

P/2015/00875

Received 12/05/15



Flood Risk Assessment and Drainage Strategy Land at The Dove Way, Uttoxeter

COSTCDW8936/ COSTCDW8936-01 Revision 0

June 2015



Document Control Sheet

Project Name:	Land at The Dove Way Uttoxeter
Project Number:	COSTCDW8936
Report Title:	Flood Risk Assessment and Drainage Strategy
Report Number:	COSTCDW8936/ COSTCDW8936-01

Issue Status/Amendment	Prepared	Reviewed	Approved
First Issue	Name: Robert Powell Rab, Sarah Signature: Date: 12/06/15	Name: Sarah Rab Signature: Date: 12/06/15	Name: Stefan Morgan Signature: Date: 12/06/15
	Name: Signature: Date:	Name: Signature: Date:	Name: Signature: Date:
	Name: Signature: Date:	Name: Signature: Date:	Name: Signature: Date:
	Name: Signature: Date:	Name: Signature: Date:	Name: Signature: Date:

Executive Summary

Introduction	This addendum to a previously submitted Flood Risk Assessment and Drainage Strategy covers both the Land off The Dove Way, Uttoxeter application and a future, separate application for a HWRC within the same site boundary. It should be noted that while the HWRC has been commented on and forms part of this report, it is by no way linked to the East Staffordshire Borough Council planning application ref: P/2015/00875
Existing Site	The site is situated adjacent to The Dove Way and the A50 by-pass, Uttoxeter, Staffordshire. An approximate postcode for the site is ST14 5AA. Existing land use is predominantly agricultural Greenfield with no watercourse intersecting the site. The nearest watercourse, Uttoxeter Brook is situated to the south east of the site. Development proposals comprise a new highway access off The Dove Way, new access road and new commercial development. A separate planning application shall also be submitted for a new Household Waste Recycling Centre to be located to the north east of the site.
Flood Risk Assessment	Environment Agency Flood Map indicates the site is located within Flood Zone 1. This FRA found that site is most sensitive to potential surface water flooding due to increased impermeable areas. Shallow ground water levels and poor ground conditions in some areas have led to the conclusion that infiltration techniques should not be utilised within the site. Flooding from Reservoirs, Coastal and Sewers have also been assessed.
Site Drainage	Existing site is Greenfield with overland flows discharging to the Uttoxeter Brook to the south east. In line with previous FRA by EWE Associates Ltd (dated September 2011) the proposed drainage of the site is to be restricted to match the existing greenfield runoff rate of 5l/s/ha discharging to Uttoxeter Brook, with attenuation provided in above ground storage.
Flood Risk Management	Due to shallow ground water levels and standing water, infiltration is not considered suitable for the site. Therefore surface water will be

	<p>discharged to Uttoxeter Brook at a restricted discharge rate of 5l/s/ha utilising above ground storage to attenuate the flow. There is a potential that hazardous waste shall be stored on site, this will be stored in accordance with EA Pollution Prevention Guidance (PPG2) as to not cause water/ land contamination.</p>
Conclusions	<p>This FRA concludes that the site is appropriate for the proposed development, inclusive of correct procedures for the temporary storage of hazardous waste pertinent to the HWRC planning application. A drainage strategy has incorporated suitable attenuation on site. It is concluded that a satisfactory means to discharge surface water drainage can be achieved and that the development proposals do not increase flood risk offsite.</p>

Contents

1	Introduction	1
1.1	Background.....	1
1.2	Site Description	1
1.3	Data Collection.....	2
1.4	Proposed Development	2
2	Data Collection	4
2.1	Environment Agency Flood Map (Planning)	4
2.2	Topographical Survey	5
2.3	British Geological Survey (BGS)	5
2.4	Flood Risk Assessment, prepared by EWE Associates Ltd September 2011	5
3	Flood Risk Assessment	7
3.1	Fluvial Flooding	7
3.2	Surface Water Flooding.....	7
3.3	Ground Water Flooding	7
3.4	Flooding from Sewers	8
3.5	Flooding from Reservoirs.....	8
3.6	Coastal Flooding.....	8
3.7	Climate Change.....	8
4	Site Drainage	9
4.1	Existing Drainage	9
4.2	Proposed Drainage	9
5	Flood Risk Management	10
6	Conclusions	12
Appendix A	Proposed Site Layout Drawing No. CDW8936-R00-04	
Appendix B	Proposed Drainage Drawing No. COSTCD8936 - 01	

Figures

Figure 1 - Site Location.....	2
Figure 2 - EA Flood Map Planning (Rivers & Seas)	4



Tables

Table 1 - Flood Risk Management Summary 11

1 Introduction

1.1 Background

Amey has been jointly commissioned by Staffordshire County Council and East Staffordshire Borough Council to prepare this addendum to the original Flood Risk Assessment (FRA) and Drainage Strategy (DS) (prepared by EWE Associates Ltd September 2011). This report is to support the planning applications for development of commercial buildings use B1, B2 and B8, new highway access off The Dove Way and the Household Waste Recycling Centre (HWRC).

This Flood Risk Assessment (FRA) has been written in accordance with National Planning Policy Framework (NPPF, March 2012) and accompanying technical guide.

The original and previously submitted FRA and DS were produced for a much larger site and, therefore the planning applications require this site specific report in accordance with current planning policies.

The prescribed route and design for the outfall in the previous FRA and DS can no longer be achieved due to the reduced extents of the site, therefore an alternate arrangement has been considered.

1.2 Site Description

The proposed scheme includes the construction of a new highway access and access road from The Dove Way and a commercial development. This report has also reflected on the potential of a new HWRC on the site (subject to a separate planning application). The proposed development is located on the outskirts of Uttoxeter within the Borough of East Staffordshire. The site is situated adjacent to The Dove Way and the A50 by-pass. A sewerage Treatment Works is located to the east of the proposed site. An approximate postcode for the site is ST14 5AA.

The existing land is considered to be Greenfield used for agricultural purposes. A main river, the River Tean is located to the north of the site whilst the Uttoxeter Brook, defined as an ordinary watercourse is located to the south east of the site. Both watercourses are tributaries to the Rive Dove which is located to the east of the proposed development. These watercourse are all situated outside the extent of the site boundary.

Figure 1 identifies the location of the proposed site and associated land features.

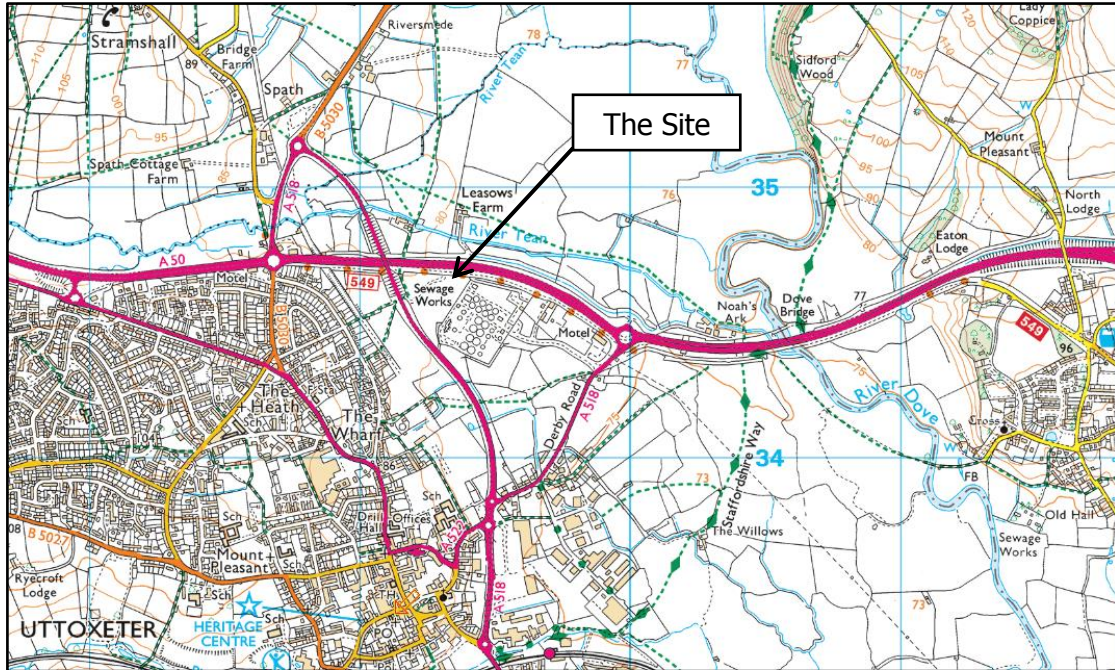


Figure 1 - Site Location

1.3 Data Collection

The following data sources were considered in the preparation of this report:

- Environment Agency Flood Map (Planning), taken from their website
- Topographical Survey
- British Geological Survey (BGS) (information taken from their website)
- Flood Risk Assessment for Proposed Mixed Development, Dove Way, prepared by EWE Associates Ltd dated September 2011.
- Staffordshire County Council – Strategic Flood Risk Assessment
- East Staffordshire Borough Council – Strategic Flood Risk Assessment (updates 2013)
- East Staffordshire Borough Council Local Plan (adopted 2006)

1.4 Proposed Development

The total site area is 3.2ha. The proposed commercial development shall be constructed within an area approximately 1.9ha and the proposed HWRC shall be constructed within an area approximately 0.6ha located 150m (min) from The Dove Way. An access road shall be constructed along the eastern boundary connecting the commercial development and HWRC to The Dove Way. The proposed layout can be found in **Appendix A**.

The following information relates to the Household Waste Recycling Centre, and is not pertinent to the application for mixed commercial use and new access. Household Waste Recycling

Centres across Staffordshire typically accept the following materials, these are stored in separate containers

Asbestos	Mattresses
Batteries	Non-recyclable household waste
Books	Paint
Car batteries	Plasterboard
Cardboard	Plastic bottles
Carpets	Rigid Plastics
Cooking Oil	Scrap metal
Florescent tubes	Small electrical appliances
Food and drink cans	Soil and hardcore
Furniture	Textiles
Garden waste	Tyres
Gas bottles Glass bottles and Jars	TVs and monitors
Household and garden chemicals	Used engine oil
Large electrical appliances	Waxed cartons
Loft Insulation	Wood and timber

Hazardous waste is identified as Waste Electrical and Electronic Equipment i.e. fluorescent tubes and small appliances which will be stored in sealed containers. Chemicals are stored in dedicated lockable containers, with powders and liquids stored apart. Batteries will be stored in a lockable container. Asbestos will be stored in a lockable container. Waste oils are not deemed as hazardous but will be collected in a double skinned tank and should be sited in a bunded area with spill kits available. All hazardous items will be stored in accordance with EA Pollution Prevention Guidelines 2 (PPG2), surrounding containment bunds will be sized at 110% of the storage capacity in line with PPG2.

The HWRC will take the public's waste and dispose of it sustainably, diverting it from landfill to be recycled.

The proposed site is located away from residential housing, and accessed off a main road, therefore any inconvenience whether visually, traffic or otherwise will be minimised.

2 Data Collection

2.1 Environment Agency Flood Map (Planning)

EA Flood Map for planning, taken from their website identifies the proposed development in within Flood Zone 1, land assessed to have less than 1 in 1000 probability of flooding from rivers and seas.

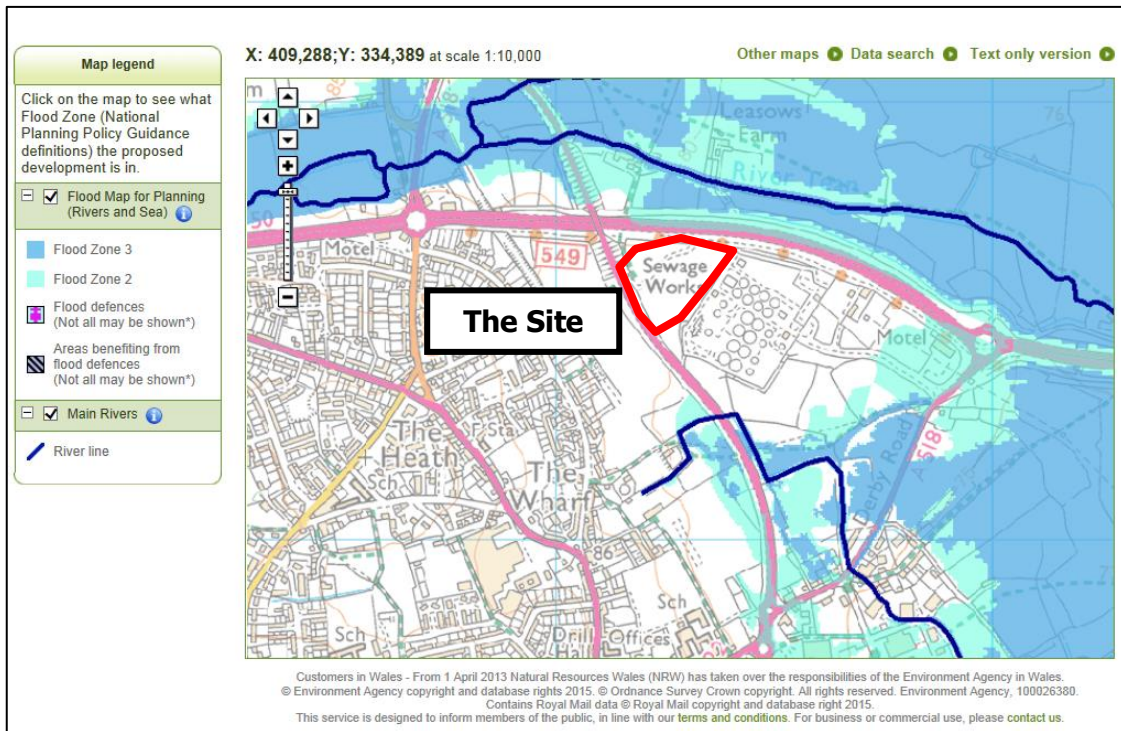


Figure 2 - EA Flood Map Planning (Rivers & Seas)

EA Flood Map for surface water shows no flooding on site.

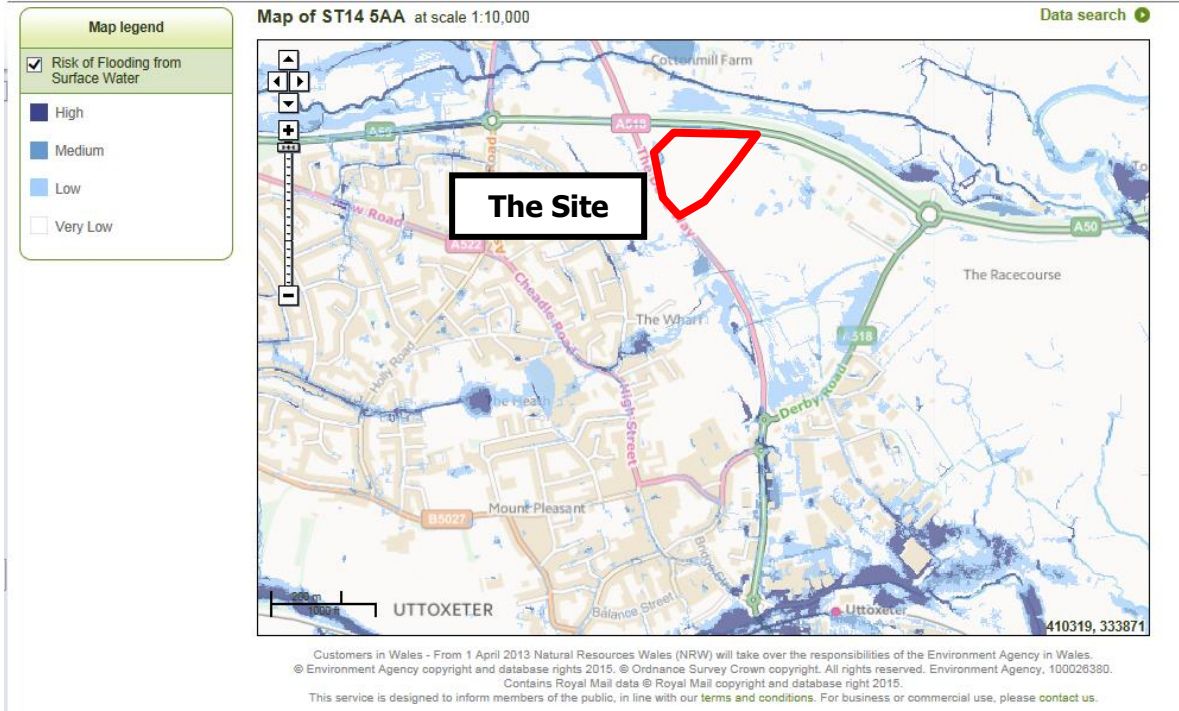


Figure 3: EA Surface Water Flood Risk Map

2.2 Topographical Survey

Existing ground levels are understood to range from 81.59mAOD at the north of the site to 77.30mAOD located in the south. The site generally slopes south towards the Uttoxeter Brook. Whilst the existing Greenfield site will predominately drain via ground infiltration, any overland surface water is expected to discharge into the Uttoxeter Brook.

2.3 British Geological Survey (BGS)

Information gathered from the BGS website identified that the existing Ground conditions of the site are Mercia Mudstone Group – mudstone bedrock with superficial deposits of Alluvium – Clay, Silt, Sand and Gravel.

Borehole logs along the Northern boundary of the proposed site showed ground water levels were found at depths approximately 5m deep.

2.4 Flood Risk Assessment, prepared by EWE Associates Ltd September 2011

The previous report was commissioned by Clowes Development (UK) Ltd. to supplement the original planning application for a proposed larger mixed use development off The Dove Way within Uttoxeter, Staffordshire. It proposed development of land both sides of The Dove Way, including commercial land to the north and residential to the south. It is considered that

information presented in the initial FRA and DS is relevant to the revised development proposals and applications.

2.4.1 *Uttoxeter Brook*

The brook is generally shallow (1.5m maximum) with a narrow bed width (1.5m maximum) with steep sides. There are no flood defences or flood walls and as such relies upon the natural bank top for its defence.

The 1 in 100 year plus climate change flood level was estimated at between 77.29mOD and 77.31mOD and the lowest bank top level in this area was surveyed at 77.60mOD. Therefore flooding from the Uttoxeter Brook is contained within channel.

2.4.2 *River Dove*

The River Dove rises on the slopes of Axe Edge, close to the Leek to Buxton Road and runs southward for 45 miles to join the River Trent to the north of Burton Upon Trent. It is predominantly a rural river, flowing through Derbyshire and Staffordshire. The confluence with the River Tean is directly upstream of the A50 road bridge. The River Dove is located approximately 1200m to the east of the site. In line with the site there are no flood defences which protect the site or Uttoxeter.

The 1 in 100 year plus climate change flood level was estimated at between 75.90mOD and 76.40mOD, lower than ground levels within the site. The site is therefore considered not to be affected by flooding from the River Dove.

3 Flood Risk Assessment

3.1 Fluvial Flooding

EA flood maps show that the site is located within Flood Zone 1. In accordance with Table 1 of NPPF, Flood Zone 1 is of low probability of flooding, comprising land assessed as having a less than 1 in 1,000 annual probability of river or sea flooding.

Environment Agency modelled flood levels of the River Dove and Uttoxeter Brook were presented in the FRA prepared by EWE Associates Ltd. It is considered that the HWRC is not at risk of flooding from these watercourses, whereby modelled fluvial flood levels for the 100 year plus Climate Change event are shown to be significantly lower than existing ground levels of the proposed site.

3.2 Surface Water Flooding

EA surface water flood maps taken from their website (Figure 3) show a small area to be at low risk of surface water flooding. The area of low risk is roughly located to the east of the proposed access road and HWRC. It is understood that no surface water flood risk areas lie within the proposed HWRC site and access route. It should be noted that predicting surface water flood risk areas cannot be achieved with a great degree of accuracy.

The development of the site leads to an increase in surface water run off rates, an adequate surface water strategy will ensure that this increase does lead to increased flood risk offsite.

3.3 Ground Water Flooding

Maps taken from the EA website shows the site is not located within a ground water source protection zone. Mapping from the EA website shows that the site is situated within an area of Minor Aquifer High Vulnerability Zone.

The FRA by EWE Associates identifies shallow ground water levels found in low lying areas typically occurring in the south of the site. It is considered that ground infiltration techniques may not be suitable in these areas. The FRA also found from previous ground investigations, that higher areas generally comprise made ground over Alluvial Clay and Mudstone, further suggesting that infiltration drainage may not be suitable.

The ESBC SFRA however, considers the risk of ground water flooding to be low and very few incidents have been recorded across the district.

3.4 Flooding from Sewers

The FRA by EWE Associates identifies that the site is crossed by a gravity foul sewer that discharges into the adjacent sewerage treatment works to the north east of the site. It is considered that no surface water or combined sewers exist within the site.

The SFRA does not show any recording of flooding from sewers to have occurred within the site.

3.5 Flooding from Reservoirs

EA maps shows that the extent of reservoir flooding under worst case scenario of dam failure. Although the site is within an affected area, the maps do not reflect the structural integrity of the dam or the chance of it failing. It is considered that the probability of dam failure is very low; hence flood risk from reservoirs is very low.

3.6 Coastal Flooding

The proposed site is deemed sufficiently inland not to be affected from coastal flooding.

3.7 Climate Change

In accordance with NPPF an allowance for climate change has been considered in line with the expected life span of the development. The design life of the whole development is 20 to 30 years; therefore an allowance for climate change of 20% should be added to the peak rainfall intensity and peak river flow to make allowance for any future increases in water volume. This does not increase the flood risk significantly.

4 Site Drainage

4.1 Existing Drainage

Information gathered identifies that the Greenfield site is considered to drain by overland flow and some element of infiltration. The FRA assumed that there is no formalised field drainage system eventually discharging to a positive outfall. As such the site is considered to discharge in a south easterly direction at the existing Greenfield runoff rate towards the Uttoxeter Brook. It is considered that any overland flow resulting from extreme rainfall events is likely to flow in a south easterly direction eventually discharging into the Uttoxeter Brook at the south east corner of the site.

4.2 Proposed Drainage

The previous FRA found that due to the presence of elevated ground water within the lower parts of the site and made ground overlying Alluvial Clay in the upper areas it is considered that infiltration drainage is not a practical solution for this site.

It is considered that due to the topography of existing ground the proposed development will drain via gravity towards the Uttoxeter Brook in the south east of the site.

Due to increased impermeable areas an attenuation pond shall be constructed in the south east corner of the site to accommodate the increased run-off. The pond shall discharge into the Uttoxeter Brook maintaining Greenfield run-off rates of 5l/s/ha.

Details of the proposed drainage layout can be found in **Appendix B**.

Using Microdrainage Source Control, based on a limiting discharge to match the Greenfield runoff rates, the following attenuation storage is required, this storage volume accommodates both elements of the scheme:

Return Period	Volume of storage required (m³)
1 in 2	243 to 387
1 in 30	575 to 831
1 in 100	817 to 1138

5 Flood Risk Management

The HWRC is defined as More Vulnerable in Table 2 of NPPF (2012) Technical Guidance, whilst the commercial development and access roads are defined as Less Vulnerable. In accordance with Table 1 of NPPF (2012) both elements of the proposed development are situated within Flood Zone 1 – Low probability, defined as land assessed as having a less than 1 in 1,000 annual probability of river or sea flooding (<0.1%).

In accordance with NPPF Technical Guidance, proposed sites greater than 1ha in Flood Zone 1, the developer should carry out a Flood Risk Assessment of sources other than fluvial flooding and assess the potential to increase flood risk elsewhere. Policy aims developers to seek opportunities to reduce the overall level of flood risk in the area and beyond through the layout and form of the development, and the appropriate application of sustainable drainage systems. Following Table 3 of NPPF (2012) Technical Guidance both elements of development are considered suitable for Flood Zone 1 and therefore the Sequential Test has been fulfilled. The main flood risk of the proposed site is the management of surface water, recognising poor existing ground conditions and shallow ground water levels.

It is proposed that increased surface water run-off due to introduction of impermeable areas shall be restricted to existing Greenfield run-off rates via an attenuation pond. The drainage method of discharging to the Uttoxeter Brook is considered to follow existing overland flow and deemed not to affect flooding off-site.

Infiltration techniques are considered not to be suitable within the proposed site, aiming not to raise existing shallow ground water levels. It has been considered that the introduction of infiltration techniques could potentially increase ponding levels.

The introduction of a positive drainage system within the site is considered to mitigate localised ponding and standing surface water identified in the existing site.

The construction of the HWRC shall incorporate appropriate storage of hazardous materials in accordance with EA Pollution Prevention Guidance (PPG2). The HWRC shall be suitably secure and well maintained. It is considered that water/land shall not be contaminated as a consequence of materials stored within the HWRC; hence possible spillage shall be managed and contained within bunded areas.

Table 1 - Flood Risk Management Summary

Flood Risk	Probability	Action Required
Fluvial Flooding	Very Low	Site deemed to be in Flood Zone 1 – Low Probability. No significant risk of fluvial flooding associated the proposed site
Surface Water Flooding	Low	Drainage strategy incorporates attenuation pond to restrict the discharge to Uttoxeter Brook to Greenfield run-off rate (5l/s/ha). Drainage strategy follows existing overland flow. Introducing a positive drainage system within the site mitigates potential of minor localised surface water issues within the existing site. No existing issues or surface water flooding found in the location of the HWRC.
Ground Water Flooding	Low	Infiltration techniques considered not to be suitable within the site due to poor ground conditions and shallow ground water levels.
Flooding From Sewers	Very low	No record of flooding from sewer within the site
Flooding From Reservoirs	Low	Site located within flood risk zone under EA worst case scenario modelling, however the probability of dam failure is very low. Flooding from Reservoirs considered to be low, hence no action required.
Coastal Flooding	N/A	None required

6 Conclusions

This Flood Risk Assessment has been prepared in accordance with NPPF (2012) and the accompanying technical guide. Both elements of the proposed development are located within Flood Zone 1, land assessed in Table 1 of NPPF as having low probability of flooding.

Information has been gathered from a previous FRA prepared by EWE Associates Ltd, dated September 2011. The previous FRA was prepared to support the planning application of mixed use development; however it did not include provision of the HWRC.

This FRA identifies that the both elements of the proposed development are at low probability of flooding from all sources. Considerations of flooding off-site have been made concluding that infiltration techniques shall not be incorporated into the site as shallow ground water levels and poor ground conditions were found in some areas.

The surface water drainage strategy has been identified to reflect existing Greenfield drainage incorporating an attenuation pond to limit discharge to the Uttoxeter Brook to Greenfield run-off rates.

In accordance with Environment Agency Pollution Prevention Guidance (PPG2) hazardous waste stored within the HWRC shall be correctly managed and contained as to not cause any water/land contamination.

Considering the low probability of flood risks and with suitable drainage strategy in place not to cause flood risks elsewhere, the proposed site is considered suitable for both elements of the proposals. A suitable means of surface water management can be achieved and the proposals do not increase flood risk elsewhere.

Appendix A Proposed Site Layout

Drawing No. CDW8936-R00-04

© Crown copyright and database rights 2013 Ordnance Survey 100019422
 You are not permitted to copy, sub-license, distribute or sell any of this data to third parties in any form.
 Produced by Staffordshire County Council, 2013.



100
50
40
30
20
10
0

A3

File Name: J:\Highways\Major Projects\Powerhouse Central\Doveway HWRC-CDW8936\CAD\Disciplines\WIP\1 Live Drgs\CDW8936-R00-04.dwg
 Layout Name: A3-1250



Rev	Date	Detail	By
-----	------	--------	----

Revisions



The Built County - Highways
 1 Staffordshire Place
 C/O Wedgwood Building, Tipping Street
 Stafford
 ST16 2DH

**A518 The Dove Way
 Uttoxeter - HWRC**

**Proposed Highway
 Infrastructure**

Prepared	Produced	Checked	Scale
MF	MF	SK	1/1250

Grid Reference
 409 350, 334 500

Date	Size
May 2015	A3
CDW8936/R00/04	Revision

Status
 Draft





Appendix B Proposed Drainage

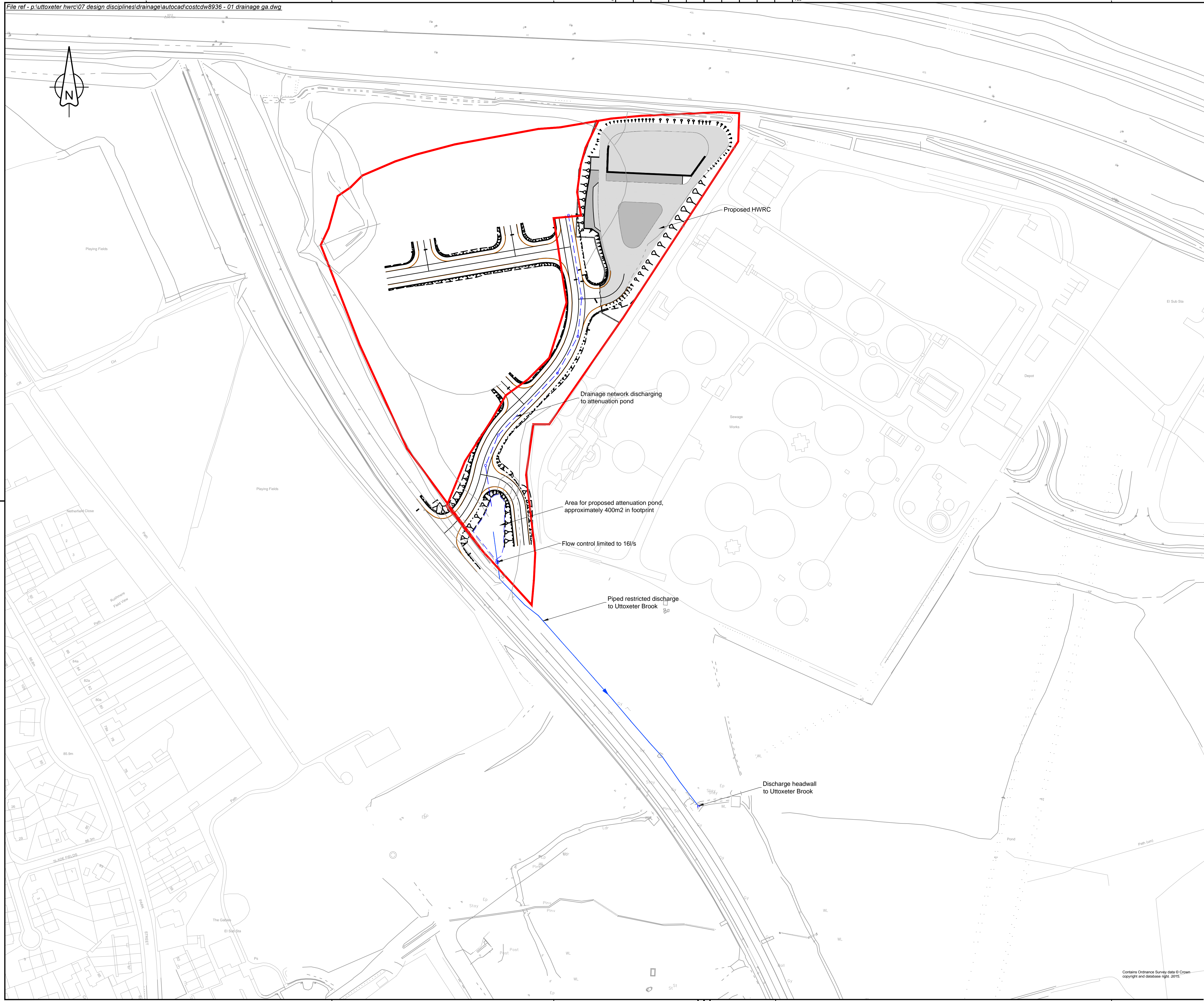
Drawing No. COSTCD8936 - 01

NOTES

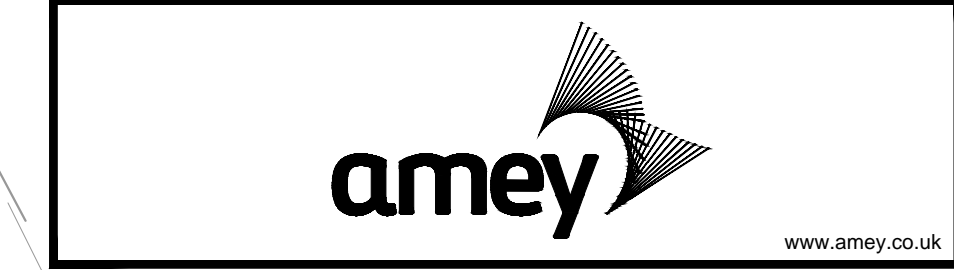
- This is an indicative drainage plan and should be read in conjunction with the FRA and Drainage Strategy, this is not for construction.

KEY

-  Proposed Carrier Drain
-  Discharge to Uttoxeter Brook
-  Proposed HWRC
-  Red Line Boundary



Rev	Revision details	Chkd	Appd	Date
Drawn: SR				Preliminary
Design: SR				For comment
Chkd: SM				For tender
Appd: SM				For construction
Date: 12.06.15				As constructed
				Other



Client
Staffordshire County Council

Project Name
Land at The Dove Way, Uttoxeter

Drawing Title
DRAINAGE
Flood Risk Assessment and
Drainage Strategy - Proposed
Drainage

Original Drawing Size : A1 Dimensions : -
Scale : As Shown Copyright © Amey

Drawing No
COSTCDW8936-01 Rev
P0

Contains Ordnance Survey data © Crown copyright and database right, 2015.