Environmental Impact Assessment Report (EIAR)

Volume 2 Appendices

Large Scale Residential Development at Kilbride, Arklow, County Wicklow

May 2025

In association with

Altemar Limited
Donnachadh O'Brien & Associates Consulting Engineers
AWN Consulting
Traynor Environmental Ltd.
Systra
Shanarc Archaeology Limited

Prepared by

mcg
MCGILL PLANNING

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Appendix 5.1

Wintering Bird Assessment (2024/2025)

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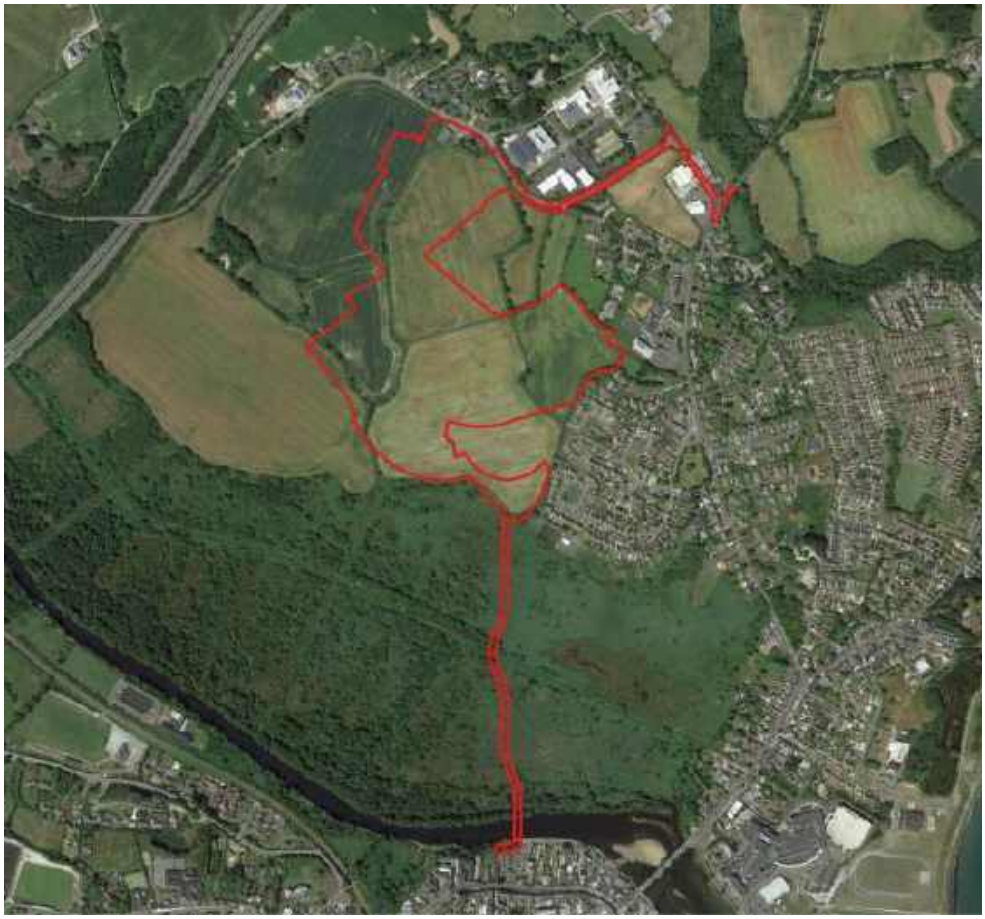
Marine & Environmental Consultancy

Wintering Bird Assessment (2024/2025) for a proposed Mixed Use Large-Scale Residential Development (LRD) at Kilbride, Arklow, Co. Wicklow.



21st May 2025

Prepared by: Bryan Deegan (MCIEEM) of Altemar Ltd.
On behalf of: Certain Assets of Dawnhill and Windhill Limited

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Document Control Sheet			
Client	Certain Assets of Dawnhill and Windhill Limited		
Project	Kilbride, Arklow, Co. Wicklow.		
Report	Wintering Bird Assessment		
Date	21st May 2025		
Version	Author	Reviewed	Date
Final	Emma Peters	Bryan Deegan	21st May 2025

Contents

Summary

Structure/features:	Arable crop fields with roadways, farm buildings and a house on site. This site also contains a portion of Arklow marsh and the Avoca River.
Location:	Kilbride, Arklow, Co. Wicklow.
Bird species present:	Buzzard, Blackbird, Blackcap, Black-headed Gull, Blue Tit, Chaffinch, Chiffchaff, Common Gull, Cormorant, Dunnock, Feral Pigeon, Greenfinch, Goldcrest, Goldfinch, Great Black backed Gull, Great tit, Grey Heron, Greylag goose, Grey wagtail, Herring Gull, Hooded Crow, House sparrow, Jackdaw, Lesser Black-backed Gull, Linnet, Long-tailed tit, Magpie, Mallard, Meadow pipit, Mistle thrush, Moorhen, Mute Swan, Pheasant, Pied wagtail, Red Kite, Redwing, Reed bunting, Rook, Skylark, Song thrush, Starling, Treecreeper, Water Rail, Woodpigeon, Wren.
Proposed work:	Large-Scale Residential Development (LRD) at Kilbride, Arklow, Co. Wicklow.
Surveys by:	Emma Peters (BSc Environmental Science) and Jack Doyle (MSc Sustainable Environments)
Survey dates:	17th, 24th & 25th of October 2024, 8th + 22nd of November 2024, 10th & 18th of December 2024, 9th & 30th of January 2025, 20th & 28th of February 2025 and the 25th of March 2025.

Receiving environment

Background

The proposed development will consist of the demolition of 3 no. structures on site including a 2-storey habitable house (total GFA 207 sq.m) and 2 no. sheds/outbuildings (c.580 sq.m). Closures of 2 no. existing entrances onto the Kilbride Road (L-6179). Construction of a new residential development and local centre comprising: 666 no. units (578 no. semi-detached and terraced housing (100 no. 2 beds, 317 no. 3 beds, 161 no. 4 beds) and 88 no. apartments and duplex apartments (24 no. 1 beds, 51 no. 2 beds and 13 no. 3 beds)). All residential units will have associated private open space facing north/ south/ east/ west. The proposal will also include a local centre (total GFA 2335 sq.m) comprising a creche (c.1,095sqm) with outdoor play area, 3 no. community/medical units (c.450 sq.m), and 3 no. retail units (c.790sq.m). . The proposal will also deliver 3 No. retail units, 3 No. community/ medical units and 1 No. creche unit.

New pedestrian/ cyclist link connecting into Arklow Town Centre is proposed via a new boardwalk and bridge across the marsh and over the Avoca River adjoining the existing greenway and the Main Street. A new road is also proposed connecting to the north to Kilbride Road. Alterations to the surrounding road network to provide a section of the regional road and upgrades to provide pedestrian facilities are also included. Vehicular access to the site will be from the new proposed regional road. The development will also provide for landscaping, public open spaces and all associated site development works to enable the development including boundary treatments, attenuation storage area and other service provision including ESB substation.

The proposed site outline and survey area are demonstrated in figures 1 & 2.

Figure 1. *Wintering bird survey area and proposed site outline.*

Figure 2. *Wintering bird survey area and proposed site outline location.*

Competency of assessor

Since its inception in 2001, Altemar has been delivering ecological and environmental services to a broad range of clients. Operational areas include: residential; infrastructural; renewable; oil & gas; private industry; Local Authorities; EC projects; and, State/semi-State Departments.

Emma Peters (BSc Environmental Science)

This Report has been contributed to by Emma Peters. Emma has carried out a range of wintering and breeding ornithological surveys in Ireland. Emma has experience in bat detection through static detector surveys, dusk emergence, and down re-entry surveys and is a member of Bat Conservation Ireland. She is also skilled in habitat identification, native and non-native species identification and terrestrial mammal surveys.

Jack Doyle (MSc Sustainable Environments)

This report has also been contributed to by Jack Doyle. Jack has previous experience in carrying out a wide range of fauna surveys, including both roving and static acoustic bat surveys, terrestrial non-avian mammal surveys, and breeding/wintering bird surveys.

Legislative context

The Wildlife Act 1976 protects wild birds in Ireland. Based on this legislation it is an offence to wilfully interfere with or destroy wild birds and their nests and eggs (other than the wild species mentioned in the Third Schedule of this Act). Under this legislation it is an offence for any person who "*wilfully takes or removes the eggs or nest of a protected wild bird otherwise than under and in accordance with such a licence, wilfully destroys, injures or mutilates the eggs or nest of a protected wild bird, wilfully disturbs a protected wild bird on or near a nest containing eggs or unflown young.*"

Habitats Directive- Council Directive 92/43/EEC 1992 on the conservation of natural habitats and of wild fauna and flora has been transposed into Irish Law, including, via, *inter alia*, the European Communities (Birds and Natural Habitats) Regulations 2011 (as amended).

Council Directive 2009/147/EC 2010 on the conservation of wild birds provides for the conservation of wild birds by, among other things, classifying important ornithological sites as Special Protection Areas. The Directive relates to the conservation of all species of naturally occurring birds in the wild state, their eggs, nests and habitats in the European territory of the Member States. The Directive prohibits in particular:

- deliberate killing or capture by any method;
- deliberate destruction of, or damage to, their nests and eggs or removal of their nests;
- taking their eggs in the wild and keeping these eggs even if empty;
- deliberate disturbance of these birds particularly during the period of breeding and rearing, in so far as disturbance would be significant having regard to the objectives of this Directive;
- keeping birds of species the hunting and capture of which is prohibited.

Under the European Communities (Birds and Natural Habitats) Regulations 2011 (as amended), notwithstanding any consent, statutory or otherwise, given to a person by a public authority or held by a person, except in accordance with a licence granted by the Minister under Regulation 54, a person who in respect of the species referred to in Part 1 of the First Schedule:

- deliberately captures or kills any specimen of these species in the wild,
- deliberately disturbs these species particularly during the period of breeding, rearing, hibernation and migration,
- deliberately takes or destroys eggs of those species from the wild,
- damages or destroys a breeding site or resting place of such an animal, or
- keeps, transports, sells, exchanges, offers for sale or offers for exchange any specimen of these species taken in the wild, other than those taken legally as referred to in Article 12(2) of the Habitats Directive, shall be guilty of an offence.

Wintering bird surveys

This report presents the methodology and results of 11 surveys by Emma Peters BSc and 1 survey by Jack Doyle MSc during the wintering bird season from October 2024 to March 2025.

Survey methodology

Wintering bird surveys were carried out over the entire wintering bird season, Kilbride, Arklow, Co. Wicklow in order to gather baseline data and to assist in assessing the potential impacts on wintering birds from future proposed developments on the grounds, in particular those listed as Qualifying Interests of SPAs within 15 km and other amber/red-listed birds of conservation concern in Ireland (BoCCI). Potential impacts on wintering bird species include disturbance, destruction of foraging areas, destruction of roosting areas and collision risk during construction and operation (cranes, buildings etc.). These wintering bird surveys were carried out based on the BTO Common Bird Census (Bibby *et al.*, 2000 and Gilbert *et al.*, 1998) and I-WeBS Counter Manual: Guidelines for Irish Wetland Bird Survey counters (BWI & NPWS), following CIEEM guidelines.

A 15-minute settlement period was given following arrival to allow resumption of bird activity after any possible disturbance caused by arrival to the site. Various features such as grassland, treelines, standalone mature trees, scrub, built land, spoil and bare ground were present within the survey area. A roving transect survey around the perimeter of the survey area, circumnavigating features within that area, was carried out on each occasion, providing clear views of all areas within and over that survey area. A vantage point in the south of the survey area was also used (figure 3.) for at least 30 minutes during each survey where the higher altitude provided the most advantageous views. Flight lines, large flights, foraging, perching and any other observed behaviour by wintering bird species within and over the survey area were recorded. Each survey was carried out by a single surveyor.

A pair of binoculars and scope were used by the surveyor to identify and count birds at distance. Care was taken not to double count any observations. Surveys were initiated at varying times (morning/midday/afternoon) and at varying tide levels to account for potential associated fluctuations in bird activity and birds transiting to/from foraging and roosting areas. Local temperatures varied from 0 - 16^{o}C. Winds varied from 0 – 5 on the Beaufort scale. Weather conditions were considered favourable on all occasions.

Peak counts for the overall survey area were calculated by adding the total abundance of each species within each survey and selecting the highest total count.

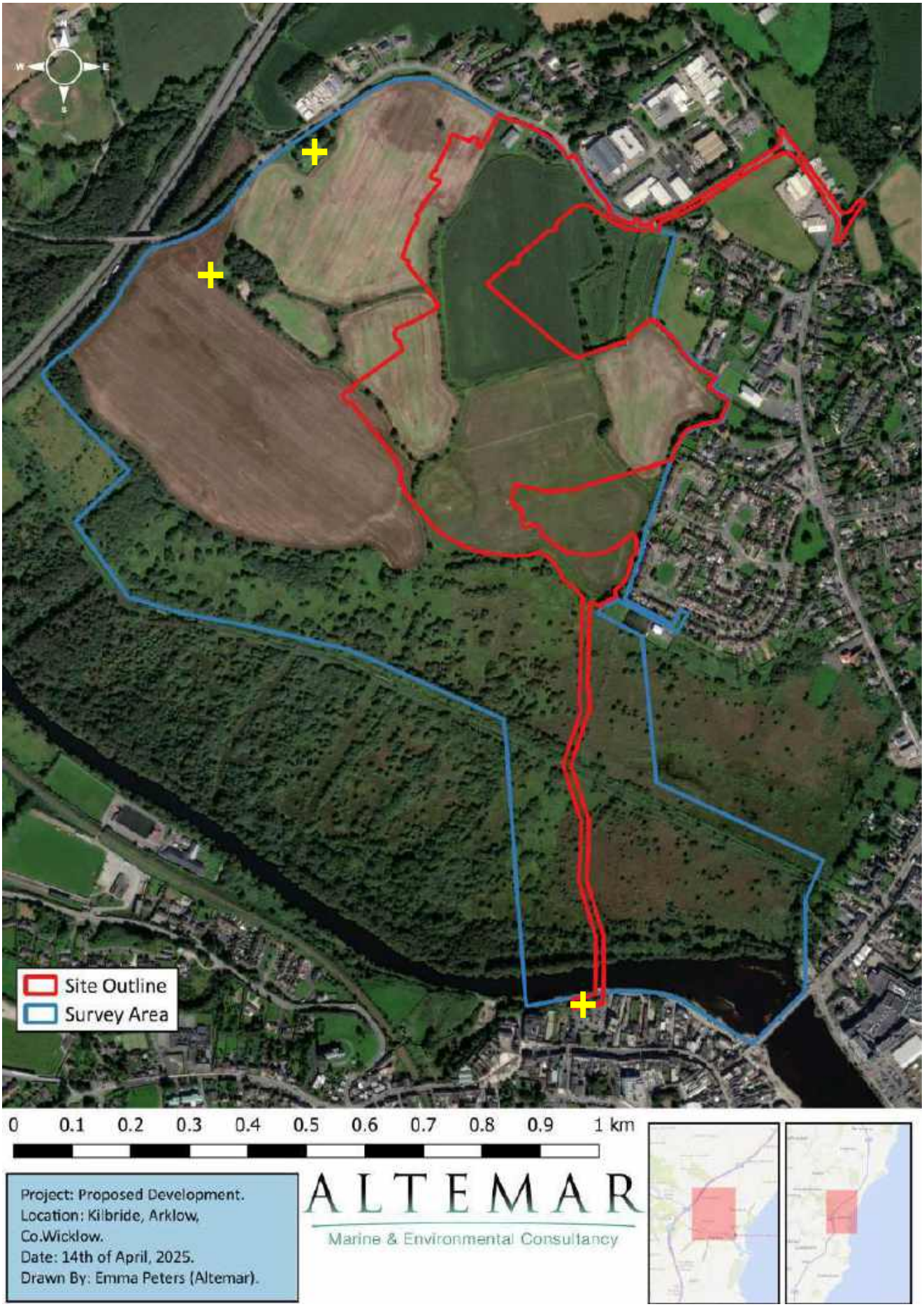

Figure 3. *Vantage point location (Yellow cross).*

Survey results/discussion

Habitats of wintering bird potential

A desk and field survey wintering bird habitat assessment were carried and used to examine the structures, features and vegetation on site that could provide wintering bird habitat. Potential features associated with foraging/roosting include agricultural fields, arable fields, improved/amenity grassland, scrub, watercourses, marsh and drainage ditches, estuaries and intertidal zones. All open areas, vegetated areas, built areas and water-holding features on site were assessed for wintering bird potential.

Arable crop fields in the north, northeast, south and southeast of the survey area were of low to moderate foraging potential for wintering birds. The survey area is located adjacent to Arklow Town Marsh pNHA and between a number of known wintering bird foraging and roosting areas, including a number of SAC's, and so there is a high potential for birds of various species to fly over the site.

Wintering bird activity survey

A total of 46 species were recorded within and above the survey areas across twelve surveys. 28 green, 14 amber and 4 red listed Birds of Conservation Concern in Ireland (BoCCI) were recorded either within, over or immediately adjacent to the overall survey area boundary. Details regarding the status, behaviour and abundances of species recorded on/over the site relevant to the conservation interests of Special Protected Areas (SPAs) and red listed BoCCI are discussed.

Grey wagtail (red BoCCI) - was observed within the survey area. Three observations were made during survey, twice calling from the small woodland towards the west of the survey area (outside the site) and one flying from woodland to the north of the site. It is likely these observations were of the same individual.

Redwing (red BoCCI)(wintering) - This species was observed four times within the survey area. Twice in the grounds of the Howard Mausoleum Pyramid towards the north of the site and twice calling from the tree line located in the southeast of the site. It is likely the species recorded in the two locations were the same individuals. The peak count of this species was three.

Meadow pipit (red BoCCI) – This species was observed on twelve occasions within the survey area. Most of the foraging activity was concentrated to the southern arable crop fields however, four observations were made in the northern fields. Three flight lines were observed during the surveys. Flights of this species were observed originating from almost all directions. Average altitude of flights by this species over the survey area was approximately 10.5 m (based on observation estimates). The peak count of this species was fifteen individuals.

Red Kite (Red BoCCI) – This species was observed on eleven occasions. It is likely that the individual observed was the same individual observed over the course of the surveys. Average altitude of large flight by this species over the survey area was approximately 58 m (based on observation estimates). The red kite was observed in eight of the twelve surveys.

Herring gull (amber BoCCI) - Average altitude of flights by this species over the survey area was approximately 33m (based on observation estimates). Flights of this species were observed originating from almost all directions. Foraging activity was concentrated to the north and east of the red line. This species was observed in nine of the twelve surveys. Peak count was a hundred and twenty-two individuals. Peak number is below 1% of the international population (table 2).

Black-headed gull (amber BoCCI) - Average altitude of flights by this species over the survey area was approximately 15.8m (based on observation estimates). Flight paths of this species were concentrated to the north of the site along the Avoca River. This species was observed foraging within the survey area on two occasions. Peak count was 64 individuals. The peak number is below 1% of the international population (table 2).

Common gull (amber BoCCI) – This species was observed in six of the twelve surveys. On two occasions, this species was observed flying with an average altitude of flights over the survey of approximately 15 m (based on observation estimates). This species observed foraging in the arable crop fields, north and south points of the

redline and primarily in the Avoca River. Peak count was eighteen individuals. The peak number is below 1% of the international population (table 2).

Lesser black-backed gull (amber BoCCI) – This species was observed on one occasion with three individuals washing and foraging in the Avoca River.

Great black-backed Gull (amber BoCCI) – This species was observed on two occasions with a peak count of four. This species was observed using the Avoca River to wash and forage.

Buzzard (green BoCCI) – This species was observed in eight of the 12 surveys. Six observations were noted of buzzards down on the ground on the arable crop fields. Large flight of circulating over the farmland portion of the survey area with an average altitude of 43m (based on observation estimates). The peak count of this species was three.

Goldcrest (amber BoCCI) was observed within the survey area. Five observations were made during the surveys. Peak count was four.

Greenfinch (amber BoCCI) was observed within the survey area. This species was noted in three surveys with a peak count of 2.

Linnet (amber BoCCI) was observed within the survey area. This species was noted in nine of the twelve surveys. The arable crop fields were of high foraging value for this species. Foraging activity was observed in the north and east of the site but most prevalent the southeast corner of the site. The peak count was 200 individuals however the average count of this species was 47m.

Cormorant (amber BoCCI) was observed on six occasions over four of the surveys carried out in 2025 (latter half). This species was observed along the Avoca River within the survey area. The peak count of this species was three. One flight was observed of a single cormorant flying west up the Avoca River just above the water's surface.

Greylag goose (amber BoCCI) This species was observed on five occasions in five of the surveys cared out in 2025 (latter half). The geese were observed foraging in the vegetation next to the nineteen arches bridge and in the Avoca River. The geese would travel up and down the bank of the Avoca within the survey area and were noted grazing on the Amenity grassland of the southern bank of the river. The peak count of this species was 17. One flightline was observed of seven individuals traveling west along the river with an altitude of 10 meters.

House sparrow (amber BoCCI) - This species was observed in five of the twelve surveys exclusively in the southeast corner of the site, adjacent to the housing estate. The peak count of this species was 15.

Mallard (amber BoCCI) – This species was observed with in the survey area in seven surveys. Fourteen observations were made in the Avoca River, and one observation was made in the marsh of two individuals. Five flightlines were observed predominantly flying east with one observation of flying east. Flights were observed with a single individual in each apart from on flight observation of four Mallards flying east along the Avoca River. Average altitude of flights by this species over the survey area was approximately 18.2 m (based on observation estimates).

Mute Swan (amber BoCCI) – This species was noted foraging within the survey are of the Avoca River. The peak count of this species was two.

Skylark (amber BoCCI) – This species was noted in three of the twelve surveys. Skylarks were noted foraging exclusively in the two southern arable crop fields. The peak count of individuals was eleven. One as flight of a single individual flying east at an altitude of 15 m.

Starling (amber BoCCI) – Starlings were noted in five of the surveys foraging to the east of the survey area. The peak count of this species was 27.

Table 1. *Species observed on, above and immediately adjacent to the survey area.*

Common name	BTO	Latin name	BoCCI
Buzzard	BZ.	*Buteo buteo*	Green
Blackbird	B.	*Turdus merula*	Green
Blackcap	BC	*Sylvia atricapilla*	Green
Black-headed Gull	BH	*Larus ridibundus*	Amber
Blue Tit	BT	*Cyanistes caeruleus*	Green
Chaffinch	CH	*Fringilla coelebs*	Green
Chiffchaff	CC	*Phylloscopus collybita*	Green
Common Gull	CM	*Larus canus*	Amber
Cormorant	CA	*Phalacrocorax carbo*	Amber
Dunnock	D.	*Prunella modularis*	Green
Feral Pigeon	FP	*Columba livia f. domestica*	Green
Greenfinch	GR	*Chloris chloris*	Amber
Goldcrest	GC	*Regulus regulus*	Amber
Goldfinch	GO	*Carduelis carduelis*	Green
Great Black-backed Gull	GB	*Larus marinus*	Green
Great tit	GT	*Parus major*	Green
Grey Heron	H.	*Ardea cinerea*	Green
Greylag goose	GJ	*Anser anser*	Amber
Grey wagtail	GL	*Motacilla cinerea*	Red
Herring Gull	HG	*Larus argentatus*	Amber
Hooded Crow	HC	*Corvus cornix*	Green
House sparrow	HS	*Passer domesticus*	Amber
Jackdaw	JD	*Coloeus monedula*	Green
Lesser Black-backed Gull	LB	*Larus fuscus*	Amber
Linnet	LI	*Linaria cannabina*	Amber
Long-tailed tit	LT	*Aegithalus caudatus*	Green
Magpie	MG	*Pica pica*	Green
Mallard	MA	*Anas platyrhynchos*	Amber
Meadow pipit	MP	*Anthus pratensis*	Red
Mistle thrush	M.	*Turdus viscivorus*	Green
Moorhen	MH	*Gallinula chloropus*	Green
Mute Swan	MS	*Cygnus olor*	Amber
Pheasant	PH	*Phasianus colchicus*	Green
Pied wagtail	PW	*Motacilla alba yarrellii*	Green
Red Kite	KT	*Milvus milvus*	Red
Redwing	RE	*Turdus iliacus*	Red
Reed bunting	RB	*Emberiza schoeniclus*	Green
Robin	R.	*Erithacus rubecula*	Green
Rook	RO	*Corvus frugilegus*	Green
Skylark	S.	*Alauda arvensis*	Amber
Song thrush	ST	*Turdus philomelos*	Green
Starling	SG	*Sturnus vulgaris*	Amber
Treecreeper	TC	*Certhia familiaris*	Green
Water Rail	WA	*Rallus aquaticus*	Green
Woodpigeon	WP	*Columba palumbus*	Green
Wren	W.	*Troglodytes troglodytes*	Green

Table 2. *Peak counts of species recorded across the 12 surveys within the survey*

Species	Peak count (2024/25)
Buzzard	3
Blackbird	8
Blackcap	1
Black-headed Gull	64
Blue Tit	8
Chaffinch	27
Chiffchaff	3
Common Gull	18
Cormorant	3
Dunnock	11
Feral Pigeon	3
Greenfinch	2
Goldcrest	4
Goldfinch	15
Great Black-backed Gull	4
Great tit	3
Grey Heron	4
Greylag goose	17
Grey wagtail	1
Herring Gull	122
Hooded Crow	30
House sparrow	15
Jackdaw	33
Lesser Black-backed Gull	2
Linnet	200
Long-tailed tit	4
Magpie	22
Mallard	22
Meadow pipit	15
Mistle thrush	1
Moorhen	2
Mute Swan	2
Pheasant	5
Pied wagtail	3
Red Kite	1
Redwing	3
Reed bunting	2
Robin	4
Rook	49
Skylark	11
Song thrush	2
Starling	27
Treecreeper	1
Water Rail	1
Woodpigeon	200
Wren	5

Table 3. *Qualifying Interests of distant SPAs recorded within the survey area.*

Code	Common Name	Latin Name
A043	Greylag Goose	*(Anser anser)*
A179	Black-headed Gull	*(Chroicocephalus ridibundus)*
A017	Cormorant	*(Phalacrocorax carbo)*
A187	Great Black-backed Gull	*(Larus marinus)*
A184	Herring Gull	*(Larus argentatus)*
A183	Lesser Black-backed Gull	*(Larus fuscus)*
A182	Common Gull	*(Larus canus)*
A053	Mallard	*(Anas platyrhynchos)*
A028	Grey Heron	*(Ardea cinera)*

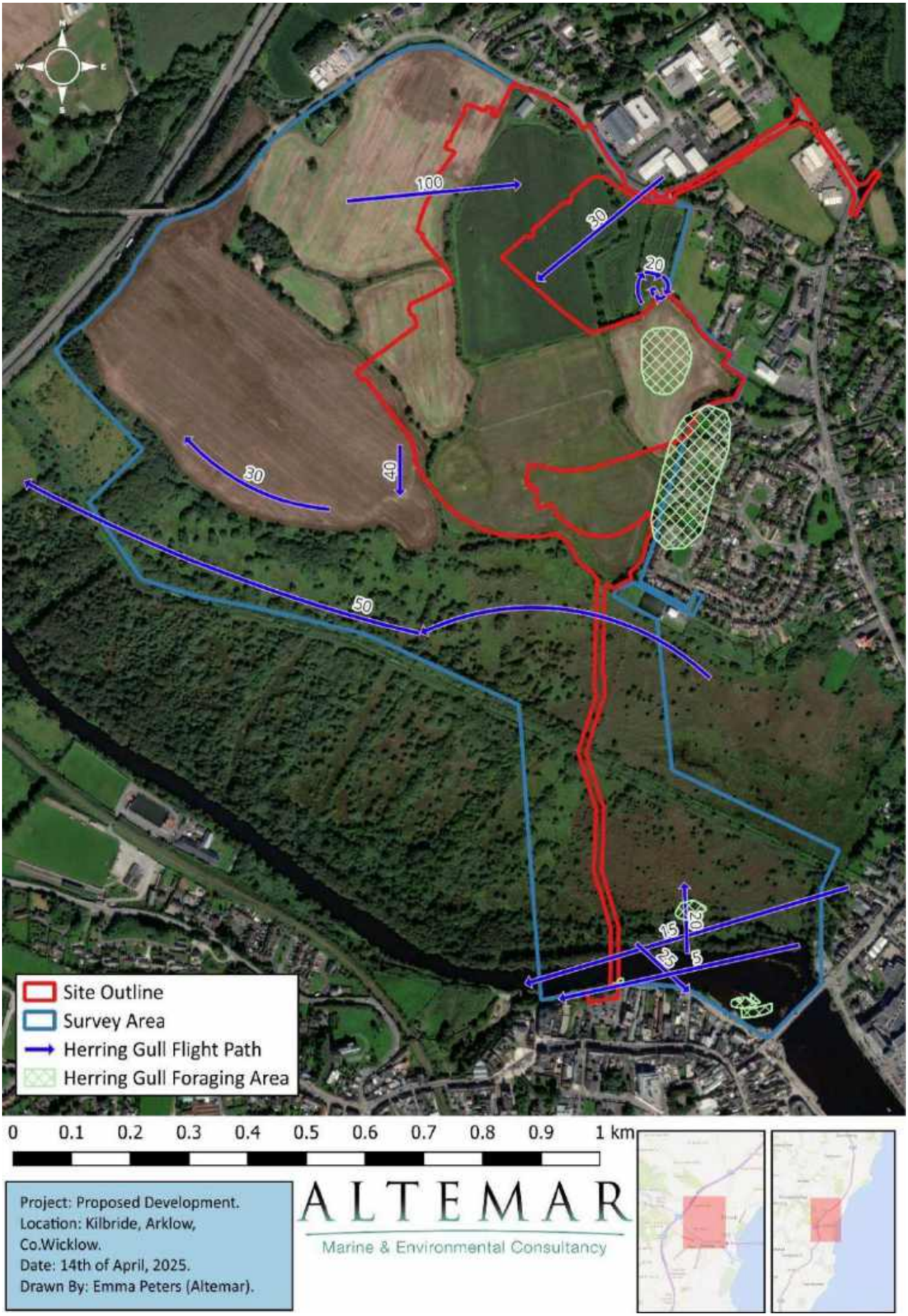

Figure. 4 *Herring Gull flight paths (Number denotes flight heights in meters) and foraging areas.*

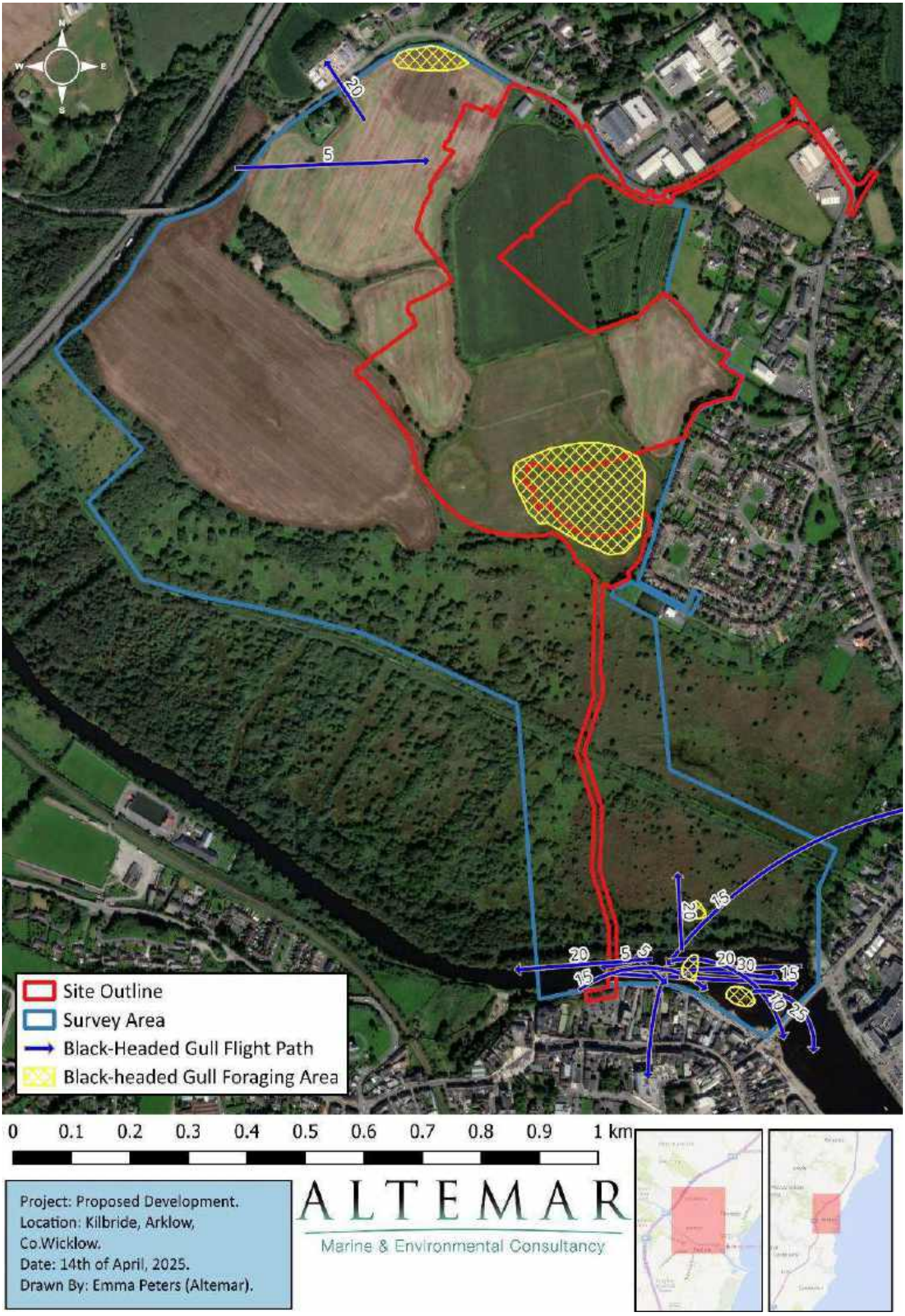

Figure. 5 *Black-headed Gull flight paths (Number denotes flight heights in meters) and foraging areas.*

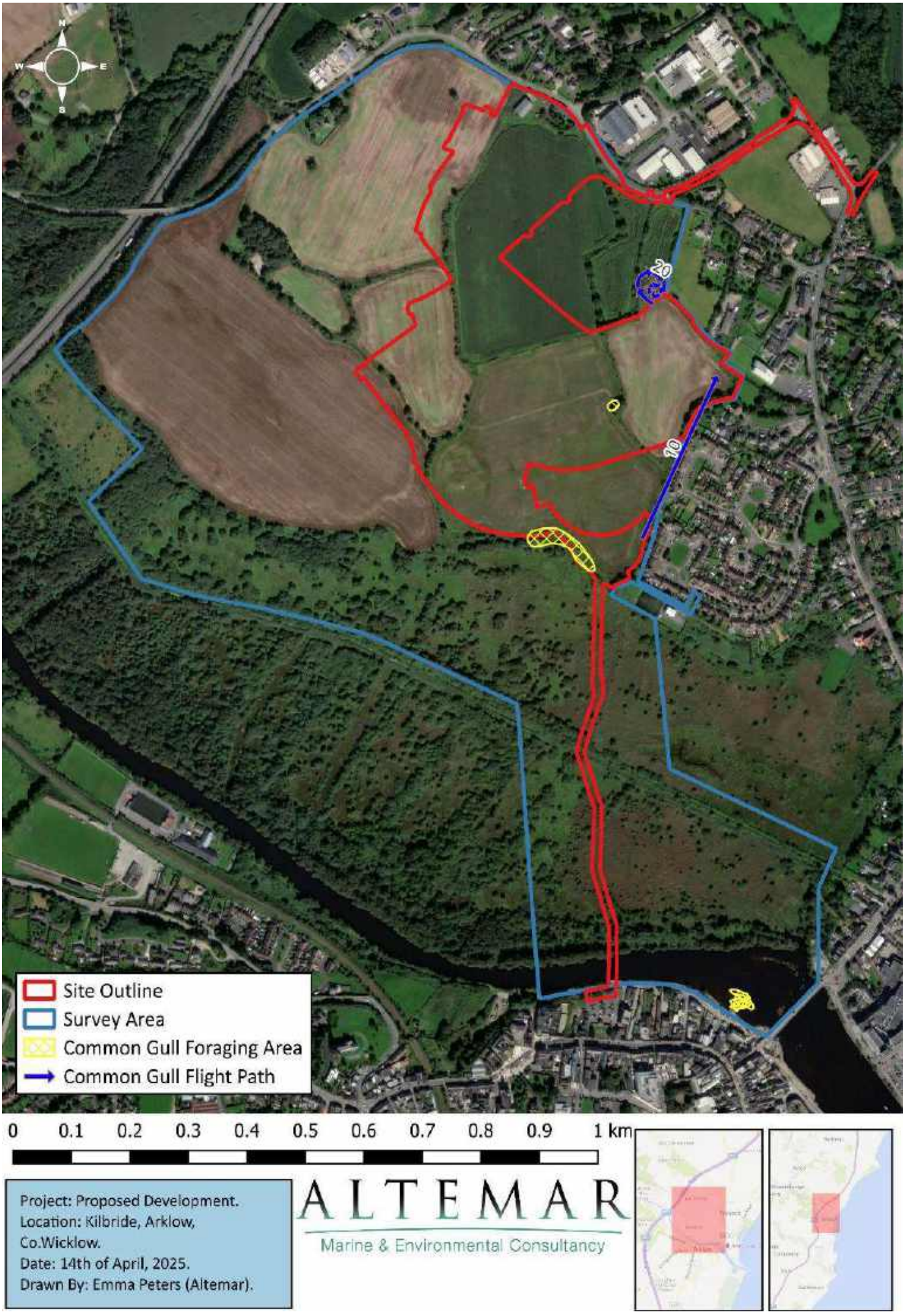

Figure. 6 *Common Gull flight paths (Number denotes flight heights in meters) and foraging areas.*

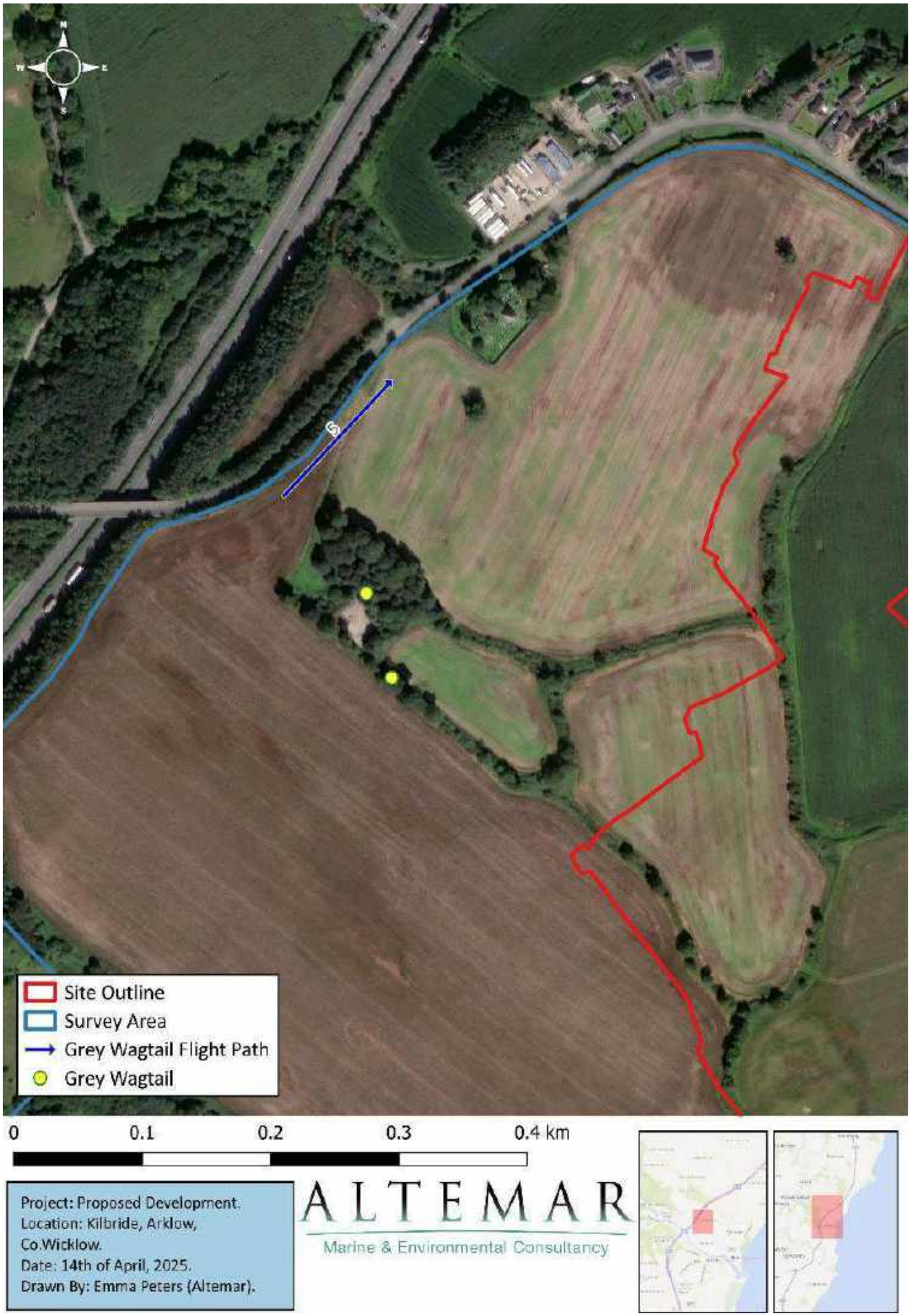

Figure. 7 *Grey wagtail flight paths (Number denotes flight heights in meters) and observation points.*

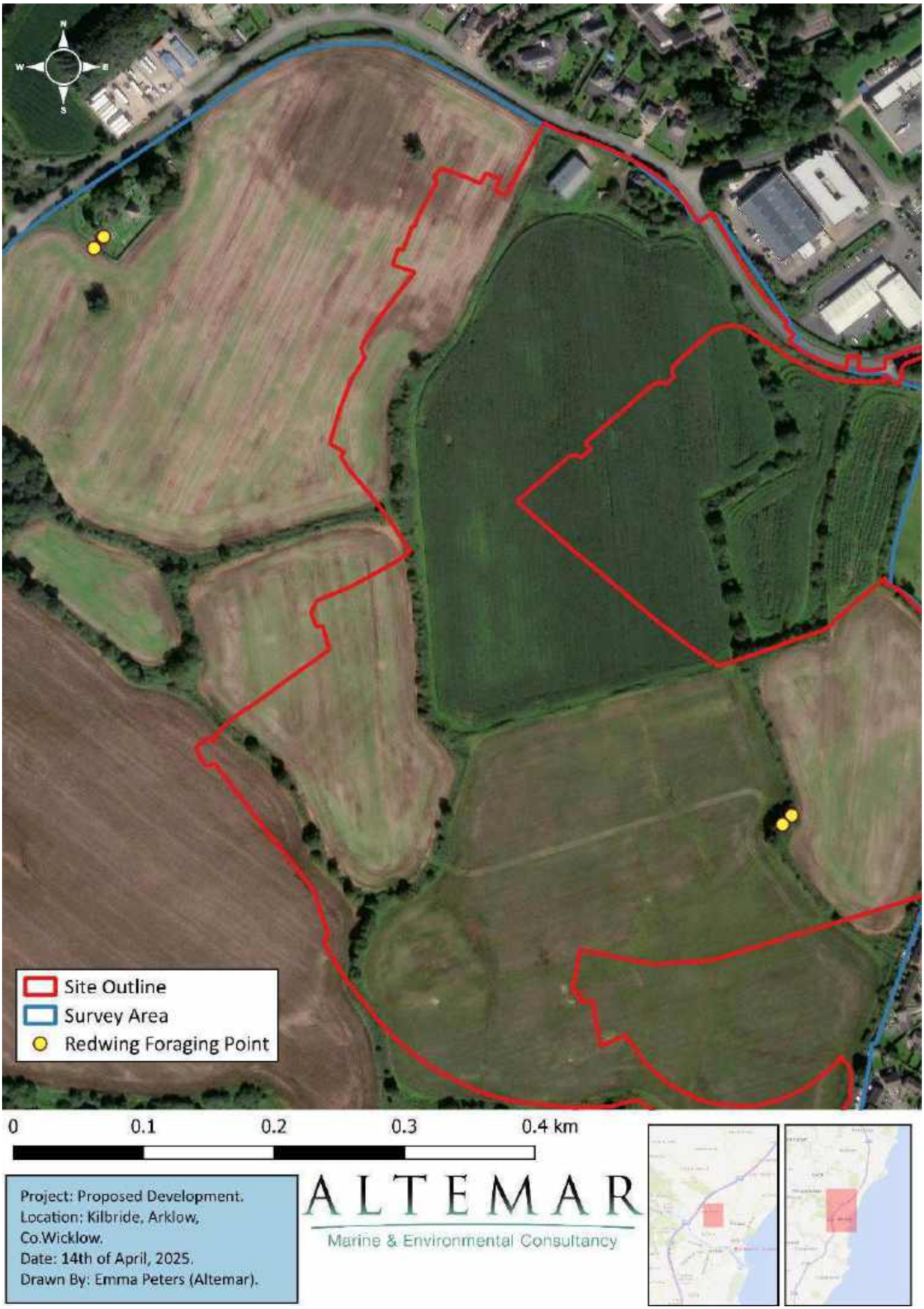

Figure. 8 *Redwing foraging points.*

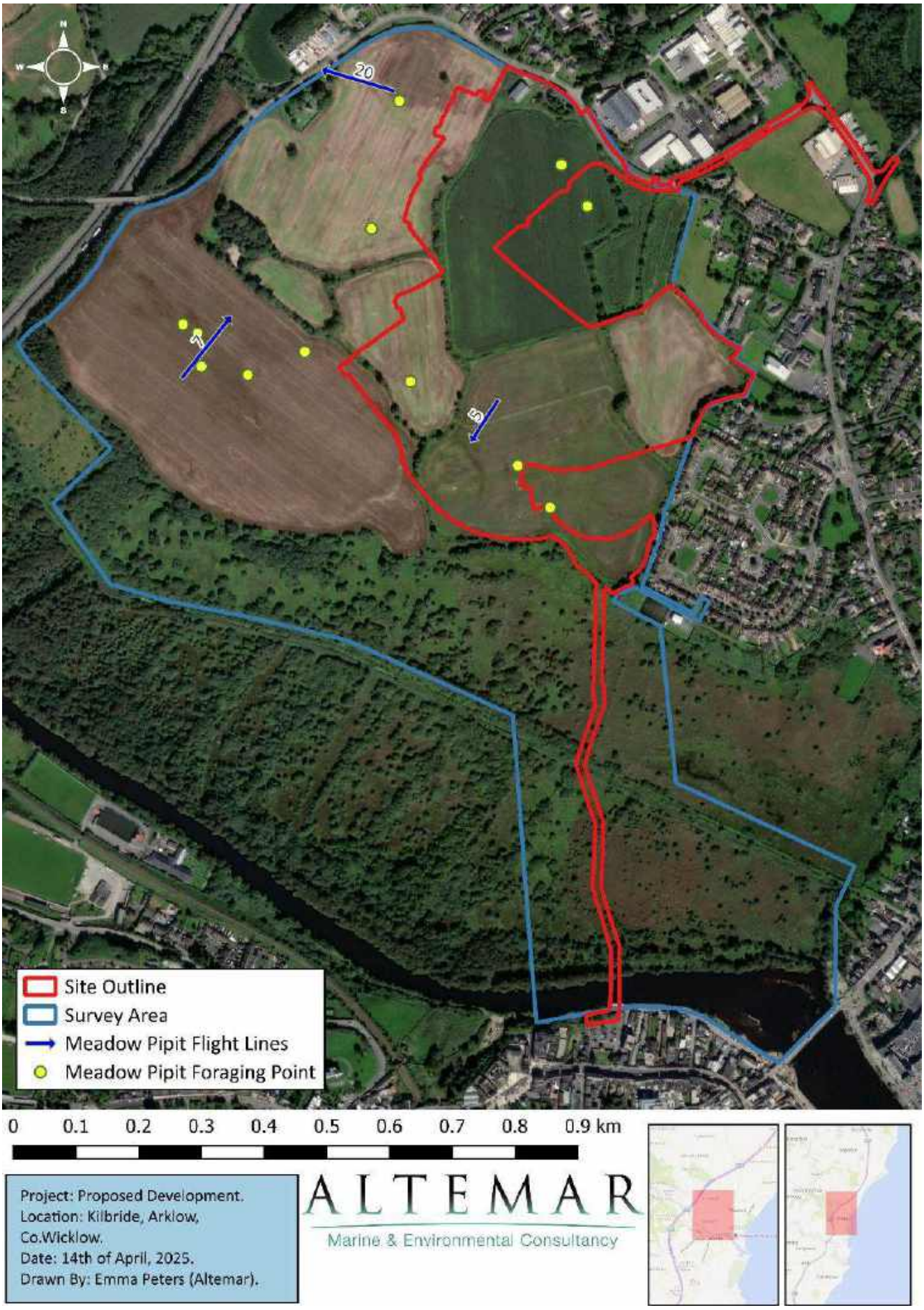

Figure. 9 *Meadow pipit flight paths (Number denotes flight heights in meters) and foraging points.*

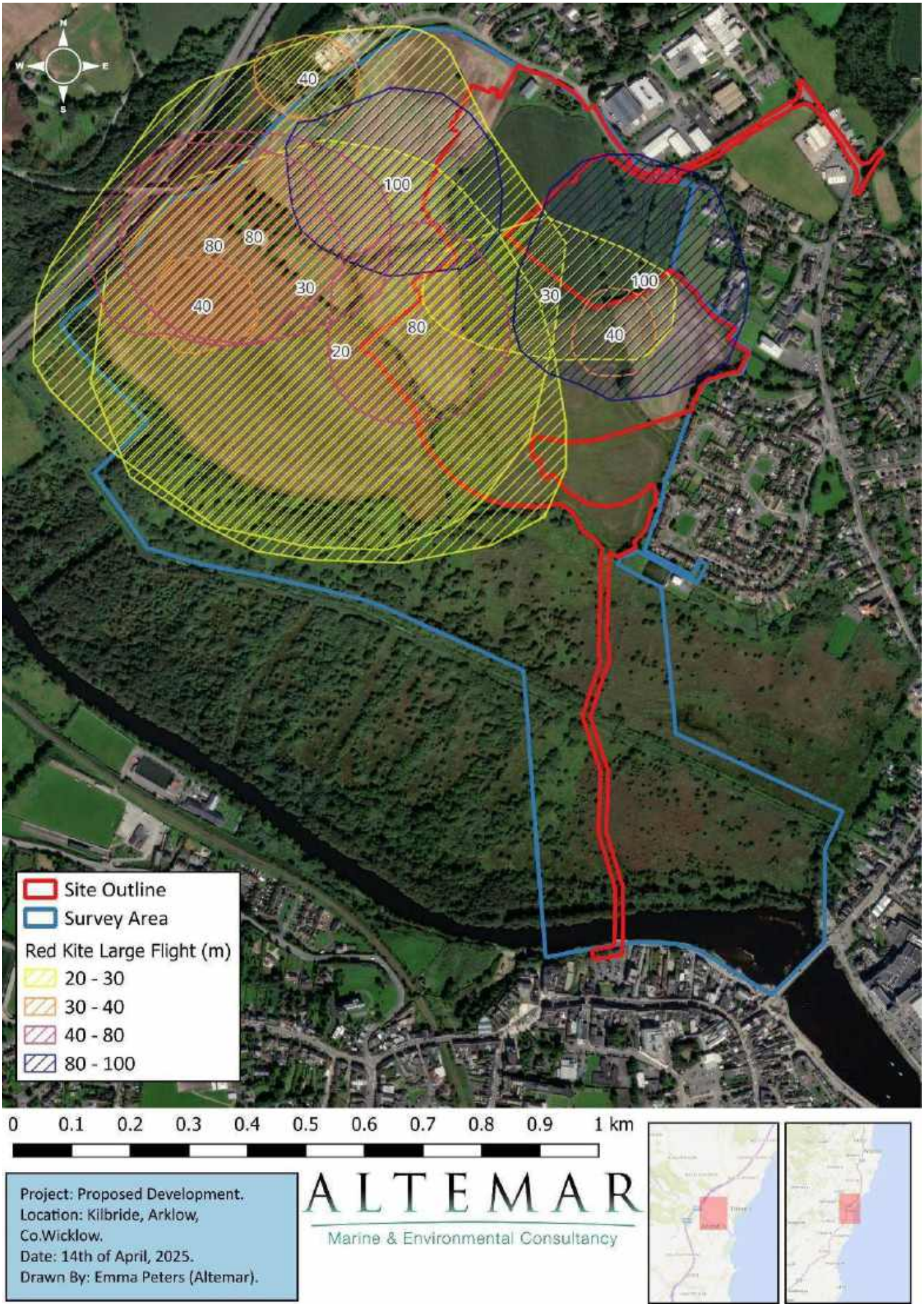

Figure. 10 *Red kite large flight observations in meters.*

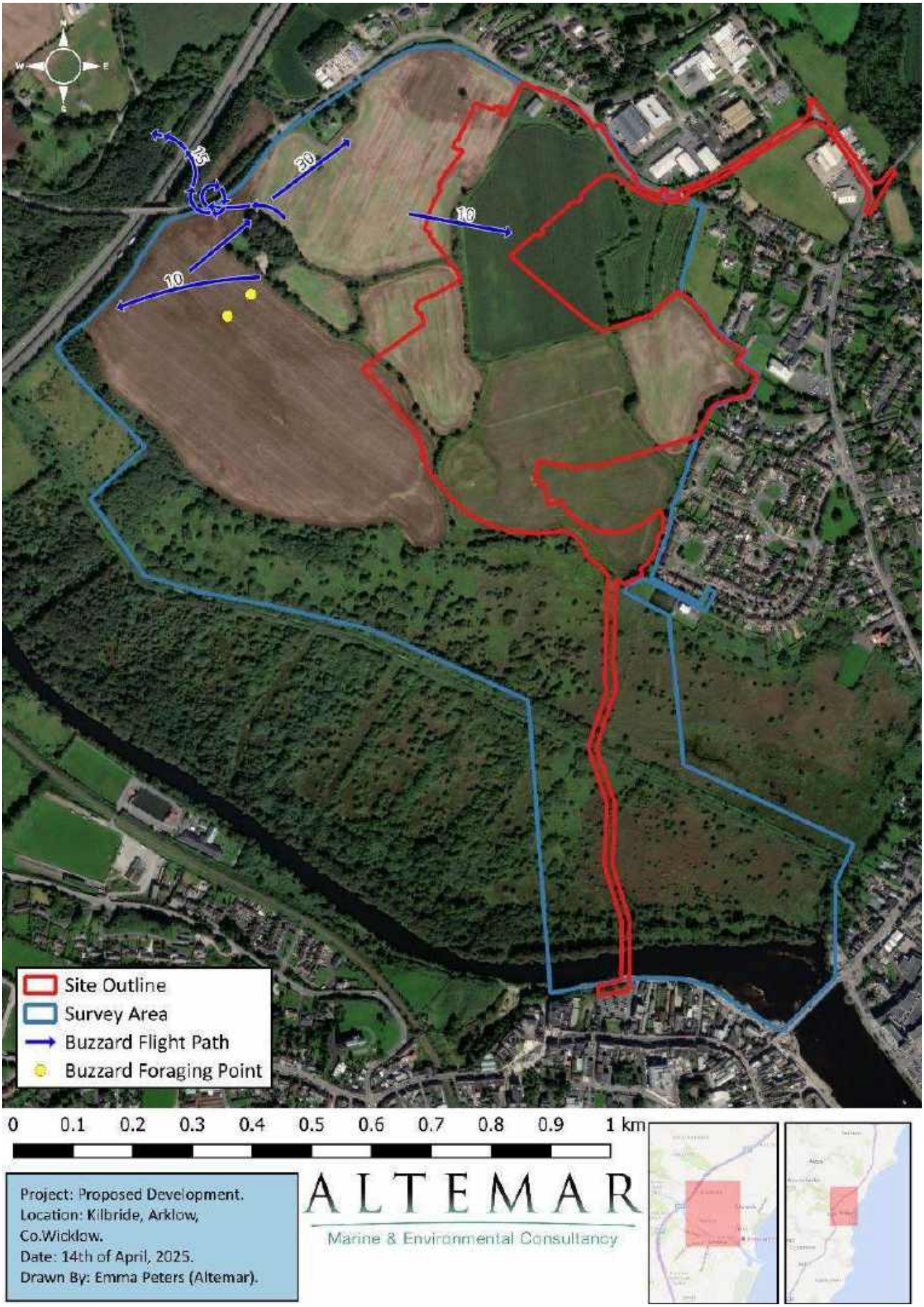

Figure. 11 *Buzzard flight paths (Number denotes flight heights in meters) and foraging points.*

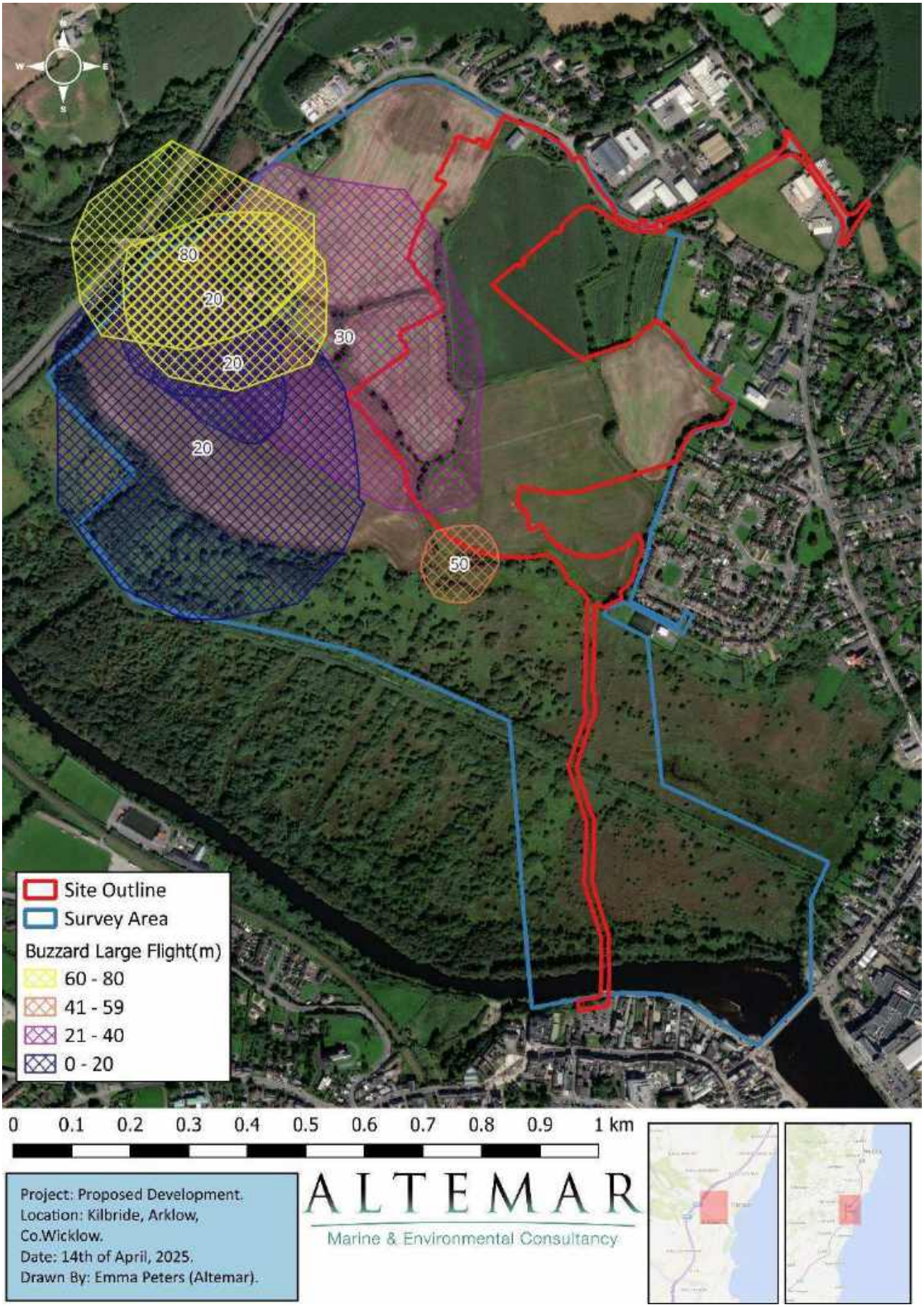

Figure 12. *Buzzard Large flight observations in meters.*

Figure. 13 *Linnet flight paths (Number denotes flight heights in meters) and Foraging area (Number denoted amount of individuals observed).*

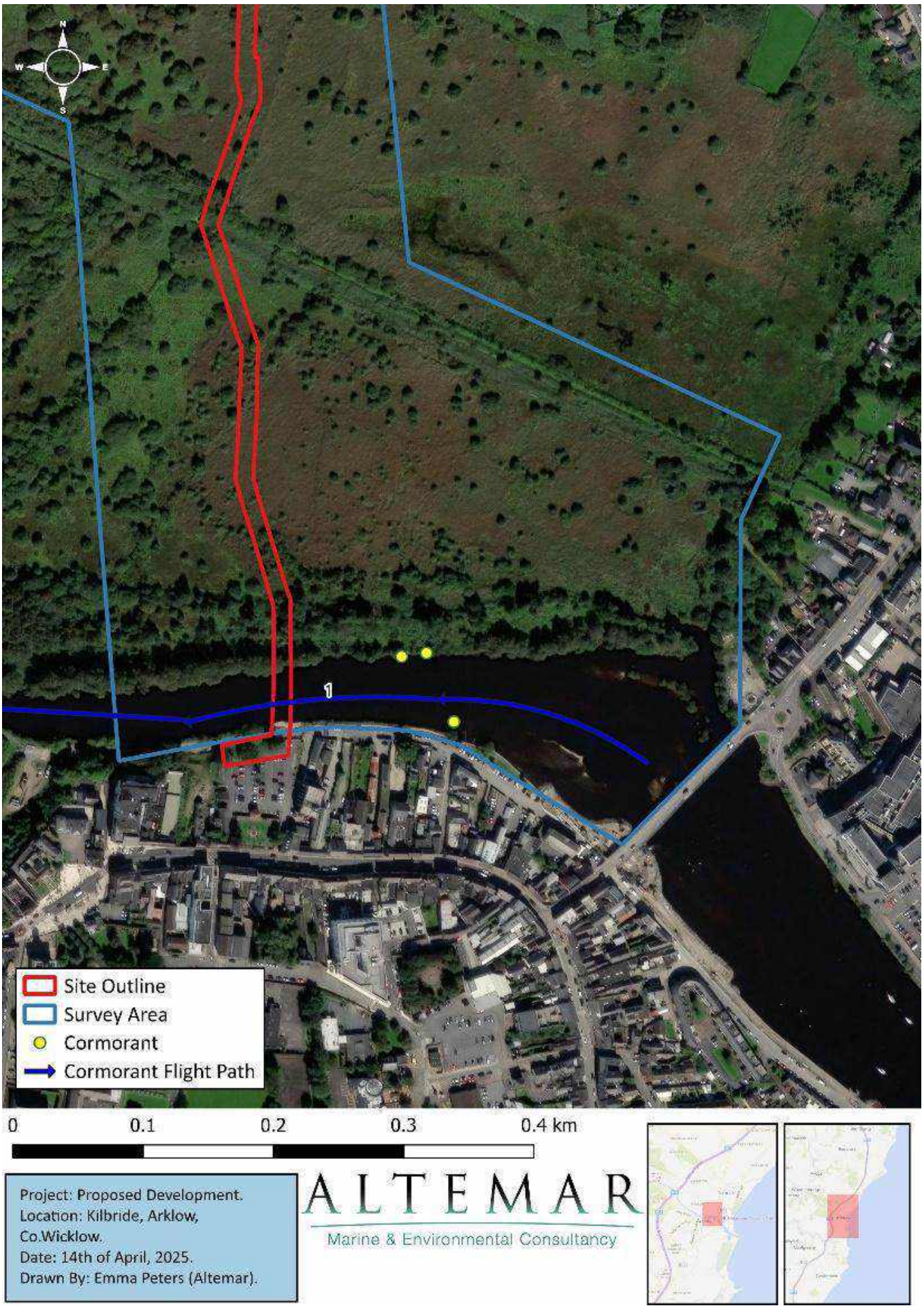

Figure. 14 *Cormorant flight path (Number denotes flight heights in meters) and points of observation.*

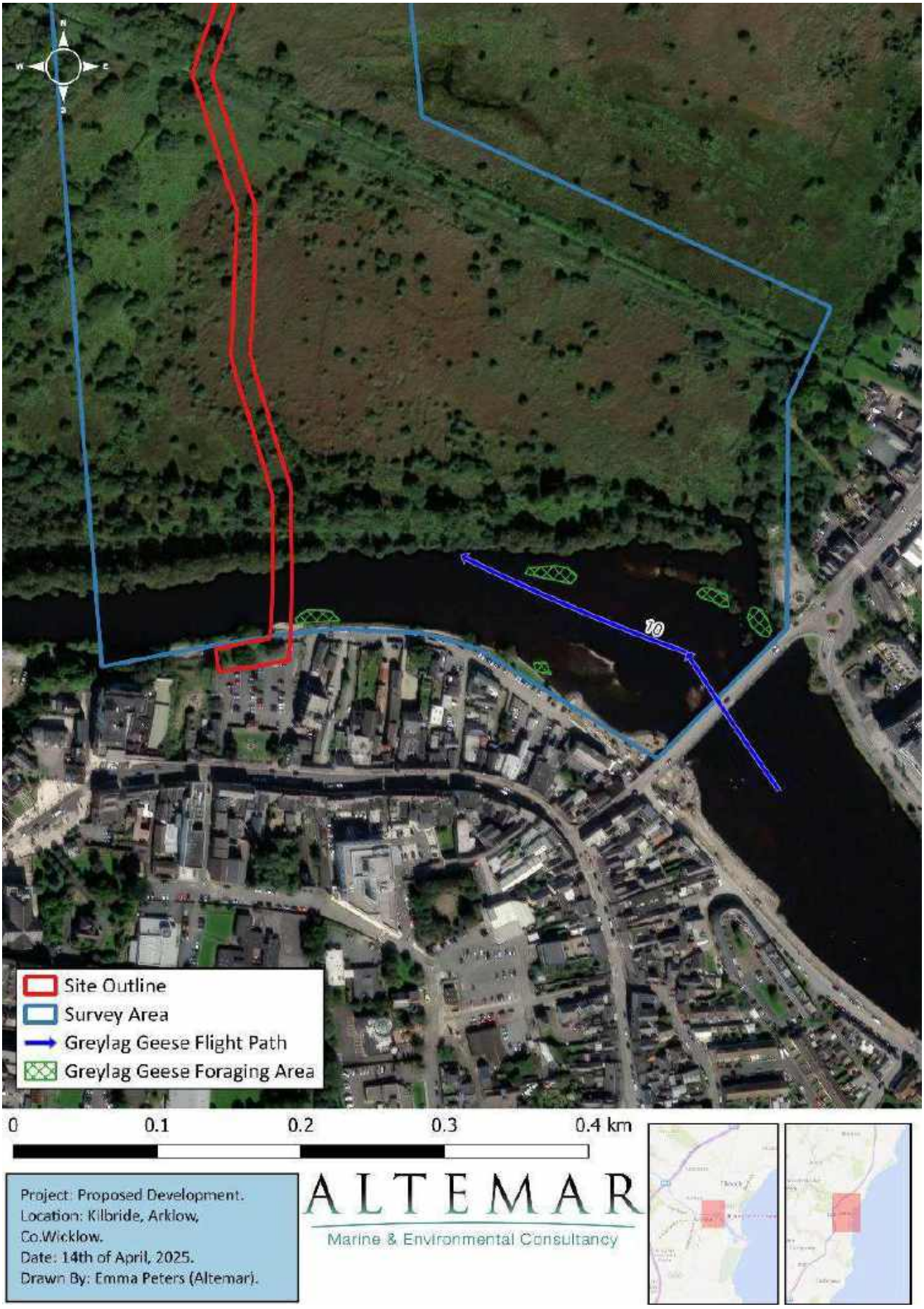

Figure. 15 *Greylag geese flight paths (Number denotes flight heights in meters) and Foraging area.*

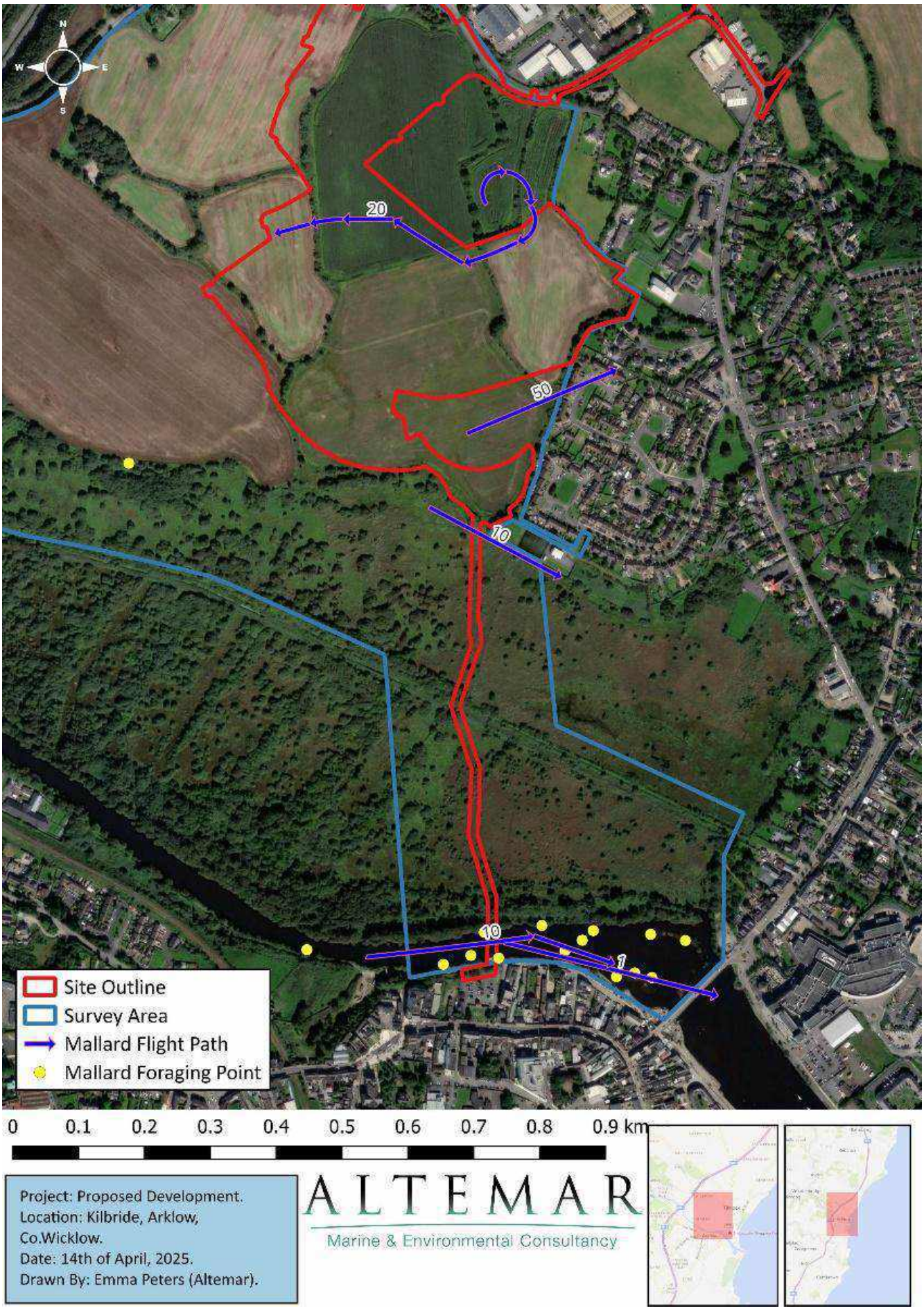

Figure. 16 *Mallard flight paths (Number denotes flight heights in meters) and Foraging points.*

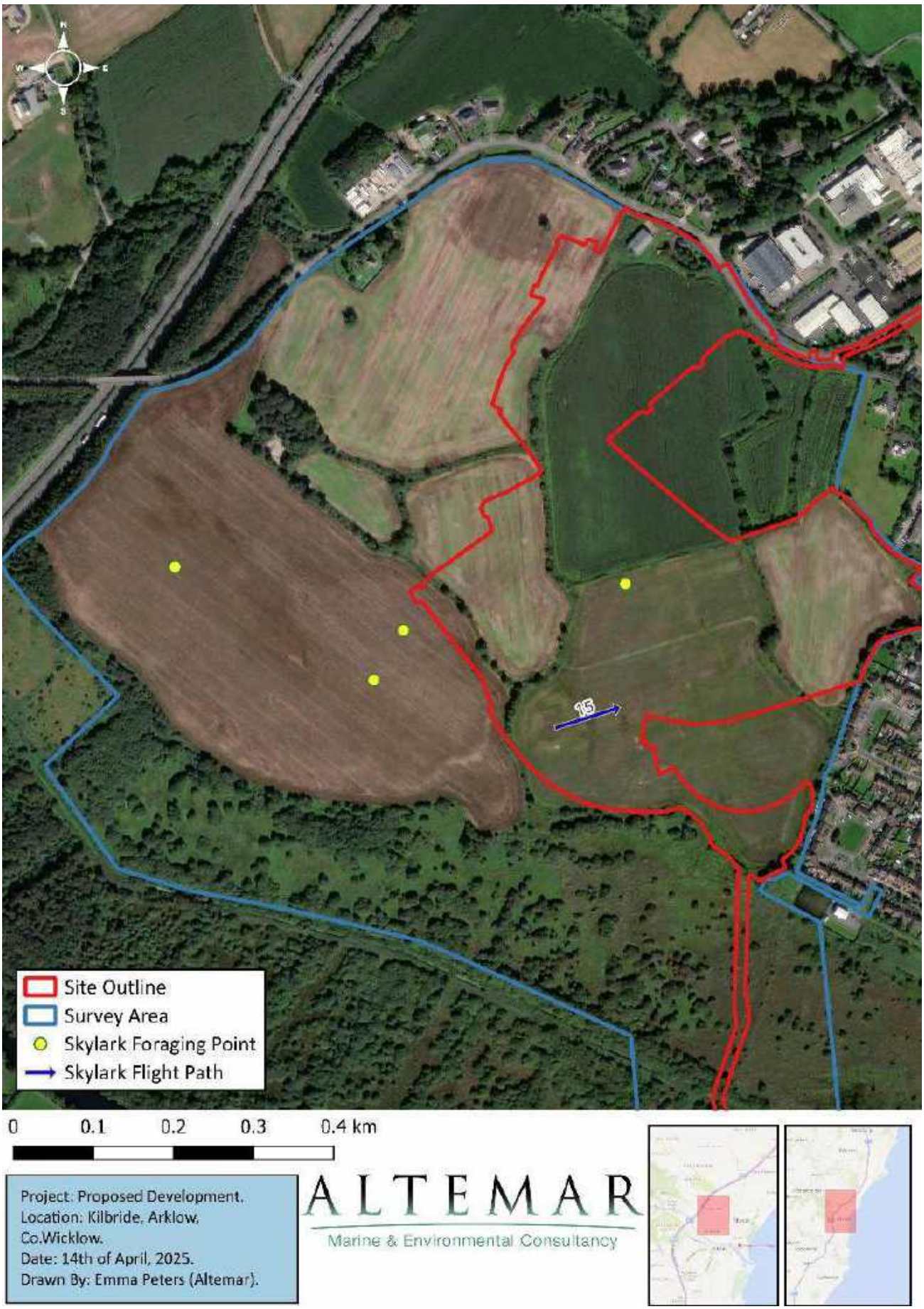

Figure. 17 *Skylark flight paths (Number denotes flight heights in meters) and Foraging points.*

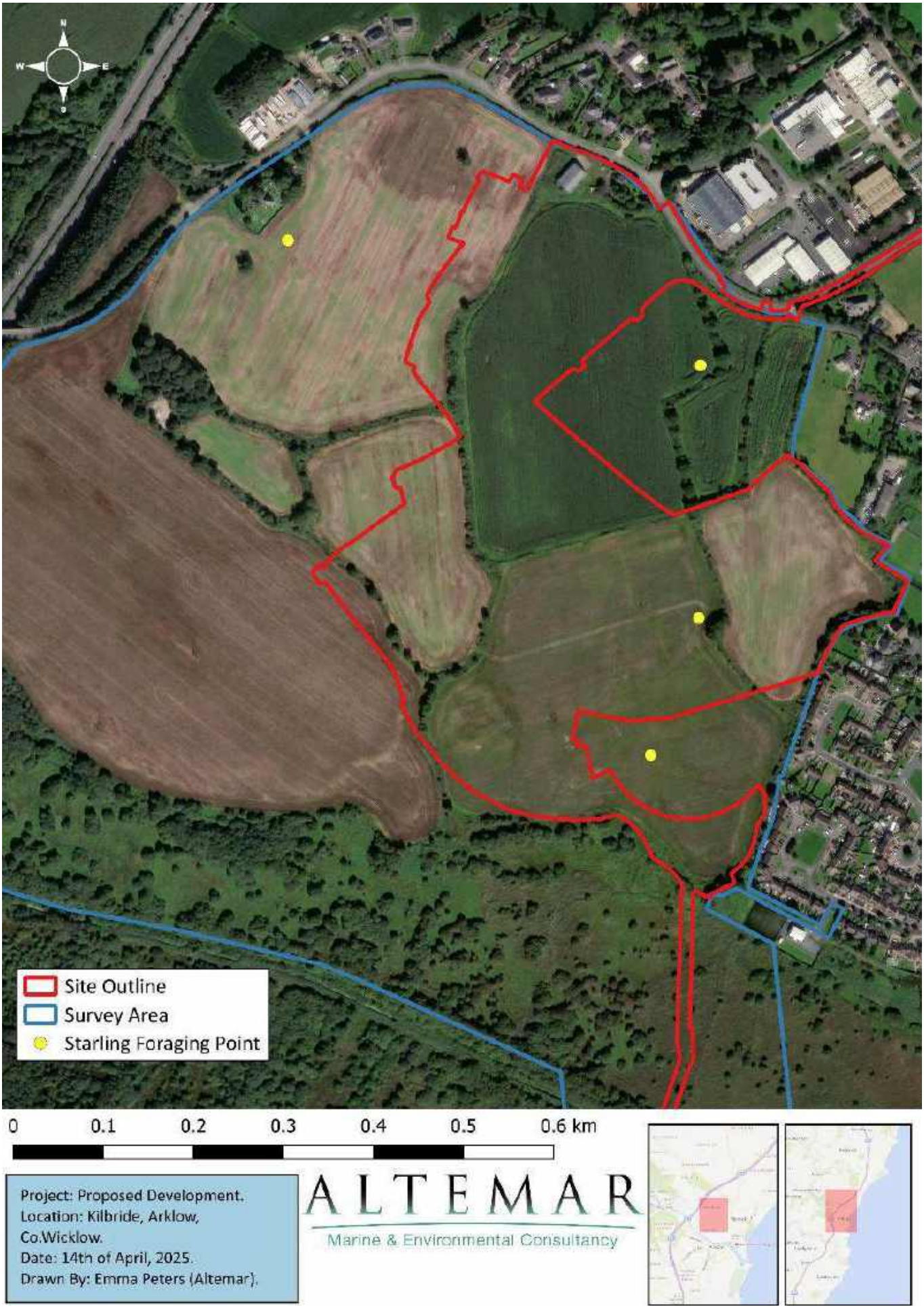

Figure 18. *Starling foraging points.*

Wintering bird assessment findings

Review of local bird records

The review of existing bird records (sourced from NBDC Database) within a Polygon drawn around the property line od the subject site encompassing the study area reveals that 41 known bird species have previously been observed and recorded locally (*Table 2*).

Table 3: *Status of bird species within the property line and immediately outside.*

Species name	Date of last record	Title of dataset	Designation
Black-headed Gull (*Larus ridibundus*)	01/02/2021	Birds of Ireland	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Blue Tit (*Cyanistes caeruleus*)	01/02/2021	Birds of Ireland	
Coal Tit (*Periparus ater)*	01/02/2021	Birds of Ireland	
Common Blackbird (*Turdus merula*)	01/02/2021	Birds of Ireland	
Common Coot (*Fulica atra*)	31/12/2001	Irish Wetland Birds Survey (I-WeBS) 1994-2001.	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Common Goldeneye (*Bucephala clangula*)	31/12/2001	Irish Wetland Birds Survey (I-WeBS) 1994-2001.	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Common Kingfisher (*Alcedo atthis*)	28/07/2020	Birds of Ireland	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Common Moorhen (*Gallinula chloropus*)	17/06/2020	Birds of Ireland	
Common Pochard (*Aythya ferina*)	31/12/2001	Irish Wetland Birds Survey (I-WeBS) 1994-2001.	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Common Snipe (*Gallinago gallinago*)	31/12/2001	Irish Wetland Birds Survey (I-WeBS) 1994-2001.	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section III Bird Species || Threatened Species: Birds

Species name	Date of last record	Title of dataset	Designation
			of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Common Starling (*Sturnus vulgaris*)	01/02/2021	Birds of Ireland	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Common Swift (*Apus apus*)	09/05/2019	Birds of Ireland	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Common Wood Pigeon (*Columba palumbus*)	01/02/2021	Birds of Ireland	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section I Bird Species
Eurasian Collared Dove (*Streptopelia decaocto*)	01/02/2021	Birds of Ireland	
Eurasian Curlew (*Numenius arquata*)	31/12/2001	Irish Wetland Birds Survey (I-WeBS) 1994-2001.	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Eurasian Jackdaw (*Corvus monedula*)	01/02/2021	Birds of Ireland	
Eurasian Oystercatcher (*Haematopus ostralegus*)	31/12/2001	Irish Wetland Birds Survey (I-WeBS) 1994-2001.	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Eurasian Wigeon (*Anas penelope*)	31/12/2001	Irish Wetland Birds Survey (I-WeBS) 1994-2001.	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
European Robin (*Erithacus rubecula*)	01/02/2021	Birds of Ireland	
Great Black-backed Gull (*Larus marinus*)	17/06/2020	Birds of Ireland	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Great Cormorant (*Phalacrocorax carbo*)	01/02/2021	Birds of Ireland	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Grey Heron (*Ardea cinerea*)	23/08/2021	Birds of Ireland	

Species name	Date of last record	Title of dataset	Designation
Greylag Goose (*Anser anser*)	01/02/2021	Birds of Ireland	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland) || Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Herring Gull (*Larus argentatus*)	01/02/2021	Birds of Ireland	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
House Sparrow (*Passer domesticus*)	13/01/2021	Birds of Ireland	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Iceland Gull (*Larus glaucoides*)	31/12/2001	Irish Wetland Birds Survey (I-WeBS) 1994-2001.	
Lesser Black-backed Gull (*Larus fuscus*)	17/06/2020	Birds of Ireland	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Little Egret (*Egretta garzetta*)	17/06/2020	Birds of Ireland	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species
Little Grebe (*Tachybaptus ruficollis*)	31/12/2001	Irish Wetland Birds Survey (I-WeBS) 1994-2001.	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Long-tailed Tit (*Aegithalos caudatus*)	09/06/2017	Birds of Ireland	
Mallard (*Anas platyrhynchos)*	01/02/2021	Birds of Ireland	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section I Bird Species
Mediterranean Gull (*Larus melanocephalus*)	08/02/2020	Birds of Ireland	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Mew Gull (*Larus canus*)	17/06/2020	Birds of Ireland	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Mistle Thrush (*Turdus viscivorus*)	01/02/2021	Birds of Ireland	
Mute Swan (*Cygnus olor*)	17/06/2020	Birds of Ireland	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List

Species name	Date of last record	Title of dataset	Designation
Northern Lapwing (*Vanellus vanellus*)	31/12/2001	Irish Wetland Birds Survey (I-WeBS) 1994-2001.	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Rook (*Corvus frugilegus*)	01/02/2021	Birds of Ireland	
Sand Martin (*Riparia riparia*)	01/04/2018	Birds of Ireland	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Tufted Duck (*Aythya fuligula*)	31/12/2001	Irish Wetland Birds Survey (I-WeBS) 1994-2001.	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Water Rail (*Rallus aquaticus*)	31/12/2001	Irish Wetland Birds Survey (I-WeBS) 1994-2001.	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List

Conclusion

This report aims to gather baseline data and to assist in assessing the potential impacts on wintering birds from future proposed developments on the grounds, particularly those listed as amber/red-listed birds of conservation concern in Ireland (BoCCI). 11 surveys by Emma Peters and 1 survey by Jack Doyle during the wintering bird season from October 2024 to March 2025.

A total of 46 species were recorded within and above the survey areas across 12 surveys. 28 green, 14 amber and 4 red species of conservation concern were recorded either within, over or immediately adjacent to the survey area boundary. The red-listed red kite and meadow pipit were using the site and displaying foraging behaviour constantly throughout the surveys. The red-listed redwing(wintering) and grey wagtail although in small numbers, was observed using the site. The 14 other Amber-listed species were observed with in the survey area, in particular the Linnet displayed consistent foraging behaviour in the arable crop fields in flocks averaging 46.7 individuals.

There are no Special Protection Areas (SPAs) within 15km of the proposed development. However, qualifying interests of distant SPAs were recorded on site (black-headed gull, common gull, cormorant, great black-backed gull, grey heron, greylag goose, lesser black-backed gull and mallard). Given that these species were recorded in low numbers, the site is deemed of low importance in supporting the qualifying interests of distant SPAs.

The proposed development is not predicted to have a significant impact on wintering bird species.

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Appendix 5.2

Wintering Bird Assessment (2020/2021)

Arklow (Kilbride) Winter Bird Surveys 2020-2021

Introduction

In the winter of 2020-2021, a total of 12 winter bird surveys were conducted at lands at Kilbride in North Arklow, by Hugh Delaney, a freelance ecologist (Birds primarily) with an experienced background in bird surveying on numerous sites with ecological consultancies over 10+ years. Hugh, a lifelong birder, is local to the Dun Laoghaire-Rathdown area in Dublin and is especially familiar with the bird life and its ecology in the environs going back over 30 years.

Winter Bird Survey Methodology

Winter bird surveys are conducted from soon after sunrise until late in the afternoon before sunset, the site is monitored throughout the day and all bird species utilizing the site recorded, including species flying through overhead. Checks are also made on suitable habitat nearby or adjacent the site for comparative purposes and to monitor any interchange of birds between sites. Target species (species of more special interest) utilizing the site will be mapped and estimates of the time these species frequented the site recorded.

Site Location

Figure 1. Site location (outlined in red) at Kilbride, North Arklow. (1) – marked in yellow is referred to in notes as the main site area.

Figure 2. Section of Avoca River in Arklow Town (also counted on site survey days).

Site Description

The site comprises arable fields north of Arklow Town (fallow for the duration of the survey period). The fields were bordered in parts by hedgerows and some larger trees. Housing estates bordered the site to the east and more arable fields bordered the site to the west. An extensive area of marshland bordered the site to the south.

Specific site survey methodology

Site traversed from north to south repeatedly during the day and vantage point observations made from the north end of the site (marked on site map with yellow x) giving an excellent overview of the site below. A count of waterbirds etc. present on the Avoca River south of the site in Arklow Town was made at least once during site visits as part of the surveys.

Survey results

October 23rd, 2020

Sunrise- 08.07hrs/Sunset 18.10hrs. Weather – Wind F4 West, Cloud 5/8, Dry, 11c, Excellent visibility. On-site 08.45hrs – 16.30hrs.

Species recorded – Black-headed Gull, Herring Gull, Mediterranean Gull, Mallard, Teal, Grey Wagtail, Pheasant, Song Thrush, Robin, Wren, Dunnock, Long-tailed Tit, Blue Tit, Woodpigeon, Buzzard, Red Kite, Linnet, Goldfinch, Chaffinch, House Sparrow, Stonechat, Chiffchaff, Rook, Jackdaw, Hooded Crow, Magpie, Meadow Pipit, Reed Bunting, Yellowhammer, Snipe, Skylark.

Observations from 08.45hrs – 12.00hrs –

A count at the Avoca River at 09.00hrs recorded 22 Black-headed Gull, 1 Mediterranean Gull, 11 Herring Gull, 3 Teal, 14 Mallard and a Grey Wagtail.

At the survey site during the morning observations included Linnet (<40) – foraging in stubble around the main site area. Also, Yellowhammer (<2), Goldfinch (<5), Chaffinch (<4), Chiffchaff (<1), Song Thrush (<4), Woodpigeon (<15) and Pheasant (<2) were recorded foraging in the same area. A Snipe was recorded in the stubble at area 2 of the site at 10.10hrs. Reed Bunting (<2), Stonechat (<1) were also recorded in area 2. A Buzzard was recorded soaring over the main site area at 09.40hrs and 10.15hrs.

Observations from 12.00hrs – 16.30hrs –

A Red Kite was noted soaring south over the main survey area at 13.15hrs. Two Buzzards were noted foraging in the stubble at the west side of the main site area at 12.30hrs. Foraging in the main site area intermittently during afternoon were Yellowhammer (<3), Skylark (<4), Reed Bunting (<2), Linnet (<35),

Chaffinch (<6), House Sparrow (<6 at east side of main site area), Stonechat (<1), Woodpigeon (<20), Meadow Pipit (<4). At area 2 a Snipe was again recorded at the north end at 13.45hrs. Also recorded in area 2 were Yellowhammer (<2), Reed Bunting (<3) and a foraging flock of Chaffinch (<12) and Goldfinch (<8) were present at the west side of area 2 from 14.15-15.00hrs. Robin (<2), Wren (<3), Long-tailed Tit (<5), Blue Tit (<1) and Dunnock (<2) were recorded in hedgerows at the north and south ends of the main site area. No other target species were recorded.

October 30th, 2020

Sunrise- 07.20hrs/Sunset 16.55hrs. Weather – Wind F2 West, Cloud 6/8, Dry, 8c, Excellent visibility. On-site 08.30hrs – 15.45hrs.

Species recorded - Black-headed Gull, Herring Gull, Mallard, Teal, Pheasant, Song Thrush, Blackbird, Robin, Wren, Dunnock, Long-tailed Tit, Blue Tit, Woodpigeon, Buzzard, Linnet, Goldfinch, Bullfinch, Redpoll, Chaffinch, House Sparrow, Stonechat, Rook, Hooded Crow, Magpie, Meadow Pipit, Reed Bunting, Yellowhammer, Starling, Snipe, Kingfisher, Skylark.

Observations from 08.30hrs – 12.00hrs –

On-site at the main site area a foraging flock of Linnet (<15), Chaffinch (<8) Redpoll (<1) Goldfinch (<10) and Reed Bunting (<2) were noted at the south end from 10.00-11.30hrs. Woodpigeon (<10) were also noted intermittently foraging across the site. A Buzzard passed west over the main site at 10.40 and 11.15hrs. At area 2 to the northeast two Snipe were flushed at 09.15hrs. Also recorded in and around area 2 Skylark (minimum of <15) were noted foraging in the stubble during the morning. Two Pheasant were noted foraging at the north end of the main site area intermittently with Blue Tit (<3), Bullfinch (<2), Robin (<1), Wren (<4), Blackbird (<3), Dunnock (<4) and Song Thrush (<7) recorded in hedgerows crossing the main site area and at the west end of area 2.

Observations from 12.00hrs – 15.45hrs –

At the main site area passerines recorded foraging on-site were Yellowhammer (<2), Linnet (<22), Blackbird (<2), Meadow Pipit (<4), House Sparrow (<6), Chaffinch (<8), Stonechat (<1) and Robin (<2). Also present at the south end of the main site area were a minimum of 4 Pheasant. Skylark (Minimum <10), Reed Bunting (<4) and Yellowhammer (<5) were noted foraging in area 2. Buzzard was recorded at area 2 at 10.15hrs (<2 foraging) and one flew west over main site area at 14.30hrs. Small numbers of corvids were noted foraging at the main site area intermittently including Hooded Crow (<3), Magpie (<4), Rook (<15) and Jackdaw (<10). A foraging flock of Starling (<30) was noted at the north end of the main site area at 15.10hrs. No other target species were recorded.

At the Avoca River count area Black-headed Gull (<35), Herring Gull (<18), Mallard (<26), Teal (<5) and a flock of feral Greylag Goose (<8) was noted at 15.45hrs. A Kingfisher was also noted in middle of the count area on the north side of the river.

November 10th, 2020

Sunrise- 07.41hrs/Sunset 16.35hrs. Weather – Wind F1 North, Cloud 3/8, Dry, 9c, Excellent visibility. On-site 08.30hrs – 16.00hrs.

Species recorded - Black-headed Gull, Herring Gull, Mute Swan, Mallard, Teal, Pheasant, Song Thrush, Mistle Thrush, Blackbird, Robin, Wren, Dunnock, Long-tailed Tit, Blue Tit, Woodpigeon, Buzzard, Red Kite, Linnet, Goldfinch, Chaffinch, House Sparrow, Stonechat, Rook, Hooded Crow, Magpie, Meadow Pipit, Pied Wagtail, Reed Bunting, Yellowhammer, Starling, Skylark.

Observations from 08.30hrs – 16.00hrs –

At the Avoca River count area Black-headed Gull (<55), Herring Gull (<16), Mallard (<34), Teal (<8), Mute Swan (<4) and Grey Heron (<1) were noted at 08.45hrs.

On-site at the main site area a foraging flock of Chaffinch (<15), Goldfinch (<8), Yellowhammer (<2), Linnet (<10) and Pied Wagtail was present intermittently throughout the morning mainly at the south end of the site. Also recorded on-site were Robin (<1), Song Thrush (<5), Blackbird (<4), Stonechat (<1), Mistle Thrush (<2) and Blue Tit (<2) at the hedgerows at the north and southeast side of site. In area 2 Pheasant (<3), Skylark (<8) and Reed Bunting (<6) were recorded. A Buzzard was noted passing south over area 2 at 10.10hrs.

Observations from 12.00hrs – 16.30hrs –

A Red Kite was noted passing north over the main site area at 12.40hrs. A Buzzard was noted foraging on ground at the south end of the main site area from 13.15-13.30hrs. Yellowhammer (<3), Chaffinch (<12), Linnet (<5), Goldfinch (<10), Reed Bunting (<4) and Pied Wagtail (<1) were noted foraging on-site in the stubble intermittently throughout the afternoon. Song Thrush (<3), Blackbird (<5), Robin (<2), Dunnock (<1) and Long-tailed Tit (<3) were noted at the hedgerows at the south and north of main site area. At area 2 Skylark (<15), Meadow Pipit (<3), Reed Bunting (<8), Woodpigeon (<10) and Pheasant (<2) were noted. Black-headed Gull (<3) were noted foraging at area 2 from 14.00-14.30hrs. No other target species recorded.

November 27th, 2020

Sunrise- 08.11hrs/Sunset 16.13hrs. Weather – Wind F1 West, Cloud 3/8, Dry, 4c, Excellent visibility. On-site 08.45hrs – 15.45hrs.

Species recorded - Black-headed Gull, Herring Gull, Common Gull, Mallard, Mute Swan, Teal, Pheasant, Song Thrush, Blackbird, Robin, Wren, Dunnock, Blue Tit, Woodpigeon, Buzzard, Red Kite, Linnet, Goldfinch, Redpoll, Chaffinch, House Sparrow, Stonechat, Rook, Raven, Hooded Crow, Magpie, Meadow Pipit, Pied Wagtail, Reed Bunting, Water Rail, Yellowhammer, Starling, Snipe, Skylark.

Observations from 08.45hrs – 12.00hrs –

On-site at the main site area Yellowhammer (<2), Goldfinch (<15), Redpoll (<1), Linnet (<6), Pied Wagtail (<1) were recorded intermittently throughout the morning. A foraging flock of Starling (<70) were present at the south end of the main site area from 10.45-12.15hrs. Also recorded on-site were Pheasant (<2), Robin (<1), Blue Tit (<3), Dunnock (<2), Wren (<2), Blackbird (<8) and Song Thrush (<4) in and around the hedgerows at the north and through the middle of the site. A Red Kite passed north over area 2 at 11.10hrs, also at area 2 were Skylark (<15), Reed Bunting (<6), and Snipe (<2). Two Buzzard were noted foraging in and around area 2 from 10.00-10.25hrs.

Observations from 12.00hrs – 15.45hrs –

At the main site area Skylark (<2), Goldfinch (<12), Redpoll (<2), Chaffinch (<9) and House Sparrow (<6) were noted foraging mainly along the east side of site. A minimum of two Water Rail were heard calling from the south end of the main site area (the birds were calling from the reed bed further south). Song Thrush (<5), Blackbird (<2), Robin (<2), Wren (<2) and Pied Wagtail (<1) were also recorded at the main site area. At area 2 Reed Bunting (<5), Skylark (<7), Siskin (<2), Buzzard (<1) and Stonechat (<2) were recorded intermittently during the afternoon. Two Raven passed south over area 2 at 15.05hrs.

At the Avoca River count area Black-headed Gull (<112), Herring Gull (<26), Common Gull (<3), Mute Swan (<6), Mallard (<38), Teal (<7) and Grey Heron (<1) were recorded at 15.30hrs.

December 11th, 2020

Sunrise- 08.31hrs/Sunset 16.06hrs. Weather – Wind F2 West, Light Showers, Cloud 5/8, 10c, Excellent visibility. On-site 09.00hrs – 15.30hrs.

Species recorded - Black-headed Gull, Herring Gull, Mallard, Mute Swan, Teal, Moorhen, Pheasant, Song Thrush, Blackbird, Redwing, Robin, Wren, Dunnock, Blue Tit, Coal Tit, Great Tit, Woodpigeon,

Buzzard, Kestrel, Linnet, Goldfinch, Redpoll, Chaffinch, House Sparrow, Stonechat, Rook, Hooded Crow, Magpie, Meadow Pipit, Pied Wagtail, Grey Wagtail, Reed Bunting, Water Rail, Yellowhammer, Starling, Snipe, Skylark.

Observations from 09.00hrs – 12.00hrs –

At the Avoca River count area Black-headed Gull (<135), Herring Gull (<32), Mute Swan (<5), Mallard (<45), Teal (<2), Moorhen (<3), Grey Wagtail (<2) and Grey Heron (<1) were recorded at 09.15hrs.

At the main site area Song Thrush (<10), Blackbird (<4), Redwing (<2), Chaffinch (<15), Goldfinch (<6), Wren (<2), Robin (<1), Coal Tit (<2) Meadow Pipit (<5) and Pied Wagtail (<2) were recorded foraging intermittently on-site during the morning. At area 2 Skylark (<20), Stonechat (<2), Reed Bunting (<14) and Yellowhammer (<4) were recorded foraging on-site during the morning. A Kestrel was recorded hunting at the west side of area 2 at 11.10hrs.

Observations from 12.00hrs – 15.30hrs –

At the main site area, a Buzzard was noted foraging at the north end at 12.50-13.10hrs. Starling (<80) were noted foraging at the east side from 13.30-14.15hrs. Also, at the main site area Yellowhammer (<3), Chaffinch (<14), House Sparrow (<5), Woodpigeon (<10), Pheasant (<2) and Rook (<15) were noted foraging during the afternoon. Minimum of 3 Water Rail were heard calling from the south side of the main site area at 15.00hrs calling from the reed bed further south. At area 2 Yellowhammer (<2), Skylark (<12), Reed Bunting (<4) and Snipe (<3 flushed) were noted at 14.30hrs. No other target species were recorded.

December 19th, 2020

Sunrise- 08.37hrs/Sunset 16.07hrs. Weather – Wind F2 Southwest, Cloud 3/8, Dry, 8c, Excellent visibility. On-site 09.00hrs – 15.30hrs.

Species recorded - Black-headed Gull, Herring Gull, Common Gull, Mallard, Mute Swan, Teal, Moorhen, Pheasant, Song Thrush, Blackbird, Redwing, Fieldfare, Robin, Wren, Dunnock, Blue Tit, Coal Tit, Woodpigeon, Buzzard, Red Kite, Linnet, Goldfinch, Chaffinch, House Sparrow, Stonechat, Rook, Hooded Crow, Magpie, Meadow Pipit, Pied Wagtail, Reed Bunting, Yellowhammer, Starling, Snipe, Skylark.

Observations from 09.00hrs – 12.00hrs –

At the main site area Linnet (<20), Yellowhammer (<2), Goldfinch (<7), Song Thrush (<5), Blackbird (<4), Wren (<3), Robin (<2), Dunnock (<2) and Rook (<15) were recorded foraging intermittently during the afternoon. A Red Kite passed east at 10.20hrs and another passed north over the main site area at 11.15hrs. Black-headed Gull (<6) were noted foraging on the main site area from 11.00-12.30hrs. At area 2 Skylark (<10), Yellowhammer (<5), Reed Bunting (<8) and Snipe (<1) were recorded during the morning. Two Buzzard were noted foraging at the west side of area 2 at 11.30hrs.

Observations from 12.00hrs – 15.30hrs –

At the main site area Song Thrush (<6), Redwing (<4), Blackbird (<5), Linnet (<16), Yellowhammer (<2), House Sparrow (<10) and Starling (<25) were noted foraging intermittently during the afternoon. Also recorded on-site were Dunnock (<4), Wren (<2), Blue Tit (<4), Coal Tit (<2), Robin (<1), Stonechat (<2), Pheasant (<2) and Pied Wagtail (<1). A flock of Fieldfare (<20) were noted passing west over the site at 14.15hrs. At area 2 Skylark (<16), Yellowhammer (<4), Reed Bunting (<12) and Snipe (<2 flushed) were noted at 13.30hrs. A flock of Chaffinch (<25) and Yellowhammer (<5) were noted at the west side of area 2 at 14.45hrs.

At the Avoca River count area Black-headed Gull (<115), Herring Gull (<32), Common Gull (<2), Mallard (<42), Teal (<4), Moorhen (<3) and Grey Heron (<2) were noted at 15.20hrs, with almost all birds recorded as usual in the area west of the bridge. No other target species recorded.

January 11th, 2021

Sunrise- 08.35hrs/Sunset 16.30hrs. Weather – Wind F3 West, Cloud 7/8, Light showers, 8c, Excellent visibility. On-site 09.15hrs – 16.00hrs.

Species recorded - Black-headed Gull, Herring Gull, Mallard, Mute Swan, Teal, Moorhen, Pheasant, Song Thrush, Mistle Thrush, Blackbird, Redwing, Robin, Wren, Dunnock, Blue Tit, Long-tailed Tit, Woodpigeon, Buzzard, Sparrowhawk, Linnet, Goldfinch, Chaffinch, House Sparrow, Stonechat, Rook, Hooded Crow, Magpie, Meadow Pipit, Pied Wagtail, Reed Bunting, Water Rail, Yellowhammer, Starling, Skylark.

Observations from 09.15hrs – 12.00hrs –

At the Avoca River count area Black-headed Gull (<90), Herring Gull (<24), Mallard (<48), Mute Swan (<4), Teal (<6), Moorhen (<4) and feral Greylag Geese (<9) were recorded at 09.25hrs. Almost all birds present in area west of the bridge.

At the main site area Black-headed Gull (<12) were noted foraging at the south end from 09.45-10.30hrs. Also noted on-site were Rook (<20), Chaffinch (<8), Song Thrush (<11), Redwing (<4), Dunnock (<2), Blackbird (<5), Wren (<2), Linnet (<5), Long-tailed Tit (<4) and Reed Bunting (<3). Water Rail (<2) were heard calling from the south end of the site at 11.10hrs, the birds calling from reed bed further south. A Sparrowhawk was noted hunting along the east side of the site at 09.40hrs. At area 2 Reed Bunting (<12), Skylark (<12), Yellowhammer (<3) and Pheasant (<2) were recorded at 11.30hrs. A foraging flock of Chaffinch (<25) and Yellowhammer were noted in the stubble at the west side of area 2 at 11.50hrs.

Observations from 12.00hrs – 16.00hrs –

At the main site area Starling (<100) were noted foraging at the east side of the site intermittently during the afternoon, also recorded on-site were Yellowhammer (<3), Linnet (<18), Goldfinch (<8), Song Thrush (<5), Mistle Thrush (<1), Blue Tit (<2), House Sparrow (<6), Robin (<2), Reed Bunting (<4), Wren (<2), Rook (<10), Stonechat (<2) and Pheasant (<1). Black-headed Gull (<5) were noted foraging on-site from 14.30-15.00hrs. A Buzzard passed south over the site at 13.20hrs. Two Water Rail were heard at 15.30hrs from the south end of the site calling from the reed bed area. At area 2 Skylark (<15), Reed Bunting (<10), Yellowhammer (<6) and Redwing (<15) were recorded at 13.15hrs. No other target species recorded.

January 25th, 2021

Sunrise- 08.20hrs/Sunset 16.55hrs. Weather – Wind F2 Southwest, Cloud 5/8, Dry, 3c, Excellent visibility. On-site 09.00hrs – 15.45hrs.

Species recorded - Black-headed Gull, Herring Gull, Common Gull, Mallard, Mute Swan, Teal, Moorhen, Pheasant, Song Thrush, Blackbird, Robin, Wren, Dunnock, Blue Tit, Coal Tit, Woodpigeon, Buzzard, Red Kite, Linnet, Goldfinch, Chaffinch, Redpoll, House Sparrow, Stonechat, Rook, Hooded Crow, Magpie, Meadow Pipit, Pied Wagtail, Reed Bunting, Yellowhammer, Starling, Water Rail, Snipe, Skylark.

Observations from 09.00hrs – 12.00hrs –

At the main site area Rook (<25), Hooded Crow (<4), Linnet (<10), Skylark (<2), Reed Bunting (<5), Goldfinch (<8), Robin (<2), Song Thrush (<10), Blackbird (<5), Woodpigeon (<8), Wren (<2), Blue Tit (<3), Coal Tit (<1), House Sparrow (<4), Redpoll (<4) and Chaffinch (<10) were recorded intermittently during the morning. Black-headed Gull (<2) were noted foraging on-site at 10.45hrs briefly and again (<5) foraging from 11.20-11.40hrs. At area 2 Skylark (<8), Yellowhammer (<2), Snipe (<2 flushed), Chaffinch

(<15) and Reed Bunting (<2) were noted during the morning. A Red Kite was noted passing south over the west side of area 2 at 12.00hrs.

Observations from 12.00hrs – 15.45hrs –

At the main site area Yellowhammer (<1), Chaffinch (<14), Goldfinch (<8), Linnet (<5), Woodpigeon (<12), Song Thrush (<8), Blackbird (<3), Dunnock (<2), Robin (<1), Rook (<5) and Pheasant (<3) were noted foraging during the afternoon. At area 2 Snipe (<4 flushed), Yellowhammer (<3), Reed Bunting (<15), Stonechat (<2), Meadow Pipit (<5), Skylark (<14) and Chaffinch (<20) were recorded foraging in the area at 13.30-14.00hrs. A minimum of 4 Water Rail were noted calling from the reedbed area near the south end of the main area at 15.00hrs.

At the Avoca River count area Black-headed Gull (<120), Herring Gull (<30), Common Gull (<5), Mute Swan (<6), Mallard (<46), Moorhen (<3) and Grey Heron (<1) were recorded at 15.20hrs.

February 6th, 2021

Sunrise- 08.00hrs/Sunset 17.18hrs. Weather – Wind F3 Northeast, Cloud 6/8, Dry, 6c, Excellent visibility. On-site 08.45hrs – 16.00hrs.

Species recorded - Black-headed Gull, Herring Gull, Mallard, Mute Swan, Teal, Moorhen, Pheasant, Song Thrush, Blackbird, Robin, Wren, Dunnock, Blue Tit, Great Tit, Woodpigeon, Buzzard, Linnet, Goldfinch, Chaffinch, Siskin, House Sparrow, Stonechat, Rook, Hooded Crow, Magpie, Raven, Meadow Pipit, Pied Wagtail, Reed Bunting, Yellowhammer, Starling, Water Rail, Skylark.

Observations from 08.45hrs – 12.00hrs –

At the Avoca River count area Black-headed Gull (<115), Herring Gull (<48), Mute Swan (<4), Mallard (<38), Teal (<5), Feral Greylag Goose (<6) and Moorhen (<4) were recorded 09.00hrs.

At the main site area Chaffinch (<10), Goldfinch (<6), Linnet (<14), Woodpigeon (<10), Song Thrush (<4), Blackbird (<2), Stonechat (<1), Meadow Pipit (<3), Pied Wagtail (<1), Robin (<2), Wren (<1), Dunnock (<3), Blue Tit (<1) were recorded intermittently during the morning foraging in the area and adjoining hedgerows. A Raven was noted flying south at 10.15hrs. At area 2 Skylark (<18), Yellowhammer (<4), Reed Bunting (<5), Song Thrush (<4) and Chaffinch (<15) were noted at 11.00hrs foraging in the area. Two Buzzards were recorded foraging at the west side of area 2 at 11.20hrs.

Observations from 12.00hrs – 16.00hrs –

On-site at the main site area Starling (<50), Song Thrush (<7), Blackbird (<3), Linnet (<8), Robin (<2), Siskin (<2), Wren (<1), Dunnock (<3), Rook (<14), Jackdaw (<5), House Sparrow (<5), Goldfinch (<10) and Pheasant (<1) were recorded foraging in the area during the afternoon. At area 2 Yellowhammer (<2), Reed Bunting (<8), Chaffinch (<10), Meadow Pipit (<5) and Skylark (<8) were recorded foraging in the area during the afternoon. A minimum of 2 Water Rail were heard calling from the reed bed at the south end of the main site area at 14.45hrs. No other target species recorded.

February 26th, 2021

Sunrise- 07.19hrs/Sunset 17.57hrs. Weather – Wind F2 Southwest, Cloud 3/8, Dry, 6c, Excellent visibility. On-site 08.30hrs – 16.30hrs.

Species recorded - Black-headed Gull, Mediterranean Gull, Great black-backed Gull, Lesser black-backed Gull, Herring Gull, Mallard, Mute Swan, Cormorant, Teal, Moorhen, Pheasant, Song Thrush, Blackbird, Redwing, Robin, Wren, Dunnock, Blue Tit, Long-tailed Tit, Woodpigeon, Buzzard, Red Kite, Linnet, Goldfinch, Chaffinch, House Sparrow, Stonechat, Rook, Hooded Crow, Magpie, Meadow Pipit, Pied Wagtail, Reed Bunting, Yellowhammer, Starling, Water Rail, Snipe, Kingfisher, Skylark.

Observations from 08.30hrs – 12.00hrs –

At the main site area, a foraging flock of Chaffinch (<22), Linnet (<8), Goldfinch (<10) and Pied Wagtail (<2) was noted at the east side from 09.30-10.30hrs. Also recorded foraging in the area during the morning were Song Thrush (<6), Blackbird (<3), Meadow Pipit (<2), Dunnock (<2), Robin (<3), Redwing (<5), Long-tailed Tit (<6) and Reed Bunting (<1). Black-headed Gull (<5) were noted briefly foraging at 09.40hrs. At area 2 Skylark (<5), Snipe (<2), Pheasant (<4), Chaffinch (<8) and Yellowhammer (<2) were recorded during the morning.

Observations from 12.00hrs – 16.00hrs –

At area 2 single Red Kite was observed flying east at 13.00hrs and south at 14.05hrs. Also recorded in area 2 were Skylark (<14), Reed Bunting (<6), Chaffinch (<9), Yellowhammer (<4) and Stonechat (<2). At the main site area Goldfinch (<18), Linnet (<20), Starling (<25), Rook (<10), Jackdaw (<6), Buzzard (<1), Chaffinch (<5), Blue Tit (<3), Meadow Pipit (<1) and Pied Wagtail (<2) were recorded on-site during the afternoon. Two Water Rail heard at 14.30hrs from south end of site calling from the nearby reed bed.

At the Avoca River count area Black-headed Gull (<80), Mediterranean Gull (<1), Herring Gull (<54), Great black-backed Gull (<1), Lesser black-backed Gull (<9), Mallard (<32), Teal (<2), Feral Greylag Goose (<8), Mute Swan (<6), Moorhen (<3), Cormorant (<2) and Kingfisher (<1) were noted at 15.45hrs.

March 9th, 2021

Sunrise- 06.54hrs/Sunset 18.18hrs. Weather – Wind F2 South, Cloud 8/8, Dry, 9c, Excellent visibility. On-site 08.30hrs – 16.00hrs.

Species recorded - Black-headed Gull, Mediterranean Gull, Common Gull, Iceland Gull, Great black-backed Gull, Lesser black-backed Gull, Herring Gull, Mallard, Mute Swan, Teal, Moorhen, Pheasant, Song Thrush, Blackbird, Redwing, Robin, Wren, Goldcrest, Dunnock, Blue Tit, Woodpigeon, Buzzard, Kestrel, Linnet, Goldfinch, Chaffinch, House Sparrow, Stonechat, Rook, Hooded Crow, Magpie, Meadow Pipit, Pied Wagtail, Grey Wagtail, Reed Bunting, Yellowhammer, Starling, Water Rail, Skylark.

Observations from 08.30hrs – 12.00hrs –

At the Avoca River count area Black-headed Gull (<125), Herring Gull (<46), Lesser black-backed Gull (<16), Iceland Gull (<1), Mediterranean Gull (<1), Common Gull (<18), Great black-backed Gull (<5), Mallard (<54), Mute Swan (<3), Grey Wagtail and Cormorant (<1) were recorded at 08.45hrs.

At the main site area Linnet (<12), Goldfinch (<15), Chaffinch (<9), Robin (<4), Wren (<2), Dunnock (<3), Song Thrush (<5), Blackbird (<2), Woodpigeon (<40), Goldcrest (<1), Rook (<10), Hooded Crow (<4), House Sparrow (<7), Pied Wagtail (<1) and Meadow Pipit (<3) were noted foraging in the area during the morning. A Kestrel was observed hunting in the center of the main site area at 10.40hrs. At area 2 Skylark (<6), Pheasant (<11), Reed Bunting (<4), Yellowhammer (<3), Song Thrush (<8), Redwing (<6) were recorded at 10.00-10.30hrs. A Buzzard was noted foraging at the west end of area 2 at 10.25hrs.

Observations from 12.00hrs – 16.00hrs –

At the main site area Woodpigeon (<60) and Starling (<45) were recorded foraging during the afternoon, also recorded were Goldfinch (<15), House Sparrow (<4), Yellowhammer (<1), Wren (<2), Dunnock (<4), Linnet (<5), Pheasant (<6) and Chaffinch (<2). A minimum of 3 Water Rail were heard calling from the reed bed near the south end of the site during the afternoon. A Kestrel was again noted hunting at the north end of the main site area at 13.35hrs. At area 2 Skylark (<5), Reed Bunting (<8), Chaffinch (<14) and Yellowhammer (<4), Song Thrush (<6) and Stonechat (<1) were recorded foraging during the afternoon. No other target species recorded.

March 23rd, 2021

Sunrise- 06.20hrs/Sunset 18.44hrs. Weather – Wind F3 Southwest, Cloud 4/8, Dry, 10c, Excellent visibility. On-site 07.45hrs – 16.00hrs.

Species recorded - Black-headed Gull, Common Gull, Great black-backed Gull, Lesser black-backed Gull, Herring Gull, Mallard, Mute Swan, Teal, Moorhen, Pheasant, Song Thrush, Blackbird, Robin, Wren, Dunnock, Blue Tit, Woodpigeon, Buzzard, Kestrel, Red Kite, Linnet, Goldfinch, Greenfinch, Chaffinch, Bullfinch, House Sparrow, Stonechat, Rook, Hooded Crow, Magpie, Meadow Pipit, Pied Wagtail, Reed Bunting, Yellowhammer, Starling, Water Rail, Skylark.

Observations from 07.45hrs – 12.00hrs –

At the main site area Linnet (<20), Yellowhammer (<2), Bullfinch (<2), Chaffinch (<5), Greenfinch (<2), Goldfinch (<12), House Sparrow (<10), Blue Tit (<3), Dunnock (<2), Song Thrush (<6), Pheasant (<2), Woodpigeon (<20) and Starling (<35) were noted foraging during the morning. A Kestrel was noted hunting at the west side of the site at 11.15hrs. At area 2 a Red Kite was noted passing south at 10.10hrs, also noted in area 2 were Skylark (<6 including two in song), Yellowhammer (<3), Song Thrush (<2), Reed Bunting (<2), Dunnock (<3) and Stonechat (<1). Two Buzzard was observed foraging on ground at the north end of area 2 at 10.30hrs.

Observations from 12.00hrs – 16.00hrs –

At the main site area Woodpigeon (<30), Starling (<15), Song Thrush (<4), Blackbird (<3), Dunnock (<3), Robin (<2), Chaffinch (<7), Goldfinch (<4), House Sparrow (<8), Rook (<15) and Pheasant (<1) were noted foraging during the afternoon. Two Buzzard was noted at the north end of the site perched in trees at 13.10hrs. At area 2 Skylark (<5), Yellowhammer (<5), Song Thrush (<3), Bullfinch (<4) and Reed Bunting (<4) were noted from 12.30-13.30hrs. A Red Kite passed north over area 2 at 13.45hrs. Minimum of two Water Rail were noted calling from the reed bed near the south end of the site at 15.15hrs.

At the Avoca River count area Black-headed Gull (<85), Common Gull (<13), Herring Gull (<53), Lesser black-backed Gull (<17), Great black-backed Gull (<3), Mute Swan (<7), Mallard (<44), Feral Greylag Goose (<10), Moorhen (<5) and Grey Heron (<1) were recorded at 15.50hrs. No other target species recorded.

Comments and observations on the survey results

56 bird species were recorded at lands at Kilbride in North Arklow during 12 winter bird surveys from October 2020 to March 2021. In the context of wintering bird species that are red listed as species of conservation concern in the revised Birdwatch Ireland List of birds of conservation concern in Ireland (2020-2026) Redwing and Snipe were recorded in small numbers. Results from the surveys suggest that the site is not an ex-situ foraging or roosting site for species of qualifying interest from nearby Special protection areas (SPA's).

Some of the more notable species recorded on-site were Yellowhammer (wintering and likely breeding), Reed Bunting (wintering), Skylark (wintering), with occasional sightings of Red Kite and Kestrel on-site. Water Rail was recorded in the reed beds to the south of the site. At the Avoca River site in Arklow Town a number of amber listed wintering species were noted wintering, including four Gull species, Mallard, Teal, Cormorant and Mute Swan.

Appendix 5.3

Breeding Bird Assessment

ALTEMAR
Marine & Environmental Consultancy

Breeding Bird Assessment for a proposed Mixed Use Large-Scale Residential Development (LRD) at Kilbride, Arklow, Co. Wicklow.

21st May 2025

Prepared by: Emma Peters of Altemar Ltd.
On behalf of: Certain Assets of Dawnhill and Windhill Limited.

Altemar Ltd., 50 Templecarrig Upper, Delgany, Co. Wicklow. 00-353-1-2010713. info@altemar.ie
Directors: Bryan Deegan and Sara Corcoran
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Document Control Sheet			
Client	Certain Assets of Dawnhill and Windhill Limited		
Project	Breeding Bird Assessment for a proposed Mixed Use Large-Scale Residential Development (LRD) at Kilbride, Arklow, Co. Wicklow.		
Report	Breeding Bird Assessment		
Date	21st May 2025		
Version	Author	Reviewed	Date
Final	Bryan Deegan	Gayle O'Farrell	21st May 2025

Summary

Structure/features:	The survey area consists primarily of crop fields, scrub, treelines, bare ground, roadways, farm buildings and a house on site.
Location:	Kilbride, Arklow, Co. Wicklow.
Bird species breeding onsite:	Blackcap, Hooded Crow, Whitethroat, Woodpigeon and Wren. (Reed warbler & Sedge warbler within the marsh habitat)
Proposed work:	Mixed-Use Large Scale Residential Development.
Impact on breeding birds:	The proposed development will result in a long-term low adverse effect on breeding birds due to habitat loss. Mitigation measures are proposed.
Surveys by:	Emma Peters BSc, Frank Spellman MSc, & Jack Doyle MSc of Altemar Ltd.
Survey dates:	29th May, 10th June and 24th June 2024 23rd April & 9th May 2025

Receiving environment

Background

The proposed mixed use Large scale Residential Development will result in the demolition of an existing dwelling, outbuilding and agricultural shed and the construction of a local and 666 No. residential units with a mix of semidetached, detached, and terraced houses along with duplex apartments and apartments. These will comprise 1, 2, 3 and 4 bed houses. All residential units will have associated private open space facing north/ south/ east/ west. The proposal will also deliver 3 No. retail units, 3 No. community/ medical units and 1 No. creche unit.

New pedestrian/ cyclist link connecting into Arklow Town Centre is proposed via a new boardwalk and bridge across the marsh and over the Avoca River adjoining the existing greenway and the Main Street. A new road is also proposed connecting to the north to Kilbride Road. Alterations to the surrounding road network to provide a section of the regional road and upgrades to provide pedestrian facilities are also included. Vehicular access to the site will be from the new proposed regional road. The development will also provide for landscaping, public open spaces and all associated site development works to enable the development including boundary treatments, attenuation storage area and other service provision including ESB substation.

The proposed site outline, location, and landscape plan are demonstrated in Figures 1-4.

Landscape

A Landscape Design Proposal has been prepared by NMP Landscape Architects Ltd to accompany this planning application. The landscape plan is demonstrated in Figure 5.

Figure 1. *Survey area*.

Figure 2. *Site location*

Figure 3. *Proposed overall layout – sheet 1*

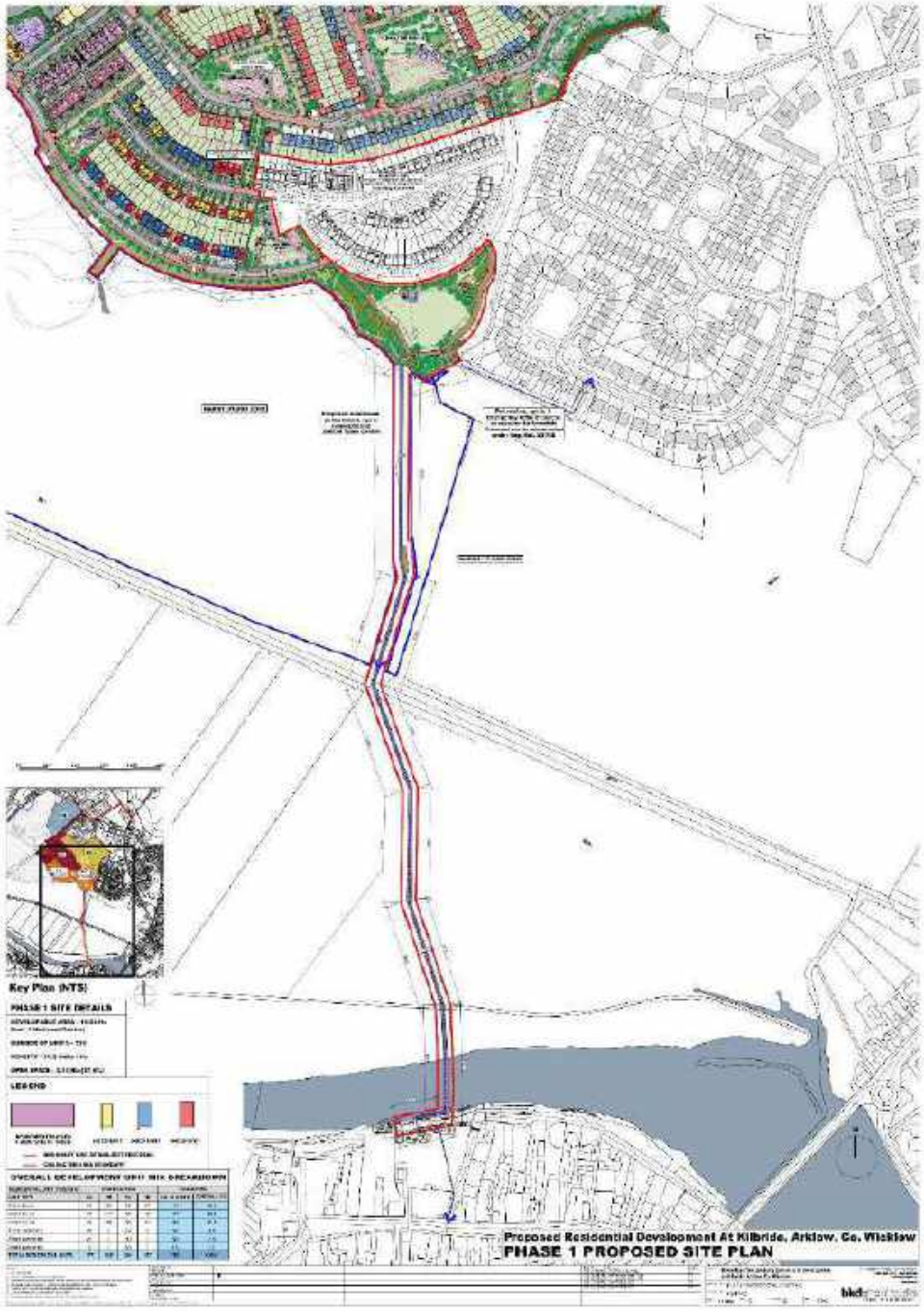

Figure 4. *Proposed overall layout – sheet 2*

Figure 5. *Proposed landscape general arrangement plan*

Competency of assessor

Emma Peters (BSc Environmental Science).

Emma has carried out a range of wintering and breeding ornithological surveys in Ireland. Emma has experience in bat detection through static detector surveys, dusk emergence, and down re-entry surveys and is a member of Bat Conservation Ireland. She is also skilled in habitat identification, native and non-native species identification and terrestrial mammal surveys. The desk and field surveys were carried out using techniques approved and recommended by CIEEM.

Frank Spellman (BSc Zoology, MSc Zoology).

Frank has extensive experience in carrying out a wide range of fauna surveys as both a sub-contractor and employee for environmental consultancies and organisations in Ireland and the US. These include both roving and static acoustic bat surveys, terrestrial non-avian mammal surveys, breeding/wintering bird surveys, and freshwater ecology surveys. Frank has been lead surveyor on numerous development projects within Ireland carrying out full mammal assessments.

Jack Doyle (MSc Sustainable Environments).

This report has also been prepared by Jack Doyle (MSc Sustainable Environments). Jack has previous experience in carrying out a wide range of fauna surveys, including both roving and static acoustic bat surveys, terrestrial non-avian mammal surveys, and breeding/wintering bird surveys.

Bryan Deegan (MCIEEM, BSc Applied Marine Biology, MSc Environmental Science)

Bryan Deegan, the managing director of Altemar, is an Environmental Scientist and Marine Biologist with 31 years' experience working in Irish terrestrial and aquatic environments, providing services to the State, Semi-State and industry. He is currently lead project ecologist for Project Pembroke and was contracted to Inland Fisheries Ireland as the sole "External Expert" to environmentally assess internal and external projects. He is also chair of an internal IFI working group on environmental assessment. Bryan Deegan (MCIEEM) holds a MSc in Environmental Science, BSc (Hons.) in Applied Marine Biology, NCEA National Diploma in Applied Aquatic Science and a NCEA National Certificate in Science (Aquaculture).

Legislative context

The Wildlife Act 1976 protects wild birds in Ireland. Based on this legislation it is an offence to wilfully interfere with or destroy wild birds and their nests and eggs (other than the wild species mentioned in the Third Schedule of this Act). Under this legislation it is an offence for any person who "*wilfully takes or removes the eggs or nest of a protected wild bird otherwise than under and in accordance with such a licence, wilfully destroys, injures or mutilates the eggs or nest of a protected wild bird, wilfully disturbs a protected wild bird on or near a nest containing eggs or unflown young.*"

Habitats Directive- Council Directive 92/43/EEC 1992 on the conservation of natural habitats and of wild fauna and flora has been transposed into Irish Law, including, via, *inter alia*, the European Communities (Birds and Natural Habitats) Regulations 2011 (as amended).

Council Directive 2009/147/EC 2010 on the conservation of wild birds provides for the conservation of wild birds by, among other things, classifying important ornithological sites as Special Protection Areas. The Directive relates to the conservation of all species of naturally occurring birds in the wild state, their eggs, nests and habitats in the European territory of the Member States. The Directive prohibits in particular:

- deliberate killing or capture by any method;
- deliberate destruction of, or damage to, their nests and eggs or removal of their nests;
- taking their eggs in the wild and keeping these eggs even if empty;
- deliberate disturbance of these birds particularly during the period of breeding and rearing, in so far as disturbance would be significant having regard to the objectives of this Directive;
- keeping birds of species the hunting and capture of which is prohibited.

Under the European Communities (Birds and Natural Habitats) Regulations 2011 (as amended), notwithstanding any consent, statutory or otherwise, given to a person by a public authority or held by a

person, except in accordance with a licence granted by the Minister under Regulation 54, a person who in respect of the species referred to in Part 1 of the First Schedule:

- deliberately captures or kills any specimen of these species in the wild,
- deliberately disturbs these species particularly during the period of breeding, rearing, hibernation and migration,
- deliberately takes or destroys eggs of those species from the wild,
- damages or destroys a breeding site or resting place of such an animal, or
- keeps, transports, sells, exchanges, offers for sale or offers for exchange any specimen of these species taken in the wild, other than those taken legally as referred to in Article 12(2) of the Habitats Directive, shall be guilty of an offence.

Breeding bird survey

This report presents the results of three site visits, by Emma Peters and Frank Spellman on 29th May, 10th June and 24th June 2024, and Emma Peters and Jack Doyle on the 23rd April 2025 and 9th May 2025. A breeding bird transect survey was carried out on each occasion.

Survey methodology

This Breeding bird survey was carried out based on the BTO Common Bird Census (Bibby *et al.*, 2000 and Gilbert *et al.*, 1998) and following CIEEM guidelines.

A 15-minute settlement period was given following arrival to allow resumption of bird activity after any possible disturbance caused by arrival to the site. Various features and habitats such as scrub, grassland, treelines, mature trees and exposed earth were present within the survey area. A single transect following the full perimeter of the survey area was carried out on each occasion, covering all areas and features available for breeding activity within and adjacent to the survey area. Each survey was carried out by a single surveyor.

The survey was carried out over 3 hours on 3 occasions in 2024 and 2 surveys in 2025, beginning at dawn and ending once all areas/features had been surveyed. A single evening survey was carried out on the 24th June 2024 in compliance with CIEEM guidelines. Care was taken not to double count any observations. Weather conditions were optimal on each occasion.

Survey results

Habitats of breeding bird potential

A desk and ground level breeding habitat assessment were carried and used to examine the structures and vegetation on site for features that could provide breeding habitat. Potential nesting features include scrub, treelines, hedgerows etc. All vegetated areas on site were assessed for breeding bird potential.

Areas of high breeding bird potential included the scrub, treelines and hedgerows throughout the survey area and its boundaries.

Breeding activity survey

Overall Survey Area
2024 Surveys
Three breeding bird surveys were carried out during the bird nesting season of 2024. Surveys were conducted by two surveyors on 29th May, 10th June and 24th June 2024, which encompassed areas both within and adjacent to the proposed site outline and general ownership boundary. Bird species present on site during the 10th and 12th of September 2024 surveys were also recorded.

In total, 46 species of bird were recorded within, adjacent and over the survey area (Table 1); 28 green listed, 14 amber, and four red-listed Birds of Conservation Concern in Ireland (BoCCI). Of these species, five were recorded breeding within the outline of the proposed development (Table 3), all of which are

green listed BoCCI. Additional species recorded breeding in habitats adjacent to the proposed site outline and/or within the general ownership/survey area are listed in Table 2. No red-listed species were recorded breeding within the proposed site outline as well as the general area covered by surveys.

2025 Surveys

In total, 29 bird species were recorded across the two surveys within, adjacent and over the survey area (Table 4): 21 green listed and 8 amber listed Bird of Conservation Concern in Ireland (BoCCI). Of these species, one was recorded breeding within the outline of the proposed development (Table 6), Additional species recorded breeding in habitats adjacent to the proposed site outline and/or within the general ownership/survey area are listed in Table 5. No red-listed species were recorded breeding within the proposed site outline as well as the general area covered by surveys.

Table 1: Bird species recorded during surveys on site during 2024 surveys.

Common name	BTO	Latin name	BoCCI
Blackbird	B.	*Turdus merula*	Green
Blackcap	BC	*Sylvia atricapilla*	Green
Blue Tit	BT	*Cyanistes caeruleus*	Green
Buzzard	BZ	*Buteo buteo*	Green
Chaffinch	CH	*Fringilla coelebs*	Green
Cormorant	CA	*Phalacrocorax carbo*	Amber
Dunnock	D.	*Prunella modularis*	Green
Feral Pigeon	FP	*Columba livia f. domestica*	Green
Goldcrest	GC	*Regulus regulus*	Amber
Great Tit	GT	*Parus major*	Green
Grey Heron	H.	*Ardea cinerea*	Green
Grey Wagtail	GL	*Motacilla cinerea*	Red
Greylag Goose	GJ	*Anser anser*	Amber
Herring Gull	HG	*Larus argentatus*	Amber
Hooded Crow	HC	*Corvus cornix*	Green
House Martin	HM	*Delichon urbicum*	Amber
Jackdaw	JD	*Corvus monedula*	Green
Jay	J.	*Garrulus glandarius*	Green
Kingfisher	KF	*Alcedo atthis*	Amber
Linnet	LI	*Carduelis cannabina*	Amber
Long-tailed Tit	LT	*Aegithalus caudatus*	Green
Magpie	MG	*Pica pica*	Green
Mallard	MA	*Anas platyrhynchos*	Amber
Meadow Pipit	MP	*Anthus pratensis*	Red
Mistle Thrush	M.	*Turdus viscivorus*	Green
Mute Swan	MS	*Cygnus olor*	Amber
Pheasant	PH	*Phasianus colchicus*	Green
Pied Wagtail	PW	*Motacilla alba yarrellii*	Green
Raven	RN	*Corvus corax*	Green
Reed Bunting	RB	*Emberiza schoeniclus*	Green
Reed Warbler	RW	*Acrocephalus scirpaceus*	Green
Robin	R.	*Erithacus rubecula*	Green
Rook	RO	*Corvus frugilegus*	Green
Sedge Warbler	SW	*Acrocephalus schoenobaenus*	Green
Skylark	S.	*Alauda arvensis*	Amber

Common name	BTO	Latin name	BoCCI
Song Thrush	ST	*Turdus philomelos*	Green
Spotted Flycatcher	SF	*Musciapa striata*	Amber
Starling	SG	*Sturnus vulgaris*	Amber
Swallow	SL	*Hirundo rustica*	Amber
Swift	SI	*Apus apus*	Red
Water Rail	WA	*Rallus aquaticus*	Green
Whitethroat	WH	*Sylvia communis*	Green
Willow Warbler	WW	*Phylloscopus trochilus*	Amber
Woodpigeon	WP	*Columba palumbus*	Green
Wren	WR	*Troglodytes troglodytes*	Green
Yellowhammer	Y.	*Emberiza citrinella*	Red

Table 2: Bird species recorded breeding within the survey area in 2024.

Common name	BTO	Latin name	BoCCI
Blackcap	BC	*Sylvia atricapilla*	Green
Chaffinch	CH	*Fringilla coelebs*	Green
Goldcrest	GC	*Regulus regulus*	Amber
Hooded Crow	HC	*Corvus cornix*	Green
Reed Warbler	RW	*Acrocephalus scirpaceus*	Green
Whitethroat	WH	*Sylvia communis*	Green
Woodpigeon	WP	*Columba palumbus*	Green
Wren	WR	*Troglodytes troglodytes*	Green

Table 3: Bird species recorded breeding within the proposed site outline in 2024.

Common name	BTO	Latin name	BoCCI
Blackcap	BC	*Sylvia atricapilla*	Green
Hooded Crow	HC	*Corvus cornix*	Green
Whitethroat	WH	*Sylvia communis*	Green
Woodpigeon	WP	*Columba palumbus*	Green
Wren	WR	*Troglodytes troglodytes*	Green

Table 4: Bird species recorded during surveys on site during 2025 surveys.

Common name	BTO	Latin name	BoCCI
Blackbird	B.	*Turdus merula*	Green
Blackcap	BC	*Sylvia atricapilla*	Green
Blue Tit	BT	*Cyanistes caeruleus*	Green
Bullfinch	BF	*Pyrrhula pyrrhula*	Green
Chaffinch	CH	*Fringilla coelebs*	Green
Chiffchaff	CC	*Phylloscopus collybita*	Green
Cormorant	CA	*Phalacrocorax carbo*	Amber
Dunnock	D.	*Prunella modularis*	Green
Goldcrest	GC	*Regulus regulus*	Amber
Goldfinch	GO	*Carduelis carduelis*	Green
Great Tit	GT	*Parus major*	Green
Greylag Goose	GJ	*Anser anser*	Amber
Herring Gull	HG	*Larus argentatus*	Amber
Hooded Crow	HC	*Corvus cornix*	Green
Jackdaw	JD	*Corvus monedula*	Green
Linnet	LI	*Carduelis cannabina*	Amber
Long-tailed Tit	LT	*Aegithalus caudatus*	Green
Magpie	MG	*Pica pica*	Green
Mallard	MA	*Anas platyrhynchos*	Amber
Mistle Thrush	M.	*Turdus viscivorus*	Green
Mute Swan	MS	*Cygnus olor*	Amber
Pheasant	PH	*Phasianus colchicus*	Green
Robin	R.	*Erithacus rubecula*	Green
Rook	RO	*Corvus frugilegus*	Green
Sedge Warbler	SW	*Acrocephalus schoenobaenus*	Green
Song Thrush	ST	*Turdus philomelos*	Green
Swallow	SL	*Hirundo rustica*	Amber
Woodpigeon	WP	*Columba palumbus*	Green
Wren	WR	*Troglodytes troglodytes*	Green

Table 5: Bird species recorded breeding within the survey area during 2025 surveys.

Common name	BTO	Latin name	BoCCI
Blackbird	B.	*Turdus merula*	Green
Blue Tit	BT	*Cyanistes caeruleus*	Green
Greylag Goose	GJ	*Anser anser*	Amber
Linnet	LI	*Carduelis cannabina*	Amber
Mallard	MA	*Anas platyrhynchos*	Amber
Mute Swan	MS	*Cygnus olor*	Amber
Sedge Warbler	SW	*Acrocephalus schoenobaenus*	Green

Table 6: Bird species recorded breeding within the site outline in 2024.

Common name	BTO	Latin name	BoCCI
Blackbird	B.	*Turdus merula*	Green

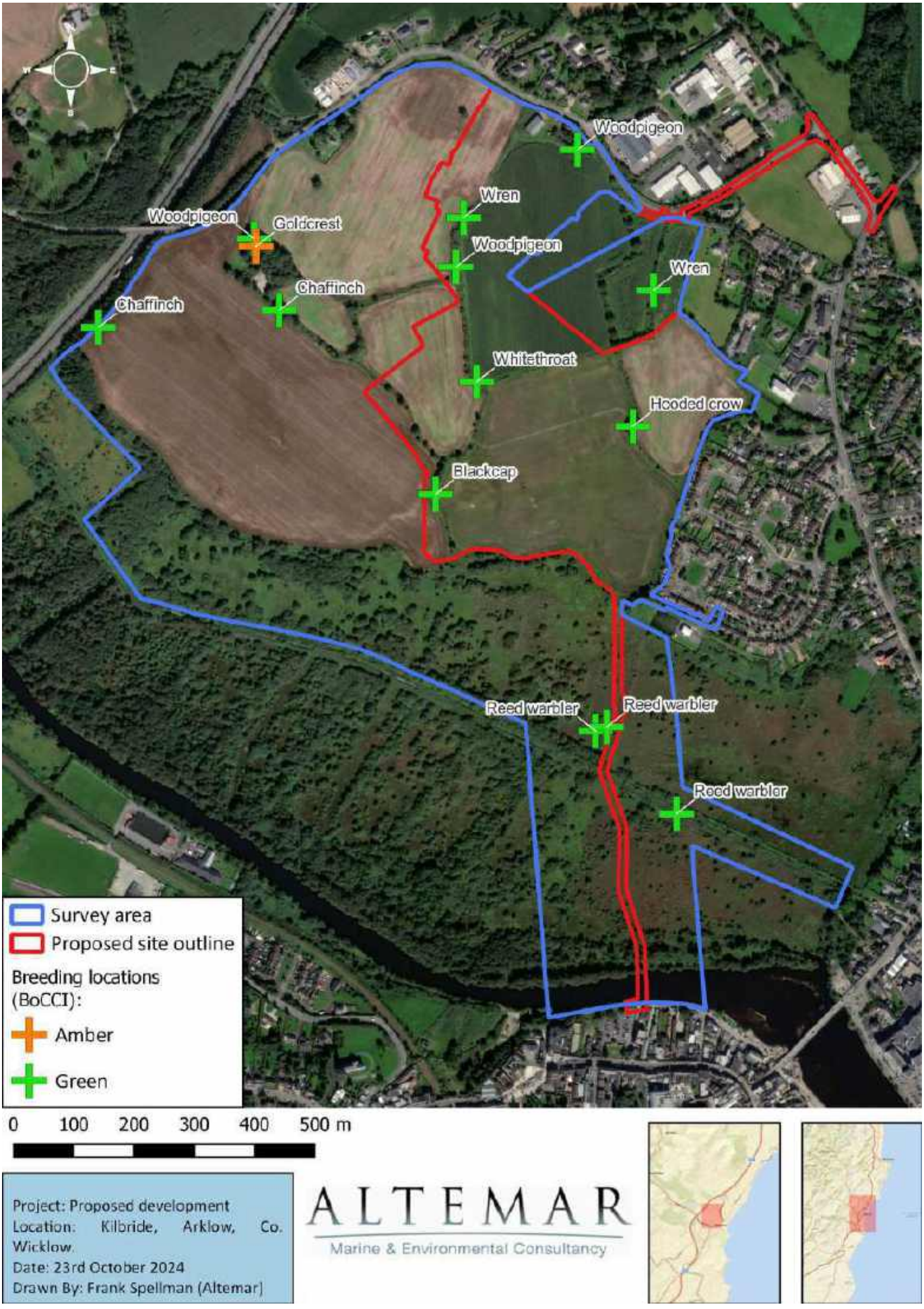

Figure 5. *Breeding locations 2024*

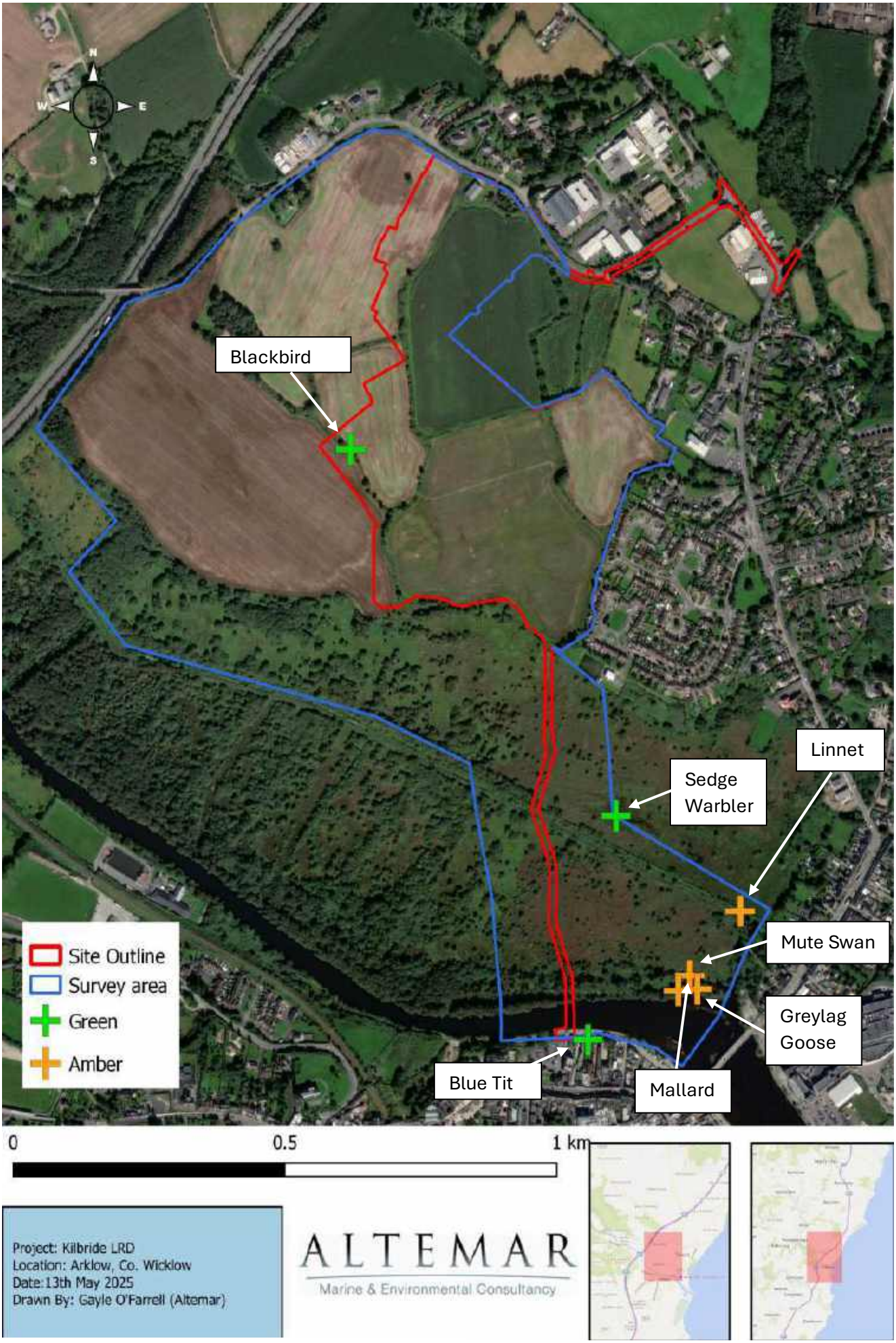

Figure 5. *Breeding locations 2025.*

Breeding bird assessment findings

Review of local bird records

The review of existing bird records (sourced from NBDC Database) within three 2 km^2 grids (Reference grids T27H, T27M and T27L) encompassing the study area reveals that the below bird species have previously been observed and recorded locally (*Table 4*).

Table 4: *Status of bird species within 2 km^2*

Species Name	Record Count	Date of Last Record	Dataset
T27H			
Barn Owl (Tyto alba)	1	02/02/2023	Birds of Ireland
Black-billed Magpie (Pica pica)	1	31/12/2011	Bird Atlas 2007 - 2011
Common Buzzard (Buteo buteo)	1	26/08/2017	Birds of Ireland
Common Pheasant (Phasianus colchicus)	1	26/08/2017	Birds of Ireland
Eurasian Woodcock (Scolopax rusticola)	1	31/12/2011	Bird Atlas 2007 - 2011
European Robin (Erithacus rubecula)	1	31/12/2011	Bird Atlas 2007 - 2011
Little Egret (Egretta garzetta)	1	31/12/2011	Bird Atlas 2007 - 2011
Red Kite (Milvus milvus)	1	18/06/2021	Birds of Ireland
White Wagtail (Motacilla alba)	1	31/12/2011	Bird Atlas 2007 - 2011
T27M			
Barn Swallow (Hirundo rustica)	1	31/12/2011	Bird Atlas 2007 - 2011
Black-billed Magpie (Pica pica)	2	31/12/2011	Bird Atlas 2007 - 2011
Blackcap (Sylvia atricapilla)	2	31/12/2011	Bird Atlas 2007 - 2011
Black-headed Gull (Larus ridibundus)	2	31/12/2011	Bird Atlas 2007 - 2011
Blue Tit (Cyanistes caeruleus)	3	01/02/2021	Birds of Ireland
Chaffinch (Fringilla coelebs)	2	31/12/2011	Bird Atlas 2007 - 2011
Coal Tit (Periparus ater)	3	01/02/2021	Birds of Ireland
Common Blackbird (Turdus merula)	3	01/02/2021	Birds of Ireland
Common Bullfinch (Pyrrhula pyrrhula)	3	16/01/2018	Birds of Ireland
Common Chiffchaff (Phylloscopus collybita)	1	31/12/2011	Bird Atlas 2007 - 2011
Common Coot (Fulica atra)	1	31/12/2001	Irish Wetland Birds Survey (I-WeBS) 1994-2001.
Common Goldeneye (Bucephala clangula)	1	31/12/2001	Irish Wetland Birds Survey (I-WeBS) 1994-2001.
Common Grasshopper Warbler (Locustella naevia)	1	31/12/2011	Bird Atlas 2007 - 2011
Common Kingfisher (Alcedo atthis)	2	31/12/2011	Bird Atlas 2007 - 2011
Common Linnet (Carduelis cannabina)	1	31/12/2011	Bird Atlas 2007 - 2011
Common Moorhen (Gallinula chloropus)	3	31/12/2011	Bird Atlas 2007 - 2011
Common Pheasant (Phasianus colchicus)	2	31/12/2011	Bird Atlas 2007 - 2011

Species Name	Record Count	Date of Last Record	Dataset
Common Pochard (Aythya ferina)	1	31/12/2001	Irish Wetland Birds Survey (I-WeBS) 1994-2001.
Common Raven (Corvus corax)	1	31/12/2011	Bird Atlas 2007 - 2011
Common Snipe (Gallinago gallinago)	2	31/12/2011	Bird Atlas 2007 - 2011
Common Starling (Sturnus vulgaris)	3	01/02/2021	Birds of Ireland
Common Whitethroat (Sylvia communis)	1	31/12/2011	Bird Atlas 2007 - 2011
Common Wood Pigeon (Columba palumbus)	3	01/02/2021	Birds of Ireland
Eurasian Collared Dove (Streptopelia decaocto)	3	01/02/2021	Birds of Ireland
Eurasian Curlew (Numenius arquata)	1	31/12/2001	Irish Wetland Birds Survey (I-WeBS) 1994-2001.
Eurasian Jackdaw (Corvus monedula)	3	01/02/2021	Birds of Ireland
Eurasian Oystercatcher (Haematopus ostralegus)	1	31/12/2001	Irish Wetland Birds Survey (I-WeBS) 1994-2001.
Eurasian Reed Warbler (Acrocephalus scirpaceus)	1	31/12/2011	Bird Atlas 2007 - 2011
Eurasian Siskin (Carduelis spinus)	1	31/12/2011	Bird Atlas 2007 - 2011
Eurasian Sparrowhawk (Accipiter nisus)	1	31/12/2011	Bird Atlas 2007 - 2011
Eurasian Treecreeper (Certhia familiaris)	1	31/12/2011	Bird Atlas 2007 - 2011
Eurasian Wigeon (Anas penelope)	1	31/12/2001	Irish Wetland Birds Survey (I-WeBS) 1994-2001.
European Golden Plover (Pluvialis apricaria)	1	31/12/2011	Bird Atlas 2007 - 2011
European Goldfinch (Carduelis carduelis)	2	31/12/2011	Bird Atlas 2007 - 2011
European Greenfinch (Carduelis chloris)	2	31/12/2011	Bird Atlas 2007 - 2011
European Robin (Erithacus rubecula)	3	01/02/2021	Birds of Ireland
Goldcrest (Regulus regulus)	2	31/12/2011	Bird Atlas 2007 - 2011
Great Spotted Woodpecker (Dendrocopos major)	1	05/04/2021	Birds of Ireland
Great Tit (Parus major)	2	31/12/2011	Bird Atlas 2007 - 2011
Grey Heron (Ardea cinerea)	1	31/12/2001	Irish Wetland Birds Survey (I-WeBS) 1994-2001.
Greylag Goose (Anser anser)	1	31/12/2001	Irish Wetland Birds Survey (I-WeBS) 1994-2001.
Hedge Accentor (Prunella modularis)	2	31/12/2011	Bird Atlas 2007 - 2011
Herring Gull (Larus argentatus)	1	31/12/2001	Irish Wetland Birds Survey (I-WeBS) 1994-2001.
Hooded Crow (Corvus cornix)	1	31/12/2011	Bird Atlas 2007 - 2011
House Martin (Delichon urbicum)	1	31/12/2011	Bird Atlas 2007 - 2011
House Sparrow (Passer domesticus)	2	31/12/2011	Bird Atlas 2007 - 2011
Lesser Redpoll (Carduelis cabaret)	2	31/12/2011	Bird Atlas 2007 - 2011

Species Name	Record Count	Date of Last Record	Dataset
Lesser Whitethroat (Sylvia curruca)	1	31/12/2011	Bird Atlas 2007 - 2011
Little Grebe (Tachybaptus ruficollis)	3	31/12/2011	Bird Atlas 2007 - 2011
Long-tailed Tit (Aegithalos caudatus)	1	31/12/2011	Bird Atlas 2007 - 2011
Mallard (Anas platyrhynchos)	3	31/12/2011	Bird Atlas 2007 - 2011
Meadow Pipit (Anthus pratensis)	1	31/12/2011	Bird Atlas 2007 - 2011
Mew Gull (Larus canus)	1	31/12/2001	Irish Wetland Birds Survey (I-WeBS) 1994-2001.
Mistle Thrush (Turdus viscivorus)	2	01/02/2021	Birds of Ireland
Mute Swan (Cygnus olor)	3	31/12/2011	Bird Atlas 2007 - 2011
Northern Lapwing (Vanellus vanellus)	2	31/12/2011	Bird Atlas 2007 - 2011
Red Kite (Milvus milvus)	5	24/06/2022	Birds of Ireland
Reed Bunting (Emberiza schoeniclus)	2	31/12/2011	Bird Atlas 2007 - 2011
Rook (Corvus frugilegus)	3	01/02/2021	Birds of Ireland
Sedge Warbler (Acrocephalus schoenobaenus)	1	31/12/2011	Bird Atlas 2007 - 2011
Sky Lark (Alauda arvensis)	1	31/12/2011	Bird Atlas 2007 - 2011
Song Thrush (Turdus philomelos)	2	31/12/2011	Bird Atlas 2007 - 2011
Stonechat *(Saxicola torquata)*	1	31/12/2011	Bird Atlas 2007 - 2011
Tufted Duck *(Aythya fuligula)*	1	31/12/2001	Irish Wetland Birds Survey (I-WeBS) 1994-2001.
Water Rail *(Rallus aquaticus)*	2	31/12/2011	Bird Atlas 2007 - 2011
White Wagtail *(Motacilla alba)*	1	31/12/2011	Bird Atlas 2007 - 2011
Willow Warbler *(Phylloscopus trochilus)*	1	31/12/2011	Bird Atlas 2007 - 2011
Winter Wren *(Troglodytes troglodytes)*	2	31/12/2011	Bird Atlas 2007 - 2011
T27L			
Barn Swallow *(Hirundo rustica)*	5	14/04/2021	Birds of Ireland
Black Kite *(Milvus migrans)*	1	23/08/2008	Rare birds of Ireland
Black-billed Magpie *(Pica pica)*	3	11/01/2018	Birds of Ireland
Blackcap *(Sylvia atricapilla)*	1	31/12/2011	Bird Atlas 2007 - 2011
Black-headed Gull *(Larus ridibundus)*	13	01/02/2021	Birds of Ireland
Blue Tit *(Cyanistes caeruleus)*	3	11/01/2018	Birds of Ireland
Chaffinch *(Fringilla coelebs)*	3	11/01/2018	Birds of Ireland
Coal Tit *(Periparus ater)*	1	11/01/2018	Birds of Ireland
Common Blackbird *(Turdus merula)*	5	17/06/2020	Birds of Ireland
Common Bullfinch *(Pyrrhula pyrrhula)*	1	17/06/2020	Birds of Ireland
Common Chiffchaff *(Phylloscopus collybita)*	2	17/06/2020	Birds of Ireland

Species Name	Record Count	Date of Last Record	Dataset
Common Coot *(Fulica atra)*	2	31/12/2011	Bird Atlas 2007 - 2011
Common Goldeneye *(Bucephala clangula)*	1	31/12/2001	Irish Wetland Birds Survey (I-WeBS) 1994-2001.
Common Kingfisher *(Alcedo atthis)*	2	28/07/2020	Birds of Ireland
Common Linnet *(Carduelis cannabina)*	2	28/04/2023	Birds of Ireland
Common Moorhen *(Gallinula chloropus)*	10	09/10/2020	Birds of Ireland
Common Pochard *(Aythya ferina)*	1	31/12/2001	Irish Wetland Birds Survey (I-WeBS) 1994-2001.
Common Starling *(Sturnus vulgaris)*	5	13/01/2021	Birds of Ireland
Common Swift *(Apus apus)*	3	12/08/2020	Birds of Ireland
Common Whitethroat *(Sylvia communis)*	1	28/06/2009	Birds of Ireland
Common Wood Pigeon *(Columba palumbus)*	3	17/06/2020	Birds of Ireland
Eurasian Collared Dove *(Streptopelia decaocto)*	2	13/01/2021	Birds of Ireland
Eurasian Curlew *(Numenius arquata)*	1	09/08/2017	Birds of Ireland
Eurasian Golden Oriole *(Oriolus oriolus)*	1	31/12/1827	Rare birds of Ireland
Eurasian Jackdaw *(Corvus monedula)*	5	13/01/2021	Birds of Ireland
Eurasian Reed Warbler *(Acrocephalus scirpaceus)*	4	07/07/2012	Birds of Ireland
Eurasian Siskin *(Carduelis spinus)*	1	11/01/2018	Birds of Ireland
Eurasian Teal *(Anas crecca)*	1	11/01/2018	Birds of Ireland
European Greenfinch *(Carduelis chloris)*	1	31/12/2011	Bird Atlas 2007 - 2011
European Robin (*Erithacus rubecula)*	5	17/06/2020	Birds of Ireland
Goldcrest *(Regulus regulus)*	1	31/12/2011	Bird Atlas 2007 - 2011
Great Black-backed Gull *(Larus marinus)*	5	17/06/2020	Birds of Ireland
Great Cormorant *(Phalacrocorax carbo)*	7	01/02/2021	Birds of Ireland
Great Spotted Woodpecker *(Dendrocopos major)*	1	17/10/1972	Rare birds of Ireland
Great Tit *(Parus major)*	3	17/06/2020	Birds of Ireland
Grey Heron *(Ardea cinerea)*	6	23/08/2021	Birds of Ireland
Greylag Goose *(Anser anser)*	10	01/02/2021	Birds of Ireland
Hedge Accentor *(Prunella modularis)*	1	31/12/2011	Bird Atlas 2007 - 2011
Herring Gull *(Larus argentatus)*	8	01/02/2021	Birds of Ireland
Hooded Crow *(Corvus cornix)*	6	17/06/2020	Birds of Ireland
House Martin *(Delichon urbicum)*	2	12/08/2020	Birds of Ireland
House Sparrow *(Passer domesticus)*	3	13/01/2021	Birds of Ireland
Iceland Gull *(Larus glaucoides)*	1	31/12/2001	Irish Wetland Birds Survey (I-WeBS) 1994-2001.

Species Name	Record Count	Date of Last Record	Dataset
Laughing Gull *(Larus atricilla)*	1	25/01/2006	Rare birds of Ireland
Lesser Black-backed Gull *(Larus fuscus)*	3	17/06/2020	Birds of Ireland
Lesser Redpoll *(Carduelis cabaret)*	2	31/12/2011	Bird Atlas 2007 - 2011
Little Egret *(Egretta garzetta)*	2	17/06/2020	Birds of Ireland
Little Grebe *(Tachybaptus ruficollis)*	5	17/06/2020	Birds of Ireland
Long-tailed Tit *(Aegithalos caudatus)*	1	09/06/2017	Birds of Ireland
Mallard *(Anas platyrhynchos)*	11	01/02/2021	Birds of Ireland
Meadow Pipit *(Anthus pratensis)*	1	11/01/2018	Birds of Ireland
Mediterranean Gull *(Larus melanocephalus)*	1	08/02/2020	Birds of Ireland
Mew Gull *(Larus canus)*	5	17/06/2020	Birds of Ireland
Mistle Thrush *(Turdus viscivorus)*	2	11/01/2018	Birds of Ireland
Montagu's Harrier *(Circus pygargus)*	1	21/08/1893	Rare birds of Ireland
Mute Swan *(Cygnus olor)*	11	09/10/2020	Birds of Ireland
Northern Lapwing *(Vanellus vanellus)*	1	31/12/2011	Bird Atlas 2007 - 2011
Northern Wheatear *(Oenanthe oenanthe)*	3	16/03/2022	Birds of Ireland
Pied Wagtail *(Motacilla alba subsp. yarrellii)*	3	12/08/2020	Birds of Ireland
Red Kite *(Milvus milvus)*	1	10/02/2016	Birds of Ireland
Red-rumped Swallow *(Cecropis daurica)*	1	20/04/1992	Rare birds of Ireland
Reed Bunting *(Emberiza schoeniclus)*	2	31/12/2011	Bird Atlas 2007 - 2011
Rock Pigeon *(Columba livia)*	2	12/08/2020	Birds of Ireland
Rock Pipit *(Anthus petrosus)*	1	11/01/2018	Birds of Ireland
Rook *(Corvus frugilegus)*	4	12/05/2018	Birds of Ireland
Rosy Starling *(Sturnus roseus)*	1	16/07/2008	Rare birds of Ireland
Sand Martin *(Riparia riparia)*	2	01/04/2018	Birds of Ireland
Sedge Warbler *(Acrocephalus schoenobaenus)*	1	31/12/2011	Bird Atlas 2007 - 2011
Song Thrush *(Turdus philomelos)*	1	31/12/2011	Bird Atlas 2007 - 2011
Stonechat *(Saxicola torquata)*	4	16/01/2018	Birds of Ireland
White Wagtail *(Motacilla alba)*	2	31/12/2011	Bird Atlas 2007 - 2011
Willow Warbler *(Phylloscopus trochilus)*	1	31/12/2011	Bird Atlas 2007 - 2011
Winter Wren *(Troglodytes troglodytes)*	4	17/06/2020	Birds of Ireland

Conclusion

This report presents the results of three site visits by Emma Peters and Frank Spellman on 29th May, 10th June and 24th June 2024, and two site visits by Emma Peters and Jack Doyle on the 23rd April 2025 and 9th May 2025. A breeding bird transect survey was carried out on each occasion. A breeding bird transect survey was carried out on each occasion. The surveys comply with bird survey guidance documentation including BTO Common Bird Census (Bibby *et al.*, 2000 and Gilbert *et al.*, 1998) following CIEEM guidelines. Weather conditions were favourable on each occasion.

In 2024, 46 species of bird were recorded within, adjacent and over the survey area: 28 green listed, 14 amber, and four red-listed Birds of Conservation Concern in Ireland (BoCCI). Of these species, five were recorded breeding within the outline of the proposed development (Table 3), all of which are green listed BoCCI (blackcap, hooded crow, whitethroat, woodpigeon & wren). No red-listed species were recorded breeding within the proposed site outline as well as the general area covered by surveys.

In 2025, 29 bird species were recorded across the two surveys within, adjacent and over the survey area (Table 4): 21 green listed and 8 amber listed Bird of Conservation Concern in Ireland (BoCCI). Of these species, one was recorded breeding within the outline of the proposed development (Table 6), Additional species recorded breeding in habitats adjacent to the proposed site outline and/or within the general ownership/survey area are listed in Table 5. No red-listed species were recorded breeding within the proposed site outline as well as the general area covered by surveys.

Notably, in 2024, reed warblers (*Acrocephalus scirpaceus*) were recorded breeding at three locations within the Arklow Town Marsh pNHA (Figure 5), proximate to the proposed boardwalk development. As such, appropriate mitigation measures are necessary to minimise potential impacts on this species.

The hotspots of breeding activity observed within the survey area consist of scrub, treelines, hedgerows and marsh area. Mitigation measures will be carried out that will prevent impacts on nesting birds and 1269 No. trees are proposed to be planted which will provide a nesting habitat for birds.

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Appendix 5.4

Bat Fauna Impact Assessment

ALTEMAR
Marine & Environmental Consultancy

Bat Fauna Impact Assessment for a proposed Mixed Use Large-Scale Residential Development (LRD) at Kilbride, Arklow, Co. Wicklow.

21st May 2025

Prepared by: Bryan Deegan (MCIEEM) of Altemar Ltd.
On behalf of: Certain Assets of Dawnhill and Windhill Limited

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Document Control Sheet			
Client	Certain Assets of Dawnhill and Windhill Limited		
Project	Bat fauna impact assessment for a proposed Mixed Use Large-Scale Residential Development (LRD) at Kilbride, Arklow, Co. Wicklow.		
Report	Bat Fauna Assessment		
Date	21st May 2025		
Version	Author	Reviewed	Date
Planning	Bryan Deegan	Gayle O'Farrell	21st May 2025

SUMMARY

Structure:	Roadways, farm buildings and a house on site.
Location:	Kilbride, Arklow, Co. Wicklow.
Bat species present:	Soprano Pipistrelle (*Pipistrellus pygmaeus*), Common Pipistrelle (Pipistrellus pipistrellus sensu lato), Lesser Noctule (Nyctalus leisleri), Natterer's Bat (Myotis nattereri), and Whiskered Bat (Myotis mystacinus) were noted on site.
Proposed work:	Large-Scale Residential Development (LRD) at Kilbride, Arklow, Co. Wicklow
Impact on bats:	As there are no confirmed bat roosts within the site boundary, a derogation licence is not required for the proposed felling of trees. However, trees of moderate to high bat roosting potential are proposed for felling as part of the proposed development. A pre-construction inspection of these trees must be carried out by a suitably qualified ecologist to ensure that there is no bat roosts present prior to the commencement of works. Increased lighting onsite during construction and operation has the potential to impact on foraging activity of bat species recorded onsite. Following implementation of a sensitive lighting strategy (in compliance with bat lighting guidelines) in consultation with an ecologist, in addition to mitigation, the species seen to occur onsite and in the surrounding area should persist. Consultation within the project team has taken place in relation to the impact of the boardwalk lighting on bat foraging in the marsh area. The proposed lighting has been modified to allow for foraging activity to continue on site. The development will not result in the loss of bat roosting. Based on the relatively low bat activity found using the site and the implementation of mitigation, any displacement from this site it will not have any significant effect on local bat populations, and that any such effect will be only significant at the local level. The potential for collision risk and impact on flight paths in relation to bats is considered is considered low due to the low level of bat activity on site and the buildings would be deemed to be clearly visible to bats. It is considered that there is poor roosting potential in the marsh. Enhancement measures are proposed.
Survey by:	Bryan Deegan (MCIEEM) MSc, Emma Peters BSc, Frank Spellman MSc & Jack Doyle MSc
Survey dates:	1st September 2019, 2nd October 2020, 22nd August 2021, (14th August 2020- 22nd August 2020 & 10th August 2021-14th August 2021 Static Detector), 11th September 2023, 10th and 12th September 2024 9th April 2025 and 9th of May 2025.

Introduction

The proposed mixed use Large scale Residential Development will result in the demolition of an existing dwelling, outbuilding and agricultural shed and the construction of a local and 666 No. residential units with a mix of semidetached, detached, and terraced houses along with duplex apartments and apartments. These will comprise 1, 2, 3 and 4 bed houses. All residential units will have associated private open space facing north/ south/ east/ west. The proposal will also deliver 3 No. retail units, 3 No. community/ medical units and 1 No. creche unit.

New pedestrian/ cyclist link connecting into Arklow Town Centre is proposed via a new boardwalk and bridge across the marsh and over the Avoca River adjoining the existing greenway and the Main Street. A new road is also proposed connecting to the north to Kilbride Road. Alterations to the surrounding road network to provide a section of the regional road and upgrades to provide pedestrian facilities are also included. Vehicular access to the site will be from the new proposed regional road. The development will also provide for landscaping, public open spaces and all associated site development works to enable the development including boundary treatments, attenuation storage area and other service provision including ESB substation.

As part of the Biodiversity Chapter for this planning permission bat surveys were conducted by Altemar Ltd. The site outline, site location, lighting plans are shown in Figures 11-15.

Competency of Assessor

Bryan Deegan MSc, BSc (MCIEEM)

This report has been prepared by Bryan Deegan MSc, BSc (MCIEEM). Bryan has over 31 years of experience providing ecological consultancy services in Ireland. He has extensive experience in carrying out a wide range of bat surveys including dusk emergence, dawn re-entry and static detector surveys. He also has extensive experience reducing the potential impact of projects that involve external lighting on Bats. Bryan trained with Conor Kelleher author of the Bat Mitigation Guidelines for Ireland (Kelleher and Marnell (2022)) and Bryan is currently providing bat ecology (impact assessment and enhancement) services to Dun Laoghaire Rathdown County Council primarily on the Shanganagh Park Masterplan. The desk and field surveys were carried out having regard to the guidance: Bat Surveys for Professional Ecologists – Good Practice Guidelines 3rd Edition (Collins, J. (Ed.) 2016) and Marnell, Kelleher and Mullen (2022), Bat Mitigation Guidelines for Ireland V2 (which update and replace the Bat Mitigation Guidelines for Ireland published in 2006). Emma Peters BSc has extensive experience in bat detection through static detector surveys, dusk emergence, and down re-entry surveys and is a member of Bat Conservation Ireland.

Emma Peters (BSc Environmental Science).

This report has been contributed to by Emma Peters of Altemar Ltd. Emma has carried out a range of wintering and breeding ornithological surveys in Ireland. Emma has experience in bat detection through static detector surveys, dusk emergence, and down re-entry surveys and is a member of Bat Conservation Ireland. She is also skilled in habitat identification, native and non-native species identification and terrestrial mammal surveys. The desk and field surveys were carried out using techniques approved and recommended by CIEEM.

Frank Spellman (BSc Zoology, MSc Zoology).

This report has been contributed to by Frank Spellman of Altemar Ltd. Frank has extensive experience in carrying out a wide range of fauna surveys as both a sub-contractor and employee for environmental consultancies and organisations in Ireland and the US. These include both roving and static acoustic bat surveys, terrestrial non-avian mammal surveys, breeding/wintering bird surveys, and freshwater ecology surveys. Frank has been lead surveyor on numerous development projects within Ireland carrying out full mammal assessments.

Jack Doyle (MSc Sustainable Environments).

This report has been contributed to by Jack Doyle of Altemar Ltd. Jack is skilled in bat detection through static detector surveys, dusk emergence, and dawn re-entry surveys. Jack is skilled in habitat identification, native and non-native species identification and ecological conservation, having experience in mitigation measures in ecological assessment.

Legislative Context

Wildlife Act 1976 (as amended by, inter alia, the Wildlife (Amendment) Act 2000).

Bats in Ireland are protected by the Wildlife (Amendment) Act 2000. Based on this legislation it is an offence to wilfully interfere with or destroy the breeding or resting place of any species of bat. Under this legislation it is an offence to "*Intentionally kill, injure or take a bat, possess or control any live or dead specimen or anything derived from a bat, wilfully interfere with any structure or place used for breeding or resting by a bat, wilfully interfere with a bat while it is occupying a structure or place which it uses for that purpose. "*

Habitats Directive- Council Directive 92/43/EEC 1992 on the conservation of natural habitats and of wild fauna and flora has been transposed into Irish Law, including, via, *inter alia*, the European Communities (Birds and Natural Habitats) Regulations 2011 (as amended). See Art.73 of the 2011 Regulations which revokes the 1997 Regulations.

Annex II of the Council Directive 92/43/EEC 1992 on the conservation of natural habitats and of wild fauna and flora (EC Habitats Directive) lists animal and plant species of Community interest, the conservation of which requires the designation of Special Areas of Conservation (SACs); Annex IV lists animal and plant species of Community interest in need of strict protection. All bat species in Ireland are listed on Annex IV of the Directive, while the Lesser Horseshoe Bat (*Rhinolophus hipposideros*) is protected under Annex II which related to the designation of Special Areas of Conservation for a species.

Under the European Communities (Birds and Natural Habitats) Regulations 2011 (as amended), all bat species are listed under the First Schedule and, pursuant to, *inter alia*, Part 6 and Regulation 51, it is an offence to:

- Deliberately capture or kill a bat;
- Deliberately disturb a bat particularly during the period of breeding, hibernating or migrating;
- Damage or destroy a breeding site or resting place of a bat;
- Keep, sell, transport, exchange, offer for sale or offer for exchange any bat taken in the wild.

Figure 1: *Site outline.*

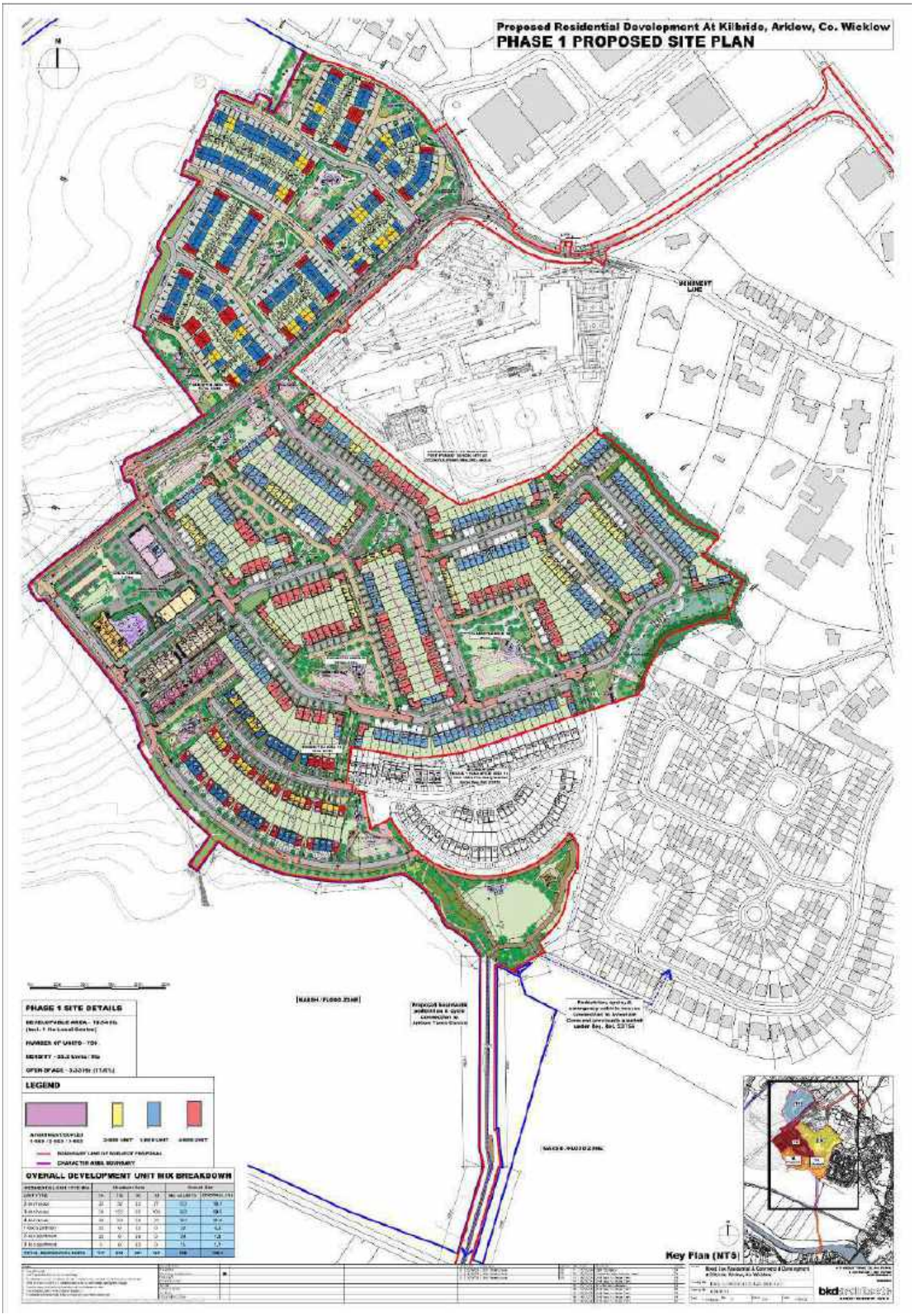


Figure 2. *Proposed site plan – sheet 1*

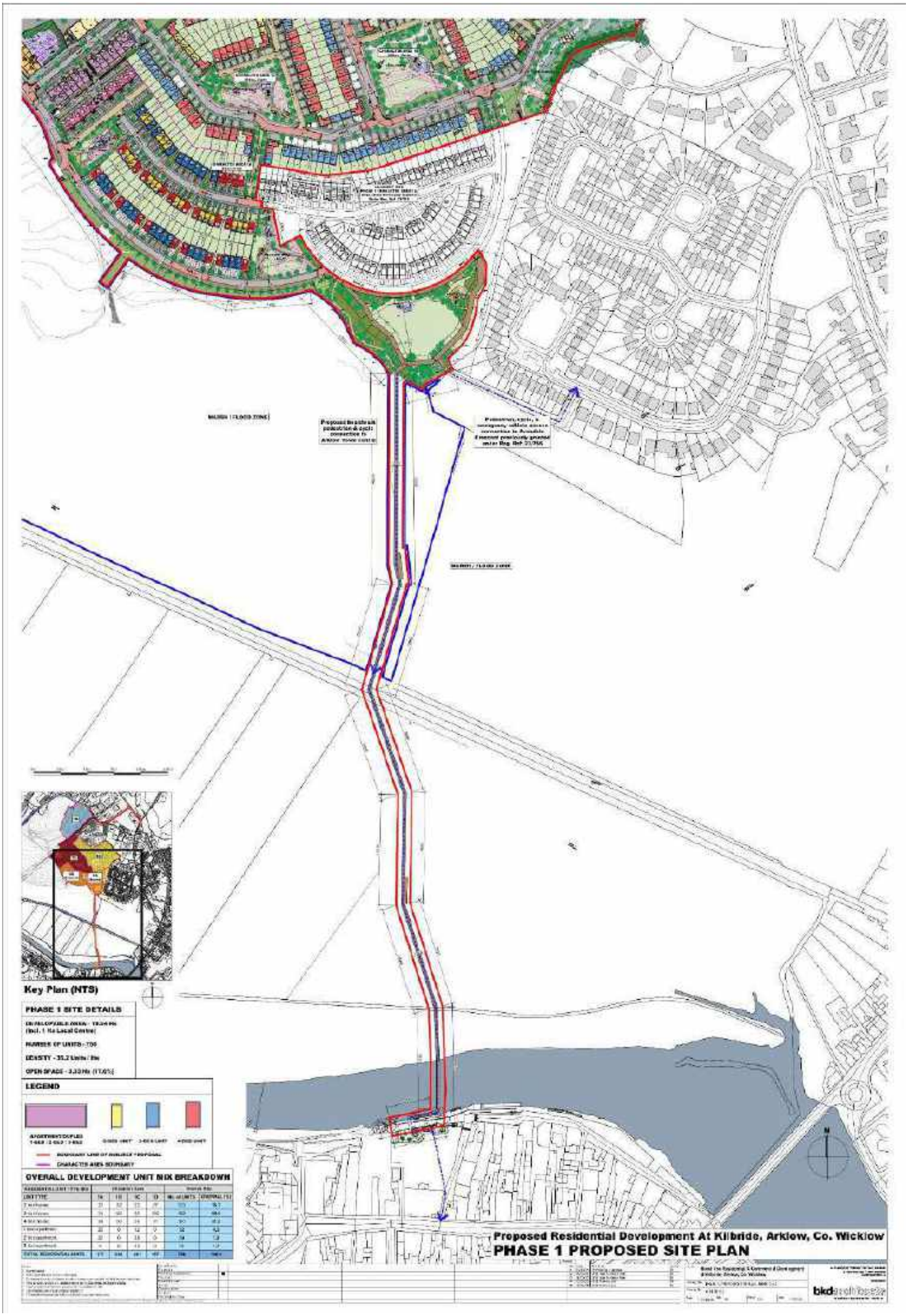


Figure 3. *Proposed site plan – sheet 2*

Figure 4. *Landscape general arrangement plan*

Arborist

An Arboricultural Report was prepared by Green Tree Arboricultural Consultants to accompany this planning application. In relation to trees on site, the report outlines the following:

'The majority of the trees surveyed are mature specimens with species including, Oak (Quercus petraea & robur) Sycamore (Acer pseudoplatanus) and Ash (Fraxinus excelsior) among others. The majority are growing either within linear groups or interspersed within the hedgerows throughout the site. The dwelling house that is located along the northern boundary adjacent to the Kilbride Road contains two planted hedgerows and 14 nr. planted trees as part of its landscaped garden.

The overall health of the trees is variable, with the majority presenting in fair to good condition. Key observations include:

- *Canopy Health: The majority of the mature trees display a well-balanced canopy structure, with healthy leaf cover and signs of normal growth. However, several trees, particularly the Ash trees, exhibit varying signs of crown dieback and reduced foliage density, indicative of Ash Dieback (Hymenoscyphus fraxineus).*
- *Structural Integrity: Most trees exhibit sound structural integrity, with no major defects observed. However, isolated instances of basal decay and the presence of deadwood were noted, particularly in the more mature specimens. Deadwood observed is largely confined to the inner canopy, suggesting it may be a result of natural aging rather than acute disease or pest activity. Remedial pruning to remove dead or weakened branches is recommended for several specimens to reduce the risk of limb failure.*
- *Pests and Diseases: No significant infestations or disease outbreaks were identified across the site. However, signs of Ash Dieback were observed in 8 nr. of the 14 nr Ash trees. The progression of the infection within these 8 nr. trees is such that they identified as category U trees and unsuitable for retention. The remaining 6 nr. will require ongoing monitoring, and potential phased removal may be necessary if their condition deteriorates.*
- *Root Systems: The root systems of the trees, where visible, show minimal signs of disturbance. However, in isolated instances where trees are growing from raised ditches the integrity of their rooting structure has been compromised and has been noted as structural weaknesses in the tree data.*
- *Trees beneath or adjacent to O/H ESB power lines – the tree survey notes that a number of trees beneath high voltage lines to the south-west of the site have only recently been severely cut – the trees T379 – T384 and the trees T447 and T448. More than 50% of the canopies of these trees have been cut leaving the trees unbalanced and unsuitable for retention (refer to section 2.18 of this report)*

Of the 69 nr. recorded trees on the site, there are 10 category B trees – the Oak trees T400, T406, T412, T418, T437, T438, T445 and T458, the Sycamore trees T361 and T438 and the Alder T453. All these trees are in both good physiological and structural condition.

The hedgerows within the site, primarily composed of mixed native species such as hawthorn (Crataegus monogyna), Willow (Salix spp), and elder (Sambucus nigra), are largely well established and contribute to the biodiversity and ecological integrity of the site. However, their condition varies across different sections:

- *Structural Condition: Many of the hedgerows are dense and provide effective screening, but certain sections, particularly those beneath the O/H ESB power lines have been continuously maintained to height of approximately 3m. Gaps and thinning are evident in some areas. In certain hedgerows,*

- *Management and Maintenance: While the majority of the hedgerows appear to have been maintained through traditional cutting practices, some sections, particularly H4 the mature stands of willow have been allowed to grow to just beneath the O/H wires. The hedgerows H10 and H12 that form the boundary of the dwelling and landscaped garden have been allowed to spread both laterally and vertically forming very dense canopies To ensure the continued health and vitality of those trees and hedgerows to be retained on-site, the following management actions are recommended:*
- *Tree Maintenance: Undertake selective pruning to remove deadwood and improve tree structure. Ongoing monitoring for signs of disease, particularly in ash trees, is crucial.*
- *Tree Protection: Implement protective measures during any site development to prevent soil compaction and root damage, particularly in areas of high foot or vehicle traffic.*
- *In conclusion, while the overall condition of the trees and hedgerows is satisfactory, proactive management will be essential in maintaining and enhancing the site's arboricultural and ecological value as part of future development plans.'*

The tree survey plan and protection plan are demonstrated in figures 5-10.

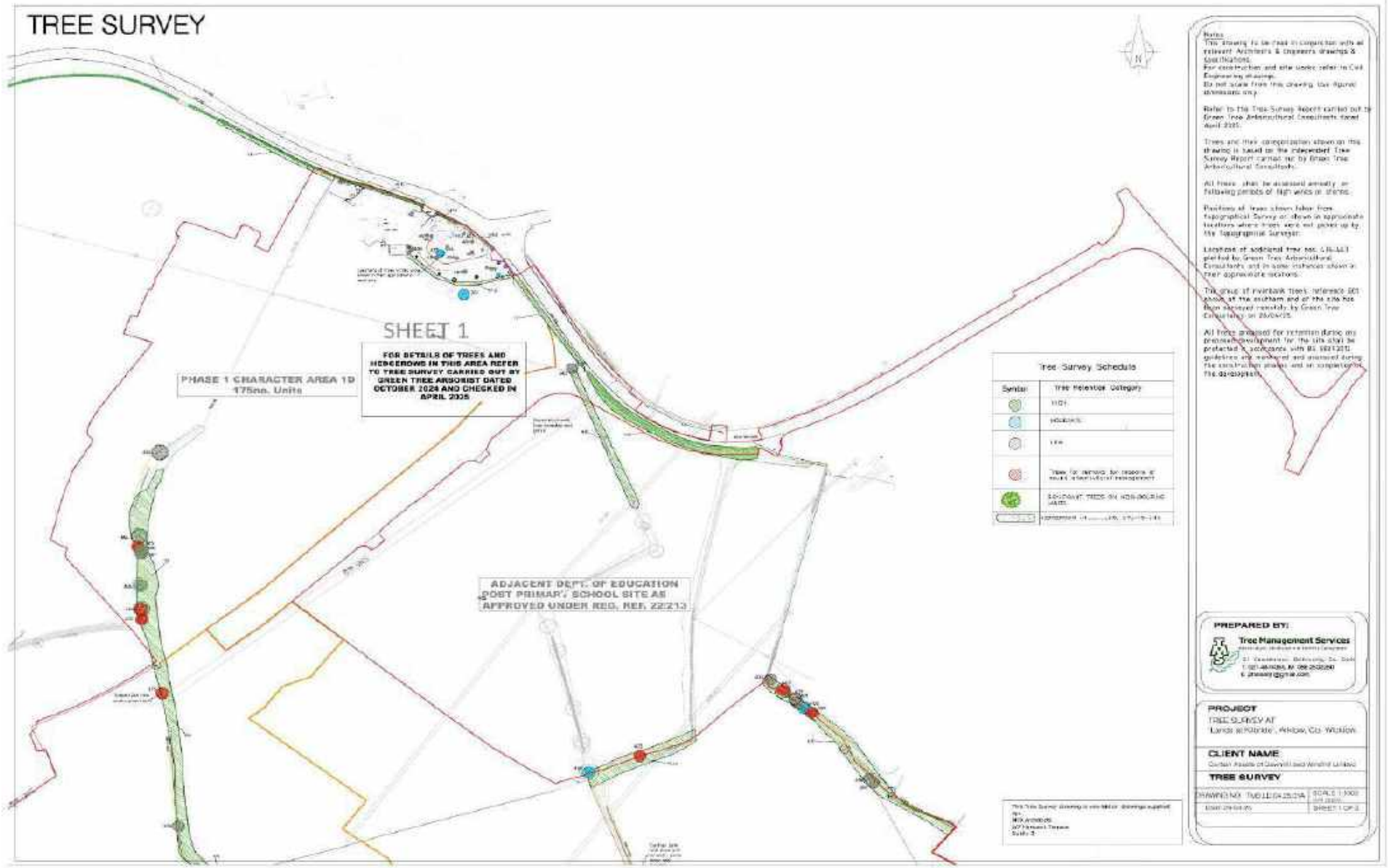


Figure 5: *Tree survey plan- sheet 1*

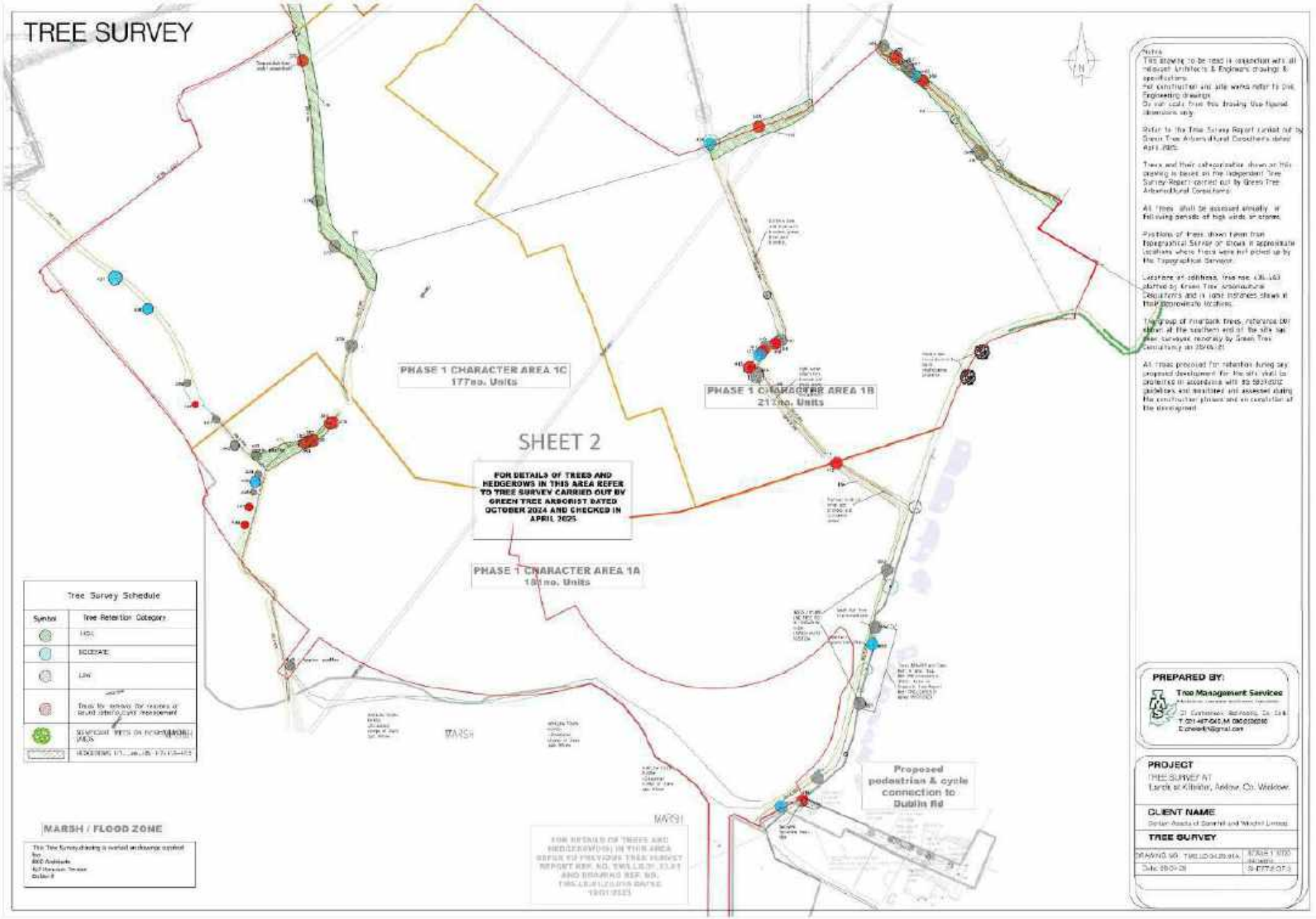


Figure 6. *Tree survey plan- sheet 2*

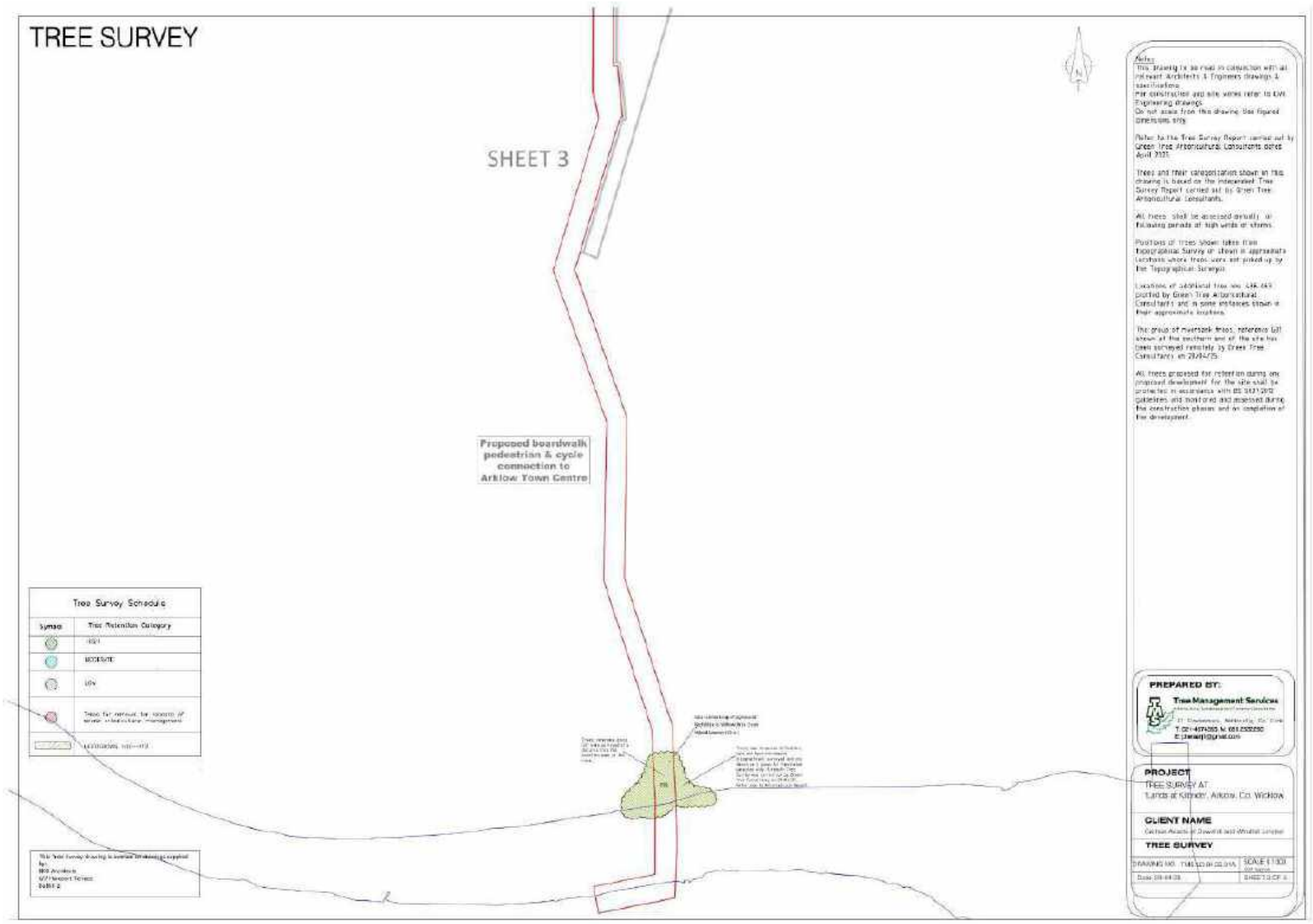


Figure 7. *Tree survey plan- sheet 3*

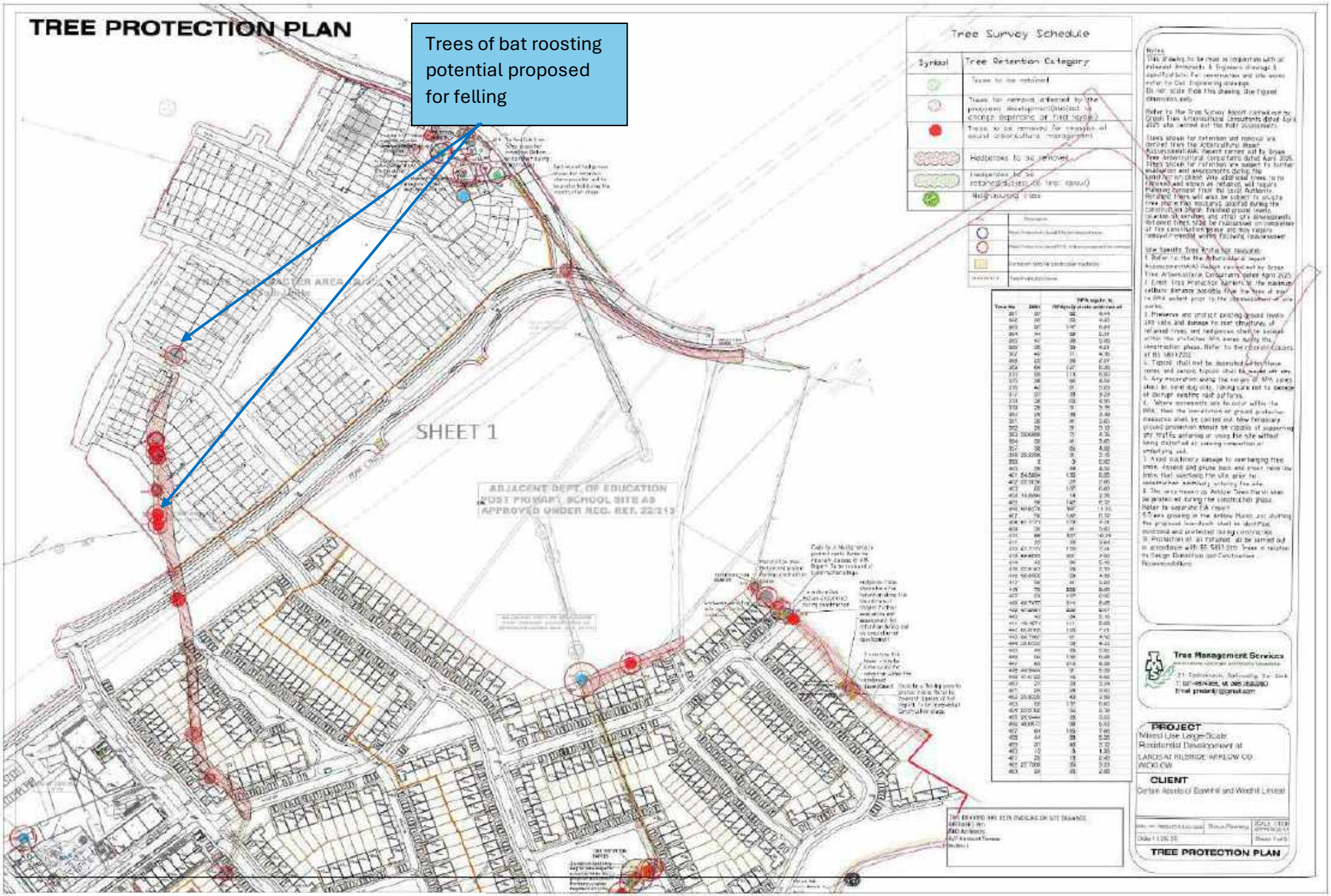


Figure 8. *Tree protection plan- sheet 1*

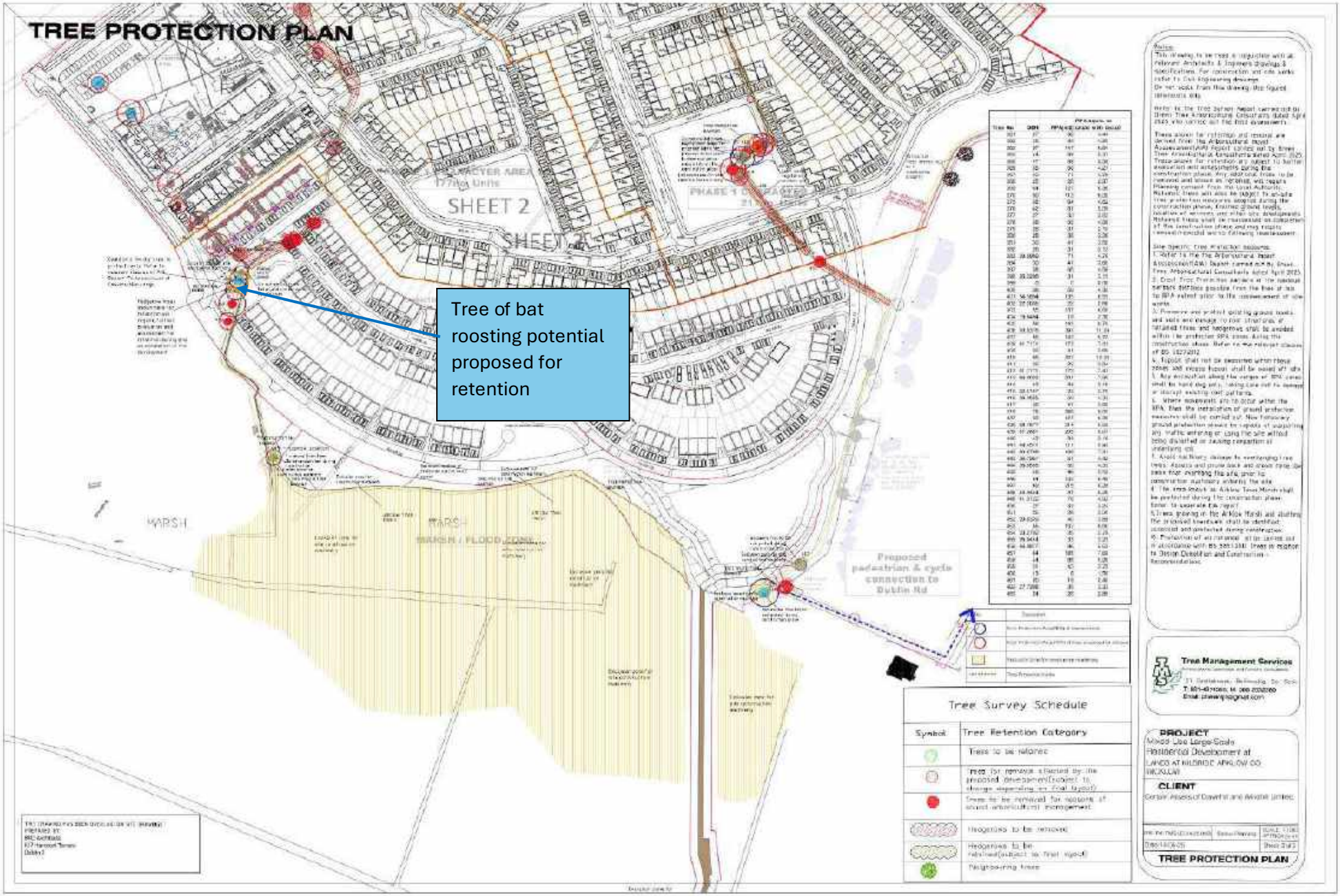


Figure 9. *Tree protection plan- sheet 2*

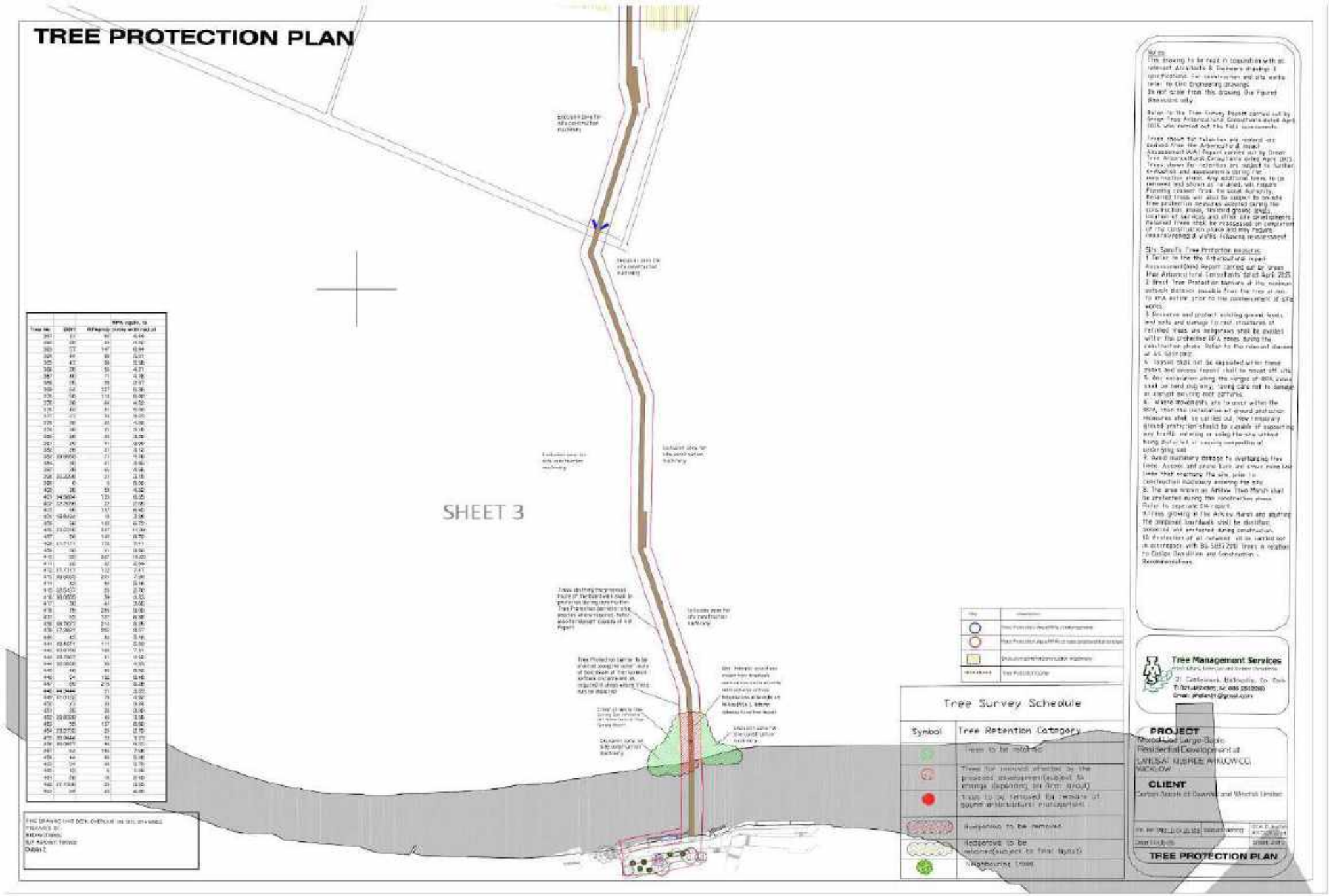


Figure 10. *Tree protection plan- sheet 3*

Lighting

A Public Lighting Report has been prepared by Fallon Design M&E Engineering to accompany this planning application. Lighting within the main area of development will be fitted with back spill protection to protect the open areas from light spill. Lighting in this area will be set to 3000K. In relation to the boardwalk lighting, consultation took place between Altemar and the lighting specialist to limit the impacts of the lighting on the Arklow Town Marsh. The handrail lighting will be focused onto the centre of the boardwalk, minimizing light spilling into the surrounding marsh and will be set to 2200K. In addition, the lux levels can be manually turned down on DALi drivers. The report outlines the following in relation to the proposed development lighting:

'Detailed Design

The design uses the following:
183 x Metro Streetlight LED 3000K with 0/5 degree tilt with the following wattages, optics and mounting arrangements:
15 x 27w Forward Throw A Optic (All single head) mounted on 6m columns to light the roads and paths
124 x 27w Street Optic R03 (All single head) mounted on 6m columns to light the roads and paths 29 x 68w Street Optic R03 (All single head) mounted on 8m columns to light the link road (Note: We may need confirmation on the extents of the link road as it wasn't clear to me from the drawings for the sections within the estate).
14 x 36w Symmetric Optic (7 x twin head) mounted on 7 x 6m columns in the carpark
1 x 36w Forward Throw A optic mounted on a 6m column at the carpark entrance

47 x City Streetlight 36w LED 3000K Street Optic R03 with internal black shield mounted on 6m columns with 0/5 degree tilt at the open areas / pathways
5 x City Streetlight 27w LED 3000K Forward Throw B Optic with internal black shield mounted on 6m columns with 0/5 degree tilt at the open areas / pathways

Light levels are as follows:
Road & Paths – Section 1 : 8.7 lux average, 1.7 lux minimum (0.20 uniformity).
Road & Paths – Section 2 : 7.5 lux average, 1.5 lux minimum (0.20 uniformity).
Road & Paths – Section 3 : 8.3 lux average, 1.6 lux minimum (0.20 uniformity).
Road & Paths – Section 4 : 8.0 lux average, 1.5 lux minimum (0.20 uniformity).
Road & Paths – Section 5 : 9.0 lux average, 1.7 lux minimum (0.20 uniformity).
Road & Paths – Section 6 : 9.8 lux average, 1.9 lux minimum (0.20 uniformity).
These levels comply with IS EN 13201-2:2015/BS 5489-1:2020 for residential roads and paths - Class P3 (7.5 lux average 1.5 lux minimum).

Link Road – Section 1 : 10.9 lux average, 2.1 lux minimum (0.20 uniformity).
Link Road – Section 2 : 10.7 lux average, 2.1 lux minimum (0.20 uniformity).
These levels comply with IS EN 13201-2:2015/BS 5489-1:2020 for roads and paths - Class P2 (10.0 lux average, 2.0 lux minimum).
Carpark : 10.6 lux average, 2.6 lux minimum (0.25 uniformity). This complies with IS EN 12464-2:2014 for parking areas – medium traffic (10 lux average, 0.25 uniformity).

Ecological Impact Design Considerations:
Careful consideration has been given to the design of Public Lighting with regard to the existing natural habitat and the wildlife. The chosen luminaire Veelight Metro Series has a full cut off lantern type, that offers with a G6 Glare rating and no upward light making it dark sky friendly.

The public lighting design has been developed in conjunction with the ecological impact assessment carried out for this application.

- *An inbuilt multi step dimming program within this luminaire allows for night time hours to be dimmed by up to 25%. This means during peak hours of nocturnal foraging, feeding and*

activity the adjacent public lighting can be further designed to minimize impact on the local wildlife.

- *The colour rendering of the selected light fitting is 3000k making the LED fittings a warmer light, helping to further minimize the impact on the local wildlife.*

- *Greater energy savings will also result using the inbuilt multi-step dimming program during late hours of darkens along the public lighting spaces.*

- *Unnecessary light spill is controlled through a combination of directional lighting and luminaire optics design.*

- *No floodlighting will be used on the scheme.*

- *The design is in reference to the Bats and Lighting in the UK – Bats and the Built Environment Series (Institute of Lighting Professionals, September 2011;*

- *Guidance Notes for the Reduction of Obtrusive Light GN01 (Institute of Lighting Professionals, 2011.*

- *Bats and Lighting – Guidance Notes for Planners, Engineers, Architects and Developers (Bat Conservation Ireland);*

The proposed public lighting layout is demonstrated in figures 11-15.

Figure 11. *Public Lighting Layout – sheet 1*

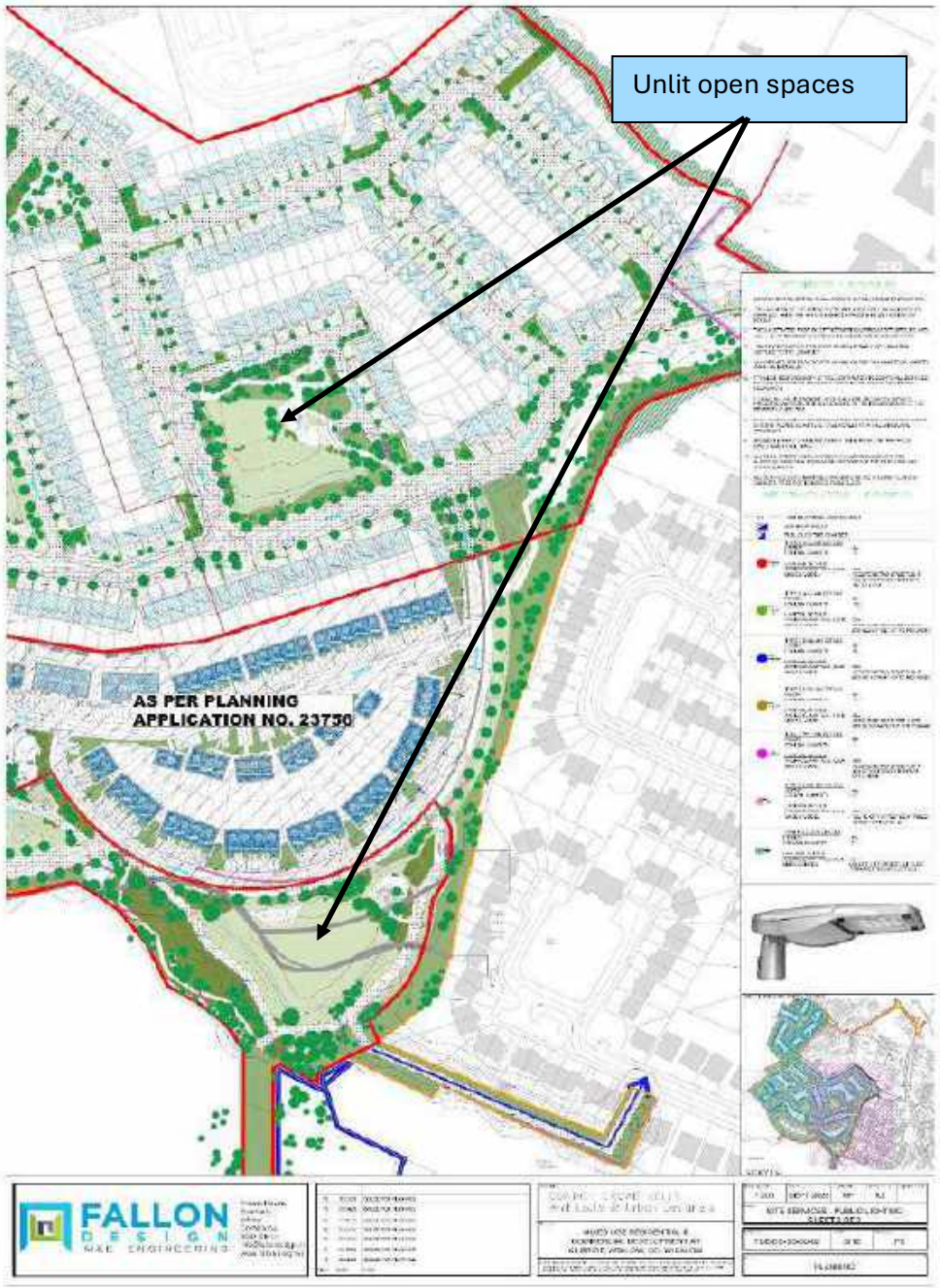


Figure 12. *Public Lighting Layout – sheet 2*

Figure 13. *Public Lighting Layout – sheet 3*

Figure 14. *Public Lighting Layout – boardwalk*

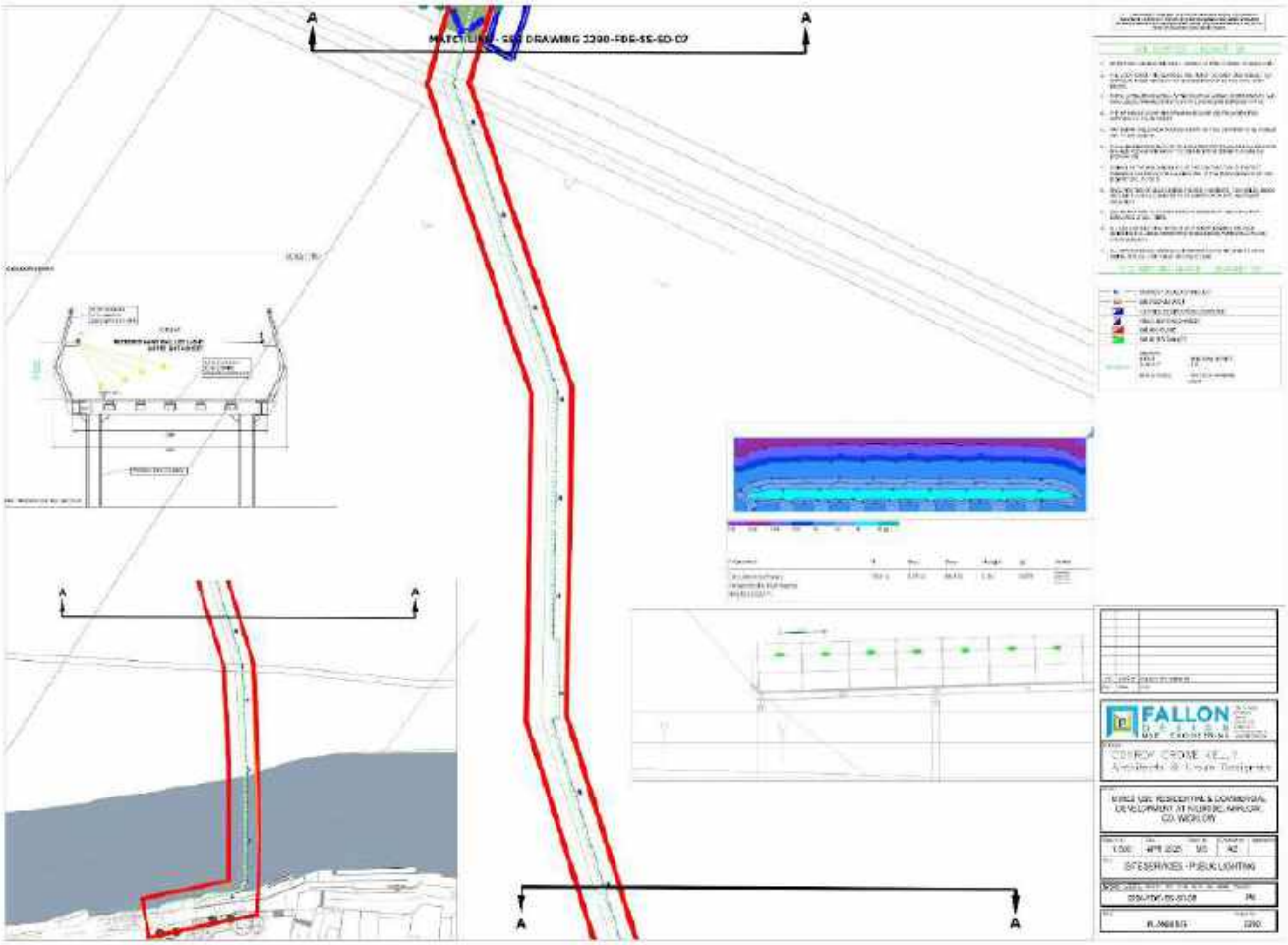


Figure 15. *Public Lighting Layout – boardwalk*

Bat survey

This report presents the results of handheld emergent and detector surveys (1st September 2019, 2nd October 2020, 22nd August 2021, 11th September 2023, 10th & 12th September 2024 and 9th April 2025), three static detector surveys and building inspection surveys undertaken by Bryan Deegan (MCIEEM) over 2020 and 2021. Two static detector surveys were also carried out (14th August 2020- 22nd August 2020, 10th August 2021-14th August 2021). A dawn re-entry survey was carried out on the abandoned house at the north of the site on the 9th May 2025.

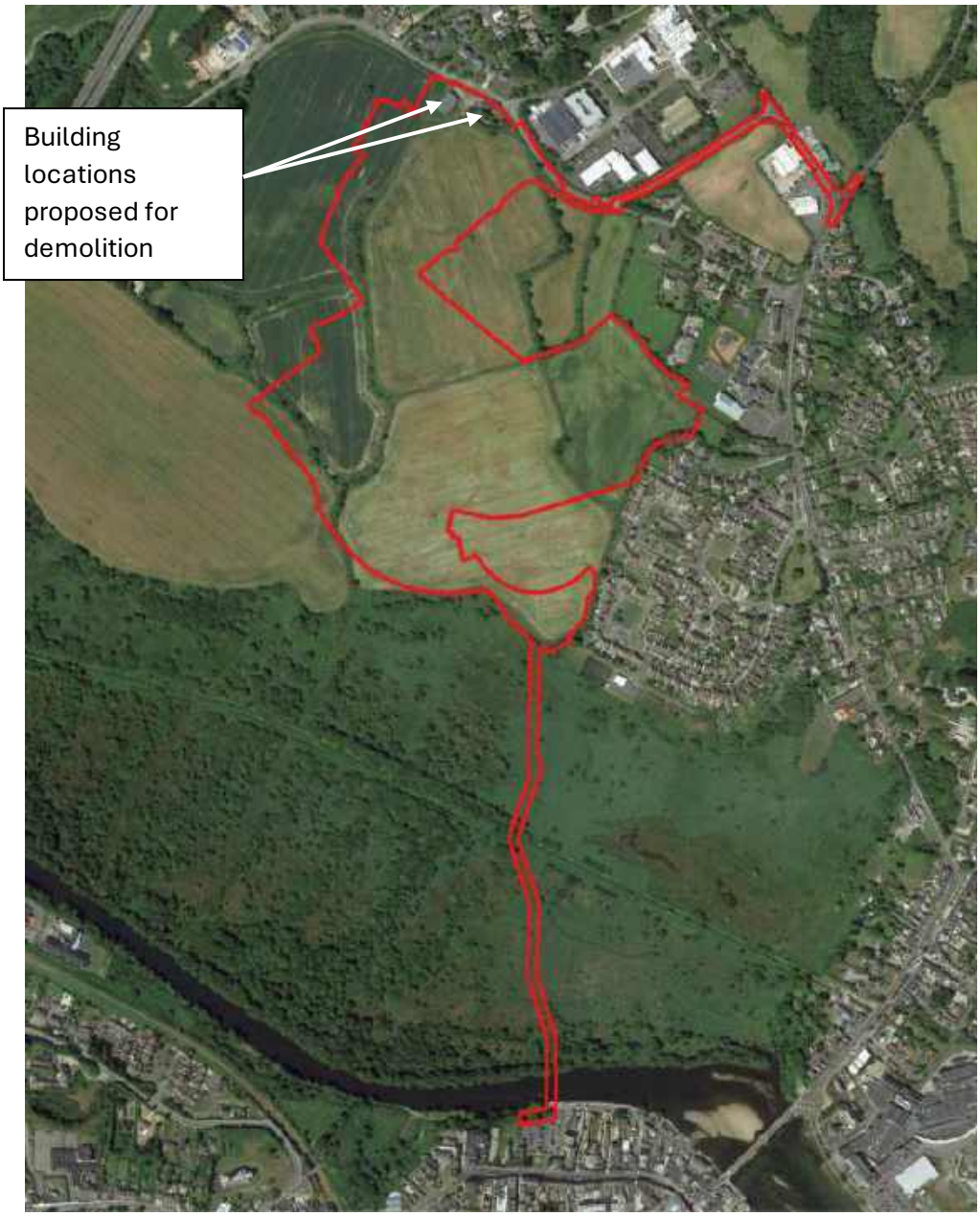
Survey methodology

As outlined in Marnell et al. 2022 *'The presence of a large maternity roost can normally be determined on a single visit at any time of year, provided that the entire structure is accessible and that any signs of bats have not been removed by others. However, most roosts are less obvious. A visit during the summer or autumn has the advantage that bats may be seen or heard. Buildings (which for this definition exclude cellars and other underground structures) are rarely used for hibernation alone, so droppings deposited by active bats provide the best clues. Roosts of species which habitually enter roof voids are probably the easiest to detect as the droppings will normally be readily visible. Roosts of crevice-dwelling species may require careful searching and, in some situations, the opening up of otherwise inaccessible areas. If this is not possible, best judgement might have to be used and a precautionary approach adopted. Roosts used by a small number of bats, as opposed to large maternity sites, can be particularly difficult to detect and may require extensive searching backed up by bat detector surveys (including static detectors) or emergence counts.'* In relation to the factors influencing survey results the guidelines outlines the following *'During the winter, bats will move around to find sites that present the optimum environmental conditions for their age, sex and bodyweight and some species will only be found in underground sites when the weather is particularly cold. During the summer, bats may be reluctant to leave their roost during heavy rain or when the temperature is unseasonably low, so exit counts should record the conditions under which they were made. Similarly, there may be times when females with young do not emerge at all or emerge only briefly and return while other bats are still emerging thus confusing the count. Within roosts, bats will move around according to the temperature and may or may not be visible on any particular visit. Bats also react to disturbance, so a survey the day after a disturbance event, may give a misleading picture of roost usage.'*

The survey involved the methodologies outlined in Collins (2016) which included the roost inspection methodologies i.e. external methodology outlined in section 5.2.4.1 and the internal survey outlines in section 5.2.4.2 of the guidelines. In addition, the methodologies for Presence absence surveys (Section 7) was carried out for dust emergent surveys.' As outlined in Collins (2016) *'The bat active period is generally considered to be between April and October inclusive (although the season is likely to be shorter in northern latitudes). However, because bats wake up during mild conditions, bat activity can also be recorded during winter months.'*

Survey Results

Building Assessment



A visual assessment of potential bat roosting sites within the onsite structures was carried out by Bryan Deegan, Emma Peters and Frank Spellman on the 9th of April 2025. The farm buildings on site were considered to be of low roosting suitability. The main house on site is considered of low bat roosting potential. A dawn re-entry survey of the main house on site was carried out on the 9th May 2025.

Trees as potential bat roosts.

A ground level roost assessment was carried and used to examine the trees on/proximate to the site for features that could form bat roosts. Potential roosting features include heavy ivy growth, broken limbs, areas of decay, vertical or horizontal cracks, cracks in bark etc. Trees of bat roosting potential were located on the east treeline All trees on site were assessed. The trees on the boundary of the site were mature and some were ivy cladded, these could be of low bat roost

potential with the individual trees highlighted in Figure 5. Whilst no trees were confirmed as bat roosts, bat activity was recorded in the 2024 surveys.

Emergent/detector surveys.

2024 Surveys

An emergent/detector survey was carried out by Emma Peters, Frank Spellman and Jack Doyle on the 10th and 12th September 2024. The detector surveys were undertaken during the active bat season and the transects covered the entire site multiple times. Weather conditions were good with light winds and no rain. During the 2024 survey, the following bat species were noted foraging: Soprano Pipistrelle (*Pipistrellus pygmaeus*), Common Pipistrelle (Pipistrellus pipistrellus sensu lato), Lesser Noctule (*Nyctalus leisleri*), Natterer's Bat (*Myotis nattereri*), and Whiskered Bat (*Myotis mystacinus*).

South of the woodland central to the site there are two derelict buildings within an agricultural courtyard. Bats were noted emerging from the building to the west and suspected to be roosting in the second building also (to the northeast). Two single bats were noted emerging from two separate oak trees onsite.

No bat roosts were noted inside the redline, however, three bat roosts are noted within the property ownership line. These are demonstrated in figure 18. The site included trees of bat roosting potential, and they are demonstrated in figure 18.

2025 Surveys

An emergent/detector survey was carried out by Bryan Deegan, Emma Peters and Frank Spellman on the 9th of April 2025. Four Soprano Pipistrelles (*Pipistrellus pygmaeus*) were noted emerging from a derelict building on the south side of the Avoca River (outside the site boundary) and went to forage along the treeline and marsh area of the north side of the riverbank. Leisler (Lesser Noctule (*Nyctalus leisleri*)), and Common Pipistrelle (*Pipistrellus pipistrellus sensu lato*) were noted foraging along the marsh and water's edge but in lesser amounts. Very little activity was noted in the farmland portion of the site. One Leisler's bat and three soprano pipistrelles were noted foraging along the redline portion of the marsh just after dusk.

A dawn re-entry survey of the main house to the north of the site was carried out by Jack Doyle on the 9th May 2025. No bats were recorded during the survey

Bat surveys have also been carried out by Altemar Ltd. on site on the 1st of September 2019, 2nd October 2020, 22nd August 2021 (Static Detectors 14th August 2020- 22nd August 2020, 10th August 2021-14th August 2021), 11th September 2023.

As outlined in Collins (2016) in relation to weather conditions '*The aim should be to carry out surveys in conditions that are close to optimal (sunset temperature 10°C or above, no rain or strong wind.), particularly when only one survey is planned.... Where surveys are carried out when the temperature at sunset is below 10°C should be justified by the ecologist and the effect on bat behaviour considered.*' Therefore, it was considered to be optimal conditions to survey. There were no constraints in relation to the surveys carried out. All areas of the site were accessible bar attic of the abandoned house, where an external survey was done instead.

At dusk, the bat detector survey was carried out onsite using a*n Echo meter touch 2 Pro* detector to determine bat activity. Bats were identified by their ultrasonic calls coupled with behavioural and flight observations.

Bat assessment findings

Review of local bat records

The review of existing bat records (sourced from Bat Conservation Ireland's National Bat Records Database) within three 2km^2 grids (Reference grids T27M, T27L, T27H) encompassing the study area reveals that five of the nine known Irish species have been observed locally (Table 1). The National Biodiversity Data Centre's online viewer was consulted in order to determine whether there have been recorded bat sightings in the wider area. This is visually represented in Figures 16, 17 & 18. The following species were noted in the wider area: Daubenton's Bat (*Myotis daubentonii*), Whiskered Bat (*Myotis mystacinus),* Lesser Noctule (*Nyctalus leisleri*), Common Pipistrelle (*Pipistrellus pipistrellus sensu stricto),* Soprano Pipistrelle (*Pipistrellus pygmaeus*), and Brown Long-eared Bat (*Plecotus auritus*) (Figures 16, 17 & 18).

Table 1: *Status of bat species within three 2km^2 grid encompassing the subject site (Reference no. T27M, T27L and T27H)*

Species name	**Count**	**Date of last record**
T27M		
Common Pipistrelle (*Pipistrellus pipistrellus sensu stricto)*	2	26/08/2014
Daubenton's Bat *(Myotis daubentonii)*	1	26/08/2014
Lesser Noctule *(Nyctalus leisleri)*	1	26/08/2014
Soprano Pipistrelle *(Pipistrellus pygmaeus)*	1	26/08/2014
Whiskered Bat *(Myotis mystacinus)*	1	26/08/2014
T27L		
Daubenton's Bat *(Myotis daubentonii)*	1	13/08/2020
T27H		
None		

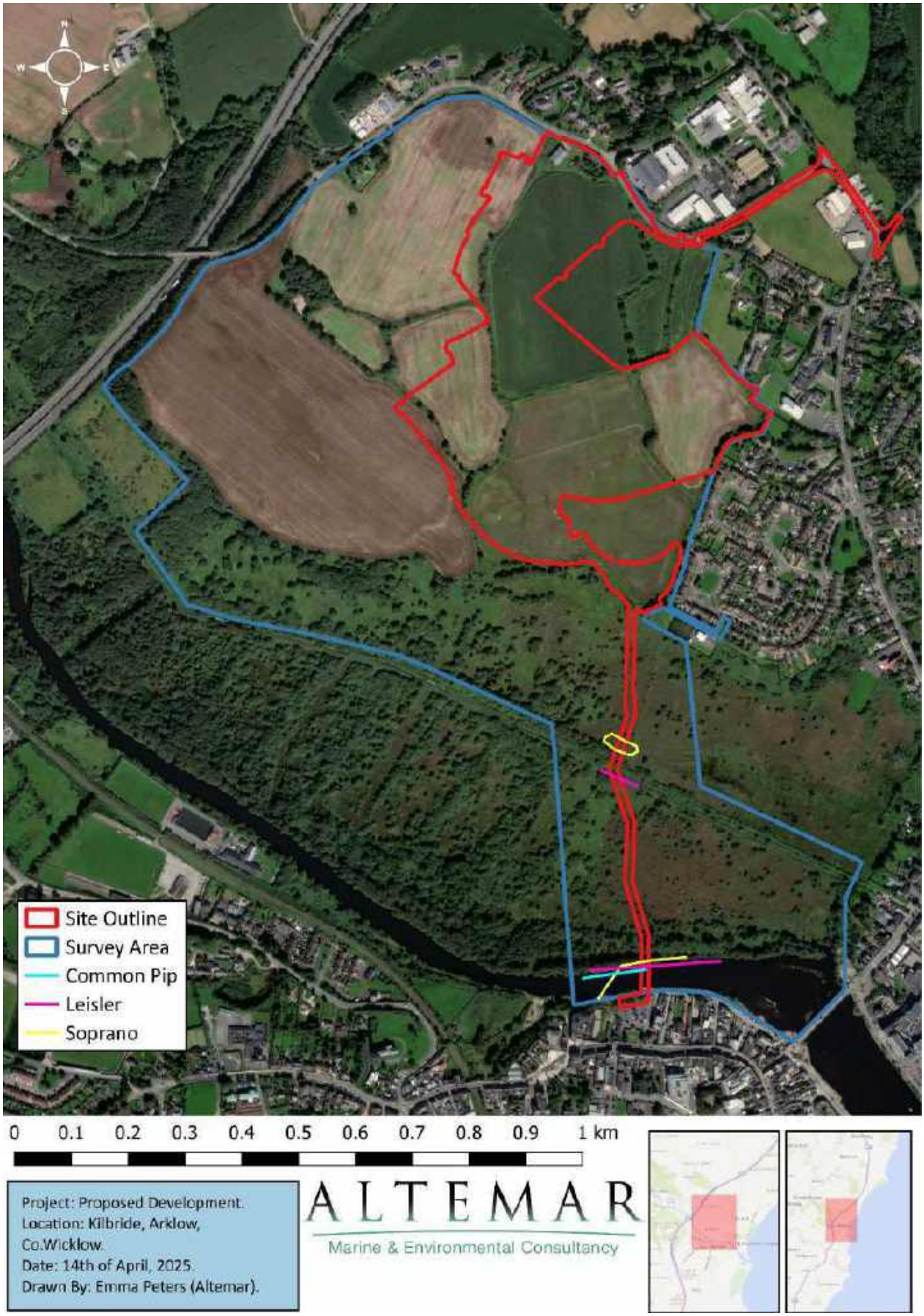


Figure 16. A map of the survey area denoting the species and activity of the bats noted during 2025 survey.

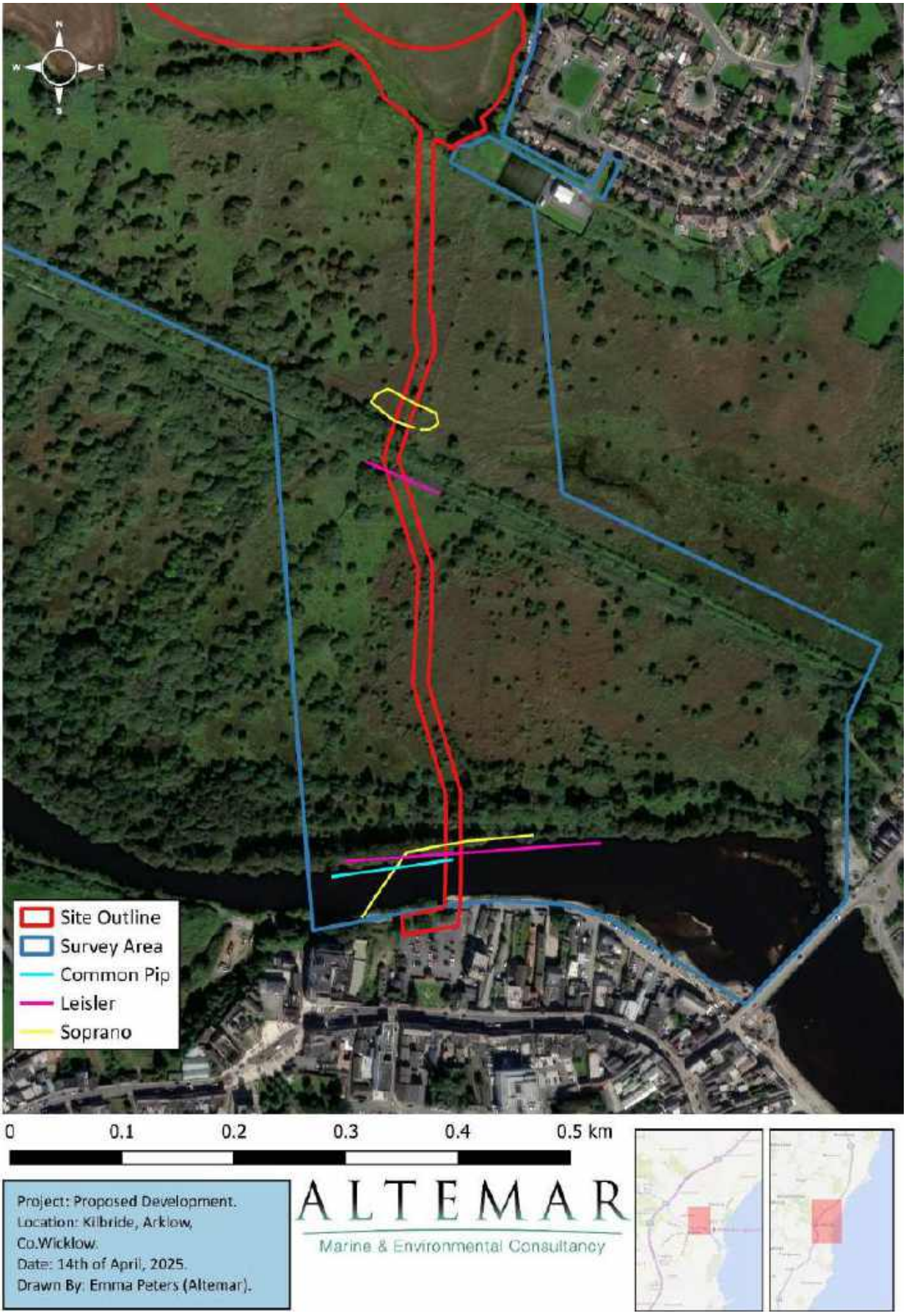


Figure 17. A map with closer view of bat activity noted during the 2025 survey.

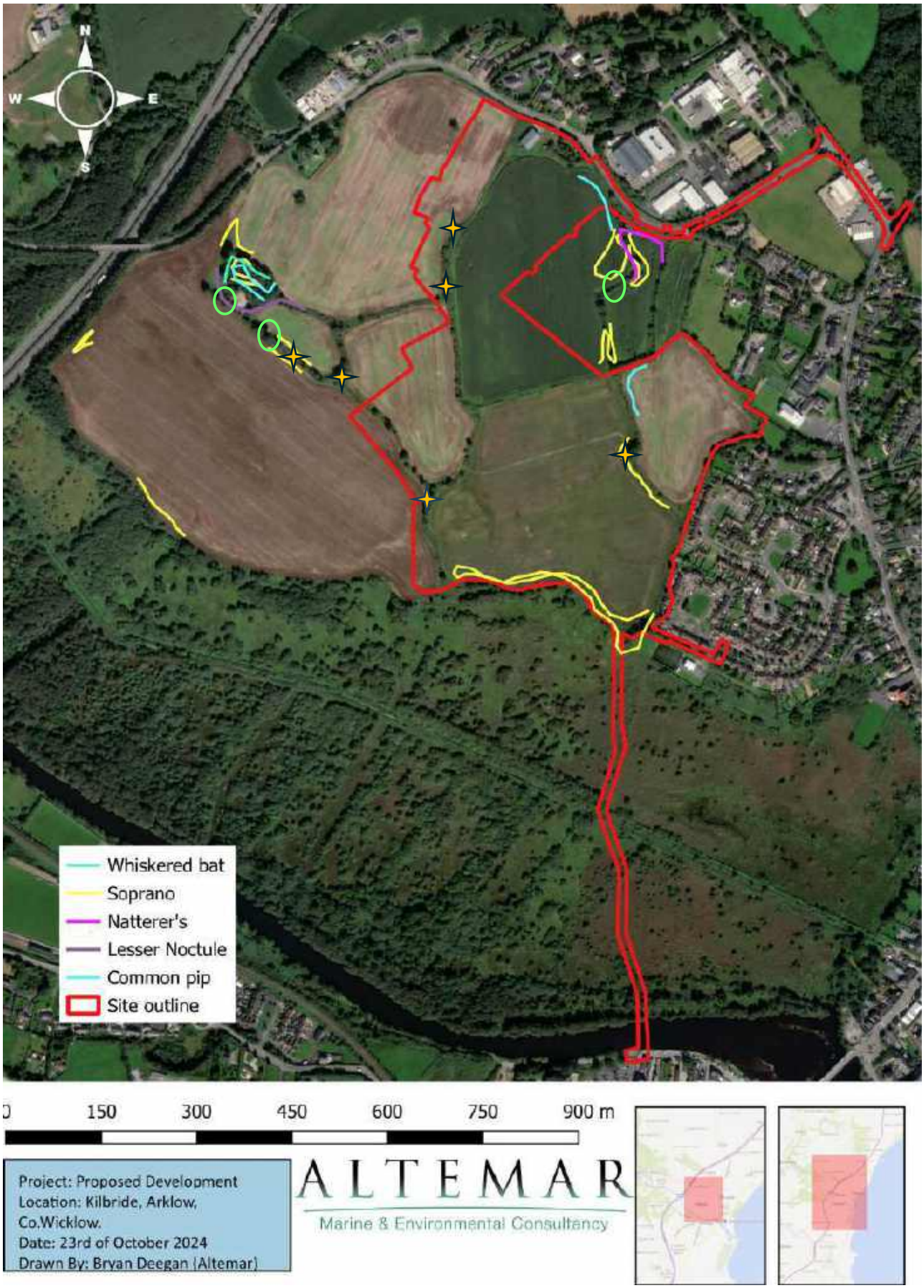


Figure 18. A map of site demonstrating the flight paths of the various bat species noted onsite. The green rings demonstrate the locations of bat roosts noted during the 2024 surveys. The orange stars indicated trees of bat roosting potential.

Figure 19. Previous locations of bat roosts and foraging areas (2024). Bat Foraging Soprano pipistrelle (orange) Leisler's Bat (blue), Common pipistrelle (yellow). Static Detector Location (orange circle).

Figure 20. Daubenton's Bat (*Myotis daubentonii*) (purple), Whiskered Bat (*Myotis mystacinus*) (yellow), and both Daubenton's Bat and Whiskered Bat (orange) (Source NBDC). Site outline – red circle.

Figure 21. Lesser Noctule (*Nyctalus leisleri*) (purple), Common Pipistrelle (*Pipistrellus pipistrellus sensu stricto*) (yellow), and both Lesser Noctule and Common Pipistrelle (orange) (Source NBDC). Site outline – red circle.

Figure 22. Soprano Pipistrelle (*Pipistrellus pygmaeus*) (purple), Brown Long-eared Bat (*Plecotus auritus*) (yellow), and both Soprano Pipistrelle and Brown Long-eared Bat (orange) (Source NBDC). Site outline – red circle.

Evaluation of Results

The bat surveys comply with bat survey guidance documentation including Marnell et al (2022) and Collins (2016). No bats were observed emerging from trees. No evidence of bats roosting in buildings or trees were noted within the site outline. However, there was minor bat activity recorded on the tree lines onsite. Whilst there is a lack of direct evidence to point towards bats roosting in the trees on-site during the 2025 surveys, there are multiple trees of at roosting potential within the site outline (Figure 18). Bats are using the treelines onsite to hunt and roosting nearby in a derelict building on the south bank of the river. The 2024 surveys revealed that bats are roosting in the mature oaks trees outside of the redline.

Potential Impact of the development on Bats

Foraging activity was relatively low across the site and no bats were observed to be roosting or emerging onsite during the 2025 surveys however, in the 2024 surveys, three bat roosts were noted within the property ownership line. These are demonstrated in figure 18. It is considered that even though insect populations are high within the marsh area are high bat foraging activity is low. This is possibly due to a lack of roosting opportunities. Enhancement measures are proposed which will improve roosting opportunities in the marsh.

There were several trees of roosting potential along the boundary, as well as the treelines in the centre of the site, as can be seen in Figure 18. The proposed development will alter the local environment as new structures are to be erected and the existing buildings to be removed. In the absence of mitigation measures, these changes would impact any potential bat roosting habitats that may develop in the future and impact the existing ones. The removal of vegetation on site will reduce bat foraging habitats. Lighting during construction and operation has the potential to impact on foraging of bats on site in the absence of mitigation. Mitigation measures will be

required to limit light spill to protect bat foraging areas including within the marsh. The lighting plan has been designed to comply with bat lighting guidelines, minimizing potential impacts on bats. The proposed development is not in proximity to sensitive bat areas. In total 1269 trees will be planted on site. The potential for collision risk and impact on flight paths in relation to bats is considered low due to the fact the buildings would be deemed to be clearly visible to bats.

Mitigation Measures

As outlined in Marnell et al. (2022) "*Mitigation should be proportionate. The level of mitigation required depends on the size and type of impact, and the importance of the population affected*." In addition as outlined in Marnell et. al (2022) '*Mitigation for bats normally comprises the following elements:*

- *Avoidance of deliberate, killing, injury or disturbance – taking all reasonable steps to ensure works do not harm individuals by altering working methods or timing to avoid bats. The seasonal occupation of most roosts provides good opportunities for this*
- *Roost creation, restoration or enhancement – to provide appropriate replacements for roosts to be lost or damaged*
- *Long-term habitat management and maintenance – to ensure the population will persist*
- *Post-development population monitoring – to assess the success of the scheme and to inform management or remedial operations.'*

Bats were not noted to be roosting on site. There are trees of bat roosting potential noted on site. The level of activity on site is moderate with no bats or evidence of bats roosting within the site outline. However, there are known bat roosts within the land ownership line. There are some areas that could be seen to have moderate roosting potential. As such the following mitigation measures are to be implemented.

- Pre-Construction inspection for bats in all buildings to be demolished and emergent survey will be carried out by a suitably qualified ecologists/bat worker, prior to the demolition of buildings.
- A post construction bat survey and light spill assessment will be carried out to ensure compliance with the lighting plan.

Specifically, in relation to the proposed boardwalk lighting, the following mitigation measures will be implemented:

- Lighting will be centred on the boardwalk to minimise spill into adjacent marsh.
- Light shielding will be used on the boardwalk lighting in consultation with the project ecologist to limit light spill into surrounding marsh and Avoca River.
- A post construction prototype light spill assessment will be [prepared in consultation with the project ecologist to minimise side spill.
- Post construction bat monitoring and surveys will be carried out to ensure bats are continuing to forage along marsh area and over Avoca River, proximate to the boardwalk.
- 18 bat boxes will be placed on site as an enhancement measure. Of these, 12 will be placed on the board walk. The position of these boxes will be carried out in consultation with an ecologist.

Predicted Residual Impact of Planned Development on Bats

The proposed development will change the local environment as new lights and structures are to be erected and the existing vegetation will be removed. No bat roosts were noted within the site

boundary. Foraging activity on site may be reduced during construction and operation due to the presence new structures and lighting. It would be expected that, with the implementation of mitigation measures as outlined above, foraging activity will continue on site. A pre-construction inspection will be carried out on onsite trees of bat roosting potential that are to be removed. Enhancement measures are proposed. The proposed development will result in a long term/low adverse/not significant/negative impacts on bats.

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Appendix 6.1

Site Investigation Report

FACTUAL REPORT DATA

HOUSING DEVELOPMENT
AT KILBRIDE ARKLOW
CO WICKLOW
LIONCOR DEVELOPMENTS

AECOM
CONSULTING ENGINEERS

CONTENTS

APPENDICES

FOREWORD

The following Conditions and Notes on Site Investigation Procedures should be read in conjunction with this report.

General.

Recommendations made, and opinions expressed in the report are based on the strata observed in the exploratory holes, together with the results of in-situ and laboratory tests. No responsibility can be held for conditions which have not been revealed by exploratory work, or which occur between exploratory hole locations. Whilst the report may suggest the likely configuration of strata, both between exploratory hole locations, or below the maximum depth of the investigation, this is only indicative, and liability cannot be accepted for its accuracy.

Unless specifically stated, no account has been taken of possible subsidence due to mineral extraction below or close to the site.

Boring Procedures.

Unless otherwise stated, the 'Shell and Auger' technique of soft ground boring has been employed. All boring operations sampling and/or logging of soils and in-situ testing complies with the recommendations of the British Standard Code of Practice BS 5930 (1981), 'Site Investigation' and BS 1377:1990, 'Methods of test for soils for civil engineering purposes'.

Whilst the technique allows the maximum data to be obtained in soft ground, some disturbance and variation of soft and layered soils is unavoidable. Attention is drawn to this condition, whenever it is suspected. Where cobbles and boulders are recorded, no conclusion should be drawn concerning the size, presence, lithological nature, or numbers per unit volume of ground.

Where peat has been encountered during siteworks, samples have been logged in accordance with the Von Post Classification (ref. Von Post, L. 1992. Sveriges Gologiska Undersoknings torvinventering och nogra av dess hittils vunna resultat (SGU peat inventory and some preliminary results) Svenska Mosskulturforeningens Tidskrift, Jonkoping, Swedden, 36, 1-37 & Hobbs N. B. Mire morphology and the properties of some British and foreign peats. QJEG, Vol. 19, 1986).

Routine Sampling.

Undisturbed samples of soils, predominantly cohesive in nature are obtained unless otherwise stated by a 104mm diameter open-drive tube sampler. In granular soils, and where undisturbed sampling is inappropriate, disturbed samples are collected. Smaller disturbed samples are also recovered at intervals to allow a visual examination of the full strata section.

In-Situ Testing.

Standard penetration tests, utilising either the standard split spoon sampler or solid cone and automatic trip-hammer are conducted unless otherwise where required by instruction. Subsequent to a seating drive of 150mm, a summation for the number of blows for 300mm penetration is recorded on the boring records together with the blow count for each 75mm penetration. In cases where incomplete penetration is obtained, the number of blows for the recorded value of penetration are noted. In coarse granular soils, a cone end is fitted to the sampler and a similar procedure adopted.

Groundwater.

The depth of entry of any influx of groundwater is recorded during the course of boring operations. However, the normal rate of boring does not usually permit the recording of an equilibrium level for any one water strike. Where possible drilling is suspended for a period of twenty minutes to monitor the subsequent rise in water level.

Groundwater conditions observed in the borings or pits are those appertaining to the period of investigation. It should be noted however, that groundwater levels are subject to diurnal, seasonal and climatic variations and can also be affected by drainage condition, tidal variation or other causes.

Retention of Samples.

After satisfactory completion of all the scheduled laboratory tests on any sample, the remaining material is discarded unless a period of retention of samples is agreed, it is our normal practice to discard all soil samples one month after submission of our final report.

FACTUAL REPORT ON A SITE INVESTIGATION
FOR A PROPOSED DEVELOPMENT
AT KILBRIDE
ARKLOW

FOR
AECOM
CONSULTING ENGINEERS

Report No. 21948 **August 2019**

I Introduction

A major new residential development is proposed for a site at Kilbride, Arklow, Co. Wicklow.

An investigation of sub soil conditions in the area of the new development has been carried out by IGSL for AECOM Consulting Engineers, on behalf of Lioncor Developments Limited.

The scheduled site investigation included the following elements:

*	Cable Percussion Borehole	6 nr.
•	Trial Pit Excavations	8 nr.
•	CBR by TRL Probe	4 nr.
•	BRE Digest 365 Percolation	6 nr.
•	Ground Water and Gas Monitoring	
•	Geotechnical Laboratory Testing	
•	Environmental Laboratory Testing	

This report includes all factual data from field operations and laboratory and discusses these findings relative to the proposed new development.

II Fieldwork

The development is to take place on a greenfield site located at Kilbride, Arklow, County Wicklow. The area is quite extensive and sloping southwards towards the Avoca River. The low lying area north of the river is extremely boggy and wet and presented access difficulties for the IGSL equipment.

The site and the proposed exploratory locations are noted on the drawing and aerial map enclosed in Appendix VII. The drawing was provided by AECOM.

The various elements of the investigation are detailed in the following paragraphs. All field works were supervised by an experienced geotechnical engineer who carefully recorded stratification, recovered samples as required and prepared detailed records.

Each location was scanned electronically (CAT) to ensure that existing services were not damaged. The locations are also referenced to National Grid Co-ordinates.

Boreholes

Boreholes were 200mm diameter and were constructed using conventional cable percussion equipment. Holes were referenced BH01 to BH06 and were spaced out over the site area.

Detailed geotechnical records are contained in Appendix I to this report - the records give details of stratification, sampling, in-situ testing and groundwater. Note is also taken of any obstructions to normal boring requiring the use of the heavy chisel for advancement. It was not possible to recover undisturbed samples because of the high stone/cobble content of the strata encountered.

Boreholes BH01 and BH02 were located to the south of the site and both encountered surface topsoil and firm clay to approximately 2.00 metres. Medium dense to dense GRAVEL was noted from 1.00 to 3.80 metres. Stiff brown sandy gravelly CLAY was then noted, continuing to final refusal depths of 7.30 and 8.10 metres.

Boreholes BH03, BH04 and BH06 consistently identified stiff brown gravelly CLAY under shallow surface topsoil. The gravelly clay continued to depths between 6.00 and 7.00 metres. A stratum of dense GRAVEL underlies the gravelly clay at BH 06.

Finally at BH05 the stratification was quite different, with top soil overlying bands of loose sand and soft silty clay. At 4.50 metres dense sandy GRAVEL was noted with borehole refusal recorded at 5.90 metres BGL.

The final borehole refusal depths may be indicative of bedrock horizon. Proof core drilling was not scheduled as part of this investigation.

Ground Water / Standpipe Installation

Ground water was encountered in BHs 01, 02 and 06, generally in association with the granular soils. Relevant details are noted on the individual boring records. The remaining boreholes were dry during the construction period.

Slotted and sealed standpipes were installed in three boreholes to facilitate ground water and gas observation. Installation details are noted on the individual boring records and readings taken at intervals are presented in Appendix V.

Trial Pits

Pits were excavated using an 8 tonne tracked excavator under engineering supervision. Detailed trial pit logs with photographs are enclosed in Appendix II.

Surface top soil (400mm) overlies soft to firm mottled grey brown gravelly SILT/CLAY with strength increasing to firm/stiff below about 1.00 metre. Excavations continued to a final scheduled depth of 3.00 metres with no ground water encountered and side wall stability throughout.

Variations to the above were noted at TP03, TP07 and TP08 . At TP03 a stratum of silty SAND was noted below the clay from 2.20 to 3.50 metres. A layer of sandy GRAVEL was noted within the clay stratum at BH07, extending from 1.50 to 2.60 metres. Finally at TP08 soft SILT and loose SAND extends below top soil to 1.00 metre where the gravelly clay stratum commences.

Ground water ingress was noted in each trial pit, recorded as light seepages at depths between 1.00 and 2.00 metres.

Trial Pits were excavated to depths ranging from 3.00 to 3.50 metres. Excavations in the cohesive soils were generally quite stable. Some instability was noted in areas where granular material was encountered.

In Situ CBR by Dynamic Cone Penetrometer

The CBR value of the soils at shallow depth was established at five locations using a Dynamic Cone Penetrometer. Testing was carried out approximately 0.50 metres BGL. The test data is processed and an equivalent CBR value is calculated. Results are summarised in the following table and detailed records are presented in Appendix III.

Test No.	**Depth**	**CBR (%)**
DCP 01	0.60	27.3
DCP 02	0.50	9.9
DCP 03	0.50	8.5
DCP 04	0.60	32.3
DCP 05	0.50	8.3

Percolation Test / BRE DIGEST 365

Infiltration testing was performed at six locations in accordance with BRE Digest 365 'Soakaway Design'. Testing was carried out in Trial Pits 02, 03, 04, 06, 07 and 8.

To obtain a measure of the infiltration rate of the sub-soils, water is poured into the test pits, and records taken of the fall in water level against time. The tests are carried over two cycles following initial soakage. Designs are based on the slowest infiltration rate, which is generally calculated from the final cycle.

The infiltration rate is the volume of water dispersed per unit exposed area per unit of time, and is generally expressed as metres/minute or metres/second. In these calculations the exposed area is the sum of the base area and the average internal area of the pit sides over the test duration.

In all six locations the test medium comprised firm to stiff gravelly CLAY. No fall in water level was observed in the relatively impermeable soils. The tests are therefore classed as failures. The results are typical of the extremely low permeability boulder clay forming the stratification in the site area. Full details are contained in Appendix IV.

Water and Gas Monitoring

Standpipes were installed at BH02, BH03 and BH05 to facilitate observation and measurement of ground water levels and gas concentrations.

The site was re-visited at intervals following the installations and readings taken in the standpipes.

Ground water levels were measured using a electronic dip-meter. A Geotech GA500 Infra-Red gas monitor was used to determine gas levels (CH4, CO2, O2, CO, H2S).

Detailed records for each site visit are presented in Appendix V.

III. Testing

a. In - Situ

Standard penetration tests were carried out at approximate 1.00 metre intervals in the geotechnical boreholes to measure relative in-situ soil strength. N values are noted in the right hand column of the boring records, representing the blow count required to drive the standard sampler 300mm into the soil, following initial seating blows. Where full test penetration was not achieved the blow count for a specific penetration is recorded, or refusal is indicated where appropriate. The results of the tests are summarised as follows:

STRATUM	N VALUE RANGE	COMMENT
Brown gravelly SILT / CLAY (excluding BH05)		
1.00 metre BGL	8 to 19	Firm to Stiff
2.00 metre BGL	20 to 24	Stiff
3.00 metres BGL	28 to 34	Stiff to very Stiff
4.00 metres BGL	18 to 34	Stiff to very Stiff
> 5.00 metres BGL	17 to 50	Stiff to Hard

Limited penetration SPT tests were occasionally recorded on cobbles or boulders within the boulder clay.

SPT tests in the GRAVEL zones found in BH01 and BH02 recorded N values ranging from 18 to 31.

The SAND stratum noted in BH05 from 0.20 to 2.50 metres is loosely compacted with SPT values of N=5 and N=6. The underlying SILT CLAY at this location is soft to firm in consistence with N = 7 and N = 12 recorded.

Laboratory

A programme of laboratory testing was scheduled following completion of site operations. Testing was in accordance with the requirements of the Bill of Quantities Geotechnical testing was carried out by IGSL in it's INAB-Accredited laboratory. Environmental and chemical testing was carried out in the UK by CHEMTEST Ltd. The test programme included the following elements:

- Liquid and Plastic Limits / Moisture Content
- PSD Grading by wet sieve and hydrometer.
- Compaction
- MCV
- CBR
- Sulphate Chloride and pH (BRE SO1 Suite)
- Environmental Test Suite 1
- Environmental Test Suite 2 (RILTA)

Individual test results are discussed in the following paragraphs.

Classification

Twenty two samples of the cohesive soils from the boreholes and trial pits had index properties established. A high degree of consistency was established with all results plotting in the CI / CL Zones of the Casagrande Classification indicative of sensitive low plasticity clay matrix material. Natural Moisture content ranged from 13 to 25%, but more typically from 16 to 20%.

Grading

Wet sieve with hydrometer analysis was used to establish PSD grading curves for a number of samples of both the gravelly CLAY and sandy GRAVEL soils

Generally the cohesive samples have a straight-line pattern with smooth grading from the clay to gravel fraction. The graphs are typical of heterogeneous glacial till or boulder clay.

Samples from the granular zones reflect material graded through the sand and gravel fraction with 0 to 15% passing to the fine silt/clay fraction.

Dry Density/ Moisture Content Relationship

Compaction testing was scheduled on three samples of the boulder clay. Tests were carried out in accordance with BS1377 Part 4 1990 using a 2.5 Kg Rammer.

The results indicate Maximum Dry Density ranging from 1.81 to 1.98 Mg/cu.m. with Optimum Moisture Contents ranging from 8 to 15%.

Moisture Condition Value (MCV)

Five trial pit samples had MCV values and natural moisture content established. Results reflect quite a variation in MCV from a low of 3 to a maximum of 10.7.

CBR

CBR values were determined for several samples taken in the trial pits at depths between 0.60 and 1.00 metres. Material was compacted in the CBR moulds using Static Compaction method 2.

The results are presented in detail on individual record sheets and are summarised as follows:

Location	Depth of Test	Average CBR %	Moisture Content %
TP01	0.90	2	20
TP02	1.00	3.2	18
TP03	1.00	1.3	16
TP04	0.60	8	17
TP05	1.00	4.4	21
TP06	1.00	45	11
TP07	1.00	1.8	14

The high CBR value from TP06 was from a SANDY / GRAVEL material, the remaining tests were carried out on brown gravelly CLAY.

Sulphate and pH.

Eight samples were selected for BRE SO1 sulphate chloride and pH analysis. Sulphate concentrations (SO4 2:1 extract) of < 0.010 g/l were established with pH values of 7.6 to 8. Chloride contents were also consistently <0.010 g/l. No special precautions are necessary to protect foundation concrete from sulphate or chloride aggression. A design class of DS-1 (ACEC Classification for Concrete) is indicated for sulphate concentrations less than 0.5 g/l.

Environmental Test Suite 1

Six samples were scheduled for testing by AECOM in accordance with Environmental Tests Suite I. Testing was carried out by CHEMTEST and the results are presented in detail in the Appendix.

Environmental Test Suite 2 (RILTA)

Two soil samples were submitted for detailed environmental analysis to RILTA (WAC) parameters. The results confirm that the material can be classified as INERT with no elevated contaminant levels recorded.

No asbestos traces were found during routine screening.

IGSL/JC
FEB 2020

Appendix I Boring Records

GEOTECHNICAL BORING RECORD

REPORT NUMBER 22153

CONTRACT	Kilbride , Co.Wicklow	**BOREHOLE NO.**	**BH01**
		SHEET	Sheet 1 of 1
CO-ORDINATES	724,196.05 E 674,388.54 N	**RIG TYPE**	DANDO 2000
		BOREHOLE DIAMETER (mm)	200
GROUND LEVEL (mOD)	4.72	**BOREHOLE DEPTH (m)**	7.30
		DATE COMMENCED	06/12/2019
		DATE COMPLETED	09/12/2019
CLIENT	Lioncor	**SPT HAMMER REF. NO.**	
ENGINEER	Aecom	**ENERGY RATIO (%)**	
		BORED BY	P.THOMAS
		PROCESSED BY	V.L

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples: Ref. Number	Samples: Sample Type	Samples: Depth (m)	Samples: Recovery	Field Test Results	Standpipe Details
0	TOPSOIL		4.42	0.30						
	Brown, very sandy SILT/CLAY		4.02	0.70	AA121843	ENV	0.50			
1	Dense grey/brown fine to coarse sandy GRAVEL with cobbles				AA121844 AA121845	ENV B	1.00 1.00		N = 31 (5, 9, 9, 7, 7, 8)	
					AA121846	ENV	1.50			
2					AA121847	B	2.00		N = 30 (3, 5, 5, 6, 9, 10)	
3			1.02	3.70	AA121848	B	3.00		N = 50/225 mm (4, 3, 8, 16, 26)	
4	Stiffto very stiff, brown, gravelly CLAY with cobbles				AA121849	B	4.00		N = 33 (5, 6, 8, 8, 9, 8)	
5					AA121850	B	5.00		N = 29 (3, 5, 6, 9, 7, 7)	
6					AA126801	B	6.00		N = 33 (3, 3, 5, 5, 9, 14)	
			-2.08	6.80						
7	Dense angular clayey GRAVEL with broken angular cobbles		-2.58	7.30	AA126802	B	7.00		N = 50/150 mm (8, 16, 19, 31)	
	Obstruction End of Borehole at 7.30 m									
8										
9										

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (h)	Comments
2.90	3.30	1.5	
7.00	7.30	2	

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
2.50	2.50	3.70	2.40	20	Slow
6.80	6.80	No	2.60	20	Rapid

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

REMARKS CAT scanned location and hand dug inspection pit carried out . Tracked dumper required to move rig on soft ground . 3 hrs moving rig into position .

Sample Legend
D - Small Disturbed (tub)
B - Bulk Disturbed
LB - Large Bulk Disturbed
Env - Environmental Sample (Jar + Vial + Tub)
UT - Undisturbed 100mm Diameter Sample
P - Undisturbed Piston Sample
W - Water Sample

IGSL BH LOG 22153 BH.GPJ IGSL.GDT 17/2/20

GEOTECHNICAL BORING RECORD

REPORT NUMBER 22153

CONTRACT	Kilbride , Co.Wicklow	**BOREHOLE NO.**	**BH02**
		SHEET	Sheet 1 of 1
CO-ORDINATES	724,189.90 E 674,561.14 N	**RIG TYPE**	DANDO 2000
		BOREHOLE DIAMETER (mm)	200
GROUND LEVEL (mOD)	11.46	**BOREHOLE DEPTH (m)**	8.10
		DATE COMMENCED	11/12/2019
		DATE COMPLETED	12/12/2019
CLIENT	Lioncor	**SPT HAMMER REF. NO.**	
		BORED BY	P.THOMAS
ENGINEER	Aecom	**ENERGY RATIO (%)**	
		PROCESSED BY	V.L

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples: Ref. Number	Sample Type	Depth (m)	Recovery	Field Test Results	Standpipe Details
0	TOPSOIL		11.16	0.30						
	Firm grey/brown sandy SILT/CLAY with some gravel				AA126814	ENV	0.50			
1			10.26	1.20	AA126815	ENV	1.00		N = 12 (3, 4, 4, 3, 3, 2)	
	Medium dense grey/brown silty/clayey GRAVEL				AA126816	B	1.00			
					AA126817	ENV	1.50			
2					AA126818	B	2.00		N = 18 (2, 4, 5, 3, 4, 6)	
3			8.36	3.10	AA126819	B	3.00		N = 13 (1, 1, 2, 3, 3, 5)	
	Firm brown, sandy, gravelly CLAY		7.86	3.60						
	Medium dense grey fine to coarse GRAVEL		7.66	3.80						
4	Stiff to very stiff brown, sandy, gravelly CLAY with some cobbles				AA126820	B	4.00		N = 27 (3, 3, 5, 7, 7, 8)	
5					AA126821	B	5.00		N = 49 (6, 8, 10, 11, 14, 14)	
6					AA126822	B	6.00		N = 39 (5, 7, 8, 9, 12, 10)	
7					AA126823	B	7.00		N = 39 (4, 9, 6, 9, 9, 15)	
8			3.36	8.10	AA126824	B	8.00		N = 50/75 mm (15, 27, 50)	
	Obstruction End of Borehole at 8.10 m									
9										

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (h)	Comments
5.40	5.60	0.75	
7.90	8.10	2	

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
1.80	1.80	3.10	0.70	20	Moderate
3.60	3.60	4.00	3.00	20	Moderate
7.80	7.80	No	6.50	20	Moderate

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type
12-12-19	9.10	1.00	8.10	50mm SP

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

REMARKS CAT scanned location and hand dug inspection pit carried out . Tracked dumper required to move rig on soft ground . 7 hrs moving rig into position . Both rig and dumper sank in very soft ground.

Sample Legend

D - Small Disturbed (tub)
B - Bulk Disturbed
LB - Large Bulk Disturbed
Env - Environmental Sample (Jar + Vial + Tub)
UT - Undisturbed 100mm Diameter Sample
P - Undisturbed Piston Sample
W - Water Sample

IGSL BH LOG 22153 BH.GPJ IGSL.GDT 17/2/20

GEOTECHNICAL BORING RECORD

REPORT NUMBER 22153

CONTRACT	Kilbride , Co.Wicklow	**BOREHOLE NO.**	**BH03**
		SHEET	Sheet 1 of 1
CO-ORDINATES	724,040.57 E 674,786.91 N	**RIG TYPE**	DANDO 2000
		BOREHOLE DIAMETER (mm)	200
GROUND LEVEL (mOD)	21.96	**BOREHOLE DEPTH (m)**	6.80
		DATE COMMENCED	18/12/2019
		DATE COMPLETED	18/12/2019
CLIENT	Lioncor	**SPT HAMMER REF. NO.**	
		BORED BY	P.THOMAS
ENGINEER	Aecom	**ENERGY RATIO (%)**	
		PROCESSED BY	V.L

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples: Ref. Number	Sample Type	Depth (m)	Recovery	Field Test Results	Standpipe Details
0	TOPSOIL		21.76	0.20						
	Brown sandy SILT/CLAY (Subsoil)		21.56	0.40						
	Soft brown very sandy SILT/CLAY with occasional gravel				AA126840	ENV	0.50			
1					AA126841	ENV	1.00		N = 6 (3, 3, 2, 2, 1, 1)	
					AA126842	B	1.00			
			20.36	1.60	AA126843	ENV	1.50			
	Stiff to very stiff brown, sandy, very gravelly CLAY with occasional cobbles									
2					AA126844	B	2.00		N = 24 (2, 3, 4, 6, 7, 7)	
3					AA126845	B	3.00		N = 32 (3, 5, 7, 8, 8, 9)	
4					AA126846	B	4.00		N = 34 (4, 5, 7, 7, 10, 10)	
5					AA126847	B	5.00		N = 17 (3, 3, 4, 3, 4, 6)	
6					AA126848	B	6.00		N = 37 (2, 4, 6, 7, 10, 14)	
					AA126849	B	6.50		N = 50/150 mm (16, 9, 29, 21)	
			15.16	6.80						
7	Obstruction End of Borehole at 6.80 m									
8										
9										

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (h)	Comments
3.40	6.60	0.75	
6.50	6.80	2	

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
					No water strike

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type
18-12-19	6.70	1.00	6.80	50mm SP

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

REMARKS CAT scanned location and hand dug inspection pit carried out . Tracked dumper required to move rig on soft ground . 4.5 hrs moving rig into position .

Sample Legend

D - Small Disturbed (tub)
B - Bulk Disturbed
LB - Large Bulk Disturbed
Env - Environmental Sample (Jar + Vial + Tub)
UT - Undisturbed 100mm Diameter Sample
P - Undisturbed Piston Sample
W - Water Sample

IGSL BH LOG 22153 BH.GPJ IGSL.GDT 17/2/20

GEOTECHNICAL BORING RECORD

REPORT NUMBER 22153

CONTRACT	Kilbride , Co.Wicklow	**BOREHOLE NO.**	**BH04**
		SHEET	Sheet 1 of 1
CO-ORDINATES	724,131.75 E 674,783.45 N	**RIG TYPE**	DANDO 2000
		BOREHOLE DIAMETER (mm)	200
GROUND LEVEL (mOD)	21.12	**BOREHOLE DEPTH (m)**	6.30
		DATE COMMENCED	17/12/2019
		DATE COMPLETED	17/12/2019
CLIENT	Lioncor	**SPT HAMMER REF. NO.**	
ENGINEER	Aecom	**ENERGY RATIO (%)**	
		BORED BY	P.THOMAS
		PROCESSED BY	V.L

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples: Ref. Number	Sample Type	Depth (m)	Recovery	Field Test Results	Standpipe Details
0	TOPSOIL		20.82	0.30						
	Stiff to very stiff grey/brown, sandy, gravelly SILT/CLAY with occasional cobbles				AA126831	ENV	0.50			
1					AA126832	ENV	1.00		N = 19 (2, 3, 3, 3, 5, 8)	
					AA126833	B	1.00			
					AA126834	ENV	1.50			
2					AA126835	B	2.00		N = 20 (3, 4, 3, 4, 6, 7)	
3					AA126836	B	3.00		N = 34 (4, 6, 7, 7, 9, 11)	
4			16.92	4.20	AA126837	B	4.00		N = 18 (5, 4, 4, 4, 5, 5)	
	Stiff red/grey/brown sandy gravelly CLAY									
5			16.02	5.10	AA126838	B	5.00		N = 31 (4, 5, 7, 10, 7, 7)	
	Stiff grey/brown very sandy gravelly CLAY with occasional cobbles				AA126839	B	5.50			
			15.12	6.00						
6	Dense grey angular clayey GRAVEL with angular cobbles and some boulders		14.82	6.30					N = 50/75 mm (12, 28, 50)	
	Obstruction End of Borehole at 6.30 m									
7										
8										
9										

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (h)	Comments
2.70	2.90	0.75	
6.00	6.30	2	

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
					No water strike

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

REMARKS CAT scanned location and hand dug inspection pit carried out . Tracked dumper required to move rig on soft ground . 5 hrs moving rig into position .

Sample Legend

D - Small Disturbed (tub)
B - Bulk Disturbed
LB - Large Bulk Disturbed
Env - Environmental Sample (Jar + Vial + Tub)
UT - Undisturbed 100mm Diameter Sample
P - Undisturbed Piston Sample
W - Water Sample

IGSL BH LOG 22153 BH.GPJ IGSL.GDT 17/2/20

GEOTECHNICAL BORING RECORD

REPORT NUMBER 22153

CONTRACT	Kilbride , Co.Wicklow	**BOREHOLE NO.**	**BH05**
		SHEET	Sheet 1 of 1
CO-ORDINATES	724,141.74 E 675,027.49 N	**RIG TYPE**	DANDO 2000
		BOREHOLE DIAMETER (mm)	200
GROUND LEVEL (mOD)	30.30	**BOREHOLE DEPTH (m)**	5.90
		DATE COMMENCED	05/12/2019
		DATE COMPLETED	06/12/2019
CLIENT	Lioncor	**SPT HAMMER REF. NO.**	
ENGINEER	Aecom	**ENERGY RATIO (%)**	
		BORED BY	P.THOMAS
		PROCESSED BY	V.L

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples: Ref. Number	Sample Type	Depth (m)	Recovery	Field Test Results	Standpipe Details
0	TOPSOIL		30.10	0.20						
	Loose brown slightly silty fine to coarse SAND				AA121834	ENV	0.50			
1					AA121835	ENV	1.00		N = 6 (1, 1, 1, 2, 1, 2)	
					AA121836	B	1.00			
					AA121837	ENV	1.50			
2					AA121838	B	2.00		N = 5 (1, 1, 1, 1, 2)	
			27.80	2.50						
	Firm grey/brown very sandy SILT/CLAY				AA121839	B	3.00		N = 7 (1, 1, 2, 1, 2, 2)	
3										
4					AA121840	B	4.00		N = 12 (1, 1, 2, 2, 3, 5)	
			25.80	4.50						
	Dense grey fine to coarse very silty GRAVEL with occasional cobbles				AA121841	B	5.00		N = 45 (4, 8, 9, 9, 12, 15)	
5									N = 50/150 mm (18, 17, 19, 31)	
			24.40	5.90						
6	Obstruction End of Borehole at 5.90 m				AA121842	B	5.90			
7										
8										
9										

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (h)	Comments
4.75	4.90	0.5	
5.70	5.90	2	

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
					No water strike

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type
06-12-19	5.70	1.00	5.70	50mm SP

REMARKS CAT scanned location and hand dug inspection pit carried out . Tracked dumper required to move rig on soft ground . 2 hrs moving rig into position .

Sample Legend
D - Small Disturbed (tub)
B - Bulk Disturbed
LB - Large Bulk Disturbed
Env - Environmental Sample (Jar + Vial + Tub)
UT - Undisturbed 100mm Diameter Sample
P - Undisturbed Piston Sample
W - Water Sample

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GEOTECHNICAL BORING RECORD

REPORT NUMBER 22153

CONTRACT	Kilbride , Co.Wicklow	**BOREHOLE NO.**	**BH06**
		SHEET	Sheet 1 of 1
CO-ORDINATES	724,362.96 E 674,648.36 N	**RIG TYPE**	DANDO 2000
		BOREHOLE DIAMETER (mm)	200
GROUND LEVEL (mOD)	11.85	**BOREHOLE DEPTH (m)**	8.50
		DATE COMMENCED	09/12/2019
		DATE COMPLETED	11/12/2019
CLIENT	Lioncor	**SPT HAMMER REF. NO.**	
ENGINEER	Aecom	**ENERGY RATIO (%)**	
		BORED BY	P.THOMAS
		PROCESSED BY	V.L

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples: Ref. Number	Sample Type	Depth (m)	Recovery	Field Test Results	Standpipe Details
0	TOPSOIL		11.55	0.30						
	Firm to stiff SILT/CLAY with some gravel				AA126803	ENV	0.50			
1			10.75	1.10	AA126804	ENV	1.00		N = 15 (2, 3, 3, 4, 4, 4)	
	Stiff brown gravelly CLAY with occasional cobbles				AA126805	B	1.00			
					AA126806	ENV	1.50			
2					AA126807	B	2.00		N = 23 (3, 4, 4, 5, 7, 7)	
3					AA126808	B	3.00		N = 28 (3, 5, 6, 5, 8, 9)	
4			7.75	4.10	AA126809	B	4.00		N = 34 (2, 4, 6, 7, 10, 11)	
	Brown very gravelly CLAY with cobbles (Possibly claybound gravel)									
5					AA126810	B	5.00		N = 29 (4, 4, 6, 6, 8, 9)	
6			5.55	6.30	AA126811	B	6.00		N = 31 (6, 6, 8, 7, 7, 9)	
	Dark grey fine to coardr sandy GRAVEL with cobbles									
7					AA126812	B	7.00		N = 34 (3, 6, 8, 8, 8, 10)	
8					AA126813	B	8.00		N = 39 (5, 7, 7, 8, 10, 14)	
			3.35	8.50						
	Obstruction End of Borehole at 8.50 m									
9										

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (h)	Comments
4.50	4.70	0.5	
7.60	7.80	0.75	
8.30	8.50	1.5	

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
6.30	6.30	No	4.50	20	Rapid

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

REMARKS CAT scanned location and hand dug inspection pit carried out . Tracked dumper required to move rig on soft ground . 3 hrs moving rig into position .

Sample Legend
D - Small Disturbed (tub)
B - Bulk Disturbed
LB - Large Bulk Disturbed
Env - Environmental Sample (Jar + Vial + Tub)
UT - Undisturbed 100mm Diameter Sample
P - Undisturbed Piston Sample
W - Water Sample

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Appendix II Trial Pit Records

TRIAL PIT RECORD

REPORT NUMBER 22153

CONTRACT	Kilbride	**TRIAL PIT NO.**	**TP01**
		SHEET	Sheet 1 of 1
LOGGED BY	V. Lowe	**CO-ORDINATES**	724,037.43 E 674,491.24 N
		DATE STARTED	05/12/2019
		DATE COMPLETED	05/12/2019
CLIENT	Lioncor	**GROUND LEVEL (m)**	8.00
ENGINEER	Aecom	**EXCAVATION METHOD**	8t Excavator

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 Dark brown TOPSOIL		0.20	7.80						
Soft to firm brown/brownish grey sandy SILT with rare subangular to subrounded gravel		0.50	7.50					88	
Firm to locally soft brown mottled grey/orange sandy slightly gravelly CLAY, gravel is subangular to rounded					AA128551	B	0.90-1.00	90	
1.0 Firm brown/grey sandy gravelly CLAY with occasional cobbles up to 120mm, cobbles are subangular to subrounded		1.10	6.90	(Seepage)				92	
2.0					AA128552	B	1.90-2.00		
Firm to stiff light brown/brown sandy gravelly CLAY with rare cobbles and boulders up to 250mm		2.20	5.80						
3.0					AA128553	B	2.90-3.00		
End of Trial Pit at 3.20m		3.20	4.80						
4.0									

Groundwater Conditions
Seepage at 1.10m

Stability
Stable

General Remarks
Engineer CAT scanned area for services

TRIAL PIT RECORD

REPORT NUMBER 22153

CONTRACT	Kilbride	**TRIAL PIT NO.**	**TP02**
		SHEET	Sheet 1 of 1
LOGGED BY	V. Lowe	**CO-ORDINATES**	724,084.99 E 674,607.52 N
		DATE STARTED	05/12/2019
		DATE COMPLETED	05/12/2019
CLIENT	Lioncor	**GROUND LEVEL (m)**	13.64
ENGINEER	Aecom	**EXCAVATION METHOD**	8t Excavator

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 Dark brown TOPSOIL (reworked)									
Soft to firm brown mottled grey/orange sandy gravelly CLAY with occasional cobbles up to 170mm, gravel is subangular to rounded		0.30	13.34					50	
1.0					AA128538	B	0.90-1.00	44	
Firm to locally soft brown mottled grey/orange slightly sandy CLAY		1.20	12.44					62	
				1 (Seepage)	AA128539	B	1.50-1.60		
Firm to stiff light brown/brown sandy gravelly CLAY with rare cobbles and boulders up to 210mm		1.70	11.94						
2.0									
					AA128540	B	2.50-2.60		
3.0									
End of Trial Pit at 3.30m		3.30	10.34		AA127203	B	3.20-3.30		
4.0									

Groundwater Conditions
Seepage at 1.70m

Stability
Slightly unstable down to 1.20m

General Remarks
Engineer CAT scanned area for services

TRIAL PIT RECORD

REPORT NUMBER 22153

CONTRACT	Kilbride	**TRIAL PIT NO.**	**TP03**
		SHEET	Sheet 1 of 1
LOGGED BY	V. Lowe	**CO-ORDINATES**	724,149.91 E 674,685.57 N
		DATE STARTED	04/12/2019
		DATE COMPLETED	04/12/2019
CLIENT	Lioncor	**GROUND LEVEL (m)**	16.88
ENGINEER	Aecom	**EXCAVATION METHOD**	8t Excavator

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
Dark brown TOPSOIL		0.20	16.68						
Firm brown sandy CLAY with rare subangular to subrounded gravel		0.40	16.48						
Firm brown mottled grey/orange sandy slightly gravelly CLAY, gravel is subangular to subrounded					AA128541	B	0.60-0.70	72	
					AA128525	B	0.90-1.00	118	
								108	
Firm brown mottled grey/orange sandy CLAY with rare subangular to subrounded gravel		1.50	15.38						
					AA128526	B	1.90-2.00		
Medium dense brown silty SAND with occasional gravel, gravel is subangular to subrounded		2.20	14.68	1 (Seepage)					
					AA128527	B	2.90-3.00		
End of Trial Pit at 3.50m		3.50	13.38						

Groundwater Conditions
Seepage at 2.20m

Stability
Stable

General Remarks
Engineer CAT scanned area for services

TRIAL PIT RECORD

REPORT NUMBER 22153

CONTRACT	Kilbride	**TRIAL PIT NO.**	**TP04**
		SHEET	Sheet 1 of 1
LOGGED BY	K. Kinsella	**CO-ORDINATES**	724,062.45 E 674,810.62 N
		DATE STARTED	04/12/2019
		DATE COMPLETED	04/12/2019
CLIENT	Lioncor	**GROUND LEVEL (m)**	23.16
ENGINEER	Aecom	**EXCAVATION METHOD**	8t Excavator

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
Dark brown TOPSOIL		0.20	22.96						
Firm brown sandy CLAY with rare subangular to subrounded gravel		0.40	22.76						
Firm brown mottled grey/orange sandy CLAY with rare subangular to subrounded gravel					AA128542	B	0.60-0.70	80	
					AA128522	B	0.90-1.00	86	
Firm brown/grey sandy CLAY		1.00	22.16					108	
Firm brown mottled grey/orange sandy CLAY with rare subangular to subrounded gravel		1.30	21.86	1 (Seepage)					
					AA128523	B	1.90-2.00		
Firm brown/grey sandy slightly gravelly CLAY, gravel is subangular to subrounded		2.60	20.56						
					AA128524	B	2.90-3.00		
End of Trial Pit at 3.50m		3.50	19.66						

Groundwater Conditions
Seepage at 1.60m

Stability
Stable

General Remarks
Engineer CAT scanned area for services

IGSL TP LOG 22153 TP.GPJ IGSL.GDT 17/2/20

TRIAL PIT RECORD

REPORT NUMBER 22153

CONTRACT	Kilbride	**TRIAL PIT NO.**	**TP05**
		SHEET	Sheet 1 of 1
LOGGED BY	K. Kinsella	**CO-ORDINATES**	724,121.30 E 674,924.19 N
		DATE STARTED	04/12/2019
		DATE COMPLETED	04/12/2019
CLIENT	Lioncor	**GROUND LEVEL (m)**	27.07
ENGINEER	Aecom	**EXCAVATION METHOD**	8t Excavator

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
Dark brown TOPSOIL		0.20	26.87						
Firm brown mottled light greyish brown/light grey sandy CLAY with rare gravel and boulder up to 220mm, gravel is subangular to subrounded					AA128519	B	0.90-1.00		
				1 (Seepage)	AA128520	B	1.90-2.00		
Firm brownish grey/greyish brown sandy CLAY with rare gravel, gravel is subangular to subrounded		2.50	24.57						
					AA128521	B	2.90-3.00		
End of Trial Pit at 3.50m		3.50	23.57		AA127201	B	3.40-3.50		

Groundwater Conditions
Seepage at 2.20m

Stability
Stable

General Remarks
Engineer CAT scanned area for services

IGSL TP LOG 22153 TP.GPJ IGSL.GDT 17/2/20

TRIAL PIT RECORD

REPORT NUMBER 22153

CONTRACT	Kilbride	TRIAL PIT NO.	TP06
		SHEET	Sheet 1 of 1
LOGGED BY	V. Lowe	CO-ORDINATES	724,325.49 E 674,562.51 N
		DATE STARTED	04/12/2019
		DATE COMPLETED	04/12/2019
CLIENT	Lioncor	GROUND LEVEL (m)	9.37
ENGINEER	Aecom	EXCAVATION METHOD	8t Excavator

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
Dark brown TOPSOIL		0.20	9.17						
Firm brown sandy CLAY with occasional subangular to subrounded gravel		0.45	8.92					42	
Loose to medium dense brown silty very gravelly SAND, gravel is subangular to rounded					AA127202	B	0.50-0.60		
					AA128528	B	0.90-1.00		
Firm to stiff brown/grey sandy CLAY with rare gravel and boulders, boulders are up to 300mm and subangular to subrounded		1.20	8.17	1 (Seepage)				62	
					AA128529	B	1.90-2.00		
Stiff grey sandy CLAY with rare gravel, gravel is subangular to subrounded		2.70	6.67						
					AA127203	B	3.00-3.10		
End of Trial Pit at 3.30m		3.30	6.07						

Groundwater Conditions
Seepage at 1.40m

Stability
Stable

General Remarks
Engineer CAT scanned area for services

TRIAL PIT RECORD

REPORT NUMBER 22153

CONTRACT	Kilbride	**TRIAL PIT NO.**	**TP07**
		SHEET	Sheet 1 of 1
LOGGED BY	V. Lowe	**CO-ORDINATES**	724,238.20 E 674,454.64 N
		DATE STARTED	04/12/2019
		DATE COMPLETED	04/12/2019
CLIENT	Lioncor	**GROUND LEVEL (m)**	6.59
ENGINEER	Aecom	**EXCAVATION METHOD**	8t Excavator

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
Dark brown TOPSOIL		0.20	6.39						
Loose to medium dense brown/greyish brown slightly silty very gravelly SAND with occasional cobbles and rare boulders up to 280mm, gravel and cobbles are subangular to rounded		0.60	5.99		AA128534	B	0.50-0.60	80	
Firm to locally soft brown mottled grey/orange sandy gravelly CLAY, gravel is subangular to rounded					AA128535	B	0.90-1.00	78 62	
Medium dense grey silty very sandy GRAVEL with occasional cobbles and boulders up to 310mm, gravel and cobbles are subangular to rounded		1.50	5.09	1 (Seepage)	AA128536	B	1.90-2.00		
Firm to stiff brown/grey slightly sandy gravelly CLAY, gravel is subangular to subrounded Water level rose from 3.10m to 3.00m in 15 minutes		2.60	3.99	2 (Slow)	AA128537	B	2.90-3.00		
End of Trial Pit at 3.20m		3.20	3.39						

Groundwater Conditions
Seepage at 1.50m & Slow flow at 2.60m

Stability
Sidewall collapse below 0.20m

General Remarks
Engineer CAT scanned area for services

IGSL TP LOG 22153 TP.GPJ IGSL.GDT 17/2/20

TRIAL PIT RECORD

REPORT NUMBER 22153

CONTRACT	Kilbride	**TRIAL PIT NO.**	**TP08**
		SHEET	Sheet 1 of 1
LOGGED BY	V. Lowe	**CO-ORDINATES**	724,310.79 E 674,417.93 N
		DATE STARTED	04/12/2019
		DATE COMPLETED	04/12/2019
CLIENT	Lioncor	**GROUND LEVEL (m)**	5.47
ENGINEER	Aecom	**EXCAVATION METHOD**	8t Excavator

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 Dark brown TOPSOIL		0.20	5.27						
Firm grey sandy SILT with rare subangular to subrounded gravel		0.50	4.97		AA128530	B	0.40-0.50	42	
Loose to medium dense reddish brown slightly silty gravelly SAND, gravel is subangular to rounded				1 (Seepage)					
1.0 Firm brown mottled grey/orange very sandy gravelly CLAY with rare gravel and cobbles, cobbless are up to 150mm and subangular to subrounded		1.00	4.47		AA128531	B	0.90-1.00	60	
Water level rose from 3.10m to 2.90m in 15 minutes				2 (Slow)					
2.0					AA128532	B	1.90-2.00		
3.0					AA128533	B	2.90-3.00		
End of Trial Pit at 3.10m		3.10	2.37						
4.0									

Groundwater Conditions
Seepage at 0.80m & Slow flow at 1.40m

Stability
Slightly unstable below 0.80m

General Remarks
Engineer CAT scanned area for services

IGSL TP LOG 22153 TP.GPJ IGSL.GDT 17/2/20

TP01 – 1 of 2

TP01 – 2 of 2

TP02 – 1 of 2

TP02 – 2 of 2

TP03 – 1 of 2

TP03 – 2 of 2

TP04 – 1 of 2

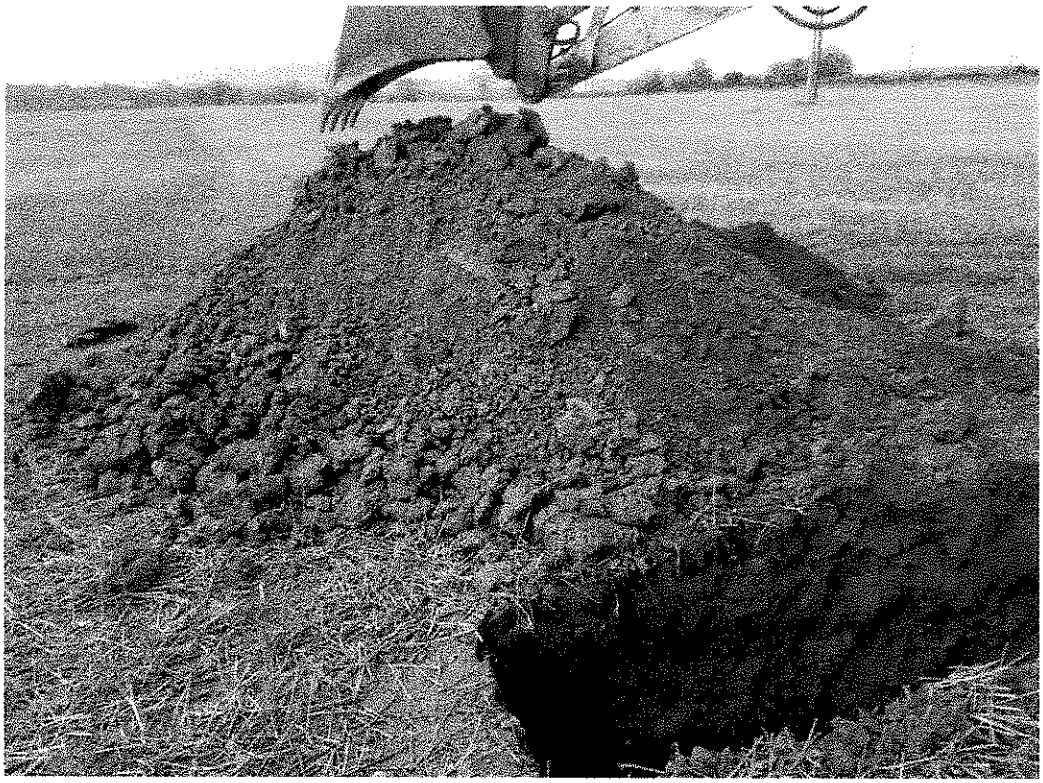
TP04 – 2 of 2

TP05 – 1 of 2

TP05 – 2 of 2

TP06 – 1 of 2

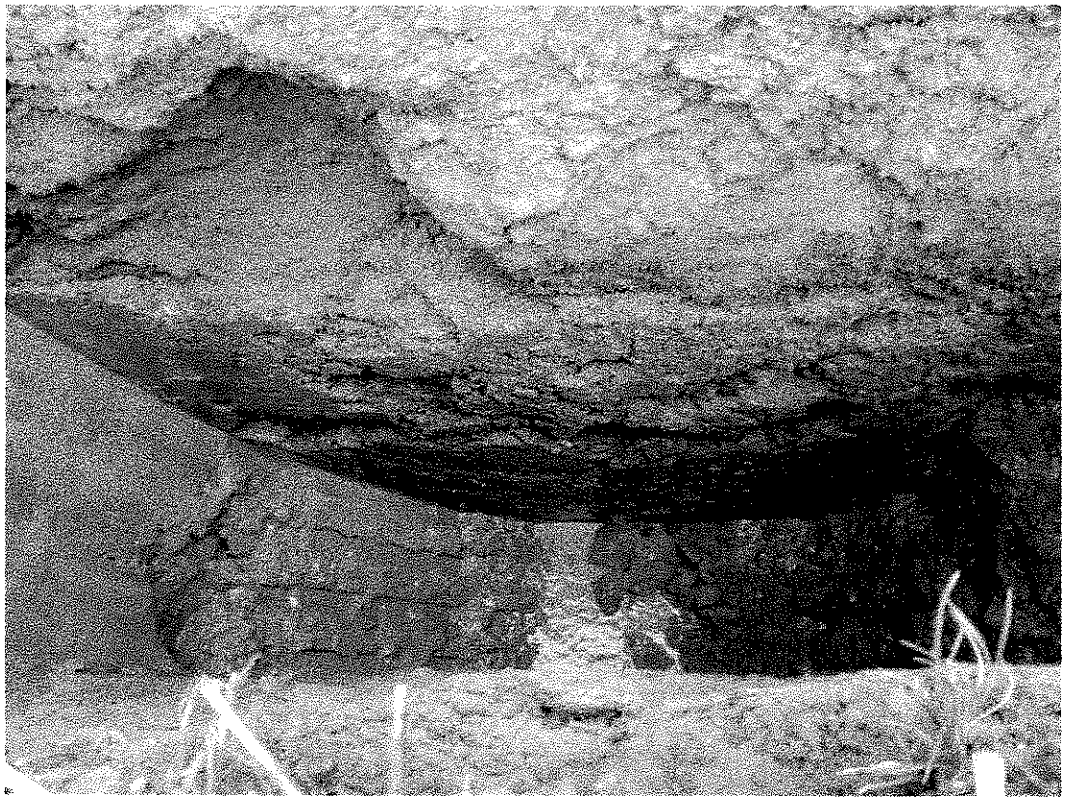
TP06 – 2 of 2



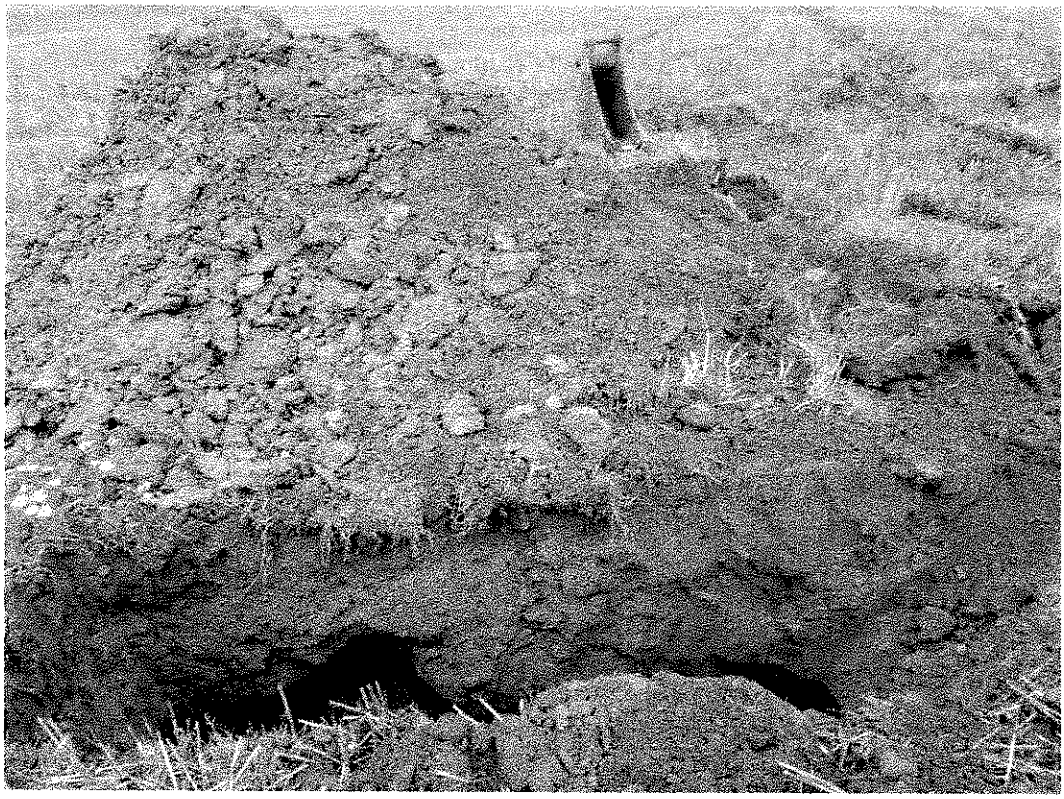
TP07 – 1 of 2

TP07 – 2 of 2

TP08 – 1 of 2



TP08 – 2 of 2



Appendix III TRL Probes (CBR)

Dynamic Cone Penetrometer

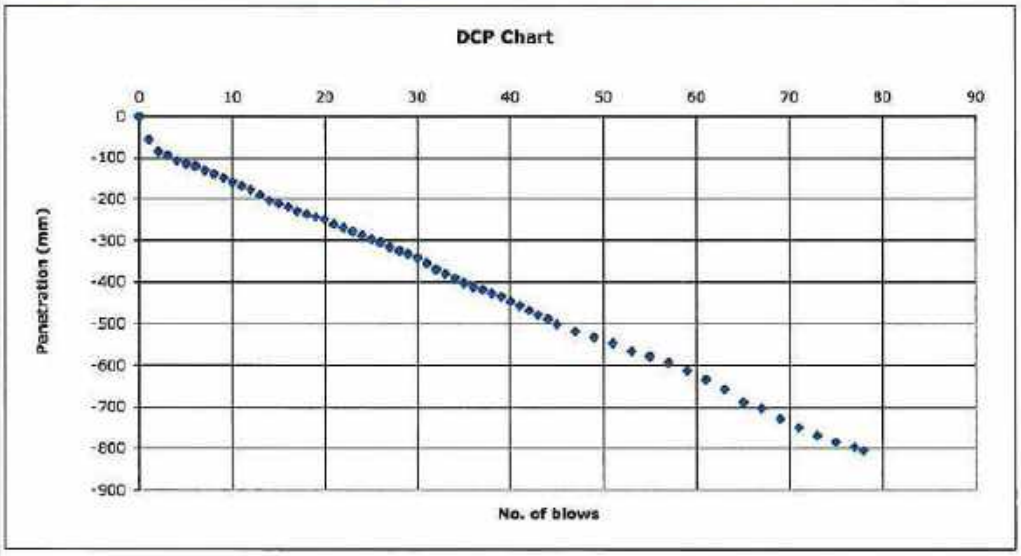
IGSL Field Records and Temps (F20)

Contract	Kilbride, Arklow	Date:	06/12/2019	Test No.	DCP01
Client	Aecom				
Contract No.	22153	DCP Zero Reading	104	mm	
Block No :		Start of Test at:	0.6	m bgl	
Layer No:					

Co ordinates : 724252.461 674364.58 3.136

Soil Description: Medium-dense, grey, very sandy, silty GRAVEL with a medium cobble content.

No of Blows	Total Blows	Reading mm	No of Blows	Total Blows	Reading mm	No of Blows	Total Blows	Reading mm
1	0	104	1	21	364	1	42	572
1	1	160	1	22	372	1	43	582
1	2	188	1	23	380	1	44	592
1	3	198	1	24	390	1	45	604
1	4	210	1	25	398	2	47	622
1	5	218	1	26	408	2	49	636
1	6	224	1	27	418	2	51	650
1	7	234	1	28	428	2	53	670
1	8	242	1	29	436	2	55	682
1	9	252	1	30	444	2	57	696
1	10	262	1	31	458	2	59	716
1	11	272	1	32	472	2	61	738
1	12	280	1	33	484	2	63	762
1	13	294	1	34	494	2	65	792
1	14	306	1	35	506	2	67	806
1	15	314	1	36	514	2	69	832
1	16	322	1	37	522	2	71	854
1	17	332	1	38	530	2	73	874
1	18	340	1	39	538	2	75	888
1	19	346	1	40	550	2	77	900
1	20	352	1	41	560	1	78	908



Start Depth 0.6 m bgl

	** From	to	Penetration	mm / blow
* Penetration range (mm)	56	804	748	10
Blows	1	78	77	

TRRL RN8 Log10 (CBR) = 2.48-1.057*Log10 (mm/blow)

Log10(CBR) = 1.436

CBR = 27.3

Dynamic Cone Penetrometer

IGSL Field Records and Temps (F20)

Contract	Kilbride, Arklow
Client	Aecom
Contract No.	22153

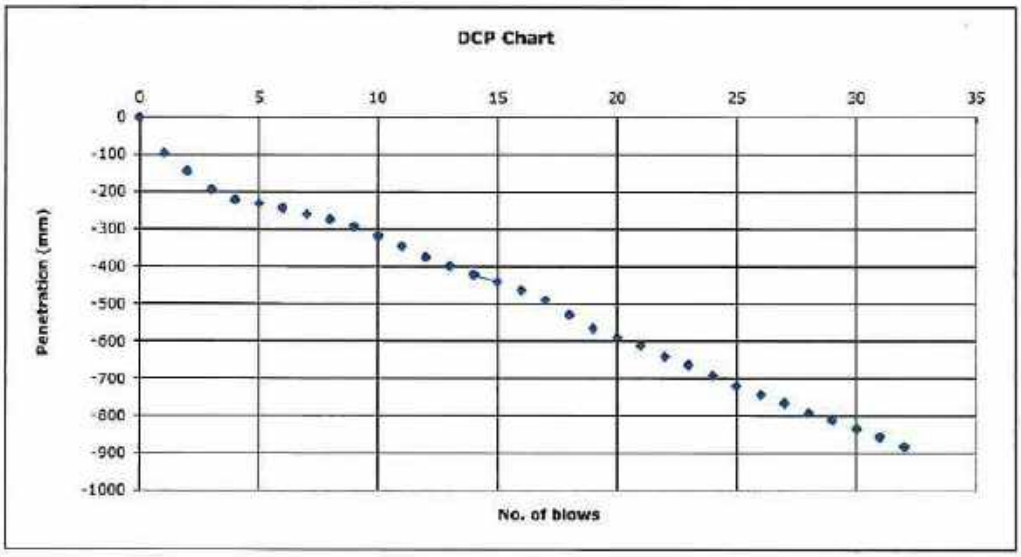
Date: 06/12/2019 Test No. DCP02

DCP Zero Reading 90 mm

Start of Test at: 0.5 m bgl

Block No :
Layer No:
Co ordinates : 724513.089 674642.13 12.084
Soil Description: Soft to firm, brown sandy CLAY.

No of Blows	Total Blows	Reading mm	No of Blows	Total Blows	Reading mm	No of Blows	Total Blows	Reading mm
1	0	90	1	21	700			
1	1	186	1	22	730			
1	2	234	1	23	752			
1	3	282	1	24	780			
1	4	310	1	25	808			
1	5	320	1	26	832			
1	6	332	1	27	854			
1	7	348	1	28	880			
1	8	364	1	29	898			
1	9	382	1	30	922			
1	10	406	1	31	944			
1	11	434	1	32	970			
1	12	464						
1	13	488						
1	14	510						
1	15	530						
1	16	552						
1	17	578						
1	18	618						
1	19	654						
1	20	678						



Start Depth 0.5 m bgl

	** From	to	Penetration	mm / blow
* Penetration range (mm)	90	880	784	25
Blows	1	32	31	

TRRL RN8 Log10 (CBR) = 2.48-1.057*Log10 (mm/blow)

Log10(CBR) = 0.997

CBR = 9.9

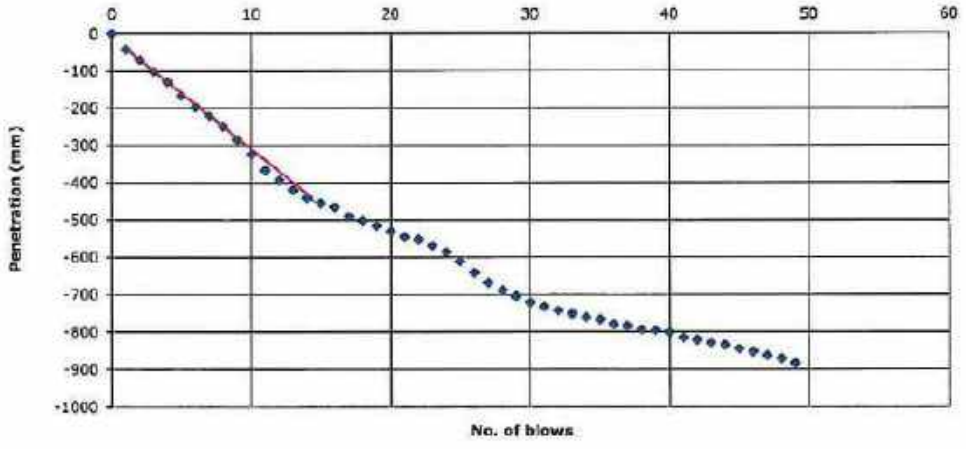
Dynamic Cone Penetrometer

IGSL Field Records and Temps (F20)

Contract	Kilbride, Arklow	**Date:**	06/12/2019
Client	Aecom	**Test No.**	DCP03
Contract No.	22153		
		DCP Zero Reading	60 mm
Block No :		**Start of Test at:**	0.5 m bgl
Layer No:			
Co ordinates :	724277.362 574590.51 10.736		
Soil Description:	Firm, orangey brown sandy CLAY. Rare, fine to coarse, sub-rounded to sub-angular gravel.		

No of Blows	Total Blows	Reading mm	No of Blows	Total Blows	Reading mm	No of Blows	Total Blows	Reading mm
1	0	60	1	21	604	1	42	880
1	1	102	1	22	612	1	43	888
1	2	130	1	23	628	1	44	894
1	3	160	1	24	646	1	45	904
1	4	188	1	25	670	1	46	912
1	5	226	1	26	700	1	47	922
1	6	256	1	27	726	1	48	930
1	7	280	1	28	748	1	49	942
1	8	308	1	29	764			
1	9	344	1	30	780			
1	10	384	1	31	792			
1	11	426	1	32	802			
1	12	452	1	33	810			
1	13	478	1	34	820			
1	14	500	1	35	826			
1	15	514	1	36	838			
1	16	524	1	37	844			
1	17	550	1	38	852			
1	18	562	1	39	854			
1	19	574	1	40	860			
1	20	590	1	41	874			

DCP Chart



Start Depth 0.5 m bgl

	** From	to	Penetration	mm / blow
* Penetration range (mm)	42	454	412	29
Blows	1	15	14	

TRRL RN8 Log10 (CBR) = 2.48-1.057*Log10 (mm/blow)

Log10(CBR) = 0.928

CBR = 8.5

Dynamic Cone Penetrometer

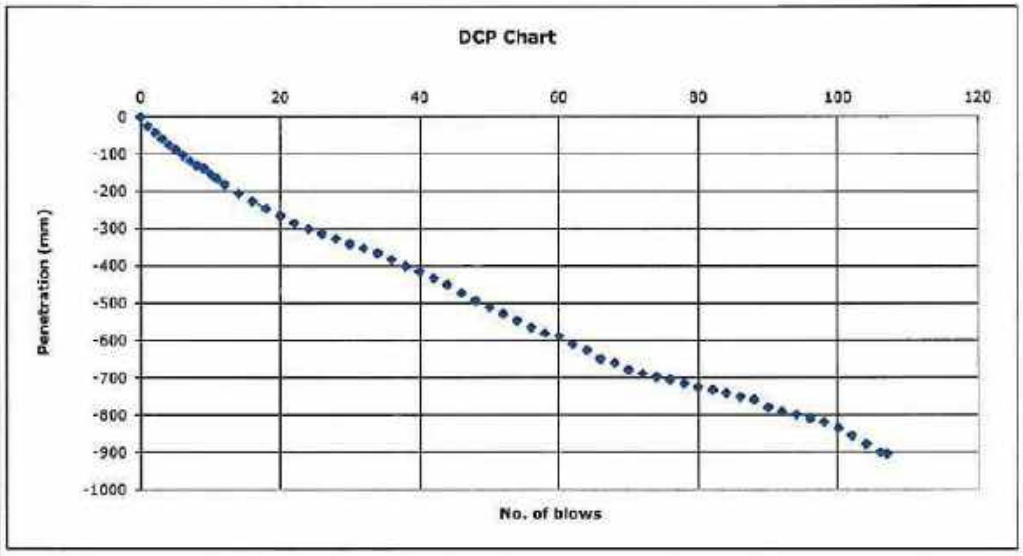
IGSL Field Records and Temps (F20)

Contract	Kilbride, Arklow	Date:	06/12/2019	Test No.	DCP04
Client	Aecom				
Contract No.	22153	DCP Zero Reading	60	mm	
Block No :		Start of Test at:	0.6	m bgl	
Layer No:					

Co ordinates : 723917.986 674745.11 21.085

Soil Description: Firm, orangey brown sandy CLAY. Rare, fine to coarse, sub-rounded to sub-angular gravel.

No of Blows	Total Blows	Reading mm	No of Blows	Total Blows	Reading mm	No of Blows	Total Blows	Reading mm
1	0	60	2	30	400	2	72	748
1	1	84	2	32	412	2	74	756
1	2	102	2	34	424	2	76	764
1	3	118	2	36	442	2	78	774
1	4	134	2	38	460	2	80	784
1	5	148	2	40	474	2	82	792
1	6	162	2	42	492	2	84	800
1	7	178	2	44	510	2	86	810
1	8	188	2	46	532	2	88	818
1	9	198	2	48	552	2	90	838
1	10	212	2	50	570	2	92	850
1	11	226	2	52	588	2	94	858
1	12	240	2	54	606	2	96	868
2	14	264	2	56	624	2	98	878
2	16	286	2	58	640	2	100	894
2	18	306	2	60	648	2	102	914
2	20	324	2	62	668	2	104	936
2	22	344	2	64	684	2	106	958
2	24	360	2	66	706	1	107	962
2	26	372	2	68	720			
2	28	386	2	70	738			



Start Depth 0.6 m bgl

	** From	to	Penetration	mm / blow
* Penetration range (mm)	24	902	878	8
Blows	1	107	106	

TRRL RN8 Log10 (CBR) = 2.48-1.057*Log10 (mm/blow)

Log10(CBR) = 1.509

CBR = 32.3

Dynamic Cone Penetrometer

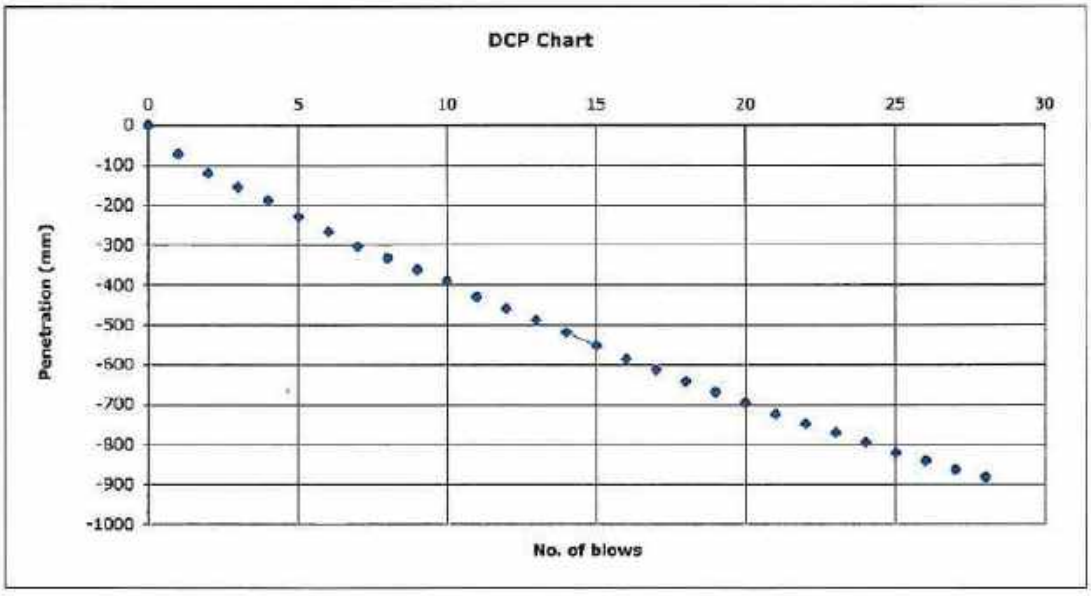
IGSL Field Records and Temps (F20)

Contract	Kilbride, Arklow	Date:	06/12/2019	Test No.	DCP05
Client	Aecom				
Contract No.	22153	DCP Zero Reading	70	mm	
Block No :		Start of Test at:	0.5	m bgl	
Layer No:					

Co ordinates : 724227.185 674915.48 25.272

Soil Description: Firm, orangey brown sandy CLAY. Rare, fine to coarse, rounded to sub-angular gravel.

No of Blows	Total Blows	Reading mm	No of Blows	Total Blows	Reading mm	No of Blows	Total Blows	Reading mm
1	0	70	1	21	794			
1	1	142	1	22	818			
1	2	190	1	23	840			
1	3	224	1	24	864			
1	4	258	1	25	890			
1	5	298	1	26	910			
1	6	336	1	27	932			
1	7	372	1	28	950			
1	8	402						
1	9	432						
1	10	460						
1	11	500						
1	12	530						
1	13	558						
1	14	588						
1	15	622						
1	16	656						
1	17	682						
1	18	712						
1	19	738						
1	20	766						



Start Depth 0.5 m bgl

	** From	to	Penetration	mm / blow
* Penetration range (mm)	72	880	808	30
Blows	1	28	27	

TRRL RN8 Log10 (CBR) = 2.48-1.057*Log10 (mm/blow)

Log10(CBR) = 0.920

CBR = 8.3

Appendix IV BRE Digest 365

TRIAL PIT RECORD

REPORT NUMBER 22153

CONTRACT	Kilbride	**TRIAL PIT NO.**	**SA02**
		SHEET	Sheet 1 of 1
LOGGED BY	V. Lowe	**CO-ORDINATES**	724,084.99 E 674,607.52 N
		DATE STARTED	05/12/2019
		DATE COMPLETED	05/12/2019
CLIENT	Lioncor	**GROUND LEVEL (m)**	13.64
ENGINEER	Aecom	**EXCAVATION METHOD**	8t Excavator

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
Dark brown TOPSOIL (reworked)		0.00							
Soft to firm brown mottled grey/orange sandy gravelly CLAY with occasional cobbles up to 170mm, gravel is subangular to rounded		0.30	13.34						
End of Trial Pit at 0.90m		0.90	12.74						

Groundwater Conditions
Damp

Stability
Slightly unstable down to 0.90m

General Remarks
Engineer CAT scanned area for services

TRIAL PIT RECORD

REPORT NUMBER 22153

CONTRACT	Kilbride	TRIAL PIT NO.	SA03
		SHEET	Sheet 1 of 1
LOGGED BY	V. Lowe	CO-ORDINATES	724,149.91 E 674,685.57 N
		DATE STARTED	05/12/2019
		DATE COMPLETED	05/12/2019
CLIENT	Lioncor	GROUND LEVEL (m)	16.88
ENGINEER	Aecom	EXCAVATION METHOD	8t Excavator

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 Dark brown TOPSOIL		0.20	16.68						
Firm brown sandy CLAY with rare subangular to subrounded gravel		0.40	16.48						
Firm brown mottled grey/orange sandy slightly gravelly CLAY, gravel is subangular to subrounded									
End of Trial Pit at 0.90m		0.90	15.98						
1.0									
2.0									
3.0									
4.0									

Groundwater Conditions
Damp

Stability
Stable

General Remarks
Engineer CAT scanned area for services

IGSL TP LOG 22153 TP.GPJ IGSL.GDT 17/2/20

TRIAL PIT RECORD

REPORT NUMBER 22153

CONTRACT	Kilbride	**TRIAL PIT NO.**	**SA04**
		SHEET	Sheet 1 of 1
LOGGED BY	V. Lowe	**CO-ORDINATES**	724,062.45 E 674,810.62 N
		DATE STARTED	05/12/2019
		DATE COMPLETED	05/12/2019
CLIENT	Lioncor	**GROUND LEVEL (m)**	23.16
ENGINEER	Aecom	**EXCAVATION METHOD**	8t Excavator

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 Dark brown TOPSOIL		0.20	22.96						
Firm brown sandy CLAY with rare subangular to subrounded gravel		0.40	22.76						
Firm brown mottled grey/orange sandy CLAY with rare subangular to subrounded gravel									
1.0 Firm brown/grey sandy CLAY		1.00	22.16						
		1.30	21.86						
Firm brown mottled grey/orange sandy CLAY with rare subangular to subrounded gravel		1.50	21.66						
End of Trial Pit at 1.50m									
2.0									
3.0									
4.0									

Groundwater Conditions
Damp

Stability
Stable

General Remarks
Engineer CAT scanned area for services

TRIAL PIT RECORD

REPORT NUMBER 22153

CONTRACT	Kilbride	**TRIAL PIT NO.**	**SA06**
		SHEET	Sheet 1 of 1
LOGGED BY	V. Lowe	**CO-ORDINATES**	724,325.49 E 674,562.51 N
CLIENT	Lioncor	**GROUND LEVEL (m)**	9.37
ENGINEER	Aecom	**DATE STARTED**	05/12/2019
		DATE COMPLETED	05/12/2019
		EXCAVATION METHOD	8t Excavator

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
Dark brown TOPSOIL		0.0							
		0.20	9.17						
Firm brown sandy CLAY with occasional subangular to subrounded gravel									
		0.45	8.92						
Loose to medium dense brown silty very gravelly SAND, gravel is subangular to rounded		1.0							
		1.30	8.07						
Firm to stiff brown/grey sandy CLAY with rare gravel and boulders, boulders are up to 300mm and subangular to subrounded		1.50	7.87						
End of Trial Pit at 1.50m		2.0							
		3.0							
		4.0							

Groundwater Conditions
Seepage at 1.40m

Stability
Stable

General Remarks
Engineer CAT scanned area for services

IGSL TP LOG 22153 TP.GPJ IGSL.GDT 17/2/20

TRIAL PIT RECORD

REPORT NUMBER 22153

CONTRACT	Kilbride	**TRIAL PIT NO.**	**SA07**
		SHEET	Sheet 1 of 1
LOGGED BY	V. Lowe	**CO-ORDINATES**	724,238.20 E 674,454.64 N
CLIENT	Lioncor	**GROUND LEVEL (m)**	6.59
ENGINEER	Aecom	**DATE STARTED**	05/12/2019
		DATE COMPLETED	05/12/2019
		EXCAVATION METHOD	8t Excavator

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
Dark brown TOPSOIL		0.20	6.39						
Loose to medium dense brown/greyish brown slightly silty very gravelly SAND with occasional cobbles and rare boulders up to 280mm, gravel and cobbles are subangular to rounded		0.60	5.99						
Firm to locally soft brown mottled grey/orange sandy very gravelly CLAY, gravel is subangular to rounded		0.90	5.69						
End of Trial Pit at 0.90m									

Groundwater Conditions
Seepage at 1.50m

Stability
Sidewall collapse below 0.15m

General Remarks
Engineer CAT scanned area for services

IGSL TP LOG 22153 TP.GPJ IGSL.GDT 17/2/20

TRIAL PIT RECORD

REPORT NUMBER 22153

CONTRACT	Kilbride	**TRIAL PIT NO.**	**SA08**
		SHEET	Sheet 1 of 1
LOGGED BY	V. Lowe	**CO-ORDINATES**	724,310.79 E 674,417.93 N
		DATE STARTED	05/12/2019
		DATE COMPLETED	05/12/2019
CLIENT	Lioncor	**GROUND LEVEL (m)**	5.47
ENGINEER	Aecom	**EXCAVATION METHOD**	8t Excavator

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
Dark brown TOPSOIL		0.20	5.27						
Firm grey sandy SILT with rare subangular to subrounded gravel		0.50	4.97						
Loose to medium dense reddish brown slightly silty gravelly SAND, gravel is subangular to rounded		1.10	4.37						
Firm brown mottled grey/orange very clayey gravelly SAND with rare gravel and cobbles, cobbles are up to 150mm and subangular to subrounded		1.40	4.07						
Firm brown mottled grey/orange very sandy gravelly CLAY with rare gravel and cobbles, cobbles are up to 150mm and subangular to subrounded		1.50	3.97						
End of Trial Pit at 1.50m									

0.0
1.0
2.0
3.0
4.0

Groundwater Conditions
Seepage at 0.80m & Slow flow at 1.40m

Stability
Slightly unstable below 1.00m

General Remarks
Engineer CAT scanned area for services

IGSL TP LOG 22153 TP.GPJ IGSL.GDT 17/2/20

Soakaway Design f -value from field tests IGSL

Contract: Kilbride, Arklow, Co. Wicklow Contract No. 22153
Test No. SA2
Engineer Aecom
Date: 05.12.2019

Summary of ground conditions

from	to	Description	Ground water
0.00	0.30	Dark brown TOPSOIL (reworked)	
0.30	0.90	Soft to firm brown mottled grey/orange sandy gravelly CLAY with occasional cobbles up to 170mm, gravel is subangular to rounded	Damp

Field Data

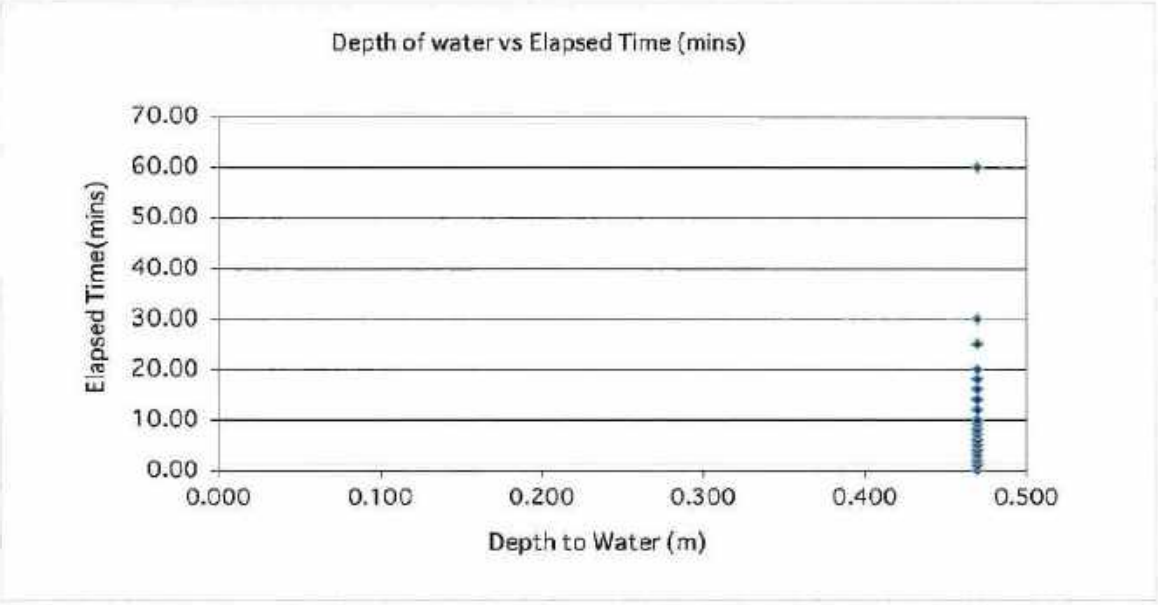
Depth to Water (m)	Elapsed Time (min)
0.470	0.00
0.470	1.00
0.470	2.00
0.470	3.00
0.470	4.00
0.470	5.00
0.470	6.00
0.470	7.00
0.470	8.00
0.470	9.00
0.470	10.00
0.470	12.00
0.470	14.00
0.470	16.00
0.470	18.00
0.470	20.00
0.470	25.00
0.470	30.00
0.470	60.00

Field Test

Depth of Pit (D)	0.90	m
Width of Pit (B)	0.40	m
Length of Pit (L)	1.40	m
Initial depth to Water =	0.47	m
Final depth to water =	0.47	m
Elapsed time (mins)=	60.00	
Top of permeable soil		m
Base of permeable soil		m
Base area=	0.56	m2
*Av. side area of permeable stratum over test period	1.548	m2
Total Exposed area =	2.108	m2

Infiltration rate (f) = Volume of water used/unit exposed area / unit time

f= 0 m/min or 0 m/sec



Soakaway Design f -value from field tests IGSL

Contract: Kilbride, Arklow, Co. Wicklow Contract No. 22153
Test No. SA3
Engineer Aecom
Date: 05.12.2019

Summary of ground conditions

from	to	Description	Ground water
0.00	0.20	Dark brown TOPSOIL	
0.20	0.40	Firm brown sandy CLAY with rare subangular to subrounded gravel	Damp
0.40	0.90	Firm brown mottled grey/orange sandy slightly gravelly CLAY, gravel is	
		subangular to subrounded	

Field Data

Depth to Water (m)	Elapsed Time (min)
0.550	0.00
0.550	1.00
0.550	2.00
0.550	3.00
0.550	4.00
0.550	5.00
0.550	6.00
0.550	7.00
0.550	8.00
0.550	9.00
0.550	10.00
0.550	12.00
0.550	14.00
0.550	16.00
0.550	18.00
0.550	20.00
0.550	25.00
0.550	30.00
0.550	60.00

Field Test

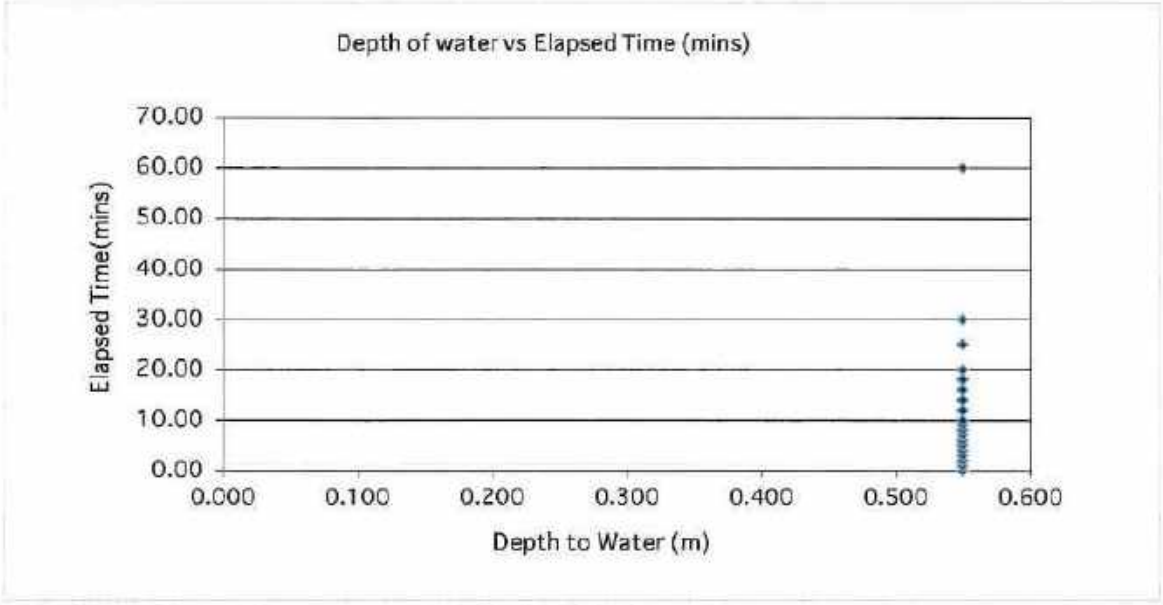
Depth of Pit (D)	0.90	m
Width of Pit (B)	0.40	m
Length of Pit (L)	1.40	m
Initial depth to Water =	0.55	m
Final depth to water =	0.55	m
Elapsed time (mins)=	60.00	
Top of permeable soil		m
Base of permeable soil		m

**Water level rose 30mm in 30mins

Base area=	0.56	m2
*Av. side area of permeable stratum over test period	1.26	m2
Total Exposed area =	1.82	m2

Infiltration rate (f) = Volume of water used/unit exposed area / unit time

f= 0 m/min or 0 m/sec



Soakaway Design f -value from field tests IGSL

Contract: Kilbride, Arklow, Co. Wicklow Contract No. 22153
Test No. SA4
Engineer Aecom
Date: 05.12.2019

Summary of ground conditions

from	to	Description	Ground water
0.00	0.20	Dark brown TOPSOIL	Damp
0.20	0.40	Firm brown sandy CLAY with rare subangular to subrounded gravel	
0.40	1.50	Firm brown mottled grey/orange sandy CLAY with rare gravel	

Field Data

Depth to Water (m)	Elapsed Time (min)
0.540	0.00
0.540	1.00
0.540	2.00
0.540	3.00
0.540	4.00
0.540	5.00
0.540	6.00
0.540	7.00
0.540	8.00
0.540	9.00
0.540	10.00
0.540	12.00
0.540	14.00
0.540	16.00
0.540	18.00
0.540	20.00
0.540	25.00
0.540	30.00
0.540	60.00

Field Test

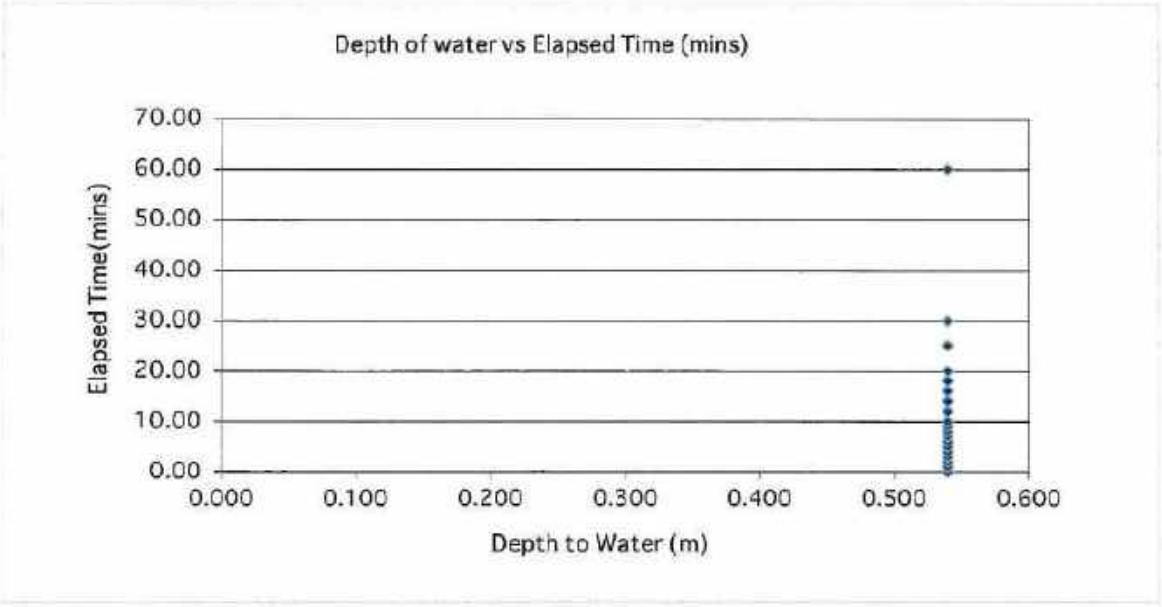
Depth of Pit (D)	1.50	m
Width of Pit (B)	0.40	m
Length of Pit (L)	1.50	m
Initial depth to Water =	0.54	m
Final depth to water =	0.54	m
Elapsed time (mins)=	60.00	
Top of permeable soil		m
Base of permeable soil		m

**Water level rose 20mm in 30mins

Base area=	0.6	m2
*Av. side area of permeable stratum over test period	3.648	m2
Total Exposed area =	4.248	m2

Infiltration rate (f) = Volume of water used/unit exposed area / unit time

f= 0 m/min or 0 m/sec



Soakaway Design f -value from field tests IGSL

Contract: Kilbride, Arklow, Co. Wicklow Contract No. 22153
Test No. SA6
Engineer Aecom
Date: 05.12.2019

Summary of ground conditions

From	to	Description	Ground water
0.00	0.20	Dark brown TOPSOIL	Seepage at 1.40m
0.20	0.45	Firm brown sandy CLAY with occasional subangular to subrounded gravel	
0.45	1.30	Loose to medium dense brown silty very gravelly SAND	
1.30	1.50	Firm to stiff brown/grey sandy CLAY with rare gravel and boulders up to 30cm	

Field Data

Depth to Water (m)	Elapsed Time (min)
1.240	0.00
1.240	1.00
1.240	2.00
1.240	3.00
1.240	4.00
1.240	5.00
1.240	6.00
1.240	7.00
1.240	8.00
1.240	9.00
1.240	10.00
1.240	12.00
1.240	14.00
1.240	16.00
1.240	18.00
1.240	20.00
1.240	25.00
1.240	30.00
1.240	60.00

Field Test

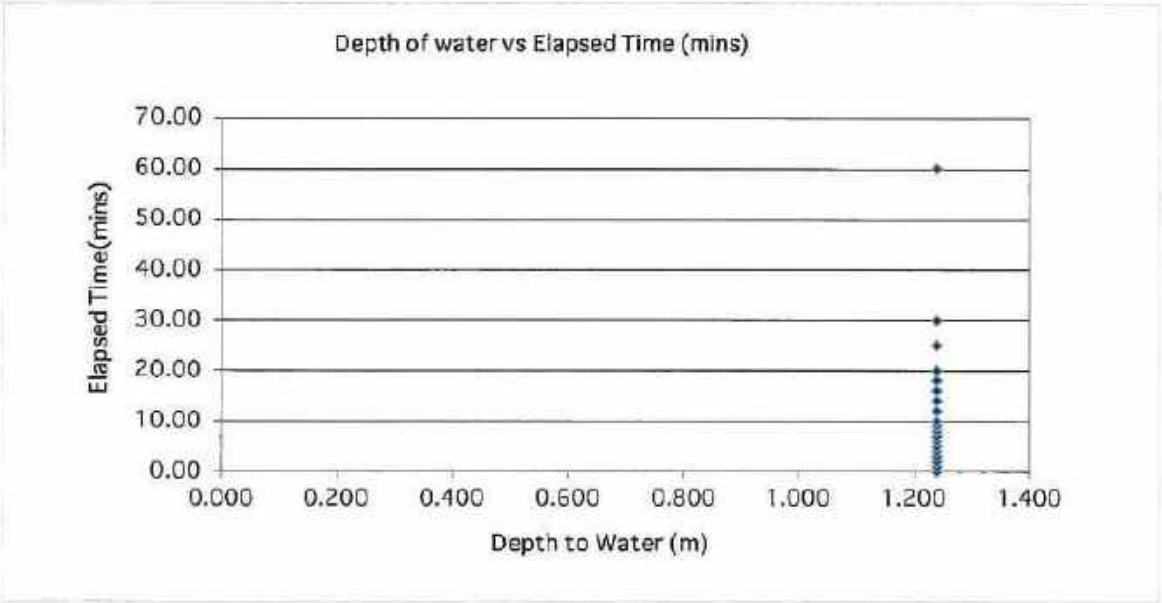
Depth of Pit (D)	1.50	m
Width of Pit (B)	0.40	m
Length of Pit (L)	1.30	m
Initial depth to Water =	1.24	m
Final depth to water =	1.24	m
Elapsed time (mins)=	60.00	
Top of permeable soil		m
Base of permeable soil		m

**Water level rose 30mm in 30mins

Base area=	0.52	m2
*Av. side area of permeable stratum over test period	0.884	m2
Total Exposed area =	1.404	m2

Infiltration rate (f) = Volume of water used/unit exposed area / unit time

f= 0 m/min or 0 m/sec



Soakaway Design f -value from field tests

IGSL

Contract: Kilbride, Arklow, Co. Wicklow — Contract No. 22153
Test No. SA7
Engineer Aecom
Date: 05.12.2019

Summary of ground conditions

from	to	Description	Ground water
0.00	0.20	Dark brown TOPSOIL	Seepage at 1.50m in adjacent TP07
0.20	0.60	Brown/greyish brown slightly silty very gravelly SAND with occasional cobbles	
0.60	0.90	Firm to locally soft brown mottled grey/orange sandy very gravelly CLAY	

Field Data

Depth to Water (m)	Elapsed Time (min)
0.560	0.00
0.560	1.00
0.560	2.00
0.560	3.00
0.560	4.00
0.560	5.00
0.560	6.00
0.560	7.00
0.560	8.00
0.560	9.00
0.560	10.00
0.560	12.00
0.560	14.00
0.560	16.00
0.560	18.00
0.560	20.00
0.560	25.00
0.560	30.00
0.560	60.00

Field Test

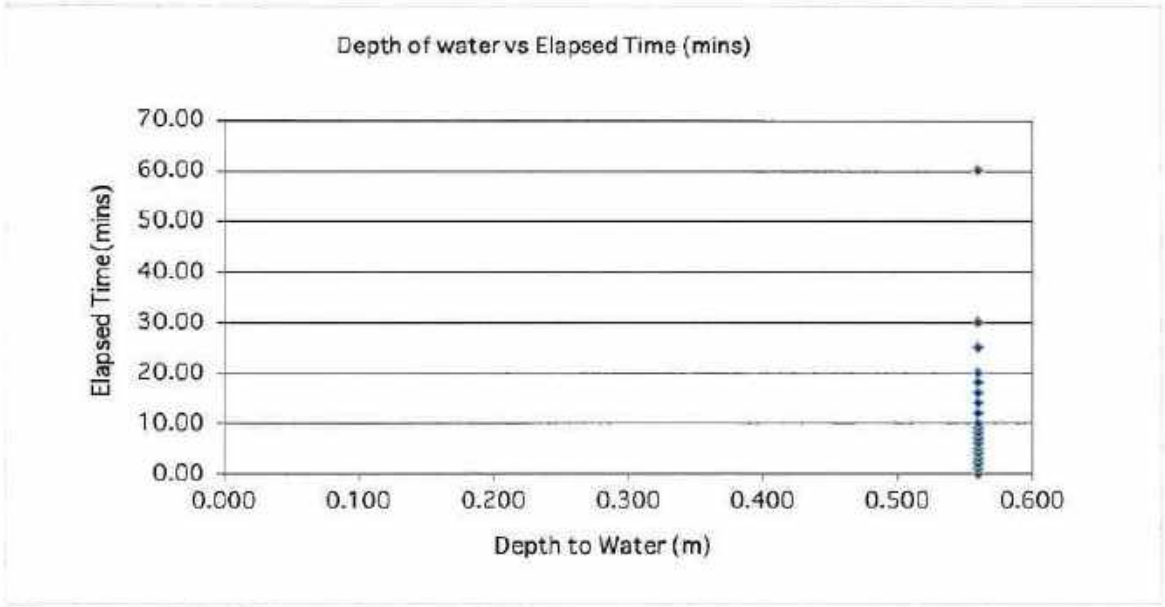
Depth of Pit (D)	0.90	m
Width of Pit (B)	0.40	m
Length of Pit (L)	1.30	m
Initial depth to Water =	0.56	m
Final depth to water =	0.56	m
Elapsed time (mins)=	60.00	
Top of permeable soil		m
Base of permeable soil		m

**Water level rose 20mm in 30mins

Base area=	0.52	m2
*Av. side area of permeable stratum over test period	1.156	m2
Total Exposed area =	1.676	m2

Infiltration rate (f) = Volume of water used/unit exposed area / unit time

f= 0 m/min or 0 m/sec



Soakaway Design f -value from field tests IGSL

Contract: Kilbride, Arklow, Co. Wicklow Contract No. 22153
Test No. SA8
Engineer Aecom
Date: 05.12.2019

Summary of ground conditions

from	to	Description	Ground water
0.00	0.50	Dark brown TOPSOIL and subsoil	Seepage at 0.80m and slow flow at 1.40m
0.50	1.10	Loose to medium dense reddish brown slightly silty gravelly SAND	
1.10	1.40	Firm very clayey gravelly SAND with rare gravel and cobbles up to 150mm	
1.40	1.50	Firm very sandy gravelly CLAY with rare gravel and cobbles	

Field Data

Depth to Water (m)	Elapsed Time (min)
1.110	0.00
1.110	1.00
1.110	2.00
1.110	3.00
1.110	4.00
1.110	5.00
1.110	6.00
1.110	7.00
1.110	8.00
1.110	9.00
1.110	10.00
1.110	12.00
1.110	14.00
1.110	16.00
1.110	18.00
1.110	20.00
1.110	25.00
1.110	30.00
1.110	60.00

Field Test

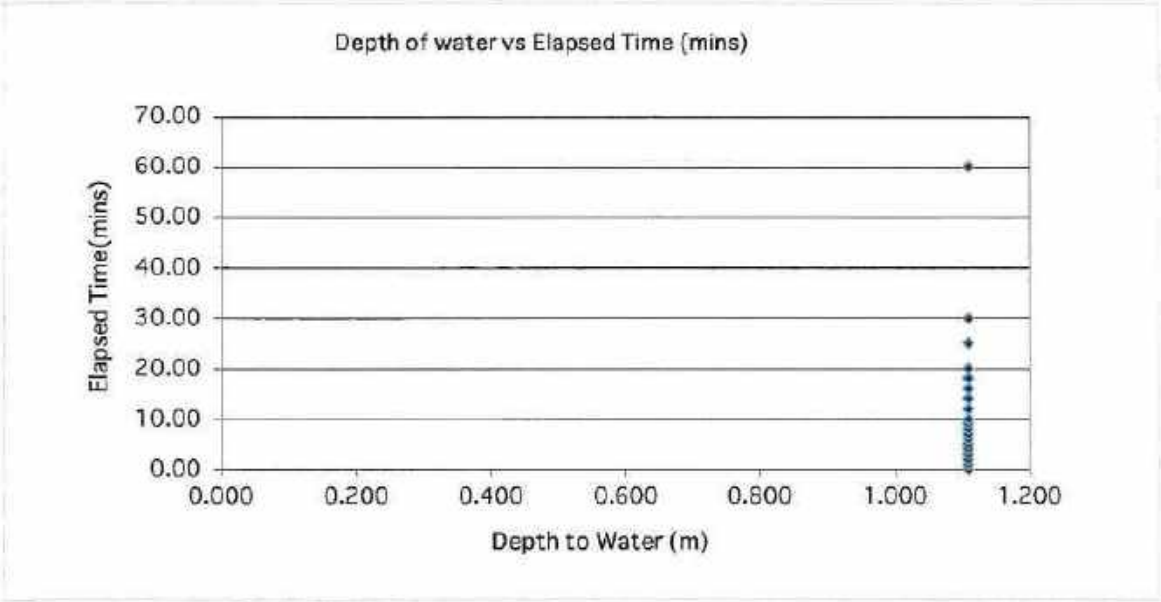
Depth of Pit (D)	1.50	m
Width of Pit (B)	0.40	m
Length of Pit (L)	1.40	m
Initial depth to Water =	1.11	m
Final depth to water =	1.11	m
Elapsed time (mins)=	60.00	
Top of permeable soil		m
Base of permeable soil		m

**Water level rose 100mm in 30mins

Base area=	0.56	m2
*Av. side area of permeable stratum over test period	1.404	m2
Total Exposed area =	1.964	m2

Infiltration rate (f) = Volume of water used/unit exposed area / unit time

f= 0 m/min or 0 m/sec



Appendix V Water and Gas Levels

Gas & Groundwater Monitoring

Site Location	Kilbride, Arklow, Co. Wicklow
Project No.	22153
Client	Lioncor
Date	16-Jan-20
Engineer	V.Lowe
Equipment	Geotech GA5000
	Peak / Steady State Readings

Location ID	**BH02**					
Time (sec)	**30**	**60**	**90**	**120**	**180**	**Peak**
Water Level (mbgl)	1.12					
Gas Flow (l/hr)	0	0	0	0	0	0
CH4 (%)	0.0	0.0	0.0	0.0	0.0	0
CO2 (%)	0.4	0.3	0.3	0.4	0.3	0.4
O2 (%)	20.9	21.0	20.9	20.9	20.8	21
CO (ppm)	0.0	0.0	0.0	0.0	0.0	0
H2S (ppm)	0.0	0.0	0.0	0.0	0.0	0
Balance (%)	78.7	78.7	78.8	78.7	78.9	78.6
Barometric Pressure (mbar)	1001					
Weather/Temp.	Dry /6 degrees					

Location ID	**BH03**					
Time (sec)	**30**	**60**	**90**	**120**	**180**	**Peak**
Water Level (mbgl)	1.45					
Gas Flow (l/hr)	0	0.1	0.1	0.1	0.1	0.1
CH4 (%)	0.0	0.0	0.0	0.0	0.0	0
CO2 (%)	0.3	0.3	0.5	0.7	0.9	0.9
O2 (%)	19.5	19.3	18.8	16.6	16.2	19.5
CO (ppm)	1.0	1.0	0.0	0.0	0	1
H2S (ppm)	0.0	0.0	0.0	0.0	0	0
Balance (%)	79.2	79.4	80.7	82.7	82.7	78.6
Barometric Pressure (mbar)	1002					
Weather/Temp.	Dry / 6 degrees					

Location ID	**BH05**					
Time (sec)	**30**	**60**	**90**	**120**	**180**	**Peak**
Water Level (mbgl)	5.22					
Gas Flow (l/hr)	0	0	0	0	0	0
CH4 (%)	0.0	0.0	0.0	0.0	0.0	0
CO2 (%)	0.3	0.3	0.3	0.3	0.3	0.3
O2 (%)	19.6	19.8	20.3	19.8	20	20.3
CO (ppm)	0.0	0.0	0.0	0.0	0.0	0
H2S (ppm)	0.0	0.0	0.0	0.0	0.0	0
Balance (%)	80.1	79.9	79.4	79.9	79.7	80.1
Barometric Pressure (mbar)	1000					
Weather/Temp.	Dry / 6 degrees					

Comments	

Gas & Groundwater Monitoring

Site Location	Kilbride, Arklow, Co. Wicklow
Project No.	22153
Client	Lioncor
Date	14-Feb-20
Engineer	V.Lowe
Equipment	Geotech GA5000
	Peak / Steady State Readings

Location ID	**BH02**					
Time (sec)	**30**	**60**	**90**	**120**	**180**	**Peak**
Water Level (mbgl)	0.67					
Gas Flow (l/hr)	0	0	0	0	0	0
CH4 (%)	0.0	0.0	0.0	0.0	0.0	0
CO2 (%)	0.3	0.3	0.3	0.3	0.3	0.3
O2 (%)	21.0	21.0	20.9	20.9	20.9	21
CO (ppm)	0.0	0.0	0.0	0.0	0.0	0
H2S (ppm)	0.0	0.0	0.0	0.0	0.0	0
Balance (%)	78.7	78.7	78.8	78.8	78.8	78.8
Barometric Pressure (mbar)	1005					
Weather/Temp.	Rain; 8°c					

Location ID	**BH03**					
Time (sec)	**30**	**60**	**90**	**120**	**180**	**Peak**
Water Level (mbgl)	1.1					
Gas Flow (l/hr)	0	0	0.1	0.1	0.1	0.1
CH4 (%)	0.0	0.0	0.0	0.0	0.0	0
CO2 (%)	0.4	0.5	0.7	0.9	1.2	1.2
O2 (%)	19.3	18.7	17.4	16.1	14.4	19.3
CO (ppm)	1.0	1.0	0.0	0.0	0	1
H2S (ppm)	0.0	0.0	0.0	0.0	0	0
Balance (%)	80.3	80.8	81.9	83.0	84.4	84.4
Barometric Pressure (mbar)	1004					
Weather/Temp.	Rain; 8°c					

Location ID	**BH05**					
Time (sec)	**30**	**60**	**90**	**120**	**180**	**Peak**
Water Level (mbgl)	4.04m					
Gas Flow (l/hr)	0	0	0	0	0	0
CH4 (%)	0.0	0.0	0.0	0.0	0.0	0
CO2 (%)	0.5	0.3	0.2	0.3	0.3	0.5
O2 (%)	20.8	20.9	21.1	21.0	20.9	21.1
CO (ppm)	0.0	0.0	0.0	0.0	0.0	0
H2S (ppm)	0.0	0.0	0.0	0.0	0.0	0
Balance (%)	78.7	78.8	78.7	78.7	78.8	78.8
Barometric Pressure (mbar)	1002					
Weather/Temp.	Rain; 8°c					
Comments						

Appendix VI Laboratory

a. Geotechnical

IGSL Ltd
Materials Laboratory
Unit J5, M7 Business Park
Newhall, Naas
Co. Kildare
045 846176

Test Report

Determination of Moisture Content, Liquid & Plastic Limits

Tested in accordance with BS1377:Part 2:1990, clauses 3.2*, 4.3, 4.4 & 5.3

Report No. **R108699** Contract No. 22153 Contract Name: Kilbride Development , Co.Wicklow

Customer Aecom

Samples Received: 07/01/20 Date Tested: 16/01/20

BH/TP	Sample No.	Depth (m)	Lab. Ref	Sample Type	Moisture Content %	Liquid Limit %	Plastic Limit %	Plasticity Index	% <425µm	Preparation	Liquid Limit Clause	Classification (BS5930)	Description
BH01	AA121850	5.0	A20/0107	B	20	36	16	20	82	WS	4.4	C I	Brown slightly sandy, slightly gravelly, CLAY
BH02	AA126820	4.0	A20/0109	B	18	35	16	19	56	WS	4.4	C L	Brown slightly sandy, gravelly, CLAY
BH02	AA126823	7.0	A20/0110	B	16	42	18	24	63	WS	4.4	C I	Brown slightly sandy, slightly gravelly, CLAY
BH03	AA128844	2.0	A20/0111	B	16	39	18	21	66	WS	4.4	C I	Brown sandy gravelly CLAY
BH03	AA128846	4.0	A20/0112	B	17	45	19	26	62	WS	4.4	C I	Brown slightly sandy, slightly gravelly, CLAY
BH04	AA126833	1.0	A20/0113	B	23	38	16	22	90	WS	4.4	C I	Brown sandy gravelly CLAY
BH04	AA126836	3.0	A20/0114	B	16	42	21	21	73	WS	4.4	C I	Brown slightly sandy, gravelly, CLAY
BH04	AA126838	5.0	A20/0115	B	17	47	22	25	55	WS	4.4	C I	Brown sandy gravelly CLAY
BH05	AA121839	3.0	A20/0117	B	25	35	15	20	99	WS	4.4	C L	Brown sandy gravelly CLAY
BH06	AA126807	2.0	A20/0119	B	13	36	17	19	63	WS	4.4	C I	Brown slightly sandy, slightly gravelly, CLAY
BH06	AA126810	5.0	A20/0120	B	19	37	17	20	81	WS	4.4	C I	Brown slightly sandy, slightly gravelly, CLAY

Notes:
Preparation: WS - Wet sieved; AR - As received; NP - Non plastic
Liquid Limit Clause: 4.3 Cone Penetrometer definitive method; 4.4 Cone Penetrometer one point method
Sample Type: B - Bulk Disturbed; U - Undisturbed

Remarks:
Results apply to the sample as received.
NOTE: *Clause 3.2 of BS1377 is a "withdrawn" standard due to publication of ISO17892-1:2014
Opinions and interpretations are outside the scope of accreditation.
The results relate to the specimens tested. Any remaining material will be retained for one month.

IGSL Ltd Materials Laboratory	Persons authorized to approve reports	Approved by	Date	Page
	H Byrne (Laboratory Manager)	H Byrne	04/02/20	1 of 1

IGSL Ltd
Materials Laboratory
Unit J5, M7 Business Park
Newhall, Naas
Co. Kildare
045 846176

Test Report

Determination of Moisture Content, Liquid & Plastic Limits

Tested in accordance with BS1377:Part 2:1990, clauses 3.2*, 4.3, 4.4 & 5.3

Report No. **R108700** Contract No. 22153 Contract Name: Kilbride Development , Co.Wicklow

Customer Aecom

Samples Received: 07/01/20 Date Tested: 16/01/20

BH/TP	Sample No.	Depth (m)	Lab. Ref	Sample Type	Moisture Content %	Liquid Limit %	Plastic Limit %	Plasticity Index	% <425µm	Preparation	Liquid Limit Clause	Classification (BS5930)	Description
TP01	AA128551	1.0	A20/0122	B	21	35	17	18	53	WS	4.4	C L	Mottled brown sandy gravelly CLAY
TP01	AA128553	3.0	A20/0123	B	17	45	22	23	64	WS	4.4	C I	Brown slightly sandy, slightly gravelly, CLAY
TP02	AA128536/7	1.0	A20/0124	B	17	39	16	23	68	WS	4.4	C I	Mottled brown sandy gravelly CLAY
TP02	AA128540	2.5	A20/0125	B	17	44	21	23	71	WS	4.4	C I	Brown sandy gravelly CLAY
TP03	AA128525	0.9	A20/0126	B	17	31	15	16	64	WS	4.4	C L	Mottled brown sandy gravelly CLAY
TP04	AA128542/3	0.6	A20/0128	B	22	44	15	29	97	WS	4.4	C I	Brown sandy gravelly CLAY
TP04	AA128524	3.0	A20/0129	B	16	44	21	23	61	WS	4.4	C I	Brown slightly sandy, slightly gravelly, CLAY
TP05	AA128519	1.0	A20/0130	B	24	42	15	27	93	WS	4.4	C I	Mottled brown sandy gravelly CLAY
TP05	AA128521	3.0	A20/0131	B	13	35	17	18	65	WS	4.4	C L	Brown slightly sandy, slightly gravelly, CLAY
TP06	AA128529	2.0	A10/0133	B	14	32	15	17	66	WS	4.4	C L	Brown sandy gravelly CLAY
TP07	AA128535	1.0	A20/0134	B	16	39	20	19	59	WS	4.4	C I	Mottled brown sandy gravelly CLAY

Notes: Preparation: WS - Wet sieved; AR - As received; NP - Non plastic
Liquid Limit Clause: 4.3 Cone Penetrometer definitive method; 4.4 Cone Penetrometer one point method
Sample Type: B - Bulk Disturbed; U - Undisturbed

Remarks:
Results apply to the sample as received.
NOTE: *Clause 3.2 of BS1377 is a "withdrawn" standard due to publication of ISO17892-1:2014
Opinions and interpretations are outside the scope of accreditation.
The results relate to the specimens tested. Any remaining material will be retained for one month.

IGSL Ltd Materials Laboratory

Persons authorized to approve reports
H Byrne (Laboratory Manager)

Approved by: H Byrne | Date: 04/02/20 | Page: 1 of 1

TEST REPORT
Determination of Particle Size Distribution
Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5
(note: Sedimentation stage not accredited)

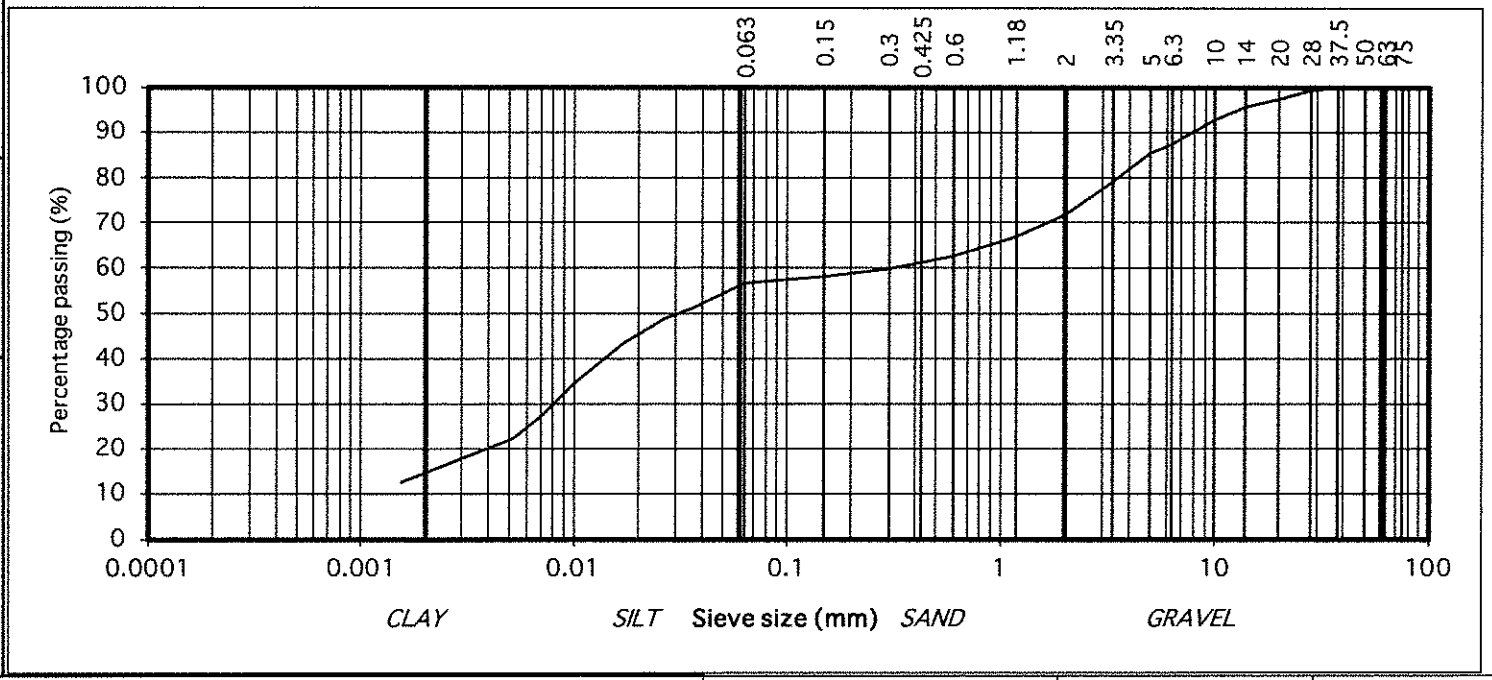
ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 137T

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	100	
28	99	
20	97	
14	96	
10	93	
6.3	87	
5	85	
3.35	79	
2	72	
1.18	67	SAND
0.6	63	
0.425	61	
0.3	60	
0.15	58	
0.063	57	SILT/CLAY
0.037	51	
0.026	49	
0.017	43	
0.010	34	
0.007	28	
0.005	22	
0.002	13	

Contract No:	22153	Report No.	R108843
Contract:	Kilbride Development , Co.Wicklow		
BH/TP :	TP01		
Sample No.	AA128553	Lab. Sample No.	A20/122
Sample Type:	B		
Depth (m)	2.90	Customer:	Aecom
Date Received	07/01/2020	Date Testing started	15/01/2020
Description:	Brown slightly sandy, slightly gravelly, CLAY		

Remarks

Note: Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 , Results apply to sample as received.



IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
H Byrne	04/02/20	1 of 1

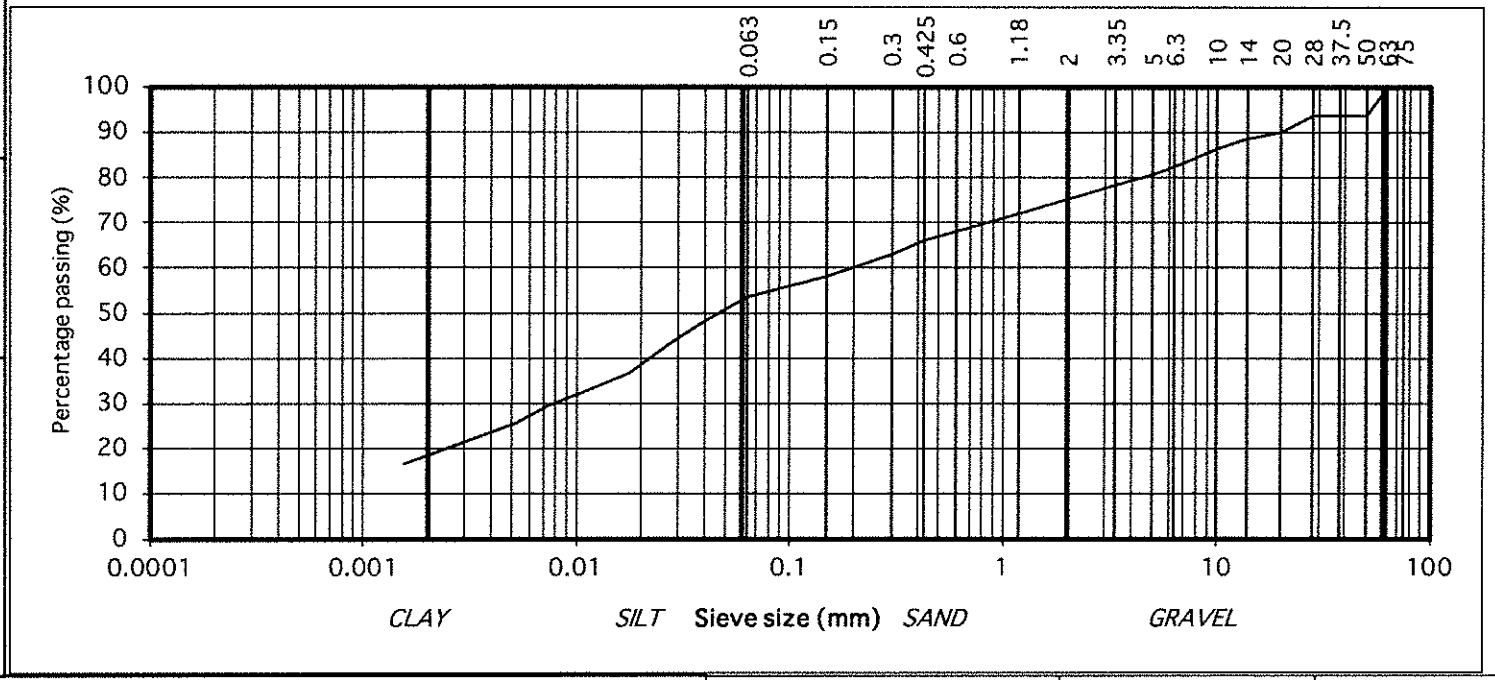
Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

TEST REPORT
Determination of Particle Size Distribution
Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5
(note: Sedimentation stage not accredited)

particle size	% passing	
75	100	COBBLES
63	100	
50	94	GRAVEL
37.5	94	
28	94	
20	90	
14	89	
10	86	
6.3	82	
5	81	
3.35	78	
2	75	
1.18	72	SAND
0.6	68	
0.425	66	
0.3	63	
0.15	58	
0.063	54	SILT/CLAY
0.039	48	
0.028	43	
0.018	37	
0.010	32	
0.007	29	
0.005	26	
0.002	17	

Contract No: 22153 Report No. R108844
Contract: Kilbride Development , Co.Wicklow
BH/TP : TP02
Sample No. AA128540 Lab. Sample No. A20/125
Sample Type: B
Depth (m) 2.50 Customer: Aecom
Date Received 07/01/2020 Date Testing started 16/01/2020
Description: Brown slightly sandy, slightly gravelly, CLAY

Remarks Note: Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 . Results apply to sample as received.



IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
	04/02/20	1 of 1

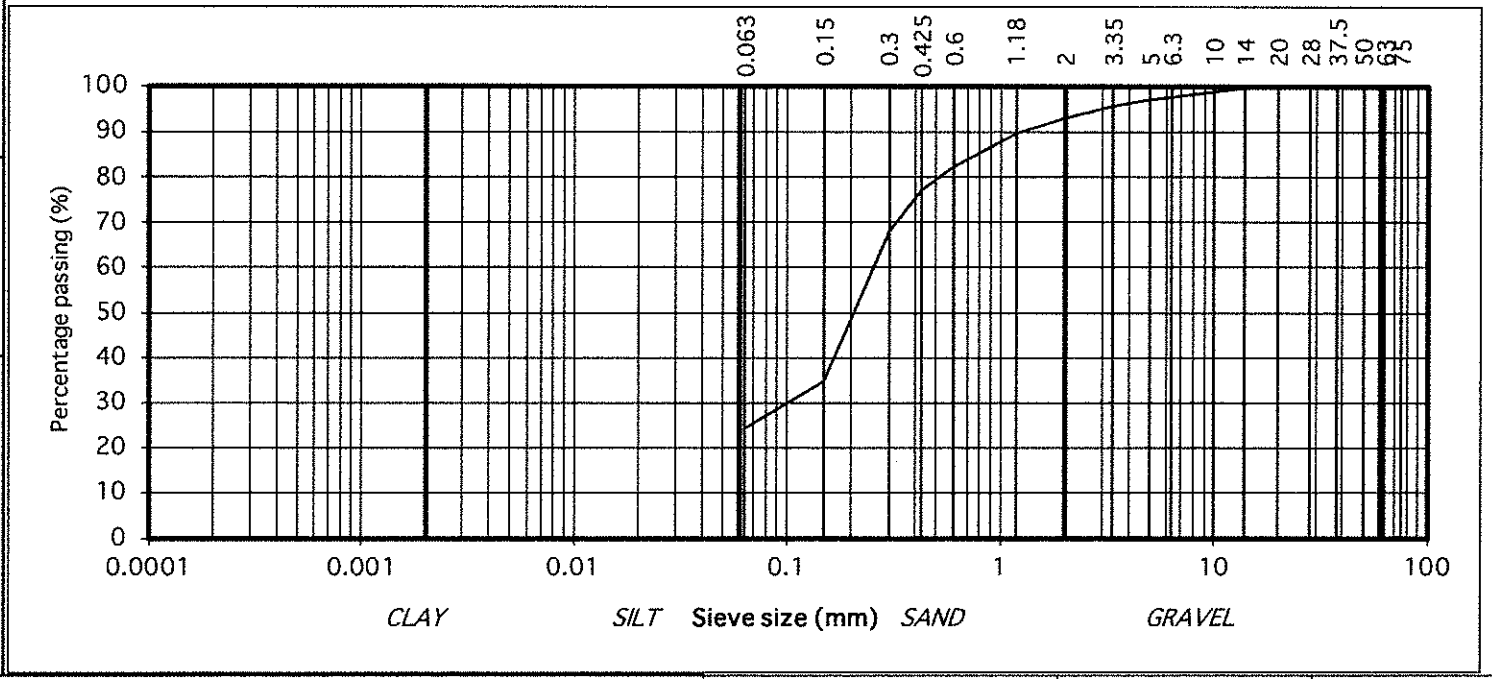
Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

TEST REPORT
Determination of Particle Size Distribution
Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5
(note: Sedimentation stage not accredited)

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	100	
28	100	
20	100	
14	100	
10	99	
6.3	98	
5	97	
3.35	96	
2	93	
1.18	90	SAND
0.6	82	
0.425	77	
0.3	68	
0.15	35	
0.063	24	SILT/CLAY

Contract No: 22153 Report No. R108914
Contract: Kilbride Development , Co.Wicklow
BH/TP : TP03
Sample No. AA128527 Lab. Sample No. A20/127
Sample Type: B
Depth (m) 3.00 Customer: Aecom
Date Received 07/01/2020 Date Testing started 16/01/2020
Description: Brown very sandy, slightly gravelly, SILT/CLAY

Remarks Note: Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 . Results apply to sample as received.



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Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

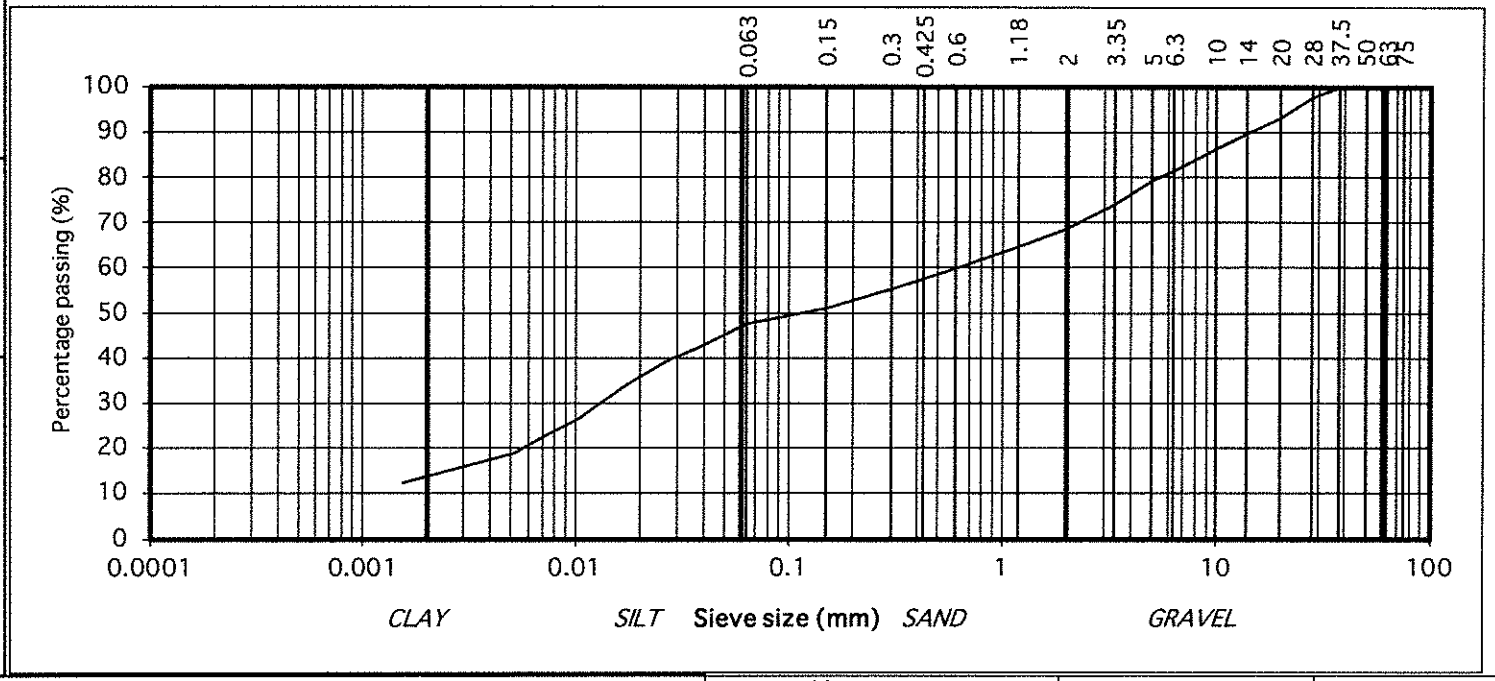
TEST REPORT
Determination of Particle Size Distribution
Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5
(note: Sedimentation stage not accredited)

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	100	
28	98	
20	93	
14	90	
10	86	
6.3	81	
5	79	
3.35	74	
2	69	
1.18	65	SAND
0.6	60	
0.425	58	
0.3	55	
0.15	51	
0.063	48	SILT/CLAY
0.037	42	
0.027	39	
0.017	34	
0.010	26	
0.007	23	
0.005	19	
0.002	12	

Contract No:	22153	Report No.	R108915
Contract:	Kilbride Development , Co.Wicklow		
BH/TP :	TP04		
Sample No.	AA128524	Lab. Sample No.	A20/129
Sample Type:	B		
Depth (m)	3.00	Customer:	Aecom
Date Received	07/01/2020	Date Testing started	16/01/2020
Description:	Brown slightly sandy, slightly gravelly, CLAY		

Remarks

Note: Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 . Results apply to sample as received.



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Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

TEST REPORT
Determination of Particle Size Distribution

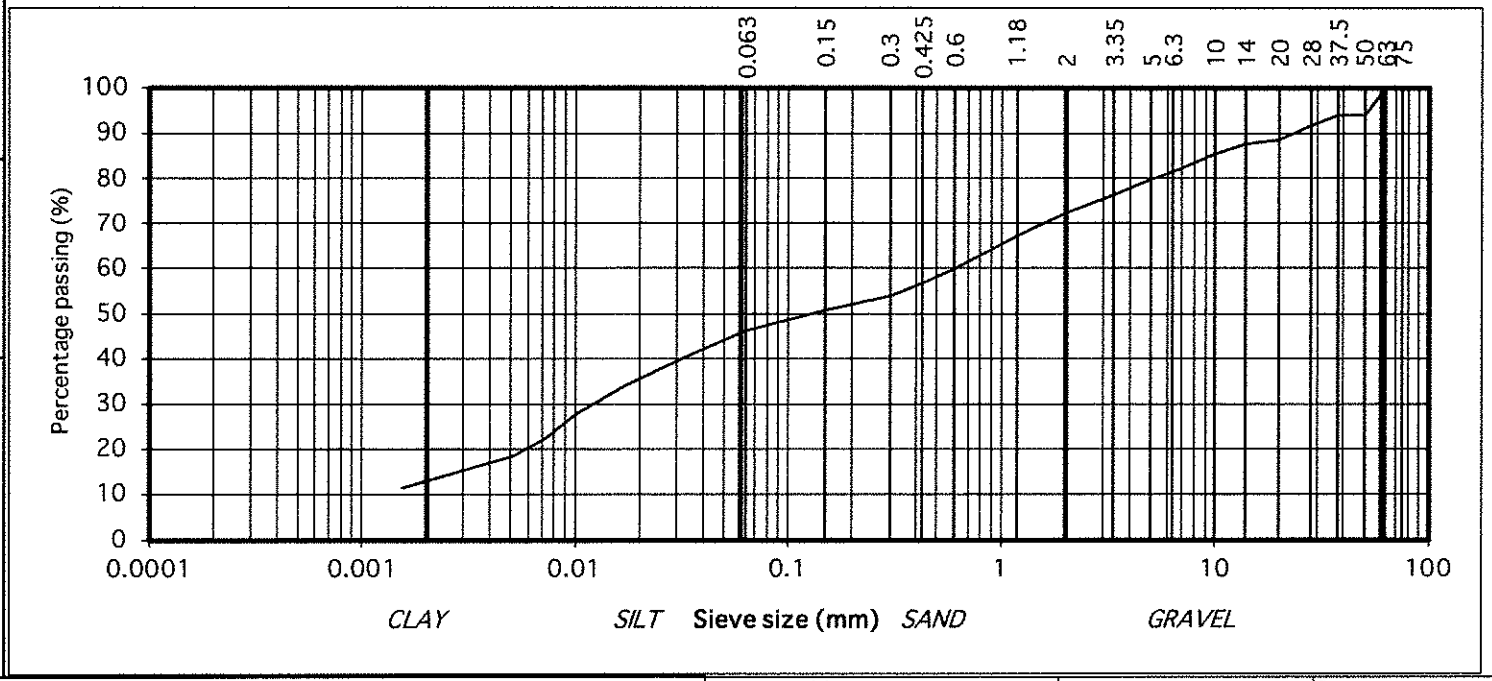
Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5
(note: Sedimentation stage not accredited)

particle size	% passing	
75	100	COBBLES
63	100	
50	94	GRAVEL
37.5	94	
28	92	
20	89	
14	88	
10	85	
6.3	81	
5	80	
3.35	77	
2	72	
1.18	67	SAND
0.6	60	
0.425	57	
0.3	54	
0.15	51	
0.063	46	SILT/CLAY
0.037	41	
0.027	38	
0.017	34	
0.010	28	
0.007	22	
0.005	19	
0.002	12	

Contract No:	22153	Report No.	R108916
Contract:	Kilbride Development , Co.Wicklow		
BH/TP :	TP05		
Sample No.	AA128521	Lab. Sample No.	A20/131
Sample Type:	B		
Depth (m)	3.00	Customer:	Aecom
Date Received	07/01/2020	Date Testing started	16/01/2020
Description:	Brown slightly sandy, slightly gravelly, CLAY		

Remarks

Note: Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 . Results apply to sample as received.



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Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

TEST REPORT
Determination of Particle Size Distribution

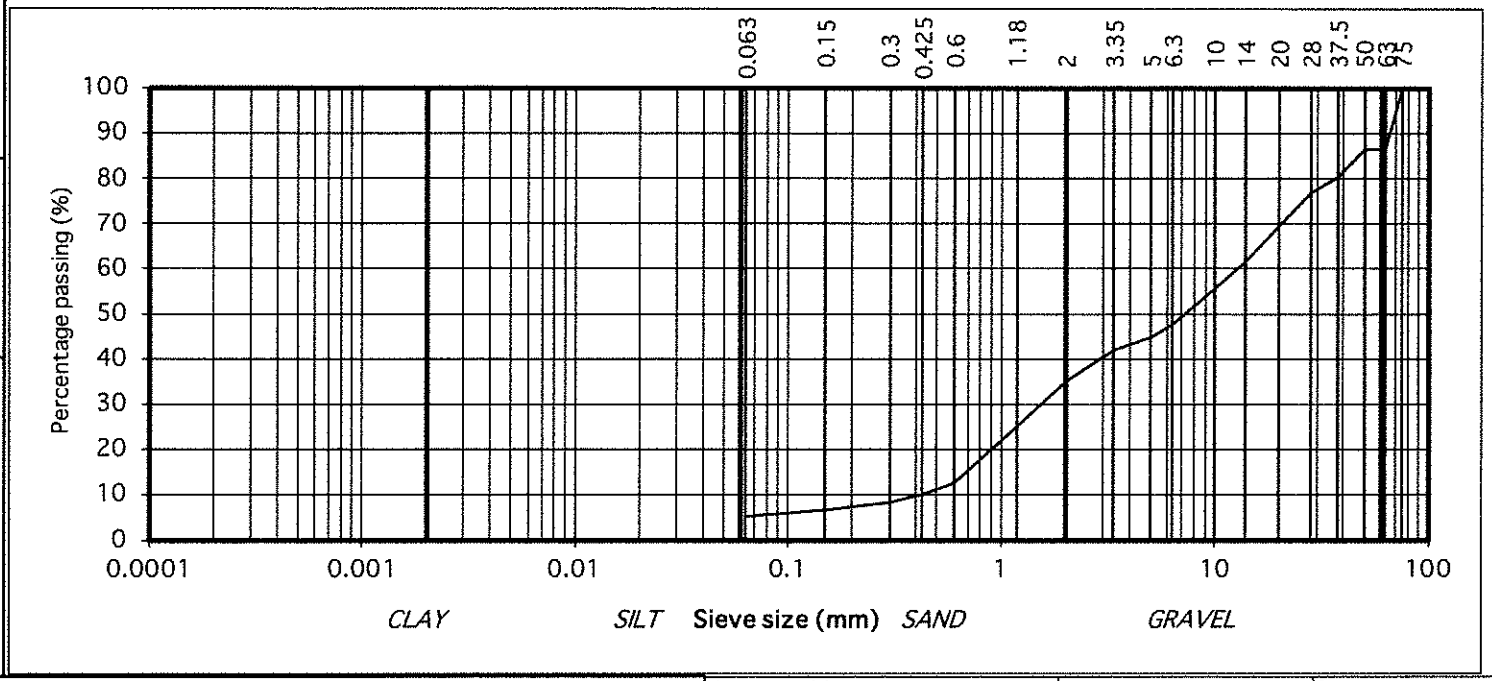
Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5
(note: Sedimentation stage not accredited)

ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

particle size	% passing	
75	100	COBBLES
63	87	
50	87	GRAVEL
37.5	80	
28	77	
20	70	
14	62	
10	56	
6.3	48	
5	45	
3.35	42	
2	35	
1.18	25	SAND
0.6	13	
0.425	10	
0.3	8	
0.15	7	
0.063	5	SILT/CLAY

Contract No: 22153 Report No. R1088917
Contract: Kilbride Development , Co.Wicklow
BH/TP : TP06
Sample No. AA128528 Lab. Sample No. A20/132
Sample Type: B
Depth (m) 1.00 Customer: Aecom
Date Received 07/01/2020 Date Testing started 16/01/2020
Description: Brown clayey/silty, very sandy, GRAVEL with some cobbles

Remarks Note: Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 . Results apply to sample as received. Sample size did not meet the requirements of BS1377



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Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

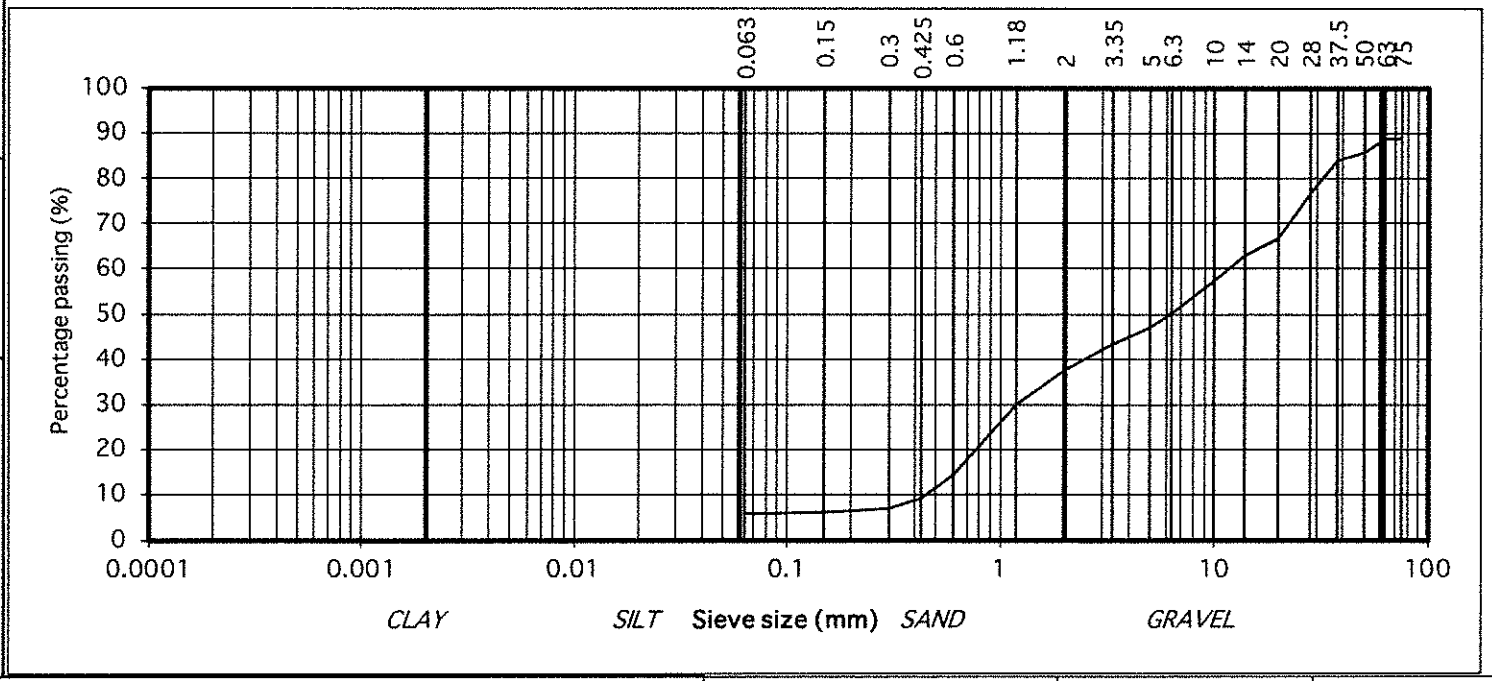
TEST REPORT
Determination of Particle Size Distribution

Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5
(note: Sedimentation stage not accredited)

particle size	% passing	
75	89	COBBLES
63	89	
50	86	GRAVEL
37.5	84	
28	77	
20	67	
14	63	
10	57	
6.3	50	
5	47	
3.35	43	
2	38	
1.18	30	SAND
0.6	14	
0.425	9	
0.3	7	
0.15	6	
0.063	6	SILT/CLAY

Contract No: 22153 Report No. R108918
Contract: Kilbride Development , Co.Wicklow
BH/TP : TP07
Sample No. AA128536 Lab. Sample No. A20/135
Sample Type: B
Depth (m) 2.00 Customer: Aecom
Date Received 07/01/2020 Date Testing started 16/01/2020
Description: Brown clayey/silty, very sandy, GRAVEL with some cobbles

Remarks Note: Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 . Results apply to sample as received. Sample size did not meet the requirements of BS1377



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Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

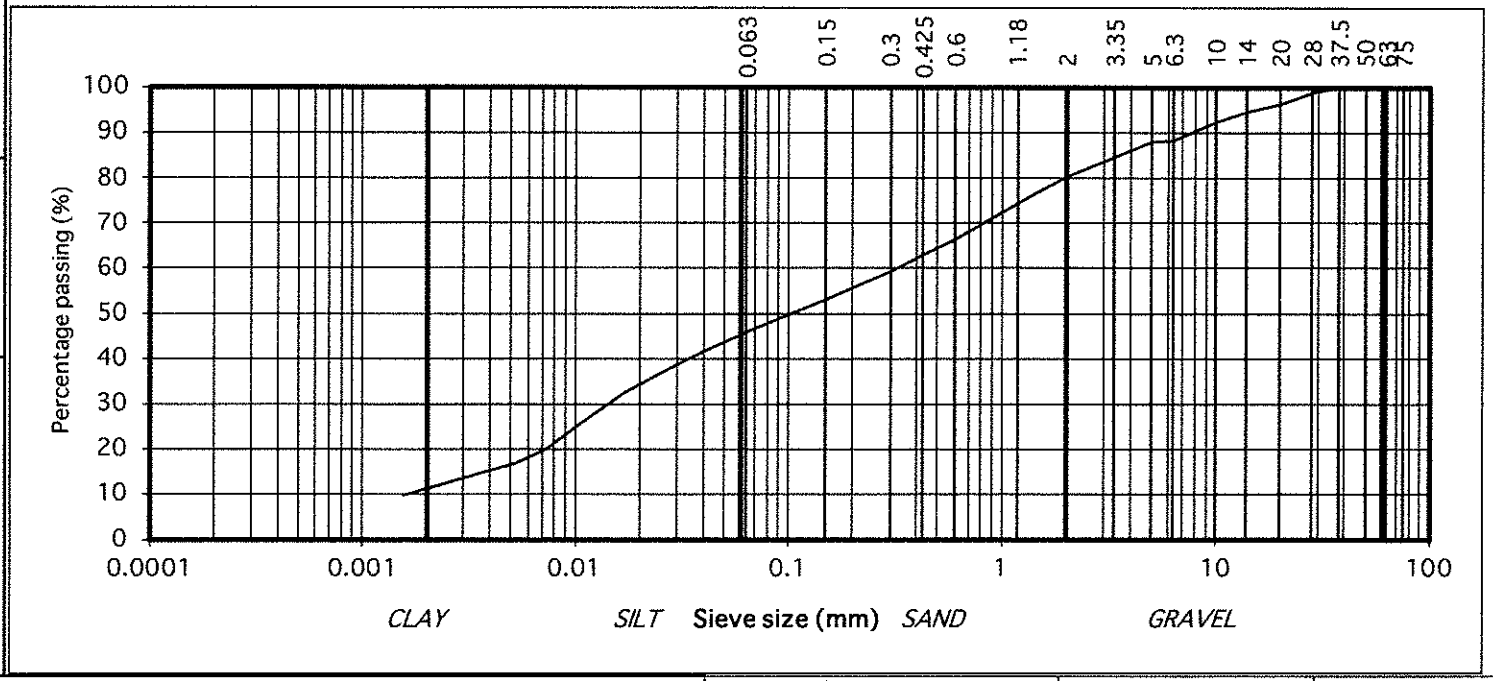
TEST REPORT
Determination of Particle Size Distribution

Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5
(note: Sedimentation stage not accredited)

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	100	
28	99	
20	96	
14	95	
10	92	
6.3	88	
5	88	
3.35	85	
2	80	
1.18	74	SAND
0.6	66	
0.425	63	
0.3	59	
0.15	53	
0.063	46	SILT/CLAY
0.037	41	
0.027	37	
0.017	32	
0.010	25	
0.007	20	
0.005	17	
0.002	10	

Contract No: 22153 Report No. R108845
Contract: Kilbride Development , Co.Wicklow
BH/TP : TP08
Sample No. AA128332 Lab. Sample No. A20/136
Sample Type: B
Depth (m) 2.00 Customer: Aecom
Date Received 07/01/2020 Date Testing started 15/01/2020
Description: Brown slightly sandy, slightly gravelly, CLAY

Remarks Note: Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 . Results apply to sample as received.



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Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

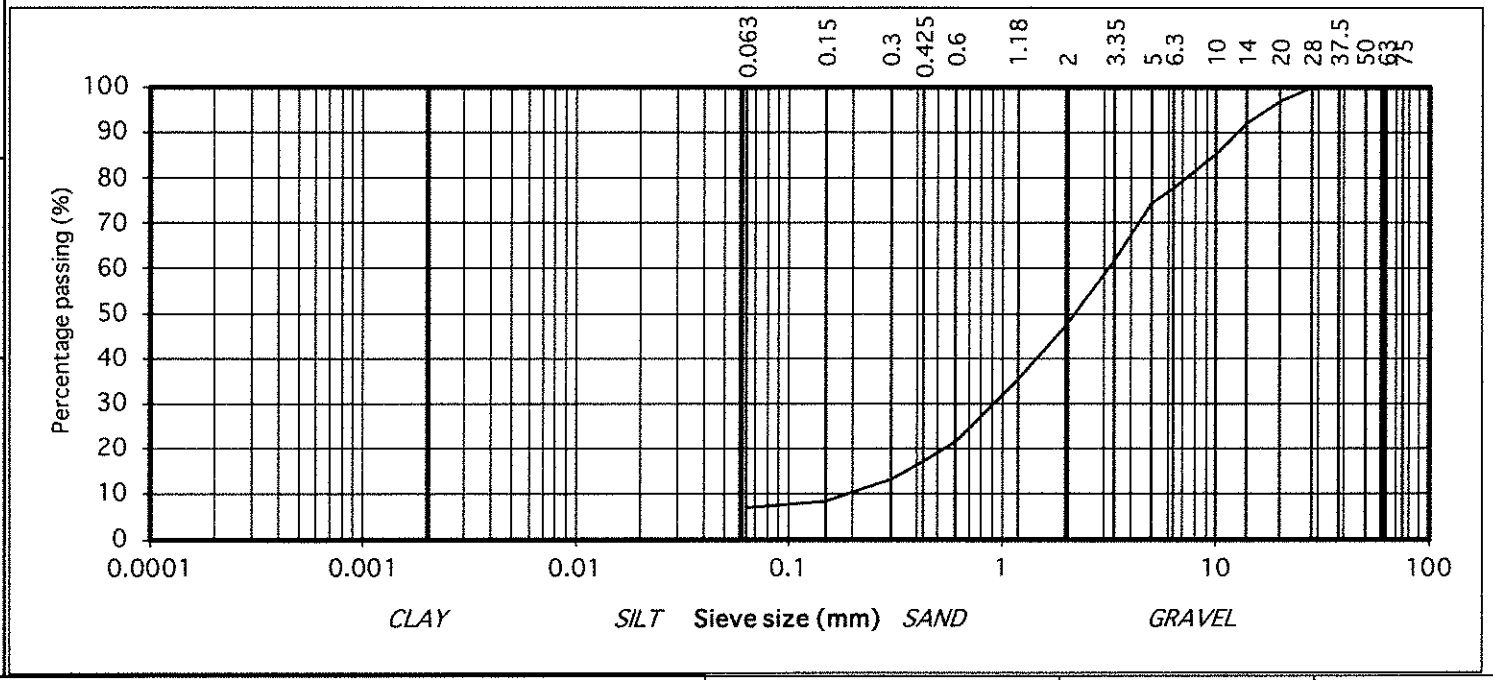
TEST REPORT
Determination of Particle Size Distribution

Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5
(note: Sedimentation stage not accredited)

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	100	
28	100	
20	97	
14	92	
10	85	
6.3	78	
5	74	
3.35	62	
2	48	
1.18	36	SAND
0.6	21	
0.425	17	
0.3	13	
0.15	8	
0.063	7	SILT/CLAY

Contract No: 22153 Report No. R108831
Contract: Kilbride Development , Co.Wicklow
BH/TP : BH01
Sample No. AA121845 Lab. Sample No. A20/105
Sample Type: B
Depth (m) 1.00 Customer: Aecom
Date Received 07/01/2020 Date Testing started 15/01/2020
Description: Brown clayey/silty, very sandy, GRAVEL

Remarks Note: Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 . Results apply to sample as received.



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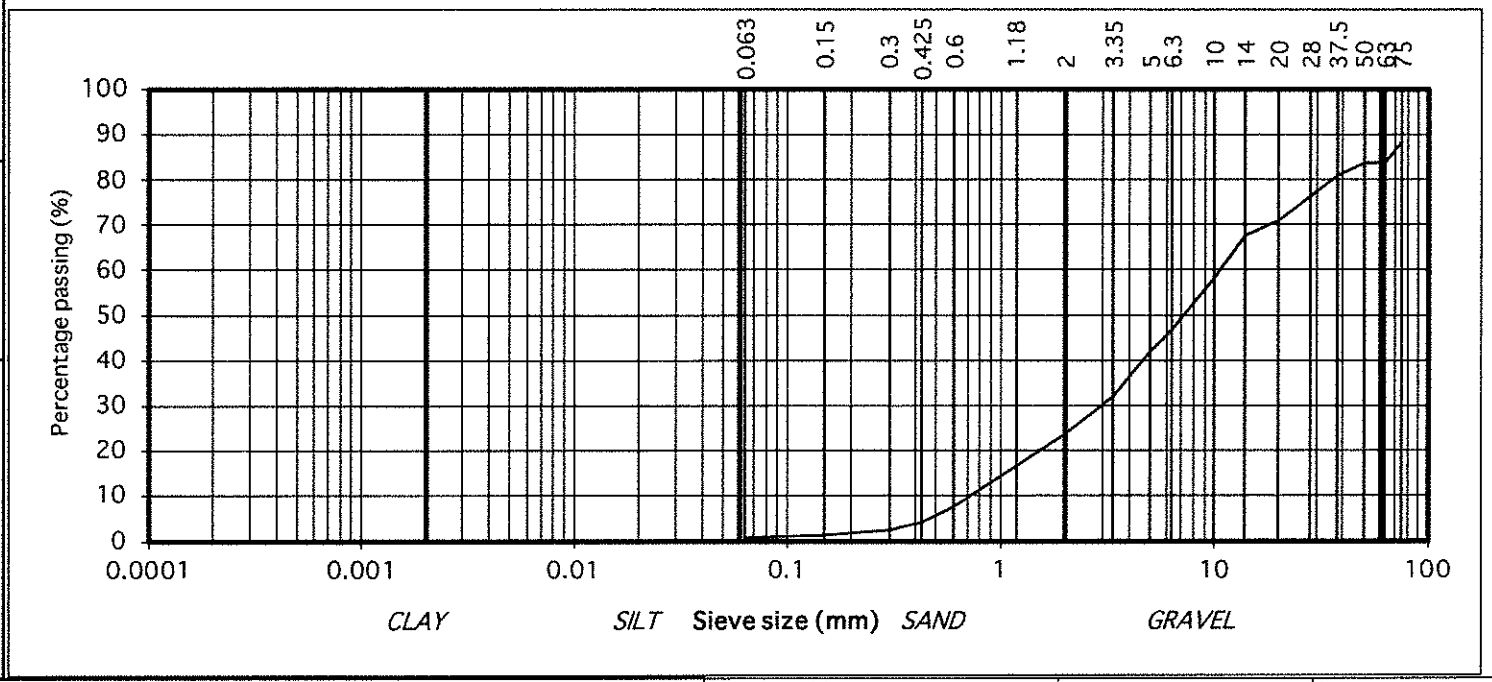
Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

TEST REPORT
Determination of Particle Size Distribution
Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5
(note: Sedimentation stage not accredited)

particle size	% passing	
75	89	COBBLES
63	84	
50	84	GRAVEL
37.5	81	
28	76	
20	71	
14	67	
10	58	
6.3	47	
5	42	
3.35	32	
2	24	
1.18	17	SAND
0.6	7	
0.425	4	
0.3	2	
0.15	1	
0.063	1	SILT/CLAY

Contract No: 22153 Report No. R108837
Contract: Kilbride Development , Co.Wicklow
BH/TP : BH01
Sample No. AA121848 Lab. Sample No. A20/106
Sample Type: B
Depth (m) 3.00 Customer: Aecom
Date Received 07/01/2020 Date Testing started 16/01/2020
Description: Brown slightly clayey/silty, very sandy, GRAVEL with some cobbles

Remarks Note: Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 . Results apply to sample as received. Sample size did not meet the requirements of BS1377



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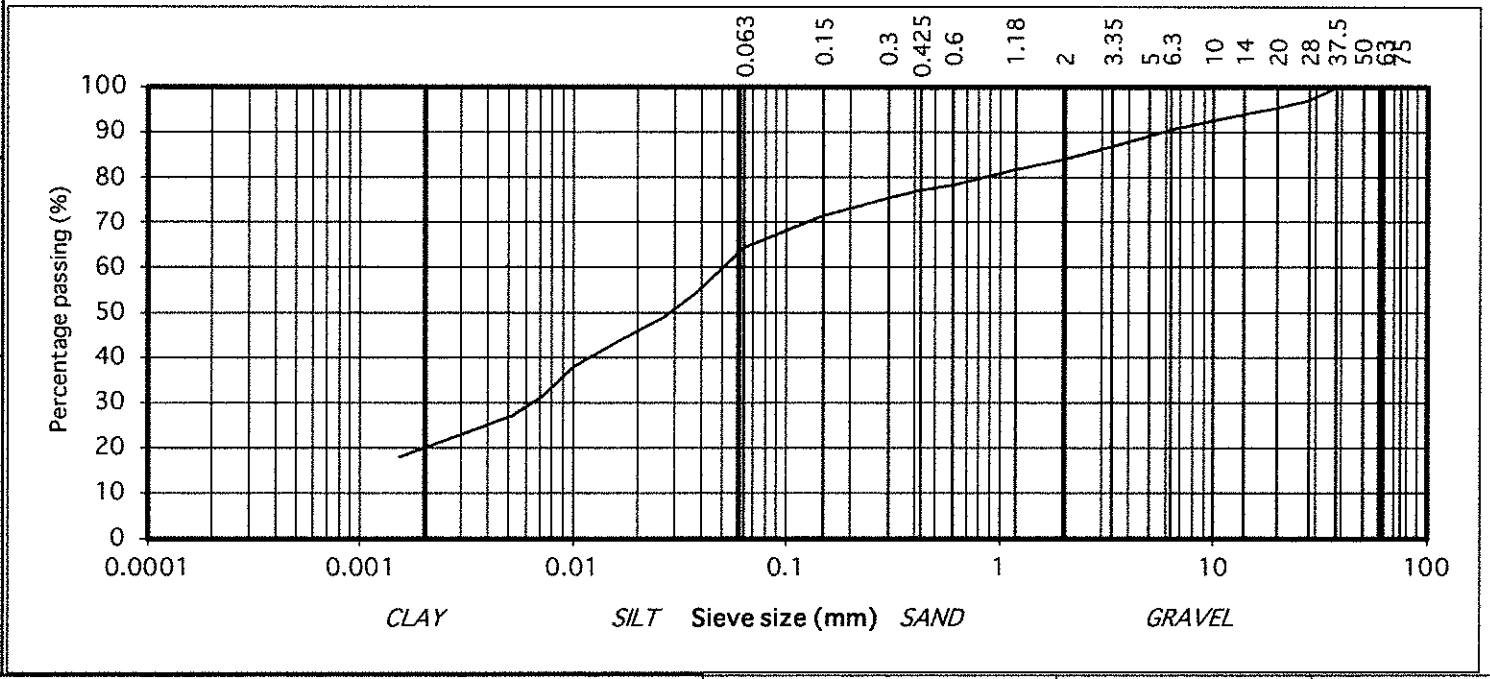
Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

TEST REPORT
Determination of Particle Size Distribution
Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5
(note: Sedimentation stage not accredited)

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	100	
28	97	
20	95	
14	94	
10	93	
6.3	91	
5	89	
3.35	87	
2	84	
1.18	82	SAND
0.6	78	
0.425	77	
0.3	75	
0.15	72	
0.063	64	SILT/CLAY
0.037	54	
0.027	49	
0.017	44	
0.010	38	
0.007	31	
0.005	27	
0.002	18	

Contract No: 22153 Report No. R108832
Contract: Kilbride Development , Co.Wicklow
BH/TP : BH01
Sample No. AA121850 Lab. Sample No. A20/107
Sample Type: B
Depth (m) 5.00 Customer: Aecom
Date Received 07/01/2020 Date Testing started 16/01/2020
Description: Brown slightly sandy, slightly gravelly, CLAY

Remarks Note: Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 . Results apply to sample as received.



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Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

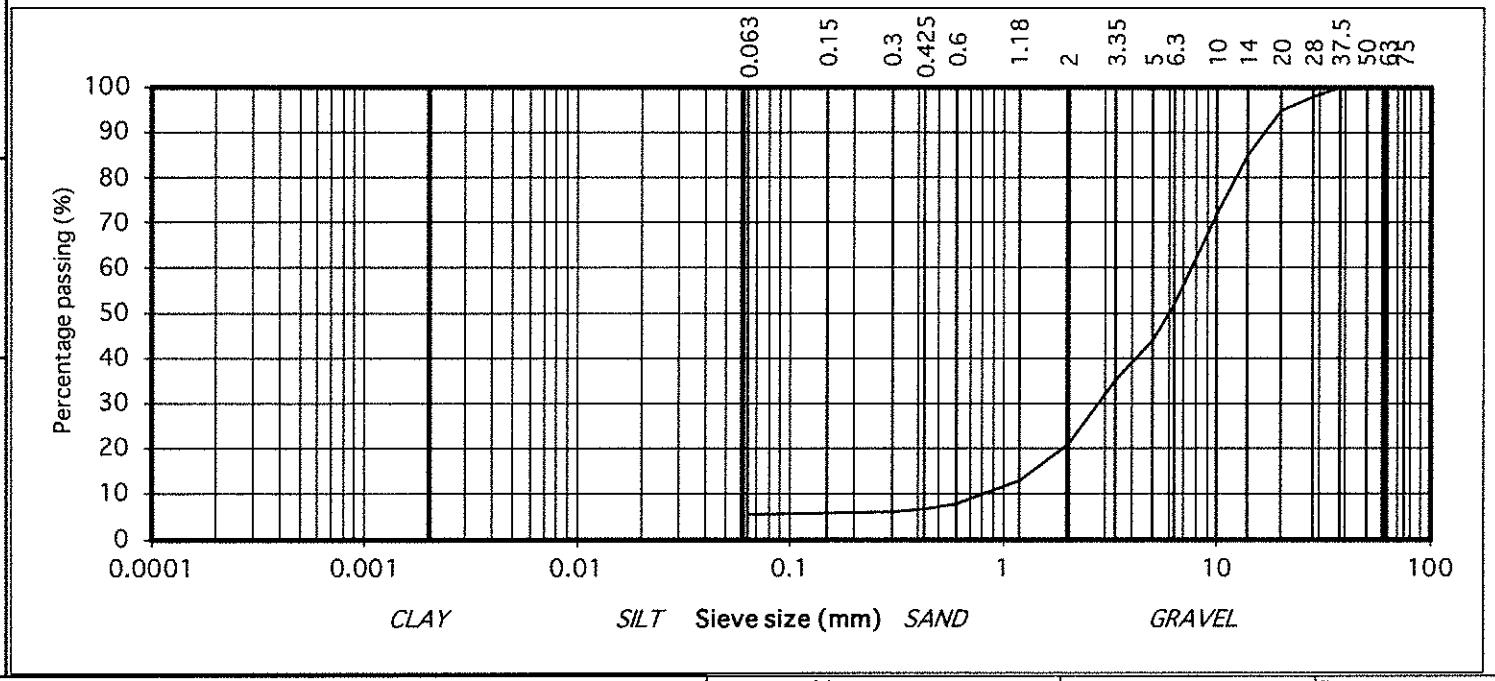
TEST REPORT
Determination of Particle Size Distribution

Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5
(note: Sedimentation stage not accredited)

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	100	
28	98	
20	95	
14	85	
10	72	
6.3	52	
5	44	
3.35	35	
2	21	
1.18	13	SAND
0.6	8	
0.425	7	
0.3	6	
0.15	6	
0.063	6	SILT/CLAY

Contract No: 22153 Report No. R108838
Contract: Kilbride Development , Co.Wicklow
BH/TP : BH02
Sample No. AA126818 Lab. Sample No. A20/108
Sample Type: B
Depth (m) 2.00 Customer: Aecom
Date Received 07/01/2020 Date Testing started 16/01/2020
Description: Brown clayey/silty, sandy, GRAVEL

Remarks Note: Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 . Results apply to sample as received.



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Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

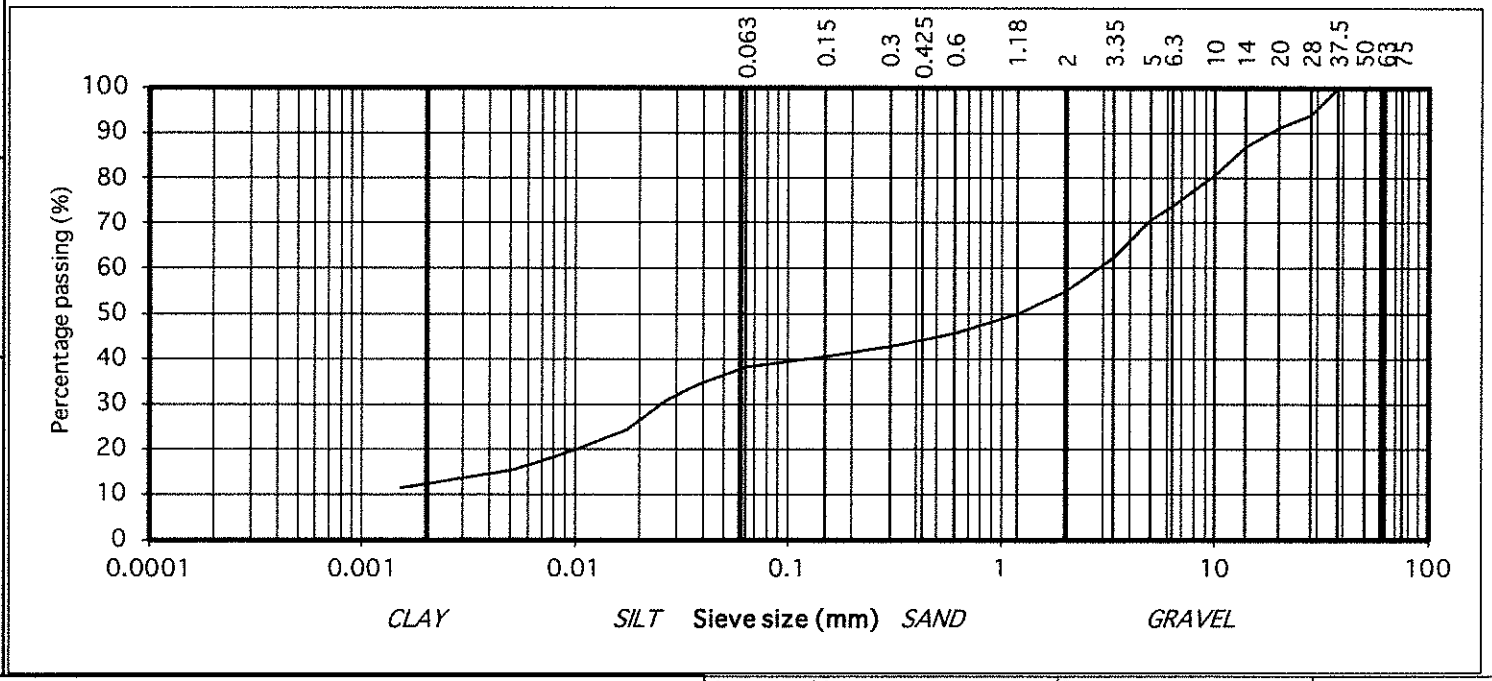
TEST REPORT
Determination of Particle Size Distribution
Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5
(note: Sedimentation stage not accredited)

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	100	
28	94	
20	91	
14	87	
10	81	
6.3	74	
5	71	
3.35	62	
2	55	
1.18	50	SAND
0.6	46	
0.425	44	
0.3	43	
0.15	41	
0.063	38	SILT/CLAY
0.037	34	
0.027	31	
0.017	24	
0.010	20	
0.007	18	
0.005	15	
0.002	12	

Contract No:	22153	Report No.	R108839
Contract:	Kilbride Development , Co.Wicklow		
BH/TP :	BH02		
Sample No.	AA126820	Lab. Sample No.	A20/109
Sample Type:	B		
Depth (m)	4.00	Customer:	Aecom
Date Received	07/01/2020	Date Testing started	16/01/2020
Description:	Brown slightly sandy, gravelly, CLAY		

Remarks

Note: Clause 9.2 and Clause 9.5 of BS1377-Part 2:1990 have been superseded by ISO17892-4:2016 . Results apply to sample as received.



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Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

TEST REPORT
Determination of Particle Size Distribution

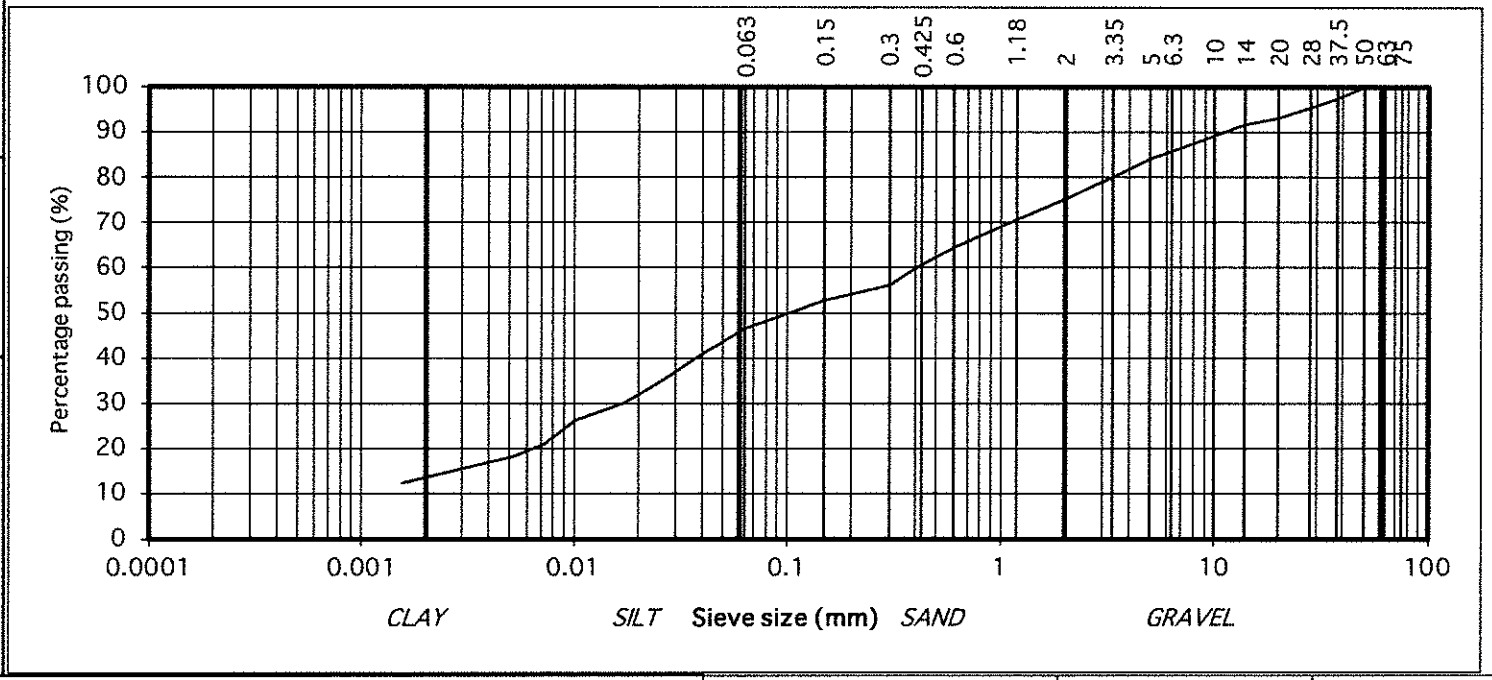
Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5
(note: Sedimentation stage not accredited)

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	97	
28	95	
20	93	
14	92	
10	89	
6.3	86	
5	84	
3.35	80	
2	75	
1.18	71	SAND
0.6	64	
0.425	61	
0.3	56	
0.15	53	
0.063	47	SILT/CLAY
0.038	40	
0.027	36	
0.018	30	
0.010	26	
0.007	21	
0.005	18	
0.002	13	

Contract No:	22153	Report No.	R108840
Contract:	Kilbride Development , Co.Wicklow		
BH/TP :	BH02		
Sample No.	AA126823	Lab. Sample No.	A20/110
Sample Type:	B		
Depth (m)	7.00	Customer:	Aecom
Date Received	07/01/2020	Date Testing started	16/01/2020
Description:	Brown slightly sandy, slightly gravelly, CLAY		

Remarks

Note: Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 , Results apply to sample as received.



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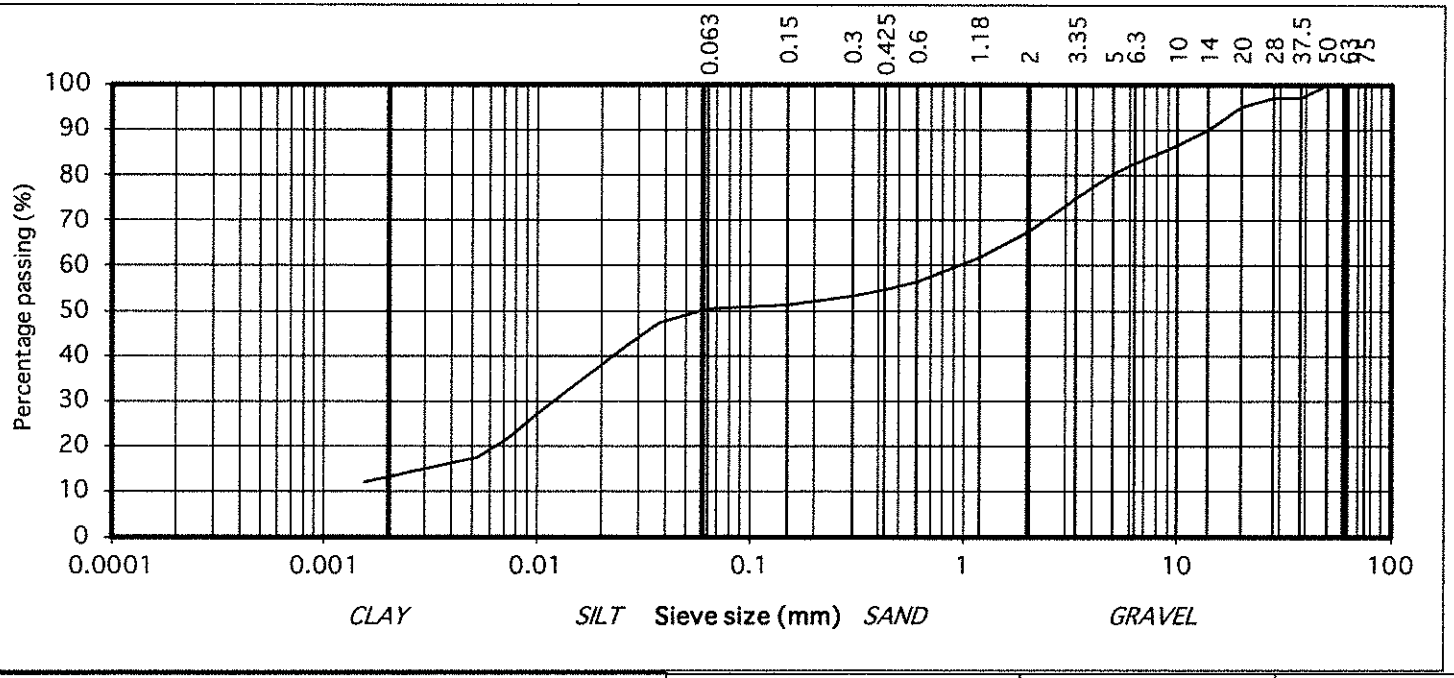
Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

TEST REPORT
Determination of Particle Size Distribution
Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5
(note: Sedimentation stage not accredited)

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	97	
28	97	
20	95	
14	90	
10	87	
6.3	83	
5	80	
3.35	75	
2	68	
1.18	62	SAND
0.6	56	
0.425	55	
0.3	53	
0.15	51	
0.063	50	SILT/CLAY
0.037	47	
0.027	42	
0.017	36	
0.010	28	
0.007	22	
0.005	17	
0.002	12	

Contract No: 22153 Report No. R108910
Contract: Kilbride Development , Co.Wicklow
BH/TP : BH03
Sample No. AA126846 Lab. Sample No. A20/112
Sample Type: B
Depth (m) 4.00 Customer: Aecom
Date Received 07/01/2020 Date Testing started 15/01/2020
Description: Brown slightly sandy, slightly gravelly, CLAY

Remarks Note: Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 . Results apply to sample as received.



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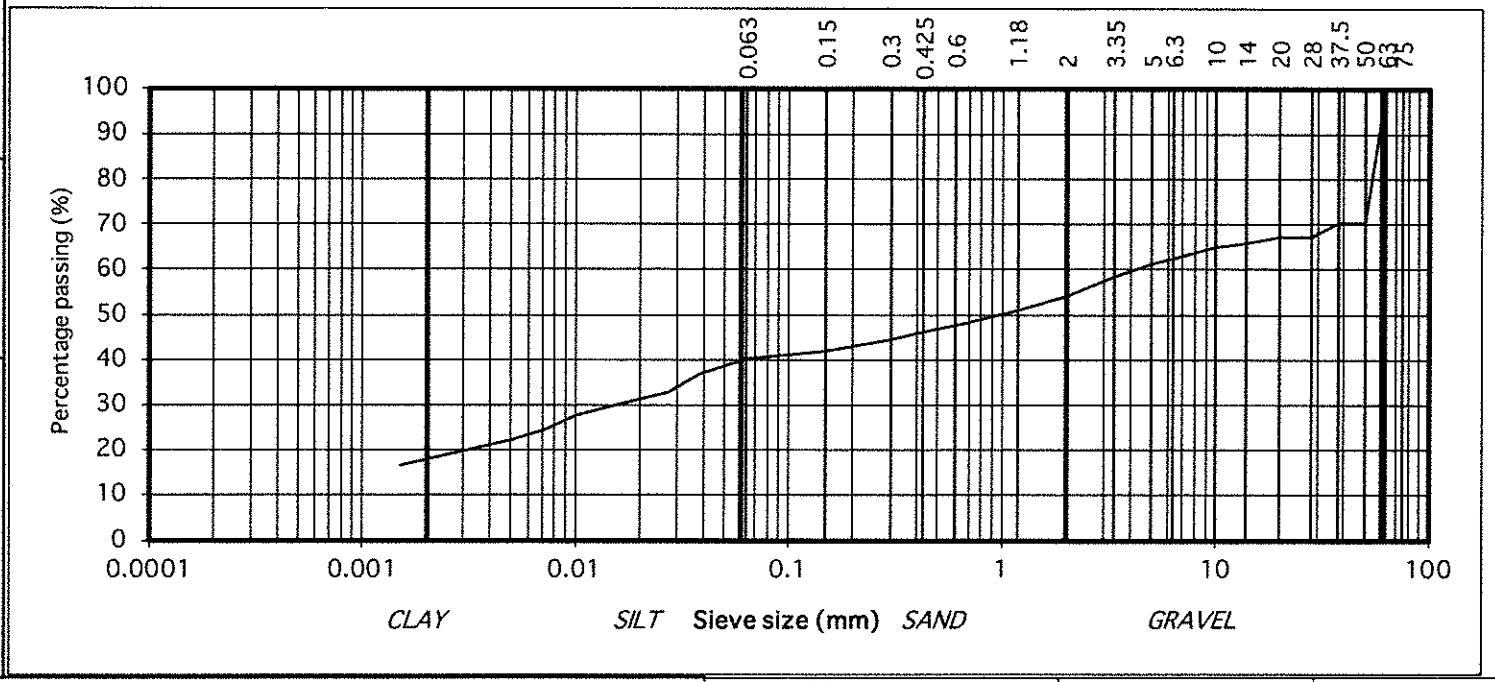
Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

TEST REPORT
Determination of Particle Size Distribution
Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5
(note: Sedimentation stage not accredited)

particle size	% passing	
75	100	COBBLES
63	100	
50	70	GRAVEL
37.5	70	
28	67	
20	67	
14	66	
10	65	
6.3	62	
5	61	
3.35	58	
2	54	
1.18	51	SAND
0.6	47	
0.425	46	
0.3	44	
0.15	42	
0.063	40	SILT/CLAY
0.038	37	
0.027	33	
0.017	30	
0.010	28	
0.007	25	
0.005	22	
0.002	17	

Contract No:	22153	Report No.	R108911
Contract:	Kilbride Development , Co.Wicklow		
BH/TP :	BH04		
Sample No.	AA126836	Lab. Sample No.	A20/114
Sample Type:	B		
Depth (m)	3.00	Customer:	Aecom
Date Received	07/01/2020	Date Testing started	16/01/2020
Description:	Brown slightly sandy, gravelly, CLAY		

Remarks Note: Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 . Results apply to sample as received. Sample size did not meet the requires of BS1377



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Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

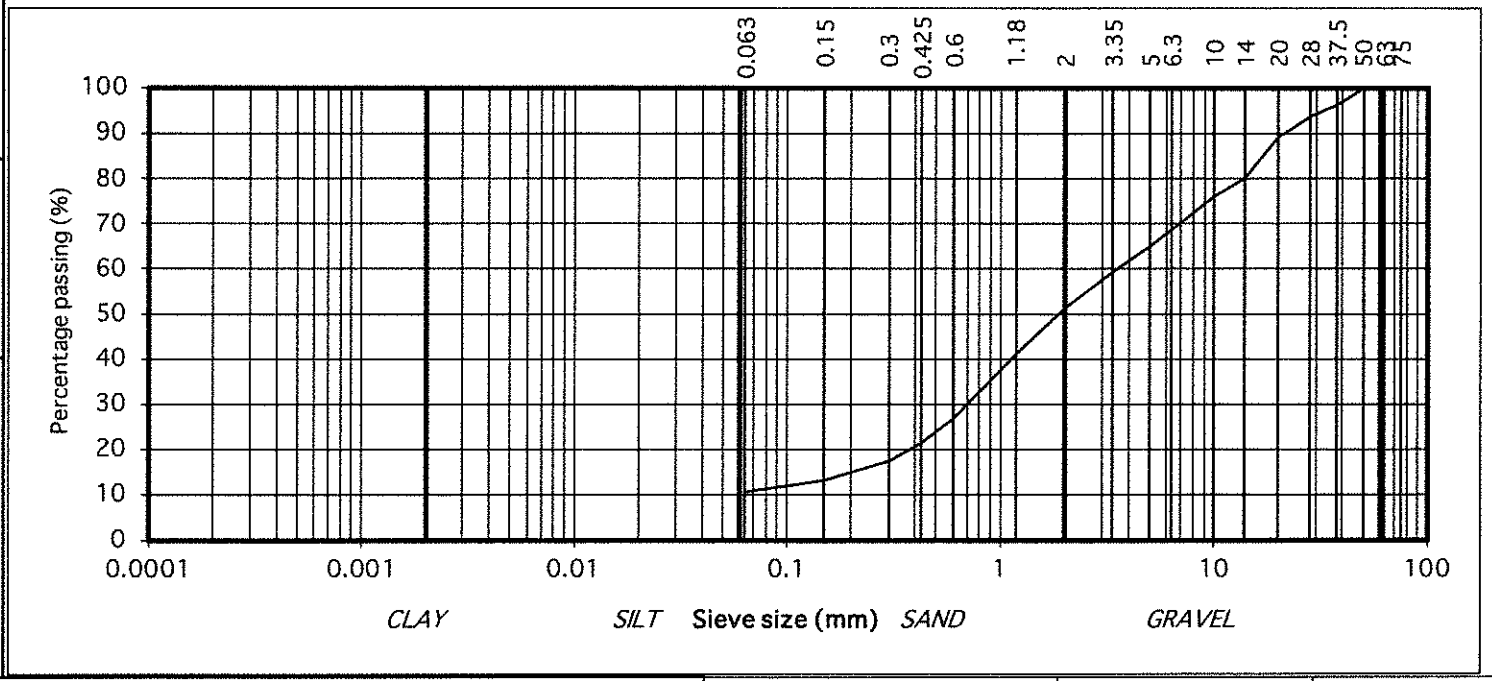
TEST REPORT
Determination of Particle Size Distribution
Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5
(note: Sedimentation stage not accredited)

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	96	
28	94	
20	89	
14	80	
10	76	
6.3	69	
5	65	
3.35	59	
2	51	
1.18	41	SAND
0.6	27	
0.425	21	
0.3	17	
0.15	13	
0.063	11	SILT/CLAY

Contract No:	22153	Report No.	R108841
Contract:	Kilbride Development , Co.Wicklow		
BH/TP :	BH05		
Sample No.	AA121836	Lab. Sample No.	A20/116
Sample Type:	B		
Depth (m)	1.00	Customer:	Aecom
Date Received	07/01/2020	Date Testing started	16/01/2020
Description:	Brown clayey/silty, very sandy, GRAVEL		

Remarks

Note: Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 . Results apply to sample as received.



IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
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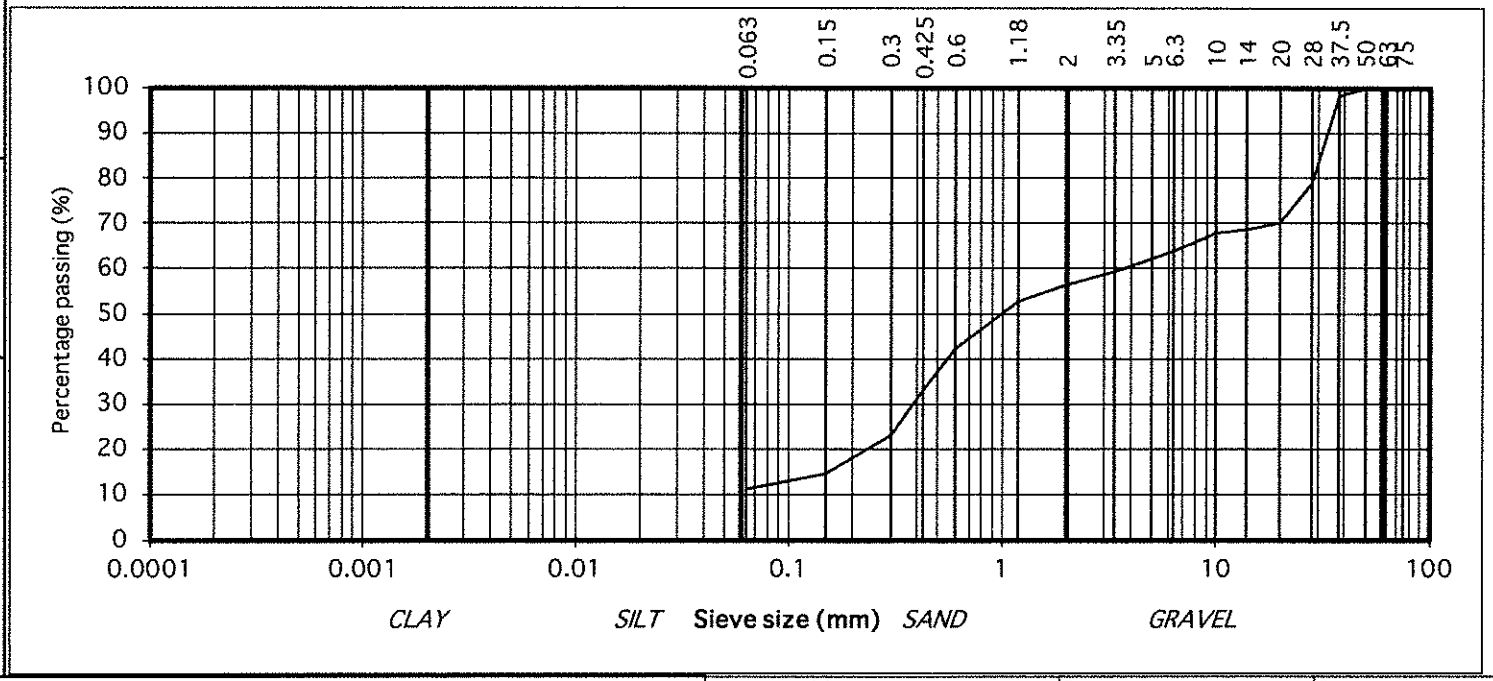
Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

TEST REPORT
Determination of Particle Size Distribution
Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5
(note: Sedimentation stage not accredited)

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	98	
28	79	
20	70	
14	69	
10	68	
6.3	64	
5	62	
3.35	59	
2	56	
1.18	53	SAND
0.6	42	
0.425	33	
0.3	23	
0.15	15	
0.063	11	SILT/CLAY

Contract No: 22153 Report No. R108912
Contract: Kilbride Development , Co.Wicklow
BH/TP : BH05
Sample No. AA121841 Lab. Sample No. A20/118
Sample Type: B
Depth (m) 5.00 Customer: Aecom
Date Received 07/01/2020 Date Testing started 16/01/2020
Description: Brown clayey/silty, very gravelly, SAND

Remarks Note: Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 . Results apply to sample as received.



IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
H Byrne	04/02/20	1 of 1

Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

TEST REPORT
Determination of Particle Size Distribution

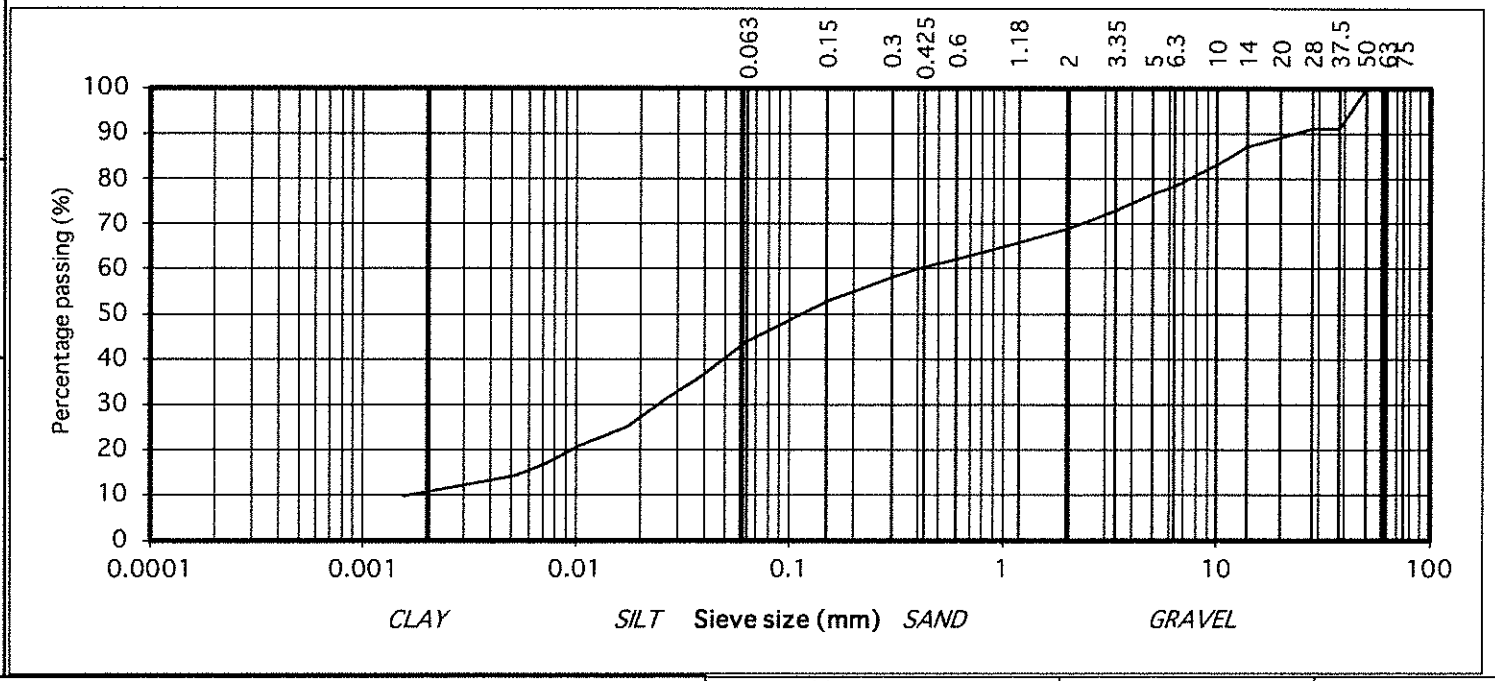
Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5
(note: Sedimentation stage not accredited)

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	91	
28	91	
20	89	
14	87	
10	83	
6.3	78	
5	77	
3.35	73	
2	69	
1.18	66	SAND
0.6	62	
0.425	60	
0.3	58	
0.15	53	
0.063	44	SILT/CLAY
0.038	36	
0.027	32	
0.018	25	
0.010	21	
0.007	17	
0.005	14	
0.002	10	

Contract No:	22153	Report No.	R108842
Contract:	Kilbride Development , Co.Wicklow		
BH/TP :	BH06		
Sample No.	AA126807	Lab. Sample No.	A20/119
Sample Type:	B		
Depth (m)	2.00	Customer:	Aecom
Date Received	07/01/2020	Date Testing started	16/01/2020
Description:	Brown slightly sandy, slightly gravelly, CLAY		

Remarks

Note: Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 . Results apply to sample as received.



IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
H Byrne	04/02/20	1 of 1

Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

TEST REPORT
Determination of Particle Size Distribution

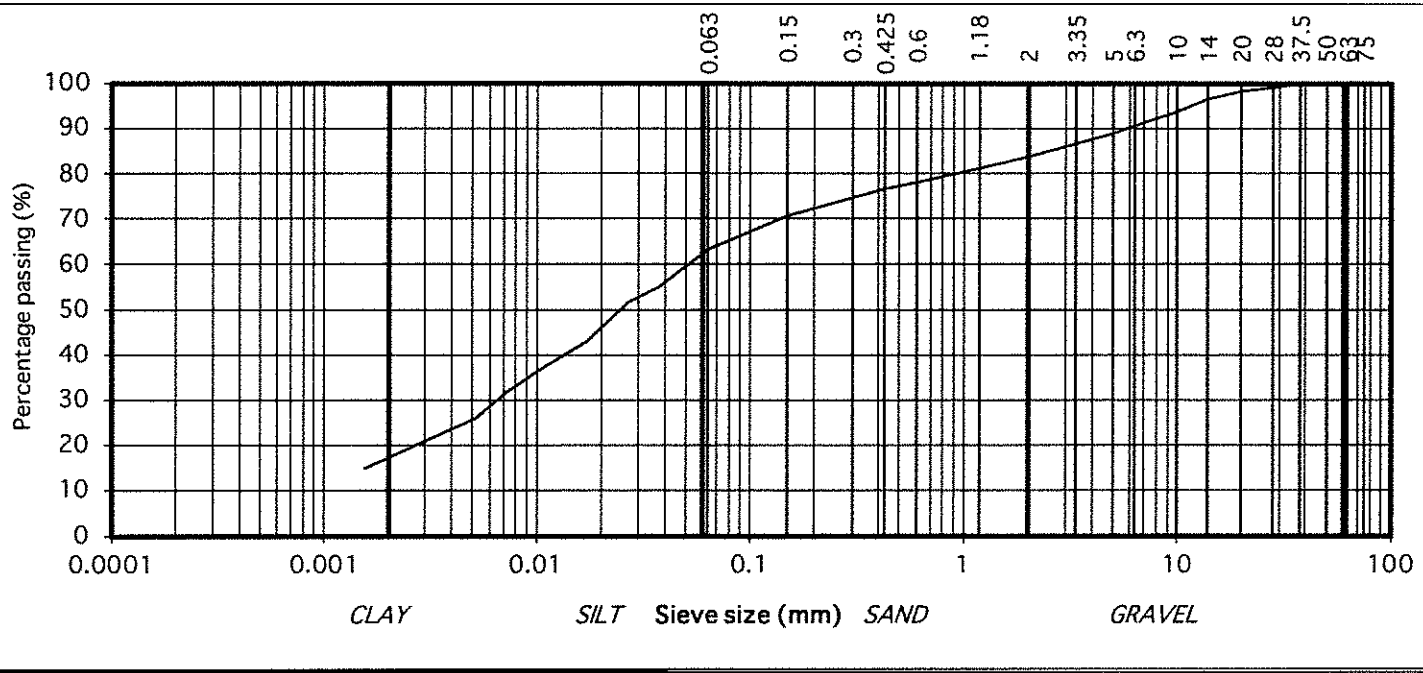
Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5
(note: Sedimentation stage not accredited)

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	100	
28	99	
20	98	
14	97	
10	94	
6.3	91	
5	89	
3.35	87	
2	84	
1.18	81	SAND
0.6	78	
0.425	77	
0.3	75	
0.15	71	
0.063	63	SILT/CLAY
0.038	55	
0.027	52	
0.017	43	
0.010	37	
0.007	32	
0.005	26	
0.002	15	

Contract No: 22153 Report No. R108833
Contract: Kilbride Development , Co.Wicklow
BH/TP : BH06
Sample No. AA126810 Lab. Sample No. A20/120
Sample Type: B
Depth (m) 5.00 Customer: Aecom
Date Received 07/01/2020 Date Testing started 16/01/2020
Description: Brown slightly sandy, slightly gravelly, CLAY

Remarks

Note: Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 . Results apply to sample as received.



IGSL Ltd Materials Laboratory

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Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

TEST REPORT
Determination of Particle Size Distribution

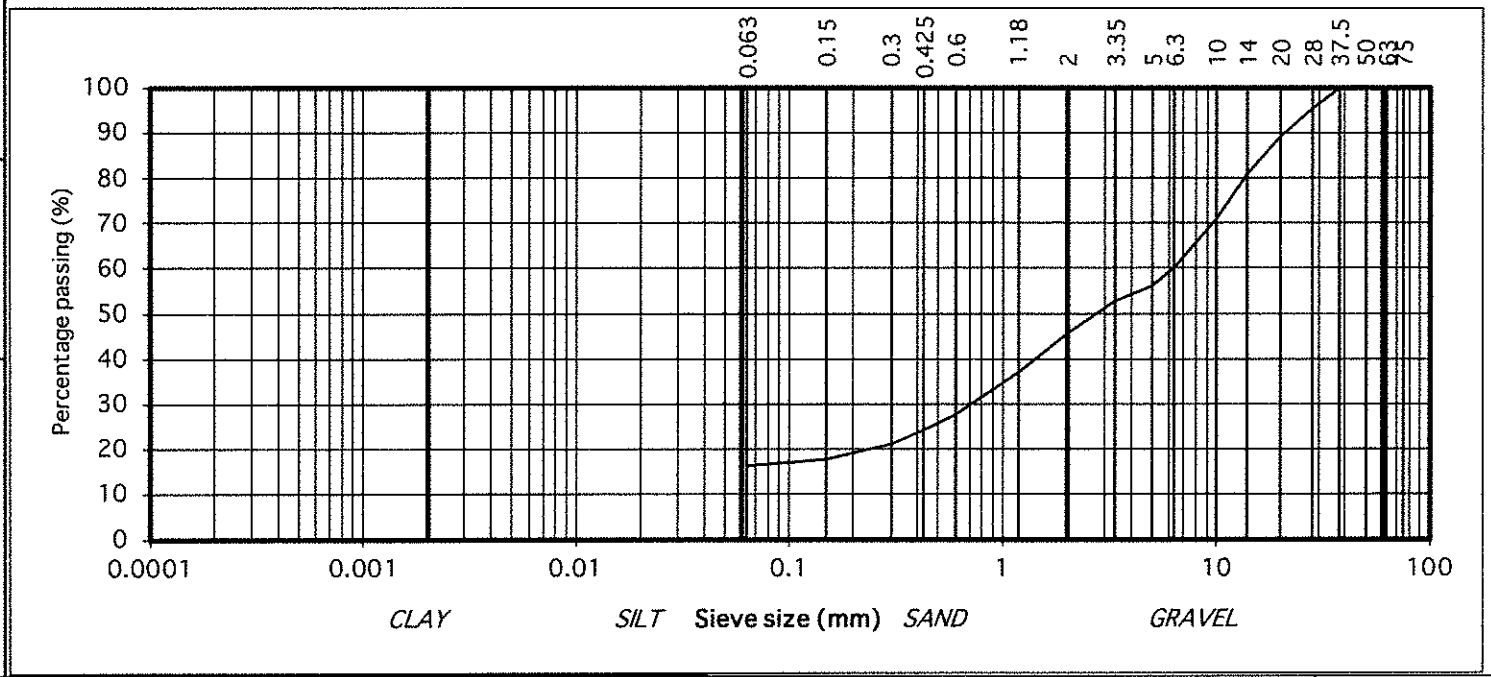
Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5
(note: Sedimentation stage not accredited)

ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	100	
28	95	
20	89	
14	81	
10	71	
6.3	60	
5	56	
3.35	53	
2	45	
1.18	37	SAND
0.6	28	
0.425	24	
0.3	21	
0.15	18	
0.063	16	SILT/CLAY

Contract No:	22153	Report No.	R108913
Contract:	Kilbride Development , Co.Wicklow		
BH/TP :	BH06		
Sample No.	AA126812	Lab. Sample No.	A20/121
Sample Type:	B		
Depth (m)	7.00	Customer:	Aecom
Date Received	07/01/2020	Date Testing started	16/01/2020
Description:	Brown clayey/silty, very sandy, GRAVEL		

Remarks Note: Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 . Results apply to sample as received.



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Approved by:	Date:	Page no:
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Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

IGSL Ltd
Materials Laboratory
M7 Business Park
Naas
Co. Kildare

Test Report

Dry Density/Moisture Content Relationship

Tested in accordance with BS1377:Part 4:1990

ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO.1331

Report No. R109020 Contract No. 22152

Contract Name: Kilbride Development , Co.Wicklow

Lab Contract No. 22152 Location: TP02

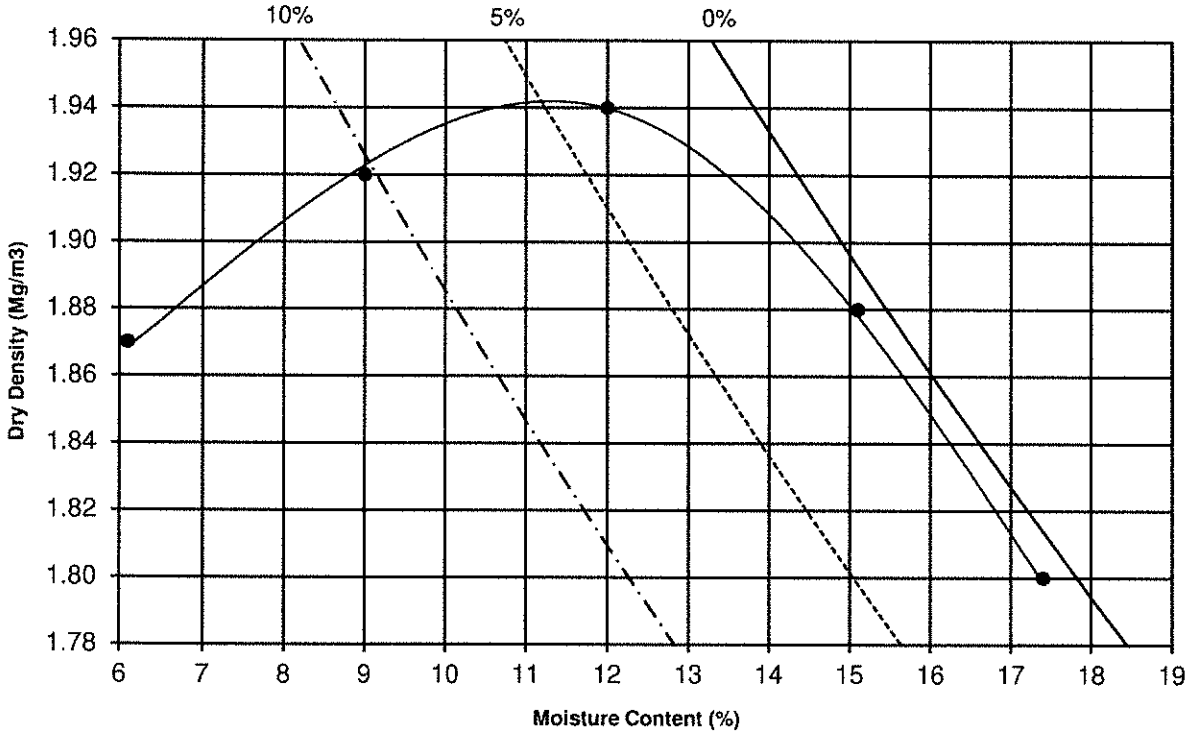
Sample No. AA128536/37 Depth (m) 1 Material Type B

Lab sample no. A20/0124 Customer: Aecom

Date Received: 07/01/2020 Test Method: 2.5 KG Rammer

Date Tested: 27/01/2020 BS1377:Part 4:1990 3.3

Dry Density (Mg/m^3)	1.80	1.88	1.94	1.92	1.87	0.00	
Moisture Content (%)	17	15	12	9.0	6.1	0	



Maximum Dry Density (Mg/m^3): 1.94 Optimum Moisture Content (%): 12

Description: Mottled brown sandy gravelly CLAY

Sample Preparation: Material passing 20mm ~~Single~~ / Separate samples used

Particle Density (Mg/m^3): 2.65 Particle Density: Assumed

% retained on 20/37.5mm sieve: 35

The result relates to the specimen tested.
Opinions and interpretations are outside the scope of accreditation

Persons authorised to approve reports
J Barrett (Quality Manager)
H Byrne (Laboratory Manager)

IGSL Materials Laboratory	Approved by	Date	Page
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IGSL Ltd
Materials Laboratory
M7 Business Park
Naas
Co. Kildare

Test Report

Dry Density/Moisture Content Relationship

Tested in accordance with BS1377:Part 4:1990

ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 1331

Report No. R108924 Contract No. 22152

Contract Name: Kilbride Development , Co.Wicklow

Lab Contract No. 22152 Location: TP04

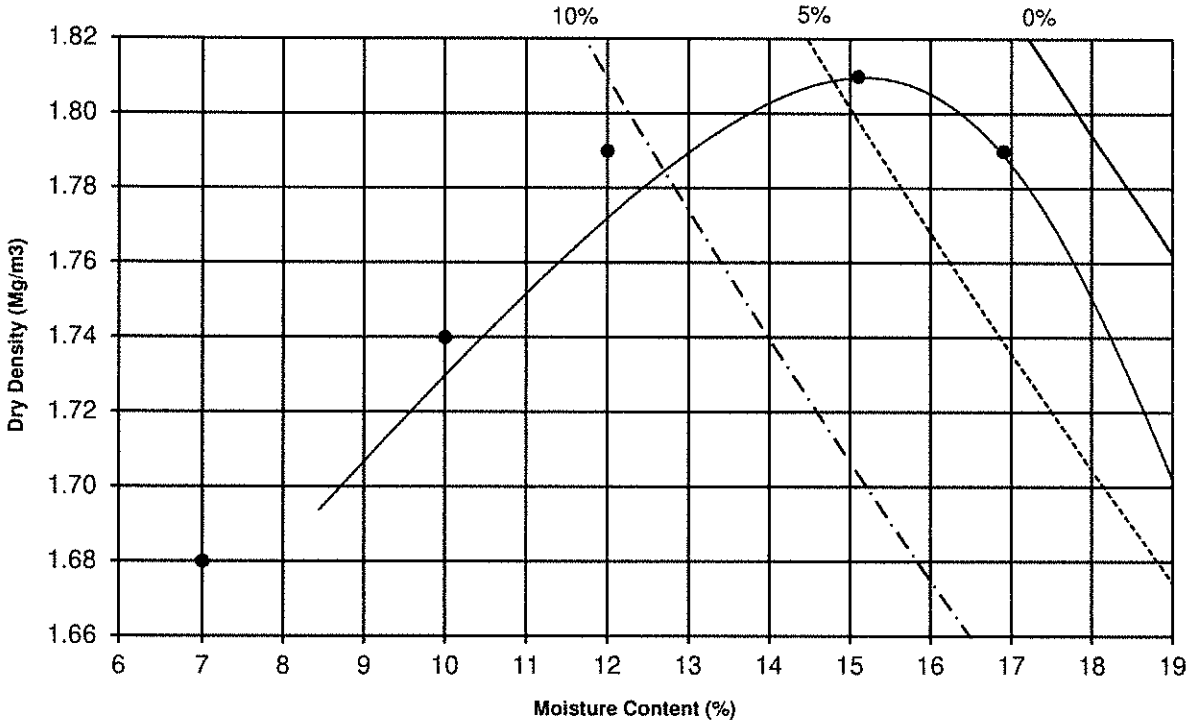
Sample No. AA128542/43 Depth (m) 0.6 Material Type B

Lab sample no. A20/0128 Customer: Aecom

Date Received: 07/01/2020 Test Method: 2.5 KG Rammer

Date Tested: 21/01/2020 BS1377:Part 4:1990 3.3

Dry Density (Mg/m^3)	1.79	1.81	1.79	1.74	1.68	1.74	
Moisture Content (%)	17	15	12	10	7.0	20	



Maximum Dry Density (Mg/m^3): 1.81 Optimum Moisture Content (%): 15

Description: Brown sandy gravelly CLAY

Sample Preparation: Material passing 20mm ~~Single~~ / Separate samples used

Particle Density (Mg/m^3): 2.65 Particle Density: Assumed

% retained on 20/37.5mm sieve: 0

Persons authorised to approve reports
J Barrett (Quality Manager)
H Byrne (Laboratory Manager)

The result relates to the specimen tested.
Opinions and interpretations are outside the scope of accreditation

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IGSL Ltd
Materials Laboratory
M7 Business Park
Naas
Co. Kildare

Test Report

Dry Density/Moisture Content Relationship

Tested in accordance with BS1377:Part 4:1990

ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

Report No. R108925 Contract No. 22152

Contract Name: Kilbride Development , Co.Wicklow

Lab Contract No. 22152 Location: TP07

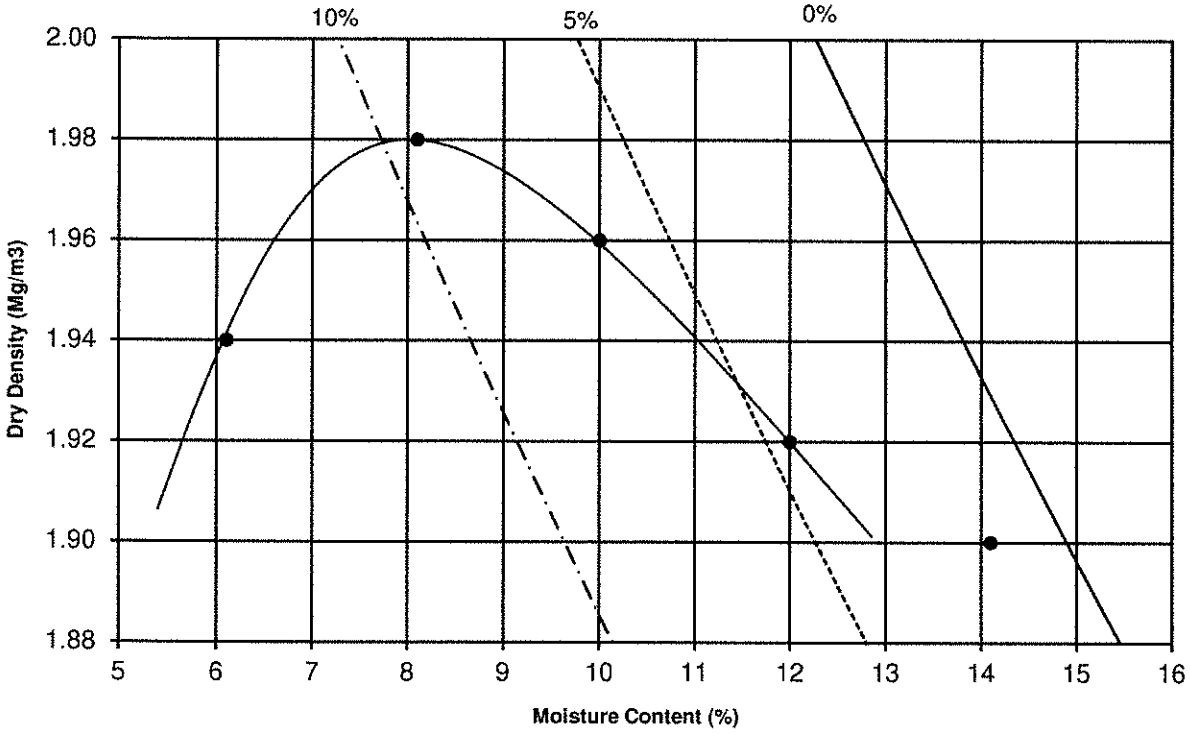
Sample No. AA128535 Depth (m) 1 Material Type B

Lab sample no. A20/0134 Customer: Aecom

Date Received: 07/01/2020 Test Method: 2.5 KG Rammer

Date Tested: 21/01/2020 BS1377:Part 4:1990 3.3

Dry Density (Mg/m^3)	1.90	1.92	1.96	1.98	1.94	0.00	
Moisture Content (%)	14	12	10	8.1	6.1	0	



Maximum Dry Density (Mg/m^3): 1.98 Optimum Moisture Content (%): 8

Description: Mottled brown sandy gravelly CLAY

Sample Preparation: Material passing 20mm ~~Single~~ / Separate samples used

Particle Density (Mg/m^3): 2.65 Particle Density: Assumed

% retained on 20/37.5mm sieve: 9.6

Persons authorised to approve reports
J Barrett (Quality Manager)
H Byrne (Laboratory Manager)

The result relates to the specimen tested.
Opinions and interpretations are outside the scope of accreditation

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IGSL Ltd
Materials Laboratory
Unit J5,M7 Business Park
Naas
Co. Kildare
045 899324

Test Report

Determination of Moisture Condition Value at Natural Moisture Content

Tested in accordance with BS1377:Part 4:1990, clause 5.4

Report No.	**R108851**
Contract No.	22153
Contract Name:	Kilbride Development , Co.Wicklow
Customer:	Aecom
BH/TP	TP02
Sample No.	AA128536/37
Depth (m)	1.00
Sample Type:	B
Lab Sample No.	A20/0124
Source (if applicable)	unknown
Material Type (if applicable):	B
Sample Received:	07/01/20
Date Tested:	21/01/20
Sample Cert:	N/A
Moisture Content (%):	16
% Particles > 20mm (By dry mass):	41
MCV:	3
Interpretation of Plot:	Steepest Straight Line
Description of Soil:	Mottled brown sandy gravelly CLAY

The result applies to the sample as received.
Any remaining material will be retained for one month.
Sampling and opinions and interpretations are outside the scope of accreditation.

Persons authorised to approve reports
J Barrett (Quality Manager)
H Byrne (Laboratory Manager)

IGSL Ltd Materials Laboratory	Approved by	Date	Page
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IGSL Ltd
Materials Laboratory
Unit J5,M7 Business Park
Naas
Co. Kildare
045 899324

Test Report

Determination of Moisture Condition Value at Natural Moisture Content

Tested in accordance with BS1377:Part 4:1990, clause 5.4

Report No.	**R108852**
Contract No.	22153
Contract Name:	Kilbride Development , Co.Wicklow
Customer:	Aecom
BH/TP	TP03
Sample No.	AA128525
Depth (m)	0.90
Sample Type:	B
Lab Sample No.	A20/0126
Source (if applicable)	unknown
Material Type (if applicable):	B
Sample Received:	07/01/20
Date Tested:	21/01/20
Sample Cert:	N/A
Moisture Content (%):	16
% Particles > 20mm (By dry mass):	23
MCV:	5.8
Interpretation of Plot:	Steepest Straight Line
Description of Soil:	Mottled brown sandy gravelly CLAY

The result applies to the sample as received.
Any remaining material will be retained for one month.
Sampling and opinions and interpretations are outside the scope of accreditation.

Persons authorised to approve reports
J Barrett (Quality Manager)
H Byrne (Laboratory Manager)

IGSL Ltd Materials Laboratory	Approved by	Date	Page
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IGSL Ltd
Materials Laboratory
Unit J5,M7 Business Park
Naas
Co. Kildare
045 899324

Test Report

Determination of Moisture Condition Value at Natural Moisture Content

Tested in accordance with BS1377:Part 4:1990, clause 5.4

Report No.	**R108853**
Contract No.	22153
Contract Name:	Kilbride Development , Co.Wicklow
Customer:	Aecom
BH/TP	TP04
Sample No.	AA128542/43
Depth (m)	0.60
Sample Type:	B
Lab Sample No.	A20/0128
Source (if applicable)	unknown
Material Type (if applicable):	B
Sample Received:	07/01/20
Date Tested:	21/01/20
Sample Cert:	N/A
Moisture Content (%):	20
% Particles > 20mm (By dry mass):	0
MCV:	10.7
Interpretation of Plot:	Steepest Straight Line
Description of Soil:	Brown sandy gravelly CLAY

The result applies to the sample as received.
Any remaining material will be retained for one month.
Sampling and opinions and interpretations are outside the scope of accreditation.

Persons authorised to approve reports
J Barrett (Quality Manager)
H Byrne (Laboratory Manager)

IGSL Ltd Materials Laboratory	Approved by	Date	Page
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IGSL Ltd
Materials Laboratory
Unit J5,M7 Business Park
Naas
Co. Kildare
045 899324

Test Report

Determination of Moisture Condition Value at Natural Moisture Content

Tested in accordance with BS1377:Part 4:1990, clause 5.4

Report No.	**R108919**
Contract No.	22153
Contract Name:	Kilbride Development , Co.Wicklow
Customer:	Aecom
BH/TP	TP06
Sample No.	AA128528
Depth (m)	1.00
Sample Type:	B
Lab Sample No.	A20/132
Source (if applicable)	unknown
Material Type (if applicable):	B
Sample Received:	07/01/20
Date Tested:	22/01/20
Sample Cert:	N/A
Moisture Content (%):	11
% Particles > 20mm (By dry mass):	16
MCV:	13.4
Interpretation of Plot:	Steepest Straight Line
Description of Soil:	Brown clayey/silty, very sandy, GRAVEL with some cobbles

The result applies to the sample as received.
Any remaining material will be retained for one month.
Sampling and opinions and interpretations are outside the scope of accreditation.

Persons authorised to approve reports
J Barrett (Quality Manager)
H Byrne (Laboratory Manager)

IGSL Ltd Materials Laboratory	Approved by	Date	Page
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IGSL Ltd
Materials Laboratory
Unit J5,M7 Business Park
Naas
Co. Kildare
045 899324

Test Report

Determination of Moisture Condition Value at Natural Moisture Content

Tested in accordance with BS1377:Part 4:1990, clause 5.4

Report No.	**R108854**
Contract No.	22153
Contract Name:	Kilbride Development , Co.Wicklow
Customer:	Aecom
BH/TP	TP07
Sample No.	AA128535
Depth (m)	1.00
Sample Type:	B
Lab Sample No.	A20/0134
Source (if applicable)	unknown
Material Type (if applicable):	B
Sample Received:	07/01/20
Date Tested:	21/01/20
Sample Cert:	N/A
Moisture Content (%):	15
% Particles > 20mm (By dry mass):	11
MCV:	4.6
Interpretation of Plot:	Steepest Straight Line
Description of Soil:	Mottled brown sandy gravelly CLAY

The result applies to the sample as received.
Any remaining material will be retained for one month.
Sampling and opinions and interpretations are outside the scope of accreditation.

Persons authorised to approve reports
J Barrett (Quality Manager)
H Byrne (Laboratory Manager)

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	H Byrne	04/02/20	1 of 1

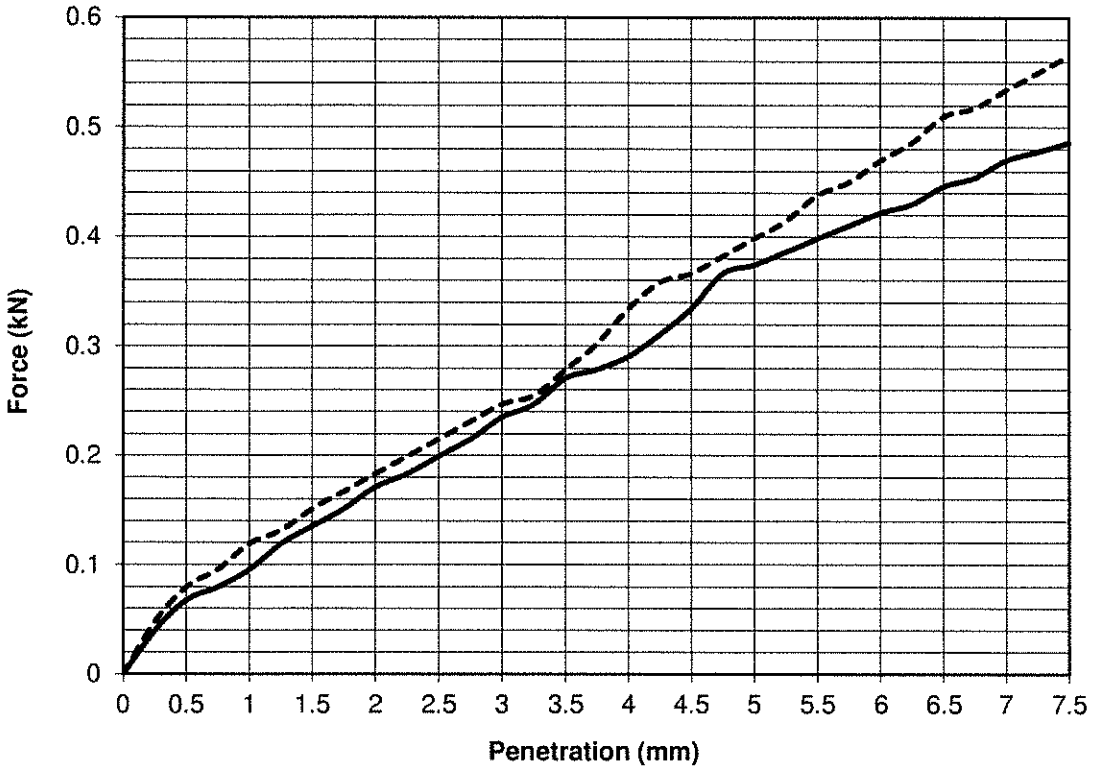
IGSL Ltd
Materials Laboratory
Unit J5,M7 Business Park
Naas Co.Kildare
045 899324

TEST REPORT
Determination of California Bearing Ratio (CBR)

Tested in accordance with BS1377:Part 4:1990, clause 7

ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO.1137

Report No.	R108724	Contract	Kilbride Development , Co.Wicklow
Contract No.	22153	Customer	Aecom
Date received	07/01/20	Date Tested	16/01/20
BH/TP No.	TP01	Sample No.	AA128551 Type: B
Depth (m)	0.90	Lab sample No.	A20/0122



Key: ———— Top ---------- Base

Description:	Mottled grey/brown sandy gravelly CLAY		
Initial Condition:	Unsoaked		
Moisture Content (%):	20	Bulk Density (Mg/m^3):	2.08
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.74
% Material >20mm:	19		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**1.9**	**2.0**
Moisture Content %	19	20

Results apply to sample as received.

Persons authorized to approve reports
J Barrett (Quality Manager)
H Byrne (Laboratory Manager)

IGSL Ltd Materials Laboratory

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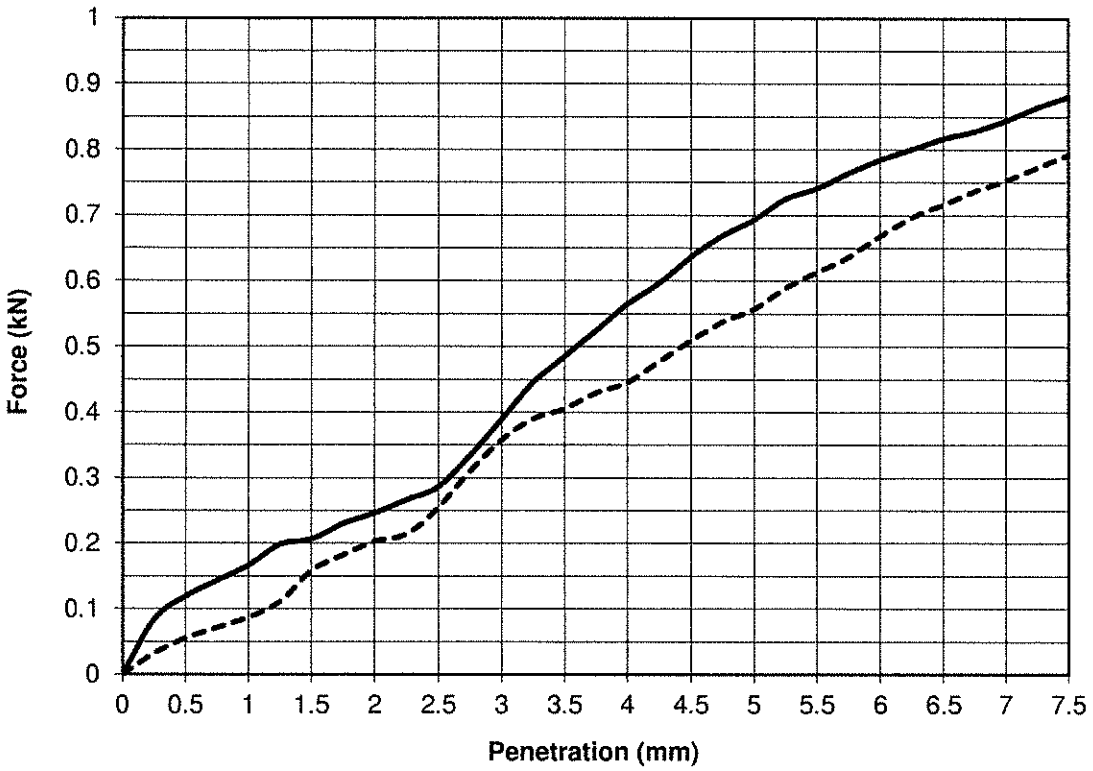
IGSL Ltd
Materials Laboratory
Unit J5,M7 Business Park
Naas Co.Kildare
045 899324

TEST REPORT
Determination of California Bearing Ratio (CBR)

Tested in accordance with BS1377:Part 4:1990, clause 7

ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO.1337

Report No.	R108927	Contract	Kilbride Development , Co.Wicklow
Contract No.	22153	Customer	Aecom
Date received	07/01/20	Date Tested	22/01/20
BH/TP No.	TP02	Sample No.	AA128536/7 Type: B
Depth (m)	1.00	Lab sample No.	A20/0124



Key: ———— Top ---------- Base

Description:	Mottled brown sandy gravelly CLAY		
Initial Condition:	Unsoaked		
Moisture Content (%):	18	Bulk Density (Mg/m^3):	2.15
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.83
% Material >20mm:	35		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**3.5**	**2.8**
Moisture Content %	17	18

Results apply to sample as received.

Persons authorized to approve reports

J Barrett (Quality Manager)
H Byrne (Laboratory Manager)

IGSL Ltd Materials Laboratory

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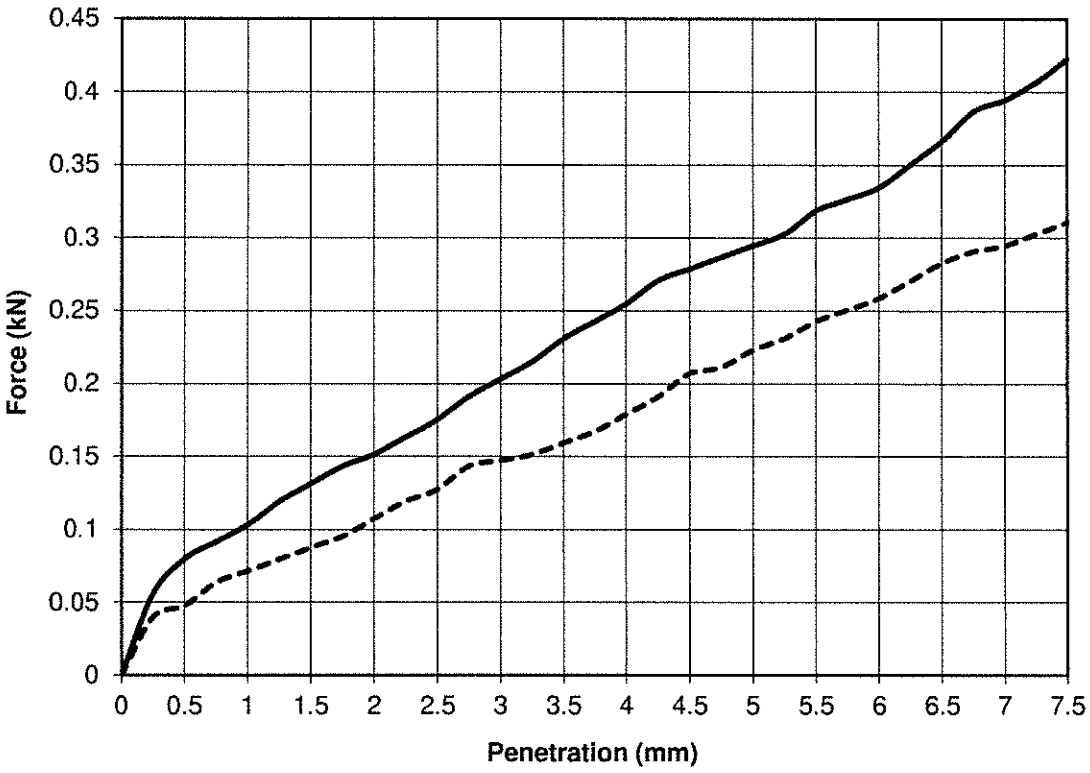
IGSL Ltd
Materials Laboratory
Unit J5,M7 Business Park
Naas Co.Kildare
045 899324

TEST REPORT
Determination of California Bearing Ratio (CBR)

Tested in accordance with BS1377:Part 4:1990, clause 7

Report No.	R108846	Contract	Kilbride Development , Co.Wicklow
Contract No.	22153	Customer	Aecom
Date received	07/01/20	Date Tested	21/01/20
BH/TP No.	TP03	Sample No.	AA128525 Type: B
Depth (m)	1.00	Lab sample No.	A20/0126



Key: ———— Top ---------- Base

Description:	Mottled brown sandy gravelly CLAY		
Initial Condition:	Unsoaked		
Moisture Content (%):	16	Bulk Density (Mg/m^3):	2.15
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.85
% Material >20mm:	20		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**1.5**	**1.1**
Moisture Content %	16	16

Results apply to sample as received.

Persons authorized to approve reports

J Barrett (Quality Manager)
H Byrne (Laboratory Manager)

IGSL Ltd Materials Laboratory

Approved by	Date	Page No.
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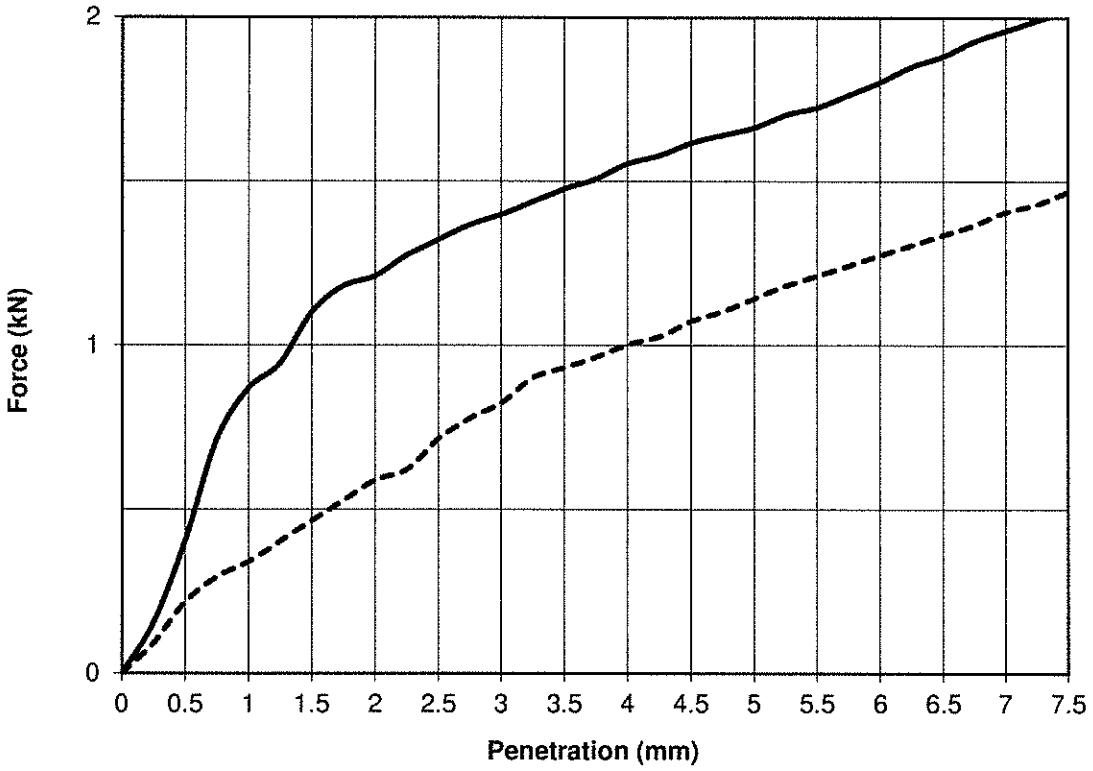
IGSL Ltd
Materials Laboratory
Unit J5,M7 Business Park
Naas Co.Kildare
045 899324

TEST REPORT
Determination of California Bearing Ratio (CBR)

Tested in accordance with BS1377:Part 4:1990, clause 7

ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO.1331

Report No.	R108847	Contract	Kilbride Development , Co.Wicklow
Contract No.	22153	Customer	Aecom
Date received	07/01/20	Date Tested	21/01/20
BH/TP No.	TP04	Sample No.	AA128542/43 Type: B
Depth (m)	0.60	Lab sample No.	A20/0128



Key: ———— Top ---------- Base

Description:	Brown sandy gravelly CLAY		
Initial Condition:	Unsoaked		
Moisture Content (%):	17	Bulk Density (Mg/m^3):	2.09
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.79
% Material >20mm:	0		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**10**	**6**
Moisture Content %	17	17

Results apply to sample as received.

Persons authorized to approve reports

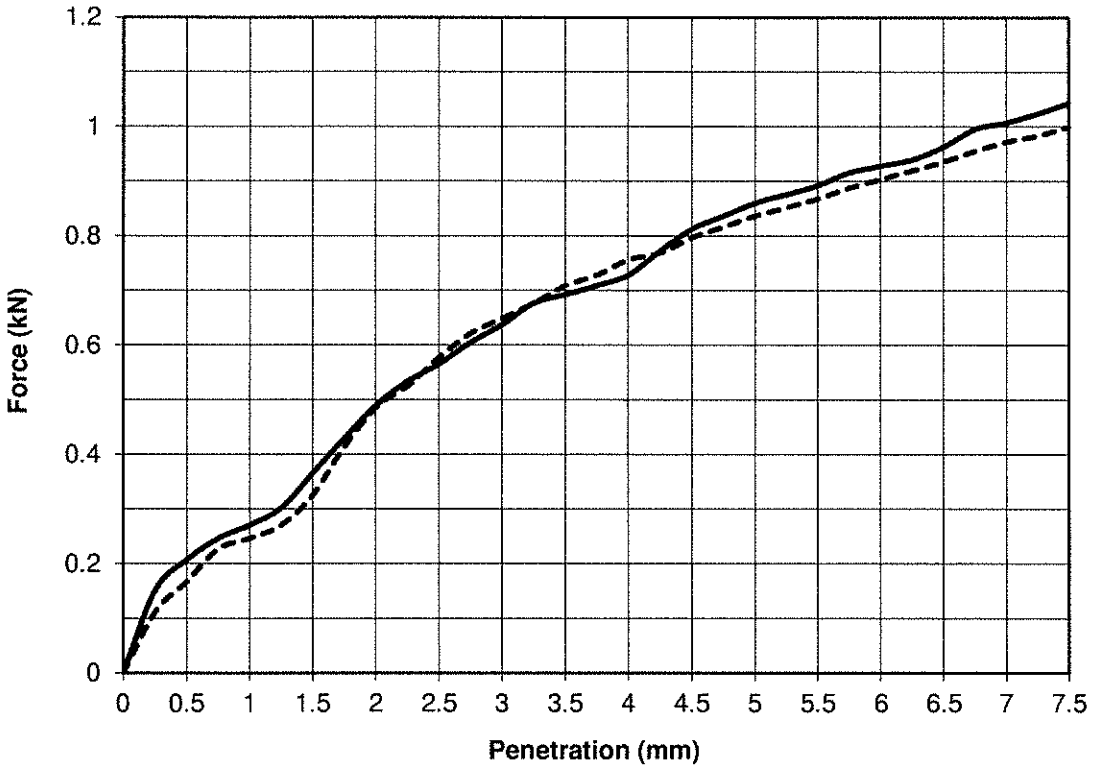
J Barrett (Quality Manager)
H Byrne (Laboratory Manager)

IGSL Ltd Materials Laboratory

Approved by	Date	Page No.
	04/02/20	1 of 1

IGSL Ltd Materials Laboratory Unit J5,M7 Business Park Naas Co.Kildare 045 899324	TEST REPORT Determination of California Bearing Ratio (CBR) Tested in accordance with BS1377:Part 4:1990, clause 7	ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO.1337

Report No.	R108725	Contract	Kilbride Development , Co.Wicklow
Contract No.	22153	Customer	Aecom
Date received	07/01/20	Date Tested	16/01/20
BH/TP No.	TP05	Sample No.	AA128519 Type: B
Depth (m)	1.00	Lab sample No.	A20/0130



Key: ———— Top ---------- Base

Description:	Mottled brown sandy gravelly CLAY		
Initial Condition:	Unsoaked		
Moisture Content (%):	21	Bulk Density (Mg/m^3):	2.03
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.68
% Material >20mm:	0		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**4.3**	**4.4**
Moisture Content %	20	21

Results apply to sample as received.

Persons authorized to approve reports

J Barrett (Quality Manager)

H Byrne (Laboratory Manager)

IGSL Ltd Materials Laboratory	Approved by	Date	Page No.
	H Byrne	04/02/20	1 of 1

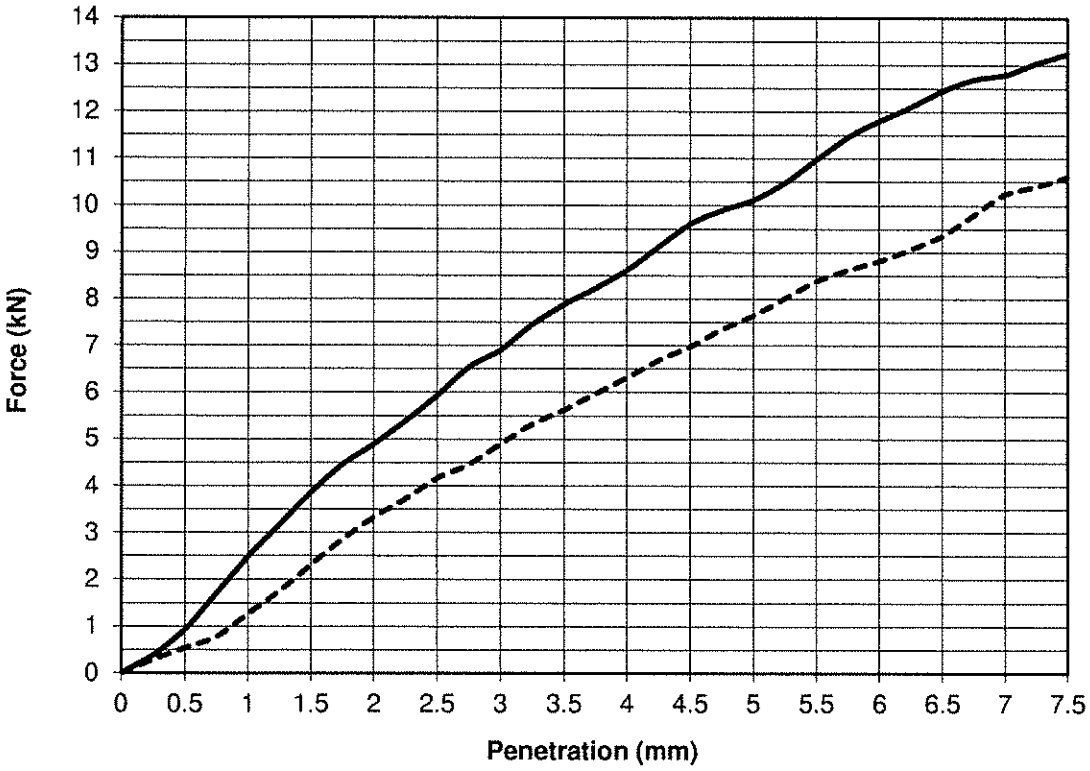
IGSL Ltd
Materials Laboratory
Unit J5,M7 Business Park
Naas Co.Kildare
045 899324

TEST REPORT
Determination of California Bearing Ratio (CBR)

Tested in accordance with BS1377:Part 4:1990, clause 7

ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 1231

Report No.	R108726	Contract	Kilbride Development , Co.Wicklow
Contract No.	22153	Customer	Aecom
Date received	07/01/20	Date Tested	16/01/20
BH/TP No.	TP06	Sample No.	AA128528 Type: B
Depth (m)	1.00	Lab sample No.	A20/0132



Key: ———— Top ---------- Base

Description:	Brown clayey/silty, very sandy, GRAVEL with some cobbles		
Initial Condition:	Unsoaked		
Moisture Content (%):	11	Bulk Density (Mg/m^3):	2.25
Surcharge (kg):	4	Dry Density (Mg/m^3):	2.02
% Material >20mm:	0		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**51**	**38**
Moisture Content %	11	11

Results apply to sample as received

Persons authorized to approve reports

J Barrett (Quality Manager)
H Byrne (Laboratory Manager)

IGSL Ltd Materials Laboratory

Approved by	Date	Page No.
	04/02/20	1 of 1

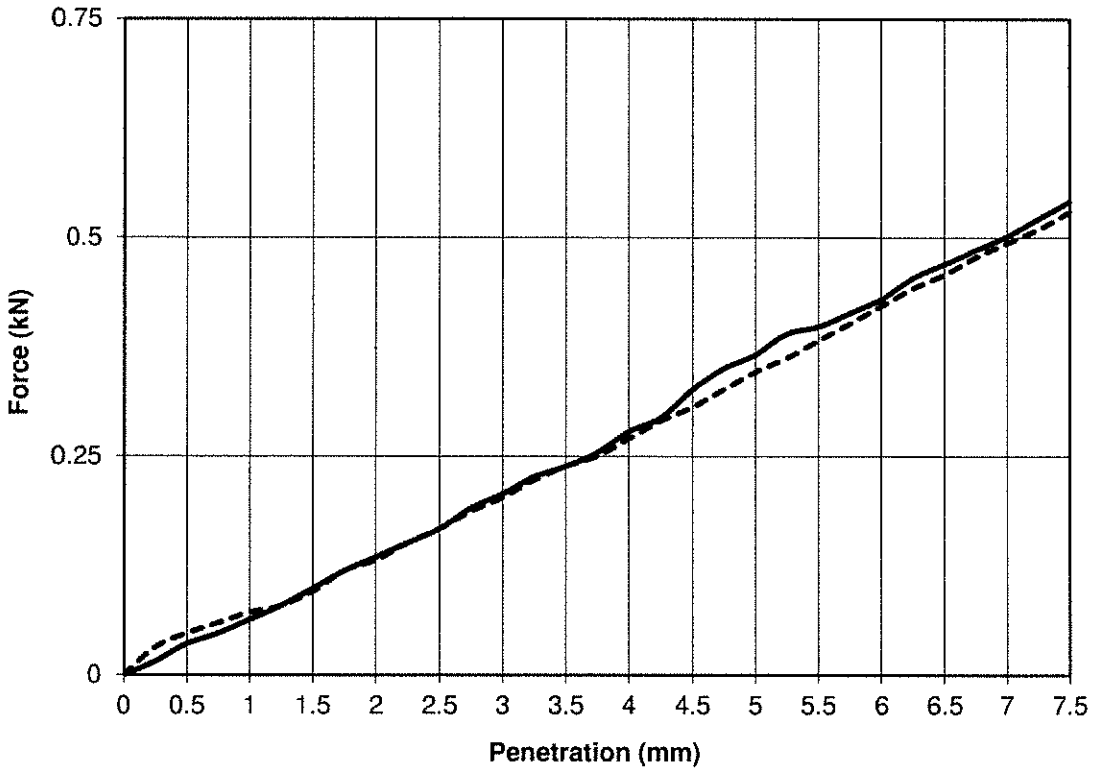
IGSL Ltd
Materials Laboratory
Unit J5,M7 Business Park
Naas Co.Kildare
045 899324

TEST REPORT
Determination of California Bearing Ratio (CBR)

Tested in accordance with BS1377:Part 4:1990, clause 7

ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO.1331

Report No.	R108850	Contract	Kilbride Development , Co.Wicklow
Contract No.	22153	Customer	Aecom
Date received	07/01/20	Date Tested	21/01/20
BH/TP No.	TP07	Sample No.	AA128535 Type: B
Depth (m)	1.00	Lab sample No.	A20/134



Key: ———— Top ---------- Base

Description:	Mottled brown sandy gravelly CLAY		
Initial Condition:	Unsoaked		
Moisture Content (%):	14	Bulk Density (Mg/m^3):	2.16
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.89
% Material >20mm:	9.6		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**1.8**	**1.7**
Moisture Content %	14	14

Results apply to sample as received.

Persons authorized to approve reports

J Barrett (Quality Manager)
H Byrne (Laboratory Manager)

IGSL Ltd Materials Laboratory

Approved by	Date	Page No.
	04/02/20	1 of 1

Appendix VI Laboratory

b. Chemical and Environmental

Chemtest
The right chemistry to deliver results
Chemtest Ltd.
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

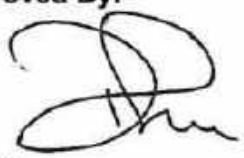
UKAS TESTING 2183

mCERTS

Final Report

Report No.:	20-01302-1		
Initial Date of Issue:	28-Jan-2020		
Client	IGSL		
Client Address:	M7 Business Park Naas County Kildare Ireland		
Contact(s):	Darren Keogh		
Project	22153 Killbride Development Wicklow (Aecom)		
Quotation No.:	Q19-18246	**Date Received:**	16-Jan-2020
Order No.:		**Date Instructed:**	20-Jan-2020
No. of Samples:	16		
Turnaround (Wkdays):	7	**Results Due:**	28-Jan-2020
Date Approved:	28-Jan-2020		

Approved By:



Details: Darrell Hall, Director

Chemtest
The right chemistry to deliver results

Results - Leachate

Project: 22153 Killbride Development Wicklow (Aecom)

Client: IGSL					**Chemtest Job No.:**	20-01302	20-01302
Quotation No.: Q19-18246					**Chemtest Sample ID.:**	954291	954295
Order No.:					Client Sample Ref.:	128530	126841
					Sample Location:	TP8	BH3
					Sample Type:	SOIL	SOIL
					Top Depth (m):	0.40	1.00
					Bottom Depth (m):	0.50	1.00
Determinand	**Accred.**	**SOP**	**Type**	**Units**	**LOD**		
pH	U	1010	10:1		N/A	8.5	8.4
Ammonium	U	1220	10:1	mg/l	0.050	0.20	0.12
Ammonium	N	1220	10:1	mg/kg	0.10	2.3	1.4
Boron (Dissolved)	U	1450	10:1	µg/l	20	< 20	< 20
Boron (Dissolved)	U	1450	10:1	mg/kg	0.20	< 0.20	< 0.20

Chemtest
The right chemistry to deliver results

Results - Soil

Project: 22153 Kilbride Development Wicklow (Aecom)

Client: IGSL					Chemtest Job No.:	20-01302	20-01302	20-01302	20-01302	20-01302	20-01302	20-01302	20-01302	20-01302	20-01302
Quotation No.: Q19-18246					Chemtest Sample ID.:	954287	954288	954289	954290	954291	954292	954293	954294	954295	954296
Order No.:					Client Sample Ref.:		128541	128519	128529	128530	121844	126815	126817	126841	128844
					Sample Location:	TP1	TP3	TP5	TP6	TP8	BH01	BH02	BH02	BH3	BH3
					Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
					Top Depth (m):	0.40	0.60	1.00	2.00	0.40	1.00	1.00	1.50	1.00	2.00
					Bottom Depth (m):		0.60	1.00	2.00	0.50	1.00	1.00	1.50	1.00	2.00
					Asbestos Lab:					DURHAM				DURHAM	
Determinand	**Accred.**	**SOP**	**Units**	**LOD**											
ACM Type	U	2192		N/A						-				-	
Asbestos Identification	U	2192	%	0.001						No Asbestos Detected				No Asbestos Detected	
ACM Detection Stage	U	2192		N/A						-				-	
Moisture	N	2030	%	0.020	14	15	17	12	9.6	11	17	12	16	12	
pH (2.5:1)	N	2010		4.0	[A] 7.8		[A] 7.8	[A] 8.2			[A] 7.8			[A] 8.1	
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40					< 0.40				< 0.40		
Magnesium (Water Soluble)	N	2120	g/l	0.010	< 0.010		< 0.010	< 0.010			< 0.010			< 0.010	
Sulphate (2:1 Water Soluble) as SO4	M	2120	g/l	0.010	< 0.010		< 0.010	< 0.010			< 0.010			< 0.010	
Total Sulphur	M	2175	%	0.010	[A] 0.022		[A] 0.011	[A] < 0.010			[A] < 0.010			[A] 1.1	
Sulphur (Elemental)	M	2180	mg/kg	1.0					[A] < 1.0				[A] 5.4		
Chloride (Water Soluble)	U	2220	g/l	0.010	[A] < 0.010		[A] < 0.010	[A] < 0.010			[A] < 0.010			[A] < 0.010	
Nitrate (Water Soluble)	N	2220	g/l	0.010	< 0.010		< 0.010	< 0.010			< 0.010			< 0.010	
Cyanide (Total)	M	2300	mg/kg	0.50					[A] < 0.50				[A] < 0.50		
Sulphide (Easily Liberatable)	N	2325	mg/kg	0.50					[A] 1.5				[A] 1.3		
Ammonium (Water Soluble)	M	2120	g/l	0.01	0.06		0.04	0.03			0.02			0.06	
Sulphate (Acid Soluble)	M	2430	%	0.010	[A] < 0.010		[A] < 0.010	[A] < 0.010	[A] < 0.010		[A] < 0.010		[A] < 0.010	[A] < 0.010	
Arsenic	M	2450	mg/kg	1.0		11			14	9.2		21	20		
Barium	M	2450	mg/kg	10					35				55		
Cadmium	M	2450	mg/kg	0.10					0.10				< 0.10		
Chromium	M	2450	mg/kg	1.0					17				21		
Molybdenum	M	2450	mg/kg	2.0					< 2.0				< 2.0		
Antimony	N	2450	mg/kg	2.0					< 2.0				< 2.0		
Copper	U	2450	mg/kg	0.50		18			15	11		28	29		
Mercury	M	2450	mg/kg	0.10		< 0.10			< 0.10	< 0.10		< 0.10	< 0.10		
Nickel	M	2450	mg/kg	0.50		40			21	17		43	33		
Lead	M	2450	mg/kg	0.50		11			19	8.9		14	18		
Selenium	M	2450	mg/kg	0.20		0.21			0.35	0.23		0.37	0.21		
Zinc	U	2450	mg/kg	0.50		36			48	32		66	62		
Chromium (Trivalent)	N	2490	mg/kg	1.0		24			17	11		27	21		
Chromium (Hexavalent)	N	2490	mg/kg	0.50		< 0.50			< 0.50	< 0.50		< 0.50	< 0.50		
Total Organic Carbon	M	2625	%	0.20					[A] 0.80				[A] < 0.20		
Mineral Oil	N	2670	mg/kg	10					< 10				< 10		
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0		[A] < 1.0			[A] < 1.0	[A] < 1.0		[A] < 1.0	[A] < 1.0		
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0		[A] < 1.0			[A] < 1.0	[A] < 1.0		[A] < 1.0	[A] < 1.0		
Aliphatic TPH >C8-C10	M	2680	mg/kg	1.0		[A] < 1.0			[A] < 1.0	[A] < 1.0		[A] < 1.0	[A] < 1.0		
Aliphatic TPH >C10-C12	M	2680	mg/kg	1.0		[A] < 1.0			[A] < 1.0	[A] < 1.0		[A] < 1.0	[A] < 1.0		
Aliphatic TPH >C12-C16	M	2680	mg/kg	1.0		[A] < 1.0			[A] < 1.0	[A] < 1.0		[A] < 1.0	[A] < 1.0		

Chemtest
The right chemistry to deliver results

Results - Soil

Project: 22153 Killbride Development Wicklow (Aecom)

Client: IGSL			Chemtest Job No.:		20-01302	20-01302	20-01302	20-01302	20-01302	20-01302	20-01302	20-01302	20-01302	20-01302
Quotation No.: Q19-18246			Chemtest Sample ID.:		954287	954288	954289	954290	954291	954292	954293	954294	954295	954296
Order No.:			Client Sample Ref.:			128541	128519	128529	128530	121844	126815	126817	126841	128844
			Sample Location:		TP1	TP3	TP5	TP6	TP8	BH01	BH02	BH02	BH3	BH3
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		0.40	0.60	1.00	2.00	0.40	1.00	1.00	1.50	1.00	2.00
			Bottom Depth (m):			0.60	1.00	2.00	0.50	1.00	1.00	1.50	1.00	2.00
			Asbestos Lab:						DURHAM				DURHAM	
Determinand	**Accred.**	**SOP**	**Units**	**LOD**										
Aliphatic TPH >C16-C21	M	2680	mg/kg	1.0		[A] < 1.0			[A] < 1.0	[A] < 1.0		[A] < 1.0	[A] < 1.0	
Aliphatic TPH >C21-C35	M	2680	mg/kg	1.0		[A] < 1.0			[A] < 1.0	[A] < 1.0		[A] < 1.0	[A] < 1.0	
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0		[A] < 1.0			[A] < 1.0	[A] < 1.0		[A] < 1.0	[A] < 1.0	
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0		[A] < 5.0			[A] < 5.0	[A] < 5.0		[A] < 5.0	[A] < 5.0	
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0		[A] < 1.0			[A] < 1.0	[A] < 1.0		[A] < 1.0	[A] < 1.0	
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0		[A] < 1.0			[A] < 1.0	[A] < 1.0		[A] < 1.0	[A] < 1.0	
Aromatic TPH >C8-C10	M	2680	mg/kg	1.0		[A] < 1.0			[A] < 1.0	[A] < 1.0		[A] < 1.0	[A] < 1.0	
Aromatic TPH >C10-C12	M	2680	mg/kg	1.0		[A] < 1.0			[A] < 1.0	[A] < 1.0		[A] < 1.0	[A] < 1.0	
Aromatic TPH >C12-C16	M	2680	mg/kg	1.0		[A] < 1.0			[A] < 1.0	[A] < 1.0		[A] < 1.0	[A] < 1.0	
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0		[A] < 1.0			[A] < 1.0	[A] < 1.0		[A] < 1.0	[A] < 1.0	
Aromatic TPH >C21-C35	M	2680	mg/kg	1.0		[A] < 1.0			[A] < 1.0	[A] < 1.0		[A] < 1.0	[A] < 1.0	
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0		[A] < 1.0			[A] < 1.0	[A] < 1.0		[A] < 1.0	[A] < 1.0	
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0		[A] < 5.0			[A] < 5.0	[A] < 5.0		[A] < 5.0	[A] < 5.0	
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0		[A] < 10			[A] < 10	[A] < 10		[A] < 10	[A] < 10	
Naphthalene	M	2700	mg/kg	0.10		[A] < 0.10				[A] < 0.10		[A] < 0.10		
Acenaphthylene	M	2700	mg/kg	0.10		[A] < 0.10				[A] < 0.10		[A] < 0.10		
Acenaphthene	M	2700	mg/kg	0.10		[A] < 0.10				[A] < 0.10		[A] < 0.10		
Fluorene	M	2700	mg/kg	0.10		[A] < 0.10				[A] < 0.10		[A] < 0.10		
Phenanthrene	M	2700	mg/kg	0.10		[A] < 0.10				[A] < 0.10		[A] < 0.10		
Anthracene	M	2700	mg/kg	0.10		[A] < 0.10				[A] < 0.10		[A] < 0.10		
Fluoranthene	M	2700	mg/kg	0.10		[A] < 0.10				[A] < 0.10		[A] < 0.10		
Pyrene	M	2700	mg/kg	0.10		[A] < 0.10				[A] < 0.10		[A] < 0.10		
Benzo[a]anthracene	M	2700	mg/kg	0.10		[A] < 0.10				[A] < 0.10		[A] < 0.10		
Chrysene	M	2700	mg/kg	0.10		[A] < 0.10				[A] < 0.10		[A] < 0.10		
Benzo[b]fluoranthene	M	2700	mg/kg	0.10		[A] < 0.10				[A] < 0.10		[A] < 0.10		
Benzo[k]fluoranthene	M	2700	mg/kg	0.10		[A] < 0.10				[A] < 0.10		[A] < 0.10		
Benzo[a]pyrene	M	2700	mg/kg	0.10		[A] < 0.10				[A] < 0.10		[A] < 0.10		
Indeno(1,2,3-c,d)Pyrene	M	2700	mg/kg	0.10		[A] < 0.10				[A] < 0.10		[A] < 0.10		
Dibenz(a,h)Anthracene	M	2700	mg/kg	0.10		[A] < 0.10				[A] < 0.10		[A] < 0.10		
Benzo[g,h,i]perylene	M	2700	mg/kg	0.10		[A] < 0.10				[A] < 0.10		[A] < 0.10		
Total Of 16 PAH's	M	2700	mg/kg	2.0		[A] < 2.0				[A] < 2.0		[A] < 2.0		
Benzene	M	2760	µg/kg	1.0					[A] < 1.0				[A] < 1.0	
Toluene	M	2760	µg/kg	1.0					[A] < 1.0				[A] < 1.0	
Ethylbenzene	M	2760	µg/kg	1.0					[A] < 1.0				[A] < 1.0	
m & p-Xylene	M	2760	µg/kg	1.0					[A] < 1.0				[A] < 1.0	
o-Xylene	M	2760	µg/kg	1.0					[A] < 1.0				[A] < 1.0	
Methyl Tert-Butyl Ether	M	2760	µg/kg	1.0					[A] < 1.0				[A] < 1.0	
Naphthalene	M	2800	mg/kg	0.10					< 0.10				< 0.10	

Chemtest
The right chemistry to deliver results

Results - Soil

Project: 22153 Killbride Development Wicklow (Aecom)

Client: IGSL					Chemtest Job No.:	20-01302	20-01302	20-01302	20-01302	20-01302	20-01302	20-01302	20-01302	20-01302	20-01302
Quotation No.: Q19-18246					Chemtest Sample ID.:	954287	954288	954289	954290	954291	954292	954293	954294	954295	954296
Order No.:					Client Sample Ref.:		128541	128519	128529	128530	121844	126815	126817	126841	128844
					Sample Location:	TP1	TP3	TP5	TP6	TP8	BH01	BH02	BH02	BH3	BH3
					Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
					Top Depth (m):	0.40	0.60	1.00	2.00	0.40	1.00	1.00	1.50	1.00	2.00
					Bottom Depth (m):		0.60	1.00	2.00	0.50	1.00	1.00	1.50	1.00	2.00
					Asbestos Lab:					DURHAM				DURHAM	
Determinand	**Accred.**	**SOP**	**Units**	**LOD**											
Acenaphthylene	N	2800	mg/kg	0.10						< 0.10				< 0.10	
Acenaphthene	M	2800	mg/kg	0.10						< 0.10				< 0.10	
Fluorene	M	2800	mg/kg	0.10						< 0.10				< 0.10	
Phenanthrene	M	2800	mg/kg	0.10						< 0.10				< 0.10	
Benzo[j]fluoranthene	N	2800	mg/kg	0.10						< 0.10				< 0.10	
Anthracene	M	2800	mg/kg	0.10						< 0.10				< 0.10	
Fluoranthene	M	2800	mg/kg	0.10						< 0.10				< 0.10	
Pyrene	M	2800	mg/kg	0.10						< 0.10				< 0.10	
Benzo[a]anthracene	M	2800	mg/kg	0.10						< 0.10				< 0.10	
Chrysene	M	2800	mg/kg	0.10						< 0.10				< 0.10	
Benzo[b]fluoranthene	M	2800	mg/kg	0.10						< 0.10				< 0.10	
Benzo[k]fluoranthene	M	2800	mg/kg	0.10						< 0.10				< 0.10	
Benzo[a]pyrene	M	2800	mg/kg	0.10						< 0.10				< 0.10	
Indeno(1,2,3-c,d)Pyrene	M	2800	mg/kg	0.10						< 0.10				< 0.10	
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.10						< 0.10				< 0.10	
Benzo[g,h,i]perylene	M	2800	mg/kg	0.10						< 0.10				< 0.10	
Coronene	N	2800	mg/kg	0.10						< 0.10				< 0.10	
Total Of 17 PAH's	N	2800	mg/kg	2.0						< 2.0				< 2.0	
PCB 28	U	2815	mg/kg	0.010						[A] < 0.010				[A] < 0.010	
PCB 52	U	2815	mg/kg	0.010						[A] < 0.010				[A] < 0.010	
PCB 90+101	U	2815	mg/kg	0.010						[A] < 0.010				[A] < 0.010	
PCB 118	U	2815	mg/kg	0.010						[A] < 0.010				[A] < 0.010	
PCB 153	U	2815	mg/kg	0.010						[A] < 0.010				[A] < 0.010	
PCB 138	U	2815	mg/kg	0.010						[A] < 0.010				[A] < 0.010	
PCB 180	U	2815	mg/kg	0.010						[A] < 0.010				[A] < 0.010	
Total PCBs (7 Congeners)	U	2815	mg/kg	0.10						[A] < 0.10				[A] < 0.10	
Demeton-O	N	2820	mg/kg	0.20		< 0.20					< 0.20		< 0.20		
Phorate	N	2820	mg/kg	0.20		< 0.20					< 0.20		< 0.20		
Demeton-S	N	2820	mg/kg	0.20		< 0.20					< 0.20		< 0.20		
Disulfoton	N	2820	mg/kg	0.20		< 0.20					< 0.20		< 0.20		
Fenthion	N	2820	mg/kg	0.20		< 0.20					< 0.20		< 0.20		
Trichloronate	N	2820	mg/kg	0.20		< 0.20					< 0.20		< 0.20		
Prothiofos	N	2820	mg/kg	0.20		< 0.20					< 0.20		< 0.20		
Fensulphothion	N	2820	mg/kg	0.20		< 0.20					< 0.20		< 0.20		
Sulprofos	N	2820	mg/kg	0.20		< 0.20					< 0.20		< 0.20		
Azinphos-Methyl	N	2820	mg/kg	0.20		< 0.20					< 0.20		< 0.20		
Coumaphos	N	2820	mg/kg	0.20		< 0.20					< 0.20		< 0.20		
Alpha-HCH	N	2840	mg/kg	0.20		< 0.20					< 0.20		< 0.20		

Chemtest
The right chemistry to deliver results

Results - Soil

Project: 22153 Killbride Development Wicklow (Aecom)

Client: IGSL			Chemtest Job No.:		20-01302	20-01302	20-01302	20-01302	20-01302	20-01302	20-01302	20-01302	20-01302	20-01302
Quotation No.: Q19-18246			Chemtest Sample ID.:		954287	954288	954289	954290	954291	954292	954293	954294	954295	954296
Order No.:			Client Sample Ref.:			128541	128519	128529	128530	121844	126815	126817	126841	128844
			Sample Location:		TP1	TP3	TP5	TP6	TP8	BH01	BH02	BH02	BH3	BH3
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		0.40	0.60	1.00	2.00	0.40	1.00	1.00	1.50	1.00	2.00
			Bottom Depth (m):			0.60	1.00	2.00	0.50	1.00	1.00	1.50	1.00	2.00
			Asbestos Lab:						DURHAM				DURHAM	
Determinand	**Accred.**	**SOP**	**Units**	**LOD**										
Gamma-HCH (Lindane)	N	2840	mg/kg	0.20		< 0.20				< 0.20		< 0.20		
Beta-HCH	N	2840	mg/kg	0.20		< 0.20				< 0.20		< 0.20		
Delta-HCH	N	2840	mg/kg	0.20		< 0.20				< 0.20		< 0.20		
Heptachlor	N	2840	mg/kg	0.20		< 0.20				< 0.20		< 0.20		
Aldrin	N	2840	mg/kg	0.20		< 0.20				< 0.20		< 0.20		
Heptachlor Epoxide	N	2840	mg/kg	0.20		< 0.20				< 0.20		< 0.20		
Gamma-Chlordane	N	2840	mg/kg	0.20		< 0.20				< 0.20		< 0.20		
Alpha-Chlordane	N	2840	mg/kg	0.20		< 0.20				< 0.20		< 0.20		
Endosulfan I	N	2840	mg/kg	0.20		< 0.20				< 0.20		< 0.20		
4,4-DDE	N	2840	mg/kg	0.20		< 0.20				< 0.20		< 0.20		
Dieldrin	N	2840	mg/kg	0.20		< 0.20				< 0.20		< 0.20		
Endrin	N	2840	mg/kg	0.20		< 0.20				< 0.20		< 0.20		
4,4-DDD	N	2840	mg/kg	0.20		< 0.20				< 0.20		< 0.20		
Endosulfan II	N	2840	mg/kg	0.20		< 0.20				< 0.20		< 0.20		
Endrin Aldehyde	N	2840	mg/kg	0.20		< 0.20				< 0.20		< 0.20		
4,4-DDT	N	2840	mg/kg	0.20		< 0.20				< 0.20		< 0.20		
Endosulfan Sulphate	N	2840	mg/kg	0.20		< 0.20				< 0.20		< 0.20		
Methoxychlor	N	2840	mg/kg	0.20		< 0.20				< 0.20		< 0.20		
Endrin Ketone	N	2840	mg/kg	0.20		< 0.20				< 0.20		< 0.20		
Total Phenols	M	2920	mg/kg	0.30					< 0.30				< 0.30	

Chemtest
The right chemistry to deliver results

Results - Soil

Project: 22153 Killbride Development Wicklow (Aecom)

Client: IGSL			Chemtest Job No.:		20-01302	20-01302	20-01302	20-01302	20-01302	20-01302
Quotation No.: Q19-18246			Chemtest Sample ID.:		954297	954298	954299	954300	954301	954302
Order No.:			Client Sample Ref.:		126833	126834	121835	121839	126803	126807
			Sample Location:		BH4	BH4	BH5	BH5	BH6	BH6
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		1.00	1.50	1.00	3.00	0.50	2.00
			Bottom Depth (m):		1.00	1.50	1.00	3.00	0.50	2.00
			Asbestos Lab:							
Determinand	**Accred.**	**SOP**	**Units**	**LOD**						
ACM Type	U	2192		N/A						
Asbestos Identification	U	2192	%	0.001						
ACM Detection Stage	U	2192		N/A						
Moisture	N	2030	%	0.020	16	14	16	17	16	9.8
pH (2.5:1)	N	2010		4.0	[A] 7.6			[A] 7.8		[A] 7.8
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40						
Magnesium (Water Soluble)	N	2120	g/l	0.010	< 0.010			< 0.010		< 0.010
Sulphate (2:1 Water Soluble) as SO4	M	2120	g/l	0.010	< 0.010			< 0.010		< 0.010
Total Sulphur	M	2175	%	0.010	[A] 0.048			[A] 0.011		[A] 0.012
Sulphur (Elemental)	M	2180	mg/kg	1.0						
Chloride (Water Soluble)	U	2220	g/l	0.010	[A] < 0.010			[A] < 0.010		[A] < 0.010
Nitrate (Water Soluble)	N	2220	g/l	0.010	< 0.010			< 0.010		< 0.010
Cyanide (Total)	M	2300	mg/kg	0.50						
Sulphide (Easily Liberatable)	N	2325	mg/kg	0.50						
Ammonium (Water Soluble)	M	2120	g/l	0.01	0.04			0.11		0.05
Sulphate (Acid Soluble)	M	2430	%	0.010	[A] < 0.010			[A] < 0.010		[A] < 0.010
Arsenic	M	2450	mg/kg	1.0		8.9	5.3		8.6	
Barium	M	2450	mg/kg	10						
Cadmium	M	2450	mg/kg	0.10						
Chromium	M	2450	mg/kg	1.0						
Molybdenum	M	2450	mg/kg	2.0						
Antimony	N	2450	mg/kg	2.0						
Copper	U	2450	mg/kg	0.50		14	6.7		13	
Mercury	M	2450	mg/kg	0.10		< 0.10	< 0.10		< 0.10	
Nickel	M	2450	mg/kg	0.50		26	16		18	
Lead	M	2450	mg/kg	0.50		11	5.3		18	
Selenium	M	2450	mg/kg	0.20		0.37	< 0.20		0.26	
Zinc	U	2450	mg/kg	0.50		31	18		45	
Chromium (Trivalent)	N	2490	mg/kg	1.0		25	9.2		16	
Chromium (Hexavalent)	N	2490	mg/kg	0.50		< 0.50	< 0.50		< 0.50	
Total Organic Carbon	M	2625	%	0.20						
Mineral Oil	N	2670	mg/kg	10						
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0		[A] < 1.0	[A] < 1.0		[A] < 1.0	
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0		[A] < 1.0	[A] < 1.0		[A] < 1.0	
Aliphatic TPH >C8-C10	M	2680	mg/kg	1.0		[A] < 1.0	[A] < 1.0		[A] < 1.0	
Aliphatic TPH >C10-C12	M	2680	mg/kg	1.0		[A] < 1.0	[A] < 1.0		[A] < 1.0	
Aliphatic TPH >C12-C16	M	2680	mg/kg	1.0		[A] < 1.0	[A] < 1.0		[A] < 1.0	

Chemtest
The right chemistry to deliver results

Results - Soil

Project: 22153 Killbride Development Wicklow (Aecom)

Client: IGSL			Chemtest Job No.:		20-01302	20-01302	20-01302	20-01302	20-01302	20-01302
Quotation No.: Q19-18246			Chemtest Sample ID.:		954297	954298	954299	954300	954301	954302
Order No.:			Client Sample Ref.:		126833	126834	121835	121839	126803	126807
			Sample Location:		BH4	BH4	BH5	BH5	BH6	BH6
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		1.00	1.50	1.00	3.00	0.50	2.00
			Bottom Depth (m):		1.00	1.50	1.00	3.00	0.50	2.00
			Asbestos Lab:							
Determinand	**Accred.**	**SOP**	**Units**	**LOD**						
Aliphatic TPH >C16-C21	M	2680	mg/kg	1.0		[A] < 1.0	[A] < 1.0		[A] < 1.0	
Aliphatic TPH >C21-C35	M	2680	mg/kg	1.0		[A] < 1.0	[A] < 1.0		[A] < 1.0	
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0		[A] < 1.0	[A] < 1.0		[A] < 1.0	
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0		[A] < 5.0	[A] < 5.0		[A] < 5.0	
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0		[A] < 1.0	[A] < 1.0		[A] < 1.0	
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0		[A] < 1.0	[A] < 1.0		[A] < 1.0	
Aromatic TPH >C8-C10	M	2680	mg/kg	1.0		[A] < 1.0	[A] < 1.0		[A] < 1.0	
Aromatic TPH >C10-C12	M	2680	mg/kg	1.0		[A] < 1.0	[A] < 1.0		[A] < 1.0	
Aromatic TPH >C12-C16	M	2680	mg/kg	1.0		[A] < 1.0	[A] < 1.0		[A] < 1.0	
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0		[A] < 1.0	[A] < 1.0		[A] < 1.0	
Aromatic TPH >C21-C35	M	2680	mg/kg	1.0		[A] < 1.0	[A] < 1.0		[A] < 1.0	
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0		[A] < 1.0	[A] < 1.0		[A] < 1.0	
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0		[A] < 5.0	[A] < 5.0		[A] < 5.0	
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0		[A] < 10	[A] < 10		[A] < 10	
Naphthalene	M	2700	mg/kg	0.10		[A] < 0.10	[A] < 0.10		[A] < 0.10	
Acenaphthylene	M	2700	mg/kg	0.10		[A] < 0.10	[A] < 0.10		[A] < 0.10	
Acenaphthene	M	2700	mg/kg	0.10		[A] < 0.10	[A] < 0.10		[A] < 0.10	
Fluorene	M	2700	mg/kg	0.10		[A] < 0.10	[A] < 0.10		[A] < 0.10	
Phenanthrene	M	2700	mg/kg	0.10		[A] < 0.10	[A] < 0.10		[A] < 0.10	
Anthracene	M	2700	mg/kg	0.10		[A] < 0.10	[A] < 0.10		[A] < 0.10	
Fluoranthene	M	2700	mg/kg	0.10		[A] < 0.10	[A] < 0.10		[A] < 0.10	
Pyrene	M	2700	mg/kg	0.10		[A] < 0.10	[A] < 0.10		[A] < 0.10	
Benzo[a]anthracene	M	2700	mg/kg	0.10		[A] < 0.10	[A] < 0.10		[A] < 0.10	
Chrysene	M	2700	mg/kg	0.10		[A] < 0.10	[A] < 0.10		[A] < 0.10	
Benzo[b]fluoranthene	M	2700	mg/kg	0.10		[A] < 0.10	[A] < 0.10		[A] < 0.10	
Benzo[k]fluoranthene	M	2700	mg/kg	0.10		[A] < 0.10	[A] < 0.10		[A] < 0.10	
Benzo[a]pyrene	M	2700	mg/kg	0.10		[A] < 0.10	[A] < 0.10		[A] < 0.10	
Indeno(1,2,3-c,d)Pyrene	M	2700	mg/kg	0.10		[A] < 0.10	[A] < 0.10		[A] < 0.10	
Dibenz(a,h)Anthracene	M	2700	mg/kg	0.10		[A] < 0.10	[A] < 0.10		[A] < 0.10	
Benzo[g,h,i]perylene	M	2700	mg/kg	0.10		[A] < 0.10	[A] < 0.10		[A] < 0.10	
Total Of 16 PAH's	M	2700	mg/kg	2.0		[A] < 2.0	[A] < 2.0		[A] < 2.0	
Benzene	M	2760	µg/kg	1.0						
Toluene	M	2760	µg/kg	1.0						
Ethylbenzene	M	2760	µg/kg	1.0						
m & p-Xylene	M	2760	µg/kg	1.0						
o-Xylene	M	2760	µg/kg	1.0						
Methyl Tert-Butyl Ether	M	2760	µg/kg	1.0						
Naphthalene	M	2800	mg/kg	0.10						

Chemtest
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Results - Soil

Project: 22153 Killbride Development Wicklow (Aecom)

Client: IGSL					Chemtest Job No.:	20-01302	20-01302	20-01302	20-01302	20-01302	20-01302
Quotation No.: Q19-18246					Chemtest Sample ID.:	954297	954298	954299	954300	954301	954302
Order No.:					Client Sample Ref.:	126833	126834	121835	121839	126803	126807
					Sample Location:	BH4	BH4	BH5	BH5	BH6	BH6
					Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
					Top Depth (m):	1.00	1.50	1.00	3.00	0.50	2.00
					Bottom Depth (m):	1.00	1.50	1.00	3.00	0.50	2.00
					Asbestos Lab:						
Determinand	**Accred.**	**SOP**	**Units**	**LOD**							
Acenaphthylene	N	2800	mg/kg	0.10							
Acenaphthene	M	2800	mg/kg	0.10							
Fluorene	M	2800	mg/kg	0.10							
Phenanthrene	M	2800	mg/kg	0.10							
Benzo[j]fluoranthene	N	2800	mg/kg	0.10							
Anthracene	M	2800	mg/kg	0.10							
Fluoranthene	M	2800	mg/kg	0.10							
Pyrene	M	2800	mg/kg	0.10							
Benzo[a]anthracene	M	2800	mg/kg	0.10							
Chrysene	M	2800	mg/kg	0.10							
Benzo[b]fluoranthene	M	2800	mg/kg	0.10							
Benzo[k]fluoranthene	M	2800	mg/kg	0.10							
Benzo[a]pyrene	M	2800	mg/kg	0.10							
Indeno(1,2,3-c,d)Pyrene	M	2800	mg/kg	0.10							
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.10							
Benzo[g,h,i]perylene	M	2800	mg/kg	0.10							
Coronene	N	2800	mg/kg	0.10							
Total Of 17 PAH's	N	2800	mg/kg	2.0							
PCB 28	U	2815	mg/kg	0.010							
PCB 52	U	2815	mg/kg	0.010							
PCB 90+101	U	2815	mg/kg	0.010							
PCB 118	U	2815	mg/kg	0.010							
PCB 153	U	2815	mg/kg	0.010							
PCB 138	U	2815	mg/kg	0.010							
PCB 180	U	2815	mg/kg	0.010							
Total PCBs (7 Congeners)	U	2815	mg/kg	0.10							
Demeton-O	N	2820	mg/kg	0.20		< 0.20	< 0.20		< 0.20		
Phorate	N	2820	mg/kg	0.20		< 0.20	< 0.20		< 0.20		
Demeton-S	N	2820	mg/kg	0.20		< 0.20	< 0.20		< 0.20		
Disulfoton	N	2820	mg/kg	0.20		< 0.20	< 0.20		< 0.20		
Fenthion	N	2820	mg/kg	0.20		< 0.20	< 0.20		< 0.20		
Trichloronate	N	2820	mg/kg	0.20		< 0.20	< 0.20		< 0.20		
Prothiofos	N	2820	mg/kg	0.20		< 0.20	< 0.20		< 0.20		
Fensulphothion	N	2820	mg/kg	0.20		< 0.20	< 0.20		< 0.20		
Sulprofos	N	2820	mg/kg	0.20		< 0.20	< 0.20		< 0.20		
Azinphos-Methyl	N	2820	mg/kg	0.20		< 0.20	< 0.20		< 0.20		
Coumaphos	N	2820	mg/kg	0.20		< 0.20	< 0.20		< 0.20		
Alpha-HCH	N	2840	mg/kg	0.20		< 0.20	< 0.20		< 0.20		

Chemtest
The right chemistry to deliver results

Results - Soil

Project: 22153 Killbride Development Wicklow (Aecom)

Client: IGSL			Chemtest Job No.:		20-01302	20-01302	20-01302	20-01302	20-01302	20-01302
Quotation No.: Q19-18246			Chemtest Sample ID.:		954297	954298	954299	954300	954301	954302
Order No.:			Client Sample Ref.:		126833	126834	121835	121839	126803	126807
			Sample Location:		BH4	BH4	BH5	BH5	BH6	BH6
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		1.00	1.50	1.00	3.00	0.50	2.00
			Bottom Depth (m):		1.00	1.50	1.00	3.00	0.50	2.00
			Asbestos Lab:							
Determinand	**Accred.**	**SOP**	**Units**	**LOD**						
Gamma-HCH (Lindane)	N	2840	mg/kg	0.20		< 0.20	< 0.20		< 0.20	
Beta-HCH	N	2840	mg/kg	0.20		< 0.20	< 0.20		< 0.20	
Delta-HCH	N	2840	mg/kg	0.20		< 0.20	< 0.20		< 0.20	
Heptachlor	N	2840	mg/kg	0.20		< 0.20	< 0.20		< 0.20	
Aldrin	N	2840	mg/kg	0.20		< 0.20	< 0.20		< 0.20	
Heptachlor Epoxide	N	2840	mg/kg	0.20		< 0.20	< 0.20		< 0.20	
Gamma-Chlordane	N	2840	mg/kg	0.20		< 0.20	< 0.20		< 0.20	
Alpha-Chlordane	N	2840	mg/kg	0.20		< 0.20	< 0.20		< 0.20	
Endosulfan I	N	2840	mg/kg	0.20		< 0.20	< 0.20		< 0.20	
4,4-DDE	N	2840	mg/kg	0.20		< 0.20	< 0.20		< 0.20	
Dieldrin	N	2840	mg/kg	0.20		< 0.20	< 0.20		< 0.20	
Endrin	N	2840	mg/kg	0.20		< 0.20	< 0.20		< 0.20	
4,4-DDD	N	2840	mg/kg	0.20		< 0.20	< 0.20		< 0.20	
Endosulfan II	N	2840	mg/kg	0.20		< 0.20	< 0.20		< 0.20	
Endrin Aldehyde	N	2840	mg/kg	0.20		< 0.20	< 0.20		< 0.20	
4,4-DDT	N	2840	mg/kg	0.20		< 0.20	< 0.20		< 0.20	
Endosulfan Sulphate	N	2840	mg/kg	0.20		< 0.20	< 0.20		< 0.20	
Methoxychlor	N	2840	mg/kg	0.20		< 0.20	< 0.20		< 0.20	
Endrin Ketone	N	2840	mg/kg	0.20		< 0.20	< 0.20		< 0.20	
Total Phenols	M	2920	mg/kg	0.30						

Results - Single Stage WAC

Project: 22153 Killbride Development Wicklow (Aecom)

Chemtest Job No:	20-01302				Landfill Waste Acceptance Criteria Limits		
Chemtest Sample ID:	954291						
Sample Ref:	128530						
Sample ID:							
Sample Location:	TP8						
Top Depth(m):	0.40						
Bottom Depth(m):	0.50						
Sampling Date:					Inert Waste Landfill	Stable, Non-reactive hazardous waste in non-hazardous Landfill	Hazardous Waste Landfill
Determinand	SOP	Accred.	Units				
Total Organic Carbon	2625	M	%	[A] 0.80	3	5	6
Loss On Ignition	2610	M	%	2.4	--	--	10
Total BTEX	2760	M	mg/kg	[A] < 0.010	6	--	--
Total PCBs (7 Congeners)	2815	M	mg/kg	< 0.10	1	--	--
TPH Total WAC (Mineral Oil)	2670	M	mg/kg	[A] < 10	500	--	--
Total (Of 17) PAH's	2800	N	mg/kg	< 2.0	100	--	--
pH	2010	M		7.8	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg	0.025	--	To evaluate	To evaluate
Eluate Analysis			10:1 Eluate mg/l	10:1 Eluate mg/kg	Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg		
Arsenic	1450	U	0.0048	< 0.050	0.5	2	25
Barium	1450	U	0.0032	< 0.50	20	100	300
Cadmium	1450	U	< 0.00010	< 0.010	0.04	1	5
Chromium	1450	U	0.0018	< 0.050	0.5	10	70
Copper	1450	U	0.0024	< 0.050	2	50	100
Mercury	1450	U	< 0.00050	< 0.0050	0.01	0.2	2
Molybdenum	1450	U	0.0011	< 0.050	0.5	10	30
Nickel	1450	U	< 0.0010	< 0.050	0.4	10	40
Lead	1450	U	0.0033	0.033	0.5	10	50
Antimony	1450	U	< 0.0010	< 0.010	0.06	0.7	5
Selenium	1450	U	< 0.0010	< 0.010	0.1	0.5	7
Zinc	1450	U	0.0018	< 0.50	4	50	200
Chloride	1220	U	1.2	12	800	15000	25000
Fluoride	1220	U	0.12	1.2	10	150	500
Sulphate	1220	U	2.1	21	1000	20000	50000
Total Dissolved Solids	1020	N	38	380	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	13	130	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	9.6

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - Single Stage WAC

Project: 22153 Killbride Development Wicklow (Aecom)

Chemtest Job No:	20-01302				Landfill Waste Acceptance Criteria Limits		
Chemtest Sample ID:	954295						
Sample Ref:	126841						
Sample ID:							
Sample Location:	BH3						
Top Depth(m):	1.00						
Bottom Depth(m):	1.00						
Sampling Date:							
Determinand	**SOP**	**Accred.**	**Units**		**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625	M	%	[A] < 0.20	3	5	6
Loss On Ignition	2610	M	%	2.7	--	--	10
Total BTEX	2760	M	mg/kg	[A] < 0.010	6	--	--
Total PCBs (7 Congeners)	2815	M	mg/kg	< 0.10	1	--	--
TPH Total WAC (Mineral Oil)	2670	M	mg/kg	[A] < 10	500	--	--
Total (Of 17) PAH's	2800	N	mg/kg	< 2.0	100	--	--
pH	2010	M		8.2	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg	0.0060	--	To evaluate	To evaluate
Eluate Analysis			**10:1 Eluate mg/l**	**10:1 Eluate mg/kg**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1450	U	< 0.0010	< 0.050	0.5	2	25
Barium	1450	U	< 0.0010	< 0.50	20	100	300
Cadmium	1450	U	< 0.00010	< 0.010	0.04	1	5
Chromium	1450	U	< 0.0010	< 0.050	0.5	10	70
Copper	1450	U	< 0.0010	< 0.050	2	50	100
Mercury	1450	U	< 0.00050	< 0.0050	0.01	0.2	2
Molybdenum	1450	U	0.0019	< 0.050	0.5	10	30
Nickel	1450	U	< 0.0010	< 0.050	0.4	10	40
Lead	1450	U	< 0.0010	< 0.010	0.5	10	50
Antimony	1450	U	< 0.0010	< 0.010	0.06	0.7	5
Selenium	1450	U	< 0.0010	< 0.010	0.1	0.5	7
Zinc	1450	U	0.0086	< 0.50	4	50	200
Chloride	1220	U	< 1.0	< 10	800	15000	25000
Fluoride	1220	U	0.25	2.5	10	150	500
Sulphate	1220	U	< 1.0	< 10	1000	20000	50000
Total Dissolved Solids	1020	N	46	450	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	6.3	63	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	16

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

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Deviations

In accordance with UKAS Policy on Deviating Samples TPS 63. Chemtest have a procedure to ensure 'upon receipt of each sample a competent laboratory shall assess whether the sample is suitable with regard to the requested test(s)'. This policy and the respective holding times applied, can be supplied upon request.The reason a sample is declared as deviating is detailed below. Where applicable the analysis remains UKAS/MCERTs accredited but the results may be compromised.

Sample:	Sample Ref:	Sample ID:	Sample Location:	Sampled Date:	Deviation Code(s):	Containers Received:
954287			TP1		A	Amber Glass 250ml
954287			TP1		A	Plastic Tub 500g
954288	128541		TP3		A	Amber Glass 250ml
954288	128541		TP3		A	Plastic Tub 500g
954289	128519		TP5		A	Amber Glass 250ml
954289	128519		TP5		A	Plastic Tub 500g
954290	128529		TP6		A	Amber Glass 250ml
954290	128529		TP6		A	Plastic Tub 500g
954291	128530		TP8		A	Amber Glass 250ml
954291	128530		TP8		A	Plastic Tub 500g
954292	121844		BH01		A	Amber Glass 250ml
954292	121844		BH01		A	Plastic Tub 500g
954293	126815		BH02		A	Amber Glass 250ml
954293	126815		BH02		A	Plastic Tub 500g
954294	126817		BH02		A	Amber Glass 250ml
954294	126817		BH02		A	Plastic Tub 500g
954295	126841		BH3		A	Amber Glass 250ml
954295	126841		BH3		A	Plastic Tub 500g
954296	128844		BH3		A	Amber Glass 250ml
954296	128844		BH3		A	Plastic Tub 500g
954297	126833		BH4		A	Amber Glass 250ml
954297	126833		BH4		A	Plastic Tub 500g

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Deviations

In accordance with UKAS Policy on Deviating Samples TPS 63. Chemtest have a procedure to ensure 'upon receipt of each sample a competent laboratory shall assess whether the sample is suitable with regard to the requested test(s)'. This policy and the respective holding times applied, can be supplied upon request.The reason a sample is declared as deviating is detailed below. Where applicable the analysis remains UKAS/MCERTs accredited but the results may be compromised.

Sample:	Sample Ref:	Sample ID:	Sample Location:	Sampled Date:	Deviation Code(s):	Containers Received:
954298	126834		BH4		A	Amber Glass 250ml
954298	126834		BH4		A	Plastic Tub 500g
954299	121835		BH5		A	Amber Glass 250ml
954299	121835		BH5		A	Plastic Tub 500g
954300	121839		BH5		A	Amber Glass 250ml
954300	121839		BH5		A	Plastic Tub 500g
954301	126803		BH6		A	Amber Glass 250ml
954301	126803		BH6		A	Plastic Tub 500g
954302	126807		BH6		A	Amber Glass 250ml
954302	126807		BH6		A	Plastic Tub 500g

Test Methods

SOP	Title	Parameters included	Method summary
1010	pH Value of Waters	pH	pH Meter
1020	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Conductivity Meter
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.
1450	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1610	Total/Dissolved Organic Carbon in Waters	Organic Carbon	TOC Analyser using Catalytic Oxidation
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.
2010	pH Value of Soils	pH	pH Meter
2015	Acid Neutralisation Capacity	Acid Reserve	Titration
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2175	Total Sulphur in Soils	Total Sulphur	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2180	Sulphur (Elemental) in Soils by HPLC	Sulphur	Dichloromethane extraction / HPLC with UV detection
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2220	Water soluble Chloride in Soils	Chloride	Aqueous extraction and measurement by 'Aquakem 600' Discrete Analyser using ferric nitrate / mercuric thiocyanate.
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Alkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2325	Sulphide in Soils	Sulphide	Steam distillation with sulphuric acid / analysis by 'Aquakem 600' Discrete Analyser, using N,N–dimethyl-p-phenylenediamine.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2610	Loss on Ignition	loss on ignition (LOI)	Determination of the proportion by mass that is lost from a soil by ignition at 550°C.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID

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Test Methods

SOP	Title	Parameters included	Method summary
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane extraction / GCxGC FID detection
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
2800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-MS	Acenaphthene*; Acenaphthylene; Anthracene*; Benzo[a]Anthracene*; Benzo[a]Pyrene*; Benzo[b]Fluoranthene*; Benzo[ghi]Perylene*; Benzo[k]Fluoranthene; Chrysene*; Dibenz[ah]Anthracene; Fluoranthene*; Fluorene*; Indeno[123cd]Pyrene*; Naphthalene*; Phenanthrene*; Pyrene*	Dichloromethane extraction / GC-MS
2815	Polychlorinated Biphenyls (PCB) ICES7Congeners in Soils by GC-MS	ICES7 PCB congeners	Acetone/Hexane extraction / GC-MS
2820	Organophosphorus (O-P) Pesticides in Soils by GC-MS	Organophosphorus pesticide representative suite including Parathion, Malathion etc, plus client specific determinands	Dichloromethane extraction / GC-MS
2840	Organochlorine (O-Cl) Pesticides in Soils by GC-MS	Organochlorine pesticide representative suite including DDT and its metabolites, 'drins' and HCH etc, plus client specific determinands	Dichloromethane extraction / GC-MS
2920	Phenols in Soils by HPLC	Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and TrimethylphenolsNote: chlorophenols are excluded.	60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.
640	Characterisation of Waste (Leaching C10)	Waste material including soil, sludges and granular waste	ComplianceTest for Leaching of Granular Waste Material and Sludge

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Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis
The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols
For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

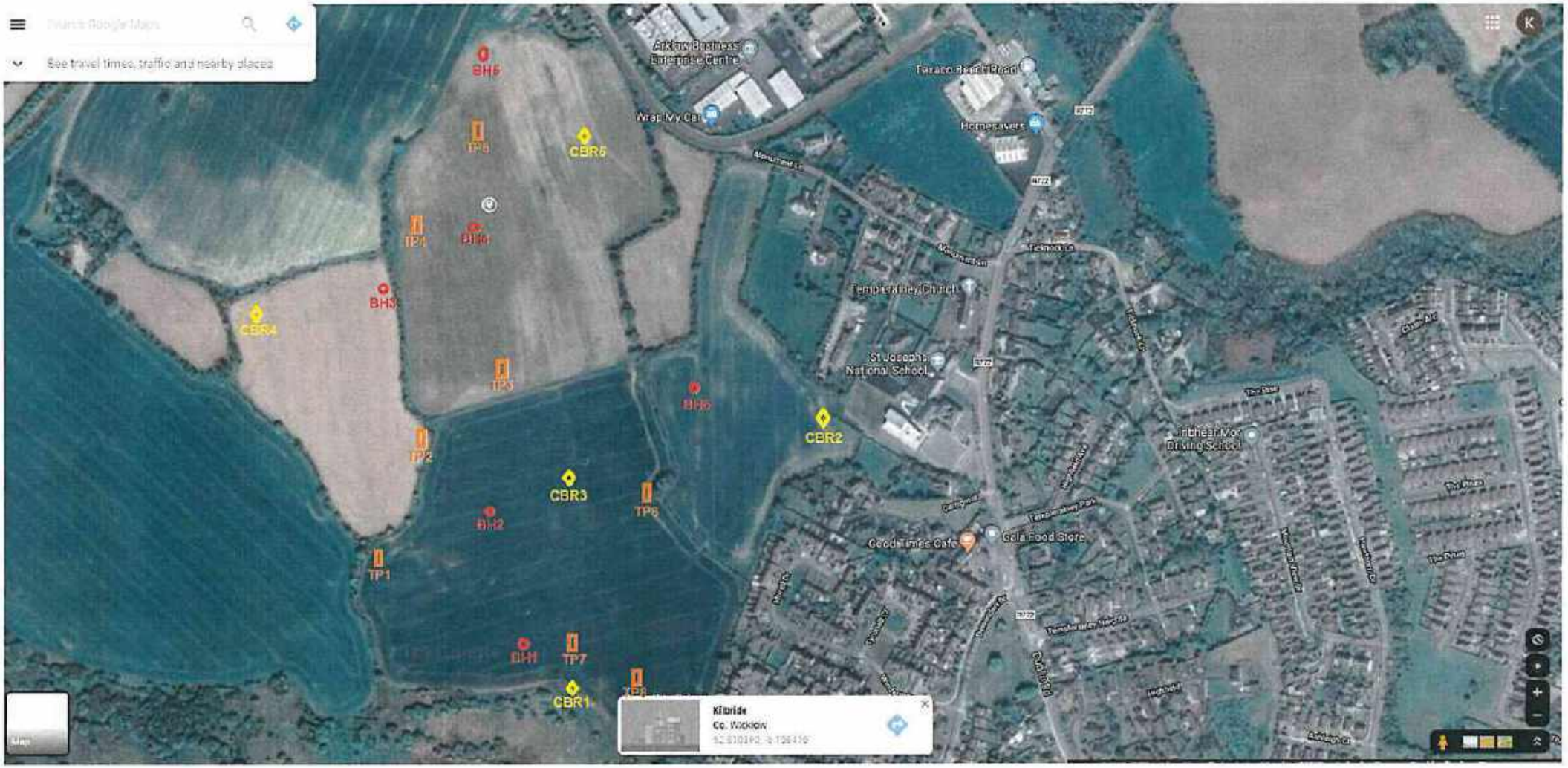
A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

Appendix VII Site Plan



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Appendix 9.1

Ambient Air Quality Standards

APPENDIX 9.1:

AMBIENT AIR QUALITY STANDARDS

National standards for ambient air pollutants in Ireland have generally ensued from Council Directives enacted in the EU (& previously the EC & EEC). The initial interest in ambient air pollution legislation in the EU dates from the early 1980s and was in response to the most serious pollutant problems at that time which was the issue of acid rain. As a result of this sulphur dioxide, and later nitrogen dioxide, were both the focus of EU legislation. Linked to the acid rain problem was urban smog associated with fuel burning for space heating purposes. Also apparent at this time were the problems caused by leaded petrol and EU legislation was introduced to deal with this problem in the early 1980s.

In recent years the EU has focused on defining a basis strategy across the EU in relation to ambient air quality. In 1996, a Framework Directive, Council Directive 96/62/EC, on ambient air quality assessment and management was enacted. The aims of the Directive are fourfold. Firstly, the Directive's aim is to establish objectives for ambient air quality designed to avoid harmful effects to health. Secondly, the Directive aims to assess ambient air quality on the basis of common methods and criteria throughout the EU. Additionally, it is aimed to make information on air quality available to the public via alert thresholds and fourthly, it aims to maintain air quality where it is good and improve it in other cases.

As part of these measures to improve air quality, the European Commission has adopted proposals for daughter legislation under Directive 96/62/EC. The first of these directives to be enacted, Council Directive 1999/30/EC, has been passed into Irish Law as S.I. No 271 of 2002 (Air Quality Standards Regulations 2002) and has set limit values which came into operation on 17th June 2002. The Air Quality Standards Regulations 2002 detail margins of tolerance, which are trigger levels for certain types of action in the period leading to the attainment date. The margin of tolerance varies from 60% for lead, to 30% for 24-hour limit value for PM_{10}, 40% for the hourly and annual limit value for NO_2 and 26% for hourly SO_2 limit values. The margin of tolerance commenced from June 2002, and started to reduce from 1 January 2003 and every 12 months thereafter by equal annual percentages to reach 0% by the attainment date. A second daughter directive, EU Council Directive 2000/69/EC, has published limit values for both carbon monoxide and benzene in ambient air. This has also been passed into Irish Law under the Air Quality Standards Regulations 2002.

The most recent EU Council Directive on ambient air quality was published on the 11/06/08 which has been transposed into Irish Law as S.I. 180 of 2011. Council Directive 2008/50/EC combines the previous Air Quality Framework Directive and its subsequent daughter directives. Provisions were also made for the inclusion of new ambient limit values relating to $PM_{2.5}$. The margins of tolerance specific

to each pollutant were also slightly adjusted from previous directives. In regards to existing ambient air quality standards, it is not proposed to modify the standards but to strengthen existing provisions to ensure that non-compliances are removed. In addition, new ambient standards for $PM_{2.5}$ are included in Directive 2008/50/EC. The approach for $PM_{2.5}$ was to establish a target value of 25 µg/m3, as an annual average (to be attained everywhere by 2010) and a limit value of 25 µg/m3, as an annual average (to be attained everywhere by 2015), coupled with a target to reduce human exposure generally to $PM_{2.5}$ between 2010 and 2020. This exposure reduction target will range from 0% (for $PM_{2.5}$ concentrations of less than 8.5 $\mu g/m^3$ to 20% of the average exposure indicator (AEI) for concentrations of between 18 - 22 $\mu g/m^3$). Where the AEI is currently greater than 22 $\mu g/m^3$ all appropriate measures should be employed to reduce this level to 18 $\mu g/m^3$ by 2020. The AEI is based on measurements taken in urban background locations averaged over a three-year period from 2008 - 2010 and again from 2018-2020. Additionally, an exposure concentration obligation of 20 $\mu g/m^3$ was set to be complied with by 2015 again based on the AEI.

Although the EU Air Quality Limit Values are the basis of legislation, other thresholds outlined by the EU Directives are used which are triggers for particular actions. The Alert Threshold is defined in Council Directive 96/62/EC as "a level beyond which there is a risk to human health from brief exposure and at which immediate steps shall be taken as laid down in Directive 96/62/EC". These steps include undertaking to ensure that the necessary steps are taken to inform the public (e.g. by means of radio, television, and the press).

The Margin of Tolerance is defined in Council Directive 96/62/EC as a concentration which is higher than the limit value when legislation comes into force. It decreases to meet the limit value by the attainment date. The Upper Assessment Threshold is defined in Council Directive 96/62/EC as a concentration above which high quality measurement is mandatory. Data from measurement may be supplemented by information from other sources, including air quality modelling.

An annual average limit for both NO_X (NO and NO_2) is applicable for the protection of vegetation in highly rural areas away from major sources of NO_X such as large conurbations, factories, and high road vehicle activity such as a dual carriageway or motorway. Annex VI of EU Directive 1999/30/EC identifies that monitoring to demonstrate compliance with the NO_X limit for the protection of vegetation should be carried out distances greater than:

- 5 km from the nearest motorway or dual carriageway
- 5 km from the nearest major industrial installation
- 20 km from a major urban conurbation

As a guideline, a monitoring station should be indicative of approximately 1000 km^2 of surrounding area.

Under the terms of EU Framework Directive on Ambient Air Quality (96/62/EC), geographical areas within member states have been classified in terms of zones. The zones have been defined in order to meet the criteria for air quality monitoring, assessment, and management as described in the Framework Directive and Daughter Directives. Zone A is defined as Dublin and its environs, Zone B is defined as Cork City, Zone C is defined as 23 urban areas with a population greater than 15,000 and Zone D is defined as the remainder of the country. The Zones were defined based on among other things, population, and existing ambient air quality.

EU Council Directive 96/62/EC on ambient air quality and assessment has been adopted into Irish Legislation (S.I. No. 33 of 1999). The act has designated the Environmental Protection Agency (EPA) as the competent authority responsible for the implementation of the Directive and for assessing ambient air quality in the State. Other commonly referenced ambient air quality standards include the World Health Organisation. The WHO guidelines differ from air quality standards in that they are primarily set to protect public health from the effects of air pollution. Air quality standards, however, are air quality guidelines recommended by governments, for which additional factors, such as socio-economic factors, may be considered.

Appendix 9.2

Dust Minimisation Plan

APPENDIX 9.2:

DUST MINIMISATION PLAN

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 United Kingdom.

Site Management

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.

At the construction/demolition 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 8.3 for the Windrose for Oak Park). As the prevailing wind is predominantly south-westerly, locating construction/demolition compounds and storage piles downwind of sensitive receptors will minimise the potential for dust nuisance to occur at sensitive receptors.

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 0.2mm/day, dust generation is generally suppressed. 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. Particular care should be taken during periods of high winds (gales) as these are periods where the potential for significant dust emissions is 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 shall be taken in order to avoid dust nuisance occurring under unfavourable meteorological conditions:

- 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;
- 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;
- At all times, the procedures put in place will be strictly monitored and assessed.

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.

Site Roads / Haulage Routes

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%.

- 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.
- Bowsers or suitable watering equipment will be available during periods of dry weather throughout the construction/demolition period. Research has found that watering can reduce dust emissions by 50%. 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.
- 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.

Land Clearing / Earth Moving

Land clearing / earth-moving works during periods of high winds and dry weather conditions can be a significant source of dust.

- 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.
- During periods of very high winds (gales), activities likely to generate significant dust emissions should be postponed until the gale has subsided.

Storage Piles

The location and moisture content of storage piles are important factors which determine their potential for dust emissions.

- 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.
- 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.

Site Traffic on Public Roads

Spillage and blow-off of debris, aggregates and fine material onto public roads should be reduced to a minimum by employing the following measures:

- 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.
- At the main site traffic exits, a wheel wash facility shall be installed if feasible. All trucks leaving the site must pass through the wheel wash. In addition, public roads outside the site shall be regularly inspected for cleanliness, as a minimum on a daily basis, and cleaned, as necessary.

Summary of Dust Mitigation Measures

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:

- 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; and
- The specification of effective measures to deal with any complaints received.

Appendix 10.1

Verified Views and CGI

3D DESIGN BUREAU

3D Solutions for the Built Environment
Design | Planning | Construction | Marketing

“Lands at Kilbride”, Arklow, Co. Wicklow.

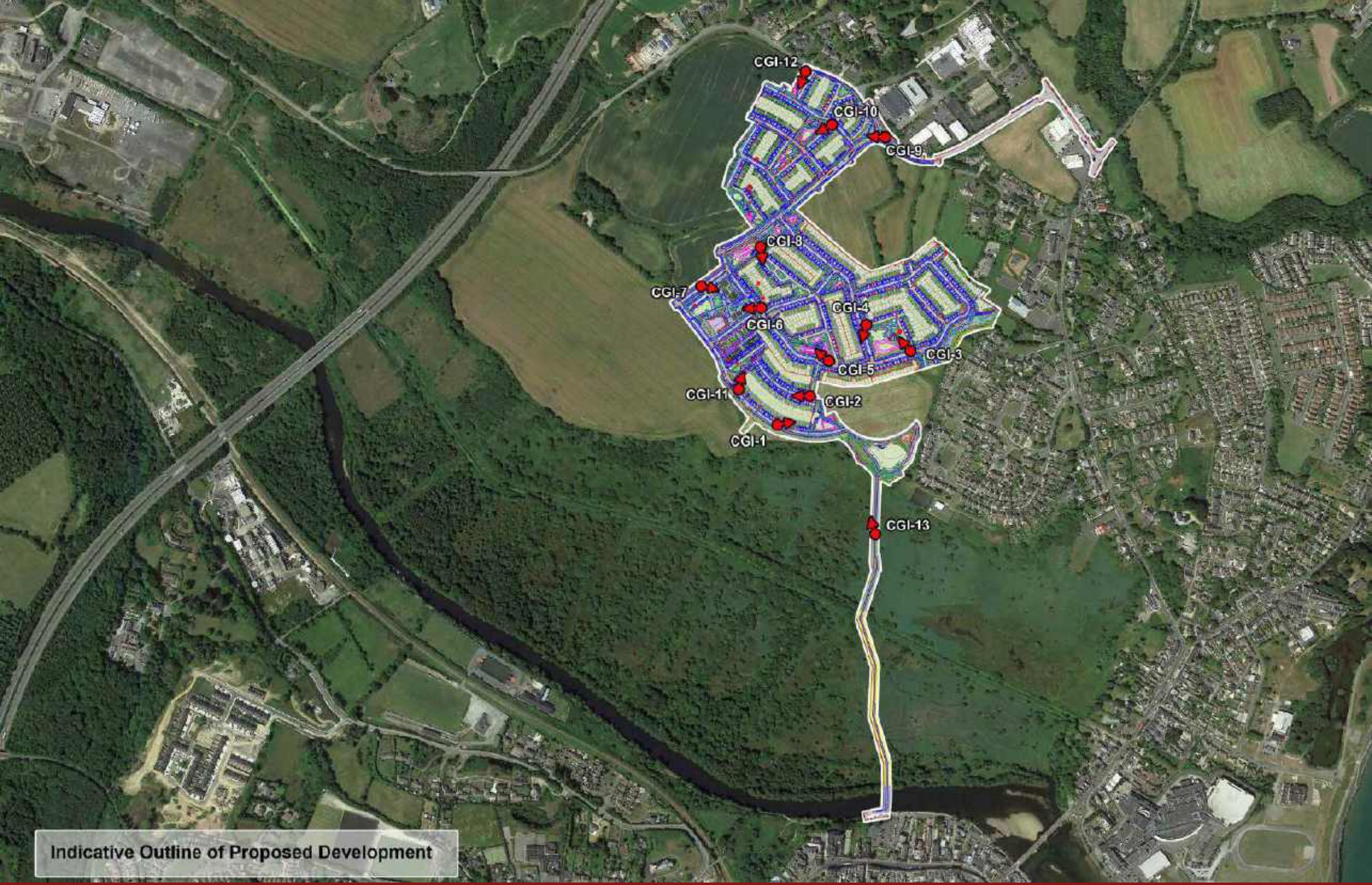
Verified Views and CGI

Applicant: Certain Assets of Dawnhill and Windhill Limited

+353 (0) 1 2880186
info@3ddesignbureau.com
www.3ddesignbureau.com

May 2025
job ref. 24354

A3 print size



Project Title :	Applicant Name :	Image Title : CGI location map
"Lands at Kilbride", Arklow, Co. Wicklow.	Certain Assets of Dawnhill and Windhill Limited	

3D DESIGN BUREAU Tel: +353 (0) 1 2880186 www.3ddesignbureau.com

Project Title :	Applicant Name :	Image Title : CGI 1
“Lands at Kilbride”, Arklow, Co. Wicklow.	Certain Assets of Dawnhill and Windhill Limited	

3D DESIGN BUREAU Tel: +353 (0) 1 2880186 www.3ddesignbureau.com

Project Title :	Applicant Name :	Image Title : CGI 1 - Option
"Lands at Kilbride", Arklow, Co. Wicklow.	Certain Assets of Dawnhill and Windhill Limited	

3D DESIGN BUREAU Tel: +353 (0) 1 2880186 www.3ddesignbureau.com

Project Title : “Lands at Kilbride”, Arklow, Co. Wicklow.	Applicant Name : Certain Assets of Dawnhill and Windhill Limited	Image Title : CGI 2

3D DESIGN BUREAU
Tel: +353 (0) 1 2880186
www.3ddesignbureau.com

Project Title :	Applicant Name :	Image Title : CGI 2 - Option
"Lands at Kilbride", Arklow, Co. Wicklow.	Certain Assets of Dawnhill and Windhill Limited	

3D DESIGN BUREAU Tel: +353 (0) 1 2880186 www.3ddesignbureau.com

Project Title :	Applicant Name :	Image Title : CGI 3
“Lands at Kilbride”, Arklow, Co. Wicklow.	Certain Assets of Dawnhill and Windhill Limited	

3D DESIGN BUREAU Tel: +353 (0) 1 2880186 www.3ddesignbureau.com

Project Title :	Applicant Name :	Image Title : CGI 3 - Option
"Lands at Kilbride", Arklow, Co. Wicklow.	Certain Assets of Dawnhill and Windhill Limited	

3D DESIGN BUREAU Tel: +353 (0) 1 2880186 www.3ddesignbureau.com

Project Title :	Applicant Name :	Image Title : CGI 4
“Lands at Kilbride”, Arklow, Co. Wicklow.	Certain Assets of Dawnhill and Windhill Limited	3D DESIGN BUREAU Tel: +353 (0) 1 2880186 www.3ddesignbureau.com

Project Title :	Applicant Name :	Image Title : CGI 4 - Option
"Lands at Kilbride", Arklow, Co. Wicklow.	Certain Assets of Dawnhill and Windhill Limited	

3D DESIGN BUREAU Tel: +353 (0) 1 2880186 www.3ddesignbureau.com

Project Title :	Applicant Name :	Image Title : CGI 5
"Lands at Kilbride", Arklow, Co. Wicklow.	Certain Assets of Dawnhill and Windhill Limited	

3D DESIGN BUREAU Tel: +353 (0) 1 2880186 www.3ddesignbureau.com

Project Title :	Applicant Name :	Image Title : CGI 5 - Option
"Lands at Kilbride", Arklow, Co. Wicklow.	Certain Assets of Dawnhill and Windhill Limited	

3D DESIGN BUREAU Tel: +353 (0) 1 2880186 www.3ddesignbureau.com

Project Title :	Applicant Name :	Image Title : CGI 6
"Lands at Kilbride", Arklow, Co. Wicklow.	Certain Assets of Dawnhill and Windhill Limited	

3D DESIGN BUREAU Tel: +353 (0) 1 2880186 www.3ddesignbureau.com

Project Title :	Applicant Name :	Image Title : CGI 6 - Option
"Lands at Kilbride", Arklow, Co. Wicklow.	Certain Assets of Dawnhill and Windhill Limited	

3D DESIGN BUREAU Tel: +353 (0) 1 2880186 www.3ddesignbureau.com

Project Title : “Lands at Kilbride”, Arklow, Co. Wicklow.	Applicant Name : Certain Assets of Dawnhill and Windhill Limited	Image Title : CGI 7

3D DESIGN BUREAU
Tel: +353 (0) 1 2880186
www.3ddesignbureau.com

Project Title :	Applicant Name :	Image Title : CGI 7 - Option
"Lands at Kilbride", Arklow, Co. Wicklow.	Certain Assets of Dawnhill and Windhill Limited	

3D DESIGN BUREAU Tel: +353 (0) 1 2880186 www.3ddesignbureau.com

Project Title :	Applicant Name :	Image Title : CGI 8
“Lands at Kilbride”, Arklow, Co. Wicklow.	Certain Assets of Dawnhill and Windhill Limited	3D DESIGN BUREAU Tel: +353 (0) 1 2880186 www.3ddesignbureau.com

Project Title :	Applicant Name :	Image Title : CGI 8 - Option
"Lands at Kilbride", Arklow, Co. Wicklow.	Certain Assets of Dawnhill and Windhill Limited	

3D DESIGN BUREAU Tel: +353 (0) 1 2880186 www.3ddesignbureau.com

Project Title :	Applicant Name :	Image Title : CGI 9
"Lands at Kilbride", Arklow, Co. Wicklow.	Certain Assets of Dawnhill and Windhill Limited	

3D DESIGN BUREAU Tel: +353 (0) 1 2880186 www.3ddesignbureau.com

Project Title :	Applicant Name :	Image Title : CGI 9 - Option
"Lands at Kilbride", Arklow, Co. Wicklow.	Certain Assets of Dawnhill and Windhill Limited	

3D DESIGN BUREAU Tel: +353 (0) 1 2880186 www.3ddesignbureau.com

Project Title : “Lands at Kilbride”, Arklow, Co. Wicklow.	Applicant Name : Certain Assets of Dawnhill and Windhill Limited	Image Title : CGI 10

3D DESIGN BUREAU Tel: +353 (0) 1 2880186 www.3ddesignbureau.com

Project Title :	Applicant Name :	Image Title : CGI 10 - Option
"Lands at Kilbride", Arklow, Co. Wicklow.	Certain Assets of Dawnhill and Windhill Limited	

3D DESIGN BUREAU Tel: +353 (0) 1 2880186 www.3ddesignbureau.com

Project Title :	Applicant Name :	Image Title : CGI 11
“Lands at Kilbride”, Arklow, Co. Wicklow.	Certain Assets of Dawnhill and Windhill Limited	

3D DESIGN BUREAU Tel: +353 (0) 1 2880186 www.3ddesignbureau.com

Project Title :	Applicant Name :	Image Title : CGI 11 - Option
"Lands at Kilbride", Arklow, Co. Wicklow.	Certain Assets of Dawnhill and Windhill Limited	

3D DESIGN BUREAU Tel: +353 (0) 1 2880186 www.3ddesignbureau.com

Project Title :	Applicant Name :	Image Title : CGI 12
“Lands at Kilbride”, Arklow, Co. Wicklow.	Certain Assets of Dawnhill and Windhill Limited	

3D DESIGN BUREAU Tel: +353 (0) 1 2880186 www.3ddesignbureau.com

Project Title :	Applicant Name :	Image Title : CGI 12
“Lands at Kilbride”, Arklow, Co. Wicklow.	Certain Assets of Dawnhill and Windhill Limited	

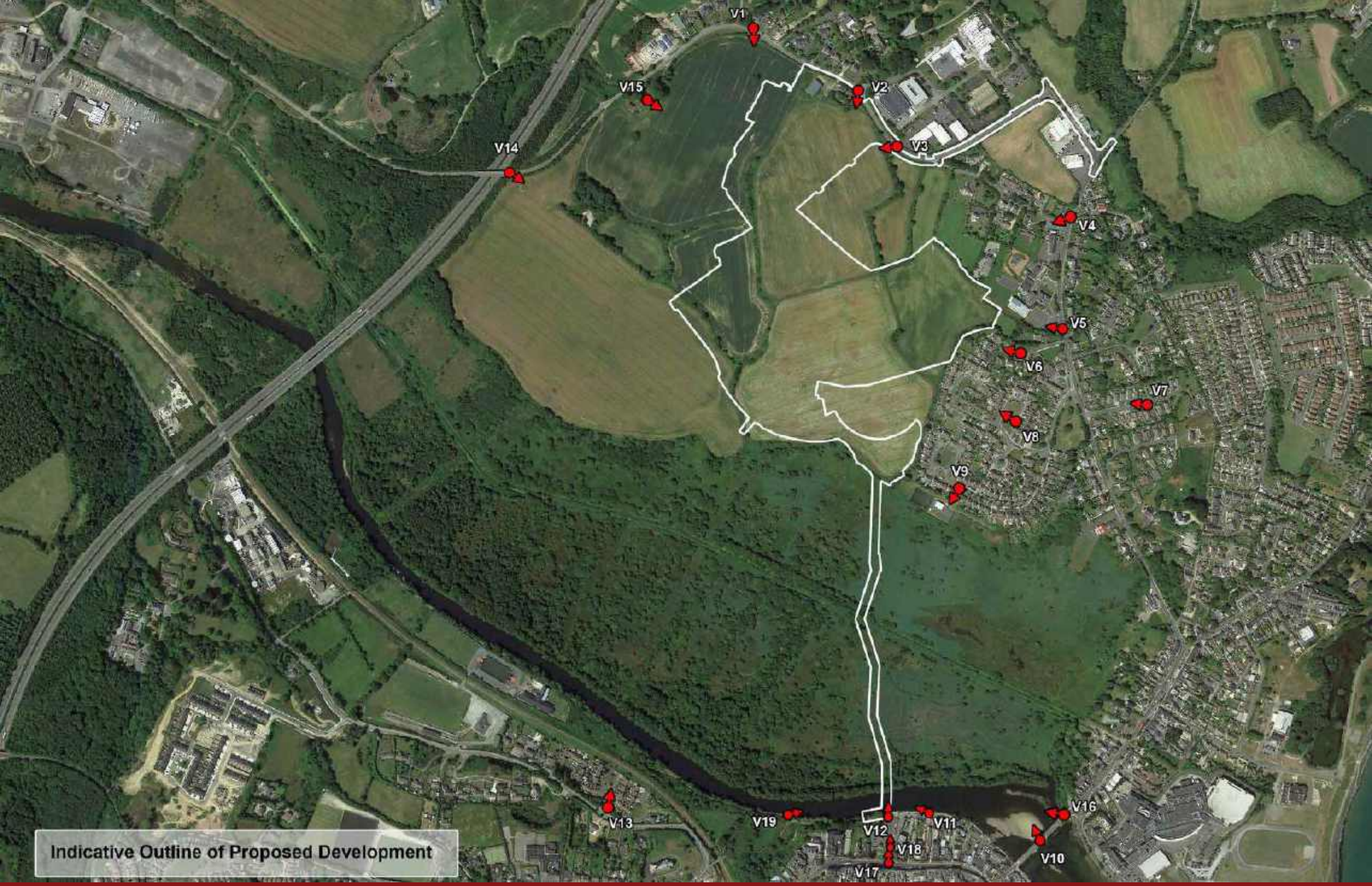
3D DESIGN BUREAU Tel: +353 (0) 1 2880186 www.3ddesignbureau.com

Project Title :	Applicant Name :	Image Title : CGI 13
“Lands at Kilbride”, Arklow, Co. Wicklow.	Certain Assets of Dawnhill and Windhill Limited	

3D DESIGN BUREAU Tel: +353 (0) 1 2880186 www.3ddesignbureau.com

Project Title :	Applicant Name :	Image Title : CGI 13 - Option
"Lands at Kilbride", Arklow, Co. Wicklow.	Certain Assets of Dawnhill and Windhill Limited	

3D DESIGN BUREAU Tel: +353 (0) 1 2880186 www.3ddesignbureau.com



Project Title :	Applicant Name :	Image Title : Viewpoint location map
"Lands at Kilbride", Arklow, Co. Wicklow.	Certain Assets of Dawnhill and Windhill Limited	3D DESIGN BUREAU Tel: +353 (0) 1 2880186 www.3ddesignbureau.com

Camera type : Canon EOS 5D Mark IV	Lens type : EF16-35mmf/4LISUSM	Focal Length : 16mm	Approx. Distance : 83.8m	Date & Time : 29/08/2024,09:55:03

Project Title : "Lands at Kilbride", Arklow, Co. Wicklow.	Applicant Name : Certain Assets of Dawnhill and Windhill Limited	Image Title : Baseline VVM 1

3D DESIGN BUREAU Tel: +353 (0) 1 2880186 www.3ddesignbureau.com

Camera type : Canon EOS 5D Mark IV	Lens type : EF16-35mmf/4LISUSM	Focal Length : 16mm	Approx. Distance : 83.8m	Date & Time : 29/08/2024,09:55:03

Project Title : “Lands at Kilbride”, Arklow, Co. Wicklow.	Applicant Name : Certain Assets of Dawnhill and Windhill Limited	Image Title : Proposed VVM 1

3D DESIGN BUREAU Tel: +353 (0) 1 2880186 www.3ddesignbureau.com

Camera type : Canon EOS 5D Mark IV	Lens type : EF16-35mmf/4LISUSM	Focal Length : 16mm	Approx. Distance : 83.8m	Date & Time : 29/08/2024,09:55:03

Project Title : "Lands at Kilbride", Arklow, Co. Wicklow.	Applicant Name : Certain Assets of Dawnhill and Windhill Limited	Image Title : Cumulative VVM 1

3D DESIGN BUREAU Tel: +353 (0) 1 2880186 www.3ddesignbureau.com

Camera type : Canon EOS 5D Mark IV	Lens type : EF16-35mmf/4LISUSM	Focal Length : 16mm	Approx. Distance : 15.3m	Date & Time : 29/08/2024,10:14:04

Project Title : “Lands at Kilbride”, Arklow, Co. Wicklow.	Applicant Name : Certain Assets of Dawnhill and Windhill Limited	Image Title : Baseline VVM 2

3D DESIGN BUREAU Tel: +353 (0) 1 2880186 www.3ddesignbureau.com

Camera type : Canon EOS 5D Mark IV	Lens type : EF16-35mmf/4LISUSM	Focal Length : 16mm	Approx. Distance : 15.3m	Date & Time : 29/08/2024,10:14:04

Project Title : “Lands at Kilbride”, Arklow, Co. Wicklow.	Applicant Name : Certain Assets of Dawnhill and Windhill Limited	Image Title : Proposed VVM 2

3D DESIGN BUREAU Tel: +353 (0) 1 2880186 www.3ddesignbureau.com

Camera type : Canon EOS 5D Mark IV	Lens type : EF16-35mmf/4LISUSM	Focal Length : 16mm	Approx. Distance : 15.3m	Date & Time : 29/08/2024,10:14:04

Project Title : "Lands at Kilbride", Arklow, Co. Wicklow.	Applicant Name : Certain Assets of Dawnhill and Windhill Limited	Image Title : Cumulative VVM 2

3D DESIGN BUREAU Tel: +353 (0) 1 2880186 www.3ddesignbureau.com

Camera type : Canon EOS 5D Mark IV	Lens type : EF16-35mmf/4LISUSM	Focal Length : 16mm	Approx. Distance : 6.6m	Date & Time : 29/08/2024,10:20:58

Project Title : "Lands at Kilbride", Arklow, Co. Wicklow.	Applicant Name : Certain Assets of Dawnhill and Windhill Limited	Image Title : Baseline VVM 3

3D DESIGN BUREAU Tel: +353 (0) 1 2880186 www.3ddesignbureau.com

Camera type : Canon EOS 5D Mark IV	Lens type : EF16-35mmf/4LISUSM	Focal Length : 16mm	Approx. Distance : 6.6m	Date & Time : 29/08/2024,10:20:58

Project Title : "Lands at Kilbride", Arklow, Co. Wicklow.	Applicant Name : Certain Assets of Dawnhill and Windhill Limited	Image Title : Proposed VVM 3

3D DESIGN BUREAU Tel: +353 (0) 1 2880186 www.3ddesignbureau.com

Camera type : Canon EOS 5D Mark IV	Lens type : EF16-35mmf/4LISUSM	Focal Length : 16mm	Approx. Distance : 6.6m	Date & Time : 29/08/2024,10:20:58

Project Title : "Lands at Kilbride", Arklow, Co. Wicklow.	Applicant Name : Certain Assets of Dawnhill and Windhill Limited	Image Title : Cumulative VVM 3

3D DESIGN BUREAU Tel: +353 (0) 1 2880186 www.3ddesignbureau.com

Camera type : Canon EOS 5D Mark IV	Lens type : EF16-35mmf/4LISUSM	Focal Length : 16mm	Approx. Distance : 223.8m	Date & Time : 29/08/2024,10:42:58

Project Title : "Lands at Kilbride", Arklow, Co. Wicklow.	Applicant Name : Certain Assets of Dawnhill and Windhill Limited	Image Title : Baseline VVM 4

3D DESIGN BUREAU Tel: +353 (0) 1 2880186 www.3ddesignbureau.com

Camera type : Canon EOS 5D Mark IV	Lens type : EF16-35mmf/4LISUSM	Focal Length : 16mm	Approx. Distance : 223.8m	Date & Time : 29/08/2024,10:42:58

Project Title : "Lands at Kilbride", Arklow, Co. Wicklow.	Applicant Name : Certain Assets of Dawnhill and Windhill Limited	Image Title : Proposed VVM 4

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