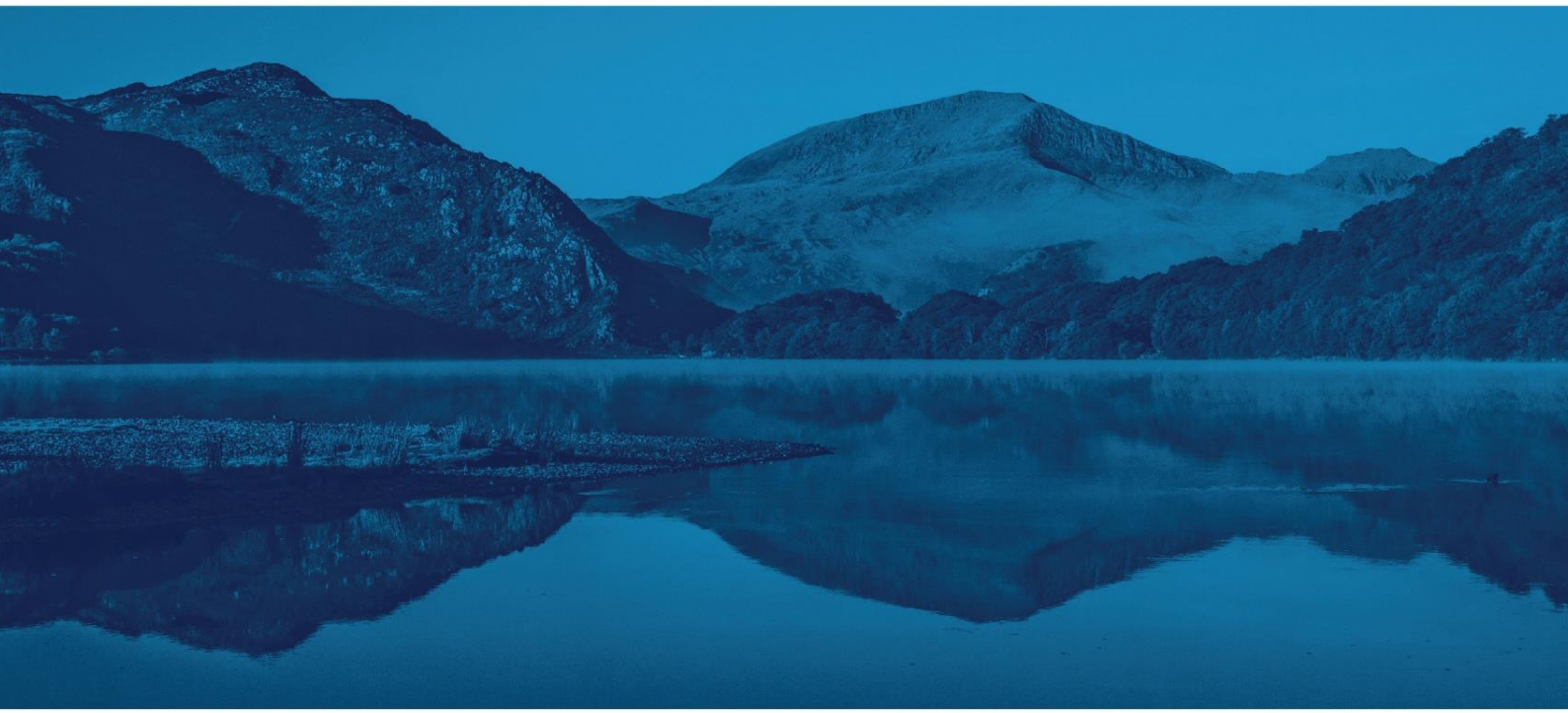
Wrexham Road, Abermorddu

Hydraulic Modelling Report

April 2017



Assessment / Modelling / Design

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DOCUMENT REVIEW & APPROVAL

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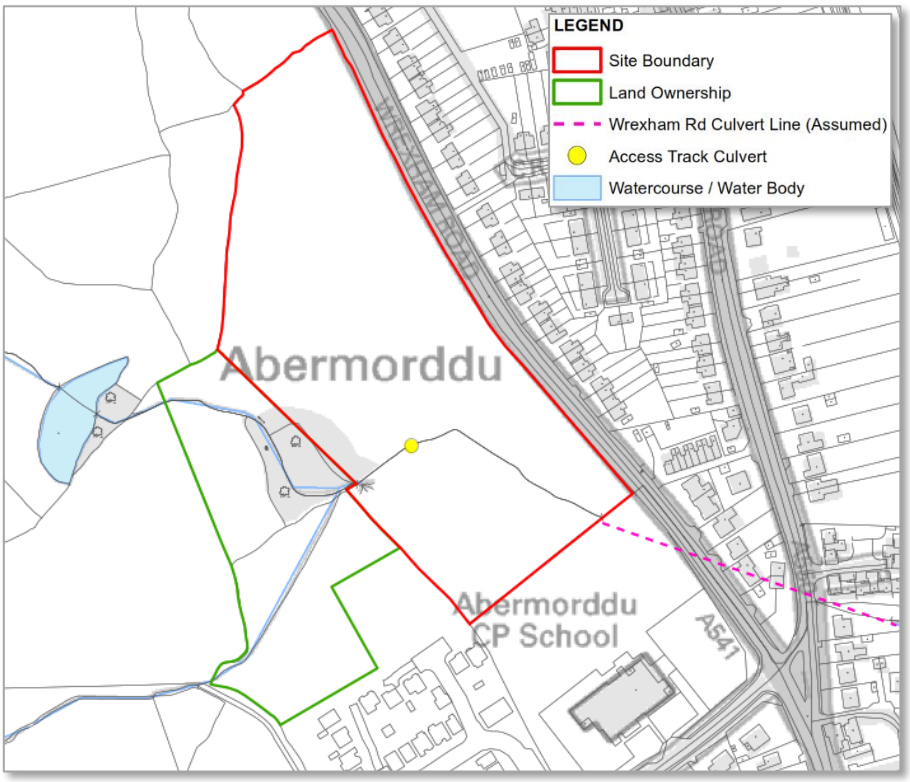
Introduction

Waterco Consultants have been commissioned to undertake a detailed fluvial hydraulic modelling study of an ordinary watercourse, Abermorddu Stream, which flows though the proposed residential development at Wrexham Road, Abermorddu, LL12 9DG.

The outputs of the hydraulic modelling study provide a detailed, up-to-date assessment of the existing fluvial flood risk at the site and quantify the change in flood risk elsewhere as a result of the development (if any). This report also supports the Flood Consequences Assessment being prepared for the development.

A location plan and an aerial photograph of the site are included in Appendix A; an extract of the location plan is included in Figure 1. The grid reference of the site is 330786E 356737N.

Figure 1 – Location Plan



Site Description and Proposed Development

The site is currently entirely 'greenfield'. Wrexham Road and an existing residential development border the site to the east, and Abermorddu primary school to the south. Undeveloped 'greenfield' land borders the site to the west and to the north. The site covers an area of 3.53ha.

A topographical survey of the site was undertaken by Powers & Tiltman Ltd in July 2016 and is provided in Appendix B for information. The survey shows existing site levels fall from west to south-east, from a level of approximately 98m AOD to approximately 88m AOD along Wrexham Road.

The proposed development comprises a total of 83 residential dwellings with associated access roads and soft landscaping areas. The proposed access to the southern area of the development is over Abermorddu Stream. Therefore, the existing Access Track Culvert (pipe) will be replaced with a larger and longer box culvert (Access Road Culvert), and an access road will be constructed over the structure. Ground levels on site will be altered to accommodate the development, critical to this study is the proposed road north and south of the structure, and also Area B, where ground levels will be raised. A proposed development plan, showing the indicative layout, is included in Appendix C.

Nearby Watercourses and Existing Flood Risk Data

Abermorddu Stream flows in a north-west to south-east direction, flowing through a small fishing pond, referred to as Witches Pool, which is located 50m west (120m upstream) of the site. From the outfall of Witches Pool, Abermorddu Stream flows south-east for 120m to reach the site. The watercourse enters the site along the western boundary and flows for 165m as an open channel to the south-eastern boundary of the site where it discharges into a long culvert, approximately 180m in length. The long culvert is referred to as Structure 3 in the Waterco hydraulic model and as Wrexham Road Culvert in this report; the location of the Wrexham Road Culvert is shown in the location plan in Appendix A. Wrexham Road Culvert diverts flow in the watercourse beneath Wrexham Road and beneath housing east of the site, the culvert then opens and flows east to eventually join the River Alyn. A tributary joins Abermorddu Stream just upstream of the site, this is referred to as the Abermorddu Tributary in this study.

Flooding at the site could occur if water levels are sufficient to overtop local banks during, or following, an extreme fluvial event. The Abermorddu Stream is considered the primary source of fluvial flood risk at the site and is the main focus of this study.

Tidal flood risk has not been considered during this study given the site's relative elevation (between 88 and 98m AOD) and distance from the coast (~30km).

The current NRW Risk of Flooding from Rivers and Sea mapping show the site to be entirely located within Flood Zone 1 – an area considered to be at low risk of fluvial flooding with an annual probability of the flooding less than 0.1% (1 in 1000) AEP (annual exceedance probability). Based on this, the TAN 15 Development Advice mapping indicates the site to be located within Zone A. An extract of the current NRW Flood Zones and TAN 15 Development Advice Map is included in Appendix D for reference.

The NRW do not currently hold a detailed hydraulic model of the area including Abermorddu Stream and the associated tributary.

To provide a site-specific assessment of fluvial flood risk from the Abermorddu Stream and its tributary a linked 1D/2D* hydraulic model has been constructed. An integrated 1D/2D model is considered the most appropriate model type in this instance due to the potential for out-of-bank flows from the

* A 1D/2D hydrodynamic model is comprised of a 1-Dimensional (1D) river network model (based on surveyed river cross-sections) coupled with a 2-Dimensional (2D) Digital Terrain Model (DTM) of the potential floodplain (created from LiDAR).

watercourse reaching the site. This model has also been used to investigate the impact on flood risk at the site in the event of blockage of nearby critical hydraulic structures.

Hydraulic Modelling

This section provides details of the 1D/2D hydraulic model build and the simulations and scenarios completed as part of this study.

Following an initial assessment of the existing fluvial flood risk at the development site, simulation outputs will be compared against those generated using the proposed development levels to quantify the change in flood risk elsewhere as a result of the development (if any).

The latest version of hydraulic modelling software MIKE FLOOD available at the start of the project have been used for all simulations; MIKE2016 SP3.

Events considered

To fully investigate the fluvial flood risk at the site during both the existing (EXG) and proposed development (DEV) scenarios, a range of fluvial events have been simulated; namely the 5% (Q20), 1% (Q100) and 0.1% (Q1000) AEP events. The impact of future climate change (CC) has also been investigated during the 1% AEP event by increasing flows by 20% and 45%. A list of simulations completed is given in Table 1.

To provide the required model inflows, a detailed hydrological assessment of the predicted flows in the Abermorddu Stream has been completed in accordance with the Flood Estimation Handbook (FEH), the EA Guidelines on use of FEH, namely 'Flood Estimation Guidelines, Technical guidance 197_08, v5 (2015)' and the NRW guidance on flood estimation, namely 'Good Practice Guide, Technical Guidance: Flood Estimation (May 2016)'. Both the FEH Statistical and ReFH flow estimation methods have been used. The completed hydrological calculations, summarised in a Flood Estimation Calculation (FEC) Record, are included in Appendix E, along with the final design hydrographs used. Peak flow estimates are given in Table 1.

Table 1 – Primary Simulation Summary

Watercourse	Fluvial Event (AEP)	Peak Flows (m3/s)	Development Scenario
Abermorddu Stream	5% (Q20)	0.08	Existing Site Layout (EXG) & Proposed Site Layout (DEV)
	1% (Q100)	0.32	
	1% + CC (Q1000 + 20%)	0.38	
	1% + CC (Q100 + 45%)	0.56	
	0.1% (Q1000)	0.59	
Abermorddu Tributary	5% (Q20)	0.05	
	1% (Q100)	0.09	
	1% + CC (Q100 + 20%)	0.11	
	1% + CC (Q100 + 45%)	0.13	
	0.1% (Q1000)	0.16	

1D Model Details

The 1D network model of the Abermorddu Stream has been constructed using river cross-sections data collected by Infomap Surveys & Mapping in October 2016 (Appendix B).

The 1D model starts 50m upstream of Witches Pool (330550E 356734N), this is approximately 250m upstream of the where the watercourse meets the site. The 1D model ends at the railway line (331096E 356582N) approximately 200m downstream of the site. Approximately 89m of Abermorddu Tributary, is also included in the 1D model network. The confluence of the tributary and Abermorddu Stream is located approximately 10m upstream of the site. In total, approximately 600m of the Abermorddu Stream and its tributary is modelled. The extent of the linked 1D/2D model is presented in Appendix F.

The upstream boundaries of the 1D model use a discharge time (QT) boundary condition applied to the most upstream node of the Abermorddu Stream (i.e. chainage 0) and the Abermorddu Tributary (i.e. chainage 0). The calculated inflow hydrographs presented in Appendix E have been specified as required. Survey data suggests Witches Pool is 1m deep, as such, to be conservative the initial water level of the Witches Pool has been set to 1m depth, to ensure that the pond is modelled as full and does not provide additional flood storage.

The downstream boundary condition of the 1D network (331096E 356582N) has been established approximately 200m downstream of the site using a discharge-stage (QH or Rating Curve) boundary condition. Required local slope data has been taken from survey data with a slope value of 0.0625 (1 in 16) being specified.

All hydraulically significant structures along the surveyed watercourse have been included in the 1D model network. A total of two structures have been modelled; a 300mm pipe Access Track Culvert (referred to as Structure 2 in survey data in Appendix B) located on-site and the 300mm pipe Wrexham Road Culvert (referred to as Structure 3 in survey data in Appendix B). Both structures are culverts located on Abermorddu Stream. The location of the culverts is shown in the location plan in Appendix A. Both structures are considered potentially critical to flooding at the site (i.e. proximity to site, blockage potential etc.) and have been subject to blockage assessment – discussed further below. Two additional structures were surveyed, namely Structure 1 and Structure 4; these are not included in the model as they are located outside the modelled area.

Within the proposed development scenario (DEV), the 300mm pipe Access Track Culvert is to be replaced by an Access Road Culvert. The proposed Access Road Culvert is a box culvert 8m long, 1m wide and 0.5m in height; an access road will be constructed over the box culvert. To accommodate the larger size of the proposed culvert, the channel bed is to be widened to a width of 1.5m, 10m upstream and 10m downstream of the culvert. The banks have been modelled as vertical gabion walls 10m upstream and 10m downstream of the proposed culvert. The proposed road deck level at the structure is 90.64m AOD, as such the 1D overtopping weir structure has been set to this level.

Manning's n coefficients have been used to represent the roughness of the channel and structures in the 1D model with the choice of coefficient based on survey observations. The coefficient values used

vary between 0.02 and 0.045. Sensitivity testing on this parameter has been performed to verify and is discussed below.

2D Model Details

The MIKE21 model has been constructed from 1m LiDAR data and site-specific topographical survey data (Appendix B). The existing pond, Witches Pool, is located approximately 160m upstream of site and has been included within the DTM based on levels provided within topographical data collected by Infomap Surveys and Mapping in October 2016.

The 2D cell size has been set at 1m. This resolution is adequate to represent the flow paths on site and within the wider floodplain whilst maintaining a reasonable run time.

OS MasterMap data (provided with the current EA model) has been used to classify land use and assign Manning's n roughness coefficients throughout the floodplain. The coefficients used are given in Table 2.

Table 2 – 2D Model Manning's n Roughness Coefficients

Land Use	Manning's n Roughness Coefficient ($s/m^{1/3}$)
Default	0.04
Buildings	0.5
Land (gardens / fields)	0.04
Woodland	0.06
Roads, paths, rail	0.02

To simulate and compare the proposed development arrangement (DEV) to the existing levels, an alternative 2D DEV model has been created using the proposed level data provided (Appendix C). The proposed road levels adjacent to the box culvert have been set to 90.64m AOD in the DTM. Area B on the proposed development plans has also been raised to a minimum of 90.74m AOD to ensure the area remains flood free. All the remaining areas where level alterations are proposed on the site have not been altered in the DTM as these do not flood during any of the fluvial scenarios.

Blockage Scenarios

The Wrexham Road Culvert and existing Access Track Culvert / proposed Access Road Culvert are considered potentially critical to flooding at the site given their close proximity to the site and potential to block.

To investigate the flood risk at the site in the event of a significant blockage of these structures, a range of blockage scenario simulations have been undertaken and detailed in Table 3. The blockage scenarios have been simulated during both the existing and proposed development scenarios.

Table 3 – Blockage Scenario Simulations

Scenario Ref	Structure	Fluvial Event (AEP)	Blockage	Model Ref
BL1	Wrexham Road Culvert (300mm pipe)	0.1% (Q1000)	100%	BL1-EXG
				BL2-DEV
BL2	Access Track Culvert (300mm pipe)			BL1-EXG
	Access Road Culvert (1m x 0.5m box culvert)			BL2-DEV

Sensitivity Testing

In the absence of available calibration data, increased significance has been placed on sensitivity testing to improve confidence in the model outputs and assess the sensitivity of the model parameters. Two sensitivity tests have been carried out (ST1-2) with respect to the 0.1% AEP, EXG event.

Sensitivity tests “ST1” and “ST2” investigate variation (+/- 20%) of Manning’s roughness coefficients in the Abermorddu Stream, Abermorddu Tributary channel and across the floodplain.

Results & Conclusions

This section of the report documents the results obtained from the primary simulations, both EXG and DEV models, blockage scenarios and sensitivity tests.

Calculated maximum water levels were extracted at each node along the 1D network model and compared for each simulation. A table of this data has been provided in Appendix G. Maximum flood depth, velocity and hazard mapping has been provided for each primary simulation in Appendix H.

Flood hazard ratings have been calculated in accordance with DEFRA document 'FD2320: Flood Risks to People' and EA guidance document 'Supplementary Note on Flood Hazard Ratings and Thresholds'.

EXG Simulations - Existing Site Layout

The results of the hydraulic modelling show that up to 15% of the existing site is affected by fluvial flooding during all simulated EXG primary simulations.

The main cause of flooding on site, and in the surrounding area, can be attributed to a lack of culvert capacity in both the Access Track Culvert and Wrexham Road, in all simulated events. The lack of capacity within both the Access Track Culvert the Wrexham Road Culvert causes water back up filling the channel upstream of the culvert, until channel capacity is reached and floodwater overtops the banks of the Abermorddu Stream. Once the banks have overtopped, floodwaters follow topographical low points in an easterly direction across the site. Floodwaters build up slightly on the western edge of Wrexham Road, eventually overtopping the road to continue to flow over the housing estate east of the site.

During the 5% AEP event approximately 10% of the site experiences flooding. Maximum flood depths are generally low (<150mm) with depths reaching 400mm behind Wrexham Road at the south-eastern boundary of the site. Maximum velocities within the floodplain are 0.85 m/s. The flood hazard rating across most of the flood extent on-site is 'Caution' with a small area considered 'Danger for some' adjacent to Wrexham Road.

During the 1% AEP event approximately 12% of the site experiences flooding. Maximum flood depths are generally low (<150mm) with depths reaching 430mm behind Wrexham Road at the south-eastern boundary of the site. Maximum velocities within the floodplain are 1.12 m/s. The flood hazard rating across most of the flood extent on-site is 'Caution' with a small area considered 'Danger for some' adjacent to Wrexham Road.

During the 1% AEP +20% climate change event approximately 13% of the site experiences flooding. Maximum flood depths are generally low (<150mm) with depths reaching 440mm behind Wrexham Road at the south-eastern boundary of the site. Maximum velocities within the floodplain are 1.2 m/s. The flood hazard rating across most of the flood extent on-site is 'Caution' with a small area considered 'Danger for some' adjacent to Wrexham Road.

During the 1% AEP +45% climate change event approximately 14% of the site experiences flooding. Maximum flood depths are generally low (<150mm) with depths reaching 450mm behind Wrexham Road at the south-eastern boundary of the site. Maximum velocities within the floodplain are

1.26 m/s. The flood hazard rating across most of the flood extent on-site is 'Caution' with some very small areas considered 'Danger for some'.

During the 0.1 AEP event approximately 15% of the site experiences flooding. Maximum flood depths are generally low (<150mm) with depths reaching 460mm behind Wrexham Road at the south-eastern boundary of the site. Maximum velocities within the floodplain are 1.40 m/s. The flood hazard rating across most of the flood extent on-site is 'Caution' with some small areas considered 'Danger for some'. An extract of the 0.1% AEP event maximum flood depths is shown in Figure 2.

DEV Simulations - Post-Development Site Layout

When the development levels are considered, the deck level of the proposed box culvert onsite and adjacent proposed roads are raised to 90.64m AOD. Area B of the proposed development plan has also been raised to a minimum of 90.74m AOD.

During all simulated DEV primary simulations (5% AEP – 0.1% AEP events) the increased capacity of the replacement box culvert (Access Road Culvert) and widened channel result in flow staying within channel where water was previously spilling over the right bank upstream of the Access Road Culvert. As a result of the changes, more of the on site floodplain is inundated on the left bank of Abermorddu Stream (west of Wrexham Road), where no development is proposed. The proposed housing and roads are not at risk of fluvial flooding during any of the modelled simulations. An extract of the maximum depth flood map for this event is given in Figure 3 for information.

During the 0.1% AEP event, approximately 10% of the site experiences flooding, most of which is of shallow depths (<100mm). Flood depths on site west of Wrexham Road reach a maximum of 460mm, similar to the existing scenario. Maximum velocities within the floodplain are 1.12 m/s. The flood hazard rating across most of the flood extent on-site is considered 'Caution' with the exception of a small area west of Wrexham Road which is classed as 'Danger for Some' and 'Danger for Most'. An extract of the 0.1% AEP event maximum flood depths is shown in Figure 3.

Figure 2 – Maximum Flood Depth – 0.1% AEP event – Existing Site Layout (EXG)

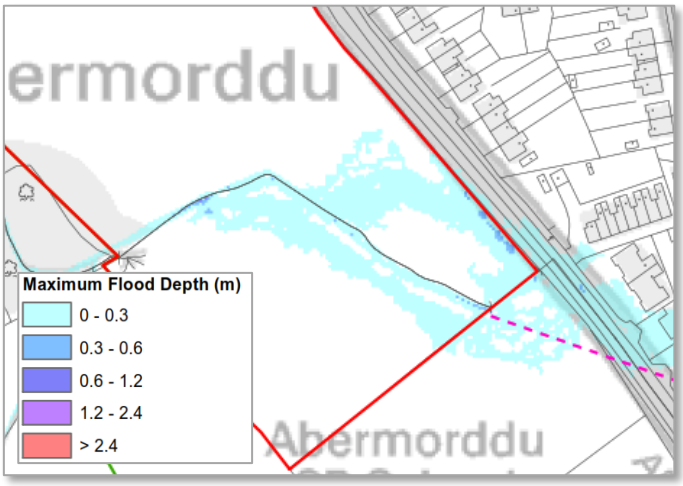
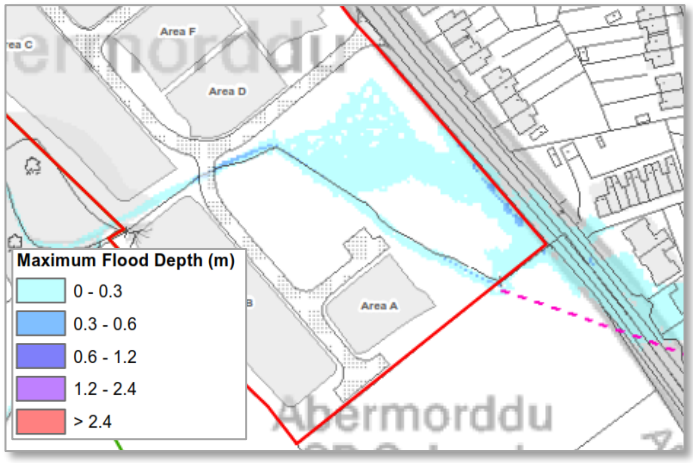


Figure 3 – Maximum Flood Depth – 0.1% AEP event – Proposed Site Layout (DEV)



Flood Risk Elsewhere

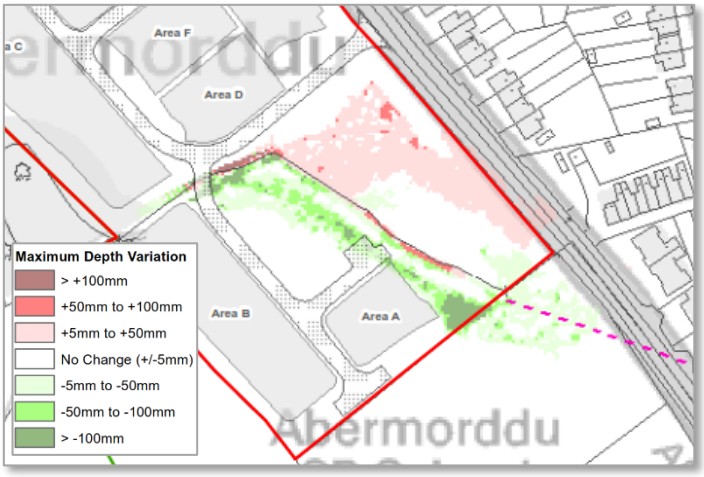
The potential impact of the proposed development on flood risk elsewhere has been quantified by comparing the results of the existing (EXG) site layout simulations with the proposed (DEV). To provide a detailed assessment of the relative changes in flood depths throughout the floodplain, a series of water level difference maps comparing the pre- and post-development maximum water levels have been created and are included in the DEV section of Appendix H.

The increase in channel and culvert capacity between development areas B, C and D has led to a reduction in flood extent across the site and has displaced floodwaters into an area on the site where no development is proposed (i.e. south-east corner).

In the areas surrounding the site, model results show that there is no increase in flood extent and/or maximum depth to any existing buildings. Whilst there is a small area along the already flooded section of Wrexham Road showing a minimal increase in flooding (<15mm), model outputs show flood risk in the school playing fields to the south of the proposed development to be reduced.

The increase in channel and culvert capacity across the site has led to a reduction in flood extent across the site and has pushed floodwaters into an area on the site where no development is proposed. An extract of the 0.1% AEP difference map is provided below as Figure 4.

Figure 4 – Maximum Flood Depth Variation (EXG vs DEV) – 0.1% AEP event



Blockage Scenario Simulations

During the existing scenario (EXG) when a 100% blockage of Wrexham Road Culvert (BL1-EXG) or the Access Track Culvert (BL2-EXG) occurs, there is minimal difference in flooding, relative to the unblocked scenario. This is due to both culverts already having limited capacity to convey flows, therefore a full blockage of structure has minimal effect on the extreme flood event extents.

When a comparison of model outputs from blockage scenario BL1 (100% blockage of Wrexham Road Culvert) for the proposed and existing scenarios is made, it can be seen that flooding at the site is slightly increased from approximately 15% (BL1-EXG) to 16% (BL1-DEV). In the area surrounding the site model results show that there is no increase to flood extents or depths at any existing buildings. On site model results show no flood risk to proposed roads or housing.

When a comparison of model outputs from blockage scenario BL2 (100% blockage of Access Road Culvert) for the proposed and existing scenarios is made, it can be seen that flooding at the site is slightly increased from approximately 15% (BL2-EXG) to 20% (BL2-DEV). In the area surrounding the site model results show that there is no increase to flood extents or depths at any existing buildings. On site model results show no flood risk to proposed housing, and only shows flooding to one proposed road which is located adjacent to Area B, where less than 60mm of flooding occurs and the hazard rating here is 'Low'. Area B remains flood free because ground levels are 100mm above the road level (90.74m AOD).

Sensitivity Tests

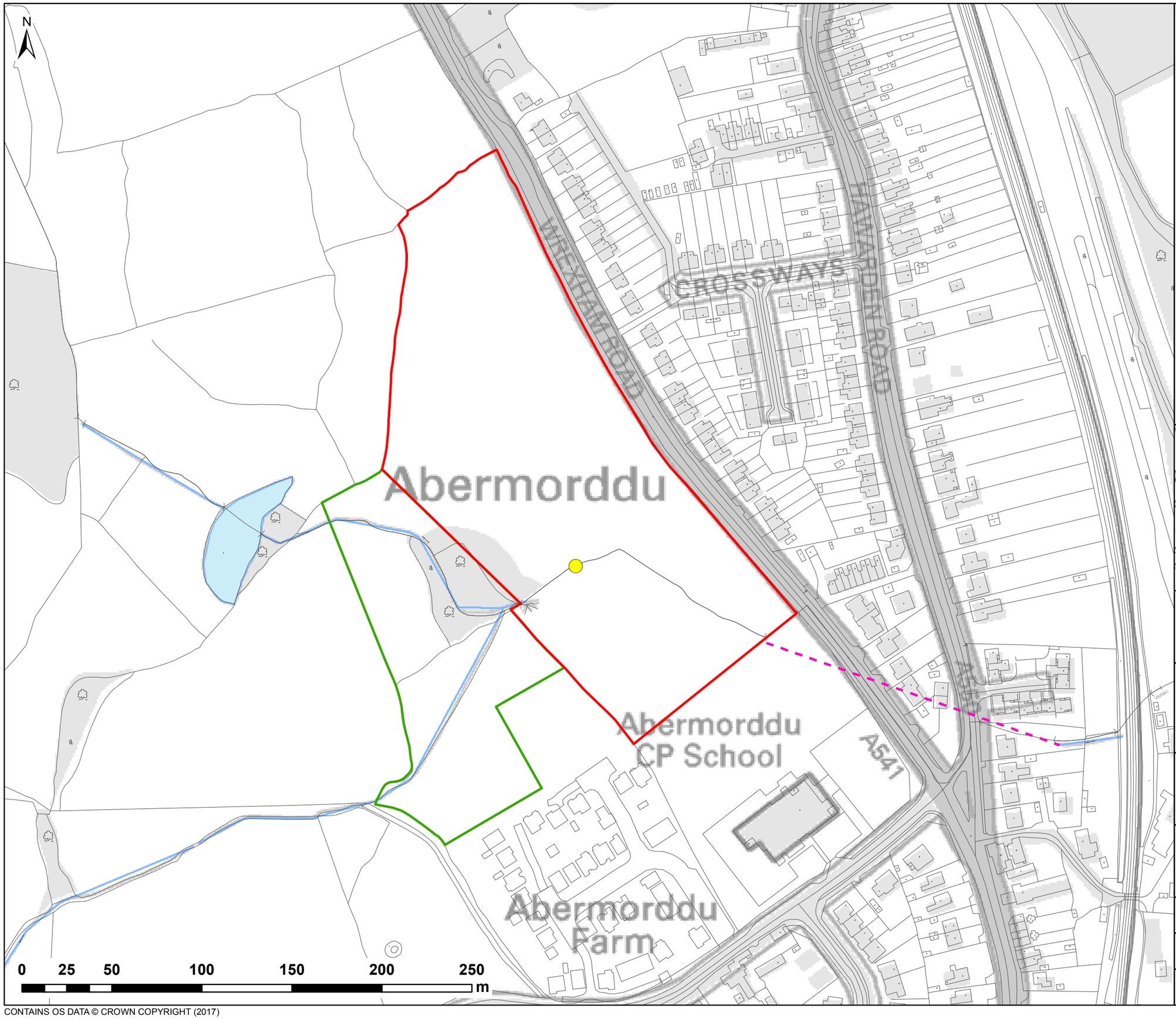
The results of sensitivity tests ST1 and ST2 show that a significant variation (+/-20%) in the Manning's 'n' coefficients used within the channel and floodplain does not increase/decrease the maximum water levels by more than 100mm. Changes to the flood extent across the site during this event are negligible.

Recommendations

The hydraulic model and associated report should be submitted to the NRW for review and approval as a reasonable representation of the existing fluvial flood risk through the proposed development site in Abermorddu.

The outputs of this modelling study should be used to support the Flood Consequences Assessment.

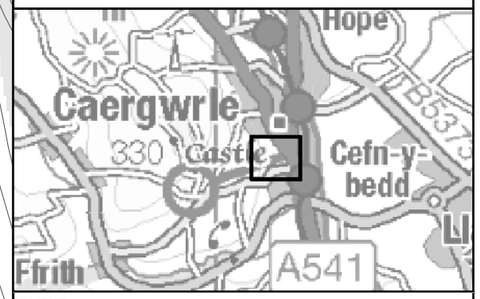
Appendix A – Location Plan and Aerial Image



NOTES:
1) ALL DIMENSIONS ARE IN METRES AND ALL LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS STATED OTHERWISE

LEGEND

- Site Boundary
- Land Ownership
- Wrexham Rd Culvert Line (Assumed)
- Access Track Culvert
- Watercourse / Water Body



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SCHEME:

CLARK ESTATE
WREXHAM RD, ABERMORDDU

PLOT TITLE:

LOCATION PLAN

PLOT STATUS:	DATE:
FINAL	10/04/2017

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE @ A3:
RCL	LS	VG	1:2,000 (UNLESS STATED OTHERWISE)

PLOT NAME:	REV:
w3246-Q1000-DEV1C-BL1-100-V	-

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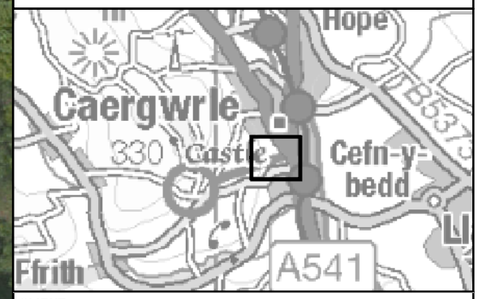
NOTES:
1) ALL DIMENSIONS ARE IN METRES AND ALL LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS STATED OTHERWISE

LEGEND

- Site Boundary
- Land Ownership
- Wrexham Rd Culvert Line (Assumed)



CLIENT:

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01824 702220
www.waterco.co.uk

SCHEME:

CLARK ESTATE
WREXHAM RD, ABERMORDDU

PLOT TITLE:

AERIAL PLAN

PLOT STATUS:	DATE:
FINAL	07/04/2017

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE @ A3:
RCL	LS	VG	1:2,000 (UNLESS STATED OTHERWISE)

PLOT NAME:	REV:
w3246-Q1000-DEV1C-BL1-100-V	-

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BASEMAP: WORLD IMAGERY. SOURCES: ESRI, DIGITALGLOBE, GEOEYE, I-CUBED, EARTHSTAR GEOGRAPHICS, CNES/AIRBUS DS, USDA, USGS, AEX, GETMAPPING, AEROGRID, IGN, IGP, SWISSTOPO, GIS USER COMMUNITY

Appendix B – Survey Data

Legend

AV	Air valve
BH	Borehole
BOL	Bollard
BT	British Telecom cover
CATV	Cable television cover
CL	Cover level
DPC	Damp proof coarsing level
Earth/ER	Earthing rod
ELEC	Electric cover
EP	Electricity pole
Fence I/R	Iron railing fence
Fence C/B	Closeboard fence
Fence C/P&P	Concrete post & panel fence
Fence P/a	Palisade fence
Fence P/W	Post and wire fence
Fence P/R	Post and rail fence
Fence P/P	Post and panel fence
FFL	Finished floor level
F/B	Flower bed
FH	Fire Hydrant
G	Gulley
GAS	Gas cover
IC	Inspection chamber
IL	Invert level
INV	Invert level
LP	Lamp post
LT	Light
MH	Manhole
Nynex	Telecommunications cover
OSBM	Ordnance Survey Bench Mark
PTM	Parking ticket machine
RE	Rodding eye
RS	Road sign
Rtt wall	Retaining wall
SBX	Switch box
SP	Sign post
SPS	Safety playing surface
ST	Stop tap
SV	Service valve
TBM	Temporary Bench Mark
TP	Telegraph pole
TRP	Trial pit
TRL	Traffic light
W	Water cover
WL	Water level
WO	Wash out

SURVEY STATIONS

Name	Easting	Northing	Height
RC1	330786.217	356832.217	90.217
RC1A	330893.525	356676.626	88.693
RC2	330740.157	356779.492	91.243
RC3	330819.736	356626.013	90.420

KEY DIMENSIONS SHOULD BE CHECKED ON SITE BEFORE COMMENCEMENT OF ANY WORKS

NOTE

Grid and Levels
Related to OS
Via Active GPS Network

Amendments

	Date	Surveyor	Description of work

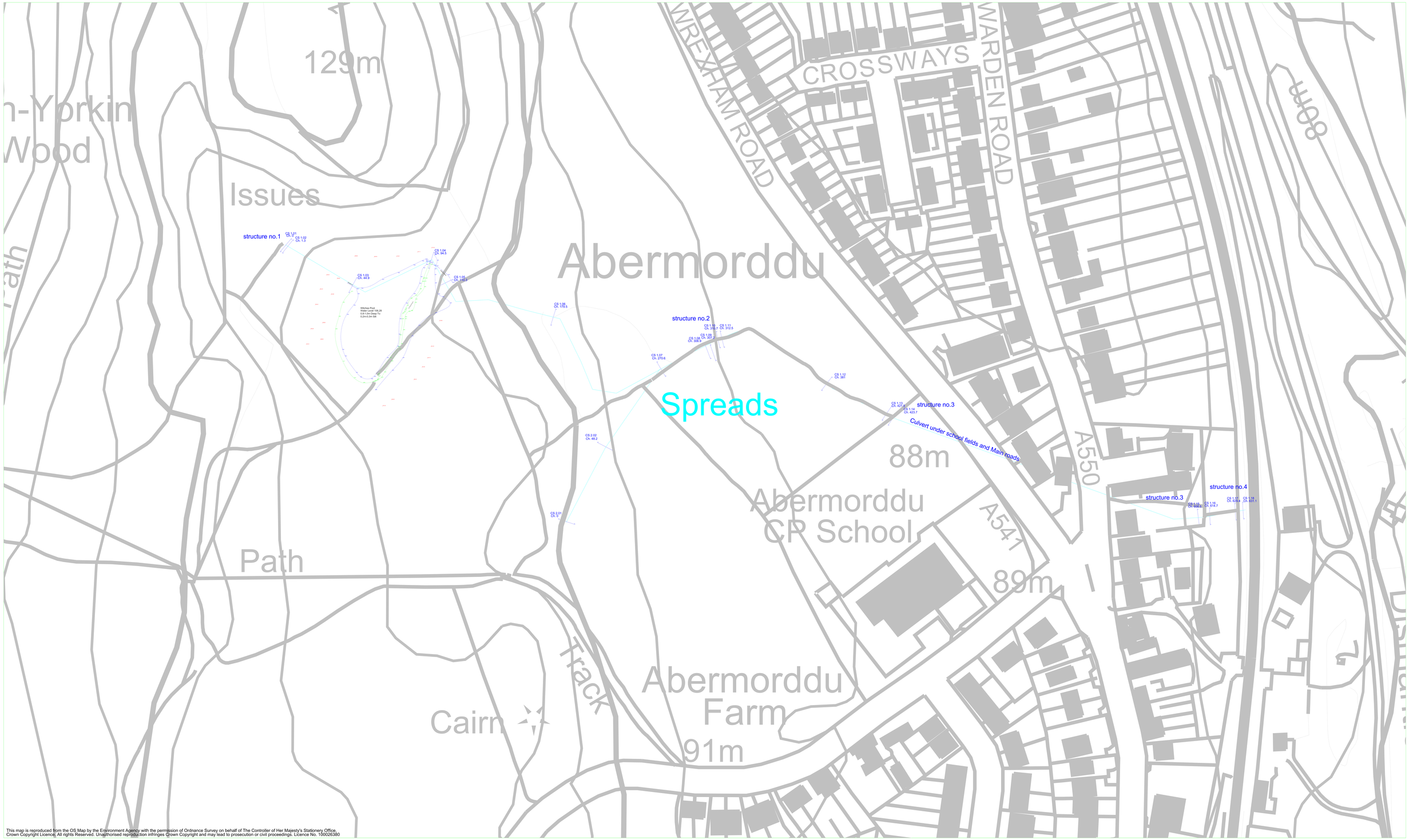
Powers & Tiltman Ltd
Land Surveyors

Meridian House
58/60 Hillside Road, Frodsham, Cheshire WA6 6AG
Tel: 01928 734473 Fax: 01928 735573
Email: mail@powerstiltman.co.uk
www.powerstiltman.co.uk

Wrexham Road
Abermorddu
Topographical Survey

Client : Fisher German

Surveyed By : RM	Date : 06/07/16	A0 @ 1:500
Drawn By : RM	Drawing No : 7558/01	
Checked By : MP	Amendment :	



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SURVEYED BY GNSS TO OSNG. LEVEL DATUM OSGM02.

20 10 0 20 40 60 80 100m

Scale: 1/1000 at A1; 1/2000 at A3

Client	Project	
WATERCO EDEN COURT LON PARCWR BUSINESS PARK RUTHIN DENBIGHSHIRE LL15 1NJ	Watercourses Survey Abermorddu Flintshire LL12 9DH	
Surveyed: J.W./I.W.	Apprd:	R.J.FLEW
Date: 18.10.2016	File Ref:	1545
Scale: 1/1000 at A1; 1/2000 at A3		

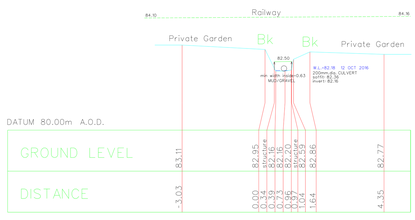
INFOMAP
SURVEYS AND MAPPING
CHARTERED SURVEYORS
RICS
Seymours House
Sunnyside Road North
Weston-super-Mare
North Somerset BS23 3PZ
Tel: 01934 644060 /fax 01934 644060
E-mail: mail@infomapsurveys.co.uk
Website: www.infomapsurveys.co.uk

DRAWING REFERENCE

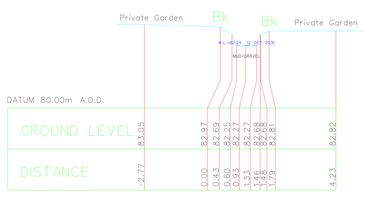
ISM/W3246 - ABERMORDDU

OVERALL PLAN

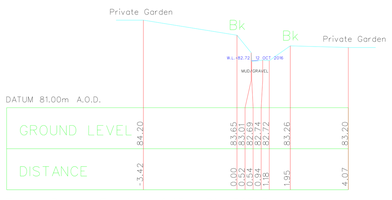
Structure no. 4. RAILWAY CULVERT UPSTREAM
Description: 200MM PIPE
(upstream face of structure)



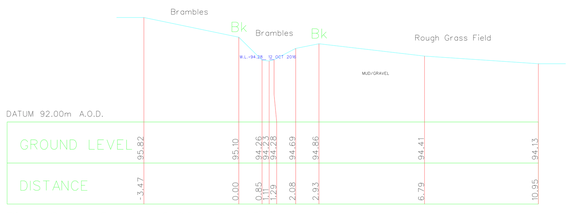
River Cross Section 1.18 Ch. 631.0



River Cross Section 1.17 Ch. 629.0

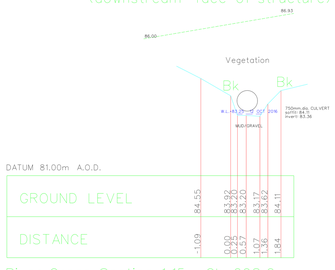


River Cross Section 1.16 Ch. 615.0

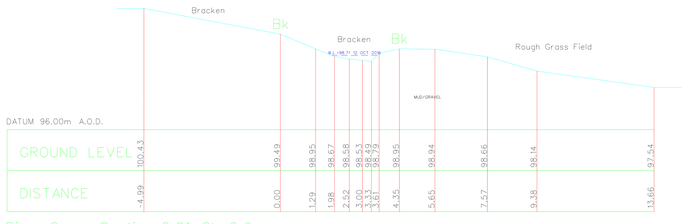


River Cross Section 2.02 Ch. 48.0

Structure no. 3. D/S CULVERT
Description: 750MM PIPE
(downstream face of structure)



River Cross Section 1.15 Ch. 608.0



River Cross Section 2.01 Ch. 0.0

5 0 5 10 15 20 25m

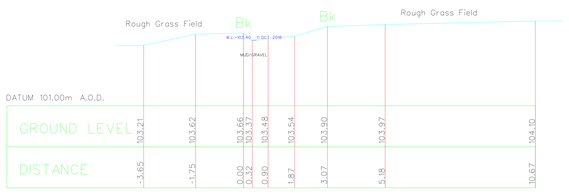
Scale: 1/100 at A1; 1/200 at A3

SURVEYED BY GPS TO OSNG. LEVEL DATUM OSGM02.
ALL SECTIONS SHOWN PERPENDICULAR TO WATERCOURSE

Client	Project	
WATERCO EDEN COURT LON PARCWR BUSINESS PARK RUTHIN DENBIGHSHIRE LL15 1NJ	Watercourses Survey Abermorddu Flintshire LL12 9DH	
Surveyed: J.W./I.W.	Apprd:	R.J.FLEW
Date: 18.10.2016	File Ref:	1545
Scale: 1/100 at A1; 1/200 at A3		

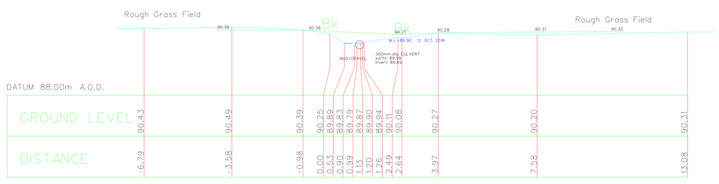
INFOMAP
SURVEYS AND MAPPING
CHARTERED SURVEYORS
RICS
Seymours House
Sunnyside Road North
Weston-super-Mare
North Somerset BS23 3PZ
Tel: 01934 644060 /fax 01934 644060
E-mail: mail@infomapsurveys.co.uk
Website: www.infomapsurveys.co.uk

DRAWING REFERENCE
ISM/W3246 - ABERMORDDU
CROSS SECTIONS-2



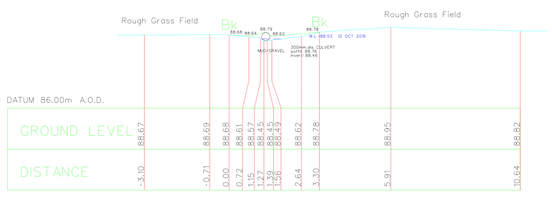
River Cross Section 1.05 Ch. 110.0

Structure no. 2. LOWER CROSSING D/S FACE
Description: 300MM PIPE
(downstream face of structure)

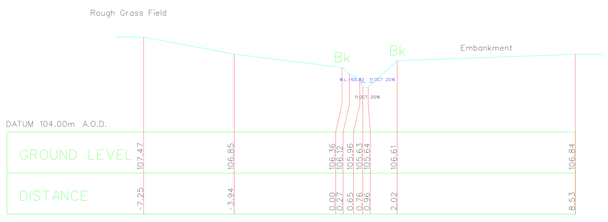


River Cross Section 1.10 Ch. 311.0

Structure no. 3. SCHOOL CULVERT
Description: 300MM PIPE
(upstream face of structure)

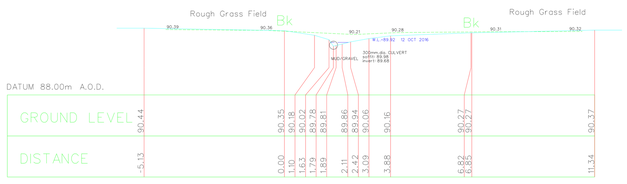


River Cross Section 1.14 Ch. 424.0

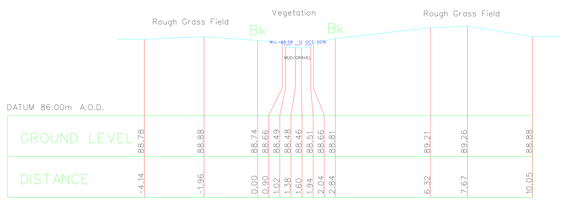


River Cross Section 1.04 Ch. 95.0

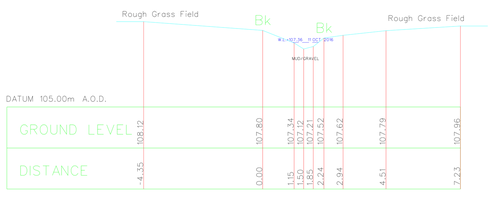
Structure no. 2. LOWER CROSSING U/S FACE
Description: 300MM PIPE
(upstream face of structure)



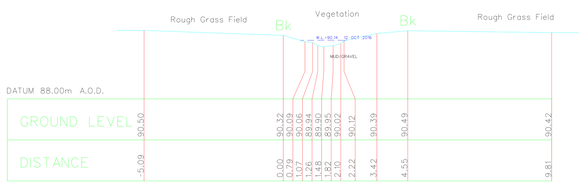
River Cross Section 1.09 Ch. 308.0



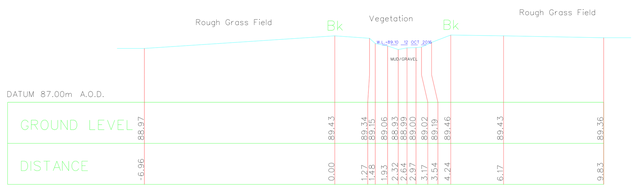
River Cross Section 1.13 Ch. 422.0



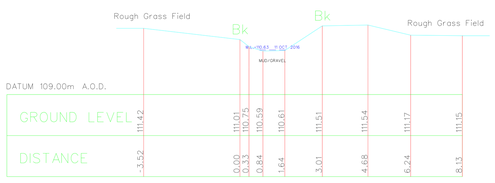
River Cross Section 1.03 Ch. 45.0



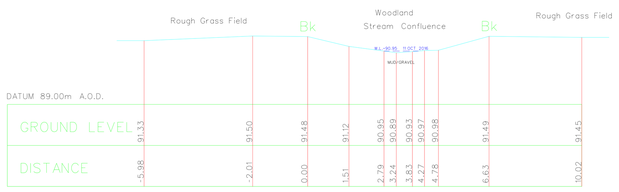
River Cross Section 1.08 Ch. 306.0



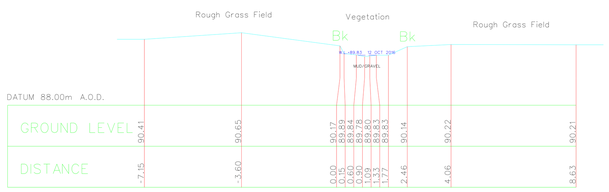
River Cross Section 1.12 Ch. 381.0



River Cross Section 1.02 Ch. 2.0

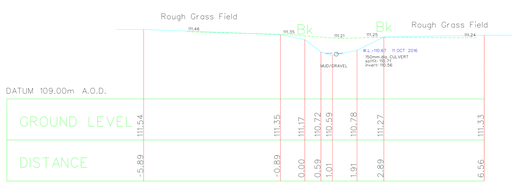


River Cross Section 1.07 Ch. 271.0

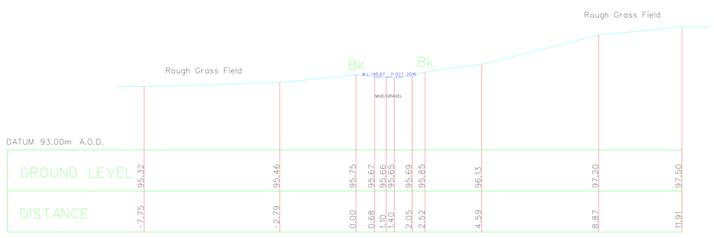


River Cross Section 1.11 Ch. 313.0

Structure no. 1. UPSTREAM PIPE
Description: 150MM PIPE
(upstream face of structure)



River Cross Section 1.01 Ch. 0.0



River Cross Section 1.06 Ch. 180.0

5 0 5 10 15 20 25m

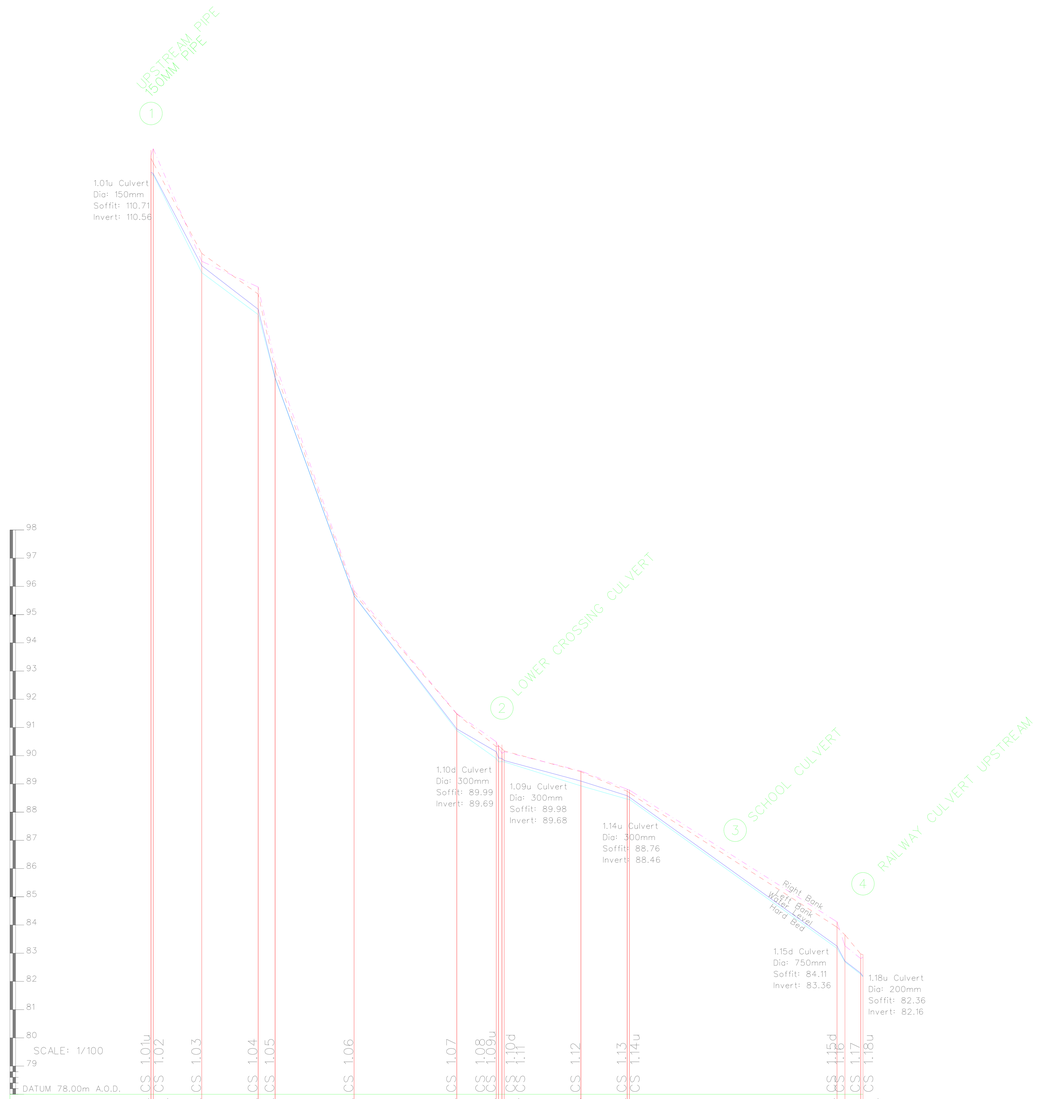
Scale: 1/100 at A1; 1/200 at A3

SURVEYED BY GPS TO OSNG. LEVEL DATUM OSGM02.
ALL SECTIONS SHOWN PERPENDICULAR TO WATERCOURSE

Client	Project	
WATERCO EDEN COURT LON PARCWR BUSINESS PARK RUTHIN DENBIGHSHIRE LL15 1NJ	Watercourses Survey Abermorddu Flintshire LL12 9DH	
Surveyed: J.W./I.W.	Apprd:	R.J.FLEW
Date: 18.10.2016	File Ref:	1545
Scale: 1/100 at A1; 1/200 at A3		

INFOMAP
SURVEYS AND MAPPING
CHARTERED SURVEYORS
RICS
Seymours House
Sunnyside Road North
Weston-super-Mare
North Somerset BS23 3PZ
Tel: 01934 644060 /fax 01934 644060
E-mail: mail@infomapsurveys.co.uk
Website: www.infomapsurveys.co.uk

DRAWING REFERENCE
ISM/W3246 - ABERMORDDU
CROSS SECTIONS-1



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BED MATERIAL	MUD/ GRAVEL	MUD/ GRAVEL	MUD/ GRAVEL	MUD/ GRAVEL	MUD/ GRAVEL	MUD/ GRAVEL	MUD/ GRAVEL	MUD/ GRAVEL	MUD/ GRAVEL	MUD/ GRAVEL	MUD/ GRAVEL	MUD/ GRAVEL	MUD/ GRAVEL	MUD/ GRAVEL	MUD/ GRAVEL	MUD/ GRAVEL	MUD/ GRAVEL	MUD/ GRAVEL
LEFT BANK LEVEL	111.17	111.01	107.80	106.36	103.66	95.75	91.48	90.32	90.35	90.79	90.17	89.43	88.74	88.68	83.32	83.65	82.97	82.95
RIGHT BANK LEVEL	111.27	111.51	107.52	106.61	103.90	95.85	91.49	90.49	90.27	90.08	90.14	89.46	88.81	88.78	84.11	83.26	82.81	82.86
WATER LEVEL	110.67	110.63	107.36	105.82	103.40	95.67	90.95	90.14	89.92	89.90	89.83	89.10	88.58	88.53	83.25	82.92	82.29	82.18
SOFT BED LEVEL																		
Hard Bed Level	110.59	110.59	107.12	105.63	103.37	95.65	90.89	89.90	89.78	88.78	88.78	88.93	88.46	88.45	83.17	82.89	82.25	82.16
REGRADE																		
CHAINAGE	0	2	4.5	95	110	180	271	306	308	311	313	381	422	424	608	615	629	631

Water Levels taken 11 OCT 2016 to 12 OCT 2016

RIVER LONG SECTION Ch. 0.00 TO 631.00

STRUCTURE SECTION

STRUCTURE No.WITH NAME (1)

SURVEYED BY GPS TO OSNG. LEVEL DATUM OSGM02.

100 0 100 200 300 400 500m

Scale: 1/2500 at A1; 1/5000 at A3

Client	Project	
WATERCO EDEN COURT LON PARCWR BUSINESS PARK RUTHIN DENBIGHSHIRE LL15 1NJ	Watercourses Survey Abermorddu Flintshire LL12 9DH	
Surveyed: J.W./I.W.	Apprd:	R.J.FLEW
Date: 18.10.2016	File Ref:	1545
Scale: 1/2500 at A1; 1/5000 at A3		

INFOMAP
SURVEYS AND MAPPING
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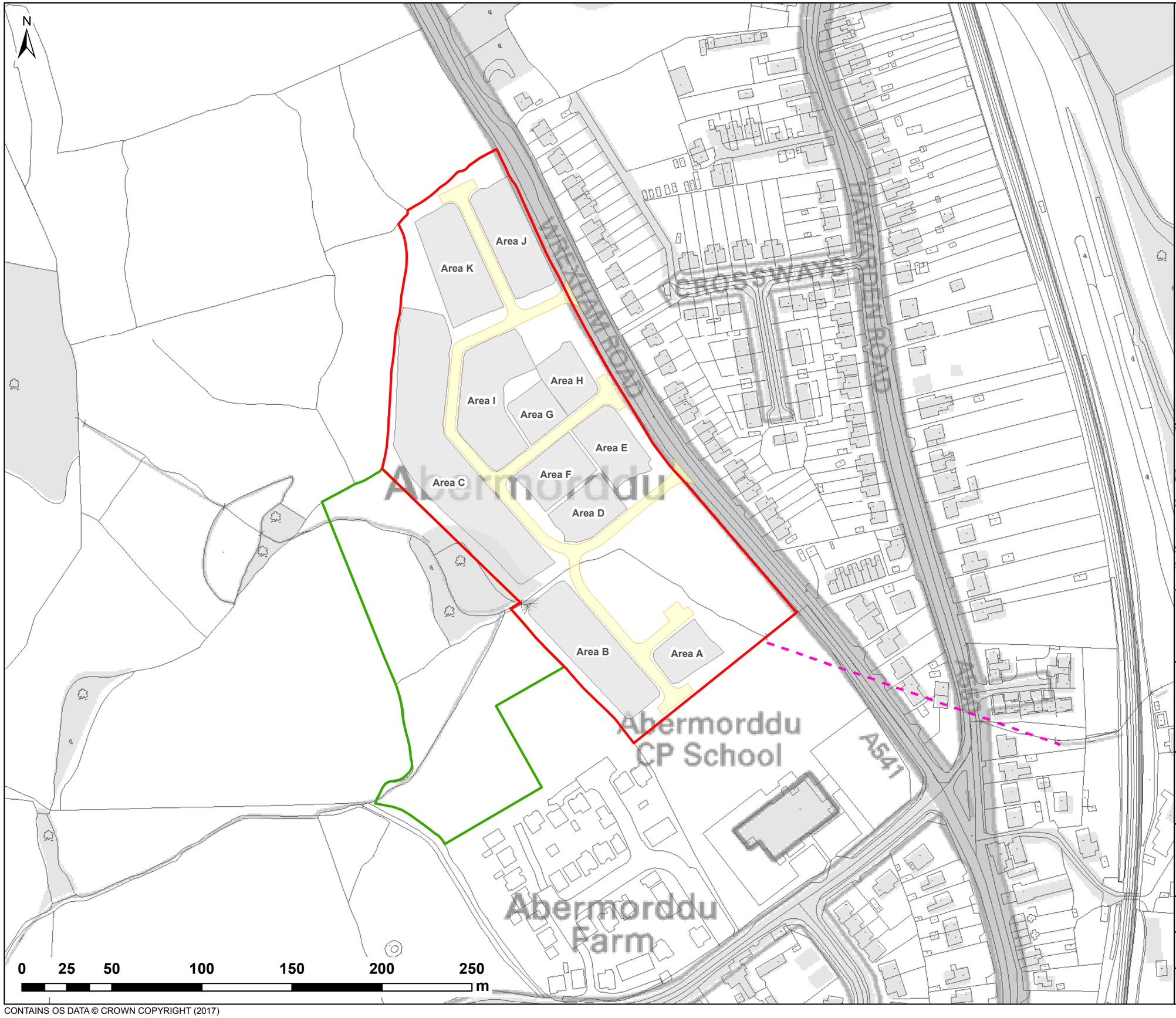
North Somerset BS23 3PZ
Tel: 01934 644060 /fax 01934 644060
E-mail: mail@infomapsurveys.co.uk
Website: www.infomapsurveys.co.uk

DRAWING REFERENCE

ISM/W3246 - ABERMORDDU

LONG SECTION

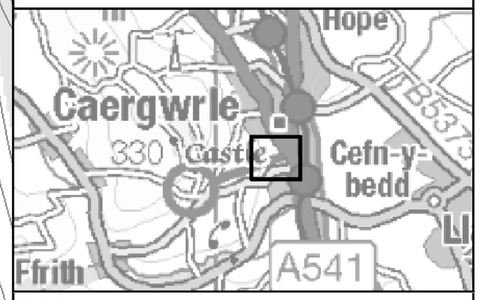
Appendix C – Proposed Development Details



NOTES:
1) ALL DIMENSIONS ARE IN METRES AND ALL LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS STATED OTHERWISE

LEGEND

- Site Boundary
- Land Ownership
- Proposed Access Roads
- Wrexham Rd Culvert Line (Assumed)
- Proposed Development Areas



CLIENT:

FISHER GERMAN

waterco consultants

Waterco Ltd
Eden Court, Ruthin, LL15 1NJ

01824 702220
www.waterco.co.uk

SCHEME:

CLARK ESTATE
WREXHAM RD, ABERMORDDU

PLOT TITLE:

PROPOSED DEVELOPMENT PLAN

PLOT STATUS:	DATE:
FINAL	07/04/2017

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE @ A3:
RCL	LS	VG	1:2,000 (UNLESS STATED OTHERWISE)

PLOT NAME:	REV:
w3246-Q1000-DEV1C-BL1-100-V	-

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OS MASTERMAP © CROWN COPYRIGHT AND DATABASE RIGHTS [2017] OS 0100042840

DWELLING TOTALS

A	TYPE A SEMI DETACHED	4 NO
B	TYPE B DETACHED	8 NO
C	TYPE B DETACHED	15 NO
D	TYPE A SEMI DETACHED	6 NO
E	TYPE A SEMI DETACHED	6 NO
F	TYPE A SEMI DETACHED	6 NO
G	TYPE A SEMI DETACHED	4 NO
H	TYPE A SEMI DETACHED	4 NO
I	TYPE A SEMI DETACHED	10 NO
J	TYPE A SEMI DETACHED	10 NO
K	TYPE A SEMI DETACHED	10 NO

DETACHED 23 NO
SEMI DETACHED 60 NO

KEY

- POS AND PLAY AREA
- STREAM WITH CLEAR ZONE
- PEDESTRIAN WAY
- EXISTING TREES RETAINED
- ROAD OVER STREAM CONCRETE BOX CULVERT INDICATIVE SIZE 1000 X 500 MM
- OVERHEAD POWER LINE
- GREEN LINK
- PLOT FRONTAGE
- VEHICLE ENTRANCE
- AREA REFERENCE
- MODIFIED EXISTING FLOOD PLAIN 0.1% AEP EVENT WITH 100% BLOCKAGE DOWN STREAM
- PLANTING AND ATTENUATION AREA SURFACE WATER
- HOUSING AREA
- PLANTING AREA
- EXISTING OVER GROWN HEDGE AND UNDER GROWTH AREA
- PROPOSED POND
- PROPOSED GABION BANK REINFORCEM TO INCREASE BED OF STREAM TO 1.5M, 10M EITHER SIDE OF STRUCTURE
- OTHER LAND IN OWNERSHIP SITE LIMITS
- + 89.200 PROPOSED LEVELS

TONKS WOTTAL WARBURTON
ARCHITECTS / URBAN DESIGNERS
CHAPEL HOUSE, CITY ROAD, CHESTER CH1 3AE
Tel : 01244 310388 Fax : 01244 325643
E-mail : enquiries@tnw-architecture.co.uk
Web : www.tnw-architecture.co.uk

SCALEBAR: 0 20m 40m 60m 80m 100m 1:1000

ALL DIMENSIONS TO BE CHECKED ON SITE AND NOT SCALED FROM THIS DRAWING.
ALL ERRORS AND OMISSIONS TO BE REPORTED TO THE ARCHITECT. © COPYRIGHT

REV:	DATE:	BY:	DESCRIPTION:
A	20/12/16	BWL	Flood storage area indicated and housing omitted in area "F"
B	6/02/17	BWL	Flood storage area indicated and housing altered to avoid flood plain
C	13/03/17	BWL	Flood storage and surface water area indicated and housing layout altered
D	06/04/17	BWL	Structure 2 proposal altered

DRAFT

CLIENT/PROJECT:
THE CLARK ESTATE
LAND AT ABERMORDDU

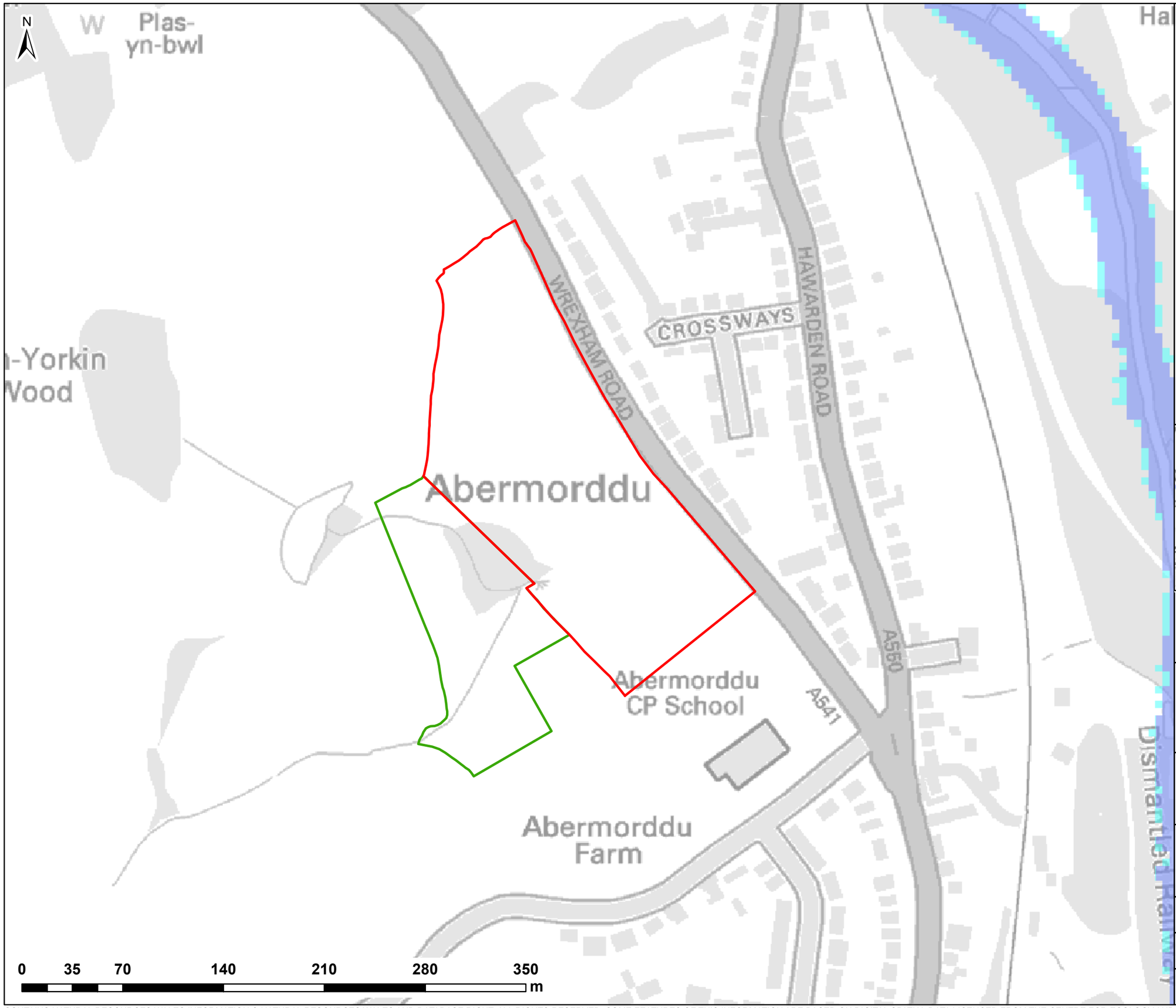
DRAWING TITLE:
INDICATIVE SITE PLAN

NORTH: N

SCALE: 1:1000 1:500@A3 | SIZE: A1 | DATE: 05:07:16 | DRAWN BY: | CHECKED BY:

JOB/DRAWING NUMBER: 1610 :SK05
REVISION: D
STATUS:

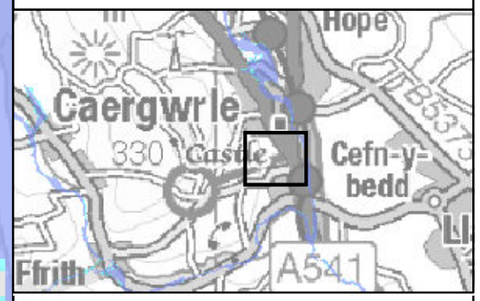
Appendix D – NRW Flood Map



NOTES:
1) ALL DIMENSIONS ARE IN METRES AND ALL LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS STATED OTHERWISE

LEGEND

- Site Boundary
- Land Ownership
- NRW Flood Zone 2
- NRW Flood Zone 3



CLIENT:

FISHER GERMAN

waterco consultants

Waterco Ltd
Eden Court, Ruthin, LL15 1NJ
01824 702220
www.waterco.co.uk

SCHEME:

CLARK ESTATE
WREXHAM RD, ABERMORDDU

PLOT TITLE:

NRW FLOOD MAP FOR PLANNING
APRIL 2017

PLOT STATUS:	DATE:
FINAL	07/04/2017

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE @ A3:
RCL	LS	VG	1:2,500 (UNLESS STATED OTHERWISE)

PLOT NAME:	REV:
w3246-Q1000-DEV1C-BL1-100-V	-

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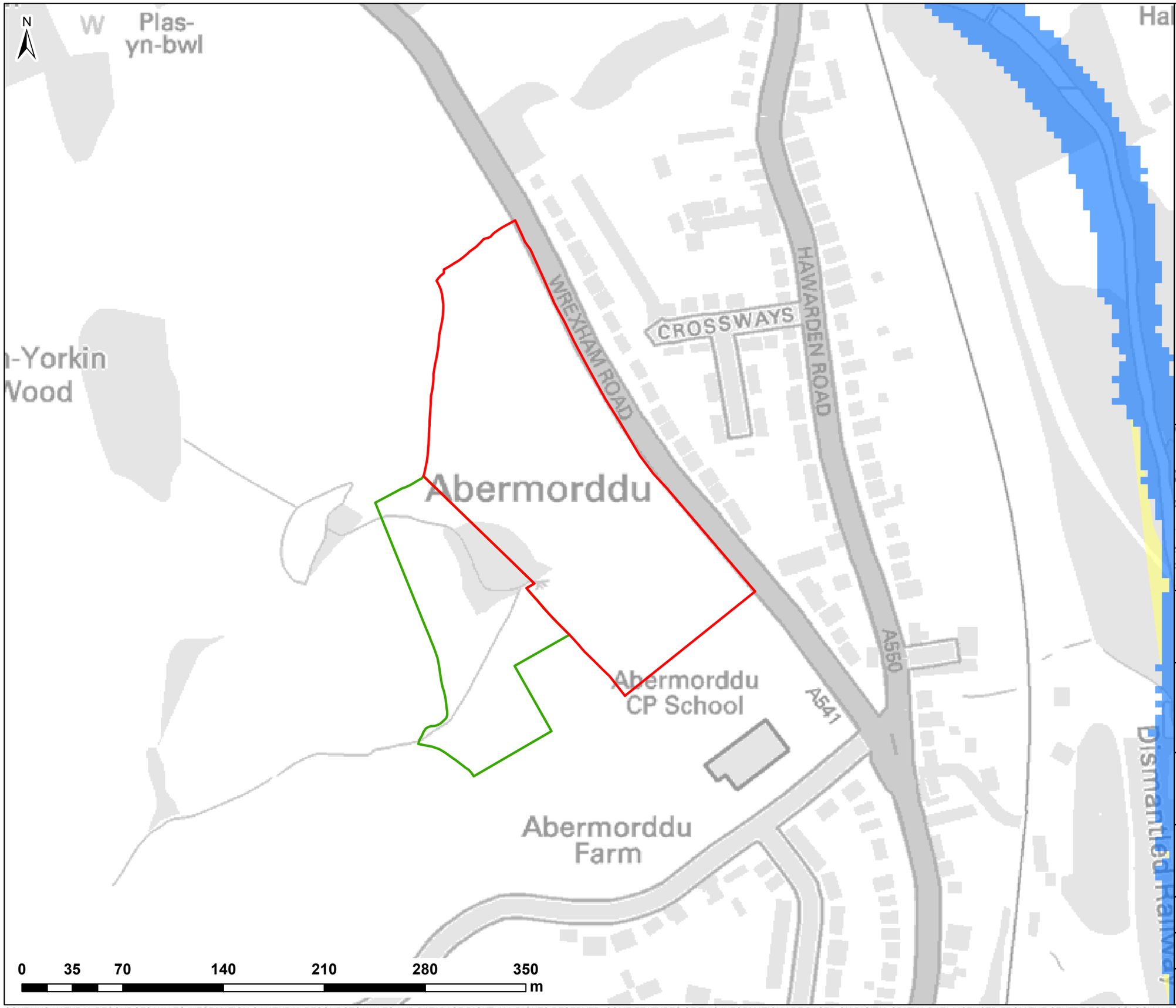
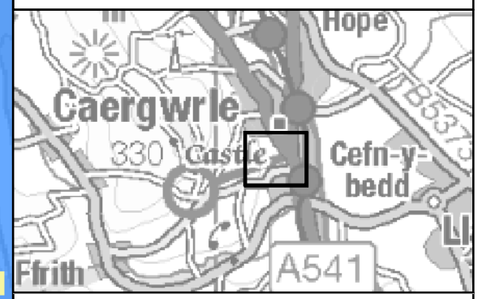


NOTES:
1) ALL DIMENSIONS ARE IN METRES AND ALL LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS STATED OTHERWISE

LEGEND

- Site Boundary
- Land Ownership
- Zone B
- Zone C1
- Zone C2



CLIENT:

FISHER GERMAN

waterco consultants

Waterco Ltd
Eden Court, Ruthin, LL15 1NJ

01824 702220
www.waterco.co.uk

SCHEME:

CLARK ESTATE
WREXHAM RD, ABERMORDDU

PLOT TITLE:

WELSH GOVERNMENT DEVELOPMENT ADVICE MAP
APRIL 2017

PLOT STATUS:	DATE:
FINAL	07/04/2017

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE @ A3:
RCL	LS	VG	1:2,500 (UNLESS STATED OTHERWISE)

PLOT NAME:	REV:
w3246-Q1000-DEV1C-BL1-100-V	-

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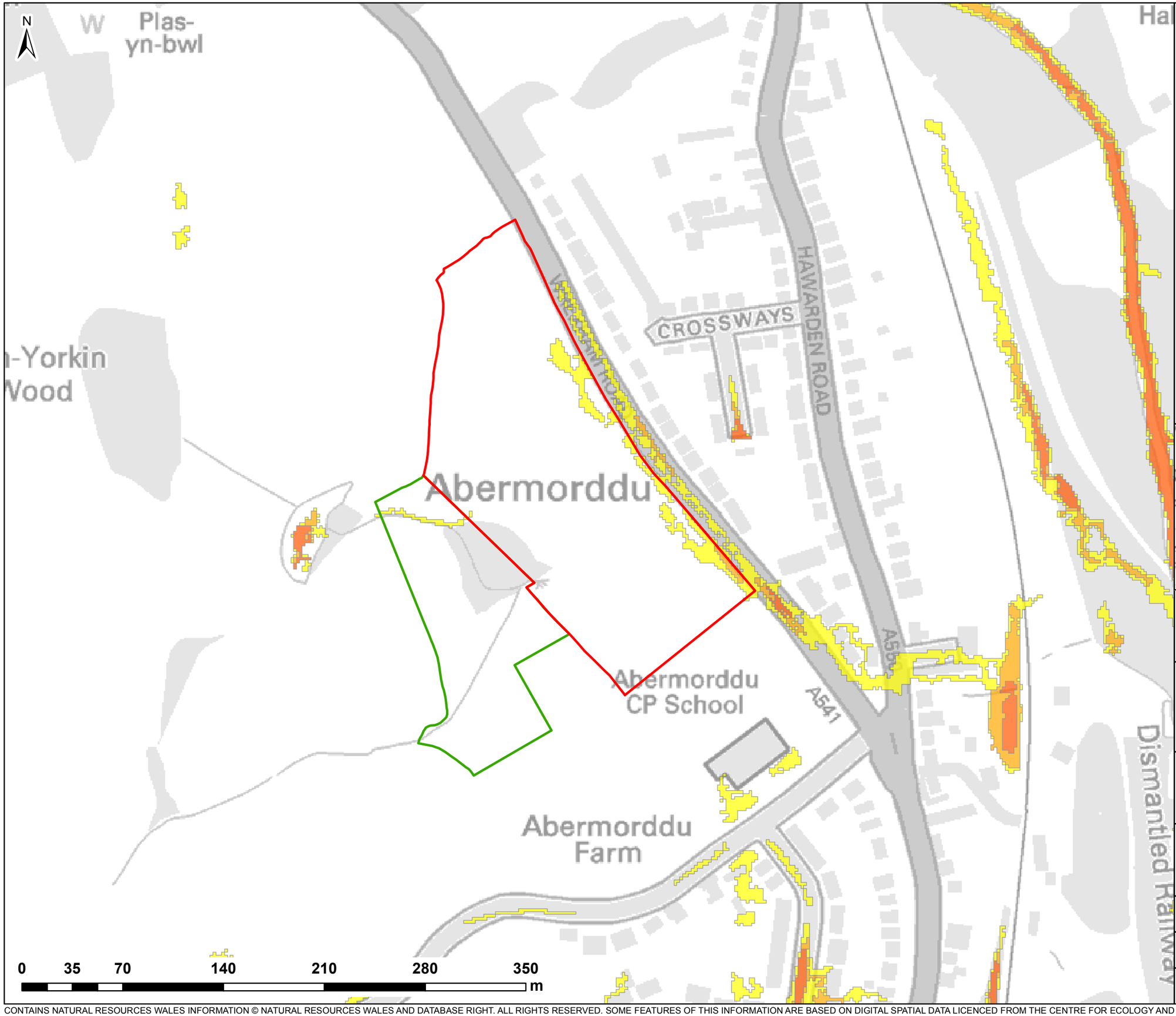
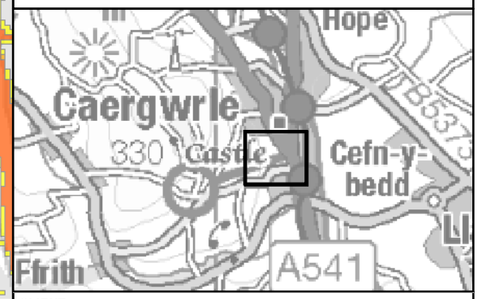


NOTES:
1) ALL DIMENSIONS ARE IN METRES AND ALL LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS STATED OTHERWISE

LEGEND

- Site Boundary
- Land Ownership
- Surface Water Flood Risk - High
- Surface Water Flood Risk - Medium
- Surface Water Flood Risk - Low



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SCHEME:

CLARK ESTATE
WREXHAM RD, ABERMORDDU

PLOT TITLE:

NRW SURFACE WATER FLOOD MAP
APRIL 2017

PLOT STATUS:	DATE:
FINAL	07/04/2017

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE @ A3:
RCL	LS	VG	1:2,500 (UNLESS STATED OTHERWISE)

PLOT NAME:	REV:
w3246-Q1000-DEV1C-BL1-100-V	-

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Appendix E – Hydrology

FLOOD ESTIMATION CALCULATION RECORD

Project:	Wrexham Road, Abermorddu	**Job No:**	W3246

Prepared by	Rory Clements (BSc) Hons	**Date:**	11/10/2016
Checked by	Bethan Young BSc (Hons) MCIWEM	**Revision:**	-
Approved by	Rob Flitter BEng (Hons) CEng MICE		

INTRODUCTION

This Flood Estimation Calculation (FEC) Record is based on the latest version of the EA's FEC Record template 197_08_SD01v2 (Aug 2015); a supporting document to the Environment Agency's flood estimation guidelines. It provides a record of the calculations and decisions made during flood estimation.

The information given here should enable the work to be reproduced in the future.

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3 STATISTICAL METHOD 7
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ABBREVIATIONS

AM	Annual Maximum
AREA	Catchment area (km^2)
BFI	Base Flow Index
BFIHOST	Base Flow Index derived using the HOST soil classification
CFMP	Catchment Flood Management Plan
CPRE	Council for the Protection of Rural England
FARL	FEH index of flood attenuation due to reservoirs and lakes
FEH	Flood Estimation Handbook
FSR	Flood Studies Report
HOST	Hydrology of Soil Types
NRFA	National River Flow Archive
POT	Peaks Over a Threshold
QMED	Median Annual Flood (with return period 2 years)
ReFH	Revitalised Flood Hydrograph method
SAAR	Standard Average Annual Rainfall (mm)
SPR	Standard percentage runoff
SPRHOST	Standard percentage runoff derived using the HOST soil classification
Tp(0)	Time to peak of the instantaneous unit hydrograph
URBAN	Flood Studies Report index of fractional urban extent
URBEXT1990	FEH index of fractional urban extent
URBEXT2000	Revised index of urban extent, measured differently from URBEXT1990
WINFAP-FEH	Windows Frequency Analysis Package – used for FEH statistical method

1 METHOD STATEMENT

1.1 Overview of requirements for flood estimates

Item	Comments
Give an overview which includes: • Purpose of study • Approx. no. of flood estimates required • Peak flows or hydrographs? • Range of return periods and locations • Approx. time available	The purpose of the study is to provide peak flow estimates and hydrographs for the Abermorddu Stream and its tributary which flow near to a proposed development site adjacent to Wrexham Road, Abermorddu, Caergwrle, Wrexham, LL12 9DG. [NGR: 330762E 356765N]. Hydrographs are required for the 1% (Q100), 1%+CCA (Q100+CCA) and 0.1% (Q1000) AEP fluvial events to be used as inflow data for a hydraulic model of the Abbermordu Stream and its tributary. Due to the similarity in catchment descriptors very small catchment areas one analysis will be carried out and the flows will be scaled based on catchment areas will be scaled by area to provide inflows for each watercourse.

1.2 Overview of catchment

Item	Comments
Brief description of catchment, or reference to section in accompanying report	The FEH Web Service shows that the catchment is very small (0.54km^2) with a moderately high slope (DPSBAR value of 143.7m/km) and elevations varying from 329m AOD in the upper reaches to 88m AOD in the lower reaches. A review of the catchment area using GIS watershed analysis gives a catchment boundary which differs significantly with that of the FEH Web Service. – the area of 0.54km^2 is incorrect and has been updated to 0.589km^2. The catchment area has been updated; therefore we have reviewed the updated catchment based on the watershed boundary. A plan showing the FEH Web Service boundary compared with the final watershed analysis boundary is included in Annex 7.2. The catchment is entirely rural and so the. $URBEXT_{1990}$ and $URBEXT_{2000}$ values have been updated to 0.00.. A review of the catchment's geology has shown that there is one main rock type underlying the catchment, namely the Millstone Grit Group composed of mudstone, sandstone and siltstone. A small extent of the catchment limited to the southern central extent is overlain by superficial deposits of Till composed of devensian diamicton and Glaciofluvial Sheet deposits composed of sand and gravel. The main soil type within the catchment is described as 'freely draining slightly acid loamy soils'. The description is compatible with a BFIHOST value of 0.802. The SAAR value is a moderate 833mm. This combined with a high permeability resulted in a PROPWET value of 0.51. There is one online reservoir or lake in the catchment of Abermorddu Stream. To allow scaling of catchment for the Abermorddu Stream tributary the FARL value has been updated to 1 and the lake will be represented within the hydraulic model to account for peak flow attenuation otherwise calculated by the FARL value. There are no springs or manmade infrastructures in the catchment. A review of the average drainage path slope using GIS software was undertaken; the updated catchment boundary area included some higher elevation areas than the FEH Web

	Service catchment boundary. As such the DPSBAR was updated to 195.4m/km to reflect this increase in drainage path slope. The DPLBAR value was found to be slightly underestimated in the FEH Web Service and has been updated to the value of 0.802 based on the updated catchment area. Location Plan provided in Annex 7.1

1.3 Source of flood peak data

Was the NRFA Peak Flows dataset used? If so, which version? If not, why not? Record any changes made	Yes – Version 4.1, May 2016

1.4 Gauging stations (flow or level)

(at the sites of flood estimates or nearby at potential donor sites)

Water-course	Station Name	Gauging Authority Number	NRFA number (used in FEH)	Grid Reference	Catch-ment Area (km²)	Type (rated / ultrasonic / level…)	Start and end of flow record

1.5 Data available at each flow gauging station

Station Name	Start and end of data on NRFA Peak Flows	Update for this study?	Suitable for QMED?	Suitable for pooling?	Data quality check needed?	**Other comments on station and flow data quality** – e.g. information from NRFA Peak Flows, trends in flood peaks, outliers.
Give link/reference to any further data quality checks carried out						

1.6 Rating equations

Station name	**Type of rating** e.g. theoretical, empirical; degree of extrapolation	Rating review needed?	**Reasons** – e.g. availability of recent flow gaugings, amount of scatter in the rating.
Give link/reference to any rating reviews carried out			

1.7 Other data available and how it has been obtained

Type of data	Data relevant to this study?	Data available?	Source of data and licence reference if from EA	Date obtained	Details

Check flow gaugings (if planned to review ratings)					
Historic flood data – give link to historic review if carried out.	N/a	N/a	N/a		Historical review reveals no specific instances of flooding at the site, or within Abermorddu. Numerous flood incidents reports in wider Caergwrle area see: http://www.bbc.co.uk/news/uk-wales-19701063 Objection to development on land west of Wrexham Road, Abermorddu has been raised in the past with residents stating that the fields are prone to flooding. However there are no specific records of flooding.: http://www.dailypost.co.uk/news/local-news/abermorddu-residents-oppose-housing-plans-2778100
Flow data for events					
Rainfall data for events					
Results from previous studies					
Other data or information (e.g. groundwater, tides)					

1.8 Initial choice of approach

Is FEH appropriate? (it may not be for very small, heavily urbanised or complex catchments) If not, describe other methods to be used.	Yes catchment is not complex and descriptors are within standard range.
Outline the conceptual model, addressing questions such as: • Where are the main sites of interest? • What is likely to cause flooding at those locations? (peak flows, flood volumes, combinations of peaks, groundwater, snowmelt, tides…) • Might those locations flood from runoff generated on part of the catchment only, e.g. downstream of a reservoir? • Is there a need to consider temporary debris dams that could collapse?	The main area of interest is an area of greenfield land to the west of Wrexham Road. The model will investigate the fluvial flood risk to the existing site.
Any unusual catchment features to take into account? e.g. • highly permeable – avoid ReFH if BFIHOST>0.65, consider permeable catchment adjustment for statistical method if SPRHOST<20% • highly urbanised – consider FEH Statistical or other alternatives; consider method that can account for differing sewer and topographic catchments • pumped watercourse – consider lowland catchment version of rainfall-runoff method	BFIHOST = 0.802 FEH-Statistical required SPRHOST = 20.84 permeable catchment adjustment may be required $URBEXT_{1990}$ and $URBEXT_{2000}$ = 0.00 which is within range for the ReFH method FARL = 1, one reservoir or lake present within the catchment extent, however feature will be included within the hydraulic modelling extent and will be incorporated within the hydraulic model. The catchment is not pumped.

• major reservoir influence (FARL<0.90) – consider flood routing • extensive floodplain storage – consider choice of method carefully	
Initial approach and reasons Will the catchment be split into subcatchments? If so, how?	The hybrid method is the initial choice of method. The FEH Statistical method will be used to estimate peak flows for the 1% and 1% AEP + CCA events and the hydrographs generated using ReFH2 will be scaled to match the statistical peak flow estimates.
Software to be used (with version numbers)	WINFAP-FEH version 3.0.003 ReFH version 2.2

2 LOCATIONS WHERE FLOOD ESTIMATES REQUIRED

The table below lists the locations of subject sites. The site codes listed below are used in all subsequent tables to save space.

2.1 Summary of subject sites

Site code	Watercourse	Site	Easting	Northing	AREA on FEH CD-ROM (km^2)	Revised AREA if altered
S001	Abermorddu Stream	Wrexham Road, Abermorddu	331100	356600	0.540	0.589
Reasons for choosing above locations						

2.2 Important catchment descriptors at each subject site (incorporating any changes made)

Site code	FARL	PROPWET	BFIHOST	DPLBAR (km)	DPSBAR (m/km)	SAAR (mm)	SPRHOST	URBEXT	FPEXT
S001	1	10.3	0.802	0.8075	195.4	833	20.84	0	0.0046

2.3 Checking catchment descriptors

Record how catchment boundary was checked and describe any changes (refer to maps if needed)	The catchment boundary was checked using 1:50000 scale OS mapping and a watershed analysis in GIS software. The catchment boundary was found to vary significantly when compared with the boundary exported from the FEH Web Service. The catchment boundary has been updated and thorough checks have been made on catchment descriptors, updates have been made where applicable.
Record how other catchment descriptors (especially soils) were checked and describe any changes. Include before/after table if necessary.	BFIHOST – has been checked using a Soil Survey of Britain map, indicating that the area has a reasonably high BFIHOST. The BFI HOST from the FEH Web Service is consistent with the geology and soil types of the updated catchment boundary and as such has not been altered. SAAR – has been checked using 1941-1970 Average Annual Rainfall maps. FARL has been checked using OS maps; there is one reservoir in the catchment resulting in the moderate FARL value of 0.959. The reservoir/lake is within the 2D hydraulic model extent. As such the FARL value has been set as 1 and the reservoir/lake is to be represented within the hydraulic model. URBEXT has been checked using OS maps –$URBEXT_{1990}$ and $URBEXT_{2000}$ values have been updated to 0.0 to reflect the entirely rural catchment.
Source of URBEXT	URBEXT1990 for ReFH / URBEXT2000 for FEH Statistical
Method for updating of URBEXT	Not applicable as catchment has zero urban extent.

3 STATISTICAL METHOD

3.1 Search for donor sites for QMED (if applicable)

Comment on potential donor sites

Mention:

- Number of potential donor sites available
- Distances from subject site
- Similarity in terms of AREA, BFIHOST, FARL and other catchment descriptors
- Quality of flood peak data

Include a map if necessary. Note that donor catchments should usually be rural.

A review of the 10 nearest potential donor stations has been carried out for the Abermorddu Stream.

The nearest potential donor is 21km away and the furthest is 64km away.

Discarded station	NRFA station no.	Justification
Wheeler @ Bodfari	66004	Gauge only suitable to low flows and catchment too large
Clwyd @ Pont-y-cambwll	66001	Catchment area is too large to be suitable
Gowy @ Bridge Trafford	68020	Catchment area is too large to be suitable
Weaver @ Audlem	68005	Catchment area is too large to be suitable
Alwen @ Druid	67006	Catchment area is too large to be suitable
Weaver @ Ashbrook	68001	Catchment area is too large to be suitable
Elwy @ Pant yr Onen	66002	Catchment area is too large to be suitable and low AMAX data years
Hirnant @ Plas Rhiwedog	67013	Flows greater than Qmed subject to station bypassing, catchment descriptors dissimilar to subject site and low AMAX data years
Arley Brook @ Gore Farm	68011	Catchment descriptors are dissimilar and no gaugings to validate the rating
Tern @ Ternhill	54044	Station not gauged to within 30% of Qmed

	Unfortunately, there are no suitable stations for donor transfer no stations have a catchment area within a factor of 10 of the subject site. Catchment descriptors differ significantly from the subject site to all suggested donors. Station 67006 increases the initial estimate of Qmed from 0.077 to 0.078. All other stations decrease the estimate of Qmed. Therefore, due to the lack of confidence with suggested donor stations it is assumed suitable to estimate Qmed from catchment descriptors.

3.2 Donor sites chosen and QMED adjustment factors

NRFA no.	Reasons for choosing or rejecting	Method (AM or POT)	Adjust-ment for climatic variation?	QMED from flow data (A)	QMED from catchment descriptors (B)	Adjust-ment ratio (A/B)
Which version of the urban adjustment was used for QMED at donor sites, and why? Note: The guidelines recommend great caution in urban adjustment of QMED on catchments that are also highly permeable (BFIHOST>0.8).				None applied to donor sites.		

3.3 Overview of estimation of QMED at each subject site

Site code	Method	Initial estimate of QMED (m^3/s)	Data transfer						Final estimate of QMED (m^3/s)
			NRFA numbers for donor sites used (see 3.3)	Distance between centroids d_{ij} (km)	Power term, a	Moderated QMED adjustment factor, $(A/B)^a$	If more than one donor		
							Weight	Weighted average adjustment factor	
S001	CDs	0.077	-	-	-	-	-	-	0.077
Are the values of QMED consistent, for example at successive points along the watercourse and at confluences?						N/a			
Which version of the urban adjustment was used for QMED, and why?						Catchment is entirely rural therefore, urban adjustment has not been applied.			

Notes

Methods: AM – Annual maxima; POT – Peaks over threshold; DT – Data transfer; CD – Catchment descriptors alone.

When QMED is estimated from POT data, it should also be adjusted for climatic variation. Details should be added.

When QMED is estimated from catchment descriptors, the revised 2008 equation from Science Report SC050050**Error! Bookmark not defined.** should be used. If the original FEH equation has been used, say so and give the reason why.

The guidelines recommend great caution in urban adjustment of QMED on catchments that are also highly permeable (BFIHOST>0.8). The adjustment method used in WINFAP-FEH v3.0.003 is likely to overestimate adjustment factors for such catchments. In this case the only reliable flood estimates are likely to be derived from local flow data.

The data transfer procedure is from Science Report SC050050. The QMED adjustment factor A/B for each donor site is given in Table 3.3. This is moderated using the power term, a, which is a function of the distance between the centroids of the subject catchment and the donor catchment. The final estimate of QMED is $(A/B)^a$ times the initial estimate from catchment descriptors.

If more than one donor has been used, use multiple rows for the site and give the weights used in the averaging. Record the weighted average adjustment factor in the penultimate column.

3.4 Derivation of pooling groups

The composition of the pooling groups is given in the Annex. Several subject sites may use the same pooling group.

Name of group	Site code from whose descriptors group was derived	Subject site treated as gauged? (enhanced single site analysis)	Changes made to default pooling group, with reasons Note also any sites that were investigated but retained in the group.	Weighted average L-moments, L-CV and L-skew, (before urban adjustment)
P001	S001	No	Minimal changes were made to the default pooling group. Details of which stations were removed, added and reviewed are included in the table below. An initial WINFAP was carried out using the default pooling group which produced lower peak flows for the 1% and 0.1% AEP events. A review of the pooling group showed that there were stations with dissimilar catchment descriptors which required review. **Station no.** / **Reason** **REMOVED** 49006 – Only 8 years of data and discordant **INVESTIGATED** 54022 – High SAAR and no gaugings, kept in as confidence in gauge due to monitoring network and no other suitable stations 91802 – High SAAR, kept in as no other suitable stations 27073 – High FPEXT and high BFIHOST, kept in as subject site has high BFIHOST and no other suitable stations 26802 – Very high BFIHOST, subject site has high BFIHOST and no other suitable stations	0.238 0.251

Notes

Pooling groups were derived using the revised procedures from Science Report SC050050 (2008).

The weighted average L-moments, before urban adjustment, can be found at the bottom of the Pooling-group details window in WINFAP-FEH.

3.5 Derivation of flood growth curves at subject sites

Site code	Method (SS, P, ESS, J)	If P, ESS or J, name of pooling group (3.4)	Distribution used and reason for choice	Note any urban adjustment or permeable adjustment	Parameters of distribution (location, scale and shape) after adjustments	Growth factor for 100-year return period
S001	P	AMS	GL	Permeable Adjustment		3.047

Notes

Methods: SS – Single site; P – Pooled; ESS – Enhanced single site; J – Joint analysis

A pooling group (or ESS analysis) derived at one gauge can be applied to estimate growth curves at a number of ungauged sites. Each site may have a different urban adjustment, and therefore different growth curve parameters.

Urban adjustments to growth curves should use the version 3 option in WINFAP-FEH: Kjeldsen (2010).

3.6 Flood estimates from the statistical method

Site code	Flood peak (m^3/s) for the following return periods (in years)								
	2	100	100 + CCA	1000					
S001	0.077	0.235	0.282	0.416					

4 REVITALISED FLOOD HYDROGRAPH (REFH) METHOD

4.1 Parameters for ReFH model

Note: If parameters are estimated from catchment descriptors, they are easily reproducible so it is not essential to enter them in the table.

Site code	Method: OPT: Optimisation BR: Baseflow recession fitting CD: Catchment descriptors DT: Data transfer (give details)	Tp (hours) Time to peak	C_{max} (mm) Maximum storage capacity	BL (hours) Baseflow lag	BR Baseflow recharge
S001	CD	1	821.73	35.26	2.49
Brief description of any flood event analysis carried out (further details should be given below or in a project report)					

4.2 Design events for ReFH method

Site code	Urban or rural	Season of design event (summer or winter)	Storm duration (hours)	Storm area for ARF (if not catchment area)
S001	Rural	Winter	1:54	0.97
Are the storm durations likely to be changed in the next stage of the study, e.g. by optimisation within a hydraulic model?				

4.3 Flood estimates from the ReFH method

Site code	Flood peak (m^3/s) for the following return periods (in years)								
	2	100	100 + CCA	1000					
S001	0.079	0.319	0.383	0.591					

5 FEH RAINFALL-RUNOFF METHOD

5.1 Parameters for FEH rainfall-runoff model

Methods:
FEA : Flood event analysis
LAG : Catchment lag
DT : Catchment descriptors with data transfer from donor catchment
CD : Catchment descriptors alone
BFI : SPR derived from baseflow index calculated from flow data

Site code	Rural (R) or urban (U)	Tp(0): method	Tp(0): value (hours)	SPR: method	SPR: value (%)	BF: method	BF: value (m^3/s)	If DT, numbers of donor sites used (see Section 5.2) and reasons

5.2 Donor sites for FEH rainfall-runoff parameters

No	Watercourse	Station	Tp(0) from data (A)	Tp(0) from CDs (B)	Adjustment ratio for Tp(0) (A/B)	SPR from data (C)	SPR from CDs (D)	Adjust-ment ratio for SPR (C/D)
1								
2								

5.3 Inputs to and outputs from FEH rainfall-runoff model

Site code	Storm duration (hours)	Storm area for ARF (if not catchment area)	Flood peaks (m^3/s) for the following return periods (in years)							
Are the storm durations likely to be changed in the next stage of the study, e.g. by optimisation within a hydraulic model?										

6 DISCUSSION AND SUMMARY OF RESULTS

6.1 Comparison of results from different methods

This table compares peak flows from various methods with those from the FEH Statistical method at example sites for two key return periods. Blank cells indicate that results for a particular site were not calculated using that method.

Site code	Return period 2 years			Return period 100 years		
	Statistical	ReFH	Ratio (ReFH / Statistical)	Statistical	ReFH	Ratio (ReFH / Statistical)
S001	0.077	0.079	0.102	0.235	0.319	1.358

6.2 Final choice of method

Choice of method and reasons – include reference to type of study, nature of catchment and type of data available.	The ReFH method has been selected as the final choice of method for a; events up to the Q1000 event. The ReFH peak flows are reasonably similar (albeit higher) to the FEH Statistical peak flows. There is a fair degree of uncertainty in both the FEH-Statistical produced peak flows due to the lack of suitable stations for donor transfer and the presence of stations in the pooling group with dissimilar characteristics to the subject site and the ReFH method due to the high permeability of the catchment. There are no suitable stations for donor transfer, 9 out of 10 of the suggested stations were shown to decrease the initial estimate of Qmed, therefore it is assumed more conservative to derive Qmed for the subject site from catchment descriptors. With no other similar gauged stations to draw a comparison from, it has been considered a better option to use the ReFH flows as a more conservative approach. The flows will be scaled by area based on the total catchment area, the catchment area of the Abermorddu Stream and the catchment area of the Abermorddu Stream tributary. Scaling is applied based on a multiplication factor derived by (Watercourse catchment area / Total catchment area = multiplication factor) a summary is provided in the Table below:

Scaling info		
Catchment	Area	Multiplication factor
Total	0.589	1
Abermorddu Stream	0.427	0.725*
Tributary	0.162	0.275*

*figures given to 3 decimal places.

6.3 Assumptions, limitations and uncertainty

List the main assumptions made (specific to this study)	There is a watercourse present in the southern extent of the catchment which appears to flow east and enter a culvert. There is limited information but it is assumed that this watercourse is the upstream extent of the Abermorddu Stream Tributary. Watershed analysis shows that the stream would certainly flow towards the lower reach of the tributary if open channel were present or during a blockage scenario. It is worth noting that south of the subject site there is present an underground reservoir, should this stream actually be a feed to this reservoir then peak flows for the Abermorddu Stream Tributary would potentially be overestimated.
Discuss any particular limitations, e.g. applying methods outside the range of catchment types or return periods for which they were developed	The 1000yr flows have been derived and have a large uncertainty.

Give what information you can on in the results – e.g. confidence limits for the QMED estimates using FEH **3** 12.5 or the factorial standard error from Science Report SC050050 (2008).	Confidence limits of 68% on FEH Statistical derived QMED: 0.077 Lower limit = 0.054 Upper limit = 0.110 NB: These limits do not apply to the ReFH method results.
Comment on the suitability of the results for future studies, e.g. at nearby locations or for different purposes.	
Give any other comments on the study, for example suggestions for additional work.	

6.4 Checks

Are the results consistent, for example at confluences?	No other gauged data for comparison.
What do the results imply regarding the return periods of floods during the period of record?	
What is the 100-year growth factor? Is this realistic? (The guidance suggests a typical range of 2.1 to 4.0)	3.047 – within the typical range.
If 1000-year flows have been derived, what is the range of ratios for 1000-year flow over 100-year flow?	FEH Stat = 1.770 ReFH = 1.852
What range of specific runoffs (l/s/ha) do the results equate to? Are there any inconsistencies?	Catchment area= 0.589km² = 58.9ha 1 in 100 yr peak (FEH) = 0.319m³/s= 319l/s Run off equates to 5.42l/s/ha* *rounded to 2 decimal places
How do the results compare with those of other studies? Explain any differences and conclude which results should be preferred.	No other studies.
Are the results compatible with the longer-term flood history?	As per historical review there is limited information regarding flooding at the subject site. However, the results appear to suggest that flooding would be experienced at the subject site during the 1% AEP and greater events. This may be in agreement with the concerns of the local residents in relation to flood risk at the site. There is however, limited information available to confirm whether the return periods of flooding mentioned by local residents are consistent with that of the hydrological analysis.
Describe any other checks on the results	

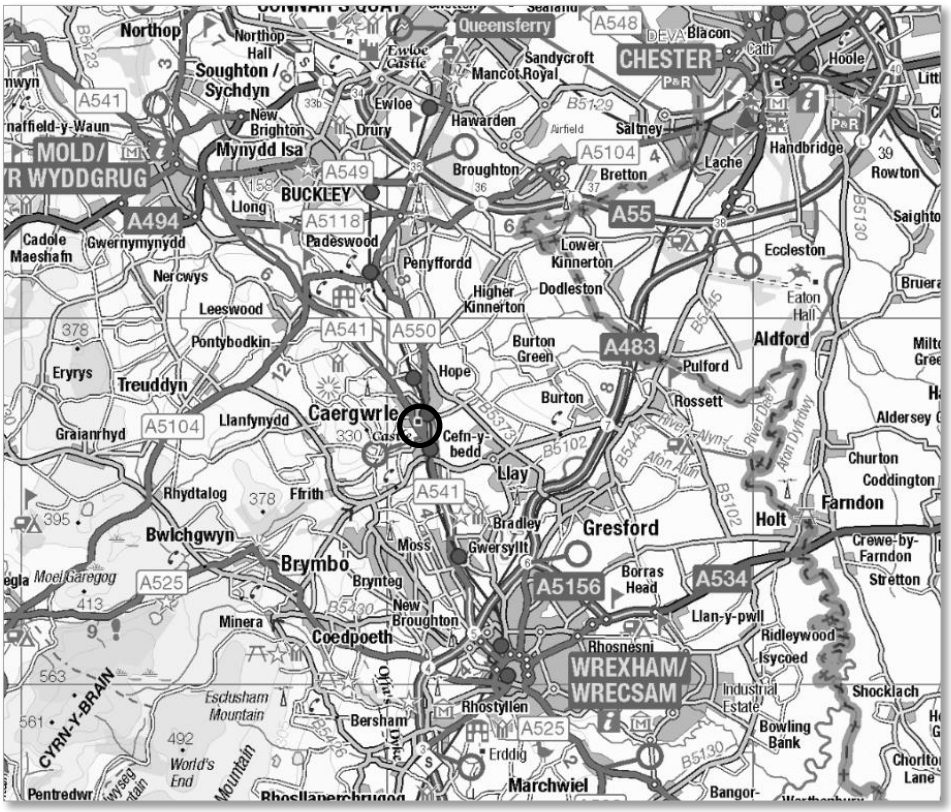
6.5 Final results

Site code	Flood peak (m^3/s) for the following return periods (in years)								
	2	**100**	**100 + CCA**	**1000**					
S001	0.079	0.319	0.383	0.591					

If flood hydrographs are needed for the next stage of the study, where are they provided? (e.g. give filename of spreadsheet, name of ISIS model, or reference to table below)	The design hydrographs are included in Annex 7.6 of this Flood Estimation Record.

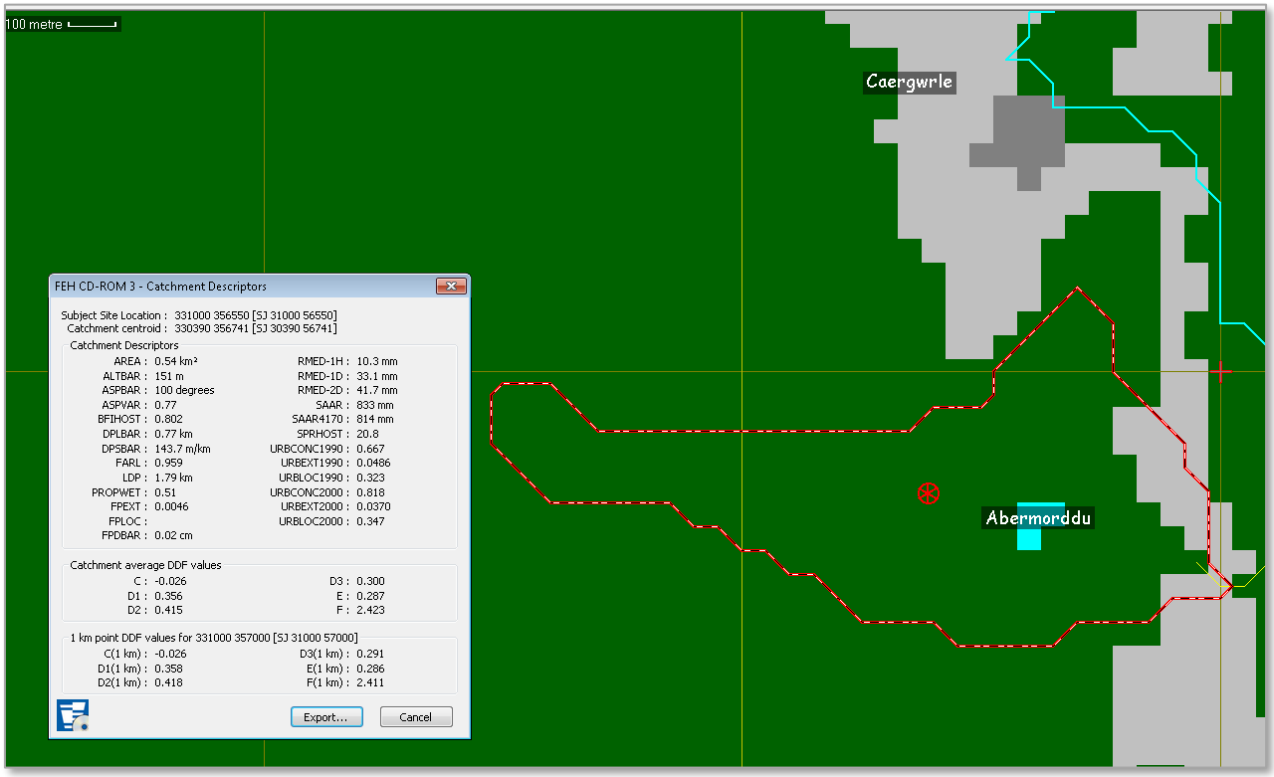
7 ANNEX - SUPPORTING INFORMATION

7.1 Site Location

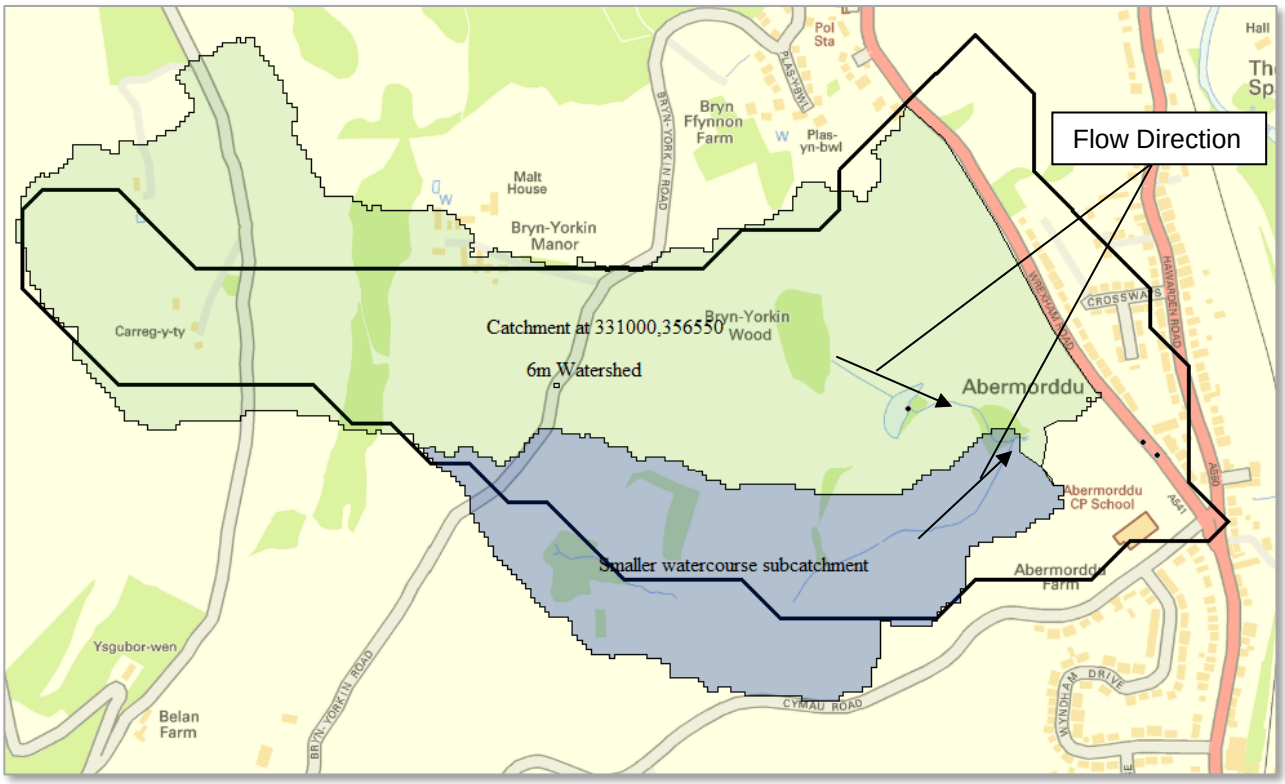


7.2 Catchment Boundary and Descriptors

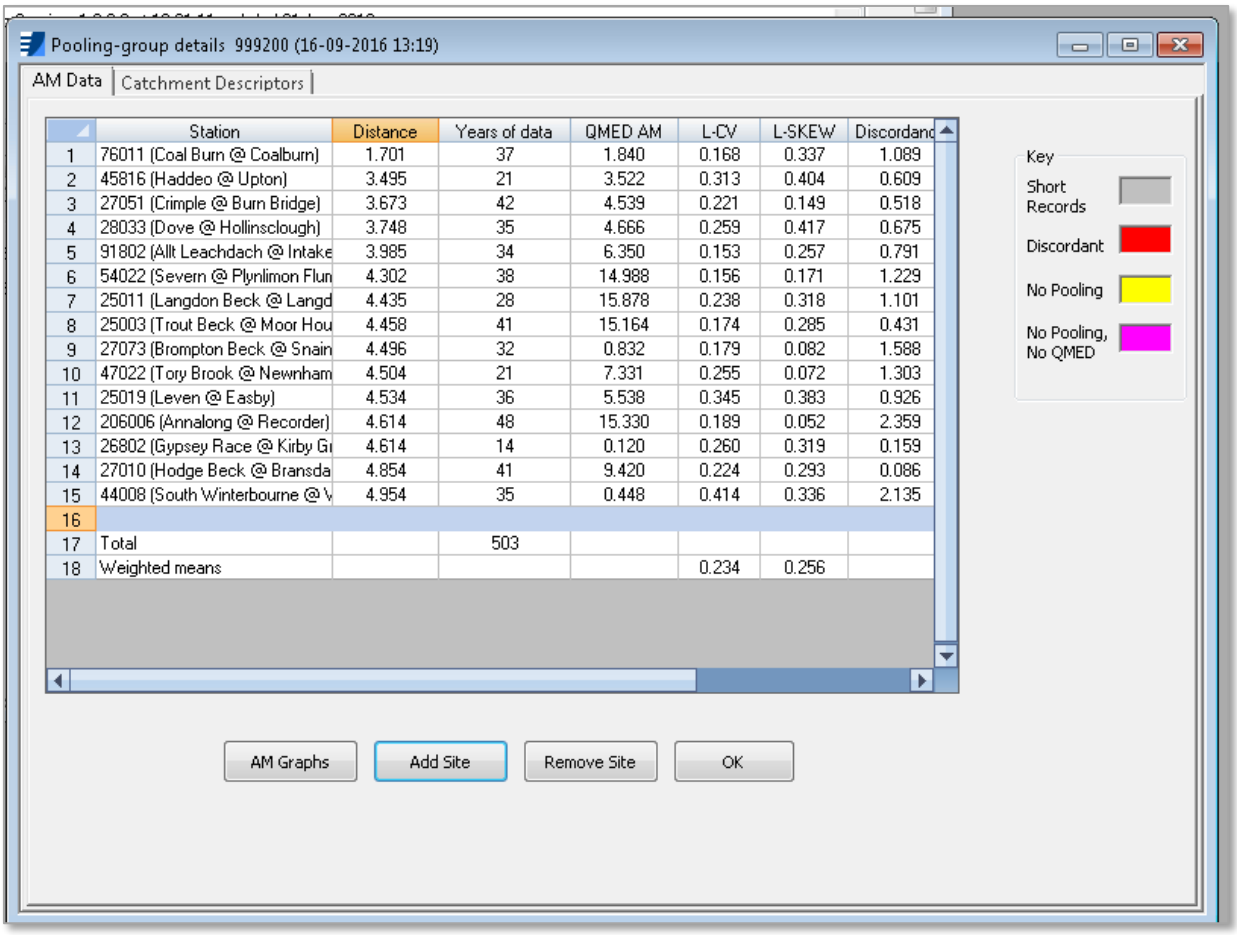
FEH CDROM v3 catchment boundary



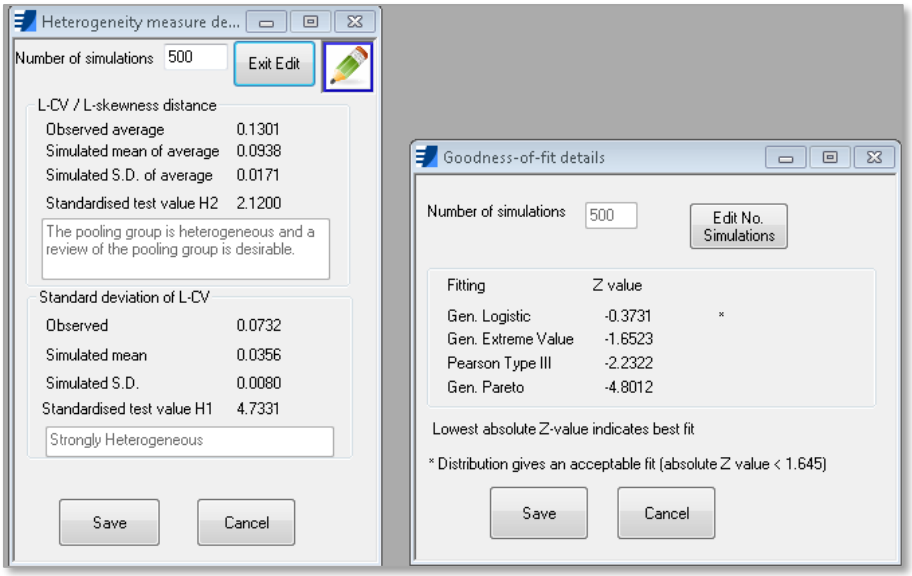
FEH Web Service 13 boundary and updated catchment watershed boundary for both larger and smaller catchments



7.3 FEH Statistical Analysis – Pooling group composition

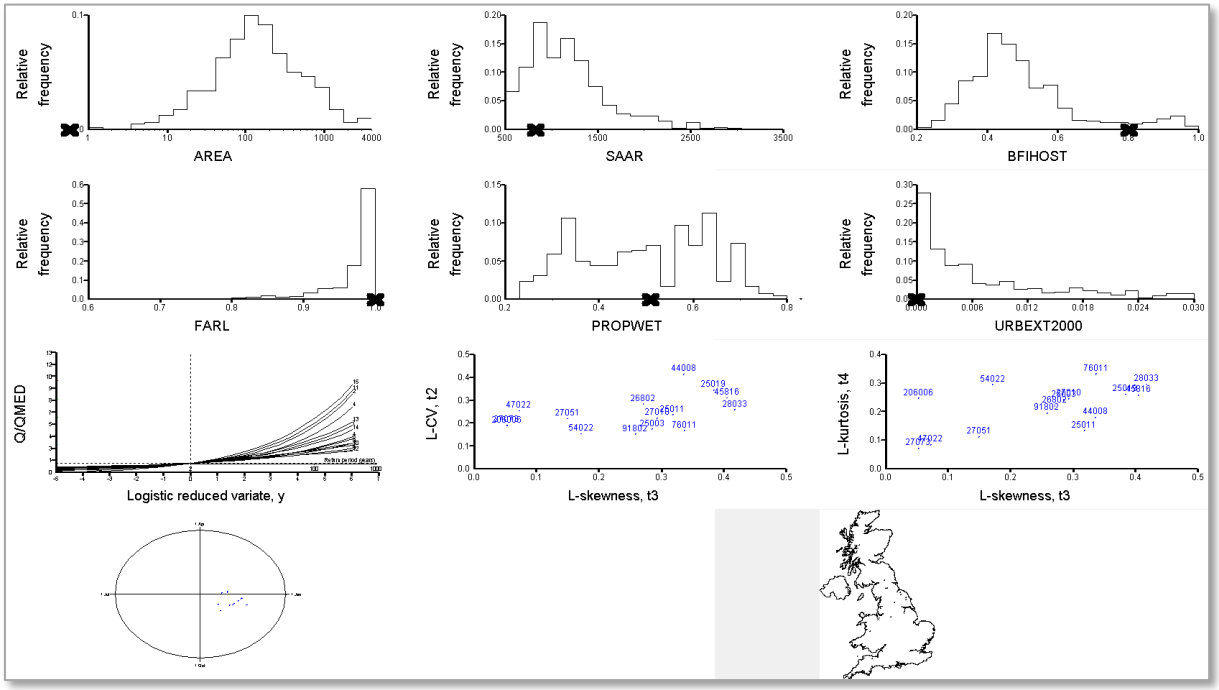


	Station	Distance	Years of data	QMED AM	L-CV	L-SKEW	Discordanc
1	76011 (Coal Burn @ Coalburn)	1.701	37	1.840	0.168	0.337	1.089
2	45816 (Haddeo @ Upton)	3.495	21	3.522	0.313	0.404	0.609
3	27051 (Crimple @ Burn Bridge)	3.673	42	4.539	0.221	0.149	0.518
4	28033 (Dove @ Hollinsclough)	3.748	35	4.666	0.259	0.417	0.675
5	91802 (Allt Leachdach @ Intake	3.985	34	6.350	0.153	0.257	0.791
6	54022 (Severn @ Plynlimon Flun	4.302	38	14.988	0.156	0.171	1.229
7	25011 (Langdon Beck @ Langd	4.435	28	15.878	0.238	0.318	1.101
8	25003 (Trout Beck @ Moor Hou	4.458	41	15.164	0.174	0.285	0.431
9	27073 (Brompton Beck @ Snain	4.496	32	0.832	0.179	0.082	1.588
10	47022 (Tory Brook @ Newnham	4.504	21	7.331	0.255	0.072	1.303
11	25019 (Leven @ Easby)	4.534	36	5.538	0.345	0.383	0.926
12	206006 (Annalong @ Recorder)	4.614	48	15.330	0.189	0.052	2.359
13	26802 (Gypsey Race @ Kirby Gı	4.614	14	0.120	0.260	0.319	0.159
14	27010 (Hodge Beck @ Bransda	4.854	41	9.420	0.224	0.293	0.086
15	44008 (South Winterbourne @ V	4.954	35	0.448	0.414	0.336	2.135
16							
17	Total		503				
18	Weighted means				0.234	0.256	

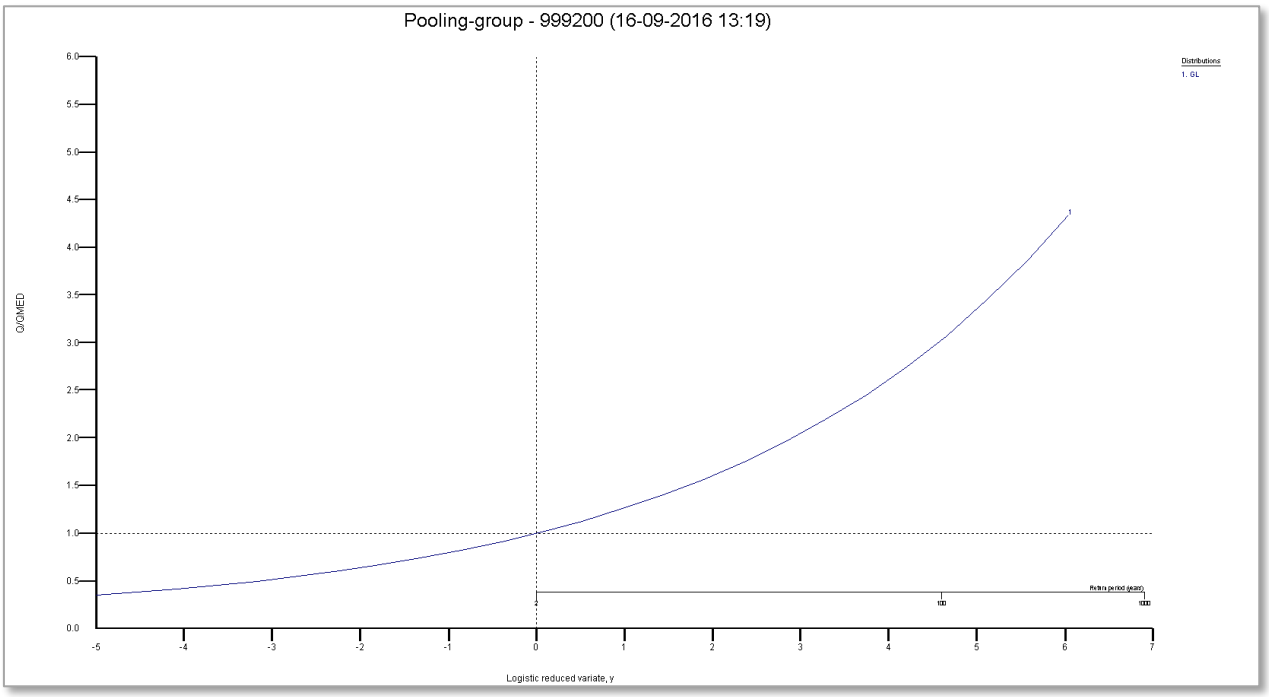


7.4 FEH Statistical Analysis – Additional supporting information

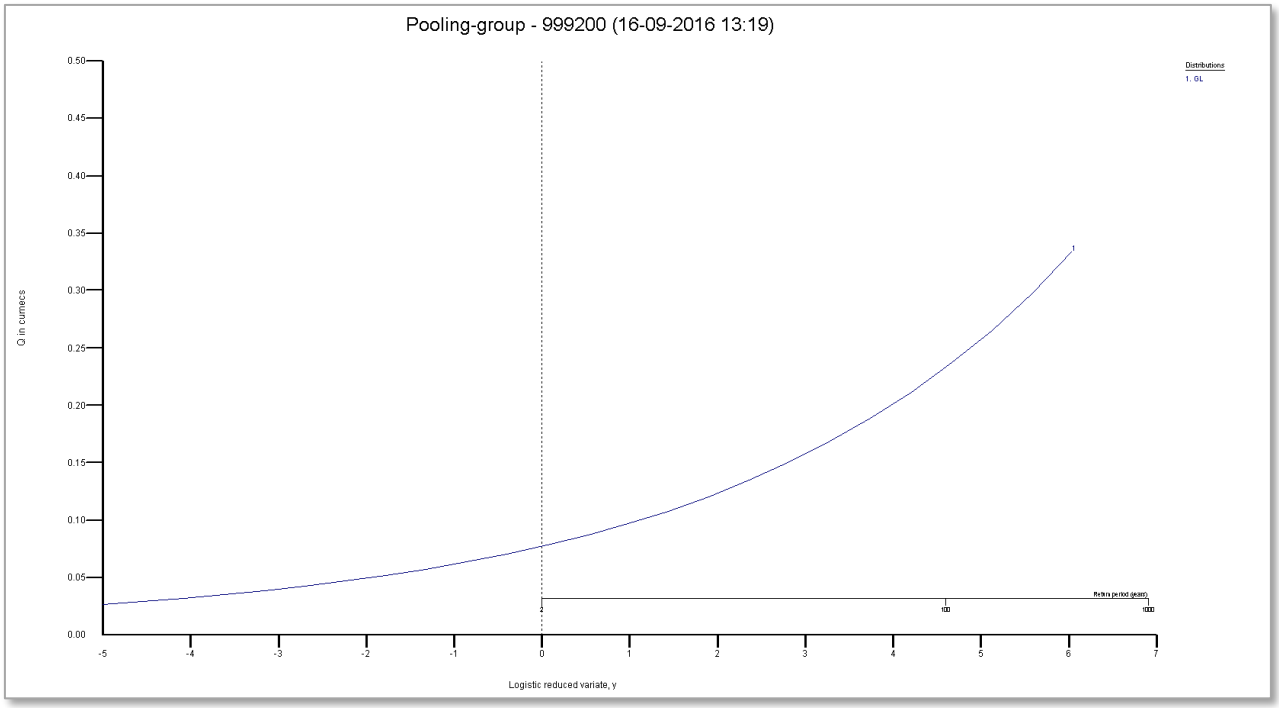
<u>All Analysis Graphs</u>


Relative frequency
AREA
SAAR
BFIHOST
FARL
PROPWET
URBEXT2000
Q/QMED
Logistic reduced variate, y
L-CV, t2
L-skewness, t3
L-kurtosis, t4
L-skewness, t3

Growth Curve graph



FFC Graph



7.5 ReFH2.2 Hydrographs

UK Design Flood Estimation

Generated on Friday, September 16, 2016 3:00:24 PM by Bethan.LloydJones
Printed from the ReFH Flood Modelling software package, version 2.2.6029.28099

Summary of estimate using the Flood Estimation Handbook revitalised flood hydrograph method (ReFH)

Site details Checksum: 3AE5-7051

Site name: FEH_Catchment_Descriptors_331000_356550 (Updated)

Easting: 331000

Northing: 356550

Country: England, Wales or Northern Ireland

Catchment Area (km^2): 0.59

Using plot scale calculations: No

Site description: None

Model run: 2 year

Summary of results

Rainfall - FEH 2013 (mm):	16.45	Total runoff (ML):	0.50
Total Rainfall (mm):	10.50	Total flow (ML):	1.74
Peak Rainfall (mm):	1.43	Peak flow (m^3/s):	0.08

Parameters

Where the user has overriden a system-generated value, this original value is shown in square brackets after the value used.
** Indicates that the user locked the duration/timestep*

Rainfall parameters (Rainfall - FEH 2013 model)

Name	Value	User-defined?
Duration (hh:mm:ss)	01:54:00	No
Timestep (hh:mm:ss)	00:06:00	No
SCF (Seasonal correction factor)	0.66	No
ARF (Areal reduction factor)	0.97	No
Seasonality	Winter	n/a

Loss model parameters

Name	Value	User-defined?
Cini (mm)	60.95	No
Cmax (mm)	821.73	No
Use alpha correction factor	No	No
Alpha correction factor	n/a	No

Routing model parameters

Name	Value	User-defined?
Tp (hr)	1	No
Up	0.65	No
Uk	0.8	No

Baseflow model parameters

Name	Value	User-defined?
BF0 (m^3/s)	0	No
BL (hr)	35.26	No
BR	2.49	No

Urbanisation parameters

Name	Value	User-defined?
Urban area (km^2)	0	No
Urbext 2000	0	No
Impervious runoff factor	0.7	No
Imperviousness factor	0.3	No
Tp scaling factor	0.5	No
Sewered area (km^2)	0.00	Yes
Sewer capacity (m^3/s)	0.00	Yes

Time series data

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
00:00:00	0.119	0.000	0.009	0.000	0.005	0.005
00:06:00	0.160	0.000	0.012	0.000	0.005	0.005
00:12:00	0.216	0.000	0.016	0.000	0.005	0.005
00:18:00	0.291	0.000	0.022	0.001	0.005	0.005
00:24:00	0.390	0.000	0.029	0.001	0.005	0.006
00:30:00	0.523	0.000	0.040	0.002	0.005	0.006
00:36:00	0.697	0.000	0.053	0.003	0.005	0.008
00:42:00	0.925	0.000	0.072	0.005	0.005	0.009
00:48:00	1.212	0.000	0.096	0.007	0.005	0.012
00:54:00	1.431	0.000	0.115	0.010	0.005	0.015
01:00:00	1.212	0.000	0.100	0.014	0.005	0.019
01:06:00	0.925	0.000	0.077	0.020	0.005	0.025
01:12:00	0.697	0.000	0.059	0.026	0.005	0.031
01:18:00	0.523	0.000	0.045	0.033	0.005	0.038
01:24:00	0.390	0.000	0.033	0.039	0.005	0.045
01:30:00	0.291	0.000	0.025	0.046	0.006	0.052
01:36:00	0.216	0.000	0.019	0.053	0.006	0.059
01:42:00	0.160	0.000	0.014	0.059	0.006	0.065
01:48:00	0.119	0.000	0.010	0.064	0.007	0.071
01:54:00	0.000	0.000	0.000	0.068	0.007	0.075
02:00:00	0.000	0.000	0.000	0.070	0.008	0.078
02:06:00	0.000	0.000	0.000	0.070	0.008	0.079
02:12:00	0.000	0.000	0.000	0.069	0.009	0.078
02:18:00	0.000	0.000	0.000	0.067	0.009	0.076
02:24:00	0.000	0.000	0.000	0.064	0.010	0.074
02:30:00	0.000	0.000	0.000	0.061	0.010	0.071
02:36:00	0.000	0.000	0.000	0.057	0.010	0.067
02:42:00	0.000	0.000	0.000	0.052	0.011	0.063
02:48:00	0.000	0.000	0.000	0.048	0.011	0.059
02:54:00	0.000	0.000	0.000	0.044	0.011	0.055
03:00:00	0.000	0.000	0.000	0.040	0.012	0.052
03:06:00	0.000	0.000	0.000	0.037	0.012	0.049
03:12:00	0.000	0.000	0.000	0.034	0.012	0.046
03:18:00	0.000	0.000	0.000	0.031	0.012	0.043
03:24:00	0.000	0.000	0.000	0.028	0.013	0.040

Printed from the ReFH Flood Modelling software package, version 2.2.6029.28099

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
03:30:00	0.000	0.000	0.000	0.025	0.013	0.038
03:36:00	0.000	0.000	0.000	0.023	0.013	0.035
03:42:00	0.000	0.000	0.000	0.020	0.013	0.033
03:48:00	0.000	0.000	0.000	0.018	0.013	0.031
03:54:00	0.000	0.000	0.000	0.016	0.013	0.029
04:00:00	0.000	0.000	0.000	0.013	0.013	0.027
04:06:00	0.000	0.000	0.000	0.011	0.013	0.024
04:12:00	0.000	0.000	0.000	0.009	0.013	0.022
04:18:00	0.000	0.000	0.000	0.007	0.013	0.021
04:24:00	0.000	0.000	0.000	0.006	0.013	0.019
04:30:00	0.000	0.000	0.000	0.004	0.013	0.017
04:36:00	0.000	0.000	0.000	0.003	0.013	0.016
04:42:00	0.000	0.000	0.000	0.002	0.013	0.015
04:48:00	0.000	0.000	0.000	0.001	0.013	0.015
04:54:00	0.000	0.000	0.000	0.001	0.013	0.014
05:00:00	0.000	0.000	0.000	0.001	0.013	0.014
05:06:00	0.000	0.000	0.000	0.000	0.013	0.013
05:12:00	0.000	0.000	0.000	0.000	0.013	0.013
05:18:00	0.000	0.000	0.000	0.000	0.013	0.013
05:24:00	0.000	0.000	0.000	0.000	0.013	0.013
05:30:00	0.000	0.000	0.000	0.000	0.013	0.013
05:36:00	0.000	0.000	0.000	0.000	0.013	0.013
05:42:00	0.000	0.000	0.000	0.000	0.013	0.013
05:48:00	0.000	0.000	0.000	0.000	0.013	0.013
05:54:00	0.000	0.000	0.000	0.000	0.013	0.013
06:00:00	0.000	0.000	0.000	0.000	0.013	0.013
06:06:00	0.000	0.000	0.000	0.000	0.013	0.013
06:12:00	0.000	0.000	0.000	0.000	0.013	0.013
06:18:00	0.000	0.000	0.000	0.000	0.013	0.013
06:24:00	0.000	0.000	0.000	0.000	0.013	0.013
06:30:00	0.000	0.000	0.000	0.000	0.013	0.013
06:36:00	0.000	0.000	0.000	0.000	0.013	0.013
06:42:00	0.000	0.000	0.000	0.000	0.013	0.013
06:48:00	0.000	0.000	0.000	0.000	0.012	0.012
06:54:00	0.000	0.000	0.000	0.000	0.012	0.012
07:00:00	0.000	0.000	0.000	0.000	0.012	0.012

Printed from the ReFH Flood Modelling software package, version 2.2.6029.28099

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
07:06:00	0.000	0.000	0.000	0.000	0.012	0.012
07:12:00	0.000	0.000	0.000	0.000	0.012	0.012
07:18:00	0.000	0.000	0.000	0.000	0.012	0.012
07:24:00	0.000	0.000	0.000	0.000	0.012	0.012
07:30:00	0.000	0.000	0.000	0.000	0.012	0.012
07:36:00	0.000	0.000	0.000	0.000	0.012	0.012
07:42:00	0.000	0.000	0.000	0.000	0.012	0.012
07:48:00	0.000	0.000	0.000	0.000	0.012	0.012
07:54:00	0.000	0.000	0.000	0.000	0.012	0.012
08:00:00	0.000	0.000	0.000	0.000	0.012	0.012
08:06:00	0.000	0.000	0.000	0.000	0.012	0.012
08:12:00	0.000	0.000	0.000	0.000	0.012	0.012
08:18:00	0.000	0.000	0.000	0.000	0.012	0.012
08:24:00	0.000	0.000	0.000	0.000	0.012	0.012
08:30:00	0.000	0.000	0.000	0.000	0.012	0.012
08:36:00	0.000	0.000	0.000	0.000	0.012	0.012
08:42:00	0.000	0.000	0.000	0.000	0.012	0.012
08:48:00	0.000	0.000	0.000	0.000	0.012	0.012
08:54:00	0.000	0.000	0.000	0.000	0.012	0.012
09:00:00	0.000	0.000	0.000	0.000	0.012	0.012
09:06:00	0.000	0.000	0.000	0.000	0.012	0.012
09:12:00	0.000	0.000	0.000	0.000	0.012	0.012
09:18:00	0.000	0.000	0.000	0.000	0.012	0.012
09:24:00	0.000	0.000	0.000	0.000	0.012	0.012
09:30:00	0.000	0.000	0.000	0.000	0.012	0.012
09:36:00	0.000	0.000	0.000	0.000	0.012	0.012
09:42:00	0.000	0.000	0.000	0.000	0.012	0.012
09:48:00	0.000	0.000	0.000	0.000	0.011	0.011
09:54:00	0.000	0.000	0.000	0.000	0.011	0.011
10:00:00	0.000	0.000	0.000	0.000	0.011	0.011
10:06:00	0.000	0.000	0.000	0.000	0.011	0.011
10:12:00	0.000	0.000	0.000	0.000	0.011	0.011
10:18:00	0.000	0.000	0.000	0.000	0.011	0.011
10:24:00	0.000	0.000	0.000	0.000	0.011	0.011
10:30:00	0.000	0.000	0.000	0.000	0.011	0.011
10:36:00	0.000	0.000	0.000	0.000	0.011	0.011

Printed from the ReFH Flood Modelling software package, version 2.2.6029.28099

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
10:42:00	0.000	0.000	0.000	0.000	0.011	0.011
10:48:00	0.000	0.000	0.000	0.000	0.011	0.011
10:54:00	0.000	0.000	0.000	0.000	0.011	0.011
11:00:00	0.000	0.000	0.000	0.000	0.011	0.011
11:06:00	0.000	0.000	0.000	0.000	0.011	0.011
11:12:00	0.000	0.000	0.000	0.000	0.011	0.011
11:18:00	0.000	0.000	0.000	0.000	0.011	0.011
11:24:00	0.000	0.000	0.000	0.000	0.011	0.011
11:30:00	0.000	0.000	0.000	0.000	0.011	0.011
11:36:00	0.000	0.000	0.000	0.000	0.011	0.011
11:42:00	0.000	0.000	0.000	0.000	0.011	0.011
11:48:00	0.000	0.000	0.000	0.000	0.011	0.011
11:54:00	0.000	0.000	0.000	0.000	0.011	0.011
12:00:00	0.000	0.000	0.000	0.000	0.011	0.011
12:06:00	0.000	0.000	0.000	0.000	0.011	0.011
12:12:00	0.000	0.000	0.000	0.000	0.011	0.011
12:18:00	0.000	0.000	0.000	0.000	0.011	0.011
12:24:00	0.000	0.000	0.000	0.000	0.011	0.011
12:30:00	0.000	0.000	0.000	0.000	0.011	0.011
12:36:00	0.000	0.000	0.000	0.000	0.011	0.011
12:42:00	0.000	0.000	0.000	0.000	0.011	0.011
12:48:00	0.000	0.000	0.000	0.000	0.011	0.011
12:54:00	0.000	0.000	0.000	0.000	0.011	0.011
13:00:00	0.000	0.000	0.000	0.000	0.010	0.010
13:06:00	0.000	0.000	0.000	0.000	0.010	0.010
13:12:00	0.000	0.000	0.000	0.000	0.010	0.010
13:18:00	0.000	0.000	0.000	0.000	0.010	0.010
13:24:00	0.000	0.000	0.000	0.000	0.010	0.010
13:30:00	0.000	0.000	0.000	0.000	0.010	0.010
13:36:00	0.000	0.000	0.000	0.000	0.010	0.010
13:42:00	0.000	0.000	0.000	0.000	0.010	0.010
13:48:00	0.000	0.000	0.000	0.000	0.010	0.010
13:54:00	0.000	0.000	0.000	0.000	0.010	0.010
14:00:00	0.000	0.000	0.000	0.000	0.010	0.010
14:06:00	0.000	0.000	0.000	0.000	0.010	0.010
14:12:00	0.000	0.000	0.000	0.000	0.010	0.010

Printed from the ReFH Flood Modelling software package, version 2.2.6029.28099

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
14:18:00	0.000	0.000	0.000	0.000	0.010	0.010
14:24:00	0.000	0.000	0.000	0.000	0.010	0.010
14:30:00	0.000	0.000	0.000	0.000	0.010	0.010
14:36:00	0.000	0.000	0.000	0.000	0.010	0.010
14:42:00	0.000	0.000	0.000	0.000	0.010	0.010
14:48:00	0.000	0.000	0.000	0.000	0.010	0.010
14:54:00	0.000	0.000	0.000	0.000	0.010	0.010
15:00:00	0.000	0.000	0.000	0.000	0.010	0.010
15:06:00	0.000	0.000	0.000	0.000	0.010	0.010
15:12:00	0.000	0.000	0.000	0.000	0.010	0.010
15:18:00	0.000	0.000	0.000	0.000	0.010	0.010
15:24:00	0.000	0.000	0.000	0.000	0.010	0.010
15:30:00	0.000	0.000	0.000	0.000	0.010	0.010
15:36:00	0.000	0.000	0.000	0.000	0.010	0.010
15:42:00	0.000	0.000	0.000	0.000	0.010	0.010
15:48:00	0.000	0.000	0.000	0.000	0.010	0.010
15:54:00	0.000	0.000	0.000	0.000	0.010	0.010
16:00:00	0.000	0.000	0.000	0.000	0.010	0.010
16:06:00	0.000	0.000	0.000	0.000	0.010	0.010
16:12:00	0.000	0.000	0.000	0.000	0.010	0.010
16:18:00	0.000	0.000	0.000	0.000	0.010	0.010
16:24:00	0.000	0.000	0.000	0.000	0.010	0.010
16:30:00	0.000	0.000	0.000	0.000	0.009	0.009
16:36:00	0.000	0.000	0.000	0.000	0.009	0.009
16:42:00	0.000	0.000	0.000	0.000	0.009	0.009
16:48:00	0.000	0.000	0.000	0.000	0.009	0.009
16:54:00	0.000	0.000	0.000	0.000	0.009	0.009
17:00:00	0.000	0.000	0.000	0.000	0.009	0.009
17:06:00	0.000	0.000	0.000	0.000	0.009	0.009
17:12:00	0.000	0.000	0.000	0.000	0.009	0.009
17:18:00	0.000	0.000	0.000	0.000	0.009	0.009
17:24:00	0.000	0.000	0.000	0.000	0.009	0.009
17:30:00	0.000	0.000	0.000	0.000	0.009	0.009
17:36:00	0.000	0.000	0.000	0.000	0.009	0.009
17:42:00	0.000	0.000	0.000	0.000	0.009	0.009
17:48:00	0.000	0.000	0.000	0.000	0.009	0.009

Printed from the ReFH Flood Modelling software package, version 2.2.6029.28099

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
17:54:00	0.000	0.000	0.000	0.000	0.009	0.009
18:00:00	0.000	0.000	0.000	0.000	0.009	0.009
18:06:00	0.000	0.000	0.000	0.000	0.009	0.009
18:12:00	0.000	0.000	0.000	0.000	0.009	0.009
18:18:00	0.000	0.000	0.000	0.000	0.009	0.009
18:24:00	0.000	0.000	0.000	0.000	0.009	0.009
18:30:00	0.000	0.000	0.000	0.000	0.009	0.009
18:36:00	0.000	0.000	0.000	0.000	0.009	0.009
18:42:00	0.000	0.000	0.000	0.000	0.009	0.009
18:48:00	0.000	0.000	0.000	0.000	0.009	0.009
18:54:00	0.000	0.000	0.000	0.000	0.009	0.009
19:00:00	0.000	0.000	0.000	0.000	0.009	0.009
19:06:00	0.000	0.000	0.000	0.000	0.009	0.009
19:12:00	0.000	0.000	0.000	0.000	0.009	0.009
19:18:00	0.000	0.000	0.000	0.000	0.009	0.009
19:24:00	0.000	0.000	0.000	0.000	0.009	0.009
19:30:00	0.000	0.000	0.000	0.000	0.009	0.009
19:36:00	0.000	0.000	0.000	0.000	0.009	0.009
19:42:00	0.000	0.000	0.000	0.000	0.009	0.009
19:48:00	0.000	0.000	0.000	0.000	0.009	0.009
19:54:00	0.000	0.000	0.000	0.000	0.009	0.009
20:00:00	0.000	0.000	0.000	0.000	0.009	0.009
20:06:00	0.000	0.000	0.000	0.000	0.009	0.009
20:12:00	0.000	0.000	0.000	0.000	0.009	0.009
20:18:00	0.000	0.000	0.000	0.000	0.009	0.009
20:24:00	0.000	0.000	0.000	0.000	0.008	0.008
20:30:00	0.000	0.000	0.000	0.000	0.008	0.008
20:36:00	0.000	0.000	0.000	0.000	0.008	0.008
20:42:00	0.000	0.000	0.000	0.000	0.008	0.008
20:48:00	0.000	0.000	0.000	0.000	0.008	0.008
20:54:00	0.000	0.000	0.000	0.000	0.008	0.008
21:00:00	0.000	0.000	0.000	0.000	0.008	0.008
21:06:00	0.000	0.000	0.000	0.000	0.008	0.008
21:12:00	0.000	0.000	0.000	0.000	0.008	0.008
21:18:00	0.000	0.000	0.000	0.000	0.008	0.008
21:24:00	0.000	0.000	0.000	0.000	0.008	0.008

Printed from the ReFH Flood Modelling software package, version 2.2.6029.28099

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
21:30:00	0.000	0.000	0.000	0.000	0.008	0.008
21:36:00	0.000	0.000	0.000	0.000	0.008	0.008
21:42:00	0.000	0.000	0.000	0.000	0.008	0.008
21:48:00	0.000	0.000	0.000	0.000	0.008	0.008
21:54:00	0.000	0.000	0.000	0.000	0.008	0.008
22:00:00	0.000	0.000	0.000	0.000	0.008	0.008
22:06:00	0.000	0.000	0.000	0.000	0.008	0.008
22:12:00	0.000	0.000	0.000	0.000	0.008	0.008
22:18:00	0.000	0.000	0.000	0.000	0.008	0.008
22:24:00	0.000	0.000	0.000	0.000	0.008	0.008
22:30:00	0.000	0.000	0.000	0.000	0.008	0.008
22:36:00	0.000	0.000	0.000	0.000	0.008	0.008
22:42:00	0.000	0.000	0.000	0.000	0.008	0.008
22:48:00	0.000	0.000	0.000	0.000	0.008	0.008
22:54:00	0.000	0.000	0.000	0.000	0.008	0.008
23:00:00	0.000	0.000	0.000	0.000	0.008	0.008
23:06:00	0.000	0.000	0.000	0.000	0.008	0.008
23:12:00	0.000	0.000	0.000	0.000	0.008	0.008
23:18:00	0.000	0.000	0.000	0.000	0.008	0.008
23:24:00	0.000	0.000	0.000	0.000	0.008	0.008
23:30:00	0.000	0.000	0.000	0.000	0.008	0.008
23:36:00	0.000	0.000	0.000	0.000	0.008	0.008
23:42:00	0.000	0.000	0.000	0.000	0.008	0.008
23:48:00	0.000	0.000	0.000	0.000	0.008	0.008
23:54:00	0.000	0.000	0.000	0.000	0.008	0.008
24:00:00	0.000	0.000	0.000	0.000	0.008	0.008
24:06:00	0.000	0.000	0.000	0.000	0.008	0.008
24:12:00	0.000	0.000	0.000	0.000	0.008	0.008
24:18:00	0.000	0.000	0.000	0.000	0.008	0.008
24:24:00	0.000	0.000	0.000	0.000	0.008	0.008
24:30:00	0.000	0.000	0.000	0.000	0.008	0.008
24:36:00	0.000	0.000	0.000	0.000	0.008	0.008
24:42:00	0.000	0.000	0.000	0.000	0.008	0.008
24:48:00	0.000	0.000	0.000	0.000	0.008	0.008
24:54:00	0.000	0.000	0.000	0.000	0.007	0.007
25:00:00	0.000	0.000	0.000	0.000	0.007	0.007

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Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
25:06:00	0.000	0.000	0.000	0.000	0.007	0.007
25:12:00	0.000	0.000	0.000	0.000	0.007	0.007
25:18:00	0.000	0.000	0.000	0.000	0.007	0.007
25:24:00	0.000	0.000	0.000	0.000	0.007	0.007
25:30:00	0.000	0.000	0.000	0.000	0.007	0.007
25:36:00	0.000	0.000	0.000	0.000	0.007	0.007
25:42:00	0.000	0.000	0.000	0.000	0.007	0.007
25:48:00	0.000	0.000	0.000	0.000	0.007	0.007
25:54:00	0.000	0.000	0.000	0.000	0.007	0.007
26:00:00	0.000	0.000	0.000	0.000	0.007	0.007
26:06:00	0.000	0.000	0.000	0.000	0.007	0.007
26:12:00	0.000	0.000	0.000	0.000	0.007	0.007
26:18:00	0.000	0.000	0.000	0.000	0.007	0.007
26:24:00	0.000	0.000	0.000	0.000	0.007	0.007
26:30:00	0.000	0.000	0.000	0.000	0.007	0.007
26:36:00	0.000	0.000	0.000	0.000	0.007	0.007
26:42:00	0.000	0.000	0.000	0.000	0.007	0.007
26:48:00	0.000	0.000	0.000	0.000	0.007	0.007
26:54:00	0.000	0.000	0.000	0.000	0.007	0.007
27:00:00	0.000	0.000	0.000	0.000	0.007	0.007
27:06:00	0.000	0.000	0.000	0.000	0.007	0.007
27:12:00	0.000	0.000	0.000	0.000	0.007	0.007
27:18:00	0.000	0.000	0.000	0.000	0.007	0.007
27:24:00	0.000	0.000	0.000	0.000	0.007	0.007
27:30:00	0.000	0.000	0.000	0.000	0.007	0.007
27:36:00	0.000	0.000	0.000	0.000	0.007	0.007
27:42:00	0.000	0.000	0.000	0.000	0.007	0.007
27:48:00	0.000	0.000	0.000	0.000	0.007	0.007
27:54:00	0.000	0.000	0.000	0.000	0.007	0.007
28:00:00	0.000	0.000	0.000	0.000	0.007	0.007
28:06:00	0.000	0.000	0.000	0.000	0.007	0.007
28:12:00	0.000	0.000	0.000	0.000	0.007	0.007
28:18:00	0.000	0.000	0.000	0.000	0.007	0.007
28:24:00	0.000	0.000	0.000	0.000	0.007	0.007
28:30:00	0.000	0.000	0.000	0.000	0.007	0.007
28:36:00	0.000	0.000	0.000	0.000	0.007	0.007

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Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
28:42:00	0.000	0.000	0.000	0.000	0.007	0.007
28:48:00	0.000	0.000	0.000	0.000	0.007	0.007
28:54:00	0.000	0.000	0.000	0.000	0.007	0.007
29:00:00	0.000	0.000	0.000	0.000	0.007	0.007
29:06:00	0.000	0.000	0.000	0.000	0.007	0.007
29:12:00	0.000	0.000	0.000	0.000	0.007	0.007
29:18:00	0.000	0.000	0.000	0.000	0.007	0.007
29:24:00	0.000	0.000	0.000	0.000	0.007	0.007
29:30:00	0.000	0.000	0.000	0.000	0.007	0.007
29:36:00	0.000	0.000	0.000	0.000	0.007	0.007
29:42:00	0.000	0.000	0.000	0.000	0.007	0.007
29:48:00	0.000	0.000	0.000	0.000	0.007	0.007
29:54:00	0.000	0.000	0.000	0.000	0.006	0.006
30:00:00	0.000	0.000	0.000	0.000	0.006	0.006
30:06:00	0.000	0.000	0.000	0.000	0.006	0.006
30:12:00	0.000	0.000	0.000	0.000	0.006	0.006
30:18:00	0.000	0.000	0.000	0.000	0.006	0.006
30:24:00	0.000	0.000	0.000	0.000	0.006	0.006
30:30:00	0.000	0.000	0.000	0.000	0.006	0.006
30:36:00	0.000	0.000	0.000	0.000	0.006	0.006
30:42:00	0.000	0.000	0.000	0.000	0.006	0.006
30:48:00	0.000	0.000	0.000	0.000	0.006	0.006
30:54:00	0.000	0.000	0.000	0.000	0.006	0.006
31:00:00	0.000	0.000	0.000	0.000	0.006	0.006
31:06:00	0.000	0.000	0.000	0.000	0.006	0.006
31:12:00	0.000	0.000	0.000	0.000	0.006	0.006
31:18:00	0.000	0.000	0.000	0.000	0.006	0.006
31:24:00	0.000	0.000	0.000	0.000	0.006	0.006
31:30:00	0.000	0.000	0.000	0.000	0.006	0.006
31:36:00	0.000	0.000	0.000	0.000	0.006	0.006
31:42:00	0.000	0.000	0.000	0.000	0.006	0.006
31:48:00	0.000	0.000	0.000	0.000	0.006	0.006
31:54:00	0.000	0.000	0.000	0.000	0.006	0.006
32:00:00	0.000	0.000	0.000	0.000	0.006	0.006
32:06:00	0.000	0.000	0.000	0.000	0.006	0.006
32:12:00	0.000	0.000	0.000	0.000	0.006	0.006

Printed from the ReFH Flood Modelling software package, version 2.2.6029.28099

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
32:18:00	0.000	0.000	0.000	0.000	0.006	0.006
32:24:00	0.000	0.000	0.000	0.000	0.006	0.006
32:30:00	0.000	0.000	0.000	0.000	0.006	0.006
32:36:00	0.000	0.000	0.000	0.000	0.006	0.006
32:42:00	0.000	0.000	0.000	0.000	0.006	0.006
32:48:00	0.000	0.000	0.000	0.000	0.006	0.006
32:54:00	0.000	0.000	0.000	0.000	0.006	0.006
33:00:00	0.000	0.000	0.000	0.000	0.006	0.006
33:06:00	0.000	0.000	0.000	0.000	0.006	0.006
33:12:00	0.000	0.000	0.000	0.000	0.006	0.006
33:18:00	0.000	0.000	0.000	0.000	0.006	0.006
33:24:00	0.000	0.000	0.000	0.000	0.006	0.006
33:30:00	0.000	0.000	0.000	0.000	0.006	0.006
33:36:00	0.000	0.000	0.000	0.000	0.006	0.006
33:42:00	0.000	0.000	0.000	0.000	0.006	0.006
33:48:00	0.000	0.000	0.000	0.000	0.006	0.006
33:54:00	0.000	0.000	0.000	0.000	0.006	0.006
34:00:00	0.000	0.000	0.000	0.000	0.006	0.006
34:06:00	0.000	0.000	0.000	0.000	0.006	0.006
34:12:00	0.000	0.000	0.000	0.000	0.006	0.006
34:18:00	0.000	0.000	0.000	0.000	0.006	0.006
34:24:00	0.000	0.000	0.000	0.000	0.006	0.006
34:30:00	0.000	0.000	0.000	0.000	0.006	0.006
34:36:00	0.000	0.000	0.000	0.000	0.006	0.006
34:42:00	0.000	0.000	0.000	0.000	0.006	0.006
34:48:00	0.000	0.000	0.000	0.000	0.006	0.006
34:54:00	0.000	0.000	0.000	0.000	0.006	0.006
35:00:00	0.000	0.000	0.000	0.000	0.006	0.006
35:06:00	0.000	0.000	0.000	0.000	0.006	0.006
35:12:00	0.000	0.000	0.000	0.000	0.006	0.006
35:18:00	0.000	0.000	0.000	0.000	0.006	0.006
35:24:00	0.000	0.000	0.000	0.000	0.006	0.006
35:30:00	0.000	0.000	0.000	0.000	0.006	0.006
35:36:00	0.000	0.000	0.000	0.000	0.006	0.006
35:42:00	0.000	0.000	0.000	0.000	0.006	0.006
35:48:00	0.000	0.000	0.000	0.000	0.005	0.005

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Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
35:54:00	0.000	0.000	0.000	0.000	0.005	0.005
36:00:00	0.000	0.000	0.000	0.000	0.005	0.005
36:06:00	0.000	0.000	0.000	0.000	0.005	0.005
36:12:00	0.000	0.000	0.000	0.000	0.005	0.005
36:18:00	0.000	0.000	0.000	0.000	0.005	0.005
36:24:00	0.000	0.000	0.000	0.000	0.005	0.005
36:30:00	0.000	0.000	0.000	0.000	0.005	0.005
36:36:00	0.000	0.000	0.000	0.000	0.005	0.005
36:42:00	0.000	0.000	0.000	0.000	0.005	0.005
36:48:00	0.000	0.000	0.000	0.000	0.005	0.005
36:54:00	0.000	0.000	0.000	0.000	0.005	0.005
37:00:00	0.000	0.000	0.000	0.000	0.005	0.005
37:06:00	0.000	0.000	0.000	0.000	0.005	0.005
37:12:00	0.000	0.000	0.000	0.000	0.005	0.005
37:18:00	0.000	0.000	0.000	0.000	0.005	0.005
37:24:00	0.000	0.000	0.000	0.000	0.005	0.005
37:30:00	0.000	0.000	0.000	0.000	0.005	0.005
37:36:00	0.000	0.000	0.000	0.000	0.005	0.005
37:42:00	0.000	0.000	0.000	0.000	0.005	0.005
37:48:00	0.000	0.000	0.000	0.000	0.005	0.005
37:54:00	0.000	0.000	0.000	0.000	0.005	0.005
38:00:00	0.000	0.000	0.000	0.000	0.005	0.005
38:06:00	0.000	0.000	0.000	0.000	0.005	0.005
38:12:00	0.000	0.000	0.000	0.000	0.005	0.005
38:18:00	0.000	0.000	0.000	0.000	0.005	0.005
38:24:00	0.000	0.000	0.000	0.000	0.005	0.005
38:30:00	0.000	0.000	0.000	0.000	0.005	0.005
38:36:00	0.000	0.000	0.000	0.000	0.005	0.005
38:42:00	0.000	0.000	0.000	0.000	0.005	0.005
38:48:00	0.000	0.000	0.000	0.000	0.005	0.005
38:54:00	0.000	0.000	0.000	0.000	0.005	0.005
39:00:00	0.000	0.000	0.000	0.000	0.005	0.005
39:06:00	0.000	0.000	0.000	0.000	0.005	0.005
39:12:00	0.000	0.000	0.000	0.000	0.005	0.005
39:18:00	0.000	0.000	0.000	0.000	0.005	0.005
39:24:00	0.000	0.000	0.000	0.000	0.005	0.005

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Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
39:30:00	0.000	0.000	0.000	0.000	0.005	0.005
39:36:00	0.000	0.000	0.000	0.000	0.005	0.005
39:42:00	0.000	0.000	0.000	0.000	0.005	0.005
39:48:00	0.000	0.000	0.000	0.000	0.005	0.005
39:54:00	0.000	0.000	0.000	0.000	0.005	0.005
40:00:00	0.000	0.000	0.000	0.000	0.005	0.005
40:06:00	0.000	0.000	0.000	0.000	0.005	0.005
40:12:00	0.000	0.000	0.000	0.000	0.005	0.005
40:18:00	0.000	0.000	0.000	0.000	0.005	0.005
40:24:00	0.000	0.000	0.000	0.000	0.005	0.005
40:30:00	0.000	0.000	0.000	0.000	0.005	0.005
40:36:00	0.000	0.000	0.000	0.000	0.005	0.005
40:42:00	0.000	0.000	0.000	0.000	0.005	0.005
40:48:00	0.000	0.000	0.000	0.000	0.005	0.005
40:54:00	0.000	0.000	0.000	0.000	0.005	0.005
41:00:00	0.000	0.000	0.000	0.000	0.005	0.005
41:06:00	0.000	0.000	0.000	0.000	0.005	0.005

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Appendix

Catchment descriptors

Name	Value	User-defined value used?
Area (km^2)	0.59	No
ALTBAR	151	No
ASPBAR	100	No
ASPVAR	0.77	No
BFIHOST	0.8	No
DPLBAR (km)	0.81	No
DPSBAR (mkm^{-1})	195.4	No
FARL	1	No
LDP	1.79	No
PROPWET (mm)	0.51	No
RMED1H	10.3	No
RMED1D	33.1	No
RMED2D	41.7	No
SAAR (mm)	833	No
SAAR4170 (mm)	814	No
SPRHOST	20.84	No
Urbext2000	0	No
Urbext1990	0	No
URBCONC	0.82	No
URBLOC	0.35	No
Urban Area (km^2)	0	No
DDF parameter C	-0.03	No
DDF parameter D1	0.36	No
DDF parameter D2	0.42	No
DDF parameter D3	0.3	No
DDF parameter E	0.29	No
DDF parameter F	2.42	No
DDF parameter C (1km grid value)	-0.03	No
DDF parameter D1 (1km grid value)	0.36	No
DDF parameter D2 (1km grid value)	0.42	No
DDF parameter D3 (1km grid value)	0.29	No
DDF parameter E (1km grid value)	0.29	No
DDF parameter F (1km grid value)	2.41	No

UK Design Flood Estimation

Generated on Friday, September 16, 2016 3:06:22 PM by Bethan.LloydJones
Printed from the ReFH Flood Modelling software package, version 2.2.6029.28099

Summary of estimate using the Flood Estimation Handbook revitalised flood hydrograph method (ReFH)

Site details Checksum: 3AE5-7051

Site name: FEH_Catchment_Descriptors_331000_356550 (Updated)

Easting: 331000

Northing: 356550

Country: England, Wales or Northern Ireland

Catchment Area (km^2): 0.59

Using plot scale calculations: No

Site description: None

Model run: 20 year

Summary of results

Rainfall - FEH 2013 (mm):	37.58	Total runoff (ML):	1.25
Total Rainfall (mm):	23.98	Total flow (ML):	4.38
Peak Rainfall (mm):	3.27	Peak flow (m^3/s):	0.19

Parameters

Where the user has overriden a system-generated value, this original value is shown in square brackets after the value used.
** Indicates that the user locked the duration/timestep*

Rainfall parameters (Rainfall - FEH 2013 model)

Name	Value	User-defined?
Duration (hh:mm:ss)	01:54:00	No
Timestep (hh:mm:ss)	00:06:00	No
SCF (Seasonal correction factor)	0.66	No
ARF (Areal reduction factor)	0.97	No
Seasonality	Winter	n/a

Loss model parameters

Name	Value	User-defined?
Cini (mm)	60.95	No
Cmax (mm)	821.73	No
Use alpha correction factor	No	No
Alpha correction factor	n/a	No

Routing model parameters

Name	Value	User-defined?
Tp (hr)	1	No
Up	0.65	No
Uk	0.8	No

Baseflow model parameters

Name	Value	User-defined?
BF0 (m^3/s)	0	No
BL (hr)	35.26	No
BR	2.49	No

Urbanisation parameters

Name	Value	User-defined?
Urban area (km^2)	0	No
Urbext 2000	0	No
Impervious runoff factor	0.7	No
Imperviousness factor	0.3	No
Tp scaling factor	0.5	No
Sewered area (km^2)	0.00	Yes
Sewer capacity (m^3/s)	0.00	Yes

Time series data

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
00:00:00	0.271	0.000	0.020	0.000	0.005	0.005
00:06:00	0.366	0.000	0.027	0.000	0.005	0.005
00:12:00	0.494	0.000	0.037	0.000	0.005	0.005
00:18:00	0.664	0.000	0.050	0.001	0.005	0.006
00:24:00	0.892	0.000	0.069	0.002	0.005	0.007
00:30:00	1.194	0.000	0.093	0.004	0.005	0.009
00:36:00	1.593	0.000	0.127	0.007	0.005	0.012
00:42:00	2.114	0.000	0.174	0.011	0.005	0.015
00:48:00	2.769	0.000	0.236	0.016	0.005	0.021
00:54:00	3.270	0.000	0.290	0.024	0.005	0.029
01:00:00	2.769	0.000	0.256	0.034	0.005	0.039
01:06:00	2.114	0.000	0.202	0.047	0.005	0.053
01:12:00	1.593	0.000	0.156	0.062	0.006	0.068
01:18:00	1.194	0.000	0.119	0.079	0.006	0.085
01:24:00	0.892	0.000	0.090	0.096	0.007	0.103
01:30:00	0.664	0.000	0.067	0.114	0.008	0.121
01:36:00	0.494	0.000	0.050	0.130	0.008	0.139
01:42:00	0.366	0.000	0.038	0.146	0.009	0.155
01:48:00	0.271	0.000	0.028	0.159	0.010	0.170
01:54:00	0.000	0.000	0.000	0.170	0.012	0.181
02:00:00	0.000	0.000	0.000	0.176	0.013	0.189
02:06:00	0.000	0.000	0.000	0.178	0.014	0.192
02:12:00	0.000	0.000	0.000	0.175	0.015	0.191
02:18:00	0.000	0.000	0.000	0.170	0.016	0.187
02:24:00	0.000	0.000	0.000	0.163	0.017	0.181
02:30:00	0.000	0.000	0.000	0.154	0.019	0.173
02:36:00	0.000	0.000	0.000	0.144	0.020	0.164
02:42:00	0.000	0.000	0.000	0.134	0.020	0.154
02:48:00	0.000	0.000	0.000	0.123	0.021	0.145
02:54:00	0.000	0.000	0.000	0.113	0.022	0.135
03:00:00	0.000	0.000	0.000	0.103	0.023	0.126
03:06:00	0.000	0.000	0.000	0.094	0.023	0.117
03:12:00	0.000	0.000	0.000	0.086	0.024	0.110
03:18:00	0.000	0.000	0.000	0.078	0.024	0.103
03:24:00	0.000	0.000	0.000	0.071	0.025	0.096

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Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
03:30:00	0.000	0.000	0.000	0.065	0.025	0.090
03:36:00	0.000	0.000	0.000	0.058	0.026	0.084
03:42:00	0.000	0.000	0.000	0.052	0.026	0.078
03:48:00	0.000	0.000	0.000	0.046	0.026	0.072
03:54:00	0.000	0.000	0.000	0.040	0.027	0.067
04:00:00	0.000	0.000	0.000	0.035	0.027	0.061
04:06:00	0.000	0.000	0.000	0.029	0.027	0.056
04:12:00	0.000	0.000	0.000	0.024	0.027	0.051
04:18:00	0.000	0.000	0.000	0.019	0.027	0.046
04:24:00	0.000	0.000	0.000	0.015	0.027	0.042
04:30:00	0.000	0.000	0.000	0.011	0.027	0.038
04:36:00	0.000	0.000	0.000	0.008	0.027	0.035
04:42:00	0.000	0.000	0.000	0.005	0.027	0.032
04:48:00	0.000	0.000	0.000	0.004	0.027	0.031
04:54:00	0.000	0.000	0.000	0.002	0.027	0.029
05:00:00	0.000	0.000	0.000	0.001	0.027	0.028
05:06:00	0.000	0.000	0.000	0.001	0.027	0.028
05:12:00	0.000	0.000	0.000	0.000	0.027	0.027
05:18:00	0.000	0.000	0.000	0.000	0.027	0.027
05:24:00	0.000	0.000	0.000	0.000	0.027	0.027
05:30:00	0.000	0.000	0.000	0.000	0.027	0.027
05:36:00	0.000	0.000	0.000	0.000	0.026	0.026
05:42:00	0.000	0.000	0.000	0.000	0.026	0.026
05:48:00	0.000	0.000	0.000	0.000	0.026	0.026
05:54:00	0.000	0.000	0.000	0.000	0.026	0.026
06:00:00	0.000	0.000	0.000	0.000	0.026	0.026
06:06:00	0.000	0.000	0.000	0.000	0.026	0.026
06:12:00	0.000	0.000	0.000	0.000	0.026	0.026
06:18:00	0.000	0.000	0.000	0.000	0.026	0.026
06:24:00	0.000	0.000	0.000	0.000	0.026	0.026
06:30:00	0.000	0.000	0.000	0.000	0.026	0.026
06:36:00	0.000	0.000	0.000	0.000	0.026	0.026
06:42:00	0.000	0.000	0.000	0.000	0.026	0.026
06:48:00	0.000	0.000	0.000	0.000	0.026	0.026
06:54:00	0.000	0.000	0.000	0.000	0.026	0.026
07:00:00	0.000	0.000	0.000	0.000	0.025	0.025

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Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
07:06:00	0.000	0.000	0.000	0.000	0.025	0.025
07:12:00	0.000	0.000	0.000	0.000	0.025	0.025
07:18:00	0.000	0.000	0.000	0.000	0.025	0.025
07:24:00	0.000	0.000	0.000	0.000	0.025	0.025
07:30:00	0.000	0.000	0.000	0.000	0.025	0.025
07:36:00	0.000	0.000	0.000	0.000	0.025	0.025
07:42:00	0.000	0.000	0.000	0.000	0.025	0.025
07:48:00	0.000	0.000	0.000	0.000	0.025	0.025
07:54:00	0.000	0.000	0.000	0.000	0.025	0.025
08:00:00	0.000	0.000	0.000	0.000	0.025	0.025
08:06:00	0.000	0.000	0.000	0.000	0.025	0.025
08:12:00	0.000	0.000	0.000	0.000	0.025	0.025
08:18:00	0.000	0.000	0.000	0.000	0.025	0.025
08:24:00	0.000	0.000	0.000	0.000	0.024	0.024
08:30:00	0.000	0.000	0.000	0.000	0.024	0.024
08:36:00	0.000	0.000	0.000	0.000	0.024	0.024
08:42:00	0.000	0.000	0.000	0.000	0.024	0.024
08:48:00	0.000	0.000	0.000	0.000	0.024	0.024
08:54:00	0.000	0.000	0.000	0.000	0.024	0.024
09:00:00	0.000	0.000	0.000	0.000	0.024	0.024
09:06:00	0.000	0.000	0.000	0.000	0.024	0.024
09:12:00	0.000	0.000	0.000	0.000	0.024	0.024
09:18:00	0.000	0.000	0.000	0.000	0.024	0.024
09:24:00	0.000	0.000	0.000	0.000	0.024	0.024
09:30:00	0.000	0.000	0.000	0.000	0.024	0.024
09:36:00	0.000	0.000	0.000	0.000	0.024	0.024
09:42:00	0.000	0.000	0.000	0.000	0.024	0.024
09:48:00	0.000	0.000	0.000	0.000	0.024	0.024
09:54:00	0.000	0.000	0.000	0.000	0.023	0.023
10:00:00	0.000	0.000	0.000	0.000	0.023	0.023
10:06:00	0.000	0.000	0.000	0.000	0.023	0.023
10:12:00	0.000	0.000	0.000	0.000	0.023	0.023
10:18:00	0.000	0.000	0.000	0.000	0.023	0.023
10:24:00	0.000	0.000	0.000	0.000	0.023	0.023
10:30:00	0.000	0.000	0.000	0.000	0.023	0.023
10:36:00	0.000	0.000	0.000	0.000	0.023	0.023

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Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
10:42:00	0.000	0.000	0.000	0.000	0.023	0.023
10:48:00	0.000	0.000	0.000	0.000	0.023	0.023
10:54:00	0.000	0.000	0.000	0.000	0.023	0.023
11:00:00	0.000	0.000	0.000	0.000	0.023	0.023
11:06:00	0.000	0.000	0.000	0.000	0.023	0.023
11:12:00	0.000	0.000	0.000	0.000	0.023	0.023
11:18:00	0.000	0.000	0.000	0.000	0.023	0.023
11:24:00	0.000	0.000	0.000	0.000	0.022	0.022
11:30:00	0.000	0.000	0.000	0.000	0.022	0.022
11:36:00	0.000	0.000	0.000	0.000	0.022	0.022
11:42:00	0.000	0.000	0.000	0.000	0.022	0.022
11:48:00	0.000	0.000	0.000	0.000	0.022	0.022
11:54:00	0.000	0.000	0.000	0.000	0.022	0.022
12:00:00	0.000	0.000	0.000	0.000	0.022	0.022
12:06:00	0.000	0.000	0.000	0.000	0.022	0.022
12:12:00	0.000	0.000	0.000	0.000	0.022	0.022
12:18:00	0.000	0.000	0.000	0.000	0.022	0.022
12:24:00	0.000	0.000	0.000	0.000	0.022	0.022
12:30:00	0.000	0.000	0.000	0.000	0.022	0.022
12:36:00	0.000	0.000	0.000	0.000	0.022	0.022
12:42:00	0.000	0.000	0.000	0.000	0.022	0.022
12:48:00	0.000	0.000	0.000	0.000	0.022	0.022
12:54:00	0.000	0.000	0.000	0.000	0.022	0.022
13:00:00	0.000	0.000	0.000	0.000	0.021	0.021
13:06:00	0.000	0.000	0.000	0.000	0.021	0.021
13:12:00	0.000	0.000	0.000	0.000	0.021	0.021
13:18:00	0.000	0.000	0.000	0.000	0.021	0.021
13:24:00	0.000	0.000	0.000	0.000	0.021	0.021
13:30:00	0.000	0.000	0.000	0.000	0.021	0.021
13:36:00	0.000	0.000	0.000	0.000	0.021	0.021
13:42:00	0.000	0.000	0.000	0.000	0.021	0.021
13:48:00	0.000	0.000	0.000	0.000	0.021	0.021
13:54:00	0.000	0.000	0.000	0.000	0.021	0.021
14:00:00	0.000	0.000	0.000	0.000	0.021	0.021
14:06:00	0.000	0.000	0.000	0.000	0.021	0.021
14:12:00	0.000	0.000	0.000	0.000	0.021	0.021

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Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
14:18:00	0.000	0.000	0.000	0.000	0.021	0.021
14:24:00	0.000	0.000	0.000	0.000	0.021	0.021
14:30:00	0.000	0.000	0.000	0.000	0.021	0.021
14:36:00	0.000	0.000	0.000	0.000	0.021	0.021
14:42:00	0.000	0.000	0.000	0.000	0.020	0.020
14:48:00	0.000	0.000	0.000	0.000	0.020	0.020
14:54:00	0.000	0.000	0.000	0.000	0.020	0.020
15:00:00	0.000	0.000	0.000	0.000	0.020	0.020
15:06:00	0.000	0.000	0.000	0.000	0.020	0.020
15:12:00	0.000	0.000	0.000	0.000	0.020	0.020
15:18:00	0.000	0.000	0.000	0.000	0.020	0.020
15:24:00	0.000	0.000	0.000	0.000	0.020	0.020
15:30:00	0.000	0.000	0.000	0.000	0.020	0.020
15:36:00	0.000	0.000	0.000	0.000	0.020	0.020
15:42:00	0.000	0.000	0.000	0.000	0.020	0.020
15:48:00	0.000	0.000	0.000	0.000	0.020	0.020
15:54:00	0.000	0.000	0.000	0.000	0.020	0.020
16:00:00	0.000	0.000	0.000	0.000	0.020	0.020
16:06:00	0.000	0.000	0.000	0.000	0.020	0.020
16:12:00	0.000	0.000	0.000	0.000	0.020	0.020
16:18:00	0.000	0.000	0.000	0.000	0.020	0.020
16:24:00	0.000	0.000	0.000	0.000	0.019	0.019
16:30:00	0.000	0.000	0.000	0.000	0.019	0.019
16:36:00	0.000	0.000	0.000	0.000	0.019	0.019
16:42:00	0.000	0.000	0.000	0.000	0.019	0.019
16:48:00	0.000	0.000	0.000	0.000	0.019	0.019
16:54:00	0.000	0.000	0.000	0.000	0.019	0.019
17:00:00	0.000	0.000	0.000	0.000	0.019	0.019
17:06:00	0.000	0.000	0.000	0.000	0.019	0.019
17:12:00	0.000	0.000	0.000	0.000	0.019	0.019
17:18:00	0.000	0.000	0.000	0.000	0.019	0.019
17:24:00	0.000	0.000	0.000	0.000	0.019	0.019
17:30:00	0.000	0.000	0.000	0.000	0.019	0.019
17:36:00	0.000	0.000	0.000	0.000	0.019	0.019
17:42:00	0.000	0.000	0.000	0.000	0.019	0.019
17:48:00	0.000	0.000	0.000	0.000	0.019	0.019

Printed from the ReFH Flood Modelling software package, version 2.2.6029.28099

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
17:54:00	0.000	0.000	0.000	0.000	0.019	0.019
18:00:00	0.000	0.000	0.000	0.000	0.019	0.019
18:06:00	0.000	0.000	0.000	0.000	0.019	0.019
18:12:00	0.000	0.000	0.000	0.000	0.019	0.019
18:18:00	0.000	0.000	0.000	0.000	0.018	0.018
18:24:00	0.000	0.000	0.000	0.000	0.018	0.018
18:30:00	0.000	0.000	0.000	0.000	0.018	0.018
18:36:00	0.000	0.000	0.000	0.000	0.018	0.018
18:42:00	0.000	0.000	0.000	0.000	0.018	0.018
18:48:00	0.000	0.000	0.000	0.000	0.018	0.018
18:54:00	0.000	0.000	0.000	0.000	0.018	0.018
19:00:00	0.000	0.000	0.000	0.000	0.018	0.018
19:06:00	0.000	0.000	0.000	0.000	0.018	0.018
19:12:00	0.000	0.000	0.000	0.000	0.018	0.018
19:18:00	0.000	0.000	0.000	0.000	0.018	0.018
19:24:00	0.000	0.000	0.000	0.000	0.018	0.018
19:30:00	0.000	0.000	0.000	0.000	0.018	0.018
19:36:00	0.000	0.000	0.000	0.000	0.018	0.018
19:42:00	0.000	0.000	0.000	0.000	0.018	0.018
19:48:00	0.000	0.000	0.000	0.000	0.018	0.018
19:54:00	0.000	0.000	0.000	0.000	0.018	0.018
20:00:00	0.000	0.000	0.000	0.000	0.018	0.018
20:06:00	0.000	0.000	0.000	0.000	0.018	0.018
20:12:00	0.000	0.000	0.000	0.000	0.018	0.018
20:18:00	0.000	0.000	0.000	0.000	0.017	0.017
20:24:00	0.000	0.000	0.000	0.000	0.017	0.017
20:30:00	0.000	0.000	0.000	0.000	0.017	0.017
20:36:00	0.000	0.000	0.000	0.000	0.017	0.017
20:42:00	0.000	0.000	0.000	0.000	0.017	0.017
20:48:00	0.000	0.000	0.000	0.000	0.017	0.017
20:54:00	0.000	0.000	0.000	0.000	0.017	0.017
21:00:00	0.000	0.000	0.000	0.000	0.017	0.017
21:06:00	0.000	0.000	0.000	0.000	0.017	0.017
21:12:00	0.000	0.000	0.000	0.000	0.017	0.017
21:18:00	0.000	0.000	0.000	0.000	0.017	0.017
21:24:00	0.000	0.000	0.000	0.000	0.017	0.017

Printed from the ReFH Flood Modelling software package, version 2.2.6029.28099

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
21:30:00	0.000	0.000	0.000	0.000	0.017	0.017
21:36:00	0.000	0.000	0.000	0.000	0.017	0.017
21:42:00	0.000	0.000	0.000	0.000	0.017	0.017
21:48:00	0.000	0.000	0.000	0.000	0.017	0.017
21:54:00	0.000	0.000	0.000	0.000	0.017	0.017
22:00:00	0.000	0.000	0.000	0.000	0.017	0.017
22:06:00	0.000	0.000	0.000	0.000	0.017	0.017
22:12:00	0.000	0.000	0.000	0.000	0.017	0.017
22:18:00	0.000	0.000	0.000	0.000	0.016	0.016
22:24:00	0.000	0.000	0.000	0.000	0.016	0.016
22:30:00	0.000	0.000	0.000	0.000	0.016	0.016
22:36:00	0.000	0.000	0.000	0.000	0.016	0.016
22:42:00	0.000	0.000	0.000	0.000	0.016	0.016
22:48:00	0.000	0.000	0.000	0.000	0.016	0.016
22:54:00	0.000	0.000	0.000	0.000	0.016	0.016
23:00:00	0.000	0.000	0.000	0.000	0.016	0.016
23:06:00	0.000	0.000	0.000	0.000	0.016	0.016
23:12:00	0.000	0.000	0.000	0.000	0.016	0.016
23:18:00	0.000	0.000	0.000	0.000	0.016	0.016
23:24:00	0.000	0.000	0.000	0.000	0.016	0.016
23:30:00	0.000	0.000	0.000	0.000	0.016	0.016
23:36:00	0.000	0.000	0.000	0.000	0.016	0.016
23:42:00	0.000	0.000	0.000	0.000	0.016	0.016
23:48:00	0.000	0.000	0.000	0.000	0.016	0.016
23:54:00	0.000	0.000	0.000	0.000	0.016	0.016
24:00:00	0.000	0.000	0.000	0.000	0.016	0.016
24:06:00	0.000	0.000	0.000	0.000	0.016	0.016
24:12:00	0.000	0.000	0.000	0.000	0.016	0.016
24:18:00	0.000	0.000	0.000	0.000	0.016	0.016
24:24:00	0.000	0.000	0.000	0.000	0.016	0.016
24:30:00	0.000	0.000	0.000	0.000	0.015	0.015
24:36:00	0.000	0.000	0.000	0.000	0.015	0.015
24:42:00	0.000	0.000	0.000	0.000	0.015	0.015
24:48:00	0.000	0.000	0.000	0.000	0.015	0.015
24:54:00	0.000	0.000	0.000	0.000	0.015	0.015
25:00:00	0.000	0.000	0.000	0.000	0.015	0.015

Printed from the ReFH Flood Modelling software package, version 2.2.6029.28099

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
25:06:00	0.000	0.000	0.000	0.000	0.015	0.015
25:12:00	0.000	0.000	0.000	0.000	0.015	0.015
25:18:00	0.000	0.000	0.000	0.000	0.015	0.015
25:24:00	0.000	0.000	0.000	0.000	0.015	0.015
25:30:00	0.000	0.000	0.000	0.000	0.015	0.015
25:36:00	0.000	0.000	0.000	0.000	0.015	0.015
25:42:00	0.000	0.000	0.000	0.000	0.015	0.015
25:48:00	0.000	0.000	0.000	0.000	0.015	0.015
25:54:00	0.000	0.000	0.000	0.000	0.015	0.015
26:00:00	0.000	0.000	0.000	0.000	0.015	0.015
26:06:00	0.000	0.000	0.000	0.000	0.015	0.015
26:12:00	0.000	0.000	0.000	0.000	0.015	0.015
26:18:00	0.000	0.000	0.000	0.000	0.015	0.015
26:24:00	0.000	0.000	0.000	0.000	0.015	0.015
26:30:00	0.000	0.000	0.000	0.000	0.015	0.015
26:36:00	0.000	0.000	0.000	0.000	0.015	0.015
26:42:00	0.000	0.000	0.000	0.000	0.015	0.015
26:48:00	0.000	0.000	0.000	0.000	0.015	0.015
26:54:00	0.000	0.000	0.000	0.000	0.014	0.014
27:00:00	0.000	0.000	0.000	0.000	0.014	0.014
27:06:00	0.000	0.000	0.000	0.000	0.014	0.014
27:12:00	0.000	0.000	0.000	0.000	0.014	0.014
27:18:00	0.000	0.000	0.000	0.000	0.014	0.014
27:24:00	0.000	0.000	0.000	0.000	0.014	0.014
27:30:00	0.000	0.000	0.000	0.000	0.014	0.014
27:36:00	0.000	0.000	0.000	0.000	0.014	0.014
27:42:00	0.000	0.000	0.000	0.000	0.014	0.014
27:48:00	0.000	0.000	0.000	0.000	0.014	0.014
27:54:00	0.000	0.000	0.000	0.000	0.014	0.014
28:00:00	0.000	0.000	0.000	0.000	0.014	0.014
28:06:00	0.000	0.000	0.000	0.000	0.014	0.014
28:12:00	0.000	0.000	0.000	0.000	0.014	0.014
28:18:00	0.000	0.000	0.000	0.000	0.014	0.014
28:24:00	0.000	0.000	0.000	0.000	0.014	0.014
28:30:00	0.000	0.000	0.000	0.000	0.014	0.014
28:36:00	0.000	0.000	0.000	0.000	0.014	0.014

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Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
28:42:00	0.000	0.000	0.000	0.000	0.014	0.014
28:48:00	0.000	0.000	0.000	0.000	0.014	0.014
28:54:00	0.000	0.000	0.000	0.000	0.014	0.014
29:00:00	0.000	0.000	0.000	0.000	0.014	0.014
29:06:00	0.000	0.000	0.000	0.000	0.014	0.014
29:12:00	0.000	0.000	0.000	0.000	0.014	0.014
29:18:00	0.000	0.000	0.000	0.000	0.014	0.014
29:24:00	0.000	0.000	0.000	0.000	0.013	0.013
29:30:00	0.000	0.000	0.000	0.000	0.013	0.013
29:36:00	0.000	0.000	0.000	0.000	0.013	0.013
29:42:00	0.000	0.000	0.000	0.000	0.013	0.013
29:48:00	0.000	0.000	0.000	0.000	0.013	0.013
29:54:00	0.000	0.000	0.000	0.000	0.013	0.013
30:00:00	0.000	0.000	0.000	0.000	0.013	0.013
30:06:00	0.000	0.000	0.000	0.000	0.013	0.013
30:12:00	0.000	0.000	0.000	0.000	0.013	0.013
30:18:00	0.000	0.000	0.000	0.000	0.013	0.013
30:24:00	0.000	0.000	0.000	0.000	0.013	0.013
30:30:00	0.000	0.000	0.000	0.000	0.013	0.013
30:36:00	0.000	0.000	0.000	0.000	0.013	0.013
30:42:00	0.000	0.000	0.000	0.000	0.013	0.013
30:48:00	0.000	0.000	0.000	0.000	0.013	0.013
30:54:00	0.000	0.000	0.000	0.000	0.013	0.013
31:00:00	0.000	0.000	0.000	0.000	0.013	0.013
31:06:00	0.000	0.000	0.000	0.000	0.013	0.013
31:12:00	0.000	0.000	0.000	0.000	0.013	0.013
31:18:00	0.000	0.000	0.000	0.000	0.013	0.013
31:24:00	0.000	0.000	0.000	0.000	0.013	0.013
31:30:00	0.000	0.000	0.000	0.000	0.013	0.013
31:36:00	0.000	0.000	0.000	0.000	0.013	0.013
31:42:00	0.000	0.000	0.000	0.000	0.013	0.013
31:48:00	0.000	0.000	0.000	0.000	0.013	0.013
31:54:00	0.000	0.000	0.000	0.000	0.013	0.013
32:00:00	0.000	0.000	0.000	0.000	0.013	0.013
32:06:00	0.000	0.000	0.000	0.000	0.012	0.012
32:12:00	0.000	0.000	0.000	0.000	0.012	0.012

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Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
32:18:00	0.000	0.000	0.000	0.000	0.012	0.012
32:24:00	0.000	0.000	0.000	0.000	0.012	0.012
32:30:00	0.000	0.000	0.000	0.000	0.012	0.012
32:36:00	0.000	0.000	0.000	0.000	0.012	0.012
32:42:00	0.000	0.000	0.000	0.000	0.012	0.012
32:48:00	0.000	0.000	0.000	0.000	0.012	0.012
32:54:00	0.000	0.000	0.000	0.000	0.012	0.012
33:00:00	0.000	0.000	0.000	0.000	0.012	0.012
33:06:00	0.000	0.000	0.000	0.000	0.012	0.012
33:12:00	0.000	0.000	0.000	0.000	0.012	0.012
33:18:00	0.000	0.000	0.000	0.000	0.012	0.012
33:24:00	0.000	0.000	0.000	0.000	0.012	0.012
33:30:00	0.000	0.000	0.000	0.000	0.012	0.012
33:36:00	0.000	0.000	0.000	0.000	0.012	0.012
33:42:00	0.000	0.000	0.000	0.000	0.012	0.012
33:48:00	0.000	0.000	0.000	0.000	0.012	0.012
33:54:00	0.000	0.000	0.000	0.000	0.012	0.012
34:00:00	0.000	0.000	0.000	0.000	0.012	0.012
34:06:00	0.000	0.000	0.000	0.000	0.012	0.012
34:12:00	0.000	0.000	0.000	0.000	0.012	0.012
34:18:00	0.000	0.000	0.000	0.000	0.012	0.012
34:24:00	0.000	0.000	0.000	0.000	0.012	0.012
34:30:00	0.000	0.000	0.000	0.000	0.012	0.012
34:36:00	0.000	0.000	0.000	0.000	0.012	0.012
34:42:00	0.000	0.000	0.000	0.000	0.012	0.012
34:48:00	0.000	0.000	0.000	0.000	0.012	0.012
34:54:00	0.000	0.000	0.000	0.000	0.012	0.012
35:00:00	0.000	0.000	0.000	0.000	0.012	0.012
35:06:00	0.000	0.000	0.000	0.000	0.011	0.011
35:12:00	0.000	0.000	0.000	0.000	0.011	0.011
35:18:00	0.000	0.000	0.000	0.000	0.011	0.011
35:24:00	0.000	0.000	0.000	0.000	0.011	0.011
35:30:00	0.000	0.000	0.000	0.000	0.011	0.011
35:36:00	0.000	0.000	0.000	0.000	0.011	0.011
35:42:00	0.000	0.000	0.000	0.000	0.011	0.011
35:48:00	0.000	0.000	0.000	0.000	0.011	0.011

Printed from the ReFH Flood Modelling software package, version 2.2.6029.28099

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
35:54:00	0.000	0.000	0.000	0.000	0.011	0.011
36:00:00	0.000	0.000	0.000	0.000	0.011	0.011
36:06:00	0.000	0.000	0.000	0.000	0.011	0.011
36:12:00	0.000	0.000	0.000	0.000	0.011	0.011
36:18:00	0.000	0.000	0.000	0.000	0.011	0.011
36:24:00	0.000	0.000	0.000	0.000	0.011	0.011
36:30:00	0.000	0.000	0.000	0.000	0.011	0.011
36:36:00	0.000	0.000	0.000	0.000	0.011	0.011
36:42:00	0.000	0.000	0.000	0.000	0.011	0.011
36:48:00	0.000	0.000	0.000	0.000	0.011	0.011
36:54:00	0.000	0.000	0.000	0.000	0.011	0.011
37:00:00	0.000	0.000	0.000	0.000	0.011	0.011
37:06:00	0.000	0.000	0.000	0.000	0.011	0.011
37:12:00	0.000	0.000	0.000	0.000	0.011	0.011
37:18:00	0.000	0.000	0.000	0.000	0.011	0.011
37:24:00	0.000	0.000	0.000	0.000	0.011	0.011
37:30:00	0.000	0.000	0.000	0.000	0.011	0.011
37:36:00	0.000	0.000	0.000	0.000	0.011	0.011
37:42:00	0.000	0.000	0.000	0.000	0.011	0.011
37:48:00	0.000	0.000	0.000	0.000	0.011	0.011
37:54:00	0.000	0.000	0.000	0.000	0.011	0.011
38:00:00	0.000	0.000	0.000	0.000	0.011	0.011
38:06:00	0.000	0.000	0.000	0.000	0.011	0.011
38:12:00	0.000	0.000	0.000	0.000	0.011	0.011
38:18:00	0.000	0.000	0.000	0.000	0.010	0.010
38:24:00	0.000	0.000	0.000	0.000	0.010	0.010
38:30:00	0.000	0.000	0.000	0.000	0.010	0.010
38:36:00	0.000	0.000	0.000	0.000	0.010	0.010
38:42:00	0.000	0.000	0.000	0.000	0.010	0.010
38:48:00	0.000	0.000	0.000	0.000	0.010	0.010
38:54:00	0.000	0.000	0.000	0.000	0.010	0.010
39:00:00	0.000	0.000	0.000	0.000	0.010	0.010
39:06:00	0.000	0.000	0.000	0.000	0.010	0.010
39:12:00	0.000	0.000	0.000	0.000	0.010	0.010
39:18:00	0.000	0.000	0.000	0.000	0.010	0.010
39:24:00	0.000	0.000	0.000	0.000	0.010	0.010

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Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
39:30:00	0.000	0.000	0.000	0.000	0.010	0.010
39:36:00	0.000	0.000	0.000	0.000	0.010	0.010
39:42:00	0.000	0.000	0.000	0.000	0.010	0.010
39:48:00	0.000	0.000	0.000	0.000	0.010	0.010
39:54:00	0.000	0.000	0.000	0.000	0.010	0.010
40:00:00	0.000	0.000	0.000	0.000	0.010	0.010
40:06:00	0.000	0.000	0.000	0.000	0.010	0.010
40:12:00	0.000	0.000	0.000	0.000	0.010	0.010
40:18:00	0.000	0.000	0.000	0.000	0.010	0.010
40:24:00	0.000	0.000	0.000	0.000	0.010	0.010
40:30:00	0.000	0.000	0.000	0.000	0.010	0.010
40:36:00	0.000	0.000	0.000	0.000	0.010	0.010
40:42:00	0.000	0.000	0.000	0.000	0.010	0.010
40:48:00	0.000	0.000	0.000	0.000	0.010	0.010
40:54:00	0.000	0.000	0.000	0.000	0.010	0.010
41:00:00	0.000	0.000	0.000	0.000	0.010	0.010
41:06:00	0.000	0.000	0.000	0.000	0.010	0.010
41:12:00	0.000	0.000	0.000	0.000	0.010	0.010
41:18:00	0.000	0.000	0.000	0.000	0.010	0.010
41:24:00	0.000	0.000	0.000	0.000	0.010	0.010
41:30:00	0.000	0.000	0.000	0.000	0.010	0.010
41:36:00	0.000	0.000	0.000	0.000	0.010	0.010
41:42:00	0.000	0.000	0.000	0.000	0.010	0.010
41:48:00	0.000	0.000	0.000	0.000	0.009	0.009
41:54:00	0.000	0.000	0.000	0.000	0.009	0.009
42:00:00	0.000	0.000	0.000	0.000	0.009	0.009
42:06:00	0.000	0.000	0.000	0.000	0.009	0.009
42:12:00	0.000	0.000	0.000	0.000	0.009	0.009
42:18:00	0.000	0.000	0.000	0.000	0.009	0.009
42:24:00	0.000	0.000	0.000	0.000	0.009	0.009
42:30:00	0.000	0.000	0.000	0.000	0.009	0.009
42:36:00	0.000	0.000	0.000	0.000	0.009	0.009
42:42:00	0.000	0.000	0.000	0.000	0.009	0.009
42:48:00	0.000	0.000	0.000	0.000	0.009	0.009
42:54:00	0.000	0.000	0.000	0.000	0.009	0.009
43:00:00	0.000	0.000	0.000	0.000	0.009	0.009

Printed from the ReFH Flood Modelling software package, version 2.2.6029.28099

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
43:06:00	0.000	0.000	0.000	0.000	0.009	0.009
43:12:00	0.000	0.000	0.000	0.000	0.009	0.009
43:18:00	0.000	0.000	0.000	0.000	0.009	0.009
43:24:00	0.000	0.000	0.000	0.000	0.009	0.009
43:30:00	0.000	0.000	0.000	0.000	0.009	0.009
43:36:00	0.000	0.000	0.000	0.000	0.009	0.009
43:42:00	0.000	0.000	0.000	0.000	0.009	0.009
43:48:00	0.000	0.000	0.000	0.000	0.009	0.009
43:54:00	0.000	0.000	0.000	0.000	0.009	0.009
44:00:00	0.000	0.000	0.000	0.000	0.009	0.009
44:06:00	0.000	0.000	0.000	0.000	0.009	0.009
44:12:00	0.000	0.000	0.000	0.000	0.009	0.009
44:18:00	0.000	0.000	0.000	0.000	0.009	0.009
44:24:00	0.000	0.000	0.000	0.000	0.009	0.009
44:30:00	0.000	0.000	0.000	0.000	0.009	0.009
44:36:00	0.000	0.000	0.000	0.000	0.009	0.009
44:42:00	0.000	0.000	0.000	0.000	0.009	0.009
44:48:00	0.000	0.000	0.000	0.000	0.009	0.009
44:54:00	0.000	0.000	0.000	0.000	0.009	0.009
45:00:00	0.000	0.000	0.000	0.000	0.009	0.009
45:06:00	0.000	0.000	0.000	0.000	0.009	0.009
45:12:00	0.000	0.000	0.000	0.000	0.009	0.009
45:18:00	0.000	0.000	0.000	0.000	0.009	0.009
45:24:00	0.000	0.000	0.000	0.000	0.009	0.009
45:30:00	0.000	0.000	0.000	0.000	0.009	0.009
45:36:00	0.000	0.000	0.000	0.000	0.009	0.009
45:42:00	0.000	0.000	0.000	0.000	0.008	0.008
45:48:00	0.000	0.000	0.000	0.000	0.008	0.008
45:54:00	0.000	0.000	0.000	0.000	0.008	0.008
46:00:00	0.000	0.000	0.000	0.000	0.008	0.008
46:06:00	0.000	0.000	0.000	0.000	0.008	0.008
46:12:00	0.000	0.000	0.000	0.000	0.008	0.008
46:18:00	0.000	0.000	0.000	0.000	0.008	0.008
46:24:00	0.000	0.000	0.000	0.000	0.008	0.008
46:30:00	0.000	0.000	0.000	0.000	0.008	0.008
46:36:00	0.000	0.000	0.000	0.000	0.008	0.008

Printed from the ReFH Flood Modelling software package, version 2.2.6029.28099

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
46:42:00	0.000	0.000	0.000	0.000	0.008	0.008
46:48:00	0.000	0.000	0.000	0.000	0.008	0.008
46:54:00	0.000	0.000	0.000	0.000	0.008	0.008
47:00:00	0.000	0.000	0.000	0.000	0.008	0.008
47:06:00	0.000	0.000	0.000	0.000	0.008	0.008
47:12:00	0.000	0.000	0.000	0.000	0.008	0.008
47:18:00	0.000	0.000	0.000	0.000	0.008	0.008
47:24:00	0.000	0.000	0.000	0.000	0.008	0.008
47:30:00	0.000	0.000	0.000	0.000	0.008	0.008
47:36:00	0.000	0.000	0.000	0.000	0.008	0.008
47:42:00	0.000	0.000	0.000	0.000	0.008	0.008
47:48:00	0.000	0.000	0.000	0.000	0.008	0.008
47:54:00	0.000	0.000	0.000	0.000	0.008	0.008
48:00:00	0.000	0.000	0.000	0.000	0.008	0.008
48:06:00	0.000	0.000	0.000	0.000	0.008	0.008
48:12:00	0.000	0.000	0.000	0.000	0.008	0.008
48:18:00	0.000	0.000	0.000	0.000	0.008	0.008
48:24:00	0.000	0.000	0.000	0.000	0.008	0.008
48:30:00	0.000	0.000	0.000	0.000	0.008	0.008
48:36:00	0.000	0.000	0.000	0.000	0.008	0.008
48:42:00	0.000	0.000	0.000	0.000	0.008	0.008
48:48:00	0.000	0.000	0.000	0.000	0.008	0.008
48:54:00	0.000	0.000	0.000	0.000	0.008	0.008
49:00:00	0.000	0.000	0.000	0.000	0.008	0.008
49:06:00	0.000	0.000	0.000	0.000	0.008	0.008
49:12:00	0.000	0.000	0.000	0.000	0.008	0.008
49:18:00	0.000	0.000	0.000	0.000	0.008	0.008
49:24:00	0.000	0.000	0.000	0.000	0.008	0.008
49:30:00	0.000	0.000	0.000	0.000	0.008	0.008
49:36:00	0.000	0.000	0.000	0.000	0.008	0.008
49:42:00	0.000	0.000	0.000	0.000	0.008	0.008
49:48:00	0.000	0.000	0.000	0.000	0.008	0.008
49:54:00	0.000	0.000	0.000	0.000	0.008	0.008
50:00:00	0.000	0.000	0.000	0.000	0.008	0.008
50:06:00	0.000	0.000	0.000	0.000	0.007	0.007
50:12:00	0.000	0.000	0.000	0.000	0.007	0.007

Printed from the ReFH Flood Modelling software package, version 2.2.6029.28099

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
50:18:00	0.000	0.000	0.000	0.000	0.007	0.007
50:24:00	0.000	0.000	0.000	0.000	0.007	0.007
50:30:00	0.000	0.000	0.000	0.000	0.007	0.007
50:36:00	0.000	0.000	0.000	0.000	0.007	0.007
50:42:00	0.000	0.000	0.000	0.000	0.007	0.007
50:48:00	0.000	0.000	0.000	0.000	0.007	0.007
50:54:00	0.000	0.000	0.000	0.000	0.007	0.007
51:00:00	0.000	0.000	0.000	0.000	0.007	0.007
51:06:00	0.000	0.000	0.000	0.000	0.007	0.007
51:12:00	0.000	0.000	0.000	0.000	0.007	0.007
51:18:00	0.000	0.000	0.000	0.000	0.007	0.007
51:24:00	0.000	0.000	0.000	0.000	0.007	0.007
51:30:00	0.000	0.000	0.000	0.000	0.007	0.007
51:36:00	0.000	0.000	0.000	0.000	0.007	0.007
51:42:00	0.000	0.000	0.000	0.000	0.007	0.007
51:48:00	0.000	0.000	0.000	0.000	0.007	0.007
51:54:00	0.000	0.000	0.000	0.000	0.007	0.007
52:00:00	0.000	0.000	0.000	0.000	0.007	0.007
52:06:00	0.000	0.000	0.000	0.000	0.007	0.007
52:12:00	0.000	0.000	0.000	0.000	0.007	0.007
52:18:00	0.000	0.000	0.000	0.000	0.007	0.007
52:24:00	0.000	0.000	0.000	0.000	0.007	0.007
52:30:00	0.000	0.000	0.000	0.000	0.007	0.007
52:36:00	0.000	0.000	0.000	0.000	0.007	0.007
52:42:00	0.000	0.000	0.000	0.000	0.007	0.007
52:48:00	0.000	0.000	0.000	0.000	0.007	0.007
52:54:00	0.000	0.000	0.000	0.000	0.007	0.007
53:00:00	0.000	0.000	0.000	0.000	0.007	0.007
53:06:00	0.000	0.000	0.000	0.000	0.007	0.007
53:12:00	0.000	0.000	0.000	0.000	0.007	0.007
53:18:00	0.000	0.000	0.000	0.000	0.007	0.007
53:24:00	0.000	0.000	0.000	0.000	0.007	0.007
53:30:00	0.000	0.000	0.000	0.000	0.007	0.007
53:36:00	0.000	0.000	0.000	0.000	0.007	0.007
53:42:00	0.000	0.000	0.000	0.000	0.007	0.007
53:48:00	0.000	0.000	0.000	0.000	0.007	0.007

Printed from the ReFH Flood Modelling software package, version 2.2.6029.28099

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
53:54:00	0.000	0.000	0.000	0.000	0.007	0.007
54:00:00	0.000	0.000	0.000	0.000	0.007	0.007
54:06:00	0.000	0.000	0.000	0.000	0.007	0.007
54:12:00	0.000	0.000	0.000	0.000	0.007	0.007
54:18:00	0.000	0.000	0.000	0.000	0.007	0.007
54:24:00	0.000	0.000	0.000	0.000	0.007	0.007
54:30:00	0.000	0.000	0.000	0.000	0.007	0.007
54:36:00	0.000	0.000	0.000	0.000	0.007	0.007
54:42:00	0.000	0.000	0.000	0.000	0.007	0.007
54:48:00	0.000	0.000	0.000	0.000	0.007	0.007
54:54:00	0.000	0.000	0.000	0.000	0.007	0.007
55:00:00	0.000	0.000	0.000	0.000	0.007	0.007
55:06:00	0.000	0.000	0.000	0.000	0.007	0.007
55:12:00	0.000	0.000	0.000	0.000	0.006	0.006
55:18:00	0.000	0.000	0.000	0.000	0.006	0.006
55:24:00	0.000	0.000	0.000	0.000	0.006	0.006
55:30:00	0.000	0.000	0.000	0.000	0.006	0.006
55:36:00	0.000	0.000	0.000	0.000	0.006	0.006
55:42:00	0.000	0.000	0.000	0.000	0.006	0.006
55:48:00	0.000	0.000	0.000	0.000	0.006	0.006
55:54:00	0.000	0.000	0.000	0.000	0.006	0.006
56:00:00	0.000	0.000	0.000	0.000	0.006	0.006
56:06:00	0.000	0.000	0.000	0.000	0.006	0.006
56:12:00	0.000	0.000	0.000	0.000	0.006	0.006
56:18:00	0.000	0.000	0.000	0.000	0.006	0.006
56:24:00	0.000	0.000	0.000	0.000	0.006	0.006
56:30:00	0.000	0.000	0.000	0.000	0.006	0.006
56:36:00	0.000	0.000	0.000	0.000	0.006	0.006
56:42:00	0.000	0.000	0.000	0.000	0.006	0.006
56:48:00	0.000	0.000	0.000	0.000	0.006	0.006
56:54:00	0.000	0.000	0.000	0.000	0.006	0.006
57:00:00	0.000	0.000	0.000	0.000	0.006	0.006
57:06:00	0.000	0.000	0.000	0.000	0.006	0.006
57:12:00	0.000	0.000	0.000	0.000	0.006	0.006
57:18:00	0.000	0.000	0.000	0.000	0.006	0.006
57:24:00	0.000	0.000	0.000	0.000	0.006	0.006

Printed from the ReFH Flood Modelling software package, version 2.2.6029.28099

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
57:30:00	0.000	0.000	0.000	0.000	0.006	0.006
57:36:00	0.000	0.000	0.000	0.000	0.006	0.006
57:42:00	0.000	0.000	0.000	0.000	0.006	0.006
57:48:00	0.000	0.000	0.000	0.000	0.006	0.006
57:54:00	0.000	0.000	0.000	0.000	0.006	0.006
58:00:00	0.000	0.000	0.000	0.000	0.006	0.006
58:06:00	0.000	0.000	0.000	0.000	0.006	0.006
58:12:00	0.000	0.000	0.000	0.000	0.006	0.006
58:18:00	0.000	0.000	0.000	0.000	0.006	0.006
58:24:00	0.000	0.000	0.000	0.000	0.006	0.006
58:30:00	0.000	0.000	0.000	0.000	0.006	0.006
58:36:00	0.000	0.000	0.000	0.000	0.006	0.006
58:42:00	0.000	0.000	0.000	0.000	0.006	0.006
58:48:00	0.000	0.000	0.000	0.000	0.006	0.006
58:54:00	0.000	0.000	0.000	0.000	0.006	0.006
59:00:00	0.000	0.000	0.000	0.000	0.006	0.006
59:06:00	0.000	0.000	0.000	0.000	0.006	0.006
59:12:00	0.000	0.000	0.000	0.000	0.006	0.006
59:18:00	0.000	0.000	0.000	0.000	0.006	0.006
59:24:00	0.000	0.000	0.000	0.000	0.006	0.006
59:30:00	0.000	0.000	0.000	0.000	0.006	0.006
59:36:00	0.000	0.000	0.000	0.000	0.006	0.006
59:42:00	0.000	0.000	0.000	0.000	0.006	0.006
59:48:00	0.000	0.000	0.000	0.000	0.006	0.006
59:54:00	0.000	0.000	0.000	0.000	0.006	0.006
60:00:00	0.000	0.000	0.000	0.000	0.006	0.006
60:06:00	0.000	0.000	0.000	0.000	0.006	0.006
60:12:00	0.000	0.000	0.000	0.000	0.006	0.006
60:18:00	0.000	0.000	0.000	0.000	0.006	0.006
60:24:00	0.000	0.000	0.000	0.000	0.006	0.006
60:30:00	0.000	0.000	0.000	0.000	0.006	0.006
60:36:00	0.000	0.000	0.000	0.000	0.006	0.006
60:42:00	0.000	0.000	0.000	0.000	0.006	0.006
60:48:00	0.000	0.000	0.000	0.000	0.006	0.006
60:54:00	0.000	0.000	0.000	0.000	0.006	0.006
61:00:00	0.000	0.000	0.000	0.000	0.006	0.006

Printed from the ReFH Flood Modelling software package, version 2.2.6029.28099

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
61:06:00	0.000	0.000	0.000	0.000	0.005	0.005
61:12:00	0.000	0.000	0.000	0.000	0.005	0.005
61:18:00	0.000	0.000	0.000	0.000	0.005	0.005
61:24:00	0.000	0.000	0.000	0.000	0.005	0.005
61:30:00	0.000	0.000	0.000	0.000	0.005	0.005
61:36:00	0.000	0.000	0.000	0.000	0.005	0.005
61:42:00	0.000	0.000	0.000	0.000	0.005	0.005
61:48:00	0.000	0.000	0.000	0.000	0.005	0.005
61:54:00	0.000	0.000	0.000	0.000	0.005	0.005
62:00:00	0.000	0.000	0.000	0.000	0.005	0.005
62:06:00	0.000	0.000	0.000	0.000	0.005	0.005
62:12:00	0.000	0.000	0.000	0.000	0.005	0.005
62:18:00	0.000	0.000	0.000	0.000	0.005	0.005
62:24:00	0.000	0.000	0.000	0.000	0.005	0.005
62:30:00	0.000	0.000	0.000	0.000	0.005	0.005
62:36:00	0.000	0.000	0.000	0.000	0.005	0.005
62:42:00	0.000	0.000	0.000	0.000	0.005	0.005
62:48:00	0.000	0.000	0.000	0.000	0.005	0.005
62:54:00	0.000	0.000	0.000	0.000	0.005	0.005
63:00:00	0.000	0.000	0.000	0.000	0.005	0.005
63:06:00	0.000	0.000	0.000	0.000	0.005	0.005
63:12:00	0.000	0.000	0.000	0.000	0.005	0.005
63:18:00	0.000	0.000	0.000	0.000	0.005	0.005
63:24:00	0.000	0.000	0.000	0.000	0.005	0.005
63:30:00	0.000	0.000	0.000	0.000	0.005	0.005
63:36:00	0.000	0.000	0.000	0.000	0.005	0.005
63:42:00	0.000	0.000	0.000	0.000	0.005	0.005
63:48:00	0.000	0.000	0.000	0.000	0.005	0.005
63:54:00	0.000	0.000	0.000	0.000	0.005	0.005
64:00:00	0.000	0.000	0.000	0.000	0.005	0.005
64:06:00	0.000	0.000	0.000	0.000	0.005	0.005
64:12:00	0.000	0.000	0.000	0.000	0.005	0.005
64:18:00	0.000	0.000	0.000	0.000	0.005	0.005
64:24:00	0.000	0.000	0.000	0.000	0.005	0.005
64:30:00	0.000	0.000	0.000	0.000	0.005	0.005
64:36:00	0.000	0.000	0.000	0.000	0.005	0.005

Printed from the ReFH Flood Modelling software package, version 2.2.6029.28099

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
64:42:00	0.000	0.000	0.000	0.000	0.005	0.005
64:48:00	0.000	0.000	0.000	0.000	0.005	0.005
64:54:00	0.000	0.000	0.000	0.000	0.005	0.005
65:00:00	0.000	0.000	0.000	0.000	0.005	0.005
65:06:00	0.000	0.000	0.000	0.000	0.005	0.005
65:12:00	0.000	0.000	0.000	0.000	0.005	0.005
65:18:00	0.000	0.000	0.000	0.000	0.005	0.005
65:24:00	0.000	0.000	0.000	0.000	0.005	0.005
65:30:00	0.000	0.000	0.000	0.000	0.005	0.005
65:36:00	0.000	0.000	0.000	0.000	0.005	0.005
65:42:00	0.000	0.000	0.000	0.000	0.005	0.005
65:48:00	0.000	0.000	0.000	0.000	0.005	0.005
65:54:00	0.000	0.000	0.000	0.000	0.005	0.005
66:00:00	0.000	0.000	0.000	0.000	0.005	0.005
66:06:00	0.000	0.000	0.000	0.000	0.005	0.005
66:12:00	0.000	0.000	0.000	0.000	0.005	0.005
66:18:00	0.000	0.000	0.000	0.000	0.005	0.005
66:24:00	0.000	0.000	0.000	0.000	0.005	0.005

Appendix

Catchment descriptors

Name	Value	User-defined value used?
Area (km^2)	0.59	No
ALTBAR	151	No
ASPBAR	100	No
ASPVAR	0.77	No
BFIHOST	0.8	No
DPLBAR (km)	0.81	No
DPSBAR (mkm^{-1})	195.4	No
FARL	1	No
LDP	1.79	No
PROPWET (mm)	0.51	No
RMED1H	10.3	No
RMED1D	33.1	No
RMED2D	41.7	No
SAAR (mm)	833	No
SAAR4170 (mm)	814	No
SPRHOST	20.84	No
Urbext2000	0	No
Urbext1990	0	No
URBCONC	0.82	No
URBLOC	0.35	No
Urban Area (km^2)	0	No
DDF parameter C	-0.03	No
DDF parameter D1	0.36	No
DDF parameter D2	0.42	No
DDF parameter D3	0.3	No
DDF parameter E	0.29	No
DDF parameter F	2.42	No
DDF parameter C (1km grid value)	-0.03	No
DDF parameter D1 (1km grid value)	0.36	No
DDF parameter D2 (1km grid value)	0.42	No
DDF parameter D3 (1km grid value)	0.29	No
DDF parameter E (1km grid value)	0.29	No
DDF parameter F (1km grid value)	2.41	No

UK Design Flood Estimation

Generated on Friday, September 16, 2016 3:06:49 PM by Bethan.LloydJones
Printed from the ReFH Flood Modelling software package, version 2.2.6029.28099

Summary of estimate using the Flood Estimation Handbook revitalised flood hydrograph method (ReFH)

Site details Checksum: 3AE5-7051

Site name: FEH_Catchment_Descriptors_331000_356550 (Updated)

Easting: 331000

Northing: 356550

Country: England, Wales or Northern Ireland

Catchment Area (km^2): 0.59

Using plot scale calculations: No

Site description: None

Model run: 100 year

Summary of results

Rainfall - FEH 2013 (mm):	58.00	Total runoff (ML):	2.11
Total Rainfall (mm):	37.02	Total flow (ML):	7.06
Peak Rainfall (mm):	5.05	Peak flow (m^3/s):	0.32

Parameters

Where the user has overriden a system-generated value, this original value is shown in square brackets after the value used.
** Indicates that the user locked the duration/timestep*

Rainfall parameters (Rainfall - FEH 2013 model)

Name	Value	User-defined?
Duration (hh:mm:ss)	01:54:00	No
Timestep (hh:mm:ss)	00:06:00	No
SCF (Seasonal correction factor)	0.66	No
ARF (Areal reduction factor)	0.97	No
Seasonality	Winter	n/a

Loss model parameters

Name	Value	User-defined?
Cini (mm)	60.95	No
Cmax (mm)	821.73	No
Use alpha correction factor	No	No
Alpha correction factor	n/a	No

Routing model parameters

Name	Value	User-defined?
Tp (hr)	1	No
Up	0.65	No
Uk	0.8	No

Baseflow model parameters

Name	Value	User-defined?
BF0 (m^3/s)	0	No
BL (hr)	35.26	No
BR	2.49	No

Urbanisation parameters

Name	Value	User-defined?
Urban area (km^2)	0	No
Urbext 2000	0	No
Impervious runoff factor	0.7	No
Imperviousness factor	0.3	No
Tp scaling factor	0.5	No
Sewered area (km^2)	0.00	Yes
Sewer capacity (m^3/s)	0.00	Yes

Time series data

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
00:00:00	0.419	0.000	0.031	0.000	0.005	0.005
00:06:00	0.565	0.000	0.042	0.000	0.005	0.005
00:12:00	0.762	0.000	0.058	0.001	0.005	0.005
00:18:00	1.025	0.000	0.079	0.002	0.005	0.006
00:24:00	1.376	0.000	0.108	0.004	0.005	0.008
00:30:00	1.843	0.000	0.148	0.006	0.005	0.011
00:36:00	2.459	0.000	0.204	0.011	0.005	0.015
00:42:00	3.262	0.000	0.282	0.017	0.005	0.021
00:48:00	4.273	0.000	0.389	0.025	0.005	0.030
00:54:00	5.047	0.000	0.488	0.037	0.005	0.043
01:00:00	4.273	0.000	0.437	0.054	0.005	0.060
01:06:00	3.262	0.000	0.349	0.076	0.006	0.082
01:12:00	2.459	0.000	0.272	0.101	0.007	0.107
01:18:00	1.843	0.000	0.208	0.128	0.007	0.136
01:24:00	1.376	0.000	0.158	0.157	0.008	0.166
01:30:00	1.025	0.000	0.119	0.187	0.009	0.196
01:36:00	0.762	0.000	0.090	0.215	0.011	0.226
01:42:00	0.565	0.000	0.067	0.242	0.012	0.255
01:48:00	0.419	0.000	0.050	0.266	0.014	0.280
01:54:00	0.000	0.000	0.000	0.284	0.016	0.300
02:00:00	0.000	0.000	0.000	0.295	0.018	0.314
02:06:00	0.000	0.000	0.000	0.299	0.020	0.319
02:12:00	0.000	0.000	0.000	0.296	0.022	0.318
02:18:00	0.000	0.000	0.000	0.288	0.024	0.312
02:24:00	0.000	0.000	0.000	0.276	0.026	0.302
02:30:00	0.000	0.000	0.000	0.262	0.028	0.290
02:36:00	0.000	0.000	0.000	0.245	0.030	0.275
02:42:00	0.000	0.000	0.000	0.228	0.031	0.259
02:48:00	0.000	0.000	0.000	0.210	0.033	0.242
02:54:00	0.000	0.000	0.000	0.192	0.034	0.226
03:00:00	0.000	0.000	0.000	0.175	0.035	0.210
03:06:00	0.000	0.000	0.000	0.160	0.036	0.196
03:12:00	0.000	0.000	0.000	0.146	0.037	0.183
03:18:00	0.000	0.000	0.000	0.133	0.038	0.171
03:24:00	0.000	0.000	0.000	0.121	0.039	0.160

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Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
03:30:00	0.000	0.000	0.000	0.110	0.040	0.150
03:36:00	0.000	0.000	0.000	0.099	0.040	0.140
03:42:00	0.000	0.000	0.000	0.089	0.041	0.130
03:48:00	0.000	0.000	0.000	0.079	0.041	0.120
03:54:00	0.000	0.000	0.000	0.069	0.042	0.111
04:00:00	0.000	0.000	0.000	0.060	0.042	0.102
04:06:00	0.000	0.000	0.000	0.051	0.042	0.093
04:12:00	0.000	0.000	0.000	0.042	0.043	0.084
04:18:00	0.000	0.000	0.000	0.033	0.043	0.076
04:24:00	0.000	0.000	0.000	0.026	0.043	0.069
04:30:00	0.000	0.000	0.000	0.019	0.043	0.062
04:36:00	0.000	0.000	0.000	0.014	0.043	0.056
04:42:00	0.000	0.000	0.000	0.010	0.043	0.052
04:48:00	0.000	0.000	0.000	0.006	0.043	0.049
04:54:00	0.000	0.000	0.000	0.004	0.043	0.047
05:00:00	0.000	0.000	0.000	0.003	0.043	0.045
05:06:00	0.000	0.000	0.000	0.001	0.042	0.044
05:12:00	0.000	0.000	0.000	0.001	0.042	0.043
05:18:00	0.000	0.000	0.000	0.000	0.042	0.042
05:24:00	0.000	0.000	0.000	0.000	0.042	0.042
05:30:00	0.000	0.000	0.000	0.000	0.042	0.042
05:36:00	0.000	0.000	0.000	0.000	0.042	0.042
05:42:00	0.000	0.000	0.000	0.000	0.042	0.042
05:48:00	0.000	0.000	0.000	0.000	0.042	0.042
05:54:00	0.000	0.000	0.000	0.000	0.041	0.041
06:00:00	0.000	0.000	0.000	0.000	0.041	0.041
06:06:00	0.000	0.000	0.000	0.000	0.041	0.041
06:12:00	0.000	0.000	0.000	0.000	0.041	0.041
06:18:00	0.000	0.000	0.000	0.000	0.041	0.041
06:24:00	0.000	0.000	0.000	0.000	0.041	0.041
06:30:00	0.000	0.000	0.000	0.000	0.041	0.041
06:36:00	0.000	0.000	0.000	0.000	0.041	0.041
06:42:00	0.000	0.000	0.000	0.000	0.041	0.041
06:48:00	0.000	0.000	0.000	0.000	0.040	0.040
06:54:00	0.000	0.000	0.000	0.000	0.040	0.040
07:00:00	0.000	0.000	0.000	0.000	0.040	0.040

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Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
07:06:00	0.000	0.000	0.000	0.000	0.040	0.040
07:12:00	0.000	0.000	0.000	0.000	0.040	0.040
07:18:00	0.000	0.000	0.000	0.000	0.040	0.040
07:24:00	0.000	0.000	0.000	0.000	0.040	0.040
07:30:00	0.000	0.000	0.000	0.000	0.040	0.040
07:36:00	0.000	0.000	0.000	0.000	0.040	0.040
07:42:00	0.000	0.000	0.000	0.000	0.039	0.039
07:48:00	0.000	0.000	0.000	0.000	0.039	0.039
07:54:00	0.000	0.000	0.000	0.000	0.039	0.039
08:00:00	0.000	0.000	0.000	0.000	0.039	0.039
08:06:00	0.000	0.000	0.000	0.000	0.039	0.039
08:12:00	0.000	0.000	0.000	0.000	0.039	0.039
08:18:00	0.000	0.000	0.000	0.000	0.039	0.039
08:24:00	0.000	0.000	0.000	0.000	0.039	0.039
08:30:00	0.000	0.000	0.000	0.000	0.039	0.039
08:36:00	0.000	0.000	0.000	0.000	0.038	0.038
08:42:00	0.000	0.000	0.000	0.000	0.038	0.038
08:48:00	0.000	0.000	0.000	0.000	0.038	0.038
08:54:00	0.000	0.000	0.000	0.000	0.038	0.038
09:00:00	0.000	0.000	0.000	0.000	0.038	0.038
09:06:00	0.000	0.000	0.000	0.000	0.038	0.038
09:12:00	0.000	0.000	0.000	0.000	0.038	0.038
09:18:00	0.000	0.000	0.000	0.000	0.038	0.038
09:24:00	0.000	0.000	0.000	0.000	0.038	0.038
09:30:00	0.000	0.000	0.000	0.000	0.037	0.037
09:36:00	0.000	0.000	0.000	0.000	0.037	0.037
09:42:00	0.000	0.000	0.000	0.000	0.037	0.037
09:48:00	0.000	0.000	0.000	0.000	0.037	0.037
09:54:00	0.000	0.000	0.000	0.000	0.037	0.037
10:00:00	0.000	0.000	0.000	0.000	0.037	0.037
10:06:00	0.000	0.000	0.000	0.000	0.037	0.037
10:12:00	0.000	0.000	0.000	0.000	0.037	0.037
10:18:00	0.000	0.000	0.000	0.000	0.037	0.037
10:24:00	0.000	0.000	0.000	0.000	0.036	0.036
10:30:00	0.000	0.000	0.000	0.000	0.036	0.036
10:36:00	0.000	0.000	0.000	0.000	0.036	0.036

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Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
10:42:00	0.000	0.000	0.000	0.000	0.036	0.036
10:48:00	0.000	0.000	0.000	0.000	0.036	0.036
10:54:00	0.000	0.000	0.000	0.000	0.036	0.036
11:00:00	0.000	0.000	0.000	0.000	0.036	0.036
11:06:00	0.000	0.000	0.000	0.000	0.036	0.036
11:12:00	0.000	0.000	0.000	0.000	0.036	0.036
11:18:00	0.000	0.000	0.000	0.000	0.036	0.036
11:24:00	0.000	0.000	0.000	0.000	0.035	0.035
11:30:00	0.000	0.000	0.000	0.000	0.035	0.035
11:36:00	0.000	0.000	0.000	0.000	0.035	0.035
11:42:00	0.000	0.000	0.000	0.000	0.035	0.035
11:48:00	0.000	0.000	0.000	0.000	0.035	0.035
11:54:00	0.000	0.000	0.000	0.000	0.035	0.035
12:00:00	0.000	0.000	0.000	0.000	0.035	0.035
12:06:00	0.000	0.000	0.000	0.000	0.035	0.035
12:12:00	0.000	0.000	0.000	0.000	0.035	0.035
12:18:00	0.000	0.000	0.000	0.000	0.035	0.035
12:24:00	0.000	0.000	0.000	0.000	0.034	0.034
12:30:00	0.000	0.000	0.000	0.000	0.034	0.034
12:36:00	0.000	0.000	0.000	0.000	0.034	0.034
12:42:00	0.000	0.000	0.000	0.000	0.034	0.034
12:48:00	0.000	0.000	0.000	0.000	0.034	0.034
12:54:00	0.000	0.000	0.000	0.000	0.034	0.034
13:00:00	0.000	0.000	0.000	0.000	0.034	0.034
13:06:00	0.000	0.000	0.000	0.000	0.034	0.034
13:12:00	0.000	0.000	0.000	0.000	0.034	0.034
13:18:00	0.000	0.000	0.000	0.000	0.034	0.034
13:24:00	0.000	0.000	0.000	0.000	0.034	0.034
13:30:00	0.000	0.000	0.000	0.000	0.033	0.033
13:36:00	0.000	0.000	0.000	0.000	0.033	0.033
13:42:00	0.000	0.000	0.000	0.000	0.033	0.033
13:48:00	0.000	0.000	0.000	0.000	0.033	0.033
13:54:00	0.000	0.000	0.000	0.000	0.033	0.033
14:00:00	0.000	0.000	0.000	0.000	0.033	0.033
14:06:00	0.000	0.000	0.000	0.000	0.033	0.033
14:12:00	0.000	0.000	0.000	0.000	0.033	0.033

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Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
14:18:00	0.000	0.000	0.000	0.000	0.033	0.033
14:24:00	0.000	0.000	0.000	0.000	0.033	0.033
14:30:00	0.000	0.000	0.000	0.000	0.032	0.032
14:36:00	0.000	0.000	0.000	0.000	0.032	0.032
14:42:00	0.000	0.000	0.000	0.000	0.032	0.032
14:48:00	0.000	0.000	0.000	0.000	0.032	0.032
14:54:00	0.000	0.000	0.000	0.000	0.032	0.032
15:00:00	0.000	0.000	0.000	0.000	0.032	0.032
15:06:00	0.000	0.000	0.000	0.000	0.032	0.032
15:12:00	0.000	0.000	0.000	0.000	0.032	0.032
15:18:00	0.000	0.000	0.000	0.000	0.032	0.032
15:24:00	0.000	0.000	0.000	0.000	0.032	0.032
15:30:00	0.000	0.000	0.000	0.000	0.032	0.032
15:36:00	0.000	0.000	0.000	0.000	0.031	0.031
15:42:00	0.000	0.000	0.000	0.000	0.031	0.031
15:48:00	0.000	0.000	0.000	0.000	0.031	0.031
15:54:00	0.000	0.000	0.000	0.000	0.031	0.031
16:00:00	0.000	0.000	0.000	0.000	0.031	0.031
16:06:00	0.000	0.000	0.000	0.000	0.031	0.031
16:12:00	0.000	0.000	0.000	0.000	0.031	0.031
16:18:00	0.000	0.000	0.000	0.000	0.031	0.031
16:24:00	0.000	0.000	0.000	0.000	0.031	0.031
16:30:00	0.000	0.000	0.000	0.000	0.031	0.031
16:36:00	0.000	0.000	0.000	0.000	0.031	0.031
16:42:00	0.000	0.000	0.000	0.000	0.031	0.031
16:48:00	0.000	0.000	0.000	0.000	0.030	0.030
16:54:00	0.000	0.000	0.000	0.000	0.030	0.030
17:00:00	0.000	0.000	0.000	0.000	0.030	0.030
17:06:00	0.000	0.000	0.000	0.000	0.030	0.030
17:12:00	0.000	0.000	0.000	0.000	0.030	0.030
17:18:00	0.000	0.000	0.000	0.000	0.030	0.030
17:24:00	0.000	0.000	0.000	0.000	0.030	0.030
17:30:00	0.000	0.000	0.000	0.000	0.030	0.030
17:36:00	0.000	0.000	0.000	0.000	0.030	0.030
17:42:00	0.000	0.000	0.000	0.000	0.030	0.030
17:48:00	0.000	0.000	0.000	0.000	0.030	0.030

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Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
17:54:00	0.000	0.000	0.000	0.000	0.029	0.029
18:00:00	0.000	0.000	0.000	0.000	0.029	0.029
18:06:00	0.000	0.000	0.000	0.000	0.029	0.029
18:12:00	0.000	0.000	0.000	0.000	0.029	0.029
18:18:00	0.000	0.000	0.000	0.000	0.029	0.029
18:24:00	0.000	0.000	0.000	0.000	0.029	0.029
18:30:00	0.000	0.000	0.000	0.000	0.029	0.029
18:36:00	0.000	0.000	0.000	0.000	0.029	0.029
18:42:00	0.000	0.000	0.000	0.000	0.029	0.029
18:48:00	0.000	0.000	0.000	0.000	0.029	0.029
18:54:00	0.000	0.000	0.000	0.000	0.029	0.029
19:00:00	0.000	0.000	0.000	0.000	0.029	0.029
19:06:00	0.000	0.000	0.000	0.000	0.029	0.029
19:12:00	0.000	0.000	0.000	0.000	0.028	0.028
19:18:00	0.000	0.000	0.000	0.000	0.028	0.028
19:24:00	0.000	0.000	0.000	0.000	0.028	0.028
19:30:00	0.000	0.000	0.000	0.000	0.028	0.028
19:36:00	0.000	0.000	0.000	0.000	0.028	0.028
19:42:00	0.000	0.000	0.000	0.000	0.028	0.028
19:48:00	0.000	0.000	0.000	0.000	0.028	0.028
19:54:00	0.000	0.000	0.000	0.000	0.028	0.028
20:00:00	0.000	0.000	0.000	0.000	0.028	0.028
20:06:00	0.000	0.000	0.000	0.000	0.028	0.028
20:12:00	0.000	0.000	0.000	0.000	0.028	0.028
20:18:00	0.000	0.000	0.000	0.000	0.028	0.028
20:24:00	0.000	0.000	0.000	0.000	0.027	0.027
20:30:00	0.000	0.000	0.000	0.000	0.027	0.027
20:36:00	0.000	0.000	0.000	0.000	0.027	0.027
20:42:00	0.000	0.000	0.000	0.000	0.027	0.027
20:48:00	0.000	0.000	0.000	0.000	0.027	0.027
20:54:00	0.000	0.000	0.000	0.000	0.027	0.027
21:00:00	0.000	0.000	0.000	0.000	0.027	0.027
21:06:00	0.000	0.000	0.000	0.000	0.027	0.027
21:12:00	0.000	0.000	0.000	0.000	0.027	0.027
21:18:00	0.000	0.000	0.000	0.000	0.027	0.027
21:24:00	0.000	0.000	0.000	0.000	0.027	0.027

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Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
21:30:00	0.000	0.000	0.000	0.000	0.027	0.027
21:36:00	0.000	0.000	0.000	0.000	0.027	0.027
21:42:00	0.000	0.000	0.000	0.000	0.026	0.026
21:48:00	0.000	0.000	0.000	0.000	0.026	0.026
21:54:00	0.000	0.000	0.000	0.000	0.026	0.026
22:00:00	0.000	0.000	0.000	0.000	0.026	0.026
22:06:00	0.000	0.000	0.000	0.000	0.026	0.026
22:12:00	0.000	0.000	0.000	0.000	0.026	0.026
22:18:00	0.000	0.000	0.000	0.000	0.026	0.026
22:24:00	0.000	0.000	0.000	0.000	0.026	0.026
22:30:00	0.000	0.000	0.000	0.000	0.026	0.026
22:36:00	0.000	0.000	0.000	0.000	0.026	0.026
22:42:00	0.000	0.000	0.000	0.000	0.026	0.026
22:48:00	0.000	0.000	0.000	0.000	0.026	0.026
22:54:00	0.000	0.000	0.000	0.000	0.026	0.026
23:00:00	0.000	0.000	0.000	0.000	0.026	0.026
23:06:00	0.000	0.000	0.000	0.000	0.025	0.025
23:12:00	0.000	0.000	0.000	0.000	0.025	0.025
23:18:00	0.000	0.000	0.000	0.000	0.025	0.025
23:24:00	0.000	0.000	0.000	0.000	0.025	0.025
23:30:00	0.000	0.000	0.000	0.000	0.025	0.025
23:36:00	0.000	0.000	0.000	0.000	0.025	0.025
23:42:00	0.000	0.000	0.000	0.000	0.025	0.025
23:48:00	0.000	0.000	0.000	0.000	0.025	0.025
23:54:00	0.000	0.000	0.000	0.000	0.025	0.025
24:00:00	0.000	0.000	0.000	0.000	0.025	0.025
24:06:00	0.000	0.000	0.000	0.000	0.025	0.025
24:12:00	0.000	0.000	0.000	0.000	0.025	0.025
24:18:00	0.000	0.000	0.000	0.000	0.025	0.025
24:24:00	0.000	0.000	0.000	0.000	0.025	0.025
24:30:00	0.000	0.000	0.000	0.000	0.024	0.024
24:36:00	0.000	0.000	0.000	0.000	0.024	0.024
24:42:00	0.000	0.000	0.000	0.000	0.024	0.024
24:48:00	0.000	0.000	0.000	0.000	0.024	0.024
24:54:00	0.000	0.000	0.000	0.000	0.024	0.024
25:00:00	0.000	0.000	0.000	0.000	0.024	0.024

Printed from the ReFH Flood Modelling software package, version 2.2.6029.28099

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
25:06:00	0.000	0.000	0.000	0.000	0.024	0.024
25:12:00	0.000	0.000	0.000	0.000	0.024	0.024
25:18:00	0.000	0.000	0.000	0.000	0.024	0.024
25:24:00	0.000	0.000	0.000	0.000	0.024	0.024
25:30:00	0.000	0.000	0.000	0.000	0.024	0.024
25:36:00	0.000	0.000	0.000	0.000	0.024	0.024
25:42:00	0.000	0.000	0.000	0.000	0.024	0.024
25:48:00	0.000	0.000	0.000	0.000	0.024	0.024
25:54:00	0.000	0.000	0.000	0.000	0.024	0.024
26:00:00	0.000	0.000	0.000	0.000	0.023	0.023
26:06:00	0.000	0.000	0.000	0.000	0.023	0.023
26:12:00	0.000	0.000	0.000	0.000	0.023	0.023
26:18:00	0.000	0.000	0.000	0.000	0.023	0.023
26:24:00	0.000	0.000	0.000	0.000	0.023	0.023
26:30:00	0.000	0.000	0.000	0.000	0.023	0.023
26:36:00	0.000	0.000	0.000	0.000	0.023	0.023
26:42:00	0.000	0.000	0.000	0.000	0.023	0.023
26:48:00	0.000	0.000	0.000	0.000	0.023	0.023
26:54:00	0.000	0.000	0.000	0.000	0.023	0.023
27:00:00	0.000	0.000	0.000	0.000	0.023	0.023
27:06:00	0.000	0.000	0.000	0.000	0.023	0.023
27:12:00	0.000	0.000	0.000	0.000	0.023	0.023
27:18:00	0.000	0.000	0.000	0.000	0.023	0.023
27:24:00	0.000	0.000	0.000	0.000	0.023	0.023
27:30:00	0.000	0.000	0.000	0.000	0.022	0.022
27:36:00	0.000	0.000	0.000	0.000	0.022	0.022
27:42:00	0.000	0.000	0.000	0.000	0.022	0.022
27:48:00	0.000	0.000	0.000	0.000	0.022	0.022
27:54:00	0.000	0.000	0.000	0.000	0.022	0.022
28:00:00	0.000	0.000	0.000	0.000	0.022	0.022
28:06:00	0.000	0.000	0.000	0.000	0.022	0.022
28:12:00	0.000	0.000	0.000	0.000	0.022	0.022
28:18:00	0.000	0.000	0.000	0.000	0.022	0.022
28:24:00	0.000	0.000	0.000	0.000	0.022	0.022
28:30:00	0.000	0.000	0.000	0.000	0.022	0.022
28:36:00	0.000	0.000	0.000	0.000	0.022	0.022

Printed from the ReFH Flood Modelling software package, version 2.2.6029.28099

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
28:42:00	0.000	0.000	0.000	0.000	0.022	0.022
28:48:00	0.000	0.000	0.000	0.000	0.022	0.022
28:54:00	0.000	0.000	0.000	0.000	0.022	0.022
29:00:00	0.000	0.000	0.000	0.000	0.022	0.022
29:06:00	0.000	0.000	0.000	0.000	0.021	0.021
29:12:00	0.000	0.000	0.000	0.000	0.021	0.021
29:18:00	0.000	0.000	0.000	0.000	0.021	0.021
29:24:00	0.000	0.000	0.000	0.000	0.021	0.021
29:30:00	0.000	0.000	0.000	0.000	0.021	0.021
29:36:00	0.000	0.000	0.000	0.000	0.021	0.021
29:42:00	0.000	0.000	0.000	0.000	0.021	0.021
29:48:00	0.000	0.000	0.000	0.000	0.021	0.021
29:54:00	0.000	0.000	0.000	0.000	0.021	0.021
30:00:00	0.000	0.000	0.000	0.000	0.021	0.021
30:06:00	0.000	0.000	0.000	0.000	0.021	0.021
30:12:00	0.000	0.000	0.000	0.000	0.021	0.021
30:18:00	0.000	0.000	0.000	0.000	0.021	0.021
30:24:00	0.000	0.000	0.000	0.000	0.021	0.021
30:30:00	0.000	0.000	0.000	0.000	0.021	0.021
30:36:00	0.000	0.000	0.000	0.000	0.021	0.021
30:42:00	0.000	0.000	0.000	0.000	0.021	0.021
30:48:00	0.000	0.000	0.000	0.000	0.020	0.020
30:54:00	0.000	0.000	0.000	0.000	0.020	0.020
31:00:00	0.000	0.000	0.000	0.000	0.020	0.020
31:06:00	0.000	0.000	0.000	0.000	0.020	0.020
31:12:00	0.000	0.000	0.000	0.000	0.020	0.020
31:18:00	0.000	0.000	0.000	0.000	0.020	0.020
31:24:00	0.000	0.000	0.000	0.000	0.020	0.020
31:30:00	0.000	0.000	0.000	0.000	0.020	0.020
31:36:00	0.000	0.000	0.000	0.000	0.020	0.020
31:42:00	0.000	0.000	0.000	0.000	0.020	0.020
31:48:00	0.000	0.000	0.000	0.000	0.020	0.020
31:54:00	0.000	0.000	0.000	0.000	0.020	0.020
32:00:00	0.000	0.000	0.000	0.000	0.020	0.020
32:06:00	0.000	0.000	0.000	0.000	0.020	0.020
32:12:00	0.000	0.000	0.000	0.000	0.020	0.020

Printed from the ReFH Flood Modelling software package, version 2.2.6029.28099

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
32:18:00	0.000	0.000	0.000	0.000	0.020	0.020
32:24:00	0.000	0.000	0.000	0.000	0.020	0.020
32:30:00	0.000	0.000	0.000	0.000	0.019	0.019
32:36:00	0.000	0.000	0.000	0.000	0.019	0.019
32:42:00	0.000	0.000	0.000	0.000	0.019	0.019
32:48:00	0.000	0.000	0.000	0.000	0.019	0.019
32:54:00	0.000	0.000	0.000	0.000	0.019	0.019
33:00:00	0.000	0.000	0.000	0.000	0.019	0.019
33:06:00	0.000	0.000	0.000	0.000	0.019	0.019
33:12:00	0.000	0.000	0.000	0.000	0.019	0.019
33:18:00	0.000	0.000	0.000	0.000	0.019	0.019
33:24:00	0.000	0.000	0.000	0.000	0.019	0.019
33:30:00	0.000	0.000	0.000	0.000	0.019	0.019
33:36:00	0.000	0.000	0.000	0.000	0.019	0.019
33:42:00	0.000	0.000	0.000	0.000	0.019	0.019
33:48:00	0.000	0.000	0.000	0.000	0.019	0.019
33:54:00	0.000	0.000	0.000	0.000	0.019	0.019
34:00:00	0.000	0.000	0.000	0.000	0.019	0.019
34:06:00	0.000	0.000	0.000	0.000	0.019	0.019
34:12:00	0.000	0.000	0.000	0.000	0.019	0.019
34:18:00	0.000	0.000	0.000	0.000	0.019	0.019
34:24:00	0.000	0.000	0.000	0.000	0.018	0.018
34:30:00	0.000	0.000	0.000	0.000	0.018	0.018
34:36:00	0.000	0.000	0.000	0.000	0.018	0.018
34:42:00	0.000	0.000	0.000	0.000	0.018	0.018
34:48:00	0.000	0.000	0.000	0.000	0.018	0.018
34:54:00	0.000	0.000	0.000	0.000	0.018	0.018
35:00:00	0.000	0.000	0.000	0.000	0.018	0.018
35:06:00	0.000	0.000	0.000	0.000	0.018	0.018
35:12:00	0.000	0.000	0.000	0.000	0.018	0.018
35:18:00	0.000	0.000	0.000	0.000	0.018	0.018
35:24:00	0.000	0.000	0.000	0.000	0.018	0.018
35:30:00	0.000	0.000	0.000	0.000	0.018	0.018
35:36:00	0.000	0.000	0.000	0.000	0.018	0.018
35:42:00	0.000	0.000	0.000	0.000	0.018	0.018
35:48:00	0.000	0.000	0.000	0.000	0.018	0.018

Printed from the ReFH Flood Modelling software package, version 2.2.6029.28099

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
35:54:00	0.000	0.000	0.000	0.000	0.018	0.018
36:00:00	0.000	0.000	0.000	0.000	0.018	0.018
36:06:00	0.000	0.000	0.000	0.000	0.018	0.018
36:12:00	0.000	0.000	0.000	0.000	0.018	0.018
36:18:00	0.000	0.000	0.000	0.000	0.018	0.018
36:24:00	0.000	0.000	0.000	0.000	0.017	0.017
36:30:00	0.000	0.000	0.000	0.000	0.017	0.017
36:36:00	0.000	0.000	0.000	0.000	0.017	0.017
36:42:00	0.000	0.000	0.000	0.000	0.017	0.017
36:48:00	0.000	0.000	0.000	0.000	0.017	0.017
36:54:00	0.000	0.000	0.000	0.000	0.017	0.017
37:00:00	0.000	0.000	0.000	0.000	0.017	0.017
37:06:00	0.000	0.000	0.000	0.000	0.017	0.017
37:12:00	0.000	0.000	0.000	0.000	0.017	0.017
37:18:00	0.000	0.000	0.000	0.000	0.017	0.017
37:24:00	0.000	0.000	0.000	0.000	0.017	0.017
37:30:00	0.000	0.000	0.000	0.000	0.017	0.017
37:36:00	0.000	0.000	0.000	0.000	0.017	0.017
37:42:00	0.000	0.000	0.000	0.000	0.017	0.017
37:48:00	0.000	0.000	0.000	0.000	0.017	0.017
37:54:00	0.000	0.000	0.000	0.000	0.017	0.017
38:00:00	0.000	0.000	0.000	0.000	0.017	0.017
38:06:00	0.000	0.000	0.000	0.000	0.017	0.017
38:12:00	0.000	0.000	0.000	0.000	0.017	0.017
38:18:00	0.000	0.000	0.000	0.000	0.017	0.017
38:24:00	0.000	0.000	0.000	0.000	0.016	0.016
38:30:00	0.000	0.000	0.000	0.000	0.016	0.016
38:36:00	0.000	0.000	0.000	0.000	0.016	0.016
38:42:00	0.000	0.000	0.000	0.000	0.016	0.016
38:48:00	0.000	0.000	0.000	0.000	0.016	0.016
38:54:00	0.000	0.000	0.000	0.000	0.016	0.016
39:00:00	0.000	0.000	0.000	0.000	0.016	0.016
39:06:00	0.000	0.000	0.000	0.000	0.016	0.016
39:12:00	0.000	0.000	0.000	0.000	0.016	0.016
39:18:00	0.000	0.000	0.000	0.000	0.016	0.016
39:24:00	0.000	0.000	0.000	0.000	0.016	0.016

Printed from the ReFH Flood Modelling software package, version 2.2.6029.28099

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
39:30:00	0.000	0.000	0.000	0.000	0.016	0.016
39:36:00	0.000	0.000	0.000	0.000	0.016	0.016
39:42:00	0.000	0.000	0.000	0.000	0.016	0.016
39:48:00	0.000	0.000	0.000	0.000	0.016	0.016
39:54:00	0.000	0.000	0.000	0.000	0.016	0.016
40:00:00	0.000	0.000	0.000	0.000	0.016	0.016
40:06:00	0.000	0.000	0.000	0.000	0.016	0.016
40:12:00	0.000	0.000	0.000	0.000	0.016	0.016
40:18:00	0.000	0.000	0.000	0.000	0.016	0.016
40:24:00	0.000	0.000	0.000	0.000	0.016	0.016
40:30:00	0.000	0.000	0.000	0.000	0.016	0.016
40:36:00	0.000	0.000	0.000	0.000	0.015	0.015
40:42:00	0.000	0.000	0.000	0.000	0.015	0.015
40:48:00	0.000	0.000	0.000	0.000	0.015	0.015
40:54:00	0.000	0.000	0.000	0.000	0.015	0.015
41:00:00	0.000	0.000	0.000	0.000	0.015	0.015
41:06:00	0.000	0.000	0.000	0.000	0.015	0.015
41:12:00	0.000	0.000	0.000	0.000	0.015	0.015
41:18:00	0.000	0.000	0.000	0.000	0.015	0.015
41:24:00	0.000	0.000	0.000	0.000	0.015	0.015
41:30:00	0.000	0.000	0.000	0.000	0.015	0.015
41:36:00	0.000	0.000	0.000	0.000	0.015	0.015
41:42:00	0.000	0.000	0.000	0.000	0.015	0.015
41:48:00	0.000	0.000	0.000	0.000	0.015	0.015
41:54:00	0.000	0.000	0.000	0.000	0.015	0.015
42:00:00	0.000	0.000	0.000	0.000	0.015	0.015
42:06:00	0.000	0.000	0.000	0.000	0.015	0.015
42:12:00	0.000	0.000	0.000	0.000	0.015	0.015
42:18:00	0.000	0.000	0.000	0.000	0.015	0.015
42:24:00	0.000	0.000	0.000	0.000	0.015	0.015
42:30:00	0.000	0.000	0.000	0.000	0.015	0.015
42:36:00	0.000	0.000	0.000	0.000	0.015	0.015
42:42:00	0.000	0.000	0.000	0.000	0.015	0.015
42:48:00	0.000	0.000	0.000	0.000	0.015	0.015
42:54:00	0.000	0.000	0.000	0.000	0.015	0.015
43:00:00	0.000	0.000	0.000	0.000	0.014	0.014

Printed from the ReFH Flood Modelling software package, version 2.2.6029.28099

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
43:06:00	0.000	0.000	0.000	0.000	0.014	0.014
43:12:00	0.000	0.000	0.000	0.000	0.014	0.014
43:18:00	0.000	0.000	0.000	0.000	0.014	0.014
43:24:00	0.000	0.000	0.000	0.000	0.014	0.014
43:30:00	0.000	0.000	0.000	0.000	0.014	0.014
43:36:00	0.000	0.000	0.000	0.000	0.014	0.014
43:42:00	0.000	0.000	0.000	0.000	0.014	0.014
43:48:00	0.000	0.000	0.000	0.000	0.014	0.014
43:54:00	0.000	0.000	0.000	0.000	0.014	0.014
44:00:00	0.000	0.000	0.000	0.000	0.014	0.014
44:06:00	0.000	0.000	0.000	0.000	0.014	0.014
44:12:00	0.000	0.000	0.000	0.000	0.014	0.014
44:18:00	0.000	0.000	0.000	0.000	0.014	0.014
44:24:00	0.000	0.000	0.000	0.000	0.014	0.014
44:30:00	0.000	0.000	0.000	0.000	0.014	0.014
44:36:00	0.000	0.000	0.000	0.000	0.014	0.014
44:42:00	0.000	0.000	0.000	0.000	0.014	0.014
44:48:00	0.000	0.000	0.000	0.000	0.014	0.014
44:54:00	0.000	0.000	0.000	0.000	0.014	0.014
45:00:00	0.000	0.000	0.000	0.000	0.014	0.014
45:06:00	0.000	0.000	0.000	0.000	0.014	0.014
45:12:00	0.000	0.000	0.000	0.000	0.014	0.014
45:18:00	0.000	0.000	0.000	0.000	0.014	0.014
45:24:00	0.000	0.000	0.000	0.000	0.014	0.014
45:30:00	0.000	0.000	0.000	0.000	0.013	0.013
45:36:00	0.000	0.000	0.000	0.000	0.013	0.013
45:42:00	0.000	0.000	0.000	0.000	0.013	0.013
45:48:00	0.000	0.000	0.000	0.000	0.013	0.013
45:54:00	0.000	0.000	0.000	0.000	0.013	0.013
46:00:00	0.000	0.000	0.000	0.000	0.013	0.013
46:06:00	0.000	0.000	0.000	0.000	0.013	0.013
46:12:00	0.000	0.000	0.000	0.000	0.013	0.013
46:18:00	0.000	0.000	0.000	0.000	0.013	0.013
46:24:00	0.000	0.000	0.000	0.000	0.013	0.013
46:30:00	0.000	0.000	0.000	0.000	0.013	0.013
46:36:00	0.000	0.000	0.000	0.000	0.013	0.013

Printed from the ReFH Flood Modelling software package, version 2.2.6029.28099

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
46:42:00	0.000	0.000	0.000	0.000	0.013	0.013
46:48:00	0.000	0.000	0.000	0.000	0.013	0.013
46:54:00	0.000	0.000	0.000	0.000	0.013	0.013
47:00:00	0.000	0.000	0.000	0.000	0.013	0.013
47:06:00	0.000	0.000	0.000	0.000	0.013	0.013
47:12:00	0.000	0.000	0.000	0.000	0.013	0.013
47:18:00	0.000	0.000	0.000	0.000	0.013	0.013
47:24:00	0.000	0.000	0.000	0.000	0.013	0.013
47:30:00	0.000	0.000	0.000	0.000	0.013	0.013
47:36:00	0.000	0.000	0.000	0.000	0.013	0.013
47:42:00	0.000	0.000	0.000	0.000	0.013	0.013
47:48:00	0.000	0.000	0.000	0.000	0.013	0.013
47:54:00	0.000	0.000	0.000	0.000	0.013	0.013
48:00:00	0.000	0.000	0.000	0.000	0.013	0.013
48:06:00	0.000	0.000	0.000	0.000	0.013	0.013
48:12:00	0.000	0.000	0.000	0.000	0.012	0.012
48:18:00	0.000	0.000	0.000	0.000	0.012	0.012
48:24:00	0.000	0.000	0.000	0.000	0.012	0.012
48:30:00	0.000	0.000	0.000	0.000	0.012	0.012
48:36:00	0.000	0.000	0.000	0.000	0.012	0.012
48:42:00	0.000	0.000	0.000	0.000	0.012	0.012
48:48:00	0.000	0.000	0.000	0.000	0.012	0.012
48:54:00	0.000	0.000	0.000	0.000	0.012	0.012
49:00:00	0.000	0.000	0.000	0.000	0.012	0.012
49:06:00	0.000	0.000	0.000	0.000	0.012	0.012
49:12:00	0.000	0.000	0.000	0.000	0.012	0.012
49:18:00	0.000	0.000	0.000	0.000	0.012	0.012
49:24:00	0.000	0.000	0.000	0.000	0.012	0.012
49:30:00	0.000	0.000	0.000	0.000	0.012	0.012
49:36:00	0.000	0.000	0.000	0.000	0.012	0.012
49:42:00	0.000	0.000	0.000	0.000	0.012	0.012
49:48:00	0.000	0.000	0.000	0.000	0.012	0.012
49:54:00	0.000	0.000	0.000	0.000	0.012	0.012
50:00:00	0.000	0.000	0.000	0.000	0.012	0.012
50:06:00	0.000	0.000	0.000	0.000	0.012	0.012
50:12:00	0.000	0.000	0.000	0.000	0.012	0.012

Printed from the ReFH Flood Modelling software package, version 2.2.6029.28099

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
50:18:00	0.000	0.000	0.000	0.000	0.012	0.012
50:24:00	0.000	0.000	0.000	0.000	0.012	0.012
50:30:00	0.000	0.000	0.000	0.000	0.012	0.012
50:36:00	0.000	0.000	0.000	0.000	0.012	0.012
50:42:00	0.000	0.000	0.000	0.000	0.012	0.012
50:48:00	0.000	0.000	0.000	0.000	0.012	0.012
50:54:00	0.000	0.000	0.000	0.000	0.012	0.012
51:00:00	0.000	0.000	0.000	0.000	0.012	0.012
51:06:00	0.000	0.000	0.000	0.000	0.012	0.012
51:12:00	0.000	0.000	0.000	0.000	0.011	0.011
51:18:00	0.000	0.000	0.000	0.000	0.011	0.011
51:24:00	0.000	0.000	0.000	0.000	0.011	0.011
51:30:00	0.000	0.000	0.000	0.000	0.011	0.011
51:36:00	0.000	0.000	0.000	0.000	0.011	0.011
51:42:00	0.000	0.000	0.000	0.000	0.011	0.011
51:48:00	0.000	0.000	0.000	0.000	0.011	0.011
51:54:00	0.000	0.000	0.000	0.000	0.011	0.011
52:00:00	0.000	0.000	0.000	0.000	0.011	0.011
52:06:00	0.000	0.000	0.000	0.000	0.011	0.011
52:12:00	0.000	0.000	0.000	0.000	0.011	0.011
52:18:00	0.000	0.000	0.000	0.000	0.011	0.011
52:24:00	0.000	0.000	0.000	0.000	0.011	0.011
52:30:00	0.000	0.000	0.000	0.000	0.011	0.011
52:36:00	0.000	0.000	0.000	0.000	0.011	0.011
52:42:00	0.000	0.000	0.000	0.000	0.011	0.011
52:48:00	0.000	0.000	0.000	0.000	0.011	0.011
52:54:00	0.000	0.000	0.000	0.000	0.011	0.011
53:00:00	0.000	0.000	0.000	0.000	0.011	0.011
53:06:00	0.000	0.000	0.000	0.000	0.011	0.011
53:12:00	0.000	0.000	0.000	0.000	0.011	0.011
53:18:00	0.000	0.000	0.000	0.000	0.011	0.011
53:24:00	0.000	0.000	0.000	0.000	0.011	0.011
53:30:00	0.000	0.000	0.000	0.000	0.011	0.011
53:36:00	0.000	0.000	0.000	0.000	0.011	0.011
53:42:00	0.000	0.000	0.000	0.000	0.011	0.011
53:48:00	0.000	0.000	0.000	0.000	0.011	0.011

Printed from the ReFH Flood Modelling software package, version 2.2.6029.28099

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
53:54:00	0.000	0.000	0.000	0.000	0.011	0.011
54:00:00	0.000	0.000	0.000	0.000	0.011	0.011
54:06:00	0.000	0.000	0.000	0.000	0.011	0.011
54:12:00	0.000	0.000	0.000	0.000	0.011	0.011
54:18:00	0.000	0.000	0.000	0.000	0.011	0.011
54:24:00	0.000	0.000	0.000	0.000	0.010	0.010
54:30:00	0.000	0.000	0.000	0.000	0.010	0.010
54:36:00	0.000	0.000	0.000	0.000	0.010	0.010
54:42:00	0.000	0.000	0.000	0.000	0.010	0.010
54:48:00	0.000	0.000	0.000	0.000	0.010	0.010
54:54:00	0.000	0.000	0.000	0.000	0.010	0.010
55:00:00	0.000	0.000	0.000	0.000	0.010	0.010
55:06:00	0.000	0.000	0.000	0.000	0.010	0.010
55:12:00	0.000	0.000	0.000	0.000	0.010	0.010
55:18:00	0.000	0.000	0.000	0.000	0.010	0.010
55:24:00	0.000	0.000	0.000	0.000	0.010	0.010
55:30:00	0.000	0.000	0.000	0.000	0.010	0.010
55:36:00	0.000	0.000	0.000	0.000	0.010	0.010
55:42:00	0.000	0.000	0.000	0.000	0.010	0.010
55:48:00	0.000	0.000	0.000	0.000	0.010	0.010
55:54:00	0.000	0.000	0.000	0.000	0.010	0.010
56:00:00	0.000	0.000	0.000	0.000	0.010	0.010
56:06:00	0.000	0.000	0.000	0.000	0.010	0.010
56:12:00	0.000	0.000	0.000	0.000	0.010	0.010
56:18:00	0.000	0.000	0.000	0.000	0.010	0.010
56:24:00	0.000	0.000	0.000	0.000	0.010	0.010
56:30:00	0.000	0.000	0.000	0.000	0.010	0.010
56:36:00	0.000	0.000	0.000	0.000	0.010	0.010
56:42:00	0.000	0.000	0.000	0.000	0.010	0.010
56:48:00	0.000	0.000	0.000	0.000	0.010	0.010
56:54:00	0.000	0.000	0.000	0.000	0.010	0.010
57:00:00	0.000	0.000	0.000	0.000	0.010	0.010
57:06:00	0.000	0.000	0.000	0.000	0.010	0.010
57:12:00	0.000	0.000	0.000	0.000	0.010	0.010
57:18:00	0.000	0.000	0.000	0.000	0.010	0.010
57:24:00	0.000	0.000	0.000	0.000	0.010	0.010

Printed from the ReFH Flood Modelling software package, version 2.2.6029.28099

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
57:30:00	0.000	0.000	0.000	0.000	0.010	0.010
57:36:00	0.000	0.000	0.000	0.000	0.010	0.010
57:42:00	0.000	0.000	0.000	0.000	0.010	0.010
57:48:00	0.000	0.000	0.000	0.000	0.010	0.010
57:54:00	0.000	0.000	0.000	0.000	0.009	0.009
58:00:00	0.000	0.000	0.000	0.000	0.009	0.009
58:06:00	0.000	0.000	0.000	0.000	0.009	0.009
58:12:00	0.000	0.000	0.000	0.000	0.009	0.009
58:18:00	0.000	0.000	0.000	0.000	0.009	0.009
58:24:00	0.000	0.000	0.000	0.000	0.009	0.009
58:30:00	0.000	0.000	0.000	0.000	0.009	0.009
58:36:00	0.000	0.000	0.000	0.000	0.009	0.009
58:42:00	0.000	0.000	0.000	0.000	0.009	0.009
58:48:00	0.000	0.000	0.000	0.000	0.009	0.009
58:54:00	0.000	0.000	0.000	0.000	0.009	0.009
59:00:00	0.000	0.000	0.000	0.000	0.009	0.009
59:06:00	0.000	0.000	0.000	0.000	0.009	0.009
59:12:00	0.000	0.000	0.000	0.000	0.009	0.009
59:18:00	0.000	0.000	0.000	0.000	0.009	0.009
59:24:00	0.000	0.000	0.000	0.000	0.009	0.009
59:30:00	0.000	0.000	0.000	0.000	0.009	0.009
59:36:00	0.000	0.000	0.000	0.000	0.009	0.009
59:42:00	0.000	0.000	0.000	0.000	0.009	0.009
59:48:00	0.000	0.000	0.000	0.000	0.009	0.009
59:54:00	0.000	0.000	0.000	0.000	0.009	0.009
60:00:00	0.000	0.000	0.000	0.000	0.009	0.009
60:06:00	0.000	0.000	0.000	0.000	0.009	0.009
60:12:00	0.000	0.000	0.000	0.000	0.009	0.009
60:18:00	0.000	0.000	0.000	0.000	0.009	0.009
60:24:00	0.000	0.000	0.000	0.000	0.009	0.009
60:30:00	0.000	0.000	0.000	0.000	0.009	0.009
60:36:00	0.000	0.000	0.000	0.000	0.009	0.009
60:42:00	0.000	0.000	0.000	0.000	0.009	0.009
60:48:00	0.000	0.000	0.000	0.000	0.009	0.009
60:54:00	0.000	0.000	0.000	0.000	0.009	0.009
61:00:00	0.000	0.000	0.000	0.000	0.009	0.009

Printed from the ReFH Flood Modelling software package, version 2.2.6029.28099

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
61:06:00	0.000	0.000	0.000	0.000	0.009	0.009
61:12:00	0.000	0.000	0.000	0.000	0.009	0.009
61:18:00	0.000	0.000	0.000	0.000	0.009	0.009
61:24:00	0.000	0.000	0.000	0.000	0.009	0.009
61:30:00	0.000	0.000	0.000	0.000	0.009	0.009
61:36:00	0.000	0.000	0.000	0.000	0.009	0.009
61:42:00	0.000	0.000	0.000	0.000	0.009	0.009
61:48:00	0.000	0.000	0.000	0.000	0.008	0.008
61:54:00	0.000	0.000	0.000	0.000	0.008	0.008
62:00:00	0.000	0.000	0.000	0.000	0.008	0.008
62:06:00	0.000	0.000	0.000	0.000	0.008	0.008
62:12:00	0.000	0.000	0.000	0.000	0.008	0.008
62:18:00	0.000	0.000	0.000	0.000	0.008	0.008
62:24:00	0.000	0.000	0.000	0.000	0.008	0.008
62:30:00	0.000	0.000	0.000	0.000	0.008	0.008
62:36:00	0.000	0.000	0.000	0.000	0.008	0.008
62:42:00	0.000	0.000	0.000	0.000	0.008	0.008
62:48:00	0.000	0.000	0.000	0.000	0.008	0.008
62:54:00	0.000	0.000	0.000	0.000	0.008	0.008
63:00:00	0.000	0.000	0.000	0.000	0.008	0.008
63:06:00	0.000	0.000	0.000	0.000	0.008	0.008
63:12:00	0.000	0.000	0.000	0.000	0.008	0.008
63:18:00	0.000	0.000	0.000	0.000	0.008	0.008
63:24:00	0.000	0.000	0.000	0.000	0.008	0.008
63:30:00	0.000	0.000	0.000	0.000	0.008	0.008
63:36:00	0.000	0.000	0.000	0.000	0.008	0.008
63:42:00	0.000	0.000	0.000	0.000	0.008	0.008
63:48:00	0.000	0.000	0.000	0.000	0.008	0.008
63:54:00	0.000	0.000	0.000	0.000	0.008	0.008
64:00:00	0.000	0.000	0.000	0.000	0.008	0.008
64:06:00	0.000	0.000	0.000	0.000	0.008	0.008
64:12:00	0.000	0.000	0.000	0.000	0.008	0.008
64:18:00	0.000	0.000	0.000	0.000	0.008	0.008
64:24:00	0.000	0.000	0.000	0.000	0.008	0.008
64:30:00	0.000	0.000	0.000	0.000	0.008	0.008
64:36:00	0.000	0.000	0.000	0.000	0.008	0.008

Printed from the ReFH Flood Modelling software package, version 2.2.6029.28099

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
64:42:00	0.000	0.000	0.000	0.000	0.008	0.008
64:48:00	0.000	0.000	0.000	0.000	0.008	0.008
64:54:00	0.000	0.000	0.000	0.000	0.008	0.008
65:00:00	0.000	0.000	0.000	0.000	0.008	0.008
65:06:00	0.000	0.000	0.000	0.000	0.008	0.008
65:12:00	0.000	0.000	0.000	0.000	0.008	0.008
65:18:00	0.000	0.000	0.000	0.000	0.008	0.008
65:24:00	0.000	0.000	0.000	0.000	0.008	0.008
65:30:00	0.000	0.000	0.000	0.000	0.008	0.008
65:36:00	0.000	0.000	0.000	0.000	0.008	0.008
65:42:00	0.000	0.000	0.000	0.000	0.008	0.008
65:48:00	0.000	0.000	0.000	0.000	0.008	0.008
65:54:00	0.000	0.000	0.000	0.000	0.008	0.008
66:00:00	0.000	0.000	0.000	0.000	0.008	0.008
66:06:00	0.000	0.000	0.000	0.000	0.008	0.008
66:12:00	0.000	0.000	0.000	0.000	0.007	0.007
66:18:00	0.000	0.000	0.000	0.000	0.007	0.007
66:24:00	0.000	0.000	0.000	0.000	0.007	0.007
66:30:00	0.000	0.000	0.000	0.000	0.007	0.007
66:36:00	0.000	0.000	0.000	0.000	0.007	0.007
66:42:00	0.000	0.000	0.000	0.000	0.007	0.007
66:48:00	0.000	0.000	0.000	0.000	0.007	0.007
66:54:00	0.000	0.000	0.000	0.000	0.007	0.007
67:00:00	0.000	0.000	0.000	0.000	0.007	0.007
67:06:00	0.000	0.000	0.000	0.000	0.007	0.007
67:12:00	0.000	0.000	0.000	0.000	0.007	0.007
67:18:00	0.000	0.000	0.000	0.000	0.007	0.007
67:24:00	0.000	0.000	0.000	0.000	0.007	0.007
67:30:00	0.000	0.000	0.000	0.000	0.007	0.007
67:36:00	0.000	0.000	0.000	0.000	0.007	0.007
67:42:00	0.000	0.000	0.000	0.000	0.007	0.007
67:48:00	0.000	0.000	0.000	0.000	0.007	0.007
67:54:00	0.000	0.000	0.000	0.000	0.007	0.007
68:00:00	0.000	0.000	0.000	0.000	0.007	0.007
68:06:00	0.000	0.000	0.000	0.000	0.007	0.007
68:12:00	0.000	0.000	0.000	0.000	0.007	0.007

Printed from the ReFH Flood Modelling software package, version 2.2.6029.28099

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
68:18:00	0.000	0.000	0.000	0.000	0.007	0.007
68:24:00	0.000	0.000	0.000	0.000	0.007	0.007

Appendix

Catchment descriptors

Name	Value	User-defined value used?
Area (km^2)	0.59	No
ALTBAR	151	No
ASPBAR	100	No
ASPVAR	0.77	No
BFIHOST	0.8	No
DPLBAR (km)	0.81	No
DPSBAR (mkm^{-1})	195.4	No
FARL	1	No
LDP	1.79	No
PROPWET (mm)	0.51	No
RMED1H	10.3	No
RMED1D	33.1	No
RMED2D	41.7	No
SAAR (mm)	833	No
SAAR4170 (mm)	814	No
SPRHOST	20.84	No
Urbext2000	0	No
Urbext1990	0	No
URBCONC	0.82	No
URBLOC	0.35	No
Urban Area (km^2)	0	No
DDF parameter C	-0.03	No
DDF parameter D1	0.36	No
DDF parameter D2	0.42	No
DDF parameter D3	0.3	No
DDF parameter E	0.29	No
DDF parameter F	2.42	No
DDF parameter C (1km grid value)	-0.03	No
DDF parameter D1 (1km grid value)	0.36	No
DDF parameter D2 (1km grid value)	0.42	No
DDF parameter D3 (1km grid value)	0.29	No
DDF parameter E (1km grid value)	0.29	No
DDF parameter F (1km grid value)	2.41	No

UK Design Flood Estimation

Generated on Friday, September 16, 2016 3:07:13 PM by Bethan.LloydJones
Printed from the ReFH Flood Modelling software package, version 2.2.6029.28099

Summary of estimate using the Flood Estimation Handbook revitalised flood hydrograph method (ReFH)

Site details Checksum: 3AE5-7051

Site name: FEH_Catchment_Descriptors_331000_356550 (Updated)

Easting: 331000

Northing: 356550

Country: England, Wales or Northern Ireland

Catchment Area (km^2): 0.59

Using plot scale calculations: No

Site description: None

Model run: 1000 year

Summary of results

Rainfall - FEH 2013 (mm):	94.28	Total runoff (ML):	3.93
Total Rainfall (mm):	60.17	Total flow (ML):	12.71
Peak Rainfall (mm):	8.20	Peak flow (m^3/s):	0.59

Parameters

Where the user has overriden a system-generated value, this original value is shown in square brackets after the value used.
** Indicates that the user locked the duration/timestep*

Rainfall parameters (Rainfall - FEH 2013 model)

Name	Value	User-defined?
Duration (hh:mm:ss)	01:54:00	No
Timestep (hh:mm:ss)	00:06:00	No
SCF (Seasonal correction factor)	0.66	No
ARF (Areal reduction factor)	0.97	No
Seasonality	Winter	n/a

Loss model parameters

Name	Value	User-defined?
Cini (mm)	60.95	No
Cmax (mm)	821.73	No
Use alpha correction factor	No	No
Alpha correction factor	n/a	No

Routing model parameters

Name	Value	User-defined?
Tp (hr)	1	No
Up	0.65	No
Uk	0.8	No

Baseflow model parameters

Name	Value	User-defined?
BF0 (m^3/s)	0	No
BL (hr)	35.26	No
BR	2.49	No

Urbanisation parameters

Name	Value	User-defined?
Urban area (km^2)	0	No
Urbext 2000	0	No
Impervious runoff factor	0.7	No
Imperviousness factor	0.3	No
Tp scaling factor	0.5	No
Sewered area (km^2)	0.00	Yes
Sewer capacity (m^3/s)	0.00	Yes

Time series data

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
00:00:00	0.681	0.000	0.051	0.000	0.005	0.005
00:06:00	0.919	0.000	0.069	0.000	0.005	0.005
00:12:00	1.238	0.000	0.095	0.001	0.005	0.006
00:18:00	1.666	0.000	0.131	0.003	0.005	0.008
00:24:00	2.237	0.000	0.181	0.006	0.005	0.011
00:30:00	2.996	0.000	0.252	0.011	0.005	0.015
00:36:00	3.997	0.000	0.354	0.018	0.005	0.022
00:42:00	5.302	0.000	0.499	0.028	0.005	0.033
00:48:00	6.946	0.000	0.705	0.042	0.005	0.048
00:54:00	8.204	0.000	0.909	0.064	0.006	0.069
01:00:00	6.946	0.000	0.833	0.093	0.006	0.099
01:06:00	5.302	0.000	0.676	0.132	0.007	0.139
01:12:00	3.997	0.000	0.532	0.177	0.008	0.185
01:18:00	2.996	0.000	0.412	0.228	0.009	0.237
01:24:00	2.237	0.000	0.314	0.282	0.011	0.293
01:30:00	1.666	0.000	0.238	0.337	0.013	0.350
01:36:00	1.238	0.000	0.179	0.391	0.016	0.407
01:42:00	0.919	0.000	0.134	0.442	0.019	0.461
01:48:00	0.681	0.000	0.100	0.488	0.022	0.510
01:54:00	0.000	0.000	0.000	0.525	0.025	0.550
02:00:00	0.000	0.000	0.000	0.549	0.029	0.578
02:06:00	0.000	0.000	0.000	0.558	0.033	0.591
02:12:00	0.000	0.000	0.000	0.554	0.037	0.591
02:18:00	0.000	0.000	0.000	0.541	0.041	0.582
02:24:00	0.000	0.000	0.000	0.520	0.044	0.565
02:30:00	0.000	0.000	0.000	0.494	0.048	0.542
02:36:00	0.000	0.000	0.000	0.464	0.051	0.515
02:42:00	0.000	0.000	0.000	0.431	0.054	0.485
02:48:00	0.000	0.000	0.000	0.397	0.057	0.454
02:54:00	0.000	0.000	0.000	0.364	0.059	0.423
03:00:00	0.000	0.000	0.000	0.332	0.061	0.393
03:06:00	0.000	0.000	0.000	0.303	0.064	0.366
03:12:00	0.000	0.000	0.000	0.277	0.065	0.342
03:18:00	0.000	0.000	0.000	0.253	0.067	0.320
03:24:00	0.000	0.000	0.000	0.230	0.069	0.299

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Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
03:30:00	0.000	0.000	0.000	0.209	0.070	0.279
03:36:00	0.000	0.000	0.000	0.189	0.071	0.260
03:42:00	0.000	0.000	0.000	0.169	0.072	0.241
03:48:00	0.000	0.000	0.000	0.150	0.073	0.224
03:54:00	0.000	0.000	0.000	0.132	0.074	0.206
04:00:00	0.000	0.000	0.000	0.115	0.075	0.189
04:06:00	0.000	0.000	0.000	0.097	0.075	0.173
04:12:00	0.000	0.000	0.000	0.081	0.076	0.156
04:18:00	0.000	0.000	0.000	0.065	0.076	0.141
04:24:00	0.000	0.000	0.000	0.051	0.076	0.127
04:30:00	0.000	0.000	0.000	0.038	0.076	0.114
04:36:00	0.000	0.000	0.000	0.027	0.076	0.103
04:42:00	0.000	0.000	0.000	0.019	0.076	0.095
04:48:00	0.000	0.000	0.000	0.013	0.076	0.089
04:54:00	0.000	0.000	0.000	0.008	0.076	0.084
05:00:00	0.000	0.000	0.000	0.005	0.076	0.081
05:06:00	0.000	0.000	0.000	0.003	0.075	0.078
05:12:00	0.000	0.000	0.000	0.001	0.075	0.077
05:18:00	0.000	0.000	0.000	0.001	0.075	0.076
05:24:00	0.000	0.000	0.000	0.000	0.075	0.075
05:30:00	0.000	0.000	0.000	0.000	0.075	0.075
05:36:00	0.000	0.000	0.000	0.000	0.074	0.074
05:42:00	0.000	0.000	0.000	0.000	0.074	0.074
05:48:00	0.000	0.000	0.000	0.000	0.074	0.074
05:54:00	0.000	0.000	0.000	0.000	0.074	0.074
06:00:00	0.000	0.000	0.000	0.000	0.074	0.074
06:06:00	0.000	0.000	0.000	0.000	0.073	0.073
06:12:00	0.000	0.000	0.000	0.000	0.073	0.073
06:18:00	0.000	0.000	0.000	0.000	0.073	0.073
06:24:00	0.000	0.000	0.000	0.000	0.073	0.073
06:30:00	0.000	0.000	0.000	0.000	0.073	0.073
06:36:00	0.000	0.000	0.000	0.000	0.072	0.072
06:42:00	0.000	0.000	0.000	0.000	0.072	0.072
06:48:00	0.000	0.000	0.000	0.000	0.072	0.072
06:54:00	0.000	0.000	0.000	0.000	0.072	0.072
07:00:00	0.000	0.000	0.000	0.000	0.072	0.072

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Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
07:06:00	0.000	0.000	0.000	0.000	0.071	0.071
07:12:00	0.000	0.000	0.000	0.000	0.071	0.071
07:18:00	0.000	0.000	0.000	0.000	0.071	0.071
07:24:00	0.000	0.000	0.000	0.000	0.071	0.071
07:30:00	0.000	0.000	0.000	0.000	0.071	0.071
07:36:00	0.000	0.000	0.000	0.000	0.070	0.070
07:42:00	0.000	0.000	0.000	0.000	0.070	0.070
07:48:00	0.000	0.000	0.000	0.000	0.070	0.070
07:54:00	0.000	0.000	0.000	0.000	0.070	0.070
08:00:00	0.000	0.000	0.000	0.000	0.070	0.070
08:06:00	0.000	0.000	0.000	0.000	0.069	0.069
08:12:00	0.000	0.000	0.000	0.000	0.069	0.069
08:18:00	0.000	0.000	0.000	0.000	0.069	0.069
08:24:00	0.000	0.000	0.000	0.000	0.069	0.069
08:30:00	0.000	0.000	0.000	0.000	0.069	0.069
08:36:00	0.000	0.000	0.000	0.000	0.068	0.068
08:42:00	0.000	0.000	0.000	0.000	0.068	0.068
08:48:00	0.000	0.000	0.000	0.000	0.068	0.068
08:54:00	0.000	0.000	0.000	0.000	0.068	0.068
09:00:00	0.000	0.000	0.000	0.000	0.068	0.068
09:06:00	0.000	0.000	0.000	0.000	0.067	0.067
09:12:00	0.000	0.000	0.000	0.000	0.067	0.067
09:18:00	0.000	0.000	0.000	0.000	0.067	0.067
09:24:00	0.000	0.000	0.000	0.000	0.067	0.067
09:30:00	0.000	0.000	0.000	0.000	0.067	0.067
09:36:00	0.000	0.000	0.000	0.000	0.066	0.066
09:42:00	0.000	0.000	0.000	0.000	0.066	0.066
09:48:00	0.000	0.000	0.000	0.000	0.066	0.066
09:54:00	0.000	0.000	0.000	0.000	0.066	0.066
10:00:00	0.000	0.000	0.000	0.000	0.066	0.066
10:06:00	0.000	0.000	0.000	0.000	0.066	0.066
10:12:00	0.000	0.000	0.000	0.000	0.065	0.065
10:18:00	0.000	0.000	0.000	0.000	0.065	0.065
10:24:00	0.000	0.000	0.000	0.000	0.065	0.065
10:30:00	0.000	0.000	0.000	0.000	0.065	0.065
10:36:00	0.000	0.000	0.000	0.000	0.065	0.065

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Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
10:42:00	0.000	0.000	0.000	0.000	0.064	0.064
10:48:00	0.000	0.000	0.000	0.000	0.064	0.064
10:54:00	0.000	0.000	0.000	0.000	0.064	0.064
11:00:00	0.000	0.000	0.000	0.000	0.064	0.064
11:06:00	0.000	0.000	0.000	0.000	0.064	0.064
11:12:00	0.000	0.000	0.000	0.000	0.064	0.064
11:18:00	0.000	0.000	0.000	0.000	0.063	0.063
11:24:00	0.000	0.000	0.000	0.000	0.063	0.063
11:30:00	0.000	0.000	0.000	0.000	0.063	0.063
11:36:00	0.000	0.000	0.000	0.000	0.063	0.063
11:42:00	0.000	0.000	0.000	0.000	0.063	0.063
11:48:00	0.000	0.000	0.000	0.000	0.062	0.062
11:54:00	0.000	0.000	0.000	0.000	0.062	0.062
12:00:00	0.000	0.000	0.000	0.000	0.062	0.062
12:06:00	0.000	0.000	0.000	0.000	0.062	0.062
12:12:00	0.000	0.000	0.000	0.000	0.062	0.062
12:18:00	0.000	0.000	0.000	0.000	0.062	0.062
12:24:00	0.000	0.000	0.000	0.000	0.061	0.061
12:30:00	0.000	0.000	0.000	0.000	0.061	0.061
12:36:00	0.000	0.000	0.000	0.000	0.061	0.061
12:42:00	0.000	0.000	0.000	0.000	0.061	0.061
12:48:00	0.000	0.000	0.000	0.000	0.061	0.061
12:54:00	0.000	0.000	0.000	0.000	0.061	0.061
13:00:00	0.000	0.000	0.000	0.000	0.060	0.060
13:06:00	0.000	0.000	0.000	0.000	0.060	0.060
13:12:00	0.000	0.000	0.000	0.000	0.060	0.060
13:18:00	0.000	0.000	0.000	0.000	0.060	0.060
13:24:00	0.000	0.000	0.000	0.000	0.060	0.060
13:30:00	0.000	0.000	0.000	0.000	0.060	0.060
13:36:00	0.000	0.000	0.000	0.000	0.059	0.059
13:42:00	0.000	0.000	0.000	0.000	0.059	0.059
13:48:00	0.000	0.000	0.000	0.000	0.059	0.059
13:54:00	0.000	0.000	0.000	0.000	0.059	0.059
14:00:00	0.000	0.000	0.000	0.000	0.059	0.059
14:06:00	0.000	0.000	0.000	0.000	0.059	0.059
14:12:00	0.000	0.000	0.000	0.000	0.058	0.058

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Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
14:18:00	0.000	0.000	0.000	0.000	0.058	0.058
14:24:00	0.000	0.000	0.000	0.000	0.058	0.058
14:30:00	0.000	0.000	0.000	0.000	0.058	0.058
14:36:00	0.000	0.000	0.000	0.000	0.058	0.058
14:42:00	0.000	0.000	0.000	0.000	0.058	0.058
14:48:00	0.000	0.000	0.000	0.000	0.057	0.057
14:54:00	0.000	0.000	0.000	0.000	0.057	0.057
15:00:00	0.000	0.000	0.000	0.000	0.057	0.057
15:06:00	0.000	0.000	0.000	0.000	0.057	0.057
15:12:00	0.000	0.000	0.000	0.000	0.057	0.057
15:18:00	0.000	0.000	0.000	0.000	0.057	0.057
15:24:00	0.000	0.000	0.000	0.000	0.056	0.056
15:30:00	0.000	0.000	0.000	0.000	0.056	0.056
15:36:00	0.000	0.000	0.000	0.000	0.056	0.056
15:42:00	0.000	0.000	0.000	0.000	0.056	0.056
15:48:00	0.000	0.000	0.000	0.000	0.056	0.056
15:54:00	0.000	0.000	0.000	0.000	0.056	0.056
16:00:00	0.000	0.000	0.000	0.000	0.055	0.055
16:06:00	0.000	0.000	0.000	0.000	0.055	0.055
16:12:00	0.000	0.000	0.000	0.000	0.055	0.055
16:18:00	0.000	0.000	0.000	0.000	0.055	0.055
16:24:00	0.000	0.000	0.000	0.000	0.055	0.055
16:30:00	0.000	0.000	0.000	0.000	0.055	0.055
16:36:00	0.000	0.000	0.000	0.000	0.054	0.054
16:42:00	0.000	0.000	0.000	0.000	0.054	0.054
16:48:00	0.000	0.000	0.000	0.000	0.054	0.054
16:54:00	0.000	0.000	0.000	0.000	0.054	0.054
17:00:00	0.000	0.000	0.000	0.000	0.054	0.054
17:06:00	0.000	0.000	0.000	0.000	0.054	0.054
17:12:00	0.000	0.000	0.000	0.000	0.054	0.054
17:18:00	0.000	0.000	0.000	0.000	0.053	0.053
17:24:00	0.000	0.000	0.000	0.000	0.053	0.053
17:30:00	0.000	0.000	0.000	0.000	0.053	0.053
17:36:00	0.000	0.000	0.000	0.000	0.053	0.053
17:42:00	0.000	0.000	0.000	0.000	0.053	0.053
17:48:00	0.000	0.000	0.000	0.000	0.053	0.053

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Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
17:54:00	0.000	0.000	0.000	0.000	0.053	0.053
18:00:00	0.000	0.000	0.000	0.000	0.052	0.052
18:06:00	0.000	0.000	0.000	0.000	0.052	0.052
18:12:00	0.000	0.000	0.000	0.000	0.052	0.052
18:18:00	0.000	0.000	0.000	0.000	0.052	0.052
18:24:00	0.000	0.000	0.000	0.000	0.052	0.052
18:30:00	0.000	0.000	0.000	0.000	0.052	0.052
18:36:00	0.000	0.000	0.000	0.000	0.051	0.051
18:42:00	0.000	0.000	0.000	0.000	0.051	0.051
18:48:00	0.000	0.000	0.000	0.000	0.051	0.051
18:54:00	0.000	0.000	0.000	0.000	0.051	0.051
19:00:00	0.000	0.000	0.000	0.000	0.051	0.051
19:06:00	0.000	0.000	0.000	0.000	0.051	0.051
19:12:00	0.000	0.000	0.000	0.000	0.051	0.051
19:18:00	0.000	0.000	0.000	0.000	0.050	0.050
19:24:00	0.000	0.000	0.000	0.000	0.050	0.050
19:30:00	0.000	0.000	0.000	0.000	0.050	0.050
19:36:00	0.000	0.000	0.000	0.000	0.050	0.050
19:42:00	0.000	0.000	0.000	0.000	0.050	0.050
19:48:00	0.000	0.000	0.000	0.000	0.050	0.050
19:54:00	0.000	0.000	0.000	0.000	0.050	0.050
20:00:00	0.000	0.000	0.000	0.000	0.049	0.049
20:06:00	0.000	0.000	0.000	0.000	0.049	0.049
20:12:00	0.000	0.000	0.000	0.000	0.049	0.049
20:18:00	0.000	0.000	0.000	0.000	0.049	0.049
20:24:00	0.000	0.000	0.000	0.000	0.049	0.049
20:30:00	0.000	0.000	0.000	0.000	0.049	0.049
20:36:00	0.000	0.000	0.000	0.000	0.049	0.049
20:42:00	0.000	0.000	0.000	0.000	0.049	0.049
20:48:00	0.000	0.000	0.000	0.000	0.048	0.048
20:54:00	0.000	0.000	0.000	0.000	0.048	0.048
21:00:00	0.000	0.000	0.000	0.000	0.048	0.048
21:06:00	0.000	0.000	0.000	0.000	0.048	0.048
21:12:00	0.000	0.000	0.000	0.000	0.048	0.048
21:18:00	0.000	0.000	0.000	0.000	0.048	0.048
21:24:00	0.000	0.000	0.000	0.000	0.048	0.048

Printed from the ReFH Flood Modelling software package, version 2.2.6029.28099

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
21:30:00	0.000	0.000	0.000	0.000	0.047	0.047
21:36:00	0.000	0.000	0.000	0.000	0.047	0.047
21:42:00	0.000	0.000	0.000	0.000	0.047	0.047
21:48:00	0.000	0.000	0.000	0.000	0.047	0.047
21:54:00	0.000	0.000	0.000	0.000	0.047	0.047
22:00:00	0.000	0.000	0.000	0.000	0.047	0.047
22:06:00	0.000	0.000	0.000	0.000	0.047	0.047
22:12:00	0.000	0.000	0.000	0.000	0.046	0.046
22:18:00	0.000	0.000	0.000	0.000	0.046	0.046
22:24:00	0.000	0.000	0.000	0.000	0.046	0.046
22:30:00	0.000	0.000	0.000	0.000	0.046	0.046
22:36:00	0.000	0.000	0.000	0.000	0.046	0.046
22:42:00	0.000	0.000	0.000	0.000	0.046	0.046
22:48:00	0.000	0.000	0.000	0.000	0.046	0.046
22:54:00	0.000	0.000	0.000	0.000	0.046	0.046
23:00:00	0.000	0.000	0.000	0.000	0.045	0.045
23:06:00	0.000	0.000	0.000	0.000	0.045	0.045
23:12:00	0.000	0.000	0.000	0.000	0.045	0.045
23:18:00	0.000	0.000	0.000	0.000	0.045	0.045
23:24:00	0.000	0.000	0.000	0.000	0.045	0.045
23:30:00	0.000	0.000	0.000	0.000	0.045	0.045
23:36:00	0.000	0.000	0.000	0.000	0.045	0.045
23:42:00	0.000	0.000	0.000	0.000	0.045	0.045
23:48:00	0.000	0.000	0.000	0.000	0.044	0.044
23:54:00	0.000	0.000	0.000	0.000	0.044	0.044
24:00:00	0.000	0.000	0.000	0.000	0.044	0.044
24:06:00	0.000	0.000	0.000	0.000	0.044	0.044
24:12:00	0.000	0.000	0.000	0.000	0.044	0.044
24:18:00	0.000	0.000	0.000	0.000	0.044	0.044
24:24:00	0.000	0.000	0.000	0.000	0.044	0.044
24:30:00	0.000	0.000	0.000	0.000	0.044	0.044
24:36:00	0.000	0.000	0.000	0.000	0.043	0.043
24:42:00	0.000	0.000	0.000	0.000	0.043	0.043
24:48:00	0.000	0.000	0.000	0.000	0.043	0.043
24:54:00	0.000	0.000	0.000	0.000	0.043	0.043
25:00:00	0.000	0.000	0.000	0.000	0.043	0.043

Printed from the ReFH Flood Modelling software package, version 2.2.6029.28099

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
25:06:00	0.000	0.000	0.000	0.000	0.043	0.043
25:12:00	0.000	0.000	0.000	0.000	0.043	0.043
25:18:00	0.000	0.000	0.000	0.000	0.043	0.043
25:24:00	0.000	0.000	0.000	0.000	0.042	0.042
25:30:00	0.000	0.000	0.000	0.000	0.042	0.042
25:36:00	0.000	0.000	0.000	0.000	0.042	0.042
25:42:00	0.000	0.000	0.000	0.000	0.042	0.042
25:48:00	0.000	0.000	0.000	0.000	0.042	0.042
25:54:00	0.000	0.000	0.000	0.000	0.042	0.042
26:00:00	0.000	0.000	0.000	0.000	0.042	0.042
26:06:00	0.000	0.000	0.000	0.000	0.042	0.042
26:12:00	0.000	0.000	0.000	0.000	0.042	0.042
26:18:00	0.000	0.000	0.000	0.000	0.041	0.041
26:24:00	0.000	0.000	0.000	0.000	0.041	0.041
26:30:00	0.000	0.000	0.000	0.000	0.041	0.041
26:36:00	0.000	0.000	0.000	0.000	0.041	0.041
26:42:00	0.000	0.000	0.000	0.000	0.041	0.041
26:48:00	0.000	0.000	0.000	0.000	0.041	0.041
26:54:00	0.000	0.000	0.000	0.000	0.041	0.041
27:00:00	0.000	0.000	0.000	0.000	0.041	0.041
27:06:00	0.000	0.000	0.000	0.000	0.040	0.040
27:12:00	0.000	0.000	0.000	0.000	0.040	0.040
27:18:00	0.000	0.000	0.000	0.000	0.040	0.040
27:24:00	0.000	0.000	0.000	0.000	0.040	0.040
27:30:00	0.000	0.000	0.000	0.000	0.040	0.040
27:36:00	0.000	0.000	0.000	0.000	0.040	0.040
27:42:00	0.000	0.000	0.000	0.000	0.040	0.040
27:48:00	0.000	0.000	0.000	0.000	0.040	0.040
27:54:00	0.000	0.000	0.000	0.000	0.040	0.040
28:00:00	0.000	0.000	0.000	0.000	0.039	0.039
28:06:00	0.000	0.000	0.000	0.000	0.039	0.039
28:12:00	0.000	0.000	0.000	0.000	0.039	0.039
28:18:00	0.000	0.000	0.000	0.000	0.039	0.039
28:24:00	0.000	0.000	0.000	0.000	0.039	0.039
28:30:00	0.000	0.000	0.000	0.000	0.039	0.039
28:36:00	0.000	0.000	0.000	0.000	0.039	0.039

Printed from the ReFH Flood Modelling software package, version 2.2.6029.28099

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
28:42:00	0.000	0.000	0.000	0.000	0.039	0.039
28:48:00	0.000	0.000	0.000	0.000	0.039	0.039
28:54:00	0.000	0.000	0.000	0.000	0.038	0.038
29:00:00	0.000	0.000	0.000	0.000	0.038	0.038
29:06:00	0.000	0.000	0.000	0.000	0.038	0.038
29:12:00	0.000	0.000	0.000	0.000	0.038	0.038
29:18:00	0.000	0.000	0.000	0.000	0.038	0.038
29:24:00	0.000	0.000	0.000	0.000	0.038	0.038
29:30:00	0.000	0.000	0.000	0.000	0.038	0.038
29:36:00	0.000	0.000	0.000	0.000	0.038	0.038
29:42:00	0.000	0.000	0.000	0.000	0.038	0.038
29:48:00	0.000	0.000	0.000	0.000	0.037	0.037
29:54:00	0.000	0.000	0.000	0.000	0.037	0.037
30:00:00	0.000	0.000	0.000	0.000	0.037	0.037
30:06:00	0.000	0.000	0.000	0.000	0.037	0.037
30:12:00	0.000	0.000	0.000	0.000	0.037	0.037
30:18:00	0.000	0.000	0.000	0.000	0.037	0.037
30:24:00	0.000	0.000	0.000	0.000	0.037	0.037
30:30:00	0.000	0.000	0.000	0.000	0.037	0.037
30:36:00	0.000	0.000	0.000	0.000	0.037	0.037
30:42:00	0.000	0.000	0.000	0.000	0.037	0.037
30:48:00	0.000	0.000	0.000	0.000	0.036	0.036
30:54:00	0.000	0.000	0.000	0.000	0.036	0.036
31:00:00	0.000	0.000	0.000	0.000	0.036	0.036
31:06:00	0.000	0.000	0.000	0.000	0.036	0.036
31:12:00	0.000	0.000	0.000	0.000	0.036	0.036
31:18:00	0.000	0.000	0.000	0.000	0.036	0.036
31:24:00	0.000	0.000	0.000	0.000	0.036	0.036
31:30:00	0.000	0.000	0.000	0.000	0.036	0.036
31:36:00	0.000	0.000	0.000	0.000	0.036	0.036
31:42:00	0.000	0.000	0.000	0.000	0.036	0.036
31:48:00	0.000	0.000	0.000	0.000	0.035	0.035
31:54:00	0.000	0.000	0.000	0.000	0.035	0.035
32:00:00	0.000	0.000	0.000	0.000	0.035	0.035
32:06:00	0.000	0.000	0.000	0.000	0.035	0.035
32:12:00	0.000	0.000	0.000	0.000	0.035	0.035

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Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
32:18:00	0.000	0.000	0.000	0.000	0.035	0.035
32:24:00	0.000	0.000	0.000	0.000	0.035	0.035
32:30:00	0.000	0.000	0.000	0.000	0.035	0.035
32:36:00	0.000	0.000	0.000	0.000	0.035	0.035
32:42:00	0.000	0.000	0.000	0.000	0.035	0.035
32:48:00	0.000	0.000	0.000	0.000	0.034	0.034
32:54:00	0.000	0.000	0.000	0.000	0.034	0.034
33:00:00	0.000	0.000	0.000	0.000	0.034	0.034
33:06:00	0.000	0.000	0.000	0.000	0.034	0.034
33:12:00	0.000	0.000	0.000	0.000	0.034	0.034
33:18:00	0.000	0.000	0.000	0.000	0.034	0.034
33:24:00	0.000	0.000	0.000	0.000	0.034	0.034
33:30:00	0.000	0.000	0.000	0.000	0.034	0.034
33:36:00	0.000	0.000	0.000	0.000	0.034	0.034
33:42:00	0.000	0.000	0.000	0.000	0.034	0.034
33:48:00	0.000	0.000	0.000	0.000	0.033	0.033
33:54:00	0.000	0.000	0.000	0.000	0.033	0.033
34:00:00	0.000	0.000	0.000	0.000	0.033	0.033
34:06:00	0.000	0.000	0.000	0.000	0.033	0.033
34:12:00	0.000	0.000	0.000	0.000	0.033	0.033
34:18:00	0.000	0.000	0.000	0.000	0.033	0.033
34:24:00	0.000	0.000	0.000	0.000	0.033	0.033
34:30:00	0.000	0.000	0.000	0.000	0.033	0.033
34:36:00	0.000	0.000	0.000	0.000	0.033	0.033
34:42:00	0.000	0.000	0.000	0.000	0.033	0.033
34:48:00	0.000	0.000	0.000	0.000	0.033	0.033
34:54:00	0.000	0.000	0.000	0.000	0.032	0.032
35:00:00	0.000	0.000	0.000	0.000	0.032	0.032
35:06:00	0.000	0.000	0.000	0.000	0.032	0.032
35:12:00	0.000	0.000	0.000	0.000	0.032	0.032
35:18:00	0.000	0.000	0.000	0.000	0.032	0.032
35:24:00	0.000	0.000	0.000	0.000	0.032	0.032
35:30:00	0.000	0.000	0.000	0.000	0.032	0.032
35:36:00	0.000	0.000	0.000	0.000	0.032	0.032
35:42:00	0.000	0.000	0.000	0.000	0.032	0.032
35:48:00	0.000	0.000	0.000	0.000	0.032	0.032

Printed from the ReFH Flood Modelling software package, version 2.2.6029.28099

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
35:54:00	0.000	0.000	0.000	0.000	0.032	0.032
36:00:00	0.000	0.000	0.000	0.000	0.031	0.031
36:06:00	0.000	0.000	0.000	0.000	0.031	0.031
36:12:00	0.000	0.000	0.000	0.000	0.031	0.031
36:18:00	0.000	0.000	0.000	0.000	0.031	0.031
36:24:00	0.000	0.000	0.000	0.000	0.031	0.031
36:30:00	0.000	0.000	0.000	0.000	0.031	0.031
36:36:00	0.000	0.000	0.000	0.000	0.031	0.031
36:42:00	0.000	0.000	0.000	0.000	0.031	0.031
36:48:00	0.000	0.000	0.000	0.000	0.031	0.031
36:54:00	0.000	0.000	0.000	0.000	0.031	0.031
37:00:00	0.000	0.000	0.000	0.000	0.031	0.031
37:06:00	0.000	0.000	0.000	0.000	0.030	0.030
37:12:00	0.000	0.000	0.000	0.000	0.030	0.030
37:18:00	0.000	0.000	0.000	0.000	0.030	0.030
37:24:00	0.000	0.000	0.000	0.000	0.030	0.030
37:30:00	0.000	0.000	0.000	0.000	0.030	0.030
37:36:00	0.000	0.000	0.000	0.000	0.030	0.030
37:42:00	0.000	0.000	0.000	0.000	0.030	0.030
37:48:00	0.000	0.000	0.000	0.000	0.030	0.030
37:54:00	0.000	0.000	0.000	0.000	0.030	0.030
38:00:00	0.000	0.000	0.000	0.000	0.030	0.030
38:06:00	0.000	0.000	0.000	0.000	0.030	0.030
38:12:00	0.000	0.000	0.000	0.000	0.030	0.030
38:18:00	0.000	0.000	0.000	0.000	0.029	0.029
38:24:00	0.000	0.000	0.000	0.000	0.029	0.029
38:30:00	0.000	0.000	0.000	0.000	0.029	0.029
38:36:00	0.000	0.000	0.000	0.000	0.029	0.029
38:42:00	0.000	0.000	0.000	0.000	0.029	0.029
38:48:00	0.000	0.000	0.000	0.000	0.029	0.029
38:54:00	0.000	0.000	0.000	0.000	0.029	0.029
39:00:00	0.000	0.000	0.000	0.000	0.029	0.029
39:06:00	0.000	0.000	0.000	0.000	0.029	0.029
39:12:00	0.000	0.000	0.000	0.000	0.029	0.029
39:18:00	0.000	0.000	0.000	0.000	0.029	0.029
39:24:00	0.000	0.000	0.000	0.000	0.029	0.029

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Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
39:30:00	0.000	0.000	0.000	0.000	0.028	0.028
39:36:00	0.000	0.000	0.000	0.000	0.028	0.028
39:42:00	0.000	0.000	0.000	0.000	0.028	0.028
39:48:00	0.000	0.000	0.000	0.000	0.028	0.028
39:54:00	0.000	0.000	0.000	0.000	0.028	0.028
40:00:00	0.000	0.000	0.000	0.000	0.028	0.028
40:06:00	0.000	0.000	0.000	0.000	0.028	0.028
40:12:00	0.000	0.000	0.000	0.000	0.028	0.028
40:18:00	0.000	0.000	0.000	0.000	0.028	0.028
40:24:00	0.000	0.000	0.000	0.000	0.028	0.028
40:30:00	0.000	0.000	0.000	0.000	0.028	0.028
40:36:00	0.000	0.000	0.000	0.000	0.028	0.028
40:42:00	0.000	0.000	0.000	0.000	0.028	0.028
40:48:00	0.000	0.000	0.000	0.000	0.027	0.027
40:54:00	0.000	0.000	0.000	0.000	0.027	0.027
41:00:00	0.000	0.000	0.000	0.000	0.027	0.027
41:06:00	0.000	0.000	0.000	0.000	0.027	0.027
41:12:00	0.000	0.000	0.000	0.000	0.027	0.027
41:18:00	0.000	0.000	0.000	0.000	0.027	0.027
41:24:00	0.000	0.000	0.000	0.000	0.027	0.027
41:30:00	0.000	0.000	0.000	0.000	0.027	0.027
41:36:00	0.000	0.000	0.000	0.000	0.027	0.027
41:42:00	0.000	0.000	0.000	0.000	0.027	0.027
41:48:00	0.000	0.000	0.000	0.000	0.027	0.027
41:54:00	0.000	0.000	0.000	0.000	0.027	0.027
42:00:00	0.000	0.000	0.000	0.000	0.027	0.027
42:06:00	0.000	0.000	0.000	0.000	0.026	0.026
42:12:00	0.000	0.000	0.000	0.000	0.026	0.026
42:18:00	0.000	0.000	0.000	0.000	0.026	0.026
42:24:00	0.000	0.000	0.000	0.000	0.026	0.026
42:30:00	0.000	0.000	0.000	0.000	0.026	0.026
42:36:00	0.000	0.000	0.000	0.000	0.026	0.026
42:42:00	0.000	0.000	0.000	0.000	0.026	0.026
42:48:00	0.000	0.000	0.000	0.000	0.026	0.026
42:54:00	0.000	0.000	0.000	0.000	0.026	0.026
43:00:00	0.000	0.000	0.000	0.000	0.026	0.026

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Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
43:06:00	0.000	0.000	0.000	0.000	0.026	0.026
43:12:00	0.000	0.000	0.000	0.000	0.026	0.026
43:18:00	0.000	0.000	0.000	0.000	0.026	0.026
43:24:00	0.000	0.000	0.000	0.000	0.025	0.025
43:30:00	0.000	0.000	0.000	0.000	0.025	0.025
43:36:00	0.000	0.000	0.000	0.000	0.025	0.025
43:42:00	0.000	0.000	0.000	0.000	0.025	0.025
43:48:00	0.000	0.000	0.000	0.000	0.025	0.025
43:54:00	0.000	0.000	0.000	0.000	0.025	0.025
44:00:00	0.000	0.000	0.000	0.000	0.025	0.025
44:06:00	0.000	0.000	0.000	0.000	0.025	0.025
44:12:00	0.000	0.000	0.000	0.000	0.025	0.025
44:18:00	0.000	0.000	0.000	0.000	0.025	0.025
44:24:00	0.000	0.000	0.000	0.000	0.025	0.025
44:30:00	0.000	0.000	0.000	0.000	0.025	0.025
44:36:00	0.000	0.000	0.000	0.000	0.025	0.025
44:42:00	0.000	0.000	0.000	0.000	0.025	0.025
44:48:00	0.000	0.000	0.000	0.000	0.024	0.024
44:54:00	0.000	0.000	0.000	0.000	0.024	0.024
45:00:00	0.000	0.000	0.000	0.000	0.024	0.024
45:06:00	0.000	0.000	0.000	0.000	0.024	0.024
45:12:00	0.000	0.000	0.000	0.000	0.024	0.024
45:18:00	0.000	0.000	0.000	0.000	0.024	0.024
45:24:00	0.000	0.000	0.000	0.000	0.024	0.024
45:30:00	0.000	0.000	0.000	0.000	0.024	0.024
45:36:00	0.000	0.000	0.000	0.000	0.024	0.024
45:42:00	0.000	0.000	0.000	0.000	0.024	0.024
45:48:00	0.000	0.000	0.000	0.000	0.024	0.024
45:54:00	0.000	0.000	0.000	0.000	0.024	0.024
46:00:00	0.000	0.000	0.000	0.000	0.024	0.024
46:06:00	0.000	0.000	0.000	0.000	0.024	0.024
46:12:00	0.000	0.000	0.000	0.000	0.024	0.024
46:18:00	0.000	0.000	0.000	0.000	0.023	0.023
46:24:00	0.000	0.000	0.000	0.000	0.023	0.023
46:30:00	0.000	0.000	0.000	0.000	0.023	0.023
46:36:00	0.000	0.000	0.000	0.000	0.023	0.023

Printed from the ReFH Flood Modelling software package, version 2.2.6029.28099

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
46:42:00	0.000	0.000	0.000	0.000	0.023	0.023
46:48:00	0.000	0.000	0.000	0.000	0.023	0.023
46:54:00	0.000	0.000	0.000	0.000	0.023	0.023
47:00:00	0.000	0.000	0.000	0.000	0.023	0.023
47:06:00	0.000	0.000	0.000	0.000	0.023	0.023
47:12:00	0.000	0.000	0.000	0.000	0.023	0.023
47:18:00	0.000	0.000	0.000	0.000	0.023	0.023
47:24:00	0.000	0.000	0.000	0.000	0.023	0.023
47:30:00	0.000	0.000	0.000	0.000	0.023	0.023
47:36:00	0.000	0.000	0.000	0.000	0.023	0.023
47:42:00	0.000	0.000	0.000	0.000	0.023	0.023
47:48:00	0.000	0.000	0.000	0.000	0.022	0.022
47:54:00	0.000	0.000	0.000	0.000	0.022	0.022
48:00:00	0.000	0.000	0.000	0.000	0.022	0.022
48:06:00	0.000	0.000	0.000	0.000	0.022	0.022
48:12:00	0.000	0.000	0.000	0.000	0.022	0.022
48:18:00	0.000	0.000	0.000	0.000	0.022	0.022
48:24:00	0.000	0.000	0.000	0.000	0.022	0.022
48:30:00	0.000	0.000	0.000	0.000	0.022	0.022
48:36:00	0.000	0.000	0.000	0.000	0.022	0.022
48:42:00	0.000	0.000	0.000	0.000	0.022	0.022
48:48:00	0.000	0.000	0.000	0.000	0.022	0.022
48:54:00	0.000	0.000	0.000	0.000	0.022	0.022
49:00:00	0.000	0.000	0.000	0.000	0.022	0.022
49:06:00	0.000	0.000	0.000	0.000	0.022	0.022
49:12:00	0.000	0.000	0.000	0.000	0.022	0.022
49:18:00	0.000	0.000	0.000	0.000	0.022	0.022
49:24:00	0.000	0.000	0.000	0.000	0.021	0.021
49:30:00	0.000	0.000	0.000	0.000	0.021	0.021
49:36:00	0.000	0.000	0.000	0.000	0.021	0.021
49:42:00	0.000	0.000	0.000	0.000	0.021	0.021
49:48:00	0.000	0.000	0.000	0.000	0.021	0.021
49:54:00	0.000	0.000	0.000	0.000	0.021	0.021
50:00:00	0.000	0.000	0.000	0.000	0.021	0.021
50:06:00	0.000	0.000	0.000	0.000	0.021	0.021
50:12:00	0.000	0.000	0.000	0.000	0.021	0.021

Printed from the ReFH Flood Modelling software package, version 2.2.6029.28099

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
50:18:00	0.000	0.000	0.000	0.000	0.021	0.021
50:24:00	0.000	0.000	0.000	0.000	0.021	0.021
50:30:00	0.000	0.000	0.000	0.000	0.021	0.021
50:36:00	0.000	0.000	0.000	0.000	0.021	0.021
50:42:00	0.000	0.000	0.000	0.000	0.021	0.021
50:48:00	0.000	0.000	0.000	0.000	0.021	0.021
50:54:00	0.000	0.000	0.000	0.000	0.021	0.021
51:00:00	0.000	0.000	0.000	0.000	0.021	0.021
51:06:00	0.000	0.000	0.000	0.000	0.020	0.020
51:12:00	0.000	0.000	0.000	0.000	0.020	0.020
51:18:00	0.000	0.000	0.000	0.000	0.020	0.020
51:24:00	0.000	0.000	0.000	0.000	0.020	0.020
51:30:00	0.000	0.000	0.000	0.000	0.020	0.020
51:36:00	0.000	0.000	0.000	0.000	0.020	0.020
51:42:00	0.000	0.000	0.000	0.000	0.020	0.020
51:48:00	0.000	0.000	0.000	0.000	0.020	0.020
51:54:00	0.000	0.000	0.000	0.000	0.020	0.020
52:00:00	0.000	0.000	0.000	0.000	0.020	0.020
52:06:00	0.000	0.000	0.000	0.000	0.020	0.020
52:12:00	0.000	0.000	0.000	0.000	0.020	0.020
52:18:00	0.000	0.000	0.000	0.000	0.020	0.020
52:24:00	0.000	0.000	0.000	0.000	0.020	0.020
52:30:00	0.000	0.000	0.000	0.000	0.020	0.020
52:36:00	0.000	0.000	0.000	0.000	0.020	0.020
52:42:00	0.000	0.000	0.000	0.000	0.020	0.020
52:48:00	0.000	0.000	0.000	0.000	0.020	0.020
52:54:00	0.000	0.000	0.000	0.000	0.019	0.019
53:00:00	0.000	0.000	0.000	0.000	0.019	0.019
53:06:00	0.000	0.000	0.000	0.000	0.019	0.019
53:12:00	0.000	0.000	0.000	0.000	0.019	0.019
53:18:00	0.000	0.000	0.000	0.000	0.019	0.019
53:24:00	0.000	0.000	0.000	0.000	0.019	0.019
53:30:00	0.000	0.000	0.000	0.000	0.019	0.019
53:36:00	0.000	0.000	0.000	0.000	0.019	0.019
53:42:00	0.000	0.000	0.000	0.000	0.019	0.019
53:48:00	0.000	0.000	0.000	0.000	0.019	0.019

Printed from the ReFH Flood Modelling software package, version 2.2.6029.28099

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
53:54:00	0.000	0.000	0.000	0.000	0.019	0.019
54:00:00	0.000	0.000	0.000	0.000	0.019	0.019
54:06:00	0.000	0.000	0.000	0.000	0.019	0.019
54:12:00	0.000	0.000	0.000	0.000	0.019	0.019
54:18:00	0.000	0.000	0.000	0.000	0.019	0.019
54:24:00	0.000	0.000	0.000	0.000	0.019	0.019
54:30:00	0.000	0.000	0.000	0.000	0.019	0.019
54:36:00	0.000	0.000	0.000	0.000	0.019	0.019
54:42:00	0.000	0.000	0.000	0.000	0.018	0.018
54:48:00	0.000	0.000	0.000	0.000	0.018	0.018
54:54:00	0.000	0.000	0.000	0.000	0.018	0.018
55:00:00	0.000	0.000	0.000	0.000	0.018	0.018
55:06:00	0.000	0.000	0.000	0.000	0.018	0.018
55:12:00	0.000	0.000	0.000	0.000	0.018	0.018
55:18:00	0.000	0.000	0.000	0.000	0.018	0.018
55:24:00	0.000	0.000	0.000	0.000	0.018	0.018
55:30:00	0.000	0.000	0.000	0.000	0.018	0.018
55:36:00	0.000	0.000	0.000	0.000	0.018	0.018
55:42:00	0.000	0.000	0.000	0.000	0.018	0.018
55:48:00	0.000	0.000	0.000	0.000	0.018	0.018
55:54:00	0.000	0.000	0.000	0.000	0.018	0.018
56:00:00	0.000	0.000	0.000	0.000	0.018	0.018
56:06:00	0.000	0.000	0.000	0.000	0.018	0.018
56:12:00	0.000	0.000	0.000	0.000	0.018	0.018
56:18:00	0.000	0.000	0.000	0.000	0.018	0.018
56:24:00	0.000	0.000	0.000	0.000	0.018	0.018
56:30:00	0.000	0.000	0.000	0.000	0.018	0.018
56:36:00	0.000	0.000	0.000	0.000	0.018	0.018
56:42:00	0.000	0.000	0.000	0.000	0.017	0.017
56:48:00	0.000	0.000	0.000	0.000	0.017	0.017
56:54:00	0.000	0.000	0.000	0.000	0.017	0.017
57:00:00	0.000	0.000	0.000	0.000	0.017	0.017
57:06:00	0.000	0.000	0.000	0.000	0.017	0.017
57:12:00	0.000	0.000	0.000	0.000	0.017	0.017
57:18:00	0.000	0.000	0.000	0.000	0.017	0.017
57:24:00	0.000	0.000	0.000	0.000	0.017	0.017

Printed from the ReFH Flood Modelling software package, version 2.2.6029.28099

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
57:30:00	0.000	0.000	0.000	0.000	0.017	0.017
57:36:00	0.000	0.000	0.000	0.000	0.017	0.017
57:42:00	0.000	0.000	0.000	0.000	0.017	0.017
57:48:00	0.000	0.000	0.000	0.000	0.017	0.017
57:54:00	0.000	0.000	0.000	0.000	0.017	0.017
58:00:00	0.000	0.000	0.000	0.000	0.017	0.017
58:06:00	0.000	0.000	0.000	0.000	0.017	0.017
58:12:00	0.000	0.000	0.000	0.000	0.017	0.017
58:18:00	0.000	0.000	0.000	0.000	0.017	0.017
58:24:00	0.000	0.000	0.000	0.000	0.017	0.017
58:30:00	0.000	0.000	0.000	0.000	0.017	0.017
58:36:00	0.000	0.000	0.000	0.000	0.017	0.017
58:42:00	0.000	0.000	0.000	0.000	0.017	0.017
58:48:00	0.000	0.000	0.000	0.000	0.016	0.016
58:54:00	0.000	0.000	0.000	0.000	0.016	0.016
59:00:00	0.000	0.000	0.000	0.000	0.016	0.016
59:06:00	0.000	0.000	0.000	0.000	0.016	0.016
59:12:00	0.000	0.000	0.000	0.000	0.016	0.016
59:18:00	0.000	0.000	0.000	0.000	0.016	0.016
59:24:00	0.000	0.000	0.000	0.000	0.016	0.016
59:30:00	0.000	0.000	0.000	0.000	0.016	0.016
59:36:00	0.000	0.000	0.000	0.000	0.016	0.016
59:42:00	0.000	0.000	0.000	0.000	0.016	0.016
59:48:00	0.000	0.000	0.000	0.000	0.016	0.016
59:54:00	0.000	0.000	0.000	0.000	0.016	0.016
60:00:00	0.000	0.000	0.000	0.000	0.016	0.016
60:06:00	0.000	0.000	0.000	0.000	0.016	0.016
60:12:00	0.000	0.000	0.000	0.000	0.016	0.016
60:18:00	0.000	0.000	0.000	0.000	0.016	0.016
60:24:00	0.000	0.000	0.000	0.000	0.016	0.016
60:30:00	0.000	0.000	0.000	0.000	0.016	0.016
60:36:00	0.000	0.000	0.000	0.000	0.016	0.016
60:42:00	0.000	0.000	0.000	0.000	0.016	0.016
60:48:00	0.000	0.000	0.000	0.000	0.016	0.016
60:54:00	0.000	0.000	0.000	0.000	0.016	0.016
61:00:00	0.000	0.000	0.000	0.000	0.015	0.015

Printed from the ReFH Flood Modelling software package, version 2.2.6029.28099

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
61:06:00	0.000	0.000	0.000	0.000	0.015	0.015
61:12:00	0.000	0.000	0.000	0.000	0.015	0.015
61:18:00	0.000	0.000	0.000	0.000	0.015	0.015
61:24:00	0.000	0.000	0.000	0.000	0.015	0.015
61:30:00	0.000	0.000	0.000	0.000	0.015	0.015
61:36:00	0.000	0.000	0.000	0.000	0.015	0.015
61:42:00	0.000	0.000	0.000	0.000	0.015	0.015
61:48:00	0.000	0.000	0.000	0.000	0.015	0.015
61:54:00	0.000	0.000	0.000	0.000	0.015	0.015
62:00:00	0.000	0.000	0.000	0.000	0.015	0.015
62:06:00	0.000	0.000	0.000	0.000	0.015	0.015
62:12:00	0.000	0.000	0.000	0.000	0.015	0.015
62:18:00	0.000	0.000	0.000	0.000	0.015	0.015
62:24:00	0.000	0.000	0.000	0.000	0.015	0.015
62:30:00	0.000	0.000	0.000	0.000	0.015	0.015
62:36:00	0.000	0.000	0.000	0.000	0.015	0.015
62:42:00	0.000	0.000	0.000	0.000	0.015	0.015
62:48:00	0.000	0.000	0.000	0.000	0.015	0.015
62:54:00	0.000	0.000	0.000	0.000	0.015	0.015
63:00:00	0.000	0.000	0.000	0.000	0.015	0.015
63:06:00	0.000	0.000	0.000	0.000	0.015	0.015
63:12:00	0.000	0.000	0.000	0.000	0.015	0.015
63:18:00	0.000	0.000	0.000	0.000	0.014	0.014
63:24:00	0.000	0.000	0.000	0.000	0.014	0.014
63:30:00	0.000	0.000	0.000	0.000	0.014	0.014
63:36:00	0.000	0.000	0.000	0.000	0.014	0.014
63:42:00	0.000	0.000	0.000	0.000	0.014	0.014
63:48:00	0.000	0.000	0.000	0.000	0.014	0.014
63:54:00	0.000	0.000	0.000	0.000	0.014	0.014
64:00:00	0.000	0.000	0.000	0.000	0.014	0.014
64:06:00	0.000	0.000	0.000	0.000	0.014	0.014
64:12:00	0.000	0.000	0.000	0.000	0.014	0.014
64:18:00	0.000	0.000	0.000	0.000	0.014	0.014
64:24:00	0.000	0.000	0.000	0.000	0.014	0.014
64:30:00	0.000	0.000	0.000	0.000	0.014	0.014
64:36:00	0.000	0.000	0.000	0.000	0.014	0.014

Printed from the ReFH Flood Modelling software package, version 2.2.6029.28099

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
64:42:00	0.000	0.000	0.000	0.000	0.014	0.014
64:48:00	0.000	0.000	0.000	0.000	0.014	0.014
64:54:00	0.000	0.000	0.000	0.000	0.014	0.014
65:00:00	0.000	0.000	0.000	0.000	0.014	0.014
65:06:00	0.000	0.000	0.000	0.000	0.014	0.014
65:12:00	0.000	0.000	0.000	0.000	0.014	0.014
65:18:00	0.000	0.000	0.000	0.000	0.014	0.014
65:24:00	0.000	0.000	0.000	0.000	0.014	0.014
65:30:00	0.000	0.000	0.000	0.000	0.014	0.014
65:36:00	0.000	0.000	0.000	0.000	0.014	0.014
65:42:00	0.000	0.000	0.000	0.000	0.014	0.014
65:48:00	0.000	0.000	0.000	0.000	0.014	0.014
65:54:00	0.000	0.000	0.000	0.000	0.013	0.013
66:00:00	0.000	0.000	0.000	0.000	0.013	0.013
66:06:00	0.000	0.000	0.000	0.000	0.013	0.013
66:12:00	0.000	0.000	0.000	0.000	0.013	0.013
66:18:00	0.000	0.000	0.000	0.000	0.013	0.013
66:24:00	0.000	0.000	0.000	0.000	0.013	0.013
66:30:00	0.000	0.000	0.000	0.000	0.013	0.013
66:36:00	0.000	0.000	0.000	0.000	0.013	0.013
66:42:00	0.000	0.000	0.000	0.000	0.013	0.013
66:48:00	0.000	0.000	0.000	0.000	0.013	0.013
66:54:00	0.000	0.000	0.000	0.000	0.013	0.013
67:00:00	0.000	0.000	0.000	0.000	0.013	0.013
67:06:00	0.000	0.000	0.000	0.000	0.013	0.013
67:12:00	0.000	0.000	0.000	0.000	0.013	0.013
67:18:00	0.000	0.000	0.000	0.000	0.013	0.013
67:24:00	0.000	0.000	0.000	0.000	0.013	0.013
67:30:00	0.000	0.000	0.000	0.000	0.013	0.013
67:36:00	0.000	0.000	0.000	0.000	0.013	0.013
67:42:00	0.000	0.000	0.000	0.000	0.013	0.013
67:48:00	0.000	0.000	0.000	0.000	0.013	0.013
67:54:00	0.000	0.000	0.000	0.000	0.013	0.013
68:00:00	0.000	0.000	0.000	0.000	0.013	0.013
68:06:00	0.000	0.000	0.000	0.000	0.013	0.013
68:12:00	0.000	0.000	0.000	0.000	0.013	0.013

Printed from the ReFH Flood Modelling software package, version 2.2.6029.28099

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
68:18:00	0.000	0.000	0.000	0.000	0.013	0.013
68:24:00	0.000	0.000	0.000	0.000	0.013	0.013

Printed from the ReFH Flood Modelling software package, version 2.2.6029.28099

Appendix

Catchment descriptors

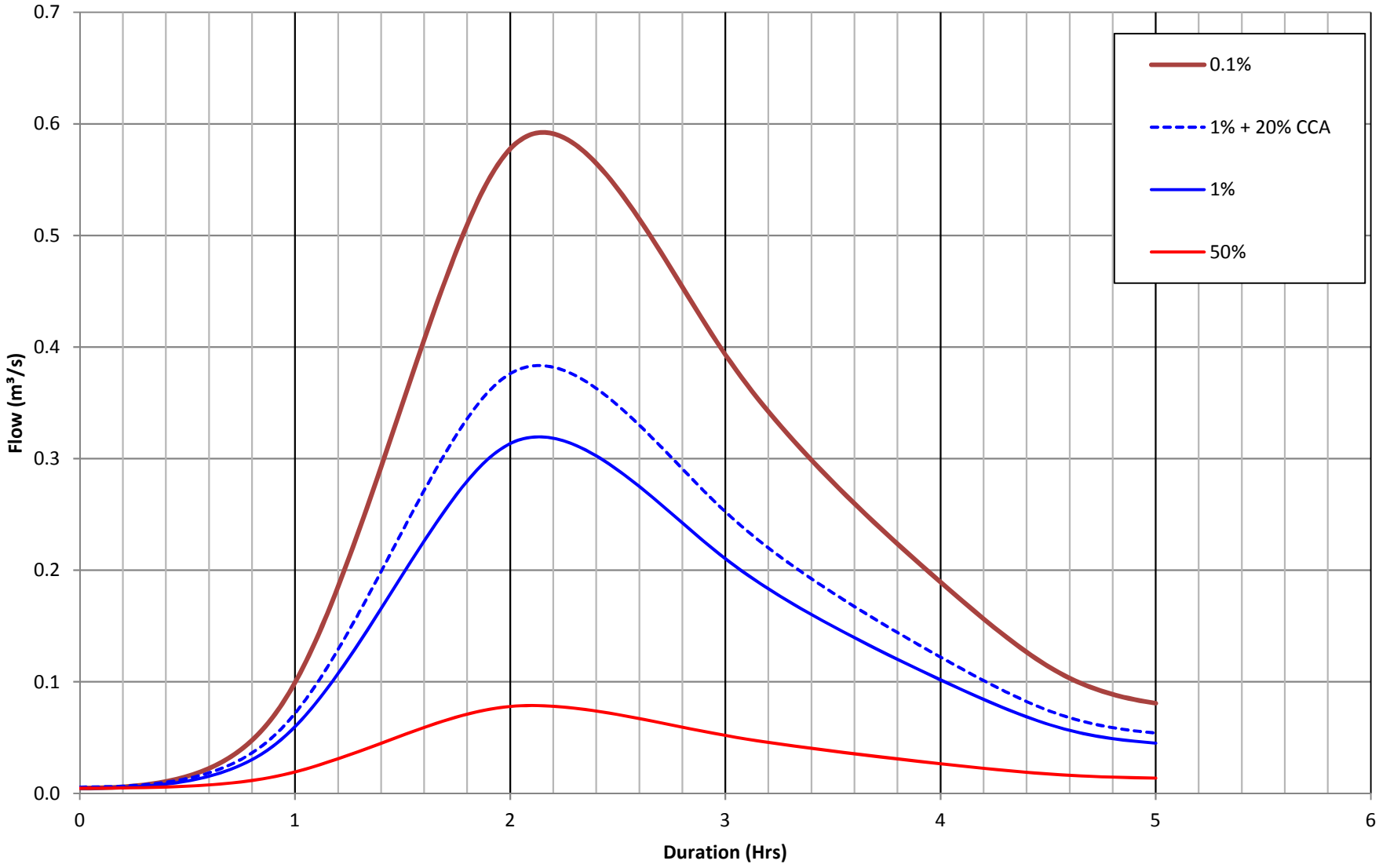
Name	Value	User-defined value used?
Area (km^2)	0.59	No
ALTBAR	151	No
ASPBAR	100	No
ASPVAR	0.77	No
BFIHOST	0.8	No
DPLBAR (km)	0.81	No
DPSBAR (mkm^{-1})	195.4	No
FARL	1	No
LDP	1.79	No
PROPWET (mm)	0.51	No
RMED1H	10.3	No
RMED1D	33.1	No
RMED2D	41.7	No
SAAR (mm)	833	No
SAAR4170 (mm)	814	No
SPRHOST	20.84	No
Urbext2000	0	No
Urbext1990	0	No
URBCONC	0.82	No
URBLOC	0.35	No
Urban Area (km^2)	0	No
DDF parameter C	-0.03	No
DDF parameter D1	0.36	No
DDF parameter D2	0.42	No
DDF parameter D3	0.3	No
DDF parameter E	0.29	No
DDF parameter F	2.42	No
DDF parameter C (1km grid value)	-0.03	No
DDF parameter D1 (1km grid value)	0.36	No
DDF parameter D2 (1km grid value)	0.42	No
DDF parameter D3 (1km grid value)	0.29	No
DDF parameter E (1km grid value)	0.29	No
DDF parameter F (1km grid value)	2.41	No

7.6 Design Hydrographs

Design Hydrographs

Abermorddu Stream

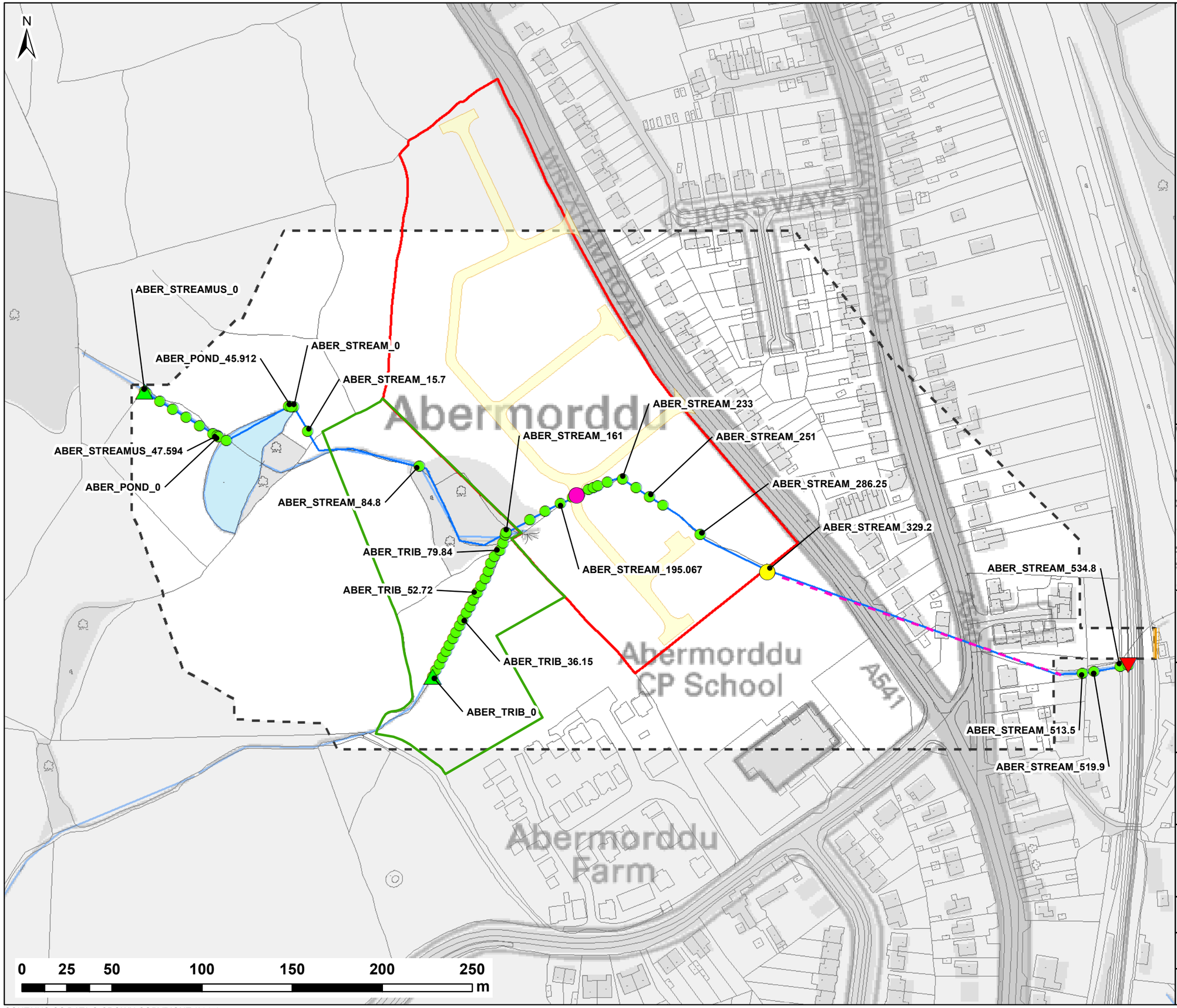
Wrexham Road, Abermorddu



waterco consultants

Printed on: 03/10/2016

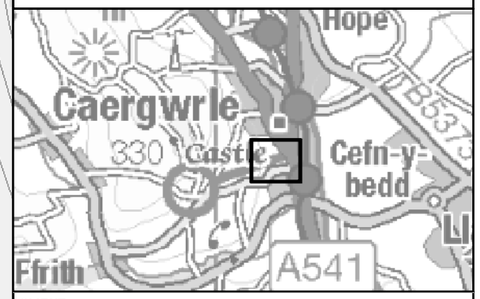
Appendix F – 1D/2D Model Extents



NOTES:
1) ALL DIMENSIONS ARE IN METRES AND ALL LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS STATED OTHERWISE

LEGEND

- Site Boundary
- Land Ownership
- Proposed Access Roads
- 1D Model Extent
- 1D Model Node
- Wrexham Rd Culvert Line (Assumed)
- 1D Upstream Boundary
- 1D Downstream Boundary
- Blockage Location (BL1)
- Blockage Location (BL2)
- 2D Model Extent
- 2D Downstream Boundary



CLIENT:

FISHER GERMAN

waterco consultants

Waterco Ltd
Eden Court, Ruthin, LL15 1NJ

01824 702220
www.waterco.co.uk

SCHEME:

CLARK ESTATE
WREXHAM RD, ABERMORDDU

PLOT TITLE:

MODEL EXTENT

PLOT STATUS:	DATE:
FINAL	07/04/2017

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE @ A3:
RCL	LS	VG	1:2,000 (UNLESS STATED OTHERWISE)

PLOT NAME:	REV:
w3246-Q1000-DEV1C-BL1-100-V	-

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OS MASTERMAP © CROWN COPYRIGHT AND DATABASE RIGHTS [2017] OS 0100042840

Appendix G – Tabulated 1D Model Results Data

Hydraulic Model Results - Abermorddu Stream @ Wrexham Road, Abermorddu

1D Model Results - Maximum Water Levels (mAOD)

Normal Flow Conditions (NFC)

Job Name: Wrexham Road, Abermorddu
Job Number: w3246
Date: 07/04/2017
Model Type: MIKE 2016 SP3

Existing Site Layout Simulations - EXG

Model Ref	Event	DTM
Q20 EXG	5% AEP (1 in 20)	Existing (EXG)
Q100 EXG	1% AEP (1 in 100)	
Q100+20%CC EXG	1% AEP + climate change (+20%)	
Q100+45%CC EXG	1% AEP + climate change (+45%)	
Q1000 EXG	0.1% AEP (1 in 1000)	

Proposed Site Layout Simulations - DEV3

Model Ref	Event	DTM
Q20 DEV3	5% AEP (1 in 20)	Proposed (DEV3)
Q100 DEV3	1% AEP (1 in 100)	
Q100+20%CC DEV3	1% AEP + climate change (+20%)	
Q100+45%CC DEV3	1% AEP + climate change (+45%)	
Q1000 DEV3	0.1% AEP (1 in 1000)	

		EXISTING SITE LAYOUT (EXG)					PROPOSED SITE LAYOUT (DEV3)									
		Q20 EXG	Q100 EXG	Q100+20CC EXG	Q100+45CC EXG	Q1000 EXG	Q20 DEV3		Q100 DEV3		Q100+20CC DEV3		Q100+45CC DEV3		Q1000 DEV3	
1D Node Label	Structure	Max WL (mAOD)	Max WL (mAOD)	Max WL (mAOD)	Max WL (mAOD)	Max WL (mAOD)	Max WL (mAOD)	WL Diff vs Q20 EXG (m)	Max WL (mAOD)	WL Diff vs Q100 EXG (m)	Max WL (mAOD)	WL Diff vs Q100+20CC EXG (m)	Max WL (mAOD)	WL Diff vs Q100+45CC EXG (m)	Max WL (mAOD)	WL Diff vs Q1000 EXG (m)
ABERMORDDU TRIB 0		98.535	98.544	98.547	98.551	98.555	98.535	0.000	98.544	0.000	98.547	0.000	98.551	0.000	98.555	0.000
ABERMORDDU TRIB 4.01667		98.243	98.266	98.275	98.286	98.302	98.243	0.000	98.266	0.000	98.275	0.000	98.286	0.000	98.302	0.000
ABERMORDDU TRIB 8.03333		97.887	97.910	97.920	97.931	97.946	97.887	0.000	97.910	0.000	97.920	0.000	97.931	0.000	97.946	0.000
ABERMORDDU TRIB 12.05		97.528	97.551	97.560	97.570	97.585	97.528	0.000	97.550	-0.001	97.560	0.000	97.570	0.000	97.585	0.000
ABERMORDDU TRIB 16.0667		97.115	97.124	97.127	97.131	97.135	97.115	0.000	97.124	0.000	97.127	0.000	97.131	0.000	97.135	0.000
ABERMORDDU TRIB 20.0833		96.821	96.845	96.856	96.868	96.885	96.821	0.000	96.845	0.000	96.856	0.000	96.868	0.000	96.885	0.000
ABERMORDDU TRIB 24.1		96.465	96.491	96.501	96.513	96.531	96.465	0.000	96.490	-0.001	96.501	0.000	96.513	0.000	96.531	0.000
ABERMORDDU TRIB 28.1167		96.107	96.132	96.142	96.153	96.169	96.107	0.000	96.131	-0.001	96.142	0.000	96.153	0.000	96.169	0.000
ABERMORDDU TRIB 32.1333		95.695	95.704	95.708	95.711	95.716	95.695	0.000	95.704	0.000	95.708	0.000	95.711	0.000	95.716	0.000
ABERMORDDU TRIB 36.15		95.402	95.430	95.441	95.455	95.474	95.402	0.000	95.430	0.000	95.441	0.000	95.455	0.000	95.474	0.000
ABERMORDDU TRIB 40.1667		95.048	95.076	95.088	95.102	95.121	95.048	0.000	95.076	0.000	95.088	0.000	95.102	0.000	95.121	0.000
ABERMORDDU TRIB 44.1833		94.691	94.718	94.730	94.742	94.760	94.691	0.000	94.718	0.000	94.729	-0.001	94.742	0.000	94.760	0.000
ABERMORDDU TRIB 48.2		94.282	94.291	94.295	94.299	94.303	94.282	0.000	94.291	0.000	94.295	0.000	94.299	0.000	94.303	0.000
ABERMORDDU TRIB 52.72		94.064	94.095	94.109	94.124	94.145	94.064	0.000	94.095	0.000	94.109	0.000	94.123	-0.001	94.145	0.000
ABERMORDDU TRIB 57.24		93.772	93.800	93.812	93.825	93.843	93.772	0.000	93.800	0.000	93.812	0.000	93.825	0.000	93.843	0.000
ABERMORDDU TRIB 61.76		93.426	93.435	93.439	93.442	93.447	93.426	0.000	93.435	0.000	93.439	0.000	93.442	0.000	93.447	0.000
ABERMORDDU TRIB 66.28		93.202	93.231	93.243	93.256	93.275	93.202	0.000	93.230	-0.001	93.242	-0.001	93.256	0.000	93.275	0.000
ABERMORDDU TRIB 70.8		92.910	92.936	92.946	92.958	92.974	92.910	0.000	92.936	0.000	92.946	0.000	92.958	0.000	92.974	0.000
ABERMORDDU TRIB 75.32		92.569	92.579	92.582	92.586	92.590	92.569	0.000	92.579	0.000	92.582	0.000	92.585	-0.001	92.590	0.000
ABERMORDDU TRIB 79.84		92.331	92.360	92.370	92.382	92.398	92.331	0.000	92.360	0.000	92.370	0.000	92.381	-0.001	92.398	0.000
ABERMORDDU TRIB 84.36		92.020	92.065	92.073	92.083	92.097	92.020	0.000	92.064	-0.001	92.073	0.000	92.083	0.000	92.097	0.000
ABERMORDDU TRIB 88.88		91.733	91.739	91.742	91.744	91.746	91.733	0.000	91.739	0.000	91.742	0.000	91.744	0.000	91.746	0.000
ABERMORDDU STREAMUS 0		110.671	110.678	110.681	110.685	110.693	110.671	0.000	110.678	0.000	110.681	0.000	110.685	0.000	110.693	0.000
ABERMORDDU STREAMUS 1.3		110.649	110.656	110.659	110.661	110.665	110.649	0.000	110.656	0.000	110.659	0.000	110.661	0.000	110.665	0.000
ABERMORDDU STREAMUS 10.02		109.955	109.963	109.965	109.968	109.971	109.955	0.000	109.963	0.000	109.965	0.000	109.968	0.000	109.971	0.000
ABERMORDDU STREAMUS 18.74		109.261	109.269	109.272	109.274	109.278	109.261	0.000	109.269	0.000	109.272	0.000	109.274	0.000	109.278	0.000
ABERMORDDU STREAMUS 27.46		108.567	108.575	108.578	108.581	108.586	108.567	0.000	108.575	0.000	108.578	0.000	108.581	0.000	108.586	0.000
ABERMORDDU STREAMUS 36.18		107.873	107.882	107.885	107.889	107.894	107.873	0.000	107.882	0.000	107.885	0.000	107.889	0.000	107.894	0.000
ABERMORDDU STREAMUS 44.9		107.159	107.169	107.173	107.177	107.184	107.159	0.000	107.169	0.000	107.173	0.000	107.177	0.000	107.184	0.000
ABERMORDDU STREAMUS 47.594		106.405	106.460	106.485	106.515	106.556	106.405	0.000	106.460	0.000	106.485	0.000	106.514	-0.001	106.556	0.000
ABERMORDDU STREAM 0		105.678	105.688	105.691	105.695	105.701	105.678	0.000	105.688	0.000	105.691	0.000	105.695	0.000	105.701	0.000
ABERMORDDU STREAM 15.7		103.422	103.432	103.435	103.439	103.445	103.422	0.000	103.432	0.000	103.435	0.000	103.439	0.000	103.445	0.000
ABERMORDDU STREAM 84.8		95.713	95.721	95.723	95.725	95.728	95.713	0.000	95.721	0.000	95.723	0.000	95.725	0.000	95.728	0.000
ABERMORDDU STREAM 161		91.733	91.739	91.742	91.744	91.746	91.733	0.000	91.739	0.000	91.742	0.000	91.744	0.000	91.746	0.000
ABERMORDDU STREAM 161		91.733	91.739	91.742	91.744	91.746	91.733	0.000	91.739	0.000	91.742	0.000	91.744	0.000	91.746	0.000
ABERMORDDU STREAM 175.8		90.968	90.975	90.977	90.979	90.982	90.967	-0.001	90.974	-0.001	90.976	-0.001	90.978	-0.001	90.982	0.000
ABERMORDDU STREAM 185.433		90.742	90.781	90.796	90.814	90.839	90.730	-0.012	90.768	-0.013	90.782	-0.014	90.799	-0.015	90.825	-0.014
ABERMORDDU STREAM 195.067		90.446	90.492	90.510	90.529	90.557	90.309	-0.137	90.359	-0.133	90.379	-0.131	90.408	-0.121	90.452	-0.105
ABERMORDDU STREAM 204.7		90.281	90.316	90.330	90.346	90.369	89.980	-0.301	90.024	-0.292	90.066	-0.264	90.123	-0.223	90.203	-0.166
ABERMORDDU STREAM 207.2	Access Bridge US	90.285	90.322	90.338	90.356	90.382	89.935	-0.350	90.024	-0.298	90.065	-0.273	90.123	-0.233	90.215	-0.167
ABERMORDDU STREAM 212.55	Access Bridge DS	90.285	90.324	90.340	90.359	90.387	89.903	-0.382	89.971	-0.353	89.998	-0.342	90.029	-0.330	90.072	-0.315
ABERMORDDU STREAM 215		89.874	89.907	89.922	89.939	89.962	89.903	0.029	89.971	0.064	89.998	0.076	90.029	0.090	90.072	0.110
ABERMORDDU STREAM 224		89.878	89.907	89.922	89.938	89.961	89.881	0.003	89.946	0.039	89.972	0.050	90.001	0.063	90.042	0.081
ABERMORDDU STREAM 233		89.874	89.906	89.921	89.938	89.961	89.784	-0.090	89.836	-0.070	89.858	-0.063	89.880	-0.058	89.910	-0.051
ABERMORDDU STREAM 242		89.862	89.904	89.919	89.936	89.960	89.686	-0.176	89.736	-0.168	89.755	-0.164	89.774	-0.162	89.798	-0.162
ABERMORDDU STREAM 251		89.763	89.804	89.819	89.835	89.857	89.586	-0.177	89.633	-0.171	89.648	-0.171	89.662	-0.173	89.675	-0.182
ABERMORDDU STREAM 260		89.663	89.705	89.720	89.735	89.754	89.482	-0.181	89.518	-0.187	89.527	-0.193	89.533	-0.202	89.536	-0.218
ABERMORDDU STREAM 286.25		89.561	89.604	89.618	89.631	89.647	89.299	-0.262	89.337	-0.267	89.342	-0.276	89.342	-0.289	89.342	-0.305
ABERMORDDU STREAM 329.2	Wrexham Road Culvert US	89.442	89.491	89.502	89.512	89.523	89.042	-0.400	89.082	-0.409	89.088	-0.414	89.088	-0.424	89.091	-0.432
ABERMORDDU STREAM 513.5	Wrexham Road Culvert DS	89.020	89.032	89.038	89.041	89.043	89.022	0.002	89.075	0.043	89.081	0.043	89.081	0.040	89.084	0.041
ABERMORDDU STREAM 519.9		88.802	88.843	88.858	88.872	88.881	88.875	0.073	88.917	0.074	88.921	0.063	88.921	0.049	88.924	0.043
ABERMORDDU STREAM 534.8		83.223	83.227	83.229	83.231	83.231	88.805	5.582	88.840	5.613	88.844	5.615	88.844	5.613	88.846	5.615
ABERMORDDU STREAM 539.323		82.859	82.910	82.928	82.944	82.953	83.223	0.364	83.227	0.317	83.227	0.299	83.227	0.283	83.228	0.275
ABERMORDDU POND 0		82.865	82.916	82.934	82.950	82.959	82.863	-0.002	82.906	-0.010	82.910	-0.024	82.911	-0.039	82.914	-0.045
ABERMORDDU POND 5		82.865	82.916	82.934	82.950	82.959	82.869	0.004	82.912	-0.004	82.916	-0.018	82.917	-0.033	82.920	-0.039
ABERMORDDU POND 14.875		106.405	106.460	106.485	106.515	106.556	82.869	-23.536	82.912	-23.548	82.916	-23.569	82.917	-23.598	82.920	-23.636
ABERMORDDU POND 24.75		106.405	106.461	106.486	106.515	106.557	106.405	0.000	106.460	-0.001	106.485	-0.001	106.514	-0.001	106.556	-0.001
ABERMORDDU POND 34.625		106.405	106.461	106.485	106.515	106.557	106.405	0.000	106.461	0.000	106.485	0.000	106.515	0.000	106.557	0.000
ABERMORDDU POND 44.5		106.405	106.461	106.485	106.515	106.557	106.405	0.000	106.461	0.000	106.485	0.000	106.515	0.000	106.557	0.000
ABERMORDDU POND 45.912		106.405	106.461	106.485	106.515	106.557	106.405	0.000	106.461	0.000	106.485	0.000	106.515	0.000	106.557	0.000

Through the Site

Hydraulic Model Results - Abermorddu Stream @ Wrexham Road, Abermorddu

1D Model Results - Maximum Water Levels (mAOD)

Blockage Scenarios & Sensitivity Tests

Job Name: Wrexham Road, Abermorddu
Job Number: w3246
Date: 30/03/2017
Model Type: MIKE 2016 SP3

Blockage Scenarios

Model Ref	Event	DTM	Blockage Detail	% Blockage
Q1000 EXG BL1	Q1000	EXG	Wrexham Road Culvert Blockage	100%
Q1000 EXG BL2			Footbridge Blockage	100%
Q1000 DEV3 BL1		DEV	Wrexham Road Culvert Blockage	100%
Q1000 DEV3 BL2			Footbridge Blockage	100%

Sensitivity Tests

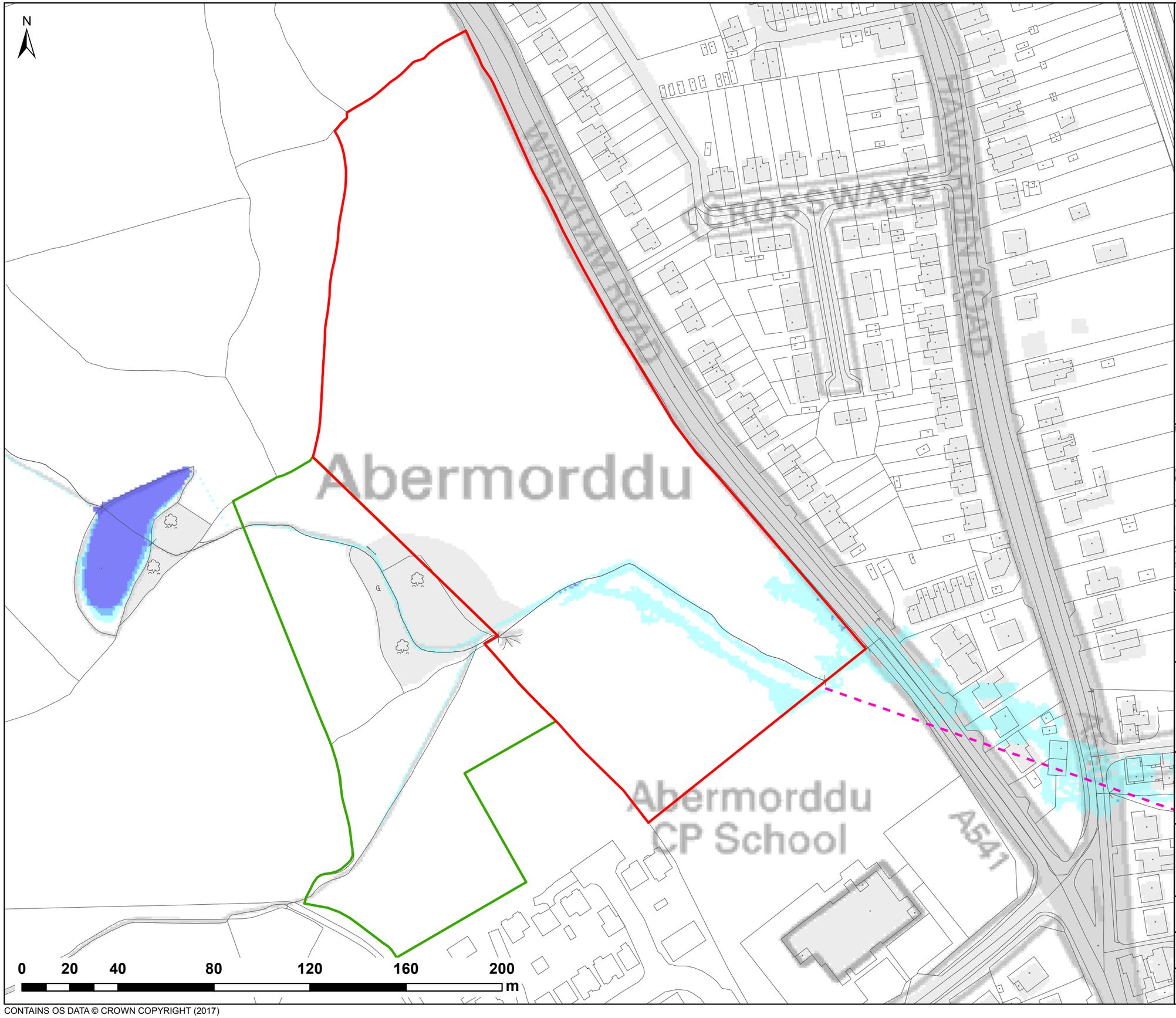
Model Ref	Details	Event	DTM
Q1000 ST1	+20% Manning's n	Q1000	EXG
Q1000 ST2	-20% Manning's n		

			EXISTING SITE LAYOUT (EXG)				PROPOSED SITE LAYOUT (DEV3)				SENSITIVITY TESTS (ST)			
		Q1000 EXG	Q1000-EXG-BL1		Q1000-EXG-BL2		Q1000-DEV3-BL1		Q1000-DEV3-BL2		ST1		ST2	
1D Node Label	Structure	Max WL (mAOD)	Max WL (mAOD)	WL Diff vs Q1000 EXG (m)	Max WL (mAOD)	WL Diff vs Q1000 EXG (m)	Max WL (mAOD)	WL Diff vs Q1000 EXG BL1 (m)	Max WL (mAOD)	WL Diff vs Q1000 EXG BL2 (m)	Max WL (mAOD)	WL Diff vs Q1000 EXG (m)	Max WL (mAOD)	WL Diff vs Q1000 EXG (m)
ABERMORDDU TRIB 0		98.555	98.555	0.000	98.555	0.000	98.555	0.000	98.555	0.000	98.556	0.001	98.554	-0.001
ABERMORDDU TRIB 4.01667		98.302	98.302	0.000	98.302	0.000	98.302	0.000	98.302	0.000	98.314	0.012	98.288	-0.014
ABERMORDDU TRIB 8.03333		97.946	97.946	0.000	97.946	0.000	97.946	0.000	97.946	0.000	97.959	0.013	97.932	-0.014
ABERMORDDU TRIB 12.05		97.585	97.585	0.000	97.585	0.000	97.585	0.000	97.585	0.000	97.597	0.012	97.571	-0.014
ABERMORDDU TRIB 16.0667		97.135	97.135	0.000	97.135	0.000	97.135	0.000	97.135	0.000	97.136	0.001	97.134	-0.001
ABERMORDDU TRIB 20.0833		96.885	96.885	0.000	96.885	0.000	96.885	0.000	96.885	0.000	96.899	0.014	96.869	-0.016
ABERMORDDU TRIB 24.1		96.531	96.531	0.000	96.531	0.000	96.531	0.000	96.531	0.000	96.545	0.014	96.515	-0.016
ABERMORDDU TRIB 28.1167		96.169	96.169	0.000	96.169	0.000	96.169	0.000	96.169	0.000	96.182	0.013	96.154	-0.015
ABERMORDDU TRIB 32.1333		95.716	95.716	0.000	95.716	0.000	95.716	0.000	95.716	0.000	95.717	0.001	95.715	-0.001
ABERMORDDU TRIB 36.15		95.474	95.474	0.000	95.474	0.000	95.474	0.000	95.474	0.000	95.490	0.016	95.456	-0.018
ABERMORDDU TRIB 40.1667		95.121	95.121	0.000	95.121	0.000	95.121	0.000	95.121	0.000	95.137	0.016	95.104	-0.017
ABERMORDDU TRIB 44.1833		94.760	94.760	0.000	94.760	0.000	94.760	0.000	94.760	0.000	94.775	0.015	94.744	-0.016
ABERMORDDU TRIB 48.2		94.303	94.303	0.000	94.303	0.000	94.303	0.000	94.303	0.000	94.305	0.002	94.302	-0.001
ABERMORDDU TRIB 52.72		94.145	94.145	0.000	94.145	0.000	94.145	0.000	94.145	0.000	94.162	0.017	94.125	-0.020
ABERMORDDU TRIB 57.24		93.843	93.843	0.000	93.843	0.000	93.843	0.000	93.843	0.000	93.858	0.015	93.827	-0.016
ABERMORDDU TRIB 61.76		93.447	93.447	0.000	93.447	0.000	93.447	0.000	93.447	0.000	93.448	0.001	93.445	-0.002
ABERMORDDU TRIB 66.28		93.275	93.275	0.000	93.275	0.000	93.275	0.000	93.275	0.000	93.290	0.015	93.258	-0.017
ABERMORDDU TRIB 70.8		92.974	92.974	0.000	92.974	0.000	92.974	0.000	92.974	0.000	92.987	0.013	92.959	-0.015
ABERMORDDU TRIB 75.32		92.590	92.590	0.000	92.590	0.000	92.590	0.000	92.590	0.000	92.591	0.001	92.589	-0.001
ABERMORDDU TRIB 79.84		92.398	92.398	0.000	92.398	0.000	92.398	0.000	92.398	0.000	92.411	0.013	92.383	-0.015
ABERMORDDU TRIB 84.36		92.097	92.097	0.000	92.097	0.000	92.097	0.000	92.097	0.000	92.107	0.010	92.084	-0.013
ABERMORDDU TRIB 88.88		91.746	91.746	0.000	91.746	0.000	91.746	0.000	91.746	0.000	91.747	0.001	91.746	0.000
ABERMORDDU STREAMUS 0		110.693	110.693	0.000	110.693	0.000	110.693	0.000	110.693	0.000	110.698	0.005	110.688	-0.005
ABERMORDDU STREAMUS 1.3		110.665	110.665	0.000	110.665	0.000	110.665	0.000	110.665	0.000	110.665	0.000	110.664	-0.001
ABERMORDDU STREAMUS 10.02		109.971	109.971	0.000	109.971	0.000	109.971	0.000	109.971	0.000	109.971	0.000	109.971	0.000
ABERMORDDU STREAMUS 18.74		109.278	109.278	0.000	109.278	0.000	109.278	0.000	109.278	0.000	109.279	0.001	109.277	-0.001
ABERMORDDU STREAMUS 27.46		108.586	108.586	0.000	108.586	0.000	108.586	0.000	108.586	0.000	108.587	0.001	108.584	-0.002
ABERMORDDU STREAMUS 36.18		107.894	107.894	0.000	107.894	0.000	107.894	0.000	107.894	0.000	107.897	0.003	107.892	-0.002
ABERMORDDU STREAMUS 44.9		107.184	107.184	0.000	107.184	0.000	107.184	0.000	107.184	0.000	107.186	0.002	107.182	-0.002
ABERMORDDU STREAMUS 47.594		106.556	106.556	0.000	106.556	0.000	106.556	0.000	106.556	0.000	106.556	0.000	106.556	0.000
ABERMORDDU STREAM 0		105.701	105.701	0.000	105.701	0.000	105.701	0.000	105.701	0.000	105.704	0.003	105.699	-0.002
ABERMORDDU STREAM 15.7		103.445	103.445	0.000	103.445	0.000	103.445	0.000	103.445	0.000	103.447	0.002	103.442	-0.003
ABERMORDDU STREAM 84.8		95.728	95.728	0.000	95.728	0.000	95.728	0.000	95.728	0.000	95.728	0.000	95.728	0.000
ABERMORDDU STREAM 161		91.746	91.746	0.000	91.746	0.000	91.746	0.000	91.746	0.000	91.747	0.001	91.746	0.000
ABERMORDDU STREAM 161		91.746	91.746	0.000	91.746	0.000	91.746	0.000	91.746	0.000	91.747	0.001	91.746	0.000
ABERMORDDU STREAM 175.8		90.982	90.982	0.000	90.982	0.000	90.982	0.000	90.984	0.002	90.985	0.003	90.980	-0.002
ABERMORDDU STREAM 185.433		90.839	90.839	0.000	90.840	0.001	90.825	-0.014	90.876	0.036	90.859	0.020	90.817	-0.022
ABERMORDDU STREAM 195.067		90.557	90.557	0.000	90.562	0.005	90.452	-0.105	90.795	0.233	90.575	0.018	90.538	-0.019
ABERMORDDU STREAM 204.7		90.369	90.369	0.000	90.391	0.022	90.203	-0.166	90.796	0.405	90.373	0.004	90.365	-0.004
ABERMORDDU STREAM 207.2	Access Bridge US	90.382	90.382	0.000	90.403	0.021	90.215	-0.167	90.799	0.396	90.386	0.004	90.378	-0.004
ABERMORDDU STREAM 212.55	Access Bridge DS	90.387	90.387	0.000	90.409	0.022	90.072	-0.315	90.002	-0.407	90.391	0.004	90.383	-0.004
ABERMORDDU STREAM 215		89.962	89.962	0.000	89.939	-0.023	90.072	0.110	90.002	0.063	89.987	0.025	89.935	-0.027
ABERMORDDU STREAM 224		89.961	89.961	0.000	89.938	-0.023	90.045	0.084	89.976	0.038	89.987	0.026	89.934	-0.027
ABERMORDDU STREAM 233		89.961	89.961	0.000	89.938	-0.023	90.045	0.084	89.861	-0.077	89.986	0.025	89.934	-0.027
ABERMORDDU STREAM 242		89.960	89.960	0.000	89.937	-0.023	90.045	0.085	89.758	-0.179	89.985	0.025	89.933	-0.027
ABERMORDDU STREAM 251		89.857	89.857	0.000	89.835	-0.022	90.045	0.188	89.650	-0.185	89.879	0.022	89.831	-0.026
ABERMORDDU STREAM 260		89.754	89.754	0.000	89.736	-0.018	90.045	0.291	89.531	-0.205	89.773	0.019	89.732	-0.022
ABERMORDDU STREAM 286.25		89.647	89.647	0.000	89.634	-0.013	90.045	0.398	89.345	-0.289	89.661	0.014	89.629	-0.018
ABERMORDDU STREAM 329.2	Wrexham Road Culvert US	89.523	89.523	0.000	89.516	-0.007	90.044	0.521	89.106	-0.410	89.528	0.005	89.511	-0.012
ABERMORDDU STREAM 513.5	Wrexham Road Culvert DS	89.043	89.045	0.002	89.044	0.001	90.044	0.999	89.102	0.058	89.040	-0.003	89.044	0.001
ABERMORDDU STREAM 519.9		88.881	88.902	0.021	88.888	0.007	89.857	0.955	88.944	0.056	88.869	-0.012	88.892	0.011
ABERMORDDU STREAM 534.8		83.231	83.179	-0.052	83.232	0.001	89.260	6.081	88.879	5.647	83.227	-0.004	83.233	0.002
ABERMORDDU STREAM 539.323		82.953	82.705	-0.248	82.962	0.009	83.180	0.475	83.231	0.269	82.911	-0.042	82.966	0.013
ABERMORDDU POND 0		82.959	82.275	-0.684	82.967	0.008	82.706	0.431	82.952	-0.015	82.917	-0.042	82.972	0.013
ABERMORDDU POND 5		82.959	82.229	-0.730	82.967	0.008	82.291	0.062	82.958	-0.009	82.917	-0.042	82.972	0.013
ABERMORDDU POND 14.875		106.556	106.556	0.000	106.556	0.000	82.290	-24.266	82.958	-23.598	106.556	0.000	106.556	0.000
ABERMORDDU POND 24.75		106.557	106.557	0.000	106.557	0.000	106.556	-0.001	106.556	-0.001	106.557	0.000	106.557	0.000
ABERMORDDU POND 34.625		106.557	106.557	0.000	106.557	0.000	106.557	0.000	106.557	0.000	106.557	0.000	106.557	0.000
ABERMORDDU POND 44.5		106.557	106.557	0.000	106.557	0.000	106.557	0.000	106.557	0.000	106.557	0.000	106.557	0.000
ABERMORDDU POND 45.912		106.557	106.557	0.000	106.557	0.000	106.557	0.000	106.557	0.000	106.557	0.000	106.557	0.000

Through the Site

Appendix H – Flood Mapping

EXG



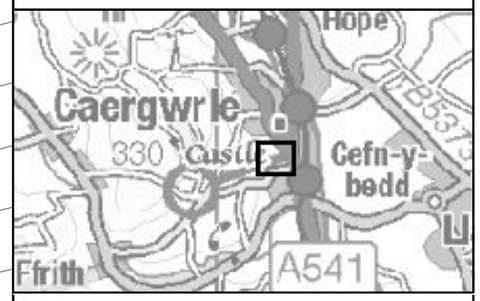
NOTES:
1) ALL DIMENSIONS ARE IN METRES AND ALL LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS STATED OTHERWISE

LEGEND

- Site Boundary
- Land Ownership
- Wrexham Rd Culvert Line (Assumed)

Maximum Flood Depth (m)

- 0 - 0.3
- 0.3 - 0.6
- 0.6 - 1.2
- 1.2 - 2.4
- > 2.4



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Eden Court, Ruthin, LL15 1NJ

01824 702220
www.waterco.co.uk

SCHEME:

CLARK ESTATE
WREXHAM RD, ABERMORDDU

PLOT TITLE:

MAXIMUM FLOOD DEPTH
5% AEP FLUVIAL EVENT
EXISTING SITE LAYOUT (EXG)
NORMAL FLOW CONDITIONS

PLOT STATUS:	DATE:
FINAL	07/04/2017

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE @ A3:
RCL	LS	VG	1:1,500 (UNLESS STATED OTHERWISE)

PLOT NAME:	REV:
w3246-Q20-EXG-NFC-D	-

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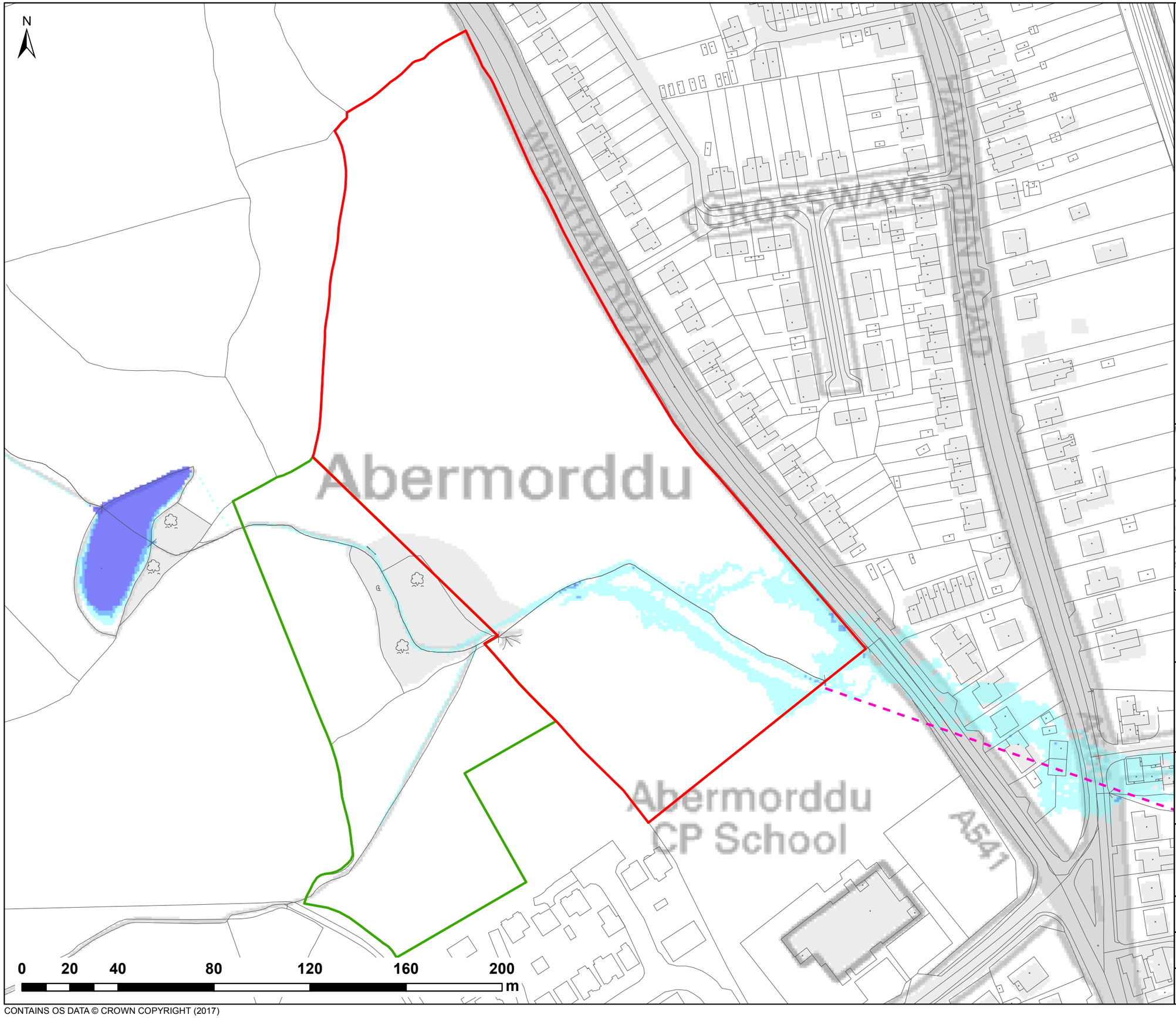

NOTES:
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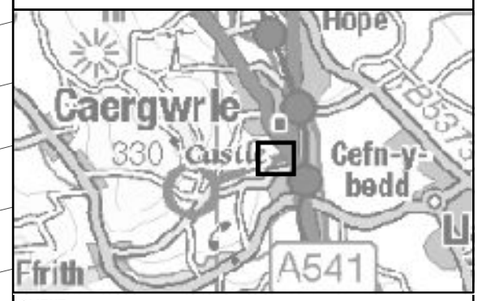
LEGEND

- Site Boundary
- Land Ownership
- Wrexham Rd Culvert Line (Assumed)

Maximum Flood Depth (m)

- 0 - 0.3
- 0.3 - 0.6
- 0.6 - 1.2
- 1.2 - 2.4
- > 2.4



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www.waterco.co.uk

SCHEME:

CLARK ESTATE
WREXHAM RD, ABERMORDDU

PLOT TITLE:

MAXIMUM FLOOD DEPTH
1% AEP FLUVIAL EVENT
EXISTING SITE LAYOUT (EXG)
NORMAL FLOW CONDITIONS

PLOT STATUS:	DATE:
FINAL	07/04/2017

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE @ A3:
RCL	LS	VG	1:1,500 (UNLESS STATED OTHERWISE)

PLOT NAME:	REV:
w3246-Q100-EXG-NFC-D	-

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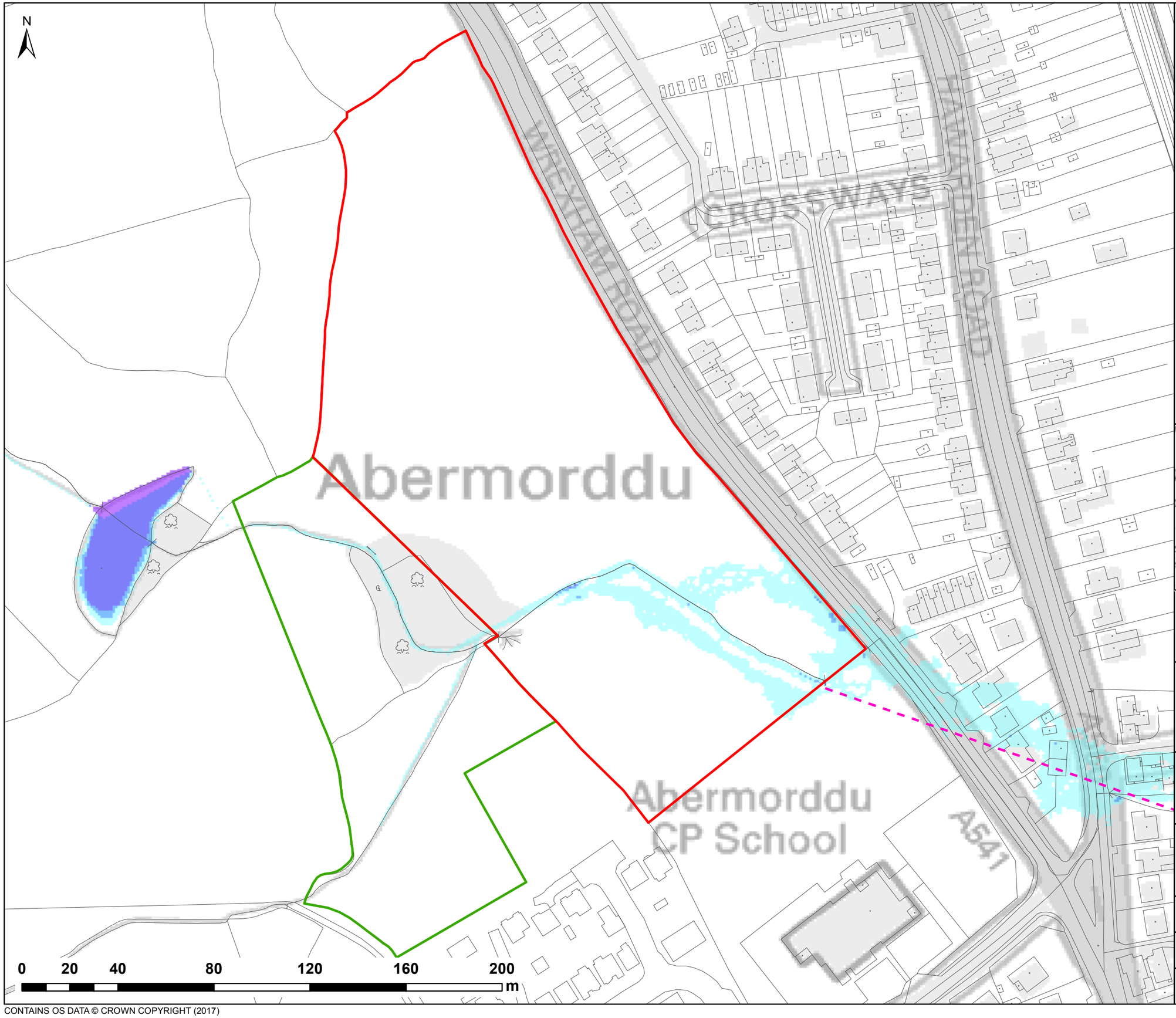


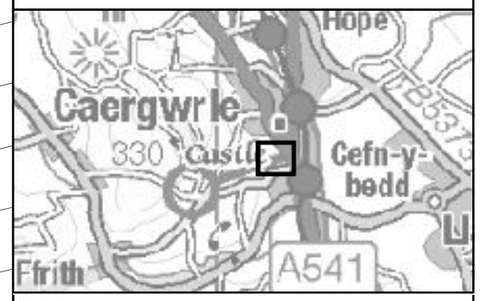
NOTES:
1) ALL DIMENSIONS ARE IN METRES AND ALL LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS STATED OTHERWISE

LEGEND

- Site Boundary
- Land Ownership
- Wrexham Rd Culvert Line (Assumed)

Maximum Flood Depth (m)

- 0 - 0.3
- 0.3 - 0.6
- 0.6 - 1.2
- 1.2 - 2.4
- > 2.4



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SCHEME:

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WREXHAM RD, ABERMORDDU

PLOT TITLE:

MAXIMUM FLOOD DEPTH
1% AEP + 20% CC FLUVIAL EVENT
EXISTING SITE LAYOUT (EXG)
NORMAL FLOW CONDITIONS

PLOT STATUS:	DATE:
FINAL	07/04/2017

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE @ A3:
RCL	LS	VG	1:1,500 (UNLESS STATED OTHERWISE)

PLOT NAME:	REV:
w3246-Q100CC1-EXG-NFC-D	-

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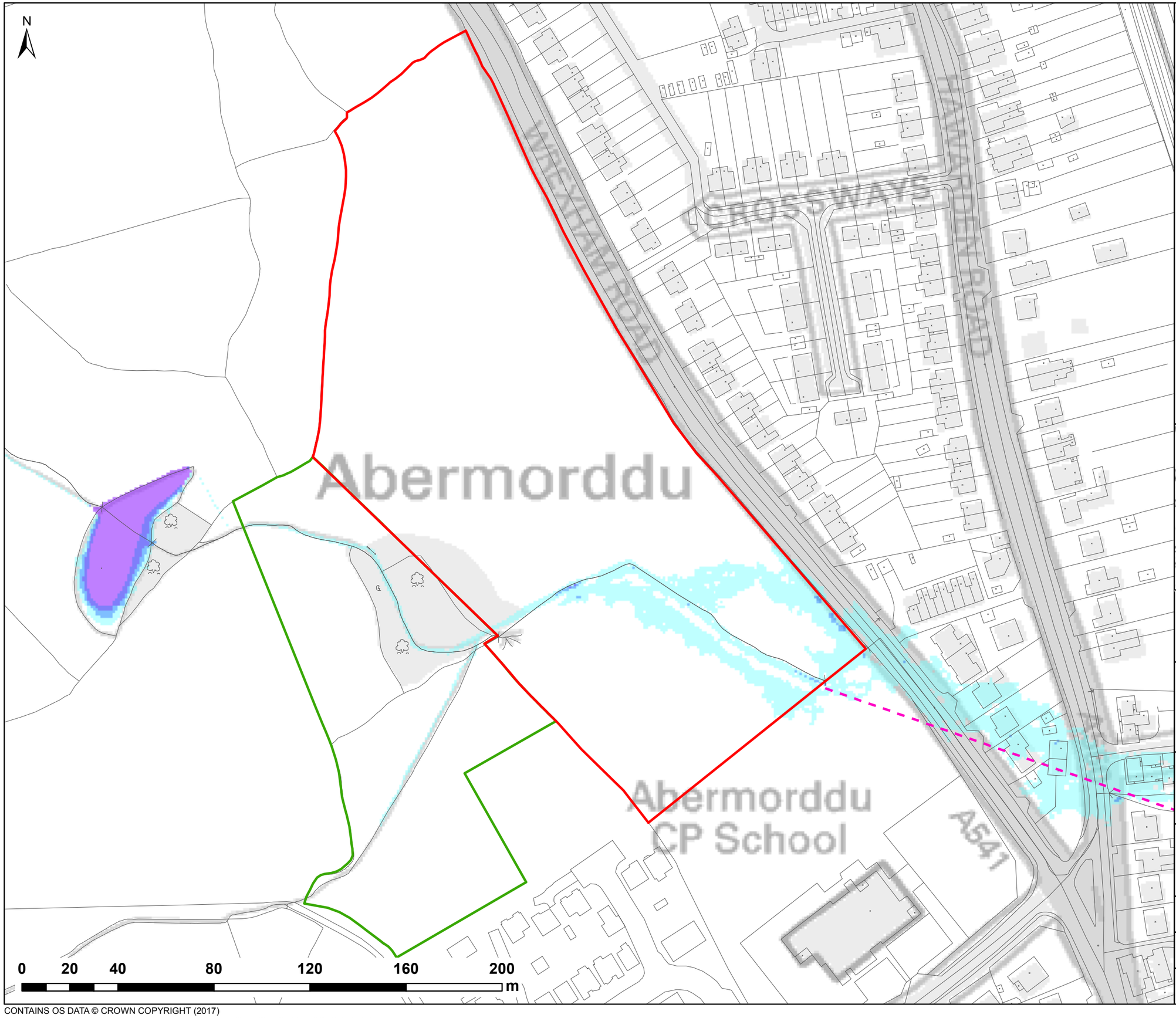


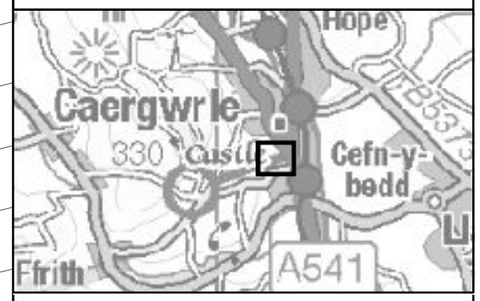
NOTES:
1) ALL DIMENSIONS ARE IN METRES AND ALL LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS STATED OTHERWISE

LEGEND

- Site Boundary
- Land Ownership
- Wrexham Rd Culvert Line (Assumed)

Maximum Flood Depth (m)

- 0 - 0.3
- 0.3 - 0.6
- 0.6 - 1.2
- 1.2 - 2.4
- > 2.4



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www.waterco.co.uk

SCHEME:

CLARK ESTATE
WREXHAM RD, ABERMORDDU

PLOT TITLE:

MAXIMUM FLOOD DEPTH
1% AEP + 45% CC FLUVIAL EVENT
EXISTING SITE LAYOUT (EXG)
NORMAL FLOW CONDITIONS

PLOT STATUS:	DATE:
FINAL	07/04/2017

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE @ A3:
RCL	LS	VG	1:1,500 (UNLESS STATED OTHERWISE)

PLOT NAME:	REV:
w3246-Q100CC2-EXG-NFC-D	-

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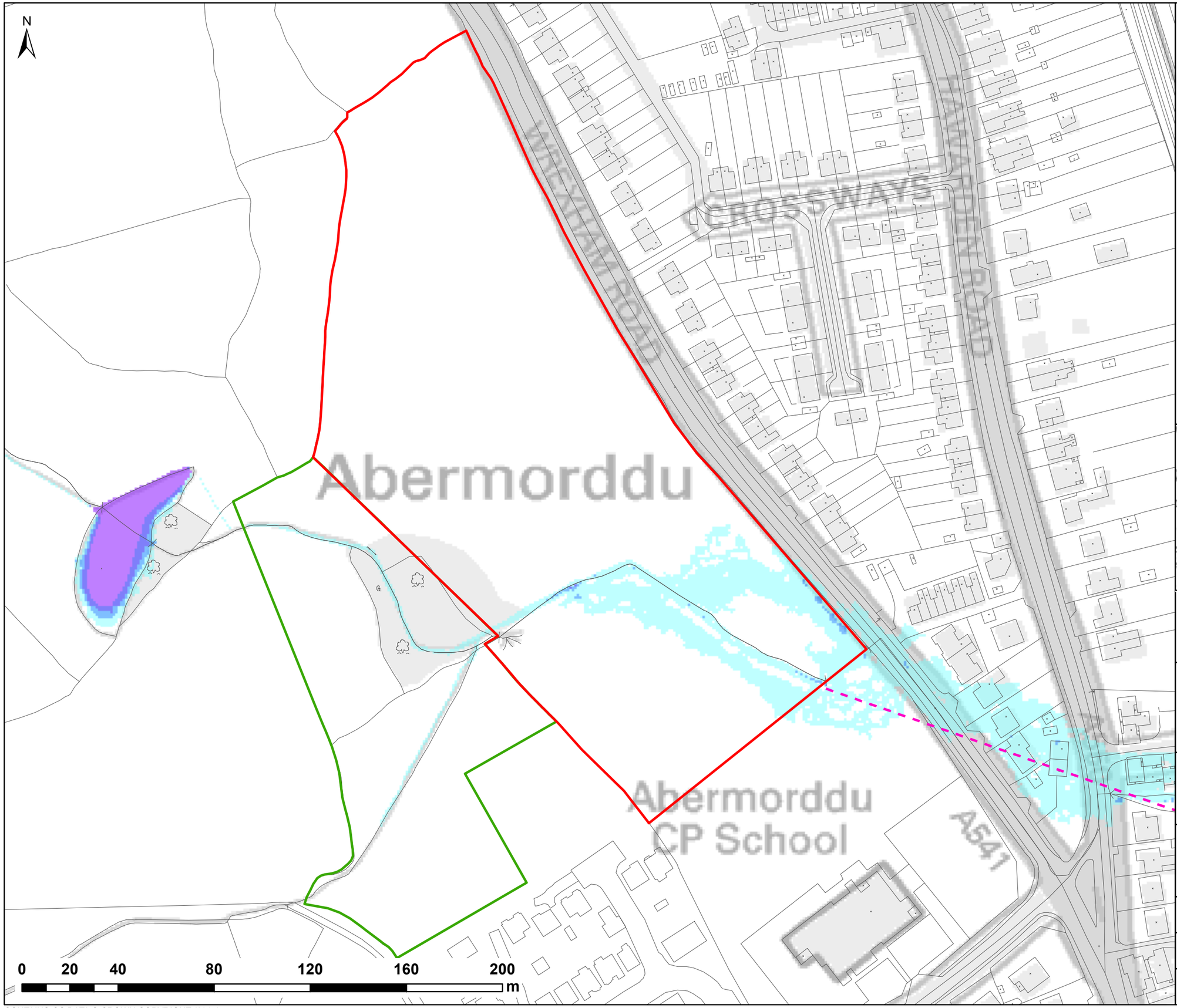


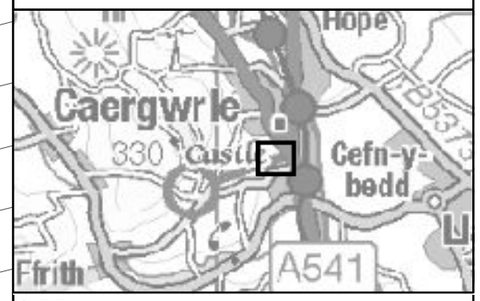
NOTES:
1) ALL DIMENSIONS ARE IN METRES AND ALL LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS STATED OTHERWISE

LEGEND

- Site Boundary
- Land Ownership
- Wrexham Rd Culvert Line (Assumed)

Maximum Flood Depth (m)

- 0 - 0.3
- 0.3 - 0.6
- 0.6 - 1.2
- 1.2 - 2.4
- > 2.4



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SCHEME:

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WREXHAM RD, ABERMORDDU

PLOT TITLE:

MAXIMUM FLOOD DEPTH
0.1% AEP FLUVIAL EVENT
EXISTING SITE LAYOUT (EXG)
NORMAL FLOW CONDITIONS

PLOT STATUS:	DATE:
FINAL	07/04/2017

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE @ A3:
RCL	LS	VG	1:1,500 (UNLESS STATED OTHERWISE)

PLOT NAME:	REV:
w3246-Q1000-EXG-NFC-D	-

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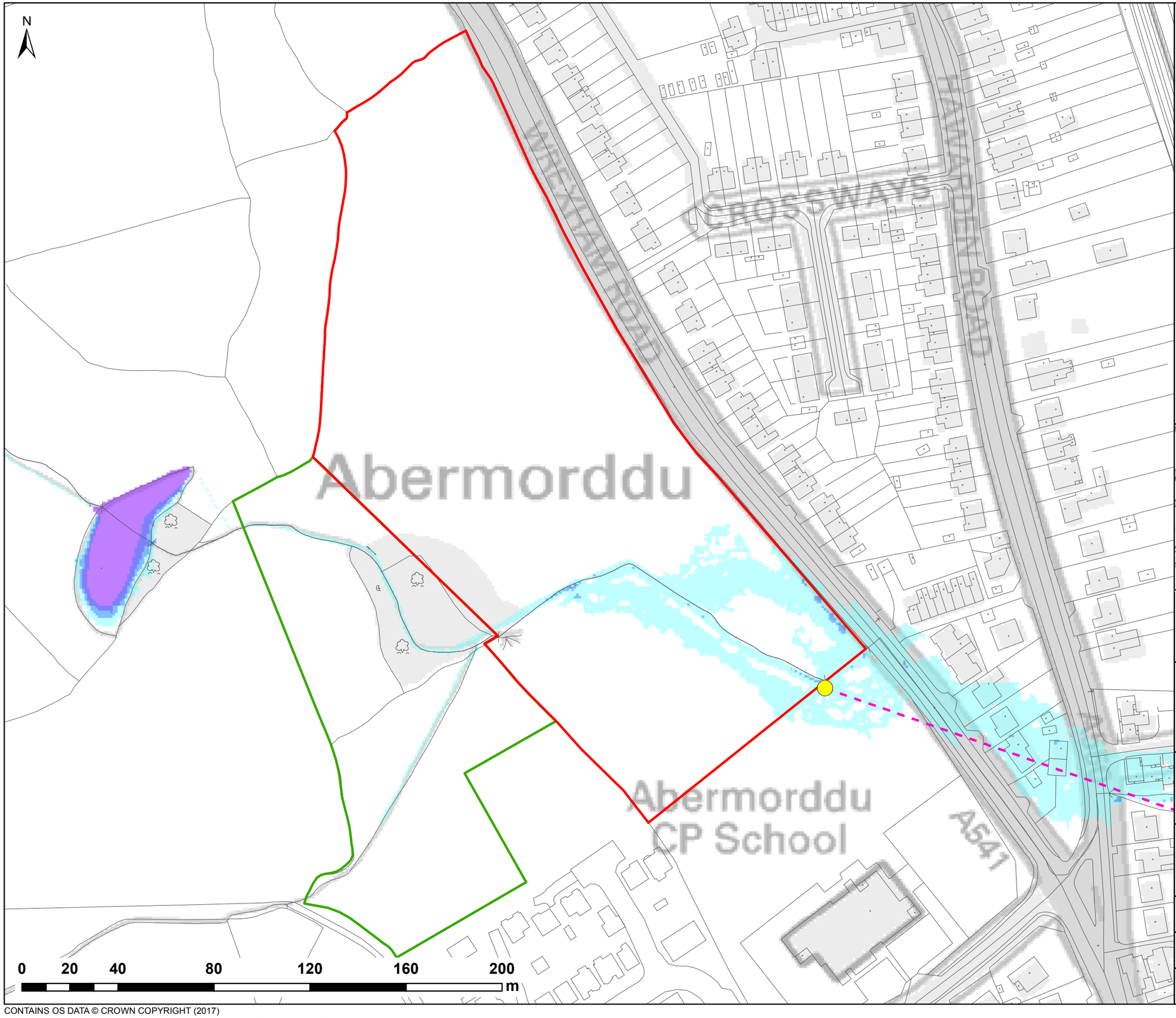


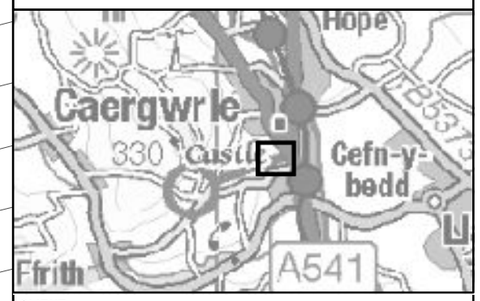
NOTES:
1) ALL DIMENSIONS ARE IN METRES AND ALL LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS STATED OTHERWISE

LEGEND

- Site Boundary
- Land Ownership
- Wrexham Rd Culvert Line (Assumed)
- Blockage Location (BL1)

Maximum Flood Depth (m)

- 0 - 0.3
- 0.3 - 0.6
- 0.6 - 1.2
- 1.2 - 2.4
- > 2.4



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www.waterco.co.uk

SCHEME:

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WREXHAM RD, ABERMORDDU

PLOT TITLE:

MAXIMUM FLOOD DEPTH
0.1% AEP FLUVIAL EVENT
EXISTING SITE LAYOUT (EXG)
WREXHAM RD CULVERT BLOCKAGE (100%)

PLOT STATUS:	DATE:
FINAL	07/04/2017

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE @ A3:
RCL	LS	VG	1:1,500 (UNLESS STATED OTHERWISE)

PLOT NAME:	REV:
w3246-Q1000-EXG-BL1-D	-

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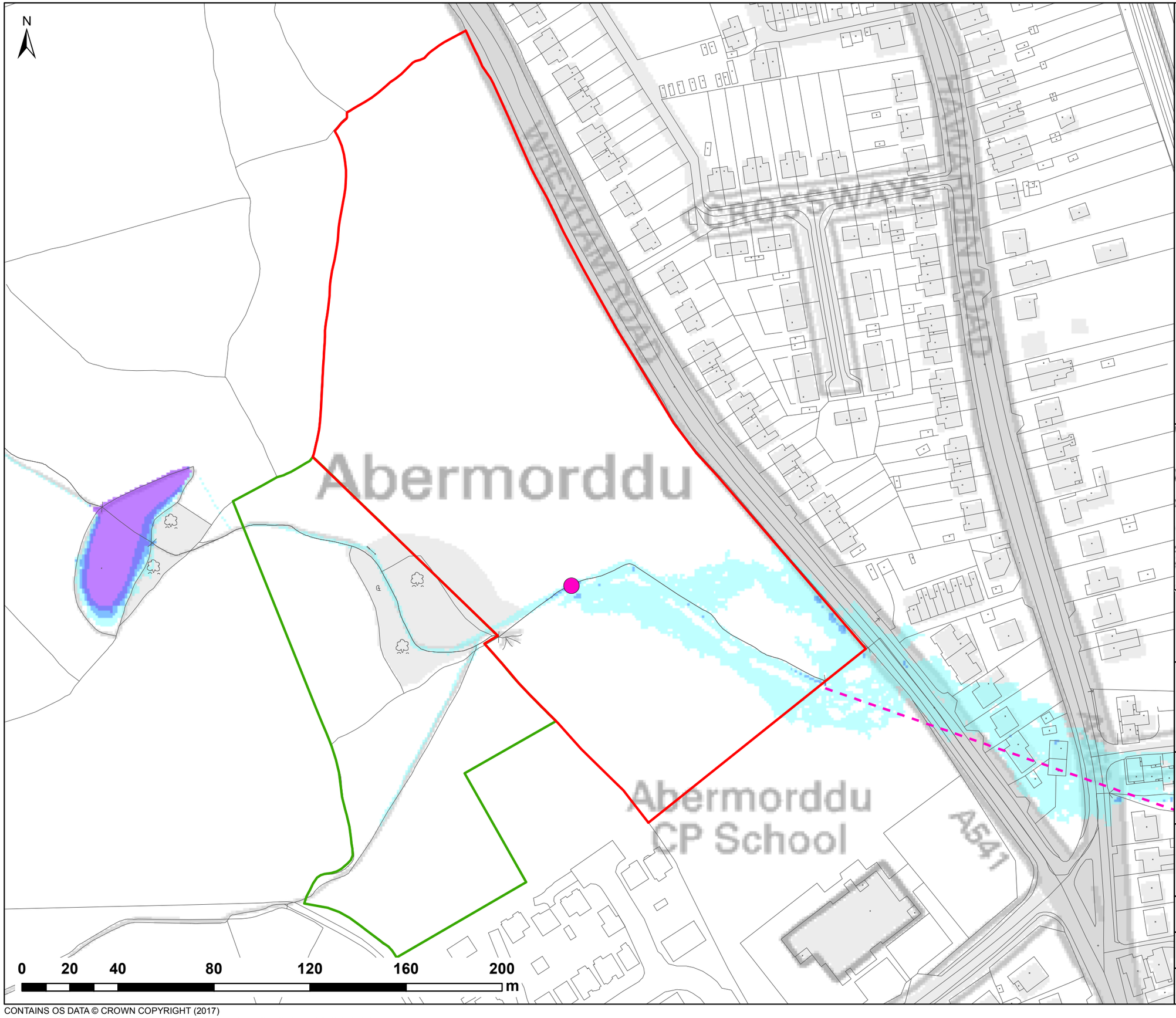


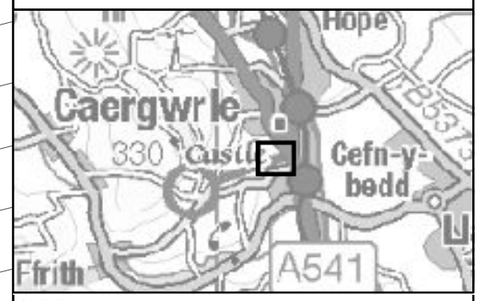
NOTES:
1) ALL DIMENSIONS ARE IN METRES AND ALL LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS STATED OTHERWISE

LEGEND

- Site Boundary
- Land Ownership
- Wrexham Rd Culvert Line (Assumed)
- Blockage Location (BL2)

Maximum Flood Depth (m)

- 0 - 0.3
- 0.3 - 0.6
- 0.6 - 1.2
- 1.2 - 2.4
- > 2.4



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www.waterco.co.uk

SCHEME:

CLARK ESTATE
WREXHAM RD, ABERMORDDU

PLOT TITLE:

MAXIMUM FLOOD DEPTH
0.1% AEP FLUVIAL EVENT
EXISTING SITE LAYOUT (EXG)
ACCESS TRACK CULVERT BLOCKAGE (100%)

PLOT STATUS:	DATE:
FINAL	07/04/2017

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE @ A3:
RCL	LS	VG	1:1,500 (UNLESS STATED OTHERWISE)

PLOT NAME:	REV:
w3246-Q1000-EXG-BL2-D	-

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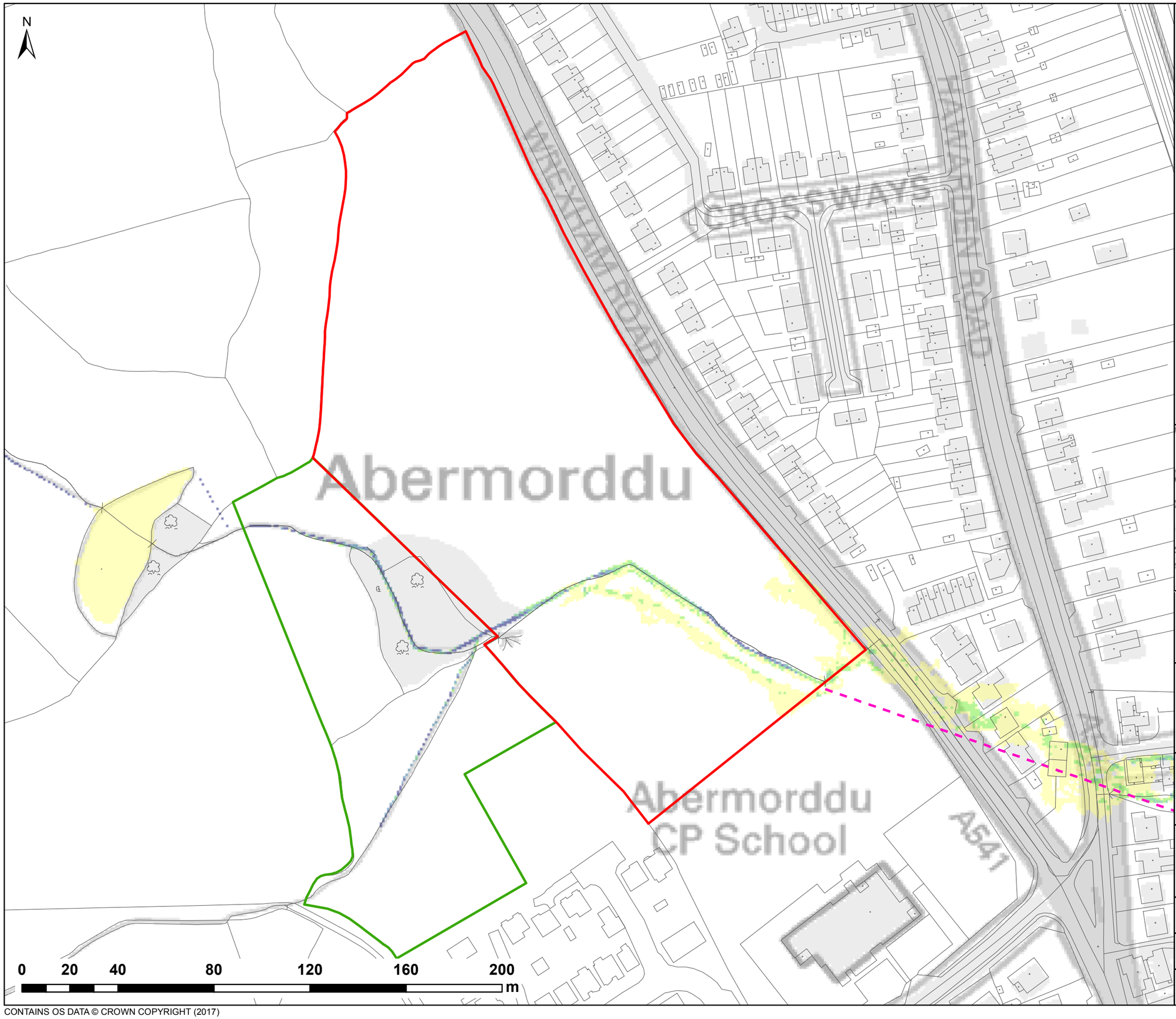


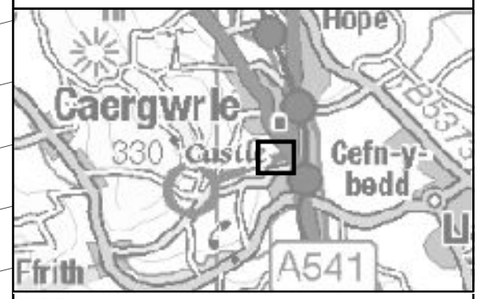
NOTES:
1) ALL DIMENSIONS ARE IN METRES AND ALL LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS STATED OTHERWISE

LEGEND

- Site Boundary
- Land Ownership
- Wrexham Rd Culvert Line (Assumed)

Maximum Velocity (m/s)

- 0.0 - 0.3
- 0.3 - 0.6
- 0.6 - 0.9
- 0.9 - 1.2
- > 1.2



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01824 702220
www.waterco.co.uk

SCHEME:

CLARK ESTATE
WREXHAM RD, ABERMORDDU

PLOT TITLE:

MAXIMUM VELOCITY
5% AEP FLUVIAL EVENT
EXISTING SITE LAYOUT (EXG)
NORMAL FLOW CONDITIONS

PLOT STATUS:	DATE:
FINAL	07/04/2017

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE @ A3:
RCL	LS	VG	1:1,500 (UNLESS STATED OTHERWISE)

PLOT NAME:	REV:
w3246-Q20-EXG-NFC-V	-

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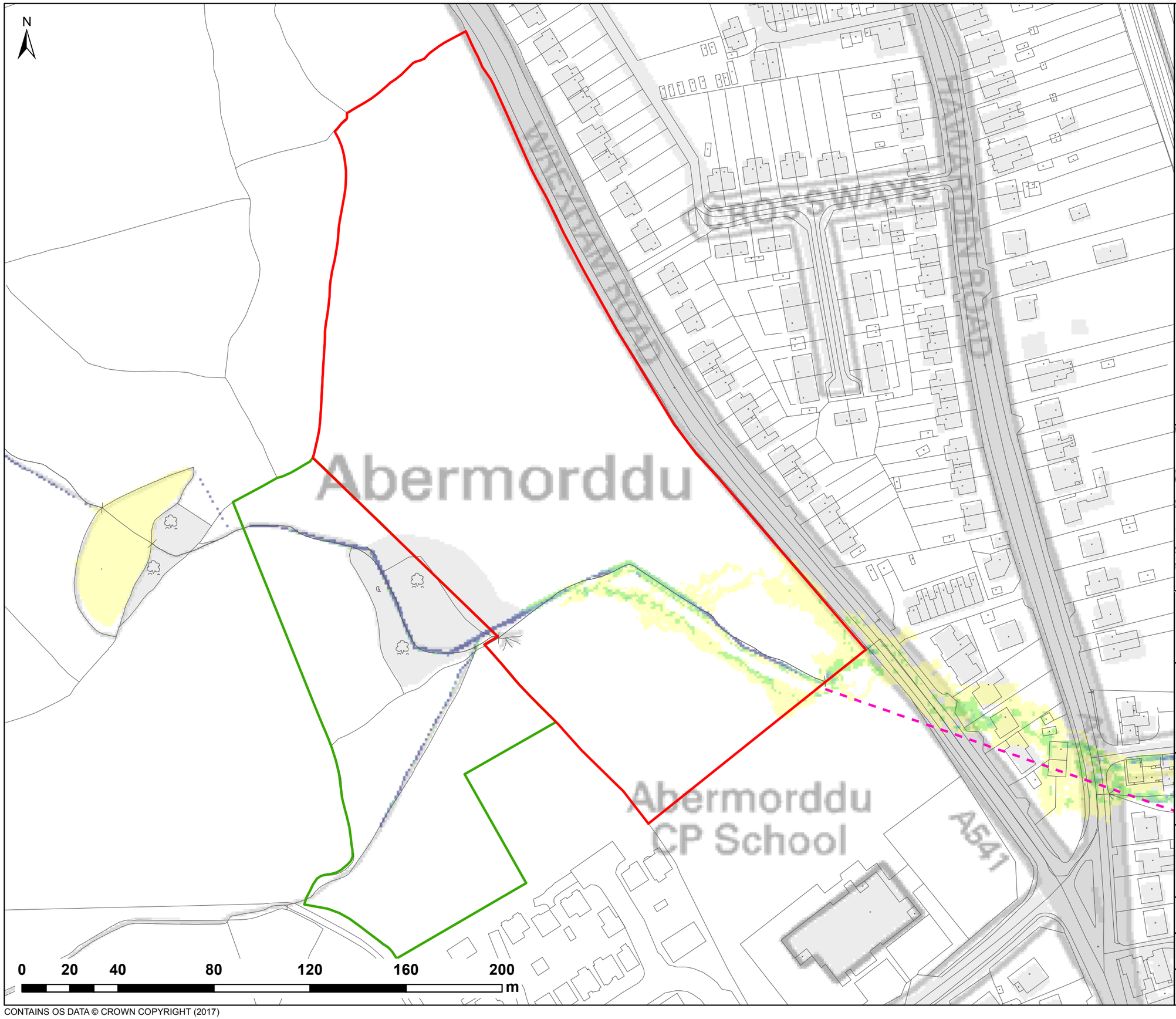


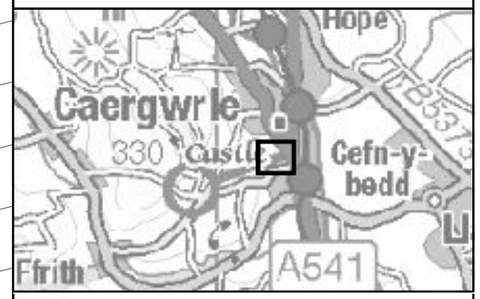
NOTES:
1) ALL DIMENSIONS ARE IN METRES AND ALL LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS STATED OTHERWISE

LEGEND

- Site Boundary
- Land Ownership
- Wrexham Rd Culvert Line (Assumed)

Maximum Velocity (m/s)

- 0.0 - 0.3
- 0.3 - 0.6
- 0.6 - 0.9
- 0.9 - 1.2
- > 1.2



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SCHEME:

CLARK ESTATE
WREXHAM RD, ABERMORDDU

PLOT TITLE:

MAXIMUM VELOCITY
1% AEP FLUVIAL EVENT
EXISTING SITE LAYOUT (EXG)
NORMAL FLOW CONDITIONS

PLOT STATUS:	DATE:
FINAL	07/04/2017

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE @ A3:
RCL	LS	VG	1:1,500 (UNLESS STATED OTHERWISE)

PLOT NAME:	REV:
w3246-Q100-EXG-NFC-V	-

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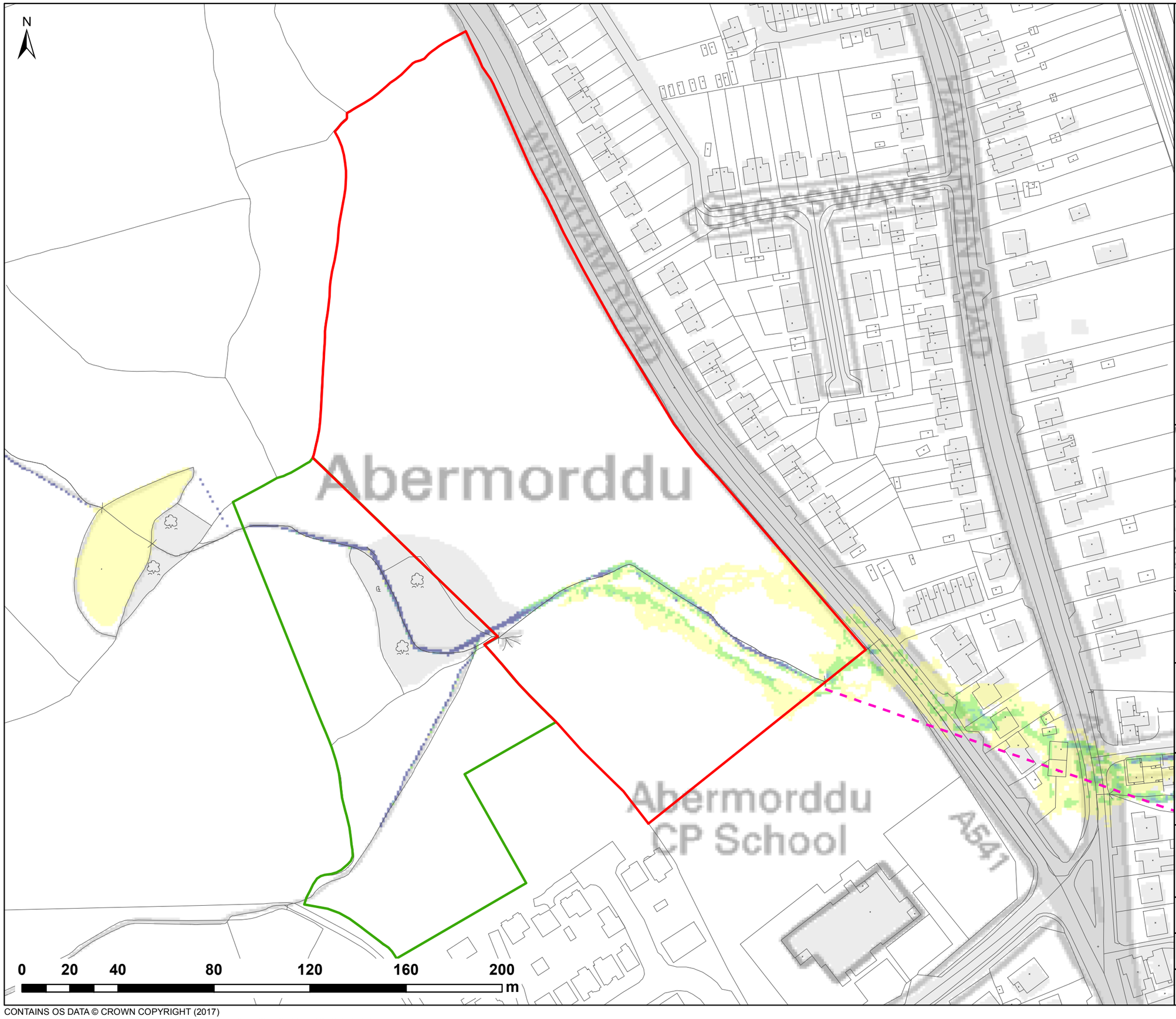


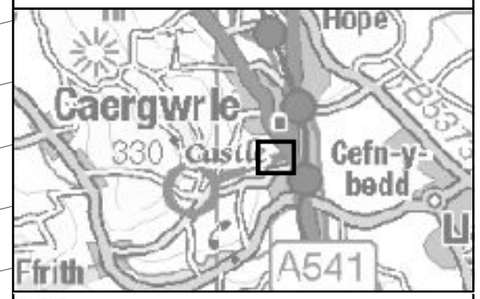
NOTES:
1) ALL DIMENSIONS ARE IN METRES AND ALL LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS STATED OTHERWISE

LEGEND

- Site Boundary
- Land Ownership
- Wrexham Rd Culvert Line (Assumed)

Maximum Velocity (m/s)

- 0.0 - 0.3
- 0.3 - 0.6
- 0.6 - 0.9
- 0.9 - 1.2
- > 1.2



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SCHEME:

CLARK ESTATE
WREXHAM RD, ABERMORDDU

PLOT TITLE:

MAXIMUM VELOCITY
1% AEP + 20% CC FLUVIAL EVENT
EXISTING SITE LAYOUT (EXG)
NORMAL FLOW CONDITIONS

PLOT STATUS:	DATE:
FINAL	07/04/2017

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE @ A3:
RCL	LS	VG	1:1,500 (UNLESS STATED OTHERWISE)

PLOT NAME:	REV:
w3246-Q100CC1-EXG-NFC-V	-

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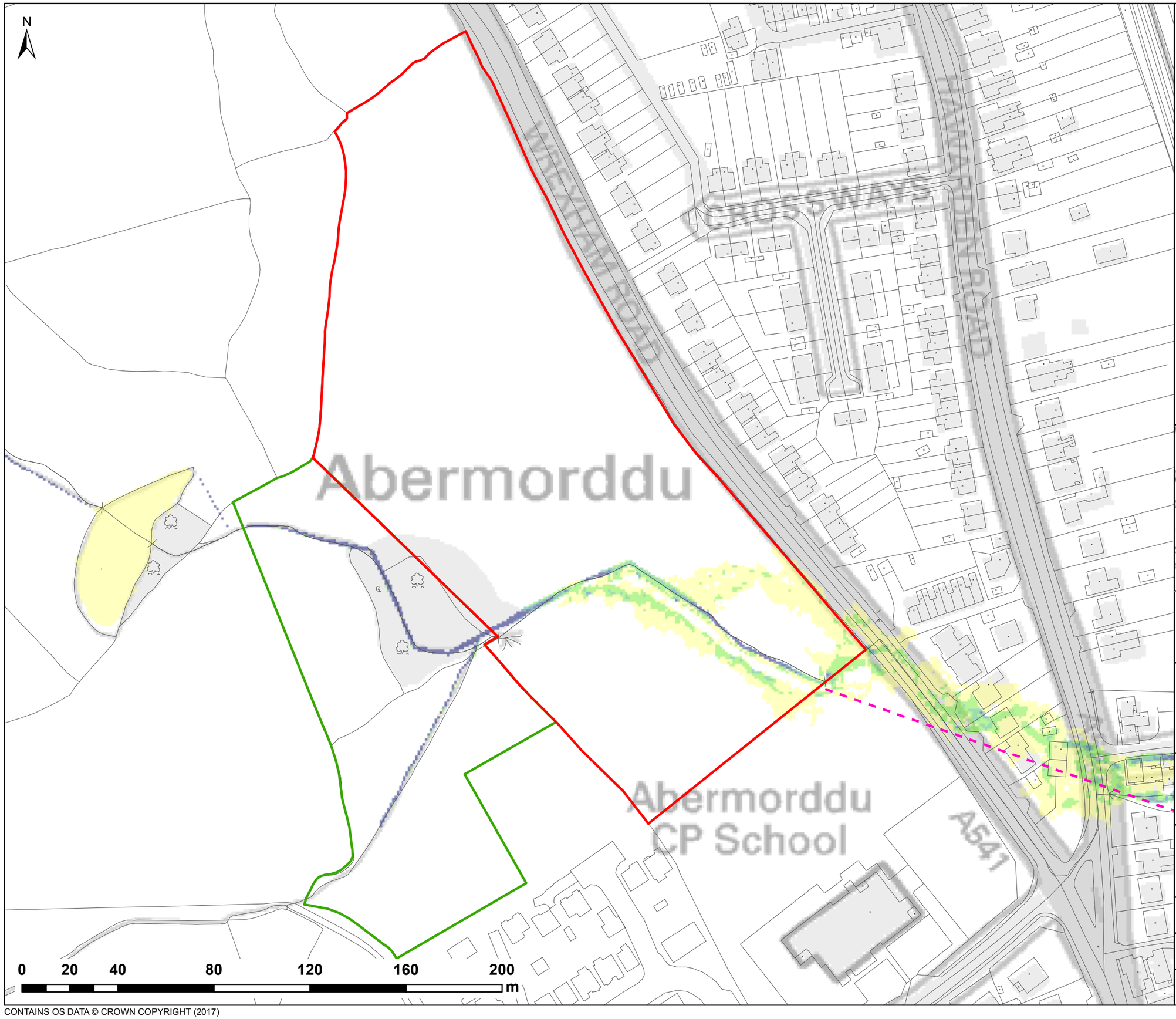


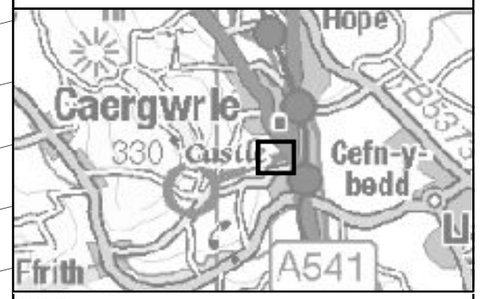
NOTES:
1) ALL DIMENSIONS ARE IN METRES AND ALL LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS STATED OTHERWISE

LEGEND

- Site Boundary
- Land Ownership
- Wrexham Rd Culvert Line (Assumed)

Maximum Velocity (m/s)

- 0.0 - 0.3
- 0.3 - 0.6
- 0.6 - 0.9
- 0.9 - 1.2
- > 1.2



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SCHEME:

CLARK ESTATE
WREXHAM RD, ABERMORDDU

PLOT TITLE:

MAXIMUM VELOCITY
1% AEP + 45% CC FLUVIAL EVENT
EXISTING SITE LAYOUT (EXG)
NORMAL FLOW CONDITIONS

PLOT STATUS:	DATE:
FINAL	07/04/2017

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE @ A3:
RCL	LS	VG	1:1,500 (UNLESS STATED OTHERWISE)

PLOT NAME:	REV:
w3246-Q100CC2-EXG-NFC-V	-

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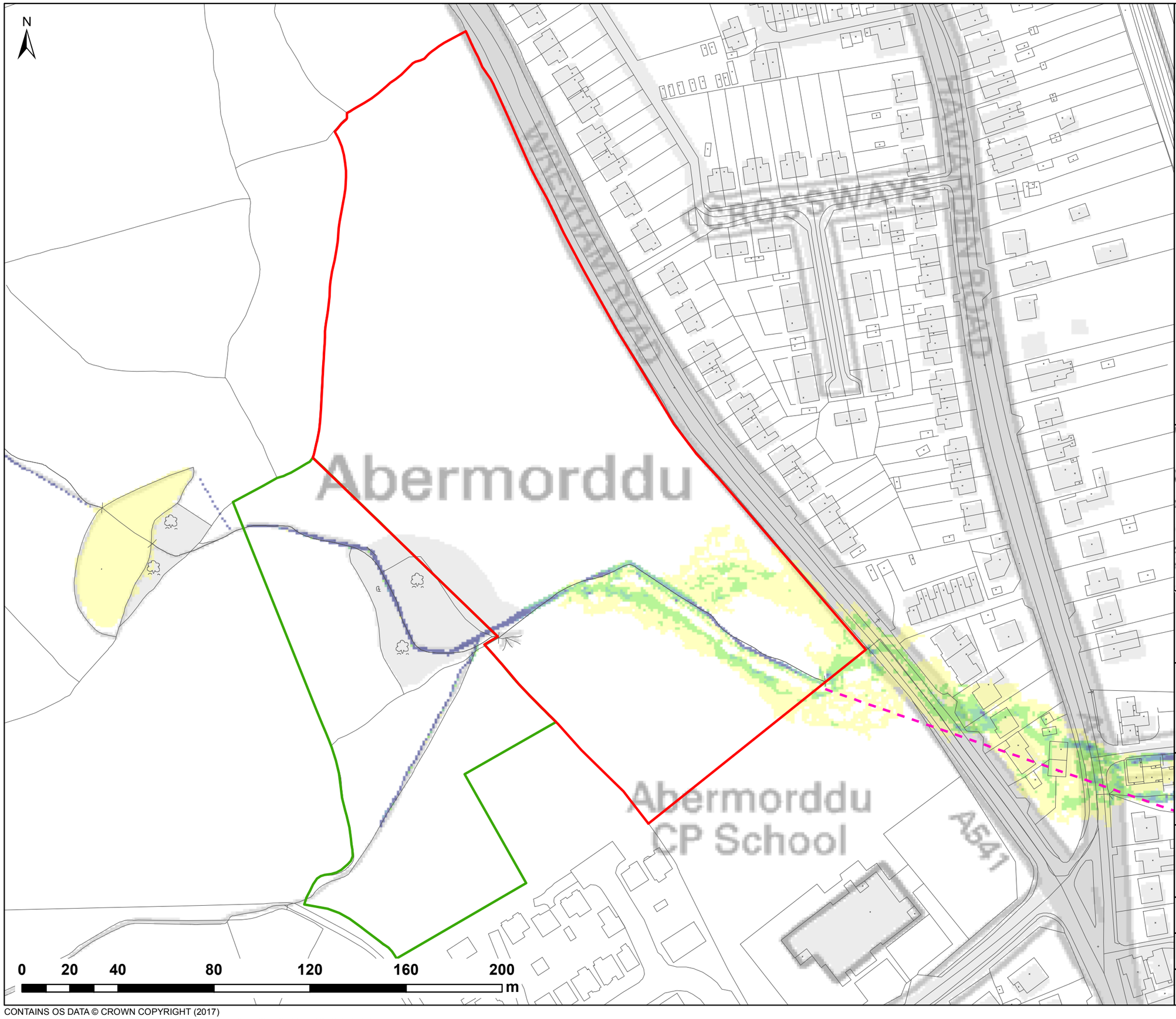

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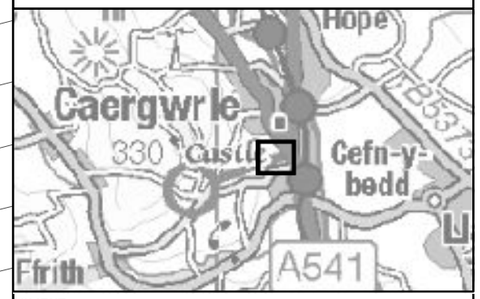
LEGEND

- Site Boundary
- Land Ownership
- Wrexham Rd Culvert Line (Assumed)

Maximum Velocity (m/s)

- 0.0 - 0.3
- 0.3 - 0.6
- 0.6 - 0.9
- 0.9 - 1.2
- > 1.2



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SCHEME:

CLARK ESTATE
WREXHAM RD, ABERMORDDU

PLOT TITLE:

MAXIMUM VELOCITY
0.1% AEP FLUVIAL EVENT
EXISTING SITE LAYOUT (EXG)
NORMAL FLOW CONDITIONS

PLOT STATUS:	DATE:
FINAL	07/04/2017

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE @ A3:
RCL	LS	VG	1:1,500 (UNLESS STATED OTHERWISE)

PLOT NAME:	REV:
w3246-Q1000-EXG-NFC-V	-

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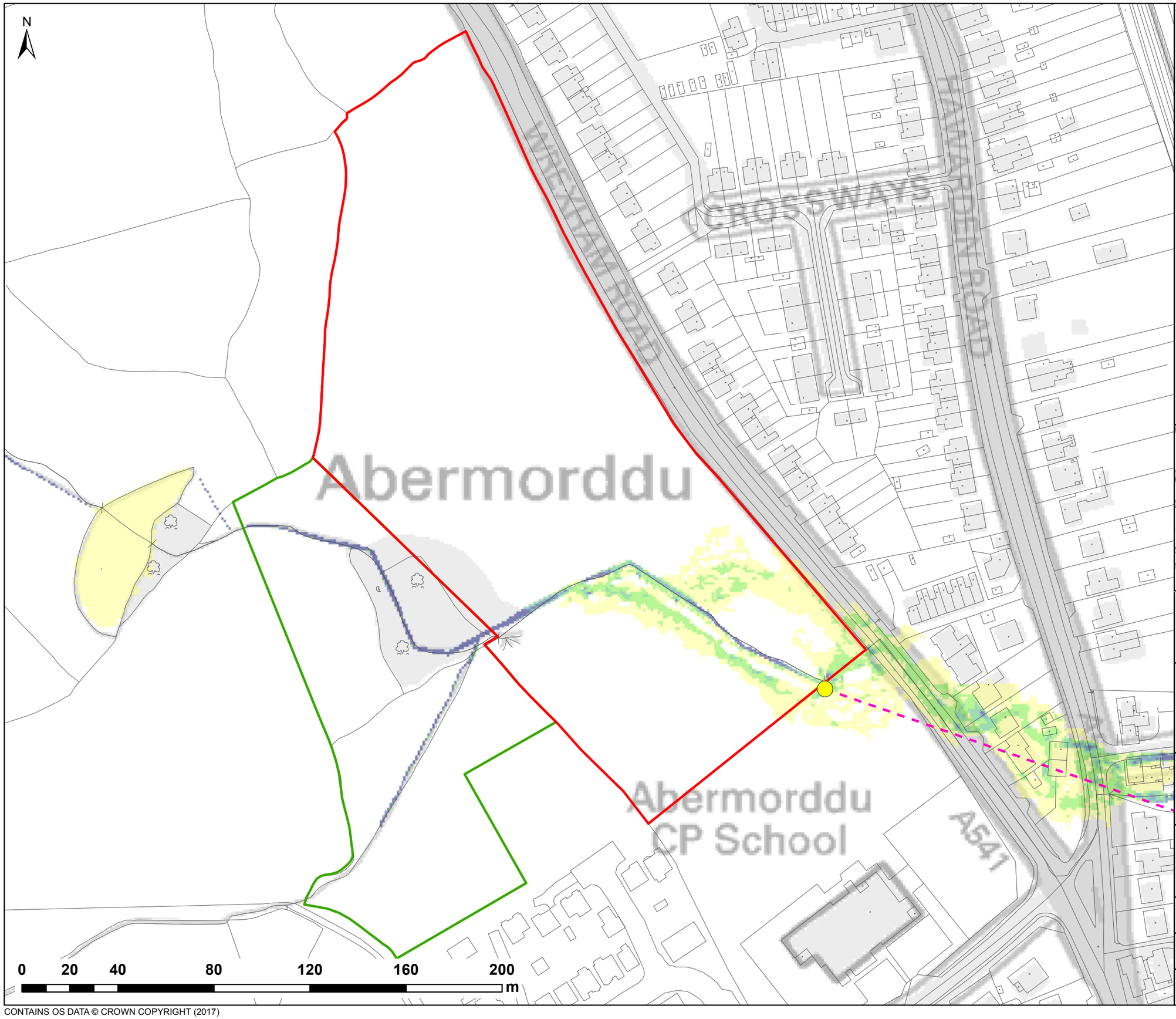

NOTES:
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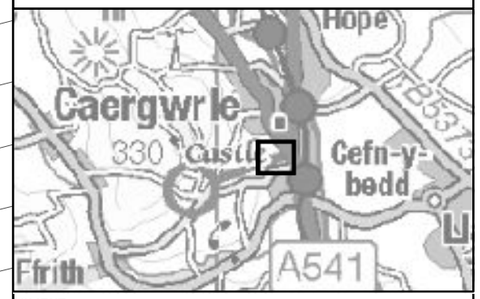
LEGEND

- Site Boundary
- Land Ownership
- Wrexham Rd Culvert Line (Assumed)
- Blockage Location (BL1)

Maximum Velocity (m/s)

- 0.0 - 0.3
- 0.3 - 0.6
- 0.6 - 0.9
- 0.9 - 1.2
- > 1.2



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SCHEME:

CLARK ESTATE
WREXHAM RD, ABERMORDDU

PLOT TITLE:

MAXIMUM VELOCITY
0.1% AEP FLUVIAL EVENT
EXISTING SITE LAYOUT (EXG)
WREXHAM RD CULVERT BLOCKAGE (100%)

PLOT STATUS:	DATE:
FINAL	07/04/2017

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE @ A3:
RCL	LS	VG	1:1,500 (UNLESS STATED OTHERWISE)

PLOT NAME:	REV:
w3246-Q1000-EXG-BL1-V	-

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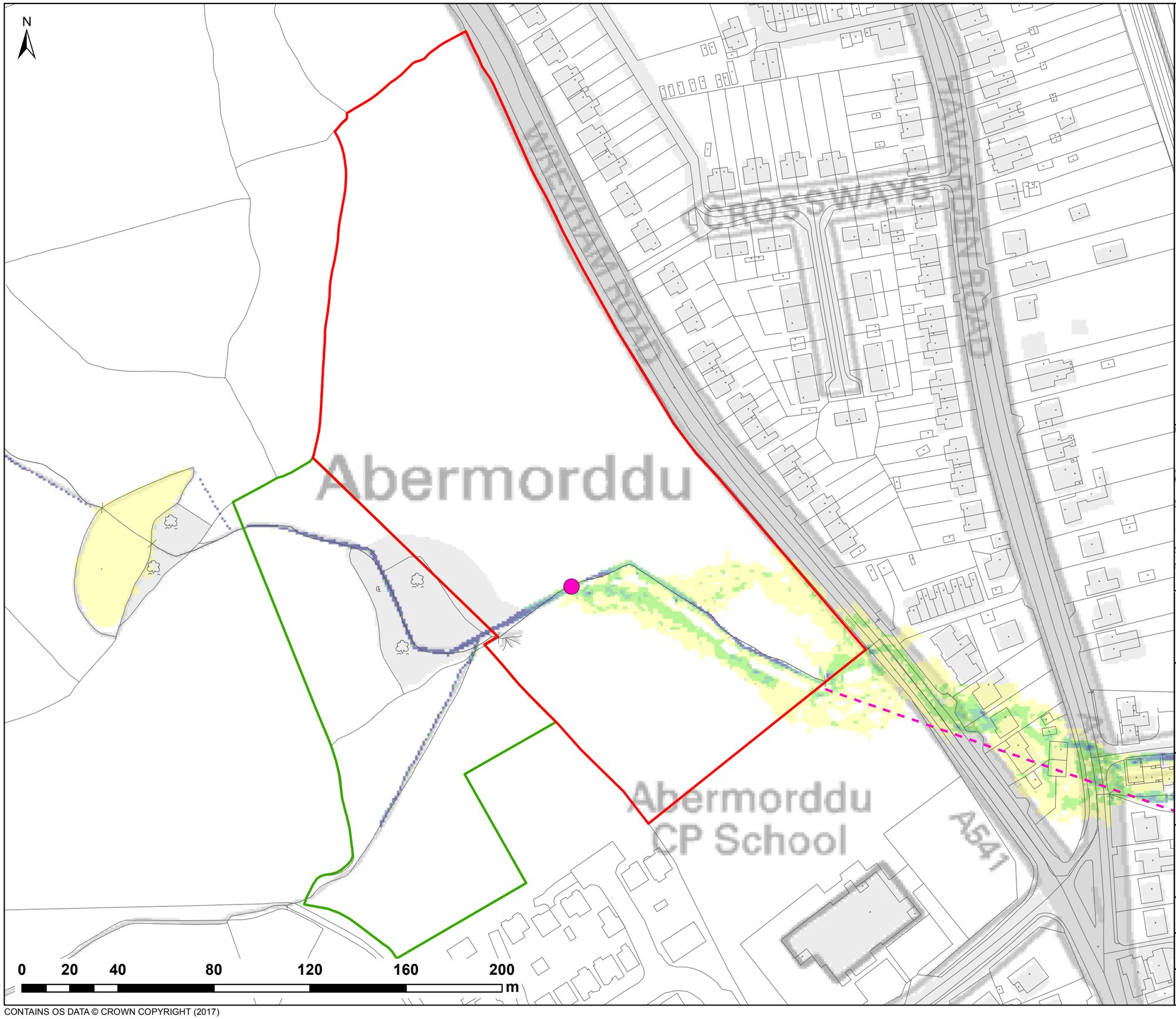


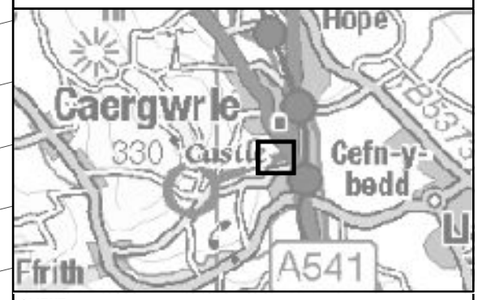
NOTES:
1) ALL DIMENSIONS ARE IN METRES AND ALL LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS STATED OTHERWISE

LEGEND

- Site Boundary
- Land Ownership
- Wrexham Rd Culvert Line (Assumed)
- Blockage Location (BL2)

Maximum Velocity (m/s)

- 0.0 - 0.3
- 0.3 - 0.6
- 0.6 - 0.9
- 0.9 - 1.2
- > 1.2



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SCHEME:

CLARK ESTATE
WREXHAM RD, ABERMORDDU

PLOT TITLE:

MAXIMUM VELOCITY
0.1% AEP FLUVIAL EVENT
EXISTING SITE LAYOUT (EXG)
ACCESS TRACK CULVERT BLOCKAGE (100%)

PLOT STATUS:	DATE:
FINAL	07/04/2017

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE @ A3:
RCL	LS	VG	1:1,500 (UNLESS STATED OTHERWISE)

PLOT NAME:	REV:
w3246-Q1000-EXG-BL2-V	-

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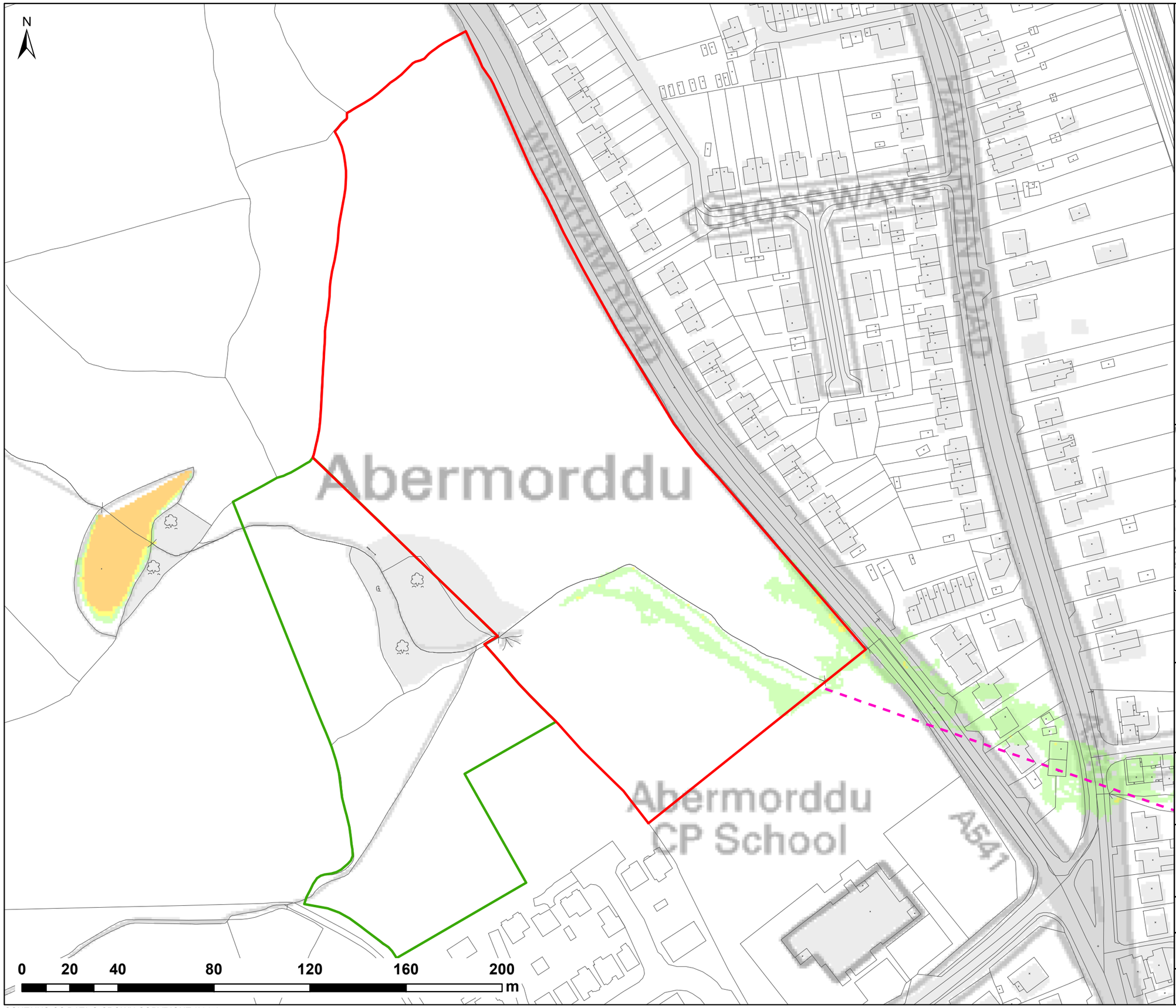


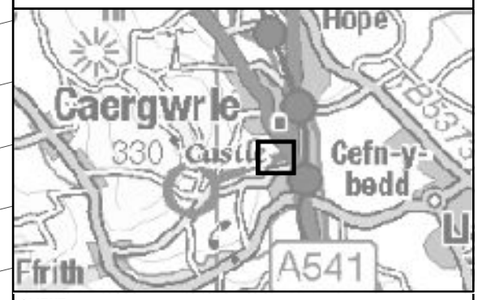
NOTES:
1) ALL DIMENSIONS ARE IN METRES AND ALL LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS STATED OTHERWISE

LEGEND

- Site Boundary
- Land Ownership
- Wrexham Rd Culvert Line (Assumed)

Maximum Flood Hazard Rating (FD2320)

- < 0.75 (Caution)
- 0.75 - 1.25 (Danger for Some)
- 1.25 - 2 (Danger for Most)
- > 2.0 (Danger for All)



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SCHEME:

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PLOT TITLE:

FLOOD HAZARD RATING
5% AEP FLUVIAL EVENT
EXISTING SITE LAYOUT (EXG)
NORMAL FLOW CONDITIONS

PLOT STATUS:	DATE:
FINAL	07/04/2017

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE @ A3:
RCL	LS	VG	1:1,500 (UNLESS STATED OTHERWISE)

PLOT NAME:	REV:
w3246-Q20-EXG-NFC-HZ	-

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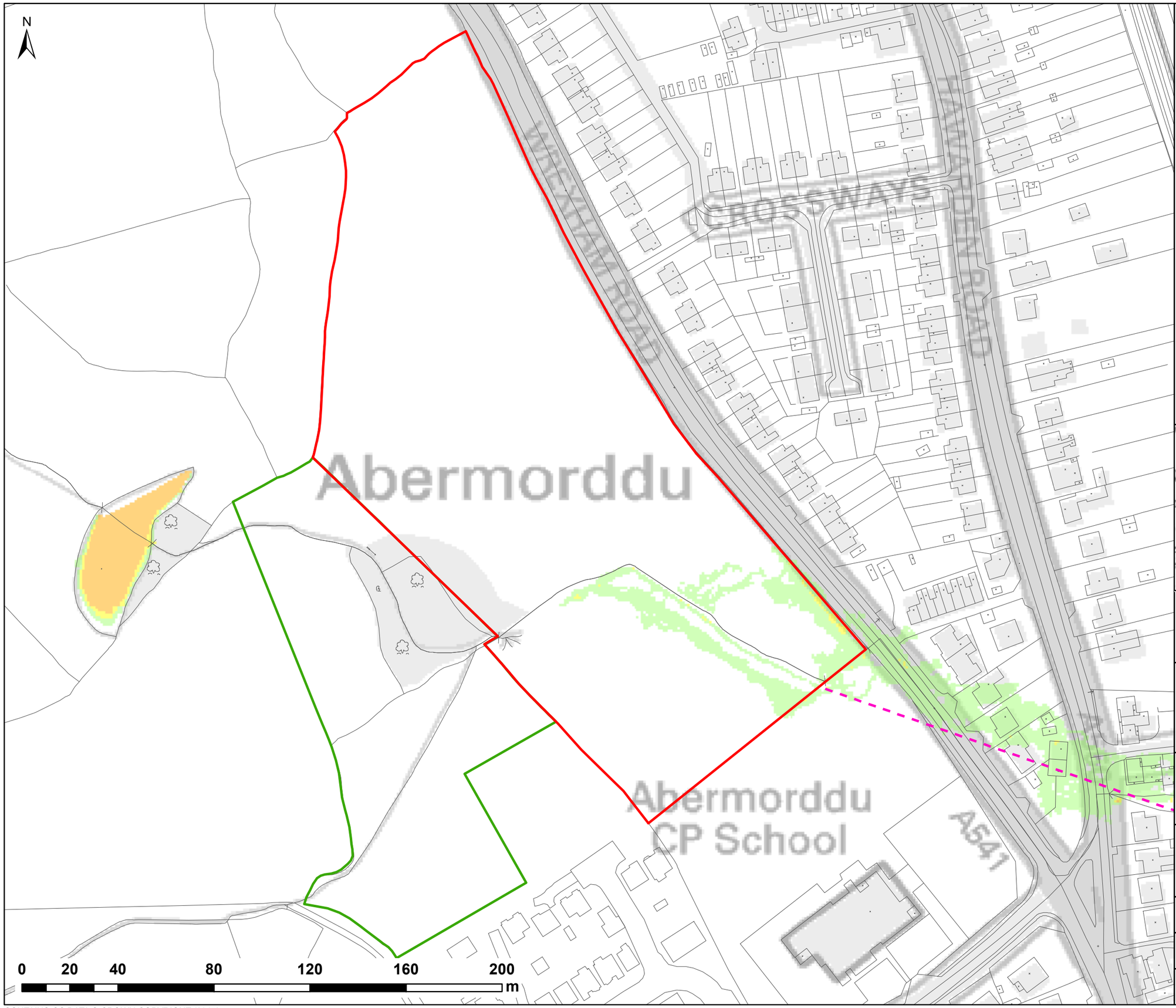


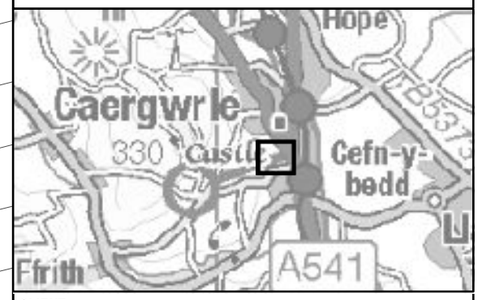
NOTES:
1) ALL DIMENSIONS ARE IN METRES AND ALL LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS STATED OTHERWISE

LEGEND

- Site Boundary
- Land Ownership
- Wrexham Rd Culvert Line (Assumed)

Maximum Flood Hazard Rating (FD2320)

- < 0.75 (Caution)
- 0.75 - 1.25 (Danger for Some)
- 1.25 - 2 (Danger for Most)
- > 2.0 (Danger for All)



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SCHEME:

CLARK ESTATE
WREXHAM RD, ABERMORDDU

PLOT TITLE:

FLOOD HAZARD RATING
1% AEP FLUVIAL EVENT
EXISTING SITE LAYOUT (EXG)
NORMAL FLOW CONDITIONS

PLOT STATUS:	DATE:
FINAL	07/04/2017

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE @ A3:
RCL	LS	VG	1:1,500 (UNLESS STATED OTHERWISE)

PLOT NAME:	REV:
w3246-Q100-EXG-NFC-HZ	-

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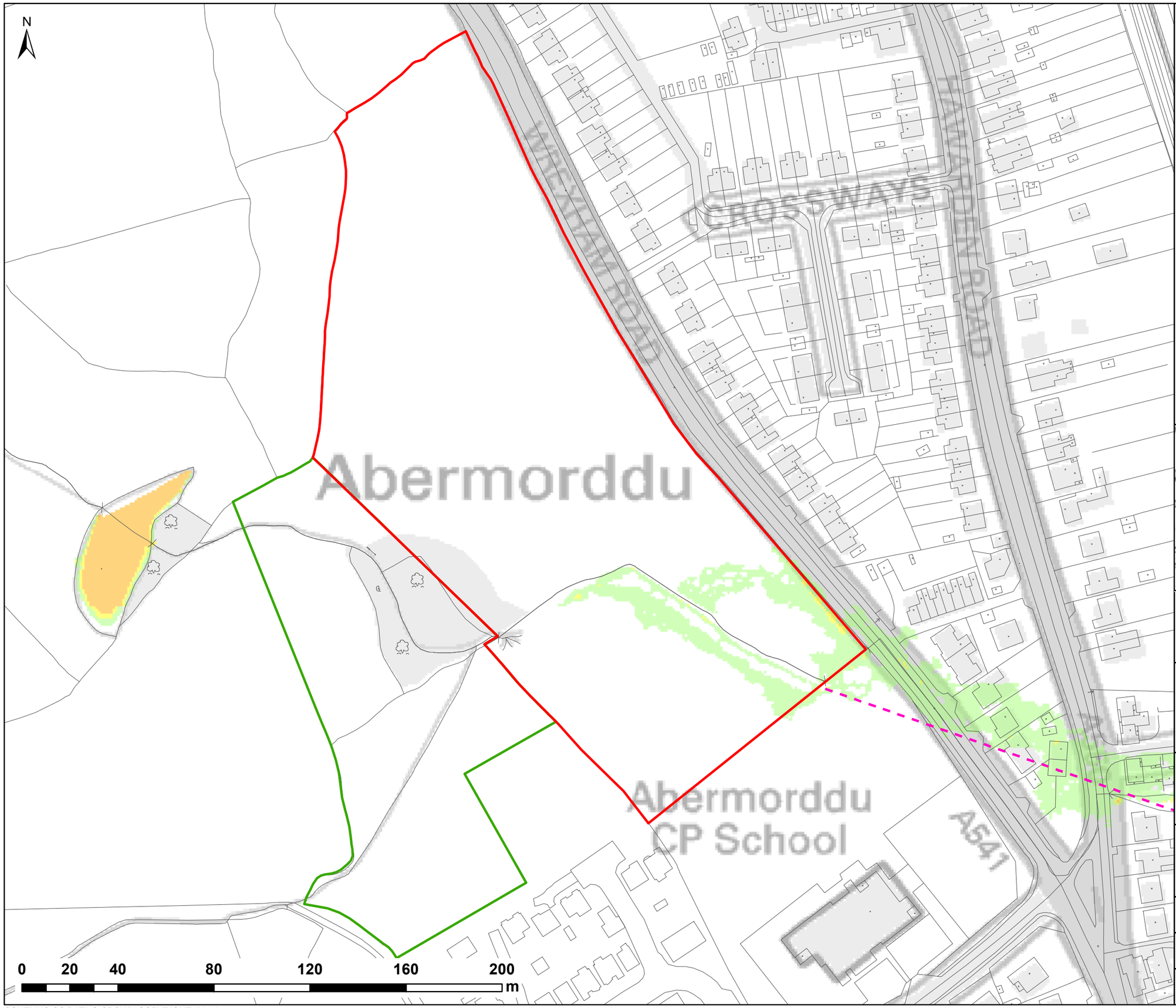

NOTES:
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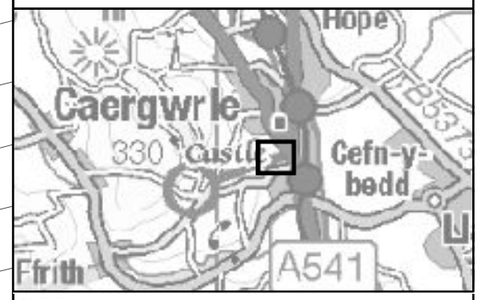
LEGEND

- Site Boundary
- Land Ownership
- Wrexham Rd Culvert Line (Assumed)

Maximum Flood Hazard Rating (FD2320)

- < 0.75 (Caution)
- 0.75 - 1.25 (Danger for Some)
- 1.25 - 2 (Danger for Most)
- > 2.0 (Danger for All)



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SCHEME:

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WREXHAM RD, ABERMORDDU

PLOT TITLE:

FLOOD HAZARD RATING
1% AEP + 20% CC FLUVIAL EVENT
EXISTING SITE LAYOUT (EXG)
NORMAL FLOW CONDITIONS

PLOT STATUS:	DATE:
FINAL	07/04/2017

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE @ A3:
RCL	LS	VG	1:1,500 (UNLESS STATED OTHERWISE)

PLOT NAME:	REV:
w3246-Q100CC1-EXG-NFC-HZ	-

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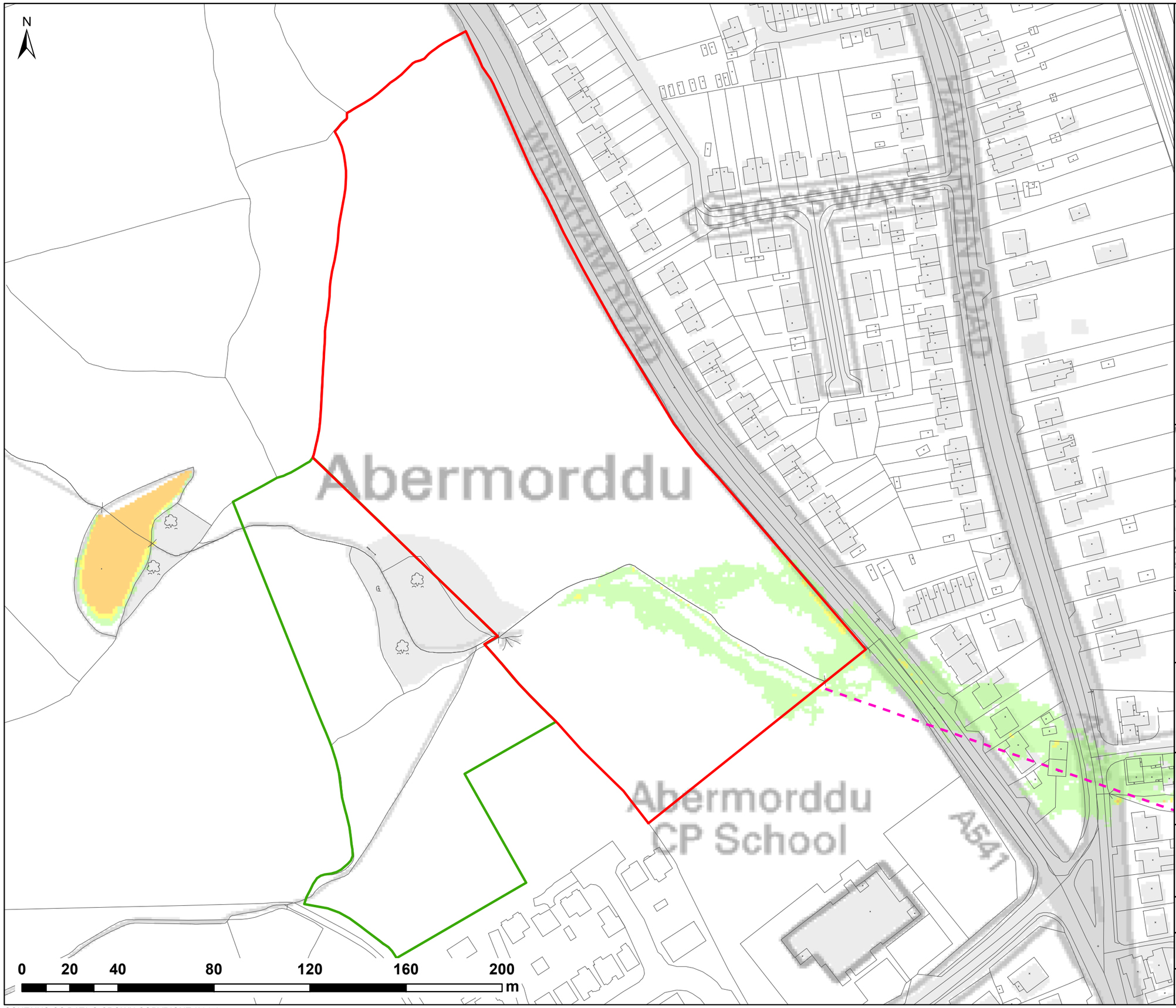

NOTES:
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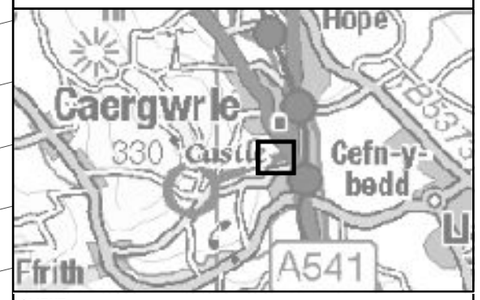
LEGEND

- Site Boundary
- Land Ownership
- Wrexham Rd Culvert Line (Assumed)

Maximum Flood Hazard Rating (FD2320)

- < 0.75 (Caution)
- 0.75 - 1.25 (Danger for Some)
- 1.25 - 2 (Danger for Most)
- > 2.0 (Danger for All)



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SCHEME:

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WREXHAM RD, ABERMORDDU

PLOT TITLE:

FLOOD HAZARD RATING
1% AEP + 45% CC FLUVIAL EVENT
EXISTING SITE LAYOUT (EXG)
NORMAL FLOW CONDITIONS

PLOT STATUS:	DATE:
FINAL	07/04/2017

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE @ A3:
RCL	LS	VG	1:1,500 (UNLESS STATED OTHERWISE)

PLOT NAME:	REV:
w3246-Q100CC2-EXG-NFC-HZ	-

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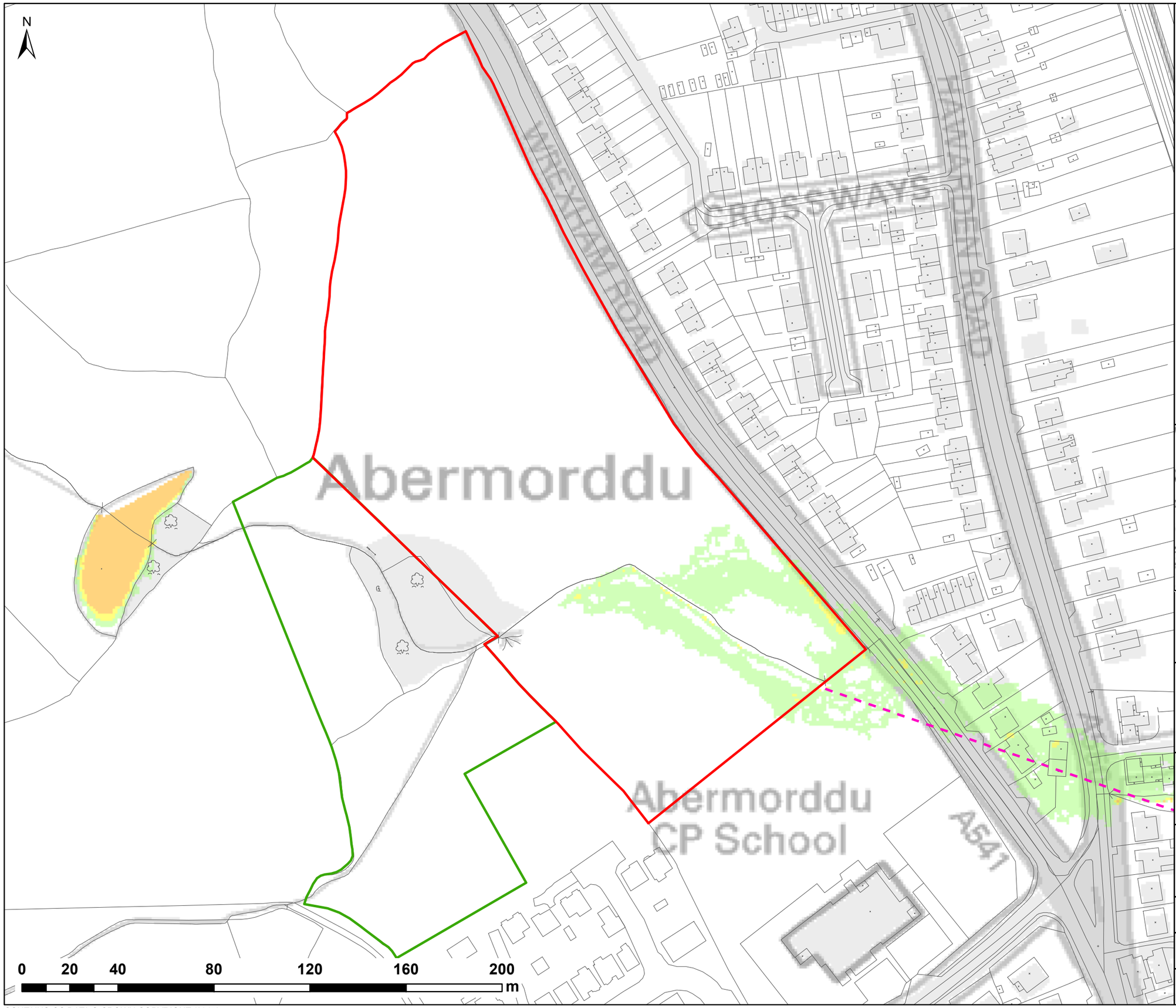

NOTES:
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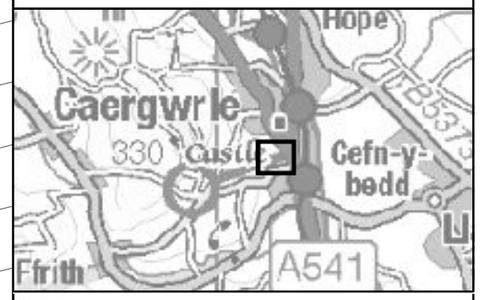
LEGEND

- Site Boundary
- Land Ownership
- Wrexham Rd Culvert Line (Assumed)

Maximum Flood Hazard Rating (FD2320)

- < 0.75 (Caution)
- 0.75 - 1.25 (Danger for Some)
- 1.25 - 2 (Danger for Most)
- > 2.0 (Danger for All)



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SCHEME:

CLARK ESTATE
WREXHAM RD, ABERMORDDU

PLOT TITLE:

FLOOD HAZARD RATING
0.1% AEP FLUVIAL EVENT
EXISTING SITE LAYOUT (EXG)
NORMAL FLOW CONDITIONS

PLOT STATUS:	DATE:
FINAL	07/04/2017

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE @ A3:
RCL	LS	VG	1:1,500 (UNLESS STATED OTHERWISE)

PLOT NAME:	REV:
w3246-Q1000-EXG-NFC-HZ	-

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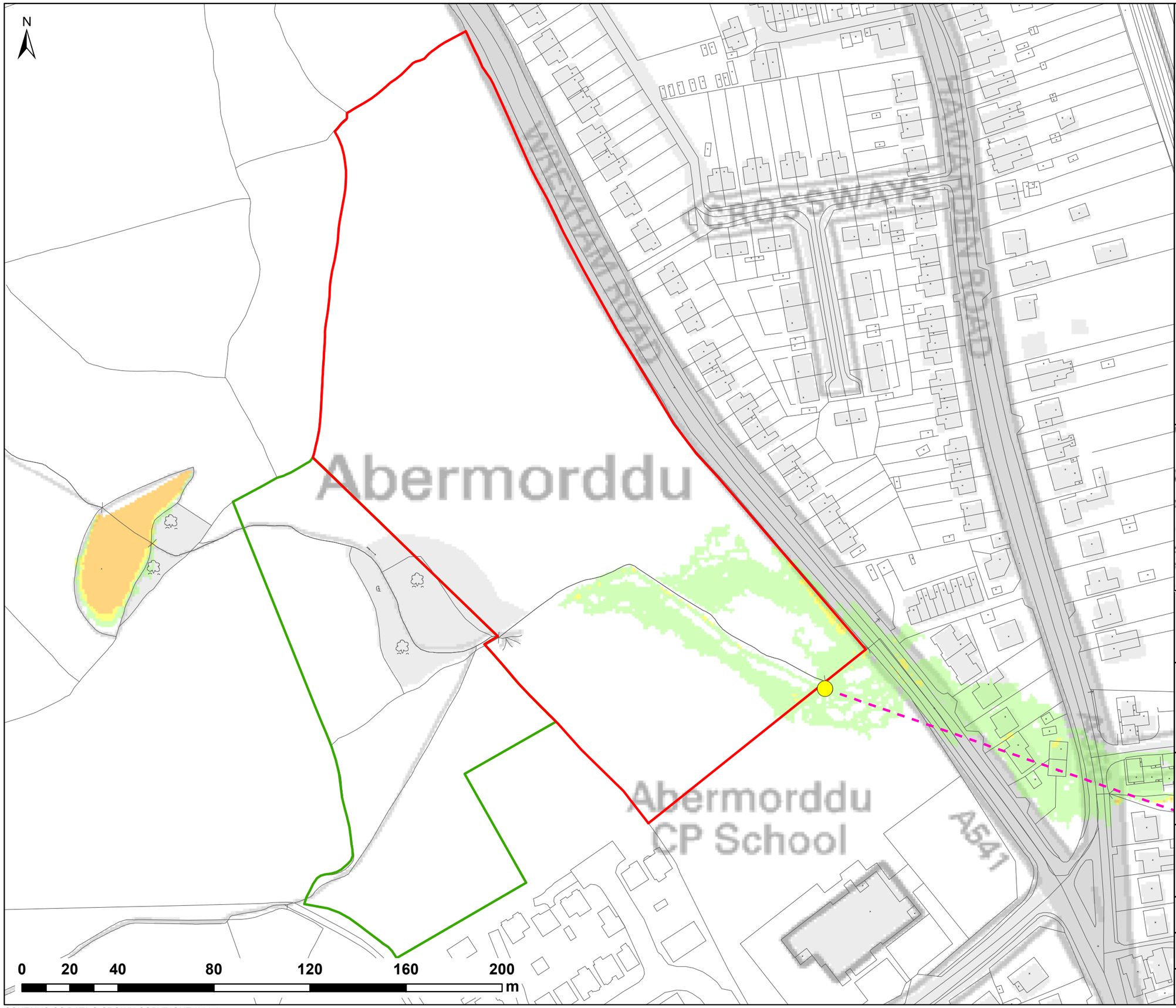


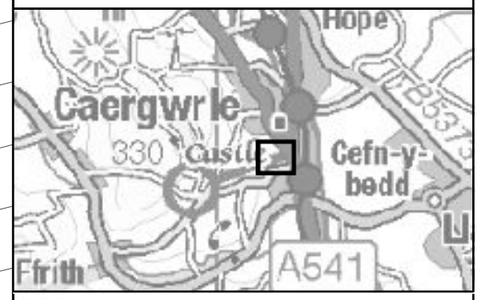
NOTES:
1) ALL DIMENSIONS ARE IN METRES AND ALL LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS STATED OTHERWISE

LEGEND

- Site Boundary
- Land Ownership
- Wrexham Rd Culvert Line (Assumed)
- Blockage Location (BL1)

Maximum Flood Hazard Rating (FD2320)

- < 0.75 (Caution)
- 0.75 - 1.25 (Danger for Some)
- 1.25 - 2 (Danger for Most)
- > 2.0 (Danger for All)



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SCHEME:

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WREXHAM RD, ABERMORDDU

PLOT TITLE:

FLOOD HAZARD RATING
0.1% AEP FLUVIAL EVENT
EXISTING SITE LAYOUT (EXG)
WREXHAM RD CULVERT BLOCKAGE (100%)

PLOT STATUS:	DATE:
FINAL	07/04/2017

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE @ A3:
RCL	LS	VG	1:1,500 (UNLESS STATED OTHERWISE)

PLOT NAME:	REV:
w3246-Q1000-EXG-BL1-HZ	-

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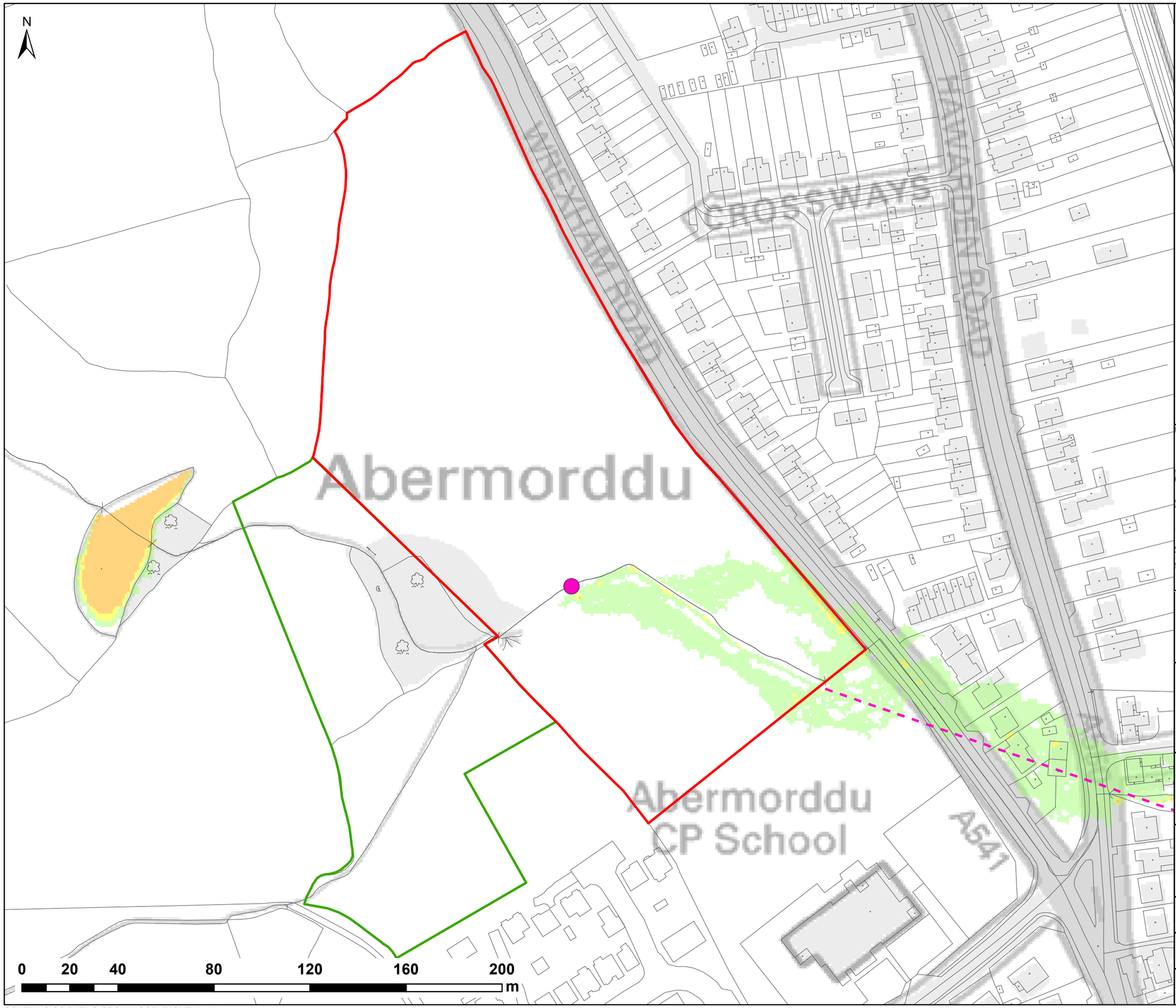

NOTES:
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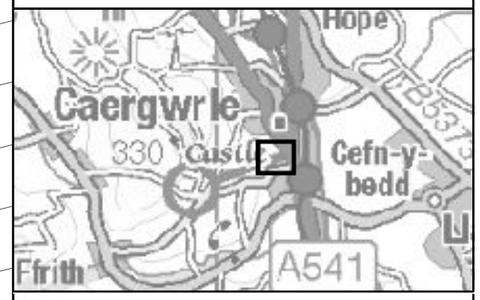
LEGEND

- Site Boundary
- Land Ownership
- Wrexham Rd Culvert Line (Assumed)
- Blockage Location (BL2)

Maximum Flood Hazard Rating (FD2320)

- < 0.75 (Caution)
- 0.75 - 1.25 (Danger for Some)
- 1.25 - 2 (Danger for Most)
- > 2.0 (Danger for All)



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SCHEME:

CLARK ESTATE
WREXHAM RD, ABERMORDDU

PLOT TITLE:

FLOOD HAZARD RATING
0.1% AEP FLUVIAL EVENT
EXISTING SITE LAYOUT (EXG)
ACCESS TRACK CULVERT BLOCKAGE (100%)

PLOT STATUS:			DATE:
FINAL			07/04/2017
DRAWN: RCL	CHECKED: LS	APPROVED: VG	PLOT SCALE @ A3: 1:1,500 (UNLESS STATED OTHERWISE)
PLOT NAME: w3246-Q1000-EXG-BL2-HZ			REV: -

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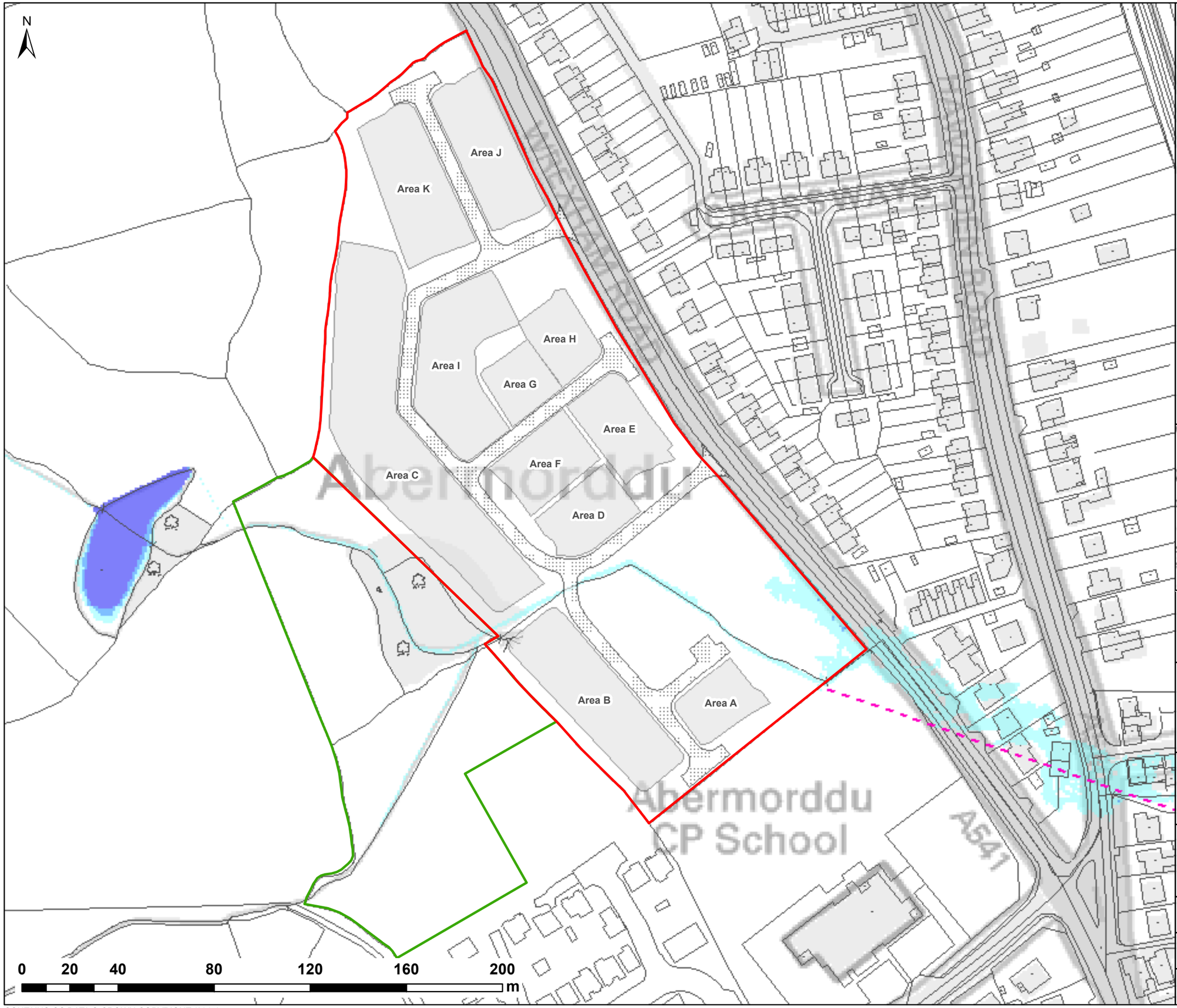


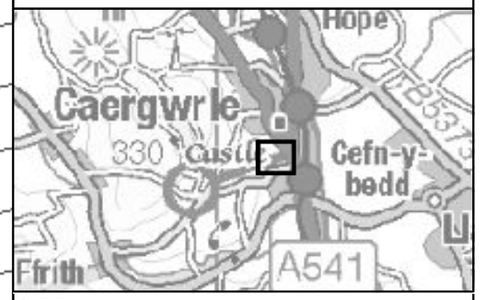
NOTES:
1) ALL DIMENSIONS ARE IN METRES AND ALL LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS STATED OTHERWISE

LEGEND

- Site Boundary
- Land Ownership
- Proposed Access Roads
- Proposed Development Areas
- Wrexham Rd Culvert Line (Assumed)

Maximum Flood Depth (m)

- 0 - 0.3
- 0.3 - 0.6
- 0.6 - 1.2
- 1.2 - 2.4
- > 2.4



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waterco consultants

Waterco Ltd
Eden Court, Ruthin, LL15 1NJ

01824 702220
www.waterco.co.uk

SCHEME:

CLARK ESTATE
WREXHAM RD, ABERMORDDU

PLOT TITLE:

MAXIMUM FLOOD DEPTH
5% AEP FLUVIAL EVENT
PROPOSED SITE LAYOUT (DEV)
NORMAL FLOW CONDITIONS

PLOT STATUS:			DATE:
FINAL			07/04/2017
DRAWN: RCL	CHECKED: LS	APPROVED: VG	PLOT SCALE @ A3: 1:1,500 (UNLESS STATED OTHERWISE)
PLOT NAME: w3246-Q20-DEV-NFC-D			REV: -

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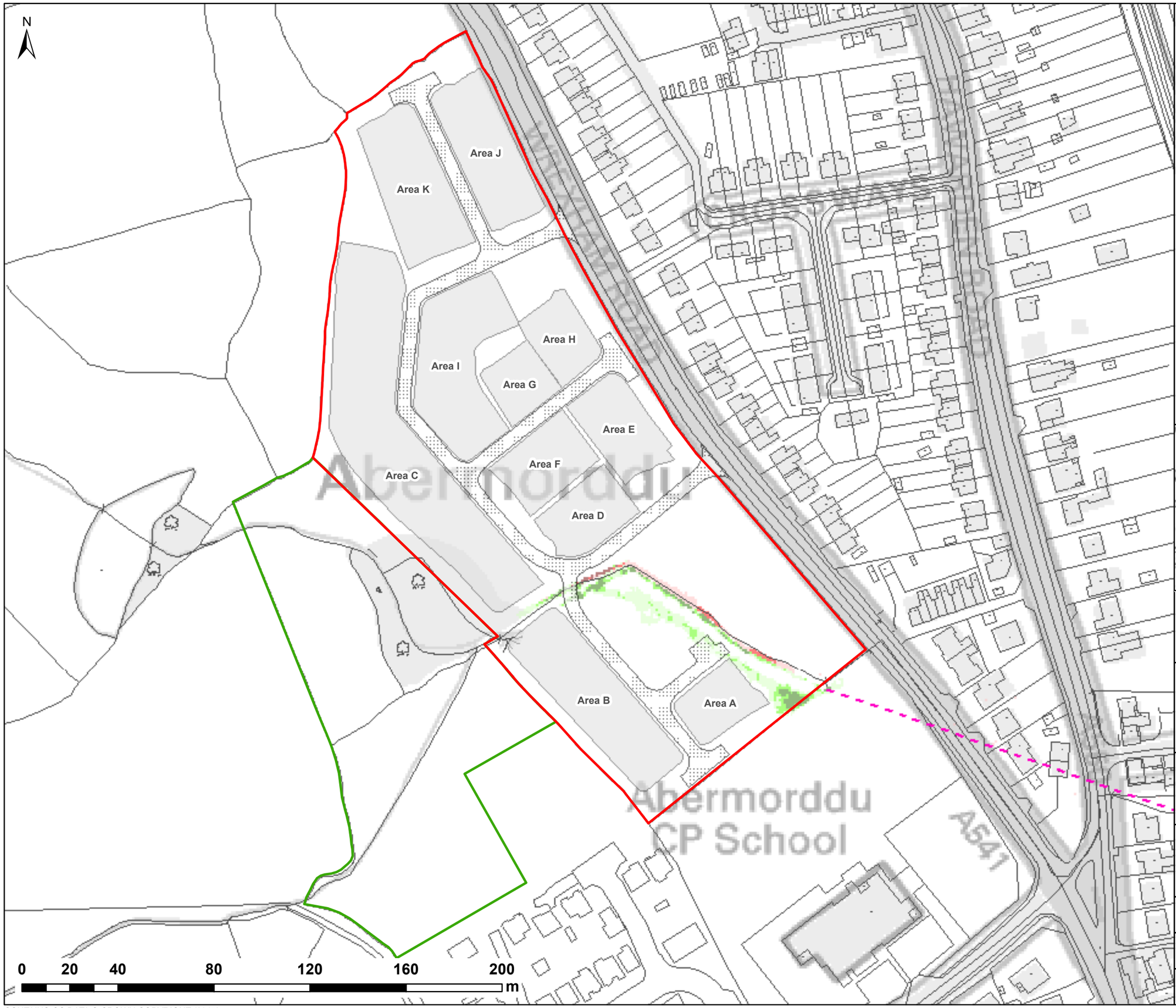


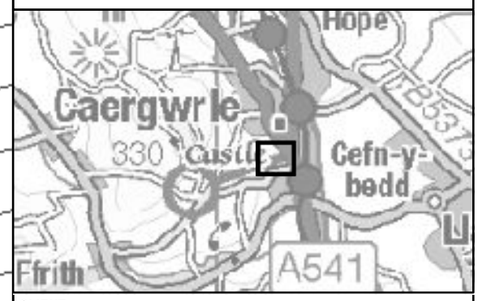
NOTES:
1) ALL DIMENSIONS ARE IN METRES AND ALL LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS STATED OTHERWISE

LEGEND

- Site Boundary
- Land Ownership
- Proposed Access Roads
- Proposed Development Areas
- Wrexham Rd Culvert Line (Assumed)

Maximum Depth Variation

- > +100mm
- +50mm to +100mm
- +5mm to +50mm
- No Change (+/-5mm)
- -5mm to -50mm
- -50mm to -100mm
- > -100mm



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Eden Court, Ruthin, LL15 1NJ
01824 702220
www.waterco.co.uk

SCHEME:

CLARK ESTATE
WREXHAM RD, ABERMORDDU

PLOT TITLE:

MAXIMUM DEPTH VARIATION
5% AEP FLUVIAL EVENT
EXG vs DEV
NORMAL FLOW CONDITIONS

PLOT STATUS:	DATE:
FINAL	07/04/2017

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE @ A3:
RCL	LS	VG	1:1,500 (UNLESS STATED OTHERWISE)

PLOT NAME:	REV:
w3246-Q20-DEV-NFC-D-DIFF	-

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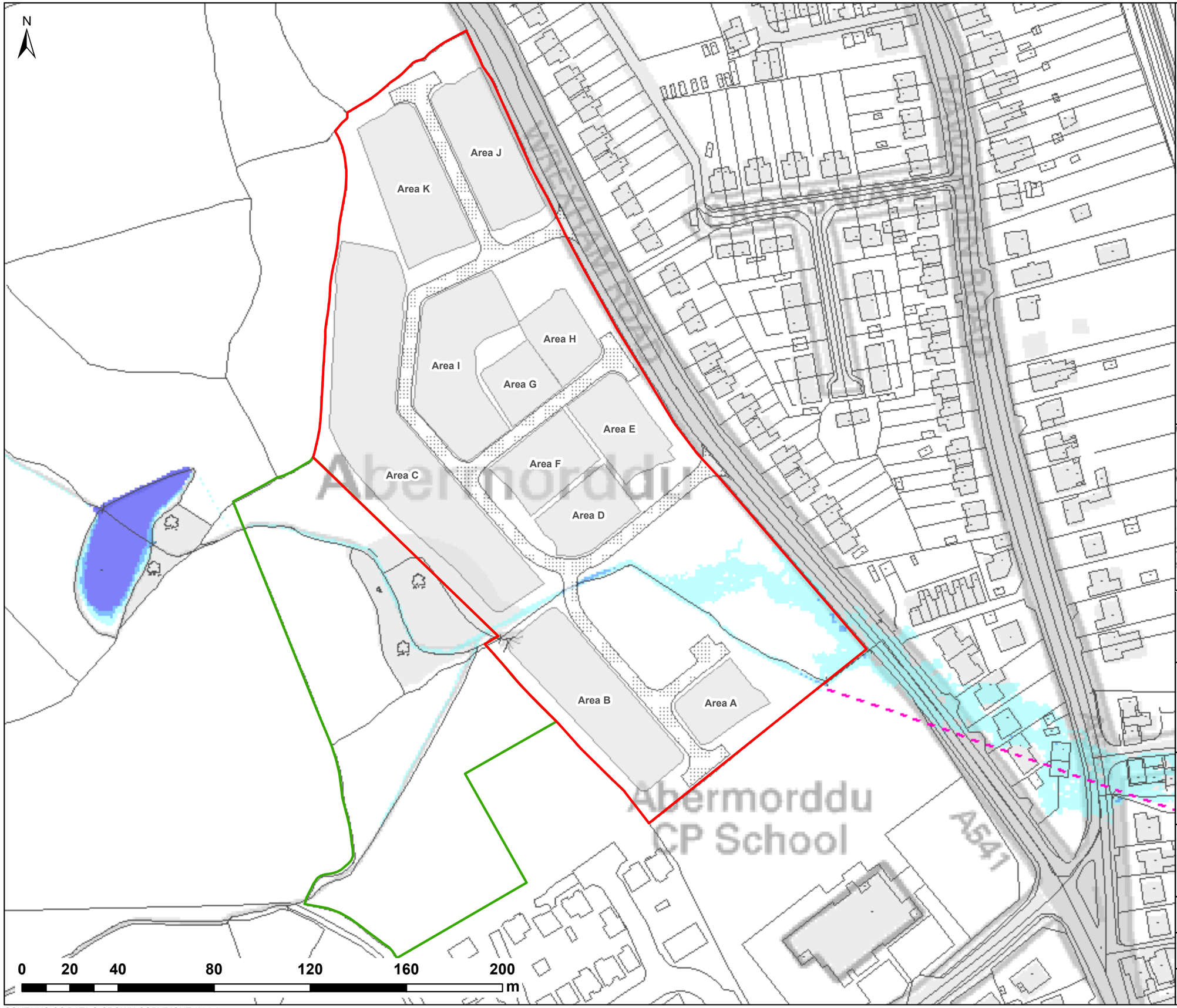


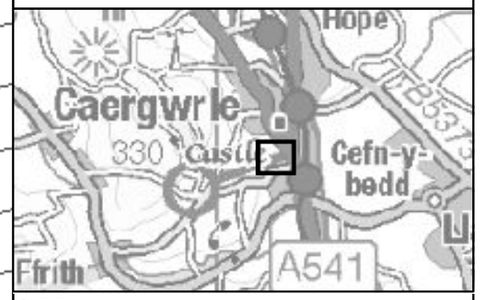
NOTES:
1) ALL DIMENSIONS ARE IN METRES AND ALL LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS STATED OTHERWISE

LEGEND

- Site Boundary
- Land Ownership
- Proposed Access Roads
- Proposed Development Areas
- Wrexham Rd Culvert Line (Assumed)

Maximum Flood Depth (m)

- 0 - 0.3
- 0.3 - 0.6
- 0.6 - 1.2
- 1.2 - 2.4
- > 2.4



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Eden Court, Ruthin, LL15 1NJ

01824 702220
www.waterco.co.uk

SCHEME:

CLARK ESTATE
WREXHAM RD, ABERMORDDU

PLOT TITLE:

MAXIMUM FLOOD DEPTH
1% AEP FLUVIAL EVENT
PROPOSED SITE LAYOUT (DEV)
NORMAL FLOW CONDITIONS

PLOT STATUS:			DATE:
FINAL			07/04/2017
DRAWN: RCL	CHECKED: LS	APPROVED: VG	PLOT SCALE @ A3: 1:1,500 (UNLESS STATED OTHERWISE)
PLOT NAME: w3246-Q100-DEV-NFC-D			REV: -

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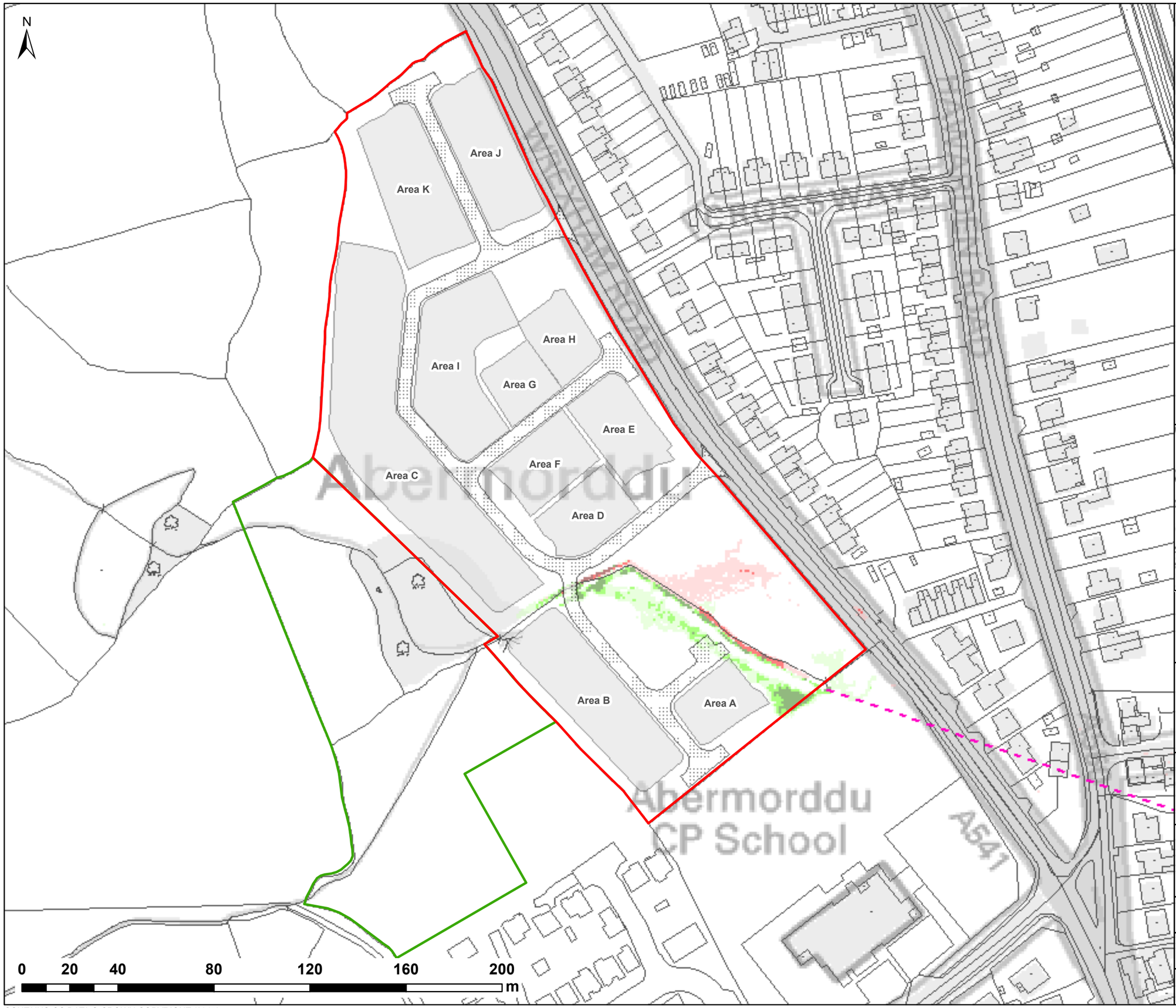


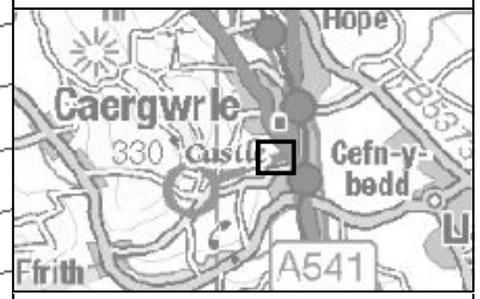
NOTES:
1) ALL DIMENSIONS ARE IN METRES AND ALL LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS STATED OTHERWISE

LEGEND

- Site Boundary
- Land Ownership
- Proposed Access Roads
- Proposed Development Areas
- Wrexham Rd Culvert Line (Assumed)

Maximum Depth Variation

- > +100mm
- +50mm to +100mm
- +5mm to +50mm
- No Change (+/-5mm)
- -5mm to -50mm
- -50mm to -100mm
- > -100mm



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waterco consultants

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Eden Court, Ruthin, LL15 1NJ
01824 702220
www.waterco.co.uk

SCHEME:

CLARK ESTATE
WREXHAM RD, ABERMORDDU

PLOT TITLE:

MAXIMUM DEPTH VARIATION
1% AEP FLUVIAL EVENT
EXG vs DEV
NORMAL FLOW CONDITIONS

PLOT STATUS:	DATE:
FINAL	07/04/2017

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE @ A3:
RCL	LS	VG	1:1,500 (UNLESS STATED OTHERWISE)

PLOT NAME:	REV:
w3246-Q100-DEV-NFC-D-DIFF	-

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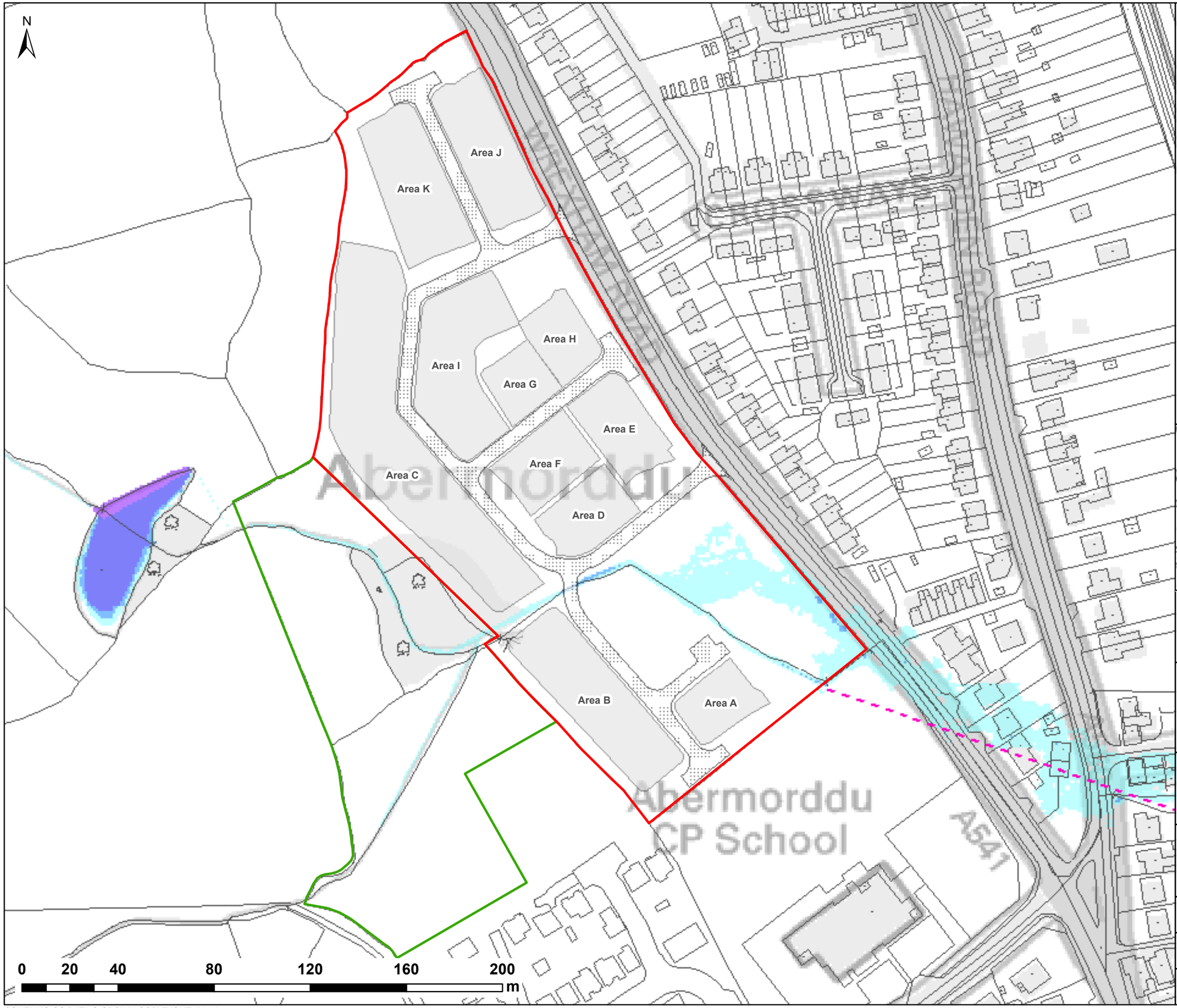


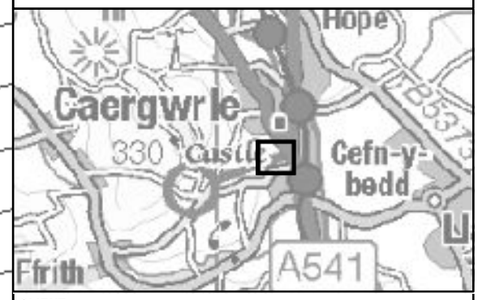
NOTES:
1) ALL DIMENSIONS ARE IN METRES AND ALL LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS STATED OTHERWISE

LEGEND

- Site Boundary
- Land Ownership
- Proposed Access Roads
- Proposed Development Areas
- Wrexham Rd Culvert Line (Assumed)

Maximum Flood Depth (m)

- 0 - 0.3
- 0.3 - 0.6
- 0.6 - 1.2
- 1.2 - 2.4
- > 2.4



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SCHEME:

CLARK ESTATE
WREXHAM RD, ABERMORDDU

PLOT TITLE:

MAXIMUM FLOOD DEPTH
1% AEP + 20% CC FLUVIAL EVENT
PROPOSED SITE LAYOUT (DEV)
NORMAL FLOW CONDITIONS

PLOT STATUS:			DATE:
FINAL			07/04/2017
DRAWN: RCL	CHECKED: LS	APPROVED: VG	PLOT SCALE @ A3: 1:1,500 (UNLESS STATED OTHERWISE)
PLOT NAME: w3246-Q100CC1-DEV-NFC-D			REV: -

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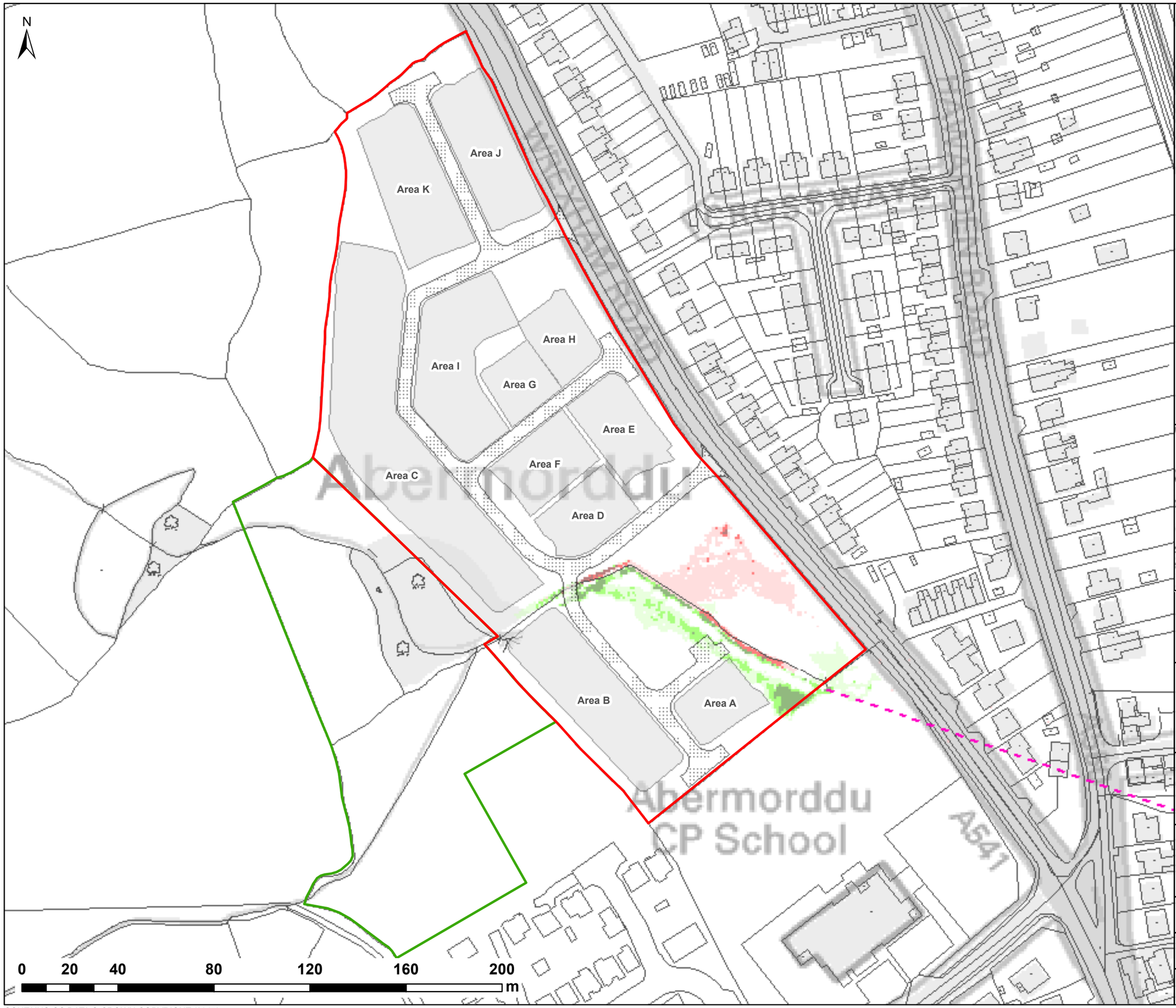


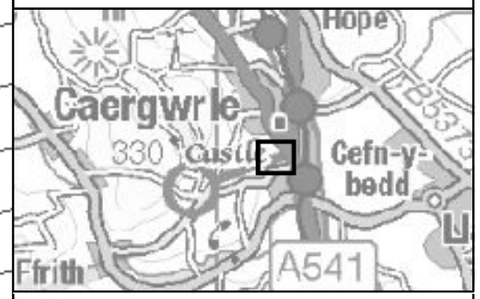
NOTES:
1) ALL DIMENSIONS ARE IN METRES AND ALL LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS STATED OTHERWISE

LEGEND

- Site Boundary
- Land Ownership
- Proposed Access Roads
- Proposed Development Areas
- Wrexham Rd Culvert Line (Assumed)

Maximum Depth Variation

- > +100mm
- +50mm to +100mm
- +5mm to +50mm
- No Change (+/-5mm)
- -5mm to -50mm
- -50mm to -100mm
- > -100mm



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Eden Court, Ruthin, LL15 1NJ
01824 702220
www.waterco.co.uk

SCHEME:

CLARK ESTATE
WREXHAM RD, ABERMORDDU

PLOT TITLE:

MAXIMUM DEPTH VARIATION
1% AEP + 20% CC FLUVIAL EVENT
EXG vs DEV
NORMAL FLOW CONDITIONS

PLOT STATUS:	DATE:
FINAL	07/04/2017

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE @ A3:
RCL	LS	VG	1:1,500 (UNLESS STATED OTHERWISE)

PLOT NAME:	REV:
w3246-Q100CC1-DEV-NFC-D-DIFF	-

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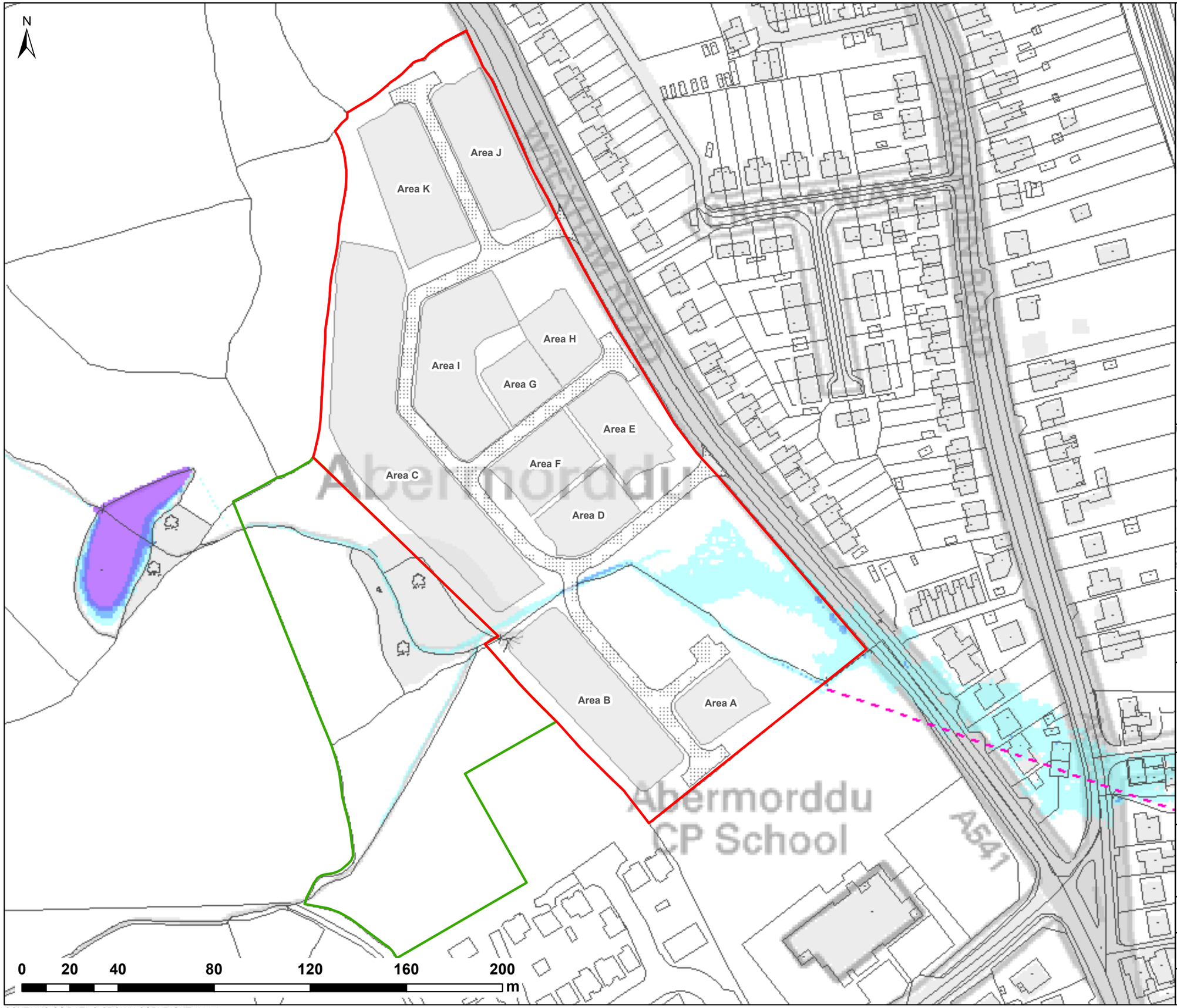


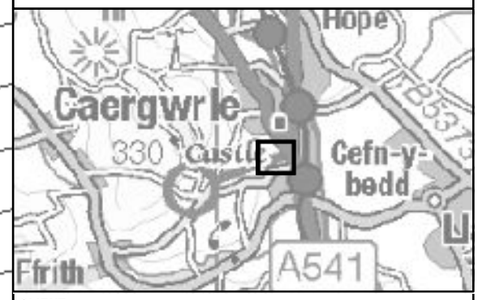
NOTES:
1) ALL DIMENSIONS ARE IN METRES AND ALL LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS STATED OTHERWISE

LEGEND

- Site Boundary
- Land Ownership
- Proposed Access Roads
- Proposed Development Areas
- Wrexham Rd Culvert Line (Assumed)

Maximum Flood Depth (m)

- 0 - 0.3
- 0.3 - 0.6
- 0.6 - 1.2
- 1.2 - 2.4
- > 2.4



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Waterco Ltd
Eden Court, Ruthin, LL15 1NJ

01824 702220
www.waterco.co.uk

SCHEME:

CLARK ESTATE
WREXHAM RD, ABERMORDDU

PLOT TITLE:

MAXIMUM FLOOD DEPTH
1% AEP + 45% CC FLUVIAL EVENT
PROPOSED SITE LAYOUT (DEV)
NORMAL FLOW CONDITIONS

PLOT STATUS:			DATE:
FINAL			07/04/2017
DRAWN: RCL	CHECKED: LS	APPROVED: VG	PLOT SCALE @ A3: 1:1,500 (UNLESS STATED OTHERWISE)
PLOT NAME: w3246-Q100CC2-DEV-NFC-D			REV: -

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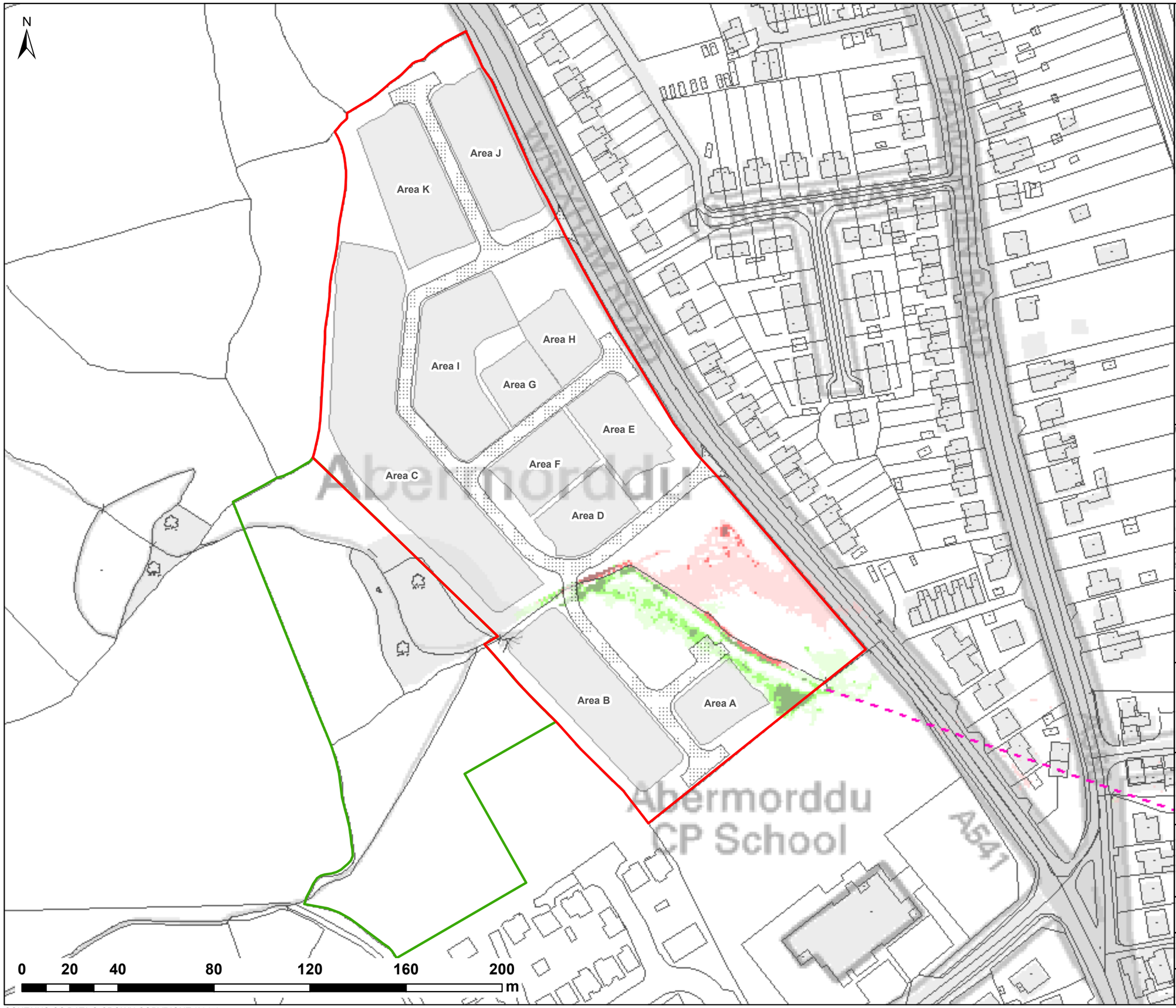


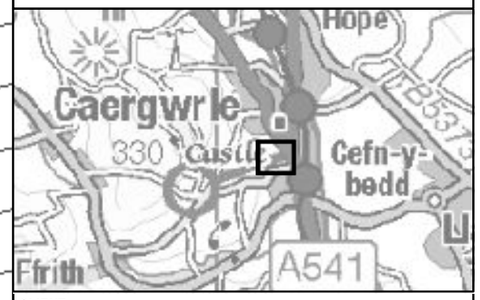
NOTES:
1) ALL DIMENSIONS ARE IN METRES AND ALL LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS STATED OTHERWISE

LEGEND

- Site Boundary
- Land Ownership
- Proposed Access Roads
- Proposed Development Areas
- Wrexham Rd Culvert Line (Assumed)

Maximum Depth Variation

- > +100mm
- +50mm to +100mm
- +5mm to +50mm
- No Change (+/-5mm)
- -5mm to -50mm
- -50mm to -100mm
- > -100mm



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Eden Court, Ruthin, LL15 1NJ
01824 702220
www.waterco.co.uk

SCHEME:

CLARK ESTATE
WREXHAM RD, ABERMORDDU

PLOT TITLE:

MAXIMUM DEPTH VARIATION
1% AEP + 45% CC FLUVIAL EVENT
EXG vs DEV
NORMAL FLOW CONDITIONS

PLOT STATUS:	DATE:
FINAL	07/04/2017

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE @ A3:
RCL	LS	VG	1:1,500 (UNLESS STATED OTHERWISE)

PLOT NAME:	REV:
w3246-Q100CC2-DEV-NFC-D-DIFF	-

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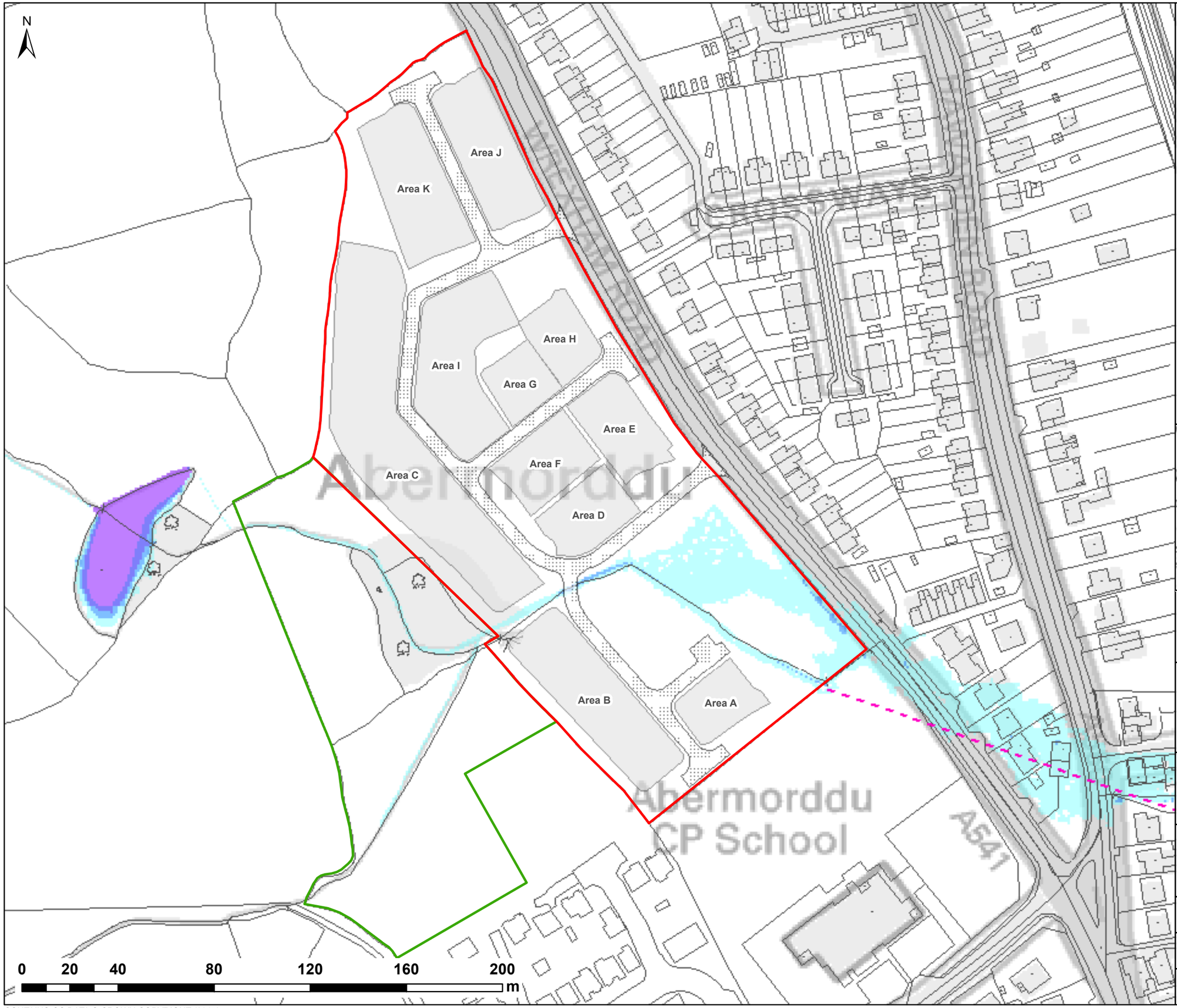

NOTES:
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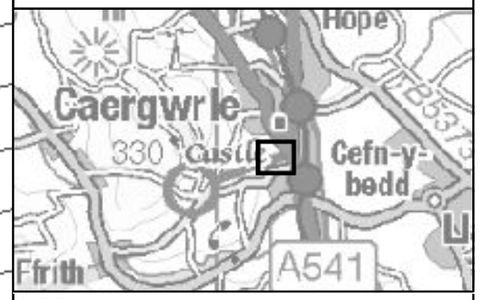
LEGEND

- Site Boundary
- Land Ownership
- Proposed Access Roads
- Proposed Development Areas
- Wrexham Rd Culvert Line (Assumed)

Maximum Flood Depth (m)

- 0 - 0.3
- 0.3 - 0.6
- 0.6 - 1.2
- 1.2 - 2.4
- > 2.4



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Eden Court, Ruthin, LL15 1NJ

01824 702220
www.waterco.co.uk

SCHEME:

CLARK ESTATE
WREXHAM RD, ABERMORDDU

PLOT TITLE:

MAXIMUM FLOOD DEPTH
0.1% AEP FLUVIAL EVENT
PROPOSED SITE LAYOUT (DEV)
NORMAL FLOW CONDITIONS

PLOT STATUS:			DATE:
FINAL			07/04/2017
DRAWN: RCL	CHECKED: LS	APPROVED: VG	PLOT SCALE @ A3: 1:1,500 (UNLESS STATED OTHERWISE)
PLOT NAME: w3246-Q1000-DEV-NFC-D			REV: -

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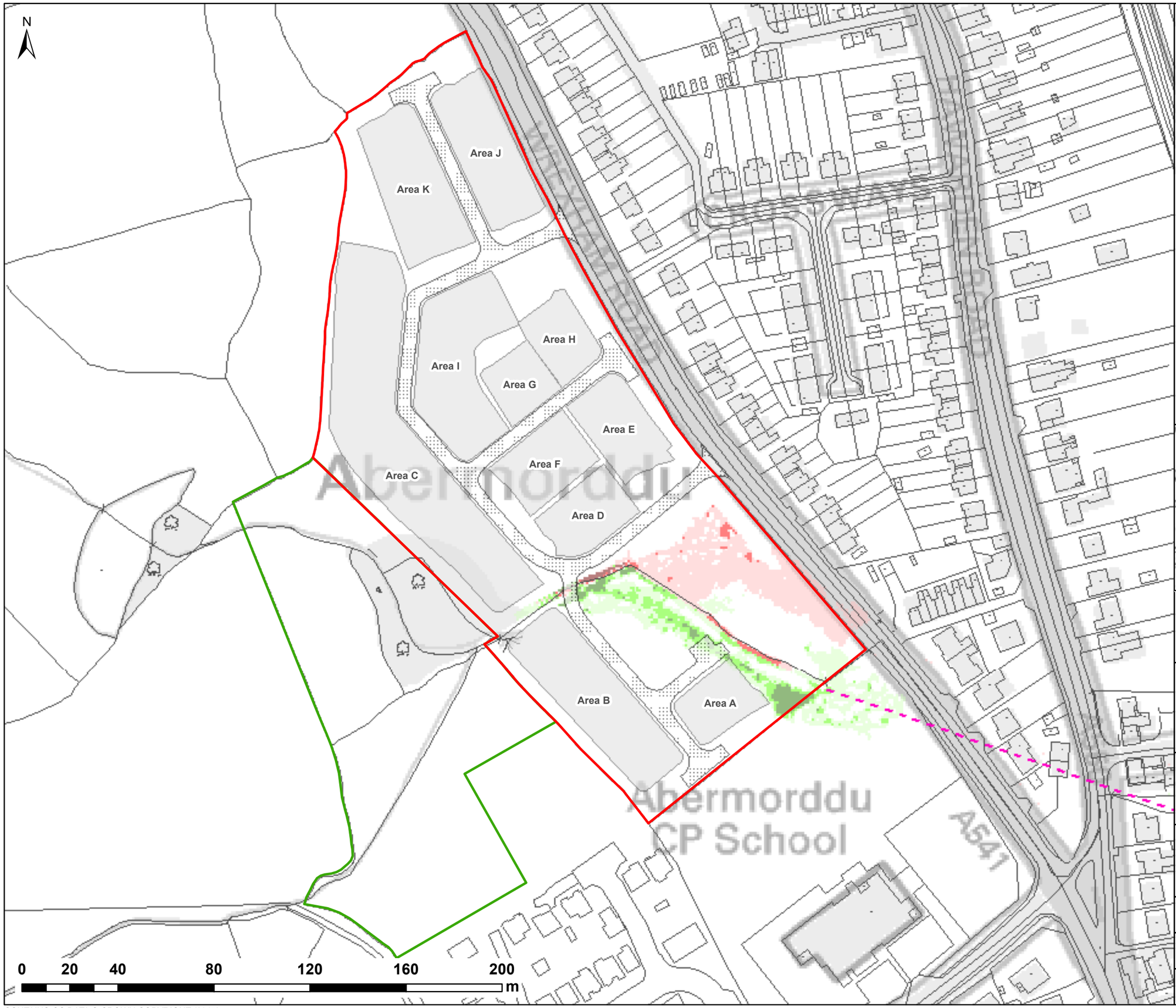


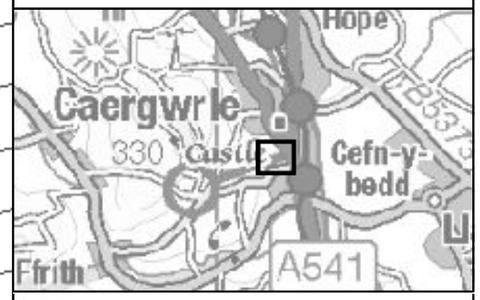
NOTES:
1) ALL DIMENSIONS ARE IN METRES AND ALL LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS STATED OTHERWISE

LEGEND

- Site Boundary
- Land Ownership
- Proposed Access Roads
- Proposed Development Areas
- Wrexham Rd Culvert Line (Assumed)

Maximum Depth Variation

- > +100mm
- +50mm to +100mm
- +5mm to +50mm
- No Change (+/-5mm)
- -5mm to -50mm
- -50mm to -100mm
- > -100mm



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Eden Court, Ruthin, LL15 1NJ
01824 702220
www.waterco.co.uk

SCHEME:

CLARK ESTATE
WREXHAM RD, ABERMORDDU

PLOT TITLE:

MAXIMUM DEPTH VARIATION
0.1% AEP FLUVIAL EVENT
EXG vs DEV
NORMAL FLOW CONDITIONS

PLOT STATUS:	DATE:
FINAL	07/04/2017

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE @ A3:
RCL	LS	VG	1:1,500 (UNLESS STATED OTHERWISE)

PLOT NAME:	REV:
w3246-Q1000-DEV-NFC-D-DIFF	-

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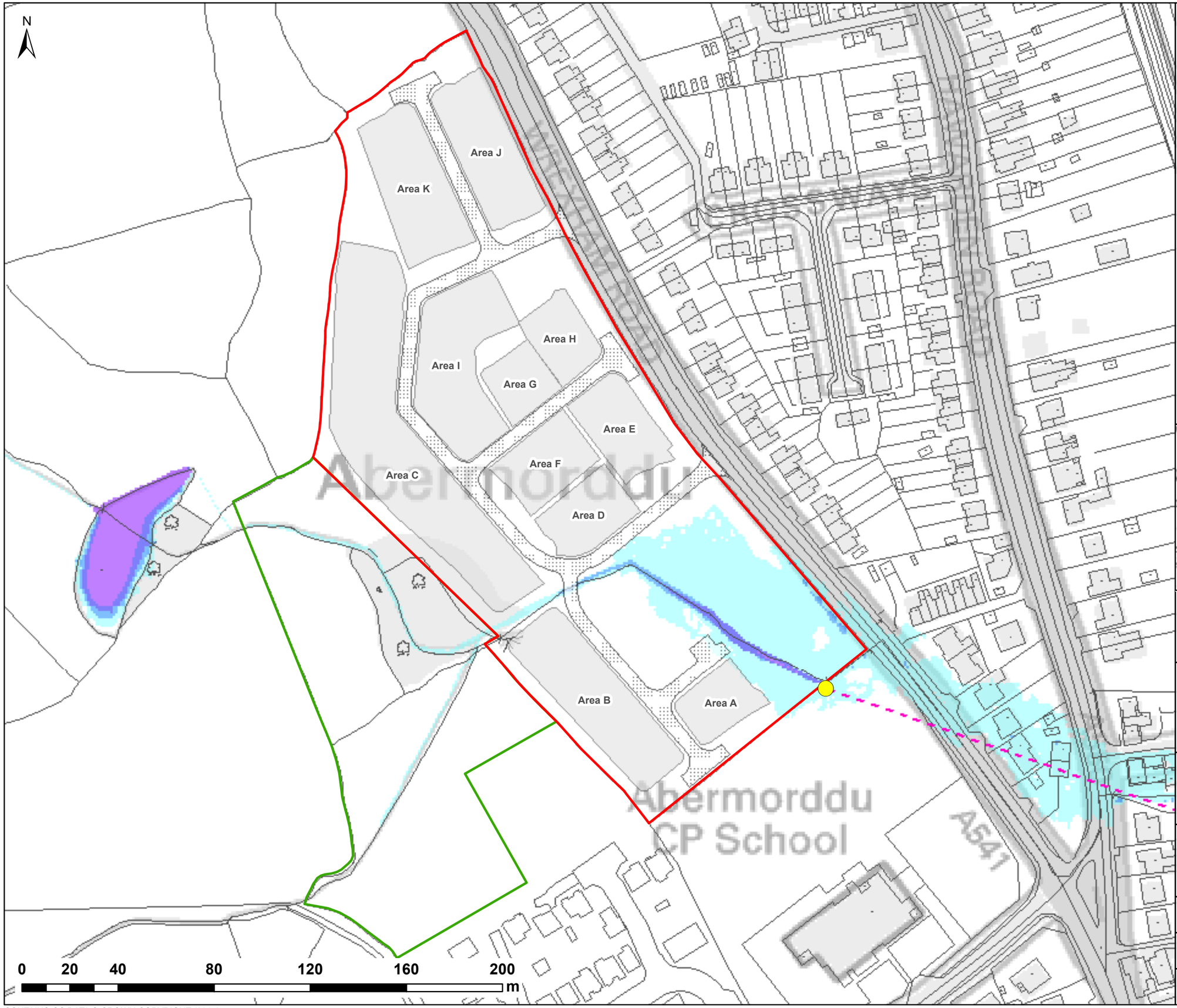


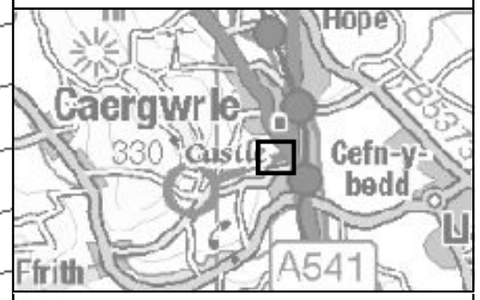
NOTES:
1) ALL DIMENSIONS ARE IN METRES AND ALL LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS STATED OTHERWISE

LEGEND

- Site Boundary
- Land Ownership
- Proposed Access Roads
- Proposed Development Areas
- Wrexham Rd Culvert Line (Assumed)
- Blockage Location (BL1)

Maximum Flood Depth (m)

- 0 - 0.3
- 0.3 - 0.6
- 0.6 - 1.2
- 1.2 - 2.4
- > 2.4



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Eden Court, Ruthin, LL15 1NJ

01824 702220
www.waterco.co.uk

SCHEME:

CLARK ESTATE
WREXHAM RD, ABERMORDDU

PLOT TITLE:

MAXIMUM FLOOD DEPTH
0.1% AEP FLUVIAL EVENT
PROPOSED SITE LAYOUT (DEV)
WREXHAM RD CULVERT BLOCKAGE (100%)

PLOT STATUS:			DATE:
FINAL			07/04/2017
DRAWN: RCL	CHECKED: LS	APPROVED: VG	PLOT SCALE @ A3: 1:1,500 (UNLESS STATED OTHERWISE)
PLOT NAME: w3246-Q1000-DEV-BL1-D			REV: -

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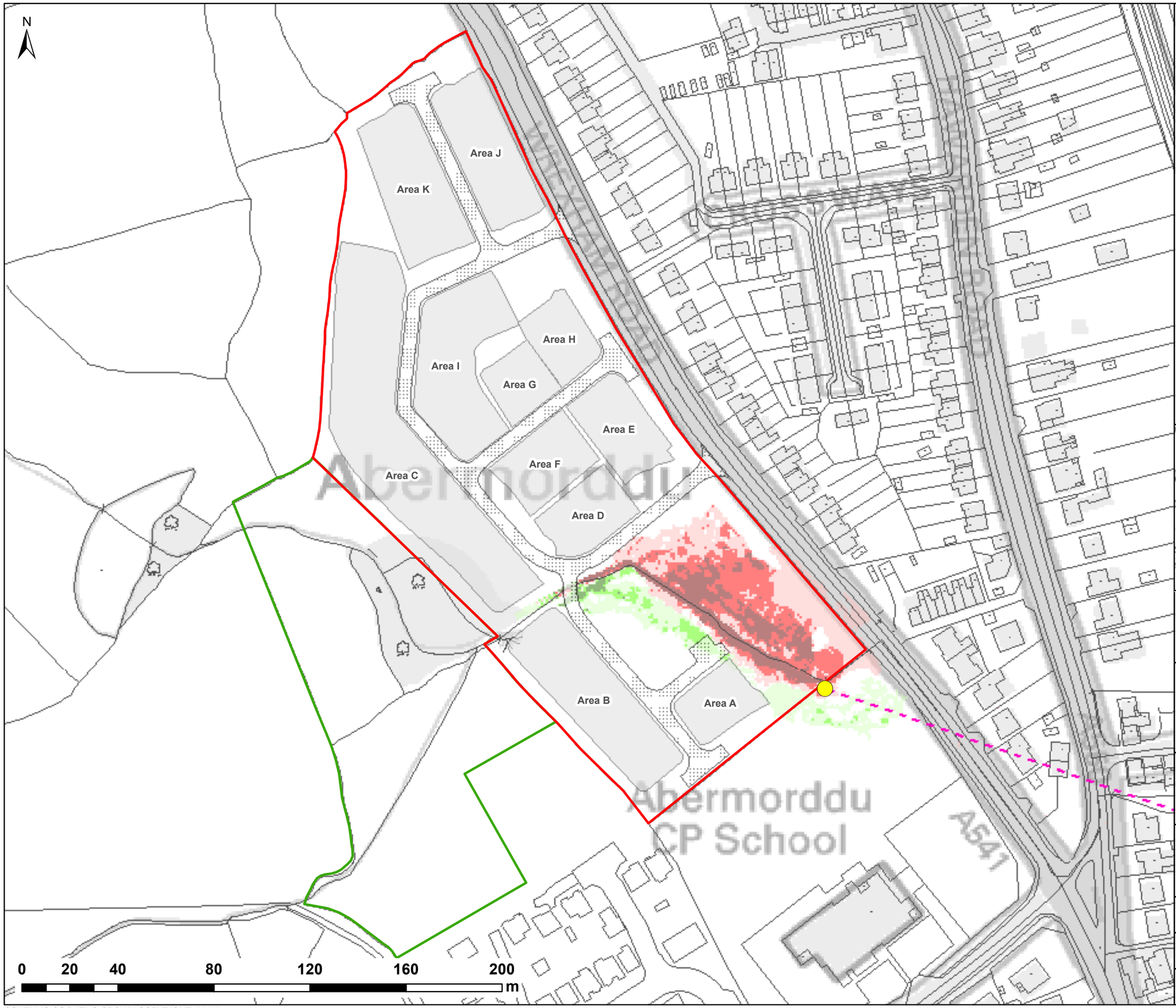

NOTES:
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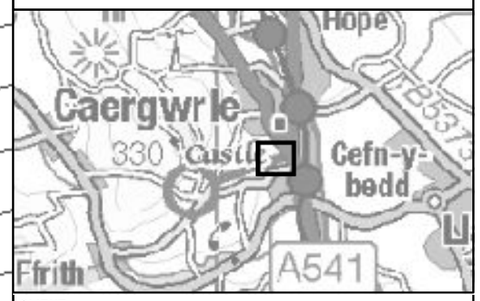
LEGEND

- Site Boundary
- Land Ownership
- Proposed Access Roads
- Proposed Development Areas
- Wrexham Rd Culvert Line (Assumed)
- Blockage Location (BL1)

Maximum Depth Variation

- > +100mm
- +50mm to +100mm
- +5mm to +50mm
- No Change (+/-5mm)
- -5mm to -50mm
- -50mm to -100mm
- > -100mm



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01824 702220
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SCHEME:

CLARK ESTATE
WREXHAM RD, ABERMORDDU

PLOT TITLE:

MAXIMUM DEPTH VARIATION
0.1% AEP FLUVIAL EVENT
EXG vs DEV
WREXHAM RD CULVERT BLOCKAGE (100%)

PLOT STATUS:	DATE:
FINAL	07/04/2017

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE @ A3:
RCL	LS	VG	1:1,500 (UNLESS STATED OTHERWISE)

PLOT NAME:	REV:
w3246-Q1000-DEV-BL1-D-DIFF	-

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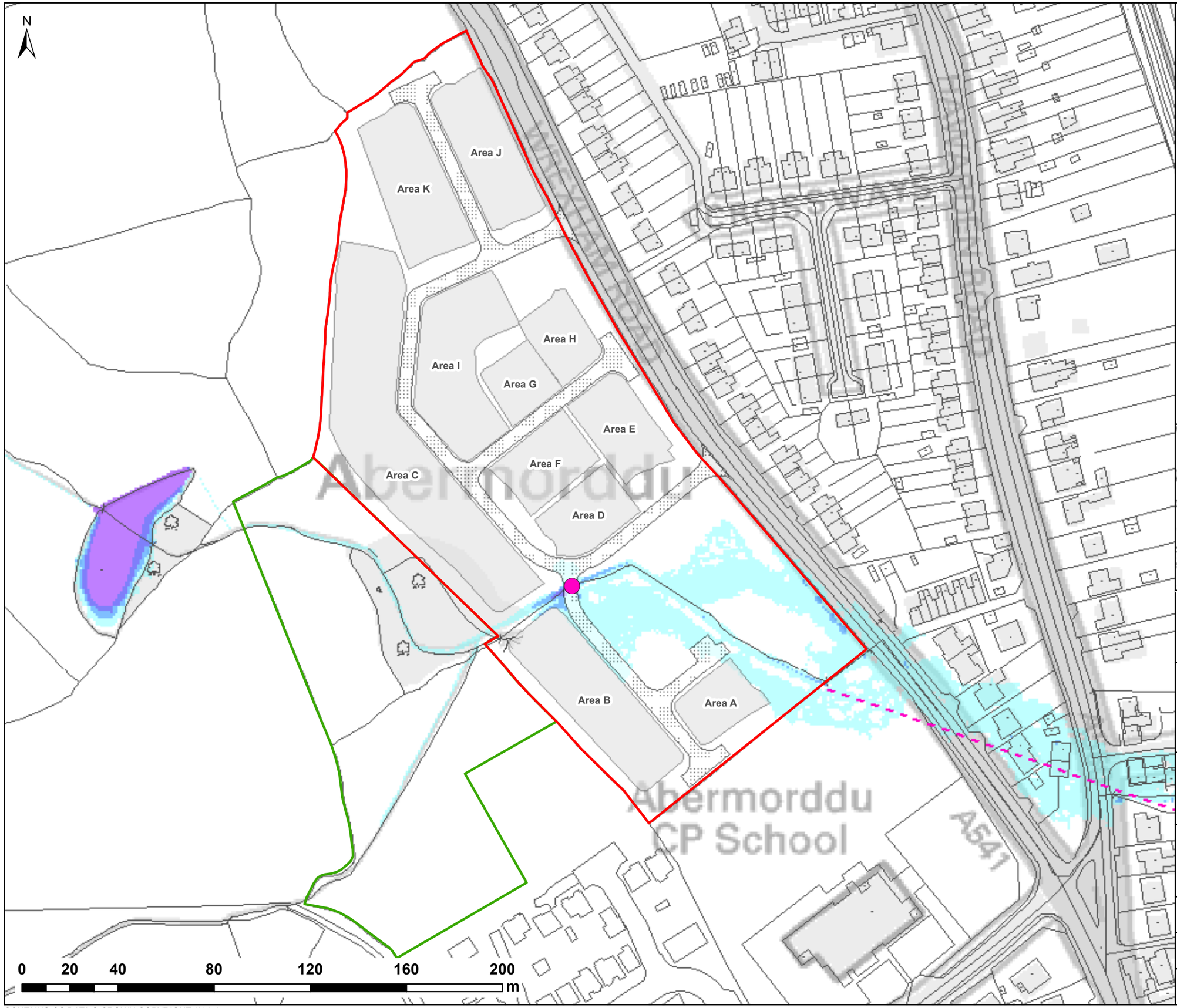


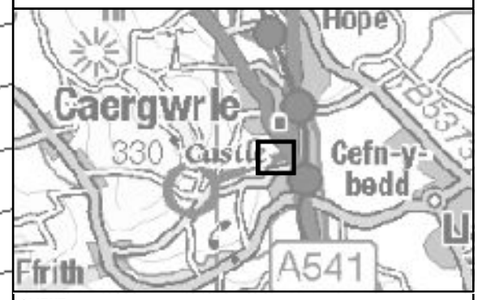
NOTES:
1) ALL DIMENSIONS ARE IN METRES AND ALL LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS STATED OTHERWISE

LEGEND

- Site Boundary
- Land Ownership
- Proposed Access Roads
- Proposed Development Areas
- Wrexham Rd Culvert Line (Assumed)
- Blockage Location (BL2)

Maximum Flood Depth (m)

- 0 - 0.3
- 0.3 - 0.6
- 0.6 - 1.2
- 1.2 - 2.4
- > 2.4



CLIENT:

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waterco consultants

Waterco Ltd
Eden Court, Ruthin, LL15 1NJ

01824 702220
www.waterco.co.uk

SCHEME:

CLARK ESTATE
WREXHAM RD, ABERMORDDU

PLOT TITLE:

MAXIMUM FLOOD DEPTH
0.1% AEP FLUVIAL EVENT
PROPOSED SITE LAYOUT (DEV)
ACCESS ROAD CULVERT BLOCKAGE (100%)

PLOT STATUS:			DATE:
FINAL			07/04/2017
DRAWN: RCL	CHECKED: LS	APPROVED: VG	PLOT SCALE @ A3: 1:1,500 (UNLESS STATED OTHERWISE)
PLOT NAME: w3246-Q1000-DEV-BL2-D			REV: -

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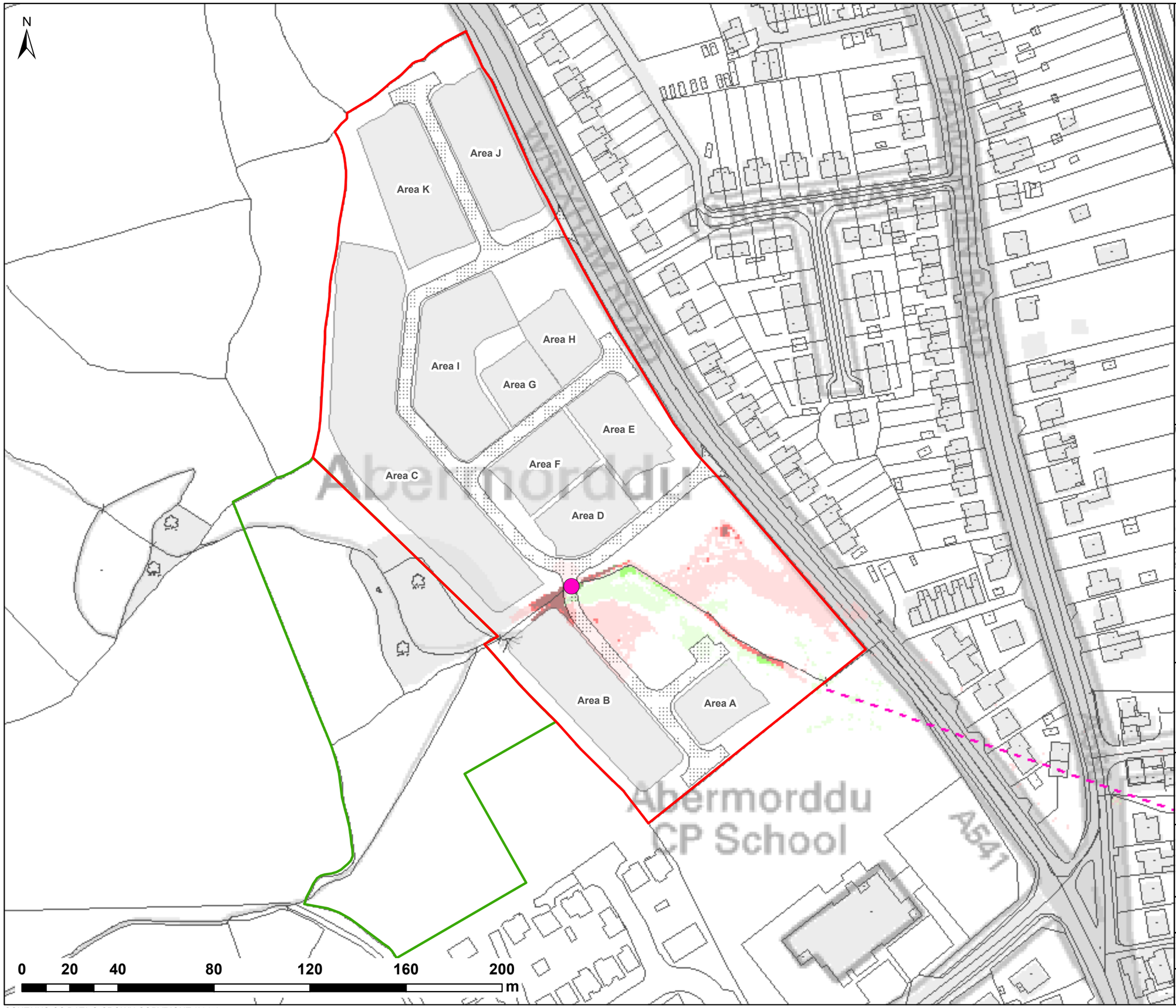


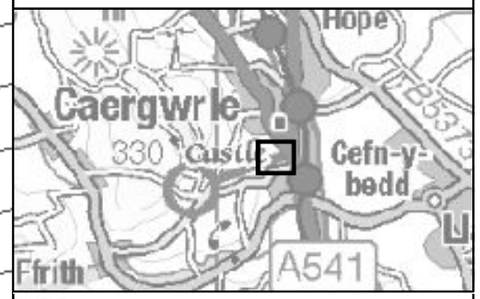
NOTES:
1) ALL DIMENSIONS ARE IN METRES AND ALL LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS STATED OTHERWISE

LEGEND

- Site Boundary
- Land Ownership
- Proposed Access Roads
- Proposed Development Areas
- Wrexham Rd Culvert Line (Assumed)
- Blockage Location (BL2)

Maximum Depth Variation

- > +100mm
- +50mm to +100mm
- +5mm to +50mm
- No Change (+/-5mm)
- -5mm to -50mm
- -50mm to -100mm
- > -100mm



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Eden Court, Ruthin, LL15 1NJ
01824 702220
www.waterco.co.uk

SCHEME:

CLARK ESTATE
WREXHAM RD, ABERMORDDU

PLOT TITLE:

MAXIMUM DEPTH VARIATION
0.1% AEP FLUVIAL EVENT
EXG vs DEV
ACCESS ROAD CULVERT BLOCKAGE (100%)

PLOT STATUS:	DATE:
FINAL	07/04/2017

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE @ A3:
RCL	LS	VG	1:1,500 (UNLESS STATED OTHERWISE)

PLOT NAME:	REV:
w3246-Q1000-DEV-BL2-D-DIFF	-

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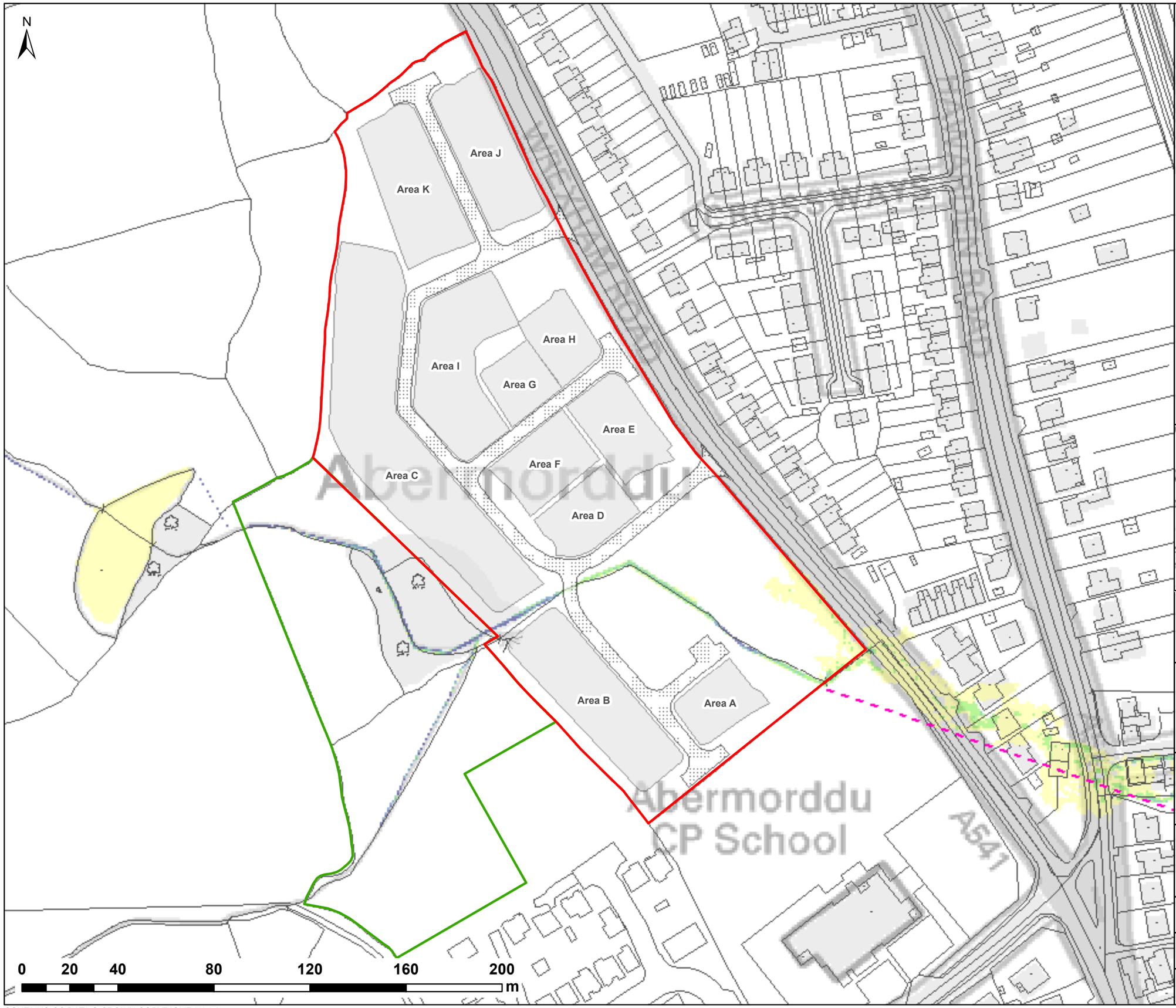


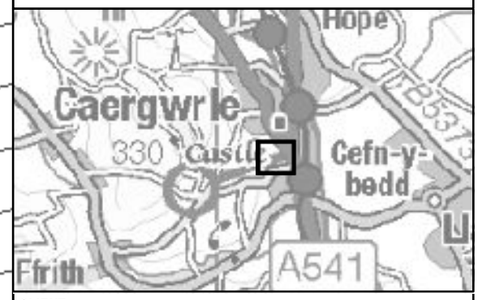
NOTES:
1) ALL DIMENSIONS ARE IN METRES AND ALL LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS STATED OTHERWISE

LEGEND

- Site Boundary
- Land Ownership
- Proposed Access Roads
- Proposed Development Areas
- Wrexham Rd Culvert Line (Assumed)

Maximum Velocity (m/s)

- 0.0 - 0.3
- 0.3 - 0.6
- 0.6 - 0.9
- 0.9 - 1.2
- > 1.2



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Eden Court, Ruthin, LL15 1NJ

01824 702220
www.waterco.co.uk

SCHEME:

CLARK ESTATE
WREXHAM RD, ABERMORDDU

PLOT TITLE:

MAXIMUM VELOCITY
5% AEP FLUVIAL EVENT
PROPOSED SITE LAYOUT (DEV)
NORMAL FLOW CONDITIONS

PLOT STATUS:	DATE:
FINAL	07/04/2017

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE @ A3:
RCL	LS	VG	1:1,500 (UNLESS STATED OTHERWISE)

PLOT NAME:	REV:
w3246-Q20-DEV-NFC-V	-

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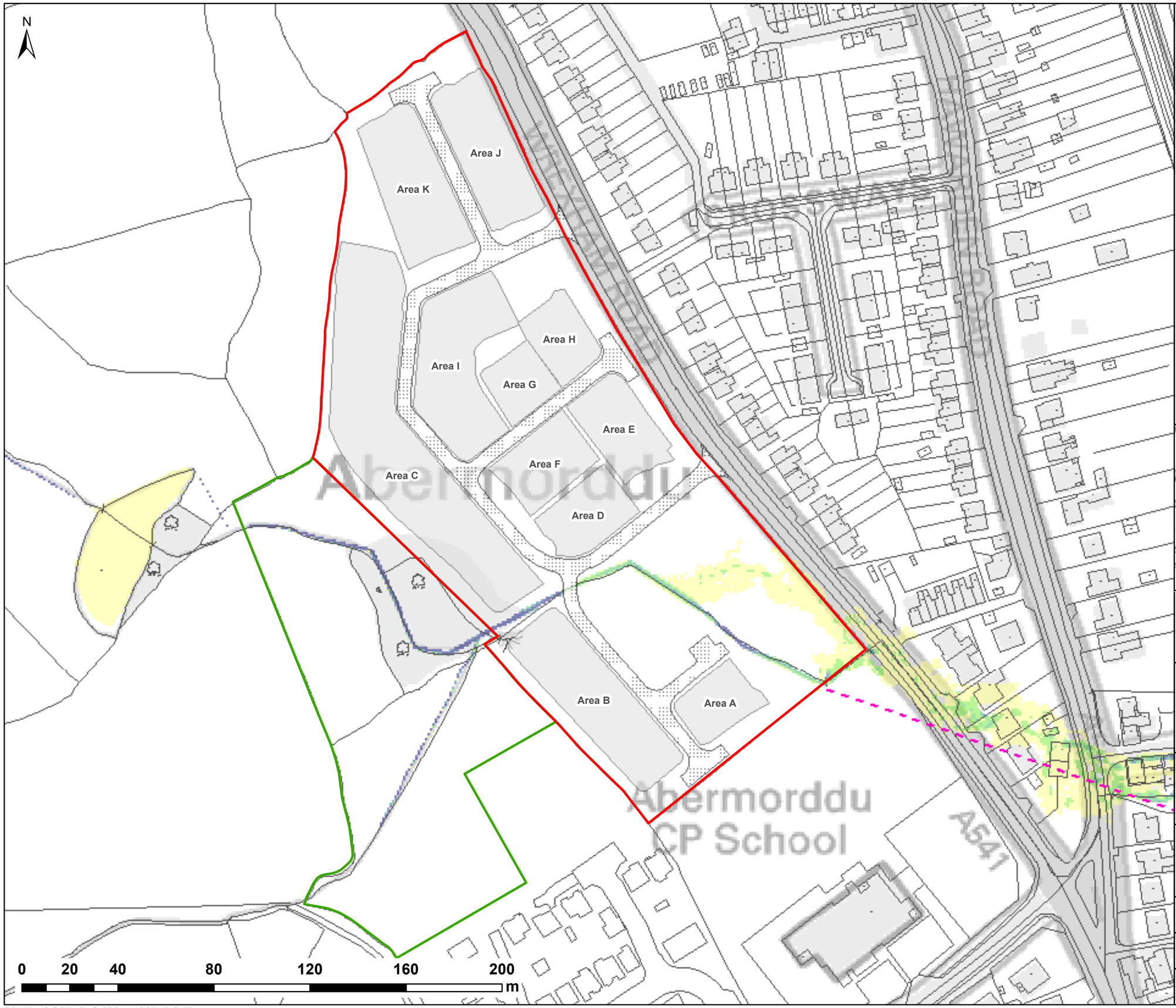


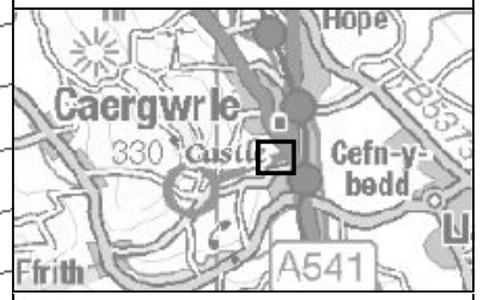
NOTES:
1) ALL DIMENSIONS ARE IN METRES AND ALL LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS STATED OTHERWISE

LEGEND

- Site Boundary
- Land Ownership
- Proposed Access Roads
- Proposed Development Areas
- Wrexham Rd Culvert Line (Assumed)

Maximum Velocity (m/s)

- 0.0 - 0.3
- 0.3 - 0.6
- 0.6 - 0.9
- 0.9 - 1.2
- > 1.2



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Eden Court, Ruthin, LL15 1NJ

01824 702220
www.waterco.co.uk

SCHEME:

CLARK ESTATE
WREXHAM RD, ABERMORDDU

PLOT TITLE:

MAXIMUM VELOCITY
1% AEP FLUVIAL EVENT
PROPOSED SITE LAYOUT (DEV)
NORMAL FLOW CONDITIONS

PLOT STATUS:			DATE:
FINAL			07/04/2017
DRAWN: RCL	CHECKED: LS	APPROVED: VG	PLOT SCALE @ A3: 1:1,500 (UNLESS STATED OTHERWISE)
PLOT NAME: w3246-Q100-DEV-NFC-V			REV: -

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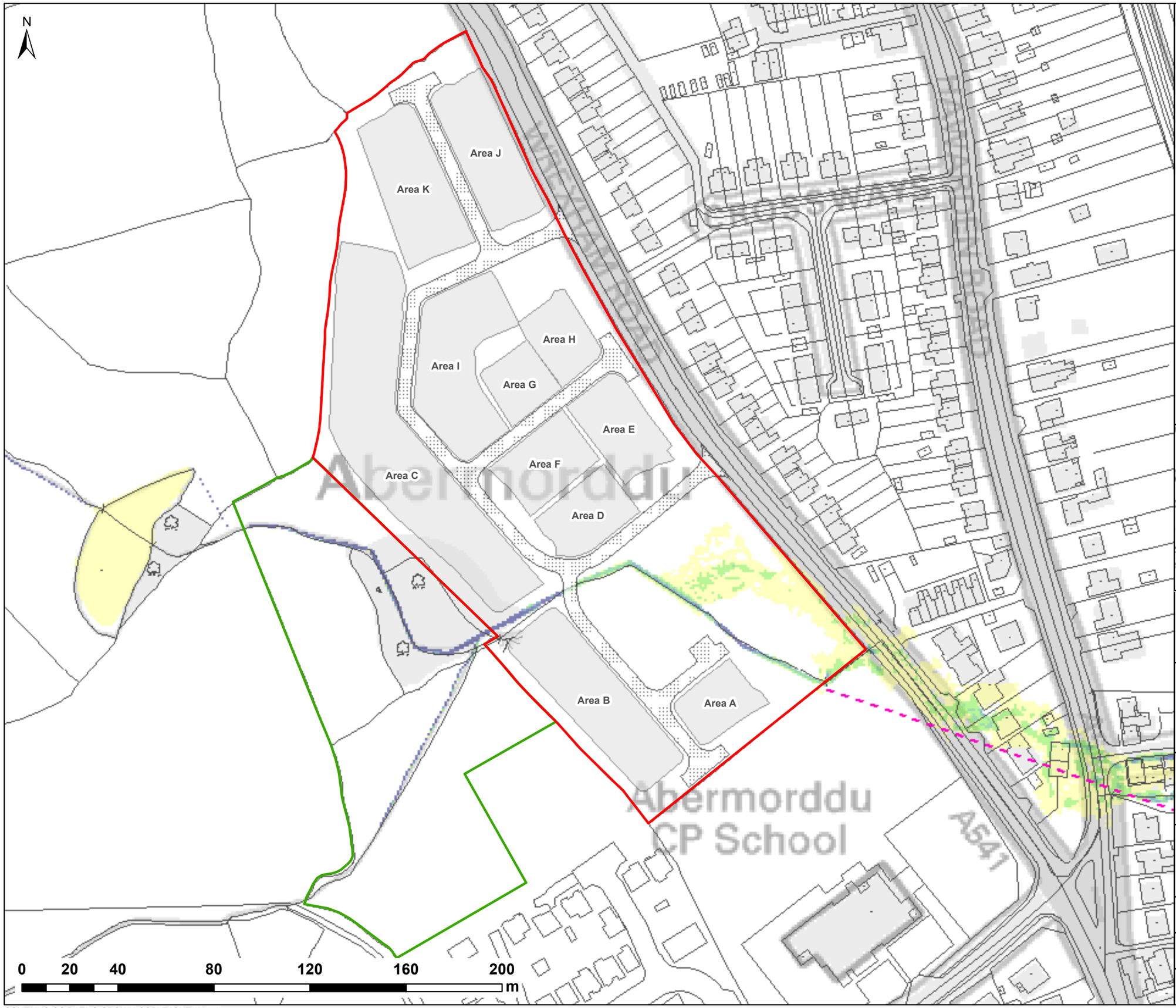


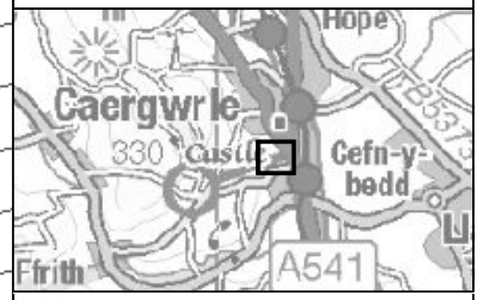
NOTES:
1) ALL DIMENSIONS ARE IN METRES AND ALL LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS STATED OTHERWISE

LEGEND

- Site Boundary
- Land Ownership
- Proposed Access Roads
- Proposed Development Areas
- Wrexham Rd Culvert Line (Assumed)

Maximum Velocity (m/s)

- 0.0 - 0.3
- 0.3 - 0.6
- 0.6 - 0.9
- 0.9 - 1.2
- > 1.2



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www.waterco.co.uk

SCHEME:

CLARK ESTATE
WREXHAM RD, ABERMORDDU

PLOT TITLE:

MAXIMUM VELOCITY
1% AEP + 20% CC FLUVIAL EVENT
PROPOSED SITE LAYOUT (DEV)
NORMAL FLOW CONDITIONS

PLOT STATUS:	DATE:
FINAL	07/04/2017

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE @ A3:
RCL	LS	VG	1:1,500 (UNLESS STATED OTHERWISE)

PLOT NAME:	REV:
w3246-Q100CC1-DEV-NFC-V	-

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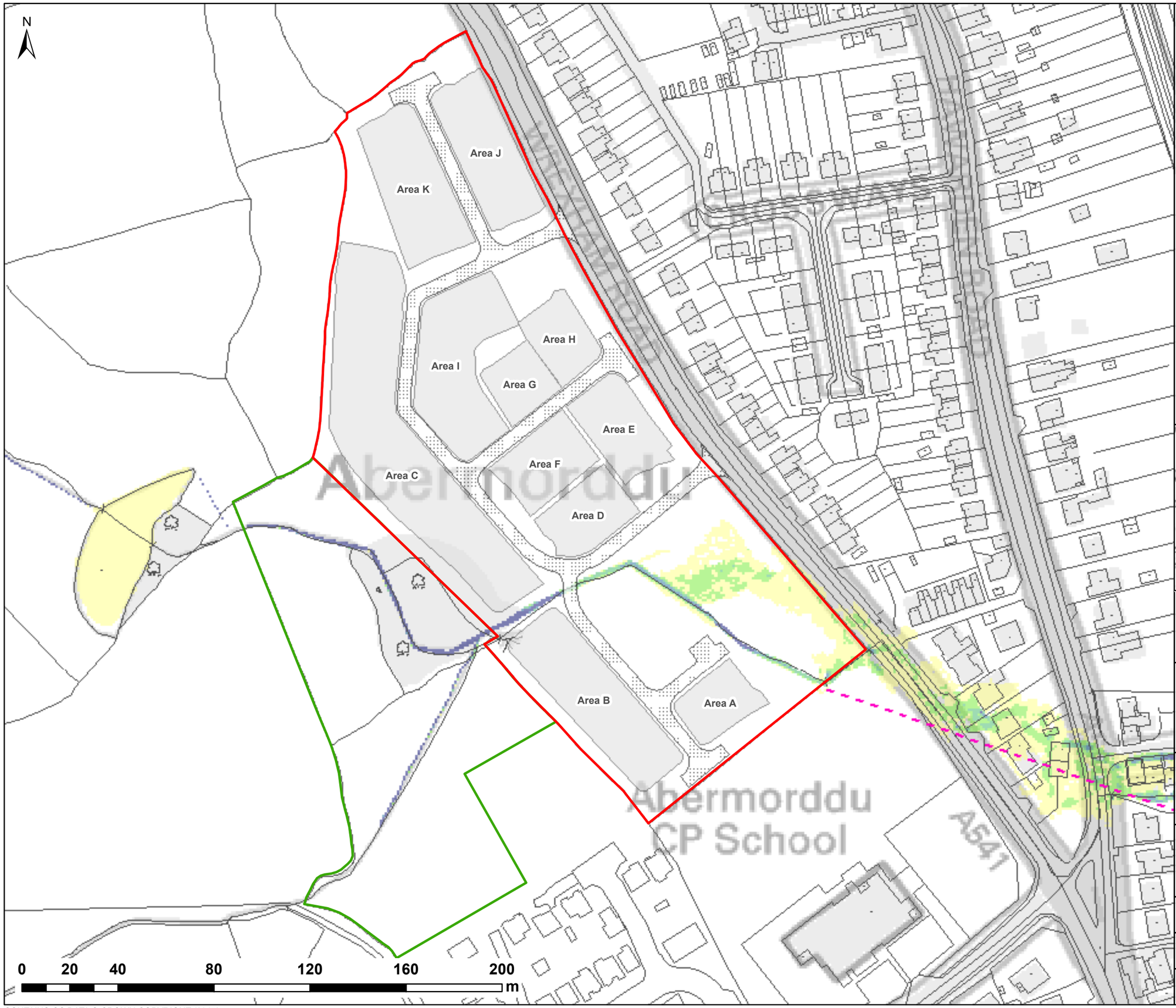


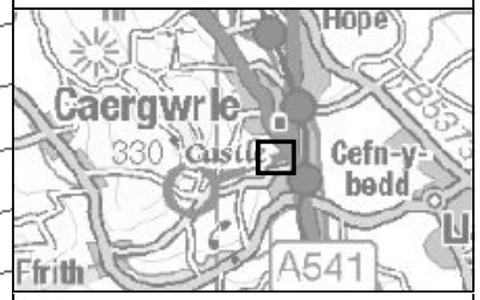
NOTES:
1) ALL DIMENSIONS ARE IN METRES AND ALL LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS STATED OTHERWISE

LEGEND

- Site Boundary
- Land Ownership
- Proposed Access Roads
- Proposed Development Areas
- Wrexham Rd Culvert Line (Assumed)

Maximum Velocity (m/s)

- 0.0 - 0.3
- 0.3 - 0.6
- 0.6 - 0.9
- 0.9 - 1.2
- > 1.2



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Eden Court, Ruthin, LL15 1NJ

01824 702220
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SCHEME:

CLARK ESTATE
WREXHAM RD, ABERMORDDU

PLOT TITLE:

MAXIMUM VELOCITY
1% AEP + 45% CC FLUVIAL EVENT
PROPOSED SITE LAYOUT (DEV)
NORMAL FLOW CONDITIONS

PLOT STATUS:	DATE:
FINAL	07/04/2017

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE @ A3:
RCL	LS	VG	1:1,500 (UNLESS STATED OTHERWISE)

PLOT NAME:	REV:
w3246-Q100CC2-DEV-NFC-V	-

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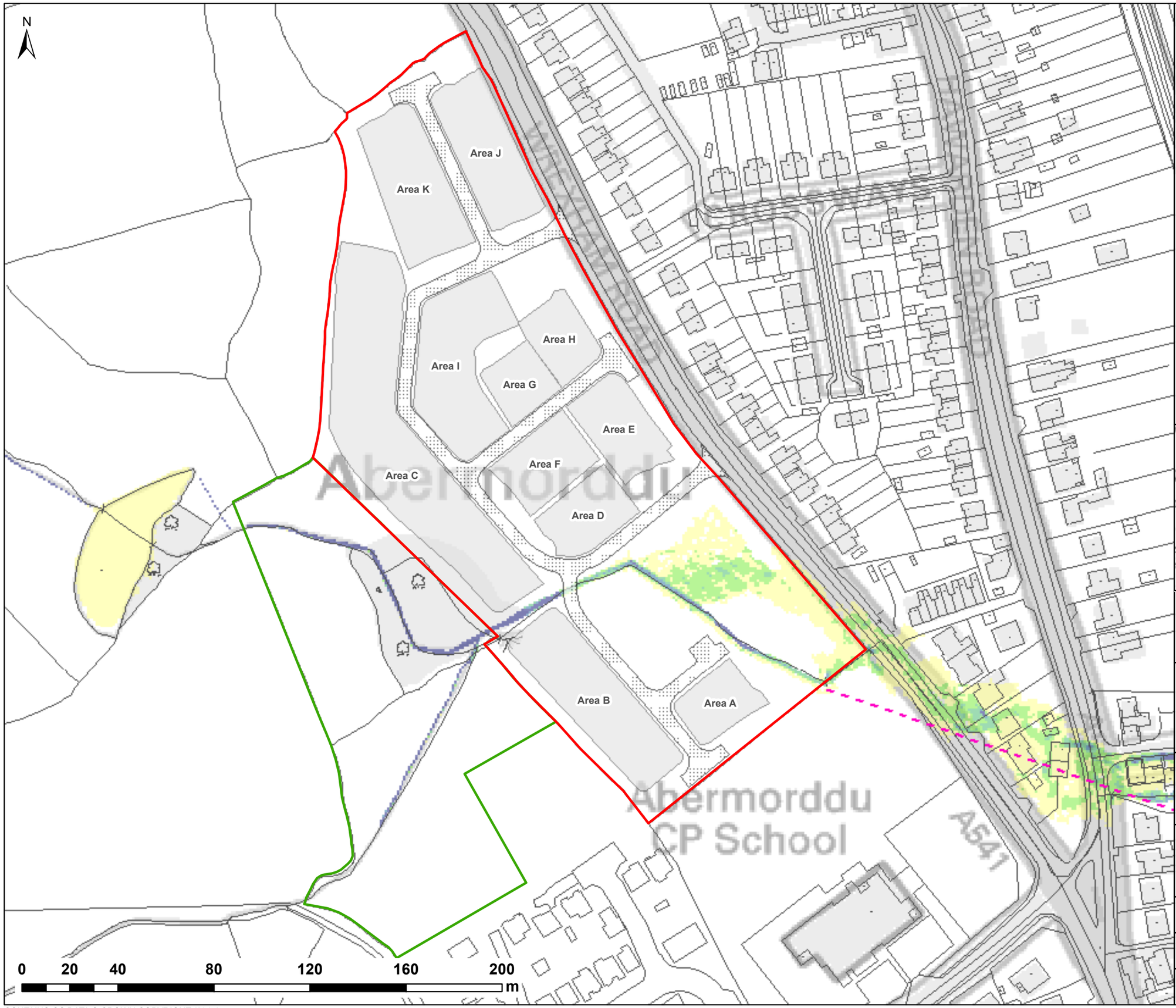


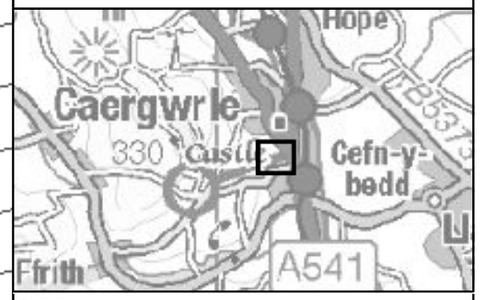
NOTES:
1) ALL DIMENSIONS ARE IN METRES AND ALL LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS STATED OTHERWISE

LEGEND

- Site Boundary
- Land Ownership
- Proposed Access Roads
- Proposed Development Areas
- Wrexham Rd Culvert Line (Assumed)

Maximum Velocity (m/s)

- 0.0 - 0.3
- 0.3 - 0.6
- 0.6 - 0.9
- 0.9 - 1.2
- > 1.2



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waterco consultants

Waterco Ltd
Eden Court, Ruthin, LL15 1NJ

01824 702220
www.waterco.co.uk

SCHEME:

CLARK ESTATE
WREXHAM RD, ABERMORDDU

PLOT TITLE:

MAXIMUM VELOCITY
0.1% AEP FLUVIAL EVENT
PROPOSED SITE LAYOUT (DEV)
NORMAL FLOW CONDITIONS

PLOT STATUS:	DATE:
FINAL	07/04/2017

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE @ A3:
RCL	LS	VG	1:1,500 (UNLESS STATED OTHERWISE)

PLOT NAME:	REV:
w3246-Q1000-DEV-NFC-V	-

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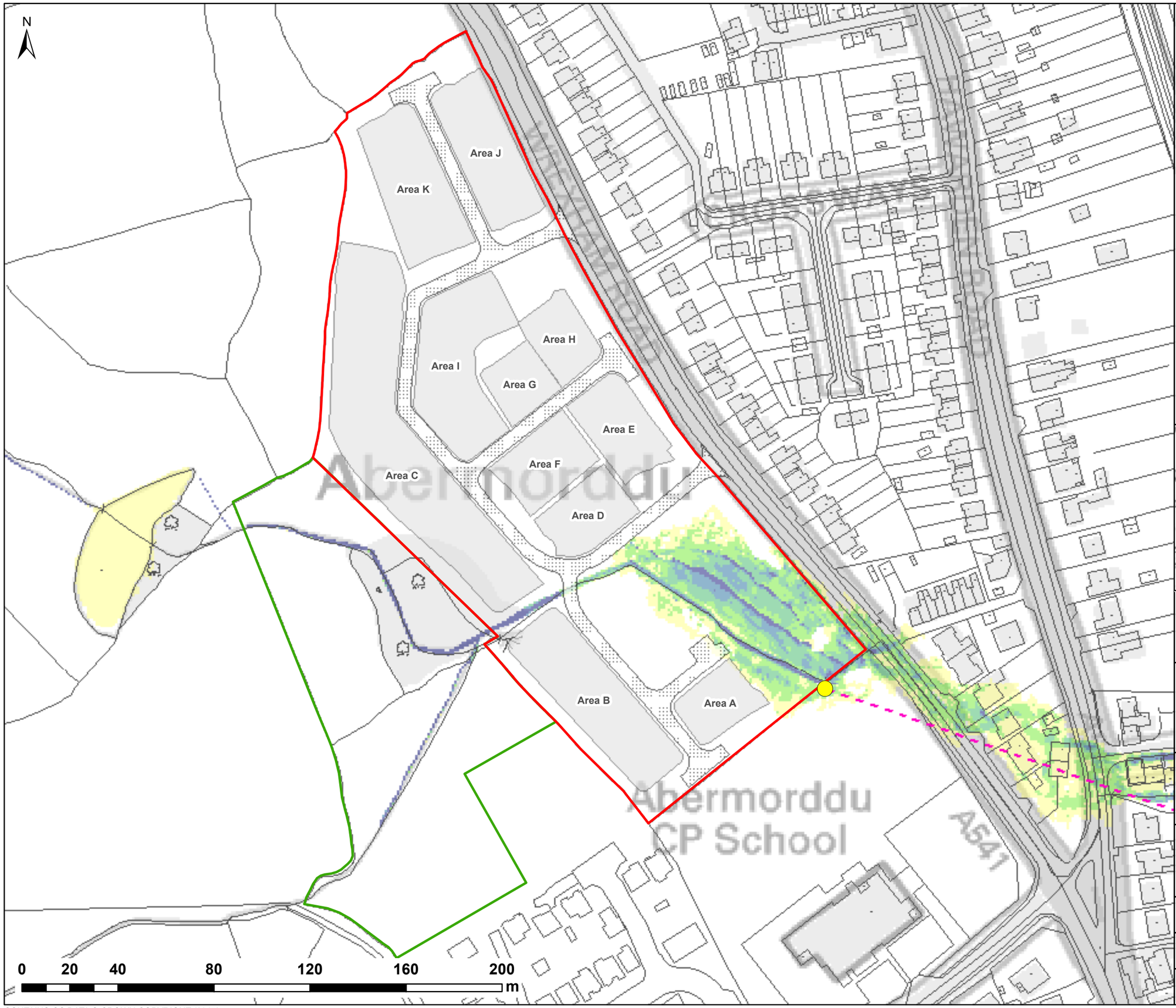


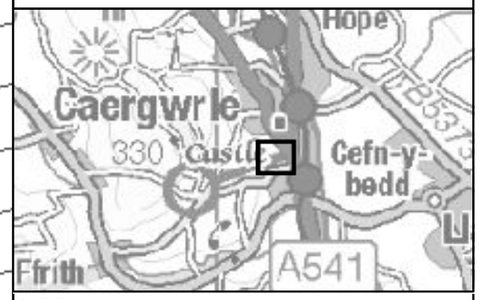
NOTES:
1) ALL DIMENSIONS ARE IN METRES AND ALL LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS STATED OTHERWISE

LEGEND

- Site Boundary
- Land Ownership
- Proposed Access Roads
- Proposed Development Areas
- Wrexham Rd Culvert Line (Assumed)
- Blockage Location (BL1)

Maximum Velocity (m/s)

- 0.0 - 0.3
- 0.3 - 0.6
- 0.6 - 0.9
- 0.9 - 1.2
- > 1.2



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waterco consultants

Waterco Ltd
Eden Court, Ruthin, LL15 1NJ

01824 702220
www.waterco.co.uk

SCHEME:

CLARK ESTATE
WREXHAM RD, ABERMORDDU

PLOT TITLE:

MAXIMUM VELOCITY
0.1% AEP FLUVIAL EVENT
PROPOSED SITE LAYOUT (DEV)
WREXHAM RD CULVERT BLOCKAGE (100%)

PLOT STATUS:			DATE:
FINAL			07/04/2017
DRAWN: RCL	CHECKED: LS	APPROVED: VG	PLOT SCALE @ A3: 1:1,500 (UNLESS STATED OTHERWISE)
PLOT NAME: w3246-Q1000-DEV-BL1-V			REV: -

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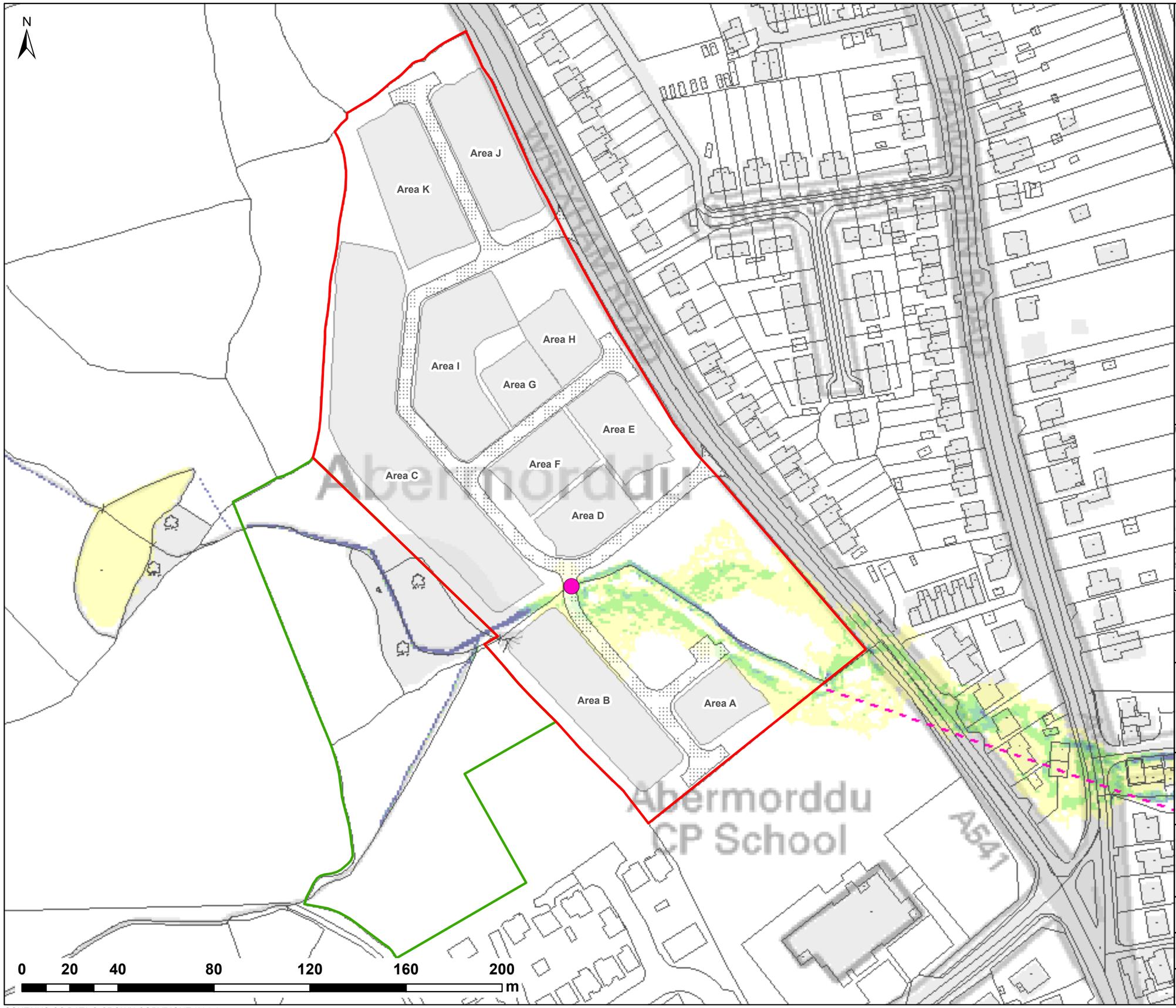


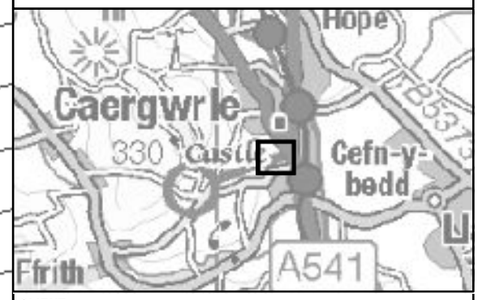
NOTES:
1) ALL DIMENSIONS ARE IN METRES AND ALL LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS STATED OTHERWISE

LEGEND

- Site Boundary
- Land Ownership
- Proposed Access Roads
- Proposed Development Areas
- Wrexham Rd Culvert Line (Assumed)
- Blockage Location (BL2)

Maximum Velocity (m/s)

- 0.0 - 0.3
- 0.3 - 0.6
- 0.6 - 0.9
- 0.9 - 1.2
- > 1.2



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Eden Court, Ruthin, LL15 1NJ

01824 702220
www.waterco.co.uk

SCHEME:

CLARK ESTATE
WREXHAM RD, ABERMORDDU

PLOT TITLE:

MAXIMUM VELOCITY
0.1% AEP FLUVIAL EVENT
PROPOSED SITE LAYOUT (DEV)
ACCESS ROAD CULVERT BLOCKAGE (100%)

PLOT STATUS:			DATE:
FINAL			07/04/2017
DRAWN: RCL	CHECKED: LS	APPROVED: VG	PLOT SCALE @ A3: 1:1,500 (UNLESS STATED OTHERWISE)
PLOT NAME: w3246-Q1000-DEV-BL2-V			REV: -

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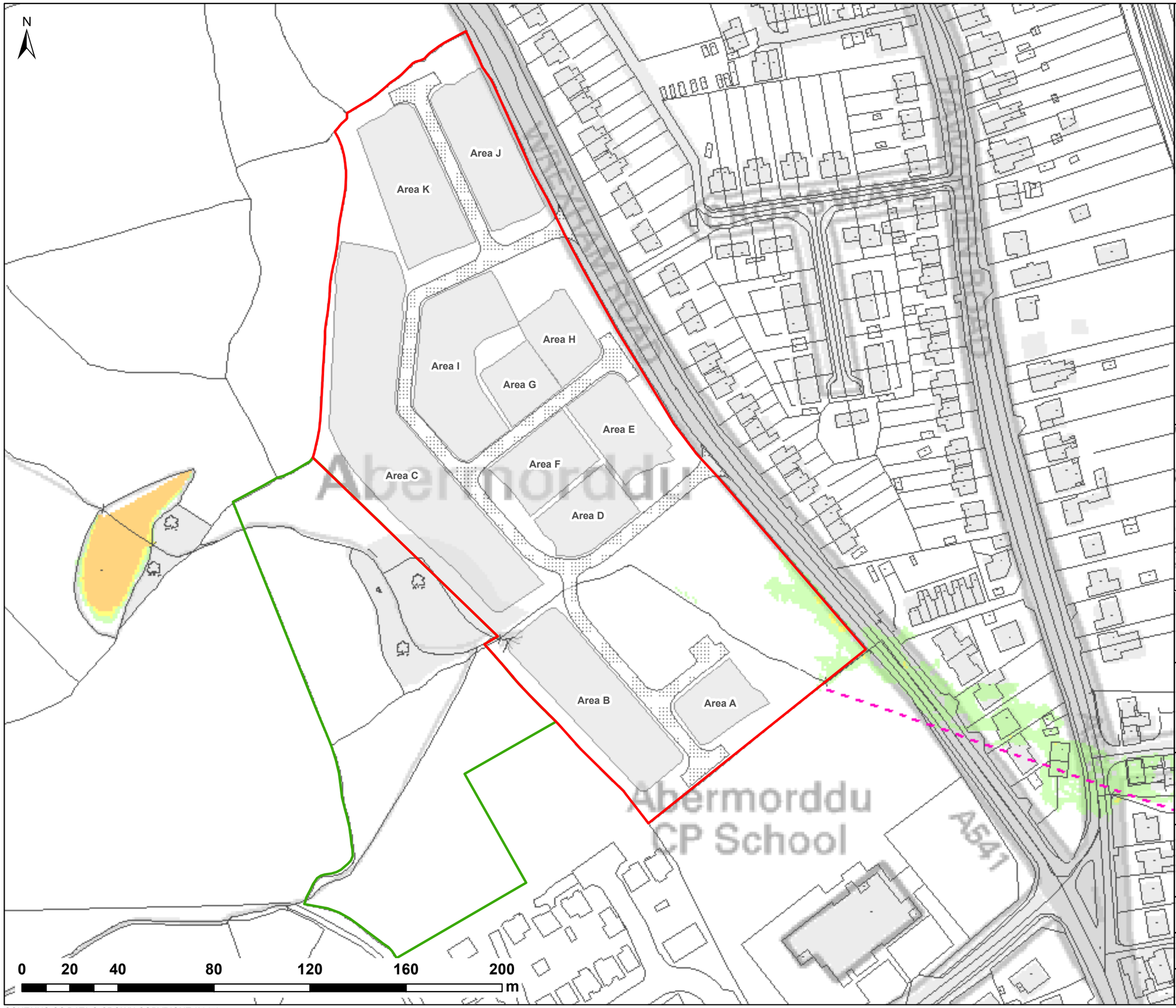


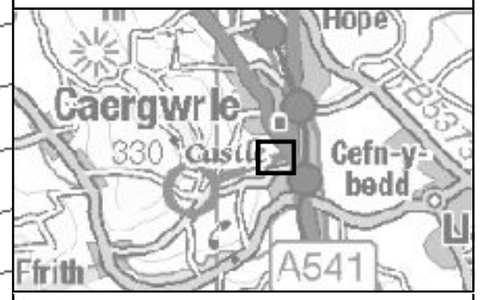
NOTES:
1) ALL DIMENSIONS ARE IN METRES AND ALL LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS STATED OTHERWISE

LEGEND

- Site Boundary
- Land Ownership
- Proposed Access Roads
- Proposed Development Areas
- Wrexham Rd Culvert Line (Assumed)

Maximum Flood Hazard Rating (FD2320)

- < 0.75 (Caution)
- 0.75 - 1.25 (Danger for Some)
- 1.25 - 2 (Danger for Most)
- > 2.0 (Danger for All)



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Eden Court, Ruthin, LL15 1NJ

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SCHEME:

CLARK ESTATE
WREXHAM RD, ABERMORDDU

PLOT TITLE:

FLOOD HAZARD RATING
5% AEP FLUVIAL EVENT
PROPOSED SITE LAYOUT (DEV)
NORMAL FLOW CONDITIONS

PLOT STATUS:	DATE:
FINAL	07/04/2017

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE @ A3:
RCL	LS	VG	1:1,500 (UNLESS STATED OTHERWISE)

PLOT NAME:	REV:
w3246-Q20-DEV-NFC-HZ	-

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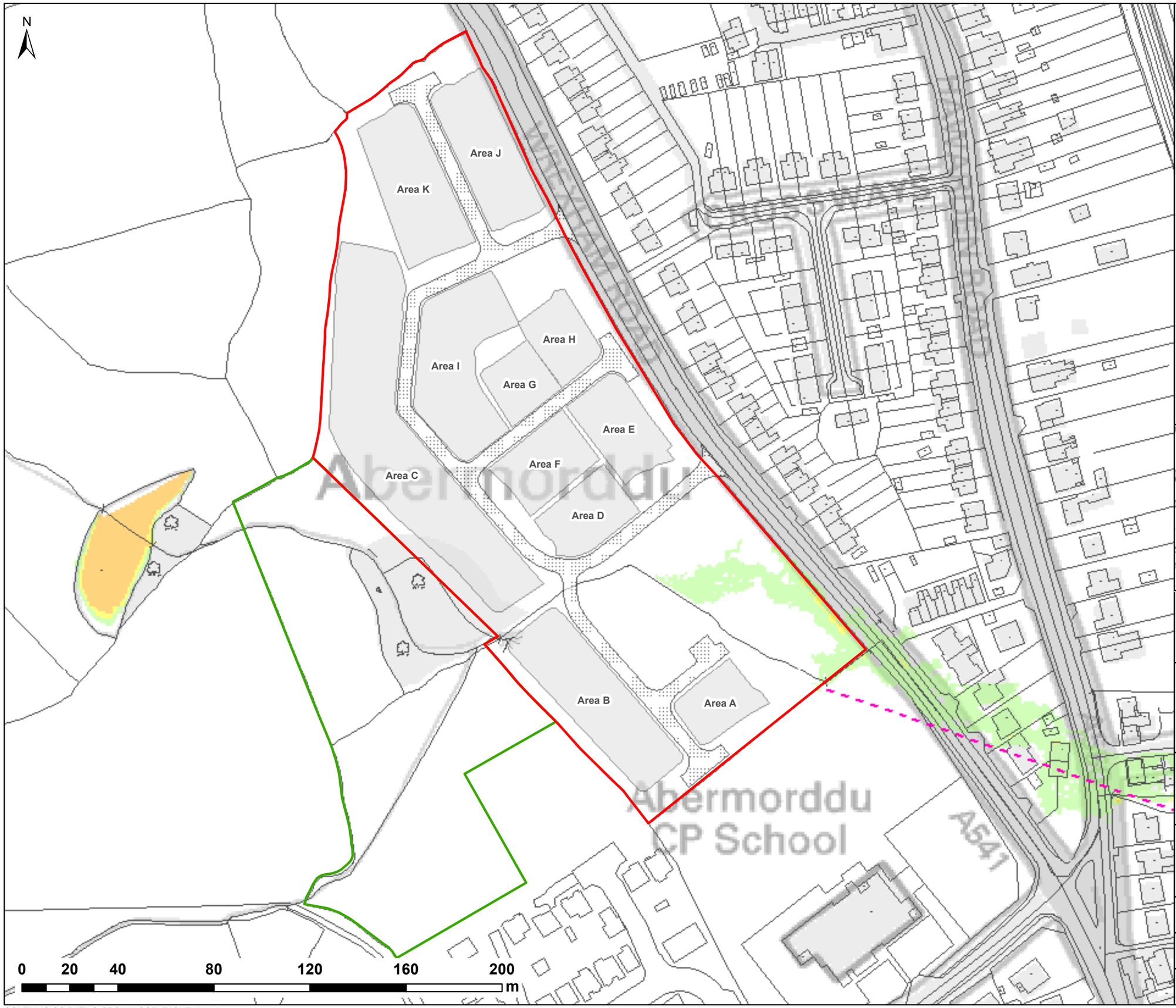

NOTES:
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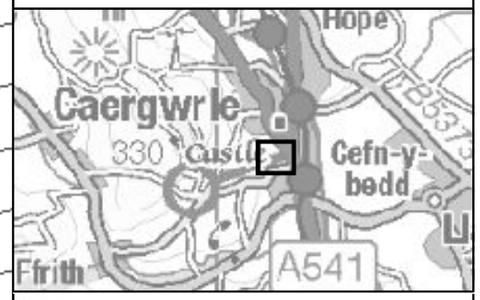
LEGEND

- Site Boundary
- Land Ownership
- Proposed Access Roads
- Proposed Development Areas
- Wrexham Rd Culvert Line (Assumed)

Maximum Flood Hazard Rating (FD2320)

- < 0.75 (Caution)
- 0.75 - 1.25 (Danger for Some)
- 1.25 - 2 (Danger for Most)
- > 2.0 (Danger for All)



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Eden Court, Ruthin, LL15 1NJ

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www.waterco.co.uk

SCHEME:

CLARK ESTATE
WREXHAM RD, ABERMORDDU

PLOT TITLE:

FLOOD HAZARD RATING
1% AEP FLUVIAL EVENT
PROPOSED SITE LAYOUT (DEV)
NORMAL FLOW CONDITIONS

PLOT STATUS:	DATE:
FINAL	07/04/2017

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE @ A3:
RCL	LS	VG	1:1,500 (UNLESS STATED OTHERWISE)

PLOT NAME:	REV:
w3246-Q100-DEV-NFC-HZ	-

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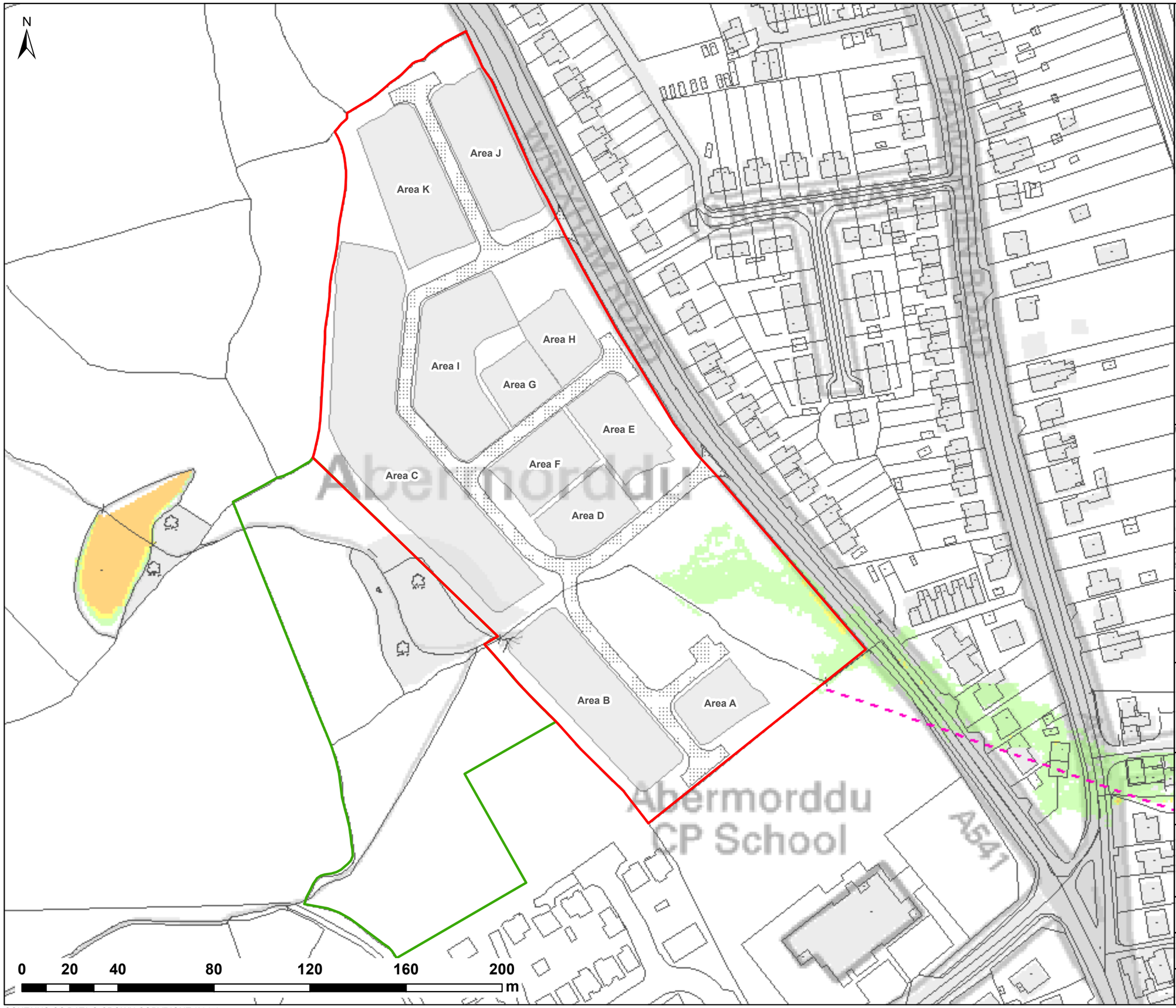


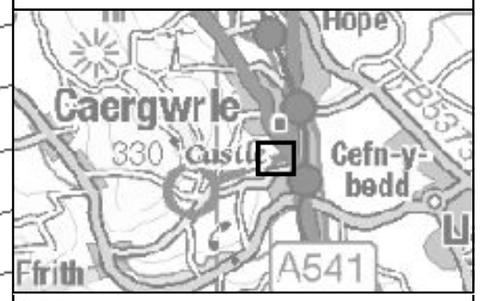
NOTES:
1) ALL DIMENSIONS ARE IN METRES AND ALL LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS STATED OTHERWISE

LEGEND

- Site Boundary
- Land Ownership
- Proposed Access Roads
- Proposed Development Areas
- Wrexham Rd Culvert Line (Assumed)

Maximum Flood Hazard Rating (FD2320)

- < 0.75 (Caution)
- 0.75 - 1.25 (Danger for Some)
- 1.25 - 2 (Danger for Most)
- > 2.0 (Danger for All)



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Eden Court, Ruthin, LL15 1NJ

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SCHEME:

CLARK ESTATE
WREXHAM RD, ABERMORDDU

PLOT TITLE:

FLOOD HAZARD RATING
1% AEP + 20% CC FLUVIAL EVENT
PROPOSED SITE LAYOUT (DEV)
NORMAL FLOW CONDITIONS

PLOT STATUS:	DATE:
FINAL	07/04/2017

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE @ A3:
RCL	LS	VG	1:1,500 (UNLESS STATED OTHERWISE)

PLOT NAME:	REV:
w3246-Q100CC1-DEV-NFC-HZ	-

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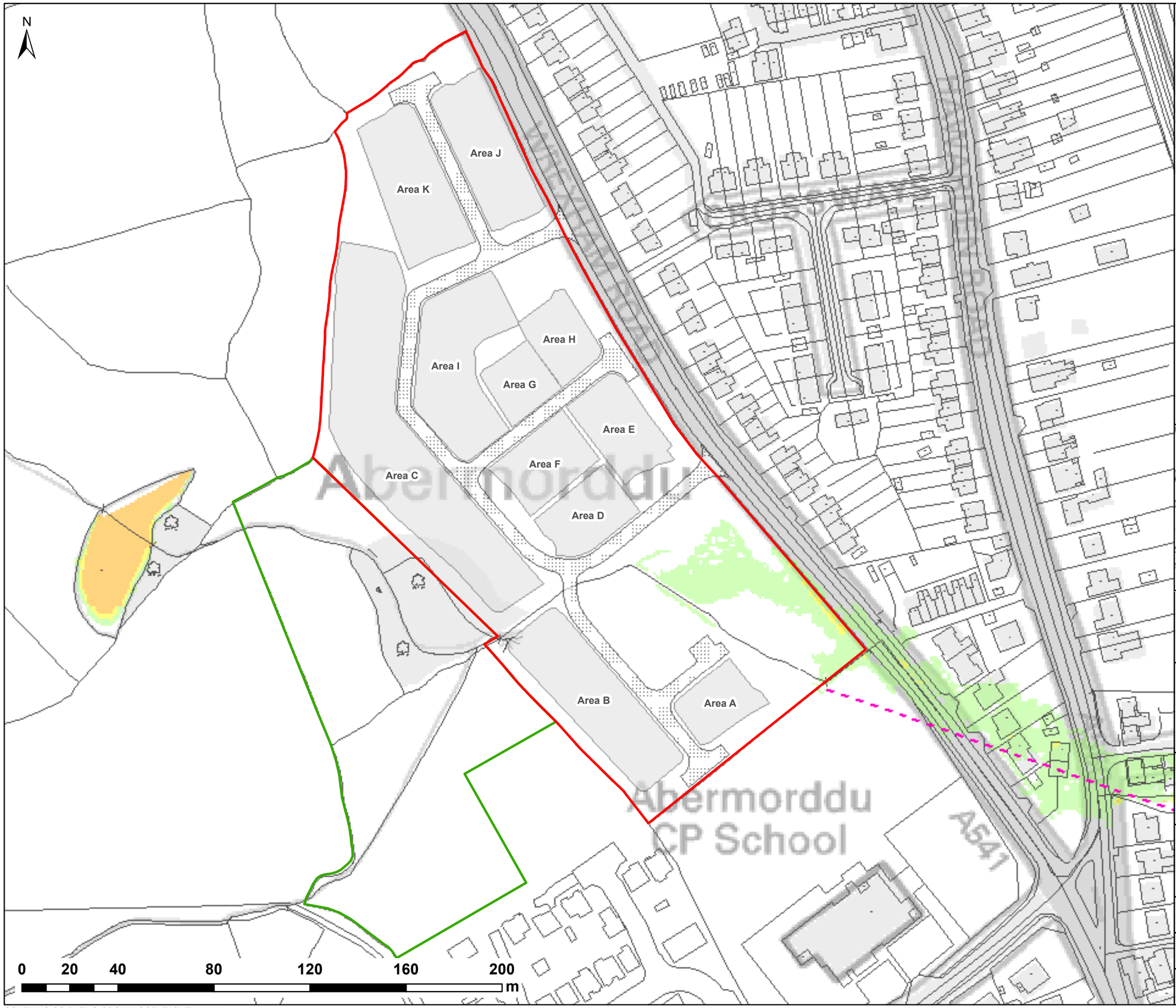


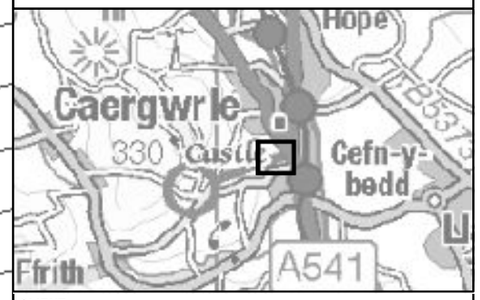
NOTES:
1) ALL DIMENSIONS ARE IN METRES AND ALL LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS STATED OTHERWISE

LEGEND

- Site Boundary
- Land Ownership
- Proposed Access Roads
- Proposed Development Areas
- Wrexham Rd Culvert Line (Assumed)

Maximum Flood Hazard Rating (FD2320)

- < 0.75 (Caution)
- 0.75 - 1.25 (Danger for Some)
- 1.25 - 2 (Danger for Most)
- > 2.0 (Danger for All)



CLIENT:

FISHER GERMAN

waterco consultants

Waterco Ltd
Eden Court, Ruthin, LL15 1NJ

01824 702220
www.waterco.co.uk

SCHEME:

CLARK ESTATE
WREXHAM RD, ABERMORDDU

PLOT TITLE:

FLOOD HAZARD RATING
1% AEP + 45% CC FLUVIAL EVENT
PROPOSED SITE LAYOUT (DEV)
NORMAL FLOW CONDITIONS

PLOT STATUS:	DATE:
FINAL	07/04/2017

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE @ A3:
RCL	LS	VG	1:1,500 (UNLESS STATED OTHERWISE)

PLOT NAME:	REV:
w3246-Q100CC2-DEV-NFC-HZ	-

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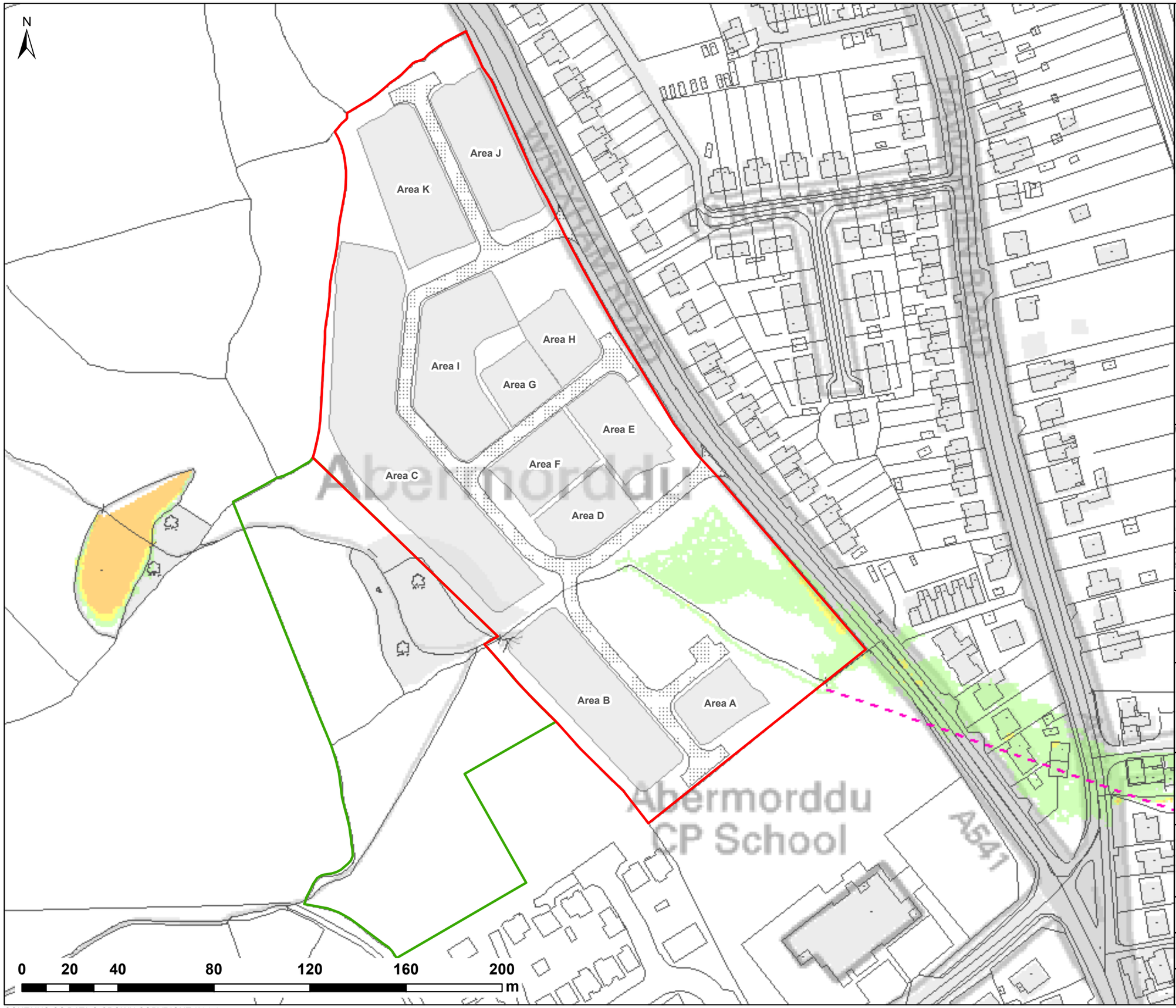


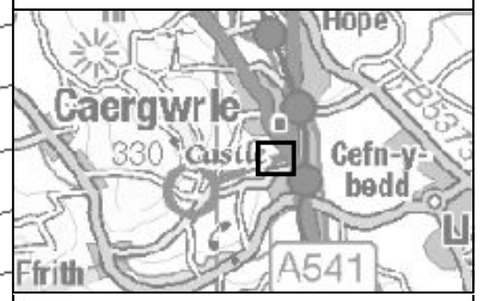
NOTES:
1) ALL DIMENSIONS ARE IN METRES AND ALL LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS STATED OTHERWISE

LEGEND

- Site Boundary
- Land Ownership
- Proposed Access Roads
- Proposed Development Areas
- Wrexham Rd Culvert Line (Assumed)

Maximum Flood Hazard Rating (FD2320)

- < 0.75 (Caution)
- 0.75 - 1.25 (Danger for Some)
- 1.25 - 2 (Danger for Most)
- > 2.0 (Danger for All)



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SCHEME:

CLARK ESTATE
WREXHAM RD, ABERMORDDU

PLOT TITLE:

FLOOD HAZARD RATING
0.1% AEP FLUVIAL EVENT
PROPOSED SITE LAYOUT (DEV)
NORMAL FLOW CONDITIONS

PLOT STATUS:	DATE:
FINAL	07/04/2017

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE @ A3:
RCL	LS	VG	1:1,500 (UNLESS STATED OTHERWISE)

PLOT NAME:	REV:
w3246-Q1000-DEV-NFC-HZ	-

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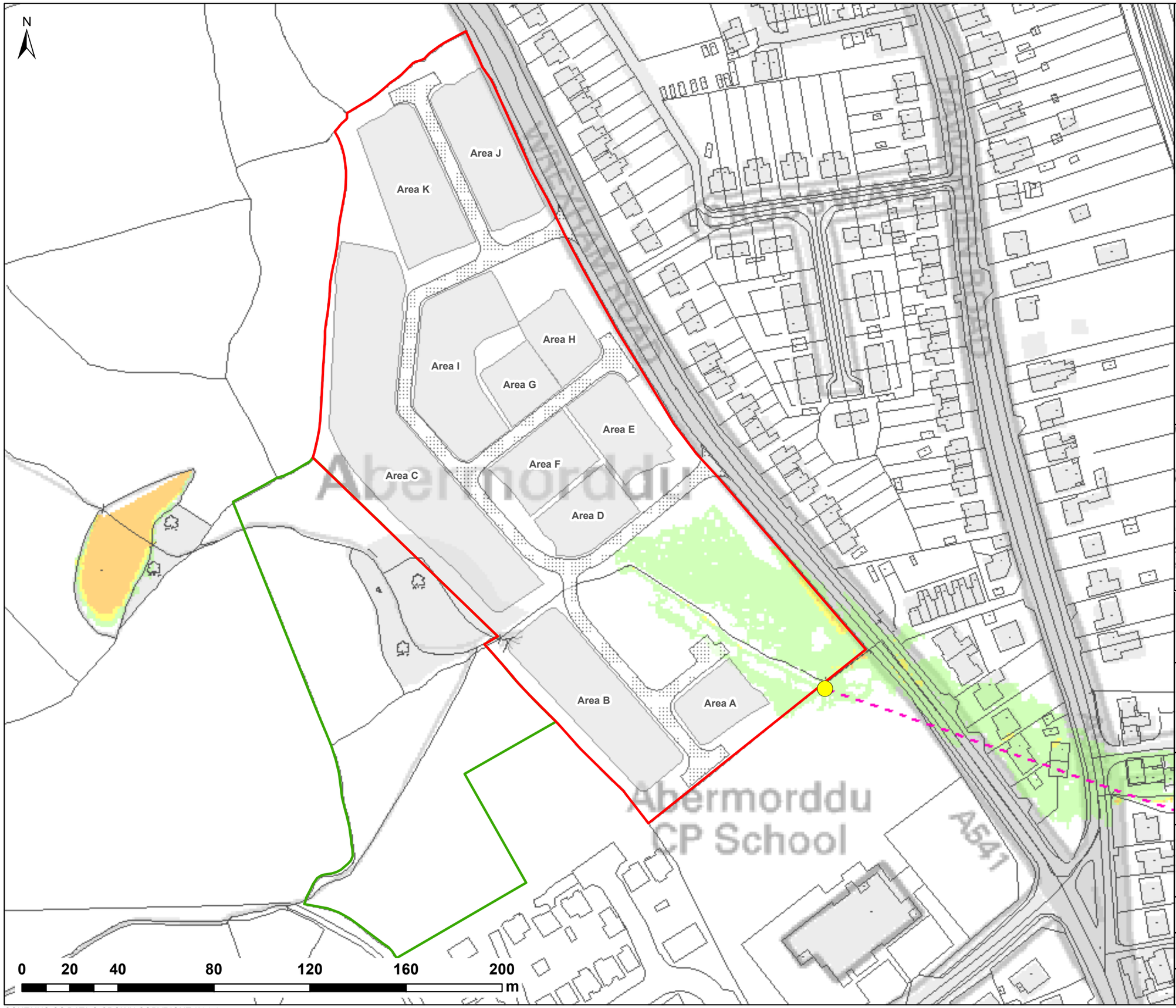


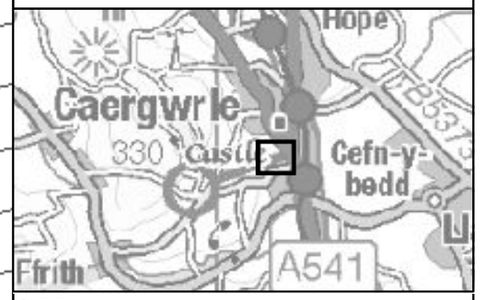
NOTES:
1) ALL DIMENSIONS ARE IN METRES AND ALL LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS STATED OTHERWISE

LEGEND

- Site Boundary
- Land Ownership
- Proposed Access Roads
- Proposed Development Areas
- Wrexham Rd Culvert Line (Assumed)
- Blockage Location (BL1)

Maximum Flood Hazard Rating (FD2320)

- < 0.75 (Caution)
- 0.75 - 1.25 (Danger for Some)
- 1.25 - 2 (Danger for Most)
- > 2.0 (Danger for All)



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SCHEME:

CLARK ESTATE
WREXHAM RD, ABERMORDDU

PLOT TITLE:

FLOOD HAZARD RATING
0.1% AEP FLUVIAL EVENT
PROPOSED SITE LAYOUT (DEV)
WREXHAM RD CULVERT BLOCKAGE (100%)

PLOT STATUS:			DATE:
FINAL			07/04/2017
DRAWN: RCL	CHECKED: LS	APPROVED: VG	PLOT SCALE @ A3: 1:1,500 (UNLESS STATED OTHERWISE)
PLOT NAME: w3246-Q1000-DEV-BL1-HZ			REV: -

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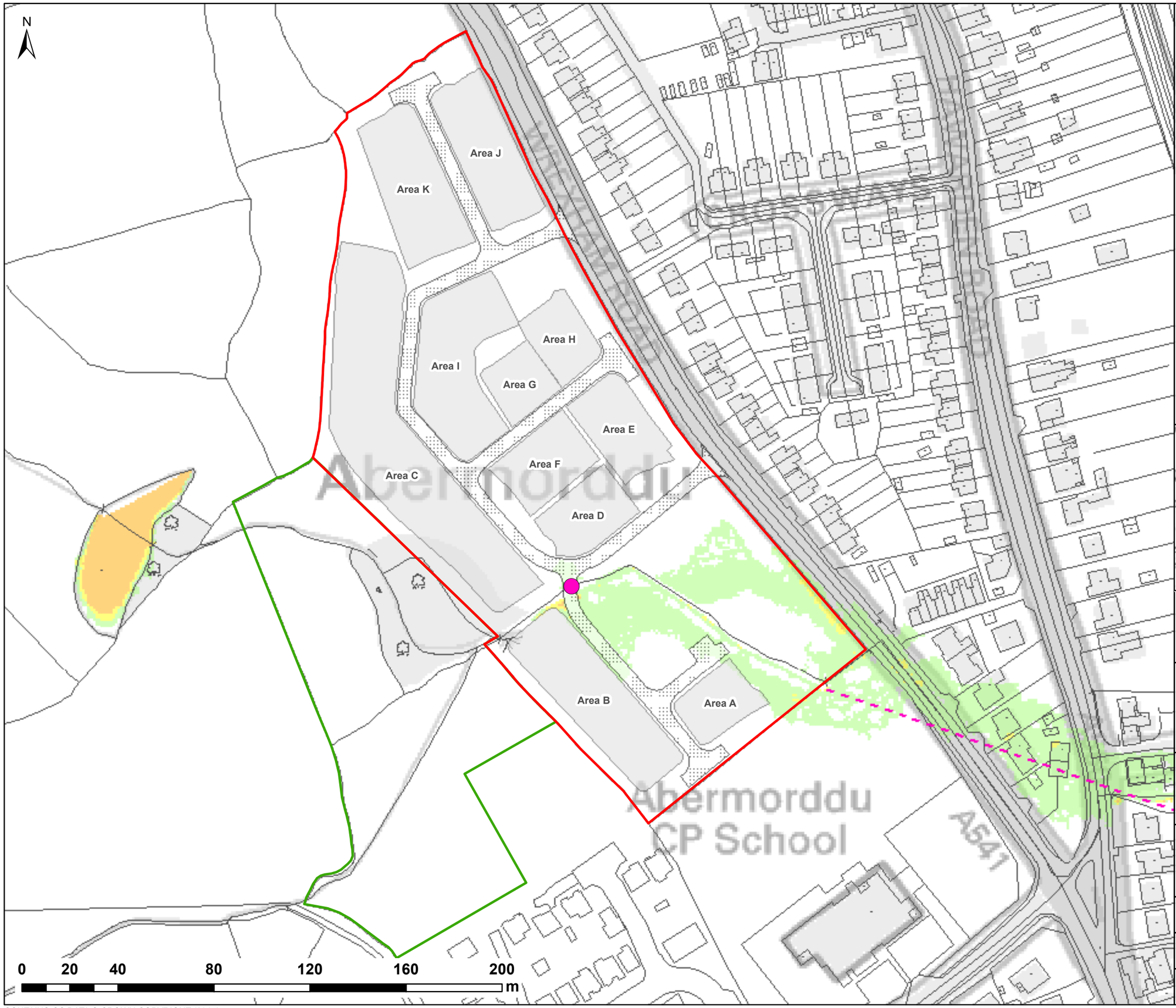


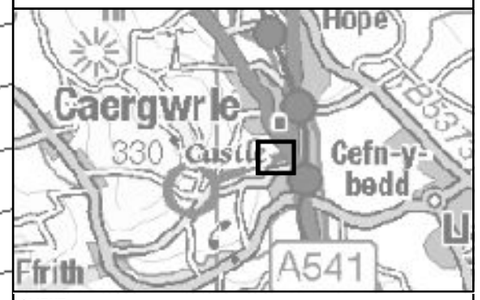
NOTES:
1) ALL DIMENSIONS ARE IN METRES AND ALL LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS STATED OTHERWISE

LEGEND

- Site Boundary
- Land Ownership
- Proposed Access Roads
- Proposed Development Areas
- Wrexham Rd Culvert Line (Assumed)
- Blockage Location (BL2)

Maximum Flood Hazard Rating (FD2320)

- < 0.75 (Caution)
- 0.75 - 1.25 (Danger for Some)
- 1.25 - 2 (Danger for Most)
- > 2.0 (Danger for All)



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SCHEME:

CLARK ESTATE
WREXHAM RD, ABERMORDDU

PLOT TITLE:

FLOOD HAZARD RATING
0.1% AEP FLUVIAL EVENT
PROPOSED SITE LAYOUT (DEV)
ACCESS ROAD CULVERT BLOCKAGE (100%)

PLOT STATUS:			DATE:
FINAL			07/04/2017
DRAWN: RCL	CHECKED: LS	APPROVED: VG	PLOT SCALE @ A3: 1:1,500 (UNLESS STATED OTHERWISE)
PLOT NAME: w3246-Q1000-DEV-BL2-HZ			REV: -

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