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Aston Hall Barns, Shropshire

Below Ground Drainage Design Strategy, including Site Flood Risk Assessment

Project Number: 10854

Date: September 2021

Content/Quality Assurance

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Prepared	Checked	Approved	Date
HP			

1 Introduction

Purpose

1.1 Mann Williams have been appointed by David and Rosalind Cleevely to provide civil and structural engineering services relating to proposed conservation, limited alteration, and extension of the outbuildings at Aston Hall, in Aston Munslow, Shropshire. We are working as part of a design team led by Giles Quarme Architects.

1.2 The barns form part of the curtilage of Aston Hall which is a Grade II* listed property.

1.3 This document describes the drainage strategy that has been developed for the scheme, in tandem with assessing the associated flood risks and describing how they have been mitigated.

1.4 This document is intended to be used as part of the project planning application.

Pre-Application Advice

1.5 The following guidance regarding drainage requirements has been received from Shropshire Council (ref REAPP/21/00368):

"… Should soakaways not be feasible, drainage calculations should limit the discharge rate from the site, equivalent to 5.0 l/s runoff rate and should be submitted for approval. The attenuation drainage system should be designed so that storm events of up to 1 in 100 year + 25% for climate change will not cause flooding of any properties either within the proposed development site or to any others in the vicinity.
…
The proposed method of foul water sewage disposal should be identified and submitted for approval, along with details of any agreements with the local water authority and the foul water drainage system should comply with the Building Regulations H2. "

(Summary

2 Site Description and Design Parameters / Constraints

Existing drainage

2.1 The house is currently served by a "traditional" septic tank arrangement, which will be decommissioned.

2.2 Much of the existing drainage is in poor condition and will be decommissioned. This also provides an opportunity to "rationalise" historic layouts. Selected existing routes in serviceable / repairable condition will be re-used where they align with the new requirements.

Public drains

2.3 Severn Trent confirm no assets in the area. No discharge to public sewers is possible.

Ground investigation

2.4 Ground investigation indicates sub-soil is unsuitable for soakaway. Underlying ground is the Upper Ludlow Shales – fine-grained mudrocks with tight jointing and limited fracture development. Measured infiltration rates varied from "practically impervious" to c.2.7x10-6m/s (very low permeability). Traditional soakaways must therefore be discounted.

2.5 Ground investigation indicates that near-surface topsoils are likely to be suitable for drainage fields. Preliminary test results indicate percolation rates of Vp = 18-19 s/mm, although further testing is required to conform to building regulations and confirm the detailed design.

Ground water

2.6 The site is on the edge of a groundwater source protection area (on a zone 2/3 boundary). There are boreholes for drinking water at Diddlebury and Munslow.

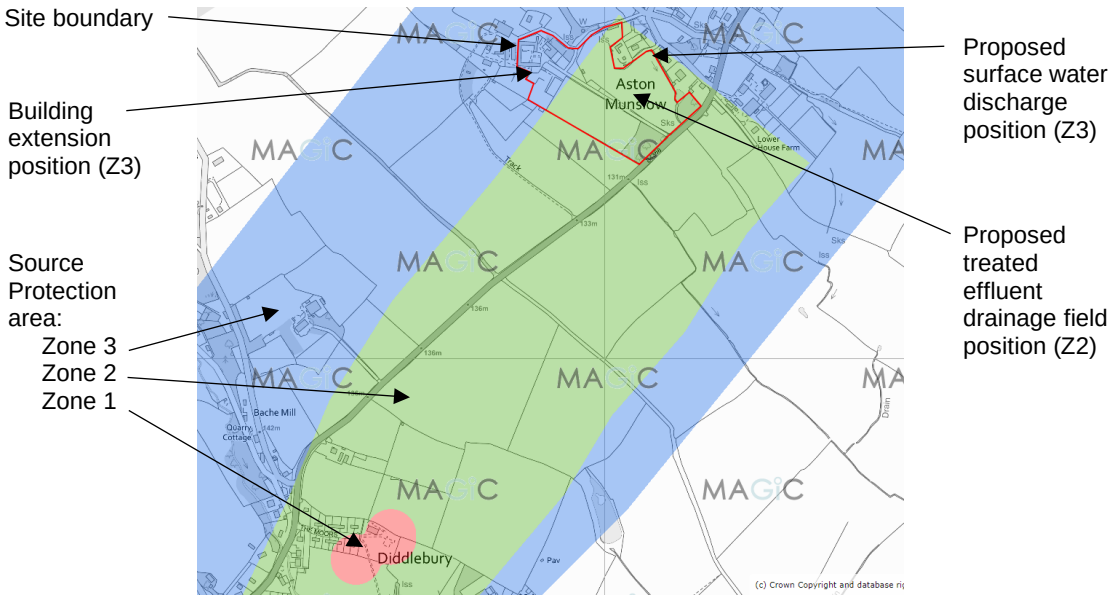


Figure 2.6

Watercourses

2.7 A small watercourse flows across the site, fed from a nearby spring. It is understood that the watercourse occasionally runs dry during summer months, therefore it is unsuitable for treated effluent discharge, but can potentially be used for surface water discharge.

Tree protection

2.8 The layout of new drains has been carefully coordinated to minimise harm to the significant existing trees on site during installation. Inspection chambers within Root Protection Zones have been avoided so far as possible since these can compromise the effectiveness of a cellular confinement root protection mat.

3 Drainage Requirements: Surface Water

3.1 Foul water will be excluded from the surface water system.

3.2 The new driveway and parking areas will be constructed with permeable surfacing and sub-base construction, such that the only impermeable areas on site are the roof surfaces.

3.3 The pool and link-building extension will create additional roof area of 360m^2. The existing tennis court, which has an impermeable surface and an area of 570m^2, is to be removed and replaced with soft landscaping. Therefore the proposals will provide a net reduction in impermeable area on the site.

3.4 However, much of the existing surface water drainage infrastructure is historic and informal, or even absent. For example, many of the barn downpipes simply terminate at the foot of the walls, with no provision for below ground disposal. For the benefit of the listed buildings, it is proposed to improve these existing drainage arrangements through providing suitable new drain connections to all downpipes, to take water away from the buildings to appropriate remote discharge.

3.5 The total impermeable (roof) areas will be as follows (see Appendix A):

Existing main hall:	42	m^2
Existing outbuildings:	856	m^2
New extension:	360	m^2
Total:	**1642**	**m^2**

3.6 Since the site ground conditions are unsuitable for soakaways, surface water is proposed to be discharged into the local watercourse

3.7 In accordance with the pre-application advice, the discharge rate from the site will be limited 5.0 l/s. A Hydrobrake device will be used.

3.8 In accordance with the SuDS hierarchy, an open drainage ditch / swale will be used upstream of the flow control device to provide the required attenuation volume. A volume of 70m^3 has been calculated to be adequate for storm events of up to 1 in 100 year + 25% for climate change. The swale banks will typically have a minimum of 200mm freeboard to prevent over-topping during extreme events; in specific positions the freeboard will be reduced to approximately 100mm so that exceedance flows will be controlled and appropriately directed to low-risk areas.

3.9 In addition to providing storage volume the swale will slow down off-site flows through bioretention and will encourage infiltration into the near-surface soils. These subtle but material benefits have not considered in the theoretical design calculations, so the real performance of the system can be expected to exceed the design requirements.

4 Drainage Requirements: Pool Drain-down water

4.1 The proposals include the construction of a new private indoor swimming pool, with a plan area of 15m x 5m and a total volume of circa 125m^3.

4.2 The pool treatment system will be a low-chlorine type. Full details to be confirmed by a pool specialist.

4.3 Full drain down will only take place very occasionally, for exceptional cleaning / maintenance requirements.

4.4 Prior to a full drain-down event the pool water will be left to stand without treatment to allow for passive venting-off before being discharged. The required duration (generally circa 2-3 days for a low chlorine pool) will be confirmed by a pool specialist.

4.5 In the absence of public drains and since the site ground conditions are unsuitable for soakaways, the only viable option for disposal of drain-down water will be to discharge to surface water. Therefore it is proposed that the drain-down should be connected to the site surface water drainage system, which will ultimately drain into the local watercourse.

4.6 The discharge rate shall be controlled to prevent scouring, flooding etc. Since drain-down will be achieved by pumping from a pool sump into a surface-water gully, then the discharge rate will be automatically limited by the pump capacity without any need for additional flow control downstream. A suitable rate should be agreed with the EA. For example a rate of 2 l/s will result in a drain-down time of around 17hrs.

4.7 Further information from a pool specialist on the nature of the drain-down water will be complied to confirm and demonstrate to the EA that the discharge will not:

- have an impact on the receiving surface water environment;
- contain solid, polluting, offensive or injurious substances;
- contain any substances prejudicial to fish or spawn, or to spawning beds or food of fish;
- have an adverse environmental impact.

5 Drainage Requirements: Foul Water

5.1 Surface water will be excluded from the foul system.

5.2 Foul water is proposed to be treated using a new domestic package treatment plant. Effluent will then be disposed of via a new drainage field constructed in accordance with Building Regulations Part H2 and BS6297:2007.

5.3 The package treatment plant will be CE-compliant.

5.4 The package treatment plant will be sized / specified by the supplier based on an assessment of the site Flows and Loads using the British Water Code of Practice 4, as follows:

Site population assessment:

- 1 Main house with 6 bedrooms & 3 "overspill" attic rooms for kids' bedrooms - say equivalent to 9 bedrooms in total: Allow 11P
- 1 Accessible flat with 1 bedroom: Allow 3P

Total "standardised" population: **14 Persons**

The pool / gym building includes 4 showers, 1 bath & 1 WC. The facility will be treated as equivalent to a "health club" for load assessment purposes.

	Flow (l)	**BOD (g)**	**Ammonia (N)**
Domestic	150	60	8
Health club	50	19	4
Total per person	200	79	12
Site Total (14P):	**2800**	**1106**	**168**

(Plus pool backwash flows – see Section 7 - details to be advised)

5.5 The following effluent quality will be requested:
20 mg/l BOD
30 mg/l SS
20 mg/l NH_3 N

5.6 Since the predicted total flow exceeds 2m^3/day, and includes backwash water, an environmental permit to discharge will be applied for.

6 Drainage Requirements: Pool Filter Back-wash water

6.1 Filter backwash is classified as a trade effluent. The volume and frequency of filter backwash water is to be advised by a pool specialist, together with details of the potential substances and concentrations present (available from the supplier/manufacturer of the filters).

6.2 Backwash water will be left to stand and passively vent-off before being discharged. The required duration will be confirmed by a pool specialist (generally circa 2-3 days for a low chlorine pool).

6.3 Since neither disposal to public sewer nor disposal to deep soakaway are feasible on this site, the only viable option is to use the proposed domestic package treatment plant to treat the backwash together with the general foul water. Disposal of the treated effluent will therefore be as per the site foul drainage system, which is to a drainage field.

6.4 An environmental permit will be applied for. This will require the input of environmental / hydrological specialists, to make an assessment of:

a) Details of the proposed treatment system and discharge arrangements.
b) Site parameters: height of the water table, percolation (Vp) results, soil conditions. This will require further on-site ground investigation as noted above.
c) Demonstration that there is no risk of run-off to surface waters.
d) Assessment of the vulnerability of the underlying ground waters to pollution, considering the proximity of other abstractions, groundwater flows etc.

6.5 The domestic package treatment plant will be specified to ensure that it is capable of treating the filter backwash without adversely impacting on the treatment facility and effluent discharge quality.

6.6 The volume, frequency and details of the backwash water (to be advised by a pool specialist) will form part of the specification to the treatment plant manufacturer, who will then need to confirm that the proposed plant can effectively treat the proposed backwash and will operate satisfactorily in the anticipated conditions and patterns of use.

7 Flood Risk Assessment

Site Location and Setting

7.1.1 The full site address is Aston Hall, Aston Munslow, Craven Arms, Shropshire, SY7 9ER.

7.1.2 The site is located in an inland, rural, farmland setting, on the edge of the Shropshire Hills AONB, on a south-east-facing slope with an average gradient of approx. 1 in 13.

7.1.3 The total site area is approx. 5.3 hectares.

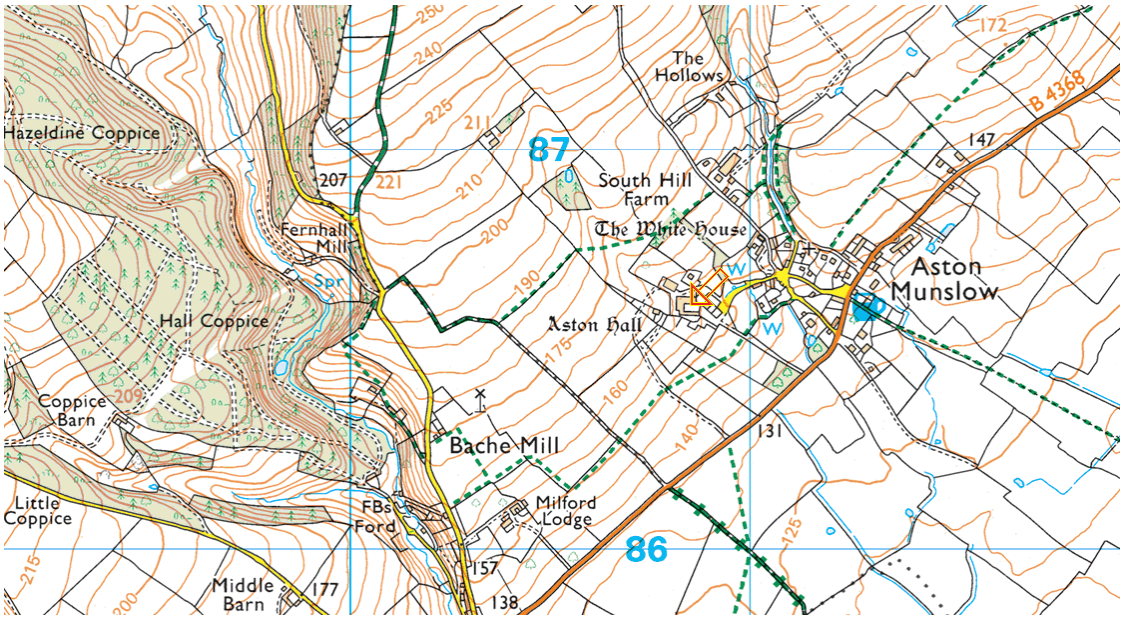


Fig 7.1.1 - Location plan (streetmap / ordnance survey)

Existing site, ground conditions and infiltrations characteristics

7.2.1 As illustrated in the aerial image below, the site is dominated by greenfield spaces including fields (currently mainly used for livestock grazing), woodland, and domestic garden areas. The existing buildings are mostly clustered around the western / upslope area, and comprise a main historic manor house, a C-shaped group of adjoining historic barns, and various other minor outbuildings.

7.2.2 There is also an existing hard-surfaced tennis court, which is proposed to be removed and replaced with soft landscaping.

7.2.3 As noted in Section 2 of this report, a ground investigation has concluded that the site sub-soil is unsuitable for soakaway. Underlying ground is the Upper Ludlow Shales – fine-grained mudrocks with tight jointing and limited fracture development. Measured infiltration rates varied from "practically impervious" to c.2.7x10-6m/s (very low permeability).

7.2.4 The Soilscapes database (Cranfield Soil and Agrifood Institute) indicates that the site has "*freely draining* slightly acid loamy soils". This correlates with on-site percolation rates testing of the near-surface soils, with preliminary test results indicating percolation rates of Vp = 18-19 s/mm. Therefore, although the ground at depth is unsuitable for soakaways, the near-surface soils are expected to have good capacity to absorb rainfall.

https://www.bing.com/maps - Plan not to scale.

KEY:

01 Aston
02 Aston Hall - Main entrance
03 Aston Hall - Main Hall
04 Aston Hall - Outbuildings
05 Aston Hall - Walled garden partially outside of property boundary
06 Aston Hall - Pond
07 Gazebo/tea house outside of property boundary
08 Pond out of property boundary
Property boundary

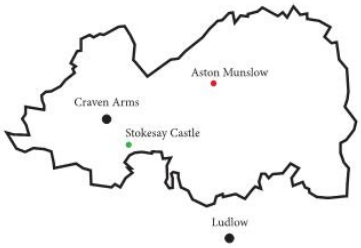


Fig 7.2.1 – Site diagram

7.2.5 Maps indicate a small local watercourse which skirts the north boundary of the site, as highlighted below. This is understood to issue from a spring, and returns to ground at various points along its length, including close to where it exits the eastern site boundary. It is understood the stream can occasionally run dry in summer months.

Fig 7.2.1 – Intermittent local watercourse

7.2.6 The nearby surface water features including ponds, wells, issues and sinks can also be identified in the plan below. Such features appear to be characteristic of the local area.

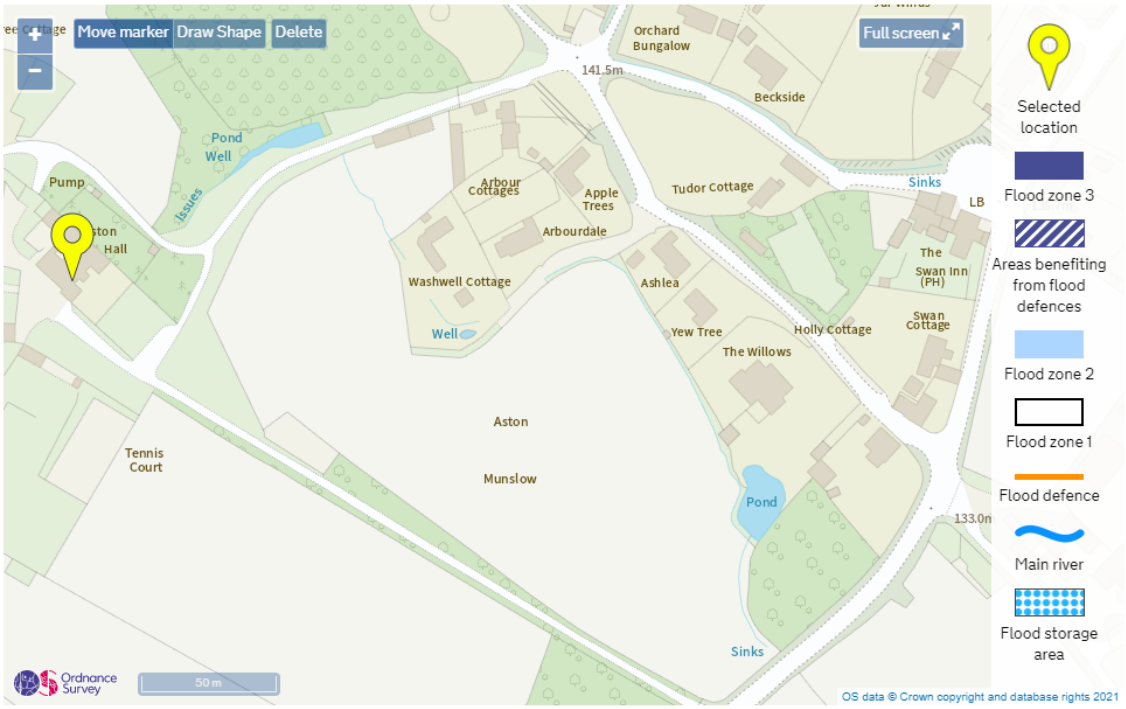


Fig 7.2.3 – local surface water features

Proposed development

7.3.1 The proposed development comprises the construction of a new single-storey pool barn, together with a linking building to the existing barns.

7.3.2 The total new roof area is 360m2, equivalent to less than 0.7% of the total site area.

7.3.3 Considering the removal of the existing tennis court (570m2), the net effect of the proposals is a reduction in impermeable site area.

7.3.4 However, the existing surface water drainage provisions to the historic buildings on site are unsatisfactory, with many areas draining either directly to the ground at the foot of the external walls, or else to informal soakaways of unknown construction and condition. It is therefore proposed to provide a new surface water drainage system serving all of the main buildings on site, both old and new. The total design catchment area of this system will be 1,642m2, as illustrated in Appendix A.

7.3.5 The new driveway will be designed with permeable construction. Although the ground investigation indicated very limited permeability of the site bedrock, it is noted that there was some variation, with the rockhead being more 'crumbly' in some areas than others. It is also noted that the depth to standing groundwater is >2m, and that despite the lack of formal drainage provision to many of the existing buildings there are no known issues of surface water problems affecting the site historically. It is therefore considered that although the permeability of the ground at any specific point will not be reliably adequate to enable soakaway design for bulk rainwater disposal, the average permeability over wider areas of the site (and including the beneficial effects of near-surface soils) will be sufficient for permeable road construction to perform satisfactorily. It was also noted in the ground investigation that the site soils should be relatively non-susceptible to deterioration due to traffic and weather, indicating that they are structurally compatible with permeable road construction.

7.3.6 There are no proposals to alter the straight section of existing driveway leading off the main road to the upper entrance gates.

Flood Risk

7.4.1 The site is located in Flood Risk Zone 1 and is categorised as having a Very Low Risk of flooding from rivers and Very Low Risk of flooding from surface water.

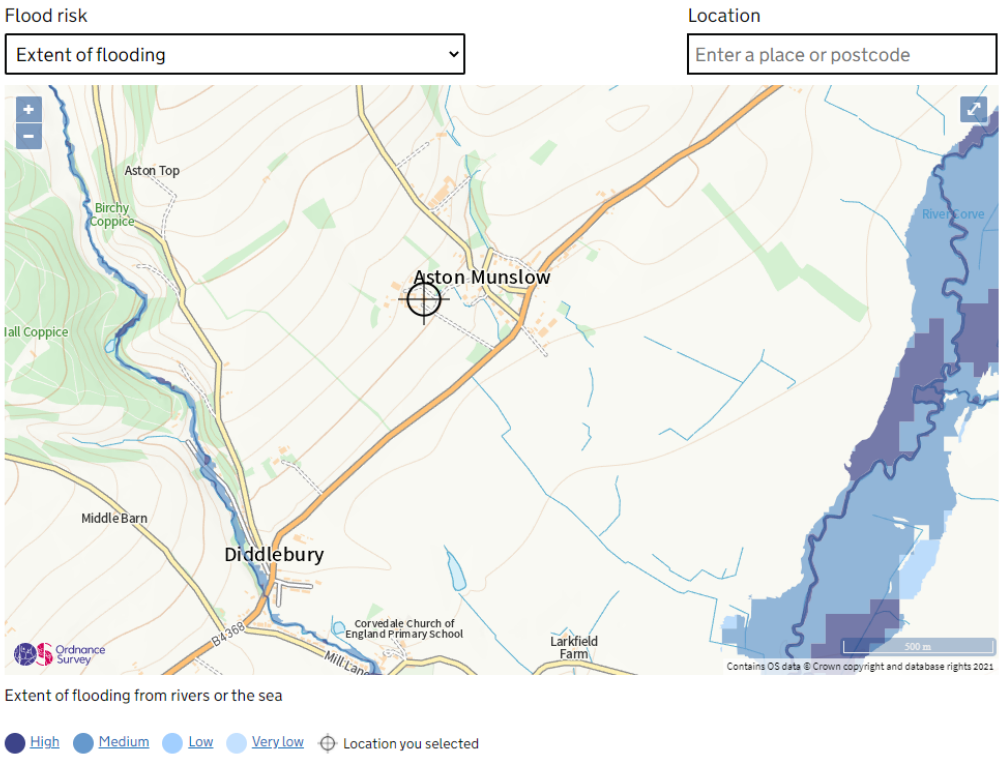


Fig 7.4.1 - Rivers and sea flood risk

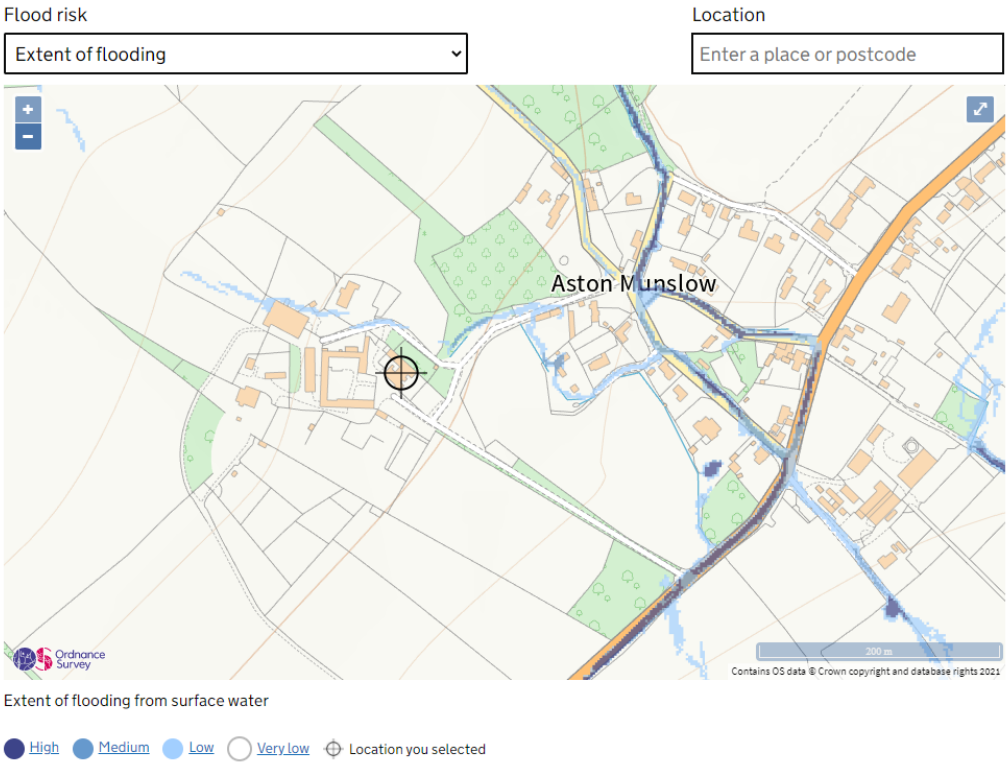


Fig 7.4.2 - Surface water flood risk

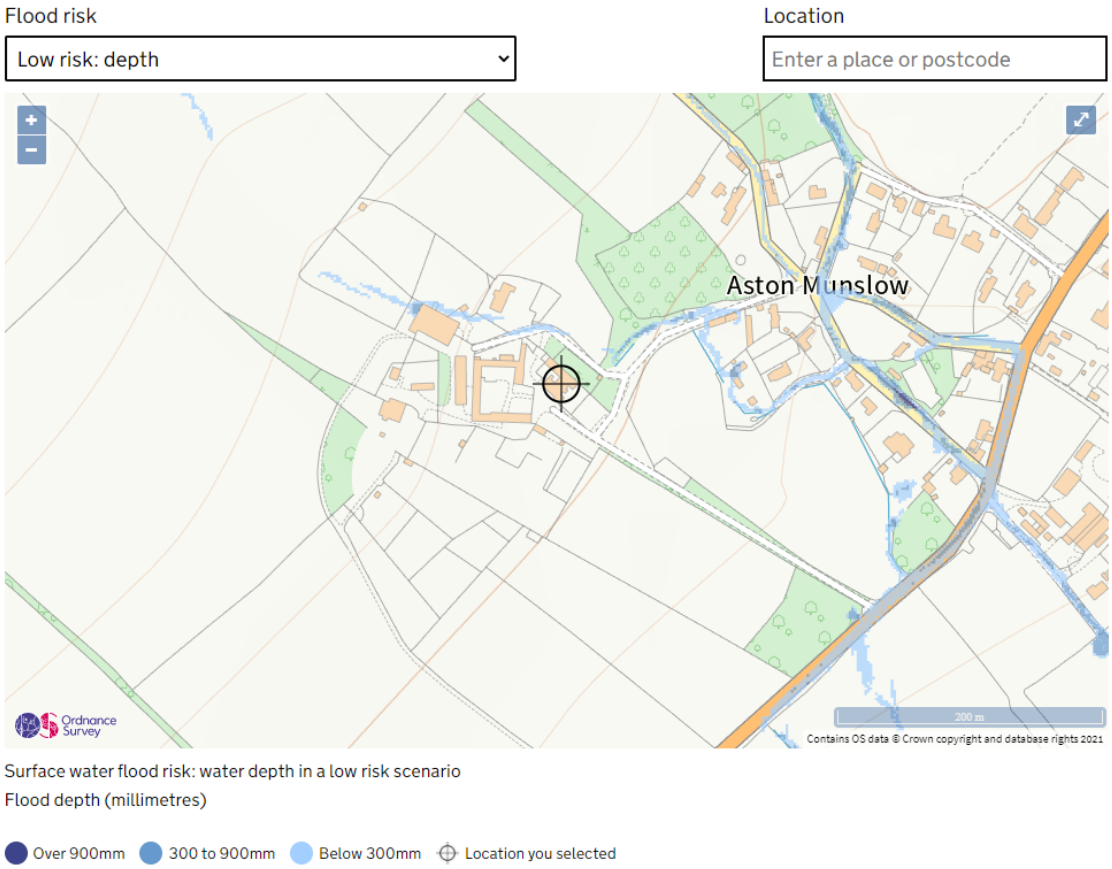


Fig 7.4.3 – Low risk flood depth

Permitted run-off

7.5.1 The local authority have proposed that 5.0 l/s is an acceptable discharge limit from the site, with design for storm events of up to 1 in 100 year + 25%.

Surface water drainage strategy

7.6.1 A new surface water drainage network is to be installed at the site.

7.6.2 DEFRA & the SuDS Manual recommend a sustainable approach to managing runoff from impermeable areas.

7.6.3 In accordance with the sustainable drainage hierarchy options for disposal of surface water drainage have been investigated. From the SuDS hierarchy, the most favourable viable method for this site is to discharge into the local watercourse via a vegetated pond, ditch or swale, to provide pollution reduction, landscape and wildlife benefit. The feature will be unlined and will allow infiltration, but the system will be designed at this stage on the precautionary principle allowing discharge into the natural receiving watercourse, mimicking the existing characteristics.

7.6.4 Calculations indicate that a storage capacity of 68.5m3 is required for the peak design scenario (see Appendix B – storage calculation).

7.6.5 It is proposed to provide this via an unlined ditch / swale feature with a minimum volume of 70m3, with the discharge rate controlled to 5.0l/s using a Hydrobrake. A site stormwater strategy drawing is including in Appendix C.

7.6.6 The additional attenuation effect of in-line upstream drains and manholes has been ignored at this preliminary stage. More significantly, the calculations have not allowed for the effect of infiltration into near-surface soils, which is difficult to accurately quantify, but based on site percolation tests, can be expected to have a substantial beneficial effect on the performance of the drainage system in practice. The proposed design is therefore considered conservative, reflecting an precautionary approach at this stage.

7.6.7 Subject to landscaping design by others, the swale may include permanent pools or marsh areas to further enhance biodiversity, which will not affect the operational requirements. The banks of the swale will rise to typically least 200mm above the design top water level to provide freeboard, and will be sloped at 1 in 3 for safety.

7.6.8 Permeable hard and soft landscaping will discharge via infiltration at source.

Discharge off site

7.7.1 The proposed attenuation swale will control the discharge rate for all events up to 1 in 100 years + 25% allowance for climate change, to 5.0 l/s maximum. The surface water will be discharged into the local watercourse where it passes along the edge of the site.

7.7.2 The detailed flood risk maps indicate that the only nearby downstream property with buildings having flood risk potential above Very Low is Washwell Cottage. So as not to elevate any risk to this property it is proposed to discharge into the watercourse further downstream, approximately as indicated below. From this point the watercourse is considered suitable for receiving the 5.0 l/s discharge limit without adversely or significantly affecting existing flood risks to any properties locally downstream, all of which are categorised as having Very Low Risk (with the exception of very marginal and localised areas well away from building structures).

Figure 7.7.1

7.7.3 The outfall will be formed using a suitable small precast concrete headwall to prevent erosion at the point of discharge, at a precise position will be selected on site to cause minimum installation disturbance.

Maintenance and management

7.8.1 The drainage system will be private and will be managed and maintained by the homeowner. The proposals have been designed to require minimal maintenance.

7.8.2 The outlet from the swale to the flow control chamber will have a trash screen to prevent entry of debris into the system. The flow control chamber will have a catch pit to separate sediment from the system. The flow control device should be inspected on a 6 monthly basis or as recommended by the manufacturer. If water is seen to linger in the ponds for longer than anticipated investigations should be carried out to identify and correct any problems as appropriate.

7.8.3 Landscaping surrounding the vegetated ponds/basins should be maintained regularly to manage debris from trees etc entering the system and causing blockages.

Exceedance flows

7.9.1 In extreme events beyond the 1 in 100 years + 25% design scenario, there will be potential for the attenuation swale to overtop.

7.9.2 The banks of the swale will be formed to direct such exceedance flows over ground across the downslope fields to the south-east, where they will have minimum potential to increase risk of flooding to any property, and maximum potential to be slowed by vegetation and to benefit from any available infiltration capacity in the near-surface soils before reaching the highway which is approximately 230m further downslope.

7.9.3 To control the discharge route of exceedance flows, it is proposed that a broad portion of the south-east bank of the swale will have a reduced freeboard of around 100mm, while the remainder of the swale will be constructed with at least 200mm freeboard. The width of the overflow zone will be generous, around 20m, and it will be formed as level as possible, to encourage a disperse exceedance discharge which will maximise infiltration potential and minimise flow velocity.

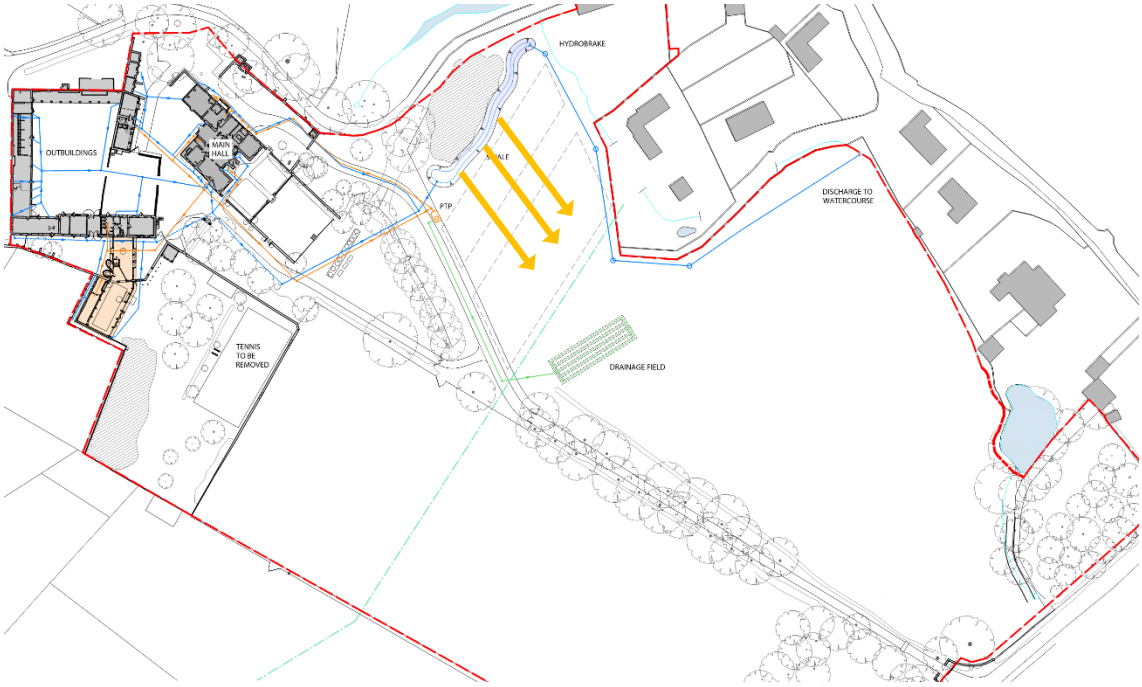


Figure 7.9.1 – Exceedance flows

7.9.4 Since direct infiltration from the swale has been conservatively neglected in the design, and the minimum 100mm freeboard will increase the actual attenuation volume by at least 30%, the true probability of exceedance occurring will be exceedingly small.

7.9.5 This strategy complies with CIRIA 625 Designing for Exceedance.

Policy

7.10.1 The development is in Flood Zone 1, and is therefore appropriate in terms of flood risk.

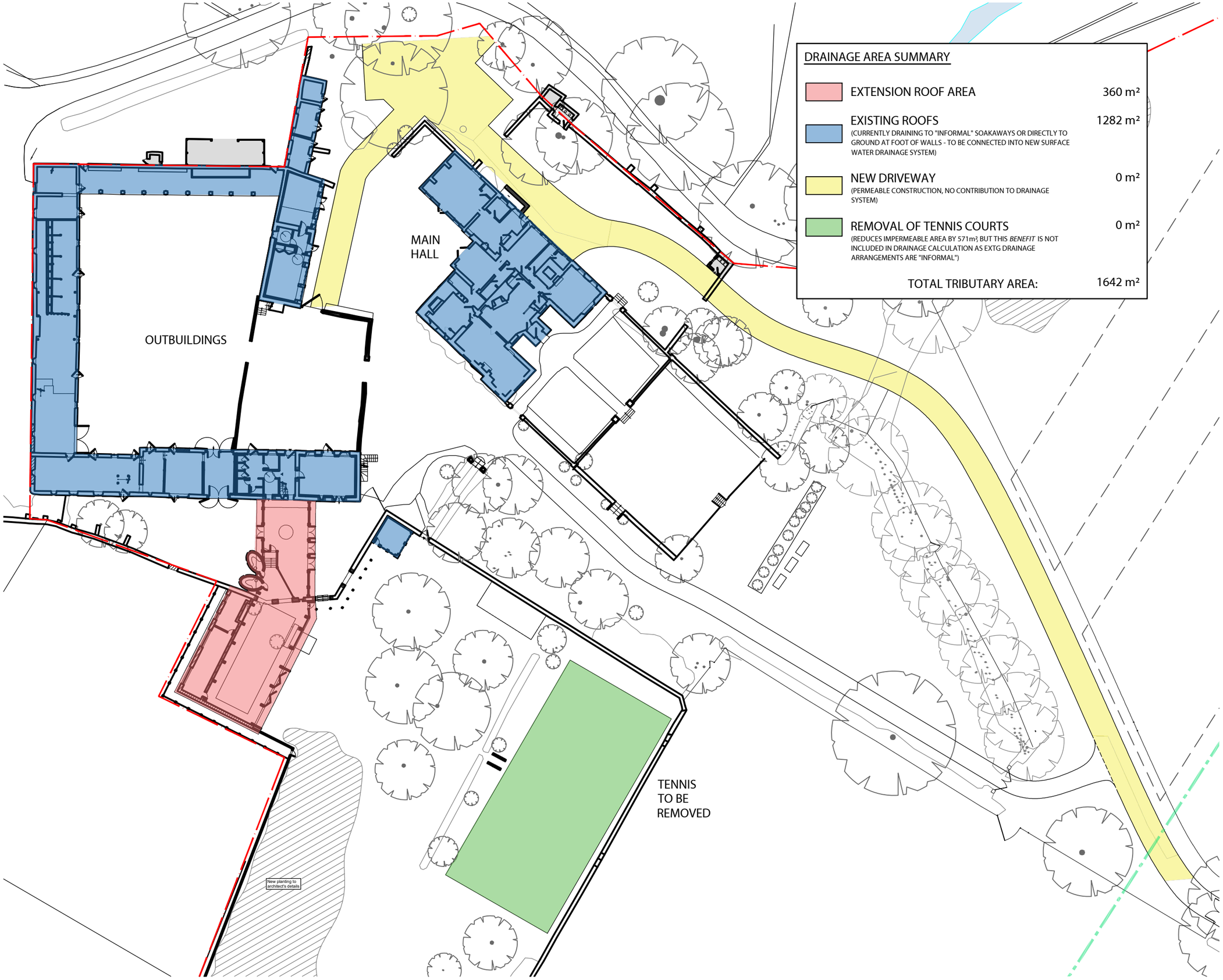
7.10.2 Runoff will be managed by attenuation and the surface water drainage system has been designed to accommodate a 100 year return period with 25% increase due to climate change.

7.10.3 The development introduces a high quality sustainable drainage solution which meets the highest target in the SuDS hierarchy for this site.

7.10.4 The proposal therefore complies with the guidance in the NPPF and local policies.

Appendix A

Catchment area diagram



DRAINAGE AREA SUMMARY

EXTENSION ROOF AREA		360 m²
EXISTING ROOFS	(CURRENTLY DRAINING TO "INFORMAL" SOAKAWAYS OR DIRECTLY TO GROUND AT FOOT OF WALLS - TO BE CONNECTED INTO NEW SURFACE WATER DRAINAGE SYSTEM)	1282 m²
NEW DRIVEWAY	(PERMEABLE CONSTRUCTION, NO CONTRIBUTION TO DRAINAGE SYSTEM)	0 m²
REMOVAL OF TENNIS COURTS	(REDUCES IMPERMEABLE AREA BY 571m²; BUT THIS *BENEFIT* IS NOT INCLUDED IN DRAINAGE CALCULATION AS EXTG DRAINAGE ARRANGEMENTS ARE "INFORMAL")	0 m²
TOTAL TRIBUTARY AREA:		1642 m²

NOTES

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3. Any ambiguities or discrepancies between this drawing and any other information given elsewhere must be reported to Mann Williams for clarification before work proceeds.
4. All dimensions to be checked on site and any discrepancies reported to the engineer before work commences.
5. Only figured or calculated dimensions should be used and no drawing , in any format should be scaled for construction purposes.
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SCALE BAR 1:500

0 20m

REV	DESCRIPTION	BY	DATE
P1	ISSUED FOR PLANNING	HP	16.09.2021

P-PRELIMINARY T-TENDER CONSTRUCTION

PROJECT
ASTON HALL BARNS

TITLE
BELOW GROUND DRAINAGE

TRIBUTARY AREA ANALYSIS

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DRAWN	CHKD	SIZE	SCALE	DATE
HP		A3	1:500	SEPT '21

STATUS
PRELIMINARY

PROJECT	DRAWING	REV
10854	520	P1

Appendix B

Surface water attenuation design calculations

Aston Hall Barns, Shropshire HP
Project 10854 Sep-21

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ATTENUATION DESIGN

RAINFALL CALCULATIONS

Calculated using TEDDS, based on the Wallingford Procedure

Return period =	100yr
Ratio of 60 min to 2 day rainfall of 5 yr return period =	0.35
5-year return period rainfall of 60 min duration =	18.5mm

Storm duration (min)	Design Intensity (mm/hr)	Plus 25%
5	144.8	181.0
10	106.6	133.3
15	88.2	110.3
30	57.7	72.1
60	37.3	46.6
120	22.9	28.6
240	13.8	17.3
360	10.2	12.8
600	6.9	8.6
1440	3.5	4.4

ATTENUATION DESIGN

Max. outflow	5.0	l/s	
Mean outflow reduction due to head-discharge relationship	25.0	%	(conservative, based on using a Hydrobrake)
Impermeable area	1642	m2	
Interception rainfall depth	5	mm	

Storm duration (min)	Design Intensity (mm/hr)	Storm rainfall (mm)	Storm rainfall less interception (mm)	Total inflow (m3)	Outflow (m3)	Required storage (m3)
5	215.4	18.0	13.0	21.3	1.1	20.1
10	156.5	26.1	21.1	34.6	2.3	32.4
15	128.6	32.1	27.1	44.6	3.4	41.2
30	83.5	41.7	36.7	60.3	6.8	53.6
60	52.8	52.8	47.8	78.5	13.5	65.0
120	31.6	63.2	58.2	95.5	27.0	68.5
240	18.6	74.4	69.4	113.9	54.0	59.9
360	13.5	81.1	76.1	125.0	81.0	44.0
600	9.0	89.7	84.7	139.1	135.0	4.1
1440	4.6	109.2	104.2	171.1	324.0	0.0
					max:	**68.5** m3

Appendix C

Existing site drainage drawing

DUTCH BARN

OUTBUILDINGS

MAIN HALL

TENNIS

In poor condition

Buried m/h 8m from MH8. Pipe blocked beyond.

MH9 buried / not lifted
Run not surveyed. MH10 speculated.

Partial blockage at blind junction

Tree roots. Unable to survey further. Assumed effluent discharge to soakaway.

Possible alternative position of buried m/h 4

Buried / unable to locate

Generally downpipes on front elevations of west (& possibly south) barn(s) appear to drain directly to ground at foot of walls, with no below ground connections.

Stone in pipe. Unable to progress survey

Survey terminated in rubble and standing water @ 32m from m/h. Assumed to lead to informal soakaway

MH1 MH2 MH3 MH4 MH5 MH6 MH7 MH8 MH9 MH10 MH11 MH12 MH13

SEPTIC TANK

blind junction?

RWP GY

KEY

- Foul or combined drain
- Assumed route
- Surface water drain
- Assumed route

RWP Highlighted drainage features are ones for which the discharge routes / connection details were not established by survey.

NOTES

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4. All dimensions to be checked on site and any discrepancies reported to the engineer before work commences.
5. Only figured or calculated dimensions should be used and no drawing , in any format should be scaled for construction purposes.

SCALE BAR 1:200

0 10m

REV	DESCRIPTION	BY	DATE
P1	ISSUED FOR PLANNING	HP	08.09.2021

P-PRELIMINARY T-TENDER CONSTRUCTION

PROJECT
ASTON HALL BARNS

TITLE
BELOW GROUND DRAINAGE

AS EXISTING

MANN WILLIAMS
CONSULTING CIVIL AND STRUCTURAL ENGINEERS
7 OLD KING STREET
QUEEN SQUARE
BATH BA1 2JW
T 01225 464419
F 01225 448651
E bath@mannwilliams.co.uk

DRAWN	CHKD	SIZE	SCALE	DATE
HP		A0	1:200	SEPT 21

STATUS
PRELIMINARY

PROJECT	DRAWING	REV
10854	500	P1

Appendix D

Proposed Drainage Strategy drawings

NOTES

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5. Only figured or calculated dimensions should be used and no drawing , in any format should be scaled for construction purposes.

DUTCH BARN

New connection TBC

OUTBUILDINGS

MAIN HALL

No internal alterations to drainage within Main Hall, but generally new external drains to serve existing connection points

New drain and driveway layout configured to minimise potential impact on significant trees.

New driveway to have permeable construction

New connections to existing roof drainage from outbuildings

Existing drainage from rear elevations piped under building to reduce impact on neighbour

Changing areas

Note these drains are existing (m/h is new)

Pool filter backwash to be allowed to passive vent off to atmosphere for 2-5 days prior to discharge into site FOUL water system. Detailed arrangements TBC by pool specialist.

Pool drain-down (exception events) to be discharged into surface water gully. Discharge rate to be controlled by pump and to be agreed with EA. Detailed arrangements TBC by pool specialist.

Indicates extent of new extension, 360m² plan area.

Pool to be low-chlorine type. Details TBC by pool specialist. Total volume approx. 125m³.

570m² extg hard surfacing returned to soft landscaping

TENNIS TO BE REMOVED

RWP GY GY? SVP RWP? RWP

KEY

- Surface water drain (new)
- Surface water drain (existing / refurbished)
- Foul drain (new)
- Foul drain (existing / refurbished)
- Treated Effluent drain (new)
- Effluent infiltration drain (new)

N

SCALE BAR 1:200

0 10m

REV	DESCRIPTION	BY	DATE
P1	ISSUED FOR PLANNING	HP	08.09.2021
P2	REVISED (ISSUED FOR PLANNING)	HP	17.09.2021

P-PRELIMINARY T-TENDER CONSTRUCTION

PROJECT
ASTON HALL BARNS

TITLE
BELOW GROUND DRAINAGE

OUTLINE STRATEGY
AS PROPOSED
SHEET 1 (WEST)

MANN WILLIAMS
CONSULTING CIVIL AND STRUCTURAL ENGINEERS
7 OLD KING STREET
QUEEN SQUARE
BATH BA1 2JW
T 01225 464419
F 01225 448651
E bath@mannwilliams.co.uk

DRAWN	CHKD	SIZE	SCALE	DATE
HP		A1	1:200	SEPT '21

STATUS
PRELIMINARY

PROJECT	DRAWING	REV
10854	510	P2

Intake headwall

Chamber with Hydrobrake flow control device.
Flow limited to 5.0 l/s

New planting to architect's details

Swale / open ditch
- To provide attenuation volume, with bioretention, and to encourage infiltration into the near-surface soils
- Providing min. 70m³ storage, plus freeboard.
- Precise layout TBC to suit site landscaping details and contours.

Freeboard reduced to approx. 100mm to form controlled overflow zone for exceedance flows. Elsewhere freeboard to be 200mm+.

GSHP Borehole Zone

GSHP Borehole Zone

Discharge headwall

CE-compliant domestic packaged treatment plant
- Designed to treat both foul water and pool backwash flows
- Details TBC by supplier

New driveway to have permeable construction

Drainage field constructed to BS6297 standard.
- *Application for Environmental Permit required.*
- Shallow infiltration into near-surface soils above Ludlow Shales rock head.
- Ground levels may need to be locally raised by 1-200mm using topsoil to achieve a minimum available depth of 0.5m above the rock head.
- Approx. 30m x 10m gross area, with approx. 120m² infiltration area, all TBC following completion of BS-compliant percolation tests.
- Precise position and alignment TBC to suit contours, crossing natural slope at an angle to achieve a 1:200-300 pipe gradient at approx. constant depth.

Public Footpath

Outfall headwall: Surface water discharge into local watercourse

ırbished)

KEY

- Surface water drain (new)
- Surface water drain (existing / refurbished)
- Foul drain (new)
- Foul drain (existing / refurbished)
- Treated Effluent drain (new)
- Effluent infiltration drain (new)

NOTES

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4. All dimensions to be checked on site and any discrepancies reported to the engineer before work commences.
5. Only figured or calculated dimensions should be used and no drawing , in any format should be scaled for construction purposes.

N

SCALE BAR 1:200

0 10m

REV	DESCRIPTION	BY	DATE
P1	ISSUED FOR PLANNING	HP	17.09.2021

P-PRELIMINARY T-TENDER CONSTRUCTION

PROJECT
ASTON HALL BARNS

TITLE
BELOW GROUND DRAINAGE

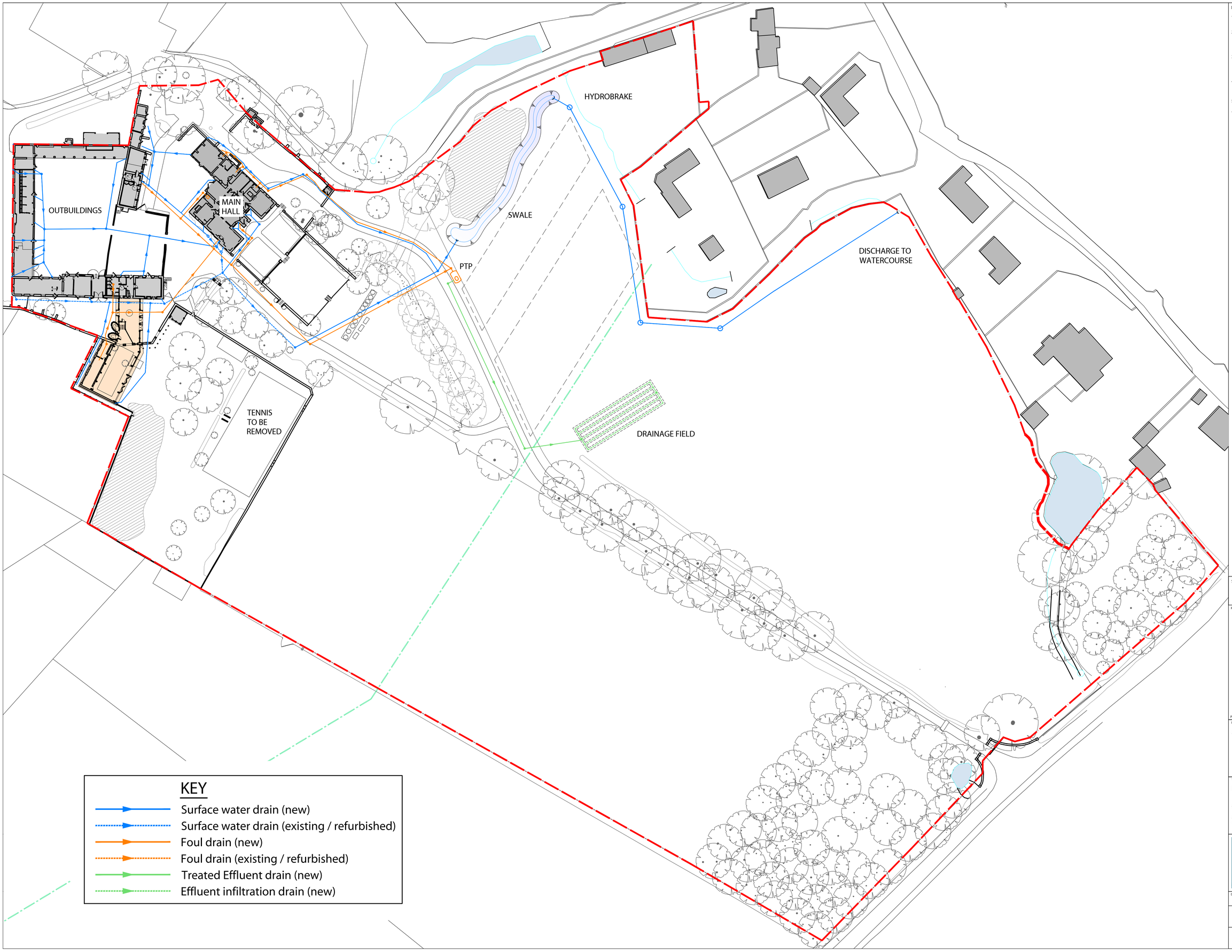
OUTLINE STRATEGY
AS PROPOSED
SHEET 2 (EAST)

MANN WILLIAMS
CONSULTING CIVIL AND STRUCTURAL ENGINEERS
7 OLD KING STREET
QUEEN SQUARE
BATH BA1 2JW
T 01225 464419
F 01225 448651
E bath@mannwilliams.co.uk

DRAWN	CHKD	SIZE	SCALE	DATE
HP		A1	1:200	SEPT '21

STATUS
PRELIMINARY

PROJECT	DRAWING	REV
10854	511	P1



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4. All dimensions to be checked on site and any discrepancies reported to the engineer before work commences.
5. Only figured or calculated dimensions should be used and no drawing , in any format should be scaled for construction purposes.

N

SCALE BAR 1:500

0 25m

REV	DESCRIPTION	BY	DATE
P1	ISSUED FOR PLANNING	HP	17.09.2021

P-PRELIMINARY T-TENDER CONSTRUCTION

PROJECT
ASTON HALL BARNS

TITLE
BELOW GROUND DRAINAGE

OUTLINE STRATEGY
AS PROPOSED
SHEET 3 (SITE OVERVIEW)

MANN WILLIAMS
CONSULTING CIVIL AND STRUCTURAL ENGINEERS
7 OLD KING STREET
QUEEN SQUARE
BATH BA1 2JW
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F 01225 448651
E bath@mannwilliams.co.uk

DRAWN	CHKD	SIZE	SCALE	DATE
HP		A1	1:500	SEPT '21

STATUS
PRELIMINARY

PROJECT	DRAWING	REV
10854	515	P1

Appendix E

Site infiltration and percolation test results

Intégrale
Understanding Ground Conditions

Suite 7, Westway Farm Business Park
Wick Road, Bishop Sutton,
Somerset BS39 5XP United Kingdom

Tel: 01275 333036
www.integrale.uk.com

Proposed Barns Conversion
Aston Hall Barns
Aston Hall
Aston Munslow
Shropshire
SY7 9ER

GEOTECHNICAL AND PHASE 1I CONTAMINATION REPORT

REPORT NO. 21035, September 2021

Mann WIlliams Note:
The following pages are an excerpt from the full report, showing the details of infiltration / percolation testing only.

Intégrale is a trading name of Integrale Limited
Registered Office: The Granary, Chewton Fields, Ston Easton,
Somerset, BA3 4BX, United Kingdom
Company Registration No. 2855366 England VAT Reg. No. 609 7402 37

Geotechnical and Phase II Contamination Report
Proposed Barns Conversion
Aston Hall Barns
Aston Hall
Aston Munslow
Shropshire
SY7 9ER

Client: Mr. & Mrs. D Cleevely

Intégrale Report No. 21035, September 2021

		Signature/Date
Project Co-ordinator & Report Preparation:	Joseph Begaj	
Mentor Consultant & Advice:	Gareth Thomas	
Technical Director & Report Overview:	Dr. Kay Boreland	
Final Check:	Joseph Begaj	

CONFIDENTIALITY STATEMENT

This report is addressed to and may be relied upon by the following:

Mr. & Mrs. D Cleevely
Aston Hall
Aston Munslow
Shropshire
SY7 9ER

Integrale Limited has prepared this report solely for the use of the client named above. Should any other parties wish to use or rely upon the contents of this report, written approval must be sought from Integrale Limited. An assignment fee may then be charged.

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Tel: 01275 333036 www.integrale.uk.com

Registered Office: The Granary, Chewton Fields, Ston Easton, Somerset, BA3 4BX, United Kingdom Company Registration No. 2855366 England

N
W
E
S

PUMP

TP14

TP15

TP16

TP17

Coach House

Main Hall

For Trial Pits in/around existing barns
see Figure 1B

BH02

A

A'

Barn
Conversions

TP08

BH03

BH01

TP12

Proposed
Link
Building

TP29

Proposed
Pool
Building

TP13

Proposed
Ancillary
Buildings

TENNIS

Tennis Court
(to be replaced by
'kitchen garden')

Field

Route of new
driveway
and parking

TPE

TPD

TPC

Field

Area of proposed
drainage field

TPG

TPF

Key:

- Rotary Cored/Probed Borehole
- Mechanical Trial Pit
- Hand excavated Trial Pit
- Percolation Test

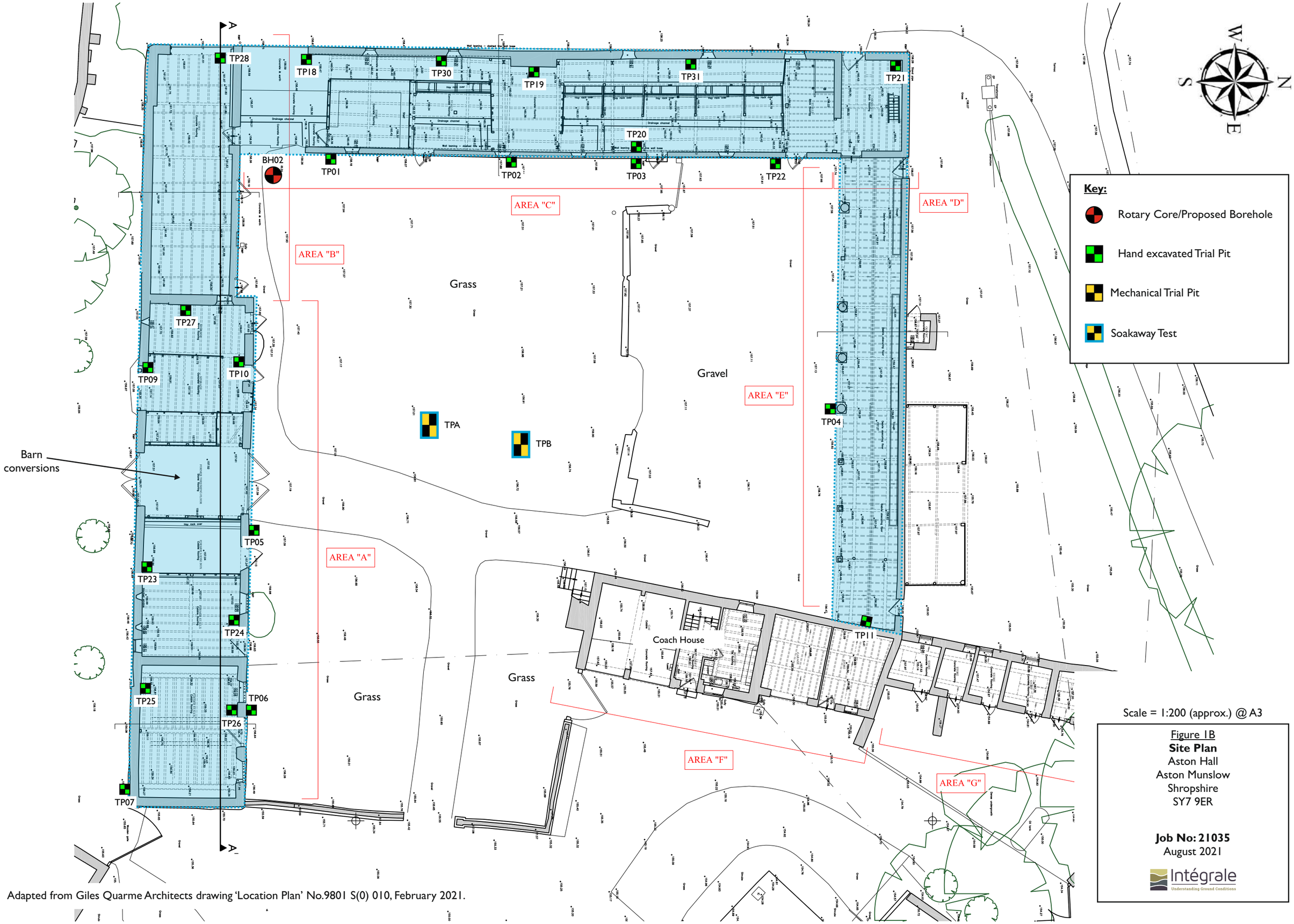
Adapted from Giles Quarme Architects drawing 'Location Plan' No.9801 S(0) 001, February 2021.

Scale = 1:500 (approx.) @ A3

Figure 1A
Site Plan
Aston Hall
Aston Munslow
Shropshire
SY7 9ER

Job No: 21035
August 2021

Intégrale
Understanding Ground Conditions



Adapted from Giles Quarme Architects drawing 'Location Plan' No.9801 S(0) 010, February 2021.

Scale = 1:200 (approx.) @ A3

Figure 1B
Site Plan
Aston Hall
Aston Munslow
Shropshire
SY7 9ER

Job No: 21035
August 2021

Intégrale
Understanding Ground Conditions

Intégrale
Understanding Ground Conditions

Suite 7, Westway Farm Business Park
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BS39 5XP, United Kingdom

Tel: 01275 333036
www.integrale.uk.com

STANDARD METHODOLOGY FOR SOAKAWAY TESTING

Some trial pits also include soakaway testing in order to assess the soils permeability for design of stormwater drainage. The soakaway tests were completed in accordance with BRE Digest 365 (September 1991). This included excavation of pits to generally 1-2m depth, which were then filled with water on one to three occasions depending on the rate of infiltration. The water was supplied by a water bowser and discharged into the pits using a centrifugal pump. The falling head was recorded and therefore the rate of infiltration into the soils beneath.

The soakaway results have been prepared using a Microsoft Excel spreadsheet.

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Understanding Ground Conditions

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Bishop Sutton
BS39 5XP
Tel: 01275 333 036
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Job No:	21035	**Soil Infiltration Rate Test**			
		BRE 365 (2007) Soakaway Design			
Job Name:	Aston Hall Barns, Aston Munslow			Hole:	**TPA**
Prepared By:	JB	Date:	02/09/2021	Sheet:	1 of 2
Checked By:		Date:			

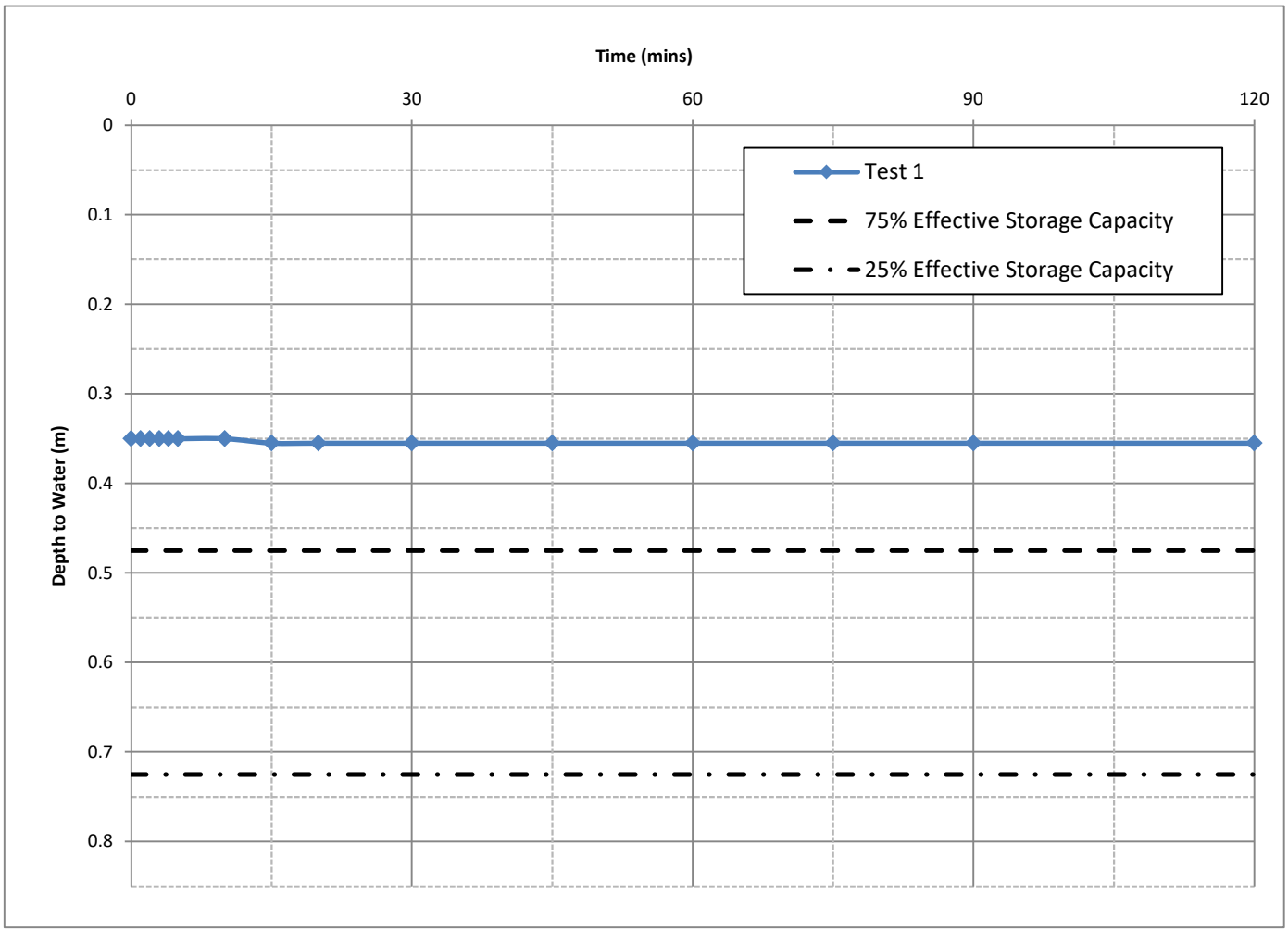
Date of Test: **9th July 2021**

Length (m): **1.80** **Width (m):** **0.60** **Depth (m):** **0.85**

Remarks: Testing terminated after negligible infiltration recorded in 2 hours.

	Test 1	Test 2	Test 3
Effective Storage Depth$_{75\text{-}25\%}$ (m)	0.25	-	-
A = Surface Area$_{50\%}$ (m^2)	2.28	-	-
V = Effective Storage Volume$_{75\text{-}25\%}$ (m^3)	0.27	-	-
t = Time$_{75\text{-}25\%}$ (mins)	-	-	-
Soil Infiltration Rate (m/s)	**N/A**	**-**	**-**

Soil Infiltration Rate (m/s)	**Practically Impervious**



Intégrale
Understanding Ground Conditions

Suite 7, Westway Farm Business Park
Wick Road
Bishop Sutton
BS39 5XP
Tel: 01275 333 036
www.integrale.uk.com

Job No:	21035	**Soil Infiltration Rate Test**			
		BRE 365 (2007) Soakaway Design			
Job Name:	Aston Hall Barns, Aston Munslow			Hole:	**TPB**
Prepared By:	JB	Date:	02/09/2021	Sheet:	2 of 2
Checked By:		Date:			

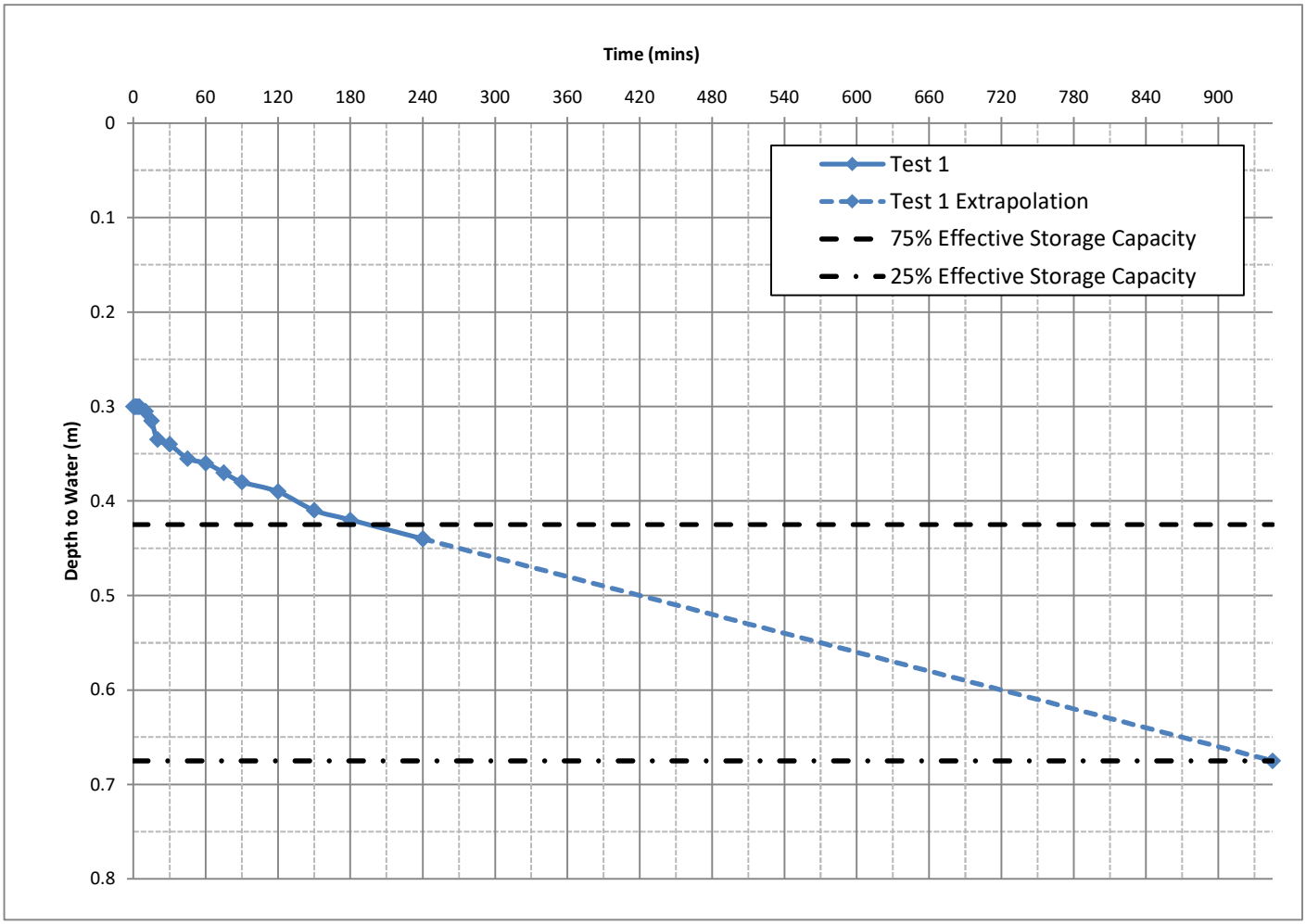
Date of Test: 9th July 2021

Length (m): 2.10 **Width (m):** 0.60 **Depth (m):** 0.80

Remarks:

	Test 1	Test 2	Test 3
Effective Storage Depth$_{75\text{-}25\%}$ (m)	0.25	-	-
A = Surface Area$_{50\%}$ (m^2)	2.61	-	-
V = Effective Storage Volume$_{75\text{-}25\%}$ (m^3)	0.32	-	-
t = Time$_{75\text{-}25\%}$ (mins)	750.0	-	-
Soil Infiltration Rate (m/s)	**2.68E-06**	**-**	**-**

Extrapolated Soil Infiltration Rate (m/s)	**2.68E-06**



Intégrale
Understanding Ground Conditions

Suite 7, Westway Farm Business Park
Wick Road
Bishop Sutton
BS39 5XP
Tel: 01275 333 036
www.integrale.uk.com

Job No:	21035	**Soil Infiltration Rate Test**			
		Building Regulations Part H (2010)			
Job Name:	Aston Hall Barns, Aston Munslow			Hole:	**TPF**
Prepared By:	JB	Date:	02/09/2021	Sheet:	1 of 2
Checked By:		Date:			

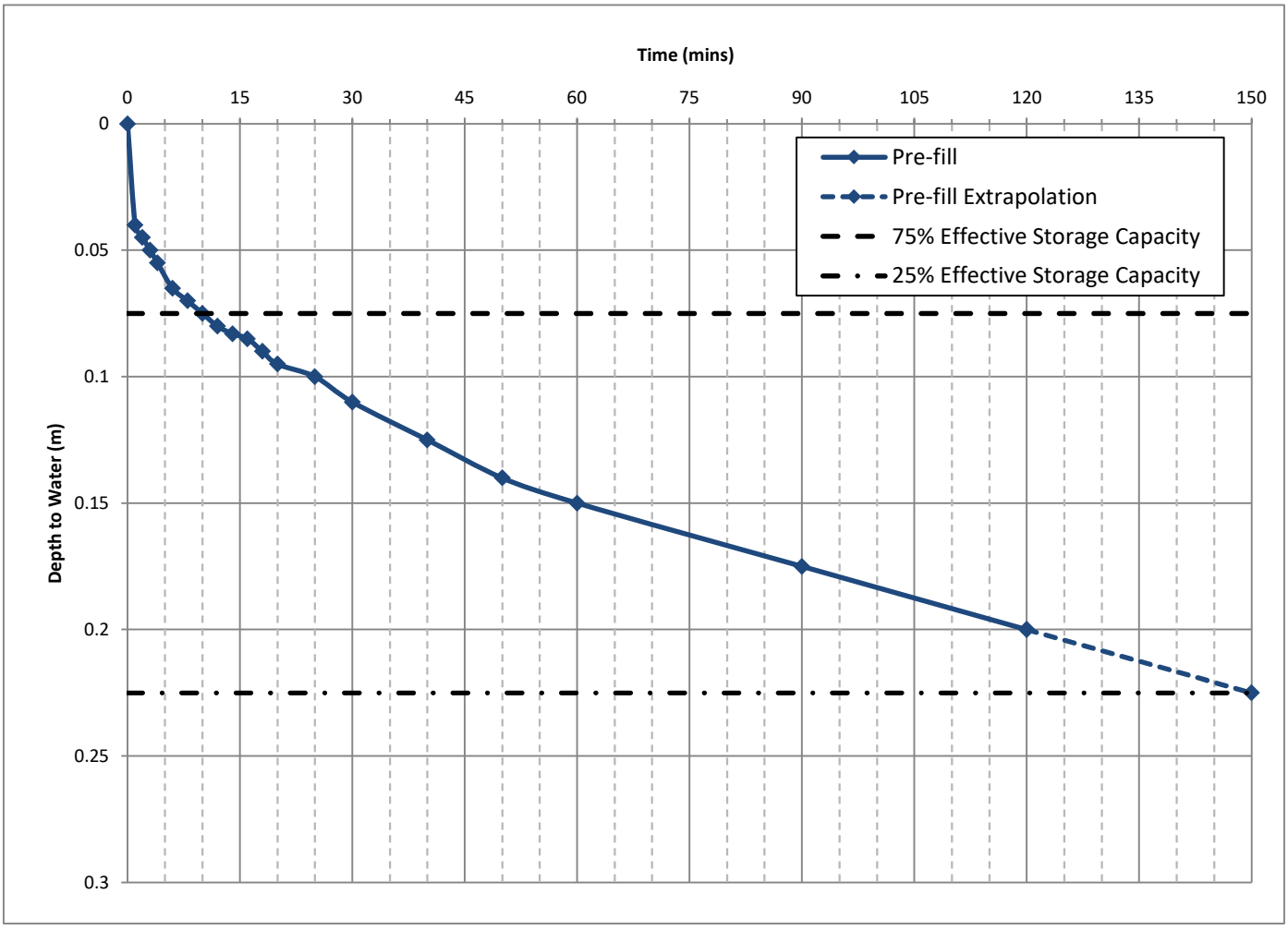
Date of Test: **9th July 2021**

Length (m): **0.30** **Width (m):** **0.30** **Depth (m):** **0.30**

Remarks: Pre-fill run only. No formal testing undertaken in time allowed on-site. Pit dug within Topsoil, due to shallow rockhead precluding deeper excavation by hand.

	Pre-fill		
Effective Storage Depth$_{75\text{-}25\%}$ (m)	0.150		
t = Time$_{75\text{-}25\%}$ (secs)	8400.0		
Vp (s/mm)	**56.0**		

Extrapolated VP (s/mm)	**18.67**



Intégrale
Understanding Ground Conditions

Suite 7, Westway Farm Business Park
Wick Road
Bishop Sutton
BS39 5XP
Tel: 01275 333 036
www.integrale.uk.com

Job No:	21035	**Soil Infiltration Rate Test**			
		Building Regulations Part H (2010)			
Job Name:	Aston Hall Barns, Aston Munslow			Hole:	**TPG**
Prepared By:	JB	Date:	02/09/2021	Sheet:	2 of 2
Checked By:		Date:			

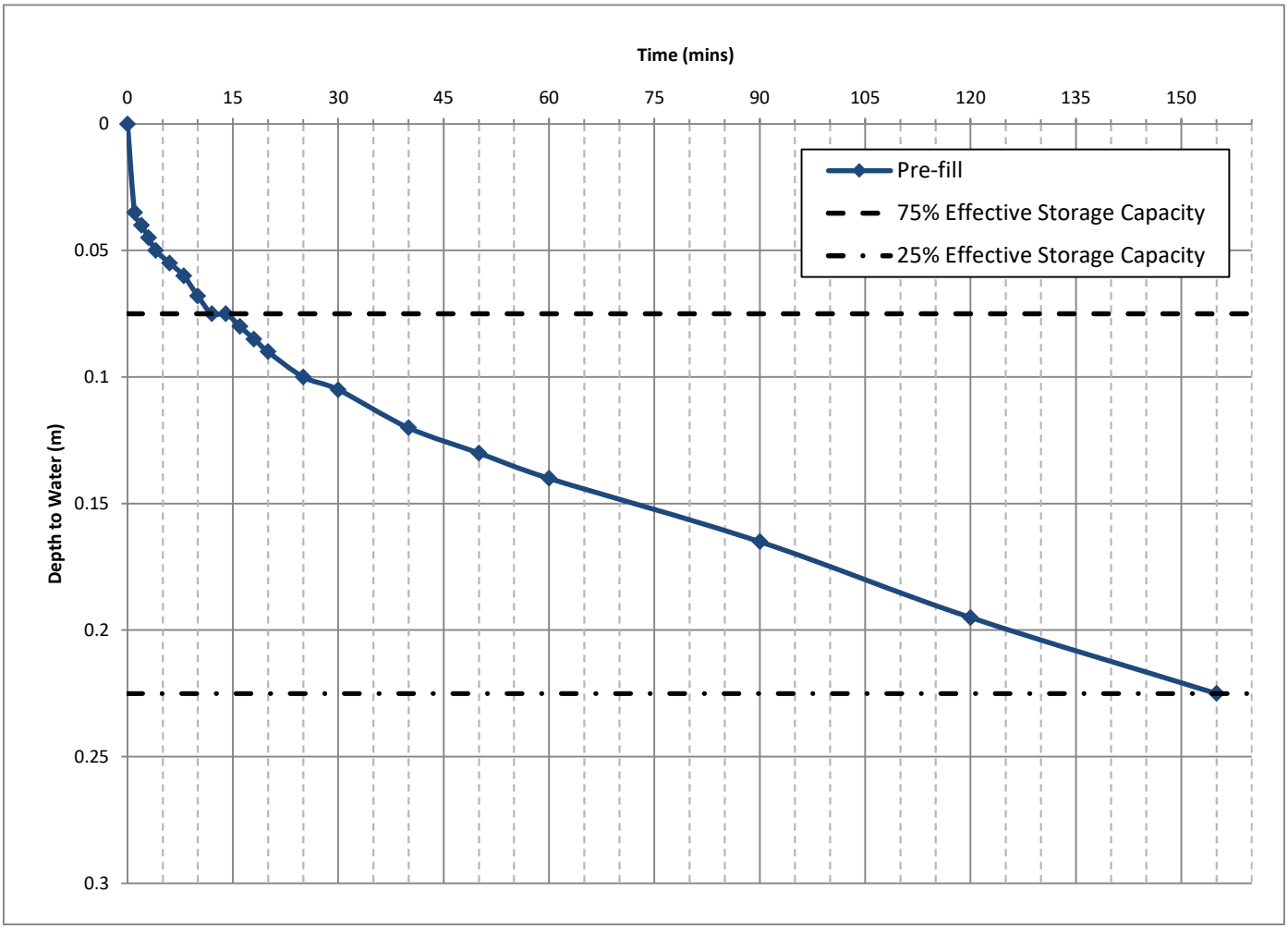
Date of Test: **9th July 2021**

Length (m): **0.30** **Width (m):** **0.30** **Depth (m):** **0.30**

Remarks: Pre-fill run only. No formal testing undertaken in time allowed on-site. Pit dug within Topsoil, due to shallow rockhead precluding deeper excavation by hand.

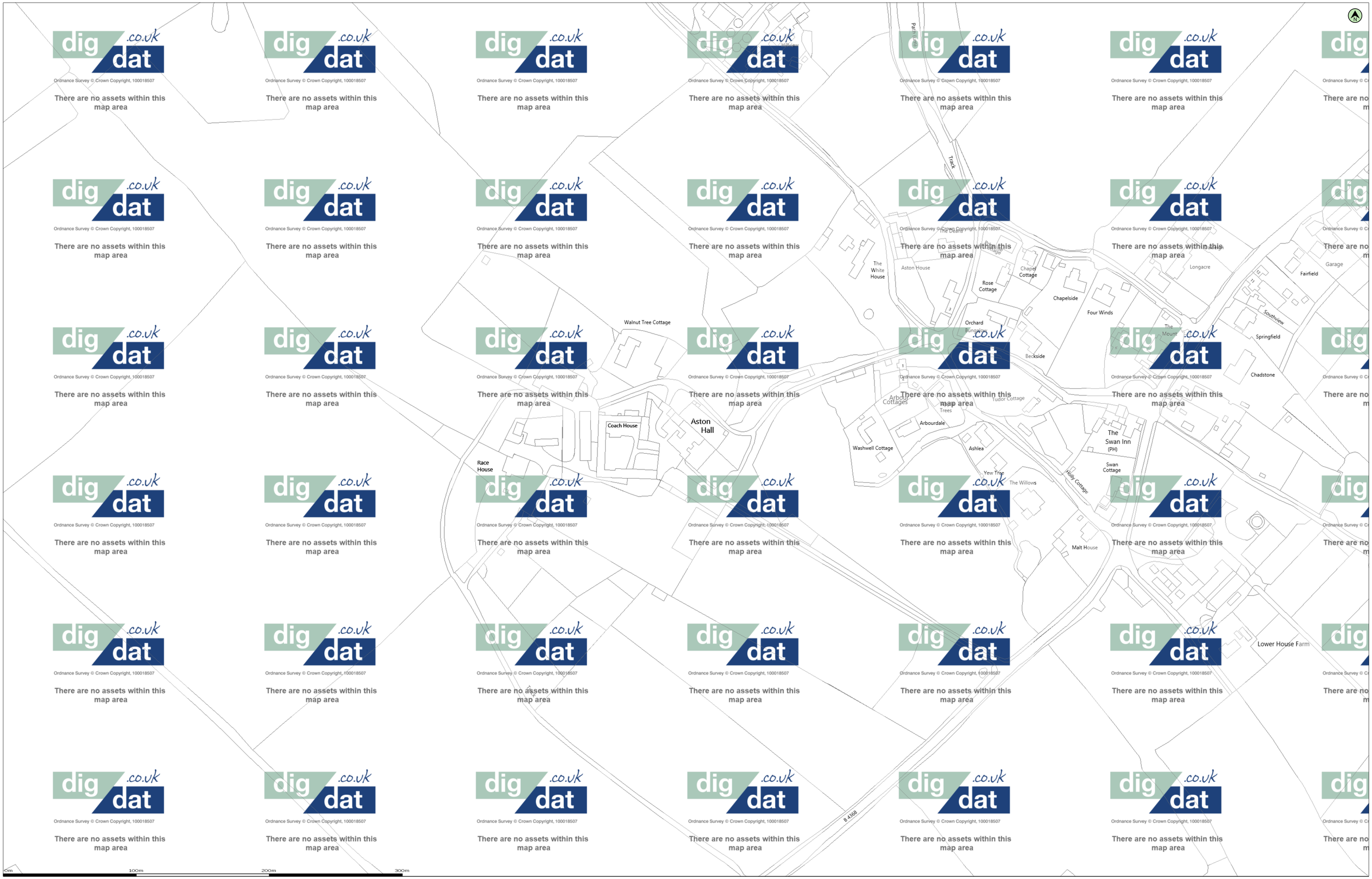
	Pre-fill		
Effective Storage Depth$_{75\text{-}25\%}$ (m)	0.150		
t = Time$_{75\text{-}25\%}$ (secs)	8580.0		
Vp (s/mm)	**57.2**		

Recorded VP (s/mm)	**19.07**



Appendix F

Severn Trent Wastewater Asset search



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Date: 17/09/21

Scale: 1:1250

Map Centre: 350893,286615

Data updated: 14/08/21

Our Ref: 651262 - 1

Wastewater Plan A1

Do not scale off this Map. This plan and any information supplied with it is furnished as a general guide, is only valid at the date of issue and no warranty as to its correctness is given or implied. In particular this plan and any information shown on it must not be relied upon in the event of any development or works (including but not limited to excavations) in the vicinity of SEVERN TRENT WATER assets or for the purposes of determining the suitability of a point of connection to the sewerage or distribution systems. On 1 October 2011 most private sewers and private lateral drains in Severn Trent Water's sewerage area, which were connected to a public sewer as at 1 July 2011, Transferred to the ownership of Severn Trent Water and became public sewers and public lateral drains. A further transfer takes place on 1 October 2012. Private pumping stations, which form part of these sewers or lateral drains, will transfer to ownership of Severn Trent Water on or before 1 October 2016. Severn Trent Water does not ossess complete records of these assets. These assets may not be displayed on the map. Reproduction by permission of Ordnance Survey on behalf of HMSO. © Crown Copyright and database right 2004. All rights reserved. Ordnance Survey licence number: 100031673. Document users are advised that this document is provided for reference purpose only and is subject to copyright, therefore, no further copies should be made from it.

Public Foul (Gravity) Lateral Drain
Public Combined (Gravity) Lateral Drain
Public Surface Water (Gravity) Lateral Drain
Pressure Foul
Pressure Combined
Pressure Surface Water
Highway Drain
Overflow Pipe
Disposal Pipe
Culverted Water Course
Pumping Station
Filling
Manhole Foul
Manhole Surface
Abandoned Pipe
Surface Water sewers are shown in green
Private sewers are shown in magenta

hp@mannwilliams.co.uk
Aston Hall

SEVERN TRENT

GENERAL CONDITIONS AND PRECAUTIONS TO BE TAKEN WHEN CARRYING OUT WORK ADJACENT TO SEVERN TRENT WATER'S APPARATUS

Please ensure that a copy of these conditions is passed to your representative and/or your contractor on site. If any damage is caused to Severn Trent Water Limited (STW) apparatus (defined below), the person, contractor or subcontractor responsible must inform STW immediately on:
0800 783 4444 (24 hours)

a) These general conditions and precautions apply to the public sewerage, water distribution and cables in ducts including (but not limited to) sewers which are the subject of an Agreement under Section 104 of the Water Industry Act 1991(a legal agreement between a developer and STW, where a developer agrees to build sewers to an agreed standard, which STW will then adopt); mains installed in accordance with an agreement for the self-construction of water mains entered into with STW and the assets described at condition b) of these general conditions and precautions. Such apparatus is referred to as "STW Apparatus" in these general conditions and precautions.

b) Please be aware that due to The Private Sewers Transfer Regulations June 2011, the number of public sewers has increased, but many of these are not shown on the public sewer record. However, some idea of their positions may be obtained from the position of inspection covers and their existence must be anticipated.

c) On request, STW will issue a copy of the plan showing the approximate locations of STW Apparatus although in certain instances a charge will be made. The position of private drains, private sewers and water service pipes to properties are not normally shown but their presence must be anticipated. This plan and the information supplied with it is furnished as a general guide only and STW does not guarantee its accuracy.

d) STW does not update these plans on a regular basis. Therefore the position and depth of STW Apparatus may change and this plan is issued subject to any such change. Before any works are carried out, you should confirm whether any changes to the plan have been made since it was issued.

e) The plan must not be relied upon in the event of excavations or other works in the vicinity of STW Apparatus. It is your responsibility to ascertain the precise location of any STW Apparatus prior to undertaking any development or other works (including but not limited to excavations).

f) No person or company shall be relieved from liability for loss and/or damage caused to STW Apparatus by reason of the actual position and/or depths of STW Apparatus being different from those shown on the plan.

In order to achieve safe working conditions adjacent to any STW Apparatus the following should be observed:

1. All STW Apparatus should be located by hand digging prior to the use of mechanical excavators.

2. All information set out in any plans received from us, or given by our staff at the site of the works, about the position and depth of the mains, is approximate. Every possible precaution should be taken to avoid damage to STW Apparatus. You or your contractor must ensure the safety of STW Apparatus and will be responsible for the cost of repairing any loss and/or damage caused (including without limitation replacement parts).

3. Water mains are normally laid at a depth of 900mm. No records are kept of customer service pipes which are normally laid at a depth of 750mm; but some idea of their positions may be obtained from the position of stop tap covers and their existence must be anticipated.

4. During construction work, where heavy plant will cross the line of STW Apparatus, specific crossing points must be agreed with STW and suitably reinforced where required. These crossing points should be clearly marked and crossing of the line of STW Apparatus at other locations must be prevented.

5. Where it is proposed to carry out piling or boring within 20 metres of any STW Apparatus, STW should be consulted to enable any affected STW Apparatus to be surveyed prior to the works commencing.

6. Where excavation of trenches adjacent to any STW Apparatus affects its support, the STW Apparatus must be supported to the satisfaction of STW. Water mains and some sewers are pressurised and can fail if excavation removes support to thrust blocks to bends and other fittings.

7. Where a trench is excavated crossing or parallel to the line of any STW Apparatus, the backfill should be adequately compacted to prevent any settlement which could subsequently cause damage to the STW Apparatus. In special cases, it may be necessary to provide permanent support to STW Apparatus which has been exposed over a length of the excavation before backfilling and reinstatement is carried out. There should be no concrete backfill in contact with the STW Apparatus.

8. No other apparatus should be laid along the line of STW Apparatus irrespective of clearance. Above ground apparatus must not be located within a minimum of 3 metres either side of the centre line of STW Apparatus for smaller sized pipes and 6 metres either side for larger sized pipes without prior approval. No manhole or chamber shall be built over or around any STW Apparatus.

9. A minimum radial clearance of 300 millimetres should be allowed between any plant or equipment being installed and existing STW Apparatus. We reserve the right to increase this distance where strategic assets are affected.

10. Where any STW Apparatus coated with a special wrapping is damaged, even to a minor extent, STW must be notified and the trench left open until the damage has been inspected and the necessary repairs have been carried out. In the case of any material damage to any STW Apparatus causing leakage, weakening of the mechanical strength of the pipe or corrosion-protection damage, the necessary remedial work will be recharged to you.

11. It may be necessary to adjust the finished level of any surface boxes which may fall within your proposed construction. Please ensure that these are not damaged, buried or otherwise rendered inaccessible as a result of the works and that all stop taps, valves, hydrants, etc. remain accessible and operable. Minor reduction in existing levels may result in conflict with STW Apparatus such as valve spindles or tops of hydrants housed under the surface boxes. Checks should be made during site investigations to ascertain the level of such STW Apparatus in order to determine any necessary alterations in advance of the works.

12. With regard to any proposed resurfacing works, you are required to contact STW on the number given above to arrange a site inspection to establish the condition of any STW Apparatus in the nature of surface boxes or manhole covers and frames affected by the works. STW will then advise on any measures to be taken, in the event of this a proportionate charge will be made.

13. You are advised that STW will not agree to either the erection of posts, directly over or within 1.0 metre of valves and hydrants,

14. No explosives are to be used in the vicinity of any STW Apparatus without prior consultation with STW.

TREE PLANTING RESTRICTIONS

There are many problems with the location of trees adjacent to sewers, water mains and other STW Apparatus and these can lead to the loss of trees and hence amenity to the area which many people may have become used to. It is best if the problem is not created in the first place. Set out below are the recommendations for tree planting in close proximity to public sewers, water mains and other STW Apparatus.

15. Please ensure that, in relation to STW Apparatus, the mature root systems and canopies of any tree planted do not and will not encroach within the recommended distances specified in the notes below.

16. Both Poplar and Willow trees have extensive root systems and should not be planted within 12 metres of a sewer, water main or other STW Apparatus.

17. The following trees and those of similar size, be they deciduous or evergreen, should not be planted within 6 metres of a sewer, water main or other STW Apparatus. E.g. Ash, Beech, Birch, most Conifers, Elm, Horse Chestnut, Lime, Oak, Sycamore, Apple and Pear. Asset Protection Statements Updated May 2014

18. STW personnel require a clear path to conduct surveys etc. No shrubs or bushes should be planted within 2 metre of the centre line of a sewer, water main or other STW Apparatus.

19. In certain circumstances, both STW and landowners may wish to plant shrubs/bushes in close proximity to a sewer, water main of other STW Apparatus for screening purposes. The following are shallow rooting and are suitable for this purpose: Blackthorn, Broom, Cotoneaster, Elder, Hazel, Laurel, Privet, Quickthorn, Snowberry, and most ornamental flowering shrubs.

Appendix G

Completed Foul drainage assessment form (FDA1)

Foul Drainage Assessment Form (FDA)

Please note: You should only use this form for planning related queries. You cannot use it to apply for an Environmental Permit but you may submit a copy of the information you have provided for planning purposes in support of your Environmental Permit application. Further information on how to apply for an environmental permit and general binding rules applicable to small discharges of domestic sewage effluent is available on the gov.uk website.

APPLICANT DETAILS	
Name	*Ros and David Cleevely*
Address	*Aston Hall, Aston Munslow, Craven Arms, Shropshire, SY7 9ER*
Telephone No	
e-mail	*david.office@cleevely.co.uk*

AGENT DETAILS (Project Engineer)	
Name	*Henry Pinder*
Address	*Mann Williams, 7 Old King Street, Bath, BA1 2JW*
Telephone No	*07912 376842*
e-mail	*hp@mannwilliams.co.uk*

We will use the information you provide on this form to establish whether non-mains drainage, either a new system or connection to an existing system, would be acceptable. It is important that you provide full and accurate information. Failure to do this will delay the processing of your application.

You must provide evidence that a connection to the public sewer is not feasible.

Other than in very exceptional circumstances, we will not allow the use of non-mains drainage as part of your Planning or Building Regulation application unless you can prove that a connection to the public sewer is not feasible. We do not consider non-mains drainage systems to be environmentally acceptable in locations where it is feasible to connect to a public sewer. Please note that a lack of capacity in, or other operating problems with, the public sewer are not valid reasons to use a non-mains drainage system where it is otherwise feasible to connect to a public sewer.

Where connection to the public sewer is feasible, you may need to get the agreement of either the owners of any land through which the drainage will run or, if you intend to connect via an existing private drain, the owner of that private drain.

The National Planning Practice Guidance and Building Regulations Approved Document H give a hierarchy of drainage options that must be considered and discounted in the following order:

1 Connection to the public sewer
2 Package sewage treatment plant (which can be offered to the Sewerage Undertaker for adoption)
3 Septic Tank
4 If none of the above are feasible a cesspool

You must respond to all the following questions. If you wish to submit additional information please do so, marked clearly "Additional Information". **In some cases you will be required to provide further information in order to demonstrate that any non-mains foul drainage system proposed is acceptable.**

Feasibility of mains foul sewer connection	**YES**	**NO**
Have you provided a written explanation of why it is not feasible to connect to the public foul sewer with this form?	*Yes*	
Is the distance from your site to the closest connection point to the public foul sewer less than the number of properties to be built on the site multiplied by 30m? *(see Guidance Note 2)*		*No*
Does your proposal form part of a phased development or planned development of a wider area?		*No*

Non-mains connection

Please provide a plan with dimensions that clearly shows the location of the whole system in relation to the proposed development and the position of the key elements e.g. septic tank, drainage fields and points of discharge.

1. Existing system	**YES**	**NO**
Do you intend to use an existing non-mains foul drainage system?		*No*
If YES, does the system already have an Environmental Permit issued by the Environment Agency? *(In the case of a cesspool write N/A)* If YES, please provide Environmental Permit reference number……	*N/A*	

2. Discharge	**YES**	**NO**
Do you propose to use a package treatment plant?	*Yes*	
Do you propose to use a septic tank?		*No*
Do you propose to use a cesspool? *If YES go to Q4*		*No*
Have you considered having your system adopted by the sewerage undertaker? *(see Guidance Note 7).*		*No*
Will all, or any part of, the discharge go to a drainage field or soakaway*? (see Guidance Note 3)* - this includes systems that combine a drainage field with a high level overflow to watercourse *If YES go to Q3.*	*Yes*	
Do you intend to use a system that discharges solely to watercourse? *(see Guidance Note 3) If YES go to Q9.*		*No*

3. Water abstraction	**YES**	**NO**
Do you receive your water from the public mains supply?	*Yes*	
If not, where do you get your water supply from?	*N/A*	

4. Cesspools *(For methods other than cesspools write N/A)*	**YES**	**NO**
Have you provided written justification for the use of a cesspool in preference to more sustainable methods of foul drainage disposal? *(see Guidance Note 4)*	*N/A*	

5. Drainage field design *(For cesspools write N/A)*	**YES**	**NO**
Will the system discharge to a drainage field designed and constructed in accordance with British Standard BS6297:2007? If not, why not?	*Yes*	
Will the discharge from the system be located in a Source Protection Zone 1 (SPZ1)?		*No*

6. Ground Conditions *(For cesspools write N/A)*	**YES**	**NO**
6a. Have you submitted a copy of the percolation test results with this form *(see Guidance Note 6)?* 6b. If NO please explain the justification for not undertaking or submitting these tests. *Note: to date 2 preliminary tests have been undertaken in the field where drainage field construction is proposed, but not in the exact location. These were to confirm feasibility only. More comprehensive tests (fully compliant with BS6297:2007) will be carried out in the finalised position in due course, to confirm the detailed design.*	*Yes* *(see note)*	
6c. Is any part of the system in land which is marshy, water logged or subject to flooding?		*No*
6d. Will the soakaway be located on artificially raised, made-up ground or ground likely to be contaminated? *If YES please provide details as additional information.* *Not likely to be contaminated. Possibly to be artificially raised.* *Drainage field construction will utilise permeability of the near-surface soils for infiltration. Weathered rock-head is typically present at shallow depth (300-500mm) across the site. This underlying strata is unsuitable for drainage field construction. A minimum soil depth of 500mm is required to construct the drainage field. Therefore, depending on the depth to rock-head encountered at the finally selected location for the drainage field, the construction area may be locally 'topped up' by 100-200mm using topsoil taken from elsewhere on the site.*	*TBC (see note)*	
6e. Have you submitted the results of a trial hole at the site to establish that the proposed drainage field will be above any standing groundwater *(see Guidance Note 6)?* *Boreholes carried out elsewhere (nearby) on the site recorded groundwater at 2.2m – 4.4m below ground level.*		*No (see note)*

7. Available Land	**YES**	**NO**
Is the application site plus any available area for a soakaway less than 0.025 hectares ($250m^2$)?		*No*

8. Siting of drainage field/soakaway discharge from a septic tank or package treatment plant or other secondary treatment. *You may need to make local enquiries to get a full answer to these questions*.	**YES**	**NO**
Will it be at least **10m** from a watercourse, permeable drain or land drain?	*Yes*	
Will it be at least **50m** from any point of abstraction from the ground for a drinking water supply (e.g. well, borehole or spring)? *This includes your own or a neighbour's supply.*	*Yes*	
Will the discharge be within a groundwater Source Protection Zone 1? *If yes, you will need to apply for an environmental permit*		*No*
Are there any drainage fields/soakaways within **50m**? *This includes any foul drainage discharge system (other than the subject of this application) or surface water soakaway on either your own or a neighbour's property.*		*No*
Will it be at least **15m** from any building?	*Yes*	
Will there be any water supply pipes or underground services within the disposal system, other than those required by the system? *(For cesspools write N/A)*		*No*

Will there be any access roads, driveways or paved areas within the disposal area? *(For cesspools write N/A)*		*No*

9. Siting of treatment plant, septic tank or cesspool	**YES**	**NO**
Is it at least **7m** from the habitable part of a building?	*Yes*	
Will there be vehicular access for emptying within **30m?**	*Yes*	
Can the plant, tank or cesspool be maintained or emptied without the contents being taken through a dwelling or place of work?	*Yes*	

10.Expected flow

Please estimate the total flow in litres per day *(see Guidance Note 5).*	*2800l/day*

11. General Binding Rules for Small Sewage Discharges	**YES**	**NO**
Does the system meet the requirements of the General Binding Rules for small sewage discharges? *The system meets all requirements except for the following:* - *Discharge volume exceeds 2.0m3/day* - *Sewage will include pool backwash water*		*No (see note)*

12. Maintenance

How do you propose to maintain the system? *The packaged treatment plant will be installed, operated and maintained in accordance with the manufacturer's specification. Maintenance will be undertaken by competent professionals and waste sludge from the system will be safely disposed of by an authorised carrier. The drainage field distribution chamber will be fitted with a sampling point.*

13. Declaration

I declare that the above information is factually correct.

Name	Signature	Date
Henry Pinder		*17.9.2021*

GUIDANCE NOTES:

1) This form is for use with *the National Planning Practice Guidance, British Standard BS6297:2007 and Building Regulations Approved Document H.* It is intended to help Local Planning Authorities establish basic information about your non-mains drainage system and

decide whether you need to submit a more detailed site assessment. If a detailed site assessment is requested but not submitted, your planning application might be refused.

2) Where the distance from a site to the closest point of connection to the foul sewer is less than the number of properties that are proposed to be built on that site multiplied by 30m an Environmental Permit will be required and an applicant will need to demonstrate as part of any application for such a permit why connection to the public foul sewer is not feasible.

Number of domestic properties served by the sewage treatment system [ ] x 30 metres = Answer [ ] metres

3) In addition to Planning Permission and Building Regulation approval **you may also require an Environmental Permit from the Environment Agency (EA). Please note that the granting of Planning Permission or Building Regulation approval does not guarantee the granting of an Environmental Permit. Upon receipt of a correctly filled in application form the EA will carry out an assessment. It can take up to 4 months before the Agency is in a position to decide whether to grant a permit or not**.

4) The use of cesspools is an option of last resort as set out in the non-mains drainage hierarchy of preference in Building Regulations Approved Document H. In principle, a properly constructed and maintained cesspool, being essentially a holding tank with no discharges, should not lead to environmental, amenity or public health problems. However, in practice, it is known that such problems occur as a result of frequent overflows due to poor maintenance, irregular emptying, lack of suitable vehicular access for emptying and even through inadequate capacity. In addition to this the requirement for frequent emptying is usually carried out by a contractor involving road transport with associated environmental costs. For these reasons, the use of cesspools will not normally be considered to be a long-term foul sewage disposal solution. In view of the environmental risks associated with their use, any proposal to use cesspools must be fully justified to the Local Planning Authority

5) Package treatment plants and septic tanks should be designed and sized according to the advice given in the current edition of Flows and Loads, published by British Water. Volumes for larger systems should be calculated based on expected flows arising from the development.

6) You should refer to Building Regulations Approved Document H2 with regard to the general requirements for construction of non mains sewerage systems. **Sections 1.33 to 1.38** deal with the test requirements for trial holes and percolation tests and for convenience the text of these sections is repeated below:

1.33 A trial hole should be dug to determine the position of the standing groundwater table. The trial hole should be a minimum of 1m^2 in area and 2m deep, or a minimum of 1.5m below the invert of the proposed drainage field pipework. The ground water table should not rise to within 1m of the invert level of the proposed effluent distribution pipes. If the test is carried out in summer, the likely winter groundwater levels should be considered. A percolation test should then be carried out to assess the further suitability of the proposed area.

1.34 Percolation test method – A hole 300mm square should be excavated to a depth 300mm below the proposed invert level of the effluent distribution pipe. Where deep drains are necessary the hole should conform to this shape at the bottom, but may be enlarged above the 300mm level to enable safe excavation to be carried out. Where deep excavations are necessary a modified test procedure may be adopted using a 300mm earth auger. Bore the test hole vertically to the appropriate depth taking care to remove all loose debris.

1.35 Fill the 300mm square section of the hole to a depth of at least 300mm with water and allow it to seep away overnight.

1.36 Next day, refill the test section with water to a depth of at least 300mm and observe the time, in seconds, for the water to seep away from 75% full to 25% full level (i.e. a depth

of 150mm). Divide this time by 150mm. The answer gives the average time in seconds (Vp) required for the water to drop 1mm.

1.37 The test should be carried out at least three times with at least two trial holes. The average figure from the tests should be taken. The test should not be carried out during abnormal weather conditions such as heavy rain, severe frost or drought.

1.38 Drainage field disposal should only be used when percolation tests indicate average values of V_p of between 12 and 100 and the preliminary site assessment report and trial hole tests have been favourable. This minimum value ensures that untreated effluent cannot percolate too rapidly into groundwater. Where V_p is outside these limits effective treatment is unlikely to take place in a drainage field. However, provided that an alternative form of secondary treatment is provided to treat the effluent from the septic tanks, it may still be possible to discharge the treated effluent to a soakaway.

N.B. When determining whether a discharge may be made under statutory General Binding Rules one of the requirements is that any drainage field must be designed and constructed in accordance with BS6297:2007. This specifies that the minimum percolation rate under that standard is 15s/mm and any discharge made to ground where the percolation rate is less than 15s/mm is subject to the granting of an Environmental Permit.

7) Developers may requisition a sewer from the Sewerage Undertaker to connect their development to the public sewer. Should this not be feasible on the grounds of cost and practicability, on site treatment in the form of package plants and their associated sewers (if constructed to an acceptable standard) can be offered to the sewerage undertaker for adoption. This approach is in support of advice from the Government contained in the National Planning Practice Guidance Developers are urged to discuss their requirements with the Sewerage Undertaker at the earliest possible opportunity.

8) Glossary

Package treatment plant
A package treatment plant is a system which offers varying degrees of biological sewage treatment and involves the production of an effluent which can be disposed of to ground via a drainage field or direct to a watercourse. There are many varieties of package treatment plant but all involve settling the solids before and/or after a biological treatment stage and almost all use electricity. Package treatment plants usually treat sewage to a higher standard than septic tanks but are vulnerable in the event of power failures and require more regular servicing and maintenance to ensure that they work effectively. The type of system chosen should be appropriate to the type of development proposed and take account of variations in flow and periods of inactivity, for example where the system will serve holiday accommodation where occupation and maintenance may be more irregular.

Septic tank
A septic tank is a two or three chamber system, which retains sewage from a property for sufficient time to allow the solids to form into sludge at the base of the tank, where it is partially broken down. The remaining liquid in the tank then drains from the tank by means of an outlet pipe.

Effluent from a septic tank is normally disposed of to ground via a drainage field and receives further treatment in the soils surrounding that drainage field, so that it does not generate a pollution risk to surface waters or groundwater resources (underground water). The most commonly used form of drainage field is a subsurface irrigation area, comprising a herringbone pattern of interconnecting dispersal pipes laid in shallow, shingle filled trenches. The dispersal pipes within the drainage field should be located at as shallow a depth as possible, usually within 1 metre of the ground surface. A septic tank typically needs to be desludged at least once a year in order to ensure that it continues to work effectively.

Cesspool
A cesspool is a covered watertight tank used for receiving and storing sewage and has no outlet. It relies on road transport for the removal of raw sewage and is therefore the least sustainable option for sewage disposal. It is essential that a cesspool is, and remains, impervious to the ingress of groundwater or surface water.

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DUTCH BARN

New connection TBC

OUTBUILDINGS

MAIN HALL

No internal alterations to drainage within Main Hall, but generally new external drains to serve existing connection points

New drain and driveway layout configured to minimise potential impact on significant trees.

New driveway to have permeable construction

New connections to existing roof drainage from outbuildings

Existing drainage from rear elevations piped under building to reduce impact on neighbour

Changing areas

Note these drains are existing (m/h is new)

Pool filter backwash to be allowed to passive vent off to atmosphere for 2-5 days prior to discharge into site FOUL water system. Detailed arrangements TBC by pool specialist.

Pool drain-down (exception events) to be discharged into surface water gully. Discharge rate to be controlled by pump and to be agreed with EA. Detailed arrangements TBC by pool specialist.

Indicates extent of new extension, 360m² plan area.

Pool to be low-chlorine type. Details TBC by pool specialist. Total volume approx. 125m³.

570m² extg hard surfacing returned to soft landscaping

TENNIS TO BE REMOVED

RWP GY GY? SVP RWP? RWP

KEY

- Surface water drain (new)
- Surface water drain (existing / refurbished)
- Foul drain (new)
- Foul drain (existing / refurbished)
- Treated Effluent drain (new)
- Effluent infiltration drain (new)

N

SCALE BAR 1:200

0 10m

REV	DESCRIPTION	BY	DATE
P1	ISSUED FOR PLANNING	HP	08.09.2021
P2	REVISED (ISSUED FOR PLANNING)	HP	17.09.2021

P-PRELIMINARY T-TENDER CONSTRUCTION

PROJECT
ASTON HALL BARNS

TITLE
BELOW GROUND DRAINAGE

OUTLINE STRATEGY
AS PROPOSED
SHEET 1 (WEST)

MANN WILLIAMS
CONSULTING CIVIL AND STRUCTURAL ENGINEERS
7 OLD KING STREET
QUEEN SQUARE
BATH BA1 2JW
T 01225 464419
F 01225 448651
E bath@mannwilliams.co.uk

DRAWN	CHKD	SIZE	SCALE	DATE
HP		A1	1:200	SEPT '21

STATUS
PRELIMINARY

PROJECT	DRAWING	REV
10854	510	P2

Intake headwall

Chamber with Hydrobrake flow control device.
Flow limited to 5.0 l/s

New planting to architect's details

Swale / open ditch
- To provide attenuation volume, with bioretention, and to encourage infiltration into the near-surface soils
- Providing min. 70m³ storage, plus freeboard.
- Precise layout TBC to suit site landscaping details and contours.

Freeboard reduced to approx. 100mm to form controlled overflow zone for exceedance flows. Elsewhere freeboard to be 200mm+.

GSHP Borehole Zone

GSHP Borehole Zone

Discharge headwall

CE-compliant domestic packaged treatment plant
- Designed to treat both foul water and pool backwash flows
- Details TBC by supplier

New driveway to have permeable construction

Drainage field constructed to BS6297 standard.
- *Application for Environmental Permit required.*
- Shallow infiltration into near-surface soils above Ludlow Shales rock head.
- Ground levels may need to be locally raised by 1-200mm using topsoil to achieve a minimum available depth of 0.5m above the rock head.
- Approx. 30m x 10m gross area, with approx. 120m² infiltration area, all TBC following completion of BS-compliant percolation tests.
- Precise position and alignment TBC to suit contours, crossing natural slope at an angle to achieve a 1:200-300 pipe gradient at approx. constant depth.

Public Footpath

Outfall headwall: Surface water discharge into local watercourse

ırbished)

KEY

- Surface water drain (new)
- Surface water drain (existing / refurbished)
- Foul drain (new)
- Foul drain (existing / refurbished)
- Treated Effluent drain (new)
- Effluent infiltration drain (new)

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N

SCALE BAR 1:200

0 10m

REV	DESCRIPTION	BY	DATE
P1	ISSUED FOR PLANNING	HP	17.09.2021

P-PRELIMINARY T-TENDER CONSTRUCTION

PROJECT
ASTON HALL BARNS

TITLE
BELOW GROUND DRAINAGE

OUTLINE STRATEGY
AS PROPOSED
SHEET 2 (EAST)

MANN WILLIAMS
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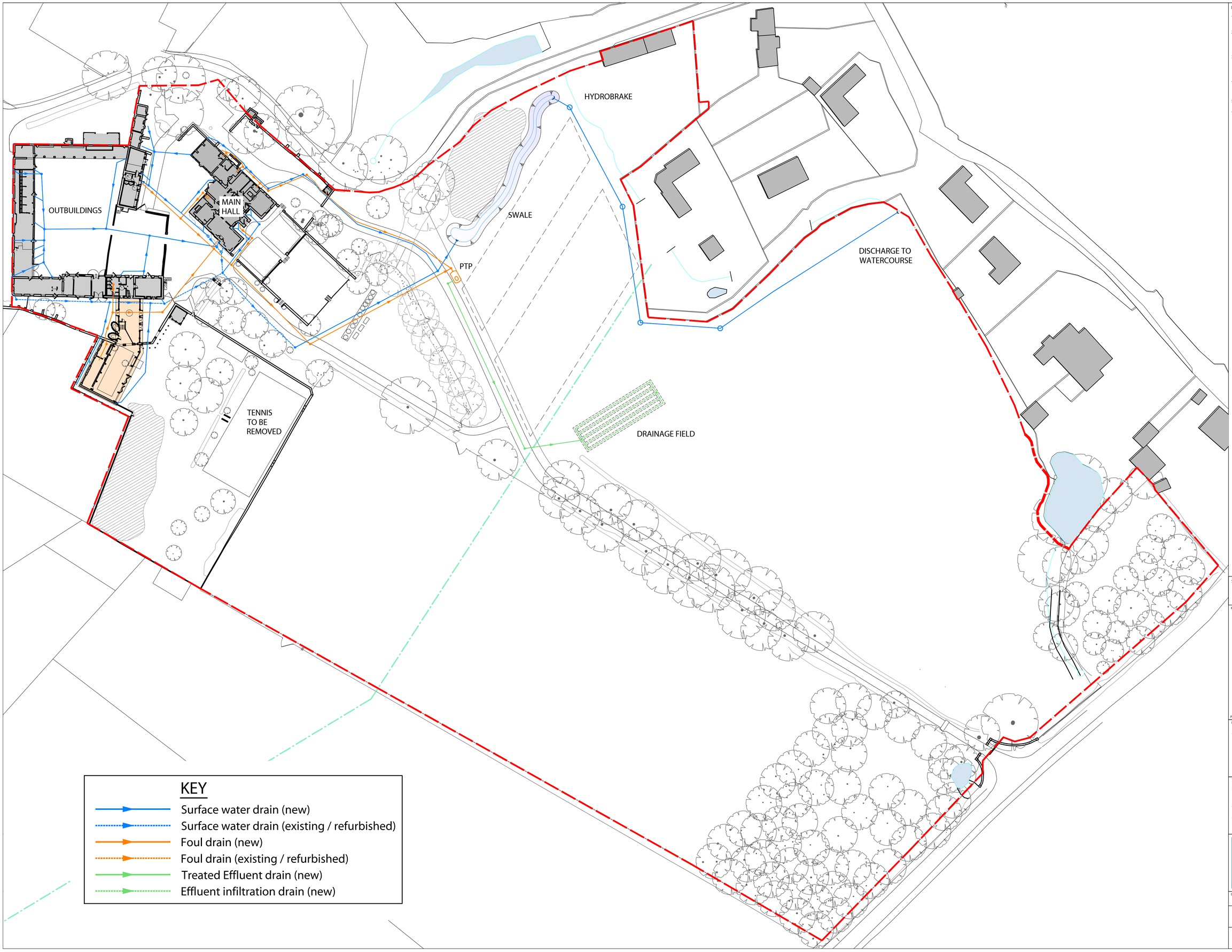
E bath@mannwilliams.co.uk

DRAWN	CHKD	SIZE	SCALE	DATE
HP		A1	1:200	SEPT '21

STATUS
PRELIMINARY

PROJECT	DRAWING	REV
10854	511	P1



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N

SCALE BAR 1:500

0 25m

REV	DESCRIPTION	BY	DATE
P1	ISSUED FOR PLANNING	HP	17.09.2021

P-PRELIMINARY T-TENDER CONSTRUCTION

PROJECT
ASTON HALL BARNS

TITLE
BELOW GROUND DRAINAGE

OUTLINE STRATEGY
AS PROPOSED
SHEET 3 (SITE OVERVIEW)

MANN WILLIAMS
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F 01225 448651
E bath@mannwilliams.co.uk

DRAWN	CHKD	SIZE	SCALE	DATE
HP		A1	1:500	SEPT '21

STATUS
PRELIMINARY

PROJECT	DRAWING	REV
10854	515	P1