WML CONSULTING
Civil, Structural and Geotechnical Engineers

Flood Risk Assessment

For a site at

Dinting Road, Glossop, High Peak

Undertaken on behalf of

High Peak Architects

WML CONSULTING
Civil, Structural and Geotechnical Engineers

Report Title:	**Dinting Road, Glossop, Flood Risk Assessment**
Report Reference:	**6499G/FRA/01/Rev. A**
Client:	**High Peak Architects**
Issue Date:	**19th April 2016**
Drafted By:	**S Mostyn**
Authorised By:	**K Tyldesley**

CONTENTS

APPENDICES

1.0 INTRODUCTION

Appointment

1.1 WML Consulting were commissioned by High Peak Architects to undertake a Flood Risk Assessment for submission with a forthcoming Planning Application for the proposed residential development at Dinting Road, Glossop.

Proposed Development

1.2 The current development proposals include the construction of fourteen, two storey 4/5 bedroom residential dwellings with associated access road, private gardens and hard-standing for parking.

1.3 A proposed sketch site layout by High Peak Architects (drawing 1174 SK), is included in Appendix 02.

Objective

1.4 This Report comprises a Flood Risk Assessment (FRA) as required by the National Planning Policy Framework (NPPF). It has been carried out in accordance with BS 8533:2011 – Assessing and Managing Flood Risk in Development.

1.5 The NPPF identifies that it is the responsibility of developers to demonstrate:

- Whether the development would be affected by current or future flooding from any source.
- That the development is safe and where possible reduces flood risk overall.
- Whether flood risk would be increased elsewhere.
- Mitigation measures for any identified flooding risks.
- That the site can be developed and occupied safely.

1.6 The FRA identifies whether there are any flooding or surface water management issues related to the development site that may warrant further consideration, to comply with current Planning Policy and associated Flood Risk Practice Guide.

Sources of Information

1.7 Information has been obtained from the following sources:

- National Planning Policy Framework (NPPF) March 2012
- Topographical Survey
- United Utilities (UU) Sewer Records
- WML Phase 1 Desk Study (Ref: 6499/G/01)
- High Peak Borough Council (HPBC) Strategic Flood Risk Assessment (SFRA).

2.0 SITE LOCATION AND DESCRIPTION

Site Address / Location	Dinting Rd Glossop High Peak	
Post Code	SK13 7DY	
Aerial View of Site		
Grid Reference	402460E	394518N
Brief Description Existing Site	The site is roughly rectangular in plan and is located in a semi-rural area of Glossop. The site is bounded to the North by Dinting Road, with existing residential properties and farmland beyond, to the West by Dinting Lane, to the South by a rail line with farmland beyond, and to the East by a track with residential buildings and farmland beyond. Access to the site is currently gained via Dinting Road through a gate in the north-western corner. The site surface is currently fully covered by grass and low level vegetation, apart from a small structure located to the northern boundary.	
Total Site Area	0.88 Ha (hectares) or 8800 square metres	
Topography	The site falls steeply to the south and west with levels falling from around 169.60m AOD in the north-western corner to 162.90m AoD in the south-western corner and 176.10m AOD in the north-eastern corner to 168.30m AoD in the south-western corner.	

3.0 EXISTING DATA

Geo-Environmental Setting

3.1 The following information has been extracted from the WML Phase 1 desk Study (Ref: 6499/G/01).

Geo-Environmental Data	The site is indicated to be underlain by Till of Devensian Age, which normally comprises silty sandy clay with pebbles but can contain gravelly or laminated sandy layers. The drift deposits are underlain by Marsden Formation strata of the Millstone Grit Group, which normally comprises sandstone interbedded with siltstone and mudstone.
Hydrogeology & Hydrology	The superficial Till beneath the site is classified by the Environment Agency as 'Unproductive'. The underlying Marsden Formation is classified as a Secondary (A) Aquifer (former minor Aquifer). These comprise permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. There are no Environment Agency Source Protection Zones within 500m of the site. There are 37 No. Detailed River Network Features within 500m of the site. These relate to the Glossop Brook located 250m to the South of the site and associated drains and tributaries.
Ground Conditions	Historic BGS borehole (SK09SW154) located 217m South of the site encountered made ground to a depth of 5.70mbgl underlain by cohesive strata to a depth of 6.30mbgl. This was underlain by granular strata to 7.40mbgl and in turn by cohesive Till, described as brown boulder clay, to a depth of 10.00mbgl where the borehole was terminated.
Groundwater	There is currently no information available regarding ground water levels at the site.

Existing Drainage

3.2 Reference should be made to the extract / mark-up of the UU public sewer records received from High Peak Architects which is included in Appendix 03.

3.3 The public sewer records indicate that the site and surrounding area is served by existing combined public sewers and that there is a 225mm / 300mm diameter combined sewer in Dinting Road to the North of the site which changes direction at UU manhole 3503 (cover level 169.75, invert level 166.61) to travel southwards along Dinting Lane to UU manhole 3502 to the south west of the site.

3.4 The mark-up of the sewer records also shows a 300mm diameter surface water culvert in land to the West of Dinting Lane.

Local Planning Policy (SFRA)

3.5 In September 2008, Halcrow completed the High Peak Borough Council (HPBC) Strategic Flood Risk Assessment (SFRA). The following planning policy recommendations extracted from the SFRA are relevant for the site:

- *Use the Sequential Test to locate new development in least risky areas, giving highest priority to Flood Zone 1*
- *Use the Sequential Approach within development sites to inform site layout by locating the most vulnerable elements of a development in the lowest risk areas, in accordance with Table D3 of PPS25*

  Ensure all new development is 'safe', meaning that dry pedestrian access to and from the development is possible without passing through the 1 in 100 year plus climate change floodplain, emergency vehicular access is possible, and flood resistance and resilience is incorporated
- *The use of sustainable urban drainage systems (SUDS) in all Flood Zones for both Brownfield and Greenfield sites, to achieve Greenfield discharge rates with a minimum reduction of 20%. Space should be set-aside for SUDS.*

4.0 ASSESSMENT OF FLOOD RISK AND MITIGATION

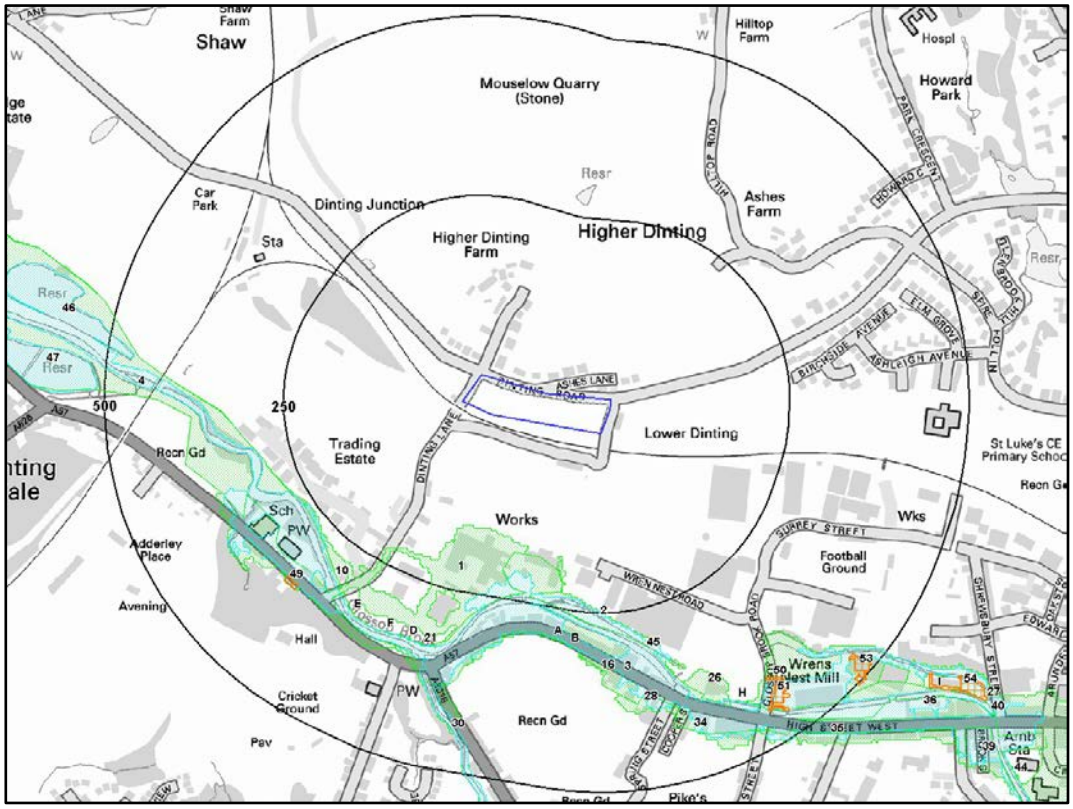
4.1 Sources of Flooding

Pluvial Flooding (Rivers and Sea)	Flood Risk Rating	Low Probability

The Environment Agency (EA) Fluvial Flood Map shows the site to be within Flood Zone 1. Zone 1 indicates an Annual Exceedance Probability (AEP) of not greater than 0.1% (Probability 1 in 1000 year) flood risk – Low Probability.

Residential dwellings are classified as "more vulnerable" developments in the current National Planning Policy Framework (NPPF). Developments of this "more vulnerable" nature are considered appropriate in Flood Zone 1.

As the site is situated within EA Flood Zone 1 and there is no history of flooding at the site, it is considered all access and egress routes to the site are safe.



Groundwater Flooding	Flood Risk Rating	Low

Due to the topography and the presence of the superficial till deposits, it is unlikely that groundwater will be able to rise to the surface and cause flooding at the site.

The EA, UU and HPBC were all contacted and all confirmed that they have no record of any historical flooding incidents at the site.

Based on the above, it is considered that the risk of flooding from groundwater is Low.

Fluvial Flooding (Surface Water)	Flood Risk Rating	Low

The site is a steeply sloping site situated between Dinting Road and the rail line. There are a number of existing residential properties beyond which is open farmland situated to the North of the site on the opposite side of Dinting Road. The topo survey indicates that road levels along Dinting Road have

been designed to drain away from the site to gullies on the opposite side of the road. It is therefore considered that any surface water run-off from the residential properties / farmland to the North would be diverted away from the site. The EA, UU and HPBC were contacted and all confirmed that they have no record of any historical flooding incidents in the vicinity of the site. Based on the above, it is considered that the risk of flooding from surface water is Low.		
Sewer Flooding	**Flood Risk Rating**	Low
The site is well served by existing private and public sewers. UU were contacted and confirmed that they have no record of any historical / current flooding incidents relating to the capacity of their sewers in the vicinity of the site. The proposed site drainage systems will be designed robustly and in accordance with the design principles laid out in the drainage strategy in section 5.0 of this Report. Taking all of the above into account, it is considered that the potential risk of flooding from existing and proposed sewers is Low.		
Flooding from Other Sources	**Flood Risk Rating**	Low
Based on an assessment of the EA flood maps, it is considered that the site is not at risk of flooding from artificial sources such as reservoirs and canals.		

Flood Mitigation Measures

Finished Floor Levels

4.2 It is recommended that finished floor levels should be set at a minimum of 0.15m above adjacent ground levels. This will enable any potential surface water to be conveyed safely across the site, without affecting property, in accordance with the approach promoted within DEFRA's Making Space for Water.

Sustainable Drainage (SUDS)

4.3 Where appropriate, SUDS should be incorporated into the surface water drainage design for the development.

Climate Change

4.4 The effect of climate change on Peak Rainfall Intensities for the development site has been assessed as part of this FRA and should be applied at 30% in accordance with the NPPF Technical Guidance, Table 5.

Future Maintenance

4.5 It is anticipated that the responsibility for the maintenance of the non-adoptable drainage will be the individual homeowners and the adoptable drainage will be the responsibility of UU. Provided that these are adequately maintained, the risk of flooding to the site will be reduced.

5.0 DRAINAGE STRATEGY

5.1 The proposed drainage strategy for this site incorporates the principles of, and, where appropriate, demonstrates compliance with The Code for Sustainable Homes (CfSH), The National Planning Policy Framework (NPPF), and The SUDS Manual. In accordance with the requirements of these documents, the proposed surface water drainage scheme for the site should demonstrate:

- That there is no increase in existing flow rates discharged to watercourse/public sewer.
- That SUDS have been used as the preferred method for the disposal of surface water.
- How run-off up to the 1 in 100 year event, plus an allowance for climate change, will be dealt with without increasing flood risk elsewhere.

5.2 The proposed drainage systems should be designed in accordance with BS EN 752-4 and Building Regulations Approved Document H (2010). Approved Document H indicates the following hierarchy for the disposal of surface water drainage from new development sites:

- Discharge via infiltration
- Discharge to watercourse
- Discharge to sewer.

5.3 Based on the prevailing ground conditions, it is considered that soakaways / other infiltration techniques are not likely to be feasible for the disposal of surface water drainage from this development. However, this should be confirmed by the intrusive site investigation at the site.

5.4 It is anticipated that the proposed site access road will be adopted by the Local Highway Authority under a Section 38 Agreement and that the new drainage within the access road will be offered for adoption to UU under a Section 104 Agreement. It is currently proposed that surface water from the site, will be connected to the existing 300mm diameter surface water culvert to the West of the site. The foul drainage from the site will drain to existing 300mm diameter combined public sewer in Dinting Lane. Both connections will be subject to the necessary approvals from the relevant authorities / landowners.

5.5 The site is currently undeveloped and is therefore considered to be a greenfield site. As such, surface water run-off rates from the developed site will be restricted to greenfield run-off rates.

5.6 A greenfield run-off calculation has been carried out using the ICP SUDS Method in MicroDrainage WinDes software (see Appendix 04). The existing greenfield run-off rates for the site are summarised as follows:

Return Period	Flow (l/s)
1 in 1 year	4.4 (5.0)
1 in 30 year	8.6
1 in 100 year	10.6

5.7 Surface water run-off rates for the developed site should not exceed the rates shown in the table above for the corresponding 1, 30 & 100 year return period storms. However, in accordance with Code for Sustainable Homes Technical Guidance, where the peak flow rate is less than 5l/s, the limiting discharge rate may be increased up to a maximum of 5 l/s at the point of discharge to reduce the risk of blockage. Therefore, the maximum run-off rates for the developed site for the 1, 30 and 100 year storms should be no more than 5 l/s (1 year), 8.6 l/s (30 year) and 10.6 l/s (100 year).

5.8 In order to achieve this restriction in flow rates, it is considered that a surface water attenuation tank with a flow control device will be required.

5.9 The proposed attenuation tank in conjunction with the proposed landscaping / site levels should be capable of temporarily containing within the site any additional volume of surface water for all storm events up to and including the 100 year storm, plus a 30% allowance for climate change without causing flooding to property. As a minimum, all storm events up to the 30 yr storm should be contained below ground.

5.10 It is anticipated that the proposed attenuation tank will be situated beneath the proposed adoptable access road and will be adopted by UU as part of the Section 104 Agreement.

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 This FRA has been undertaken for submission with the forthcoming Planning Application for the proposed residential development at Dinting Road, Glossop.

6.2 It has been carried out in due cognisance of the High Peak Borough Council (HPBC) Strategic Flood Risk Assessment (SFRA) and the National Planning Policy Framework (NPPF).

6.3 The Environment Agency, United Utilities and High Peak Borough Council were contacted and all confirmed that they have no record of any flooding issues which may affect the site.

6.4 The proposed development is located on land assessed by the EA and the SFRA as being within river and coastal Flood Zone 1, indicating that the flood risk from these sources is considered to be low.

6.5 Residential dwellings are classified as “more vulnerable” developments in the current National Planning Policy Framework (NPPF). Developments of this “more vulnerable” nature are considered appropriate in Flood Zone 1.

6.6 The site is considered to be at low risk of flooding from all other sources, ie. flooding from land, from groundwater, from sewers and from artificial sources.

6.7 The prevailing ground conditions at the site are such that soakaways are not likely to be suitable for disposal of surface water from the site.

6.8 It is anticipated that the proposed site access road will be adopted by the Local Highway Authority under a Section 38 Agreement and that the new drainage within the access road will be offered for adoption to United Utilities under a Section 104 Agreement. It is currently proposed that surface water from the site, subject to further investigations, will be connected to the existing 300mm diameter surface water culvert to the West of the site. The foul drainage from the site will drain to existing 300mm diameter combined public sewer in Dinting Lane. Both connections will be subject to the necessary approvals from the relevant authorities / landowners.

6.9 The site is currently undeveloped and is therefore considered to be a greenfield site. Surface water run-off from the development site will be restricted to the existing greenfield run-off rates for the 1, 30 & 100 year return period storm events.

6.10 In order to achieve this restriction in flow rates, it is anticipated that a surface water attenuation tank with a flow control device will be required. The volume of storage required will be confirmed at detailed drainage design stage.

APPENDIX 01

Topographical Survey

Topographical Survey Legend

B	Bollard	h	Height	RWP	Rain Water Pipe	Level Prefix Descriptions	
BS	Bus Stop	Hyd	Hydrant	SP	Soil Pipe	AL	Arch Level
BT	Telecommunications IC	IC	Inspection Cover	SPS	Stone Paving Slabs	BL	Bed Level
CPS	Concrete Paving Slabs	JB	Junction Box	ST	Stop Tap	CL	Cover Level
CTV	Cable Television Cover	KO	Kerb Outlet	Stay	Cable Stay	EL	Eaves Level
DP	Downpipe	LB	Letter Box	SV	Stop Valve	FL	Floor Level
DR	Drain	LP	Lamp Post	TCB	Telephone Call Box	IL	Invert Level
Elec	Electrical IC	Mkr	Utility Marker	TL	Traffic Light	OL	Overhead Cable Level
EP	Elec. Pole	MP	Mile Post	TP	Telegraph Pole	PL	Parapet Level
ER	Earth Rod	NP	Name Plate	TPS	Tactile Paving Slabs	RL	Roof/ridge Level
FP	Flagpole	P	Post	VP	Vent Pipe	SL	Soffit Level
FT	Floodlight	PM	Parking Meter	WM	Water Meter	Spr	Arch Springing Level
G	Gully	RE	Rodding Eye	WO	Water Outlet	TF	Top Of Fence Level
GP	Gate Post	RS	Road Sign	UTL	Unable To Lift	TW	Top Of Wall Level
GV	Gas Valve	RTW	Retaining Wall			Thr	Threshold Level
						WL	Water Level

Fence Annotation

B/W	Barbed Wire
C/B	Closed Boarded
C/I	Corrugated Iron
C/L	Chain Link
C/P	Concrete Panel
H/R	Hand Rail
I/R	Iron Railings
O/B	Open Boarded
P/C	Post & Chain
P/R	Post & Rail
P/W	Post & Wire
W/M	Wire Mesh

C/L Fence

Safety Barrier

Gate

Stile

Hedge

Limit of Foliage & Tree Canopy

50.00 Spot Level

SSL1 50.00 Survey Control Station (coordinated point)

Tree

MT Multi Trunk

Levels defining edge of carriageway are observed at channel (bottom of kerb). Unless otherwise stated.

Survey Station Coordinates

Stn	Easting	Northing	Level
RP01	402357.81	394532.89	162.67
RP02	402367.75	394548.56	165.69
RP03	402375.12	394564.04	168.69
RP04	402376.47	394575.72	169.81
RP05	402426.42	394555.25	170.50
RP06	402451.50	394548.97	171.28
RP07	402482.90	394544.01	173.16
RP08	402536.09	394538.21	175.51
RP09	402564.54	394537.52	176.32
RP1A	402414.79	394534.53	167.71
RP1B	402493.61	394517.10	170.57
RP1C	402564.41	394511.88	172.65
RP1D	402550.80	394468.86	166.20
RP3A	402390.97	394554.66	168.33

Please note:

Any discrepancy found between an Ordnance Survey benchmark and an OSGM02 computed orthometric height is likely to be due to bench mark subsidence or uplift and, assuming precise GPS survey has been carefully carried out, the orthometric height given by OSGM02 should be considered correct in preference to archive benchmark heights. OSGM02 converts GPS ellipsoid heights to orthometric heights above mean sea level.

Head and Registered Office
Survey Systems Ltd
Willow Bank House
Old Road
Handforth • Wilmslow
Cheshire SK9 3AZ
Tel. 01625 533444
Fax 01625 526815
mail@survsys.co.uk
www.survsys.co.uk

Levels are related to **OSGM02**
Value **n/a**

Coordinates are related to **National Grid (GPS)**

Scale **1:200**

0 2 4 6 8 10 12 14 16 18 metres

Client High Peak Architects

Title

Topographical Survey
Dinting Road
Dinting Lane
Glossop SK13 7DY

Surveyed	RP AT AC	Drawn	BP
Date	September 2014	Checked	AG
File name	16156	Revision No.	Sheet size A0

Drawing No. **SSL:16156:200:1:1**

SURVEYsystems

APPENDIX 02

Proposed Site Layout

House Types

Type 1, 2 bed: House nos 16,17,18,19, 20

Type 2, 3 bed semi-detached: House nos 2, 3, 7, 8, 9, 10, 11, 12, 13, 14

Type 4, 3 bed detached: House nos 1, 15

Type 3, 4 bed: House nos 4, 5, 6

Existing tree

New tree

Tree to be removed

Tree shown indicatively

FOR DISCUSSION

North

HIGH PEAK ARCHITECTS LTD
2nd Floor, Wharf House, Wharf Road, Whaley Bridge, High Peak, Derbys SK23 7AD
Tel: 01663 719717 Website: highpeakarch.com Email: hpa@highpeakarch.com

Residential Development

Dinting Road/ Dinting Lane, Glossop

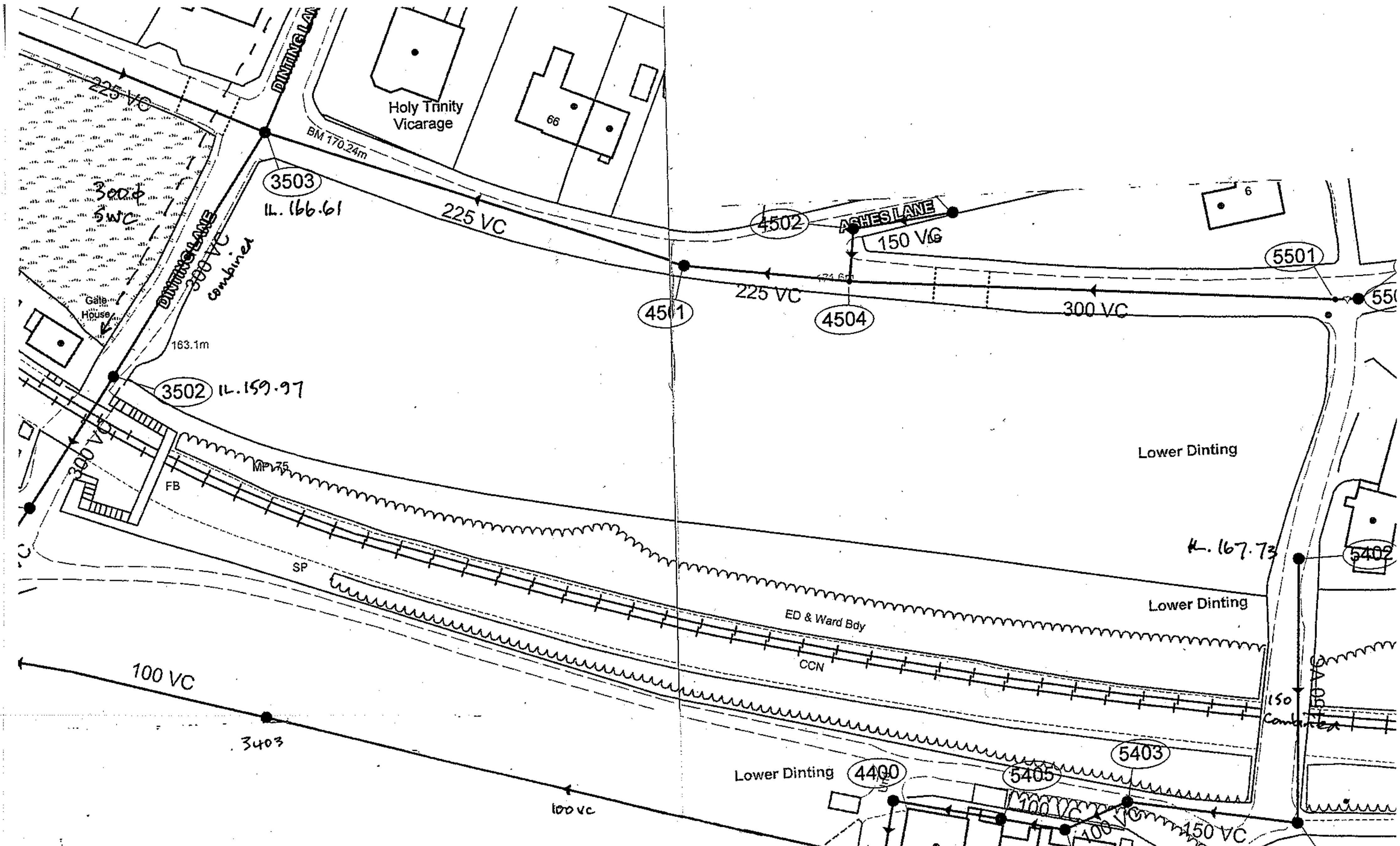
Proposed sketch layout

1174. SK

Scale: 1:500 @ A3 Date: April 2015 DO NOT SCALE OFF THIS DRAWING Rev:

APPENDIX 03

Public Sewer Records



Mtg. 3.7.14 Drainage Engineers Buxton

Confirmed (1) Exis. 300ϕ combined in Dinting Lane could take FWS from site but not SWS

(2) 300ϕ SW culvert can be used on W side Dinting Lane.

APPENDIX 04

Greenfield Runoff Calculations

ICP SUDS Mean Annual Flood

Input

Return Period (years)	100	Soil	0.450
Area (ha)	0.880	Urban	0.000
SAAR (mm)	883	Region Number	Region 10

Results l/s

QBAR Rural	5.1
QBAR Urban	5.1
Q100 years	10.6
Q1 year	4.4
Q30 years	8.6
Q100 years	10.6

APPENDIX 05

Environment Agency Correspondence

Stephen Mostyn

From: GMMC Info Requests <Inforequests.gmmc@environment-agency.gov.uk>
Sent: 28 April 2015 16:31
To: Stephen Mostyn
Subject: GMMC4754AB Fee attached from the Environment Agency

Dear Stephen,

Your Ref: GMMC4754AB
PUBLIC REGISTER AND ENVIRONMENTAL INFORMATION REQUEST
Dinting Road, Glossop

Thank you for your e-mail dated 22/4/15 regarding the above.

The proposed site is located in Flood Zone 1 (less than 1 in 1,000 annual probability of river or sea flooding.)

If water levels are still required, we can provide a Product 3 Detailed Map and Table. The nearest modelled water levels can be provided from Glossop Brook, which is located approximately 0.26km away from the proposed site. In channel water levels for the following return periods can be supplied:

1 in 75 year

1 in 100 year

1 in 1000 year

We have no record of flooding affecting this site. However, this does not mean flooding has not occurred in the past or that it will not flood in future. We recommend that you also contact United Utilities and High Peak Council who may hold additional information (the former especially in relation to sewer flooding).

Before proceeding with this request, we will require a payment of £50 + VAT (£60). This is not a charge for supplying the data, but a charge for the copyright licence which is set out in our Standard Notice. The Standard Notice explains how you may use the information you have asked for and will be sent to you at the same time that we send you your information.

Charging Summary

Product 3 Basic FRA/FCA Map
Copyright Licence Charge = £50 + VAT @ 20%
Total Charge = £60

You can use the link below that takes you to where the products are explained.

http://www.environment-agency.gov.uk/research/planning/93498.aspx

If paying by cheque, please make it payable to the 'Environment Agency' and send it to the External Relations Team, at the address below. If you prefer to pay by credit card please contact us on 01925 542937. We will supply the information/data you have requested as we receive your payment. We will not start work on your enquiry until we have received your payment. If we have not received payment within 1 month of this letter being issued the request for information will be deemed to have been withdrawn.

If you have any further queries please do not hesitate to contact this office.

Regards,

Anne Ball
Customer and Engagement
Richard Fairclough House
Knutsford Road
Warrington
WA4 1HT

Tel: 01925 542937
Fax: 01925 415961
Email: **Inforequests.GMMC@environment-agency.gov.uk**

APPENDIX 06

United Utilities Correspondence

Stephen Mostyn

From: Wastewater Developer Services <WastewaterDeveloperServices@uuplc.co.uk>
Sent: 23 April 2015 10:08
To: Stephen Mostyn
Subject: RE: 6499G_Dinting Rd, Glossop

Hi

I can confirm that there are no recorded historical sewer flooding issues within the vicinity of the proposed development site.

Please note that United Utilities Water plc (UUW) can only record and check flooding events which are reported to us and we have to comply with our Regulators instructions on the qualification of flooding events to place on the 'at risk' register.

Also, this does not include any sewer flooding events caused by blockages or collapses which are the result of third party actions, natural events or other actions over which UUW has no control and not a facet of sewer capacity.

Should you require any further information please do not hesitate to contact me.

Thanks sue

If you have received a great service today why not tell us?
Visit: unitedutilities.com/wow
Sue King
Developer Services Assistant
Developer Services and Planning
Business Operations
United Utilities
T: 01925 679413 (internal 79413)
unitedutilities.com

From: Stephen Mostyn [mailto:Stephen.Mostyn@wmlconsulting.com]
Sent: 22 April 2015 13:24
To: Wastewater Developer Services
Subject: 6499G_Dinting Rd, Glossop

Dear Sirs,

We are presently preparing a Flood Risk Assessment for the proposed residential development at Dinting Rd, Glossop (National Grid Reference 402460E, 394518N) with an indicative postcode of SK13 7DY.

Could you please advise if you are aware of any flooding issues effecting the site, either current or historic.

Regards,

Steve Mostyn
WML Consulting Ltd
Tel: 0161 482 0600
Fax: 0161 486 9210
email: stephen.mostyn@wmlconsulting.com
website: www.wmlconsulting.com

APPENDIX 07

High Peak Borough Council Correspondence

Stephen Mostyn

From: Gallacher, Hayley <Hayley.Gallacher@highpeak.gov.uk>
Sent: 24 April 2015 14:57
To: Stephen Mostyn
Subject: Historic Flooding Records

Dear Mr Mostyn

We have received your enquiry from our Customer Services department. Please contact the Environment Agency to obtain information regarding historic flooding.

Kind Regards
Hayley Gallacher
Planning Support
0345 129 0210