RPS

HRA | PLANNING
chartered town planning consultants

Shannon Foynes
PORT COMPANY

Capacity Extension at Shannon Foynes

Environmental Impact Assessment Report

Volume 2 Appendices

APPENDICES

Appendix 1

Introduction

There is no appendix for Introduction

Appendix 2

Project Description

Appendix 2.1

Drawings

These drawings are presented in Volume 3 of the EIAR due to their A3 size.

Appendix 2.2

Foul Treatment System Design Document

CAPACITY EXTENSION AT SHANNON FOYNES

DOCUMENT CONTROL SHEET

Client	**Shannon Foynes Port Company**					
Project Title	**Capacity Extension at Shannon Foynes**					
Document Title	**Wastewater Treatment Design Summary**					
Document No.	**IBM0679-WwTS-01**					
This Document Comprises	DCS	TOC	Text	List of Tables	List of Figures	No. of Appendices
	1	1	4	-	1	2

Rev.	Status	Author(s)	Reviewed By	Approved By	Office of Origin	Issue Date
-	Planning	E.H.	S.H.	S.H.	Belfast	April 2018

Confidentiality statement:

The information disclosed in this proposal should be treated as being strictly private and confidential and you are requested to take all reasonable precautions to maintain its status as such. You are requested to use and apply the information solely for the purpose of evaluating this proposal and are asked not at any time to disclose or otherwise make available the information to any third party except for those officers, employees and professional advisers who are required by you in the course of such evaluation to receive and consider the information and who agree to be bound by these non-disclosure terms.

TABLE OF CONTENTS

1. WASTEWATER TREATMENT ELEMENTS 2

2. DESIGN LOADING 2

3. TREATMENT PROCESS 2

3.1. KINGSPAN KLARGESTER BIODISC BE MODEL (OR SIMILAR APPROVED) 2

3.2. SAND POLISHING FILTER 3

4. REFERENCES 5

5. APPENDIX A: KLARGESTER BIODISC COMMERCIAL SEWAGE TREATMENT PLANT SPECIFICATION SHEET 6

6. APPENDIX B: 60M² GRAVITY-FED SAND POLISHING FILTER/INFILTRATION AREA LAYOUT ... 7

APPENDICES

APPENDIX A: KLARGESTER BIODISC COMMERCIAL SEWAGE TREATMENT PLANT SPECIFICATION SHEET

APPENDIX B: 60m² GRAVITY-FED SAND POLISHING FILTER/INFILTRATION AREA LAYOUT

1. WASTEWATER TREATMENT ELEMENTS

The wastewater treatment system proposed for the treatment of domestic type effluent from the 3nr warehouses and security kiosk proposed as part of the Phase 1 Durnish development will consist of the following:

- 1 no. Kingspan Klargester BioDisc BE Model (or similar approved) to provide both primary and secondary treatment
- 1no. 60m^2 stratified sand polishing filter to provide tertiary treatment and infiltration field

It is proposed to construct a gravity-fed foul wastewater system, accommodating the necessary gradients and falls within the 2.0m – 2.5m infilled region/removed topsoil.

2. DESIGN LOADING

The package treatment plant has been designed to cater for wastewater from human activity within the proposed Phase 1 development of the Durnish Lands, and will be of domestic strength.

It is expected that the maximum occupancy of the Phase 1 development will be 48 persons, and the site will be operational 24/7.

The package treatment plant has been designed to cater for a load from 60 personnel, allowing for a factor of safety of 1.25.

On this basis, the package treatment plant will have a design population equivalent of 30 and loadings of 1.8kgBOD/d and 3.6m^3/d.

The design loadings are calculated based on 30gBOD/person/day and 60litres/person/day for an office and/or factory with canteen as detailed in Table 3 of the EPA Wastewater Treatment Manual (EPA,1999)[1].

3. TREATMENT PROCESS

3.1. Kingspan Klargester BioDisc BE Model (or similar approved)

Kingspan Klargester BioDisc (see Appendix A: Klargester BioDisc Commercial Sewage Treatment Plant Specification Sheet) models are all Rotating Biological Contactor systems, comprising a primary settlement tank, secondary treatment compartment and a secondary settlement tank. Effluent treatment takes place within the secondary treatment compartment by means of micro-organisms attached to inert media discs mounted on a shaft which is rotated by an electric motor and partially

[1] Environmental Protection Agency, Wastewater Treatment Manuals: *Treatment Systems for Small Communities, Business, Leisure Centres and Hotels* (Wexford: Environmental Protection Agency, 1999).

submerged within the primary treated effluent. It is on these media discs that the biofilms form, treating the effluent before secondary settlement.

Selection of an appropriate package treatment plant was carried out by considering the proposed occupancy for Phase 1 of the Durnish development, along with a conservative factor of safety. These occupancy values then have the relevant wastewater loading rates applied from Table 3 of the EPA Wastewater Treatment Manual (EPA,1999)[1]. A suitable package wastewater treatment plant model was the selected based on the max BoD_5/hydraulic loading specified for each model and the calculated loading rates.

The Klargester BioDisc BE Model was selected, which produces a secondary treated effluent compliant with industry requirements across commercial sectors including national and international regulations such as BS EN 12255 and EN 12566-3. The BioDisc BE Model is capable of servicing the foul wastewater treatment demand for a Population Equivalent of 35 i.e. a maximum daily BOD_5 loading of 2.1 kg and a maximum daily flow of 7,000 litres. Based on the anticipated number of employees that will occupy Phase 1 of the Durnish Lands development and the corresponding factor of safety, the design daily BOD_5 loading is 1.8 kg and the design daily flow of 3,600 litres. Therefore the Klargester BioDisc BE Model is considered sufficient for the Phase 1 development

Appendix A: Klargester BioDisc Commercial Sewage Treatment Plant Specification Sheet has been included for further reference.

3.2. Sand Polishing Filter

A stratified sand polishing filter is proposed to provide the dual function of providing tertiary effluent treatment and acting as an infiltration field to return the tertiary treated effluent into the groundwater. Natural micro-organisms within the sand layers support the growth of biofilms which allow for further nutrient and micro-organism reduction within the treated effluent, which is then returned to the ground water by percolation through the constructed sand polishing filter and natural undisturbed subsoil beneath.

Sizing of the proposed stratified sand polishing filter has been based upon a maximum hydraulic loading value of 60litres/m²/day as recommended by EPA guidance. As the design hydraulic loading is 60litres/person/day, the design area of the sand polishing filter is 1m²/person/day, with an area of 60m² for Phase 1.

The filter has been designed in accordance with necessary EPA guidance and Irish Statutory Instruments (see References).

[1] Environmental Protection Agency, Wastewater Treatment Manuals: *Treatment Systems for Small Communities, Business, Leisure Centres and Hotels* (Wexford: Environmental Protection Agency, 1999).

In summary the polishing filter will consist of the following:

- Min. 300mm topsoil layer on geotextile.
- 100mm distribution gravel (10-20mm) containing perforated infiltration lateral pipes (32mm Dia. uPVC laterals with 4mm to 6mm orifices at 300mm C/C spacing).
- 650mm deep Stratified Sand Polishing Filter as follows:
    - Layer 1 – 200mm of coarse sand (0.4-1.4mm).
    - 75mm pea-sized gravel separation layer.
    - Layer 2 – 150mm of fine sand (0.1-0.5mm).
    - 75mm pea-sized gravel separation layer.
    - Layer 3 - 150mm of fine sand (0.1-0.5mm).
- Min. 150mm free-draining, graded gravel (10-20mm).
- Min. 1200mm natural undisturbed subsoil above water table.

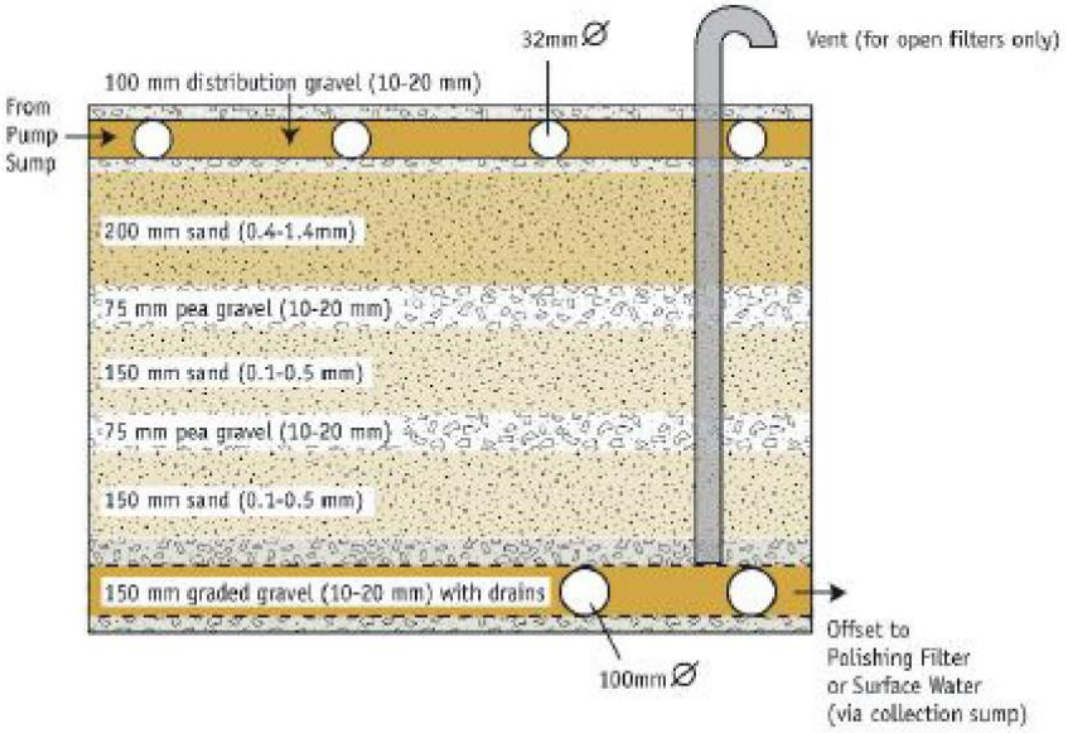


FIGURE 8.5. SCHEMATIC CROSS SECTION OF STRATIFIED SAND FILTER.

Reference: EPA Code of Practice: Wastewater Treatment and Disposal Systems Serving Single Houses (P.E. ≤ 10) Figure 8.5.

The infiltration laterals shall be arranged in a closed loop distribution network and are proposed to be 25mmØ, 6.3m in length with orifice diameters of 4mm – 6mm at 900mm C/C spacing. To ensure uniform effluent throughout the individual lateral sand the polishing filter area, the first and last orifices in alternate laterals shall be located one half the perforation spacing from either end. In the remaining laterals, the first and last orifice will be located one perforation spacing from either end to produce a staggered perforation arrangement. It is proposed that the infiltration pipe network shall be gravity-fed, achieved by maintaining a gradient within the system of 0% to 1%.

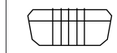
4. REFERENCES

- US EPA Wastewater Design Manual for Onsite Wastewater Treatment and Disposal Systems.
- EPA Wastewater Treatment Manuals: Treatment Systems for Small Communities, Business, Leisure Centres and Hotels.
- EPA Code of Practice: Wastewater Treatment and Disposal Systems Serving Single Houses (P.E. ≤ 10).
- S.I. No. 254/2001 – Urban Wastewater Treatment Regulations, 2001.

5. APPENDIX A: KLARGESTER BIODISC COMMERCIAL SEWAGE TREATMENT PLANT SPECIFICATION SHEET

Klargester BioDisc®
Commercial Sewage Treatment Plant

Single Piece System



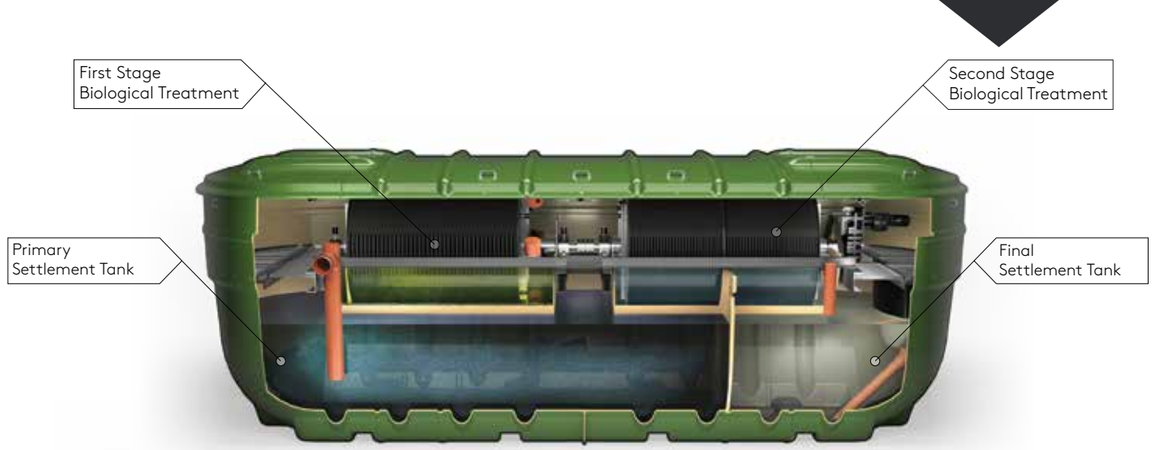
Delivered as a single, packaged system, the Klargester BioDisc® RBC range (up to 300PE), offers low running costs due to its unique design and operational efficiencies.

Product Benefits

- Unique RBC technology.
- Tried and tested technology, offers robust and efficient water management treatment.
- Low running costs.
- Noise free.
- Fully removable lid for easy desludging.
- Fully packaged system, delivered direct on site.
- Bespoke technical support offered from our in-house technical teams.

Performance & Compliance

- Odour free – tested and fully approved in accordance with BSEN13725.
- Designed for applications selected in compliance with British Water Code of Practice Flows and Loads.
- 100% compliance with industry requirements across commercial sectors, including national and international regulations such as BS EN12255 and EN12566-3 (up to 50 PE).



Technical Specifications

Model Reference	BD	BE	BF	BG	BH	BJ	BK	BL	BM	BN
Maximum Daily BOD (kg)	1.5	2.1	3	4.2	4.5	6	7.5	9	13.5	18
Maximum Daily Flow (m3)	5	7	10	14	15	20	25	30	45	60
Ø/Width (mm)	2450	2450	2450	2450	2450	2450	2450	2450	2450	2450
Length (mm)	3340	3340	4345	5235	7755	7755	7755	7755	10420	13100
Inlet Invert depth (mm)	600/1100	600/1100	600/1100	600/1100	600/1000	600/1000	600/1000	600/1000	600/1000	600/1000
Depth Below Inlet Invert (mm)	1820	1820	1820	1820	1790	1790	1790	1790	1790	1790
Outlet Invert Depth (mm)	1735	1735	1720	1720	1640	1640	1640	1640	1640	1640
Overall Height (mm)	2825/3325	2825/3325	2825/3325	2825/3325	2830/3230	2830/3230	2830/3230	2830/3230	2830/3230	2830/3230
Height to Rim of Cover (mm)	2485/2985	2485/2985	2485/2985	2485/2985	2490/2890	2490/2890	2490/2890	2490/2890	2490/2890	2490/2890
Empty Weight (kg)	1100/1200	1200/1300	1315/1465	1660/1810	3000/3020	3100/3120	3200/3220	3300/3320	4200/4250	5500/5650
Standard Power Supply	1 phase	1 phase	1 phase	1 phase	1 phase	1 phase	1 phase	1 phase	1 phase	1 phase
Motor Rating - 1 Phase (Watts)	75	75	120	180	250	250	370	370	550	2 x 370
Full Load Current 1 Phase (amps)	1.1	1.1	1.3	1.6	1.5	1.5	2.35	2.35	2.8	2 x 2.35
Optional Power Supply	3 phase	3 phase	3 phase	3 phase	3 phase	3 phase	3 phase	3 phase	3 phase	3 phase
Motor Rating - 3 Phase (Watts)	90	90	120	180	250	250	370	370	550	2 x 370
Full Load Current 3 Phase (amps)	0.38	0.38	0.42	0.63	0.88	0.88	1.35	1.35	2.8	2 x 1.35
Sludge Return Pump Rating (watts)	250	250	250	250	250	250	250	250	250	250

01

Primary Settlement Tank

This is the initial stage of treatment and simply involves the retention of coarse solids present in raw sewage and wastewater for subsequent gradual breakdown. BioDisc® features one chamber to ensure efficient operation with a flow balancing facility.

02

First Stage Biological Treatment

The liquor and fine solids then flow into the first stage of Biological Treatment. A unique managed flow system ensures peak performance by smoothing variable loads.

03

Second Stage Biological Treatment

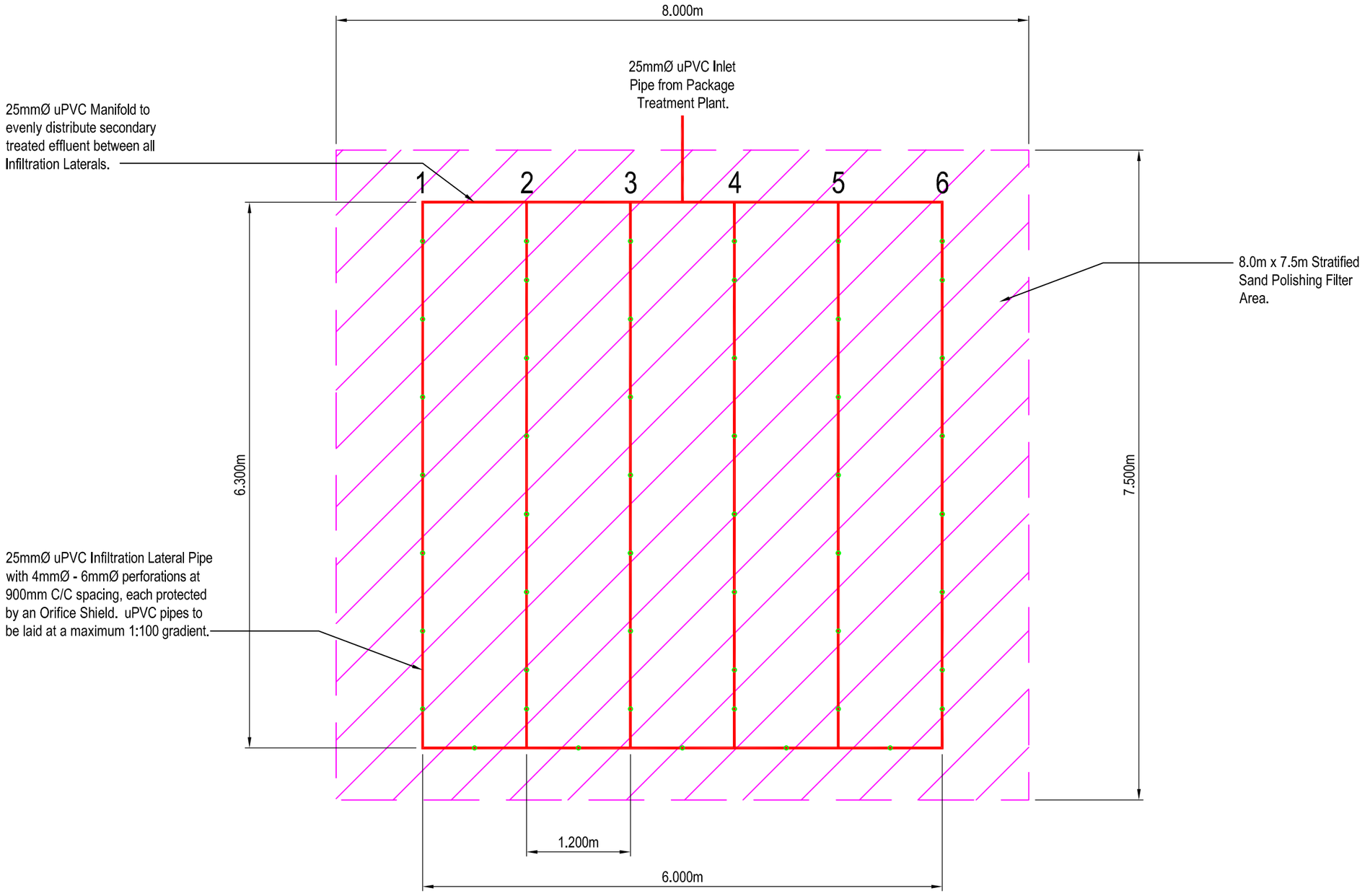
The liquor is then fed forward at a controlled rate into Biological Treatment stage 2 for further cleaning. This process ensures the whole media area available is utilised ensuring maximum efficiency.

04

Final Settlement Tank

The surplus micro-organisms continuously slough off the discs and are carried forward to the final settlement where they settle out as a humus sludge, leaving a clear treated effluent to be discharged to ground or water course. The settled humus sludge is returned to the Primary Settlement Tank by the sludge return pump under timer control. The sludge return pump also removes any floating scum which helps to keep the final settlement tank working efficiently.

6. APPENDIX B: 60M² GRAVITY-FED SAND POLISHING FILTER/INFILTRATION AREA LAYOUT



Distribution Laterals nr. 1,3,5 = 7 nr. orifices
Distribution Laterals nr. 2,4,6 = 9 nr. orifices
Loop Closure Pipework = 5 nr. orifices
Total = 53 nr. orifices

60m² Gravity-Fed Sand Polishing Filter/Infiltration Area Layout [1:50]

NOTES

1. Verifying Dimensions.
   The contractor shall verify dimensions against such other drawings or site conditions as pertain to this part of the work.
2. Existing Services.
   Any information concerning the location of existing services indicated on this drawing is intended for general guidance only. It shall be the responsibility of the contractor to determine and verify the exact horizontal and vertical alignment of all cables, pipes, etc. (both underground and overhead) before work commences.
3. Issue of Drawings.
   Hard copies, dwf and pdf will form a controlled issue of the drawing. All other formats (dwg, dxf etc.) are deemed to be an uncontrolled Issue and any work carried out based on these files is at the recipients own risk. RPS will not accept any responsibility for any errors arising from the use of these files, either by human error by the recipient, listing of un-dimensioned measurements, compatibility issues with the recipient's software, and any errors arising when these files are used to aid the recipients drawing production, or setting out on site.
4. DATUM: ORDNANCE DATUM (Malin)

KEY:

- 25mmØ uPVC Distribution Manifold
- 25mmØ Perforated uPVC Infiltration Lateral Pipe
- Sand Polishing Filter Area

rev	amendments	drawn date	checked date

RPS
Elmwood House
74 Boucher Road
Belfast
BT12 6RZ
T +44 (0) 28 90 667914
F +44 (0) 28 90 668286
W www.rpsgroup.com/Ireland
E ireland@rpsgroup.com

Client: Shannon Foynes Port Company

Project: Port of Foynes Capacity Extension

Title: 60m² Gravity-Fed Sand Polishing Filter/Infiltration Area Layout

Drawing Status	Sheet Size	Drawing Scale
Planning	A3	1:50

Drawing Number: M0679-WwT-SK-01 Rev -

Project Leader	Drawn By	Date	Initial Review
S.H.	E.H.	17/04/18	S.H.

Appendix 2.3

Preliminary Programmes

Capacity Extension at Shannon Foynes

Preliminary Programme- Single Phase Development of Durnish Lands

	JETTY EXTENSION & DEVELOPMENT OF DURNISH LANDS																																							
	2019									2020												2021												2022						
	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
JETTY CONSTRUCTION																																								
Piling of Open Pile Structure																																								
Installation of Precast Elements																																								
Insitu Concrete in Beams																																								
Concrete Deck construction																																								
Services (drainage, lighting, water)																																								
Fender installation																																								
Quay Furniture fit out																																								
Durnish Lands Development																																								
Single Phase Construction																																								
Construction of Access Structures across Drainage Channel																																								
Roundabout Construction & Trunk Road Improvements																																								
Stripping of Topsoil and Profiling of Berm for Planting																																								
Planting of Perimeter Boundary																																								
Importation and Placement of Infill Material																																								
Importation and Placement of Surfacing																																								
Services (foul/stormwater drainage)																																								
Internal Road Construction (Kerbs, surfacing, road lighting)																																								
Installation of High Mast Lights																																								
Erection of Warehousing																																								

Capacity Extension at Shannon Foynes

Preliminary Programme- Phased Development of Durnish Lands

	JETTY CONSTRUCTION & PHASE 1a of DURNISH LANDS DEVELOPMENT																			
	2019									2020										
	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	
JETTY CONSTRUCTION																				
Piling of Open Pile Structure																				
Installation of Precast Elements																				
Insitu Concrete in Beams																				
Concrete Deck construction																				
Services (drainage, lighting, water)																				
Fender installation																				
Quay Furniture fit out																				
DURNISH LANDS DEVELOPMENT																				
Phase 1a																				
Construction of Access Structures across Drainage Channel																				
Roundabout Construction & Trunk Road Improvements																				
Stripping of Topsoil and Profiling of Berm for Planting																				
Planting of Perimeter Boundary																				
Importation and Placement of Infill Material																				
Importation and Placement of Surfacing																				
Services (foul and stormwater drainage)																				
Internal Road Construction (Kerbs, surfacing, road lighting)																				
Erection of Warehousing																				
Installation of High Mast Lights																				
Phase 1b (Expected commencement 2024)																				
Importation and Placement of Infill Material																				
Importation and Placement of Surfacing																				
Services (stormwater drainage)																				
Phase 1c (Expected commencment 2027)																				
Importation and Placement of Infill Material																				
Importation and Placement of Surfacing																				
Services (stormwater drainage)																				

	PHASE 1b of DURNISH LANDS DEVELOPMENT																			
	2024												2025							
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18		
JETTY CONSTRUCTION																				
Piling of Open Pile Structure																				
Installation of Precast Elements																				
Insitu Concrete in Beams																				
Concrete Deck construction																				
Services (drainage, lighting, water)																				
Fender installation																				
Quay Furniture fit out																				
DURNISH LANDS DEVELOPMENT																				
Phase 1a																				
Construction of Access Structures across Drainage Channel																				
Roundabout Construction & Trunk Road Improvements																				
Stripping of Topsoil and Profiling of Berm for Planting																				
Planting of Perimeter Boundary																				
Importation and Placement of Infill Material																				
Importation and Placement of Surfacing																				
Services (foul and stormwater drainage)																				
Internal Road Construction (Kerbs, surfacing, road lighting)																				
Erection of Warehousing																				
Installation of High Mast Lights																				
Phase 1b (Expected commencement 2024)																				
Importation and Placement of Infill Material																				
Importation and Placement of Surfacing																				
Services (stormwater drainage)																				
Phase 1c (Expected commencment 2027)																				
Importation and Placement of Infill Material																				
Importation and Placement of Surfacing																				
Services (stormwater drainage)																				

	PHASE 1c of DURNISH LANDS DEVELOPMENT																			
	2027												2028							
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan						Feb	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	
JETTY CONSTRUCTION																				
Piling of Open Pile Structure																				
Installation of Precast Elements																				
Insitu Concrete in Beams																				
Concrete Deck construction																				
Services (drainage, lighting, water)																				
Fender installation																				
Quay Furniture fit out																				
DURNISH LANDS DEVELOPMENT																				
Phase 1a																				
Construction of Access Structures across Drainage Channel																				
Roundabout Construction & Trunk Road Improvements																				
Stripping of Topsoil and Profiling of Berm for Planting																				
Planting of Perimeter Boundary																				
Importation and Placement of Infill Material																				
Importation and Placement of Surfacing																				
Services (foul and stormwater drainage)																				
Internal Road Construction (Kerbs, surfacing, road lighting)																				
Erection of Warehousing																				
Installation of High Mast Lights																				
Phase 1b (Expected commencement 2024)																				
Importation and Placement of Infill Material																				
Importation and Placement of Surfacing																				
Services (stormwater drainage)																				
Phase 1c (Expected commencment 2027)																				
Importation and Placement of Infill Material																				
Importation and Placement of Surfacing																				
Services (stormwater drainage)																				

Appendix 3

Spatial Planning Policy and Strategic Infrastructure Projects

There is no appendix for Spatial Planning Policy and Strategic Infrastructure Projects

Appendix 4

Project Scoping & Consultation

Appendix 4.1

Consultee Scoping Letter

RPS Consulting Engineers, Elmwood House, 74 Boucher Road, Belfast BT12 6RZ, Northern Ireland
T +44 (0)28 9066 7914 F +44 (0)28 9066 8286 E ireland@rpsgroup.com W www.rpsgroup.com/ireland

Limerick County Council
Planning and Environment Section
Dooradoyle
Co. Limerick

9th October 2017

Our Ref: IBE01128

Extension of jetty facilities including the reclamation of foreshore, and extension of the port estate, Port of Foynes, Foynes, Co Limerick

Dear Sir/Madam

RPS and HRA have been appointed by Shannon Foynes Port Company (SFPC) to prepare an Environmental Impact Statement (EIS), Natura Impact Statement (NIS) and outline Construction Environmental Management Plan (CEMP) to support a future planning application for the extension of jetty facilities including the reclamation of foreshore, and extension of the port estate, Port of Foynes, Foynes, Co Limerick.

An Information Pack is attached which provides a more detailed description of the proposed development works together with outline site plans and engineering drawings.

An Bord Pleanála has determined that the proposed development is Strategic Infrastructure Development (SID) within the meaning of section 37A of the Planning and Development Act 2000, as amended. The planning application will therefore be made directly to the Board.

As part of the environmental assessment process, SFPC wish to consult with those statutory and non-statutory bodies that may have an interest in the proposal. We would be therefore grateful if you could provide any information relevant to the proposed site that you may hold, and/or highlight any issues that you feel should be addressed within the scope of the EIS, NIS and CEMP.

As we anticipate submitting an application for planning to An Bord Pleanála in Quarter 4 2017, it would assist our programme of work greatly if you could reply by Friday 24th November 2017.

If you require any further information, or clarification on any matter, please contact Ruth Barr by email ruth.barr@rpsgroup.com or telephone +44 2890 667914.

We thank you in anticipation for your valued input at this early stage of the planning process.

Yours sincerely

Ruth Barr

Ruth Barr
For RPS

Appendix 4.2

List of Consultees

Consultee	Type of Response
1. Dept. of Housing, Planning, Community and Local Government	Acknowledgement
2. Dept. of Communications, Climate Action and Environment	Acknowledgement
3. Dept. of Agriculture, Food and the Marine	Acknowledgement
4. Development Applications Unit	Submission
5. Environmental Protection Agency	No response
6. Office of Public Works	No response
7. Limerick City & County Council	No response
8. Clare County Council	Submission
9. Kerry County Council	No response
10. Southern Regional Assembly	No response
11. Dept. of Transport, Tourism and Sport	No response
12. National Transport Authority	No response
13. Transport Infrastructure Ireland	Submission
14. Commission for Railway Regulation	Submission
15. Irish Rail	No response
16. Health and Safety Authority	No response
17. Commissioners of Irish Lights	No response
18. RNLI	No response
19. Arts Council	No response
20. Heritage Council	No response
21. Failte Ireland	Acknowledgement
22. An Taisce	No response
23. Inland Fisheries Ireland HQ	No response
24. Inland Fisheries Ireland (Regional Office)	No response
25. Waterways Ireland	No response
26. Bord Iascaigh Mhara	Submission
27. Marine Institute	No response
28. Geological Survey of Ireland	No response
29. Birdwatch Ireland	Submission
30. Irish Whale and Dolphin Group	No response
31. Irish Water	No response
32. Eircom	No response
33. ESB	No response
34. Bord Gais Eireann	No response
35. Dept. of Education and Skills	Acknowledgement
36. Dept. of Jobs, Enterprise & Innovation	Acknowledgement
37. Dept. of Foreign Affairs & Trade	No response
38. Dept. of Health	No response
39. Office of Radiological Protection, EPA	No response
40. Coillte	Submission

Appendix 4.3

Consultee Responses

AN COIMISIÚN UM RIALÁIL IARNRÓID
COMMISSION FOR RAILWAY REGULATION

RPS Consulting Engineers,
Elmwood House
74 Boucher Road,
Co. Belfast
BT12 6RZ

24/11/17

Re: Extension of jetty facilities including the reclamation of foreshore, and extension of the port estate, Port of Foynes, Foynes, Co Limerick.
Ref – LAA 5 2017

Dear Ms Barr

With reference to the above planning application the Commission for Railway Regulation (CRR) makes the following observations;

1. Notification of your decision is required to the railway undertaking, namely Iarnród Éireann.

2. Iarnród Éireann should be consulted to ensure that risks associated with railway trespass are not increased in the vicinity of this development either during the works or when the works are complete.

3. The party undertaking the construction should ensure future works which may affect the safe operation of the railway are undertaken with the consultation of Iarnród Éireann and in accordance with RSC Guideline RSC-G-010-A (Third Party Guidance on Railway Risk Volume 1 Planning and Development – available on the CRR website).

4. Observations or issues raised by Iarnród Éireann should be addressed.

5. If permission is granted, the party undertaking the work should consult with Iarnród Éireann regarding road-rail interfaces, such as level crossings, on access routes which may have increased flow or abnormal loads during the construction phase.

Yours sincerely,

Aidan O'Sullivan
Assistant Inspector
Commission for Railway Regulation

Mary Hughes

From: Oonagh Duggan <oduggan@birdwatchireland.ie>
Sent: 20 December 2017 16:46
To: Ruth Barr
Cc: casework@birdwatchireland.ie
Subject: [EXT] proposed expansion at Foynes Port

Dear Ruth:
BirdWatch Ireland received the scoping information in relation to the proposed expansion at Foynes Port. We list below some initial points of concern but there may be more depending on receipt of the planning application.

1. We would like to be kept informed of when this application is due to go to An Bord Pleanála please.
2. We are particularly concerned about the potential impacts of the reclamation proposal on the site integrity, as well as the conservation interests, of the River Shannon and River Fergus SPAs and the Lower River Shannon SAC. Careful scrutiny and assessment will be required of the impacts of this proposal. In addition, there is the potential that this proposal might not meet the requirements of Article 6 (3) of the Habitats Directive and may need to be assessed against Article 6 (4) though until all the documentation is presented and reviewed this is not a definitive outcome but we are raising it as a potential outcome.
3. BirdWatch Ireland manages the Irish Wetland Bird Survey and there may be data available for a subsite (OI480) which is located within Foynes harbour. You can find out more information about this here https://www.birdwatchireland.ie/?tabid=111 and there is also a link on this webpage to request Data.
4. Site specific waterbird bird survey work using a qualified waterbird ecologist may be required for this proposal.
5. In addition, careful assessment will be required of the potential of increased ship traffic and the impacts of this on conservation interests. In addition, the impacts of the jetty on the movement of water and sediment will also need to be included.
6. Cumulative and incombination impacts from other projects already developed and those within the planning process will also need to be considered.

Again, we would like to be kept abreast of this development.
Thank you for including us in your scoping consultation.
Best regards,
Oonagh

Oonagh Duggan
Assistant Head of Division-Policy and Advocacy
BirdWatch Ireland

BirdWatch Ireland | Unit 20 Block D | Bullford Business Campus | Kilcoole | County Wicklow | Ireland
www.birdwatchireland.ie
www.birdlife.org

Email: oduggan@birdwatchireland.ie
Office Tel: +353 (0)1 2819878
Skype: oonaghbwi

We are a science-based conservation charity, and Ireland's largest environmental NGO with;

….15,000 members
….2,000 active volunteers
….30 local branches across the nation
...450 events free to the public in every year
…116 partners across the globe in BirdLife International
…22,000 people who receive our e-zine, a monthly update about our work
…2017 as an opportunity to make the changes urgently needed for nature in Ireland, across Europe and globally

To receive our e-zine, join as a member, make a donation or volunteer for us call +353 (0)1 281 9878
Shop online and see more about our work by visiting **www.birdwatchireland.ie**

Twitter: @BirdWatchIE and @BirdsMatter_ie

COMHAIRLE CONTAE AN CHLÁIR | CLARE COUNTY COUNCIL

17th November 2017

Ruth Barr,
RPS Consulting Engineers,
Elmwood House,
74 Boucher Road,
Belfast,
BT12 6RZ
Northern Ireland

Our ref: PL/17/11/2017
Your Ref: IBE1128/ltr 1

Dear Ms Barr,

Clare County Council welcomes the opportunity to input to your environmental assessment process relating to the proposed Strategic Infrastructure Development at the Port of Foynes.

The information pack indicates that an Environmental Impact Statement (EIS) will be submitted in support of the planning application to An Bord Pleanála. In this regard I would draw your attention to Circular PL1/2017 and the transposition of the 2014 EIA Directive which requires an Environmental Impact Assessment Report to be prepared where EIA is required (previously EIS). The relevant information to be provided by the applicant is set out in Article 5(1)(a) to (e) of the 2014 Directive. The following key areas will need to be addressed by the applicant:

- Population & Human Health (not human beings)
- Biodiversity (Not Flora and Fauna)
- Land
- Interaction including vulnerability to disasters
- Subsoil pollution
- Reasonable alternatives relevant to the proposal (this should tie in with the need/justification for the project as is set out in the information pack). The main reasons for the option chosen should be clearly expanded upon given the location of the proposed works within a dual designated European site, the Shannon Estuary and the west coast of Ireland. A robust case should be made, with the necessary scientific evidence presented, to support the need for the proposed development, taking other developments at Foynes Port and previous environmental impact assessments into account. The project options or alternatives should be clearly explaned and analysed to show how conclusions were reached. The rationale for selecting the current option as the preferred or favoured option should be demonstrated adequately and on a scientific basis.

Forbairt Eacnamaíochta
Áras Contae an Chláir, Bothar Nua, Inis, Co. an Chláir | Economic Development
Áras Contae an Chláir, New Road, Ennis, Co. Clare

☎: 065 6846232 F : 065 6892071 ✉: planoff@clarecoco.ie 🌍: www.clarecoco.ie

The application should outline Foynes Port position in terms of Irelands ocean economy and how it fits with Ireland's targets as set out in the Governments Integrated Marine Plan for Ireland – Harnessing our Ocean Wealth (2012). The 2017 Price Waterhouse Cooper Report *" PwC HELM Circumnavigation: An integrated approach to the economy of the sea Ireland in the world"* has taken 10 years of data in terms of assessing the usage of the seas and ultimately concluded that sustainable growth and development of the economy of the sea needs an integrated approach. Irelands Integrated Marine Plan is the product of this integrated approach which acknowledges the long term nature of maritime development. The extension at the Port of Foynes needs to be set in this context establishing the integrated approach and the long term focus and plan for the Port within the context of the estuary and Ireland's maritime economy as a whole.

I would again reiterate earlier comments made in relation to the relevant sections of the Strategic Integrated Framework Plan for the Shannon Estuary.

As your proposed enhancement of berthing facilities at Foynes Port is located within a site identified as a Strategic Development Location for Marine Related Industry through the SIFP process and adopted into the Limerick City and County Development Plan it is imperative that the following is considered and adhered to;

- Over-arching mitigation measures (Section 6.2 of the NIR, Table 11.2 of the SEA ER)
- Mitigation measures per theme (Section 6.2.1 of the NIR)
- Site specific mitigation measures (See Table 3.24 relating to Site D of the NIR, Table 11.3 of the SEA ER)

The following observations are made in relation to the availability of datasets and comments in relation to scope and direction of surveys and assessment;

- Following the completion of the Bird Data Review by Bird Watch Ireland on behalf of the SIFP Steering Group one of the most comprehensive bird usage surveys every undertaken of the River Shannon and Fergus Estuaries SPA commenced in May 2017 and will continue over a 12 month monitoring period, covering all season, across 2017 and 2018. This work is being implemented through the Steering Group appointed to implement the Strategic Integrated Framework Plan for the Shannon Estuary. The Shannon and Fergus Estuaries have been counted as part of the national waterbird monitoring scheme, the Irish Wetland Bird Survey (I-WeBS) since 1994/1995, but the size and complexity of this wetland complex, combined with the relatively large numbers that the site supports, makes it extremely difficult to count from ground-based vantage points. As a result, small discrete sections of the site only have been surveyed in most seasons, thereby limiting assessments of the importance of the site and the species trends overall. The output from the Bird Usage survey of the Shannon Estuary can be made available and utilised to inform the future potential development of Foynes Port.

- In relation to the NIS and CEMP you will be aware of the case law of the Court of Justice of the European Union which has established that such an assessment *"cannot have lacunae and must contain complete precise and definitive findings and conclusions capable of removing all resonable scientific doubt as to the effects of the works proposed on the protected site concerned"* (see, for example, C-258/11, Sweetman vs An Bord Pleanála). As the CEMP will be the mechanism through which any mitigation measures identified through the NIS will be delivered during the construction stage it is critical that all elements of the construction are incorporated into this e.g. contractors method statements, any removal of temporary infrastructure, any habitat rehabilitation should this be deemed necessary, biosecurity measures and any proposed monitoring. Full details of all necessary mitigation measures should be available with the application, and shown in maps and drawings, as appropriate. The likely effects of mitigation measures themselves should be assessed in the NIS, e.g. installation and removal of any silt control measures, or survey/testing areas. It must be demonstrated that mitigation measures will be effective in addressing and ameliorating the full scale and nature of the effects arising, and that they will be feasible within the specific characterisitics and constraints of such a site, so that the residual effects of the project may be known.

I hope these observations will be useful to your assessment, should you have any queries in relation to this please do not hesitate to contact me,

Yours faithfully,

Sheila Downes

Sheila Downes
Environmental Assessment Officer
Planning Department
Clare County Council, Áras Contae an Chláir, New Road, Ennis, Co. Clare, V95 DXP2
T: 065 6846499 | **M:** 087 9914048 | **E:** sdownes@clarecoco.ie | **W:** www.clarecoco.ie

COMHAIRLE CONTAE AN CHLÁIR
CLARE COUNTY COUNCIL

An Roinn
Cultúir, Oidhreachta agus Gaeltachta

Department of
Culture, Heritage and the Gaeltacht

Your Ref: IBE01128
Our Ref: **G Pre00212/2017** *(Please quote in all related correspondence)*

20 November 2017

Ruth Barr BSc MSc Csci MCIWEM
Senior Associate
RPS Consulting Engineers
Elmwood House
74 Boucher Road
Belfast BT12 6RZ
Northern Ireland

Via email to Ruth.Barr@rpsgroup.com

Re: Pre-planning enquiry for Shannon Foynes Port Company - Extension of Jetty Facilities and Extension of Port Estate

A chara

On behalf of the Department of Culture, Heritage and the Gaeltacht, I refer to correspondence received in connection with the above.

Outlined below are heritage-related observations/recommendations of the Department under the stated heading(s).

Archaeology

All proposed development and strategies should be in compliance with the National Monuments Acts 1930 to 2004 and with the national policy on protection of archaeological heritage – 'Framework and Principles for the Protection of the Archaeological Heritage' published in 1999 by the Department of Arts, Heritage, Gaeltacht and the Islands.

General Guidance

1. All areas of archaeological heritage should be addressed where relevant, including;
   a) Immovable cultural heritage e.g., monuments and ancient field boundaries.
   b) Underwater cultural heritage such as river fording points, shipwrecks, fish weirs, fish traps and other underwater ruins such as submerged jetties.
   c) Movable cultural heritage e.g., loose carved stones, sculptures, architectural fragments etc.

2. All proposed development within proximity to archaeological monuments should be subject to appropriate consultation, at the earliest possible stage, with the Department of Arts, Heritage and the Gaeltacht.

3. All impacts which may impinge on the archaeological heritage should be appropriately assessed by a suitably qualified archaeologist.

4. Where appropriate, specialists in the field of archaeological heritage should be consulted throughout the process, from design through to implementation.

5. All surveys pertaining to archaeological heritage must be of a high standard in order to allow informed decisions to be taken.

6. All impacts must be assessed, to include ground disturbance, impacts on the setting of the monuments and visual impacts. These should include direct, indirect, temporary and cumulative impacts.

7. Mitigation of impacts, identified through consultation, should be taken into account within the development at the earliest possible stages. Various approaches should be considered, such as avoidance, design modification and relocation where appropriate.

8. Where there are no archaeological monuments present but the development is large in scale, e.g., over 0.5 hectares in area and over 1 kilometre in length, it is generally recommended that an archaeological assessment should be undertaken, unless there are substantial grounds to show that it is not necessary. Refer to Framework and Principles for the Protection of the Archaeological Heritage 1999, in particular section 3.6.6 in regard to EIA.

Further information and relevant publications can be obtained on www.archaeology.ie

Underwater Archaeology

The Underwater Archaeology Unit concurs with the archaeological recommendations above and as per previous scoping for associated development at Foynes Ports to inform an EIS it should contain a specific section that addresses the underwater cultural heritage. To inform this section, the services of a suitably qualified *underwater* archaeologist shall be engaged to undertake an Underwater Archaeological Impact Assessment (UAIA).This to tie in with and correspond to the Archaeological Impact Assessment for the terrestrial development element of the proposed works.

For the UAIA a Desktop Study shall be done and following on from that, an intertidal/foreshore survey and underwater archaeological assessment of areas that remain fully covered by water. The assessment shall be licensed by this Department and the application shall include a detailed method statement with impact details.

It is noted that there has been extensive reclamation and dredging work done for the East Jetty development and for which the Appropriate Assessments were carried out, including subsequent archaeological monitoring. The current requested Desktop Study should therefore assess what has already been done with regard to underwater archaeology as a mechanism to feed into the new proposed areas for development and the assessment of these from a cultural heritage perspective.

The recommended UAIA shall include assessment of the quay structure, as has been previously done for the East Jetty and shall propose mitigation to record, protect where necessary, preserve either by record or *in situ* any identified archaeological and architecturally-sensitive features, structures or material within the footprint of the proposed works, including those areas that may be impacted by works traffic.

Once complete, the EIS shall be submitted and forward for further consideration and comment by this Department.

Nature conservation observations/recommendations, if any, will follow in due course.

The above observations/recommendations are based on the papers submitted to this Department on a pre-planning basis and are made without prejudice to any observations that the Minister may make in the context of any consultation arising on foot of any development application referred to the Minister, by the planning authority/ies, in her/his role as statutory consultee under the Planning and Development Act, 2000, as amended.

You are requested to send further communications to this Department's Development Applications Unit (DAU) at **manager.dau@chg.gov.ie** (team monitored); if this is not possible, correspondence may alternatively be sent to:

The Manager
Development Applications Unit (DAU)
Department of Culture, Heritage and the Gaeltacht
Newtown Road
Wexford
Y35 AP90

Is mise, le meas

Yvonne Nolan
Development Applications Unit

Bord Iascaigh Mhara
An Cheannoifig
Bóthar Crofton,
Dún Laoghaire,
Co. Bhaile Átha Cliath
A96 E5A0

Bord Iascaigh Mhara
Head Office
Crofton Road,
Dún Laoghaire,
Co. Dublin
A96 E5A0

T +353 (0)1 214 4100
F +353 (0)1 284 1123
www.bim.ie

Ms Ruth Barr
RPS Consulting Engineers
Elmwood House
74 Boucher Road
Belfast

21st November 2017

Re: Consultation – Extension of jetty facilities including the reclamation of foreshore, and extension of the port estate, Port of Foynes, Foynes, Co. Limerick

Dear Ms. Barr,

I refer to your letter of 9th October 2017 regarding the above proposed development. Bord Iascaigh Mhara welcomes the opportunity to respond to this proposal and would like you to consider the following comments, in relation to the aquaculture and fishing sectors:

- There are a number of licensed aquaculture sites within the Foynes estuary. Some of these licenced areas are located very close to the proposed works area (see map included below). Oysters (*Crassostrea gigas*) and Mussels (*Mytilus edulis*) are the main species grown.
- Licenced shellfish sites are designated under SI No. 268 of 2006 European Communities (Quality of Shellfish Waters) Regulations 2006, we seek assurances that the proposed works will observe the terms of the SI and thus provide adequate protection for the aquaculture industry. In particular the SI specifies that background levels of suspended solids in these waters cannot at any time increase by more than 30%. We request that a continuous monitoring programme be put in place to ensure compliance with the suspended solid limits.
- Fishing activities within the area include mackerel and scad fishing off the coast of Loop Head, whitefish trawlers operate from Fenit, Doonbeg and Rossaveal. V-notching lobster schemes operate in North Kerry and West Clare.
- A number of local licensed boats operate from piers and slips within the Shannon Estuary, working with mainly pots for crab, lobster and shrimp as well as gillnets and tanglenets. The gillnets are used to catch white pollock, haddock, dogfish, black pollock, cod and ling. During the summer tanglenet fisheries mainly catch monkfish, turbot and ray. Approximately ten vessels fish from Carraigaholt, Kilbaha, Cashen, Ballylongford and Tarbert ports. From late summer to early

- spring shrimp are fished within the Estuary. Numerous fish buyers also operate in the area to varying extents (Cashen, Kerry and Carraigaholt).
- Changes to storm water discharge or freshwater inputs may impact shellfish and fish health.
- As the aquaculture and fishing sectors are prominent in this area it is important that those involved are aware of the proposed development and should be contacted individually as part of this consultation process.

BIM recognize the significant role played by the Port of Foynes in the area. This is a substantial development which if managed responsibly during planning, construction and operation could bring significant positive benefits to the local economy.

I hope that you will take time to consider the issues raised in our submission. Please do not hesitate to contact me or one of my colleagues (Aquaculture – Ms Catherine Butler – 068-24885, Fisheries – Ms Vera O' Donovan 066-9150909) if you require any further information.

Yours Sincerely

Martina O'Brien

Martina O'Brien

Environmental Officer

Aquaculture licenses (red outline with blue fill) and applications in the vicinity of Port of Foynes, Shannon Estuary.

Bonneagar Iompair Éireann
Transport Infrastructure Ireland

Ms. Ruth Barr
RPS Consulting Engineers
Elmwood House
74 Boucher Road
Belfast
BT12 6RZ

Dáta | Date	Ár dTag | Our Ref.	Bhur dTag | Your Ref.
22 November 2017	**TII17-99405**	**IBE01128**

RE: EIAR Scoping relating to Proposed Extension of jetty facilities at the Port of Foynes

Dear Ms. Barr,

Thank you for your letter and enclosures of 9 October 2017 regarding the above. The position in relation to your enquiry is as follows.

Transport Infrastructure Ireland (TII) wishes to advise that it is not in a position to engage directly with planning applicants in respect to proposed developments. TII will endeavour to consider and respond to planning applications referred to it given its status and duties as a statutory consultee under the Planning Acts. The approach to be adopted by TII in making such submissions or comments will seek to uphold official policy and guidelines as outlined in the Spatial Planning and National Roads Guidelines for Planning Authorities (DoECLG, 2012). Regard should also be had to other relevant guidance available at www.TII.ie.

The issuing of this correspondence is provided as best practice guidance only and does not prejudice TII's statutory right to make any observations, requests for further information, objections or appeals following the examination of any valid planning application referred.

With respect to EIAR/EIS scoping issues, the recommendations indicated below provide only general guidance for the preparation of an EIAR/EIS, which may affect the National Roads Network.

The developer should have regard, inter alia, to the following:

- Consultations should be had with the relevant Local Authority/National Roads Design Office with regard to locations of existing and future national road schemes; i.e. the Foynes to Limerick road improvement scheme which includes a new junction and a terminal service area adjacent to the current port access route.
- TII would be specifically concerned as to potential significant impacts the development would have on the national road network (and junctions with national roads) in the proximity of the proposed development. Particular focus on the N69 would be required.

Bonneagar Iompair Éireann
Ionad Ghnó Gheata na Páirce
Sráid Gheata na Páirce
Baile Átha Cliath 8
D08 DK10

Transport Infrastructure Ireland
Parkgate Business Centre
Parkgate Street
Dublin 8
D08 DK10

info@tii.ie
www.tii.ie
+353 (0)1 646 3600
+353 (0)1 646 3601

- The developer should assess visual impacts from existing national roads.
- The developer should have regard to any Environmental Impact Statement and all conditions and/or modifications imposed by An Bord Pleanála regarding road schemes in the area. The developer should in particular have regard to any potential cumulative impacts.
- The developer, in conducting the Environmental Impact Assessment, should have regard to TII Publications (formerly DMRB and the Manual of Contract Documents for Road Works).
- The developer, in conducting Environmental Impact Assessment, should have regard to TII's Environmental Assessment and Construction Guidelines, including the Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes (National Roads Authority, 2006).
- The EIAR/EIS should consider the Environmental Noise Regulations 2006 (SI 140 of 2006) and, in particular, how the development will affect future action plans by the relevant competent authority. The developer may need to consider the incorporation of noise barriers to reduce noise impacts (see Guidelines for the Treatment of Noise and Vibration in National Road Schemes (1st Rev., National Roads Authority, 2004)).
- It would be important that, where appropriate, subject to meeting the appropriate thresholds and criteria and having regard to best practice, a Traffic and Transport Assessment be carried out in accordance with relevant guidelines, noting traffic volumes attending the site and traffic routes to/from the site with reference to impacts on the national road network and junctions of lower category roads with national roads. TII's Traffic and Transport Assessment Guidelines (2014) should be referred to in relation to proposed development with potential impacts on the national road network. The scheme promoter is also advised to have regard to Section 2.2 of the NRA/TII TTA Guidelines which addresses requirements for sub-threshold TTA.
- The designers are asked to consult TII Publications to determine whether a Road Safety Audit is required.
- In the interests of maintaining the safety and standard of the national road network, the EIS should identify the methods/techniques proposed for any works traversing/in proximity to the national road network.
- In relation to haul route identification, the applicant/developer should clearly identify haul routes proposed and fully assess the network to be traversed. Separate structure approvals/permits and other licences may be required in connection with the proposed haul route and all structures on the haul route should be checked by the applicant/developer to confirm their capacity to accommodate any abnormal load proposed.

Notwithstanding any of the above, the developer should be aware that this list is non-exhaustive, thus site and development specific issues should be addressed in accordance with best practise.

I hope that the above comments are of use in your EIAR preparation.

Yours sincerely,

P.P. Mark Byrne

Elaine Edmonds
Land Use Planning

Mary Hughes

From: Mary Hughes
Sent: 12 March 2018 15:24
To: Mary Hughes

-------- Original message --------
From: Bernard Burke <Bernard.Burke@coillte.ie>
Date: 13/10/2017 14:10 (GMT+00:00)
To: Ruth Barr <Ruth.Barr@rpsgroup.com>
Cc: Bernard Burke <Bernard.Burke@coillte.ie>
Subject: [EXT] FOYNES PORT

Hi Ruth,

I had a look at that submission for Foynes Port both written and drawings. The proposed development appears not to interfere or infringe on the Coillte boundary to the west of the port, although it is adjacent to the boundary as per map below. I understand that currently there is no proposals to access the development from the Coillte area, so at the moment I have no reason for concern in relation to the development.

Best Regards,

Bernard Burke

BAU Leader, Coillte Forest | Coillte
Back Of The Forge, Lower Main Street, Castleisland, Co Kerry, Ireland

E Bernard.Burke@coillte.ie
T +353667163374
M +353(86)6020096

www.coillte.ie

Shannon Foynes Port Company c/o Ethan Hamill
RPS
Elmwood House
74 Boucher Road
Belfast

Uisce Éireann
Bosca OP 6000
Baile Átha Cliath 1
Éire

Irish Water
PO Box 6000
Dublin 1
Ireland

T: +353 1 89 25000
F: +353 1 89 25001
www.water.ie

24 April 2018

Dear Sir/Madam,

Re: Customer Reference No 3223747215 pre-connection enquiry - Subject to contract | Contract denied
Connection for water and wastewater for container storage/small office units

Irish Water has reviewed your pre-connection enquiry in relation to
water and wastewater connections at Durnish Lands, Shannon Foynes Port Access Road, Co Limerick
Based upon the details you have provided with your pre-connection enquiry and on the capacity currently available as assessed by Irish Water, we wish to advise you that, subject to a valid connection agreement being put in place, your proposed connection to the Irish Water network can be facilitated.

The confirmation of feasibility to connect to the Irish Waterinfrastructure does not extend to your fire flow requirements.To guarantee a flow to meet the Fire Authority requirements you should provide adequate fire storage capacity within your development.

Irish Water currently does not have any plans to extend its waste water network in this area.
Please contact Irish Water to discuss further.

You are advised that this correspondence does not constitute an offer in whole or in part to provide a connection to any Irish Water infrastructure and is provided subject to a connection agreement being signed at a later date.

A connection agreement can be applied for by completing the connection application form available at **www.water.ie/connections**. Irish Water's current charges for water and wastewater connections are set out in the Water Charges Plan as approved by the Commission for Utility Regulation.

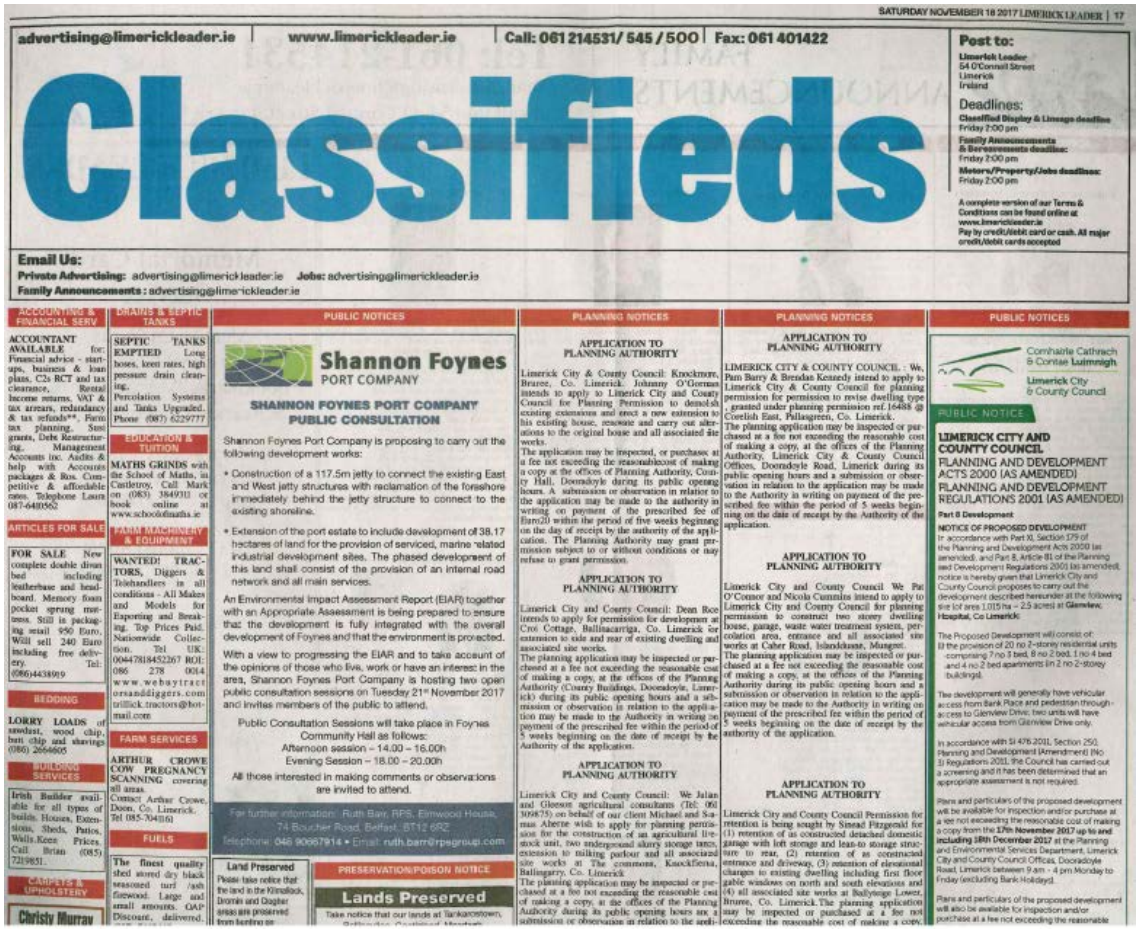
If you have any further questions, please contact Tim O'Connor from the design team on 022 52299 or email timoconnor@water.ie. For further information, visit **www.water.ie/connections**

Yours sincerely,

Maria O'Dwyer
Connections and Developer Services

Appendix 4.4

Public Consultation Notices



SATURDAY NOVEMBER 18 2017 LIMERICK LEADER | 17

advertising@limerickleader.ie | www.limerickleader.ie | Call: 061 214531/ 545 / 500 | Fax: 061 401422

Classifieds

Post to:
Limerick Leader
54 O'Connell Street
Limerick
Ireland

Deadlines:
Classified Display & Lineage deadline Friday 2:00 pm
Family Announcements & Bereavements deadline: Friday 2:00 pm
Motors/Property/Jobs deadline: Friday 2:00 pm

A complete version of our Terms & Conditions can be found online at www.limerickleader.ie
Pay by credit/debit card or cash. All major credit/debit cards accepted

Email Us:
Private Advertising: advertising@limerickleader.ie **Jobs:** advertising@limerickleader.ie
Family Announcements: advertising@limerickleader.ie

ACCOUNTING & FINANCIAL SERV

ACCOUNTANT AVAILABLE for: Financial advice - start-ups, business & loan plans, C2s RCT and tax clearance, Rental Income returns, VAT & tax arrears, redundancy & tax refunds**, Farm tax planning, Sus grants, Debt Restructuring, Management Accounts inc. Audits & help with Accounts packages & Rns. Competitive & affordable rates. Telephone Laura 087-6401562

ARTICLES FOR SALE

FOR SALE New complete double divan bed including leatherbase and headboard, Memory foam pocket sprung mattress. Still in packaging retail $90 Euro, Will sell 240 Euro including free delivery. Tel: (086)4438919

BEDDING

LORRY LOADS of sawdust, wood chip, bun chip and shavings (086) 2664605

BUILDING SERVICES

Irish Builder available for all types of builds. Houses, Extensions, Sheds, Patios, Walls.Keen Prices. Call Brian (085) 7219851.

CARPETS & UPHOLSTERY

Christy Murray

DRAINS & SEPTIC TANKS

SEPTIC TANKS EMPTIED Long hoses, keen rates, high pressure drain cleaning. Percolation Systems and Tanks Upgraded. Phone (087) 6229777

EDUCATION & TUITION

MATHS GRINDS with the School of Maths, in Castletroy, Call Mark on (083) 3849311 or book online at www.schoolofmaths.ie

FARM MACHINERY & EQUIPMENT

WANTED! TRACTORS, Diggers & Telehandlers in all conditions - All Makes and Models for Exporting and Breaking. Top Prices Paid. Nationwide Collection. Tel UK: 00447818452267 ROI: 086 278 0014 www.webuytractorsanddiggers.com trillick.tractors@hotmail.com

FARM SERVICES

ARTHUR CROWE COW PREGNANCY SCANNING covering all areas. Contact Arthur Crowe, Doon, Co. Limerick. Tel 085-7043161

FUELS

The finest quality shed stored dry black seasoned turf /ash firewood. Large and small amounts. OAP Discount, delivered.

PUBLIC NOTICES

Shannon Foynes
PORT COMPANY

SHANNON FOYNES PORT COMPANY
PUBLIC CONSULTATION

Shannon Foynes Port Company is proposing to carry out the following development works:

- Construction of a 117.5m jetty to connect the existing East and West jetty structures with reclamation of the foreshore immediately behind the jetty structure to connect to the existing shoreline.
- Extension of the port estate to include development of 38.17 hectares of land for the provision of serviced, marine related industrial development sites. The phased development of this land shall consist of the provision of an internal road network and all main services.

An Environmental Impact Assessment Report (EIAR) together with an Appropriate Assessment is being prepared to ensure that the development is fully integrated with the overall development of Foynes and that the environment is protected.

With a view to progressing the EIAR and to take account of the opinions of those who live, work or have an interest in the area, Shannon Foynes Port Company is hosting two open public consultation sessions on Tuesday 21st November 2017 and invites members of the public to attend.

Public Consultation Sessions will take place in Foynes Community Hall as follows:
Afternoon session – 14.00 – 16.00h
Evening Session – 18.00 – 20.00h

All those interested in making comments or observations are invited to attend.

For further information: Ruth Barr, RPS, Elmwood House, 74 Boucher Road, Belfast, BT12 6RZ
Telephone: 048 90667914 • Email: ruth.barr@rpsgroup.com

Land Preserved
Please take notice that the land in the Kinvallick, Dromin and Dagher areas are preserved from landing or

PRESERVATION/POISON NOTICE

Lands Preserved
Take notice that our lands at Tankardstown,

PLANNING NOTICES

APPLICATION TO PLANNING AUTHORITY

Limerick City & County Council: Knockmore, Bruree, Co. Limerick. Johnny O'Gorman intends to apply to Limerick City and County Council for Planning Permission to demolish existing extensions and erect a new extension to his existing house, reasoone and carry out alterations to the original house and all associated site works.
The application may be inspected, or purchases at a fee not exceeding the reasonablecost of making a copy at the offices of Planning Authority, County Hall, Doorndyle during its public opening hours. A submission or observation in relation to the application may be made to the authority in writing on payment of the prescribed fee of Euro20 within the period of five weeks beginning on the day of receipt by the authority of the application. The Planning Authority may grant permission subject to or without conditions or may refuse to grant permission.

APPLICATION TO PLANNING AUTHORITY

Limerick City and County Council: Dean Rice intends to apply for permission for development at Croi Cottage, Ballinacarriga, Co. Limerick for extension to side and rear of existing dwelling and associated site works.
The planning application may be inspected or purchased at a fee not exceeding the reasonable cost of making a copy, at the offices of the Planning Authority (County Buildings, Doorndoyle, Limerick) during its public opening hours and a submission or observation in relation to the application may be made to the Authority in writing on payment of the prescribed fee within the period of 5 weeks beginning on the date of receipt by the Authority of the application.

APPLICATION TO PLANNING AUTHORITY

Limerick City and County Council: We Julian and Gleeson agricultural consultants (Tel: 061 309875) on behalf of our client Michael and Seamus Aherne wish to apply for planning permission for the construction of an agricultural livestock unit, two underground slurry storage tanks, extension to milking parlour and all associated site works at The commons, KnockTecka, Ballingarry, Co. Limerick.
The planning application may be inspected or purchased at a fee not exceeding the reasonable cost of making a copy, at the offices of the Planning Authority during its public opening hours are a submission or observation in relation to the appli-

PLANNING NOTICES

APPLICATION TO PLANNING AUTHORITY

LIMERICK CITY & COUNTY COUNCIL : We, Pam Barry & Brendan Kennedy intend to apply to Limerick City & County Council for planning permission for permission to revise dwelling type , granted under planning permission ref.16488 @ Corelish East, Pallasgreen, Co. Limerick.
The planning application may be inspected or purchased at a fee not exceeding the reasonable cost of making a copy, at the offices of the Planning Authority, Limerick City & County Council Offices, Doorndoyle Road, Limerick during its public opening hours and a submission or observation in relation to the application may be made to the Authority in writing on payment of the prescribed fee within the period of 5 weeks beginning on the date of receipt by the Authority of the application.

APPLICATION TO PLANNING AUTHORITY

Limerick City and County Council We Pat O'Connor and Nicola Cummins intend to apply to Limerick City and County Council for planning permission to construct two storey dwelling house, garage, waste water treatment system, percolation area, entrance and all associated site works at Caher Road, Islanddusaie, Mungret.
The planning application may be inspected or purchased at a fee not exceeding the reasonable cost of making a copy, at the offices of the Planning Authority during its public opening hours and a submission or observation in relation to the application may be made to the Authority in writing on payment of the prescribed fee within the period of 5 weeks beginning on the date of receipt by the authority of the application.

APPLICATION TO PLANNING AUTHORITY

Limerick City and County Council Permission for retention is being sought by Sinead Fitzgerald for (1) retention of as constructed detached domestic garage with loft storage and lean-to storage structure to rear, (2) retention of as constructed entrance and driveway, (3) retention of elevational changes to existing dwelling including first floor gable windows on north and south elevations and (4) all associated site works at Ballyteige Lower, Bruree, Co. Limerick.The planning application may be inspected or purchased at a fee not exceeding the reasonable cost of making a copy

PUBLIC NOTICES

Comhairle Cathrach & Contae Luimnigh
Limerick City & County Council

PUBLIC NOTICE

LIMERICK CITY AND COUNTY COUNCIL
PLANNING AND DEVELOPMENT ACTS 2000 (AS AMENDED)
PLANNING AND DEVELOPMENT REGULATIONS 2001 (AS AMENDED)

Part 8 Development

NOTICE OF PROPOSED DEVELOPMENT

In accordance with Part XI, Section 179 of the Planning and Development Acts 2000 (as amended), and Part 8, Article 81 of the Planning and Development Regulations 2001 (as amended), notice is hereby given that Limerick City and County Council proposes to carry out the development described hereunder at the following site (of area 1.015 ha – 2.5 acres) at **Glenview, Hospital, Co Limerick:**

The Proposed Development will consist of:
(i) the provision of 20 no 2-storey residential units comprising 7 no 3 bed, 8 no 2 bed, 1 no 4 bed and 4 no 2 bed apartments (in 2 no 2-storey buildings).

The development will generally have vehicular access from Bank Place and pedestrian through-access to Glenview Drive; two units will have vehicular access from Glenview Drive only.

In accordance with SI 476-2011, Section 250, Planning and Development (Amendment) (No 3) Regulations 2011, the Council has carried out a screening and it has been determined that an appropriate assessment is not required.

Plans and particulars of this proposed development will be available for inspection and/or purchase at a fee not exceeding the reasonable cost of making a copy from the **17th November 2017 up to and including 18th December 2017** at the Planning and Environmental Services Department, Limerick City and County Council Offices, Doorndoyle Road, Limerick between 9 am - 4 pm Monday to Friday (excluding Bank Holidays).

Plans and particulars of the proposed development will also be available for inspection and/or purchase at a fee not exceeding the reasonable

Public Consultation Advertisement for Consultation Event no. 1 (notice of event placed in Limerick Leader newspaper on 18th November 2017)

Appendix 4.5

Public Consultation Questionnaire

Shannon Foynes
PORT COMPANY

PUBLIC CONSULTATION QUESTIONNAIRE

We would appreciate if you could take a few minutes to fill in our short questionnaire in relation to the proposed harbour development at Shannon Foynes Port.

What do you feel are the main issues with the proposed development?

_____

_____

Do you have any information you feel would be relevant to the Environmental Impact Assessment Report?

_____

_____

_____

If you wish, please provide your contact details below:

Name: _____

Address: _____

Phone Number: _____

Email: _____

Thank you for your cooperation

Appendix 4.6

Public Submissions Received

20 March 2018.

Mary Moylon.
Ardneer
Foynes
Co. Limerick

Dear Mr. Carlton,

I note that there was a public consultation process regarding the preparation of an Environmental Impact Assessement Report for the proposed development of the Port in Foynes on the 14th of March 2018.

As a landowner in Ardneer Foynes I submitted a response to the SFPC public consultation questionnaire on the 11th December 2017.

Below is a list of my objections to the proposed development to be included in the Environmental Impact Report being sent to Bord Pleanala.

1. My lands at Ardneer are adjacent to Foynes Port. The development of the Port will result in pollution to my lands, resulting in damage to my farm and live stock.
2. The wild life and fauna in Ardneed, which is in close proximity to the proposed development will be destroyed by such a large scale Project.

20/March/2018.

3. The development will impact the drainage and the quality of waters in Ardineer.

4. I will suffer financial loss due to the development and the value of my land will decrease.

Please note my position as outlined above.

Yours sincerely,

Mary Moylan.

My mobile number is. 087/9563472.
and my address to forward any information is.

Mary Moylan.
C/o queens pharmacy
7 Mitchel Street
Nenagh - Co. Tipperary.

Appendix 5

Examination of Alternatives

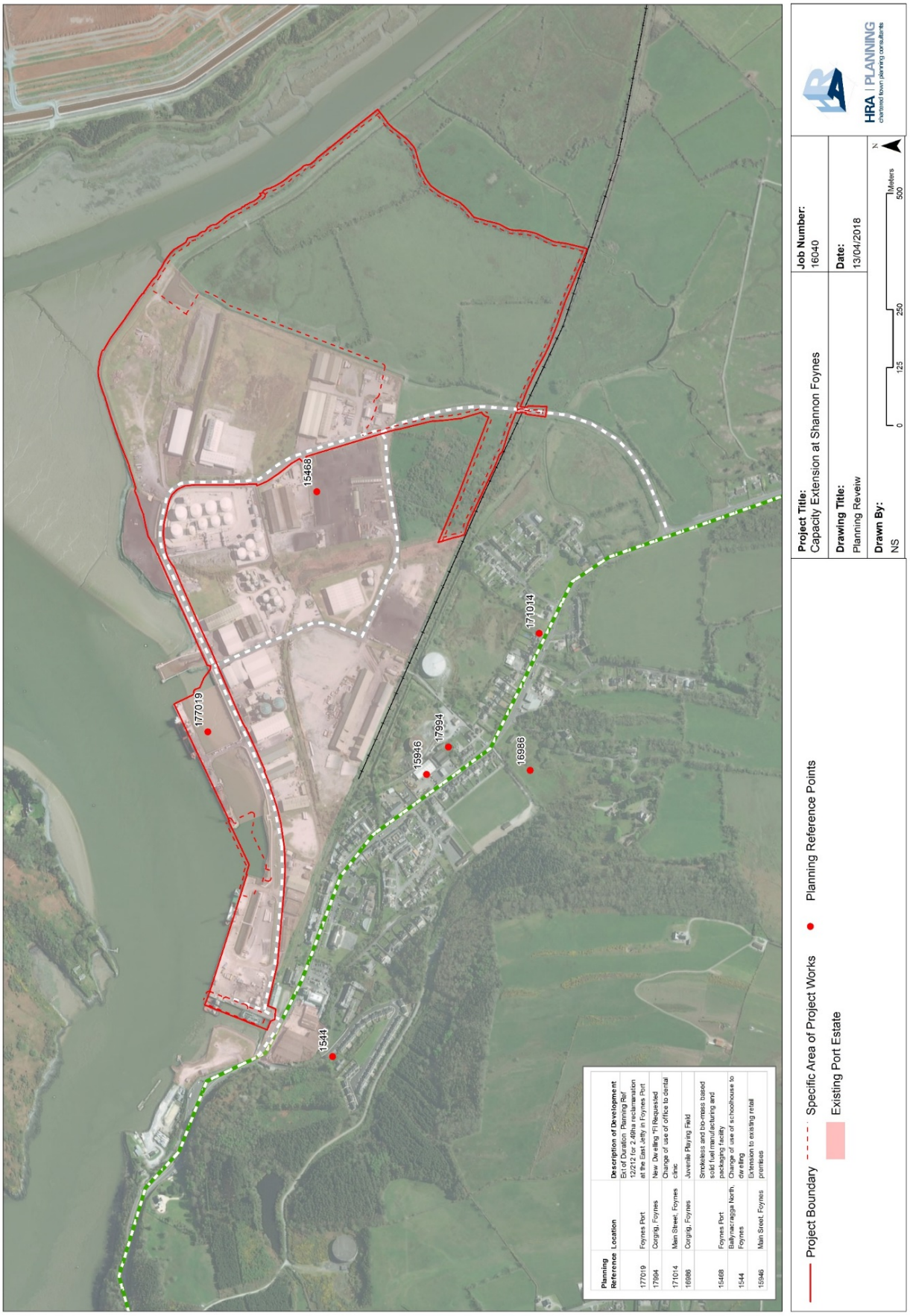
There is no appendix for Examination of Alternatives

Appendix 6

Population and Human Health

Appendix 6.1

Future Receptors – Planning Consents



Planning Reference	Location	Description of Development
177019	Foynes Port	Ext of Duration Planning Ref 12/212 for 2.48ha reclamation at the East Jetty in Foynes Port
17994	Coolgrig, Foynes	New Dwelling "FI Requested
171014	Main Street, Foynes	Change of use of office to dental clinic
16986	Coolgrig, Foynes	Juvenile Playing Field
15468	Foynes Port	Smokeless and bio-mass based solid fuel manufacturing and packaging facility
1544	Ballynacraggaa North, Foynes	Change of use of schoolhouse to dwelling
15946	Main Street, Foynes	Extension to existing retail premises

Appendix 7

Flora & Fauna, And Biodiversity

Appendix 7.1

Terrestrial Biodiversity Data Tables

Table A7.1: Scientific names of species described in the report

PLANTS	
Alder	*Alnus glutinosa*
Annual Meadow-grass	*Poa annua*
Ash	*Fraxinus excelsior*
Bent sp.	*Agrostis sp.*
Bird's-foot-trefoil	*Lotus corniculatus*
Bittersweet	*Solanum dulcamara*
Black Bindweed	*Fallopia convolvulus*
Black Medick	*Medicago lupulina*
Black Nightshade	*Solanum nigrum*
Blackthorn	*Prunus spinosa*
Bracken	*Pteridium aquilinum*
Bramble	*Rubus sp.*
Broad-leaved Dock	*Rumex obtusifolius*
Buddleia (Butterfly-bush)	*Buddleja davidii*
Bulrush	*Typha latifolia*
Bush Vetch	*Vicia sepium*
Cat's Ear	*Hypochaeris radicata*
Centaury	*Centaurium erythraea*
Charlock	*Sinapis arvensis*
Cinquefoil	*Potentiall sp.*
Cock's-foot	*Dactylis glomerata*
Colt's-foot	*Tussilago farfara*
Common Bent	*Agrostis capillaris*
Common Cord Grass	*Spartina anglica*
Common Couch	*Elytrigia repens*
Common Fleabane	*Pulicaria dysenterica*
Common Reed	*Phragmites australis*
Common Sorrel	*Rumex acetosa*
Common Spike-rush	*Eleocharis palustris*
Common Spotted-orchid	*Dactylorhiza fuchsii*
Common Vetch	*Vicia sativa*
Cornflower	*Centaurea cyanus*
Couch sp.	*Elytrigia sp.*
Cowslip	*Primula veris*
Creeping Buttercup	*Ranunuculus repens*
Creeping Thistle	*Cirsium arvense*
Crested Dogtail	*Cynosurus cristatus*
Curled dock	*Rumex crispus agg.*
Daisy	*Bellis perennis*
Dandelion	*Taraxacum agg.*
Dock	*Rumex sp.*
Duckweed sp.	*Lemna sp.*
Elder	*Sambucus nigra*
Eyebright	*Euphrasia sp.*
False Fox Sedge	*Carex otrubae*

False Oat-grass	*Arrhenatherum elatius*
Fescue	*Festuca sp.*
Fool's Watercress	*Apium nodiflorum*
Fumitory	*Fumaria officinalis*
Glaucous Sedge	*Carex flacca*
Golden Dock	*Rumex maritimus*
Great Burnet	*Sanguisorba officinalis*
Great Willowherb	*Epilobium hirsutum*
Greater Bird'sfoot-trefoil	*Lotus pedunculatus*
Greater Burnet Saxifrage	*Pimpinella major*
Greater Plantain	*Plantago major*
Groundsel	*Senecio vulgaris*
Hairy Violet	*Viola hirta*
Hard Rush	*Juncus inflexus*
Hart's-tongue Fern	*Asplenium scolopendrium*
Hawthorn	*Crataegus monogyna*
Hedge Mustard	*Sisymbrium officinale*
Hedge Woundwort	*Stachys sylvatica*
Herb Robert	*Geranium robertianum*
Hoary Willowherb	*Epilobium parviflorum*
Hogweed	*Heracleum sphondylium*
Hornbeam	*Carpinus betulus*
Honeysuckle	*Lonicera periclymenum*
Horsetail sp.	*Equisetum sp.*
Imperforate St. John's Wort	*Hypericium maculatum*
Ivy	*Hedera helix*
Japanese Knotweed	*Fallopia japonica*
Knapweed	*Centaurea nigra*
Lady's Bedstraw	*Galium verum*
Large Bindweed	*Calystegia sylvatica*
Lesser Bulrush	*Typha angustifolia*
Lesser Swinecress	*Lepidium didymum*
Lesser Trefoil	*Trifolium dubium*
Long-headed Poppy	*Papaver dubium*
Lords-and-ladies	*Arum maculatum*
Marsh Bedstraw	*Galium palustre*
Marsh Cinquefoil	*Comarum palustre*
Marsh Foxtail	*Alopecurus geniculatus*
Marsh Thistle	*Cirsium palustre*
Marsh Woundwort	*Stachys palustris*
Meadow Barley	*Hordeum secalinum*
Meadow Buttercup	*Ranunculus acris*
Meadow Thistle	*Cirsium dissectum*
Meadow Vetchling	*Lathyrus pratensis*
Meadowsweet	*Filipendula ulmaria*
Narrow-leaved Ragwort	*Senecio inaequidens*

Nettle	*Urtica dioica*
Nipplewort	*Lapsana communis*
Opposite-leaved Pondweed	*Groenlandia densa*
Perennial Rye-grass	*Lolium perenne*
Perennial Sow-thistle	*Sonchus arvensis*
Pignut	*Conopodium majus*
Pineappleweed	*Matricaria discoidea*
Prickly Sowthistle	*Sonchus asper*
Pyramidal Orchid	*Anacamptis pyramidalis*
Ragwort	*Senecio jacobaea*
Red Bartsia	*Odontites vernus*
Red Clover	*Trifolium pratense*
Redshank	*Persicaria maculosa*
Reed Canary-grass	*Phalaris arundinacea*
Ribwort Plantain	*Plantago lanceolata*
Rose	*Rosa spp.*
Rosebay Willowherb	*Chamerion angustifolia*
Round-headed Prickly Poppy (Rough Poppy)	*Papaver hybridum*
Rusty Willow	*Salix cinerea*
Scarlet Pimpernel	*Anagallis arvensis*
Scurvygrass	*Cochlearia danica*
Sea Beet	*Beta vulgaris subsp maritima*
Sea Mayweed	*Tripleurospermum maritimum*
Sea Club-rush	*Bolboschoenus maritimus*
Selfheal	*Prunella vulgaris*
Shepherds purse	*Capsella bursa-pastoris*
Sharp-flowered Rush	*Juncus acutiflorus*
Silverweed	*Potentilla anserina*
Smooth Sowthistle	*Sonchus oleraceus*
Soft-rush	*Juncus effusus*
Spear Thistle	*Cirsium vulgare*
St John’s-wort	*Hypericum sp.*
Summer Snowflake	*Leucojum aestivum*
Sweet Vernal Grass	*Anthoxanthum odoratum*
Sycamore	*Acer pseudoplatanus*
Thorn Apple	*Datura stramonium*
Timothy	*Phleum pratense sensu lato*
Tormentil	*Potentilla erecta*
Traveller's Joy	*Clematis vitalba*
Tree Mallow	*Malva arborea*
Triangular Club-rush	*Schoenoplectus triqueter*
Tufted Forget-me-not	*Myosotis laxa*
Turnip	*Brassica rapa*
Upright Hedge Parsley	*Torilis japonica*
Water Figwort	*Scrophularia auriculata*
Water Mint	*Mentha aquatica*

Water-cress	*Nasturtium sp.*
White Clover	*Trifolium repens*
Wild Angelica	*Angelica sylvestris*
Wild Carrot	*Daucus carota*
Willow	*Salix sp.*
Willowherb	*Epilobium sp.*
Winter Heliotrope	*Petasites fragrans*
Yarrow	*Achillea millefolium*
Yellow Rattle	*Rhinanthus minor*
Yorkshire-fog	*Holcus lanatus*
BATS	
Brandt's Bat	*Myotis brandtii*
Brown Long-eared Bat	*Plecotus auritus*
Common Pipistrelle	*Pipistrellus pipistrellus*
Daubenton's Bat	*Myotis daubentonii*
Leisler's Bat	*Nyctalus leisleri*
Lesser Horseshoe Bat	*Rhinolophus hipposiderus*
Nathusius' Pipistrelle	*Pipistrellus nathusii*
Natterer's Bat	*Myotis naterreri*
Soprano Pipistrelle	*Pipistrellus pygmaeus*
Whiskered Bat	*Myotis mystacinus*
TERRESTRIAL MAMMALS	
Badger (Eurasian Badger)	*Meles meles*
Bank Vole	*Clethrionomys glareolus*
Brown Rat	*Rattus norvegicus*
Fox (Red Fox)	*Vulpes vulpes*
Greater White-toothed Shrew	*Crocidura russula*
Hedgehog	*Erinaceus europaeus*
House Mouse	*Mus domesticus*
Irish Hare	*Lepus timidus hibernicus*
Irish Stoat	*Mustela erminea hibernica*
Mink (American Mink)	*Neovison vison*
Otter (European Otter)	*Lutra lutra*
Pine Marten	*Martes martes*
Pygmy Shrew	*Sorex minutus*
Rabbit (European Rabbit)	*Oryctolagus cuniculus*
Red Squirrel (Eurasian Red Squirrel)	*Sciurus vulgaris*
Wild Boar	*Sus scrofa*
Wood Mouse	*Apodemus sylvaticus*
OTHER VERTEBRATES	
Common Frog	*Rana temporaria*
Common Lizard (Viviparous Lizard)	*Zootoca vivipara*
European Eel	*Anguilla anguilla*

Smooth Newt	*Lissotriton vulgaris*
BUTTERFLIES & DRAGONFLIES	
Blue-tailed Damselfly	*Ischnura elegans*
Common Blue	*Polyommatus icarus*
Common Darter	*Sympetrum striolatum*
Brown Hawker	*Aeshna grandis*
Four-spotted Chaser	*Libellula quadrimaculata*
Grayling	*Hipparchia semele*
Green-veined White	*Pieris napi*
Large White	*Pieris brassicae*
Marsh Fritillary	*Euphydryas aurinia*
Meadow Brown	*Maniola jurtina*
Peacock	*Inachis io*
Ringlet	*Aphantopus hyperantus*
Scarce Blue-tailed Damselfly	*Ischnura pumilio*
Small Blue	*Cupido minimus*
Small White	*Pieris rapae*
Speckled Wood	*Pararge aegeria*
Variable Damselfly	*Coenagrion pulchellum*
Wall	*Lasiommata megera*
Wood White	*Leptidea sinapis*

Table A7.2: Protected plant species recorded in the vicinity of site of proposed development

Species	Common Name	Location	Source	Irish Grid	Record Date	Min. Distance from site*	Status	Habitat
Viola hirta	Hairy Violet	Foynes	NPWS database	R2050	1890	5.3 km	FPO. Threat Status: Vulnerable	Sand dunes, dry grassland and limestone rocks
		Aughinish Island	NPWS database	R2050	1904	5.3 km		
		Canon Island	NPWS database	R2050	1907	5.3 km		
		Poulaweala River	NPWS database	R2950	1974	2.7 km		
		Poulaweala River	NPWS database	R2952	1988	2.4 km		
		Barrigone	NPWS database	R2952	1998	2.4 km		
Papaver hybridum	Round Prickly-headed Poppy	Foynes	NPWS database	R2050	1906	5.3 km	FPO Threat Status: Regionally Extinct	Sandy fields, arable
Hordeum secalinum	Meadow Barley	Aughinish Island	Ciaran Cronin	R2752	23/06/2017	1.5 km	FPO Threat Status: Vulnerable	Upper parts of brackish marsh
		Foynes	NPWS database	R2050	1905	5.3 km		
		within 10km	NBDC Maps		31/12/2006	<10 km		
Sanguisorba officinalis	Great Burnet	Aughinish Island	NPWS database	R275513	27/07/2004	0.9 km	FPO Threat Status: Vulnerable	Damp, unimproved grassland / dry banks
		Aughinish Island	Ciaran Cronin	R2752	23/06/2017	1.5 km		
Centaurea cyanus	Cornflower	within 10km	NBDC Maps		22/07/2008	<10 km	Threat Status: Waiting List	Formerly in arable fields; waste ground

Table A7.3: Camera Trap Deployments and Capture Summary

Deployment	*Camera*	*Easting (ITM)*	*Northing (ITM)*	*Location Description*	*Deployment Date*	*Date Ceased Recording*	*No. Dates Operational*	*No. Hours Operational*	*Mammals Detected (No. Captures)*
1	1	526329	652049	On Pool in NW, on culvert	06/12/2016	27/12/2016	22	499	None
2	1	526381	652023	On pool in NW, staked at NE corner	15/02/2017	28/02/2017	14	314	None
3	2	526488	651324	Eastern hedgerow (H1)	15/02/2017	28/02/2017	14	318	Irish Hare (3), Red Fox (1), Brown Rat (3)
4	1	526488	651324	Eastern hedgerow (H1)	23/03/2017	08/04/2017	17	381	Badger (2), Irish Hare (60), Irish Stoat (3), Red Fox (3), Small Mammal sp (6)
5	2	526381	652023	On pool in NW, staked at NE corner	23/03/2017	26/03/2017	4	79	None
6	1	526117	651318	Culvert B (T3)	26/04/2017	09/05/2017	14	313	Bat Sp (1), Hedgehog (2), Irish Hare (49), Red Fox (7), Unknown (5)
7	2	526267	651398	Internal Hedgerow (H7)	26/04/2017	09/05/2017	14	310	Irish Hare (29), Mouse sp. (1), Red Fox (5), Unknown(2)
8	1	526550	651513	Internal Hedgerow (H2)	09/05/2017	07/06/2017	30	684	Irish Hare (5), Red Fox (6), Unknown (1)
9	2	526423	651655	Internal Hedgerow (H4)	09/05/2017	07/06/2017	30	683	Domestic Dog (1), Irish Hare (20), Badger (1), Stoat (13)
10	1	525989	651302	Railway Treeline (T2)	13/06/2017	22/06/2017	10	202	Domestic Cat (2)
11	2	526488	651866	Culvert D (in north)	13/06/2017	22/06/2017	10	209	Domestic Dog (1), Brown Rat (2), Irish Hare (37), Red Fox (14), Stoat (4), Badger (3)

Table A7.4: Mammal species known from vicinity of site

Area	Species	Evidence	Protected Status
1km SW from site	Eurasian Red Squirrel	Desktop - Irish Squirrel Survey, 2012	Wildlife Acts
700m west of site	Bank Vole	Desktop, 10 trapped nearby in 2011	None, Invasive
On-Site	Brown Rat	Camera	None, Invasive
On-Site	Small Mammal sp (Wood Mouse or House Mouse)	Camera & Signs	None
On Site	Irish Hare	Sightings and Camera	Habitats Directive Annex V Wildlife Acts
On-Site	Hedgehog	Camera	Wildlife Acts
1.1km west of site	Greater White-toothed Shrew	Desktop, trapped nearby in 2010	None, invasive
On Site	Red Fox	Camera and Signs	None
On Site	Eurasian Badger	Camera and Tracks	Wildlife Acts
On Site	Otter	Signs and Trails	Habitats Directive Annex II & Annex IV Wildlife Acts
On Site	Pine Marten	Signs	Habitats Directive Annex V Wildlife Acts
On Site	Irish Stoat	Camera	Wildlife Acts

Appendix 7.2

Bat Survey Report

Port of Foynes Capacity Extension & Harbour Development

Bat Survey Report

DOCUMENT CONTROL SHEET

Client:	**Shannon Foynes Port Company**						
Project Title:	**Port of Foynes Capacity Extension & Harbour Development**						
Document Title:	**Bat Survey Report**						
Document No:	**NI1773.Rpt.Ec01**						
This Document Comprises:	**DCS**	**TOC**	**Text**	**Appendices**	**Figures**	**Tables**	**Photographic Plates**
	1	**1**	**45**	**2**	**10**	**6**	**50**

Rev.	Status	Author(s)	Reviewed	Approved	Office	Issued
A01	For issue	CC	JMC	JMC	Belfast	16.03.2018

Confidentiality statement;

The information disclosed in this proposal should be treated as being strictly private and confidential and you are requested to take all reasonable precautions to maintain its status as such. You are requested to use and apply the information solely for the purpose of evaluating this proposal and are asked not at any time to disclose or otherwise make available the information to any third party except for those officers, employees and professional advisers who are required by you in the course of such evaluation to receive and consider the information and who agree to be bound by these non-disclosure terms.

TABLE OF CONTENTS

1 INTRODUCTION 1
1.1 SITE LOCATION 1
1.2 PROPOSED DEVELOPMENT 4
2 METHODOLOGY 5
2.1 BAT SURVEY 5
2.1.1 Activity Surveys 5
2.1.2 Roost Surveys 7
3 SURVEY RESULTS 10
3.1 BAT SPECIES ACCOUNTS 12
3.1.1 Pipistrelles 12
3.1.2 Myotis Bats 13
3.1.3 Leisler's Bat 16
3.1.4 Brown Long-eared Bat 17
3.1.5 Lesser Horseshoe Bat 19
3.2 COMMUTING AND FORAGING HABITATS FOR BATS 22
3.2.1 Old Tree-lined Railway Line 22
3.2.2 River 22
3.2.3 Drainage Channels and Artificial Pond 24
3.2.4 Hedgerows/Treelines of Field Boundaries 25
3.2.5 Port Areas 27
3.2.6 Connectivity with Wider Landscape 27
3.3 POTENTIAL ROOST FEATURES 28
3.3.1 Bat Roost Potential in Structures 29
3.3.2 Bat Roost Potential in Trees 34
3.4 SUMMARY OF BAT RESULTS 45
APPENDIX I: PHOTOS OF ENGINEERING SHED LEAN-TO STRUCTURE 46
APPENDIX II: SAMPLE BAT ACOUSTIC RECORDINGS 55

1 INTRODUCTION

RPS was commissioned by Shannon Foynes Port Company to undertake bat surveys of lands in relation to the proposed extension of Foynes Port to inform an Environmental Impact Assessment Report. Initial survey work in 2016 identified a need for further survey work on mammals, which was undertaken in 2016 and 2017.

1.1 SITE LOCATION

The project area comprises the following main components, forming one overall project proposal as shown in Figures 1 and 2.

Component 1: The Durnish lands.

This forms the main body of the survey area and is located on the eastern boundary of the port of Foynes, in Co. Limerick. It consists primarily of a number of enclosed fields, with internal and boundary hedgerows, and a small river following the southern border. At its' northern border it is adjacent to the Robertstown River which drains into the Shannon Estuary adjacent to the site. The centre of the Durnish site is located at approximate Irish Grid Reference R 264 516. The Robertstown River forms part of the *River Shannon and River Fergus SPA* (Site Code 004077), as well as the *Lower River Shannon SAC* (Site Code 002165). These two designated Natura 2000 sites thus adjoin this portion of the site, although the site itself is not within them.

A disused railway line passes through the southern portion of the Durnish site in a south-east/north-west direction, and the main entrance road to the port runs north/south, effectively splitting the Durnish site into quadrants. The railway corridor itself is not contained within the site boundary. The western boundary of the Durnish site adjoins a number of industrial sites within the port, and the south-western extremity is adjacent to a small housing estate at the periphery of Foynes town (Dernish Avenue). The eastern and southern boundaries adjoin habitats similar to those adjacent within the site.

Component 2: The jetty extension

This component involves the joining of two jetties in the main port area, the eastern and western jetties, on the south shore of the River Shannon. The inner areas will be filled, with the outer portions resting on piles. The centre of this area is located at approximate Irish Grid Reference R 252 518. The jetty extension area is located within the *Lower River Shannon SAC.* The jetties are both man-made concrete structures, currently used for shipping and cargo handling and storage. Habitats in the area are almost entirely industrial with little vegetation, comprising offices, warehouses or similar, and associated infrastructure. Assessment of the intertidal and benthic marine habitats and ecology has been commissioned separately.

Figure 1: Site Location and Extent

Figure 2a: Site Boundary (Jetty)

Figure 2b: Site Boundary (Durnish)

1.2 PROPOSED DEVELOPMENT

The proposed development comprises the construction of a jetty extension between the existing East Jetty and West Quay at the Port of Foynes, and the development of lands at Durnish. The proposed works are separated into two sections:

- East Jetty Extension Works
- Durnish Lands Development

The project aims to increase the cargo storage capability of the port. The jetty extensions will provide an increased area for shipping, cargo handling and storage operations, while the Durnish lands will provide for additional cargo storage and general port related activity.

2 METHODOLOGY

2.1 BAT SURVEY

Bat surveys were conducted primarily in accordance with the latest guidance "*Bat Surveys for Professional Ecologists: Good Practice Guidelines, 3rd Edn*" (Collins, 2016). Further guidance on survey and impact assessment was taken from "*Bat Mitigation Guidelines for Ireland, Irish Wildlife Manuals, No.25*" (Kelleher & Marnell, 2006). Information on population trends, distribution and threats was taken primarily from the Bat Conservation Ireland publication "*Irish Bats in the 21st Century*" (Roche et al., 2014).

The results of this survey are presented in Section 3.

The initial desktop review and habitat surveys identified a potential for usage of the site by bats. The desktop review also included an assessment of habitat connectivity of landscape features such as hedgerows, woodland, and waterways from aerial photography and historic maps (e.g. Google Earth and Bing maps and Ordnance Survey Ireland historic 6-inch maps dating from c. 1829-41).

The entire site (Durnish area, jetty area and road) was subsequently surveyed, by walkover survey on 15/11/2016. Surveyors were bat specialist Dr. Isobel Abbott, and Ciarán Cronin. That survey resulted in a preliminary identification and assessment of a number of potential roost features (PRF's) for bats in trees on site, as well as features suitable for bat commuting and foraging. Particular note was made of hedgerows, treelines, trees and wetlands/waterways on site. Hedgerows were assessed for bat usage in terms of their age, structure, species composition and connectivity with other site features and the wider landscape. All potential roost features were identified, photographed and their positions recorded. That bat assessment was undertaken outside the optimal timeframe for active bat surveys (May to September), and as such relied on daytime visual habitat assessment only.

Further targeted bat surveys were then conducted monthly between April and June 2017. Two separate survey methods were employed at the site – Activity surveys and Roost surveys. Given the nature of the landscape (very wet, near deep water, evidence of drinking/antisocial behaviour, livestock often present) it was required to have two surveyors per visit for safety reasons. Surveyors worked separately in some areas and together in higher risk areas, and were in contact throughout.

2.1.1 Activity Surveys

Bat activity surveys were conducted using a mixture of manual transect surveys and static detector surveys in order to comprehensively assess usage of the site by bats.

Manual activity surveys were conducted across the site on one dusk period per month (April – June 2017). Survey effort is listed in Table 1. These consisted of a series of 3 minute spot counts, covering a total of 42 pre-determined spots per survey as illustrated in Figure 3, along a walked transect. Transect Spot Counts generally took place from sunset to 3 hours after sunset, although on some particularly bright evenings start times were delayed until light levels were sufficiently faded that there was a likelihood of encountering bats.

Spots were placed strategically around the site as illustrated in Figure 3, at targeted locations to cover the full range of habitats present. Start points along the route were staggered between surveys to offset any biases due to timing of activity. Surveying continued while transiting between spots to increase the chances of recording rarer species, although only spot counts were analysed and presented. Surveys were conducted using broadband detectors, with presence or absence of species and feeding activity recorded at each spot. The use of spot counts to record bat activity was primarily chosen on Health & Safety grounds as ground conditions on site were predominantly rough and it allowed surveyors to pay attention to their footing whilst moving between spots. It also allowed for the potential for individual spots to be omitted for safety reasons (eg antisocial behaviour or animal presence), without necessarily losing a whole transect. It was thus deemed the safest approach at this particular site.

Some bat species are difficult to detect and others may only use the site on occasion. Therefore, in order to supplement the manual activity surveys, 2 or 3 static bat detectors were also deployed at strategic locations on site each month (April – July 2017), for periods ranging from 3 to 16 nights at locations illustrated in Figure 4. Static detectors were deployed for a combined total of 66 nights (40 non-overlapping nights), in 9 separate locations in the Durnish area. Deployment locations were chosen to cover the main parts of the site where bat activity was likely and to maximise the possibility of detection of target species. Two SM4 (Wildlife Acoustics) and an Anabat Express (Titley Scientific) were used. Survey effort is listed in Table 2.

These allowed for further detection of species not present or not detected on transect surveys. Activity or static surveys were not conducted at the site of the proposed jetty extension between the existing East Jetty and West Quay. It was determined that there are no features present here of value to the local population of bats.

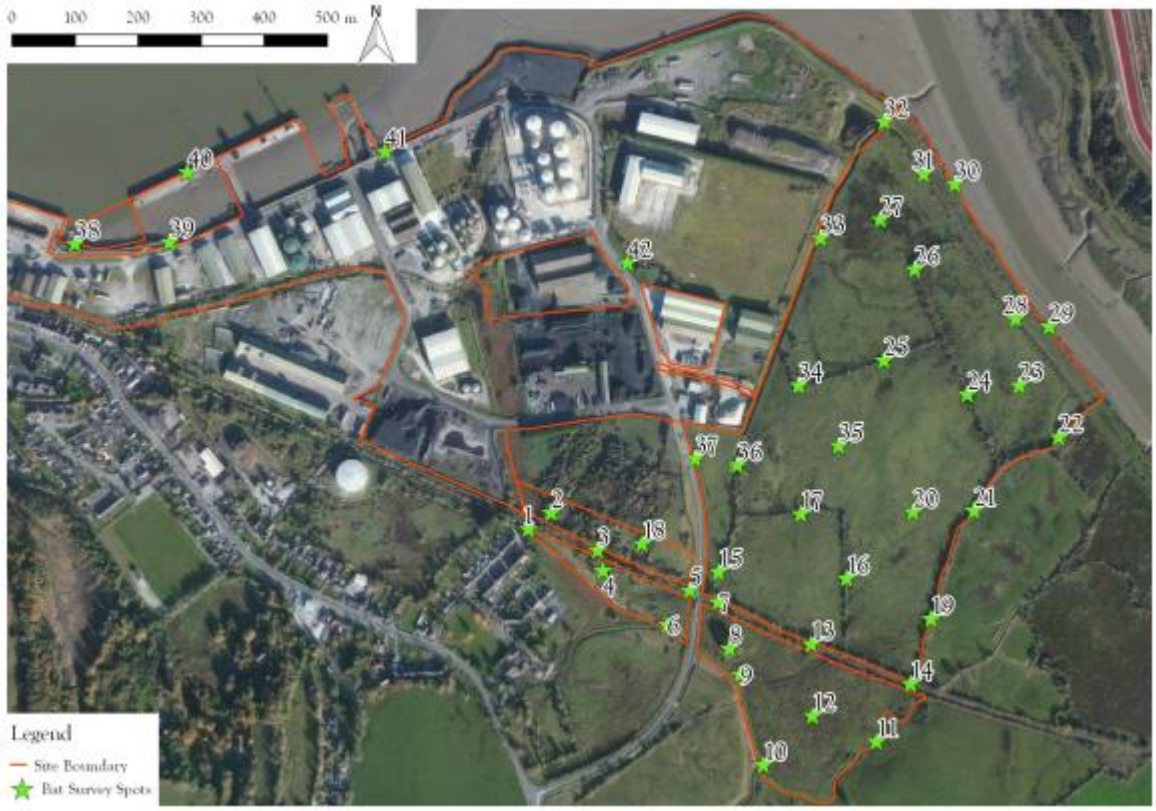


Figure 3: Bat Transect Spot Locations

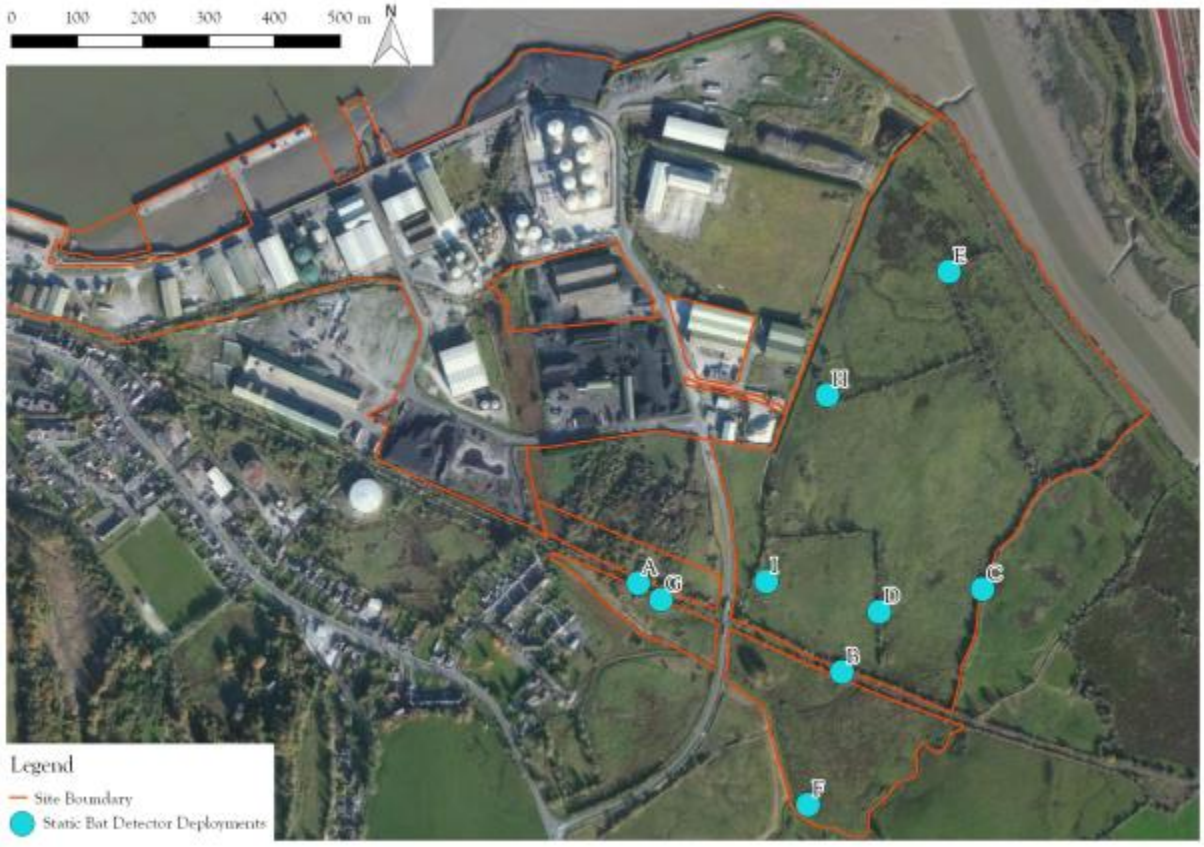


Figure 4: Deployment Locations of Static Detectors

2.1.2 Roost Surveys

A number of potential bat roost features in trees on the site were identified in the initial site survey in November 2016. Tree roosts of bats are notoriously difficult to identify and assess, are very variable in usage rates as roost features can be used by bats in a number of different ways, some bats can move roosts very regularly, or utilise different roosts at different times, both within the same night or through the season.

Also, and importantly, most mature boundary vegetation at the site of proposed development is to be retained and supplemented. Therefore, in order to provide information on trees that could possibly contain roosts identified in the 2016 survey, visual and acoustic surveys were conducted on individual trees or close clusters of trees at least once between April and June 2017, either at dawn or dusk to provide information on whether or not bat activity and calls were occurring in proximity to trees at emergence or re-entry times. Dawn re-entry surveys were conducted from 2 hours before sunrise, to 15 mins after, while dusk emergence surveys were conducted from 15 mins before sunset to 2 hours after.

An extension to an industrial unit which is to be demolished for a mid-point access road into the site was visually inspected both internally and externally. Roost surveys were not conducted at the site of the proposed jetty extension between the existing East Jetty and West Quay. It was determined that there are no features present here of roosting value to the local population of bats.

Table 1: Bat Survey Effort (Transect Spots and Roost surveys)

Date	Start Time	End Time	Sunrise/Sunset	Survey Type	Surveyors	Area Surveyed	Wind	Cloud / 8	Temp °C (Min-Max)	Precipitation
15/11/2016	09:30	16:00		Daytime inspection	Isobel Abbott & Ciarán Cronin	Durnish lands, port areas and road	1	6	13	Light Showers
25/04/2017	21:20	00:10	21:10	Spot Transect	Isobel Abbott	Spots 1 - 18, 37 - 39	N - 1	1	4 - 7	Nil
25/04/2017	21:20	00:10	21:10	Spot Transect	Ciaran Cronin	Spots 19 - 36, 40 - 42	N - 1	1	4 - 7	Nil
26/04/2017	05:30	07:44	05:44	Dawn Roost	Isobel Abbott	Roosts 8,22	N - 1	2	7	Nil
26/04/2017	05:30	07:44	05:44	Dawn Roost	Ciaran Cronin	Roosts 9,10,11	N - 1	2	7	Nil
08/05/2017	20:50	22:45	21:16	Dusk Roost	Ciaran Cronin	Roost 12	0	3	11	Nil
09/05/2017	04:12	05:50	05:53	Dawn Roost	Ciaran Cronin	Roost 23,24	SE - 1	4	7 - 8	Nil
09/05/2017	21:35	00:20	21:50	Spot Transect	Isobel Abbott	Spots 1 - 18, 37 - 39, 41	S - 1	3	11 - 13	Nil
09/05/2017	21:35	00:20	21:50	Spot Transect	Ciaran Cronin	Spots 19 - 36, 40, 42	S - 1	3	11 - 13	Nil
10/05/2017	04:20	05:49	05:52	Dawn Roost	Isobel Abbott	Roost 13,14	0	2	12	Nil
10/05/2017	04:05	05:55	05:52	Dawn Roost	Ciaran Cronin	Roost 15,16	0	2	12	Nil
06/06/2017	21:40	23:50	21:56	Dusk Roost	Ciaran Cronin	Roost 21,25,26,27	W - 1	4	11	Nil
07/06/2017	03:19	05:08	05:19	Dawn Roost	Ciaran Cronin	Roost 4,5,6,7	0	8	10 - 11	Nil
13/06/2017	22:12	00:42	22:01	Spot Transect	Isobel Abbott	Spots 1 - 18, 38 - 39	S - 3	7	14 - 15	Nil
13/06/2017	22:12	00:42	22:01	Spot Transect	Ciaran Cronin	Spots 19 - 36, 40 - 42	S – 3	7	14 - 15	Nil
14/06/2017	04:05	05:14	05:18	Dawn Roost	Isobel Abbott	Roost 17,18,19	1	7	13	Nil
14/06/2017	04:05	05:23	05:18	Dawn Roost	Ciaran Cronin	Roost 20,28,29	0	7	12	Nil
22/06/2017	21:50	23:40	22:05	Dusk Roost	Ciaran Cronin	Roost 1,2,3	W - 1	8	13 - 15	Heavy rain from 23:40
13/03/2018	11:15	12:45	n/a	Daytime inspection	James McCrory	industrial unit at proposed access road	SW - 1	5	11	Nil

Table 2: Survey Effort (Static Bat Detectors) - For Deployment locations see Figure 4

Deployment	Device	Surveyor	Start Date	End Date	Nights Running	Nights Analysed**
A	SM4_S4U00970	Isobel Abbot	25/04/2017	03/05/2017	8	6
B	SM4_S4U00496	Isobel Abbot	25/04/2017	03/05/2017	8	6
C	SM4_S4U00970	Isobel Abbot	09/05/2017	12/05/2017	3	3
D	SM4_S4U00496	Isobel Abbot	09/05/2017	15/05/2017	6	6
E	SM4_S4U00496	Isobel Abbot	13/06/2017	19/06/2017	6	6
F	SM4_S4U00970	Isobel Abbot	14/06/2017	19/06/2017	5	5
G	Anabat Express V5506L	Ciaran Cronin	10/05/2017	25/05/2017	16	16
H	Anabat Express V5506L	Ciaran Cronin	07/06/2017	13/06/2017	6	6
I	Anabat Express V5506L	Ciaran Cronin	14/06/2017	22/06/2017	8	8

*** Nights analysed refers to full analysis for all species. Myotis, Brown Long-eared and Lesser Horseshoe bats were checked for on all nights.*

3 SURVEY RESULTS

All Irish bats are protected under Annex IV of the European Habitats Directive (*"Animal and plant species of community interest in need of strict protection requiring strict protection"* ie protected wherever they occur), but Lesser Horseshoe Bat has additional protection under Annex 2 (*"Animal and plant species of community interest whose conservation requires the designation of special areas of conservation")*.

All Irish bat species are also afforded protection under the Irish Wildlife Acts, which makes it an offence to wilfully interfere with, or destroy, the breeding or resting place of these species.

Seven species of bat, including Lesser Horseshoe Bat, were recorded at the site on surveys between April and July 2017 and these are described below, grouped for ease of reference. April was a cool month and the April transect spot survey recorded only one bat. More were recorded in April by static detectors, and there were significantly more bats recorded in May and June in all survey types. Although bats were recorded throughout the site, the bulk of both activity and species diversity was centred around the railway corridor. There were differences in results between static detectors and transect counts, and results for both type are presented.

Acoustic detection of bats, whilst a very valuable survey tool, does not provide an indication of the numbers of individual bats or population size in an area. For example, 100 registrations of a particular bat species might result from a single bat making 100 passes, 100 bats each making a single pass, or any combination between. Numbers of passes should therefore be treated as an index of activity and not as representative of a population size.

Table 3 summarises bat activity registrations (passes) from static detectors, showing the mean number of registrations per night and the percentage of analysed full nights on which the species was recorded.

Table 3: Summary of activity registrations (passes) from static detectors, showing the mean number of registrations per night and the percentage of analysed full nights on which the species was recorded.

	Common Pip.		*Soprano Pip.*		*50kHz Pip.*		*Leisler's*		*Brown Long-eared*		*Natterer's*		*Whiskered*		*Myotis sp.*		*Lesser Horseshoe*	
Location	***Mean/ night***	***% Nights***	***Mean/ night***	***% Nights***	***Mean/ night***	***% Nights***	***Mean/ night***	***% Nights***	***Mean/ night***	***% Nights***	***Mean/ night***	***% Nights***	***Mean/ night***	***% Nights***	***Mean/ night***	***% Nights***	***Mean/ night***	***% Nights***
A	71.2	100.0	26.8	100.0	7.8	83.3	1.8	50.0	0.0	0.0	0.8	33.3	0.0	0.0	0.0	0.0	0.2	16.7
B	61.0	100.0	91.0	100.0	9.0	100.0	4.0	66.7	0.2	16.7	0.5	33.3	0.0	0.0	0.0	0.0	0.3	16.7
C	80.3	100.0	66.3	100.0	35.0	100.0	12.3	100.0	0.3	33.3	0.3	33.3	1.0	33.3	0.0	0.0	0.0	0.0
D	56.7	100.0	56.5	100.0	8.3	83.3	8.0	100.0	0.2	16.7	0.2	16.7	0.0	0.0	1.0	50.0	0.0	0.0
E	200.8	100.0	363.8	100.0	43.8	100.0	121.5	100.0	0.0	0.0	0.2	16.7	0.0	0.0	0.0	0.0	0.0	0.0
F	20.8	100.0	11.4	100.0	5.6	100.0	44.6	100.0	0.0	0.0	4.6	80.0	0.0	0.0	0.2	20.0	0.0	0.0
G	19.6	100.0	10.3	100.0	2.6	87.5	9.8	100.0	0.8	50.0	0.0	18.8	0.0	0.0	1.8	62.5	0.1	12.5
H	31.8	83.3	21.0	83.3	9.8	83.3	5.3	83.3	0.2	16.7	0.0	0.0	0.0	0.0	0.5	16.7	0.0	0.0
I	38.9	100.0	19.4	87.5	26.6	100.0	22.3	100.0	0.9	25.0	0.1	12.5	0.0	0.0	1.6	75.0	0.6	12.5

3.1 BAT SPECIES ACCOUNTS

3.1.1 Pipistrelles

Three Pipistrelle species occur in Ireland. Common and Soprano Pipistrelles are two of the most abundant bat species, while Nathusius' Pipistrelle is scarcer and more localised, with some resident individuals and others assumed to be migrants. Common and Soprano Pipistrelles were the most commonly encountered bat species at the Durnish site of proposed development. Nathusius' Pipistrelle was not recorded and is not known from the wider area (nearest known record is 16km away in 2014). Records from surveys are shown in Figure 5.

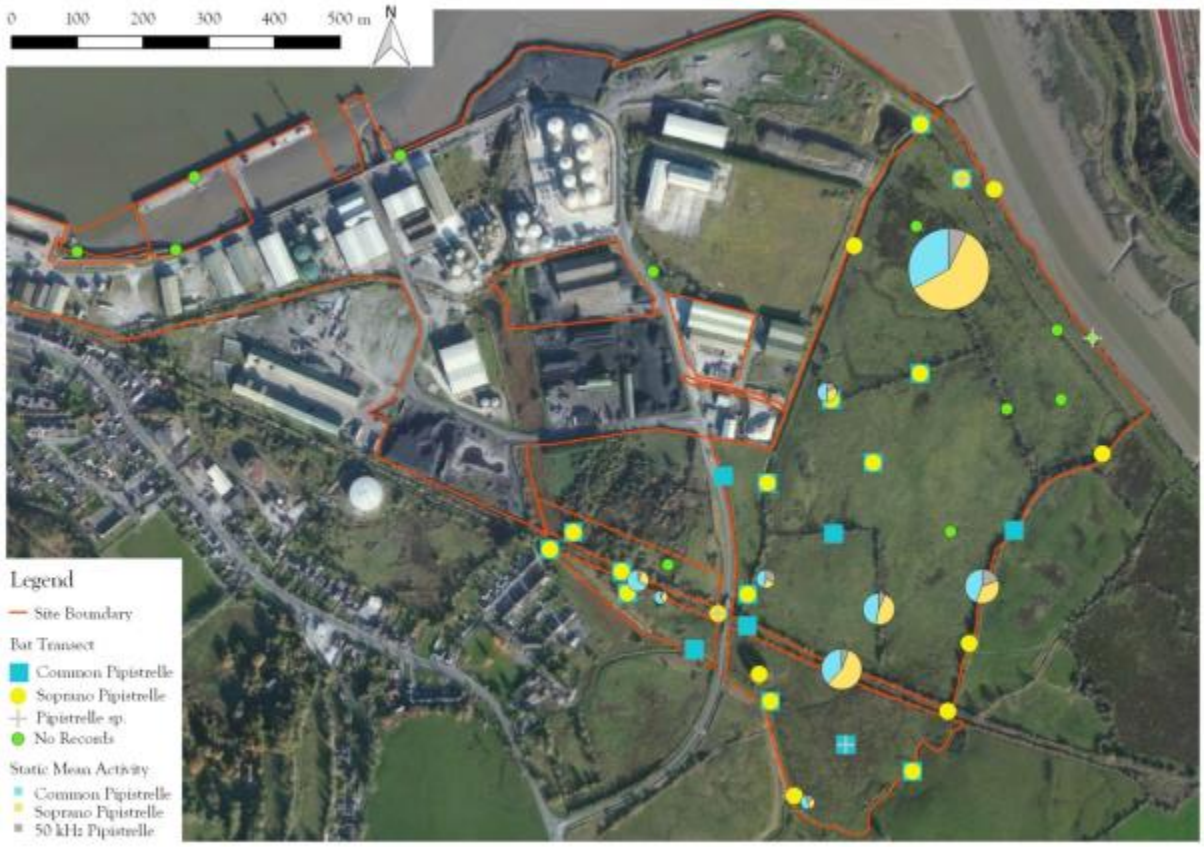


Figure 5: Pipistrelle records from site (Static symbols relative to highest mean registrations/night)

Although transect records show a wide distribution of Common and Soprano Pipistrelles at the site of proposed development at Durnish, it was clear that numbers of registrations in the northern parts were far fewer than in the southern section, with activity particularly pronounced around the railway corridor and eastern hedgerow. However, the static detectors showed a distinctly and anomalously high number of registrations, including feeding buzzes and some social calls, in June at location E (refer Figure 4) in the Phase II site of proposed development at Durnish. It is not known if this is a regular feature in this area. There was also a high level of activity noted south of and outside of the site of proposed development at the river. Registrations of Soprano Pipistrelles averaged somewhat higher than Commons.

There was no Pipistrelle activity noted within the existing port section of the site.

Summer roosts have been found primarily in buildings and they are assumed to hibernate in buildings and trees but hibernacula have been seldom recorded in Ireland. Foraging habitat appears to be primarily associated with tree lines, hedgerows and woodland (NPWS, 2009), although Soprano Pipistrelles are often found closer to water.

No roosts were detected at the site of proposed development. However, activity strongly indicative of the presence of a Common Pipistrelle roost was noted along the western section of the railway corridor outside of the site of proposed development, in the vicinity of Potential Roost Features (PRF's) 1 & 3, and 6/7 (Refer Section 3.3 for discussion on PRFs and Figure 10 for PRF locations). Bats were seen circling and foraging actively around suitable trees, very early in the evening, and were possibly seen entering and exiting PRFs 1 and 3. Although Soprano Pipistrelles were also noted later, these appeared to be mostly coming in from the west (Foynes town).

At the eastern section of railway, behaviour was also noted around PRF 25 to the south of the proposed open storage area which was suggestive of roost activity (early emergence, lots foraging) of both Pipistrelle species, although this was not certain.

In addition, a lot of late morning commuting and foraging of both Pipistrelle species was noted along the eastern Hedgerow H1 (refer Figure 7.2 of Chapter 7), although most bats were seen to fly off to the north or south at the last minute.

Common and Soprano Pipistrelles are the most common bat species in Ireland and widespread through the country (NPWS, 2009). They are classified as Least Concern in the Irish Red List of Terrestrial Mammals (Marnell et al, 2009), both in Ireland and Europe, and are given a Favourable Conservation Status in the most recent reports on the Status of EU Protected Habitats and Species in Ireland (NPWS, 2013). As with all Irish bat species, these species are protected species under the Wildlife Acts and Annex IV of the Habitats Directive.

Due primarily to their protected status and their widespread and common status in Ireland, these two species as biodiversity features at this site of proposed development, are assessed to be of local (higher) value.

3.1.2 Myotis Bats

Identifying Myotis bats from acoustic data is extremely difficult and usually not possible, and these species are treated as a group here for that reason, despite having differing ecologies. Of all the species, Natterer's Bat has the widest range of vocalisation frequency and can sometimes be identified as a result of this, as at this site. Records of individually identified Myotis species, based solely on acoustic data, should always be treated with a degree of caution however. Myotis bat activity was recorded at the site of proposed development in small amounts but in widespread locations (Figure 6), although very few were recorded north of the railway in the actual site of proposed development. Myotis bats showed a clear preference for habitat features to the south of the site, in particular near the stream and along the railway corridor, with lower activity on the eastern hedgerow and even less within the site of proposed development. The highest amount of activity was recorded near the stream to the south of the site by static detector in June.

A Natterer's Bat was seen and recorded feeding near this location during spot counts in June, and many of the static recordings were strongly suggestive or characteristic of this species, showing the characteristic steep and short broadband frequency sweep (see Appendix II). Natterer's Bats were identified from acoustic data along the railway on 5 of 24 nights in May, with unidentified Myotis on an additional 11 of 24 nights.

The high level of Natterer's Bat activity near the stream in the south was concentrated over two nights (20 of the 23 records), although activity was recorded on 4 out of 5 nights here. Almost all activity was recorded between 0100 and 0230 hours (21 of 23 records).

Whiskered Bat was identified from acoustic static detector data along the eastern hedgerow, giving 3 recordings on the night of 11/12 May (see Appendix II), two close together at 2321/2322 hours, and another at 0506 hours. The extremely similar Brandt's Bat has been recorded on a very few occasions in Ireland, and while that species cannot be entirely excluded here, on current knowledge it is much more likely that records refer to Whiskered Bat, and they are treated as such. A consultation response from Bat Conservation Ireland shows that this species has also been recorded within approximately 1km south of the site boundary. As a primarily woodland species it is considered to be an occasional visitor to the site due to low amount of suitable foraging habitat.

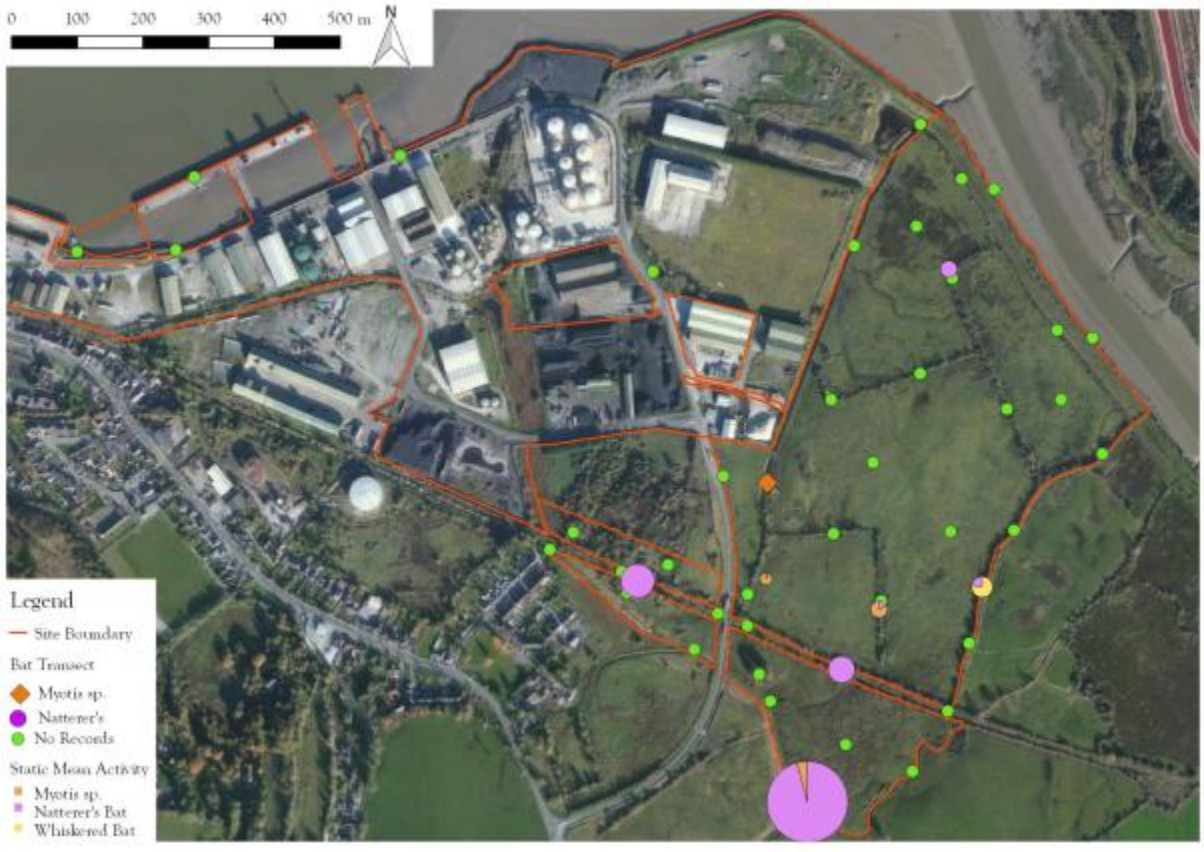


Figure 6: Myotis records from site (Static symbols relative to highest mean registrations/night)

Daubenton's Bat was not identified at the site of proposed development. Although some waterbodies exist close to or on the site, these are generally small and congested with plant life, thus of reduced suitability for this species. A consultation response from Bat

Conservation Ireland shows that this species has been recorded within approximately 1km south of the site boundary. It is considered unlikely to regularly occur on site due to lack of habitat.

There was no activity of Myotis Bats noted from within the port section of the site.

Myotis bats are the some of the least studied or recorded resident bat species in Ireland. Foraging habitat of Whiskered Bats appears centred on grassland surrounded by hedgerows, or woodland, while Natterer's prefers to glean prey from broad leaved woodland, and tree lined river corridors, ponds and grassland. Daubenton's are primarily associated with slow moving waterbodies. Nonetheless, all species can be found in hedgerow and woodland habitats (NPWS, 2009).

Summer and nursery roosts of Whiskered and Natterer's have been found primarily in buildings, with roosts usually consisting of small numbers of individuals, although both species have also regularly been found roosting in bridges. Daubenton's has been found primarily roosting in bridges, although is often also found in buildings in summer (probably prefers older buildings near water). All have been recorded roosting in trees, and Daubenton's has also been recorded in bat boxes (Schwegler type) in Ireland (NPWS, 2009).

Whiskered hibernate in a range of underground sites, while Natterer's have been primarily found in caves or underground sites, but with some records from ruined buildings and bridges. Hibernacula of Daubenton's bats are rarely found, but it is likely that they commonly use underground sites (NPWS, 2009).

No activity suggestive of roosting on site was detected for any Myotis bats, although these species can enter and leave roosts late and our level of roost work was unlikely to detect roosting Myotis bats especially in the small numbers likely to be present on site.

Whiskered, Natterer's and Daubenton's appear to occur in widespread locations throughout the country, but only Daubenton's appears to be common (NPWS, 2009). Both Whiskered and Natterer's appear to be scarce, although both species can be found in small numbers in the right habitats. They are all classified as Least Concern in the Irish Red List of Terrestrial Mammals (Marnell et al, 2009), both in Ireland and Europe, and all are given a Favourable Conservation Status in the most recent reports on the Status of EU Protected Habitats and Species in Ireland (NPWS, 2013). As with all Irish bat species, these species are all protected species under the Wildlife Acts and Annex IV of the Habitats Directive.

Natterer's Bat appears to be the most regularly occurring Myotis Bat at the site of proposed development, particularly along the railway corridor and over grassland adjacent to the stream to the south of the site of proposed development. Given its general scarcity on a national level, and the apparently regular occurrence on site the species, as a biodiversity feature at this site of proposed development, is assessed to be of County value.

Whiskered Bat appears to be only an occasional visitor on site. However, given its general scarcity on a national level and known occurrences nearby the species, as a biodiversity feature at this site of proposed development, is assessed to be of local (higher) value.

Daubenton's Bat is not known to occur on site, and there are only poor quality foraging habitats for the species on site. Nonetheless it is known from the vicinity, and many of the Myotis registrations were not identified to species level. It may occur as a foraging species

along the railway corridor or may commute along the same. Due primarily to its widespread and common status in Ireland, general lack of records on site and generally low site suitability, Daubenton's Bat is assessed to have a low local value.

3.1.3 Leisler's Bat

Leisler's Bats were commonly recorded throughout the site of proposed development during all survey types (Figure 7). As with Pipistrelles, a significant amount of feeding activity was noted in June in the north of the site (static deployment site E), which was similarly somewhat anomalous to the results from other surveys, when Leisler's Bat was more rarely recorded in the northern parts of the site. Otherwise records show some concentration to the south and south-west outside of the site. Bats were occasionally noted foraging high above the railway line area.

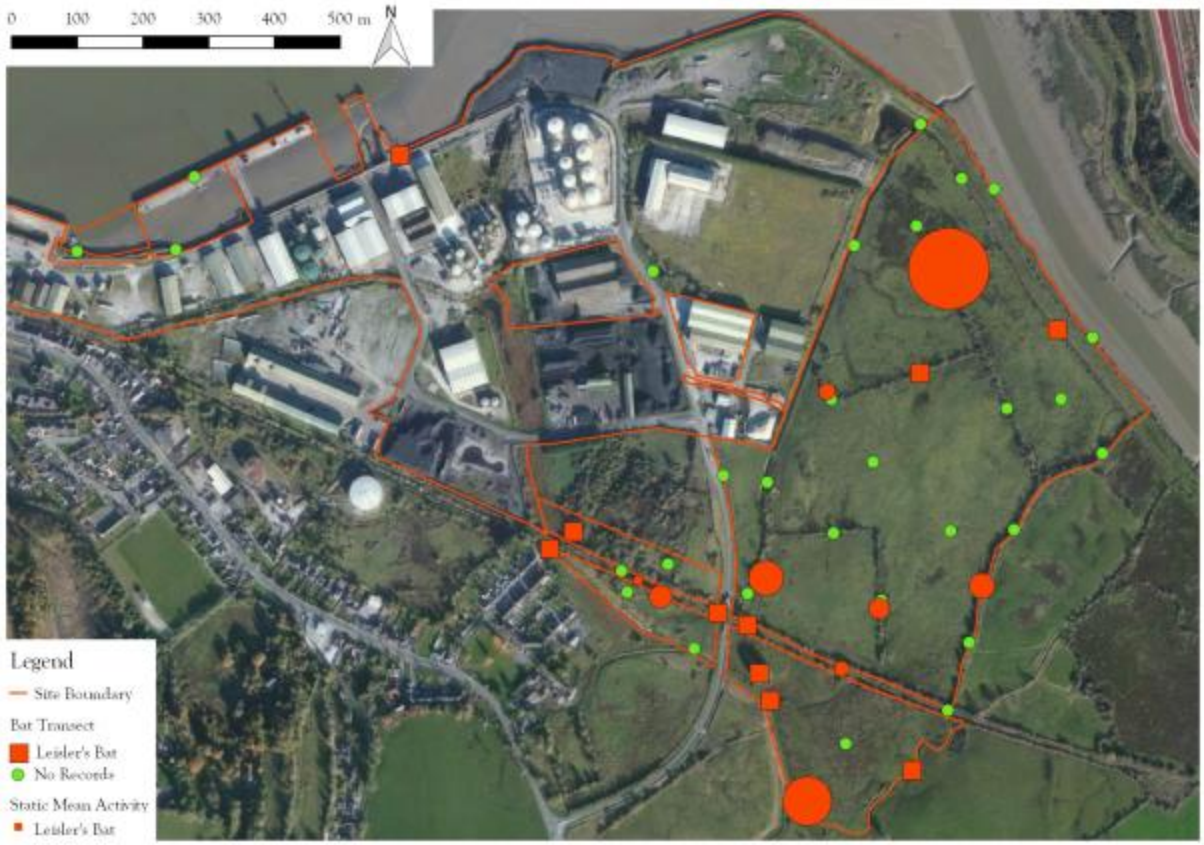


Figure 7: Leisler's Bat records from site (Static symbols relative to highest mean registrations/night)

Leisler's Bat was the only bat species recorded within the existing port boundary, when a single individual was heard and seen flying in at dusk from the direction of Foynes Island, and on through the port. This individual almost certainly roosted on Foynes Island, outside the site boundary.

Foraging has been recorded over a wide variety of habitats, although there are some indications that pasture may be preferred, along with drainage canals and lakes. Leisler's Bats are strong fliers, and have been recorded foraging up to 13.4km from roosts (NPWS, 2009).

Summer roosts have been found primarily in buildings in Ireland, although some have been found in trees (beech, oak and ash), and elsewhere in Europe trees are the preferred roost locations (NPWS, 2009). Small numbers are known to roost in bat boxes (Schwegler type). This species is known to exhibit regular roost switching behaviour. Day roosts in buildings and hollow trees have been recorded, and these have also been used as night roosts on occasion.

There are few data regarding hibernation roosts for this species, although bats have been found both in old buildings and in tree roosts (with large trees such as oak and beech seemingly preferred).

No roost locations were detected on or near the site during our surveys. On a number of occasions bats were seen flying in the direction of Foynes town, often at high altitude (30 – 100m), early in the morning before sunrise. As with Pipistrelles, buildings around Foynes town would appear to have a high suitability for roosting bats. In June, bats were noted foraging high above the ring of sycamores (PRF 23-24) only 10 minutes after sunset. Although no roosts were detected, the sycamore ring may be a roost for small numbers of bats.

Leisler's Bat is one of the most common bat species in Ireland and widespread through the country (NPWS, 2009). It is classified as Near Threatened in the Irish Red List of Terrestrial Mammals (Marnell et al, 2009), but of Least Concern in Europe. It is given a Favourable Conservation Status in the most recent reports on the Status of EU Protected Habitats and Species in Ireland (NPWS, 2013). As with all Irish bat species, these species are protected species under the Wildlife Acts and Annex IV of the Habitats Directive.

Ireland is the European stronghold for this species, and it is estimated to account for 20-25% of the European population. Unlike elsewhere in Europe there is no other large bat species competing for the ecological niche in Ireland. Due primarily to its widespread and common status in Ireland, combined with the importance of Ireland on a European scale this species, as a biodiversity feature at this site of proposed development, is assessed to be of local (higher) value.

3.1.4 Brown Long-eared Bat

Brown Long-eared bats have very quiet echolocation calls, and often don't call very much, relying on their large ears to detect movement of prey items. As such they are difficult to detect acoustically, and as with our surveys, are more often detected using static detectors. A single bat was located visually and acoustically in April – the only bat recorded on the April transect surveys – at the eastern end of the railway. Otherwise, records almost all came from static detectors, with a concentration of records in the central portion of the site, along the railway line and nearby hedgerows. The largest concentration of records in Figure 8, just north of the railway (near the old ash tree), is primarily due to records from a single night, when 6 of the 7 records were obtained.

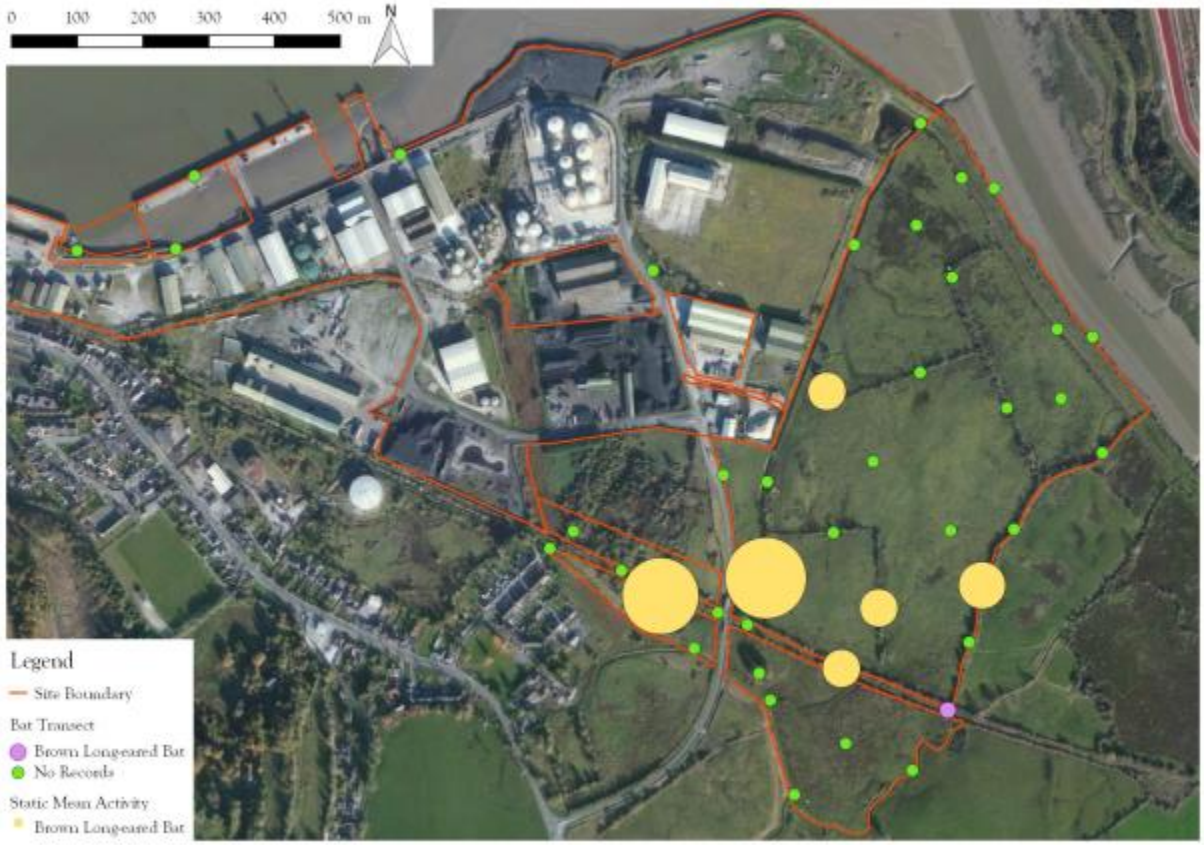


Figure 8: Brown Long-eared records from site (Static symbols relative to highest mean registrations/night)

Brown Long-eared Bat is another of the most common and widespread bat species in Ireland (NPWS, 2009). It is classified as Least Concern in the Irish Red List of Terrestrial Mammals (Marnell et al, 2009), both in Ireland and Europe. It is given a Favourable Conservation Status in the most recent reports on the Status of EU Protected Habitats and Species in Ireland (NPWS, 2013). As with all Irish bat species, it is protected under the Wildlife Acts and Annex IV of the Habitats Directive.

The species requires large open spaces for roosting, where it can fly around prior to emergence. Summer nursery roosts have been found primarily in buildings in Ireland, in large open attics, although tree holes and farm buildings are sometimes used as temporary roosts. The species shows a high degree of roost fidelity (NPWS, 2009). Small numbers are known to roost in bat boxes (Schwegler type).

There are few data regarding hibernation roosts for this species, although bats have been found both in old buildings and caves (NPWS, 2009).

No indications of roosting on site were observed during all surveys. Foraging has been recorded over a wide variety of habitats, although there are indications that it is closely associated with some degree of tree cover (NPWS, 2009), which might include woodland, parks and gardens, hedgerows and scrub etc.

Due primarily to its regular occurrence on site, this species as a biodiversity feature at this site of proposed development, is assessed to be of local (higher) value.

3.1.5 Lesser Horseshoe Bat

This species echo-locates at much higher frequencies than other Irish bats, and can be very difficult to detect on heterodyne detectors. There were no records of this species from transect counts, but a small number of records from static detectors in the vicinity of the railway corridor (Figure 9).

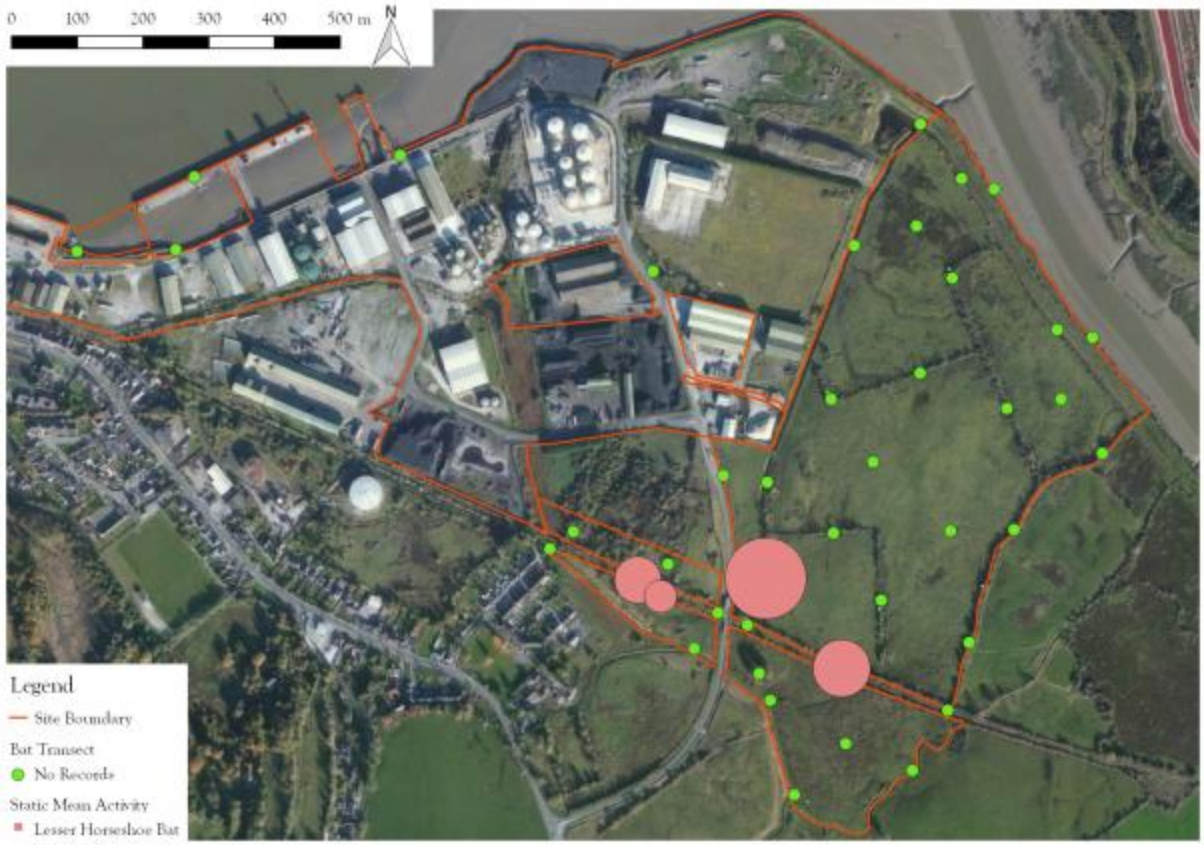


Figure 9: Lesser Horseshoe Bat records from site (Static symbols relative to highest mean registrations/night)

The species was recorded on 5 nights out of 24 on the railway and 1 night out of 8 immediately north of the railway in Treeline T3, as shown in Table 4. There were no detections elsewhere on site, despite a further 34 nights of detector deployment. It is likely, given the highly clustered nature of the records, that all 5 records on 15/6/2017 refer to the same individual spending 10 minutes in the vicinity. Similarly, the two records on 27/04/2017 may also refer to a single bat.

Given that the species is easily overlooked, activity of Lesser Horseshoe bats along the railway line is likely to be somewhat more regular than indicated by our results, although it is unlikely that the species occurs commonly. The railway area thus represents a regularly used resource by this species, for foraging or commuting.

The species requires open spaces for roosting and hibernating, which it can easily fly into. Summer nursery roosts have been found primarily in old or derelict buildings in Ireland, and

the species shows a high degree of roost fidelity (Marnell et al, 2009). There is a single Irish record of roosting in a very large tree hollow (McAney et al, 2013). Hibernacula are generally well known in Ireland and are typically underground, in structures such as caves, cellars, souterrains etc. (Marnell et al, 2009).

Table 4: Records of Lesser Horseshoe Bat on site

Record	*Static Deployment*	*Date*	*Time*	*Minutes after sunset*
1	B	27/04/2017	22:27	77
2	B	27/04/2017	22:28	78
3	A	01/05/2017	00:13	163
4	B	02/05/2017	00:56	206
5	G	12/05/2017	00:23	152
6	G	21/05/2017	03:54	360
7	I	15/06/2017	02:43	282
8	I	15/06/2017	02:46	285
9	I	15/06/2017	02:50	289
10	I	15/06/2017	02:51	290
11	I	15/06/2017	02:53	292

Lesser Horseshoe bats typically forage in deciduous woodland and riparian vegetation, normally within a few km of their roosts. Bontandina et al (2002) found one bat foraging up to 4.2km from a nursery roost, but noted that most spent over 50% of their foraging time within 600m of it. Similarly, Motte and Libois (2002) also noted most activity within 500m of a nursery roost. Both authors suggest that conservation management of this species should concentrate on areas within 1.0 km - 2.5 km of the nursery roost. Many studies indicate heavy reliance on connectivity between roost and foraging areas, with bats relying on linear landscape features such as treeline, stonewalls and hedgerows to navigate and commute (Marnell et al, 2009).

There are no likely roost sites of any type on the site of proposed development. In Limerick, the population of Lesser Horseshoe bats appears to be small and centred on the Curraghchase area, approximately 14km east of the site (Roche et al, 2015). Consultation has revealed three known Lesser Horseshoe Bat roosts within 10km of the proposed development site. The closest is in the Mount Trenchard area, approximately 3km west of the site. This is towards the upper end of commuting distance to the site, but it may be that this is the source of the bats occurring on site.

The other known roosts are in the Kiladysert area, across the River Shannon to the north, and separated from the site by a minimum 2km of water. Lesser Horseshoe bats are known to be averse to crossing even relatively short open spaces on land, and it can be said with a degree of confidence that bats from this area will therefore not occur on site. Another known roost is 10km to the south near Rathkeale, and again this area is too distant for bats from that roost to occur on site.

A review of aerial imagery reveals that potential suitable foraging habitat also exists around the southern and western boundaries of Foynes town, and there is potential for undetected Lesser Horseshoe Bat roosts in this area. Given that the species often emerges late from roosts (Collins 2016), the presence of individuals 80 minutes after sunset in April might suggest the presence of a closer roost, although given the generally colder weather in April bats may have emerged earlier and travelled longer distances on suitable nights.

Similarly, apparently suitable foraging habitat exists to the south-east of the site at Barrigone, which may also have suitable undetected roost areas. This is a minimum of 2.5km from the site, but significantly longer for bats avoiding open water areas, and connectivity between the sites is poor, being mostly agricultural farmland with some hedgerow. As such, there is unlikely to be significant commuting of bats from this area, should they exist.

Given the open nature of the habitats within the port, the general unsuitability of the building types and the high level of lighting through the night, it is not likely that Lesser Horseshoe Bats roost within the port boundary.

Foynes Island is close to the site, being 300m from the port but 1.2 km from nearest Lesser Horseshoe Bat recorded. It is densely wooded (mostly but not entirely conifers), and has a large building on site which has potential to be a Lesser Horsehoe roost. However, bats would have to cross a minimum 200m of open water from the port to the island, so again, it is unlikely that Lesser Horseshoe bats would either occur there or regularly cross to the site.

A widespread decline in this species across Europe was evident in the late 20th Century, although there are increasing signs of a stabilisation or partial recovery (McAney et al, 2013). The most recent population estimate in Ireland is 14,010 individuals, although the Irish population shows increasing trends in both the short and long-term (NPWS, 2013). Loss of roosting sites due to deterioration or renovation of old buildings, loss of commuting routes linking roosts to foraging sites and unsympathetic management of foraging sites are the major threats to this species (NPWS, 2013).

Lesser Horseshoe Bat has a restricted range in Ireland, being confined primarily to the six western seaboard counties of Cork, Kerry, Clare, Limerick, Galway and Mayo. It is classified as Least Concern in the Irish Red List of Terrestrial Mammals, but Near Threatened in Europe (Marnell et al, 2009). It is given a Favourable Conservation Status in the most recent reports on the Status of EU Protected Habitats and Species in Ireland (NPWS, 2013). As with all Irish bat species, it is protected under the Wildlife Acts and Annex IV of the Habitats Directive, but is the only Irish bat species afforded additional protection under Annex II of the Habitats Directive (with 41 Special Areas of Conservation designated). Roche et al, (2015) note that overall, the Lesser Horseshoe Bat population in Limerick is very small and the considerable distance to Kerry sites to the south and even south Clare sites to the north means that there is an ongoing risk of inbreeding or even extinction.

The species was only recorded occasionally on site, and there are no suitable nursery or hibernation roosts on site. Nonetheless, due primarily to its restricted range in Ireland, scarcity in the county and declining status in Europe, this species as a biodiversity feature at this site of proposed development, is assessed to be of County value.

3.2 COMMUTING AND FORAGING HABITATS FOR BATS

Habitats at the site of proposed development which are of the highest potential value to bat species are the hedgerows, treelines and aquatic habitats - in particular where these are adjacent to eachother or inter-connect. There is ample foraging habitat for a variety of bat species in the field areas. The port area does not provide a roosting, foraging or commuting resource for bats.

3.2.1 Old Tree-lined Railway Line

The disused railway line bordering the site of proposed development to the south is bound on both sides by mature treelines and hedgerows, with Ash and Hawthorn being the main mature tree species. At the west of the survey area, a relatively wide waterway, c. 4 m, runs to the south of the railway. There is wet marshy land to the south, and scrub to the north along the section of railway lying west of the road crossing the road to Foynes port. In the Durnish farmland (east of access road), there is grassland on both sides of the tree-lined railway corridor. There is currently no artificial lighting along the railway line, and this lack of light spill would be beneficial to all Irish bat species with the possible exception of Leisler's bat (Mathews *et al.* 2015). The tree-lined railway corridor is likely to provide relatively high quality foraging and commuting habitat for the full range of bat species recorded in the area. Potential bat roost features were also noted in trees and a bridge along the railway, as outlined in section 3.3 of the Bat Survey Report at Appendix 7.2. Common and Soprano Pipistrelles were frequently noted foraging and commuting in this area in May and June and Leisler's Bat was recorded regularly. Brown Long-eared Bat was recorded occasionally although is likely more frequent than records suggest as it is difficult to detect, while Natterer's Bat also showed a cluster of records in this area. In particular, Lesser Horseshoe Bat was recorded occasionally along the railway corridor and clearly uses the area on an occasional basis, although probably in small numbers.

This area is considered to be the most important area on the site for bat foraging and commuting, both in terms of activity levels, species diversity and roost potential.

3.2.2 River

There is a natural river channel to the south of the railway line and beyond the site if proposed development. It is a tributary of the Robertsown River which runs parallel to the north-east perimeter of the site of proposed development at Durnish. Rivers are generally highly productive foraging grounds for all Irish bat species because of the productivity of emergent aquatic insects on which many bat species feed. Daubenton's Bat and Soprano Pipistrelle are particularly associated with foraging along rivers in Ireland, but all bat species will take aquatic insects on occasion. Daubenton's Bat is a so-called 'trawling' bat species, which hunts at low heights above water, often <50 cm, capturing insects directly from or close to the smooth surface of slow-moving rivers. It also hunts at lakes and other habitats such as woodland and hedgerow on occasion. This river on site is slow-moving, but it is unlikely to be particularly favourable to foraging Daubenton's Bat, because its surface is covered in aquatic vegetation for much of its length (Plates 1 - 2). This vegetation would create 'acoustic clutter', inhibiting the effectiveness of the bats' echolocation in pinpointing insects floating on, or emerging from, the surface. The river channel is also generally too narrow along the majority of its length to facilitate the typical foraging flight behaviour of Daubenton's Bat, i.e. wide figure-of-eight loops and turns close to the surface. Furthermore, the riverbank lacks cover of tall vegetation, generally favoured by bat species. The river is not sheltered by steep banks, and it is almost completely lacking in cover or riparian trees,

except for a few immature willows in places (Plates 1 - 2). It is also noteworthy that the river as shown in Plate 2 was significantly more flooded during the winter (when photo was taken) compared to the summer period, and as such is of even lower value during the drier main flight period for Irish bats due to more constricted flow and denser plant cover. Nonetheless, the river provides limited foraging opportunities, via emergent aquatic insects, to a range of bat species in the area. It may also provide a source of freshwater drinking water for bats in the area. No Daubenton's Bats were recorded on site, although activity of Natterer's Bat was highest in the vicinity of the river. Pipistrelle activity was also generally high in the area, as was Leisler's Bat.

To the north of the site of proposed development, the larger Robertstown River flows adjacent to the site boundary. This is brackish water, with almost no cover of hedgerow or tree along the western bank (the site boundary). Two bat transect spots were located over the embankment adjacent to this river but no bats were recorded there (a small number of Soprano Pipistrelle registrations referred to bats commuting on the inner side of the embankment, towards the drainage channels). It is not considered likely that the Robertstown River provides a significant foraging resource for bats at this site.

Plate 1: Part of the river along the southern perimeter. Note lack of riparian tree cover.

Plate 2: Part of the river along southern perimeter showing cover of aquatic vegetation

3.2.3 Drainage Channels and Artificial Pond

There are drainage channels, which are man-made, running along the western edge of the site of proposed development at Durnish from near the railway crossing to the artificial pond in the north-west cormer of the site (Plates 3 - 4), and from the pond along the north-eastern site perimeter to the north-eastern edge of the site and beyond (Plate 4). These waterways are c. 2 - 4 m wide with a smooth water surface. As mentioned, Daubenton's Bat generally prefers wider water channels where it can perform wide looping flights, searching for emerging aquatic insects using its echolocation. The channels are lacking bankside tree/hedgerow cover along the majority of their length (Plate 4), and this relative lack of shelter for both bats and insects would likely reduce the value of the channels as bat foraging habitats. Duckweed (*Lemna* sp.) which covers the surface in some sections, , in particular the larger pool, also reduces the foraging efficiency of Daubenton's Bat (Boonman *et al.* 1998). These areas are also subject to a rather high level of lighting throughout the night, due to light spill from the floodlit adjacent port areas, although some of the deeper channels in the western section remain quite dark. As such their suitability for bats is reduced, as many species are quite light averse, including Daubenton's Bat. Notwithstanding this, the drainage channels and artificial pond are likely to provide aquatic insect prey, albeit limited, to Daubenton's Bat, Leisler's Bat as well as Common and Soprano Pipistrelles, and may also provide a source of drinking water to bats. There were small numbers of Pipistrelles, primarily Soprano Pipistrelles, recorded along the drainage channel in the west of Durnish. In the southernmost part of the drainage channel, where there is less light spill, and significant tree cover adjacent to the drainage ditch there were small numbers of Myotis bats recorded, along with Brown Long-eared and Lesser Horseshoe bats.

Plate 3: Man-made drainage channels along west and north perimeter of site connected to artificial pond

Plate 4: Artificial pond just outside north-west of Durnish site

3.2.4 Hedgerows/Treelines of Field Boundaries

Many field boundary hedgerows at the site of proposed development are mature, composed mainly of old Hawthorn trees, with other mixed deciduous species including Ash, Sycamore, Willow and Hornbeam. Where they are mature, they have not been subject to hedgerow management such as strimming, cutting or ivy removal, and although often gappy, most sections have areas of thick bramble cover at the base (e.g. Plate 5), often filling gaps. Some sections of hedgerow have drainage ditches and earthen banks or old stone walls embedded in earthen banks. These features are attractive for bat foraging and commuting due to the shelter and source of insect prey they provide. Furthermore, the old drainage ditches/streams along some sections (e.g. Plate 6) would provide aquatic prey, and hence foraging opportunities for bats. The Hawthorn trees are remarkable for their maturity and the old-growth ivy cover (Plate 7), and this is discussed in relation to potential roosting opportunities in Section 3.3. The eastern hedgerow (H1) is the best example on site, being a well established old townland boundary.

The internal hedgerows, especially in the northern half of the Durnish site, are subject to a rather high level of lighting throughout the night, due to light spill from the floodlit port areas to the west, although most are of course somewhat darker on the shaded side. The hedgerows on site are potentially used for foraging or commuting by all bat species known from the site.

Indeed, both Pipistrelle species were regularly recorded on the eastern hedgerow both foraging and commuting. They were recorded generally less often, although still regularly in small numbers on the internal hedgerow network, although a period of intense Pipistrelle and Leisler's Bat activity was somewhat anomalously recorded at the western side of hedgerow H2 over a few days in June. Leisler's Bat was recorded at a generally low level of activity, but often related to hedgerows.

Myotis bats were very infrequently recorded on the internal hedgerow network, although both Whiskered and Natterer's bats were recorded on the eastern hedgerow on one occasion. Brown Long-eared Bat was closely associated with hedgerows, usually near the railway corridor and adjacent hedgerows (including the eastern hedgerow H1).

Plate 5: Field boundary hedgerows mainly of mature Hawthorn with some tall trees in hedges

Plate 6: Drainage ditch along a section of field boundary hedge at eastern perimeter of site

Plate 7: Very mature Hawthorn trees with old-growth ivy cover dominate field boundary hedgerows

3.2.5 Port Areas

The site of proposed development shown in Figure 2a at the existing port, comprises rock armour along the shoreline, with existing concrete jetties in brackish water. The jetties are adjacent to the built-up, industrial footprint of the existing port. The jetties and their immediate surroundings are considered unlikely to provide foraging or roosting opportunities to bats, as they are in an exposed setting without cover of tall vegetation to provide shelter or insect prey to bats.

The entire port area is very strongly floodlit throughout the night, which would repel all bat species at such intensity. Indeed, only one bat was recorded within the port area – a single Leisler's Bat which flew over the shoreline and port area from Foynes Island at dusk. This bat did not stop to forage within the area.

3.2.6 Connectivity with Wider Landscape

Hedgerows and waterways form vital connective corridors in the Irish landscape for bats, as well as other wildlife. Most bat species generally forage and commute along sheltered linear features such as hedgerows, waterways and woodland edge and often move between different patches of roosting and foraging habitat along such habitat corridors. The hedgerows, treelines and waterways on site not only provide foraging habitats in themselves, but are likely to be used by bats travelling between roosts and foraging grounds.

The existing Foynes port estate is almost devoid of trees and other natural vegetation, and very brightly lit and hence generally unfavourable to bats. Futhermore, the modern industrial-type buildings on site would generally not be those typically used by bat species for roosting. The Robertstown River at the northern boundary of the site is not considered to provide a significant foraging resource and at approximately 120m wide is more likely to form a barrier to commuting by many bat species.

Given therefore that both the western and norther parts of the site form barriers to movement of most bat species, the site in its broader context forms something of a 'dead-end' for bats, and the hedgerows are therefore not likely to be a significant commuting route for bats. The exceptions to this are the densely vegetated linear railway corridor which is clearly used by commuting bats, and the eastern hedgerow H1 which provides a somewhat less important, but nonetheless clear connective role.

It is likely that the majority of bats which use the Durnish farmland for commuting and foraging would originate in roosts in buildings south of the existing port footprint, as well as south or south-west of the Durnish lands (e.g. Foynes town).

3.3 POTENTIAL ROOST FEATURES

A corrugated lean-to extension of a building occurs within the footprint of proposed development and that extension must be demolished to facilitate an access road. The original building will remain. All other buildings within the existing footprint of Foynes port will not be affected by the proposed development. This one building extension, along with bridges and trees were visually assessed regarding their potential to support potential roost features (PRF's) for bats, and their locations are illustrated in Figure 10. Such features include holes, cracks, crevices, split boughs, peeling bark and thick ivy-cover on trees and cracks/crevices in bridges for example. Close-focusing binoculars and a high powered torch were used to search for potential bat roost features, while also searching for evidence of bat roosting. The locations of trees with potential roost features were recorded using a GPS unit. The surveys were preliminary ground-based surveys, and did not include close-up or invasive physical inspection of all potential bat roost features.

Many of the mature trees have a dense cover of Ivy which makes them potentially suitable for roosting bats. These trees and structures were categorised for their potential suitability for bats in accordance with Table 4.1 of Collins (2016) guidance, which is aligned also with the system of categorisation in BS 8569:2015 Surveying for bats in trees and woodland (BSI, 2015). Four categories of 'suitability' are available, as described in Table 5.

Table 5: Guidelines for assessing the potential suitability of features for roosting bats

Suitability	Roosting habitat description
Negligible	A structure with negligible features likely to be used by roosting bats.
Low	A structure with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions[a] and/or suitable surrounding habitat to be used on a regular basis by large numbers of bats (i.e. unlikely to be suitable for maternity or hibernation[b]). A tree of sufficient size or age to contain PRFs but with none seen from the ground or features seen with only very limited roosting potential[c].

Suitability	Roosting habitat description
Moderate	A structure or tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions[a] and surrounding habitat but unlikely to support a roost of high conservation status (with respect to roost type only – the assessments in this table are made irrespective of species conservation status, which is established after presence is confirmed).
High	A structure or tree with one or more potential roost sites that are obviously suitable for use by large numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat.

[a] For example, in terms of temperature, humidity, height above ground level, light levels or levels of disturbance.

[b] Evidence from the Netherlands shows mass swarming events of common pipistrelle bats in the autumn followed by mass hibernation in a diverse range of building types in urban environments (Korsten *et al*., 2015). This phenomenon requires some research in the UK but ecologists should be aware of the potential for larger numbers of this species to be present during the autumn and winter in large buildings in highly urbanised environments.

[c] This system of categorisation aligns with BS 8569:2015 Surveying for bats in trees and woodland (BSI, 2015).

Extracted from Collins (2016)

3.3.1 Bat Roost Potential in Structures

None of the structures on site were endoscopically surveyed under licence for bat occupancy.

Cracks and crevices in the underside and walls of bridges can provide suitable roosting spaces for bats throughout the year. Old stone bridges with deep crevices and cracks and loose/missing grout have particularly high potential to provide bat roosting spaces.

To date, Daubenton's Bat, Whiskered Bat, Natterer's Bat, Brown Long-eared Bat, Common Pipistrelle, and Soprano Pipistrelle have been recorded roosting in bridges in Ireland. Daubenton's Bat is consistently the most frequently recorded bat species roosting in bridges in Ireland and the UK. This species is closely associated with foraging for aquatic insects along rivers and lakes.

Table 6 summarises the potential of bridges and buildings at the site of proposed development to support bat roosts. Only one structure (Bridge A) had potential to support bat roosts and it is located >300m from the site of proposed development. It is a small stone masonry single-arch bridge spanning over a small river, and connecting the railway line on the north to a housing estate (Durnish Avenue) on the south (Plates 8 - 9). The rest of the bridges (B - D) were small concrete pipe culverts of diameter c. 1.2m which do not support suitable crevices for roosting (Plates 10 - 11).

Table 6: Bat roost potential in structures on site

Bridge Identifier	ITM Easting	ITM Northing	Type	Roost potential
A	525819	651372	Stone masonry	Contains features of low suitability for roosting bats
B	526117	651318	Concrete culvert	Contains features of negligible suitability for roosting bats
C	526158	651522	Concrete culvert	Contains features of negligible suitability for roosting bats

D	526489	651866	Concrete culvert	Contains features of negligible suitability for roosting bats
E	526086	651590	Corrugated shed	Contains features of low suitability for roosting bats. No bat droppings or cadavers present.

The stone masonry bridge (A) appears on Ordnance Survey Ireland historic 6-inch maps from the early 19th century. There was c. 1 - 1.2 m clearance from the water level to the top of the arch at the time of the survey (Plate 14). Using a high powered torch beam, it was possible to see at least two suitable roost crevices within stonework on the underside of the arch from an observer position in the channel of the river at the east bridge opening (waders necessary). However, there was deep mud in the middle of the riverbed, and it was considered unsafe to wade underneath the stone arch to carry out close-up inspection of the crevices. Ivy growth covering the stonework in the walls of the bridge provides limited potential for roosting as the ivy is not mature/thick and has not lifted away from the wall to form potential roost spaces. This bridge is >300m from the site of proposed development.

A lean-to extension to one of the Foynes Engineering buildings must be removed to facilitate an access road. It is a 7x20m steel frame building covered by a single skin of steel corrugated sheeting, and Plate 13 illustrates the lean-to extension of the main building that will be removed (in red hatch). Foynes Engineering advise that the extension was erected c.1999. It has a large roller door entrance on its eastern aspect alongside a standard portal door entrance. There is no cladding present on the corrugated sheeting either inside or outside. A number of additional photographic plates from survey are provided in Appendix I.

House Martin nests were observed within this storage building, and their droppings were noted in places both near to and below nests, and on sills and stored goods on the floor space. A large roller door on the western aspect of the building has a gap above it, providing easy access for the birds. One bird was observed to fly both in and out of this opening. This building was dusty but otherwise clean and all floorspace and walls were accessible. An internal partition room was also open and inspected. Only signs of nesting birds were observed. As the building is not used regularly, any droppings or cadavers indicating roosting bats would be visible on beams, joists, purlins or walls and remain there until cleaned off. No signs of bats were observed and no signs of recent cleaning were observed.

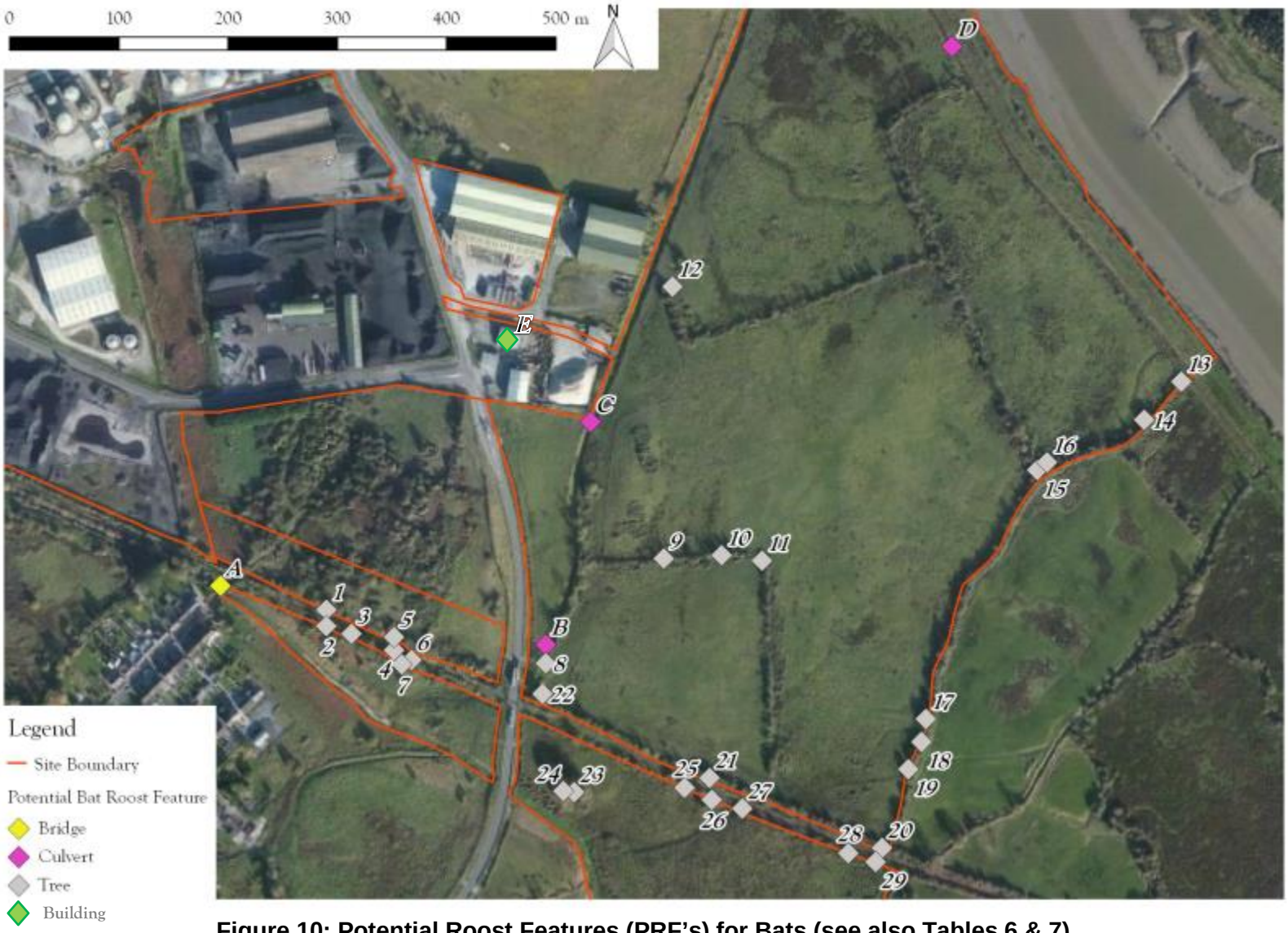


Figure 10: Potential Roost Features (PRF's) for Bats (see also Tables 6 & 7)

Plate 8: Bridge A; eastern side of old stone masonry bridge with crevices suitable for bat roosting

Plate 9: Bridge A; underside of old stone masonry bridge with crevices suitable for bat roosting

Plate 10: Bridge B; concrete pipe culvert bridge does not have bat roost potential

Plate 11: Bridge C; concrete pipe culvert bridge does not have bat roost potential

Plate 12: Bridge D; concrete pipe culvert bridge does not have bat roost potential

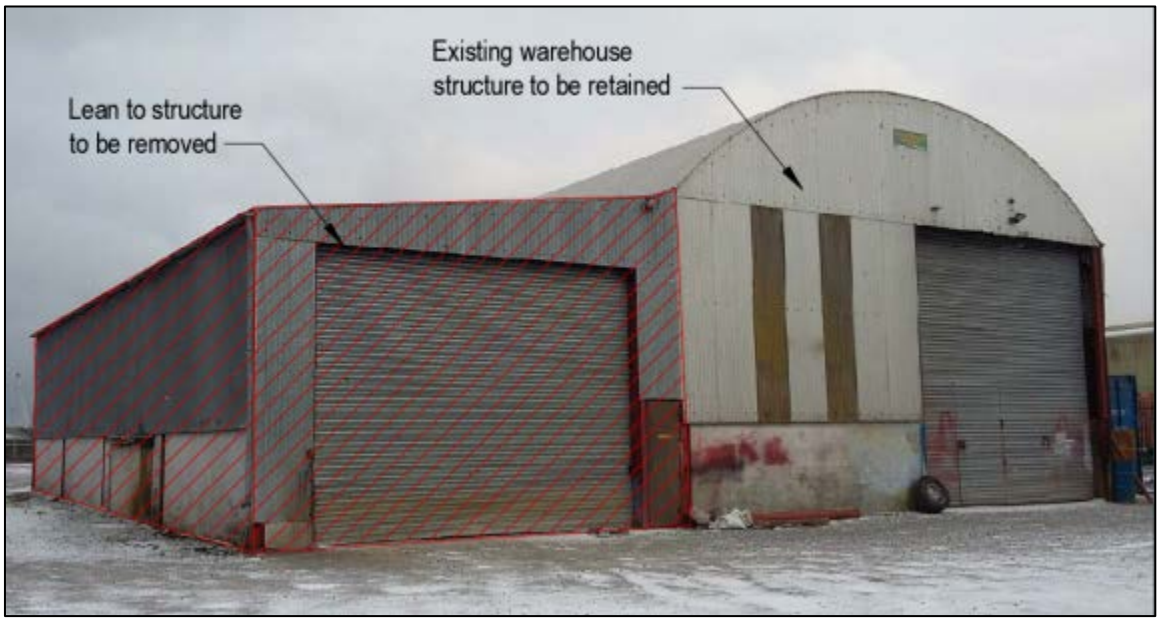


Plate 13: Extent of lean-to structure E to be removed

3.3.2 Bat Roost Potential in Trees

It is notoriously difficult to find bats roosting in trees, and few tree roosts have been recorded in Ireland to date. All Irish bat species have been confirmed to roost in trees elsewhere in Europe, and it is likely that tree roosts are very under-recorded in Ireland. Bats may use tree roosts at a particular time of the year and not at other times, and may regularly move from one roost to another. Trees can be used as maternity roosts, temporary or night roosts, or hibernation roosts for various species. Bat roost features in trees are created through fungal decay or physical damage of tree tissues which form hollows, cavities or fissures where bats may hide. Bats can crawl into very tight spaces of only 1-2 cm width, and may also roost

between boughs and old growth ivy cover. Bat roost features are more often associated with larger, older tree specimens, but bats may also roost in young trees where suitable physical roost features have formed.

There were several mature Ash along the railway corridor forming the southern boundary of the site of proposed development with thick ivy growth and other potential roost features. Many of the Hawthorn in field boundary hedgerows were very old. (Plate 13). Hawthorn is in general a small tree species, or bush, and as such would not usually be considered highly suitable for bat roosting. However, their maturity and lack of management at the site has resulted in thick cover of old-growth ivy and decay/damage to some boughs, which makes the Hawthorn notable at this site in regard to potential bat roosting. Table 7 summarises trees on site where suitable bat roost features were observed from ground level using close-focusing binoculars. The reference number in Table 7 is cross-referenced with photographic figures below.

Table 7: Bat roost potential and survey results in trees on site

Ref.	Tree species	ITM Easting	ITM Northing	Potential Roost Features (PRF's)
1	Ash	525916	651350	Multi-stemmed with thick ivy cover, north side of railway (Plate 19). Other trees north of railway at this point also have thick ivy cover
2	Ash	525916	651335	Thick ivy cover, south side of railway
3	Ash	525939	651328	Thick ivy cover, south side of track
PRF's 1/2/3 were surveyed at dusk on 22nd June. Abundant Pipistrelle activity was recorded, dominated by Common Pipistrelle but both species present. Common Pipistrelles recorded almost continuously from 12 minutes after sunset, when very bright, through the night. Initially up to 4 individuals visible at any one time around the target area, but most moved eastwards and many foraging over tree in vicinity of PRF's 6/7, where up to 9 Pipistrelle bats could be seen at any one time. Bats may have exited from tree 3 and spent a lot of time circling this tree and feeding. A few minutes later 2 individuals probably entered tree 1. Soprano Pipistrelles were noted in same areas from 26 mins after sunrise. From 34 mins after sunrise (still quite bright) small numbers of mainly Soprano Pipistrelles were noted passing from the west in direct flight. Leisler's Bat was detected 4 times during the survey with the first over an hour after sunset. These are trees with moderate suitability of features for roosting bats.				
4	Ash	525978	651313	Thick ivy cover, south side of track
5	Ash	525978	651325	Thick ivy cover, north side of track
6	Ash	525994	651304	Possibly the oldest Ash tree on site. Thick ivy cover, codominant stems, fissure/double leader c. 1 m from base, other potential roost features obscured by ivy (Plate 20).
7	Ash	525985	651300	Beside Ash ref. 6. Tear-out hollow in almost horizontal bough (see red arrow in Plate 21).
PRF's 4/5/6/7 were surveyed at dawn on 7th June. Lot of Pipistrelle activity throughout the survey, including abundant feeding, up to 27 mins before sunrise, dominated by Common Pipistrelle although both species present. From 0420 (1 hour before sunrise) to 0452 (27 mins before sunrise) at least 15 passes of Common Pipistrelles moving westwards along railway towards Foynes. Leisler's Bat heard during night, but 1 seen circling then heading westwards 37 mins before sunrise, and another seen flying westwards at 30m height 9 mins later. One Brown Long-eared Bat was seen an hour before sunrise. See also 1/2/3. These are trees with moderate suitability of features for roosting bats.				
8	Ash	526117	651301	Split bough with woodworm holes and potential fungal decay, knot holes, peeling bark (Plate 22)

Ref.	Tree species	ITM Easting	ITM Northing	Potential Roost Features (PRF's)
PRF's 8/22 were surveyed at dawn on 26th April. No bats were detected although conditions were sub-optimal. Lesser Horseshoe Bat was noted to spend 10 minutes in this area on 15th June, but is unlikely to roost here (brief temporary roost possible in ash). This area is not prone to excessive floodlighting and is well used by foraging bats. PRF 8 in particular has a significant likelihood of being used by roosting bats, while use of PRF 22 cannot be excluded. This tree has moderate suitability of features for roosting bats.				
9	Hawthorn	526225	651397	Old-growth thick ivy and stem split (Plate 23)
10	Hawthorn & Ash	526278	651400	Both with thick old-growth ivy. Ash has 'ash canker' which can result in cavity roost features in stem. Obscured by ivy. (Plate 24).
11	Hawthorn	526315	651395	Old-growth thick ivy cover and tree decay
PRF's 9/10/11 were surveyed at dawn on 26th April. No bats were detected although conditions were sub-optimal. Noted brightness of area from adjacent floodlighting. Very unlikely to be bat roosts due to intense lighting and less dense nature of hedgerow. These are trees with negligible suitability of features for roosting bats.				
12	Hawthorn	526233	651646	Old-growth thick ivy cover and tree decay
PRF 12 was surveyed at dusk on 8th May. No bats were detected in the area until a single Soprano Pipistrelle at 2212 (56 mins after sunset). This area is very brightly lit from adjacent floodlights. Very unlikely to be a bat roost due to intense lighting. This tree has negligible suitability of features for roosting bats.				
13	Hawthorn	526699	651559	Old-growth thick ivy cover
14	Willow sp.	526665	651524	Longitudinal split stem >2m long, maybe a frost crack. (Plate 25).
PRF's 13/14 were surveyed at dawn on 10th May. Both Pipistrelle species were observed foraging and commuting when quite bright (up to 45 minutes before sunrise). All Common Pipistrelles observed travelled N to S, while most Sopranos travelled S to N. This area receives significant lighting from the intense floodlights in the port, reducing the likelihood of it being used as a roosting site, although use cannot be entirely discounted. These are trees with low suitability of features for roosting bats.				
15	Hawthorn	526567	651478	Old-growth thick ivy cover and tree decay
16	Hawthorn	526576	651485	Old-growth thick ivy cover and tree decay
PRF's 15/16 were surveyed at dawn on 10th May. Large amount of Pipistrelle activity including lots of feeding through the watch, and continued until precisely dawn. Maximum of 3 individuals seen at one time. Last two abruptly turned and flew south through trees, for unknown distance. This area receives significant lighting from the intense floodlights in the port, reducing the likelihood of it being used as a roosting site, although use cannot be entirely discounted. These are trees with low suitability of features for roosting bats.				
17	Sycamore	526465	651250	Mature sycamore with thick ivy cover
18	Hawthorn	526461	651229	Old-growth thick ivy cover and tree decay
19	Hawthorn	526449	651204	Very mature hawthorn. Split boughs, decay and old-growth thick ivy cover. (Plate 13).
PRF's 17/18/19 were surveyed at dawn on 14th June. Regular Pipistrelle activity through survey, including feeding activity up to 53 mins before sunrise. Last detections 38 mins before sunrise of both species commuting southwards and over the railway. Leisler's Bat detected regularly, with last being 2 faint detections 23 mins before sunrise (not seen).				

Ref.	Tree species	ITM Easting	ITM Northing	Potential Roost Features (PRF's)
This area is subject to some lighting through the night from the intense floodlights in the port, reducing the likelihood of it being used as a roosting site, although use cannot be entirely discounted. These are trees with low suitability of features for roosting bats.				
20	Hawthorn	526425	651132	Old-growth thick ivy cover
PRF's 20/28/29 were surveyed at dawn on 14th June. At least five Pipistrelles at a time (both Soprano and Common simultaneously) could be seen foraging and interacting with each other in flight over the bushes lining the railway and near stream. Very active in same area. At 04:45 am (quite bright, 30 mins before sunrise) there was an abrupt end to Pipistrelle activity, with two individuals observed flying toward Foynes along the railway. The direction of flight of the other individuals was not observed. The presence of a roost here cannot be discounted. This is a tree with low suitability of features for roosting bats.				
21	Willow	526267	651196	Split horizontal limb forming a so-called 'hazard beam' roost feature. (Red arrow on Plate 26).
PRF's 21/25/26/27 were surveyed at dusk on 6th June. Leisler's Bat recorded from 10 mins after sunset c.60m high foraging over sycamore ring (PRF 23/24), then occasionally heard through night. Common Pipistrelle seen regularly from 24 mins after sunrise, when still quite bright, with activity initially focused around area PRF 25. Soprano Pipistrelle soon after in same area. Up to 50 mins later still lot of foraging activity, with 2-3 Soprano Pipistrelle around top of 25, and lots of activity for rest of survey. A single Brown Long-eared Bat was seen 43 mins after sunset. The presence of a bat roost in this area cannot be discounted, with PRF 25 in particular a likely location. This is a tree with low suitability of features for roosting bats.				
22	Sycamore	526114	651273	Split bough from a large branch tear-off, and peeling bark
See PRF 8 for results of PRF 22. This is a tree with low suitability of features for roosting bats.				
23	Sycamore	526143	651183	Fairly thick ivy cover
24	Sycamore	526133	651184	Fairly thick ivy cover
PRF's 23/24 were surveyed at dawn on 9th May. Some commuting activity (Myotis, SP, CP, Leis) was noted in the hour prior to dawn, but no evidence of roosting. See also 21-27. The presence of a bat roost in this area cannot be discounted, with Leisler's Bat in particular having roost potential here. These are trees with low suitability of features for roosting bats.				
25	Ash	526244	651187	Fairly thick ivy cover
26	Hawthorn	526269	651176	Old-growth thick ivy cover
27	Hawthorn	526297	651168	Old-growth thick ivy cover
See PRF 21 for results of PRF's 25/26/27. These are trees with low suitability of features for roosting bats.				
28	Hawthorn	526394	651127	Old-growth thick ivy cover
29	Hawthorn	526419	651119	Old-growth thick ivy cover
See PRF 20 for results of PRF's 28/29. These are trees with low suitability of features for roosting bats.				

Plate 19: Tree ref. no. 1. Multi-stemmed Ash with thick ivy cover

Plate 20: Tree ref. no. 6. Mature Ash with thick ivy cover and co-dominant stems. Other roost features possible.

Plate 21: Tree ref. no. 7. Mature Ash beside no. 6 above, red arrow showing tear-out potential roost feature

Plate 22: Tree ref. no. 8. Mature Ash with split bough and knot-hole

Plate 23: Tree ref. no. 9. Mature Hawthorn with split stem and old-growth, thick ivy cover

Plate 24: Tree ref. no. 10. Mature Hawthorn (background) and Ash with Ash Canker (foreground). Both have old growth ivy cover and decay features which may support bat roosts.

Plate 25: Tree ref. no. 14. Multi-stemmed willow in eastern boundary hedgerow with longitudinal crack, may be a frost crack.

Plate 26: Tree ref. no. 21. So-called 'hazard beam' potential roost feature in Willow

3.3.2.1 Summary of Potential Roost Features in Trees

Table 8 summarises the suitability of trees visually inspected for their roost potential features. Refer to Figure 10 for tree locations.

Table 8: Summary table of bat roost potential in trees

Trees with moderate suitability of features for roosting bats	1, 2, 3, 4, 5, 6, 7, 8
Trees with low suitability of features for roosting bats	13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29
Trees with negligible suitability of features for roosting bats	9, 10, 11, 12

3.4 SUMMARY OF BAT RESULTS

Seven bat species were recorded on site, showing that the site of proposed development generally and particularly the linear railway corridor to the south of the site of proposed development, has a diverse range of bat species. Common and Soprano Pipistrelle and Leisler's Bat were the most frequently encountered species, reflecting their range and distribution, and they were regularly encountered foraging and commuting on site.

Activity was centred along the disused railway corridor, with high levels of Pipistrelle activity. Pipistrelle presence was also consistently noted on the eastern hedgerow (H1), and at lower levels, activity was detected in almost all parts of the site. Activity was generally low over the main body of the Durnish lands proposed for development, save for one period of high bat foraging activity detected along hedgerow H2 in June. There were indications of possible roosting of these species in trees along the railway corridor outside of the site of proposed development, although it is likely that many (if not all) of these bats are roosting in nearby buildings at Foynes.

Brown Long-eared Bat was detected regularly at the site of proposed development, again with records focused on the railway corridor and adjacent hedgerows.

Myotis Bats were also recorded regularly at the site of proposed development, in particular Natterers Bats, but Whiskered Bat also on one night. Daubentons Bat was not recorded and is unlikely to forage on site. Natterers Bat activity focused on the grassland adjacent to the river and along the railway corridor.

Lesser Horseshoe Bat was recorded occasionally at the site of proposed development, with records distinctly focused on the railway corridor, although one period of activity was detected at Treeline T3 between the site of proposed development and the Port access road. It is not likely to occur elsewhere on site. The nearest known roost is over 3km away and although there is no likelihood of the species roosting at the site of proposed development, the presence of an undetected roost closer to the railway corridor cannot be discounted, most likely in the deciduous woodland to the south and west of Foynes town.

In accordance with Section 6.2.9 of Collins (2016) guidance, where moderate or high suitability roosting habitat has been established and where impacts on roosting habitat or features are possible, then further surveys are required. Conversely, where low or negligible suitability has been assigned then no further survey is required.

Structures A and E have been assigned a low suitability of features for roosting bats. No bat droppings or cadavers were observed within Building E. Structures B, C and D have been assigned a negligible suitability of features for roosting bats. No further action is required.

Tree No's. 9, 10, 11 and 12 occur within the site of proposed development at Durnish and will be felled to facilitate the proposed development. They have been assigned a negligible suitability of features for roosting bats and no further action is required. All other trees either occur beyond the site of proposed development or on the boundary of the site of proposed development, are to be retained. Tree No.8 to be retained is the only tree with moderate suitability of features for roosting bats in the boundary vegetation of the site of proposed development, in the southwest corner of the covered storage / warehousing area. It shall be protected from root damage in accordance with BS 5837:2012 *Trees in relation to design, demolition and construction* as part of the construction contract.

APPENDIX I: PHOTOS OF ENGINEERING SHED LEAN-TO STRUCTURE

Plate A1: Western aspect of lean-to extension to engineering shed

Plate A2: Eastern aspect of lean-to shed, showing roller door

Plate A3: Corrugated roller door with gap at top

Plate A4: Southeastern corner of lean-to extension

Plate A5: Damaged edge of corrugated steel sheeting

Plate A6: Interior of lean-to extesion. It is a storage shed

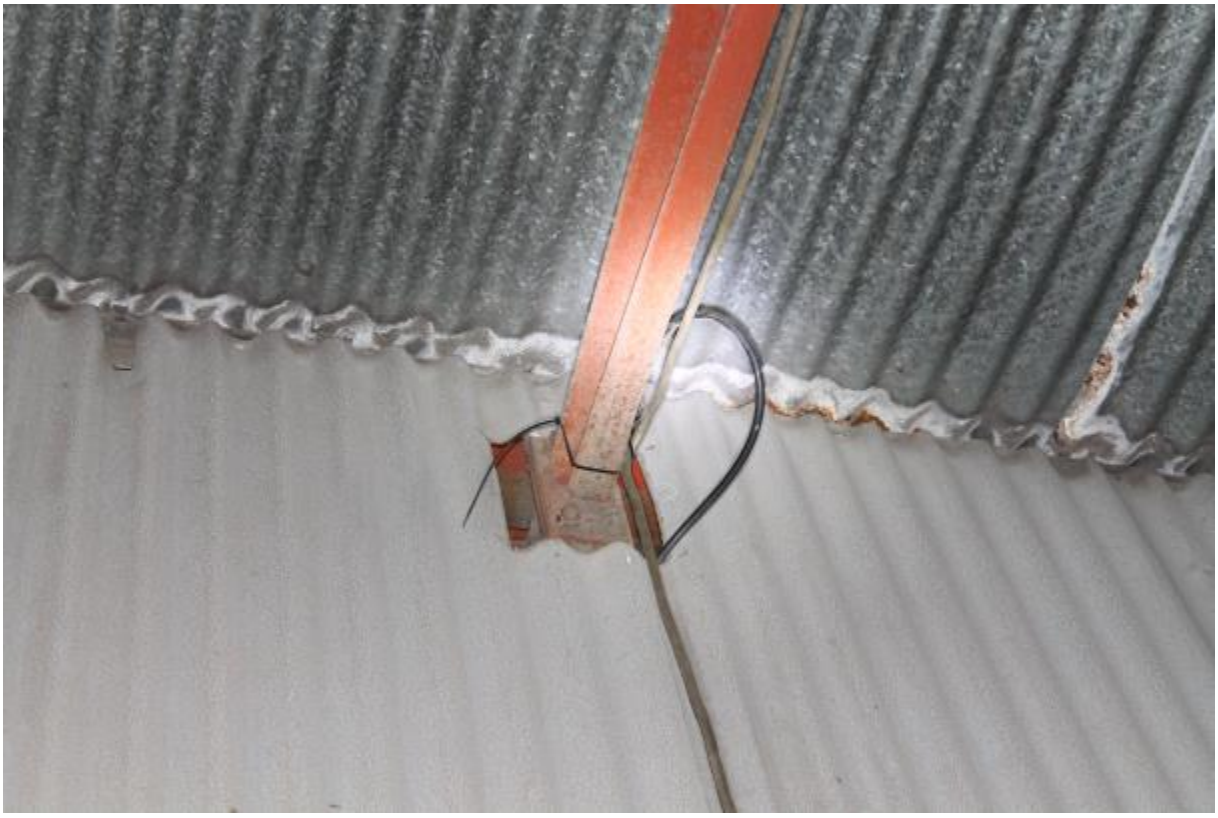


Plate A7: Trusses being inspected by torchlight

Plate A8: Purlins being inspected by torchlight

Plate A9: House Martin droppings under nest

Plate A10: Inspection of beams and trusses by torchlight

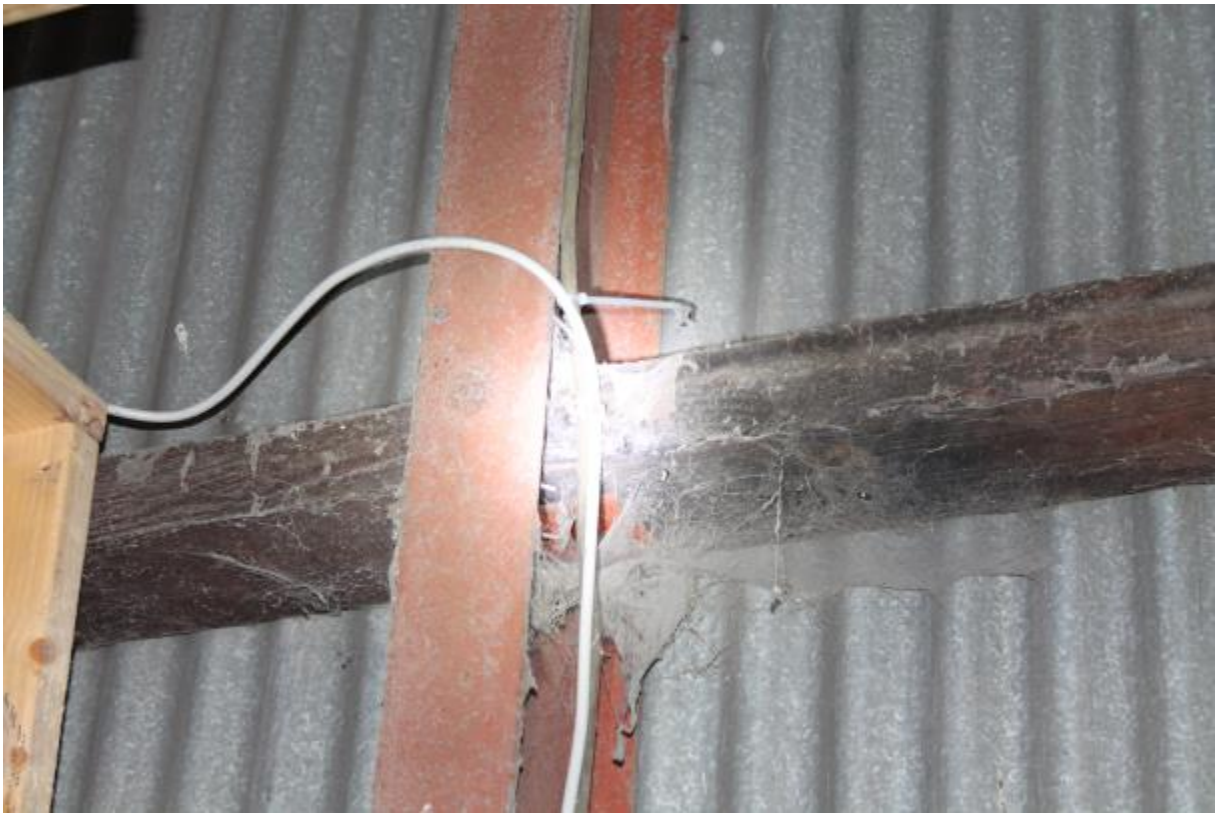


Plate A11: Inspection of portal framework for droppings

Plate A12: Interior of lean-to storage shed

Plate A13: Interior of lean-to storage shed

Plate A14: Inspection of roller door gap and mechanism

APPENDIX II: SAMPLE BAT ACOUSTIC RECORDINGS

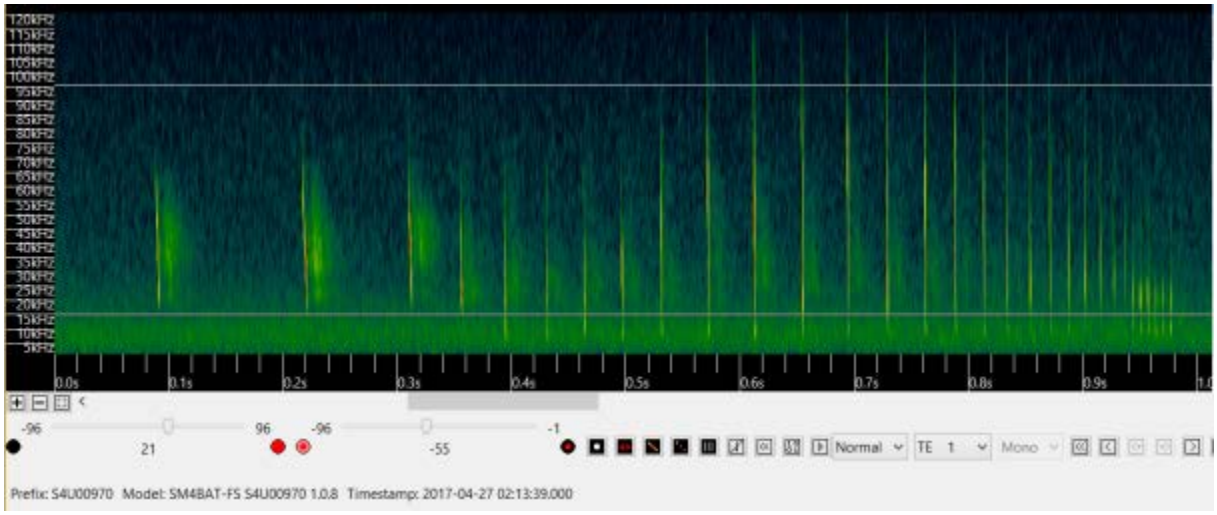


Plate A15: Passive A. Natterer's Bat showing broadband steeply modulated pulses with terminal feeding buzz. Lines at 20kHz and 100kHz for visual reference.

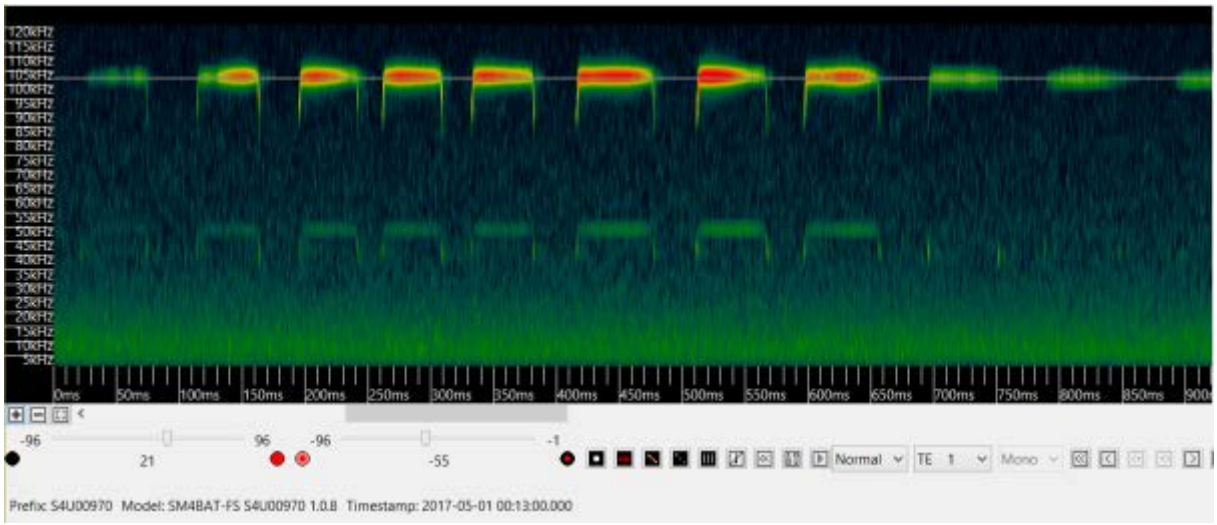


Plate A16: Passive A. Lesser Horseshoe Bat. Line at 107kHz for visual reference.

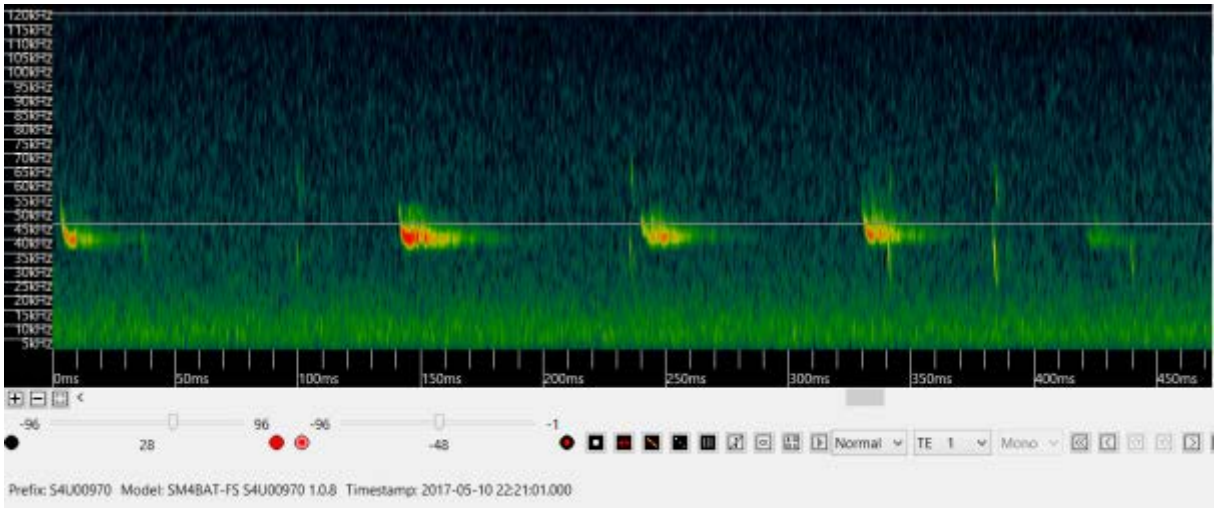


Plate A17: Passive C. Brown Long-eared Bat simultaneously recorded with Common Pipistrelle. Line at 50kHz for visual reference.

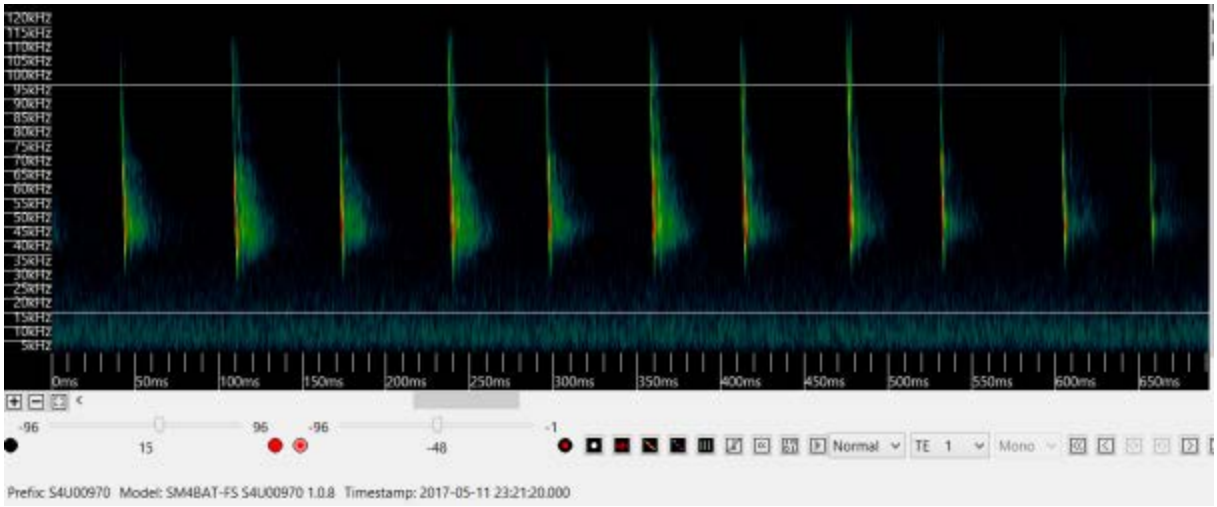


Plate A18: Passive C. Whiskered Bat. Strong, clear pulses with end frequencies >30kHz. Lines at 20kHz and 100kHz for visual reference.

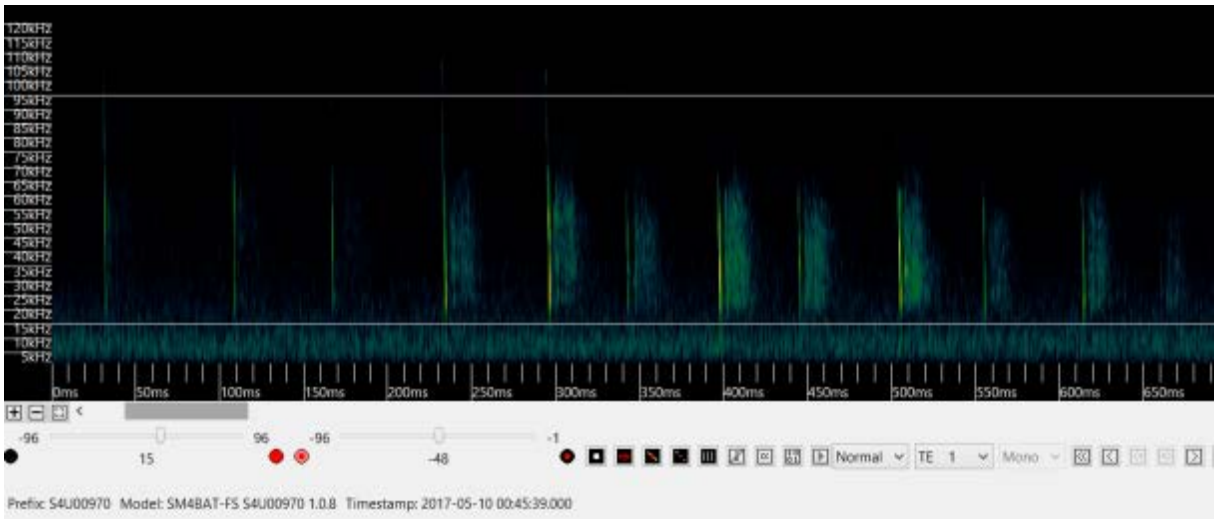


Plate A19: Passive C. Natterer's Bat. Lines at 20kHz and 100kHz for visual reference.

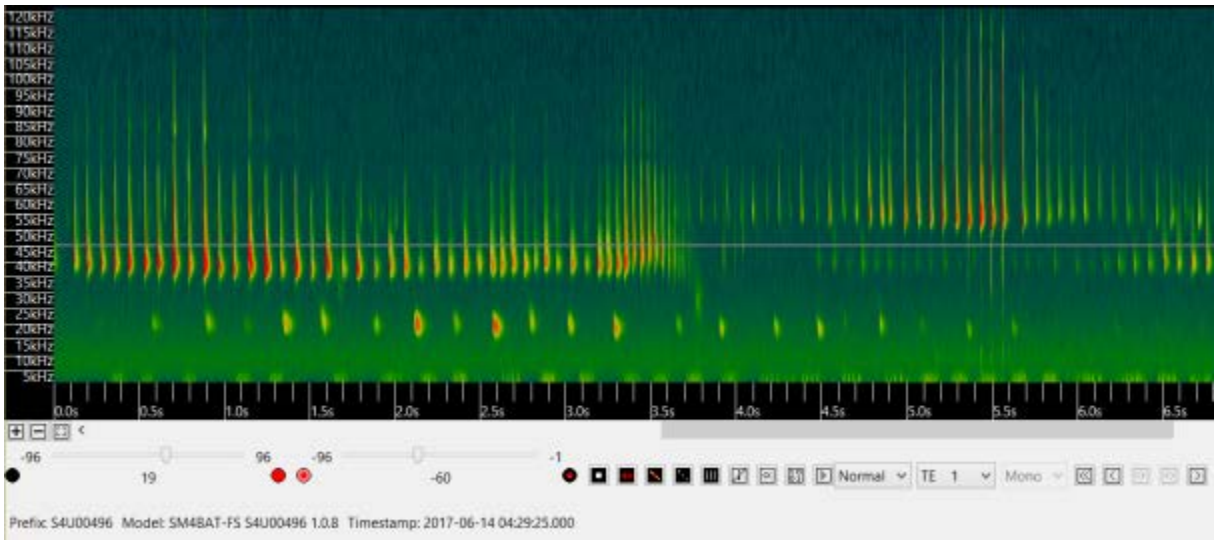


Plate A20: Passive E. Common Pipistrelle with feeding buzz, Soprano Pipistrelle and Leisler's Bat simultaneously recorded. Line at 50kHz for visual reference.

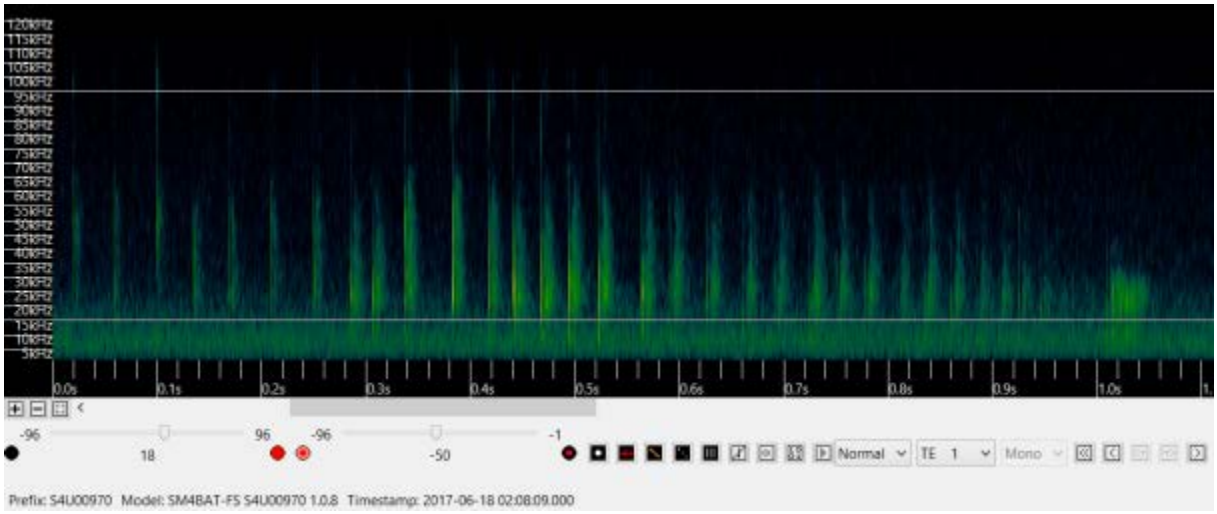


Plate A21: Passive F. Natterer's bat with feeding buzz, foraging in wet grassland beside stream. Lines at 20kHz and 100kHz for visual reference.

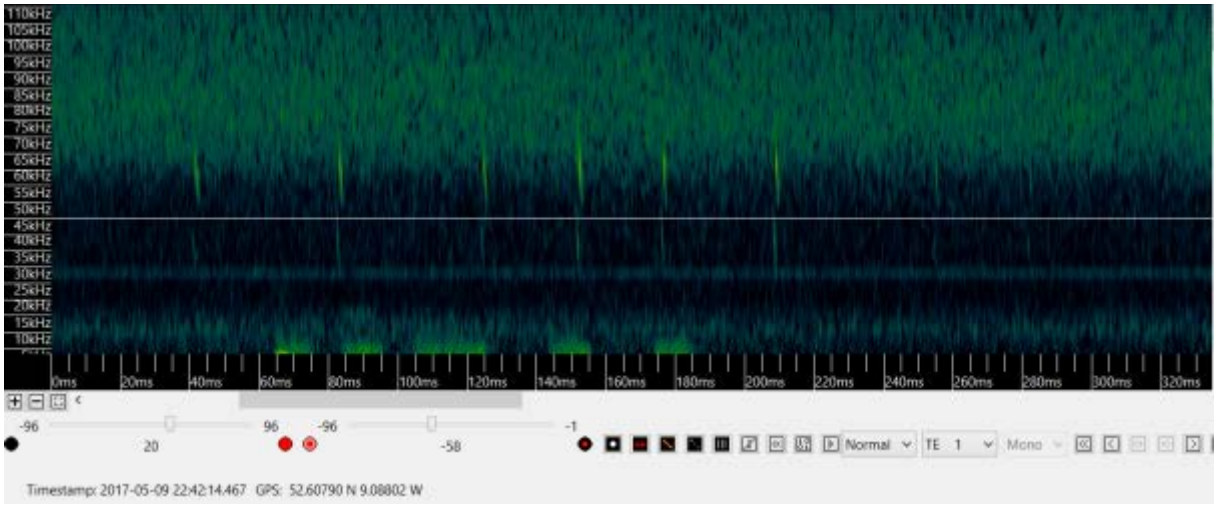


Plate A22: 9 May 2017 active walkover survey - Brown Long-eared Bat at spot 16 eastern boundary. Line at 50kHz for visual reference.

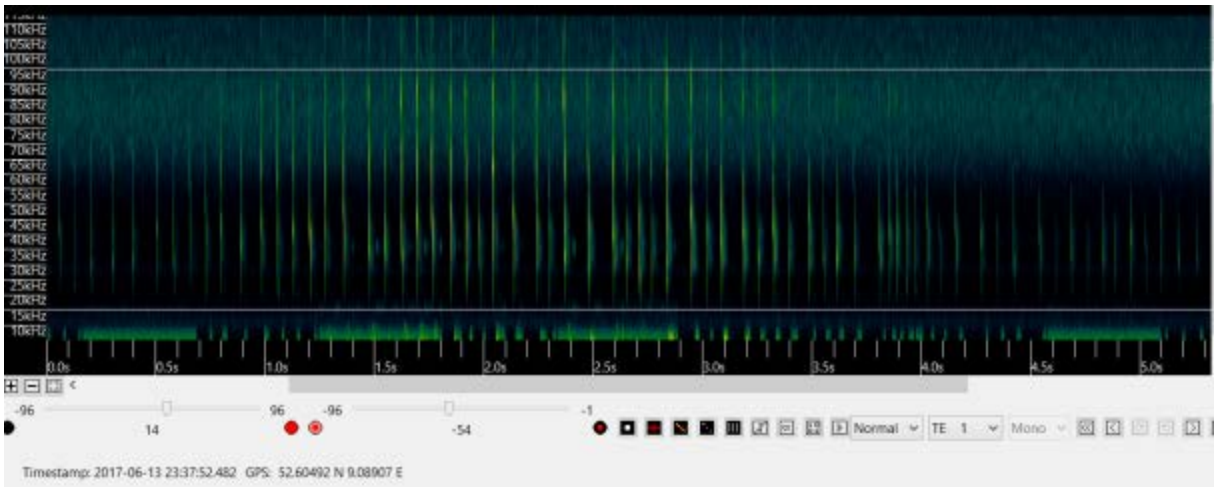


Plate A23: 13 June 2017 active walkover survey - Natterer's Bat recorded foraging beside stream. Lines at 20kHz and 100kHz for visual reference.

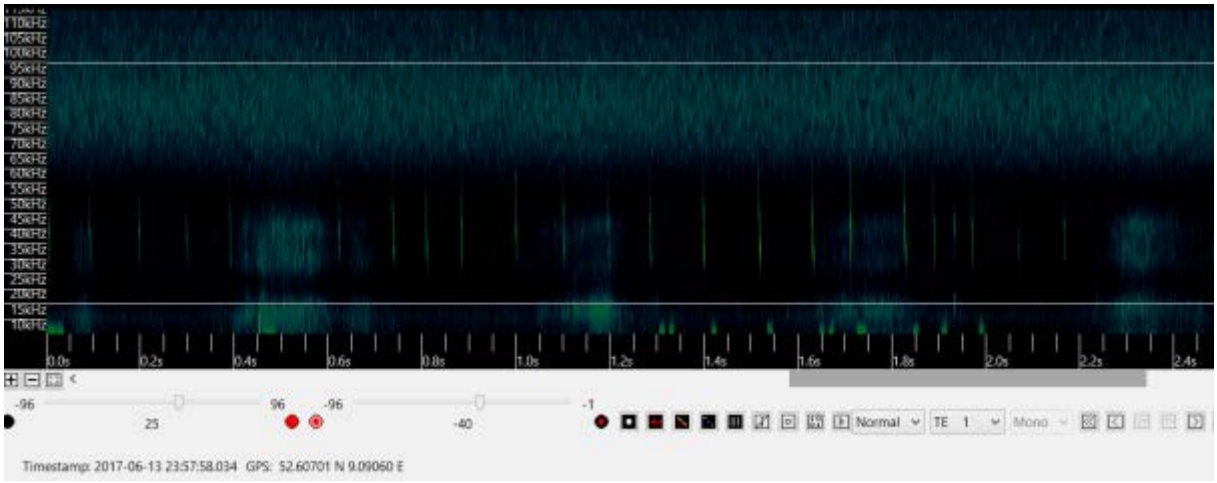


Plate A24: 13 June 2017 active walkover survey - unidentified Myotis sp. recorded at 'sycamore circle'. Lines at 20kHz and 100kHz for visual reference.

Appendix 7.3

Proposed NHA Site Synopsis

SITE SYNOPSIS

SITE NAME: INNER SHANNON ESTUARY - SOUTH SHORE

SITE CODE: 000435

The River Shannon Estuary sweeps inland from Foynes, Co. Limerick, as far as Limerick City. This is a large tidal system with intertidal mudflats, fringing reedbeds, swamps, polders, salt marsh and wet marsh habitats. Reedbeds and their associated swamp habitats generally mark the edges of the various rivers and stream channels and sheltered creeks within the system. The common reed (Phragmites australis) dominates with clubrushes (Scirpus spp.) and bulrushes (Typha spp.) more locally abundant. Brackish estuarine marsh and salt marsh habitats make up a considerable portion of the fringing vegetation. The extensive mudflats of the Shannon Estuary abound with invertebrate food, which supports many thousands of wading birds and duck. Greenland White-fronted and Greylag Geese frequent the southern shores of the estuary during the winter months.

This site along with sections in Co's. Kerry and Clare and the associated Fergus Estuary are amongst the most important sites in Europe for wintering and migrating waterfowl. The vast sweep of mudflats provides a rich source of nutrition for thousands of wildfowl. On a national scale it is perhaps more important for waders than for wildfowl. Regular counts have established its international importance. The spread of cord grass (Spartina sp.) requires investigation as its presence over large areas reduces the available feeding ground and reduces the attractiveness to waterfowl. The mudflats would be susceptible to various forms of toxic water pollution and close monitoring is required of any present or planned industrial development in the area. The presence of two rare plant species along the estuary greatly increases the scientific value of the site. The estuary is a stronghold for both the rare triangular rush (Scirpus triqueter) and summer snowflake (Leucojuin pestirum): both are found locally abundant along the system.

11th July 1995.

Appendix 7.4

Sediment Chemistry Results

Hydrographic Surveys Ltd.
The Cobbles, Crosshaven, Co. Cork.
Tel: +353 21 4831184 • Fax: +353 21 4831193
E-mail: info@hydrosurvey.com
www.hydrosurvey.com

Port of Foynes

Sampling Survey Final Report

Report No. PH18006_Rp_Rev.01

Client:

Shannon Foynes
PORT COMPANY

REPORT CONTROL SHEET

Client	Shannon Foynes Port Company					
Project Name	Port of Foynes Sampling Survey					
Report Name	Port of Foynes Sampling Survey Report					
Project Number	PH18006					
This Report Comprises of	TOC	Text	No. of Volume	No. of Appendices	Drawings	Electronic data
	1	8	1	0	0	*.pdf, *.xls

Revision	**Status**	**Author(s)**	**Approved By:**	**Issue Date**
Rev.00	Draft	HP	JBJ	05.04.2018
Rev.01	Final	HP	JBJ	25.04.2018

TABLE OF CONTENTS

1. EXECUTIVE SUMMARY 4

1. INTRODUCTION 5

1.1 SITE LOCATION AND SURVEY DESCRIPTION 5

1.2 SURVEY OBJECTIVES 6

2. SURVEY METHODOLOGY 7

2.1 SAMPLING SURVEY 7

2.2 HORIZONTAL CONTROL 7

2.2.1 Sample Acquisition 7

2.3 GEOTECHNICAL ANALYSIS 7

3. SURVEY RESULTS 8

1. Executive Summary

Hydrographic Surveys Ltd. was requested by Shannon Foynes Port Company to undertake a sediment sampling survey at Port of Foynes.

The objectives of the survey were as follows;

- Collect samples at 12 no. designated locations at Port of Foynes and analyse for pre-designated criteria.

All fieldwork was undertaken on the 6th Feb 2018.

The results for the geochemical analysis are provided along with this report in the EPA Dumping at Sea material analysis spreadsheet format as well as the laboratories own analysis report.

1. Introduction

1.1 Site Location and Survey Description

Hydrographic Surveys Ltd. was requested by Port of Foynes Company to undertake a sediment sampling survey at Port of Foynes.

The sampling locations were as follows;

Sampling Location ID	Position Latitude (WGS84 decimal degrees)	Position Longitude (WGS84 decimal degrees)	Sampling depth below seabed
INT-S1	52.61273	-9.10551	Surface
INT-S2	52.61296	-9.10373	Surface
INT-S3	52.61548	-9.09841	Surface
INT-S4	52.61813	-9.09525	Surface
SUB-S1	52.61271	-9.10602	Surface
SUB-S2	52.61298	-9.10507	Surface
SUB-S3	52.61323	-9.10577	Surface
SUB-S4	52.61580	-9.09867	Surface
G01	52.61315	-9.10609	Surface
G02	52.61290	-9.10581	Surface
G03	52.61307	-9.10520	Surface
G04	52.61332	-9.10515	Surface

Table1.1: Sampling locations (Lat /Lon in WGS84 coordinate system)

The 12 no. surface sediment samples were taken via a stainless steel Van Veen sampler and analysed for the geochemical properties (as outlined in Section 2.3). Values were also measured with reference to Certified Reference Materials (CRM) and the results for these are included along with the results of the geochemical properties analysed. The samples to be tested for geochemical properties were sent to RPS Laboratories in Letchworth, UK for analysis.

All fieldwork was undertaken on the 6th Feb 2018.

1.2 Survey Objectives

The objectives of the survey were as follows;

- Collect samples at 12 no. designated location at Port of Foynes and analyse for pre-designated criteria.

2. Survey Methodology

The sampling survey took place on the 6th Feb 2018 on-board the Shannon Foynes Port Company 'Multicat 'vessel.

2.1 Sampling Survey

The locations for sampling were designated by the Ruth Barr (RPS Consulting Engineers).

2.2 Horizontal Control

Horizontal control for the survey was provided by a Trimble differential GPS receiver. The differential signal was received from the Omnistar satellite. All sampling took place on the sample locations.

2.2.1 Sample Acquisition

All samples were acquired with a Van Veen 0.2m³ capacity stainless steel grab sampler.

All samples were placed directly into the appropriate containers and couriered in a cool box to the certified laboratories. The samples for geochemical analysis were sent to RPS Laboratories Letchworth. The samples were dispatched to RPS Laboratories via fast track courier on 7th Feb 2018.

2.3 Geotechnical Analysis

The geotechnical analysis involved the following for the 5 no. samples as specified in DaS Permit S0024-01.

1. Visual inspection, to include colour, texture, odour, presence of animals etc.
2. Water content, density (taking into account sample collection and handling)
3. Granulometry including % gravel (> 2mm fraction), % sand (< 2mm fraction) and % mud (< 63µm fraction).
4. The following determinants in the sand-mud (< 2mm) fraction:

a) Total organic carbon.
b) Carbonate.
c) Zinc, Nickel. Copper, Lead, Arsenic, Cadmium, Lithium, Aluminium, Chromium, Mercury
d) Organochlorines including - HCH (Lindane) and PCBs (to be reported as the 7 individual CB congeners: 28, 52, 101, 118, 138, 153, and 180).
e) Total extractable hydrocarbons.
f) Tributyltin (TBT) and dibutyltin (DBT).
g) Polycyclic aromatic hydrocarbons (PAH) - Acenaphthene, Acenaphthylene, Anthracene, Benzo (a) anthracene, Benzo (a) pyrene, Benzo (b) fluoranthene, Benzo (ghi) perylene, Benzo (k) fluoranthene, Chrysene, Dibenz (a,h) anthracene, Flourene, Fluoranthene, Indeno 1,2,3 – cd pyrene, Naphthalene, Phenanthrene, Pyrene.

3. Survey Results

The results for the geochemical analysis are provided along with this report in the EPA Dumping at Sea material analysis spreadsheet format as well as the laboratories own analysis report.

2 Shaftesbury Industrial Centre, Icknield Way, Letchworth Garden City, Hertfordshire, SG6 1HE
T +44 (0)1462 480 400, **F** +44 (0)1462 480 403, **E** rpsmh@rpsgroup.com, **W** rpsgroup.com

Certificate of Analysis

Report No.: 18-69055-2

Issue No.: **2**
Date of Issue **12/03/2018**

Customer Details: Hydrographic Surveys Ltd
The Cobbles
Crosshaven
County Cork

Customer Contact: Hugh Power (2)

Customer Order No.: 10304

Customer Reference: Not Supplied

Quotation Reference: 171117/01

Description: 12 sediment samples

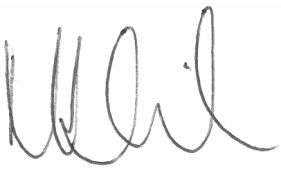
Date Received: 08/02/2018

Date Started: 14/02/2018

Date Completed: 12/03/2018

Test Methods: Details available on request (refer to SOP code against relevant result/s)

Notes: This report replaces issue 1 in its entirety



Approved By: **Matthew Hickson, Laboratory Manager**

UKAS TESTING
1663

2 Shaftesbury Industrial Centre, Icknield Way, Letchworth Garden City, Hertfordshire, SG6 1HE
T +44 (0)1462 480 400, **F** +44 (0)1462 480 403, **E** rpsmh@rpsgroup.com, **W** rpsgroup.com

Results Summary - Dry Weights, Moisture, Total Organic Carbon, TPH, Organotins & Density

Report No.: **18-69055-2**
Customer Reference: Not given
Customer Order No: 10304

						Customer Sample No	**Certified Reference Material**		**AQC spike**			**INT-S1**	**INT-S2**	**INT-S3**	**INT-S4**
						Customer Sample ID									
						RPS Sample No						354212	354213	354214	354215
						Sample Type	**SEDIMENT**		**SEDIMENT**			**SEDIMENT**	**SEDIMENT**	**SEDIMENT**	**SEDIMENT**
						Sample Location									
						Sample Depth (m)									
						Sampling Date	**CRM BCR-646**		**Spike on clean sediment**			23/01/2018	23/01/2018	23/01/2018	23/01/2018
						Sampling Time									
Determinand	**CAS No**	**Codes**	**SOP**	**Units**	**RL**	**Assigned Value**	**Measured Value**	**Recovery %**	**Assigned Value**	**Measured Value**	**Recovery %**				
dry solids (at 105°C)		N	397	%		n/a	n/a	n/a	n/a	n/a	n/a	48.9	59.3	59.9	65.1
carbonate % dry matter		N	In house	%	0.1	n/a	n/a	n/a	n/a	n/a	n/a	4.58	4.67	4.69	5.01
total organic carbon		U	404	%	0.3	n/a	n/a	n/a	n/a	n/a	n/a	1.2	0.7	0.9	0.7
total hydrocarbon content by GC-FID		N	in house	ug/kg DW	0.1	n/a	n/a	n/a	n/a	n/a	n/a	11100	6070	7470	5800
dibutyltin (DBT)	1002-53-5	U	395	ug/kg DW	5	770	517	67.1%	40	44.33	110.8%	< 10.23	< 5.00	< 5.00	< 5.00
tributyltin (TBT)	56573-85-4	U	395	ug/kg DW	2	480	453.6	94.5%	40	48.73	121.8%	< 4.09	< 2.00	< 2.00	< 2.00
density (on dry solid)		N	In house	g/cm3		n/a	n/a	n/a	n/a	n/a	n/a	1.6	1.2	1.2	1.4

2 Shaftesbury Industrial Centre, Icknield Way, Letchworth Garden City, Hertfordshire, SG6 1HE
T +44 (0)1462 480 400, **F** +44 (0)1462 480 403, **E** rpsmh@rpsgroup.com, **W** rpsgroup.com

Results Summary - Dry Weights, Moisture, Total Organic Carbon, TPH, Organotins & Density

Report No.: **18-69055-2**
Customer Reference: Not given
Customer Order No: 10304

						Customer Sample No	**Certified Reference Material**		**AQC spike**			**SUB-S1**	**SUB-S2**	**SUB-S3**	**SUB-S4**
						Customer Sample ID									
						RPS Sample No						354216	354217	354218	354219
						Sample Type	**SEDIMENT**		**SEDIMENT**			**SEDIMENT**	**SEDIMENT**	**SEDIMENT**	**SEDIMENT**
						Sample Location									
						Sample Depth (m)									
						Sampling Date	**CRM BCR-646**		**Spike on clean sediment**			23/01/2018	23/01/2018	23/01/2018	23/01/2018
						Sampling Time									
Determinand	**CAS No**	**Codes**	**SOP**	**Units**	**RL**	**Assigned Value**	**Measured Value**	**Recovery %**	**Assigned Value**	**Measured Value**	**Recovery %**				
dry solids (at 105°C)		N	397	%		n/a	n/a	n/a	n/a	n/a	n/a	45.8	44.6	53.9	56.4
carbonate % dry matter		N	In house	%	0.1	n/a	n/a	n/a	n/a	n/a	n/a	4.59	4.49	5.11	4.96
total organic carbon		U	404	%	0.3	n/a	n/a	n/a	n/a	n/a	n/a	1.4	1.3	0.8	0.7
total hydrocarbon content by GC-FID		N	in house	ug/kg DW	0.1	n/a	n/a	n/a	n/a	n/a	n/a	9390	14500	12300	9230
dibutyltin (DBT)	1002-53-5	U	395	ug/kg DW	5	770	517	67.1%	40	44.33	110.8%	< 10.92	< 11.21	< 5.00	< 5.00
tributyltin (TBT)	56573-85-4	U	395	ug/kg DW	2	480	453.6	94.5%	40	48.73	121.8%	< 4.37	< 4.49	< 2.00	< 2.00
density (on dry solid)		N	In house	g/cm3		n/a	n/a	n/a	n/a	n/a	n/a	1.3	1.8	1.5	1.6

2 Shaftesbury Industrial Centre, Icknield Way, Letchworth Garden City, Hertfordshire, SG6 1HE
T +44 (0)1462 480 400, **F** +44 (0)1462 480 403, **E** rpsmh@rpsgroup.com, **W** rpsgroup.com

Results Summary - Dry Weights, Moisture, Total Organic Carbon, TPH, Organotins & Density

Report No.: **18-69055-2**
Customer Reference: Not given
Customer Order No: 10304

						Customer Sample No	**Certified Reference Material**		**AQC spike**			**G01**	**G02**	**G03**	**G04**
						Customer Sample ID									
						RPS Sample No						354220	354221	354222	354223
						Sample Type	**SEDIMENT**		**SEDIMENT**			**SEDIMENT**	**SEDIMENT**	**SEDIMENT**	**SEDIMENT**
						Sample Location									
						Sample Depth (m)									
						Sampling Date	**CRM BCR-646**		**Spike on clean sediment**			23/01/2018	23/01/2018	23/01/2018	23/01/2018
						Sampling Time									
Determinand	**CAS No**	**Codes**	**SOP**	**Units**	**RL**	**Assigned Value**	**Measured Value**	**Recovery %**	**Assigned Value**	**Measured Value**	**Recovery %**				
dry solids (at 105°C)		N	397	%		n/a	n/a	n/a	n/a	n/a	n/a	51.1	56.6	51.0	54.9
carbonate % dry matter		N	In house	%	0.1	n/a	n/a	n/a	n/a	n/a	n/a	4.81	4.59	4.78	4.74
total organic carbon		U	404	%	0.3	n/a	n/a	n/a	n/a	n/a	n/a	1.3	1.1	1.2	1.0
total hydrocarbon content by GC-FID		N	in house	ug/kg DW	0.1	n/a	n/a	n/a	n/a	n/a	n/a	17500	13800	22800	11700
dibutyltin (DBT)	1002-53-5	U	395	ug/kg DW	5	770	517	67.1%	40	44.33	110.8%	< 5.00	< 5.00	< 5.00	< 5.00
tributyltin (TBT)	56573-85-4	U	395	ug/kg DW	2	480	453.6	94.5%	40	48.73	121.8%	< 2.00	< 2.00	< 2.00	< 2.00
density (on dry solid)		N	In house	g/cm3		n/a	n/a	n/a	n/a	n/a	n/a	1.4	1.4	1.8	1.6

2 Shaftesbury Industrial Centre, Icknield Way, Letchworth Garden City, Hertfordshire, SG6 1HE
T +44 (0)1462 480 400, **F** +44 (0)1462 480 403, **E** rpsmh@rpsgroup.com, **W** rpsgroup.com

Results Summary - Metals

Report No.: **18-69055-2**
Customer Reference: Not given
Customer Order No: 10304

						Customer Sample No	**Standard Reference Material**		**INT-S1**	**INT-S2**	**INT-S3**	**INT-S4**	**SUB-S1**	**SUB-S2**
						Customer Sample ID								
						RPS Sample No			354212	354213	354214	354215	354216	354217
						Sample Type	**SEDIMENT**		**SEDIMENT**	**SEDIMENT**	**SEDIMENT**	**SEDIMENT**	**SEDIMENT**	**SEDIMENT**
						Sample Location								
						Sample Depth (m)								
						Sampling Date	**SRM-2702**		23/01/2018	23/01/2018	23/01/2018	23/01/2018	23/01/2018	23/01/2018
						Sampling Time								
Determinand	**CAS No**	**Codes**	**SOP**	**Units**	**RL**	**Assigned Value**	**Measured Value**	**Recovery %**						
aluminium	7429-90-5	USI	M-129	mg/kg DW	12	84100	69600	82.8%	31600	29000	23300	22500	30000	31400
arsenic	7440-38-2	USI	M-129	mg/kg DW	0.5	45.3	44.5	98.2%	11.7	9.54	7.08	7.41	11.2	11.6
cadmium	7440-43-9	USI	M-129	mg/kg DW	0.1	0.817	0.83	101.6%	0.27	0.31	0.29	0.31	0.31	0.46
chromium	7440-47-3	USI	M-129	mg/kg DW	0.5	352	316	89.8%	48.1	43.7	35.4	34.9	46.7	46.6
copper	7440-50-8	USI	M-129	mg/kg DW	0.5	Not certified	Not certified	n/a	10.4	8.50	6.73	6.47	10.9	11.0
lead	7439-92-1	USI	M-129	mg/kg DW	0.5	132.8	139	104.7%	22.6	20.2	16.6	15.4	23.9	24.8
lithium	7439-93-2	USI	M-129	mg/kg DW	6	Not certified	Not certified	n/a	26.0	26.7	20.3	19.2	27.3	31.2
mercury	7439-97-6	USI	M-129	mg/kg DW	0.01	0.4474	0.45	100.6%	0.05	0.05	0.04	0.03	0.06	0.06
nickel	7440-02-0	USI	M-129	mg/kg DW	0.5	75.4	68.8	91.2%	23.5	21.2	16.9	16.1	22.8	23.6
zinc	7440-66-6	USI	M-129	mg/kg DW	2	485.3	471	97.1%	75.9	68.6	55.8	56.0	76.6	76.0

2 Shaftesbury Industrial Centre, Icknield Way, Letchworth Garden City, Hertfordshire, SG6 1HE
T +44 (0)1462 480 400, **F** +44 (0)1462 480 403, **E** rpsmh@rpsgroup.com, **W** rpsgroup.com

Results Summary - Metals

Report No.: **18-69055-2**
Customer Reference: Not given
Customer Order No: 10304

						Customer Sample No	**Standard Reference Material**		**SUB-S3**	**SUB-S4**	**G01**	**G02**	**G03**	**G04**
						Customer Sample ID								
						RPS Sample No			354218	354219	354220	354221	354222	354223
						Sample Type	**SEDIMENT**		**SEDIMENT**	**SEDIMENT**	**SEDIMENT**	**SEDIMENT**	**SEDIMENT**	**SEDIMENT**
						Sample Location	**SRM-2702**							
						Sample Depth (m)								
						Sampling Date			23/01/2018	23/01/2018	23/01/2018	23/01/2018	23/01/2018	23/01/2018
						Sampling Time								
Determinand	**CAS No**	**Codes**	**SOP**	**Units**	**RL**	**Assigned Value**	**Measured Value**	**Recovery %**						
aluminium	7429-90-5	USI	M-129	mg/kg DW	12	84100	69600	82.8%	26700	24800	31700	31500	29100	31400
arsenic	7440-38-2	USI	M-129	mg/kg DW	0.5	45.3	44.5	98.2%	10.3	8.72	11.4	11.0	10.8	12.2
cadmium	7440-43-9	USI	M-129	mg/kg DW	0.1	0.817	0.83	101.6%	0.31	0.28	0.33	0.30	0.30	0.32
chromium	7440-47-3	USI	M-129	mg/kg DW	0.5	352	316	89.8%	40.1	38.4	47.1	48.2	43.6	48.2
copper	7440-50-8	USI	M-129	mg/kg DW	0.5	Not certified	Not certified	n/a	9.44	7.44	10.7	9.97	10.7	9.90
lead	7439-92-1	USI	M-129	mg/kg DW	0.5	132.8	139	104.7%	20.7	18.7	25.0	24.9	24.9	24.7
lithium	7439-93-2	USI	M-129	mg/kg DW	6	Not certified	Not certified	n/a	26.1	23.7	33.0	30.2	28.0	31.0
mercury	7439-97-6	USI	M-129	mg/kg DW	0.01	0.4474	0.45	100.6%	0.05	0.04	0.06	0.16	0.06	0.05
nickel	7440-02-0	USI	M-129	mg/kg DW	0.5	75.4	68.8	91.2%	20.0	17.8	23.4	23.7	21.5	23.8
zinc	7440-66-6	USI	M-129	mg/kg DW	2	485.3	471	97.1%	66.6	60.2	77.7	76.1	73.7	77.8

2 Shaftesbury Industrial Centre, Icknield Way, Letchworth Garden City, Hertfordshire, SG6 1HE
T +44 (0)1462 480 400, **F** +44 (0)1462 480 403, **E** rpsmh@rpsgroup.com, **W** rpsgroup.com

Results Summary - Polycyclic Aromatic Hydrocarbons (EPA 16 PAHs)

Report No.: **18-69055-2**
Customer Reference: Not given
Customer Order No: 10304

						Customer Sample No	**Certified Reference Material**		**AQC spike**			**INT-S1**	**INT-S2**	**INT-S3**	**INT-S4**
						Customer Sample ID									
						RPS Sample No						354212	354213	354214	354215
						Sample Type	**SEDIMENT**		**SEDIMENT**			**SEDIMENT**	**SEDIMENT**	**SEDIMENT**	**SEDIMENT**
						Sample Location									
						Sample Depth (m)									
						Sampling Date	**NMIJ CRM-7307a**		**Spike on clean sediment**			23/01/2018	23/01/2018	23/01/2018	23/01/2018
						Sampling Time									
Determinand	**CAS No**	**Codes**	**SOP**	**Units**	**RL**	**Assigned Value**	**Measured Value**	**Recovery %**	**Assigned Value**	**Measured Value**	**Recovery %**				
naphthalene	91-20-3	U	396	ug/kg DW	3	Not certified	Not certified	n/a	50	56.45	112.9%	13.8	14.6	12.2	8.34
acenaphthylene	208-96-8	U	396	ug/kg DW	2	Not certified	Not certified	n/a	50	45.61	91.2%	< 2.000	6.34	< 2.0	< 2.0
acenaphthene	83-32-9	U	396	ug/kg DW	1.7	Not certified	Not certified	n/a	50	50.43	100.9%	1.86	< 1.7	< 1.7	< 1.7
fluorene	86-73-7	U	396	ug/kg DW	1.7	5.98	5.79	96.8%	50	53.62	107.2%	7.43	12.8	5.91	6.89
phenanthrene	85-01-8	U	396	ug/kg DW	4	24.5	26.37	107.6%	50	56.73	113.5%	24.2	36.1	17.8	32.3
anthracene	120-12-7	U	396	ug/kg DW	2.5	3.59	2.03	56.5%	50	42.19	84.4%	6.92	13.5	5.86	15.1
fluoranthene	206-44-0	U	396	ug/kg DW	2.5	25.1	27.64	110.1%	50	54.99	110.0%	33.9	67.3	26.1	65.2
pyrene	129-00-0	U	396	ug/kg DW	2.8	22.2	18.7	84.2%	50	49.28	98.6%	26.0	50.0	20.0	52.4
benzo(a)anthracene	56-55-3	U	396	ug/kg DW	1.6	7.15	6.26	87.6%	50	45.18	90.4%	17.8	42.3	14.3	39.3
chrysene	218-01-9	U	396	ug/kg DW	1.7	8.39	10	119.2%	50	52.67	105.3%	12.6	24.5	9.64	22.8
benzo(b+j)fluoranthene	205-99-2	U	396	ug/kg DW	1.6	31.9	34.91	109.4%	50	51.78	103.6%	55.5	84.1	45.6	75.9
benzo(k)fluoranthene	207-08-9	U	396	ug/kg DW	2	5.28	6.24	118.2%	50	54.16	108.3%	22.0	36.5	18.3	31.6
benzo(a)pyrene	50-32-8	U	396	ug/kg DW	0.9	4.57	2.9	63.5%	50	51.57	103.1%	28.1	62.6	18.5	54.6
indeno(1,2,3-c,d)pyrene	193-39-5	U	396	ug/kg DW	2.2	5.6	6.38	113.9%	50	45.58	91.2%	23.2	30.0	18.9	25.1
dibenzo(a,h)anthracene	53-70-3	U	396	ug/kg DW	1.6	Not certified	Not certified	n/a	50	44.2	88.4%	8.12	11.1	8.11	7.78
benzo(g,h,i)perylene	191-24-2	U	396	ug/kg DW	1.4	6.76	8.12	120.1%	50	41.41	82.8%	27.6	32.6	24.6	29.0

2 Shaftesbury Industrial Centre, Icknield Way, Letchworth Garden City, Hertfordshire, SG6 1HE
T +44 (0)1462 480 400, **F** +44 (0)1462 480 403, **E** rpsmh@rpsgroup.com, **W** rpsgroup.com

Results Summary - Polycyclic Aromatic Hydrocarbons (EPA 16 PAHs)

Report No.: **18-69055-2**
Customer Reference: Not given
Customer Order No: 10304

						Customer Sample No	**Certified Reference Material**		**AQC spike**			**SUB-S1**	**SUB-S2**	**SUB-S3**	**SUB-S4**
						Customer Sample ID									
						RPS Sample No						354216	354217	354218	354219
						Sample Type	**SEDIMENT**		**SEDIMENT**			**SEDIMENT**	**SEDIMENT**	**SEDIMENT**	**SEDIMENT**
						Sample Location									
						Sample Depth (m)									
						Sampling Date	**NMIJ CRM-7307a**		**Spike on clean sediment**			23/01/2018	23/01/2018	23/01/2018	23/01/2018
						Sampling Time									
Determinand	**CAS No**	**Codes**	**SOP**	**Units**	**RL**	**Assigned Value**	**Measured Value**	**Recovery %**	**Assigned Value**	**Measured Value**	**Recovery %**				
naphthalene	91-20-3	U	396	ug/kg DW	3	Not certified	Not certified	n/a	50	56.45	112.9%	13.9	15.2	14.7	10.4
acenaphthylene	208-96-8	U	396	ug/kg DW	2	Not certified	Not certified	n/a	50	45.61	91.2%	< 2.000	< 2.000	< 2.0	< 2.0
acenaphthene	83-32-9	U	396	ug/kg DW	1.7	Not certified	Not certified	n/a	50	50.43	100.9%	< 1.700	2.24	< 1.7	< 1.7
fluorene	86-73-7	U	396	ug/kg DW	1.7	5.98	5.79	96.8%	50	53.62	107.2%	6.95	6.59	7.42	4.95
phenanthrene	85-01-8	U	396	ug/kg DW	4	24.5	26.37	107.6%	50	56.73	113.5%	20.6	23.7	28.8	14.9
anthracene	120-12-7	U	396	ug/kg DW	2.5	3.59	2.03	56.5%	50	42.19	84.4%	6.64	6.37	8.28	4.56
fluoranthene	206-44-0	U	396	ug/kg DW	2.5	25.1	27.64	110.1%	50	54.99	110.0%	32.6	31.9	43.3	26.4
pyrene	129-00-0	U	396	ug/kg DW	2.8	22.2	18.7	84.2%	50	49.28	98.6%	25.8	24.4	31.4	19.6
benzo(a)anthracene	56-55-3	U	396	ug/kg DW	1.6	7.15	6.26	87.6%	50	45.18	90.4%	18.4	14.3	24.9	16.0
chrysene	218-01-9	U	396	ug/kg DW	1.7	8.39	10	119.2%	50	52.67	105.3%	11.3	8.99	16.2	11.6
benzo(b+j)fluoranthene	205-99-2	U	396	ug/kg DW	1.6	31.9	34.91	109.4%	50	51.78	103.6%	59.0	45.8	62.6	43.4
benzo(k)fluoranthene	207-08-9	U	396	ug/kg DW	2	5.28	6.24	118.2%	50	54.16	108.3%	23.9	17.4	31.7	18.5
benzo(a)pyrene	50-32-8	U	396	ug/kg DW	0.9	4.57	2.9	63.5%	50	51.57	103.1%	28.7	21.0	41.4	19.4
indeno(1,2,3-c,d)pyrene	193-39-5	U	396	ug/kg DW	2.2	5.6	6.38	113.9%	50	45.58	91.2%	25.1	18.0	22.7	13.5
dibenzo(a,h)anthracene	53-70-3	U	396	ug/kg DW	1.6	Not certified	Not certified	n/a	50	44.2	88.4%	9.02	7.06	8.05	5.28
benzo(g,h,i)perylene	191-24-2	U	396	ug/kg DW	1.4	6.76	8.12	120.1%	50	41.41	82.8%	28.6	20.3	28.0	17.3

2 Shaftesbury Industrial Centre, Icknield Way, Letchworth Garden City, Hertfordshire, SG6 1HE
T +44 (0)1462 480 400, **F** +44 (0)1462 480 403, **E** rpsmh@rpsgroup.com, **W** rpsgroup.com

Results Summary - Polycyclic Aromatic Hydrocarbons (EPA 16 PAHs)

Report No.: **18-69055-2**
Customer Reference: Not given
Customer Order No: 10304

						Customer Sample No	**Certified Reference Material**		**AQC spike**			**G01**	**G02**	**G03**	**G04**
						Customer Sample ID									
						RPS Sample No						354220	354221	354222	354223
						Sample Type	**SEDIMENT**		**SEDIMENT**			**SEDIMENT**	**SEDIMENT**	**SEDIMENT**	**SEDIMENT**
						Sample Location									
						Sample Depth (m)									
						Sampling Date	**NMIJ CRM-7307a**		**Spike on clean sediment**			23/01/2018	23/01/2018	23/01/2018	23/01/2018
						Sampling Time									
Determinand	**CAS No**	**Codes**	**SOP**	**Units**	**RL**	**Assigned Value**	**Measured Value**	**Recovery %**	**Assigned Value**	**Measured Value**	**Recovery %**				
naphthalene	91-20-3	U	396	ug/kg DW	3	Not certified	Not certified	n/a	50	56.45	112.9%	15.4	15.4	12.8	5.08
acenaphthylene	208-96-8	U	396	ug/kg DW	2	Not certified	Not certified	n/a	50	45.61	91.2%	< 2.0	< 2.0	< 2.0	< 2.0
acenaphthene	83-32-9	U	396	ug/kg DW	1.7	Not certified	Not certified	n/a	50	50.43	100.9%	< 1.7	< 1.7	< 1.7	3.15
fluorene	86-73-7	U	396	ug/kg DW	1.7	5.98	5.79	96.8%	50	53.62	107.2%	7.44	6.63	6.25	3.50
phenanthrene	85-01-8	U	396	ug/kg DW	4	24.5	26.37	107.6%	50	56.73	113.5%	25.0	16.7	21.5	13.2
anthracene	120-12-7	U	396	ug/kg DW	2.5	3.59	2.03	56.5%	50	42.19	84.4%	6.58	5.32	5.51	< 2.4
fluoranthene	206-44-0	U	396	ug/kg DW	2.5	25.1	27.64	110.1%	50	54.99	110.0%	38.5	25.6	29.2	29.5
pyrene	129-00-0	U	396	ug/kg DW	2.8	22.2	18.7	84.2%	50	49.28	98.6%	28.4	19.2	21.3	22.9
benzo(a)anthracene	56-55-3	U	396	ug/kg DW	1.6	7.15	6.26	87.6%	50	45.18	90.4%	19.9	14.9	13.1	14.6
chrysene	218-01-9	U	396	ug/kg DW	1.7	8.39	10	119.2%	50	52.67	105.3%	13.2	8.34	8.33	8.96
benzo(b+j)fluoranthene	205-99-2	U	396	ug/kg DW	1.6	31.9	34.91	109.4%	50	51.78	103.6%	58.2	46.9	41.2	32.5
benzo(k)fluoranthene	207-08-9	U	396	ug/kg DW	2	5.28	6.24	118.2%	50	54.16	108.3%	24.0	20.7	16.0	13.0
benzo(a)pyrene	50-32-8	U	396	ug/kg DW	0.9	4.57	2.9	63.5%	50	51.57	103.1%	34.9	26.6	16.3	24.7
indeno(1,2,3-c,d)pyrene	193-39-5	U	396	ug/kg DW	2.2	5.6	6.38	113.9%	50	45.58	91.2%	20.8	17.2	15.5	13.0
dibenzo(a,h)anthracene	53-70-3	U	396	ug/kg DW	1.6	Not certified	Not certified	n/a	50	44.2	88.4%	7.42	5.13	5.27	4.88
benzo(g,h,i)perylene	191-24-2	U	396	ug/kg DW	1.4	6.76	8.12	120.1%	50	41.41	82.8%	24.6	19.9	17.7	14.9

2 Shaftesbury Industrial Centre, Icknield Way, Letchworth Garden City, Hertfordshire, SG6 1HE
T +44 (0)1462 480 400, **F** +44 (0)1462 480 403, **E** rpsmh@rpsgroup.com, **W** rpsgroup.com

Results Summary - Organochlorine Pesticides & Polychlorinated Biphenyls (ICES 7)

Report No.: **18-69055-2**
Customer Reference: Not given
Customer Order No: 10304

						Customer Sample No	**Certified Reference Material**		**AQC spike**			**INT-S1**	**INT-S2**	**INT-S3**	**INT-S4**
						Customer Sample ID									
						RPS Sample No						354212	354213	354214	354215
						Sample Type	**SEDIMENT**		**SEDIMENT**			**SEDIMENT**	**SEDIMENT**	**SEDIMENT**	**SEDIMENT**
						Sample Location									
						Sample Depth (m)									
						Sampling Date	**CRM BCR-536**		**Spike on clean sediment**			23/01/2018	23/01/2018	23/01/2018	23/01/2018
						Sampling Time									
Determinand	**CAS No**	**Codes**	**SOP**	**Units**	**RL**	**Assigned Value**	**Measured Value**	**Recovery %**	**Assigned Value**	**Measured Value**	**Recovery %**				
aldrin	309-00-2	N	396	ug/kg DW	1	n/a	n/a	n/a	50	46.34	92.7%				
alpha-hexachlorocyclohexane (alpha-HCH)	319-84-6	U	396	ug/kg DW	1	n/a	n/a	n/a	50	45.81	91.6%				
beta-hexachlorocyclohexane (beta-HCH, beta-BHC)	319-85-7	U	396	ug/kg DW	1	n/a	n/a	n/a	50	45.77	91.5%	< 0.5	< 0.5	< 0.5	< 0.5
delta-hexachlorocyclohexane (delta-HCH)	319-86-8	U	396	ug/kg DW	1	n/a	n/a	n/a	50	56.38	112.8%	< 0.4	< 0.3	< 0.3	< 0.3
gamma-hexachlorocyclohexane (lindane)	58-89-9	U	396	ug/kg DW	1	n/a	n/a	n/a	50	48.47	96.9%	< 0.4	< 0.4	< 0.4	< 0.4
hexachlorobenzene (HCB)	118-74-1	U	396	ug/kg DW	1	n/a	n/a	n/a	50	51.05	102.1%	< 0.9	< 0.9	< 0.9	< 0.9
dieldrin	60-57-1	U	396	ug/kg DW	1	n/a	n/a	n/a	50	46.63	93.3%	< 0.4	< 0.2	< 0.2	< 0.2
endrin	72-20-8	N	396	ug/kg DW	1	n/a	n/a	n/a	50	45.69	91.4%	< 1.00	< 1.00	< 1.00	< 1.00
p,p'-DDD	3424-82-6	U	396	ug/kg DW	1	n/a	n/a	n/a	50	44.08	88.2%	< 0.6	< 0.6	< 0.6	< 0.6
p,p'-DDT	72-54-8	U	396	ug/kg DW	1	n/a	n/a	n/a	50	51.12	102.2%	< 1.0	< 1.0	< 1.0	< 1.0
p,p'-DDE	50-29-3	U	396	ug/kg DW	1	n/a	n/a	n/a	50	47.06	94.1%	< 0.8	< 0.8	< 0.8	< 0.8
2,4,4'-trichlorobiphenyl (PCB congener 28)	7012-37-5	U	396	ug/kg DW	1	44	50.43	114.6%	25	21.97	87.9%	< 0.41	< 0.9	< 0.9	< 0.9
2,2',5,5'-tetrachlorobiphenyl (PCB congener 52)	35693-99-3	U	396	ug/kg DW	0.7	38	42.05	110.7%	25	21.41	85.6%	< 0.41	< 0.7	< 0.7	< 0.7
2,2',4,5,5'-pentachlorobiphenyl (PCB congener 101)	37680-73-2	U	396	ug/kg DW	0.6	44	50.4	114.5%	25	22.55	90.2%	< 0.60	< 0.6	< 0.6	< 0.6
2,3',4,4',5-pentachlorobiphenyl (PCB congener 118)	31508-00-6	U	396	ug/kg DW	0.8	27.5	33.81	122.9%	25	24.79	99.2%	< 0.41	< 0.8	< 0.8	< 0.8
2,2',3,4,4',5-hexachlorobiphenyl (PCB 138)	35065-28-2	U	396	ug/kg DW	0.5	44.2	52.39	118.5%	25	24.06	96.2%	< 0.41	< 0.4	< 0.4	< 0.4
2,2',4,4',5,5'-hexachlorobiphenyl (PCB 153)	35065-27-1	U	396	ug/kg DW	0.5	50	59.78	119.6%	25	23.39	93.6%	< 0.41	< 0.5	< 0.5	< 0.5
2,2',3,4,4',5,5'-heptachlorobiphenyl (PCB 180)	35065-29-3	U	396	ug/kg DW	0.6	22.4	29.72	132.7%	25	25.43	101.7%	< 0.41	< 0.6	< 0.6	< 0.6

2 Shaftesbury Industrial Centre, Icknield Way, Letchworth Garden City, Hertfordshire, SG6 1HE
T +44 (0)1462 480 400, **F** +44 (0)1462 480 403, **E** rpsmh@rpsgroup.com, **W** rpsgroup.com

Results Summary - Organochlorine Pesticides & Polychlorinated Biphenyls (ICES 7)

Report No.: **18-69055-2**
Customer Reference: Not given
Customer Order No: 10304

					Customer Sample No	**Certified Reference Material**			**AQC spike**			**SUB-S1**	**SUB-S2**	**SUB-S3**	**SUB-S4**
					Customer Sample ID										
					RPS Sample No							354216	354217	354218	354219
					Sample Type	**SEDIMENT**			**SEDIMENT**			**SEDIMENT**	**SEDIMENT**	**SEDIMENT**	**SEDIMENT**
					Sample Location										
					Sample Depth (m)										
					Sampling Date	**CRM BCR-536**			**Spike on clean sediment**			23/01/2018	23/01/2018	23/01/2018	23/01/2018
					Sampling Time										
Determinand	**CAS No**	**Codes**	**SOP**	**Units**	**RL**	**Assigned Value**	**Measured Value**	**Recovery %**	**Assigned Value**	**Measured Value**	**Recovery %**				
aldrin	309-00-2	N	396	ug/kg DW	1	n/a	n/a	n/a	50	46.34	92.7%				
alpha-hexachlorocyclohexane (alpha-HCH)	319-84-6	U	396	ug/kg DW	1	n/a	n/a	n/a	50	45.81	91.6%				
beta-hexachlorocyclohexane (beta-HCH, beta-BHC)	319-85-7	U	396	ug/kg DW	1	n/a	n/a	n/a	50	45.77	91.5%	< 0.5	< 0.5	< 0.5	< 0.5
delta-hexachlorocyclohexane (delta-HCH)	319-86-8	U	396	ug/kg DW	1	n/a	n/a	n/a	50	56.38	112.8%	< 0.4	< 0.4	< 0.3	< 0.3
gamma-hexachlorocyclohexane (lindane)	58-89-9	U	396	ug/kg DW	1	n/a	n/a	n/a	50	48.47	96.9%	< 0.4	< 0.4	< 0.4	< 0.4
hexachlorobenzene (HCB)	118-74-1	U	396	ug/kg DW	1	n/a	n/a	n/a	50	51.05	102.1%	< 0.9	< 0.9	< 0.9	< 0.9
dieldrin	60-57-1	U	396	ug/kg DW	1	n/a	n/a	n/a	50	46.63	93.3%	< 0.4	< 0.4	< 0.2	< 0.2
endrin	72-20-8	N	396	ug/kg DW	1	n/a	n/a	n/a	50	45.69	91.4%	< 1.00	< 1.00	< 1.00	< 1.00
p,p'-DDD	3424-82-6	U	396	ug/kg DW	1	n/a	n/a	n/a	50	44.08	88.2%	< 0.6	< 0.6	< 0.6	< 0.6
p,p'-DDT	72-54-8	U	396	ug/kg DW	1	n/a	n/a	n/a	50	51.12	102.2%	< 1.0	< 1.0	< 1.0	< 1.0
p,p'-DDE	50-29-3	U	396	ug/kg DW	1	n/a	n/a	n/a	50	47.06	94.1%	< 0.8	< 0.8	< 0.8	< 0.8
2,4,4'-trichlorobiphenyl (PCB congener 28)	7012-37-5	U	396	ug/kg DW	1	44	50.43	114.6%	25	21.97	87.9%	< 0.44	< 0.45	< 0.9	< 0.9
2,2',5,5'-tetrachlorobiphenyl (PCB congener 52)	35693-99-3	U	396	ug/kg DW	0.7	38	42.05	110.7%	25	21.41	85.6%	< 0.44	< 0.45	< 0.7	< 0.7
2,2',4,5,5'-pentachlorobiphenyl (PCB congener 101)	37680-73-2	U	396	ug/kg DW	0.6	44	50.4	114.5%	25	22.55	90.2%	< 0.60	< 0.60	< 0.6	< 0.6
2,3',4,4',5-pentachlorobiphenyl (PCB congener 118)	31508-00-6	U	396	ug/kg DW	0.8	27.5	33.81	122.9%	25	24.79	99.2%	< 0.44	< 0.45	< 0.8	< 0.8
2,2',3,4,4',5-hexachlorobiphenyl (PCB 138)	35065-28-2	U	396	ug/kg DW	0.5	44.2	52.39	118.5%	25	24.06	96.2%	< 0.44	< 0.45	< 0.4	< 0.4
2,2',4,4',5,5'-hexachlorobiphenyl (PCB 153)	35065-27-1	U	396	ug/kg DW	0.5	50	59.78	119.6%	25	23.39	93.6%	< 0.44	< 0.45	< 0.5	< 0.5
2,2',3,4,4',5,5'-heptachlorobiphenyl (PCB 180)	35065-29-3	U	396	ug/kg DW	0.6	22.4	29.72	132.7%	25	25.43	101.7%	< 0.44	< 0.45	< 0.6	< 0.6

2 Shaftesbury Industrial Centre, Icknield Way, Letchworth Garden City, Hertfordshire, SG6 1HE
T +44 (0)1462 480 400, **F** +44 (0)1462 480 403, **E** rpsmh@rpsgroup.com, **W** rpsgroup.com

Results Summary - Organochlorine Pesticides & Polychlorinated Biphenyls (ICES 7)

Report No.: **18-69055-2**
Customer Reference: Not given
Customer Order No: 10304

					Customer Sample No	**Certified Reference Material**			**AQC spike**			**G01**	**G02**	**G03**	**G04**
					Customer Sample ID										
					RPS Sample No							354220	354221	354222	354223
					Sample Type	**SEDIMENT**			**SEDIMENT**			**SEDIMENT**	**SEDIMENT**	**SEDIMENT**	**SEDIMENT**
					Sample Location										
					Sample Depth (m)										
					Sampling Date	**CRM BCR-536**			**Spike on clean sediment**			23/01/2018	23/01/2018	23/01/2018	23/01/2018
					Sampling Time										
Determinand	**CAS No**	**Codes**	**SOP**	**Units**	**RL**	**Assigned Value**	**Measured Value**	**Recovery %**	**Assigned Value**	**Measured Value**	**Recovery %**				
aldrin	309-00-2	N	396	ug/kg DW	1	n/a	n/a	n/a	50	46.34	92.7%				
alpha-hexachlorocyclohexane (alpha-HCH)	319-84-6	U	396	ug/kg DW	1	n/a	n/a	n/a	50	45.81	91.6%				
beta-hexachlorocyclohexane (beta-HCH, beta-BHC)	319-85-7	U	396	ug/kg DW	1	n/a	n/a	n/a	50	45.77	91.5%	< 0.5	< 0.5	< 0.5	< 0.5
delta-hexachlorocyclohexane (delta-HCH)	319-86-8	U	396	ug/kg DW	1	n/a	n/a	n/a	50	56.38	112.8%	< 0.3	< 0.3	< 0.3	< 0.3
gamma-hexachlorocyclohexane (lindane)	58-89-9	U	396	ug/kg DW	1	n/a	n/a	n/a	50	48.47	96.9%	< 0.4	< 0.4	< 0.4	< 0.4
hexachlorobenzene (HCB)	118-74-1	U	396	ug/kg DW	1	n/a	n/a	n/a	50	51.05	102.1%	< 0.9	< 0.9	< 0.9	< 0.9
dieldrin	60-57-1	U	396	ug/kg DW	1	n/a	n/a	n/a	50	46.63	93.3%	< 0.2	< 0.2	< 0.2	< 0.2
endrin	72-20-8	N	396	ug/kg DW	1	n/a	n/a	n/a	50	45.69	91.4%	< 1.00	< 1.00	< 1.00	< 1.00
p,p'-DDD	3424-82-6	U	396	ug/kg DW	1	n/a	n/a	n/a	50	44.08	88.2%	< 0.6	< 0.6	< 0.6	< 0.6
p,p'-DDT	72-54-8	U	396	ug/kg DW	1	n/a	n/a	n/a	50	51.12	102.2%	< 1.0	< 1.0	< 1.0	< 1.0
p,p'-DDE	50-29-3	U	396	ug/kg DW	1	n/a	n/a	n/a	50	47.06	94.1%	< 0.8	< 0.8	< 0.8	< 0.8
2,4,4'-trichlorobiphenyl (PCB congener 28)	7012-37-5	U	396	ug/kg DW	1	44	50.43	114.6%	25	21.97	87.9%	< 0.9	< 0.9	< 0.9	< 0.9
2,2',5,5'-tetrachlorobiphenyl (PCB congener 52)	35693-99-3	U	396	ug/kg DW	0.7	38	42.05	110.7%	25	21.41	85.6%	< 0.7	< 0.7	< 0.7	< 0.7
2,2',4,5,5'-pentachlorobiphenyl (PCB congener 101)	37680-73-2	U	396	ug/kg DW	0.6	44	50.4	114.5%	25	22.55	90.2%	< 0.6	< 0.6	< 0.6	< 0.6
2,3',4,4',5-pentachlorobiphenyl (PCB congener 118)	31508-00-6	U	396	ug/kg DW	0.8	27.5	33.81	122.9%	25	24.79	99.2%	< 0.8	< 0.8	< 0.8	< 0.8
2,2',3,4,4',5-hexachlorobiphenyl (PCB 138)	35065-28-2	U	396	ug/kg DW	0.5	44.2	52.39	118.5%	25	24.06	96.2%	< 0.4	< 0.4	< 0.4	< 0.4
2,2',4,4',5,5'-hexachlorobiphenyl (PCB 153)	35065-27-1	U	396	ug/kg DW	0.5	50	59.78	119.6%	25	23.39	93.6%	< 0.5	< 0.5	< 0.5	< 0.5
2,2',3,4,4',5,5'-heptachlorobiphenyl (PCB 180)	35065-29-3	U	396	ug/kg DW	0.6	22.4	29.72	132.7%	25	25.43	101.7%	< 0.6	< 0.6	< 0.6	< 0.6

2 Shaftesbury Industrial Centre, Icknield Way, Letchworth Garden City, Hertfordshire, SG6 1HE
T +44 (0)1462 480 400, **F** +44 (0)1462 480 403, **E** rpsmh@rpsgroup.com, **W** rpsgroup.com

Results Summary - PSA Results

Report No.: **18-69055-2**
Customer Reference: Not given
Customer Order No: 10304

	Customer Sample No	INT-S1	INT-S2	INT-S3	INT-S4	SUB-S1	SUB-S2	SUB-S3	SUB-S4	G01	G02	G03	G04
	Customer Sample ID												
	RPS Sample No	354212	354213	354214	354215	354216	354217	354218	354219	354220	354221	354222	354223
	Sample Type	**SEDIMENT**	**SEDIMENT**	**SEDIMENT**	**SEDIMENT**	**SEDIMENT**	**SEDIMENT**	**SEDIMENT**	**SEDIMENT**	**SEDIMENT**	**SEDIMENT**	**SEDIMENT**	**SEDIMENT**
	Sample Location												
	Sample Depth (m)												
	Sampling Date	23/01/2018	23/01/2018	23/01/2018	23/01/2018	23/01/2018	23/01/2018	23/01/2018	23/01/2018	23/01/2018	23/01/2018	23/01/2018	23/01/2018
	Sampling Time												

Determinand	CAS No	Codes	SOP	Units												
sample type		S	In-house		Bimodal, Very Poorly Sorted	Bimodal, Very Poorly Sorted	Bimodal, Very Poorly Sorted	Bimodal, Poorly Sorted	Bimodal, Very Poorly Sorted	Bimodal, Very Poorly Sorted	Bimodal, Very Poorly Sorted	Coarse Silt	Bimodal, Very Poorly Sorted	Bimodal, Poorly Sorted	Bimodal, Very Poorly Sorted	Bimodal, Very Poorly Sorted
textural group (GRADISTAT)		S	In-house		Sandy Mud	Sandy Mud	Sandy Mud	Sandy Mud	Sandy Mud	Sandy Mud	Sandy Mud	Sandy Mud	Sandy Mud	Sandy Mud	Sandy Mud	Sandy Mud
sediment name		S	In-house		Very Fine Sandy Very Coarse Silt	Very Fine Sandy Very Coarse Silt	Very Fine Sandy Very Coarse Silt	Very Fine Sandy Very Coarse Silt	Very Fine Sandy Very Coarse Silt	Very Fine Sandy Very Coarse Silt	Very Fine Sandy Very Coarse Silt	Very Fine Sandy Very Coarse Silt	Very Fine Sandy Very Coarse Silt	Very Fine Sandy Very Coarse Silt	Very Fine Sandy Very Coarse Silt	Very Fine Sandy Very Coarse Silt
arithmetic mean (method of moments)		S	In-house	um	38.1	44.6	56.3	66.8	41.1	36.9	49.8	75.6	42.0	38.9	46.2	45.3
arithmetic sorting (method of moments)		S	In-house	um	48.3	47.7	51.2	56.2	48.9	45.6	53.0	139	48.7	44.7	48.1	51.2
arithmetic skewness (method of moments)		S	In-house	um	2.23	1.81	1.38	1.17	2.05	2.17	1.63	5.11	1.89	1.99	1.63	1.52
arithmetic kurtosis (method of moments)		S	In-house	um	8.66	6.88	5.25	4.47	7.75	8.31	5.85	34.5	6.81	7.48	5.91	4.88
geometic mean (method of moments)		S	In-house	um	16.3	21.0	28.9	36.4	18.4	16.3	22.9	28.8	18.9	18.4	21.9	18.9
geometic sorting (method of moments)		S	In-house	um	4.37	4.35	4.30	4.14	4.32	4.30	4.48	4.82	4.34	4.10	4.35	4.84
geometic skewness (method of moments)		S	In-house	um	-0.537	-0.851	-1.19	-1.40	-0.671	-0.596	-0.832	-0.719	-0.671	-0.738	-0.896	-0.707
geometic kurtosis (method of moments)		S	In-house	um	3.05	3.38	4.06	4.76	3.30	3.20	3.35	3.66	3.21	3.58	3.55	3.10
logarithmic mean (method of moments)		S	In-house	phi	5.93	5.57	5.11	4.78	5.76	5.93	5.44	5.11	5.72	5.75	5.50	5.71
logarithmic sorting (method of moments)		S	In-house	phi	2.13	2.12	2.10	2.05	2.11	2.10	2.16	2.27	2.12	2.04	2.12	2.27
logarithmic skewness (method of moments)		S	In-house	phi	0.544	0.859	1.20	1.40	0.682	0.607	0.842	0.728	0.680	0.751	0.908	0.722
logarithmic kurtosis (method of moments)		S	In-house	phi	3.05	3.39	4.07	4.78	3.31	3.21	3.36	3.67	3.22	3.60	3.57	3.12
mean (Folk and Ward method - um)		S	In-house	um	17.4	22.5	30.4	38.0	19.7	17.4	24.6	29.6	20.2	19.8	23.7	20.8
sorting (Folk and Ward method - um)		S	In-house	um	4.33	4.24	4.11	3.87	4.23	4.23	4.35	4.48	4.26	3.94	4.18	4.77
skewness (Folk and Ward method - um)		S	In-house	um	-0.124	-0.330	-0.461	-0.469	-0.178	-0.133	-0.312	-0.336	-0.189	-0.168	-0.327	-0.218
kurtosis (Folk and Ward method - um)		S	In-house	um	0.954	0.967	1.09	1.31	0.956	0.959	0.925	1.03	0.938	0.961	0.950	0.916
mean (Folk and Ward method - phi)		S	In-house	phi	5.85	5.47	5.04	4.72	5.66	5.85	5.34	5.08	5.63	5.66	5.40	5.59
sorting (Folk and Ward method - phi)		S	In-house	phi	2.12	2.08	2.04	1.95	2.08	2.08	2.12	2.16	2.09	1.98	2.06	2.26
skewness (Folk and Ward method - phi)		S	In-house	phi	0.124	0.330	0.461	0.469	0.178	0.133	0.312	0.336	0.189	0.168	0.327	0.218
kurtosis (Folk and Ward method - phi)		S	In-house	phi	0.954	0.967	1.09	1.31	0.956	0.959	0.925	1.03	0.938	0.961	0.950	0.916
mean description (Folk and Ward method)		S	In-house		Coarse Silt	Coarse Silt	Coarse Silt	Very Coarse Silt	Coarse Silt	Coarse Silt	Coarse Silt	Coarse Silt	Coarse Silt	Coarse Silt	Coarse Silt	Coarse Silt
sorting description (Folk and Ward method)		S	In-house		Very Poorly Sorted	Very Poorly Sorted	Very Poorly Sorted	Poorly Sorted	Very Poorly Sorted	Very Poorly Sorted	Very Poorly Sorted	Very Poorly Sorted	Very Poorly Sorted	Poorly Sorted	Very Poorly Sorted	Very Poorly Sorted

RPS

2 Shaftesbury Industrial Centre, Icknield Way, Letchworth Garden City, Hertfordshire, SG6 1HE
T +44 (0)1462 480 400, **F** +44 (0)1462 480 403, **E** rpsmh@rpsgroup.com, **W** rpsgroup.com

Results Summary - PSA Results

Report No.: **18-69055-2**
Customer Reference: Not given
Customer Order No: 10304

				Customer Sample No	**INT-S1**	**INT-S2**	**INT-S3**	**INT-S4**	**SUB-S1**	**SUB-S2**	**SUB-S3**	**SUB-S4**	**G01**	**G02**	**G03**	**G04**
				Customer Sample ID												
				RPS Sample No	354212	354213	354214	354215	354216	354217	354218	354219	354220	354221	354222	354223
				Sample Type	**SEDIMENT**	**SEDIMENT**	**SEDIMENT**	**SEDIMENT**	**SEDIMENT**	**SEDIMENT**	**SEDIMENT**	**SEDIMENT**	**SEDIMENT**	**SEDIMENT**	**SEDIMENT**	**SEDIMENT**
				Sample Location												
				Sample Depth (m)												
				Sampling Date	23/01/2018	23/01/2018	23/01/2018	23/01/2018	23/01/2018	23/01/2018	23/01/2018	23/01/2018	23/01/2018	23/01/2018	23/01/2018	23/01/2018
				Sampling Time												
Determinand	**CAS No**	**Codes**	**SOP**	**Units**												
skewness description (Folk and Ward method)		S	In-house		Fine Skewed	Very Fine Skewed	Very Fine Skewed	Very Fine Skewed	Fine Skewed	Fine Skewed	Very Fine Skewed	Very Fine Skewed	Fine Skewed	Fine Skewed	Very Fine Skewed	Fine Skewed
kurtosis description (Folk and Ward method)		S	In-house		Mesokurtic	Mesokurtic	Mesokurtic	Leptokurtic	Mesokurtic	Mesokurtic	Mesokurtic	Mesokurtic	Mesokurtic	Mesokurtic	Mesokurtic	Mesokurtic
MODE 1 - um		S	In-house	um	53.4	53.4	75.5	75.5	53.4	37.7	75.5	53.4	53.4	53.4	53.4	53.4
MODE 2 - um		S	In-house	um	9.41	9.41	9.41	9.41	9.41	9.41	9.41	9.41	9.41	13.3	9.41	9.41
MODE 3 - um		S	In-house	um												
MODE 1 - phi		S	In-house	phi	4.25	4.25	3.75	3.75	4.25	4.75	3.75	4.25	4.25	4.25	4.25	4.25
MODE 2 - phi		S	In-house	phi	6.75	6.75	6.75	6.75	6.75	6.75	6.75	6.75	6.75	6.25	6.75	6.75
MODE 3 - phi		S	In-house	phi												
D10 - um		S	In-house	um	2.4	2.7	3.3	4.3	2.7	2.4	2.9	3.3	2.7	3.0	2.9	2.3
D50 - um		S	In-house	um	18.8	30.4	46.2	56.0	22.6	18.8	32.8	41.3	23.4	22.2	31.6	24.6
D90 - um		S	In-house	um	97.5	105	121	143	103	91.8	119	148	106	95.3	110	122
(D90/D10) - um		S	In-house	um	41.4	39.1	36.7	33.5	37.7	37.7	40.9	45.5	38.8	31.4	37.5	53.8
(D90 - D10) - um		S	In-house	um	95.2	103	117	139	100	89.3	116	145	104	92.3	107	120
(D75/D25) - um		S	In-house	um	8.09	7.57	5.90	4.22	7.76	7.75	8.42	7.35	8.07	6.96	7.69	9.87
(D75 - D25) - um		S	In-house	um	44.2	54.0	65.8	70.5	48.7	43.2	63.1	69.7	51.1	45.7	57.5	59.2
D10 - phi		S	In-house	phi	3.36	3.25	3.05	2.80	3.28	3.45	3.07	2.75	3.23	3.39	3.19	3.04
D50 - phi		S	In-house	phi	5.73	5.04	4.44	4.16	5.47	5.73	4.93	4.60	5.42	5.49	4.98	5.35
D90 - phi		S	In-house	phi	8.73	8.53	8.25	7.87	8.51	8.68	8.43	8.26	8.51	8.37	8.42	8.79
(D90/D10) - phi		S	In-house	phi	2.60	2.63	2.70	2.81	2.60	2.52	2.75	3.00	2.63	2.47	2.64	2.89
(D90 - D10) - phi		S	In-house	phi	5.37	5.29	5.20	5.07	5.24	5.24	5.36	5.51	5.28	4.98	5.23	5.75
(D75/D25) - phi		S	In-house	phi	1.70	1.73	1.70	1.61	1.71	1.68	1.81	1.79	1.74	1.66	1.75	1.84
(D75 - D25) - phi		S	In-house	phi	3.02	2.92	2.56	2.08	2.96	2.95	3.07	2.88	3.01	2.80	2.94	3.30
% gravel		S	In-house	%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
% sand		S	In-house	%	19.1	24.8	36.4	45.2	21.6	18.6	29.8	34.7	22.9	20.1	27.0	26.5
% mud		S	In-house	%	81.0	75.2	63.6	54.8	78.4	81.4	70.2	65.4	77.1	79.9	73.0	73.6
% very coarse gravel (>32<64mm or <-5>-6phi)		S	In-house	%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
% coarse gravel (>16<32mm or <-4>-5phi)		S	In-house	%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
% medium gravel (>8<16mm or <-3>-4phi)		S	In-house	%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
% fine gravel (>4<8mm or <-2>-3phi)		S	In-house	%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
% very fine gravel (>2<4mm or <-1>-2phi)		S	In-house	%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
% very coarse sand (>1<2mm or <0>-1phi)		S	In-house	%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.48	0.00	0.00	0.00	0.00
% coarse sand (>0.5<1mm or <1>0phi)		S	In-house	%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00

2 Shaftesbury Industrial Centre, Icknield Way, Letchworth Garden City, Hertfordshire, SG6 1HE
T +44 (0)1462 480 400, **F** +44 (0)1462 480 403, **E** rpsmh@rpsgroup.com, **W** rpsgroup.com

Results Summary - PSA Results

Report No.: **18-69055-2**
Customer Reference: Not given
Customer Order No: 10304

				Customer Sample No	**INT-S1**	**INT-S2**	**INT-S3**	**INT-S4**	**SUB-S1**	**SUB-S2**	**SUB-S3**	**SUB-S4**	**G01**	**G02**	**G03**	**G04**
				Customer Sample ID												
				RPS Sample No	354212	354213	354214	354215	354216	354217	354218	354219	354220	354221	354222	354223
				Sample Type	**SEDIMENT**	**SEDIMENT**	**SEDIMENT**	**SEDIMENT**	**SEDIMENT**	**SEDIMENT**	**SEDIMENT**	**SEDIMENT**	**SEDIMENT**	**SEDIMENT**	**SEDIMENT**	**SEDIMENT**
				Sample Location												
				Sample Depth (m)												
				Sampling Date	23/01/2018	23/01/2018	23/01/2018	23/01/2018	23/01/2018	23/01/2018	23/01/2018	23/01/2018	23/01/2018	23/01/2018	23/01/2018	23/01/2018
				Sampling Time												
Determinand	**CAS No**	**Codes**	**SOP**	**Units**												
% medium sand (>0.25<0.5mm or <2>1phi)		S	In-house	%	0.30	0.19	0.25	0.48	0.27	0.12	0.34	1.12	0.16	0.07	0.11	0.05
% fine sand (>0.125<0.25mm or <3>2phi)		S	In-house	%	5.92	6.40	8.65	12.6	6.40	5.50	8.44	9.10	6.90	5.56	7.05	9.42
% very fine sand (>0.0625<0.125mm or <4>3phi)		S	In-house	%	12.8	18.2	27.5	32.1	14.9	12.9	21.1	22.0	15.9	14.5	19.8	17.0
% very coarse silt (>0.03125<0.0625mm or <5>4phi		S	In-house	%	19.1	24.5	26.1	24.5	20.5	19.3	21.5	23.5	20.3	21.1	23.4	18.6
% coarse silt (>0.015625<0.03125mm or <6>5phi)		S	In-house	%	16.0	14.9	10.9	8.70	15.9	16.3	13.2	12.0	15.4	16.9	14.1	13.5
% medium silt (>0.007813<0.015625mm or <7>6phi)		S	In-house	%	16.0	11.7	7.92	6.41	15.4	16.4	12.0	9.76	14.9	16.5	12.3	13.5
% fine silt (>0.003906<0.007813mm or <8>7phi)		S	In-house	%	13.9	10.3	7.41	6.00	12.5	13.8	10.5	8.58	12.4	12.6	10.4	12.2
% very fine silt (>0.001953<0.003906mm or <9>8phi		S	In-house	%	7.76	6.30	4.97	4.00	6.76	7.53	6.10	5.19	6.77	6.27	5.96	7.06
% clay (<0.001953mm or >9phi)		S	In-house	%	8.30	7.52	6.42	5.28	7.34	8.06	6.94	6.39	7.33	6.52	6.95	8.75

2 Shaftesbury Industrial Centre, Icknield Way, Letchworth Garden City, Hertfordshire, SG6 1HE
T +44 (0)1462 480 400, **F** +44 (0)1462 480 403, **E** rpsmh@rpsgroup.com, **W** rpsgroup.com

Results Summary - PSA Size Class & Statistics

Report No.: **18-69055-2**
Customer Reference: Not given
Customer Order No: 10304

			Customer Sample No	**INT-S1**	**INT-S2**	**INT-S3**	**INT-S4**	**SUB-S1**	**SUB-S2**	**SUB-S3**	**SUB-S4**	**G01**	**G02**	**G03**	**G04**
			Customer Sample ID												
			RPS Sample No	354212	354213	354214	354215	354216	354217	354218	354219	354220	354221	354222	354223
			Sample Type	**SEDIMENT**	**SEDIMENT**	**SEDIMENT**	**SEDIMENT**	**SEDIMENT**	**SEDIMENT**	**SEDIMENT**	**SEDIMENT**	**SEDIMENT**	**SEDIMENT**	**SEDIMENT**	**SEDIMENT**
			Sample Location												
			Sample Depth (m)												
			Sampling Date	23/01/2018	23/01/2018	23/01/2018	23/01/2018	23/01/2018	23/01/2018	23/01/2018	23/01/2018	23/01/2018	23/01/2018	23/01/2018	23/01/2018
			Sampling Time												
Sediment	**mm**	**phi ϕ**	**Units**												
Very coarse gravel	>32<64	<-5>-6	%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coarse gravel	>16<32	<-4>-5	%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medium gravel	>8<16	<-3>-4	%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine gravel	>4<8	<-2>-3	%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Very fine gravel	>2<4	<-1>-2	%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Very coarse sand	>1<2	<0>-1	%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.48	0.00	0.00	0.00	0.00
Coarse sand	>0.5<1	<1>0	%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00
Medium sand	>0.25<0.5	<2>1	%	0.30	0.19	0.25	0.48	0.27	0.12	0.34	1.12	0.16	0.07	0.11	0.05
Fine sand	>0.125<0.25	<3>2	%	5.92	6.40	8.65	12.60	6.40	5.50	8.44	9.10	6.90	5.56	7.05	9.42
Very fine sand	>0.0625<0.125	<4>3	%	12.80	18.20	27.50	32.10	14.90	12.90	21.10	22.00	15.90	14.50	19.80	17.00
Very coarse silt	>0.03125<0.0625	<5>4	%	19.10	24.50	26.10	24.50	20.50	19.30	21.50	23.50	20.30	21.10	23.40	18.60
Coarse silt	>0.015625<0.03125	<6>5	%	16.00	14.90	10.90	8.70	15.90	16.30	13.20	12.00	15.40	16.90	14.10	13.50
Medium silt	>0.007813<0.015625	<7>6	%	16.00	11.70	7.92	6.41	15.40	16.40	12.00	9.76	14.90	16.50	12.30	13.50
Fine silt	>0.003906<0.007813	<8>7	%	13.90	10.30	7.41	6.00	12.50	13.80	10.50	8.58	12.40	12.60	10.40	12.20
Very fine silt	>0.001953<0.003906	<9>8	%	7.76	6.30	4.97	4.00	6.76	7.53	6.10	5.19	6.77	6.27	5.96	7.06
Clay	<0.001953	>9	%	8.30	7.52	6.42	5.28	7.34	8.06	6.94	6.39	7.33	6.52	6.95	8.75
Statistics*	Mean (phi)			5.85	5.47	5.04	4.72	5.66	5.85	5.34	5.08	5.63	5.66	5.40	5.59
	Sorting			2.12	2.08	2.04	1.95	2.08	2.08	2.12	2.16	2.09	1.98	2.06	2.26
	Skewness			0.124	0.330	0.461	0.469	0.178	0.133	0.312	0.336	0.189	0.168	0.327	0.218
	Kurtosis			0.954	0.967	1.09	1.31	0.956	0.959	0.925	1.03	0.938	0.961	0.950	0.916
	% Silt/Clay		%	81.06	75.22	63.72	54.89	78.40	81.39	70.24	65.42	77.10	79.89	73.11	73.61
	Textural Group**			Sandy Mud	Sandy Mud	Sandy Mud	Sandy Mud	Sandy Mud	Sandy Mud	Sandy Mud	Sandy Mud	Sandy Mud	Sandy Mud	Sandy Mud	Sandy Mud

* Folk & Ward

** GRADISTAT classification system (Blott, S. J. & Pye, K., 2001)

2 Shaftesbury Industrial Centre, Icknield Way, Letchworth Garden City, Hertfordshire, SG6 1HE
T +44 (0)1462 480 400, **F** +44 (0)1462 480 403, **E** rpsmh@rpsgroup.com, **W** rpsgroup.com

Results Summary - PSA Wentworth Scale

Report No.: **18-69055-2**
Customer Reference: Not given
Customer Order No: 10304

Customer Sample No		INT-S1	INT-S2	INT-S3	INT-S4	SUB-S1	SUB-S2	SUB-S3	SUB-S4	G01	G02	G03	G04
Customer Sample ID													
RPS Sample No		354212	354213	354214	354215	354216	354217	354218	354219	354220	354221	354222	354223
Sample Type		**SEDIMENT**	**SEDIMENT**	**SEDIMENT**	**SEDIMENT**	**SEDIMENT**	**SEDIMENT**	**SEDIMENT**	**SEDIMENT**	**SEDIMENT**	**SEDIMENT**	**SEDIMENT**	**SEDIMENT**
Sample Location													
Sample Depth (m)													
Sampling Date		23/01/2018	23/01/2018	23/01/2018	23/01/2018	23/01/2018	23/01/2018	23/01/2018	23/01/2018	23/01/2018	23/01/2018	23/01/2018	23/01/2018
Sampling Time													
Parameter	**Units**												
Pebble	%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Granule	%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Very coarse sand	%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.48	0.00	0.00	0.00	0.00
Coarse sand	%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00
Medium sand	%	0.30	0.19	0.25	0.48	0.27	0.12	0.34	1.12	0.16	0.07	0.11	0.05
Fine sand	%	5.92	6.40	8.65	12.60	6.40	5.50	8.44	9.10	6.90	5.56	7.05	9.42
Very fine sand	%	12.80	18.20	27.50	32.10	14.90	12.90	21.10	22.00	15.90	14.50	19.80	17.00
Silt Clay	%	81.06	75.22	63.72	54.89	78.40	81.39	70.24	65.42	77.10	79.89	73.11	73.61
Total	%	100.1	100.0	100.1	100.1	100.0	99.9	100.1	100.1	100.1	100.0	100.1	100.1

2 Shaftesbury Industrial Centre, Icknield Way, Letchworth Garden City, Hertfordshire, SG6 1HE
T +44 (0)1462 480 400, **F** +44 (0)1462 480 403, **E** rpsmh@rpsgroup.com, **W** rpsgroup.com

Deviating Samples

Report No.: **18-69055-2**
Customer Reference: Not given
Customer Order No: 10304

Our policy on Deviating Samples and reference list of Holding Times applied can be supplied on request. These have been implemented in accordance with UKAS Policy on Deviating Samples (TPS63).
RPS is not responsible for the integrity of samples as received, unless RPS personnel performed the sampling, and it is possible that samples submitted may be declared to be deviating.
Where applicable the analysis method remains UKAS accredited, however results reported for a deviating sample may be invalid. The reason for a sample being declared to be deviating is indicated below.
Where no sampling date was supplied, samples have been declared to be deviating. However, if a date of sampling can be supplied, the results may be reissued with the deviating sample status removed.
Where the sample container used was unsuitable, the appropriate Holding Time was exceeded, or the sample is flagged as deviating for some other reason, re-sampling/re-submisson may be required.

RPS No.	Customer No.	Customer ID	Date Sampled	Containers Received	Deviating Sample	Reason for Sample Deviation
354212	INT-S1		23/01/2018	plastic & metal containers	No	
354213	INT-S2		23/01/2018	plastic & metal containers	No	
354214	INT-S3		23/01/2018	plastic & metal containers	No	
354215	INT-S4		23/01/2018	plastic & metal containers	No	
354216	SUB-S1		23/01/2018	plastic & metal containers	No	
354217	SUB-S2		23/01/2018	plastic & metal containers	No	
354218	SUB-S3		23/01/2018	plastic & metal containers	No	
354219	SUB-S4		23/01/2018	plastic & metal containers	No	
354220	G01		23/01/2018	plastic & metal containers	No	
354221	G02		23/01/2018	plastic & metal containers	No	
354222	G03		23/01/2018	plastic & metal containers	No	
354223	G04		23/01/2018	plastic & metal containers	No	

2 Shaftesbury Industrial Centre, Icknield Way, Letchworth Garden City, Hertfordshire, SG6 1HE
T +44 (0)1462 480 400, **F** +44 (0)1462 480 403, **E** rpsmh@rpsgroup.com, **W** rpsgroup.com

Report Information

Key to Report Codes

U	UKAS Accredited
M	MCERTS Accredited
N	Not Accredited
S	Subcontracted to approved laboratory
US	Subcontracted to approved laboratory UKAS Accredited for the test
MS	Subcontracted to approved laboratory MCERTS/UKAS Accredited for the test
SI	Subcontracted to internal RPS Group Laboratory
USI	Subcontracted to internal RPS Group Laboratory UKAS Accredited for the test
MSI	Subcontracted to internal RPS Group Laboratory MCERTS/UKAS Accredited for the test
I/S (in results)	Insufficient Sample
U/S (in results)	Unsuitable Sample
S/C (in results)	See Comments
ND (in results)	Not Detected
DW (in units)	Results are expressed on a dry weight basis

Sample Retention and Disposal

Samples will generally* be retained for the following times prior to disposal:

Perishables, e.g. foodstuffs	1 month (if frozen) from the issue date of this report
Waters	2 weeks from the issue date of this report
Other Liquids	1 months from the issue date of this report
Solids (including Soils)	1 months from the issue date of this report

*Sample retention may be subject to agreement with the customer for particular projects

Analytical Methods

PAH's and PCB's	GCMS analysis following extraction of the wet sediment with DCM:acetone by ASE 350 extraction. Extract cleaned-up with silica and activated copper.
Metals	ICP-MS analysis following microwave assisted digestion in hydrofluoric acid of the dried (<30°C) and ground sediment.
TOC	Combustion and infrared analysis following carbonate removal with hydrochloric acid.
PSA	Wet and dry sieving followed by laser diffraction analysis.
Density	Determination of density from the dry sediment by gravimetric analysis of a known volume of sediment.
Dry solids at 105°C	A portion of the wet sediment is dried at 105°C to constant weight.
TBT and DBT	GCMS analysis following the extraction of the wet sediment and subsequent derivatisation.
Please note:	All testing carried out using the <2mm fraction

Laboratories

RPS Letchworth	UKAS Accreditation Laboratory No. 1663
RPS Manchester (Metals only)	UKAS Accreditation Laboratory No. 0605
Ocean Ecology PSA only	NMBAQC

RPS Letchworth and Manchester Laboratories participate in the QUASIMEME Proficiency Testing Scheme

1. General Information	Applicant (company name)	
	Location (port/harbour)	
	Dredge Quantity (tonnes)	
	Permit Application Reg. No. (to be assigned by EPA)	

2. Survey Information	Survey Company	Hydrographic Surveys Ltd.
	Sampling Date	06/02/2018
	Analysing Laboratory	RPS Mountainheath UKAS 1663 and RPS Laboratories UKAS 0605
	Sub Contract Lab	Ocean Ecology (granulometry)
	Analysis Date	14/02/2018 to 12/03/2018

3. Methods Information	Fraction analysed	<2mm
	Water content of sample (reported as %)	see results
	Are results reported as wet weight or dry weight?	dry weight basis
	Granulometry method	sieving and laser particle sizing
	TEH method	DCM/methanol extraction, silica cleanup and GC-FID
	Organic carbon (OC) method	carbonate removal with acid followed by combustion and Infra Red detection
	Metals (incl. mercury & arsenic) extraction type	Hydrofluoric Acid microwave extraction (Total)
	Methods of detection (metals, incl. mercury & arsenic)	ICP-MS for all metals excluding mercury which is analysed by CV-AFS
	Organics extraction types	Accelerated Solvent Extraction ASE 300 and ultrasonic extraction
	Methods of detection (PCBs / PAHs / TBT / DBT)	GC-MS and GC-MS/MS

EPA Dumping at Sea Permit Application - Material Analysis Reporting Form (Version 1.0)
Sheet 3. Results

Sample ID code	Company Name	Location	Sampling date (dd/mm/yyyy)	Sampling Location ID	Position Latitude (WGS84 decimal degrees)	Position Longitude (WGS84 decimal degrees)	Sampling depth below seabed m	Lab Report ID	Sample appearance (e.g colour, texture, signs of life)
INT-S1	Shannon Foynes Port Company	Foynes Harbour	06/02/2018	INT-S1	52.61273	-9.10551	Surface	354212	Sample colour: dark brown, silty / clayey material, no signs of life
INT-S2	Shannon Foynes Port Company	Foynes Harbour	06/02/2018	INT-S2	52.61296	-9.10373	Surface	354213	Sample colour: dark brown, silty / clayey material, no signs of life
INT-S3	Shannon Foynes Port Company	Foynes Harbour	06/02/2018	INT-S3	52.61548	-9.09841	Surface	354214	Sample colour: dark brown, silty / clayey material, no signs of life
INT-S4	Shannon Foynes Port Company	Foynes Harbour	06/02/2018	INT-S4	52.61813	-9.09525	Surface	354215	Sample colour: dark brown, silty / clayey material, no signs of life
SUB-S1	Shannon Foynes Port Company	Foynes Harbour	06/02/2018	SUB-S1	52.61271	-9.10602	Surface	354216	Sample colour: dark brown, silty / clayey material, no signs of life
SUB-S2	Shannon Foynes Port Company	Foynes Harbour	06/02/2018	SUB-S2	52.61298	-9.10507	Surface	354217	Sample colour: dark brown, silty / clayey material, no signs of life
SUB-S3	Shannon Foynes Port Company	Foynes Harbour	06/02/2018	SUB-S3	52.61323	-9.10577	Surface	354218	Sample colour: dark brown, silty / clayey material, no signs of life
SUB-S4	Shannon Foynes Port Company	Foynes Harbour	06/02/2018	SUB-S4	52.61580	-9.09867	Surface	354219	Sample colour: dark brown, silty / clayey material, no signs of life
G01	Shannon Foynes Port Company	Foynes Harbour	06/02/2018	G01	52.61315	-9.10609	Surface	354220	Sample colour: dark brown, silty / clayey material, no signs of life
G02	Shannon Foynes Port Company	Foynes Harbour	06/02/2018	G02	52.61290	-9.10581	Surface	354221	Sample colour: dark brown, silty / clayey material, no signs of life
G03	Shannon Foynes Port Company	Foynes Harbour	06/02/2018	G03	52.61307	-9.10520	Surface	354222	Sample colour: dark brown, silty / clayey material, no signs of life

EPA Dumping at Sea Permit Application - Material Analysis Reporting Form (Version 1.0)
Sheet 3. Results

Sample ID code	Company Name	Location	Sampling date (dd/mm/yyyy)	Sampling Location ID	Position Latitude (WGS84 decimal degrees)	Position Longitude (WGS84 decimal degrees)	Sampling depth below seabed m	Lab Report ID	Sample appearance (e.g. colour, texture, signs of life)
G04	Shannon Foynes Port Company	Foynes Harbour	06/02/2018	G04	52.61332	-9.10515	Surface	354223	Sample colour: dark brown, silty / clayey material, no signs of life

<insert more rows as necessary>

EPA Dumping at Sea Permit Application - Material Analysis Reporting Form (Version 1.0)
Sheet 3. Results

Sample ID code	% Moisture	Particle size >2mm %	Particle size <2mm >63um %	Partic+B:Nle size <63um %	OC %	Carbonate %	Dry solids %	Al mg kg^{-1}	Cd mg kg^{-1}	Hg mg kg^{-1}	As mg kg^{-1}	Cr mg kg^{-1}	Cu mg kg^{-1}	Pb mg kg^{-1}	Ni mg kg^{-1}
INT-S1	51.1	0.0	19.1	81.0	1.2	4.58	48.9	31600	0.27	0.05	11.7	48.1	10.4	22.6	24
INT-S2	40.7	0.0	24.8	75.2	0.7	4.67	59.3	29000	0.31	0.05	9.54	43.7	8.5	20.2	21
INT-S3	40.1	0.0	36.4	63.6	0.9	4.69	59.9	23300	0.29	0.04	7.08	35.4	6.73	16.6	16.9
INT-S4	34.9	0.0	45.2	54.8	0.7	5.01	65.1	22500	0.31	0.03	7.41	34.9	6.47	15.4	16.1
SUB-S1	54.2	0.0	21.6	78.4	1.4	4.59	45.8	30000	0.31	0.06	11.2	46.7	10.9	23.9	22.8
SUB-S2	55.4	0.0	18.6	81.4	1.3	4.49	44.6	31400	0.46	0.06	11.6	46.6	11	24.8	23.6
SUB-S3	46.1	0.0	29.8	70.2	0.8	5.11	53.9	26700	0.31	0.05	10.3	40.1	9.44	20.7	20.0
SUB-S4	43.6	0.0	34.7	65.4	0.7	4.96	56.4	24800	0.28	0.04	8.72	38.4	7.44	18.7	17.8
G01	48.9	0.0	22.9	77.1	1.3	4.81	51.1	31700	0.33	0.06	11.4	47.1	10.7	25	23.4
G02	43.4	0.0	20.1	79.9	1.1	4.59	56.6	31500	0.3	0.16	11	48.2	9.97	24.9	23.7
G03	49	0.0	27.0	73.0	1.2	4.78	51	29100	0.3	0.06	10.8	43.6	10.7	24.9	21.5

EPA Dumping at Sea Permit Application - Material Analysis Reporting Form (Version 1.0)
Sheet 3. Results

Sample ID code	% Moisture	Particle size >2mm %	Particle size <2mm >63um %	Partic+B:Nle size <63um %	OC %	Carbonate %	Dry solids %	Al mg kg^{-1}	Cd mg kg^{-1}	Hg mg kg^{-1}	As mg kg^{-1}	Cr mg kg^{-1}	Cu mg kg^{-1}	Pb mg kg^{-1}	Ni mg kg^{-1}
G04	45.1	0.0	26.5	73.6	1	4.74	54.9	31400	0.32	0.05	12.2	48.2	9.9	24.7	23.8

<insert more rows as necessary>

EPA Dumping at Sea Permit Application - Material Analysis Reporting Form (Version 1.0)
Sheet 3. Results

Sample ID code	Zn mg kg^{-1}	TEH g kg^{-1}	PAH S 16 ug kg^{-1}	PCB S7 PCB ug kg^{-1}	HCB (kg dry wt) ug kg^{-1}	g-HCH (kg dry wt) ug kg^{-1}	p.p' DDT (kg dry wt) ug kg^{-1}	p,p' DDD (kg dry wt) ug kg^{-1}	p,p' DDE (kg dry wt) ug kg^{-1}	Σ DDX (kg dry wt) ug kg^{-1}	TBT mg kg^{-1}	DBT mg kg^{-1}	PCB 028 ug kg^{-1}	PCB 052 ug kg^{-1}	PCB 101 ug kg^{-1}
INT-S1	75.9	11100	311.03	3.06	0.90	0.40	1.00	0.60	0.80		< 0.00409	< 0.01023	0.41	0.41	0.60
INT-S2	68.6	6070	526.04	4.50	0.90	0.40	1.00	0.60	0.80		< 0.002	< 0.005	0.90	0.70	0.60
INT-S3	55.8	7470	249.52	4.50	0.90	0.40	1.00	0.60	0.80		< 0.002	< 0.005	0.90	0.70	0.60
INT-S4	56	5800	470.01	4.50	0.90	0.40	1.00	0.60	0.80		< 0.002	< 0.005	0.90	0.70	0.60
SUB-S1	76.6	9390	314.21	3.24	0.90	0.40	1.00	0.60	0.80		< 0.00437	< 0.01092	0.44	0.44	0.60
SUB-S2	76	14500	265.25	3.30	0.90	0.40	1.00	0.60	0.80		< 0.00449	< 0.01121	0.45	0.45	0.60
SUB-S3	66.6	12300	373.15	4.50	0.90	0.40	1.00	0.60	0.80		< 0.002	< 0.005	0.90	0.70	0.60
SUB-S4	60.2	9230	229.49	4.50	0.90	0.40	1.00	0.60	0.80		< 0.002	< 0.005	0.90	0.70	0.60
G01	77.7	17500	328.04	4.50	0.90	0.40	1.00	0.60	0.80		< 0.002	< 0.005	0.90	0.70	0.60
G02	76.1	13800	252.22	4.50	0.90	0.40	1.00	0.60	0.80		< 0.002	< 0.005	0.90	0.70	0.60
G03	73.7	22800	233.66	4.50	0.90	0.40	1.00	0.60	0.80		< 0.002	< 0.005	0.90	0.70	0.60

EPA Dumping at Sea Permit Application - Material Analysis Reporting Form (Version 1.0)
Sheet 3. Results

Sample ID code	Zn mg kg^{-1}	TEH g kg^{-1}	PAH S 16 ug kg^{-1}	PCB S7 PCB ug kg^{-1}	HCB (kg dry wt) ug kg^{-1}	g-HCH (kg dry wt) ug kg^{-1}	p,p' DDT (kg dry wt) ug kg^{-1}	p,p' DDD (kg dry wt) ug kg^{-1}	p,p' DDE (kg dry wt) ug kg^{-1}	Σ DDX (kg dry wt) ug kg^{-1}	TBT mg kg^{-1}	DBT mg kg^{-1}	PCB 028 ug kg^{-1}	PCB 052 ug kg^{-1}	PCB 101 ug kg^{-1}
G04	77.8	11700	208.27	4.50	0.90	0.40	1.00	0.60	0.80		< 0.002	< 0.005	0.90	0.70	0.60
						ug/kg	ug/kg	ug/kg	ug/kg						

<insert more rows as necessary>

EPA Dumping at Sea Permit Application - Material Analysis Reporting Form (Version 1.0)
Sheet 3. Results

Sample ID code	PCB 138 ug kg^{-1}	PCB 153 ug kg^{-1}	PCB 180 ug kg^{-1}	PCB 118 ug kg^{-1}	PAH Acenaphthene ug kg^{-1}	PAH Acenaphthylene ug kg^{-1}	PAH Anthracene ug kg^{-1}	PAH Benzo (a) anthracene ug kg^{-1}	PAH Benzo (a) pyrene ug kg^{-1}	PAH Benzo (b) fluoranthene ug kg^{-1}	PAH Benzo (ghi) perylene ug kg^{-1}	PAH Benzo (k) fluoranthene ug kg^{-1}	PAH Chrysene ug kg^{-1}	PAH Dibenz (a,h) anthracene ug kg^{-1}	PAH Flourene ug kg^{-1}	PAH Fluoranthene ug kg^{-1}
INT-S1	0.41	0.41	0.41	0.41	1.9	2.0	6.9	17.8	28.1	55.5	27.6	22.0	12.6	8.1	7.4	33.9
INT-S2	0.40	0.50	0.60	0.80	1.7	6.3	13.5	42.3	62.6	84.1	32.6	36.5	24.5	11.1	12.8	67.3
INT-S3	0.40	0.50	0.60	0.80	1.7	2.0	5.9	14.3	18.5	45.6	24.6	18.3	9.6	8.1	5.9	26.1
INT-S4	0.40	0.50	0.60	0.80	1.7	2.0	15.1	39.3	54.6	75.9	29.0	31.6	22.8	7.8	6.9	65.2
SUB-S1	0.44	0.44	0.44	0.44	1.7	2.0	6.6	18.4	28.7	59.0	28.6	23.9	11.3	9.0	7.0	32.6
SUB-S2	0.45	0.45	0.45	0.45	2.2	2.0	6.4	14.3	21.0	45.8	20.3	17.4	9.0	7.1	6.6	31.9
SUB-S3	0.40	0.50	0.60	0.80	1.7	2.0	8.3	24.9	41.4	62.6	28.0	31.7	16.2	8.1	7.4	43.3
SUB-S4	0.40	0.50	0.60	0.80	1.7	2.0	4.6	16.0	19.4	43.4	17.3	18.5	11.6	5.3	5.0	26.4
G01	0.40	0.50	0.60	0.80	1.7	2.0	6.6	19.9	34.9	58.2	24.6	24.0	13.2	7.4	7.4	38.5
G02	0.40	0.50	0.60	0.80	1.7	2.0	5.3	14.9	26.6	46.9	19.9	20.7	8.3	5.1	6.6	25.6
G03	0.40	0.50	0.60	0.80	1.7	2.0	5.5	13.1	16.3	41.2	17.7	16.0	8.3	5.3	6.3	29.2

Sheet 3. Results

Sample ID code	PCB 138 ug kg^{-1}	PCB 153 ug kg^{-1}	PCB 180 ug kg^{-1}	PCB 118 ug kg^{-1}	PAH Acenaphthene ug kg^{-1}	PAH Acenaphthylene ug kg^{-1}	PAH Anthracene ug kg^{-1}	PAH Benzo (a) anthracene ug kg^{-1}	PAH Benzo (a) pyrene ug kg^{-1}	PAH Benzo (b) fluoranthene ug kg^{-1}	PAH Benzo (ghi) perylene ug kg^{-1}	PAH Benzo (k) fluoranthene ug kg^{-1}	PAH Chrysene ug kg^{-1}	PAH Dibenz (a,h) anthracene ug kg^{-1}	PAH Flourene ug kg^{-1}	PAH Fluoranthene ug kg^{-1}
G04	0.40	0.50	0.60	0.80	3.2	2.0	2.4	14.6	24.7	32.5	14.9	13.0	9.0	4.9	3.5	29.5

<insert more rows as necessary>

Sample ID code	PAH Indeno (1,2,3–cd) pyrene ug kg^{-1}	PAH Naphthalene ug kg^{-1}	PAH Phenanthrene ug kg^{-1}	PAH Pyrene ug kg^{-1}											
INT-S1	23.2	13.8	24.2	26.0											
INT-S2	30.0	14.6	36.1	50.0											
INT-S3	18.9	12.2	17.8	20.0											
INT-S4	25.1	8.3	32.3	52.4											
SUB-S1	25.1	13.9	20.6	25.8											
SUB-S2	18.0	15.2	23.7	24.4											
SUB-S3	22.7	14.7	28.8	31.4											
SUB-S4	13.5	10.4	14.9	19.6											
G01	20.8	15.4	25.0	28.4											
G02	17.2	15.4	16.7	19.2											
G03	15.5	12.8	21.5	21.3											

EPA Dumping at Sea Permit Application - Material Analysis Reporting Form (Version 1.0)
Sheet 3. Results

Sample ID code	PAH Indeno (1,2,3-cd) pyrene ug kg^{-1}	PAH Naphthalene ug kg^{-1}	PAH Phenanthrene ug kg^{-1}	PAH Pyrene ug kg^{-1}											
G04	13.0	5.1	13.2	22.9											

<insert more rows as necessary>

Sample ID code						
INT-S1						
INT-S2						
INT-S3						
INT-S4						
SUB-S1						
SUB-S2						
SUB-S3						
SUB-S4						
G01						
G02						
G03						

Sample ID code						
G04						

<insert more rows as necessary>

EPA Dumping at Sea Permit Application - Material Analysis Reporting Form (Version 1.0)
Sheet 4. QA

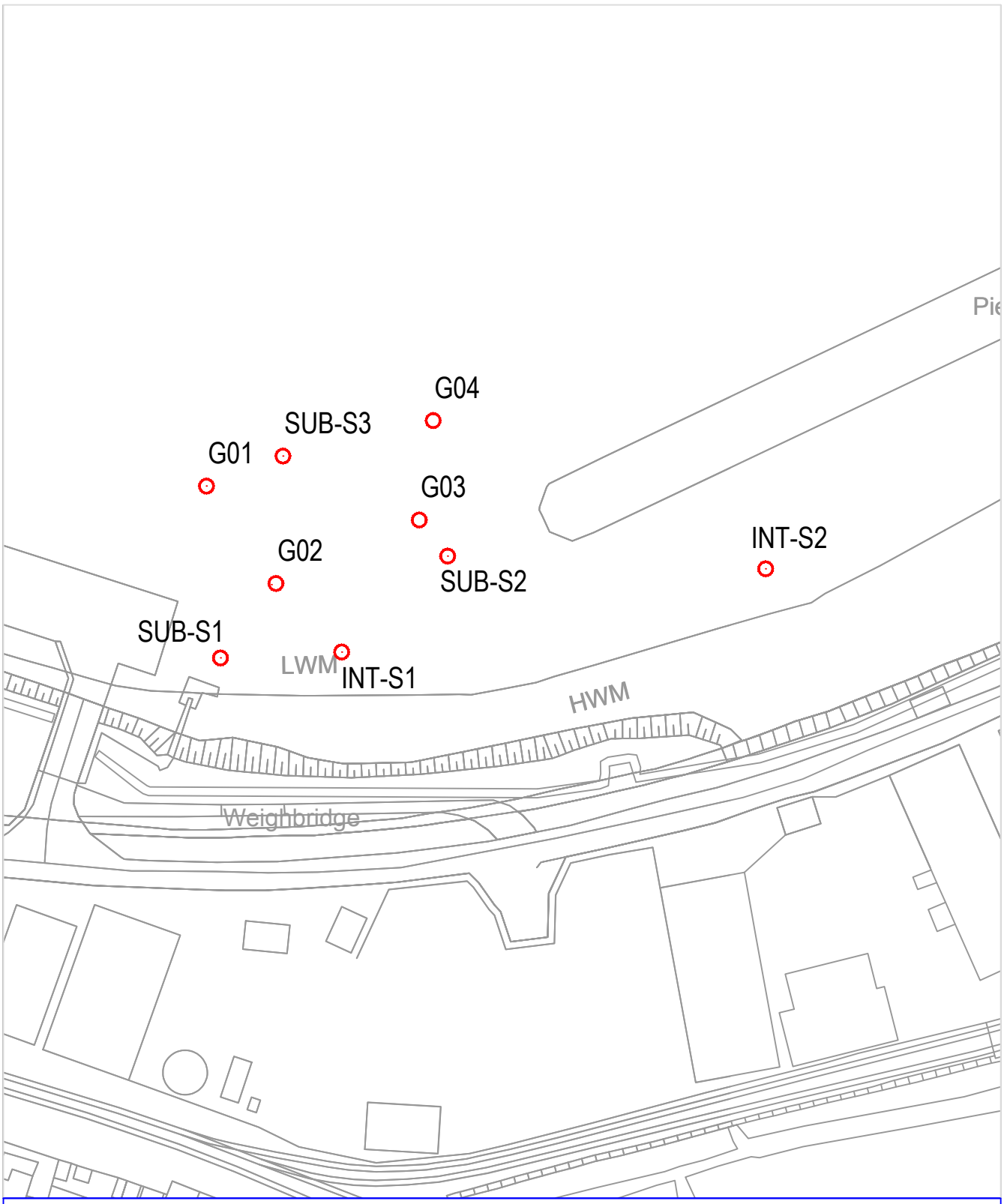
Reference Type	Reference Material	OC %	TEH g kg^{-1}	Cu mg kg^{-1}	Zn mg kg^{-1}	Cd mg kg^{-1}	Hg mg kg^{-1}	Pb mg kg^{-1}	As mg kg^{-1}	Cr mg kg^{-1}	Ni mg kg^{-1}	Li mg kg^{-1}
CRM (measured value)	SRM - 2702			not certified	471.0	0.8	0.5	139.0	44.5	316.0	68.8	not certified
CRM (certified value)	SRM - 2702			not certified	485.3	0.8	0.4	132.8	45.3	352.0	75.4	not certified
CRM (measured value)	NMIJ CRM-7307a											
CRM (certified value)	NMIJ CRM-7307a											
CRM (measured value)	CRM BCR-536											
CRM (certified value)	CRM BCR-536											
CRM (measured value)	CRM BCR-646											
CRM (certified value)	CRM BCR-646											

EPA Dumping at Sea Permit Application - Material Analysis Reporting Form (Version 1.0)
Sheet 4. QA

Reference Type	Al mg kg^{-1}	DBT mg kg^{-1}	TBT mg kg^{-1}	PCB 028 ug kg^{-1}	PCB 052 ug kg^{-1}	PCB 101 ug kg^{-1}	PCB 138 ug kg^{-1}	PCB 153 ug kg^{-1}	PCB 180 ug kg^{-1}	PCB 118 ug kg^{-1}	PAH Acenaphthene ug kg^{-1}	PAH Acenaphthylene ug kg^{-1}	PAH Anthracene ug kg^{-1}
CRM (measured value)	69600.0												
CRM (certified value)	84100.0												
CRM (measured value)											Not certified	Not certified	3.6
CRM (certified value)											Not certified	Not certified	2.0
CRM (measured value)				44.0	38.0	44.0	44.2	50.0	22.4	27.5			
CRM (certified value)				50.4	42.1	50.4	52.4	59.8	29.7	33.8			
CRM (measured value)		0.770	0.480										
CRM (certified value)		0.517	0.454										

Reference Type	PAH Benzo (a) anthracene ug kg^{-1}	PAH Benzo (a) pyrene ug kg^{-1}	PAH Benzo (b) fluoranthene ug kg^{-1}	PAH Benzo (ghi) perylene ug kg^{-1}	PAH Benzo (k) fluoranthene ug kg^{-1}	PAH Chrysene ug kg^{-1}	PAH Dibenz (a,h) anthracene ug kg^{-1}	PAH Flourene ug kg^{-1}	PAH Fluoranthene ug kg^{-1}
CRM (measured value)									
CRM (certified value)									
CRM (measured value)	7.2	4.6	31.9	6.8	5.3	8.4	Not certified	6.0	25.1
CRM (certified value)	6.3	2.9	34.9	8.1	6.2	10.0	Not certified	5.8	27.6
CRM (measured value)									
CRM (certified value)									
CRM (measured value)									
CRM (certified value)									

Reference Type	PAH Indeno (1,2,3–cd) pyrene ug kg^{-1}	PAH Naphthalene ug kg^{-1}	PAH Phenanthrene ug kg^{-1}	PAH Pyrene ug kg^{-1}	Notes / comments:
CRM (measured value)					
CRM (certified value)					
CRM (measured value)	5.6	Not certified	24.5	22.2	
CRM (certified value)	6.4	Not certified	26.4	18.7	
CRM (measured value)					
CRM (certified value)					
CRM (measured value)					
CRM (certified value)					



RPS
Elmwood House
74 Boucher Road
Belfast
BT12 6RZ
T +44 (0) 28 90 667914
F +44 (0) 28 90 668286
W www.rpsgroup.com/ireland
E ireland@rpsgroup.com

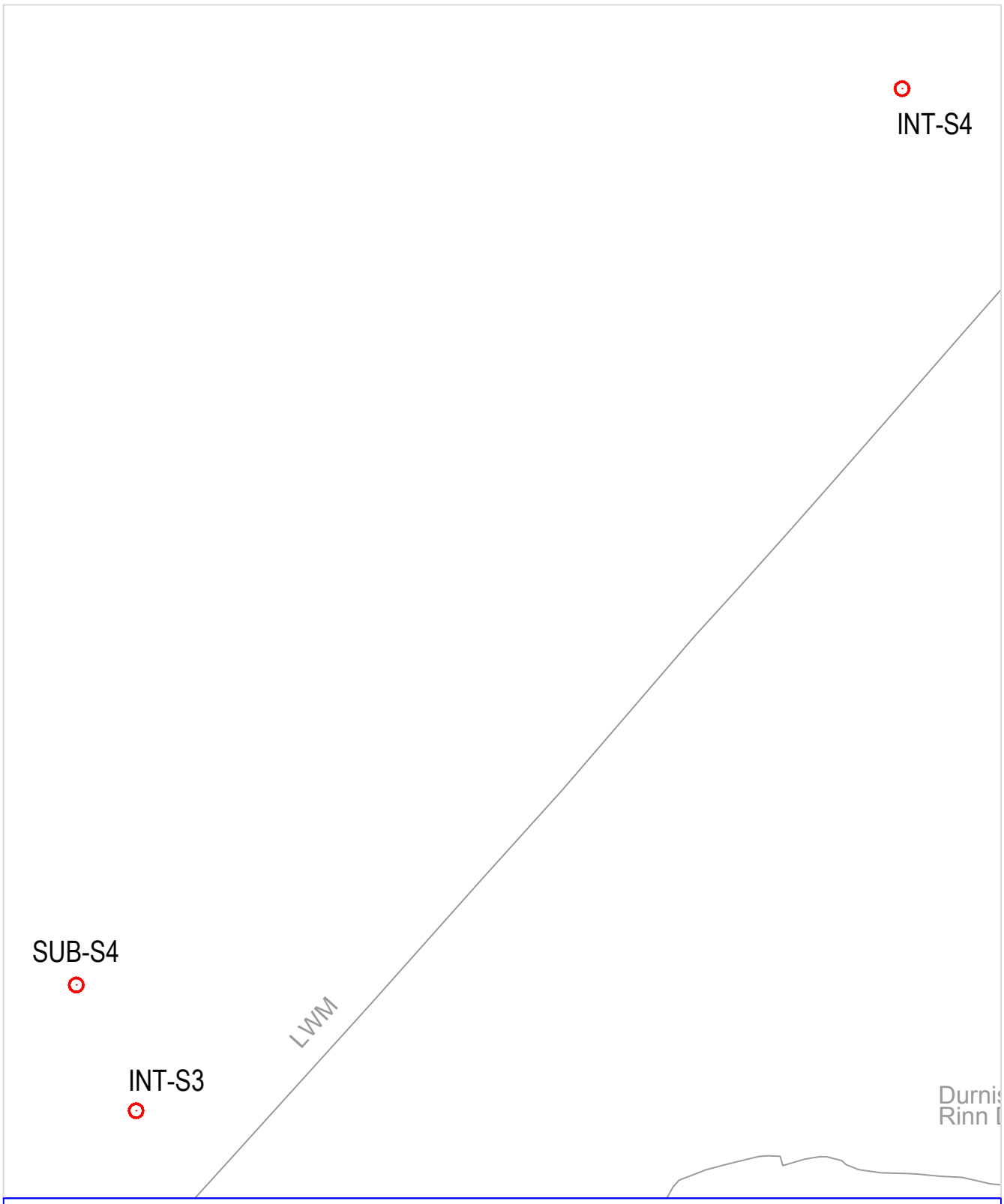
Drawing Number	Rev
M0679-RPS-00-XX-DR-SK101	-

Project
Port of Foynes - Jetty Extension & Port Estate Expansion

Client
SHANNON FOYNES PORT COMPANY

Title
Grab Sample Positions

Drawing Status	Sheet Size	Drawing Scale	Project Leader	Drawn By	Date	Initial Review
Preliminary	A4	1:1500	SAH	SAH	25.04.2018	SAH



RPS
Elmwood House
74 Boucher Road
Belfast
BT12 6RZ
T +44 (0) 28 90 667914
F +44 (0) 28 90 668286
W www.rpsgroup.com/ireland
E ireland@rpsgroup.com

Drawing Number: M0679-RPS-00-XX-DR-SK101

Rev: -

Project: Port of Foynes - Jetty Extension & Port Estate Expansion

Client: SHANNON FOYNES PORT COMPANY

Title: Grab Sample Positions

Drawing Status	Sheet Size	Drawing Scale	Project Leader	Drawn By	Date	Initial Review
Preliminary	A4	1:1500	SAH	SAH	25.04.2018	SAH

Appendix 7.5

Maps of Aquaculture Sites in the Shannon Estuary

Maps of Aquaculture Sites in the Shannon Estuary (Southern Shore)

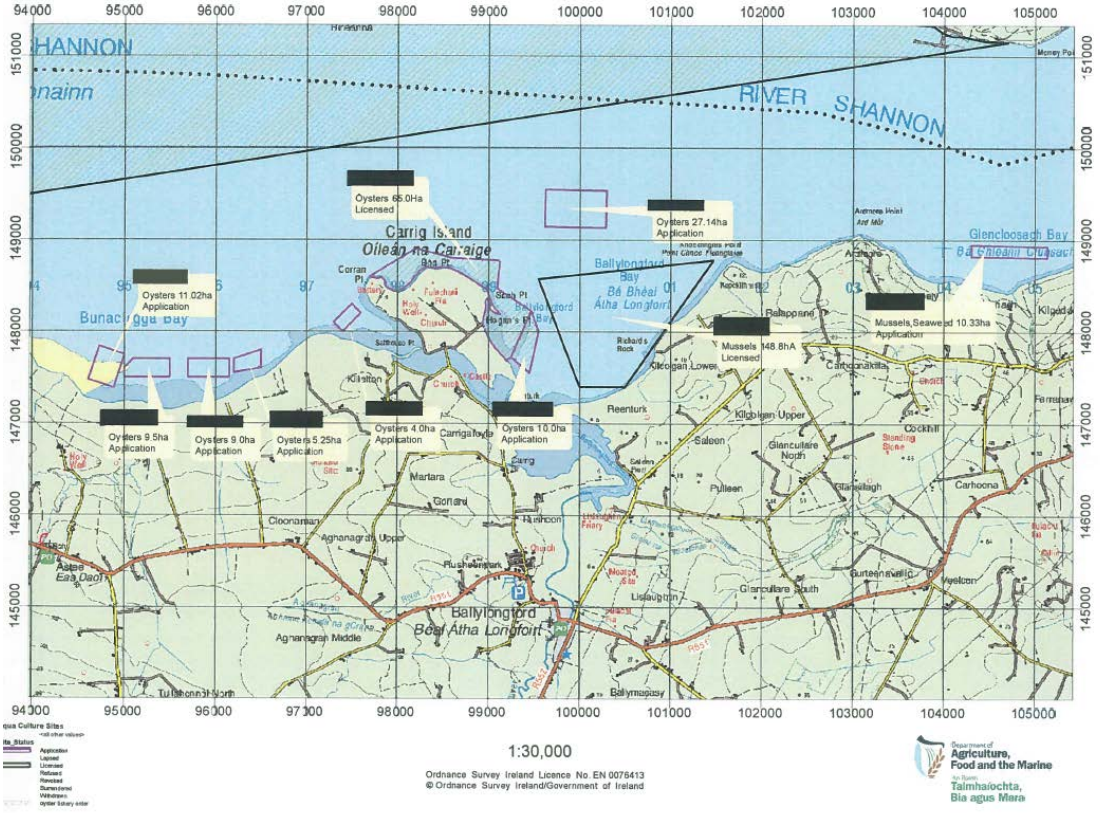


Figure 7-A Aquaculture sites licensed and applications pending at Ballylongford west of Foynes.

1 NO. SITE AT SHANNON ESTUARY CO.LIMERICK

Co-ordinates & Area

(32.31 Ha)

The area seaward of the high water mark and enclosed by a line drawn from Irish National Grid Reference point

132592, 155663 to Irish National Grid Reference point
133066, 156215 to Irish National Grid Reference point
133457, 155970 to Irish National Grid Reference point
132867, 155398 to the first mentioned point.

Figure 7-B Coordinates for aquaculture application site east of those shown in Fig 7-A

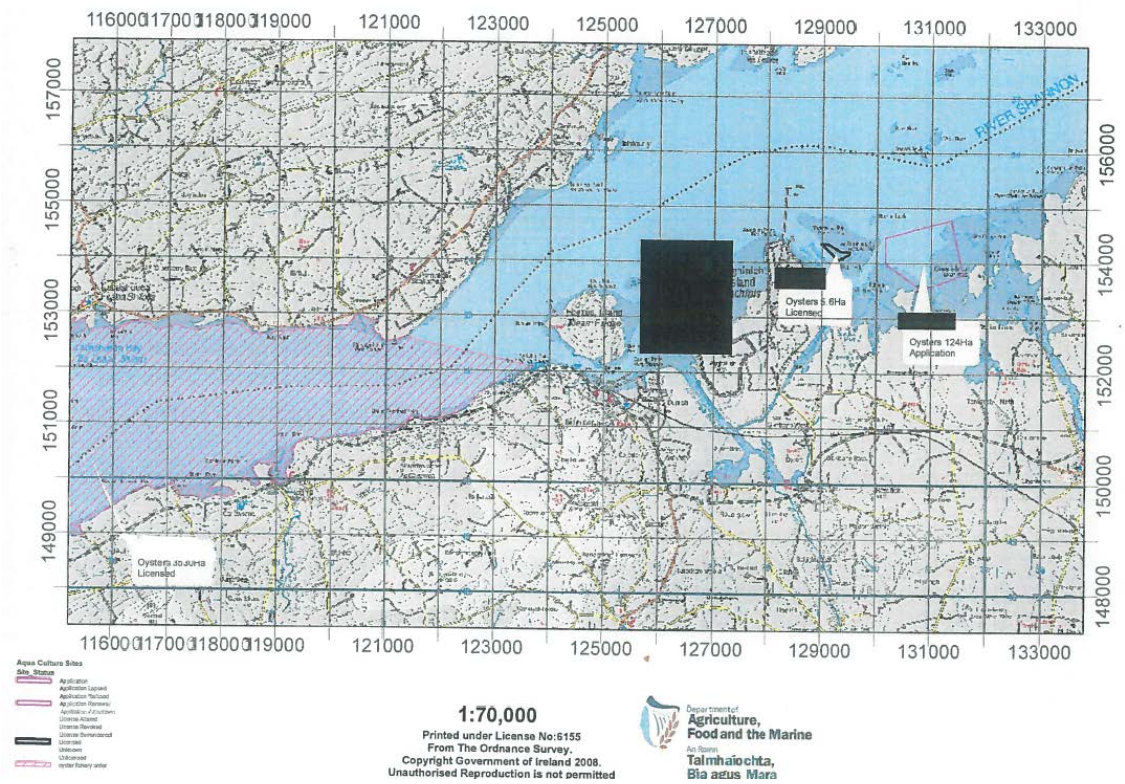


Figure 7-C Aquaculture sites licensed and applications pending at Askeaton east of Foynes.

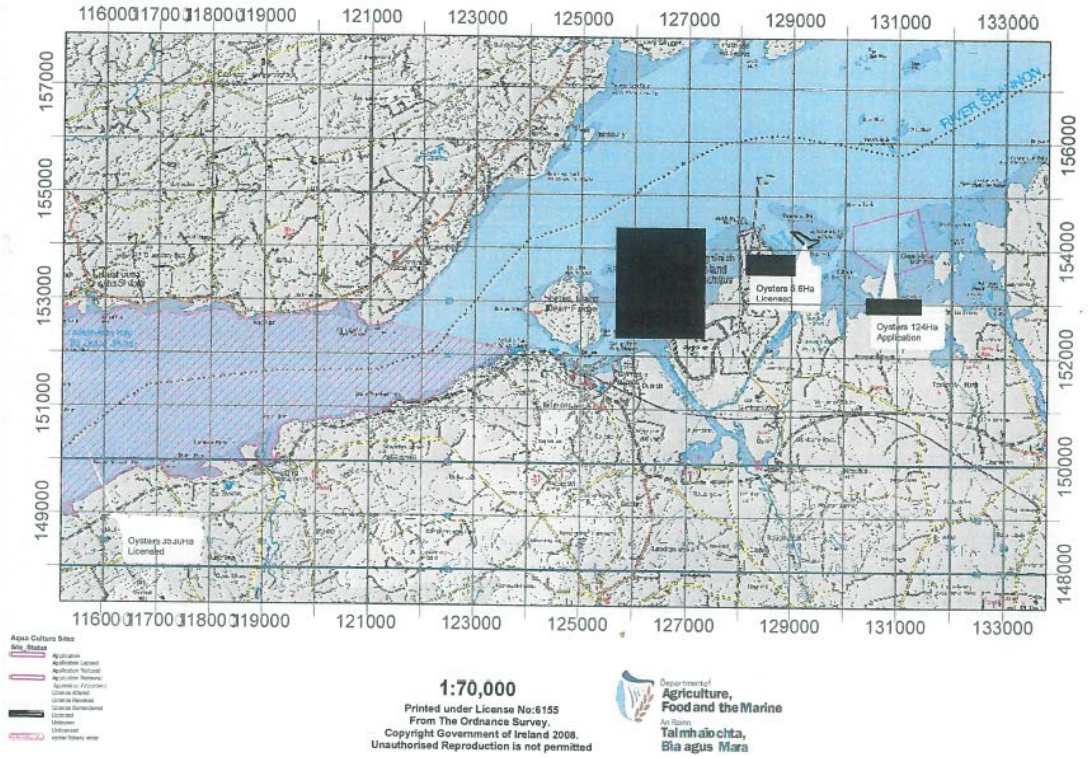


Figure 7-D Oyster Order (red hatching) Lower Shannon.

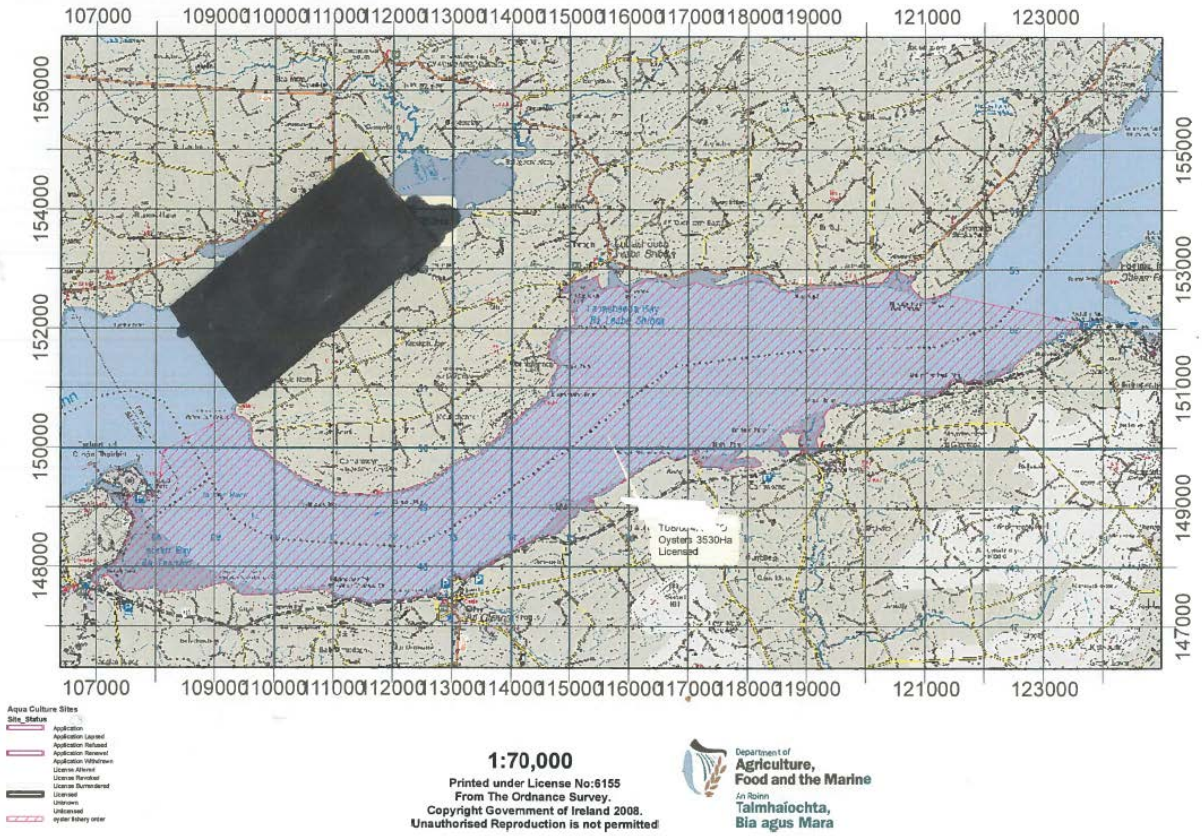


Figure 7-E Oyster Order (red hatching) Middle Shannon Estuary (note Foynes Island on far right)

Appendix 8

Soils, Geology, Hydrogeology and Waste

Appendix 8.1

Desk Study

Contents

1 Introduction 1
1.1 Report objectives and scope 1
1.2 Sources of information 1
2 Site description 3
2.1 Introduction 3
2.2 Study area 3
2.3 Surrounding land-use 5
3 Site history 6
3.1 Historical development of the site 6
3.2 Ordnance Survey Ireland Environmental Report (Ref. 19734562) 7
4 Site geology & hydrogeology 8
4.1 Site geology 8
4.2 Hydrogeology 10
4.3 Groundwater vulnerability 11
4.4 Surface water hydrology 11
5 Consultation responses 13
6 Overview of potential contamination 14
6.1 Introduction 14
6.2 On site sources 14
6.2.1 Current land use 14
6.2.2 Previous land use – historical development 14
6.2.3 Ground borne gases 14
6.2.4 Radon gas 14
6.3 Off site sources 15
6.3.1 Surrounding land uses – current 15
6.3.2 Surrounding land uses – historical 15
7 Conceptual Site Model and Risk Assessment 16
7.1 Conceptual Site Model 16
8 Conclusions and recommendations 19
8.1 Conclusions 19
8.2 Recommendations 19

Figures

Figure 1 Site location
Figure 2 Existing site layout
Figure 3 Solid geology (taken from GSI's Spatial Resources portal)
Figure 4 Sub soils (taken from GSI's Spatial Resources portal)
Figure 5 Groundwater aquifer (taken from GSI's Spatial Resources portal)
Figure 6 Groundwater vulnerability (taken from GSI's Spatial Resources portal)

Tables

Table 1 Application site details
Table 2 Surrounding land uses
Table 3 Historical site and surrounding area development
Table 4 Risk Assessment & Site Conceptual Model

Appendices

Appendix A Ordnance Survey Ireland Environmental Report (Ref. 19734562)
Appendix B Photographic record

1 Introduction

RPS was appointed by Shannon Foynes Port Company (SFPC) to undertake a Desk Study Report for proposed redevelopment measures at the existing Port of Foynes (Main Street, Ballynacragga North, Foynes, County Limerick). The redevelopment will incorporate a jetty extension, pontoon relocation and expansion of the Port onto neighbouring lands to the east (Durnish Lands). As part of the port expansion the Durnish Lands site will be raised and filled with material imported from authorised quarries.

This report describes the research and assessments undertaken to assess the ground conditions and potential for any ground contamination that may have arisen from the site's present and historical use.

1.1 Report objectives and scope

The objectives of this report are as follows:

- Collate desk study information regarding the site and surrounds to allow the identification of potential contaminant sources, potential pathways and potential receptors in accordance with DEFRA's Contaminated Land Report 11. This will form the basis of the Preliminary Risk Assessment and production of a Conceptual Site Model (CSM).
- Collation of existing geo-environmental data to facilitate a risk assessment with regards to potential risks to human health and environmental risks.
- Assessment of the above to determine if intrusive investigation and further assessment will be necessary.

1.2 Sources of information

Sources of information used in the production of this report include:

- Internet based aerial photography
- Ordnance Survey Ireland Environmental Report (Ref no. 19734562)
- Geological Survey Ireland Spatial Resources Map Viewer – Department of Communications, Climate Action and Environment (http://dcenr.maps.arcgis.com/apps/MapSeries/index.html?appid=a30af518e87a4c0ab2fbde2aaac3c228)
- Environmental Protection Agency Radon Map (http://www.epa.ie/radiation/radonmap/)

- Port of Foynes – Jetty Phase 2, Ground Investigation Report, ABCO Marine and Gavin and Doherty Geosolutions Ltd, February 2018.
- Port of Foynes – Jetty Phase 2, Ground Investigation Factual Report, ABCO Marine and Gavin and Doherty Geosolutions Ltd, January 2018.

2 Site description

2.1 Introduction

Figure 1 Site location

Port of Foynes is located to the north of the small village of Foynes, approximately 35km west of Limerick.

2.2 Study area

The Port of Foynes is the main deepwater facility on the Shannon Estuary. The Port Estate comprises 64 hectares with 42.5 hectares of land in the ownership of Shannon Foynes Port Company (SFPC) and 10.7 hectares in third party ownership (Durnish Lands). The main proposed extension to the port will be on the Durnish Lands to the east of the Port. In addition, a proposed extension to the East Jetty will be completed. The marine area currently comprises two marine structures; the East Jetty and the West Quay, and the intertidal area in between. The marine area and Durnish Lands are shown in Figure 2 along with the overall planning boundary for the site redevelopment.

Figure 2 Site layout plan

A site walkover was completed by RPS personnel on 20th March 2017. A photographic record of the site walkover is included in Appendix B. The Port of Foynes is located at the edge of hilly land on the southern bank of the River Shannon Estuary, where the river widens before it flows into the Atlantic Ocean.

As shown on Figure 2, the proposed extension area is located to the east and south east of the existing port in the Durnish Lands area. The Durnish Lands are bounded by the River Shannon to the north, the River Robertstown (a tributary river to the River Shannon) to the east, the N69 Road to the south (which leads into Foynes Village) and the Harbour Entrance Road to the west. The Durnish Lands are generally flat, hummocky, low lying ground. In the area west of the Harbour Entrance Road there is higher land with a steeper gradient, due to a large rock outcrop covered in thick vegetation. Various low points within the site are prone to having standing water and are very soft. Active channels of water are thought to have previously crossed the fields, though this may be dependent on rainfall or saturation of the soil. A box culvert is located on the Durnish site with a shallow watercourse. Drainage ditches bound the land and demarcate the fields; the water level in the ditches is controlled by sluices to prevent flooding. The north east of the Durnish land is protected from the tide along the river estuary by levees. A disused railway line runs east to west along the

southern boundary of the Durnish Lands and crosses the Harbour Entrance Road. The railway line is mostly at the same level as the surrounding land with only short stretches on low embankments.

The Durnish Lands site is currently a greenfield site. The land is generally covered in grass with hedge lines located along the Harbour entrance road on the western boundary. The historic maps (Section 3.1) of the Durnish Lands show that the site has been used for agricultural purposes. A potential quarry was identified to the west of the site however this was not marked on OSI current or historic maps. Therefore, it can be assumed that the quarry was a minor work possibly used as a local source for limestone as lime kilns are noted in the greater area.

Table 1 Application site details

Site address	Port of Foynes, Foynes, Limerick, Ireland
Grid reference	126300E 151445N
Estimated site area	620,870 m^2

2.3 Surrounding land-use

The pertinent surrounding land uses of the site are given in Table 2.

Table 2 Surrounding land uses

Boundary	Surrounding land uses of the proposed development
North	The Shannon Estuary is present to the north of the site.
East	The River Robertstown is present to the east of the site; it flows into the Shannon Estuary just north of the site. Beyond the river to the east, Aughinish Alumina, Europe's largest alumina refinery, is present. The Bauxite Residue Disposal Area (BRDA) for the plant is present just east of the river. The waste bauxite residue produced during the refining of the alumina is deposited in this area.
South	The Port of Foynes is present to the south of the site. A railway line runs along the southern boundary of the Durnish Lands site. The small village of Foynes is present further south.
West	The area to the west of the site is generally undeveloped.

3 Site history

3.1 Historical development of the site

Two historical maps of the area are provided within the Ordnance Survey Ireland (OSI) Environmental Report; a six inch map from c. 1830s and a twenty-five inch map from c. 1890s. Table 3 provides a summary of potentially contaminating activities during the history of both the site and its surrounding area.

Table 3 Historical site and surrounding area development

Date	Site history	Surrounding land use history
c. 1830s	Durnish Cottage is developed on the wider Port of Foynes site.	The surrounding area of the site is generally undeveloped. Robertstown River is present to the east of the site, with no development shown on the land east of the river. The north, south and west of the site are generally undeveloped.
c. 1890s	As 1830.	As above, the surrounding area remains undeveloped. The railway line now appears to run along the southern boundary of the site in its modern day position.

As reported in the Ground Investigation Report produced by Gavin and Doherty Geosolutions (February 2018), initial works were carried out at the Port in 1846, with the construction of a masonry wharf 83m long and 12m wide in the location now known as the West Quay. This wall is still in place at Berth 1.

In 1936, the port was designed to cater for 8,000 ton vessels with maximum draft of 7.6m. In 1968 the Trustees constructed the East Jetty under Foreshore License; this was principally for the provision of a berth to service ore exports and included a conveyor and loading arm.

In 1984, the East Jetty was extended westwards to cater for the growing number of ships calling at the Harbour. A dedicated Oil Dolphin facility was constructed in 1992 and provided a berth for oil and chemical tankers. The new West Quay was completed in 1999.

The Port has expanded during the 20th century. The inner port area of Foynes comprises of two distinct jetties; the western jetty and the eastern jetty. Planning permission was secured in 2012 for a 2.5 hectare land reclamation project behind the jetty. The western jetty was originally constructed in 1934 and then completely upgraded and extended in 1998, with 271m of quayside berthage (SFPC Master Plan, February 2013).

3.2 Ordnance Survey Ireland Environmental Report (Ref. 19734562)

No records of quarries, mines, collieries or lime kilns were located within the 1km search radius of the site. One historic well, two seasonal lakes and one area of flood plain was noted within the search radius.

The disused railway line is present running along the southern boundary of the site. No integrated pollution control or waste licenses were identified within the search radius.

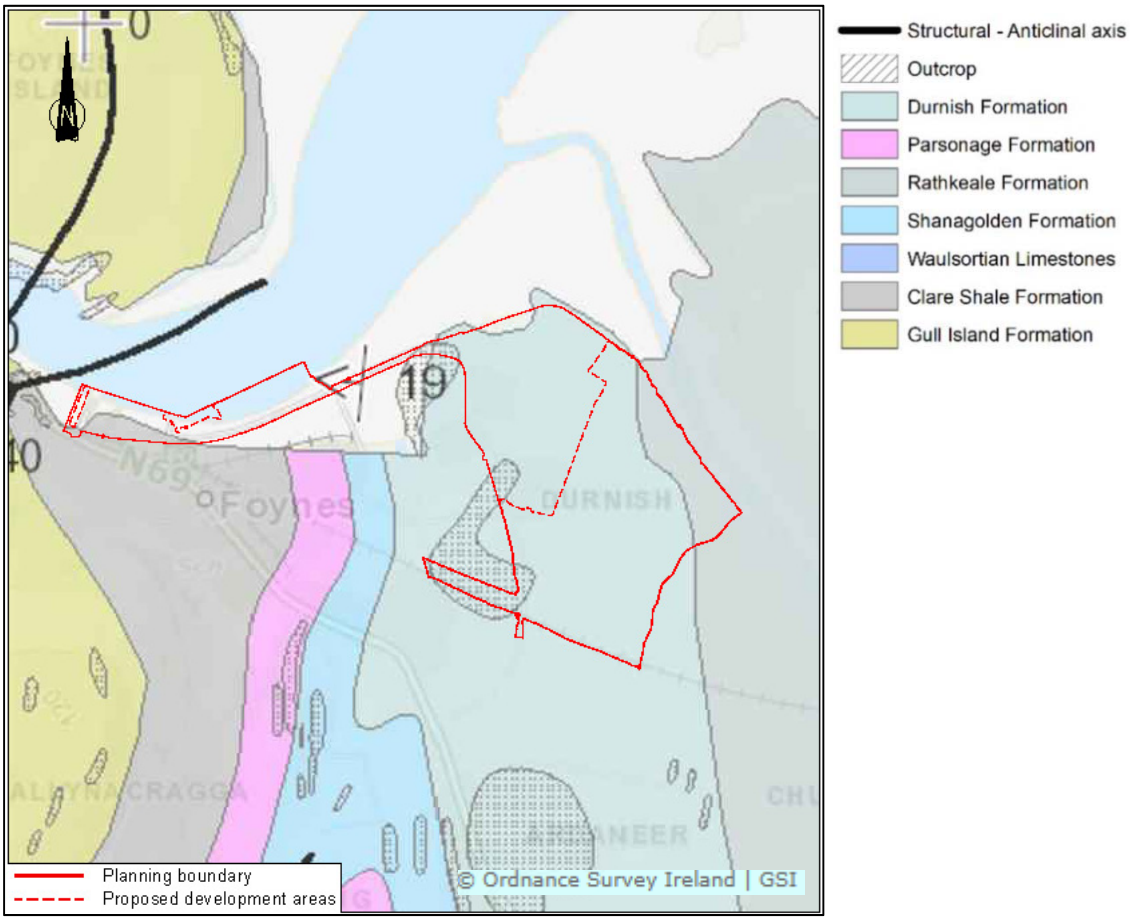
4 Site geology & hydrogeology

4.1 Site geology

Information held online by Geological Survey Ireland at their Spatial Resources Map Viewer was used to clarify the geology and hydrogeology information provided in the OSI Environmental Report (Appendix A). The following describes the findings of this preliminary research. Information on the anticipated ground conditions is also provided within the Ground Investigation and Ground Investigation Factual Reports produced by ABCO Marine and Gavin and Doherty Geosolutions.

Solid geology

Figure 3 Solid geology (taken from GSI's Spatial Resources portal)



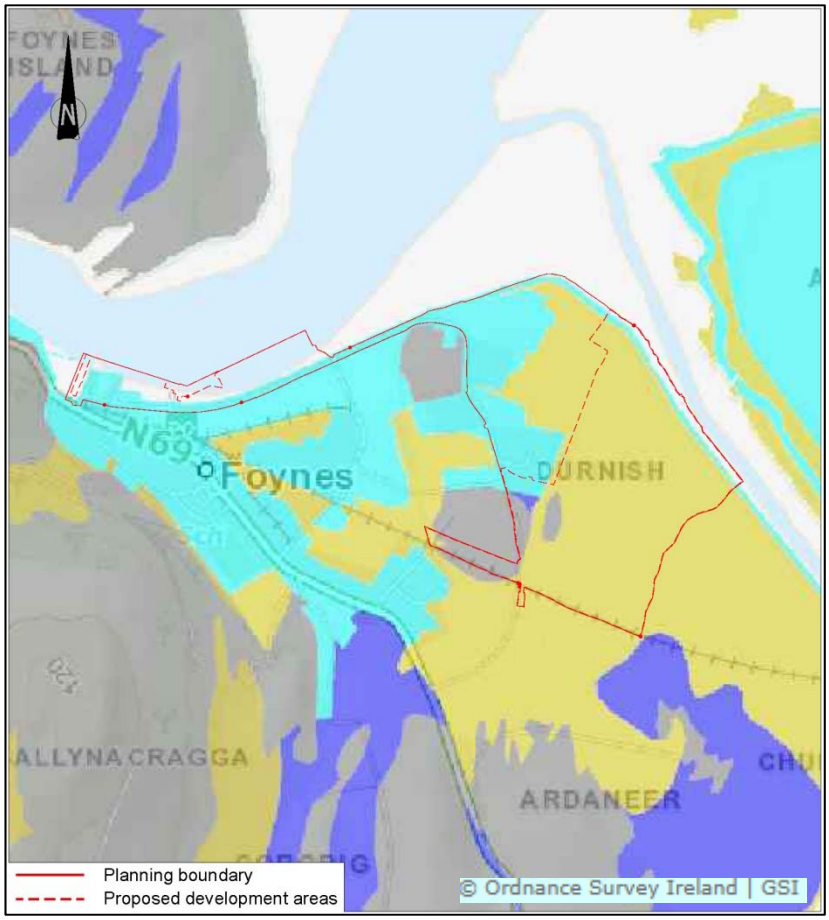
The bedrock geology anticipated in the vicinity of the site is shown on Figure 3. The geology of the wider Foynes area consists of formations from the Carboniferous system, from the Visean and basal Namurian stage. The formations are dipping gently to the south west. The bedrock of the Durnish lands site consists of the Rathkeale Formation to the east of the site

and the Durnish Formation to the west. The bedrock geology of the Port of Foynes marine site is the Clare Shale Formation.

The Rathkeale Formation comprises non fossiliferous dark muddy limestone with mudstones, which are well bedded and brittle. This is uniformly overlain by the Durnish Formation, which is a uniform bioclastic limestone with bands that include chert nodules parallel to bedding. It is abundant in fossils, with complete coral beds. The Durnish formation is overlain by the Shanagolden Formation of black limestone and then the Parsonage and Corgrig Lodge formation, a fine grained muddy limestone. These are overlain by the Clare Shale Formation which is a clay rich mudstone with bands of siltstone. The carboniferous limestone formations represent an offshore ramp. The changes in grain size and the fossil content between the formations indicates changes in relative sea level. The Clare shale formation which was deposited above the carboniferous limestone formations represents a deep marine, representing a significant rise in relative sea level.

Drift geology

Figure 4 Sub soils (taken from GSI's Spatial Resources portal)



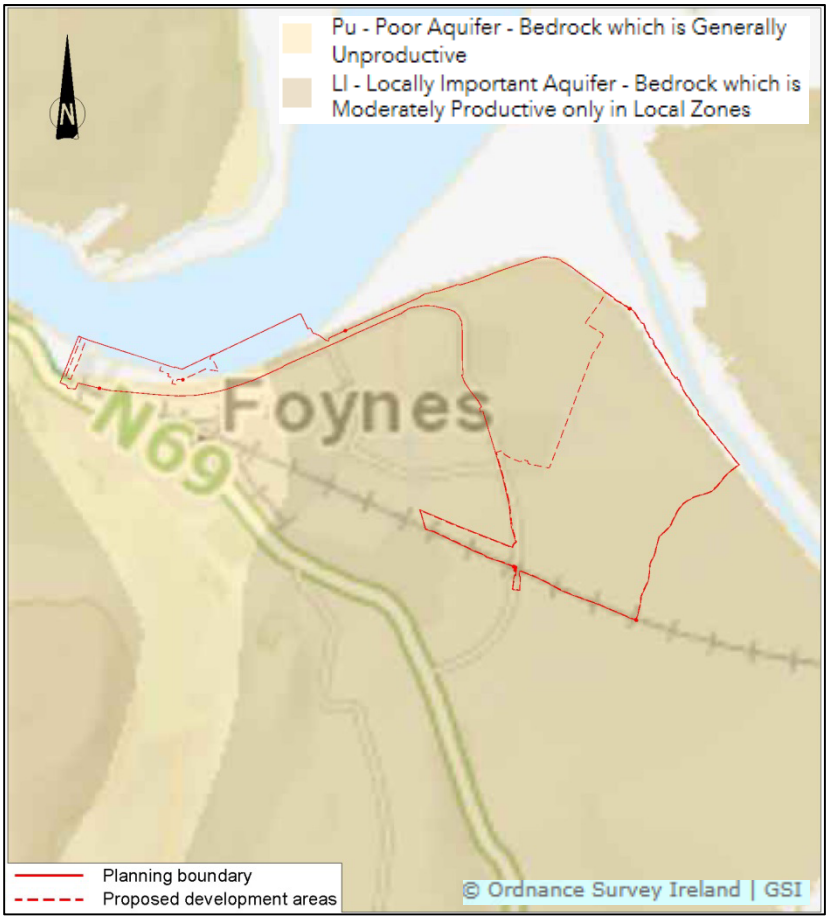
As shown on Figure 4, the Port of Foynes is mapped as Made Ground (blue), which is superimposed on a region composed mostly of Estuarine Sediments consisting of silts and clays (green). Glacial tills (purple), mainly of limestone origin, are present to the south of the Durnish site while bedrock (shale and limestone) is anticipated at surface in certain areas on and in proximity to the site (grey).

4.2 Hydrogeology

As shown in Figure 5, the site area is located across two aquifer domains: Poor Aquifer (PU) and Locally Important Aquifer (LI). The PU designation represents bedrock which is generally unproductive while the LI designation represents bedrock which is moderately productive only in local zones. A Regionally Important Aquifer - Karstified (conduit) is present to the east of the site area (approximately 2km).

Karst activities were found in two boreholes less than 3k from Port of Foynes in the Walsortian Limestone and Rathkeale Formation.

Figure 5 Groundwater aquifer (taken from GSI's Spatial Resources portal)

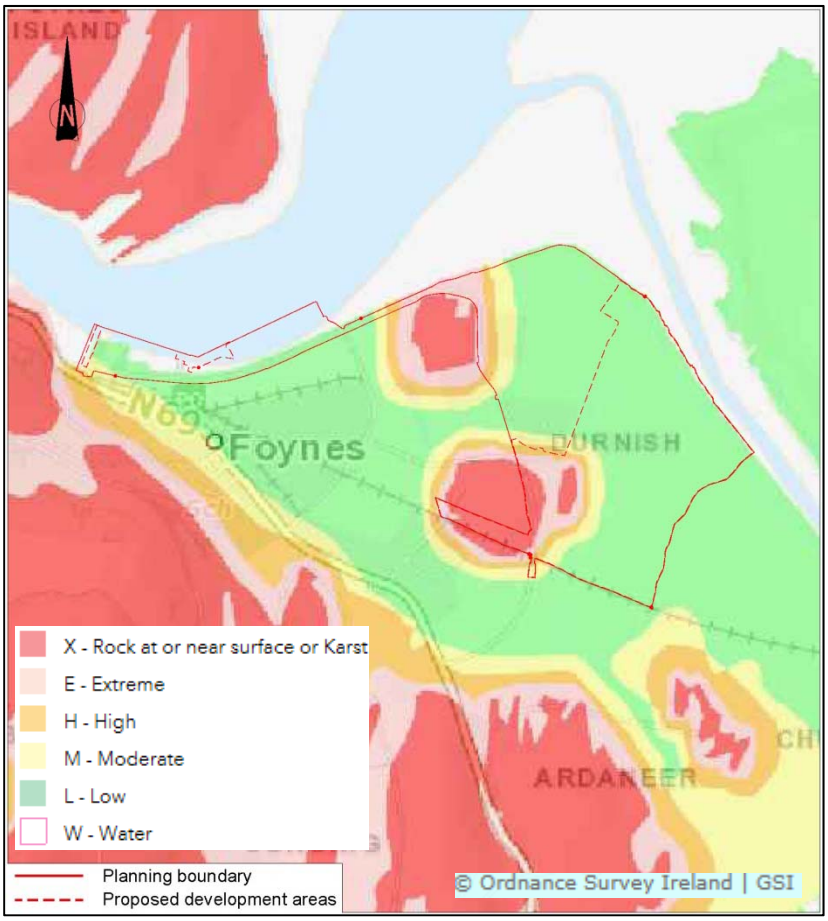


4.3 Groundwater vulnerability

In accordance with the Water Framework Directive (2000/60/EC) it is necessary to understand the groundwater vulnerability of the site, which is defined as the tendency and likelihood for general contaminants to reach the water table after introduction at the ground surface.

The site mainly falls within an area of low groundwater vulnerability. However, higher groundwater vulnerability is anticipated where rock is present at surface i.e. in the western portion of the site.

Figure 6 Groundwater vulnerability (taken from GSI's Spatial Resources portal)



4.4 Surface water hydrology

The OSI Environmental Report shows a number of watercourses to be present on the site. Small watercourses seem to form the boundary of the site. In addition, a number of watercourses are present in the northern portion of the site with small field drains also

present along many of the field boundaries. The large Robertstown River runs along the eastern boundary of the site, into the Shannon River/Estuary just north of the site.

The OSI Environmental Reports identifies one weir, four springs, two sluices and two pumps within the search radius of the site. The Lower Shannon Estuary is noted to be of unpolluted status.

5 Consultation responses

Consultation requests were sent to a number of statutory consultees as part of the EIA scoping process. The responses have been reviewed and summarised below where any comments relevant to this assessment were noted.

Clare County Council

The response received from Clare County Council requested that 'subsoil pollution' be addressed as part of the Environmental Impact Statement.

BIM – Ireland's Seafood Development Agency

As part of the BIM response it is noted that adequate protection will be provided to the aquaculture industry. In particular, they note that background levels of suspended solids in the nearby waters cannot at any time increase by more than 30% (due to the presence of licenced shellfish sites).

6 Overview of potential contamination

6.1 Introduction

The nature of potential contamination that may have arisen from the past activities on and surrounding the site is considered below.

6.2 On site sources

6.2.1 Current land use

The port was first developed in 1846 and has expanded over time. The Durnish lands have remained in agricultural use. No significant sources of ground contamination have been identified although made ground may be present within the port area.

6.2.2 Previous land use – historical development

The historical maps and existing layout of the site would suggest that the land has not been previously developed prior to the Port of Foynes development.

6.2.3 Ground borne gases

Made Ground or organic rich alluvial soils underlying the site would have the potential to generate elevated levels of ground gases. A potential risk from ground gases only exists on the Durnish Lands site as receptors in the form of buildings are planned for construction on this site. Made ground is not anticipated on the Durnish Lands site as it is a greenfield site. In addition, the land at Durnish is to be raised and filled with material that will be imported from authorised quarries. This material may act as a 'passive dispersal layer' for any ground gas to be dispersed through. It has therefore not been deemed necessary for ground gas monitoring to be completed on the site.

6.2.4 Radon gas

According to the radon map for the Republic of Ireland, between one and five per cent of the homes in the area are estimated to be above the reference level.

6.3 Off site sources

6.3.1 Surrounding land uses – current

A disused railway line remains present running along the southern boundary of the Durnish Lands site. Aughinish Alumina, Europe's largest alumina refinery, is present to the east of the site, beyond River Robertstown.

6.3.2 Surrounding land uses – historical

No other historical potentially contaminating land uses have been identified in the area surrounding the site.

7 Conceptual Site Model and Risk Assessment

7.1 Conceptual Site Model

Risk estimation involves detailed evaluation of source - pathway - receptor scenarios to determine whether a linkage exists between any sources of contamination and potential receptors. A risk exists where a receptor is exposed to a source of contamination, via a pathway. If any element of the source-pathway-target linkage is absent, then no risk is present.

In order to consider potential risks at the site, a conceptual site model was developed, to examine the potential source - pathway - receptor linkages that may exist on the site. The conceptual model and the risk assessment for the site are illustrated in Table 4.

Table 4 Risk Assessment & Site Conceptual Model

Source	Potential pathway(s)	Potential receptors(s)	Relevant Source – Pathway – Receptor Linkage	Further investigation required
On site sources				
Contaminants within the soils and groundwater	Dermal contact, ingestion of/and direct inhalation of potential contaminants present within soil	Humans in form of future site users (commercial, site workers), landscaping and maintenance workers	No significant sources of ground contamination have been identified although Made Ground could be present within the port area.	**Yes** Intrusive investigation and collection /analysis of sub-soil and groundwater samples followed by generic risk assessment as per CLR 11 methodology will be required prior to commencement of construction.
	Subsurface infiltration, leaching from sub-soils and groundwater flow	Perched groundwater, bedrock aquifer, small local watercourses, Robertstown River and Shannon River/Estuary	Contaminants in soil have the potential to leach through sub-soils and effect perched groundwater, adjacent surface water and/or the bedrock aquifer. As discussed above, limited potential for contaminants in soils is anticipated.	
Soil gas: Radon	Migration along service trenches	Humans in the form of future site users	According to the radon map for the Republic of Ireland, between one and five per cent of the homes in the area are estimated to be above the reference level.	**No**
Soil gas: Made Ground or highly organic soils may contain high organic content that is degrading and producing Methane, Carbon dioxide and depleted Oxygen gases	Migration along cracks in foundations and service trenches	Humans in the form of future site users	Made Ground is not anticipated to be present within the Durnish Lands.	**No**

Source	Potential pathway(s)	Potential receptors(s)	Relevant Source – Pathway – Receptor Linkage	Further investigation required
Off site sources				
Current and historical surrounding land uses	Subsurface infiltration, leaching from sub-soils and groundwater flow	Perched groundwater, bedrock aquifer, small local watercourses, Robertstown River and Shannon River/Estuary	Potentially contaminating land uses are located near the site and in particular the Durnish Lands (Aughinish Alumina) However, the distance from the Durnish lands would suggest that any risk posed would be minimal.	**Yes** Intrusive investigation and collection /analysis of sub-soil and groundwater samples followed by generic risk assessment as per CLR 11 methodology will be required prior to commencement of construction.

8 Conclusions and recommendations

8.1 Conclusions

- The desk study has highlighted the potential contamination sources, pathways and receptors which are likely to be present on the current site. The principal source of contamination is likely to be the presence of Made Ground within the Port and an off site source (Aughinish Alumina).
- Made Ground has the potential to effect ground gas, groundwater and contaminants in shallow soils.
- In accordance with CLR11, an intrusive site investigation and quantitative risk assessment should be carried out if the site is redeveloped to ascertain if the source – pathway – receptor linkages are present.

8.2 Recommendations

- A number of boreholes should be advanced across the site with a density as suggested in BS 10175:2011+A2:2017 having consideration of the development proposals.
- A number of representative sub-soil samples will be collected and sent for laboratory analysis. The suites of analysis will include; Metals, Polycyclic Aromatic Hydrocarbons, Inorganics, Hydrocarbons (TPH CWG), PCBs and Dioxins, Volatile Organic Compounds and Semi Volatile Organic Compounds.
- Boreholes will be installed with monitoring installations to facilitate the collection of groundwater samples. Groundwater samples will be analysed as per a similar suite of analysis as described above for soils.
- A Generic Quantitative Risk Assessment (GQRA) will be undertaken to ascertain the potential risks to future site users (human health) and environmental receptors.
- If deemed necessary from the GQRA, a Detailed Quantitative Risk Assessment (DQRA) will be undertaken to set site specific remedial targets for the development.

Appendix A

Ordnance Survey Ireland Environmental Report (Ref. 19734562)

Ordnance Survey Ireland

National Mapping Agency
www.osi.ie

Environmental Report

Reference No: 19734562

County Council: Limerick County Council

Date Produced: 05/01/2017

Radius Inner: 500 metres

Radius Outer: 1000 metres

Center Easting: 526302

Center Northing: 651803

Address:
RPS, Elmwood House
74 Boucher Road
Belfast BT12 6RZ
IE

Ordnance Survey Ireland

epa

GSI
Geological Survey of Ireland
Suirbhéireacht Gheolaíochta Éireann

Environmental Report
Environmental Map Data

Reference No.19734562 Report No: 8490

Table of Contents

INTRODUCTION 3
SECTION 1: SEARCH_RESULTS 12
SECTION 2: LAND_USE_MAP 13
SECTION 3: LAND_USE_DETAIL 14
SECTION 4: SITE_HISTORY_MAP 15
SECTION 5: SITE_HISTORY_DETAIL 16
SECTION 6: STABILITY_MAP 17
SECTION 7: STABILITY_DETAIL 18
SECTION 8: WATER_HISTORY_MAP 20
SECTION 9: WATER_HISTORY_DETAIL 21
SECTION 10: STATUTORY LICENSES MAP 22
SECTION 11: STATUTORY LICENCES DETAIL 23
SECTION 12: ORTHO 24
SECTION 13: HISTORIC_6_INCH 25
SECTION 14: HISTORIC_25_INCH 26
TERMS AND CONDITIONS OF SALE (“CONDITIONS”) 27

Introduction

Welcome to Ordnance Survey Ireland's (OSi) Environmental Report. The report outlines information on an area of land, based on a location you specified when ordering your report, and covers an area with a radius of 1000m from a specific geo point generated from the location information provided by you (excluding any land outside of the Republic of Ireland). The report is generated by searching for information using this specific geo-point, therefore the report should not be used in respect of any other location and will not contain any information on land outside of the area described above.

For ease of use the report is broken down into the following sections:

- Land use
- Historic Site History
- Stability
- Water History
- Statutory Licences
- Other

The report consists of a summary of the information we have found after searching certain databases (a list of these databases and an explanation of which is contained in each of them follows). More detailed information is provided in the subsequent content pages. The content pages provide information using symbology to identify the relevant features on a map. The report also provides an aerial photograph of the area covered by the report.

This report consists solely of information obtained from OSI's sources as identified. These sources do not comprise all sources of environmental or mapping information in relation to the land area you have chosen and there may be features of the land which are not identified in our sources. This report may therefore not contain all the information you need. Furthermore this report is intended only as a summary of information and OSI does not provide any risk assessment service or advice to you in relation to any matter relating to the selected land area. Further sources of information in relation to particular aspects of the report are set out in the explanation of the data sets.

OSI stresses the need to consult a qualified professional when assessing any piece of land and/or making decisions in relation to the fitness for any purpose of any land, or the saleability or value of any land. A qualified professional should also be consulted to assess the significance and validity of the information provided in the report. Furthermore this report is not intended as a substitute for a physical inspection of the land and structures on it.

Whilst OSI has taken all due care in the provision of the information contained in the report, it does not provide any guarantee of the accuracy of the data. A number of organisations have provided data used in the generation of the Environmental Report. Where appropriate a link to the organisation's website is provided where it may be possible to obtain further information.
For further information in relation to use of this report please refer to the copy of the terms and conditions annexed to the end of this report pursuant to which your purchase was made.

Report Dataset Information

❖ Land use

Name: Colliery
Description of data: This information was captured from the 1830's Ordnance Survey Historic mapping showing locations of Collieries. A coal mine and its accompanying structures are collectively known as a colliery.
Source: Ordnance Survey Ireland
Currency of Data: circa 1830's.
Further Information: Contact Ordnance Survey Ireland www.osi.ie or Ph +35318025300

Name: Mine
Description of data contained: This dataset displays the surface and underground sites of mines and originates from the Mine Records dataset, which is held within the Geological Survey of Ireland. The dataset gives the size and shape of the workings above ground and also indicates if there are underground workings associated with the site. Attributes include the site name, whether the site is a surface or underground feature.
Source: Geological Survey of Ireland
Currency of data: 2003
Further Information: http://www.gsi.ie/

Name: Quarry
Description of data: This information was captured from the 1830's Ordnance Survey Historic mapping showing locations of Quarries.
Source: Ordnance Survey Ireland
Currency of Data: circa 1830's.
Further Information: Contact Ordnance Survey Ireland www.osi.ie or Ph +35318025300

Name: Active Quarries
Description of data contained: This dataset is part of the 2004 Directory of Active Pits and Quarries published by the GSI.The entries in the Directory are based on information supplied by the operators and includes operator name, address, location, contact person, rock or mineral type, geological description, products, specifications and scale of the operation. The Directory provides information on individual operations indexed by location, rock or mineral type, product and operator name.
Source: Geological Survey of Ireland
Currency of data: 2004
Further Information: http://www.gsi.ie/

Name: Gravel Pits
Description of data: This information was captured from the 1830's Ordnance Survey Historic mapping showing locations of Gravel Pits. A Gravel pit is the British English term for an open cast working for extraction of gravel (river-deposited rounded stones). Gravel pits normally lie in river valleys where the water table is high, so they fill naturally with water to form ponds or lakes.

Source: Ordnance Survey Ireland
Currency of Data: circa 1830's.
Further Information: Contact Ordnance Survey Ireland www.osi.ie or Ph +35318025300

Name: Lime Kiln
Description of data: This information was captured from the 1830's Ordnance Survey Historic mapping showing locations Lime Kilns. Lime Kilns date from the 18th century and were in use until the 1940s in some areas. By lighting fires in these kilns and adding crushed limestone, lime was produced for use as fertiliser in the fields and also for whitewashing cottages. Most of the lime kilns around the country have been destroyed and only rare examples survive.
Source: Ordnance Survey Ireland
Currency of Data: circa 1830's.
Further Information: Contact Ordnance Survey Ireland www.osi.ie or Ph +35318025300

❖ Site History

Name: Seasonal Lakes
Description of data: This information was captured from the 1830's Ordnance Survey Historic mapping showing locations of Historic Seasonal Lakes. Seasonal lakes or Turlough's are usually found in the lowland karsts of western Ireland. They are lakes which disappear for part of the year, leaving a floor covered with grasses, sedges and herbs. They occur in limestone areas west of the Shannon and are unique to Ireland.
Source: Ordnance Survey Ireland
Currency of Data: circa 1830's .
Further Information: Contact Ordnance Survey Ireland www.osi.ie or Ph +35318025300

Name: Rail Tram /Tram Line
Description of data: This information was captured from the 1890's Ordnance Survey Historic mapping showing locations of Railway and Tram lines.
Source: Ordnance Survey Ireland
Currency of Data: circa 1890's.
Further Information: Contact Ordnance Survey Ireland www.osi.ie or Ph +35318025300

Name: Historic Well
Description of data: This information was captured from the 1890's Ordnance Survey Historic mapping showing Historic locations of wells.
Source: Ordnance Survey Ireland
Currency of Data: circa 1890's.
Further Information: Contact Ordnance Survey Ireland www.osi.ie or Ph +35318025300

Name: Power Stations
Description of data: This information was captured from the 1830's Ordnance Survey Historic mapping showing locations of Power Stations.
Source: Ordnance Survey Ireland
Currency of Data: circa 1830's .
Further Information: Contact Ordnance Survey Ireland www.osi.ie or Ph +35318025300

Name: Mills
Description of data: This information was captured from the 1830's Ordnance Survey Historic mapping showing locations various types of mills.
Source: Ordnance Survey Ireland
Currency of Data: circa 1830's
Further Information: Contact Ordnance Survey Ireland www.osi.ie or Ph +35318025300

Name: Marsh
Description of data: This information was captured from the 1830's Ordnance Survey Historic mapping showing locations of Marsh. A Marsh is a type of wetland.
Source: Ordnance Survey Ireland
Currency of Data: circa 1830's
Further Information: Contact Ordnance Survey Ireland www.osi.ie or Ph +35318025300

Name: Gas Works
Description of data: This information was captured from the 1830's Ordnance Survey Historic mapping showing locations historic Gas Stations. Gas Works are the workplace where coal gas is manufactured.
Source: Ordnance Survey Ireland
Currency of Data: circa 1830's
Further Information: Contact Ordnance Survey Ireland www.osi.ie or Ph +35318025300

Name: Foundry
Description of data: This information was captured from the 1830's Ordnance Survey Historic mapping showing locations of Foundries. A foundry is the buildings and iron works for casting metals.
Source: Ordnance Survey Ireland
Currency of Data: circa 1830's
Further Information: Contact Ordnance Survey Ireland www.osi.ie or Ph +35318025300

Name: Windmill
Description of data: This information was captured from the 1830's Ordnance Survey Historic mapping showing locations of Windmill Sites.
Source: Ordnance Survey Ireland
Currency of Data: circa 1830's
Further Information: Contact Ordnance Survey Ireland www.osi.ie or Ph +35318025300

Name: Historic Flood Plains
Description of data: This information was captured from the 1830's Ordnance Survey Historic mapping showing locations of Historic liable to Flood areas.
Source: Ordnance Survey Ireland
Currency of Data: circa 1830's
Further Information: Contact Ordnance Survey Ireland www.osi.ie or Ph +35318025300

Name: Historic B&W 6 inch
Description of data: This image is an extract of the 1830's Ordnance Survey 6 inch Historic mapping.
Currency of data: circa 1830's
Further Information: Contact Ordnance Survey Ireland www.osi.ie or Ph +35318025300

Name: Historic B&W 25 inch
Description of data: This image is an extract of the 1890's Ordnance Survey 25 inch Historic mapping.
Currency of data: circa 1890's
Further Information: Contact Ordnance Survey Ireland www.osi.ie or Ph +35318025300

- **Stability**

Name: Vulnerability
Description of data: Vulnerability is a term used to represent the intrinsic geological and hydrogeological characteristics that determine the ease with which groundwater may be contaminated by human activities. The map shows the vulnerability of the first groundwater encountered (in either sand/gravel aquifers or in bedrock) to contaminants released at depths of 1-2 m below the ground surface. Where contaminants are released at significantly different depths, site specific data is used to determine groundwater vulnerability The geological and hydrogeological characteristics can be examined and mapped, thereby providing a groundwater vulnerability assessment for any area or site. Four groundwater vulnerability categories are used in the scheme - **extreme (E)**, **high (H)**, **moderate (M)** and **low (L)**. Vulnerability maps are an important part of groundwater protection schemes.
These datasets are shown in accordance with the River Basin District (RBD) in which they lie.
Source: Geological Survey of Ireland
Currency of Data: 1996
Further information:
http://www.gsi.ie/ and also at http://www.wfdireland.ie/ - The European Union Water Framework Directive which rationalises and updates existing water legislations and provides for water management on the basis of River Basin Districts (RBD's).

Name: Sub Soils
Description of data: This dataset contains details of the modelling of soil types and forest productivity rankings in any given area. The Soils and Subsoil's data was generated by Teagasc with co-operation of the Forest Service, EPA and The Department of Marine and Natural Resources in May 2006 under the NDP program. This dataset is not represented cartographically in the report, however the information from this dataset is provided in the details section. Within the Irish forest soils classification project a number of themes are mapped nationally using remotely
sensed imagery and data, from which soil type, productivity and distribution are modelled. These themes include Subsoils, Topography and Land Cover. The association of subsoil (soil parent material), topography and land cover with soil type is being modelled using the thematic maps and field data within a Geographic Information System (GIS). The soil types being modelled fall into five broad classes; shallow mineral, deep mineral well drained, mineral poorly drained, peat over mineral and peat. Finally forest productivity rankings will be ascribed to different soil types based on analysis of existing forest productivity datasets and supplementary fieldwork. The program was completed in May 2006 and there is no formal update plan.
Source: Environmental Protection Agency
Currency of Data: May 2006
Further information www.epa.ie

Name: Bedrock, National Bedrock Aquifer Map
Description of data: This map displays any stratum or combination of strata that stores or transmits groundwater (Local Government (Water Pollution) Act, 1990 (an aquifer). More commonly an aquifer is described as a permeable geological stratum or formation that can both store and transmit water in significant quantities. This dataset is not represented cartographically, however the information from this dataset is provided in the details section where the classification of aquifers developed by the Geological Survey of Ireland are shown. Some factors used in this classification are hydro geological, lithological and structural. Based on the hydro geological characteristics and on the value of the groundwater resource, the Republic of Ireland's entire land surface is divided into nine aquifer categories (also described as resource protection areas).
Source: Geological Survey of Ireland
Currency of Data: 2003
Further Information: http://www.gsi.ie/

Name: National Bedrock Map of Ireland 1:1,000,000
Description of data: Simplified Geological map of Ireland, compiled by the GSI. Attributes shown are Formation Name, Rock Type and Age of the Bedrock. This dataset is not shown cartographically in the report, but the recorded attributes are provided in the details section.
Source: Geological Survey of Ireland
Currency of Data: 2003
Further information: http://www.gsi.ie/

Name: Dykes500K
Description of data: A dyke in geology refers to an intrusive igneous body. This dataset is derived directly from the seamless digital National Bedrock Map of Ireland 1:100,000 and consists of a map of the structural Geology of Ireland at the scale 1:500,000, detailing linework codes and dyke names.
Source: Geological Survey of Ireland
Currency of Data: 2007
Further Information: http://www.gsi.ie/

Name: Faults500K
Description of data: Faults are planar rock fractures, which show evidence of relative movement. This dataset is derived directly from the seamless digital National Bedrock Map of Ireland 1:1,000.000 and consists of a map of the structural Geology of Ireland at the scale 1:500,000, detailing linework codes and fault names.
Source: Geological Survey of Ireland
Currency of Data: 2007
Further Information: http://www.gsi.ie/

Name: Landslide Locations
Description of data: This information is extracted from the National Landslides Database, which was compiled by the Irish Landslides Working Group and further information can be found in "Landslides in Ireland" which was published by the GSI in 2006. Attributes include the name, county, mechanism type, material, terrain type and the source of the information documented.
Source: Geological Survey of Ireland
Currency of Data: 2006
Further information: http://www.gsi.ie/

Name: National Bedrock Map of Ireland 1:500,000 Scale
Description of data: An all-Ireland Geology map at 1:500,000 scale detailing attributes of Formation, Rock Type and Age of bedrock. The map is derived from the GSI 1:100,000 scale Bedrock Map Series and the GSNI 1:250,000 scale Geological Map of Northern Ireland. This dataset is not shown cartographically in the report, but the recorded attributes are provided in the details section.
Source: The Geological Survey of Ireland (GSI) in conjunction with the Geological Survey of Northern Ireland (GSNI) published this map.
Currency of Data: From 2003
Further Information: http://www.gsi.ie/

❖ Water History

Name: Bathing Water Quality
Description of data: This database contains details of the bathing areas from each county and their compliancy with the quality of bathing water regulations for the past four years

The Quality of Bathing Water Regulations (S.I. 155 of 1992) implemented the requirements of the Bathing Water Directive (76/160/EC) in Irish law. The purpose of the legislation is to ensure that the quality of bathing water is maintained and, where necessary, improved so that it complies with specified standards designed to protect public health and the environment. A new Bathing Water Directive was entered into force in March 2006, with member states having until March 2008 to comply with the new requirements. This new Directive aims to provide greater benefits in relation to improved health protection for bathers and a more pro-active approach to beach management including public involvement.
Source: Environmental Protection Agency
Currency of Data: 2006
Further information www.epa.ie **or** www.wfdireland.ie

Name: Ground Water Quality
Description of data: This dataset contains details of groundwater monitoring networks and the links between groundwater and the ecological health of associated receptors. This information is used to help protect groundwater used for public and private drinking water supplies and is also used to help protect associated surface water and ecological receptors.
Historically groundwater monitoring in the Republic of Ireland focused on the protection of drinking water supplies and investigating the impacts of point source pollution. However, the WFD and the forthcoming EU Directive on "the Protection of Groundwater Against Pollution and Deterioration" adopt a more holistic view of water resources, establishing links between groundwater and associated surface water and ecological receptors. Therefore, groundwater monitoring networks have been developed to improve knowledge of, and the links between, groundwater and the ecological health of associated receptors.
The National WFD Groundwater Monitoring Programme is implemented by the Environmental Protection Agency. The monitoring is used to assess the general state of groundwater quality and groundwater levels / flows in the Republic of Ireland. Thereafter, groundwater monitoring data are used to help determine the status of groundwater in the Republic of Ireland. In turn this information is used to help protect groundwater used for public and private drinking water supplies and is also used to help protect associated surface water and ecological receptors. **Source:** Environmental Protection Agency
Currency of Data: 2006
Further information: www.epa.ie or www.wfdireland.ie

Name: Estuarine and Coastal Water Quality
Description of data: This dataset contains details of include inputs of organic matter, nutrients and contaminants from sources such as urban waste water, industrial discharges, riverine inputs and accidental spillages into Estuarine and Coastal waters.
This dataset is not represented cartographically in the report, however the information from this dataset is provided in the details section.
The estuarine and coastal environment is subject to a wide variety of pressures. These include inputs of organic matter, nutrients and contaminants from sources such as urban waste water, industrial discharges, riverine inputs and accidental spillages. Local impacts can also arise from marine-based activities such as dredging and aquaculture. The quality of Ireland's tidal waters is determined by the composition of the waters of the North East Atlantic that bathe our coasts and the degree to which this is altered by inputs of organic matter, nutrients and other materials from the land and atmosphere.The principal legislation governing water quality in Ireland is the European Communities (Water Policy) Regulations 2003 (S.I. 722 of 2003), which transposed the requirements of Directive 2000/60/EC, establishing a framework for Community action in the field of water policy (the Water Framework Directive, WFD) into Irish law.
The WFD has set out that a Member State shall implement the necessary measures to prevent deterioration of the status of all bodies of surface water, and shall protect, enhance and restore all bodies of surface water with the aim of achieving good status by 2015.
Source: Environmental Protection Agency
Currency of Data: 2006
Further information www.epa.ie **or** www.wfdireland.ie

Name: Lake Water Quality
Description of data: This dataset contains details of the levels of Eutrophication in lakes in Ireland. This dataset is not represented cartographically in the report, however the information from this dataset is provided in the details section.
Lakes are a national asset on which we depend for many services and amenities. They are an important source of drinking water, water used in industry and for agricultural purposes. In addition they provide for recreational activities such as angling, sailing, bathing and many other water-based sports. Eutrophication is the principal threat to lake water quality in Ireland. This is caused by the over-enrichment of lake waters by nutrients, especially phosphorus, which results in accelerated growth of planktonic algae, Cyanobacteria and higher forms of plant life.
The principal legislation governing lake water quality in Ireland is the Phosphorus Regulations, prepared under Article 4(4) of the Local Government (Water Pollution) Act, 1977 (Water Quality Standards of Phosphorus) Regulations, 1998 (S.I. 258 of 1998). The Phosphorus Regulations require that water quality be maintained or improved by reference to the trophic status assigned by the EPA with a target of oligotrophic or mesotrophic status in all our lakes.
Source: Environmental Protection Agency
Currency of Data: 2006
Further information www.epa.ie **or** www.wfdireland.ie

Name: River Water Quality
Description of data: This dataset contains details of the rating of any river under the Q-value system used by the EPA in its river monitoring program
The Q value system describes the relationship between water quality and the macroinvertebrate community in numerical terms. Q5 waters have high diversity of macroinverebrates and good water quality, while Q1 have little or no macroinvertebrate diversity and bad water quality.Intermediate values, Q1-2, 2-3, 3-4 etc denote transitional conditions.
Source: Environmental Protection Agency
Currency of Data: 2006
Further information www.epa.ie **or** www.wfdireland.ie

Name: Catchments All Island
Description of data: This dataset shows the boundaries of river basins in Ireland, as digitized from the OSI source "Ireland's Rivers and their basins" circa 1956
This dataset is not represented cartographically in the report, however the information from this dataset is provided in the details section. The management of water resources based on catchments or river basin districts have been instigated at European Union level with the introduction of the Water Framework Directive in the year 2000. The European Communities (Water Policy) Regulations 2003 enacted on the 22nd December 2003 brings this legislation into Irish law and states that by June 2009 all local authorities will have to have a River Basin Management Plan adopted. A co-coordinated programme of measures to achieve at least "good status" for rivers, lakes, ground water, estuarine waters and coastal waters needs to be provided. Ireland has been divided into 7 No. river basin districts and Consultants are currently engaged in the drafting of river basin management plans in close consultation with the local authorities involved. The original source of this information is from the 1958 map 'Ireland and its river basins' and was digitised in 1997 with no formal update schedule.
Source: Environmental Protection Agency
Currency of Data: 1997
Further information www.epa.ie

Name: River Basins District
Description of data: This dataset contains details of the specific river basin district covering the area and the lead authority with responsibility for monitoring the district.
Management of water quality in the EU was placed on a new and more comprehensive footing by the adoption, in late 2000, of the directive establishing a framework for Community action in the field of water policy. The directive is very ambitious in its intent, calling as it does for the attainment of good quality in all waters by 2015. Good quality in this context is a situation in which biological and/or chemical characteristics show only minor differences compared to the natural state. While there is provision for less demanding targets in the case of waters which have been irreversibly modified, the achievement of the quality goals of the directive are likely to prove extremely difficult if not impossible in many situations. In addition to the quality target, the directive promotes inter alia the sustainable use of water resources and the elimination of the discharge of hazardous substances.
The directive requires that waters be managed as hydrological units, i.e. as individual river catchments or groups of contiguous catchments, termed river basin districts (RBDs). The main duties of the RBDs are to draw up management plans and to prepare programmes of the measures considered necessary to achieve the quality and other goals of the directive. Member States must identify competent authorities to apply the rules of the directive in each RBD and in regard to other aspects of the directive. There is a very specific requirement that the public be consulted in the implementation of the directive, in particular the preparation of management plans and programme of measures. A web site (www.wfdireland.ie) has been established by the Department of the Environment, Heritage and Local Government to provide information to the public on the background and aims of the directive.
The directive was adopted in Ireland under Regulations made in December 2003. A total of seven RBDs have been identified, four (Eastern, South Eastern, South Western and Western) wholly within the State and three (North Western, Neagh-Bann and Shannon*) shared with Northern Ireland. The competent authorities identified are the local authorities in the case of the RBDs and the EPA for a number of technical aspects including the formulation of
The hydrometric areas are checked against the hydrological DTM with field verification in 2002, reported to Europe in 2004 (Article 3 Water framework directive) and not expected to change.
Monitoring programmes. Other public authorities identified in the regulations are required to exercise their functions in a manner which is consistent with the aims of the directive. The regulations also give powers to the EPA to specify the public authorities by whom the monitoring programmes required under the directive will be undertaken. This dataset is not represented cartographically in the report, however the information from this dataset is provided in the details section.
Source: Environmental Protection Agency
Currency of Data: 2002
Further information www.epa.ie **or** www.wfdireland.ie

Name: Groundwater Well locations
Description of data: A database compiled by the Geological Survey of Ireland, containing details on water wells drilled containing such information as yield, location, discharge rate and pumping test information.
Source: Geological Survey of Ireland
Currency of Data: 2007
Further information:
http://www.gsi.ie/

Name: Karst Information
Description of data: A database compiled by the Geological Survey of Ireland, containing locations of karst features classified according to Karst type, e.g. springs, turloughs, caves, depressions, swallow holes and enclosed depressions. Each karst feature has a Grid reference and further descriptions. **Karst** is a term used worldwide to describe the distinctive landforms that develop on rock types that are readily dissolved by water. In Ireland, limestone (composed of calcium carbonate) and to a lesser extent **dolomite** (calcium and magnesium carbonate) is by far the most widespread rocks that show karst features.
Source: Geological Survey of Ireland
Currency of Data: 1998
Further information:
http://www.gsi.ie/

Name: Spring
Description of data: This information was captured from the 1830's Ordnance Survey Historic mapping showing locations of spring sources. A Spring is any natural discharge of water from rock or soil onto the surface of the land of into a body or surface water.
Source: Ordnance Survey Ireland
Currency of Data: circa 1830's
Further Information: Contact Ordnance Survey Ireland www.osi.ie or Ph +35318025300

Name: Water Pump Locations
Description of data: This information was captured from the 1830's Ordnance Survey Historic mapping showing locations of water pumps.
Source: Ordnance Survey Ireland
Currency of Data: circa 1830's
Further Information: Contact Ordnance Survey Ireland www.osi.ie or Ph +35318025300

Name: Sluice
Description of data: This information was captured from the 1830's Ordnance Survey Historic mapping showing locations of sluices. A sluice is a small door in a lock gate that is opened to allow water to enter, or leave, the lock. A sluice is a water channel that is controlled at its head by a gate. A sluice gate is traditionally a wooden or metal plate which slides in grooves in the sides of the channel.
Source: Ordnance Survey Ireland
Currency of Data: circa 1830's
Further Information: Contact Ordnance Survey Ireland www.osi.ie or Ph +35318025300

Name: Weir
Description of data: This information was captured from the 1830's Ordnance Survey Historic mapping showing locations of Weirs. A weir is a small overflow type dam commonly used to raise the level of a small river or stream. Weirs have traditionally been used to create mill ponds. Water flows over the top of a weir, although some weirs have sluice gates which release water at a level below the top of the weir. The crest of an overflow spillway on a large dam is often called a weir.
Source: Ordnance Survey Ireland
Currency of Data: circa 1830's
Further Information: Contact Ordnance Survey Ireland www.osi.ie or Ph +35318025300

Name: Reservoir Locations
Description of data: This information was captured from the 1830's Ordnance Survey Historic mapping showing locations of Reservoirs. A Reservoir is a place where water is stored until it is needed. A reservoir can be an open lake or an enclosed storage tank.
Source: Ordnance Survey Ireland
Currency of Data: circa 1830's
Further Information: Contact Ordnance Survey Ireland www.osi.ie or Ph +35318025300

Name: Swallow Holes
Description of data: This information was captured from the 1830's Ordnance Survey Historic mapping showing locations of Swallow holes. Swallow holes are the point at which a surface stream disappears underground. A swallow hole generally implies nearly instantaneous water loss into an opening at the bottom of a sink hole or karst valley i.e. the Burren, Co. Clare.

Source: Ordnance Survey Ireland
Currency of Data: circa 1830's
Further Information: Contact Ordnance Survey Ireland www.osi.ie or Ph +35318025300

❖ Statutory Licences

Name: Integrated Pollution Control (IPC)
Description of data: This dataset contains details of all active IPC licences granted by the EPA as per March 2007
Since 2002, any person or company involved in certain large-scale or complex industrial processes with significant polluting potential were required to have an IPC licence. Over 70 industrial classes came within the scope of IPC licensing and these are listed in the First Schedule of the Environmental Protection Agency Act, 1992.
Since the commencement of IPC Licensing in 1994, the EPA had processed 675 applications and granted 624 IPC licences by 31st July 2004.
Source: Environmental Protection Agency
Currency of Data: 2007
Further Information: www.epa.ie

Name: Waste Licence
Description of data: This dataset contains details of all active waste licences granted by the EPA as per March 2007**.** In 1996 the Environmental Protection Agency began licensing certain activities in the waste sector, including landfills, transfer stations, hazardous waste disposal and other significant waste disposal and recovery activities in Ireland.

Aim of Waste Licensing:
A waste licence is a single integrated licence, which deals with emissions to all environmental media, in addition to the environmental management of the facility. All related waste operations carried on by the applicant in
connection with the activity are taken into consideration in determining an application for a waste licence. The EPA must be satisfied that the activity will not cause environmental pollution when it is carried on in accordance with the conditions of a waste licence. The detailed procedures in respect of the processing of a waste licence application are set out in the Waste Management Act, 1996 which was amended by the Protection of the Environment Act, 2003 and associated Regulations
Source: Environmental Protection Agency
Currency of Data: 2007
Further Information: www.epa.ie

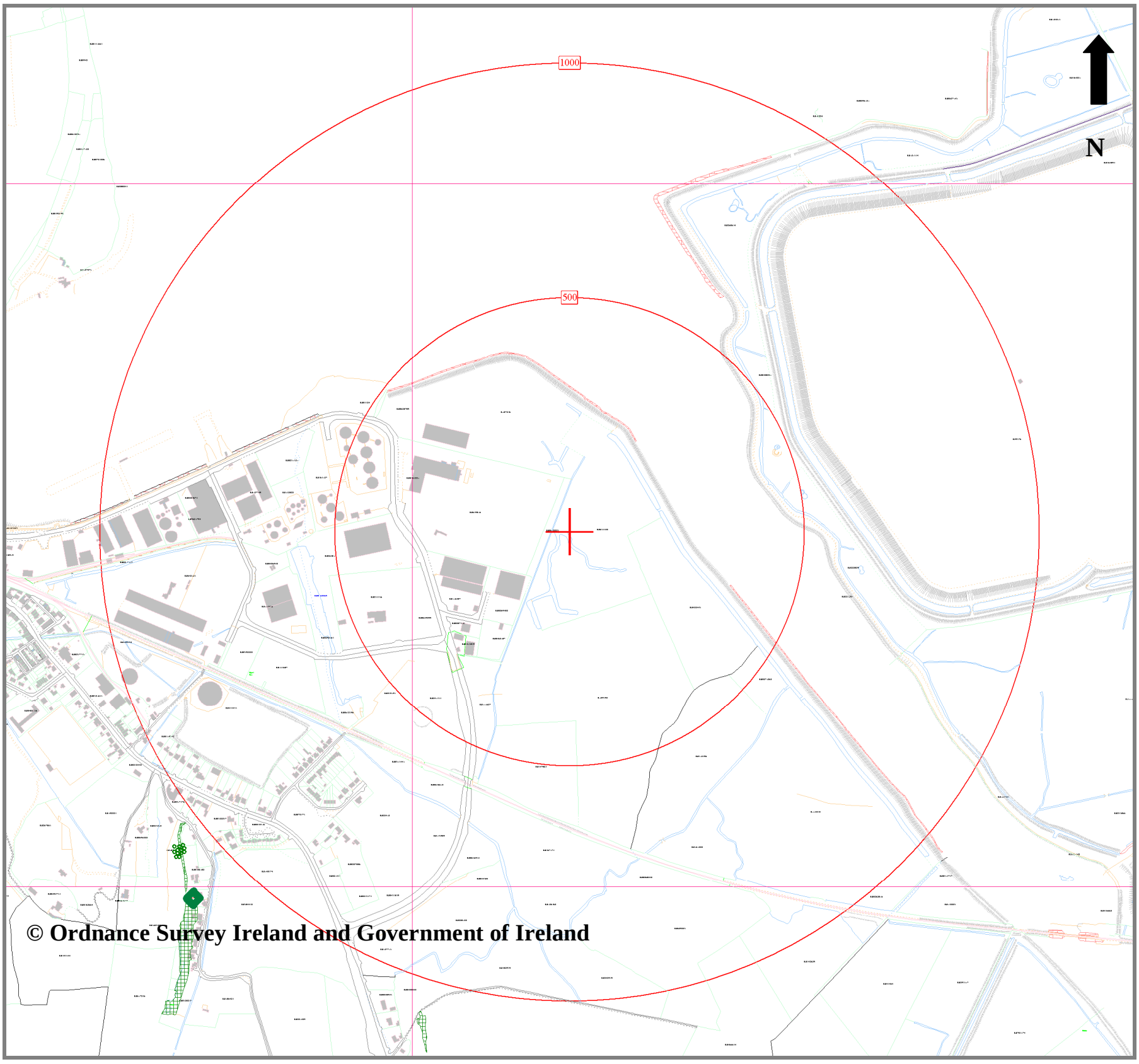
❖ Other

Name: Aerial Photography Information
Ordnance Survey Ireland has captured a national database of Aerial Photography captured at 1:40,000.
Source: Ordnance Survey Ireland
Currency of Data: Captured from 2004 – 2006
Further Information: Contact Ordnance Survey Ireland www.osi.ie or Ph +35318025300

Section 1: Search_Results

Source	Total	0-500 metres	500-1000 metres
Land Use			
Colliery	0	0	0
Mine	0	0	0
Quarry	0	0	0
Active Quarries	0	0	0
Gravel	0	0	0
Lime Kiln	0	0	0
Site History			
Rail Tram	0	0	0
Seasonal Lake	2	1	1
Tram Line	0	0	0
Historic Well	1	0	1
Power Station	0	0	0
Mills	0	0	0
Marsh	0	0	0
Gaswork	0	0	0
Foundry	0	0	0
Wind Mill	0	0	0
Flood Plain	1	1	0
Stability			
Vulnerability	10	6	4
Subsoils	21	17	4
Bedrock Aquifer	6	3	3
Dykes 500K	0	0	0
Faults 500K	0	0	0
Landslide Locations	0	0	0
Bedrock 500k	2	1	1
Water History			
Bathing Water Quality	0	0	0
Weir	2	0	2
Catchments All Island	1	1	0
Estuarine and Coastal Water Quality	1	1	0
Ground water Quality	0	0	0
Lake Water Quality	0	0	0
River Basin Districts	2	2	0
River Water Quality	0	0	0
Karst Features	0	0	0
Wells	0	0	0
Pump	2	2	0
Reservoir	0	0	0
Sluice	2	1	1
Spring	4	0	4
Swallow Hole	0	0	0
Statutory Licences			
Integrated Pollution Control	0	0	0
Waste Licences	0	0	0

Section 2: Land_Use_Map



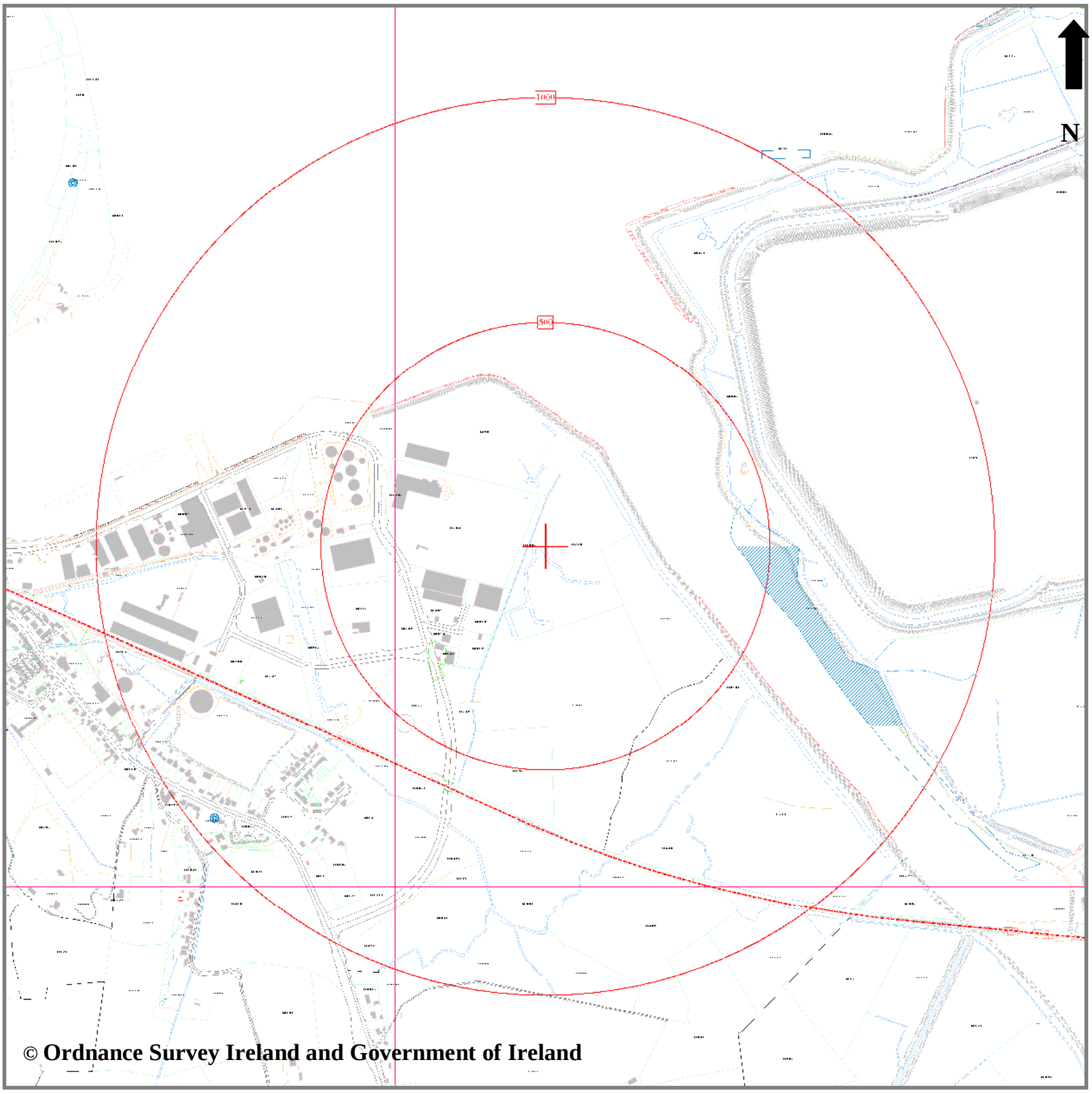
Section 3: Land_Use_Detail

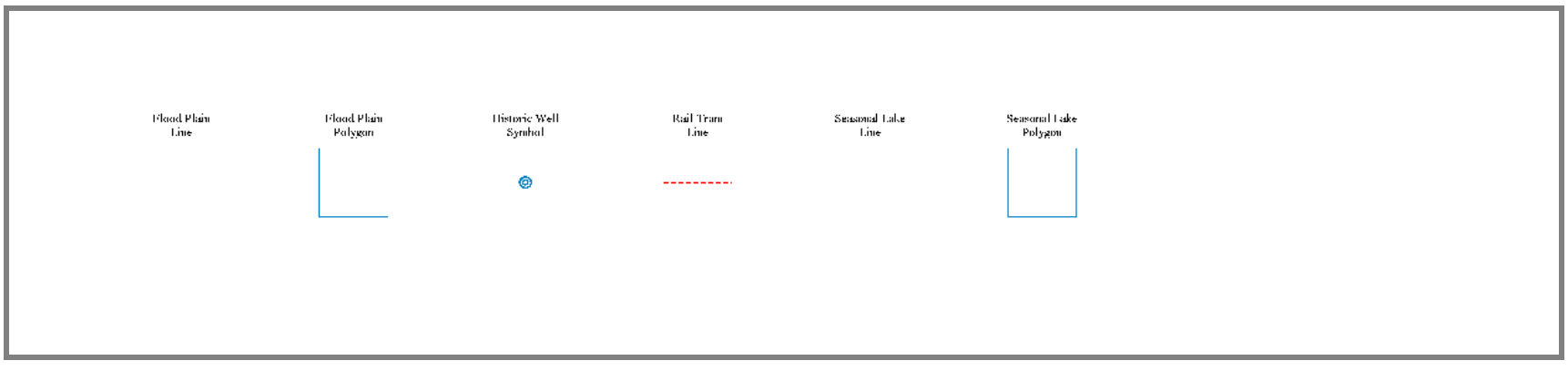
Theme	Text
Land Use	
Quarry	No results found when searching this layer
Mine	No results found when searching this layer
Active Quarries	No results found when searching this layer
Gravel	No results found when searching this layer
Colliery	No results found when searching this layer
Lime Kiln	No results found when searching this layer

*Where the centroid co-ordinate is found, this is the central point of the polygon.

#Additional information is only provided for results found within the buffer zone

Section 4: Site_History_Map





Section 5: Site_History_Detail

Theme	Text
Site History	
Wind Mill	No results found when searching this layer
Historic Well	Point East, North: 525566, 651197
Seasonal Lake	Description: Covered At Spring Tides Centroid East, North: 526978, 651530
Seasonal Lake	Description: Covered By Spring Tides Centroid East, North: 526837, 652677
Flood Plain	Description: Covered At Spring Tides Centroid East, North: 526978, 651530
Mills	No results found when searching this layer
Marsh	No results found when searching this layer
Gaswork	No results found when searching this layer
Foundry	No results found when searching this layer
Power Station	No results found when searching this layer

*Where the centroid co-ordinate is found, this is the central point of the polygon.

#Additional information is only provided for results found within the buffer zone

Section 6: Stability_Map

Bedrock Aquifer Polygon

Bedrock500k Polygon

Subsoils Polygon

Vulnerability Polygon

Section 7: Stability_Detail

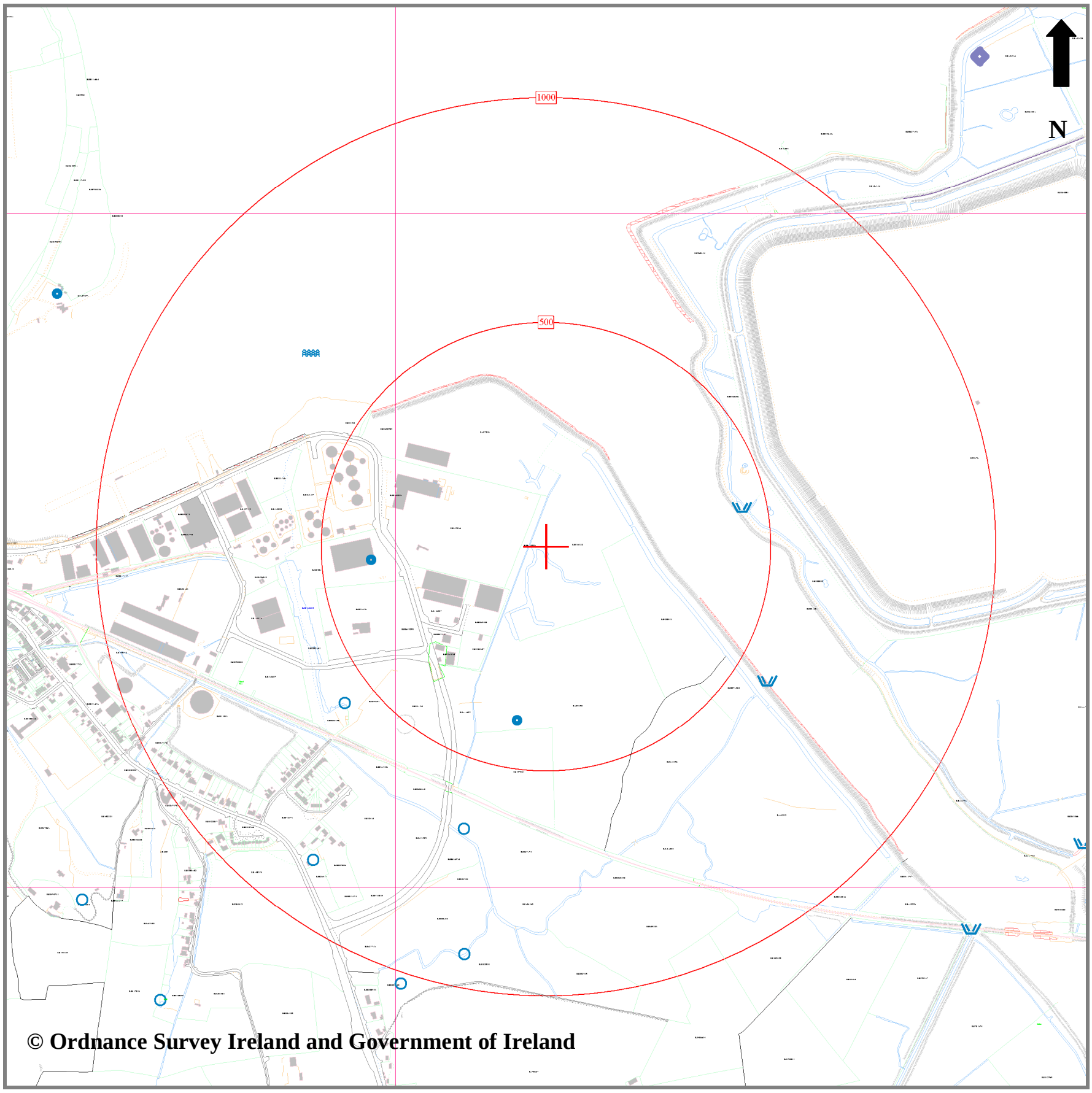
Theme	Text
Stability	
Landslide Locations	No results found when searching this layer
Vulnerability	Vulnerability: Extreme Centroid East, North: 525275, 650091
Vulnerability	Vulnerability: E (Rock near Surface or Karst) Centroid East, North: 526067, 650320
Vulnerability	Vulnerability: Extreme Centroid East, North: 525833, 651927
Vulnerability	Vulnerability: E (Rock near Surface or Karst) Centroid East, North: 525827, 651920
Vulnerability	Vulnerability: Extreme Centroid East, North: 526034, 651432
Vulnerability	Vulnerability: E (Rock near Surface or Karst) Centroid East, North: 525981, 651419
Vulnerability	Vulnerability: E (Rock near Surface or Karst) Centroid East, North: 526188, 651460
Vulnerability	Vulnerability: Extreme Centroid East, North: 526602, 650779
Vulnerability	Vulnerability: E (Rock near Surface or Karst) Centroid East, North: 526607, 650778
Vulnerability	Vulnerability: High-Low Centroid East, North: 536214, 637636
Subsoils	County: Limerick Soil Composition: Estuarine sediments (silts/clays) Centroid East, North: 526457, 651208
Subsoils	County: Limerick Soil Composition: Made ground Centroid East, North: 525608, 651607
Subsoils	County: Limerick Soil Composition: Made ground Centroid East, North: 527090, 651431
Subsoils	County: Limerick Soil Composition: Estuarine sediments (silts/clays) Centroid East, North: 527489, 652028
Subsoils	County: Limerick Soil Composition: Estuarine sediments (silts/clays) Centroid East, North: 526957, 651532
Subsoils	County: Limerick Soil Composition: Rock Centroid East, North: 525981, 651419
Subsoils	County: Limerick Soil Composition: Rock Centroid East, North: 526188, 651459
Subsoils	County: Limerick Soil Composition: Limestone till (Carboniferous) Centroid East, North: 526111, 651513
Subsoils	County: Limerick Soil Composition: Made ground Centroid East, North: 527234, 652238
Subsoils	County: Limerick Soil Composition: Rock Centroid East, North: 525827, 651920
Subsoils	County: Limerick Soil Composition: Estuarine sediments (silts/clays) Centroid East, North: 526713, 651872
Subsoils	County: Limerick Soil Composition: Made ground Centroid East, North: 526902, 652574
Subsoils	County: Limerick

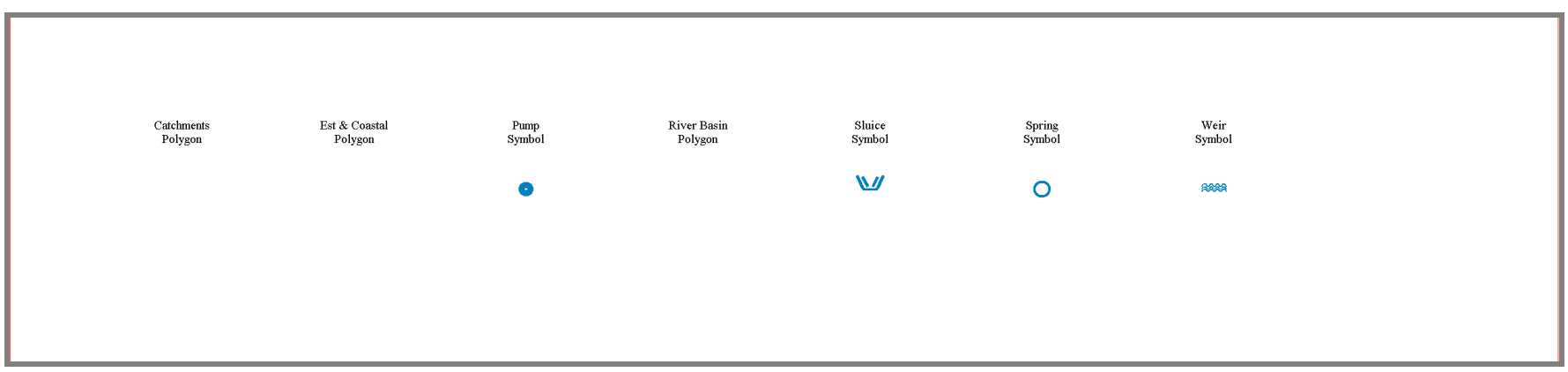
	Soil Composition:	Estuarine sediments (silts/clays)
	Centroid East, North:	526702, 651890
Subsoils	County:	Limerick
	Soil Composition:	Estuarine sediments (silts/clays)
	Centroid East, North:	526654, 652001
Subsoils	County:	Limerick
	Soil Composition:	Estuarine sediments (silts/clays)
	Centroid East, North:	526649, 652121
Subsoils	County:	Limerick
	Soil Composition:	Estuarine sediments (silts/clays)
	Centroid East, North:	526636, 652140
Subsoils	County:	Limerick
	Soil Composition:	Estuarine sediments (silts/clays)
	Centroid East, North:	526584, 652207
Subsoils	County:	Limerick
	Soil Composition:	Estuarine sediments (silts/clays)
	Centroid East, North:	526821, 652684
Subsoils	County:	Limerick
	Soil Composition:	Rock
	Centroid East, North:	526067, 650320
Subsoils	County:	Limerick
	Soil Composition:	Rock
	Centroid East, North:	526607, 650778
Subsoils	County:	Limerick
	Soil Composition:	Limestone till (Carboniferous)
	Centroid East, North:	529057, 638660
Bedrock 500k	Unit Name:	Fluvio-deltaic & basinal marine (Turbiditic); Shale, sandstone, siltstone & coal
	Age Bracket:	Palaeozoic, Carboniferous, Pennsylvanian
	Centroid East, North:	709633, 765762
Bedrock 500k	Unit Name:	Marine shelf facies; Limestone & calcareous shale
	Age Bracket:	Palaeozoic, Carboniferous, Mississippian
	Centroid East, North:	616991, 617346
Bedrock Aquifer	Description:	Locally Important Aquifer - Bedrock which is Moderately Productive only in Local Zones
	Centroid East, North:	527327, 649241
Bedrock Aquifer	Description:	Locally Important Aquifer - Bedrock which is Moderately Productive only in Local Zones
	Centroid East, North:	527299, 652113
Bedrock Aquifer	Description:	Poor Aquifer - Bedrock which is Generally Unproductive
	Centroid East, North:	525198, 649901
Bedrock Aquifer	Description:	Locally Important Aquifer - Bedrock which is Moderately Productive only in Local Zones
	Centroid East, North:	525509, 649840
Bedrock Aquifer	Description:	Locally Important Aquifer - Bedrock which is Moderately Productive only in Local Zones
	Centroid East, North:	525746, 649363
Bedrock Aquifer	Description:	Locally Important Aquifer - Bedrock which is Moderately Productive only in Local Zones
	Centroid East, North:	526360, 649632

*Where the centroid co-ordinate is found, this is the central point of the polygon.

#Additional information is only provided for results found within the buffer zone

Section 8: Water_History_Map





Section 9: Water_History_Detail

Theme	Text
Water History	
Weir	Point East, North: 525779, 652232
Weir	Description: Salmon Weir Point East, North: 525779, 652233
Bathing Water Quality	No results found when searching this layer
Spring	Point East, North: 525785, 651106
Spring	Point East, North: 526120, 651175
Spring	Point East, North: 525855, 651456
Spring	Point East, North: 526120, 650896
Sluice	Point East, North: 526737, 651881
Sluice	Point East, North: 526793, 651495
Reservoir	No results found when searching this layer
Pump	Point East, North: 525913, 651773
Pump	Point East, North: 526238, 651417
Wells	No results found when searching this layer
Karst Features	No results found when searching this layer
River Water Quality	No results found when searching this layer
River Basin Districts	Name: Shannon Lead Authority: Limerick County Council Centroid East, North: 570177, 707814
River Basin Districts	Name: Shannon Lead Authority: Limerick County Council Centroid East, North: 486578, 648827
Lake Water Quality	No results found when searching this layer
Ground water Quality	No results found when searching this layer
Estuarine and Coastal Water Quality	Name: Lower Shannon Estuary Category Name: Estuary Assesment ASS01_05: Unpolluted Assesment ASS99_03: Unpolluted Assesment ASS95_99: Unpolluted Centroid East, North: 516908, 652328
Catchments All Island	Centroid East, North: 584792, 720947
Swallow Hole	No results found when searching this layer

*Where the centroid co-ordinate is found, this is the central point of the polygon.

#Additional information is only provided for results found within the buffer zone

Section 10: Statutory Licenses Map

Section 11: Statutory Licences Detail

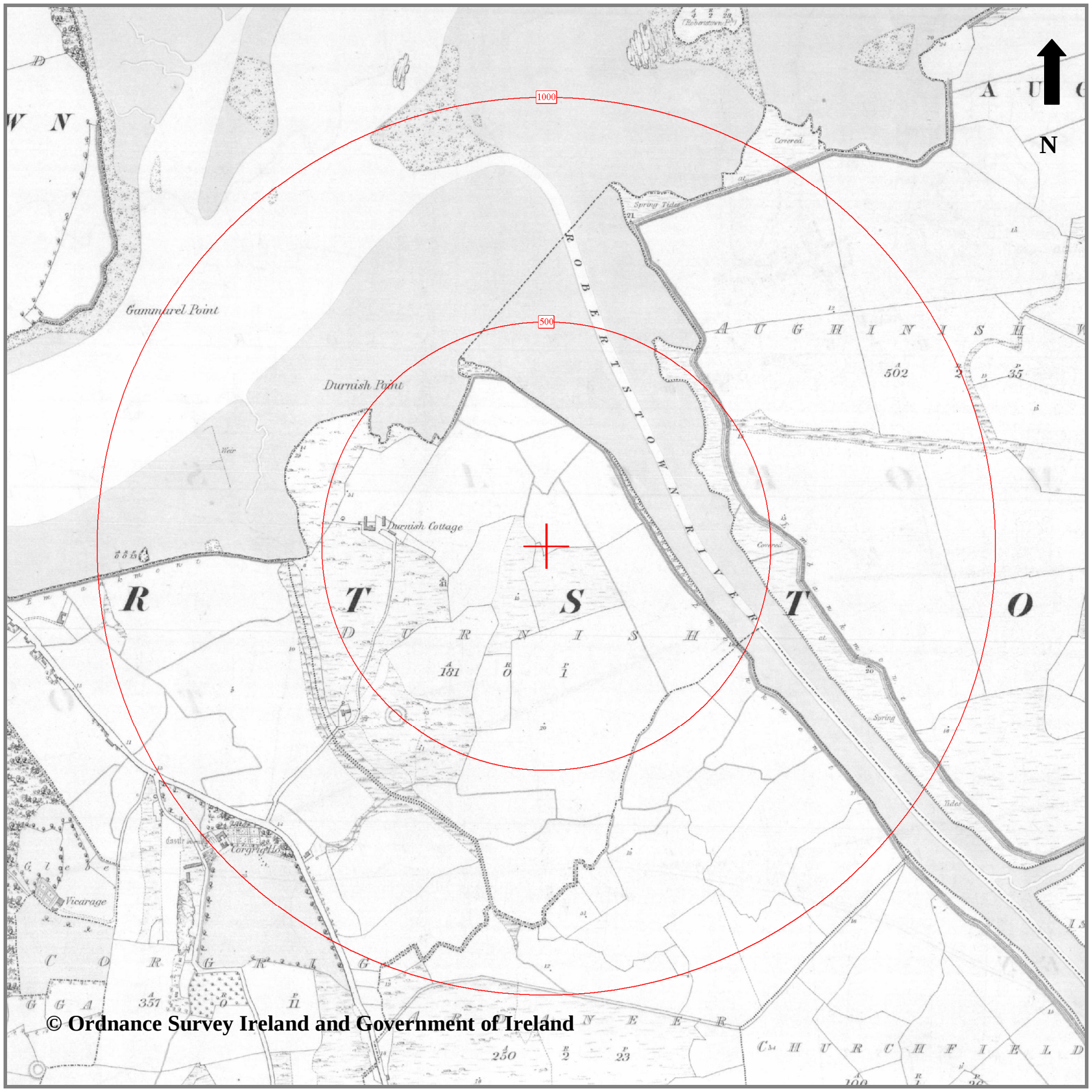
Theme	Text
Statutory Licences	
Integrated Pollution Control	No results found when searching this layer
Waste Licences	No results found when searching this layer

*Where the centroid co-ordinate is found, this is the central point of the polygon.

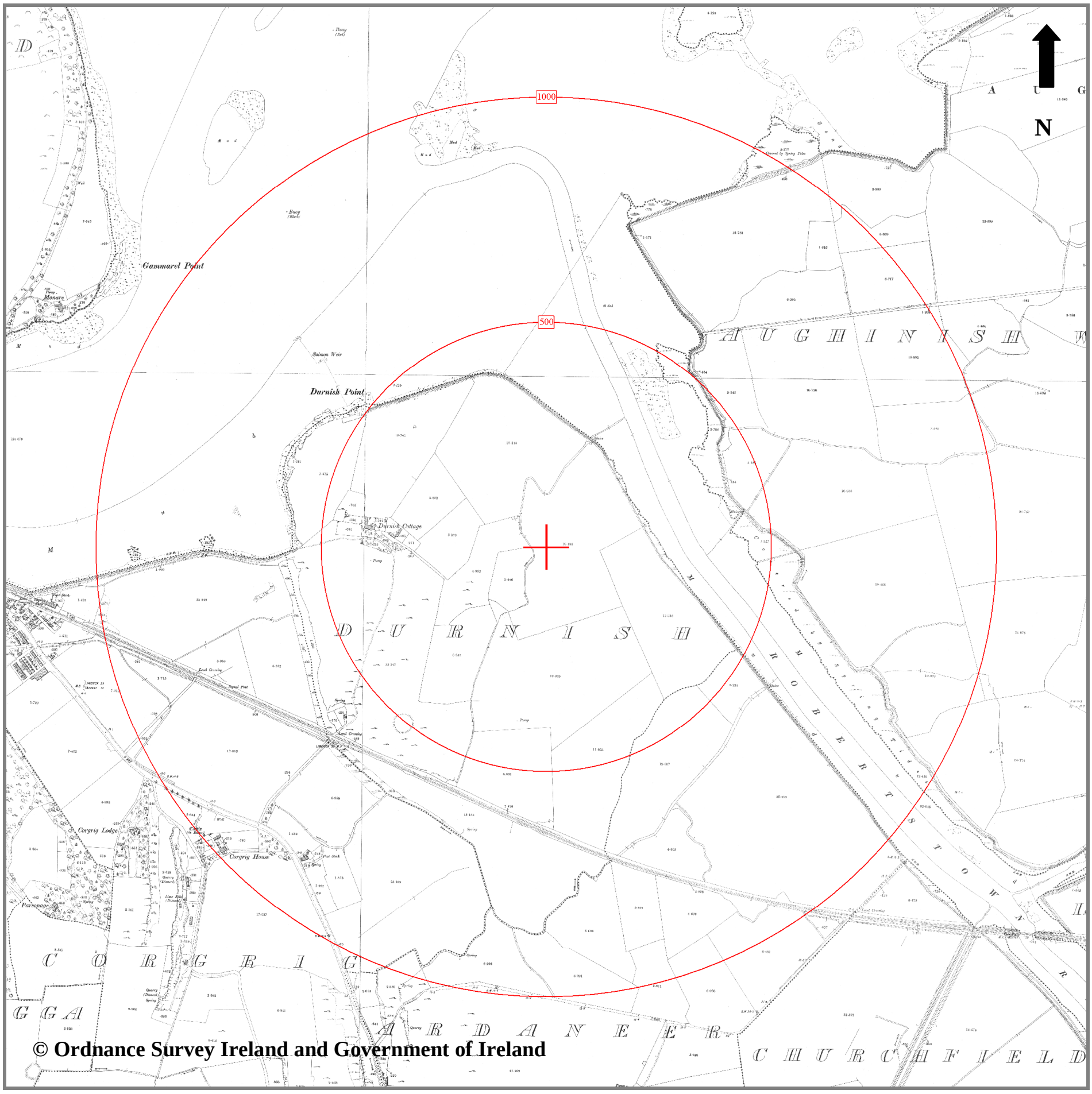
#Additional information is only provided for results found within the buffer zone

Section 12: Ortho

Section 13: Historic_6_Inch



Section 14: Historic_25_Inch



ORDNANCE SURVEY IRELAND ("OSi")

TERMS AND CONDITIONS OF SALE ("Conditions")

Please read the following information carefully. These Conditions, our privacy statement and our legal notices govern the sale of goods and services on this website. The acceptance by OSi of any order for such goods and services from you is subject to these Conditions, our privacy statement and our legal notices.

Please print a copy of these Conditions and retain the copy for your records.

1. **WHAT PRODUCTS ARE AVAILABLE ON THIS WEBSITE?**

1.1 This website allows you to purchase the following items (each a "**Product**"):

(a) Orthophotographic Maps;

(b) Wind Speed Maps;

(c) Environmental Reports; and

(d) Land Registry Compliant Maps.

Orthophotographic Maps, Wind Speed Maps and Land Registry Compliant Maps can be ordered in either A4 or A3 size. Environmental Reports can be ordered in A4 size (covering a 400 metre search radius) or A3 size (covering a 600 metre search radius).
Please note that Environmental Reports are subject to certain specific terms and conditions of sale and these are set out at clause 10 below.
Please also note that Orthophotographic Maps, Wind Speed Maps and Land Registry Compliant Maps are delivered by way of direct download from this website in electronic pdf format and cannot be provided either by email or in hard copy by post. Environmental Reports however can be sent to you either in hard copy by post or in electronic pdf format by email.
Environmental Reports will be sent by email unless you specifically request delivery by post when submitting your delivery details (see clause 4.6 below). Further details of how Products are delivered are set out in clause 6 below.

2. **REQUIREMENT TO REGISTER**

2.1 In order to browse our interactive map viewer and purchase Products on this website, you will need to register as a user on this website.

3. **HOW TO REGISTER**

3.1 To register, click on the 'LOGIN/REGISTER' button and fill in your first and last name, your chosen user name, your chosen password and your email address and press the 'SUBMIT' button. Once you have registered, you will be transferred to the registered user part of this website.

3.2 In the registered user part of this website you can access our interactive map viewer and purchase Products. If you add Products to your shopping cart and log out before purchasing those Products, we will store this information and it will be available to you the next time you log on to the website. If you want to remove any item from your shopping cart permanently, you can press the 'REMOVE ITEM' button above the relevant product (see clause 4.4 below for further details).
LAS\1448831.2

3.3 If you are an existing customer, you will also be able to view your existing order details and track the delivery of any existing order on the registered user part of the website by clicking on the 'YOUR ORDERS' button and filling in your order number.

4. HOW TO ORDER

4.1 Login as an existing customer or register as a new customer (see clause 3 above) to access the registered user area of this website.

4.2 Click on the 'BROWSE MAPS' button and find the area that you want to order a Product for by either:
(a) zooming in on the interactive map viewer to locate the relevant area; or
(b) clicking on the 'SEARCH' button, inserting the details of the address that you are looking for and then pressing the 'SUBMIT' button to allow our search facility to direct you to the relevant part of the interactive map viewer.

4.3 Once you have found the area that you are looking for, click on the 'BUY MAPS' button. This will bring up a window that will allow you to place the relevant Product that you want into a shopping cart by clicking on the relevant Product option and the size option for that Product and then clicking on the 'ADD TO CART' button. You will then be given the option of either viewing the contents of your shopping cart and proceeding with your order or going back to browse the maps in order to place additional Products in your shopping cart. Adding a Product to your shopping cart does not commit you to buy that Product as you can always remove it later.

4.4 Once you have placed all the Products you want into your shopping cart, click on the 'VIEW CART' button to proceed. You will then be able to view all the Products that are currently in your shopping cart, the unit price for each such Product and the sub-total price for all the Products in your shopping cart. Please check your shopping cart carefully to ensure that the Products you want are in the shopping cart. You can take any Product out of your shopping cart at this stage by clicking on the 'REMOVE ITEM' button above the relevant Product.Alternatively, you can empty your shopping cart and remove all the Products in it by clicking on the 'REMOVE ALL' button at the foot of the page.
Please note that all prices indicated on the shopping cart page are VAT exclusive. You will be notified of the VAT amount at a later stage in the ordering process before you submit your order (see clause 4.7)
Please also note that if you are ordering an Environmental Report, the price indicated on the shopping cart page does not include any relevant package and posting charges that will apply if you want to have that Environmental Report sent to you by post instead of by email. The applicable package and posting charges will be calculated on an individual basis depending on the delivery address you specify in the next step of the ordering process. You will be notified of the amount of these charges at a later stage in the ordering process before you submit your order (see clause 4.7).

4.5 Once you are happy that all the Products you want to order are in your shopping cart, click on the 'CHECKOUT' button to proceed.

4.6 The next screen sets out your customer and delivery details. It will automatically show the name and email address details you gave us when you registered on the website and will prompt you to insert additional details including your postal address where relevant. If you have already inserted such details on a previous visit, these details will automatically appear.
If any of the details displayed on this screen is not correct you should correct them now and click on the 'RESET' button. If your shopping cart contains an Environmental Report, you will also be given the option on this page to choose, by 'un-clicking' the relevant box, to have that Environmental Report sent to you in hard copy by post to the postal address provided by you. If you do not 'un-click' the relevant box your Environmental Report will automatically be sent LAS\1448831.2 to you by email in pdf format to the email address you have provided. You will also be given an option to have your Environmental Report issued in Irish instead of English by clicking on the relevant box. Please ensure all the details you have entered are correct and once you arehappy with the details you have entered, press 'SUBMIT' to proceed.

4.7 The next screen will show your order summary which will include the customer details you provided previously, the Products included in your order and the price to be paid.
Please note that any VAT chargeable on your purchase and/or any package and posting charges for the delivery of an Environmental Report by post will be calculated at this point and will be indicated on this page. Please note therefore that the total purchase price indicated on your order may be different to the sub total indicated when you viewed your shopping cart. If you are happy with the details set out in the order summary, click the 'CHECKOUT' button to proceed.

4.8 The next screen will prompt you to enter your credit/debit card details for the purposes of your order. Once you have filled in these details and are ready to submit your order, click on the 'SUBMIT' button. Until you click on this button you will still be able to cancel your order by using the appropriate buttons of your browser to go back if you wish.

4.9 If your credit card payment is authorised, the next screen will show your credit card authorisation number and will outline the details of your order.

4.10 To complete your order, click on the 'PROCESS' button.

5. ACCEPTANCE OF ORDERS

5.1 All orders are subject to acceptance by OSi.

5.2 If your order is received and accepted by OSi an order confirmation screen will appear. You should print out this confirmation screen and make a note of the order number in the top right hand corner of the screen for future reference.

6. DELIVERY

Orthophotographic Maps, Wind Speed Maps and Land Registry Compliant Maps

6.1 If your order is accepted, any Orthophotographic Map, Wind Speed Map and Land Registry Compliant Maps ordered by you will become available for download by you directly from the website in electronic pdf format. Instructions for download will appear on the order confirmation screen.

6.2 You have 14 days in which to download such Products. You can choose to download them immediately or else log-on to the website again later and access them for download by clicking on the 'YOUR ORDERS' button and inserting your order number.

6.3 If you do not download these products within 14 days of purchase they will no longer be available for download by you and will need to be re-purchased.
Environmental Reports

6.4 If your order is accepted, any Environmental Report in your order will automatically be sent to you either by email or by post depending on the delivery method you specified in your order.

6.5 Unless you have specifically requested in your order that an Environmental Report be sent to you by post, it will be delivered to you electronically in pdf format to the email address
provided by you in your order. If you have requested it to be sent to you by post, it will be sent to the postal address provided by you in your order.
LAS\1448831.2

6.6 In the case of delivery of an Environmental Report by email, OSi aims to deliver the Environmental Report on the same day as the order is accepted. In the case of delivery of an Environmental Report by post, OSi aims to deliver within two (2) working days of acceptance of an order to any delivery address within the Republic of Ireland and within ten (10) working days of acceptance of an order to any delivery address outside of the Republic of Ireland. However, delays may occur and these delivery targets may not be met.

6.7 If your Environmental Report does not arrive within the time specified above or if you have any trouble downloading any Orthophotographic Map, Wind Speed map or Land Registry Compliant Map that you have purchased, please contact us by email at custserv@osi.ie or phone +353-1-802-5300 or fax +353-1-820-4156 or post at Ordnance Survey Ireland, Phoenix Park, Dublin 8, Ireland, quoting your order number (see clause 4.9 above)

6.8 If you choose to order Products for delivery outside of the Republic of Ireland, you are responsible for complying with local laws, if and to the extent that they are applicable. If you order Products for delivery outside the Republic of Ireland, they may be subject to import duties and taxes and you will be responsible for these.

7. PRICES

7.1 The price of each Product is shown in the 'Pricing' section of our website and both the price of each Product and the total price of your order are also shown during the ordering process.

7.2 All prices are indicated in Euro and are VAT exclusive. A currency converter is available at appropriate stages during the ordering process to allow you to view the price of your order in another currency. This currency converter is provided by a third party (xe.com) however and OSi cannot accept any responsibility or liability for the exchange rates used by xe.com. You should be aware that the exchange rates used by xe.com may differ from the exchange rate imposed by your banking provider when your payment is processed by OSi.

7.3 VAT and package and posting will be charged where appropriate. Any applicable VAT and/or package and posting charges will be shown in your order summary before you submit your order.

7.4 OSi's VAT registration number is IE 4748790P

7.5 OSi reserves the right to change its prices at any time. Irrespective of any change of prices, you will be charged the price that was specified for the Products when you ordered them.

8. **RIGHT OF WITHDRAWAL**

8.1 Where you have purchased an Orthophotographic Map, a Wind Speed Map or a Land Registry Compliant Map which is to be downloaded directly from our website, you may cancel your purchase within seven (7) working days of the date on which we confirm your purchase as long as you have not downloaded the map (see clause 6 above). If you have already downloaded the map you will not be able to cancel your purchase.

8.2 Unfortunately, because Environmental Reports are generated automatically in accordance with your particular specifications, you will not be able to cancel your purchase of an Environmental Report once your order has been accepted.

9. **COMPLAINTS**

9.1 OSi seeks to ensure that you are happy with your purchase. If you are unhappy with any Product which you have purchased from us, please contact us by email at custserv@osi.ie or phone +353-1-802-5300 or fax +353-1-820-4156 or post at Ordnance Survey Ireland, Phoenix Park, Dublin 8, Ireland.
LAS\1448831.2

9.2 Without prejudice to any other provision of these Conditions, where any valid claim in respect of any Product sold by OSi is based on any defect in the quality or condition of the Product or its failure to meet specification in accordance with the order made by you, OSi shall be entitled to replace the Product (or the part in question) free of charge, or at the sole discretion of OSi, refund the price of the Product concerned (or a proportionate part of the price), but OSi shall have no further liability to you.

10. **SALE OF ENVIRONMENTAL REPORTS**

Definitions

10.1 In this clause 10 the following terms shall have the following meanings:
(a) "Datasets" means the datasets set out in the Environmental Reports Datasets Schedule (which schedule may be amended from time to time].
(b) "Environmental Report" means the report described more particularly in clause 10.2 below and supplied to you by OSi pursuant to these Conditions;
(c) "Geopoint" means the specific mapping co-ordinate that corresponds as nearly as possible to the location specified by you on the interactive map viewer when ordering an Environmental Report

(d) "Intellectual Property" means all intellectual property of whatever nature anywhere in the world and the rights subsisting therein.
(e) "Chosen Location Area" means the area of land contained within a circle that takes the Geopoint as its centre and which, if you have a chosen a residential report, has a radius of 400 metres or, if you have chosen a commercial report, has a radius of 600 metres. For the avoidance of doubt, please note that the Chosen Location Area does not correspond to the area within the superimposed box outlined in yellow that appears on the interactive map viewer when you are browsing the viewer.
(f) "Third Party Data" means any data or information contained in or taken from any Dataset generated, owned and/or controlled by any Third Party;
(g) "Third Party" means any person or entity other than OSi.

What is an Environmental Report

10.2 An Environmental Report is a computer generated report that comprises the results of a computerised search against certain environmental data and mapping information pertaining to the Chosen Location Area and contained in the Datasets.
The results of that search are presented in the Environmental Report, both in summary and in more detailed form, under various headings including the following:
• Historic Site History
• Land Use
• Stability
• Water History
• Statutory Licences
The Environmental Report also includes an aerial photograph with the Chosen Location Area marked thereon. LAS\1448831.2 The Environmental Report can be purchased in two formats: (a) in A4 size covering a Chosen Location Area of 400 metre radius from the Geopoint (a "**Residential Report**") or (b) in A3 size covering a Chosen Location Area of 600 metre radius from the Geopoint (a "**Commercial Report**").

10.3 The Environmental Report relates to the Chosen Location Area only. Any information and/or data contained in the Datasets relating to areas outside the Chosen Location Area will not be searched for the purposes of generating the Environmental Report and will not be included in the Environmental Report.

10.4 The Datasets are national datasets only and do not contain any data or information in respect of territory outside of the Republic of Ireland. Accordingly, where the whole or any part of the Chosen Location Area falls outside the territory of the Republic of Ireland, the Environmental Report will not contain any data or information in respect of that whole or part.

10.5 The Datasets do not constitute an exhaustive source of all environmental and mapping data and information that may relate to the Chosen Location Area and other sources of such data and information may be available. The Environmental Report should therefore not be relied upon as the sole source of environmental and mapping information in respect of the Chosen Location Area.

10.6 The particular Datasets used by OSi in the generation of Environmental Reports may change from time to time. In the event of any such change, OSi shall use reasonable endeavours to promptly post notice of the change on this website. In the event that any Dataset becomes temporarily unavailable (for technical or other reasons), there may be a delay in the delivery of your Environmental Report. In the event that OSi becomes aware that a particular Dataset which should have been searched in the production of your Environmental Report has not been so searched, OSi shall use reasonable endeavours to contact you to inform you of this.

10.7 The Environmental Report is intended to be used for information purposes only. The Environmental Report is not a risk assessment report and does not, in any way howsoever, constitute advice. You assume all responsibility for assessing the data and information contained in the Environmental Report and assessing what further investigations, if any, ought to be made and by whom, in relation to that data and information. In order to assist you in this regard, where Third Party Data is included in an Environmental Report, contact details for the relevant Third Party responsible for that Third Party Data will be provided in the Environmental Report where possible. OSi also strongly recommends that you obtain the advice of an appropriately qualified professional in relation to the significance and assessment of the data and information contained in the Environmental Report and any further investigations that ought to be carried out in relation to that data and information.

10.8 The Environmental Report does not include any information relating to the actual state or condition of the Chosen Location Area (or any building or structure thereon) and the Environmental Report should not be used or taken as an indication of actual fitness or unfitness of the Chosen Location Area (or any building or structure thereon) for any particular purpose nor should it be relied upon for determining the saleability or value of the Chosen Location Area (or any building or structure thereon) or be used as a substitute for any physical inspection of the Chosen Location Area (or any building or structure thereon). OSI strongly recommends that you physically inspect the Chosen Location Area (and any building and structure thereon) and obtain the advice of appropriately qualified professionals in relation to actual state and condition of the Chosen Location Area (and any building or structure thereon).

11. **INTELLECTUAL PROPERTY**

11.1 All Intellectual Property in and/or relating to each Product and the data and information contained therein (which, for the avoidance of doubt, includes all Intellectual Property in the Datasets and Third Party Data used in the generation of any Environmental Report) remains the exclusive property of OSi/Government of Ireland and/or its Third Party licensors and LAS\1448831.2 nothing in these Conditions or any Product purports to transfer, assign, or grant any rights to you in respect of such Intellectual Property.

11.2 You are permitted to use any Product purchased by you on this website for your personal and private use only. You are permitted to make (or print, in the case of any Products that is delivered by email or that are downloaded directly from the website) three (3) hard copies of any Product purchased by you for such personal and private use. You are not permitted to use any Product in connection with any business or for any commercial purposes whatsoever without the prior written agreement of OSi.

11.3 Except as explicitly permitted in these Conditions, you are not allowed to copy, reproduce, make available, distribute, re-sell, republish, reverse engineer, download, display or otherwise use or deal in any Product without the prior written permission of OSi.

12. **EXCLUSIONS AND LIMITATIONS OF LIABILITY**

12.1 Each Product is sold without any guarantees or representations and all representations, warranties and conditions, whether express or implied, in relation to each Product and the data and information contained therein or used in the generation thereof are hereby excluded by OSi to the fullest extent permitted by law. Without prejudice to the generality of the foregoing and in so far as is permissible under law, no representations, warranties or conditions, whether express or implied, are given by OSi in relation to the accuracy, currency or completeness of any Third Party Data contained in or used in generating an Environmental Report.

12.2 OSi excludes, to the fullest extent permitted by law, all liability for any and all direct, indirect or consequential damage, loss or expense (including, without limitation, loss of profit) howsoever caused or arising by reason of, or in connection with, each Product and/or the data and information contained therein or used in the generation thereof (including Third Party Data) and/or any act or omission of OSI.

12.3 To the extent that any liability arises under these Conditions, OSI's entire liability (including any liability for the acts and/or omissions of its employees, agents or sub-contractors) in respect of any and all breaches of its contractual obligations and any and all tortious acts or omissions (including but not limited to negligence) shall not, in aggregate, exceed the purchase price paid by you for the relevant Product pursuant to these Conditions.

12.4 None of the limitations or exclusions set out in these Conditions shall operate to affect any statutory rights to which you are entitled as a consumer or otherwise. In particular, but without limitation to the generality of the foregoing, if you are a consumer, none of the limitations or exclusions set out in these Conditions shall operate to exclude or limit OSi's liability for death or personal injury caused by any act or omission of OSi.

13. PRIVACY STATEMENT AND LEGAL NOTICES

13.1 For details of our privacy statement, visit www.osi.ie

13.2 For further legal notices, visit www.osi.ie

14. UNENFORCEABILITY

14.1 In the event that any of these Conditions or any part thereof are rendered void or unenforceable by any rule of law or any decision of any court or administrative body of competent jurisdiction, the Condition or relevant part thereof shall be void and unenforceable to the extent only that it breaches the relevant law or decision and no further. In such circumstances the infringing Condition or part thereof shall apply with such modification as would be necessary to make it valid and effective.

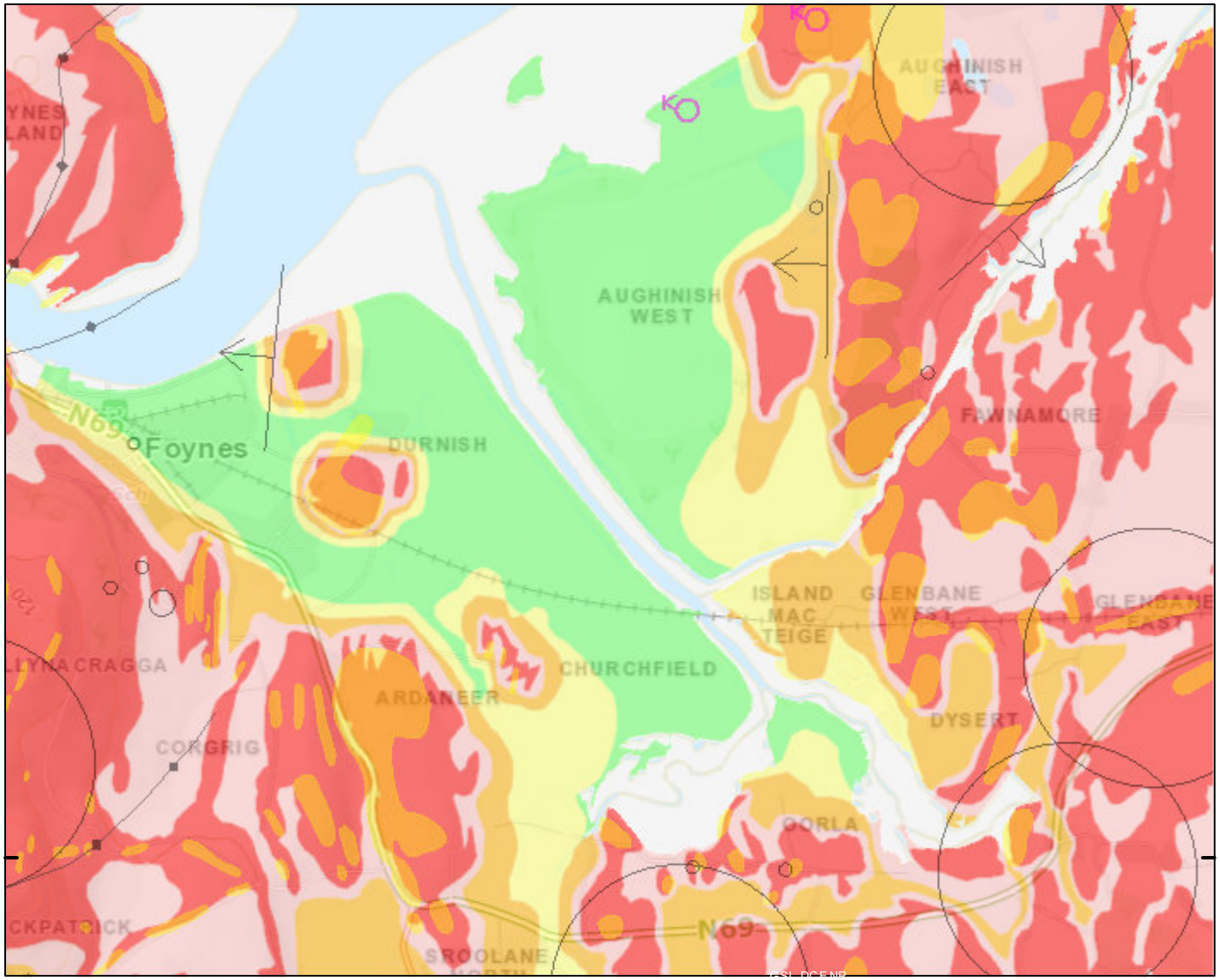
15. GOVERNING LAW & JURISDICTION

LAS\1448831.2

15.1 These Conditions shall be governed by and construed in accordance with the laws of Ireland and you hereby submit to the exclusive jurisdiction of the Irish courts in relation to any dispute arising in relation to or in connection with these Conditions.

Products are supplied by Ordnance Survey Ireland, Phoenix Park, Dublin 8, Ireland

Geological Survey Ireland Public Data



Legend

Karst Landforms

- Borehole
- Cave
- Dry Valley
- Enclosed Depression
- Spring
- Superficial Solution Features
- Swallow Hole
- Turlough

Traced Underground Connections

Groundwater Wells and Springs

Scale: 1:25,000

Geological Survey Ireland

PSI Licence

N S W E

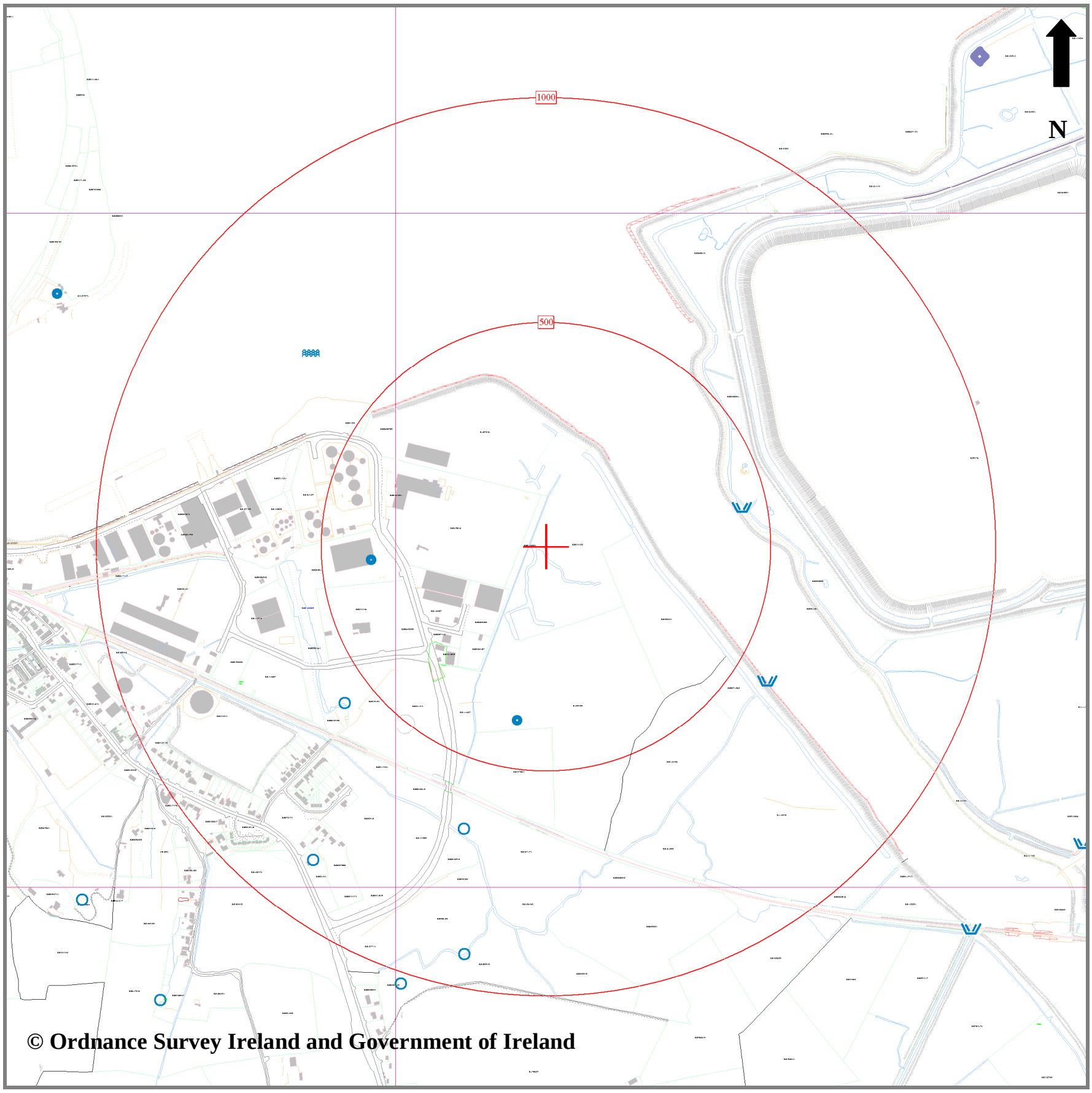
0 0.175 0.35 0.7 mi

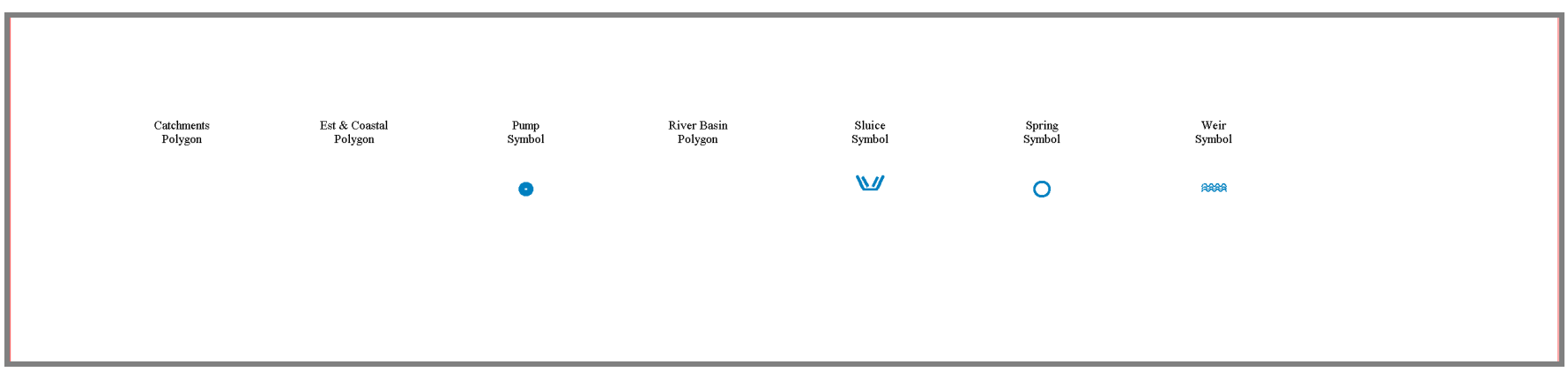
0 0.275 0.55 1.1 km

Map Centre Coordinates (ITM) 526,997 651,421

Snapshot Date: June 16, 2017

Section 8: Water_History_Map





Appendix B

Photographic record

Plate 1: View of Durnish Lands

Plate 2: View of road leading to port entrance

Plate 3: Disused railway line along southern boundary of Durnish Lands site

Plate 4: View of drainage stream in Durnish Lands

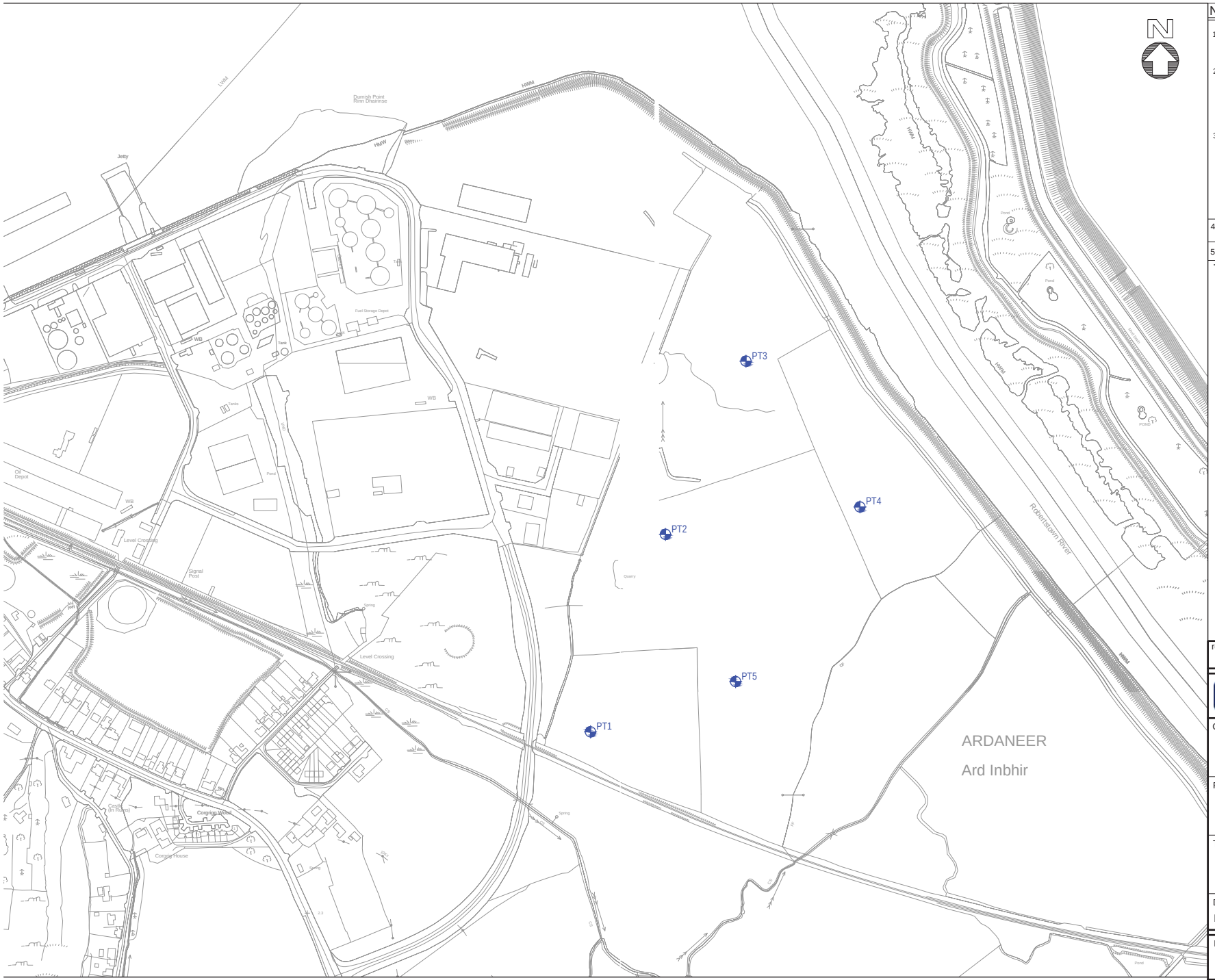
Appendix 8.2

GQRA Report

Due to the large size of this document, the GQRA Report is presented in a separate volume of the EIAR. The GQRA Report can be found in Volume 8.

Appendix 8.3

Percolation Tests and Test Results



NOTES

1. Verifying Dimensions.
   The contractor shall verify dimensions against such other drawings or site conditions as pertain to this part of the work.

2. Existing Services.
   Any information concerning the location of existing services indicated on this drawing is intended for general guidance only. It shall be the responsibility of the contractor to determine and verify the exact horizontal and vertical alignment of all cables, pipes, etc. (both underground and overhead) before work commences.

3. Issue of Drawings.
   Hard copies, dwf and pdf will form a controlled issue of the drawing. All other formats (dwg, dxf etc.) are deemed to be an uncontrolled issue and any work carried out based on these files is at the recipients own risk. RPS will not accept any responsibility for any errors arising from the use of these files, either by human error by the recipient, listing of un-dimensioned measurements, compatibility issues with the recipient's software, and any errors arising when these files are used to aid the recipients drawing production, or setting out on site.

4. DATUM: Ordnance Datum (Malin)

5. PERCOLATION TEST LOCATIONS PT3

Test locations are in metres and relative to Irish National Grid/TM65

Reference	Easting (m)	Northing (m)	Depth (mm)
PT1	126202.846	151239.587	min. 400mm
PT2	126305.225	151509.569	min. 400mm
PT3	126415.369	151746.390	min. 400mm
PT4	126571.100	151547.155	min. 400mm
PT5	126401.228	151308.379	min. 400mm

rev	amendments	drawn date	checked date

RPS
Elmwood House
74 Boucher Road
Belfast
BT12 6RZ
T +44 (0) 28 90 667914
F +44 (0) 28 90 668286
W www.rpsgroup.com/ireland
E ireland@rpsgroup.com

Client
Shannon Foynes Port Company

Project
Port Of Foynes- Jetty Extension & Port Estate Expansion

Title
Durnish Lands Proposed Percolation Test Locations

Drawing Status	Sheet Size	Drawing Scale
Preliminary	A3	1:5000

Drawing Number: M0679-RPS-00-XX-DR-C-0122
Rev -

Project Leader	Drawn By	Date	Initial Review
SAH	SAH	26.02.18	MMcC

SITE CHARACTERISATION FORM
COMPLETING THE FORM

Step 1:

Goto Menu Item **File, Save As** and save the file under a reference relating to the client or the planning application reference if available.

Use the **Clear Form** button to clear all information fields.

Notes:

All calculations in this form are automatic.

Where possible information is presented in the form of drop down selection lists to eliminate potential errors.

Variable elements are recorded by tick boxes. In all cases only one tick box should be activated.

All time record fields must be entered in twenty hour format as follows: HH:MM

All date formats are DD/MM/YYYY.

All other data fields are in text entry format.

This form can be printed out fully populated for submission with related documents and for your files. It can also be submitted by email.

Section 3.2

In this section use an underline _____ across all six columns to indicate the depth at which changes in classification / characteristics occur.

Section 3.4

Lists supporting documentation required.

Section 4

Select the treatment systems suitable for this site and the discharge route.

Section 5

Indicate the system type that it is proposed to install.

Section 6

Provide details, as required, on the proposed treatment system.

APPENDIX B: SITE CHARACTERISATION FORM

File Reference: TEST HOLE NO 5

1.0 GENERAL DETAILS (From planning application)

Prefix: | First Name: SHANNON FOYNES PORT CO | Surname:

Address: Durnish, Foynes Co .Limeirck

Site Location and Townland: as across

Telephone No: n/a | Fax No: n/a

E-Mail: n/a

Maximum no. of Residents: | No. of Double Bedrooms: | No. of Single Bedrooms:

Proposed Water Supply: Mains ☐ Private Well/Borehole ☐ Group Well/Borehole ☐

2.0 GENERAL DETAILS (From planning application)

Soil Type, (Specify Type): Deep Poorly drained mineral (BminPD)

Aquifer Category: Regionally Important ☐ Locally Important LI Poor ☐

Vulnerability: Extreme ✔ High ☐ Moderate ☐ Low ☐ High to Low ☐ Unknown ☐

Bedrock Type: Limestone

Name of Public/Group Scheme Water Supply within 1 km: Gwss in foynes

Groundwater Protection Scheme (Y/N): | Source Protection Area: SI ☐ SO ☐

Groundwater Protection Response: R2[1]

Presence of Significant Sites (Archaeological, Natural & Historical): none

Past experience in the area: none. other site assessments in the area have a T value between 30 -50

Comments:

(Integrate the information above in order to comment on: the potential suitability of the site, potential targets at risk, and/or any potential site restrictions).

Ground water is potential target at risk
no site restrictions identified.
GSI Ground water Protection Zone R21

Note: Only information available at the desk study stage should be used in this section.

3.0 ON-SITE ASSESSMENT

3.1 Visual Assessment

Landscape Position: Flat site undulating topography where test was carried out in five different locations

Slope: Steep (>1:5) ☐ Shallow (1:5-1:20) ☐ Relatively Flat (<1:20) ✔

Surface Features within a minimum of 250m (Distance To Features Should Be Noted In Metres)

Houses: there are approx. 2 houses within 250m of the site.

Existing Land Use: Agricultural Grassland

Vegetation Indicators: Grass with Thistle and Bracken evident in the headgerow of the site

Groundwater Flow Direction: Estimated to be downslope to the North towards river

Ground Condition: firm under foot with no evidence of poaching towards the front of the land. poaching evident towards the north side of

Site Boundaries: Hedgerow and road with railway to the south of land

Roads: site served by a access road to the foynes port

Outcrops (Bedrock And/Or Subsoil): none evident

Surface Water Ponding: none in 250m Lakes: none within site

Beaches/Shellfish: none in 250m Areas/Wetlands: none in 250m

Karst Features: not within 150m of the site according to the GSI web mapping.

Watercourse/Stream*: Shannon estuary to the north and stream to the east that feeds into the estuary

Drainage Ditches*: a number of drainage ditched through out the land

Springs / Wells*: none within the land shown

Comments:
(Integrate the information above in order to comment on: the potential suitability of the site, potential targets at risk, the suitability of the site to treat the wastewater and the location of the proposed system within the site).

Groundwater is potential target at risk from effluent from potential wastewater treatment system
Site suitability will depend on nature and thickness of subsoil.

***Note and record** water level

3.2 Trial Hole (should be a minimum of 2.1m deep (3m for regionally important aquifers))

To avoid any accidental damage, a trial hole assessment or percolation tests should not be undertaken in areas, which are at or adjacent to significant sites (e.g. NHAs, SACs, SPAs, and/or Archaeological etc.), without prior advice from National Parks and Wildlife Service or the Heritage Service.

Depth of trial hole (m): 1.70

Depth from ground surface to bedrock (m) (if present): 1.0

Depth from ground surface to water table (m) (if present): 1.20

Depth of water ingress: 1.20

Rock type (if present): Limestone

Date and time of excavation: 12/03/2018 09:00

Date and time of examination: 12/03/2018 09:00

	Depth of P/T Test*	Soil/Subsoil Texture & Classification**	Plasticity and dilatancy***	Soil Structure	Density/ Compactness	Colour****	Preferential flowpaths
0.1 m		0.0-0.3m Gravelly SILT/CLAY Topsoil	Ribbons:60,60,60 Treads:4,2,3 Dilatent	Crumb	Firm	Brown	Rootlets to 0.2m
0.2 m							
0.3 m							
0.4 m	T1,2,3	0.3-1.2m CLAY with cobbles	Ribbons:100,10,110 Treads:10,10,10 Not Dilatent	Blocky	Firm	Grey	None
0.5 m							
0.6 m	T1,2,3						
0.7 m							
0.8 m							
0.9 m							
1.0 m							
1.1 m		mottling evident 1.2M Water table					
1.2 m							
1.3 m							
1.4 m							
1.5 m							
1.6 m							
1.7 m		End of Trial Hole					
1.8 m							
1.9 m							
2.0 m							
2.1 m							
2.2 m							
2.3 m							
2.4 m							
2.5 m							
2.6 m							
2.7 m							
2.8 m							
2.9 m							
3.0 m							

Likely T value: 50.00

Note: *Depth of percolation test holes should be indicated on log above. (Enter P or T at depts as appropriate).
** See Appendix E for BS 5930 classification.
*** 3 samples to be tested for each horizon and results should be entered above for each horizon.
**** All signs of mottling should be recorded.

3.2 **Trial Hole (contd.)** Evaluation:

mottling evident in trial hole above the water table at 1.2m b.g.l
evidence of water table at 1.7m deep
Site suitability to be confirmed by T testing of soil.

3.3(a) Percolation ("T") Test for Deep Subsoils and/or Water Table

Step 1: Test Hole Preparation

Percolation Test Hole	1	2	3
Depth from ground surface to top of hole (mm) (A)	300	300	300
Depth from ground surface to base of hole (mm) (B)	700	700	700
Depth of hole (mm) [B - A]	400	400	400
Dimensions of hole [length x breadth (mm)]	300 x 300	300 x 300	300 x 300

Step 2: Pre-Soaking Test Holes

Date and Time pre-soaking started	09/03/2018	09:00	09/03/2018	09:00	09/03/2018	09:00

Each hole should be pre-soaked twice before the test is carried out. Each hole should be empty before refilling.

Step 3: Measuring T_{100}

Percolation Test Hole No.	1	2	3
Date of test	12/03/2018	12/03/2018	12/03/2018
Time filled to 400 mm	10:20	10:21	10:22
Time water level at 300 mm	12:39	11:15	12:57
Time to drop 100 mm (T_{100})	139.00	54.00	155.00
Average T_{100}			116.00

If T_{100} > 300 minutes then T-value >90 – site unsuitable for discharge to ground
If $T_{100} \leq$ 210 minutes then go to Step 4;
If T_{100} > 210 minutes then go to Step 5;

Step 4: Standard Method (where $T_{100} \leq 210$ minutes)

Percolation Test Hole	1			2			3		
Fill no.	Start Time (at 300 mm)	Finish Time (at 200 mm)	Δt (min)	Start Time (at 300 mm)	Finish Time (at 200 mm)	Δt (min)	Start Time (at 300 mm)	Finish Time (at 200 mm)	Δt (min)
1	12:39	14:50	131.00	11:15	12:19	64.00	12:57	15:37	160.00
2	14:50	17:18	148.00	12:20	13:41	81.00	15:38	18:27	169.00
3	17:19	19:31	132.00	13:42	15:39	117.00	18:28	21:00	152.00
Average Δt Value			137.00			87.33			160.33
	Average Δt/4 = [Hole No.1]		34.25 (t_1)	Average Δt/4 = [Hole No.2]		21.83 (t_2)	Average Δt/4 = [Hole No.3]		40.08 (t_3)

Result of Test: T = 32.06 (min/25 mm)

Comments:

Subsoil has good hydraulic assimilative capacity.

Step 5: Modified Method (where $T_{100} > 210$ minutes)

Percolation Test Hole No.	1				2				3			
Fall of water in hole (mm)	Time Factor = T_f	Time of fall (mins) = T_m	K_{fs} = T_f / T_m	T – Value = 4.45 / K_{fs}	Time Factor = T_f	Time of fall (mins) = T_m	K_{fs} = T_f / T_m	T – Value = 4.45 / K_{fs}	Time Factor = T_f	Time of fall (mins) = T_m	K_{fs} = T_f / T_m	T – Value = 4.45 / K_{fs}
300 - 250	8.1				8.1				8.1			
250 - 200	9.7				9.7				9.7			
200 - 150	11.9				11.9				11.9			
150 - 100	14.1				14.1				14.1			
Average T- Value	T- Value Hole 1= (t_1)			0.00	T- Value Hole 1= (t_2)			0.00	T- Value Hole 1= (t_3)			0.00

Result of Test: T = 0.00 (min/25 mm)

Comments:

3.3(b) Percolation ("P") Test for Shallow Soil / Subsoils and/or Water Table

Step 1: Test Hole Preparation

Percolation Test Hole	1	2	3
Depth from ground surface to top of hole (mm)	0	0	0
Depth from ground surface to base of hole (mm)			
Depth of hole (mm)	0	0	0
Dimensions of hole [length x breadth (mm)]	x	x	x

Step 2: Pre-Soaking Test Holes

Date and Time pre-soaking started					

Each hole should be pre-soaked twice before the test is carried out. Each hole should be empty before refilling.

Step 3: Measuring P_{100}

Percolation Test Hole No.	1	2	3
Date of test			
Time filled to 400 mm			
Time water level at 300 mm			
Time to drop 100 mm (P_{100})	0.00	0.00	0.00
Average P_{100}			0.00

If P_{100} > 300 minutes then P-value >90 – site unsuitable for discharge to ground
If $P_{100} \leq$ 210 minutes then go to Step 4;
If P_{100} > 210 minutes then go to Step 5;

Step 4: Standard Method (where $P_{100} \leq 210$ minutes)

Percolation Test Hole	1			2			3		
Fill no.	Start Time (at 300 mm)	Finish Time (at 200 mm)	Δp (min)	Start Time (at 300 mm)	Finish Time (at 200 mm)	Δp (min)	Start Time (at 300 mm)	Finish Time (at 200 mm)	Δp (min)
1			0.00			0.00			0.00
2			0.00			0.00			0.00
3			0.00			0.00			0.00
Average Δp Value			0.00			0.00			0.00
	Average Δp/4 = [Hole No.1]		0.00 (p_1)	Average Δp/4 = [Hole No.2]		0.00 (p_2)	Average Δp/4 = [Hole No.3]		0.00 (p_3)

Result of Test: P = 0.00 (min/25 mm)

Comments:

Step 5: Modified Method (where $P_{100} > 210$ minutes)

Percolation Test Hole No.	1				2				3			
Fall of water in hole (mm)	Time Factor = T_f	Time of fall (mins) = T_m	$K_{fs} = T_f / T_m$	P – Value = 4.45 / K_{fs}	Time Factor = T_f	Time of fall (mins) = T_m	$K_{fs} = T_f / T_m$	P – Value = 4.45 / K_{fs}	Time Factor = T_f	Time of fall (mins) = T_m	$K_{fs} = T_f / T_m$	P – Value = 4.45 / K_{fs}
300 - 250	8.1				8.1				8.1			
250 - 200	9.7				9.7				9.7			
200 - 150	11.9				11.9				11.9			
150 - 100	14.1				14.1				14.1			
Average P- Value	P- Value Hole 1= (p_1)			0.00	P- Value Hole 1= (p_2)			0.00	P- Value Hole 1= (p_3)			0.00

Result of Test: P = 0.00 (min/25 mm)

Comments:

3.4 The following associated Maps, Drawings and Photographs should be appended to this site characterisation form.

1. Discovery Series 1:50,000 Map indicating overall drainage, groundwater flow direction and housing density in the area.
2. Supporting maps for vulnerability, aquifer classification, soil, bedrock.
3. North point should always be included.
4. (a) Sketch of site showing measurements to Trial Hole location and
   (b) Percolation Test Hole locations,
   (c) wells and
   (d) direction of groundwater flow (if known),
   (e) proposed house (incl. distances from boundaries)
   (f) adjacent houses,
   (g) watercourses,
   (h) significant sites
   (i) and other relevant features.
5. Cross sectional drawing of the site and the proposed layout[1] should be submitted.
6. Photographs of the trial hole, test holes and site (date and time referenced).

[1] The calculated percolation area or polishing filter area should be set out accurately on the site layout drawing in accordance with the code of practice's requirements.

4.0 CONCLUSION of SITE CHARACTERISATION

Integrate the information from the desk study and on-site assessment (i.e. visual assessment, trial hole and percolation tests) above and conclude the type of system(s) that is (are) appropriate. This information is also used to choose the optimum final disposal route of the treated wastewater.

Not Suitable for Development ☐

Suitable for [1]		**Discharge Route**
1. Septic tank system (septic tank and percolation area)	☐	☐
2. Secondary Treatment System		
a. septic tank and filter system constructed on-site and polishing filter; or	☐	
b. packaged wastewater treatment system and polishing filter	☐	

5.0 RECOMMENDATION

Propose to install: ☐

and discharge to: ☐

Trench Invert level (m): ☐

Site Specific Conditions (e.g. special works, site improvement works testing etc.

☐

[1] note: more than one option may be suitable for a site and this should be recorded

[2] A discharge of sewage effluent to "waters" (definition includes any or any part of any river, stream, lake, canal, reservoir, aquifer, pond, watercourse or other inland waters, whether natural or artificial) will require a licence under the Water Pollution Acts 1977-90. Refer to Section 2.6.2.

6.0 TREATMENT SYSTEM DETAILS

SYSTEM TYPE: Septic Tank System

Tank Capacity (m^3)

Percolation Area		Mounded Percolation Area	
No. of Trenches		No. of Trenches	
Length of Trenches (m)		Length of Trenches (m)	
Invert Level (m)		Invert Level (m)	

SYSTEM TYPE: Secondary Treatment System

Filter Systems

Media Type	Area (m^2)*	Depth of Filter	Invert Level
Sand/Soil			
Soil			
Constructed Wetland			
Other			

Package Treatment Systems

Type

Capacity PE

Sizing of Primary Compartment

m^3

SYSTEM TYPE: Tertiary Treatment System

Polishing Filter: Surface Area (m^2)*

or **Gravity Fed:**

No. of Trenches

Length of Trenches (m)

Invert Level (m)

Package Treatment System: Capacity (pe)

Constructed Wetland: Surface Area (m^2)*

DISCHARGE ROUTE:

Groundwater ☐ Hydraulic Loading Rate * ($l/m^2.d$)

Surface Water ** ☐ Discharge Rate (m^3/hr)

TREATMENT STANDARDS:

Treatment System Performance Standard (mg/l)	BOD	SS	NH_4 - N	Total N	Total P

QUALITY ASSURANCE:

Installation & Commissioning	On-going Maintenance

* Hydraulic loading rate is determined by the percolation rate of subsoil

** Water Pollution Act discharge licence required

7.0 SITE ASSESSOR DETAILS

Company: MESKELL CONSULTING ENGINEERS

Prefix: Mr. First Name: MAURICE Surname: MESKELL

Address:
COOLCAPPA,
ARDAGH,
CO.LIMERICK

Qualifications/Experience: B.E.M.I.E.I Approved Site Assessor

Date of Report: 14/03/2018

Phone: 0879641862 Fax: e-mail MAURICE.MESKELL@GMAIL.COM

Indemnity Insurance Number:

Signature: _____

SITE CHARACTERISATION FORM
COMPLETING THE FORM

Step 1:

Goto Menu Item **File, Save As** and save the file under a reference relating to the client or the planning application reference if available.

Use the **Clear Form** button to clear all information fields.

Notes:

All calculations in this form are automatic.

Where possible information is presented in the form of drop down selection lists to eliminate potential errors.

Variable elements are recorded by tick boxes. In all cases only one tick box should be activated.

All time record fields must be entered in twenty hour format as follows: HH:MM

All date formats are DD/MM/YYYY.

All other data fields are in text entry format.

This form can be printed out fully populated for submission with related documents and for your files. It can also be submitted by email.

Section 3.2

In this section use an underline _____ across all six columns to indicate the depth at which changes in classification / characteristics occur.

Section 3.4

Lists supporting documentation required.

Section 4

Select the treatment systems suitable for this site and the discharge route.

Section 5

Indicate the system type that it is proposed to install.

Section 6

Provide details, as required, on the proposed treatment system.

APPENDIX B: SITE CHARACTERISATION FORM

File Reference: TEST HOLE NO 1

1.0 GENERAL DETAILS (From planning application)

Prefix: | First Name: SHANNON FOYNES PORT CO | Surname:

Address: Durnish, Foynes Co .Limeirck

Site Location and Townland: as across

Telephone No: n/a | Fax No: n/a

E-Mail: n/a

Maximum no. of Residents: | No. of Double Bedrooms: | No. of Single Bedrooms:

Proposed Water Supply: Mains ☐ | Private Well/Borehole ☐ | Group Well/Borehole ☐

2.0 GENERAL DETAILS (From planning application)

Soil Type, (Specify Type): Deep Poorly drained mineral (BminPD)

Aquifer Category: Regionally Important ☐ | Locally Important LI | Poor ☐

Vulnerability: Extreme ✔ | High ☐ | Moderate ☐ | Low ☐ | High to Low ☐ | Unknown ☐

Bedrock Type: Limestone

Name of Public/Group Scheme Water Supply within 1 km: Gwss in foynes

Groundwater Protection Scheme (Y/N): | Source Protection Area: SI ☐ SO ☐

Groundwater Protection Response: R2[1]

Presence of Significant Sites (Archaeological, Natural & Historical): none

Past experience in the area: none. other site assessments in the area have a T value between 30 -50

Comments:

(Integrate the information above in order to comment on: the potential suitability of the site, potential targets at risk, and/or any potential site restrictions).

Ground water is potential target at risk
no site restrictions identified.
GSI Ground water Protection Zone R21
Rock evident in this area are the per digital mapping

Note: Only information available at the desk study stage should be used in this section.

3.0 ON-SITE ASSESSMENT

3.1 Visual Assessment

Landscape Position: Flat site undulating topography where test was carried out in five different locations

Slope: Steep (>1:5) ☐ Shallow (1:5-1:20) ☐ Relatively Flat (<1:20) ✔

Surface Features within a minimum of 250m (Distance To Features Should Be Noted In Metres)

Houses: there are approx. 2 houses within 250m of the site.

Existing Land Use: Agricultural Grassland

Vegetation Indicators: Grass with Thistle and Bracken evident in the headgerow of the site

Groundwater Flow Direction: Estimated to be downslope to the North towards river

Ground Condition: firm under foot with no evidence of poaching towards the front of the land. poaching evident towards the north side of

Site Boundaries: Hedgerow and road with railway to the south of land

Roads: site served by a access road to the foynes port

Outcrops (Bedrock And/Or Subsoil): none evident

Surface Water Ponding: none in 250m Lakes: none within site

Beaches/Shellfish: none in 250m Areas/Wetlands: none in 250m

Karst Features: not within 150m of the site according to the GSI web mapping.

Watercourse/Stream*: Shannon estuary to the north and stream to the east that feeds into the estuary

Drainage Ditches*: a number of drainage ditched through out the land

Springs / Wells*: none within the land shown

Comments:
(Integrate the information above in order to comment on: the potential suitability of the site, potential targets at risk, the suitability of the site to treat the wastewater and the location of the proposed system within the site).

Groundwater is potential target at risk from effluent from potential wastewater treatment system
Site suitability will depend on nature and thickness of subsoil.

***Note and record** water level

3.2 Trial Hole (should be a minimum of 2.1m deep (3m for regionally important aquifers))

To avoid any accidental damage, a trial hole assessment or percolation tests should not be undertaken in areas, which are at or adjacent to significant sites (e.g. NHAs, SACs, SPAs, and/or Archaeological etc.), without prior advice from National Parks and Wildlife Service or the Heritage Service.

Depth of trial hole (m): 1.00

Depth from ground surface to bedrock (m) (if present): 1.00

Depth from ground surface to water table (m) (if present): 1.20

Depth of water ingress: 1.20

Rock type (if present): Limestone

Date and time of excavation: 12/03/2018 09:00

Date and time of examination: 12/03/2018 09:00

	Depth of P/T Test*	Soil/Subsoil Texture & Classification**	Plasticity and dilatancy***	Soil Structure	Density/ Compactness	Colour****	Preferential flowpaths
0.1 m		0.0-0.3m Gravelly SILT/CLAY Topsoil	Ribbons:30,30,40 Treads:2,2,3 Dilatent	Crumb	Firm	Brown	Rootlets to 0.2m
0.2 m							
0.3 m							
0.4 m	T1,2,3	0.3-1.0m CLAY with cobbles	Ribbons:40,40,40 Treads:2,3,2 Not Dilatent	Blocky	Firm	Grey	None
0.5 m							
0.6 m	T1,2,3						
0.7 m							
0.8 m							
0.9 m							
1.0 m		1.0M rock End of Trial Hole					
1.1 m							
1.2 m							
1.3 m							
1.4 m							
1.5 m							
1.6 m							
1.7 m							
1.8 m							
1.9 m							
2.0 m							
2.1 m							
2.2 m							
2.3 m							
2.4 m							
2.5 m							
2.6 m							
2.7 m							
2.8 m							
2.9 m							
3.0 m							

Likely T value: 20.00

Note: *Depth of percolation test holes should be indicated on log above. (Enter P or T at depts as appropriate).
** See Appendix E for BS 5930 classification.
*** 3 samples to be tested for each horizon and results should be entered above for each horizon.
**** All signs of mottling should be recorded.

3.2 Trial Hole (contd.) Evaluation:

Rock at 1.om B.G.L
Site suitability to be confirmed by T testing of soil.

3.3(a) Percolation ("T") Test for Deep Subsoils and/or Water Table

Step 1: Test Hole Preparation

Percolation Test Hole	1	2	3
Depth from ground surface to top of hole (mm) (A)	300	300	300
Depth from ground surface to base of hole (mm) (B)	700	700	700
Depth of hole (mm) [B - A]	400	400	400
Dimensions of hole [length x breadth (mm)]	300 x 300	300 x 300	300 x 300

Step 2: Pre-Soaking Test Holes

Date and Time pre-soaking started	09/03/2018	09:00	09/03/2018	09:00	09/03/2018	09:00

Each hole should be pre-soaked twice before the test is carried out. Each hole should be empty before refilling.

Step 3: Measuring T_{100}

Percolation Test Hole No.	1	2	3
Date of test	12/03/2018	12/03/2018	12/03/2018
Time filled to 400 mm	09:21	09:22	09:23
Time water level at 300 mm	12:39	10:55	11:25
Time to drop 100 mm (T_{100})	879.00	93.00	122.00
Average T_{100}			364.67

If T_{100} > 300 minutes then T-value >90 – site unsuitable for discharge to ground
If $T_{100} \leq$ 210 minutes then go to Step 4;
If T_{100} > 210 minutes then go to Step 5;

Step 4: Standard Method (where $T_{100} \leq 210$ minutes)

Percolation Test Hole	1			2			3		
Fill no.	Start Time (at 300 mm)	Finish Time (at 200 mm)	Δt (min)	Start Time (at 300 mm)	Finish Time (at 200 mm)	Δt (min)	Start Time (at 300 mm)	Finish Time (at 200 mm)	Δt (min)
1	12:39	14:50	0.00	10:55	12:01	66.00	11:25	13:35	130.00
2	14:50	17:18	0.00	12:02	13:33	91.00	13:36	15:55	139.00
3	17:19	19:31	0.00	13:34	15:41	127.00	15:56	18:12	136.00
Average Δt Value			0.00			94.67			135.00
	Average Δt/4 = [Hole No.1]		0.00 (t_1)	Average Δt/4 = [Hole No.2]		23.67 (t_2)	Average Δt/4 = [Hole No.3]		33.75 (t_3)

Result of Test: T = 19.14 (min/25 mm)

Comments:

Subsoil has good hydraulic assimilative capacity.

Step 5: Modified Method (where $T_{100} > 210$ minutes)

Percolation Test Hole No.	1				2				3			
Fall of water in hole (mm)	Time Factor = T_f	Time of fall (mins) = T_m	K_{fs} = T_f / T_m	T – Value = 4.45 / K_{fs}	Time Factor = T_f	Time of fall (mins) = T_m	K_{fs} = T_f / T_m	T – Value = 4.45 / K_{fs}	Time Factor = T_f	Time of fall (mins) = T_m	K_{fs} = T_f / T_m	T – Value = 4.45 / K_{fs}
300 - 250	8.1				8.1				8.1			
250 - 200	9.7				9.7				9.7			
200 - 150	11.9				11.9				11.9			
150 - 100	14.1				14.1				14.1			
Average T- Value	T- Value Hole 1= (t_1)			0.00	T- Value Hole 1= (t_2)			0.00	T- Value Hole 1= (t_3)			0.00

Result of Test: T = 0.00 (min/25 mm)

Comments:

3.3(b) Percolation ("P") Test for Shallow Soil / Subsoils and/or Water Table

Step 1: Test Hole Preparation

Percolation Test Hole	1	2	3
Depth from ground surface to top of hole (mm)	0	0	0
Depth from ground surface to base of hole (mm)			
Depth of hole (mm)	0	0	0
Dimensions of hole [length x breadth (mm)]	x	x	x

Step 2: Pre-Soaking Test Holes

Date and Time pre-soaking started					

Each hole should be pre-soaked twice before the test is carried out. Each hole should be empty before refilling.

Step 3: Measuring P_{100}

Percolation Test Hole No.	1	2	3
Date of test			
Time filled to 400 mm			
Time water level at 300 mm			
Time to drop 100 mm (P_{100})	0.00	0.00	0.00
Average P_{100}			0.00

If P_{100} > 300 minutes then P-value >90 – site unsuitable for discharge to ground
If $P_{100} \leq$ 210 minutes then go to Step 4;
If P_{100} > 210 minutes then go to Step 5;

Step 4: Standard Method (where $P_{100} \leq 210$ minutes)

Percolation Test Hole	1			2			3		
Fill no.	Start Time (at 300 mm)	Finish Time (at 200 mm)	Δp (min)	Start Time (at 300 mm)	Finish Time (at 200 mm)	Δp (min)	Start Time (at 300 mm)	Finish Time (at 200 mm)	Δp (min)
1			0.00			0.00			0.00
2			0.00			0.00			0.00
3			0.00			0.00			0.00
Average Δp Value			0.00			0.00			0.00
	Average Δp/4 = [Hole No.1]		0.00 (p_1)	Average Δp/4 = [Hole No.2]		0.00 (p_2)	Average Δp/4 = [Hole No.3]		0.00 (p_3)

Result of Test: P = 0.00 (min/25 mm)

Comments:

Step 5: Modified Method (where $P_{100} > 210$ minutes)

Percolation Test Hole No.	1				2				3			
Fall of water in hole (mm)	Time Factor = T_f	Time of fall (mins) = T_m	$K_{fs} = T_f / T_m$	P – Value = 4.45 / K_{fs}	Time Factor = T_f	Time of fall (mins) = T_m	$K_{fs} = T_f / T_m$	P – Value = 4.45 / K_{fs}	Time Factor = T_f	Time of fall (mins) = T_m	$K_{fs} = T_f / T_m$	P – Value = 4.45 / K_{fs}
300 - 250	8.1				8.1				8.1			
250 - 200	9.7				9.7				9.7			
200 - 150	11.9				11.9				11.9			
150 - 100	14.1				14.1				14.1			
Average P- Value	P- Value Hole 1= (p_1)			0.00	P- Value Hole 1= (p_2)			0.00	P- Value Hole 1= (p_3)			0.00

Result of Test: P = 0.00 (min/25 mm)

Comments:

3.4 The following associated Maps, Drawings and Photographs should be appended to this site characterisation form.

1. Discovery Series 1:50,000 Map indicating overall drainage, groundwater flow direction and housing density in the area.
2. Supporting maps for vulnerability, aquifer classification, soil, bedrock.
3. North point should always be included.
4. (a) Sketch of site showing measurements to Trial Hole location and
   (b) Percolation Test Hole locations,
   (c) wells and
   (d) direction of groundwater flow (if known),
   (e) proposed house (incl. distances from boundaries)
   (f) adjacent houses,
   (g) watercourses,
   (h) significant sites
   (i) and other relevant features.
5. Cross sectional drawing of the site and the proposed layout[1] should be submitted.
6. Photographs of the trial hole, test holes and site (date and time referenced).

[1] The calculated percolation area or polishing filter area should be set out accurately on the site layout drawing in accordance with the code of practice's requirements.

4.0 CONCLUSION of SITE CHARACTERISATION

Integrate the information from the desk study and on-site assessment (i.e. visual assessment, trial hole and percolation tests) above and conclude the type of system(s) that is (are) appropriate. This information is also used to choose the optimum final disposal route of the treated wastewater.

Not Suitable for Development ☐

Suitable for [1]		**Discharge Route**
1. Septic tank system (septic tank and percolation area)	☐	☐
2. Secondary Treatment System		
a. septic tank and filter system constructed on-site and polishing filter; or	☐	
b. packaged wastewater treatment system and polishing filter	☐	

5.0 RECOMMENDATION

Propose to install: ☐

and discharge to: ☐

Trench Invert level (m): ☐

Site Specific Conditions (e.g. special works, site improvement works testing etc.

☐

[1] note: more than one option may be suitable for a site and this should be recorded

[2] A discharge of sewage effluent to "waters" (definition includes any or any part of any river, stream, lake, canal, reservoir, aquifer, pond, watercourse or other inland waters, whether natural or artificial) will require a licence under the Water Pollution Acts 1977-90. Refer to Section 2.6.2.

6.0 TREATMENT SYSTEM DETAILS

SYSTEM TYPE: Septic Tank System

Tank Capacity (m^3)

Percolation Area		Mounded Percolation Area	
No. of Trenches		No. of Trenches	
Length of Trenches (m)		Length of Trenches (m)	
Invert Level (m)		Invert Level (m)	

SYSTEM TYPE: Secondary Treatment System

Filter Systems

Media Type	Area (m^2)*	Depth of Filter	Invert Level
Sand/Soil			
Soil			
Constructed Wetland			
Other			

Package Treatment Systems

Type

Capacity PE

Sizing of Primary Compartment

m^3

SYSTEM TYPE: Tertiary Treatment System

Polishing Filter: Surface Area (m^2)*

or **Gravity Fed:**

No. of Trenches

Length of Trenches (m)

Invert Level (m)

Package Treatment System: Capacity (pe)

Constructed Wetland: Surface Area (m^2)*

DISCHARGE ROUTE:

Groundwater ☐ Hydraulic Loading Rate * ($l/m^2.d$)

Surface Water ** ☐ Discharge Rate (m^3/hr)

TREATMENT STANDARDS:

Treatment System Performance Standard (mg/l)	BOD	SS	NH_4 - N	Total N	Total P

QUALITY ASSURANCE:

Installation & Commissioning	On-going Maintenance

* Hydraulic loading rate is determined by the percolation rate of subsoil

** Water Pollution Act discharge licence required

7.0 SITE ASSESSOR DETAILS

Company: MESKELL CONSULTING ENGINEERS

Prefix: Mr. First Name: MAURICE Surname: MESKELL

Address:
COOLCAPPA,
ARDAGH,
CO.LIMERICK

Qualifications/Experience: B.E.M.I.E.I Approved Site Assessor

Date of Report: 14/03/2018

Phone: 0879641862 Fax: e-mail MAURICE.MESKELL@GMAIL.COM

Indemnity Insurance Number:

Signature: _____

SITE CHARACTERISATION FORM
COMPLETING THE FORM

Step 1:

Goto Menu Item **File, Save As** and save the file under a reference relating to the client or the planning application reference if available.

Use the **Clear Form** button to clear all information fields.

Notes:

All calculations in this form are automatic.

Where possible information is presented in the form of drop down selection lists to eliminate potential errors.

Variable elements are recorded by tick boxes. In all cases only one tick box should be activated.

All time record fields must be entered in twenty hour format as follows: HH:MM

All date formats are DD/MM/YYYY.

All other data fields are in text entry format.

This form can be printed out fully populated for submission with related documents and for your files. It can also be submitted by email.

Section 3.2

In this section use an underline _____ across all six columns to indicate the depth at which changes in classification / characteristics occur.

Section 3.4

Lists supporting documentation required.

Section 4

Select the treatment systems suitable for this site and the discharge route.

Section 5

Indicate the system type that it is proposed to install.

Section 6

Provide details, as required, on the proposed treatment system.

APPENDIX B: SITE CHARACTERISATION FORM

File Reference: TEST HOLE NO 1

1.0 GENERAL DETAILS (From planning application)

Prefix: | First Name: SHANNON FOYNES PORT CO | Surname:

Address: Durnish, Foynes Co .Limeirck

Site Location and Townland: as across

Telephone No: n/a | Fax No: n/a

E-Mail: n/a

Maximum no. of Residents: | No. of Double Bedrooms: | No. of Single Bedrooms:

Proposed Water Supply: Mains ☐ | Private Well/Borehole ☐ | Group Well/Borehole ☐

2.0 GENERAL DETAILS (From planning application)

Soil Type, (Specify Type): Deep Poorly drained mineral (BminPD)

Aquifer Category: Regionally Important ☐ | Locally Important LI | Poor ☐

Vulnerability: Extreme ✔ | High ☐ | Moderate ☐ | Low ☐ | High to Low ☐ | Unknown ☐

Bedrock Type: Limestone

Name of Public/Group Scheme Water Supply within 1 km: Gwss in foynes

Groundwater Protection Scheme (Y/N): | Source Protection Area: SI ☐ SO ☐

Groundwater Protection Response: R2[1]

Presence of Significant Sites (Archaeological, Natural & Historical): none

Past experience in the area: none. other site assessments in the area have a T value between 30 -50

Comments:

(Integrate the information above in order to comment on: the potential suitability of the site, potential targets at risk, and/or any potential site restrictions).

Ground water is potential target at risk
no site restrictions identified.
GSI Ground water Protection Zone R21
Rock evident in this area are the per digital mapping

Note: Only information available at the desk study stage should be used in this section.

3.0 ON-SITE ASSESSMENT

3.1 Visual Assessment

Landscape Position: Flat site undulating topography where test was carried out in five different locations

Slope: Steep (>1:5) ☐ Shallow (1:5-1:20) ☐ Relatively Flat (<1:20) ✔

Surface Features within a minimum of 250m (Distance To Features Should Be Noted In Metres)

Houses: there are approx. 2 houses within 250m of the site.

Existing Land Use: Agricultural Grassland

Vegetation Indicators: Grass with Thistle and Bracken evident in the headgerow of the site

Groundwater Flow Direction: Estimated to be downslope to the North towards river

Ground Condition: firm under foot with no evidence of poaching towards the front of the land. poaching evident towards the north side of

Site Boundaries: Hedgerow and road with railway to the south of land

Roads: site served by a access road to the foynes port

Outcrops (Bedrock And/Or Subsoil): none evident

Surface Water Ponding: none in 250m Lakes: none within site

Beaches/Shellfish: none in 250m Areas/Wetlands: none in 250m

Karst Features: not within 150m of the site according to the GSI web mapping.

Watercourse/Stream*: Shannon estuary to the north and stream to the east that feeds into the estuary

Drainage Ditches*: a number of drainage ditched through out the land

Springs / Wells*: none within the land shown

Comments:
(Integrate the information above in order to comment on: the potential suitability of the site, potential targets at risk, the suitability of the site to treat the wastewater and the location of the proposed system within the site).

Groundwater is potential target at risk from effluent from potential wastewater treatment system
Site suitability will depend on nature and thickness of subsoil.

***Note and record** water level

3.2 Trial Hole (should be a minimum of 2.1m deep (3m for regionally important aquifers))

To avoid any accidental damage, a trial hole assessment or percolation tests should not be undertaken in areas, which are at or adjacent to significant sites (e.g. NHAs, SACs, SPAs, and/or Archaeological etc.), without prior advice from National Parks and Wildlife Service or the Heritage Service.

Depth of trial hole (m): 1.00

Depth from ground surface to bedrock (m) (if present): 1.00

Depth from ground surface to water table (m) (if present): 1.20

Depth of water ingress: 1.20

Rock type (if present): Limestone

Date and time of excavation: 12/03/2018 09:00

Date and time of examination: 12/03/2018 09:00

	Depth of P/T Test*	Soil/Subsoil Texture & Classification**	Plasticity and dilatancy***	Soil Structure	Density/ Compactness	Colour****	Preferential flowpaths
0.1 m		0.0-0.3m Gravelly SILT/CLAY Topsoil	Ribbons:30,30,40 Treads:2,2,3 Dilatent	Crumb	Firm	Brown	Rootlets to 0.2m
0.2 m							
0.3 m							
0.4 m	T1,2,3	0.3-1.0m CLAY with cobbles	Ribbons:40,40,40 Treads:2,3,2 Not Dilatent	Blocky	Firm	Grey	None
0.5 m							
0.6 m	T1,2,3						
0.7 m							
0.8 m							
0.9 m							
1.0 m		1.0M rock End of Trial Hole					
1.1 m							
1.2 m							
1.3 m							
1.4 m							
1.5 m							
1.6 m							
1.7 m							
1.8 m							
1.9 m							
2.0 m							
2.1 m							
2.2 m							
2.3 m							
2.4 m							
2.5 m							
2.6 m							
2.7 m							
2.8 m							
2.9 m							
3.0 m							

Likely T value: 20.00

Note: *Depth of percolation test holes should be indicated on log above. (Enter P or T at depts as appropriate).
** See Appendix E for BS 5930 classification.
*** 3 samples to be tested for each horizon and results should be entered above for each horizon.
**** All signs of mottling should be recorded.

3.2 Trial Hole (contd.) Evaluation:

Rock at 1.om B.G.L
Site suitability to be confirmed by T testing of soil.

3.3(a) Percolation ("T") Test for Deep Subsoils and/or Water Table

Step 1: Test Hole Preparation

Percolation Test Hole	1	2	3
Depth from ground surface to top of hole (mm) (A)	300	300	300
Depth from ground surface to base of hole (mm) (B)	700	700	700
Depth of hole (mm) [B - A]	400	400	400
Dimensions of hole [length x breadth (mm)]	300 x 300	300 x 300	300 x 300

Step 2: Pre-Soaking Test Holes

Date and Time pre-soaking started	09/03/2018	09:00	09/03/2018	09:00	09/03/2018	09:00

Each hole should be pre-soaked twice before the test is carried out. Each hole should be empty before refilling.

Step 3: Measuring T_{100}

Percolation Test Hole No.	1	2	3
Date of test	12/03/2018	12/03/2018	12/03/2018
Time filled to 400 mm	09:21	09:22	09:23
Time water level at 300 mm	12:39	10:55	11:25
Time to drop 100 mm (T_{100})	879.00	93.00	122.00
Average T_{100}			364.67

If T_{100} > 300 minutes then T-value >90 – site unsuitable for discharge to ground
If $T_{100} \leq$ 210 minutes then go to Step 4;
If T_{100} > 210 minutes then go to Step 5;

Step 4: Standard Method (where $T_{100} \leq 210$ minutes)

Percolation Test Hole	1			2			3		
Fill no.	Start Time (at 300 mm)	Finish Time (at 200 mm)	Δt (min)	Start Time (at 300 mm)	Finish Time (at 200 mm)	Δt (min)	Start Time (at 300 mm)	Finish Time (at 200 mm)	Δt (min)
1	12:39	14:50	0.00	10:55	12:01	66.00	11:25	13:35	130.00
2	14:50	17:18	0.00	12:02	13:33	91.00	13:36	15:55	139.00
3	17:19	19:31	0.00	13:34	15:41	127.00	15:56	18:12	136.00
Average Δt Value			0.00			94.67			135.00
	Average Δt/4 = [Hole No.1]		0.00 (t_1)	Average Δt/4 = [Hole No.2]		23.67 (t_2)	Average Δt/4 = [Hole No.3]		33.75 (t_3)

Result of Test: T = 19.14 (min/25 mm)

Comments:

Subsoil has good hydraulic assimilative capacity.

Step 5: Modified Method (where $T_{100} > 210$ minutes)

Percolation Test Hole No.	1				2				3			
Fall of water in hole (mm)	Time Factor = T_f	Time of fall (mins) = T_m	K_{fs} = T_f / T_m	T – Value = 4.45 / K_{fs}	Time Factor = T_f	Time of fall (mins) = T_m	K_{fs} = T_f / T_m	T – Value = 4.45 / K_{fs}	Time Factor = T_f	Time of fall (mins) = T_m	K_{fs} = T_f / T_m	T – Value = 4.45 / K_{fs}
300 - 250	8.1				8.1				8.1			
250 - 200	9.7				9.7				9.7			
200 - 150	11.9				11.9				11.9			
150 - 100	14.1				14.1				14.1			
Average T- Value	T- Value Hole 1= (t_1)			0.00	T- Value Hole 1= (t_2)			0.00	T- Value Hole 1= (t_3)			0.00

Result of Test: T = 0.00 (min/25 mm)

Comments:

3.3(b) Percolation ("P") Test for Shallow Soil / Subsoils and/or Water Table

Step 1: Test Hole Preparation

Percolation Test Hole	1	2	3
Depth from ground surface to top of hole (mm)	0	0	0
Depth from ground surface to base of hole (mm)			
Depth of hole (mm)	0	0	0
Dimensions of hole [length x breadth (mm)]	x	x	x

Step 2: Pre-Soaking Test Holes

Date and Time pre-soaking started					

Each hole should be pre-soaked twice before the test is carried out. Each hole should be empty before refilling.

Step 3: Measuring P_{100}

Percolation Test Hole No.	1	2	3
Date of test			
Time filled to 400 mm			
Time water level at 300 mm			
Time to drop 100 mm (P_{100})	0.00	0.00	0.00
Average P_{100}			0.00

If P_{100} > 300 minutes then P-value >90 – site unsuitable for discharge to ground
If $P_{100} \leq$ 210 minutes then go to Step 4;
If P_{100} > 210 minutes then go to Step 5;

Step 4: Standard Method (where $P_{100} \leq 210$ minutes)

Percolation Test Hole	1			2			3		
Fill no.	Start Time (at 300 mm)	Finish Time (at 200 mm)	Δp (min)	Start Time (at 300 mm)	Finish Time (at 200 mm)	Δp (min)	Start Time (at 300 mm)	Finish Time (at 200 mm)	Δp (min)
1			0.00			0.00			0.00
2			0.00			0.00			0.00
3			0.00			0.00			0.00
Average Δp Value			0.00			0.00			0.00
	Average Δp/4 = [Hole No.1]		0.00 (p_1)	Average Δp/4 = [Hole No.2]		0.00 (p_2)	Average Δp/4 = [Hole No.3]		0.00 (p_3)

Result of Test: P = 0.00 (min/25 mm)

Comments:

Step 5: Modified Method (where $P_{100} > 210$ minutes)

Percolation Test Hole No.	1				2				3			
Fall of water in hole (mm)	Time Factor = T_f	Time of fall (mins) = T_m	$K_{fs} = T_f / T_m$	P – Value = 4.45 / K_{fs}	Time Factor = T_f	Time of fall (mins) = T_m	$K_{fs} = T_f / T_m$	P – Value = 4.45 / K_{fs}	Time Factor = T_f	Time of fall (mins) = T_m	$K_{fs} = T_f / T_m$	P – Value = 4.45 / K_{fs}
300 - 250	8.1				8.1				8.1			
250 - 200	9.7				9.7				9.7			
200 - 150	11.9				11.9				11.9			
150 - 100	14.1				14.1				14.1			
Average P- Value	P- Value Hole 1= (p_1)			0.00	P- Value Hole 1= (p_2)			0.00	P- Value Hole 1= (p_3)			0.00

Result of Test: P = 0.00 (min/25 mm)

Comments:

3.4 The following associated Maps, Drawings and Photographs should be appended to this site characterisation form.

1. Discovery Series 1:50,000 Map indicating overall drainage, groundwater flow direction and housing density in the area.
2. Supporting maps for vulnerability, aquifer classification, soil, bedrock.
3. North point should always be included.
4. (a) Sketch of site showing measurements to Trial Hole location and
   (b) Percolation Test Hole locations,
   (c) wells and
   (d) direction of groundwater flow (if known),
   (e) proposed house (incl. distances from boundaries)
   (f) adjacent houses,
   (g) watercourses,
   (h) significant sites
   (i) and other relevant features.
5. Cross sectional drawing of the site and the proposed layout[1] should be submitted.
6. Photographs of the trial hole, test holes and site (date and time referenced).

[1] The calculated percolation area or polishing filter area should be set out accurately on the site layout drawing in accordance with the code of practice's requirements.

4.0 CONCLUSION of SITE CHARACTERISATION

Integrate the information from the desk study and on-site assessment (i.e. visual assessment, trial hole and percolation tests) above and conclude the type of system(s) that is (are) appropriate. This information is also used to choose the optimum final disposal route of the treated wastewater.

Not Suitable for Development ☐

Suitable for [1]		**Discharge Route**
1. Septic tank system (septic tank and percolation area)	☐	☐
2. Secondary Treatment System		
a. septic tank and filter system constructed on-site and polishing filter; or	☐	
b. packaged wastewater treatment system and polishing filter	☐	

5.0 RECOMMENDATION

Propose to install: ☐

and discharge to: ☐

Trench Invert level (m): ☐

Site Specific Conditions (e.g. special works, site improvement works testing etc.

☐

[1] note: more than one option may be suitable for a site and this should be recorded

[2] A discharge of sewage effluent to "waters" (definition includes any or any part of any river, stream, lake, canal, reservoir, aquifer, pond, watercourse or other inland waters, whether natural or artificial) will require a licence under the Water Pollution Acts 1977-90. Refer to Section 2.6.2.

6.0 TREATMENT SYSTEM DETAILS

SYSTEM TYPE: Septic Tank System

Tank Capacity (m^3)

Percolation Area		Mounded Percolation Area	
No. of Trenches		No. of Trenches	
Length of Trenches (m)		Length of Trenches (m)	
Invert Level (m)		Invert Level (m)	

SYSTEM TYPE: Secondary Treatment System

Filter Systems

Media Type	Area (m^2)*	Depth of Filter	Invert Level
Sand/Soil			
Soil			
Constructed Wetland			
Other			

Package Treatment Systems

Type

Capacity PE

Sizing of Primary Compartment

m^3

SYSTEM TYPE: Tertiary Treatment System

Polishing Filter: Surface Area (m^2)*

or **Gravity Fed:**

No. of Trenches

Length of Trenches (m)

Invert Level (m)

Package Treatment System: Capacity (pe)

Constructed Wetland: Surface Area (m^2)*

DISCHARGE ROUTE:

Groundwater ☐ Hydraulic Loading Rate * ($l/m^2.d$)

Surface Water ** ☐ Discharge Rate (m^3/hr)

TREATMENT STANDARDS:

Treatment System Performance Standard (mg/l)	BOD	SS	NH_4 - N	Total N	Total P

QUALITY ASSURANCE:

Installation & Commissioning	On-going Maintenance

* Hydraulic loading rate is determined by the percolation rate of subsoil

** Water Pollution Act discharge licence required

7.0 SITE ASSESSOR DETAILS

Company: MESKELL CONSULTING ENGINEERS

Prefix: Mr. First Name: MAURICE Surname: MESKELL

Address:
COOLCAPPA,
ARDAGH,
CO.LIMERICK

Qualifications/Experience: B.E.M.I.E.I Approved Site Assessor

Date of Report: 14/03/2018

Phone: 0879641862 Fax: e-mail MAURICE.MESKELL@GMAIL.COM

Indemnity Insurance Number:

Signature: _____

SITE CHARACTERISATION FORM
COMPLETING THE FORM

Step 1:

Goto Menu Item **File, Save As** and save the file under a reference relating to the client or the planning application reference if available.

Use the **Clear Form** button to clear all information fields.

Notes:

All calculations in this form are automatic.

Where possible information is presented in the form of drop down selection lists to eliminate potential errors.

Variable elements are recorded by tick boxes. In all cases only one tick box should be activated.

All time record fields must be entered in twenty hour format as follows: HH:MM

All date formats are DD/MM/YYYY.

All other data fields are in text entry format.

This form can be printed out fully populated for submission with related documents and for your files. It can also be submitted by email.

Section 3.2

In this section use an underline _____ across all six columns to indicate the depth at which changes in classification / characteristics occur.

Section 3.4

Lists supporting documentation required.

Section 4

Select the treatment systems suitable for this site and the discharge route.

Section 5

Indicate the system type that it is proposed to install.

Section 6

Provide details, as required, on the proposed treatment system.

APPENDIX B: SITE CHARACTERISATION FORM

File Reference: TEST HOLE NO 1

1.0 GENERAL DETAILS (From planning application)

Prefix: | First Name: SHANNON FOYNES PORT CO | Surname:

Address: Durnish, Foynes Co .Limeirck

Site Location and Townland: as across

Telephone No: n/a | Fax No: n/a

E-Mail: n/a

Maximum no. of Residents: | No. of Double Bedrooms: | No. of Single Bedrooms:

Proposed Water Supply: Mains ☐ | Private Well/Borehole ☐ | Group Well/Borehole ☐

2.0 GENERAL DETAILS (From planning application)

Soil Type, (Specify Type): Deep Poorly drained mineral (BminPD)

Aquifer Category: Regionally Important ☐ | Locally Important LI | Poor ☐

Vulnerability: Extreme ✔ | High ☐ | Moderate ☐ | Low ☐ | High to Low ☐ | Unknown ☐

Bedrock Type: Limestone

Name of Public/Group Scheme Water Supply within 1 km: Gwss in foynes

Groundwater Protection Scheme (Y/N): | Source Protection Area: SI ☐ SO ☐

Groundwater Protection Response: R2[1]

Presence of Significant Sites (Archaeological, Natural & Historical): none

Past experience in the area: none. other site assessments in the area have a T value between 30 -50

Comments:

(Integrate the information above in order to comment on: the potential suitability of the site, potential targets at risk, and/or any potential site restrictions).

Ground water is potential target at risk
no site restrictions identified.
GSI Ground water Protection Zone R21
Rock evident in this area are the per digital mapping

Note: Only information available at the desk study stage should be used in this section.

3.0 ON-SITE ASSESSMENT

3.1 Visual Assessment

Landscape Position: Flat site undulating topography where test was carried out in five different locations

Slope: Steep (>1:5) ☐ Shallow (1:5-1:20) ☐ Relatively Flat (<1:20) ✔

Surface Features within a minimum of 250m (Distance To Features Should Be Noted In Metres)

Houses: there are approx. 2 houses within 250m of the site.

Existing Land Use: Agricultural Grassland

Vegetation Indicators: Grass with Thistle and Bracken evident in the headgerow of the site

Groundwater Flow Direction: Estimated to be downslope to the North towards river

Ground Condition: firm under foot with no evidence of poaching towards the front of the land. poaching evident towards the north side of

Site Boundaries: Hedgerow and road with railway to the south of land

Roads: site served by a access road to the foynes port

Outcrops (Bedrock And/Or Subsoil): none evident

Surface Water Ponding: none in 250m Lakes: none within site

Beaches/Shellfish: none in 250m Areas/Wetlands: none in 250m

Karst Features: not within 150m of the site according to the GSI web mapping.

Watercourse/Stream*: Shannon estuary to the north and stream to the east that feeds into the estuary

Drainage Ditches*: a number of drainage ditched through out the land

Springs / Wells*: none within the land shown

Comments:
(Integrate the information above in order to comment on: the potential suitability of the site, potential targets at risk, the suitability of the site to treat the wastewater and the location of the proposed system within the site).

Groundwater is potential target at risk from effluent from potential wastewater treatment system
Site suitability will depend on nature and thickness of subsoil.

***Note and record** water level

3.2 Trial Hole (should be a minimum of 2.1m deep (3m for regionally important aquifers))

To avoid any accidental damage, a trial hole assessment or percolation tests should not be undertaken in areas, which are at or adjacent to significant sites (e.g. NHAs, SACs, SPAs, and/or Archaeological etc.), without prior advice from National Parks and Wildlife Service or the Heritage Service.

Depth of trial hole (m): 1.00

Depth from ground surface to bedrock (m) (if present): 1.00

Depth from ground surface to water table (m) (if present): 1.20

Depth of water ingress: 1.20

Rock type (if present): Limestone

Date and time of excavation: 12/03/2018 09:00

Date and time of examination: 12/03/2018 09:00

	Depth of P/T Test*	Soil/Subsoil Texture & Classification**	Plasticity and dilatancy***	Soil Structure	Density/ Compactness	Colour****	Preferential flowpaths
0.1 m		0.0-0.3m Gravelly SILT/CLAY Topsoil	Ribbons:30,30,40 Treads:2,2,3 Dilatent	Crumb	Firm	Brown	Rootlets to 0.2m
0.2 m							
0.3 m							
0.4 m	T1,2,3	0.3-1.0m CLAY with cobbles	Ribbons:40,40,40 Treads:2,3,2 Not Dilatent	Blocky	Firm	Grey	None
0.5 m							
0.6 m	T1,2,3						
0.7 m							
0.8 m							
0.9 m							
1.0 m		1.0M rock End of Trial Hole					
1.1 m							
1.2 m							
1.3 m							
1.4 m							
1.5 m							
1.6 m							
1.7 m							
1.8 m							
1.9 m							
2.0 m							
2.1 m							
2.2 m							
2.3 m							
2.4 m							
2.5 m							
2.6 m							
2.7 m							
2.8 m							
2.9 m							
3.0 m							

Likely T value: 20.00

Note: *Depth of percolation test holes should be indicated on log above. (Enter P or T at depts as appropriate).
** See Appendix E for BS 5930 classification.
*** 3 samples to be tested for each horizon and results should be entered above for each horizon.
**** All signs of mottling should be recorded.

3.2 Trial Hole (contd.) Evaluation:

Rock at 1.om B.G.L
Site suitability to be confirmed by T testing of soil.

3.3(a) Percolation ("T") Test for Deep Subsoils and/or Water Table

Step 1: Test Hole Preparation

Percolation Test Hole	1	2	3
Depth from ground surface to top of hole (mm) (A)	300	300	300
Depth from ground surface to base of hole (mm) (B)	700	700	700
Depth of hole (mm) [B - A]	400	400	400
Dimensions of hole [length x breadth (mm)]	300 x 300	300 x 300	300 x 300

Step 2: Pre-Soaking Test Holes

Date and Time pre-soaking started	09/03/2018	09:00	09/03/2018	09:00	09/03/2018	09:00

Each hole should be pre-soaked twice before the test is carried out. Each hole should be empty before refilling.

Step 3: Measuring T_{100}

Percolation Test Hole No.	1	2	3
Date of test	12/03/2018	12/03/2018	12/03/2018
Time filled to 400 mm	09:21	09:22	09:23
Time water level at 300 mm	12:39	10:55	11:25
Time to drop 100 mm (T_{100})	879.00	93.00	122.00
Average T_{100}			364.67

If T_{100} > 300 minutes then T-value >90 – site unsuitable for discharge to ground
If $T_{100} \leq$ 210 minutes then go to Step 4;
If T_{100} > 210 minutes then go to Step 5;

Step 4: Standard Method (where $T_{100} \leq 210$ minutes)

Percolation Test Hole	1			2			3		
Fill no.	Start Time (at 300 mm)	Finish Time (at 200 mm)	Δt (min)	Start Time (at 300 mm)	Finish Time (at 200 mm)	Δt (min)	Start Time (at 300 mm)	Finish Time (at 200 mm)	Δt (min)
1	12:39	14:50	0.00	10:55	12:01	66.00	11:25	13:35	130.00
2	14:50	17:18	0.00	12:02	13:33	91.00	13:36	15:55	139.00
3	17:19	19:31	0.00	13:34	15:41	127.00	15:56	18:12	136.00
Average Δt Value			0.00			94.67			135.00
	Average Δt/4 = [Hole No.1]		0.00 (t_1)	Average Δt/4 = [Hole No.2]		23.67 (t_2)	Average Δt/4 = [Hole No.3]		33.75 (t_3)

Result of Test: T = 19.14 (min/25 mm)

Comments:

Subsoil has good hydraulic assimilative capacity.

Step 5: Modified Method (where $T_{100} > 210$ minutes)

Percolation Test Hole No.	1				2				3			
Fall of water in hole (mm)	Time Factor = T_f	Time of fall (mins) = T_m	K_{fs} = T_f / T_m	T – Value = 4.45 / K_{fs}	Time Factor = T_f	Time of fall (mins) = T_m	K_{fs} = T_f / T_m	T – Value = 4.45 / K_{fs}	Time Factor = T_f	Time of fall (mins) = T_m	K_{fs} = T_f / T_m	T – Value = 4.45 / K_{fs}
300 - 250	8.1				8.1				8.1			
250 - 200	9.7				9.7				9.7			
200 - 150	11.9				11.9				11.9			
150 - 100	14.1				14.1				14.1			
Average T- Value	T- Value Hole 1= (t_1)			0.00	T- Value Hole 1= (t_2)			0.00	T- Value Hole 1= (t_3)			0.00

Result of Test: T = 0.00 (min/25 mm)

Comments:

3.3(b) Percolation ("P") Test for Shallow Soil / Subsoils and/or Water Table

Step 1: Test Hole Preparation

Percolation Test Hole	1	2	3
Depth from ground surface to top of hole (mm)	0	0	0
Depth from ground surface to base of hole (mm)			
Depth of hole (mm)	0	0	0
Dimensions of hole [length x breadth (mm)]	x	x	x

Step 2: Pre-Soaking Test Holes

Date and Time pre-soaking started					

Each hole should be pre-soaked twice before the test is carried out. Each hole should be empty before refilling.

Step 3: Measuring P_{100}

Percolation Test Hole No.	1	2	3
Date of test			
Time filled to 400 mm			
Time water level at 300 mm			
Time to drop 100 mm (P_{100})	0.00	0.00	0.00
Average P_{100}			0.00

If P_{100} > 300 minutes then P-value >90 – site unsuitable for discharge to ground
If $P_{100} \leq$ 210 minutes then go to Step 4;
If P_{100} > 210 minutes then go to Step 5;

Step 4: Standard Method (where $P_{100} \leq 210$ minutes)

Percolation Test Hole	1			2			3		
Fill no.	Start Time (at 300 mm)	Finish Time (at 200 mm)	Δp (min)	Start Time (at 300 mm)	Finish Time (at 200 mm)	Δp (min)	Start Time (at 300 mm)	Finish Time (at 200 mm)	Δp (min)
1			0.00			0.00			0.00
2			0.00			0.00			0.00
3			0.00			0.00			0.00
Average Δp Value			0.00			0.00			0.00
	Average Δp/4 = [Hole No.1]		0.00 (p_1)	Average Δp/4 = [Hole No.2]		0.00 (p_2)	Average Δp/4 = [Hole No.3]		0.00 (p_3)

Result of Test: P = 0.00 (min/25 mm)

Comments:

Step 5: Modified Method (where $P_{100} > 210$ minutes)

Percolation Test Hole No.	1				2				3			
Fall of water in hole (mm)	Time Factor = T_f	Time of fall (mins) = T_m	$K_{fs} = T_f / T_m$	P – Value = 4.45 / K_{fs}	Time Factor = T_f	Time of fall (mins) = T_m	$K_{fs} = T_f / T_m$	P – Value = 4.45 / K_{fs}	Time Factor = T_f	Time of fall (mins) = T_m	$K_{fs} = T_f / T_m$	P – Value = 4.45 / K_{fs}
300 - 250	8.1				8.1				8.1			
250 - 200	9.7				9.7				9.7			
200 - 150	11.9				11.9				11.9			
150 - 100	14.1				14.1				14.1			
Average P- Value	P- Value Hole 1= (p_1)			0.00	P- Value Hole 1= (p_2)			0.00	P- Value Hole 1= (p_3)			0.00

Result of Test: P = 0.00 (min/25 mm)

Comments:

3.4 The following associated Maps, Drawings and Photographs should be appended to this site characterisation form.

1. Discovery Series 1:50,000 Map indicating overall drainage, groundwater flow direction and housing density in the area.
2. Supporting maps for vulnerability, aquifer classification, soil, bedrock.
3. North point should always be included.
4. (a) Sketch of site showing measurements to Trial Hole location and
   (b) Percolation Test Hole locations,
   (c) wells and
   (d) direction of groundwater flow (if known),
   (e) proposed house (incl. distances from boundaries)
   (f) adjacent houses,
   (g) watercourses,
   (h) significant sites
   (i) and other relevant features.
5. Cross sectional drawing of the site and the proposed layout[1] should be submitted.
6. Photographs of the trial hole, test holes and site (date and time referenced).

[1] The calculated percolation area or polishing filter area should be set out accurately on the site layout drawing in accordance with the code of practice's requirements.

4.0 CONCLUSION of SITE CHARACTERISATION

Integrate the information from the desk study and on-site assessment (i.e. visual assessment, trial hole and percolation tests) above and conclude the type of system(s) that is (are) appropriate. This information is also used to choose the optimum final disposal route of the treated wastewater.

Not Suitable for Development ☐

Suitable for [1]		**Discharge Route**
1. Septic tank system (septic tank and percolation area)	☐	☐
2. Secondary Treatment System		
a. septic tank and filter system constructed on-site and polishing filter; or	☐	
b. packaged wastewater treatment system and polishing filter	☐	

5.0 RECOMMENDATION

Propose to install: ☐

and discharge to: ☐

Trench Invert level (m): ☐

Site Specific Conditions (e.g. special works, site improvement works testing etc.

☐

[1] note: more than one option may be suitable for a site and this should be recorded

[2] A discharge of sewage effluent to "waters" (definition includes any or any part of any river, stream, lake, canal, reservoir, aquifer, pond, watercourse or other inland waters, whether natural or artificial) will require a licence under the Water Pollution Acts 1977-90. Refer to Section 2.6.2.

6.0 TREATMENT SYSTEM DETAILS

SYSTEM TYPE: Septic Tank System

Tank Capacity (m^3)

Percolation Area		Mounded Percolation Area	
No. of Trenches		No. of Trenches	
Length of Trenches (m)		Length of Trenches (m)	
Invert Level (m)		Invert Level (m)	

SYSTEM TYPE: Secondary Treatment System

Filter Systems

Media Type	Area (m^2)*	Depth of Filter	Invert Level
Sand/Soil			
Soil			
Constructed Wetland			
Other			

Package Treatment Systems

Type

Capacity PE

Sizing of Primary Compartment

m^3

SYSTEM TYPE: Tertiary Treatment System

Polishing Filter: Surface Area (m^2)*

or **Gravity Fed:**

No. of Trenches

Length of Trenches (m)

Invert Level (m)

Package Treatment System: Capacity (pe)

Constructed Wetland: Surface Area (m^2)*

DISCHARGE ROUTE:

Groundwater ☐ Hydraulic Loading Rate * ($l/m^2.d$)

Surface Water ** ☐ Discharge Rate (m^3/hr)

TREATMENT STANDARDS:

Treatment System Performance Standard (mg/l)	BOD	SS	NH_4 - N	Total N	Total P

QUALITY ASSURANCE:

Installation & Commissioning	On-going Maintenance

* Hydraulic loading rate is determined by the percolation rate of subsoil

** Water Pollution Act discharge licence required

7.0 SITE ASSESSOR DETAILS

Company: MESKELL CONSULTING ENGINEERS

Prefix: Mr. First Name: MAURICE Surname: MESKELL

Address:
COOLCAPPA,
ARDAGH,
CO.LIMERICK

Qualifications/Experience: B.E.M.I.E.I Approved Site Assessor

Date of Report: 14/03/2018

Phone: 0879641862 Fax: e-mail MAURICE.MESKELL@GMAIL.COM

Indemnity Insurance Number:

Signature: _____

SITE CHARACTERISATION FORM
COMPLETING THE FORM

Step 1:

Goto Menu Item **File, Save As** and save the file under a reference relating to the client or the planning application reference if available.

Use the **Clear Form** button to clear all information fields.

Notes:

All calculations in this form are automatic.

Where possible information is presented in the form of drop down selection lists to eliminate potential errors.

Variable elements are recorded by tick boxes. In all cases only one tick box should be activated.

All time record fields must be entered in twenty hour format as follows: HH:MM

All date formats are DD/MM/YYYY.

All other data fields are in text entry format.

This form can be printed out fully populated for submission with related documents and for your files. It can also be submitted by email.

Section 3.2

In this section use an underline _____ across all six columns to indicate the depth at which changes in classification / characteristics occur.

Section 3.4

Lists supporting documentation required.

Section 4

Select the treatment systems suitable for this site and the discharge route.

Section 5

Indicate the system type that it is proposed to install.

Section 6

Provide details, as required, on the proposed treatment system.

APPENDIX B: SITE CHARACTERISATION FORM

File Reference: TEST HOLE NO 1

1.0 GENERAL DETAILS (From planning application)

Prefix: | First Name: SHANNON FOYNES PORT CO | Surname:

Address: Durnish, Foynes Co .Limeirck

Site Location and Townland: as across

Telephone No: n/a | Fax No: n/a

E-Mail: n/a

Maximum no. of Residents: | No. of Double Bedrooms: | No. of Single Bedrooms:

Proposed Water Supply: Mains ☐ | Private Well/Borehole ☐ | Group Well/Borehole ☐

2.0 GENERAL DETAILS (From planning application)

Soil Type, (Specify Type): Deep Poorly drained mineral (BminPD)

Aquifer Category: Regionally Important ☐ | Locally Important LI | Poor ☐

Vulnerability: Extreme ✔ | High ☐ | Moderate ☐ | Low ☐ | High to Low ☐ | Unknown ☐

Bedrock Type: Limestone

Name of Public/Group Scheme Water Supply within 1 km: Gwss in foynes

Groundwater Protection Scheme (Y/N): | Source Protection Area: SI ☐ SO ☐

Groundwater Protection Response: R2[1]

Presence of Significant Sites (Archaeological, Natural & Historical): none

Past experience in the area: none. other site assessments in the area have a T value between 30 -50

Comments:

(Integrate the information above in order to comment on: the potential suitability of the site, potential targets at risk, and/or any potential site restrictions).

Ground water is potential target at risk
no site restrictions identified.
GSI Ground water Protection Zone R21
Rock evident in this area are the per digital mapping

Note: Only information available at the desk study stage should be used in this section.

3.0 ON-SITE ASSESSMENT

3.1 Visual Assessment

Landscape Position: Flat site undulating topography where test was carried out in five different locations

Slope: Steep (>1:5) ☐ Shallow (1:5-1:20) ☐ Relatively Flat (<1:20) ✔

Surface Features within a minimum of 250m (Distance To Features Should Be Noted In Metres)

Houses: there are approx. 2 houses within 250m of the site.

Existing Land Use: Agricultural Grassland

Vegetation Indicators: Grass with Thistle and Bracken evident in the headgerow of the site

Groundwater Flow Direction: Estimated to be downslope to the North towards river

Ground Condition: firm under foot with no evidence of poaching towards the front of the land. poaching evident towards the north side of

Site Boundaries: Hedgerow and road with railway to the south of land

Roads: site served by a access road to the foynes port

Outcrops (Bedrock And/Or Subsoil): none evident

Surface Water Ponding: none in 250m Lakes: none within site

Beaches/Shellfish: none in 250m Areas/Wetlands: none in 250m

Karst Features: not within 150m of the site according to the GSI web mapping.

Watercourse/Stream*: Shannon estuary to the north and stream to the east that feeds into the estuary

Drainage Ditches*: a number of drainage ditched through out the land

Springs / Wells*: none within the land shown

Comments:
(Integrate the information above in order to comment on: the potential suitability of the site, potential targets at risk, the suitability of the site to treat the wastewater and the location of the proposed system within the site).

Groundwater is potential target at risk from effluent from potential wastewater treatment system
Site suitability will depend on nature and thickness of subsoil.

***Note and record** water level

3.2 Trial Hole (should be a minimum of 2.1m deep (3m for regionally important aquifers))

To avoid any accidental damage, a trial hole assessment or percolation tests should not be undertaken in areas, which are at or adjacent to significant sites (e.g. NHAs, SACs, SPAs, and/or Archaeological etc.), without prior advice from National Parks and Wildlife Service or the Heritage Service.

Depth of trial hole (m): 1.00

Depth from ground surface to bedrock (m) (if present): 1.00

Depth from ground surface to water table (m) (if present): 1.20

Depth of water ingress: 1.20

Rock type (if present): Limestone

Date and time of excavation: 12/03/2018 09:00

Date and time of examination: 12/03/2018 09:00

	Depth of P/T Test*	Soil/Subsoil Texture & Classification**	Plasticity and dilatancy***	Soil Structure	Density/ Compactness	Colour****	Preferential flowpaths
0.1 m		0.0-0.3m Gravelly SILT/CLAY Topsoil	Ribbons:30,30,40 Treads:2,2,3 Dilatent	Crumb	Firm	Brown	Rootlets to 0.2m
0.2 m							
0.3 m							
0.4 m	T1,2,3	0.3-1.0m CLAY with cobbles	Ribbons:40,40,40 Treads:2,3,2 Not Dilatent	Blocky	Firm	Grey	None
0.5 m							
0.6 m	T1,2,3						
0.7 m							
0.8 m							
0.9 m							
1.0 m		1.0M rock End of Trial Hole					
1.1 m							
1.2 m							
1.3 m							
1.4 m							
1.5 m							
1.6 m							
1.7 m							
1.8 m							
1.9 m							
2.0 m							
2.1 m							
2.2 m							
2.3 m							
2.4 m							
2.5 m							
2.6 m							
2.7 m							
2.8 m							
2.9 m							
3.0 m							

Likely T value: 20.00

Note: *Depth of percolation test holes should be indicated on log above. (Enter P or T at depts as appropriate).
** See Appendix E for BS 5930 classification.
*** 3 samples to be tested for each horizon and results should be entered above for each horizon.
**** All signs of mottling should be recorded.

3.2 Trial Hole (contd.) Evaluation:

Rock at 1.om B.G.L
Site suitability to be confirmed by T testing of soil.

3.3(a) Percolation ("T") Test for Deep Subsoils and/or Water Table

Step 1: Test Hole Preparation

Percolation Test Hole	1	2	3
Depth from ground surface to top of hole (mm) (A)	300	300	300
Depth from ground surface to base of hole (mm) (B)	700	700	700
Depth of hole (mm) [B - A]	400	400	400
Dimensions of hole [length x breadth (mm)]	300 x 300	300 x 300	300 x 300

Step 2: Pre-Soaking Test Holes

Date and Time pre-soaking started	09/03/2018	09:00	09/03/2018	09:00	09/03/2018	09:00

Each hole should be pre-soaked twice before the test is carried out. Each hole should be empty before refilling.

Step 3: Measuring T_{100}

Percolation Test Hole No.	1	2	3
Date of test	12/03/2018	12/03/2018	12/03/2018
Time filled to 400 mm	09:21	09:22	09:23
Time water level at 300 mm	12:39	10:55	11:25
Time to drop 100 mm (T_{100})	879.00	93.00	122.00
Average T_{100}			364.67

If T_{100} > 300 minutes then T-value >90 – site unsuitable for discharge to ground
If $T_{100} \leq$ 210 minutes then go to Step 4;
If T_{100} > 210 minutes then go to Step 5;

Step 4: Standard Method (where $T_{100} \leq 210$ minutes)

Percolation Test Hole	1			2			3		
Fill no.	Start Time (at 300 mm)	Finish Time (at 200 mm)	Δt (min)	Start Time (at 300 mm)	Finish Time (at 200 mm)	Δt (min)	Start Time (at 300 mm)	Finish Time (at 200 mm)	Δt (min)
1	12:39	14:50	0.00	10:55	12:01	66.00	11:25	13:35	130.00
2	14:50	17:18	0.00	12:02	13:33	91.00	13:36	15:55	139.00
3	17:19	19:31	0.00	13:34	15:41	127.00	15:56	18:12	136.00
Average Δt Value			0.00			94.67			135.00
	Average Δt/4 = [Hole No.1]		0.00 (t_1)	Average Δt/4 = [Hole No.2]		23.67 (t_2)	Average Δt/4 = [Hole No.3]		33.75 (t_3)

Result of Test: T = 19.14 (min/25 mm)

Comments:

Subsoil has good hydraulic assimilative capacity.

Step 5: Modified Method (where $T_{100} > 210$ minutes)

Percolation Test Hole No.	1				2				3			
Fall of water in hole (mm)	Time Factor = T_f	Time of fall (mins) = T_m	K_{fs} = T_f / T_m	T – Value = 4.45 / K_{fs}	Time Factor = T_f	Time of fall (mins) = T_m	K_{fs} = T_f / T_m	T – Value = 4.45 / K_{fs}	Time Factor = T_f	Time of fall (mins) = T_m	K_{fs} = T_f / T_m	T – Value = 4.45 / K_{fs}
300 - 250	8.1				8.1				8.1			
250 - 200	9.7				9.7				9.7			
200 - 150	11.9				11.9				11.9			
150 - 100	14.1				14.1				14.1			
Average T- Value	T- Value Hole 1= (t_1)			0.00	T- Value Hole 1= (t_2)			0.00	T- Value Hole 1= (t_3)			0.00

Result of Test: T = 0.00 (min/25 mm)

Comments:

3.3(b) Percolation ("P") Test for Shallow Soil / Subsoils and/or Water Table

Step 1: Test Hole Preparation

Percolation Test Hole	1	2	3
Depth from ground surface to top of hole (mm)	0	0	0
Depth from ground surface to base of hole (mm)			
Depth of hole (mm)	0	0	0
Dimensions of hole [length x breadth (mm)]	x	x	x

Step 2: Pre-Soaking Test Holes

Date and Time pre-soaking started					

Each hole should be pre-soaked twice before the test is carried out. Each hole should be empty before refilling.

Step 3: Measuring P_{100}

Percolation Test Hole No.	1	2	3
Date of test			
Time filled to 400 mm			
Time water level at 300 mm			
Time to drop 100 mm (P_{100})	0.00	0.00	0.00
Average P_{100}			0.00

If P_{100} > 300 minutes then P-value >90 – site unsuitable for discharge to ground
If $P_{100} \leq$ 210 minutes then go to Step 4;
If P_{100} > 210 minutes then go to Step 5;

Step 4: Standard Method (where $P_{100} \leq 210$ minutes)

Percolation Test Hole	1			2			3		
Fill no.	Start Time (at 300 mm)	Finish Time (at 200 mm)	Δp (min)	Start Time (at 300 mm)	Finish Time (at 200 mm)	Δp (min)	Start Time (at 300 mm)	Finish Time (at 200 mm)	Δp (min)
1			0.00			0.00			0.00
2			0.00			0.00			0.00
3			0.00			0.00			0.00
Average Δp Value			0.00			0.00			0.00
	Average Δp/4 = [Hole No.1]		0.00 (p_1)	Average Δp/4 = [Hole No.2]		0.00 (p_2)	Average Δp/4 = [Hole No.3]		0.00 (p_3)

Result of Test: P = 0.00 (min/25 mm)

Comments:

Step 5: Modified Method (where $P_{100} > 210$ minutes)

Percolation Test Hole No.	1				2				3			
Fall of water in hole (mm)	Time Factor = T_f	Time of fall (mins) = T_m	$K_{fs} = T_f / T_m$	P – Value = 4.45 / K_{fs}	Time Factor = T_f	Time of fall (mins) = T_m	$K_{fs} = T_f / T_m$	P – Value = 4.45 / K_{fs}	Time Factor = T_f	Time of fall (mins) = T_m	$K_{fs} = T_f / T_m$	P – Value = 4.45 / K_{fs}
300 - 250	8.1				8.1				8.1			
250 - 200	9.7				9.7				9.7			
200 - 150	11.9				11.9				11.9			
150 - 100	14.1				14.1				14.1			
Average P- Value	P- Value Hole 1= (p_1)			0.00	P- Value Hole 1= (p_2)			0.00	P- Value Hole 1= (p_3)			0.00

Result of Test: P = 0.00 (min/25 mm)

Comments:

3.4 The following associated Maps, Drawings and Photographs should be appended to this site characterisation form.

1. Discovery Series 1:50,000 Map indicating overall drainage, groundwater flow direction and housing density in the area.
2. Supporting maps for vulnerability, aquifer classification, soil, bedrock.
3. North point should always be included.
4. (a) Sketch of site showing measurements to Trial Hole location and
   (b) Percolation Test Hole locations,
   (c) wells and
   (d) direction of groundwater flow (if known),
   (e) proposed house (incl. distances from boundaries)
   (f) adjacent houses,
   (g) watercourses,
   (h) significant sites
   (i) and other relevant features.
5. Cross sectional drawing of the site and the proposed layout[1] should be submitted.
6. Photographs of the trial hole, test holes and site (date and time referenced).

[1] The calculated percolation area or polishing filter area should be set out accurately on the site layout drawing in accordance with the code of practice's requirements.

4.0 CONCLUSION of SITE CHARACTERISATION

Integrate the information from the desk study and on-site assessment (i.e. visual assessment, trial hole and percolation tests) above and conclude the type of system(s) that is (are) appropriate. This information is also used to choose the optimum final disposal route of the treated wastewater.

Not Suitable for Development ☐

Suitable for [1]		**Discharge Route**
1. Septic tank system (septic tank and percolation area)	☐	☐
2. Secondary Treatment System		
a. septic tank and filter system constructed on-site and polishing filter; or	☐	
b. packaged wastewater treatment system and polishing filter	☐	

5.0 RECOMMENDATION

Propose to install: ☐

and discharge to: ☐

Trench Invert level (m): ☐

Site Specific Conditions (e.g. special works, site improvement works testing etc.

☐

[1] note: more than one option may be suitable for a site and this should be recorded

[2] A discharge of sewage effluent to "waters" (definition includes any or any part of any river, stream, lake, canal, reservoir, aquifer, pond, watercourse or other inland waters, whether natural or artificial) will require a licence under the Water Pollution Acts 1977-90. Refer to Section 2.6.2.

6.0 TREATMENT SYSTEM DETAILS

SYSTEM TYPE: Septic Tank System

Tank Capacity (m^3)

Percolation Area		Mounded Percolation Area	
No. of Trenches		No. of Trenches	
Length of Trenches (m)		Length of Trenches (m)	
Invert Level (m)		Invert Level (m)	

SYSTEM TYPE: Secondary Treatment System

Filter Systems

Media Type	Area (m^2)*	Depth of Filter	Invert Level
Sand/Soil			
Soil			
Constructed Wetland			
Other			

Package Treatment Systems

Type

Capacity PE

Sizing of Primary Compartment

m^3

SYSTEM TYPE: Tertiary Treatment System

Polishing Filter: Surface Area (m^2)*

or **Gravity Fed:**

No. of Trenches

Length of Trenches (m)

Invert Level (m)

Package Treatment System: Capacity (pe)

Constructed Wetland: Surface Area (m^2)*

DISCHARGE ROUTE:

Groundwater ☐ Hydraulic Loading Rate * ($l/m^2.d$)

Surface Water ** ☐ Discharge Rate (m^3/hr)

TREATMENT STANDARDS:

Treatment System Performance Standard (mg/l)	BOD	SS	NH_4 - N	Total N	Total P

QUALITY ASSURANCE:

Installation & Commissioning	On-going Maintenance

* Hydraulic loading rate is determined by the percolation rate of subsoil

** Water Pollution Act discharge licence required

7.0 SITE ASSESSOR DETAILS

Company: MESKELL CONSULTING ENGINEERS

Prefix: Mr. First Name: MAURICE Surname: MESKELL

Address:
COOLCAPPA,
ARDAGH,
CO.LIMERICK

Qualifications/Experience: B.E.M.I.E.I Approved Site Assessor

Date of Report: 14/03/2018

Phone: 0879641862 Fax: e-mail MAURICE.MESKELL@GMAIL.COM

Indemnity Insurance Number:

Signature: _____

Appendix 9

Water Quality and Flood Risk Assessment

There is no appendix for Water Quality and Flood Risk Assessment

Appendix 10

Air and Climate

There is no appendix for Air and Climate

Appendix 11

Noise and Vibration

There is no appendix for Noise and Vibration

Appendix 12

Material Assets – Coastal Processes

There is no appendix for Coastal Processes

Appendix 13

Material Assets – Roads and Traffic

Appendix 13.1

Indicative Site Layout

524800.00 524900.00 525000.00

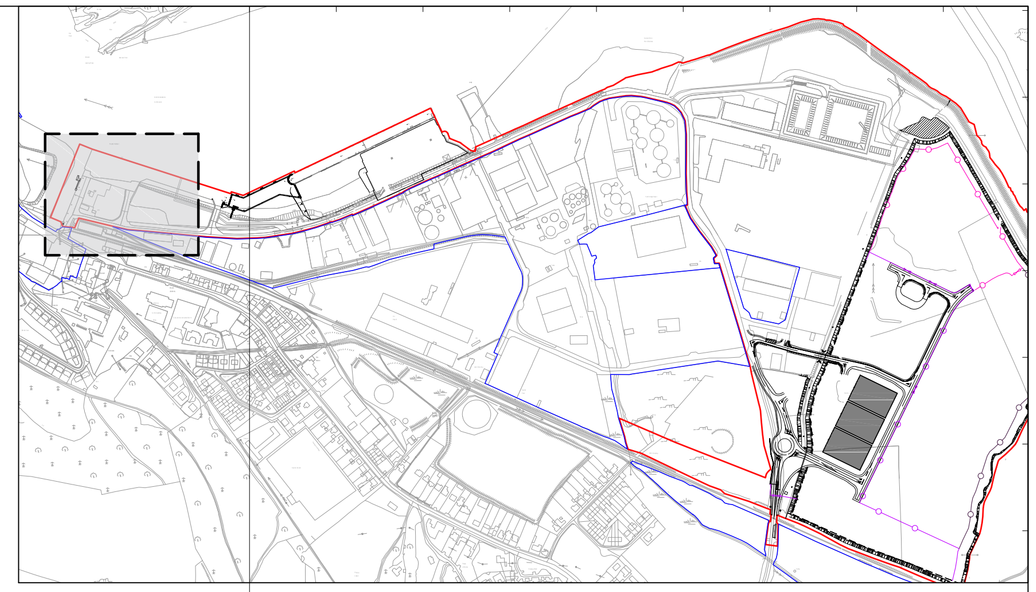
651900.00 651800.00 651700.00

Key:

Phase 1A
Refer to Concrete or Bituminous Surface Detail

30m TOWER WITH 2 No. FLOODLIGHTS OMNIblast GEN2 2 2297 - 96 XP-L2 2000mA NW 230V Flat, Glass Lamp 96XP-L22000mA NW 230V

30m TOWER WITH 6 No. FLOODLIGHTS OMNIblast GEN2 2 2297 - 96 XP-L2 2000mA NW 230V Flat, Glass Lamp 96XP-L22000mA NW 230V



Foynes Harbour
Pier
Existing West Quay Structure
+4.07m
54.82m
255.68m
Landing Pontoon (relocated from behind New Berth 4)
2Nr locating piles (as per original pontoon)
24.55m
Access Gangway
14.71m
Concrete bankseat cast into existing quay wall structure
63.98m
Quay
Mooring Posts
ES
WEST QUAY
Localised demolition of existing deck to facilitate connection to new structure
39.32m
Existing high mast light new location
Existing high mast light retained and relocated
Existing Revetment
+4.07m
21.91m
+4.00m
MH103
57.01m
36.11m
Port Road
WB
Site Notice. Location 1
Ramp
UND
PO
Museum
FF

NOTES

1. Verifying Dimensions.
   The contractor shall verify dimensions against such other drawings or site conditions as pertain to this part of the work.
2. Existing Services.
   Any information concerning the location of existing services indicated on this drawing is intended for general guidance only. It shall be the responsibility of the contractor to determine and verify the exact horizontal and vertical alignment of all cables, pipes, etc. (both underground and overhead) before work commences.
3. Issue of Drawings.
   Hard copies, dwf and pdf will form a controlled issue of the drawing. All other formats (dwg, dxf etc,) are deemed to be an uncontrolled issue and any work carried out based on these files is at the recipients own risk. RPS will not accept any responsibility for any errors arising from the use of these files, either by human error by the recipient, listing of un-dimensioned measurements, compatibility issues with the recipient's software, and any errors arising when these files are used to aid the recipients drawing production, or setting out on site.
4. DATUM: Ordnance Datum Malin
5. Map Series

Map Series 1:2500	Map Series 1:5000
4794-D REVISION DATE = 01-Nov-2005 SURVEY DATE = 01-Feb-1995 LEVELLED DATE = 31-Dec-1977	4794 REVISION DATE = 31-Dec-2000 SURVEY DATE = 31-Dec-2000
4795-A REVISION DATE = 31-Dec-1980 SURVEY DATE = 31-Dec-1980	4795 REVISION DATE = 31-Dec-2000 SURVEY DATE = 31-Dec-2000
4795-B REVISION DATE = 24-Mar-2008 SURVEY DATE = 31-Dec-1980	1:5000 4858 REVISION DATE = 14-Oct-2009 SURVEY DATE = 31-Jul-2000
4795-C REVISION DATE = 15-Mar-2010 SURVEY DATE = 01-Mar-1995 LEVELLED DATE = 31-Dec-1977	
4795-D REVISION DATE = 24-Mar-2008 SURVEY DATE = 30-Jun-2001	
4858-A REVISION DATE = 14-Oct-2009 SURVEY DATE = 02-Jan-1995 LEVELLED DATE = 31-Dec-1981	
4858-B REVISION DATE = 14-Oct-2009 SURVEY DATE = 02-Jan-1995 LEVELLED DATE = 31-Dec-1977	
4858-C REVISION DATE = 31-Dec-1978 SURVEY DATE = 31-Dec-1978 LEVELLED DATE = 31-Dec-1981	
4858-D REVISION DATE = 31-Dec-1978 SURVEY DATE = 31-Dec-1978 LEVELLED DATE = 31-Dec-1977	

6. Projection: IRENET95 /Irish Transverse Mercator

Key:

- Planning Boundary
- Land in ownership of Applicant but not forming part of application
- Proposed Development Area
- Site Notice (4Nr in total)
- National Road
- Secondary Road

rev	amendments	drawn	date

RPS
Elmwood House
74 Boucher Road
Belfast
BT12 6RZ
T +44 (0) 28 90 667914
F +44 (0) 28 90 668286
W www.rpsgroup.com/ireland
E ireland@rpsgroup.com

Client
Shannon Foynes Port Company

Project
Capacity Extension at Shannon Foynes

Title
Proposed Site Layout Plan Sheet 1

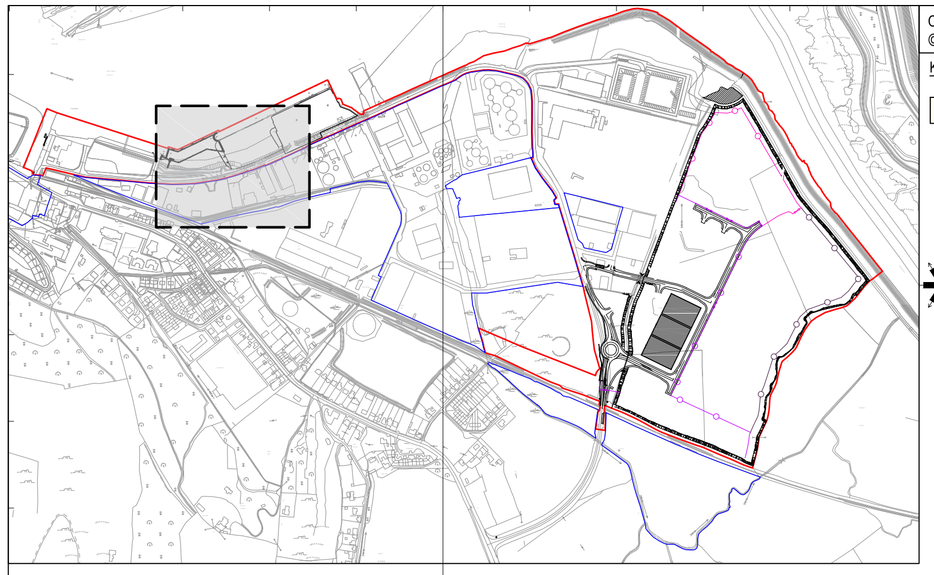
Drawing Status	Sheet Size	Drawing Scale
Planning	A1	1:500

Drawing Number	Rev
M0679-RPS-00-PL-DR-C-0111	-

Project Leader	Drawn By	Date	Initial Review
S.H.	M.H.	March 2018	E.H.

525100.00 525200.00 525300.00 525400.00

651900.00 651800.00 651700.00



Key:

- Phase 1A
  Refer to Concrete or Bituminous Surface Detail
- 30m TOWER WITH 2 No. FLOODLIGHTS
  OMNIblast GEN2 2 2297 - 96 XP-L2
  2000mA NW 230V Flat, Glass Lamp
  96XP-L22000mA NW 230V
- 30m TOWER WITH 6 No. FLOODLIGHTS
  OMNIblast GEN2 2 2297 - 96 XP-L2
  2000mA NW 230V Flat, Glass Lamp
  96XP-L22000mA NW 230V

East Jetty +4.05m

East Jetty

Phase 1 of
LCCC Planning permission 12/212
Completed

INFILLING BEHIND EAST JETTY
(UNDER LCCC PLANNING PERMISSION 12/212)

PHASE 2 of infilling of
LCCC Planning Permission 12/212
Ongoing

Proposed safety ladder

Existing high mast light relocated +4.05m

18.25m

Localised demolition of existing deck to facilitate connection to new structure

Approx 28.53m

Existing fenders removed to allow proposed extension to tie into existing jetty

Existing high mast light new position

Proposed deck transition onto reclamation

Proposed Berth 4 - 94m

Proposed fenders along quay edge

Proposed galvanised steel toe rail

Proposed mooring bollard

MH106 +4.0m

MH105

Dia: 250mm Concrete Pipe

Localised demolition of existing deck to facilitate connection to new structure

39.32m

22.50m

Proposed Concrete Deck

Existing high mast light retained and relocated +4.07m

21.91m

MH103 +4.00m

Dia: 250mm Concrete Pipe

25.00m

Dia: 250mm Concrete Pipe

MH104

LWM

Drainage Gullies

Rock armour revetment (as part of Berth 5 permitted development)

HWM

74.34m

Existing Revetment

Existing above ground pipework

Proposed 30m High Mast Light

Existing Revetment

Removal of existing pontoon and walkway

57.01m

36.11m

48.67m

Weighbridge

Port Road +3.10m

Port Road

Existing above ground pipework

Port Road

NOTES

1. Verifying Dimensions.
   The contractor shall verify dimensions against such other drawings or site conditions as pertain to this part of the work.
2. Existing Services.
   Any information concerning the location of existing services indicated on this drawing is intended for general guidance only. It shall be the responsibility of the contractor to determine and verify the exact horizontal and vertical alignment of all cables, pipes, etc. (both underground and overhead) before work commences.
3. Issue of Drawings.
   Hard copies, dwf and pdf will form a controlled issue of the drawing. All other formats (dwg, dxf etc.) are deemed to be an uncontrolled issue and any work carried out based on these files is at the recipients own risk. RPS will not accept any responsibility for any errors arising from the use of these files, either by human error by the recipient, listing of un-dimensioned measurements, compatibility issues with the recipient's software, and any errors arising when these files are used to aid the recipients drawing production, or setting out on site.
4. DATUM: Ordnance Datum Malin
5. Map Series

Map Series 1:2500	Map Series 1:5000
4794-D REVISION DATE = 01-Nov-2005 SURVEY DATE = 01-Feb-1995 LEVELLED DATE = 31-Dec-1977	4794 REVISION DATE = 31-Dec-2000 SURVEY DATE = 31-Dec-2000
4795-A REVISION DATE = 31-Dec-1980 SURVEY DATE = 31-Dec-1980	4795 REVISION DATE = 31-Dec-2000 SURVEY DATE = 31-Dec-2000
4795-B REVISION DATE = 24-Mar-2008 SURVEY DATE = 31-Dec-1980	1:5000 4858 REVISION DATE = 14-Oct-2009 SURVEY DATE = 31-Jul-2000
4795-C REVISION DATE = 15-Mar-2010 SURVEY DATE = 01-Mar-1995 LEVELLED DATE = 31-Dec-1977	
4795-D REVISION DATE = 24-Mar-2008 SURVEY DATE = 30-Jun-2001	
4858-A REVISION DATE = 14-Oct-2009 SURVEY DATE = 02-Jan-1995 LEVELLED DATE = 31-Dec-1981	
4858-B REVISION DATE = 14-Oct-2009 SURVEY DATE = 02-Jan-1995 LEVELLED DATE = 31-Dec-1977	
4858-C REVISION DATE = 31-Dec-1978 SURVEY DATE = 31-Dec-1978 LEVELLED DATE = 31-Dec-1981	
4858-D REVISION DATE = 31-Dec-1978 SURVEY DATE = 31-Dec-1978 LEVELLED DATE = 31-Dec-1977	

6. Projection: IRENET95 /Irish Transverse Mercator

Key:

- Planning Boundary
- Land in ownership of Applicant but not forming part of application
- Proposed Development Area
- Site Notice (4Nr in total)
- National Road
- Secondary Road
- Proposed Drainage Pipe and Manhole

rev	amendments	drawn	date

RPS
Elmwood House
74 Boucher Road
Belfast
BT12 6RZ
T +44 (0) 28 90 667914
F +44 (0) 28 90 668286
W www.rpsgroup.com/ireland
E ireland@rpsgroup.com

Client: Shannon Foynes Port Company

Project: Capacity Extension at Shannon Foynes

Title: Proposed Site Layout Plan Sheet 2

Drawing Status	Sheet Size	Drawing Scale
Planning	A1	1:500

Drawing Number: M0679-RPS-00-PL-DR-C-0112

Rev -

Project Leader	Drawn By	Date	Initial Review
S.H.	M.H.	March 2018	E.H.

525800.00 525900.00 526000.00 526100.00

651300.00 651200.00 651100.00

Area outside of
Planning Application Boundary

9230

9928

Dia. 150mm uPVC/PE Pipe

Reinforced concrete retaining structure to facilitate roadworks

Port Security Kiosk with Access Barriers

MH

Existing access retained

Security gate

Proposed ESB Substation

Site Notice. Location 2

Site Notice. Location 3

10067

Existing railway line retained insitu and unaffected by proposed works

Port Road

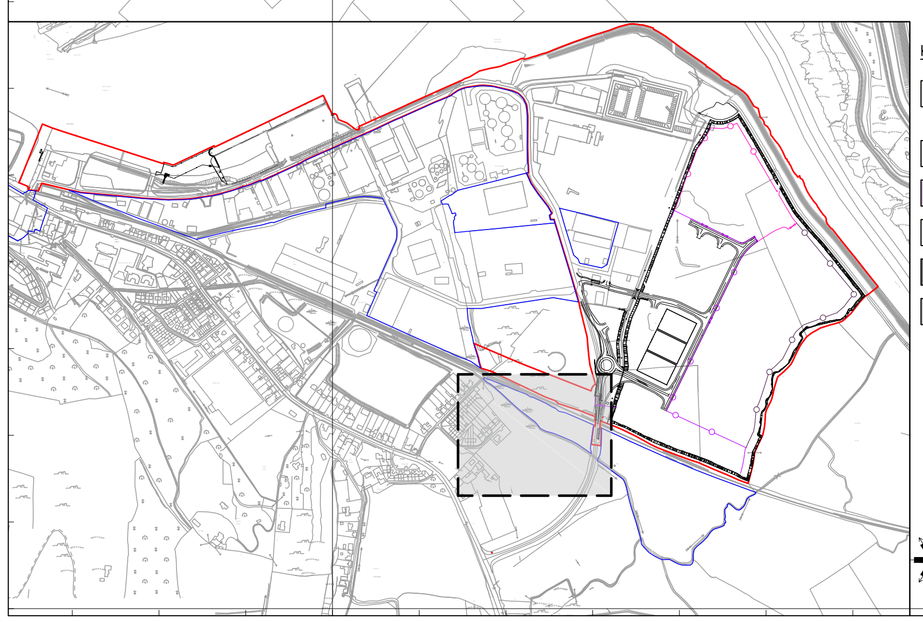
Existing Railway Line

Existing access retained

Existing access retained

CS

CS



Key:

- Phase 1A
  Refer to Concrete or Bituminous Surface Detail
- Phase 1B
- Phase 1C
- Landscaping.
  Refer to 1773.5.01 for details
- Carriageway/Access Road.
  Refer to IBH0548 Series Drawings
- Footway/Cycleway
  Refer to IBH0548 Series Drawings
- 8m COLUMN WITH
  1 No. LED LUMINAIRE AXIA 2.1 5187 24 Nichia NVSL219CT 890mA NW 383442 Intergrated Lenses 230V
- 30m TOWER WITH 2 No. FLOODLIGHTS
  OMNIblast GEN2 2 2297 - 96 XP-L2 2000mA NW 230V Flat, Glass Lamp 96XP-L22000mA NW 230V
- 30m TOWER WITH 6 No. FLOODLIGHTS
  OMNIblast GEN2 2 2297 - 96 XP-L2 2000mA NW 230V Flat, Glass Lamp 96XP-L22000mA NW 230V

NOTES

1. Verifying Dimensions.
   The contractor shall verify dimensions against such other drawings or site conditions as pertain to this part of the work.

2. Existing Services.
   Any information concerning the location of existing services indicated on this drawing is intended for general guidance only. It shall be the responsibility of the contractor to determine and verify the exact horizontal and vertical alignment of all cables, pipes, etc. (both underground and overhead) before work commences.

3. Issue of Drawings.
   Hard copies, dwf and pdf will form a controlled issue of the drawing. All other formats (dwg, dxf etc.) are deemed to be an uncontrolled issue and any work carried out based on these files is at the recipients own risk. RPS will not accept any responsibility for any errors arising from the use of these files, either by human error by the recipient, listing of un-dimensioned measurements, compatibility issues with the recipient's software, and any errors arising when these files are used to aid the recipients drawing production, or setting out on site.

4. DATUM: Ordnance Datum Malin

5. Map Series

Map Series 1:2500	Map Series 1:5000
4794-D REVISION DATE = 01-Nov-2005 SURVEY DATE = 01-Feb-1995 LEVELLED DATE = 31-Dec-1977	4794 REVISION DATE = 31-Dec-2000 SURVEY DATE = 31-Dec-2000
4795-A REVISION DATE = 31-Dec-1980 SURVEY DATE = 31-Dec-1980	4795 REVISION DATE = 31-Dec-2000 SURVEY DATE = 31-Dec-2000
4795-B REVISION DATE = 24-Mar-2008 SURVEY DATE = 31-Dec-1980	1:5000 4858 REVISION DATE = 14-Oct-2009 SURVEY DATE = 31-Jul-2000
4795-C REVISION DATE = 15-Mar-2010 SURVEY DATE = 01-Mar-1995 LEVELLED DATE = 31-Dec-1977	
4795-D REVISION DATE = 24-Mar-2008 SURVEY DATE = 30-Jun-2001	
4858-A REVISION DATE = 14-Oct-2009 SURVEY DATE = 02-Jan-1995 LEVELLED DATE = 31-Dec-1981	
4858-B REVISION DATE = 14-Oct-2009 SURVEY DATE = 02-Jan-1995 LEVELLED DATE = 31-Dec-1977	
4858-C REVISION DATE = 31-Dec-1978 SURVEY DATE = 31-Dec-1978 LEVELLED DATE = 31-Dec-1981	
4858-D REVISION DATE = 31-Dec-1978 SURVEY DATE = 31-Dec-1978 LEVELLED DATE = 31-Dec-1977	

6. Projection: IRENET95 /Irish Transverse Mercator

Key:

- Planning Boundary
- Land in ownership of Applicant but not forming part of application
- Proposed Development Area
- Site Notice (4Nr in total)
- National Road
- Secondary Road
- Proposed Drainage Pipe and Manhole

rev	amendments	drawn	date

RPS
Elmwood House
74 Boucher Road
Belfast
BT12 6RZ
T +44 (0) 28 90 667914
F +44 (0) 28 90 668286
W www.rpsgroup.com/ireland
E ireland@rpsgroup.com

Client
Shannon Foynes Port Company

Project
Capacity Extension at Shannon Foynes

Title
Proposed Site Layout Plan
Sheet 9

Drawing Status	Sheet Size	Drawing Scale
Planning	A1	1:500

Drawing Number: M0679-RPS-00-PL-DR-C-0119
Rev -

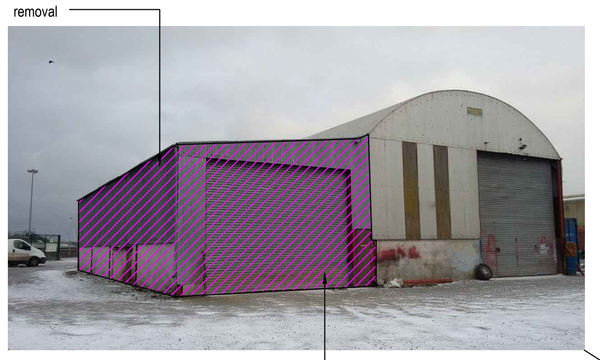
Project Leader	Drawn By	Date	Initial Review
S.H.	M.H.	March 2018	E.H.

525800.00 525900.00 526000.00 526100.00

651600.00 651500.00 651400.00

Key:

- Phase 1A
  Refer to Concrete or Bituminous Surface Detail
- Phase 1B
- Phase 1C
- Landscaping.
  Refer to 1773.5.01 for details
- Carriageway/Access Road.
  Refer to IBH0548 Series Drawings
- Footway/Cycleway
  Refer to IBH0548 Series Drawings
- 8m COLUMN WITH
  1 No. LED LUMINAIRE AXIA 2.1 5187 24 Nichia NVSL219CT 890mA NW 383442 Intergrated Lenses 230V
- 30m TOWER WITH 2 No. FLOODLIGHTS
  OMNIblast GEN2 2 2297 - 96 XP-L2 2000mA NW 230V Flat, Glass Lamp 96XP-L22000mA NW 230V
- 30m TOWER WITH 6 No. FLOODLIGHTS
  OMNIblast GEN2 2 2297 - 96 XP-L2 2000mA NW 230V Flat, Glass Lamp 96XP-L22000mA NW 230V



Lean-to Dimensions: 6.9mtr wide by 19.3mtr long.

Lean-to construction: Steel frame with single skin steel corrugated sheeting.

Refer to M0679-RPS-00-PL-DR-C-0166 and 167 for lean to details

Area outside of Planning Application Boundary

Proposed Footpath to tie into existing grass verge

8419

13224

Existing 'Foynes Engineering' lean to demolished.

Existing 'Foynes Engineering' building

8m High street lighting column with lamp

Port Road

MH30

Dia: 250m Concrete P

Area outside of Planning Application Boundary

Spring

Level Crossing

Existing roadway realigned to allow access to Durnish Lands

Reinforced concrete retaining structure to facilitate roundabout

12080

Proposed new roundabout and approach lanes

36688

PHAS STORAG ST

NOTES

1. Verifying Dimensions.
   The contractor shall verify dimensions against such other drawings or site conditions as pertain to this part of the work.
2. Existing Services.
   Any information concerning the location of existing services indicated on this drawing is intended for general guidance only. It shall be the responsibility of the contractor to determine and verify the exact horizontal and vertical alignment of all cables, pipes, etc. (both underground and overhead) before work commences.
3. Issue of Drawings.
   Hard copies, dwf and pdf will form a controlled issue of the drawing. All other formats (dwg, dxf etc.) are deemed to be an uncontrolled issue and any work carried out based on these files is at the recipients own risk. RPS will not accept any responsibility for any errors arising from the use of these files, either by human error by the recipient, listing of un-dimensioned measurements, compatibility issues with the recipient's software, and any errors arising when these files are used to aid the recipients drawing production, or setting out on site.
4. DATUM: Ordnance Datum Malin
5. Map Series

Map Series 1:2500	Map Series 1:5000
4794-D REVISION DATE = 01-Nov-2005 SURVEY DATE = 01-Feb-1995 LEVELLED DATE = 31-Dec-1977	4794 REVISION DATE = 31-Dec-2000 SURVEY DATE = 31-Dec-2000
4795-A REVISION DATE = 31-Dec-1980 SURVEY DATE = 31-Dec-1980	4795 REVISION DATE = 31-Dec-2000 SURVEY DATE = 31-Dec-2000
4795-B REVISION DATE = 24-Mar-2008 SURVEY DATE = 31-Dec-1980	1:5000 4858 REVISION DATE = 14-Oct-2009 SURVEY DATE = 31-Jul-2000
4795-C REVISION DATE = 15-Mar-2010 SURVEY DATE = 01-Mar-1995 LEVELLED DATE = 31-Dec-1977	
4795-D REVISION DATE = 24-Mar-2008 SURVEY DATE = 30-Jun-2001	
4858-A REVISION DATE = 14-Oct-2009 SURVEY DATE = 02-Jan-1995 LEVELLED DATE = 31-Dec-1981	
4858-B REVISION DATE = 14-Oct-2009 SURVEY DATE = 02-Jan-1995 LEVELLED DATE = 31-Dec-1977	
4858-C REVISION DATE = 31-Dec-1978 SURVEY DATE = 31-Dec-1978 LEVELLED DATE = 31-Dec-1981	
4858-D REVISION DATE = 31-Dec-1978 SURVEY DATE = 31-Dec-1978 LEVELLED DATE = 31-Dec-1977	

6. Projection: IRENET95 /Irish Transverse Mercator

Key:

- Planning Boundary
- Land in ownership of Applicant but not forming part of application
- Proposed Development Area
- Site Notice (4Nr in total)
- National Road
- Secondary Road
- Proposed Drainage Pipe and Manhole

rev	amendments	drawn	date

RPS
Elmwood House
74 Boucher Road
Belfast
BT12 6RZ
T +44 (0) 28 90 667914
F +44 (0) 28 90 668286
W www.rpsgroup.com/ireland
E ireland@rpsgroup.com

Client
Shannon Foynes Port Company

Project
Capacity Extension at Shannon Foynes

Title
Proposed Site Layout Plan
Sheet 8

Drawing Status	Sheet Size	Drawing Scale
Planning	A1	1:500

Drawing Number: M0679-RPS-00-PL-DR-C-0118
Rev -

Project Leader	Drawn By	Date	Initial Review
S.H.	M.H.	March 2018	E.H.

526200.00 526300.00 526400.00

651300.00 651200.00 651100.00

Dia: 150mm uPVC/PE Pipe

Dia: 225mm uPVC/PE Pipe

Package treatment Plant as Kingspan Klargester BE or similar model

Slope 1:2

60m² stratified sand polishing filter as per EPA CoP Fig 8.5

Proposed drainage channel crossing structure

Proposed carriageway access road

Dia: 250mm Concrete Pipe

Dia: 250mm uPVC Perforated Pipe

MH115

Interceptor 02

MH19

MH20

MH21

Dia: 250mm Concrete Pipe

Proposed 4m Wide wayleave

MH146

Proposed headwall for outfall. Outfall discharges through flap valve

Dia: 250mm uPVC Perforated Pipe

ESB

MH08

OPW drainage channel and 5m wayleave

MH111

Phase 1A perimeter security fencing

PHASE1C SERVICED LAND
(LAND RAISING AND
INFRASTRUCTURE)

MH17

MH15

MH110

Interceptor 01

MH04

4m High Noise barrier

Slope 1:2

10457

MH14

Proposed 30m high lighting mast. Lighting mast sits on 1m high concrete base

PHASE1A OPEN
STORAGE /CONTAINER
STORAGE

202430

MH12

Phase 1C
2.4m High
Security fencing

MH03

MH06

MH13

84514

Existing Railway Line

22875

MH02

MH05

Phase 1A perimeter security fencing

Landscaping. Refer to planting drawings for details

MH01

2.4m High Security fencing stops

Slope 1:2

4m High Noise barrier begins

Area outside of
Planning Application Boundary

Spring

Key:

- Phase 1A — Refer to Concrete or Bituminous Surface Detail
- Phase 1B
- Phase 1C
- Landscaping. Refer to 1773.5.01 for details
- Carriageway/Access Road. Refer to IBH0548 Series Drawings
- Footway/Cycleway Refer to IBH0548 Series Drawings
- 8m COLUMN WITH 1 No. LED LUMINAIRE AXIA 2.1 5187 24 Nichia NVSL219CT 890mA NW 383442 Intergrated Lenses 230V
- 30m TOWER WITH 2 No. FLOODLIGHTS OMNIblast GEN2 2 2297 - 96 XP-L2 2000mA NW 230V Flat, Glass Lamp 96XP-L22000mA NW 230V
- 30m TOWER WITH 6 No. FLOODLIGHTS OMNIblast GEN2 2 2297 - 96 XP-L2 2000mA NW 230V Flat, Glass Lamp 96XP-L22000mA NW 230V
- Drainage Channel crossing point
- Proposed Noise Barrier
- Proposed Foul Sewer

NOTES

1. Verifying Dimensions.
   The contractor shall verify dimensions against such other drawings or site conditions as pertain to this part of the work.
2. Existing Services.
   Any information concerning the location of existing services indicated on this drawing is intended for general guidance only. It shall be the responsibility of the contractor to determine and verify the exact horizontal and vertical alignment of all cables, pipes, etc. (both underground and overhead) before work commences.
3. Issue of Drawings.
   Hard copies, dwf and pdf will form a controlled issue of the drawing. All other formats (dwg, dxf etc.) are deemed to be an uncontrolled issue and any work carried out based on these files is at the recipients own risk. RPS will not accept any responsibility for any errors arising from the use of these files, either by human error by the recipient, listing of un-dimensioned measurements, compatibility issues with the recipient's software, and any errors arising when these files are used to aid the recipients drawing production, or setting out on site.
4. DATUM: Ordnance Datum Malin
5. Map Series

Map Series 1:2500	Map Series 1:5000
4794-D REVISION DATE = 01-Nov-2005 SURVEY DATE = 01-Feb-1995 LEVELLED DATE = 31-Dec-1977	4794 REVISION DATE = 31-Dec-2000 SURVEY DATE = 31-Dec-2000
4795-A REVISION DATE = 31-Dec-1980 SURVEY DATE = 31-Dec-1980	4795 REVISION DATE = 31-Dec-2000 SURVEY DATE = 31-Dec-2000
4795-B REVISION DATE = 24-Mar-2008 SURVEY DATE = 31-Dec-1980	1:5000 4858 REVISION DATE = 14-Oct-2009 SURVEY DATE = 31-Jul-2000
4795-C REVISION DATE = 15-Mar-2010 SURVEY DATE = 01-Mar-1995 LEVELLED DATE = 31-Dec-1977	
4795-D REVISION DATE = 24-Mar-2008 SURVEY DATE = 30-Jun-2001	
4858-A REVISION DATE = 14-Oct-2009 SURVEY DATE = 02-Jan-1995 LEVELLED DATE = 31-Dec-1981	
4858-B REVISION DATE = 14-Oct-2009 SURVEY DATE = 02-Jan-1995 LEVELLED DATE = 31-Dec-1977	
4858-C REVISION DATE = 31-Dec-1978 SURVEY DATE = 31-Dec-1978 LEVELLED DATE = 31-Dec-1981	
4858-D REVISION DATE = 31-Dec-1978 SURVEY DATE = 31-Dec-1978 LEVELLED DATE = 31-Dec-1977	

6. Projection: IRENET95 /Irish Transverse Mercator

Key:

- Planning Boundary
- Land in ownership of Applicant but not forming part of application
- Proposed Development Area
- Site Notice (4Nr in total)
- National Road
- Secondary Road
- Proposed Drainage Pipe and Manhole

rev	amendments	drawn	date

RPS
Elmwood House
74 Boucher Road
Belfast
BT12 6RZ
T +44 (0) 28 90 667914
F +44 (0) 28 90 668286
W www.rpsgroup.com/ireland
E ireland@rpsgroup.com

Client
Shannon Foynes Port Company

Project
Capacity Extension at Shannon Foynes

Title
Proposed Site Layout Plan
Sheet 13

Drawing Status	Sheet Size	Drawing Scale
Planning	A1	1:500

Drawing Number	Rev
M0679-RPS-00-PL-DR-C-0123	-

Project Leader	Drawn By	Date	Initial Review
S.H.	M.H.	March 2018	E.H.

526100.00 526200.00 526300.00 526400.00

651600.00 651500.00 651400.00

Proposed headwall for outfall. Outfall discharges through flap valve

Proposed 5m Wide wayleave

OPW drainage channel and 5m wayleave

MH148

Slope 1:2

Proposed sloped access to wayleave

Proposed drainage channel crossing structure

4m High Noise barrier

MH44

MH124

MH45

Dia: 250mm uPVC Perforated Pipe

Dia: 250mm Concrete Pipe

171418

Security gate to restrict access

MH126

PHASE1A OPEN STORAGE /CONTAINER STORAGE

Proposed carriageway access road

Proposed cycle parking

MH43

Existing crossing retained for OPW access. Security gate installed to restrict access

Dia: 250mm Concrete Pipe

MH31

Interceptor 03

5m Wide wayleave

Proposed headwall for outfall. Outfall discharges through flap valve

Proposed 30m high lighting mast. Lighting mast sits on 1m high concrete base

Quarry

Proposed Storage Warehouse 1

Proposed Storage Warehouse 2

Proposed Storage Warehouse 3

76715

14400

2500

51075

MH29

MH28

MH147

MH117

MH121

Foul Nework MH1

Dia: 225mm uPVC

Dia: 300mm uPVC Perforated Pipe

Dia: 250mm uPVC Perforated Pipe

Dia: 250mm Concrete Pipe

MH123

MH41

Proposed 30m high lighting mast. Lighting mast sits on 1m high concrete base

8m High street lighting column with lamp

MH38

Interceptor 04

MH39

MH40

MH37

Phase 1A Security gate

Phase 1A perimeter security fencing

PHASE1C SERVICED LAND (LAND RAISING AND INFRASTRUCTURE)

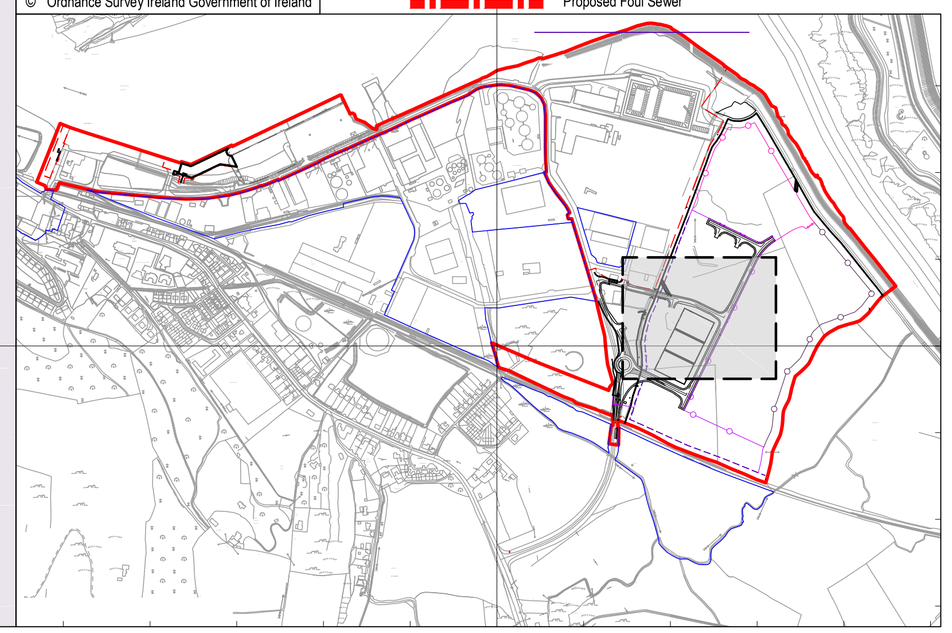
3000

8000

14000

Key:

- Phase 1A Refer to Concrete or Bituminous Surface Detail
- Phase 1B
- Phase 1C
- Landscaping. Refer to 1773.5.01 for details
- Carriageway/Access Road. Refer to IBH0548 Series Drawings
- Footway/Cycleway Refer to IBH0548 Series Drawings
- 8m COLUMN WITH 1 No. LED LUMINAIRE AXIA 2.1 5187 24 Nichia NVSL219CT 890mA NW 383442 Intergrated Lenses 230V
- 30m TOWER WITH 2 No. FLOODLIGHTS OMNIblast GEN2 2 2297 - 96 XP-L2 2000mA NW 230V Flat, Glass Lamp 96XP-L22000mA NW 230V
- 30m TOWER WITH 6 No. FLOODLIGHTS OMNIblast GEN2 2 2297 - 96 XP-L2 2000mA NW 230V Flat, Glass Lamp 96XP-L22000mA NW 230V
- Drainage Channel crossing point
- Proposed Noise Barrier
- Proposed Foul Sewer



NOTES

1. Verifying Dimensions.
   The contractor shall verify dimensions against such other drawings or site conditions as pertain to this part of the work.
2. Existing Services.
   Any information concerning the location of existing services indicated on this drawing is intended for general guidance only. It shall be the responsibility of the contractor to determine and verify the exact horizontal and vertical alignment of all cables, pipes, etc. (both underground and overhead) before work commences.
3. Issue of Drawings.
   Hard copies, dwf and pdf will form a controlled issue of the drawing. All other formats (dwg, dxf etc.) are deemed to be an uncontrolled issue and any work carried out based on these files is at the recipients own risk. RPS will not accept any responsibility for any errors arising from the use of these files, either by human error by the recipient, listing of un-dimensioned measurements, compatibility issues with the recipient's software, and any errors arising when these files are used to aid the recipients drawing production, or setting out on site.
4. DATUM: Ordnance Datum Malin
5. Map Series

Map Series 1:2500	Map Series 1:5000
4794-D REVISION DATE = 01-Nov-2005 SURVEY DATE = 01-Feb-1995 LEVELLED DATE = 31-Dec-1977	4794 REVISION DATE = 31-Dec-2000 SURVEY DATE = 31-Dec-2000
4795-A REVISION DATE = 31-Dec-1980 SURVEY DATE = 31-Dec-1980	4795 REVISION DATE = 31-Dec-2000 SURVEY DATE = 31-Dec-2000
4795-B REVISION DATE = 24-Mar-2008 SURVEY DATE = 31-Dec-1980	1:5000 4858 REVISION DATE = 14-Oct-2009 SURVEY DATE = 31-Jul-2000
4795-C REVISION DATE = 15-Mar-2010 SURVEY DATE = 01-Mar-1995 LEVELLED DATE = 31-Dec-1977	
4795-D REVISION DATE = 24-Mar-2008 SURVEY DATE = 30-Jun-2001	
4858-A REVISION DATE = 14-Oct-2009 SURVEY DATE = 02-Jan-1995 LEVELLED DATE = 31-Dec-1981	
4858-B REVISION DATE = 14-Oct-2009 SURVEY DATE = 02-Jan-1995 LEVELLED DATE = 31-Dec-1977	
4858-C REVISION DATE = 31-Dec-1978 SURVEY DATE = 31-Dec-1978 LEVELLED DATE = 31-Dec-1981	
4858-D REVISION DATE = 31-Dec-1978 SURVEY DATE = 31-Dec-1978 LEVELLED DATE = 31-Dec-1977	

6. Projection: IRENET95 /Irish Transverse Mercator

Key:

- Planning Boundary
- Land in ownership of Applicant but not forming part of application
- Proposed Development Area
- Site Notice (4Nr in total)
- National Road
- Secondary Road
- Proposed Drainage Pipe and Manhole

rev	amendments	drawn	date

RPS
Elmwood House
74 Boucher Road
Belfast
BT12 6RZ
T +44 (0) 28 90 667914
F +44 (0) 28 90 668286
W www.rpsgroup.com/ireland
E ireland@rpsgroup.com

Client
Shannon Foynes Port Company

Project
Capacity Extension at Shannon Foynes

Title
Proposed Site Layout Plan Sheet 12

Drawing Status	Sheet Size	Drawing Scale
Planning	A1	1:500

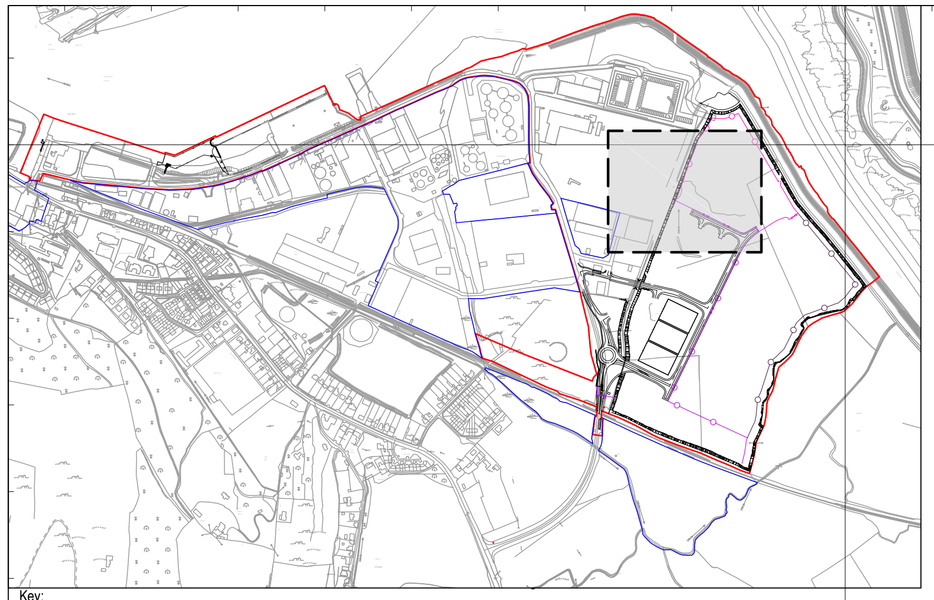
Drawing Number M0679-RPS-00-PL-DR-C-0122

Rev -

Project Leader	Drawn By	Date	Initial Review
S.H.	M.H.	March 2018	E.H.

526200.00 526300.00 526400.00

651900.00 651800.00 651700.00



Key:

- Phase 1A — Refer to Concrete or Bituminous Surface Detail
- Phase 1B
- Phase 1C
- Landscaping. Refer to 1773.5.01 for details
- Carriageway/Access Road. Refer to IBH0548 Series Drawings
- Footway/Cycleway Refer to IBH0548 Series Drawings

- 8m COLUMN WITH 1 No. LED LUMINAIRE AXIA 2.1 5187 24 Nichia NVSL219CT 890mA NW 383442 Intergrated Lenses 230V
- 30m TOWER WITH 2 No. FLOODLIGHTS OMNIblast GEN2 2 2297 - 96 XP-L2 2000mA NW 230V Flat, Glass Lamp 96XP-L22000mA NW 230V
- 30m TOWER WITH 6 No. FLOODLIGHTS OMNIblast GEN2 2 2297 - 96 XP-L2 2000mA NW 230V Flat, Glass Lamp 96XP-L22000mA NW 230V

fencing
Proposed 5m Wide wayleave
Dia: 250mm uPVC Perforated Pipe
Dia: 250mm Concrete Pipe
Slope 1:2
OPW drainage channel
PHASE1B SERVICED LAND (LAND RAISING AND INFRASTRUCTURE)
Proposed headwall for outfall. Outfall discharges through flap valve
MH149
2.4m High Security fencing
MH60
2.4m High Security fencing stops
55136
4m High Noise barrier begins
MH56
1400
Phase 1A Security gate
8000
Proposed carriageway access road
3000
MH59
Proposed 30m high lighting mast. Lighting mast sits on 1m high concrete base
182974
PHASE1A OPEN STORAGE /CONTAINER STORAGE
Proposed HGV turning circle and unloading bay
4m High Noise barrier
Intercepter 05
Indicative Future Access
MH54
MH52
8m High street lighting column with lamp
MH53
Phase 1 Security

NOTES

1. Verifying Dimensions.
   The contractor shall verify dimensions against such other drawings or site conditions as pertain to this part of the work.
2. Existing Services.
   Any information concerning the location of existing services indicated on this drawing is intended for general guidance only. It shall be the responsibility of the contractor to determine and verify the exact horizontal and vertical alignment of all cables, pipes, etc. (both underground and overhead) before work commences.
3. Issue of Drawings.
   Hard copies, dwf and pdf will form a controlled issue of the drawing. All other formats (dwg, dxf etc,) are deemed to be an uncontrolled issue and any work carried out based on these files is at the recipients own risk. RPS will not accept any responsibility for any errors arising from the use of these files, either by human error by the recipient, listing of un-dimensioned measurements, compatibility issues with the recipient's software, and any errors arising when these files are used to aid the recipients drawing production, or setting out on site.
4. DATUM: Ordnance Datum Malin
5. Map Series

Map Series 1:2500	Map Series 1:5000
4794-D REVISION DATE = 01-Nov-2005 SURVEY DATE = 01-Feb-1995 LEVELLED DATE = 31-Dec-1977	4794 REVISION DATE = 31-Dec-2000 SURVEY DATE = 31-Dec-2000
4795-A REVISION DATE = 31-Dec-1980 SURVEY DATE = 31-Dec-1980	4795 REVISION DATE = 31-Dec-2000 SURVEY DATE = 31-Dec-2000
4795-B REVISION DATE = 24-Mar-2008 SURVEY DATE = 31-Dec-1980	1:5000 4858 REVISION DATE = 14-Oct-2009 SURVEY DATE = 31-Jul-2000
4795-C REVISION DATE = 15-Mar-2010 SURVEY DATE = 01-Mar-1995 LEVELLED DATE = 31-Dec-1977	
4795-D REVISION DATE = 24-Mar-2008 SURVEY DATE = 30-Jun-2001	
4858-A REVISION DATE = 14-Oct-2009 SURVEY DATE = 02-Jan-1995 LEVELLED DATE = 31-Dec-1981	
4858-B REVISION DATE = 14-Oct-2009 SURVEY DATE = 02-Jan-1995 LEVELLED DATE = 31-Dec-1977	
4858-C REVISION DATE = 31-Dec-1978 SURVEY DATE = 31-Dec-1978 LEVELLED DATE = 31-Dec-1981	
4858-D REVISION DATE = 31-Dec-1978 SURVEY DATE = 31-Dec-1978 LEVELLED DATE = 31-Dec-1977	

6. Projection: IRENET95 /Irish Transverse Mercator

Key:

- Planning Boundary
- Land in ownership of Applicant but not forming part of application
- Proposed Development Area
- Site Notice (4Nr in total)
- National Road
- Secondary Road
- Proposed Drainage Pipe and Manhole

rev	amendments	drawn	date

RPS
Elmwood House
74 Boucher Road
Belfast
BT12 6RZ
T +44 (0) 28 90 667914
F +44 (0) 28 90 668286
W www.rpsgroup.com/ireland
E ireland@rpsgroup.com

Client: Shannon Foynes Port Company

Project: Capacity Extension at Shannon Foynes

Title: Proposed Site Layout Plan Sheet 11

Drawing Status	Sheet Size	Drawing Scale
Planning	A1	1:500

Drawing Number	Rev
M0679-RPS-00-PL-DR-C-0121	-

Project Leader	Drawn By	Date	Initial Review
S.H.	M.H.	March 2018	E.H.

526000.00 526100.00 526200.00 526300.00

652100.00

652000.00

HWM

Petcoke Development
Planning Permission Reference: 151059

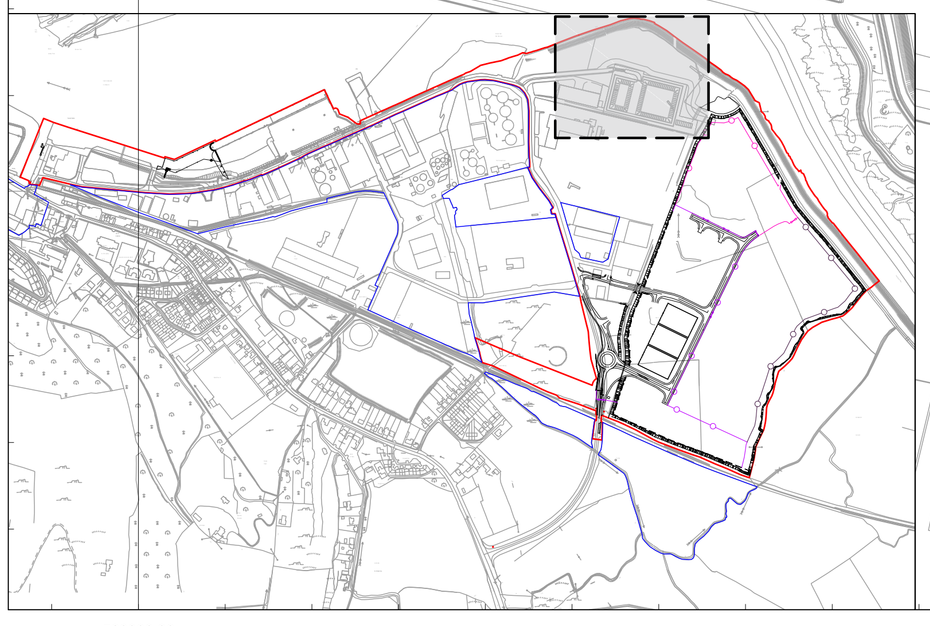
No impact of proposed works on permitted development

Existing attenuation pond

Proposed headwall for outfall, Outfall discharges through flap valve

Proposed 5m Wayleave

7800



NOTES

1. Verifying Dimensions.
   The contractor shall verify dimensions against such other drawings or site conditions as pertain to this part of the work.

2. Existing Services.
   Any information concerning the location of existing services indicated on this drawing is intended for general guidance only. It shall be the responsibility of the contractor to determine and verify the exact horizontal and vertical alignment of all cables, pipes, etc. (both underground and overhead) before work commences.

3. Issue of Drawings.
   Hard copies, dwf and pdf will form a controlled issue of the drawing. All other formats (dwg, dxf etc.) are deemed to be an uncontrolled issue and any work carried out based on these files is at the recipients own risk. RPS will not accept any responsibility for any errors arising from the use of these files, either by human error by the recipient, listing of un-dimensioned measurements, compatibility issues with the recipient's software, and any errors arising when these files are used to aid the recipients drawing production, or setting out on site.

4. DATUM: Ordnance Datum Malin

5. Map Series

Map Series 1:2500	Map Series 1:5000
4794-D REVISION DATE = 01-Nov-2005 SURVEY DATE = 01-Feb-1995 LEVELLED DATE = 31-Dec-1977	4794 REVISION DATE = 31-Dec-2000 SURVEY DATE = 31-Dec-2000
4795-A REVISION DATE = 31-Dec-1980 SURVEY DATE = 31-Dec-1980	4795 REVISION DATE = 31-Dec-2000 SURVEY DATE = 31-Dec-2000
4795-B REVISION DATE = 24-Mar-2008 SURVEY DATE = 31-Dec-1980	1:5000 4858 REVISION DATE = 14-Oct-2009 SURVEY DATE = 31-Jul-2000
4795-C REVISION DATE = 15-Mar-2010 SURVEY DATE = 01-Mar-1995 LEVELLED DATE = 31-Dec-1977	
4795-D REVISION DATE = 24-Mar-2008 SURVEY DATE = 30-Jun-2001	
4858-A REVISION DATE = 14-Oct-2009 SURVEY DATE = 02-Jan-1995 LEVELLED DATE = 31-Dec-1981	
4858-B REVISION DATE = 14-Oct-2009 SURVEY DATE = 02-Jan-1995 LEVELLED DATE = 31-Dec-1977	
4858-C REVISION DATE = 31-Dec-1978 SURVEY DATE = 31-Dec-1978 LEVELLED DATE = 31-Dec-1981	
4858-D REVISION DATE = 31-Dec-1978 SURVEY DATE = 31-Dec-1978 LEVELLED DATE = 31-Dec-1977	

6. Projection: IRENET95 /Irish Transverse Mercator

Key:

- Planning Boundary
- Land in ownership of Applicant but not forming part of application
- Proposed Development Area
- Site Notice (4Nr in total)
- National Road
- Secondary Road

rev	amendments	drawn	date

RPS
Elmwood House
74 Boucher Road
Belfast
BT12 6RZ
T +44 (0) 28 90 667914
F +44 (0) 28 90 668286
W www.rpsgroup.com/ireland
E ireland@rpsgroup.com

Client
Shannon Foynes Port Company

Project
Capacity Extension at Shannon Foynes

Title
Proposed Site Layout Plan Sheet 10

Drawing Status	Sheet Size	Drawing Scale
Planning	A1	1:500

Drawing Number	Rev
M0679-RPS-00-PL-DR-C-0120	-

Project Leader	Drawn By	Date	Initial Review
S.H.	M.H.	March 2018	E.H.

526400.00 526500.00 526600.00

652100.00

652000.00

651900.00

Existing OPW embankment

Existing Lagoon Pumping Facility.
300mm Dia Pump sump and Discharge. (No works proposed)
IL: -1.30m OD Malin
Position: 526410.43E
652037.94N

59628

41991

Existing attenuation pond

Extended attenuation area

Proposed 5m Wide wayleave

Proposed 5m Wide wayleave

34647

57991

7800

Slope 1:2

Slope 1:2

Existing OPW drainage channel and 5m wayleave

Existing OPW drainage channel

Existing OPW embankment

Robertstown River

HWM

Area outside of
Planning Application Boundary

Proposed headwall for outfall. / Outfall discharges through flap valve

1.01m
1.45m

Dia: 250mm
uPVC Perforated Pipe

Landscaping.
Refer to planting drawings for details

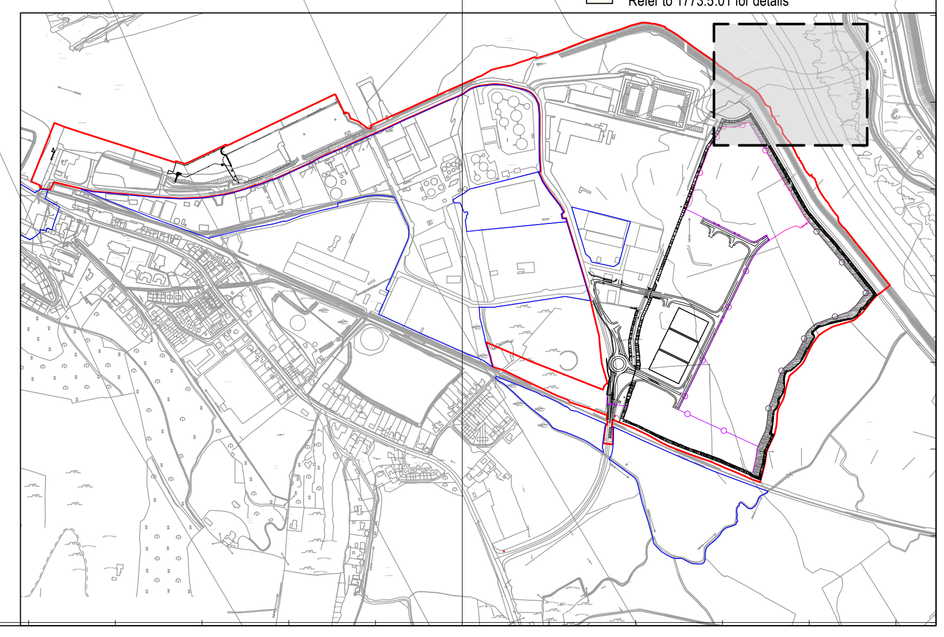
Phase 1B
2.4m High Security fencing

Phase 1B
2.4m High Security fencing

MH64

Key:

- Phase 1A
  Refer to Concrete or Bituminous Surface Detail
- Phase 1B
- Phase 1C
- Landscaping.
  Refer to 1773.5.01 for details



NOTES

1. Verifying Dimensions.
   The contractor shall verify dimensions against such other drawings or site conditions as pertain to this part of the work.

2. Existing Services.
   Any information concerning the location of existing services indicated on this drawing is intended for general guidance only. It shall be the responsibility of the contractor to determine and verify the exact horizontal and vertical alignment of all cables, pipes, etc. (both underground and overhead) before work commences.

3. Issue of Drawings.
   Hard copies, dwf and pdf will form a controlled issue of the drawing. All other formats (dwg, dxf etc.) are deemed to be an uncontrolled issue and any work carried out based on these files is at the recipients own risk. RPS will not accept any responsibility for any errors arising from the use of these files, either by human error by the recipient, listing of un-dimensioned measurements, compatibility issues with the recipient's software, and any errors arising when these files are used to aid the recipients drawing production, or setting out on site.

4. DATUM: Ordnance Datum Malin

5. Map Series

1:2500	1:5000
4794-D REVISION DATE = 01-Nov-2005 SURVEY DATE = 01-Feb-1995 LEVELLED DATE = 31-Dec-1977	4794 REVISION DATE = 31-Dec-2000 SURVEY DATE = 31-Dec-2000
4795-A REVISION DATE = 31-Dec-1980 SURVEY DATE = 31-Dec-1980	4795 REVISION DATE = 31-Dec-2000 SURVEY DATE = 31-Dec-2000
4795-B REVISION DATE = 24-Mar-2008 SURVEY DATE = 31-Dec-1980	1:5000 4858 REVISION DATE = 14-Oct-2009 SURVEY DATE = 31-Jul-2000
4795-C REVISION DATE = 15-Mar-2010 SURVEY DATE = 01-Mar-1995 LEVELLED DATE = 31-Dec-1977	
4795-D REVISION DATE = 24-Mar-2008 SURVEY DATE = 30-Jun-2001	
4858-A REVISION DATE = 14-Oct-2009 SURVEY DATE = 02-Jan-1995 LEVELLED DATE = 31-Dec-1981	
4858-B REVISION DATE = 14-Oct-2009 SURVEY DATE = 02-Jan-1995 LEVELLED DATE = 31-Dec-1977	
4858-C REVISION DATE = 31-Dec-1978 SURVEY DATE = 31-Dec-1978 LEVELLED DATE = 31-Dec-1981	
4858-D REVISION DATE = 31-Dec-1978 SURVEY DATE = 31-Dec-1978 LEVELLED DATE = 31-Dec-1977	

6. Projection: IRENET95 /Irish Transverse Mercator

Key:

- Planning Boundary
- Land in ownership of Applicant but not forming part of application
- Proposed Development Area
- Site Notice (4Nr in total)
- National Road
- Secondary Road
- Proposed Drainage Pipe and Manhole

rev	amendments	drawn	date

RPS
Elmwood House
74 Boucher Road
Belfast
BT12 6RZ
T +44 (0) 28 90 667914
F +44 (0) 28 90 668286
W www.rpsgroup.com/ireland
E ireland@rpsgroup.com

Client
Shannon Foynes Port Company

Project
Capacity Extension at Shannon Foynes

Title
Proposed Site Layout Plan
Sheet 14

Drawing Status	Sheet Size	Drawing Scale
Planning	A1	1:500

Drawing Number
M0679-RPS-00-PL-DR-C-0124

Rev -

Project Leader	Drawn By	Date	Initial Review
S.H.	M.H.	March 2018	E.H.

526500.00 526600.00 526700.00

651900.00 651800.00 651700.00

Pond

Robertstown River

HWM

Slope 1:2

Slope 1:2

Proposed 5m Wide wayleave

Existing OPW drainage channel

Existing OPW embankment

Access up and over landscape berm for OPW access to wayleave

Dia: 250mm uPVC Perforated Pipe

Security gate to restrict access

Phase 1B 2.4m High Security fencing

Dia: 250mm uPVC Perforated Pipe

Dia: 250mm Concrete Pipe

Interceptor 06

Dia: 250mm Concrete Pipe

MH62

Landscaping. Refer to planting drawings for details

Phase 1B Security gate

Dia: 250mm Concrete Pipe

MH93

Dia: 250mm Concrete Pipe

MH95

Dia: 250mm Concrete Pipe

Phase 1C 2.4m High Security fencing

Phase 1A Security gate

Phase 1B perimeter security fencing

Phase 1A perimeter security fencing

PHASE1C SERVICED LAND
(LAND RAISING AND
INFRASTRUCTURE)

Area outside of
Planning Application Boundary

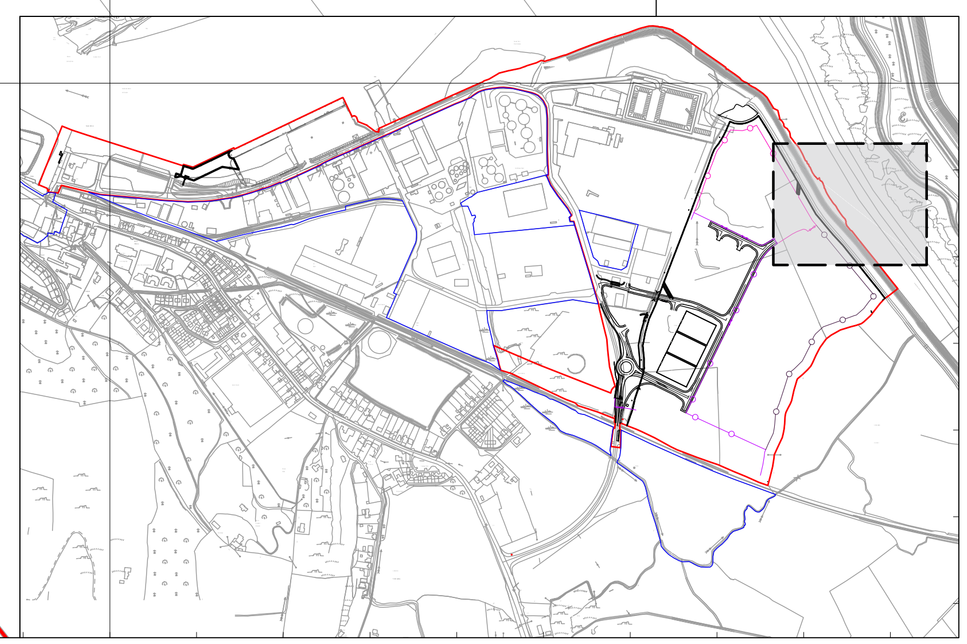
54087

42515

36723

Key:

- Phase 1A
  Refer to Concrete or Bituminous Surface Detail
- Phase 1B
- Phase 1C
- Landscaping.
  Refer to 1773.5.01 for details
- Carriageway/Access Road.
  Refer to IBH0548 Series Drawings
- Footway/Cycleway
  Refer to IBH0548 Series Drawings
- 8m COLUMN WITH
  1 No. LED LUMINAIRE AXIA 2.1 5187
  24 Nichia NVSL219CT 890mA NW
  383442 Intergrated Lenses 230V
- 30m TOWER WITH 2 No. FLOODLIGHTS
  OMNIblast GEN2 2 2297 - 96 XP-L2
  2000mA NW 230V Flat, Glass Lamp
  96XP-L22000mA NW 230V
- 30m TOWER WITH 6 No. FLOODLIGHTS
  OMNIblast GEN2 2 2297 - 96 XP-L2
  2000mA NW 230V Flat, Glass Lamp
  96XP-L22000mA NW 230V



NOTES

1. Verifying Dimensions.
   The contractor shall verify dimensions against such other drawings or site conditions as pertain to this part of the work.
2. Existing Services.
   Any information concerning the location of existing services indicated on this drawing is intended for general guidance only. It shall be the responsibility of the contractor to determine and verify the exact horizontal and vertical alignment of all cables, pipes, etc. (both underground and overhead) before work commences.
3. Issue of Drawings.
   Hard copies, dwf and pdf will form a controlled issue of the drawing. All other formats (dwg, dxf etc.) are deemed to be an uncontrolled issue and any work carried out based on these files is at the recipients own risk. RPS will not accept any responsibility for any errors arising from the use of these files, either by human error by the recipient, listing of un-dimensioned measurements, compatibility issues with the recipient's software, and any errors arising when these files are used to aid the recipients drawing production, or setting out on site.
4. DATUM: Ordnance Datum Malin
5. Map Series

Map Series 1:2500	Map Series 1:5000
4794-D REVISION DATE = 01-Nov-2005 SURVEY DATE = 01-Feb-1995 LEVELLED DATE = 31-Dec-1977	4794 REVISION DATE = 31-Dec-2000 SURVEY DATE = 31-Dec-2000
4795-A REVISION DATE = 31-Dec-1980 SURVEY DATE = 31-Dec-1980	4795 REVISION DATE = 31-Dec-2000 SURVEY DATE = 31-Dec-2000
4795-B REVISION DATE = 24-Mar-2008 SURVEY DATE = 31-Dec-1980	1:5000 4858 REVISION DATE = 14-Oct-2009 SURVEY DATE = 31-Jul-2000
4795-C REVISION DATE = 15-Mar-2010 SURVEY DATE = 01-Mar-1995 LEVELLED DATE = 31-Dec-1977	
4795-D REVISION DATE = 24-Mar-2008 SURVEY DATE = 30-Jun-2001	
4858-A REVISION DATE = 14-Oct-2009 SURVEY DATE = 02-Jan-1995 LEVELLED DATE = 31-Dec-1981	
4858-B REVISION DATE = 14-Oct-2009 SURVEY DATE = 02-Jan-1995 LEVELLED DATE = 31-Dec-1977	
4858-C REVISION DATE = 31-Dec-1978 SURVEY DATE = 31-Dec-1978 LEVELLED DATE = 31-Dec-1981	
4858-D REVISION DATE = 31-Dec-1978 SURVEY DATE = 31-Dec-1978 LEVELLED DATE = 31-Dec-1977	

6. Projection: IRENET95 /Irish Transverse Mercator

Key:

- Planning Boundary
- Land in ownership of Applicant but not forming part of application
- Proposed Development Area
- Site Notice (4Nr in total)
- National Road
- Secondary Road
- Proposed Drainage Pipe and Manhole

rev	amendments	drawn	date

RPS
Elmwood House
74 Boucher Road
Belfast
BT12 6RZ
T +44 (0) 28 90 667914
F +44 (0) 28 90 668286
W www.rpsgroup.com/ireland
E ireland@rpsgroup.com

Client
Shannon Foynes Port Company

Project
Capacity Extension at Shannon Foynes

Title
Proposed Site Layout Plan
Sheet 15

Drawing Status	Sheet Size	Drawing Scale
Planning	A1	1:500

Drawing Number
M0679-RPS-00-PL-DR-C-0125

Rev -

Project Leader	Drawn By	Date	Initial Review
S.H.	M.H.	March 2018	E.H.

526500.00 526600.00 526700.00

651600.00 651500.00 651400.00

Dia: 250mm Concrete Pipe

MH51

Dia: 250mm Concrete Pipe

Phase 1C
2.4m High
Security fencing

MH92

Dia: 250mm Concrete Pipe

MH91

Dia: 250mm Concrete Pipe

Dia: 250mm Concrete Pipe

PHASE1C SERVICED LAND
(LAND RAISING AND
INFRASTRUCTURE)

MH49

Dia: 250mm Concrete Pipe

MH50

Phase 1C
2.4m High
Security fencing

Dia: 250mm Concrete Pipe

MH48

Existing OPW drainage channel

Proposed 5m Wide swale/verge

Existing OPW embankment

51807

41866

36060

Landscaping.
Refer to planting drawings for details

Robertstown River

1:2 Slope

Area outside of
Planning Application Boundary

Landscaping.
Refer to planting drawings for details

MH35

Dia: 250mm Concrete Pipe

MH36

22180

7872

1:2 Slope

Dia: 250mm Concrete Pipe

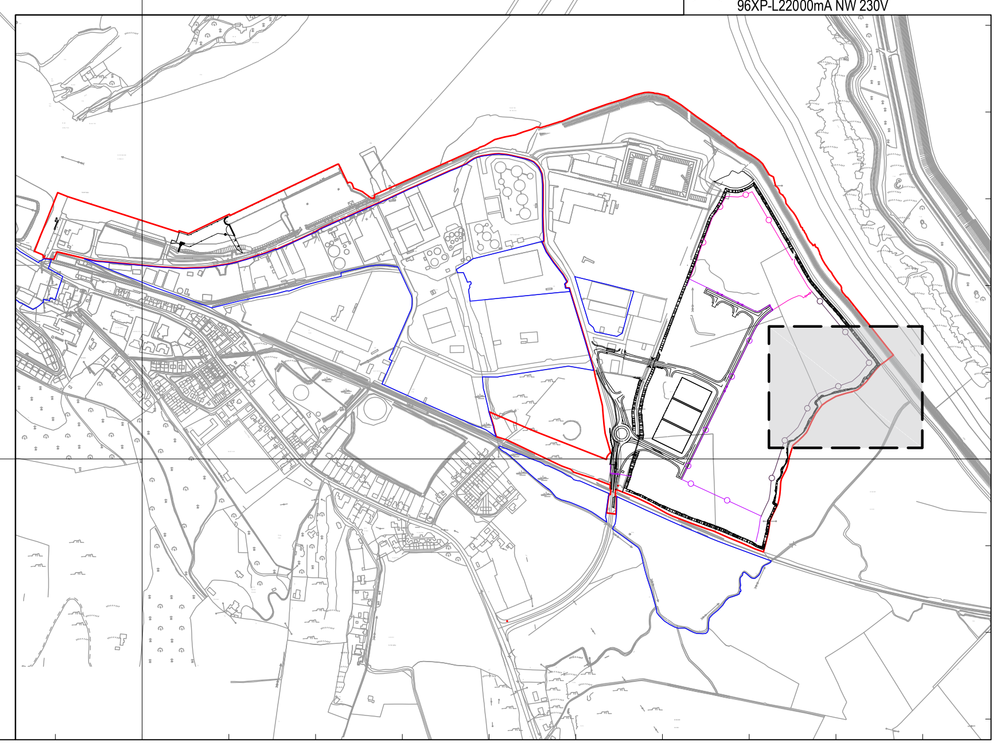
MH34

Area outside of
Planning Application Boundary

Ordnance Survey Ireland Licence No EN 0034218
© Ordnance Survey Ireland Government of Ireland

Key:

- Phase 1A
  Refer to Concrete or Bituminous Surface Detail
- Phase 1B
- Phase 1C
- Landscaping.
  Refer to 1773.5.01 for details
- Carriageway/Access Road.
  Refer to IBH0548 Series Drawings
- Footway/Cycleway
  Refer to IBH0548 Series Drawings
- 8m COLUMN WITH
  1 No. LED LUMINAIRE AXIA 2.1 5187
  24 Nichia NVSL219CT 890mA NW
  383442 Intergrated Lenses 230V
- 30m TOWER WITH 2 No. FLOODLIGHTS
  OMNIblast GEN2 2 2297 - 96 XP-L2
  2000mA NW 230V Flat, Glass Lamp
  96XP-L22000mA NW 230V
- 30m TOWER WITH 6 No. FLOODLIGHTS
  OMNIblast GEN2 2 2297 - 96 XP-L2
  2000mA NW 230V Flat, Glass Lamp
  96XP-L22000mA NW 230V



NOTES

1. Verifying Dimensions.
   The contractor shall verify dimensions against such other drawings or site conditions as pertain to this part of the work.
2. Existing Services.
   Any information concerning the location of existing services indicated on this drawing is intended for general guidance only. It shall be the responsibility of the contractor to determine and verify the exact horizontal and vertical alignment of all cables, pipes, etc. (both underground and overhead) before work commences.
3. Issue of Drawings.
   Hard copies, dwf and pdf will form a controlled issue of the drawing. All other formats (dwg, dxf etc.) are deemed to be an uncontrolled issue and any work carried out based on these files is at the recipients own risk. RPS will not accept any responsibility for any errors arising from the use of these files, either by human error by the recipient, listing of un-dimensioned measurements, compatibility issues with the recipient's software, and any errors arising when these files are used to aid the recipients drawing production, or setting out on site.
4. DATUM: Ordnance Datum Malin
5. Map Series

Map Series 1:2500	Map Series 1:5000
4794-D REVISION DATE = 01-Nov-2005 SURVEY DATE = 01-Feb-1995 LEVELLED DATE = 31-Dec-1977	4794 REVISION DATE = 31-Dec-2000 SURVEY DATE = 31-Dec-2000
4795-A REVISION DATE = 31-Dec-1980 SURVEY DATE = 31-Dec-1980	4795 REVISION DATE = 31-Dec-2000 SURVEY DATE = 31-Dec-2000
4795-B REVISION DATE = 24-Mar-2008 SURVEY DATE = 31-Dec-1980	4858 REVISION DATE = 14-Oct-2009 SURVEY DATE = 31-Jul-2000
4795-C REVISION DATE = 15-Mar-2010 SURVEY DATE = 01-Mar-1995 LEVELLED DATE = 31-Dec-1977	
4795-D REVISION DATE = 24-Mar-2008 SURVEY DATE = 30-Jun-2001	
4858-A REVISION DATE = 14-Oct-2009 SURVEY DATE = 02-Jan-1995 LEVELLED DATE = 31-Dec-1981	
4858-B REVISION DATE = 14-Oct-2009 SURVEY DATE = 02-Jan-1995 LEVELLED DATE = 31-Dec-1977	
4858-C REVISION DATE = 31-Dec-1978 SURVEY DATE = 31-Dec-1978 LEVELLED DATE = 31-Dec-1981	
4858-D REVISION DATE = 31-Dec-1978 SURVEY DATE = 31-Dec-1978 LEVELLED DATE = 31-Dec-1977	

6. Projection: IRENET95 /Irish Transverse Mercator

Key:

- Planning Boundary
- Land in ownership of Applicant but not forming part of application
- Proposed Development Area
- Site Notice (4Nr in total)
- National Road
- Secondary Road
- Proposed Drainage Pipe and Manhole

rev	amendments	drawn	date

RPS
Elmwood House
74 Boucher Road
Belfast
BT12 6RZ
T +44 (0) 28 90 667914
F +44 (0) 28 90 668286
W www.rpsgroup.com/ireland
E ireland@rpsgroup.com

Client
Shannon Foynes Port Company

Project
Capacity Extension at Shannon Foynes

Title
Proposed Site Layout Plan
Sheet 16

Drawing Status	Sheet Size	Drawing Scale
Planning	A1	1:500

Drawing Number
M0679-RPS-00-PL-DR-C-0126

Rev -

Project Leader	Drawn By	Date	Initial Review
S.H.	M.H.	March 2018	E.H.

526500.00 526600.00 526700.00 526800.00

651300.00

651200.00

Phase 1C
2.4m High
Security fencing

Slope
1:2

PHASE 1C SERVICED LAND
(LAND RAISING AND
INFRASTRUCTURE)

Landscaping.
Refer to planting
drawings for details

24823 8168 6760

7749 22392 11862

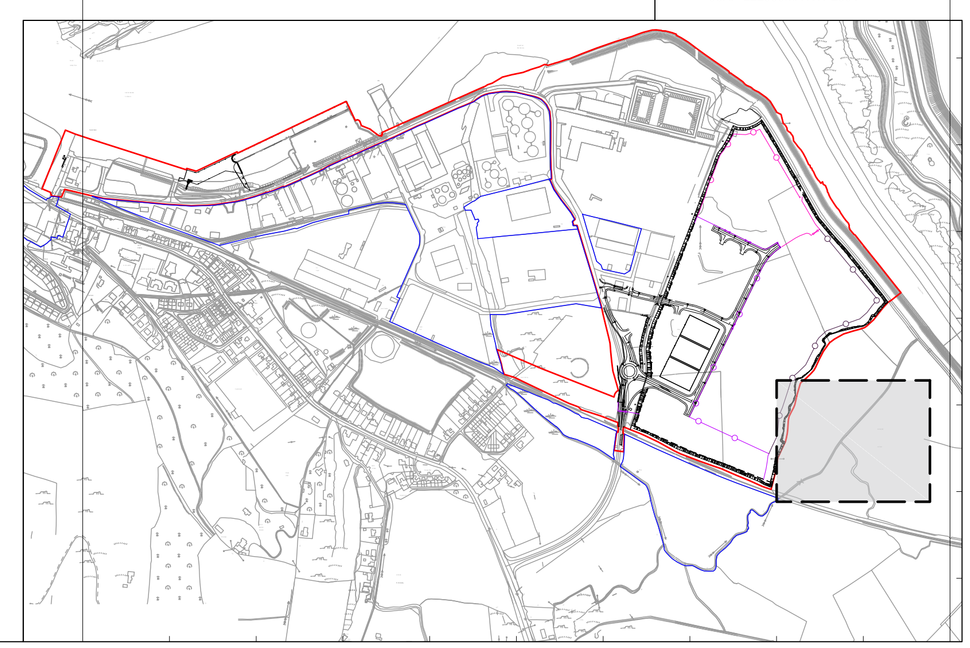
Area outside of
Planning Application Boundary

ARDANEER

Ard Inbhir

Key:

- Phase 1A
  Refer to Concrete or Bituminous Surface Detail
- Phase 1B
- Phase 1C
- Landscaping.
  Refer to 1773.5.01 for details
- Carriageway/Access Road.
  Refer to IBH0548 Series Drawings
- Footway/Cycleway
  Refer to IBH0548 Series Drawings
- 8m COLUMN WITH
  1 No. LED LUMINAIRE AXIA 2.1 5187
  24 Nichia NVSL219CT 890mA NW
  383442 Intergrated Lenses 230V
- 30m TOWER WITH 2 No. FLOODLIGHTS
  OMNIblast GEN2 2 2297 - 96 XP-L2
  2000mA NW 230V Flat, Glass Lamp
  96XP-L22000mA NW 230V
- 30m TOWER WITH 6 No. FLOODLIGHTS
  OMNIblast GEN2 2 2297 - 96 XP-L2
  2000mA NW 230V Flat, Glass Lamp
  96XP-L22000mA NW 230V



NOTES

1. Verifying Dimensions.
   The contractor shall verify dimensions against such other drawings or site conditions as pertain to this part of the work.

2. Existing Services.
   Any information concerning the location of existing services indicated on this drawing is intended for general guidance only. It shall be the responsibility of the contractor to determine and verify the exact horizontal and vertical alignment of all cables, pipes, etc. (both underground and overhead) before work commences.

3. Issue of Drawings.
   Hard copies, dwf and pdf will form a controlled issue of the drawing. All other formats (dwg, dxf etc.) are deemed to be an uncontrolled issue and any work carried out based on these files is at the recipients own risk. RPS will not accept any responsibility for any errors arising from the use of these files, either by human error by the recipient, listing of un-dimensioned measurements, compatibility issues with the recipient's software, and any errors arising when these files are used to aid the recipients drawing production, or setting out on site.

4. DATUM: Ordnance Datum Malin

5. Map Series

Map Series 1:2500	Map Series 1:5000
4794-D REVISION DATE = 01-Nov-2005 SURVEY DATE = 01-Feb-1995 LEVELLED DATE = 31-Dec-1977	4794 REVISION DATE = 31-Dec-2000 SURVEY DATE = 31-Dec-2000
4795-A REVISION DATE = 31-Dec-1980 SURVEY DATE = 31-Dec-1980	4795 REVISION DATE = 31-Dec-2000 SURVEY DATE = 31-Dec-2000
4795-B REVISION DATE = 24-Mar-2008 SURVEY DATE = 31-Dec-1980	1:5000 4858 REVISION DATE = 14-Oct-2009 SURVEY DATE = 31-Jul-2000
4795-C REVISION DATE = 15-Mar-2010 SURVEY DATE = 01-Mar-1995 LEVELLED DATE = 31-Dec-1977	
4795-D REVISION DATE = 24-Mar-2008 SURVEY DATE = 30-Jun-2001	
4858-A REVISION DATE = 14-Oct-2009 SURVEY DATE = 02-Jan-1995 LEVELLED DATE = 31-Dec-1981	
4858-B REVISION DATE = 14-Oct-2009 SURVEY DATE = 02-Jan-1995 LEVELLED DATE = 31-Dec-1977	
4858-C REVISION DATE = 31-Dec-1978 SURVEY DATE = 31-Dec-1978 LEVELLED DATE = 31-Dec-1981	
4858-D REVISION DATE = 31-Dec-1978 SURVEY DATE = 31-Dec-1978 LEVELLED DATE = 31-Dec-1977	

6. Projection: IRENET95 /Irish Transverse Mercator

Key:

- Planning Boundary
- Land in ownership of Applicant but not forming part of application
- Proposed Development Area
- Site Notice
  (4Nr in total)
- National Road
- Secondary Road
- Proposed Drainage Pipe and Manhole

rev	amendments	drawn	date

RPS
Elmwood House
74 Boucher Road
Belfast
BT12 6RZ
T +44 (0) 28 90 667914
F +44 (0) 28 90 668286
W www.rpsgroup.com/ireland
E ireland@rpsgroup.com

Client
Shannon Foynes Port Company

Project
Capacity Extension at
Shannon Foynes

Title
Proposed Site Layout Plan
Sheet 17

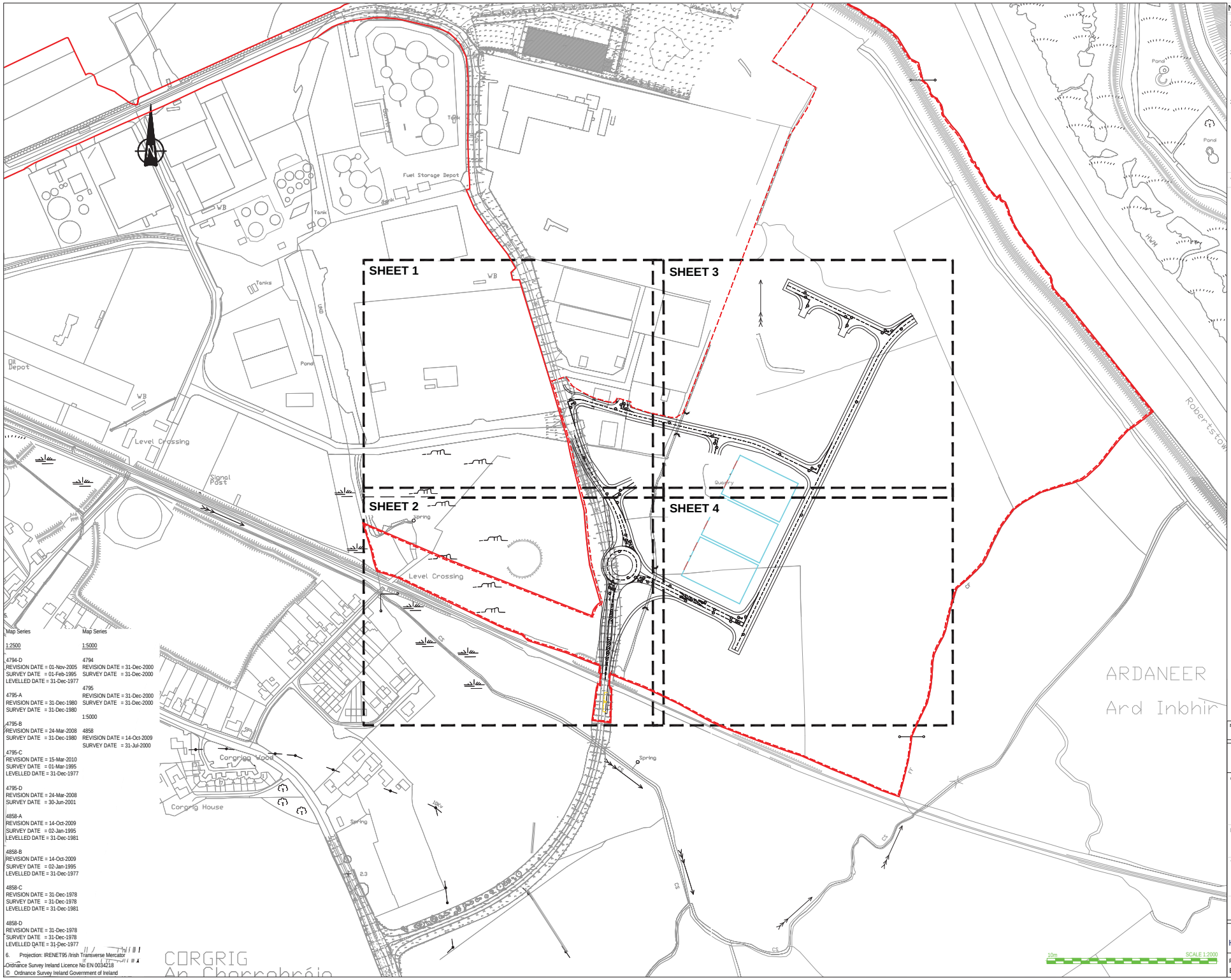
Drawing Status	Sheet Size	Drawing Scale
Planning	A1	1:500

Drawing Number: M0679-RPS-00-PL-DR-C-0127
Rev -

Project Leader	Drawn By	Date	Initial Review
S.H.	M.H.	March 2018	E.H.

Appendix 13.2

New Internal Layout



Map Series 1:2500

4794-D
REVISION DATE = 01-Nov-2005
SURVEY DATE = 01-Feb-1995
LEVELLED DATE = 31-Dec-1977

4795-A
REVISION DATE = 31-Dec-1980
SURVEY DATE = 31-Dec-1980

4795-B
REVISION DATE = 24-Mar-2008
SURVEY DATE = 31-Dec-1980

4795-C
REVISION DATE = 15-Mar-2010
SURVEY DATE = 01-Mar-1995
LEVELLED DATE = 31-Dec-1977

4795-D
REVISION DATE = 24-Mar-2008
SURVEY DATE = 30-Jun-2001

4858-A
REVISION DATE = 14-Oct-2009
SURVEY DATE = 02-Jan-1995
LEVELLED DATE = 31-Dec-1981

4858-B
REVISION DATE = 14-Oct-2009
SURVEY DATE = 02-Jan-1995
LEVELLED DATE = 31-Dec-1977

4858-C
REVISION DATE = 31-Dec-1978
SURVEY DATE = 31-Dec-1978
LEVELLED DATE = 31-Dec-1981

4858-D
REVISION DATE = 31-Dec-1978
SURVEY DATE = 31-Dec-1978
LEVELLED DATE = 31-Dec-1977

Map Series 1:5000

4794
REVISION DATE = 31-Dec-2000
SURVEY DATE = 31-Dec-2000

4795
REVISION DATE = 31-Dec-2000
SURVEY DATE = 31-Dec-2000

1:5000
4858
REVISION DATE = 14-Oct-2009
SURVEY DATE = 31-Jul-2000

6. Projection: IRENET95 /Irish Transverse Mercator

CORGRIG
An Chorrabhróis

NOTES

1. Verifying Dimensions.
The contractor shall verify dimensions against such other drawings or site conditions as pertain to this part of the work.

2. Existing Services.
Any information concerning the location of existing services indicated on this drawing is intended for general guidance only. It shall be the responsibility of the contractor to determine and verify the exact horizontal and vertical alignment of all cables, pipes, etc. (both underground and overhead) before work commences.

3. Issue of Drawings.
Hard copies, dwf and pdf will form a controlled issue of the drawing. All other formats (dwg, dxf etc.) are deemed to be an uncontrolled issue and any work carried out based on these files is at the recipients own risk. RPS will not accept any responsibility for any errors arising from the use of these files, either by human error by the recipient, listing of un-dimensioned measurements, compatibility issues with the recipient's software, and any errors arising when these files are used to aid the recipients drawing production, or setting out on site.

4. Datum: Ordance Datum Malin

Key

Existing Layout

Proposed Layout

Proposed Retaining Wall

KEY TO ROAD MARKINGS

Road markings and traffic sign details to comply with the "Traffic signs Manual Chapter 7 (Republic of Ireland) subsequent amending regulations. Diagram numbers are referenced to this document.

Road markings shall be in thermoplastic screed to BS EN 1436 with applied solid glass beads to BS EN 1423.

The removal of all superseded road markings within the site boundary shall be carried out to the satisfaction of the engineer.

All road markings are subject to the approval of a representative of DRD Roads Service at the time of application.

ROAD MARKINGS:

1. DIAGRAM M 115:-
Triangular Yield Marking - 3750mm long marking; 1250mm wide and 150mm thick.
2. DIAGRAM RRM 003B:-
Hazard warning line - 1 No. 100mm wide line; 4000mm long mark, 2000mm long gap; colour white.
3. DIAGRAM RRM 018:-
Yield Line - 1 No. 200mm wide line: 1000mm long mark, 1000mm long gap: Colour white.
4. DIAGRAM RRM 021:-
Cross hatching (to restrict vehicular access) - 2 no. 100mm wide boundary lines (as per diagram 1004 above); 150mm wide cross hatching between boundary lines; cross hatching @ 45° to direction of flow with 3000mm between lines of hatching; colour white.
5. DIAGRAM RRM 019:-
No Entry Line: 1 No. 200mm wide Continuous single line and 1 No. 200mm wide line 1000mm long mark, 1000mm long gap. 300mm apart.Colour white
6. DIAGRAM RRM 017:-
Stop Line, 1 no. 200mm Continuous single line, Colour White
7. DIAGRAM R 102:-
Bifurcation Arrow - 8000mm long arrow. Colour White

rev	amendments	drawn	date

RPS
Elmwood House
74 Boucher Road
Belfast
BT12 6RZ
T +44 (0) 28 90 667914
F +44 (0) 28 90 668286
W www.rpsgroup.com/ireland
E ireland@rpsgroup.com

Client
Shannon Foynes Port Company

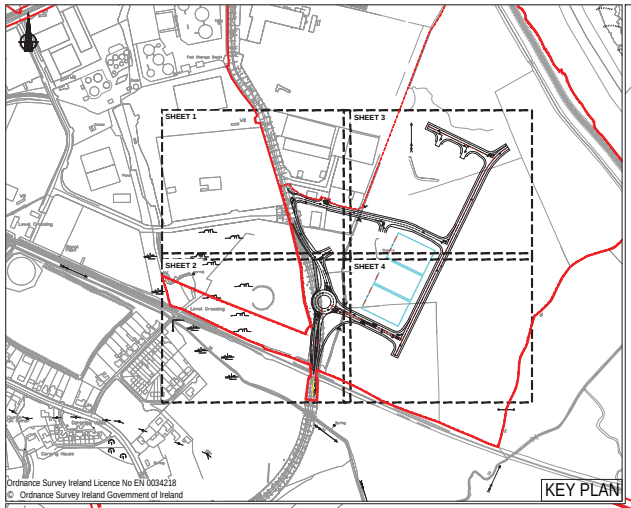
Project
Capacity Extension at Shannon Foynes

Title
Proposed Road Markings - Overall

Drawing Status	Sheet Size	Drawing Scale
Planning	A1	1:2000

Drawing Number	Rev
H0548-RPS-XX-00-DR-HE-110-01	-

Project Leader	Drawn By	Date	Initial Review
BD	MMcG	April 2018	JB



Level Crossing

5.

Map Series 1:2500	Map Series 1:5000
4794-D REVISION DATE = 01-Nov-2005 SURVEY DATE = 01-Feb-1995 LEVELLED DATE = 31-Dec-1977	4794 REVISION DATE = 31-Dec-2000 SURVEY DATE = 31-Dec-2000
4795-A REVISION DATE = 31-Dec-1980 SURVEY DATE = 31-Dec-1980	4795 REVISION DATE = 31-Dec-2000 SURVEY DATE = 31-Dec-2000
4795-B REVISION DATE = 24-Mar-2008 SURVEY DATE = 31-Dec-1980	1:5000 4858 REVISION DATE = 14-Oct-2009 SURVEY DATE = 31-Jul-2000
4795-C REVISION DATE = 15-Mar-2010 SURVEY DATE = 01-Mar-1995 LEVELLED DATE = 31-Dec-1977	
4795-D REVISION DATE = 24-Mar-2008 SURVEY DATE = 30-Jun-2001	
4858-A REVISION DATE = 14-Oct-2009 SURVEY DATE = 02-Jan-1995 LEVELLED DATE = 31-Dec-1981	
4858-B REVISION DATE = 14-Oct-2009 SURVEY DATE = 02-Jan-1995 LEVELLED DATE = 31-Dec-1977	
4858-C REVISION DATE = 31-Dec-1978 SURVEY DATE = 31-Dec-1978 LEVELLED DATE = 31-Dec-1981	
4858-D REVISION DATE = 31-Dec-1978 SURVEY DATE = 31-Dec-1978 LEVELLED DATE = 31-Dec-1977	

6. Projection: IRENET95 /Irish Transverse Mercator

NOTES

1. Verifying Dimensions.
   The contractor shall verify dimensions against such other drawings or site conditions as pertain to this part of the work.
2. Existing Services.
   Any information concerning the location of existing services indicated on this drawing is intended for general guidance only. It shall be the responsibility of the contractor to determine and verify the exact horizontal and vertical alignment of all cables, pipes, etc. (both underground and overhead) before work commences.
3. Issue of Drawings.
   Hard copies, dwf and pdf will form a controlled issue of the drawing. All other formats (dwg, dxf etc.) are deemed to be an uncontrolled issue and any work carried out based on these files is at the recipients own risk. RPS will not accept any responsibility for any errors arising from the use of these files, either by human error by the recipient, listing of un-dimensioned measurements, compatibility issues with the recipient's software, and any errors arising when these files are used to aid the recipients drawing production, or setting out on site.
4. Datum: Ordance Datum Malin

Key

Existing Layout

Proposed Layout

Proposed Retaining Wall

KEY TO ROAD MARKINGS

Road markings and traffic sign details to comply with the "Traffic signs Manual Chapter 7 (Republic of Ireland) subsequent amending regulations. Diagram numbers are referenced to this document.

Road markings shall be in thermoplastic screed to BS EN 1436 with applied solid glass beads to BS EN 1423.

The removal of all superseeded road markings within the site boundary shall be carried out to the satisfaction of the engineer.

All road markings are subject to the approval of a representative of DRD Roads Service at the time of application.

ROAD MARKINGS:

1. DIAGRAM M 115:-
   Triangular Yield Marking - 3750mm long marking; 1250mm wide and 150mm thick.
2. DIAGRAM RRM 003B:-
   Hazard warning line - 1 No. 100mm wide line; 4000mm long mark, 2000mm long gap; colour white.
3. DIAGRAM RRM 018:-
   Yield Line - 1 No. 200mm wide line: 1000mm long mark, 1000mm long gap: Colour white.
4. DIAGRAM RRM 021:-
   Cross hatching (to restrict vehicular access) - 2 no. 100mm wide boundary lines (as per diagram 1004 above); 150mm wide cross hatching between boundary lines; cross hatching @ 45° to direction of flow with 3000mm between lines of hatching; colour white.
5. DIAGRAM RRM 019:-
   No Entry Line: 1 No. 200mm wide Continuous single line and 1 No. 200mm wide line 1000mm long mark, 1000mm long gap. 300mm apart.Colour white
6. DIAGRAM RRM 017:-
   Stop Line, 1 no. 200mm Continuous single line, Colour White
7. DIAGRAM R 102:-
   Bifurcation Arrow - 8000mm long arrow. Colour White

rev	amendments	drawn	date

RPS
Elmwood House
74 Boucher Road
Belfast
BT12 6RZ
T +44 (0) 28 90 667914
F +44 (0) 28 90 668286
W www.rpsgroup.com/ireland
E ireland@rpsgroup.com

Client

Shannon Foynes Port Company

Project

Capacity Extension at Shannon Foynes

Title

Proposed Road Markings - Sheet 2 of 4

Drawing Status	Sheet Size	Drawing Scale
Planning	A1	1:500

Drawing Number	Rev
H0548-RPS-XX-00-DR-HE-110-03	-

Project Leader	Drawn By	Date	Initial Review
BD	MMcG	April 2018	JB

10m SCALE 1:500

Appendix 13.3

Scoping Correspondence

AN COIMISIÚN UM RIALÁIL IARNRÓID
COMMISSION FOR RAILWAY REGULATION

RPS Consulting Engineers,
Elmwood House
74 Boucher Road,
Co. Belfast
BT12 6RZ

24/11/17

Re: Extension of jetty facilities including the reclamation of foreshore, and extension of the port estate, Port of Foynes, Foynes, Co Limerick.
Ref – LAA 5 2017

Dear Ms Barr

With reference to the above planning application the Commission for Railway Regulation (CRR) makes the following observations;

1. Notification of your decision is required to the railway undertaking, namely Iarnród Éireann.

2. Iarnród Éireann should be consulted to ensure that risks associated with railway trespass are not increased in the vicinity of this development either during the works or when the works are complete.

3. The party undertaking the construction should ensure future works which may affect the safe operation of the railway are undertaken with the consultation of Iarnród Éireann and in accordance with RSC Guideline RSC-G-010-A (Third Party Guidance on Railway Risk Volume 1 Planning and Development – available on the CRR website).

4. Observations or issues raised by Iarnród Éireann should be addressed.

5. If permission is granted, the party undertaking the work should consult with Iarnród Éireann regarding road-rail interfaces, such as level crossings, on access routes which may have increased flow or abnormal loads during the construction phase.

Yours sincerely,

Aidan O'Sullivan
Assistant Inspector
Commission for Railway Regulation

Bonneagar Iompair Éireann
Transport Infrastructure Ireland

Ms. Ruth Barr
RPS Consulting Engineers
Elmwood House
74 Boucher Road
Belfast
BT12 6RZ

Dáta | Date	Ár dTag | Our Ref.	Bhur dTag | Your Ref.
22 November 2017	**TII17-99405**	**IBE01128**

RE: EIAR Scoping relating to Proposed Extension of jetty facilities at the Port of Foynes

Dear Ms. Barr,

Thank you for your letter and enclosures of 9 October 2017 regarding the above. The position in relation to your enquiry is as follows.

Transport Infrastructure Ireland (TII) wishes to advise that it is not in a position to engage directly with planning applicants in respect to proposed developments. TII will endeavour to consider and respond to planning applications referred to it given its status and duties as a statutory consultee under the Planning Acts. The approach to be adopted by TII in making such submissions or comments will seek to uphold official policy and guidelines as outlined in the Spatial Planning and National Roads Guidelines for Planning Authorities (DoECLG, 2012). Regard should also be had to other relevant guidance available at www.TII.ie.

The issuing of this correspondence is provided as best practice guidance only and does not prejudice TII's statutory right to make any observations, requests for further information, objections or appeals following the examination of any valid planning application referred.

With respect to EIAR/EIS scoping issues, the recommendations indicated below provide only general guidance for the preparation of an EIAR/EIS, which may affect the National Roads Network.

The developer should have regard, inter alia, to the following:

- Consultations should be had with the relevant Local Authority/National Roads Design Office with regard to locations of existing and future national road schemes; i.e. the Foynes to Limerick road improvement scheme which includes a new junction and a terminal service area adjacent to the current port access route.
- TII would be specifically concerned as to potential significant impacts the development would have on the national road network (and junctions with national roads) in the proximity of the proposed development. Particular focus on the N69 would be required.

Bonneagar Iompair Éireann
Ionad Ghnó Gheata na Páirce
Sráid Gheata na Páirce
Baile Átha Cliath 8
D08 DK10

Transport Infrastructure Ireland
Parkgate Business Centre
Parkgate Street
Dublin 8
D08 DK10

info@tii.ie
www.tii.ie
+353 (0)1 646 3600
+353 (0)1 646 3601

- The developer should assess visual impacts from existing national roads.
- The developer should have regard to any Environmental Impact Statement and all conditions and/or modifications imposed by An Bord Pleanála regarding road schemes in the area. The developer should in particular have regard to any potential cumulative impacts.
- The developer, in conducting the Environmental Impact Assessment, should have regard to TII Publications (formerly DMRB and the Manual of Contract Documents for Road Works).
- The developer, in conducting Environmental Impact Assessment, should have regard to TII's Environmental Assessment and Construction Guidelines, including the Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes (National Roads Authority, 2006).
- The EIAR/EIS should consider the Environmental Noise Regulations 2006 (SI 140 of 2006) and, in particular, how the development will affect future action plans by the relevant competent authority. The developer may need to consider the incorporation of noise barriers to reduce noise impacts (see Guidelines for the Treatment of Noise and Vibration in National Road Schemes (1st Rev., National Roads Authority, 2004)).
- It would be important that, where appropriate, subject to meeting the appropriate thresholds and criteria and having regard to best practice, a Traffic and Transport Assessment be carried out in accordance with relevant guidelines, noting traffic volumes attending the site and traffic routes to/from the site with reference to impacts on the national road network and junctions of lower category roads with national roads. TII's Traffic and Transport Assessment Guidelines (2014) should be referred to in relation to proposed development with potential impacts on the national road network. The scheme promoter is also advised to have regard to Section 2.2 of the NRA/TII TTA Guidelines which addresses requirements for sub-threshold TTA.
- The designers are asked to consult TII Publications to determine whether a Road Safety Audit is required.
- In the interests of maintaining the safety and standard of the national road network, the EIS should identify the methods/techniques proposed for any works traversing/in proximity to the national road network.
- In relation to haul route identification, the applicant/developer should clearly identify haul routes proposed and fully assess the network to be traversed. Separate structure approvals/permits and other licences may be required in connection with the proposed haul route and all structures on the haul route should be checked by the applicant/developer to confirm their capacity to accommodate any abnormal load proposed.

Notwithstanding any of the above, the developer should be aware that this list is non-exhaustive, thus site and development specific issues should be addressed in accordance with best practise.

I hope that the above comments are of use in your EIAR preparation.

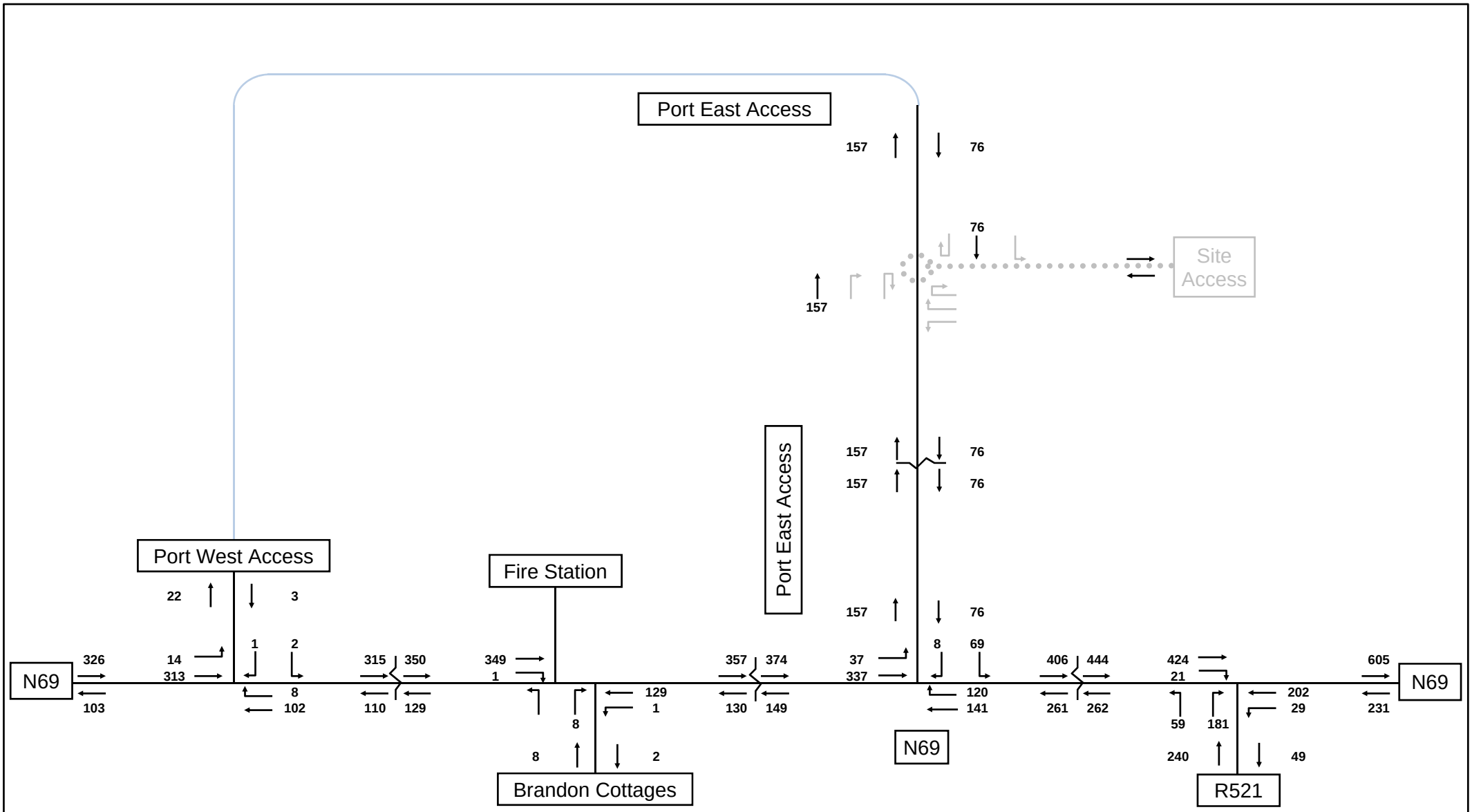
Yours sincerely,

P.P. Mark Byrne

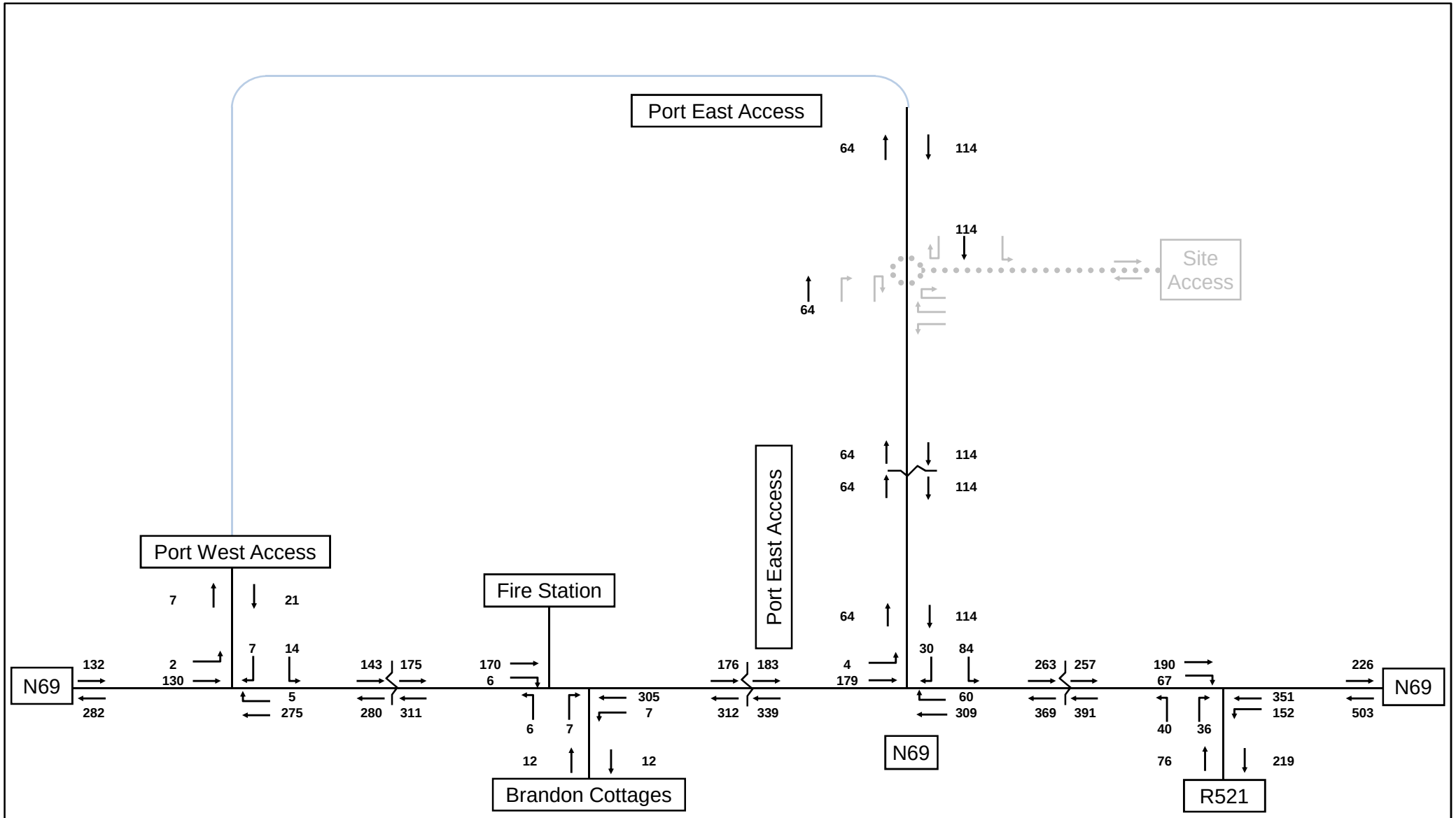
Elaine Edmonds
Land Use Planning

Appendix 13.4

Existing Traffic Flows



IBH0548 Shannon Foynes
Existing Traffic Flows (PCU)
2017 AM Peak (07:15-08:15)

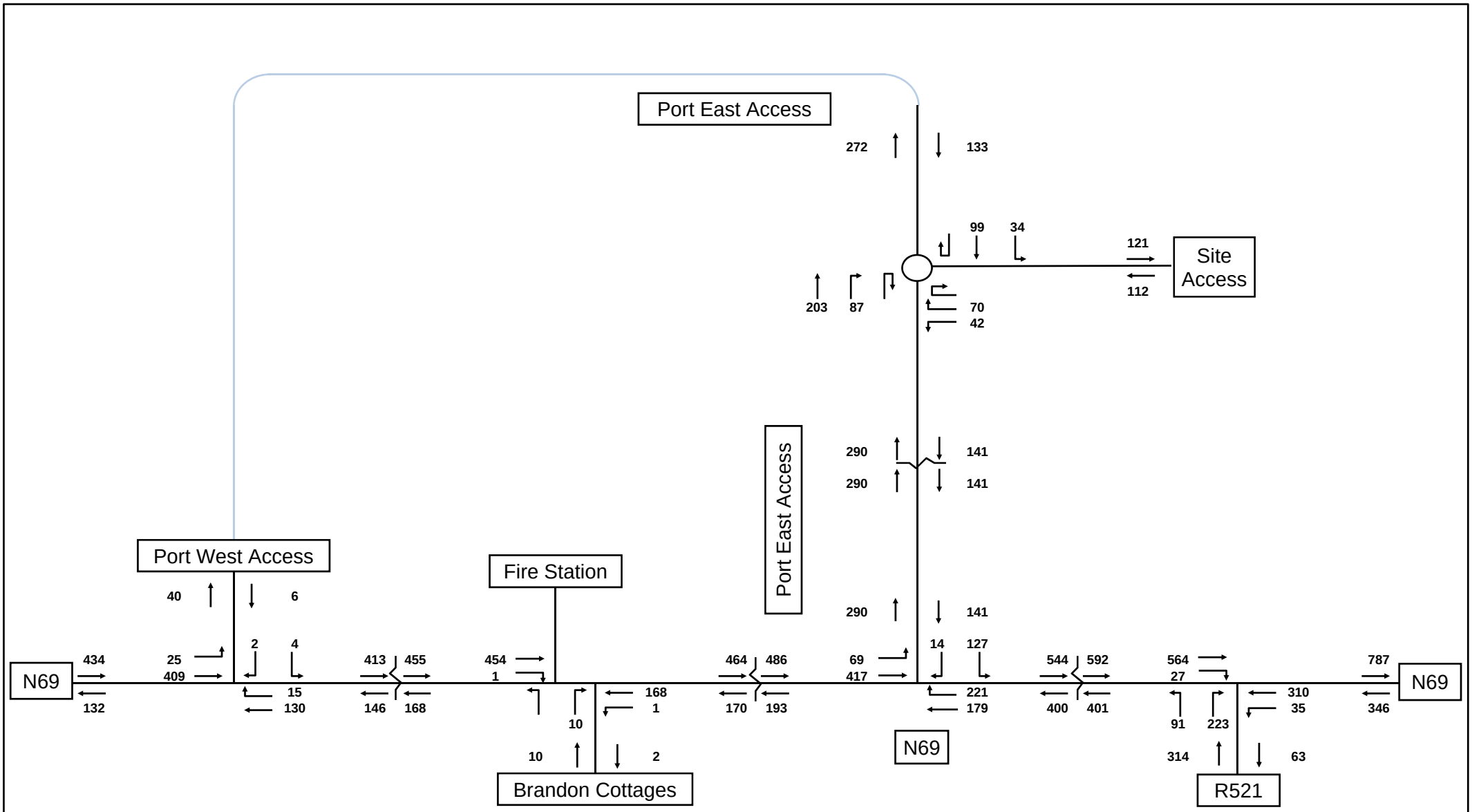


IBH0548 Shannon Foynes
Existing Traffic Flows (PCU)
2017 PM Peak (16:30-17:30)

RPS

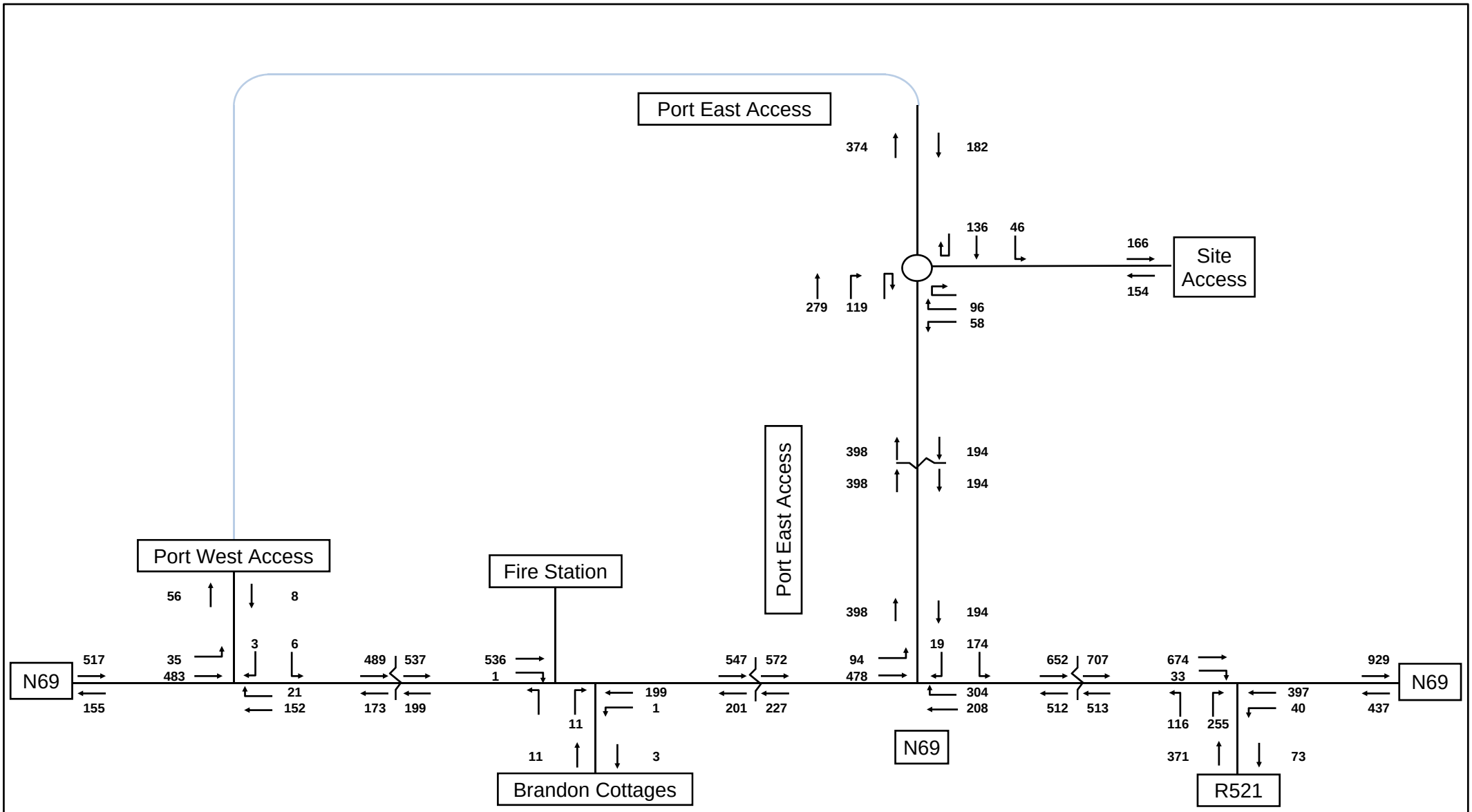
Appendix 13.5

Proposed Traffic Flows

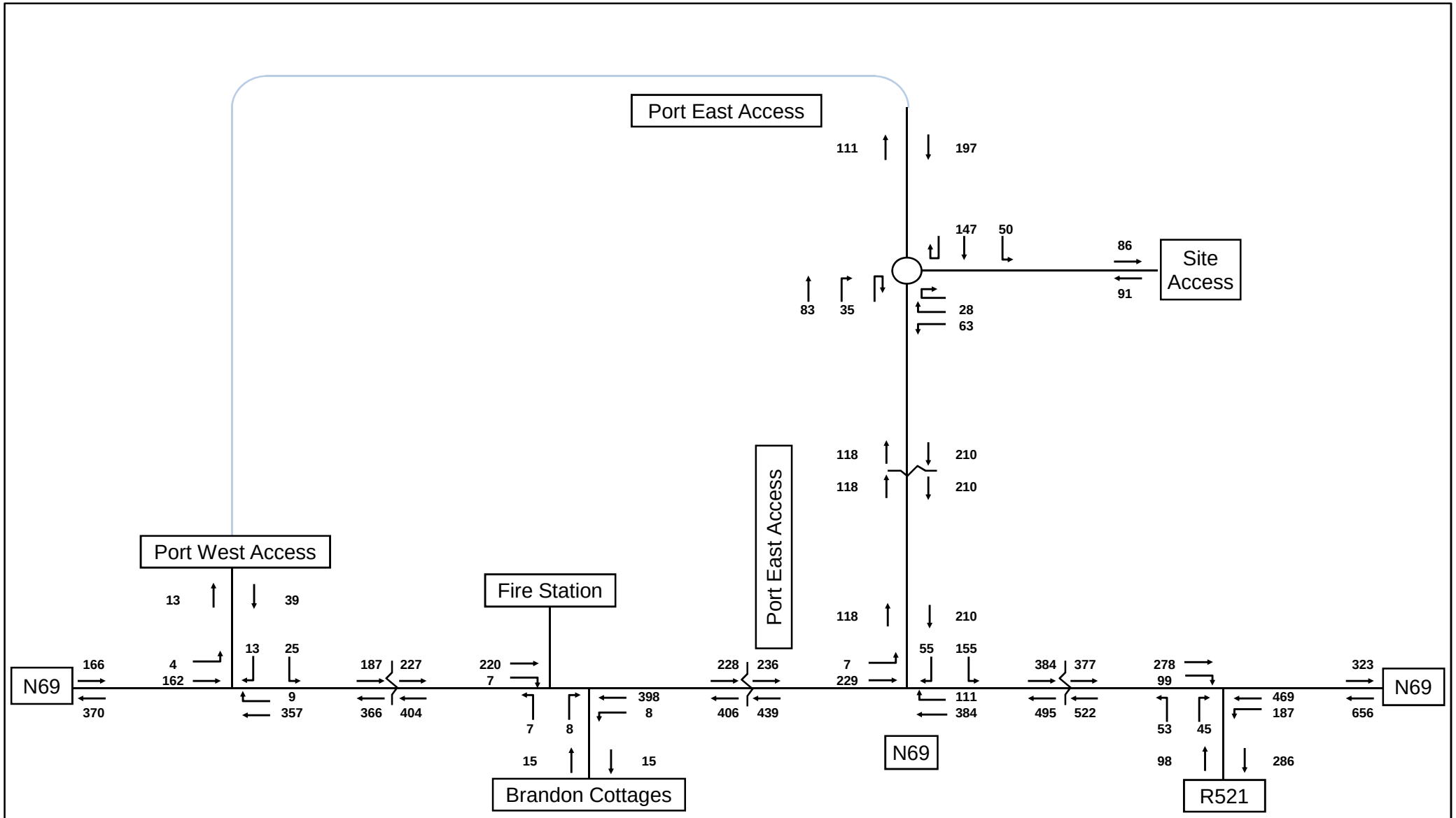


IBH0548 Shannon Foynes
Proposed Traffic Flows (PCU)
2029 AM Peak (07:15-08:15)

RPS

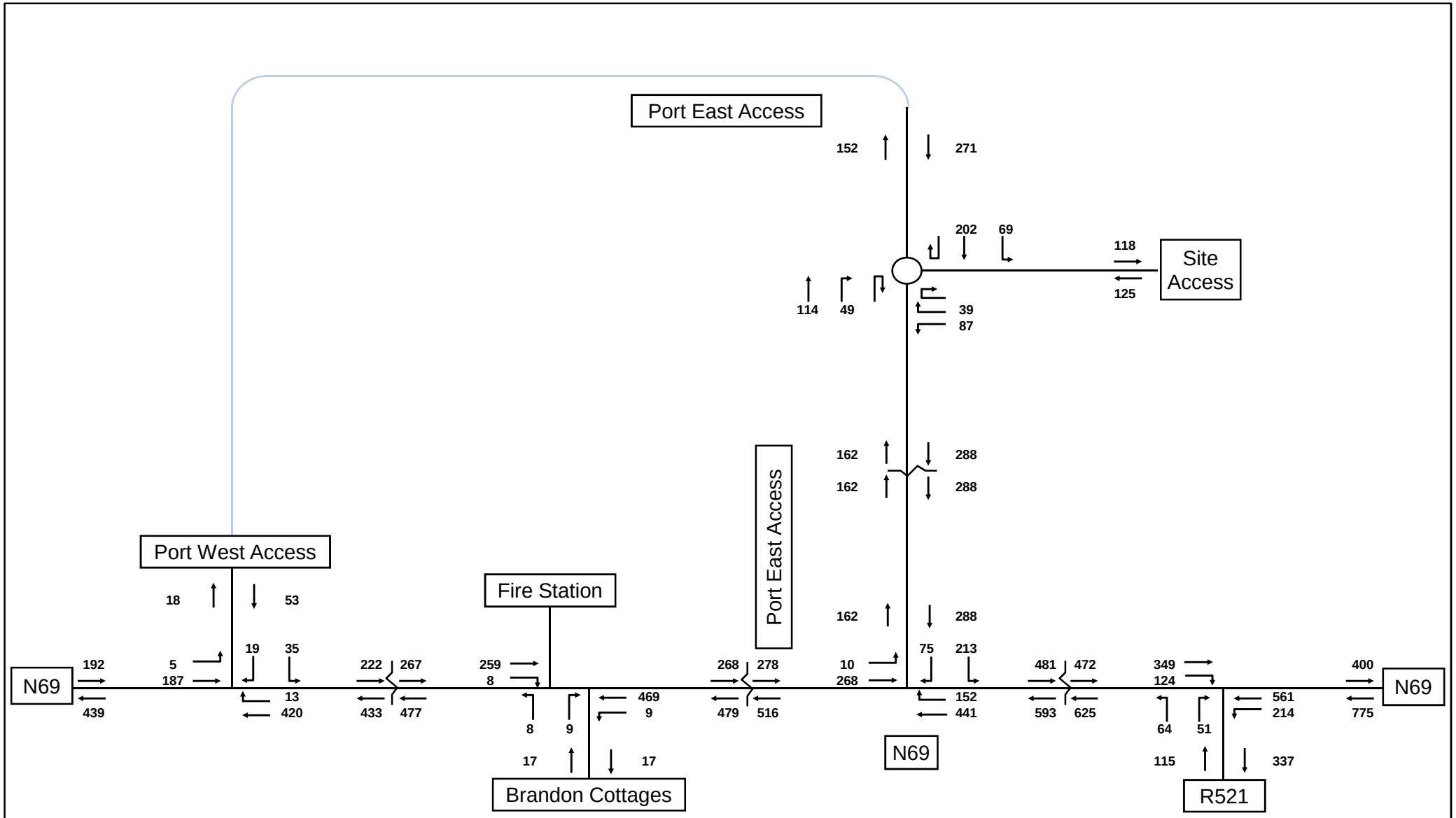


IBH0548 Shannon Foynes
Proposed Traffic Flows (PCU)
2041 AM Peak (07:15-08:15)



IBH0548 Shannon Foynes
Proposed Traffic Flows (PCU)
2029 PM Peak (16:30-17:30)

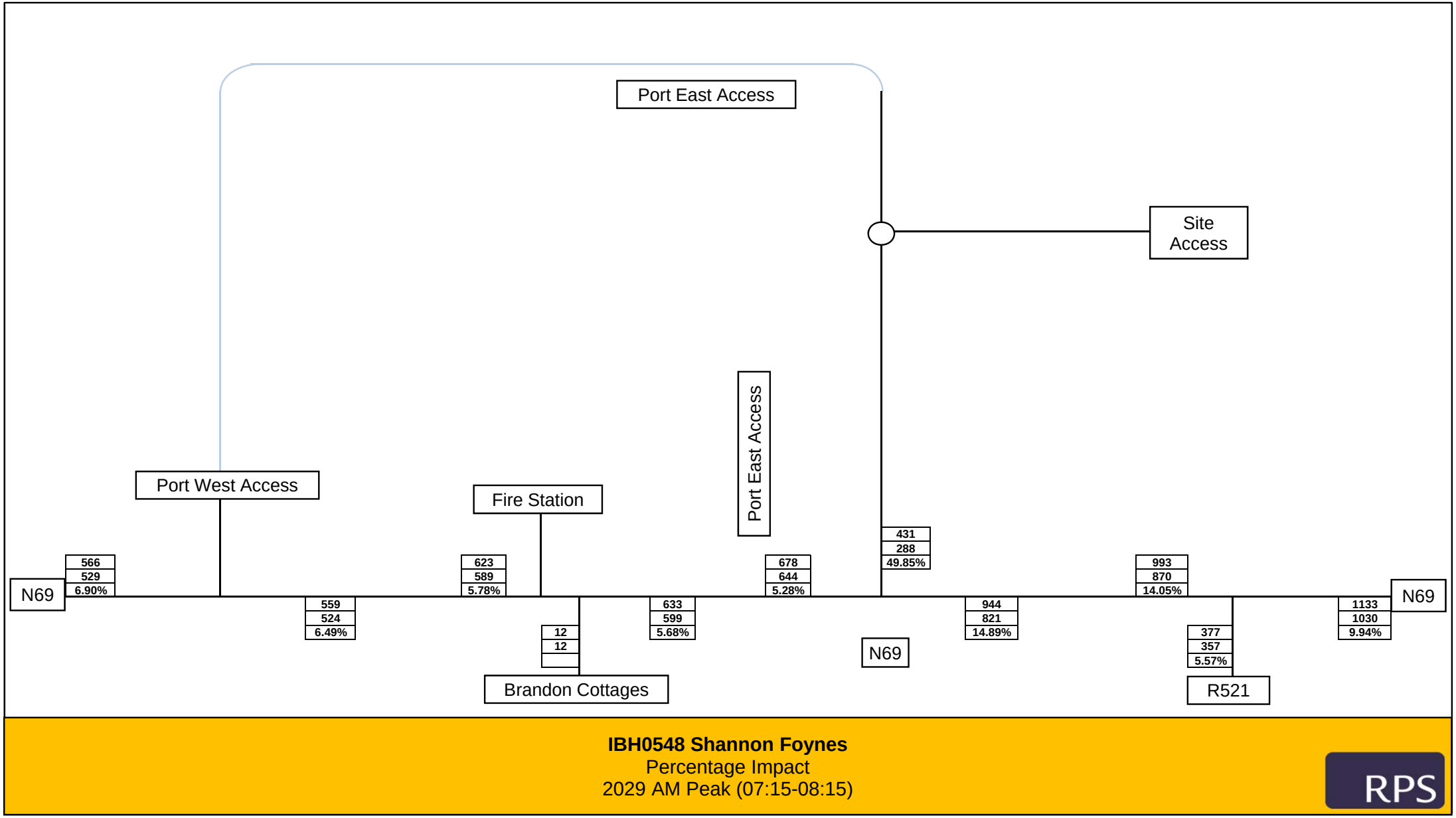
RPS



IBH0548 Shannon Foynes
Proposed Traffic Flows (PCU)
2041 PM Peak (16:30-17:30)

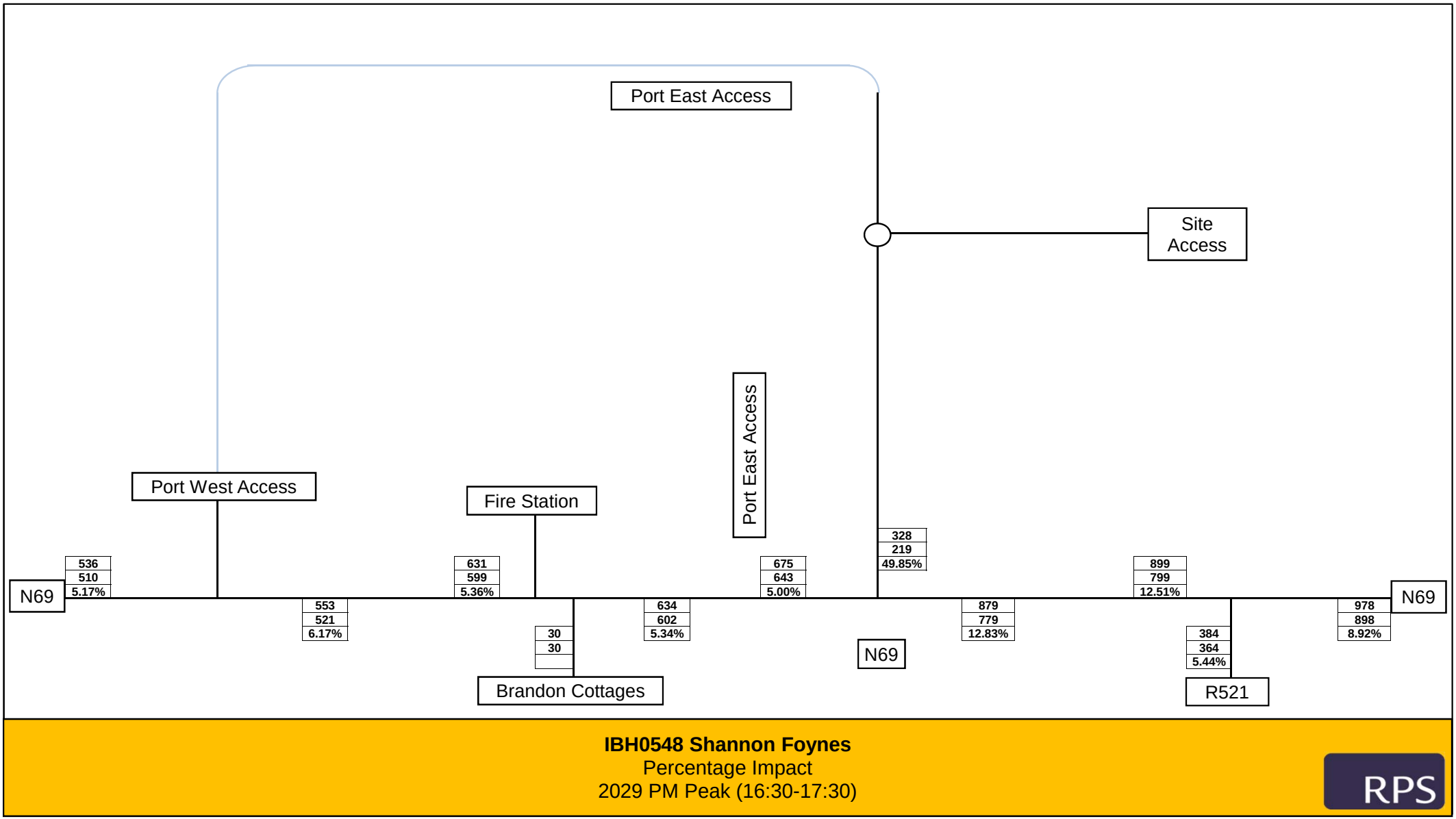
Appendix 13.6

Percentage Impact



IBH0548 Shannon Foynes
Percentage Impact
2029 AM Peak (07:15-08:15)

RPS

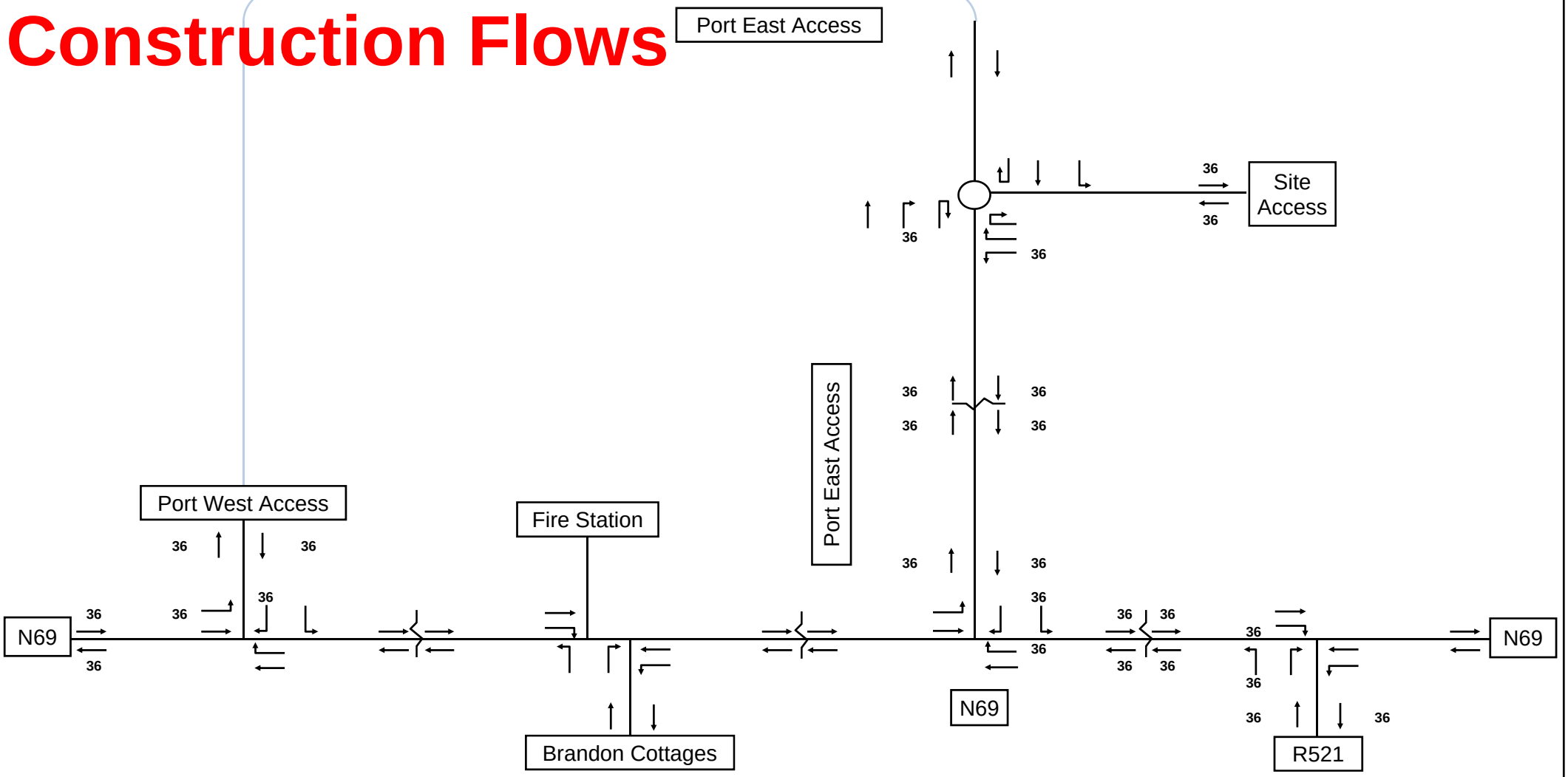


IBH0548 Shannon Foynes
Percentage Impact
2029 PM Peak (16:30-17:30)

Appendix 13.7

Sensitivity Test 1 – Construction Traffic Sensitivity Flows

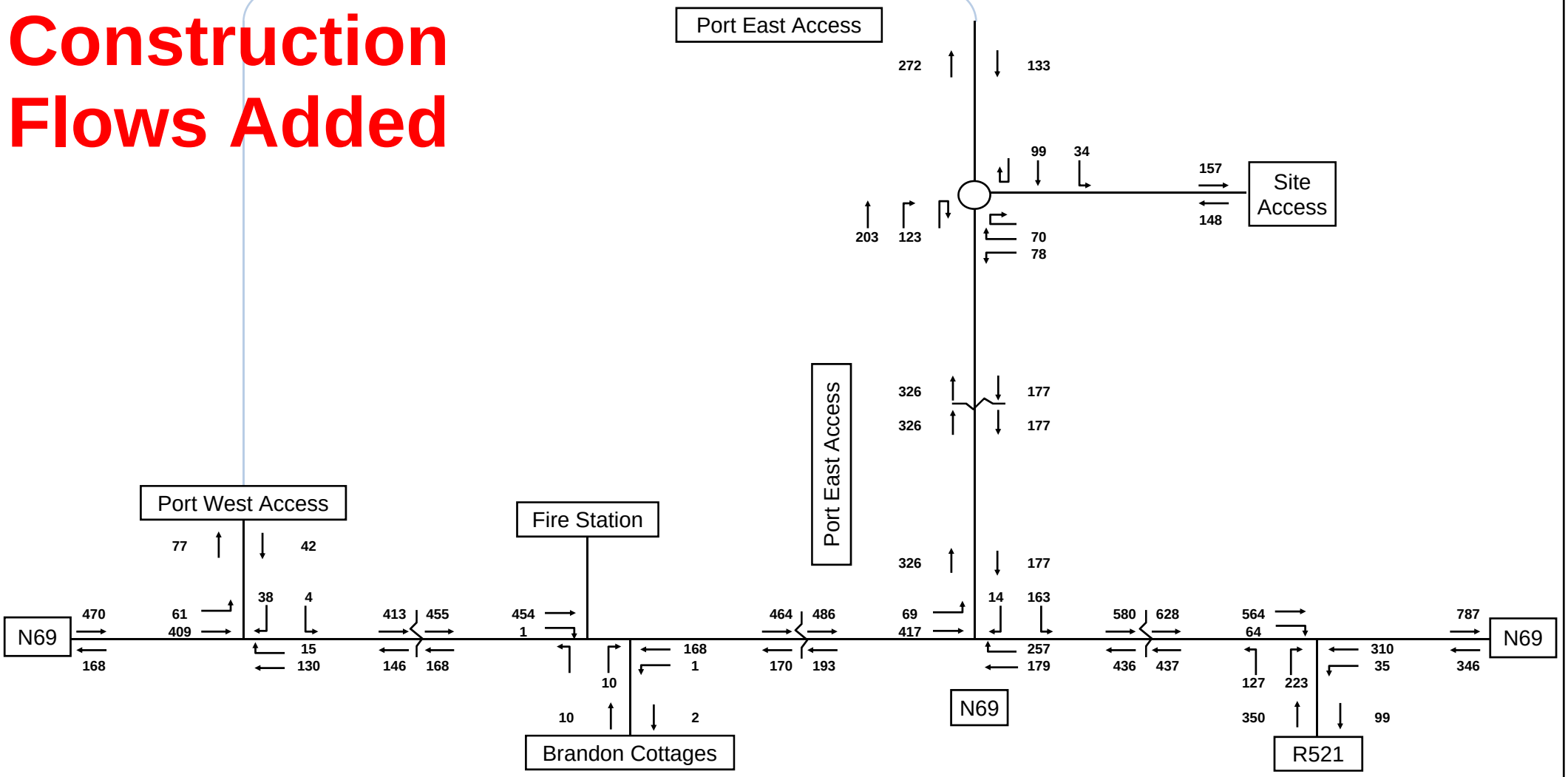
Sensitivity Test 1 - Construction Flows



IBH0548 Shannon Foynes
Sensitivity Test 1
Construction Traffic Flows (PCU)

RPS

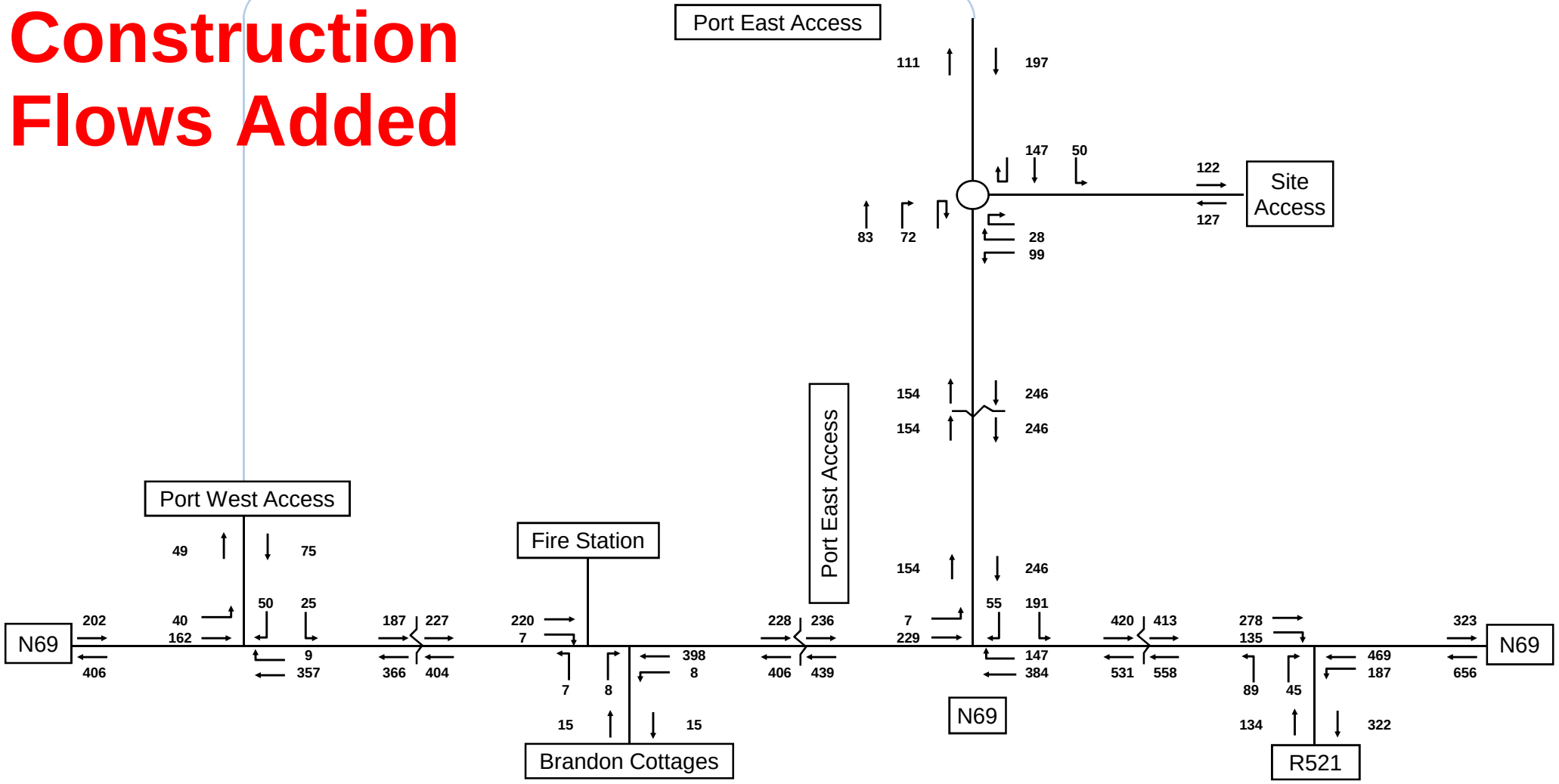
Sensitivity Test 1 - Construction Flows Added



IBH0548 Shannon Foynes
Sensitivity Test 1
Propoesd Traffic Flows (PCU)
2029 AM Peak (07:15-08:15)

RPS

Sensitivity Test 1 - Construction Flows Added



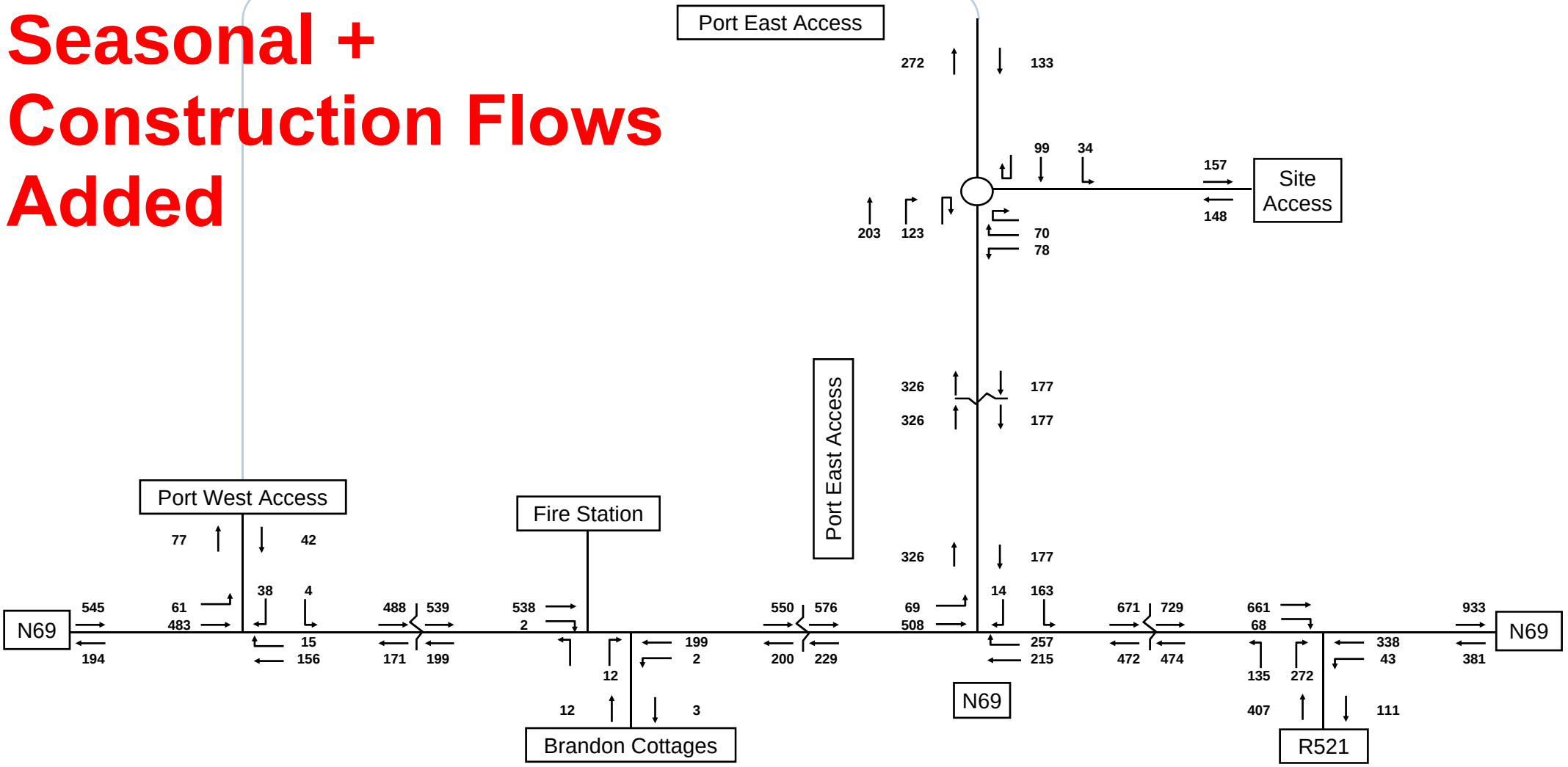
IBH0548 Shannon Foynes
Sensitivity Test 1
Propsed Traffic Flows (PCU)
2029 PM Peak (16:30-17:30)

RPS

Appendix 13.8

Sensitivity Test 2 – Seasonal Variation Traffic Sensitivity

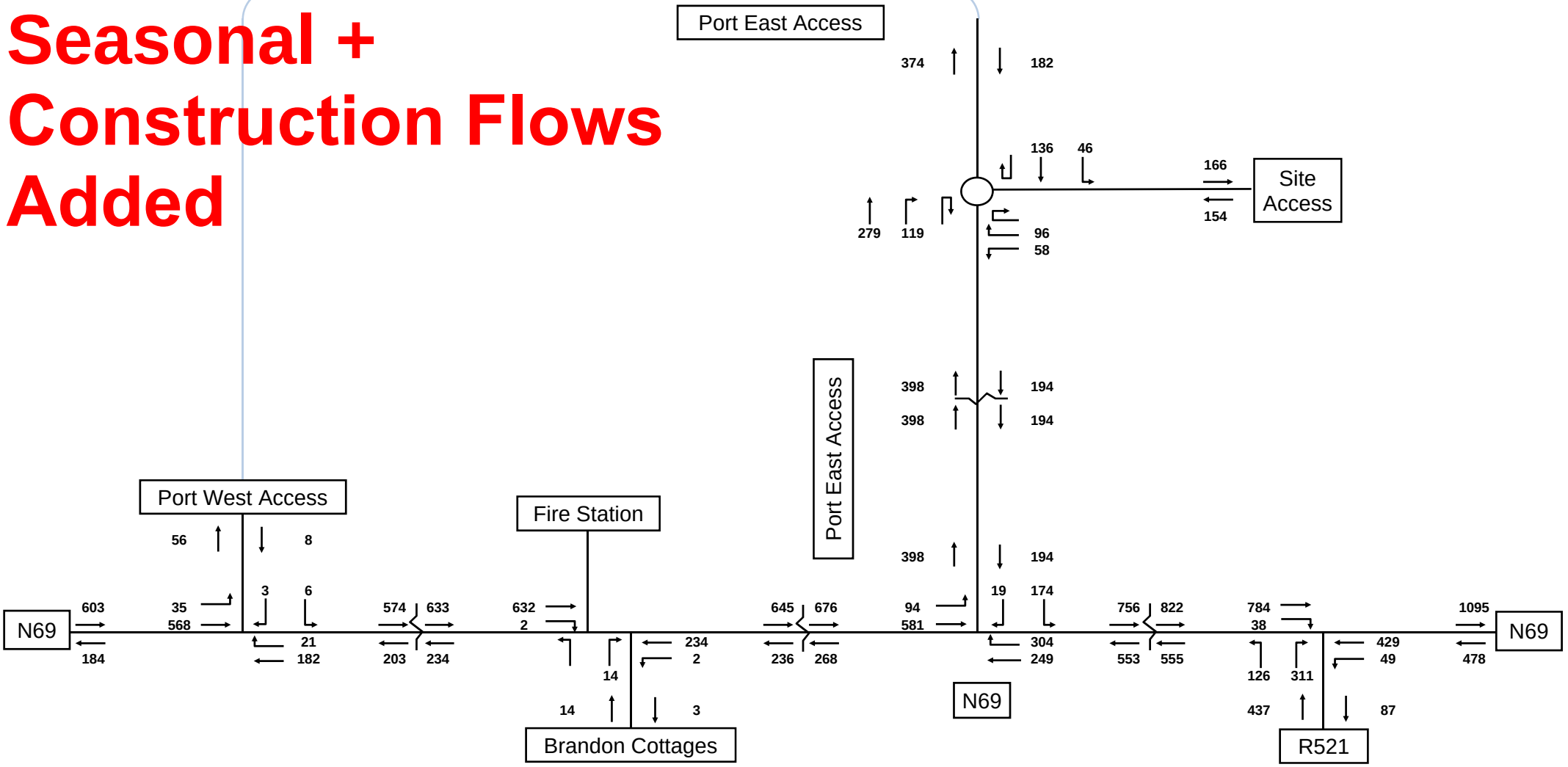
Sensitivity Test 2 - Seasonal + Construction Flows Added



IBH0548 Shannon Foynes
Sensitivity Test 2
Proposed Traffic Flows (PCU)
2029 AM Peak (07:15-08:15)

RPS

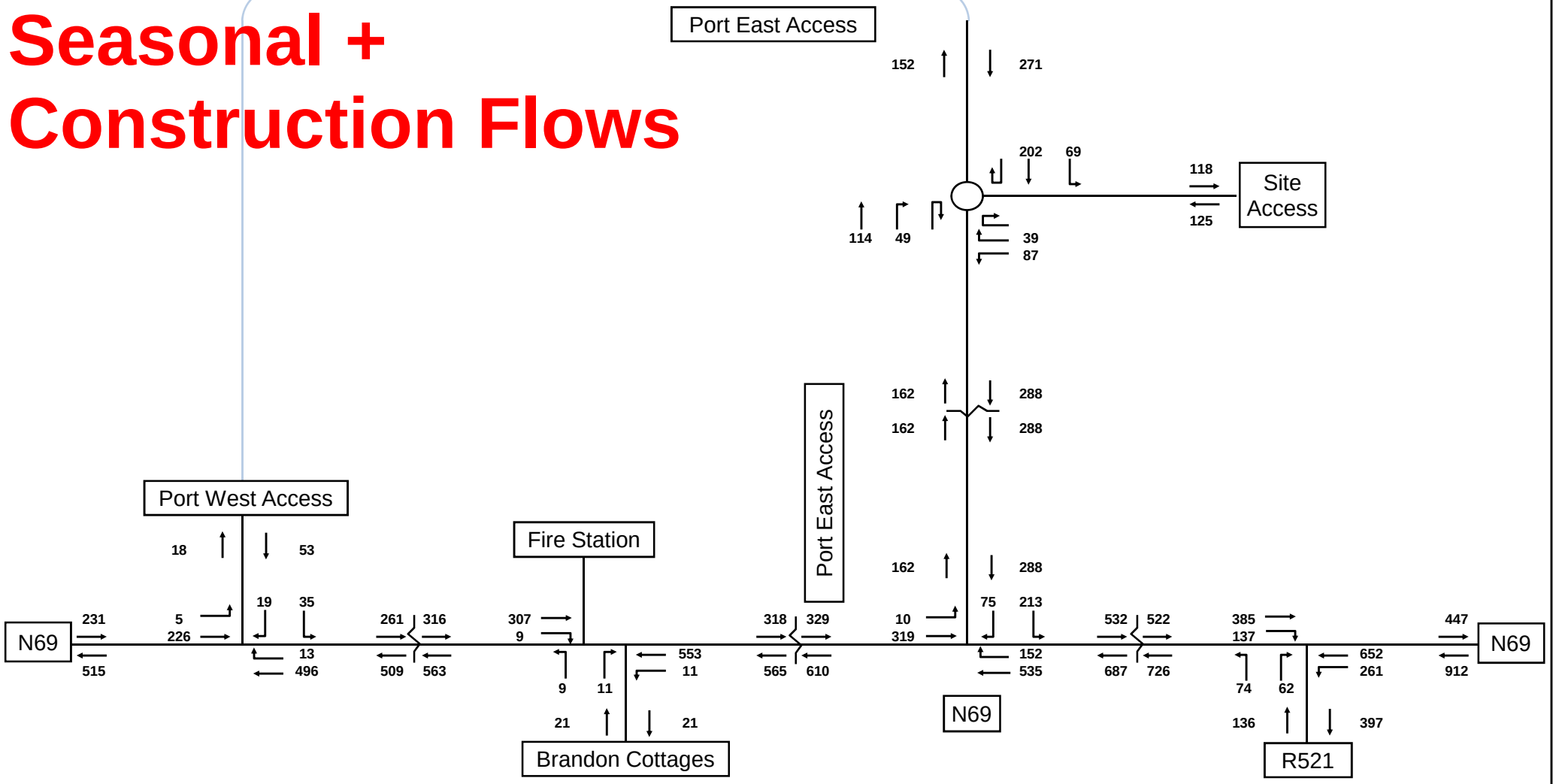
Sensitivity Test 2 - Seasonal + Construction Flows Added



IBH0548 Shannon Foynes
Sensitivity Test 2
Proposed Traffic Flows (PCU)
2041 AM Peak (07:15-08:15)

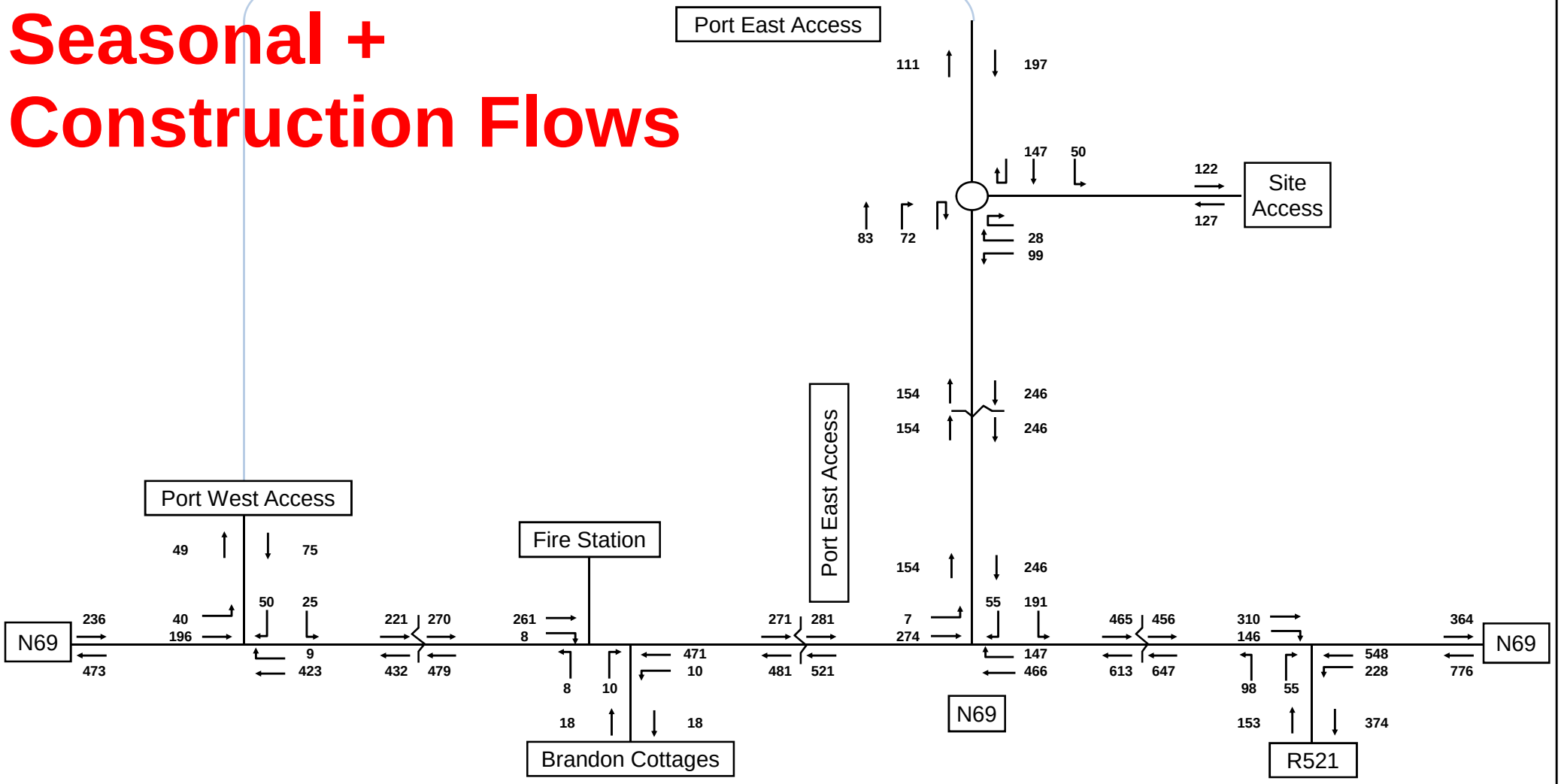
RPS

Sensitivity Test 2 - Seasonal + Construction Flows



IBH0548 Shannon Foynes
Sensitivity Test 2
Proposed Traffic Flows (PCU)
2041 PM Peak (16:30-17:30)

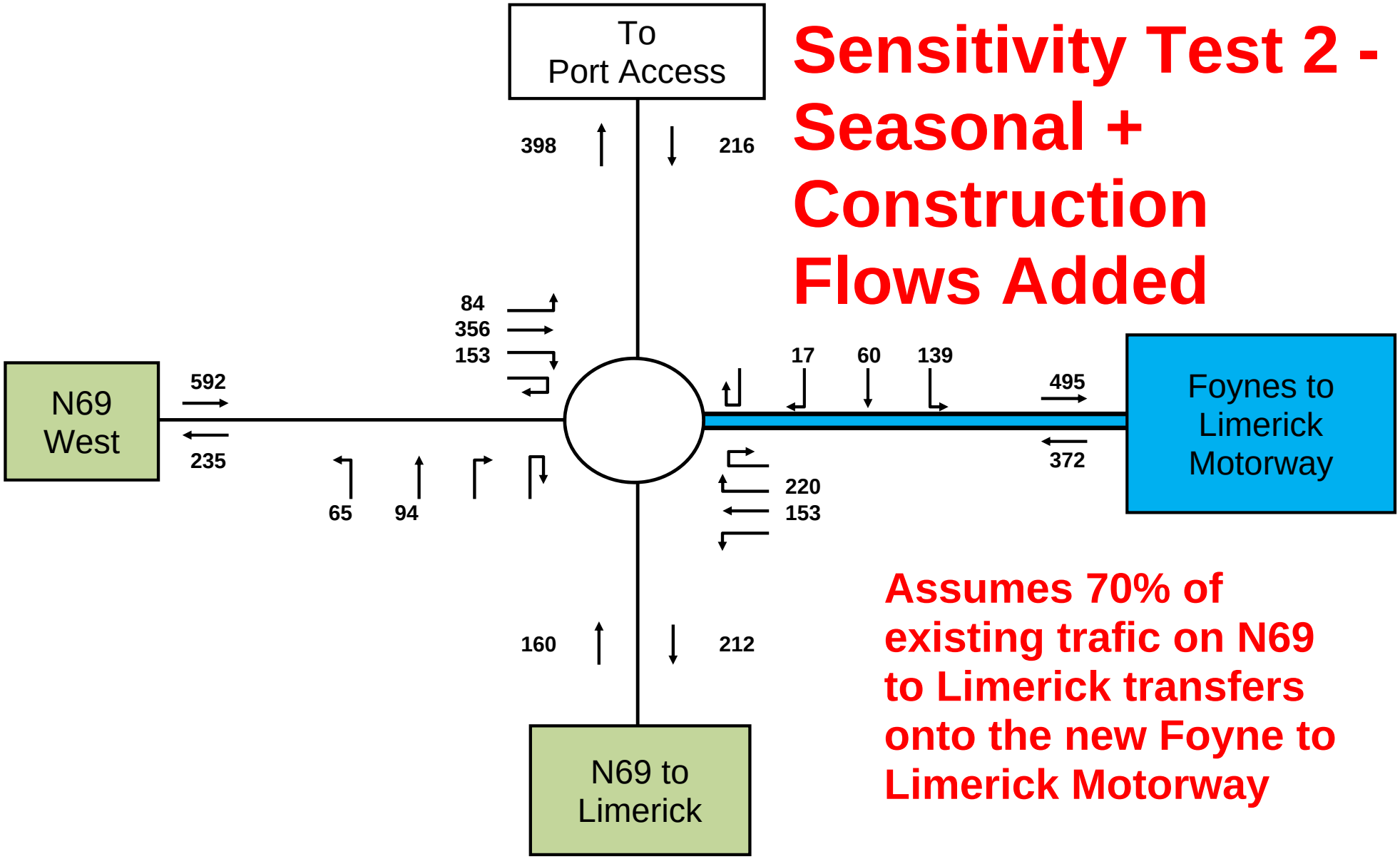
Sensitivity Test 2 - Seasonal + Construction Flows



IBH0548 Shannon Foynes
Sensitivity Test 2
Proposed Traffic Flows (PCU)
2029 Peak (16:30-17:30)

RPS

Sensitivity Test 2 - Seasonal + Construction Flows Added

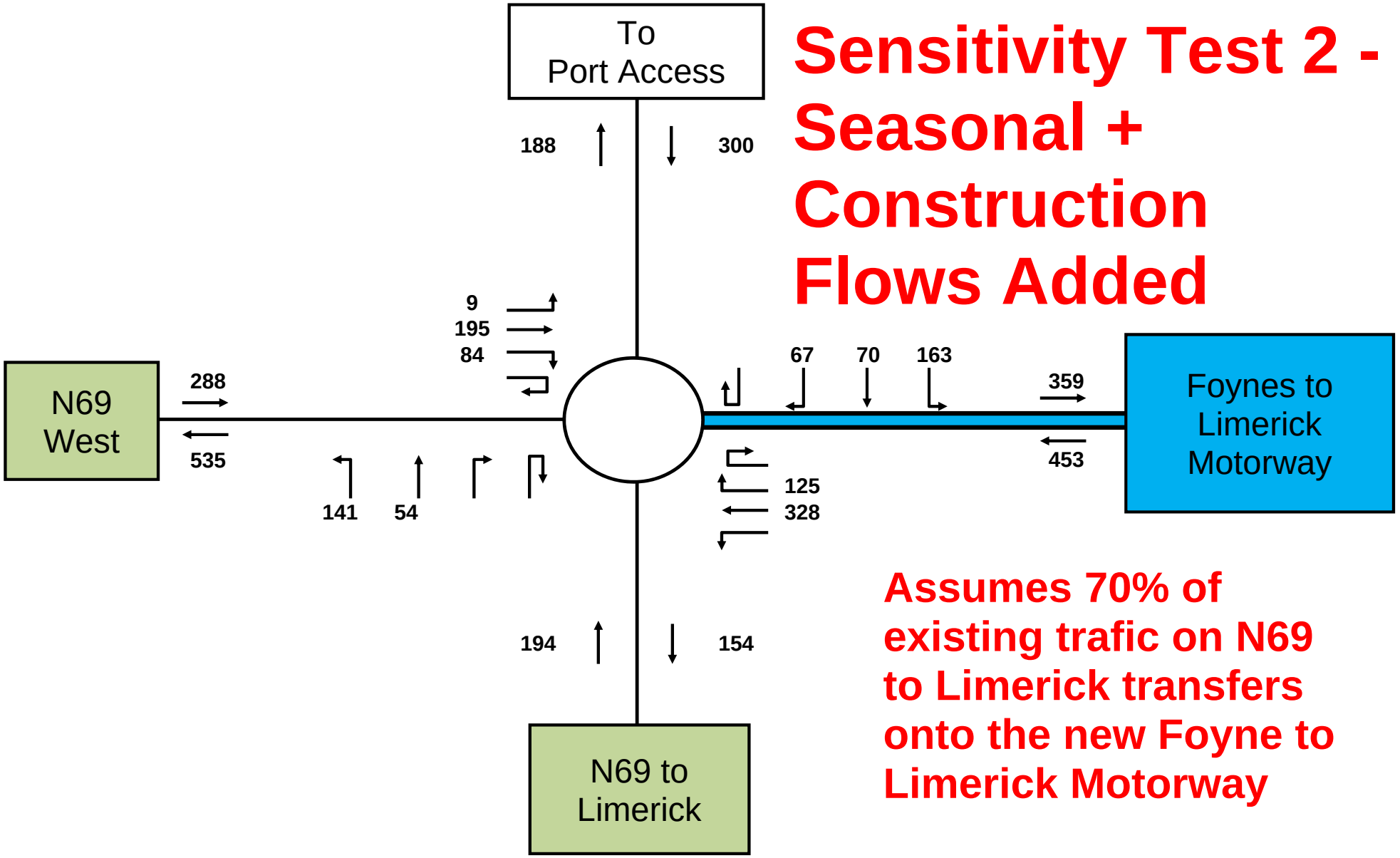


Assumes 70% of existing trafic on N69 to Limerick transfers onto the new Foyne to Limerick Motorway

IBH0548 Shannon Foynes
Sensitivity Test 2 - Proposed Traffic Flows (PCU)
New Motorway Roundabout
2029 AM Peak (07:15-08:15)

RPS

Sensitivity Test 2 - Seasonal + Construction Flows Added

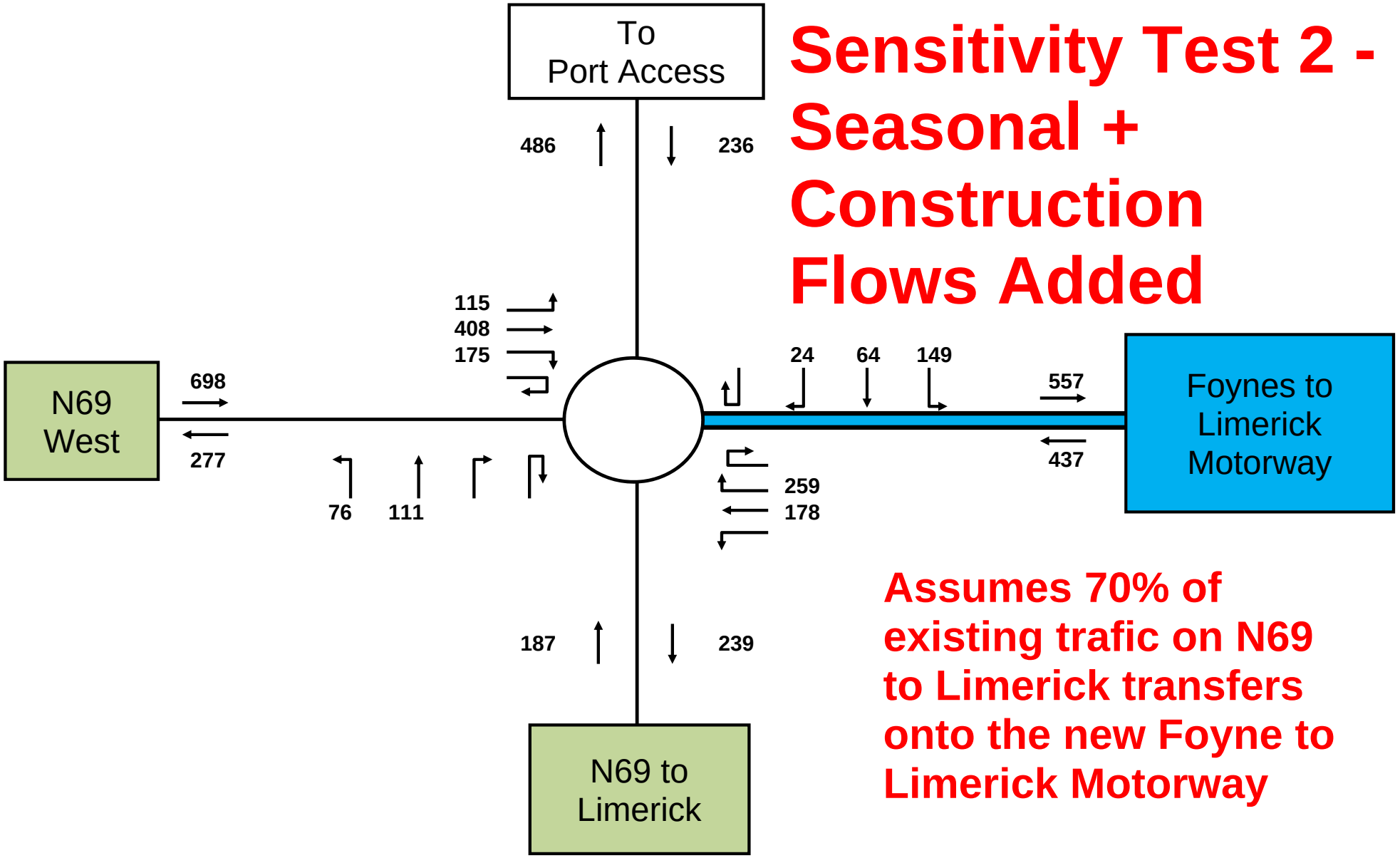


Assumes 70% of existing trafic on N69 to Limerick transfers onto the new Foyne to Limerick Motorway

IBH0548 Shannon Foynes
Sensitivity Test 2 - Proposed Traffic Flows (PCU)
New Motorway Roundabout
2029 PM Peak (16:30-17:30)

RPS

Sensitivity Test 2 - Seasonal + Construction Flows Added

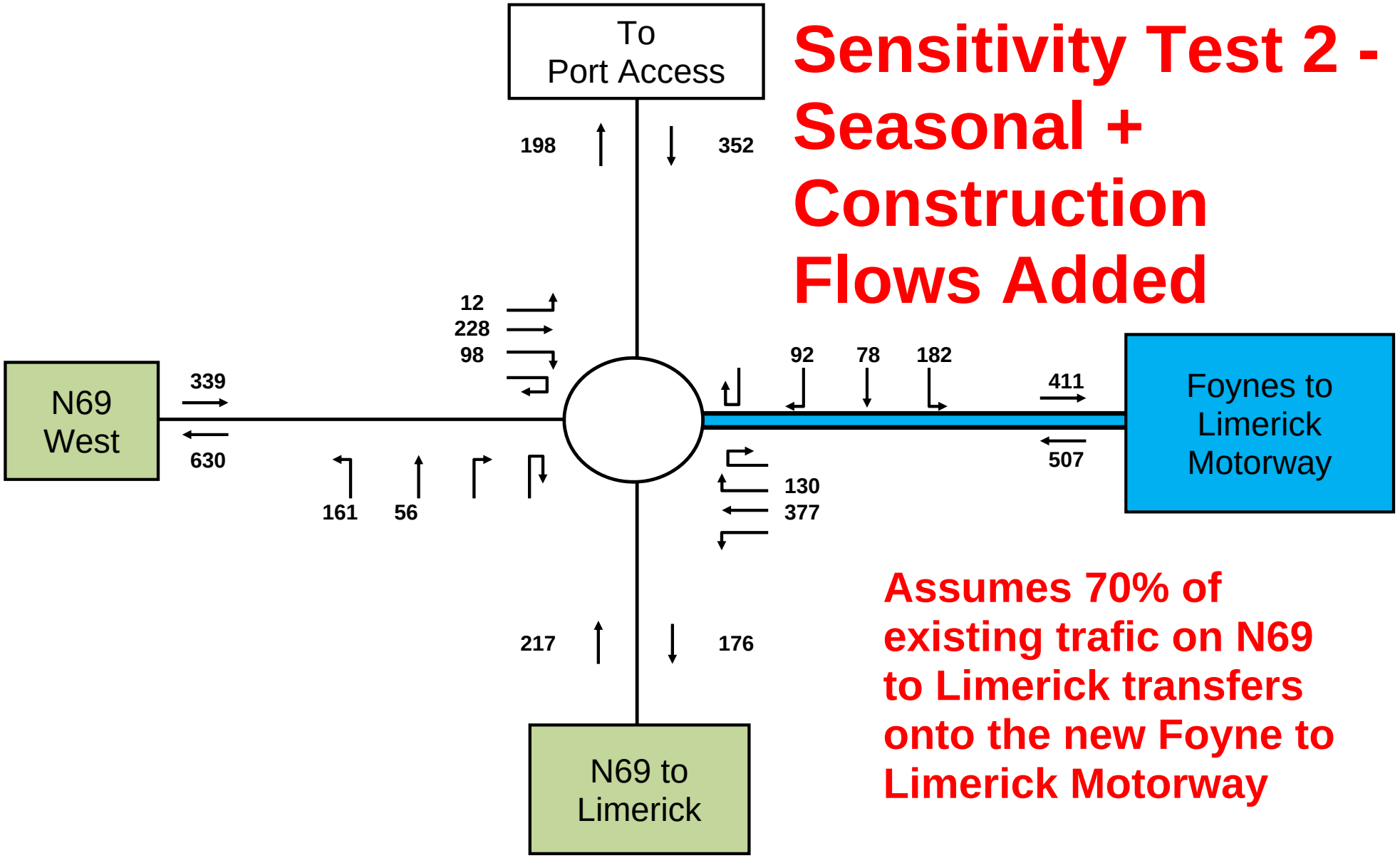


Assumes 70% of existing trafic on N69 to Limerick transfers onto the new Foyne to Limerick Motorway

IBH0548 Shannon Foynes
Sensitivity Test 2 - Proposed Traffic Flows (PCU)
New Motorway Roundabout
2041 AM Peak (07:15-08:15)

RPS

Sensitivity Test 2 - Seasonal + Construction Flows Added



Assumes 70% of existing trafic on N69 to Limerick transfers onto the new Foyne to Limerick Motorway

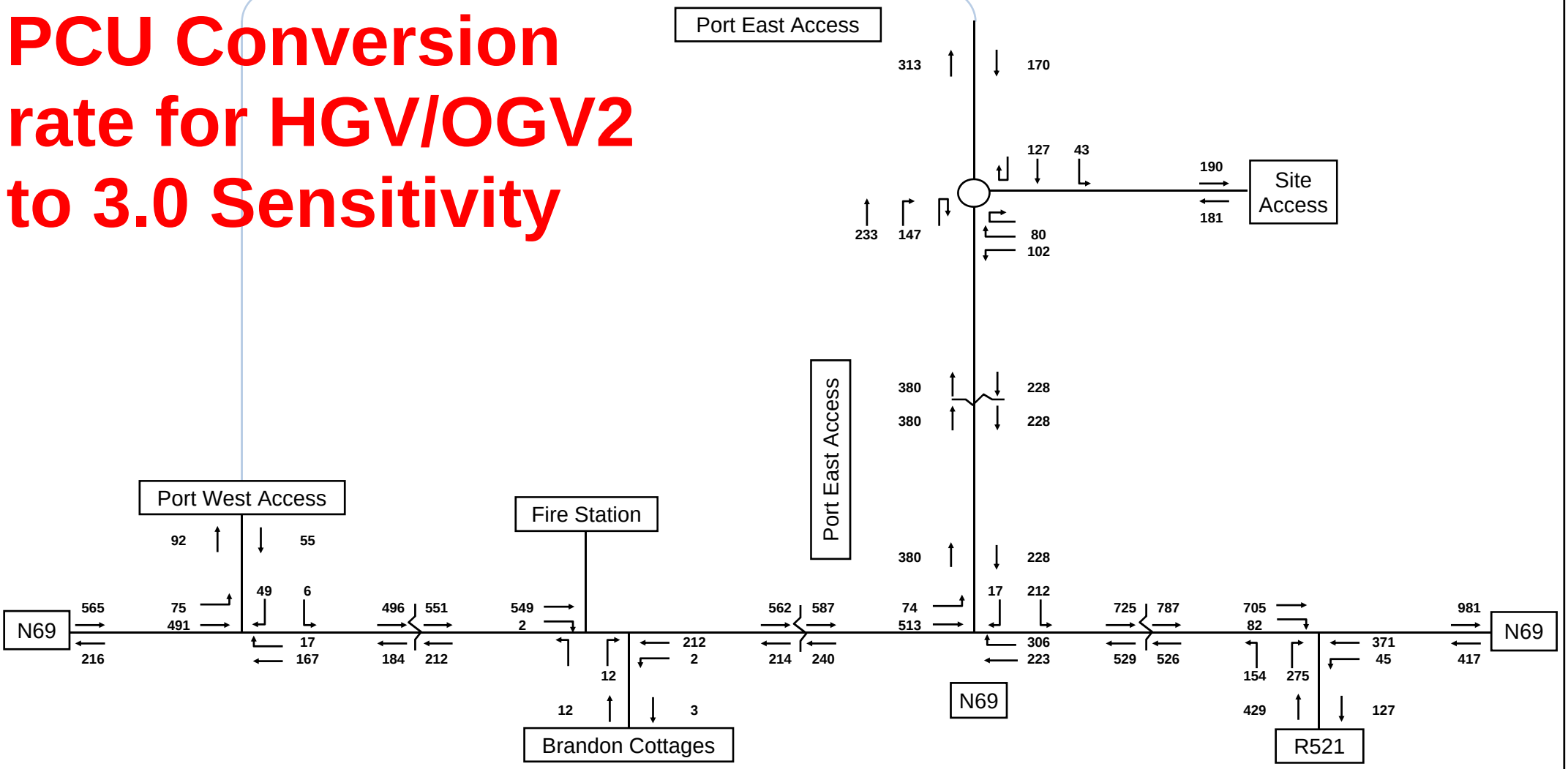
IBH0548 Shannon Foynes
Sensitivity Test 2 - Proposed Traffic Flows (PCU)
New Motorway Roundabout
2041 PM Peak (16:30-17:30)

RPS

Appendix 13.9

Sensitivity Test 3 – PCU Conversion Rate Flows for HGV OGV 2 to 3.0 Traffic Sensitivity Flows

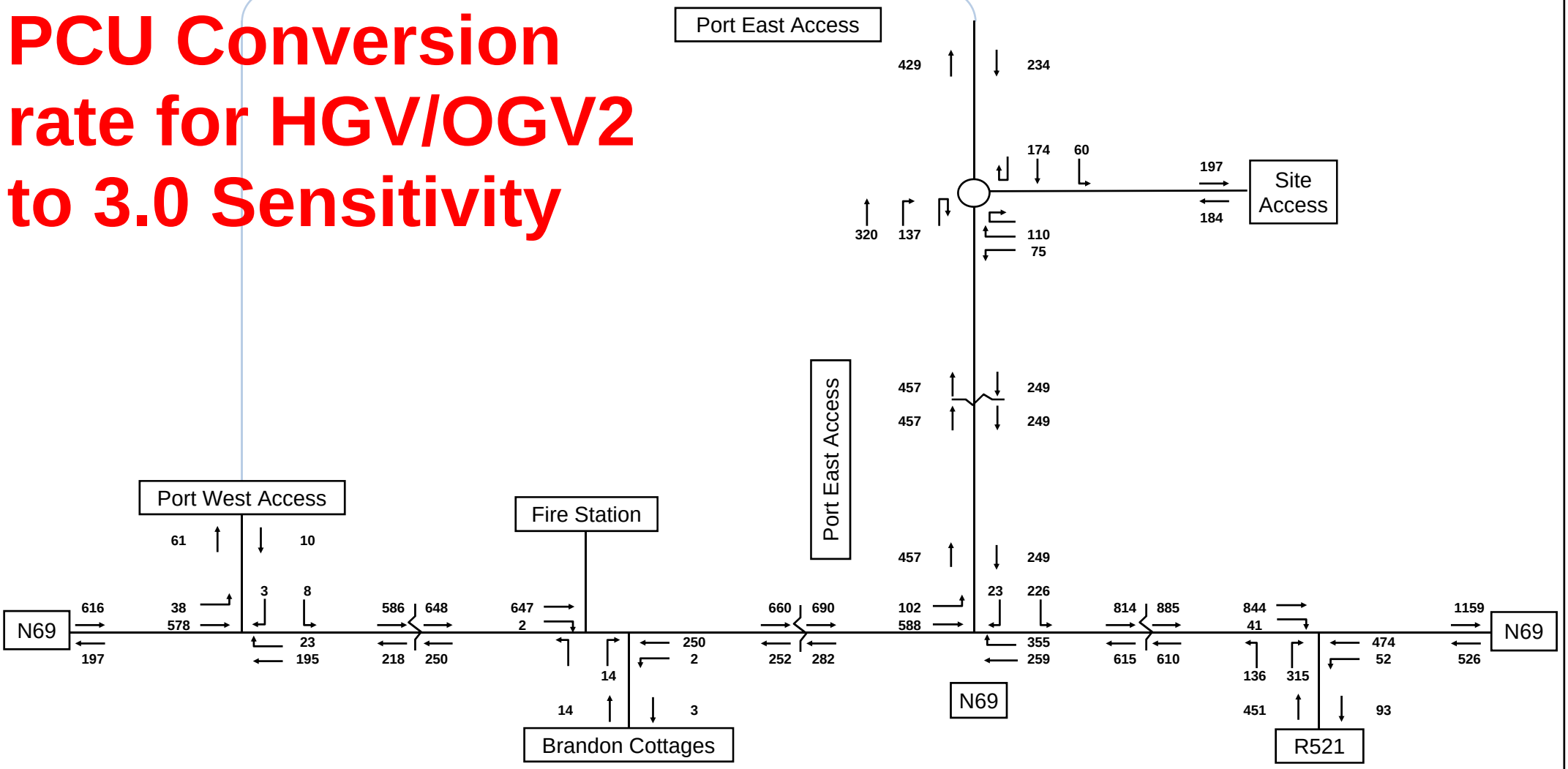
Sensitivity Test 3 - PCU Conversion rate for HGV/OGV2 to 3.0 Sensitivity



IBH0548 Shannon Foynes
Sensitivity Test 3
ProposedTraffic Flows (PCU)
2029 AM Peak (07:15-08:15)

RPS

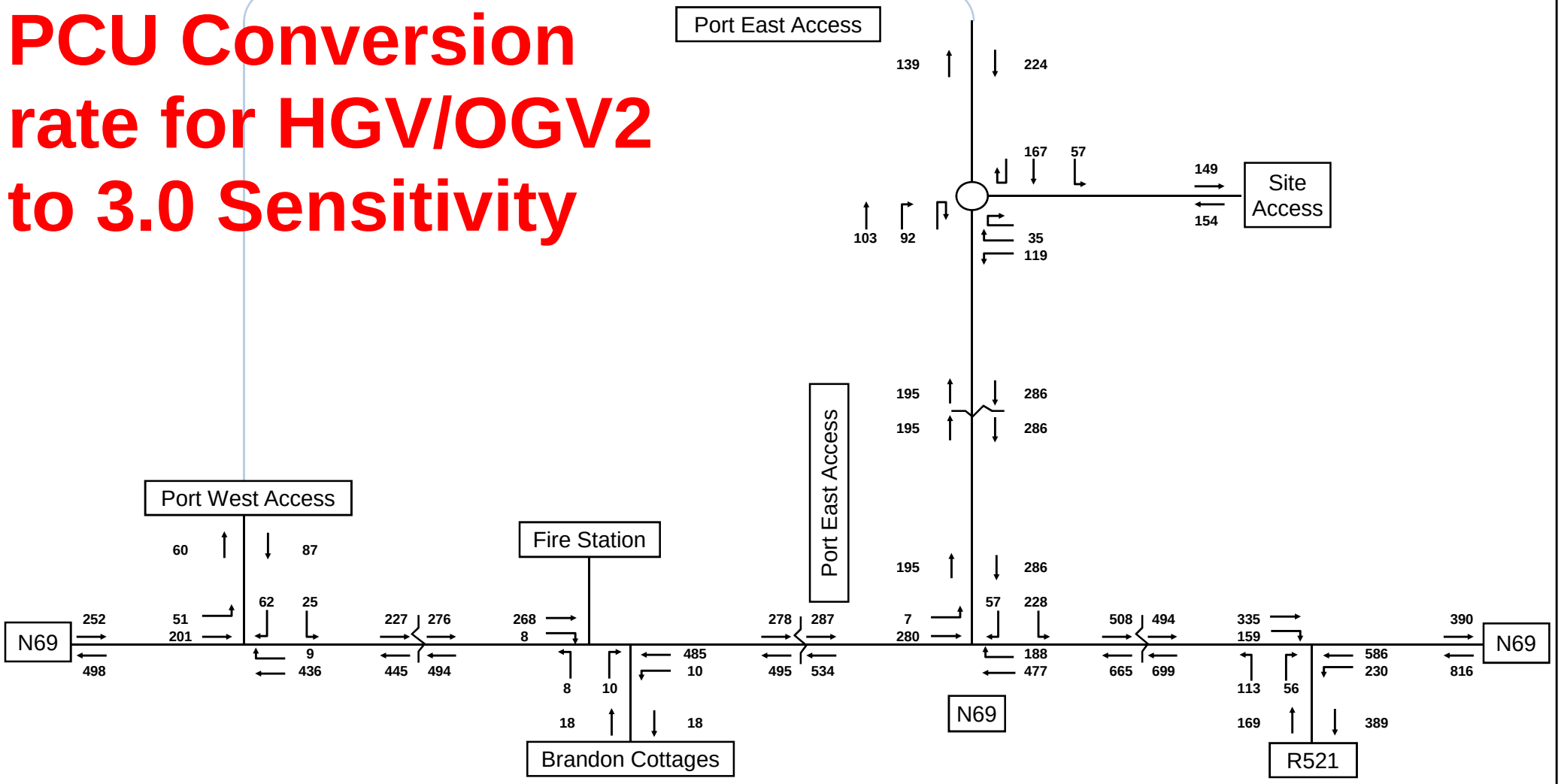
Sensitivity Test 3 - PCU Conversion rate for HGV/OGV2 to 3.0 Sensitivity



IBH0548 Shannon Foynes
Sensitivity Test 3
Proposed Traffic Flows (PCU)
2041 AM Peak (07:15-08:15)

RPS

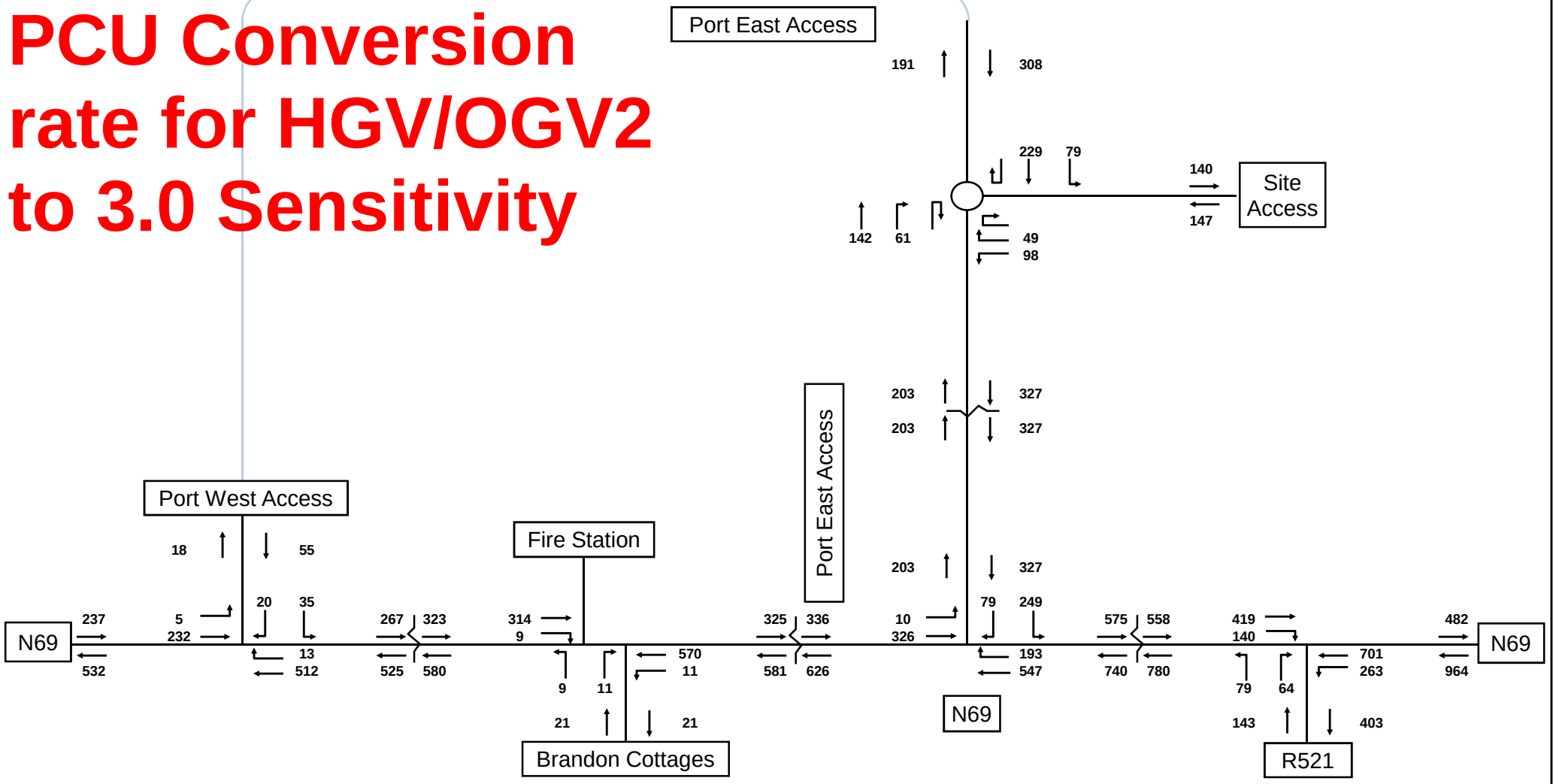
Sensitivity Test 3 - PCU Conversion rate for HGV/OGV2 to 3.0 Sensitivity



IBH0548 Shannon Foynes
Sensitivity Test 3
Proposed Traffic Flows (PCU)
2029 PM Peak (16:30-17:30)

RPS

Sensitivity Test 3 - PCU Conversion rate for HGV/OGV2 to 3.0 Sensitivity



IBH0548 Shannon Foynes
SensitivityTest 3
Proposed Traffic Flows (PCU)
2041 PM Peak (16:30-17:30)

RPS

Appendix 13.10

Junction Geometric Parameters

(These drawings are presented in Volume 9 of this EIAR)

Appendix 13.11

Bus Eireann 314

TIMETABLE FROM SUNDAY 27th AUGUST 2017

Table No.

LIMERICK – ASKEATON – FOYNES 314

		MONDAY TO FRIDAY						SATURDAY			SUNDAY	
SERVICE NUMBER		***314***	***314***	***314***	***314***	***314***	***314***	***314***		***314***		
					WO		**FO**					
Limerick (Augustinian Church)	dep.	0745	....	....	....	....	....	....	....	....	....	....
Limerick (Bus Station)		|	1335	1615	1740	1740	2135	1335	....	1740	....	....
St Nessans Rd (Crescent Centre)		0752	1341**P**	1621**P**	1746**P**	1746**P**	2140**P**	1341**P**	....	1746**P**	....	....
St Nessans Rd (Regional Hosp)		0755**P**	1344**P**	|	|	|	2143**P**	1344**P**	....	|	....	....
Mungret (St Oliver Plunket Ch)		0810	1348	1630	1751	1751	|	1348	....	1751	....	....
Clarina (Filling Station)		0815	1351	1635	1755	1755	|	1351	....	1755	....	....
Kildimo (Slatterys Pub)		0825	1400	1645	1805	1805	2155	1400	....	1805	....	....
Pallaskenry (Scouts Den)		0835	1408	1655	1815	1815	|	1408	....	1815	....	....
Askeaton (East Square)		0855	1425	....	1830	1830	2210	1425	....	1830	....	....
Shanagolden (The Old Stand)		|	|	....	1850	1850	|	1440	....	1850	....	....
Foynes (Main St Museum)		0910	1440	....	1900	1900	2225	1445	....	1900	....	....
Loughill (Anglers Rest Pub)		0917	1450	....	|	....	|	1455	....	....	....	....
Glin (Conways Hotel)		0930	1500	....	1915	....	2240	1505	....	....	....	....
Tarbert (Ferry House The Square)		....	....	....	....	....	2245	....	....	....	....	....
Listowel (The Square Bridge Rd)		....	....	....	....	....	2300	....	....	....	....	....
Tralee (Bus Station)	arr.	....	....	....	....	....	2340	....	....	....	....	....

WO= Wednesday only. **FO** = Friday only.

		MONDAY TO FRIDAY						SATURDAY			SUNDAY	
SERVICE NUMBER		***314***	***314***	***314***		***314***		***314***		***314***		***314***
Tralee (Bus Station)	dep.	....	....	....	....	....	....	....	....	....	....	1500
Listowel (St Marys Church Square)		....	....	....	....	....	....	....	....	....	....	1530
Tarbert (Opp Ferry House)		....	....	....	....	....	....	....	....	....	....	1545
Glin (Conways Hotel)		....	0930	1505	....	....	....	0930	....	1505	....	1555
Loughill (Opposite Church)		....	0940	1512	....	....	....	0940	....	1512	....	|
Foynes (Main St Station Building)		0720	0950	1520	....	....	....	0950	....	1520	....	1610
Shanagolden (The Old Stand)		0725	1000	|	....	....	....	1000	....	|	....	|
Askeaton (Opp East Square)		0735	1015	1535	....	....	....	1015	....	1535	....	1625
Pallaskenry (Scouts Den)		0750	1030	|	....	1700	....	1030	....	1550	....	|
Kildimo (Post Office)		0755	1038	1555	....	1708	....	1038	....	1600	....	1640
Clarina (Barber Shop)		0800	1048	1605	....	1715	....	1048	....	1610	....	|
Mungret (Opp St Oliver Plunket Ch)		0805	1050	1607	....	1720	....	1050	....	1612	....	|
St Nessans Rd (Op Regional Hosp)		0810**D**	1055**D**	1610**D**	....	1725**D**	....	1055**D**	....	1615**D**	....	1655**D**
St Nessans Rd (Op Shopping Cntr)		0812**D**	1056**D**	1611**D**	....	1726**D**	....	1056**D**	....	1616**D**	....	1656**D**
Henry Street (Dunnes Stores)		0820**D**	|	|	....	|	....	|	....	|	....	|
Limerick (Bus Station)	arr.	0840	1100	1615	....	1730	....	1100	....	1620	....	1700

P : – Pick–up stop only. D : – Drop–off stop only.
No services on Christmas Day or St. Stephen's Day.
Sunday service will operate on other Public Holidays.

TFI TRANSPORT FOR IRELAND

For further information
phone 1850 836 611
or see Homepage:
www.buseireann.ie

Bus Éireann
www.buseireann.ie

Appendix 13.12

Client Request & Letter of Consent Roundabout

Elmwood House, 74 Boucher Road, Belfast, BT12 6RZ, Northern Ireland
T +44 (0)28 90667914 **F** +44 (0)28 90668286 **E** rpsbe@rpsgroup.com **W** rpsgroup.com/ireland

Our Ref: IBH0548/CDa/01

Email: celine.daly@rpsgroup.com
Phone: +44 (0) 28 9066 7914
Date: 23 February 2018

FAO Vincent Murray
Senior Executive, Physical Development Directorate,
Limerick City & County Council
Dooradoyle Road,
Dooradoyle,
Limerick,
V94 WV78

Dear Vincent

RE: Shannon Foynes Port Company SID Planning Application – Requests Relating to LCCC Lands in the Environs of the Shannon Port East Access

Thank you for attending the meeting on 20th February 2018 relating to the forthcoming Shannon Foynes Port Company (SFPC) SID planning application.

We have been appointed by SFPC as the transportation & highways consultants for the planning application.

This letter addresses two issues discussed during the meeting relating to Limerick City and County Council (LCCC) lands in the environs of the SFPC eastern access to the port:

- Item 1: Request for Letter of Consent to include LCCC lands within the planning application relating to the provision of a new access roundabout;
- Item 2: Request for port access barrier to be relocated to within LCCC Lands;

Item 1: Request for Letter of Consent to Include LCCC Lands within Planning Application Relating to the Provision of a New Access Roundabout

As tabled during the meeting, the proposals include the provision of a new access roundabout to improve the access at the eastern side of the port.

Part of the lands required to deliver the roundabout are within the control of LCCC, and we would welcome a Letter of Consent from LCCC giving consent for the lands to be included in the application.

Figure 1 below highlights the location of the proposed new roundabout within the general layout of the proposals.

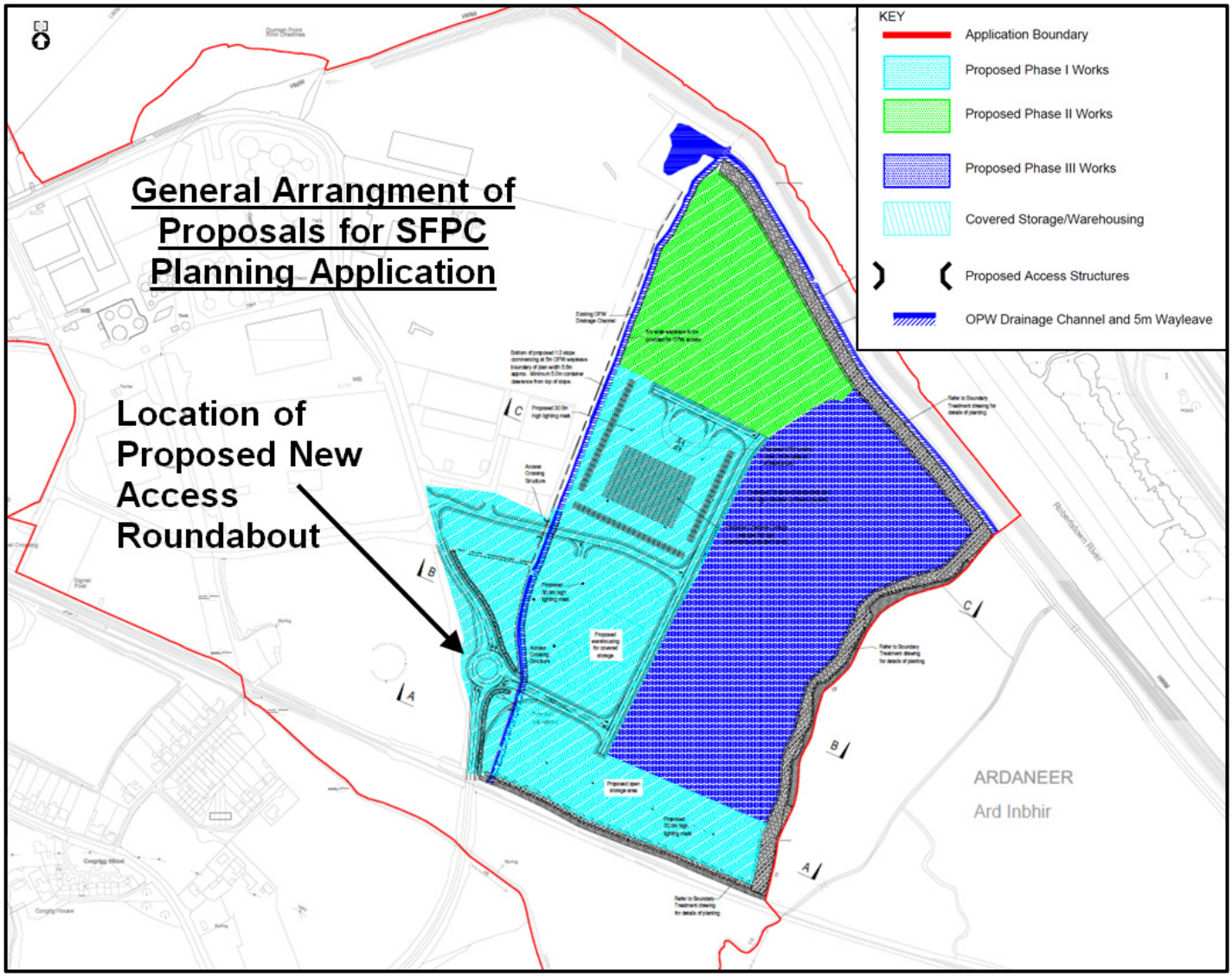


Figure 1: Indicative Location of the Proposed New Access Roundabout at the Eastern Port Access within the General Layout of the Proposals for Durnish Lands

Figure 2 indicates the area of land owned by LCCC within the application boundary.

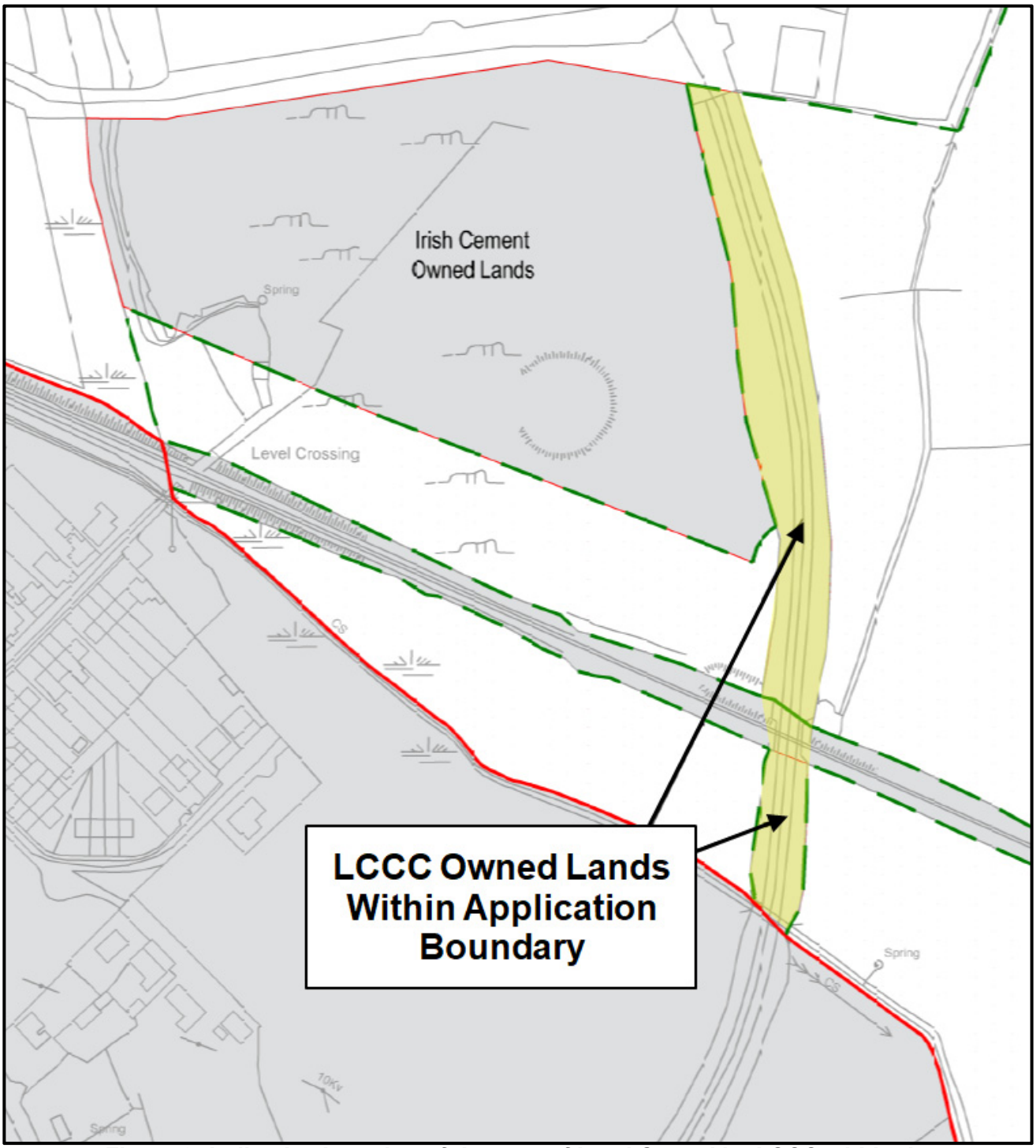


Figure 2: Indicative Location of the area of Land Owned by LCCC within the Application Boundary

Figure 3 indicates how the area of land within the application boundary owned by LCCC lies in context of the proposed roundabout.

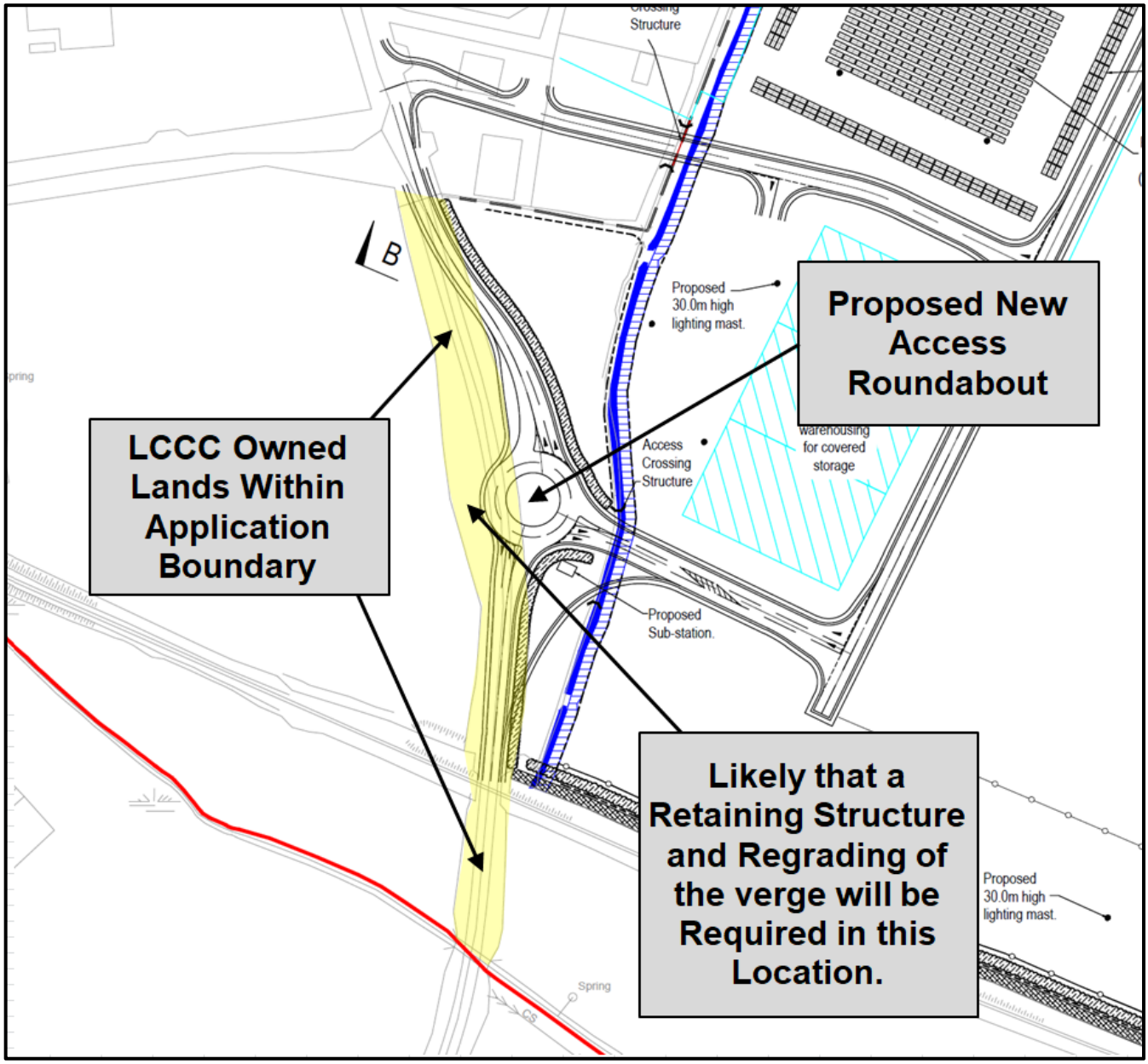


Figure 3: The Area of Land within the Application Boundary Owned by LCCC in Context of the Proposed Roundabout

Item 2: Request for Port Access Barrier to be relocated to within LCCC Lands

There is an existing port access barrier at the interface between the public road and the port internal road at the eastern side of the port. The barrier layout and location are illustrated in Figure 4 below.

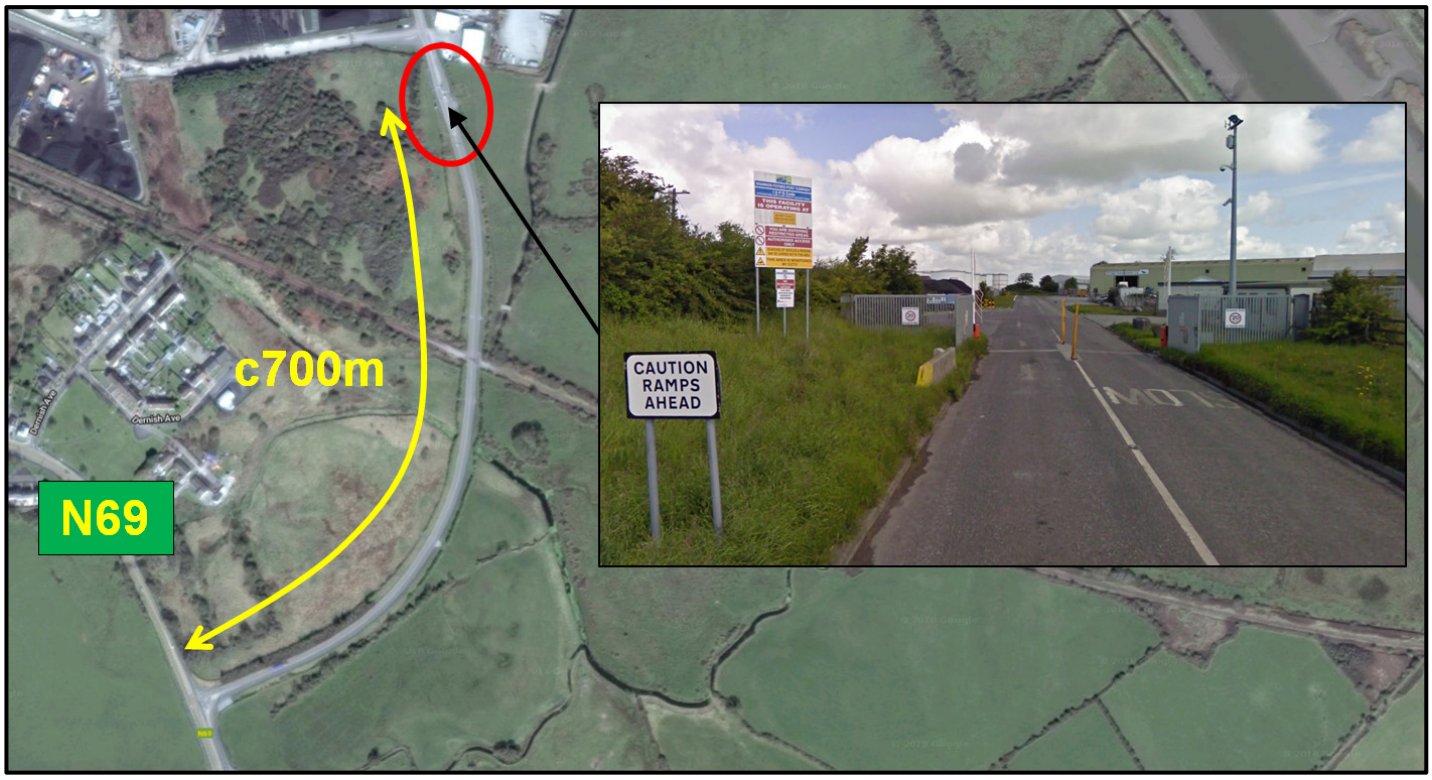


Figure 4: Layout and Location of Existing Port Access Barrier at the Eastern Port Access

Figure 4 shows that the barrier is located c700m from the junction with the N69.

To avoid the need for two separate access barriers, it would be the preference of SFPC to relocate the access barrier to a location south of the new port access roundabout, as indicated in Figure 5 below.

Cognizance will be taken on the location of the railway tracks in the detailed design for the new barrier location.

As demonstrated in Figure 5 below, the barrier will be relocated a distance of c425m from the junction with the N69, providing a queuing distance of 74pcus between the barrier and N69.

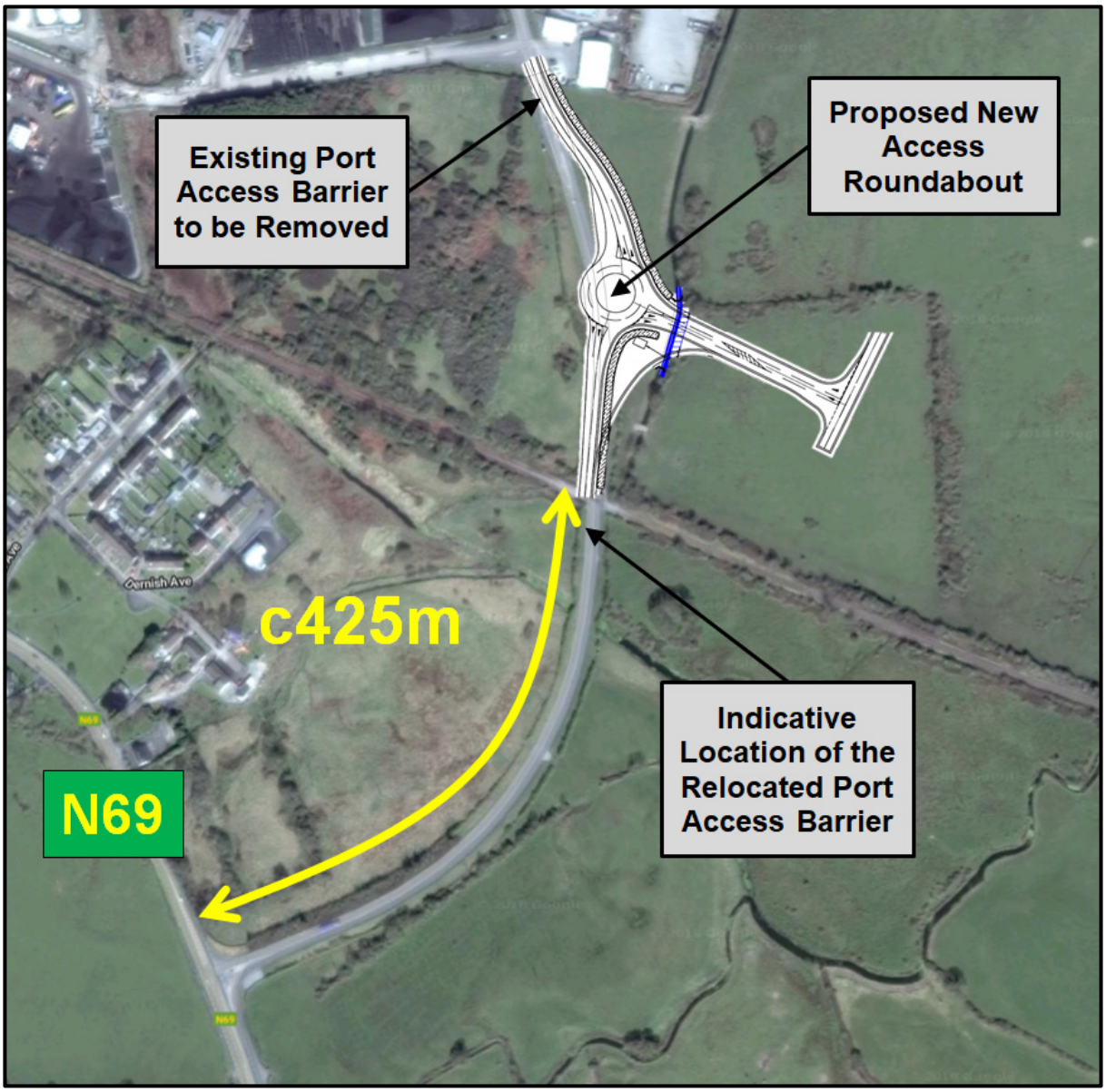


Figure 5: Indicative location of the Proposed New Port Access Barrier

The location of the relocated barrier would be on lands controlled by LCCC. SFPC, therefore, requests permission from LCCC to consent to the principle of allowing the relocated barrier to be contained within LCCC lands should planning permission be granted, and to indicate this relocated barrier position within the planning application.

We hope the above provides sufficient detail to inform a decision, and are hopeful that the consents requested can be forwarded on both matters.

Yours sincerely
for RPS

Celine Daly

Celine Daly
Senior Associate
Dip, BSc (Hons), CMILT MCIHT MTPS

CC

John Charlton, SFPC, Engineering & Port Services Manager
Mary Hughes, HRA Planning
Alan Barr, RPS

COMHAIRLE
CATHRACH & CONTAE
Luimnigh
Limerick
CITY & COUNTY
COUNCIL

Seirbhísí Maoine,
Comhairle Cathrach agus Contae Luimnigh,
7-8 Sráid Phádraig,
Luimneach

Property Services,
Limerick City and County Council,
7-8 Patrick Street,
Limerick

EIRCODE V94 XF67

t: +353 (0) 61 407 100
f: +353 (0) 61 415 266

Ms Celine Daly,
RPS Group,
Elmwood House,
74 Boucher Road,
Belfast,
BT12 6RZ,
Northern Ireland

Without Prejudice/Subject to Contract/Contract Denied

12th March 2018

Re: 1 - Consent to Apply for Planning Permission on Limerick City and County Council owned lands

Dear Ms Daly,

Limerick City and County Council hereby consent to a planning application being submitted by Shannon Foynes Port Company on Council property located at Corgrig, Foynes, Co Limerick on the following terms:

1 This consent to apply for planning permission shall not be construed as an acknowledgment that planning permission will in due course be granted. It is a matter for the applicant to satisfy the relevant planning requirements of Limerick City and County Council and/or An Bord Pleanala.

2 The preparation of any such planning application and all associated costs are entirely a matter for the applicant.

3 The issue of any planning permission shall not form the basis of any binding Contract with Limerick City and County Council. The terms of any such Contract will have to be firstly agreed with the Property Services Section of Limerick City and County Council.

4. Subject to the grant of planning permission Shannon Foynes Port Company are to be responsible for the inspection and maintenance of the road on the port side of where the new barrier is located on LCCC lands.

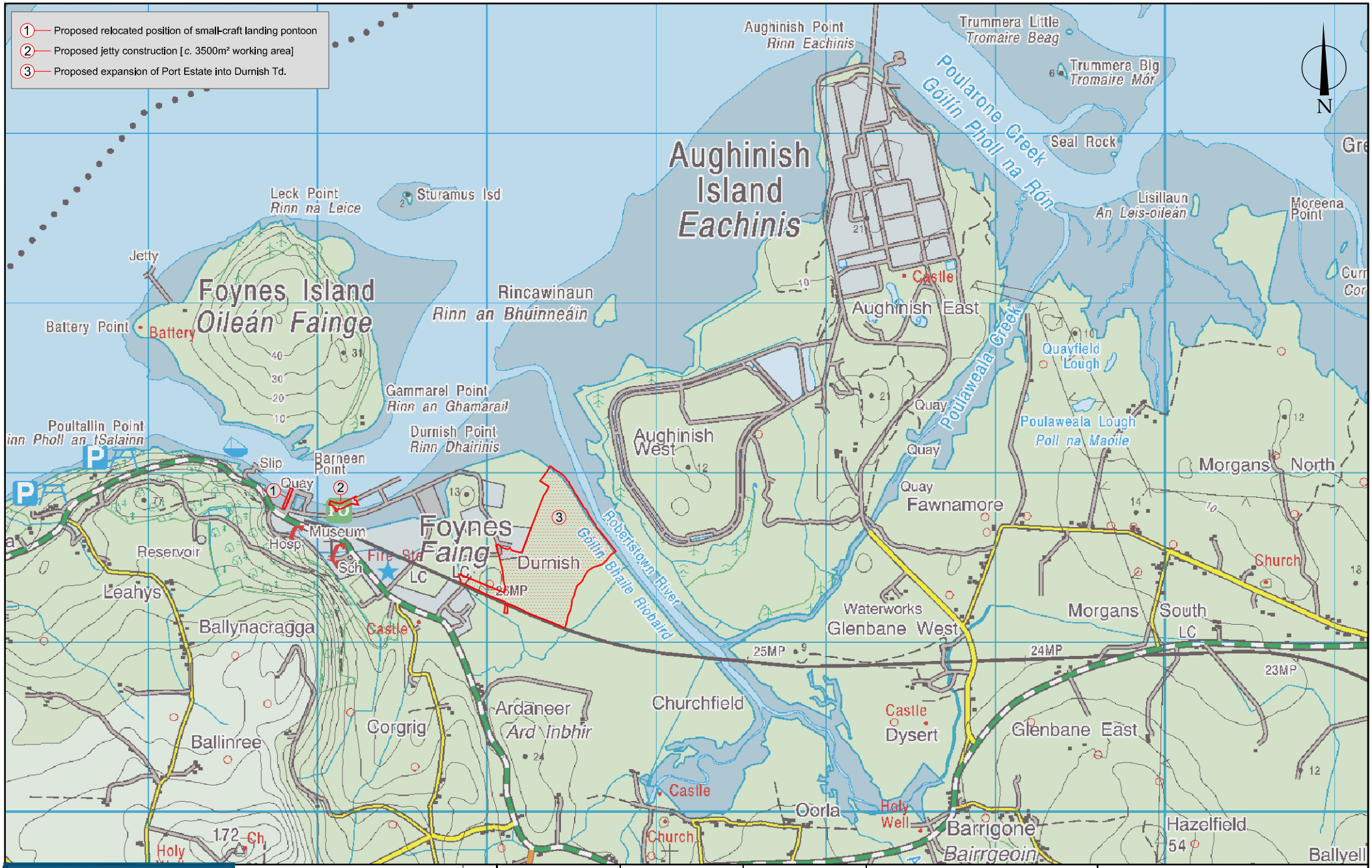
Please note that this application for Consent to apply for Planning Permission is valid for a period of six months from date of this letter.

Yours Sincerely,

Jayne Leahy
Head of Property Services

Appendix 14

Archaeology and Cultural Heritage



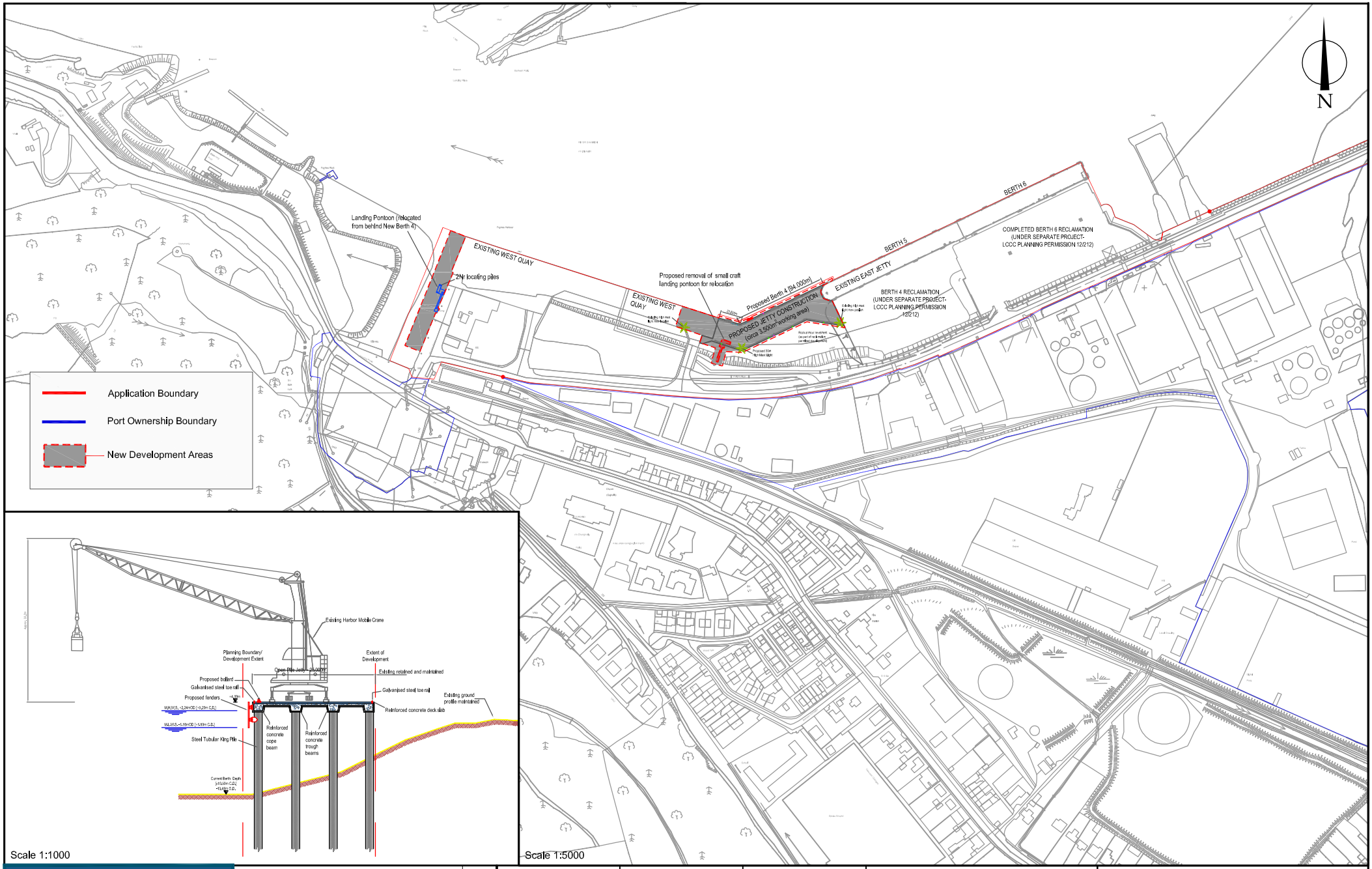
ADCO

Notes
Source: OSi Discovery Series Mapping
Extent of proposed development areas

A4

Job/Exc No. 17D0017	**Compiled by** R.Bangerter	**CAD reference** ShannonFoynes	**Client** RPS Consulting Engineers/ SFPC
Date 18.04.18	**Scale** 1:30,000	**Drawing No.** Figure 14.1	**Project** Port of Foynes, Jetty Extension & Port Estate Expansion project.

Title
Figure 14.1- Extract from OS Map showing location and extent of proposed development within the Shannon Foynes Port Estate and Drunish Townland [Areas 1-3].



ADCO

Notes

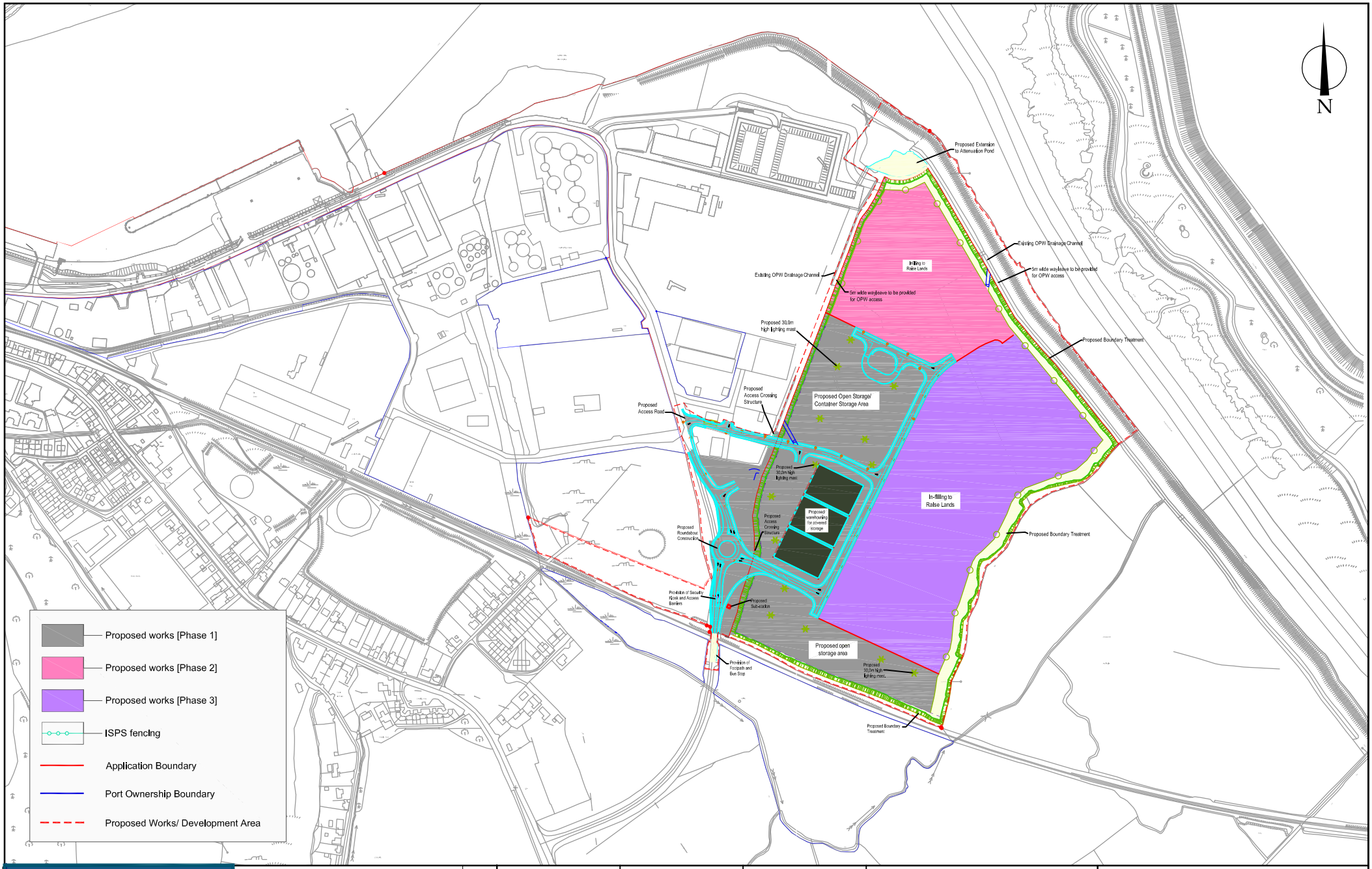
Source: Figure adapted from RPS Project Drawing No.: M0679-RPS-00-PL-DR-C-0111 to 0112 [East Jetty Extension].

A4

Job/Exc No. 17D0017	**Compiled by** R.Bangerter	**CAD reference** ShannonFoynes	**Client** RPS Consulting Engineers/ SFPC
Date 18.04.18	**Scale** 1:5000/ 1:1000	**Drawing No.** Figure 14.2	**Project** Port of Foynes, Jetty Extension & Port Estate Expansion project.

Title

Figure 14.2 - Project Drawing showing nature & extent of proposed Jetty Extension between the existing East Jetty and West Quay structures in Shannon Foynes Port.



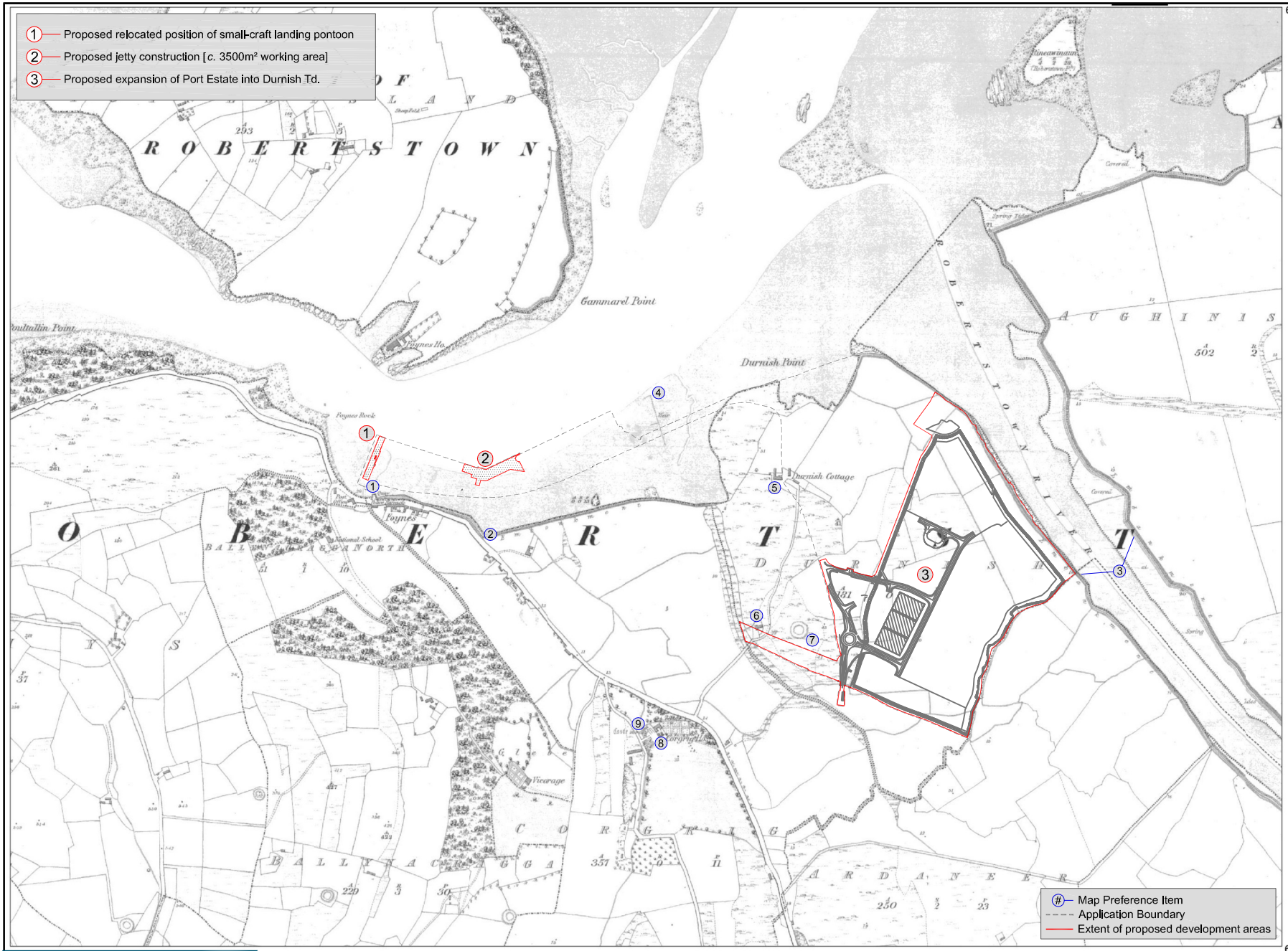
ADCO

Notes
Source: Figure adapted from RPS Project Drawing No.: M0679-RPS-00-POL-DR-C-0118 to 0127.

A4

Job/Exc No. 17D0017	**Compiled by** R.Bangerter	**CAD reference** ShannonFoynes	**Client** RPS Consulting Engineers/ SFPC
Date 18.04.18	**Scale** 1:7500	**Drawing No.** Figure 14.3	**Project** Port of Foynes, Jetty Extension & Port Estate Expansion project.

Title
Figure 14.3- Project Drawing showing nature & extent of proposed development of lands within Drunish townland.



653137

ITM CENTRE PT. COORDS.

525546,651847

DESCRIPTION

MAP SHEETS

6 inchBE1
LK010 CE069
CE070

N

Authorised Internet Map

N

650557

ADCO

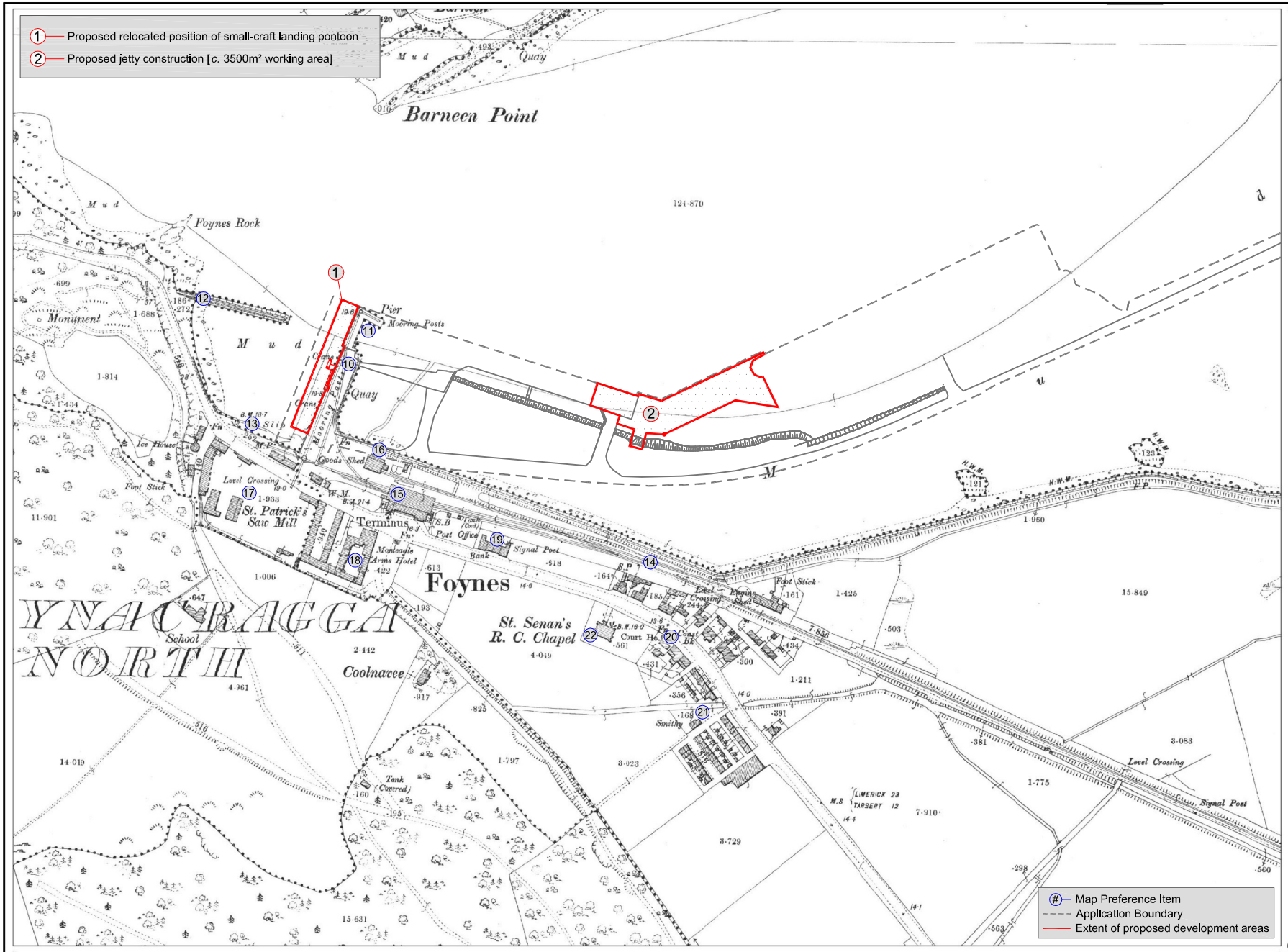
Notes
Source: OSi Historic Map Archive

Development details extracted from Project Drawings:
– M0679-RPS-00-PL-DR-C-0111-0112 [East Jetty]
– M0679-RPS-00-PL-DR-C-0118-0127 [Durnish]

A4

Job/Exc No. 17D0017	**Compiled by** R.Bangerter	**CAD reference** ShannonFoynes	**Client** RPS Consulting Engineers/ SFPC
Date 18.04.18	**Scale** 1:15,000	**Drawing No.** Figure 14.4	**Project** Port of Foynes, Jetty Extension & Port Estate Expansion project.

Title
Figure 14.4- Extract from OS First Edition (1844) map of Foynes with extent of proposed port development and map reference items superimposed.



652221

ITM CENTRE PT. COORDS.

525088,651791

DESCRIPTION

MAP SHEETS

25 inchBE1
LK010-05 LK010-09

N

Authorised Internet Map

N

651361

ADCO

Notes
Source: OSi Historic Map Archive

Development details extracted from Project Drawing:
– M0679-RPS-00-PL-DR-C-0011-0112.

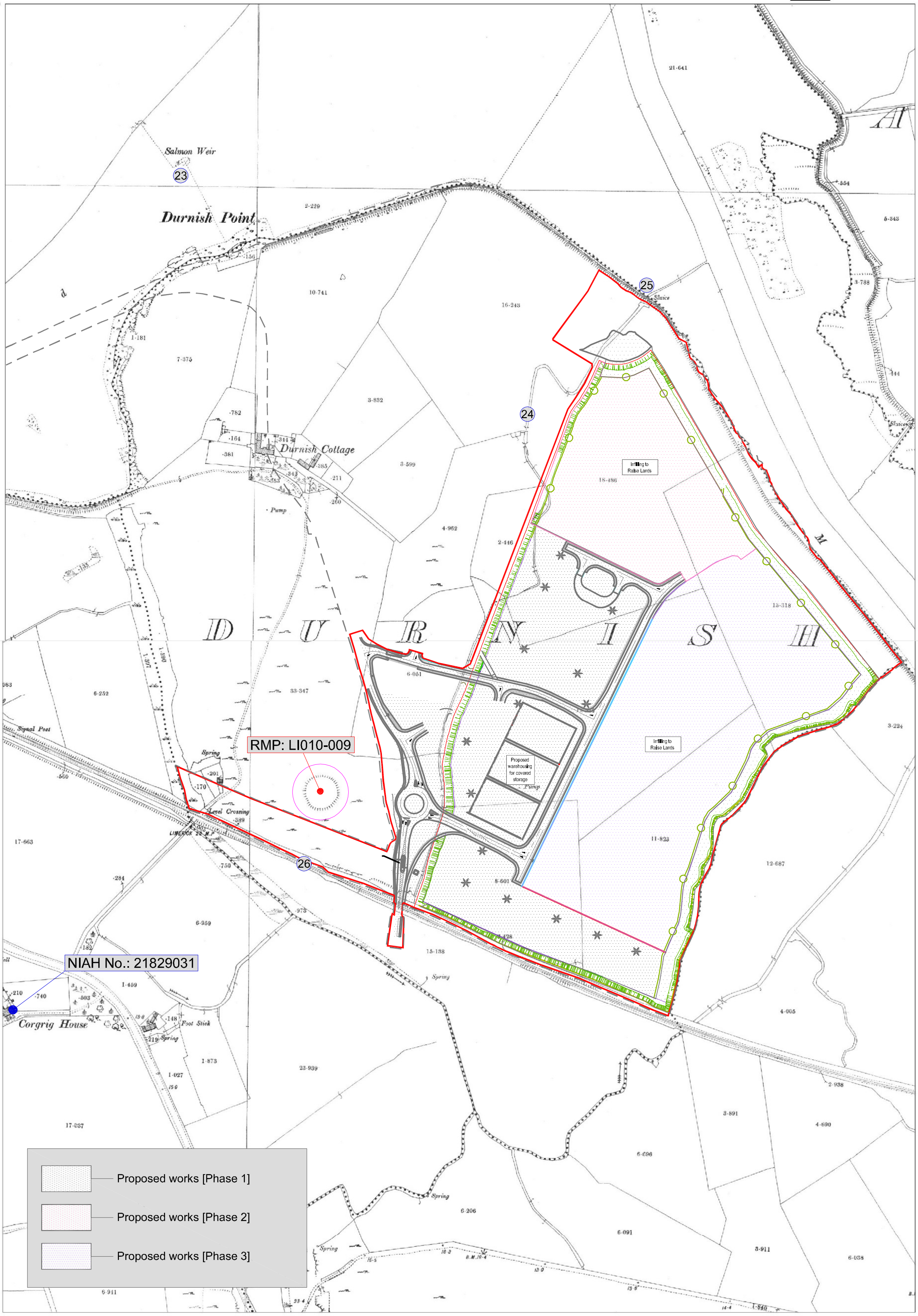
A4

Job/Exc No. 17D0017	**Compiled by** R.Bangerter	**CAD reference** ShannonFoynes	**Client** RPS Consulting Engineers/ SFPC
Date 18.04.18	**Scale** 1:5000	**Drawing No.** Figure 14.5	**Project** Port of Foynes, Jetty Extension & Port Estate Expansion project.

Title
Figure 14.5- Extract from OS 25-Inch Edition (1898) map of Foynes with proposed jetty extension, foreshore reclamation area, and map reference items superimposed.

Surveyed 1898-1899
Revised 1898-1899
Levelled

Historic Map



ITM CENTRE PT. COORDS.
526160,651990

DESCRIPTION

MAP SHEETS
25 inchBE1
LK010-05 LK010-06
LK010-09 LK010-10

Authorised Internet Map

ITM CENTRE PT. COORDS.
526160,651177

DESCRIPTION

MAP SHEETS
25 inchBE1
LK010-09 LK010-10

Authorised Internet Map

Scale:- 1:5,000
Scála:- 1:5,000

0 100 200 300 400 500 Metres
0 200 400 600 800 1,000 Feet

Plot Ref. No. 19744055_2_1
Plot Date 16-APR-2017

N

ADCO

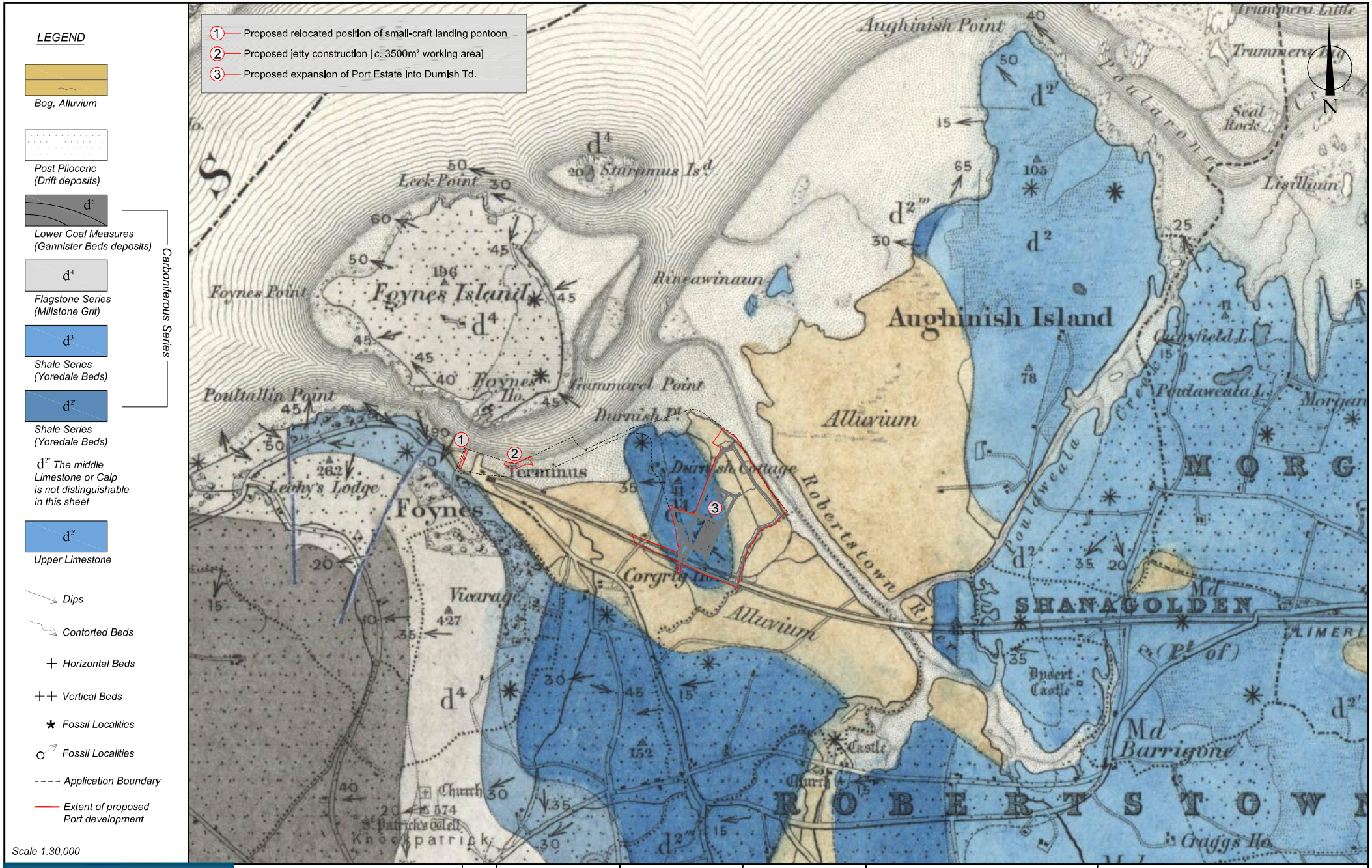
Client
RPS Consulting Engineers/ SFPC

Notes
Source: OSi Historic Map Archive
(#) Map Reference Item
Application Boundary
Extent of proposed development works/ development area [Durnish TD.]
Buffer/ Exclusion zone around RMP site.
[Development details extracted from Project DWG: M0679-RPS-00-PL-DR-C-0118-0127]

A4

Title
Figure 14.6- Extract from OS 25-inch Edition (1898) map of Durnish townland with proposed port expansion area [Area 3] and map reference items superimposed.

Project	Job/Exc No.	Compiled by	CAD reference	Date	Scale	Drawing No.
Port of Foynes, Jetty Extension & Port Estate Expansion project	17D0017	R.Bangerter	ShannonFoynes	18.04.18	1:5000	Figure 14.6



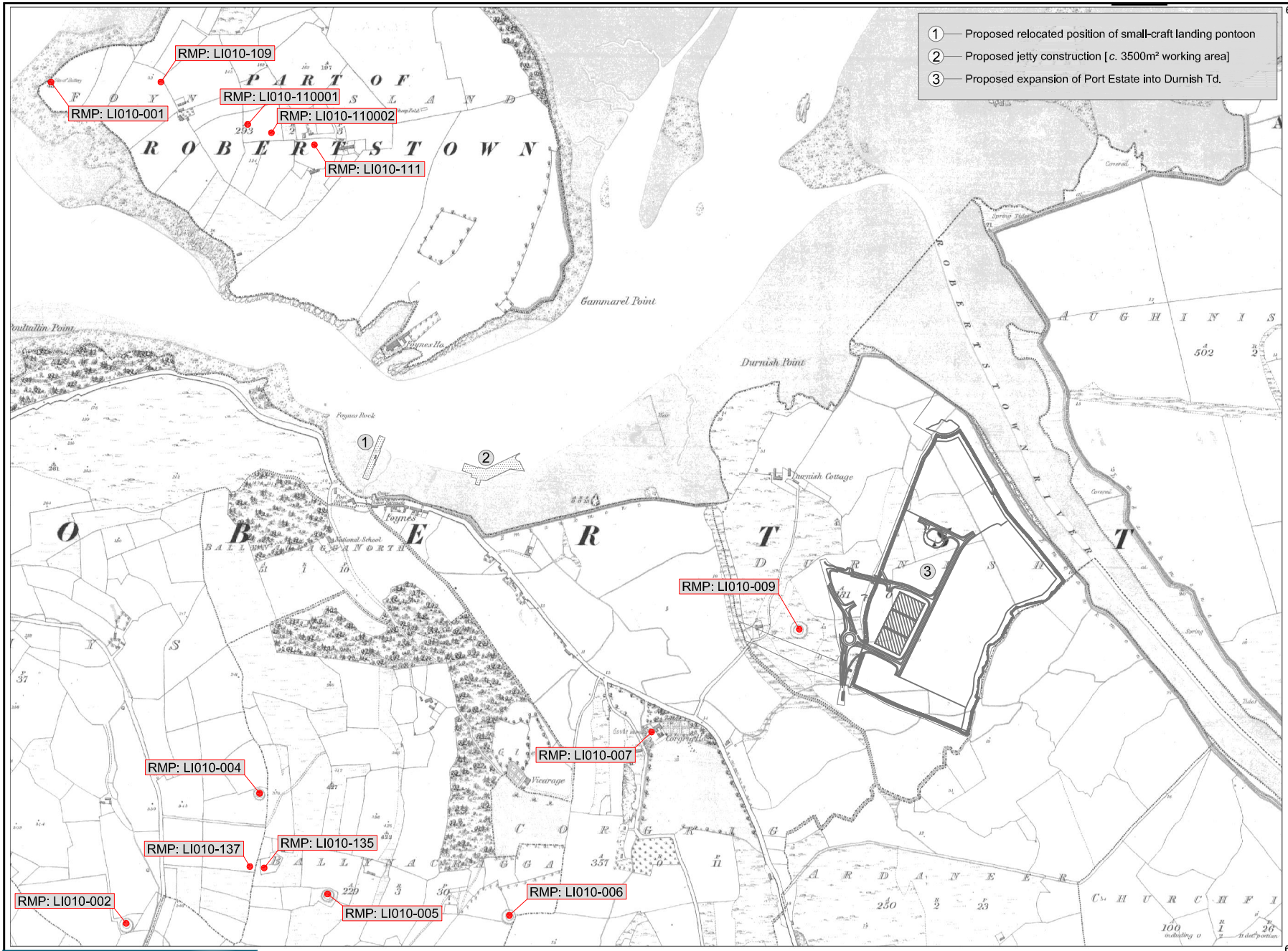
ADCO

Notes
Source: Figure adapted from Sheet 142, Foynes, 1882, Surveyed by G.H. Kinahan and F.J. Foot [www.geologicalmaps.net]

A4

Job/Exc No. 17D0017	**Compiled by** R.Bangerter	**CAD reference** ShannonFoynes	**Client** RPS Consulting Engineers/ SFPC
Date 18.04.18	**Scale** 1:30,000	**Drawing No.** Figure 14.7	**Project** Port of Foynes, Jetty Extension & Port Estate Expansion project.

Title
Figure 14.7- Extract from nineteenth-century geological map (1882) of Foynes and its surrounding townlands; proposed Port development areas superimposed.



ITM CENTRE PT. COORDS.

525546,651847

DESCRIPTION

MAP SHEETS

6 inchBE1
LK010 CE069
CE070

N

Authorised Internet Map

N

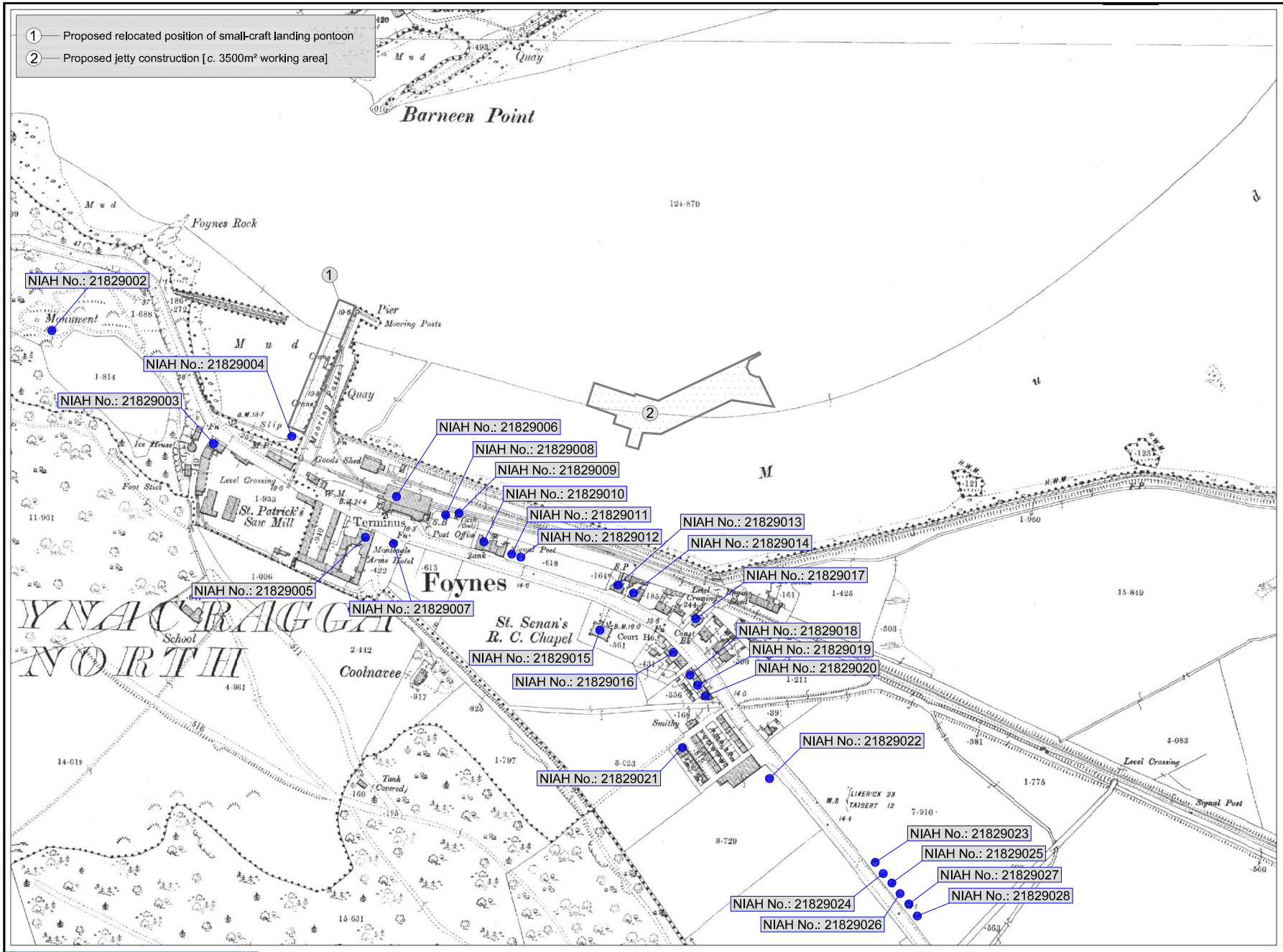
ADCO

Notes
Source: OSi Historic Map Archive, RMP Limerick Sheet 10, & DCHG database [www.archaeology.ie]

A4

Job/Exc No. 17D0017	**Compiled by** R.Bangerter	**CAD reference** ShannonFoynes	**Client** RPS Consulting Engineers/ SFPC
Date 18.04.18	**Scale** 1:15,000	**Drawing No.** Figure 14.8	**Project** Port of Foynes, Jetty Extension & Port Estate Expansion project.

Title
Figure 14.8- Extract from OS First Edition (1844) map of Foynes with sites listed in the RMP superimposed.



652221

ITM CENTRE PT. COORDS.

525088,651791

DESCRIPTION

MAP SHEETS

25 inchBE1
LK010-05 LK010-09

N

OSi Authorised Internet Map

N

651361

ADCO

Notes
Source: OSi Historic Map Archive & National Inventory of Architectural Heritage [www.buildingsofirleand.ie]

A4

Job/Exc No.	Compiled by	CAD reference	Client
17D0017	R.Bangerter	ShannonFoynes	RPS Consulting Engineers/ SFPC
Date	**Scale**	**Drawing No.**	**Project**
18.04.18	1:5000	Figure 14.9	Port of Foynes, Jetty Extension & Port Estate Expansion project.

Title
Figure 14.9- Extract from OS 25-Inch Edition (1898) map of Foynes Harbour with sites listed in the NIAH superimposed.

ADCO

Client
RPS Consulting Engineers/ SFPC

Notes
Source: [A] GSI [accessed via ttps://www.gsi.ie]
[B] Foynes Port Ground Investigation Report [GDG Geosolutions]

Borehole Locations Trial Pit Locations

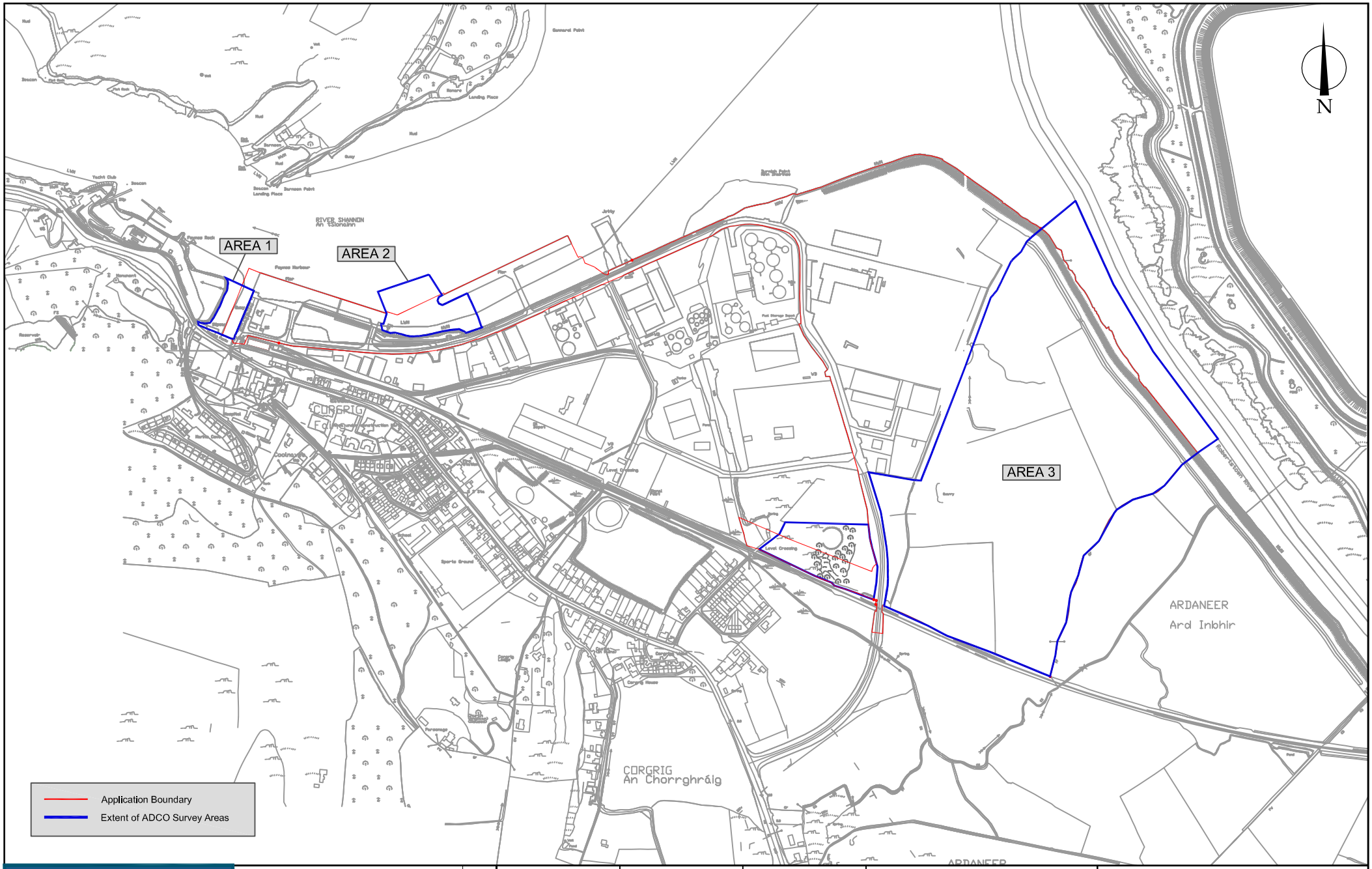
A4

Title
Figure 14.10-

A] Map showing bedrock geology surrounding Foynes and the proposed development areas.

B] Map showing subsoil deposits surrounding Foynes with Ground Investigation Works superimposed.

Project	Job/Exc No.	Compiled by	CAD reference	Date	Scale	Drawing No.
Port of Foynes, Jetty Extension & Port Estate Expansion project	17D0017	R.Bangerter	ShannonFoynes	18.04.18	NTS	Figure 14.10



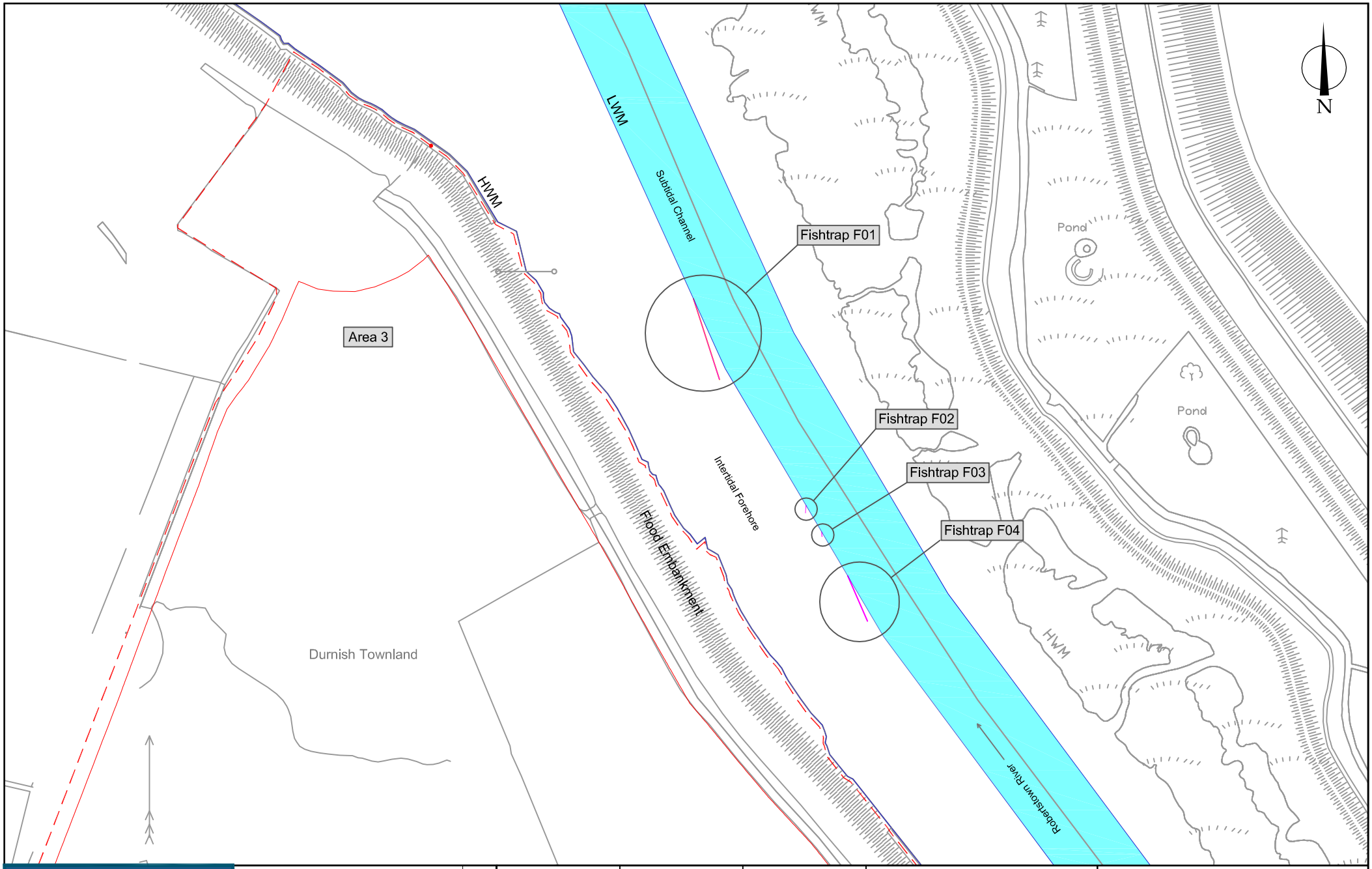
ADCO

Notes
Source: OS Background Mapping

A4

Job/Exc No. 17D0017	**Compiled by** R.Bangerter	**CAD reference** ShannonFoynes	**Client** RPS Consulting Engineers/ SFPC
Date 18.04.18	**Scale** 1:10,000	**Drawing No.** Figure 14.11	**Project** Port of Foynes, Jetty Extension & Port Estate Expansion project.

Title
Figure 14.11- OS Background Mapping showing location and extent of ADCO's on-site survey at Areas 1-3.



ADCO

Notes
Source: OS Background Mapping
Proposed Durnish development land, Area 3

A4

Job/Exc No. 17D0017	**Compiled by** R.Bangerter	**CAD reference** ShannonFoynes	**Client** RPS Consulting Engineers/ SFPC	**Title** Figure 14.12- Map showing location of Fishtrap Sites F01-F04 on intertidal foreshore adjacent to the proposed development area within Durnish townland (Area 3).
Date 18.04.18	**Scale** 1:2500	**Drawing No.** Figure 14.12	**Project** Port of Foynes, Jetty Extension & Port Estate Expansion project.	

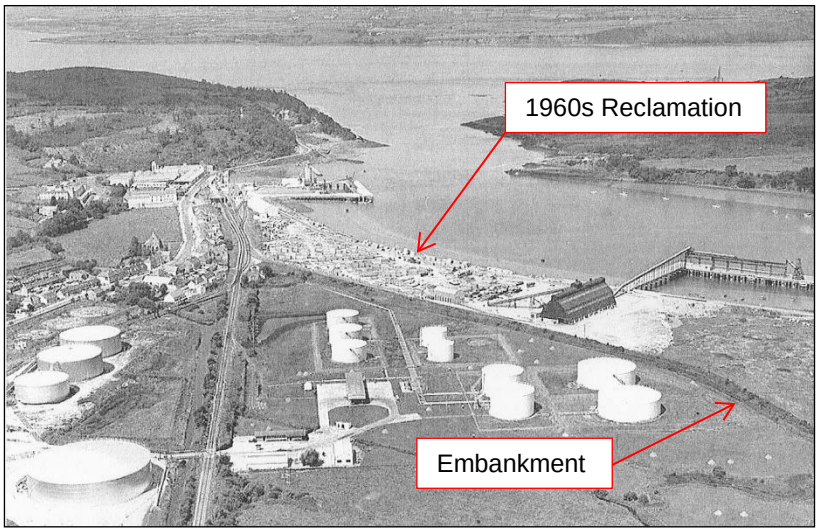


Plate 1: Northwest-facing view of Foynes subsequent to foreshore reclamation and expansion of the Port in the 1960s. Note: flood embankment running between northernmost silos and the newly reclaimed foreshore area (source: eirtrains.com).

Plate 2: Aerial-view, northwest-facing, of present-day Shannon Foynes Port (source: SFPC).

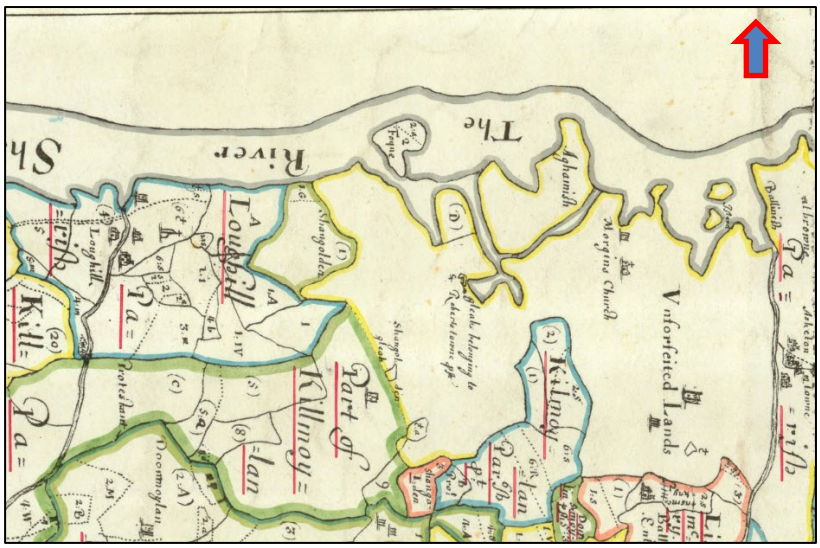


Plate 3: Extract from the Down Survey Mapping of 1656-58; *Barony of Connello (*source: downsurvey.tcd.ie/down-survey-maps).

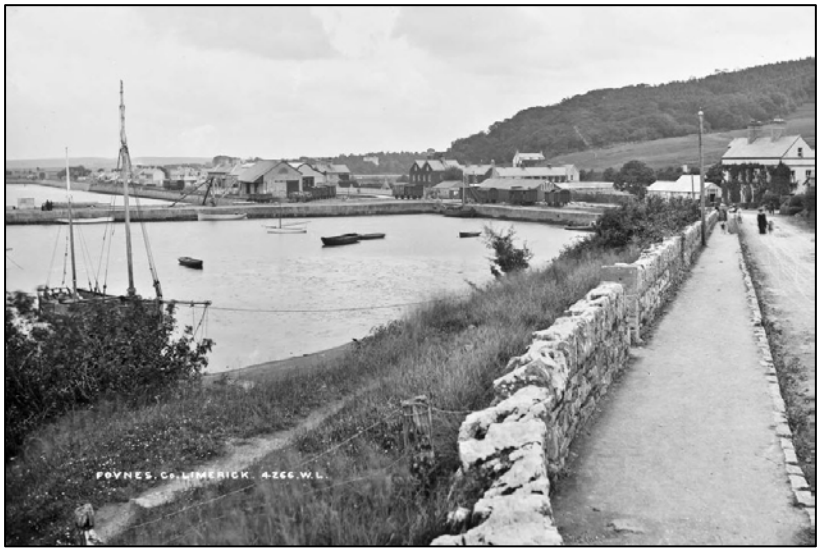


Plate 4: Nineteenth-century photograph (southeast-facing) of the historic harbour area at Fyones (source: Limerick County Archive).

Plate 5: Nineteenth-century photograph (east-facing) of the historic harbour at Fyones; note breakwater in foreground (source: Limerick County Archive).

Plate 6: Nineteenth-century photograph (east-facing) of inner part of the historic harbour area at Fyones; note boat-slipway in foreground (source: Limerick County Archive).

Plate 7: Nineteenth-century photograph (east-facing) of Foynes Railway Station; note flood embankment to left of picture (source: Limerick County Archive).

Plate 8: Nineteenth-century photograph, *c.*1890, of a saw mill that was once in operation to the south of Foynes Harbour; masonry quay and boat slipway in foreground (source: Limerick County Archive).

Plate 9: West-facing view of metal-detector at find spot of an Irish (1/2d) half-penny coin, dated 1928, Durnish Townland.

Plate 10: Example shot of DGPS unit in use during the field-walking of the proposed port expansion area within Durnish Td.; note flood embankment in background.

Plate 11: Working shot of ADCO diver entering water from ladder in the West Quay, Foynes Harbour.

Plate 12: North-east view across the intertidal foreshore within Area 1, located on the west side of Shannon Foynes Port.

Plate 13: East-facing view of masonry quayside delineating the east side of the historic harbour (Area 1) at Foynes.

Plate 14: North-facing view of Area 1, note rock-armour delineating the upper foreshore on west side of harbour area.

Plate 15: South-facing view across the intertidal foreshore within the historic harbour at Foynes (Area 1).

Plate 16: South-east facing view of sub-tidal area within Area 2; note western terminus of the East Jetty to centre of picture.

Plate 17: Southwest-facing view West Quay at Shannon Foynes Port.

Plate 18: West-facing view of intertidal zone within Area 2; note rock-armour delineating upper foreshore.

Plate 19: Aerial view (southeast-facing) of greenfield site (Area 3),

Durnish Td., located to east of the existing port estate development.

Plate 20: Northwest-facing view of proposed Durnish development land (Area 3); shot taken from northwest corner of the site (1m scale).

Plate 21: East-facing view of proposed Durnish development land (Area 3); shot taken from east side of the site (1m scale).

Plate 22: South-facing view of proposed Durnish development land (Area 3); shot taken from middle of the site (1m scale).

Plate 23: West-facing view along disused railway line to the south of the proposed Durnish development land (Area 3).

Plate 24: South-facing view (Area 3) showing flood embankment to the left and drainage ditch to the right of picture (1m scale).

Plate 25: South-facing view of intertidal foreshore, taken at Low Water, showing large flood embankment delineating the upper foreshore of Robertstown Estuary.

Plate 26: North-facing view of large drainage ditch delineating the east side of the proposed Durnish Development Land, Area 3 (1m scale).

Plate 27: East-facing view of large drainage ditch delineating the north side of the proposed Durnish Development Land, Area 3.

Plate 28: Aerial view (northwest-facing) of the proposed Durnish Development Land (Area 3), lying to the south of the existing port estate.

Plate 29: Aerial view (south-facing) of the proposed Durnish Development Land (Area 3); note frequent pooling of water, attenuation pond, and associated drainage ditches.

Plate 30: West-facing view of rock-face of area of quarried bedrock located within the proposed Durnish development land (Area 3).

Plate 31: East-facing view of folding anchor located within the northwest corner of Area 1 (1m scale).

Plate 32: South-facing view of folding anchor located within the northwest corner of Area 1 (1m scale).

Plate 33: West-facing view of anchor in its new position at base of the rock-armour and outside of Area 1; positioned at NGR: 124796E, 151882N.

Plate 34: North-facing view of inner side of the East Jetty at Low Water (1m scale).

Plate 35: Northwest-facing view of intertidal foreshore (Area 2) and eastern terminus of the West Quay.

Plate 36: Northwest-facing view of a small-craft floating pontoon, currently positioned close to the eastern terminus of the West Quay.

Plate 37: East-facing view of sub-tidal and intertidal areas located between the East Jetty and the West Quay; shot taken from West Quay.

Plate 38: West-facing view of intertidal foreshore within Area 2; note natural drainage channels from run-off cut through foreshore deposits.

Plate 39: Southeast-facing view of flood embankment constructer along the upper foreshore of Robertstown River Estuary (1m scale).

Plate 40: Northwest-facing view along top of flood embankment that runs along the upper foreshore of Robertstown River Estuary.

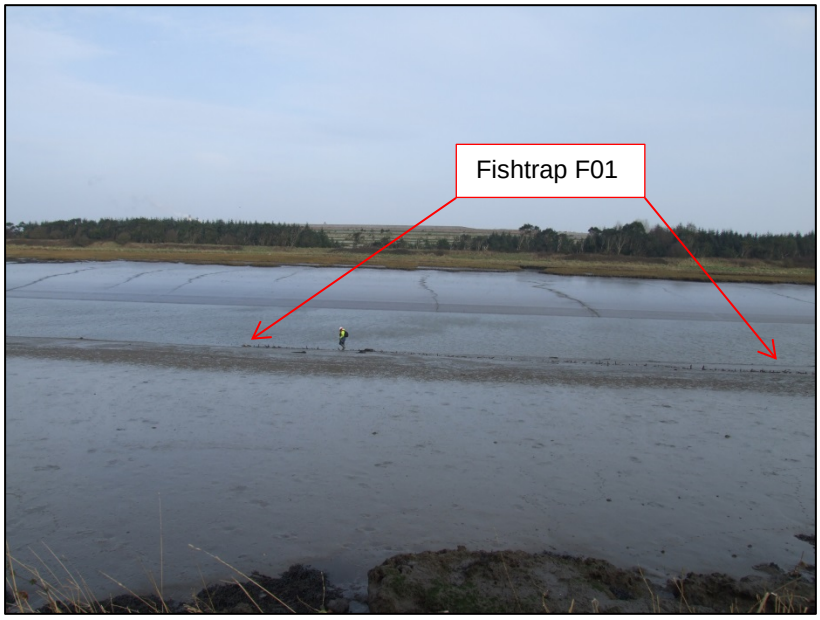


Plate 41: Northeast-facing view of intertidal foreshore at Low Water, leading to Fishtrap F01 in distance.

Plate 42: North-facing view along Fishtrap F01 which forms a curvilinear post-and-wattle structure that extends 43.2m south of the Low Water Mark (1m scale).

Plate 43: Detail shot showing topmost layer of hazel rods that form wattle wall panels that remain buried *in situ* along the structure (750mm scale).

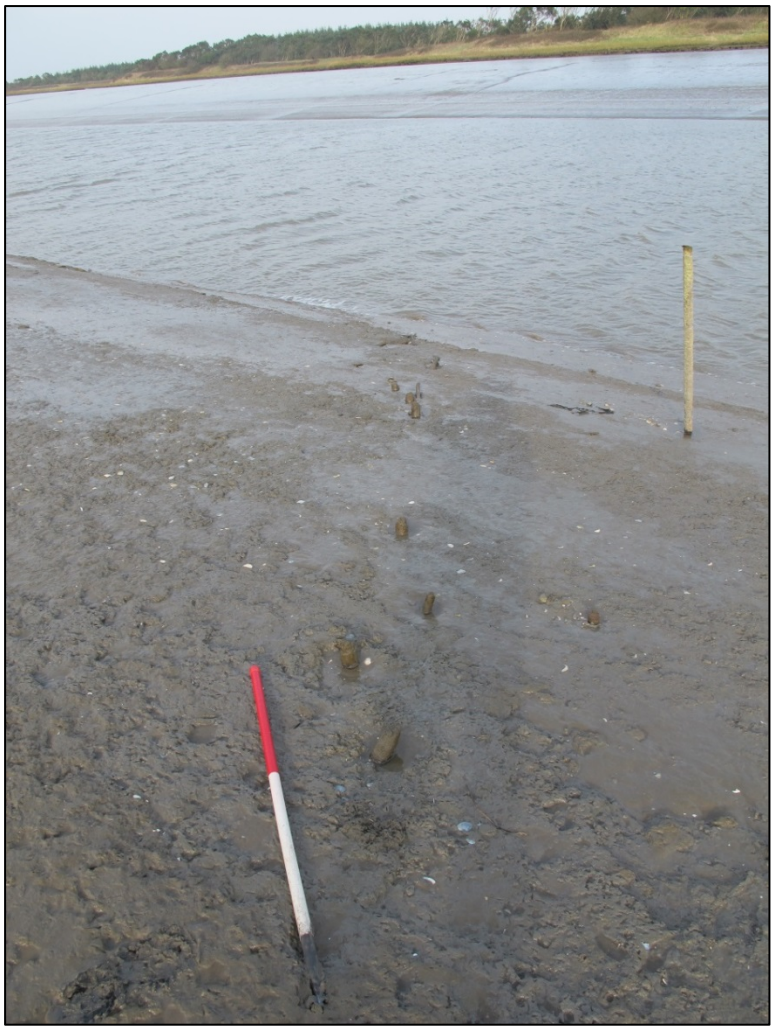


Plate 44: North-facing view of wooden posts that from visible extent of Fishtrap F02 (1m scale).

Plate 45: North-facing view of wooden posts and associated wattle rods that from visible extent of Fishtrap F03 (1m scale).

Plate 46: North-facing view along Fishtrap F04 that extends south *c.* 25m from the Low Water Mark (1m scale).

Plate 47: Detail shot of timber post from Fishtrap F04 (750mm scale).

Plate 48: Irish (1/2d) half-penny coin dated 1928; recovered from metal-detection survey of Area 3.

Plate 49: Irish sixpence (2/6d) coin dated 1961; recovered from metal-detection survey of Area 3.

Plate 50: English half-penny dated 1927; recovered from metal-detection survey of Area 3.

Plate 51: English half-penny dated 1938; recovered from metal-detection survey of Area 3.

Topographical Files, National Museum of Ireland

Reference No.	Classification	Townland	Description	Easting	Northing	Location in relation to development
Record	Stone axehead, polished	Foynes Island	Long narrow axehead polished on its cutting edge. Made from silicified black mudstone, typical of the 'Clare Shales' of Cos. Clare and Limerick, and which outcrop at the east end of Foynes Island (identified by Dr. J. Jackson 1986). L 17.7cm, W of blade 5cm, max T. 2.3cm. In private possession. (Find location identified in centre of Island on its southerly side; c. 1cm south of the island on OS sheet 10).	n/a	n/a	Outside

Register of Monuments and Places

RMP No	Classification	Townland	Description	Easting	Northing	Distance to nearest development area
LI 010-001	Battery, site of	Foynes Island	Kerrigan: this was an earthwork battery for six 24-pounders; remains of the battery survive. www.clarelibrary.ie	123938	152860	1.37km northwest of historic harbour [Area 1].
LI 010-002	Ringfort., Rath	Leahys	Located in an undulating pasture field, on east-facing slope of a low rise. Circular area (34m diameter) enclosed by earthen bank (internal height 1.3m, external height 1.8m) with external fosse (width 2m, depth 0.50m).	124152	150566	1.64km southwest of proposed East Jetty Extension [Area 2].
LI 010-004	Ringfort., Rath	Leahys	Located in a pasture field, on a north-facing slope. Circular area (27.8m N-S) enclosed by earth-and-stone bank (internal height 0.40m, external height 1.9m) with external fosse (width 1.5m, depth 0.20m). Site covered by dense undergrowth and trees.	124512	150926	1.14km southwest of proposed East Jetty Extension [Area 2].
LI 010-005	Ringfort., Rath	Ballynacragga	Located in an undulating pasture field, mixed with marshy areas and rock outcrops. Roughly circular area (32.1m N-S, 28.9 m E-W) enclosed by two concentric earth-and-stone banks with intervening fosse.	124699	150641	1.26km southwest of proposed East Jetty Extension [Area 2].
LI 010-006	Ringfort., Rath	Ballynacragga	Located in a pasture field, near foot of steep East-facing slope. Roughly circular area (32m N-S; 24m from bank to field boundary E-W) enclosed by earthen bank with external fosse. Because of fall in ground on west side, the enclosure is cut into the hill-slope and this is reflected in the profile of the enclosing element: on west side bank is high internally (1.7m) but shallow externally (0.45m) with the external fosse also cut into the hillside (0.7m depth, 2.25m width); on east the side the enclosing element is covered by dense overgrowth. It has a low internal height and steep external height, falling to a shallow fosse. Enclosing	125188	150591	1.12km southwest of proposed Durnish development land [Area 3].

RMP No	Classification	Townland	Description	Easting	Northing	Distance to nearest development area
			element truncated by north-south field boundary.			
LI 010-007	Tower House	Corgrig	In area of dense overgrowth today but situated beside a small stream, two blocks of fallen masonry lying on either side of a culverted stream; a Geraldine castle described in 1583 as large and excellent, it fell into ruins in the mid-17th century	125651	151043	611m southwest of proposed Durnish development land [Area 3].
LI 010-009	Enclosure	Durnish	In rough terrain with limestone outcrops, a roughly oval area measuring 26m by 23m is enclosed by collapsed stone wall, 50cm high.	126011	151356	85m west of proposed Durnish development land [Area 3].
LI 010-109	Fulachta Fiadh complex, possible	Foynes Island	Within a coniferous plantation, the landowner reported a scatter of burnt material revealed during planting.	124259	152918	1.2km northwest of northwest of historic harbour [Area 1].
LI 010-1101	Fulachta Fiadh	Foynes Island	Within a coniferous plantation, a kidney-shaped mound of burned material was recorded measuring 8.5m by 9.6m and 70cm high.	124488	152745	988m northwest of northwest of historic harbour [Area 1].
LI 010-1102	Fulachta Fiadh, possible	Foynes Island	Within a coniferous plantation, the landowner reported a scatter of burnt material revealed during planting.	124545	152711	930m north of northwest of historic harbour [Area 1].
LI 010-111	Fulachta Fiadh, possible	Foynes Island	Within a coniferous plantation, the landowner reported a scatter of burnt material revealed during planting, measuring 15m by 30m in size.	124682	152692	880m north of northwest of historic harbour [Area 1].
LI 010-135	Fulachta Fiadh	Ballynacragga	The site was part of a fulacht fiadh, with a significant part still remaining in the adjacent field to the north-east, a baulk section of which was recorded. The exposed area of the mound measured 12.5m south-east/north-west by 9.5m, and the material had a maximum depth of 0.47m. The outer edges of the spread were 0.01–0.02m deep, and the mound was cut by a modern field drain. Six layers were recorded, containing charcoal-enriched, silty clay and heat-cracked sandstone. Two additional layers exposed in the baulk section, beneath the burnt material, were sterile, silty clays, one overlying the other. Three subsoil-cut features (a trough, a roughly stone-lined hearth and a possible roasting pit) and a charcoal spread were found beneath the mound. The trough was sub-oval, measuring 1.86m by 1.8m, and was 0.8m deep, with concave sloping sides and an undulating base. The deposit in the trough contained heat-cracked stones and charcoal-rich, silty clay and was interpreted as a backfill of mound material. No lining was evident in the trough, although, when excavated, it filled with water to a depth of c. 0.1m,	124531	150669	1.28km southwest of proposed East Jetty Extension [Area 2].

RMP No	Classification	Townland	Description	Easting	Northing	Distance to nearest development area
			indicating the level of a trapped water table. The charcoal spread, 0.75m west of the trough, may have represented the waste from its cleaning. The roasting pit (0.6m south-east of the trough) was sub-oval, measuring 2.1m by 1.7m, and was 0.4m deep. It had concave sloping sides and a predominantly flat base. Laid flat at the bottom and centre of the pit were thin sandstone slabs forming a sub-rectangular platform. The platform measured 0.94m by 0.6m, and the average thickness of the stones was 0.03m. Beneath the stones was a layer of charcoal that overlay an area of scorched subsoil, which may support the theory of a roasting function. The north-western side of the pit was cut into an outcrop of naturally occurring sandstone bedrock, which was layered and split. The top few layers were pushed back into the subsoil, creating what may have been a standing/sitting work platform. A further two fills made up the remaining deposit in the pit. The lower fill was mid-grey sandy clay with occasional charcoal flecks and occasional burnt stones. The upper and final fill was dark brown, silty clay, containing occasional charcoal flecks. This final fill also contained a concentration of large, unburnt sandstones near the top, which protruded from the pit before it was excavated. The hearth was 0.25m south-east of the roasting pit. Sub-oval in plan, it had a concave profile and a rounded base. It measured 1.6m by 1.2m and was 0.1m deep. The stones delineating the hearth were naturally occurring bedrock. Although there was evidence of in situ burning on the base of the hearth, no remains of the last firing were present. This suggests that the hearth was cleaned/scraped out after its last use. Because of its proximity to the possible roasting pit, it is thought likely that they were associated.			
LI 010-137	Burnt Mound	Leahys	Burnt mounded excavated under licence 02E0900 and described as a shallow mound of burnt clay and heat-shattered stone measuring 9.85m x 9.25m. Despite recent disturbance the mound reached a maximum height of 0.75m. The burnt stone itself was noteworthy, as the local geological deposits included a large band of shale, which had been used in the mound. At least two phases of site activity and mound construction were visible. A relatively thick deposit of mid-brown/black clay and burnt stone lay directly above the natural geological deposits, although this was visible only at the limit of the excavation, suggesting that most of this phase of activity fell outside the excavated area. There was no evidence of a hearth or trough associated with this area of the site. Slightly overlapping this layer was a stony, dark brown/grey clay deposit, presumably roughly contemporaneous. Immediately	124483	150680	1.2km southwest of proposed East Jetty Extension [Area 2].

RMP No	Classification	Townland	Description	Easting	Northing	Distance to nearest development area
			above these layers was evidence of the second phase of activity. This partially overlay the earlier phase, but its focus was farther east. A possible pit or trough was observed, cutting into the earlier layers. This was 0.94m wide and 0.17m deep. The northern edge of the cut was relatively steep, with straight sides, and boulders obscured the southern edge.			

National Inventory of Architectural Heritage

Reg. No.	Classification/ Rating	Townland	Description	Easting	Northing	Distance to nearest development area
21829003	Saint Patrick's Saw Mill, Miller's House; now SFPC office Reginal importance; architectural & artistic	Leahys	Detached four-bay two-storey with dormer attic former saw mill and mill house, built in 1863, having return to rear (south) elevation. Pitched slate roof with brick eaves course and brick chimneystacks. Timber bargeboards to dormer windows. Roughly dressed limestone walls having brick stringcourse. Square-headed openings with bipartite one-over-one pane timber sliding sash windows and limestone sills. Square-headed openings to dormer attic having timber casement windows. Square-headed opening to ground floor with one-over-one pane timber sliding sash window and limestone sill. Square-headed door opening to east elevation having brick *voussoirs*, double-leaf glazed doors and balcony with concrete consoles and cast-iron railings. Square-headed opening having inscribed limestone lintel and glazed over-light over half-glazed timber panelled door. Square-headed opening to west elevation with timber battened door. Formerly part of a saw mill complex, this building retains much of its original fabric and presents a well composed architectural design to the streetscape. It was built by the architect William Fogarty. It was originally an agent's house constructed for Thomas Spring Rice, 1st Baron Monteagle of Mount Trenchard. The combination of red brick dressings and limestone walls combine to give a very pleasing textural and chromatic effect. Evidence of high quality workmanship can be seen in the stone	124798	151804	50m south of historic harbour [Area 1].

Reg. No.	Classification/ Rating	Townland	Description	Easting	Northing	Distance to nearest development area
			detailing and brickwork execution. The surviving inscribed lintel to the door opening is an interesting historical artefact.			
21829004	Harbour/dock/port Reginal importance; architectural & technical	Corgrig	T-plan limestone pier with harbour, built in 1847. Ashlar walls and copings having recent metal railings. Concrete surface to pier and concrete ramp to west. Painted stone and cast-iron mooring posts to west and north elevations. The pier, which is still in use, attests to the proficiency of marine architects and engineers in the nineteenth century. It was erected as a part of a famine relief scheme and was a joint undertaking by the Spring Rice Family and the Commissioners of Public Works each of whom shared the cost of its construction, £10,000. It is an integral part of Foynes's architectural and social heritage, having played a significant role in the economic development of the local community.	256995	117149	0m [within]; historic harbour [Area 1].
21829005	Hotel; former	Corgrig	Detached gable-fronted two-bay three-storey former railway hotel, built c. 1870, having two-bay four-storey extension with viewing gallery to west, two-bay two-storey addition to west and four-bay two-storey addition to south. External metal staircase to west elevation. Pitched slate roof with timber bargeboards finals and rendered chimneystacks. Pitched slate roof to additions having rendered chimneystacks. Flat roof to extension. Rendered walls. Square-headed openings having two-over-two pane timber sliding sash windows and concrete sills. Round-headed opening with spoked fanlight over half-glazed timber panelled double-leaf doors. Square-headed opening to east elevation having glazed over-light over timber panelled door. Square-headed opening to west addition with render architrave over double-leaf timber panelled door with glazed over-light and flanking sidelights having timber panelled risers. Pair of square-profile limestone piers to north with carved panels, plinths and ornate caps. Decorative cast-iron railings set in limestone plinths terminating in second pair of square-profile rusticated limestone piers.	124864	151684	100m southeast of historic harbour [Area 1].
21829006	Railway Station; former	Corgrig	Detached four-bay two-storey former railway station, built between 1856-58, having shallow projecting centre-bay, gable-fronted projecting end-bay, five-bay single-storey wing to east and gable-fronted train shed to rear (north) elevation. Hipped and pitched slate roofs with rendered chimneystacks and timber bargeboards. Train shed having pitched corrugated-iron roof and timber battened cladding to gables. Snecked limestone walls having tooled limestone quoins, plinth course and benchmark to front elevation. Rendered walls to rear elevation. Camber-headed openings with cut limestone *voussoirs*, keystones, sills and six-	124902	151749	211m southeast of proposed East Jetty Extension [Area 2].

Reg. No.	Classification/ Rating	Townland	Description	Easting	Northing	Distance to nearest development area
			over-six pane timber sliding sash windows. Camber-headed openings to first floor, gable-fronted projection having cut limestone voussoirs, keystones, sills and two-over-two pane timber sliding sash windows. Square-headed opening to first floor, centre-bay with limestone sill and two-over-two pane timber sliding sash window. Square-headed opening to first floor and west elevation, first floor, having limestone sills and tripartite two-over-two pane timber sliding sash windows with flanking one-over-one pane timber sliding sash windows. Recessed square-headed openings to rear having painted stone sills and six-over-six pane timber sliding sash windows. Camber-headed opening with tooled limestone block-and-start surround and half-glazed timber panelled door with flanking sidelights. Limestone steps to entrance. Camber-headed opening to wing, front elevation having tooled limestone block-and-start surround and multiple-pane glazed over-light over double-leaf timber panelled doors. Limestone steps to entrance. Recessed square-headed openings to rear having multiple-pane glazed over-lights over timber panelled doors. Snecked limestone wall to wing, east elevation with limestone copings having camber-headed pedestrian entrance with timber battened door. Limestone platform to north. Single-bay single-storey outbuilding to north-west having replacement tiled roof and cut limestone chimneystack. Camber-headed window opening with limestone block-and-start surround and sill.			
21829007	Fountain	Corgrig	Freestanding limestone Celtic high cross style fountain, built *c*. 1910. Cut limestone stepped base with square-profile basin, now blocked up, surmounted by rock-faced plinth with cast-iron spout to west elevation. Carved Celtic cross with inscribed limestone plaques. Inscription reads: 'This fountain is erected in grateful recognition of the numerous benefits conferred on his native country on the poor and on this neighbourhood by Sir Stephen Edward De Vere Bart, statesman, philanthropist, poet, through whose generous aid and zealous co-operation in conjunction with contributions from others the Catholic Church of Foynes was built. Died 10 November 1904 Aged 92 Years'.	124896	151683	200m southeast of proposed East Jetty Extension [Area 2].
21829008	Signal Box	Corgrig	Detached single-bay two-storey signal box, built c. 1900. Pitched slate roof with timber bargeboards, finials and brick chimneystack. Brick walls, brick plinth course and metal external staircase to east elevation. Timber battened walls to east and west gables. Square-headed openings having fixed windows to first floor. Camber-headed openings with brick *voussoirs*, label mouldings, terracotta sills and fixed windows. Square-headed openings to	124942	151706	158m southeast of proposed East Jetty Extension [Area 2].

Reg. No.	Classification/ Rating	Townland	Description	Easting	Northing	Distance to nearest development area
			east elevation having timber battened doors. This well maintained attractive signal box retains much of its original form and fabric and forms an integral part of the Foynes Railway Station complex.			
21829009	Water Tower; cast-iron	Corgrig	Freestanding cast-iron water tower, erected in 1892. Comprising Doric style columns joined by metal braces supporting rectangular-plan tank with raised panels and maker's name: 'H. Graham 1892 Waterford'. This water tank forms part of a group of related railway structures including the station and signal tower. Constructed in materials characteristic of such functional structures of its time, it is distinguished by the decorative raised panels to the tank.	124955	151700	144m southeast of proposed East Jetty Extension [Area 2].
21829010	Post Office & Bank; former	Corgrig	Detached H-plan seven-bay two-storey former post office and bank, built c. 1910, having recent extensions to rear (north) elevation. Hipped slate roof with rendered chimneystacks, overhanging eaves and timber brackets. Roughcast rendered walls to first floor having rusticated limestone quoins. Rusticated coursed limestone walls to ground floor with rusticated plinth course. Bipartite square-headed openings to projecting end-bays, first floor having rusticated limestone block-and-start surrounds, mullions, sills and four-over-four pane timber sliding sash windows. Tripartite square-headed openings to centre-bay, first floor and projecting end-bays, ground floor with rusticated limestone block-and-start surrounds, mullions, sills and four-over-four pane timber sliding sash windows. Quadripartite square-headed openings to centre-bay, ground floor having rusticated limestone block-and-start surrounds, mullions, sills and four-over-four pane timber sliding sash windows. Round-headed opening to centre-bay with rusticated limestone surround and inset square-headed multiple-pane fixed window and square-headed opening having multi pane over-light over timber panelled door. Square-headed openings to projecting end-bays with multiple-pane over-lights over timber panelled doors. Designed by William Clifford Smith, this building is a particularly attractive example of early twentieth-century Arts and Crafts style architecture, of which the projecting bays and overhanging eaves are characteristic features. Its form as well as its size and scale, mark it out in the streetscape. The long rectangular H-plan form is emphasised by the overhanging eaves and tripartite and quadripartite windows, which underscore the horizontal planes. The rusticated limestone walls to the ground floor contrast with	124985	151678	122m south-southeast of proposed East Jetty Extension [Area 2].

Reg. No.	Classification/ Rating	Townland	Description	Easting	Northing	Distance to nearest development area
			the rendered upper floor and interest to the façade			
21829011	House & former shop	Corgrig	Detached four-bay two-storey former house and shop, built c. 1930, having shopfront to front and recent multiple-bay single-storey extensions to east elevation. Now in use as restaurant. Hipped slate roof having rendered chimneystacks, cast-iron roof-lights and overhanging eaves. Lined-and-ruled rendered walls with render quoins and plinth course. Square-headed openings to first floor having bipartite one-over-one pane timber sliding sash windows, shouldered render surrounds and render sill course. Square-headed openings to ground floor with shouldered render surrounds, concrete sills and timber casement windows. Square-headed opening having render surround and timber panelled door. Shopfront comprising timber fascia and square-headed curved multi pane display windows. Square-headed opening with half-glazed timber panelled door. This building retains much of its original fabric and presents a well composed façade to the streetscape. The fenestration to the upper floor combines to give a very pleasing symmetry. The Shannon House is a good example of the tradition of combined dwelling and shop and contributes to the streetscape and architectural heritage of Foynes.	125020	151673	140m south of proposed East Jetty Extension [Area 2].
21829012	House & former shop	Corgrig	End-of-terrace three-bay two-storey house and former shop, built c. 1930, having render shopfront and projecting end-bay to front (south) elevation. Half-hipped slate roof with rendered chimneystacks and render eaves course. Roughcast rendered walls having render plinth course and moulded stringcourse to recessed bay. Square-headed openings with two-over-two pane timber sliding sash windows and painted stone sills. Square-headed opening to west elevation having two-over-two pane timber sliding sash window with cast-iron sill guard. Square-headed opening having multiple-paned over-light over timber battened door. Shopfront comprising fascia with raised lettering, moulded consoles supporting heavy cornice. Square-headed display opening having multiple-paned over-lights over tripartite fixed window. Square-headed opening having multiple-paned over-light over half-glazed timber battened door. The projecting end-bay and decorative render shopfront distinguish this building in the streetscape. The ornamental render detailing and sash windows further mark it out and add artistic interest to the site.	125043	151658	140m south of proposed East Jetty Extension [Area 2].
21829013	House & former shop	Corgrig	End-of-terrace three-bay two-storey house and shop, built c.	125085	151646	145m south- of

Reg. No.	Classification/ Rating	Townland	Description	Easting	Northing	Distance to nearest development area
			1930, having shopfront to front (south) elevation. Pitched slate roof with brick chimneystacks. Rendered walls. Square-headed openings having bipartite one-over-one pane timber sliding sash windows and painted stone sills. Square-headed opening with glazed over-light over timber panelled door. Shopfront comprising timber fascia with raised lettering and cornice. Square-headed display window. Square-headed opening having replacement glazed door. Joyce's shop is situated at the end of a terrace with a similar roof line and profile. It plays an important role in creating the streetscape and has retained many notable features such as its shopfront and bipartite timber sliding sash windows.			proposed East Jetty Extension [Area 2].
21829014	House & Shopfront	Corgrig	Terraced three-bay two-storey house and shop, built c. 1930, having render shopfront to front (south) elevation. Pitched slate roof with brick chimneystack. Rendered walls. Square-headed openings having bipartite one-over-one pane timber sliding sash windows and painted stone sills. Square-headed opening with glazed over-light over timber panelled door. Shopfront comprising fascia with raised lettering and cornice. Square-headed display window. Square-headed opening having replacement glazed door. M. A. Nolan's is part of a terrace of similar structures yet it is distinguished as a building, which has retained its character and form over the years. Though no longer used as a shop the shopfront remains virtually intact and, as a result, enlivens the modest façade. It plays a positive role in the architectural heritage of Foynes.	125094	151643	154m south- of proposed East Jetty Extension [Area 2].
21829015	Church; formerly Saint Senan's Roman Catholic Chapel	Corgrig	Freestanding single-cell Roman Catholic Church, begun in 1868 and completed in 1932, having gable-fronted porch to north elevation and recent multiple-bay extension to south elevation. Pitched slate roof with fishscale patter, limestone bracketed eaves course, copings and finial, cast-iron ridge crestings and finial. Rusticated snecked limestone walls and buttresses to porch and corners. Canted buttress to west elevation. Paired trefoil-headed lancet stained glass quarry glazed windows to nave and east gable having chamfered limestone block-and-start surrounds and quatrefoil stained glass stained glass quarry glazed windows over. Quatrefoil window openings to east and west gable apexes and porch, east and west elevations. Oculus to east gable having inset multifoil quarry glazed window. Rose window to west gable comprising inset multifoil and quatrefoil openings and limestone surround. Oculi to west gable with inset quatrefoil quarry glazed	125080	151591	186m south of proposed East Jetty Extension [Area 2].

Reg. No.	Classification/ Rating	Townland	Description	Easting	Northing	Distance to nearest development area
			windows. Trefoil window openings to canted buttress. Pointed arch opening to porch having roll-moulded limestone surround, Corinthian-style columns with carved limestone caps, marble banded shafts and replacement glazed double-leaf doors. Timber scissors truss ceiling to interior. Shouldered-square-headed openings to west wall having chamfered limestone surrounds, cast-iron gate to first floor opening, timber battened door to ground floor. Pointed arch opening to west wall with double-leaf timber battened doors having cast-iron strap hinges and lock. Rusticated limestone boundary walls to north having limestone cappings and single-leaf timber gate. The original church in Foynes was designed by the eminent Gothic Revival architect J.J. McCarthy. It was begun in 1868 but the was not completed until by 1932 by Ralph Henry Byrne. The original contractor was John Ryan & Son, Limerick. The site was given by Lord Monteagle to the parishioners of Foynes. McCarthy's intended transepts, chancel and central tower were not built, instead a fan-shaped nave was added alongside the south wall of the church which was then removed, so that the original nave became a re-orientated chancel. The church retains much of its simple form despite these additions to the rear. It includes original features, which mark it as a building of significance, such as the rusticated walls, which contrasts dramatically with the finely tooled limestone dressings. Saint Senan's plays a positive role on the streetscape and adds to the architectural character of the area.			
21829016	House & former shop	Corgrig	End-of-terrace three-bay two-storey house and former shop, built c. 1900, having tripartite timber shopfront to front (north) elevation. Pitched slate roof with brick chimneystacks, render copings and bracketed eaves course. Rendered walls. Round-headed openings to first floor having painted brick hood-moulding course, concrete sills and one-over-one pane timber sliding sash windows. Camber-headed openings to ground floor with painted brick hood-moulding course, concrete sills and one-over-one pane timber sliding sash windows. Camber-headed opening having glazed over-light over timber panelled door with limestone threshold. Shopfront comprising fluted pilasters, scrolled consoles, fascia having raised lettering and dentillated course and carved cornice. Square-headed display openings with inset bipartite camber-headed fixed windows having carved geometric motifs to spandrels. Brick risers. Square-headed opening with flanking fluted pilasters having ornate consoles, inset elliptical-headed over-light over double-leaf timber panelled doors.	125148	151580	192m south of proposed East Jetty Extension [Area 2].

Reg. No.	Classification/ Rating	Townland	Description	Easting	Northing	Distance to nearest development area
21829017	House & former shop	Corgrig	Detached three-bay two-storey house and shop, built c. 1900, having render shopfront to front (south) elevation. Now in use as public house. Hipped and pitched slate roof with rendered chimneystacks. Snecked rusticated limestone walls with tooled limestone quoins. Square-headed openings to first floor having tooled limestone block-and-start surrounds, limestone sills and bipartite one-over-one pane timber sliding sash windows. Shopfront comprising pilasters with scrolled consoles, fascia and moulded cornice. Square-headed display openings having inset camber-headed tripartite fixed windows with painted brick risers. Square-headed opening having glazed over-light over double-leaf timber panelled doors and flanking pilasters.	125170	151611	182m south of proposed East Jetty Extension [Area 2].
21829018	House; end of terrace	Corgrig	End-of-terrace three-bay single-storey with dormer attic house, built c. 1925. Pitched slate roof with timber bargeboards to dormer and limestone chimneystacks. Rubble limestone walls. Square-headed opening to dormer with one-over-one pane timber sliding sash window and painted stone sill. Square-headed openings to ground floor having limestone *voussoirs*, bipartite one-over-one pane timber sliding sash windows and painted stone sills. Square-headed opening with limestone *voussoir* and glazed over-light over replacement timber battened door. Pair of rendered square-profile piers to north-east having single-leaf gate and rendered boundary walls. This terraced house retains its original form complete with decorative elements such as the timber bargeboards to the dormer window and limestone *voussoirs* to ground floor openings. Features such as the timber sash windows and slate roof help to preserve the original appearance of the building, which makes a positive contribution to the streetscape. The terrace was originally a scheme for six houses designed by the architects Clifford Smith and Newenham.	125167	151562	214m south of proposed East Jetty Extension [Area 2].
21829019	House; terraced	Corgrig	Terraced three-bay single-storey with dormer attic house, built c. 1925. Pitched slate roof with timber bargeboards to dormer and limestone chimneystacks. Rubble limestone walls. Square-headed opening to dormer with one-over-one pane timber sliding sash window and painted stone sill. Square-headed openings to ground floor having limestone *voussoirs*, bipartite four-over-six pane timber casement windows and painted stone sills. Square-headed opening with limestone *voussoir* and glazed over-light over double-leaf half-glazed timber panelled doors. Pair of rendered square-profile piers to north-east having single-leaf metal gate and rendered boundary walls.	125172	151555	226m south of proposed East Jetty Extension [Area 2].

Reg. No.	Classification/ Rating	Townland	Description	Easting	Northing	Distance to nearest development area
			This terraced house retains its original form complete with decorative elements such as the timber bargeboards to the dormer window and limestone *voussoirs* to ground floor openings. Features such as the timber sash window and slate roof help to preserve the original appearance of the building, which makes a positive contribution to the streetscape. The terrace was originally a scheme for six houses designed by the architects Clifford Smith and Newenham.			
21829020	House; terraced	Corgrig	Terraced three-bay single-storey with dormer attic house, built c. 1925, having shopfront to front (north-east) elevation. Pitched artificial slate roof with replacement uPVC bargeboards to dormers and limestone chimneystack. Rubble limestone walls. Square-headed openings to dormers with one-over-one pane timber sliding sash windows and painted stone sills. Square-headed opening to ground floor having limestone *voussoirs*, bipartite one-over-one pane timber sliding sash window and painted stone sill. Square-headed opening to ground floor having limestone *voussoirs*, one-over-one pane timber sliding sash window and painted stone sill. Shopfront comprising square-headed display openings with fixed windows and concrete sills. Recessed square-headed opening having half-glazed timber panelled door. This terraced house retains its original form complete with decorative architectural elements such as the dormer windows and limestone *voussoirs* to ground floor openings. Features such as the timber sash windows help to preserve the original appearance of the building, which makes a positive contribution to the streetscape. The terrace was originally a scheme for six houses designed by the architects Clifford Smith and Newenham.	125176	151547	236m south of proposed East Jetty Extension [Area 2].
21829021	House; terraced	Corgrig	End-of-terrace pair of two-bay single-storey houses, built c. 1910. Pitched slate roof with rendered chimneystack and cast-iron roof light. Roughly dressed limestone walls having dressed limestone quoins. Square-headed openings with tooled limestone block-and-start surrounds, limestone sills and two-over-two pane timber sliding sash windows. Square-headed opening to north elevation having replacement uPVC windows and limestone sills. Square-headed opening to south block having tooled limestone block-and-start surround and timber panelled door. Square-headed opening to north block with tooled limestone block-and-start surround and timber battened door. This modest pair of houses retain much of their original form and constitute part of a group of similar limestone structures. The	125161	151493	291m south of proposed East Jetty Extension [Area 2].

Reg. No.	Classification/ Rating	Townland	Description	Easting	Northing	Distance to nearest development area
			retention of timber sash windows, the panelled and timber battened doors enhance the building's character. These cottages may have been part of a scheme designed by the architects Clifford Smith and Newenham.			
21829022	House; detached	Corgrig	Detached three-bay two-storey house, built c. 1945. Hipped slate roof. Square-headed window openings. Canted bay windows to ground floor. Pebble-dashed and rendered walls. Boundary walls to front. This house, though modest, is a significant twentieth-century urban building within Foynes. It retains its overall character and is a positive contribution to the streetscape.	125289	151393	332m south of proposed East Jetty Extension [Area 2].
21829023	House; end of terrace	Corgrig	End-of-terrace two-bay two-storey with dormer attic house, built in 1907. Hipped slate roof having terracotta ridge tiles, overhanging eaves, timber brackets and rendered chimneystacks. Roughcast rendered walls with rock-faced limestone stringcourse. Square-headed openings having replacement uPVC windows and rock-faced limestone sills. Square-headed opening with replacement uPVC door. Roughly dressed limestone boundary walls having roughly-dressed capping and single-leaf cast-iron gate. This house, which forms a handsome terminus of this symmetrical and picturesque terrace of six, was designed by William Clifford Smith. The terrace is distinguished by its distinctive roofline and rendered walls with well-crafted limestone dressings. The terrace's long low form and broken massing gives it a domestic scale.	125374	151350	439m south of proposed East Jetty Extension [Area 2].
21829024	House; terraced	Corgrig	Terraced three-bay two-storey with dormer attic estate house, built in 1907. Pitched artificial slate roof having terracotta ridge tiles, overhanging eaves, timber brackets and rendered chimneystack. Roughcast rendered walls with rock-faced limestone stringcourse. Square-headed opening to first floor having replacement uPVC window and rock-faced limestone sill. Square-headed openings to ground floor with replacement uPVC windows and continuous rock-faced limestone sill. Round-headed slightly recessed niche having rusticated limestone *voussoirs* and inset square-headed opening with replacement uPVC window and limestone lintel over square-headed opening with timber panelled door and rock-faced limestone lintel. Roughly dressed limestone boundary walls having roughly-dressed capping and single-leaf cast-iron gate. This house, built as part of a terrace of six, retains its original form and some distinctive features, such as the rock-faced limestone	125378	151345	453m south of proposed East Jetty Extension [Area 2].

Reg. No.	Classification/ Rating	Townland	Description	Easting	Northing	Distance to nearest development area
			dressings and boundary walls. Designed by William Clifford Smith, the terrace is a fine example of early twentieth-century domestic architecture and plays a positive role in the architectural heritage of Foynes.			
21829025	House; terraced	Corgrig	Terraced three-bay two-storey with dormer attic house, built in 1907. Pitched artificial slate roof having terracotta ridge tiles, overhanging eaves, timber brackets and rendered chimneystack. Roughcast rendered walls with rock-faced limestone stringcourse. Square-headed opening to first floor having replacement uPVC window and rock-faced limestone sill. Square-headed openings to ground floor with replacement uPVC windows and continuous rock-faced limestone sill. Round-headed slightly recessed niche having rusticated limestone *voussoirs* and inset square-headed opening with replacement uPVC window and limestone lintel over square-headed opening with replacement uPVC door and rock-faced limestone lintel. Roughly dressed limestone boundary walls having roughly-dressed capping and single-leaf cast-iron gate. This house, built as part of a terrace of six, retains its original form and some distinctive features, such as the rock-faced limestone dressings and boundary walls. Designed by William Clifford Smith, the terrace is a fine example of early twentieth century domestic architecture and plays a positive role in the architectural heritage of Foynes.	125380	151339	459m south of proposed East Jetty Extension [Area 2].
21829026	House; terraced	Corgrig	Terraced three-bay two-storey with dormer attic house, built in 1907. Pitched slate roof having terracotta ridge tiles, overhanging eaves, timber brackets and rendered chimneystack. Roughcast rendered walls with rock-faced limestone stringcourse. Square-headed opening to first floor having six-over-six pane timber sliding sash window and rock-faced limestone sill. Square-headed openings to ground floor with six-over-six pane timber sliding sash windows and continuous rock-faced limestone sill. Round-headed slightly recessed niche having rusticated limestone *voussoirs* and inset square-headed opening with replacement uPVC window and limestone lintel over square-headed opening with half-glazed timber panelled door and rock-faced limestone lintel. Roughly dressed limestone boundary walls having roughly-dressed capping and single-leaf cast-iron gate. This house, built as part of a terrace of six, retains its original form and some distinctive features, such as the rock-faced limestone dressings, timber sash windows and boundary walls. Designed by William Clifford Smith, the terrace is a fine example of early twentieth century domestic architecture and plays a positive role	125383	151335	474m south of proposed East Jetty Extension [Area 2].

Reg. No.	Classification/ Rating	Townland	Description	Easting	Northing	Distance to nearest development area
			in the architectural heritage of Foynes.			
21829027	House; terraced	Corgrig	Terraced three-bay two-storey with dormer attic house, built in 1907. Pitched slate roof having terracotta ridge tiles, overhanging eaves, timber brackets and rendered chimneystack. Roughcast rendered walls with rock-faced limestone stringcourse. Square-headed opening to first floor having replacement uPVC window and rock-faced limestone sill. Square-headed openings to ground floor with replacement uPVC windows and continuous rock-faced limestone sill. Round-headed slightly recessed niche having rusticated limestone *voussoirs* and inset square-headed opening with replacement uPVC window and limestone lintel over square-headed opening with replacement uPVC door and rock-faced limestone lintel. Roughly dressed limestone boundary walls having roughly-dressed capping and single-leaf cast-iron gate. This house, built as part of a terrace of six, retains its original form and some distinctive features, such as the rock-faced limestone dressings and boundary walls. Designed by William Clifford Smith, the terrace is a fine example of early twentieth century domestic architecture and plays a positive role in the architectural heritage of Foynes.	125389	151332	487m south of proposed East Jetty Extension [Area 2].
21829028	House; end of terrace	Corgrig	End-of-terrace two-bay two-storey with dormer attic house, built in 1907. Hipped slate roof having terracotta ridge tiles, overhanging eaves, timber brackets and rendered chimneystacks. Roughcast rendered walls with rock-faced limestone stringcourse. Square-headed openings having replacement uPVC windows and rock-faced limestone sills. Square-headed opening with replacement uPVC door. Roughly dressed limestone boundary walls having roughly-dressed capping and single-leaf cast-iron gate. This house, which forms a handsome terminus to this symmetrical and picturesque terrace of six, was designed by William Clifford Smith. The distinctive roofline and rendered walls with well-crafted limestone dressings along with the long low form and broken massing gives the terrace a domestic scale.	125390	151325	501m south of proposed East Jetty Extension [Area 2].
21829031	*Corgrig House*; detached house	Corgrig	Detached five-bay two-storey house, built c. 1800, having single-bay two-storey extension to rear (north) elevation. Pitched slate roof with render copings and rendered chimneystacks to gable ends. Roughcast rendered walls. Square-headed openings having replacement uPVC windows and limestone sills. Pointed arch opening with replacement uPVC over-light over replacement uPVC door. Cobblestones to north yard. Three-bay single-storey outbuilding to west having lean-to and external limestone	125620	151088	514m west of proposed Durnish development land [Area 3].

Reg. No.	Classification/ Rating	Townland	Description	Easting	Northing	Distance to nearest development area
			staircase to south gable. Pitched corrugated-iron roof with brick chimneystack. Rubble limestone walls. Square-headed window openings. Square-headed door openings having roughly dressed *voussoirs*. Three-bay single-storey outbuilding to east with pitched corrugated-iron roof. Rubble limestone walls. Square-headed window and door openings. Elliptical-headed carriage arch to west having roughly dressed limestone *voussoirs*. Pair of square-profile rendered piers to west with double-leaf metal gates and rendered boundary walls having limestone copings terminating in second pair of piers. This house has a well-proportioned simple design. It retains much of its original form as well as interesting features such as the gable-ended chimneystacks with external flues. The additions to the rear add context and continuity to the structure. The setting is enhanced by the simple outbuildings and carriage arch to rear/			

Historic Shipwreck Inventory

Name	Location	Date	Description	Easting	Northing	Location in relation to development
Unknown	near Foynes Island	12/08/1788	The boat was carrying three men form Limerick when it overturned in a squall. Two of the men drowned.	n/a	n/a	unknown
Castleragget	near Foynes Island	10/1833	A turf boat journeying from Limerick when she was hit by a brig. Nine people died.	n/a	n/a	unknown

Licensed Archaeological work

Source: Excavations Bulletin [www.excvations.ie]

Licence	Classification	Townland	Description	Easting	Northing	Location in relation to development
1974:0025	Ringforts, two	Aughinish Island	Both sites were of similar construction, consisting of an internal and external revetment of limestone slabs and rubble	12850	15350	Outside

Licence	Classification	Townland	Description	Easting	Northing	Location in relation to development
			core. Both measured 35m across and neither showed evidence of an accompanying ditch. Site 1 was built directly on bedrock and so no post-holes were evident. However, there was evidence of levelling and clearance of the jagged bed-rock in one area suggesting a house site. Two large rock-cut pits were also uncovered. Traces of an occupation layer were found underlying the internal wall collapse, which produced coarse pottery, a heavily corroded iron bridle bit, a bronze chisel and pin and two saddle querns. The pin and bit are suggested to be of Halstatt C context; the chisel is of Downs type, and the pottery compares well with wares from LBA sites such as Rathgall and Lough Eskragh. It would seem that the site was built and occupied exclusively during the Late Bronze Age. At Site 2, 200 metres Se of site 1 the plan of a circular house 8m in diameter was found, along with pits and some entrance features, which produced coarse pottery of the type found at Site 1. It would, then, also appear to date to the late Bronze Age. Remains of a small rectangular stone-walled structure measuring 5m x 4m partly overlaid the collapsed fort wall but was not directly dated. It compares with a structure excavated by Mrs. Hickey (site 27 below). Excavated by Eamonn Kelly.			
1974:0028	Tower house, bawn	Aughinish Island	The castle itself dates to the late 16th-early 17th centuries and is set in a roughly circular enclosure, indicated by a low ridge showing in the grass. A preliminary trial trench was cut on the northern side of the site and this revealed the base of the bawn wall. The wall, which was well-built, averaged 2.20m in thickness and was built directly on the limestone bedrock. It was roughly circular in plan with no evidence of towers. An entrance to the bawn area was found on the southern side; it is about 3.0m wide and well cobbled with small rounded stones. To the east of the castle, a portion of the bawn wall appears to have been built on an artificially constructed 'platform' of loose stones and earth. This 'platform' which is approx. 1.0m high, would have been necessary to make this area level with the adjacent field. No evidence was found of a ditch outside the wall. An interesting feature uncovered by the excavation, was a square-built structure, 3.40m x 3.40m, situated in the northern	12850	15310	Outside

Licence	Classification	Townland	Description	Easting	Northing	Location in relation to development
			area of the bawn, interpreted as the base for a domed oven, of the type found on medieval sites. Considerable area-excavation was carried out within the bawn, and thirty-one skeletons were uncovered, the majority being young children and babies. Finds from the site include: animal bone; sherds of late and post-medieval pottery; a wide range of iron objects; clay-pipe fragments; a blue glass bead; a bronze disc-headed pin, and an Irish halfpenny dating to the reign of Charles 11(1683). Excavated by Ann Lynch.			
96E168	Enclosure	Aughinish West	Much of the site had been levelled in antiquity and the only extant feature was the truncated remains of a low enclosing bank that would have had a diameter of 35-40m. The interior of the site was generally flat but was very heavily overgrown until recent times. A stone wall/field boundary ran through the southern half of the site. Trenches with a combined area of 87.4m2 were opened to determine the exact nature and extent of any possible subsurface archaeological deposits or features. The only feature uncovered was a shallow linear trench located immediately inside the bank, in a localised area. No finds or other material of archaeological interest were recovered from the excavated areas. Excavated by Martin Byrne.	12750	15220	Outside
04E1306	Miscellaneous features	Aughinish	SMR Li 10:82. Test-trenching undertaken adjacent to a ringfort in advance of a gas pipeline construction project did not uncover any archaeological features or finds. Monitoring was subsequently undertaken during the gas-line construction phase and four small-scale sites were uncovered during monitoring. Site 1 comprised two pits cut into orange subsoil and connected by a 0.03m-deep shallow linear depression. Both pits contained iron slag, clay lining from the furnace pits and iron bloom in the fills and this indicates that the pits were associated with ironworking. An Early Medieval dating was suggested. Site 2 was a thin spread of shell over an area measuring 17m by 8m. The shell species included cockle, periwinkle, mussel and some oyster. Modern pottery sherds and clay-pipe fragments were found among the shell. The site was in close proximity to the estuary and the shell may have been	12893	14997	Outside

Licence	Classification	Townland	Description	Easting	Northing	Location in relation to development
			introduced to the site as part of soil improvements where seaweed was spread as a fertiliser. Site 3a was a sub-circular pit with some bone fragments in the basal fill. A large flat stone occupied part of the base on the north end. The pit fill was charcoal-enriched brown/black soil with some burnt bone, seashell and a burnt hazelnut shell fragment. Five pieces of flint debitage were found at the base of the fill and Beaker pottery sherds were found throughout. The pottery was broken in antiquity and may have been deposited in the pit as some type of ritualistic gesture. Site 3b contained pits similar to post-pits and may indicate a settlement of unknown date in the area outside the pipeline wayleave. Site 4 was a paved area found at the edge of the wayleave and this continued into the baulk. Eight flat stones extended over an area measuring 0.92m by 0.29m. Ash and charcoal flecks were visible on the east side. Oxidised and charcoal-flecked soil was visible 0.54m to the west. The site was probably a hearth. Excavated by Rose Cleary.			
07E0805	Landscape	Island Mac Téige, Aughinish West and Glenbane West	Geophysical survey carried out in 2007 (07R0105). Identified a number of anomalies in the form of linear features, possible pits and a large curving ditch. Test excavation revealed ten linear features in Fields 1, 4, 6, 9, 18, 19 and 20. A burnt spread was noted in Field 3. Probable post-medieval burning was visible in Field 6. A small area of burning was also noted in Field 13 and cultivation activity was noted in Fields 1, 2, 6, 7, 9 and 18–20. Excavated by Nikolah Gilligan.	12487	15074	Outside
02E0848	Burnt Mound	Ballynacragga	BGE 3/42/3. Monitoring identified a low mound of charcoal-enriched soil and heat-cracked stones, immediately beneath the topsoil, which was part of a *fulacht fiadh*. The exposed area of the mound measured 12.5m south-east/north-west by 9.5m, and the material had a maximum depth of 0.47m. The outer edges of the spread were 0.01–0.02m deep, and the mound was cut by a modern field drain. Three subsoil-cut features (a trough, a roughly stone-lined hearth and a possible roasting pit) and a charcoal spread were found beneath the mound. Excavated by Toni Bartlett and Kate Taylor.	124530	150671	
02E0901	No archaeological significance	Ballynacragga	An area of what appeared to be heat-shattered stone was recorded during monitoring, but excavation of this site did not reveal archaeology. Excavated by Graham Hull.	124578	150581	Outside

Licence	Classification	Townland	Description	Easting	Northing	Location in relation to development
04E0197	No archaeological significance	Ballynacragga	Monitoring close to the zone of archaeological potential for an enclosure in the nearby townland of Leahys revealed nothing of archaeological significance. Excavated by Frank Coyne.	12453	15094	Outside
07E1114	No archaeological significance	Durnish	Topsoil-stripping of land exposed natural bedrock below a thin covering of sod. Excavated by Ross MacLeod.	125953	151687	Outside
02E1767	Monitoring of dredging	Foynes Harbour	Monitoring of maintenance dredging at Foynes Port took place from 7 to 14 December 2002. Previously, the port had been dredged as part of a capital expansion scheme in 1999, and maintenance dredging was undertaken in 2001, both without archaeological monitoring. The 2002 dredging operations were designed to remove estuarine silts and debris that had accumulated since the completion of the previous dredging campaigns. Nothing of archaeological interest was observed. Monitored by Kieran Campbell	12500	15200	Adjacent
02E0302	Pit	Leahys	The pit lay on elevated ground c. 200m south of the Shannon. The pit was 1.1m long, 1m wide and 0.3m deep. The fill was crumbly, dark grey/brown, charcoal-rich clay containing numerous burnt stone fragments. The northern side of the pit was cut by a drain aligned north-east to south-west. The presence of burnt stone material in the pit fill indicates that the feature was related to a *fulacht fiadh*, for which no other evidence was revealed. Excavated by Ken Wiggins	12355	15175	Outside
02E0900	Burnt mound	Leahys	The excavated deposit was a shallow mound of burnt clay and heat-shattered stone measuring 9.85m by 9.25m. At least two phases of site activity and mound construction were visible. A possible pit or trough was observed, cutting into the earlier layers. Excavated by Kate Taylor and Martin Jones.	124487	150683	Outside
02E0849	Fulacht fiadh	Leahys	The site was on the north-facing cusp of a steep hill and was one of a complex of three *fulachta fiadh* on the hilltop. The site was a sub-oval mound, measuring 12m north–south by 9.2m by 0.8m deep; it was composed of burnt sandstone in a brown matrix. The mound overlay three intercutting troughs, a pot-boiler and a small pit. Four hearth sites were also identified. Three phases of archaeological activity were present. No artefacts were retrieved from the excavation of the site, but a small bone sample was recovered from the Phase II trough. A pollen core was taken from the peat formation in the base of the Phase III trough. Excavated by Emer Dennehy	124330	151108	Outside
02E0469	Estuary seabed	Leahys, Co. Limerick–	A submarine section of gas pipe was laid across the River Shannon, between Leahys townland, Co. Limerick, and	123154 & 121433	151863 &152623	Outside

Licence	Classification	Townland	Description	Easting	Northing	Location in relation to development
		Shanakea, Co. Clare	Shanakea townland, Co. Clare. The total length of underwater pipeline was c. 2km. Monitoring of the dredging operation observed no archaeological deposits or artefacts. Monitored by Graham Hull.			

Appendix 15

The Landscape

Please note that the Appendix for Chapter 15 is presented in Volume 3 of this EIAR.