

***APPENDIX***

***A) SITE LOCATION PLAN***



***APPENDIX***

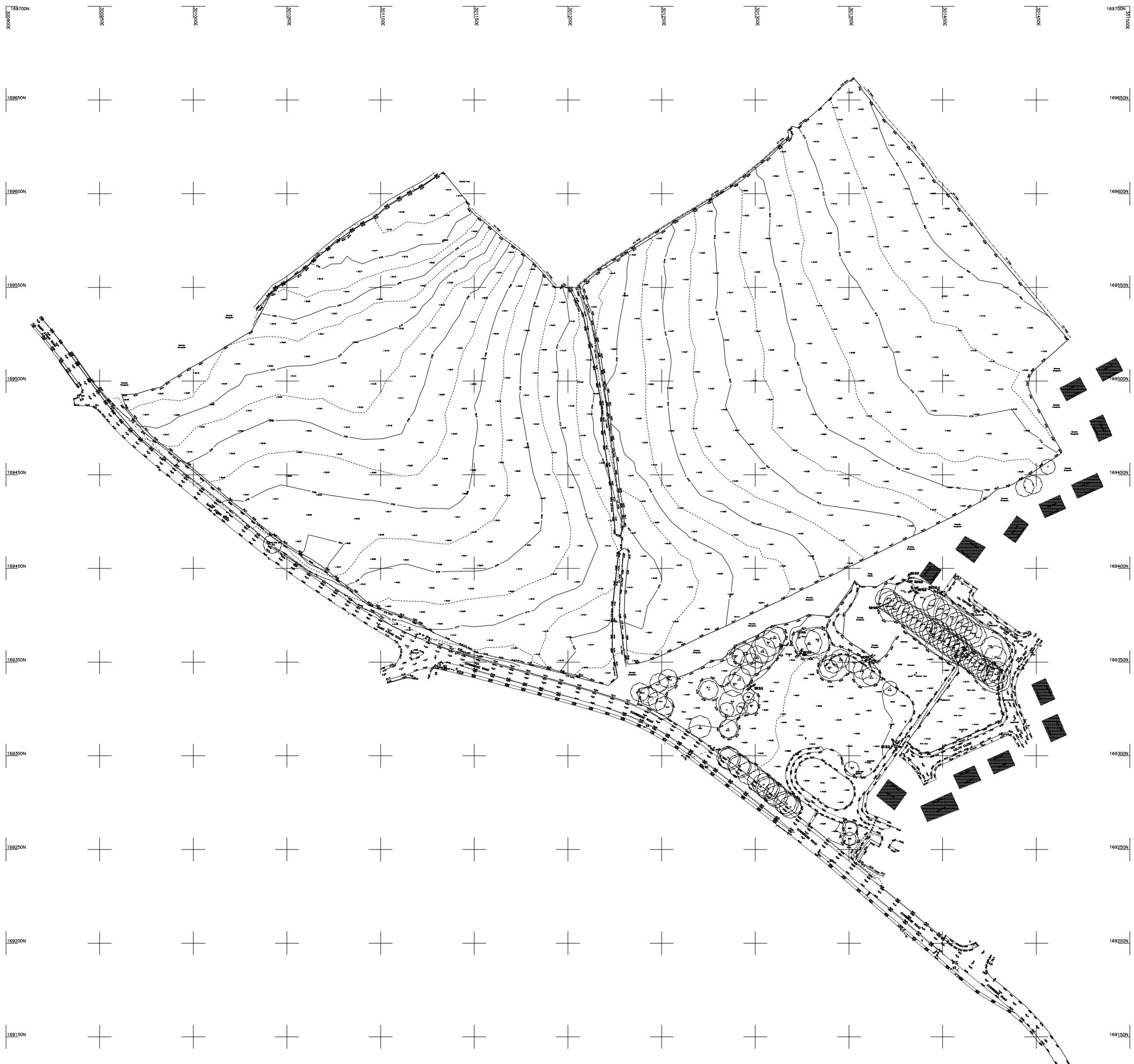
***B) TOPOGRAPHICAL SURVEY***



NOTES

GENERAL

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
2. ALL LEVELS ARE IN METRES UNLESS NOTED OTHERWISE.
3. DO NOT SCALE FROM THIS DRAWING. USE FIGURED DIMENSIONS ONLY.
4. ANY DISCREPANCIES TO BE REPORTED IMMEDIATELY TO THE ENGINEER.
5. THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, SUBCONTRACTORS AND SPECIALISTS DRAWINGS AND SPECIFICATIONS.
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REV	DATE	DESCRIPTION	BY	CHK
AMENDMENTS				

CLIENT: EDENSTONE HOMES

PROJECT: COWBRIDGE ROAD, ST ATHAN  
RESIDENTIAL DEVELOPMENT

TITLE: TOPOGRAPHICAL SURVEY



7 Ashtree Court - Woody Close - Cardiff Gate Business Park - Cardiff - CF23 8RW  
Tel: 029 2054 7000 - Fax: 029 2054 7001 - www.shear-design.com - enquiries@shear-design.com

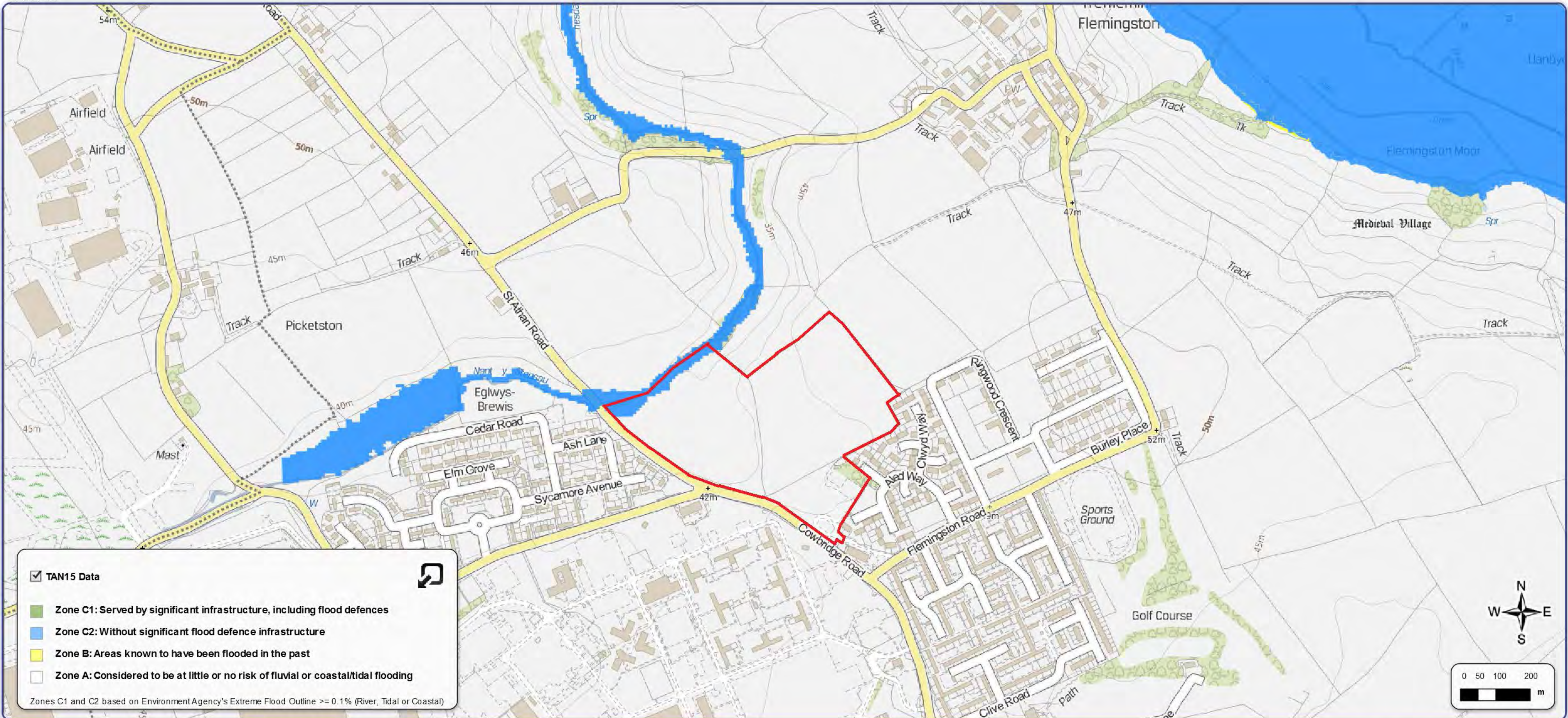
DRAWN: JP	CHECKED: MJ	DATE: SEPT 2016	SCALE: 1:250 @ A1
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STATUS KEY: I = INFORMATION P = PRELIMINARY A = APPROVAL CO = CONTRACT		
T = TENDER C = CONSTRUCTION AB = AS-BUILT		
STATUS: I	DRAWING NUMBER: 16156-100	REVISION: -

***APPENDIX***

***C) FLOOD MAP***





TAN15 Data

- Zone C1: Served by significant infrastructure, including flood defences
- Zone C2: Without significant flood defence infrastructure
- Zone B: Areas known to have been flooded in the past
- Zone A: Considered to be at little or no risk of fluvial or coastal/tidal flooding

Zones C1 and C2 based on Environment Agency's Extreme Flood Outline  $\geq 0.1\%$  (River, Tidal or Coastal)

Scale: 0 50 100 200 m



Map Title

Map Perygl Llifogydd / Flood Risk Map

Allwedd / Legend

Graddfa / Scale 1:20,767

Dyddiad / Date  
01/09/2016



0.7 0 0.33 0.7 Miles

British\_National\_Grid

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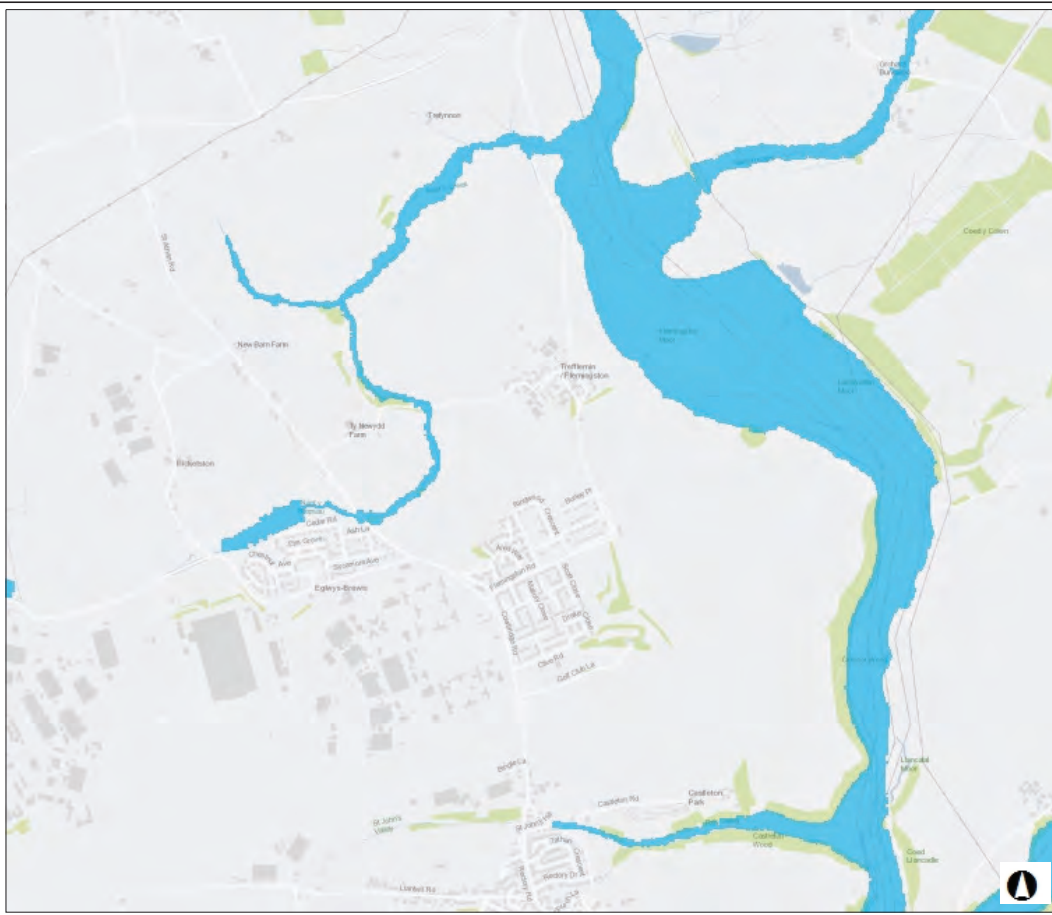
Map Title

Map Perygl Llifogydd / Flood Risk Map

Allwedd / Legend

Graddfa / Scale 1:20,767

Dyddiad / Date  
01/09/2016



0.7 0 0.33 0.7 Miles

British\_National\_Grid





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**Map Title**

**Map Perygl Llifogydd / Flood Risk Map**

**Allwedd / Legend**

-  Main rivers
-  Risk of flooding from surface water - High
-  Risk of flooding from surface water - Medium
-  Risk of flooding from surface water - Low



**Graddfa / Scale** 1: 12,954

**Dyddiad / Date**  
12/09/2016



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***APPENDIX***

***D) DCWW CORRESPONDANCE (WELSH WATER)***



Mr Richard Kelso  
Eden Stone Homes  
Priory House Priory Street  
Usk  
Monmouthshire  
NP15 1BJ

**Date: 09/09/2015**  
Our Ref: PPA0001094

Dear Mr Kelso

**Grid Ref: ST0123269487 301232 169487**  
Site: Land at Cowbridge Road St Athan  
**Development: Land at Cowbridge Road**

We refer to the pre-planning enquiry relating to the above site, and we can provide the following comments in respect to the proposed development.

### **SEWERAGE**

The sewerage system within the vicinity of your proposed development is generally of a separate type.

The discharge of foul flows only from the proposed development of 300 dwellings can be accommodated within the 225mm public foul sewerage system downstream of manhole ST1694001 located in Cowbridge Road.

If you would like a point of connection closer to the proposed development site, then it will be necessary for a hydraulic modelling assessment to be undertaken on the public sewerage system. The conclusion of this study will determine the connection point and / or any improvement works required.

The costs for undertaking this study must be paid for by the developer. For you to obtain a quotation for the hydraulic modelling assessment, we will require a fee of £250 + VAT to engage our consultants, this fee is non refundable.

With reference to the surface water flows from the proposed development, you are required to fully exhaust all technical options outlined under Sections 3.2 and 3.4 of Part H of the publication 'Building Regulations 2000; Disposal should be made through the hierarchical approach, preferring infiltration and, where infiltration is not possible, disposal to watercourses in liaison with the Land Drainage Authority and/or the Environment Agency. Discharge of surface water to the public sewer is only to be made as a last resort.

Other methods of SUDS must also be investigated. SUDS is an approach to managing surface water run-off which seeks to imitate natural drainage systems and retain water on or near the site as opposed to traditional drainage approaches which involve piping water off site as quickly as possible.

SUDS involve a range of techniques including green roofs, rainwater harvesting, permeable pavements, etc. SUDS offer significant advantages over conventional piped drainage systems in reducing flood risk by attenuating the rate and quantity of surface water run-off from a site, promoting groundwater recharge, and improving water quality and amenity.

The variety of SUDS techniques available means that virtually any development should be able to include a scheme based around these principles. Good justification would be required not to incorporate a SUDS scheme on the site.

Please note that no highway or land drainage run-off will be permitted to discharge directly or indirectly into the public sewerage system.

If any onsite or offsite sewers are to be offered for adoption they must be constructed to conform with the publication "Sewers for Adoption"- 7th Edition.

If a connection is required to the public sewerage system, the developer is advised to contact Dwr Cymru Welsh Water's Developer Services on 0800 917 2652.

The Welsh Government have introduced new legislation that will make it mandatory for all developers who wish to communicate with the public sewerage system to obtain an adoption agreement for their sewerage with Dwr Cymru Welsh Water (DCWW). Welsh Ministers Standards for the construction of sewerage apparatus and an agreement under Section 104 of the Water Industry Act (WIA) 1991 will need to be completed in advance of any authorisation to communicate with the public sewerage system under Section 106 WIA 1991 being granted by DCWW.

We have published information on the Welsh Ministers Standards which will be available for viewing on the Developer Services Section of our website - [www.dwrcymru.com](http://www.dwrcymru.com)





Further information on the Welsh Ministers Standards can be found on the Welsh Government website - [www.wales.gov.uk](http://www.wales.gov.uk)

## **SEWAGE TREATMENT**

No problems are envisaged with the Waste Water Treatment Works for the treatment of domestic discharges from this site.

## **WATER SUPPLY**

A water supply can be made available to service this proposed development. Initial indications are that a connection can be made from the '12" diameter watermain in 'St Athan rd' location. The cost of providing new on-site watermains can be calculated upon the receipt of detailed site layout plans which should be sent to the above address.

We trust the above information is helpful. Our response is based on the information provided in your enquiry and should the information change we reserve the right to make a new representation.

If you have any queries please contact Developer Services on 0800 917 2652 or via email at [developer.services@dwrcymru.com](mailto:developer.services@dwrcymru.com)

Please quote our reference number in all communications and correspondence.

Yours faithfully,



**Owain George**  
**Lead Development Control Officer**  
**Developer Services**

***Demands upon the water and sewerage systems change continually; consequently the information given above should be regarded as reliable for a maximum period of 12 months from the date of this letter.***





Dŵr Cymru  
Welsh Water

PPA0001094



**LEGEND(Representative of most common features)**

Fault chamber	Surface water chamber	Combined sewer overflow	Special purpose chamber	Treatment works	Pumping station	Private sewer	Private sewer subject to Sect. 104 adoption agreement	Private Sewer Transfer	Lateral Drain	Inspection Chamber
Combined sewer overflow	Gravity sewer	Private sewer	Private sewer subject to Sect. 104 adoption agreement	Private Sewer Transfer	Lateral Drain	Inspection Chamber				

NB: See symbols on plan for details  
 800 - Combined  
 600 - Surface Water  
 400 - Sewer  
 Purple - For use 321 sewers (for inspection purposes only)

**Notes:**

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

Dŵr Cymru Cŵl gives this information as to the position of its underground apparatus by way of general guidance only on the strict understanding that it is based on the best information available and no warranty as to its correctness is relied upon in the event of excavations or other works made in the vicinity of the Company's apparatus and any onus of locating the apparatus before carrying out any excavations rests entirely on you. It must be understood that the furnishing of the information is entirely without prejudice to the position of the New Roads and Streetworks Act 1991 and of the Company's right to be compensated for any damage to its apparatus.

Service pipes are not generally shown but their presence should be anticipated.

**EXACT LOCATIONS OF ALL APPARATUS  
TO BE DETERMINED ON SITE.**

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Dŵr Cymru  
Welsh Water

PPA0001094



**LEGEND**

**Clean network:**

-  Sluice valve
  -  Pressure reducing valve
  -  Meter
  -  Bulk meter
  -  Hydrant
  -  Cap end
  -  Air valve
  -  Stop tap
  -  Water Treatment Works
  -  Water Pumping Station
  -  Existing main
  -  Non-operational main
  -  Raw Water
- NB: Water main symbols colour indicates the type.
- LIGHT BLUE - Trunk  
DARK BLUE - Distribution  
YELLOW - Raw Water

**Notes:**

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

Dŵr Cymru Cyl gives this information as to the position of its underground apparatus by way of general guidance only on the strict understanding that it is based on the best information available and no warranty as to its correctness is relied upon in the event of excavations or other works made in the vicinity of the Company's apparatus and any error of locating the apparatus before carrying out any excavations rests entirely on you. It must be understood that the furnishing of the information is entirely without prejudice to the provision of the New Roads and Streetworks Act 1991 and of the Company's right to be compensated for any damage to its apparatus.

Service pipes are not generally shown but their presence should be anticipated.

**EXACT LOCATIONS OF ALL APPARATUS TO BE DETERMINED ON SITE.**

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Map scale: 1:2,250  
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## Richard Kelso

**From:** Morris Martin <Martin.Morris2@dwrcymru.com>  
**Sent:** 23 September 2015 14:13  
**To:** Richard Kelso  
**Cc:** Powell Clare  
**Subject:** RE: PPA0001094 - LAND AT COWBRIDGE ROAD, ST ATHAN  
**Attachments:** Location ST01694001.png

Mr Kelso,

The manhole is located on Cowbridge Road at the head of the rising main, as marked with a red circle on the attached plan.

Regards



**Martin Morris**  
Development Control Officer | Developer Services | Dwr Cymru Welsh Water  
Linea | Cardiff | CF3 0LT | T: 0800 917 2652 | [www.dwrcymru.com](http://www.dwrcymru.com)

**From:** NDC Planning  
**Sent:** 22 September 2015 15:35  
**To:** Morris Martin  
**Subject:** FW: PPA0001094 - LAND AT COWBRIDGE ROAD, ST ATHAN

## *Gillian Williams*

Developer Services  
Tel: 0800 9172652  
[gillian.williams@dwrcymru.com](mailto:gillian.williams@dwrcymru.com)

Have you seen Developer Services new web pages at [www.dwrcymru.com](http://www.dwrcymru.com)? Here you will find information about the services we have available and all of our application forms and guidance notes. You can complete forms on-line and also make payments. If you have a quotation you can pay for this on-line or alternatively by telephoning 0800 917 2652 using a credit/debit card.

**From:** services developer  
**Sent:** 22 September 2015 15:12  
**To:** NDC Planning  
**Subject:** FW: PPA0001094 - LAND AT COWBRIDGE ROAD, ST ATHAN

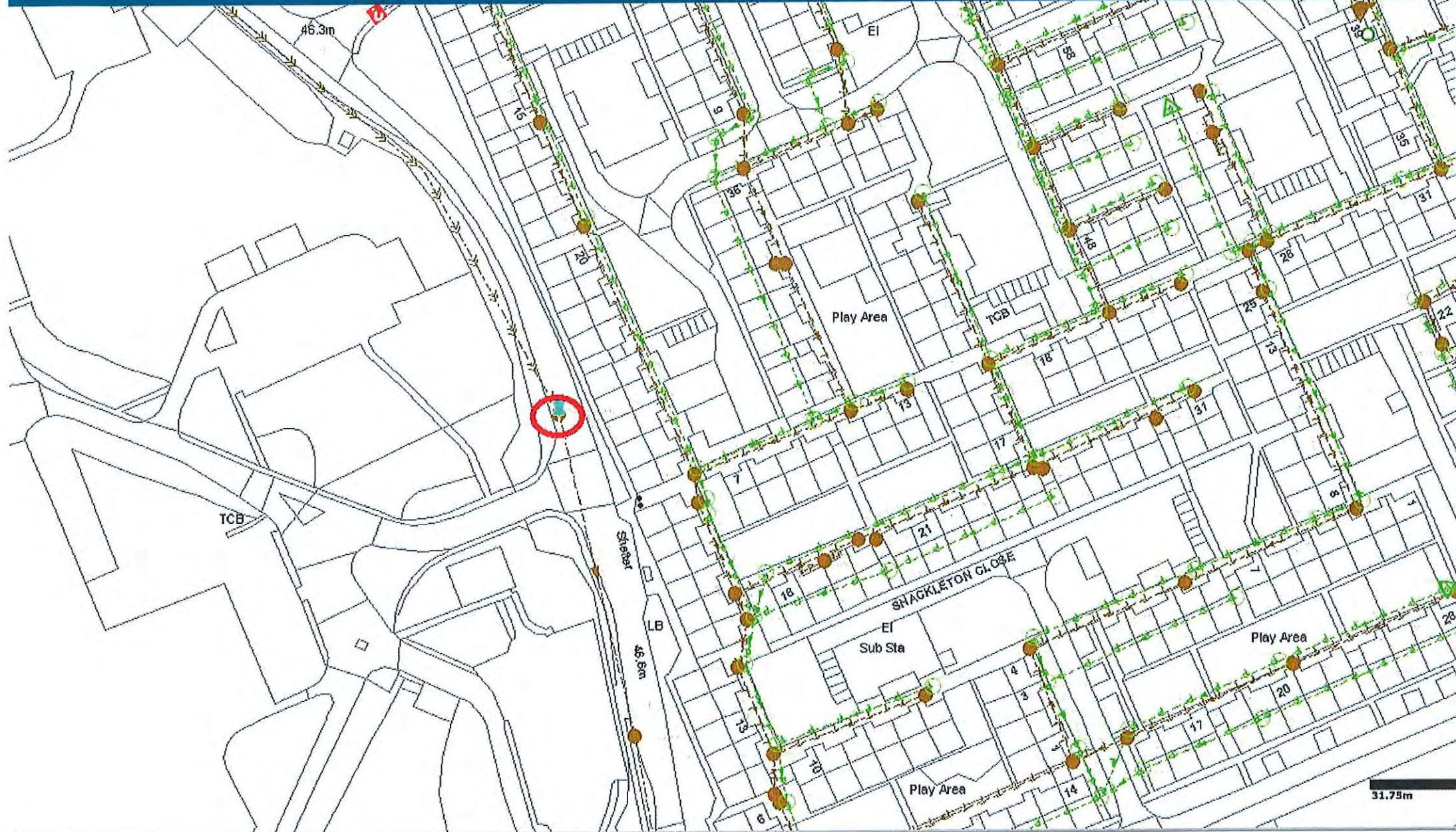


Tools Help

ST01694001  Fuzzy Search



DIMS





***APPENDIX***

***E) DRAINAGE CALCULATIONS***



Summary of Results for 30 year Return Period

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Overflow (l/s)	Max Σ Outflow (l/s)	Max Volume (m <sup>3</sup> )	Status
15 min Summer	34.789	0.789	49.8	0.0	49.8	631.4	O K
30 min Summer	35.064	1.064	49.8	0.0	49.8	850.9	O K
60 min Summer	35.350	1.350	49.8	0.0	49.8	1080.2	O K
120 min Summer	35.593	1.593	49.8	0.0	49.8	1274.5	O K
180 min Summer	35.682	1.682	49.8	0.0	49.8	1345.4	O K
240 min Summer	35.705	1.705	49.8	0.0	49.8	1364.2	O K
360 min Summer	35.706	1.706	49.8	0.0	49.8	1364.4	O K
480 min Summer	35.683	1.683	49.8	0.0	49.8	1346.7	O K
600 min Summer	35.650	1.650	49.8	0.0	49.8	1320.0	O K
720 min Summer	35.610	1.610	49.8	0.0	49.8	1288.2	O K
960 min Summer	35.521	1.521	49.8	0.0	49.8	1216.8	O K
1440 min Summer	35.312	1.312	49.8	0.0	49.8	1049.6	O K
2160 min Summer	34.986	0.986	49.8	0.0	49.8	788.5	O K
2880 min Summer	34.737	0.737	49.8	0.0	49.8	589.8	O K
4320 min Summer	34.434	0.434	48.9	0.0	48.9	347.5	O K
5760 min Summer	34.301	0.301	45.9	0.0	45.9	240.6	O K
7200 min Summer	34.258	0.258	40.7	0.0	40.7	206.6	O K
8640 min Summer	34.232	0.232	35.8	0.0	35.8	185.8	O K
10080 min Summer	34.214	0.214	32.1	0.0	32.1	171.4	O K
15 min Winter	34.892	0.892	49.8	0.0	49.8	713.5	O K
30 min Winter	35.205	1.205	49.8	0.0	49.8	964.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m <sup>3</sup> )	Discharge Volume (m <sup>3</sup> )	Overflow Volume (m <sup>3</sup> )	Time-Peak (mins)
15 min Summer	67.133	0.0	696.4	0.0	38
30 min Summer	45.239	0.0	940.8	0.0	51
60 min Summer	29.238	0.0	1223.7	0.0	78
120 min Summer	18.341	0.0	1536.1	0.0	132
180 min Summer	13.796	0.0	1733.6	0.0	188
240 min Summer	11.208	0.0	1878.2	0.0	238
360 min Summer	8.359	0.0	2101.5	0.0	298
480 min Summer	6.781	0.0	2273.2	0.0	364
600 min Summer	5.761	0.0	2414.1	0.0	434
720 min Summer	5.041	0.0	2534.6	0.0	504
960 min Summer	4.079	0.0	2735.0	0.0	644
1440 min Summer	3.023	0.0	3039.7	0.0	920
2160 min Summer	2.236	0.0	3378.7	0.0	1284
2880 min Summer	1.804	0.0	3633.8	0.0	1632
4320 min Summer	1.331	0.0	4018.9	0.0	2304
5760 min Summer	1.072	0.0	4321.8	0.0	2960
7200 min Summer	0.907	0.0	4570.8	0.0	3680
8640 min Summer	0.792	0.0	4784.3	0.0	4408
10080 min Summer	0.705	0.0	4970.9	0.0	5144
15 min Winter	67.133	0.0	780.8	0.0	39
30 min Winter	45.239	0.0	1054.5	0.0	52

7 Ashtree Court  
 Woodsy Close  
 Cardiff Gate Business Park



Date 15/09/2016 15:57  
 File 1 IN 30 YEAR WITH 5.6ha...

Designed by James  
 Checked by

Causeway Source Control 2016.1

Summary of Results for 30 year Return Period

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Overflow (l/s)	Max Σ Outflow (l/s)	Max Volume (m <sup>3</sup> )	Status
60 min Winter	35.530	1.530	49.8	0.0	49.8	1224.1	O K
120 min Winter	35.811	1.811	49.8	0.0	49.8	1448.8	O K
180 min Winter	35.923	1.923	49.8	0.0	49.8	1538.2	O K
<b>240 min Winter</b>	<b>35.960</b>	<b>1.960</b>	<b>49.8</b>	<b>0.0</b>	<b>49.8</b>	<b>1568.2</b>	<b>O K</b>
360 min Winter	35.953	1.953	49.8	0.0	49.8	1562.4	O K
480 min Winter	35.922	1.922	49.8	0.0	49.8	1537.9	O K
600 min Winter	35.872	1.872	49.8	0.0	49.8	1498.0	O K
720 min Winter	35.811	1.811	49.8	0.0	49.8	1449.0	O K
960 min Winter	35.672	1.672	49.8	0.0	49.8	1337.7	O K
1440 min Winter	35.352	1.352	49.8	0.0	49.8	1081.5	O K
2160 min Winter	34.836	0.836	49.8	0.0	49.8	668.7	O K
2880 min Winter	34.513	0.513	49.6	0.0	49.6	410.1	O K
4320 min Winter	34.274	0.274	43.4	0.0	43.4	219.3	O K
5760 min Winter	34.229	0.229	35.2	0.0	35.2	183.4	O K
7200 min Winter	34.204	0.204	29.9	0.0	29.9	163.4	O K
8640 min Winter	34.187	0.187	26.2	0.0	26.2	149.6	O K
10080 min Winter	34.174	0.174	23.3	0.0	23.3	139.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m <sup>3</sup> )	Discharge Volume (m <sup>3</sup> )	Overflow Volume (m <sup>3</sup> )	Time-Peak (mins)
60 min Winter	29.238	0.0	1371.0	0.0	78
120 min Winter	18.341	0.0	1720.9	0.0	132
180 min Winter	13.796	0.0	1942.0	0.0	186
<b>240 min Winter</b>	<b>11.208</b>	<b>0.0</b>	<b>2104.0</b>	<b>0.0</b>	<b>240</b>
360 min Winter	8.359	0.0	2354.1	0.0	316
480 min Winter	6.781	0.0	2546.4	0.0	386
600 min Winter	5.761	0.0	2704.3	0.0	464
720 min Winter	5.041	0.0	2839.3	0.0	542
960 min Winter	4.079	0.0	3063.7	0.0	696
1440 min Winter	3.023	0.0	3405.0	0.0	1000
2160 min Winter	2.236	0.0	3784.5	0.0	1344
2880 min Winter	1.804	0.0	4070.3	0.0	1660
4320 min Winter	1.331	0.0	4502.2	0.0	2248
5760 min Winter	1.072	0.0	4840.7	0.0	2952
7200 min Winter	0.907	0.0	5119.6	0.0	3680
8640 min Winter	0.792	0.0	5359.0	0.0	4408
10080 min Winter	0.705	0.0	5568.6	0.0	5128



7 Ashtree Court  
 Woodsy Close  
 Cardiff Gate Business Park



Date 15/09/2016 15:57  
 File 1 IN 30 YEAR WITH 5.6ha...

Designed by James  
 Checked by

Causeway Source Control 2016.1


Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	30	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	19.000	Shortest Storm (mins)	15
Ratio R	0.325	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+0

Time Area Diagram

Total Area (ha) 5.600

Time (mins)		Area	Time (mins)		Area	Time (mins)		Area	Time (mins)		Area
From:	To:	(ha)	From:	To:	(ha)	From:	To:	(ha)	From:	To:	(ha)
0	4	0.500	8	12	1.000	16	20	1.000	24	28	0.600
4	8	0.500	12	16	1.000	20	24	1.000			

Shear Design Ltd		Page 4
7 Ashtree Court Woodsy Close Cardiff Gate Business Park		
Date 15/09/2016 15:57 File 1 IN 30 YEAR WITH 5.6ha...	Designed by James Checked by	
Causeway		Source Control 2016.1

Model Details

Storage is Offline Dividing Weir Level (m) 34.000  
Cover Level (m) 37.000

Tank or Pond Structure

Invert Level (m) 34.000

Depth (m)	Area (m <sup>2</sup> )	Depth (m)	Area (m <sup>2</sup> )	Depth (m)	Area (m <sup>2</sup> )
0.000	800.0	2.000	800.0	2.010	2.0

Hydro-Brake Optimum® Outflow Control

Unit Reference	MD-SHE-0281-5000-2000-5000
Design Head (m)	2.000
Design Flow (l/s)	50.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	281
Invert Level (m)	34.000
Minimum Outlet Pipe Diameter (mm)	300
Suggested Manhole Diameter (mm)	2100

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.000	49.9
Flush-Flo™	0.612	49.8
Kick-Flo®	1.330	41.0
Mean Flow over Head Range	-	42.9

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake Optimum® as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	8.8	1.200	45.0	3.000	60.7	7.000	91.5
0.200	29.0	1.400	42.0	3.500	65.4	7.500	94.7
0.300	45.9	1.600	44.8	4.000	69.7	8.000	97.7
0.400	48.3	1.800	47.4	4.500	73.8	8.500	100.6
0.500	49.5	2.000	49.9	5.000	77.7	9.000	103.5
0.600	49.8	2.200	52.2	5.500	81.4	9.500	106.2
0.800	49.3	2.400	54.5	6.000	84.9		
1.000	47.9	2.600	56.6	6.500	88.3		

Weir Overflow Control

Discharge Coef 0.544 Width (m) 5.000 Invert Level (m) 36.050



Summary of Results for 100 year Return Period (+30%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Overflow (l/s)	Max Σ Outflow (l/s)	Max Volume (m <sup>3</sup> )	Status
15 min Summer	34.694	0.694	49.8	0.0	49.8	1110.6	O K
30 min Summer	34.945	0.945	49.8	0.0	49.8	1511.2	O K
60 min Summer	35.215	1.215	49.8	0.0	49.8	1943.2	O K
120 min Summer	35.479	1.479	49.8	0.0	49.8	2367.1	O K
180 min Summer	35.604	1.604	49.8	0.0	49.8	2567.0	O K
240 min Summer	35.667	1.667	49.8	0.0	49.8	2667.3	O K
360 min Summer	35.725	1.725	49.8	0.0	49.8	2759.7	O K
480 min Summer	35.732	1.732	49.8	0.0	49.8	2770.8	O K
600 min Summer	35.724	1.724	49.8	0.0	49.8	2757.7	O K
720 min Summer	35.709	1.709	49.8	0.0	49.8	2734.7	O K
960 min Summer	35.669	1.669	49.8	0.0	49.8	2671.1	O K
1440 min Summer	35.570	1.570	49.8	0.0	49.8	2511.8	O K
2160 min Summer	35.401	1.401	49.8	0.0	49.8	2241.4	O K
2880 min Summer	35.201	1.201	49.8	0.0	49.8	1922.2	O K
4320 min Summer	34.871	0.871	49.8	0.0	49.8	1393.8	O K
5760 min Summer	34.630	0.630	49.8	0.0	49.8	1008.2	O K
7200 min Summer	34.471	0.471	49.3	0.0	49.3	753.1	O K
8640 min Summer	34.368	0.368	47.7	0.0	47.7	589.3	O K
10080 min Summer	34.305	0.305	46.1	0.0	46.1	488.1	O K
15 min Winter	34.782	0.782	49.8	0.0	49.8	1250.4	O K
30 min Winter	35.065	1.065	49.8	0.0	49.8	1703.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m <sup>3</sup> )	Discharge Volume (m <sup>3</sup> )	Overflow Volume (m <sup>3</sup> )	Time-Peak (mins)
15 min Summer	112.766	0.0	1147.6	0.0	39
30 min Summer	76.773	0.0	1570.6	0.0	53
60 min Summer	49.937	0.0	2078.5	0.0	82
120 min Summer	31.341	0.0	2611.7	0.0	138
180 min Summer	23.482	0.0	2936.4	0.0	196
240 min Summer	18.977	0.0	3164.6	0.0	252
360 min Summer	14.057	0.0	3516.7	0.0	366
480 min Summer	11.345	0.0	3784.4	0.0	464
600 min Summer	9.598	0.0	4001.7	0.0	520
720 min Summer	8.368	0.0	4185.7	0.0	582
960 min Summer	6.732	0.0	4487.6	0.0	712
1440 min Summer	4.943	0.0	4934.4	0.0	990
2160 min Summer	3.621	0.0	5462.4	0.0	1408
2880 min Summer	2.899	0.0	5830.5	0.0	1796
4320 min Summer	2.115	0.0	6369.6	0.0	2520
5760 min Summer	1.689	0.0	6804.0	0.0	3192
7200 min Summer	1.421	0.0	7151.4	0.0	3896
8640 min Summer	1.233	0.0	7446.5	0.0	4520
10080 min Summer	1.095	0.0	7699.4	0.0	5168
15 min Winter	112.766	0.0	1288.2	0.0	40
30 min Winter	76.773	0.0	1761.3	0.0	53

7 Ashtree Court  
 Woodsy Close  
 Cardiff Gate Business Park



Date 15/09/2016 15:57  
 File 1 IN 100 YEAR WITH 30 P...

Designed by James  
 Checked by

Causeway Source Control 2016.1

Summary of Results for 100 year Return Period (+30%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Overflow (l/s)	Σ Outflow (l/s)	Max Volume (m <sup>3</sup> )	Status
60 min Winter	35.373	1.373	49.8	0.0	49.8	2197.1	O K
120 min Winter	35.671	1.671	49.8	0.0	49.8	2674.0	O K
180 min Winter	35.817	1.817	49.8	0.0	49.8	2907.9	O K
240 min Winter	35.894	1.894	49.8	0.0	49.8	3031.1	O K
360 min Winter	35.973	1.973	49.8	0.0	49.8	3157.0	O K
480 min Winter	35.993	1.993	49.8	0.0	49.8	3189.4	O K
600 min Winter	35.982	1.982	49.8	0.0	49.8	3171.9	O K
720 min Winter	35.956	1.956	49.8	0.0	49.8	3130.4	O K
960 min Winter	35.906	1.906	49.8	0.0	49.8	3049.4	O K
1440 min Winter	35.763	1.763	49.8	0.0	49.8	2820.7	O K
2160 min Winter	35.512	1.512	49.8	0.0	49.8	2419.1	O K
2880 min Winter	35.205	1.205	49.8	0.0	49.8	1928.0	O K
4320 min Winter	34.710	0.710	49.8	0.0	49.8	1136.5	O K
5760 min Winter	34.424	0.424	48.7	0.0	48.7	678.2	O K
7200 min Winter	34.292	0.292	45.6	0.0	45.6	466.7	O K
8640 min Winter	34.256	0.256	40.2	0.0	40.2	409.3	O K
10080 min Winter	34.233	0.233	35.9	0.0	35.9	372.1	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m <sup>3</sup> )	Discharge Volume (m <sup>3</sup> )	Overflow Volume (m <sup>3</sup> )	Time-Peak (mins)
60 min Winter	49.937	0.0	2329.3	0.0	82
120 min Winter	31.341	0.0	2926.4	0.0	138
180 min Winter	23.482	0.0	3290.0	0.0	192
240 min Winter	18.977	0.0	3545.5	0.0	250
360 min Winter	14.057	0.0	3939.6	0.0	360
480 min Winter	11.345	0.0	4239.2	0.0	470
600 min Winter	9.598	0.0	4482.4	0.0	574
720 min Winter	8.368	0.0	4688.2	0.0	612
960 min Winter	6.732	0.0	5025.5	0.0	754
1440 min Winter	4.943	0.0	5523.3	0.0	1066
2160 min Winter	3.621	0.0	6118.7	0.0	1528
2880 min Winter	2.899	0.0	6531.5	0.0	1936
4320 min Winter	2.115	0.0	7137.8	0.0	2616
5760 min Winter	1.689	0.0	7621.4	0.0	3240
7200 min Winter	1.421	0.0	8010.9	0.0	3768
8640 min Winter	1.233	0.0	8342.2	0.0	4440
10080 min Winter	1.095	0.0	8627.9	0.0	5152



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Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	19.000	Shortest Storm (mins)	15
Ratio R	0.325	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

Time Area Diagram

Total Area (ha) 5.600

Time (mins)		Area	Time (mins)		Area	Time (mins)		Area	Time (mins)		Area
From:	To:	(ha)	From:	To:	(ha)	From:	To:	(ha)	From:	To:	(ha)
0	4	0.500	8	12	1.000	16	20	1.000	24	28	0.600
4	8	0.500	12	16	1.000	20	24	1.000			

Shear Design Ltd		Page 4
7 Ashtree Court Woodsy Close Cardiff Gate Business Park		
Date 15/09/2016 15:57 File 1 IN 100 YEAR WITH 30 P...	Designed by James Checked by	
Causeway		Source Control 2016.1

Model Details

Storage is Offline Dividing Weir Level (m) 34.000  
Cover Level (m) 37.000

Tank or Pond Structure

Invert Level (m) 34.000

Depth (m)	Area (m <sup>2</sup> )	Depth (m)	Area (m <sup>2</sup> )	Depth (m)	Area (m <sup>2</sup> )
0.000	1600.0	2.000	1600.0	2.010	2.0

Hydro-Brake Optimum® Outflow Control

Unit Reference	MD-SHE-0281-5000-2000-5000
Design Head (m)	2.000
Design Flow (l/s)	50.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	281
Invert Level (m)	34.000
Minimum Outlet Pipe Diameter (mm)	300
Suggested Manhole Diameter (mm)	2100

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.000	49.9
Flush-Flo™	0.612	49.8
Kick-Flo®	1.330	41.0
Mean Flow over Head Range	-	42.9

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake Optimum® as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	8.8	1.200	45.0	3.000	60.7	7.000	91.5
0.200	29.0	1.400	42.0	3.500	65.4	7.500	94.7
0.300	45.9	1.600	44.8	4.000	69.7	8.000	97.7
0.400	48.3	1.800	47.4	4.500	73.8	8.500	100.6
0.500	49.5	2.000	49.9	5.000	77.7	9.000	103.5
0.600	49.8	2.200	52.2	5.500	81.4	9.500	106.2
0.800	49.3	2.400	54.5	6.000	84.9		
1.000	47.9	2.600	56.6	6.500	88.3		

Weir Overflow Control

Discharge Coef 0.544 Width (m) 5.000 Invert Level (m) 36.050



7 Ashtree Court  
Woodsy Close  
Cardiff Gate Business Park



Date 13/09/2016 13:07  
File

Designed by matt.jessop  
Checked by

Causeway Source Control 2015.1

ICP SUDS Mean Annual Flood

Input

Return Period (years)	100	Soil	0.300
Area (ha)	1.000	Urban	0.000
SAAR (mm)	988	Region Number	Region 9

**Results 1/s**

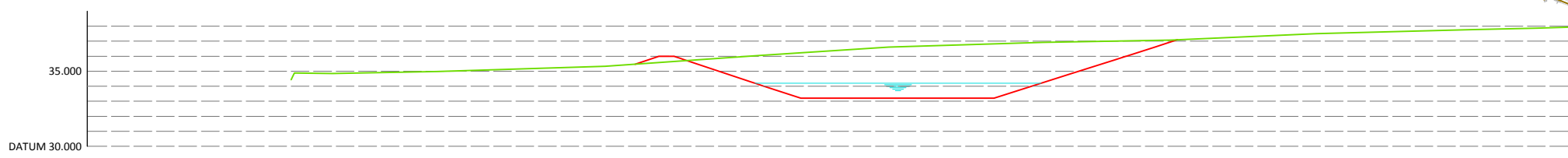
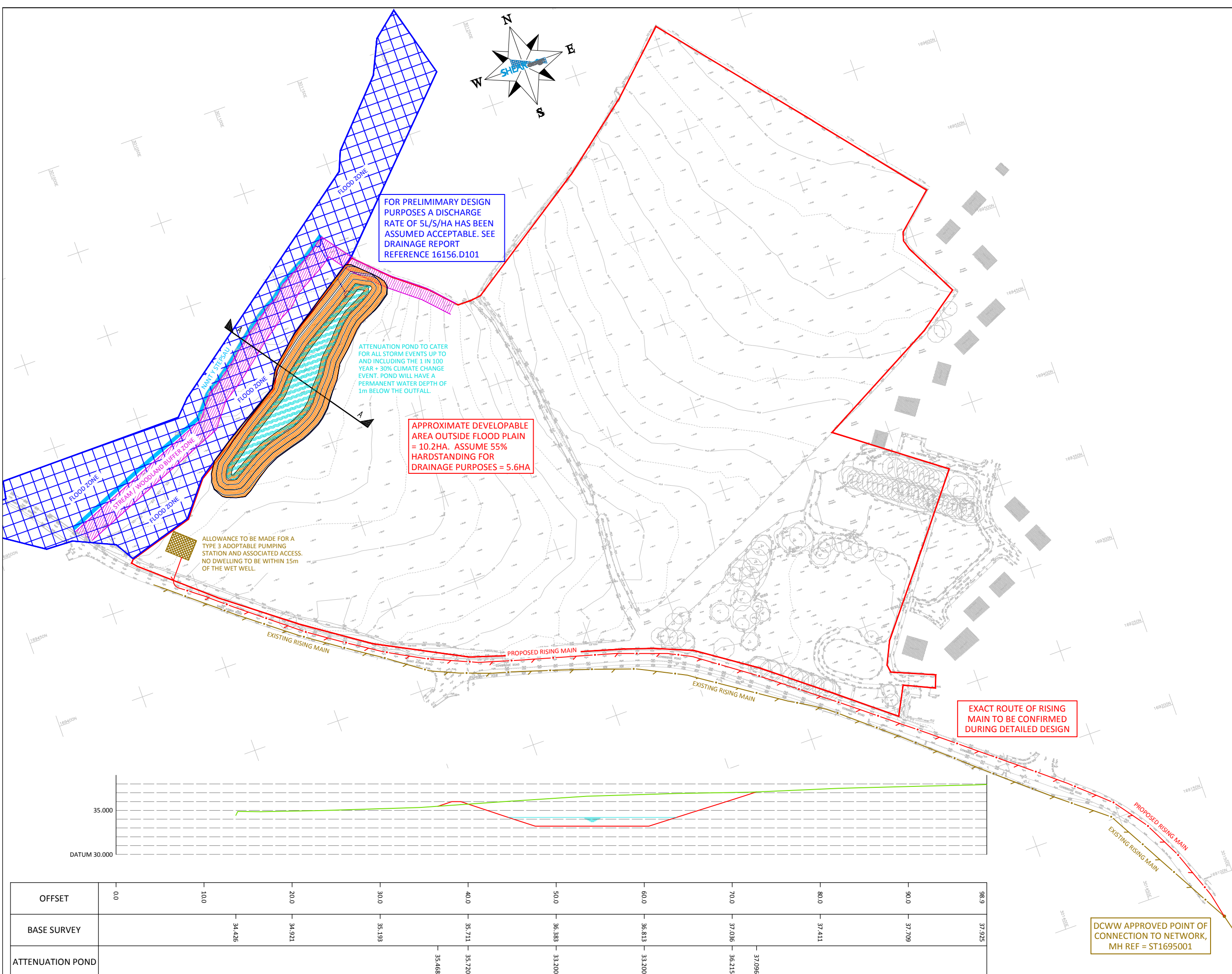
QBAR Rural	2.7
QBAR Urban	2.7
Q100 years	5.9
Q1 year	2.4
Q30 years	4.8
Q100 years	5.9

***APPENDIX***

***F) DRAINAGE CONSTRAINTS PLAN***

NOTES

- GENERAL**
1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
  2. ALL LEVELS ARE IN METRES UNLESS NOTED OTHERWISE.
  3. DO NOT SCALE FROM THIS DRAWING. USE FIGURED DIMENSIONS ONLY.
  4. ANY DISCREPANCIES TO BE REPORTED IMMEDIATELY TO THE ENGINEER.
  5. THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, SUBCONTRACTORS AND SPECIALISTS DRAWINGS AND SPECIFICATIONS.
  6. THIS DRAWING IS COPYRIGHT © PROPERTY OF SHEAR DESIGN LIMITED.



OFFSET	0.0	10.0	20.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0	98.9
BASE SURVEY		34.425	34.921	35.193	35.711	36.383	36.813	37.096	37.411	37.709	37.925
ATTENUATION POND				35.468	35.720	33.200	33.200	36.215	37.096		

SECTION A-A  
INDICATIVE SECTION THROUGH  
ATTENUATION POND

REV	DATE	DESCRIPTION	BY	CHK
A	07.11.16	FOUL STRATEGY UPDATED	JP	MJ

CLIENT: EDENSTONE HOMES

PROJECT: COWBRIDGE ROAD, ST ATHAN RESIDENTIAL DEVELOPMENT

TITLE: DRAINAGE CONSTRAINTS

Consulting Civil and Structural Engineers

7 Ashtree Court - Woody Close - Cardiff Gate Business Park - Cardiff - CF23 8RW  
Tel: 029 2054 7000 - Fax: 029 2054 7001 - www.shear-design.com - enquiries@shear-design.com

DRAWN:	JP	CHECKED:	MJ	DATE:	SEPT 2016	SCALE:	1:250 @ A1
STATUS KEY:	I = INFORMATION	P = PRELIMINARY	A = APPROVAL	CO = CONTRACT	T = TENDER	C = CONSTRUCTION	AB = AS-BUILT
STATUS:	P	DRAWING NUMBER:	16156-SK100	REVISION:	A		



***APPENDIX***

***G) HISTORIC PLANNING CORRESPONDENCE***

**THE VALE OF GLAMORGAN COUNCIL**

Town and Country Planning Act 1990  
Town and Country Planning (General Development Procedure) Order 1995  
Article 3  
The Town and Country Planning (Environmental Impact Assessment) (England  
and Wales) Regulations 1999 (as amended)

**OUTLINE PLANNING PERMISSION**

Agent:  
Entec UK Ltd,  
Pacific House,  
Imperial Way,  
Reading,  
Berkshire RG2 0TD

Applicant:  
The Secretary of State for Defence,  
Metrix UK  
Limited and Sodexo Limited,  
10, Great George Street,  
2nd Floor,  
London.  
W1P 3AE

**Development of a Defence Technical College and associated facilities and works, including 483 Service Families' Accommodation dwellings, military external and field training areas, the alteration and reconfiguration of St Athan golf course, a hotel, an energy centre, improved parking and servicing facilities for the existing spar shop on Eglwys Brewis Road, the provision of a new access road and other associated highway works and improvements, including a garage for Rose Cottage, and all associated ancillary building, sports, community, ecological mitigation and enhancement, engineering, landscaping, means of enclosure and other works.**

**at**

**Land at and adjoining MoD St. Athan in the Vale of Glamorgan, extending from the B4265 at Boverton in the west to Castleton Farm, St Athan, in the east, and from north of the runway and north of Castleton Road at St Athan in the south to land at the northern end of the MoD St Athan site at Picketston and up to Flemingston Road, St Athan, in the north; together with land adjoining the B4265 near Gileston and land at Waycock Cross, Barry.**

The Council in pursuance of its powers under the above mentioned Act and Order and having taken all the environmental information into consideration as required by section 3(2) of the above regulations, hereby **GRANTS OUTLINE PERMISSION** for the carrying out of the proposed development as described above and in accordance with the application and plans registered by the Council on 12 May 2009 subject to the following condition(s):

- 2. The applicant should be aware that the Boverton Brook, Llanmaes Brook and the Nant-y- Stepsau are statutory main rivers. Any works in, under or over the river channel, including the diversion of a channel, may require a formal Flood Defence Consent under Section 109 of the Water Resources Act 1991. In addition a Flood Defence Consent under Environment Agency Wales Byelaws may also be required for works within 7 metres from the top of the natural banks or from the landward toe of any artificial embankment or structure designed to contain flood water. A Flood Defence Consent will also be required under S.23 of the Land Drainage Act 1991 for structures within the channel of any ordinary watercourse that may effect the flow within the channel.**
- 3. The maximum Greenfield run-off rate for any discharges into the Boverton Brook catchment is 3.9 litres/second/hectare, and 7.4 litres/ second/ hectare for the Nant-y-Stepsau.**
- 4. The EAW advise that the emergency outfall location (Boverton Brook or Nant y Stepsau) relating to the proposed new foul sewage pumping station is yet to be agreed. They also advise that discharge (even only in an emergency) into the Boverton Brook may not be acceptable, and that they therefore expect to be re-consulted on any proposals regarding the location of the emergency overflow outfall and discharge to ensure the watercourse selected for the outfall location could achieve sufficient dilution. Irrespective of any planning permission granted, the applicant should be aware that consent to discharge will be required from the Environment Agency for the new foul pumping station / emergency overflow. More information can be found on the Environment Agency's website: <http://www.environment-agency.gov.uk/business/regulation/32038.aspx>**
- 5. Where any species listed under schedules 2 or 4 of the Conservation (Natural Habitats, &c.) Regulations 1994 is present on the site, or other identified area, in respect of which this permission is hereby granted, no works of site clearance, demolition or construction shall take place, unless a licence to disturb any such species has been granted by the Welsh Assembly Government in accordance with the aforementioned Regulations.**
- 6. Bats must not be disturbed or destroyed during felling work. A full visual inspection of the trees to be felled must be carried out prior to felling to check for the presence of bats. Advice on bats and trees may be obtained from the Countryside Council for Wales. Bats may be present in cracks, cavities, under flaps of bark, in dense Ivy and so forth. Should bats be identified, please contact either the Countryside Council for Wales on 02920 772400 or the Council's Ecology Section on 01446 704627.**



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D.E.E.R
RECEIVED
ACTION BY: SJB
NO: P706
ACK:



**RECEIVED**  
Asiantaeth yr  
Amgylchedd a'r  
31 July 2009  
Environment  
Agency Wales  
ENVIRONMENTAL  
AND ECONOMIC  
REGENERATION

Steve Ball  
The Vale Of Glamorgan Council  
Development Control  
Docks Office  
Subway Road  
Barry  
CF63 4RT

**Ein cyf/Our ref:** SE/2009/110668-69/01  
**Eich cyf/Your ref:** 2009/00500/OUT &  
2009/00501/OUT

**Dyddiad/Date:** 30 July 2009

Annwyl Mr Ball / Dear Mr Ball

**2009/00500/OUT: Development of a Defence Technical College and associated facilities and works at land at and adjoining MoD St Athan, Vale of Glamorgan**  
**2009/00501/OUT: Development at and adjoining the Aerospace Business Park at land at and adjoining the Aerospace Business Park at St Athan, Vale of Glamorgan**

Thank you for referring planning application consultations for the Defence Technical College and the Aerospace Business Park to the Environment Agency on 14 May 2009.

We acknowledge receipt of the plans and documents listed in the 'Documents Register' (created 13 May 2009) on the Vale of Glamorgan's electronic consultation page:

<http://vog.planning-register.co.uk/PlaRecord.aspx?AppNo=2009/00500/OUT> and  
[2009/00501/OUT](http://vog.planning-register.co.uk/PlaRecord.aspx?AppNo=2009/00501/OUT)

We also welcome those discussions that have already taken place between interested parties on a number of issues and we trust such dialogue will continue. We also recognise and welcome that development proposals have taken on board sustainable development principles, striving towards low carbon energy generation, adherence to BREEAM standards in building design, incorporating water efficiency measures, sustainable drainage and have adopted a more formalised approach to waste management.

We advise that we have no objection to the proposed developments as submitted, and subject to our advice being taken into account (request for conditions) by the local planning authority in determination of both planning applications. Our advice below represents our response to both the application for the Defence Technical College (2009/00500/OUT) and Aerospace Business Park (2009/00501/OUT), and relates to various environmental topics including: flood risk, pollution prevention, foul water drainage, surface water drainage, land potentially affected by contamination, water resources, waste strategy, environmental permitting regulations (2007) and biodiversity matters. We therefore advise as follows:

Asiantaeth yr Amgylchedd Cymru/Environment Agency Wales  
Rivers House Fortran Road, St. Mellons, Cardiff, CF3 0EY.  
Llinell gwasanaethau cwsmeriaid/Customer services line: 08708 506 506  
E-bost/Email: [enquiries@environment-agency.gov.uk](mailto:enquiries@environment-agency.gov.uk)  
[www.environment-agency.gov.uk](http://www.environment-agency.gov.uk)



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INVESTING IN PEOPLE



## **1.0 Flood risk management matters**

### **1.1 Flood Consequence Assessment (FCA), associated model and flood outlines: our summary of comments**

We have reviewed the following submission:

- Flood Consequence Assessment (FCA) dated May 2009, produced by Entec Ltd.

We also requested a copy of Hec-Ras Model produced by Entec Ltd in support of the FCA and we received a copy of this model direct from Entec on 22 June 2009. We request that the local planning authority include this model as part of the planning application submission. Following our review of the Hec-Ras model and FCA, we offer the following advice:

In summary, we advise that the model provides a good representation of the local hydraulic climate and the flood outlines produced by the consultants in their FCA report could be considered realistic. We therefore advise that the findings of the FCA and output of the Hec-Ras model submitted in support of the Defence Technical College and Aerospace Business Park appear to be acceptable.

### **1.2 Our detailed comments**

The steady state Hec-Ras model was produced by Entec Ltd in order to determine any impact the proposed works may have on the local hydraulic network.

The Hec-ras model would appear to give a good representation of the local hydraulic climate. The model includes a good number of surveyed cross sections, and all relevant structures and variables such as friction co-efficients are representative of the locale. Several sensitivity runs of the model have been undertaken, including blockages to bridges and culverts, friction factors and boundary conditions. The model replicates previous work undertaken by the Environment Agency which concluded that the railway culvert between the site and Boverton village becomes heavily surcharged during extreme events. However, this is sufficiently far enough downstream not to have a backwater effect at the site itself.

The original flow estimates used by the Consultants were approximately 10% lower than our values (Q1000 of 14.4 cumecs cf 16.6 cumecs). The Consultants have re-run the model with the revised flow estimates and the differences in modelled water surface levels are minimal (approximately 0.1m for Q1000 event). The differences are so small the original flood outline as prepared by the Consultants would not be altered.

We therefore consider that the HEC-RAS hydraulic model produced in support of the FCA provides a good representation of the local hydraulic climate and the flood outlines produced could be considered realistic.

The FCA also states that the proposed development will be designed to preclude construction within the predicted flood risk areas, up to the 0.1% event, that is, to develop outside of the agreed flood outlines. We request therefore that any development approved by the local planning authority should be designed outside the agreed flood outlines.



On a minor point of clarity, please note, in the last paragraph on page 20 of the FCA (section 3.2) it states that the Nant y Stepsau and Rhyl stream flow westwards. However, the text should state eastwards.

### **1.3 Surface water drainage and attenuation**

It is imperative therefore that any surface water drainage from the new site is adequately managed so as not to increase the flow in the Boverton Brook. Boverton Brook has been known to cause frequent flooding in the village of Boverton, some 2 kilometres downstream of the application sites. However, there is no history of flooding adjacent to the site where the Brook is in its upper reaches and takes the form of a small ditch running alongside the public highway.

A Greenfield run-off restriction also applies to surface water discharges into the Nant-y-Stepsau, which is designated as a main river, and includes any surface water discharges into storm water sewers that ultimately drain into a watercourse.

To this end, the FCA confirms the use of sustainable drainage systems (SuDs) where possible, and alternative attenuation to Greenfield rates elsewhere. To ensure that restricted run-off rates are applied on surface water discharges into the Boverton Brook and Nant-y-Stepsau, we request the following condition is included in any planning permission(s) granted:

**Condition:** No development approved by this permission shall be commenced until a scheme for the provision and implementation of a surface water regulation system has been submitted to and approved in writing by the Local Planning Authority. Such a scheme shall be implemented prior to the construction of any impermeable surfaces draining to the system unless otherwise agreed in writing by the Local Planning Authority. The scheme must be able to demonstrate the Greenfield run-off rates for the Boverton Brook and Nant-y-Stepsau are maintained post development.

**Reason:** To prevent the increased risk of flooding.

Please note, the maximum Greenfield run-off rate for any discharges into the Boverton Brook catchment is 3.9 litres/second/hectare (this has been provided previously by us to the Consultant and is quoted within the FCA submission). The maximum Greenfield run-off restriction for the Nant-y-Stepsau is 7.4 litres/second/hectare.

### **1.4 Diversion works (upper reaches of Boverton Brook)**

We note that the proposals include the diversion of parts of the upper reaches of the Boverton Brook, designed to provide betterment with regards to flood risk. However, these proposals will be the subject of future detailed discussions between the developers, the local planning authority and the Environment Agency. Details of the diversion scheme (including details of any necessary future maintenance works) will need to be submitted and agreed.

We therefore request your Authority include a suitably worded condition into any planning permission granted to secure the submission of a diversion scheme (to divert part of the upper reaches of the Boverton Brook) prior to the commencement of such works.

### **1.5 Flood Defence Consent: regulatory controls by Environment Agency**

We note that a new access road is to be constructed to the north of the site. This road will cross the Boverton Brook and the adjacent Llanmaes Brook. The applicant should be aware that the Boverton Brook, Llanmaes Brook and the Nant-y-Stepsau



are statutory main rivers. Any works in, under or over the river channel, including the diversion of a channel, may require a formal Flood Defence Consent under Section 109 of the Water Resources Act 1991. In addition a Flood Defence Consent under Environment Agency Wales Byelaws may also be required for works within 7 metres from the top of the natural banks or from the landward toe of any artificial embankment or structure designed to contain flood water. A Flood Defence Consent will also be required under S.23 of the Land Drainage Act 1991 for structures within the channel of any ordinary watercourse that may effect the flow within the channel.

## **2.0 Foul drainage, surface water drainage and pollution prevention measures**

### **2.1 Foul drainage: improvements to Llantwit Major WwTW**

It is intended that additional foul flows are to be dealt with through funding of conveyance infrastructure (new foul pumping station and rising main) and enhancements to treatment provisions at Llantwit Major Wastewater Treatment Works (WwTW). As details are to be agreed, we would request the following condition be included in any planning permission granted or legal agreement imposed to ensure that such improvements take place without any adverse impact on the environment:

#### **Condition**

No development approved by this permission shall be commenced until a scheme for the improvement and/or extension of the existing sewerage system has been submitted to and approved in writing by the local planning authority. The scheme shall be implemented as approved. No occupation of buildings/dwellings approved by this permission shall occur until the scheme for improvement and/or extension of the existing sewerage system has been completed.

#### **Reasons**

To ensure that the Wastewater Treatment Works and conveyance infrastructure is capable of treating all additional foul flows and also to prevent failure of statutory and non-statutory water quality objectives.

### **2.2 Foul drainage: a new foul sewage pumping station (SPS)**

As part of proposals it is also intended that a new foul sewage pumping station (SPS) will serve the proposed development, and an emergency overflow is proposed with two potential receiving watercourses under consideration. We also note that the emergency outfall location (Boverton Brook or Nant y Stepsau) is yet to be agreed. We wish to highlight that discharge (even only in an emergency) into the Boverton Brook may not be acceptable. We would therefore expect to be re-consulted on any proposals regarding the location of the emergency overflow outfall and discharge. We would seek to ensure the watercourse selected for the outfall location could achieve sufficient dilution.

Irrespective of any planning permission granted, the applicant should be aware that consent to discharge will be required from the Environment Agency for the new foul pumping station / emergency overflow. More information can be found on the Environment Agency's website:

<http://www.environment-agency.gov.uk/business/regulation/32038.aspx>

### **2.3 Surface water drainage and pollution prevention measures**

With regards to surface water drainage, section 3.1.4 of '7.3: Surface Water Drainage Strategy' for the Service Families Accommodation (SFA) sites suggests soakaways as being a potential method for managing surface water runoff, with soakaway testing to be carried out prior to detailed design to ascertain effectiveness.



We would therefore confirm that for clean roof water, this would only be acceptable provided that:

- 1) these areas have not been subject to previous contaminative activities (to be verified by the further investigation referred to below in item 3); and
- 2) An adequate unsaturated zone is maintained between the base of the soakaway and the maximum seasonal water table.

As a pollution prevention measure, roof water down pipes should be connected into the system either directly or by means of back inlet gullies provided with sealing plates instead of open gratings.

If run-off from roads and residential parking areas are to be considered for discharge to soakaway, then we would need to be satisfied that there were adequate protective measures in place including arrangements for effective management and maintenance of the system.

With regards to the increase in car parking and impermeable surfaces, oil interceptors are recommended to be installed on site. SuDS are also a possible way of treating contaminated surface water. Techniques that control pollution close to the source, such as permeable surfaces or infiltration trenches, can offer a suitable means of treatment for run-off from low risk areas such as roofs, car parks and non-operational areas. In higher risk areas, other SuDS facilities such as constructed ponds, wetlands or swales could be considered. Where there is a high risk of oil contamination (that is, car parks) it will be appropriate to use an oil interceptor as part of the SUDS scheme.

We request the above details and implementation of schemes are controlled by way of a planning condition on any planning permission granted:

**Condition**

The development hereby permitted shall not be commenced until such time as a scheme to dispose of foul and surface water has been submitted to, and approved in writing by, the local planning authority. The scheme shall be implemented as approved.

**Reason**

To prevent pollution to controlled waters.

**2.4 Silt, oil and other possible pollutants**

The potential pollution of controlled waters by silt, oil and other possible pollutants and suitable mitigation measures are mentioned throughout the application. The mitigation measures outlined must be adhered to and implemented otherwise there is a risk of the potential pollution of controlled waters. We therefore request that the following scheme is agreed and implemented by way of a planning condition:

**Condition**

The development hereby permitted shall not be commenced until such time as a scheme to treat and remove suspended solids from surface water run-off during construction works has been submitted to, and approved in writing by, the local planning authority. The scheme shall be implemented as approved.

**Reasons**

To prevent the pollution of controlled waters.

**Condition:** Any facilities for the storage of oils, fuels or chemicals shall be sited on impervious bases and surrounded by impervious bund walls. The volume of the



bunded compound should be at least equivalent to the capacity of the tank plus 10%. If there is multiple tankage, the compound should be at least equivalent to the capacity of the largest tank, or the combined capacity of interconnected tanks, plus 10%. All filling points, vents, gauges and sight glasses must be located within the bund. The drainage system of the bund shall be sealed with no discharge to any watercourse, land or underground strata. Associated pipework should be located above ground and protected from accidental damage. All filling points and tank overflow pipe outlets should be detailed to discharge downwards into the bund. **Reason:** To prevent pollution of the water environment.

Our Pollution Prevention Guidelines (PPGs) which detail current best practices are available on our website on the following link:  
<http://www.environment-agency.gov.uk/business/topics/pollution/39083.aspx>

## **2.5 Construction Method Statement (CMS) and Construction Environmental Management Plan (CEMP) Site Waste Management Plan (SWP)**

We note that an overarching Construction Environmental Management Plan (CEMP), Construction Method Statement (CMS) and Site Waste Management Plan (SWS) will be prepared for the entire proposed development. We recognise that an outline CEMP has been included as part of the planning submissions and that a "more fully robust version" will be prepared before development proceeds. We would request to be consulted on the more detailed CEMP, method statements and SWP, prior to the commencement of relevant works on site. (Please note, we would request adequate time be allowed (normally 21 days) for review of these documents).

We request your Authority include a suitably worded condition requiring the submission, agreement and implementation of the CMS, CEMP and Site Waste Management Plan (outlined in chapter 2.0 of '7.5 Construction Method Statement'). This is to ensure that such plans are agreed and implemented, prior to any works being commenced.

We would also request that the developer provide us with a timetable/programme of works. Our Environment Management team would like the opportunity to attend relevant meetings leading up to construction and on site visits during construction to ensure mitigation methods as detailed in the various environmental reports / documents, are robust and suitable for the activity

## **2.6 Construction Method Statement - excavated material**

The construction method statement details that excavated material from site will be reused on site. Excavated material produced and used on the same site can still be considered as waste. The voluntary Code of Practice (CoP) (CL:AIRE The Definition of Waste: Development Industry Code of Practice) provides a framework for determining whether or not excavated material used in land development is waste. The CoP sets out good practice for the development industry to use when assessing, if materials are classified as waste or not and determining when treated waste can cease to be waste for a particular use. We suggest when reusing excavated material on site the developer refers to the CoP on the link below to ensure compliance with waste legislation:

<http://www.environment-agency.gov.uk/static/documents/PS006.pdf>

We note in 'Chapter 2: Environmental' of the Construction Method Statement that bricks, concrete and other demolition materials will be crushed and reused on site. These materials are also intended to be stored on site. For these activities to go



ahead, the appropriate waste exemptions will be required from the Environment Agency.

### **2.7 Construction Method Statement: Asbestos**

Many of the buildings being demolished listed in 'Chapter 4.0: Demolition' of '7.5 Construction Method Statement' contain asbestos. We would request that a detailed method statement is produced due to the potential large amounts of asbestos being present on site. This should include: details on the removal of asbestos off site; how the asbestos will be stored whilst on site prior to disposal; and how it will finally be disposed of. We recommend your Authority include a suitably worded condition requiring the submission of a detailed method statement regarding the asbestos prior to any works being commenced. We would request to be re-consulted on this method statement. In addition, the applicant will also ensure compliance with the Hazardous Waste Regulations.

The applicant should be aware that as producers of the hazardous waste, they will need to register as a hazardous waste producer (if they have not already done so) to comply with the Hazardous Waste Regulations.

### **2.8 Duty of Care Regulations**

The Duty of Care regulations for dealing with waste materials are applicable for any off-site movements of wastes. The developer as waste producer therefore has a duty of care to ensure all materials removed go to an appropriate licensed disposal site and all relevant documentation is completed and kept in line with regulations.

Our Environment Management team in our St Mellons office, Cardiff can be contacted on 029 2024 5110 for more information regarding waste legislation. Alternatively, available guidance is on our website under the following link: <http://www.environment-agency.gov.uk/subjects/waste>.

## **3.0 Land potentially affected by contamination**

### **3.1 Additional investigations**

Table 10.5 in 'Chapter 10: Land Quality' of the Environmental Statement (ES) outlines planned additional investigations which include: an additional survey for the Defence Technical College (DTC); further site investigation for the SFA; and verification testing for the Aerospace Business Park (ABP). Entec Ltd have identified the compliance mechanism for this work as being through planning conditions. We would therefore request that the following conditions are included as part of any planning permission granted:

#### **Condition**

Prior to the commencement of development approved by this planning permission (or such other date or stage in development as may be agreed in writing with the Local Planning Authority), the following components of a scheme to deal with the risks associated with contamination of the site shall each be submitted to and approved, in writing, by the local planning authority:

1. A preliminary risk assessment which has identified:
  - all previous uses
  - potential contaminants associated with those uses
  - a conceptual model of the site indicating sources, pathways and receptors
  - Potentially unacceptable risks arising from contamination at the site.



2. A site investigation scheme, based on (1) to provide information for a detailed assessment of the risk to all receptors that may be affected, including those off site.
3. The site investigation results and the detailed risk assessment (2) and, based on these, an options appraisal and remediation strategy giving full details of the remediation measures required and how they are to be undertaken.
4. A verification plan providing details of the data that will be collected in order to demonstrate that the works set out in (3) are complete and identifying any requirements for longer-term monitoring of pollutant linkages, maintenance and arrangements for contingency action.

Any changes to these components require the express consent of the local planning authority. The scheme shall be implemented as approved.

**Reason**

For the protection of controlled waters.

**Condition**

Prior to occupation of any part of the permitted development, a verification report demonstrating completion of the works set out in the approved remediation strategy and the effectiveness of the remediation shall be submitted to and approved, in writing, by the local planning authority. The report shall include results of sampling and monitoring carried out in accordance with the approved verification plan to demonstrate that the site remediation criteria have been met. It shall also include any plan (a "long-term monitoring and maintenance plan") for longer-term monitoring of pollutant linkages, maintenance and arrangements for contingency action, as identified in the verification plan, and for the reporting of this to the local planning authority.

**Reason**

For the protection of controlled waters.

**Condition**

Reports on monitoring, maintenance and any contingency action carried out in accordance with a long-term monitoring and maintenance plan shall be submitted to the local planning authority as set out in that plan. On completion of the monitoring programme a final report demonstrating that all long-term site remediation criteria have been met and documenting the decision to cease monitoring shall be submitted to and approved in writing by the local planning authority.

**Reason**

For the protection of controlled waters.

**3.2 Contamination / remediation mitigation plans and unexpected contamination**

We also note that in 'Chapter 11: Hydrology, Geology and Hydrogeology' of the ES, Entec Ltd recommend the use of planning conditions to enforce compliance with the CEMP and EMP, with the Construction and Phasing Statement (section 2.11: Proposals for dealing with any ecological, archaeological or contamination issues during construction) referring to 'Contamination/Remediation Mitigation Plans' being drawn up for each construction site by Parsons Brinckerhoff/Pell Frischmann. Once



these Mitigation Plans have been drafted we would expect to be consulted on these Plans, via the local planning authority.

In the event that there is the potential for unexpected contamination, then we would also request that the following condition be included in any planning permission granted:

#### **Condition**

If, during development, contamination not previously identified is found to be present at the site then no further development (unless otherwise agreed in writing with the Local Planning Authority) shall be carried out until the developer has submitted, and obtained written approval from the Local Planning Authority for, an amendment to the remediation strategy detailing how this unsuspected contamination shall be dealt with.

#### **Reasons**

To ensure that any contamination encountered is managed appropriately so as not to cause contamination of controlled water receptors.

Please note the Environment Agency will subsequently limit itself to controlled waters in any post determination work.

### **4.0 Water resources**

#### **4.1 Water supply modelling and plans: Dwr Cymru/Welsh Water (DC/WW)**

Comments contained in Chapter 11-19 of the ES explain that the abstraction and supply of water from the reservoir to St Athan has taken place since 1997; previously, the site water supply was provided from borehole sources which are now being made redundant. Comments in the ES also indicate that Dwr Cymru/Welsh Water (DC/WW) will carry out water supply modelling to account for the demand posed by the proposed developments. We recommend that the local planning authority consult with DC/WW and confirm that the extra demand has been adequately allowed for in their plans.

#### **4.2 Potable water supply: regulatory controls by Environment Agency**

Chapter 11-19 of the ES includes comments that suggest the Red Dragon Hangar is equipped with its own independent potable water supply storage and distribution system which is in good condition. Section 11-19 of the ES also contains comments that suggest arrangements across East Camp are more variable, with some infrastructure in fairly poor condition. From our own regulatory controls, we therefore advise that the potable water supply may require an abstraction licence from the Environment Agency. Although the development is exempt from requiring an abstraction licence as it's a Crown operation, we do consider it best environmental practise to obtain an abstraction licence if one is required. Our Water Resources Permitting Support Centre can be contacted on 01142 898340 for more information. Please note, an abstraction licence has previously been granted on the site for environmental remediation.

#### **4.3 Water conservation and sustainable drainage**

We support the water conservation methods which are suggested in 3.9: Water conservation and sustainable drainage (S08) of Sustainability Statement, particularly in view of climate change.



## **5.0 Waste Strategy**

We support the level of consideration and detail given to the waste strategy, and support and commend the aim of achieving 80% recycling of waste generated through core activities (not including FSA waste).

We also support the design of the FSA to enable source segregated waste collection. It is noted within the strategy that the list of waste collection services provided by the Vale of Glamorgan Authority does not include food waste. There is currently a food waste collection scheme pilot being rolled out in the Vale of Glamorgan, and a requirement from WAG for all local authorities to divert food waste from landfill to Anaerobic Digestion facilities by 2012. We would therefore advise that the future demand for the ability to store source segregated food waste be recognised within the design of the accommodation.

Whilst fully supporting the aim to achieve waste recycling and appropriate containment we would recommend that the strategy be considered under an ecological footprint assessment, whereby the contribution of the vehicles, infrastructure etc are taken into account when determining the environmental impact. When detailing where waste will be taken after collection, several streams are taken to non-specified facilities. The facility and mode of transport should be chosen through an assessment of the whole environmental impact.

## **6.0 Environmental Permitting Regulations 2007: regulatory controls by the Environment Agency**

We are pleased that a Combined Heat and Power Facility (CHP) are being proposed for energy generation and heat utilisation. Given the estimated outputs from the Biomass boiler, it is likely that the thermal input of the boiler (and standby boilers) will meet the threshold for regulation by Environment Agency Wales, as a Section 1.1 Part A (1) (a) activity as defined under the Environmental Permitting (England & Wales) Regulations 2007. The applicant is advised to contact Environment Agency Wales to organise pre-application discussions ahead of application for an EPR permit.

The applicant wishes to source the biomass feedstock for the CHP boiler from within Wales. Recent experiences gained from other industrial sites indicate that there may not always be a sufficiently robust source of local biomass.

## **7.0 Biodiversity: protected species**

We understand there has been a lot of previous work on the site, and the populations of Great Crested Newts (GCN) have been identified, and a management plan for the habitat creation and translocation of the Great Crested Newts has been produced. We recommend this Plan is followed as detailed in the Ecology Strategy and that there is continued consultation with the Countryside Council for Wales (CCW) regarding the protected species.

We trust our advice above is useful. Please contact me if you have any queries.

Yn gywir / Yours faithfully



**Christian Servini**  
**Planning Liaison Officer**

Deialu uniongyrchol/Direct dial 02920 245 235

Ffacs uniongyrchol/Direct fax 02920 362920

E-bost uniongyrchol/Direct e-mail [christian.servini@environment-agency.gov.uk](mailto:christian.servini@environment-agency.gov.uk)

cc Entec UK Ltd