Maes Emlyn, Rhyl

Flood Consequences Assessment

December 2022

Waterco

Assessment | Modelling | Design

Project Information	
Project:	Maes Emlyn, Rhyl
Report Title:	Flood Consequences Assessment
Client:	TACP Architects Ltd
Instruction:	The instruction to undertake this Flood Consequences Assessment was received from Matthew Gregory of TACP Architects Ltd.
File Ref:	14973-FCA-01

Approval Record	
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Document History		
Revision	**Date**	**Comment**
01	15/12/2022	First issue

This report will remain valid for a period of twelve months (from the date of last issue) after which the source data should be reviewed in order to reassess the findings and conclusions on the basis of latest available information.

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Introduction

Waterco has been instructed to prepare a Flood Consequences Assessment (FCA) in respect of a proposed residential re-development at Maes Emlyn, Rhyl, LL18 4AB.

The purpose of this report is to outline the potential flood risk to the site, the impact of the proposed development on flood risk elsewhere, and the proposed measures which could be incorporated to mitigate the identified flood risk. This report has been prepared in accordance with the guidance contained in Planning Policy Wales (PPW) and Technical Advice Note 15 (TAN15): Development and Flood Risk.

Existing Conditions

The site covers an area of approximately 8,900m² and is located at National Grid Reference (NGR) 301448, 381587. A location plan and an aerial image are included in Appendix A.

Online mapping (including Google Maps / Google Streetview imagery, accessed November 2022) shows that the site comprises existing residential properties (59 units) with associated access and parking. The site is bordered by residential properties to the north, north-east and west, and a railway to the east and south. Access to the site is provided from Churton Road to the north.

Local Topography

Topographic levels to metres Above Ordnance Datum (m AOD) have been derived from a 1m resolution Natural Resources Wales (NRW) composite 'Light Detecting and Ranging' (LiDAR) Digital Terrain Model (DTM). A review of LiDAR data shows that the site slopes from approximately 7.08m AOD in the south-west to approximately 6.45m AOD in the east. A LiDAR extract is included as Appendix B.

Ground Conditions

The British Geological Survey (BGS) online mapping (1:50,000 scale) indicates that the site is underlain by superficial deposits of blown sand. The superficial deposits are identified as being underlain by the Kinnerton Sandstone Formation.

The geological mapping is available at a scale of 1:50,000 and as such may not be accurate on a site-specific basis.

The closest historical BGS borehole record (BGS reference: SJ08SW10) is located 320m north-west of the site and is included in Appendix C. The borehole record generally identifies sand to approximately 2.5metres below ground level (m.bgl) underlain by silty clay to approximately 3.3m.bgl.

Local Drainage

Public sewer records have been obtained from Dŵr Cymru Welsh Water (DCWW) and are included in Appendix D. The DCWW sewer records show that there is a 300mm public combined sewer originating in the eastern extent of the site flowing east. There are also public foul and surface water sewers serving residential properties in Y Gorlan to the north-west of the site. The public foul and surface water sewers in Y Gorlan

discharge to a public combined sewer in Churton Road immediately north of the site.

A GPR utility survey was undertaken by PM Surveys UK Ltd in August 2022 and is included in Appendix E. The GPR survey shows that foul flows from the site drain to the public combined sewer in the eastern extent of the site. No details are provided for the existing surface water drainage arrangement.

Development Proposals

The proposal is for a residential re-development to include the demolition of 59no. existing dwellings and the erection of 38no. dwellings with associated access roads, parking and gardens. A proposed development plan is included in Appendix F.

Flood Zone Category and Policy Context

Flood Zone Category

The Welsh Government Development Advice Map, included in Appendix G, shows that the site is located within Flood Zone A – an area considered to be at little or no risk of fluvial or tidal flooding, with a less than 0.1% (1 in 1000) annual probability of flooding.

The NRW 'Flood Risk from Rivers' map (Appendix G) shows that the site is not located in an area at risk of flooding from rivers, meaning it has less than 0.1% annual probability of flooding.

The NRW 'Flood Risk from the Sea' map (Appendix G) shows that the site is not located in an area at risk of flooding from the sea, meaning it has less than 0.1% annual probability of flooding.

Development Vulnerability Classification

The proposed residential development is considered to be 'highly vulnerable' development in accordance with Figure 2 of the Welsh Government's Technical Advice Note 15 – Development and Flood Risk (TAN15).

Highly vulnerable development is considered appropriate within Flood Zone A subject to not increasing flood risk elsewhere.

Local guidance documents including the Denbighshire County Council Strategic Flood Consequences Assessment (SFCA) (January 2018) and the Denbighshire County Council Preliminary Flood Risk Assessment (PFRA) (June 2011 and its 2017 addendum) have been reviewed and inform this report.

Consultation

A pre-planning opinion request was submitted to NRW in October 2022. In their response, provided as Appendix G, NRW have stated that:

'Flood Risk Management

The planning application proposes highly vulnerable development (Residential). The application site is within Zone A of the Development Advice Map (DAM) contained in TAN15 (2004). However, our Flood Map for Planning (FMfP) identifies the application site to be at risk of flooding and within Flood Zone 2/3 sea.

As confirmed in the letter from Welsh Government dated 15 December 2021, the FMfP represents better and more up-to-date information on areas at flood risk than the DAM. Therefore, we advise you produce a Flood Consequences Assessment (FCA), to demonstrate that the consequences of flooding can be acceptably managed over the lifetime of development. The criteria for the FCA, which should normally be undertaken by a suitable qualified person carrying an appropriate professional indemnity, are given in Section 7 and Appendix 1 of TAN15 (2004). The FCA should be proportionate to the development proposed. You may also refer to our website, which contains technical advice and recommendations.

The site is currently occupied by 59 flats. The proposal is for the redevelopment of the site to provide up to 40 residential units. The information submitted does not confirm whether these would consist of flats or individual units all with ground floor living space. As such, is not clear if the proposal would result in an intensification of use of the site, and confirmation on this point would be needed from the Local Planning Authority (LPA).

There is a requirement to prepare a Flood Consequences Assessment (FCA) in support of the planning application. The FCA would need to demonstrate that the consequences of flooding are acceptable in accordance with the requirements of TAN15. The primary source of flood risk at the site is tidal flood risk. We would expect the FCA to refer to outputs from the Point of Ayr to Pensarn Tidal Flood Risk Analysis (2017) and the Denbighshire Strategic Flood Consequences Assessment (SFCA) when preparing the FCA, including specific reference to the 0.5% Annual Exceedance Probability (AEP) breach event with an allowance for climate change, which is the design event.

If the proposal is considered to be an intensification of use, then the FCA would need to demonstrate that the site can be designed to be flood free in the design event. If the LPA confirms that the proposal does not result in an intensification of use compared to the current highly vulnerable land use at the site, then we would expect flood risk betterment to be provided compared to the existing situation. We would expect this to include raising finished floor levels higher than existing and incorporation of flood resistance/resilience techniques.

The FCA should also consider the 0.1% AEP breach event with climate change, in relation to the requirements of sections A1.12 and A1.15 of TAN15. In order to comply with section A1.12, the FCA will need to show that the development proposal does not increase flood risk elsewhere in up to the 0.1% AEP breach event with climate change. This requirement will apply irrespective of whether the proposal is considered to be an intensification or not.

Any flood risk data we hold for the site can be requested by submitting a request for environmental data. The criteria for the FCA, which should normally be undertaken by a suitably qualified person carrying an appropriate professional indemnity, are given under Section 7 and Annex 1 of TAN15.'

Sources of Flooding and Probability

Fluvial and Tidal

The nearest watercourse is The Cut which is located approximately 260m east of the site. The Cut flows south-west to its confluence with the River Clwyd.

The site is located approximately 600m south-east of the coastline and 2km north-east of the River Clwyd which is tidally influenced in this location.

The development site is located in an area which benefits from flood defences in the form of a coastal sea wall and earth embankments along the River Clwyd. The minimum crest level of the sea wall is 7m AOD. The minimum crest level of the River Clwyd flood defences is 6m AOD. Flood defence crest levels have been obtained from the Welsh Government 'Lle' geoportal.

Fluvial flooding could occur if the Cut overtopped its banks during or following an extreme rainfall event. Tidal flooding could occur from overtopping of the defences along the River Clwyd or along the coastline during an extreme tidal event. Flooding could also occur from a breach of the flood defences coinciding with an extreme tidal flood event.

The NRW 'Historical Flood Risk' map (Appendix G) indicates that there are no records of historical flooding at or near to the site.

NRW Fluvial and Tidal Modelled Data

Rhyl Cut and Prestatyn Gutter Model (fluvial)

Modelled outputs for The Cut have been obtained from NRW in November 2022 and are included in Appendix H. The modelled outputs have been taken from the Wallingford HydroSolutions 'Rhyl Cut and Prestatyn Gutter' 2019 model.

The model considers defended and undefended scenarios. An undefended scenario represents the removal of all linear flood defences. Modelled outputs have been provided for the 3.33% Annual Exceedance Probability (AEP), 1% AEP, 1% AEP plus 30% climate change (CC), 1% AEP plus 75% CC and 0.1% AEP events. A mean high water spring (MHWS) tidal boundary is applied to all fluvial flood scenarios, which is increased by 1.12m to represent 100 years of sea level rise in the climate change scenarios.

The results from the hydraulic modelling (Appendix H) show that the site is flood free during all considered flood events up to and including the 0.1% AEP plus 75% CC event for both defended and undefended scenarios. The risk of flooding from The Cut is therefore considered to be very low.

Point of Ayr to Pensarn Model (tidal)

Modelled outputs for the Point of Ayr to Pensarn tidal model have been obtained from NRW in November 2022 and are included in Appendix H. Modelled outputs have been provided for a range of events including the defended 1% AEP, 0.5% AEP and 0.1% AEP events for both present day (year 2016) and climate change (year 2117) scenarios.

A review of the modelled outputs (Appendix H) shows that the site is flood free during all considered flood events up to and including the 0.1% AEP (year 2117) event.

The Point of Ayr to Pensarn tidal model also considers the risk of flooding from a tidal breach event. A total of 10 tidal breach locations have been considered as part of the NRW 'Point of Ayr to Pensarn' model for the 0.5% AEP (present day) and 0.5% AEP (year 2117) events. Breach 10 (Garford Road) is the closest breach location to the site and has been modelled as a 50m wide gap in the flood defence.

As shown in the modelled outputs (Appendix H), the site is flood free during the 0.5% AEP (year 2117) Garford Road Breach event.

Tidal Clwyd SFCA Model

Tidal breach scenarios have been modelled as part of the Denbighshire County Council SFCA update in 2014 and 2018. The SFCA modelling includes separate breach locations at Marine Lake and Clwyd Retail Park (along the River Clwyd). Breach scenarios have been modelled for the 0.5% AEP and 0.1% AEP with climate change to the year 2117 events. Modelled outputs for the 0.1% AEP (year 2117) breach events are provided in Appendix H.

As shown on the modelled outputs, the site is flood free during the 0.1% AEP plus CC (year 2117) Clwyd Retail Park breach event.

As shown in Figure 1, the majority of the site is flood free during the 0.1% AEP plus CC (year 2117) Marine Lake Breach event. A small section in the eastern extent of the site is at risk of shallow depth flooding with depths of up to 20mm. No flooding is shown in the location of existing or proposed buildings.

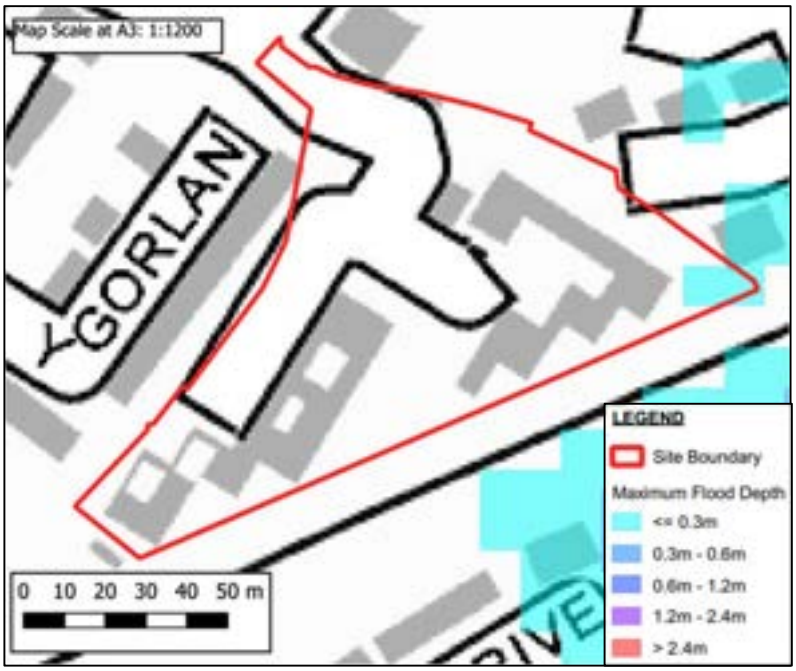


Figure 1 – 0.1% AEP (Year 2117) – Marine Lake Tidal Breach Event - Flood Depths

It can be concluded that the risk of fluvial and tidal flooding is very low over the lifetime of the development.

Surface Water

Surface water flooding occurs when rainwater does not drain away through the normal drainage system or soak into the ground. It is usually associated with high intensity rainfall events but can also occur with lower intensity rainfall or melting snow where the ground is saturated, frozen or developed, resulting in overland flow and ponding in depressions in topography. Surface water flooding can occur anywhere without warning. However, flow paths can be determined by consideration of contours and relative levels.

The NRW 'Flood Risk from Surface Water and Small Watercourses' map (Appendix G) shows that the majority of the site is at very low risk of surface water flooding, meaning it has a less than 0.1% annual probability of flooding. The existing internal access road in the centre of the site is identified at low risk of surface water flooding, with between a 1% and 0.1% annual probability of flooding.

The low flood risk identified by NRW surface water mapping is associated with an isolated topographical low point on site. The flood risk is unlikely to be realised when accounting for the function of the sites drainage system.

Any potential surface water flooding arising at or near to the site would be directed east, away from the site, following the local topography.

The SFCA and PFRA contain no records of surface water flooding at or near to the site. It can therefore be concluded that the risk of surface water flooding is very low.

Sewer

Flooding from sewers can occur when a sewer is overwhelmed by heavy rainfall, becomes blocked, is damaged, or is of inadequate capacity. Flooding is mostly applicable to combined and surface water sewers.

The DCWW sewer records (Appendix D) show that there is a 300mm public combined sewer originating in the eastern extent of the site. The combined sewer accommodates foul flows from the site. There is also a 300mm public combined sewer in Churton Road immediately north of the site.

Any potential flooding arising from the 300mm public combined sewer originating in the eastern extent of the site would be directed east, away from the site, following the local topography. There are no distinct flow routes in the area which would direct any potential flooding from the 300mm public combined sewer in Churton Road towards the site.

The SFCA and PFRA contain no records of sewer flooding at or near to the site. It can therefore be concluded that the risk of sewer flooding is very low.

Groundwater

Groundwater flooding occurs when water levels underneath the ground rise above normal levels. Prolonged heavy rainfall soaks into the ground and can cause the ground to become saturated. This results in rising groundwater levels which leads to flooding above ground.

The SFCA and PFRA contain no records of groundwater flooding at or near to the site.

Anecdotal information from the site owner (Denbighshire County Council) suggests that the water table is locally high. However, no basement levels are proposed.

It can therefore be concluded that the risk of groundwater flooding is low.

Artificial Sources

There are no canals in the immediate vicinity of the site. The NRW 'Flood Risk from Reservoirs' map (Appendix G) shows that the site is not at risk of flooding from reservoirs.

Therefore, it can be concluded that the risk of flooding from artificial sources is very low.

Summary of Potential Flooding

It can be concluded that the risk of flooding from all sources is very low. Therefore, no site-specific mitigation measures are considered necessary. However, in accordance with Building Regulations, finished floor levels should be set 150mm above surrounding ground levels.

Flood Warnings and Evacuation

Flood warnings cover this area. Residents should register to receive flood warnings. Flood warnings is a free service that provides prior warning of a tidal flood event.

The property owners should prepare a flood plan to inform residents of the flood risk and to provide advice on what to do prior to and in the event of a flood. The flood plan should include details of an evacuation route to be used upon receipt of a flood warning. A flood evacuation plan is included as Appendix I.

Upon receipt of a flood warning, and prior to flooding occurring, evacuation should be sought via Rhyl Coast Road to the north-west of Maes Emlyn heading east towards Prestatyn. Access to Rhyl Coast Road is available from Churton Road to the north-west of Maes Emlyn.

Conclusions

The proposal is for a residential re-development to include the demolition of 59no. existing dwellings and the erection of 38no. dwellings with associated access roads, parking and gardens.

The site is located within Flood Zone A on the Welsh Government Development Advice Map – an area considered to be at little or no risk of fluvial or tidal flooding, with a less than 0.1% (1 in 1000) annual probability of flooding.

Fluvial and tidal modelled outputs have been obtained from NRW and show that the site is not considered to be at risk of fluvial or tidal flooding during all considered events up to and including the 0.1% AEP plus climate change (year 2117) tidal breach event.

Safe access / egress is available during all considered fluvial and tidal flood events.

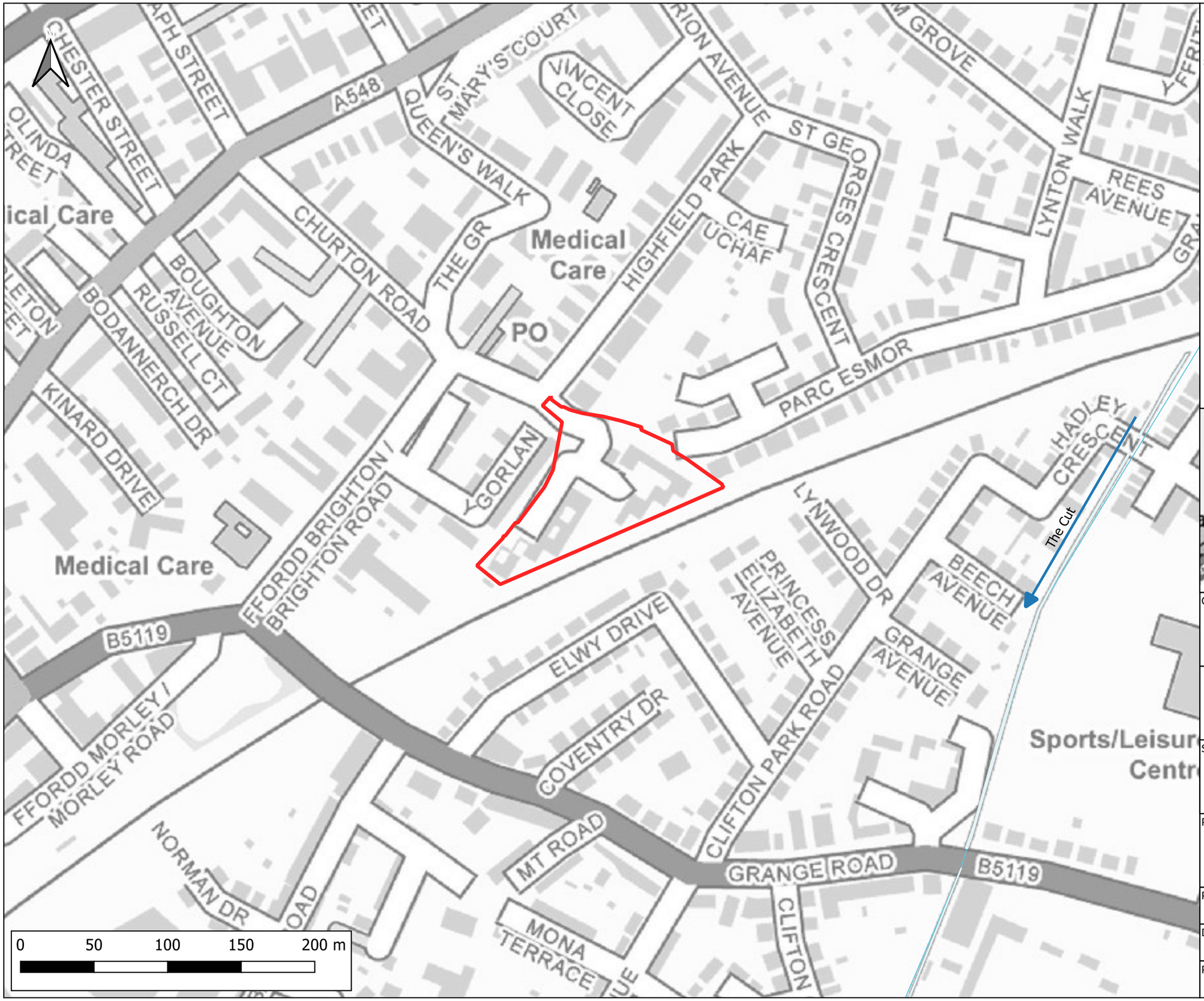
The proposed development is considered to be justified in this location and is compliant with TAN15.

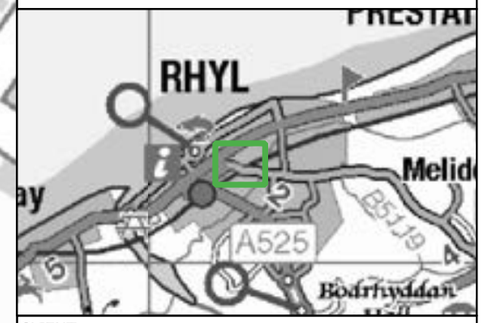
Recommendations

1. Submit this Flood Consequences Assessment to the Planning Authority in support of the Planning Application.

2. Set finished floor levels a minimum of 150mm above surrounding ground levels.

Appendix A Location Plan & Aerial Image





Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise

LEGEND

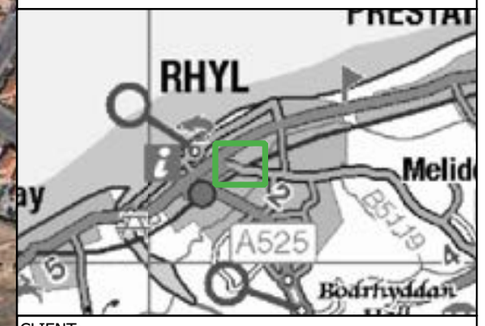
- Site Boundary
- Watercourses
- Waterbodies

CLIENT:	TACP Architects Ltd
	www.waterco.co.uk
SCHEME:	Maes Emlyn, Rhyl
PLOT TITLE:	Location Plan
PLOT STATUS: FINAL	DATE: 13-12-2022
DRAWN: AM / CHECKED: JR / APPROVED: AW / PLOT SCALE AT A3: 1:2500	
PLOT NAME: 14973_Location_Plan	REVISION: -

Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise

LEGEND

Site Boundary



CLIENT:
TACP Architects Ltd

waterco
www.waterco.co.uk

SCHEME:
Maes Emlyn, Rhyl

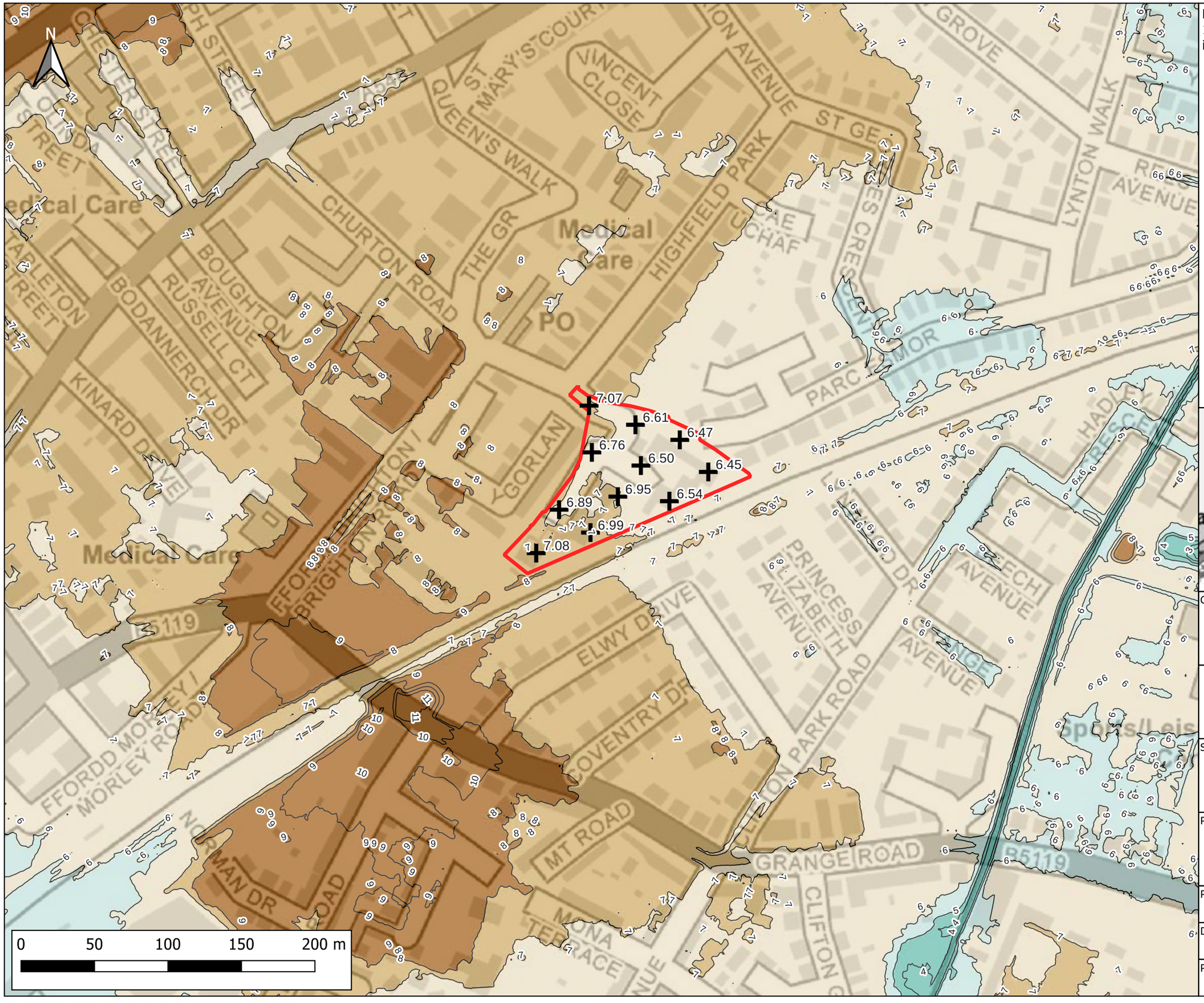
PLOT TITLE:
Aerial Plan

PLOT STATUS:	DATE:
FINAL	13-12-2022

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
AM	JR	AW	1:2500

PLOT NAME:	REVISION:
14973_Aerial_Plan	-

Appendix B LiDAR Plan



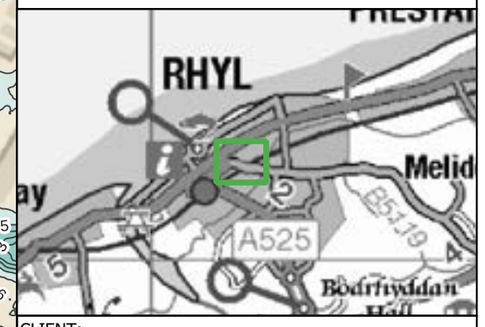
Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless

LEGEND

- Site Boundary
- Site Levels (m AOD)

Ground Elevations (m AOD)

- <= 5
- 5 - 6
- 6 - 7
- 7 - 8
- > 8



CLIENT:
TACP Architects Ltd

waterco
www.waterco.co.uk

SCHEME:
Maes Emlyn, Rhyl

PLOT TITLE:
LiDAR Plan
1m Resolution
Data from Natural Resources Wales

PLOT STATUS:	DATE:
FINAL	11-11-2022

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
RM	JR	AW	1:2500

PLOT NAME:	REVISION:
14973_LiDAR_Plan	-

Appendix C Historical BGS Borehole Record

SJ 08 SW / 10a

Geological Investigations Ltd.

RECORD OF BOREHOLE/TRIAL HOLE NO. 1

014 D (SE) 8196
(1" 95)

Scale 1 : 50 metric

SITE: RHYL. Crown Building.
JOB REF. NO.: FCE/673
GROUND LEVEL: 8.03m
METHOD/SIZE: SACC 152mm
DATE: 7.11.77

DESCRIPTION OF STRATA	INTERFACE LEVEL m	N
0 to 0.10m Tarmacadam surfacing. FILL.	7.93	
0.10 to 0.40m Mod.loose brick and stone FILL.	7.63	
0.40 to 1.30m Loose brown slightly silty medium grained SAND with very occasional fine to medium gravel, and small fragments of mortar, brick, and cinder. Possibly FILL.	6.73	6
1.30 to 2.20m Loose brown slightly silty medium grained SAND, with very occasional fine to medium gravel, and fine shells.	5.83	8
2.20 to 2.60m Loose saturated grey/brown patchy SILTY medium grained SAND.	5.43	
2.60 to 2.89m Mod compact dark grey/brown CLAYEY GRAVELLY SAND.	5.14	
2.89 to 3.15m Soft to firm orangy brown with grey fissures, SILTY CLAY with occasional fine to medium sub rounded and angular gravel with spent root traces.	4.88	
3.15 to 5.20m Firm to stiff reddish brown SILTY CLAY with occasional fine to medium sub rounded gravel, and fine near vertical fissures with spent root fibres.	2.83	
5.20 to 9.50m Firm to stiff reddish brown SILTY CLAY with occasional fine to medium sub rounded and angular gravel, and occasional partings and thin bands of wet sand.	-1.47	
9.50 to 10.00m Stiff to very stiff reddish brown SILTY CLAY with occasional fine to medium gravel, and traces of silty partings.	-1.97	

Hole terminated at 10.00m
Standpipe inserted to 4.0m

WATER STRUCK AT DEPTHS	DEPTH OF CASING WHEN SEALED N.S.—NOT SEALED	ESTIMATED FLOW	WATER ADDED AT DEPTHS TO ASSIST BORING	WATER LEVEL IN CASED/UNCASED BOREHOLE ON COMPLETION: DATE	WATER LEVEL	DEPTH OF CASING
1. Please refer to Section 5 of the written text.						
2.						

SJ 08 SW / 106.

;eological Investigations Ltd. (1"95)

.ECORD OF BOREHOLE/TRIAL HOLE NO....2....

0140 8194

SITE ...RHYL.
Crown Building.

JOB REF. NO. ...PGR/675...

GROUND LEVEL ...7.72m OD

METHOD/SIZE ...S&CC 152mm

DATE ...9-11.11.77

Scale 1 : 50 metric

DESCRIPTION OF STRATA	INTERFACE LEVEL m	N
. 0.70m Black TOPSOIL.	7.02	7
) to 1.80m Loose moist to saturated brown SILTY medium grained SAND with tree roots.	5.92	[illegible]
) to 2.90m Mod compact saturated dark grey SILTY medium grained SAND.	4.82	
) to 4.50m Firm to stiff reddish brown with grey vertical fissures, SILTY CLAY with occasional fine to medium sub rounded gravel, spent root traces and small patches of silty fine to medium grained sand.	3.22	
) to 5.50m Very stiff reddish brown with grey fissures SILTY CLAY with occasional fine to medium sub rounded and angular gravel and sandy partings.	2.22	
) to 6.35m Firm reddish brown with grey fissures, SILTY CLAY with traces of fine sub rounded gravel.	1.37	
5 to 8.10m Firm reddish brown SILTY CLAY with traces of fine gravel.	-0.38	
.0 to 9.25m Stiff reddish brown SILTY laminated CLAY.	-1.53	
25 to 10.00m Dense saturated grey/brown medium grained SAND with occasional gravel, grading into well graded SAND and fine to coarse sub rounded GRAVEL.		43

'ERSTRUCK .T DEPTHS	DEPTH OF CASING WHEN SEALED N.S.-NOT SEALED	ESTIMATED FLOW	WATER ADDED AT DEPTHS TO ASSIST BORING	WATER LEVEL IN CASED/UNCASED BOREHOLE ON COMPLETION: DATE	WATER LEVEL	DEPTH OF CASING
Please refer to Section 5 of the written text.						

SJ 09 SW

Geological Investigations Ltd.

RECORD OF BOREHOLE/TRIAL HOLE NO 2
continued.

SITE RHYL
Crown Building.
JOB REF. NO 203/82
GROUND LEVEL 7.72m OD
METHOD/SIZE
DATE

Scale 1 : 50 metric

DESCRIPTION OF STRATA	m Depth	SAMPLES U/T'K	SPT	DIST.	BULK	Water	SYMBOL	INTERFACE LEVEL m	N
00 to 10.50m Dense saturated grey/brown well graded SAND and GRAVEL.								-2.78	
50 to 12.00m Firm to stiff reddish brown SILTY CLAY with occasional fine to coarse sub rounded and angular gravel, and fine bands of wet silty sand.	11	NR		•	•				
00 to 13.50m Firm to stiff reddish brown SILTY laminated CLAY with bands of silty clay with gravel, and bands of wet silty fine to medium grained SAND.	12		•	•				-4.28	22
	13								
50 to 16.00m Firm to stiff reddish brown SILTY partially laminated CLAY with bands of clayey silt, and wet silty fine grained sand.								-5.78	26
	14								
	15	NR		•					22
ole terminated at 16.00m tandpipe inserted to 12.0m	16			•				-8.28	
	17								
	18								
	19								
	20								

ER STRUCK AT DEPTHS	DEPTH OF CASING WHEN SEALED N.S.–NOT SEALED	ESTIMATED FLOW	WATER ADDED AT DEPTHS TO ASSIST BORING	WATER LEVEL IN CASED/UNCASED BOREHOLE ON COMPLETION		
				DATE	WATER LEVEL	DEPTH OF CASING

SJ 08SW/10 c

Geological Investigations Ltd.

(1"95)

RECORD OF BOREHOLE/TRIAL HOLE NO. 4A

0138 8194

SITE RHYL. Crown Building.

JOB REF. NO. PGE/673

GROUND LEVEL 7.85m OD

METHOD/SIZE S&CO 152mm

DATE 9-11.11.77

Scale 1 : 50 metric

DESCRIPTION OF STRATA	Depth	SAMPLES U/W	SPT	DIST.	BULK	Water	SYMBOL	INTERFACE LEVEL m	N
0 to 0.40m Concrete over stone FILL.								7.45	
0.40 to 2.10m Loose to mod compact brown SILTY medium grained sand with occasional small fragments of clinker, brick, mortar and coal. Probably FILL.	1		•	•					7
				•					9
	2			•					8
2.10 to 3.30m Very loose wet grey/brown SILTY fine to medium grained SAND with traces of clay. +4.55				•				5.75	2
	3			•					3
3.30 to 3.50m Firm grey/brown SILTY CLAY with small pockets of greyish green SILT. +4.35				•				4.55	
3.50 to 7.50m Very stiff becoming stiff to firm reddish brown with grey fissures and streaks, SILTY CLAY with occasionnal fine to medium sub rounded and angular gravel.	4			•				4.35	
	5			•					
	6			•					
	7			•					
7.50 to 10.00m Soft to firm reddish brown partially laminated SILTY CLAY with traces of fine gravel.								0.35	
	8			•					
	9								
	10								

WATER STRUCK AT DEPTHS	DEPTH OF CASING WHEN SEALED N.S.—NOT SEALED	ESTIMATED FLOW	WATER ADDED AT DEPTHS TO ASSIST BORING	WATER LEVEL IN CASED/UNCASED BOREHOLE ON COMPLETION		
				DATE	WATER LEVEL	DEPTH OF CASING

1. Please refer to Section 5 of the written text.

SJ 08 SW '10c

Geological Investigations Ltd.

RECORD OF BOREHOLE/TRIAL HOLE NO. 4A
continued.

SITE RHYL, Crown Building.
JOB REF. NO. RGE/673
GROUND LEVEL 7.85m. OD
METHOD/SIZE
DATE

Scale 1 : 50 metric

DESCRIPTION OF STRATA	Depth	SAMPLES	SYMBOL	INTER-FACE LEVEL m	N
10.00 to 10.80m Soft to firm reddish brown partially laminated SILTY CLAY with occasional coarse gravel. -2.95				-2.95	
10.80 to 13.40m Compact saturated grey/brown slightly silty fine to coarse SAND, and fine to coarse sub rounded and angular GRAVEL.	11				13
	12				15
13.40 to 15.80 Compact saturated orangy brown slightly silty fine to coarse SAND, and fine to coarse sub rounded and angular GRAVEL. -7.95	13			-5.55	30
	14				
	15				43
15.80 to 17.50m Firm to mod.stiff reddish brown SILTY CLAY with occasional fine to medium sub rounded gravel, and silt partings.	16			-7.95	
	17				
17.50 to 17.70m Stiff grey SILT				-9.65	
17.70 to 18.70m Bands of orangy brown slightly silty fine grained SAND, and firm to stiff reddish brown SANDY CLAY with occasional gravel.	18			-9.85	
18.70 to 20.00m Firm to stiff reddish brown VERY SILTY CLAY with fine silt and sand partings.	19			-10.85	29
	20				

WATER STRUCK AT DEPTHS	DEPTH OF CASING WHEN SEALED N.S.–NOT SEALED	ESTIMATED FLOW	WATER ADDED AT DEPTHS TO ASSIST BORING	WATER LEVEL IN CASED/UNCASED BOREHOLE ON COMPLETION		
				DATE	WATER LEVEL	DEPTH OF CASING

SJ 08 SW / 10c

Geological Investigations Ltd.

RECORD OF BOREHOLE/TRIAL HOLE NO. 4A continued.

SITE RHYL Crown Building.
JOB REF. NO. PGR/673
GROUND LEVEL 7.85m OD
METHOD/SIZE
DATE

Scale 1 : 50 metric

DESCRIPTION OF STRATA	Depth m	Samples	Symbol	Interface level m	N
20.00 to 23.50m Stiff reddish brown VERY SILTY CLAY, with occasional fine gravel, silt and sand partings (wet).	20–23.50				48, 53
23.50 to 25.00m Very stiff reddish brown VERY SILTY CLAY with occasional fine gravel, and thin wet sand partings.	23.50–25.00			-15.65	53
Hole terminated at 25.00m	25.00			-17.15	

WATER STRUCK AT DEPTHS	DEPTH OF CASING WHEN SEALED N.S.–NOT SEALED	ESTIMATED FLOW	WATER ADDED AT DEPTHS TO ASSIST BORING	WATER LEVEL IN CASED/UNCASED BOREHOLE ON COMPLETION: DATE	WATER LEVEL	DEPTH OF CASING

SJ 08 SW/10a

Geological Investigations Ltd. (1"95)

RECORD OF BOREHOLE/TRIAL HOLE NO. 5

0136 8191

SITE RHYL, Crown Building.
JOB REF. NO. RGE/673
GROUND LEVEL 7.43m. OD
METHOD/SIZE S&CC 152mm
DATE 14/15.11.77

Scale 1 : 50 metric

DESCRIPTION OF STRATA	Depth	SAMPLES U4/1%	SPT	DIST.	BULK	Water	SYMBOL	INTERFACE LEVEL m	N
0 to 0.60m Black TOPSOIL.									
0.60 to 1.95m Loose grey/brown medium grained SAND with traces of shell, glass and clinker. Possibly FILL.								6.83	7
1.95 to 2.50m Compact saturated grey/brown medium grained SAND.								5.48	24
2.50 to 3.00m Compact grey/black VERY SILTY medium to coarse grained SAND with patches of grey/black SILT, and traces of organic matter.								4.93	
3.00 to 3.65m Stiff orangy brown with grey fissures and streaks, SILTY CLAY with fine to coarse sub rounded gravel, and spent root fibres.								4.43	
3.65 to 3.70m Fine GRAVEL.								3.78	
3.70 to 8.70m Firm with local firm to stiff bands, reddish brown SILTY CLAY with occasional fine to medium sub rounded and angular gravel, and thin wet sandy partings.								3.73	
8.70 to 10.00m Stiff reddish brown VERY SILTY CLAY with occasional brown medium grained wet sand partings.								-1.27	
								-2.57	

WATER STRUCK AT DEPTHS	DEPTH OF CASING WHEN SEALED N.S.—NOT SEALED	ESTIMATED FLOW	WATER ADDED AT DEPTHS TO ASSIST BORING	WATER LEVEL IN CASED/UNCASED BOREHOLE ON COMPLETION		
				DATE	WATER LEVEL	DEPTH OF CASING

1. Please refer to Section 5 of the written text.

SJ 08 SW / 10 d

Geological Investigations Ltd.

RECORD OF BOREHOLE/TRIAL HOLE NO. 5 continued.

SITE RHYL. Crown Building.
JOB REF. NO. FGE/673
GROUND LEVEL 7.43m. OD
METHOD/SIZE
DATE

Scale 1 : 50 metric

DESCRIPTION OF STRATA	Depth m	INTERFACE LEVEL m
10.00 to 15.30m Firm to stiff reddish brown SILTY CLAY with occasional fine to medium sub rounded and angular gravel.	10–15.30	-7.87
15.30 to 18.20m Soft to firm reddish brown VERY SILTY CLAY with traces of fine to medium gravel.	15.30–18.20	-10.77
18.20 to 19.50m Firm to stiff reddish brown SILTY CLAY with occasional fine to medium sub rounded and angular gravel.	18.20–19.50	-12.07
Hole terminated at 19.50m Standpipe inserted to 4.0m		

WATER STRUCK AT DEPTHS	DEPTH OF CASING WHEN SEALED N.S.—NOT SEALED	ESTIMATED FLOW	WATER ADDED AT DEPTHS TO ASSIST BORING	WATER LEVEL IN CASED/UNCASED BOREHOLE ON COMPLETION: DATE	WATER LEVEL	DEPTH OF CASING
1.						

Appendix D DCWW Sewer Plan

Dŵr Cymru
Welsh Water

Maes Emlyn Rhyl Denbighshire LL18 4AB

N
W E
S

LEGEND(Representative of most common features)

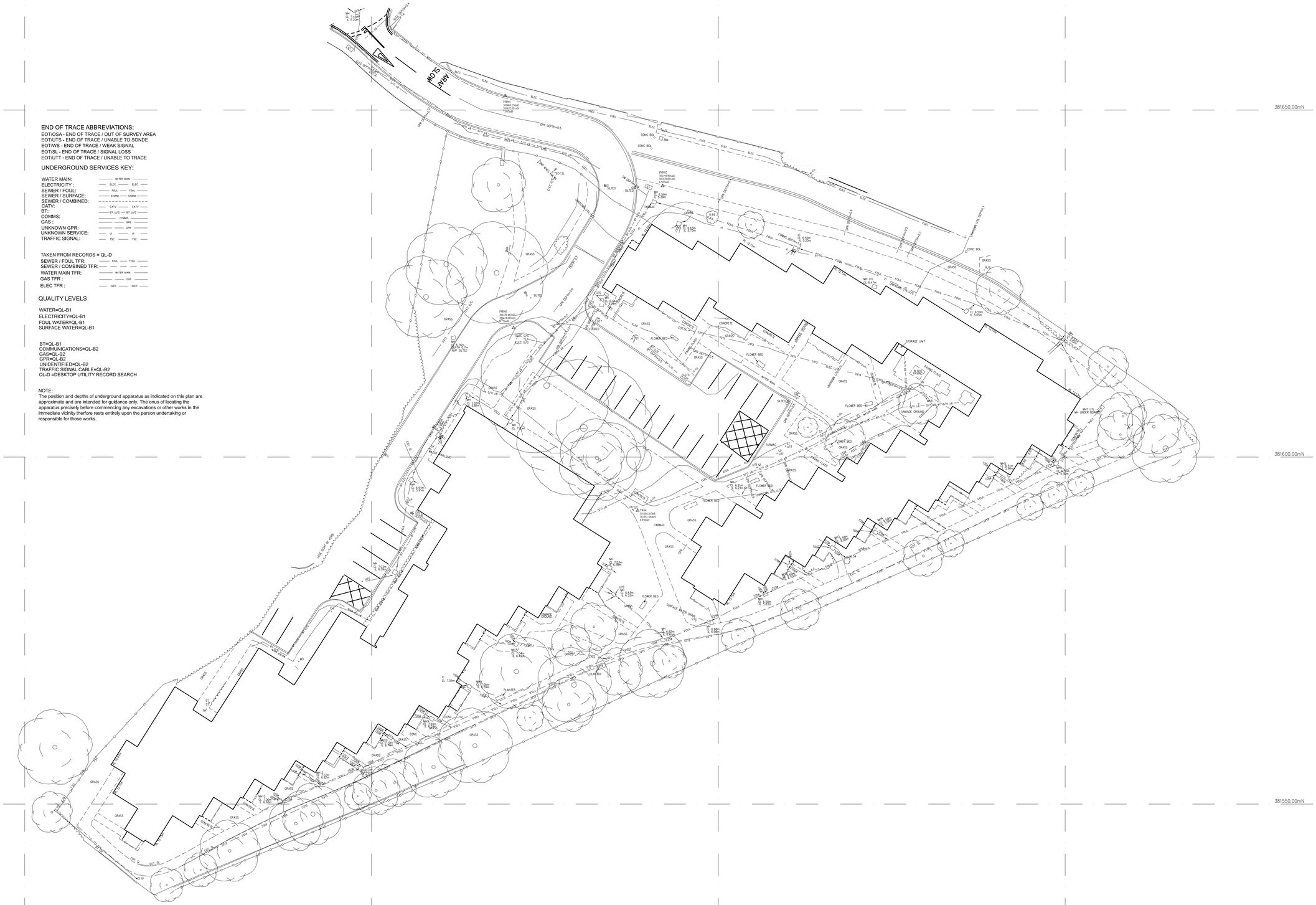
Notes:

Whilst every reasonable effort has been taken to correctly record the pipe material of DCWW assets, there is a possibility that in some cases pipe material (other than Asbestos Cement or Pitch Fibre) may be found to be asbestos cement (AC) or Pitch Fibre (PF) . It is therefore advisable that the possible presence of AC or PF pipes be anticipated and considered as part of any risk assessment prior to excavation

EXACT LOCATIONS OF ALL APPARATUS TO BE DETERMINED ON SITE.

Map Ref:	301491,381594
Map scale:	1:1250
Printed by:	Zara Howells
Printed on:	18 Oct 2022

Appendix E GPR Survey



END OF TRACE ABBREVIATIONS:

EOT/OSA - END OF TRACE / OUT OF SURVEY AREA
EOT/UTS - END OF TRACE / UNABLE TO SONDE
EOT/WS - END OF TRACE / WEAK SIGNAL
EOT/SL - END OF TRACE / SIGNAL LOSS
EOT/UTT - END OF TRACE / UNABLE TO TRACE

UNDERGROUND SERVICES KEY:

WATER MAIN:	—— WATER MAIN ——
ELECTRICITY :	— ELEC —— ELEC —
SEWER / FOUL:	—— FOUL —— FOUL ——
SEWER / SURFACE:	—— STORM —— STORM ——
SEWER / COMBINED:	– – – – – – – – – – – – – – –
CATV:	— CATV —— CATV —
BT:	—— BT U/G —— BT U/G ——
COMMS:	—— COMMS ——
GAS :	—— · —— GAS ——
UNKNOWN GPR:	—— · —— GPR ——
UNKNOWN SERVICE:	— UI —— UI —
TRAFFIC SIGNAL:	— TSC —— TSC —

TAKEN FROM RECORDS = QL-D

SEWER / FOUL TFR:	—— FOUL —— FOUL ——
SEWER / COMBINED TFR:	—— —— —— —— ——
WATER MAIN TFR:	—— WATER MAIN ——
GAS TFR :	—— · —— GAS ——
ELEC TFR :	— ELEC —— ELEC —

QUALITY LEVELS

WATER=QL-B1
ELECTRICITY=QL-B1
FOUL WATER=QL-B1
SURFACE WATER=QL-B1

BT=QL-B1
COMMUNICATIONS=QL-B2
GAS=QL-B2
GPR=QL-B2
UNIDENTIFIED=QL-B2
TRAFFIC SIGNAL CABLE=QL-B2
QL-D =DESKTOP UTILITY RECORD SEARCH

NOTE:
The position and depths of underground apparatus as indicated on this plan are approximate and are intended for guidance only. The onus of locating the apparatus precisely before commencing any excavations or other works in the immediate vicinity therfore rests entirely upon the person undertaking or responsible for those works.

Site Grid North

Symbols/Abbreviations (Where Applicable):

+ AV:	AIR VALVE
+ BB:	BELISHA BEACON
● BH:	BOREHOLE
T BM:	BENCHMARK
○ BOL:	BOLLARD
○ B/S:	BUS STOP
+ CAM:	CAMERA
+ CS:	CABLE STAY
● CATV:	C.A.T.V INSPECTION CHAMBER
+ CBOX:	ELECTRICITY BOX, CABLE BOX, ETC.
✧ CCTV:	C.C.T.V CAMERA
+ C.PIT:	CATCH PIT
☐ EC:	ELECTRICITY COVER
○ EP:	ELECTRICITY POLE
+ ER:	EARTH ROD
+ FH:	FIRE HYDRANT
○ FP:	FLAG POLE
▤ G:	GULLY
○ G:	GULLY (ROUND)
+ GV:	GAS VALVE
☐ IC:	INSPECTION COVER (SQUARE)
○ IC:	INSPECTION COVER (ROUND)
+ IL:	INVERT LEVEL
+ KO:	KERB OUTLET
+ LB:	LETTER BOX
○ LC:	LIGHTING COLUMN
○ LP:	LAMP POST
○ LP/BS:	LAMP POST/BUS STOP
☐ MH:	MANHOLE (SQUARE)
○ MH:	MANHOLE (ROUND)
+ MKR:	MARKER
○ P:	POST
+ RE:	RODDING EYE
+ R/S:	ROAD SIGN
+ S/P:	SIGN POST
+ SNP:	STREET NAME PLATE
+ ST:	STOP TAP
+ SV:	STOP VALVE
+ TCB:	TELEPHONE CALL BOX
+ TL:	TRAFFIC LIGHT
○ TP:	TELEGRAPH POLE
○ TP/EP:	TELEGRAPH POLE/ELECTRIC POLE
+ T/IC:	TELECOM INSPECTION COVER
+ WO:	WATER OUTLET
+ WM:	WATER METER
⋈	GATE
×	DEFINED POINT
▲	CONTROL POINT
○	TREE (CONIFEROUS)
○	TREE (DECIDUOUS)
●	FOLIAGE
▨	HEDGE
DPC 99.99m	DAMP PROOF COURSE LEVEL
EL 99.99m	EAVES LEVEL
FL 99.99m	FLOOR LEVEL
RL 99.99m	RIDGE LEVEL
SL 99.99m	SOFFIT LEVEL
TL 99.99m	THRESHOLD LEVEL

FENCE DESCRIPTIONS:

B/W:	BARBED WIRE FENCE
C/B:	CLOSE BOARDED FENCE
C/L:	CHAIN LINK FENCE
C/P:	CHESTNUT PALING FENCE
CONC/P:	CONCRETE PANEL FENCE
I/R:	IRON RAILING FENCE
P/R:	POST AND RAIL FENCE
P/W:	POST AND WIRE FENCE
P/C:	POST AND CHAIN FENCE
S/PAL:	STEEL PALISADE FENCE
S/B:	SAFETY BARRIER
T/PAL:	TIMBER PALISADE FENCE

Revision Information

Rev	Date	Description

INFORMATION

1) Ordnance Survey co-ordinates and level are derived from OSTN15 and OSGM15, transformed from WGS84.

2) Only services located during the site survey are shown on this plan. Further investigation may be required to ascertain the full extent of the site services.

3) Copyright of this drawing remains the property of PM Surveys UK Ltd. Do not scale from this drawing. In the event of any discrepancy, refer query to PM Surveys UK Ltd.

NOTES

PM SURVEYS UK

ISO 9001 Registered Firm

INTERNATIONAL ACCREDITATION BOARD

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Pentre
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Email: info@pmsurveys.co.uk

Client Info

Denbighshire CC
Caledfryn
Smithfield Road
Denbigh

Tel:
Email: melvyn.edwards@denbighshire.gov.uk

Project

Maes Emlyn
Rhyl
GPR Survey

Project No PMS22185	Sheet: A0 Scale: 1:200	Surveyed By:	DJ TW HBB
		Drawn By:	JW
		Approved By:	PM
Dwg PMS22185-02		Issued:	30/08/22

Appendix F Proposed Development Plan

QMS

1. Contractor to verify all dimensions and check level datums on site
2. All of the designs are the sole property of TACP Architects Ltd and may not be used without their written agreement
3. All prints, specifications and their copyright are the property of TACP Architects Ltd
4. Do not scale off drawings
5. All dimensions shall be checked on site before commencement of shop drawings, manufacture and all discrepancies must be reported to TACP Architects Ltd

Unit Key:

1 Bedroom - 2 Person Apartment
Quantity = 21no.
(GFLR units to be Part M Cat 3 wheelchair accessible)

2 Bedroom - 4 Person Apartment
Quantity = 3no.

2 Bedroom - 4 person House (2 Storey)
Quantity = 10no.

3 Bedroom - 5 Person House (2 Storey)
Quantity = 4no.

Site Key:

Parking Bay

1 no. space per bedroom + 1 no. visitor space per 5 units
Quantity = 59 + 8 = 67 spaces
Spaces to be 2.6 m wide as standard (possibility to widen to 3.3m)

Refuse pick-up points

Existing tree with RPA based on Arboricultural Survey

Risk Assessments

28.11.2022 DRAFT ISSUE ONLY - WORKING DOCUMENT FOR DISCUSSION

Revisions

Rev	Date	Description	By	Check

Consultants

Client

Denbighshire County Council

Project Title

Maes Emlyn Housing, Rhyl

Drawing Title

Site layout

Scale	Date	Drawn By	Checked By	Office
As indicated@A0	07/11/22	KM	MG	Wrexham

Job Number	Project•Originator•Zone•Level•Type•Role•Number	Revision
22038	MEH-TACP- PS- ST- DR-A- 701	

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E. admin@tacparchitects.co.uk
www.tacparchitects.co.uk

Architecture ● Interior Design ● Healthcare Planning ● Conservation ● Masterplanning ● Sustainable Design

Appendix G NRW Maps and Correspondence

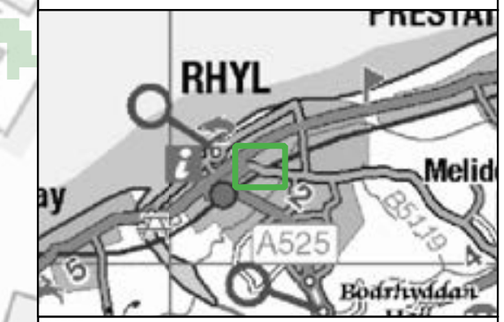
Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise

LEGEND

- Site Boundary

Development Advice Map (TAN15)

- Zone A
- Zone B
- Zone C1
- Zone C2



0 50 100 150 200 m

CLIENT:	TACP Architects Ltd
	www.waterco.co.uk
SCHEME:	Maes Emlyn, Rhyl
PLOT TITLE:	NRW Development Advice Map Data accessed November 2022
PLOT STATUS: FINAL	DATE: 11-11-2022
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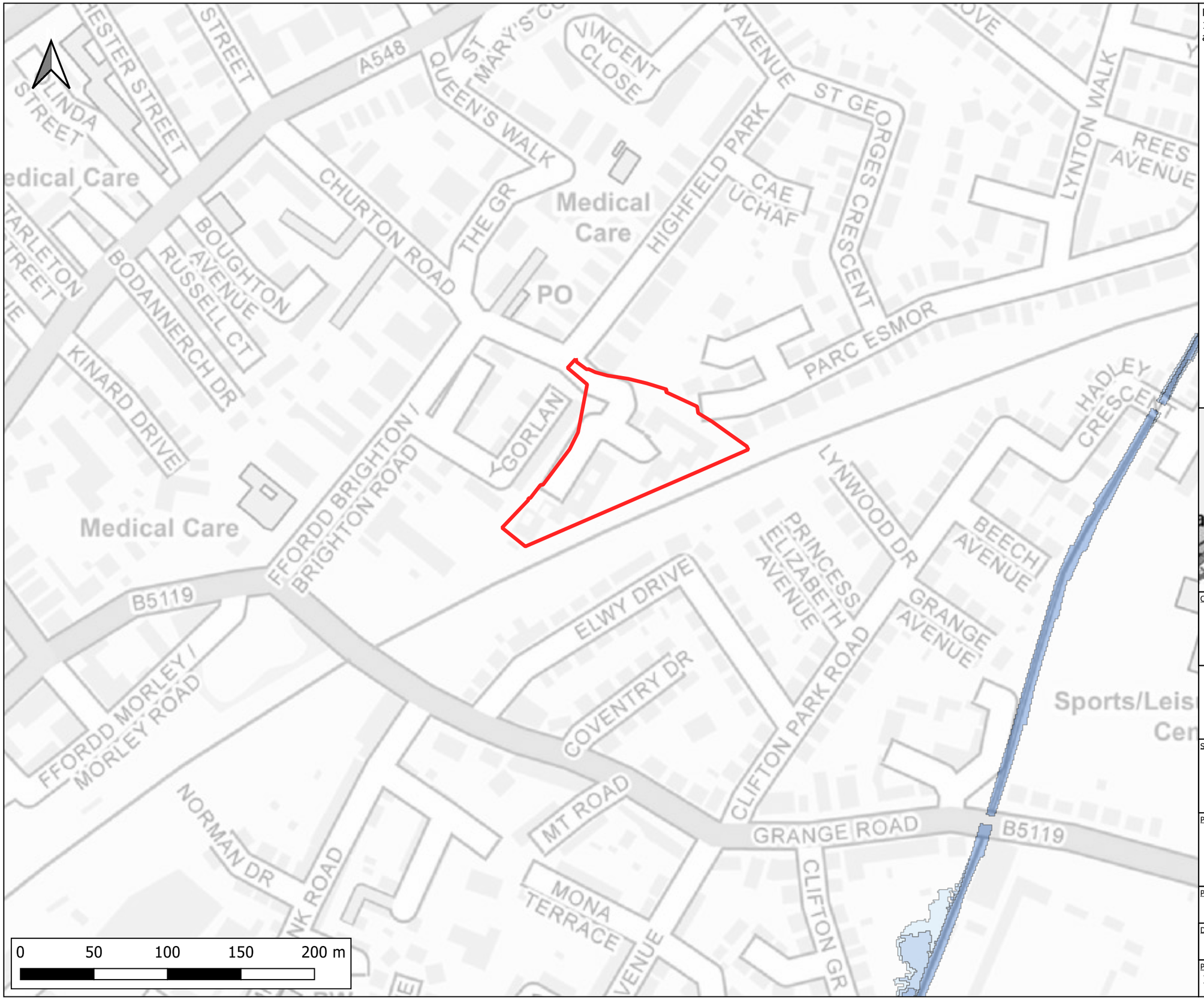


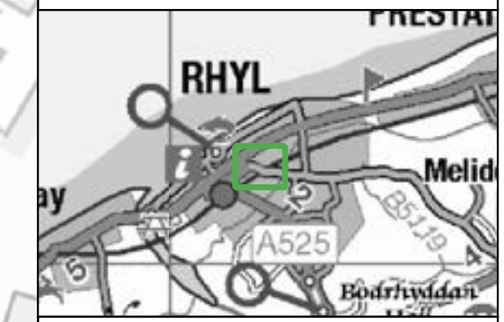
Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise

LEGEND

- Site Boundary

Flood Risk from Rivers

- High
- Medium
- Low



CLIENT:
TACP Architects Ltd

waterco
www.waterco.co.uk

SCHEME:
Maes Emlyn, Rhyl

PLOT TITLE:
NRW Flood Risk from Rivers
Data accessed November 2022

PLOT STATUS:	DATE:
FINAL	11-11-2022

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
AM	JR	AW	1:2500

PLOT NAME:	REVISION:
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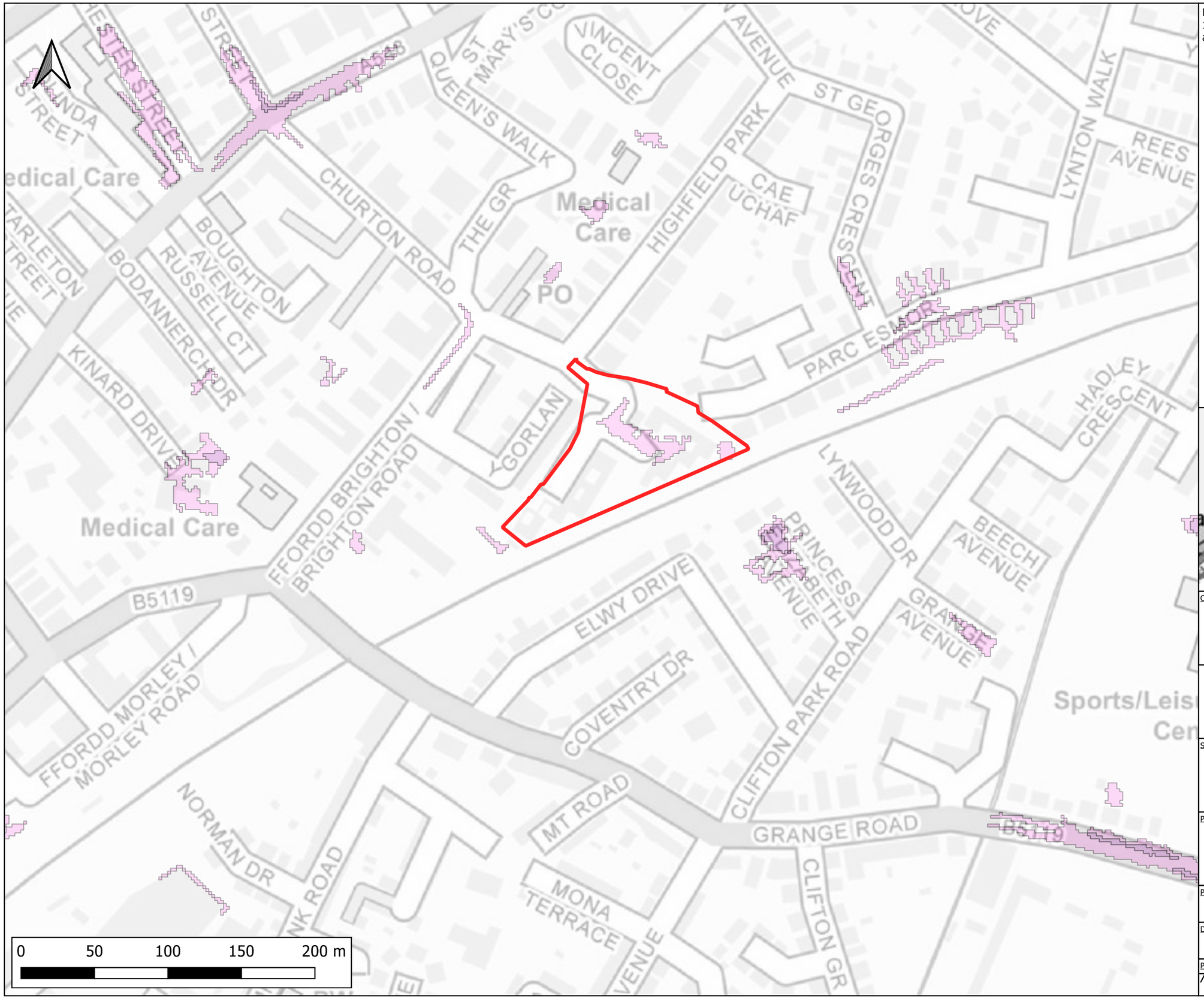


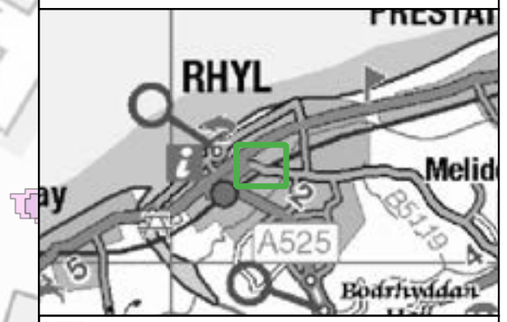
Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise

LEGEND

- Site Boundary

Flood Risk from Surface Water

- High
- Medium
- Low



CLIENT:	TACP Architects Ltd
	www.waterco.co.uk
SCHEME:	Maes Emlyn, Rhyl
PLOT TITLE:	NRW Flood Risk from Surface Water & Small Watercourses Data accessed November 2022
PLOT STATUS: FINAL	DATE: 11-11-2022
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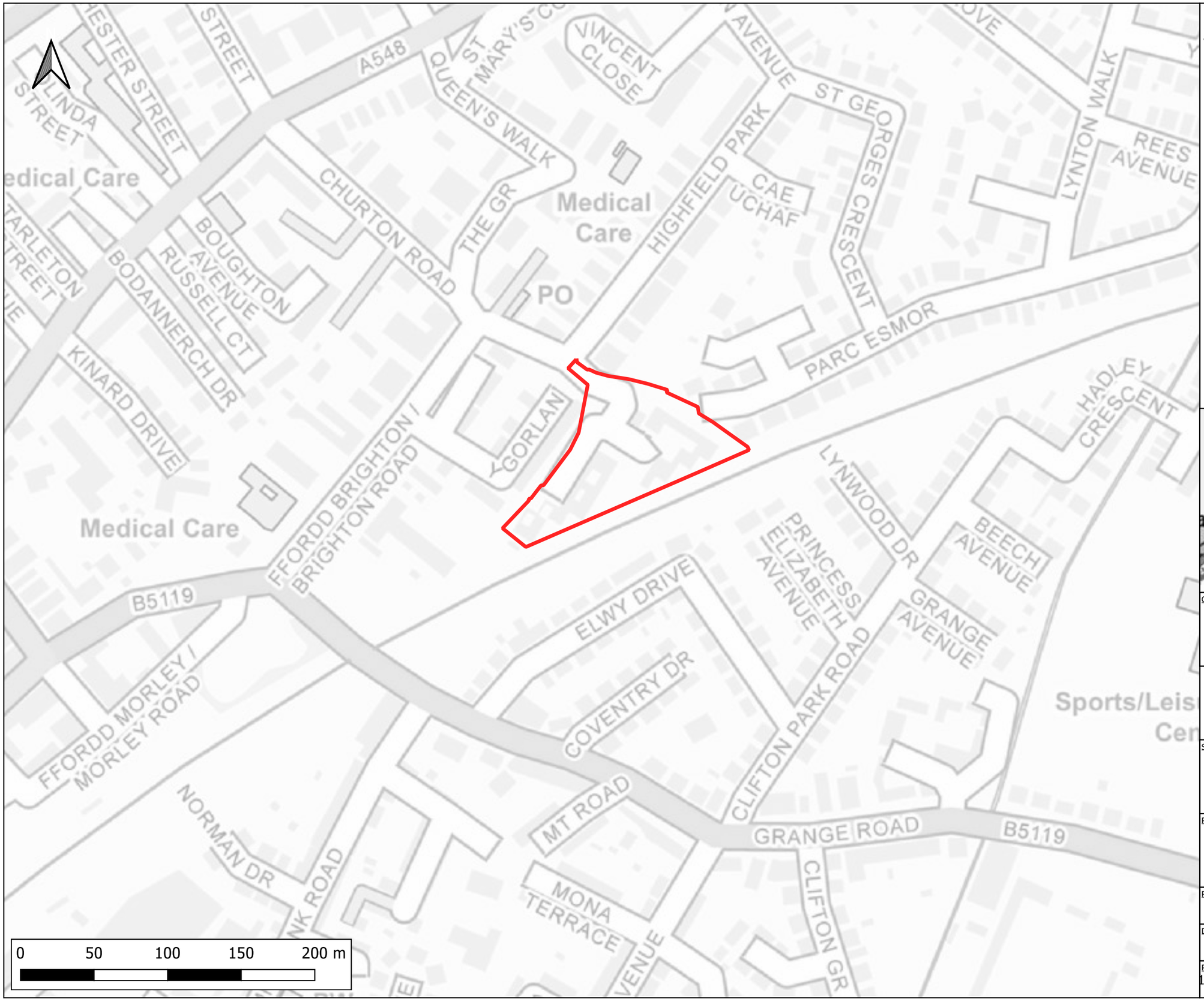


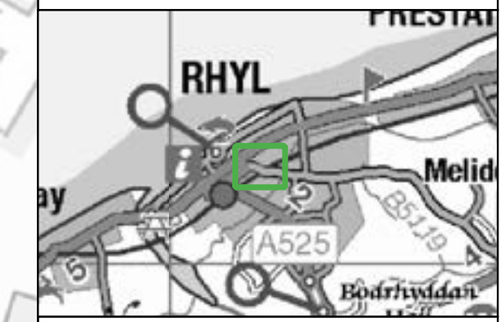
Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise

LEGEND

- Site Boundary

Flood Risk from the Sea

- High
- Medium
- Low



CLIENT:
TACP Architects Ltd

waterco
www.waterco.co.uk

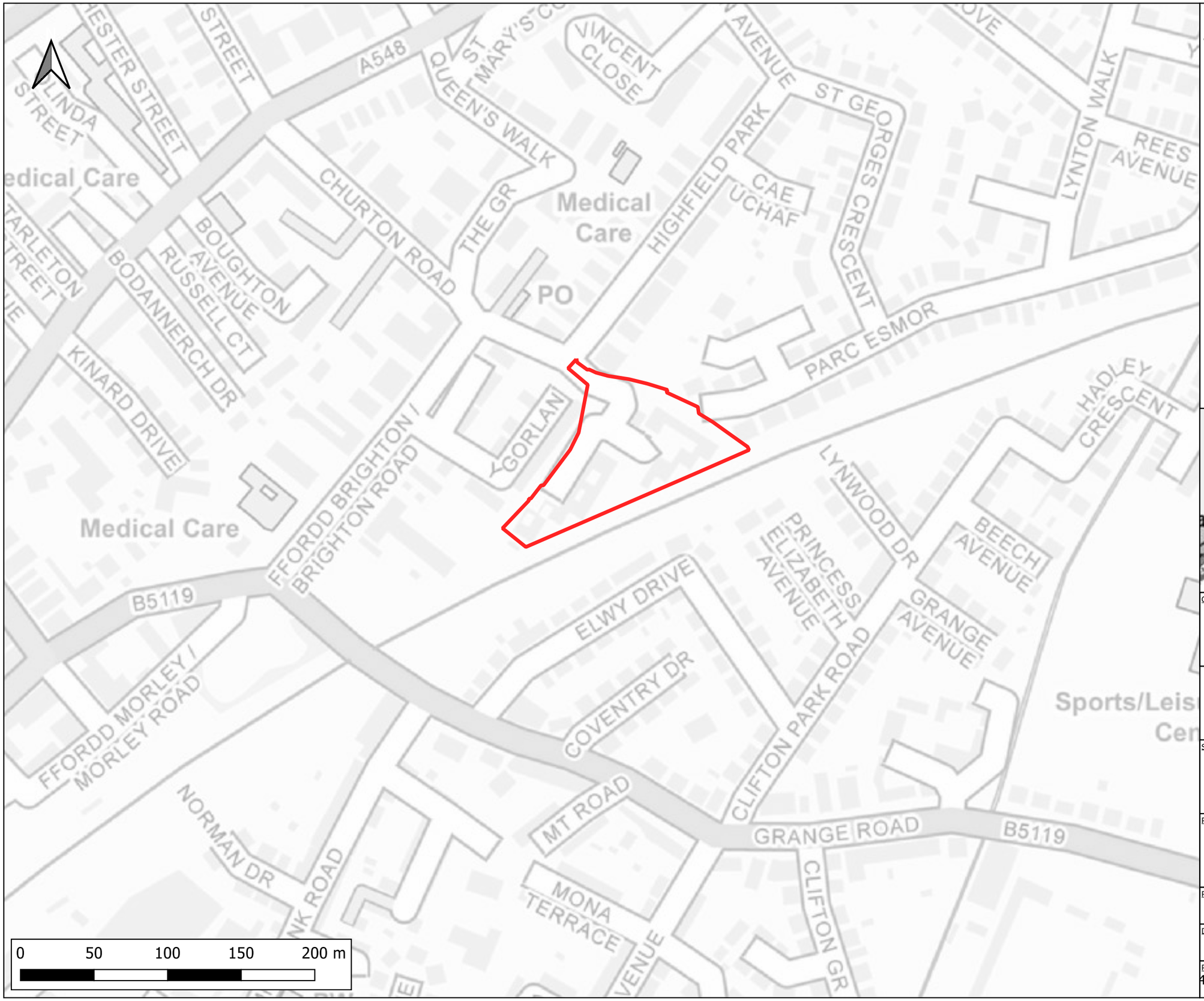
SCHEME:
Maes Emlyn, Rhyl

PLOT TITLE:
NRW Flood Risk from the Sea
Data accessed November 2022

PLOT STATUS:	DATE:
FINAL	11-11-2022

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
AM	JR	AW	1:2500

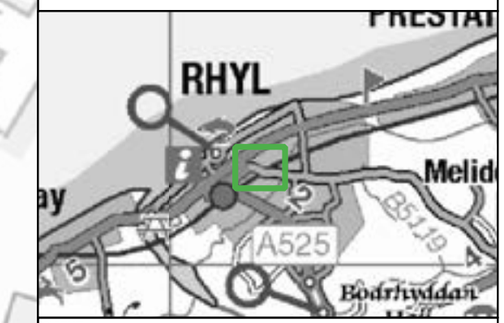
PLOT NAME:	REVISION:
14973_NRW_Flood_Risk_from_the_Sea	-



Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise

LEGEND

- Site Boundary
- Flood Risk from Reservoirs



CLIENT:	TACP Architects Ltd
	www.waterco.co.uk
SCHEME:	Maes Emlyn, Rhyl
PLOT TITLE:	NRW Flood Risk from Reservoirs Data accessed November 2022
PLOT STATUS: FINAL	DATE: 11-11-2022
DRAWN: AM / CHECKED: JR / APPROVED: AW	PLOT SCALE AT A3: 1:2500
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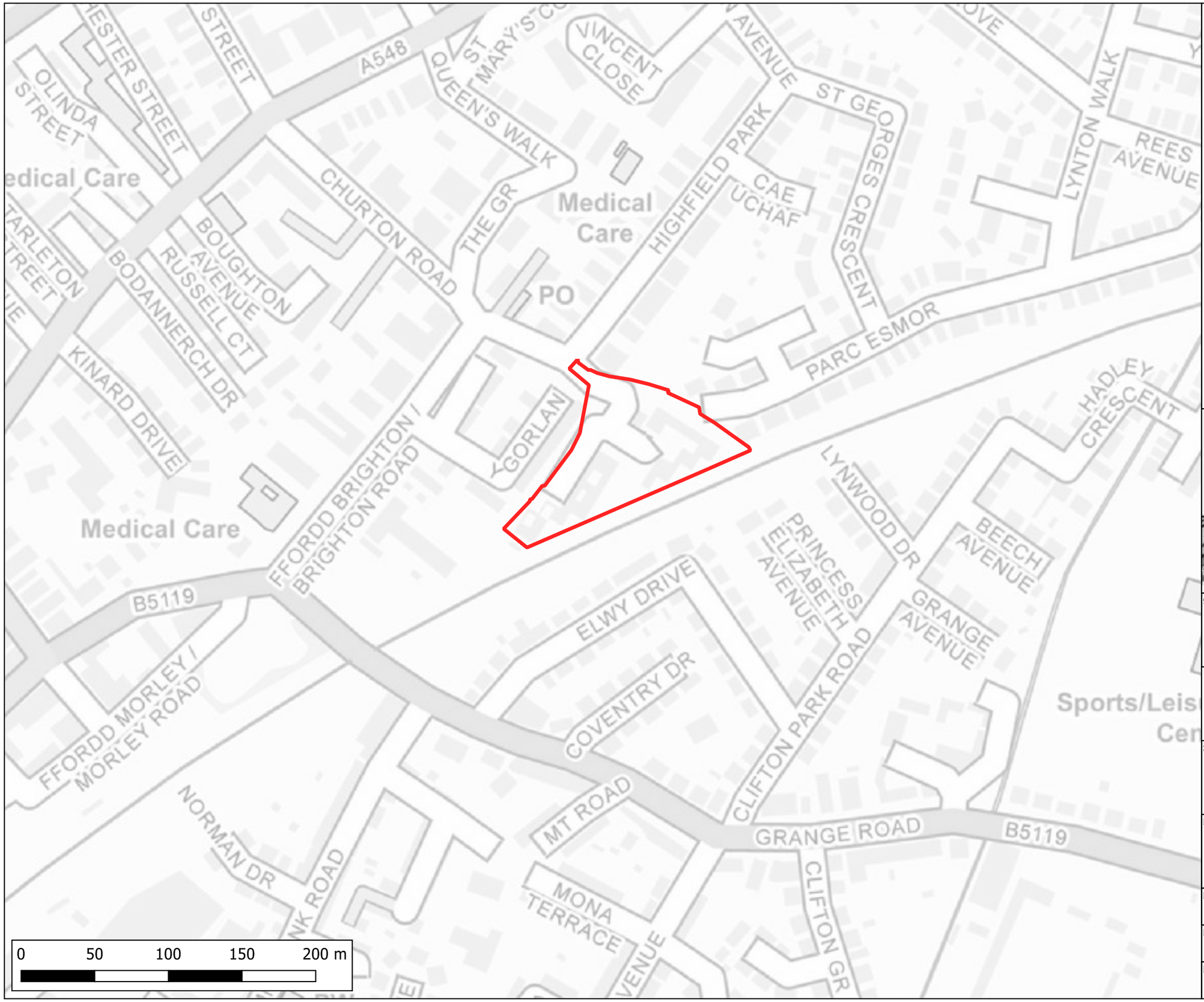
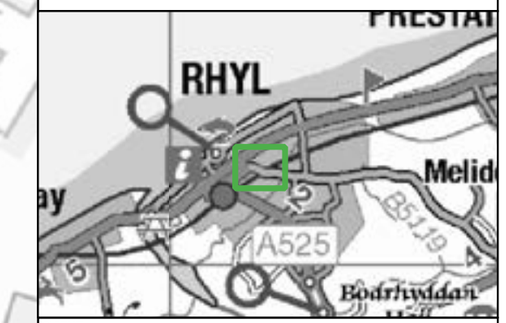


Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise

LEGEND

- Site Boundary
- Recorded Flood Extent



CLIENT:
TACP Architects Ltd

waterco
www.waterco.co.uk

SCHEME:
Maes Emlyn, Rhyl

PLOT TITLE:
NRW Historic Flood Risk
Data accessed November 2022

PLOT STATUS:	DATE:
FINAL	11-11-2022

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
AM	JR	AW	1:2500

PLOT NAME:	REVISION:
14973_NRW_Historic_Flood_Risk	-

Cyfoeth Naturiol Cymru
Natural Resources Wales

Ein cyf/Our ref: CAS-201285-M8B0
Eich cyf/Your ref: 14973-FCA

Maes Y Ffynnon,
Penrhosgarnedd,
Bangor,
Gwynedd
LL572DW

Adam Muculloch
Waterco

ebost/email:
northplanning@cyfoethnaturiolcymru.gov.uk

25/10/2022

Dear Sir,

PRELIMINARY PRE-APPLICATION ADVICE

PROPOSAL: DEVELOPMENT PLANS ARE CURRENTLY BEING PREPARED HOWEVER WILL BE SUBJECT TO FLOOD RISK CONSTRAINTS. AS PER THE ATTACHED, THERE ARE CURRENTLY 59 FLATS ON SITE. DEVELOPMENT PROPOSALS WOULD BE FOR UP TO 40 UNITS.

LOCATION: MAES EMLYN, RHYL, LL18 4AB

Thank you for consulting Cyfoeth Naturiol Cymru / Natural Resources Wales about the above pre-application enquiry, which we received on 14th October 2022.

We have considered your enquiry in relation to our Development Planning Consultations Topics document (September 2018). We advise that the following matters are relevant to your site / proposed development and suggest you consider these further prior to the submission of any planning application:

Flood Risk Management

The planning application proposes highly vulnerable development (Residential). The application site is within Zone A of the Development Advice Map (DAM) contained in TAN15 (2004). However, our Flood Map for Planning (FMfP) identifies the application site to be at risk of flooding and within Flood Zone 2/3 Sea.

As confirmed in the letter from Welsh Government dated 15 December 2021, the FMfP represents better and more up-to-date information on areas at flood risk than the DAM. Therefore, we advise you produce a Flood Consequences Assessment (FCA), to demonstrate that the consequences of flooding can be acceptably managed over the lifetime of development. The criteria for the FCA, which should normally be undertaken by a suitably

qualified person carrying an appropriate professional indemnity, are given in Section 7 and Appendix 1 of TAN15 (2004). The FCA should be proportionate to the development proposed. You may also refer to our website, which contains technical advice and recommendations.

The site is currently occupied by 59 flats. The proposal is for redevelopment of the site to provide up to 40 residential units. The information submitted does not confirm whether these would consist of flats or individual units all with ground floor living space. As such, is not clear if the proposal would result in an intensification of use of the site, and confirmation on this point would be needed from the Local Planning Authority (LPA).

There is a requirement to prepare a Flood Consequences Assessment (FCA) in support of the planning application. The FCA would need to demonstrate that the consequences of flooding are acceptable in accordance with the requirements of TAN15. The primary source of flood risk at the site is tidal flood risk. We would expect the FCA to refer to outputs from the Point of Ayr to Pensarn Tidal Flood Risk Analysis (2017) and the Denbighshire Strategic Flood Consequences Assessment (SFCA) when preparing the FCA, including specific reference to the 0.5% Annual Exceedance Probability (AEP) breach event with an allowance for climate change, which is the design event.

If the proposal is considered to be an intensification of use, then the FCA would need to demonstrate that the site can be designed to be flood free in the design event. If the LPA confirms that the proposal does not result in an intensification of use compared to the current highly vulnerable land use at the site, then we would expect flood risk betterment to be provided compared to the existing situation. We would expect this to include raising finished floor levels higher than existing and incorporation of flood resistance/resilience techniques.

The FCA should also consider the 0.1% AEP breach event with climate change, in relation to the requirements of sections A1.12 and A1.15 of TAN15. In order to comply with section A1.12, the FCA will need to show that the development proposal does not increase flood risk elsewhere in up to the 0.1% AEP breach event with climate change. This requirement will apply irrespective of whether the proposal is considered to be an intensification or not.

Any flood risk data we hold for the site can be requested by submitting a request for environmental data. The criteria for the FCA, which should normally be undertaken by a suitably qualified person carrying an appropriate professional indemnity, are given under Section 7 and Appendix 1 of TAN15.

European Protected Species (EPS)
Our records show there may be protected species in the vicinity of the site. We advise liaison with the LPA ecologist to discuss and agree the scope of any surveys required.

We refer you to our website for further advice.

Foul Drainage
Before deciding a planning application, the LPA needs to be satisfied the foul drainage arrangements for the proposed development are suitable. From the details submitted there

is no reference to the foul drainage arrangements for the proposed development. We recommend you provide details regarding foul drainage arrangements with any planning application.

We refer you to WG Circular 008/2018 on private drainage, and specifically paragraphs 2.3-2.5, which stress the first presumption must be to provide a system of foul drainage discharging into a public sewer.

Groundwater protection and land contamination
Advice on environmental considerations and the assessments needed to support your planning application can be found on our external website.

- For advice on how to deal with possible land contamination on your development visit: http://naturalresources.wales/guidance-and-advice/business-sectors/planning-and-development/advice-for-developers/land-contamination/?lang=en
- For advice on how to protect groundwater at your development visit: http://naturalresources.wales/guidance-and-advice/business-sectors/planning-and-development/advice-for-developers/protecting-groundwater/?lang=en

Provision of Data
In addition to the above, please note, we can also provide certain data free of charge, as set out in our Open Data Policy. Customers can access our data via our website.

Other Matters

Please note the view expressed in this letter is a response to a pre-planning enquiry only. We trust these comments will prove helpful but they should not set a precedent for any future Natural Resources Wales' response to any formal application for planning permission or other legal consent. Such applications shall be assessed on the information submitted and regulations of relevance at that time. The details contained in this letter are based on the information available to date.

As part of our discretionary advice service we can provide further advice relating to land contamination, groundwater and flood risk prior to your planning application being submitted. There is a charge for this service. Further details are available on our website.

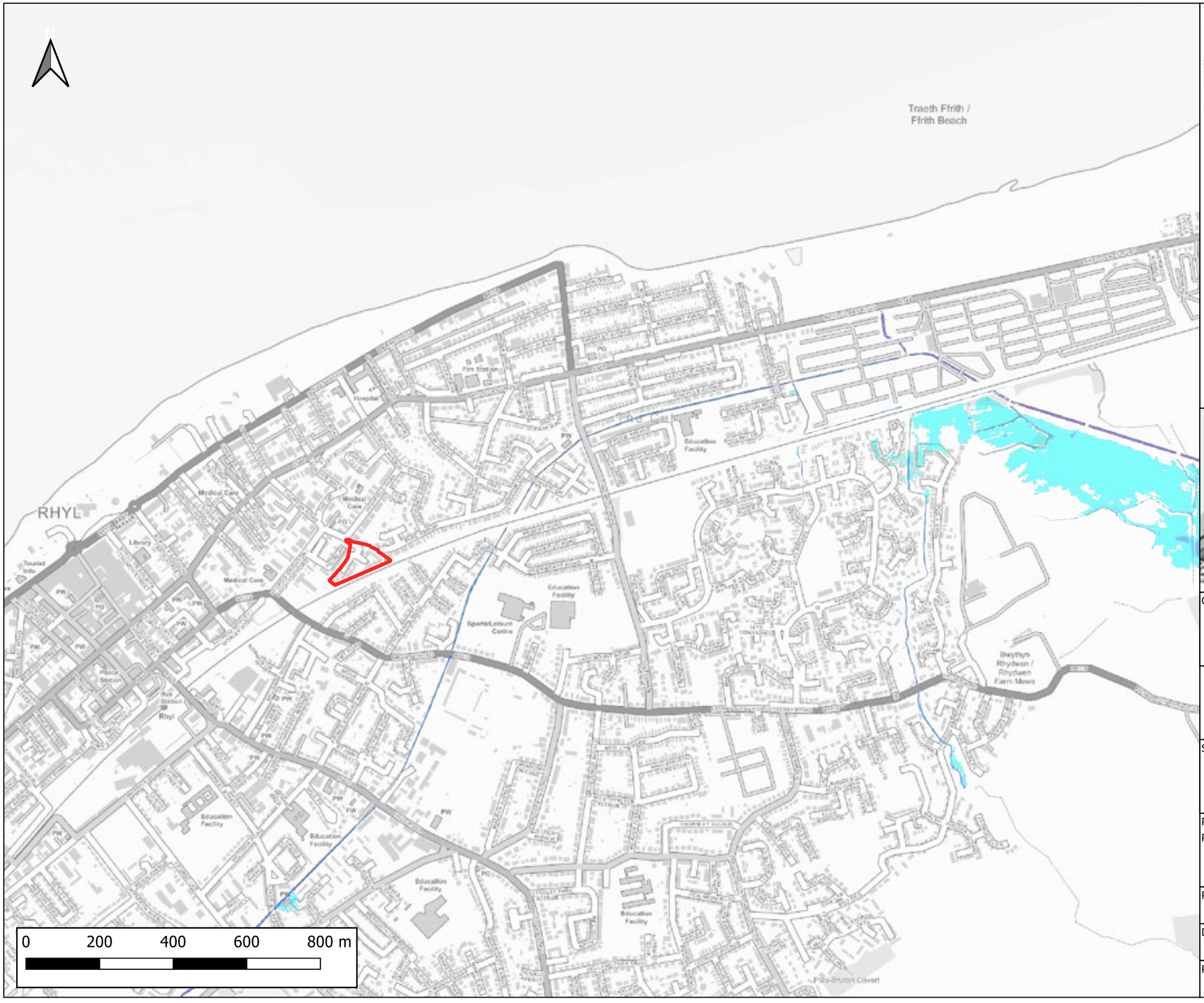
If you have any queries on the above please do not hesitate to contact us.

Yours faithfully

Ruth Prichard
Cynghorydd - Cynllunio Datblygu / Advisor - Development Planning
Cyfoeth Naturiol Cymru / Natural Resources Wales

Appendix H Modelled Output Maps

Rhyl Cut and Prestatyn Gutter Model (fluvial and tidal)



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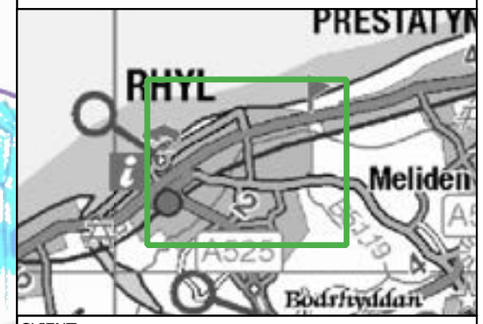

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SCHEME: Maes Emlyn, Rhyl

PLOT TITLE: MAXIMUM FLOOD DEPTH
RHYL CUT AND PRESTATYN GUTTER - FLUVIAL AND TIDAL
3.33% AEP FLUVIAL COINCIDING WITH A MHWS (2120) EVENT
DEFENDED

PLOT STATUS:	DATE:
FINAL	13-12-2022

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PLOT NAME:	REVISION:
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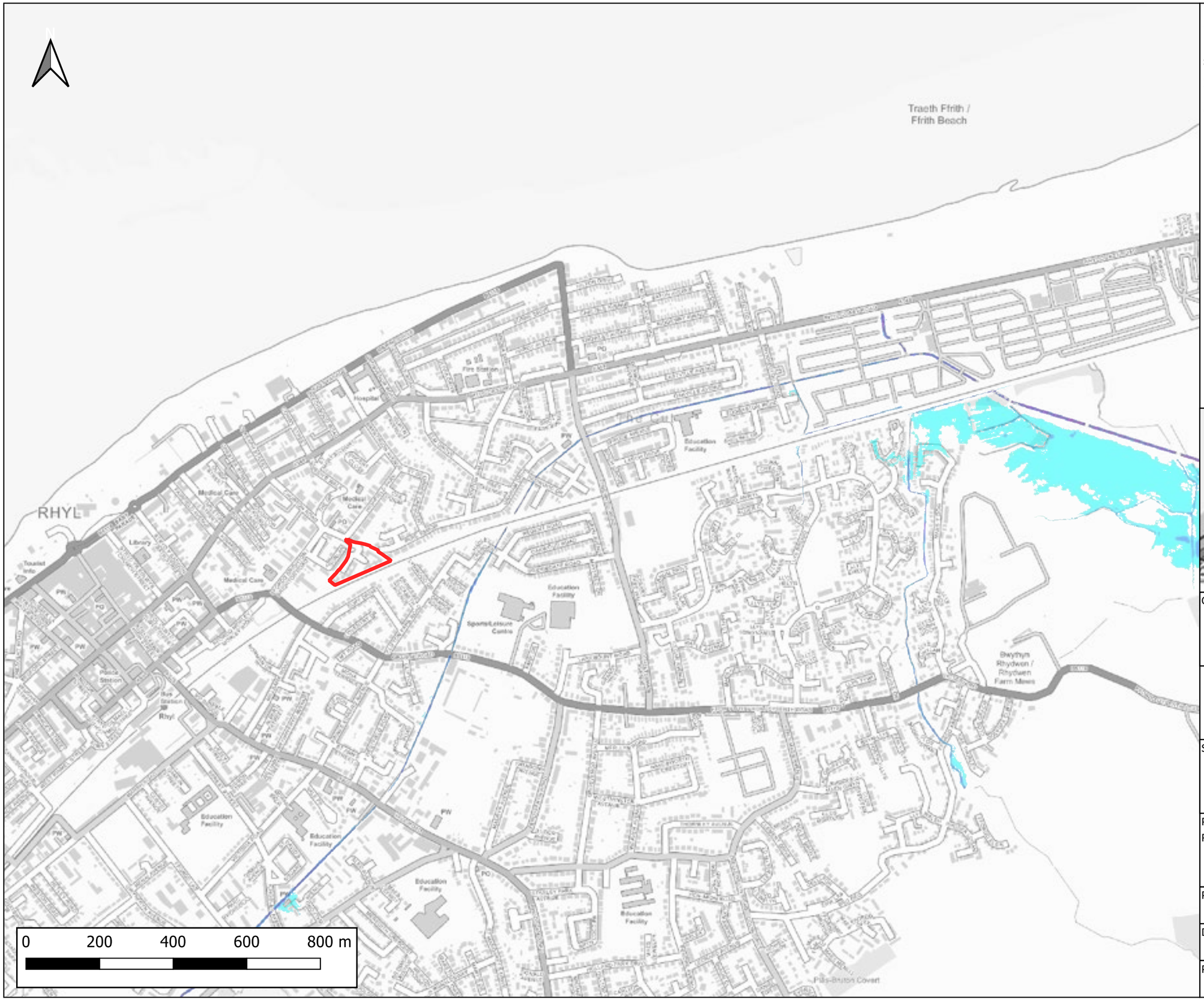

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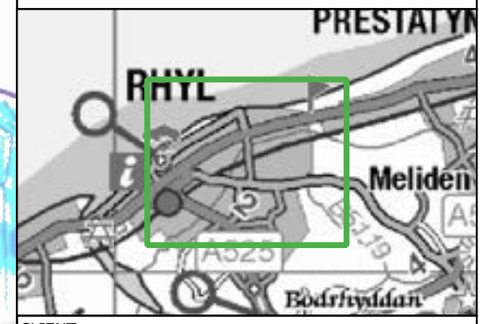

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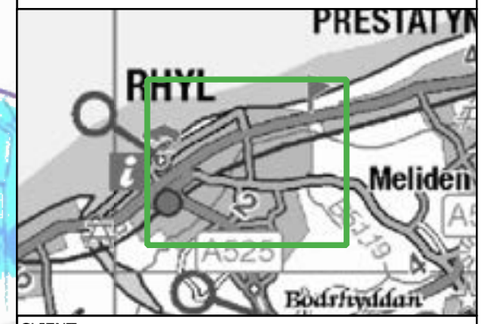

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SCHEME: Maes Emlyn, Rhyl

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RHYL CUT AND PRESTATYN GUTTER - FLUVIAL AND TIDAL
1% AEP FLUVIAL COINCIDING WITH A MHWS (2120) EVENT
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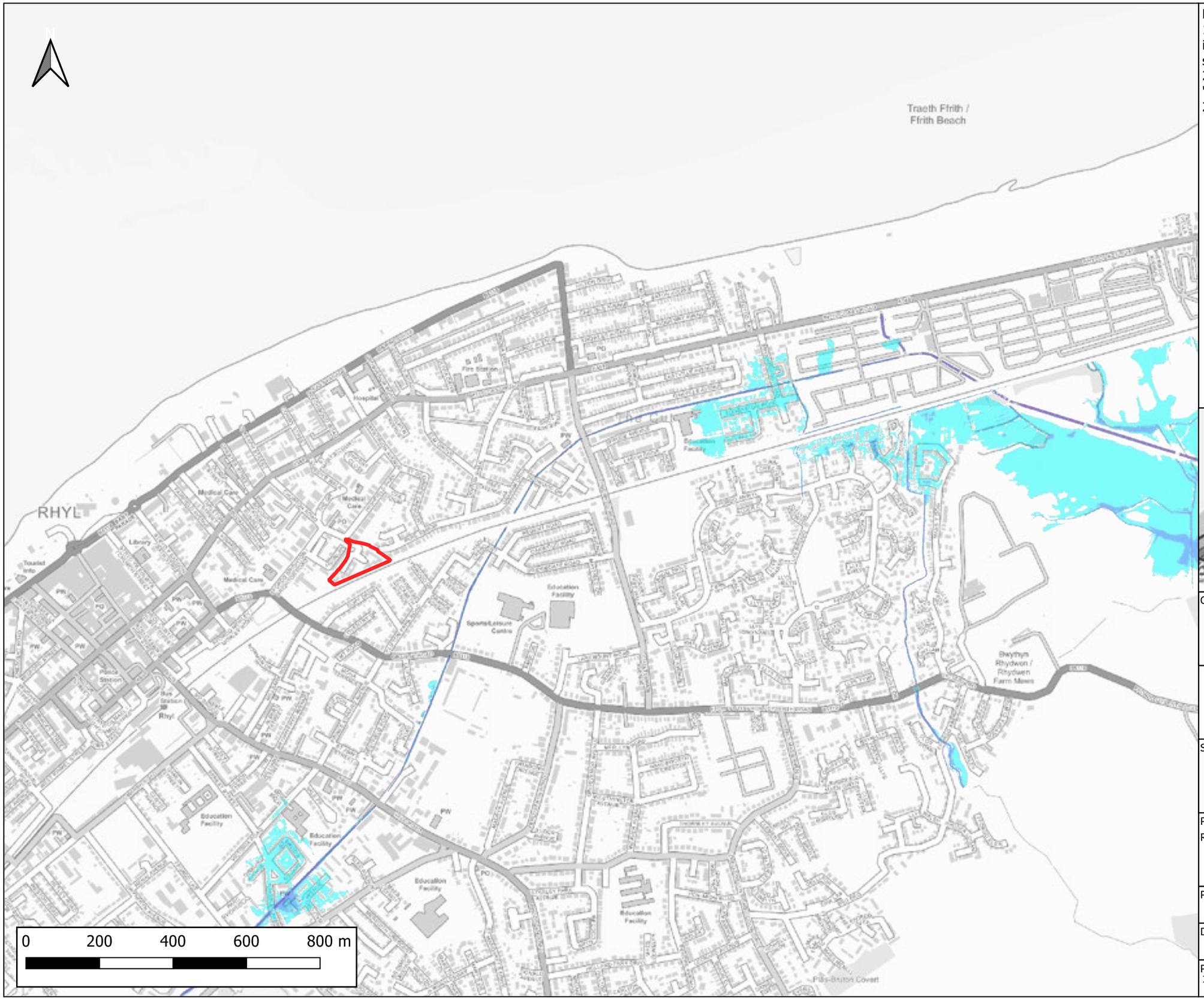

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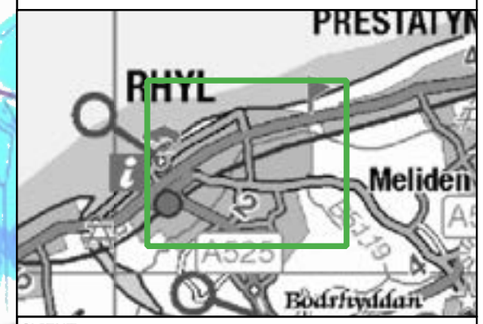

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SCHEME:
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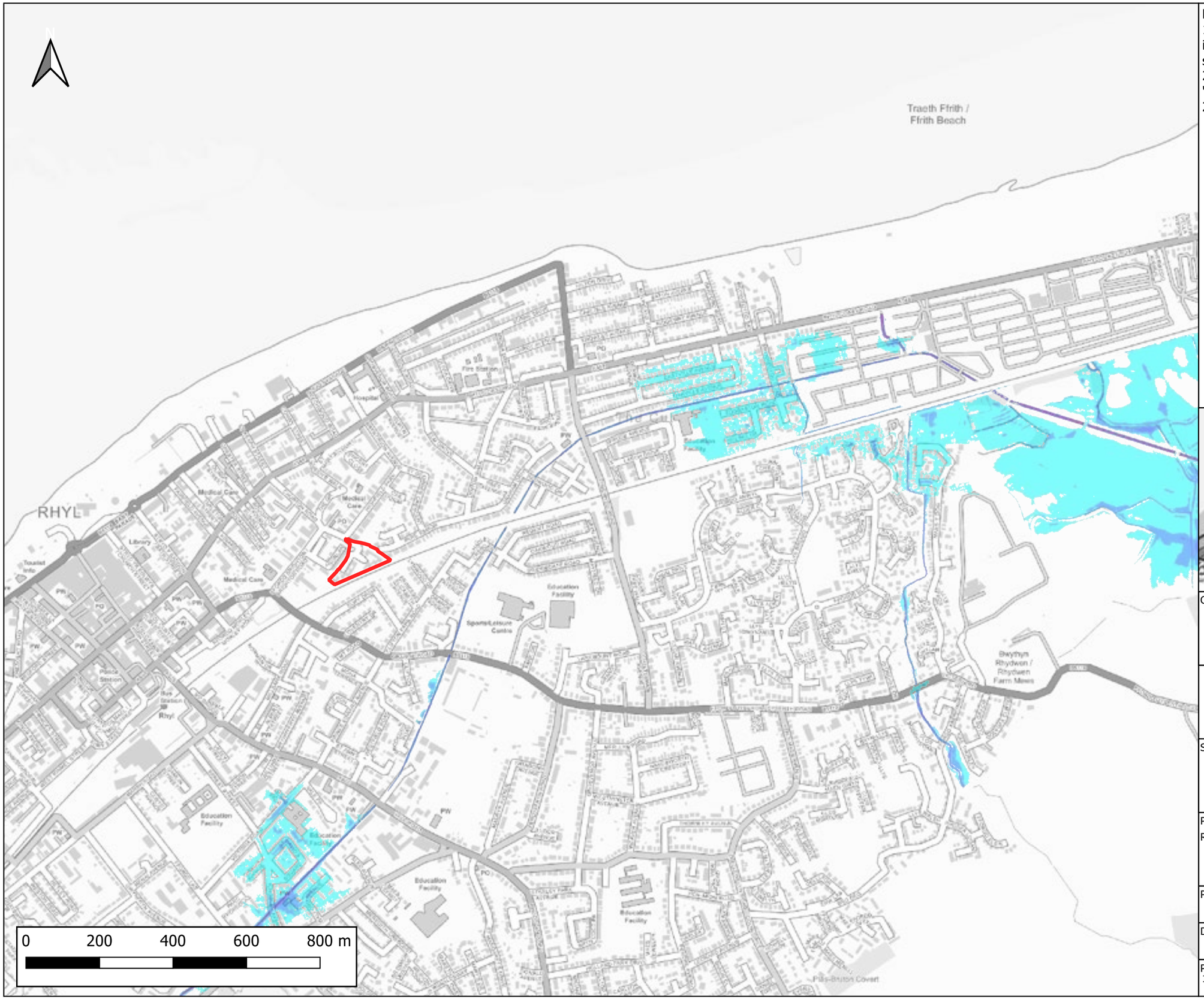

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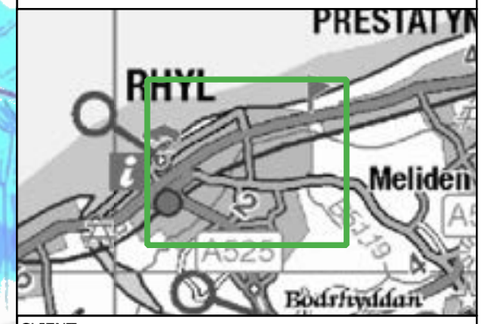

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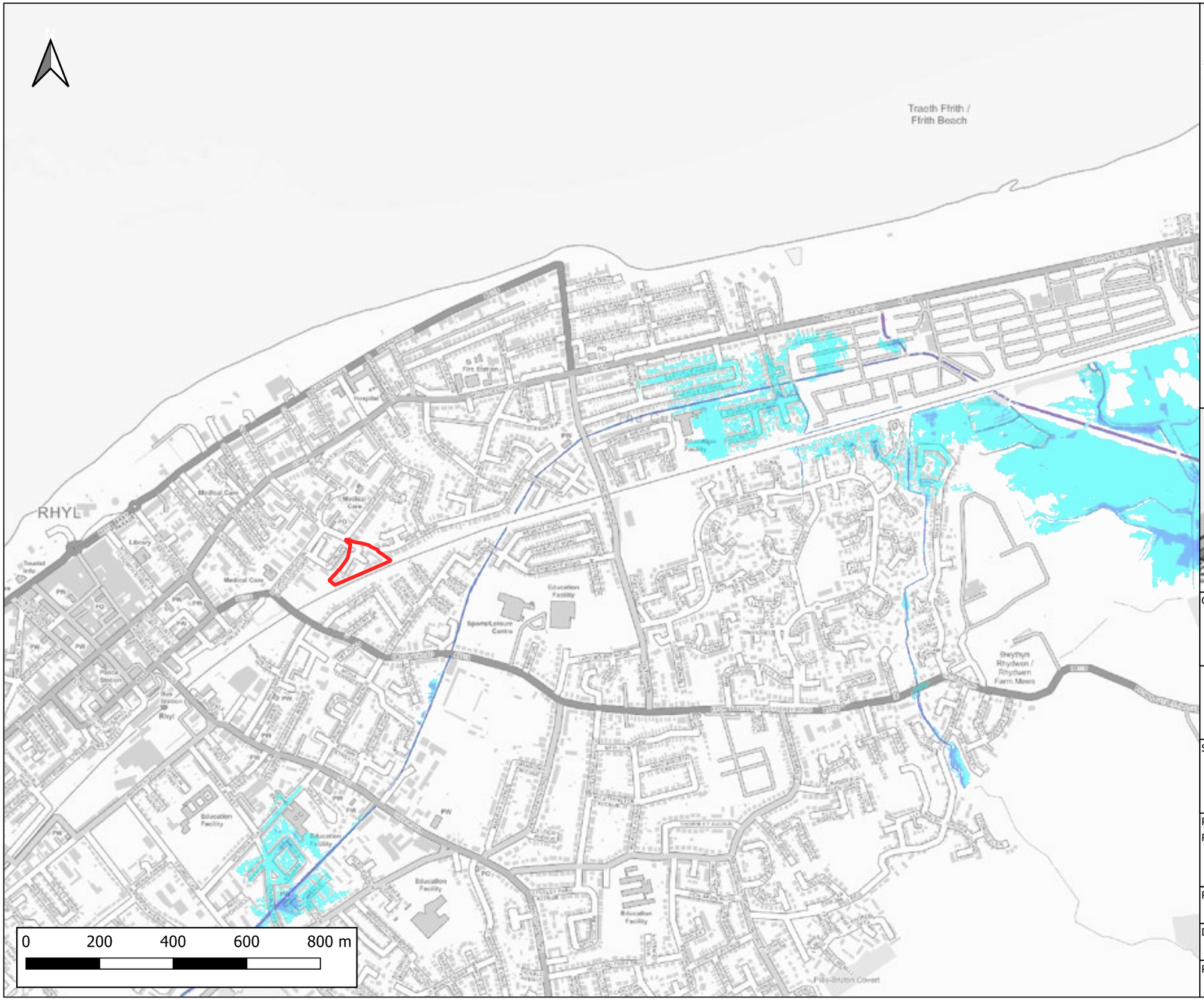

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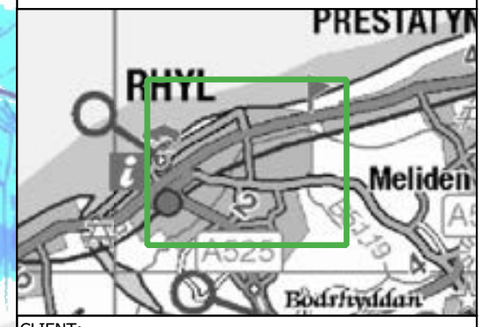

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SCHEME:
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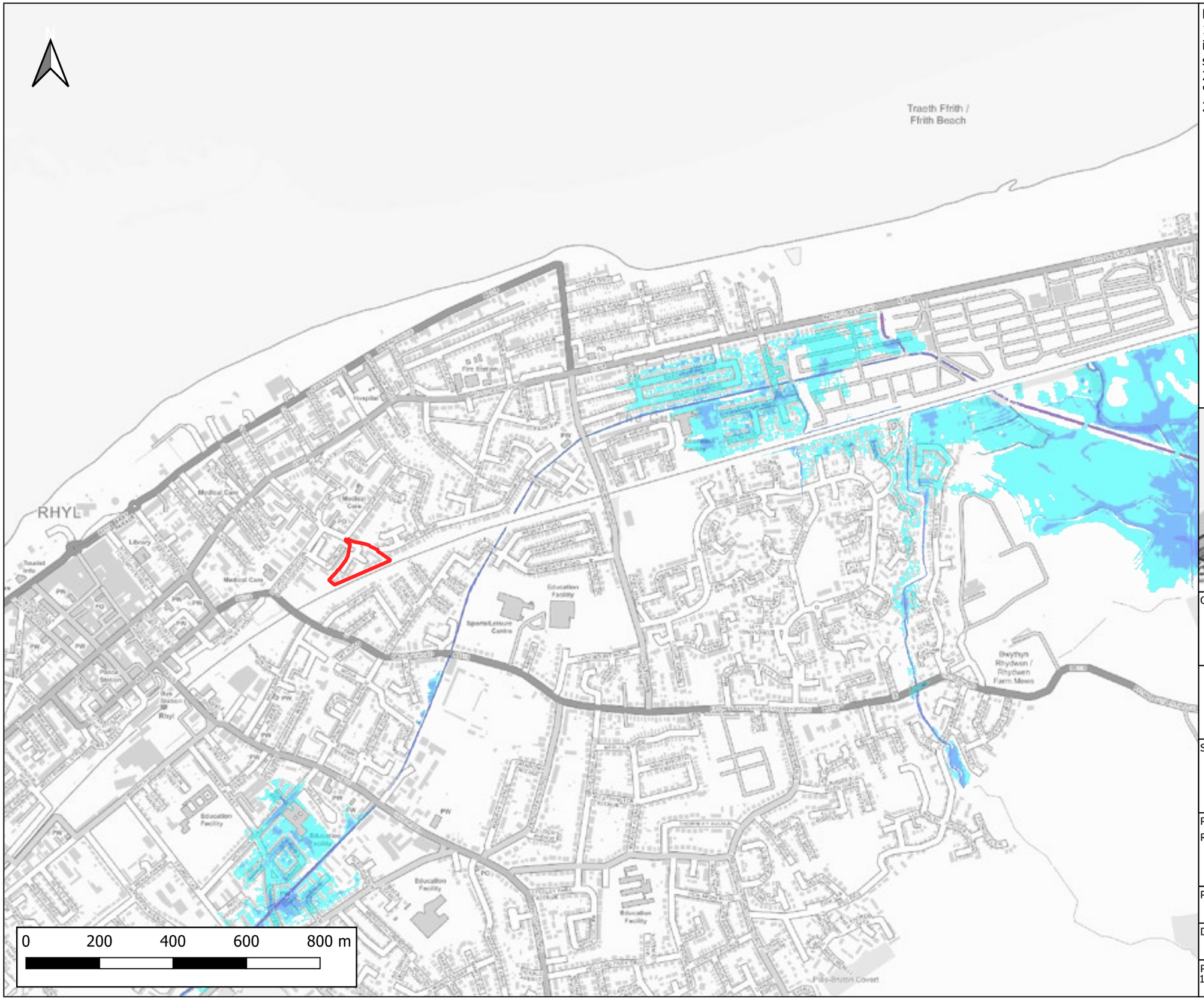

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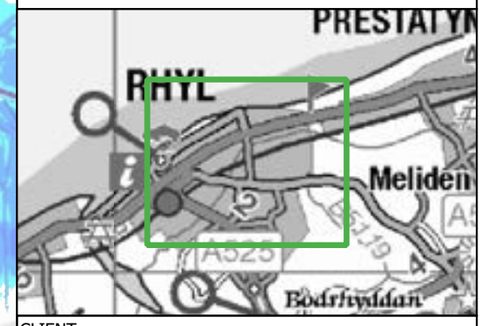

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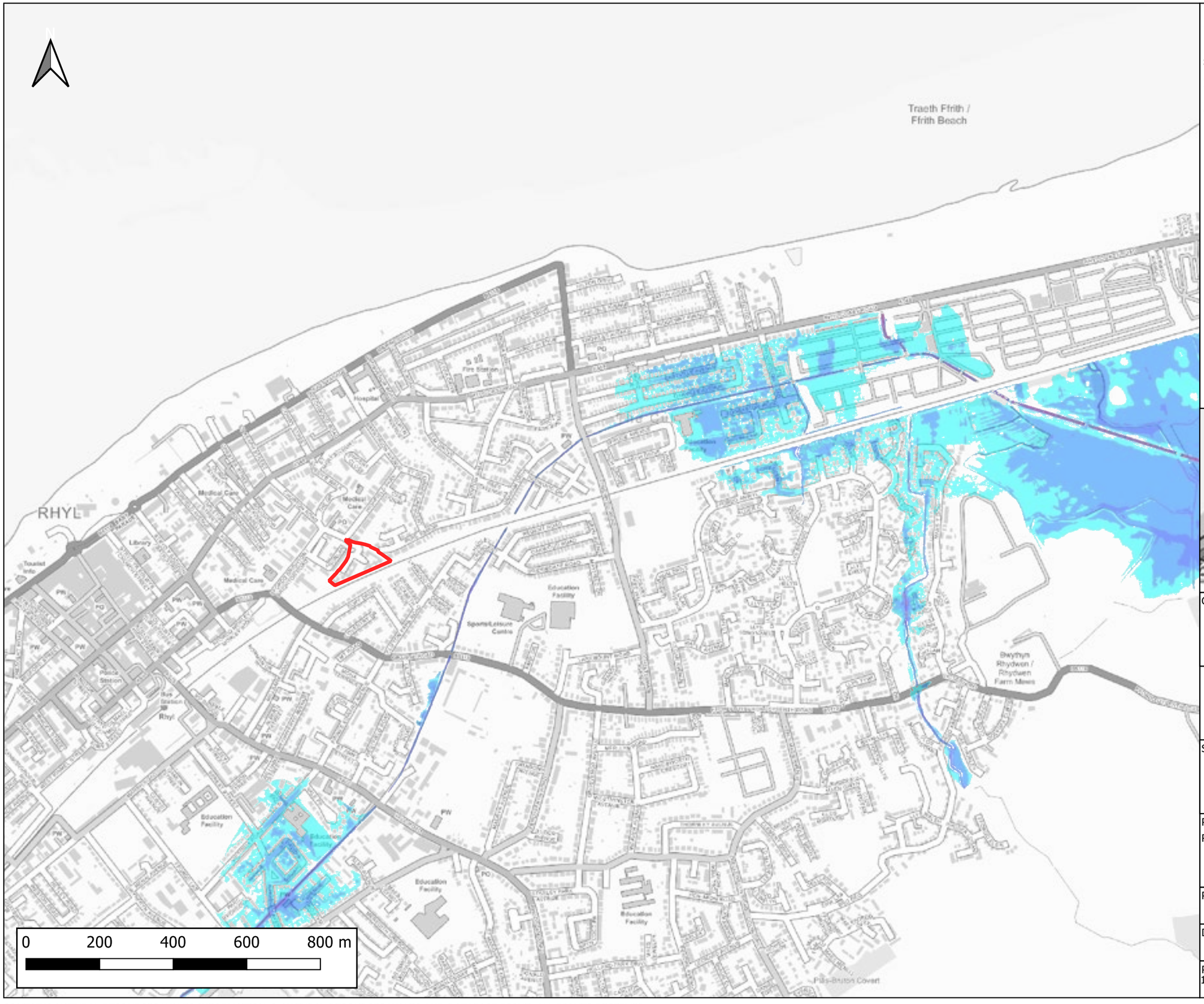

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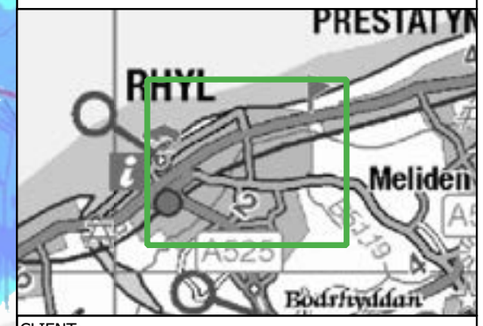

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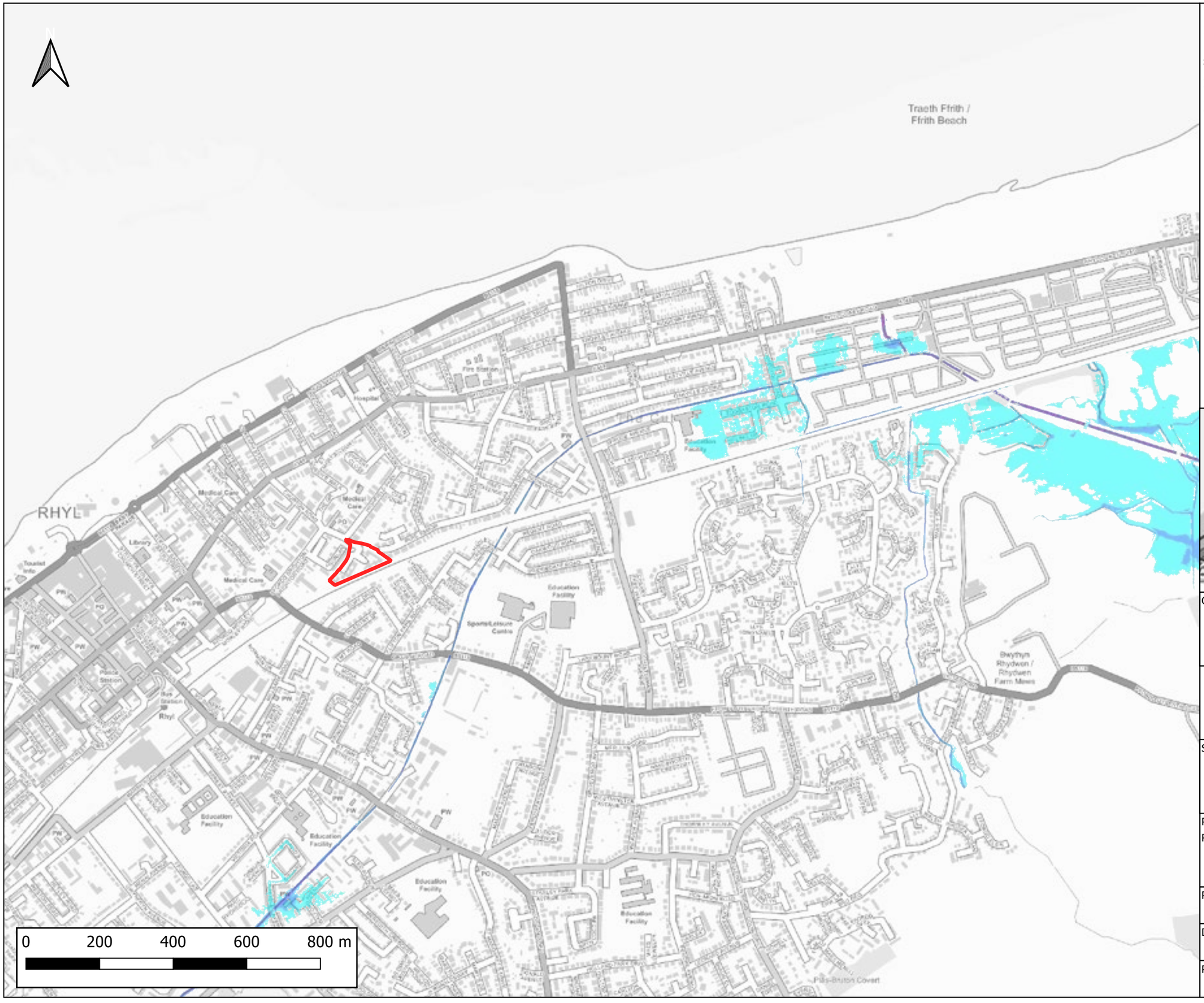

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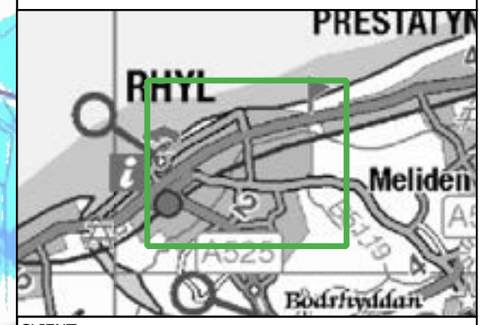

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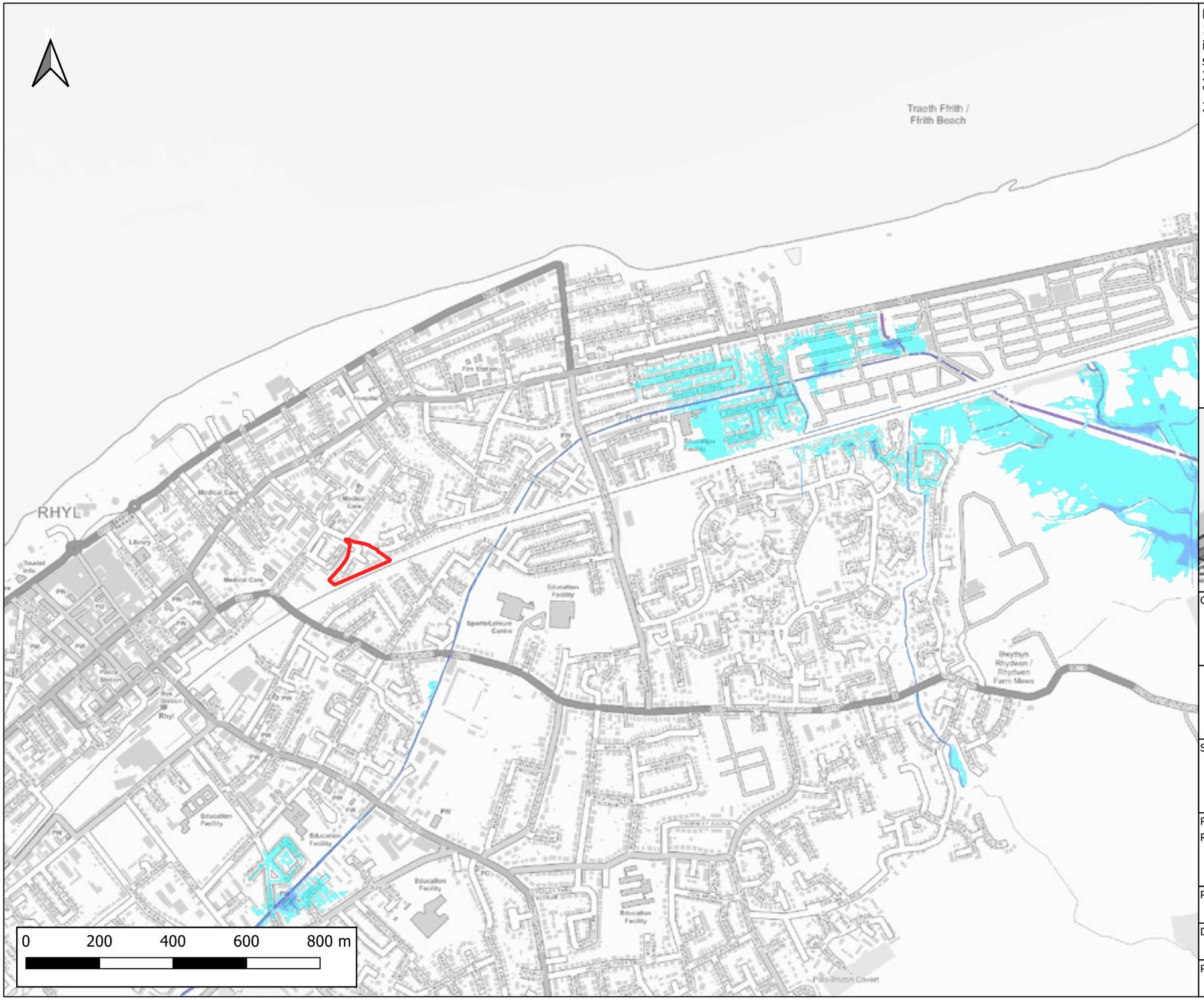

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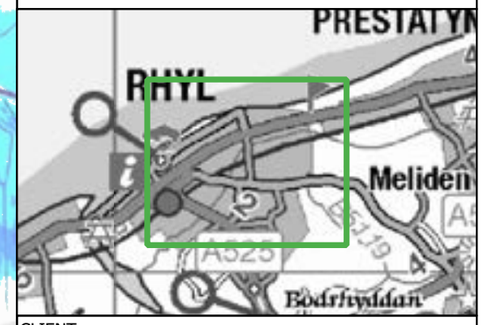

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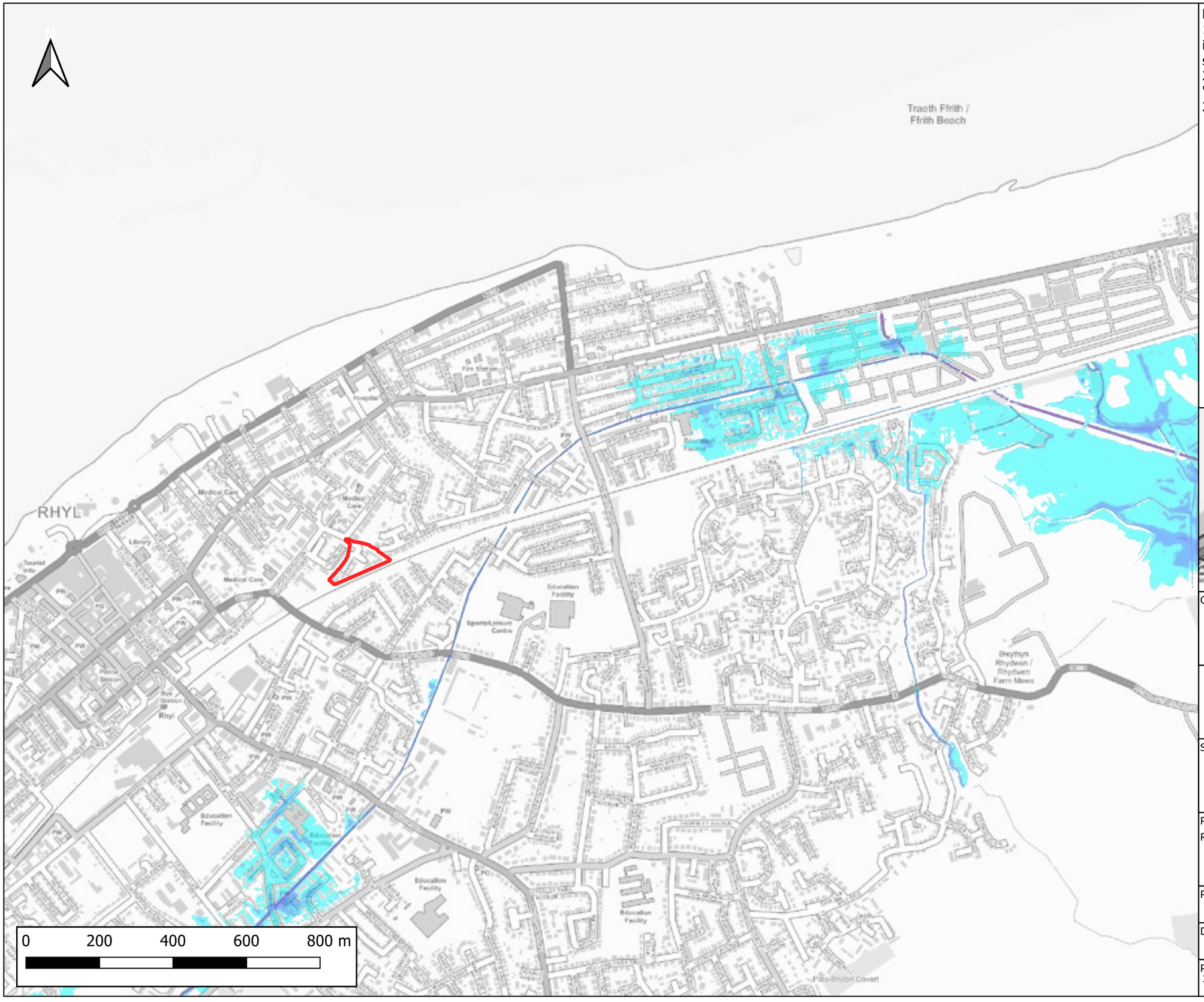

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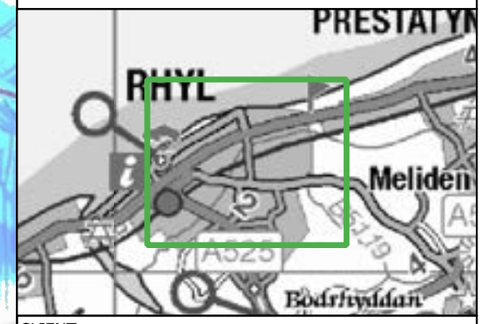

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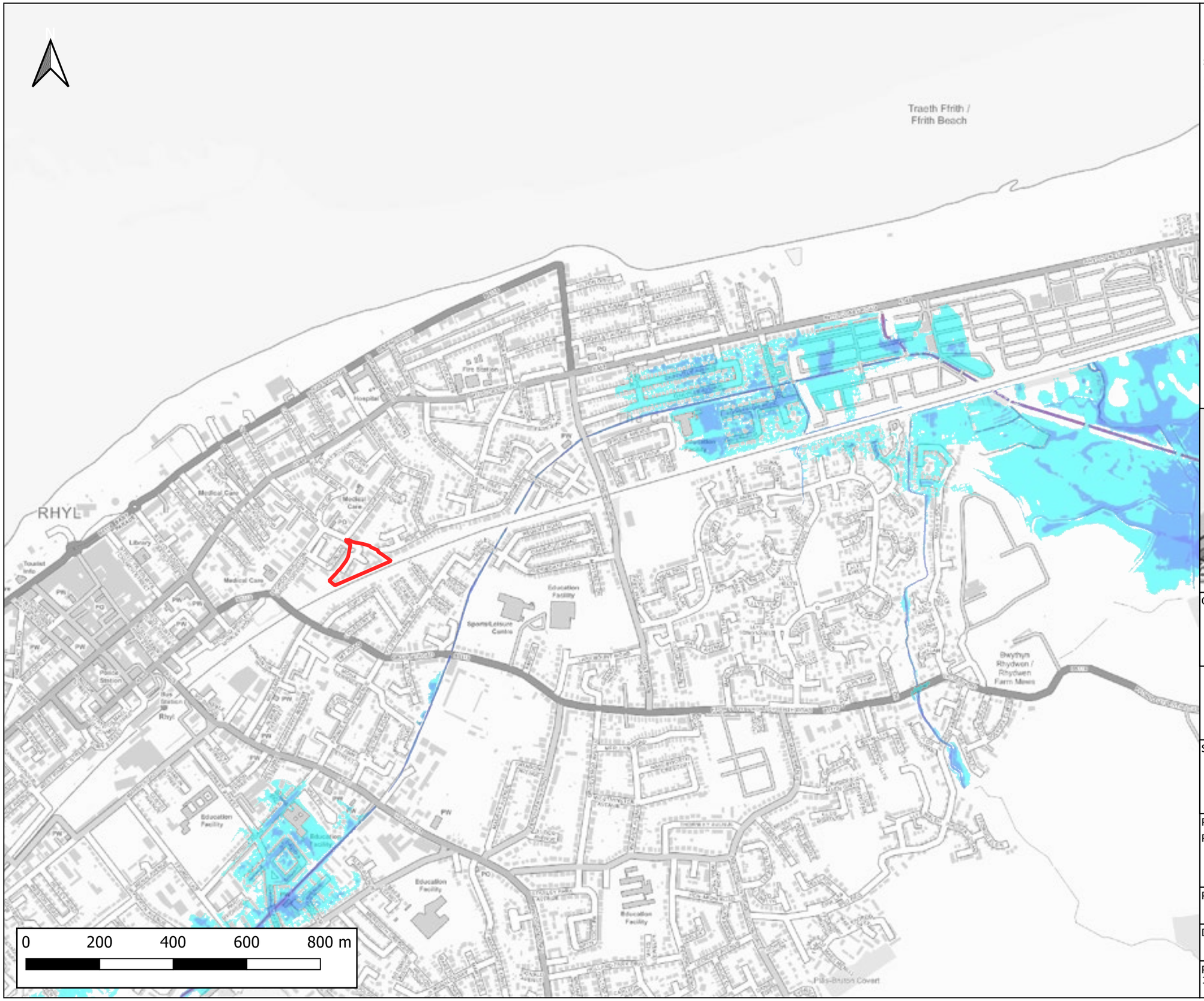

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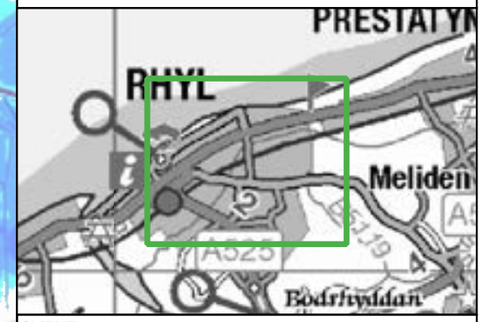

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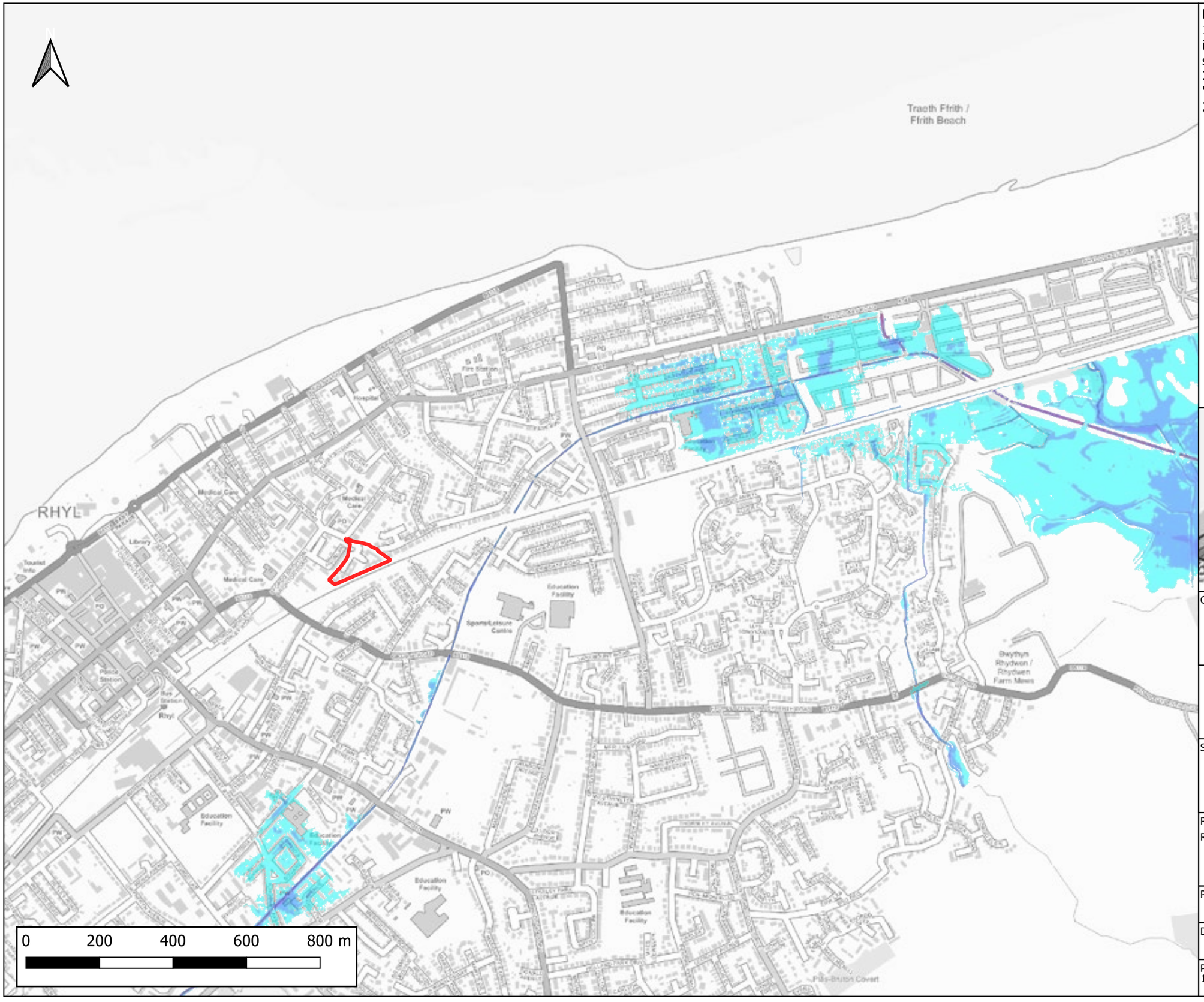

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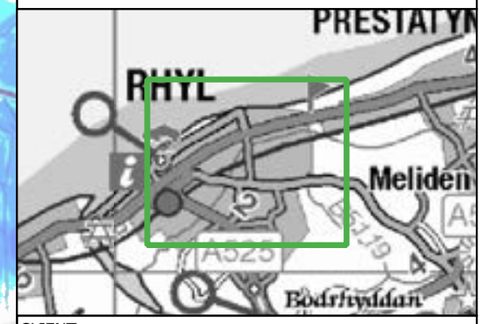

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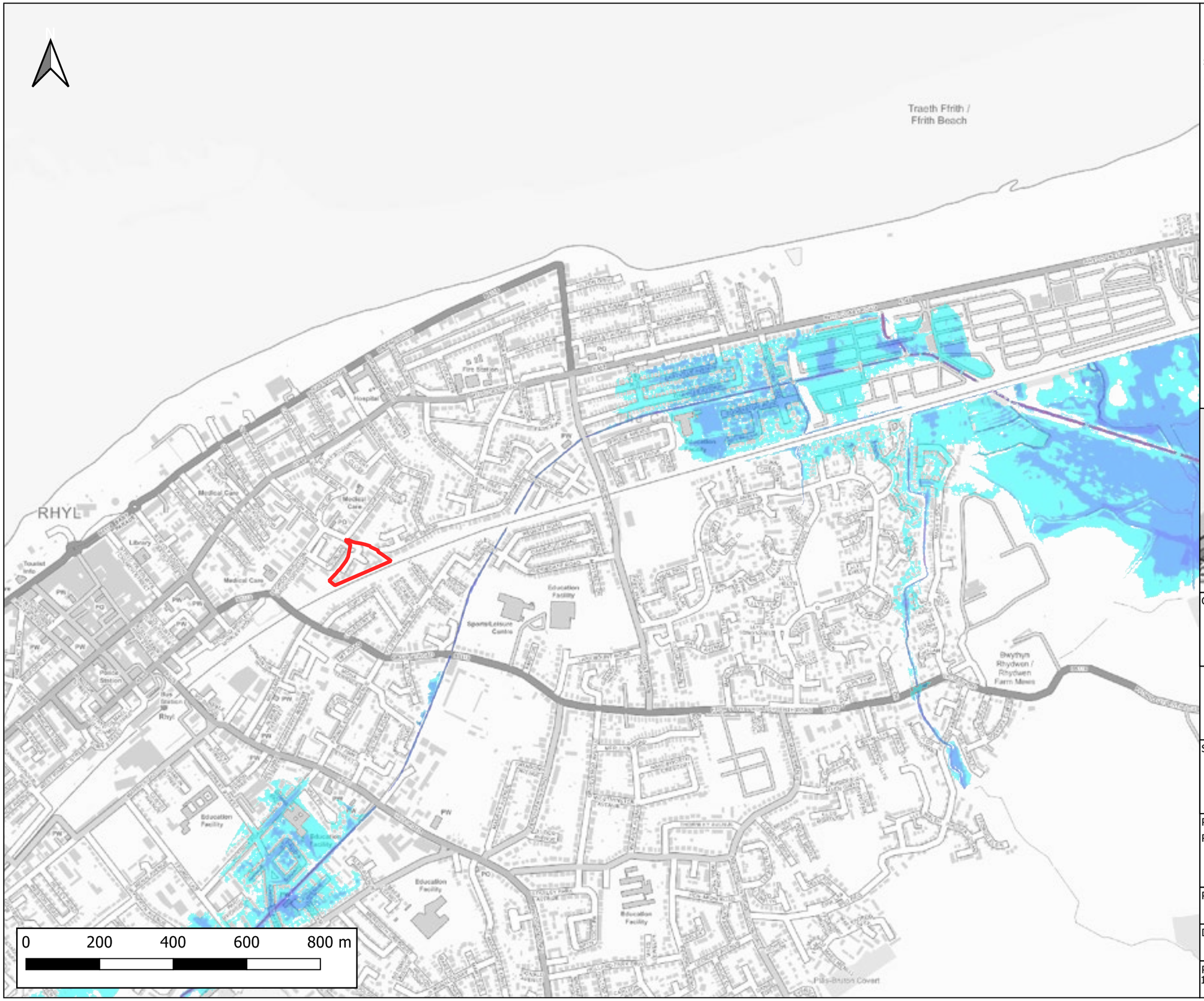
SCHEME: Maes Emlyn, Rhyl

PLOT TITLE: MAXIMUM FLOOD DEPTH
RHYL CUT AND PRESTATYN GUTTER - FLUVIAL AND TIDAL
0.1% AEP FLUVIAL COINCIDING WITH A MHWS (2120) EVENT EVENT
UNDEFENDED

PLOT STATUS:	DATE:
FINAL	13-12-2022

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
AM	JR	AW	1:10000

PLOT NAME:	REVISION:
14973_RCPGQ1000UND+100YEARMHWS_dMax	-



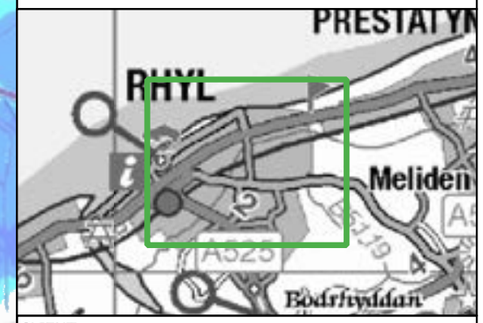
Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise.
2) Modelled Outputs taken from the 'RhylPrestatyn_5_V1.0_2019 Model' and its 2021 update.

LEGEND

- Site Boundary

Maximum Flood Depth

- <= 0.3m
- 0.3m - 0.6m
- 0.6m - 1.2m
- 1.2m - 2.4m
- > 2.4m



CLIENT: TACP Architects Ltd

waterco
www.waterco.co.uk

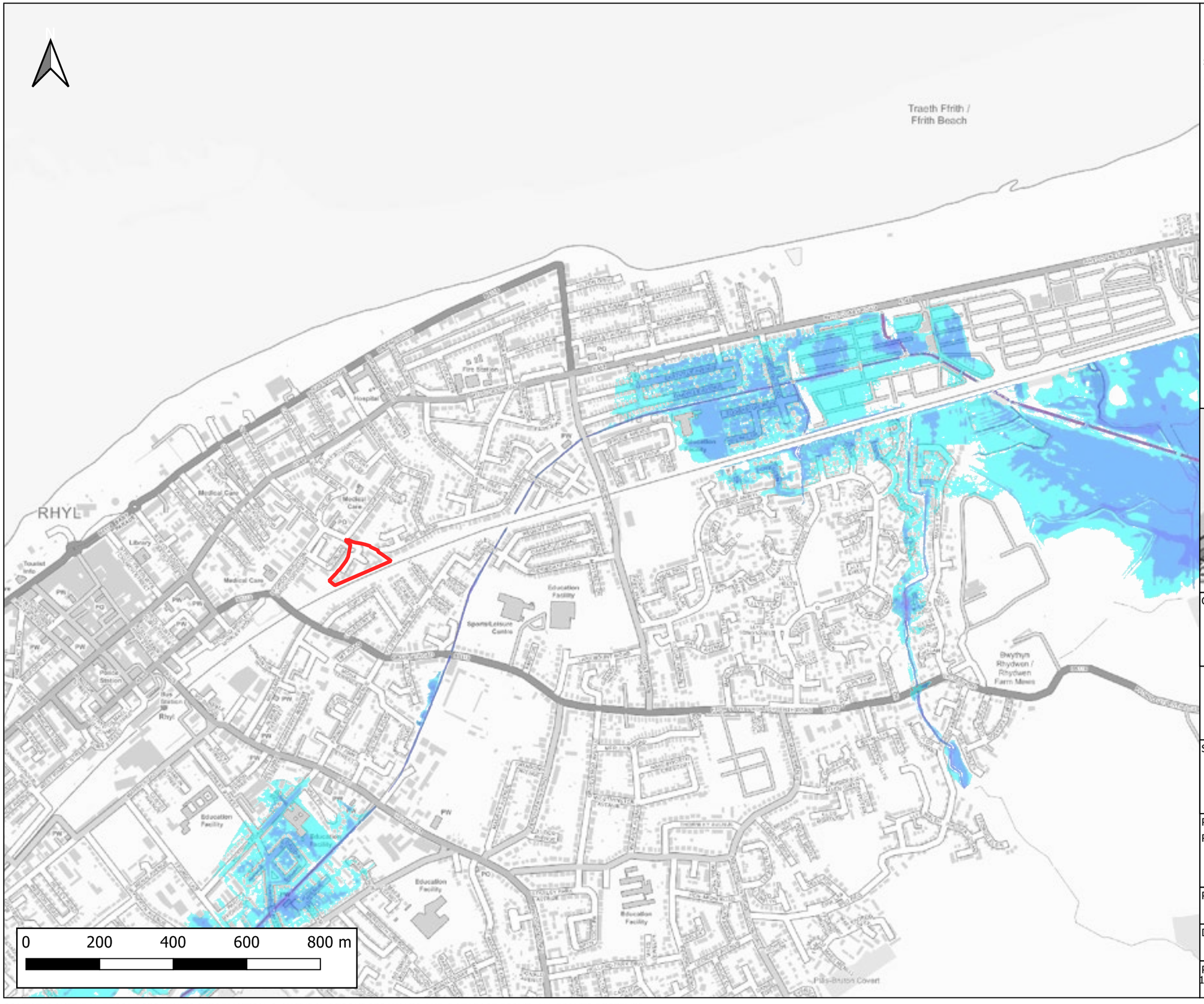
SCHEME: Maes Emlyn, Rhyl

PLOT TITLE: MAXIMUM FLOOD DEPTH
RHYL CUT AND PRESTATYN GUTTER - FLUVIAL AND TIDAL
0.1% AEP PLUS 30% CC FLUVIAL COINCIDING WITH A MHWS (2120) EVENT
UNDEFENDED

PLOT STATUS:	DATE:
FINAL	13-12-2022

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
AM	JR	AW	1:10000

PLOT NAME: 14973_RCPGQ100030CC+100YEARMHWS_dMax
REVISION: -



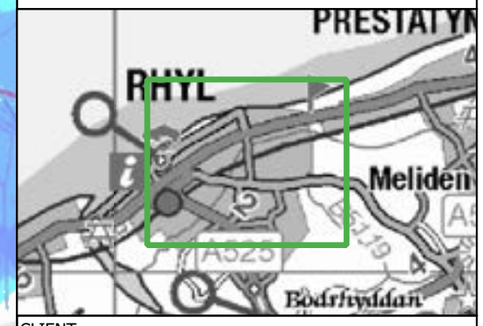
Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise.
2) Modelled Outputs taken from the 'RhylPrestatyn_5_V1.0_2019 Model' and its 2021 update.

LEGEND

- Site Boundary

Maximum Flood Depth

- <= 0.3m
- 0.3m - 0.6m
- 0.6m - 1.2m
- 1.2m - 2.4m
- > 2.4m



CLIENT:
TACP Architects Ltd

waterco
www.waterco.co.uk

SCHEME:
Maes Emlyn, Rhyl

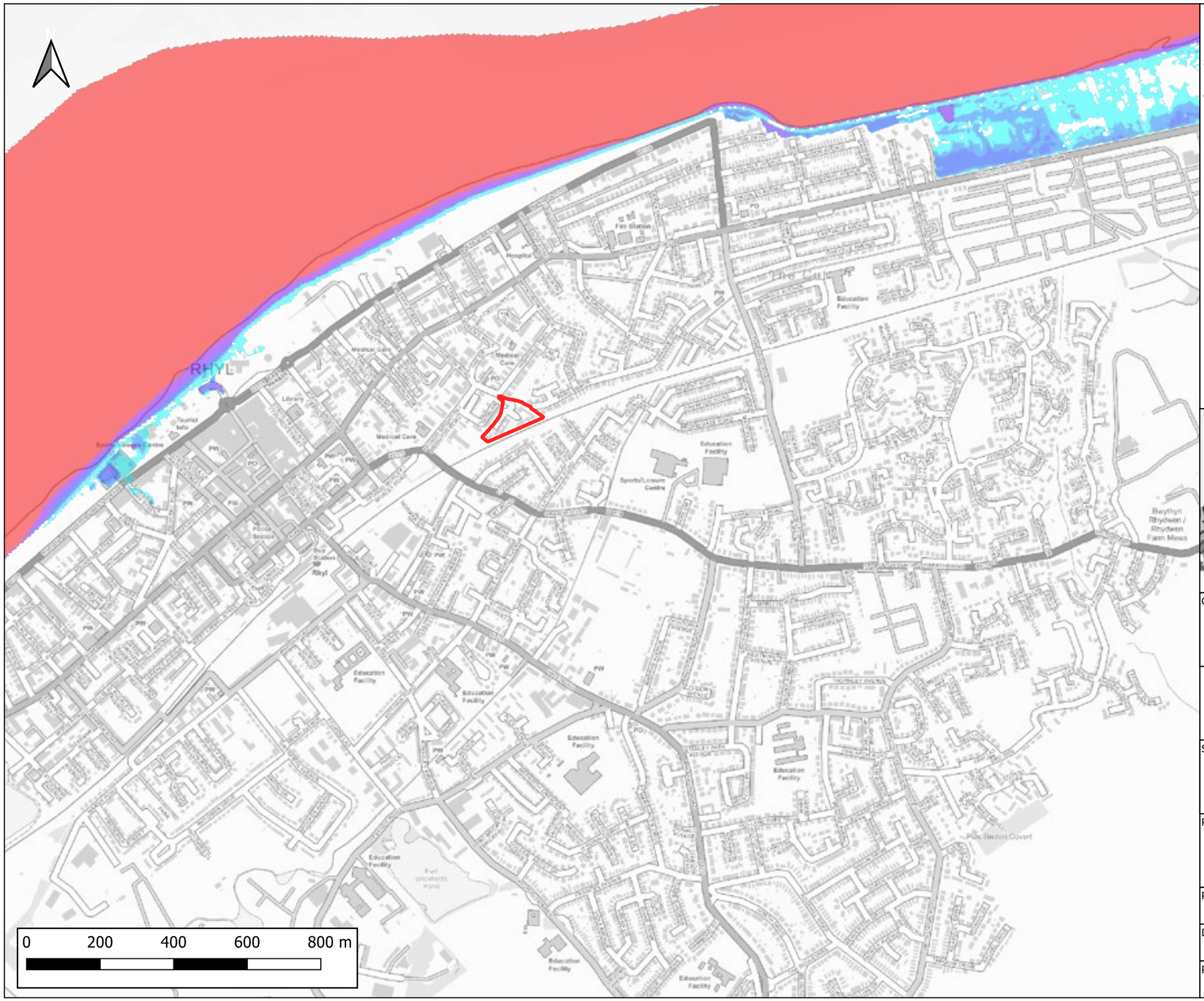
PLOT TITLE:
MAXIMUM FLOOD DEPTH
RHYL CUT AND PRESTATYN GUTTER - FLUVIAL AND TIDAL
0.1% AEP PLUS 75% CC FLUVIAL COINCIDING WITH A MHWS (2120) EVENT
UNDEFENDED

PLOT STATUS:	DATE:
FINAL	13-12-2022

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
AM	JR	AW	1:10000

PLOT NAME:	REVISION:
14973_RCPGQ100075CC+100YEARCCUND_dMax	-

Point of Ayr to Pensarn Model (tidal)



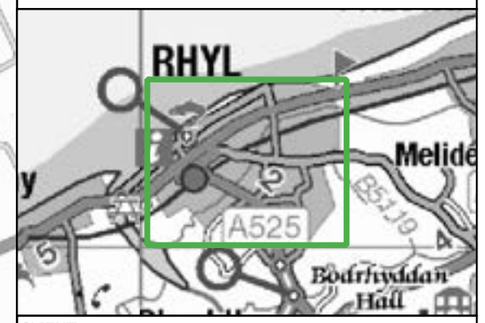
Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise.
2) Modelled Outputs taken from the 'Point of Ayr to Pensarn Tidal Flood Risk Analysis (2017) Model'.

LEGEND

- Site Boundary

Maximum Flood Depth

- <= 0.3m
- 0.3m - 0.6m
- 0.6m - 1.2m
- 1.2m - 2.4m
- > 2.4m



CLIENT: TACP Architects Ltd

www.waterco.co.uk

SCHEME: Maes Emlyn, Rhyl

PLOT TITLE: MAXIMUM FLOOD DEPTH
POINT OF AYR TO PENSARN - TIDAL
1% AEP (2016) EVENT
DEFENDED

PLOT STATUS:	DATE:
FINAL	13-12-2022

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
AM	JR	AW	1:10000

PLOT NAME:	REVISION:
14973_POATPT_Q100DEF_dMax	-

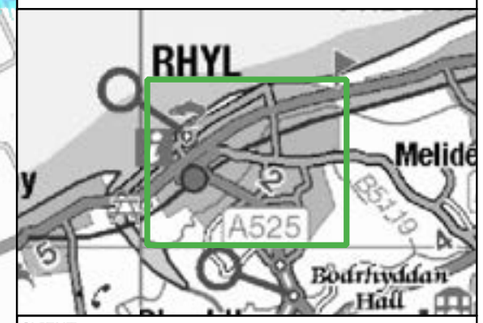
Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise.
2) Modelled Outputs taken from the 'Point of Ayr to Pensarn Tidal Flood Risk Analysis (2017) Model'.

LEGEND

- Site Boundary

Maximum Flood Depth

- <= 0.3m
- 0.3m - 0.6m
- 0.6m - 1.2m
- 1.2m - 2.4m
- > 2.4m



0 200 400 600 800 m

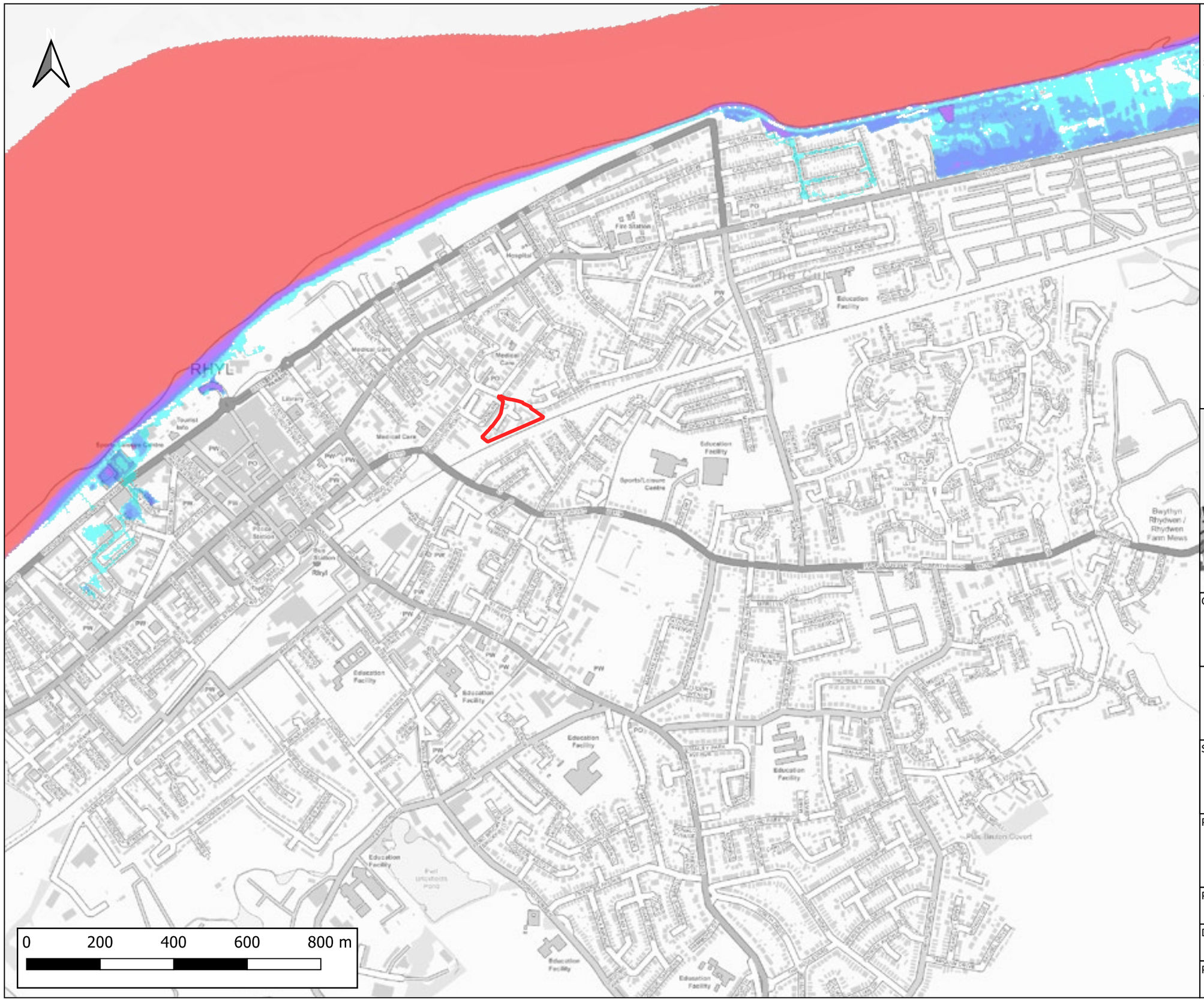
CLIENT: TACP Architects Ltd

www.waterco.co.uk

SCHEME: Maes Emlyn, Rhyl

PLOT TITLE: MAXIMUM FLOOD DEPTH
POINT OF AYR TO PENSARN - TIDAL
1% AEP PLUS CLIMATE CHANGE (2117) EVENT
DEFENDED

PLOT STATUS:			DATE:
FINAL			13-12-2022
DRAWN: AM	CHECKED: JR	APPROVED: AW	PLOT SCALE AT A3: 1:10000
PLOT NAME: 14973_POATPT_Q100CCDEF_dMax			REVISION: -



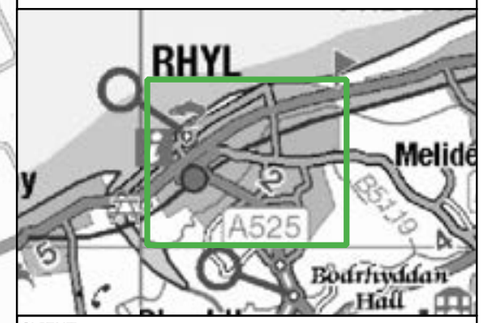
Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise.
2) Modelled Outputs taken from the 'Point of Ayr to Pensarn Tidal Flood Risk Analysis (2017) Model'.

LEGEND

- Site Boundary

Maximum Flood Depth

- <= 0.3m
- 0.3m - 0.6m
- 0.6m - 1.2m
- 1.2m - 2.4m
- > 2.4m



CLIENT: TACP Architects Ltd

www.waterco.co.uk

SCHEME: Maes Emlyn, Rhyl

PLOT TITLE: MAXIMUM FLOOD DEPTH
POINT OF AYR TO PENSARN - TIDAL
0.5% AEP (2016) EVENT
DEFENDED

PLOT STATUS:	DATE:
FINAL	13-12-2022

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
AM	JR	AW	1:10000

PLOT NAME:	REVISION:
14973_POATPT_Q200DEF_dMax	-

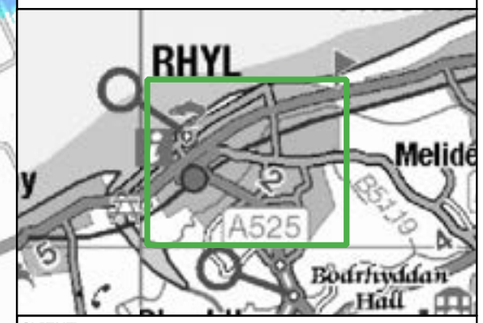
Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise.
2) Modelled Outputs taken from the 'Point of Ayr to Pensarn Tidal Flood Risk Analysis (2017) Model'.

LEGEND

- Site Boundary

Maximum Flood Depth

- <= 0.3m
- 0.3m - 0.6m
- 0.6m - 1.2m
- 1.2m - 2.4m
- > 2.4m



0 200 400 600 800 m

CLIENT: TACP Architects Ltd

www.waterco.co.uk

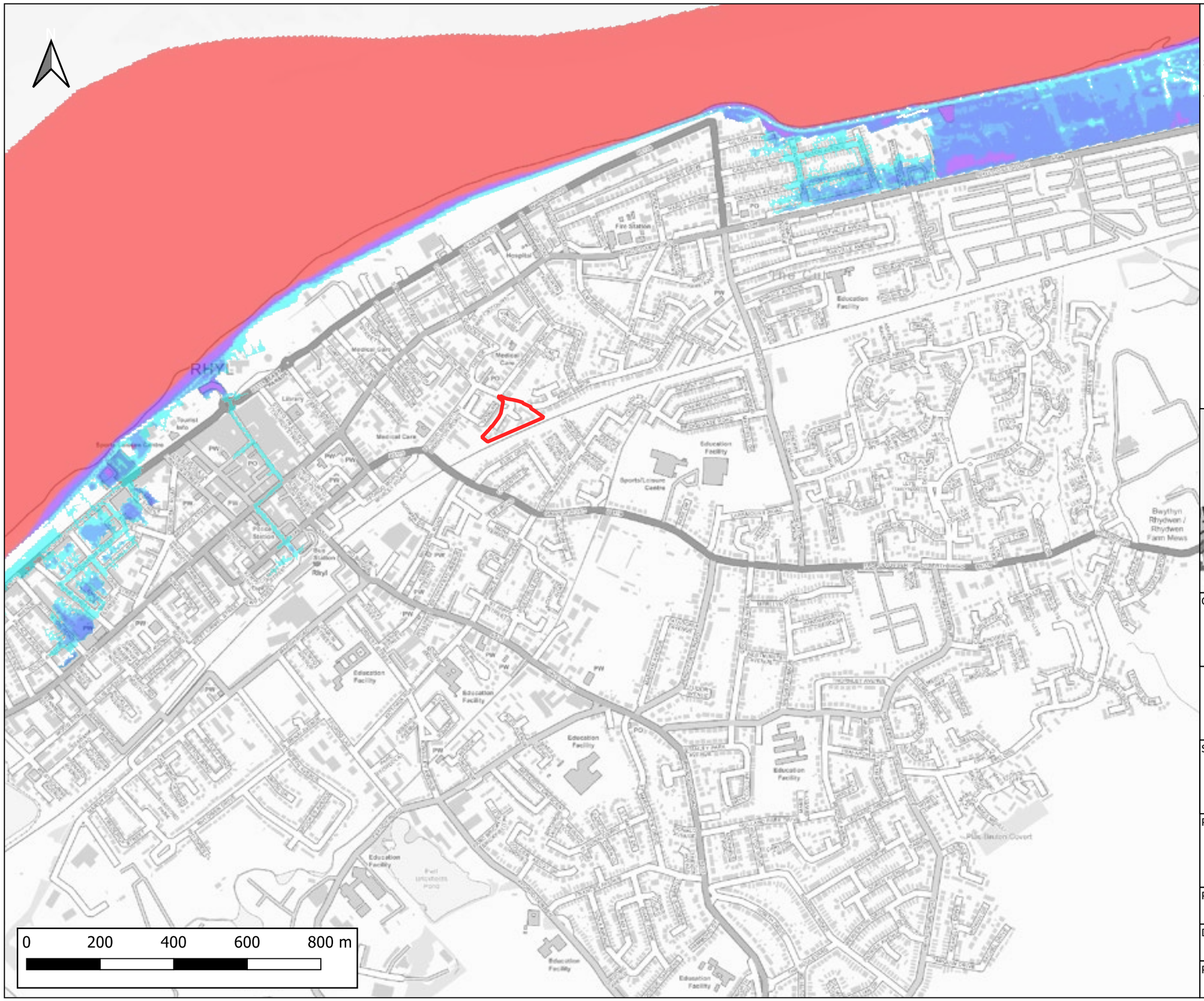
SCHEME: Maes Emlyn, Rhyl

PLOT TITLE: MAXIMUM FLOOD DEPTH
POINT OF AYR TO PENSARN - TIDAL
0.5% AEP PLUS CLIMATE CHANGE (2117)
EVENT
DEFENDED

PLOT STATUS:	DATE:
FINAL	13-12-2022

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
AM	JR	AW	1:10000

PLOT NAME:	REVISION:
14973_POATPT_Q200CCDEF_dMax	-



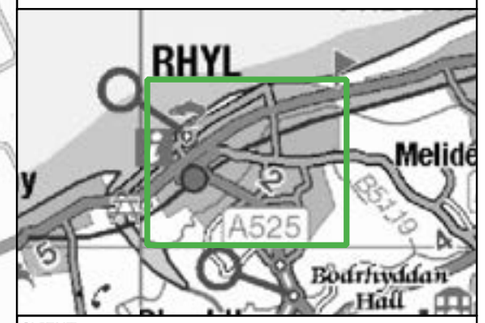
Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise.
2) Modelled Outputs taken from the 'Point of Ayr to Pensarn Tidal Flood Risk Analysis (2017) Model'.

LEGEND

- Site Boundary

Maximum Flood Depth

- <= 0.3m
- 0.3m - 0.6m
- 0.6m - 1.2m
- 1.2m - 2.4m
- > 2.4m



CLIENT: TACP Architects Ltd

www.waterco.co.uk

SCHEME: Maes Emlyn, Rhyl

PLOT TITLE: MAXIMUM FLOOD DEPTH
POINT OF AYR TO PENSARN - TIDAL
0.1% AEP (2016) EVENT
DEFENDED

PLOT STATUS:			DATE:
FINAL			13-12-2022
DRAWN: AM	CHECKED: JR	APPROVED: AW	PLOT SCALE AT A3: 1:10000
PLOT NAME: 14973_POATPT_Q1000DEF_dMax			REVISION: -

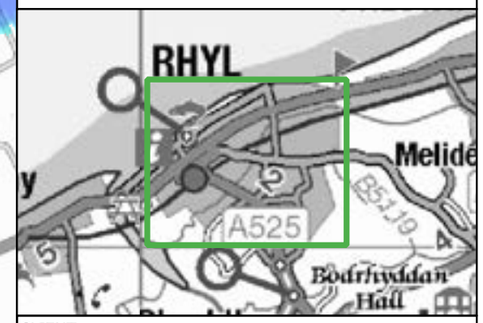
Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise.
2) Modelled Outputs taken from the 'Point of Ayr to Pensarn Tidal Flood Risk Analysis (2017) Model'.

LEGEND

- Site Boundary

Maximum Flood Depth

- <= 0.3m
- 0.3m - 0.6m
- 0.6m - 1.2m
- 1.2m - 2.4m
- > 2.4m



0 200 400 600 800 m

CLIENT: TACP Architects Ltd

www.waterco.co.uk

SCHEME: Maes Emlyn, Rhyl

PLOT TITLE: MAXIMUM FLOOD DEPTH
POINT OF AYR TO PENSARN - TIDAL
0.1% AEP PLUS CLIMATE CHANGE (2117)
EVENT
DEFENDED

PLOT STATUS:	DATE:
FINAL	13-12-2022

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
AM	JR	AW	1:10000

PLOT NAME:	REVISION:
14973_POATPT_Q1000CCDEF_dMax	-

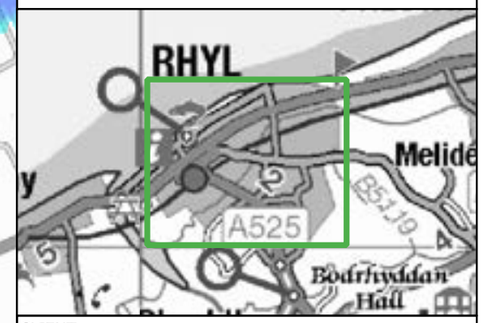
Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise.
2) Modelled Outputs taken from the 'Point of Ayr to Pensarn Tidal Flood Risk Analysis (2017) Model'.

LEGEND

- Site Boundary
- Garford Road, Rhyl Breach Location

Maximum Flood Depth

- <= 0.3m
- 0.3m - 0.6m
- 0.6m - 1.2m
- 1.2m - 2.4m
- > 2.4m



0 200 400 600 800 m

CLIENT:	TACP Architects Ltd
	www.waterco.co.uk
SCHEME:	Maes Emlyn, Rhyl
PLOT TITLE:	MAXIMUM FLOOD DEPTH POINT OF AYR TO PENSARN - TIDAL 0.5% AEP (2117) EVENT GARFORD ROAD BREACH
PLOT STATUS: FINAL	DATE: 13-12-2022
DRAWN: AM / CHECKED: JR / APPROVED: AW	PLOT SCALE AT A3: 1:10000
PLOT NAME: 14973_POATPT_Q200BR_dMax	REVISION: -

Marine Lake and Clwyd Retail Park Breaches

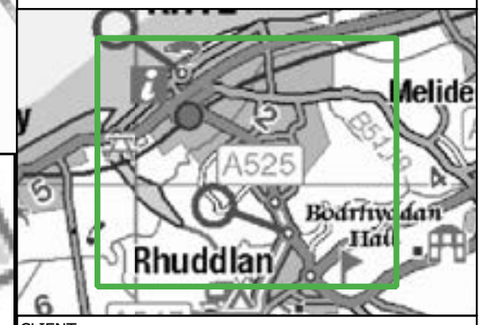
Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise.
2) Modelled Outputs taken from the 'Dembighshire Flood Consequence Assessment - Level 1 (2018) Model'.

LEGEND

- Site Boundary
- River Clwyd Breach Location

Maximum Flood Depth

- <= 0.3m
- 0.3m - 0.6m
- 0.6m - 1.2m
- 1.2m - 2.4m
- > 2.4m



Map Scale at A3: 1:1200

0 200 400 600 800 m

0 10 20 30 40 50 m

CLIENT: TACP Architects Ltd

waterco
www.waterco.co.uk

SCHEME: Maes Emlyn, Rhyl

PLOT TITLE: MAXIMUM FLOOD DEPTH
RIVER CLWYD - TIDAL
0.5% AEP PLUS CLIMATE CHANGE (2117) EVENT
CLWYD RETAIL PARK BREACH

PLOT STATUS:	DATE:
FINAL	13-12-2022

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
AM	JR	AW	1:15000

PLOT NAME: 14973_RCFQ200CCRCBRE_dMax
REVISION: -

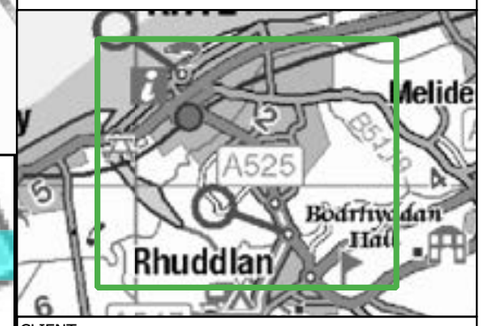
Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise.
2) Modelled Outputs taken from the 'Dembighshire Flood Consequence Assessment - Level 1 (2018) Model'.

LEGEND

- Site Boundary
- River Clwyd Breach Location

Maximum Flood Depth

- <= 0.3m
- 0.3m - 0.6m
- 0.6m - 1.2m
- 1.2m - 2.4m
- > 2.4m



Map Scale at A3: 1:1200

0 200 400 600 800 m

0 10 20 30 40 50 m

CLIENT: TACP Architects Ltd

waterco
www.waterco.co.uk

SCHEME: Maes Emlyn, Rhyl

PLOT TITLE: MAXIMUM FLOOD DEPTH
RIVER CLWYD - TIDAL
0.1% AEP PLUS CLIMATE CHANGE (2117) EVENT
CLWYD RETAIL PARK BREACH

PLOT STATUS:	DATE:
FINAL	13-12-2022

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
AM	JR	AW	1:15000

PLOT NAME:	REVISION:
14973_RCFQ1000CCRCBRE_dMax	-

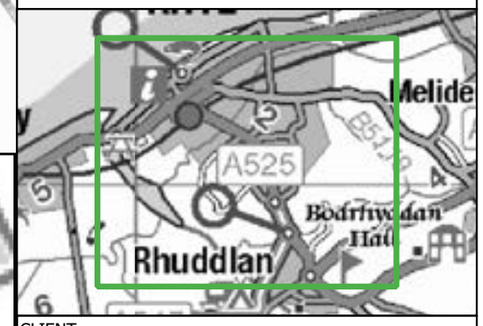
Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise.
2) Modelled Outputs taken from the 'Dembighshire Flood Consequence Assessment - Level 1 (2018) Model'.

LEGEND

- Site Boundary
- Marine Lake Breach Location

Maximum Flood Depth

- <= 0.3m
- 0.3m - 0.6m
- 0.6m - 1.2m
- 1.2m - 2.4m
- > 2.4m



Map Scale at A3: 1:1200

0 200 400 600 800 m

0 10 20 30 40 50 m

CLIENT: TACP Architects Ltd

waterco
www.waterco.co.uk

SCHEME: Maes Emlyn, Rhyl

PLOT TITLE: MAXIMUM FLOOD DEPTH
RIVER CLWYD - TIDAL
0.5% AEP PLUS CLIMATE CHANGE (2117) EVENT
MARINE LAKE BREACH

PLOT STATUS:	DATE:
FINAL	13-12-2022

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
AM	JR	AW	1:15000

PLOT NAME: 14973_RCFQ200CCRMLBRE_dMax
REVISION: -

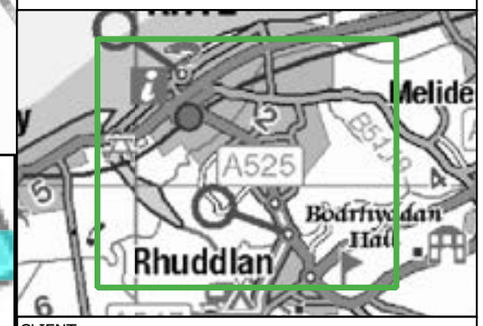
Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise.
2) Modelled Outputs taken from the 'Dembighshire Flood Consequence Assessment - Level 1 (2018) Model'.

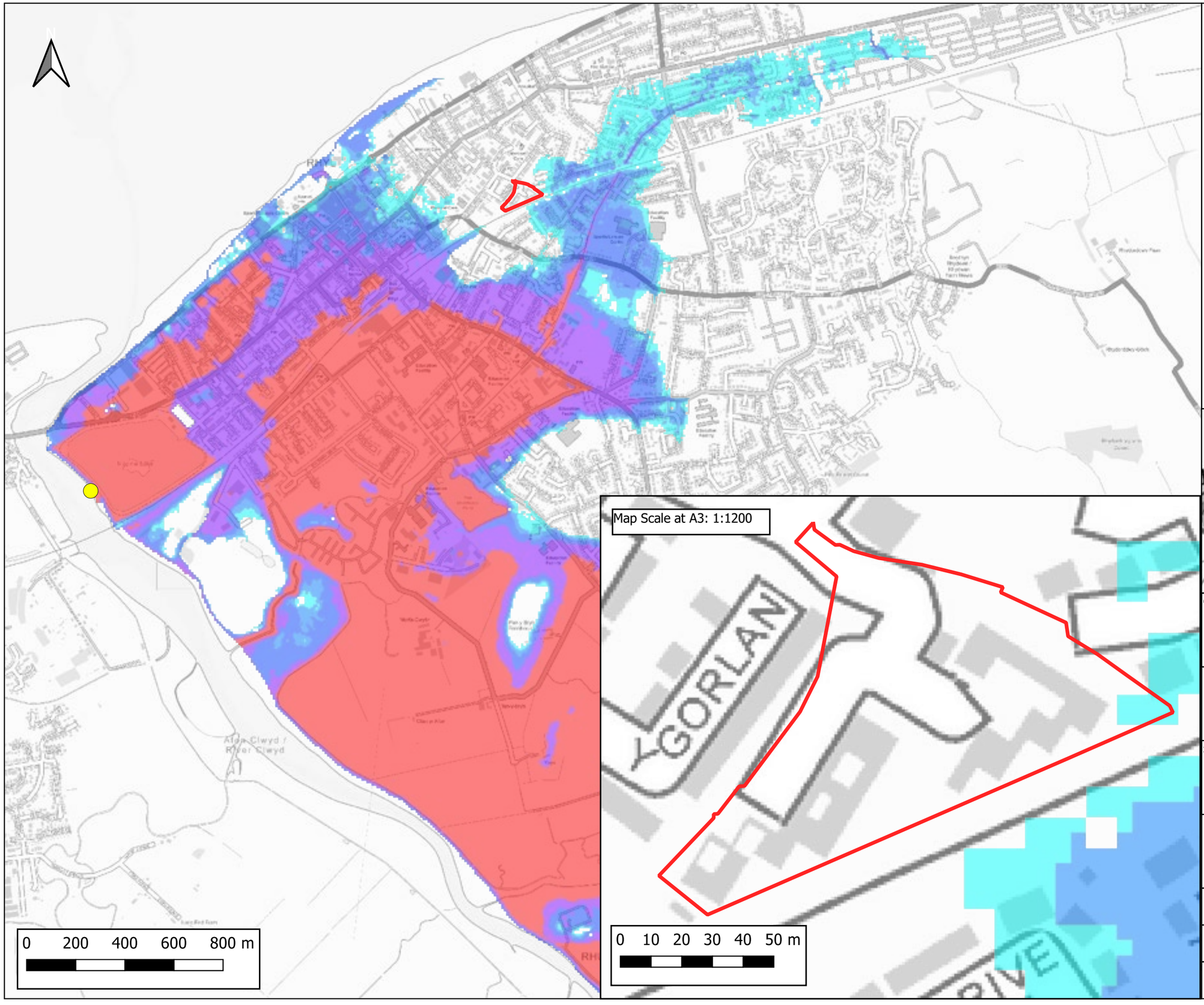
LEGEND

- Site Boundary
- Marine Lake Breach Location

Maximum Flood Depth

- <= 0.3m
- 0.3m - 0.6m
- 0.6m - 1.2m
- 1.2m - 2.4m
- > 2.4m





CLIENT: TACP Architects Ltd

waterco
www.waterco.co.uk

SCHEME: Maes Emlyn, Rhyl

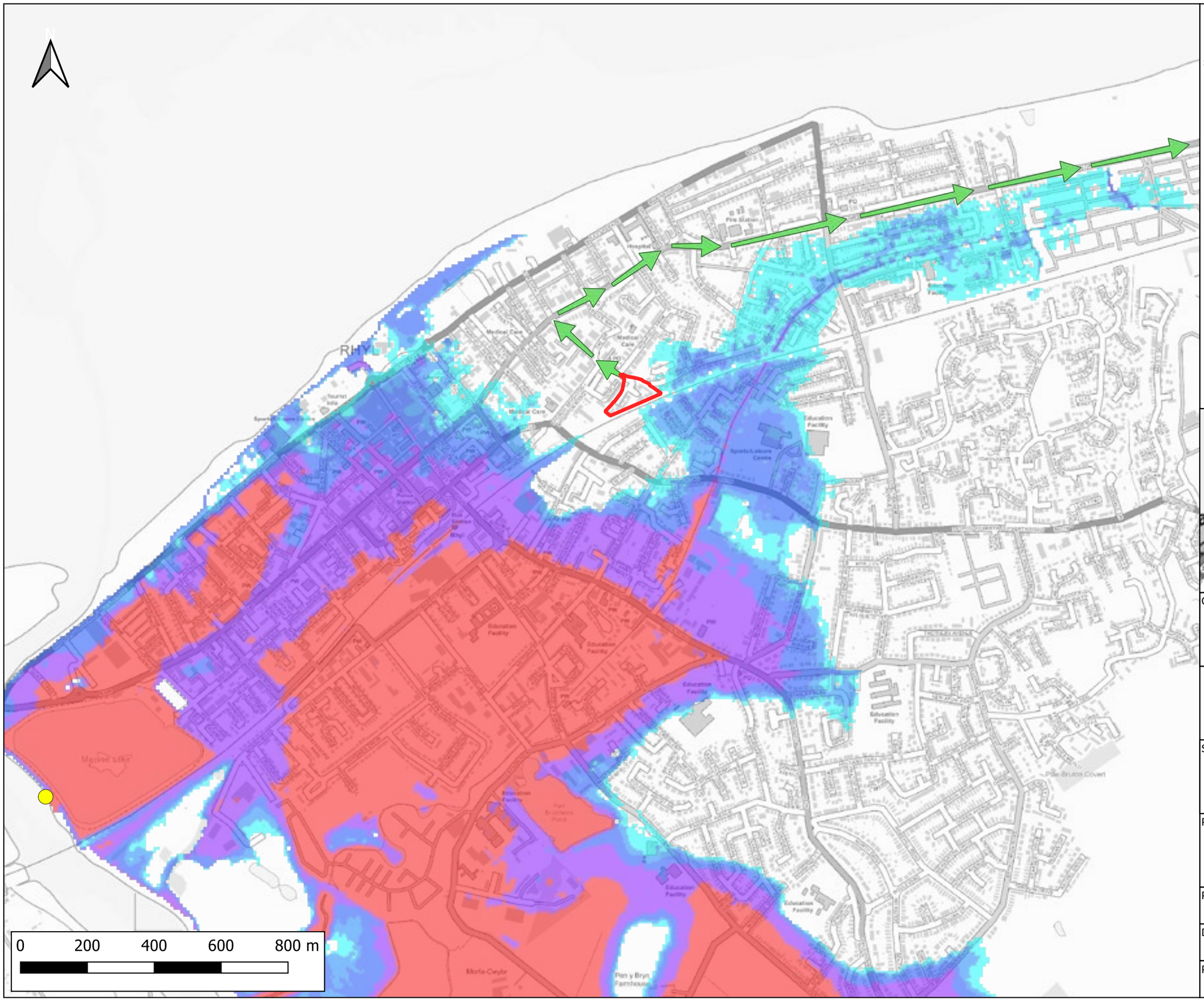
PLOT TITLE:
MAXIMUM FLOOD DEPTH
RIVER CLWYD - TIDAL
0.1% AEP PLUS CLIMATE CHANGE (2117) EVENT
MARINE LAKE BREACH

PLOT STATUS:	DATE:
FINAL	13-12-2022

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
AM	JR	AW	1:15000

PLOT NAME:	REVISION:
14973_RCFQ1000CCRMLBRE_dMax	-

Appendix I Flood Evacuation Plan



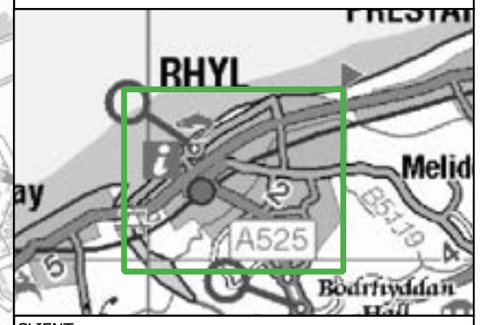
Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise

LEGEND

- Site Boundary
- Marine Lake Breach Location

Maximum Flood Depth

- <= 0.3m
- 0.3m - 0.6m
- 0.6m - 1.2m
- 1.2m - 2.4m
- > 2.4m



CLIENT:
TACP Architects Ltd

waterco
www.waterco.co.uk

SCHEME:
Maes Emlyn, Rhyl

PLOT TITLE:
Flood Evacuation Plan
0.1% AEP Plus Climate Change (2117) Event
Marine Lake Breach

PLOT STATUS:	DATE:
FINAL	13-12-2022

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
AM	JR	AW	1:11000

PLOT NAME:	REVISION:
14973_LiDAR_Plan	-