during the Construction Phase of both developments. The impact is assessed as Negative, Not Significant and Short-Term. There is no potential for a cumulative impact during the Operational Phases of both developments.	Biodiversity: None required	Biodiversity: Construction Phase: Negative, Not Significant and Short-Term Operational Phase: None
				Soils and Geology: There is no potential for cumulative impacts during the Construction and Operational Phases, as there are no geological heritage sites or contaminated land sites along the proposed route. Hydrogeology: Should work from both developments be carried out at the same time, there is the potential for Negative, Slight and Short-Term cumulative impacts on groundwater quality. No long-term significant changes to groundwater flows, levels and quality are predicted as part of the Proposed Development. Therefore, there is no potential for a cumulative impacts during the Operational Phase of both developments.	Soils and Geology: None required Hydrogeology: The proposed mitigation measures outlined in Chapter 11 (Soils, Geology and Hydrogeology) in Volume 2 of the EIAR are deemed sufficient. No additional mitigation measures are required.	Soils and Geology: None Hydrogeology: Construction Phase: Negative, Imperceptible to Slight and Short-Term for groundwater quality. Operational Phase: None

Tier	Application Reference / Planning Body	Applicant for 'Other Development' and Brief Description	Approximate Distance from Proposed Development Infrastructure (at Nearest Point to the Planning Application Boundary)	Assessment of Cumulative Impact with Proposed Development	Proposed Mitigation Measures	Residual Cumulative Impact
				Hydrology: There is the potential for a Negative, Significant and Short-Term impact on the Dunboyne Stream_010 waterbody as both developments would cross this watercourse if Construction Phases were to overlap. Potential impacts would result from increases in sediment laden runoff, removal of bed material and changes to the bed and bank as a result of open cut trenching. There is no potential for a cumulative impact during the Operational Phases of both developments as the cables would not interact with surface water features.	Hydrology: The mitigation measures outlined in Chapter 12 (Hydrology) in Volume 2 of the EIAR are sufficient to prevent sediment laden runoff entering the watercourse and to maintain flows through the crossings. No additional mitigation measures are required.	Hydrology: Construction Phase: Negative, Not Significant and Short-Term Operational Phase: None
				Archaeology, Architectural and Cultural Heritage: There is no potential for cumulative impacts to arise during the Construction and Operational Phases as no impacts on archaeology, architectural and cultural heritage were assessed in the spatial overlap between the two developments.	Archaeology, Architectural and Cultural Heritage: None	Archaeology, Architectural and Cultural Heritage: None
				Traffic: There is the potential for a Negative, Not Significant and Short-Term impact on traffic if Construction Phases were to overlap due to cumulative construction traffic on R125, R147, R154, R156, R157 and The Red Road. No significant cumulative impacts are anticipated as cumulative traffic will not be sufficient to trigger cumulative effects. The sensitivity of the area is negligible, being a rural unclassified road.	Traffic: No significant cumulative traffic impacts are predicted which will require mitigation. Therefore, no cumulative mitigation is proposed. However, Construction Phase traffic for the Proposed Development will be managed in line with a detailed Construction Traffic Management Plan, which will be adapted from the Construction Phase Traffic Management Plan included as Appendix B to the CEMP (included as a standalone document in the planning application pack).	Traffic: Construction Phase: Negative, Not Significant and Short-Term Operational Phase: None
				Agronomy and Equine: There is no potential for cumulative impacts on agronomy and equine during the Construction and Operational Phases as overlaps between the two developments will occur within the footprint of the existing Woodland Substation.	Agronomy and Equine: None required	Agronomy and Equine: None
				Waste: Both developments will create surplus materials (e.g. soils, concrete and asphalt) which will require proper management and removal from the sites to be either treated as a waste or as a by-product (as appropriate and suitable for the material type, condition and quantity). In the event of overlapping Construction Phases, the waste from both developments could have a potentially Negative, Significant and Short-Term cumulative impact on the annual capacity of waste management facilities within the region during overlapping years, in the absence of any mitigation. Potential wastes associated with the Operational Phases for both developments are insignificant, and therefore, there are no significant cumulative impacts anticipated. The impact is therefore deemed as Neutral, Imperceptible and Long-Term.	Waste: The following measure, which is included in Chapter 16 (Waste) in Volume 2 of this EIAR will be implemented: In order to minimise the creation of waste, opportunities for reuse of materials (e.g. excavated material as fill) within both developments will be sought. Where there is remaining excess material, the potential for reuse as a by-product in accordance with Article 27 of the Waste Management Act will be investigated. Where material is unsuitable for either type of reuse, it will be treated as a waste. Appropriate handling, storage and management of any waste streams arising on either development will be managed in accordance with legislative requirements and best practice. No additional mitigation measures are required.	Waste: Construction Phase: Negative, Not Significant and Short-Term Operational Phase: Neutral, Imperceptible and Long-Term
				Material Assets: Given the minimal spatial overlap, there is limited potential for an overlap in interfaces with existing utilities requiring diversions during the Construction Phases of both developments. The potential impact is therefore assessed as Neutral, Imperceptible and Temporary. There is the potential for a Positive, Significant and Long-Term cumulative impact on the regional electricity network once both developments are operational.	Material Assets: The mitigation included in this EIAR and in the CEMP (included as a standalone documents in the planning application pack) is deemed sufficient to mitigate and / or manage the identified potential impacts. No additional mitigation measures are required.	Material Assets: Construction Phase: Neutral, Imperceptible and Temporary Operational Phase: Positive, Significant and Long-Term
				Landscape and Visual: Visual cumulative impact, if Construction Phases were to overlap, is deemed to be Neutral, Imperceptible and Short-Term, due to the notable intervening distance to the nearest visual receptors.	Landscape and Visual: No significant cumulative landscape or visual impacts are predicted which will require mitigation. Therefore, no cumulative landscape or visual mitigation is proposed.	Landscape and Visual: Construction Phase (visual): Neutral, Imperceptible and Short-Term Construction Phase (landscape): Negative, Slight and Short-Term

Tier	Application Reference / Planning Body	Applicant for 'Other Development' and Brief Description	Approximate Distance from Proposed Development Infrastructure (at Nearest Point to the Planning Application Boundary)	Assessment of Cumulative Impact with Proposed Development	Proposed Mitigation Measures	Residual Cumulative Impact
				Cumulative construction works on both developments would be transient in nature and would be similar in scale. For these reasons, the Construction Phase landscape cumulative impacts are deemed to be Negative, Slight and Short-Term. Due to the notable intervening distance to the nearest visual receptors, Operational Phase visual impacts are deemed to be Negative, Imperceptible and Permanent. As all permanent above ground Operational Phase structures will be within or immediately adjacent to the existing electrical infrastructure, thus Operational Phase landscape cumulative impacts are deemed to be Negative, Imperceptible and Permanent.		Operational Phase: Negative, Imperceptible and Permanent
1	316372 - ABP	EirGrid CP0966 Kildare Meath Grid Upgrade Development of a 400 kV underground cable between Dunstown 400 kV substation in the townland of Dunnstown, Co. Kildare and Woodland 400 kV substation in the townland of Woodland, Co. Meath.	Overlaps with the Proposed Development at Woodland Substation and along the 'Woodland Corridor' between Woodland Substation and the R156 Regional Road	<u>Population:</u> No potential for cumulative impacts during the Construction and Operational Phases, as while both developments will share a portion of the same study area, there are no sensitive receptors located within this area.	<u>Population:</u> None required	<u>Population:</u> None
				<u>Human Health:</u> Both developments may have a temporary effect on access along the Red Road and the point of intersection between Red Road and the R156 in the region of vehicular road users, walkers and cyclists and horse riders, however given the very limited duration of impact and limited number of and limited number of people affected, the cumulative effect on public health (transport modes, access and connections) is assessed as Negative, Imperceptible and Temporary during construction. During the Operational Phase, both projects have been designed to comply with ICIRIP Guidelines on Limiting Exposure to EMF and so there will be no cumulative EMF impacts. There is no potential for other cumulative impacts during the Operational Phases.	<u>Human Health:</u> No significant cumulative health impacts are predicted which will require mitigation. Therefore, no cumulative mitigation is proposed.	<u>Human Health:</u> Construction Phase: Negative, Imperceptible and Temporary Operational Phase: None
				<u>Air Quality:</u> There is a Negligible to Medium risk of dust impacts as a result of the Proposed Development which is assessed as a Not Significant impact. Therefore, the potential impact of the two developments, in the event of Construction Phases overlapping is assessed as Negative, Not Significant and Short-Term. There is no potential for cumulative impacts during the Operational Phases.	<u>Air Quality:</u> Although there is no potential for significant cumulative impacts, the mitigation measures outlined in Chapter 7 (Air Quality) in Volume 2 of the EIAR and also outlined in the CEMP (included as a standalone document in the planning application pack) will ensure that dust and particulate matter emissions are minimised. In addition, liaison meetings with CP0966 construction management team will be held to ensure plans in the Woodland Corridor are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport / deliveries which might be using the same strategic road network routes.	<u>Air Quality:</u> Construction Phase: Negative, Not Significant and Short-Term Operational Phase: None
				<u>Noise and Vibration:</u> There is the potential for a Negative, Not Significant and Short-Term impact, in the event of overlapping Construction Phases as there is a spatial overlap with both developments. There is no potential for a cumulative impact during the Operational Phases of both developments.	<u>Noise and Vibration:</u> None required	<u>Noise and Vibration:</u> Construction Phase: Negative, Not Significant and Short-Term Operational Phase: None
				<u>Biodiversity:</u> Water Quality: Adjacent to the Woodland Substation, there is the potential for a Negative, Significant and Short-Term impact on Dunboyne_010 as both developments would cross this watercourse if Construction Phases were to overlap. Impacts would be because of increases in sediment laden runoff, removal of bed material and changes to the bed and bank as a result of open cut trenching. Calcareous Grassland at Woodland Substation: There is a spatial overlap at Woodland Substation but the Planning Application Boundary for these two	<u>Biodiversity:</u> The following mitigation measures, will be implemented during the Construction Phase: Water Quality: The mitigation measures outlined in Chapter 12 (Hydrology) in Volume 2 of the EIAR will be implemented in full. In addition to the mitigation provided for in this EIAR, the following additional mitigation measure will be implemented:	<u>Biodiversity:</u> Construction Phase: • Water Quality: Negative, Not Significant and Short-Term; • Calcareous Grassland: None • Treelines: Negative, Moderate and Long-Term; • Bats: Negative, Not Significant and Short-Term; and

Tier	Application Reference / Planning Body	Applicant for 'Other Development' and Brief Description	Approximate Distance from Proposed Development Infrastructure (at Nearest Point to the Planning Application Boundary)	Assessment of Cumulative Impact with Proposed Development	Proposed Mitigation Measures	Residual Cumulative Impact
				developments is the same, and Construction Phases are likely to overlap. Dry calcareous grassland occupies much of the habitat within Woodland Substation but the impact on both projects as individually assessed will be the same and there will not be a cumulative impact between them. Treelines: For both developments, the loss of treelines / grassland is considered a likely Significant impact. The permanent treeline loss for CP0966 within the entirety of its Planning Application Boundary is approximately 772m and the permanent treeline loss for within the entirety of the Proposed Development Planning Application is approximately 0.04km. Treeline loss between Woodland Substation and R156 Regional Road (shared corridor) will be the same, but along most of the route it will be cumulative. The combined impact is assessed as Negative,Significant and Long-Term. Bats: Not bat roots were found within both overlapping development study areas. However, as trees will be felled over both developments and as bats switch roost trees regularly, there is a risk that bats might colonise trees within which none were previously recorded. There is therefore a risk that roots could be lost and bats killed injured or disturbed. Habitat loss, particular of linear features such as hedges and trees could lead to severance effects as bats commonly use such features for commuting. Therefore, there is potential for a cumulative impact resulting from construction for these two developments on bats that is assessed as Negative, Significant and Long-Term. Breeding Birds: For both developments, the loss of nesting and foraging habitat and displacement of breeding birds due to impacts to trees and hedgerows is considered a likely significant impact at local level. The effect is likely to be cumulative due to number of trees and length of hedgerows to be removed. During construction, there is potential for a Negative, Significant and Medium-Term impact on breeding birds. There is no potential for a cumulative impact during the Operational Phase of both developments.	• Given the proximity of the two development crossings of the Dunboyne Stream_010 water body, coordination of the construction programmes for the two developments will be required between the respective appointed contractors to ensure that, where possible, works to cross the water body are undertaken at the same time, and as such, minimising disruption. Calcareous Grassland at Woodland Substation: As outlined in Chapter 10 (Biodiversity) in Volume 2 of the EIAR, the appointed contractor's Ecological Clerk of Works (ECOW) will develop site-specific re-instatement plans for all semi-natural habitats (including dry calcareous grassland, dry meadows and grassy verges). Locally collected seed from similar habitat will be used for re-instatement. Treelines and Breeding Birds: As outlined in Chapter 10 (Biodiversity) in Volume 2 of the EIAR, replacement tree planting, and replanting of hedges, will be undertaken at agreed compensation sites and along the Proposed Development for hedges. Bats: As outlined in Chapter 10 (Biodiversity) in Volume 2 of the EIAR, any roosts recorded during the pre-construction surveys will be felled under a derogation licence. As part of the licence, mitigation measures such as the provision of bat boxes as alternative roosts will be required. As well as bat box installation, mitigation includes replacement tree planting at agreed compensation sites. Tree planting on easements, subject to approval by EirGrid and ESB Networks.	• Breeding Birds: Negative, Not Significant and Medium-Term. Operational Phase: None
				<u>Soils and Geology:</u> There is no potential for cumulative impacts during the Construction and Operational Phases, as there are no geological heritage sites or contaminated land sites along the proposed route. <u>Hydrogeology:</u> Any localised dewatering effect is expected to be minor and localised and very short lived. At the aquifer scale, this is expected to result in a potential Negative, Negligible and Short-Term impact to the underlying aquifers. One potential GWDTE site (GWDTEw2) is located within 100 m of the proposed cable route and could be impacted by localised short lived dewatering. This has the potential to result in a Negative, Moderate and Short-Term significance on the hydrology of GWDTEw2. Should work from both developments be carried out at the same time, there is the potential for Negative, Slight and Short-Term cumulative impacts on groundwater quality. No long-term significant changes to groundwater flows, levels and quality are predicted as part of the Proposed Development. Therefore, there is no potential for a cumulative impacts during the Operational Phase of both developments.	<u>Soils and Geology:</u> None required <u>Hydrogeology:</u> The proposed mitigation measures outlined in Chapter 11 (Soils, Geology and Hydrogeology) in Volume 2 of the EIAR are deemed sufficient. No additional mitigation measures are required.	<u>Soils and Geology:</u> None <u>Hydrogeology:</u> Construction Phase: Negative, Negligible and Short-Term for underlying aquifers, Negative, Imperceptible to Slight and Short-Term for the hydrology of GWDTEw2, and Negative, Imperceptible to Slight and Short-Term for groundwater quality. Operational Phase: None

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				Hydrology: Adjacent to the Woodland Substation, there is the potential for a Negative, Significant and Short-Term impact on Dunboyne_010 as both developments would cross this watercourse if Construction Phases were to overlap. Impacts would be because of potential increases in sediment laden runoff, removal of bed material and changes to the bed and bank as a result of open cut trenching. There is no potential for a cumulative impact during the Operational Phases of both developments as the cable would not interact with surface water features.	Hydrology: The mitigation measures outlined in Chapter 12 (Hydrology) in Volume 2 of the EIAR will be implemented in full. In addition to the mitigation provided for in this EIAR, the following additional mitigation measure will be implemented: • Given the proximity of the two development crossings of the Dunboyne Stream_010 water body, coordination of the construction programmes for the two developments will be required between the respective appointed contractors to ensure that, where possible, works to cross the water body are undertaken at the same time, and as such, minimising disruption.	Hydrology: Construction Phase: Negative, Not Significant, Short-Term Operational Phase: None
				Archaeology, Architectural Heritage and Cultural Heritage: There is no potential for cumulative impacts on archaeology, architectural and cultural heritage due to the Construction and Operational Phases of both developments, as the footprint of the working area will be the same, with the same receptors to be affected by either development. Therefore, the impacts in the Woodland Corridor are individual impacts, as assessed Chapter 13 (Archaeology, Architectural Heritage and Cultural Heritage) in Volume 2 of this EIAR. There is no potential for a cumulative impact during the Operational Phase of both developments.	Archaeology, Architectural Heritage and Cultural Heritage: None required	Archaeology, Architectural Heritage and Cultural Heritage: None
				Traffic: There is the potential for a Negative, Not Significant and Short-Term impact on traffic if Construction Phases were to overlap due to cumulative construction traffic on R125, R147, R154, R156, R157 and The Red Road. No significant cumulative impacts are anticipated as cumulative traffic will not be sufficient to trigger cumulative effects. All roads experiencing cumulative traffic will experience less than a 5% total increase with The Red Road the only exception, impacted by up to 15%. The sensitivity of the area is also negligible / low, being far from any major residential areas and located on rural Regional and local roads and therefore not significant. There is no potential for a cumulative traffic impact during the Operational Phase of both developments.	Traffic: Despite there being no predicted cumulative impacts as a result of the Construction Phases, the following additional mitigation measures will be implemented: • Coordination of the construction programmes for the two developments will be required to ensure that there are no conflicting road closures from either project at the same time; and • Cumulative construction traffic will also be timed not to coincide at peaks in construction programmes and will not be sufficient to trigger cumulative impacts, where possible. Construction Phase traffic for the Proposed Development will be managed in line with a detailed Construction Traffic Management Plan, which will be adapted from the Construction Phase Traffic Management Plan included as Appendix B to the Construction Environmental Management Plan (included as a standalone document in the planning application pack).	Traffic: Construction Phase: Negative, Not Significant and Short-Term Operational Phase: None
				Agronomy and Equine: There is the potential for cumulative impacts along the 'Woodland Corridor' where either the Construction Phase of CP0966 occurs simultaneously or at a different time. The footprint of the working area of the CP0966 development and the Proposed Development will be the same in this corridor. However, the additional soil excavation and disturbance to soil structure and drainage will occur due to the construction of the CP0966 development. During the Operational Phase, the additional underground cable and associated infrastructure (e.g. Joint Bays) located on farms along the 'Woodland Corridor' has the potential to have additional impacts on land utilisation and permanent land take. There is the potential for Construction and Operational Phase cumulative impacts on the following land parcels: • Land parcel Ref No 1 – Negative, Not Significant and Long-Term • Land parcel Ref No 2 – Negative, Not Significant and Long-Term • Land parcel Ref No 3 – Negative, Slight and Long-Term • Land parcel Ref No 4 – Negative, Slight and Long-Term	Agronomy and Equine: The mitigation measures proposed in in Chapter 15 (Agronomy and Equine) in Volume 2 of the EIAR are sufficient to address cumulative impacts, where applicable. No additional mitigation measures are required.	Agronomy and Equine: Construction and Operational Phases: • Land parcel Ref No 1 – Negative, Not Significant and Long-Term • Land parcel Ref No 2 – Negative, Not Significant and Long-Term • Land parcel Ref No 3 – Negative, Slight and Long-Term • Land parcel Ref No 4 – Negative, Slight and Long-Term

Tier	Application Reference / Planning Body	Applicant for 'Other Development' and Brief Description	Approximate Distance from Proposed Development Infrastructure (at Nearest Point to the Planning Application Boundary)	Assessment of Cumulative Impact with Proposed Development	Proposed Mitigation Measures	Residual Cumulative Impact
				<u>Waste:</u> Both developments will create surplus materials (e.g. soils, concrete and asphalt) which will require proper management and removal from the sites to be either treated as a waste or as a by-product (as appropriate and suitable for the material type, condition and quantity). In the event of overlapping Construction Phases, the waste from both developments could have a potentially Negative, Significant and Short-Term cumulative impact on the annual capacity of waste management facilities within the region during overlapping years, in the absence of any mitigation. Potential wastes associated with the Operational Phases for both developments are insignificant, and therefore, there are no significant cumulative impacts anticipated. The impact is therefore deemed as Neutral, Imperceptible and Long-Term.	<u>Waste:</u> The following measure, which is included in Chapter 16 (Waste) in Volume 2 of this EIAR will be implemented: In order to minimise the creation of waste, opportunities for reuse of materials (e.g. excavated material as fill) within both developments will be sought. Where there is remaining excess material, the potential for reuse as a by-product in accordance with Article 27 of the Waste Management Act will be investigated. Where material is unsuitable for either type of reuse, it will be treated as a waste. Appropriate handling, storage and management of any waste streams arising on either development will be managed in accordance with legislative requirements and best practice. No additional mitigation measures are required.	<u>Waste:</u> Construction Phase: Negative, Not Significant and Short-Term Operational Phase: Neutral, Imperceptible and Long-Term
				<u>Material Assets:</u> No known existing utility interfaces identified which may require diversion at the location where the two developments overlap. Potential impact is Neutral, Imperceptible and Temporary during the Construction Phase. There is the potential for a Positive, Significant and Long-Term cumulative impact on the regional electricity network once both developments are operational.	<u>Material Assets:</u> Coordination / consultation between the appointed contractors for the two developments will be required in the event that there are overlapping works within the Woodland Corridor area. Any future utility work identified as being required during the Construction Phase will be undertaken in consultation with the relevant utility companies.	<u>Material Assets:</u> Construction Phase: Neutral, Imperceptible and Temporary Operational Phase: Positive, Significant and Long-Term
				<u>Landscape and Visual:</u> Significant cumulative impacts are not anticipated during the Construction or Operational Phase for landscape or visual. If the Construction Phase of the Proposed Development overlaps with the Construction Phase of the CP0966 development, there is the potential for cumulative visual impacts on receptors located (in the townlands of Ribstown and Culcommon) along the local road to the east of the 'Woodland Corridor' between Woodland Substation and the R156 Regional Road. There is also the potential for cumulative visual impacts on receptors located (in the townlands of Culcommon and Barstown) along R156 Regional Road. Construction Phase visual impacts for the CP0966 development are deemed to be no greater than Adverse (Negative), Slight and Short-Term. The 'Woodland Corridor' between Woodland Substation and the R156 Regional Road occurs within the Tara Skryne Hills landscape character area. The significance of the impact of the CP0966 development on the Tara Skryne Hills landscape character area during the Construction Phase is deemed to be Adverse (Negative), Moderate-Slight and Short-Term. Potential cumulative Construction Phase impacts could arise due to increased intensity of construction activity within the Planning Application Boundary and increased vehicle movement on the nearby road network. It is not uncommon to see tractors and plant machines operating within agricultural fields, but the construction works would represent an increased intensity. However, cumulative construction works would be transient in nature and would result in brief visual intrusions for nearby receptors rather than producing an enduring visual obstruction. For these reasons, the Construction Phase visual cumulative impacts are deemed to be Negative (Adverse), Slight and Short-Term and the Construction Phase landscape cumulative impacts are deemed to be Negative (Adverse), Moderate-slight and Short-term. Operational Phase visual effects are deemed to be no greater than Negative (Adverse), Slight and Permanent. The significance of the effect on the Tara Skryne Hills landscape character area during the Operational Phase is deemed to be Negative (Adverse), Imperceptible and Permanent.	<u>Landscape and Visual:</u> No significant cumulative landscape or visual impacts are predicted which will require mitigation. Therefore, no cumulative landscape or visual mitigation is proposed.	<u>Landscape and Visual:</u> Construction Phase visual: Negative (Adverse), Slight and Short-Term. Construction Phase landscape: Negative (Adverse), Moderate-Slight and Short-Term. Operational Phase visual: Negative (Adverse), Slight and Permanent. Operational Phase landscape: Negative (Adverse), Imperceptible and Permanent.

Tier	Application Reference / Planning Body	Applicant for 'Other Development' and Brief Description	Approximate Distance from Proposed Development Infrastructure (at Nearest Point to the Planning Application Boundary)	Assessment of Cumulative Impact with Proposed Development	Proposed Mitigation Measures	Residual Cumulative Impact
1	312131 - ABP	Uisce Éireann Greater Dublin Drainage Project. This project consists of a new wastewater treatment plant in Clonshagh and co-located sludge hub centre, an orbital sewer, outfall pipeline and regional biosolids storage facility.	Proposed orbital sewer will overlap with the proposed cable on approach to Belcamp Substation.	<u>Population:</u> There is the potential for the following cumulative impacts with this other development, if the Construction Phases were to overlap, as the footprint of both developments overlap: • Negative, Slight and Temporary impact on amenity; • Negative, Slight to Moderate and Temporary on accessibility and severance of nearby sensitive receptors; • Positive, Not Significant and Short-Term on employment; and • Negative, Not Significant and Temporary on the local economy. There is no potential for cumulative impacts during the Operational Phases of the developments.	<u>Population:</u> The mitigation included in this EIAR is deemed sufficient to mitigate and / or manage the identified potential impacts. No additional mitigation measures are required.	<u>Population:</u> Construction Phase: Neutral, Not Significant and Temporary for amenity, accessibility and severance and the local economy; and Positive, Not Significant and Short-Term for employment Operational Phase: None
				<u>Human Health:</u> Should the Construction Phases of the two developments overlap, there is the potential for cumulative impacts on the air quality and noise health determinants for residents of small areas 267005001/02 and 267001009/03 in Dublin. Given the rolling nature of the construction programme for the Proposed Development, the significance of the cumulative impact is considered to be Negative, Imperceptible and Temporary during construction. No cumulative impacts on health determinants are considered likely during the Operational Phases.	<u>Human Health:</u> No significant cumulative health impacts are predicted which will require mitigation. Therefore, no cumulative mitigation is proposed.	<u>Human Health:</u> Construction Phase: Negative, Imperceptible and Temporary Operational Phase: None
				<u>Air Quality:</u> There is a Negligible to Medium risk of dust impacts as a result of the Proposed Development which is assessed as a Not Significant impact. Therefore, the potential impact of the two developments, in the event of Construction Phases overlapping is assessed as Negative, Not Significant and Short-Term. There is no potential for cumulative impacts during the Operational Phases.	<u>Air Quality:</u> Although there is no potential for significant cumulative impacts, the mitigation measures outlined in Chapter 7 (Air Quality) in Volume 2 of the EIAR and also outlined in the CEMP (included as a standalone document in the planning application pack) will ensure that dust and particulate matter emissions are minimised. No additional mitigation measures are required.	<u>Air Quality:</u> Construction Phase: Negative, Not Significant and Short-Term Operational Phase: None
				<u>Noise and Vibration:</u> There is the potential for a Negative, Not Significant and Short-Term impact, in the event of overlapping Construction Phases as there is a spatial overlap with both developments. There is no potential for a cumulative impact during the Operational Phases of both developments.	<u>Noise and Vibration:</u> None required	<u>Noise and Vibration:</u> Construction Phase: Negative, Not Significant and Short-Term Operational Phase: None
				<u>Biodiversity:</u> Water Quality: Adjacent to Belcamp Substation, there is the potential for a Negative, Significant and Short-Term impact on Mayne_010, as both developments would cross this watercourse if Construction Phases were to overlap. Potential impacts are likely to arise due to potential increases in sediment laden runoff and removal of bed material. There is no potential for a cumulative impact during the Operational Phases of both developments.	<u>Biodiversity:</u> Water Quality: The mitigation measures outlined in Chapter 12 (Hydrology) in Volume 2 of the EIAR are sufficient to prevent sediment laden runoff entering the watercourse and to maintain flows through the crossings. No additional mitigation measures are required.	<u>Biodiversity:</u> Construction Phase: Negative, Not Significant and Short-Term on water quality Operational Phase: None
				<u>Soils and Geology:</u> There is no potential for cumulative impacts during the Construction and Operational Phases, as there are no geological heritage sites or contaminated land sites along the proposed route. <u>Hydrogeology:</u> Should work from both developments be carried out at the same time, there is the potential for Negative, Slight and Short-Term cumulative impacts on groundwater quality.	<u>Soils and Geology:</u> None required <u>Hydrogeology:</u> The proposed mitigation measures outlined in Chapter 11 (Soils, Geology and Hydrogeology) in Volume 2 of the EIAR are deemed sufficient. No additional mitigation measures are required.	<u>Soils and Geology:</u> None <u>Hydrogeology:</u> Construction Phase: Negative, Imperceptible to Slight and Short-Term for groundwater quality. Operational Phase: None

Tier	Application Reference / Planning Body	Applicant for 'Other Development' and Brief Description	Approximate Distance from Proposed Development Infrastructure (at Nearest Point to the Planning Application Boundary)	Assessment of Cumulative Impact with Proposed Development	Proposed Mitigation Measures	Residual Cumulative Impact
				No long term significant changes to groundwater flows, levels and quality are predicted as part of the Proposed Development. Therefore there is no potential for a cumulative impacts during the Operational Phase of both developments.		
				Hydrology: Adjacent to Belcamp Substation, there is the potential for a Negative, Significant and Short-Term impact on Mayne_010, as both developments would cross this watercourse if Construction Phases were to overlap. Potential impacts are likely to arise due to potential increases in sediment laden runoff, removal of bed material and changes to the bed and bank as a result of open cut trenching. There is no potential for a cumulative impact during the Operational Phases of both developments as the cable / orbital sewer would not interact with surface water features.	Hydrology: The mitigation measures outlined in Chapter 12 (Hydrology) in Volume 2 of the EIAR are sufficient to prevent sediment laden runoff entering the watercourse and to maintain flows through the crossings. No additional mitigation measures are required.	Hydrology: Construction Phase: Negative, Not Significant and Short-Term Operational Phase: None
				Archaeology, Architectural and Cultural Heritage: There is the potential for a Negative, Moderate and Permanent impact on CH_32 (Field system) as a result of the interaction between this project and the Proposed Development, as both will remove archaeological remains that form this part of this asset. There is no potential for a cumulative impact during the Operational Phases of both developments.	Archaeology, Architectural and Cultural Heritage: The mitigation measures proposed in Chapter 13 (Archaeology, Architectural and Cultural Heritage) in Volume 2 of the EIAR are sufficient to address the potential cumulative impacts. No additional mitigation measures are required.	Archaeology, Architectural and Cultural Heritage: Construction Phase: Negative, Slight and Permanent Operational Phase: None
				Traffic: There is the potential for a Negative, Not Significant and Short-Term impact on traffic if Construction Phases were to overlap on the R139 and Clonshaugh Road due to cumulative construction traffic. There is no potential for cumulative traffic impacts during the Operational Phases.	Traffic: No significant cumulative traffic impacts are predicted which will require mitigation. Therefore, no cumulative mitigation is proposed. Construction Phase traffic for the Proposed Development will be managed in line with a detailed Construction Traffic Management Plan, which will be adapted from the Construction Phase Traffic Management Plan included as Appendix B to the CEMP (included as a standalone document in the planning application pack).	Traffic: Construction Phase: Negative, Not Significant and Short-Term Operational Phase: None
				Agronomy and Equine: The construction of the Wastewater Treatment Plant (WwTP) for the Greater Dublin Drainage Project will acquire in excess of 4 hectares of land from land parcel Ref No 40 and 18ha from land parcel Ref No 39. There is a spatial overlap with the Greater Dublin Drainage Project pipeline on approach to Belcamp Substation within land parcel Ref No 40. Therefore, the potential cumulative impacts are assessed for the Construction and Operational Phases as Negative, Profound and Permanent on land parcel Ref No 39 due to the extent of the permanent land take of WwTP and assessed for land parcel Ref No 40 as Negative, Significant and Permanent.	Agronomy and Equine: None applicable	Agronomy and Equine: Construction and Operational Phases: Negative, Profound and Permanent on land parcel Ref No 39 and Negative, Significant and Permanent on land parcel Ref No 40.
				Waste: Both developments will create surplus materials (e.g. soils, concrete and asphalt) which will require proper management and removal from the sites to be either treated as a waste or as a by-product (as appropriate and suitable for the material type, condition and quantity). In the event of overlapping Construction Phases, the waste from both developments could have a potentially Negative, Significant and Short-Term cumulative impact on the annual capacity of waste management facilities within the region during overlapping years, in the absence of any mitigation. Potential wastes associated with the Operational Phases for both developments are insignificant, and therefore, there are no significant cumulative impacts anticipated. The impact is therefore deemed as Neutral, Imperceptible and Long-Term.	Waste: The following measure, which is included in Chapter 16 (Waste) in Volume 2 of this EIAR will be implemented: In order to minimise the creation of waste, opportunities for reuse of materials (e.g. excavated material as fill) within both developments will be sought. Where there is remaining excess material, the potential for reuse as a by-product in accordance with Article 27 of the Waste Management Act will be investigated. Where material is unsuitable for either type of reuse, it will be treated as a waste. Appropriate handling, storage and management of any waste streams arising on either development will be managed in accordance with legislative requirements and best practice. No additional mitigation measures are required.	Waste: Construction Phase: Negative, Not Significant and Short-Term Operational Phase: Neutral, Imperceptible and Long-Term

Tier	Application Reference / Planning Body	Applicant for 'Other Development' and Brief Description	Approximate Distance from Proposed Development Infrastructure (at Nearest Point to the Planning Application Boundary)	Assessment of Cumulative Impact with Proposed Development	Proposed Mitigation Measures	Residual Cumulative Impact
				Material Assets: No known existing utility interfaces identified which may require diversion at the location where the two developments overlap. Potential impact is Neutral, Imperceptible and Temporary. No Operational Phase cumulative impacts anticipated.	Material Assets: The mitigation included in this EIAR and in the CEMP (included as a standalone documents in the planning application pack) is deemed sufficient to mitigate and / or manage the identified potential impacts. No additional mitigation measures are required.	Material Assets: Construction Phase: Neutral, Imperceptible and Temporary Operational Phase: None
				Landscape and Visual: There is no potential for cumulative impacts during the Construction and Operational Phases due to the nature of the existing environment in this vicinity.	Landscape and Visual: None required	Landscape and Visual: None
1	314724 - ABP	Transport Infrastructure Ireland. MetroLink from Swords (Estuary) to Charlemont via Dublin City Centre	Overlaps with the Planning Application Boundary for the proposed cable route	Population: There is the potential for the following cumulative impacts with this other development, if the Construction Phases were to overlap, as the footprint of both developments overlap: • Negative, Slight and Temporary impact on amenity; • Negative, Slight to Moderate and Temporary on accessibility and severance of nearby sensitive receptors; • Positive, Not Significant and Short-Term on employment; and • Negative, Not Significant and Temporary on the local economy. There is no potential for cumulative impacts during the Operational Phases of the developments.	Population: The mitigation included in this EIAR is deemed sufficient to mitigate and / or manage the identified potential impacts. No additional mitigation measures are required.	Population: Construction Phase: Neutral, Not Significant and Temporary for amenity, accessibility and severance and the local economy, and Positive, Not Significant and Short-Term for employment. Operational Phase: None
				Human Health: Should the Construction Phase of the two developments overlap, there is the potential for cumulative impacts on the air quality, noise and traffic and transport for residents of small area 267005001/02 and 26709902. The significance of impact is assessed as Negative, Not Significant and Temporary. No cumulative impacts on health determinants considered likely during the Operational Phases.	Human Health: No significant cumulative health impacts are predicted which will require mitigation. Therefore, no cumulative mitigation is proposed.	Human Health: Construction Phase: Negative, Not Significant and Temporary Operational Phase: None
				Air Quality: There is a Negligible to Medium risk of dust impacts as a result of the Proposed Development which is assessed as a Not Significant impact. Therefore, the potential impact of the two developments, in the event of Construction Phases overlapping is assessed as Negative, Not Significant and Short-Term. There is no potential for cumulative impacts during the Operational Phases.	Air Quality: Although there is no potential for significant cumulative impacts, the mitigation measures outlined in Chapter 7 (Air Quality) in Volume 2 of the EIAR and also outlined in the CEMP (included as a standalone document in the planning application pack) will ensure that dust and particulate matter emissions are minimised. No additional mitigation measures are required.	Air Quality: Construction Phase: Negative, Not Significant and Short-Term Operational Phase: None
				Noise and Vibration: There is the potential for a Negative, Not Significant and Short-Term impact, in the event of overlapping Construction Phases as there is a spatial overlap with both developments. There is no potential for a cumulative impact during the Operational Phases of both developments.	Noise and Vibration: None required	Noise and Vibration: Construction Phase: Negative, Not Significant and Short-Term Operational Phase: None
				Biodiversity: Water Quality: Adjacent to the Ballymun, Collins Town and Forest Little, there is the potential for a Negative, Significant and Short-Term impact on Sluice_010 and Mayne_010, as both developments would cross these watercourses within 500m of each other, if Construction Phases were to overlap. Potential impacts would result from potential increases in sediment laden runoff, removal of bed material and changes to the bed and bank as a result of open cut trenching. There is no potential for a cumulative impact during the Operational Phases of both developments.	Biodiversity: The mitigation measures outlined in Chapter 12 (Hydrology) in Volume 2 of the EIAR are sufficient to prevent sediment laden runoff entering the watercourse and to maintain flows through the crossings. No additional mitigation measures are required.	Biodiversity: Construction Phase: Negative, Not Significant and Short-Term on water quality Operational Phase: None

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				Soils and Geology: There is no potential for cumulative impacts during the Construction and Operational Phases, as there are no geological heritage sites or contaminated land sites along the proposed route. Hydrogeology: Should work from both developments be carried out at the same time, there is the potential for Negative, Slight and Short-Term cumulative impacts on groundwater quality. No long-term significant changes to groundwater flows, levels and quality are predicted as part of the Proposed Development. Therefore, there is no potential for cumulative impacts during the Operational Phase of both developments.	Soils and Geology: None required Hydrogeology: The proposed mitigation measures outlined in Chapter 11 (Soils, Geology and Hydrogeology) in Volume 2 of the EIAR are deemed sufficient. No additional mitigation measures are required.	Soils and Geology: None Hydrogeology: Construction Phase: Negative, Imperceptible to Slight and Short-Term for groundwater quality. Operational Phase: None
				Hydrology: Adjacent to the Ballymun, Collins Town and Forest Little, there is the potential for a Negative, Significant and Short-Term impact on Sluice_010 and Mayne_010, as both developments would cross these watercourses within 500m of each other, if Construction Phases were to overlap. Potential impacts would result from potential increases in sediment laden runoff, removal of bed material and changes to the bed and bank as a result of open cut trenching. There is no potential for a cumulative impact during the Operational Phases of both developments.	Hydrology: The mitigation measures outlined in Chapter 12 (Hydrology) in Volume 2 of the EIAR are sufficient to prevent sediment laden runoff entering the watercourse and to maintain flows through the crossings. No additional mitigation measures are required.	Hydrology: Construction Phase: Negative, Not Significant and Short-Term Operational Phase: None
				Archaeology, Architectural and Cultural Heritage: There is the potential for a Negative, Slight and Permanent impact on AY_43 (a Recorded Monument) as a result of the interaction between this project and the Proposed Development, as both will be located within the Zone of Notification. However, both developments will be within the existing road line in this location, which is likely to have removed or truncated any archaeological remains associated with this monument that may have been present. There is no potential for a cumulative impact during the Operational Phases of both developments.	Archaeology, Architectural and Cultural Heritage: The mitigation measures proposed in Chapter 13 (Archaeology, Architectural and Cultural Heritage) in Volume 2 of the EIAR are sufficient to address the potential cumulative impacts. No additional mitigation measures are required.	Archaeology, Architectural and Cultural Heritage: Construction Phase: Negative, Not Significant and Permanent Operational Phase: None
				Traffic: There is the potential for a Negative, Not Significant and Short-Term impact on traffic if Construction Phases were to overlap on the R132 due to cumulative construction traffic. There is no potential for cumulative traffic impacts during the Operational Phases.	Traffic: No significant cumulative traffic impacts are predicted which will require mitigation. Therefore, no cumulative mitigation is proposed. Construction Phase traffic for the Proposed Development will be managed in line with a detailed Construction Traffic Management Plan, which will be adapted from the Construction Phase Traffic Management Plan included as Appendix B to the CEMP (included as a standalone document in the planning application pack).	Traffic: Construction Phase: Negative, Not Significant and Short-Term Operational Phase: None
				Agronomy and Equine: There is no potential for cumulative impacts on agronomy and equine during the Construction and Operational Phases as there will be no overlapping interaction with agricultural receptors.	Agronomy and Equine: None required	Agronomy and Equine: None
				Waste: Both developments will create surplus materials (e.g. soils, concrete and asphalt) which will require proper management and removal from the sites to be either treated as a waste or as a by-product (as appropriate and suitable for the material type, condition and quantity). In the event of overlapping Construction Phases, the waste from both developments could have a potentially Negative, Significant and Short-Term cumulative impact on the annual capacity of waste management	Waste: The following measure, which is included in Chapter 16 (Waste) in Volume 2 of this EIAR will be implemented: In order to minimise the creation of waste, opportunities for reuse of materials (e.g. excavated material as fill) within both developments will be sought. Where there is remaining excess material, the potential for reuse as a by-product in	Waste: Construction Phase: Negative, Not Significant and Short-Term Operational Phase: Neutral, Imperceptible and Long-Term

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				facilities within the region during overlapping years, in the absence of any mitigation. Potential wastes associated with the Operational Phases for both developments are insignificant, and therefore, there are no significant cumulative impacts anticipated. The impact is therefore deemed as Neutral, Imperceptible and Long-Term.	accordance with Article 27 of the Waste Management Act will be investigated. Where material is unsuitable for either type of reuse, it will be treated as a waste. Appropriate handling, storage and management of any waste streams arising on either development will be managed in accordance with legislative requirements and best practice. No additional mitigation measures are required.	
				<u>Material Assets:</u> There is the potential for overlap in interface with existing utilities requiring diversions if the Construction Phases were to overlap. Therefore, there is the potential for a Negative, Moderate and Temporary impact. No Operational Phase cumulative impacts anticipated.	<u>Material Assets:</u> The mitigation included in this EIAR and in the CEMP (included as a standalone documents in the planning application pack) is deemed sufficient to mitigate and / or manage the identified potential impacts. No additional mitigation measures are required.	<u>Material Assets:</u> Construction Phase: Negative, Moderate and Temporary Operational Phase: None
				<u>Landscape and Visual:</u> There is no potential for cumulative impacts during the Construction and Operational Phases.	<u>Landscape and Visual:</u> None required	<u>Landscape and Visual:</u> None
1	314232 - ABP	Transport Infrastructure Ireland. Dart+ West – electrification and re-signaling of Maynooth and M3 Parkway Line, capacity enhancements at Connolly station, new Spencer Dock station, level crossing closures, new Dart depot west of Maynooth etc.	Directly adjacent to the Planning Application Boundary for the proposed cable route	<u>Population:</u> There is the potential for the following cumulative impacts with this other development, if the Construction Phases were to overlap, as the footprint of both developments overlap: • Negative, Slight and Temporary impact on amenity; • Negative, Slight to Moderate and Temporary on accessibility and severance of nearby sensitive receptors; • Positive, Not Significant and Short-Term on employment; and • Negative, Not Significant and Temporary on the local economy. There is no potential for cumulative impacts during the Operational Phases of the developments.	<u>Population:</u> The mitigation included in this EIAR is deemed sufficient to mitigate and / or manage the identified potential impacts. No additional mitigation measures are required.	<u>Population:</u> Construction Phase: Neutral, Not Significant and Temporary for amenity, accessibility and severance and the local economy, and Positive, Not Significant and Short-Term for employment. Operational Phase: None
				<u>Human Health:</u> In considering the nature of the works, there is no potential for cumulative impacts on human health during the Construction and Operational Phases of both developments.	<u>Human Health:</u> None required	<u>Human Health:</u> None
				<u>Air Quality:</u> There is a Negligible to Medium risk of dust impacts as a result of the Proposed Development which is assessed as a Not Significant impact. Therefore, the potential impact of the two developments, in the event of Construction Phases overlapping is assessed as Negative, Not Significant and Short-Term. There is no potential for cumulative impacts during the Operational Phases.	<u>Air Quality:</u> Although there is no potential for significant cumulative impacts, the mitigation measures outlined in Chapter 7 (Air Quality) in Volume 2 of the EIAR and also outlined in the CEMP (included as a standalone document in the planning application pack) will ensure that dust and particulate matter emissions are minimised. No additional mitigation measures are required.	<u>Air Quality:</u> Construction Phase: Negative, Not Significant and Short-Term Operational Phase: None
				<u>Noise and Vibration:</u> There is the potential for a Negative, Not Significant and Short-Term impact, in the event of overlapping Construction Phases as there is a spatial overlap with both developments. There is no potential for a cumulative impact during the Operational Phases of both developments.	<u>Noise and Vibration:</u> None required	<u>Noise and Vibration:</u> Construction Phase: Negative, Not Significant and Short-Term Operational Phase: None
				<u>Biodiversity:</u> In considering the nature of the works, there is no potential for cumulative impacts on biodiversity during the Construction and Operational Phases of both developments.	<u>Biodiversity:</u> None required	<u>Biodiversity:</u> None
				<u>Soils and Geology:</u> In considering the nature of the works, there is no potential for a cumulative impacts during the Construction and Operational Phases of both developments.	<u>Soils and Geology:</u> None required	<u>Soils and Geology:</u> None

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				Hydrogeology: In considering the nature of the works, there is no potential for a cumulative impacts during the Construction and Operational Phases of both developments.	Hydrogeology: None required	Hydrogeology: None
				Hydrology: There is no potential for likely significant, direct or indirect cumulative impacts, in combination with the other development, on hydrology for both the Construction and Operational Phases as the developments are not hydrologically connected.	Hydrology: None required	Hydrology: None
				Archaeology, Architectural and Cultural Heritage: There is no potential for cumulative impacts to arise during the Construction and Operational Phases as no impacts on archaeology, architectural and cultural heritage were assessed between the two developments.	Archaeology, Architectural and Cultural Heritage: None required	Archaeology, Architectural and Cultural Heritage: None
				Traffic: There is the potential for a Negative, Not Significant and Short-Term impact on traffic if Construction Phases were to overlap on the R157 due to cumulative construction traffic. There is no potential for cumulative traffic impacts during the Operational Phases.	Traffic: No significant cumulative traffic impacts are predicted which will require mitigation. Therefore, no cumulative mitigation is proposed. Construction Phase traffic for the Proposed Development will be managed in line with a detailed Construction Traffic Management Plan, which will be adapted from the Construction Phase Traffic Management Plan included as Appendix B to the CEMP (included as a standalone document in the planning application pack).	Traffic: Construction Phase: Negative, Not Significant and Short-Term Operational Phase: None
				Agronomy and Equine: The Dart+ West – electrification and re-signaling of Maynooth and M3 Parkway Line Project is located to the south-side of Junction 5 on the M3 Motorway and agricultural land parcels Ref No 10 and 11 are located on the north side of the junction on the west and east side of the junction. The potential works of the rail project will be confined to the south-side of the junction and will not significantly affect land parcels 10 and 11. Therefore, the cumulative impact is assessed as Neutral, Not Significant and Short-Term during the Construction Phase. There is no potential for Operational Phase cumulative impacts.	Agronomy and Equine: None required	Agronomy and Equine: Construction Phase: Neutral, Not Significant and Short-Term Operational Phase: None
				Waste: Both developments will create surplus materials (e.g. soils, concrete and asphalt) which will require proper management and removal from the sites to be either treated as a waste or as a by-product (as appropriate and suitable for the material type, condition and quantity). In the event of overlapping Construction Phases, the waste from both developments could have a potentially Negative, Significant and Short-Term cumulative impact on the annual capacity of waste management facilities within the region during overlapping years, in the absence of any mitigation. Potential wastes associated with the Operational Phases for both developments are insignificant, and therefore, there are no significant cumulative impacts anticipated. The impact is therefore deemed as Neutral, Imperceptible and Long-Term.	Waste: The following measure, which is included in Chapter 16 (Waste) in Volume 2 of this EIAR will be implemented: In order to minimise the creation of waste, opportunities for reuse of materials (e.g. excavated material as fill) within both developments will be sought. Where there is remaining excess material, the potential for reuse as a by-product in accordance with Article 27 of the Waste Management Act will be investigated. Where material is unsuitable for either type of reuse, it will be treated as a waste. Appropriate handling, storage and management of any waste streams arising on either development will be managed in accordance with legislative requirements and best practice. No additional mitigation measures are required.	Waste: Construction Phase: Negative, Not Significant and Short-Term Operational Phase: Neutral, Imperceptible and Long-Term
				Material Assets: In considering the nature of the works, there is no potential for Construction or Operational Phase cumulative impacts given lack of overlap between two developments.	Material Assets: None required	Material Assets: None
				Landscape and Visual: In considering the nature of the works, there is no potential for cumulative impacts during the Construction and Operational Phases.	Landscape and Visual: None required	Landscape and Visual: None

Tier	Application Reference / Planning Body	Applicant for 'Other Development' and Brief Description	Approximate Distance from Proposed Development Infrastructure (at Nearest Point to the Planning Application Boundary)	Assessment of Cumulative Impact with Proposed Development	Proposed Mitigation Measures	Residual Cumulative Impact
1	317121 - ABP	NTA BusConnects - Swords to City Centre Core Bus Corridor Scheme	Overlaps with the Planning Application Boundary for the proposed cable route	<u>Population:</u> There is the potential for the following cumulative impacts with this other development, if the Construction Phases were to overlap, as the footprint of both developments overlap: • Negative, Slight and Temporary impact on amenity; • Negative, Slight to Moderate and Temporary on accessibility and severance of nearby sensitive receptors; • Positive, Not Significant and Short-Term on employment; and • Negative, Not Significant and Temporary on the local economy. There is no potential for cumulative impacts during the Operational Phases of the developments.	<u>Population:</u> The mitigation included in this EIAR is deemed sufficient to mitigate and / or manage the identified potential impacts. No additional mitigation measures are required.	<u>Population:</u> Construction Phase: Neutral, Not Significant and Temporary for amenity, accessibility and severance and the local economy, and Positive, Not Significant and Short-Term for employment. Operational Phase: None
				<u>Human Health:</u> Should the Construction Phase of the two developments overlap, there is the potential for cumulative traffic and transport impacts for residents of small areas 267001009/03, 267005001/02, 267132011 and 267099015/01. The significance of impact is assessed as Negative, Not Significant and Temporary. No cumulative impacts on health determinants considered likely during the Operational Phases.	<u>Human Health:</u> No significant cumulative health impacts are predicted which will require mitigation. Therefore, no cumulative mitigation is proposed.	<u>Human Health:</u> Construction Phase: Negative, Not Significant and Temporary Operational Phase: None
				<u>Air Quality:</u> There is a Negligible to Medium risk of dust impacts as a result of the Proposed Development which is assessed as a Not Significant impact. Therefore, the potential impact of the two developments, in the event of Construction Phases overlapping is assessed as Negative, Not Significant and Short-Term. There is no potential for cumulative impacts during the Operational Phases.	<u>Air Quality:</u> Although there is no potential for significant cumulative impacts, the mitigation measures outlined in Chapter 7 (Air Quality) in Volume 2 the EIAR and also outlined in the CEMP (included as a standalone document in the planning application pack) will ensure that dust and particulate matter emissions are minimised. No additional mitigation measures are required.	<u>Air Quality:</u> Construction Phase: Negative, Not Significant and Short-Term Operational Phase: None
				<u>Noise and Vibration:</u> There is the potential for a Negative, Not Significant and Short-Term impact, in the event of overlapping Construction Phases as there is a spatial overlap with both developments. There is no potential for a cumulative impact during the Operational Phases of both developments.	<u>Noise and Vibration:</u> None required	<u>Noise and Vibration:</u> Construction Phase: Negative, Not Significant and Short-Term Operational Phase: None
				<u>Biodiversity:</u> The BusConnects Scheme will overlap with the Proposed Development at the junction of the R132 with Stockhole Lane, at the approach to the National Show Centre east of to Dublin Airport. There is potential for a cumulative impact between the two developments from the combined effect of the loss of trees and hedgerows. During construction, the cumulative impact of both developments on trees and hedgerows is considered to the Negative, Significant and Long-Term. There is no potential for a cumulative impact during the Operational Phases of both developments.	<u>Biodiversity:</u> Both developments have included mitigation measures for the loss of hedgerows and trees in their respective EIARs. Replacement tree planting for the Proposed Development will be undertaken at agreed compensation sites. Tree planting will also be accommodated on easements, subject to approval by EirGrid and ESB Networks. For the BusConnects Scheme there will be tree planting and landscaping and re-instatement of temporary and permanent land acquisitions. No additional mitigation measures are required.	<u>Biodiversity:</u> Construction Phase: Negative, Moderate and Long-Term Operational Phase: None
				<u>Soils and Geology:</u> There is no potential for cumulative impacts during the Construction and Operational Phases, as there are no geological heritage sites or contaminated land sites along the proposed route.	<u>Soils and Geology:</u> None required	<u>Soils and Geology:</u> None

Tier	Application Reference / Planning Body	Applicant for 'Other Development' and Brief Description	Approximate Distance from Proposed Development Infrastructure (at Nearest Point to the Planning Application Boundary)	Assessment of Cumulative Impact with Proposed Development	Proposed Mitigation Measures	Residual Cumulative Impact
				Hydrogeology: Should work from both developments be carried out at the same time, there is the potential for Negative, Slight and Short-Term cumulative impacts on groundwater quality. No long term significant changes to groundwater flows, levels and quality are predicted as part of the Proposed Development. Therefore there is no potential for a cumulative impacts during the Operational Phase of both developments.	Hydrogeology: The proposed mitigation measures outlined in Chapter 11 (Soils, Geology and Hydrogeology) in Volume 2 of the EIAR are deemed sufficient. No additional mitigation measures are required.	Hydrogeology: Construction Phase: Negative, Imperceptible to Slight and Short-Term for groundwater quality. Operational Phase: None
				Hydrology: Adjacent to the Ballymun and Dublin Airport, there is the potential for a Negative, Significant and Short-Term impact on Sluice_010 and Mayne_010, as both developments would cross these watercourses within 500m of each other, if Construction Phases were to overlap. Potential impacts would arise from potential increases in sediment laden runoff, removal of bed material and changes to the bed and bank. There is no potential for a cumulative impact during the Operational Phases of both developments.	Hydrology: The mitigation measures outlined in Chapter 12 (Hydrology) in Volume 2 of the EIAR are sufficient to prevent sediment laden runoff entering the watercourse and to maintain flows through the crossings. No additional mitigation measures are required.	Hydrology: Construction Phase: Negative, Not Significant and Short-Term Operational Phase: None
				Archaeology, Architectural and Cultural Heritage: There is no potential for cumulative impacts to arise during the Construction and Operational Phases as no impacts on archaeology, architectural and cultural heritage were assessed in this overlapping study area.	Archaeology, Architectural and Cultural Heritage: None required	Archaeology, Architectural and Cultural Heritage: None
				Traffic: There is the potential for a Negative, Not Significant and Short-Term impact on traffic if Construction Phases were to overlap on the R132 due to cumulative construction traffic. There is no potential for cumulative traffic impacts during the Operational Phases.	Traffic: No significant cumulative traffic impacts are predicted which will require mitigation. Therefore, no cumulative mitigation is proposed. Construction Phase traffic for the Proposed Development will be managed in line with a detailed Construction Traffic Management Plan, which will be adapted from the Construction Phase Traffic Management Plan included as Appendix B to the CEMP (included as a standalone document in the planning application pack).	Traffic: Construction Phase: Negative, Not Significant and Short-Term Operational Phase: None
				Agronomy and Equine: There is no potential for cumulative impacts on agronomy and equine during the Construction and Operational Phases as there will be no overlapping interaction with agricultural receptors.	Agronomy and Equine: None required	Agronomy and Equine: None
				Waste: Both developments will create surplus materials (e.g. soils, concrete and asphalt) which will require proper management and removal from the sites to be either treated as a waste or as a by-product (as appropriate and suitable for the material type, condition and quantity). In the event of overlapping Construction Phases, the waste from both developments could have a potentially Negative, Significant and Short-Term cumulative impact on the annual capacity of waste management facilities within the region during overlapping years, in the absence of any mitigation. Potential wastes associated with the Operational Phases for both developments are insignificant, and therefore, there are no significant cumulative impacts anticipated. The impact is therefore deemed as Neutral, Imperceptible and Long-Term.	Waste: The following measure, which is included in Chapter 16 (Waste) in Volume 2 of this EIAR will be implemented: In order to minimise the creation of waste, opportunities for reuse of materials (e.g. excavated material as fill) within both developments will be sought. Where there is remaining excess material, the potential for reuse as a by-product in accordance with Article 27 of the Waste Management Act will be investigated. Where material is unsuitable for either type of reuse, it will be treated as a waste. Appropriate handling, storage and management of any waste streams arising on either development will be managed in accordance with legislative requirements and best practice. No additional mitigation measures are required.	Waste: Construction Phase: Negative, Not Significant and Short-Term Operational Phase: Neutral, Imperceptible and Long-Term
				Material Assets: No known existing utility interfaces identified which may require diversion at the location where the two developments overlap. Potential impact is therefore assessed as Neutral, Imperceptible and Temporary.	Material Assets: The mitigation included in this EIAR and in the CEMP (included as a standalone documents in the planning application pack) is deemed sufficient to mitigate and / or manage the identified potential impacts. No additional mitigation measures are required.	Material Assets: Construction Phase: Neutral, Imperceptible and Temporary Operational Phase: None

Tier	Application Reference / Planning Body	Applicant for 'Other Development' and Brief Description	Approximate Distance from Proposed Development Infrastructure (at Nearest Point to the Planning Application Boundary)	Assessment of Cumulative Impact with Proposed Development	Proposed Mitigation Measures	Residual Cumulative Impact
				There is no potential for Operational Phase cumulative impacts.		
				Landscape and Visual: There is no potential for cumulative impacts during the Construction and Operational Phases.	Landscape and Visual: None required	Landscape and Visual: None
1	312060 / F21A/0401 – ABP / FCC	Gannon Properties Construction of 78 residential units comprising 58 houses, 20 apartment/duplex/triplex units and associated works at Belcamp Hall, Malahide Road, Dublin 17	1km from the Planning Application Boundary at Belcamp Substation	Population: There is no potential for cumulative impacts during the Construction and Operational Phases, as both developments are of sufficient distance away from each other to avoid any potential cumulative impacts related to population.	Population: None required	Population: None
				Human Health: In considering the nature and distance of the works, there is no potential for cumulative impacts on human health during the Construction and Operational Phases of both developments.	Human Health: None required	Human Health: None
				Air Quality: There is no potential for cumulative impacts during the Construction and Operational Phases due to the distance between the two developments.	Air Quality: None required	Air Quality: None
				Noise and Vibration: Due to the distance between the two developments there is no potential for cumulative noise and vibration impacts during the Construction or Operational Phases.	Noise and Vibration: None required	Noise and Vibration: None
				Biodiversity: In considering the nature and distance of the works, there is no potential for cumulative impacts on biodiversity during the Construction and Operational Phases of both developments.	Biodiversity: None required	Biodiversity: None
				Soils and Geology: In considering the nature and distance of the works, there is no potential for a cumulative impacts during the Construction and Operational Phases of both developments. Hydrogeology: In considering the nature and distance of the works, there is no potential for a cumulative impacts during the Construction and Operational Phases of both developments.	Soils and Geology: None required Hydrogeology: None required	Soils and Geology: None Hydrogeology: None
				Hydrology: There is no potential for likely significant, direct or indirect cumulative impacts, in combination with the other development, on hydrology for both the Construction and Operational Phases, as although the developments are hydrologically connected, there is sufficient distance between them that impacts are not likely to occur.	Hydrology: None required	Hydrology: None
				Archaeology, Architectural and Cultural Heritage: There is no potential for cumulative impacts to arise during the Construction and Operational Phases as no impacts on archaeology, architectural and cultural heritage were assessed between these two developments.	Archaeology, Architectural and Cultural Heritage: None required	Archaeology, Architectural and Cultural Heritage: None
				Traffic: There is the potential for a Negative, Not Significant and Short-Term impact on traffic if Construction Phases were to overlap on the R139 due to cumulative construction traffic.	Traffic: No significant cumulative traffic impacts are predicted which will require mitigation. Therefore, no cumulative mitigation is proposed. Construction Phase traffic for the Proposed Development will be managed in line with a detailed Construction Traffic Management Plan, which will be adapted	Traffic: Construction Phase: Negative, Not Significant and Short-Term Operational Phase: None

Tier	Application Reference / Planning Body	Applicant for 'Other Development' and Brief Description	Approximate Distance from Proposed Development Infrastructure (at Nearest Point to the Planning Application Boundary)	Assessment of Cumulative Impact with Proposed Development	Proposed Mitigation Measures	Residual Cumulative Impact
				There is no potential for cumulative traffic impacts during the Operational Phases.	from the Construction Phase Traffic Management Plan included as Appendix B to the CEMP (included as a standalone document in the planning application pack).	
				Agronomy and Equine: There is no potential for cumulative impacts on agronomy and equine during the Construction and Operational Phases as there will be no overlapping interaction with agricultural receptors.	Agronomy and Equine: None required	Agronomy and Equine: None
				Waste: Both developments will create surplus materials (e.g. soils, concrete and asphalt) which will require proper management and removal from the sites to be either treated as a waste or as a by-product (as appropriate and suitable for the material type, condition and quantity). In the event of overlapping Construction Phases, the waste from both developments could have a potentially Negative, Significant and Short-Term cumulative impact on the annual capacity of waste management facilities within the region during overlapping years, in the absence of any mitigation. Potential wastes associated with the Operational Phases for both developments are insignificant, and therefore, there are no significant cumulative impacts anticipated. The impact is therefore deemed as Neutral, Imperceptible and Long-Term.	Waste: The following measure, which is included in Chapter 16 (Waste) in Volume 2 of this EIAR will be implemented: In order to minimise the creation of waste, opportunities for reuse of materials (e.g. excavated material as fill) within both developments will be sought. Where there is remaining excess material, the potential for reuse as a by-product in accordance with Article 27 of the Waste Management Act will be investigated. Where material is unsuitable for either type of reuse, it will be treated as a waste. Appropriate handling, storage and management of any waste streams arising on either development will be managed in accordance with legislative requirements and best practice. No additional mitigation measures are required.	Waste: Construction Phase: Negative, Not Significant and Short-Term Operational Phase: Neutral, Imperceptible and Long-Term
				Material Assets: There is no potential for Construction or Operational Phase cumulative impacts, given the lack of spatial overlap between the two developments.	Material Assets: None required	Material Assets: None
				Landscape and Visual: There is no potential for cumulative impacts during the Construction and Operational Phases, given the lack of spatial overlap between the two developments.	Landscape and Visual: None required	Landscape and Visual: None
1	314169 / F22A/0136 – ABP / FCC	Gerard Gannon Properties Construction of 40 residential units in one block, including a childcare facility and café at Belcamp Hall, Malahide Road, Dublin 17	695m from the Planning Application Boundary at Belcamp Substation	Population: There is no potential for cumulative impacts during the Construction and Operational Phases, as both developments are of sufficient distance away from each other to avoid any potential cumulative impacts related to population.	Population: None required.	Population: None
				Human Health: In considering the nature and distance of the works, there is no potential for cumulative impacts on human health during the Construction and Operational Phases of both developments.	Human Health: None required.	Human Health: None
				Air Quality: There is no potential for cumulative impacts during the Construction and Operational Phases due to the distance between the two developments.	Air Quality: None required	Air Quality: None
				Noise and Vibration: Due to the distance between the two developments there is no potential for cumulative noise and vibration impacts during the Construction or Operational Phases.	Noise and Vibration: None required	Noise and Vibration: None
				Biodiversity: In considering the nature and distance of the works, there is no potential for cumulative impacts on biodiversity during the Construction and Operational Phases of both developments.	Biodiversity: None required	Biodiversity: None

Tier	Application Reference / Planning Body	Applicant for 'Other Development' and Brief Description	Approximate Distance from Proposed Development Infrastructure (at Nearest Point to the Planning Application Boundary)	Assessment of Cumulative Impact with Proposed Development	Proposed Mitigation Measures	Residual Cumulative Impact
				Soils and Geology: In considering the nature and distance of the works, there is no potential for a cumulative impacts during the Construction and Operational Phases of both developments. Hydrogeology: In considering the nature and distance of the works, there is no potential for a cumulative impacts during the Construction and Operational Phases of both developments.	Soils and Geology: None required Hydrogeology: None required	Soils and Geology: None Hydrogeology: None
				Hydrology: There is no potential for likely significant, direct or indirect cumulative impacts, in combination with the other development, on hydrology for both the Construction and Operational Phases, as although the developments are hydrologically connected, there is sufficient distance between them that impacts are not likely to occur.	Hydrology: None required	Hydrology: None
				Archaeology, Architectural and Cultural Heritage: There is no potential for cumulative impacts to arise during the Construction and Operational Phases as no impacts on archaeology, architectural and cultural heritage were assessed in this overlapping study area.	Archaeology, Architectural and Cultural Heritage: None required	Archaeology, Architectural and Cultural Heritage: None
				Traffic: There is the potential for a Negative, Not Significant and Short-Term impact on traffic if Construction Phases were to overlap on the R139 due to cumulative construction traffic. There is no potential for cumulative traffic impacts during the Operational Phases.	Traffic: No significant cumulative traffic impacts are predicted which will require mitigation. Therefore, no cumulative mitigation is proposed. Construction Phase traffic for the Proposed Development will be managed in line with a detailed Construction Traffic Management Plan, which will be adapted from the Construction Phase Traffic Management Plan included as Appendix B to the CEMP (included as a standalone document in the planning application pack).	Traffic: Construction Phase: Negative, Not Significant and Short-Term Operational Phase: None
				Agronomy and Equine: There is no potential for cumulative impacts on agronomy and equine during the Construction and Operational Phases as there will be no overlapping interaction with agricultural receptors.	Agronomy and Equine: None required	Agronomy and Equine: None
				Waste: Both developments will create surplus materials (e.g. soils, concrete and asphalt) which will require proper management and removal from the sites to be either treated as a waste or as a by-product (as appropriate and suitable for the material type, condition and quantity). In the event of overlapping Construction Phases, the waste from both developments could have a potentially Negative, Significant and Short-Term cumulative impact on the annual capacity of waste management facilities within the region during overlapping years, in the absence of any mitigation. Potential wastes associated with the Operational Phases for both developments are insignificant, and therefore, there are no significant cumulative impacts anticipated. The impact is therefore deemed as Neutral, Imperceptible and Long-Term.	Waste: The following measure, which is included in Chapter 16 (Waste) in Volume 2 of this EIAR will be implemented: In order to minimise the creation of waste, opportunities for reuse of materials (e.g. excavated material as fill) within both developments will be sought. Where there is remaining excess material, the potential for reuse as a by-product in accordance with Article 27 of the Waste Management Act will be investigated. Where material is unsuitable for either type of reuse, it will be treated as a waste. Appropriate handling, storage and management of any waste streams arising on either development will be managed in accordance with legislative requirements and best practice. No additional mitigation measures are required.	Waste: Construction Phase: Negative, Not Significant and Short-Term Operational Phase: Neutral, Imperceptible and Long-Term
				Material Assets: There is no potential for Construction or Operational Phase cumulative impacts, given the lack of spatial overlap between the two developments.	Material Assets: None required	Material Assets: None
				Landscape and Visual: There is no potential for cumulative impacts during the Construction and Operational Phases, given the lack of spatial overlap between the two developments.	Landscape and Visual: None required	Landscape and Visual: None

Tier	Application Reference / Planning Body	Applicant for 'Other Development' and Brief Description	Approximate Distance from Proposed Development Infrastructure (at Nearest Point to the Planning Application Boundary)	Assessment of Cumulative Impact with Proposed Development	Proposed Mitigation Measures	Residual Cumulative Impact
1	308130 - ABP	Enginenode Limited 220kV substation with 2 underground transmission cables between Pace and Bracetown	3m from the Planning Application Boundary for the proposed cable route	<u>Population:</u> There is the potential for the following cumulative impacts with this other development, if the Construction Phases were to overlap, as the footprint of both developments overlap: • Negative, Slight and Temporary impact on amenity; • Negative, Slight to Moderate and Temporary on accessibility and severance of nearby sensitive receptors; • Positive, Not Significant and Short-Term on employment; and • Negative, Not Significant and Temporary on the local economy. There is no potential for cumulative impacts during the Operational Phases of the developments.	<u>Population:</u> The mitigation included in this EIAR is deemed sufficient to mitigate and / or manage the identified potential impacts. No additional mitigation measures are required.	<u>Population:</u> Construction Phase: Neutral, Not Significant and Temporary for amenity, accessibility and severance and the local economy, and Positive, Not Significant and Short-Term for employment. Operational Phase: None
				<u>Human Health:</u> There is the potential for cumulative impacts on traffic and transport determinant for residents of small areas 167029015 and 167029001 as both developments have potential to affect access along the L5025, if Construction Phases were to overlap. The significance of impact is assessed as Negative, Imperceptible and Temporary. No cumulative effects on health determinants considered likely during the Operational Phases.	<u>Human Health:</u> No significant cumulative health impacts are predicted which will require mitigation. Therefore, no cumulative mitigation is proposed.	<u>Human Health:</u> Construction Phase: Negative, Imperceptible and Temporary Operational Phase: None
				<u>Air Quality:</u> There is a Negligible to Medium risk of dust impacts as a result of the Proposed Development which is assessed as a Not Significant impact. Therefore, the potential impact of the two developments, in the event of Construction Phases overlapping is assessed as Negative, Not Significant and Short-Term. There is no potential for cumulative impacts during the Operational Phases.	<u>Air Quality:</u> Although there is no potential for significant cumulative impacts, the mitigation measures outlined in Chapter 7 (Air Quality) in Volume 2 of the EIAR and also outlined in the CEMP (included as a standalone document in the planning application pack) will ensure that dust and particulate matter emissions are minimised. No additional mitigation measures are required.	<u>Air Quality:</u> Construction Phase: Negative, Not Significant and Short-Term Operational Phase: None
				<u>Noise and Vibration:</u> There is the potential for a Negative, Not Significant and Short-Term noise and vibration impact, in the event of overlapping Construction Phases as the developments are in close proximity to each other. There is no potential for cumulative impacts during the Operational Phases.	<u>Noise and Vibration:</u> None required	<u>Noise and Vibration:</u> Construction Phase: Negative, Not Significant and Short-Term Operational Phase: None
				<u>Biodiversity:</u> In considering the nature of the works, there is no potential for significant cumulative impacts on biodiversity during the Construction Phase of both developments. The impact is assessed as Negative, Not Significant and Short-Term. There is no potential for a cumulative impact during the Operational Phases of both developments.	<u>Biodiversity:</u> None required	<u>Biodiversity:</u> Construction Phase: Negative, Not Significant and Short-Term Operational Phase: None
				<u>Soils and Geology:</u> In considering the nature of the works, there is no potential for a cumulative impacts during the Construction and Operational Phases of both developments. <u>Hydrogeology:</u> In considering the nature of the works, there is no potential for a cumulative impacts during the Construction and Operational Phases of both developments.	<u>Soils and Geology:</u> None required <u>Hydrogeology:</u> None required	<u>Soils and Geology:</u> None <u>Hydrogeology:</u> None
				<u>Hydrology:</u> There is no potential for likely significant, direct or indirect cumulative impacts, in combination with the other development, on hydrology for both the Construction and Operational Phases as the developments are not hydrologically connected.	<u>Hydrology:</u> None required	<u>Hydrology:</u> None

Tier	Application Reference / Planning Body	Applicant for 'Other Development' and Brief Description	Approximate Distance from Proposed Development Infrastructure (at Nearest Point to the Planning Application Boundary)	Assessment of Cumulative Impact with Proposed Development	Proposed Mitigation Measures	Residual Cumulative Impact
				Archaeology, Architectural and Cultural Heritage: There is no potential for cumulative impacts to arise during the Construction and Operational Phases as no impacts on archaeology, architectural and cultural heritage were assessed in this overlapping study area.	Archaeology, Architectural and Cultural Heritage: None required	Archaeology, Architectural and Cultural Heritage: None
				Traffic: There is the potential for a Negative, Not Significant and Short-Term impact on traffic if Construction Phases were to overlap on the R147 and R157 due to cumulative construction traffic. There is no potential for cumulative traffic impacts during the Operational Phases.	Traffic: No significant cumulative traffic impacts are predicted which will require mitigation. Therefore, no cumulative mitigation is proposed. Construction Phase traffic for the Proposed Development will be managed in line with a detailed Construction Traffic Management Plan, which will be adapted from the Construction Phase Traffic Management Plan included as Appendix B to the CEMP (included as a standalone document in the planning application pack).	Traffic: Construction Phase: Negative, Not Significant and Short-Term Operational Phase: None
				Agronomy and Equine: The circuit No 1 underground transmission cable and the associated overhead line interface compound will be located in land parcel No 11. There are potential cumulative impacts due to the construction of a second underground cable in this land parcel and the soil disturbance associated with these works. Also there is a potential cumulative impact due to the land take of the interface compound. However the temporary works will be confined to less than 2.5% of the area of the land parcel and the land take of the compound will be less than 1% of the land parcel area. Therefore, the cumulative impact is assessed as Negative, Not Significant and Short-Term for the Construction Phases. There is no potential for a cumulative impact during the Operational Phases.	Agronomy and Equine: None required	Agronomy and Equine: Construction Phase: Negative, Not Significant and Short-Term Operational Phase: None
				Waste: Both developments will create surplus materials (e.g. soils, concrete and asphalt) which will require proper management and removal from the sites to be either treated as a waste or as a by-product (as appropriate and suitable for the material type, condition and quantity). In the event of overlapping Construction Phases, the waste from both developments could have a potentially Negative, Significant and Short-Term cumulative impact on the annual capacity of waste management facilities within the region during overlapping years, in the absence of any mitigation. Potential wastes associated with the Operational Phases for both developments are insignificant, and therefore, there are no significant cumulative impacts anticipated. The impact is therefore deemed as Neutral, Imperceptible and Long-Term.	Waste: The following measure, which is included in Chapter 16 (Waste) in Volume 2 of this EIAR will be implemented: In order to minimise the creation of waste, opportunities for reuse of materials (e.g. excavated material as fill) within both developments will be sought. Where there is remaining excess material, the potential for reuse as a by-product in accordance with Article 27 of the Waste Management Act will be investigated. Where material is unsuitable for either type of reuse, it will be treated as a waste. Appropriate handling, storage and management of any waste streams arising on either development will be managed in accordance with legislative requirements and best practice. No additional mitigation measures are required.	Waste: Construction Phase: Negative, Not Significant and Short-Term Operational Phase: Neutral, Imperceptible and Long-Term
				Material Assets: There is no potential for Construction or Operational Phase cumulative impacts, given the lack of spatial overlap between the two developments.	Material Assets: None required	Material Assets: None
				Landscape and Visual: There is no potential for cumulative impacts during the Construction and Operational Phases, given the lack of spatial overlap between the two developments.	Landscape and Visual: None required	Landscape and Visual: None

Tier	Application Reference / Planning Body	Applicant for 'Other Development' and Brief Description	Approximate Distance from Proposed Development Infrastructure (at Nearest Point to the Planning Application Boundary)	Assessment of Cumulative Impact with Proposed Development	Proposed Mitigation Measures	Residual Cumulative Impact
1	309833 / FW21A/0003 – ABP / FCC	Montague Ventures Limited Residential development on site of c.1.7 hectares consisting of construction of 52 no. residential units, refurbishment of existing former barracks building on site, carparking spaces, bicycle parking spaces and all associated site works.	237m from the Planning Application Boundary for the proposed cable route	<u>Population:</u> There is the potential for the following cumulative impacts with this other development, if the Construction Phases were to overlap, as the footprint of both developments overlap: • Negative, Slight and Temporary impact on amenity; • Negative, Slight to Moderate and Temporary on accessibility and severance of nearby sensitive receptors; • Positive, Not Significant and Short-Term on employment; and • Negative, Not Significant and Temporary on the local economy. There is no potential for cumulative impacts during the Operational Phases of the developments.	<u>Population:</u> The mitigation included in this EIAR is deemed sufficient to mitigate and / or manage the identified potential impacts. No additional mitigation measures are required.	<u>Population:</u> Construction Phase: Neutral, Not Significant and Temporary for amenity, accessibility and severance and the local economy, and Positive, Not Significant and Short-Term for employment. Operational Phase: None
				<u>Human Health:</u> There is potential for cumulative impacts on the air quality and noise determinants for a small number of residential dwellings located in the Hollywood / Hollystown area, in the event of overlapping Construction Phases. The significance of impact is assessed as Negative, Imperceptible, and Temporary for both determinants. No cumulative impacts on health determinants considered likely during the Operational Phases.	<u>Human Health:</u> No significant cumulative health impacts are predicted which will require mitigation. Therefore, no cumulative mitigation is proposed.	<u>Human Health:</u> Construction Phase: Negative, Imperceptible and Temporary Operational Phase: None
				<u>Air Quality:</u> There is no potential for cumulative impacts during the Construction and Operational Phases due to the distance between the two developments.	<u>Air Quality:</u> None required	<u>Air Quality:</u> None
				<u>Noise and Vibration:</u> Due to the distance between the two developments there is no potential for cumulative noise and vibration impacts during the Construction or Operational Phases.	<u>Noise and Vibration:</u> None required	<u>Noise and Vibration:</u> None
				<u>Biodiversity:</u> The proposed access to the residential development runs parallel to Kilbridge Road (L3080) which is lined with mature trees with potential bat roost features and fourteen trees are scheduled for removal. The Proposed Development lies approximately 480m away at its nearest location. Cumulative impacts to bats could result from disturbance / lighting along the proposed access to the construction sites and the loss of trees / hedgerows from the Proposed Development. The potential cumulative impact during construction is assessed as Negative, Significant and Long-Term. There is no potential for cumulative impacts during the Operational Phases of the developments.	<u>Biodiversity:</u> The mitigation measures proposed in Chapter 10 (Biodiversity) in Volume 2 of the EIAR are sufficient to address the potential cumulative impacts. No additional mitigation measures are required.	<u>Biodiversity:</u> Construction Phase: Negative, Not Significant and Medium-Term Operational Phase: None
				<u>Soils and Geology:</u> There is no potential for cumulative impacts during the Construction and Operational Phases, as there are no geological heritage sites or contaminated land sites along the proposed route. <u>Hydrogeology:</u> There is no potential for a cumulative impacts during the Construction and Operational Phases of both developments, due to the distance between the two developments.	<u>Soils and Geology:</u> None required <u>Hydrogeology:</u> None required	<u>Soils and Geology:</u> None <u>Hydrogeology:</u> None

Tier	Application Reference / Planning Body	Applicant for 'Other Development' and Brief Description	Approximate Distance from Proposed Development Infrastructure (at Nearest Point to the Planning Application Boundary)	Assessment of Cumulative Impact with Proposed Development	Proposed Mitigation Measures	Residual Cumulative Impact
				Hydrology: There is no potential for likely significant, direct or indirect cumulative impacts, in combination with the other development, on hydrology for both the Construction and Operational Phases as the developments are not hydrologically connected.	Hydrology: None required	Hydrology: None
				Archaeology, Architectural and Cultural Heritage: There is the potential for a Negative, Moderate and Permanent impact on DL_05 (Designed Landscape) as a result of the interaction between this project and the Proposed Development, as both will remove features that form this part of this asset. During operation, there is the potential for a Negative, Moderate and Permanent impact as a result of the presence of both developments due to the Proposed Development's permanent access tracks and Joint Bay covers remaining visible and the presence of the other development further reducing the legibility of this demesne.	Archaeology, Architectural and Cultural Heritage: The mitigation measures proposed in Chapter 13 (Archaeology, Architectural and Cultural Heritage) in Volume 2 of the EIAR are sufficient to address the potential cumulative impacts, where applicable.	Archaeology, Architectural and Cultural Heritage: Construction Phase: Negative, Slight and Permanent Operational Phase: Negative, Moderate and Permanent
				Traffic: There is the potential for a Negative, Not Significant and Short-Term impact on traffic if Construction Phases were to overlap on the Cherryhound Tyrrelstown Link Road, Ratoath Road, Kilbride Road and R121 Ward Road, due to cumulative construction traffic. There is no potential for cumulative traffic impacts during the Operational Phases.	Traffic: No significant cumulative traffic impacts are predicted which will require mitigation. Therefore, no cumulative mitigation is proposed. Construction Phase traffic for the Proposed Development will be managed in line with a detailed Construction Traffic Management Plan, which will be adapted from the Construction Phase Traffic Management Plan included as Appendix B to the CEMP (included as a standalone document in the planning application pack).	Traffic: Construction Phase: Negative, Not Significant and Short-Term Operational Phase: None
				Agronomy and Equine: There is no potential for cumulative impacts on agronomy and equine during the Construction and Operational Phases as there will be no overlapping interaction with agricultural receptors.	Agronomy and Equine: None required	Agronomy and Equine: None
				Waste: Both developments will create surplus materials (e.g. soils, concrete and asphalt) which will require proper management and removal from the sites to be either treated as a waste or as a by-product (as appropriate and suitable for the material type, condition and quantity). In the event of overlapping Construction Phases, the waste from both developments could have a potentially Negative, Significant and Short-Term cumulative impact on the annual capacity of waste management facilities within the region during overlapping years, in the absence of any mitigation. Potential wastes associated with the Operational Phases for both developments are insignificant, and therefore, there are no significant cumulative impacts anticipated. The impact is therefore deemed as Neutral, Imperceptible and Long-Term.	Waste: The following measure, which is included in Chapter 16 (Waste) in Volume 2 of this EIAR will be implemented: In order to minimise the creation of waste, opportunities for reuse of materials (e.g. excavated material as fill) within both developments will be sought. Where there is remaining excess material, the potential for reuse as a by-product in accordance with Article 27 of the Waste Management Act will be investigated. Where material is unsuitable for either type of reuse, it will be treated as a waste. Appropriate handling, storage and management of any waste streams arising on either development will be managed in accordance with legislative requirements and best practice. No additional mitigation measures are required.	Waste: Construction Phase: Negative, Not Significant and Short-Term Operational Phase: Neutral, Imperceptible and Long-Term
				Material Assets: There is no potential for Construction or Operational Phase cumulative impacts, given the lack of spatial overlap between the two developments.	Material Assets: None required	Material Assets: None
				Landscape and Visual: There is no potential for cumulative impacts during the Construction and Operational Phases, given the lack of spatial overlap between the two developments.	Landscape and Visual: None required	Landscape and Visual: None

Tier	Application Reference / Planning Body	Applicant for 'Other Development' and Brief Description	Approximate Distance from Proposed Development Infrastructure (at Nearest Point to the Planning Application Boundary)	Assessment of Cumulative Impact with Proposed Development	Proposed Mitigation Measures	Residual Cumulative Impact
1	312271 - ABP	Glenveagh Homes Limited Demolition of an existing shed, construction of 548 no. residential units (401 no. houses, 147 no. apartments), 2 no. creches and associated site works.	184m from the Planning Application Boundary for the proposed cable route	<u>Population:</u> There is the potential for the following cumulative impacts with this other development, if the Construction Phases were to overlap, as the footprint of both developments overlap: • Negative, Slight and Temporary impact on amenity; • Negative, Slight to Moderate and Temporary on accessibility and severance of nearby sensitive receptors; • Positive, Not Significant and Short-Term on employment; and • Negative, Not Significant and Temporary on the local economy. There is no potential for cumulative impacts during the Operational Phases of the developments.	<u>Population:</u> The mitigation included in this EIAR is deemed sufficient to mitigate and / or manage the identified potential impacts. No additional mitigation measures are required.	<u>Population:</u> Construction Phase: Neutral, Not Significant and Temporary for amenity, accessibility and severance and the local economy, and Positive, Not Significant and Short-Term for employment. Operational Phase: None
				<u>Human Health:</u> There is potential for cumulative impacts on the air quality and noise determinants for a small number of residential dwellings located in the Yellowstown area, in the event of overlapping Construction Phases. The significance of impact is assessed as Negative, Imperceptible, and Temporary for both determinants. No cumulative impacts on health determinants considered likely during the Operational Phases.	<u>Human Health:</u> No significant cumulative health impacts are predicted which will require mitigation. Therefore, no cumulative mitigation is proposed.	<u>Human Health:</u> Construction Phase: Negative, Imperceptible and Temporary Operational Phase: None
				<u>Air Quality:</u> There is no potential for cumulative impacts during the Construction and Operational Phases due to the distance between the two developments.	<u>Air Quality:</u> None required	<u>Air Quality:</u> None
				<u>Noise and Vibration:</u> Due to the distance between the two developments there is no potential for cumulative noise and vibration impacts during the Construction or Operational Phases.	<u>Noise and Vibration:</u> None required	<u>Noise and Vibration:</u> None
				<u>Biodiversity:</u> In considering the nature of the works, there is no potential for significant cumulative impacts on biodiversity during the Construction Phase of both developments. The impact is assessed as Negative, Not Significant and Short-Term. There is no potential for a cumulative impact during the Operational Phases of both developments.	<u>Biodiversity:</u> None required	<u>Biodiversity:</u> Construction Phase: Negative, Not Significant and Short-Term Operational Phase: None
				<u>Soils and Geology:</u> There is no potential for cumulative impacts during the Construction and Operational Phases, as there are no geological heritage sites or contaminated land sites along the proposed route. <u>Hydrogeology:</u> There is no potential for a cumulative impacts during the Construction and Operational Phases of both developments, due to the distance between the two developments.	<u>Soils and Geology:</u> None required <u>Hydrogeology:</u> None required	<u>Soils and Geology:</u> None <u>Hydrogeology:</u> None
				<u>Hydrology:</u> There is no potential for likely significant, direct or indirect cumulative impacts, in combination with the other development, on hydrology for both the Construction and Operational Phases as the developments are not hydrologically connected.	<u>Hydrology:</u> None required	<u>Hydrology:</u> None
				<u>Archaeology, Architectural and Cultural Heritage:</u> There is the potential for a Negative, Moderate and Permanent impact on DL_05 as a result of the interaction between this project and the Proposed Development, as both will remove features that form this part of this asset.	<u>Archaeology, Architectural and Cultural Heritage:</u> The mitigation measures proposed in Chapter 13 (Archaeology, Architectural and Cultural Heritage) in Volume 2 of the EIAR are sufficient to address the potential cumulative impacts. No additional mitigation measures are required.	<u>Archaeology, Architectural and Cultural Heritage:</u> Construction Phase: Negative, Slight and Permanent

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				During operation, there is the potential for a Negative, Moderate and Permanent impact as a result of the presence of both developments due to the Proposed Development's permanent access tracks and Joint Bay covers remaining visible and the presence of this other project further reducing the legibility of this demesne.		Operational Phase: Negative, Moderate and Permanent
				<u>Traffic:</u> There is the potential for a Negative, Not Significant and Short-Term impact on traffic if Construction Phases were to overlap on the Cherryhound Tyrrelstown Link Road, Ratoath Road, Kilbride Road and R121 Ward Road, due to cumulative construction traffic. There is no potential for cumulative traffic impacts during the Operational Phases.	<u>Traffic:</u> No significant cumulative traffic impacts are predicted which will require mitigation. Therefore, no cumulative mitigation is proposed. Construction Phase traffic for the Proposed Development will be managed in line with a detailed Construction Traffic Management Plan, which will be adapted from the Construction Phase Traffic Management Plan included as Appendix B to the CEMP (included as a standalone document in the planning application pack).	<u>Traffic:</u> Construction Phase: Negative, Not Significant and Short-Term Operational Phase: None
				<u>Agronomy and Equine:</u> There is no potential for cumulative impacts on agronomy and equine during the Construction and Operational Phases as there will be no overlapping interaction with agricultural receptors.	<u>Agronomy and Equine:</u> None required	<u>Agronomy and Equine:</u> None
				<u>Waste:</u> Both developments will create surplus materials (e.g. soils, concrete and asphalt) which will require proper management and removal from the sites to be either treated as a waste or as a by-product (as appropriate and suitable for the material type, condition and quantity). In the event of overlapping Construction Phases, the waste from both developments could have a potentially Negative, Significant and Short-Term cumulative impact on the annual capacity of waste management facilities within the region during overlapping years, in the absence of any mitigation. Potential wastes associated with the Operational Phases for both developments are insignificant, and therefore, there are no significant cumulative impacts anticipated. The impact is therefore deemed as Neutral, Imperceptible and Long-Term.	<u>Waste:</u> The following measure, which is included in Chapter 16 (Waste) in Volume 2 of this EIAR will be implemented: In order to minimise the creation of waste, opportunities for reuse of materials (e.g. excavated material as fill) within both developments will be sought. Where there is remaining excess material, the potential for reuse as a by-product in accordance with Article 27 of the Waste Management Act will be investigated. Where material is unsuitable for either type of reuse, it will be treated as a waste. Appropriate handling, storage and management of any waste streams arising on either development will be managed in accordance with legislative requirements and best practice. No additional mitigation measures are required.	<u>Waste:</u> Construction Phase: Negative, Not Significant and Short-Term Operational Phase: Neutral, Imperceptible and Long-Term
				<u>Material Assets:</u> There is no potential for Construction or Operational Phase cumulative impacts, given the lack of spatial overlap between the two developments.	<u>Material Assets:</u> None required	<u>Material Assets:</u> None
				<u>Landscape and Visual:</u> There is no potential for cumulative impacts during the Construction and Operational Phases, given the lack of spatial overlap between the two developments.	<u>Landscape and Visual:</u> None required	<u>Landscape and Visual:</u> None
1	312848 / F21A/0488 – ABP / FCC	Gerard Gannon Properties Construction of 77 residential units across 2 no. apartment blocks at Belcamp Hall, Malahide Road, Dublin 17	961m from the Planning Application Boundary at Belcamp Substation	<u>Population:</u> There is no potential for cumulative impacts during the Construction and Operational Phases, as both developments are of sufficient distance away from each other to avoid any potential cumulative impacts related to population.	<u>Population:</u> None required.	<u>Population:</u> None
				<u>Human Health:</u> In considering the nature and distance of the works, there is no potential for cumulative impacts on human health during the Construction and Operational Phases of both developments.	<u>Human Health:</u> None required	<u>Human Health:</u> None
				<u>Air Quality:</u> There is no potential for cumulative impacts during the Construction and Operational Phases due to the distance between the two developments.	<u>Air Quality:</u> None required	<u>Air Quality:</u> None

Tier	Application Reference / Planning Body	Applicant for 'Other Development' and Brief Description	Approximate Distance from Proposed Development Infrastructure (at Nearest Point to the Planning Application Boundary)	Assessment of Cumulative Impact with Proposed Development	Proposed Mitigation Measures	Residual Cumulative Impact
				Noise and Vibration: Due to the distance between the two developments there is no potential for cumulative noise and vibration impacts during the Construction or Operational Phases.	Noise and Vibration: None required	Noise and Vibration: None
				Biodiversity: In considering the nature of the works, there is no potential for significant cumulative impacts on biodiversity during the Construction Phase of both developments. The impact is assessed as Negative, Not Significant and Short-Term. There is no potential for a cumulative impact during the Operational Phases of both developments.	Biodiversity: None required	Biodiversity: Construction Phase: Negative, Not Significant and Short-Term Operational Phase: None
				Soils and Geology: There is no potential for a cumulative impacts during the Construction and Operational Phases of both developments, due to the distance between the two developments. Hydrogeology: There is no potential for a cumulative impacts during the Construction and Operational Phases of both developments, due to the distance between the two developments.	Soils and Geology: None required. Hydrogeology: None required	Soils and Geology: None Hydrogeology: None
				Hydrology: There is no potential for likely significant, direct or indirect cumulative impacts, in combination with the other development, on hydrology for both the Construction and Operational Phases, as although the developments are hydrologically connected, there is sufficient distance between them that impacts are not likely to occur.	Hydrology: None required	Hydrology: None
				Archaeology, Architectural and Cultural Heritage: There is no potential for cumulative impacts to arise during the Construction and Operational Phases as no impacts on archaeology, architectural and cultural heritage were assessed in this overlapping study area.	Archaeology, Architectural and Cultural Heritage: None	Archaeology, Architectural and Cultural Heritage: None
				Traffic: There is the potential for a Negative, Not Significant and Short-Term impact on traffic if Construction Phases were to overlap on the R139 Road, due to cumulative construction traffic. There is no potential for cumulative traffic impacts during the Operational Phases.	Traffic: No significant cumulative traffic impacts are predicted which will require mitigation. Therefore, no cumulative mitigation is proposed. Construction Phase traffic for the Proposed Development will be managed in line with a detailed Construction Traffic Management Plan, which will be adapted from the Construction Phase Traffic Management Plan included as Appendix B to the CEMP (included as a standalone document in the planning application pack).	Traffic: Construction Phase: Negative, Not Significant and Short-Term Operational Phase: None
				Agronomy and Equine: There is no potential for cumulative impacts on agronomy and equine during the Construction and Operational Phases as there will be no overlapping interaction with agricultural receptors.	Agronomy and Equine: None required	Agronomy and Equine: None
				Waste: Both developments will create surplus materials (e.g. soils, concrete and asphalt) which will require proper management and removal from the sites to be either treated as a waste or as a by-product (as appropriate and suitable for the material type, condition and quantity). In the event of overlapping Construction Phases, the waste from both developments could have a potentially Negative, Significant and	Waste: The following measure, which is included in Chapter 16 (Waste) in Volume 2 of this EIAR will be implemented: In order to minimise the creation of waste, opportunities for reuse of materials (e.g. excavated material as fill) within both developments will be sought. Where there is remaining excess material, the potential for reuse as a by-product in	Waste: Construction Phase: Negative, Not Significant and Short-Term Operational Phase: Neutral, Imperceptible and Long-Term

Tier	Application Reference / Planning Body	Applicant for 'Other Development' and Brief Description	Approximate Distance from Proposed Development Infrastructure (at Nearest Point to the Planning Application Boundary)	Assessment of Cumulative Impact with Proposed Development	Proposed Mitigation Measures	Residual Cumulative Impact
				Short-Term cumulative impact on the annual capacity of waste management facilities within the region during overlapping years, in the absence of any mitigation. Potential wastes associated with the Operational Phases for both developments are insignificant, and therefore, there are no significant cumulative impacts anticipated. The impact is therefore deemed as Neutral, Imperceptible and Long-Term.	accordance with Article 27 of the Waste Management Act will be investigated. Where material is unsuitable for either type of reuse, it will be treated as a waste. Appropriate handling, storage and management of any waste streams arising on either development will be managed in accordance with legislative requirements and best practice. No additional mitigation measures are required.	
				Material Assets: There is no potential for Construction or Operational Phase cumulative impacts, given the lack of spatial overlap between the two developments.	Material Assets: None required	Material Assets: None
				Landscape and Visual: There is no potential for cumulative impacts during the Construction and Operational Phases, given the lack of spatial overlap between the two developments.	Landscape and Visual: None required	Landscape and Visual: None
1	314894 - ABP	Kilshane Energy Ltd. Proposed development of a 220kV Gas Insulated Switchgear (GIS) substation on lands at Kilshane Road, and an underground 220kV transmission line connection to the existing Cruiserath 220kV substation.	557m from the Planning Application Boundary for the proposed cable route	Population: There is no potential for cumulative impacts during the Construction and Operational Phases, as both developments are of sufficient distance away from each other to avoid any potential cumulative impacts related to population.	Population: None required	Population: None
				Human Health: In considering the nature and distance of the works, there is no potential for cumulative impacts on human health during the Construction and Operational Phases of both developments.	Human Health: None required	Human Health: None
				Air Quality: There is no potential for cumulative impacts during the Construction and Operational Phases due to the distance between the two developments.	Air Quality: None required	Air Quality: None
				Noise and Vibration: Due to the distance between the two developments there is no potential for cumulative noise and vibration impacts during the Construction or Operational Phases.	Noise and Vibration: None required	Noise and Vibration: None
				Biodiversity: In considering the nature of the works, there is no potential for significant cumulative impacts on biodiversity during the Construction Phase of both developments. The impact is assessed as Negative, Not Significant and Short-Term. There is no potential for a cumulative impact during the Operational Phases of both developments.	Biodiversity: None required	Biodiversity: Construction Phase: Negative, Not Significant and Short-Term Operational Phase: None
				Soils and Geology: There is no potential for a cumulative impacts during the Construction and Operational Phases of both developments, due to the distance between the two developments. Hydrogeology: There is no potential for a cumulative impacts during the Construction and Operational Phases of both developments, due to the distance between the two developments.	Soils and Geology: None required Hydrogeology: None required	Soils and Geology: None Hydrogeology: None

Tier	Application Reference / Planning Body	Applicant for 'Other Development' and Brief Description	Approximate Distance from Proposed Development Infrastructure (at Nearest Point to the Planning Application Boundary)	Assessment of Cumulative Impact with Proposed Development	Proposed Mitigation Measures	Residual Cumulative Impact
				Hydrology: There is no potential for likely significant, direct or indirect cumulative impacts, in combination with the other development, on hydrology for both the Construction and Operational Phases, as although the developments are hydrologically connected, there is sufficient distance between them that impacts are not likely to occur.	Hydrology: None required	Hydrology: None
				Archaeology, Architectural and Cultural Heritage: There is no potential for cumulative impacts to arise during the Construction and Operational Phases as no impacts on archaeology, architectural and cultural heritage were assessed in this overlapping study area.	Archaeology, Architectural and Cultural Heritage: None required	Archaeology, Architectural and Cultural Heritage: None
				Traffic: There is the potential for a Negative, Not Significant and Short-Term impact on traffic if Construction Phases were to overlap on the Cherryhound Tyrrelstown Link Road, Ratoath Road, Kilbride Road and R121 Ward Road, due to cumulative construction traffic. There is no potential for cumulative traffic impacts during the Operational Phases.	Traffic: No significant cumulative traffic impacts are predicted which will require mitigation. Therefore, no cumulative mitigation is proposed. Construction Phase traffic for the Proposed Development will be managed in line with a detailed Construction Traffic Management Plan, which will be adapted from the Construction Phase Traffic Management Plan included as Appendix B to the CEMP (included as a standalone document in the planning application pack).	Traffic: Construction Phase: Negative, Not Significant and Short-Term Operational Phase: None
				Agronomy and Equine: There is no potential for cumulative impacts on agronomy and equine during the Construction and Operational Phases as there will be no overlapping interaction with agricultural receptors.	Agronomy and Equine: None required	Agronomy and Equine: None
				Waste: Both developments will create surplus materials (e.g. soils, concrete and asphalt) which will require proper management and removal from the sites to be either treated as a waste or as a by-product (as appropriate and suitable for the material type, condition and quantity). In the event of overlapping Construction Phases, the waste from both developments could have a potentially Negative, Significant and Short-Term cumulative impact on the annual capacity of waste management facilities within the region during overlapping years, in the absence of any mitigation. Potential wastes associated with the Operational Phases for both developments are insignificant, and therefore, there are no significant cumulative impacts anticipated. The impact is therefore deemed as Neutral, Imperceptible and Long-Term.	Waste: The following measure, which is included in Chapter 16 (Waste) in Volume 2 of this EIAR will be implemented: In order to minimise the creation of waste, opportunities for reuse of materials (e.g. excavated material as fill) within both developments will be sought. Where there is remaining excess material, the potential for reuse as a by-product in accordance with Article 27 of the Waste Management Act will be investigated. Where material is unsuitable for either type of reuse, it will be treated as a waste. Appropriate handling, storage and management of any waste streams arising on either development will be managed in accordance with legislative requirements and best practice. No additional mitigation measures are required.	Waste: Construction Phase: Negative, Not Significant and Short-Term Operational Phase: Neutral, Imperceptible and Long-Term
				Material Assets: There is no potential for Construction or Operational Phase cumulative impacts, given the lack of spatial overlap between the two developments.	Material Assets: None required	Material Assets: None
				Landscape and Visual: There is no potential for cumulative impacts during the Construction and Operational Phases, given the lack of spatial overlap between the two developments.	Landscape and Visual: None required	Landscape and Visual: None

Tier	Application Reference / Planning Body	Applicant for 'Other Development' and Brief Description	Approximate Distance from Proposed Development Infrastructure (at Nearest Point to the Planning Application Boundary)	Assessment of Cumulative Impact with Proposed Development	Proposed Mitigation Measures	Residual Cumulative Impact
1	F21A/0147 / F23A/0006 - FCC	Genvest ULC. 2 no single storey light industrial buildings (total floor area of 3,333 sq.m) accommodating 3 units including ancillary office space at site west of Stockhole Lane/Clonshaugh Road, Clonshaugh, Co. Dublin.	121m from the Planning Application Boundary for the proposed cable route	Population: There is the potential for the following cumulative impacts with this other development, if the Construction Phases were to overlap, as the footprint of both developments overlap: • Negative, Slight and Temporary impact on amenity; • Negative, Slight to Moderate and Temporary on accessibility and severance of nearby sensitive receptors; • Positive, Not Significant and Short-Term on employment; and • Negative, Not Significant and Temporary on the local economy. There is no potential for cumulative impacts during the Operational Phases of the developments.	Population: The mitigation included in this EIAR is deemed sufficient to mitigate and / or manage the identified potential impacts. No additional mitigation measures are required.	Population: Construction Phase: Neutral, Not Significant and Temporary for amenity, accessibility and severance and the local economy, and Positive, Not Significant and Short-Term for employment. Operational Phase: None
				Human Health: There is potential for cumulative impacts on the air quality and noise determinants for a small number of residential dwellings located in Stockhole Lane area of Clonshaugh area (small area 267005001/02), in the event of overlapping Construction Phases. The significance of impact is assessed as Negative, Imperceptible, and Temporary for both determinants. No cumulative impacts on health determinants considered likely during the Operational Phases.	Human Health: No significant cumulative health impacts are predicted which will require mitigation. Therefore, no cumulative mitigation is proposed.	Human Health: Construction Phase: Negative, Imperceptible and Temporary Operational Phase: None
				Air Quality: There is no potential for cumulative impacts during the Construction and Operational Phases due to the distance between the two developments.	Air Quality: None required	Air Quality: None
				Noise and Vibration: Due to the distance between the two developments there is no potential for cumulative noise and vibration impacts during the Construction or Operational Phases.	Noise and Vibration: None required	Noise and Vibration: None
				Biodiversity: In considering the nature of the works, there is no potential for significant cumulative impacts on biodiversity during the Construction Phase of both developments. The impact is assessed as Negative, Not Significant and Short-Term. There is no potential for a cumulative impact during the Operational Phases of both developments.	Biodiversity: None required	Biodiversity: Construction Phase: Negative, Not Significant and Short-Term Operational Phase: None
				Soils and Geology: There is no potential for cumulative impacts during the Construction and Operational Phases, as there are no geological heritage sites or contaminated land sites along the proposed route. Hydrogeology: There is no potential for a cumulative impacts during the Construction and Operational Phases of both developments, due to the distance between the two developments.	Soils and Geology: None required Hydrogeology: None required	Soils and Geology: None Hydrogeology: None
				Hydrology: There is no potential for likely significant, direct or indirect cumulative impacts, in combination with the other development, on hydrology for both the Construction and Operational Phases, due to the distance between the two developments.	Hydrology: None required	Hydrology: None

Tier	Application Reference / Planning Body	Applicant for 'Other Development' and Brief Description	Approximate Distance from Proposed Development Infrastructure (at Nearest Point to the Planning Application Boundary)	Assessment of Cumulative Impact with Proposed Development	Proposed Mitigation Measures	Residual Cumulative Impact
				Archaeology, Architectural and Cultural Heritage: There is no potential for cumulative impacts to arise during the Construction and Operational Phases as no impacts on archaeology, architectural and cultural heritage were assessed in this overlapping study area.	Archaeology, Architectural and Cultural Heritage: None required	Archaeology, Architectural and Cultural Heritage: None
				Traffic: There is the potential for a Negative, Not Significant and Short-Term impact on traffic if Construction Phases were to overlap on the R139 Road, Clonshaugh Road and Stockhole Lane, due to cumulative construction traffic. There is no potential for cumulative traffic impacts during the Operational Phases.	Traffic: No significant cumulative traffic impacts are predicted which will require mitigation. Therefore, no cumulative mitigation is proposed. Construction Phase traffic for the Proposed Development will be managed in line with a detailed Construction Traffic Management Plan, which will be adapted from the Construction Phase Traffic Management Plan included as Appendix B to the CEMP (included as a standalone document in the planning application pack).	Traffic: Construction Phase: Negative, Not Significant and Short-Term Operational Phase: None
				Agronomy and Equine: There is no potential for cumulative impacts on agronomy and equine during the Construction and Operational Phases as there will be no overlapping interaction with agricultural receptors.	Agronomy and Equine: None required	Agronomy and Equine: None
				Waste: Both developments will create surplus materials (e.g. soils, concrete and asphalt) which will require proper management and removal from the sites to be either treated as a waste or as a by-product (as appropriate and suitable for the material type, condition and quantity). In the event of overlapping Construction Phases, the waste from both developments could have a potentially Negative, Significant and Short-Term cumulative impact on the annual capacity of waste management facilities within the region during overlapping years, in the absence of any mitigation. Potential wastes associated with the Operational Phases for both developments are insignificant, and therefore, there are no significant cumulative impacts anticipated. The impact is therefore deemed as Neutral, Imperceptible and Long-Term.	Waste: The following measure, which is included in Chapter 16 (Waste) in Volume 2 of this EIAR will be implemented: In order to minimise the creation of waste, opportunities for reuse of materials (e.g. excavated material as fill) within both developments will be sought. Where there is remaining excess material, the potential for reuse as a by-product in accordance with Article 27 of the Waste Management Act will be investigated. Where material is unsuitable for either type of reuse, it will be treated as a waste. Appropriate handling, storage and management of any waste streams arising on either development will be managed in accordance with legislative requirements and best practice. No additional mitigation measures are required.	Waste: Construction Phase: Negative, Not Significant and Short-Term Operational Phase: Neutral, Imperceptible and Long-Term
				Material Assets: There is no potential for Construction or Operational Phase cumulative impacts, given the lack of spatial overlap between the two developments.	Material Assets: None required	Material Assets: None
				Landscape and Visual: There is no potential for cumulative impacts during the Construction and Operational Phases, given the lack of spatial overlap between the two developments.	Landscape and Visual: None required	Landscape and Visual: None
1	F20A/0550 - FCC	daa PLC Full planning permission to extend the North Apron in the Airfield at Dublin Airport, Co Dublin to facilitate the provision of twelve aircraft stands and a ground servicing equipment area on a site of 19.2ha.	448m from the Planning Application Boundary for the proposed cable route	Population: There is no potential for cumulative impacts during the Construction and Operational Phases, as both developments are of sufficient distance away from each other to avoid any potential cumulative impacts related to population.	Population: None required	Population: None
				Human Health: In considering the nature and distance of the works, there is no potential for cumulative impacts on human health during the Construction and Operational Phases of both developments.	Human Health: None required	Human Health: None
				Air Quality: There is no potential for cumulative impacts during the Construction and Operational Phases due to the distance between the two developments.	Air Quality: None required	Air Quality: None

Tier	Application Reference / Planning Body	Applicant for 'Other Development' and Brief Description	Approximate Distance from Proposed Development Infrastructure (at Nearest Point to the Planning Application Boundary)	Assessment of Cumulative Impact with Proposed Development	Proposed Mitigation Measures	Residual Cumulative Impact
				Noise and Vibration: Due to the distance between the two developments there is no potential for cumulative noise and vibration impacts during the Construction or Operational Phases.	Noise and Vibration: None required	Noise and Vibration: None
				Biodiversity: In considering the nature and distance of the works, there is no potential for cumulative impacts on human health during the Construction and Operational Phases of both developments.	Biodiversity: None required	Biodiversity: None
				Soils and Geology: There is no potential for a cumulative impacts during the Construction and Operational Phases of both developments, due to the distance between the two developments. Hydrogeology: There is no potential for a cumulative impacts during the Construction and Operational Phases of both developments, due to the distance between the two developments.	Soils and Geology: None required Hydrogeology: None required	Soils and Geology: None Hydrogeology: None
				Hydrology: There is no potential for likely significant, direct or indirect cumulative impacts, in combination with the other development, on hydrology for both the Construction and Operational Phases, due to the distance between the two developments.	Hydrology: None required	Hydrology: None
				Archaeology, Architectural and Cultural Heritage: There is no potential for cumulative impacts to arise during the Construction and Operational Phases as no impacts on archaeology, architectural and cultural heritage were assessed in this overlapping study area.	Archaeology, Architectural and Cultural Heritage: None	Archaeology, Architectural and Cultural Heritage: None
				Traffic: There is the potential for a Negative, Not Significant and Short-Term impact on traffic if Construction Phases were to overlap on the R132 Road, due to cumulative construction traffic. There is no potential for cumulative traffic impacts during the Operational Phases.	Traffic: No significant cumulative traffic impacts are predicted which will require mitigation. Therefore, no cumulative mitigation is proposed. Construction Phase traffic for the Proposed Development will be managed in line with a detailed Construction Traffic Management Plan, which will be adapted from the Construction Phase Traffic Management Plan included as Appendix B to the CEMP (included as a standalone document in the planning application pack).	Traffic: Construction Phase: Negative, Not Significant and Short-Term Operational Phase: None
				Agronomy and Equine: There is no potential for cumulative impacts on agronomy and equine during the Construction and Operational Phases as there will be no overlapping interaction with agricultural receptors.	Agronomy and Equine: None required	Agronomy and Equine: None
				Waste: Both developments will create surplus materials (e.g. soils, concrete and asphalt) which will require proper management and removal from the sites to be either treated as a waste or as a by-product (as appropriate and suitable for the material type, condition and quantity). In the event of overlapping Construction Phases, the waste from both developments could have a potentially Negative, Significant and Short-Term cumulative impact on the annual capacity of waste management facilities within the region during overlapping years, in the absence of any mitigation.	Waste: The following measure, which is included in Chapter 16 (Waste) in Volume 2 of this EIAR will be implemented: In order to minimise the creation of waste, opportunities for reuse of materials (e.g. excavated material as fill) within both developments will be sought. Where there is remaining excess material, the potential for reuse as a by-product in accordance with Article 27 of the Waste Management Act will be investigated. Where material is unsuitable for either type of reuse, it will be treated as a waste. Appropriate handling, storage and management of any waste streams arising on either development will be managed in accordance with legislative requirements and best practice. No additional mitigation measures are required.	Waste: Construction Phase: Negative, Not Significant and Short-Term Operational Phase: Neutral, Imperceptible and Long-Term

Tier	Application Reference / Planning Body	Applicant for 'Other Development' and Brief Description	Approximate Distance from Proposed Development Infrastructure (at Nearest Point to the Planning Application Boundary)	Assessment of Cumulative Impact with Proposed Development	Proposed Mitigation Measures	Residual Cumulative Impact
				Potential wastes associated with the Operational Phases for both developments are insignificant, and therefore, there are no significant cumulative impacts anticipated. The impact is therefore deemed as Neutral, Imperceptible and Long-Term.		
				<u>Material Assets:</u> There is no potential for Construction or Operational Phase cumulative impacts, given the lack of spatial overlap between the two developments.	<u>Material Assets:</u> None required	<u>Material Assets:</u> None
				<u>Landscape and Visual:</u> There is no potential for cumulative impacts during the Construction and Operational Phases, given the lack of spatial overlap between the two developments.	<u>Landscape and Visual:</u> None required	<u>Landscape and Visual:</u> None
1	F21A/0681 / 3041/22 – FCC / DCC	Mayne Stability Limited Development of access to the Synchronous Compensator Development (Grid Stabilisation Facility) on the site of a c 0.94 ha. at lands south of Belcamp 220KV substation , Belcamp Dublin 17 .	4m from Planning Application Boundary at Belcamp Substation	<u>Population:</u> There is the potential for the following cumulative impacts with this other development, if the Construction Phases were to overlap, as the footprint of both developments overlap: • Negative, Slight and Temporary impact on amenity; • Negative, Slight to Moderate and Temporary on accessibility and severance of nearby sensitive receptors; • Positive, Not Significant and Short-Term on employment; and • Negative, Not Significant and Temporary on the local economy. There is no potential for cumulative impacts during the Operational Phases of the developments.	<u>Population:</u> The mitigation included in this EIAR is deemed sufficient to mitigate and / or manage the identified potential impacts. No additional mitigation measures are required.	<u>Population:</u> Construction Phase: Neutral, Not Significant and Temporary for amenity, accessibility and severance and the local economy, and Positive, Not Significant and Short-Term for employment. Operational Phase: None
				<u>Human Health:</u> In considering the nature of the works, there is no potential for cumulative impacts on human health during the Construction and Operational Phases of both developments.	<u>Human Health:</u> None required	<u>Human Health:</u> None
				<u>Air Quality:</u> There is a Negligible to Medium risk of dust impacts as a result of the Proposed Development which is assessed as a Not Significant impact. Therefore, the potential impact of the two developments, in the event of Construction Phases overlapping is assessed as Negative, Not Significant and Short-Term. There is no potential for cumulative impacts during the Operational Phases.	<u>Air Quality:</u> Although there is no potential for significant cumulative impacts, the mitigation measures outlined in Chapter 7 (Air Quality) in Volume 2 of the EIAR and also outlined in the CEMP (included as a standalone document in the planning application pack) will ensure that dust and particulate matter emissions are minimised. No additional mitigation measures are required.	<u>Air Quality:</u> Construction Phase: Negative, Not Significant and Short-Term Operational Phase: None
				<u>Noise and Vibration:</u> There is the potential for a Negative, Not Significant and Short-Term impact, in the event of overlapping Construction Phases as there is a spatial overlap with both developments. There is no potential for a cumulative impact during the Operational Phases of both developments.	<u>Noise and Vibration:</u> None required	<u>Noise and Vibration:</u> Construction Phase: Negative, Not Significant and Short-Term Operational Phase: None
				<u>Biodiversity:</u> In considering the nature of the works, there is no potential for significant cumulative impacts on biodiversity during the Construction Phase of both developments. The impact is assessed as Negative, Not Significant and Short-Term. There is no potential for a cumulative impact during the Operational Phases of both developments.	<u>Biodiversity:</u> None required	<u>Biodiversity:</u> Construction Phase: Negative, Not Significant and Short-Term Operational Phase: None
				<u>Soils and Geology:</u> In considering the nature of the works, there is no potential for cumulative impacts on human health during the Construction and Operational Phases of both developments.	<u>Soils and Geology:</u> None required	<u>Soils and Geology:</u> None

Tier	Application Reference / Planning Body	Applicant for 'Other Development' and Brief Description	Approximate Distance from Proposed Development Infrastructure (at Nearest Point to the Planning Application Boundary)	Assessment of Cumulative Impact with Proposed Development	Proposed Mitigation Measures	Residual Cumulative Impact
				Hydrogeology: Should work from both developments be carried out at the same time, there is the potential for Negative, Slight and Short-Term cumulative impacts on groundwater quality. No long term significant changes to groundwater flows, levels and quality are predicted as part of the Proposed Development. Therefore there is no potential for a cumulative impacts during the Operational Phase of both developments.	Hydrogeology: The proposed mitigation measures outlined in Chapter 11 (Soils, Geology and Hydrogeology) in Volume 2 of the EIAR are deemed sufficient. No additional mitigation measures are required.	Hydrogeology: Construction Phase: Negative, Imperceptible to Slight and Short-Term for groundwater quality. Operational Phase: None
				Hydrology: There is no potential for likely significant, direct or indirect cumulative impacts, in combination with the other development, on hydrology for both the Construction and Operational Phases, as although the developments are hydrologically connected, there is sufficient distance between them that impacts are not likely to occur.	Hydrology: None required	Hydrology: None
				Archaeology, Architectural and Cultural Heritage: There is no potential for cumulative impacts to arise during the Construction and Operational Phases as no impacts on archaeology, architectural and cultural heritage were assessed in this overlapping study area.	Archaeology, Architectural and Cultural Heritage: None required	Archaeology, Architectural and Cultural Heritage: None
				Traffic: There is the potential for a Negative, Not Significant and Short-Term impact on traffic if Construction Phases were to overlap on the R139 Road, due to cumulative construction traffic. There is no potential for cumulative traffic impacts during the Operational Phases.	Traffic: No significant cumulative traffic impacts are predicted which will require mitigation. Therefore, no cumulative mitigation is proposed. Construction Phase traffic for the Proposed Development will be managed in line with a detailed Construction Traffic Management Plan, which will be adapted from the Construction Phase Traffic Management Plan included as Appendix B to the CEMP (included as a standalone document in the planning application pack).	Traffic: Construction Phase: Negative, Not Significant and Short-Term Operational Phase: None
				Agronomy and Equine: There is no potential for cumulative impacts on agronomy and equine during the Construction and Operational Phases as there will be no overlapping interaction with agricultural receptors.	Agronomy and Equine: None required	Agronomy and Equine: None
				Waste: Both developments will create surplus materials (e.g. soils, concrete and asphalt) which will require proper management and removal from the sites to be either treated as a waste or as a by-product (as appropriate and suitable for the material type, condition and quantity). In the event of overlapping Construction Phases, the waste from both developments could have a potentially Negative, Significant and Short-Term cumulative impact on the annual capacity of waste management facilities within the region during overlapping years, in the absence of any mitigation. Potential wastes associated with the Operational Phases for both developments are insignificant, and therefore, there are no significant cumulative impacts anticipated. The impact is therefore deemed as Neutral, Imperceptible and Long-Term.	Waste: The following measure, which is included in Chapter 16 (Waste) in Volume 2 of this EIAR will be implemented: In order to minimise the creation of waste, opportunities for reuse of materials (e.g. excavated material as fill) within both developments will be sought. Where there is remaining excess material, the potential for reuse as a by-product in accordance with Article 27 of the Waste Management Act will be investigated. Where material is unsuitable for either type of reuse, it will be treated as a waste. Appropriate handling, storage and management of any waste streams arising on either development will be managed in accordance with legislative requirements and best practice. No additional mitigation measures are required.	Waste: Construction Phase: Negative, Not Significant and Short-Term Operational Phase: Neutral, Imperceptible and Long-Term
				Material Assets: There is no potential for Construction or Operational Phase cumulative impacts, given the lack of spatial overlap between the two developments. Potential Positive, Significant and Long-Term cumulative impact on the regional electricity network once both developments are operational.	Material Assets: None required	Material Assets: Construction Phase: None Operational Phase: Positive, Significant and Long-Term

Tier	Application Reference / Planning Body	Applicant for 'Other Development' and Brief Description	Approximate Distance from Proposed Development Infrastructure (at Nearest Point to the Planning Application Boundary)	Assessment of Cumulative Impact with Proposed Development	Proposed Mitigation Measures	Residual Cumulative Impact
				Landscape and Visual: There is no potential for cumulative impacts during the Construction and Operational Phases,. given the lack of spatial overlap between the two developments.	Landscape and Visual: None required	Landscape and Visual: None
1	FW22A/0167 - FCC	IPUT plc Provision of c. 72,753sq.m of logistics and associated office uses across 5 no. buildings on lands comprising c. 26.8ha to the north of the Cherryhound, Tyrrelstown M2/M3 Link Road and south of the R121, Cherryhound, Spricklestown and Killamonan, The Ward, Dublin.	Approximately 500m from the Planning Application Boundary for the proposed cable route	Population: There is the potential for the following cumulative impacts with this other development, if the Construction Phases were to overlap, as the footprint of both developments overlap: • Negative, Slight and Temporary impact on amenity; • Negative, Slight to Moderate and Temporary on accessibility and severance of nearby sensitive receptors; • Positive, Not Significant and Short-Term on employment; and • Negative, Not Significant and Temporary on the local economy. There is no potential for cumulative impacts during the Operational Phases of the developments.	Population: The mitigation included in this EIAR is deemed sufficient to mitigate and / or manage the identified potential impacts. No additional mitigation measures are required.	Population: Construction Phase: Neutral, Not Significant and Temporary for amenity, accessibility and severance and the local economy, and Positive, Not Significant and Short-Term for employment. Operational Phase: None
				Human Health: Potential for cumulative impacts on the air quality, noise and traffic and transport health determinants for residents of small area 267158009/02 during construction as both developments will affect access at Spricklestown and will generate noise and dust emissions experienced by a small number of residents at Spricklestown . The significance of impact is assessed as Negative, Imperceptible and Temporary. No potential for cumulative impacts on any health determinants during the Operational Phases.	Human Health: No significant cumulative health impacts are predicted which will require mitigation. Therefore, no cumulative mitigation is proposed.	Human Health: Construction Phase: Negative, Imperceptible and Temporary Operational Phase: None
				Air Quality: There is a Negligible to Medium risk of dust impacts as a result of the Proposed Development which is assessed as a Not Significant impact. Therefore, the potential impact of the two developments, in the event of Construction Phases overlapping is assessed as Negative, Not Significant and Short-Term. There is no potential for cumulative impacts during the Operational Phases.	Air Quality: Although there is no potential for significant cumulative impacts, the mitigation measures outlined in Chapter 7 (Air Quality) in Volume 2 of the EIAR and also outlined in the CEMP (included as a standalone document in the planning application pack) will ensure that dust and particulate matter emissions are minimised. No additional mitigation measures are required.	Air Quality: Construction Phase: Negative, Not Significant and Short-Term Operational Phase: None
				Noise and Vibration: There is the potential for a Negative, Not Significant and Short-Term impact, in the event of overlapping Construction Phases as there is a spatial overlap with both developments. There is no potential for a cumulative impact during the Operational Phases of both developments.	Noise and Vibration: None required	Noise and Vibration: Construction Phase: Negative, Not Significant and Short-Term Operational Phase: None
				Biodiversity: Wintering Birds: This other development is located within large flat arable fields which are suitable for wintering birds. There is the potential for a cumulative impact from disturbance to wintering birds if Construction Phases were to overlap. This is assessed as Negative, Slight and Short-Term. There is no potential for a cumulative impact during the Operational Phases of both developments.	Biodiversity: The site-wide mitigation measures outlined in Chapter 10 (Biodiversity) in Volume 2 of this EIAR are considered sufficient to mitigate for the potential impacts on wintering birds. No additional mitigation measures are required.	Biodiversity: Construction Phase: Negative, Not Significant and Short-Term Operational Phase: None
				Soils and Geology: There is no potential for cumulative impacts during the Construction and Operational Phases, as there are no geological heritage sites or contaminated land sites along the proposed route.	Soils and Geology: None required.	Soils and Geology: None

Tier	Application Reference / Planning Body	Applicant for 'Other Development' and Brief Description	Approximate Distance from Proposed Development Infrastructure (at Nearest Point to the Planning Application Boundary)	Assessment of Cumulative Impact with Proposed Development	Proposed Mitigation Measures	Residual Cumulative Impact
				Hydrogeology: Should work from both developments be carried out at the same time, there is the potential for Negative, Slight and Short-Term cumulative impacts on groundwater quality. No long term significant changes to groundwater flows, levels and quality are predicted as part of the Proposed Development. Therefore there is no potential for a cumulative impacts during the Operational Phase of both developments.	Hydrogeology: The proposed mitigation measures outlined in Chapter 11 (Soils, Geology and Hydrogeology) in Volume 2 of the EIAR are deemed sufficient. No additional mitigation measures are required.	Hydrogeology: Construction Phase: Negative, Imperceptible to Slight and Short-Term for groundwater quality. Operational Phase: None
				Hydrology: There is no potential for likely significant, direct or indirect cumulative impacts, in combination with the other development, on hydrology for both the Construction and Operational Phases, as although the developments are hydrologically connected, there is sufficient distance between them that impacts are not likely to occur.	Hydrology: None required	Hydrology: None
				Archaeology, Architectural and Cultural Heritage: There is no potential for cumulative impacts to arise during the Construction and Operational Phases as no impacts on archaeology, architectural and cultural heritage were assessed in this overlapping study area.	Archaeology, Architectural and Cultural Heritage: None required	Archaeology, Architectural and Cultural Heritage: None
				Traffic: Although unlikely, due to likely construction routes being further south than those assumed for the Proposed Development, there is limited potential for a Negative, Not Significant and Short-Term impact on traffic if Construction Phases were to overlap on Cherryhound Tyrrelstown Link Road due to cumulative construction traffic. There is no potential for cumulative traffic impacts during the Operational Phases.	Traffic: No significant cumulative traffic impacts are predicted which will require mitigation. Therefore, no cumulative mitigation is proposed. Construction Phase traffic for the Proposed Development will be managed in line with a detailed Construction Traffic Management Plan, which will be adapted from the Construction Phase Traffic Management Plan included as Appendix B to the CEMP (included as a standalone document in the planning application pack).	Traffic: Construction Phase: Negative, Not Significant and Short-Term Operational Phase: None
				Agronomy and Equine: There is no potential for cumulative impacts on agronomy and equine during the Construction and Operational Phases as there will be no overlapping interaction with agricultural receptors.	Agronomy and Equine: None required	Agronomy and Equine: None
				Waste: Both developments will create surplus materials (e.g. soils, concrete and asphalt) which will require proper management and removal from the sites to be either treated as a waste or as a by-product (as appropriate and suitable for the material type, condition and quantity). In the event of overlapping Construction Phases, the waste from both developments could have a potentially Negative, Significant and Short-Term cumulative impact on the annual capacity of waste management facilities within the region during overlapping years, in the absence of any mitigation. Potential wastes associated with the Operational Phases for both developments are insignificant, and therefore, there are no significant cumulative impacts anticipated. The impact is therefore deemed as Neutral, Imperceptible and Long-Term.	Waste: The following measure, which is included in Chapter 16 (Waste) in Volume 2 of this EIAR will be implemented: In order to minimise the creation of waste, opportunities for reuse of materials (e.g. excavated material as fill) within both developments will be sought. Where there is remaining excess material, the potential for reuse as a by-product in accordance with Article 27 of the Waste Management Act will be investigated. Where material is unsuitable for either type of reuse, it will be treated as a waste. Appropriate handling, storage and management of any waste streams arising on either development will be managed in accordance with legislative requirements and best practice. No additional mitigation measures are required.	Waste: Construction Phase: Negative, Not Significant and Short-Term Operational Phase: Neutral, Imperceptible and Long-Term
				Material Assets: No known existing utility interfaces identified which may require diversion at the location where the two developments overlap. Potential impact is assessed as Neutral, Imperceptible and Temporary. No Operational Phase cumulative impacts anticipated.	Material Assets: The mitigation included in this EIAR and in the CEMP (included as a standalone documents in the planning application pack) is deemed sufficient to mitigate and / or manage the identified potential impacts. No additional mitigation measures are required.	Material Assets: Construction Phase: Neutral, Imperceptible and Temporary Operational Phase: None
				Landscape and Visual: There is no potential for cumulative impacts during the Construction and Operational Phases.	Landscape and Visual: None required	Landscape and Visual: None

Tier	Application Reference / Planning Body	Applicant for 'Other Development' and Brief Description	Approximate Distance from Proposed Development Infrastructure (at Nearest Point to the Planning Application Boundary)	Assessment of Cumulative Impact with Proposed Development	Proposed Mitigation Measures	Residual Cumulative Impact
1	FW19A/0177 - FCC	ESB Engineering & Major Projects Proposed underground cable route originating from the existing Macetown ESB station (on Damastown Avenue in the townland of Macetown Middle) , running in an easterly direction along Damastown Avenue and the R121 (in the townlands of Macetown Middle, Macetown South, Tyrrelstown, Cruiserath and Buzzardstown), to a permitted medium voltage (MV) substation located within a permitted data storage facility	1km from Planning Application Boundary for the proposed cable route	Population: There is no potential for cumulative impacts during the Construction and Operational Phases, as both developments are of sufficient distance away from each other to avoid any potential cumulative impacts related to population.	Population: None required	Population: None
				Human Health: In considering the nature and distance of the works, there is no potential for cumulative impacts on human health during the Construction and Operational Phases of both developments.	Human Health: None required	Human Health: None
				Air Quality: There is no potential for cumulative impacts during the Construction and Operational Phases due to the distance between the two developments.	Air Quality: None required	Air Quality: None
				Noise and Vibration: There will be no spatial overlap resulting from the two developments and therefore there is no potential for cumulative noise and vibration impacts during the Construction or Operational Phases.	Noise and Vibration: None required	Noise and Vibration: None
				Biodiversity: The ESB scheme crosses the River Tolka which is hydrologically connected to North Dublin Bay Special Area of Conservation (SAC), South Dublin Bay and River Tolka Estuary Special Protection Area (SPA) and North Bull Island SPA. The Proposed Development is hydrologically linked to these European sites via the same pathway. There is therefore the potential for pollution to enter into River Tolka and be transported to these European sites. In the event of Construction Phases overlapping, and in the absence of mitigation, the potential cumulative impact is assessed as Negative, Very Significant and Short-Term. There is no potential for a cumulative impacts during the Operational Phases of both developments.	Biodiversity: The pollution control mitigation measures outlined in Chapter 10 (Biodiversity) and Chapter 12 (Hydrology) in Volume 2 of this EIAR are sufficient to mitigate for the potential impacts to these European sites. No additional mitigation measures are required.	Biodiversity: Construction Phase: Negative, Not Significant and Short-Term Operational Phase: None
				Soils and Geology: There is no potential for a cumulative impacts during the Construction and Operational Phases of both developments, due to the distance between the two developments. Hydrogeology: There is no potential for a cumulative impacts during the Construction and Operational Phases of both developments, due to the distance between the two developments.	Soils and Geology: None required Hydrogeology: None required	Soils and Geology: None Hydrogeology: None
				Hydrology: There is no potential for likely significant, direct or indirect cumulative impacts, in combination with the other development, on hydrology for both the Construction and Operational Phases, due to the distance between the two developments..	Hydrology: None required	Hydrology: None
				Archaeology, Architectural and Cultural Heritage: There is no potential for cumulative impacts to arise during the Construction and Operational Phases as no impacts on archaeology, architectural and cultural heritage were assessed in this overlapping study area.	Archaeology, Architectural and Cultural Heritage: None required	Archaeology, Architectural and Cultural Heritage: None
				Traffic: There is the potential for a Negative, Not Significant and Short-Term impact on traffic if Construction Phases were to overlap on Cherryhound Tyrrelstown Link Road due to cumulative construction traffic.	Traffic: No significant cumulative traffic impacts are predicted which will require mitigation. Therefore, no cumulative mitigation is proposed. Construction Phase traffic for the Proposed Development will be managed in line with a detailed Construction Traffic Management Plan, which will be adapted	Traffic: Construction Phase: Negative, Not Significant and Short-Term Operational Phase: None

Tier	Application Reference / Planning Body	Applicant for 'Other Development' and Brief Description	Approximate Distance from Proposed Development Infrastructure (at Nearest Point to the Planning Application Boundary)	Assessment of Cumulative Impact with Proposed Development	Proposed Mitigation Measures	Residual Cumulative Impact
				There is no potential for cumulative traffic impacts during the Operational Phases.	from the Construction Phase Traffic Management Plan included as Appendix B to the CEMP (included as a standalone document in the planning application pack).	
				<u>Agronomy and Equine:</u> There is no potential for cumulative impacts on agronomy and equine during the Construction and Operational Phases as there will be no overlapping interaction with agricultural receptors.	<u>Agronomy and Equine:</u> None required	<u>Agronomy and Equine:</u> None
				<u>Waste:</u> Both developments will create surplus materials (e.g. soils, concrete and asphalt) which will require proper management and removal from the sites to be either treated as a waste or as a by-product (as appropriate and suitable for the material type, condition and quantity). In the event of overlapping Construction Phases, the waste from both developments could have a potentially Negative, Significant and Short-Term cumulative impact on the annual capacity of waste management facilities within the region during overlapping years, in the absence of any mitigation. Potential wastes associated with the Operational Phases for both developments are insignificant, and therefore, there are no significant cumulative impacts anticipated. The impact is therefore deemed as Neutral, Imperceptible and Long-Term.	<u>Waste:</u> The following measure, which is included in Chapter 16 (Waste) in Volume 2 of this EIAR will be implemented: In order to minimise the creation of waste, opportunities for reuse of materials (e.g. excavated material as fill) within both developments will be sought. Where there is remaining excess material, the potential for reuse as a by-product in accordance with Article 27 of the Waste Management Act will be investigated. Where material is unsuitable for either type of reuse, it will be treated as a waste. Appropriate handling, storage and management of any waste streams arising on either development will be managed in accordance with legislative requirements and best practice. No additional mitigation measures are required.	<u>Waste:</u> Construction Phase: Negative, Not Significant and Short-Term Operational Phase: Neutral, Imperceptible and Long-Term
				<u>Material Assets:</u> There is no potential for Construction or Operational Phase cumulative impacts, given the lack of spatial overlap between the two developments. Potential Positive, Significant and Long-Term cumulative impact on the regional electricity network once both developments are operational.	<u>Material Assets:</u> None required	<u>Material Assets:</u> Construction Phase: None Operational Phase: Positive, Significant and Long-Term
				<u>Landscape and Visual:</u> There is no potential for cumulative impacts during the Construction and Operational Phases, given the lack of spatial overlap between the two developments.	<u>Landscape and Visual:</u> None required	<u>Landscape and Visual:</u> None
1	F18A/0306 - FCC	Clarke Family Partnership Permission for the construction of 36 residential units consisting of 30 two storey houses (23 three bedroom type, 7 four bedroom type) and 6 number two bedroom apartments in a three storey block, with ancillary open spaces, boundary treatment and site works at Fosterstown North.	1km from the Planning Application Boundary for the proposed cable route	<u>Population:</u> There is no potential for cumulative impacts during the Construction and Operational Phases, as both developments are of sufficient distance away from each other to avoid any potential cumulative impacts related to population.	<u>Population:</u> None required	<u>Population:</u> None
				<u>Human Health:</u> In considering the nature and distance of the works, there is no potential for cumulative impacts on human health during the Construction and Operational Phases of both developments.	<u>Human Health:</u> None required	<u>Human Health:</u> None
				<u>Air Quality:</u> There is no potential for cumulative impacts during the Construction and Operational Phases due to the distance between the two developments.	<u>Air Quality:</u> None required	<u>Air Quality:</u> None
				<u>Noise and Vibration:</u> There will be no spatial overlap resulting from the two developments and therefore there is no potential for cumulative noise and vibration impacts during the Construction or Operational Phases.	<u>Noise and Vibration:</u> None required	<u>Noise and Vibration:</u> None
				<u>Biodiversity:</u> In considering the nature and distance of the works, there is no potential for cumulative impacts during the Construction and Operational Phases of both developments.	<u>Biodiversity:</u> None required	<u>Biodiversity:</u> None

Tier	Application Reference / Planning Body	Applicant for 'Other Development' and Brief Description	Approximate Distance from Proposed Development Infrastructure (at Nearest Point to the Planning Application Boundary)	Assessment of Cumulative Impact with Proposed Development	Proposed Mitigation Measures	Residual Cumulative Impact
				Soils and Geology: There is no potential for a cumulative impacts during the Construction and Operational Phases of both developments, due to the distance between the two developments. Hydrogeology: There is no potential for a cumulative impacts during the Construction and Operational Phases of both developments, due to the distance between the two developments.	Soils and Geology: None required Hydrogeology: None required	Soils and Geology: None Hydrogeology: None
				Hydrology: There is no potential for likely significant, direct or indirect cumulative impacts, in combination with the other development, on hydrology for both the Construction and Operational Phases, due to the distance between the two developments.	Hydrology: None required	Hydrology: None
				Archaeology, Architectural and Cultural Heritage: There is no potential for cumulative impacts to arise during the Construction and Operational Phases as no impacts on archaeology, architectural and cultural heritage were assessed in this overlapping study area.	Archaeology, Architectural and Cultural Heritage: None required	Archaeology, Architectural and Cultural Heritage: None
				Traffic: There is the potential for a Negative, Not Significant and Short-Term impact on traffic if Construction Phases were to overlap on the R132 Road, due to cumulative construction traffic. There is no potential for cumulative traffic impacts during the Operational Phases.	Traffic: No significant cumulative traffic impacts are predicted which will require mitigation. Therefore, no cumulative mitigation is proposed. Construction Phase traffic for the Proposed Development will be managed in line with a detailed Construction Traffic Management Plan, which will be adapted from the Construction Phase Traffic Management Plan included as Appendix B to the CEMP (included as a standalone document in the planning application pack).	Traffic: Construction Phase: Negative, Not Significant and Short-Term Operational Phase: None
				Agronomy and Equine: There is no potential for cumulative impacts on agronomy and equine during the Construction and Operational Phases as there will be no overlapping interaction with agricultural receptors.	Agronomy and Equine: None required	Agronomy and Equine: None
				Waste: Both developments will create surplus materials (e.g. soils, concrete and asphalt) which will require proper management and removal from the sites to be either treated as a waste or as a by-product (as appropriate and suitable for the material type, condition and quantity). In the event of overlapping Construction Phases, the waste from both developments could have a potentially Negative, Significant and Short-Term cumulative impact on the annual capacity of waste management facilities within the region during overlapping years, in the absence of any mitigation. Potential wastes associated with the Operational Phases for both developments are insignificant, and therefore, there are no significant cumulative impacts anticipated. The impact is therefore deemed as Neutral, Imperceptible and Long-Term.	Waste: The following measure, which is included in Chapter 16 (Waste) in Volume 2 of this EIAR will be implemented: In order to minimise the creation of waste, opportunities for reuse of materials (e.g. excavated material as fill) within both developments will be sought. Where there is remaining excess material, the potential for reuse as a by-product in accordance with Article 27 of the Waste Management Act will be investigated. Where material is unsuitable for either type of reuse, it will be treated as a waste. Appropriate handling, storage and management of any waste streams arising on either development will be managed in accordance with legislative requirements and best practice. No additional mitigation measures are required.	Waste: Construction Phase: Negative, Not Significant and Short-Term Operational Phase: Neutral, Imperceptible and Long-Term
				Material Assets: There is no potential for Construction or Operational Phase cumulative impacts, given the lack of spatial overlap between the two developments.	Material Assets: None required	Material Assets: None
				Landscape and Visual: There is no potential for cumulative impacts during the Construction and Operational Phases, given the lack of spatial overlap between the two developments.	Landscape and Visual: None required	Landscape and Visual: None

Tier	Application Reference / Planning Body	Applicant for 'Other Development' and Brief Description	Approximate Distance from Proposed Development Infrastructure (at Nearest Point to the Planning Application Boundary)	Assessment of Cumulative Impact with Proposed Development	Proposed Mitigation Measures	Residual Cumulative Impact
1	FW22A/0156 - FCC	Earlstand Corporation Unlimited Company Construction of 6 no. warehouses/logistics units including ancillary office/administration use and entrance/reception areas over two levels (Units 1-6) with a combined total floor gross area (GFA) of 50,934 sq.m at Mooretown and Northwest Logistics Park, Ballycoolin, Dublin 15	1km from the Planning Application Boundary for the proposed cable route	Population: There is no potential for cumulative impacts during the Construction and Operational Phases, as both developments are of sufficient distance away from each other to avoid any potential cumulative impacts related to population.	Population: None required	Population: None
				Human Health: In considering the nature of the works, there is no potential for cumulative impacts on human health during the Construction and Operational Phases of both developments.	Human Health: None required	Human Health: None
				Air Quality: There is no potential for cumulative impacts during the Construction and Operational Phases due to the distance between the two developments.	Air Quality: None required	Air Quality: None
				Noise and Vibration: There will be no spatial overlap resulting from the two developments and therefore there is no potential for cumulative noise and vibration impacts during the Construction or Operational Phases.	Noise and Vibration: None required	Noise and Vibration: None
				Biodiversity: Wintering Birds: This other development is located within large flat arable fields which are suitable for wintering birds. There is the potential for a cumulative impact from disturbance to wintering birds if Construction Phases were to overlap. This is assessed as Negative, Slight and Short-Term. There is no potential for a cumulative impact during the Operational Phases of both developments.	Biodiversity: The site-wide mitigation measures outlined in Chapter 10 (Biodiversity) in Volume 2 of this EIAR are considered sufficient to mitigate for the potential impacts on wintering birds. No additional mitigation measures are required.	Biodiversity: Construction Phase: Negative, Not Significant and Short-Term Operational Phase: None
				Soils and Geology: There is no potential for a cumulative impacts during the Construction and Operational Phases of both developments, due to the distance between the two developments. Hydrogeology: There is no potential for a cumulative impacts during the Construction and Operational Phases of both developments, due to the distance between the two developments.	Soils and Geology: None required Hydrogeology: None required	Soils and Geology: None Hydrogeology: None
				Hydrology: There is no potential for likely significant, direct or indirect cumulative impacts, in combination with the other development, on hydrology for both the Construction and Operational Phases, due to the distance between the two developments.	Hydrology: None required	Hydrology: None
				Archaeology, Architectural and Cultural Heritage: There is no potential for cumulative impacts to arise during the Construction and Operational Phases as no impacts on archaeology, architectural and cultural heritage were assessed in this overlapping study area.	Archaeology, Architectural and Cultural Heritage: None required	Archaeology, Architectural and Cultural Heritage: None
				Traffic: There is the potential for a Negative, Not Significant and Short-Term impact on traffic if Construction Phases were to overlap on the Cherryhound Tyrrelstown Link Road, due to cumulative construction traffic. There is no potential for cumulative traffic impacts during the Operational Phases.	Traffic: No significant cumulative traffic impacts are predicted which will require mitigation. Therefore, no cumulative mitigation is proposed. Construction Phase traffic for the Proposed Development will be managed in line with a detailed Construction Traffic Management Plan, which will be adapted from the Construction Phase Traffic Management Plan included as Appendix B to the CEMP (included as a standalone document in the planning application pack).	Traffic: Construction Phase: Negative, Not Significant and Short-Term Operational Phase: None

Tier	Application Reference / Planning Body	Applicant for 'Other Development' and Brief Description	Approximate Distance from Proposed Development Infrastructure (at Nearest Point to the Planning Application Boundary)	Assessment of Cumulative Impact with Proposed Development	Proposed Mitigation Measures	Residual Cumulative Impact
				<u>Agronomy and Equine:</u> There is no potential for cumulative impacts on agronomy and equine during the Construction and Operational Phases as there will be no overlapping interaction with agricultural receptors.	<u>Agronomy and Equine:</u> None required	<u>Agronomy and Equine:</u> None
				<u>Waste:</u> Both developments will create surplus materials (e.g. soils, concrete and asphalt) which will require proper management and removal from the sites to be either treated as a waste or as a by-product (as appropriate and suitable for the material type, condition and quantity). In the event of overlapping Construction Phases, the waste from both developments could have a potentially Negative, Significant and Short-Term cumulative impact on the annual capacity of waste management facilities within the region during overlapping years, in the absence of any mitigation. Potential wastes associated with the Operational Phases for both developments are insignificant, and therefore, there are no significant cumulative impacts anticipated. The impact is therefore deemed as Neutral, Imperceptible and Long-Term.	<u>Waste:</u> The following measure, which is included in Chapter 16 (Waste) in Volume 2 of this EIAR will be implemented: In order to minimise the creation of waste, opportunities for reuse of materials (e.g. excavated material as fill) within both developments will be sought. Where there is remaining excess material, the potential for reuse as a by-product in accordance with Article 27 of the Waste Management Act will be investigated. Where material is unsuitable for either type of reuse, it will be treated as a waste. Appropriate handling, storage and management of any waste streams arising on either development will be managed in accordance with legislative requirements and best practice. No additional mitigation measures are required.	<u>Waste:</u> Construction Phase: Negative, Not Significant and Short-Term Operational Phase: Neutral, Imperceptible and Long-Term
				<u>Material Assets:</u> There is no potential for Construction or Operational Phase cumulative impacts, given the lack of spatial overlap between the two developments.	<u>Material Assets:</u> None required	<u>Material Assets:</u> None
				<u>Landscape and Visual:</u> There is no potential for cumulative impacts during the Construction and Operational Phases, given the lack of spatial overlap between the two developments.	<u>Landscape and Visual:</u> None required	<u>Landscape and Visual:</u> None
1	FW21A/0042 - FCC	Glenveagh Homes Ltd The proposed development will consist of 69 no. houses comprising 52 no. 2-storey houses and 17 no. 3-storey houses (13 no. 2-bed units, 39 no. 3-bed units, 17 no. 4-bed units), private open spaces, carports and all associated roads, services, visitor parking.	756m from the Planning Application Boundary for the proposed cable route	<u>Population:</u> There is no potential for cumulative impacts during the Construction and Operational Phases, as both developments are of sufficient distance away from each other to avoid any potential cumulative impacts related to population.	<u>Population:</u> None required	<u>Population:</u> None
				<u>Human Health:</u> In considering the nature of the works, there is no potential for cumulative impacts on human health during the Construction and Operational Phases of both developments.	<u>Human Health:</u> None required	<u>Human Health:</u> None
				<u>Air Quality:</u> There is no potential for cumulative impacts during the Construction and Operational Phases due to the distance between the two developments.	<u>Air Quality:</u> None required	<u>Air Quality:</u> None
				<u>Noise and Vibration:</u> There will be no spatial overlap resulting from the two developments and therefore there is no potential for cumulative noise and vibration impacts during the Construction or Operational Phases.	<u>Noise and Vibration:</u> None required	<u>Noise and Vibration:</u> None
				<u>Biodiversity:</u> Wintering Birds: This other development is located within large flat arable fields which are suitable for wintering birds. There is the potential for a cumulative impact from disturbance to wintering birds if Construction Phases were to overlap. This is assessed as Negative, Slight and Short-Term. There is no potential for a cumulative impact during the Operational Phases of both developments.	<u>Biodiversity:</u> The site-wide mitigation measures outlined in Chapter 10 (Biodiversity) in Volume 2 of this EIAR are considered sufficient to mitigate for the potential impacts on wintering birds. No additional mitigation measures are required.	<u>Biodiversity:</u> Construction Phase: Negative, Not Significant and Short-Term Operational Phase: None

Tier	Application Reference / Planning Body	Applicant for 'Other Development' and Brief Description	Approximate Distance from Proposed Development Infrastructure (at Nearest Point to the Planning Application Boundary)	Assessment of Cumulative Impact with Proposed Development	Proposed Mitigation Measures	Residual Cumulative Impact
				Soils and Geology: There is no potential for a cumulative impacts during the Construction and Operational Phases of both developments, due to the distance between the two developments. Hydrogeology: There is no potential for a cumulative impacts during the Construction and Operational Phases of both developments, due to the distance between the two developments.	Soils and Geology: None required Hydrogeology: None required	Soils and Geology: None Hydrogeology: None
				Hydrology: There is no potential for likely significant, direct or indirect cumulative impacts, in combination with the other development, on hydrology for both the Construction and Operational Phases.	Hydrology: None required	Hydrology: None
				Archaeology, Architectural and Cultural Heritage: There is the potential for a Negative, Moderate and Permanent impact on DL_05 as a result of the interaction between this project and the Proposed Development, as both will remove features that form this part of this asset. During operation, there is the potential for a Negative, Moderate and Permanent impact as a result of the presence of both developments due to the Proposed Development's permanent access tracks and joint bay covers remaining visible and the presence of this other project further reducing the legibility of this demesne.	Archaeology, Architectural and Cultural Heritage: The mitigation measures proposed in Chapter 13 (Archaeology, Architectural and Cultural Heritage) in Volume 2 of the EIAR are sufficient to address the potential cumulative impacts. No additional mitigation measures are required.	Archaeology, Architectural and Cultural Heritage: Construction Phase: Negative, Slight and Permanent Operational Phase: Negative, Moderate and Permanent
				Traffic: There is the potential for a Negative, Not Significant and Short-Term impact on traffic if Construction Phases were to overlap on the Cherryhound Tyrrelstown Link Road, Ratoath Road, Kilbride Road and R121 Ward Road, due to cumulative construction traffic. There is no potential for cumulative traffic impacts during the Operational Phases.	Traffic: No significant cumulative traffic impacts are predicted which will require mitigation. Therefore, no cumulative mitigation is proposed. Construction Phase traffic for the Proposed Development will be managed in line with a detailed Construction Traffic Management Plan, which will be adapted from the Construction Phase Traffic Management Plan included as Appendix B to the CEMP (included as a standalone document in the planning application pack).	Traffic: Construction Phase: Negative, Not Significant and Short-Term Operational Phase: None
				Agronomy and Equine: There is no potential for cumulative impacts on agronomy and equine during the Construction and Operational Phases as there will be no overlapping interaction with agricultural receptors.	Agronomy and Equine: None required	Agronomy and Equine: None
				Waste: Both developments will create surplus materials (e.g. soils, concrete and asphalt) which will require proper management and removal from the sites to be either treated as a waste or as a by-product (as appropriate and suitable for the material type, condition and quantity). In the event of overlapping Construction Phases, the waste from both developments could have a potentially Negative, Significant and Short-Term cumulative impact on the annual capacity of waste management facilities within the region during overlapping years, in the absence of any mitigation. Potential wastes associated with the Operational Phases for both developments are insignificant and therefore there are no significant cumulative effects anticipated. The impact is therefore deemed as Neutral, Imperceptible and Long-Term.	Waste: The following measure, which is included in Chapter 16 (Waste) of this EIAR will be implemented: In order to minimise the creation of waste, opportunities for reuse of materials (e.g. excavated material as fill) within both developments will be sought. Where there is remaining excess material, the potential for reuse as a by-product in accordance with Article 27 of the Waste Management Act will be investigated. Where material is unsuitable for either type of reuse, it will be treated as a waste. Appropriate handling, storage and management of any waste streams arising on either development will be managed in accordance with legislative requirements and best practice. No additional mitigation measures are required.	Waste: Construction Phase: Negative, Not Significant and Short-Term Operational Phase: Neutral, Imperceptible and Long-Term
				Material Assets: There is no potential for Construction or Operational Phase cumulative impacts, given the lack of spatial overlap between the two developments.	Material Assets: None required	Material Assets: None

Tier	Application Reference / Planning Body	Applicant for 'Other Development' and Brief Description	Approximate Distance from Proposed Development Infrastructure (at Nearest Point to the Planning Application Boundary)	Assessment of Cumulative Impact with Proposed Development	Proposed Mitigation Measures	Residual Cumulative Impact
				Landscape and Visual: There is no potential for cumulative impacts during the Construction and Operational Phases, given the lack of spatial overlap between the two developments.	Landscape and Visual: None required	Landscape and Visual: None
1	F22A/0682 - FCC	Fingleton White The development will consist of alterations to the Dublin Port to Dublin Airport fuel pipeline previously approved under Reg. Ref. F15A/0141. The proposed alterations, in the Athletic Union League/FAI sports grounds, M1 and Dublin Airport, are located within the townlands of Toberbunny and Stockhole, Co. Dublin. Permission is sought to amend the route of the pipeline as follows: It is now proposed to reroute the approved pipeline from Clonshaugh Road North along the southern boundary of Athletic Union League/FAI sports grounds, under the M1 Motorway, into Dublin Airport lands.	Overlaps with the Planning Application Boundary for the proposed cable route	Population: There is the potential for the following cumulative impacts with this other development, if the Construction Phases were to overlap, as the footprint of both developments overlap: • Negative, Slight and Temporary impact on amenity; • Negative, Slight to Moderate and Temporary on accessibility and severance of nearby sensitive receptors; • Positive, Not Significant and Short-Term on employment; and • Negative, Not Significant and Temporary on the local economy. There is no potential for cumulative impacts during the Operational Phases of the developments.	Population: The mitigation included in this EIAR is deemed sufficient to mitigate and / or manage the identified potential impacts. No additional mitigation measures are required.	Population: Construction Phase: Neutral, Not Significant and Temporary for amenity, accessibility and severance and the local economy, and Positive, Not Significant and Short-Term for employment. Operational Phase: None
				Human Health: In considering the nature of the works, there is no potential for cumulative impacts on human health during the Construction and Operational Phases of both developments.	Human Health: None required.	Human Health: None
				Air Quality: There is a Negligible to Medium risk of dust impacts as a result of the Proposed Development which is assessed as a Not Significant impact. Therefore, the potential impact of the two developments, in the event of Construction Phases overlapping is assessed as Negative, Not Significant and Short-Term. There is no potential for cumulative impacts during the Operational Phases.	Air Quality: Although there is no potential for significant cumulative impacts, the mitigation measures outlined in Chapter 7 (Air Quality) in the EIAR and also outlined in the CEMP (included as a standalone document in the planning application pack) will ensure that dust and particulate matter emissions are minimised. No additional mitigation measures are required.	Air Quality: Construction Phase: Negative, Not Significant and Short-Term Operational Phase: None
				Noise and Vibration: There is the potential for a Negative, Not Significant and Short-Term impact, in the event of overlapping Construction Phases as there is a spatial overlap with both developments. There is no potential for a cumulative impact during the Operational Phases of both developments.	Noise and Vibration: None required.	Noise and Vibration: Construction Phase: Negative, Not Significant and Short-Term Operational Phase: None
				Biodiversity: In considering the nature of the works, there is no potential for significant cumulative impacts on biodiversity during the Construction Phase of both developments. The impact is assessed as Negative, Not Significant and Short-Term. There is no potential for a cumulative impact during the Operational Phases of both developments.	Biodiversity: None required.	Biodiversity: Construction Phase: Negative, Not Significant and Short-Term Operational Phase: None
				Soils and Geology: There is no potential for cumulative impacts during the Construction and Operational Phases, as there are no geological heritage sites or contaminated land sites along the proposed route. Hydrogeology: Should work from both developments be carried out at the same time, there is the potential for Negative, Slight and Short-Term cumulative impacts on groundwater quality.	Soils and Geology: None required. Hydrogeology: The proposed mitigation measures outlined in Chapter 11 (Soils, Geology and Hydrogeology) of the EIAR are deemed sufficient. No additional mitigation measures are required.	Soils and Geology: None Hydrogeology: Construction Phase: Negative, Imperceptible to Slight and Short-Term for groundwater quality.

Tier	Application Reference / Planning Body	Applicant for 'Other Development' and Brief Description	Approximate Distance from Proposed Development Infrastructure (at Nearest Point to the Planning Application Boundary)	Assessment of Cumulative Impact with Proposed Development	Proposed Mitigation Measures	Residual Cumulative Impact
				No long term significant changes to groundwater flows, levels and quality are predicted as part of the Proposed Development. Therefore there is no potential for a cumulative impacts during the Operational Phase of both developments.		Operational Phase: None
				Hydrology: In considering the nature of the works, there is no potential for likely significant, direct or indirect cumulative impacts, in combination with the other development, on hydrology for both the Construction and Operational Phases.	Hydrology: None required	Hydrology: None
				Archaeology, Architectural and Cultural Heritage: There is the potential for a Negative, Slight and Permanent impact on DL_15 as a result of the interaction between this project and the Proposed Development, as both projects will remove features that form this part of this asset. There is no potential for cumulative impacts to arise during the Operational Phases.	Archaeology, Architectural and Cultural Heritage: The mitigation measures proposed in Chapter 13 (Archaeology, Architectural and Cultural Heritage) of the EIAR are sufficient to address the potential cumulative impacts. No additional mitigation measures are required.	Archaeology, Architectural and Cultural Heritage: Construction Phase: Negative, Imperceptible and Permanent Operational Phase: None
				Traffic: There is the potential for a Negative, Not Significant and Short-Term impact on traffic if Construction Phases were to overlap on the R139 Road, Stockhole Lane, Clonshaugh Road and the R132 Road, due to cumulative construction traffic. There is no potential for cumulative traffic impacts during the Operational Phases.	Traffic: No significant cumulative traffic impacts are predicted which will require mitigation. Therefore, no cumulative mitigation is proposed. Construction Phase traffic for the Proposed Development will be managed in line with a detailed Construction Traffic Management Plan, which will be adapted from the Construction Phase Traffic Management Plan included as Appendix B to the Construction Environmental Management Plan (included as a standalone document in the planning application pack).	Traffic: Construction Phase: Negative, Not Significant and Short-Term Operational Phase: None
				Agronomy and Equine: There is no potential for cumulative impacts on agronomy and equine during the Construction and Operational Phases as there will be no overlapping interaction with agricultural receptors.	Agronomy and Equine: None required	Agronomy and Equine: None
				Waste: Both developments will create surplus materials (e.g. soils, concrete and asphalt) which will require proper management and removal from the sites to be either treated as a waste or as a by-product (as appropriate and suitable for the material type, condition and quantity). In the event of overlapping Construction Phases, the waste from both developments could have a potentially Negative, Significant and Short-Term cumulative impact on the annual capacity of waste management facilities within the region during overlapping years, in the absence of any mitigation. Potential wastes associated with the Operational Phases for both developments are insignificant, and therefore, there are no significant cumulative impacts anticipated. The impact is therefore deemed as Neutral, Imperceptible and Long-Term.	Waste: The following measure, which is included in Chapter 16 (Waste) in Volume 2 of this EIAR will be implemented: In order to minimise the creation of waste, opportunities for reuse of materials (e.g. excavated material as fill) within both developments will be sought. Where there is remaining excess material, the potential for reuse as a by-product in accordance with Article 27 of the Waste Management Act will be investigated. Where material is unsuitable for either type of reuse, it will be treated as a waste. Appropriate handling, storage and management of any waste streams arising on either development will be managed in accordance with legislative requirements and best practice. No additional mitigation measures are required.	Waste: Construction Phase: Negative, Not Significant and Short-Term Operational Phase: Neutral, Imperceptible and Long-Term
				Material Assets: No known existing utility interfaces identified which may require diversion at the location where the two developments overlap. Potential impact is assessed as Neutral, Imperceptible and Temporary. No Operational Phase cumulative impacts anticipated.	Material Assets: The mitigation included in this EIAR and in the CEMP (included as a standalone documents in the planning application pack) is deemed sufficient to mitigate and / or manage the identified potential impacts. No additional mitigation measures are required.	Material Assets: Construction Phase: Neutral, Imperceptible and Temporary Operational Phase: None
				Landscape and Visual: In considering the nature of the works, there is no potential for cumulative impacts during the Construction and Operational Phases.	Landscape and Visual: None required	Landscape and Visual: None

Tier	Application Reference / Planning Body	Applicant for 'Other Development' and Brief Description	Approximate Distance from Proposed Development Infrastructure (at Nearest Point to the Planning Application Boundary)	Assessment of Cumulative Impact with Proposed Development	Proposed Mitigation Measures	Residual Cumulative Impact
1	F23A/0040 - FCC	CP1213 Belcamp 220kV Extension The development will consist of the provision of new electricity transmission infrastructure at the existing ESB Belcamp 220 kV substation, and any known modifications to this application that have taken place due to the work that is ongoing in relation to the detailed design and requirements of the 220kV GIS Switchgear building permitted under planning application number F23A/0040.	Overlaps with the Proposed Development at Belcamp Substation	<u>Population:</u> There is the potential for the following cumulative impacts with this other development, if the Construction Phases were to overlap, as the footprint of both developments overlap: • Negative, Slight and Temporary impact on amenity; • Negative, Slight to Moderate and Temporary on accessibility and severance of nearby sensitive receptors; • Positive, Not Significant and Short-Term on employment; and • Negative, Not Significant and Temporary on the local economy. There is no potential for cumulative impacts during the Operational Phases of the developments.	<u>Population:</u> The mitigation included in this EIAR is deemed sufficient to mitigate and / or manage the identified potential impacts. No additional mitigation measures are required.	<u>Population:</u> Construction Phase: Neutral, Not Significant and Temporary for amenity, accessibility and severance and the local economy, and Positive, Not Significant and Short-Term for employment. Operational Phase: None
				<u>Human Health:</u> In considering the nature of the works, there is no potential for cumulative impacts on human health during the Construction and Operational Phases of both developments.	<u>Human Health:</u> None required	<u>Human Health:</u> None
				<u>Air Quality:</u> There is a Negligible to Medium risk of dust impacts as a result of the Proposed Development which is assessed as a Not Significant impact. Therefore, the potential impact of the two developments, in the event of Construction Phases overlapping is assessed as Negative, Not Significant and Short-Term. There is no potential for cumulative impacts during the Operational Phases.	<u>Air Quality:</u> Although there is no potential for significant cumulative impacts, the mitigation measures outlined in Chapter 7 (Air Quality) in Volume 2 of the EIAR and also outlined in the CEMP (included as a standalone document in the planning application pack) will ensure that dust and particulate matter emissions are minimised. No additional mitigation measures are required.	<u>Air Quality:</u> Construction Phase: Negative, Not Significant and Short-Term Operational Phase: None
				<u>Noise and Vibration:</u> There is the potential for a Negative, Not Significant and Short-Term impact, in the event of overlapping Construction Phases as there is a spatial overlap with both developments. There is no potential for a cumulative impact during the Operational Phases of both developments.	<u>Noise and Vibration:</u> None required	<u>Noise and Vibration:</u> Construction Phase: Negative, Not Significant and Short-Term Operational Phase: None
				<u>Biodiversity:</u> Water Quality: There is the potential for a Negative, Significant and Short-Term impact on the Dunboyne Stream_010 waterbody as both developments would work adjacent to this watercourse if Construction Phases were to overlap. Potential impacts would result from potential increases in sediment laden runoff, removal of bed material and changes to the bed and bank as a result of open cut trenching. Calcareous / Neutral Grassland at Belcamp Substation: At Belcamp Substation, both developments will overlap. Dry calcareous and neutral grassland occupies much of the habitat within and surrounding Belcamp Substation and the developments will impact this grassland due to the works and temporary laydown areas. During the Construction Phases, the impact is assessed as Negative, Significant and Long-Term. Bats: No bat roosts were found during surveys for either development. However, as bats switch tree roosts regularly, there is a risk bats might colonise trees within which none were previously recorded. Therefore, there is a risk that bats could be disturbed during the Construction Phases. Tree felling at Belcamp requires removal of six mature trees within a 300m length of hedgerow, calculated by area only the estimated loss of hedgerow/trees at Belcamp is 900m^2. There is potential for a cumulative impact on bats that is assessed as Negative, Significant and Long -Term.	<u>Biodiversity:</u> The following mitigation measures which are included in this EIAR will be implemented during the Construction Phase: Water Quality: The mitigation measures outlined in Chapter 12 (Hydrology) in Volume 2 of the EIAR are sufficient to prevent sediment laden runoff entering the watercourse and to maintain flows through the crossings. Calcareous / Neutral Grassland at Belcamp Substation: The appointed contractor's Ecological Clerk of Works (ECoW) will develop site-specific re-instatement plans for all semi-natural habitats (including dry calcareous grassland, dry meadows and grassy verges). Locally collected seed from similar habitat will be used for re-instatement, and the grassland will be managed for its wildflowers. Bats: Any roosts recorded during the pre-construction surveys will be felled under a derogation licence. As part of the licence, mitigation measures such as the provision of bat boxes as alternative roosts will be required. As well as bat box installation, mitigation includes replacement tree planting at agreed compensation sites. Tree planting on easements, subject to approval by EirGrid and ESB Networks. Breeding Birds: Replacement hedge and tree planting will be undertaken along the Proposed Development and at agreed compensation sites. Tree planting will	<u>Biodiversity:</u> Construction Phase: • Water Quality: Negative, Not Significant and Short-Term; • Calcareous / Natural Grassland at Belcamp Substation: Negative, Significant and Medium-Term; • Bats: Negative, Not Significant and Short-Term; and • Breeding Birds: Negative, Not Significant and Medium-Term. Operational Phase: None

Tier	Application Reference / Planning Body	Applicant for 'Other Development' and Brief Description	Approximate Distance from Proposed Development Infrastructure (at Nearest Point to the Planning Application Boundary)	Assessment of Cumulative Impact with Proposed Development	Proposed Mitigation Measures	Residual Cumulative Impact
				Breeding Birds: For both developments, the loss of nesting and foraging habitat and displacement of breeding birds due to impacts to trees and hedgerows is considered a likely significant effect at local level. The effect is likely to be a cumulative impact due to number of trees and length of hedgerows to be removed. During construction there is potential for a cumulative impact on breeding birds that is assessed as Negative, Significant and Medium-Term. There is no potential for a cumulative impact during the Operational Phases of both developments.	also be accommodated on easements, subject to approval by EirGrid and ESB Networks.	
				<u>Soils and Geology:</u> There is no potential for cumulative impacts during the Construction and Operational Phases, as there are no geological heritage sites or contaminated land sites along the proposed route. <u>Hydrogeology:</u> Should work from both developments be carried out at the same time, there is the potential for Negative, Slight and Short-Term cumulative impacts on groundwater quality. No long term significant changes to groundwater flows, levels and quality are predicted as part of the Proposed Development. Therefore there is no potential for a cumulative impacts during the Operational Phase of both developments.	<u>Soils and Geology:</u> None required <u>Hydrogeology:</u> The proposed mitigation measures outlined in Chapter 11 (Soils, Geology and Hydrogeology) in Volume 2 of the EIAR are deemed sufficient. No additional mitigation measures are required.	<u>Soils and Geology:</u> None <u>Hydrogeology:</u> Construction Phase: Negative, Imperceptible to Slight and Short-Term for groundwater quality. Operational Phase: None
				<u>Hydrology:</u> There is the potential for a Negative, Significant and Short-Term impact on the Dunboyne Stream_010 waterbody as both developments would work adjacent to this watercourse if Construction Phases were to overlap. Potential impacts would result from potential increases in sediment laden runoff, removal of bed material and changes to the bed and bank as a result of open cut trenching. There is no potential for a cumulative impact during the Operational Phases of both developments as the cables would not interact with surface water features.	<u>Hydrology:</u> The mitigation measures outlined in Chapter 12 (Hydrology) in Volume 2 of the EIAR are sufficient to prevent sediment laden runoff entering the watercourse and to maintain flows through the crossings. No additional mitigation measures are required.	<u>Hydrology:</u> Construction Phase: Negative, Not Significant and Short-Term Operational Phase: None
				<u>Archaeology, Architectural and Cultural Heritage:</u> There is the potential for a Negative, Slight and Permanent direct impact on CH_32 (Field system) if the Construction Phases were to overlap. There is no potential for a cumulative impact during the Operational Phase of both developments.	<u>Archaeology, Architectural and Cultural Heritage:</u> The mitigation measures proposed in Chapter 13 (Archaeology, Architectural and Cultural Heritage) in Volume 2 of the EIAR are sufficient to address the potential cumulative impacts. No additional mitigation measures are required.	<u>Archaeology, Architectural and Cultural Heritage:</u> Construction Phase: Negative, Imperceptible and Permanent Operational Phase: None
				<u>Traffic:</u> There is the potential for a Negative, Not Significant and Short-Term impact on traffic if Construction Phases were to overlap on the R139 Road, due to cumulative construction traffic. There is no potential for cumulative traffic impacts during the Operational Phases.	<u>Traffic:</u> No significant cumulative traffic impacts are predicted which will require mitigation. Therefore, no cumulative mitigation is proposed. Construction Phase traffic for the Proposed Development will be managed in line with a detailed Construction Traffic Management Plan, which will be adapted from the Construction Phase Traffic Management Plan included as Appendix B to the CEMP (included as a standalone document in the planning application pack).	<u>Traffic:</u> Construction Phase: Negative, Not Significant and Short-Term Operational Phase: None
				<u>Agronomy and Equine:</u> The extension to the Belcamp 220kV substation will acquire in excess of 4 hectares of land from land parcel Ref No 40. Therefore the potential cumulative effects on land parcel Ref No 40 from the F23A/0040 project are Negative, Significant and Permanent for both the Construction and Operational Phases.	<u>Agronomy and Equine:</u> None applicable	<u>Agronomy and Equine:</u> Construction and Operational Phases: Negative, Significant and Permanent.

Tier	Application Reference / Planning Body	Applicant for 'Other Development' and Brief Description	Approximate Distance from Proposed Development Infrastructure (at Nearest Point to the Planning Application Boundary)	Assessment of Cumulative Impact with Proposed Development	Proposed Mitigation Measures	Residual Cumulative Impact
				Waste: Both developments will create surplus materials (e.g. soils, concrete and asphalt) which will require proper management and removal from the sites to be either treated as a waste or as a by-product (as appropriate and suitable for the material type, condition and quantity). In the event of overlapping Construction Phases, the waste from both developments could have a potentially Negative, Significant and Short-Term cumulative impact on the annual capacity of waste management facilities within the region during overlapping years, in the absence of any mitigation. Potential wastes associated with the Operational Phases for both developments are insignificant, and therefore, there are no significant cumulative impacts anticipated. The impact is therefore deemed as Neutral, Imperceptible and Long-Term.	Waste: The following measure, which is included in Chapter 16 (Waste) in Volume 2 of this EIAR will be implemented: In order to minimise the creation of waste, opportunities for reuse of materials (e.g. excavated material as fill) within both developments will be sought. Where there is remaining excess material, the potential for reuse as a by-product in accordance with Article 27 of the Waste Management Act will be investigated. Where material is unsuitable for either type of reuse, it will be treated as a waste. Appropriate handling, storage and management of any waste streams arising on either development will be managed in accordance with legislative requirements and best practice. No additional mitigation measures are required.	Waste: Construction Phase: Negative, Not Significant and Short-Term Operational Phase: Neutral, Imperceptible and Long-Term
				Material Assets: Given minimal spatial overlap, there is limited potential for overlap in interface with existing utilities requiring diversions during the Construction Phases. Potential impact is assessed as Neutral, Imperceptible and Temporary. Potential Positive, Significant and Long-Term cumulative impact on the regional electricity network once both developments are operational.	Material Assets: The mitigation included in this EIAR and in the CEMP (included as a standalone documents in the planning application pack) is deemed sufficient to mitigate and / or manage the identified potential impacts. No additional mitigation measures are required.	Material Assets: Construction Phase: Neutral, Imperceptible and Temporary Operational Phase: Positive, Significant and Long-Term
				Landscape and Visual: There is the potential for a Negative, Slight-imperceptible and Short-Term visual cumulative impact during the Construction Phases, due to the high degree of intervening vegetative screening within the relatively flat landform of the study area. There is the potential for a Negative, Slight and Short-Term landscape cumulative impact during the Construction Phases, as construction works for both developments would be transient in nature and would be similar in scale. Due to the notable high degree of intervening vegetative screening within the relatively flat landform of the study area, Operational Phase visual impacts are deemed to be Negative, Imperceptible and Permanent. As all permanent above ground Operational Phase structures will be within or immediately adjacent to the existing electrical infrastructure, thus Operational Phase landscape cumulative impacts are deemed to be Negative, Imperceptible and Permanent.	Landscape and Visual: No significant cumulative landscape or visual impacts are predicted which will require mitigation. Therefore, no cumulative landscape or visual mitigation is proposed.	Landscape and Visual: Construction Phase (visual): Negative, Slight-Imperceptible and Short-Term Construction Phase (landscape): Negative, Slight and Short-Term. Operational Phase: Negative, Imperceptible and Permanent.
1	F22A/0687 - FCC	Clondev Properties Limited The development will consist of 1. Demolition of existing residential dwelling Hollytree House (c. 449.2 sqm). 2. Construction of 85 no. residential apartments (35 no. 1-bed, 37 no. 2-bed units and 13 no. 3 bed units) within a 5 - 8 no. storey (over undercroft) building, with all apartments served by private terrace or balcony.	1km from the Planning Application Boundary for the proposed cable route	Population: There is no potential for cumulative impacts during the Construction and Operational Phases, as both developments are of sufficient distance away from each other to avoid any potential cumulative impacts related to population.	Population: None required	Population: None
				Human Health: In considering the nature and distance of the works, there is no potential for cumulative impacts on human health during the Construction and Operational Phases of both developments.	Human Health: None required	Human Health: None
				Air Quality: There is no potential for cumulative impacts during the Construction and Operational Phases due to the distance between the two developments.	Air Quality: None required	Air Quality: None
				Noise and Vibration: There will be no spatial overlap resulting from the two developments and therefore there is no potential for cumulative noise and vibration impacts during the Construction or Operational Phases.	Noise and Vibration: None required	Noise and Vibration: None

Tier	Application Reference / Planning Body	Applicant for 'Other Development' and Brief Description	Approximate Distance from Proposed Development Infrastructure (at Nearest Point to the Planning Application Boundary)	Assessment of Cumulative Impact with Proposed Development	Proposed Mitigation Measures	Residual Cumulative Impact
				Biodiversity: In considering the nature and distance of the works, there is no potential for cumulative impacts during the Construction and Operational Phases of both developments.	Biodiversity: None required	Biodiversity: None
				Soils and Geology: There is no potential for a cumulative impacts during the Construction and Operational Phases of both developments, due to the distance between the two developments. Hydrogeology: There is no potential for a cumulative impacts during the Construction and Operational Phases of both developments, due to the distance between the two developments.	Soils and Geology: None required Hydrogeology: None required	Soils and Geology: None Hydrogeology: None
				Hydrology: There is no potential for likely significant, direct or indirect cumulative impacts, in combination with the other development, on hydrology for both the Construction and Operational Phases, due to the distance between the two developments.	Hydrology: None required	Hydrology: None
				Archaeology, Architectural and Cultural Heritage: There is no potential for cumulative impacts to arise during the Construction and Operational Phases as no impacts on archaeology, architectural and cultural heritage were assessed in this overlapping study area.	Archaeology, Architectural and Cultural Heritage: None required	Archaeology, Architectural and Cultural Heritage: None
				Traffic: There is the potential for a Negative, Not Significant and Short-Term impact on traffic if Construction Phases were to overlap on the R139 Road, Stockhole Lane, Clonshaugh Road and the R139 Road, due to cumulative construction traffic. There is no potential for cumulative traffic impacts during the Operational Phases.	Traffic: No significant cumulative traffic impacts are predicted which will require mitigation. Therefore, no cumulative mitigation is proposed. Construction Phase traffic for the Proposed Development will be managed in line with a detailed Construction Traffic Management Plan, which will be adapted from the Construction Phase Traffic Management Plan included as Appendix B to the CEMP (included as a standalone document in the planning application pack).	Traffic: Construction Phase: Negative, Not Significant and Short-Term Operational Phase: None
				Agronomy and Equine: There is no potential for cumulative impacts on agronomy and equine during the Construction and Operational Phases as there will be no overlapping interaction with agricultural receptors.	Agronomy and Equine: None required	Agronomy and Equine: None
				Waste: Both developments will create surplus materials (e.g. soils, concrete and asphalt) which will require proper management and removal from the sites to be either treated as a waste or as a by-product (as appropriate and suitable for the material type, condition and quantity). In the event of overlapping Construction Phases, the waste from both developments could have a potentially Negative, Significant and Short-Term cumulative impact on the annual capacity of waste management facilities within the region during overlapping years, in the absence of any mitigation. Potential wastes associated with the Operational Phases for both developments are insignificant, and therefore, there are no significant cumulative impacts anticipated. The impact is therefore deemed as Neutral, Imperceptible and Long-Term.	Waste: The following measure, which is included in Chapter 16 (Waste) in Volume 2 of this EIAR will be implemented: In order to minimise the creation of waste, opportunities for reuse of materials (e.g. excavated material as fill) within both developments will be sought. Where there is remaining excess material, the potential for reuse as a by-product in accordance with Article 27 of the Waste Management Act will be investigated. Where material is unsuitable for either type of reuse, it will be treated as a waste. Appropriate handling, storage and management of any waste streams arising on either development will be managed in accordance with legislative requirements and best practice. No additional mitigation measures are required.	Waste: Construction Phase: Negative, Not Significant and Short-Term Operational Phase: Neutral, Imperceptible and Long-Term
				Material Assets: There is no potential for Construction or Operational Phase cumulative impacts, given the lack of spatial overlap between the two developments.	Material Assets: None required	Material Assets: None

Tier	Application Reference / Planning Body	Applicant for 'Other Development' and Brief Description	Approximate Distance from Proposed Development Infrastructure (at Nearest Point to the Planning Application Boundary)	Assessment of Cumulative Impact with Proposed Development	Proposed Mitigation Measures	Residual Cumulative Impact
				Landscape and Visual: There is no potential for cumulative impacts during the Construction and Operational Phases, given the lack of spatial overlap between the two developments.	Landscape and Visual: None required	Landscape and Visual: None
1	4367/19 - DCC	The Electricity Supply Board (ESB) 200m long medium/low voltage (MV/LV) underground cable (UGC), to be installed in underground cable ducting in a c. 1m wide trench of depth c. 1m within an area of c.200sq.m., connecting the existing ESB network within the former Diamond Innovations site to the existing ESB Darndale substation.	1km from the Planning Application Boundary at Belcamp Substation	Population: There is no potential for cumulative impacts during the Construction and Operational Phases, as both developments are of sufficient distance away from each other to avoid any potential cumulative impacts related to population.	Population: None required	Population: None
				Human Health: In considering the nature and distance of the works, there is no potential for cumulative impacts on human health during the Construction and Operational Phases of both developments.	Human Health: None required	Human Health: None
				Air Quality: There is no potential for cumulative impacts during the Construction and Operational Phases due to the distance between the two developments.	Air Quality: None required	Air Quality: None
				Noise and Vibration: There will be no spatial overlap resulting from the two developments and therefore there is no potential for cumulative noise and vibration impacts during the Construction or Operational Phases.	Noise and Vibration: None required	Noise and Vibration: None
				Biodiversity: In considering the nature and distance of the works, there is no potential for cumulative impacts during the Construction and Operational Phases of both developments.	Biodiversity: None required.	Biodiversity: None
				Soils and Geology: There is no potential for a cumulative impacts during the Construction and Operational Phases of both developments, due to the distance between the two developments. Hydrogeology: There is no potential for a cumulative impacts during the Construction and Operational Phases of both developments, due to the distance between the two developments.	Soils and Geology: None required. Hydrogeology: None required	Soils and Geology: None Hydrogeology: None
				Hydrology: There is no potential for likely significant, direct or indirect cumulative impacts, in combination with the other development, on hydrology for both the Construction and Operational Phases, due to the distance between the two developments.	Hydrology: None required	Hydrology: None
				Archaeology, Architectural and Cultural Heritage: There is no potential for cumulative impacts to arise during the Construction and Operational Phases as no impacts on archaeology, architectural and cultural heritage were assessed in this overlapping study area.	Archaeology, Architectural and Cultural Heritage: None required	Archaeology, Architectural and Cultural Heritage: None
				Traffic: There is the potential for a Negative, Not Significant and Short-Term impact on traffic if Construction Phases were to overlap on the R139 Road, due to cumulative construction traffic. There is no potential for cumulative traffic impacts during the Operational Phases.	Traffic: No significant cumulative traffic impacts are predicted which will require mitigation. Therefore, no cumulative mitigation is proposed. Construction Phase traffic for the Proposed Development will be managed in line with a detailed Construction Traffic Management Plan, which will be adapted from the Construction Phase Traffic Management Plan included as Appendix B	Traffic: Construction Phase: Negative, Not Significant and Short-Term Operational Phase: None

Tier	Application Reference / Planning Body	Applicant for 'Other Development' and Brief Description	Approximate Distance from Proposed Development Infrastructure (at Nearest Point to the Planning Application Boundary)	Assessment of Cumulative Impact with Proposed Development	Proposed Mitigation Measures	Residual Cumulative Impact
					to the CEMP (included as a standalone document in the planning application pack).	
				<u>Agronomy and Equine:</u> There is no potential for cumulative impacts on agronomy and equine during the Construction and Operational Phases as there will be no overlapping interaction with agricultural receptors.	<u>Agronomy and Equine:</u> None required	<u>Agronomy and Equine:</u> None
				<u>Waste:</u> Both developments will create surplus materials (e.g. soils, concrete and asphalt) which will require proper management and removal from the sites to be either treated as a waste or as a by-product (as appropriate and suitable for the material type, condition and quantity). In the event of overlapping Construction Phases, the waste from both developments could have a potentially Negative, Significant and Short-Term cumulative impact on the annual capacity of waste management facilities within the region during overlapping years, in the absence of any mitigation. Potential wastes associated with the Operational Phases for both developments are insignificant, and therefore, there are no significant cumulative impacts anticipated. The impact is therefore deemed as Neutral, Imperceptible and Long-Term.	<u>Waste:</u> The following measure, which is included in Chapter 16 (Waste) in Volume 2 of this EIAR will be implemented: In order to minimise the creation of waste, opportunities for reuse of materials (e.g. excavated material as fill) within both developments will be sought. Where there is remaining excess material, the potential for reuse as a by-product in accordance with Article 27 of the Waste Management Act will be investigated. Where material is unsuitable for either type of reuse, it will be treated as a waste. Appropriate handling, storage and management of any waste streams arising on either development will be managed in accordance with legislative requirements and best practice. No additional mitigation measures are required.	<u>Waste:</u> Construction Phase: Negative, Not Significant and Short-Term Operational Phase: Neutral, Imperceptible and Long-Term
				<u>Material Assets:</u> There is no potential for Construction Phase cumulative impacts, given the lack of spatial overlap between the two developments. Potential Positive, Significant and Long-Term cumulative impact on the regional electricity network once both developments are operational.	<u>Material Assets:</u> None required	<u>Material Assets:</u> Construction Phase: None Operational Phase: Positive, Significant and Long-Term
				<u>Landscape and Visual:</u> There is no potential for cumulative impacts during the Construction and Operational Phases, given the lack of spatial overlap between the two developments.	<u>Landscape and Visual:</u> None required	<u>Landscape and Visual:</u> None
1	2360290 – MCC	Marina Quarter Ltd. Large-Scale Residential Development consisting of 267 no. residential units comprising 145 no. dwelling houses and 122 no. apartments/duplexes providing a mix of 1, 2, 3 and 4-bed units at Bennetstown (townland) to the south of the M3 Parkway park and ride and rail station, and also extending into Pace & Dunboyne (townlands), Dunboyne North, Co. Meath	315m from the Planning Application Boundary for the proposed cable route	<u>Population:</u> There is the potential for the following cumulative impacts with this other development, if the Construction Phases were to overlap, as the footprint of both developments overlap: • Negative, Slight and Temporary impact on amenity; • Negative, Slight to Moderate and Temporary on accessibility and severance of nearby sensitive receptors; • Positive, Not Significant and Short-Term on employment; and • Negative, Not Significant and Temporary on the local economy. There is no potential for cumulative impacts during the Operational Phases of the developments.	<u>Population:</u> The mitigation included in this EIAR is deemed sufficient to mitigate and / or manage the identified potential impacts. No additional mitigation measures are required.	<u>Population:</u> Construction Phase: Neutral, Not Significant and Temporary for amenity, accessibility and severance and the local economy, and Positive, Not Significant and Short-Term for employment. Operational Phase: None
				<u>Human Health:</u> There is the potential for cumulative impacts on the noise, air quality and traffic and transport health determinants, if the Construction Phases were to overlap. A very small number of residents on the northern fringe of Dunboyne may experience noise and dust emissions from both developments, and residents of small areas 167029001 and 167029015 may experience disruption to access west of Junction 5 of the M3. The significance of impact is assessed as Negative, Imperceptible and Temporary for each of these three determinants. No potential for cumulative Impacts on any health determinants during the Operational Phases.	<u>Human Health:</u> No significant cumulative health impacts are predicted which will require mitigation. Therefore, no cumulative mitigation is proposed.	<u>Human Health:</u> Construction Phase: Negative, Imperceptible and Temporary Operational Phase: None

Tier	Application Reference / Planning Body	Applicant for 'Other Development' and Brief Description	Approximate Distance from Proposed Development Infrastructure (at Nearest Point to the Planning Application Boundary)	Assessment of Cumulative Impact with Proposed Development	Proposed Mitigation Measures	Residual Cumulative Impact
				Air Quality: There is no potential for cumulative impacts during the Construction and Operational Phases due to the distance between the two developments.	Air Quality: None required	Air Quality: None
				Noise and Vibration: There will be no spatial overlap resulting from the two developments and therefore there is no potential for cumulative noise and vibration impacts during the Construction or Operational Phases.	Noise and Vibration: None required	Noise and Vibration: None
				Biodiversity: In considering the nature of the works, there is no potential for significant cumulative impacts on biodiversity during the Construction Phase of both developments. The impact is assessed as Negative, Not Significant and Short-Term. There is no potential for a cumulative impact during the Operational Phases of both developments.	Biodiversity: None required	Biodiversity: Construction Phase: Negative, Not Significant and Short-Term Operational Phase: None
				Soils and Geology: There is no potential for a cumulative impacts during the Construction and Operational Phases of both developments, due to the distance between the two developments. Hydrogeology: There is no potential for a cumulative impacts during the Construction and Operational Phases of both developments, due to the distance between the two developments.	Soils and Geology: None required Hydrogeology: None required	Soils and Geology: None Hydrogeology: None
				Hydrology: There is no potential for likely significant, direct or indirect cumulative impacts, in combination with the other development, on hydrology for both the Construction and Operational Phases, as although the developments are hydrologically connected, there is sufficient distance between them that impacts are not likely to occur.	Hydrology: None required	Hydrology: None
				Archaeology, Architectural and Cultural Heritage: There is no potential for cumulative impacts to arise during the Construction and Operational Phases as no impacts on archaeology, architectural and cultural heritage were assessed in this overlapping study area.	Archaeology, Architectural and Cultural Heritage: None required	Archaeology, Architectural and Cultural Heritage: None
				Traffic: There is the potential for a Negative, Not Significant and Short-Term impact on traffic if Construction Phases were to overlap on the R157 Road, due to cumulative construction traffic. There is no potential for cumulative traffic impacts during the Operational Phases.	Traffic: No significant cumulative traffic impacts are predicted which will require mitigation. Therefore, no cumulative mitigation is proposed. Construction Phase traffic for the Proposed Development will be managed in line with a detailed Construction Traffic Management Plan, which will be adapted from the Construction Phase Traffic Management Plan included as Appendix B to the CEMP (included as a standalone document in the planning application pack).	Traffic: Construction Phase: Negative, Not Significant and Short-Term Operational Phase: None
				Agronomy and Equine: There is no potential for cumulative impacts on agronomy and equine during the Construction and Operational Phases as there will be no overlapping interaction with agricultural receptors.	Agronomy and Equine: None required	Agronomy and Equine: None

Tier	Application Reference / Planning Body	Applicant for 'Other Development' and Brief Description	Approximate Distance from Proposed Development Infrastructure (at Nearest Point to the Planning Application Boundary)	Assessment of Cumulative Impact with Proposed Development	Proposed Mitigation Measures	Residual Cumulative Impact
				Waste: Both developments will create surplus materials (e.g. soils, concrete and asphalt) which will require proper management and removal from the sites to be either treated as a waste or as a by-product (as appropriate and suitable for the material type, condition and quantity). In the event of overlapping Construction Phases, the waste from both developments could have a potentially Negative, Significant and Short-Term cumulative impact on the annual capacity of waste management facilities within the region during overlapping years, in the absence of any mitigation. Potential wastes associated with the Operational Phases for both developments are insignificant, and therefore, there are no significant cumulative impacts anticipated. The impact is therefore deemed as Neutral, Imperceptible and Long-Term.	Waste: The following measure, which is included in Chapter 16 (Waste) in Volume 2 of this EIAR will be implemented: In order to minimise the creation of waste, opportunities for reuse of materials (e.g. excavated material as fill) within both developments will be sought. Where there is remaining excess material, the potential for reuse as a by-product in accordance with Article 27 of the Waste Management Act will be investigated. Where material is unsuitable for either type of reuse, it will be treated as a waste. Appropriate handling, storage and management of any waste streams arising on either development will be managed in accordance with legislative requirements and best practice. No additional mitigation measures are required.	Waste: Construction Phase: Negative, Not Significant and Short-Term Operational Phase: Neutral, Imperceptible and Long-Term
				Material Assets: There is no potential for Construction or Operational Phase cumulative impacts, given the lack of spatial overlap between the two developments.	Material Assets: None required	Material Assets: None
				Landscape and Visual: There is no potential for cumulative impacts during the Construction and Operational Phases, given the lack of spatial overlap between the two developments.	Landscape and Visual: None required	Landscape and Visual: None
1	22837 / 23136 - MCC	GDA Energy 4 Ltd Proposed development constitutes a new battery energy storage facility & synchronous condenser, with associated change of use on lands currently in agricultural use. The proposed development will comprise of rechargeable battery units with grid forming inverters contained within 253 no. 40 foot containers on site at Woodland, County Meath.	160m from Planning Application Boundary at Woodland Substation	Population: There is the potential for the following cumulative impacts with this other development, if the Construction Phases were to overlap, as the footprint of both developments overlap: • Negative, Slight and Temporary impact on amenity; • Negative, Slight to Moderate and Temporary on accessibility and severance of nearby sensitive receptors; • Positive, Not Significant and Short-Term on employment; and • Negative, Not Significant and Temporary on the local economy. There is no potential for cumulative impacts during the Operational Phases of the developments.	Population: The mitigation included in this EIAR is deemed sufficient to mitigate and / or manage the identified potential impacts. No additional mitigation measures are required.	Population: Construction Phase: Neutral, Not Significant and Temporary for amenity, accessibility and severance and the local economy, and Positive, Not Significant and Short-Term for employment. Operational Phase: None
				Human Health: In considering the nature of the works, there is no potential for cumulative impacts on human health during the Construction and Operational Phases of both developments.	Human Health: None required	Human Health: None
				Air Quality: There is a Negligible to Medium risk of dust impacts as a result of the Proposed Development which is assessed as a Not Significant impact. Therefore, the potential impact of the two developments, in the event of Construction Phases overlapping is assessed as Negative, Not Significant and Short-Term. There is no potential for cumulative impacts during the Operational Phases.	Air Quality: Although there is no potential for significant cumulative impacts, the mitigation measures outlined in Chapter 7 (Air Quality) in Volume 2 the EIAR and also outlined in the CEMP (included as a standalone document in the planning application pack) will ensure that dust and particulate matter emissions are minimised. No additional mitigation measures are required.	Air Quality: Construction Phase: Negative, Not Significant and Short-Term Operational Phase: None
				Noise and Vibration: There will be no spatial overlap resulting from the two developments and therefore there is no potential for cumulative noise and vibration impacts during the Construction or Operational Phases.	Noise and Vibration: None required	Noise and Vibration: None
				Biodiversity: In considering the nature of the works, there is no potential for significant cumulative impacts on biodiversity during the Construction Phase of both developments. The impact is assessed as Negative, Not Significant and Short-Term.	Biodiversity: None required	Biodiversity: Construction Phase: Negative, Not Significant and Short-Term Operational Phase: None

Tier	Application Reference / Planning Body	Applicant for 'Other Development' and Brief Description	Approximate Distance from Proposed Development Infrastructure (at Nearest Point to the Planning Application Boundary)	Assessment of Cumulative Impact with Proposed Development	Proposed Mitigation Measures	Residual Cumulative Impact
				There is no potential for a cumulative impact during the Operational Phases of both developments.		
				Soils and Geology: There is no potential for cumulative impacts during the Construction and Operational Phases, as there are no geological heritage sites or contaminated land sites along the proposed route. Hydrogeology: In considering the nature of the works, there is no potential for a cumulative impacts during the Construction and Operational Phases of both developments.	Soils and Geology: None required. Hydrogeology: None required	Soils and Geology: None Hydrogeology: None
				Hydrology: In considering the nature of the works, there is no potential for likely significant, direct or indirect cumulative impacts, in combination with the other development, on hydrology for both the Construction and Operational Phases.	Hydrology: None required	Hydrology: None
				Archaeology, Architectural and Cultural Heritage: There is no potential for cumulative impacts to arise during the Construction and Operational Phases as no impacts on archaeology, architectural and cultural heritage were assessed in this overlapping study area.	Archaeology, Architectural and Cultural Heritage: None required	Archaeology, Architectural and Cultural Heritage: None
				Traffic: There is the potential for a Negative, Not Significant and Short-Term impact on traffic if Construction Phases were to overlap on the R147, R154 and R125 Roads, due to cumulative construction traffic. There is no potential for cumulative traffic impacts during the Operational Phases.	Traffic: No significant cumulative traffic impacts are predicted which will require mitigation. Therefore, no cumulative mitigation is proposed. Construction Phase traffic for the Proposed Development will be managed in line with a detailed Construction Traffic Management Plan, which will be adapted from the Construction Phase Traffic Management Plan included as Appendix B to the CEMP (included as a standalone document in the planning application pack).	Traffic: Construction Phase: Negative, Not Significant and Short-Term Operational Phase: None
				Agronomy and Equine: There is no potential for cumulative impacts on agronomy and equine during the Construction and Operational Phases as there will be no overlapping interaction with agricultural receptors.	Agronomy and Equine: None required	Agronomy and Equine: None
				Waste: Both developments will create surplus materials (e.g. soils, concrete and asphalt) which will require proper management and removal from the sites to be either treated as a waste or as a by-product (as appropriate and suitable for the material type, condition and quantity). In the event of overlapping Construction Phases, the waste from both developments could have a potentially Negative, Significant and Short-Term cumulative impact on the annual capacity of waste management facilities within the region during overlapping years, in the absence of any mitigation. Potential wastes associated with the Operational Phases for both developments are insignificant, and therefore, there are no significant cumulative impacts anticipated. The impact is therefore deemed as Neutral, Imperceptible and Long-Term.	Waste: The following measure, which is included in Chapter 16 (Waste) in Volume 2 of this EIAR will be implemented: In order to minimise the creation of waste, opportunities for reuse of materials (e.g. excavated material as fill) within both developments will be sought. Where there is remaining excess material, the potential for reuse as a by-product in accordance with Article 27 of the Waste Management Act will be investigated. Where material is unsuitable for either type of reuse, it will be treated as a waste. Appropriate handling, storage and management of any waste streams arising on either development will be managed in accordance with legislative requirements and best practice. No additional mitigation measures are required.	Waste: Construction Phase: Negative, Not Significant and Short-Term Operational Phase: Neutral, Imperceptible and Long-Term
				Material Assets: There is no potential for Construction or Operational Phase cumulative impacts, given the lack of spatial overlap between the two developments.	Material Assets: None required	Material Assets: None
				Landscape and Visual: There is no potential for cumulative impacts during the Construction and Operational Phases, given the lack of spatial overlap between the two developments.	Landscape and Visual: None required	Landscape and Visual: None

Tier	Application Reference / Planning Body	Applicant for 'Other Development' and Brief Description	Approximate Distance from Proposed Development Infrastructure (at Nearest Point to the Planning Application Boundary)	Assessment of Cumulative Impact with Proposed Development	Proposed Mitigation Measures	Residual Cumulative Impact
1	RA170873 / 23787 - MCC	South Meath Solar Farm Limited Solar farm including photovoltaic panels on ground mounted frames, inverter stations, 1 No. 110KV 4 Bay Electrical Substation at a site in the townlands of Vesingstown, Polleban and Harlockstown, Dunboyne, County Meath.	660m from the Planning Application Boundary for the proposed cable route	Population: There is no potential for cumulative impacts during the Construction and Operational Phases, as both developments are of sufficient distance away from each other to avoid any potential cumulative impacts related to population.	Population: None required	Population: None
				Human Health: In considering the nature and distance of the works, there is no potential for cumulative impacts on human health during the Construction and Operational Phases of both developments.	Human Health: None required	Human Health: None
				Air Quality: There is no potential for cumulative impacts during the Construction and Operational Phases due to the distance between the two developments.	Air Quality: None required	Air Quality: None
				Noise and Vibration: There will be no spatial overlap resulting from the two developments and therefore there is no potential for cumulative noise and vibration impacts during the Construction or Operational Phases.	Noise and Vibration: None required	Noise and Vibration: None
				Biodiversity: In considering the nature of the works, there is no potential for significant cumulative impacts on biodiversity during the Construction Phase of both developments. The impact is assessed as Negative, Not Significant and Short-Term. There is no potential for a cumulative impact during the Operational Phases of both developments.	Biodiversity: None required	Biodiversity: Construction Phase: Negative, Not Significant and Short-Term Operational Phase: None
				Soils and Geology: There is no potential for a cumulative impacts during the Construction and Operational Phases of both developments, due to the distance between the two developments. Hydrogeology: There is no potential for a cumulative impacts during the Construction and Operational Phases of both developments, due to the distance between the two developments.	Soils and Geology: None required Hydrogeology: None required	Soils and Geology: None Hydrogeology: None
				Hydrology: There is no potential for likely significant, direct or indirect cumulative impacts, in combination with the other development, on hydrology for both the Construction and Operational Phases, as although the developments are hydrologically connected, there is sufficient distance between them that impacts are not likely to occur.	Hydrology: None required	Hydrology: None
				Archaeology, Architectural and Cultural Heritage: There is no potential for cumulative impacts to arise during the Construction and Operational Phases as no impacts on archaeology, architectural and cultural heritage were assessed in this overlapping study area.	Archaeology, Architectural and Cultural Heritage: None required	Archaeology, Architectural and Cultural Heritage: None
				Traffic: There is the potential for a Negative, Not Significant and Short-Term impact on traffic if Construction Phases were to overlap on the R147, R156 and R157 Roads, due to cumulative construction traffic. There is no potential for cumulative traffic impacts during the Operational Phases.	Traffic: No significant cumulative traffic impacts are predicted which will require mitigation. Therefore, no cumulative mitigation is proposed. Construction Phase traffic for the Proposed Development will be managed in line with a detailed Construction Traffic Management Plan, which will be adapted from the Construction Phase Traffic Management Plan included as Appendix B	Traffic: Construction Phase: Negative, Not Significant and Short-Term Operational Phase: None

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					to the CEMP (included as a standalone document in the planning application pack).	
				Agronomy and Equine: There is no potential for cumulative impacts on agronomy and equine during the Construction and Operational Phases as there will be no overlapping interaction with agricultural receptors.	Agronomy and Equine: None required	Agronomy and Equine: None
				Waste: Both developments will create surplus materials (e.g. soils, concrete and asphalt) which will require proper management and removal from the sites to be either treated as a waste or as a by-product (as appropriate and suitable for the material type, condition and quantity). In the event of overlapping Construction Phases, the waste from both developments could have a potentially Negative, Significant and Short-Term cumulative impact on the annual capacity of waste management facilities within the region during overlapping years, in the absence of any mitigation. Potential wastes associated with the Operational Phases for both developments are insignificant, and therefore, there are no significant cumulative impacts anticipated. The impact is therefore deemed as Neutral, Imperceptible and Long-Term.	Waste: The following measure, which is included in Chapter 16 (Waste) in Volume 2 of this EIAR will be implemented: In order to minimise the creation of waste, opportunities for reuse of materials (e.g. excavated material as fill) within both developments will be sought. Where there is remaining excess material, the potential for reuse as a by-product in accordance with Article 27 of the Waste Management Act will be investigated. Where material is unsuitable for either type of reuse, it will be treated as a waste. Appropriate handling, storage and management of any waste streams arising on either development will be managed in accordance with legislative requirements and best practice. No additional mitigation measures are required.	Waste: Construction Phase: Negative, Not Significant and Short-Term Operational Phase: Neutral, Imperceptible and Long-Term
				Material Assets: There is no potential for Construction or Operational Phase cumulative impacts, given the lack of spatial overlap between the two developments.	Material Assets: None required	Material Assets: None
				Landscape and Visual: There is no potential for cumulative impacts during the Construction and Operational Phases.	Landscape and Visual: None required	Landscape and Visual: None
1	221550/ MCC	EirGrid PLC CP1194 Woodland Station 400kV Station Redevelopment. The development will consist of 1. Installation of outdoor Air Insulated Switchgear (AIS) electrical apparatus, including an associated extension to the hardstand compound (approximately 4 hectares) to facilitate same.	Overlaps with the Proposed Development at Woodland Substation	Population: No potential for cumulative impacts during the Construction and Operational Phases, as while both developments will share a portion of the same study area, there are no sensitive receptors located within this area.	Population: None required	Population: None
				Human Health: There is no potential for cumulative impacts during the Construction and Operational Phases, as while both developments will share a portion of the same study area, there are no sensitive receptors located within this area. During the Operational Phase, both projects have been designed to comply with ICIRIP Guidelines on Limiting Exposure to EMF and so there will be no cumulative EMF impacts. There is no potential for other cumulative impacts during the Operational Phases.	Human Health: None required	Human Health: None
				Air Quality: There is a Negligible to Medium risk of dust impacts as a result of the Proposed Development which is assessed as a Not Significant impact. Therefore, the potential impact of the two developments, in the event of Construction Phases overlapping is assessed as Negative, Not Significant and Short-Term. There is no potential for cumulative impacts during the Operational Phases.	Air Quality: Although there is no potential for significant cumulative impacts, the mitigation measures outlined in Chapter 7 (Air Quality) in Volume 2 of the EIAR and also outlined in the CEMP (included as a standalone document in the planning application pack) will ensure that dust and particulate matter emissions are minimised. No additional mitigation measures are required.	Air Quality: Construction Phase: Negative, Not Significant and Short-Term Operational Phase: None
				Noise and Vibration: Although there is an overlap with CP1194 at the Woodland Substation, there is unlikely to be cumulative noise and vibration impacts during the Construction Phases because there are no sensitive receptors in this area. There is no potential for a cumulative noise and vibration impact during the Operational Phase of both developments.	Noise and Vibration: None required	Noise and Vibration: None

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				Biodiversity: In considering the nature of the works, there is no potential for significant cumulative impacts on biodiversity during the Construction Phase of both developments. The impact is assessed as Negative, Not Significant and Short-Term. There is no potential for a cumulative impact during the Operational Phases of both developments.	Biodiversity: None required	Biodiversity: Construction Phase: Negative, Not Significant and Short-Term Operational Phase: None
				Soils and Geology: There is no potential for cumulative impacts during the Construction and Operational Phases, as there are no geological heritage sites or contaminated land sites along the proposed route. Hydrogeology: In considering the nature of the works, there is no potential for likely significant, direct or indirect cumulative impacts, in combination with the other development, on hydrology for both the Construction and Operational Phases.	Soils and Geology: None required Hydrogeology: None required	Soils and Geology: None Hydrogeology: None
				Hydrology: In considering the nature of the works, there is no potential for likely significant, direct or indirect cumulative impacts, in combination with the other development, on hydrology for both the Construction and Operational Phases.	Hydrology: None required	Hydrology: None
				Archaeology, Architectural and Cultural Heritage: There is no potential for cumulative impacts to arise during the Construction and Operational Phases as no impacts on archaeology, architectural and cultural heritage were assessed in the spatial overlap between the two developments.	Archaeology, Architectural and Cultural Heritage: None required	Archaeology, Architectural and Cultural Heritage: None
				Traffic: There is the potential for a Negative, Not Significant and Short-Term impact on traffic if Construction Phases were to overlap due to cumulative construction traffic on R125, R147, R154, R156, R157 and The Red Road. No significant cumulative impacts are anticipated as cumulative traffic will not be sufficient to trigger cumulative effects. The sensitivity of the area is negligible, being a rural unclassified road.	Traffic: No significant cumulative traffic impacts are predicted which will require mitigation. Therefore, no cumulative mitigation is proposed. Construction Phase traffic for the Proposed Development will be managed in line with a detailed Construction Traffic Management Plan, which will be adapted from the Construction Phase Traffic Management Plan included as Appendix B to the CEMP (included as a standalone document in the planning application pack).	Traffic: Construction Phase: Negative, Not Significant and Short-Term Operational Phase: None
				Agronomy and Equine: There is no potential for cumulative impacts on agronomy and equine during the Construction and Operational Phases as overlaps between the two developments will occur within the footprint of the existing Woodland Substation.	Agronomy and Equine: None required	Agronomy and Equine: None
				Waste: Both developments will create surplus materials (e.g. soils, concrete and asphalt) which will require proper management and removal from the sites to be either treated as a waste or as a by-product (as appropriate and suitable for the material type, condition and quantity). In the event of overlapping Construction Phases, the waste from both developments could have a potentially Negative, Significant and Short-Term cumulative impact on the annual capacity of waste management facilities within the region during overlapping years, in the absence of any mitigation. Potential wastes associated with the Operational Phases for both developments are insignificant, and therefore, there are no significant cumulative impacts anticipated. The impact is therefore deemed as Neutral, Imperceptible and Long-Term.	Waste: The following measure, which is included in Chapter 16 (Waste) in Volume 2 of this EIAR will be implemented: In order to minimise the creation of waste, opportunities for reuse of materials (e.g. excavated material as fill) within both developments will be sought. Where there is remaining excess material, the potential for reuse as a by-product in accordance with Article 27 of the Waste Management Act will be investigated. Where material is unsuitable for either type of reuse, it will be treated as a waste. Appropriate handling, storage and management of any waste streams arising on either development will be managed in accordance with legislative requirements and best practice. No additional mitigation measures are required.	Waste: Construction Phase: Negative, Not Significant and Short-Term Operational Phase: Neutral, Imperceptible and Long-Term

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				<u>Material Assets:</u> Given the minimal spatial overlap, there is limited potential for an overlap in interfaces with existing utilities requiring diversions during the Construction Phases of both developments. The potential impact is therefore assessed as Neutral, Imperceptible and Temporary. There is the potential for a Positive, Significant and Long-Term cumulative impact on the regional electricity network once both developments are operational.	<u>Material Assets:</u> The mitigation included in this EIAR and in the CEMP (included as a standalone documents in the planning application pack) is deemed sufficient to mitigate and / or manage the identified potential impacts. No additional mitigation measures are required.	<u>Material Assets:</u> Construction Phase: Neutral, Imperceptible and Temporary Operational Phase: Positive, Significant and Long-Term
				<u>Landscape and Visual:</u> Visual cumulative impacts if Construction Phases were to overlap is deemed to be Neutral, Imperceptible and Short-Term, due to the notable intervening distance to the nearest visual receptors. Cumulative construction works on both developments would be transient in nature and would be similar in scale. For these reasons, the Construction Phase landscape cumulative impacts are deemed to be Negative, Slight and Short-Term. Due to the notable intervening distance to the nearest visual receptors, Operational Phase visual impacts are deemed to be Negative, Imperceptible and Permanent. As all permanent above ground Operational Phase structures will be within or immediately adjacent to the existing electrical infrastructure, thus Operational Phase landscape cumulative impacts are deemed to be Negative, Imperceptible and Permanent.	<u>Landscape and Visual:</u> No significant cumulative landscape or visual impacts are predicted which will require mitigation. Therefore, no cumulative landscape or visual mitigation is proposed.	<u>Landscape and Visual:</u> Construction Phase (visual): Neutral, Imperceptible and Short-Term Construction Phase (landscape): Negative, Slight and Short-Term Operational Phase: Negative, Imperceptible and Permanent