

STAGE I FLOOD RISK ASSESSMENT

**Enterprise South Liverpool Academy,
Heath Road,
Liverpool,
L19 4TN**

**REC Report: 44655p4r0
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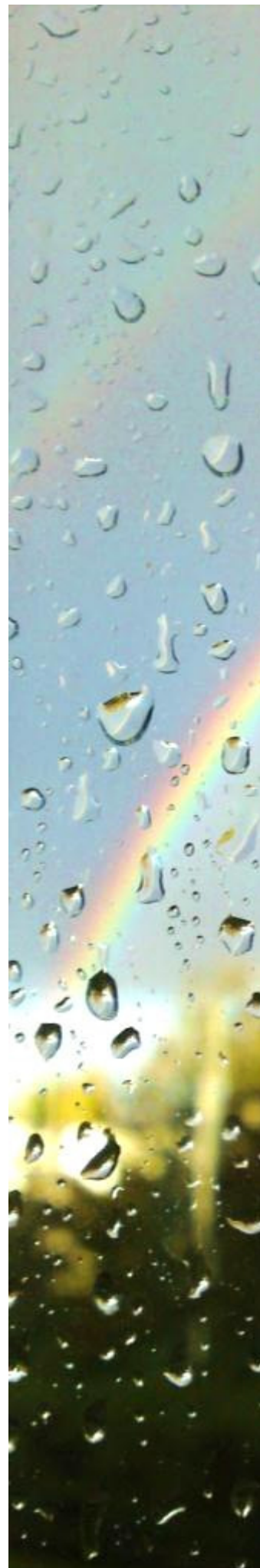
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QUALITY ASSURANCE

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Date	January 2013			
Prepared by	C Burrows			
Qualifications	BSc, MSc, CEnv			
Signature				
Authorised by	L Waterhouse			
Qualifications	BSc, MSc, AIEMA			
Signature				
Authorised by	M Dyer			
Qualifications	BSC. FGS, CEnv, M I EnvSci,			
Signature	 pp			
Project number	44655p4r0			

REC Offices

Manchester

Osprey House
Pacific Quay
Broadway
Manchester
M50 2UE
Tel: 0161 868 1300

London Stansted

Environment House
Bullock Lane
Takeley
Bishop's Stortford
Hertfordshire
CM22 6TA
Tel: 01279 879 416

Birmingham

Unit 19 Bordesley Trading Estate
Bordesley Green Road
Birmingham
B8 1BZ
Tel: 0121 326 7007

Dundee

Unit 1.7 Discovery House
Gemini Crescent
Dundee
DD2 1SW
Tel: 01382 561 985

Plymouth

Unit 13, Barn Close, Langage
Business Park
Plymouth
Devon
PL7 5HQ
Tel: 0844 561 6735

Swindon

Unit 58, Shrivensham Hundred
Business Park
Majors Road
Watchfield
Swindon
SN6 8TY
Tel: 01793 784 935

Newcastle

Unit 20, Hubway House
Bassington Industrial Estate
Bassington Lane
Cramlington
Northumberland
NE23 8AD
Tel: 0167 0700 927

Northern Ireland

69A Killyman Street
Moy
County Tyrone
BT71 7EA
Tel: 02887 789 180

Southampton

Environment House
Segensworth Business Centre
Segensworth Road (West)
Fareham
Hampshire
PO15 5RQ
Tel: 01329 847 783

Cardiff

Unit 1, Phase 11
Greenmeadow Spring Business Park
Tongwynlais
Cardiff
Wales
CF15 7AB
Tel: 02920 529 822

Glasgow

16 Langlands Place
Kelvin South Business Park
East Kilbride
Glasgow
G75 0YF
Tel: 01355 573 350

London

85 Tottenham Court Road
London
W1T 4TQ
Tel: 02034 022 352

Port Talbot

Unit 19 Kenfig Industrial Estate
Margam
Port Talbot
SA13 2PE
Tel: 01659 749 823

Stirling

11 Murchison Park
Dune
Stirling
FK16 6AY
Tel: 0845 676 9303

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1.0 INTRODUCTION

1.1 Background

Resource and Environmental Consultants (REC) Ltd have been commissioned by Redrow Homes (NW) to undertake a preliminary Flood Risk Assessment (FRA) at Enterprise South Liverpool Academy, Heath Road, Liverpool, L19 4TN.

The report is required in support of a planning application and planning policy in relation to flood risk is contained within the NPPF and the accompanying 'Technical Guidance to the National Planning Policy Framework'.

Annex 3 to the NPPF is a list of documents replaced by the NPPF, which includes Planning Policy Statement 25: Development and Flood Risk (PPS25), the previous planning policy setting out the requirements for proposed developments in terms of flood risk and drainage, but not the PPS25 Practice Guide.

1.2 Objectives

The objectives of the preliminary FRA are to:

- Undertake a review of the Environment Agency (EA) indicative flood mapping;
- Review, British Geological Society, National Flood Risk Assessment (NaFRA) and JBA Consulting information;
- Review of available Strategic Flood Risk Assessment information;
- Review of available development proposals; and,
- Undertake an initial assessment of the flood risk and identify areas that need further investigation.

1.3 Sources of Information

Background information was sought from the following sources:

- Environment Agency Indicative Flood Mapping;
- Liverpool City Council Strategic Flood Risk Assessment;
- Ordnance Survey Landranger 1:50,000 scale;
- British Geological Survey Solid and Drift Geological Map; and,
- Groundsure Flood Insight Report.

1.4 Limitations of the Study

Reliance has been placed on factual and anecdotal data obtained from the sources identified. REC Ltd cannot be held responsible for the scope of work, or any omissions, misrepresentation, errors or inaccuracies with the supplied information. The initial flood risk assessment information is not necessarily exhaustive and further information relevant to the site may be available. New information, revised practices or changes in legislation may necessitate the re-interpretation of the report, in whole or in part.

2.0 SITE SETTING

2.1 Site Details

Site Address	Enterprise South Liverpool Academy, Heath Road, Liverpool, L19 4TN
National Grid Reference	E340756, N386117

2.2 Site Description

2.2.1 Current Layout

The site is an approximate rectangular plot of land that houses Enterprise South Liverpool Academy in the east and an associated playing field in the west. The site is located on a south westerly facing slope with ground levels falling in a south westerly direction by approximately 13m.

The eastern sector of the site contains the school buildings whilst the western side of the site is the associated school's playing fields, predominantly comprising large fields divided by a large hedge row. The Enterprise South Liverpool Academy buildings comprise the main three storey building in the east, three smaller buildings in the north and a new sports hall in the south of the sector.

Semi mature and mature trees are evident along the majority of the boundaries of the site. A number of Tree Preservation Orders are associated with these trees. The site is secured by a 3m high palisade fence in the east (surrounding the school) and 1m – 2m high wooden fence in the west.

The site is bound by the residential developments to the north, while residential properties are located beyond Heath Road and Mather Avenue to the south and west respectively. Allerton Park and Allerton Golf Course are located beyond Allerton Road to the east.

The current site layout and topographic map are presented as Figure 1 and Figure 2 within Appendix I.

2.2.2 Surrounding Hydrology

There are no surface water features within 250m of the site and no detailed river network within 500m.

2.2.3 Surrounding Area

The surrounding area is described in the table below:

Direction	Description
North	Residential
East	Allerton Golf Course and Allerton Park
South	Heath Road with Residential properties beyond
West	Mather Avenue with Residential properties beyond

2.3 Future Site Use

The development will comprise low density residential housing with the majority of the development being surfaced with hardstanding.

The development plan is provided as Figure 2 within Appendix I.

3.0 SOURCES OF FLOODING

3.1 Flooding from Rivers

3.1.1 Environment Agency Indicative Flood Plain Map

The Environment Agency (EA) River and Coastal Flood Plain Map shows that the site is not within a currently defined flood zone. The EA has no records of any historical flooding events on site or within a 250m radius of the subject site and there are no areas within a 250m radius of the site that are used for flood storage.

The River and Coastal Flood Risk Map is presented as Figure 3 in Appendix I.

3.1.2 Strategic Flood Risk Assessment

There are no specific references to the subject site or immediate surrounding area within the Liverpool City Council SFRA. There is a number to reference to the main Allerton Road which was affected by flash flooding in July 2010. This location does appear to be some distance from the site and did not affect the location directly. Reports at the time suggested this was due to torrential rain in a short period and the drainage system not being able to cope. Note The JBA Pluvial Flood Risk Map is presented as Figure 5 in Appendix I.

3.1.3 National Flood Risk Assessment (NaFRA 2008) Flood Rating

The Environment Agency NaFRA database provides an indication of river and coastal flood risk. The data considers the probability that flood defences will overtop or breach and the distance from the river or the sea.

The highest risk of flooding on site is considered to be negligible.

The NaFRA Flood Rating Map is presented as Figure 4 in Appendix I.

3.2 Flooding from Groundwater

The geological map for shows the following formations are present beneath the site:

Geological Unit	Description
West - Till, Devensian East - N/A	Boulder Clay N/A
Sherwood Sandstone Group	Sandstone

The BGS has assessed the subject site as being of a very low susceptibility to groundwater flooding.

3.3 Flooding from Reservoirs, Canals and other Artificial Watercourse

No artificial watercourses have been identified within influencing distance of the site.

3.4 Pluvial Flood Risk

Pluvial Flooding is defined as flooding caused by rainwater generated overland flow before run-off enters a watercourse or sewer and is modelled on a 1 in 200 year rainfall event. In

such events sewerage and drainage systems and surface watercourses may be overwhelmed.

The Pluvial Flood Risk mapping indicates that an area in the most westerly part of site is at risk of Pluvial Flooding, this has been classified as significant.

The JBA Pluvial Flood Risk Map is presented as Figure 5 in Appendix I.

3.5 Flooding from Sewers and Surface Water Drainage

The development site will have connections to foul sewer and surface water drainage associated with the school building. It will be possible to connect in to this with due consultation with the utility provider.

4.0 FLOOD RISK ASSESSMENT

4.1 Flooding from Rivers

The site is located outside of any currently defined fluvial flood risk zone.

4.2 Flooding from Groundwater

The site is not recorded as being within a groundwater flood risk area with the geological map indicating that the site is underlain by permeable strata (sandstone). Furthermore given the relative steepness of the site gradients it is unlikely that groundwater will pond significantly.

4.3 Flooding from Sewers

There are no sewers at the site which could cause a risk of flooding to the proposed development.

Drainage from the proposed scheme is has yet to be determined but we understand there is capacity in adjacent networks

4.4 Flooding from Reservoirs, Canals & Other Artificial Sources

No artificial watercourses have been identified within influencing distance of the subject site.

4.5 Flood Zone Classification

The site is not in any currently defined flood zone.

4.6 Access and Egress

There are no access or egress issues for the site in the event of flooding elsewhere as the surrounding area is shown to be located outside of any defined flood risk zone.

4.7 Flood Warning and Evacuation Plans

There are no flood warning issues with regard to immediate danger to the site.

4.8 Attenuation of Surface Waters and Discharge/Storage Calculations

The following information shows the surface water discharge calculations based on the site are with a low density housing development (with an impermeable area of 80% of the gross site area which seems reasonable for such developments)

Surface Water Storage Requirements/Discharge Calculations for Sites

Site name: Enterprise South Liverpool Academy.











Site location: Liverpool.

Site coordinates: Latitude: 53.36850 deg N, and Longitude: 2.89242 deg W

This is an estimation of the storage volume requirements that are needed to meet normal best practice criteria in line with Environment Agency guidance "Preliminary rainfall runoff management for developments" (2005), W5-074/A/TR1/1 rev. D and the CIRIA SUDS Manual (2007). **It is not to be used for detailed design of drainage systems but it forms a basis of the calculations required to achieve a surface water discharge strategy.**




It is recommended that detailed design of any drainage scheme uses hydraulic modelling software to finalise storage requirements before construction takes place.

Site Characteristics:











-  Total site area: 6.24 ha;
-  Significant public open space: 0 ha;
-  Area positively drained: 6.24 ha;
-  Impermeable area: 4.992 ha;
-  Percentage of drained area that is impermeable: 80%;
-  Impervious area drained via infiltration: 0 ha;
-  Return period for infiltration system design: 10 year;
-  Impervious area drained to rainwater harvesting systems: 0 ha;
-  Return period for rainwater harvesting system design: 10 year; and
-  Compliance factor for rainwater harvesting system design: 70%.

Net site area for Storage Volume Design: 6.24 ha

Methodology:

-  Greenfield runoff method IH 124; and,
-  Volume control approach Long Term Storage.
- 

Hydrological Characteristics:

-  HOST 24;
 -  SPRHOST: 0.397%;
 -  SAAR: 819 mm;
 -  M5-60 Rainfall Depth: 20mm;
 -  'r' Ratio M5-60/M5-2 day: 0.4;
 -  FEH/FSR conversion factor: 0.94;
 -  Hydrological Region: 10;
 -  Growth curve factor: 1 year: 0.87;
 -  Growth curve factor: 30 year: 1.7; and
 -  Growth curve factor: 100 year: 2.08.
-

Design Criteria:

- Climate change allowance factor: 1.3 ;
- Urban creep allowance factor: 1.1; and,
- Interception rainfall depth: 5 mm.

Greenfield Runoff Rates:

- Q_{bar} 25.1 l/s;
- 1 in 1 year: 21.84 l/s;
- 1 in 30 years: 42.67 l/s; and,
- 1 in 100 years: 52.2 l/s.

Estimated Storage Volumes:

- Interception storage: 199.68m³;
- Attenuation storage: 2846.81m³;
- Long term storage: 955.28m³; and,
- Treatment storage 599.04m³.

Total storage/runoff: 4001.77 m³

Please note that a minimum flow of 5 l/s applies to any site

It is recommended that the drainage design, which will be undertaken post planning, should incorporate suitable attenuation to meet the requirements of the EA and since there is some question of possible surface water flooding on Mather Avenue (outside of the site) – some mitigation measures and drainage attenuation may be required at time of surface water flooding in this area.

A copy of the calculations are presented in Appendix II.

5.0 CONCLUSIONS & RECOMMENDATIONS

Conclusions

A review of the EA indicative flood mapping and other relevant data indicates that the site is located outside any predefined area that is deemed to be at risk from flooding by rivers, surface water bodies or groundwater.

On the basis that the site drainage can be appropriately managed then REC Ltd considers that the site is acceptable for the proposed scheme.

Executive Summary

STAGE I FLOOD RISK ASSESSMENT - Enterprise South Liverpool Academy, Heath Road, Liverpool, L19 4TN

Summary points

- The site is located outside of the Environment Agencies Flood Zones;
- There are no indicative Flood Zones 2 or 3 within 250m of the site;
- Neither are there any flood defences within 250m that protect the site;
- The National Flood Risk Assessment (NaFRA) Flood Rating for the site is Negligible;
- Records show that the site has not been subject to flooding;
- The site could be affected by pluvial flooding (surface water flooding) and some modification to the existing drainage systems on Mather Avenue should be considered. There is minimal effect of flooding from this source on the site; and,
- Possibility of groundwater flooding is very low.

Summary

Overall, there is no risk to this site from flooding. Consideration needs to be given to the design and layout of the surface water connections to Mather Avenue (if any) and some site attenuation may be required.

Note the above drainage run-off/storage calculation based on Greenfield runoff method IH 124 shown in Section 4.8 above and shown here:-

1 in 1 year: 21.84 l/s;
1 in 30 years: 42.67 l/s;
1 in 100 years: 52.2 l/s;
Interception storage: 199 m³
Attenuation storage: 2846.81 m³
Long term storage: 955.28 m³
Treatment storage: 599.04 m³
Total storage/runoff: 4001.77 m³

APPENDIX I

FIGURES

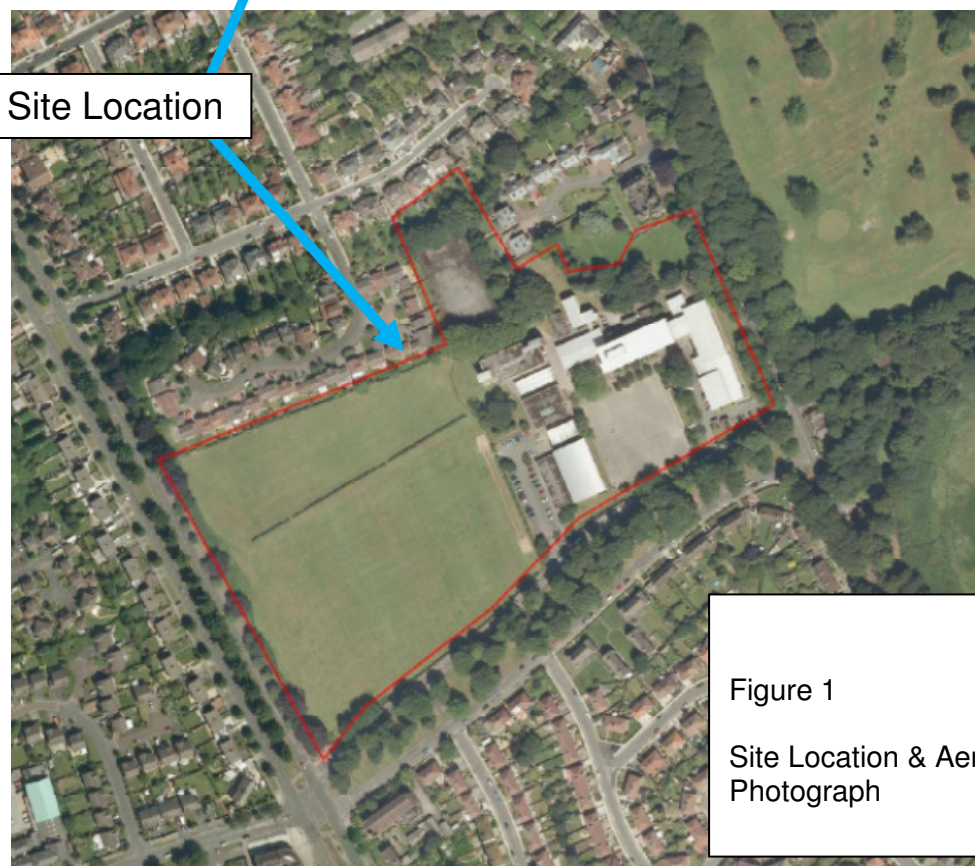


Figure 1

Site Location & Aerial
Photograph



Figure 2
Proposed Site
Layout

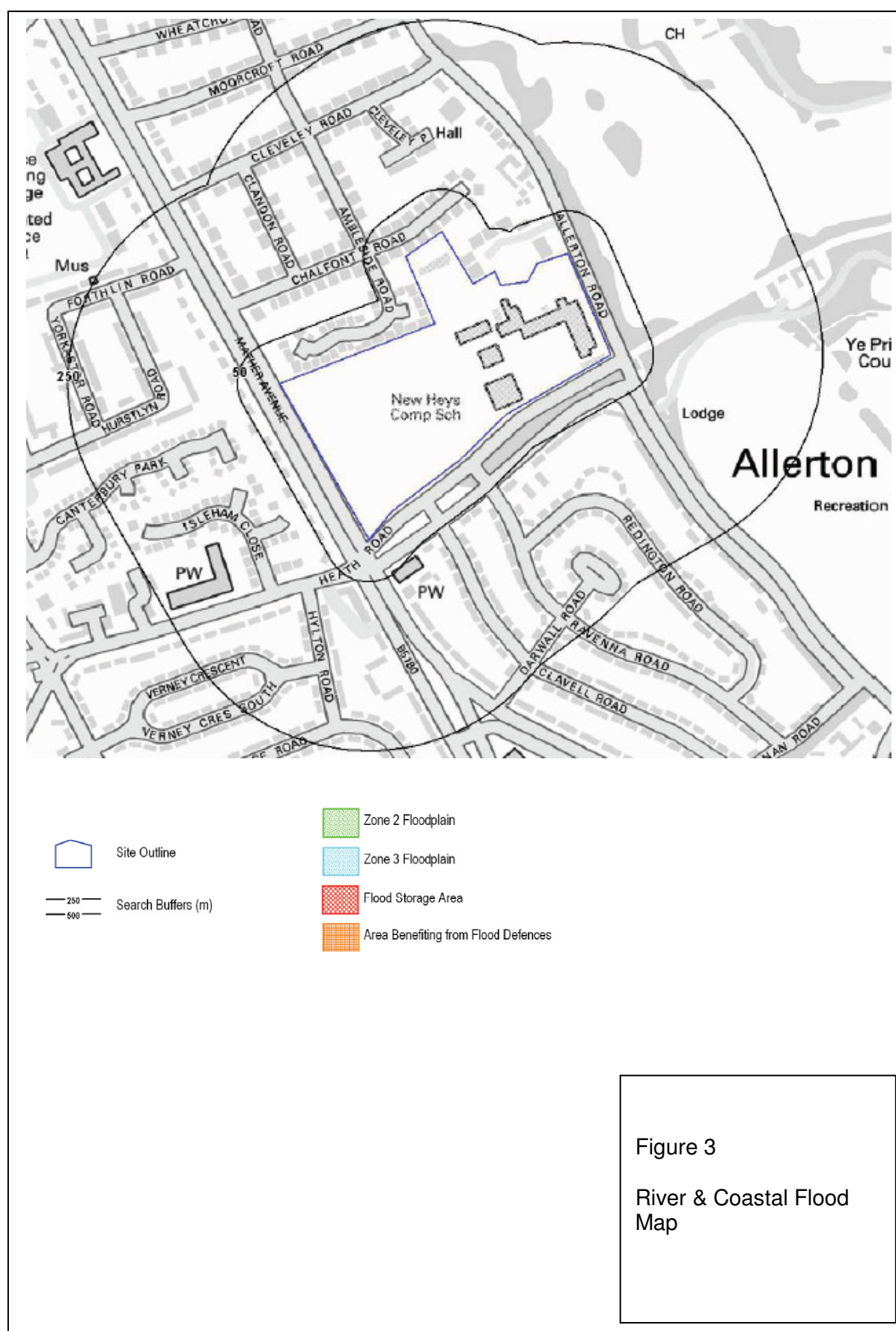


Figure 3

River & Coastal Flood
Map





Figure 5
Pluvial Flood Map

APPENDIX II

CALCULATIONS

Surface Water Storage Requirements for Sites

Site name: Enterprise South Liverpool Academy

Site location: Liverpool

Site coordinates

Latitude: 53.36850 deg N

Longitude: 2.89242 deg W

Reference:

Date:

This is an estimation of the storage volume requirements that are needed to meet normal best practice criteria in line with Environment Agency guidance "Preliminary rainfall runoff management for developments" (2005), W5-074/A/TR1/1 rev. D and the CIRIA SUDS Manual (2007). It is not to be used for detailed design of drainage systems. It is recommended that detailed design of any drainage scheme uses hydraulic modelling software to finalise storage requirements before construction takes place.

Site Characteristics:

Total site area	6.24	ha
Significant public open space		ha
Area positively drained	6.24	ha
Impermeable area	4.992	ha
Percentage of drained area that is impermeable	80	%
Impervious area drained via infiltration	0	ha
Return period for infiltration system design	10	year
Impervious area drained to rainwater harvesting systems	0	ha
Return period for rainwater harvesting system design	10	year
Compliance factor for rainwater harvesting system design	70	%

Net site area for storage volume design	6.24	ha
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▸ **Methodology:**

Greenfield runoff method	IH 124
Volume control approach	Long Term Storage

▸ **Hydrological Characteristics:**

Automatic values

Editable values

HOST	24	24	
SPRHOST	0.397	0.397	%
SAAR	819	819	mm
M5-60 Rainfall Depth	20	20	mm
'r' Ratio M5-60/M5-2 day	0.4	0.4	
FEH/FSR conversion factor	0.94	0.94	
Hydrological region	10	10	
Growth curve factor: 1 year	0.87	0.87	
Growth curve factor: 30 year	1.7	1.7	
Growth curve factor: 100 year	2.08	2.08	

▸ **Design Criteria:**

Climate change allowance factor	1.3	1.3	
Urban creep allowance factor	1.1	1.1	
Interception rainfall depth	5	5	mm

▸ **Greenfield Runoff Rates:**

Qbar	25.1	25.1	l/s
1 in 1 year	21.84	21.84	l/s
1 in 30 years	42.67	42.67	l/s
1 in 100 years	52.2	52.2	l/s

▸ **Estimated Storage Volumes:**

Interception storage	199.68	199.68	m ³
Attenuation storage	2846.81	2846.81	m ³
Long term storage	955.28	955.28	m ³
Treatment storage	599.04	599.04	m ³
Total storage	4001.77	4001.77	m ³

Please note that a minimum flow of 5 l/s applies to any site

[HR Wallingford Ltd](#), the Environment Agency and any local authority are not liable for the performance of a drainage scheme which is based upon the output of this report.