



**Reading Blue Coat School,
Way Hall,
Performing Arts Centre**
Surface Water Drainage Strategy

On behalf of **Reading Blue Coat School**

Project Ref: 330511026/2000 | Rev: 02 | Date: October 2024

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Document Control Sheet

Project Name: Reading Blue Coat School, Performing Arts Centre

Project Ref: 330511026

Report Title: Drainage Strategy

Doc Ref: R001 Rev 02

Date: October 2024

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Revision	Date	Description	Prepared	Reviewed	Approved
01	17.11.2023	First Issue	JPS	PJG	PJG
02	04.10.2024	Minor amendments	STB	JPS	PJG

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1 Introduction

- 1.1.1 Stantec has been commissioned by Reading Blue Coat School to prepare a Surface Water Drainage Strategy for the redevelopment proposals for the Performing Arts Centre Way Hall and Music Annexe, Reading Blue Coat School.
- 1.1.2 This strategy has been prepared in accordance with relevant national, regional and local planning policy guidance as follows:
- National policy regarding flood risk as contained within National Planning Policy Framework (NPPF), revised September 2023, and the accompanying Flood Risk and Coastal Change Planning Practice Guidance (PPG), dated 6th March 2014 and updated in August 2022,
 - The Ministerial Statement HCWS161, dated 18th December 2014,
 - Department of Environment, Food and Rural Affairs (DEFRA) Non-statutory Technical Standards for Sustainable Drainage Systems, dated March 2015,
 - Environment Agency (EA), Flood Risk Assessments: Climate Change Allowances, dated 19th February 2016 and updated May 2022,
 - DEFRA Climate Change Allowances mapping for rainfall climate change allowance.
 - Wokingham Borough Council, Preliminary Flood Risk Assessment (PFRA), June 2011;
 - Wokingham Borough Council, Strategic Flood Risk Assessment (SFRA), January 2020;
 - Wokingham Borough Council, SuDS Strategy, April 2016;
 - Wokingham Borough Local Development Framework, Sustainable Design and Construction, Supplementary Planning Document, May 2010;
 - Wokingham Borough Council, Local Flood Risk Management Strategy, April 2015: and
 - Wokingham Borough Council, Local Development Framework, Adopted Core Strategy Development Plan Document, January 2010.

1.2 Flood Risk

- 1.2.1 The flood risk map for planning from the Environment Agency (EA) is given in **Appendix A**. This shows the site is located in Flood Zone 1.
- 1.2.2 Section 14 of the National Planning Policy Framework, clause 173, footnote 59 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 in a strategic flood risk assessment 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.

- 1.2.3 The site has an area of 0.311ha, which is less than 1ha. The site has not been identified as being at an increased flood risk in the future or land subject to other sources of flooding, therefore a flood risk assessment has not been carried out.

2 Site Information

2.1 Location and Topography

- 2.1.1 The site is situated within the Borough of Wokingham, on Sonning Lane to the south of Sonning Village. Way Hall and the Music Annexe are within the Reading Blue Coat School Campus. They are bordered on the southern side by other school buildings and bounded to the north by a playing field. The exact site location is shown in **Figure 2.1**.



Figure 2.1: Site Location

- 2.1.2 The existing site comprises of a number of single story buildings including Way Hall, Music Annexe and the Drama Studio in addition to paved areas and landscaping.
- 2.1.3 The site has a predominant fall from west to east with levels falling from approximately 58.8m AOD to 57.0m AOD. A copy of the Topographical and Utilities Survey (Midland Survey LTD Drawing No. 12773/1, dated June 2010) is shown within the existing drainage drawing in **Appendix B**.

2.2 Geology and Ground Conditions

- 2.2.1 British Geological Survey mapping shows the site is close to an interface between Seaford Chalk formation and Lambeth Group Clay. A ground investigation carried out by Risk Management Limited on the adjacent Richard Aldworth Building in 2010 identified that the ground is underlain by clay to a depth of between 2.4m and 4.3m and then chalk below this.

- 2.2.2 We are aware that previous geotechnical investigations completed on the school site have shown that shallow infiltration soakaways do not work effectively and have not recorded a value following BRE 365 tests.
- 2.2.3 Deep bore soakways were used as part of the surface water drainage requirements on the adjacent Richard Aldworth Building in 2011. Therefore, as a result the proposed drainage strategy for this development will similarly look to incorporate deep bore soakaways.
- 2.2.4 Specific deep bore infiltration tests will be completed when the soakaways are installed to check they provide the infiltration rates used within the hydraulic calculations.

2.3 Proposals

2.3.1 The development proposals are as follows:

Minor amendments to planning permission 232925 for the 'proposed erection of a part single, part two storey building for educational purposes following the substantial demolition of existing building; permanent retention of temporary drama studio for educational purposes; external alterations, including new roof and cladding, to existing music annexe; associated hard and soft landscaping'. Amendments to include enlarged footprint and revised massing of approved building, and associated changes to surface water drainage layout'.

2.3.2 The alterations to the existing Music Annexe building will not change the size of the building or how surface water from the building is currently drained into an existing soakaway, therefore surface water discharge will not change. Therefore, the Music Annexe it is not considered further in this drainage strategy which focuses on the drainage strategy for Way Hall.

2.3.3 The Gray Baynes and Shew Proposed Ground Floor Plan for Way Hall (7119-GBS-XX-XX-DR-A-110) is contained in **Appendix C**.

3 Existing Drainage Regime

- 3.1.1 The existing drainage regime which is informed by the Midland Topographic and Utility survey is shown on Stantec Drawing 330511026/2001/002 in **Appendix B**.
- 3.1.2 The survey does not identify a surface water drainage network serving the Way Hall building. A section of the roof at the southern end of the building drains into a foul drain. This conveys water east away from the site. This is believed to eventually discharge into a Thames Water sewer.
- 3.1.3 The Midland survey was unable to trace where the remainder of the rainwater pipes from the roof drains too. It is therefore assumed that these pipes drain to individual local soakaways that allow water to infiltrate to ground.
- 3.1.4 It is assumed that surface water from the hardstanding paved areas around the building either discharges to the foul drainage network south of the building or infiltrates to ground.

4 Proposed Surface Water Drainage

4.1 Proposed Strategy

- 4.1.1 The proposed drainage strategy is to collect surface water from the building into a new surface water drainage network. This network will convey surface water from the east along the southern side of the building and through a drain running beneath the building to the northern part of the site adjacent to the playing field. From there surface water will be discharged to groundwater through deep bore soakaways, as a result of the ground conditions described in **Section 2.2**. The drainage network includes a cellular storage tank to attenuate excess surface water before it infiltrates.
- 4.1.2 The proposed paved surfaces around the building will be permeable paving which will allow surface water to discharge to ground.
- 4.1.3 Dissolution features are not known to be prevalent in the area and the density of the chalk is unknown. Therefore in accordance with the CIRIA C574 Engineering in Chalk (CIRIA, dated 2002) guidance the soakaway has been located with a minimum 10m offset from all building foundations.
- 4.1.4 At this stage infiltration testing has not yet been carried out on the site therefore the infiltration rate for the deep bore soakaways has been assumed at this stage to be 2.38 m/hr in the MicroDrainage calculations. If following infiltration tests the rate is found to be significantly different to the assumed rate the number of deep bore soakaways or storage will be changed.
- 4.1.5 A copy of the Proposed Drainage Strategy (Stantec drawing 330511026/2001/001) is contained within **Appendix D** and the accompanying MicroDrainage calculations are contained in **Appendix E**.

4.2 Discharge Destination

- 4.2.1 In accordance with the discharge destination hierarchies of the Building Regulations H3 and the PPG an assessment of the suitability of the site to utilise infiltration drainage techniques has been undertaken.

See the Planning Practice Guidance

This states:

"Generally the aim should be discharge surface runoff as high up the following hierarchy of drainage options as reasonably practicable:

- 1. Into the ground (infiltration)*
- 2. To a surface water body;*
- 3. To a surface water sewer, highway drain or another drainage system;*
- 4. To a combined sewer."*

- 4.2.2 As outlined in **Section 4.1**, it is proposed that surface water runoff will discharge to ground. Therefore, the requirements of the of the discharge destination hierarchy are satisfied.

4.3 Peak Flow Control – Defra Technical Standard S3

S3. For developments which were previously developed, the peak runoff rate from the development to any drain, sewer or surface water body for the 1 in 1 year rainfall event and the 1 in 100 year rainfall event should be as close as reasonably practicable to the greenfield runoff rate from the development for the same rainfall event, but should never exceed the rate of discharge from the development prior to redevelopment for that event.

- 4.3.1 Runoff will not discharge to a drain, sewer or surface water body; therefore, the requirements of the technical standard are met.
- 4.3.2 The EA's Flood Risk Assessments: Climate Change Allowances guidance, which supports the NPPF, provides contingency allowances for potential increases in sea level rise, peak river flow and rainfall intensity. The DEFRA Climate Change Allowances map provides allowances for climate change for rainfall intensity on a catchment by catchment basis. The site is within the Thames and South Chilterns Management Catchment and the climate change allowances are provided in Table 4.1 for a school development such as this with a minimum design life of 50 years.
- 4.3.3 In accordance with this guidance, the potential for increased flood probability as the result of possible climate change has been taken into account in the consideration of mitigation measures over the lifetime of the development through an increase in peak rainfall intensity (i.e. surface water drainage) of +20% and +35% for the 1 in 30 year event and +20% and +40% for the 1 in 100 year event.

Thames and South Chilterns Management Catchment	Central	Upper End
Total potential change anticipated for 3.3% (30 year) rainfall event for 2061 to 2125	20%	35%
Total potential change anticipated for 1% (100 year) rainfall event for 2061 to 2125	20%	40%

Table 4.1: Climate Change Allowances Thames and South Chilterns Management Catchment for a development with a 50 year design life

- 4.3.4 The drainage system has been designed not to flood during the 1 in 30 year event with a +35% allowance for climate change (Upper End) and with no flooding to buildings during a 1 in 100 year event with a +40% allowance for climate change, as set out in the Wokingham Borough Council, SuDS Strategy, April 2016.

4.4 Volume Control – Defra Technical Standard S6

S5. Where reasonably practicable, for developments which have been previously developed, the runoff volume from the development to any highway drain, sewer or surface water body in the 1 in 100 year, 6 hour rainfall event must be constrained to a value as close as is reasonably practicable to the greenfield runoff volume for the same event, but should never exceed the runoff volume from the development site prior to redevelopment for that event.

- 4.4.1 Runoff will not discharge to a drain, sewer or surface water body; therefore, the requirements of the technical standard are met. We are removing surface water connections to the foul drainage network therefore there is significant betterment.

4.5 Flood Risk within the Development – Defra Technical Standards S7 to S9

S7. The drainage system must be designed so that, unless an area is designated to hold and/or convey water as part of the design, flooding does not occur on any part of the site for a 1 in 30 year rainfall event.

S8. The drainage system must be designed so that, unless an area is designated to hold and/or convey water as part of the design, flooding does not occur during a 1 in 100 year rainfall event in any part of: a building (including a basement) or in any utility plant susceptible to water (e.g. pumping station or electricity substation) within the development.

- 4.5.1 The proposed surface water drainage network has been designed not to flood in a 1 in 30 year event with a +35% allowance for climate change.
- 4.5.2 During a 1 in 100 year event with a +40% allowance for climate change there is 22.3m³ of flooding from the deep bore soakaways. These soakaways are located at the bottom of the slope away from the building with a cover level approximately 740mm below the building finished floor level. Water flooding from the soakaway will flow north over the adjacent playing fields way from all school buildings.
- 4.5.3 A copy of the Proposed Drainage Strategy (Stantec drawing 330511026/2001/001) is contained within **Appendix D** and accompanying MicroDrainage calculations are contained in **Appendix E**.

S9. The design of the site must ensure that so far as is reasonably practicable, flows resulting from rainfall in excess of a 1 in 100 year rainfall event are managed in exceedance routes that minimise the risks to people and property.

- 4.5.4 In the event of a storm in excess of a 100 year + 40% climate change event, surface water will flow overland north into the playing field which is an area of lower topography. This is away from the school buildings.

4.6 SuDS Selection

- 4.6.1 The Ministerial Statement HCWS161, dated 18th December 2014 states that:

*'.....the Government's expectation is that sustainable drainage systems will be provided in new developments **wherever this is appropriate.***

- 4.6.2 The NPPG paragraph 055 describes SuDS as follows:

'Sustainable drainage systems (or SuDS) are designed to control surface water run off close to where it falls, combining a mixture of built and nature-based techniques to mimic natural drainage as closely as possible, and accounting for the predicted impacts of climate change. They provide benefits for water quantity, water quality, biodiversity and amenity. Many types of sustainable drainage systems are possible, contributing to reducing the causes and impacts of flooding. Multifunctional sustainable drainage systems are those that deliver a wider range of additional biodiversity and environmental net gains such as to:

- *ameliorate urban heating and air pollution;*
- *replenish groundwater resources;*
- *contribute to biodiversity net gain targets;*
- *capture and re-use rainwater;*

- *store carbon;*
- *reduce the need for carbon-intensive construction techniques and pumped systems;*
- *release capacity in combined sewerage systems and at wastewater treatment works;*
- *create and connect valuable areas of blue-green infrastructure*
- *reduce lifetime maintenance costs; and*
- *enhance the attractiveness and value of new development by integrating water management with habitat for wildlife and opportunities for amenity and recreation.*

The layout and function of drainage systems needs to be considered at the start of the design process for new development, as integration with road networks and other infrastructure can maximise the availability of developable land.

- 4.6.3 The current planning policy and guidance advises that SuDS in the form of open or near surface systems employing natural processes should be used where possible, **not that they must be used**. They can also provide opportunities to combine water management with amenity and wildlife, but only where appropriate.
- 4.6.4 The proposed drainage strategy utilises deep bore soakaways and permeable paving which infiltrate all surface water from the proposed development to ground. Infiltration is the preferred option of the surface water drainage hierarchy and constitutes a sustainable drainage strategy.
- 4.6.5 These proposals follow the requirements of the Defra Non-Statutory Technical Standards for Sustainable Drainage Systems and the principles of the NPPG SuDS requirements by reducing flood risk and improving water quality.
- 4.6.6 A copy of the proposed surface water drainage layout (Drawing Numbers 330511026/2001/001) is contained within **Appendix D**.
- 4.6.7 It is proposed that SuDS are used in the form of a deep bore soakaway with storage. This will ensure that surface water can be effectively managed to accommodate storms up to 100 year + 40%.
- 4.6.8 Pollutant / contaminant removal will be implemented through the use of permeable paving trapped gullies and catchpits before the deep bore soakaways. Surface water run-off is from roofs or pedestrian paved areas.

4.7 Structural Integrity – Defra Technical Standards S10 & S11

S10. Components must be designed to ensure structural integrity of the drainage system and any adjacent structures or infrastructure under anticipated loading conditions over the design life of the development taking into account the requirement for reasonable levels of maintenance.

S11. The materials, including products, components, fittings or naturally occurring materials, which are specified by the designer must be of a suitable nature and quality for their intended use.

- 4.7.1 The components that make up any drainage network have different life expectancies which can be greatly affected by the effectiveness of their maintenance regime and upstream sediment capture / management.
- 4.7.2 This drainage network comprises, permeable paving, piped network, inspection chambers / catchpits, deep bore soakaways and cellular storage. As with any drainage system, this network

requires regular inspection and maintenance to ensure that the individual components continue to operate as designed, both in terms of hydraulic capacity and potential pollutant removal.

- 4.7.3 The school will be responsible for the maintenance and inspection of all the drainage channel sumps, catchpits, and deep bore soakaways.
- 4.7.4 Further details regarding the maintenance of the proposed system are contained in **Section 5**.

5 Maintenance Strategy

- 5.1.1 This section sets out the inspection and maintenance requirements for long term management of the development's surface water drainage system which will be the responsibility of the school.

5.2 Health, Safety and Welfare

- 5.2.1 All those responsible for maintenance should take appropriate health, safety and welfare precautions for all activities including lone working, if relevant, and risk assessments should always be undertaken. The site's infrastructure Health and Safety File should be consulted before carrying out any works either inside or outside of the development's boundary and information regarding the location of existing utilities passed on to operatives.
- 5.2.2 The requirements of the Health and Safety at Work Act 1974 and The Construction (Design and Management) Regulations 2015 should be adhered to and any residual risks identified in the Health and Safety File should be managed and information passed on to maintenance operatives through task specific risk assessments.

5.3 Operation and Maintenance

- 5.3.1 There are three types of maintenance activities associated with surface water drainage systems. The SuDS Manual, CIRIA C753, defines these as:
- Regular Maintenance – *'basic tasks undertaken on a frequent and predictable schedule' including vegetation management, litter and debris removal, and inspections.'*
 - Occasional Maintenance – *'tasks that are likely to be required periodically, but on a much less frequent and predictable basis than the routine tasks (sediment removal is an example).'*
 - Remedial Maintenance – *'intermittent tasks that may be required to rectify faults associated with the system, although the likelihood of faults can be minimised by good design. Where remedial work is found to be necessary, it is likely to be due to site-specific characteristics or unforeseen events, and as such timings are difficult to predict.'*
- 5.3.2 Specific maintenance needs should be monitored and maintenance schedules adjusted to suit the location and condition of the drainage feature in question.

Operation and Maintenance Activity	Piped Network / Inspection Chambers	Permeable Paving	Deep Bore Soakaway	Cellular / Modular Storage
Regular Maintenance				
Inspection	■	■	■	■
Litter and debris removal	■	■	■	□
Weed and invasive plant control		□		
Occasional Maintenance				
Sediment management	■	■	■	■
Vacuum sweeping and brushing		■		
Remedial Maintenance				
Structure rehabilitation / repair	□	□	□	□
Infiltration surface reconditioning			□	
■ Will be required □ May be required				

Table 5.1: Extract from The SuDS Manual Table 32.1: Typical key SuDS components operation and maintenance activities

5.4 Piped Network / Inspection Chambers

- 5.4.1 Piped network components requires regular inspection and maintenance to ensure that the individual components continue to operate as designed, both in terms of hydraulic capacity and potential pollutant removal. All the gullies, inspection chambers and catchpits will therefore be inspected and cleaned regularly.

Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Inspect and identify any features that are not operating correctly. If required take remedial action.	Monthly for three months, then six monthly
	Debris removal from catchment surface / gratings (where may cause risks to performance).	Monthly (and after large storms)
	Remove sediment from trapped sumps, manholes and catchpits.	Annually or as required
Remedial Maintenance	Repair / rehabilitation of gratings, inlets and outlets.	As required
Monitoring	Inspect / check all gratings, trapped sumps, manholes and catchpits to ensure that they are in good condition and operating as designed.	Annually and after large storm events
Structure Rehabilitation / Repair	Regular Maintenance and Monitoring to identify if repair and / or replacement of features or pipework is required.	As required

Table 5.2: Piped Network / Inspection Chambers operation and maintenance

5.5 Permeable Surfacing

- 5.5.1 Permeable surfacing is a form of surface construction which allows rainwater to permeate through the surface and into the underlying construction layers, where it is stored prior to infiltration into the ground or discharge into a wider drainage network. As water travels through the construction layers hydrocarbons and other organic materials are trapped and degraded by micro-organisms providing a water quality benefit.
- 5.5.2 The principal requirements related to permeable surfaces involve surface cleaning at least three times a year. Additionally, litter and vegetation should be removed on a regular basis. Note that the use of grit and salt may adversely affect the treatment and drainage potential of permeable surfaces, and the use of weed killers can disrupt the biological breakdown of contaminants that would otherwise occur in the sub-base. An alternative de-icing agent such as wet gritting which does not contain the chlorides and contaminants found in road salt should be used.

Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Brushing and vacuuming (standard cosmetic sweep over the whole surface). Care should be taken in adjusting vacuuming equipment to avoid removal of jointing material if present. Any lost material should be replaced.	Once a year, after autumn leaf fall, or reduced frequency as required, based on site-specific observations of clogging or manufacturers' recommendations – pay particular attention to areas where water runs from adjacent impermeable areas as this area is most likely to collect the most sediment
	Stabilise and mow contributing and adjacent areas.	As required
Occasional Maintenance	Removal of weed or management using glyphosate applied directly to the weeds by an applicator rather than spraying	As required – once per year on less frequently used surfaces
	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50mm of the level of the surfacing.	As required
Remedial Maintenance	Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structured performance or a hazard to users, and replace lost jointing material	As required
	Rehabilitation of surface and upper substructure by remedial sweeping	Every 10 to 15 year or as required (if infiltration and filtration performance is reduced due to significant clogging)
Monitoring	Initial inspection	Monthly for three months after installation
	Inspect for evidence of poor operation and / or weed growth - If required, take remedial action.	Three-monthly, forty-eight hours after large rainfall events in the first six months
	Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually
	Monitor inspection chambers	Annually

Table 5.3: The SuDS Manual Table 20.15: Operation and maintenance requirements for pervious surfaces

5.6 Deep Bore Soakaways

- 5.6.1 Deep bore soakaways allow surface water to infiltrate into a suitable geological strata below ground level. Soakaways can be used along side storage features where necessary to minimise flood risk.

Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Inspect for sediment and debris in pre-treatment components and floor of inspection tube or chamber and inside of concrete manhole rings.	Annually
	Cleaning of gutters and any filters on downpipes.	Annually (or as required based on inspections)
	Trimming any roots that may be causing blockages.	Annually (or as required)
Occasional Maintenance	Remove sediment and debris from pre-treatment components and floor of inspection tube or chamber and inside of concrete manhole rings.	As required, based on inspections
Remedial Actions	Reconstruct soakaway and/or replace or clean void fill, if performance deteriorates or failure occurs.	As required
	Replacement of clogged geotextile (will require reconstruction of soakaway).	As required
Monitoring	Inspect silt traps and note rate of sediment accumulation.	Monthly in the first year and then annually
	Check soakaway to ensure emptying is occurring.	Annually

Table 5.4: Extract from The SuDS Manual Table 13.1: Operation and maintenance requirements for soakaways

5.7 Cellular / Modular Storage

- 5.7.1 Cellular storage systems are plastic high void ratio modular systems which can be used to control and manage runoff.

Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Inspect and identify any areas that are not operating correctly. If required take remedial action	Monthly for three months, then annually
	Remove debris from catchment surface (where may cause risks to performance)	Monthly
	For systems where rainfall infiltrates into the from above, check surface of filter for blockage by silt, algae or other matter. Remove and replace surface infiltration medium as necessary	Annually
	Remove sediment from pre-treatment structures and / or internal forebays	Annually, or as required
Remedial Maintenance	Repair / rehabilitate inlets, outlets, overflows and vents	As required
Monitoring	Inspect / check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed	Annually, and after large rainfall events
	Survey inside of tank for sediment build-up and remove if necessary	Every 5 years or as required
Structure Rehabilitation / Repair	Regular Maintenance and Monitoring to identify if repair and / or replacement of storage units is required.	As required

Table 5.5: The SuDS Manual Table 21.3: Operation and maintenance requirements for attenuation storage tanks

6 Summary

- 6.1.1 This Drainage Strategy has been developed in accordance with relevant national, regional and local planning policy guidance.
- 6.1.2 The proposed surface water drainage strategy is to discharge all surface water runoff to ground via permeable paving and deep bore soakaways, with cellular storage. This mimics the drainage strategy for the surrounding buildings on the school.
- 6.1.3 The proposed surface water drainage network has been designed not to flood in a 1 in 30 year event with a +35% allowance for climate change.
- 6.1.4 During a 1 in 100 year event with a +40% allowance for climate change there is 22.3m³ of flooding from the deep bore soakaways, based on the current infiltration rate. These soakaways are located at the bottom of the slope away from the building with a cover level approximately 740mm below the building finished floor level. Water flooding from the soakaway will flow north over the adjacent playing fields way from all school buildings.
- 6.1.5 The proposed network which utilises a piped network, cellular storage and deep bore soakaway follows the principles of the PPG SuDS requirements by reducing flood risk and removal of pollutants / contaminants through the use of trapped gullies and catchpits / silt traps.
- 6.1.6 The school will be responsible for the long term maintenance of the proposed system and will undertake inspection and maintenance in accordance with this Strategy.
- 6.1.7 As a result, the principles advocated by relevant national, regional and local planning policy guidance have been satisfactorily addressed.

Appendix A Flood Zone Map

Flood map for planning

Your reference
<Unspecified>

Location (easting/northing)
475324/175215

Created
3 Oct 2024 12:11

Your selected location is in flood zone 1, an area with a low probability of flooding.

You will need to do a flood risk assessment if your site is **any of the following:**

- bigger than 1 hectare (ha)
- In an area with critical drainage problems as notified by the Environment Agency
- identified as being at increased flood risk in future by the local authority's strategic flood risk assessment
- at risk from other sources of flooding (such as surface water or reservoirs) and its development would increase the vulnerability of its use (such as constructing an office on an undeveloped site or converting a shop to a dwelling)

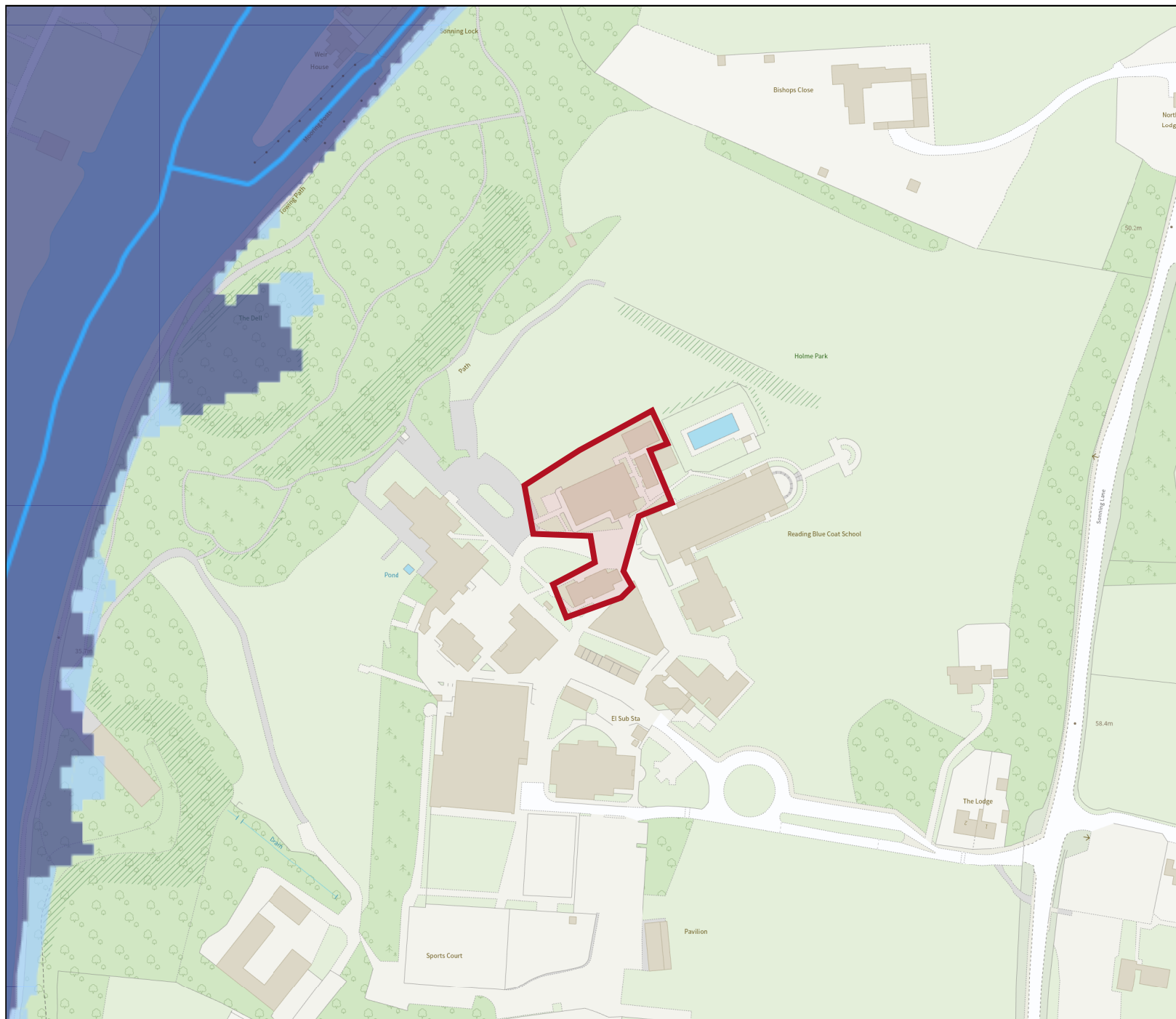
Notes

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.

Flood risk data is covered by the Open Government Licence **which** sets out the terms and conditions for using government data. <https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/>

Use of the address and mapping data is subject to Ordnance Survey public viewing terms under Crown copyright and database rights 2022 OS 100024198. <https://flood-map-for-planning.service.gov.uk/os-terms>



Flood map for planning

Your reference
<Unspecified>

Location (easting/northing)
475324/175215

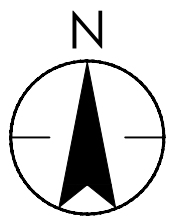
Scale
1:2500

Created
3 Oct 2024 12:11

-  Selected area
-  Flood zone 3
-  Flood zone 2
-  Flood zone 1
-  Flood defence
-  Main river
-  Water storage area

0 20 40 60m

Appendix B Existing Drainage Drawing



Stantec UK Limited
Caversham Bridge House, Waterman Place
Reading
RG1 8DN
Tel. +44 1189 500 761
www.stantec.com/uk

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Notes

UTILITIES NOTE: The position of any existing public or private sewers, utility services, plant or apparatus shown on this drawing is believed to be correct, but no warranty to this is expressed or implied. Other such plant or apparatus may also be present but not shown. The Contractor is therefore advised to undertake their own investigation where the presence of any existing sewers, services, plant or apparatus may affect their operations.

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2. ALL DIMENSIONS ARE IN METRES UNLESS STATED OTHERWISE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT CONTRACT DRAWINGS, CONSTRUCTION DETAILS AND SPECIFICATIONS.

KEY:

- SITE BOUNDARY
- EXISTING SURFACE WATER DRAINAGE
- EXISTING FOUL WATER DRAINAGE

P01 FIRST ISSUE	JR	PJG	2023.11.15
Issued/Revision	By	Appd	YYYY.MM.DD
	JR	JPS	PJG
	Dwn.	Dsgn.	Chkd.
			2023.11.15
			YYYY.MM.DD

Issue Status

PLANNING

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Client/Project Logo

READING BLUE COAT SCHOOL

Client/Project

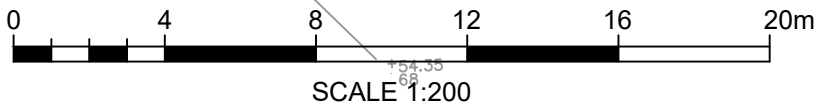
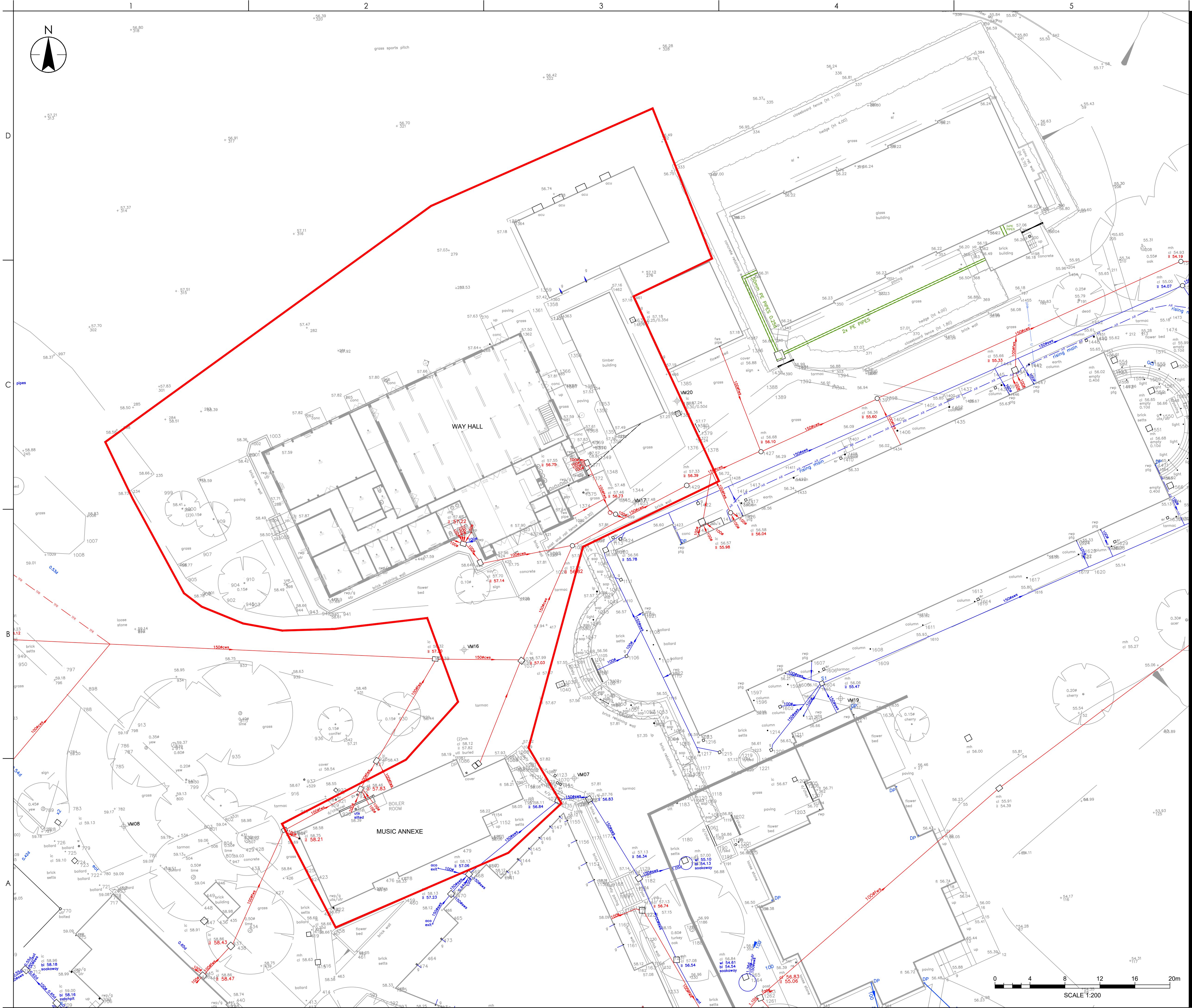
READING BLUE COAT SCHOOL
WAY HALL
PERFORMING ARTS CENTRE

Title

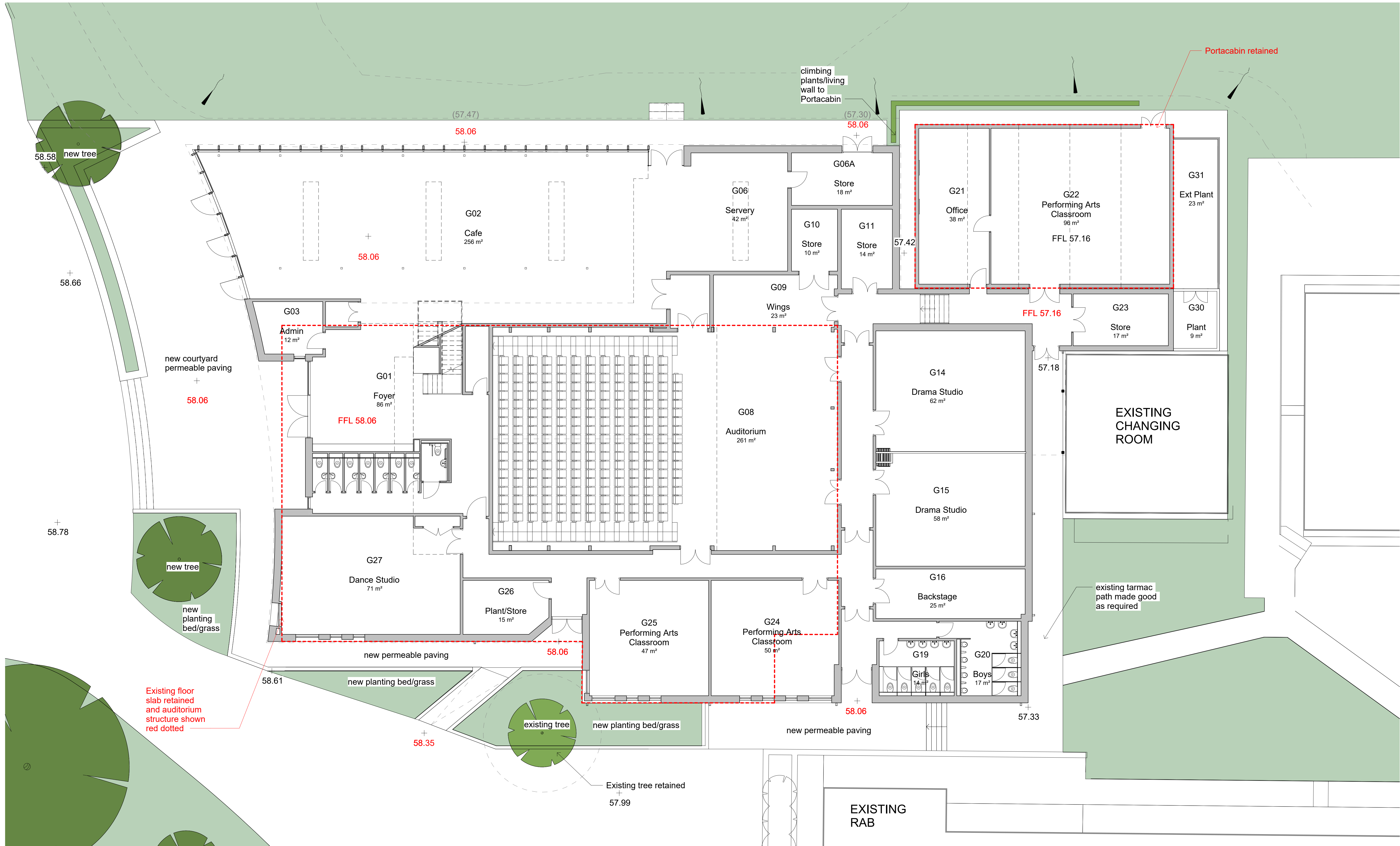
EXISTING SURFACE AND FOUL WATER DRAINAGE

Project No.	A1 Scale
330511026	1:200
Revision	Drawing No.
P01	330511026-2001-002

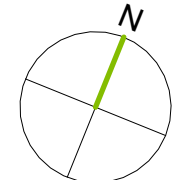
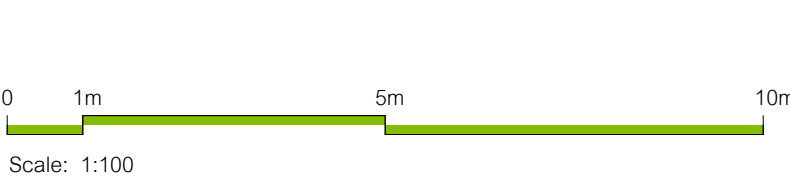
Plotted: 15.11.2023 20:23 11.15.25:19 PM by: Romina.djrn
C:\projects\330511026-2001-002\Drawings\330511026-2001-002.dwg



Appendix C Gray Baynes and Shew Proposed Ground Floor Plan



- + 58.00 Existing level (retained)
- + (58.00) Existing level to be altered
- + 58.00 Proposed level



UPDATED FOR S73 APPLICATION
revision

20/09/24 P01
by date index

READING BLUE COAT SCHOOL
REDEVELOPMENT OF WAY HALL

GBS architects

Proposed Ground Floor

St Thomas House, 6 Becket Street, Oxford, OX1 1PP
t: 01865 305 130 e: info@gsarchitects.co.uk w: www.gbsarchitects.co.uk

scale: 1 : 100@A1 date: AUG 24 dwn/cckt: FG/DW

7119-GBS-XX-00-DR-A-110-P01

Appendix D Proposed Drainage Layouts



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3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT CONTRACT DRAWINGS, CONSTRUCTION DETAILS AND SPECIFICATIONS.

LEGEND

	SITE BOUNDARY
	EXISTING SURFACE WATER DRAINAGE & MANHOLE
	EXISTING FOUL WATER DRAINAGE & MANHOLE
	EXISTING COMBINED WATER DRAINAGE & MANHOLE
	PROPOSED SURFACE WATER DRAINAGE AND MANHOLE
	PROPOSED RAINWATER DOWNPIPE
	PROPOSED CHANNEL DRAIN
	PROPOSED THRESHOLD DRAIN
	PROPOSED DEEP BORE SOAKAWAY
	PROPOSED SURFACE GULLY AND CONNECTION
	PROPOSED FILTER DRAIN
	PROPOSED PERMEABLE PAVING
	TARMAC CONSTRUCTION
	PROPOSED FOUL WATER DRAINAGE AND MANHOLE
	PROPOSED FOUL SOIL VENT PIPE
	PROPOSED FOUL GULLY AND CONNECTION
	PROPOSED LEVELS

P02 PROPOSED DRAINAGE UPDATED	CSD	JPS	2024.10.04
P01 FIRST ISSUE	JR	PJG	2024.01.19
Issued/Revision	By	Appd	YYYY.MM.DD
	JR	JPS	2024.01.19
	Dwn.	Dsgn.	Chkd.
			YYYY.MM.DD

FOR PLANNING

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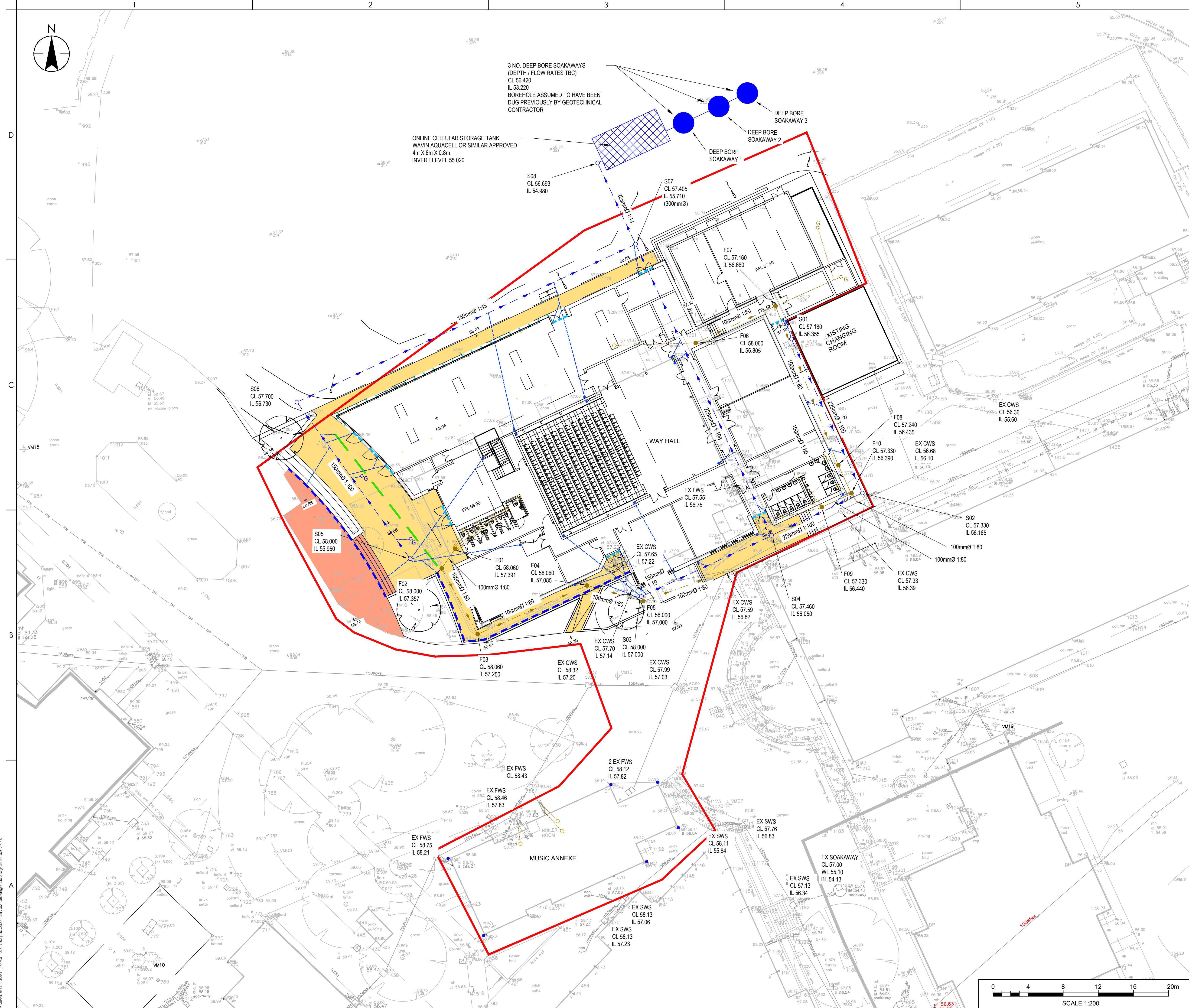
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Client/Project
READING BLUE COAT SCHOOL
WAY HALL
PERFORMING ARTS CENTRE

Title

PROPOSED DRAINAGE AND LEVELS

Project No. 330511026	A1 Scale 1:200
Revision P02	Drawing No. 330511026-2001-001



Appendix E Proposed MicroDrainage Calculations



Micro
Drainage

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Caversham Bridge House Waterman Place Reading, RG1 8DN	RBCS - Way Hall	
Date 02/10/2024	Designed by JPS	
File SW Network.MDX	Checked by PJG	
Innovyze	Network 2020.1	
<u>Simulation Criteria for Storm</u> Volumetric Runoff Coeff 0.750 Additional Flow - % of Total Flow 0.000 Areal Reduction Factor 1.000 MADD Factor * 10m³/ha Storage 2.000 Hot Start (mins) 0 Inlet Coefficient 0.800 Hot Start Level (mm) 0 Flow per Person per Day (l/per/day) 0.000 Manhole Headloss Coeff (Global) 0.500 Run Time (mins) 60 Foul Sewage per hectare (l/s) 0.000 Output Interval (mins) 1 Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0 Number of Online Controls 1 Number of Storage Structures 4 Number of Real Time Controls 0 <u>Synthetic Rainfall Details</u> Rainfall Model FSR Profile Type Summer Return Period (years) 2 Cv (Summer) 0.750 Region England and Wales Cv (Winter) 0.840 M5-60 (mm) 18.900 Storm Duration (mins) 30 Ratio R 0.400		
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Caversham Bridge House	RBCS - Way Hall						
Waterman Place							
Reading, RG1 8DN							
Date 02/10/2024	Designed by JPS						
File SW Network.MDX	Checked by PJG						
Innovyze	Network 2020.1						
<u>Online Controls for Storm</u>							
<u>Pump Manhole: 12, DS/PN: 1.008, Volume (m³): 0.0</u>							
Invert Level (m) 54.855							
Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	0.0000	0.900	0.0000	1.700	0.0000	2.500	0.0000
0.200	0.0000	1.000	0.0000	1.800	0.0000	2.600	0.0000
0.300	0.0000	1.100	0.0000	1.900	0.0000	2.700	0.0000
0.400	0.0000	1.200	0.0000	2.000	0.0000	2.800	0.0000
0.500	0.0000	1.300	0.0000	2.100	0.0000	2.900	0.0000
0.600	0.0000	1.400	0.0000	2.200	0.0000	3.000	0.0000
0.700	0.0000	1.500	0.0000	2.300	0.0000		
0.800	0.0000	1.600	0.0000	2.400	0.0000		
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Cellular Storage Manhole: 9, DS/PN: 1.005

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	32.0	32.0	0.801	0.0	51.2
0.800	32.0	51.2			

Chamber Invert Level (m)	39.220	Infiltration Coefficient Base (m/hr)	0.00000
Chamber Diameter/Length (m)	2.400	Safety Factor	1.5
Borehole Diameter (m)	0.300		
Borehole Depth (m)	14.000		

0.000	0.11833	6.000	0.11833	9.100	0.36104	11.800	1.16376	12.900	2.38588	13.000	0.00000
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Chamber Invert Level (m)	39.220	Infiltration Coefficient Base (m/hr)	0.00000
Chamber Diameter/Length (m)	2.400	Safety Factor	1.5
Borehole Diameter (m)	0.300		
Borehole Depth (m)	14.000		

0.000	0.11833	6.000	0.11833	9.100	0.36104	11.800	1.16376	12.900	2.38588	13.000	0.00000
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Chamber Invert Level (m)	39.220	Infiltration Coefficient Base (m/hr)	0.00000
Chamber Diameter/Length (m)	2.400	Safety Factor	1.5
Borehole Diameter (m)	0.300		
Borehole Depth (m)	14.000		

Stantec UK Ltd		Page 10	
Caversham Bridge House Waterman Place Reading, RG1 8DN		RBCS - Way Hall	
Date 02/10/2024		Designed by JPS	
File SW Network.MDX		Checked by PJG	
Innovyze		Network 2020.1	

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coefficient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
 Number of Online Controls 1 Number of Storage Structures 4 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.400
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	19.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm) 300.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status OFF
 DVD Status ON
 Inertia Status ON

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
 Return Period(s) (years) 1, 30, 100
 Climate Change (%) 0, 35, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1	15 Winter	1	+0%	100/15 Summer				56.405
1.001	2	15 Winter	1	+0%	100/15 Summer				56.225
2.000	3	15 Winter	1	+0%					57.021
1.002	4	15 Winter	1	+0%	100/15 Summer				56.128
3.000	5	15 Winter	1	+0%	30/15 Summer				57.011
3.001	6	15 Winter	1	+0%	100/15 Summer				56.783
1.003	7	15 Winter	1	+0%	30/240 Winter				55.777
1.004	8	15 Winter	1	+0%	30/15 Summer				55.127
1.005	9	15 Winter	1	+0%	30/15 Summer				55.089
1.006	10	30 Winter	1	+0%	30/15 Summer	100/60 Winter			55.042
1.007	11	240 Winter	1	+0%	30/15 Summer	100/60 Winter			54.902
1.008	12	240 Winter	1	+0%	30/15 Summer	100/60 Winter			41.232

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Date 02/10/2024

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Network 2020.1

Page 12



30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)

for Storm

Simulation Criteria

Areal Reduction Factor 1.000

Additional Flow - % of Total Flow 0.000

Hot Start (mins) 0

MADD Factor * 10m³/ha Storage 2.000

Hot Start Level (mm) 0

Inlet Coefficient 0.800

Manhole Headloss Coeff (Global) 0.500

Flow per Person per Day (l/per/day) 0.000

Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0

Number of Offline Controls 0

Number of Time/Area Diagrams 0

Number of Online Controls 1

Number of Storage Structures 4

Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model

FSR

Ratio R 0.400

Region England and Wales Cv (Summer) 0.750

M5-60 (mm)

19.000 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm)

300.0

Analysis Timestep 2.5 Second Increment (Extended)

DTS Status

OFF

DVD Status

ON

Inertia Status

ON

Profile(s)

Summer and Winter

Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440

Return Period(s) (years)

1, 30, 100

Climate Change (%)

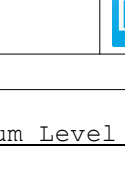
0, 35, 40

WARNING: Half Drain Time has not been calculated as the structure is too full.

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1	15 Winter	30	+35%	100/15 Summer				56.449
1.001	2	15 Winter	30	+35%	100/15 Summer				56.285
2.000	3	15 Winter	30	+35%					57.040
1.002	4	15 Winter	30	+35%	100/15 Summer				56.224
3.000	5	15 Winter	30	+35%	30/15 Summer				57.161
3.001	6	15 Winter	30	+35%	100/15 Summer				56.842
1.003	7	240 Winter	30	+35%	30/240 Winter				56.022
1.004	8	240 Winter	30	+35%	30/15 Summer				56.019
1.005	9	480 Winter	30	+35%	30/15 Summer				55.822
1.006	10	240 Winter	30	+35%	30/15 Summer	100/60 Winter			56.018
1.007	11	240 Winter	30	+35%	30/15 Summer	100/60 Winter			56.017
1.008	12	240 Winter	30	+35%	30/15 Summer	100/60 Winter			56.017

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Date 02/10/2024 File SW Network.MDX		Designed by JPS Checked by PJG	
Innovyze		Network 2020.1	



100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coefficient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
 Number of Online Controls 1 Number of Storage Structures 4 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.400
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	19.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm) 300.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status OFF
 DVD Status ON
 Inertia Status ON

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
 Return Period(s) (years) 1, 30, 100
 Climate Change (%) 0, 35, 40

WARNING: Half Drain Time has not been calculated as the structure is too full.

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1	15 Winter	100	+40%	100/15 Summer				56.682
1.001	2	15 Winter	100	+40%	100/15 Summer				56.642
2.000	3	15 Winter	100	+40%					57.047
1.002	4	15 Winter	100	+40%	100/15 Summer				56.551
3.000	5	15 Winter	100	+40%	30/15 Summer				57.549
3.001	6	15 Winter	100	+40%	100/15 Summer				57.180
1.003	7	120 Winter	100	+40%	30/240 Winter				56.452
1.004	8	240 Winter	100	+40%	30/15 Summer				56.433
1.005	9	1440 Summer	100	+40%	30/15 Summer				55.822
1.006	10	240 Winter	100	+40%	30/15 Summer	100/60 Winter			56.428
1.007	11	360 Winter	100	+40%	30/15 Summer	100/60 Winter			56.427
1.008	12	360 Winter	100	+40%	30/15 Summer	100/60 Winter			56.427

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