



SHINFIELD WEST SOUTHERN
ALLOTMENTS

FLOOD RISK ASSESSMENT & DRAINAGE STRATEGY

UNIVERSITY OF READING

21 JULY 2025





Abley Letchford
3 Tealgate
Charnham Park
Hungerford
RG17 0YT

T: 01488 684390
E: contact@ableyletchford.co.uk
W: www.ableyletchford.co.uk

Quality Management:

Prepared by:	K Bush & G Roinas
Authorised by:	E Philpott
Date:	21 July 2025
Document Reference:	A243-R012

**COPYRIGHT © ABLEY LETCHFORD PARTNERSHIP LIMITED t/a
ABLEY LETCHFORD**

The material presented in this report is confidential. This report has been prepared for the exclusive use of UNIVERSITY OF READING within the terms of the contract and shall not be distributed or made available to any other company or person without the knowledge and written consent of Abley Letchford.

Any such party relies on the report at their own risk.



Contents

1.0 Introduction..... 1

2.0 Policy and Sources of Information 3

3.0 Site Setting 6

4.0 Overview of Flood Risk..... 8

5.0 Sequential Test and Exception Test..... 15

6.0 Flood Mitigation Strategy 16

7.0 Surface Water Drainage 17

8.0 Foul Water Drainage..... 23

9.0 Conclusion 24

Appendices

- Appendix A - Plans
- Appendix B - SFRA Documents
- Appendix C - LLFA Checklist
- Appendix D - Drainage Documentation



1.0 Introduction

1.1 Context

- 1.1.1 This Flood Risk Assessment (FRA) has been prepared by Abley Letchford, on behalf of the University of Reading to support a full planning application seeking planning permission for community allotments. The site is located to the south of the residential area of Shinfield and east of the existing pavilion and associated car park.
- 1.1.2 Outline planning permission for the Shinfield West development was granted by the Secretary of State on 8th November 2012. In conjunction with the development proposals for up to 1,350 dwellings, a local centre and a primary school, the outline planning consent also allowed for the promotion of playing fields, a sports pavilion, and the now-proposed allotment area in the southern portion of the site.

1.2 Development Proposals

- 1.2.1 The proposals for community allotments and their associated access, parking arrangements and landscaping are depicted on the Southern Allotment General Arrangements (GA) Plan within **Appendix A**.

1.3 Requirement for a Flood Risk Assessment

- 1.3.1 The requirement for an FRA is set out in Section 14 of the revised National Planning Policy Framework (NPPF) as revised in December 2024.
- 1.3.2 The footnote accompanying Paragraph 181 states:
- ‘A site-specific flood risk assessment should be provided for all development in Flood Zones 2 and 3. In Flood Zone 1, an assessment should accompany all proposals involving: sites of 1 hectare or more; land which has been identified by the Environment Agency as having critical drainage problems; land identified in a strategic flood risk assessment as being at increased flood risk in future; or land that may be subject to other sources of flooding, where its development would introduce a more vulnerable use.’*
- 1.3.3 The site is a greenfield site. To comply with the requirements of the NPPF, matters related to flood risk and drainage are addressed within this report.

1.4 Report Aim and Formation

- 1.4.1 The principal aims of this report are to demonstrate that the proposed development complies with national and local planning policy in respect to flood risk and to demonstrate that a suitable drainage strategy can be provided as part of development.
- 1.4.2 This report will also summarise the impacts the development could have on flood risk to the surrounding area and outlines the mitigation strategies that will be implemented to minimise this risk.
- 1.4.3 The drainage design embraces the guiding principles of Sustainable Drainage Systems (SuDS) which are central to the design of the surface water drainage strategy for the proposed development.



1.5 Report Structure

1.5.1 This report addresses the requirements of revised NPPF and considers the following aspects:

- Section 2: Policy and Sources of Information – a review of policy relevant to the assessment and sources of information used to inform the assessment.
- Section 3: Site Setting – a description of the site location, topography, geology and hydrology.
- Section 4: Overview of Flood Risk – a review of data for flooding from all sources to determine the baseline flood risk to the site and an assessment of the impacts of the development on flood risk.
- Section 5: Sequential Test and Exception Test – a description of the proposed development and a classification of the vulnerability in the context of the Sequential Test and Exception Test.
- Section 6: Flood Risk Mitigation – the mitigation measures implemented to manage the potential flood risk to the development.
- Sections 7 and 8: Drainage Strategy – a summary of appropriate strategies to manage the surface water and foul water from the site in the post development scenario.
- Section 9: Conclusion – a summary of the development proposals in the context of site vulnerability and the requirements of the NPPF.



2.0 Policy and Sources of Information

2.1 Introduction

2.1.1 This chapter provides a review of policy relevant to the assessment and the available information on all sources of flood risk.

2.1.2 National Planning Policy

2.1.3 National Policy in relation to flood risk is set out in Section 14 of the National Planning Policy Framework, Dec 2024 (NPPF) and Planning Practice Guidance ID:7 for Flood Risk and Coastal Change, Aug 2022 (PPG). Flood Risk is discussed at Paragraphs 170 to 182 of the NPPF.

2.1.4 Paragraphs 173 to 176 discuss the sequential approach with respect to individual applications. Paragraph 174 refers to the Strategic Flood Risk Assessment (SFRA) that would form the basis of applying the Sequential Test for local authorities to allocate developments, whilst Paragraphs 177-179 relate to Exception Tests.

2.1.5 Paragraph 181 discusses the determination of planning applications stating:

‘When determining any planning applications, local planning authorities should ensure that flood risk is not increased elsewhere. Where appropriate, applications should be supported by a site-specific flood-risk assessment. Development should only be allowed in areas at risk of flooding where, in the light of this assessment (and the sequential and exception tests, as applicable) it can be demonstrated that:

- *Within the site, the most vulnerable development is located in areas of lowest flood risk unless there are overriding reasons to prefer a different location.*
- *The development is appropriately flood resistant and resilient, such that, in the event of a flood, it could be quickly brought back into use without significant refurbishment.*
- *It incorporates sustainable drainage systems, unless there is clear evidence that this would be inappropriate.*
- *Any residual risk can be safely managed; and*
- *Safe access and escape routes are included where appropriate, as part of an agreed emergency plan.’*

2.1.6 The proposed development is for a community allotment at the site which covers approximately 0.6 hectares and would, therefore, be classed as a minor development because it is for non residential uses and the site is less than 1 hectare. There are no specific requirements for drainage within NPPF for a minor development.

2.1.7 The PPG sets out more specific guidance on how to apply and implement the NPPF policies. This includes guidance on when a Sequential Test is required and considerations on how to apply the test. In paragraph 023 of the PPG the aim of the sequential approach is clarified and includes the following:

‘The approach is designed to ensure that areas at little or no risk of flooding from any source are developed in preference to areas at higher risk. ‘

2.1.8 In applying the Sequential Test to planning applications, NPPF paragraph 175 confirms specific development cases when the test is not applicable:



‘The sequential test should be used in areas known to be at risk now or in the future from any form of flooding, except in situations where a site-specific flood risk assessment demonstrates that no built development within the site boundary, including access or escape routes, land raising or other potentially vulnerable elements, would be located on an area that would be at risk of flooding from any source, now and in the future (having regard to potential changes in flood risk).’

2.2 Environment Agency

- 2.2.1 The Flood and Water Management Act (2010) provides the Environment Agency (EA) a strategic overview role for all forms of flooding and coastal erosion. The EA also has direct responsibility for the prevention, mitigation and remediation of flood damage for main rivers and coastal areas. The EA is a statutory consultee in relation to flood risk and planning dependent upon criteria.
- 2.2.2 The EA Flood Map for Planning and EA Long Term Flood Risk Mapping have been interrogated in respect to flood risk extents and sources.

2.3 Local Authorities

- 2.3.1 The site lies within the administrative area of Wokingham Borough Council (WBC). WBC is the Local Planning Authority (LPA) and Lead Local Flood Authority (LLFA).
- 2.3.2 Planning guidance published by WBC regarding the flood risk was referred to in order to assess the methodology best suited to suit the local area. The following key documents were reviewed:
- Wokingham Borough Local Development Framework, Core Strategy, Core Policy CP1: Sustainable Development (adopted January 2010),
 - Wokingham Borough Council Local Flood Risk Management Strategy (dated April 2015),
 - Wokingham Borough Council Preliminary Flood Risk Assessment (PFRA) (dated June 2011) and PFRA addendum (dated December 2017),
 - Wokingham Borough Council Level 1 Strategic Flood Risk Assessment (SFRA) (dated May 2023), and
 - Wokingham Borough Council Level 2 Strategic Flood Risk Assessment (SFRA) (dated August 2023).
- 2.3.3 WBC became the LLFA under the Flood and Water Management Act 2010. WBC provide guidance to assess, manage and inform flood risk.
- 2.3.4 WBC has permissive rights over any Ordinary Watercourses including land drainage ditches. If any work is required within the watercourse (improvements or crossings) then approval from the LLFA is required under the Flood and Water Management Act 1991. The LLFA also provides guidance on surface water drainage requirements, which has been referred to as part of this FRA and a completed WBC checklist for Minor Development Full Application is provided in **Appendix C**.

2.4 Local Water Authority

- 2.4.1 Thames Water (TW) is responsible for the supply of clean water and the disposal of wastewater for the Shinfield area.
- 2.4.2 Information with regards to sewer and water main flooding contained within the SFRA has been reviewed as part of this FRA. All water companies have a statutory obligation to maintain a register



of properties and areas which are at risk of flooding from the public sewerage system and is shown on the DG5 Flood Register.

2.5 Other Sources of Information

- 2.5.1 A desktop study of the site was carried out using the following websites to ascertain local features, hydrology and soil characteristics:
- DEFRA's Magic Map portal.
 - British Geological Survey (BGS) 'Geology of Britain' online viewer; and
 - Cranfield University 'Soilscapes' portal.
- 2.5.2 Guidance with respect to Sustainable Drainage Systems (SuDS) is contained within DEFRA document Sustainable Drainage Systems, Non-statutory technical standards for sustainable drainage systems March 2015, CIRIA C753 The SuDS Manual and within the NPPF Planning Practice Guidance (PPG) – 'Flood Risk and Coastal Change'.
- 2.5.3 Additional guidance on development and flood risk is contained within CIRIA C624 Development and Flood Risk – Guidance for the Construction Industry which identifies several key aims for a development to ensure it is sustainable in flood risk terms.

3.0 Site Setting

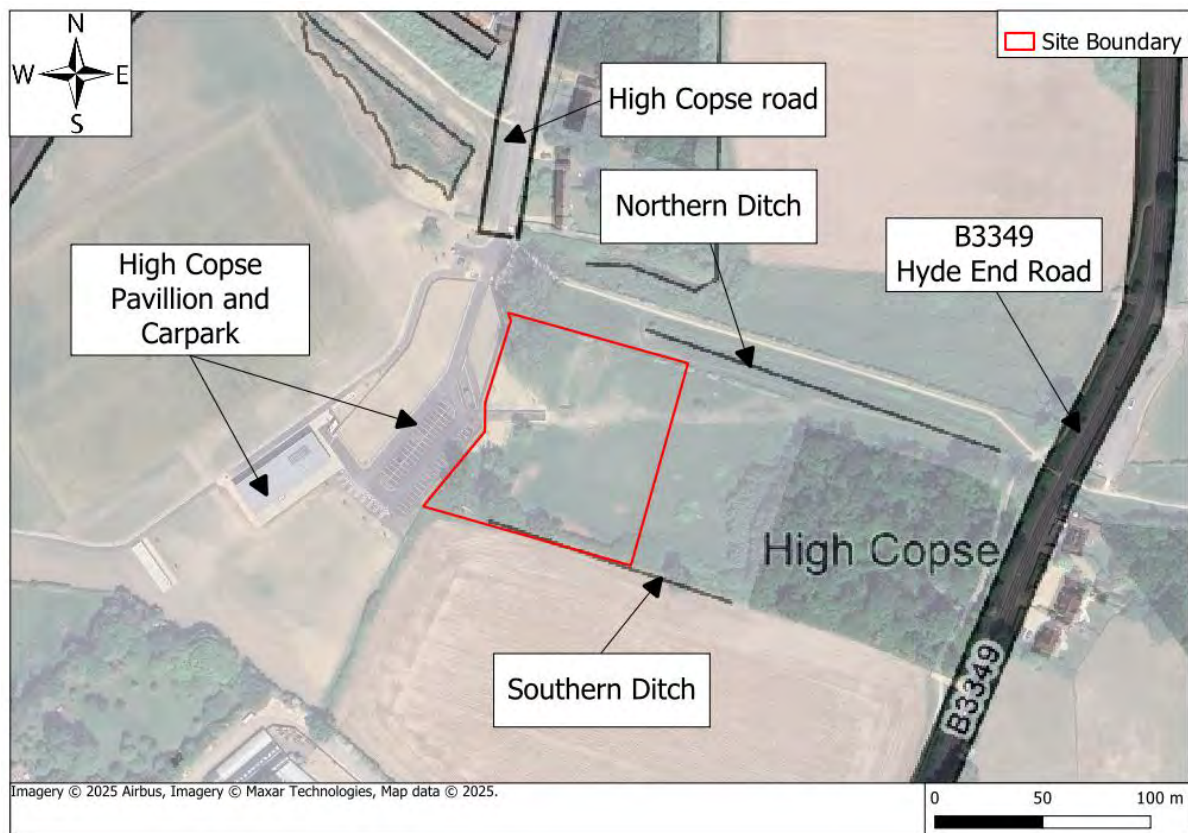
3.1 Introduction

3.1.1 This chapter provides a description of the site location, its topography, hydrological context, geology and hydrogeology.

3.2 Site Location

3.2.1 The site is located at land to the south of the residential area of Shinfield. The nearest postcode is RG2 9ES. The site centre grid reference is SU 72890 67202. The site location is shown in **Figure 1**.

Figure 1: Site Location



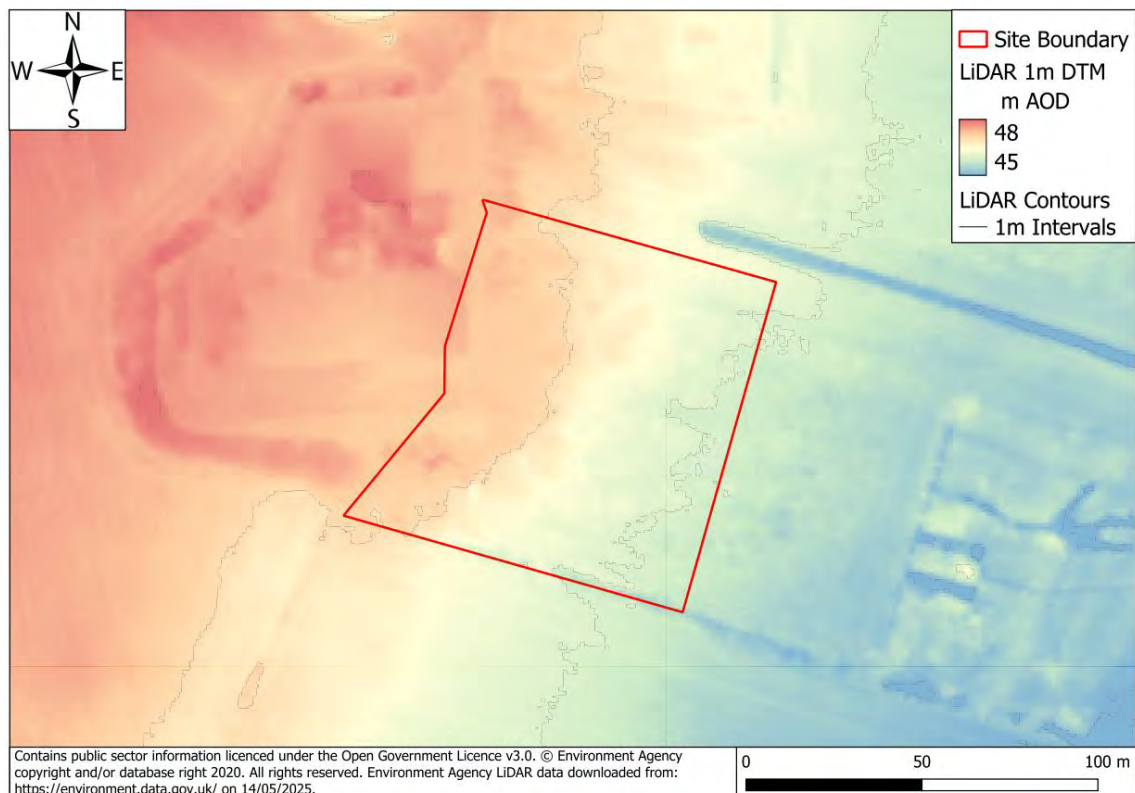
3.2.2 The site covers an area of approximately 0.6 hectares.

3.2.3 **Figure 1** also shows the location of the High Copse Pavilion and its associated car park to the west of the proposed allotment site. This shares an access road into the allotment site.

3.3 Topography

3.3.1 The ground levels across the site are shown by LiDAR in **Figure 2**.

Figure 2: Site Topography



- 3.3.2 The site is generally relatively flat. Ground levels slope down slightly to the east with levels varying from approximately 47.5m AOD in the west to approximately 45.7m AOD in the southeastern corner of the site.

3.4 Geology and Hydrogeology

- 3.4.1 The British Geological Survey (BGS) 'Geology of Britain' online viewer indicates that the geology underlying the site is River Terrace Deposits, 3 - sand and gravel.
- 3.4.2 The Cranfield University 'Soilscapes' online viewer indicates that the soil type is loamy soils with naturally high groundwater.
- 3.4.3 The DEFRA Magic Map online viewer indicates that the site lies within an area that is 'Unproductive'. Unproductive is defined by BGS as '*areas comprised of rocks that have negligible significance for water supply or baseflow to rivers, lakes and wetlands. They consist of bedrock or superficial deposits with a low permeability that naturally offer protection to any aquifers that may be present beneath.*'

4.0 Overview of Flood Risk

4.1 EA Flood Zone Map

4.1.1 The EA Flood Map for Planning provides an initial indication of the extent of Flood Zones. In the NPPF, Flood Zones are defined as follows:

- Flood Zone 1 'Low Probability' – Land less than 1 in 1,000 (0.1%) annual probability of river or sea flooding.
- Flood Zone 2 'Medium Probability' – Land between 1 in 100 (1%) and 1 in 1,000 (0.1%) annual probability of river flooding, or between 1 in 200 (0.5%) and 1 in 1,000 (0.1%) annual probability of sea flooding.
- Flood Zone 3 'High Probability' – Land at 1 in 100 (1%) or greater annual probability of river flooding, or 1 in 200 (0.5%) or greater annual probability of sea flooding.

4.1.2 **Figure 3** shows the EA Flood Zone mapping.

Figure 3: EA Flood Zone Map



4.1.3 **Figure 3** shows the entirety of the site lies within Flood Zone 1.

4.1.4 The site's overall risk of flooding from fluvial sources is considered low.

4.2 Flood Risk from Surface Water

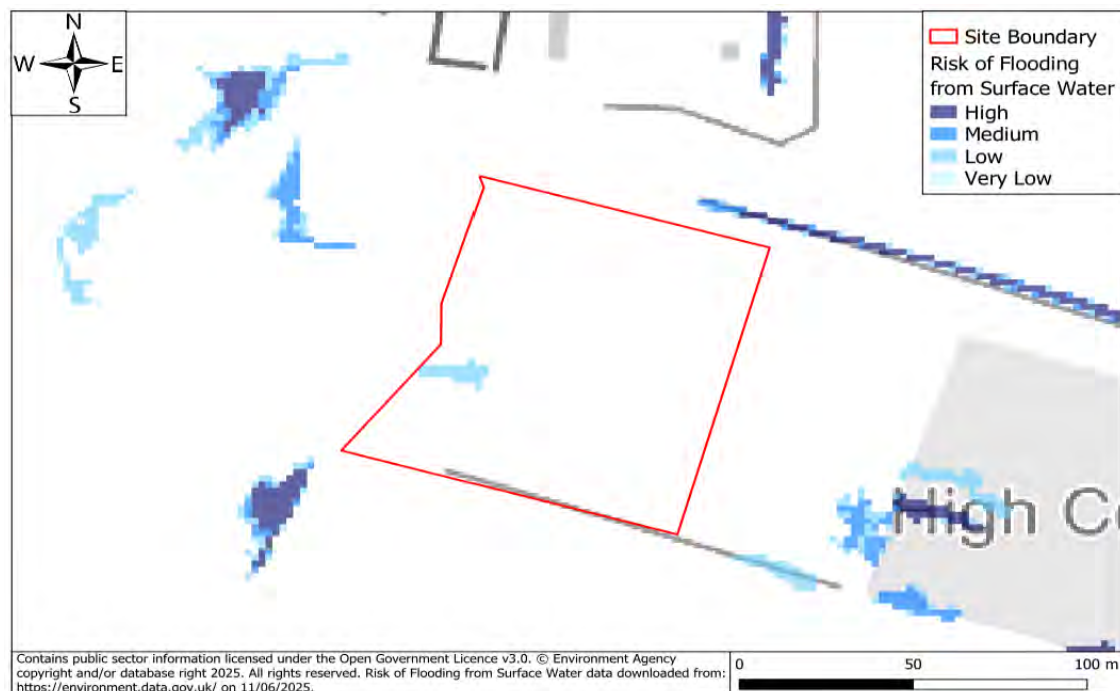
4.2.1 The EA's Risk of Flooding from Surface Water mapping indicates areas that could be susceptible to surface water flooding during extreme rainfall events. The EA surface water mapping defines rainfall events based on the following:

- 1 in 30 (3.3%) annual probability 'High Risk'
- 1 in 100 (1%) annual probability 'Medium Risk'
- 1 in 1,000 (0.1%) annual probability 'Low Risk'
- Lower than 1 in 1,000 (0.1%) annual probability 'Very Low Risk'.

4.2.2 The NPPF PPG – 'Flood Risk and Coastal Change' includes the 1 in 100 annual probability of surface water flood (including climate change) within the definition of the design flood event to be used to inform an FRA.

4.2.3 **Figure 4** shows the potential flood risk from surface water.

Figure 4: EA Flood Risk from Surface Water



4.2.4 The EA Flood Risk from Surface Water mapping shows that the majority of the site lies outside of any surface water flow routes or areas of ponding.

4.2.5 On the western boundary there is an area at low risk of surface water ponding. This appears to correlate with the boundary between the location of a wooded area and a flatter surfaced area.

4.2.6 Overall, the site is at a low risk from pluvial sources.



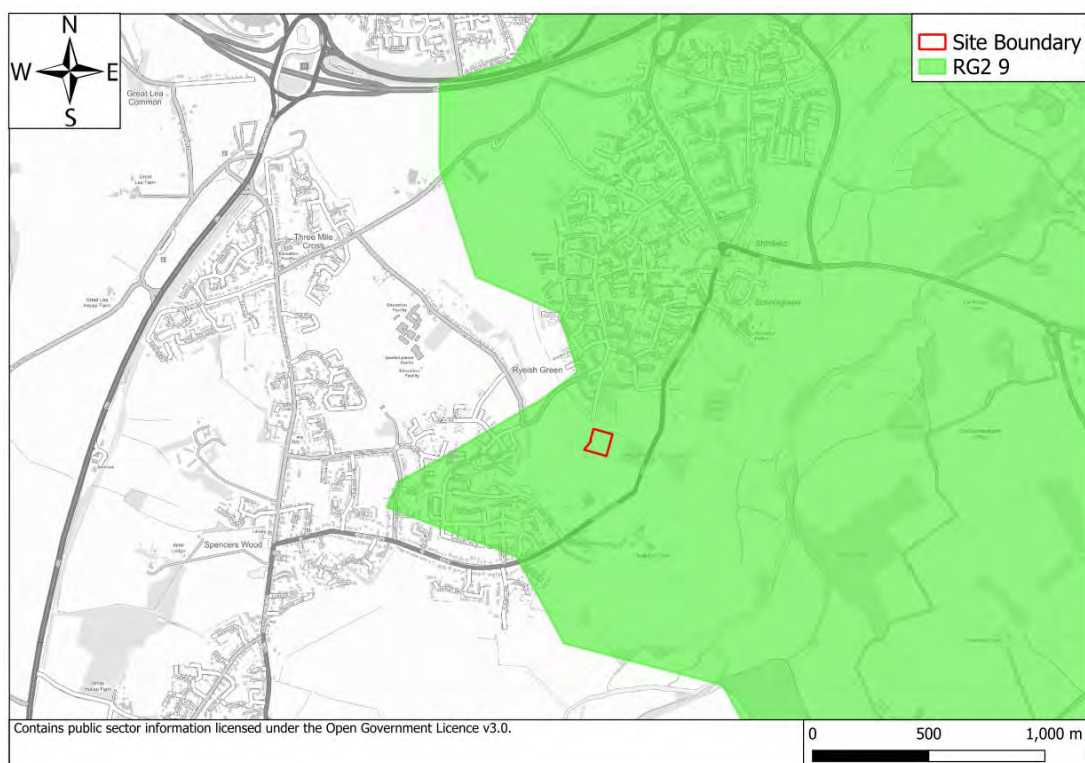
4.3 Flood Risk from Groundwater

- 4.3.1 Groundwater flooding has the potential to occur after prolonged periods of unusually high rainfall. During such periods, more water than usual infiltrates through the ground, raising the water table above its normal depth below the surface. Where the water table is at a shallow depth, in any case, the water table can reach the surface. This can cause groundwater to merge with rainfall and cause localised flooding.
- 4.3.2 The WBC Level 1 SFRA assesses the area for susceptibility to groundwater flooding and emergence of groundwater. A copy of this figure is included within **Appendix B** of this report. The site lies within a 1km grid cell that is $\geq 75\%$ susceptible to groundwater flooding.
- 4.3.3 The WBC Level 1 SFRA also maps the JBA groundwater emergence (5m resolution). This shows that the site lies within an area that is less than 0.025m below the surface.
- 4.3.4 Further, intrusive investigations reported by RPS as part of the outline application for Shinfield West residential development identified shallow groundwater levels across the development. Groundwater was observed as being slow to rapid between 0.6m and 4.3m below prevailing ground levels. Given there is no known evidence of flooding from groundwater affecting the site the risk of flooding from groundwater sources is considered low.
- 4.3.5 Overall, the site has a low risk of flooding from groundwater. The proposed development is not particularly sensitive to groundwater flooding and there is no plan for any significant excavations that could be more sensitive to groundwater flooding.

4.4 Flood Risk from Sewers

- 4.4.1 When exceeded, surcharged sewer networks can lead to flooding from backed up manholes and gully connections.
- 4.4.2 Within the WBC Level SFRA, the number of sewer flooding incidents recorded by Thames Water (January 2000 – May 2022) is shown. The site lies within the postcode of RG2 9, as shown in **Figure 5**. This entire area has a total of 172 recorded flooding incidents. The total area of this postcode is 1,958 hectares, but the site covers only 0.6 hectares.
- 4.4.3 When this mapping is analysed, it is apparent that the incidents are most likely to have occurred in the more urban areas of the postcode, where there are more sewers. Therefore, it can be concluded that the site has a low risk of flooding from sewer incidents.

Figure 5: Site within the larger postcode area



4.5 Flood Risk from Reservoirs

4.5.1 The EA Flood Risk from Reservoirs Map shows areas that would be at risk of flooding in the event of a reservoir breach.

4.5.2 **Figure 6** shows the flood risk from reservoirs in relation to the site.

Figure 6: EA Flood Risk from Reservoirs



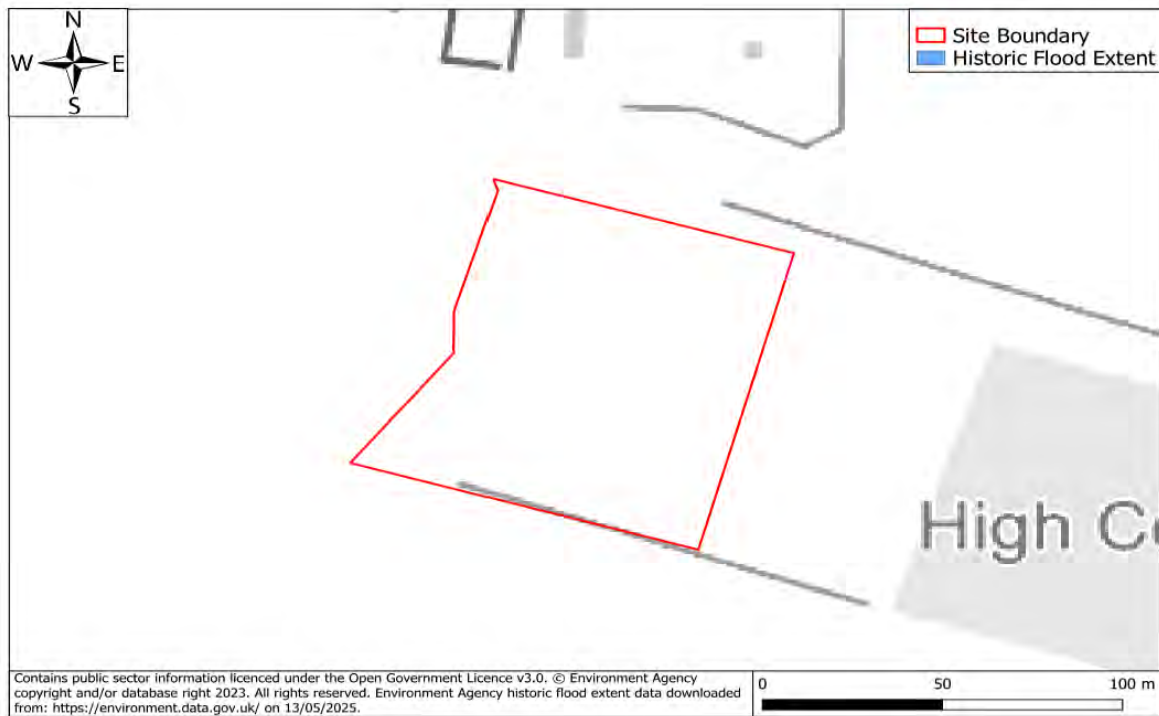
4.5.3 The mapping shows that the entirety of the site lies outside areas at risk from flooding from reservoir breach, in both wet and dry day events.

4.5.4 Therefore, the overall risk to the site from reservoir flooding is low.

4.6 Historic Flooding

4.6.1 **Figure 7** shows the historic flood extent records held by the EA. The EA Historic Flood Map shows the maximum extent of recorded flood events.

Figure 7: Historic Flood Extents



4.6.2 No historical flooding events have been recorded within the area of the site boundary.



4.7 Flood Risk Summary

4.7.1 A summary of flooding from all sources is provided in **Table 1**.

Table 1: Summary of Flood Risk

Source of Flooding	High	Medium	Low	Comments
Fluvial			✓	The majority of the site lies outside of areas at risk of potential flooding from surface water flooding. There is a small area of surface water ponding. Overall, the majority of the site is at a low risk of flooding from all sources.
Pluvial			✓	The entirety of the site lies within Flood Zone 1. Therefore, the risk of flooding from fluvial sources is deemed to be low.
Groundwater			✓	The site lies within a 1km grid cell that is $\geq 75\%$ susceptible to groundwater flooding. It is also shown to be in an area that is less than 0.025m below the surface. Further investigations were carried out which concluded there was no evidence of groundwater flooding affecting the site. Overall, the site is at a low risk of flooding from groundwater.
Sewers			✓	The overall postcode has 172 recorded incidents of sewer flooding. However, this covers a large area. An area that also incorporates the large residential area of Shinfield. The site, in comparison is extremely small and a greenfield site. The risk of flooding from sewers is therefore considered to be low.
Reservoirs, canals and other artificial sources			✓	The site does not lie within an area at risk of flooding from reservoir breach, in both wet and dry day events.



5.0 Sequential Test and Exception Test

5.1 NPPF Sequential Test

- 5.1.1 NPPF states that Local Planning Authorities allocating land for development should apply the Sequential Test to demonstrate that there are no reasonably available sites in areas with a lower probability of flooding that would be appropriate to the type of development or land use proposed.
- 5.1.2 The entirety of the site is located within Flood Zone 1 and, from this assessment, is shown to be at low risk of flooding from all sources.
- 5.1.3 Therefore, the Sequential Test does not need to be applied.

5.2 Exception Test

- 5.2.1 The Sequential Test does not need to be undertaken and therefore the Exception Test is not required.



6.0 Flood Mitigation Strategy

6.1 Sequential Approach

- 6.1.1 The NPPF encourages a 'sequential approach' in master planning for new development: locating the more vulnerable uses of the development in the areas of lowest flood risk from all sources.
- 6.1.2 The purposes and use of this development is for a community allotment site and thus, development is considered to be less vulnerable. There is no built development within the site.
- 6.1.3 In summary, the Sequential Test does not need to be applied for this site.

6.2 Safe Access

- 6.2.1 Continuous safe access for the development is located outside of any flood risk. The access to the site will be from the western road from the existing pavilion development.

6.3 Residual Risk

- 6.3.1 The NPPF PPG – 'Flood Risk and Coastal Change' defined residual risk as coming from 'flood risk management infrastructure' and the 'residual risk to a development once any site-specific flood mitigation measures are taken into account'.
- 6.3.2 Residual risk to the site includes a breach in the raised flood defences, the failure of a reservoir and a flood event greater than the designed standards.
- 6.3.3 The residual risk to the site is low. The EA AIMS dataset which contains information of flood defences indicates that the site does not benefit from flood defences. The EA mapping for reservoir breaches indicates that it is outside of the modelled extents. The whole site is located outside of the 1 in 1,000 annual probability flood extent.



7.0 Surface Water Drainage

7.1 Introduction

- 7.1.1 This chapter provides details on the surface water drainage strategy and measures to drain the site. Given the nature of the proposals, foul effluent discussions are not applicable.

7.2 Overall Strategy

- 7.2.1 The proposed drainage strategy utilises an existing drainage feature to meet the requirements of the NPPF by providing a surface water drainage system which embraces the SuDS philosophy and key principles. The utilisation of Sustainable Drainage Systems (SuDS) not only provides the benefit of controlling waters at source but also online treatment of collected surface water.
- 7.2.2 The alteration of natural surface water flow patterns through developments can lead to problems elsewhere in the catchment, particularly flooding downstream. Changes to land uses can have significant downstream impacts where existing drainage systems may not have sufficient capacity for any additional surface water flow.
- 7.2.3 A surface water management strategy is therefore required to manage and reduce the flood risk posed by the surface water runoff from the site, albeit the proposals effectively change 'greenfield' to positively drained 'greenfield' by virtue of the introduction of a positive drainage system attributed to the allotment design.
- 7.2.4 The surface water drainage arrangements should be such that the volumes and peak flow rates of surface water leaving a developed site are no greater than the rates to the pre-development scenario, unless specific off-site arrangements are made and result in the same net effect.
- 7.2.5 Sustainable water management measures (SuDS) should be introduced to control the surface water runoff from the proposed site therefore, managing the flood risk to the site and surrounding areas from the surface water runoff. By directing surface water flows into the nearby above ground attenuation feature, such controls are afforded with minimal disruption.
- 7.2.6 The use of existing SuDS features, and connectivity will ensure that flood risk downstream is not increased due to the proposals. These features will also provide positive improvements to the quality of surface water runoff from the site.

7.3 Pre and Post Development Areas/Rates

- 7.3.1 The site is classed as Greenfield. Given the nature of the proposals, there will be an increase in impermeable area and surface water runoff volume.
- 7.3.2 The existing Greenfield/Pre-Development runoff rate has been determined using the HR Wallingford UKSUDS web service.
- 7.3.3 An assessment of existing surface water runoff has been undertaken utilising the following parameters.
- Average Annual Rainfall (SAAR): 649mm
 - Soil: 0.470



- Region No.: 6
- 7.3.4 An assessment of the overall allotment provision has derived a total site area of 0.637 hectares (ha). Whilst the current agricultural field will be improved to provide the allotment surfaces, the remaining area will remain as per the pre-development condition.
- 7.3.5 It is acknowledged that the entire site area of 0.637ha currently slopes towards the proposed surface water drainage system, due to the existing topography.
- 7.3.6 The calculated Greenfield run-off discharge rates for both scenarios are as presented in **Table 2**. The corresponding runoff output created from within the UKSUDS Website can be found within **Appendix D**.

Table 2: Pre-Development Runoff Rates/Volumes per Hectare

Annual Probability	Greenfield/Pre-Development Runoff Rate per hectare (l/s/ha)	Greenfield/Pre-Development Volume 360 minute storm (m ³) for the entire site (0.637ha)
1 in 1 year event (100% AEP)	3.8	-
1 in 2 year event (50% AEP)	-	60
QBar	4.4	-
1 in 30 year event (3.3% AEP)	10.2	146
1 in 100 year event (1% AEP)	16.5	191

- 7.3.7 To comply with best practice as stipulated in EA Report SC030219 'Rainfall Runoff Management for Developments', proposed discharge rates should be restricted to one of two methods for all storms up to and including the 1 in a 100-year storm event, plus a 40% allowance for climate change.

7.4 Surface Water Proposals

- 7.4.1 As depicted on the Southern Allotment GA Plan found in **Appendix A**, a gravel path is proposed to be used around the allotments. Permeable pavement is also proposed to be used at the access road of the allotments. Perforated pipes will be used under the access road to collect the surface water runoff and transfer it to the existing swale feature for further attenuation.
- 7.4.2 The flows from the existing onsite swale feature will be transferred to the existing drainage swale attributed to Shinfield Meadows.
- 7.4.3 It is proposed to provide a network of trapped gullies, perforated pipes and Sustainable Drainage (SuDS) features to collect the surface water runoff from impermeable road areas. The traditional system will work in combination with such features as permeable paving and existing swale within the allotment parcel to filtrate, store and transport water to an attenuation swale to provide attenuation storage and high-quality water benefits.
- 7.4.4 Drawing A243-AL-501, a copy of which is included within **Appendix D**, provides an overview of the drainage proposals.



- 7.4.5 The banks of the existing swale feature are at a maximum gradient of 1 in 3 and provides an appropriate freeboard above the maximum water level. This allows landscaping of both wetland and wildflower mixes to provide an appropriate landscape context in the vicinity of the features through the provision of an aquatic shelf.
- 7.4.6 Proposed discharge rates will be restricted to QBAR for all storm events up to and including the 1 in 100-year storm event, plus 40% allowance for climate change. This would negate the requirement for Long Term Storage, and flows would be attenuated on site and discharged utilising an onsite flow control device such as a Hydrobrake.
- 7.4.7 The access road and the footway are the only impermeable area of this allotment site and cover an area of approximately 420m². The access road is proposed to have a subbase depth of 350mm, constructed using gravel with a 30% void ratio.
- 7.4.8 The proposed swale and the permeable pavement provide adequate attenuation volume for the allotment site and the swale also receive and manage flows from the nearby car park. Supporting calculations can be found in **Appendix D**.
- 7.4.9 All conveyance systems will be designed to cater for the 1:30-year storm event, in accordance with industry standard, with all attenuation features designed to allow for the 1 in 100-year storm event plus 40% climate change allowance.
- 7.4.10 The proposals draw reference to the DEFRA document Sustainable Drainage Systems, Non-statutory technical standards for sustainable drainage systems, March 2015, as well as CIRIA C753 The SuDS Manual.
- 7.4.11 Any uncontrolled pluvial runoff exhibited onsite during high rainfall events will be mitigated because of the Development. This will occur by virtue of the change in surface from greenfield to positively drained impermeable areas, which will serve to capture, attenuate and delay surface water runoff eastwards. This will be a benefit to downstream receptors.
- 7.4.12 This proposal identifies the principal components of the surface water strategy and is subject to further detailed localised investigations as part of the subsequent Detailed Design.
- 7.4.13 There is scope to utilise source control techniques (such as granular strips), which will assist with the reduction of larger attenuation storage features. This should be embraced and investigated as the project progresses.
- 7.4.14 Subject to the provision of additional geotechnical information, the attenuation swale may require partial lining to protect against the ingress of natural groundwater. Such lining provides the ability to create localised, small permanent bodies of water, which adds landscaping and biodiversity opportunities to the scheme.

7.5 Exceedance Flood Routing

- 7.5.1 Flows in excess of the above design storms, which may flood from the network for storms in excess of the 1 in 100-year storm plus 40% climate change, will be kept within the internal road network until such time as they can be directed into adjacent landscaping areas or existing vegetation/woodland. This ensures that no onsite or offsite residential units are afforded an increased level of protection from flood waters until such time as the rain events become significant.



- 7.5.2 The attenuation swale is designed to provide 300mm freeboard and therefore can accept additional flood water from manholes upstream.

7.6 Water Quality Improvements

- 7.6.1 CIRIA report C753 The SuDS Manual outlines the methodology for assessing water quality risks associated with new development. This is a simple index approach which provides a high-level scoping analysis of the land usage and gives guidelines for appropriate treatment stages.
- 7.6.2 This process identifies features necessary to provide adequate substance removal in line with the Environment Agency requirements. This is a three-step process of Allocation, Mitigation and Review.
- 7.6.3 Surfaces generating runoff are 'graded' on their potential to contribute to various harmful pollutants and give each surface a risk of pollution from each element. An extract of Table 26.2 within the SuDS Manual is set out overleaf.

Table 3: Extract from Table 26.2 SuDS Manual

Land Use	Pollution Hazard Level	Total Suspended Solids	Metals	Hydrocarbons
Residential Roofs	Very Low	0.2	0.2	0.05
Other Roofs	Low	0.3	0.2-0.8	0.05
Low traffic residential roads and non-residential parking with infrequent change.	Low	0.5	0.4	0.4
Commercial yard, parking with frequent change, other roads,	Medium	0.7	0.6	0.7
Sites with heavy pollution	High	0.8	0.8	0.9

- 7.6.4 Historically, PPG3 documentation would recommend that pollutants were removed utilising oil separators, but since its superseding, more recent guidance has shifted to the use of SuDS features to remove pollutants; thereby providing significant improvements in treatment.
- 7.6.5 The use of non-mechanical features decreases the requirements for maintenance and increase natural biodiversity. That said, the SuDS Manual does not remove the possibility of utilising separators, so long as they are considered in partnership with a comprehensive overall SuDS regime.
- 7.6.6 Without adequate treatment, the pollutants would cause damage if they were to enter the watercourse or water table in large volumes. The use of SuDS features to slow down and degrade these pollutants is critical to the provision of an acceptable discharge.
- 7.6.7 The respective cleansing abilities of common SuDS features are given by corresponding mitigation indices within the SuDS Manual. An extract of Table 26.3 is set out below.



Table 4: Extract from Table 26.3 SuDS Manual

Type of component	SuDS	Total Solids	Suspended	Metals	Hydrocarbons
Filter strip		0.4		0.4	0.5
Filter Drain		0.4		0.4	0.4
Swale		0.5		0.6	0.6
Bioretention system		0.8		0.8	0.8
Permeable Paving		0.7		0.6	0.7
Detention Basin		0.5		0.5	0.6
Pond		0.7		0.7	0.5
Wetland		0.8		0.8	0.8

- 7.6.8 The individual pollution indices are totalled, with the first SuDS component utilising its full value and subsequent downstream SuDS features acting with 50% efficiency. This provides a realistic strategy which mimics the reduced cleansing effectiveness as the concentration of a pollutant decreases along the SuDS train.
- 7.6.9 The mitigation indices for the Total Suspended Solids will be 0.95, the Metals will be 0.9 and for the Hydrocarbons will be 1.0. As a result, the permeable pavement and the detention swale will provide more than adequate pollution mitigation for the pollutants that derive from the access road and the allotments.
- 7.6.10 In line with Environment Agency guidance, the proposals are reviewed and analysed in order to identify potential shortcomings and to ensure that adequate volume of SuDS features are provided to mitigate the risk of pollution from each source.

7.7 SuDS Maintenance Strategy

- 7.7.1 For the water treatment effects of SuDS features to remain effective, a comprehensive maintenance strategy should be implemented.
- 7.7.2 During construction, maintenance of SuDS features should be undertaken by the Contractor. Upon completion, the assets would be retained by the University of Reading to maintain the features in perpetuity.
- 7.7.3 As part of the strategy, a regular maintenance regime will be created, which consists of several primary measures required to ensure the longevity of the system. These should be undertaken on a regular basis to ensure consistent performance. Typical maintenance activities consist of:
- Inspecting and reporting; relatively regular review of the condition, identifying issues and providing resolutions. Periodic review from the maintenance contractor;
 - Litter and debris removal;
 - Grass trimming, overall cutting and localised strimming, preventing blockages;
 - Weed and evasive plant control;



- Shrub management;
- Aquatic and shoreline vegetation management;
- Sweeping pervious surfaces; and
- Oil removal from proprietary systems.

7.7.4 A remedial maintenance schedule would be recommended as part of the handover of the SuDS features. Remedial maintenance is required to provide repairs to the system and monitor long-term damage, ensuring the system remains consistently productive. The schedule could consist of;

- Structure rehabilitation and repair;
- Infiltration surface rehabilitation;
- Scarifying to remove “Thatch”;
- Spiking or Tining the soil;
- Air pressure treatment.

7.7.5 The maintenance schedule contents and timing will depend upon multiple factors, including usage, contents of water utilising the system, location and biology. To this end, it is suggested that the schedule be finalised as part of the detailed design, ensuring the most comprehensive maintenance schedule is incorporated for the phase at hand.

7.8 Adoption and Ownership

7.8.1 The drainage system is designed to the appropriate standards, including the new Sewerage Sector Guidance (SSG), the Building Regulations and the requirements of the National Planning Policy Framework.

7.8.2 The University of Reading will retain ownership of all the drainage assets in perpetuity.



8.0 Foul Water Drainage

- 8.1.1 The proposed development does not produce any effluent and therefore a foul drainage strategy is not required. The existing foul sewers on site will remain unchanged and unaffected.



9.0 Conclusion

9.1 Flood Risk

9.1.1 The EA Flood Risk mapping has been reviewed alongside the Wokingham Borough Council (WBC) Preliminary Flood Risk Assessment (PFRA) and Level 1 and Level 2 Strategic Flood Risk Assessment (SFRA).

9.1.2 This Flood Risk Assessment (FRA) concludes that:

- The entire site is located in Flood Zone 1.
- The majority of the site lies outside any areas of surface water flooding. There is a small area of surface water ponding on the western boundary of the site.
- The site lies within an area of $\leq 75\%$ susceptibility to groundwater flooding. Also, below 0.025m of groundwater emergence. However, through further groundwater investigation, there was no known evidence of flooding from groundwater affecting the site and no observed high groundwater levels. Overall, the site is at low risk from groundwater flooding.
- The risk of flooding from sewers is considered to be low.
- The entire site is an area outside of an area of risk of flooding from reservoir breach, in both wet and dry day events.

9.1.3 In summary, the site is considered to have a low risk of flooding from all sources.

9.2 Sequential Test and Exception Test

9.2.1 The Sequential and Exception Tests are not required.

9.3 Mitigation Strategy

9.3.1 The proposed surface water drainage strategy will manage the flood risk posed by uncontrolled surface water runoff from the site. Any increase in surface water run-off can be managed using SuDS source control techniques as well as attenuation features to provide storage in extreme storm events. This provides the minimum of two treatment storage stages which is in accordance with the recommendations of CIRIA C753. All surface water drainage systems will be designed to restrict drainage discharge rates to QBAR runoff rates and store the balance of water for all events up to and including the 1 in 100-year event including an allowance for a 40% increase in rainfall intensities as a result of climate change and urban creep.

9.4 Summary

9.4.1 This FRA demonstrates that the proposed development complies with national and local planning policy with respect to flood risk and drainage. The risk of flooding is adequately managed, and, with the implementation of a suitable surface water drainage strategy, the offsite flood risk is not increased



Appendices



Appendix A - Plans

Southern Allotment GA Plan

PLANTING NOTES

GENERAL

- Plant material to conform to the National Plant Specification. All plant stock to originate from within the UK. Plant handling and planting operations to be in accordance with HTA 'Handling and Establishing Landscape Plants', Parts I-III.
- Topsoil for planting and amenity grass areas to be fertile with maximum 35% clay content and 5% minimum organic content, pH 5.8 - 7.5 and to be free of perennial weeds, weed seeds and contamination. Maximum stone content 20% (20mm+ particle size), maximum size of stones 50mm in any direction. Existing topsoil to be ameliorated and/or screened if necessary to achieve this specification. Imported topsoil to be to BS 3882: Multi Purpose Grade, from an approved source, and to accord with the above specification.
- Excess topsoil excavated from haul road/paths to be distributed on plots (subject to accordance with above specification).
- Existing vegetation within allotment site to be felled and roots mechanically removed as required. Herbicide application required.

TREE PLANTING

- Extra Heavy Standards- Planted in pits approximately 1200x1200x900mm, backfilled with excavated subsoil/topsoil to replicate adjacent soil profile mixed with 120g 'Sierrablen Flora' slow release fertiliser. Supported by double stake and adjustable tree tie and base of trunk protected with spiral rabbit guards.
- All standard trees are to be fitted with 'Greenleaf' 'Root-rain Urban' irrigation pipe and inlet, or similar approved, size as appropriate.
- No trees are to be planted within 3m of sewers or services (or other easement recommended by the relevant statutory undertaker) without the use of tree root barriers, eg. 'Greenleaf' Reroot 600 /100 placed between the tree and services. Contractor to ascertain the location of all sewers and services prior to tree planting.

WOODLAND PLANTING

PREPARATION:

- Planting to be undertaken into existing in-situ topsoil.
- Existing crops to be removed. Topsoil/subsoil to be cultivated/ripped to a depth of 500mm to relieve compaction.

PLANTING:

- All plant material to be of UK origin.
- The roots of bare-root plants must be kept covered at all times, to prevent them drying out. Keep small bare-root plants completely within a polythene sack until the moment of planting.
- Refer to matrixes and schedules from planting arrangements and mixes (dwg L04).
- Transplants- Notch planted or pit planted depending on soil conditions and size of roots with 30g 'Sierrablen Flora' slow release fertiliser. Ensure notch is large enough to accommodate roots without bending or breaking. Plant at the same depth transplant was growing at previously. All plants to be fitted with tree/shrub shelters, securely staked and with full ground contact.
- Planting to be carried out late October to late March, on a mild, damp day. Avoid days with frost or strong, drying winds.
- Water immediately after planting.
- Undertaken chemical weeding of an area of 1m diameter around each plant immediately after planting. Ensure herbicide application is carried out by a suitably trained person, only in periods of low winds, and with careful directional application to ensure no spray drift. Observe all precautions recommended by the manufacturer and remove containers from site immediately they have been emptied or are no longer required
- Area to be protected by rabbit/deer proof fencing (with pedestrian access gates for maintenance).

HEDGE PLANTING

- Hedge beds to have a minimum depth of 450mm topsoil over 150mm broken up ground with all stones over 50mm removed.
- Apply a suitable peat free organic compost, 50mm depth even coverage and incorporate into topsoil during cultivation operations, to a minimum depth of 150mm. Compost source and sample to be approved.
- Transplants- Notch planted or pit planted depending on soil conditions and size of roots with 30g 'Sierrablen Flora' slow release fertiliser. Ensure notch is large enough to accommodate roots without bending or breaking. Plant at the same depth transplant was growing at previously. All plants to be fitted with tree/shrub shelters, securely staked and with full ground contact.
- All hedge beds to be mulched with matured coniferous bark, with an even particle size between 15 - 65mm, to a minimum depth of 75mm over weed free soil after completion of all planting and watering operations. Mulch to be free of pests, diseases, fungus and weeds, and with no fines or dust. Mulch source and sample to be approved.

GRASS AREAS

- Grass areas are to have a minimum depth of 150mm topsoil brought to a fine tilth all stones over 40mm, in any direction removed. Areas should be uniformly firmed. Seeding to be low maintenance species rich grass mix e.g. DLG SFG (Species Rich Grass) mix sown at 25kg/ha.

WILDFLOWER MEADOW WETLAND

- Ground Preparation.** Endeavour to select ground that is not highly fertile and does not have a problem with perennial weeds. Good preparation is essential to success so aim to control weeds and produce a good quality seed bed before sowing.
- To prepare a seed bed first remove weeds using repeated cultivation. Then plough or dig to bury the surface vegetation, harrow or rake to produce a medium tilth, and roll, or tread, to produce a firm surface.
- Sourcing and preparation.** Wildflower mix shall be Emorsgate EM8. Sowings on ground prone to winter flooding are safest either in the early autumn or in spring once the land has drained. Most plants need time to grow mature enough to withstand flooding.
- The seed must be surface sown and can be applied by machine or broadcast by hand. To get an even distribution and avoid running out, divide the seed into two or more parts and sow in overlapping sections. Do not incorporate or cover the seed but firm in with a roll, or by treading, to give good soil/seed contact.
- First year management.** Most of the sown meadow species are perennial and are slow to establish. Soon after sowing there will be a flush of annual weeds, arising from the soil seed bank. These weeds can look unsightly, but they will offer shelter to the sown seedlings, are great for bugs, and they will die before the year is out. So resist cutting the annual weeds until mid to late summer, especially if the mixture contains Yellow Rattle, or has been sown with a nurse of cornfield annuals. Then cut, remove and compost the cuttings. This will reveal the young meadow, which can then be kept short by grazing or mowing through to the end of March of the following year. Dig out any residual perennial weeds such as docks. Amenity grass: April to October

TIMES OF YEAR FOR PLANTING

- Deciduous trees and shrubs: Late October to early March (subject to ground conditions and temperature)
- Container grown plants: At any time if ground and weather conditions are favourable
- Amenity grass: April to October

TREES

Qty	Abbv	Trees	Size /girth	Notes
8	Ac ca	(EHS)Acer campestre	14-16 cm	RB/ clear stem 2m

CODE	SPECIES	COMMON NAME	DESCRIPTION	SPECIFICATION	ROOTSTOCK	EVENTUAL HEIGHT/SPREAD	DWARF VARIETY	BERKSHIRE VARIETY	SELF FERTILE	SUITABLE POLLINATOR IF REQUIRED	NUMBER
Md'BO'	Malus domestica 'Blenheim Orange'	Blenheim Orange Dual Purpose Apple	Blenheim Orange is a classic English dual purpose apple useful for dessert and culinary purposes	2 year Bush-Trained 12L Pot Grown	M26	2-3m After 10 Years	N	Y	N	Md'G' or Md'CR'	1
Md'G'	Malus domestica 'Greensleeves'	Greensleeves Apple	Greensleeves is the result of an interesting experiment, crossing the crisp sweet flavours of Golden Delicious with the juicy acidity of the famous 'Scottish apple variety, James Grieve	2 year Bush-Trained 12L Pot Grown	M26	2-3m After 10 Years	N	N	Partially	Md'CR'	1
Pa'L'	Prunus avium 'Lapins'	Lapins Cherry	Lapins is a large dark red juicy cherry with a mild sweet/sharp flavour, and will appeal to those who like cherries but prefer a milder flavour	2 year Bush-Trained 11.5L Pot Grown	Gisela 5	2-3m After 10 Years	N	N	Y	NOT REQUIRED	1
Pc'C'	Pyrus communis 'Conference'	Conference Pear	Conference is a popular and reliable English pear well suited to the UK climate	2 year Bush-Trained 11.5L Pot Grown	Quince Eline	2-3m After 10 Years	N	Y	Y	NOT REQUIRED	1

ROOTSTOCK KEY

Nons

Plant not grafted onto rootstock

M26

M26 is a good general purpose rootstock, which can be used for a wide variety of purposes, from medium-sized bush trees, to cordons and espaliers. Used where you want a smaller tree, although vigour increases in warmer climates. Tree may require permanent stake.

Gisela 5

Gisela 5 has quickly established itself as the rootstock of choice for gardeners who want a cherry tree with manageable proportions. It produces a tree about 3m / 10ft tall after 5 years or so roughly equivalent to the apple M26 rootstock, and about 50% the size of a "standard" cherry tree on seedling rootstock. Cherry trees on Gisela 5 cannot support themselves so you will need a 2m permanent stake or other means of support.

Quince Eline

Eline is a new quince rootstock which can be used for pears and quinces, with similar vigour and architecture to Quince C. It was developed in the 1950s in the Netherlands, primarily to provide improved cold hardiness over the widely planted Quince C rootstock. Trees grafted on Quince Eline have a somewhat more erect habit than the same varieties grafted on Quince C or Quince A. Quince Eline also seems to reduce the extent of russetting on Conference, which is important for commercial growers

SELF FERTILITY KEY

N

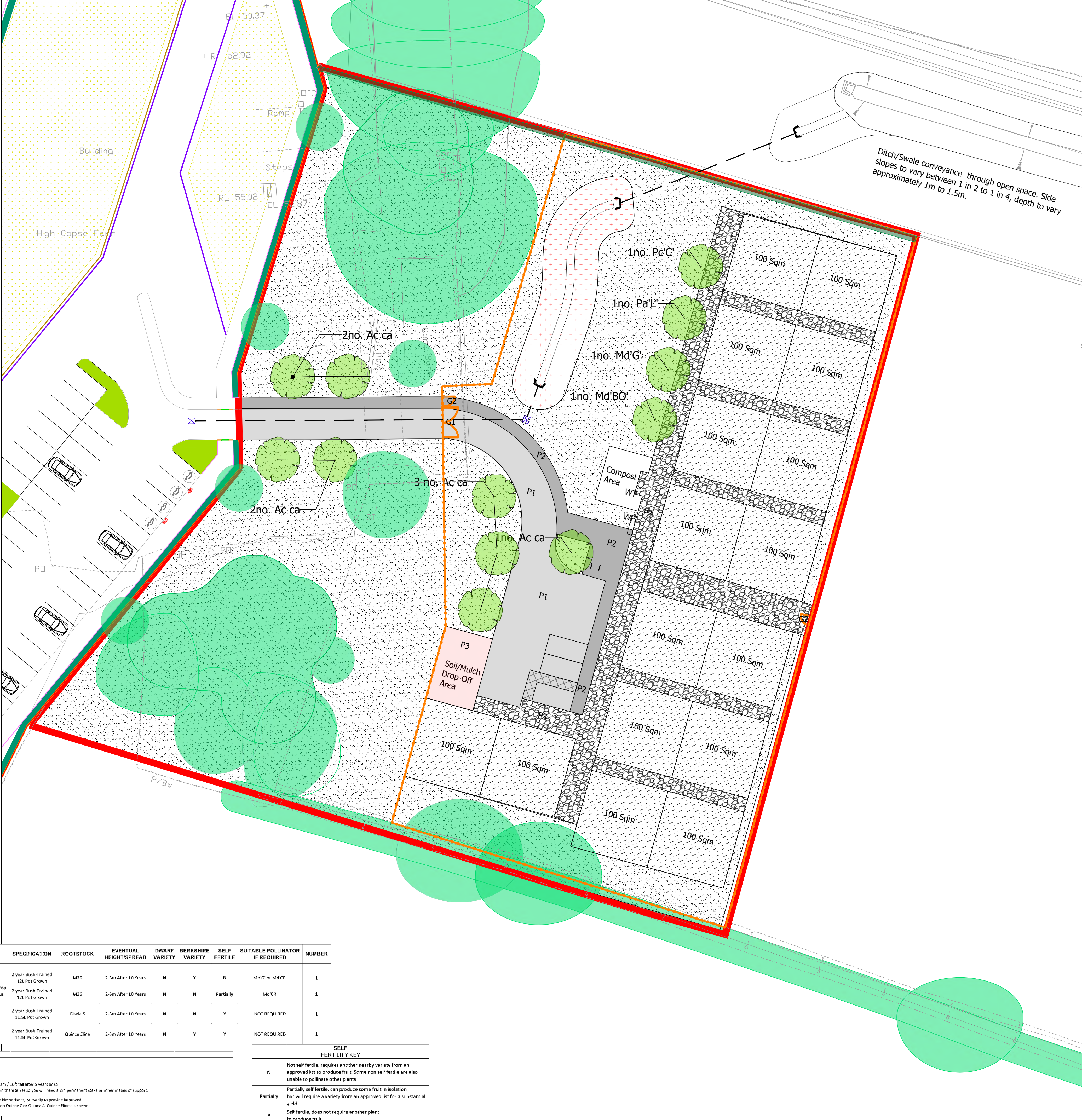
Not self fertile, requires another nearby variety from an approved list to produce fruit. Some non self fertile are also unable to pollinate other plants.

Partially

Partially self fertile, can produce some fruit in isolation but will require a variety from an approved list for a substantial yield

Y

Self fertile, does not require another plant to produce fruit



The scaling of this drawing cannot be assured

RevisionDateDmCkd

LEGEND

Application Boundary 6300 Sqm (0.63 Ha)

Landscape Scope of Works Boundary

Woodland Buffer

SOFT LANDSCAPE

Proposed trees

Existing tree to be retained with root protection zone

Emorsgate EH1 hedgerow mixture

Emorsgate EM8 Meadow mixture for wetlands

Community allotments

Proposed native hedge

HARD LANDSCAPE

P1 - Roads
Black bituminous material

P2 - Pedestrian Routes
Black bituminous material

P3 - Compacted MOT base with grass seeded surface (allotments haulage road)

Paladin fence (green) to allotments, 1.8m high, with matching lockable gates

STREET FURNITURE

Double leaf metal gate to match Bulmershe Pavilion

Single gate to match Paladin Fence F1

Cycle hoop, 1100x770mmx Dia 48mm, Mild steel hot dipped galvanised, root fixed below ground to engineers specification

Water Point

Water Trough: Galvanised Steel Allotment Dip Tank 1.8m x 0.6m
Supplier: City Irrigation or similar approved.

Project

University of Reading

Drawing Title

Southern Allotment GA Plan

Date

13.08.24

Scale

1:250

Drawn by

BA

Check by

DS

Project No

333101011

Drawing No

RG-LD-94

Revision

C

04m

Stantec

Stantec UK Limited

10th Floor

Bank House

8 Cherry Street

Birmingham

B2 5AL

T: 0121 633 2900

stantec.com\uk

Reproduced from the Ordnance Survey Map with the permission of the Controller of HMSO. Crown Copyright Reserved. Licence No. 100019279.

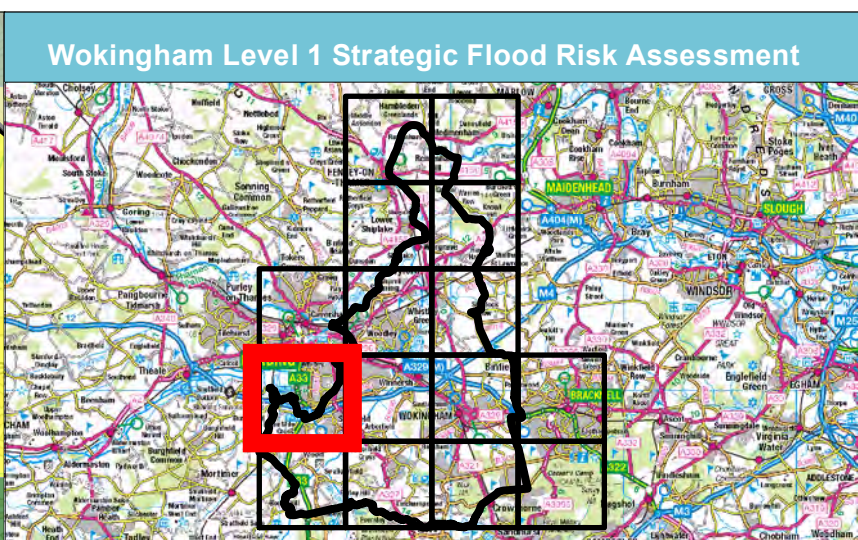
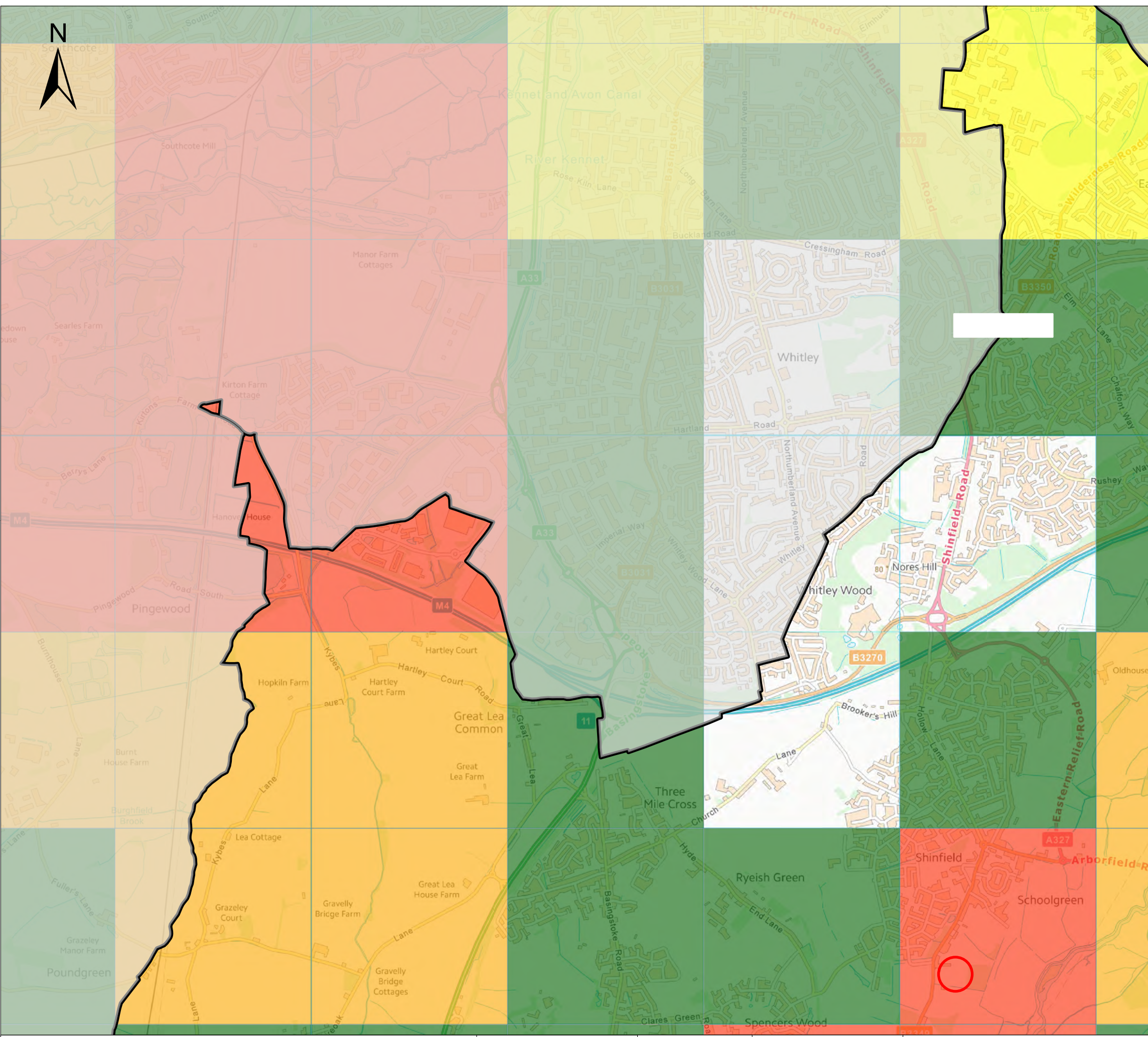
U:\333101011\4 - Drawings & Registers\Landscape\333101011-RG-LD-94B Shinfield Allotment GA.dwg - 01



Appendix B - SFRA Documents

WBC Groundwater Susceptibility Mapping

WBC Groundwater Emergence Mapping



Wokingham Level 1 Strategic Flood Risk Assessment

Legend

- Wokingham Borough Council boundary
- Watercourses**

Main Rivers

All Watercourses
- Fluvial Flood Zones**

Indicative Flood Zone 3b

Flood Zone 3b

Flood Zone 3a

Flood Zone 2
- Fluvial Flood Extent with Climate Change**

1% AEP with Central Climate Change allowance

1% AEP with Higher Central Climate Change allowance
- Risk of Flooding from Surface Water**

Surface Water Extent

3.3% AEP

1% AEP

0.1% AEP
- Surface Water Extent plus climate change**

3.3% AEP plus 35% Climate Change

1% AEP plus 40% Climate Change
- Risk of Groundwater Flooding**

EA Areas Susceptible to Groundwater Flooding

< 25%

>= 25% < 50%

>= 50% < 75%

>= 75%
- JBA Groundwater Emergence Map (5m Resolution)

Depth below ground surface

Less than 0.025m below surface

Between 0.025m - 0.5m below surface

Between 0.5m - 5m below surface

At least 5m below surface

No risk
- Risk of Flooding from Reservoirs**

Wet Day

Dry Day
- Flood Defences**

Demountable Defence

Embankment

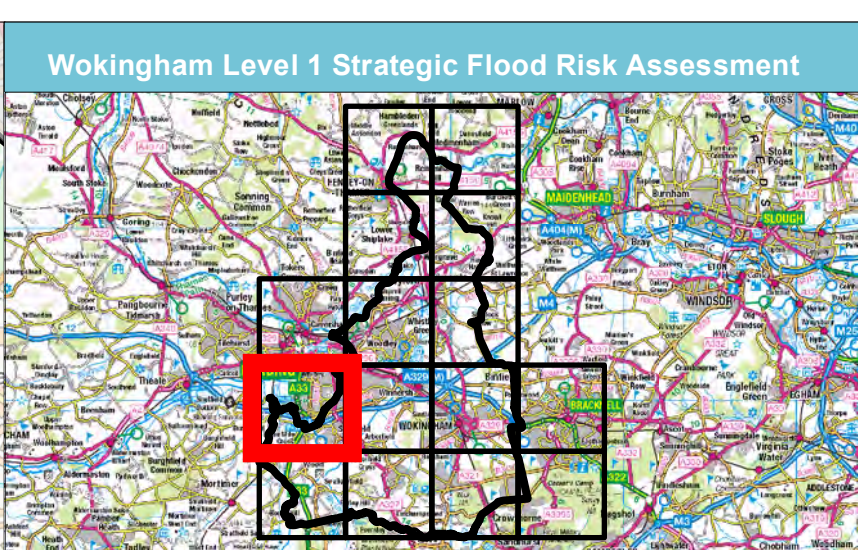
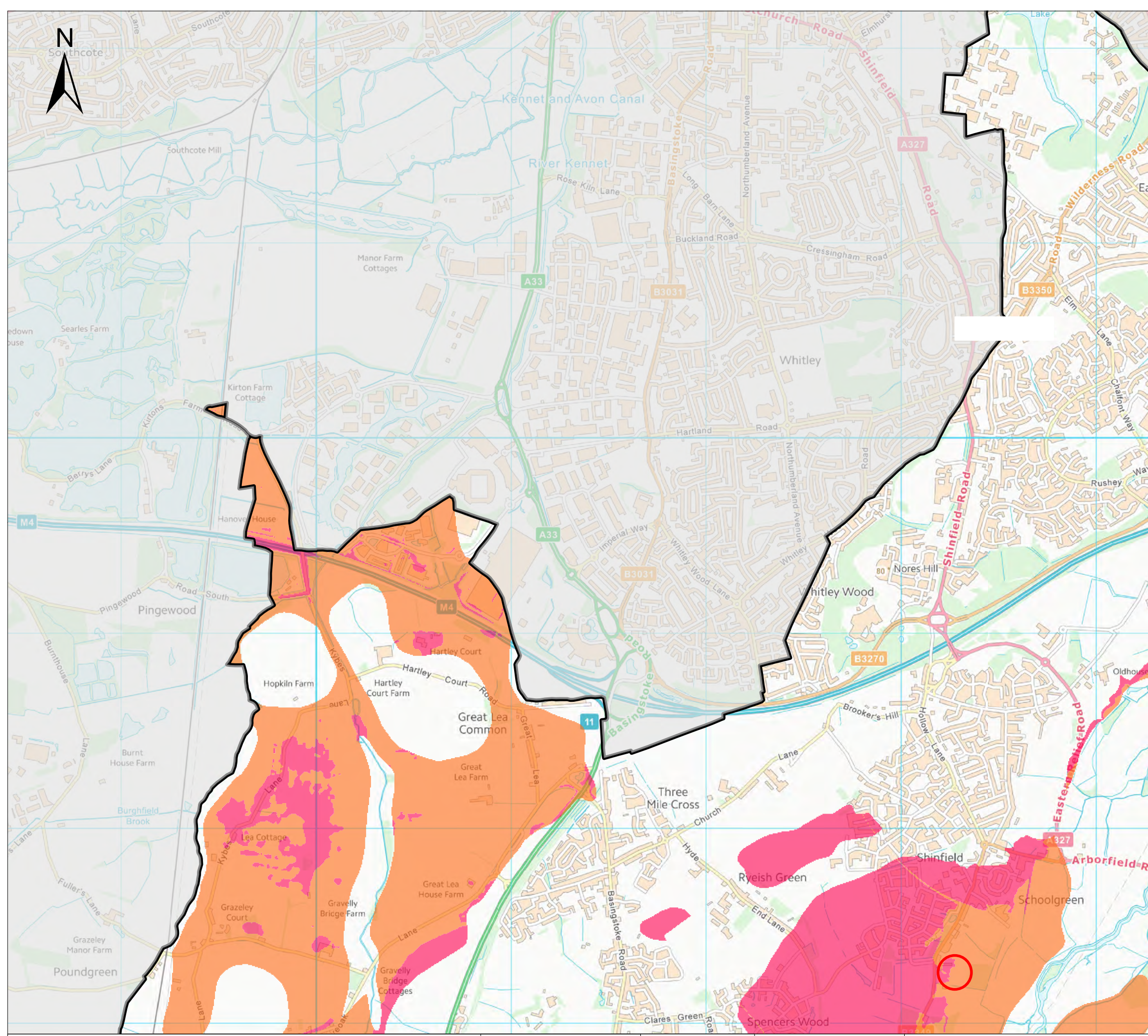
Wall

Natural High Ground
- Flood Mitigation**

Flood Alert Areas

Flood Warning Areas
- Flood History**

EA Historic Flood map



Legend

Wokingham Borough Council boundary

Watercourses

- Main Rivers
- All Watercourses

Fluvial Flood Zones

- Indicative Flood Zone 3b
- Flood Zone 3b
- Flood Zone 3a
- Flood Zone 2

Fluvial Flood Extent with Climate Change

- 1% AEP with Central Climate Change allowance
- 1% AEP with Higher Central Climate Change allowance

Risk of Flooding from Surface Water

Surface Water Extent

- 3.3% AEP
- 1% AEP
- 0.1% AEP

Surface Water Extent plus climate change

- 3.3% AEP plus 35% Climate Change
- 1% AEP plus 40% Climate Change

Risk of Groundwater Flooding

EA Areas Susceptible to Groundwater Flooding

- < 25%
- >= 25% < 50%
- >= 50% < 75%
- >= 75%

JBA Groundwater Emergence Map (5m Resolution)

Depth below ground surface

- Less than 0.025m below surface
- Between 0.025m - 0.5m below surface
- Between 0.5m - 5m below surface
- At least 5m below surface
- No risk

Risk of Flooding from Reservoirs

- Wet Day
- Dry Day

Flood Defences

- Demountable Defence
- Embankment
- Wall
- Natural High Ground

Flood Mitigation

- Flood Alert Areas
- Flood Warning Areas

Flood History

- EA Historic Flood map

Contains Environment Agency information © Environment Agency and/or database right Reproduced from Ordnance Survey map with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office. © Crown copyright. (2023) Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings.

This document is the property of Jeremy Benn Associates Ltd. It shall not be reproduced in whole or in part, nor disclosed to a third party, without the permission of Jeremy Benn Associates Ltd.

0 250 500 M

Page: D1

IDT-JBAU-XX-XX-MP-HM-0002-GeoPDF_D1

Notes
Please see the accompanying user guide of the SFRA report for further guidance on the sources of data included within the map. This map should be opened using Adobe Acrobat Reader.



Appendix C - LLFA Checklist

Wokingham Borough Council Checklist

Minor Development Full Application

For a full planning application it must include the following information and details on the proposed drainage strategy and system.

WBC to provide any additional requirements to the following.

Ref.	Detail required	Requirement met/included
	Full design calculations and design parameters to demonstrate conformity with the design criteria for the site. This should be a calculation pack for the following storm events: ■ 1:1 year ■ 1:30 year ■ 1:100 year ■ 1:100 year with climate change The calculations should be able to be easily referenced to appropriate drawings of the drainage system with pipe and manhole references and clearly labelled storage and conveyance features (basins, swales, tanks etc.)	Included in Appendix D of the FRA and Drainage Strategy Report A2243-R012 FRA+DS
	Suitable Construction Details. ■ Cross sections of storage and conveyance features that form part of the drainage system. ■ Typical details of inlets, outlets, manhole chambers, flow control structures and any proprietary devices to be used in the drainage system	Included in Appendix D of the FRA and Drainage Strategy Report A2243-R012 FRA+DS
	Plan of proposed drainage system with catchment areas including: ■ Sub-catchments within the site ■ Impermeable areas ■ Phasing ■ The proposed 'management train' and total land take ■ Location and type of source control measures ■ Site control measures ■ Conveyance and exceedance routes ■ The destination of runoff with clearly defined outfall locations ■ Any surface water/groundwater flow routes entering the development from adjacent land.	Included in Appendix D of the FRA and Drainage Strategy Report A2243-R012 FRA+DS
	Details of connections (including flow control devices) to watercourses, sewers, public surface water sewers, highway drains and SuDS.	Included in Appendix D of the FRA and Drainage Strategy Report A2243-R012 FRA+DS
	Details of any offsite works required, together with any necessary consents.	Not Applicable
	Operational characteristics of any mechanical features including maintenance and energy requirements.	Not Applicable
	Plan demonstrating sub-catchments for the 1 in 100 year storm when the system is at capacity and demonstrating flow paths for exceedance.	Not Applicable

	Access arrangements for maintenance of all aspects of the proposed drainage systems.	Included in Appendix D of the FRA and Drainage Strategy Report A2243-R012 FRA+DS
	Management plan for operation and maintenance of the drainage system which provides: ■ Details of which body will be responsible for operating and maintenance for individual aspects of the drainage proposals ■ A management statement to outline the management goals for the site and required maintenance ■ Description of maintenance schedule and materials and tools needed ■ A maintenance schedule ■ Legal agreements to ensure the continued operation and maintenance of the drainage system for the lifetime of the development. A site plan including access points, easements and outfalls	Included in the FRA and Drainage Strategy Report A2243-R012 FRA+DS
	Health and safety plan, if appropriate, considering all potential health and safety risks posed by the proposed drainage system including but not limited to areas of open water, confined spaces, and steep slopes.	Not Applicable
	Ground investigation, including infiltration test results, where appropriate. These investigations should account for: ■ The presence of constraints that must be considered prior to planning infiltration SuDS ■ The drainage potential of the ground ■ Potential for ground instability when water is infiltrated ■ Potential for deterioration in groundwater quality as a result of infiltration This information is available via the British Geological Survey, by contacting enquiries@bgs.ac.uk. Evidence of infiltration tests, particularly at the location of any intended infiltration device, and groundwater level monitoring is also required.	Included in the overarching FRA and Drainage Strategy Report as part of the Outline Application
	Assessment of the potential water quality impact of the proposed development and how the drainage system will perform to ensure that there are no detrimental impacts on the water quality of the receiving water body. This should include a description of how appropriate use of the management train principles has been used to deliver water quality benefits and prevent pollution of receiving waterbodies. If the proposed destination of discharge is the ground, appropriate consideration should be given to potential contamination and an assessment made to ensure pollutants are not mobilised that may contaminate groundwater.	Included in the FRA and Drainage Strategy Report A2243-R012 FRA+DS
	Confirmation of land ownership of all land required for drainage and relevant permissions.	Met



Appendix D - Drainage Documentation

Greenfield Runoff Rate Estimation

Greenfield Volume

Computational Drainage Calculations (FLOW) – 100%,50%,3.3%,1%,1% AEP plus 40%CC

Drainage Strategy Drawing

Construction Details Drawing

Calculated by:	Leigh Abley
Site name:	A243 Shinfield Northern Pitches
Site location:	Shinfield, Wokingham

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013), the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Site Details

Latitude:	51.39978° N
Longitude:	0.95709° W
Reference:	791831717
Date:	Aug 07 2023 10:01

Runoff estimation approach

IH124

Site characteristics

Total site area (ha):	1
-----------------------	---

Methodology

Q _{BAR} estimation method:	Calculate from SPR and SAAR
SPR estimation method:	Calculate from SOIL type

Notes

(1) Is Q_{BAR} < 2.0 l/s/ha?

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

Soil characteristics

	Default	Edited
SOIL type:	4	4
HOST class:	N/A	N/A
SPR/SPRHOST:	0.47	0.47

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

Hydrological characteristics

	Default	Edited
SAAR (mm):	649	649
Hydrological region:	6	6
Growth curve factor 1 year:	0.85	0.85
Growth curve factor 30 years:	2.3	2.3
Growth curve factor 100 years:	3.19	3.19
Growth curve factor 200 years:	3.74	3.74

(3) Is SPR/SPRHOST ≤ 0.3?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

Greenfield runoff rates

Default

Edited

Q_{BAR} (l/s):	4.42	4.42
1 in 1 year (l/s):	3.76	3.76
1 in 30 years (l/s):	10.16	10.16
1 in 100 year (l/s):	14.1	14.1
1 in 200 years (l/s):	16.53	16.53

This report was produced using the greenfield runoff tool developed by HR Wallingford and available at www.uksuds.com. The use of this tool is subject to the UK SuDS terms and conditions and licence agreement , which can both be found at www.uksuds.com/terms-and-conditions.htm. The outputs from this tool are estimates of greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, CEH, Hydrosolutions or any other organisation for the use of this data in the design or operational characteristics of any drainage scheme.

Greenfield Volume

50% AEP

Pre-development discharge

Site Makeup	Greenfield
Greenfield Method	FSR/FEH
Positively Drained Area (ha)	0.637
Soil Index	4
SPR	0.47
Catchment Wetness Index	94.560
Return Period (years)	2
Climate Change (%)	0
Storm Duration (mins)	360
Betterment (%)	0
	Calc
PR	0.394
Runoff Volume (m³)	60

3.3% AEP

Pre-development discharge

Site Makeup	Greenfield
Greenfield Method	FSR/FEH
Positively Drained Area (ha)	0.637
Soil Index	4
SPR	0.47
Catchment Wetness Index	94.560
Return Period (years)	30
Climate Change (%)	0
Storm Duration (mins)	360
Betterment (%)	0
	Calc
PR	0.423
Runoff Volume (m³)	146

1% AEP

Pre-development discharge

Site Makeup	Greenfield
Greenfield Method	FSR/FEH
Positively Drained Area (ha)	0.637
Soil Index	4
SPR	0.47
Catchment Wetness Index	94.560
Return Period (years)	100
Climate Change (%)	0
Storm Duration (mins)	360
Betterment (%)	0
	Calc
PR	0.440
Runoff Volume (m³)	191

Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	2	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	1.000	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	550.0		

Nodes

Name	Area (ha)	T of E (mins)	Add Inflow (l/s)	Cover Level (m)	Easting (m)	Northing (m)	Depth (m)
Basin/Swale	0.000	5.00		100.000	0.350	57.628	0.884
PP	0.064	5.00	3.5	100.000	-1.565	57.806	0.530

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	PP	Basin/Swale	85.000	0.600	99.470	99.116	0.354	240.1	300	6.40	51.3

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	1.010	71.4	15.4	0.230	0.584	0.064	3.5	94	0.809

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	85.000	240.1	300	Circular	100.000	99.470	0.230	100.000	99.116	0.584

Link	US Node	Node Type	DS Node	Node Type
1.000	PP	Junction	Basin/Swale	Junction

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Connections	Link	IL (m)	Dia (mm)
Basin/Swale	0.350	57.628	100.000	0.884	1 	1.000	99.116	300
PP	-1.565	57.806	100.000	0.530	0 	1.000	99.470	300

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Starting Level (m)	
Rainfall Events	Singular	Skip Steady State	x	Check Discharge Rate(s)	x
Summer CV	1.000	Drain Down Time (mins)	240	Check Discharge Volume	x
Winter CV	1.000	Additional Storage (m³/ha)	0.0		

Storm Durations

15	60	180	360	600	960	2160	4320	7200	10080
30	120	240	480	720	1440	2880	5760	8640	

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
2	0	0	0
30	0	0	0
100	0	0	0
100	40	0	0

Node Basin/Swale Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	98.670	Product Number	CTL-SHE-0092-3800-1000-3800
Design Depth (m)	1.000	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	3.8	Min Node Diameter (mm)	1200

Node Basin/Swale Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	98.670
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	26.1	26.1	1.330	215.0	220.7

Node PP Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	99.470
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Time to half empty (mins)	7

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	309.0	0.0	0.350	309.0	0.0	0.351	0.0	0.0

Results for 1 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
600 minute summer	Basin/Swale	435	98.943	-0.173	4.8	12.3949	0.0000	OK
120 minute summer	PP	68	99.529	0.059	7.0	5.4629	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m ³)	Discharge Vol (m ³)
600 minute summer	Basin/Swale	Hydro-Brake®		3.8				176.6
120 minute summer	PP	1.000	Basin/Swale	6.1	0.634	0.086	0.8232	

Results for 2 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
720 minute summer	Basin/Swale	525	98.993	-0.123	5.1	15.8331	0.0000	OK
60 minute summer	PP	37	99.535	0.065	10.4	6.0685	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m ³)	Discharge Vol (m ³)
720 minute summer	Basin/Swale	Hydro-Brake®		3.8				204.5
60 minute summer	PP	1.000	Basin/Swale	7.6	0.673	0.107	0.9624	

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.98%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
960 minute summer	Basin/Swale	1200	99.248	0.132	6.1	38.8428	0.0000	OK
30 minute summer	PP	21	99.577	0.107	32.4	9.9512	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m ³)	Discharge Vol (m ³)
960 minute summer	Basin/Swale	Hydro-Brake®		3.8				247.2
30 minute summer	PP	1.000	Basin/Swale	20.0	0.885	0.280	1.9226	

Results for 100 year Critical Storm Duration. Lowest mass balance: 99.95%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
2880 minute summer	Basin/Swale	3120	99.438	0.322	4.7	61.9596	0.0000	OK
30 minute summer	PP	21	99.595	0.125	41.0	11.5516	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
2880 minute summer	Basin/Swale	Hydro-Brake®		3.8				643.1
30 minute summer	PP	1.000	Basin/Swale	26.4	0.957	0.370	2.3450	

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.80%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
10080 minute summer	Basin/Swale	10080	99.545	0.429	4.2	77.2444	0.0000	OK
30 minute summer	PP	20	99.623	0.153	55.9	14.1512	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
10080 minute summer	Basin/Swale	Hydro-Brake®		3.8				2193.5
30 minute summer	PP	1.000	Basin/Swale	37.7	1.060	0.528	3.0201	



© ABLE LETCHFORD PARTNERSHIP LTD.
This drawing should not be reproduced
without consent.

- NOTES:
- 1) All measurements are in meters AOD unless otherwise stated.
 - 2) The access road and footway cover an area of 420m². The access road will provide 350mm of depth in its sub-base. The voids ratio of the gravel is 30%.
 - 3) Proposed layout based on Stantec drawing 333101011-RG-LD-94

- KEY:
- PROPOSED SURFACE WATER PIPE
 - PROPOSED PERFORATED PIPE
 - PROPOSED HEADWALL
 - EXISTING FOUL NETWORK
 - EXISTING SURFACE WATER NETWORK
 - EXISTING SWALE (11N3 SIDE SLOPES)
 - RED LINE BOUNDARY
 - EXCEEDANCE FLOW ARROW
 - PROPOSED TREE
 - EXISTING TREE
 - EXISTING RPA - BASED ON FLAC SURVEY 38-1035.01 B

Rev	Date	Description	Drawn	Checked
A	07/25	FIRST ISSUE	CS	LPA



www.ableletchford.co.uk

Client

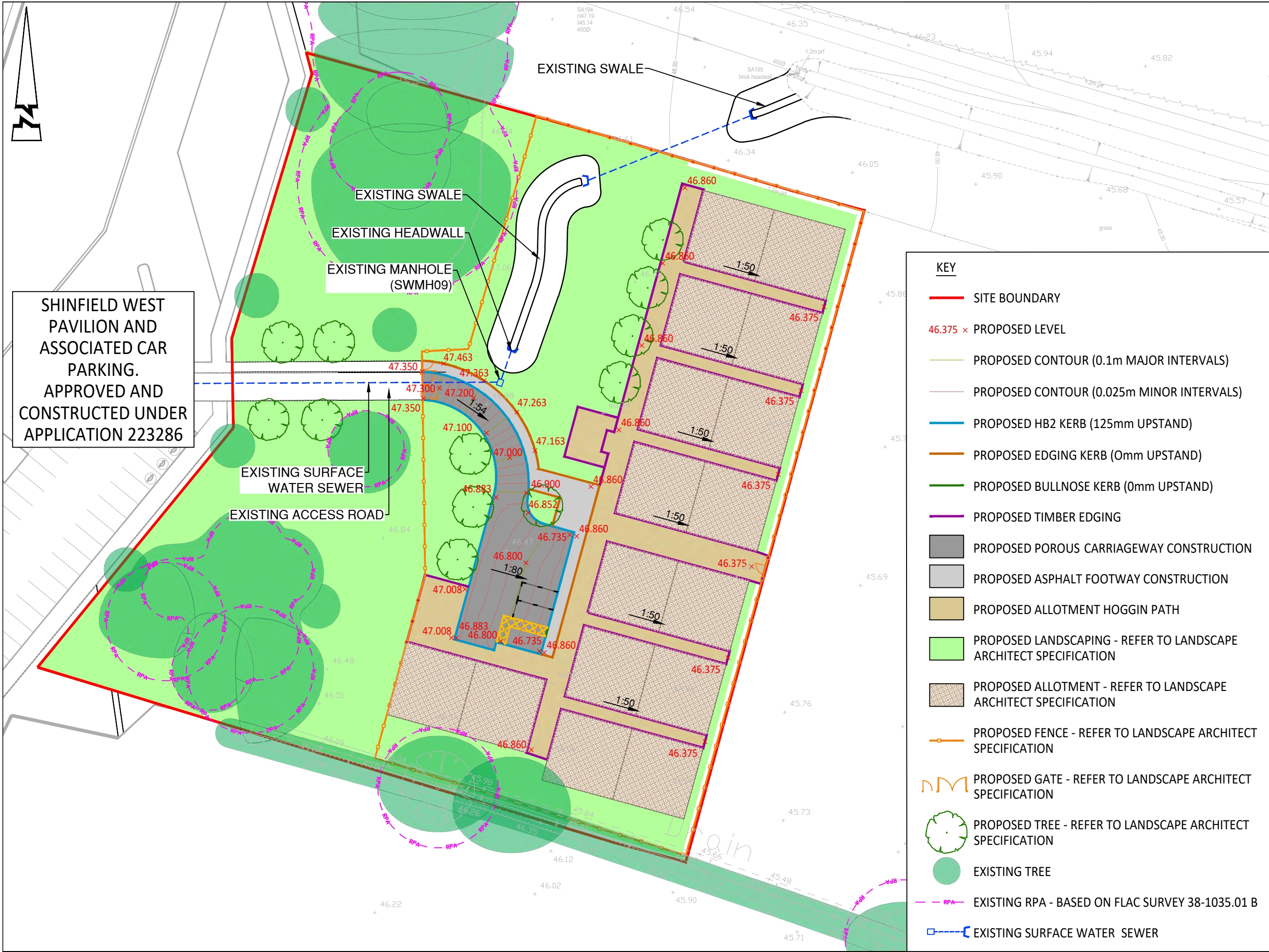
UNIVERSITY OF READING

Project
SHINFIELD WEST
SOUTHERN ALLOTMENTS

Title
PROPOSED DRAINAGE
STRATEGY

Status

Scale	Date	Drawn	Checked
1:250 @ A1	JUL 2025	CS	LPA
Drawing No	Revision		
A243-AL-501	A		



SHINFIELD WEST
PAVILION AND
ASSOCIATED CAR
PARKING.
APPROVED AND
CONSTRUCTED UNDER
APPLICATION 223286

- KEY**
- SITE BOUNDARY
 - 46.375 × PROPOSED LEVEL
 - PROPOSED CONTOUR (0.1m MAJOR INTERVALS)
 - PROPOSED CONTOUR (0.025m MINOR INTERVALS)
 - PROPOSED HB2 KERB (125mm UPSTAND)
 - PROPOSED EDGING KERB (0mm UPSTAND)
 - PROPOSED BULLNOSE KERB (0mm UPSTAND)
 - PROPOSED TIMBER EDGING
 - PROPOSED POROUS CARRIAGEWAY CONSTRUCTION
 - PROPOSED ASPHALT FOOTWAY CONSTRUCTION
 - PROPOSED ALLOTMENT HOGGIN PATH
 - PROPOSED LANDSCAPING - REFER TO LANDSCAPE ARCHITECT SPECIFICATION
 - PROPOSED ALLOTMENT - REFER TO LANDSCAPE ARCHITECT SPECIFICATION
 - PROPOSED FENCE - REFER TO LANDSCAPE ARCHITECT SPECIFICATION
 - PROPOSED GATE - REFER TO LANDSCAPE ARCHITECT SPECIFICATION
 - PROPOSED TREE - REFER TO LANDSCAPE ARCHITECT SPECIFICATION
 - EXISTING TREE
 - EXISTING RPA - BASED ON FLAC SURVEY 38-1035.01 B
 - EXISTING SURFACE WATER SEWER

© ABLE LETCHFORD PARTNERSHIP LTD.
This drawing should not be reproduced without consent.

NOTES:

- FOR LANDSCAPING DETAILS REFER TO STANTEC DRAWING: 333101011 RG-LD-94
- FOR DRAINAGE DETAILS REFER TO DRAWING A243-AL-501
- FOR CONSTRUCTION DETAILS REFER TO DRAWING A243-AL-710

Rev	Date	Description	Drawn	Checked
P1	07/25	FIRST ISSUE	CS	LPA

Abley Letchford
www.ableyletchford.co.uk

Client: **UNIVERSITY OF READING**

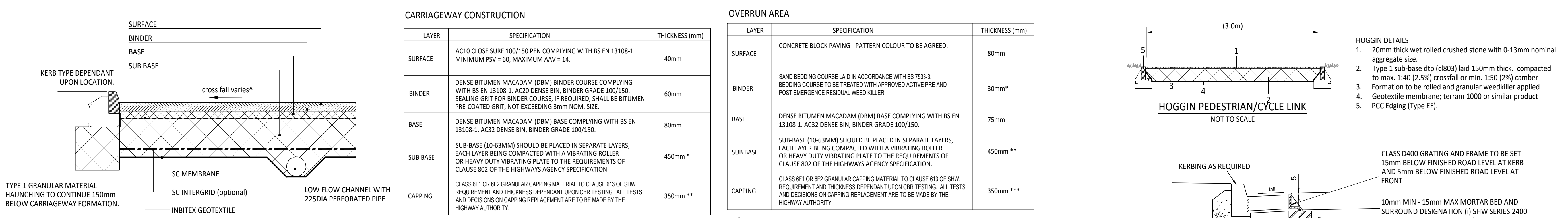
Project: **SHINFIELD WEST SOUTHERN ALLOTMENTS**

Title: **PROPOSED GENERAL, MATERIALS AND ENGINEERING LAYOUT**

Status:

Scale	Date	Drawn	Checked
1:500 @ A3	JULY 2025	CS	LPA

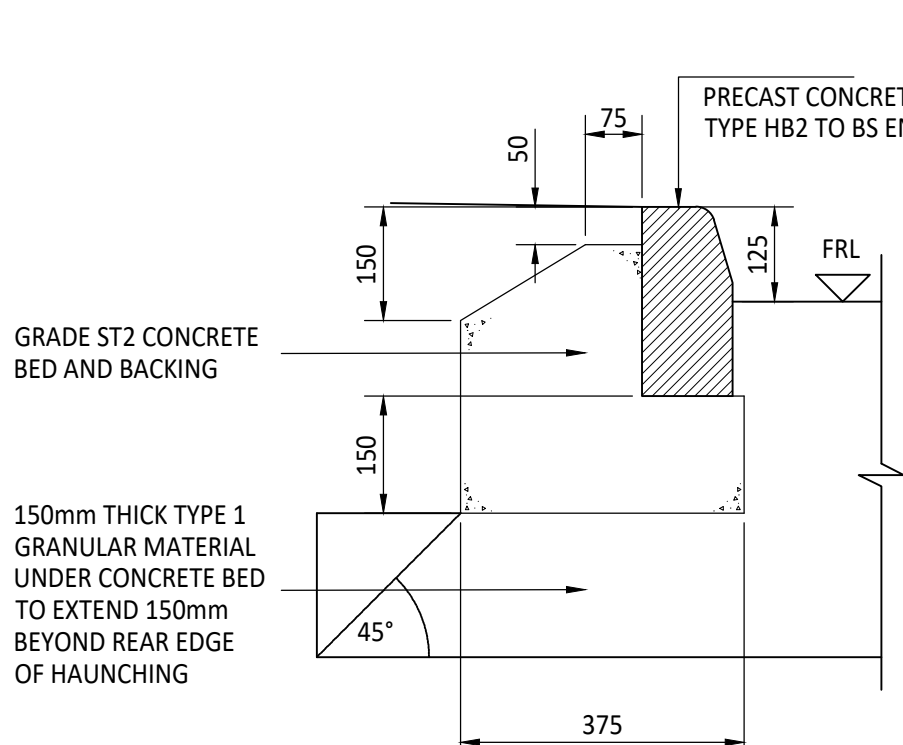
Drawing No: **A243-AL-101** Revision: **A**



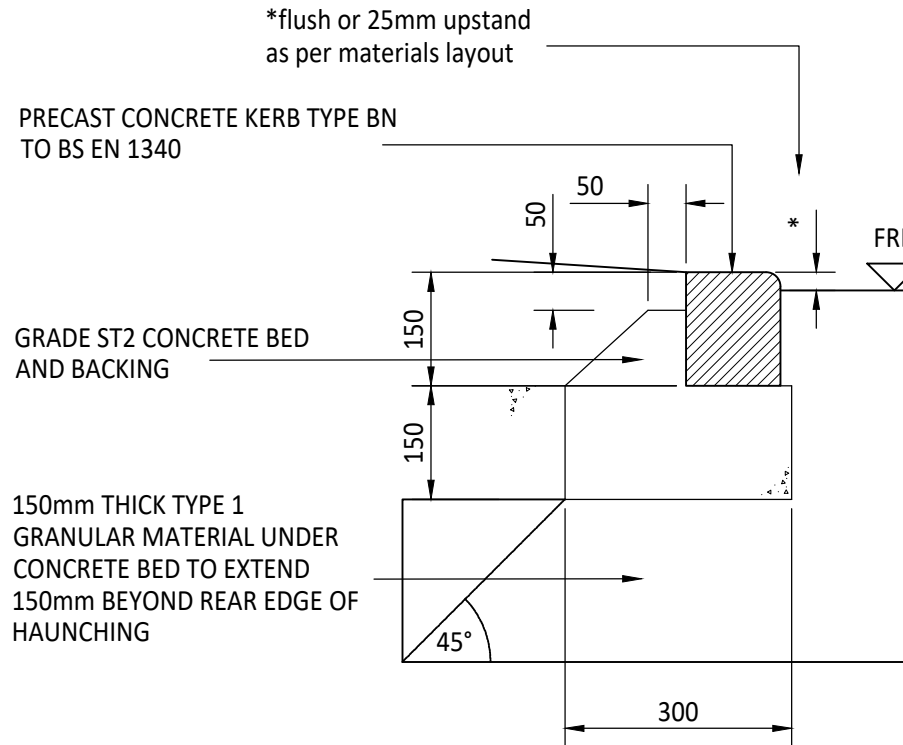
CARRIAGEWAY CONSTRUCTION
REFER TO TABLES FOR DETAILS

CARRIAGEWAY CAPPING REQUIREMENTS	
CBR OF SUB-GRADE	THICKNESS (mm)
<2%	600mm TYPE 6F1/6F2
<5%	350mm TYPE 6F1/6F2
<15%	180mm TYPE 6F1/6F2
>15%	NOT REQUIRED

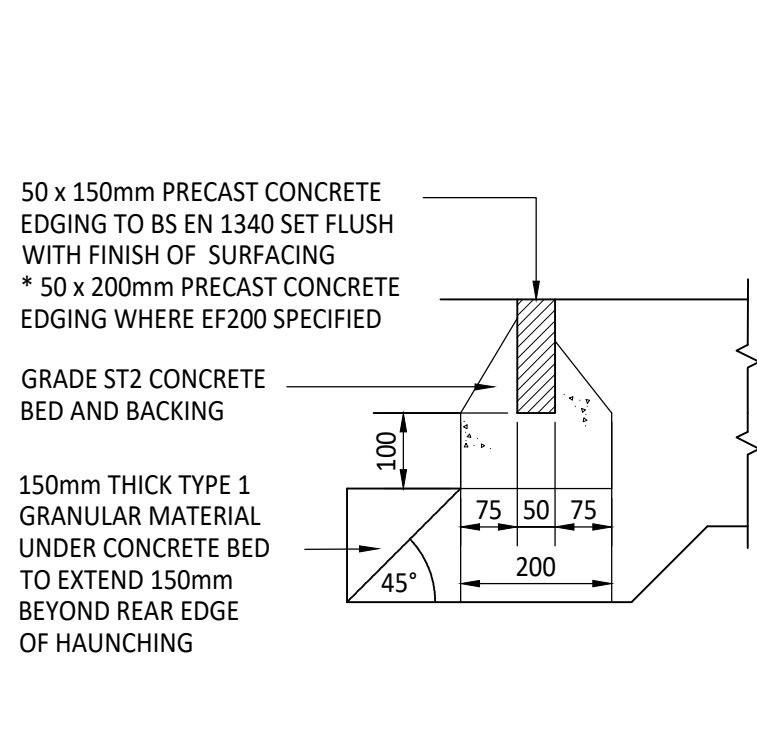
ALL THICKNESSES STATED ARE FINISHED COMPACTED THICKNESSES.
FOR FROST SUSCEPTIBLE SOILS MINIMUM CONSTRUCTION DEPTH IS 450MM.
ADDITIONAL CAPPING LAYER IS TO BE LAID BELOW THE SUB-BASE TO ACHIEVE THE OVERALL CONSTRUCTION DEPTH OF 450MM.
BASE, SUB-BASE AND CAPPING LAYERS SHOULD BE COMPACTED IN ACCORDANCE WITH DTP "SPECIFICATION FOR HIGHWAY WORKS".



STANDARD KERB TYPE HB2
SCALE 1:10



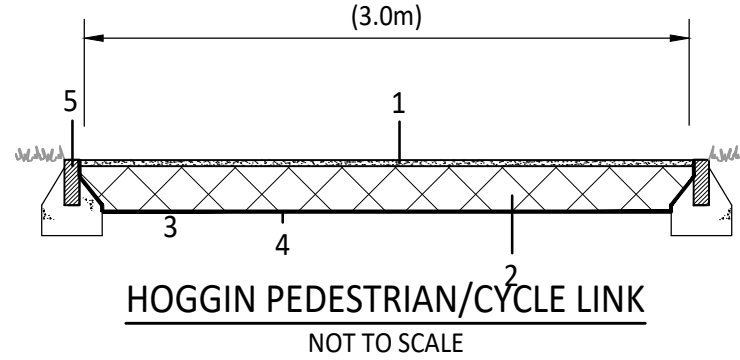
BULLNOSE KERB TYPE BN
SCALE 1:10



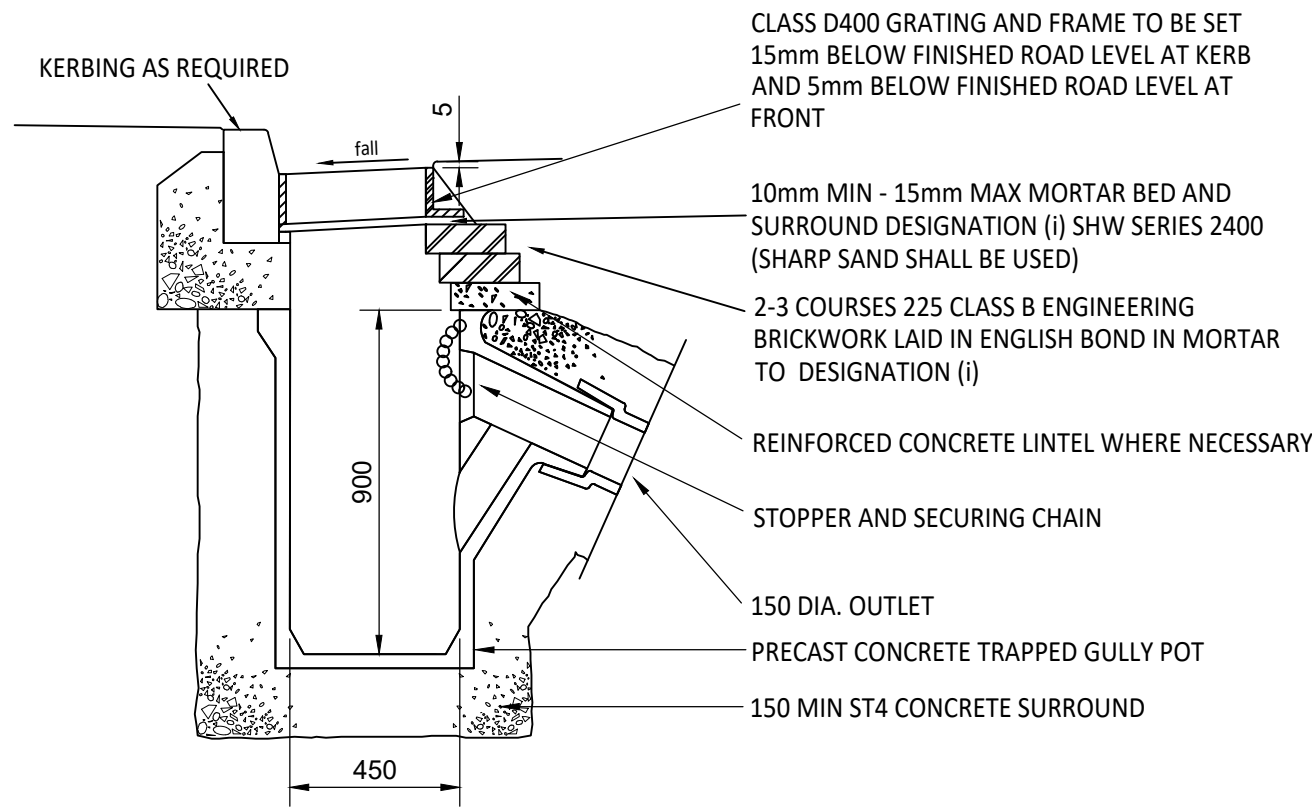
PCC EDGING TYPE EF/EF200
SCALE 1:10

LAYER	SPECIFICATION	THICKNESS (mm)
SURFACE	CONCRETE BLOCK PAVING - PATTERN COLOUR TO BE AGREED.	80mm
BINDER	SAND BEDDING COURSE LAID IN ACCORDANCE WITH BS 7533.3. BEDDING COURSE TO BE TREATED WITH APPROVED ACTIVE PRE AND POST EMERGENCE RESIDUAL WEED KILLER.	30mm*
BASE	DENSE BITUMEN MACADAM (DBM) BASE COMPLYING WITH BS EN 13108-1. AC32 DENSE BIN, BINDER GRADE 100/150.	75mm
SUB BASE	SUB-BASE (10-63MM) SHOULD BE PLACED IN SEPARATE LAYERS, EACH LAYER BEING COMPACTED WITH A VIBRATING ROLLER OR HEAVY DUTY VIBRATING PLATE TO THE REQUIREMENTS OF CLAUSE 802 OF THE HIGHWAYS AGENCY SPECIFICATION.	450mm **
CAPPING	CLASS 6F1 OR 6F2 GRANULAR CAPPING MATERIAL TO CLAUSE 613 OF SHW. REQUIREMENT AND THICKNESS DEPENDANT UPON CBR TESTING. ALL TESTS AND DECISIONS ON CAPPING REPLACEMENT ARE TO BE MADE BY THE HIGHWAY AUTHORITY.	350mm ***

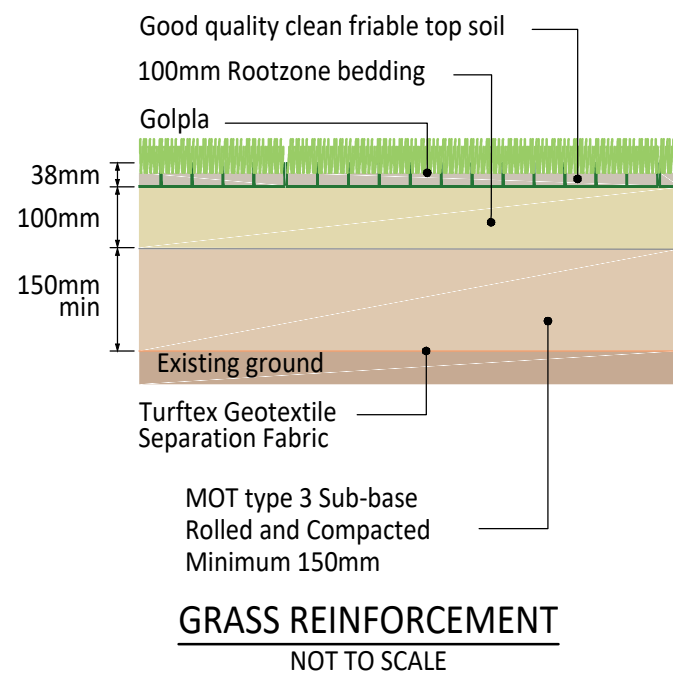
- * FINISHED COMPACTED THICKNESS.
- ** GRANULAR SUB-BASE MATERIAL SHALL COMPRISE CRUSHED GRAVEL, ROCK OR CONCRETE POSSESSING WELL DEFINED EDGES AND BE IN ACCORDANCE WITH THE LOS ANGELES COEFFICIENT CARRIED OUT TO THE REQUIREMENTS OF EN 1097-2 1998 CLAUSE 5.
- *** THE ABOVE DESIGN APPLIES WHERE THE FORMATION CBR 3% INSITU. CBR TEST TO BE CARRIED OUT BY THE CONTRACTOR AT 30m INTERVALS AND RESULTS REPORTED TO THE HIGHWAY AUTHORITY/ENGINEER.



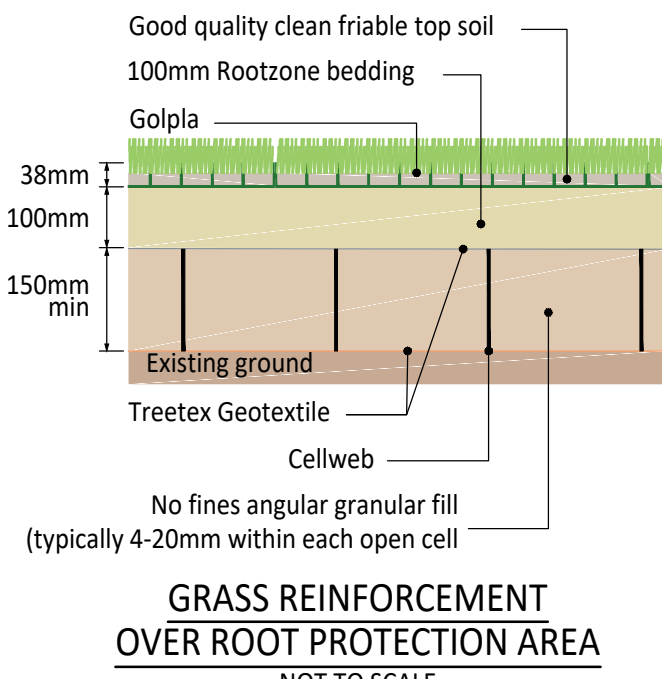
- HOGGIN DETAILS
- 20mm thick wet rolled crushed stone with 0-13mm nominal aggregate size.
 - Type 1 sub-base dtp (cl803) laid 150mm thick. compacted to max. 1:40 (2.5%) crossfall or min. 1:50 (2%) camber
 - Formation to be rolled and granular weedkiller applied
 - Geotextile membrane; terram 1000 or similar product
 - PCC Edging (Type EF).



TYPICAL TRAPPED GULLY DETAIL
SCALE 1:10



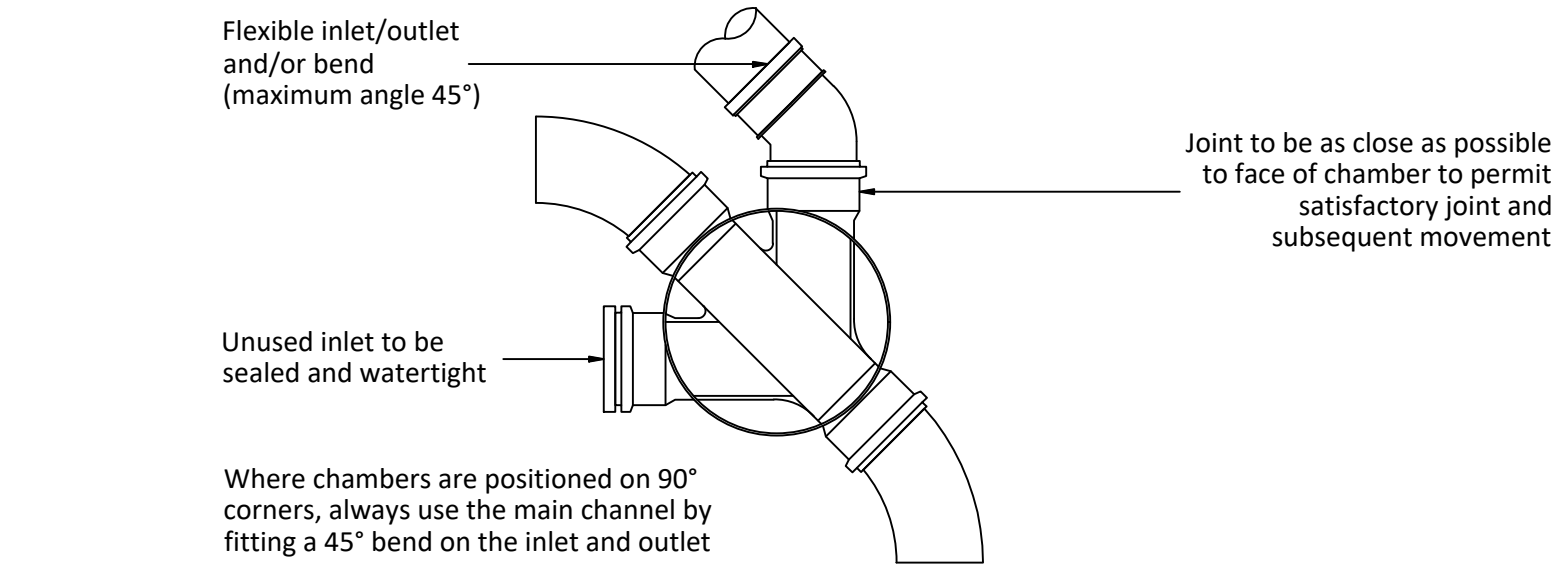
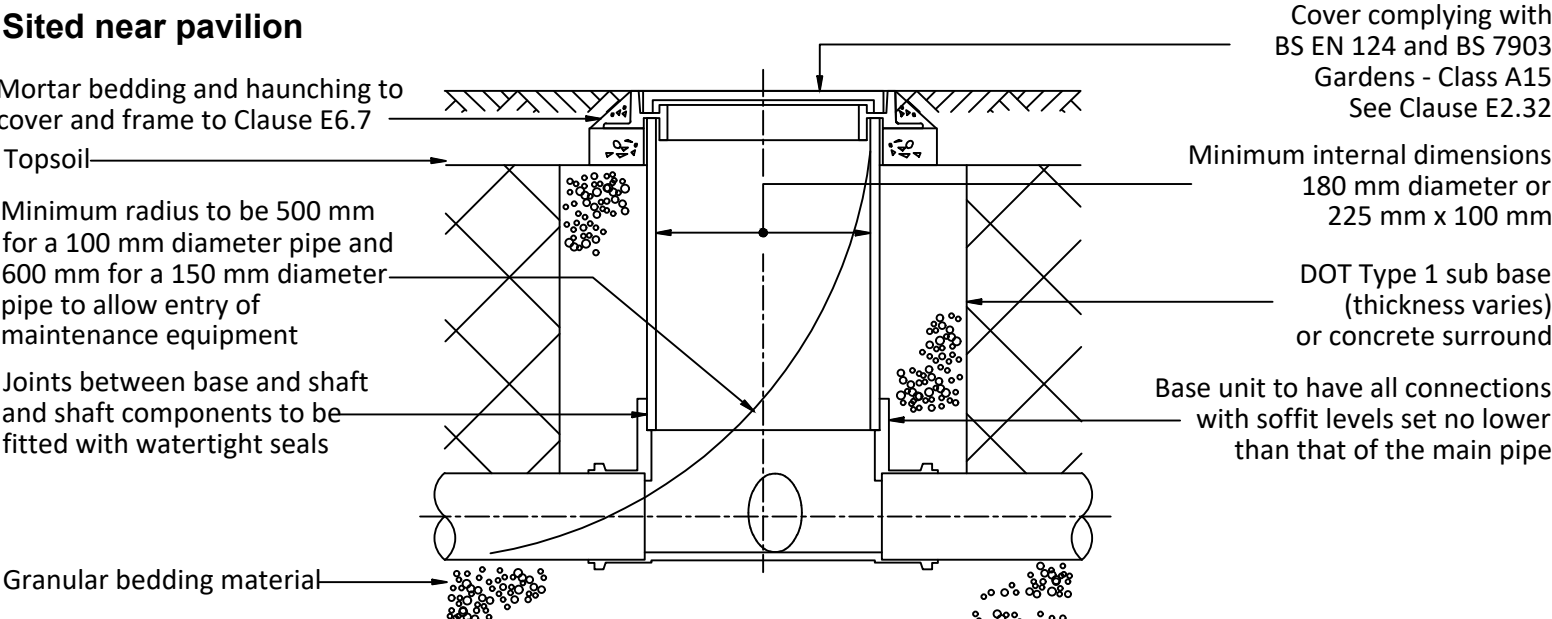
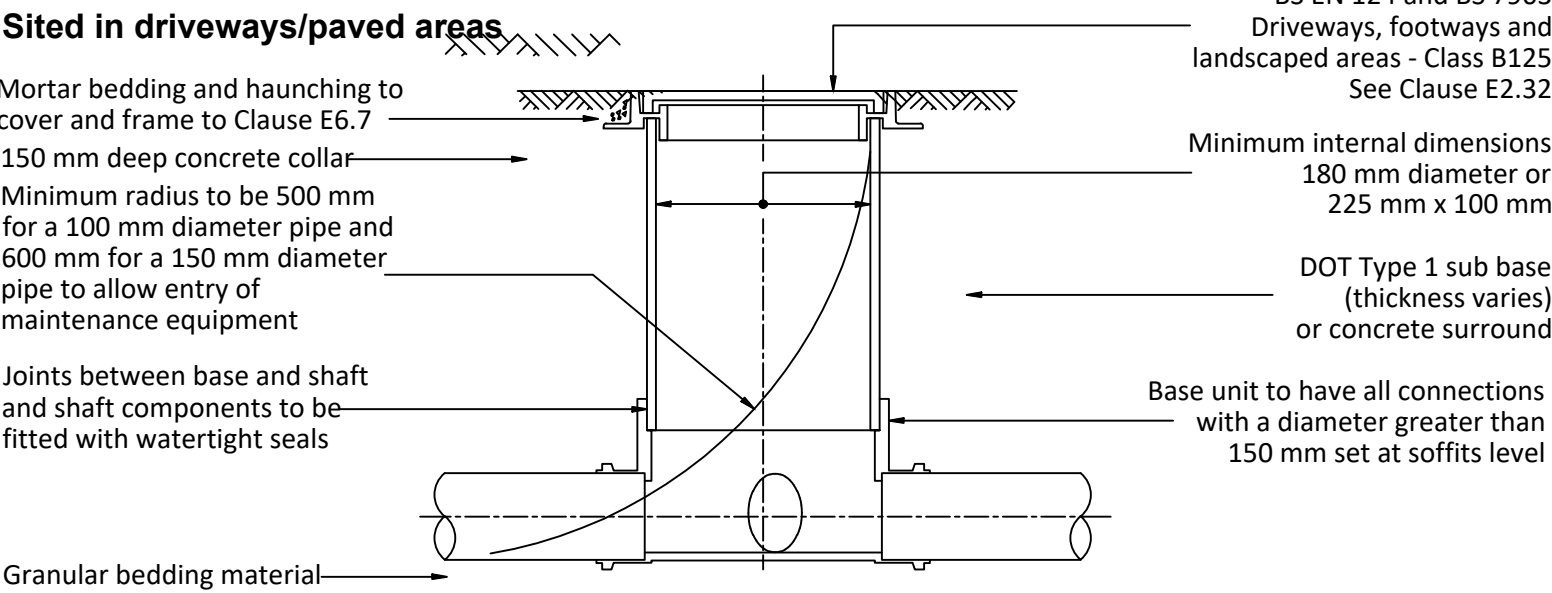
GRASS REINFORCEMENT
NOT TO SCALE



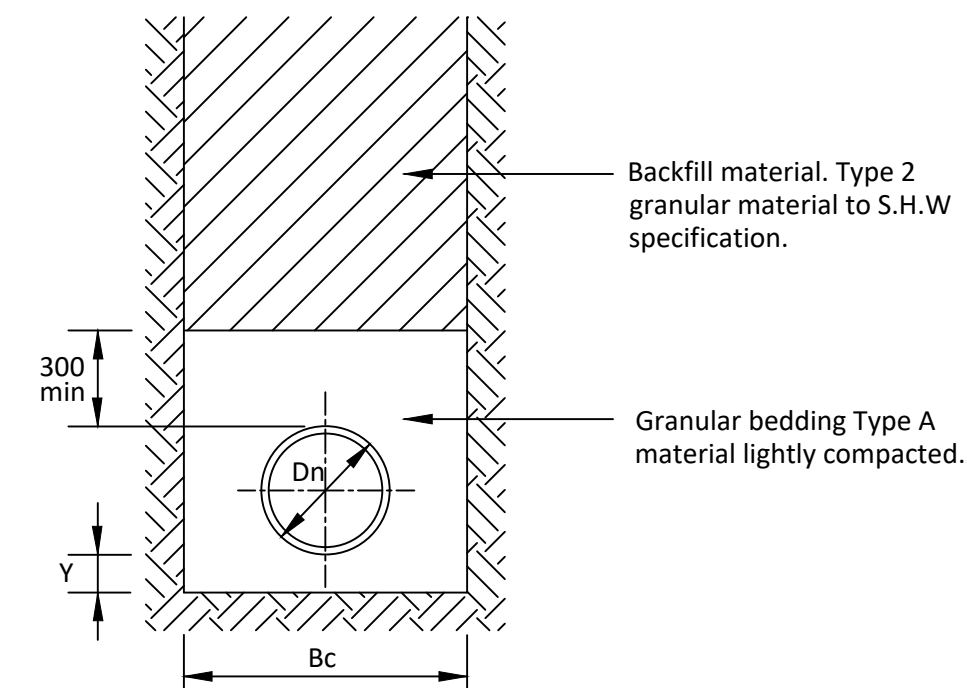
GRASS REINFORCEMENT
OVER ROOT PROTECTION AREA
NOT TO SCALE

TYPICAL INSPECTION CHAMBER DETAIL - TYPE 4 (Flexible material detail)
Maximum depth from cover level to soffit of pipe 2 m, non-entry

Plastic chambers and rings shall comply with BS EN 13598-1 and BS EN 13598-2 or have equivalent independent approval



Note: Where the access chamber is in the highway the Highway Authority can have specific requirements

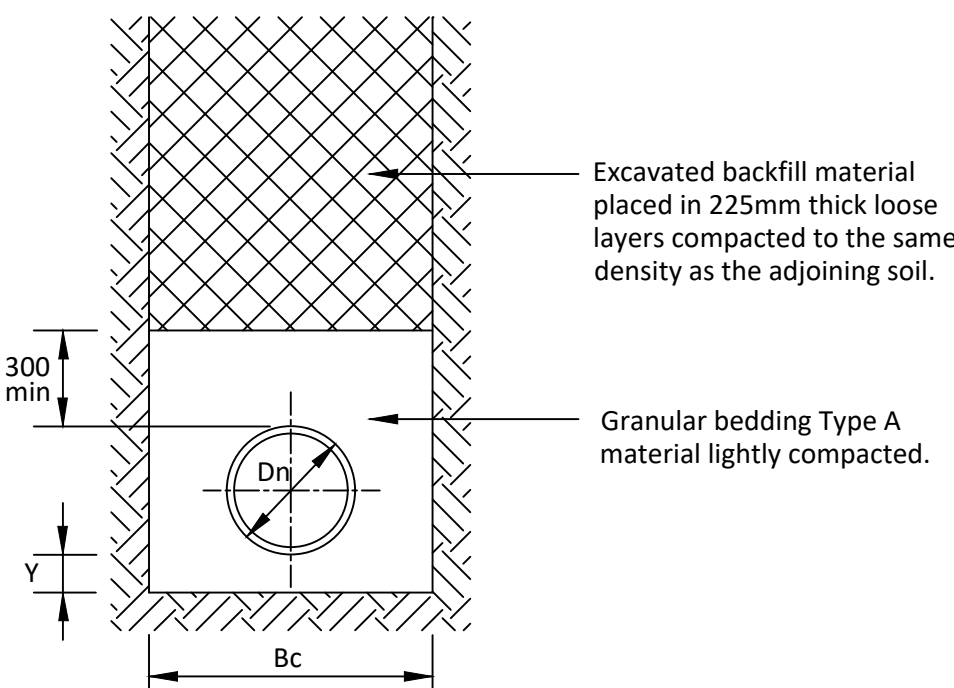


CLASS S BEDDING
(On trafficked areas)

Nominal bore of pipe (mm)	Alternative Aggregate sizes (mm)	
	Sized single	Graded
100	10	-
150	10 or 14	14-5
225-300	14 or 20	14-5 or 20-5
375-525	14 or 20	14-5 or 20-5
>525	14, 20 or 40	14-5, 20-5 or 40-5

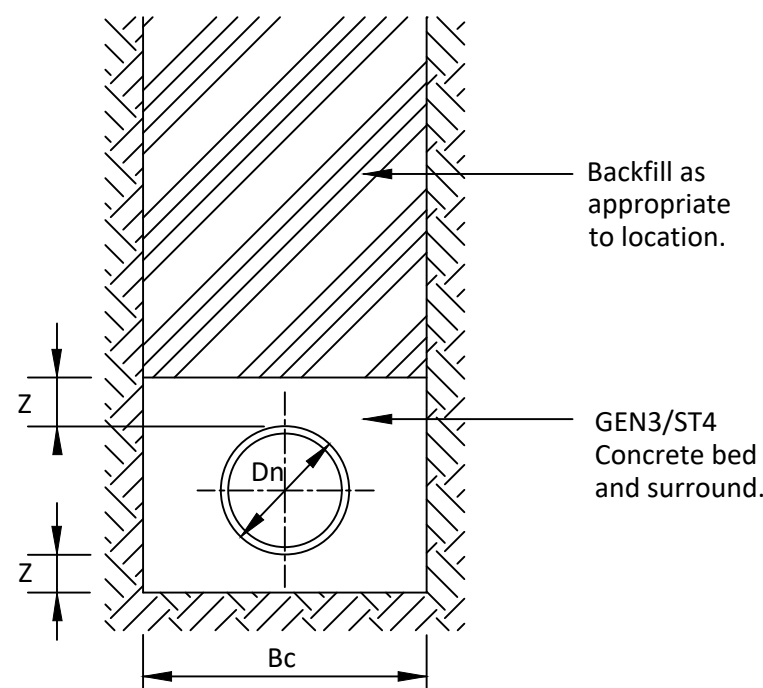
Granular bedding for pipes and backfilling material for temporary drains (trench sub-drains) shall consist of aggregates from natural sources to BS EN 13242 and BS EN 1744-1 or sintered pulverised fuel ash complying with the relevant provisions of BS 3892; sized in accordance with the above table

Selected fill material, whether selected from locally excavated material or imported, shall consist of uniform, readily compactable material, free from vegetable matter, building rubbish and frozen material, or materials susceptible to spontaneous combustion, and excluding clay of liquid limit greater than 80 and/or plastic limit greater than 55 and materials of excessively high moisture content. Clay lumps and stones shall be retained on 100mm and 40mm sieves respectively.

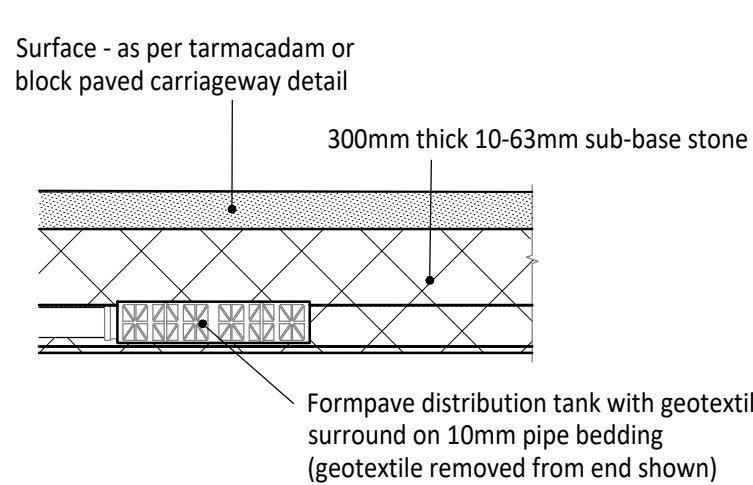


CLASS S BEDDING
(Verges & Landscaping)

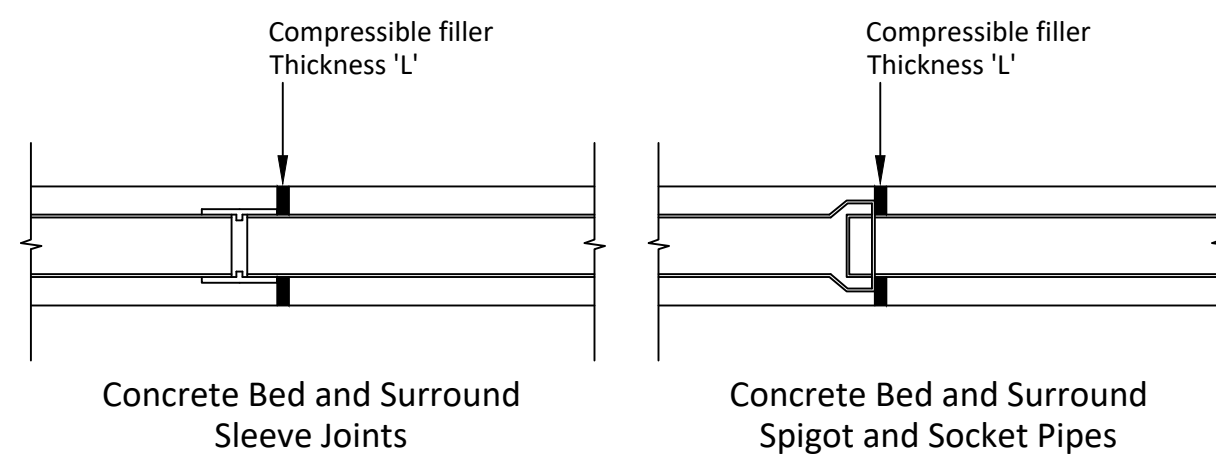
Dia Dn (mm)	Width Bc (mm)		Y(mm)		L(mm)	Z MIN (mm)
	Max	Min	Y1 (Uniform Soil)	Y2 (Rock)		
100	550	450	100	200	18	150
150	600	490	150	200		150
225	700	580	150	200		150
300	750	680	150	200	36	150
375	1050	950	150	200		150
450	1150	1030	150	200		150
525	1200	1120	150	200	54	150
600	1350	1240	150	200		150
675	1450	1330	150	200		225
750	1500	1400	150	200	54	225
825	1600	1490	150	225		225
900	2100	1900	150	225		225
975	2150	1950	175	250	54	300
1050	2250	2050	175	275		300
1200	2500	2250	200	300		300
OVER 1200	O.D+1000	O.D+800	I.D/6	I.D/4	54	400



CLASS Z BEDDING
(Cover to pipe <1.2m or as specified)



DISTRIBUTION TANK DETAIL
NOT TO SCALE



FLEXIBLE JOINT DETAILS

Form vertical construction joints in GEN3/ST4 concrete surround at face of every pipe joint using compressible board (refer to table for thickness 'L', precut to finished profile of concrete and pipe. Fill any gap between spigot and socket with resilient material to prevent entry.

A	07/25	First Issue		CS	LPA
Rev	Date	Description		Drawn	Checked



www.ableyletchford.co.uk

Client	UNIVERSITY OF READING				
Project	SHINFIELD WEST SOUTHERN ALLOTMENTS				
Title	CONSTRUCTION DETAILS				
Status					
Scale	AS SHOWN @ A1	Date	JUL 2025	Drawn	CS
Drawing No	A243-AL-710				Checked
					LPA
					Revision
					A



Transport Planning | Flood & Water Management | Civil Engineering

Hungerford Office

3 Tealgate, Charnham Park,
Hungerford RG17 0YT

01488 684 390

Reading Office

6th Floor, Reading Bridge House,
George Street, Reading, RG1 8LS

0118 237 1736

www.ableyletchford.co.uk