

**Planning & Development Act, 2000 - 2020,
European Communities (Environmental Impact Assessment) Regulations 1989 (as
amended), Planning & Development Regulations, 2001 (as amended)**

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

APPENDICES

**EdgeConneX Ireland Ltd.
Data Centre (DUB05)
Ballymakailly**

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MARSTON

PLANNING CONSULTANCY

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Appendix 2.2 Schedule of mitigation measures

Project Phase	Mitigation Measures
<p>Construction - Nationally designated sites, Non-native invasive species</p>	<p>Biodiversity</p> <p>The following mitigation measures will ensure that there will be no impacts from non-native invasive species on the adjacent Grand Canal pNHA. It is recommended that <i>Buddleia davidii</i> is removed prior to construction works onsite.</p> <p><i>Buddleja davidii</i> is a highly invasive species that is widespread in urban environments. It can grow in very poor, shallow soil, along railways and even on walls and buildings. Each plant can produce up to three million seeds that can remain viable in the soil for many years. It creates competition for resources such as pollinators, light and space and poses a threat to native plant species within the lands. Only two plants of this species were located in the north of the site during the field surveys.</p> <p>There are two options for the removal and control of <i>B. davidii</i>. The first option is for the physical removal of <i>B. davidii</i> is only suitable for very small infestations of this species. If this is the chosen method of removal, care should be taken to remove all parts of the plant as branches are capable of re-rooting from cuttings. The plants should not be removed when in seed as there would be a risk of spreading the seeds further. Where removal of mature plants is not immediately feasible, the flower heads should be removed in June before they go to seed. It is essential to plant the ground with native species immediately following removal to prevent new seedlings taking hold.</p> <p>The second option is to cut back the plants to a stump during active growth (late spring to early summer) and then immediately treated with a systemic weed killer (brushed on). Foliar application of herbicide may be adequate for smaller infestations of younger plants but must be followed up on a six-monthly basis. The measures outlined above to control the spread of the non-native invasive species <i>B. davidii</i> will also mitigate against their spread within the habitats in the Proposed Development site.</p>
<p>Construction – Habitats – Water quality</p>	<p>The following mitigation measures will ensure there are no impacts on water quality in the immediate vicinity of the Proposed Development from release of hydrocarbons, polluting chemicals, sediment/silt and contaminated waters control during the construction stage of the Proposed Development and therefore no potential impacts on the downstream receiving water courses, <i>i.e.</i> the Griffeen River:</p> <ul style="list-style-type: none"> • Specific measures to prevent the release of sediment over baseline conditions to the existing surface water drainage network, during the construction work, which will be implemented as the need arises. These measures include, but are not limited to, the use of silt fences, silt curtains, settlement lagoons and filter materials. • Provision of exclusion zones and barriers (e.g. silt fences) between earthworks, stockpiles and temporary surfaces to prevent sediment washing into the existing drainage systems and hence the downstream receiving water environment. • Provision of temporary construction surface drainage and sediment control measures to be in place before earthworks commence. • Weather conditions will be taken into account when planning construction activities to minimise risk of run-off from the site. • Prevailing weather and environmental conditions will be taken into account prior to the pouring of cementitious materials for the works adjacent to any surface water drainage features, or drainage features connected to same. Pumped concrete will be monitored to ensure no accidental discharge. Mixer washings and excess concrete will not be discharged to existing surface water drainage systems. Concrete washout areas will be located remote any surface water drainage features, where feasible, to avoid accidental discharge to watercourses. Washing out of any concrete trucks on site will be avoided (dry brush shoots will be used instead). • Any fuels of chemicals (including hydrocarbons or any polluting chemicals) will be stored in a designated, secure bunded area(s) to prevent any seepage of potential pollutants into the local surface water network. These designated areas will be clearly sign-posted and all personnel on site will be made aware of their locations and associated risks. • All mobile fuel bowsers shall carry a spill kit and operatives must have spill response training. All fuel containing equipment such as portable generators shall be placed on drip trays. All fuels and chemicals required to be stored on-site will be clearly marked. Care and attention should be taken during refuelling and maintenance operations. Particular attention should be paid to gradient and ground conditions, which could increase risk of

	<p>discharge to waters.</p> <ul style="list-style-type: none"> • A register of all hazardous substances, which will either be used on site or expected to be present (in the form of soil and/or groundwater contamination) will be established and maintained. This register will be available at all times and shall include as a minimum: <ul style="list-style-type: none"> - Valid Safety Data Sheets; - Health & Safety, Environmental controls to be implemented when storing, handling, using and in the event of spillage of materials; - Emergency response procedures/precautions for each material; and, - The Personal Protective Equipment (PPE) required when using the material. - Implementation of response measures to potential pollution incidents. • Robust and appropriate Spill Response Plan and Environmental Emergency Plan will be prepared prior to works commencing and they will be communicated, resourced and implemented for the duration of the works. Emergency procedures/precautions and spillage kits will be available and construction staff will be trained and experienced in emergency procedures in the event of accidental fuel spillages. • All trucks will have a built-on tarpaulin that will cover excavated material as it is being hauled off-site and wheel wash facilities will be provided at all site egress points. • Water supplies shall be recycled for use in the wheel wash. All waters shall be drained through appropriate filter material prior to discharge from the construction sites. • The removal of any made ground material, which may be contaminated, from the construction site and transportation to an appropriate licenced facility shall be carried out in accordance with the Waste Management Act, best practice and guidelines for same. • A discovery procedure for contaminated material will be prepared and adopted by the appointed contractor prior to excavation works commencing on site. These documents will detail how potentially contaminated material will be dealt with during the excavation phase. • Implementation of measures to minimise waste and ensure correct handling, storage and disposal of waste (most notably wet concrete, pile arisings and asphalt). • All of the above measures implemented on site will be monitored throughout the duration of construction to ensure that they are working effectively, to implement maintenance measures if required and applicable, and to address any potential issues that may arise.
<p>Construction phase – Birds – vegetation clearance / demolition</p>	<p>The following mitigation measures are proposed to comply with the legal protection afforded to breeding birds and their nests under the Wildlife Acts:</p> <ul style="list-style-type: none"> • In order to avoid disturbance or harm to breeding birds, their nests, eggs and/or their unflown young, all works involving the removal of trees, hedgerows, grasslands or the demolition of the structure will be undertaken outside of the nesting season (i.e. 1 March to 31 August inclusive); or where this seasonal restriction cannot be observed then: • A breeding bird survey will be undertaken by a suitably experienced ecologist in order to assess whether birds are nesting within suitable habitat affected by or immediately adjacent to the proposed works. Should nesting birds be encountered during surveys, it may be necessary to delay the removal of trees or hedgerows or the demolition of the buildings until after the nesting season (i.e. 1 March to 31 August inclusive), or until the chicks have fully fledged.
<p>Construction phase – Bats - lighting</p>	<p>During construction, any external lighting to be installed, including facilitating night-time working or security lighting, on the site shall be sensitive to the presence of bats in the area, downlighting, and time limited where possible. Lighting of sensitive wildlife areas and primary ecological corridors (e.g. Grand Canal) and light pollution in general should be avoided. Lighting of the site during construction is designed in accordance with the following guidance:</p> <ul style="list-style-type: none"> • Guidance Notes for the Reduction of Obtrusive Light GN01 (Institute of Lighting Professionals, 2020) • Bats & Lighting - Guidance Notes for Planners, Engineers, Architects and Developers (Bat Conservation Ireland, December 2010) • Bats and Lighting in the UK – Bats and the Built Environment Series (Bat Conservation Trust UK, January 2008).
<p>Construction phase – Bats, Vegetation clearance</p>	<p>The following mitigation measures are proposed in relation to those trees identified as having potential to support roosting bats (see Figure 6.15). Bats could occupy suitable roosting features at any time prior to the commencement of works. Therefore, there is an inherent risk that bats could be affected by felling works. The following mitigation procedures will be followed:</p> <ul style="list-style-type: none"> • Felling of potential tree roosts will be undertaken during the periods April to May or

	<p>September to October as during this period bats are capable of flight and may avoid the risks from tree felling if proper measures are undertaken, but also are neither breeding nor in hibernation</p> <ul style="list-style-type: none"> • Use of detectors alone may not be sufficient to record bat emergence and re-entry in darkness. Therefore, prior to felling of confirmed and potential tree roosts, an emergence survey using infra-red illumination and video camera(s) and bat detectors will be carried out on the night immediately preceding the felling operation to determine if bats are present • Where it is safe and appropriate to do so for both bats and humans, such trees may be felled using heavy plant to push over the tree. In order to ensure the optimum warning for any roosting bats that may still be present, the tree will be pushed lightly two to three times, with a pause of approximately 30 seconds between each nudge to allow bats to become active. The tree should then be pushed to the ground slowly and should remain in place until it is inspected by a bat specialist • Trees should only be felled "in section" where the sections can be rigged to avoid sudden movements or jarring of the sections • Where remedial works (e.g. pruning of limbs) is to be undertaken to trees deemed to be suitable for bats, the affected sections of the tree will be checked by a bat specialist (using endoscope under a separate derogation licence held by that individual) for potential roost features before removal. For limbs containing potential roost features high in the tree canopy, this will necessitate the rigging and lowering of the limb to the ground (with the potential roost feature intact) for inspection by the bat specialist before it is cut up or mulched. If bats are found to be present, they will be removed by a bat specialist licenced to handle bats and released in the area in the evening following capture • If any bat tree roosts are confirmed, and will be removed by the proposed felling works, then a derogation licence will be required from the NPWS and appropriate alternative roosting sites will be provided in the form of bat boxes.
<p>Construction phase – Common frog</p>	<p>If works to clear any of the habitat features suitable to support common frog are to begin during the season where frogspawn or tadpoles may be present (<i>i.e.</i> February to mid-summer), a pre-construction survey will be undertaken to determine whether breeding common frogs are present. If required, a licence permitting their removal should be applied for from the NPWS. Any frog spawn, tadpoles, juvenile or adult frogs present will be captured and removed from affected habitat by hand net and translocated to suitable alternative habitat within the environs of the site. Any capture and translocation works shall be undertaken immediately in advance of site clearance and construction works commencing.</p>
<p>Construction phase – Fish and white clawed crayfish</p>	<p>Mitigation measures outlined above for the protection of water quality in the downstream receiving water courses, <i>i.e.</i> Griffeen River, and its immediate environs will mitigate against impacts of water pollution on fish and white-clawed crayfish during construction stage.</p>
<p>Construction phase - badgers</p>	<p>Before works to clear any of the habitat features suitable to supporting badgers commence, a pre-construction survey will be undertaken to determine whether badgers are present on site. If required, a licence permitting their filming to assess locations of activity and their subsequent removal should be applied for from the NPWS. Any active badger setts located within the development or 30m from the development must be safely closed with the use of one-way badger gates and (infra-red camera) monitoring to ensure that all badgers have left the sett(s) and that it is no longer occupied, prior to sett removal. Any sett closing works shall be undertaken between the months of July to November inclusive (to avoid peak breeding season for this species and therefore avoid risk of disturbance to or mortality of cubs), in advance of site clearance and construction works commencing.</p>
<p>Operational phase - habitats</p>	<p>The landscape plans (see Chapter 11) of the Proposed Development site will implement appropriate measures such as using plants of native origin in planting/meadows and by leaving unmanaged and/or enhanced areas for biodiversity. To offset the loss of habitats, the proposed landscape plans include the planting of native treelines and also woody hedgerow species to fill in gaps in existing hedgerows/treelines in the northern buffer area of the site, the construction of a new pond wetland habitat in the north-eastern corner of the site with wetland planting (c.1.7ha) and the planting of wildflower hay meadows, also in the northern buffer area of the site. The planted hedgerow species will mainly consist of <i>Corylus avellana</i>, <i>Crataegus monogyna</i> and <i>Prunus avium</i>, whilst the treelines will mainly consist of <i>Alnus glutinosa</i>, <i>Betula pendula</i>, <i>Pinus sylvestris</i> and <i>Quercus petraea</i>. The pond will be planted with <i>Phragmites australis</i>, <i>Sparganium erectum</i> and <i>Typha latifolia</i>, amongst other species. Any remaining hedgerows will be preserved, retained and protected in accordance with the arborist's report and where feasible. Landscaping will also include extensive areas of wildflower hay meadow throughout the Proposed Development.</p>

<p>Operational phase - birds</p>	<p>The Proposed Development will result in foraging and breeding habitat loss of various bird species. The landscape planting includes planting of treeline, hedgerow, pond wetland and wildflower hay meadow grassland habitats, which will mitigate the loss of pre-existing habitats for breeding and wintering bird species. In addition, landscaping will also include extensive areas of wildflower hay meadow throughout the Proposed Development, which will especially benefit granivorous (e.g. finches) and wintering bird species (<i>i.e.</i> snipe).</p> <p>The Proposed Development will create a barrier to bird movement through the previously undeveloped lands. The landscape plans include treeline/hedgerow retention and also treeline planting in the north of the site, which will encourage birds to fly at higher flight lines near the buildings, and thus help to prevent bird collision and mortality associated with building collision.</p>
<p>Operational phase – bats, lighting</p>	<p>The lighting plans take into consideration sensitive wildlife areas (<i>e.g.</i> Grand Canal and areas of high bat activity marked in Figure 6.16), and are downlighting, and time limited where possible. The following recommendations have been considered in relation to the detailed operational lighting design, and have been reviewed by a suitably qualified and experienced ecologist:</p> <ul style="list-style-type: none"> • Lighting levels should be the minimum required for health and safety requirements. • Vertical light spill shall be minimized by the use of suitable cut off luminaires. • No floodlighting should be used, this causes a large amount of light spillage into the sky. The spread of light should be kept below the horizontal. • Lights should be of low intensity. It is better to use several low intensity lights than one strong light spilling light across the entire area. • Narrow spectrum lighting should be used with a low UV component (UV filters can be used to reduce the UV component emitted by lights). Glass also helps reduce the UV component emitted by lights. • The use of LED directional lighting (through the use of hoods, louvres, shields, or cowls) to restrict light to those areas where it is needed. • Consideration the use of automatic sensor or dimming systems to minimise the duration and intensity of lighting on the site. <p>The technical details of the lighting plans for the Proposed Development include the following:</p> <ul style="list-style-type: none"> • Lighting will be restricted to the building perimeter, plant areas, roadways and car parking; • All pathways will be illuminated using bollards; • All columns will be a maximum of 5 metres high with sharp cut off luminaires, located to minimise light back spill; and, • LED-based lighting. <p>These are in adherence with the guidance presented in relation to bats and lighting previously in this Chapter.</p>
<p>Operational phase – bats, collision risk</p>	<p>The Proposed Development will create a barrier to bat movement through the previously undeveloped lands. The landscape plans include treeline/hedgerow retention and also treeline planting in the north of the site, which will encourage birds to fly at higher flight lines near the buildings, and thus help to prevent bat collision and mortality associated with building collision.</p>
<p><i>Land, Soil and Geology</i></p>	
<p>Construction phase – Soil removal and compaction</p>	<p>Reuse of excavated soil on site and capping with hardstand will minimise any increase in aquifer vulnerability. Construction works will require local removal of soil cover where levelling of the site is required and its use for re-instatement elsewhere on site. According to the GSI database the bedrock vulnerability is already extreme due to the thin cover of overburden on the site, removal of soil cover will increase the vulnerability of the underlying bedrock. However due to levelling works imported fill will need to be deposited over a sizable proportion of the proposed development site. Overall vulnerability would not alter across the site. It is envisaged that any soil excavated will be retained on site and reused as fill material or landscaping.</p> <p>Temporary storage of soil will be carefully managed in such a way as to prevent any potential negative impact on the receiving environment and the material will be stored away from any open surface water drains. Movement of material will be minimised in order to reduce degradation of soil structure and generation of dust.</p>

	<p>Although there is no evidence of historical contamination in the proposed development site, all excavated materials will be visually assessed for signs of possible contamination such as staining or strong odours. Should any unusual staining or odour be noticed, samples of this soil will be analysed for the presence of possible contaminants in order to ensure that historical pollution of the soil has not occurred. Should it be determined that any of the soil excavated is contaminated, this will be disposed of by a licensed waste disposal contractor.</p>
<p>Construction phase – Fuel and chemical handling</p>	<p>To minimise any impact on the underlying subsurface strata from material spillages, all oils, solvents and paints used during construction will be stored within temporary bunded areas. Oil and fuel storage tanks shall be stored in designated areas, and these areas shall be bunded to a volume of 110% of the capacity of the largest tank/container within the bunded area(s) (plus an allowance of 30 mm for rainwater ingress). Drainage from the bunded area(s) shall be diverted for collection and safe disposal.</p> <p>Refuelling of construction vehicles and the addition of hydraulic oils or lubricants to vehicles will take place in a designated area (or where possible off the site) which will be away from surface water gulleys or drains. In the event of a machine requiring refuelling outside of this area, fuel will be transported in a mobile double skinned tank. An adequate supply of spill kits and hydrocarbon adsorbent packs will be stored in this area. All relevant personnel will be fully trained in the use of this equipment. Guidelines such as "Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors" (CIRIA 532, 2001) will be complied with.</p> <p>Where feasible all ready-mixed concrete will be brought to site by truck. A suitable risk assessment for wet concreting will be completed prior to works being carried out which will include measures to prevent discharge of alkaline wastewaters or contaminated storm water to the underlying subsoil. Wash down and washout of concrete transporting vehicles will take place at an appropriate facility offsite.</p> <p>In the case of drummed fuel or other chemical which may be used during construction, containers should be stored in a dedicated internally bunded chemical storage cabinet and labelled clearly to allow appropriate remedial action in the event of a spillage.</p>
<p>Construction phase – CEMP</p>	<p>A Construction Environmental Management Plan (CEMP) has been developed by Winthrop Engineering and Contracting Limited and included with the application documentation. This will be refined by the Applicant and the construction contractor prior to commencement of construction. The CEMP will incorporate the mitigation measures outlined above as they relate to the construction phase. The CEMP will include emergency response procedures in the event of a spill, leak, fire or other environmental incident related to construction. This is an active document which is continuously updated to manage risk during the construction programme. All relevant personnel working on the site will be trained in the implementation of the procedures.</p> <p>As a minimum, the CEMP will be formulated in accordance with best international practice including but not limited to:</p> <ul style="list-style-type: none"> • CIRIA, (2001), Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors; • Construction Industry Research and Information Association (CIRIA) Environmental Good Practice on Site (C650), 2005; • BPGCS005, Oil Storage Guidelines; • Eastern Regional Fisheries Board, (2006), Fisheries Protection Guidelines: Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites; • CIRIA 697, The SUDS Manual, 2007; and • UK Pollution Prevention Guidelines (PPG) UK Environment Agency. 2004.
<p>Operational phase – Fuel and chemical handling</p>	<p>In order to minimise any impact on the underlying subsurface strata from material spillages, each generator will be installed in an externally rated container with a self-contained belly tank (steel double wall type for leak containment and inner tank leak alarm system) with 48 hours diesel fuel storage capacity at full load.</p> <p>Any chemicals, oils, herbicides required for site maintenance will be stored in suitable contained areas. As the site will be paved any accidental emissions from fuel spills or contaminated runoff will be directed through the surface water drainage system through oil</p>

	interceptors prior to discharge to the proposed attenuation tank onsite rather than infiltrate directly to ground.
Operational phase – Environmental Plan	An environmental management plan will be prepared and followed during the operational phase incorporating mitigation measures and emergency response measures.
	Hydrology
Construction phase - CEMP	<p>A Construction Environmental Management Plan (CEMP) has been developed by Winthrop Engineering and Contracting Limited and included with the application documentation. This will be refined by the Applicant and the construction contractor prior to commencement of construction. The CEMP will incorporate the mitigation measures outlined above as they relate to the construction phase. The CEMP will include emergency response procedures in the event of a spill, leak, fire or other environmental incident related to construction. This is an active document which is continuously updated to manage risk during the construction programme. All relevant personnel working on the site will be trained in the implementation of the procedures.</p> <p>As a minimum, the CEMP will be formulated in accordance with best international practice including but not limited to:</p> <ul style="list-style-type: none"> • CIRIA, (2001), Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors; • Construction Industry Research and Information Association (CIRIA) Environmental Good Practice on Site (C650), 2005; • BPGCS005, Oil Storage Guidelines; • Eastern Regional Fisheries Board, (2006), Fisheries Protection Guidelines: Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites; • CIRIA 697, The SUDS Manual, 2007; and • UK Pollution Prevention Guidelines (PPG) UK Environment Agency, 2004. <p>Project Engineers (Pinnacle) have outlined mitigation measures for the site in their Engineering Planning Report that accompanies this application as a stand-alone document. The following mitigation measures include, but are not limited to, those provided in that report and are designed to address the impacts associated with the construction and operational phase of the project. Due to the inter-relationship between this section and Chapter 7 (Land, Soils, Geology and Hydrogeology) the following mitigation measures discussed will be considered applicable to both.</p>
Construction phase - Increased run-off and sediment loading	<p>During the construction phase any drains carrying a high sediment load will be diverted through the settlement ponds. The settlement ponds will be located between the area of construction and the nearest field drain. Surface water runoff will not be discharged directly to local watercourses. The following mitigation measures will be adopted:</p> <ul style="list-style-type: none"> • the drainage system and settlement ponds will be constructed as a first step; • any excavations required will remain open for as little time as possible before the placement of fill. This will help to minimise potential for groundwater ingress into excavations; • silt traps will be placed in the existing drainage network around the site to minimise silt loss. These should be inspected and cleaned regularly. • weather conditions will be considered when planning construction activities to minimise risk of run off from the site; and • distance between topsoil piles etc. and streams will be maintained – to protect from dampening operations.
Construction phase – Contamination of local water courses	<p>To minimise any impact on the underlying subsurface strata from material spillages, all oils, solvents, paints and fuels used during construction will be stored within temporary bunded areas and each of these areas will be bunded to a volume of 110% of the capacity of the largest tank/container within it (plus an allowance of 30 mm for rainwater ingress). Filling and draw-off points will be located entirely within the bunded area(s). Drainage from the bunded area(s) will be diverted for collection and safe disposal.</p> <p>Wet concrete operations adjacent to watercourses will be avoided where possible. A suitable risk assessment for wet concreting will be completed prior to works being carried out which will include measures to prevent discharge of alkaline wastewaters or contaminated storm water</p>

	<p>to groundwater.</p> <p>The contractor will be required to make provision for removal of any concrete wash waters, most likely by means of tankering off-site and no such wash waters will be discharged to groundwater. Any effluent generated by temporary onsite sanitary facilities will be taken off-site for appropriate treatment.</p> <p>Re-fuelling of construction equipment and the addition of hydraulic oil or lubricants to vehicles/equipment will take place in designated bunded areas where possible. Re-fuelling will be avoided in so far as possible at the other work sites but where necessary will take place within appropriately bunded areas.</p> <p>If it is not possible to bring a machine to the refuelling point, fuel will be delivered in a double-skinned mobile fuel bowser. A drip tray will be used beneath the fill point during refuelling operations in order to contain any spillages that may occur. The vehicles and equipment will not be left unattended during refuelling. Spill kits and hydrocarbon absorbent packs will be stored in the cab of each vehicle and operators will be fully trained in the use of this equipment.</p> <p>The generation of runoff from stockpiles of soils, excavated during construction, will be prevented from entering watercourses by diverting runoff to the settlement ponds on site, and removing the material off-site as soon as possible to designated storage areas.</p>
Operational phase – Increased surface water run-off	<p>The proposed drainage system for the site is outlined in Pinnacle's Engineering Planning Report and has been designed in accordance with Greater Dublin Strategic Design System (GSDSDS) specifications. The drainage system will include a Stormtech attenuation system or similar. Roof water will be directed into an onsite reticulation system which will drain, along with road run-off, into the attenuation ponds which is to be located to the north of the site. A hydrobrake will also be installed at the outflow to reduce the ultimate discharge.</p> <p>Pinnacle have identified that the above storm water drainage systems will accommodate a 1:2 year storm frequency. The attenuation system is also designed to accommodate a 1:100 year storm event accounting for a 20% increase with climate change.</p>
Operational phase – Contamination of surface water	<p>Due to a variety of measures such as the design of the attenuation system with hydrocarbon interceptors, the speed restrictions in place and the fact that no refuelling will be carried out on site (when practicable), the likelihood of any spills entering the water environment from vehicles on site is negligible.</p> <p>Run-off from the car park areas and access roads / delivery areas will be drained following these options:</p> <ul style="list-style-type: none"> • A series of on-site gullies and channels draining into a separate system of below ground gravity storm water sewers; and • A Duraflow (or similar approved), porous asphalt product. <p>To minimise any impact from material spillages, all oils, solvents, paints and fuels to be stored onsite will be stored within permanently bunded areas and each of these areas will be bunded to a volume of 110% of the capacity of the largest tank/container within it (plus an allowance of 30mm for rainwater ingress). Drainage from the bunded area(s) will be diverted for collection and safe disposal.</p>
Operational phase – Foul water	<p>In their Engineering Planning Report Pinnacle have proposed to discharge foul water from the proposed development, via a 225mm diameter gravity foul sewer outfall and discharge into the existing 450mm diameter connection. The increase in flow to the existing public foul sewer is not expected to have a negative effect on the foul drainage system in the area.</p>
Operational phase – Water supply	<p>The water system will be metered to facilitate detection of leakage and the prevention of water loss. Dual & low flush toilets and water economy outlets and water saving measures will also be proposed.</p>
	Noise and vibration
Construction – Noise and vibration	<p>With regard to construction activities, reference will be made to BS5228 Parts 1 and 2, which offer detailed guidance on the control of noise and vibration from demolition and construction activities.</p>

	<p>Various mitigation measures will be considered and applied during the construction of the proposed development. Specific examples of such measures are:</p> <ul style="list-style-type: none"> • limiting the hours during which site activities likely to create high levels of noise or vibration are permitted; • establishing channels of communication between the contractor/developer, Local Authority and residents; • appointing a site representative responsible for matters relating to noise and vibration; • monitoring levels of noise and/or vibration during critical periods and at sensitive locations; and • all site access roads will be kept even so as to mitigate the potential for vibration from lorries <p>Furthermore, it is envisaged that a variety of practicable noise control measures will be employed. These may include:</p> <ul style="list-style-type: none"> • selection of plant with low inherent potential for generation of noise and/or vibration; • erection of barriers as necessary around items such as generators or high-duty compressors; • situate any noisy plant as far away from sensitive properties as permitted by site constraints and the use of vibration-isolated support structures where necessary. <p>It is recommended that vibration from construction activities to off-site residences be limited to the values set out in Table 9.6. It should be noted that these limits are not absolute, but provide guidance as to magnitudes of vibration that are very unlikely to cause cosmetic damage. Magnitudes of vibration slightly greater than those in the table are normally unlikely to cause cosmetic damage, but construction work creating such magnitudes should proceed with caution. Where there is existing damage these limits may need to be reduced by up to 50%.</p>
Operational phase - Building services noise / emergency site operation	Noise from external plant will be minimised by purchasing low noise generating equipment and incorporating appropriately specified in line attenuators for stacks and exhausts where necessary. With due consideration as part of the detailed design process, this approach will result in the site operating well within the constraints of the best practice guidance noise limits that have been adopted as part of this detailed assessment.
Operational phase - Additional vehicular traffic on public roads	The noise impact assessment outlined previously has demonstrated that mitigation measures are not required.
Operational phase – Noise and human health	<i>Guidelines for construction and operational phase:</i> Noise criteria are provided by relevant bodies with consideration of the likely impact of noise on human health. The construction phase is short-term and therefore any elevated levels of noise will be of limited duration and, as a result, are not expected to pose any risk to human health. In terms of the noise exposure of construction workers and potential hearing damage that may be caused due to exposure to high levels of noise, the Safety, Health and Welfare at Work (General Application) Regulations 2007 (Statutory Instrument No. 299 of 2007) provides guidance in terms of allowable workplace noise exposure levels for employees. The Regulations specify two noise Action Levels at which the employer is legally obliged to reduce the risk of exposure to noise. The appointed contractor will be required to comply with the Regulations and provide appropriate noise exposure mitigation measures where necessary. No significant noise impacts are expected from the operational phase of the proposed development. As such, there is no anticipated risk of long-term exposure to noise on human health resulting from the proposed development.
Air quality and climate	
Construction phase – Climate	Construction vehicles, generators etc.. may give rise to some CO ₂ and N ₂ O emissions. However, due to short-term and temporary nature of these works the impact on climate will not be significant.
Construction phase – Air Quality	The objective of dust control at the site is to ensure that no significant nuisance occurs at nearby sensitive receptors. In order to develop a workable and transparent dust control strategy, the following management plan has been formulated by drawing on best practice guidance from Ireland and the UK (IAQM (2014), The Scottish Office (1996), UK Office of Deputy Prime Minister (2002) and BRE (2003)) and the USA (USEPA (1997)).

<p>Construction phase – site management</p>	<p>The aim is to ensure good site management by avoiding dust becoming airborne at source. This will be done through good design and effective control strategies.</p> <p>At the construction planning stage, the siting of activities and storage piles will take note of the location of sensitive receptors and prevailing wind directions in order to minimise the potential for significant dust nuisance (see Figure 10.1 for the windrose for Casement Aerodrome). As the prevailing wind is predominantly south-westerly, locating construction compounds and storage piles downwind (to the north-east) of sensitive receptors will minimise the potential for dust nuisance to occur at sensitive receptors.</p> <p>Good site management will include the ability to respond to adverse weather conditions by either restricting operations on-site or quickly implementing effective control measures before the potential for nuisance occurs. When rainfall is greater than 0.2 mm/day, dust generation is generally suppressed (UK Office of Deputy Prime Minister (2002), BRE (2003)). The potential for significant dust generation is also reliant on threshold wind speeds of greater than 10 m/s (19.4 knots) (at 7m above ground) to release loose material from storage piles and other exposed materials (USEPA, 1986). Particular care should be taken during periods of high winds (gales) as these are periods where the potential for significant dust emissions are highest. The prevailing meteorological conditions in the vicinity of the site are favourable in general for the suppression of dust for a significant period of the year. Nevertheless, there will be infrequent periods where care will be needed to ensure that dust nuisance does not occur. The following measures should be taken in order to avoid dust nuisance occurring under unfavourable meteorological conditions:</p> <ul style="list-style-type: none"> • The Principal Contractor or equivalent must monitor the contractors' performance to ensure that the proposed mitigation measures are implemented and that dust impacts and nuisance are minimised; • During working hours, dust control methods will be monitored as appropriate, depending on the prevailing meteorological conditions; • The name and contact details of a person to contact regarding air quality and dust issues shall be displayed on the site boundary, this notice board should also include head/regional office contact details; • It is recommended that community engagement be undertaken before works commence on site explaining the nature and duration of the works to local residents and businesses; • A complaints register will be kept on site detailing all telephone calls and letters of complaint received in connection with dust nuisance or air quality concerns, together with details of any remedial actions carried out; • It is the responsibility of the contractor at all times to demonstrate full compliance with the dust control conditions herein; and • At all times, the procedures put in place will be strictly monitored and assessed. <p>The dust minimisation measures shall be reviewed at regular intervals during the works to ensure the effectiveness of the procedures in place and to maintain the goal of minimisation of dust through the use of best practice and procedures. In the event of dust nuisance occurring outside the site boundary, site activities will be reviewed and satisfactory procedures implemented to rectify the problem. Specific dust control measures to be employed are described below.</p>
<p>Construction – site roads / haulage routes</p>	<p>Movement of construction trucks along site roads (particularly unpaved roads) can be a significant source of fugitive dust if control measures are not in place. The most effective means of suppressing dust emissions from unpaved roads is to apply speed restrictions. Studies show that these measures can have a control efficiency ranging from 25 to 80% (UK Office of Deputy Prime Minister, 2002).</p> <ul style="list-style-type: none"> • A speed restriction of 20 km/hr will be applied as an effective control measure for dust for on-site vehicles using unpaved site roads; • Access gates to the site shall be located at least 10m from sensitive receptors where possible; • Bowers or suitable watering equipment will be available during periods of dry weather throughout the construction period. Research has found that watering can reduce dust emissions by 50% (USEPA, 1997). Watering shall be conducted during sustained dry periods to ensure that unpaved areas are kept moist. The required application frequency will vary according to soil type, weather conditions and vehicular use; and • Any hard surface roads will be swept to remove mud and aggregate materials from their surface while any unsurfaced roads shall be restricted to essential site traffic only.

Construction phase – Land clearing / earth moving	<p>Land clearing / earth-moving works during periods of high winds and dry weather conditions can be a significant source of dust.</p> <ul style="list-style-type: none"> • During dry and windy periods, and when there is a likelihood of dust nuisance, watering shall be conducted to ensure moisture content of materials being moved is high enough to increase the stability of the soil and thus suppress dust; and • During periods of very high winds (gales), activities likely to generate significant dust emissions should be postponed until the gale has subsided.
Construction phase – storage piles	<p>The location and moisture content of storage piles are important factors which determine their potential for dust emissions.</p> <ul style="list-style-type: none"> • Overburden material will be protected from exposure to wind by storing the material in sheltered regions of the site. Where possible storage piles should be located downwind of sensitive receptors; • Regular watering will take place to ensure the moisture content is high enough to increase the stability of the soil and thus suppress dust. The regular watering of stockpiles has been found to have an 80% control efficiency (UK Office of Deputy Prime Minister, 2002); and • Where feasible, hoarding will be erected around site boundaries to reduce visual impact. This will also have an added benefit of preventing larger particles from impacting on nearby sensitive receptors.
Construction phase – Site traffic on public roads	<p>Spillage and blow-off of debris, aggregates and fine material onto public roads should be reduced to a minimum by employing the following measures:</p> <ul style="list-style-type: none"> • Vehicles delivering or collecting material with potential for dust emissions shall be enclosed or covered with tarpaulin at all times to restrict the escape of dust; and • In addition, public roads outside the site shall be regularly inspected for cleanliness, as a minimum on a daily basis, and cleaned as necessary.
Construction phase – Dust mitigation	<p>The pro-active control of fugitive dust will ensure that the prevention of significant emissions, rather than an inefficient attempt to control them once they have been released, will contribute towards the satisfactory performance of the contractor. The key features with respect to control of dust will be:</p> <ul style="list-style-type: none"> • The specification of a site policy on dust and the identification of the site management responsibilities for dust issues; • The development of a documented system for managing site practices with regard to dust control; • The development of a means by which the performance of the dust minimisation plan can be regularly monitored and assessed; • The specification of effective measures to deal with any complaints received.
Operational phase – Air Quality	<p>The stack heights of the gas generators have been designed in an iterative fashion to ensure that an adequate height was selected to aid dispersion of the plume. Provided each gas generator flue stack is built to a height of 25m above local ground level and based on the site layout modelled, the air impact assessment has demonstrated that mitigation measures are not required. Similarly, the standby diesel generators have been designed in an iterative fashion to ensure that an adequate height was selected to aid dispersion of the plume. Provided each standby diesel generator flue stack is built to a height of 25m above local ground level and based on the site layout modelled and hours of operation, the air impact assessment has demonstrated that mitigation measures are not required.</p>
Operational phase - Climate	<p>On-site emissions of greenhouse gases will mainly derive from the gas generators with infrequent standby emissions due to the diesel generators. However, the emissions from the gas generators will form part of the EU-wide Emission Trading Scheme (ETS) and thus greenhouse gas emission from onsite electricity generation are not included when determining compliance with the targeted 30% reduction in the non-ETS sector. In addition, gas generators have the lowest greenhouse gas emission rate of any fossil fuel. Thus, no mitigation measures for the gas generators will be required.</p>
Landscape and visual assessment	
Operational – visual impact	<p>The mitigation of potential negative landscape and visual impacts has influenced the design and layout of the scheme from the beginning of the design process (refer to</p>

	<p>Landscape Mitigation Drawing). As a result, the following landscape design mitigation measures have been made:</p> <ul style="list-style-type: none"> • earth modelling and large tree planting reinforced with woodland whip planting in belts is proposed to provide a high level of visual screening of the most sensitive views of the development; and • the creation of a large wetland and woodland habitat in a buffer zone between the canal and the built development • the colour palette chosen for the building aims to further reduce any visual impact of the building.
Traffic and transportation	
Construction – CMP	<p>The Construction Management Plan prepared by Winthrop (see Appendix 12.1 of the EIAR) incorporates a range of integrated control measures and associated management initiatives with the objective of mitigating the impact of the proposed developments on-site construction activities. To minimise disruption to the surrounding environment, the following mitigation measures will be implemented:</p> <ul style="list-style-type: none"> • During the pre-construction phase, the site will be securely fenced off from adjacent properties, public footpaths and roads. • All road works will be adequately signposted and enclosed to ensure the safety of all road users and construction personnel. • A dedicated 'construction' site access / egress junction will be provided during all construction phases. This will coincide with the overall site access/ • Provision of sufficient on-site parking and compounding to ensure no potential overflow of construction generated traffic onto the local network. • Site offices and compound will be located within the site boundary. The site will be able to accommodate employee and visitor parking throughout the construction period through the construction of temporary hardstanding areas. • A material storage zone will also be provided in the compound area. This storage zone will include material recycling areas and facilities. • A series of 'way finding' signage will be provided to route staff / deliveries into the site and to designated compound / construction areas. • Dedicated construction haul routes will be identified and agreed with the local authority prior to the commencement of constructions activities on-site. • Truck wheel washes will be installed at construction entrances if deemed necessary and any specific recommendations with regard to construction traffic management made by the Local Authority will be adhered to. • On completion of the works all construction materials, debris, temporary hardstands etc. from the site compound will be removed off site and the site compound area reinstated in full on completion of the works. <p>All construction related parking will be provided on site. Construction traffic will consist of the following two principal categories:</p> <ul style="list-style-type: none"> • Private vehicles owned and driven by site construction staff and by full time supervisory staff; • Excavation plant and dumper trucks involved in site development works and material delivery vehicles for the following: granular fill materials, concrete pipes, manholes, reinforcement steel, ready mix concrete and mortar, concrete blocks, miscellaneous building materials, etc. <p>It is anticipated that the generation of HGV's during the construction period will be evenly spread throughout the day and as such will not impact significantly during the peak traffic periods.</p>
Operational – traffic and transportation	<p>The Adamstown Road (R120) and Nangor Road (R134) Improvement Scheme provides suitable infrastructure and transport services for travel by sustainable modes. A key barrier to modal shift towards sustainable modes of travel is often a lack of information about potential alternatives to the car. As such, it is proposed that staff at the data centre are made aware of potential alternatives including information on walking, cycle routes and public transport.</p> <p>The local area provides suitable infrastructure and transport services for travel by sustainable</p>

	<p>modes. A key barrier to modal shift towards sustainable modes of travel is often a lack of information about potential alternatives to the car. As such, it is proposed that staff and visitors of the proposed development are made aware of potential alternatives including information on walking, cycle routes and public transport.</p> <p>A number of walking and cycling connection points are proposed within the development. These connection points will provide access for pedestrians and cyclists onto the R120. These facilities will provide attractive, convenient and safe routes for staff & visitors. Therefore, there are good links proposed for staff to travel by more sustainable modes.</p> <p>It is proposed to provide car parking that will meet the expected-on site demand. The marketing of new pedestrian & cyclists routes along with public transport information will further reinforce the efforts been made towards a modal shift away from car-based trips.</p> <p>Staff will be encouraged to avail of these facilities for travel to and from work. Provision of this information would be made upon opening of the proposed development, as this represents the best opportunity to secure travel behaviour change. It is anticipated that this measure may help to reduce the level of traffic at the proposed development, thus providing mitigation against the already minimal traffic and transport effects of the development.</p>
Operational phase - CTMP	A Construction Traffic Management Plan (CTMP) would be prepared by the appointed contractor in order to minimise the potential impact of the construction phase of the proposed development on the safety and amenity of other users of the public road.
Cultural heritage	
Construction phase - Archaeology	<p>A programme of licensed archaeological monitoring will be agreed with the National Monuments Service of the Department of Culture, Heritage and the Gaeltacht, for areas not previously subjected to archaeological testing.</p> <p>A report outlining the results of the programme of archaeological monitoring will be prepared and will include a detailed method statement for any archaeological excavation of features identified, agreed in advance with the National Monuments Service of the Department of Culture, Heritage and the Gaeltacht. The report will include a schedule of works detailing timeframes, personnel and logistical requirements.</p> <p>Any areas that require archaeological excavation will be cordoned off to facilitate the archaeological team to carry out the excavations. A buffer zone will be agreed with National Monuments Service and no construction works will be undertaken in these areas until archaeological excavations have been completed.</p> <p>Provision has been made for all costs associated with archaeological testing, any required excavations and reporting of the results to the standards required by the National Monuments Service of the Department of Culture, Heritage and the Gaeltacht.</p> <p>The remedial or reductive mitigation measures outlined here are subject to the approval of the National Monuments Service of the Department of Culture, Heritage and the Gaeltacht.</p>
Operational phase – cultural heritage	No remedial or reductive measures are considered necessary during the operational phase of the proposed development, as the operational phase will not give rise to any adverse impacts.
Waste management	
Construction – C&D WMP	<p>A project specific C&D WMP has been prepared in line with the requirements of the <i>Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects</i> guidance document issued by the Department of Environment, Heritage and Local Government (DoEHLG). Adherence to the high-level strategy presented in this C&D WMP will ensure effective waste management and minimisation, reuse, recycling, recovery and disposal of waste material generated during the construction phase of the Proposed Development. Prior to commencement of construction, the contractor(s) will be required to refine/update this document to detail specific measures to minimise waste generation and resource consumption and provide details of the proposed waste contractors and destinations of each waste stream.</p> <p>The project engineers have estimated that c. 5,875 m³ soil, subsoil, and stones and up to c. 16,117 m³ of topsoil will be generated from the excavations to facilitate construction. The main contractor will endeavour to ensure that surplus material is reused on site where possible.</p>

	<p>Surplus material that is not required for reuse onsite, will be reused or recovered off-site insofar as is reasonably practicable. Where there is no suitable reuse or recovery option available, it will be disposed of at an authorised facility.</p> <p>In addition, the following mitigation measures will be implemented:</p> <ul style="list-style-type: none"> • Building materials will be chosen with an aim to 'design out waste'; • On-site segregation of waste materials will be carried out to increase opportunities for off-site reuse, recycling and recovery – it is anticipated that the following waste types, at a minimum, will be segregated: <ul style="list-style-type: none"> - Concrete rubble (including ceramics, tiles and bricks); - Plasterboard; - Metals; - Glass; and - Timber. • Left over materials (e.g. timber off-cuts, broken concrete blocks/bricks) and any suitable construction materials shall be re-used on-site, where possible; • All waste materials will be temporarily stored in skips or other suitable receptacles in designated areas of the site; • Any hazardous wastes generated (such as chemicals, solvents, glues, fuels, oils) will also be segregated and will be stored in appropriate receptacles (in suitably bunded areas, where required); • A person responsible for waste management will be appointed by the main contractor(s) to ensure effective management of waste during the excavation and construction works; • All construction staff will be provided with training regarding the waste management procedures: • All waste leaving site will be reused, recycled or recovered where possible to avoid material designated for disposal; • All waste leaving the site will be transported by suitable permitted contractors and taken to suitably registered, permitted or licensed facilities; and • All waste leaving the site will be recorded and copies of relevant documentation maintained. <p>Nearby sites requiring clean fill material will be contacted to investigate reuse opportunities for clean and inert material that requires removal off-site. If any of the material is to be reused on another site as by-product (and not as a waste), this will be completed in accordance with Article 27 of the <i>EC (Waste Directive) Regulations (2011)</i> as detailed in the C&D WMP (Appendix 14.1).</p> <p>These mitigation measures will ensure that the waste arising from the construction phase of the development is dealt with in compliance with the provisions of the <i>Waste Management Act 1996</i>, as amended, associated Regulations, the <i>Litter Pollution Act 1997 to 2009</i> and the <i>EMR Waste Management Plan (2015 - 2021)</i>. It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved and will encourage sustainable consumption of resources.</p>
Operational - Waste	<p>All waste materials will be segregated into appropriate categories and will be temporarily stored in appropriate bins or other suitable receptacles in a designated, easily accessible areas on the site. In addition, the following mitigation measures will be implemented:</p> <ul style="list-style-type: none"> • On-site segregation of all waste materials into appropriate categories including (but not limited to): <ul style="list-style-type: none"> - Dry Mixed Recyclables; - Organic food/green waste; - Mixed Non-Recyclable Waste; - Batteries (non-hazardous and hazardous); - Waste electrical and electronic equipment (WEEE) including computers, printers and other ICT equipment; and - Cleaning chemicals (solvents, pesticides, paints, adhesives, resins, detergents, etc.). • All waste materials will be stored in colour coded bins or other suitable receptacles in designated, easily accessible locations. Bins will be clearly labelled with the approved waste type to ensure there is no cross contamination of waste materials; • All waste collected from the development will be reused, recycled or recovered where possible, with the exception of those waste streams where appropriate facilities are currently not available; • All waste leaving the site will be transported by suitable permitted contractors and taken to

	<p>suitably registered, permitted or licensed facilities; and</p> <ul style="list-style-type: none"> All waste leaving the site will be recorded and copies of relevant documentation maintained. <p>These mitigation measures will ensure the waste arising from the development is dealt with in compliance with the provisions of the <i>Waste Management Act 1996</i>, as amended, associated Regulations, the <i>Litter Pollution Act 1997</i> and the <i>EMR Waste Management Plan (2015 - 2021)</i>. It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved.</p>
	Material assets
Construction – Service providers	Construction of the Proposed Development will require connections to water supply and drainage infrastructure, power and telecommunications. Ongoing consultation with SDCC, Irish Water, Eirgrid, ESB and other relevant service providers within the locality and compliance with any requirements or guidelines they may have will ensure a smooth construction schedule without disruption to local and business community.
Construction – Power and Electricity supply	The power demand for the construction phase will be relatively minor and the temporary connection works are entirely within the Proposed Development site, so that this would not have any potential offsite impact. The excavation of trenches within the vicinity of existing electrical services will be carried out in consultation with ESB Networks to ensure there is no impact on existing users. Once completed, ESB Networks will be mobilised to complete the commissioning in accordance with the ESB Network requirements. No remedial or mitigation measures are required in relation to power supply for the construction phase.
Construction phase – Telecommunications	A fibre optic cable distribution network will be installed within the site for the Proposed Development. The connection into the wider telecommunications network will be undertaken by a statutory telecommunications operator. No remedial or mitigation measures are required in relation to telecommunications.
Construction phase – Water supply, surface water and foul water infrastructure	<p>Run-off water containing silt will be contained on site and treated to ensure adequate silt removal. The works contractor will be obliged to put best practice measures in place to ensure that there are no interruptions to service in existing surface water drainage network. There will not be any interruptions to service in existing surface water sewers. Should interruptions to surface water infrastructure be anticipated, they will be agreed in advance. Strict quality control measures as outlined under the CEMP of the contractor will be undertaken while laying pipes to minimise or eradicate infiltration (where existing water in the ground enters the surface water infrastructure) and ex-filtration (where water in the surface water infrastructure escapes into the ground).</p> <p><i>Foul drainage infrastructure</i></p> <p>A temporary connection to the foul water drainage network will be made and is required for the welfare facilities for the construction staff. The foul water drainage network has sufficient available capacity for the wastewater discharges from the welfare facilities for the short term construction phase.</p> <p>The works contractor will be obliged to put a number of measures as outlined in Chapter 2 of this EIA Report and will be detailed within the CEMP in place to ensure that there is no impact on the existing foul drainage network during the construction works.</p> <p>Foul drainage construction for the Proposed Development will be in accordance with the relevant standards for design and construction, including the Irish Water Code of Practice for Wastewater Infrastructure, The Building Regulations Technical Guidance Document 'Part H' & the Regional Code of Practice for Drainage Works. Strict quality control measures that will be outlined within the CEMP will be undertaken while laying pipes to minimise or eradicate infiltration and ex-filtration.</p> <p>Portable toilets will be provided for construction staff. The existing sewer will be extended into the site to facilitate the Proposed Development. As the construction works are entirely within the site boundary and business park, this would not have any offsite impact. The works contractor will be obliged to put a number of measures in place as outlined under the CEMP to ensure that there is no impact on the foul drainage network of the business park. Strict quality control measures as outlined under the CEMP will be undertaken while laying pipes to minimise or eradicate infiltration and ex-filtration.</p>

	<p><i>Water supply</i></p> <p>Welfare facilities (canteens, toilets etc.) will be required for the construction staff. A temporary connection will be put in place for the construction phase. As the connection works are entirely within the Proposed Development site, and would therefore not have any potential offsite impact. The works contractor will be obliged to put best practice measures in place as outlined within the CEMP and elsewhere to ensure that there are no interruptions to service from the existing watermain. There will not be any interruptions to service from the existing water main, but should interruptions be required, they will be agreed in advance. Strict quality control measures as set out as best practice and as outlined under the CEMP will be undertaken while laying pipes to minimise or eradicate infiltration and ex-filtration.</p>
<p>Operational – Power and electricity supply</p>	<p>Eirgrid's All-Island Generation Capacity Statement 2017-2026 (published April 2017) sets out that Eirgrid has the capacity to provide for such developments and has factored this demand in its projections out to 2026. The Flexible Demand offer from Eirgrid requires an onsite energy generation solution for the site in the case where there are capacity issues on the National Grid. The Power Plants, as well as providing short term permanent power will also provide mitigation back-up power supply in line with the Eirgrid offer for the site.</p> <p>The <i>Heat Recovery Feasibility Report</i> that accompanies this planning application also describes how waste heat associated with the facility has the capacity with a future district heating scheme developed by others. Further detail is provided in the <i>Heat Recovery Feasibility Report</i> by <i>Ethos engineering</i> which accompanies the planning application.</p>
<p>Operational - Telecommunications</p>	<p>There is sufficient capacity available in the area network for the Proposed Development. Therefore, no remedial or mitigation measures are required in relation to telecommunications.</p>
<p>Operational - water supply, surface water and foul water infrastructure</p>	<p><i>Surface water infrastructure</i></p> <p>The surface water drainage system for the Proposed Development incorporates runoff control in the form of attenuation, which will restrict discharge from the Proposed Development to the allowable greenfield runoff rate. The attenuation storage and interceptors allows for any detritus material to be removed from the water and aids in particulate removal, increasing overall storm water quality prior to disposal.</p> <p>To limit the discharges from the attenuation zones to pre-development levels flow control devices are required. It is proposed to use 'Hydrobrake' flow control systems to achieve the required discharge rates. SuDS measures will prevent an increase in the rate of surface water runoff offsite. The allowable greenfield runoff rate has been established by the project engineers, Pinnacle, Consulting Engineers, using the methodology set out in the Water Services Report. A Class 1 Bypass Oil Separator will be used to treat runoff prior to discharging from site.</p> <p><i>Foul drainage infrastructure</i></p> <p>Foul drainage for the Proposed Development will be in accordance with the Building Regulations Technical Guidance Document H for design and construction and Irish Waters Code of Practice for Wastewater Infrastructure. The foul drainage network will be maintained by maintenance staff to ensure system is fit for purpose and to address any operational issues should they arise over the life time of the Proposed Development.</p> <p>No additional remedial or mitigation measures are required in relation to foul drainage infrastructure.</p> <p><i>Water supply</i></p> <p>Cold water storage tanks will be provided as part of the Proposed Development; pumps will supply water to the Proposed Development from the storage tanks. The storage tanks will act as break tanks and buffer demand on the public watermain infrastructure. Further discussions are ongoing with Irish Water. No remedial or mitigation measures are required in relation to water supply.</p>

CHAPTER 6 - BIODIVERSITY

Appendix 6.1 Protected sites for Nature Conservation in the Vicinity of the Proposed Development

European sites in the vicinity of the proposed development are listed below in Table 1, along with their qualifying/special conservation interests, reference to the most recent conservation objectives document, and their location relative to the proposed development site.

Other nationally protected sites for nature conservation in the vicinity of the proposed development are listed below in Table 2 along with the nature conservation interests for which they are designated, and their location relative to the proposed development site.

European Site Name [Code] and its Qualifying interest(s) / Special Conservation Interest(s) (*Priority Annex I Habitats)	Location Relative to the Proposed Development Site
Special Area of Conservation (SAC)	
Rye Water Valley/Cartron SAC [001398] [7220] Petrifying springs with tufa formation (<i>Cratoneurion</i>)* [1014] Narrow-mouthed Whorl Snail <i>Vertigo angustior</i> [1016] Desmoulin's Whorl Snail <i>Vertigo moulinsiana</i> NPWS (2020) Conservation objectives for Rye Water Valley/Cartron SAC [001398]. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.1	c. 4.1km north-west of the proposed development
Glenasmole Valley SAC [001209] [6210] Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) (* important orchid sites) [6410] Molinia meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinion caeruleae</i>) [7220] Petrifying springs with tufa formation (<i>Cratoneurion</i>) NPWS (2018) Conservation objectives for Glenasmole Valley SAC [001209]. Generic Version 6.0. Department of Culture, Heritage and the Gaeltacht.	c. 9.8km south-east of the proposed development
Wicklow Mountains SAC [002122] [3110] Oligotrophic waters containing very few minerals of sandy plains (<i>Littorelletalia uniflorae</i>) [3160] Natural dystrophic lakes and ponds [4010] Northern Atlantic wet heaths with <i>Erica tetralix</i> [4030] European dry heaths [4060] Alpine and Boreal heaths [6130] <i>Calaminarian</i> grasslands of the <i>Violetalia calaminariae</i> [6230] Species-rich <i>Nardus</i> grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe) [7130] Blanket bogs (* if active bog) [8110] Siliceous scree of the montane to snow levels (<i>Androsacetalia alpinae</i> and <i>Galeopsietalia ladani</i>) [8210] Calcareous rocky slopes with chasmophytic vegetation [8220] Siliceous rocky slopes with chasmophytic vegetation [91A0] Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [1355] Otter <i>Lutra lutra</i>	c. 11.4km south of the proposed development

¹ The versions of the conservation objectives documents referenced in this table are the most recent published versions at the time of writing

European Site Name [Code] and its Qualifying interest(s) / Special Conservation Interest(s) (*Priority Annex I Habitats)	Location Relative to the Proposed Development Site
<p>NPWS (2017) <i>Conservation Objectives: Wicklow Mountains SAC 002122</i>. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.</p>	
<p>North Dublin Bay SAC [000206] 1140 Mudflats and sandflats not covered by seawater at low tide 1210 Annual vegetation of drift lines 1310 Salicornia and other annuals colonising mud and sand 1330 Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>) 1395 Petalwort <i>Petalophyllum ralfsii</i> 1410 Mediterranean salt meadows (<i>Juncetalia maritimi</i>) 2110 Embryonic shifting dunes 2120 Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) 2130 Fixed coastal dunes with herbaceous vegetation (grey dunes) 2190 Humid dune slacks</p> <p>NPWS (2013) <i>Conservation Objectives: North Dublin Bay SAC 000206</i>. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.</p>	<p>c. 18.8km east of the proposed development</p>
<p>Red Bog, Kildare SAC [000397] 7140 Transition mires and quaking bogs</p> <p>NPWS (2019) <i>Conservation Objectives: Red Bog, Kildare SAC 000397</i>. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht.</p>	<p>c. 15km south of the proposed development</p>
<p>South Dublin Bay SAC [000210] 1140 Mudflats and sandflats not covered by seawater at low tide 1210 Annual vegetation of drift lines 1310 Salicornia and other annuals colonising mud and sand 2110 Embryonic shifting dunes</p> <p>NPWS (2013) <i>Conservation Objectives: South Dublin Bay SAC 000210</i>. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.</p>	<p>c. 16.4km east of the proposed development</p>
<p>Special Protected Area (SPA)</p>	
<p>North Bull Island SPA [004006] A046 Light-bellied Brent Goose <i>Branta bernicla hrota</i> A048 Shelduck <i>Tadorna tadorna</i> A052 Teal <i>Anas crecca</i> A054 Pintail <i>Anas acuta</i> A056 Shoveler <i>Anas clypeata</i> A130 Oystercatcher <i>Haematopus ostralegus</i> A140 Golden Plover <i>Pluvialis apricaria</i> A141 Grey Plover <i>Pluvialis squatarola</i> A143 Knot <i>Calidris canutus</i> A144 Sanderling <i>Calidris alba</i> A149 Dunlin <i>Calidris alpina</i> A156 Black-tailed Godwit <i>Limosa limosa</i> A157 Bar-tailed Godwit <i>Limosa lapponica</i></p>	<p>c. 15.7km east from the proposed development</p>

European Site Name [Code] and its Qualifying interest(s) / Special Conservation Interest(s) (*Priority Annex I Habitats)	Location Relative to the Proposed Development Site
<p>A160 Curlew <i>Numenius arquata</i> A162 Redshank <i>Tringa totanus</i> A169 Turnstone <i>Arenaria interpres</i> A179 Black-headed Gull <i>Croicocephalus ridibundus</i> A999 Wetlands & Waterbirds</p> <p>NPWS (2015) <i>Conservation Objectives: North Bull Island SPA 004006</i>. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.</p>	
<p>Wicklow Mountains SPA [004040] [A098] Merlin <i>Falco columbarius</i> [A103] Peregrine <i>Falco peregrinus</i></p> <p>NPWS (2018) <i>Conservation objectives for Wicklow Mountains SPA [004040]</i>. Generic Version 6.0. Department of Culture, Heritage and the Gaeltacht.</p>	c. 16.4km south-east of the proposed development
<p>South Dublin Bay and River Tolka Estuary SPA [004024] A046 Light-bellied Brent Goose <i>Branta bernicla hrota</i> A130 Oystercatcher <i>Haematopus ostralegus</i> A137 Ringed Plover <i>Charadrius hiaticula</i> A141 Grey Plover <i>Pluvialis squatarola</i> A143 Knot <i>Calidris canutus</i> A144 Sanderling <i>Calidris alba</i> A149 Dunlin <i>Calidris alpina</i> A157 Bar-tailed Godwit <i>Limosa lapponica</i> A162 Redshank <i>Tringa totanus</i> A179 Black-headed Gull <i>Croicocephalus ridibundus</i> A192 Roseate Tern <i>Sterna dougallii</i> A193 Common Tern <i>Sterna hirundo</i> A194 Arctic Tern <i>Sterna paradisaea</i> A999 Wetland and Waterbirds</p> <p>NPWS (2015) <i>Conservation Objectives: South Dublin Bay and River Tolka Estuary SPA 004024</i>. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.</p>	c. 16.4km east of the proposed development

Table 1: European sites in the vicinity of the proposed development.

Designated Site Name [Code] and its nature conservation features	Location Relative to the Proposed Development Site
proposed Natural Heritage Area (pNHA)	
<p>Grand Canal pNHA [002104]</p> <p>Diversity of flora species the canal ecosystem supports and the presence of legally protected plant species, opposite-leaved pondweed <i>Groenlandia densa</i>.</p>	located within a small section of the north-western corner of the proposed development boundary
<p>Liffey Valley pNHA [000128]</p>	c. 2.8km north of the proposed development site

Designated Site Name [Code] and its nature conservation features	Location Relative to the Proposed Development Site
The site is important for its diversity of habitats within, ranging from terrestrial to aquatic. A number of rare and threatened plant species, such as <i>Scrophularia umbrosa</i> , <i>Hypericum hirsutum</i> and <i>Lamiastrum caleobdolon</i> have been recorded from the site.	
Rye Water Valley/Carton pNHA [001398] Diversity of flora and fauna species the river ecosystem supports – see also Rye Water Valley/Carton SAC in Table 1 above.	c. 4.2km north-west of the proposed development
Royal Canal pNHA [002103] Diversity of flora species the canal ecosystem supports and the presence of legally protected plant species, opposite-leaved pondweed <i>Groenlandia densa</i> .	c. 4.5km north of the proposed development
Lugmore Glen pNHA [001212] The site is important as it is a fine example of wooded glen with a good representation of woodland flora. This type of habitat is scarce in Co. Dublin. The site also holds a Red Data Book species <i>Lamiastrum galeobdolon</i> .	c. 7km south of the proposed development site
Dodder Valley pNHA [000991] The site represents the last remaining stretch of natural riverbank vegetation on the River Dodder in the built-up Greater Dublin Area. Includes a diversity of flora and bird species as well.	c. 8.8km south-east of the proposed development site
Slade of Saggart and Crooksling Glen pNHA [000211] The site includes a good example of a wooded river valley and a small wetland system. The presence of a rare plant, a rare invertebrate and a variety of wildfowl species adds to the interest of the site.	c. 6.7km south of the proposed development site
Glenasmole Valley pNHA [001209] Listed under similar conservation objectives as its SAC designation.	c. 9.5km south-east of the proposed development site
Kilteel Wood pNHA [001394] The site is a fine example of a largely deciduous wood. Its elevated position gives it scenic value.	c. 10.8km south-west of the proposed development site
Red Bog, Kildare pNHA [000397] Listed under similar conservation objectives as its SAC and SPA designations.	c. 15km south of the proposed development site
South Dublin Bay pNHA [000210] Listed under similar conservation objectives as its SAC and SPA designations.	c. 16km east of the proposed development site
North Dublin Bay pNHA [000210] Listed under similar conservation objectives as its SAC and SPA designations.	c. 15km east of the proposed development site
Boosterstown Marsh pNHA [001205] The site is designated for its tidal habitats, rare flora and wintering bird populations.	c. 17.1km east of the proposed development site
Dolphins, Dublin Docks pNHA [000201] Listed for similar objectives as the South Dublin Bay and River Tolka Estuary SPA.	c. 17.2km east of the proposed development site

Table 2: Nationally protected sites in the vicinity of the proposed development.

Appendix 6.2 Desk study Flora and Fauna records

Desktop records of protected, rare, or other notable plant species, from within the same hectad grid square in which the proposed development is located (i.e. O03), are listed below in Table 3. These are plant species which are legally protected under the Flora (Protection) Order, 2015 and/or are listed as Critically Endangered, Endangered or Vulnerable on the relevant national Red Data list for Ireland².

Common Name/ Scientific name	Legal Status ³	Red List Status	Source
Basil thyme <i>Clinopodium acinos</i> (<i>Acinos arvensis</i>)	FPO	none	NPWS database record
Betony <i>Betonica officinalis</i> (<i>Stachys officinalis</i>)	FPO	none	NPWS database record
Green figwort <i>Scrophularia umbrosa</i>	None	Endangered	NPWS database record
Hairy St. John's-wort <i>Hypericum hirsutum</i>	FPO	Vulnerable	NPWS database record
Hairy violet <i>Viola hirta</i>	FPO	Vulnerable	NPWS database record
Meadow barley <i>Hordeum secalinum</i>	FPO	Vulnerable	NPWS database record
Opposite-leaved pondweed <i>Groenlandia densa</i>	FPO	Endangered	NBDC online database record NPWS database record
Red-hemp nettle <i>Galeopsis angustifolia</i>	FPO	Vulnerable	NPWS database record

Table 3: Records of protected, red-listed or notable flora recorded from the desk study in the vicinity of the study area.

Desktop records of protected, rare, or other notable fauna species are listed below in Table 4. In relation to amphibian, reptile and mammal species those which are protected under the Wildlife Acts, the Habitats Directive and/or are listed as threatened (Vulnerable to Critically Endangered) on the relevant national Red Lists are included. In the case of bird species, only those species listed in Annex I of the *Birds Directive* or on the *Birds of Conservation Concern in Ireland* (BoCCI) Red List are included in the table below. For invertebrate species, those which are listed as threatened (Vulnerable to Critically Endangered) on the relevant national Red List are included.

² Vascular flora from Wyse Jackson, M., FitzPatrick, Ú., Cole, E., Jebb, M., McFerran, D., Sheehy Skeffington, M. & Wright, M. (2016) *Ireland Red List No. 10: Vascular Plants*. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs, Dublin, Ireland.

Bryophytes from Lockhart, N., Hodgetts, N. & Holyoak, D. (2012) *Ireland Red List No.8: Bryophytes*. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

³ HDII/IV/V = Habitats Directive Annexes II/IV/V; FPO = Flora (Protection) Order, 2015; WA = Wildlife Acts

Common Name/ Scientific Name	Legal Status ⁴	Red List Status ⁵	Source
Amphibians and Reptiles			
Common frog <i>Rana temporaria</i>	HD_V, WA	Least concern	NBDC online database record NPWS database record
Common lizard <i>Zootoca vivipara</i>	WA	Least concern	NPWS database record
Smooth newt <i>Lissotriton vulgaris</i>	WA	Least concern	NBDC online database record NPWS database record
Mammals (Terrestrial)			
Badger <i>Meles meles</i>	WA	Least concern	NBDC online database record NPWS database record
Brown long-eared bat <i>Plecotus auritus</i>	HD_IV, WA	Least concern	NBDC online database record
Common pipistrelle <i>Pipistrellus pipistrellus</i>	HD_IV, WA	Least concern	NBDC online database record
Daubenton's bat <i>Myotis daubentonii</i>	HD_IV, WA	Least concern	NBDC online database record
Hedgehog <i>Erinaceus europaeus</i>	WA	Least concern	NBDC online database record NPWS database record
Irish hare <i>Lepus timidus</i> subsp. <i>hibernicus</i>	WA	Least concern	NBDC online database record NPWS database record
Irish stoat <i>Mustela erminea</i> subsp. <i>hibernica</i>	WA	Least concern	NBDC online database record NPWS database record
Leisler's bat <i>Nyctalus leisleri</i>	HD_IV, WA	Least concern	NBDC online database record

⁴ HD_II/IV/V = Habitats Directive Annexes II/IV/V; WA = Wildlife Acts; BD_I/II/III = Birds Directive Annex I/II/III; OSPAR = Convention for the protection of the marine environment of the North-east Atlantic 1992

⁵ Mammals from Marnell, F., Looney, D. & Lawton, C. (2019) *Ireland Red List No. 12: Terrestrial Mammals*. National Parks and Wildlife Service, Department of the Culture, Heritage and the Gaeltacht, Dublin, Ireland.

Birds from Colhoun, K. & Cummins, S. (2013) *Birds of Conservation Concern in Ireland 2014-2019*. Irish Birds 9:523-544.

Amphibians, reptiles and fish from King, J.L., Marnell, F., Kingston, N., Rosell, R., Boylan, P., Caffrey, J.M., Fitzpatrick, Ú., Gargan, P.G., Kelly, F.L., O'Grady, M.F., Poole, R., Roche, W.K. & Cassidy, D. (2011) *Ireland Red List No. 5: Amphibians, Reptiles & Freshwater Fish*.

Non-Marine Molluscs from Byrne, A., Moorkens, E.A., Anderson, R., Killeen, I.J. & Regan, E.C. (2009) *Ireland Red List No. 2: Non-Marine Molluscs*.

Butterflies from Regan, E.C., Nelson, B., Aldwell, B., Bertrand, C., Bond, K., Harding, J., Nash, D., Nixon, D., & Wilson, C.J. (2010) *Ireland Red List No. 4: Butterflies*.

Moths from Allen, D., O'Donnell, M., Nelson, B., Tyner, A., Bond, K.G.M., Bryant, T., Crory, A., Mellon, C., O'Boyle, J., O'Donnell, E., Rolston, T., Sheppard, R., Strickland, P., Fitzpatrick, U., & Regan, E. (2016) *Ireland Red List No. 9: Macromoths (Lepidoptera)*.

Damselflies and dragonflies from Nelson, B., Ronayne, C. & Thompson, R. (2011) *Ireland Red List No.6: Damselflies & Dragonflies (Odonata)*.

Water beetles from Foster, G. N., Nelson, B. H. & O Connor, Á. (2009) *Ireland Red List No. 1: Water beetles*.

Common Name/ Scientific Name	Legal Status ⁴	Red List Status ⁵	Source
Otter <i>Lutra lutra</i>	HD_II, V, WA	Least concern	NBDC online database record NPWS database record
Pine marten <i>Martes martes</i>	WA	Least concern	NPWS database record
Pygmy shrew <i>Sorex minutus</i>	WA	Least concern	NBDC online database record
Red squirrel <i>Sciurus vulgaris</i>	WA	Least concern	NBDC online database record NPWS database record
Soprano pipistrelle <i>Pipistrellus pygmaeus</i>	HD_IV, WA	Least concern	NBDC online database record
Birds			
Barn swallow <i>Hirundo rustica</i>	WA	Amber	NBDC online database record
Black-headed gull <i>Chroicocephalus ridibundus</i>	WA	Red	NBDC online database record
Common coot <i>Fulica atra</i>	WA	Red	NBDC online database record
Common kingfisher <i>Alcedo atthis</i>	BD_I, WA	Amber	NBDC online database record
Common Pheasant <i>Phasianus colchicus</i>	BD_II (I), III (I), WA	Green	NBDC online database record
Common redshank <i>Tringa totanus</i>	WA	Red	NBDC online database record
Common starling <i>Sturnus vulgaris</i>	WA	Amber	NBDC online database record
Common Wood Pigeon <i>Columba palumbus</i>	BD_II (I), III (I), WA	Green	NBDC online database record
European greenfinch <i>Pluvialis apricaria</i>	WA	Amber	NBDC online database record
European robin <i>Erithacus rubecula</i>	WA	Amber	NBDC online database record
Great black-backed gull <i>Larus marinus</i>	WA	Amber	NBDC online database record
Great cormorant <i>Phalacrocorax carbo</i>	WA	Amber	NBDC online database record
Herring gull <i>Larus argentatus</i>	WA	Red	NBDC online database record
House martin <i>Delichon urbicum</i>	WA	Amber	NBDC online database record
House sparrow <i>Passer domesticus</i>	WA	Amber	NBDC online database record
Lesser black-backed gull <i>Larus fuscus</i>	WA	Amber	NBDC online database record
Little egret <i>Egretta garzetta</i>	BD_I, WA	Green	NBDC online database record

Common Name/ Scientific Name	Legal Status ⁴	Red List Status ⁵	Source
Little grebe <i>Tachybaptus ruficollis</i>	WA	Amber	NBDC online database record
Mistle thrush <i>Turdus viscivorus</i>	WA	Amber	NBDC online database record
Mute swan <i>Cygnus olor</i>	WA	Amber	NBDC online database record
Northern lapwing <i>Vanellus vanellus</i>	BD_II (II), WA	Red	NBDC online database record
Peregrine falcon <i>Falco peregrinus</i>	BD_I, WA	Red	NBDC online database record
Red kite <i>Milvus milvus</i>	WA	Amber	NBDC online database record
Tufted duck <i>Aythya fuligula</i>	BD_II (I), III (I), WA	Amber	NBDC online database record
Invertebrates			
<i>Chaetarthria seminulum</i>	none	Data Deficient	NBDC online database record
Trimmer's Mining Bee <i>Andrena trimmerana</i>	none	Critically Endangered	NBDC online database record
<i>Andrena nigroaenea</i>	none	Vulnerable	NBDC online database record
Desmoulin's whorl snail <i>Vertigo moulinsiana</i>	HB_II	Endangered	NPWS database record
Freshwater white-clawed crayfish <i>Austropotamobius pallipes</i>	HB_II, V, WA	Not evaluated for Ireland.	NBDC online database record NPWS database record

Table 4: Records of protected, red-listed or notable fauna from the desktop study in the vicinity of the study area.

Appendix 6.3 Examples of valuing important ecological features

International Importance:

'European Site' including Special Area of Conservation (SAC), Site of Community Importance (SCI), Special Protection Area (SPA) or proposed Special Area of Conservation.

Proposed Special Protection Area (pSPA).

Site that fulfils the criteria for designation as a 'European Site' (see Annex III of the Habitats Directive, as amended).

Features essential to maintaining the coherence of the Natura 2000 Network.⁶

Site containing 'best examples' of the habitat types listed in Annex I of the Habitats Directive.

Resident or regularly occurring populations (assessed to be important at the national level)⁷ of the following:

Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; and/or

Species of animal and plants listed in Annex II and/or IV of the Habitats Directive.

Ramsar Site (Convention on Wetlands of International Importance Especially Waterfowl Habitat 1971).

World Heritage Site (Convention for the Protection of World Cultural & Natural Heritage, 1972).

Biosphere Reserve (UNESCO Man & The Biosphere Programme).

Site hosting significant species populations under the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals, 1979).

Site hosting significant populations under the Berne Convention (Convention on the Conservation of European Wildlife and Natural Habitats, 1979).

Biogenetic Reserve under the Council of Europe.

European Diploma Site under the Council of Europe.

Salmonid water designated pursuant to the European Communities (Quality of Salmonid Waters) Regulations, 1988, (S.I. No. 1988).⁸

National Importance:

Site designated or proposed as a Natural Heritage Area (NHA).

Statutory Nature Reserve.

Refuge for Fauna and Flora protected under the Wildlife Acts.

National Park.

⁶ See Articles 3 and 10 of the Habitats Directive

⁷ It is suggested that, in general, 1% of the national population of such species qualifies as an internationally important population. However, a smaller population may qualify as internationally important where the population forms a critical part of a wider population or the species is at a critical phase of its life cycle.

⁸ Note that such waters are designated based on these waters' capabilities of supporting salmon (*Salmo salar*), trout (*Salmo trutta*), char (*Salvelinus*) and whitefish (*Coregonus*)

Undesignated site fulfilling the criteria for designation as a Natural Heritage Area (NHA); Statutory Nature Reserve; Refuge for Fauna and Flora protected under the Wildlife Act; and/or a National Park.

Resident or regularly occurring populations (assessed to be important at the national level)⁹ of the following:

Species protected under the Wildlife Acts; and/or

Species listed on the relevant Red Data list.

Site containing 'viable areas'¹⁰ of the habitat types listed in Annex I of the Habitats Directive

County Importance:

Area of Special Amenity.¹¹

Area subject to a Tree Preservation Order.

Area of High Amenity, or equivalent, designated under the County Development Plan.

Resident or regularly occurring populations (assessed to be important at the County level)¹² of the following:

Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive;

Species of animal and plants listed in Annex II and/or IV of the Habitats Directive;

Species protected under the Wildlife Acts; and/or

Species listed on the relevant Red Data list.

Site containing area or areas of the habitat types listed in Annex I of the Habitats Directive that do not fulfil the criteria for valuation as of International or National importance.

County important populations of species, or viable areas of semi-natural habitats or natural heritage features identified in the National or Local Biodiversity Action Plan, if this has been prepared.

Sites containing semi-natural habitat types with high biodiversity in a county context and a high degree of naturalness, or populations of species that are uncommon within the county.

Sites containing habitats and species that are rare or are undergoing a decline in quality or extent at a national level.

Local Importance (higher value):

Locally important populations of priority species or habitats or natural heritage features identified in the Local BAP, if this has been prepared;

⁹ It is suggested that, in general, 1% of the national population of such species qualifies as a nationally important population. However, a smaller population may qualify as nationally important where the population forms a critical part of a wider population or the species is at a critical phase of its life cycle.

¹⁰ A 'viable area' is defined as an area of a habitat that, given the particular characteristics of that habitat, was of a sufficient size and shape, such that its integrity (in terms of species composition, and ecological processes and function) would be maintained in the face of stochastic change (for example, as a result of climatic variation).

¹¹ It should be noted that whilst areas such as Areas of Special Amenity, areas subject to a Tree Preservation Order and Areas of High Amenity are often designated on the basis of their ecological value, they may also be designated for other reasons, such as their amenity or recreational value. Therefore, it should not be automatically assumed that such sites are of County importance from an ecological perspective.

¹² It is suggested that, in general, 1% of the County population of such species qualifies as a County important population. However, a smaller population may qualify as County important where the population forms a critical part of a wider population or the species is at a critical phase of its life cycle.

Resident or regularly occurring populations (assessed to be important at the Local level)¹³ of the following:

Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive;

Species of animal and plants listed in Annex II and/or IV of the Habitats Directive;

Species protected under the Wildlife Acts; and/or

Species listed on the relevant Red Data list.

Sites containing semi-natural habitat types with high biodiversity in a local context and a high degree of naturalness, or populations of species that are uncommon in the locality;

Sites or features containing common or lower value habitats, including naturalised species that are nevertheless essential in maintaining links and ecological corridors between features of higher ecological value.

Local importance (lower value):

Sites containing small areas of semi-natural habitat that are of some local importance for wildlife;

Sites or features containing non-native species that are of some importance in maintaining habitat links.

¹³ It is suggested that, in general, 1% of the local population of such species qualifies as a locally important population. However, a smaller population may qualify as locally important where the population forms a critical part of a wider population or the species is at a critical phase of its life cycle.

Appendix 6.4 Flora Species List by Habitat

Dry meadows and grassy verges (GS2)		Hedgerows (WL1)		Treelines (WL2)	
Scientific Name	DAFOR	Scientific Name	DAFOR	Scientific Name	DAFOR
<i>Dactylis glomerata</i>	A	<i>Acer pseudoplatanus</i>	A	<i>Acer pseudoplatanus</i>	A
<i>Urtica dioica</i>	O	<i>Rubus fruticosus</i> agg.	A	<i>Rubus fruticosus</i> agg.	A
<i>Ranunculus repens</i>	F	<i>Hedera helix</i>	F	<i>Hedera helix</i>	F
<i>Vicia sepium</i>	R	<i>Vicia sepium</i>	R	<i>Crataegus monogyna</i>	F
<i>Epilobium parviflorum</i>	O	<i>Rosa canina</i> agg.	O	<i>Brachypodium sylvaticum</i>	O
<i>Epilobium hirsutum</i>	R	<i>Crataegus monogyna</i>	F	<i>Sambucus nigra</i>	O
<i>Trifolium pratense</i>	O	<i>Galium aparine</i>	R	<i>Anthriscus sylvestris</i>	O
<i>Agrostis stolonifera</i>	A	<i>Brachypodium sylvaticum</i>	O	<i>Urtica dioica</i>	O
<i>Rumex obtusifolius</i>	F	<i>Dactylis glomerata</i>	O	<i>Salix alba</i>	F
<i>Taraxacum</i> agg.	R	<i>Sonchus arvensis</i>	R		
<i>Plantago lanceolata</i>	R	<i>Sambucus nigra</i>	O		
<i>Arctium minus</i>	F	<i>Buddleia davidii</i>	R		
<i>Triticum aestivum</i>	R	<i>Prunus spinosa</i>	O		
<i>Carex flacca</i>	R	<i>Ilex aquifolium</i>	O		
<i>Cirsium arvense</i>	F				
<i>Conyza floribunda</i>	O				
<i>Cirsium vulgare</i>	R				
<i>Rubus fruticosus</i> agg.	R				
<i>Crepis capillaris</i>	R				
<i>Conium maculatum</i>	O				
<i>Buddleia davidii</i>	R				
<i>Potentilla reptans</i>	R				
<i>Arrhenatherum elatius</i>	F				
<i>Senecio jacobaea</i>	R				

Drainage Ditches (FW4)		Improved agricultural grassland (GA1)	
Scientific Name	DAFOR	Scientific Name	DAFOR
<i>Agrostis stolonifera</i>	A	<i>Holcus lanatus</i>	A
<i>Ranunculus repens</i>	A	<i>Urtica dioica</i>	O
<i>Rubus fruticosus</i> agg.	A	<i>Ranunculus repens</i>	O
		<i>Trifolium pratense</i>	O
		<i>Rumex obtusifolius</i>	O
		<i>Taraxacum</i> agg.	R

Recolonising bare ground (ED3)	
Scientific Name	DAFOR
<i>Trifolium dubium</i>	O
<i>Conyza floribunda</i>	O
<i>Epilobium</i>	R
<i>Sagina procumbens</i>	R
<i>Rumex obtusifolius</i>	O
<i>Syntrichia ruralis</i>	R
<i>Didymodon species</i>	A
<i>Brachythecium rutabulum</i>	O
<i>Calliergonella cuspidata</i>	R
<i>Lolium perenne</i>	F
<i>Sonchus oleraceus</i>	R
<i>Cirsium vulgare</i>	R
<i>Bellis perennis</i>	R
<i>Bryum capillare</i>	O
<i>Senecio vulgaris</i>	R
<i>Agrostis stolonifera</i>	O
<i>Crepis capillaris</i>	R
<i>Arabidopsis thaliana</i>	R
<i>Cerastium fontanum</i>	R
<i>Euphorbia peplus</i>	R
<i>Cardamine hirsuta</i>	R
<i>Matricaria discoidea</i>	R
<i>Mercurialis annua</i>	R
<i>Galium aparine</i>	O
<i>Stellaria media</i>	O
<i>Lamium purpureum</i>	O
<i>Brassica rapa</i>	O
<i>Veronica persica</i>	R

Recolonising bare ground (ED3)	
<i>Sisymbrium officinale</i>	R
<i>Ranunculus repens</i>	F
<i>Trifolium dubium</i>	O
<i>Conyza floribunda</i>	O

Appendix 6.5 Relevant Policies and objectives

Policies and objectives relevant to the proposed development and referenced in the chapter are presented in the following tables. Table 1 covers relevant policies and objectives found in the South Dublin County Development Plan 2016-2022, and includes those covering designated sites, water quality and biodiversity. Table 2 covers additional land use plan policies and objectives that are relevant in the wider area, together with the South Dublin County Development Plan 2016-2022, on European sites and water quality within Dublin Bay.

South Dublin County Development Plan 2016-2022

G Policy 1 Green Infrastructure

It is the policy of the Council to protect, enhance and further develop a multifunctional Green Infrastructure network by building an interconnected network of parks, open spaces, hedgerows, grasslands, protected areas, and rivers and streams that provide a shared space for amenity and recreation, biodiversity protection, flood management and adaptation to climate change.

G1 Objective 1

To establish a coherent, integrated and evolving Green Infrastructure network across South Dublin County with parks, open spaces, hedgerows, grasslands, protected areas, and rivers and streams forming the strategic links and to integrate the objectives of the Green Infrastructure Strategy throughout all relevant Council plans, such as Local Area Plans and other approved plans.

G2 Objective 1

To reduce fragmentation of the Green Infrastructure network and strengthen ecological links between urban areas, Natura 2000 sites, proposed Natural Heritage Areas, parks and open spaces and the wider regional Green Infrastructure network.

G2 Objective 9

To preserve, protect and augment trees, groups of trees, woodlands and hedgerows within the County by increasing tree canopy coverage using locally native species and by incorporating them within design proposals and supporting their integration into the Green Infrastructure network.

G Policy 3 Watercourses Network

It is the policy of the Council to promote the natural, historical and amenity value of the County's watercourses; to address the long-term management and protection of these corridors and to strengthen links at a regional level.

G3 Objective 1

To promote the natural, historical and amenity value of the County's watercourses and address the long-term management and protection of these corridors in the South Dublin Green Infrastructure Strategy.

G3 Objective 2

To maintain a biodiversity protection zone of not less than 10 metres from the top of the bank of all watercourses in the County, with the full extent of the protection zone to be determined on a case by case basis by the Planning Authority, based on site specific characteristics and sensitivities. Strategic Green Routes and Trails identified in the South Dublin Tourism Strategy, 2015; the Greater Dublin Area Strategic Cycle Network; and other government plans or programmes will be open for consideration within the biodiversity protection zone, subject to appropriate safeguards and assessments, as these routes increase the accessibility of the Green Infrastructure network.

G3 Objective 5

To restrict the encroachment of development on watercourses, and provide for protection measures to watercourses and their banks, including but not limited to: the prevention of pollution of the watercourse, the protection of the river bank from erosion, the retention and/or provision of wildlife corridors and the protection from light spill in sensitive locations, including during construction of permitted development.

G6 Objective 1

To protect and enhance existing ecological features including tree stands, woodlands, hedgerows and watercourses in all new developments as an essential part of the design process.

HCL12 Objective 1

To prevent development that would adversely affect the integrity of any Natura 2000 site located within and immediately adjacent to the County and promote favourable conservation status of habitats and protected species including those listed under the Birds Directive, the Wildlife Acts and the Habitats Directive.

HCL12 Objective 2

To ensure that projects that give rise to significant direct, indirect or secondary impacts on Natura 2000 sites, either individually or in combination with other plans or projects, will not be permitted unless the following is robustly demonstrated in accordance with Article 6(4) of the Habitats Directive and S.177AA of the Planning and Development Act (2000 – 2010) or any superseding legislation:

1. There are no less damaging alternative solutions available; and
2. There are imperative reasons of overriding public interest (as defined in the Habitats Directive) requiring the project to proceed; and
3. Adequate compensatory measures have been identified that can be put in place.

HCL15 Objective 3

To protect existing trees, hedgerows, and woodlands which are of amenity or biodiversity value and/ or contribute to landscape character and ensure that proper provision is made for their protection and management in accordance with Living with Trees: South Dublin County Council's Tree Management Policy 2015-2020.

IE Policy 1 Water & Wastewater

It is the policy of the Council to work in conjunction with Irish Water to protect existing water and drainage infrastructure and to promote investment in the water and drainage network to support environmental protection and facilitate the sustainable growth of the County.

IE1 Objective 1

To work in conjunction with Irish Water to protect, manage and optimise water supply and foul drainage networks in the County.

IE1 Objective 2

To work in conjunction with Irish Water to facilitate the timely delivery of ongoing upgrades and the expansion of water supply and wastewater services to meet the future needs of the County and the Region.

IE Policy 2 Surface Water & Groundwater

It is the policy of the Council to manage surface water and to protect and enhance ground and surface water quality to meet the requirements of the EU Water Framework Directive.

IE2 Objective 1

To maintain, improve and enhance the environmental and ecological quality of our surface waters and groundwater by implementing the programme of measures set out in the Eastern River Basin District River Basin Management Plan.

IE2 Objective 3

To maintain and enhance existing surface water drainage systems in the County and promote and facilitate the development of Sustainable Urban Drainage Systems (SUDS), including integrated constructed wetlands, at a local, district and County level, to control surface water outfall and protect water quality.

IE2 Objective 4

To incorporate Sustainable Urban Drainage Systems (SUDS) as part of Local Area Plans, Planning Schemes, Framework Plans and Design Statements to address the potential for Sustainable Urban Drainage at a site and/or district scale, including the potential for wetland facilities.

IE2 Objective 5

To limit surface water run-off from new developments through the use of Sustainable Urban Drainage Systems (SUDS) and avoid the use of underground attenuation and storage tanks.

IE2 Objective 6

To promote and support the retrofitting of Sustainable Urban Drainage Systems (SUDS) in established urban areas, including integrated constructed wetlands.

IE2 Objective 9

To protect water bodies and watercourses, including rivers, streams, associated undeveloped riparian strips, wetlands and natural floodplains, within the County from inappropriate development. This will include protection buffers in riverine and wetland areas as appropriate (see also Objective G3 Objective 2 – Biodiversity Protection Zone).

Table 1: Relevant land use plan policies/objectives within South Dublin County Development Plan 2016-2022 relating to the protection of designated sites, water quality and biodiversity.

Dún Laoghaire-Rathdown County Development Plan 2016-2022

Policy LHB19: Protection of Natural Heritage and the Environment

It is Council policy to protect and conserve the environment including, in particular, the natural heritage of the County and to conserve and manage Nationally and Internationally important and EU designated sites - such as Special Protection Areas, candidate Special Areas of Conservation, proposed Natural Heritage Areas and Ramsar sites - as well as non-designated areas of high nature conservation value which serve as 'Stepping Stones' for the purposes of Article 10 of the Habitats Directive.

Policy LHB20: Habitats Directive

It is Council policy to ensure the protection of natural heritage and biodiversity, including European sites that form part of the Natura 2000 network, in accordance with relevant EU Environmental Directives and applicable National Legislation, Policies, Plans and Guidelines.

Policy LHB22: Designated Sites

It is Council policy to protect and preserve areas designated as proposed Natural Heritage Areas, candidate Special Areas of Conservation, and Special Protection Areas. It is Council policy to promote the maintenance and as appropriate, delivery of 'favourable' conservation status of habitats and species within these areas.

Policy EI2: Wastewater Treatment and Appropriate Assessment

It is Council policy to provide adequate wastewater treatment facilities to serve the existing and future population of the County, subject to complying with the Water Framework Directive and the associated River Basin Management Plan or any updated version of this document, 'Water Quality in Ireland 2007-2009' (EPA 2011) or any updated version of the document, Pollution Reduction Programmes for Designated Shellfish Areas, the Urban Waste Water Treatment Directive and the Habitats Directive.

Policy EI3: Surface Water Drainage and Appropriate Assessment

It is Council policy to require that a Sustainable Drainage System (SuDS) is applied to any development and that site specific solutions to surface water drainage systems are developed, which meet the requirements of the Water Framework Directive and the associated River Basin Management Plans and 'Water Quality in Ireland 2007-2009' (EPA 2011) or any updated version of the document.

Fingal Development Plan 2017-2023

Objective NH10

Ensure that the Council takes full account of the requirements of the Habitats and Birds Directives, as they apply both within and without European Sites in the performance of its functions.

Objective NH11

Ensure that the Council, in the performance of its functions, takes full account of the objectives and management practices proposed in any management or related plans for European Sites in and adjacent to Fingal published by the Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.

Objective NH15

Strictly protect areas designated or proposed to be designated as Natura 2000 sites (i.e. Special Areas of Conservation (SACs) and Special Protection Areas (SPAs); also known as European sites) including any areas that may be proposed for designation or designated during the period of this Plan.

Objective SW04

Require the use of sustainable drainage systems (SuDS) to minimise and limit the extent of hard surfacing and paving and require the use of sustainable drainage techniques where appropriate, for new development or for extensions to existing developments, in order to reduce the potential impact of existing and predicted flooding risks.

Objective WQ01

Strive to achieve 'good status' in all waterbodies in compliance with the Water Framework Directive, the Eastern River Basin District Management Plan 2009-2015 and the associated Programme of Measures (first cycle) and to cooperate with the development and implementation of the second cycle national River Basin Management Plan 2017-2021.

Objective WQ04

Protect existing riverine wetland and coastal habitats and where possible create new habitats to maintain naturally functioning ecosystems whilst ensuring they do not impact negatively on the conservation objectives of any European Sites.

Objective WT01

Liaise with and work in conjunction with Irish Water during the lifetime of the plan for the provision, extension and upgrading of waste water collection and treatment systems in all towns and villages of the County to serve existing populations and facilitate sustainable development of the County, in accordance with the requirements of the Settlement Strategy and associated Core Strategy.

Objective WT02

Liaise with Irish Water to ensure the provision of wastewater treatment systems in order to ensure compliance with existing licences, EU Water Framework Directive, River Basin Management Plans, the Urban Wastewater Directive and the EU Habitats Directive.

Wicklow County Development Plan 2016-2022

NH2

No projects giving rise to significant cumulative, direct, indirect or secondary impacts on Natura 2000 sites arising from their size or scale, land take, proximity, resource requirements, emissions (disposal to land, water or air), transportation requirements, duration of construction, operation, decommissioning or from any other effects shall be permitted on the basis of this plan (either individually or in combination with other plans or projects).

Except as provided for in Section 6(4) of the Habitats Directive, viz. There must be a) no alternative solution available, b) imperative reasons of overriding public interest for the project to proceed; and c) Adequate compensatory measures in place.

NH3

To contribute, as appropriate, towards the protection of designated ecological sites including candidate Special Areas of Conservation (cSACs) and Special Protection Areas (SPAs); Wildlife Sites (including proposed Natural Heritage Areas); Salmonid Waters; Flora Protection Order sites; Wildfowl Sanctuaries (see S.I. 192 of 1979); Freshwater Pearl Mussel catchments; and Tree Preservation Orders (TPOs). To contribute towards compliance with relevant EU Environmental Directives and applicable National Legislation, Policies, Plans and Guidelines, including the following and any updated/superseding documents:

- EU Directives, including the Habitats Directive (92/43/EEC, as amended)⁷, the Birds Directive (2009/147/EC)⁸, the Environmental Liability Directive (2004/35/EC)⁹, the Environmental Impact Assessment Directive (85/337/EEC, as amended), the Water Framework Directive (2000/60/EC) and the Strategic Environmental Assessment Directive (2001/42/EC).
- National legislation, including the Wildlife Act 1976¹⁰, the European Communities (Environmental Impact Assessment) Regulations 1989 (SI No. 349 of 1989) (as amended), the Wildlife (Amendment) Act 2000, the European Union (Water Policy) Regulations 2003 (as amended), the Planning and Development Act 2000 (as amended), the European Communities (Birds and Natural Habitats) Regulations 2011 (SI No. 477 of 2011) and the European Communities (Environmental Liability) Regulations 2008¹¹.

- National policy guidelines (including any clarifying Circulars or superseding versions of same), including the Landscape and Landscape Assessment Draft Guidelines 2000, the Environmental Impact Assessment Sub-Threshold Development Guidelines 2003, Strategic Environmental Assessment Guidelines 2004 and the Appropriate Assessment Guidance 2010.
- Catchment and water resource management Plans, including Eastern and South Eastern River Basin Management Plan 2009-2015 (including any superseding versions of same).
- Biodiversity Plans and guidelines, including Actions for Biodiversity 2011-2016: Ireland's 2nd National Biodiversity Plan (including any superseding version of same).
- Ireland's Environment 2014 (EPA, 2014, including any superseding versions of same), and to make provision where appropriate to address the report's goals and challenges.

NH4

All projects and plans arising from this plan¹² (including any associated improvement works or associated infrastructure) will be screened for the need to undertake Appropriate Assessment under Article 6 of the Habitats Directive. A plan or project will only be authorised after the competent authority has ascertained, based on scientific evidence, Screening for Appropriate Assessment, and a Stage 2 Appropriate Assessment where necessary, that:

- 1) The Plan or project will not give rise to significant adverse direct, indirect or secondary effects on the integrity of any European site (either individually or in combination with other plans or projects); or
- 2) The Plan or project will have significant adverse effects on the integrity of any European site (that does not host a priority natural habitat type and / or a priority species) but there are no alternative solutions and the plan or project must nevertheless be carried out for imperative reasons of overriding public interest, including those of a social or economic nature. In this case, it will be a requirement to follow procedures set out in legislation and agree and undertake all compensatory measures necessary to ensure the protection of the overall coherence of Natura 2000; or
- 3) The Plan or project will have a significant adverse effect on the integrity of any European site (that hosts a natural habitat type and/or a priority species) but there are no alternative solutions and the plan or project must nevertheless be carried out for imperative reasons for overriding public interest, restricted to reasons of human health or public safety, to beneficial consequences of primary importance for the environment or, further to an opinion from the Commission, to other imperative reasons of overriding public interest. In this case, it will be a requirement to follow procedures set out in legislation and agree and undertake all compensatory measures necessary to ensure the protection of the overall coherence of Natura 2000.

NH5

To maintain the conservation value of all proposed and future Natural Heritage Areas (NHAs) and to protect other designated ecological sites in Wicklow.

Along with cSACs, SPAs and pNHA these include Salmonid Waters; Flora Protection Order sites; Wildfowl Sanctuaries (see S.I. 192 of 1979); Freshwater Pearl Mussel catchments; and Tree Preservation Orders (TPOs).

WI2

To protect existing and potential water resources of the County, in accordance with the EU Water Framework Directive, the River Basin Management Plans, the Groundwater Protection Scheme and source protection plans for public water supplies.

WI12

Ensure the implementation of Sustainable Urban Drainage Systems (SUDS) and in particular, to ensure that all surface water generated in a new development is disposed of on-site or is attenuated and treated prior to discharge to an approved surface water system.

WI6

In order to fulfil the objectives of the Core Strategy, Wicklow County Council will work alongside and facilitate the delivery of Irish Water's Water Services Investment Programme, to ensure that all lands zoned for development are serviced by an adequate wastewater collection and treatment system and in particular, to endeavour to secure the delivery of regional and strategic wastewater schemes. In

particular, to support and facilitate the development of a WWTP in Arklow, at an optimal location following detailed technical and environmental assessment and public consultation.

WI7

Permission will be considered for private wastewater treatment plants for single rural houses where: • the specific ground conditions have been shown to be suitable for the construction of a treatment plant and any associated percolation area;

- the system will not give rise to unacceptable adverse impacts on ground waters / aquifers and the type of treatment proposed has been drawn up in accordance with the appropriate groundwater protection response set out in the Wicklow Groundwater Protection Scheme (2003);
- the proposed method of treatment and disposal complies with Wicklow County Council's Policy for Wastewater Treatment & Disposal Systems for Single Houses (PE ≤ 10) and the Environmental Protection Agency "Wastewater Treatment Manuals"; and
- in all cases the protection of ground and surface water quality shall remain the overriding priority and proposals must definitively demonstrate that the proposed development will not have an adverse impact on water quality standards and requirements set out in EU and national legislation and guidance documents.

WI9

Private wastewater treatment plants for commercial / employment generating development will only be considered where:

- Irish Water has confirmed the site is due to be connected to a future public system in the area or Irish Water have confirmed there are no plans for a public system in the area;
- it can clearly demonstrated that the proposed system can meet all EPA / Local Authority environmental criteria; and
- an annually renewed contract for the management and maintenance of the system is contracted with a reputable company / person, details of which shall be provided to the Local Authority.

Table 2: Relevant land use plan policies/objectives relating to the protection of European sites and water quality in Dublin Bay.

Appendix 6.6 Appropriate Assessment Screening Report



**Appropriate Assessment Screening Report
for DUB05 EdgeConneX Data Centre Development,
Ballymakailly, Co. Dublin**

prepared for EdgeConneX Ireland Ltd.

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Document Control

Project Title	EdgeConnex Data Centre Development	Project No.	200244	
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This report has been prepared by Scott Cawley Ltd. in accordance with the particular instructions and requirements of our agreement with the Client, the project's budgetary and time constraints and in line with best industry standards. The methodology adopted and the sources of information used by Scott Cawley Ltd. in providing its services are outlined in this report. The scope of this report and the services are defined by these circumstances.

Where the conclusions and recommendations contained within this document are based upon information provided by others than Scott Cawley Ltd., no liability is accepted on the validity or accuracy of that information. It is assumed that all relevant information has been provided by those parties from whom it has been requested and that the information is true and accurate. No independent verification of any documentation or information supplied by others has been made.

The conclusions presented in this report represent Scott Cawley Ltd.'s best professional judgement based on review of site conditions observed during the site visit (if applicable) and the relevant information available at the time of writing. Scott Cawley Ltd. has used reasonable skill, care and diligence in compiling this report and no warranty is provided as to the report's accuracy.



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Appendix I

The Qualifying Interests (QIs) and Special Conservation Interests (SCIs) of the European sites in the vicinity of the proposed development site (see Figure 1)

Appendix II

Planning policies/objectives relating to the protection of European sites and water quality

Appendix III

Records of SCI species from the desktop study in the vicinity of the study area

1 Introduction

This report, which contains information required for the competent authority (in this instance South Dublin County Council) to undertake a screening for Appropriate Assessment (AA), has been prepared by Scott Cawley Ltd. on behalf of the applicant. It provides information on, and assesses the potential for, the proposed development to impact on the Natura 2000 network (hereafter referred to as European sites)¹. The proposed development consists of a data centre development, with associated landscaping, lighting and drainage.

An AA is required if significant effects on European sites arising from a proposed development cannot be ruled out at the screening stage, either alone or in combination with other plans or projects. It is the responsibility of the competent authority to make a decision as to whether or not the proposed development is likely to have significant effects on European sites, either individually or in combination with other plans or projects.

For the reasons set out in detail in this AA Screening Report, an **Appropriate Assessment of the proposed development is not required in this instance** as it can be concluded, on the basis of objective information, that the proposed development, either individually or in combination with other plans or projects, will not have a significant effect on any European sites.

2 Methodology

2.1 Guidance

This Appropriate Assessment Screening Report has been prepared with regard to the following guidance documents, as relevant:

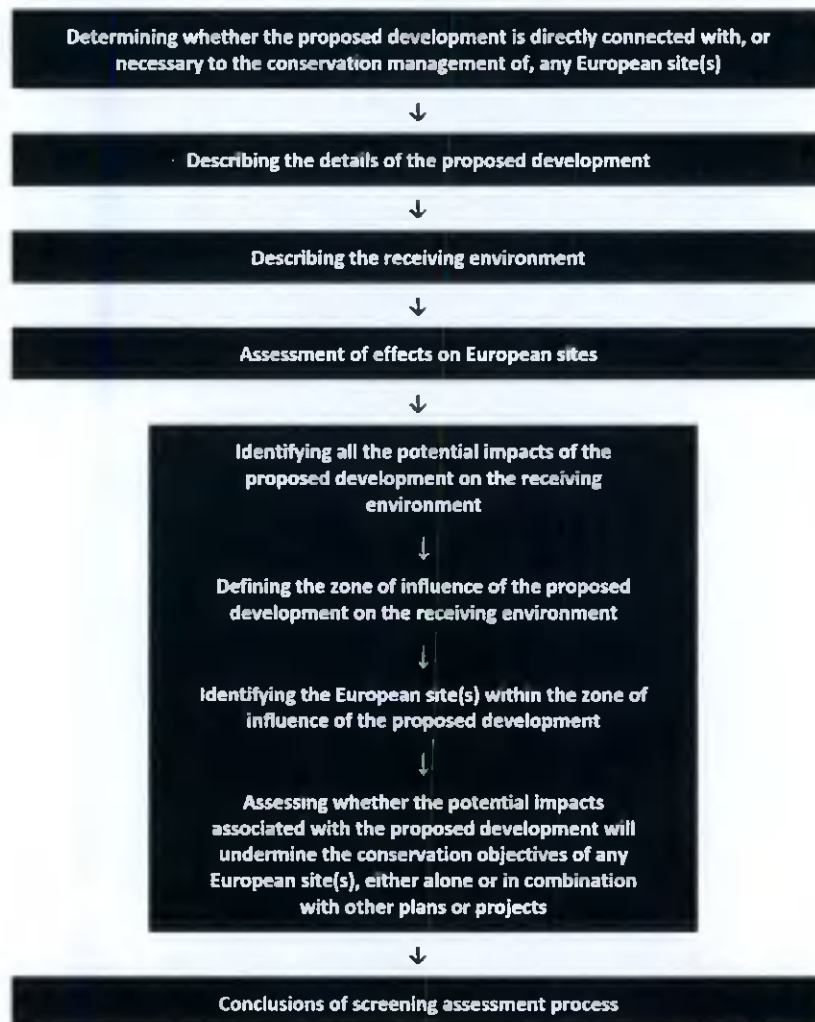
- *Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities.* (Department of Environment, Heritage and Local Government, 2010 revision)
- *Appropriate Assessment under Article 6 of the Habitats Directive: Guidance for Planning Authorities.* Circular NPW 1/10 & PSSP 2/10
- *Assessment of Plans and Projects Significantly Affecting Natura 2000 sites: Methodological Guidance on the Provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC* (European Commission, 2001)
- *Communication from the Commission on the precautionary principle* (European Commission, 2000), and
- *Managing Natura 2000 Sites: The Provisions of Article 6 of the Habitat's Directive 92/43/EEC* (European Commission, 2019)

¹ The Natura 2000 network is a European network of important ecological sites, as defined under Article 3 of the Habitats Directive 92/43/EEC, which comprises both special areas of conservation and special protection areas. Special conservation areas are sites hosting the natural habitat types listed in Annex I, and habitats of the species listed in Annex II, of the Habitats Directive, and are established under the Habitats Directive itself. Special protection areas are established under Article 4 of the Birds Directive 2009/147/EC for the protection of endangered species of wild birds. The aim of the network is to aid the long-term survival of Europe's most valuable and threatened species and habitats.

In Ireland these sites are designed as European sites – defined under the Planning Acts and/or the Birds and Habitats Regulations as (a) a candidate site of Community importance, (b) a site of Community importance, (c) a candidate special area of conservation, (d) a special area of conservation, (e) a candidate special protection area, or (f) a special protection area. They are commonly referred to in Ireland as Special Areas of Conservation (SACs) and Special Protection Areas (SPAs).

2.2 Assessment Methodology

- 1 The above referenced guidance sets out a staged process for carrying out Appropriate Assessment. To determine if an Appropriate Assessment is required, documented screening is required. Screening identifies the potential for effects on the conservation objectives of European sites, if any, which would arise from a proposed plan or project, either alone or in combination with other plans and projects (i.e. likely significant effects).
- 2 Significant effects on a European site are those that would undermine the conservation objectives supporting the favourable conservation condition of the Qualifying Interest (QI) habitats and/or the QI/Special Conservation Interest (SCI) species of a European site(s).
- 3 Screening for Appropriate Assessment involves the following steps:



If the conclusions at the end of screening are that there is no likelihood of significant effects occurring on any European sites as a result of the proposed plan or project, either alone or in combination with other plans and projects, then there is no requirement to undertake an Appropriate Assessment.

In establishing which European sites are potentially at risk (in the absence of mitigation) from the proposed development, a source-pathway-receptor approach was applied. In order for an impact to occur, there must be a risk enabled by having a source (e.g. water abstraction or construction works), a receptor (e.g. a European site or its QI(s) or SCI(s)²), and a pathway between the source and the receptor (e.g. pathway by air for airborne pollution, or a pathway by a watercourse for mobilisation of pollution). For an impact to occur, all three elements must exist; the absence or removal of one of the elements means there is no possibility for the impact to occur.

The identification of source-pathway-receptor connection(s) between the proposed development and European sites essentially is the process of identifying which European sites are within the Zone of Influence (Zoi) of the proposed development, and therefore potentially at risk of significant effects. The Zoi is the area over which the proposed development could affect the receiving environment such that it could potentially have significant effects on the QI habitats or QI/SCI species of a European site, or on the achievement of their conservation objectives³.

The identification of a source-pathway-receptor link does not automatically mean that significant effects will arise. The likelihood for significant effects will depend upon the characteristics of the source (e.g. extent and duration of construction works), the characteristics of the pathway (e.g. direction and strength of prevailing winds for airborne pollution) and the characteristics of the receptor (e.g. the sensitivities of the European site and its QIs/SCIs). Where uncertainty exists, the precautionary principle⁴ is applied.

2.3 Desktop Data Review

The desktop data sources used to inform the assessment presented in this report are as follows (accessed on the 29th January 2021):

- Online data available on European sites and protected habitats/species as held by the National Parks and Wildlife Service (NPWS) from www.npws.ie⁵, including conservation objectives documents

² The term qualifying interest is used when referring to the habitats or species for which an SAC is designated, the term special conservation interest is used when referring to the bird species (or wetland habitats) for which an SPA is designated.

³ As defined in the *Guidelines for Ecological Impact Assessment in the UK and Ireland* (CIEEM, 2018)

⁴ The precautionary principle is a guiding principle that derives from Article 191 of the Treaty on the Functioning of the European Union and has been developed in the case law of the European Court of Justice (e.g. ECJ case C-127/02 – Waddenzee, Netherlands)

The guidance document *Communication from the Commission on the Precautionary Principle* (European Commission, 2000) notes that the precautionary principle “covers those specific circumstances where scientific evidence is insufficient, inconclusive or uncertain and there are indications through preliminary objective scientific evaluation that there are reasonable grounds for concern that the potentially dangerous effects on the environment, human, animal or plant health may be inconsistent with the chosen level of protection”.

Applying the precautionary principle in the context of screening for appropriate assessment requires that where there is uncertainty or doubt about the risk of significant effects on a European site(s), it should be assumed that significant effects are possible and AA must be carried out.

⁵ The following SAC and SPA GIS boundary datasets are the most recently available at the time of writing: SAC_ITM_2019_12 and SPA_ITM_2019_12

⁶ The following SAC and SPA GIS boundary datasets are the most recently available at the time of writing: SAC_ITM_2019_12 and SPA_ITM_2019_12.

- Online data available on protected species as held by the National Biodiversity Data Centre (NBDC) from www.biodiversityireland.ie
- Information on the surface water network and surface water quality in the area available from www.epa.ie
- Information on groundwater resources and groundwater quality in the area available from www.epa.ie and www.gsi.ie
- Ordnance Survey of Ireland mapping and aerial photography available from www.osi.ie
- Information on the location, nature and design of the proposed development supplied by the applicant's design team
- *Environmental Impact Assessment Report for DUB05 EdgeConnex Data Centre Development* (Marston Planning Consultancy, 2021)
- *Environmental Impact Assessment Report for EdgeConneX Ireland Ltd., Data Centre (Phase 4), Newcastle Road, Grange Castle* (Marston Planning Consultancy, 2018)
- *Environmental Impact Assessment Report for Road Infrastructure Development at Clonburris Strategic Development Zone, Co. Dublin* (Stephen Little & Associates, 2020)
- *Ecological Survey of Clonburris Strategic Development Zone, Clondalkin, Co. Dublin* (FERS, 2018)

2.4 Consultations

Consultation letters were submitted by email to the Development Applications Unit of the Department of Culture, Heritage and the Gaeltacht (DAU Ref: G Pre 00014/2021) on the 25th January 2021. The letters included an outline description of the proposed development and a request for any comments on the proposal. No response from either authority was received by Scott Cawley Ltd. prior to submission of the planning application for the proposed development.

Inland Fisheries Ireland was also contacted on the 25th January 2021 to request additional data on species which may use the Griffeen River and for any comments they may have on the proposal. No response was received by Scott Cawley Ltd. prior to submission of the planning application for the proposed development.

2.5 Baseline Surveys

This section describes the ecological surveys carried out to inform the assessment of likely significant effects on European sites

2.5.1 Habitats and Flora Survey

A habitat survey was undertaken of the proposed development site on the 26th January 2021 by Alexis Fitzgerald B.A. (Hons) MSc and Siofra Quigley BSc (Hons) MSc of Scott Cawley Ltd. following the methodology described in *Best Practice Guidance for Habitat Survey and Mapping*⁷. All habitat types were classified using the *Guide to Habitats in Ireland*⁸, recording the indicator species and abundance using the DAFOR scale⁹ and recording any species of conservation interest. Vascular and bryophyte plant

⁷ Smith, G.F., O'Donoghue, P., O'Hara, K. & Delaney, E. (2011) *Best Practice Guidance for Habitat Survey and Mapping*. The Heritage Council Church Lane, Kilkenny, Ireland.

⁸ Fossitt, J.A. (2000) *A Guide to Habitats in Ireland*. Heritage Council, Kilkenny.

⁹ The DAFOR scale is an ordinal or semi-quantitative scale for recording the relative abundance of plant species. The name DAFOR is an acronym for the abundance levels recorded: Dominant, Abundant, Frequent, Occasional and Rare.

nomenclature generally follow that of *The National Vegetation Database*¹⁰, having regard to more recent taxonomic changes to species names after the *New Flora of the British Isles*¹¹ and the British Bryological Society's *Mosses and Liverworts of Britain and Ireland: A Field Guide*¹².

2.5.2 Fauna Surveys

2.5.2.1 Terrestrial Mammals (excl. Bats)

A terrestrial fauna survey (excluding bats) was undertaken on the 26th of January 2021 by Alexis Fitzgerald B.A. (Hons) MSc and Síofra Quigley BSc (Hons) MSc of Scott Cawley Ltd. The presence/absence of terrestrial fauna species were surveyed through the detection of field signs such as tracks, markings, feeding signs, and droppings, as well as by direct observation. The habitats on site were assessed for signs of usage by protected/red-listed fauna species, and their potential to support these species. Surveys to check for the presence of badger setts and otter holts within the study area, and to record any evidence of use, were undertaken on the 26th of January 2021.

3 Provision of Information for Screening for Appropriate Assessment

The following sections provide information to facilitate the Appropriate Assessment screening of the proposed development to be undertaken by the competent authority.

A description of the proposed development and the receiving environment is provided to identify the potential ecological impacts. The environmental baseline conditions are discussed, as relevant to the assessment of ecological impacts where they may highlight potential pathways for impacts associated with the proposed development to affect the receiving ecological environment (e.g. hydrological data).

The potential impacts are examined in order to define the potential zone of influence of the proposed development on the receiving environment. This then informs the assessment of whether the proposed development will result in significant effects on any European sites; i.e. affect the conservation objectives supporting the favourable conservation condition of the European site's QIs or SCIs.

3.1 Description of the Proposed Development

The proposed development of 22.1 hectares is to be located to the west of Grange Castle Business Park located in the townland of Ballymakailly between the N4 and N7 in west Dublin. The Grand Canal runs along the northern boundary of the site.

The development will consist of the construction of two no. single storey data centres with associated office and service areas; and three no. gas powered generation plant buildings with an overall gross floor area of 24,624sqm that will comprise of the following:

- Demolition of abandoned single storey dwelling, remaining agricultural shed and derelict former farm building;
- Construction of 2 no. single storey data centres (12,797sqm), both with associated plant at roof level; with 24 no. standby diesel generators with associated flues (each 25m high) that will be attached to a single storey goods receiving area / store and single storey office area (2,404sqm)

¹⁰ Weekes, L.C. & FitzPatrick, Ú. (2010) *The National Vegetation Database: Guidelines and Standards for the Collection and Storage of Vegetation Data in Ireland*. Version 1.0. Irish Wildlife Manuals, No. 49. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government. Dublin, Ireland.

¹¹ Stace, C. (2019) *New Flora of the British Isles*. 4th Edition. C&M Floristics.

¹² Atherton, I., Bosanquet, S. & Lawley, M. (2010) *Mosses and Liverworts of Britain and Ireland. A Field Guide*. Latimer Trend & Co., Plymouth.

- located to the west of the data centres as well as associated water tower and sprinkler tank and other services;
- amendments to the internal access road and omission of access to loading bay permitted under SDCC Planning Ref. SD19A/0042 / ABP Ref. PL06S.305948 that include the relocation of permitted, and new, internal security gates; and new internal access roads to serve the proposed development that will provide access to 39 no. new car parking spaces (including 4 no. electric and 2 no. disabled spaces) and sheltered bicycle parking to serve the new data centres;
 - The development will also include the phased development of 3 no. two storey gas powered generation plants (9,286sqm) within three individual buildings and ancillary development to provide power to facilitate the development of the overall site to be located within the south-west part of the overall site. Gas Plant 1 (3,045sqm) will contain 20 no. generator units (18+2) with associated flues (each 25m high) will facilitate, once operational the decommissioning of the temporary Gas Powered Generation Plant within its open compound as granted under SDCC Planning Ref. SD19A/0042 / ABP Ref. PL06S.305948. Gas Plant 2 (3,045sqm) will contain 20 no. generator units (18+2) with associated flues (each 25m high); and Gas Plant 3 (3,196sqm) will contain 21 no. generator units (19+2) with associated flues (each 25m high). These Plants will be built to provide power to each data centre, if and, when required. The Gas Plants will be required as back-up power generation once the permanent power connection via the permitted substation is achieved;
 - Green walls are proposed to the southern elevation of each Power plant, as well as to the northern elevation of the generator compound of the data centres, and enclosing the water tower/pump room compound; and a new hedgerow is proposed linking the east and west of the site; and
 - Proposed Above Ground Gas Installation compound to contain single storey kiosk (93sqm) and boiler room (44sqm).
- 21 The development will also include ancillary site works, connections to existing infrastructural services as well as fencing and signage. The development will include minor modifications to the permitted landscaping to the west of the site as granted under SDCC Planning Ref. SD19A/0042 / ABP Ref. PL06S.305948. The site will remain enclosed by landscaping to all boundaries. The development will be accessed off the R120 via the permitted access granted under SDCC Planning Ref. SD19A/0042 / ABP Ref. PL06S.305948.
- 22 The site will be positively drained and surface water will be contained within the overall sites drainage network and managed in a sustainable manner, in accordance with all relevant guidelines and specifications.
- 23 Stormwater will discharge through an adequately sized attenuation pond at the northern end of the site ultimately discharging to the existing storm sewer to the north east of the site. The outflow from the attenuation pond, will be restricted by way of a Hydrobrake facility, which will limit the discharge to 9.60l/s, which is the calculated QBAR greenfield run-off rate. A connection to the existing off site Irish Water foul sewer and potable water network will be established.
- 24 The proposed development will result in an increased demand for water of c. 7.4 m³/day (average). A confirmation by Irish Water that this resource is available within the existing network is required.
- 25 With regard to foul water, the proposed development is proposed to discharge foul water from the proposed development, via a 225mm Ø gravity foul sewer outfall and discharge into the existing 450mm Ø connection. It is proposed that all foul condensate effluent from the proposed new data halls, will be connected into head manholes adjacent to the data halls. The peak wastewater flow will not be in excess of c. 0.54l/s. A confirmation by Irish Water that this discharge on the existing network is feasible is required.
- 26 There will be no blasting or other works that may impact groundwater.
- 27 The construction programme is expected to last 18 months.

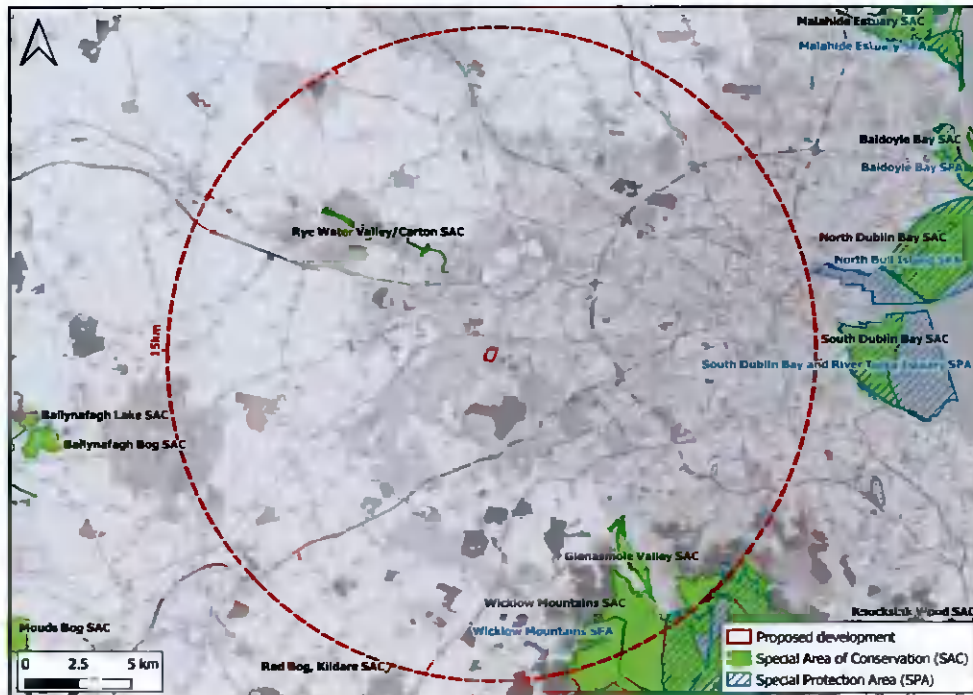
- 25 See *Environmental Impact Assessment Report for DUB05 EdgeConnex Data Centre Development* (Marston Planning Consultancy, 2021) Chapter 2 for a comprehensive description of the development.

3.2 Overview of the Receiving Environment

3.2.1 European sites

- 30 There are nine European sites located within c. 15km and downstream of the proposed development. The proposed development does not overlap with any European sites. The nearest European site is Rye Water Valley/Carton SAC, located c. 4.1km to the north-west of the proposed development site. The proposed development is hydrologically connected via the surface and foul water network to European sites further downstream in Dublin Bay (North Dublin Bay SAC, South Dublin Bay SAC, North Bull Island SPA and South Dublin Bay and River Tolka Estuary SPA).
- 31 All of the European sites present in the vicinity of the proposed development are shown on Figure 1 below. The QIs/SCIs of the European sites in the vicinity of the proposed development are provided in Appendix I.

Figure 1 European sites in the vicinity of the proposed development



3.2.2 Habitats

- 3.2.2.1 The proposed development is flanked by the agricultural lands to the west and south, and by commercial areas to the east and north. The Grand Canal runs along the northern boundary.
- 3.2.2.2 The following habitat types assigned using the Heritage Council classification system⁸ were identified within the proposed development site:

- Improved agricultural grassland (GA1)
- Dry meadows and grassy verges (GS2)
- Hedgerows (WL1)
- Treelines (WL2)
- Buildings and artificial surfaces (BL3)
- Recolonising bare ground (ED3)
- Drainage ditches (FW4)

- 3.2.2.3 At the time of survey, the habitats on site largely comprised of improved agricultural grassland (GA1), dry meadows and grassy verges (GS2) and recolonising bare ground (ED3).

- 3.2.2.4 There are no Annex I habitats present within the proposed development site or immediate environs. The hedgerows, treelines and dry meadows and grassy verges habitats within the proposed development are

considered to be of local importance (higher value). The habitat types are described in greater detail in Chapter 6 of the EIAR accompanying this application¹³.

3.2.3 Flora and Fauna Species

- The desktop study found did not find records for any Annex II flora within c. 2km of the proposed development. Field surveys undertaken at the proposed development site did not record any Annex II flora.

Otter & Desmoulin's whorl snail

- The desktop study found records for two Annex II species, Desmoulin's whorl snail *Vertigo moulinsiana* and otter *Lutra lutra*, for which European sites in the vicinity of the proposed development are designated. There are two records for Desmoulin's whorl snail and three records for otter within c. 2km of the proposed development. The most recent record for Desmoulin's whorl snail is from the same grid square, O03, in which the proposed development site is located in, from 1945. The nearest European site designated for the species is the Rye Water Valley/Carlton SAC, located c. 4.1km north-west, along the Rye Water, a tributary of the River Liffey. There is no suitable habitat for Desmoulin's whorl snail within the proposed development site.

- The most recent record for otter in the NBDC database is from along the Grand Canal, c. 50m east of the proposed development, in 1980. The most recent observation of otter by Scott Cawley ecologists along the Grand Canal and near the proposed development is from the 1st February 2021. They have also previously observed otter in the Baldonnell stream that lies upstream of the Griffeen and are aware that artificial otter holts were installed along the Griffeen River when it was realigned as part of the Grangecastle area development (L. Higgins 2021, pers. comm. 1 February 2021). Otters are also known to use the River Liffey and the Camac River (Macklin *et al.*, 2019) and have been recorded on the Grand Canal. No evidence of otter was recorded within the proposed development site during field surveys undertaken in 2021. The closest European site for which otter is a QI is the Wicklow Mountains SAC, c. 14.3km south-east of the proposed development site.

Freshwater white-clawed crayfish

- The NBDC data search yielded no records for Annex II species freshwater white-clawed crayfish *Austropotamobius pallipes* within c. 2km of the proposed development site. However, ecological studies¹⁴ carried out in the Clonburris Strategic Development Zone (SDZ) in 2018 found populations of freshwater white-clawed crayfish in the Grand Canal and the Griffeen River. Freshwater white-clawed crayfish is also known from downstream River Liffey. There are no European sites designated upstream or downstream of the proposed development site. The nearest designated site for the species is the Lough Lene SAC, c. 60.8km north-west of the proposed development site.

Atlantic salmon

- The NBDC did not yield any records for Atlantic salmon *Salmo salar* within c. 2km of the proposed development, however, previous reports¹⁵ for the Clonburris SDZ provided records for Atlantic salmon *Salmo salar* in the Griffeen River. The nearest designated site for Atlantic salmon is the River Boyne and River Blackwater SAC, c. 30.9km north-west of the proposed development.

¹³Environmental Impact Assessment Report for DUB05 EdgeConnex Data Centre Development (Marston Planning Consultancy, 2021).

¹⁴Ecological Survey of Clonburris Strategic Development Zone, Clondalkin, Co. Dublin (FERS, 2018).

¹⁵Environmental Impact Assessment Report for Road Infrastructure Development at Clonburris Strategic Development Zone, Co. Dublin (Stephen Little & Associates, 2020).

Wintering birds

- 11 The desktop study found records for 12 SCI wintering bird within c. 2km of the proposed development. A full list of SCI species from the desktop study is represented in Appendix III.
- 12 A single wintering bird survey was carried out for an EIAR¹⁶ completed in 2018 on the 22nd November 2018 within the proposed development site. A flock of c. 300 lapwing *Vanellus vanellus* was recorded in the most southerly fields within the site boundary. The nearest designated site for lapwing is the Boyne Estuary SPA, located c. 43.9km north-east of the proposed development.
- 13 The proposed development is within the normal foraging range of SCI species of North Bull Island SPA and South Dublin Bay and River Tolka Estuary SPA; however, it comprises of limited areas of suitable foraging habitat due to grasslands being enclosed by hedgerows and/or treelines and lack of suitable foraging grounds (e.g. open amenity grassland). No other SCI species of any European sites were recorded in the vicinity of the proposed development site during field surveys.

Raptors

- 14 The desktop study found records for one SCI raptor species, peregrine *Falco peregrinus*, within c. 2km of the proposed development.
- 15 There is suitable foraging habitat for peregrine within the proposed development site. The nearest SPA designated for this species is the Wicklow Mountains SAC, located c. 14.3km south-east of the proposed development.

Non-native invasive species

- 16 With regards to records for non-native invasive species within c. 2km of the proposed development, the NBDC database search returned records for the following non-native invasive species:
 - *Elodea nuttallii*, and,
 - Eastern grey squirrel *Sciurus carolinensis*.

Both of these species are listed on the Third Schedule of the *European Communities (Birds and Natural Habitats) Regulations, 2011*. *Elodea nuttallii* has been recorded once in 2020, c. 1km east of the proposed development along the Grand Canal.

- 17 There are three records for Eastern grey squirrel, of which the most recent one is from the Finnstown Castle Hotel, c. 1.1km north, from 2015.
- 18 In addition to the NBDC data records, *Reynoutria japonica* was recorded by the Scott Cawley Ltd. surveyors along the Kishoge Road, c. 1.4km north-east during field surveys in 2020. *Reynoutria japonica* is listed on the Third Schedule of the *European Communities (Birds and Natural Habitats) Regulations, 2011*.
- 19 No non-native invasive species listed on the Third Schedule of the *European Communities (Birds and Natural Habitats) Regulations, 2011* were recorded within the proposed development site during the surveys in 2021.

3.2.4 Hydrology

- 20 There are no major waterbodies within the proposed development site, however, a network of drainage ditches connects the site to the Lucan Stream to the west, and the Griffeen River to the east. The nearest waterbody to the proposed development site is the Ballymakailly Stream, c. 150m, east of the proposed development. It joins the Griffeen River, c. 330m, east from its origin. The Griffeen River flows c. 180m east of the proposed development site towards north. It is joined by the Adamstown stream, c. 1km, the

¹⁶ *Environmental Impact Assessment Report for EdgeConnex Ireland Ltd., Data Centre (Phase 4), Newcastle Road, Grange Castle* (Marston Planning Consultancy, 2018)



Laraghcon, c. 3.4km, and the Moat stream, c. 3.5km, north of the proposed development site, before its confluence with the River Liffey, c. 4km downstream of the proposed development site. The Lucan Stream is located c. 300m west of the proposed development. It runs northerly and is joined by the Tobermaclugg and Backtown Streams, c. 1.5km and c. 3km north, respectively, before merging into the River Liffey, c. 4.1km downstream of the proposed development. The Griffeen River, the Lucan Stream and all their adjoining streams, all have 'Good' WFD status and are listed as 'At risk' waterbodies by the EPA. Kilmahuddrick stream, not shown on the EPA maps, starts at the southern edge of the Griffeen Valley Park, before joining the Griffeen River, c. 330m north-west of its starting point in the park. The River Liffey has a 'Good' WFD status until just downstream of the Lucan village, where it has a WFD status of 'Unassigned' until Chapelizod, changing to 'Moderate' and then to 'Good' WFD status before joining the Upper and Lower Liffey Estuary waterbodies, c. 15.5km downstream and east of the proposed development site.

The Grand Canal runs along the northern boundary of the proposed development. It merges with the Lower Liffey Estuary waterbody c. 16km east of the proposed development site. It has a 'Good' WFD status and is listed as being 'At Risk' by the EPA. There is no direct hydrological connection between the Grand Canal and the proposed development site.

The Upper and Lower Liffey Estuary waterbodies have 'Good' WFD status and are listed as 'At risk' by the EPA. Dublin Bay, located c. 23.3km downstream of the proposed development site, is considered to be 'Unpolluted' with a 'Good' WFD status and belongs to the 'Not at risk' category.

The site is located within the Liffey sub-catchment and sub-basin in the Liffey and Dublin Bay catchment, which drain to Dublin Bay.

The waterbodies present in the vicinity of the proposed development are shown on Figure 2.

Figure 2 Waterbodies in the vicinity of the proposed development



3.2.5 Hydrogeology

- 56 Geological Survey of Ireland (GSI) data indicates that the site is underlain by a Locally Important Bedrock Aquifer (LI), which is moderately productive only in local zones. The site is located in an area of 'Extreme' vulnerability, with bedrock close to surface at places, in relation to the underlying aquifer.
- 57 The Groundwater Body (GWB) underlying the site is the Dublin GWB, which is currently classified by the EPA as having 'Good Status' and 'Not at risk'. There is only one European site within the Dublin GWB designated for groundwater dependent terrestrial habitats and species, Rye Water Valley/Carton SAC, c. 4.1km north-west of the proposed development site.

3.3 Assessment of Effects on European Sites

- 58 This section identifies all the potential impacts associated with the proposed development, examines whether there are any European sites within the Zol of effects from the proposed development, and assesses whether there is any risk of the proposed development resulting in a significant effect on any European site, either alone or in combination with other plans or projects.

In assessing the potential for the proposed development to result in a significant effect on any European sites, any measures intended to avoid or reduce the harmful effects of the project on European sites are not taken into account.

3.3.1 Habitat loss and fragmentation

- 59 The proposed development does not overlap with the boundary of any European site. Therefore, there are no European sites at risk of direct habitat loss impacts.
- 60 As the proposed development does not traverse any European sites there is no potential for habitat fragmentation to occur.
- 61 The proposed development site does not support populations of any fauna species linked with the QI populations of any European site.

- Otter - while the Griffeen River and the River Liffey are known to support otter, the population is not considered to form part of the QI population of any European sites. The closest European site for which otter is a QI is the Wicklow Mountains SAC, c. 14.3km south-west of the proposed development site. Due to distance and estimated foraging ranges for otter (estimated as 7.5 ± 1.5 km in length for females, and 13.2 ± 5.3 km in length for males)¹⁷ the local population of otter is not considered to form part of the Wicklow Mountains SAC population.
- Freshwater white-clawed crayfish - there are no European sites designated for freshwater white-clawed crayfish hydrologically connected to the proposed development. The nearest European site for the species is the Lough Lene SAC, c. 60.8km north-west of the proposed development site.
- Atlantic salmon - the nearest European site for Atlantic salmon is the River Boyne and River Blackwater SAC, c. 30.9km north-west of the proposed development. Considering that the Griffeen River is located in a different sub-catchment than the River Boyne and River Blackwater SAC and its location relative to the proposed development site, Atlantic salmon populations found in this river do not form part of any SAC population.

- 62 The SCI species recorded within the proposed development site are not considered to be linked with the SCI populations of any European site. The proposed development is within the normal foraging range of SCI species of North Bull Island SPA and South Dublin Bay and River Tolka Estuary SPA; however, it

¹⁷ Reid, N., Hayden, B., Lundy, M.G., Pietravalle, S., McDonald, R.A. & Montgomery, W.I. (2013) *National Otter Survey of Ireland 2010/12*. Irish Wildlife Manuals No. 76. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

comprises of limited areas of suitable foraging habitat (e.g. open amenity grassland) due to grasslands being enclosed by hedgerows and/or treelines, and due to the absence of suitable wetlands used by wintering SCI species.

- Although lapwing was recorded during the surveys in 2018, the habitats (improved agricultural grassland (GA1), dry meadows and grassy verges (GS2) and recolonising bare ground (ED3)) recorded within the proposed development site in 2021 are considered sub-optimal habitat for the species, i.e. lapwing generally prefer open pastureland and arable fields (i.e. tillage) which are currently absent in the proposed development site. At the time of the surveys in 2018, the site was dominated by arable crops (BC1) instead of the grassland habitats recorded in 2021. Land use change that has occurred since 2018, followed by habitat change, has rendered the proposed development site sub-optimal for lapwing. Considering that the nearest designated site for lapwing is c. 43.9km north-east of the proposed development site, the local populations do not form part of SPA populations.

As the proposed development will not result in habitat loss or habitat fragmentation within any European site, there is no potential for any in combination effects to occur in that regard.

3.3.2 Habitat degradation as a result of hydrological impacts

Surface water run-off and discharges from the proposed development will drain to the existing and proposed local surface water drainage network. Foul waters from the proposed development will be discharged to Ringsend WWTP for treatment, via the existing foul water drainage network, prior to discharge into the Liffey Estuary/Dublin Bay. Therefore, the Zone of Influence (Zoi) of potential effects on water quality from the proposed development could extend to Dublin Bay.

Surface water

Surface water run-off and discharges from the proposed development will enter the downstream receiving environment via existing and proposed surface water drainage network. This network will ultimately discharge into the Liffey Estuary and Dublin Bay. Therefore, the Zone of Influence (Zoi) of potential effects on water quality from the proposed development could extend to Dublin Bay.

Surface water runoff from the proposed development will be attenuated to greenfield runoff rates and conveyed to the receiving watercourse, the Griffeen River. The surface drainage network will be designed in accordance with the recommendations of the Greater Dublin Strategic Drainage Study (GDSGS). Attenuation measures include gullies, channels, storage ponds and porous asphalt. All surface water will run through hydrocarbon interceptors before its release to the receiving watercourse.

Chapter 8 Hydrology in the EIA submitted with this application deals with the hydrology of the proposed development site. The chapter assesses the hydrological and hydrogeological risks associated with the proposed development. The assessment noted that based on the potential sources of pollution from the proposed development during construction and operation phases and distance of c. 20 km downstream, there is no potential for impacts to occur on European sites in Dublin Bay. This conclusion is based on a good understanding of the hydrological and hydrogeological environment, plausible sources of impact and knowledge of receptor requirements. This allowed possible source-pathway-receptor linkages to be identified. Potential sources of impacts during construction and operation were considered in Chapter 8 and all potential sources of contamination were considered in relation to European sites without taking account of any measures intended to avoid or reduce harmful effects of the proposed development (mitigation measures) i.e. a worst-case scenario.

Results of Chapter 8 carried out by AWN and which inform this AA screening report, indicate that surface run-off from the proposed development, during both construction and operational phases respectively, will not result in any impact on water quality in downstream receiving waters in Dublin Bay (and thus in the European sites therein). This is in light of expected hazard loading, dilution and attenuation within the Griffeen River, and considerable distance between the proposed development site and Dublin Bay.

In line with good practice effective mitigation measures have been included in the construction design, management of construction programme and during the operational phase of the proposed development. However, it must be noted that these are included in the design, not for the purposes of avoiding or

reducing any potential harmful effects to any European sites but are required for new developments under the objectives of the Greater Dublin Strategic Drainage Study and South Dublin County Council Development Plan and in line with good construction practice.

- It is an objective of the Greater Dublin Strategic Drainage Study, and the South Dublin County Council Development Plan 2016-2022, to incorporate Sustainable Urban Drainage Systems (SUDS) within new developments. The SUDS features associated with the proposed development are not included within the design to avoid or reduce any potential harmful effects to any European sites.
- Therefore, there is no possibility of the proposed development undermining the conservation objectives of any of the qualifying interests or special conservation interests of the European sites in, or associated with, Dublin Bay as a result of surface water run-off or discharges.

Foul water

Foul water, comprising sewage and industrial effluent (and some surface water run-off), from the Dublin area has historically been, and will continue to be, treated at Ringsend WWTP prior to discharge to Dublin Bay. The most recent information from Irish Water indicates that the plant is operating above its capacity of 1.64 million P.E. (Irish Water, 2017), with a current operational loading of c. 2.2 million P.E. Ringsend WWTP operates under a discharge licence from the EPA (D0034-01) and must comply with the licence conditions.

Despite the capacity issues associated with the Ringsend WWTP, the Liffey Estuary Lower and Dublin Bay are currently classified by the EPA as being of “Unpolluted” water quality status¹⁸. The Tolka Estuary is currently classified by the EPA as being “Potentially Eutrophic”. The pollutant content of future foul water discharges to Dublin Bay is considered likely to decrease in the long-term for the following reasons:

- An Bord Pleanála granted planning permission for an upgrade to the Ringsend WWTP in April 2019¹⁹, which will increase capacity at the plant, and
- There is a commitment in the National Development Plan 2018-2027²⁰ to invest in and progress the Greater Dublin Drainage Project which will involve the provision of a new regional wastewater treatment plant at a site in the northern part of the Greater Dublin Area and the provision of a new Orbital Drainage Sewer linking the new plant to the existing regional sewer network, which will enable future connections for identified areas of development within the catchment area. The provision of the Greater Dublin Drainage Project will augment the wastewater treatment capacity currently provided by Ringsend WWTP across the Greater Dublin Area.

It is also an objective of the Greater Dublin Strategic Drainage Study, and all development plans within the catchment of Ringsend WWTP, to include Sustainable Urban Drainage Systems (SUDS) within new developments. The relevant development plans also have protective policies/objectives in place to protect water quality in the receiving freshwater and marine environments, and to implement the Water Framework Directive in achieving good water quality status for Dublin Bay.

Considering the above, particularly the current unpolluted status of Dublin Bay, and that foul water discharges from the proposed development would equate to a very small percentage of the overall discharge volumes sent to Ringsend WWTP for treatment, it is concluded that the proposed development will not impact on the overall water quality status of Dublin Bay.

¹⁸ Transitional and Coastal Surface Water Quality data (2010-2012) accessed from the EPA Envision Mapviewer www.gis.epa.ie/Envision (accessed May 2019)

¹⁹ An Bord Pleanála Case Reference PL295.301798 – 10-year permission for development of the Ringsend wastewater treatment plant upgrade project including a regional bio solids storage facility, Available online at www.pleanala.ie/casenum/301798.htm.

²⁰ Government of Ireland (2018) *Project Ireland 2040, National Development Plan 2018-2027*.

- Therefore, there is no possibility of the proposed development undermining the conservation objectives of any of the qualifying interests or special conservation interests of the European sites in, or associated with, Dublin Bay as a result of foul water discharges.

In Combination

- There is potential for “in-combination” effects on water quality in Dublin Bay from any other projects carried out within the functional areas of the *Dublin City Development Plan 2016-2022* (Dublin City Council, 2016), the *Dún Laoghaire-Rathdown County Development Plan 2016-2022* (Dún Laoghaire-Rathdown County Council, 2016), the *Fingal Development Plan 2017-2023* (Fingal County Council, 2017), *South Dublin County Council Development Plan 2016-2022* (South Dublin County Council, 2016), or any other land use plans which could influence conditions in Dublin Bay via rivers and other surface water features.

The Eastern & Midland Regional Assembly, *Regional Spatial & Economic Strategy 2019-2031*²¹ (Eastern & Midland Regional Assembly, 2019) includes a range of policy objectives relevant to the protection of European sites and the protection of water quality in Dublin Bay, to which the relevant planning authorities must have regard to in the preparation and adoption of their development plans (included in Appendix II).

The planning authority for the proposed development is South Dublin County Council (SDCC). Plans and developments within the administrative area of South Dublin County Council must comply with the following policy objectives of the *South Dublin County Council Development Plan 2016-2022* (South Dublin County Council, 2016) relevant to the protection of European sites and the protection of water quality in Dublin Bay:

HCL12 Objective 1: To prevent development that would adversely affect the integrity of any Natura 2000 site located within and immediately adjacent to the County and promote favourable conservation status of habitats and protected species including those listed under the Birds Directive, the Wildlife Acts and the Habitats Directive.

HCL12 Objective 2: To ensure that projects that give rise to significant direct, indirect or secondary impacts on Natura 2000 sites, either individually or in combination with other plans or projects, will not be permitted unless the following is robustly demonstrated in accordance with Article 6(4) of the Habitats Directive and S.177AA of the Planning and Development Act (2000 – 2010) or any superseding legislation:

1. There are no less damaging alternative solutions available; and
2. There are imperative reasons of overriding public interest (as defined in the Habitats Directive) requiring the project to proceed; and
3. Adequate compensatory measures have been identified that can be put in place.

IE Policy 1 Water & Wastewater: It is the policy of the Council to work in conjunction with Irish Water to protect existing water and drainage infrastructure and to promote investment in the water and drainage network to support environmental protection and facilitate the sustainable growth of the County.

IE1 Objective 1: To work in conjunction with Irish Water to protect, manage and optimise water supply and foul drainage networks in the County.

IE1 Objective 2: To work in conjunction with Irish Water to facilitate the timely delivery of ongoing upgrades and the expansion of water supply and wastewater services to meet the future needs of the County and the Region.

²¹ Eastern & Midland Regional Assembly (2019) *Regional Spatial & Economic Strategy 2019-2031*.

IE Policy 2 Surface Water & Groundwater: It is the policy of the Council to manage surface water and to protect and enhance ground and surface water quality to meet the requirements of the EU Water Framework Directive.

IE2 Objective 1: To maintain, improve and enhance the environmental and ecological quality of our surface waters and groundwater by implementing the programme of measures set out in the Eastern River Basin District River Basin Management Plan.

IE2 Objective 3: To maintain and enhance existing surface water drainage systems in the County and promote and facilitate the development of Sustainable Urban Drainage Systems (SUDS), including integrated constructed wetlands, at a local, district and County level, to control surface water outfall and protect water quality.

IE2 Objective 4: To incorporate Sustainable Urban Drainage Systems (SUDS) as part of Local Area Plans, Planning Schemes, Framework Plans and Design Statements to address the potential for Sustainable Urban Drainage at a site and/or district scale, including the potential for wetland facilities.

IE2 Objective 5: To limit surface water run-off from new developments through the use of Sustainable Urban Drainage Systems (SUDS) and avoid the use of underground attenuation and storage tanks.

IE2 Objective 6: To promote and support the retrofitting of Sustainable Urban Drainage Systems (SUDS) in established urban areas, including integrated constructed wetlands.

Plans and developments within the other local authority areas which could influence conditions in Dublin Bay via rivers and other surface water features, also must comply with the policies and objectives relevant to the protection of European sites and water quality. These include the *Dún Laoghaire-Rathdown County Development Plan 2016-2022* (Dún Laoghaire-Rathdown County Council, 2016), the *Fingal Development Plan 2017-2023* (Fingal County Council, 2017), the *Dublin City Development Plan 2016 – 2022* (Dublin City Council, 2016), the *Kildare County Development Plan 2017-2023* (Kildare County Council, 2017) and the *Wicklow County Development Plan 2016-2022* (Wicklow County Council, 2016). The relevant policies and objectives in those plans for the protection of European sites and water quality are included in Appendix II.

In conclusion, there are a number of projects referred to above which will upgrade the capacity of Ringsend WWTP which will, over time, address the capacity issues at Ringsend WWTP referred to above.

As noted under the surface water section above, Dublin Bay is currently unpolluted, and the proposed development will not result in any measurable effect on water quality in Dublin Bay. There are also protective policies and objectives in place at a strategic planning level to protect water quality in Dublin Bay.

Therefore, and having regard to the policies and objectives referred to under the relevant development plans, it is concluded that the possibility of any other plans or projects acting in combination with the proposed development to give rise to significant effects on any European site in, or associated with, Dublin Bay can be excluded.

3.3.3 *Habitat degradation as a result of hydrogeological impacts*

The proposed development lies within the Dublin Groundwater Body (Dublin GWB). The only European site within the Dublin GWB that is designated for groundwater dependant habitats and/or species is the Rye Water Valley/Carton SAC, located c. 4.1km north-west of the proposed development. All of the qualifying interests of the Rye Water Valley/Carton SAC, the priority Annex I habitat Petrifying springs and the two whorl snail species, are dependent upon the existing condition and functioning of the groundwater regime.

Based on information published by Geological Survey Ireland (GSI) on the Dublin GWB²², 'The general groundwater flow direction in this aquifer is towards the coast and also towards the River Liffey and Dublin City'. As the proposed development is separated from the Rye Water Valley/Carton SAC by several waterbodies and located downstream of the SAC, it cannot influence groundwater conditions in the European site.

- Therefore, there is no possibility of the proposed development undermining the conservation objectives of any of the qualifying interests or special conservation interests of any European sites, either alone or in combination with any other plans or projects, as a result of hydrogeological effects.

3.3.4 Habitat degradation as a result of introducing/spreading non-native invasive species

No Third Schedule species of the *European Communities (Birds and Natural Habitats) Regulations, 2011* were recorded within, or directly adjacent to, the proposed development site, therefore non-native invasive species poses no risk to any European sites downstream.

3.3.5 Disturbance and displacement impacts

Construction-related disturbance and displacement of fauna species could potentially occur within the vicinity of the proposed development. For mammal species such as otter, disturbance effects would not be expected to extend beyond 150m²³. For birds, disturbance effects would not be expected to extend beyond a distance of c. 300m, as noise levels associated with general construction activities would attenuate to close to background levels at that distance.²⁴ There are no European sites within the disturbance ZoI; the next nearest European site to the proposed development is the Rye Water Valley/Carton SAC c. 4.1km away.

The Griffeen River and the Grand Canal may support populations of Annex II species such as otter and freshwater white-clawed crayfish, however, these local populations are not QI SAC populations. The nearest site designated for otter is the Wicklow Mountains SAC, located c. 14.3km south-east of the proposed development site, and for freshwater white-clawed crayfish, the Lough Lene SAC, located c. 60.8km north-west of the proposed development site.

The nearest SPA to the proposed development site designated for wintering special conservation interest species is the North Bull Island SPA, located c. 15.7km east of the proposed development. The proposed development is within the normal foraging range of SCI species of this European site, however the proposed development site has very limited habitat suitability (i.e. open amenity grasslands) for wintering SCI species such as light-bellied Brent goose *Branta bernicla hrota*. Lapwing, a SCI species, was found using the proposed development site in 2018, however, the nearest designated site for lapwing is the Boyne Estuary SPA, c. 43.9km north-east of the proposed development site and considering its location and distance to the proposed development site, it is considered that lapwing recorded within the proposed development site do not form part of any SPA population. Considering the lack of suitable habitat for the

²² https://secure.dccae.gov.ie/GSI_DOWNLOAD/Groundwater/Reports/GWB/DublinGWB.pdf

²³ This is consistent with Transport Infrastructure Ireland (TII) guidance (Guidelines for the Treatment of Otters prior to the Construction of National Road Schemes and Guidelines for the Treatment of Badgers prior to the Construction of National Road Schemes) documents. This is a precautionary distance, and likely to be moderated by the screening effect provided by surrounding vegetation and buildings, with the actual ZoI of construction related disturbance likely to be much less in reality.

²⁴ The disturbance zone of influence for waterbirds is based on the relationship between the noise levels generated by general construction traffic/works (BS 5228:2009 Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 1 Noise) and the proximity of those noise levels to birds – as assessed in Cutts, N. Phelps, A. & Burdon, D. (2009) *Construction and Waterfowl: Defining Sensitivity, Response, Impacts and Guidance*, and Wright, M., Goodman, P & Cameron, T. (2010) Exploring Behavioural Responses of Shorebirds to Impulsive Noise. *Wildfowl* (2010) 60: 150–167. At 300m, noise levels are below 60dB or, in most cases, are approaching the 50dB threshold below which no disturbance or displacement effects would arise

species within the site and no individuals recorded using the site for foraging and/or roosting during the surveys in 2021, the proposed development will not result in displacement of SCI populations of lapwing, or any other SCI species, for which there are European sites designated for within the vicinity of the proposed development.

- 80 As the proposed development will not result in the disturbance/displacement of the qualifying/special conservation interest species of any European site, there is no potential for any in combination effects to occur in that regard.

3.3.6 Summary

- 81 The potential impacts associated with the proposed development do not have the potential to affect the receiving environment and, consequently, do not have the potential to affect the conservation objectives supporting the qualifying interest/special conservation interests of any European sites. Therefore, the proposed development is not likely to have significant effects on any European sites.
- 82 As the proposed development itself will not have any effects on the QIs/SCIs or conservation objectives of any European sites and taking into account the policies and objectives of the statutory plans referred to above, it is concluded that there is no potential for any other plan or project to act in combination with it to result in significant effects on any European sites.
- 83 The potential impacts of the proposed development on the receiving environment, their Zol, and the European sites at risk of significant effects are summarised in Table 1 below. In assessing the potential for the proposed development to result in a significant effect on any European sites, any measures intended to avoid or reduce the harmful effects of the project on European sites are not taken into account.

Table 1 Summary of Analysis of Likely Significant Effects on European sites

Potential Direct, Indirect In Combination Effects and the Zol of the Potential Effects	Are there any European sites within the Zol of the proposed development?
Habitat loss Habitat loss will be confined to the lands within the proposed development boundary.	No There are no European sites within the proposed development boundary
Habitat degradation as a result of hydrological impacts Habitats and species downstream of the proposed development site and the associated surface water drainage discharge points, and downstream of offsite wastewater treatment plants.	No There are no European sites at risk of hydrological effects associated with the proposed development
Habitat degradation as a result of hydrogeological impacts Groundwater-dependant habitats, and the species those habitats support, in the local area that lie downgradient of the proposed development site.	No There are no European sites at risk of hydrogeological effects associated with the proposed development
Habitat degradation as a result of introducing/spreading non-native invasive species. Habitat areas within, adjacent to, and potentially downstream of the proposed development site.	No There are no non-native invasive species present on the proposed development site and, therefore, no risk associated with the proposed development to any European sites from the spread/introduction of non-native invasive species
Disturbance and displacement impacts Potentially up to several hundred metres from the proposed development boundary, dependent upon the predicted levels of noise, vibration and visual disturbance associated with the proposed development, taking into	No There are no European sites within the potential zone of influence of disturbance effects associated with the construction or operation of the proposed development



Potential Direct, Indirect In Combination Effects and the Zoi of the Potential Effects	Are there any European sites within the Zoi of the proposed development?
account the sensitivity of the qualifying interest species to disturbance effects	

4 Conclusions of Screening Assessment Process

- Following an examination, analysis and evaluation of the best available information, and applying the precautionary principle, it can be concluded that the possibility of any significant effects on any European sites, whether arising from the project alone or in combination with other plans and projects, can be excluded, for the reasons set out in Section 3.3 above. In reaching this conclusion, the nature of the project and its potential relationship with all European sites within the zone of influence, and their conservation objectives, have been fully considered.
- Therefore, it is the professional opinion of the authors of this report that the application for consent for the proposed development does not require an Appropriate Assessment or the preparation of a Natura Impact Statement (NIS).

Appendix I

The Qualifying Interests (QIs) and Special Conservation Interests (SCIs) of the European sites in the vicinity of the proposed development site (see Figure 1)

European Site Name [Code] and its Qualifying Interest(s) / Special Conservation Interest(s) (*Priority Annex I Habitats)	Location Relative to the Proposed Development Site
Special Area of Conservation (SAC)	
Rye Water Valley/Carton SAC [001398] 7220 Petrifying springs with tufa formation (<i>Cratoneurion</i>)* 1014 Narrow-mouthed Whorl Snail <i>Vertigo angustior</i> 1016 Desmoulin's Whorl Snail <i>Vertigo moulinsiana</i> NPWS (2020) <i>Conservation objectives for Rye Water Valley/Carton SAC [001398]. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.</i> ²⁵	c. 4.1km north-west of the proposed development
Glenasmole Valley SAC [001209] 6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) (* important orchid sites) 6410 <i>Molinia</i> meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinion caeruleae</i>) 7220 Petrifying springs with tufa formation (<i>Cratoneurion</i>)* NPWS (2020) <i>Conservation objectives for Glenasmole Valley SAC [001209]. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.</i>	c. 9.8km south-east of the proposed development
Wicklow Mountains SAC [002122] 3110 Oligotrophic waters containing very few minerals of sandy plains (<i>Littorelletalia uniflorae</i>) 3160 Natural dystrophic lakes and ponds 4010 Northern Atlantic wet heaths with <i>Erica tetralix</i> 4030 European dry heaths 4060 Alpine and Boreal heaths 6130 <i>Calaminarian</i> grasslands of the <i>Violetalia colaminariae</i> 6230 Species-rich <i>Nardus</i> grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe) 7130 Blanket bogs (* if active bog) 8110 Siliceous scree of the montane to snow levels (<i>Androsacetalia alpinae</i> and <i>Galeopsietalia ladani</i>) 8210 Calcareous rocky slopes with chasmophytic vegetation 8220 Siliceous rocky slopes with chasmophytic vegetation 91A0 Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles 1355 Otter <i>Lutra lutra</i>	c. 11.4km south of the proposed development

²⁵ The versions of the conservation objectives documents referenced in this table are the most recent published versions at the time of writing.

European Site Name [Code] and its Qualifying Interest(s) / Special Conservation Interest(s) (*Priority Annex I Habitats)	Location Relative to the Proposed Development Site
NPWS (2017) <i>Conservation Objectives: Wicklow Mountains SAC 002122. Version 1.</i> National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.	
Red Bog, Kildare SAC [000397] 7140 Transition mires and quaking bogs NPWS (2019) <i>Conservation Objectives: Red Bog, Kildare SAC 000397. Version 1.</i> National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht.	c. 15km south of the proposed development
South Dublin Bay SAC [000210] 1140 Mudflats and sandflats not covered by seawater at low tide 1210 Annual vegetation of drift lines 1310 <i>Salicornia</i> and other annuals colonising mud and sand 2110 Embryonic shifting dunes NPWS (2013) <i>Conservation Objectives: South Dublin Bay SAC 000210. Version 1.</i> National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.	c. 16.4km east of the proposed development
North Dublin Bay SAC [000206] 1140 Mudflats and sandflats not covered by seawater at low tide 1210 Annual vegetation of drift lines 1310 <i>Salicornia</i> and other annuals colonising mud and sand 1330 Atlantic salt meadows (<i>Glauca-Puccinellietalia maritima</i>) 1395 Petalwort <i>Petalophyllum ralfsii</i> 1410 Mediterranean salt meadows (<i>Juncetalia maritimi</i>) 2110 Embryonic shifting dunes 2120 Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) 2130 Fixed coastal dunes with herbaceous vegetation (grey dunes) 2190 Humid dune slacks NPWS (2013) <i>Conservation Objectives: North Dublin Bay SAC 000206. Version 1.</i> National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.	c. 18.8km east of the proposed development
Special Protection Area (SPA)	
North Bull Island SPA [004006] A046 Light-bellied Brent Goose <i>Branta bernicla hrota</i> A048 Shelduck <i>Tadorna tadorna</i> A052 Teal <i>Anas crecca</i> A054 Pintail <i>Anas acuta</i> A056 Shoveler <i>Anas clypeata</i> A130 Oystercatcher <i>Haematopus ostralegus</i> A140 Golden Plover <i>Pluvialis apricaria</i> A141 Grey Plover <i>Pluvialis squatarola</i> A143 Knot <i>Calidris canutus</i>	c. 15.7km east of the proposed development

European Site Name [Code] and its Qualifying Interest(s) / Special Conservation Interest(s) (*Priority Annex I Habitats)	Location Relative to the Proposed Development Site
<p>A144 Sanderling <i>Calidris alba</i> A149 Dunlin <i>Calidris alpina</i> A156 Black-tailed Godwit <i>Limosa limosa</i> A157 Bar-tailed Godwit <i>Limosa lapponica</i> A160 Curlew <i>Numenius arquata</i> A162 Redshank <i>Tringa totanus</i> A169 Turnstone <i>Arenaria interpres</i> A179 Black-headed Gull <i>Croicocephalus ridibundus</i> A999 Wetlands & Waterbirds</p> <p>NPWS (2015) <i>Conservation Objectives: North Bull Island SPA 004006</i>. Version 1 National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.</p>	
<p>Wicklow Mountains SPA [004040] A098 Merlin <i>Falco columbarius</i> A103 Peregrine <i>Falco peregrinus</i></p> <p>NPWS (2020) <i>Conservation objectives for Wicklow Mountains SPA [004040]</i>. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht</p>	c. 12.3km south-east of the proposed development
<p>South Dublin Bay and River Tolka Estuary SPA [004024] A046 Light-bellied Brent Goose <i>Branta bernicla hrota</i> A130 Oystercatcher <i>Haematopus ostralegus</i> A137 Ringed Plover <i>Charadrius hiaticula</i> A141 Grey Plover <i>Pluvialis squatarola</i> A143 Knot <i>Calidris canutus</i> A144 Sanderling <i>Calidris alba</i> A149 Dunlin <i>Calidris alpina</i> A157 Bar-tailed Godwit <i>Limosa lapponica</i> A162 Redshank <i>Tringa totanus</i> A179 Black-headed Gull <i>Croicocephalus ridibundus</i> A192 Roseate Tern <i>Sterna dougallii</i> A193 Common Tern <i>Sterna hirundo</i> A194 Arctic Tern <i>Sterna paradisaea</i> A999 Wetland and Waterbirds</p> <p>NPWS (2015) <i>Conservation Objectives: South Dublin Bay and River Tolka Estuary SPA 004024</i>. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht</p>	c. 16.4km east of the proposed development

Appendix II

Planning policies/objectives relating to the protection of European sites and water quality

Eastern & Midland Regional Assembly, Regional Spatial & Economic Strategy 2019-2031

Regional Policy Objective 3.4

Ensure that all plans, projects and activities requiring consent arising from the Regional Spatial and Economic Strategy are subject to the relevant environmental assessment requirements including SEA, EIA and AA as appropriate. In addition the future strategic development of settlements throughout the Region will have full cognisance of the legal requirements pertaining to sites of International Nature Conservation Interest.

Regional Policy Objective 7.2

To achieve and maintain 'Good Environmental Status' for marine waters and to ensure the sustainable use of shared marine resources in the Region, and to promote the development of a cross-boundary and cross-border strategic management and stakeholder engagement framework to protect the marine environment.

Regional Policy Objective 7.10

Support the implementation of the Water Framework Directive in achieving and maintaining at least good environmental status for all water bodies in the Region and to ensure alignment between the core objectives of the Water Framework Directive and other relevant Directives, River Basin Management plans and local authority land use plans.

Regional Policy Objective 7.11

For water bodies with 'high ecological status' objectives in the Region, local authorities shall incorporate measures for both their continued protection and to restore those water bodies that have fallen below high ecological status and areas 'At Risk' into the development of local planning policy and decision making any measures for the continued protection of areas with high ecological status in the Region and for mitigation of threats to waterbodies identified as 'At Risk' as part of a catchment based approach in consultation with the relevant agencies. This shall include recognition of the need to deliver efficient wastewater facilities with sufficient capacity and thus contribute to improved water quality in the Region.

Regional Policy Objective 7.12

Future statutory land use plans shall include Strategic Flood Risk Assessment (SFRA) and seek to avoid inappropriate land use zonings and development in areas at risk of flooding and to integrate sustainable water management solutions (such as SuDS, nonporous surfacing and green roofs) to create safe places in accordance with the Planning System and Flood Risk Assessment Guidelines for Local Authorities.

Regional Policy Objective 7.15

Local authorities shall take opportunities to enhance biodiversity and amenities and to ensure the protection of environmentally sensitive sites and habitats, including where flood risk management measures are planned.

Regional Policy Objective 7.16

Support the implementation of the Habitats Directives in achieving an improvement in the conservation status of protected species and habitats in the Region and to ensure alignment between the core objectives of the EU Birds and Habitats Directives and local authority development plans.

Regional Policy Objective 7.22

Local authority development plan and local area plans, shall identify, protect, enhance, provide and manage Green Infrastructure in an integrated and coherent manner and should also have regard to the required targets in relation to the conservation of European sites, other nature conservation sites, ecological networks and protected species.

Regional Policy Objective 10.6

Delivery and phasing of services shall be subject to the required appraisal, planning and environmental assessment processes and shall avoid adverse impacts on the integrity of the Natura 2000 network.

Regional Policy Objective 10.7

Local authority core strategies shall demonstrate compliance with DHPLG Water Services Guidelines for local authorities and demonstrate phased infrastructure – led growth that is commensurate with the carrying

capacity of water services and prevent adverse impacts on the integrity of water dependent habitats and species within the Natura 2000 network.

Regional Policy Objective 10.10

Support Irish Water and the relevant local authorities in the Region to eliminate untreated discharges from settlements in the short term, while planning strategically for long term growth in tandem with Project Ireland 2040 and in increasing compliance with the requirements of the Urban Waste Water Treatment Directive from 39% today to 90% by the end of 2021, to 99% by 2027 and to 100% by 2040.

Regional Policy Objective 10.11

EMRA supports the delivery of the wastewater infrastructure set out in Table 10.2, subject to appropriate environmental assessment and the planning process.²⁶

Regional Policy Objective 10.12

Development plans shall support strategic wastewater treatment infrastructure investment and provide for the separation of foul and surface water networks to accommodate the future growth of the Region.

Regional Policy Objective 10.15

Support the relevant local authorities (and Irish Water where relevant) in the Region to improve storm water infrastructure to improve sustainable drainage and reduce the risk of flooding in the urban environment and in the development and provision at a local level of Sustainable Urban Drainage solutions.

Regional Policy Objective 10.16

Implement policies contained in the Greater Dublin Strategic Drainage Study (GDSDS), including SuDS.

Regional Policy Objective 10.18

Local authorities shall ensure adequate surface water drainage systems are in place which meet the requirements of the Water Framework Directive and the associated River Basin Management Plans.

Dún Laoghaire-Rathdown County Development Plan 2016-2022

Policy LHB19: Protection of Natural Heritage and the Environment

It is Council policy to protect and conserve the environment including, in particular, the natural heritage of the County and to conserve and manage Nationally and Internationally important and EU designated sites - such as Special Protection Areas, candidate Special Areas of Conservation, proposed Natural Heritage Areas and Ramsar sites - as well as non-designated areas of high nature conservation value which serve as 'Stepping Stones' for the purposes of Article 10 of the Habitats Directive.

Policy LHB20: Habitats Directive

It is Council policy to ensure the protection of natural heritage and biodiversity, including European sites that form part of the Natura 2000 network, in accordance with relevant EU Environmental Directives and applicable National Legislation, Policies, Plans and Guidelines.

Policy LHB22: Designated Sites

It is Council policy to protect and preserve areas designated as proposed Natural Heritage Areas, candidate Special Areas of Conservation, and Special Protection Areas. It is Council policy to promote the maintenance and as appropriate, delivery of 'favourable' conservation status of habitats and species within these areas.

Policy EI2: Wastewater Treatment and Appropriate Assessment

It is Council policy to provide adequate wastewater treatment facilities to serve the existing and future population of the County, subject to complying with the Water Framework Directive and the associated River Basin Management Plan or any updated version of this document, 'Water Quality in Ireland 2007-2009' (EPA 2011) or any updated version of the document, Pollution Reduction Programmes for Designated Shellfish Areas, the Urban Waste Water Treatment Directive and the Habitats Directive.

Policy EI3: Surface Water Drainage and Appropriate Assessment

²⁶ The Greater Dublin Drainage Project, the Regional Wastewater Treatment Plant Project, the M50/M60 Drainage Project and the Upper Liffey Valley Sewerage Scheme

It is Council policy to require that a Sustainable Drainage System (SuDS) is applied to any development and that site specific solutions to surface water drainage systems are developed, which meet the requirements of the Water Framework Directive and the associated River Basin Management Plans and 'Water Quality in Ireland 2007-2009' (EPA 2011) or any updated version of the document.

Fingal Development Plan 2017-2023

Objective NH10

Ensure that the Council takes full account of the requirements of the Habitats and Birds Directives, as they apply both within and without European Sites in the performance of its functions.

Objective NH11

Ensure that the Council, in the performance of its functions, takes full account of the objectives and management practices proposed in any management or related plans for European Sites in and adjacent to Fingal published by the Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.

Objective NH15

Strictly protect areas designated or proposed to be designated as Natura 2000 sites (i.e. Special Areas of Conservation (SACs) and Special Protection Areas (SPAs); also known as European sites) including any areas that may be proposed for designation or designated during the period of this Plan.

Objective SW04

Require the use of sustainable drainage systems (SuDS) to minimise and limit the extent of hard surfacing and paving and require the use of sustainable drainage techniques where appropriate, for new development or for extensions to existing developments, in order to reduce the potential impact of existing and predicted flooding risks.

Objective WQ01

Strive to achieve 'good status' in all waterbodies in compliance with the Water Framework Directive, the Eastern River Basin District Management Plan 2009-2015 and the associated Programme of Measures (first cycle) and to cooperate with the development and implementation of the second cycle national River Basin Management Plan 2017-2021.

Objective WQ04

Protect existing riverine wetland and coastal habitats and where possible create new habitats to maintain naturally functioning ecosystems whilst ensuring they do not impact negatively on the conservation objectives of any European Sites.

Objective WT01

Liaise with and work in conjunction with Irish Water during the lifetime of the plan for the provision, extension and upgrading of waste water collection and treatment systems in all towns and villages of the County to serve existing populations and facilitate sustainable development of the County, in accordance with the requirements of the Settlement Strategy and associated Core Strategy.

Objective WT02

Liaise with Irish Water to ensure the provision of wastewater treatment systems in order to ensure compliance with existing licences, EU Water Framework Directive, River Basin Management Plans, the Urban Waste Water Directive and the EU Habitats Directive.

South Dublin County Council Development Plan 2016-2022

HCL12 Objective 1

To prevent development that would adversely affect the integrity of any Natura 2000 site located within and immediately adjacent to the County and promote favourable conservation status of habitats and protected species including those listed under the Birds Directive, the Wildlife Acts and the Habitats Directive.

HCL12 Objective 2

To ensure that projects that give rise to significant direct, indirect or secondary impacts on Natura 2000 sites, either individually or in combination with other plans or projects, will not be permitted unless the following is robustly demonstrated in accordance with Article 6(4) of the Habitats Directive and S.177AA of the Planning and Development Act (2000 – 2010) or any superseding legislation:

1. There are no less damaging alternative solutions available; and

2. There are imperative reasons of overriding public interest (as defined in the Habitats Directive) requiring the project to proceed; and

3. Adequate compensatory measures have been identified that can be put in place.

IE Policy 1 Water & Wastewater

It is the policy of the Council to work in conjunction with Irish Water to protect existing water and drainage infrastructure and to promote investment in the water and drainage network to support environmental protection and facilitate the sustainable growth of the County.

IE1 Objective 1

To work in conjunction with Irish Water to protect, manage and optimise water supply and foul drainage networks in the County.

IE1 Objective 2

To work in conjunction with Irish Water to facilitate the timely delivery of ongoing upgrades and the expansion of water supply and wastewater services to meet the future needs of the County and the Region.

IE Policy 2 Surface Water & Groundwater

It is the policy of the Council to manage surface water and to protect and enhance ground and surface water quality to meet the requirements of the EU Water Framework Directive.

IE2 Objective 1

To maintain, improve and enhance the environmental and ecological quality of our surface waters and groundwater by implementing the programme of measures set out in the Eastern River Basin District River Basin Management Plan.

IE2 Objective 3

To maintain and enhance existing surface water drainage systems in the County and promote and facilitate the development of Sustainable Urban Drainage Systems (SUDS), including integrated constructed wetlands, at a local, district and County level, to control surface water outfall and protect water quality.

IE2 Objective 4

To incorporate Sustainable Urban Drainage Systems (SUDS) as part of Local Area Plans, Planning Schemes, Framework Plans and Design Statements to address the potential for Sustainable Urban Drainage at a site and/or district scale, including the potential for wetland facilities.

IE2 Objective 5

To limit surface water run-off from new developments through the use of Sustainable Urban Drainage Systems (SUDS) and avoid the use of underground attenuation and storage tanks.

IE2 Objective 6

To promote and support the retrofitting of Sustainable Urban Drainage Systems (SUDS) in established urban areas, including integrated constructed wetlands.

Dublin City Development Plan 2016-2022

GI23

To protect flora, fauna and habitats, which have been identified by Articles 10 and 12 of Habitats Directive, Birds Directive, Wildlife Acts 1976–2012, the Flora (Protection) Order 2015 S.I. No. 356 of 2015, European Communities (Birds and Natural Habitats) Regulations 2011 to 2015.

GI24

To conserve and manage all Natural Heritage Areas, Special Areas of Conservation and Special Protection Areas designated, or proposed to be designated, by the Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.

GI017

To seek the continued improvement of water quality, bathing facilities and other recreational opportunities in the coastal, estuarine and surface waters in the city and to protect the ecology and wildlife of Dublin Bay.

GI20

To seek continued improvement in water quality, bathing facilities and other recreational opportunities in the coastal, estuarine and surface waters in the city, having regard to the sensitivities of Dublin Bay and to protect the ecology and wildlife of Dublin Bay.

SI18

To require the use of Sustainable Urban Drainage Systems in all new developments, where appropriate, as set out in the Greater Dublin Regional Code of Practice for Drainage Works. The following measures will apply:

- The infiltration into the ground through the development of porous pavement such as permeable paving, swales, and detention basins
- The holding of water in storage areas through the construction of green roofs, rainwater harvesting, detention basins, ponds, and wetlands
- The slow-down of the movement of water.

Kildare County Development Plan 2017-2023

NH 4

Support the conservation and enhancement of Natura 2000 Sites including any additional sites that may be proposed for designation during the period of this Plan and to protect the Natura 2000 network from any plans and projects that are likely to have a significant effect on the coherence or integrity of a Natura 2000 Site.

NH 5

Prevent development that would adversely affect the integrity of any Natura 2000 site located within and immediately adjacent to the county and promote favourable conservation status of habitats and protected species including those listed under the Birds Directive, the Wildlife Acts and the Habitats Directive.

NH 6

Ensure an Appropriate Assessment, in accordance with Article 6(3) and Article 6(4) of the Habitats Directive and with DEHLG guidance (2009), is carried out in respect of any plan or project not directly connected with or necessary to the management of a Natura 2000 site to determine the likelihood of the plan or project having a significant effect on a Natura 2000 site, either individually or in combination with other plans or projects and to ensure that projects which may give rise to significant cumulative, direct, indirect or secondary impacts on Natura 2000 sites will not be permitted (either individually or in combination with other plans or projects) unless for reasons of overriding public interest.

WQ 1

Co-operate with the EPA and other authorities in the continued implementation of the EU Water Framework Directive and assist and co-operate with the lead authority for the River Basin Management Plan(s).

WQ 2

Ensure, through the implementation of the River Basin Management Plan(s) and the associated Programmes of Measures and any other associated legislation, the protection and improvement of all drinking water, surface water and ground waters throughout the county.

WQ 6

Protect recognised salmonid water courses in conjunction with Inland Fisheries Ireland such as the Liffey catchment, which are recognised to be exceptional in supporting salmonid fish species.

WW 4

Ensure that adequate wastewater services will be available to service development prior to the granting of planning permission. Applicants who are proposing to connect to the public wastewater network should consult with Irish Water regarding available capacity prior to applying for planning permission.

WW 12

Ensure that existing and permitted private wastewater treatment plants are operated in compliance with their wastewater discharge license, in order to protect water quality.

Wicklow County Development Plan 2016-2022

NH2

No projects giving rise to significant cumulative, direct, indirect or secondary impacts on Natura 2000 sites arising from their size or scale, land take, proximity, resource requirements, emissions (disposal to land, water or air), transportation requirements, duration of construction, operation, decommissioning or from any other effects shall be permitted on the basis of this plan (either individually or in combination with other plans or projects).

Except as provided for in Section 6(4) of the Habitats Directive, viz. There must be: a) no alternative solution available, b) imperative reasons of overriding public interest for the project to proceed; and c) Adequate compensatory measures in place.

NH3

To contribute, as appropriate, towards the protection of designated ecological sites including candidate Special Areas of Conservation (cSACs) and Special Protection Areas (SPAs); Wildlife Sites (including proposed Natural Heritage Areas); Salmonid Waters; Flora Protection Order sites; Wildfowl Sanctuaries (see S.I. 192 of 1979); Freshwater Pearl Mussel catchments; and Tree Preservation Orders (TPOs). To contribute towards compliance with relevant EU Environmental Directives and applicable National Legislation, Policies, Plans and Guidelines, including the following and any updated/superseding documents:

- EU Directives, including the Habitats Directive (92/43/EEC, as amended)⁷, the Birds Directive (2009/147/EC)⁸, the Environmental Liability Directive (2004/35/EC)⁹, the Environmental Impact Assessment Directive (85/337/EEC, as amended), the Water Framework Directive (2000/60/EC) and the Strategic Environmental Assessment Directive (2001/42/EC).
- National legislation, including the Wildlife Act 1976¹⁰, the European Communities (Environmental Impact Assessment) Regulations 1989 (SI No. 349 of 1989) (as amended), the Wildlife (Amendment) Act 2000, the European Union (Water Policy) Regulations 2003 (as amended), the Planning and Development Act 2000 (as amended), the European Communities (Birds and Natural Habitats) Regulations 2011 (SI No. 477 of 2011) and the European Communities (Environmental Liability) Regulations 2008¹¹.
- National policy guidelines (including any clarifying Circulars or superseding versions of same), including the Landscape and Landscape Assessment Draft Guidelines 2000, the Environmental Impact Assessment Sub-Threshold Development Guidelines 2003, Strategic Environmental Assessment Guidelines 2004 and the Appropriate Assessment Guidance 2010.
- Catchment and water resource management Plans, including Eastern and South Eastern River Basin Management Plan 2009-2015 (including any superseding versions of same).
- Biodiversity Plans and guidelines, including Actions for Biodiversity 2011-2016: Ireland's 2nd National Biodiversity Plan (including any superseding version of same).
- Ireland's Environment 2014 (EPA, 2014, including any superseding versions of same), and to make provision where appropriate to address the report's goals and challenges.

NH4

All projects and plans arising from this plan¹² (including any associated improvement works or associated infrastructure) will be screened for the need to undertake Appropriate Assessment under Article 6 of the Habitats Directive. A plan or project will only be authorised after the competent authority has ascertained, based on scientific evidence, Screening for Appropriate Assessment, and a Stage 2 Appropriate Assessment where necessary, that:

- 1) The Plan or project will not give rise to significant adverse direct, indirect or secondary effects on the integrity of any European site (either individually or in combination with other plans or projects); or
- 2) The Plan or project will have significant adverse effects on the integrity of any European site (that does not host a priority natural habitat type and / or a priority species) but there are no alternative solutions, and the plan or project must nevertheless be carried out for imperative reasons of overriding public interest, including those of a social or economic nature. In this case, it will be a requirement to follow procedures set out in legislation and agree and undertake all compensatory measures necessary to ensure the protection of the overall coherence of Natura 2000; or
- 3) The Plan or project will have a significant adverse effect on the integrity of any European site (that hosts a natural habitat type and/or a priority species) but there are no alternative solutions and the plan

or project must nevertheless be carried out for imperative reasons for overriding public interest, restricted to reasons of human health or public safety, to beneficial consequences of primary importance for the environment or, further to an opinion from the Commission, to other imperative reasons of overriding public interest. In this case, it will be a requirement to follow procedures set out in legislation and agree and undertake all compensatory measures necessary to ensure the protection of the overall coherence of Natura 2000.

NH5

To maintain the conservation value of all proposed and future Natural Heritage Areas (NHAs) and to protect other designated ecological sites in Wicklow.

Along with cSACs, SPAs and pNHA these include Salmonid Waters; Flora Protection Order sites; Wildfowl Sanctuaries (see S.I. 192 of 1979); Freshwater Pearl Mussel catchments; and Tree Preservation Orders (TPOs).

WI2

To protect existing and potential water resources of the County, in accordance with the EU Water Framework Directive, the River Basin Management Plans, the Groundwater Protection Scheme and source protection plans for public water supplies.

WI12

Ensure the implementation of Sustainable Urban Drainage Systems (SUDS) and in particular, to ensure that all surface water generated in a new development is disposed of on-site or is attenuated and treated prior to discharge to an approved surface water system.

WI6

In order to fulfil the objectives of the Core Strategy, Wicklow County Council will work alongside and facilitate the delivery of Irish Water's Water Services Investment Programme, to ensure that all lands zoned for development are serviced by an adequate wastewater collection and treatment system and in particular, to endeavour to secure the delivery of regional and strategic wastewater schemes. In particular, to support and facilitate the development of a WWTP in Arklow, at an optimal location following detailed technical and environmental assessment and public consultation.

WI7

Permission will be considered for private wastewater treatment plants for single rural houses where:

- the specific ground conditions have been shown to be suitable for the construction of a treatment plant and any associated percolation area;
- the system will not give rise to unacceptable adverse impacts on ground waters / aquifers and the type of treatment proposed has been drawn up in accordance with the appropriate groundwater protection response set out in the Wicklow Groundwater Protection Scheme (2003);
- the proposed method of treatment and disposal complies with Wicklow County Council's Policy for Wastewater Treatment & Disposal Systems for Single Houses (PE ≤ 10) and the Environmental Protection Agency "Waste Water Treatment Manuals"; and
- in all cases the protection of ground and surface water quality shall remain the overriding priority and proposals must definitively demonstrate that the proposed development will not have an adverse impact on water quality standards and requirements set out in EU and national legislation and guidance documents.

WI9

Private wastewater treatment plants for commercial / employment generating development will only be considered where:

- Irish Water has confirmed the site is due to be connected to a future public system in the area or Irish Water have confirmed there are no plans for a public system in the area;
- it can clearly be demonstrated that the proposed system can meet all EPA / Local Authority environmental criteria; and
- an annually renewed contract for the management and maintenance of the system is contracted with a reputable company / person, details of which shall be provided to the Local Authority.

Appendix III

Records of SCI species from the desktop study in the vicinity of the study area

Common Name/ Scientific Name	Legal Status ²⁷	Red List Status ²⁸	Source
Birds			
Black-headed gull <i>Chroicocephalus ridibundus</i>	WA	Red	NBDC online database record
Common coot <i>Fulica atra</i>	WA	Red	NBDC online database record
Common kingfisher <i>Alcedo atthis</i>	BD_I, WA	Amber	NBDC online database record
Common redshank <i>Tringa totanus</i>	WA	Red	NBDC online database record
Great cormorant <i>Phalacrocorax carbo</i>	WA	Amber	NBDC online database record
Herring gull <i>Larus argentatus</i>	WA	Red	NBDC online database record
Lesser black-backed gull <i>Larus fuscus</i>	WA	Amber	NBDC online database record
Little grebe <i>Tachybaptus ruficollis</i>	WA	Amber	NBDC online database record
Mallard <i>Anas platyrhynchos</i>	BD_II (I), III (I), WA	Green	NBDC online database record
Northern lapwing <i>Vanellus vanellus</i>	BD_II (II), WA	Red	NBDC online database record
Peregrine falcon <i>Falco peregrinus</i>	BD_I, WA	Red	NBDC online database record
Tufted duck <i>Aythya fuligula</i>	BD_II (I), III (II), WA	Amber	NBDC online database record

²⁷ HD_II/IV/V = Habitats Directive Annexes II/IV/V, WA = Wildlife Acts; BD_I/II/III = Birds Directive Annex I/II/III, OSPAR = Convention for the protection of the marine environment of the North-east Atlantic 1992

²⁸ Birds from Colhoun, K. & Cummins, S. (2013) Birds of Conservation Concern in Ireland 2014-2019. Irish Birds 9:523-544.

CHAPTER 7 - LAND, SOIL, GEOLOGY AND HYDROGEOLOGY**Appendix 7.1 Criteria for Rating Site Attributes – Estimation of Importance of Hydrogeological Attributes (National Roads Authority (NRA, 2009))****Table 1 Criteria for rating site importance of Geological Features (NRA)**

Importance	Criteria	Typical Example
Very High	Attribute has a high quality, significance or value on a regional or national scale Degree or extent of soil contamination is significant on a national or regional scale Volume of peat and/or soft organic soil underlying route is significant on a national or regional scale.	Geological feature rare on a regional or national scale (NHA) Large existing quarry or pit Proven economically extractable mineral resource
High	Attribute has a high quality, significance or value on a local scale. Degree or extent of soil contamination is significant on a local scale. Volume of peat and/or soft organic soil underlying route is significant on a local scale.	Contaminated soil on site with previous heavy industrial usage Large recent landfill site for mixed wastes Geological feature of high value on a local scale (County Geological Site) Well drained and/or high fertility soils Moderately sized existing quarry or pit Marginally economic extractable mineral resource
Medium	Attribute has a medium quality, significance or value on a local scale Degree or extent of soil contamination is moderate on a local scale Volume of peat and/or soft organic soil underlying route is moderate on a local scale	Contaminated soil on site with previous light industrial usage Small recent landfill site for mixed wastes Moderately drained and/or moderate fertility soils Small existing quarry or pit Sub-economic extractable mineral resource
Low	Attribute has a low quality, significance or value on a local scale Degree or extent of soil contamination is minor on a local scale. Volume of peat and/or soft organic soil underlying route is small on a local scale	Large historical and/or recent site for construction and demolition wastes. Small historical and/or recent landfill site for construction and demolition wastes. Poorly drained and/or low fertility soils. Uneconomically extractable mineral resource.

Table 2 Criteria for rating impact magnitude at EIS stage – Estimation of magnitude of impact on soil / geology attribute (NRA)

Magnitude of Impact	Criteria	Typical Examples
Large Adverse	Results in loss of attribute	Loss of high proportion of future quarry or pit reserves
Moderate Adverse	Results in impact on integrity of attribute or loss of part of attribute	Loss of moderate proportion of future quarry or pit reserves
Small Adverse	Results in minor impact on integrity of attribute or loss of small part of attribute	Loss of small proportion of future quarry or pit reserves
Negligible	Results in an impact on attribute but of insufficient magnitude to affect either use or integrity	No measurable changes in attributes
Minor Beneficial	Results in minor improvement of attribute quality	Minor enhancement of geological heritage feature
Moderate Beneficial	Results in moderate improvement of attribute quality	Moderate enhancement of geological heritage feature
Major Beneficial	Results in major improvement of attribute quality	Major enhancement of geological heritage feature

The NRA criteria for estimation of the importance of hydrogeological attributes at the site during the EIA stage are summarised in [Table 4](#) below.

Table 3 Criteria for rating Site Attributes - Estimation of Importance of Hydrogeology Attributes (NRA)

Magnitude of Impact	Criteria	Typical Examples
Extremely High	Attribute has a high quality or value on an international scale	Groundwater supports river, wetland or surface water body ecosystem protected by EU legislation e.g. SAC or SPA status
Very High	Attribute has a high quality or value on a regional or national scale	Regionally Important Aquifer with multiple well fields Groundwater supports river, wetland or surface water body ecosystem protected by national legislation – NHA status Regionally important potable water source supplying >2500 homes Inner source protection area for regionally important water source
	Attribute has a high quality or value on a local scale	Regionally Important Aquifer Groundwater provides large proportion of baseflow to local rivers Locally important potable water source supplying >1000 homes Outer source protection area for regionally important water source Inner source protection area for locally important water source
Medium	Attribute has a medium quality or value on a local scale	Locally Important Aquifer Potable water source supplying >50 homes Outer source protection area for locally important water source
Low	Attribute has a low quality or value on a local scale	Poor Bedrock Aquifer Potable water source supplying <50 homes

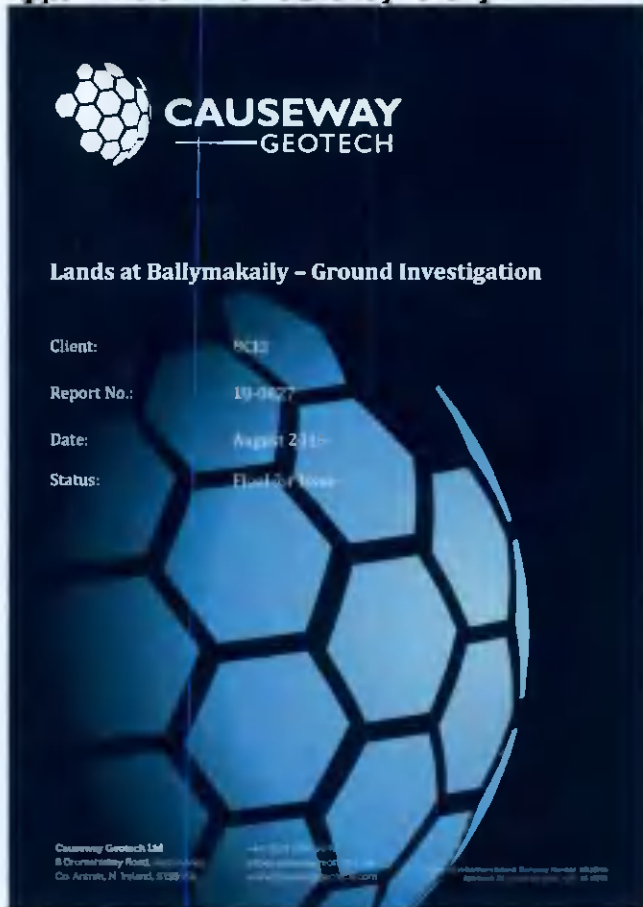
Table 4 Criteria for Rating Impact Significance at EIS Stage – Estimation of Magnitude of Impact on Hydrogeology Attribute (NRA)

Magnitude of Impact	Criteria	Typical Examples
Large Adverse	Results in loss of attribute and /or quality and integrity of attribute	Removal of large proportion of aquifer. Changes to aquifer or unsaturated zone resulting in extensive change to existing water supply springs and wells, river baseflow or ecosystems. Potential high risk of pollution to groundwater from routine run-off. Calculated risk of serious pollution incident >2% annually.
Moderate Adverse	Results in impact on integrity of attribute or loss of part of attribute	Removal of moderate proportion of aquifer. Changes to aquifer or unsaturated zone resulting in moderate change to existing water supply springs and wells, river baseflow or ecosystems. Potential medium risk of pollution to groundwater from routine run-off. Calculated risk of serious pollution incident >1% annually.
Small Adverse	Results in minor impact on integrity of attribute or loss of small part of attribute	Removal of small proportion of aquifer. Changes to aquifer or unsaturated zone resulting in minor change to water supply springs and wells, river baseflow or ecosystems. Potential low risk of pollution to groundwater from routine run-off. Calculated risk of serious pollution incident >0.5% annually.
Negligible	Results in an impact on attribute but of insufficient magnitude to affect either use or integrity	Calculated risk of serious pollution incident <0.5% annually.

Table 5: Rating of Significant Environmental Impacts at EIS Stage (NRA)

Importance of Attribute	Magnitude of Importance			
	Negligible	Small Adverse	Moderate Adverse	Large Adverse
Extremely High	Imperceptible	Significant	Profound	Profound
Very High	Imperceptible	Significant/moderate	Profound/Significant	Profound
High	Imperceptible	Moderate/Slight	Significant/moderate	Profound/Significant
Medium	Imperceptible	Slight	Moderate	Significant
Low	Imperceptible	Imperceptible	Slight	Slight/Moderate

Appendix 7.2 Lands at Ballymakilly - Ground Investigations



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APPENDICES

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Appendix C	Trial pit logs
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Appendix F	Indirect in-situ CBR test results
Appendix G	Geotechnical Laboratory test results
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Appendix I	SPT hammer energy measurement report

August 2018

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Document Control Sheet

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 Peter Ross HSE MS		 Stephen Franey RSc (Hons) MSc		 Daire O'Mahony RSc MSc MIEI	

The works were conducted in accordance with:

- BSI Specification for Ground Investigation 2nd Edition, published by ICE Publishing (2011)
- British Standards Institute (2015) BS 5930 2015, Code of practice for site investigations
- BS EN 1997-2:2007 Eurocode 7 Geotechnical design Part 2 Ground investigation and testing
- Geotechnical Society of Ireland (2016). Specification & Related Documents for Ground Investigation in Ireland

Laboratory testing was conducted in accordance with:

- British Standards Institute BS 1377 1990 parts 2, 4, 5, 7 and 9

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METHODS OF DESCRIBING SOILS AND ROCKS

Soil and rock descriptions are based on the guidance in BS5930:2015, The Code of Practice for Site Investigation.

Abbreviations used on exploratory bore logs	
SP	Normal 100mm diameter undisturbed open tube sample (thick walled sampler)
UT	Normal 100mm diameter undisturbed open tube sample (thin walled sampler)
F	Normal 700mm diameter undisturbed piston sample
R	Bulk disturbed sample
LR	Large bulk disturbed sample
I	Small disturbed sample
K	Core tube sample (sampled on the Field Record) (voids on the logs)
L	Liner sample from dynamic sampled borehole
W	Water sample
ES / EW	Soil sample for environmental testing / Water sample for environmental testing
SPT (q)	Standard penetration test using a split spoon sampler (small diameter sample obtained)
SPT (r)	Standard penetration test using of degree results only
N, N ₆₀ , C _u	Blow count (N) given by the summation of the blows (N) required to drive the full test length (100mm) through 150mm and the remaining blow to the 75mm increment of the test length. This length is referred to as the 'penetration length' for any test increment between 75mm.
N ₆₀	SPT blow count 'N' given by the summation of the blows (N) required to drive the full test length (100mm)
N ₆₀ (G)	Corrected standard penetration test where the full test length was not achieved. The blow 'N' represents the total blows for the given test length 'G' (mm)
V	Undisturbed shear strength
VR	Disturbed shear strength
CU	Date & water level at the borehole depth at the end of which soil was dry
Abbreviations relating to core core – reference Clause 10.4.4 of BS 5930:2015	
TR (%)	Total Core Recovery: Ratio of rock (soil) core recovered (both solid and non-solid) to the total length of core run
SCR (%)	Solid Core Recovery: Ratio of solid core to the total length of core run. Solid core has a full diameter, unreciprocated by natural discontinuities but just represents a full circumference and is measured along the core axis between natural fractures
RQD (%)	Rock Quality Designation: Ratio of total length of solid core pieces greater than 100mm to the total length of core run
F _i	Fracture Index: Number of natural discontinuities per metre or over an indicated length of core or similar length of fracturing
N _i	N _i is the total number of rock material was recovered (fragmented) by sample drill pipe to coarse gravel or smaller
AZCL	Assumed zone of voids: The estimated depth range where voids was not observed
PH	Hard surface fracture: A fracture of non-geological origin brought about by the rock being



Lands at Ballymakilly

1 AUTHORITY

On the Instructions of BCKL ("the Client"), a ground investigation was undertaken at the above location to provide geotechnical and environmental information for input to the design and construction of a proposed data centre.

This report details the work carried out both on site and in the geotechnical and chemical testing laboratories. It contains a description of the site and the works undertaken, the exploratory bore logs and the laboratory test results. A discussion on the recommendations for construction is also provided.

All information given in this report is based upon the ground conditions encountered during the site investigation works, and on the results of the laboratory and field tests performed. However, there may be conditions at the site that have not been taken into account, such as unpredictable soil strata, contaminant concentrations, and water conditions between or below exploratory holes. It should be noted that groundwater levels usually vary due to seasonal and/or other effects and may at times differ to those recorded during the investigation. No responsibility can be taken for conditions not encountered through the scope of work commissioned, for example between exploratory hole points, or beneath the termination depths achieved.

This report was prepared by Causeway Geotech Ltd for the use of the Client in response to a particular set of instructions. Any other parties using the information contained in this report do so at their own risk, and any duty of care to those parties is excluded.

2 SCOPE

The extent of the investigation, as instructed by the Client, included boreholes, trial pits, dynamic probing, soil and rock core sampling, environmental sampling, in-situ and laboratory testing, and the preparation of a report on the findings including recommendations for construction.

3 DESCRIPTION OF SITE

As shown on the site location plan in Appendix A, the works were conducted on the site of agricultural lands in west Dublin, just north of Baldornell Aerodrome. The site is bounded to the north by the Grand Canal, to the east by the R120 and to the south and west by agricultural fields. The site generally slopes downwards towards the north east.



4 SITE OPERATIONS

4.1 Summary of site works

Site operations, which were conducted between 23rd July and 21st August 2018, comprised:

- fifteen boreholes by dynamic sampling methods;
- a standpipe installation on six boreholes;
- nineteen dynamic probes;
- nineteen machine dug trial pits;
- indirect CBR tests at eighteen locations.

The exploratory notes and in-situ tests were located as instructed by the Client's Representative, as shown on the exploratory hole location plan in Appendix A.

4.2 Boreholes

Fifteen boreholes (BH01-BH15) were put down to completion by light percussion boring techniques using a Duro D-Terror dynamic sampling rig. The boreholes were put down initially in 150mm diameter, reducing in diameter with depth as required, down to 50mm by use of the smallest sampler.

The boreholes were taken to depths ranging between 0.5m and 3.4m where they were terminated after encountering virtual refusal on obstructions above their scheduled depth.

Standard penetration tests were carried out in accordance with BS EN 22476-3:2005 at standard depth intervals using the split spoon sampler (SPS) or solid cone attachment (SPC). The penetrations are stated for those tests for which the full 150mm sampling drive or 300mm test drive was not possible. The R_f values provided on the borehole logs are uncorrected and no allowance has been made for energy ratio corrections. The SPT hammer energy measurement report is provided in Appendix I.

Disturbed (bulk and small bag) samples were taken within the encountered strata. Environmental samples were taken at standard intervals.

Any water strikes encountered during boring were recorded along with any changes to their levels as the borehole proceeded. Details of the water strikes are presented on the individual borehole logs.

Appendix B presents the borehole logs.



4.3 Standpipe installations

A groundwater monitoring standpipe was installed in boreholes BH05, BH09, BH10, BH11, BH14 and BH15.

Details of the installations, including the depth range of the response zone, are provided in Appendix B on the individual borehole logs.

4.4 Trial Pits

Nineteen trial pits (TP01-TP19) were excavated using an 8t tracked excavator fitted with a 600mm wide bucket, to depths ranging between 0.40m and 2.5m where they were terminated on obstructions.

Disturbed (small jar and bulk bag) samples were taken at standard depth intervals and at change of strata.

Environmental samples were taken at depths of 0.5m and 1.5m in each trial pit.

Any water strikes encountered during excavation were recorded along with any changes to their levels as the excavation proceeded. The stability of the trial pit walls was noted on completion.

Appendix C presents the trial pit logs with photographs of the pits and arching provided in Appendix D.

4.5 Dynamic Probes

Nineteen dynamic probes were conducted adjacent to trial pits using the DPSPB method as described in BS EN ISO 22476-2:2005. The method entails a 62.5kg hammer falling 0.75m onto a 50.5mm diameter cone with an apex angle of 90°.

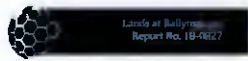
Appendix E provides the dynamic probe logs on the sheet following the relevant borehole log in the form of plots, against depth, of the number of blows per 100mm penetration.

4.6 Indirect CBR tests

An indirect CBR test was conducted at eighteen locations (TP02-TP19) adjacent to the trial pits using a Dynamic Cone Penetrometer (DCP). The equipment was developed in conjunction with the UK Transport Research Laboratory, is used widely throughout the world, and is referred to in the UK Highway Agency Interim Advice Note 73/06. A DCP test was not undertaken at TP01 due to the presence of made ground.

The test results are presented in Appendix F in the form of plots of the variation with depth of the penetration per blow. Straight lines have been fitted to the plots and the CBR for each depth range estimated using the following relationships as proposed by Kleyn & Van Heerden (1983):

$$\text{Log CBR} = 2.632 - 1.28 \text{ Log } (\text{m}/\text{blow})$$



The frequently elevated CBR values are a consequence of the coarse-grained content of the penetrated soils and are often not representative of the soil matrix.

6.7 Surveying

The as-built exploratory hole positions were surveyed following completion of site operations by a Site Engineer from Causeway Geotech. Surveying was carried out using a Trimble R4 GPS system employing VRS real time kinematic (RTK) techniques.

The plan coordinates (Irish National Grid) and ground elevations (eOD Mean) at each location are recorded on the individual exploratory hole logs. The exploratory hole plan presented in Appendix A shows these as built positions.

5 LABORATORY WORK

Upon their receipt in the laboratory, all disturbed samples were carefully examined and accurately described, and their descriptions incorporated into the borehole logs.

5.1 Geotechnical laboratory testing of soils

Laboratory testing of soils comprised:

- soil classification, moisture content measurement, Atterberg Limit Tests and particle size distribution analysis.
- soil chemistry: pH and water-soluble sulphate content.

Laboratory testing of soils samples was carried out in accordance with British Standards (reference BS 1377, Methods of test for soils for civil engineering purposes: Part 1 (2016), and Parts 2-9 (1990)).

The test results are presented in Appendix G.

5.2 Environmental laboratory testing of soils

Environmental testing was conducted on selected environmental soil samples by Chemtest at its laboratory in Newmarket, Suffolk.

Testing was carried out for a range of determinands, including:

- Metals
- Speciated total petroleum hydrocarbons (TPH)



- Speciated polycyclic aromatic hydrocarbons (PAH)
- Cyanides
- Asbestos screen
- pH.

Results of environmental laboratory testing are presented in Appendix M.

6 GROUND CONDITIONS

6.1 General geology of the area

Published geological mapping indicates the superficial deposits underlying the site comprise Glacial Till. These deposits are underlain by limestones and shales of the Lurgan Formation.

6.2 Ground types encountered during investigation of the site

A summary of the ground types encountered in the exploratory holes is listed below, in approximate stratigraphic order:

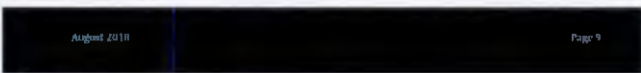
- **Topsoil:** encountered typically in 200-400mm thickness across the site.
- **Made Ground (MG):** reworked clay fill with fragments of red brick, plastic, steel, fabric and concrete. Encountered only in TP03 to a depth of 1.6m, close to the canal.
- **Glacial Till:** sandy gravelly clay, frequently with low silt/clay content, typically firm or stiff in upper horizons, becoming very stiff with increasing depth. Contains localised pockets of granular material, consisting of sandy clayey gravel.

6.3 Groundwater

Groundwater was encountered during percussion boring through soil and in trial pits as water strikes as shown in Table 1 below.

Table 1 Groundwater strikes encountered during ground investigations

GI Ref	Water strike (mgl)	Comments
TP12	2.2	Seepage
TP14	3.1	Seepage
TP15	2.6	Seepage
TP16	1.9	Seepage





Details of the individual groundwater strikes, along with any relative changes in levels as works proceeded, are presented on the exploratory hole logs for each location.

Groundwater was not noted during drilling at any of the borehole locations. However, it should be noted that the casing used in supporting the borehole walls during drilling may have sealed out any groundwater strikes encountered and the possibility of encountering groundwater during excavation works should not be ruled out. Seasonal variation to groundwater levels should also be factored into design considerations.

Continued monitoring of the six installed standpipes will give an indication of the seasonal variation in groundwater level.

7 DISCUSSION

7.1 Proposed construction

It is proposed to construct a new data centre on the site.

No further details were available to Causeway Geotech at the time of preparing this report and any designs based on the recommendations or conclusions within this report should be completed in accordance with the current design codes, taking into account the variations and the specific details contained within the exploratory holes. Causeway Geotech were commissioned to provide a geotechnical report, and it is our wish to advise on a structure design.

7.2 Recommended foundations for construction

7.2.1 Summary

Based on the presence of silt/clay fill and possible bedrock at relatively shallow depths across the footprint of the proposed building, the implementation of traditional shallow (spread) foundations (strip/pad) are considered suitable.

7.2.2 Soil strength parameters

When estimating the shear strength of fine soils (silt/clay), reference is made to the results of Standard Penetration Tests (SPT's) carried out within the boreholes. The undrained shear strength of fine soils can be estimated using the correlation developed by Skempton & Butler:

$$c_u = 0.3 \times N$$

where f_u is typically in the range 4 to 6. A median f_u value of 5 is adopted for this report.



For granular soils (sand/gravel), a graphical relationship between SPT "N" value and angle of shearing resistance, ϕ , has been developed by Peck, Hanson and Thornburn. This is published in Foundation Design and Construction (Tomlinson, 2001) and is referenced in this report when deriving angles of shearing resistance for the gravel soils.

7.2.3 Bearing resistance

The ultimate bearing resistance for conventional strip or pad foundations can be obtained from British Standard's general equation:

$$q_{ult} = cN_c s_c d_c l_c b_c + p_o N_q s_q d_q l_q b_q + \frac{1}{2} \gamma B N_\gamma s_\gamma d_\gamma l_\gamma b_\gamma$$

where:

- q_u = ultimate bearing resistance
- c = undrained cohesion of soil
- B = foundation width
- p_o = effective overburden pressure at foundation level
- N_c, N_q, N_γ = bearing capacity factors
- s_c, s_q, s_γ = shape factors
- d_c, d_q, d_γ = depth factors
- l_c, l_q, l_γ = load inclination factors
- b_c, b_q, b_γ = base inclination factors

For conventional strip and pad foundations constructed on fine soils, the general equation has been simplified by Terzaghi to:

$$Net\ ultimate\ bearing\ resistance = c + N_c$$

where:

- c = undrained cohesion
- N_c = bearing capacity factor

For cohesionless soils (sand/gravel, $c=0$), the calculation of ultimate bearing resistance is generally required only for loose sands. This is because coarser gravel soils would not be expected to suffer a bearing capacity failure. However, limits are placed on the allowable bearing resistance in order to control settlement. For shallow conventional pad foundations on granular soils, Terzaghi's simplified equation can be used as follows:

$$q_u = (p_o N_c - 1) + 0.4 B N_c + p$$



where
 p = total overburden pressure

It is obvious from the equations 1 to 3 that some knowledge of the foundation width and depth is required before the ultimate bearing resistance can be calculated.

Table 1 provides an indication of minimum founding depth at each borehole location. Also shown are approximate soil strengths based on the Stroud and Butler [1975] correlations with SPT N-values and visual examination of recovered samples of the clay deposits.

The table also suggests allowable bearing resistance using Equations 2 and 3 for cohesive and cohesionless soils respectively.

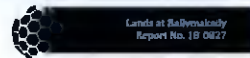
This table does not take into account the variations in soil composition, and the effects of differential movement within a particular structure. Calculation of the design bearing resistance over the entire structure will require a knowledge of the magnitude and distribution of the structural actions.

7.2.4 Foundations and ground floor construction

Foundations should transfer loading to below any Made Ground or subsoil. The recommended foundation construction and allowable bearing pressure (ABP) at the borehole locations are presented in Table 1

Table 1- Construction recommendations

Borehole	Depth below EGL* to suitable bearing stratum	Estimated ABP (kPa)	Strata description	Foundation type	Ground floor construction	Groundwater
BH01	1.0m	>250	Stiff Glacial Till/Possible bedrock	Strip & pad	Ground bearing	Not encountered
BH02	1.20m	>250	Stiff Glacial Till	Strip & pad	Ground bearing	Not encountered
BH03	1.30m	>250	Stiff Glacial Till	Strip & pad	Ground bearing	Not encountered
BH04	1.20m	230	Stiff Glacial Till	Strip & pad	Ground bearing	Not encountered
BH05	1.20m	360	Stiff Glacial Till	Strip & pad	Ground bearing	Not encountered
BH06	0.50m	>250	Possible bedrock	Strip & pad	Ground bearing	Not encountered



Borehole	Depth below EGL* to suitable bearing stratum	Estimated ABP (kPa)	Strata description	Foundation type	Ground floor construction	Groundwater
BH07	2.0m	>250	Stiff Glacial Till	Strip & pad	Ground bearing	Not encountered
BH08	1.20m	220	Stiff Glacial Till	Strip & pad	Ground bearing	Not encountered
BH09	1.20m	>250	Stiff Glacial Till	Strip & pad	Ground bearing	Not encountered
BH10	1.20m	200	Stiff Glacial Till	Strip & pad	Ground bearing	Not encountered
BH11	1.20m	>250	Stiff Glacial Till	Strip & pad	Ground bearing	Not encountered
BH12	1.20m	>250	Stiff Glacial Till	Strip & pad	Ground bearing	Not encountered
BH13	1.20m	>250	Stiff Glacial Till	Strip & pad	Ground bearing	Not encountered
BH14	1.20m	130	Firm Glacial Till	Strip & pad	Ground bearing	Not encountered
	2.0m	>250	Stiff Glacial Till			
BH15	1.20m	200	Stiff Glacial Till	Strip & pad	Ground bearing	Not encountered

*Existing Ground Level

Based on the findings of the site investigation, spread foundations (strip/pad) are considered suitable with estimated allowable bearing pressures between 130kPa and >250kPa at depths between 0.5m and 3.5m on stiff glacial till or possible bedrock. If foundations are designed to be constructed on bedrock, it is recommended that rotary drilling to undertake determine rock strength across the site, as this will aid in design.

The base of foundation excavations should be thoroughly inspected, any soft soil should be removed with the resultant void backfilled with S11 concrete. A consistent bearing stratum should be provided for any building unit to limit differential settlements.

Given the generally fine grained/cohesive nature of the soils throughout the proposed formation levels, excavations for foundations are likely to be relatively stable. However any instability can be minimised by battering the side slopes at 2 vertical to 1 horizontal and by limiting the duration that the excavation is open. Groundwater control, where required, will be possible by pumping from sumps formed in the base of excavations.



7.2.5 Floor slabs

Floor slabs should not bear directly onto Made Ground or soft soils. The use of ground bearing floor slabs is only appropriate following the removal of any surface Made Ground and soft clay layers and their replacement using well-graded well-compacted granular fill. However, a suspended floor slab should be adopted where the difference in levels of the proposed floor and the base of Made Ground/soft soils is greater than 600mm.

7.2.6 Excavations for services

For the installation of services ducts/trenches, it is suggested that open trenching will be the most practicable construction method. Generally speaking, the ground conditions should render the use of open trenching by backhoe excavator possible. Localised rock breaking may be required depending on the invert level of services in the west of the site. This may be possible using a hydraulic rock breaker depending on the strength of the rock.

When working in open trenches, it is thought that trench support systems, by way of a trench box may be required to maintain trench stability and safe working conditions. Groundwater control at these locations should be possible by means of sump pumping.

To preclude the eventuality of differential settlements in pipes, they should be laid on a consistent stratum of appropriate allowable bearing capacity and protected with appropriate fill cover.

Where ducts and chambers must be installed in areas where localised soft spots are encountered, the use of geogrid reinforcement along the base of the very soft/soft soil (e.g. peat) below the trench base is recommended. This will stiffen the base of the trench and help control longitudinal differential settlement.

Backfilling of trenches may be completed by using compacted CI 804 granular fill and reinstated as appropriate.

7.2.7 Soil aggressivity

An assessment of the Aggressive Chemical Environment for Concrete (ACEC) was undertaken through reference to the Building Research Establishment (BRE) Special Digest 1 (2017).

As noted by BRE Special Digest 1 sulphates in the soil and groundwater are the chemical agents most likely to attack concrete. The extent to which sulphates affect concrete is linked to their concentrations, the type of ground, the presence of groundwater, the type of concrete and the form of construction in which concrete is used.

BRE Special Digest 1 identifies four different categories of site which require specific procedures for investigation for aggressive ground conditions.

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- Sites not subjected to previous industrial development and not perceived as containing pyrite.
- Sites not subjected to previous industrial development and perceived as containing pyrite.
- Brownfield sites not perceived as containing pyrite.
- Brownfield sites perceived as containing pyrite.

For the purposes of this report the site was classified as not having been subject to previous industrial development and perceived as potentially containing pyrite.

The results of chemical tests (pH and water-soluble sulphate content) on soil samples indicate Design Sulphate Class DS-1 and ACEC Class AC-1 - reference Table C1 of BRE Special Digest 1 (Building Research Establishment, 2005). The Special Digest does not require any measures to protect underground concrete elements greater than 140mm thick.

7.2.8 Access roads, car parks and hard standing

Based on the strata descriptions and the results of in-situ (direct CBR tests) [DCP], the following design CBR values are appropriate:

- less than 4% at locations where the sub-grade is formed in Made Ground, requiring a 600mm thick capping.
- A value of 4% at depth of 8m, inappropriate where stiff Clastic Till is encountered at sub-formation level.

Although the CBR value increases with depth, with a value of above 5% below a depth of 300mm, the required construction thickness should be determined by the minimum long-term equilibrium CBR value of the Clastic Till. The value of 4% stated for a depth of 300mm is based on the soil plasticity, as per Table 2.1 of volume 7 section 2 of the Design Manual for Roads and Bridges, assuming average construction conditions. A CBR of 4% requires a 300mm thick capping layer.

The use of geotextiles in the construction of paved areas, will be beneficial, particularly in areas of Made Ground. These could include a geotextile (e.g. a geogrid) at subgrade level with further benefit gained by incorporating further layer(s) within the capping/sub-base layer.

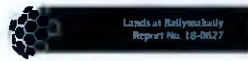
7.3 Site contamination and waste disposal

Selected soil samples were analysed for a range of potential contaminants including:

- Metals.
- Speciated total petroleum hydrocarbons (TPH).
- Speciated polycyclic aromatic hydrocarbons (PAH).
- Cyanides.

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- Sulphates and sulphide;
- Phenols; and
- Asbestos screening.

Samples were also tested for a Waste Acceptance Criteria (WAC) test to assess the potential categorisation of waste from the site.

In the initial examination of the potential risk of site contamination, the laboratory results have been compared to the following available assessment criteria relevant to the proposed land use:

- The Environment Agency Soil Guideline Values (SGVs) published in 2009. These relate to arsenic, mercury, selenium, cadmium, benzene, toluene, ethylbenzene, xylene, and phenol.

The results from these selected samples do not identify significantly elevated concentrations above the SGVs where criteria are available.

It should be noted that the above assessment is based on the results of the tested soil samples against publicly available criteria. No further assessment has been undertaken where criteria are not available. Any potential contamination identified during site development by visual or olfactory means should be investigated, including further laboratory testing, and appropriate health & safety, waste disposal and remediation measures adopted.

In assessment of the disposal of waste, the test results have been compared with the European Union Directive limits for inert waste landfill, Stable, Non-reactive hazardous waste in non-hazardous landfill and hazardous waste landfill criteria.

From the thirty samples tested for WAC analysis, material from the site may potentially be classified as non-hazardous. It is noted however that any material excavated for off-site disposal would a Waste Classification following the guidance in the National Hazardous Waste Management Plan (EPA, 2014).

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BS EN ISO 14688-1:2018. Geotechnical investigation and testing. Identification and classification of soil. Part 1 Identification and description. British Standards Institution.

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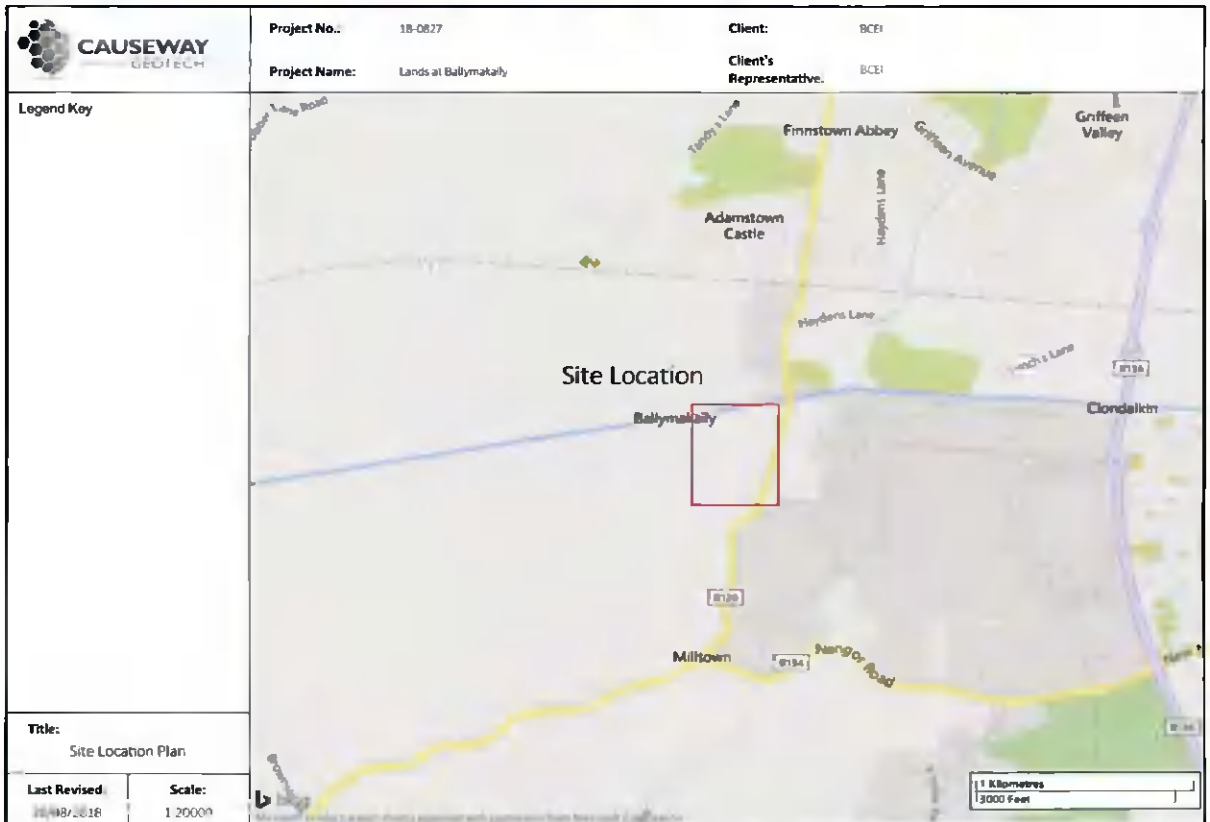
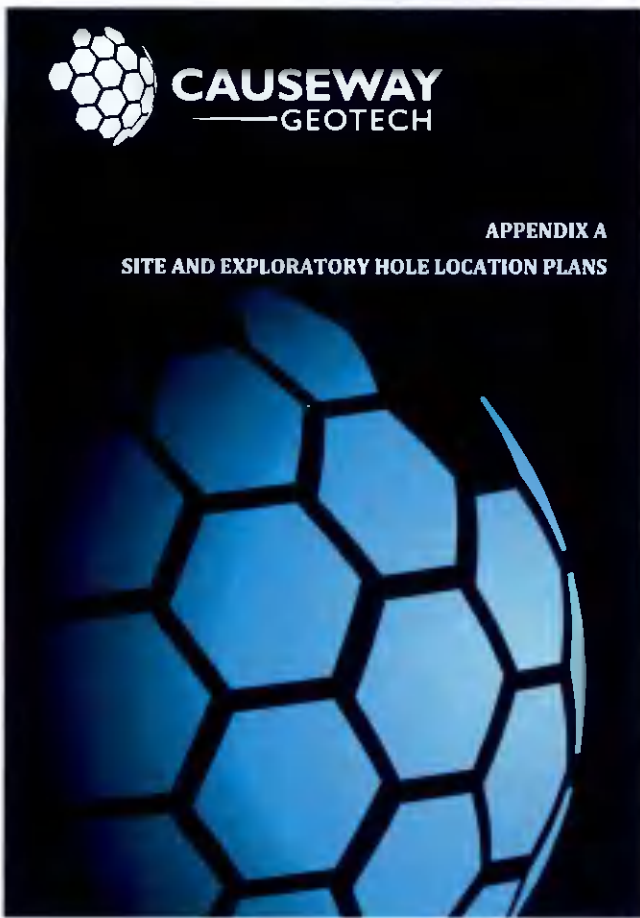
BS EN ISO 22476-3:2005+A1:2011. Geotechnical investigation and testing. Field testing. Standard penetration test.

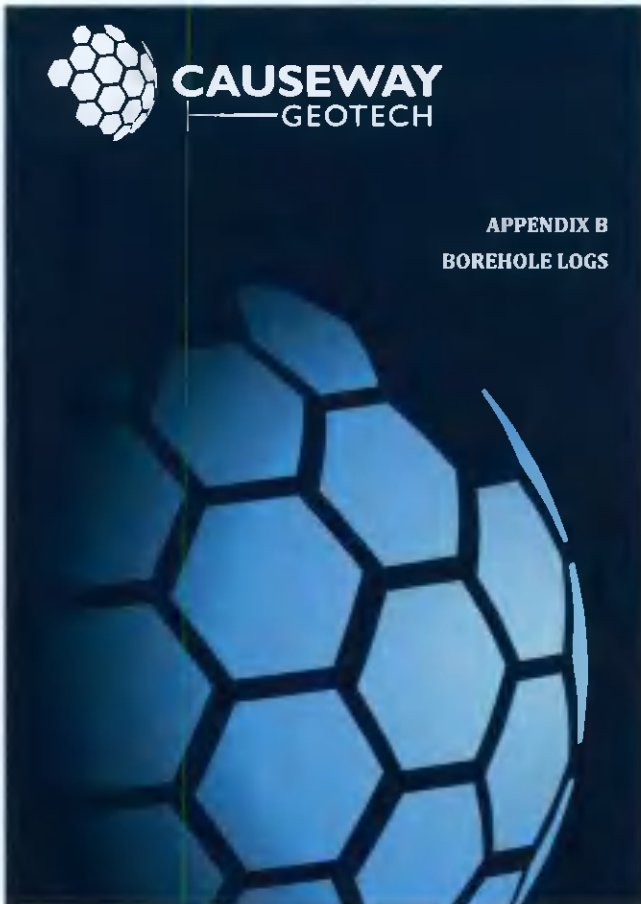
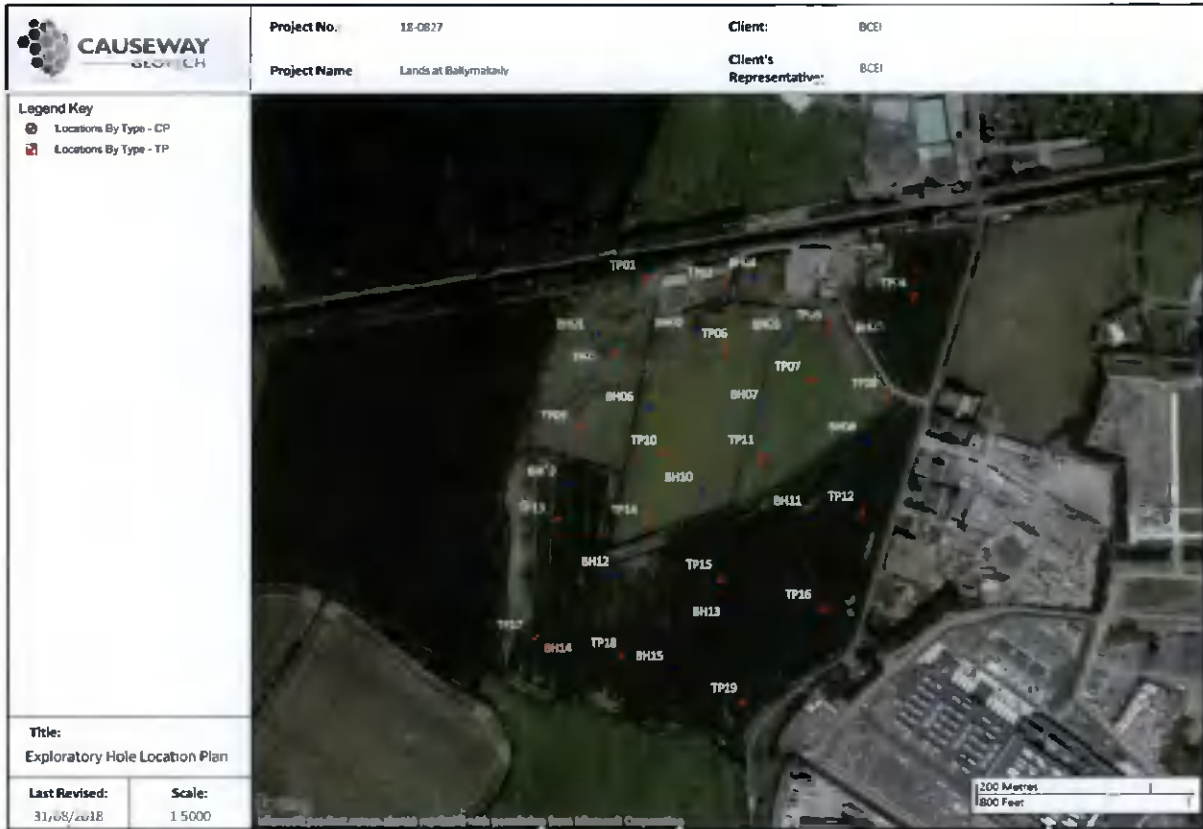
Building Research Establishment (2005) BRE Special Digest 3, Concrete to aggressive ground.

Contaminated Land Report (CLR) 11 (2009) Model Procedures for the Management of Land Contamination, The Department for Environment, Food and Rural Affairs (Defra) and the Environment Agency.

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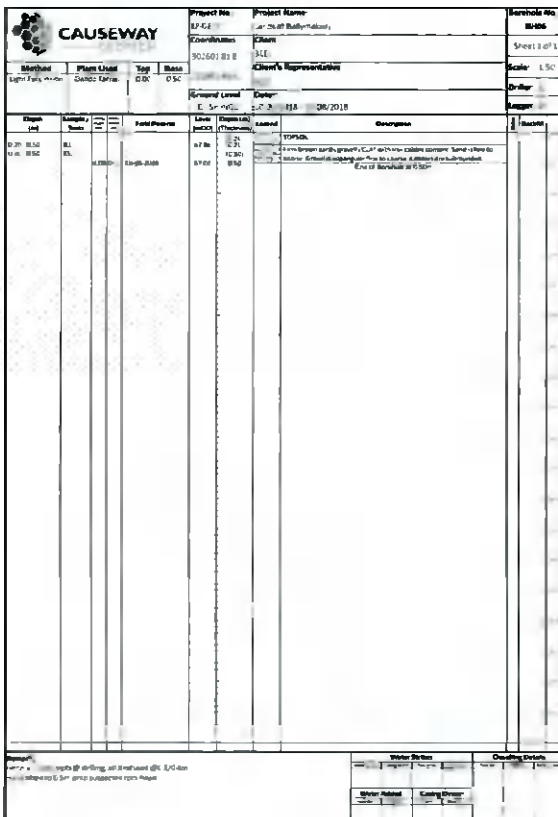
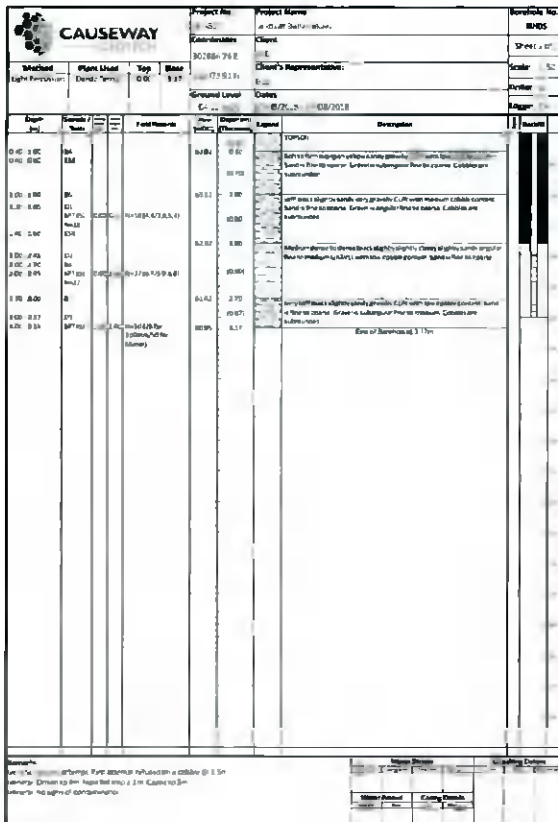


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Coordinates: 62343 55 E					Client:	Scale: 1:50	Sheet 3 of 4	
Method: Depth: 1.00m, Plant Used: DPC, Top: 1.00, Base: 1.00					Client's Representative:	Driller: J.	Logger: J.	
Ground Level: E2 40 000					Date: 11-10-2018	Logger: J.		
Depth (m)	Sample No.	Field No.	Hand Number	Level (m)	Depth (m)	Legend	Description	Notes
at 1.00 to 0.00	02 03			0.00	0.00		TOPSOIL	
0.00 to 1.00	04 05			0.06	0.06			
				0.26	0.26			
Note: Soil sample taken at 0.06m depth with a Dibble @ 5cm intervals.								

CAUSEWAY					Project No.	Project Name	Worksheet No.	
					18-05	at Ballinacorney	0902	
Coordinates: 62355 81 E					Client:	Scale: 1:50	Sheet 1 of 4	
Method: Depth: 1.00m, Plant Used: DPC, Top: 1.00, Base: 1.00					Client's Representative:	Driller: J.	Logger: J.	
Ground Level: E2 40 000					Date: 11-10-2018	Logger: J.		
Depth (m)	Sample No.	Field No.	Hand Number	Level (m)	Depth (m)	Legend	Description	Notes
at 1.00 to 0.00	06 07			0.00	0.00			
0.00 to 1.00	08 09			0.20	0.20			
1.00 to 2.00	10 11			0.30	0.30			
2.00 to 3.00	12 13			0.40	0.40			
3.00 to 4.00	14 15			0.50	0.50			
4.00 to 5.00	16 17			0.60	0.60			
Note: Soil sample taken at 0.60m depth with a Dibble @ 5cm intervals.								

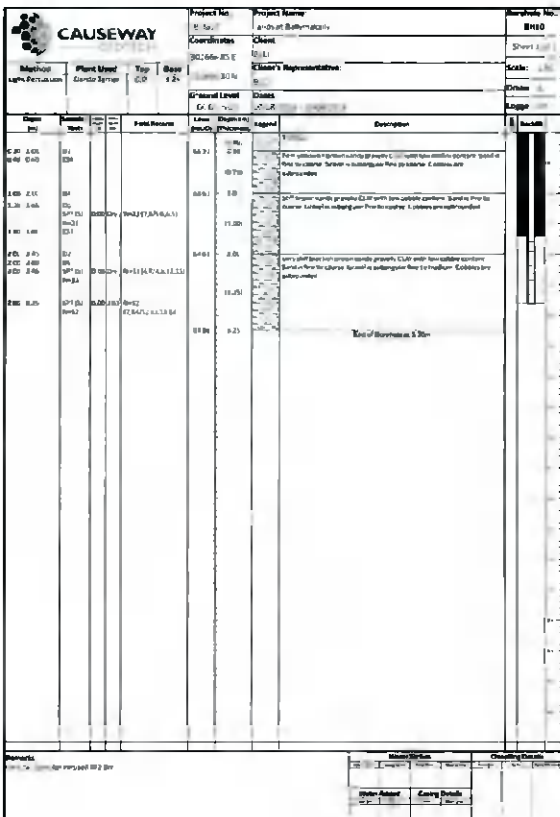
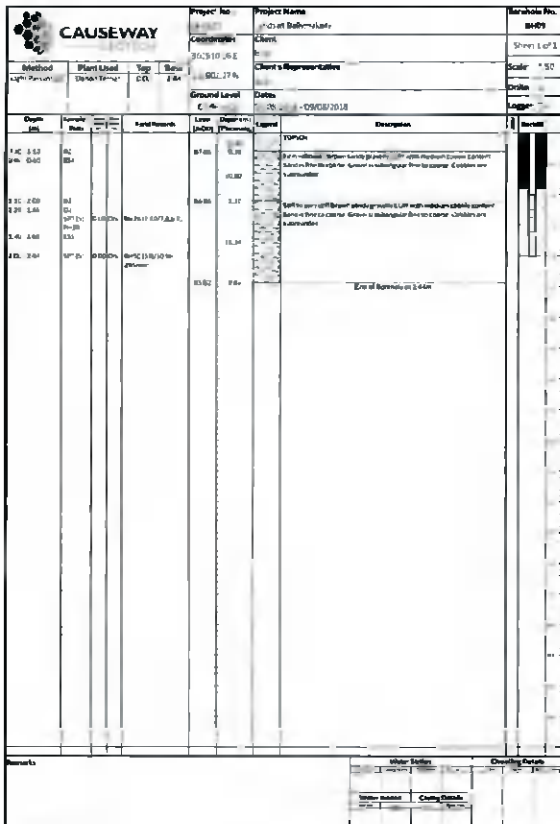
Method		Plant Used	Tag	Scale	Project No	Project Name	Sheet No	
Light Photogrammetry		Leica Station	0.50	1:50	18-06.7	Lot 1 at Balfourpark	BMS4	
Coordinates		Easting		North		Sheet 1 of 1		
827761.57 E		57271.87 E		57271.87 E		Scale 1:50		
Client & Representative		Date		Project		Author		
Client & Representative		Date		Project		Author		
Ground Level		Easting		North		Project		
57.27187 E		57.27187 E		57.27187 E		Project		
Depth (m)	Sample No	Plant	Point Name	Level (m)	Depth (m)	Layer	Description	Notes
0.20 - 0.30	83			58.27	0.30	TOPSOIL		
0.40 - 0.50	83			58.27	0.30		1.0m yellow brown sandy gravelly CLM with low soluble content. Some fine to coarse sand & siltstone fragments. Claystone and siltstone.	
1.00 - 1.70	84			58.73	0.50		Very soft grey brown sandy gravelly CLM with low soluble content. Some fine to coarse sand & siltstone fragments. Claystone and siltstone.	
1.80 - 1.90	85			58.83	0.50		Very soft grey brown sandy gravelly CLM with low soluble content. Some fine to coarse sand & siltstone fragments. Claystone and siltstone.	
1.90 - 2.00	86			58.93	0.50		Very soft grey brown sandy gravelly CLM with low soluble content. Some fine to coarse sand & siltstone fragments. Claystone and siltstone.	
2.00 - 2.10	87			59.03	0.50		Very soft grey brown sandy gravelly CLM with low soluble content. Some fine to coarse sand & siltstone fragments. Claystone and siltstone.	
2.10 - 2.20	88			59.13	0.50		Very soft grey brown sandy gravelly CLM with low soluble content. Some fine to coarse sand & siltstone fragments. Claystone and siltstone.	
End of Borehole at 2.1m								

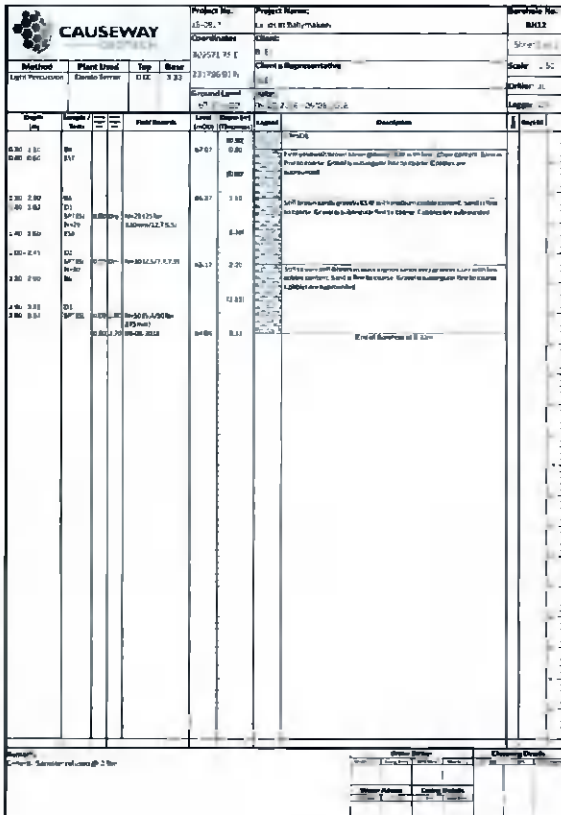
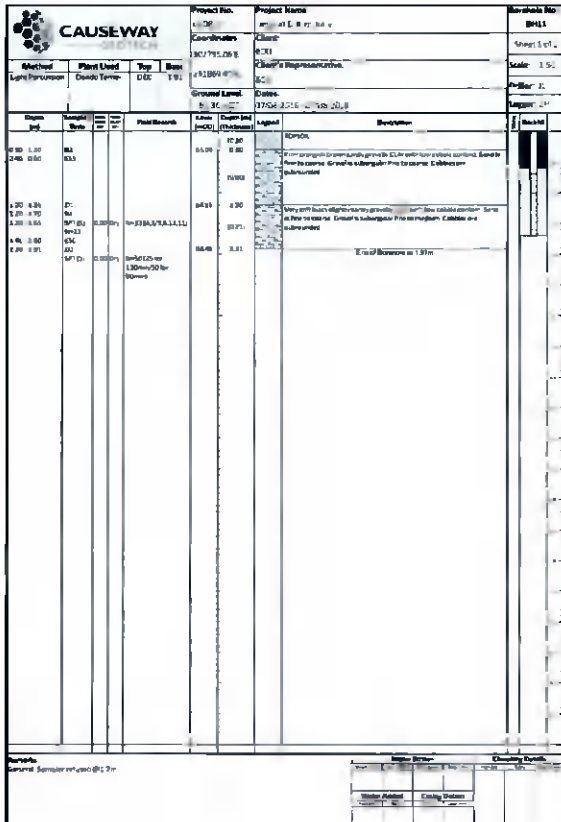
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Light Photogrammetry		Leica Station	0.50	1:50	18-06.7	Lot 1 at Balfourpark	BMS4	
Coordinates		Easting		North		Sheet 1 of 1		
827721.87 E		57271.87 E		57271.87 E		Scale 1:50		
Client & Representative		Date		Project		Author		
Client & Representative		Date		Project		Author		
Ground Level		Easting		North		Project		
57.27187 E		57.27187 E		57.27187 E		Project		
Depth (m)	Sample No	Plant	Point Name	Level (m)	Depth (m)	Layer	Description	Notes
0.70 - 1.00	82			60.40	0.30	TOPSOIL		
0.40 - 0.50	83			60.50	0.30		1.0m yellow brown sandy gravelly CLM with low soluble content. Some fine to coarse sand & siltstone fragments. Claystone and siltstone.	
1.00 - 1.70	84			60.76	1.00		Very soft grey brown sandy gravelly CLM with low soluble content. Some fine to coarse sand & siltstone fragments. Claystone and siltstone.	
1.80 - 1.90	85			60.86	0.50		Very soft grey brown sandy gravelly CLM with low soluble content. Some fine to coarse sand & siltstone fragments. Claystone and siltstone.	
1.90 - 2.00	86			60.96	0.50		Very soft grey brown sandy gravelly CLM with low soluble content. Some fine to coarse sand & siltstone fragments. Claystone and siltstone.	
2.00 - 2.10	87			61.06	0.50		Very soft grey brown sandy gravelly CLM with low soluble content. Some fine to coarse sand & siltstone fragments. Claystone and siltstone.	
2.10 - 2.20	88			61.16	0.50		Very soft grey brown sandy gravelly CLM with low soluble content. Some fine to coarse sand & siltstone fragments. Claystone and siltstone.	
End of Borehole at 2.1m								

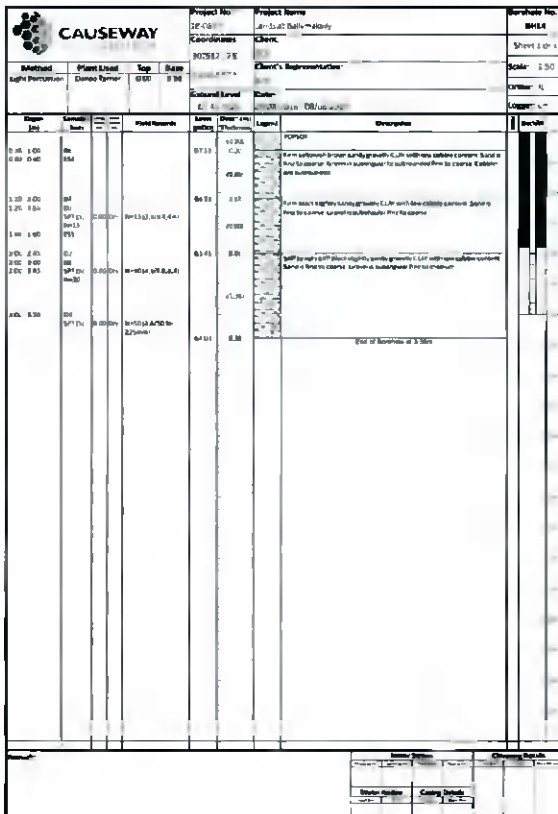


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Method Light Penetration Date/Time 11/02/2018 10:54 Top 2.54 Base 11.927 47.4 Ground Level 17.56						15-CE-1	L2, L1 at Babystash	BH07
Coordinates 807774.0 E Client's Representative BCI Scale 1:50 Drawing 11 Logbook 11						15-CE-1	L2, L1 at Babystash	BH08
Depth (m)	Sample No.	Core No.	Field Notes	Lab No.	Depth (m)	Logbook	Description	Scale
0.20 - 0.30	80			64.78	0.20		TOPSOIL	
0.40 - 0.50	81	131		64.83	0.30		Light greyish brown silty loam (sandy) CL, silty sh. with 0.01% silt. Fine to coarse. Fine to coarse. Organic matter 0.1% to 0.2%	
1.00 - 1.50	82			64.96	1.00		Soft to very soft black silty sandy grey CL, silty sh. with 0.01% silt. Fine to coarse. Organic matter 0.1% to 0.2%	
1.50 - 1.95	83	132	10-11, 22, 2, 2, 2, 1	65.03	1.50		Very soft brown silty loam (sandy) CL, silty sh. with 0.01% silt. Fine to coarse. Organic matter 0.1% to 0.2%	
2.40 - 1.80	84	133		64.94	2.00		Very soft brown silty loam (sandy) CL, silty sh. with 0.01% silt. Fine to coarse. Organic matter 0.1% to 0.2%	
1.80 - 2.00	85		10-11, 22, 2, 2, 2, 1	64.92	2.04		Very soft brown silty loam (sandy) CL, silty sh. with 0.01% silt. Fine to coarse. Organic matter 0.1% to 0.2%	
2.00 - 2.04	86	134		64.92	2.04		Very soft brown silty loam (sandy) CL, silty sh. with 0.01% silt. Fine to coarse. Organic matter 0.1% to 0.2%	
East of Babystash at 2.54m								

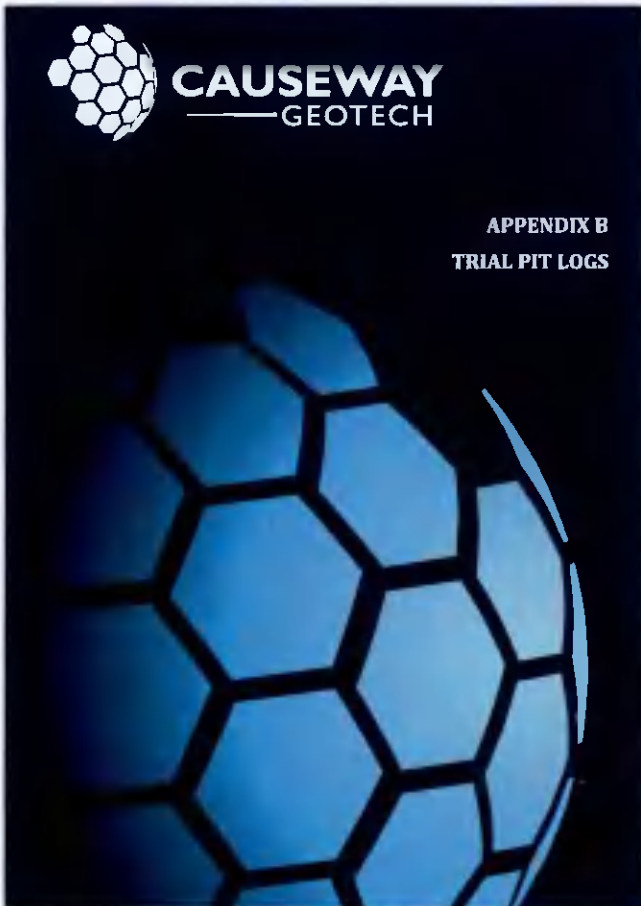
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Method Light Penetration Date/Time 11/02/2018 10:54 Top 2.54 Base 11.927 47.4 Ground Level 17.56						15-CE-1	L2, L1 at Babystash	BH08
Coordinates 807774.0 E Client's Representative BCI Scale 1:50 Drawing 11 Logbook 11						15-CE-1	L2, L1 at Babystash	BH08
Depth (m)	Sample No.	Core No.	Field Notes	Lab No.	Depth (m)	Logbook	Description	Scale
0.20 - 0.30	80			64.78	0.20		TOPSOIL	
0.40 - 0.50	81	131		64.83	0.30		Light greyish brown silty loam (sandy) CL, silty sh. with 0.01% silt. Fine to coarse. Fine to coarse. Organic matter 0.1% to 0.2%	
1.00 - 1.50	82			64.96	1.00		Soft to very soft black silty sandy grey CL, silty sh. with 0.01% silt. Fine to coarse. Organic matter 0.1% to 0.2%	
1.50 - 1.95	83	132	10-11, 22, 2, 2, 2, 1	65.03	1.50		Very soft brown silty loam (sandy) CL, silty sh. with 0.01% silt. Fine to coarse. Organic matter 0.1% to 0.2%	
2.40 - 1.80	84	133		64.94	2.00		Very soft brown silty loam (sandy) CL, silty sh. with 0.01% silt. Fine to coarse. Organic matter 0.1% to 0.2%	
1.80 - 2.00	85		10-11, 22, 2, 2, 2, 1	64.92	2.04		Very soft brown silty loam (sandy) CL, silty sh. with 0.01% silt. Fine to coarse. Organic matter 0.1% to 0.2%	
2.00 - 2.04	86	134		64.92	2.04		Very soft brown silty loam (sandy) CL, silty sh. with 0.01% silt. Fine to coarse. Organic matter 0.1% to 0.2%	
East of Babystash at 2.54m								





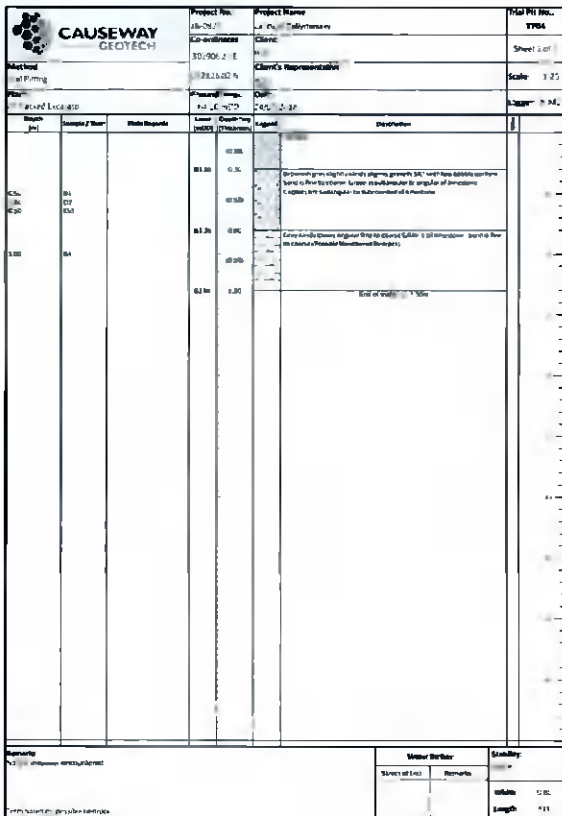
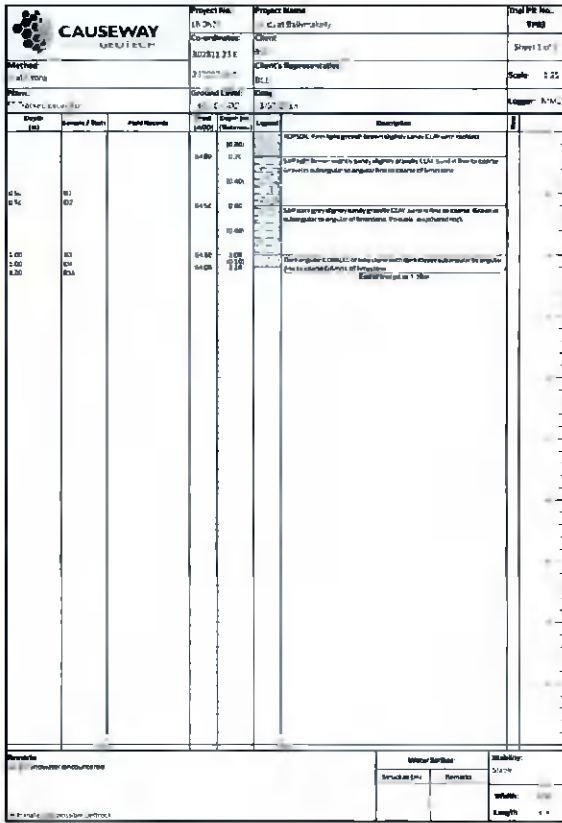


Project No.				Project Name				Worksheet				
Method				Client's Representative				Scale				
Plant Used				Date				Sheet				
Site				Date				Sheet				
Ground Level				Date				Sheet				
Station	Interval	Depth	Notes	Depth	Interval	Notes	Depth	Interval	Notes	Depth	Interval	Notes
0	0.20	0.20		0.20	0.20		0.20	0.20		0.20	0.20	
0	0.20	0.40		0.40	0.20		0.40	0.20		0.40	0.20	
1.00	0.20	0.60		0.60	0.20		0.60	0.20		0.60	0.20	
1.00	0.20	0.80		0.80	0.20		0.80	0.20		0.80	0.20	
1.00	0.20	1.00		1.00	0.20		1.00	0.20		1.00	0.20	
1.00	0.20	1.20		1.20	0.20		1.20	0.20		1.20	0.20	
1.00	0.20	1.40		1.40	0.20		1.40	0.20		1.40	0.20	
1.00	0.20	1.60		1.60	0.20		1.60	0.20		1.60	0.20	
1.00	0.20	1.80		1.80	0.20		1.80	0.20		1.80	0.20	
1.00	0.20	2.00		2.00	0.20		2.00	0.20		2.00	0.20	
1.00	0.20	2.20		2.20	0.20		2.20	0.20		2.20	0.20	
1.00	0.20	2.40		2.40	0.20		2.40	0.20		2.40	0.20	
1.00	0.20	2.60		2.60	0.20		2.60	0.20		2.60	0.20	
1.00	0.20	2.80		2.80	0.20		2.80	0.20		2.80	0.20	
1.00	0.20	3.00		3.00	0.20		3.00	0.20		3.00	0.20	
1.00	0.20	3.20		3.20	0.20		3.20	0.20		3.20	0.20	
1.00	0.20	3.40		3.40	0.20		3.40	0.20		3.40	0.20	
1.00	0.20	3.60		3.60	0.20		3.60	0.20		3.60	0.20	
1.00	0.20	3.80		3.80	0.20		3.80	0.20		3.80	0.20	
1.00	0.20	4.00		4.00	0.20		4.00	0.20		4.00	0.20	
1.00	0.20	4.20		4.20	0.20		4.20	0.20		4.20	0.20	
1.00	0.20	4.40		4.40	0.20		4.40	0.20		4.40	0.20	
1.00	0.20	4.60		4.60	0.20		4.60	0.20		4.60	0.20	
1.00	0.20	4.80		4.80	0.20		4.80	0.20		4.80	0.20	
1.00	0.20	5.00		5.00	0.20		5.00	0.20		5.00	0.20	



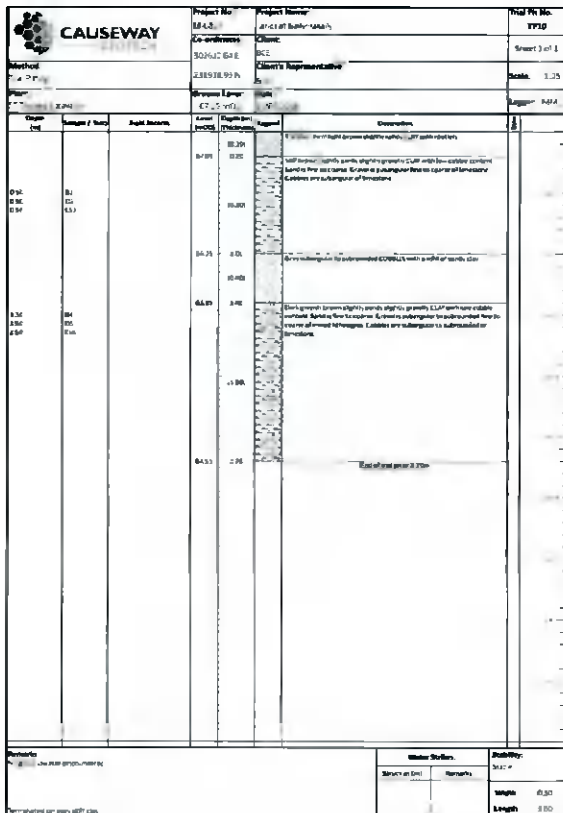
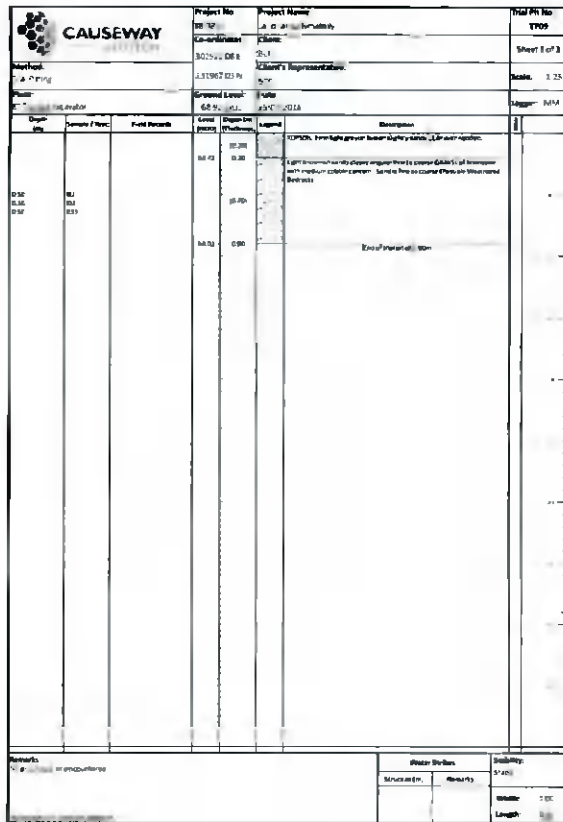
CAUSEWAY			Project No.	Project Name	Total No. Sheets	
Method T.P. Plotting			14-02-7	4.3 at Ballyvaughan	TP02	
Client M.J. Kelly			14-02-7	Client's Representative M.J. Kelly	Sheet 1 of 1	
Scale 1:250			14-02-7	Client's Representative M.J. Kelly	Scale 1:250	
Project M.J. Kelly			14-02-7	Client's Representative M.J. Kelly	Author M.J. Kelly	
Chain No.	Sample / Spot	Field Name	Level (mOD)	Depth (m)	Log No.	Description
020	021		00.20	0.20		Top light grey silty sand (CL) with 10% silt.
			00.20	0.20		MADE (L14.02) - fine light grey silty sand, sandy silt, CL with 10% silt, some small stones, fragments of gravel, other fabric concrete particles, but a few to about 4mm in diameter, 10% silt, and 10% fragments of gravel, CL with 10% silt.
			01.00			
			01.20			
			01.70	0.05		Thin brown clay (CL)
			01.90			
			02.00	0.05		End of T.P. at 2.00m
Remarks			Notes Below		Status	
M.J. Kelly			M.J. Kelly		Scale	
M.J. Kelly			M.J. Kelly		Width	
M.J. Kelly			M.J. Kelly		Length	

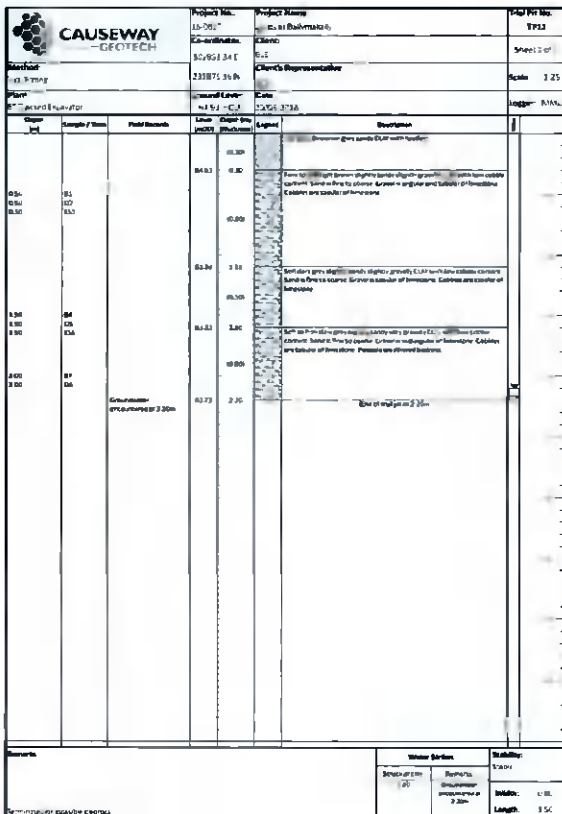
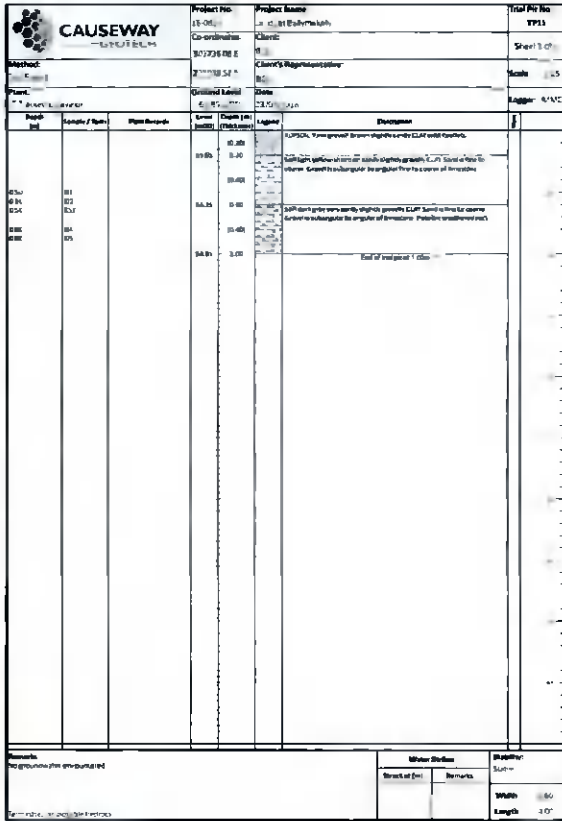
CAUSEWAY			Project No.	Project Name	Total No. Sheets	
Method T.P. Plotting			14-02-7	4.3 at Ballyvaughan	TP02	
Client M.J. Kelly			14-02-7	Client's Representative M.J. Kelly	Sheet 1 of 1	
Scale 1:250			14-02-7	Client's Representative M.J. Kelly	Scale 1:250	
Project M.J. Kelly			14-02-7	Client's Representative M.J. Kelly	Author M.J. Kelly	
Chain No.	Sample / Spot	Field Name	Level (mOD)	Depth (m)	Log No.	Description
020	021		00.40	0.40		Top light grey silty sand (CL) with 10% silt.
			00.92	0.40		End of T.P. at 2.00m
Remarks			Notes Below		Status	
M.J. Kelly			M.J. Kelly		Scale	
M.J. Kelly			M.J. Kelly		Width	
M.J. Kelly			M.J. Kelly		Length	

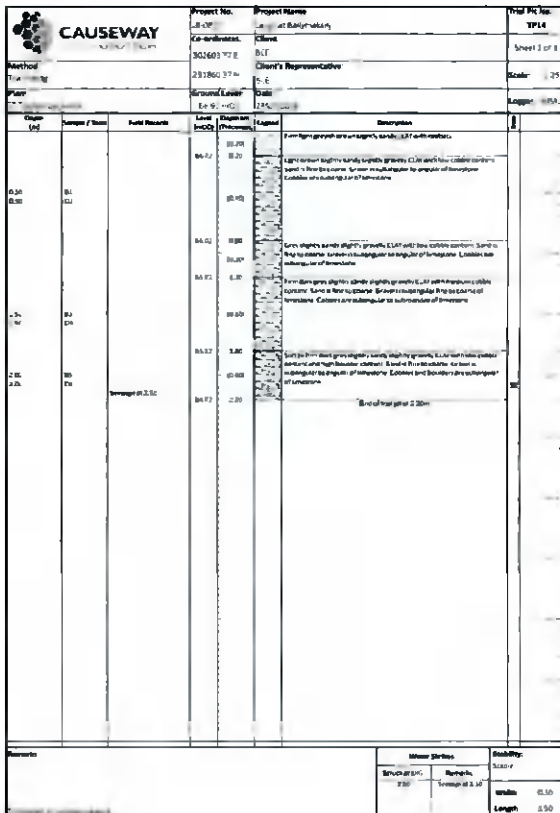
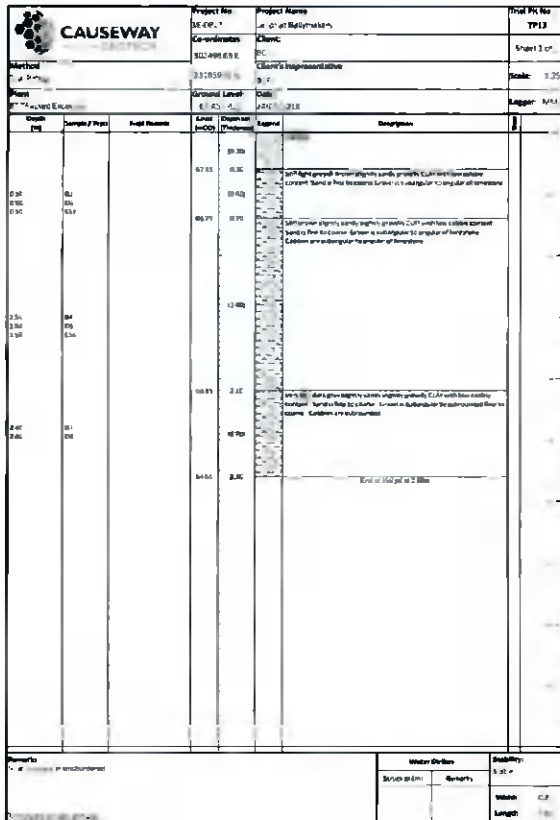


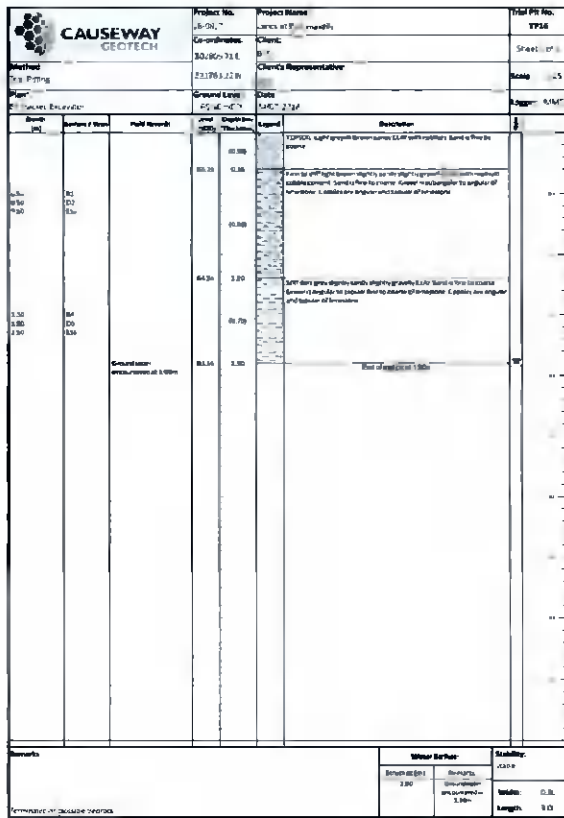
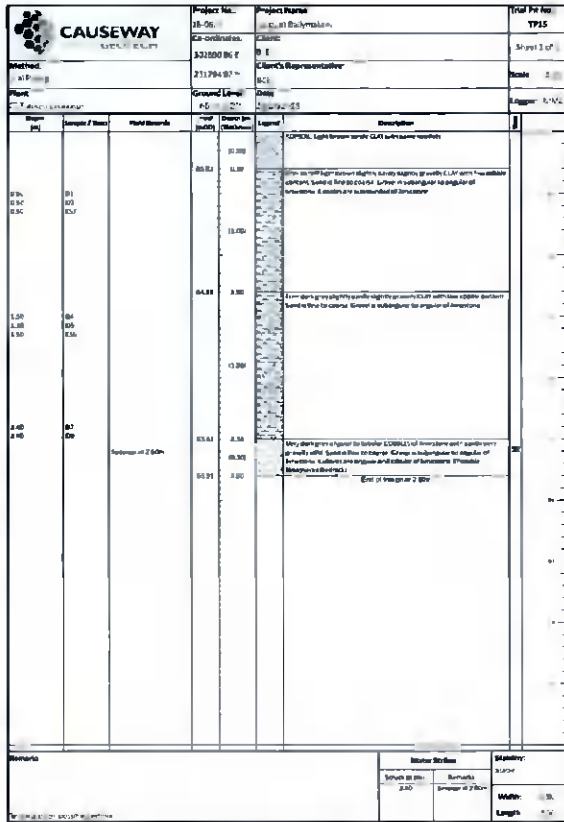
		Project No. 15-042	Project Name: Analysis of Infrastructure	Plot No. TP05	
Method: 1:4		Co-ordinates: 802543.53 E	Client: PUA	Sheet: 1 of 1	
Scale: 1:25		Client's Representative: PUA	Scale: 1:25		
Map: 1:50,000		Ground Level: 4.4	Date: 28/07/2015	Layer: BVMC	
Depth (m)	Sample / Note	Field Remarks	Level (m)	Depth (m)	Description
			88.30	0.00	Topsoil, 10-15cm depth, sandy clay with nodules
			88.34	0.06	Lignitic sandy siltstone with nodules of lignite, some clay, some fine to coarse, coarse nodules of lignite
			88.34	0.40	Lignitic sandy siltstone with nodules of lignite, some clay, some fine to coarse, coarse nodules of lignite
Remarks: No significant observations					
			Water Status		Stability
			Remarks		Stability
					Notes: 1:25
					Length: 10.0

		Project No. 15-042	Project Name: Analysis of Infrastructure	Plot No. TP05	
Method: 1:4		Co-ordinates: 812687.48 E	Client: PUA	Sheet: 1 of 1	
Scale: 1:25		Client's Representative: PUA	Scale: 1:25		
Map: 1:50,000		Ground Level: 6.1	Date: 28/07/2015	Layer: BVMC	
Depth (m)	Sample / Note	Field Remarks	Level (m)	Depth (m)	Description
			84.17	0.00	Topsoil, 10-15cm depth, sandy clay with nodules
			84.17	0.06	Lignitic sandy siltstone with nodules of lignite, some clay, some fine to coarse, coarse nodules of lignite
			84.17	0.40	Lignitic sandy siltstone with nodules of lignite, some clay, some fine to coarse, coarse nodules of lignite
			84.17	0.81	Lignitic sandy siltstone with nodules of lignite, some clay, some fine to coarse, coarse nodules of lignite
			84.17	1.19	Lignitic sandy siltstone with nodules of lignite, some clay, some fine to coarse, coarse nodules of lignite
			84.17	1.70	Lignitic sandy siltstone with nodules of lignite, some clay, some fine to coarse, coarse nodules of lignite
			84.17	2.70	Lignitic sandy siltstone with nodules of lignite, some clay, some fine to coarse, coarse nodules of lignite
			84.17	4.05	Lignitic sandy siltstone with nodules of lignite, some clay, some fine to coarse, coarse nodules of lignite
			84.17	6.73	Lignitic sandy siltstone with nodules of lignite, some clay, some fine to coarse, coarse nodules of lignite
Remarks: No significant observations					
			Water Status		Stability
			Remarks		Stability
					Notes: 1:25
					Length: 10.0





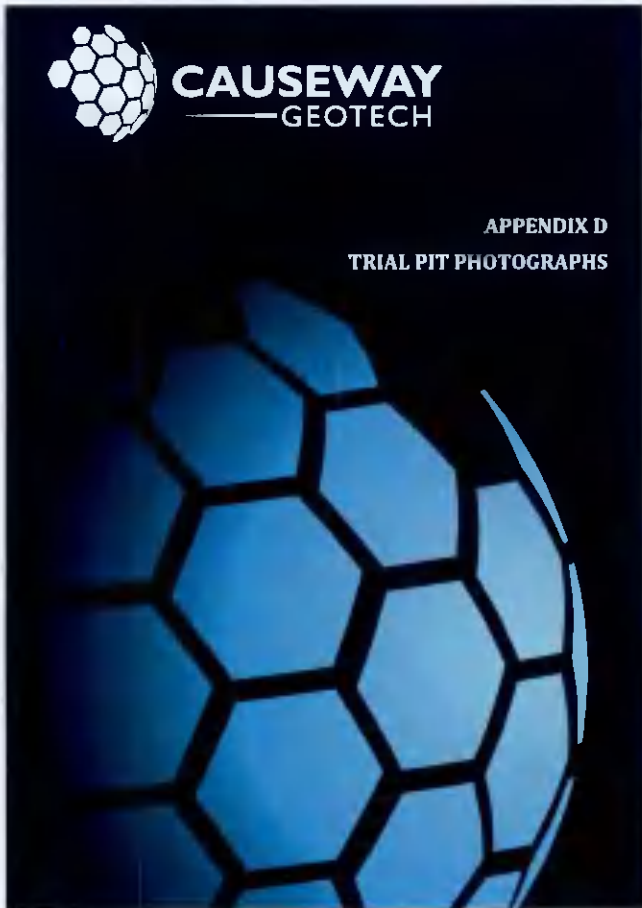




CAUSEWAY		Project No.	Project Name	Plot No.		
		2144	Lot 11 at Ballymahon	TP17		
Method		302475 991	Client	Sheet 1 of 1		
Map		23.723 45 N	Client's Representative	Scale: 1:25		
Plan		Ground Level	Date	Logger: BFM		
		6.75 124	24.7			
Depth (m)	Sample / Test	Field Remarks	Level (mOD)	Depth (m)	Logical	Description
0.30	01		07.80	07.80		Dark grey gravel (greenish) Luff with some white sand & fine to coarse
0.30	02		07.62	07.62		Light grey to brown silt, sandy silt, greenish Luff sand with fine to coarse. Some in subangular to angular of limestone
0.30	03		07.05	07.05		Light grey to white silt, (S.S.) of limestone. Greenish subangular to angular fine to coarse of limestone
0.30	04		6A-11	5.10		Dark grey to black silt, sandy silt, greenish Luff sand with fine to coarse. Some in subangular to angular of limestone. Some in angular of limestone. Coarse in subangular to angular of limestone
0.30	05			05.24		
0.30	06		05.55	5.20		Dark grey to black silt, sandy silt, greenish Luff sand with fine to coarse. Some in subangular to angular of limestone. Coarse in angular of limestone
0.30	07		05.30	5.10		
0.30	08		0A-09	3.10		End of plot at 3.10m

CAUSEWAY		Project No.	Project Name	Plot No.		
		2144	Lot 11 at Ballymahon	TP18		
Method		302575 01 E	Client	Sheet 1 of 1		
Map		23.1213 10 N	Client's Representative	Scale: 1:25		
Plan		Ground Level	Date	Logger: BFM		
		6.75 124	24.7			
Depth (m)	Sample / Test	Field Remarks	Level (mOD)	Depth (m)	Logical	Description
0.30	01		06.20	06.20		Dark grey gravel (greenish) Luff with some white sand & fine to coarse
0.30	02		06.10	06.10		Light grey to brown silt, sandy silt, greenish Luff sand with fine to coarse. Some in subangular to angular of limestone
0.30	03		05.70	05.70		
0.30	04		04.00	4.00		Dark grey to black silt, sandy silt, greenish Luff sand with fine to coarse. Some in subangular to angular of limestone. Coarse in angular of limestone. Some in angular of limestone
0.30	05		03.20	3.10		Dark grey to black silt, sandy silt, greenish Luff sand with fine to coarse. Some in subangular to angular of limestone. Coarse in angular of limestone. Some in angular of limestone
0.30	06		0A-10	2.10		End of plot at 2.10m

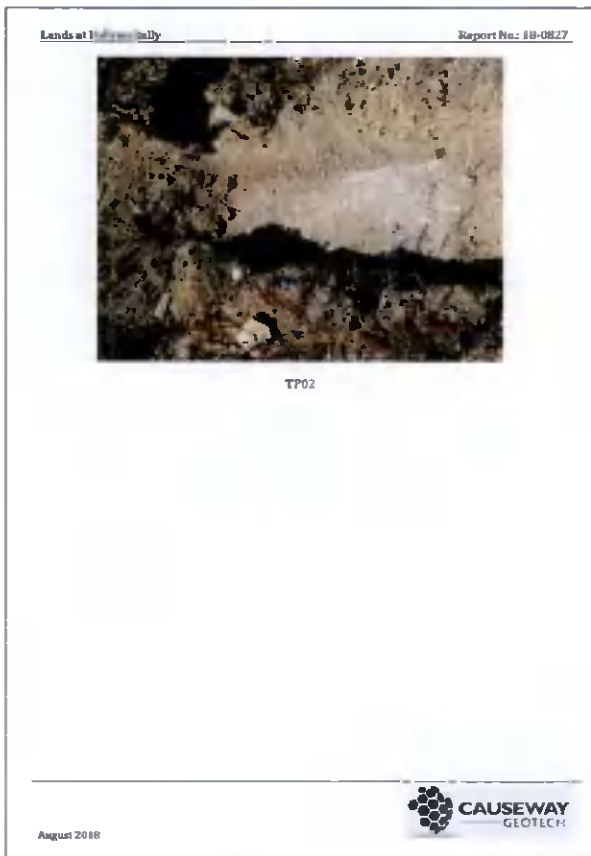
Owner	Survey / Name	Field Book No.	From (m)	To (m)	Depth (m)	Layer	Description	
CAUSEWAY GEOTECH	Edgeconnex (DUB05), EIAR	27705-1-1-1	0.00	0.00	0.00	1	Topsoil (100mm)	Topsoil (100mm)
			0.00	0.00	0.00	2	Light grey to dark grey silty clay with low plasticity. Silt to clay. Contains occasional thin layers of limestone.	Light grey to dark grey silty clay with low plasticity. Silt to clay. Contains occasional thin layers of limestone.
			0.00	0.00	0.00	3	Dark grey silty clay with low plasticity. Clay with low plasticity. Silt to clay. Contains occasional thin layers of limestone.	Dark grey silty clay with low plasticity. Clay with low plasticity. Silt to clay. Contains occasional thin layers of limestone.
			0.00	0.00	0.00	4	Dark grey silty clay with low plasticity. Clay with low plasticity. Silt to clay. Contains occasional thin layers of limestone.	Dark grey silty clay with low plasticity. Clay with low plasticity. Silt to clay. Contains occasional thin layers of limestone.
			0.00	0.00	0.00	5	Dark grey silty clay with low plasticity. Clay with low plasticity. Silt to clay. Contains occasional thin layers of limestone.	Dark grey silty clay with low plasticity. Clay with low plasticity. Silt to clay. Contains occasional thin layers of limestone.
			0.00	0.00	0.00	6	Dark grey silty clay with low plasticity. Clay with low plasticity. Silt to clay. Contains occasional thin layers of limestone.	Dark grey silty clay with low plasticity. Clay with low plasticity. Silt to clay. Contains occasional thin layers of limestone.
			0.00	0.00	0.00	7	Dark grey silty clay with low plasticity. Clay with low plasticity. Silt to clay. Contains occasional thin layers of limestone.	Dark grey silty clay with low plasticity. Clay with low plasticity. Silt to clay. Contains occasional thin layers of limestone.
			0.00	0.00	0.00	8	Dark grey silty clay with low plasticity. Clay with low plasticity. Silt to clay. Contains occasional thin layers of limestone.	Dark grey silty clay with low plasticity. Clay with low plasticity. Silt to clay. Contains occasional thin layers of limestone.
			0.00	0.00	0.00	9	Dark grey silty clay with low plasticity. Clay with low plasticity. Silt to clay. Contains occasional thin layers of limestone.	Dark grey silty clay with low plasticity. Clay with low plasticity. Silt to clay. Contains occasional thin layers of limestone.
			0.00	0.00	0.00	10	Dark grey silty clay with low plasticity. Clay with low plasticity. Silt to clay. Contains occasional thin layers of limestone.	Dark grey silty clay with low plasticity. Clay with low plasticity. Silt to clay. Contains occasional thin layers of limestone.













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TP04



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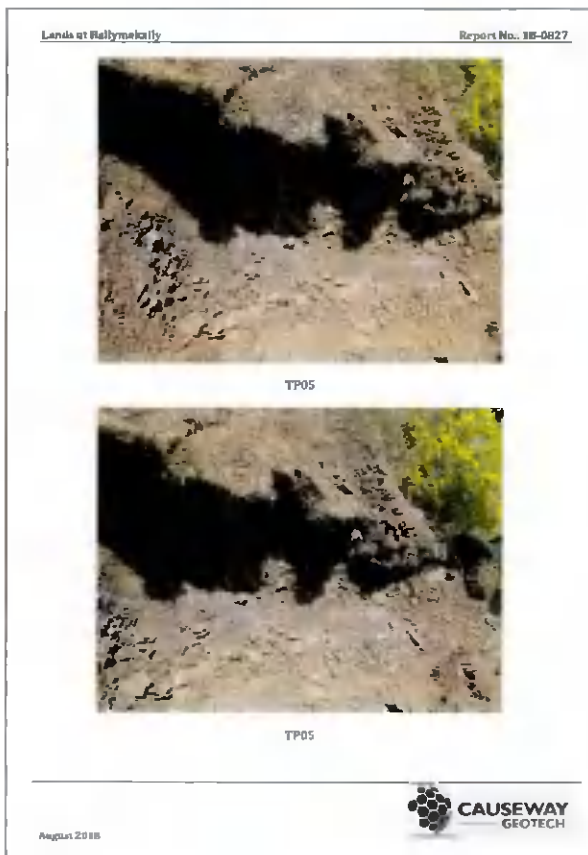
TP04

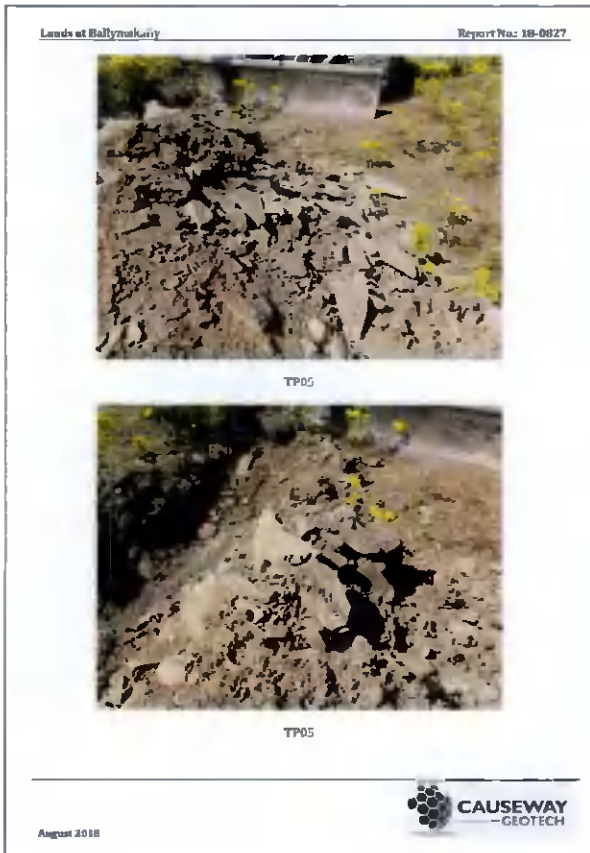


TP04

August 2018









Lands at Ballymekelly Report No.: 18-0627



TP06



TP06

August 2018



Lands at Ballymekelly Report No.: 18-0627



TP07



TP07

August 2018







