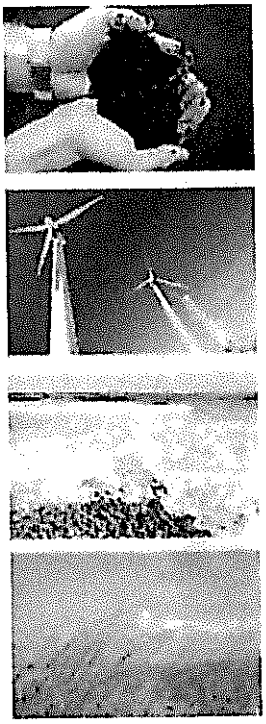
Appendix 5

Additional Bird Survey Data



Hinterland Survey Data 2018/19

Site	Location	Date	Observer	Start Time	Cloud	Visibility	Rain	Wind	Species	Species Quantity
Inchamore Gortyrahilly	Inchigeelagh	04/02/2019	LM	09:40	1/8	Excellent	None	F0-1 SW	Mute Swan	2
Inchamore Gortyrahilly	Inchigeelagh	04/02/2019	LM	09:40	1/8	Excellent	None	F0-1 SW	Little Egret	1
Inchamore Gortyrahilly	Inchigeelagh	04/02/2019	LM	09:40	1/8	Excellent	None	F0-1 SW	Moor Hen	1
Inchamore Gortyrahilly	Inchigeelagh	04/02/2019	LM	09:40	1/8	Excellent	None	F0-1 SW	Mallard	1
Inchamore Gortyrahilly	Lee Valley	04/02/2019	LM	09:40	1/8	Excellent	None	F0-1 SW	Mute Swan	11
Inchamore Gortyrahilly	Lee Valley	04/02/2019	LM	09:40	1/8	Excellent	None	F0-1 SW	Whooper Swan	69
Inchamore Gortyrahilly	Lee Valley	04/02/2019	LM	09:40	1/8	Excellent	None	F0-1 SW	Greylag Goose	46
Inchamore Gortyrahilly	Lough Allua	04/02/2019	LM	09:40	1/8	Excellent	None	F0-1 SW	Mute Swan	2
Inchamore Gortyrahilly	Lough Allua	04/02/2019	LM	09:40	1/8	Excellent	None	F0-1 SW	Whooper Swan	10
Inchamore Gortyrahilly	Lough Allua	04/02/2019	LM	09:40	1/8	Excellent	None	F0-1 SW	Cormorant	5
Inchamore Gortyrahilly	Lough Allua	04/02/2019	LM	09:40	1/8	Excellent	None	F0-1 SW	Mallard	5
Inchamore Gortyrahilly	Gearagh	01/02/2019	LM + JD	14:30	4/8	Good	Light rain	F2	Teal	24
Inchamore Gortyrahilly	Gearagh	01/02/2019	LM + JD	14:30	4/8	Good	Light rain	F2	Long-tailed tit	1
Inchamore Gortyrahilly	Gearagh	01/02/2019	LM + JD	14:30	4/8	Good	Light rain	F2	Wigeon	12
Inchamore Gortyrahilly	Gearagh	01/02/2019	LM + JD	14:30	4/8	Good	Light rain	F2	Greylag Goose	1
Inchamore Gortyrahilly	Gearagh	01/02/2019	LM + JD	14:30	4/8	Good	Light rain	F2	Mute Swan	1
Inchamore Gortyrahilly	Gearagh	01/02/2019	LM + JD	14:30	4/8	Good	Light rain	F2	Gull sp.	1
Inchamore Gortyrahilly	Gearagh	01/02/2019	LM + JD	14:30	4/8	Good	Light rain	F2	Mallard	2

Site	Location	Date	Observer	Start Time	Cloud	Visibility	Rain	Wind	Species	Species Quantity
Inchamore Gortyrahilly	Gearagh	01/02/2019	LM + JD	14:30	4/8	Good	Light rain	F2	Snipe	1
Inchamore Gortyrahilly	Gearagh	01/02/2019	LM + JD	14:30	4/8	Good	Light rain	F2	Grey Herron	1
Inchamore Gortyrahilly	Gearagh	01/02/2019	LM + JD	14:30	4/8	Good	Light rain	F2	Cormorant	1
Inchamore Gortyrahilly	Sillahtane WFE	04/02/2019	LM	10:40	1/8	Excellent	None	F0-1 SW	N/A	-
Inchamore Gortyrahilly	Lough Nabuddoga	04/02/2019	LM	10:40	1/8	Excellent	None	F0-1 SW	N/A	-
Inchamore Gortyrahilly	Sillahtane WFE	15/02/2019	LM	11:35	8/8	Excellent	None	F3 S	Snipe	1
Inchamore Gortyrahilly	Lough Allua	15/02/2019	LM	11:35	8/8	Excellent	None	F3 S	Cormorant	1
Inchamore Gortyrahilly	Lough Allua	15/02/2019	LM	11:35	8/8	Excellent	None	F3 S	Mute Swan	2
Inchamore Gortyrahilly	Lough Allua	15/02/2019	LM	11:35	8/8	Excellent	None	F3 S	Mallard	4
Inchamore Gortyrahilly	Lough Allua	15/02/2019	LM	11:35	8/8	Excellent	None	F3 S	Whooper Swan	10
Inchamore Gortyrahilly	Inchigeelagh	15/02/2019	LM	11:35	8/8	Excellent	None	F3 S	Mallard	1
Inchamore Gortyrahilly	Inchigeelagh	15/02/2019	LM	11:35	8/8	Excellent	None	F3 S	Moor Hen	1
Inchamore Gortyrahilly	Lee Valley	15/02/2019	LM	11:35	8/8	Excellent	None	F3 S	Mute Swan	25
Inchamore Gortyrahilly	Lee Valley	15/02/2019	LM	11:35	8/8	Excellent	None	F3 S	Whooper Swan	55
Inchamore Gortyrahilly	Lee Valley	15/02/2019	LM	11:35	8/8	Excellent	None	F3 S	Greylag Goose	22
Inchamore Gortyrahilly	Gearagh	15/02/2019	LM	11:35	8/8	Excellent	None	F3 S	Whooper Swan	2
Inchamore Gortyrahilly	Gearagh	15/02/2019	LM	11:35	8/8	Excellent	None	F3 S	Mallard	11
Inchamore Gortyrahilly	Gearagh	15/02/2019	LM	11:35	8/8	Excellent	None	F3 S	Mute Swan	3
Inchamore Gortyrahilly	Gearagh	15/02/2019	LM	11:35	8/8	Excellent	None	F3 S	Cormorant	2

Site	Location	Date	Observer	Start Time	Cloud	Visibility	Rain	Wind	Species	Species Quantity
Inchamore Gortyrahilly	Gearagh	15/02/2019	LM	11:35	8/8	Excellent	None	F3 S	Black-headed Gull	6
Inchamore Gortyrahilly	Gearagh	06/03/2019	LM	10:44	8/8	OK	Light rain	F3	Cormorant	5
Inchamore Gortyrahilly	Gearagh	06/03/2019	LM	10:44	8/8	OK	Light rain	F3	Mallard	17
Inchamore Gortyrahilly	Gearagh	06/03/2019	LM	10:44	8/8	OK	Light rain	F3	Great Black-backed Gull	2
Inchamore Gortyrahilly	Gearagh	06/03/2019	LM	10:44	8/8	OK	Light rain	F3	Teal	37
Inchamore Gortyrahilly	Gearagh	06/03/2019	LM	10:44	8/8	OK	Light rain	F3	Golden Plover	1
Inchamore Gortyrahilly	Gearagh	06/03/2019	LM	10:44	8/8	OK	Light rain	F3	Swan Sp. (too far)	1
Inchamore Gortyrahilly	Gearagh	06/03/2019	LM	10:44	8/8	OK	Light rain	F3	Grey Herron	5
Inchamore Gortyrahilly	Gearagh	06/03/2019	LM	10:44	8/8	OK	Light rain	F3	Grey wagtail	2
Inchamore Gortyrahilly	Gearagh	06/03/2019	LM	10:44	8/8	OK	Light rain	F3	Sparrowhawk	1
Inchamore Gortyrahilly	Gearagh	06/03/2019	LM	10:44	8/8	OK	Light rain	F3	Starling	30
Inchamore Gortyrahilly	Gearagh	06/03/2019	LM	10:44	8/8	OK	Light rain	F3	Whooper Swan	18
Inchamore Gortyrahilly	Gearagh	06/03/2019	LM	10:44	8/8	OK	Light rain	F3	Greylag Goose	19
Inchamore Gortyrahilly	Lee Valley	06/03/2019	LM	10:44	8/8	OK	Light rain	F3	Mute Swan	2
Inchamore Gortyrahilly	Lee Valley	06/03/2019	LM	10:44	8/8	OK	Light rain	F3	Black-headed Gull	50
Inchamore Gortyrahilly	Lee Valley	06/03/2019	LM	10:44	8/8	OK	Light rain	F3	Whooper Swan	64
Inchamore Gortyrahilly	Lee Valley	06/03/2019	LM	10:44	8/8	OK	Light rain	F3	Grey Herron	1
Inchamore Gortyrahilly	Lough Allua	06/03/2019	LM	10:44	8/8	OK	Light rain	F3	Mallard	12
Inchamore Gortyrahilly	Lough Allua	06/03/2019	LM	10:44	8/8	OK	Light rain	F3	Whooper Swan	5

Site	Location	Date	Observer	Start Time	Cloud	Visibility	Rain	Wind	Species	Species Quantity
Inchamore Gortyrahilly	Lough Allua	06/03/2019	LM	10:44	8/8	OK	Light rain	F3	Teal	3
Inchamore Gortyrahilly	Lough Allua	06/03/2019	LM	10:44	8/8	OK	Light rain	F3	Cormorant	3
Inchamore Gortyrahilly	Lough Allua	06/03/2019	LM	10:44	8/8	OK	Light rain	F3	Grey Herron	2
Inchamore Gortyrahilly	Sillahtane WFE	06/03/2019	LM	10:44	8/8	OK	Light rain	F3	N/A	-
Inchamore Gortyrahilly	Sillahtane WFE	26/04/2018	JA	-	0/8	Good	None	F2	N/A	-
Inchamore Gortyrahilly	Lough Nabuddoga	26/04/2018	JA	-	0/8	Good	None	F2	N/A	-
Inchamore Gortyrahilly	Grousmont	26/04/2018	JA	-	0/8	Good	None	F2	N/A	-
Inchamore Gortyrahilly	Sillahtane WFE	24th May 2018	JA	-	0/8	Good	None	F1	WE	1
Inchamore Gortyrahilly	Lough Nabuddoga	24th May 2018	JA	-	0/8	Good	None	F3	N/A	-
Inchamore Gortyrahilly	Grousmont	24th May 2018	JA	-	0/8	Good	None	F3	N/A	-
Inchamore Gortyrahilly	Lough Allua	24th May 2018	JA	-	0/8	Good	None	F3	N/A	-
Inchamore Gortyrahilly	Inchigeelagh	24th May 2018	JA	-	0/8	Good	None	F3	N/A	-
Inchamore Gortyrahilly	Gearagh	24th May 2018	JA	-	0/8	Good	None	F3	N/A	-
Inchamore Gortyrahilly	Sillahtane WFE	10/05/2018	JA	-	0/8	Good	None	F3	WE	1
Inchamore Gortyrahilly	Sillahtane WFE	10/05/2018	JA	-	0/8	Good	None	F3	WE	1
Inchamore Gortyrahilly	Lough Nabuddoga	10/05/2018	JA	-	0/8	Good	None	F3	N/A	-
Inchamore Gortyrahilly	Grousmont	10/05/2018	JA	-	0/8	Good	None	F3	N/A	-
Inchamore Gortyrahilly	Lough Allua	10/05/2018	JA	-	0/8	Good	None	F3	N/A	-
Inchamore Gortyrahilly	Inchigeelagh	10/05/2018	JA	-	0/8	Good	None	F3	N/A	-

Site	Location	Date	Observer	Start Time	Cloud	Visibility	Rain	Wind	Species	Species Quantity
Inchamore Gortyrahilly	Gearagh	10/05/2018	JA	-	0/8	Good	None	F3	N/A	-
Inchamore Gortyrahilly	Sillahtane WFE	22/08/2018	JA	-	5/8	OK	Slight	F3	WE	1
Inchamore Gortyrahilly	Lough Nabuddoga	22/08/2018	JA	-	5/8-	OK	Slight	F3	N/A	-
Inchamore Gortyrahilly	Grousmont	22/08/2018	JA	-	5/8-	OK	Slight	F3	N/A	-
Inchamore Gortyrahilly	Lough Allua	22/08/2018	JA	-	5/8-	OK	Slight	F3	N/A	-
Inchamore Gortyrahilly	Inchigeelagh	22/08/2018	JA	-	5/8-	OK	Slight	F3	N/A	-
Inchamore Gortyrahilly	Gearagh	22/08/2018	JA	-	5/8-	OK	Slight	F3	N/A	-
Inchamore Gortyrahilly	Sillahtane WFE	13/09/2018	JA	-	0/8	Good	None	F2	WE	1
Inchamore Gortyrahilly	Lough Nabuddoga	13/09/2018	JA	-	0/8	Good	None	F2	N/A	-
Inchamore Gortyrahilly	Grousmont	13/09/2018	JA	-	0/8	Good	None	F2	N/A	-
Inchamore Gortyrahilly	Lough Allua	13/09/2018	JA	-	0/8	Good	None	F2	N/A	-
Inchamore Gortyrahilly	Inchigeelagh	13/09/2018	JA	-	0/8	Good	None	F2	N/A	-
Inchamore Gortyrahilly	Gearagh	13/09/2018	JA	-	0/8	Good	None	F2	N/A	-
Inchamore Gortyrahilly	Sillahtane WFE	11/07/2018	JA	-	1/8	Good	None	F2	WE	1
Inchamore Gortyrahilly	Lough Nabuddoga	11/07/2018	JA	-	1/8	Good	None	F2	N/A	-
Inchamore Gortyrahilly	Grousmont	11/07/2018	JA	-	1/8	Good	None	F2	N/A	-
Inchamore Gortyrahilly	Lough Allua	11/07/2018	JA	-	1/8	Good	None	F2	N/A	-
Inchamore Gortyrahilly	Inchigeelagh	11/07/2018	JA	-	1/8	Good	None	F2	N/A	-
Inchamore Gortyrahilly	Gearagh	11/07/2018	JA	-	1/8	Good	None	F2	N/A	

Site	Location	Date	Observer	Start Time	Cloud	Visibility	Rain	Wind	Species	Species Quantity
Inchamore Gortyrahilly	Gearagh	26/11/2018	JA	-	8/8	Good-excellent	Occasional shower	F4-5 SE	Teal	8
Inchamore Gortyrahilly	Lee Valley	26/11/2018	JA	-	8/8	Good-excellent	Occasional shower	F4-5 SE	Whooper Swan	21
Inchamore Gortyrahilly	Coolea town	26/11/2018	JA	-	8/8	Good-excellent	Occasional shower	F4-5 SE	mallard	7
Inchamore Gortyrahilly	Gearagh	18/10/2018	JA	-	8/8	Excellent	None	F1-2 SW	Little Egret	3
Inchamore Gortyrahilly	Gearagh	18/10/2018	JA	-	8/8	Excellent	None	F1-2 SW	Lapwing	188
Inchamore Gortyrahilly	Gearagh	18/10/2018	JA	-	8/8	Excellent	None	F1-2 SW	Grey Heron	4
Inchamore Gortyrahilly	Gearagh	18/10/2018	JA	-	8/8	Excellent	None	F1-2 SW	Mute swan	4
Inchamore Gortyrahilly	Gearagh	18/10/2018	JA	-	8/8	Excellent	None	F1-2 SW	Cormorant	4
Inchamore Gortyrahilly	Gearagh	18/10/2018	JA	-	8/8	Excellent	None	F1-2 SW	Teal	87
Inchamore Gortyrahilly	Gearagh	18/10/2018	JA	-	8/8	Excellent	None	F1-2 SW	Coot	1
Inchamore Gortyrahilly	Gearagh	18/10/2018	JA	-	8/8	Excellent	None	F1-2 SW	Kingfisher	2
Inchamore Gortyrahilly	Gearagh	18/10/2018	JA	-	8/8	Excellent	None	F1-2 SW	Lesser black-backed Gull	9
Inchamore Gortyrahilly	Gearagh	18/10/2018	JA	-	8/8	Excellent	None	F1-2 SW	Curlew	1
Inchamore Gortyrahilly	Gearagh	18/10/2018	JA	-	8/8	Excellent	None	F1-2 SW	Black-headed gull	13
Inchamore Gortyrahilly	Gearagh	18/10/2018	JA	-	8/8	Excellent	None	F1-2 SW	Snipe	1
Inchamore Gortyrahilly	Gearagh	18/10/2018	JA	-	8/8	Excellent	None	F1-2 SW	mallard	4
Inchamore Gortyrahilly	Ballyvorney	18/10/2018	JA	-	8/8	Excellent	None	F1-2 SW	N/A Chough	-
Inchamore Gortyrahilly	Ballyvorney	26/11/2018	JA	-	8/8	Good-excellent	occasional shower	F4-5 SE	N/A Chough	-
Inchamore Gortyrahilly	Ballyvorney	26/04/2018	JA	-	8/8	Good-excellent	occasional shower	F4-5 SE	N/A Chough	-

Merlin Survey Data 2018

Site	Location Transect/ Square No.	Date	Observer	Start Time	Cloud	Visibility	Rain	Wind	Merlin	General Notes
Inchamore	13047/ 78511	28/04/2018	KW	06:30	0/8	Good	Dry	F2	No	Tree felling in progress
Inchamore	13176/ 78927	28/04/2018	KW	06:30	0/8	Good	Dry	F2	No	
Inchamore	13488/ 78865	28/04/2018	KW	06:30	0/8	Good	Dry	F2	No	
Inchamore	13505/ 788345	28/04/2018	KW	06:30	0/8	Good	Dry	F2	No	
Inchamore	13047/ 78511	11/05/2018	KW	06:30	0/8	Good	N/A	F3	No	
Inchamore	13176/ 78927	11/05/2018	KW	06:30	0/8	Good	N/A	F3	No	
Inchamore	13488/ 78865	11/05/2018	KW	06:30	0/8	Good	N/A	F3	No	
Inchamore	13505/ 788345	11/05/2018	KW	06:30	0/8	Good	N/A	F3	No	
Inchamore	13047/ 78511	21/06/2018	KW	08:15	0/8	Good	Dry	F2	No	
Inchamore	13176/ 78927	21/06/2018	KW	08:15	0/8	Good	Dry	F2	No	
Inchamore	13488/ 78865	21/06/2018	KW	08:15	0/8	Good	Dry	F2	No	
Inchamore	13505/ 788345	21/06/2018	KW	08:15	0/8	Good	Dry	F2	No	
Inchamore	13047/ 78511	07/08/2018	KW	08:15	3/8	Good	Dry	F3	No	
Inchamore	13176/ 78927	07/08/2018	KW	08:15	3/8	Good	Dry	F3	No	
Inchamore	13488/ 78865	07/08/2018	KW	08:15	3/8	Good	Dry	F3	No	
Inchamore	13505/ 788345	07/08/2018	KW	08:15	3/8	Good	Dry	F3	No	
Gortyrahilly	16262/ 72808	14/05/2018	JA	13:00	2/8, bright warm, sunny 15oC	Excellent	None	NE F4	No	Male K. hunting at centre of site, HC 2x, RN 9x, MT 2x, S. 3x, CH 8x, R. 6x, WW 1x SK 1x, No MP observed, No ML activity. Habitat excellent for breeding ML! Route was walked for 30m from forest edge, checking for nests. Forest edge was surveyed by stopping at intervals and checking for activity. In addition, outcropping was observed for nests, white was and remains of prey items/ pluckings posts. Fence lines were checked for plucking posts. No evidence of ML activity was observed, despite the area being

Site	Location Transect/ Square No.	Date	Observer	Start Time	Cloud	Visibility	Rain	Wind	Merlin	General Notes
										favourable for ML plenty of prey items. No old HC nests found.
Gortyrahilly	16262/ 72808	14/06/2018	JA	14:15	2/8, Humid sunny 18oC	Excellent	Nil	SW F3-4	N/A	Same route as May 14th. S. 5x, MP 4x, MT 2x, RN 8, HC 3x, CH 4x, No evidence of Merlin
Gortyrahilly	16262/ 72808	10/07/2018	JA	14:00	0/8	Excellent	Not indicated	SW F1-2	N/A	S. 4x, MT 8x, CH 4x, MP 7x, RN 6x, HC 2x, No signs of Merlin

Red Grouse Survey Data 2019

Transect No.	Grid Coordinates	Date	Start Time	Record number	Record Type	Transect # of record	Record details (Sex, ad/juv, behav, colour, pellet, old?)	Habitat (H%, hab, landuse, grid, damp, alt)	Non-grouse records
W1278	T1a, T1b, T2a, T2b	25/02/2019	12:00	1	Feathers	T1b	Feather blew away before collected	70%, raised bog, Stones around, wet, 410m ASL	S. flying and singing, Rn present
W1278	T1a, T1b, T2a, T2b	25/02/2019	12:00	2	Sighting	T1b	Unsexed adult, flying not calling, medium darkness	70%, raised bog, Stones around, wet, 440m ASL	S. flying and singing, Rn present
W1278	T1a, T1b, T2a, T2b	25/02/2019	12:00	3	Sighting	T1a	Male adult, flying not calling, medium darkness	70%, raised bog, Stones around, wet, 450m ASL	S. flying and singing, Rn present
W1278	T1a, T1b, T2a, T2b	25/02/2019	12:00	4	Sighting	T1b	Unsexed adult, flying not calling	70%, raised bog, Stones around, wet, 440m ASL	S. flying and singing, Rn present
W1278	T1a, T1b, T2a, T2b	25/02/2019	12:00	5	Call	T1a	-	70%, raised bog, Stones around, wet, 410m ASL	S. flying and singing, Rn present
W1076	T3a, T3b	27/02/2019	09:20	No Grouse Detected			-		
W1272	T6a, T6b	26/02/2019	11:30	1	Sighting	T6a	Male adult, flew off with no call	80%, upland heath, grazing sheep, exposed rock, wet, 460m asl	
W1272	T6a, T6b	26/02/2019	11:30	2	Droppings	T6a	pellets, fresh	80%, upland heath, grazing sheep, exposed rock, wet, 460m asl	
W1572	T5b, T5a, T4b, T4a	25/02/2019	14:30	1	Droppings	T4b	pellets, fresh	2%, agricultural grassland, sheep grazing, wet, some exposed rocks, 320m asl	
W1570	T7a, T7b	26/02/2019	09:30	No Grouse Detected			-		

APPENDIX 7.20:

BASELINE ORNITHOLOGICAL SURVEYS – INCHAMORE WIND FARM SUMMER 2020 AND WINTER 2020/21.

PREPARED BY FEHILY TIMONEY & COMPANY

Please note that this report was prepared based on surveys carried out for an extended Inchamore wind farm site boundary (Inchamore - turbines 1-25) and also to include an additional proposed site to the southeast (Gortyrahilly - turbines 26-58). However, in the intervening period, the site boundary for the proposed Inchamore wind farm has been reduced which now only accommodates 5 no. turbines while Gortyrahilly is now a standalone site and is at the planning stage. The relevant data for the current Inchamore site boundary has been extracted from this baseline report and used to inform the assessments.

FEHILY TIMONEY

CONSULTANTS IN ENGINEERING, ENVIRONMENTAL SCIENCE & PLANNING

INCHAMORE BIRD SURVEYS

Baseline Ornithological Surveys - Inchamore Wind Farm Summer 2020 and Winter 2020/2021

Prepared for:

Inchamore Wind DAC

Date: **March 2023**

NOTE: THIS REPORT CONTAINS SENSITIVE INFORMATION ON LOCATIONS OF BREEDING ANNEX I BIRDS

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Baseline Ornithological Surveys - Inchamore Wind Farm Summer 2020 and Winter 2020/2021

REVISION CONTROL TABLE, CLIENT, KEYWORDS AND ABSTRACT

User is responsible for Checking the Revision Status of This Document

Rev. No.	Description of Changes	Prepared by:	Checked by:	Approved by:	Date:
0	Issue to Client	KOR/SJ	JK	JH	08/03/2023

Client: Inchamore Wind DAC

Keywords: Baseline, Ornithological Surveys, Wind Farm, Inchamore

Abstract: This document comprises of year three baseline ornithological surveys at the proposed wind farm site at Inchamore, Co. Cork.

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1. INTRODUCTION

Fehily Timoney & Company (FT) undertake ornithological surveys at the proposed Inchamore wind farm in Co. Cork for Inchamore Wind DAC between 2020 to 2021 comprising one full year (summer 2020 to winter 2020/2021) of surveys. This report presents the results of the ornithological surveys and summarises the activity of specific target bird species during each survey period.

The assessment of bird activity within the site during the breeding and winter seasons was completed using vantage point survey watches. Surveys took place at four vantage point (VP) locations from May 2020 to February 2021 (inclusive). Six hours of surveying was completed at each VP for every survey round. Surveys followed Scottish Natural Heritage guidance (SNH, 2017).

Hinterland surveys were completed in potential favourable bird habitats within a 10 km radius of the proposed wind farm development. These surveys were used to assess species populations surrounding the proposed development site. Breeding bird surveys were completed along transects within the site.

1.1 Study Area

Inchamore is located along along Cork-Kerry border, an estimated 18km south-east of the town of Killarney and 5km west of the town of Ballyvourney. Surrounding habitats and land uses are described by Corine 2018 as 'Forest' and 'semi-natural areas with transitional woodland scrub and Conifer Plantation' (324 & 312), 'Peat bogs' (412), 'Land principally occupied by agriculture with significant areas of natural vegetation' (243) and 'Pastures' (231). Figure 2-1 displays the site location and survey area.

Protected European and national sites within the area include Sillahertane Bog NHA (Site Code: 001882), St. Gobnet's Wood pNHA & SAC (Site Code: 000106), Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment NHA & SAC & SPA (Site Code: 000365), Roughty River NHA (Site Code: 001376), Mullaghanish to Musheramore Mountains SPA (Site Code: 004162), Mullaghanish Bog SAC & NHA (Site Code: 001890), Kilgarvan Wood pNHA (Site Code: 001787), Kilgarvan Ice House SAC (Site Code: 000364), Ballagh Bog pNHA, Glanlough Woods SAC (Site Code: 002315) and the Gearagh SAC (Site Code: 000108).

Musheramore Mountains SPA (Site Code: 004162), located to the northeast of Inchamore, is designated for hen harrier *(Circus cyaneus)*. During the latest national survey conducted in 2015, it was noted that there has been an 80% decline recorded in the Mullaghanish to Musheramore Mountains SPA since 2005. Five confirmed hen harrier territories were noted within the SPA during the 2005 national survey (Barton et al, 2006), two confirmed and one possible territory during the third national survey in 2010 (Ruddock et al, 2012) and only one confirmed hen harrier territory in 2015 (Ruddock et al, 2016). The Hen Harrier Programme – Hen Harrier Monitoring 2020[2] reported five confirmed breeding pair in this SPA. The site also supports a breeding population of Merlin. The site synopsis[1] states that *'the population size is not well known but is likely to be one or two pairs.'*

[1] NPWS (2012). *Site Synopsis for the Mullaghanish to Musheramore Mountains SPA (Site Code: 004162)*. published 25/01/2012

[2] The Hen Harrier Project EIP (2017–2022), funded by the Department of Agriculture, Food and the Marine (DAFM) under the European Innovation Partnership (EIP) for Agriculture Productivity and Sustainability (EIP-AGRI), is a results-based, locally-led scheme that has built strong partnerships with farmers and offers participants additional opportunities to earn an income from their land. The HHP specifically targets farmers with land in the six hen harrier SPAs to develop an effective model for the sustainable management of lands critical for breeding hen harrier.

2. SURVEY METHODOLOGY

The avian surveys carried out at the proposed wind farm used the methods described in Scottish Natural Heritage guidance (SNH, 2017). The following surveys were completed:

- Vantage point surveys (breeding and non-breeding season);
- Hinterland surveys (hen harrier winter roost; I-WeBS and geese/swan census; and breeding target species); and
- Breeding & winter bird transect surveys.

2.1 Vantage Point Surveys

VP surveys were carried out at the proposed Inchamore Wind Farm site from May 2020 to February 2021 during the non-breeding and breeding seasons, following the Scottish Natural Heritage Methodology for onshore wind farms (SNH, 2017). These surveys were divided into summer (May, June, and August 2020) winter (October and December 2020 and February 2021). Four fixed VP locations overlooking the study area were used during the VP surveys. VPs were chosen to cover a specific viewshed of the proposed development site. Each was chosen specifically to encompass the view of a 500 m circular buffer drawn around each of the proposed turbines (known as the 'flight activity survey area'), per SNH (2017) guidance.

The main purposes of VP survey watches are to collect data on target species that will enable estimates to be made of:

a) The time spent flying over the defined survey area;
b) The relative use of different parts of the defined survey area; and
c) The proportion of flying time spent within the upper and lower height limits as determined by the rotor diameter and rotor hub height.

The specific vantage points and their viewsheds can be seen in Figure 2-2 below.

Vantage point locations were based on observations from walkover/reconnaissance surveys, viewshed analysis (using GIS) and collated information on known feeding and roosting sites from both desktop review and consultation. The number and location of vantage points was selected in order to achieve visibility of the entire flight activity survey area and important features for birds in close proximity to the site (e.g. lakes, wetlands).

In line with recommended best practice (SNH, 2017 and Band et al. 2007), viewshed analysis was undertaken using ARCMAP 10.3, to calculate a theoretical zone of visibility from each vantage point. Visibility is calculated from each vantage point along an invisible layer suspended at the predicted lowermost height passed through by the rotor blade tips, using an observer height of 1.5 m.

We note the following from SNH guidance in respect of priority areas for viewshed analysis (emphasis added):

> *"Where the key purpose is to estimate the risk of collision with turbines, it is the visibility of the airspace to be occupied by the turbine rotors (the collision risk volume) that is of prime importance. Therefore, it is recommended that visibility be calculated using the least visible part of this airspace, i.e. an imaginary layer suspended at the lowermost height passed through by the rotor blade tips (typically about 20-30 m above ground level). Predicting visibility at this level is a simple task using GIS. Being able to view all or most of the site to ground level can be helpful in gauging overall bird activity and usage of the site but is not as important as being able to view the collision risk volume."*

Following SNH guidance (2017), watches were conducted to sampling diurnal, crepuscular and nocturnal activity of target species, and exceeding the required effort from SNH.

The method of observing was via constant search effort, mostly through quality binoculars, or a telescope and a tripod used to scan the horizon back and forth in search of target species combined with short spells of eyeballing the foreground. In this way, smaller target species such as kestrel can be found and tracked up to the 2 km limit of each viewshed in most weather conditions. Dictaphones were utilised to dictate bird heights whilst tracking flight events.

Data recorded included flight activity of target species (flight height, duration, directionality), in addition to metrics such as flock size (per recorded transit) and time of observation. Detailed notes of each observation of a target bird species were recorded including behaviour, gender (where possible), numbers, flight height, associated habitat and the period spent within the study area. Successful foraging events were also noted if they arose. Other bird species seen or heard during the VP surveys were also recorded on a casual basis and were considered separately in the analysis as additional species. Flight activity was annotated onto field maps. Total numbers of birds present both on arrival at the vantage point and on departure was noted. Details of each flight-path observation are provided in Section 3.

When a flock of the same species were located, one individual within the flock was identified and tracked to record the times within each height band.

Flight heights are estimated visually as allowed for in SNH (2017) guidance. Flight height estimation using a clinometer or rangefinder is accepted as an alternative means of determining flight height; however, this is often not practicable (equipment may be clumsy and birds may be lost from view whilst trying to focus additional equipment on a target species rapidly moving out of sight). It should be noted that in practice many birds do not fly close enough to a surveyor for a rangefinder to be used, resulting in most flights heights being estimated in any case. An experienced surveyor was used, resulting in a more robust dataset.

As previously mentioned, VP surveys were carried out at the site from May 2020 to February 2021 and involved completing 6 hours per VP survey round. Surveys were carried out during May, June, August, October and December 2020 and February 2021.

A total of thirty hours of VP effort was carried out at each vantage point across the breeding and non-breeding survey periods. The proportion of survey time that activity was recorded inside and outside the wind farm site boundary was used as part of the overall analysis and assessment of target species usage of the study area. VP locations can be found in Table 2-1 below. All surveys were conducted during suitable weather conditions and a proportion of surveys spanned dawn and dusk periods.

Table 2-1: Grid References for VP locations at Inchamore Wind Farm

Vantage Point	Easting, Northing (ITM)
VP1	512600, 578973
VP2	512393, 578592
VP3	514385, 579799
VP4	510657, 576557

2.2 Hinterland Surveys (IWeBS, hen harrier winter roost and breeding target species)

Hinterland surveys were carried out between May 2020 and March 2021.

The surveys were conducted in suitable woodland and wetland habitats in the area surrounding the proposed wind farm site. These sites were chosen as they had suitable habitat for the following target species: raptors, waders, geese, swans and waterfowl.

For the winter IWeBS-style census surveys, this comprised of fifteen sites within 10 km of the proposed wind farm site. These sites included Ballyvourney North and South, Gearagh, Gortyrahilly, Gougane Barra, Grousemount, Inchigeelagh, Kilgarvan North, Lee Valley, Lough Allua, Lough Nabuddoga, Roughty River Sillahertane, and Toon Valley/Killeens. (see Figure 2-3). Hinterland IWeBS-style surveys were carried out following a 'look-see' methodology as outlined in BirdWatch Ireland/NPWS's counter manual[2].

Details of hinterland survey locations and dates are shown below in Table 2-2 and Figure 2-3.

Table 2-2: Hinterland Survey Locations

Hinterland Site	Easting, Northing (ITM)	Dates visited
Ballyvourney North	520276 578290	28/05/2020, 30/06/2020, 26/08/2020, 20/10/2020, 13/11/2020, 5/12/2020, 8/01/2021, 2/02/2021, 11/3/2021
Ballyvourney South	513456 573844	20/10/2020
Gearagh	531400 570836	28/05/2020, 09/06/2020, 30/06/2020, 26/08/2020, 20/10/2020, 13/11/2020, 05/12/2020, 08/01/2021, 02/02/2021, 11/03/2021

[2] https://birdwatchireland.ie/app/uploads/2019/03/IWeBS-Counter-Manual.pdf. Accessed March 2023.

*Location approximate – hen harrier roost counts conducted at numerous points in vicinity – locations withheld due to sensitivity.

Hinterland Site	Easting, Northing (ITM)	Dates visited
Gortyrahilly*	517317 571249	13/11/2020, 05/12/2020, 08/01/2021, 02/02/2021, 11/03/2021
Gougane Barra	508767 566076	28/05/2020, 09/06/2020, 30/06/2020, 22/07/2020 26/08/2020, 20/10/2020, 13/11/2020, 05/12/2020, 08/01/2021, 02/02/2021, 11/03/2021
Grousemount	509274 569529	28/05/2020, 09/06/2020, 30/06/2020, 26/08/2020, 20/10/2020, 13/11/2020, 05/12/2020, 08/01/2021, 02/02/2021, 11/03/2021
Inchigeelagh	522331 566141	28/05/2020, 30/06/2020, 26/08/2020, 20/10/2020, 13/11/2020, 05/12/2020, 08/01/2021, 02/02/2021, 11/03/2021
Kilgarvan North	500889 576879	28/05/2020, 09/06/2020
Lee Valley	523471 566494	28/05/2020, 09/06/2020, 30/06/2020, 26/08/2020, 20/10/2020, 13/11/2020, 05/12/2020, 08/01/2021, 02/02/2021, 11/03/2021
Lough Allua	518735 565624	28/05/2020, 09/06/2020, 30/06/2020, 26/08/2020, 20/10/2020, 13/11/2020, 05/12/2020, 08/01/2021, 02/02/2021, 11/03/2021
Lough Nabuddoga	506728 573791	28/05/2020, 09/06/2020, 30/06/2020, 26/08/2020, 20/10/2020, 13/11/2020, 05/12/2020, 08/01/2021, 02/02/2021, 11/03/2021
Roughty River	507548 574079	30/06/2020
Sillahertane	510719 573143	28/05/2020, 09/06/2020, 30/06/2020, 26/08/2020, 20/10/2020, 13/11/2020, 05/12/2020, 08/01/2021, 02/02/2021, 11/03/2021
Toon Valley/Killeens	524163 569753	28/05/2020, 09/06/2020, 30/06/2020, 26/08/2020, 20/10/2020, 13/11/2020, 05/12/2020, 08/01/2021, 02/02/2021, 11/03/2021

2.3 Breeding Bird Surveys

For breeding bird surveys, the method utilised was based on the existing British Trust for Ornithology (BTO) Breeding Bird Survey (BBS; Bibby et al, 2000). The study area for this survey comprised a total of four no. c. 1 km transects which were selected and centred on different habitats present within the subject site (see Figure 2-4 for the location of transects). Birds were counted over two visits, each timed to coincide with the early part of the breeding season (June 2020) and later part of the season (July 2020), with visits at least four weeks apart (transect order and direction were reversed between surveys to avoid confounding transect order and direction with time of day). Surveyors recorded all birds seen or heard as they walked methodically along the transect routes. Birds were recorded in four distance categories, measured at right angles to the transect line (within 25 m, between 25 m - 100 m and over 100 m from the transect line) and those seen in flight only. Recording birds in distance bands gives a measure of bird detectability and allows relative population densities to be estimated if required (BTO, 2018).

The breeding bird transect schedule is available in Table 2-3 and locations illustrated in Figure 2-4:

Table 2-3: Breeding Bird Transect Survey Details

Date	Transect	Time	Weather Conditions
8/06/2020	1	08:20-09:10	**Cloud:** 8\8 **Rain:** Dry **Visibility:** Good **Wind:** F1 N
17/06/2020	2, 3 & 4	09:30-10:45 09:05-09:25 11:28-12:05	**Cloud:** 8\8 **Rain:** Dry **Visibility:** Good **Wind:** F W **Cloud:** 8\8 **Rain:** Dry **Visibility:** Good **Wind:** F2 NW **Cloud:** 8\8 **Rain:** Dry **Visibility:** Good **Wind:** F2 NW
22/07/2020	1,2,3, 4	09:15-10:02 12:17-13:02 11:35-12:08 07:38-08:15	**Cloud:** 8\8 **Rain:** Drizzle **Visibility:** Poor **Wind:** F2 SW **Cloud:** 8\8 **Rain:** Dry **Visibility:** Good **Wind:** F3 SW **Cloud:** 1\8 **Rain:** Dry **Visibility:** Good **Wind:** F3 SW **Cloud:** 8\8 **Rain:** Light mist **Visibility:** Good **Wind:** F1 SW

2.4 Wintering Bird Survey

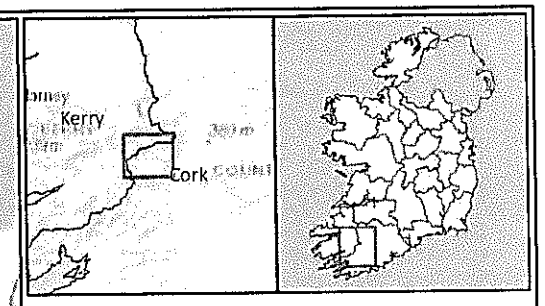
For the general wintering bird survey, the method utilised was the same as for the breeding bird transects, except it was undertaken in the winter season. Here, winter bird surveys were carried out in October 2020 and March 2021 in year three. See Figure 2-4 for the location of transects.

The wintering bird transect schedule is available in Table 2-4.

Table 2-4: Wintering Bird Transect Survey Details

Date	Transect	Time	Weather Conditions
17/10/2020	1,2,3,4	10:30-11:25 12:37-13:25 12:15-12:36 11:30-12:00	**Cloud:** 8/8 **Rain:** Showers **Visibility:** Poor **Wind:** f3
25/03/2021	1, 2, 3, 4	08:25-09:12 11:10-12:20 10:20-11:00 09:20-10:00	**Cloud:** 8/8 **Rain:** Rain **Visibility:** good **Wind:** f2 W **Cloud:** 7/8 **Rain:** Dry **Visibility:** good **Wind:** f4 SW **Cloud:** 5/8 **Rain:** Dry **Visibility:** good **Wind:** f3 SW **Cloud:** 6/8 **Rain:** Dry **Visibility:** good **Wind:** f3 SW

Path: P:\Map Production\2023\FP23-114\Workspace\Ecology\Inchamore\FP23_114_GIS_Fig2_1_WindFarmSiteLocationAndStudyArea_A3.mxd



Legend

- Site Boundary
- Survey Area
- SNH Buffer
- County Boundary
- Turbine Locations

T1
T2
T3
T4
T5

N
W
E
S

0 1 2 4 Kilometers

TITLE:	Windfarm Site location and Study Area
PROJECT:	Inchamore Wind Farm, Co. Cork
FIGURE NO:	2.1
CLIENT:	Inchamore Wind DAC
SCALE:	1:40000
REVISION:	0
DATE:	3/8/2023
PAGE SIZE:	A3

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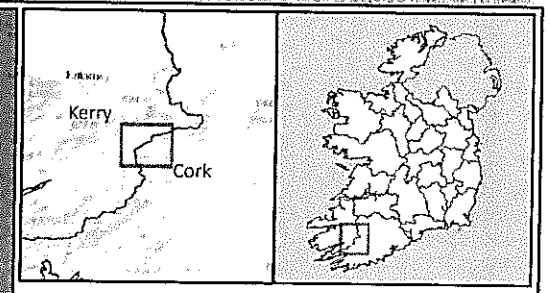

Legend

- Site Boundary
- SNH Buffer
- Turbine Locations
- Vantage Point Locations

Viewsheds

- VP1 Viewshed
- VP2 Viewshed
- VP3 Viewshed
- VP4 Viewshed

VP1
VP2
VP3
VP4
T1
T2
T3
T4
T5

N
W E
S

0 1 2 4 Kilometers

TITLE:	Vantage Point Locations and Viewsheds		
PROJECT:	Inchamore Wind Farm, Co. Cork		
FIGURE NO:	2.2		
CLIENT:	Inchamore Wind DAC		
SCALE:	1:30000	**REVISION:**	0
DATE:	3/8/2023	**PAGE SIZE:**	A3

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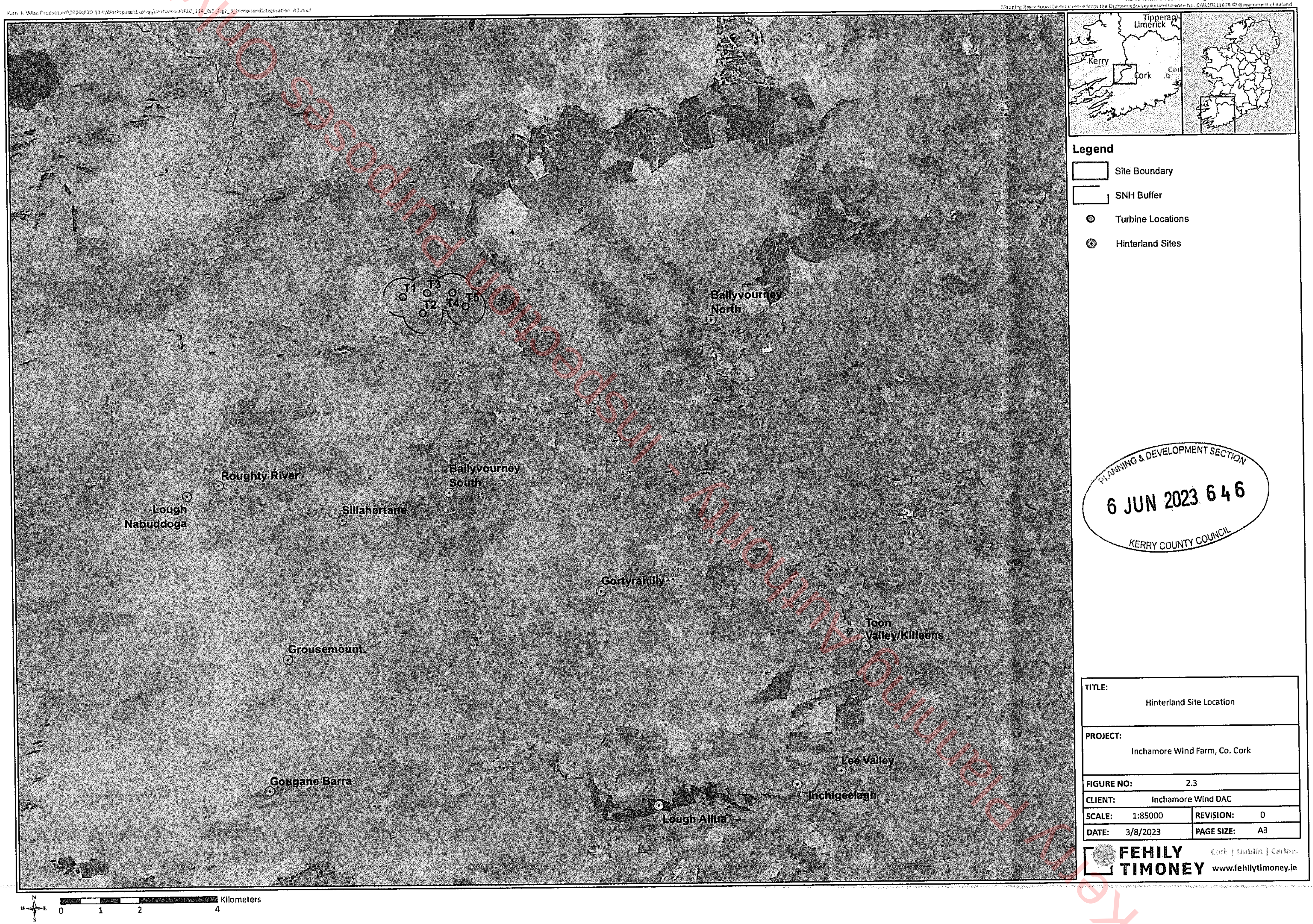

TITLE:	Hinterland Site Location
PROJECT:	Inchamore Wind Farm, Co. Cork
FIGURE NO:	2.3
CLIENT:	Inchamore Wind DAC
SCALE: 1:85000	REVISION: 0
DATE: 3/8/2023	PAGE SIZE: A3

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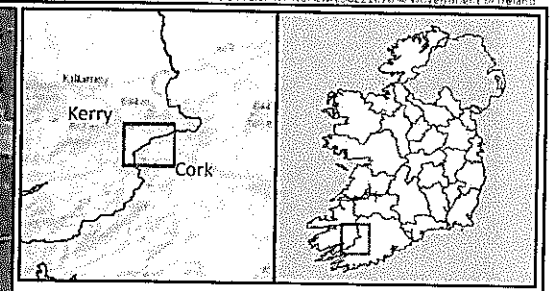

Legend

- Site Boundary
- SNH Buffer
- Turbine Locations
- Breeding Bird Transects

T1
T2
T3
T4
T5
1N
2N
3N
4N

N
W E
S

0 1 2 4 Kilometers

TITLE:	Breeding and Wintering Bird Transect Locations		
PROJECT:	Inchamore Wind Farm, Co. Cork		
FIGURE NO:	2.4		
CLIENT:	Inchamore Wind DAC		
SCALE:	1:30000	**REVISION:**	0
DATE:	3/8/2023	**PAGE SIZE:**	A3

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3. RESULTS

3.1 Avian usage of the Study Area – Vantage Point surveys

3.1.1 Summary Results Summer 2020 (May, June, and August 2020)

Over the summer survey period 19 species in total were recorded. There were eight individual flight lines of three target species observed during the Summer 2020 survey period.

Of these target species, one is red-listed (kestrel), one is amber-listed (lesser black-backed gull) and one is green-listed (sparrowhawk).

Flight lines are shown for each target species in Appendices 2 and 3.

All species recorded during year 3 VP surveys are listed in Table 3-1 below.

3.1.2 Summary Results Winter 2020/21 (October, December 2020 and February 2021)

Over the winter survey period 41 species in total were recorded. There were 16 individual flight lines of seven target species observed during the Winter 2020/2021 survey period.

Of these target species, two are Red-listed (kestrel and golden plover), one is amber-listed (lesser black-backed gull) and four are green-listed (buzzard, great black-backed gull, peregrine falcon and sparrowhawk). Golden plover is also listed on Annex I of the EU Birds Directive.

Flight lines are shown for each target species in Appendices 2 and 3.

All species recorded during year 3 VP surveys are listed in Table 3-1 below.

3.2 Target Species Observations

3.2.1 Buzzard

There were three observations of this green-listed species during winter 2020/21 VP surveys. The first one occurred on 26th February 2021 from VP 1. This was a single bird recorded inside the SNH buffer and spent 43 seconds flying over peatland but below a height of 30m. The second and third observation occurred on 28th February 2021 from VP 2, the first of which flew for 46 seconds between 20-50m outside the SNH buffer and the second flew for 25 seconds between 50-100m inside the SNH buffer. Both of these latter observations were recorded over peatland. There were no observations noted during summer VP surveys.

3.2.2 Golden Plover

This red-listed and Annex I species was recorded on three occasions during winter 2020/21 VP surveys. On one occasion the bird was only heard and not observed. This was noted from VP 2 over heath bog on the 28th February 2021. The two sightings of the species were recorded on the 26th February 2021 from VP 1 inside the SNH buffer. The first one noted a single bird flying for 12 seconds between 20-30m while the second record noted 25 individuals flying for 20 seconds below 10m. There were no summer VP records of this species.

3.2.3 Great Black-backed gull

This green-listed species was recorded on one occasion during winter 2020/21 VP surveys. This observation was recorded on the 18th February 2021 from VP 4 and note one adult gull flying for 68 seconds below 50m. This occurred outside the SNH buffer.

3.2.4 Kestrel

Summer

This red-listed species was recorded on five occasions during summer 2020 VP surveys. The first observation occurred on the 28th May 2020 from VP 3 and noted a single bird flying for 42 seconds below 50m inside the SNH buffer. Three observations were recorded on the 7th August from VP 3, one of which noted an individual flying inside the SNH for five seconds as it was stooping for prey. A second observation on this date saw two birds interacting with one another and spending 248 seconds below 50m, while another recorded one bird hunting for 165 seconds between 30-50m. These both occurred outside the SNH buffer. The final sighting was found on the 29th August 2020 from VP 2 and recorded a single bird flying for seven minutes below 20m, inside the SNH buffer.

Winter

Kestrels were recorded on six occasions during winter 2020/21 VP surveys. The first three observations were recorded on the 9th October 2020 from VP 3 and noted single birds hunting and flying below 100m outside the SNH buffer. There was one sighting on the 9th December 2020 from VP 3 of one individual commuting outside the SNH buffer and spending 13 seconds between 20-30m. The final two observations were made on the 28th February 2021 from VP 2. The first recorded one female flying for 12 seconds below 10m, inside the SNH buffer and hunting over peatland. The second of these observations noted a male kestrel hunting over peatland inside the SNH buffer and spending 55 seconds below 50m.

3.2.5 Lesser Black-backed Gull

Summer

This amber-listed species was noted on four occasions during summer 2020 VP surveys. The first two occurred on the 30th August 2020 from VP 1 one of which observed three gulls flying inside the SNH buffer for 350 seconds between 50-185m, while the other recorded six gulls outside the buffer for 300 seconds flying between 50-185m.

The other two records were gulls that were only heard and not seen. These occurred on the 28th May 2020 from VP 3 and VP 4 on the 8th June 2020.

Winter

There was one observation of the lesser black-backed gull during winter VP surveys. This occurred on the 18th February 2021 from VP 4. This noted one immature gull flying for 10 seconds between 30-50m outside the buffer.

3.2.6 Peregrine Falcon

There was one observation of this green-listed species from VP 2 on the 28th February 2021. This noted a pair interacting inside the SNH buffer for 88 seconds between 50-185m height band. There were no summer VP records of this species.

3.2.7 Sparrowhawk

Summer

During summer 2020 VP surveys, there was one observation made of this green-listed species. This single bird spent five seconds below 10m outside the SNH buffer.

Winter

This green-listed species was observed twice during winter 2020/21 VP surveys. The first occasion occurred on the 13th December 2020 from VP 4 and noted one bird flying for 28 seconds between 20-30m outside the SNH buffer and appeared to be commuting. The second observation was recorded on the 4th February 2021 from VP 3 and noted a single female hunting for 5 seconds below 10m outside the buffer.

Table 3-1: Status of species observed in year three VP Surveys (summer 2020 and winter 2020/21)[3]

Common name (BTO code)	Scientific name	*BoCCI status	**Annex I status
Blackbird (B.)	*Turdus merula*	Green	No
Blackcap (BC)	*Sylvia atricapilla*	Green	No
Blue tit (BT)	*Cyanistes caeruleus*	Green	No
Buzzard (BZ)	*Buteo buteo*	Green	No
Chaffinch (CH)	*Fringilla coelebs*	Green	No
Coal tit (CT)	*Periparus ater*	Green	No
Dunnock (D.)	*Prunella modularis*	Green	No
Fieldfare (FF)	*Turdus pilaris*	Green	No
Goldcrest (GC)	*Regulus regulus*	Amber	No
Golden Plover (GP)	*Pluvialis apricaria*	Red	Yes
Goldfinch (GO)	*Carduelis carduelis*	Green	No
Great tit (GT)	*Parus major*	Green	No
Greenfinch (GR)	*Chloris chloris*	Amber	No
Grey heron (H.)	*Ardea cinerea*	Green	No
Grey wagtail (GL)	*Motacilla cinerea*	Red	No
Hooded crow (HC)	*Corvus cornix*	Green	No
Jackdaw (JD)	*Coloeus monedula*	Green	No

[3] Species listed under Annex I of the EU Birds Directive shown in bold.

Common name (BTO code)	Scientific name	*BoCCI status	**Annex I status
Jay (J.)	*Garrulus glandarius*	Green	No
Kestrel (K.)	*Falco tinnunculus*	Red	No
Lesser black-backed gull (LB)	*Larus fuscus*	Amber	No
Long-tailed tit (LT)	*Aegithalos caudatus*	Green	No
Magpie (MG)	*Pica pica*	Green	No
Meadow pipit (MP)	*Anthus pratensis*	Red	No
Mistle thrush (M.)	*Turdus viscivorus*	Green	No
Pheasant (PH)	*Phasianus colchicus*	Green	No
Peregrine (PE)	**Falco peregrinus**	**Green**	**Yes**
Pied wagtail (PW)	*Motacilla alba*	Green	No
Raven (RN)	*Corvus corax*	Green	No
Redpoll (LR)	*Acanthis flammea*	Green	No
Redwing (RE)	*Turdus iliacus*	Red	No
Robin (R.)	*Erithacus rubecula*	Green	No
Rook (RO)	*Corvus frugilegus*	Green	No
Siskin (SK)	*Spinus spinus*	Green	No
Skylark (S.)	*Alauda arvensis*	Amber	No
Snipe (SN)	*Gallinago gallinago*	Red	No
Song thrush (ST)	*Turdus philomelos*	Green	No
Sparrowhawk (SH)	*Accipiter nisus*	Green	No
Starling (SG)	*Sturnus vulgaris*	Amber	No
Stonechat (SC)	*Saxicola rubicola*	Green	No
Swallow (SL)	*Hirundo rustica*	Amber	No
Willow warbler (WW)	*Phylloscopus trochilus*	Amber	No
Woodpigeon (WP)	*Columba palumbus*	Green	No
Wren (WR)	*Troglodytes troglodytes*	Green	No

* refers to the conservation status of the species according to Birds of Conservation Concern in Ireland.

**refers to species listed on Annex I of the EU Birds Directive; shown in bold.

3.3 Hinterland Survey (IWeBS, Hen Harrier winter roosts and breeding target species)

3.3.1 Summer 2020

Hinterland surveys to establish occupancy and quantity of target species that could potentially cross the site whilst moving to and from roosting and feeding grounds within a 10 km radius were carried out monthly between May and August 2020. These surveys were for breeding target species. The survey schedule and locations of the hinterland watches are shown in Table 2-2 of Section 2.2.

Species recorded are shown below in Table 3-2. For site-specific hinterland survey results see Appendix 5 of this report.

During the summer season, 52 bird species were recorded in total across hinterland surveys including 23 target species. Of these target species recorded three are red-listed (dunlin, kestrel, and snipe), fifteen are amber-listed (black-headed gull, common sandpiper, coot, cormorant, great-crested grebe, greylag goose, lesser black-backed gull, mallard, mute swan, ringed plover, ruff, shag, sparrowhawk, teal, and whooper swan) and five are green-listed (great black-backed gull, grey heron, little egret, mallard, and peregrine). Little egret, peregrine, ruff, and whooper swan are also listed on Annex I of the Birds Directive.

These target species were mainly recorded at 3 hVP (hinterland vantage point) sites: Gearagh, Gougane Barra and Lough Allua.

3.3.2 Winter 2020/2021

Winter hinterland surveys were carried out from October 2020 to March 2021. These surveys were for wintering target species. The survey schedule and locations of the hinterland watches are shown in Table 2-2 of Section 2.2. Species recorded are shown below in see Table 3-2. For site-specific hinterland survey results see Appendix 5 of this report.

During the winter season, 65 bird species in total were recorded including 32 target species. Of these target species seven are red-listed (curlew, dunlin, golden plover, kestrel, lapwing, snipe, and woodcock), fifteen are amber-listed (barnacle goose, black-headed gull, cormorant, goosander, great crested grebe, greylag goose, hen harrier, lesser black-backed gull, mallard, merlin, mute swan, sparrowhawk, teal, whooper swan and wigeon) and ten are green-listed (buzzard, great black-backed gull, great white egret, grey heron, little egret, little grebe, long-eared owl, peregrine, pink footed goose and white-fronted goose). Barnacle goose, golden plover, hen harrier, little egret, merlin, peregrine, great white egret, white-fronted goose and whooper swan are also listed on Annex I of the Birds Directive.

The hen harrier observation arose from a hen harrier roost watch carried out at Gortyrahilly in early December 2020. A male was seen circling over suitable roost habitat, but it flew out of sight and was not observed landing.

These target species were mainly recorded at two hVP sites: Gearagh and Toon Valley/Killeens.

Table 3-2: Target Bird Species Recorded During Year Three Hinterland Surveys (IWeBS and Breeding Target Species)

Common Name	Scientific Name	Conservation Status	
		BoCCI*	Annex I**
Barnacle Goose	**Branta leucopsis**	**Amber**	**Yes**
Black-headed Gull	*Chroicocephalus ridibundus*	Amber	No
Buzzard	*Buteo buteo*	Green	No
Common Sandpiper	*Actitis hypoleucos*	Amber	No
Coot	*Fulica atra*	Amber	No
Cormorant	*Phalacrocorax carbo*	Amber	No
Curlew	*Numenius arquata*	Red	No
Dunlin	*Calidris alpina*	Red	No
Golden Plover	**Pluvialis apricaria**	**Red**	**Yes**
Goosander	*Mergus merganser*	Amber	No
Great Black-backed Gull	*Larus marinus*	Green	No
Great Crested Grebe	*Podiceps cristatus*	Amber	No
Great White Egret	**Ardea alba**	**Green**	**Yes**
Grey Heron	*Ardea cinerea*	Green	No
Greenland White-fronted goose	**Anser albifrons flavirostris**	**Amber**	**Yes**
Greylag Goose	*Anser anser*	Amber	No
Hen Harrier	**Circus cyaneus**	**Amber**	**Yes**
Kestrel	*Falco tinnunculus*	Red	No
Lapwing	*Vanellus vanellus*	Red	No
Lesser Black-backed Gull	*Larus fuscus*	Amber	No
Little Egret	**Egretta garzetta**	**Green**	**Yes**
Little Grebe	*Tachybaptus ruficollis*	Green	No
Long eared owl	*Asio otus*	Green	No
Mallard	*Anas platyrhynchos*	Amber	No
Merlin	**Falco columbarius**	**Amber**	**Yes**
Moorhen	*Gallinula chloropus*	Green	No
Mute Swan	*Cygnus olor*	Amber	No
Peregrine	**Falco peregrinus**	**Green**	**Yes**
Pink footed Goose	*Anser brachyrhynchus*	Green	No
Ringed Plover	*Charadrius hiaticula*	Amber	No
Ruff	**Philomachus pugnax**	**Amber**	**Yes**

Common Name	Scientific Name	Conservation Status	
		BoCCI*	Annex I**
Shag	*Phalacrocorax aristotelis*	Amber	No
Snipe	*Gallinago gallinago*	Red	No
Sparrowhawk	*Accipiter nisus*	Amber	No
Teal	*Anas crecca*	Amber	No
Whooper Swan	**Cygnus cygnus**	**Amber**	**Yes**
Wigeon	*Anas penelope*	Amber	No
Woodcock	Scolopax rusticola	Red	No

* refers to the conservation status of the species according to Birds of Conservation Concern in Ireland.

**refers to species listed on Annex I of the EU Birds Directive; shown in bold.

3.4 Breeding Bird Survey

The results of the breeding bird transect survey in Summer 2020 at Inchamore are shown in Table 3-3.

A total of 25 species were recorded along the transects. Two red-listed species were recorded: grey wagtail and meadow pipit, five amber-listed species: goldcrest, starling, skylark, swallow and willow warbler. The remaining 18 species are Green-listed.

No birds listed under Annex I of the EU Birds Directive were recorded breeding within the proposed wind farm site during breeding transect surveys.

Meadow pipit is considered to be breeding within the site and was recorded within 25m of the transects in early and late summer. These records were frequently recorded at transect 1, 3 and 4 in groups of two to eight individuals.

Goldcrest, skylark, swallow and willow warbler were all recorded within 25m of the transects and can be assumed to be breeding on the site. The site contains suitable habitats for willow warbler (hedgerows and dense vegetation), goldcrest which inhabit a broad range of habitats including dense coniferous woodland and skylark which are commonly found breeding in peatland habitats.

3.5 Wintering Bird Survey

The results of the wintering bird transect survey at Inchamore are shown in Table 3-4.

A total of eleven species were recorded along the transects. One red-listed species was recorded during surveys, namely meadow pipit and there was one amber listed species; house sparrow. The remaining nine species are green listed.

Meadow pipit was recorded on four occasions at all transects, three observations which occurred within 25m of the transects in groups of 1-4. A single bird was also found within 100m of transect 4. These all occurred in March 2021.

Table 3-3: Results of breeding bird transects surveys during summer 2020[4]

Common Name	Scientific Name	Early T1			Late T1			Early T2			Late T2			Early T3			Late T3			Early T4			Late T4		
		0-25m	25-100m	>100/FO	0-25m	25-100m	>100/FO	0-25m	25-100m	>100/FO	0-25m	25-100m	>100/FO	0-25m	25-100m	>100/FO	0-25m	25-100m	>100/FO	0-25m	25-100m	>100/FO	0-25m	25-100m	>100/FO
Blackbird	*Turdus merula*	1						1									1								
Blackcap	*Sylvia atricapilla*	2																							
Blue Tit	*Cyanistes caeruleus*	1						1																	
Carrion Crow	*Corvus corone*																			1					
Chaffinch	*Fringilla coelebs*	15	7		2				1		3				1		2			4					
Coal Tit	*Periparus ater*	1						1															1		
Common Crossbill	*Loxia curvirostra*												12												
Dunnock	*Prunella modularis*				2																				
Goldcrest	*Regulus regulus*				1			1																	
Grey Wagtail	*Motacilla cinerea*	2				1																			
Hooded Crow	*Corvus cornix*			3																	1				
Jay	*Garrulus glandarius*							2			1														
Magpie	*Pica pica*														1										
Meadow Pipit	*Anthus pratensis*	4			3									8			5			8	1		2	2	
Mistle Thrush	*Turdus viscivorus*							1																	
Raven	*Corvus corax*																								1
Robin	*Erithacus rubecula*	2				1		3	5		1														
Starling	*Sturnus vulgaris*																				70				
Siskin	*Carduelis spinus*				2			5																	
Skylark	*Alauda arvensis*													1									2		
Song Thrush	*Turdus philomelos*							1																	
Swallow	*Hirundo rustica*																			1			1		

[4] Zero values are not shown to increase readability.

Common Name	Scientific Name	Early T1 0-25m	Early T1 25-100m	Early T1 >100/FO	Late T1 0-25m	Late T1 25-100m	Late T1 >100/FO	Early T2 0-25m	Early T2 25-100m	Early T2 >100/FO	Late T2 0-25m	Late T2 25-100m	Late T2 >100/FO	Early T3 0-25m	Early T3 25-100m	Early T3 >100/FO	Late T3 0-25m	Late T3 25-100m	Late T3 >100/FO	Early T4 0-25m	Early T4 25-100m	Early T4 >100/FO	Late T4 0-25m	Late T4 25-100m	Late T4 >100/FO
Willow Warbler	*Phylloscopus trochilus*	4	2											1						1			1		
Woodpigeon	*Columba palumbus*	1																							
Wren	*Troglodytes troglodytes*	5			1			5	1					7	2						1		1		
Total Number of Species												25													

4. DISCUSSION

FT carried out ornithological surveys at the proposed Inchamore Wind Farm between May 2020 and March 2021 for Inchamore Wind DAC. Surveys completed during this time included: vantage point surveys (breeding and non-breeding season), breeding and winter bird transect surveys and hinterland surveys (including I-WeBS style surveys, and surveys for breeding target species). Vantage point surveys were completed following SNH methodology for bird surveys on onshore wind farms (SNH, 2017). Hinterland surveys were undertaken following methodology by Bibby et al. (2000), Hardey et al. (2013) and NPWS/BirdWatch Ireland's guidance for I-WeBS surveys. Breeding bird and winter bird transect surveys followed the methodology of Bibby et al. (2000).

Year Three Summer survey (breeding season) 2020

Target bird species recorded at Inchamore within the flight activity survey area consisted of the following: kestrel, sparrowhawk, and lesser black-backed gull. Of these species, the most frequently recorded was the red-listed kestrel (five observations) exhibiting mainly hunting behaviours. The level of activity and behaviour recorded for this species is indicative of a breeding territory in the vicinity of the site, and suitable hunting habitat is present within the site. The habitats within the site are likely to form part of a larger mosaic of hunting grounds incorporating upland habitats and more intensively managed lowland farmed areas. Kestrels are also using the wider area, with confirmed hunting recorded at Sillahertane and presence noted in Grousemount, Gougane Barra and Ballyvourney North.

Th amber-listed lesser black-backed gull were recorded five times (three observations, heard on two occasions) within the flight activity survey area during this period. Gulls may traverse the site and could forage occasionally in farmland and lowland areas within and surrounding the site. Lesser black-backed gulls were found at Lough Nabuddoga, Sillahertane, Lough Allua and the Gearagh during summer hinterland surveys and at the Gearagh, Toon Valley and Lee Valley during winter hinterland surveys. This indicates that this species is also likely foraging in the wider area nearby the site.

There was one observation of the green-listed sparrowhawk during VP surveys throughout the 2020 summer season. This species is cryptic, often waiting in ambush and making short dashing flights when travelling or in pursuit of prey. Sparrowhawk could potentially breed in the vicinity of the site and may occasionally hunt within the site. Sparrowhawks were also observed with prey at Sillahertane indicating that this is a hunting ground for raptors.

The red-listed and ground-nesting passerine meadow pipit was recorded twice along transect 1, 3 and 4 in groups of two to eight individuals within 25m of the transects. The peatland and upland grassland habitats at the site provide suitable breeding habitat for this species which often occurs in high concentrations in the uplands. This site is also likely a breeding ground for the amber-listed willow warbler, goldcrest, skylark and swallow that were recorded within 25m of transects. The peatland provides suitable breeding habitat for willow warbler and goldcrests are known to breed within dense conifer plantations such as those present at this site.

Other important species of conservation including red-listed dunlin and snipe and Annex I species little egret, peregrine falcon, ruff and whooper swan were recorded in the surrounding area during summer hinterland surveys but were not found inside the site.

Year Three Winter survey (non-breeding season) 2020/2021

Target species recorded at Inchamore during winter VP surveys included the following: buzzard, golden plover, great black-backed gull, lesser black-backed gull, peregrine falcon and kestrel. The most frequently observed of these species was kestrel, with a total of six observations. Individuals were mainly observed hunting or commuting over the site. Coupled with the observed breeding season activity levels for this species, the winter observations demonstrate a regular and established kestrel presence in the area. During winter hinterland surveys, kestrels were also found in the surrounding area at Lee Valley, Ballyvourney North and Sillahertane.

Annex I-listed golden plover was recorded in flight twice during this period in groups of one to twenty-five flying within the survey area over heath bog. The large flock size recorded here suggests that this site is an important wintering ground for golden plovers. This species was also detected at the Gearagh in flocks with up to 86 individuals during winter hinterland surveys.

This site could be a wintering ground for Annex I species peregrine falcon with a pair detected within the SNH buffer. This species also utilises the wider surrounding area the summer with one individual recorded at Ballyvourney north in May 2020 during summer hinterland surveys.

Sparrowhawk was observed twice during winter, which when coupled with summer observations is consistent with their regular presence in the area. This species also utilizes the wider area with its presence detected in Gougane Barra during winter hinterland surveys.

Records of large gull species, lesser black-backed gull and great black-backed gull in the area during the winter suggest that these species have an established presence in the vicinity of this proposed development site.

The presence of meadow pipit in winter transect surveys indicates the regular presence of this species within the area.

Other species of conversation interest were recorded in surrounding areas during winter hinterland surveys including red-listed curlew, dunlin, snipe, lapwing and woodcock and Annex I species barnacle goose, hen harrier, little egret, merlin and whooper swan. Snipe were also recorded during winter VP surveys at VP 1, 2 and 4. The remaining species were absent from VP surveys and so are unlikely to traverse the site.

4.1 Conclusion

In conclusion, FT conducted a third year of ornithological surveys at the proposed Inchamore Wind Farm between May 2020 and March 2021. These surveys revealed a variety of species occurring at the site. Although not confirmed, it is possible that red-listed kestrel is breeding within or close to the site as it was the most frequently observed target species during both summer and winter VP surveys. This site is also a potential breeding ground for the green-listed sparrowhawk and red-listed passerine species; meadow pipit.

5. REFERENCES

Band, W., Madders, M., Whitfield, D.P. 2007. Developing Field and Analytical Methods to Assess Avian Collision Risk at Wind Farms. Janss, G.F.E., Ferrer, M. (Editors) De Lucas. Birds and Wind Farms: Risk Assessment and Mitigation. Madrid: Quercus, 2007.

Barton, C., Pollock, C., Norriss, D.W., Nagle, T., Oliver, G.A. & Newton, S. 2006. The second national survey of breeding Hen Harriers Circus cyaneus in Ireland. Irish Birds 8: 1–20.

Bibby, C. J., Burgess, N. D., Hill, D. A. & Mustoe, S. H. 2000. Bird census techniques (second edition). Academic Press, London.

British Trust for Ornithology. http://www.bto.org/volunteer-surveys/bbs/research-conservation/methodology www.bto.org [Online] Accessed: March 2023.

Fossitt, J. 2000. A Guide to Habitats in Ireland. The Heritage Council. Dublin.

Hardey, J., Crick, H., Wernham, C., Riley, H., Etheridge, B. & Thompson, D. (2013). Raptors: a field guide to survey and monitoring (3rd Edition). The Stationery Office, Edinburgh

Ruddock, M., Dunlop, B.J., O'Toole, L., Mee, A. & Nagle, T. (2012). Republic of Ireland National Hen Harrier survey 2010. Irish Wildlife Manual, No. 59. National Parks and Wildlife Service, Dublin.

Scottish Natural Heritage (2017). Recommended bird survey methods to inform impact assessment of onshore wind farms. Scottish Natural Heritage.

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APPENDIX 1

VP Summer 2020

Survey Details

VP Summer 2020/21 - Survey Details

VP no.	Date	Start Time	End Time	Cloud	Visibility	Rain	Wind
1	06/06/2020	09:15	15:15	7\8	Good	Showers	F3
2	07/06/2020	11:20	17:20	6\8	Very Good	Dry	F3-4
2	29/08/2020	09:30	15:30	6\8	Very Good	Dry	F2
1	30/08/2020	11:10	17:10	7\8	Very Good	Dry	F 1-2
3	07/08/2020	11:00	17:00	5\8	Good	Dry	F2 W
4	27/08/2020	10:30	16:30	5\8-8\8	Very Good	Showers	F3 SW
4	08/06/2020	10:00	16:00	8\8	Good	Dry	F2 NW
3	28/05/2020	12:30	18:30	2\8	Very Good	Dry	F4 SE

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APPENDIX 2

Flight Line Data 2020/21

VP no.	Date	Mapnote / Flightline No.	Common Name	Species Quantity	Sex	Time of Obs.	SNH Buffer (In/Out)	Total Duration (s)	0-10 m (s)	10-20 m (s)	20-30 m (s)	30-50 m (s)	50-100 m (s)	100-185 m (s)	>185 m (s)	Bird Notes
1	30/08/2020	1	Lesser Black-backed Gull	3		12:12	In	350					250	100		
1	30/08/2020	2	Lesser Black-backed Gull	6		13:42	Out	300					100	200		
1	26/02/2021	3	Golden Plover	1		10:58	In	12			12					Flying over heath bog
1	26/02/2021	4	Golden Plover	25		12:50	In	20	20							Flying over heath bog
1	26/02/2021	5	Buzzard	1		15:55	In	43	3	20	20					Flying over heath bog
2	29/08/2020	6	Kestrel	1		11:22	In	7 min	120	300						Flew out of view below brow of hill
2	28/02/2021	7	Buzzard	1		11:54	Out	46			20	26				Flying over heath bog
2	28/02/2021	8	Kestrel	1	Female/ imm	12:03	In	12	12							Hunting over heath bog
2	28/02/2021	9	Kestrel	1	Male	15:25	In	55		10	20	25				Hunting over heath bog
2	28/02/2021	10	Peregrine	2	Pair	15:33	In	88					70	18		Pair interacting over site
2	28/02/2021	11	Buzzard	1		15:36	In	25					25			Flying over heath bog
3	28/05/2020	12	Sparrowhawk	1		13:40	Out	5	5							Flew out of view below brow of hill
3	28/05/2020	13	Kestrel	1		17:19	In	42				6				

VP no.	Date	Mapnote / Flightline No.	Common Name	Species Quantity	Sex	Time of Obs.	SNH Buffer (In/Out)	Total Duration (s)	0-10 m (s)	10-20 m (s)	20-30 m (s)	30-50 m (s)	50-100 m (s)	100-185 m (s)	>185 m (s)	Bird Notes
3	07/08/2020	14	Kestrel	1		13:03	Out	165				165				hunting
3	07/08/2020	15	Kestrel	2		13:50	Out	248				248				Interacting
3	07/08/2020	16	Kestrel	1		14:08	In	5	1	2	2					Stooping for prey
3	09/10/220	17	Kestrel	1		11:43	Out	56	56							hunting and perched
3	09/10/2020	18	Kestrel	1		14:28	Out	64				14	50			hunting
3	09/10/2020	19	Kestrel	1		16:15	Out	48					48			hunting
4	18/02/2021	20	Great Black-backed Gull	1		14:40	Out	68	10	20	20	18				Adult
4	18/02/2021	21	Lesser Black-backed Gull	1		15:30	Out	10				10				Immature
3	09/12/2020	22	Kestrel	1		09:09	Out	13			13					Commuting
4	13/12/2020	23	Sparrowhawk	1		10:34	Out	28			28					Commuting
3	04/02/2021	24	Sparrowhawk	1	Female	10:56	Out	5	5							hunting flight

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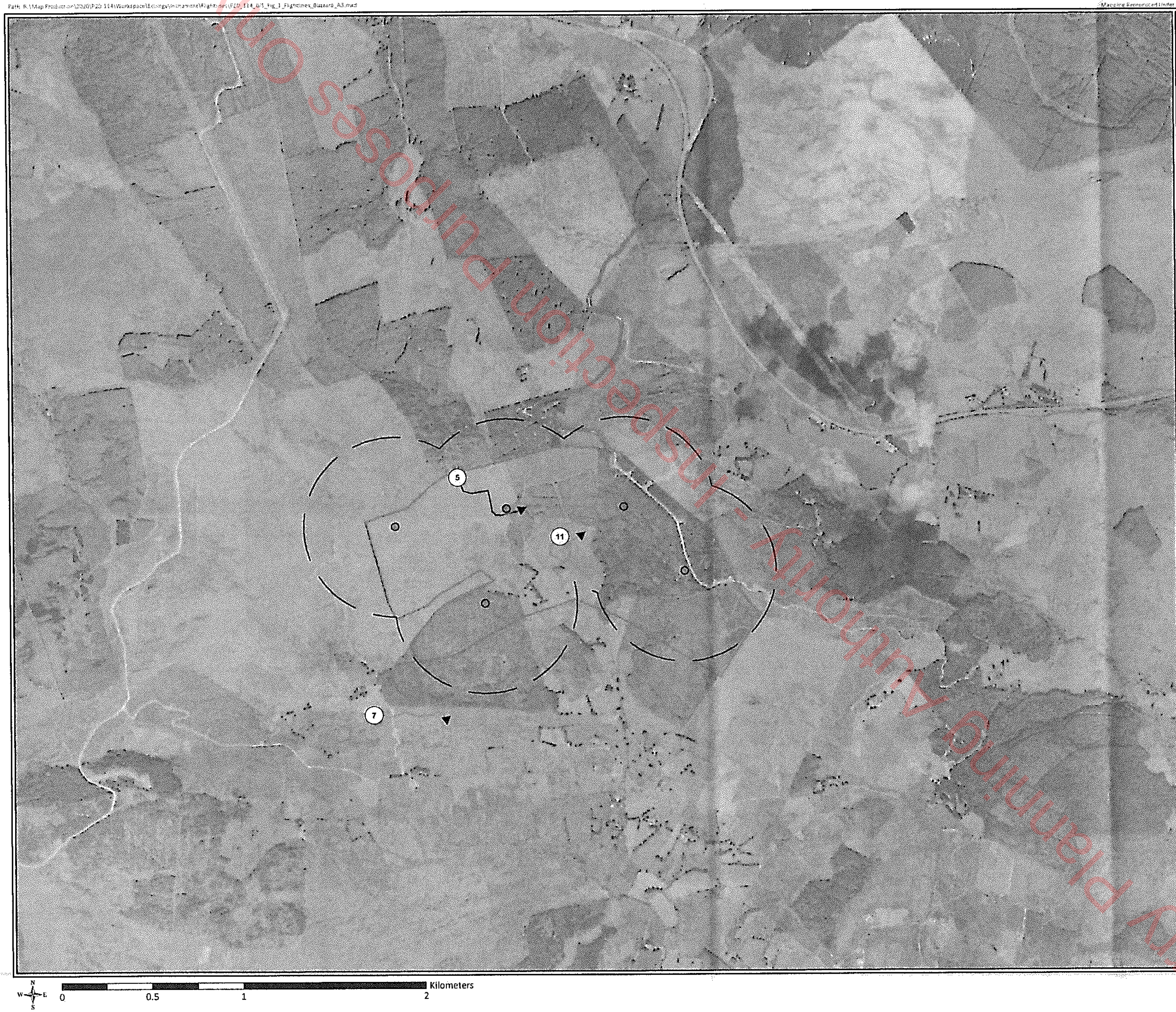
APPENDIX 3

Flightline Figures



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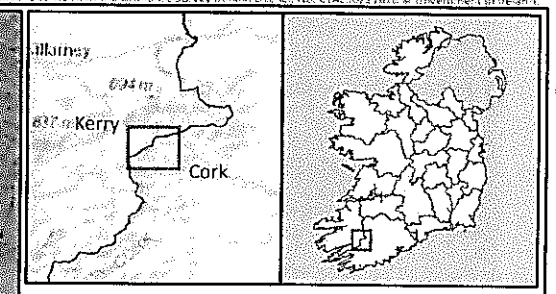

Legend

- Site Boundary
- SNH Buffer
- Turbine Locations

Flightline, Date, Time

- 3, 2/26/2021, 10:58
- 4, 2/26/2021, 12:50

0 0.5 1 2 Kilometers

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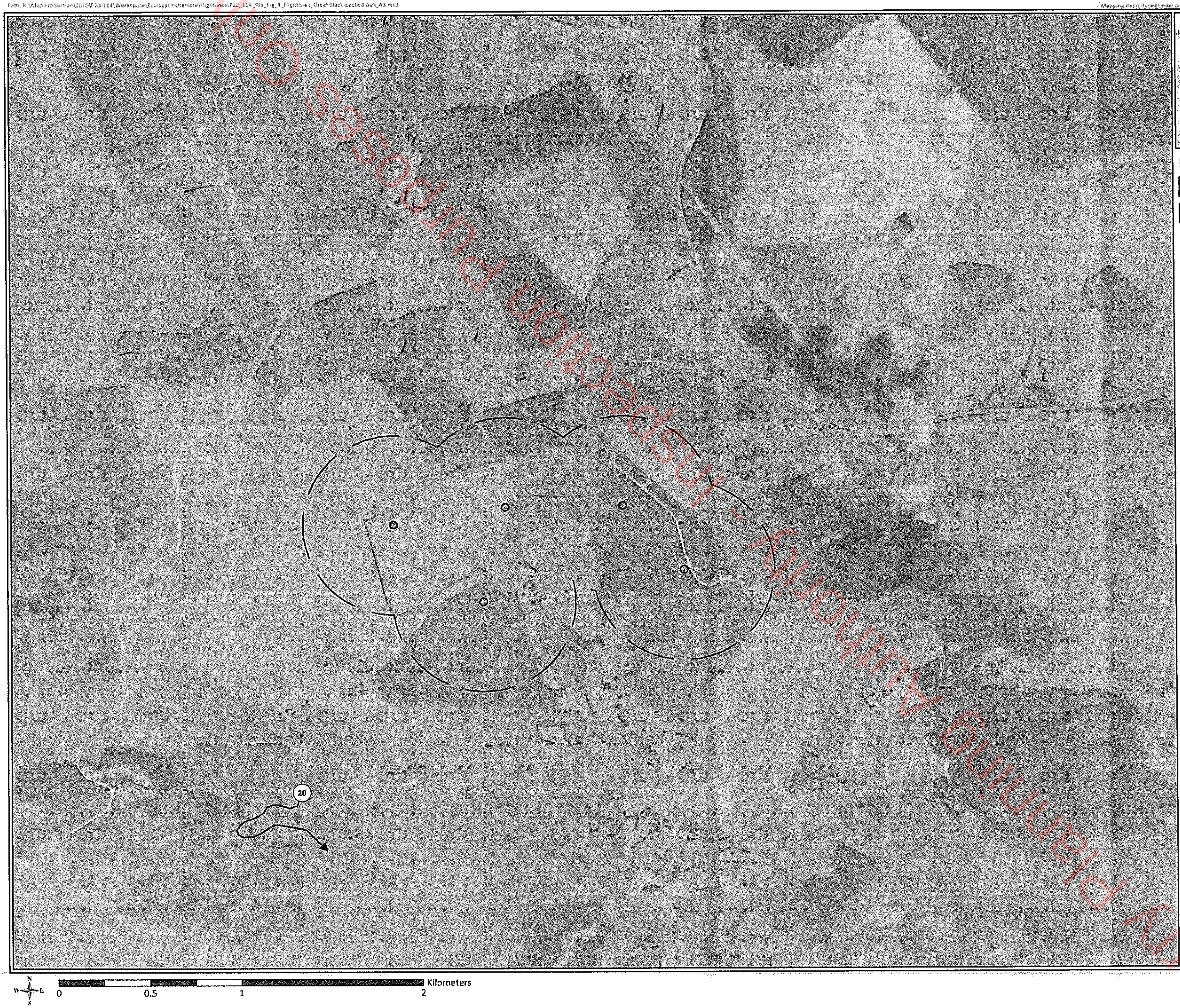

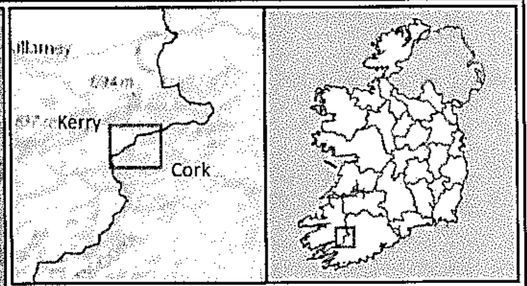

Legend

- Site Boundary
- SNH Buffer
- Turbine Locations

Flightline, Date, Time

→ 20, 2/18/2021, 14:40

TITLE:	Great Black-backed Gull 2021		
PROJECT:	Inchamore Wind Farm, Co. Cork		
FIGURE NO:	3		
CLIENT:	Inchamore Wind DAC		
SCALE:	1:20000	REVISION:	0
DATE:	3/8/2023	PAGE SIZE:	A3

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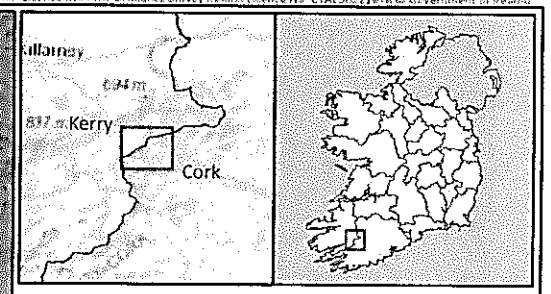

Legend

- Site Boundary
- SNH Buffer
- Turbine Locations

Flightline, Date, Time

- 6, 8/29/2020, 11:22
- 8, 2/28/2021, 12:03
- 9, 2/28/2021, 15:25
- 13, 5/28/2020, 17:19
- 14, 8/7/2020, 13:03
- 15, 8/7/2020, 13:50
- 16, 8/7/2020, 14:08
- 17, 10/9/2020, 11:43
- 18, 10/9/2020, 14:28
- 19, 10/9/2020, 16:15
- 22, 12/9/2020, 09:09

0 0.5 1 2 Kilometers

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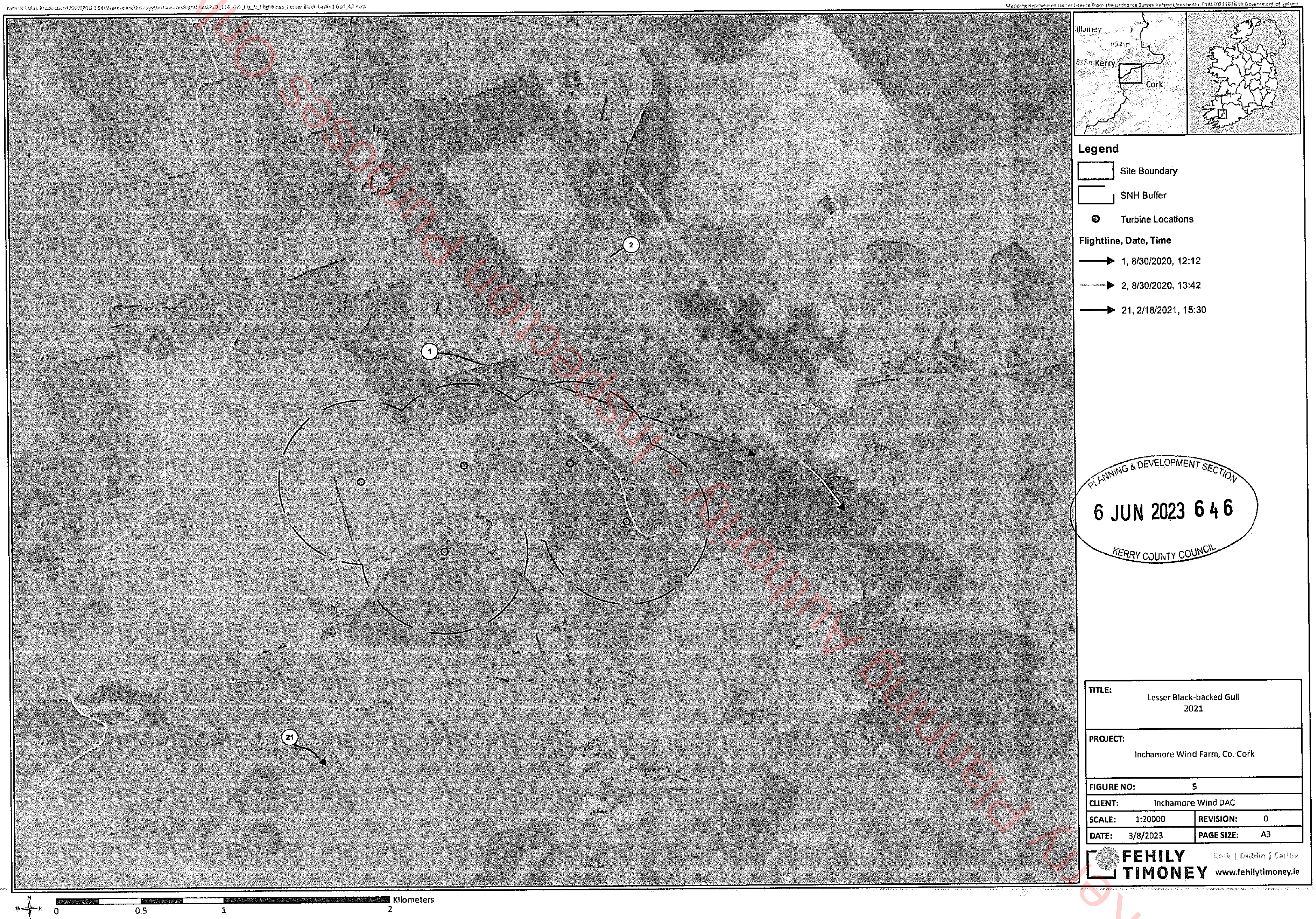

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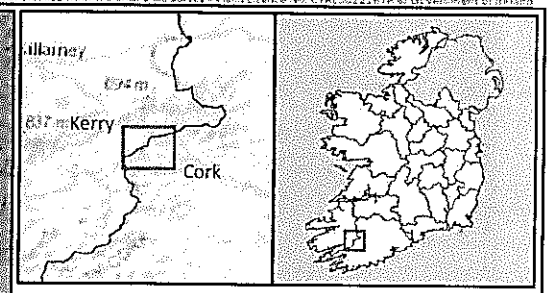

Legend

- Site Boundary
- SNH Buffer
- Turbine Locations

Flightline, Date, Time

- 10, 2/28/2021, 15:33

N W E S

0 0.5 1 2 Kilometers

TITLE:	Peregrine 2021		
PROJECT:	Inchamore Wind Farm, Co. Cork		
FIGURE NO:	6		
CLIENT:	Inchamore Wind DAC		
SCALE:	1:20000	**REVISION:**	0
DATE:	3/8/2023	**PAGE SIZE:**	A3

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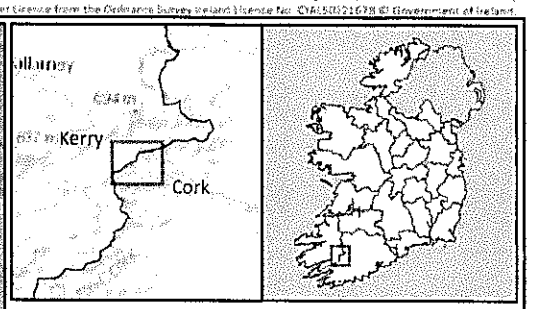

Legend

- Site Boundary
- SNH Buffer
- Turbine Locations

Flightline, Date, Time

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- 23, 12/13/2020, 10:34
- 24, 2/4/2021, 10:56

TITLE:	Sparrowhawk 2021		
PROJECT:	Inchamore Wind Farm, Co. Cork		
FIGURE NO:	7		
CLIENT:	Inchamore Wind DAC		
SCALE:	1:20000	**REVISION:**	0
DATE:	3/8/2023	**PAGE SIZE:**	A3

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N W E S

0 0.5 1 2 Kilometers

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APPENDIX 4

VP Winter 2020/2021 Survey Details

VP no.	Date	Start Time	End Time	Cloud	Visibility	Rain	Wind
1	30/10/2020	10:15	16:15	8/8	good	dry	f2 SW
2	27/10/2020	10:30	16:30	5/8-8/8	good	showers	f4 W
3	09/10/2020	10:25	16:25	8/8	good	showers	f4 W
4	28/10/2020	10:00	16:00	3/8-8/8	good	heavy showers	f4 NW
3	09/12/2020	08:42	12:42	8/8	3-5KM	Shower	F2-3 S
4	13/12/2020	10:22	16:22	8/8	3-5KM	shower	F4 SW
2	11/12/2020	09:04	15:04	7/8	Excellent	Dry - rain last hour	F4 SW
1	07/12/2020	09:32	15:32	3/8	low cloud cleared	None	F3 N
4	18/02/2021	11:05	17:05	5/8	Excellent	None	F4 W
1	26/02/2021	10:24	16:24	8/8	Excellent	None	F4 SW
2	28/02/2021	11:11	17:11	3/8	Excellent	None	F2-4E
3	04/02/2021	10:15	16:15	8/8	frequent showers	good	f2 SW

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APPENDIX 5

Hinterland Survey Data

Hinterland Survey Data Summer 2020

Date	Site	Common Name	Quantity
28/05/2020	Gearagh	Great Crested Grebe	28
28/05/2020	Gearagh	Greylag Goose	6
28/05/2020	Lee Valley	No species of note	
28/05/2020	Inchigeelagh	Grey wagtail	4
28/05/2020	Inchigeelagh	Swift	1
28/05/2020	Inchigeelagh	Sand Martin	1
28/05/2020	Inchigeelagh	House Martin	1
28/05/2020	Lough Allua	Mute Swan	1
28/05/2020	Lough Allua	Jay	1
28/05/2020	Lough Allua	Lesser Black-backed Gul	1
28/05/2020	Gougane Barra	Cormorant	1
28/05/2020	Sillahertane	Lesser Black-backed Gul	28
28/05/2020	Grousemount	No species of note	
28/05/2020	Lough Nabuddoga	Lesser Black-backed Gul	1
28/05/2020	North Kilgarvan	No species of note	
28/05/2020	Ballyvourney North	Peregrine	1
09/06/2020	Gearagh	Great Crested Grebe	11
09/06/2020	Gearagh	Mallard	26
09/06/2020	Gearagh	Mute Swan	7
09/06/2020	Gearagh	Stonechat	1
09/06/2020	Gearagh	Grey wagtail	2
09/06/2020	Lee Valley	Sand Martin	20
09/06/2020	Lee Valley	Spotted Flycatcher	2
09/06/2020	Lough Allua	Mute Swan	2
09/06/2020	Lough Allua	Cormorant	3
09/06/2020	Lough Allua	Mallard	1
09/06/2020	Lough Allua	Grey Heron	1
09/06/2020	Lough Allua	Lesser Black-backed Gul	1
09/06/2020	Lough Allua	Moorhen	1
09/06/2020	Gougane Barra	Cuckoo	1
09/06/2020	Gougane Barra	Kestrel	1
09/06/2020	Sillahertane	No species of note	
09/06/2020	Grousemount	Kestrel	1

Date	Site	Common Name	Quantity
09/06/2020	Lough Nabuddoga	No species of note	
09/06/2020	Kilgarvan North	No species of note	
09/06/2020	Ballyvourney North	No species of note	
30/06/2020	Gearagh	Great Crested Grebe	13
30/06/2020	Gearagh	Coot	2
30/06/2020	Gearagh	Moorhen	6
30/06/2020	Gearagh	Mute Swan	52
30/06/2020	Gearagh	Whooper Swan	1
30/06/2020	Gearagh	Snipe	1
30/06/2020	Gearagh	Mallard	6
30/06/2020	Lee Valley	Mallard	5
30/06/2020	Lee Valley	Grey wagtail	2
30/06/2020	Inchigeelagh	House Martin	
30/06/2020	Inchigeelagh	Sand Martin	10
30/06/2020	Inchigeelagh	Heron	1
30/06/2020	Lough Allua	Heron	5
30/06/2020	Lough Allua	Lesser Black-backed Gul	1
30/06/2020	Lough Allua	Stonechat	1
30/06/2020	Lough Allua	Mallard	3
30/06/2020	Lough Allua	Cormorant	3
30/06/2020	Gougane Barra	Sandpiper	2
30/06/2020	Gougane Barra	Greater Black-backed Gull	
30/06/2020	Gougane Barra	Lesser Black-backed Gul	
30/06/2020	Gougane Barra	Jay	4
30/06/2020	Sillahertane	No species of note	
30/06/2020	Grousemount	No species of note	
30/06/2020	Roughty River	Common Sandpiper	
30/06/2020	Roughty River	Sand Martin	
30/06/2020	Lough Nabuddoga	Mallard	2
30/06/2020	Ballyvourney North	No species of note	
22/07/2020	Gearagh	Great Crested Grebe	12
22/07/2020	Lee Valley	Mallard	6
22/07/2020	Lee Valley	Grey Heron	1
22/07/2020	Inchigeelagh	Common Sandpiper	2

Date	Site	Common Name	Quantity
22/07/2020	Inchigeelagh	Grey Wagtail	1
22/07/2020	Inchigeelagh	Spotted Flycatcher	3
22/07/2020	Inchigeelagh	Dipper	1
22/07/2020	Inchigeelagh	Moorhen	1
22/07/2020	Lough Allua	Sparrowhawk	1
22/07/2020	Lough Allua	Cormorant	2
22/07/2020	Lough Allua	Lesser Black-backed Gul	1
22/07/2020	Gougane Barra	Kestrel	1
22/07/2020	Gougane Barra	Moorhen	1
22/07/2020	Gougane Barra	Stonechat	1
22/07/2020	Gougane Barra	Grey Heron	1
22/07/2020	Sillahertane	Sparrowhawk	1
22/07/2020	Sillahertane	Kestrel	1
22/07/2020	Grousemount	No species of note	
22/07/2020	Lough Nabuddoga	Sparrowhawk	2
22/07/2020	Ballyvourney North	Kestrel	1
22/07/2020	Ballyvourney North	Swifts	2
26/08/2020	Gearagh	Shag	1
26/08/2020	Gearagh	Ruff	1
26/08/2020	Gearagh	Dunlin	2
26/08/2020	Gearagh	Ringed Plover	4
26/08/2020	Gearagh	Greylag Goose	17
26/08/2020	Gearagh	Teal	27
26/08/2020	Gearagh	Mallard	43
26/08/2020	Gearagh	Little egret	6
26/08/2020	Gearagh	Great Crested Grebe	21
26/08/2020	Gearagh	Heron	2
26/08/2020	Ballyvourney North	No species of note	
26/08/2020	Lough Nabuddoga	No species of note	
26/08/2020	Grousemount	No species of note	
26/08/2020	Sillahertane	No species of note	
26/08/2020	Gougane Barra	Cormorant	1
26/08/2020	Lough Allua	Mute Swan	2
26/08/2020	Lough Allua	Great Black-backed Gull	1

Date	Site	Common Name	Quantity
26/08/2020	Inchigeelagh	No species of note	
26/08/2020	Lee Valley	No species of note	

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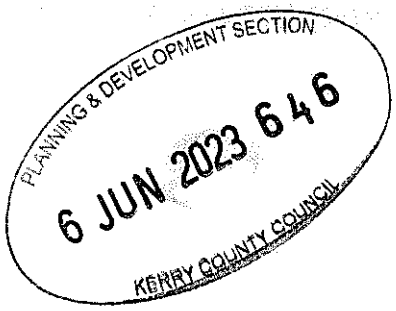
Inchamore Wind Farm, Co. Cork

Appendices

Chapter 8 – Soils & Geology

May 2023



APPENDIX 8.1:

SITE INVESTIGATION REPORT - STABILITY AND GEOTECHNICAL ASSESSMENT

Prepared for;

Jennings O'Donovan

Inchamore Windfarm (IWF)

Site Investigation Report & Peat & Subsoil Stability Risk Assessment

JENNINGS O'DONOVAN & PARTNERS LIMITED
CONSULTING ENGINEERS

603679 IWF EIAR App. 8.1 SI & PSSRA (02)

ISO 9001 ISO 14001 OHSAS 18001
DNV DNV DNV
REGISTERED REGISTERED REGISTERED
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RSK

MARCH 2023

RSK GENERAL NOTES

Project No.: 603679 (02)

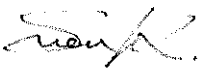
Title: Site Investigation & Peat & Subsoil Stability Risk Assessment Report

Client: Jennings O'Donovan

Date: 03/04/2023

Office: RSK Dublin

Status: (03) FINAL

Author	Lissa Colleen McClung	**Technical reviewer**	Sven Klinkenbergh
Signature		Signature	
Date:	03/04/2023	Date:	26/04/2023

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SI Appendix B	Peat Depth & Subsoil Databases
SI Appendix C	Trial Pit & Borehole Locations
SI Appendix D	Trial Pit Logs
SI Appendix E	Trial Pit and Site Photos
SI Appendix F	Borehole Logs & Bedrock Core Testing Laboratory Certificates
SI Appendix G	Subsoil Testing - Laboratory Certificates
SI Appendix H	Register of Geo-Hazards
SI Appendix I	Peat and Subsoil Stability Risk Assessment

1. Introduction

1.1 Background

RSK Ireland was commissioned by Jennings O'Donovan & Partners (JOD, the Client) on behalf of Inchamore Wind DAC (the Developer/s) to assess the geological site characteristics in relation to the planning application for the Inchamore Wind Farm (IWF, the Development) in Co. Cork.

1.2 Purpose

Site Investigation for the purposes of assessing ground conditions at EIA design phase of a proposed wind farm development, Inchamore Wind Farm, Co. Cork. Assessing ground conditions in terms of peat and slope stability risk, subsoil and geological characterisation and classification.

1.3 Scope of Works – Tender

The scope of works was initially specified by the Developer at tender phase. The scope of works for ground investigations at tender included the following works;

- Peat probing (50 m grid), 50 ha
- Trial pits, 35 no.
- Number of groundwater monitoring wells, 4 no.
- SI report with detailed findings, records and interpretation

Provisional works included;

- Gouge auger samples
- Boreholes up to 15 m, 5 no.
- Ground penetrating radar surveys (5 days)

In consultation with the Client and Developer the scope of works was adapted to the site based on observations made by desk study and initial site walk overs and assessments. The actual completed scope of works is detailed in **Section 2**.

This work has been carried out in unison with the EIAR for the Project. Therefore, this report will be appended to **EIAR Chapter 8 - Soils & Geology** as part of the planning application for the Project. The EIAR tender scope includes for a stand-alone Peat Stability Report as well as stand alone Site Investigation report, however the two will be merged in this Site Investigation report. This is done with a view streamlining the site geological assessment.

Further to the above, the geological or environmental setting of the site will be described in detail in **EIAR Chapter 8 – Soil & Geology** with appended maps and graphics for reference. This report will refer and summarise the EIAR chapter/s to avoid duplication of information or graphics. This report will also reference **EIAR Chapter 9 – Hydrology & Hydrogeology** in relation to groundwater.

1.4 Statement of Authority

RSK (Ireland) Ltd. (RSK), part of RSK Group, is a consultancy providing environmental services in the hydrological, hydrogeological and other environmental disciplines. The company and group provide consultancy to clients in both the public & private sectors. More information can be found at www.rskgroup.com. The principal members of the RSK EIA team involved in this assessment include the following persons;

- Sven Klinkenbergh – B.Sc. (Environmental Science), P.G.Dip. (Environmental Protection) – Associate, Project Manager and EIA Lead Author with c. 10 years industry experience in the preparation of hydrological, hydrogeological and geological reports..
- Project Scientist: Lissa Colleen McClung - B.Sc. (Hons.) Environmental Studies, M.Sc. (Hons.) Environmental Science. Current Role: Graduate Project Scientist
- Project Scientist: Mairéad Duffy – B.Sc. (Environmental Science), M.Sc. (Climate Change). Current Role: Graduate Project Scientist

2. Site Investigation Works & Methods

2.1 Scope of Works – Completed

The completed scope of works included;

- Peat depth probing, approx. 150 no. sampling locations.
- Trial pits, 16 no.
- Sub-soil sampling and Particle Size Distribution analysis, 4 no.
- Drilling – Rotary Core, 1 no.
- Drill core sample analysis. Point Load (PL) and Unconfined Compression Test (UCS).

2.2 Peat & Slope Stability Risk Assessment Methodology

2.2.1 Key assessment principals

The site assessment is carried out following key principals in line with relevant guidance, namely;

- BS 5930:2015+A1:2020 Code of Practice for Site Investigations.
- Scottish Government (2017) Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Developments

Some key insights to application and interpretation are provided from numerous documents, in particular;

- N. Boylan, P. Jennings & M. Long (2008) Peat slope failure in Ireland. Quarterly Journal of Engineering Geology and Hydrogeolog.

2.2.1.1 BS 5930 – Code of Practice for Site Investigations

This document explains the important steps to be taken in preparing for, scoping, and executing site investigations of various nature. The standard covers the following aspects:

- Planning: This section provides guidance on the planning of site investigations, including the purpose of the investigation, the scope of work, and the selection of appropriate investigation techniques.
- Desk Study: This section provides guidance on the collection and review of existing information, such as geological maps, site records, and historical data, that can aid in the planning and execution of site investigations.
- Site reconnaissance: This section provides guidance on the preliminary site visit to collect data on site characteristics and conditions.
- Investigation methods: This section provides guidance on the selection of appropriate investigation methods, such as drilling, sampling, and testing techniques, based on the site characteristics and the purpose of the investigation.
- Field testing: This section provides guidance on the execution of field testing, such as in-situ testing, geophysical surveys, and environmental testing.
- Laboratory testing: This section provides guidance on the selection and execution of laboratory testing, such as soil and rock testing, and the interpretation of laboratory results.
- Reporting: This section provides guidance on the reporting of site investigations, including the presentation of data, the interpretation of results, and the conclusions and recommendations.

Scoping site investigations and sampling regime in terms of sampling locations and frequency is an important and dynamic process. While BS 5930 details sampling frequency in terms of soil and rock geotechnical and environmental testing, standard provides guidance on the spacing and frequency of sampling points, which may vary depending on the site conditions, the purpose of the investigation, and the type of sampling method being used. It is important to scope and align appropriate methodologies and sampling regime with specific objectives and within specific environments, including Peat & Slope Stability Risk Assessments in peatland areas.

2.2.1.2 Scottish Government (2017) Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Developments

The Scottish Government's Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Developments is a document that provides guidance on the assessment of landslide

hazard and risk in peatland areas, particularly in relation to proposed electricity generation developments. The document is published and written in context of Scottish peatlands, however in the absence of relevant guidance, it is widely accepted as relevant guidance in Ireland.

The guide emphasizes the need for a comprehensive assessment of landslide hazard and risk in peatland areas, which is particularly important due to the unique characteristics of these environments. Peatlands are often found in areas of high rainfall, and the accumulation of peat can result in unstable ground conditions, which can increase the risk of landslides.

The guide provides a step-by-step approach to landslide hazard and risk assessment, including the identification of potential landslide triggers, the characterization of the peatland environment, the assessment of landslide susceptibility, and the estimation of landslide hazard and risk. The guide also provides guidance on the selection of appropriate methods for landslide hazard and risk assessment, such as field mapping, remote sensing, and numerical modelling. The guide emphasizes the importance of stakeholder engagement and communication in the landslide hazard and risk assessment process, particularly in relation to proposed electricity generation developments, which can potentially have significant impacts on the surrounding environmental receptors and communities. The guide covers the following aspects which should be included in the site risk assessment;

- Sampling Regime: The guide recommends a sampling regime that includes both surface and subsurface surveys, using techniques such as; depth probing, gouge coring, trialpitting, drilling, and geophysical surveys. The aim is to obtain a comprehensive understanding of the geology and hydrogeology of the site, as well as the depth and condition of the peat layer.
- Assessment of Desk Top Data: The guide recommends an assessment of desktop data to identify potential sources of instability, such as steep slopes, drainage features, and areas of peat degradation. This assessment should be based on available data sources such as geological maps, aerial photographs, and LiDAR data.
- Degree of Geomorphological Assessment: The guide recommends a high degree of geomorphological assessment, using methods such as aerial photography interpretation and field mapping to identify potential instability features such as landslides and erosion channels. Many sources of data can input to the interpretation of stability risk at any particular location, and field reconnasance is also a valuable tool in this repsect.
- Interpretation of Data: The guide recommends a detailed interpretation of all data collected, including the results of field surveys and laboratory testing. This should involve the identification of key parameters such as peat depth, soil properties, and groundwater levels or saturation, as well as the integration of all available data to develop a comprehensive understanding of the potential for instability. This can result in screening out peat stability risk, for example; in areas of extensive shallow bedrock or bedrock outcrops, or areas with very minor inclines. Conversly, high risk areas can potentially be identified by desk top assessment alone, for example; steep slopes in excess 15 degrees, or areas with historical stability issues or historic landslides.
- The development of numerical models for peat stability risk assessments has been driven by advances in computer technology (e.g. QGIS) and modeling techniques, as well as an increased awareness of the risks associated with peat instability. The use of numerical modeling in peat stability risk assessments typically involves the following steps:
    - Development of a conceptual model: This involves the development of a conceptual model of the site based on the results of field investigations and laboratory testing. The conceptual model should include information on the geometry and properties of the peat layer, as well hydrogeological characteristics such as pore water pressure or bul unit weight (saturation).
    - Selection of appropriate modeling techniques: There are a variety of modeling techniques that can be used to simulate peat stability, including finite element and finite difference methods. The selection of an appropriate modeling technique will depend on the specific characteristics of the site and the goals of the assessment.
    - Calibration and validation of the model: The model is calibrated and validated using data collected during field investigations and laboratory testing. This involves adjusting model parameters to improve the match between simulated and observed data.

Overall, the guide emphasizes the importance of a comprehensive and integrated approach to peat landslide hazard and risk assessments, which includes a thorough sampling regime, an assessment of desktop data, a high degree of geomorphological assessment, and a detailed interpretation of all data collected. By following these guidelines potential hazards and risks associated with peat instability can be identified and managed effectively.

2.2.2 Desktop baseline characterisation & approach

The site and proposed development are assessed using QGIS mapping software with relevant environmental data layers published by relevant bodies including; EPA, and GSI.

Open source Global Digital Elevation Model (DGEM) data is used to determine the general nature of the topography at the site, including interrogating elevation data to determine slope inclines across the site.

Areas of the site undergo preliminary risk assessment and development constraints are identified and mapped. This will include slope inclines >8 degrees, 50m and 150m surface water or other environmental receptor buffers, etc. This data is used to inform the initial design phase of a project and to scope the site survey and sampling regime.

On completion of the initial phases of site surveys, georeferenced data is compiled and mapped in QGIS along with the initial desktop data. The site undergoes further preliminary risk assessment, preliminary modelling and constraints are updated and the process repeats i.e. phase 2.

Other environmental data, including peatland ecological data is incorporated where relevant.

2.2.3 Peat depth probing & topography assessments

Peat depth probing was undertaken at the site including at each proposed potential turbine location, at proposed locations for other infrastructure, and elsewhere on site where desktop assessment could not screen out stability risk.

Depth probing was conducted using a fibreglass depth probe and at each survey point the depth of peat, local incline (incline within a c. 5-10 m radius of the survey point) and grid reference (Irish Grid) were recorded. Notes on observations were also recorded including time of taking photographs, presence of drains etc.

A number of inferred peat depth probe points with a value of 0.5m, distributed in 2 no. transects at proposed turbine location T2. The inferred transects are intended to assess variability of peat stability corresponding with variability of incline, and to risk assess stability in close proximity to sensitive receptors.

2.2.4 Peat gouge coring & qualitative assessments

Gouge coring of peat was carried out to a limited extent (peat depth generally shallow). Peat quality assessment were made at existing cuttings and during trial pitting.

2.2.5 Piezometer installation & groundwater assessments

Not applicable. Peat depth at the site observed to be shallow generally at the site.

2.2.6 Topography & substrate topology

Using available topographical data provided for the site and peat thickness / depth data obtained during MEL surveys, the topology (characteristics of a surface) of the substrate underlying the peat on site was assessed and cross sections generated to evaluate variance from the surface topology.

2.2.7 Peat stability numerical assessment

This stability assessment has been undertaken using a relatively simple infinite slope stability approach (Boylan, N, and Long, M, 2012) (derived from Bromhead's formula (Scottish Gov., 2017)), as follows;

$$FoS = \frac{cu}{yz \sin \alpha \cos \alpha}$$

For the purpose of this assessment, the above formula will be referred to as the *FoS Formula*.

Qualifying peat stability at all peat survey points and trial pit locations was done using the following parameters;

Table 1: Formula Parameters & Symbols

Symbol	Description	Unit
FoS	Factor of Safety	FoS
c_u	Effective cohesion or Undrained Shear Strength	kPa
y	Bulk Unit Weight of Peat	kN/m3
z	Depth to failure plain	m
α	Slope Angle	Degrees

The Factor of Safety (FoS) result will range from 0 to infinity, however the following ranges are prescribed ratings as follows;

Table 2: Factor of Safety (FoS) Classifications (Scottish Gov., 2017)

Description	FoS Value Range	Classification
Stable	>1.3	Acceptable
Marginally Stable	1.0 > < 1.3	Acceptable
Unstable	<1.0	Unacceptable

As per the guidance listed in Section 2 of this report, FoS values of 1.0 or greater are considered acceptable in terms of peat stability (Scottish Gov., 2017).

The assessment has been completed on the basis of 2 no. scenarios, which are as follows;

1. Scenario A – Peat stability in terms of the receiving environment as is, that is using the depth of peat observed and recorded during site surveys.
2. Scenario B – Peat stability in terms of the in-situ peat with 1m fill (presumed peat) placed on top, that is using the depth of peat observed and recorded during site surveys plus 1 metre fill (depth + 1.0m). This is the assessment worst case scenario, and this will be used to assess stability at proposed infrastructure locations.

Undrained shear strength (effective cohesion) (c_u) has been derived by means of assessing moisture content results, which is; there is a correlation between peat moisture content and shear strength (effective cohesion). Shear vane testing has been carried out on the site however, shear vane test, or in situ barrel shear tests are not considered representative of shear strength characteristics of the peat being assessed in terms of stability assessment given numerous flaws with the test itself, namely; the shear vane test evaluates the shear strength where by the force is exerted in a vertical and cylindrical plane, which is not indicative of forces at play with respect slope stability or mass movement; and fibres and roots within the peat will effect the test itself, potentially exaggerating, or giving misleading data. The following graph presents conceptual shear strength values for peat (Boylan N, Jennings P & Long M., 2008).

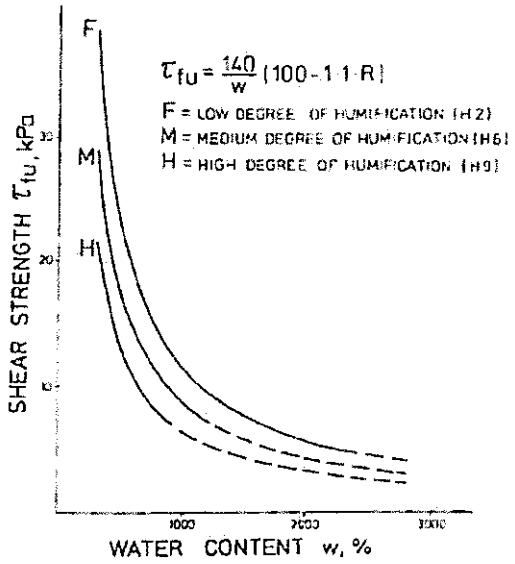

Figure 1: Correlation Between Moisture Content and Shear Strength of Peat (N. Boylan, P. Jennings & M. Long, 2008)

The following table presents the typical minimum, average and maximum moisture content which been used to determine indicative shear strength values for the Site.

Table 3: Peat Moisture Content Range & Indicative Shear Strength

Category	Moisture Content (%)	Indicative Shear Strength (kPa)
Minimum	200	>20
Average	750	10-20
Maximum	1500	<10

For the purpose of assessing peat stability for the Site a conservative undrained shear strength (effective cohesion) value will be used in numerical assessments, i.e., 3.5 kPa.

In situ bulk density (kg/m^3), or bulk unit weight (kN/m^3) of peat (y) is typically within the range of 900-1100 kg/m^3 (Munro R, 2004), or 8.8-10.8kN/m^3. For the purpose of assessing peat stability for the Site a conservative bulk unit weight value will be used in numerical assessments i.e., 11kN/m^3.

The depth to failure plane (z) is presumed to be thickness or depth of peat at any given sampling point being assessed, however it should be noted that the failure plane can potentially be within peat (peat on peat movement), or the substrate i.e., weathered rock or underlying soils.

Slope angle (α) is presumed to be topographical incline measured on site / evaluated using high resolution elevation data at any given sampling point being assessed, however it should be noted that the slope angle (α) relates to the failure plane angle, which is presumed to be the peat and substrate interface, and which is presumed to be parallel to the surface when using FoS Formula (Infinite Slope Formula). In reality the underlying substrate is unlikely to be parallel to the surface topology.

It should be noted that FoS Formula does not account for forces related to the toe and head of an area or mass of soil with the potential for mass movement, which is; in reality the Infinite Slope formula will likely exaggerate stability conditions negatively.

The following table lists parameter values, including inferred conservative parameter values used in numerical assessments.

Table 4: Formula Parameters, Symbols & Inferred Conservative Values

Symbol	Description	Value	Unit
c_u	Effective cohesion	3.5	kPa
y	Bulk Unit Weight of Peat	11	kN/m3
z	Depth to failure plain	Depth of Peat	m
α	Slope Angle	Surface Topography	Degrees

2.2.8 Risk Matrices & Ranking

In assessing the risk in relation to peat stability on site it is important to rate the risk in terms of the hazard, the likelihood and the consequences if any such issue should arise. Therefore, the slope stability risk assessment considers the following parameters, which are assessed by means of a series of risk matrices (Scottish Gov., 2017).

Table 5: Parameters Included in Risk Matrices and Assessed

Category	Description
Landslide History	Considers the likelihood of landslide events occurring based on the history of the site, including the current site use.
Factor of Safety	As described above, includes the following; • Peat depth • Peat quality / condition • Moisture content • Incline (surface topography) • Shear strength • Bulk unit weight of peat
Substrate Topology	Identifying and qualifying variance in substrate topology and qualifying variance from theory underlining the stability formula used i.e., Infinite Slope (Parallel and no foot and head forces)
Significance of Receptor	Qualifying potential receptors in terms of significance.
Distance to Receptor	Qualifying localised proposed development areas in terms of distance to nearest receptor.

Considering the above parameters, the stability assessment follows the following steps;

1. FoS_{RAW} - Assess the site in terms of soil stability using the FoS Formula and calculate a Factor of Safety (FoS) using the *raw* data. This step is considered as preparation of the data obtained for the site i.e., translating the data to a value related to stability, and is not considered the final output of the stability assessment.
2. $FoS_{ADJUSTED}$ - Assess the FoS_{RAW} values in terms of suitability of the application of FoS Formula by considering the history of landslides in relation to the proposed site, and the topology of the substrate compared to the surface topology of the site. This is done by means of a risk matrix which qualifies the point, and also applies a coefficient for the next risk assessment step.
3. Risk Ranking RR_{SF} - The $FoS_{ADJUSTED}$ data is assessed in terms of significance of associated receptor. This is done by means of a risk matrix which qualifies the point, and also applies a coefficient for the next risk assessment step.
4. Risk Ranking RR_D – The RR_{SF} data is assessed in terms of distance to associated receptor. This is done by means of a risk matrix which qualifies the point.

Results and conclusions made by means of the above risk assessment are viewed as two tiered, that is;

1. The likelihood of a stability issue or landslide while considering the significance of the receptor (RR_{SF}).
2. The consequence of a stability issue or landslide while considering the distance to the receptor (RR_{D}).

For example, (1) The risk of a stability issues or landslide occurring at location X and impacting on receptor Y is negligible. (2) Considering the short distance from location X to receptor Y, in the unlikely event that an issue did arise the risk of adverse impacts effecting receptor Y is moderate.

Risk Matrices are presented in **Appendix I**.

2.2.9 Interpretation of Results.

Results of the numerical stability risk assessment are modelled / mapped and interrogated in the context of site topography, site conditions, the Project and receptor sensitivity and susceptibility. Interpretation of results in the context of the development, activity and any potential consequences is an important step of the slope stability risk assessment. It is important to consider groups of data sets and site-specific dynamics at a particular location (for example, at a proposed turbine location) and to qualitatively risk assess stability in the context of all observed site characteristics, including topography, substrate topology, geology, hydrogeology, and hydrology, etc. For example; data might indicate a single point of unacceptable FoS / stability, however this needs to be considered in context of neighbouring data and actual site conditions, such as the presence of deep peat within a localised basin confined by shallow bedrock at the surface at neighbouring points, that is; deep, "unstable" peat (by numerical model) observed to be confined by shallow bedrock does not equate to an elevated risk of a catastrophic landslide event occurring, but does equate to potential localised stability issues arising if excavating at that particular location with deep peat.

In turn, any potential stability hazard must be considered in risk assessments in terms of potential consequences to receptors, and not simply likelihood of a stability issues arising. For example, in an area with low risk in terms of stability or Factor of Safety (FoS), but immediately and directly upgradient of a sensitive receptor such as a surface water body, in the unlikely event (low risk = acceptable FoS) that a significant stability issue should arise, due to the proximity to the receiving receptor the consequences of such an event have the potential to be significant.

The following table presents the interpretation of stability risk assessment data in the context of stability, or factor of safety (FoS) (Adjusted, Scenario B) at each significant development infrastructure unit.

2.3 Subsoil & Slope Stability Risk Assessment Methodology

2.3.1 Subsoil stability numerical assessment

This stability assessment has been undertaken in a similar manner to the peat stability assessment. However, due to the limited data available (compared to number of peat depth probing locations) qualifying stability in subsoils at the Site will infer data obtained at nearest neighbour trial pit locations.

Subsoils observed on site generally are classified as follows;

- Clayey, silty, sandy, GRAVEL (or TILL) with coobles and boulders.

The undrained shear strength observed in till subsoils at the Site ranged from 15 to 180kPa (**Appendix B**). This data is not considered highly reliable due to numerous site-specific factors including particle size distribution of subsoils, particularly with high gravel / cobble content in this instance.

The undrained shear strength for inorganic silty sandy soils is typically in the range of 50 to 75kPa but is highly variable depending on the particular particle sizes and their character comprising the soil. It should be noted saturation / pore water pressure can also dramatically impact and reduce shear strength, or cohesion values in soils.

For the purpose of assessing subsoil stability for the Site a conservative undrained shear strength (effective cohesion) value will be used in numerical assessments, i.e., 40 kPa.

In situ bulk density (kg/m^3), or bulk unit weight (kN/m^3) of soils/subsoils (y), namely silty sandy subsoils, is typically within the range of 2500 to 2700 kg/m^3, or 24.5 to 26.5 kN/m^3. For the purpose of assessing subsoil stability for the Site a conservative bulk unit weight value will be used in numerical assessments i.e., 27 .0 kN/m^3.

The depth to failure plane (z) is presumed to be thickness or depth of subsoils at any given sampling point being assessed. However, subsoil depths will be inferred in areas of the site with limited data. It should be noted that the failure plane can potentially be within subsoils (subsoil on subsoil movement), or the substrate i.e., weathered bedrock. In relation to the Site specifically, it is important to note the presence of iron pan. Iron pan is a layer of oxidised iron within the subsoil. The iron pan layer is relatively impermeable which can impede or significantly alter groundwater movement in the subsoils. Under the right circumstances the iron pan layer can therefore become a slip or failure plane. In such instances the failure plane has the potential to parallel to the overlying topography.

Slope angle (α) is presumed to be topographical incline measured on site / evaluated using high resolution elevation data at any given sampling point being assessed, however it should be noted that the slope angle (α) relates to the failure plane angle, which is presumed to be the peat and substrate interface, and which is presumed to be parallel to the surface when using FoS Formula (Infinite Slope Formula). In reality the underlying substrate (bedrock) is unlikely to be parallel to the surface topology. However, considering the presence of iron pan in subsoils at the site it is important to consider the potential for parallel failure planes when assessing stability at the site.

It should be noted that FoS Formula does not account for forces related to the toe and head of an area or mass of soil with the potential for mass movement, which is in reality the Infinite Slope formula will likely exaggerate stability conditions negatively.

The following table lists parameter values, including inferred conservative parameter values used in numerical assessments.

Table 6: Formula Parameters, Symbols & Inferred Conservative Values

Symbol	Description	Value	Unit
c_u	Effective cohesion	40	kPa
y	Bulk Unit Weight of Peat	27.0	kN/m3
z	Depth to failure plain	Depth of subsoil to bedrock	m
α	Slope Angle	Surface Topography	Degrees

2.3.2 Risk Matrices & Ranking

In assessing the risk in relation to subsoil stability on site it is important to rate the risk in terms of the hazard, the likelihood and the consequences if any such issue should arise. Therefore, the slope stability risk assessment considers the following parameters, which are assessed by means of a series of risk matrices (Scottish Gov., 2017)

Table 7: Parameters Included in Risk Matrices and Assessed

Category	Description
Landslide History	Considers the likelihood of landslide events occurring based on the history of the site, including the current site use.
Factor of Safety	As described above, includes the following; • Subsoil depth (to failure plain)

Category	Description
	• Subsoil composition (PSD) • Moisture content • Incline (surface topography) • Shear strength • Bulk unit weight of subsoil
Substrate Topology	Identifying and qualifying variance in substrate topology and qualifying variance from theory underlining the stability formula used i.e., Infinite Slope (Parallel and no foot and head forces) **For the purposes of considering worst case conditions (the potential for iron pan and parallel failure plains), substrate topology is considered parallel.**
Significance of Receptor	Qualifying potential receptors in terms of significance.
Distance to Receptor	Qualifying localised proposed development areas in terms of distance to nearest receptor.

Considering the above parameters, the stability assessment follows the following steps;

5. FoS_{RAW} - Assess the site in terms of soil stability using the FoS Formula and calculate a Factor of Safety (FoS) using the *raw* data. This step is considered as preparation of the data obtained for the site i.e., translating the data to a value related to stability, and is not considered the final output of the stability assessment.
6. $FoS_{ADJUSTED}$ - Assess the FoS_{RAW} values in terms of suitability of the application of FoS Formula by considering the history of landslides in relation to the proposed site, and the topology of the substrate compared to the surface topology of the site. This is done by means of a risk matrix which qualifies the point, and also applies a coefficient for the next risk assessment step.
7. Risk Ranking RR_{SF} - The $FoS_{ADJUSTED}$ data is assessed in terms of significance of associated receptor. This is done by means of a risk matrix which qualifies the point, and also applies a coefficient for the next risk assessment step.
8. Risk Ranking RR_D – The RR_{SF} data is assessed in terms of distance to associated receptor. This is done by means of a risk matrix which qualifies the point.

Results and conclusions made by means of the above risk assessment are viewed as two tiered, that is;

1. The likelihood of a stability issue or landslide while considering the significance of the receptor (RR_{SF}).
2. The consequence of a stability issue or landslide while considering the distance to the receptor (RR_D).

For example, (1) The risk of a stability issues or landslide occurring at location X and impacting on receptor Y is negligible. (2) Considering the short distance from location X to receptor Y, in the unlikely event that an issue did arise the risk of adverse impacts effecting receptor Y is moderate.

Risk Matrices are presented in **Appendix I**.

3. Baseline Conditions

3.1 Site Description & History

There no recorded landslide events in close proximity to the Site (GSI, Accessed 2021).

There were no indications of stability issues or mass movement observed on the Site during site surveys.

The Site is mapped as having areas ranging from Low Risk to High Risk in terms of Landslide Stability, that is; full spectrum of slope stability risk categories (GSI, ND). Larger areas of High-Risk landslide susceptibility are associated with relatively expansive steep slopes.

Refer to EIAR baseline section for further information (**Chapter 8: Soils and Geology**).

3.2 Site Geology

Consultation with Geological Survey Ireland Spatial Resources (GSI) indicates that the bedrock at 1:1,000,000 scale the Site is underlain by;

- Gun Point Formation (GP) – Green-grey to purple medium to fine-grained sandstones, interbedded with green and red to purple siltstones to fine sandstones.

The region contains a multitude of complex geological features however, there are no mapped faults or other significant features underlying the area of the Site.

Rocky outcrops are common within the Site Boundary.

Refer to EIAR baseline section for further information (**Chapter 8: Soils and Geology**).

3.3 Site Soils & Subsoils

Consultation with available maps (GSI) indicate that the soil type across the entire area of the Site, and the general area in the region is mostly Blanket Peat and Till derived from Devonian sandstones with several significant areas mapped as being Bedrock at Surface.

Peat depths observed on the Site are generally 'Rock' to 'shallow' with isolated pockets of moderately deep peat, however depths at most sampling points are within the range of 0.0-0.5 m and areas with deeper, particularly extremely deep peat have been avoided in terms of the Project footprint. Peat depths are mapped and presented in **Appendix A**.

Peat quality assessment (by gouge coring / trial pitting / observations at cut locations) indicate relatively moderate to high Von Post values (generally H5 to H8) across the Site.

Refer to EIAR baseline section for further information (**Chapter 8: Soils and Geology**).

3.4 Topography & Substrate Topology

The topography at and in the immediate area surrounding the Site is highly variable with multiple peaks, ridges with variable elevations and inclines. At lower elevations the topography is relatively flat or comprising of low magnitude inclines, however at mid and high elevation relative to the Site, steep high magnitude inclines are commonplace.

Site observations indicate that the substrate topology varies significantly to surface topology. Highest rates of variance are associated with areas which include deeper peat, that is; areas of deeper peat are contained with "pockets" delineated by areas or ridges of shallow bedrock. Areas with generally shallower peat have less variance from the substrate however such areas are indicatively low risk in terms of stability given the peat is shallow.

3.5 Hydrology & Climate

Three (3no.) mapped rivers run through and directly adjacent to the Site. Several extensive constructed drainage channels associated with forestry, agriculture and peat cutting activities exist at the site.

Refer to EIAR baseline section for further information (**Chapter 9: Hydrology and Hydrogeology**).

3.6 Receptors

Receptors associated with the Project footprint are generally limited to non-critical infrastructure and water bodies.

Receptors associated with the Project, which is; streams, rivers, lakes and groundwater, are considered highly sensitive receptors considering;

- 'Good' WFD River status and objective to protect same.
- 'Moderate' WFD Lake (Carrigdrohid) status and objective to restore same to at least good status by 2027.
- The numerous downgradient designations (sensitive protected areas) associated with each of the two associated catchments and the sensitive habitats and species associated with same.
- Designation of some downgradient surface water bodies and all groundwater bodies as sources of drinking water (Sullane_050).

Ultimately, all surface water and groundwater associated with the Site is considered sensitive and must be protected.

Risk to receptors must consider both the hazard, and likelihood of adversely impacting on any given sensitive receptor, and therefore parameters such as; distance from potential source of hazard to receptor, pathway directness and/or connectivity, and assimilative capacity of the receiving water body should also be considered.

Distance of proposed turbine and hard stand areas have been assessed in terms of distance to associates receptors (surface water features), the results for which are presented in **Appendix I.**

Refer to EIAR baseline section for further information (**Chapter 9: Hydrology and Hydrogeology**).

4. Site Investigation Data & Results

4.1 Peat Depth Data

Approximately 150 no. peat depth probe locations were assessed at the Site. Georeferenced and categorized peat depth locations are presented in **Appendix A**. Peat depth data is presented in **Appendix B**. Number of probe locations by Depth Category are presented in **Table 8**.

Table 8: Peat Depth Probe Points per Depth Category

Peat Depth Category	No.
A – Rock (0.00-0.01 m)	16
B – Very Shallow (0.01-0.5 m)	92
C – Shallow (0.5-2.0 m)	66
D – Moderately Deep (2.0-3.5m)	12
E – Deep (3.5-5.0 m)	1
F – Very Deep (>5.0 m)	0
TOTAL	187 (21 Inferred)

4.2 Trial Pit Data

A total of 16 no. Trial Pits were completed, logged and sampled at the Site. Trial Pit and Borehole locations are presented in **Appendix C**. Trial Pit Logs are presented in **Appendix D**. Trial Pit and Site Investigation Photos are presented in **Appendix E**. A total of 3 no. subsoil samples were obtained from the Site and tested for particle size distribution (PSD). Subsoil laboratory certificates are presented in **Appendix G**.

Particle Size Distribution (PSD) Soil Description results for subsoils (BS 1377: Part 2: 1990: Clause 9) at the site are presented in **Table 9**. Note: cobble size particles observed on trial pit log sheets and have likely been screened out to a degree at the time of sampling.

Table 9: Reported Subsoil Description (PSD)

Sample ID	Cobbles (%)	Gravel (%)	Sand (%)	Silt & Clay (%)	Description
TP03-A2 (SS1)	0.0	43.0	32.0	25.0	Very clayey very sandy GRAVEL
TP08-A2 (SS1)	0.0	50.0	19.0	31.0	Slightly sandy gravelly CLAY
TP11-A2 (SS1)	0.0	51.0	26.0	22.0	Very clayey very sandy GRAVEL

Cobbles were observed on site and were likely screened out at the time of sampling. Further details are presented in **Appendix D.** Iron pan was observed in several trial pits as listed in **Appendix H**, and presented in **Appendix C, Appendix D** and **Appendix E**.

4.3 Borehole Data

A total of 1 no. rotary core borehole was completed, logged, and sampled at the Site. Borehole logs are presented in **Appendix F**. Drill logs indicate that;

- Bedrock underlying the site is described as SILTSTONE (BH01I)
- Bedrock shows minor signs of weathering.
- Driller notes water strike at BH01I at ~2.50m bGL likley perched groundwater on top of unweathered bedrock. .

Siltstone is mainly comprised of silt-sized particles. Silt-sized particles range between 0.002 and 0.063 millimeters in diameter (BS 5930). They are intermediate in size between coarse clay on the small side and fine sand on the large side.

Bedrock cores obtained were tested for Unconfined Compressive Strength (UCS) and Point Load Strength (PL). Rock core testing laboratory certificates are presented in **Appendix F**. Unconfined Compressive Strength (UCS) results presented in **Table 10** indicate bedrock underlying the site is considered weak.

Table 10: Bedrock Core Laboratory Strength Testing Results

Parameter	(Unit)	BH01I
UCS Results	*Kn*	23.3
UCS Results	*MPa*	5.17
Rock Strength (UCS MPa)	*BS 5930* *BS EN ISO 14689*	Weak

4.4 Peat Stability Risk Assessment Results

Review of peat stability assessment result data and maps as presented in **Appendix I** indicate that the factor of safety is generally acceptable and very low to low stability risk across the site with the exception of minor isolated areas or pockets of deeper peat.

Summary of risk at the site under varying conditions and scenarios is presented in in the following tables.

Table 11: Factor of Safety (Adjusted) at Peat Probe Locations

	Acceptable	Marginally Stable	Unstable
FoS (Adj.) Scenario A	149	1	0
FoS (Adj.) Scenario B	118	24	8

Table 12: Risk Ranking (Distance) at Peat Probe Locations

	Very Low	Low	Moderate	High
RR (Dist.) Scenario A	104	11	34	1
RR (Dist.) Scenario B	81	27	37	5

Areas of elevated stability risk, even at a localised scale, are considered geo-hazards requiring mitigation. Geo-hazards are presented in **Appendix H**.

The following plates present the available peat data per proposed turbine locations, including the results of numerical model stability risk assessment.

SI Appendix B - Peat & Subsoil Survey Database

Inchamore WF, Co. Cork

Prepared by: SK 07/02/2023
RSK File Ref.: 603679-00.xls

Sample / Test Category	Sample of Test Point ID No.	Association	ITM Easting	ITM Northing	Thickness / Depth of peat (m)	Classification of Thickness / Depth of peat	Slope (Extracted from GDEM) (Degrees)	Note	Scenario A FoS_RAW Factor of Safety (FoS) for Peat Stability	COEFFICIENT	Scenario B FoS_RAW Factor of Safety (FoS) for Peat Stability	COEFFICIENT	FoS Adjustment Coefficient	FoS Adjustment Value	Scenario A FoS_ADJ Adjusted Factor of Safety (FoS) for Peat Stability	COEFFICIENT	Scenario B FoS_ADJ Adjusted Factor of Safety (FoS) for Peat Stability	COEFFICIENT	Significant Feature Ranking Coefficient	Scenario A RR_SF Ranking Risk re Potential for Adverse Consequences on Sensitive Receptors	COEFFICIENT	Scenario B RR_SF Ranking Risk re Potential for Adverse Consequences on Sensitive Receptors	COEFFICIENT	Distance to Sensitive Receptor (m)	Distance to Sensitive Receptor Coefficient	Scenario A RR_D Risk Ranking Accounting for Distance to Sensitive Receptors	Scenario A Risk Category	Scenario B RR_D Risk Ranking Accounting for Distance to Sensitive Receptors	Scenario B Risk Category
Depth Probe	DP001	T1	512342.9	578929.9	0.1	B - Very Shallow (0.0-0.5m)	5.76569		31.83	[illegible]	2.89	[illegible]	2.0	0.0	31.83	[illegible]	2.89	[illegible]	2.0	[illegible]	1.0	[illegible]	1.0	420.3	1.0	[illegible]	A - Very Low Risk	[illegible]	A - Very Low Risk
Depth Probe	DP002	T1	512346.9	578942.9	0.1	B - Very Shallow (0.0-0.5m)	5.76569		31.83	[illegible]	2.89	[illegible]	2.0	0.0	31.83	[illegible]	2.89	[illegible]	2.0	[illegible]	1.0	[illegible]	1.0	413.5	1.0	[illegible]	A - Very Low Risk	[illegible]	A - Very Low Risk
Depth Probe	DP003	T1	512390.9	579012.9	0.2	B - Very Shallow (0.0-0.5m)	2.54332		35.89	[illegible]	5.98	[illegible]	2.0	0.0	35.89	[illegible]	5.98	[illegible]	2.0	[illegible]	1.0	[illegible]	1.0	414.1	1.0	[illegible]	A - Very Low Risk	[illegible]	A - Very Low Risk
Depth Probe	DP004	T1	512398.9	578941.9	0.1	B - Very Shallow (0.0-0.5m)	5.89515		31.14	[illegible]	2.83	[illegible]	2.0	0.0	31.14	[illegible]	2.83	[illegible]	2.0	[illegible]	1.0	[illegible]	1.0	373.5	1.0	[illegible]	A - Very Low Risk	[illegible]	A - Very Low Risk
Depth Probe	DP005	T1	512395.9	578926.9	0.1	B - Very Shallow (0.0-0.5m)	10.03382	Rocky outcrop east west steep	18.44	[illegible]	1.68	[illegible]	2.0	0.0	18.44	[illegible]	1.68	[illegible]	2.0	[illegible]	1.0	[illegible]	1.0	368.4	1.0	[illegible]	A - Very Low Risk	[illegible]	A - Very Low Risk
Depth Probe	DP006	T1	512401.9	578948.9	0.7	C - Shallow (0.5-2.0m)	6.8615	Cut peat. Photo #150	4.33	[illegible]	1.78	[illegible]	2.0	0.0	4.33	[illegible]	1.78	[illegible]	2.0	[illegible]	1.0	[illegible]	1.0	348.9	1.0	[illegible]	A - Very Low Risk	[illegible]	A - Very Low Risk
Depth Probe	DP007	T1	512411.9	578971.9	0.6	C - Shallow (0.5-2.0m)	2.61186		11.65	[illegible]	4.37	[illegible]	2.0	0.0	11.65	[illegible]	4.37	[illegible]	2.0	[illegible]	1.0	[illegible]	1.0	363.8	1.0	[illegible]	A - Very Low Risk	[illegible]	A - Very Low Risk
Depth Probe	DP008	T1	512413.8	578785.9	2.1	D - Moderately Deep (2.0-3.5m	4.97205		1.75	[illegible]	1.19	2.0	2.0	0.0	1.75	[illegible]	1.19	2.0	2.0	[illegible]	1.0	4.0	2.0	311.5	1.0	[illegible]	A - Very Low Risk	2.0	B - Low Risk
Depth Probe	DP009	T1	512447.9	578987.9	1	C - Shallow (0.5-2.0m)	3.12206		5.85	[illegible]	2.93	[illegible]	2.0	0.0	5.85	[illegible]	2.93	[illegible]	2.0	[illegible]	1.0	[illegible]	1.0	343.2	1.0	[illegible]	A - Very Low Risk	[illegible]	A - Very Low Risk
Depth Probe	DP010	T1	512459.9	579048.9	0.0001	A - Rock (0.0m)	0.87333	Rock	207449.24	[illegible]	20.74	[illegible]	2.0	0.0	207449.24	[illegible]	20.74	[illegible]	2.0	[illegible]	1.0	[illegible]	1.0	367.2	1.0	[illegible]	A - Very Low Risk	[illegible]	A - Very Low Risk
Depth Probe	DP011	T1	512465.9	579026.9	1.2	C - Shallow (0.5-2.0m)	0.87393	Rocky adjacent	17.29	[illegible]	9.43	[illegible]	2.0	0.0	17.29	[illegible]	9.43	[illegible]	2.0	[illegible]	1.0	[illegible]	1.0	348.5	1.0	[illegible]	A - Very Low Risk	[illegible]	A - Very Low Risk
Depth Probe	DP014	T1	512510	579076	1.1	C - Shallow (0.5-2.0m)	2.52049		6.58	[illegible]	3.45	[illegible]	2.0	0.0	6.58	[illegible]	3.45	[illegible]	2.0	[illegible]	1.0	[illegible]	1.0	345.2	1.0	[illegible]	A - Very Low Risk	[illegible]	A - Very Low Risk
Depth Probe	DP015	T1	512521.9	578733.9	0.0001	A - Rock (0.0m)	6.05493	Rock	30334.02	[illegible]	3.93	[illegible]	2.0	0.0	30334.02	[illegible]	3.93	[illegible]	2.0	[illegible]	1.0	[illegible]	1.0	245.6	1.0	[illegible]	A - Very Low Risk	[illegible]	A - Very Low Risk
Depth Probe	DP016	T1	512524	579140	0.0001	A - Rock (0.0m)	2.08987	Rock	87351.72	[illegible]	8.73	[illegible]	2.0	0.0	87351.72	[illegible]	8.73	[illegible]	2.0	[illegible]	1.0	[illegible]	1.0	387.7	1.0	[illegible]	A - Very Low Risk	[illegible]	A - Very Low Risk
Depth Probe	DP017	T1	512528	579034	0.0001	A - Rock (0.0m)	4.37171	Rock	41863.31	[illegible]	4.19	[illegible]	2.0	0.0	41863.31	[illegible]	4.19	[illegible]	2.0	[illegible]	1.0	[illegible]	1.0	287.7	1.0	[illegible]	A - Very Low Risk	[illegible]	A - Very Low Risk
Depth Probe	DP018	T1	512529	579026	0.0001	A - Rock (0.0m)	3.27531	Rock	55781.75	[illegible]	5.58	[illegible]	2.0	0.0	55781.75	[illegible]	5.58	[illegible]	2.0	[illegible]	1.0	[illegible]	1.0	298.7	1.0	[illegible]	A - Very Low Risk	[illegible]	A - Very Low Risk
Depth Probe	DP019	T1	512532	579219	2.1	D - Moderately Deep (2.0-3.5m	4.90234		1.78	[illegible]	1.27	2.0	2.0	0.0	1.78	[illegible]	1.27	2.0	2.0	[illegible]	1.0	4.0	2.0	450.3	1.0	[illegible]	A - Very Low Risk	2.0	B - Low Risk
Depth Probe	DP021	T1	512543	579061	0.0001	A - Rock (0.0m)	3.35734	Rock	54424.65	[illegible]	5.44	[illegible]	2.0	0.0	54424.65	[illegible]	5.44	[illegible]	2.0	[illegible]	1.0	[illegible]	1.0	271.7	1.0	[illegible]	A - Very Low Risk	[illegible]	A - Very Low Risk
Depth Probe	DP023	T1	512544	579108	2.6	D - Moderately Deep (2.0-3.5m	2.00633		3.50	[illegible]	2.53	[illegible]	2.0	0.0	3.50	[illegible]	2.53	[illegible]	2.0	[illegible]	1.0	[illegible]	1.0	350.0	1.0	[illegible]	A - Very Low Risk	[illegible]	A - Very Low Risk
Depth Probe	DP024	T1	512545	579027	3.8	D - Moderately Deep (2.0-3.5m	2.39497		2.72	[illegible]	2.61	[illegible]	2.0	0.0	2.72	[illegible]	2.61	[illegible]	2.0	[illegible]	1.0	[illegible]	1.0	287.8	1.0	[illegible]	A - Very Low Risk	[illegible]	A - Very Low Risk
Depth Probe	DP025	T1	512548.9	579026.9	1.5	C - Shallow (0.5-2.0m)	2.00623	Rocky adjacent photo	6.06	[illegible]	3.64	[illegible]	2.0	0.0	6.06	[illegible]	3.64	[illegible]	2.0	[illegible]	1.0	[illegible]	1.0	337.4	1.0	[illegible]	A - Very Low Risk	[illegible]	A - Very Low Risk
Depth Probe	DP026	T1	512550	579157	2.5	D - Moderately Deep (2.0-3.5m	1.46867		4.90	[illegible]	3.59	[illegible]	2.0	0.0	4.90	[illegible]	3.59	[illegible]	2.0	[illegible]	1.0	[illegible]	1.0	336.2	1.0	[illegible]	A - Very Low Risk	[illegible]	A - Very Low Risk
Depth Probe	DP027	T1	512550	579013	2.2	D - Moderately Deep (2.0-3.5m	3.25734		2.47	[illegible]	1.78	[illegible]	2.0	0.0	2.47	[illegible]	1.78	[illegible]	2.0	[illegible]	1.0	[illegible]	1.0	278.6	1.0	[illegible]	A - Very Low Risk	[illegible]	A - Very Low Risk
Depth Probe	DP028	T1	512554	579029	3	D - Moderately Deep (2.0-3.5m	2.39487		2.54	[illegible]	1.91	[illegible]	2.0	0.0	2.54	[illegible]	1.91	[illegible]	2.0	[illegible]	1.0	[illegible]	1.0	282.9	1.0	[illegible]	A - Very Low Risk	[illegible]	A - Very Low Risk
Depth Probe	DP029	T1	512556.9	579097.9	2.5	D - Moderately Deep (2.0-3.5m	2.00639	Rocky adjacent photo	3.64	[illegible]	2.60	[illegible]	2.0	0.0	3.64	[illegible]	2.60	[illegible]	2.0	[illegible]	1.0	[illegible]	1.0	334.3	1.0	[illegible]	A - Very Low Risk	[illegible]	A - Very Low Risk
Depth Probe	DP030	T1	512563	579056	3	D - Moderately Deep (2.0-3.5m	4.10763		1.48	[illegible]	1.17	2.0	2.0	0.0	1.48	[illegible]	1.17	2.0	2.0	[illegible]	1.0	4.0	2.0	233.5	1.0	[illegible]	A - Very Low Risk	2.0	B - Low Risk
Depth Probe	DP031	T1	512570	579177	2.3	D - Moderately Deep (2.0-3.5m	1.93158		4.62	[illegible]	3.13	[illegible]	2.0	0.0	4.62	[illegible]	3.13	[illegible]	2.0	[illegible]	1.0	[illegible]	1.0	335.4	1.0	[illegible]	A - Very Low Risk	[illegible]	A - Very Low Risk
Depth Probe	DP032	T1	512580	579018	0.1	B - Very Shallow (0.0-0.5m)	7.22121		25.52	[illegible]	2.32	[illegible]	2.0	0.0	25.52	[illegible]	2.32	[illegible]	2.0	[illegible]	1.0	[illegible]	1.0	257.2	1.0	[illegible]	A - Very Low Risk	[illegible]	A - Very Low Risk
Depth Probe	DP033	T1	512583	579002	1.1	C - Shallow (0.5-2.0m)	7.22121		2.32	[illegible]	1.22	2.0	2.0	0.0	2.32	[illegible]	1.22	2.0	2.0	[illegible]	1.0	4.0	2.0	243.3	1.0	[illegible]	A - Very Low Risk	2.0	B - Low Risk
Depth Probe	DP034	T1	512591	578975	0.0001	A - Rock (0.0m)	6.88097	Rocky adjacent	26750.90	[illegible]	2.67	[illegible]	2.0	0.0	26750.90	[illegible]	2.67	[illegible]	2.0	[illegible]	1.0	[illegible]	1.0	213.6	1.0	[illegible]	A - Very Low Risk	[illegible]	A - Very Low Risk
Depth Probe	DP036	T1	512594	579134	1.1	C - Shallow (0.5-2.0m)	1.44436		11.48	[illegible]	6.61	[illegible]	2.0	0.0	11.48	[illegible]	6.61	[illegible]	2.0	[illegible]	1.0	[illegible]	1.0	346.2	1.0	[illegible]	A - Very Low Risk	[illegible]	A - Very Low Risk
Depth Probe	DP038	T1	512614	579081	2.5	D - Moderately Deep (2.0-3.5m	4.16378		1.76	[illegible]	1.26	2.0	2.0	0.0	1.76	[illegible]	1.26	2.0	2.0	[illegible]	1.0	4.0	2.0	298.8	1.0	[illegible]	A - Very Low Risk	2.0	B - Low Risk
Depth Probe	DP041	T1	512625	579052	2	C - Shallow (0.5-2.0m)	3.50355		2.61	[illegible]	1.74	[illegible]	2.0	0.0	2.61	[illegible]	1.74	[illegible]	2.0	[illegible]	1.0	[illegible]	1.0	254.5	1.0	[illegible]	A - Very Low Risk	[illegible]	A - Very Low Risk
Depth Probe	DP043	T1	512645	579030	0.0001	A - Rock (0.0m)	4.87526	Rock	37574.56	[illegible]	3.76	[illegible]	2.0	0.0	37574.56	[illegible]	3.76	[illegible]	2.0	[illegible]	1.0	[illegible]	1.0	230.3	1.0	[illegible]	A - Very Low Risk	[illegible]	A - Very Low Risk
Depth Probe	DP044	T1	512651	579011	0.2	B - Very Shallow (0.0-0.5m)	5.95167		15.43	[illegible]	2.57	[illegible]	2.0	0.0	15.43	[illegible]	2.57	[illegible]	2.0	[illegible]	1.0	[illegible]	1.0	210.7	1.0	[illegible]	A - Very Low Risk	[illegible]	A - Very Low Risk
Depth Probe	DP046	T1	512657	579101	1.4	C - Shallow (0.5-2.0m)	4.51536		2.50	[illegible]	1.69	[illegible]	2.0	0.0	2.50	[illegible]	1.69	[illegible]	2.0	[illegible]	1.0	[illegible]	1.0	315.5	1.0	[illegible]	A - Very Low Risk	[illegible]	A - Very Low Risk
Depth Probe	DP047	T1	512657	579121	1.1	C - Shallow (0.5-2.0m)	4.51536		3.69	[illegible]	1.93	[illegible]	2.0	0.0	3.69	[illegible]	1.93	[illegible]	2.0	[illegible]	1.0	[illegible]	1.0	215.5	1.0	[illegible]	A - Very Low Risk	[illegible]	A - Very Low Risk
Depth Probe	DP048	T1	512657.9	579097.9	1.2	C - Shallow (0.5-2.0m)	4.63283		3.23	[illegible]	1.80	[illegible]	2.0	0.0	3.23	[illegible]	1.80	[illegible]	2.0	[illegible]	1.0	[illegible]	1.0	257.7	1.0	[illegible]	A - Very Low Risk	[illegible]	A - Very Low Risk
Depth Probe	DP049	T1	512671	578968	0.0001	A - Rock (0.0m)	8.54113	Rock	21656.48	[illegible]	2.17	[illegible]	2.0	0.0	21656.48	[illegible]	2.17	[illegible]	2.0	[illegible]	1.0	[illegible]	1.0	163.4	1.0	[illegible]	A - Very Low Risk	[illegible]	A - Very Low Risk
Trail Pit	TP13	T1	512553	578911	0.1	B - Very Shallow (0.0-0.5m)	6.30361		29.15	[illegible]	2.65	[illegible]	2.0	0.0	29.15	[illegible]	2.65	[illegible]	2.0	[illegible]	1.0	[illegible]	1.0	182.5	1.0	[illegible]	A - Very Low Risk	[illegible]	A - Very Low Risk
Trail Pit	TP14	T1	512564	579045	3.1	D - Moderately Deep (2.0-3.5m	2.39497		2.46	[illegible]	1.89	[illegible]	2.0	0.0	2.46	[illegible]	1.89	[illegible]	2.0	[illegible]	1.0	[illegible]	1.0	234.8	1.0	[illegible]	A - Very Low Risk	[illegible]	A - Very Low Risk
Trail Pit	TP15	T1	512439	578939	0.3	B - Very Shallow (0.0-0.5m)	3.12206		19.50	[illegible]	4.59	[illegible]	2.0	0.0	19.50	[illegible]	4.59	[illegible]	2.0	[illegible]	1.0	[illegible]	1.0	321.6	1.0	[illegible]	A - Very Low Risk	[illegible]	A - Very Low Risk
Trail Pit	TP16	T1	512293	578930	0.2	B - Very Shallow (0.0-0.5m)	4.67613	Groundwater logged at base	19.60	[illegible]	3.27	[illegible]	2.0	0.0	19.60	[illegible]	3.27	[illegible]	2.0	[illegible]	1.0	[illegible]	1.0	482.6	1.0	[illegible]	A - Very Low Risk	[illegible]	A - Very Low Risk

Plate 1: Peat Data & Risk Assessment Results – T1

SI Appendix B - Peat & Subsoil Survey Database
Inchamore WF, Co. Cork

Prepared by: SK 07/02/2023
RSK File Ref.: 603679-00.xls

Sample / Test Category	Sample / Test Point ID No.	Association	ITM Easting	ITM Northing	Thickness / Depth of peat (m)	Classification of Thickness / Depth of peat	Slope (Extracted from GDEM) (Degrees)	Note
Depth Probe	DP051	T2	512693.9	578676.9	0.3	B - Very Shallow (0.01-0.5m)	9.62254	Rocky adjacent
Depth Probe	DP052	T2	512707.1	578640.5	0.0001	A - Rock (0.0m)	8.58034	
Depth Probe	DP056	T2	512772.9	578616	0.0001	A - Rock (0.0m)	9.15338	Rock
Depth Probe	DP057	T2	512776.8	578593	0.2	B - Very Shallow (0.01-0.5m)	9.60824	
Depth Probe	DP059	T2	512806.8	578632.9	0.1	B - Very Shallow (0.01-0.5m)	10.32984	Rocky adjacent
Depth Probe	DP061	T2	512811.8	578616	0.1	B - Very Shallow (0.01-0.5m)	10.13739	Rocky adjacent
Depth Probe	DP062	T2	512816	578491.8	0.2	B - Very Shallow (0.01-0.5m)	11.45979	
Depth Probe	DP063	T2	512819.8	578667.9	0.1	B - Very Shallow (0.01-0.5m)	8.95798	Rocky adjacent
Depth Probe	DP065	T2	512848.8	578655.9	0.1	B - Very Shallow (0.01-0.5m)	7.50129	Rocky adjacent
Depth Probe	DP066	T2	512852	578578	0.1	B - Very Shallow (0.01-0.5m)	7.07017	
Depth Probe	DP067	T2	512836.6	578530.5	0.0001	A - Rock (0.0m)	8.69802	Rocky
Depth Probe	DP068	T2	512902.1	578511.3	0.3	B - Very Shallow (0.01-0.5m)	8.69302	
Depth Probe	DP070	T2	512946	578538	0.5	B - Very Shallow (0.01-0.5m)	11.33164	
Depth Probe	DP152	T2	512849	578544.3	0.5	B - Very Shallow (0.01-0.5m)	7.0394	INFERRED
Depth Probe	DP153	T2	512867.2	578564	0.5	B - Very Shallow (0.01-0.5m)	3.67025	INFERRED
Depth Probe	DP154	T2	512893.7	578596.7	0.5	B - Very Shallow (0.01-0.5m)	6.5471	INFERRED
Depth Probe	DP155	T2	512893.3	578605.5	0.5	B - Very Shallow (0.01-0.5m)	12.38938	INFERRED
Depth Probe	DP156	T2	512911.6	578622.7	0.5	B - Very Shallow (0.01-0.5m)	13.05768	INFERRED
Depth Probe	DP157	T2	512918.4	578630.4	0.5	B - Very Shallow (0.01-0.5m)	13.63092	INFERRED
Depth Probe	DP158	T2	512923.9	578637.8	0.5	B - Very Shallow (0.01-0.5m)	9.73503	INFERRED
Depth Probe	DP159	T2	512935.8	578651.6	0.5	B - Very Shallow (0.01-0.5m)	9.73503	INFERRED
Depth Probe	DP160	T2	512944.9	578665.1	0.5	B - Very Shallow (0.01-0.5m)	6.01271	INFERRED
Depth Probe	DP161	T2	512955.3	578672.3	0.5	B - Very Shallow (0.01-0.5m)	6.01271	INFERRED
Depth Probe	DP162	T2	512969.9	578683.4	0.5	B - Very Shallow (0.01-0.5m)	7.25983	INFERRED
Depth Probe	DP163	T2	512982.8	578704.9	0.5	B - Very Shallow (0.01-0.5m)	7.52427	INFERRED
Depth Probe	DP164	T2	512890.8	578718.5	0.5	B - Very Shallow (0.01-0.5m)	12.32755	INFERRED
Depth Probe	DP165	T2	512900.5	578702	0.5	B - Very Shallow (0.01-0.5m)	14.02991	INFERRED
Depth Probe	DP166	T2	512913.8	578632.3	0.5	B - Very Shallow (0.01-0.5m)	14.77303	INFERRED
Depth Probe	DP167	T2	512930.3	578679	0.5	B - Very Shallow (0.01-0.5m)	7.95622	INFERRED
Depth Probe	DP168	T2	512842	578670.6	0.5	B - Very Shallow (0.01-0.5m)	6.01271	INFERRED
Depth Probe	DP169	T2	512956.9	578653.9	0.5	B - Very Shallow (0.01-0.5m)	6.01271	INFERRED
Depth Probe	DP170	T2	512974.7	578650.2	0.5	B - Very Shallow (0.01-0.5m)	7.77762	INFERRED
Depth Probe	DP171	T2	512991.6	578638.9	0.5	B - Very Shallow (0.01-0.5m)	7.78146	INFERRED
Trial Pit	TP11	T2	512781	578602	0.4	B - Very Shallow (0.01-0.5m)	12.49517	
Trial Pit	TP12	T2	512867	578632	0.3	B - Very Shallow (0.01-0.5m)	9.46395	

$FoS = \frac{c_u}{\gamma z \sin\alpha \cos\alpha}$; $FoS_{ADJ} = \frac{c_u}{\gamma z \sin\alpha \cos\alpha}$ + Adjustment Value

ID No.	Scenario A FoS_{RAW} Factor of Safety (FoS) for Peat Stability	COEFFICIENT	Scenario B FoS_{RAW} Factor of Safety (FoS) for Peat Stability	COEFFICIENT	FoS Adjustment Coefficient	FoS Adjustment Value	Scenario A FoS_{ADJ} Adjusted Factor of Safety (FoS) for Peat Stability	COEFFICIENT	Scenario B FoS_{ADJ} Adjusted Factor of Safety (FoS) for Peat Stability	COEFFICIENT	Significant Feature Ranking Coefficient μ_{SF}	Scenario A RR_{SF} Ranking Risk re Potential for Adverse Consequences on Sensitive Receptors	COEFFICIENT	Scenario B RR_{SF} Ranking Risk re Potential for Adverse Consequences on Sensitive Receptors	COEFFICIENT	Distance to Sensitive Receptor (m)	Distance to Sensitive Receptor Coefficient	Scenario A RR_D Risk Ranking Accounting for Distance to Sensitive Receptors	Risk Category	Scenario B RR_D Risk Ranking Accounting for Distance to Sensitive Receptors	Risk Category
DP051	6.43	1.0	1.48	1.0	2.0	0.0	6.43	1.0	1.48	1.0	2.0	2.0	1.0	2.0	1.0	127.5	2.0	2.0	B - Low Risk	2.0	B - Low Risk
DP052	2567.82	1.0	2.16	1.0	2.0	0.0	2567.82	1.0	2.16	1.0	2.0	2.0	1.0	2.0	1.0	133.1	2.0	2.0	B - Low Risk	2.0	B - Low Risk
DP056	20245.82	1.0	2.02	1.0	2.0	0.0	20245.82	1.0	2.02	1.0	2.0	2.0	1.0	2.0	1.0	93.0	2.0	2.0	B - Low Risk	2.0	B - Low Risk
DP057	9.67	1.0	1.61	1.0	2.0	0.0	9.67	1.0	1.61	1.0	2.0	2.0	1.0	2.0	1.0	112.8	2.0	2.0	B - Low Risk	2.0	B - Low Risk
DP059	10.04	1.0	1.64	1.0	2.0	0.0	10.04	1.0	1.64	1.0	2.0	2.0	1.0	2.0	1.0	62.8	2.0	2.0	B - Low Risk	2.0	B - Low Risk
DP061	10.26	1.0	1.66	1.0	2.0	0.0	10.26	1.0	1.66	1.0	2.0	2.0	1.0	2.0	1.0	74.2	2.0	2.0	B - Low Risk	2.0	B - Low Risk
DP062	8.17	1.0	1.36	1.0	2.0	0.0	8.17	1.0	1.36	1.0	2.0	2.0	1.0	2.0	1.0	174.7	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
DP063	20.69	1.0	1.89	1.0	2.0	0.0	20.69	1.0	1.89	1.0	2.0	2.0	1.0	2.0	1.0	28.1	4.0	4.0	C - Moderate Risk	4.0	C - Moderate Risk
DP065	24.58	1.0	2.23	1.0	2.0	0.0	24.58	1.0	2.23	1.0	2.0	2.0	1.0	2.0	1.0	20.2	4.0	4.0	C - Moderate Risk	4.0	C - Moderate Risk
DP066	28.05	1.0	2.37	1.0	2.0	0.0	28.05	1.0	2.37	1.0	2.0	2.0	1.0	2.0	1.0	83.5	2.0	2.0	B - Low Risk	2.0	B - Low Risk
DP067	2082.141	1.0	2.08	1.0	2.0	0.0	2082.141	1.0	2.08	1.0	2.0	2.0	1.0	2.0	1.0	92.0	2.0	2.0	B - Low Risk	2.0	B - Low Risk
DP068	6.94	1.0	1.60	1.0	2.0	0.0	6.94	1.0	1.60	1.0	2.0	2.0	1.0	2.0	1.0	104.3	2.0	2.0	B - Low Risk	2.0	B - Low Risk
DP070	3.30	1.0	1.10	2.0	2.0	0.0	3.30	1.0	1.10	2.0	2.0	2.0	1.0	4.0	2.0	60.0	2.0	2.0	B - Low Risk	4.0	C - Moderate Risk
DP152	4.79	1.0	1.60	1.0	2.0	0.0	4.79	1.0	1.60	1.0	2.0	2.0	1.0	2.0	1.0	110.2	2.0	2.0	B - Low Risk	2.0	B - Low Risk
DP153	9.45	1.0	3.15	1.0	2.0	0.0	9.45	1.0	3.15	1.0	2.0	2.0	1.0	2.0	1.0	86.8	2.0	2.0	B - Low Risk	2.0	B - Low Risk
DP154	5.62	1.0	1.87	1.0	2.0	0.0	5.62	1.0	1.87	1.0	2.0	2.0	1.0	2.0	1.0	57.1	2.0	2.0	B - Low Risk	2.0	B - Low Risk
DP155	3.04	1.0	1.01	2.0	2.0	0.0	3.04	1.0	1.01	2.0	2.0	2.0	1.0	4.0	2.0	35.0	4.0	4.0	C - Moderate Risk	8.0	D - High Risk
DP156	7.23	1.0	1.20	2.0	2.0	0.0	7.23	1.0	1.20	2.0	2.0	2.0	1.0	4.0	2.0	13.4	4.0	4.0	C - Moderate Risk	8.0	D - High Risk
DP157	2.78	1.0	0.93	4.0	2.0	0.0	2.78	1.0	0.93	4.0	2.0	2.0	1.0	8.0	4.0	3.2	4.0	4.0	C - Moderate Risk	16.0	D - High Risk
DP158	3.82	1.0	1.27	2.0	2.0	0.0	3.82	1.0	1.27	2.0	2.0	2.0	1.0	4.0	2.0	5.8	4.0	4.0	C - Moderate Risk	8.0	D - High Risk
DP159	3.82	1.0	1.27	2.0	2.0	0.0	3.82	1.0	1.27	2.0	2.0	2.0	1.0	4.0	2.0	24.0	4.0	4.0	C - Moderate Risk	8.0	D - High Risk
DP160	6.11	1.0	2.04	1.0	2.0	0.0	6.11	1.0	2.04	1.0	2.0	2.0	1.0	2.0	1.0	8.4	4.0	4.0	C - Moderate Risk	4.0	C - Moderate Risk
DP161	6.11	1.0	2.04	1.0	2.0	0.0	6.11	1.0	2.04	1.0	2.0	2.0	1.0	2.0	1.0	4.5	4.0	4.0	C - Moderate Risk	4.0	C - Moderate Risk
DP162	5.08	1.0	1.69	1.0	2.0	0.0	5.08	1.0	1.69	1.0	2.0	2.0	1.0	2.0	1.0	26.4	4.0	4.0	C - Moderate Risk	4.0	C - Moderate Risk
DP163	4.90	1.0	1.63	1.0	2.0	0.0	4.90	1.0	1.63	1.0	2.0	2.0	1.0	2.0	1.0	46.6	4.0	4.0	C - Moderate Risk	4.0	C - Moderate Risk
DP164	3.05	1.0	1.02	2.0	2.0	0.0	3.05	1.0	1.02	2.0	2.0	2.0	1.0	4.0	2.0	38.5	4.0	4.0	C - Moderate Risk	8.0	D - High Risk
DP165	2.71	1.0	0.90	4.0	2.0	0.0	2.71	1.0	0.90	4.0	2.0	2.0	1.0	8.0	4.0	23.8	4.0	4.0	C - Moderate Risk	16.0	D - High Risk
DP166	2.58	1.0	0.86	4.0	2.0	0.0	2.58	1.0	0.86	4.0	2.0	2.0	1.0	8.0	4.0	15.8	4.0	4.0	C - Moderate Risk	16.0	D - High Risk
DP167	4.64	1.0	1.55	1.0	2.0	0.0	4.64	1.0	1.55	1.0	2.0	2.0	1.0	2.0	1.0	9.0	4.0	4.0	C - Moderate Risk	4.0	C - Moderate Risk
DP168	6.11	1.0	2.04	1.0	2.0	0.0	6.11	1.0	2.04	1.0	2.0	2.0	1.0	2.0	1.0	6.5	4.0	4.0	C - Moderate Risk	4.0	C - Moderate Risk
DP169	6.11	1.0	2.04	1.0	2.0	0.0	6.11	1.0	2.04	1.0	2.0	2.0	1.0	2.0	1.0	2.3	4.0	4.0	C - Moderate Risk	4.0	C - Moderate Risk
DP170	4.75	1.0	1.59	1.0	2.0	0.0	4.75	1.0	1.59	1.0	2.0	2.0	1.0	2.0	1.0	2.8	4.0	4.0	C - Moderate Risk	4.0	C - Moderate Risk
DP171	4.74	1.0	1.58	1.0	2.0	0.0	4.74	1.0	1.58	1.0	2.0	2.0	1.0	2.0	1.0	3.1	4.0	4.0	C - Moderate Risk	4.0	C - Moderate Risk
TP11	3.77	1.0	1.08	2.0	2.0	0.0	3.77	1.0	1.08	2.0	2.0	2.0	1.0	4.0	2.0	103.1	2.0	2.0	B - Low Risk	4.0	C - Moderate Risk
TP12	6.54	1.0	1.51	1.0	2.0	0.0	6.54	1.0	1.51	1.0	2.0	2.0	1.0	2.0	1.0	30.1	4.0	4.0	C - Moderate Risk	4.0	C - Moderate Risk

Plate 2: Peat Data & Risk Assessment Results – T2

SI Appendix B - Peat & Subsoil Survey Database
Inchamore WF, Co. Cork

Prepared by: SK 07/02/2023
RSK File Ref.: 603679-00.xls

Sample / Test Category	Sample / Test Point ID No.	Association	ITM Easting	ITM Northing	Thickness / Depth of peat (m)	Classification of Thickness / Depth of peat	Slope (Extracted from GDEM) (Degrees)	Note
Depth Probe	DP058	T3	512706.9	579087.9	0.9	C - Shallow (0.5-2.0m)	8.27293	
Depth Probe	DP060	T3	512811	579022	1	C - Shallow (0.5-2.0m)	12.57654	
Depth Probe	DP064	T3	512837	579015	0.4	B - Very Shallow (0-0.5m)	10.70068	Deeply eroded drain
Depth Probe	DP069	T3	512940.8	579093.8	0.8	C - Shallow (0.5-2.0m)	9.24406	Cut peat photo
Depth Probe	DP071	T3	512967	579236	0.0001	A - Rock (0.0m)	4.87812	Cut peat
Depth Probe	DP072	T3	512963	579208	0.6	C - Shallow (0.5-2.0m)	4.87812	Uncut peat
Depth Probe	DP073	T3	512980	579233	0.0001	A - Rock (0.0m)	6.08375	Cut peat
Depth Probe	DP074	T3	512981	579239	0.6	C - Shallow (0.5-2.0m)	6.08375	Uncut peat
Depth Probe	DP075	T3	512996	579176	0.1	B - Very Shallow (0-0.5m)	8.00368	Cut peat
Depth Probe	DP076	T3	512997	579176	1.5	C - Shallow (0.5-2.0m)	8.00368	Uncut peat
Depth Probe	DP077	T3	513000	579133	0.1	B - Very Shallow (0-0.5m)	7.88543	
Depth Probe	DP078	T3	513000	579134	1.1	C - Shallow (0.5-2.0m)	7.88543	Uncut peat, Interred
Depth Probe	DP079	T3	513001	579084	1.1	C - Shallow (0.5-2.0m)	10.71365	Cut peat on hill
Depth Probe	DP080	T3	513026.8	579106.8	0.4	B - Very Shallow (0-0.5m)	10.73903	Cut peat photo
Depth Probe	DP081	T3	513028	579084	0.2	B - Very Shallow (0-0.5m)	10.73867	Top of steep slope
Depth Probe	DP082	T3	513052.8	579009.8	1	C - Shallow (0.5-2.0m)	11.97277	
Depth Probe	DP083	T3	513054	579101	0.5	B - Very Shallow (0-0.5m)	11.97277	Up out of drain
Depth Probe	DP084	T3	513084	579172	1.3	C - Shallow (0.5-2.0m)	9.33154	
Depth Probe	DP085	T3	513097.8	579093.9	0.1	B - Very Shallow (0-0.5m)	10.52563	
Depth Probe	DP086	T3	513098.8	579053.9	0.8	C - Shallow (0.5-2.0m)	7.92501	
Depth Probe	DP087	T3	513098.8	579053.9	1.8	C - Shallow (0.5-2.0m)	7.92501	
Depth Probe	DP088	T3	513099.9	579131.8	0.8	C - Shallow (0.5-2.0m)	9.93355	
Depth Probe	DP089	T3	513124.8	579024.9	1.1	C - Shallow (0.5-2.0m)	8.46323	
Depth Probe	DP091	T3	513149	579189	0.9	C - Shallow (0.5-2.0m)	7.11033	
Depth Probe	DP092	T3	513159.8	579061.9	1.1	C - Shallow (0.5-2.0m)	6.02525	
Trial Pit	TP07	T3	512950	578987	0.2	B - Very Shallow (0-0.5m)	11.35258	
Trial Pit	TP08	T3	512974	579057	0.2	B - Very Shallow (0-0.5m)	9.37565	
Trial Pit	TP09	T3	512983	579081	0.2	B - Very Shallow (0-0.5m)	7.6724	

FoS (raw) formula: $FoS = \frac{c}{\gamma z \sin\alpha \cos\alpha}$; FoS (adjusted) formula: $FoS = \frac{c}{\gamma z \sin\alpha \cos\alpha} \times \text{Adjustment Value}$

Sample / Test Point ID No.	Scenario A: FoS_{RAW} Factor of Safety (FoS) for Peat Stability	COEFFICIENT	Scenario B: FoS_{RAW} Factor of Safety (FoS) for Peat Stability	COEFFICIENT	FoS Adjustment Coefficient	FoS Adjustment Value	Scenario A: FoS_{ADJ} Adjusted Factor of Safety (FoS) for Peat Stability	COEFFICIENT	Scenario B: FoS_{ADJ} Adjusted Factor of Safety (FoS) for Peat Stability	COEFFICIENT	Significant Feature Ranking Coefficient (μ_{SF})
DP058	2.48	[illegible]	1.19	2.0	2.0	0.0	2.48	[illegible]	1.19	2.0	2.0
DP060	1.50	[illegible]	0.75	4.0	2.0	0.0	1.50	[illegible]	0.75	4.0	2.0
DP064	4.36	[illegible]	1.25	2.0	2.0	0.0	4.36	[illegible]	1.25	2.0	2.0
DP069	2.23	[illegible]	1.06	2.0	2.0	0.0	2.23	[illegible]	1.06	2.0	2.0
DP071	37553.14	[illegible]	3.75	[illegible]	2.0	0.0	37553.14	[illegible]	3.75	[illegible]	2.0
DP072	6.26	[illegible]	2.35	[illegible]	2.0	0.0	6.26	[illegible]	2.35	[illegible]	2.0
DP073	30132.29	[illegible]	3.02	[illegible]	2.0	0.0	30132.29	[illegible]	3.02	[illegible]	2.0
DP074	5.03	[illegible]	1.89	[illegible]	2.0	0.0	5.03	[illegible]	1.89	[illegible]	2.0
DP075	23.08	[illegible]	2.18	[illegible]	2.0	0.0	23.08	[illegible]	2.18	[illegible]	2.0
DP076	1.54	[illegible]	0.92	4.0	2.0	0.0	1.54	[illegible]	0.92	4.0	2.0
DP077	23.47	[illegible]	2.13	[illegible]	2.0	0.0	23.47	[illegible]	2.13	[illegible]	2.0
DP078	2.13	[illegible]	1.12	2.0	2.0	0.0	2.13	[illegible]	1.12	2.0	2.0
DP079	1.58	[illegible]	0.83	4.0	2.0	0.0	1.58	[illegible]	0.83	4.0	2.0
DP080	4.36	[illegible]	1.24	2.0	2.0	0.0	4.36	[illegible]	1.24	2.0	2.0
DP081	8.63	[illegible]	1.45	[illegible]	2.0	0.0	8.63	[illegible]	1.45	[illegible]	2.0
DP082	1.57	[illegible]	0.78	4.0	2.0	0.0	1.57	[illegible]	0.78	4.0	2.0
DP083	3.14	[illegible]	1.05	2.0	2.0	0.0	3.14	[illegible]	1.05	2.0	2.0
DP084	2.65	[illegible]	1.58	[illegible]	2.0	0.0	2.65	[illegible]	1.58	[illegible]	2.0
DP085	17.72	[illegible]	1.61	[illegible]	2.0	0.0	17.72	[illegible]	1.61	[illegible]	2.0
DP086	2.31	[illegible]	1.29	2.0	2.0	0.0	2.31	[illegible]	1.29	2.0	2.0
DP087	1.29	2.0	0.83	4.0	2.0	0.0	1.29	2.0	0.83	4.0	2.0
DP088	2.36	[illegible]	1.05	2.0	2.0	0.0	2.36	[illegible]	1.05	2.0	2.0
DP089	1.96	[illegible]	1.04	2.0	2.0	0.0	1.96	[illegible]	1.04	2.0	2.0
DP091	2.88	[illegible]	1.36	[illegible]	2.0	0.0	2.88	[illegible]	1.36	[illegible]	2.0
DP092	2.77	[illegible]	1.45	[illegible]	2.0	0.0	2.77	[illegible]	1.45	[illegible]	2.0
TP07	8.24	[illegible]	1.37	[illegible]	2.0	0.0	8.24	[illegible]	1.37	[illegible]	2.0
TP08	8.90	[illegible]	1.65	[illegible]	2.0	0.0	8.90	[illegible]	1.65	[illegible]	2.0
TP09	12.02	[illegible]	2.00	[illegible]	2.0	0.0	12.02	[illegible]	2.00	[illegible]	2.0

Sample / Test Point ID No.	Scenario A: RR_{SF} Ranking Risk re Potential for Adverse Consequences on Sensitive Receptors	COEFFICIENT	Scenario B: RR_{SF} Ranking Risk re Potential for Adverse Consequences on Sensitive Receptors	COEFFICIENT	Distance to Sensitive Receptor (m)	Distance to Sensitive Receptor Coefficient	Scenario A: RR_D Risk Ranking Accounting for Distance to Sensitive Receptors	Scenario A: Risk Category	Scenario B: RR_D Risk Ranking Accounting for Distance to Sensitive Receptors	Scenario B: Risk Category
DP058	[illegible]	1.0	4.0	2.0	225.7	1.0	[illegible]	A - Very Low Risk	2.0	B - Low Risk
DP060	[illegible]	1.0	8.0	4.0	157.0	1.0	[illegible]	A - Very Low Risk	4.0	C - Moderate Risk
DP064	[illegible]	1.0	4.0	2.0	149.3	2.0	2.0	B - Low Risk	4.0	C - Moderate Risk
DP069	[illegible]	1.0	4.0	2.0	294.3	1.0	[illegible]	A - Very Low Risk	2.0	B - Low Risk
DP071	[illegible]	1.0	[illegible]	1.0	442.5	1.0	[illegible]	A - Very Low Risk	[illegible]	A - Very Low Risk
DP072	[illegible]	1.0	[illegible]	1.0	442.0	1.0	[illegible]	A - Very Low Risk	[illegible]	A - Very Low Risk
DP073	[illegible]	1.0	[illegible]	1.0	401.9	1.0	[illegible]	A - Very Low Risk	[illegible]	A - Very Low Risk
DP074	[illegible]	1.0	[illegible]	1.0	433.2	1.0	[illegible]	A - Very Low Risk	[illegible]	A - Very Low Risk
DP075	[illegible]	1.0	[illegible]	1.0	352.6	1.0	[illegible]	A - Very Low Risk	[illegible]	A - Very Low Risk
DP076	[illegible]	1.0	8.0	4.0	353.9	1.0	[illegible]	A - Very Low Risk	4.0	C - Moderate Risk
DP077	[illegible]	1.0	[illegible]	1.0	337.6	1.0	[illegible]	A - Very Low Risk	[illegible]	A - Very Low Risk
DP078	[illegible]	1.0	4.0	2.0	318.7	1.0	[illegible]	A - Very Low Risk	2.0	B - Low Risk
DP079	[illegible]	1.0	8.0	4.0	278.3	1.0	[illegible]	A - Very Low Risk	4.0	C - Moderate Risk
DP080	[illegible]	1.0	4.0	2.0	333.3	1.0	[illegible]	A - Very Low Risk	2.0	B - Low Risk
DP081	[illegible]	1.0	[illegible]	1.0	276.8	1.0	[illegible]	A - Very Low Risk	[illegible]	A - Very Low Risk
DP082	[illegible]	1.0	8.0	4.0	310.5	1.0	[illegible]	A - Very Low Risk	4.0	C - Moderate Risk
DP083	[illegible]	1.0	4.0	2.0	321.3	1.0	[illegible]	A - Very Low Risk	2.0	B - Low Risk
DP084	[illegible]	1.0	[illegible]	1.0	383.1	1.0	[illegible]	A - Very Low Risk	[illegible]	A - Very Low Risk
DP085	[illegible]	1.0	[illegible]	1.0	361.9	1.0	[illegible]	A - Very Low Risk	[illegible]	A - Very Low Risk
DP086	[illegible]	1.0	4.0	2.0	317.2	1.0	[illegible]	A - Very Low Risk	2.0	B - Low Risk
DP087	4.0	2.0	8.0	4.0	117.2	1.0	2.0	B - Low Risk	4.0	C - Moderate Risk
DP088	[illegible]	1.0	4.0	2.0	363.1	1.0	[illegible]	A - Very Low Risk	2.0	B - Low Risk
DP089	[illegible]	1.0	4.0	2.0	313.4	1.0	[illegible]	A - Very Low Risk	2.0	B - Low Risk
DP091	[illegible]	1.0	[illegible]	1.0	323.2	1.0	[illegible]	A - Very Low Risk	[illegible]	A - Very Low Risk
DP092	[illegible]	1.0	[illegible]	1.0	303.1	1.0	[illegible]	A - Very Low Risk	[illegible]	A - Very Low Risk
TP07	[illegible]	1.0	[illegible]	1.0	163.3	1.0	[illegible]	A - Very Low Risk	[illegible]	A - Very Low Risk
TP08	[illegible]	1.0	[illegible]	1.0	240.4	1.0	[illegible]	A - Very Low Risk	[illegible]	A - Very Low Risk
TP09	[illegible]	1.0	[illegible]	1.0	268.0	1.0	[illegible]	A - Very Low Risk	[illegible]	A - Very Low Risk

Plate 3: Peat Data & Risk Assessment Results – T3

SI Appendix B - Peat & Subsoil Survey Database
Inchamore WF, Co. Cork

Prepared by: SK 07/02/2023
RSK File Ref.: 603679-00.sls

Sample / Test Category	Sample / Test Point ID No.	Association	ITM Easting	ITM Northing	Thickness / Depth of peat	Classification of Thickness / Depth of peat	Slope (Extracted from GDEM)	Note	Scenario A FoS_{RAW} Factor of Safety (FoS) for Peat Stability	COEFFICIENT	Scenario B FoS_{RAW} Factor of Safety (FoS) for Peat Stability	COEFFICIENT	FoS Adjustment Coefficient	FoS Adjustment Value	Scenario A FoS_{ADJ} Adjusted Factor of Safety (FoS) for Peat Stability	COEFFICIENT	Scenario B FoS_{ADJ} Adjusted Factor of Safety (FoS) for Peat Stability	COEFFICIENT	Significant Feature Ranking Coefficient	Scenario A RR_{SF} Ranking Risk re Potential for Adverse Consequences on Sensitive Receptors	COEFFICIENT	Scenario B RR_{SF} Ranking Risk re Potential for Adverse Consequences on Sensitive Receptors	COEFFICIENT	Distance to Sensitive Receptor	Distance to Sensitive Receptor Coefficient	Scenario A RR_D Risk Ranking Accounting for Distance to Sensitive Receptors	Risk Category	Scenario B RR_D Risk Ranking Accounting for Distance to Sensitive Receptors	Risk Category
					m		Degrees		FoS	#	FoS	#	#	#	FoS	#	FoS	#	#	RR_{SF}	#	RR_{SF}	#	m	#	RR_D		RR_D	
Depth Probe	DP1N	T4	536559.7	579092.9	0.2	A - Very Shallow (0-0.5m)	11.0727		6.37	1.0	1.39	1.0	2.0	0.0	6.37	1.0	1.39	1.0	2.0	4.0	1.0	2.0	1.0	1916	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Depth Probe	DP1S	T4	536678.7	578922.9	1	C - Shallow (0.5-2.0m)	11.47724		1.63	1.0	0.82	4.0	2.0	0.0	1.63	1.0	0.82	4.0	2.0	8.0	1.0	4.0	2.0	2168	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Depth Probe	DP1E	T4	536780.7	578993.9	0.1	A - Very Shallow (0-0.5m)	5.62442		2.777	1.0	2.82	1.0	2.0	0.0	2.777	1.0	2.82	1.0	2.0	4.0	1.0	4.0	2.0	2048	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Depth Probe	DP1W	T4	536682.7	578920.9	1	C - Shallow (0.5-2.0m)	11.47724		1.63	1.0	0.82	4.0	2.0	0.0	1.63	1.0	0.82	4.0	2.0	8.0	1.0	4.0	2.0	2152	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Depth Probe	DP1N	T4	536697	579762	0.8	C - Shallow (0.5-2.0m)	9.36656	INFERRED, TRACKSIDE	2.48	1.0	1.91	2.0	2.0	0.0	2.48	1.0	1.91	2.0	2.0	8.0	1.0	4.0	2.0	2222	1.0	1.0	A - Very Low Risk	2.0	B - Low Risk
Depth Probe	DP1S	T4	536699.7	579679.9	0.6	B - Very Shallow (0.5-0.7m)	9.79765		3.79	1.0	1.26	2.0	2.0	0.0	3.79	1.0	1.26	2.0	2.0	8.0	1.0	4.0	2.0	2230	1.0	1.0	A - Very Low Risk	2.0	B - Low Risk
Depth Probe	DP1W	T4	536714.7	579869.9	0.1	A - Very Shallow (0-0.5m)	7.80224		23.66	1.0	2.15	1.0	2.0	0.0	23.66	1.0	2.15	1.0	2.0	8.0	1.0	4.0	2.0	2447	1.0	1.0	A - Very Low Risk	2.0	B - Low Risk
Depth Probe	DP1N	T4	536717	579956	0.3	A - Very Shallow (0-0.5m)	11.77141		8.31	1.0	1.23	2.0	2.0	0.0	8.31	1.0	1.23	2.0	2.0	8.0	1.0	4.0	2.0	2546	1.0	1.0	A - Very Low Risk	2.0	B - Low Risk
Depth Probe	DP1S	T4	536736.6	579878.9	0.1	A - Very Shallow (0-0.5m)	7.80224		23.66	1.0	2.15	1.0	2.0	0.0	23.66	1.0	2.15	1.0	2.0	8.0	1.0	4.0	2.0	2435	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Depth Probe	DP1E	T4	536728	579044	0.05	A - Very Shallow (0-0.5m)	11.87142		31.61	1.0	1.81	1.0	2.0	0.0	31.61	1.0	1.81	1.0	2.0	4.0	1.0	2.0	1.0	2634	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Depth Probe	DP1N	T4	536744	579023	0.2	A - Very Shallow (0-0.5m)	12.26207		7.87	1.0	1.28	2.0	2.0	0.0	7.87	1.0	1.28	2.0	2.0	8.0	1.0	4.0	2.0	2768	1.0	1.0	A - Very Low Risk	2.0	B - Low Risk
Depth Probe	DP1S	T4	536746	579039	0.2	A - Very Shallow (0-0.5m)	12.26207		15.23	1.0	1.38	1.0	2.0	0.0	15.23	1.0	1.38	1.0	2.0	4.0	1.0	2.0	1.0	2803	1.0	1.0	A - Very Low Risk	2.0	B - Low Risk
Depth Probe	DP1W	T4	536755.6	579036.9	0.1	A - Very Shallow (0-0.5m)	12.24511		11.33	1.0	1.69	1.0	2.0	0.0	11.33	1.0	1.69	1.0	2.0	4.0	1.0	2.0	1.0	2897	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Depth Probe	DP1S	T4	536768	579030	0.2	A - Very Shallow (0-0.5m)	9.15535		22.66	1.0	2.06	1.0	2.0	0.0	22.66	1.0	2.06	1.0	2.0	4.0	1.0	2.0	1.0	3012	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Depth Probe	DP1N	T4	536774	579048	0.1	A - Very Shallow (0-0.5m)	9.15535	Flock	18.02	1.0	3.00	1.0	2.0	0.0	18.02	1.0	3.00	1.0	2.0	4.0	1.0	2.0	1.0	3093	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Depth Probe	DP1S	T4	536781	579066	0.2	A - Very Shallow (0-0.5m)	9.08511		4.90	1.0	1.60	1.0	2.0	0.0	4.90	1.0	1.60	1.0	2.0	4.0	1.0	2.0	1.0	3177	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Depth Probe	DP1W	T4	536798	579065	0.5	A - Very Shallow (0-0.5m)	7.89429	Drain 0.8/sec	6.81	1.0	1.42	1.0	2.0	0.0	6.81	1.0	1.42	1.0	2.0	4.0	1.0	2.0	1.0	3278	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Depth Probe	DP1E	T4	536814	579071	0.3	A - Very Shallow (0-0.5m)	8.8285		53.06	1.0	2.63	1.0	2.0	0.0	53.06	1.0	2.63	1.0	2.0	4.0	1.0	2.0	1.0	3440	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Depth Probe	DP1S	T4	536828	578957	0.05	A - Very Shallow (0-0.5m)	9.93989		6.16	1.0	1.42	1.0	2.0	0.0	6.16	1.0	1.42	1.0	2.0	4.0	1.0	2.0	1.0	3538	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Depth Probe	DP1N	T4	536844	578940	0.3	A - Very Shallow (0-0.5m)	10.05862		3.84	1.0	1.10	2.0	2.0	0.0	3.84	1.0	1.10	2.0	2.0	8.0	1.0	4.0	2.0	3576	1.0	1.0	A - Very Low Risk	2.0	B - Low Risk
Trial Pit	TP04	T4	536760	579306	0.4	A - Very Shallow (0-0.5m)	12.16074		12.09	1.0	2.79	1.0	2.0	0.0	12.09	1.0	2.79	1.0	2.0	4.0	1.0	2.0	1.0	2361	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk
Trial Pit	TP05	T4	536761	579323	0.3	A - Very Shallow (0-0.5m)	8.05259																	3011	1.0	1.0	A - Very Low Risk	1.0	A - Very Low Risk

Plate 4: Peat Data & Risk Assessment Results – T4

SI Appendix B - Peat & Subsoil Survey Database
Inchamore WF, Co. Cork

Prepared by: SK 07/02/2023
RSK File Ref.: 603679-00.xls

Sample / Test Category	Sample / Test Point ID No.	Association	ITM Easting	ITM Northing	Thickness / Depth of peat (m)	Classification of Thickness / Depth of peat	Slope (Extracted from GDEM) (Degrees)	Note
Depth Probe	DP135	T5	513982.6	578542	0.6	C - Shallow (0.5-2.0m)	9.03814	
Depth Probe	DP136	T5	514008.6	578535	0.5	[illegible] Very Shallow [illegible]	7.20536	
Depth Probe	DP137	T5	514016.6	578595	0.3	[illegible]	7.1321	
Depth Probe	DP139	T5	514094.6	578581	0.1	[illegible]	9.42544	
Depth Probe	DP142	T5	514182.9	578674.8	1.2	C - Shallow (0.5-2.0m)	6.54985	
Trial Pit	TP01	T5	514105	578653	0.3	[illegible] Very Shallow [illegible]	6.5297	
Trial Pit	TP02	T5	513978	578679	1	C - Shallow (0.5-2.0m)	8.22902	
Trial Pit	TP03	T5	513964	578729	0.8	C - Shallow (0.5-2.0m)	5.65128	

Sample / Test Point ID No.	Scenario A: FoS_{RAW} Factor of Safety (FoS) for Peat Stability (FoS)	COEFFICIENT	Scenario B: FoS_{RAW} Factor of Safety (FoS) for Peat Stability (FoS)	COEFFICIENT	FoS Adjustment Coefficient	FoS Adjustment Value	Scenario A: FoS_{ADJ} Adjusted Factor of Safety (FoS) for Peat Stability (FoS)	COEFFICIENT	Scenario B: FoS_{ADJ} Adjusted Factor of Safety (FoS) for Peat Stability (FoS)	COEFFICIENT	Significant Feature Ranking Coefficient (R_{SF})
DP135	3.42	1.5	1.28	2.0	2.0	0.0	3.42	[illegible]	1.28	2.0	2.0
DP136	5.11	[illegible]	1.70	[illegible]	2.0	0.0	5.11	[illegible]	1.70	[illegible]	2.0
DP137	8.61	[illegible]	1.99	[illegible]	2.0	0.0	8.61	[illegible]	1.99	[illegible]	2.0
DP139	21.95	[illegible]	2.00	[illegible]	2.0	0.0	21.95	[illegible]	2.00	[illegible]	2.0
DP142	2.75	[illegible]	1.50	[illegible]	2.0	0.0	2.75	[illegible]	1.50	[illegible]	2.0
TP01	9.39	[illegible]	2.17	[illegible]	2.0	0.0	9.39	[illegible]	2.17	[illegible]	2.0
TP02	2.95	[illegible]	1.47	[illegible]	2.0	0.0	2.95	[illegible]	1.47	[illegible]	2.0
TP03	4.06	[illegible]	1.80	[illegible]	2.0	0.0	4.06	[illegible]	1.80	[illegible]	2.0

$FoS = \frac{c_u}{\gamma z \sin\alpha \cos\alpha}$; $FoS = \frac{c_u}{\gamma z \sin\alpha \cos\alpha} + \text{Adjustment Value}$

Sample / Test Point ID No.	Scenario A: RR_{SF} Ranking Risk re Potential for Adverse Consequences on Sensitive Receptors	COEFFICIENT	Scenario B: RR_{SF} Ranking Risk re Potential for Adverse Consequences on Sensitive Receptors	COEFFICIENT	Distance to Sensitive Receptor (m)	Distance to Sensitive Receptor Coefficient	Scenario A: RR_D Risk Ranking Accounting for Distance to Sensitive Receptors	Scenario A: Risk Category	Scenario B: RR_D Risk Ranking Accounting for Distance to Sensitive Receptors	Scenario B: Risk Category
DP135	[illegible]	1.0	4.0	2.0	490.7	1.0	[illegible]	A - Very Low Risk	2.0	B - Low Risk
DP136	[illegible]	1.0	[illegible]	1.0	512.2	1.0	[illegible]	A - Very Low Risk	[illegible]	A - Very Low Risk
DP137	[illegible]	1.0	[illegible]	1.0	527.1	1.0	[illegible]	A - Very Low Risk	[illegible]	A - Very Low Risk
DP139	[illegible]	1.0	[illegible]	1.0	601.2	1.0	[illegible]	A - Very Low Risk	[illegible]	A - Very Low Risk
DP142	[illegible]	1.0	[illegible]	1.0	665.0	1.0	[illegible]	A - Very Low Risk	[illegible]	A - Very Low Risk
TP01	[illegible]	1.0	[illegible]	1.0	607.3	1.0	[illegible]	A - Very Low Risk	[illegible]	A - Very Low Risk
TP02	[illegible]	1.0	[illegible]	1.0	493.1	1.0	[illegible]	A - Very Low Risk	[illegible]	A - Very Low Risk
TP03	[illegible]	1.0	[illegible]	1.0	469.3	1.0	[illegible]	A - Very Low Risk	[illegible]	A - Very Low Risk

Plate 5: Peat Data & Risk Assessment Results – T5

Plate 6: Peat Data - FoS (ADJ) (B) with Slope (GDEM) presents peat stability risk assessment Factor of Safety (FoS (ADJ) (Scenario B)) results, receptors and associated 50m buffer zones, and slope (GDEM).

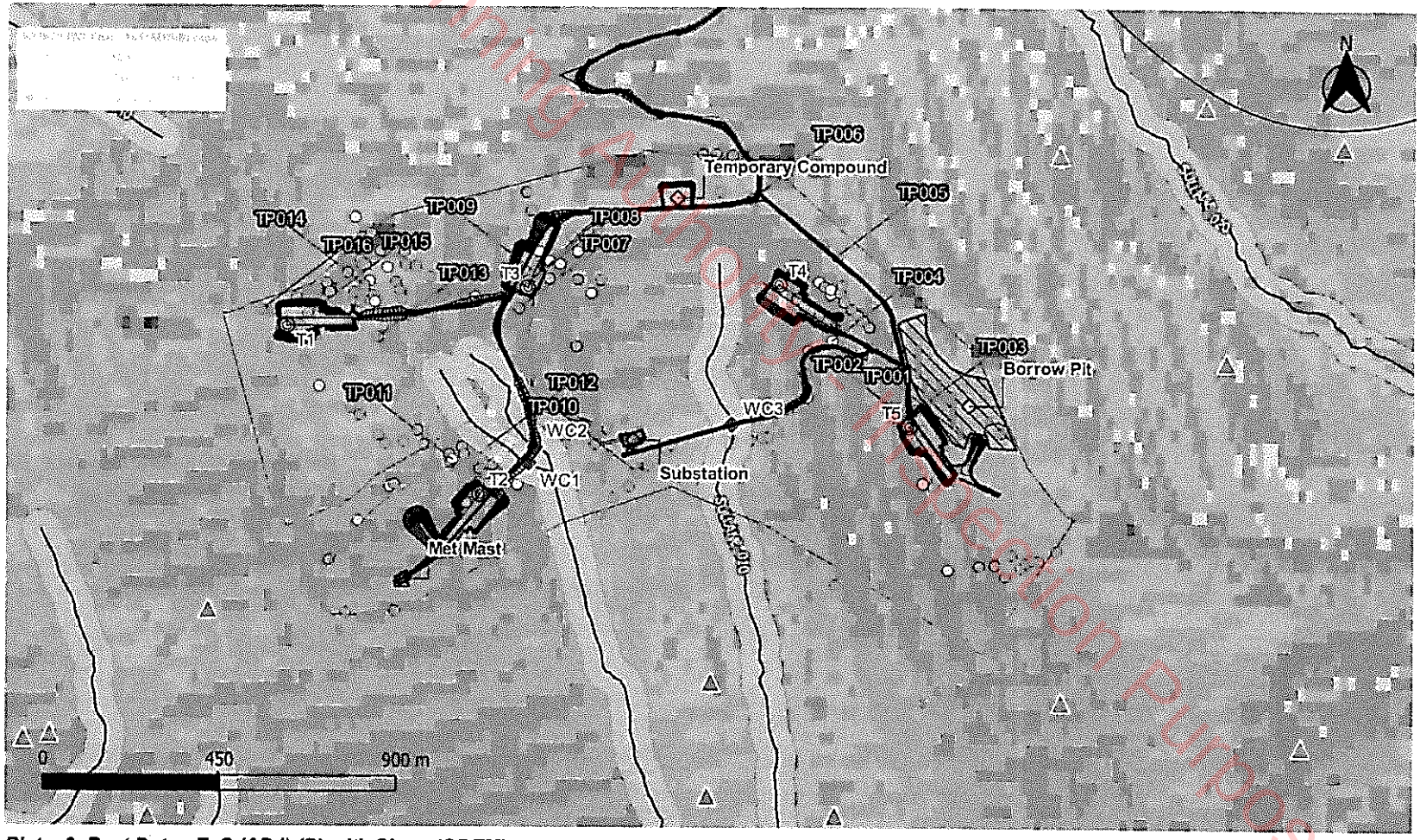

Plate 6: Peat Data - FoS (ADJ) (B) with Slope (GDEM)

4.5 Peat Stability Risk Assessment Interpretation

Table 13: Peat Stability Risk Assessment – Factor of Safety (Adjusted) (Scenario B) at Main Infrastructure Units presents the interpretation of stability risk assessment data in the context of stability, or factor of safety (FoS) (Adjusted, Scenario B) at each significant development infrastructure unit.

Table 13: Peat Stability Risk Assessment – Factor of Safety (Adjusted) (Scenario B) at Main Infrastructure Units

Turbine No. / Unit	FoS_{ADJ} (Factor of Safety adjusted according considering site specific conditions)	Geo-Hazard / Comment (Important to consider when carrying out detailed design and preconstruction planning)
T1	Generally acceptable. Data indicates peat stability is primarily acceptable, with the exception of * pockets of moderately deeper peat (marginally acceptable / unstable at localised scale north of proposed turbine locality).	Localised steep inclines and potential for pockets of deep peat. Residual risk = localised stability issues. Relatively extensive area of deep peat to north / northwest of development footprint at T1. Development footprint avoids this area however vehicular movements must be managed, and this area avoided completely.
T2	Generally acceptable with localised areas of marginally stable FoS, localised areas of unstable peat. Data indicates that peat depth in the area is generally shallow with relatively extensive rock outcrops. Steep inclines in the area are a key driver of unfavourable results.	Localised steep inclines and potential for pockets of deep peat. Residual risk = localised stability issues. Proximity to receptor (river).
T3	Data indicates peat stability is primarily acceptable, marginally acceptable. Some locations on approach (access tracks) possess locally unstable data due to relatively higher localized slope angles, and/or deeper peat however peat depths are shallow.	Localised steep inclines and potential for pockets of deep peat. Residual risk = localised stability issues.
T4	Generally acceptable. Data indicates peat stability is primarily acceptable, with isolated pockets Marginally acceptable.	Localised steep inclines and potential for pockets of deep peat. Residual risk = localised stability issues.
T5	Generally acceptable. Data indicates peat stability is primarily acceptable, with isolated pockets Marginally acceptable.	Localised steep inclines and potential for pockets of deep peat. Residual risk = localised stability issues.

Turbine No. / Unit	FoS_{ADJ} (Factor of Safety adjusted according considering site specific conditions)	Geo-Hazard / Comment (Important to consider when carrying out detailed design and preconstruction planning)
Met Mast	Generally acceptable. Data indicates peat stability is primarily acceptable, with isolated pockets Marginally acceptable.	Localised steep inclines and potential for pockets of deep peat. Residual risk = localised stability issues.
Borrow Pit	Generally acceptable. Data indicates peat stability is primarily acceptable, with isolated pockets Marginally acceptable.	Localised steep inclines and potential for pockets of deep peat. Residual risk = localised stability issues.
Substation	Data indicates peat stability is acceptable. Very Low Risk in terms of Receptors	Potential for localised stability issues.

The following table presents the interpretation of stability risk assessment data in the context of stability, or factor of safety (FoS) in context of receptor type (RR (SF)) and distance to receptor (RR(D)) at each significant development infrastructure unit.

Table 14: Peat Stability Risk Assessment – Factor of Safety (Adjusted) (Scenario B) at Main Infrastructure Units

Turbine No. / Unit	RR(D) (Ranked Risk considering Distance to Sensitive Receptors)	Geo-Hazard / Comment (Important to consider when carrying out detailed design and preconstruction planning)
T1	Very Low to Low Risk	Localised stability and drainage network.
T2	Low to High Risk	Localised stability and proximity to sensitive receptor (river). Minor, localised stability issues have the potential to have significant adverse impacts on receptors.
T3	Very Low to Moderate Risk	Localised stability and drainage network.
T4	Very Low to Moderate Risk	Localised stability and drainage network. Limited data between downstream receptors. Potential for deep pockets of peat but peat depth generally shallow. Max (GDEM) incline = approx. 8 degrees, moderate incline.
T5	Very Low to Low Risk	Localised stability and drainage network.
Met Mast	Very Low to Moderate Risk	Localised stability and drainage network.

Turbine No. / Unit	RR(D) (Ranked Risk considering Distance to Sensitive Receptors)	Geo-Hazard / Comment (Important to consider when carrying out detailed design and preconstruction planning)
Borrow Pit	Very Low to Moderate Risk	Localised stability and drainage network.
Substation	Very Low to Low Risk	Localised stability and drainage network.

4.6 Subsoil Stability Risk Assessment Results

Review of subsoil stability assessment result data and maps as presented in **Appendix I** indicate that the factor of safety is generally acceptable and very low to low stability risk across the site (areas assessed / trial pit locations*) with the exception of minor isolated areas of steeper inclines and deeper till deposits (inferred*).

Summary of risk at the site under varying conditions and scenarios is presented in the following tables.

Table 15: Factor of Safety (Adjusted) at Trial Pit Locations

	Acceptable	Marginally Stable	Unstable
FoS (Adj.) Scenario A	16	0	0
FoS (Adj.) Scenario B	14	2	0

Table 16: Risk Ranking (Distance) at Trial Pit Locations

	Very Low	Low	Moderate	High
RR (Dist.) Scenario A	14	1	1	0
RR (Dist.) Scenario B	13	1	2	0

Based on the inferred conservative values applied to the above stability risk assessment, the factor of safety is highly dependent on cohesive strength, which in turn is highly dependent on hydrogeological characteristics including pore water pressure. **Figure 2** presents potential varying Factors of Safety for subsoils at the Site depending on varying cohesive strength and depths to failure plane.

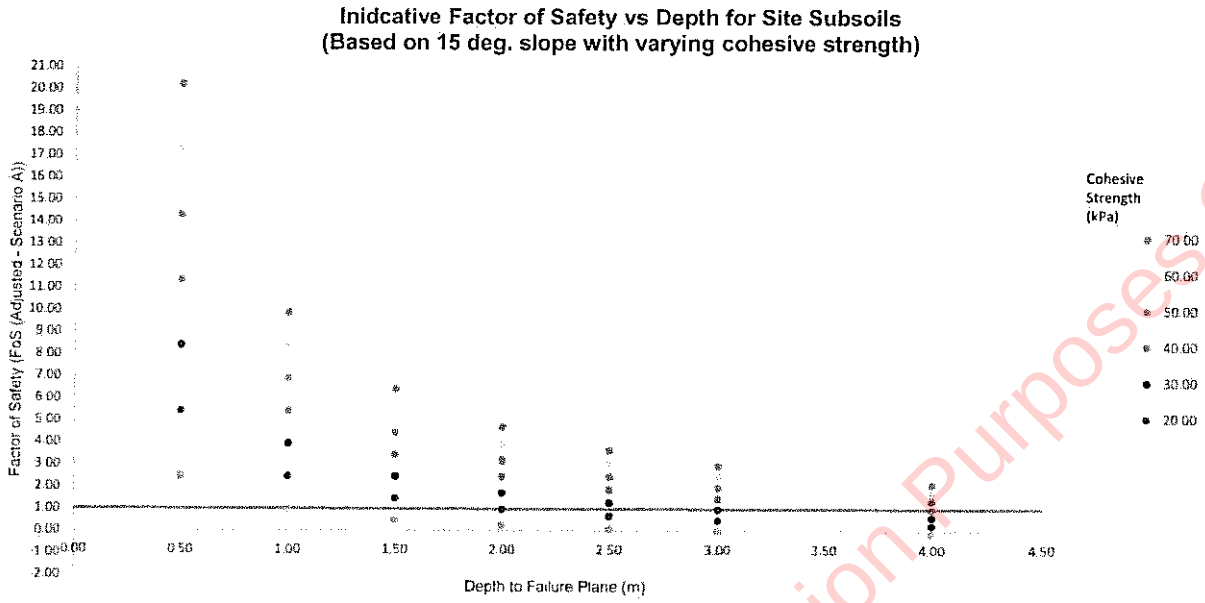

Figure 2: Correlation Between Factor of Safety, Cohesive Strength and Depth of Subsoils

Observations made during site walkovers include deep deposits of till in the northwestern area of the site immediately north of T1. Iron pan was also observed in trial pits in those areas. The area is also extensively modified in terms of constructed drainage for agricultural and forestry purposes.

Areas with potentially deep till deposits, steep incline (c. >15 degrees), potential for iron pan, and enhanced opportunity for recharge to groundwater are considered to have elevated Moderate to High risk in terms of subsoil soil stability.

Areas of elevated stability risk, even at a localised scale, are considered geo-hazards requiring mitigation. Geo-hazards are presented in **Appendix H**.

4.7 Subsoil Stability Risk Assessment Interpretation

The following table presents the interpretation of stability risk assessment data in the context of stability, or factor of safety (FoS) (Adjusted, Scenario B) at each significant development infrastructure unit.

Table 17: Subsoil Stability Risk Assessment – Risk Ranking (Distance) (Scenario B) at Main Infrastructure Units

Turbine No. / Unit	RR_D (Ranked Risk considering Distance to Sensitive Receptors)	Geo-Hazard / Comment
T1	Low	Localised stability and drainage network.
T2	Low to Moderate	Localised stability and proximity to sensitive receptor (river). Minor, localised stability issues have the potential to have significant adverse impacts on receptors.
T3	Low	Localised stability and drainage network.
T4	Low	Localised stability and drainage network.
T5	Low	Localised stability and drainage network.

Turbine No. / Unit	RR_D (Ranked Risk considering Distance to Sensitive Receptors)	Geo-Hazard / Comment
Met Mast	Low	Localised stability and drainage network.
Borrow Pit	Low	Localised stability and drainage network.
Substation	Low	Localised stability and drainage network.

5. Conclusions

Peat Stability

Peat depth across the site is generally very shallow to shallow with the exception of isolated pockets of moderately deep peat delineated by shallow subsoils and/or bedrock at or near the surface, particularly in the NW of the site. There was no very deep peat observed at the site. There is a relatively extensive area of deep peat north of the proposed location for T1 and the associated access track. The footprint of the Project avoids this area.

The Factor of Safety (Adjusted) (Scenario B i.e., 1m surcharge) at peat probe locations is generally Acceptable throughout the Site with occasional Marginal locations and some Unacceptable localities associated with relatively steeper slopes coupled with relative peat depths.

Marginally Stable Locations, presented in yellow in **Plate 7** above, are concentrated around Site Access tracks and do not overlap with any hardstand areas with the exception of proposed location of T3. Unstable/Unacceptable locations, denoted in red in **Plate 7**, are seen adjacent to the Site Access Tacks to the proposed substation location and T1 as well as the proposed hardstand location of T3.

The Risk Ranking (Distance) Scenario B i.e., 1m surcharge) at peat probe locations is generally Very Low to Low with the exception of Moderate to High-risk point locations, outlined in **Plates 1 - 5** above, mainly associated with close proximity to sensitive receptors (e.g., mapped EPA rivers and artificial draining with direct linkage to rivers). The location of these 'Moderate Risk' to 'High Risk' vary throughout the Site. All proposed turbine hardstand areas are located outside of these elevated risk areas, with the exception of three No. points at T3, Site drainage maps highlight the connection of forestry drains to the Sullane_010.

In summary, through the process of mitigation by design, the Development avoids areas where significant peat or slope stability risk is highest. There remains a residual risk of displacement at a localised scale, which is inherent with all construction / excavation activities particularly when dealing with peat. This is of particular importance to consider when working in close proximity to sensitive receptors, for example; working near, over in surface water features, or when designing drainage networks and the positioning of outfalls.

Subsoil Stability

Subsoils underlying the site are characterized generally as clayey sandy GRAVEL or TILL.

The Factor of Safety (Adjusted) (Scenario B i.e., 1m surcharge) at trial pit locations is generally Acceptable with no exception of marginally stable / unstable point locations.

The Risk Ranking (Distance) Scenario B i.e., 1m surcharge) at trial pit locations is generally Very Low to Low with no exceptions of Moderate or High-risk point locations.

Rock Strength

Bedrock is slightly unweathered.

Bedrock strength at the Site is reported as Weak.

Reuse There is a risk that if used for track surfacing, the trafficked material will gradually degrade, potentially leading to chronic siltation of drainage features or dust depending on meteorological conditions. Therefore, bedrock material arising at the Site will be reused as fill material, Site Access Roads and Turbine Hardstands will be surfaced with a harder rock imported to the Site.

Geo-Hazards

A register of Geo-Hazards is mapped and presented in **Appendix H**.

6. Caveats & Recommendations

The risk of landslides occurring on the proposed site under worst case scenario conditions (Conservative values and Scenario B (+1m)) has been determined to be generally **very low to low** however, the following points should be noted;

- The low risk classification is largely driven by shallow peat depths at sampling points associated with proposed infrastructure locations, and by the undulating nature of the substrate topology, however the potential for deeper areas of peat associated with the Project footprint suggests that soil stability at a highly localized scale may give rise to some difficulty e.g. collapse of side walls in excavations, and subsidence over time under newly installed floating hardstands (on peat), etc. Such potential issues give rise to the need for vigilance during and after the construction phase of the Project and it is recommended that all works are supervised and monitored by a competent person (Geotechnical Engineer) through out the construction phase, and that the site is monitored at a reasonable frequency during the operational phase of the proposed development. The frequency of monitoring during the operational phase will be conducted at a high frequency (e.g. weekly) during the initial months, and will reduce (e.g. monthly) gradually over the following year minimum, or until site conditions are observed to be stable.

- The main infrastructure components such as the turbine hardstand areas avoid very sensitive areas of the site. However, a portion of the proposed access track associated with the proposed watercourse crossings are within 50m of a sensitive receptor (Sullane_010). Peat depths at these locations are shallow however some moderately steep (>8 degrees) to steep (>14 degrees) inclines result in some localised unstable peat data (0.5m peat depth inferred). Unstable peat data in the context of proximity to the dowstream receptor (RR(D)) results in a High Risk classification.

- Through EIA, constraint identification and design process, the Project footprint avoids areas of significant unacceptable risk, however this will include all aspects of the Project including; vehicle movements, personell movements, temporary storage, etc. In other words, the Project(including construction activities) will be limited to the Project footprint, and will avoid areas of elevated risk. . Managament of excavation arisings or any bulk material or equipment will consider proximity to these areas or geo-constraints, and developer's or sub-contractors method statement and risk assessments will incorporate this into operational and health and safety mitigation measures.

7. References

Scottish Government (2017) Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Developments

N. Boylan, P. Jennings & M. Long (2008) Peat slope failure in Ireland. Quarterly Journal of Engineering Geology and Hydrogeology. Available at https://www.researchgate.net/publication/245379146_Peat_slope_failure_in_Ireland Accessed: 20/08/19.

R. Munro (2004) Dealing with bearing capacity problems on low volume roads constructed on peat. Roadex, Northern Periphery.

GSI Map Viewer. Available at: http://dcenr.maps.arcgis.com/apps/MapSeries/index.html?appid=a30af518e87a4c0ab2fbde2aaac3c228 Accessed: 20/08/19.

EPA Map Viewer. Available at: https://gis.epa.ie/EPAMaps/ Accessed: 20/08/19.

EANI River Basin Viewer. Available at https://appsd.daera-ni.gov.uk/RiverBasinViewer/. Accessed; 20/08/19.

D. L. Fitzgerald (2007) Estimation of point rainfall frequencies. Irish Meteorological Service Technical Note 61

R. A. Lindsay (2005) Wind Farms and Blanket Peat - The Bog Slide of 16th October 2003 at Derrybrien, Co. Galway, Ireland. University of East London and The Derrybrien Development Cooperative Ltd.

Farrell, E.R., Long, M., Gavin, K. Henry, T.; (2006) 'Chapter 4: Geotechnics of Landslides' In: Creighton, R (eds). Landslides in Ireland. Dublin: Geological Survey of Ireland., pp.23-31

Met Eireann (MET) (2018) 2018, A summer of Heat Waves and Droughts

Met Eireann (MET) (2018) Available Data. Available: https://www.met.ie Accessed: 06/08/19

Boylan, N. and Long, M. (2012) Evaluation of peat strength for stability assessments. Geotechnical Engineering Volume 167 Issue GE5, Institution of Civil Engineers (ICE)

Agus F., Hairiah K., Mulyani A. (2011) *Practical Guidelines – Measuring Carbon Stock in Peat Soils*. Bogor, Indonesia: World Agroforestry Centre (ICRAF) Southeast Asia Regional Program, Indonesian Centre for Agricultural Land Resources Research and Development.

Kiley G., Leahy P., McVeigh P., Lewis C., Sottocornola M., Laine A. and Koehler A. (2012) PeatGHG – Survey of GHG Emission and Sink - Potential of Blanket Peatlands. EPA Report No. 228, Environmental Protection Agency (EPA), Ireland.

Renou-Wilson F. and Wilson D. (2014) *Vulnerability Assessment of Peatlands: Exploration of Impacts and Adaptation Options in Relation to Climate Change and Extreme Events (VAPOR)*. EPA Report No. 250, Environmental Protection Agency (EPA), Ireland.

Wilson, S; Bray, R; Cooper, P (CIRIA, 2004) Sustainable Drainage Systems – Hydraulic, structural and water quality advice. CIRIA C609, London, UK.

Geotech Data (ND) Cohesion [Online] Available at: http://www.geotechdata.info/parameter/cohesion Accessed: July 2021

British Standard (BSI) (2010) Code of Practice for Site Investigations (BS 5390:1999 + A2:2010, ISBN 978 0 580 64609 6)

Appendix A