FLOOD RISK ASSESSMENT FOR THE PROPOSED SPORTS PITCH DEVELOPMENT: THE AGEAS BOWL, WEST END, SOUTHAMPTON, SO30 3XH
Grid Reference: SU475 140



For

The Ageas Bowl
Southampton,
Hampshire
SO30 3XH

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CONTENTS

1 INTRODUCTION 1
2 SITE DESCRIPTION 1
2.1 Location 1
2.2 Topography 1
2.3 Land Use 2
2.4 Soils 2
2.5 Geology 2
2.6 In Fill 2
2.7 Hydrogeology 2
3 HYDROLOGY 3
3.1 Catchment 3
3.2 Flood Zones 4
4 EXISTING DEVELOPMENT 4
4.1 Existing Site Development 4
4.2 Existing Site Drainage 4
5 PROPOSED DEVELOPMENT 5
6 FLOOD CONSIDERATION 6
6.1 Sequential Test 6
6.2 Exception Test 6
6.3 Flooding from stream and rivers 6
6.4 Flooding from the sea 6
6.5 Flooding from groundwater 6
6.6 Flooding to / from sewer 6
6.7 Flooding to / from reservoirs and canals 6
6.8 Flooding to / from roads 6
6.9 Flooding from other upstream sources 7
6.10 Flooding to other downstream receptors 7
6.11 Dry access routes and dry islands 7
6.12 Environment Agency Consents 7
6.13 Summary 7
7 SUMMARY 8
8 REFERENCES 8

FIGURES

Figure 1 Site Location and Water Features
Figure 2 Flood Zones
Figure 3 Existing Development Plan
Figure 4 Proposed Development Plan

TABLES

Table 1 Hydrological Catchment Descriptors

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1 INTRODUCTION

Paris Smith LLP are submitting a planning application on behalf of The Ageas Bowl to develop two grassed sports pitches at the The Ageas Bowl, Botley Road, West End, Southampton, Hampshire, SO30 3XH. The proposal is for two grassed sports pitches suitable for football, rugby or hockey.

This Flood Risk Assessment (FRA) has been undertaken to support the planning application. The principal objective of this assessment is to demonstrate that the proposed development will not increase the flood risk at the site or elsewhere.

This FRA includes:

1. Location plans showing geographical features, topographic data and watercourses;
2. Details of the existing development and water management;
3. Details of the proposed development and water management;
4. An appropriate level of assessment carried out in the context of the National Policy Planning Framework (NPPF) [Ref 1].

This report has been prepared by Envireau Water, a specialist independent water resources and water management consultancy with extensive experience of preparing FRAs.

2 SITE DESCRIPTION

2.1 Location

The proposed development site has an approximate area of 3 Ha and is located within the grounds of the Ageas Bowl sports stadium complex. The Ageas Bowl (formerly the Rose Bowl) is located on the north eastern edge of Southampton, adjacent to Junction 7 of the M27. The proposed development site is to the west of the stadium and adjacent to the south western boundary. The grid reference for the approximate site centre is SU475 140, and is shown on Figure 1.

2.2 Topography

The site has an elevation of approximately 55mAOD. West of the site the ground rises to 85mAOD within approximately 800m of the site, giving an approximate gradient of 1 in 25. Heading south east from the site the ground slopes down to 35mAOD, over an approximate distance of 500m, also giving an approximate gradient of 1 in 25.

2.3 Land Use

The Ageas Bowl complex consists of the main stadium and cricket pitch, sporting facilities, golf course, car parking and other facilities. The Ageas Bowl is located within a generally green area, bounded on the east by the M27. Directly south of the site is Telegraph Woods, which is a designated Site of Importance for Nature Conservation.

2.4 Soils

The soil type has been taken from the LandIS Soilscapes website, developed by Cranfield University. The soil type is: Naturally wet very acid sandy and loamy soils.

2.5 Geology

The geological setting of the area has been characterised using information from the British Geological Survey (BGS); 1:50 000 scale sheets 315 (Southampton).

The bedrock geology at the site is the Bracklesham Group of which the following formations are present; the Marsh Farm Formation of laminated clay, sand interbedded with clay, and sand; underlain by the Earnley Sand Formation of silty sands and sandy silts; underlain by the Wittering Formation of laminated clay, sand interbedded with clay, and sand. The Bracklesham Group is underlain by the London Clay Formation, both are of Palaeogene age.

There are no superficial deposits recorded on the geological map.

2.6 In Fill

The area proposed for the sports pitches is within an area that has been previously filled and raised within the last 5 years. The infill material is inert fill of a silty / clayey nature inter-dispersed with pebble size stone or amalgamates

2.7 Hydrogeology

The Bracklesham Group is classified by the Environment Agency as a Secondary A aquifer; 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.

The Bracklesham Group is part of the Palaeogene minor aquifers of the London and Hampshire basins [Ref 3]. Where more sandy horizons are present these behave as aquifers, with clay layers acting as barriers to flow. Within the Bracklesham Group, in this area, the Earnley Sand Formation is listed as behaving as an aquifer [Ref 3].

Groundwater levels are estimated to be at the top of the Earnley Sand Formation around 5 to 10m below ground level. These estimates are based on topography and the geology of the area.

3 HYDROLOGY

3.1 Catchment

The site is located at the very western edge of the East Hampshire CAMS, and lies within the catchment of the River Hamble. The site is located just to the east of the regional catchment divide, and water from the site flows east towards the River Hamble. Water falling on the land just north and west of the site contributes to the River Itchen, as shown on Figure 2.

At the site there are four sub-catchment divides, with water from the site flowing east, as shown on Figure 1. The sub-catchment in which the site is located is served by a watercourse that has undergone extensive anthropogenic alteration over several decades. Upstream of the site the watercourse is a stream which rises in Telegraph Woods; immediately prior to entering the site the watercourse is culverted beneath the site before entering into an open channel and finally flowing east into a lagoon just west of the M27. A stream flows from the lagoon, to the east, and joins the River Hamble after approximately 4km.

The hydrological catchment descriptors relating to the site and adjacent land have been derived from the Flood Estimation Handbook (FEH) CD ROM 3 [Ref. 2] and are provided in Table 1.

Table 1 Hydrological Catchment Descriptors

Descriptor	Abbreviation	Value
Area	AREA	0.56 km^2
Mean Altitude	ALTBAR	50m
Mean direction of all drainage path slopes	ASPBAR	58 degrees
Base Flow Index associated with each HOST soil class	BFIHOST	0.469
Proportion of time when soil moisture deficit was equal to, or below, 6mm during 1961-90	PROPWET	0.33 (i.e. 33% of the time)
Average Annual Rainfall (1961 – 1990)	SAAR	805mm
Extent of urban and suburban land within catchment	$URBEXT_{2000}$	0.246
Description of location of urban / suburban areas within catchment	$URBLOC_{2000}$	1.092
Concentration of catchment urbanisation (quantification of connectivity of urban and suburban areas)	$URBCONC_{2000}$	0.613
Standard Percentage Runoff associated with each HOST soil class	SPRHOST	36.51%

The SPRHOST value indicates that the proportion of runoff is 36.5% which is a moderate value. Correspondingly the value for BFIHOST is 47% indicating a moderate proportion of base flow from the catchment. The value of PROPWET indicates the percentage of time when there is a deficit in soil moisture levels; the value of 33% indicates there will be a deficit for 33% of the time, or expressed another way the soils will be at field capacity for 66% of the time i.e. the soils are generally wet.

The values presented in Table 1 are generally consistent with the known hydrogeological setting. However there will be local variations dependent on the local geological strata, with values of SPRHOST, and runoff, expected to be higher where the more clayey Marsh Farm Formation is present.

3.2 Flood Zones

The site is NOT situated within a flood risk zone, as defined by the Environment Agency mapping as shown on Figure 2.

4 EXISTING DEVELOPMENT

4.1 Existing Site Development

The area of the proposed development is covered by planning permission (reference F/09/65289), which was granted in September 2009. The granted planning permission includes the construction of a park and ride area.

The development works on the park and ride area have not been fully completed, and the existing site currently consists of the following, which are indicated on Figure 3:

- An area of pervious hardstanding for the park and ride area
- An area of ground prepared for the development of the western end of the park and ride area
- Preliminary site re-profiling in preparation for future development works
- Attenuation area to allow runoff water to infiltrate to ground
- Grassed areas and a number of soil stacks yet to be landscaped; these give the site a localised lumpy/mounded topography

4.2 Existing Site Drainage

The existing site drainage is described as follows:

- The developed park and ride area has been developed to ensure no increase in runoff rates and utilises a pervious surface, which allows infiltration to ground
- Within the site the general runoff direction is to the northeast
- The final destination of surface waters from the site is the watercourse which flows east. The watercourse from Telegraph Wood enters into an existing pond. The pond is dammed and flows exit the pond via a short spillway before entering into a culvert. The culvert opening is circa. 250mm square feeding into two 150mm diameter pipes and would provide a restriction to flows down the culvert during times of high flows. The culvert is piped to a sealed chamber beneath an existing attenuation area. The outflow from this chamber is via a 300mm diameter pipe that carries runoff beneath the site to an open drainage channel, as shown on Figure 3. Flow from this watercourse eventually finds its way to the lagoon adjacent to the M27, as shown on Figure 1.
- The high flows from Telegraph Wood and the surface runoff that does not enter into the culvert, gravitate to an existing attenuation area, as shown on Figure 3. This attenuation area is dry during normal conditions and has no outflow mechanism, allowing captured runoff to infiltrate to ground. The freeboard storage within the attenuation has been calculated as circa. 3700m^3.
- A local foul sewer network exists at the Ageas Bowl and the surrounding urban area that is separate from the site surface water drainage system.

5 PROPOSED DEVELOPMENT

The proposed development consists of two full size (FA standard) grass football pitches, plus some surrounding area, which is required for re-profiling to ensure the pitches are flat. The total pitch area is approximately 1.6 Ha and the total development area including the re-profiling land is approximately 3 Ha, as shown on Figure 4.

The re-profiling of the ground will result in the football pitches being slightly raised above the surrounds. Drainage will occur naturally with water draining under gravity and infiltrating to ground through the soils.

The proposed development will result in an increase in the area covered by grass and a reduction in the area covered by hardstanding, due to a reduction in the park and ride area. The attenuation pond from the existing development will be retained, and will allow runoff water to infiltrate to ground. The re-profiling will increase the freeboard storage capacity within the attenuation area by circa. 1200m^3 to circa. 4700m^3.

The re-profiling will increase slope gradients in some areas and but will create a much larger area of flat ground. All areas that have an increased slope gradient fall onto large open areas where the gradients will be greatly reduced or are already low gradient.

The proposed development will not include any buildings or hardstanding.

The proposed development will utilise the existing site drainage and presents no fundamental change to the current site drainage regime. There will be:

- No fundamental change to drainage of water from the site
- No addition to the site of impervious areas
- No change to the general runoff direction from the site, which is to the east
- No change to the main site watercourse which serves the site and flows east
- No change to the discharge of water from the site
- No change to groundwater
- No change to ingress of water to the site
- No change to the separation of the sewer system from the surface water drainage system

There will be:

- An increase in freeboard storage at the attenuation area
- A decrease in the park and ride hardstanding area (to be replaced by grass)
- A general increase in open, flat or low gradient grassed areas
- A positive, net benefit to runoff reduction and attenuation in relation to the existing land use and form

6 FLOOD CONSIDERATION

6.1 Sequential Test

The Sequential Test from the technical guidance to the National Policy Planning Framework (NPPF) [Ref 1] gives guidance on the appropriate types of development that can take place within flood risk zones.

The proposed development is located in Flood Risk Zone 1 (low probability of flooding). Under the technical guidance laid out in the NPPF, the development has been classified as "less vulnerable" and is considered appropriate for Flood Zone 1.

6.2 Exception Test

The technical guidance to the NPPF indicates that the Exception Test is not relevant to this development.

6.3 Flooding from stream and rivers

As previously discussed the proposed development will not fundamentally change the current site drainage regime, although there would be a net benefit to runoff reduction and attenuation due to the proposed landforming. Drainage from the site will continue to be directed to the site watercourse, and will not increase the flood risk from this watercourse.

The only watercourse upstream of the site is the watercourse which enters the site from Telegraph Woods and flows east beneath the site. The flow of water onto site from this watercourse is controlled by the pipe diameter where the stream becomes culverted. During hi flows, the culvert will become inundated and flows will enter into the attenuation area. The attenuation area provides a significant and oversized freeboard storage volume and as such will not generate flooding for the site.

6.4 Flooding from the sea

There is no risk from flooding from sea.

6.5 Flooding from groundwater

Groundwater levels are estimated to be around 5 to 10m below ground level, based on topography and the geology of the area. This range of groundwater level will not pose a risk to the development. It is unlikely that groundwater will be raised sufficient to induce flooding of the site.

6.6 Flooding to / from sewer

The sewer network at the site is separated and will continue to be separate to the surface water drainage system. The development will not increase the flood risk to the sewer system and there are no other sewer systems downstream of the development area at risk of flooding from the site.

6.7 Flooding to / from reservoirs and canals

There are no reservoirs or canals upstream or downstream of the development area.

6.8 Flooding to / from roads

The proposed development drains to the east via the site watercourse and poses no flood risk to roads.

There is no risk of flooding to the site from nearby roads.

6.9 Flooding from other upstream sources

There is no risk of flooding from other upstream sources.

6.10 Flooding to other downstream receptors

There are no residential dwellings or other flood receptors downstream of the site at risk of flooding from the proposed development.

6.11 Dry access routes and dry islands

Based on the location of the site in Flood Zone 1, a dry access route during the 1 in 100 year +30% event will always be available.

In the event of flooding, EA Flood Zones 2 and 3 do not surround the site and therefore, no dry islands will be produced.

6.12 Environment Agency Consents

The development is NOT located within 8m of the banks of any local watercourses.

There is no requirement for a land drainage, impoundment or flood defence consent.

6.13 Summary

The development site is not deemed to be at risk from flooding. The principal flood risk for consideration is to others. The flood risk should not be increased as a result of the development.

The development proposals put forward do not propose to fundamentally change the water regime on the site. The development will not result in any increase to the current flood water flows and will not increase the risk of flooding elsewhere.

7 SUMMARY

This FRA demonstrates that the proposed sports pitch development at The Ageas Bowl, West End, Southampton, SO30 3XH, will not have a detrimental impact on drainage and flooding at or from the site, providing that the surface water continues to be managed.

The development is located within Flood Zone 1. Under technical guidance laid out in the National Planning Policy Framework, the extensions are classified as "less vulnerable" and the development is considered appropriate for Flood Zone 1.

The proposed development will remain safe and operational during times of flood; will result in no net loss of floodplain storage; will not impede water flows and will not increase the flood risk elsewhere.





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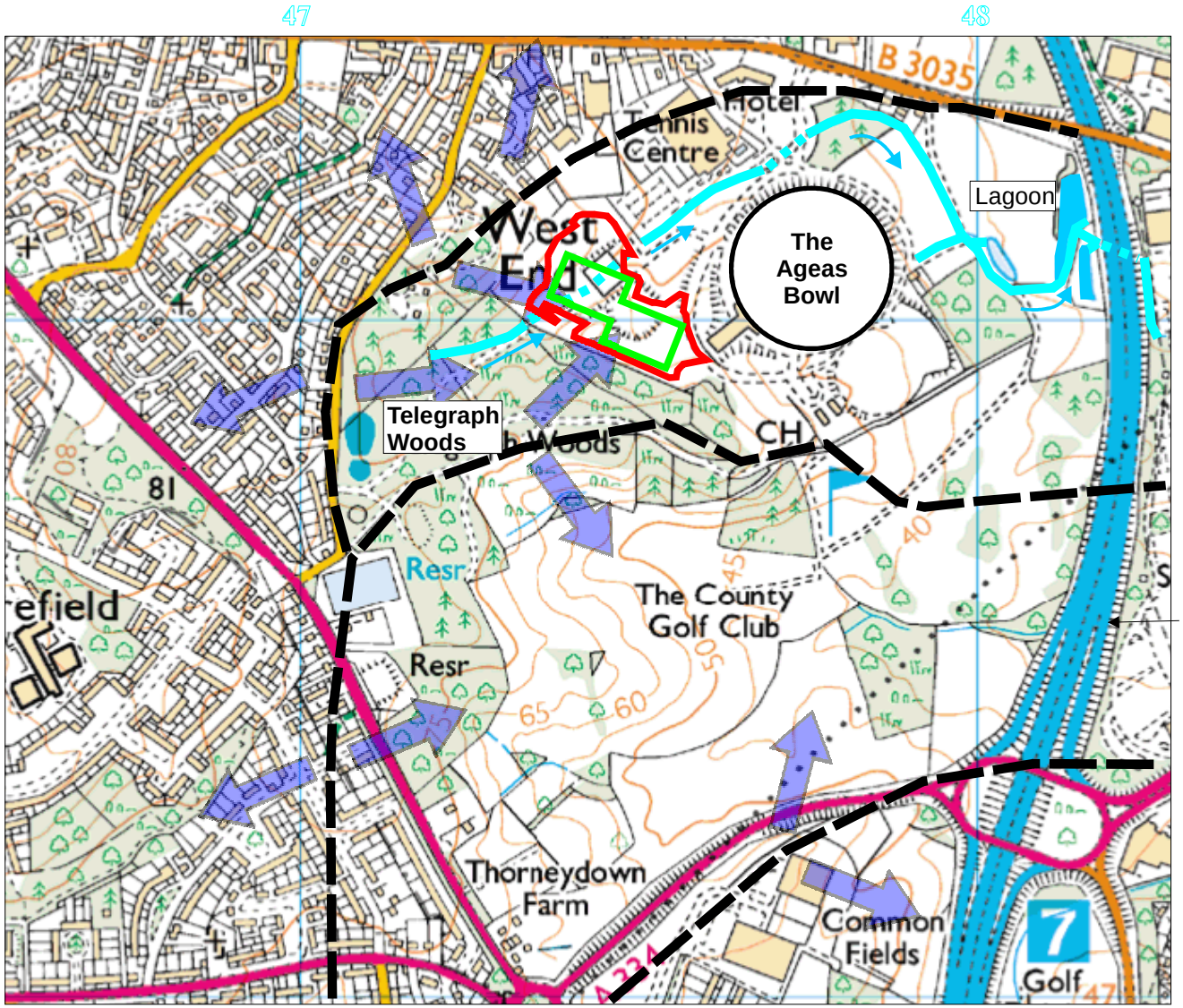
8 REFERENCES

Ref 1: National Planning Policy Framework. 2012.

Ref 2: NERC (1999) Flood Estimation Handbook, with WIN-FAP FEH software and FEH CD-ROM 3 (2010) for catchment descriptors. Centre for Ecology and Hydrology, Wallingford.

Ref 3: The Physical Properties of Minor Aquifers in England and Wales. Environment Agency Hydrogeology Group. Technical Report WD/00/04 No.68 (2000).

Figures

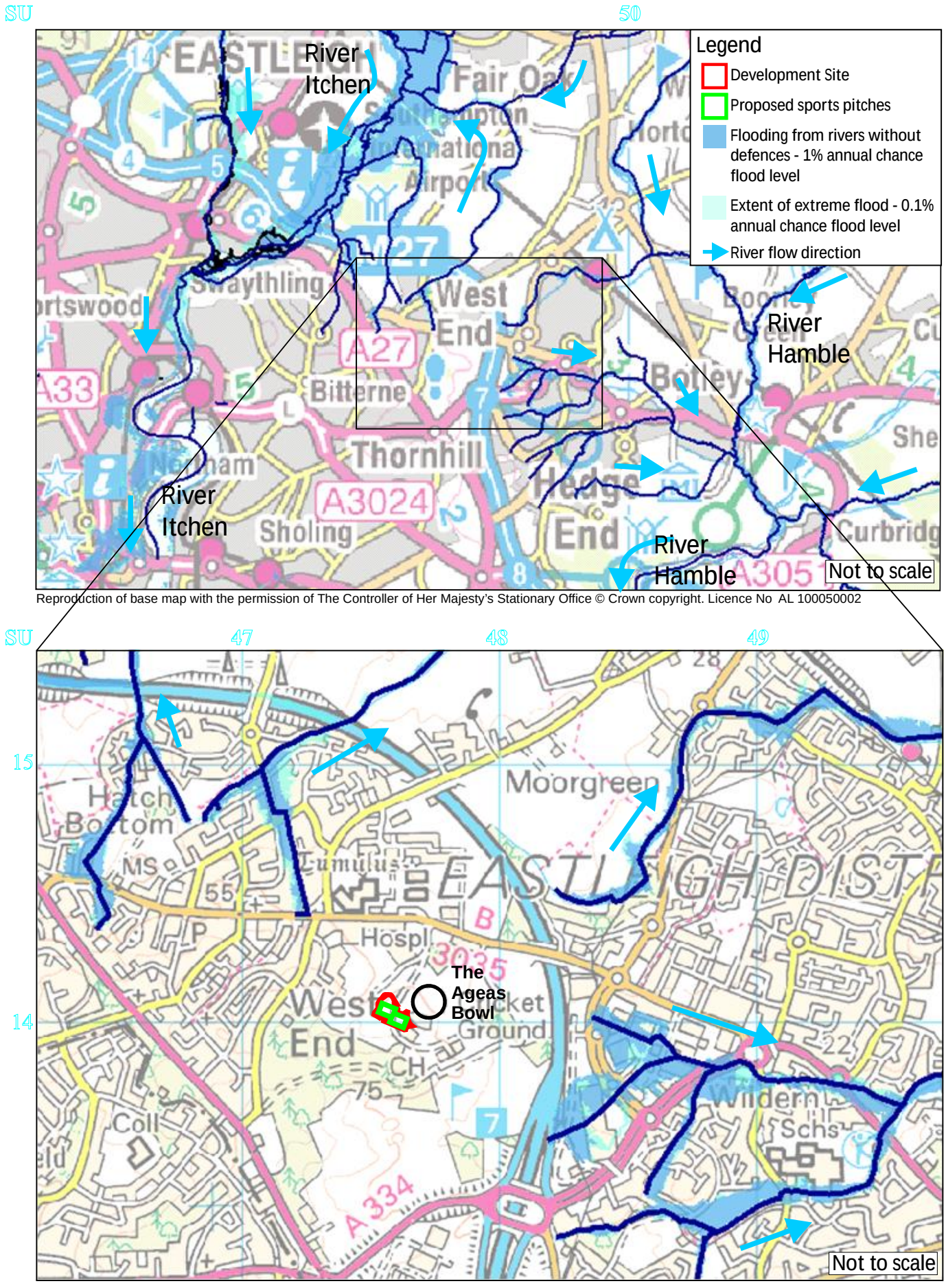


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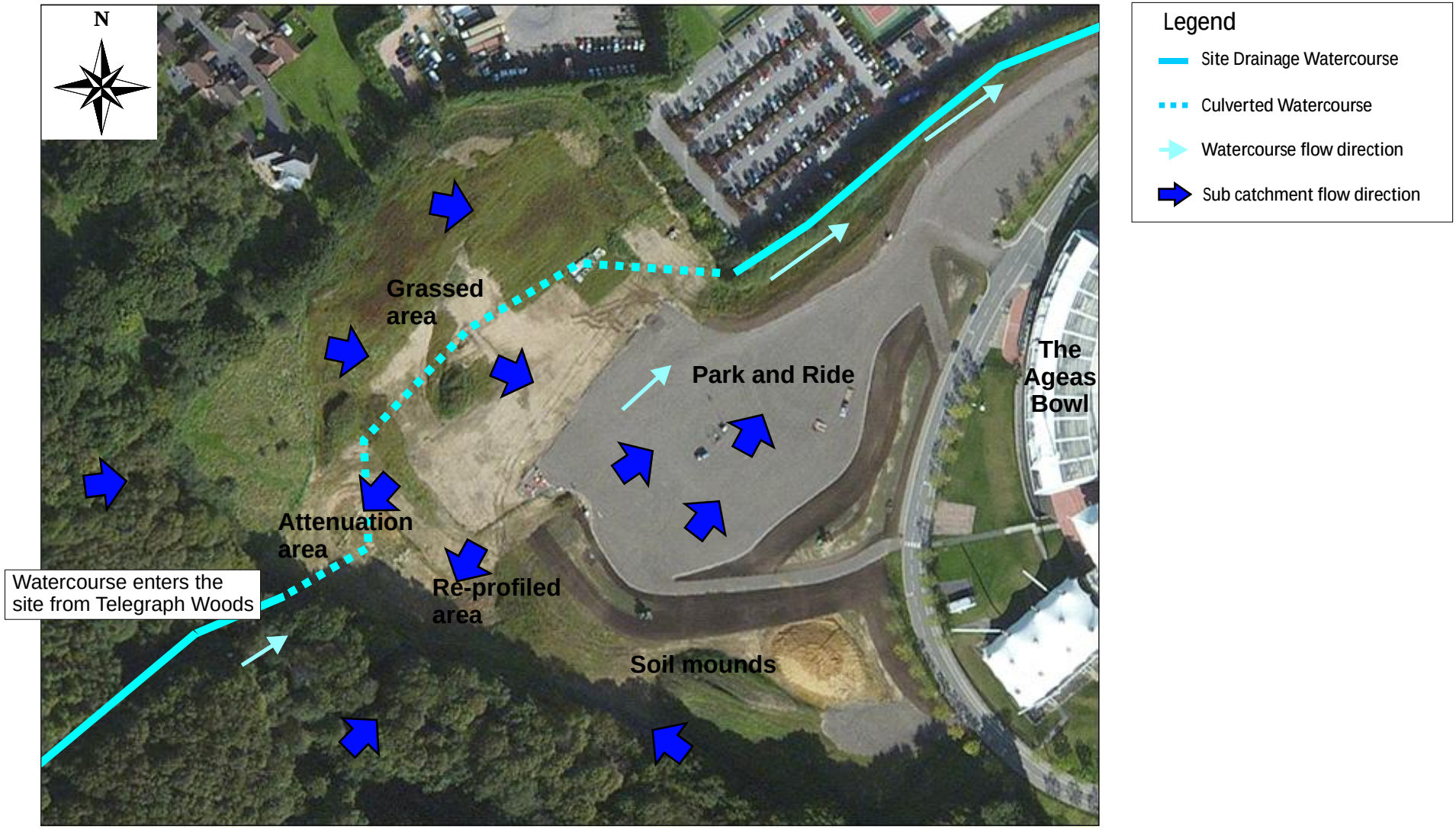
Ref: P:\The Ageas Bowl FP (1546)\ Fig 1 - Site Location.cdr Date: 16/04/2013	The Ageas Bowl, West End, Southampton, SO30 3XH
Figure 1	Site Location and Water Features



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Figure 2	Flood Zones



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Ref: P:\The Ageas Bowl FP (1546)\ Fig 3 - Existing Development.cdr Date: 16/04/2013	The Ageas Bowl, West End, Southampton, SO30 3XH
Figure 3	Existing Development



Legend

- Development Site
- Proposed sports pitches
- Site Drainage Watercourse
- Culverted Watercourse
- Watercourse flow direction
- Sub catchment flow direction
- Current contours
- Raised contours
- Lowered contours

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Figure 4	Proposed Development