

**FLOOD RISK ASSESSMENT
&
SUDS Strategy for Planning
(focus on residual surface water flood risk)**

Compliant with LLFA SUDS Guidance

NPPF & EA Compliant

**Demolish existing dwelling;
Erect replacement dwelling**

Establish formal 1st floor

No bedrooms on the ground floor

All sleeping now above the extreme flood level

at:

50 Sandy Point Road, Hayling Island, PO11 9SH

September 2020

ARK Environmental Consultancy Ltd

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If this report has been released electronically, the appendices referred to herein can be found in the annexed zip folder/s as .pdf or .dwg files. If this report has been released in hard copy the appendices will be bound into the back of this report. Plans may be annexed separately as A1 or A0 copies where a bound-in A3 copy is not appropriate.

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1.0 Scope

This report contains the details of a Flood Risk Assessment carried out by Ark Environmental Consultancy Limited ("ARK Ltd") for 50 Sandy Point Road, Hayling Island, PO11 9SH, henceforth referred to as "the site" in this report. This report has been prepared for Thorns Young Architects and must not be relied upon by any other party without the explicit written permission of ARK Ltd. All parties to this report do not intend any of the terms of the Contracts (Right of Third Parties Act 1999) to apply to this report. Please note this report does not purport to provide definitive legal advice nor can it be used to demonstrate that the site will never flood in the future.

The Executive Summary contains an overview of key findings and conclusions. However, no reliance should be placed on the Executive Summary until the whole of the report has been read. Other sections of the report may contain information which puts into context the findings noted within the Executive Summary.

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2.0 Executive Summary

This FRA&SUDS Strategy for Planning has been carried out in accordance with the National Planning Policy Framework (NPPF) and NPPG to assist the council and EA in their assessment of the planning application.

The proposed development is for demolition of existing dwelling and erect a replacement dwelling with new porous & permeable areas maximized and new SUDS.

- Establish formal 1st floor
- All sleeping now above the extreme flood level

Replacement dwelling: no trigger for objection as scheme is NPPF and EA compliant.

- Site is at the far extent of a patchy EA FZ2 / FZ3 Tidal defended
- Edge of the tidal floodplain; immediate access to unrestricted FZ1
- EA official LOW risk: including for new climate change allowances
- Within NO - VERY LOW surface water hazard based on site specific mapping
- REDUCES FLOOD RISK OVERALL
 - Maximise porous and permeable areas
 - New discharge to soakaway for previously unattenuated site discharging to sewer
- Resilient and resistant measures
- **Results in better protected and flood future proofed dwelling than existing**

This is categorized as a "More Vulnerable" in FZ3/FZ2: in accordance with the NPPF classifications the NPPF/PPG Exception Test does need to be passed.

Given the residual risk flood setting, the level, extent and depth of flooding on the site can be managed in terms of resistant and resilient measures and precautionary mitigation measures.

Based on the likely flooding risk and small scale of the proposed development, it is considered that the proposed development can be constructed and continue to be operated safely in flood risk terms, without increasing flood risk elsewhere; it is therefore considered appropriate development in accordance with the NPPF / PPG.

3.0 Introduction

The FRA combined a desktop study, review of available information, consultations and an assessment of all sources of flooding posed to and from the site and proposed development, in accordance with NPPF & NPPG. Appropriate flood mitigation measures were then considered, either as already incorporated within the scheme or recommended for inclusion at detailed design stage. The suitability of the proposed development was also reviewed in the context of the NPPF/NPPG and any relevant technical guidance accompanying the NPPF.

4.0 Purpose of the Report

This FRA has been carried out in accordance with National Planning Policy Framework (NPPF) & PPG. The report provides the following information in accordance with the NPPF:

- An assessment of the flood risk posed to the site based on flood information and mapping provided by the EA and Strategic Flood Risk Assessment (SFRA);
- An assessment of the proposed development in terms of surface water run-off; and
- Proposals for measures to mitigate the flood risks posed to and from the development where appropriate.

5.0 Report Information Sources

The information source used to undertake this FRA has been collected from the following sources:

- British Geological Survey Website & iGeology App
- EA Website & Data
- Havant Council Strategic Flood Risk Assessment (2018 and as updated)
- Havant Preliminary Flood Risk Assessment (2011 and as updated);
- Hampshire County Council as the Lead Local Flood Authority (LLFA) SUDS Policies and Guidance
- North Solent Shoreline Management Plan
- HAYLING ISLAND EMERGENCY PLANNING FRAMEWORK
- Internet mapping and searches.

6.0 Consultation

Where appropriate, the EA and local council will have been contacted to request any available and relevant flooding data.

7.0 Overview of British Legislation

7.1 National Planning Policy

The National Planning Policy Framework (NPPF) and NPPG supercede all Planning Policy Statements (PPS's) and Planning Policy Guidance (PPG's). Flood risk is retained as a key development consideration.

The Sequential and Exception Tests are retained. The accompanying NPPF Technical Guidance / NPPG also include Tables 2 and 3 to assist with flood risk vulnerability classifications and development suitability.

New Climate Change Allowances and Government SUDS guidance compliant.

7.2 Local Policy

The Strategic Flood Risk Assessment (SFRA) is a key source of flood risk specific information for the area. The SFRA provides a more detailed review of flood risks and recommendations for ensuring developments can be constructed and operated safely in accordance with the NPPF. Greater detail of the SFRA is provided in the report where appropriate.

LLFA SUDS guidance compliant.

8.0 Site Status and Environmental Setting

8.1 Site Location and Status

The site is currently occupied by an existing dwelling, soft and hard landscaping.

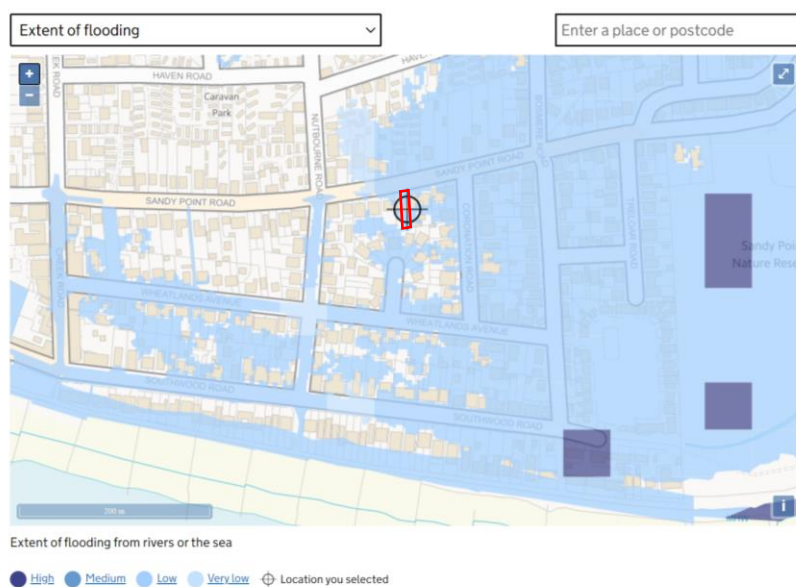
The location plan is included in Appendix A.

8.2 Existing Flood Risk

Flood Sources	Site Status	Comment on flood risk posed to / from the development
Fluvial / Tidal	Site is at the far extent of a patchy EA FZ2 / FZ3 Tidal defended Edge of the tidal floodplain; immediate access to unrestricted FZ1 EA official LOW risk	Replacement dwelling is appropriate in FZ3/ FZ2 tidal and the scheme can incorporate suitable mitigation measures to address residual surface water risk and access to FZ1 in always LOW hazard. Raised ground floor and first floor as refuge above extreme event for lifetime of the scheme Results in better protected and flood future proofed dwelling than existing.
Groundwater	SWMP indicates site not in potential elevated future groundwater risk	The proposed development will not increase the risk of groundwater flooding; New slabs can be engineered / waterproofed appropriately to industry standard Non return valves and sump Low Risk
Artificial Sources	No artificial sources within 250m	Low Risk
Surface Water / Sewer Flooding	Site is in NO – VERY LOW hazard area Evacuation route which is to the north always in NO – VERY LOW hazard Condition, depth and location of surrounding infrastructure uncertain	Scheme can REDUCE FLOOD RISK OVERALL: see main sections below Scheme incorporate new SUDS Development will utilise existing connection to sewers, gravity drainage and non-return valves Development will not increase the peak flow or volume of discharge from the site: Low Risk No further drainage assessment required
Climate Change including new allowances	Included in the flood modelling extents Site not within climate change flood extent area	Development will not increase the peak flow and volume of discharge from the site Low risk posed to and from the development



Site is in official EA LOW risk



8.3 Geology (for SUDS)

Based on BGS mapping and surrounding adjacent boreholes:

- Bedrock: Portsmouth & Whitecliff / Wittering Sand Member
- Superficial: River Terrace Deposits

No lost / underground rivers documented at the site or near the site nor identifiable by the local geology mapping.

8.4 Surface Water Risk and Hazard Summary

- Property itself is not inundated:
 - In No hazard in all EA risk scenarios
- Access & Egress is always in NO hazard
- Scheme will reduce this flood risk by storing on site and reducing surface water discharge



8.5 SFRA / LFRMS Surface Water Mapping & Hazard

NOTE: the resolution of the SFRA and SWMP mapping is not appropriate to be site specific.

The mapping corroborates the data in the more detailed mapping above.

- Floodwaters not likely to immediately reach or inundate the site
- Regardless: scheme can address this residual risk and REDUCE FLOOD RISK OVERALL

8.6 Design Response: address SUDS hierarchy and climate change

- Replacement dwelling is appropriate
- Establish formal 1st floor
- All sleeping now above the extreme flood level
- No bedrooms on the ground floor
 - This report demonstrates that the scheme can pass the Exception Test

- NPPF compliant

REDUCE FLOOD RISK OVERALL

- Maximise porous and permeable areas – significant betterment
- Highest forms of SUDS to be used for a previously 100% un-attenuated site
 - Permeable and Porous areas
 - SUDS storage on site: EA specification for granular angular subbase
 - Soakaway and discharge to sewer (as restricted overflow / back up)
- **Oversized storage for betterment and flood future-proofing**
- Betterment as will attenuate for areas currently unattenuated
- Mandatory and standard resilient measures

8.7 How to address new climate change allowances: please read

We include this section worded deliberately because during COVID times, there have been too many EA responses where it is impossible that reports have been read by the officers: objections have been raised and we have wasted further hours of life having to respond where each answer has been included in the original report.

There should be no objections using the new climate change allowances for this site and scheme.

This is a replacement dwelling which provides a first floor and no bedrooms on the ground floor at the edge of Tidal FZ3 defended, adjacent to FZ1.

It is not possible for the EA to object if they have read and understood this report and the scheme and their flood settings and guidance.

Any site specific data are irrelevant to this scheme.

The whole ground floor will be resilient

The upper floor is the appropriate response as a replacement better dwelling in flood risk terms.

8.8 Breach Flood Scenario Response: please read

There should not be any objections relating to breach flood data or breach responses.

These data are not relevant for a replacement dwelling scheme that has no bedrooms on the ground floor and has a first floor.

The data would not alter the designs or the report assessment or recommendations.

9.0 Assessment of Proposed Development

9.1 Proposed Development

The proposed development can be seen in Appendix A&B.

The proposed development comprises:

- Demolish existing dwelling and remove impermeable areas
- Erect replacement 2 storey dwelling with maximised porous / permeable areas
- **Establish formal 1st floor**
- **All sleeping now above the extreme flood level**
 - Increase in footprint is acceptable in FZ3 / FZ2 tidal: no flood compensation required
- If required: slightly raised ground floor and first floor as refuge above extreme event for lifetime of the scheme
- **Reduces flood risk overall**
 - New modern flood resilience – see below
 - New porous / permeable and soakaway (designs by others) – see below
- Given the site constraints and LOW hazard setting: further raised floor levels are not considered necessary

As an appropriate response, the site will operate as existing with an improvement based on the design:

- 1) robust resilient construction techniques in order to minimise the damage caused by water entry and also to reduce the time taken to return the property to use after a flood (see later sections)
- 2) Reduce flood risk overall with new lower water demand white goods: betterment of surface water management on the site as a result of the scheme where feasible

Drainage

The existing connections will be retained / additional secured with the water company; non-return valves can be utilized as standard.

9.2 Drainage Connections

Foul

The existing connections will be retained / new connections installed subject to agreement with the water company.

Surface Water

SUDS Storage on site and connection to soakaway and overflow connection to sewer

9.3a SUDS Calculations & Assumptions

The site is c. 300m².

The existing site discharges 100% unattenuated.

- The scheme results in impermeable areas of c. 80m².
- This is c. 27% of the site.

For the calculations to oversize and future-proof:

- Assume 100% of the site
- This means the scheme will be attenuating for 100% of the site
- 73% buffer
- Use 40% for climate change
- Use 3 l/s as the lowest suitable restricted discharge to further oversize: as per industry standard: any lower and the smallness of the aperture becomes a flood risk in itself as it would be so easily blocked
- Likely storage of 3.0m³
 - The full output calculation is included in Appendix C

9.3b SUDS Specifications: see Appendix B also

New permeable front parking area:

- Use the area equivalent to 2 car park spaces = 24.5m²
 - This is a fact based on standard size of a car park space (4.9m by 2.5m)
- Using just extra 0.2m depth of granular angular storage in the make-up = 4.9m³ of storage using EA specifications:

New permeable surfacing to be constructed using the following EA guidance:

- Use the EA's specific "Guidance on the permeable surfacing of front gardens"

<http://www.communities.gov.uk/publications/planningandbuilding/pavingfrontgardens>

- Additional formal extensive SUDS would not be commensurate with the scale and sensitivity of the scheme.
- Retain all existing porous grassed / planting areas

9.4 Pipe sizes /Manholes / Pipe runs

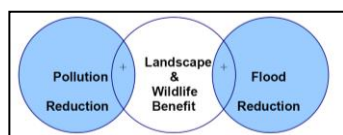
These will be confirmed as part of detailed designs; specifications of landscaping and drainage products need to be confirmed through Buildings Regs. Not required at this stage to demonstrate scheme can accommodate the surface water flows or meet LLFA requirements.

9.5 SUDS Hierarchy Check: site and scheme specific

The scheme offers tangible benefit in that it maximises permeable / porous areas and includes one of the highest forms of discharge: to soakaway.

Concept SUDS Strategy

The following diagram indicates the philosophy behind the proposed SUDS strategy, and is taken from the EA's SUDS guidance:



(Source: Environment Agency, 2009)

Table 2 indicates the SUDS Hierarchy Appraisal for the site and proposed development:

Table 2: Site Specific SUDS Appraisal

SUDS Hierarchy	SUDS Technique	Potential Benefits			Site Specific	
		Flood Reduction	Pollution Reduction	Landscape & Wildlife Benefit	?	Scheme Specific SUDS Suitability Appraisal and Comment
Most Sustainable ↑ ↓ Least Sustainable	Living Roofs	•	•	•	*	To reduce the amount of underground storage SUDS but not likely feasible given nature of build
	Ponds / Basins	•	•	•	X	Site is a single dwelling plot; not necessary
	Swales	•	•	•	X	Site is a single dwelling plot; not necessary
	Infiltration Techniques	•	•		*	Scheme has an existing connection given existing dwelling: hence BRE365 tests are not required at the planning stage Tests to be undertaken as pre-commencement.
	Permeable and Porous Surfaces with discharge to soakaway / sewer	•	•		✓	The scheme significantly oversizes the SUDS storage on site. Existing connections can be used: utilize soakaway if feasible / restricted overflow to sewer as necessary.
	Tanked Systems	•			*	Incorporated as necessary by drainage strategy to meet and better the LLFA requirements

Key:

Potentially suitable at the site: * Incorporated in the scheme: ✓ Not suitable / possible at the site: X

9.6 Flood Resilience

The proposed development will utilize the flood resilient techniques recommended in the NPPF Technical Guidance where appropriate and also the recommendations that have previously been issued by various local authorities:

As per previous correspondence with planning officers and as agreed:

The FRA provides the recommended resilient measures that can be incorporated, it will depend on the construction team as to what construction will actually need to be undertaken and what materials are used exactly. This does not invalidate the point and recommendations of this FRA. The FRA cannot simply specify the exact measures that need to be changed; they are not required of planning.

- Non-return valves as standard for ground
- Waterproofing to be tied in to ground floor slab as appropriate; details to be provided at detailed design to building regulations requirements: to reduce the turnaround time for returning the property to full operation after a flood event.
- Waterproofing to be installed above ground level as appropriate
- Plasterboards will be installed in horizontal sheets on ground levels rather than conventional vertical installation methods to minimise the amount of plasterboard that could be damaged in a flood event
- Wall sockets will be raised to as high as is feasible and practicable in order to minimise damage if flood waters inundate the property
- Any wood fixings on ground floor will be robust and/or protected by suitable coatings in order to minimise damage during a flood event
- Airbricks will be raised to as high as is feasible and practicable
- The Damp Proof Membrane / ground waterproofing will be installed above the main floor slab and tied in to the walls where appropriate, to reduce the turnaround time for returning the property to full operation after a flood event.

9.7 Refuge and Evacuation

HAYLING ISLAND EMERGENCY PLANNING FRAMEWORK

EA Flood Warning

Based on the likely flood risk and associated warning time, evacuation is usually preferred and feasible at this site, floodwaters are also not likely to enter the building; refuge is a preferred flood response.

Range of Flood Events

The site is at the edge of FZ3 tidal defended and not in a rapid inundation zone.

Preferred evacuation route is to the west and reach

All site users have access to the first floor, above the extreme event for lifetime of the scheme.

It is therefore considered likely that there would be sufficient time to seek refuge and/or evacuate to an area outside of the surface water flooding.

The property itself will be a modern protected and resilient dwelling as a result of the scheme and based on the available mapping is not likely to be inundated hence the site users can remain dry within the property for the duration of the likely flood event.

EA's Emergency Flood Route for Hayling Island

From this site:

Head west on Sandy Point Road and use emergency routes as directed by the EA / emergency services West and North to reach South Hayling in unrestricted FZ1



9.8 Annual Monitoring

It is recommended that tenants should contact the EA on an annual basis to confirm the flood status of the property.

If the flood status has changed, the evacuation and refuge plan should be reviewed and updated by suitable flood risk consultants as appropriate.

9.9 Surface Water Runoff – Flood Risk from the Development

In accordance with the NPPF / NPPG, this FRA also considers the risks posed from the development to surrounding areas.

The scheme is **compliant with LLFA SUDS policy – new oversized SUDS strategy**: maximise porous and permeable areas with >73% extra volume of SUDS storage on site and discharge to soakaway if found to be feasible / restricted overflow to sewer.

The proposals will incorporate new low-water demand devices such that despite no likely increase in peak flow and volume of flow, this can be managed appropriately for the lifetime of the scheme.

Given the small scale of the proposed development it is considered likely that the development will have a negligible effect on surrounding infrastructure. There will not be any significant increase in overland flow from the site.

9.10 Climate Change including New Allowances

The impact of climate change in accordance with the NPPF / PPG is likely to be an increase in the rainfall intensity in the future, which will increase peak storm flows to sewer. The proposed development will incorporate low flush and reduced water demand showers and toilets, such that the combined flows to sewer are likely to have a negligible impact. It is considered therefore that flows in the future are not likely to have a significant impact, even with an allowance for climate change.

There is unlikely to be an unacceptable impact on the receiving sewers owing to the small scale of the development and the fact that the scheme reduces discharge rates from the site.

The scheme includes new porous / permeable areas to address residual surface water risk and to encourage storage within the site.

The EA data incorporate likely increases in flood levels including an accommodation for climate change.

10.0 Flood Storage

It is considered that flood compensation is not required given the footprint is wholly within tidal floodplain.

11.0 Conclusion

The proposed development is for demolition of existing dwelling and erect a replacement dwelling with new porous & permeable areas maximized and new SUDS.

- Establish formal 1st floor
- All sleeping now above the extreme flood level

Replacement dwelling: no trigger for objection as scheme is NPPF and EA compliant.

- Site is at the far extent of a patchy EA FZ2 / FZ3 Tidal defended
- Edge of the tidal floodplain; immediate access to unrestricted FZ1
- EA official LOW risk: including for new climate change allowances
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This is categorized as a "More Vulnerable" in FZ3/FZ2: in accordance with the NPPF classifications the NPPF/PPG Exception Test does need to be passed.

Given the residual risk flood setting, the level, extent and depth of flooding on the site can be managed in terms of resistant and resilient measures and precautionary mitigation measures.

Based on the likely flooding risk and small scale of the proposed development, it is considered that the proposed development can be constructed and continue to be operated safely in flood risk terms, without increasing flood risk elsewhere; it is therefore considered appropriate development in accordance with the NPPF / PPG.

11.1 Recommendations for Further Work

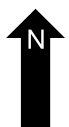
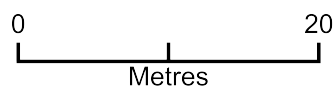
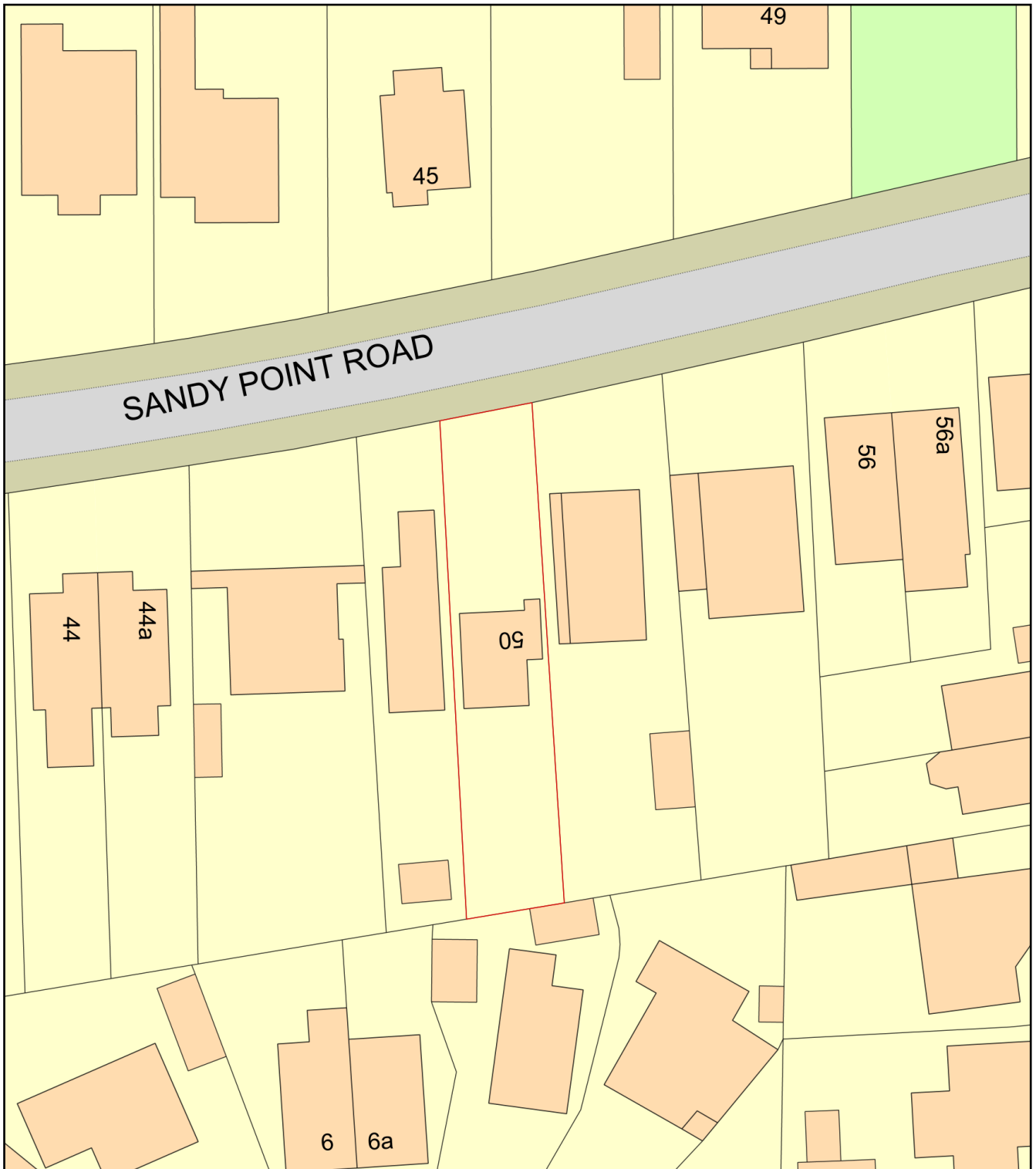
1. Detailed SUDS and drainage designs with BRE365 Testing and specifications as part of detailed design stage to discharge standard condition

12.0 Appendices

- A. Site Location & Existing Layout
- B. Proposed Development Plans & EA Specification for SUDS
- C. SUDS Storage Calculations

Appendix A

50 Sandy Point Road, hayling Island



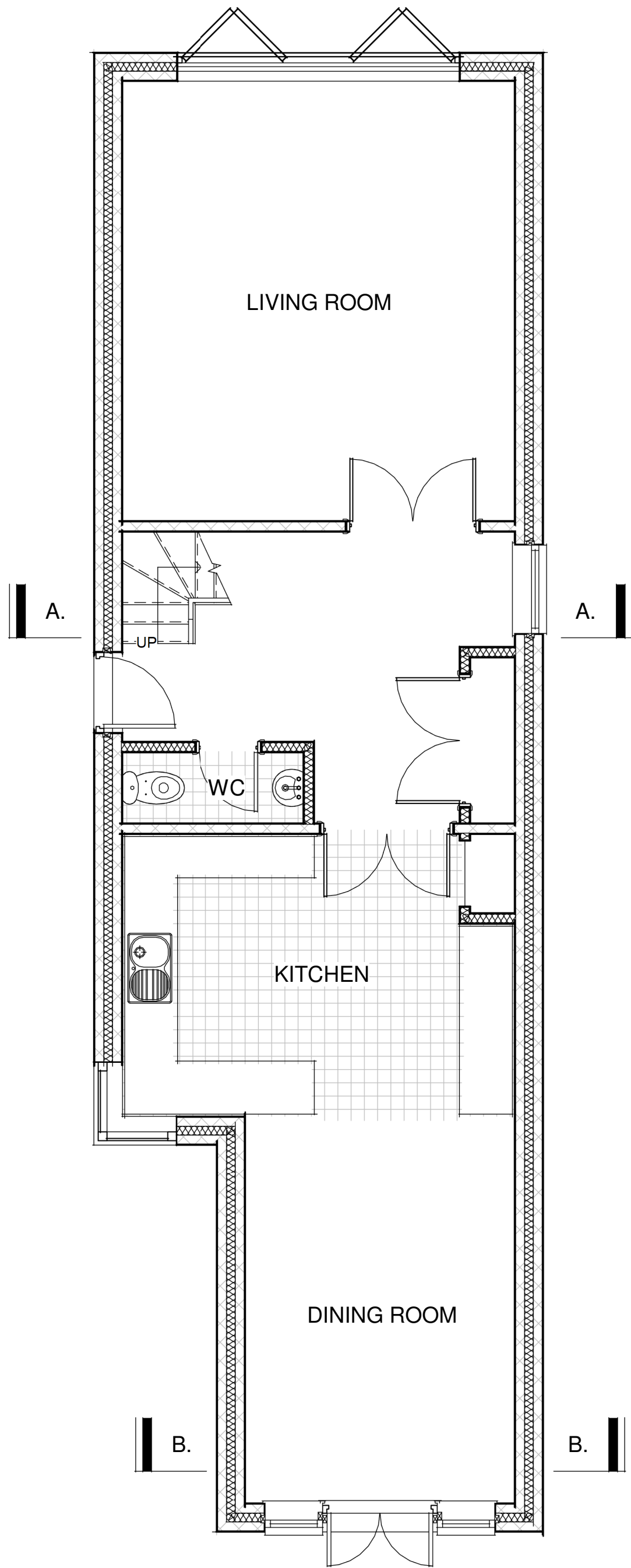
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Date Produced: 12 Aug 2019

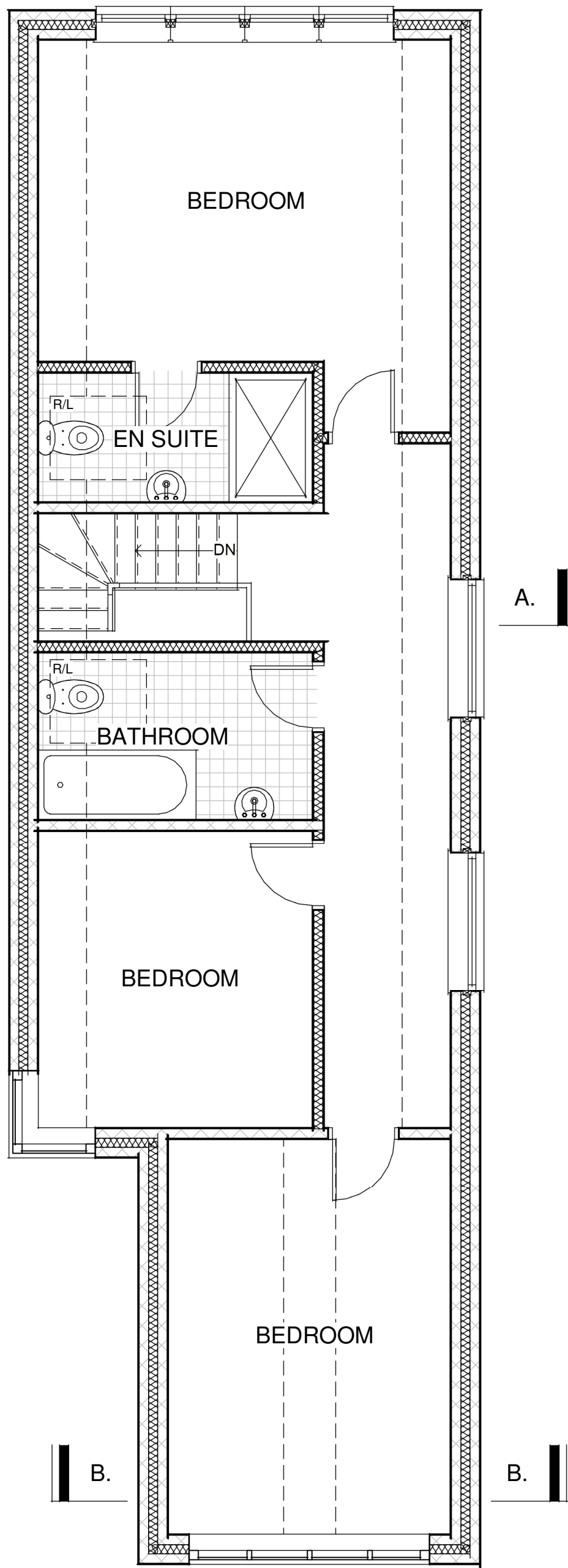
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Appendix B



Proposed Ground Floor
1 : 50



Proposed First Floor
1 : 50



Proposed Front (North)
1 : 100



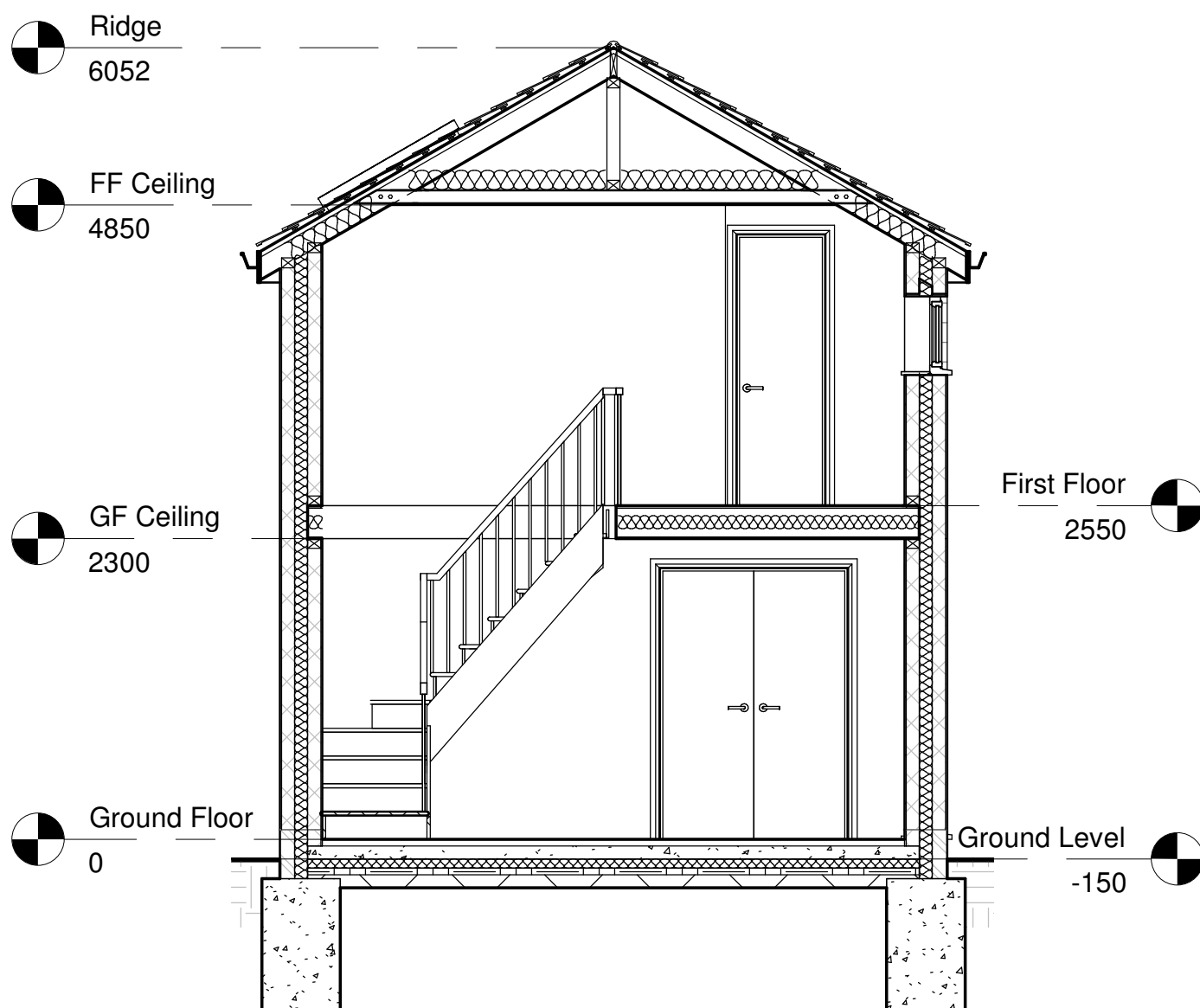
Proposed Side (East)
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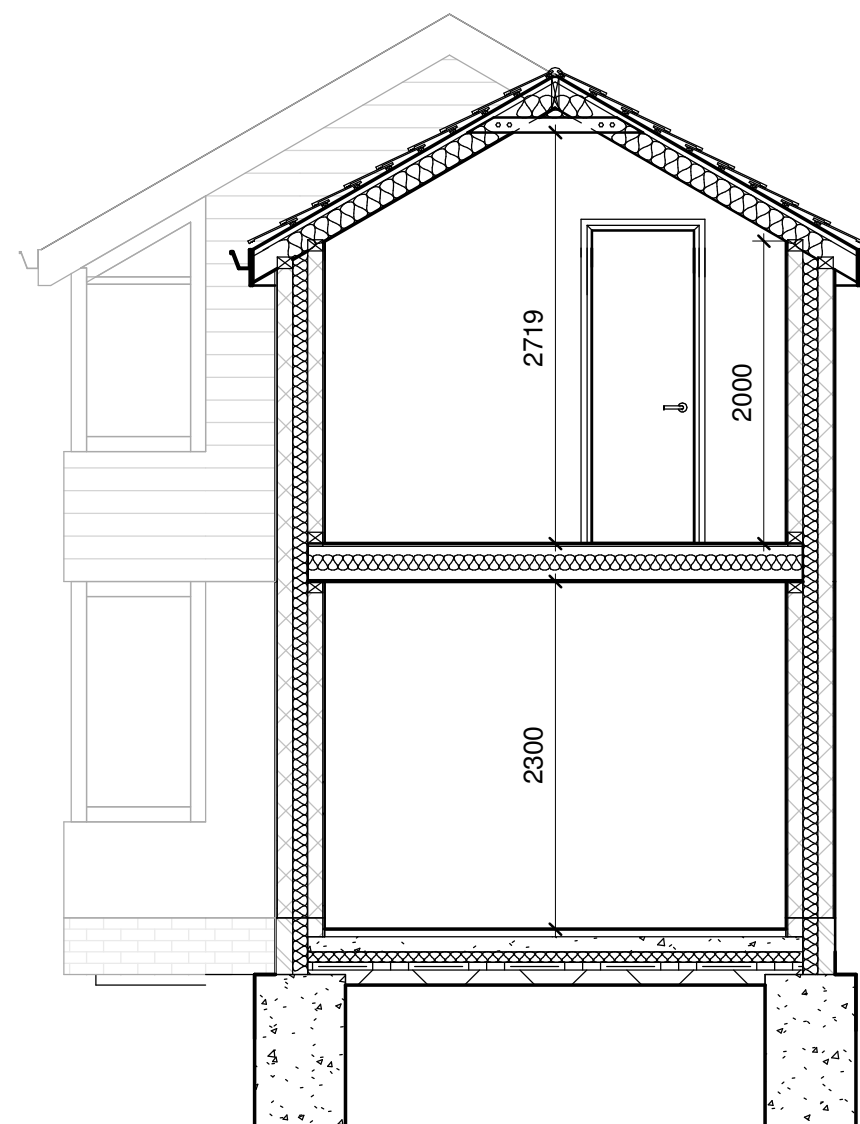
Proposed Rear (South)
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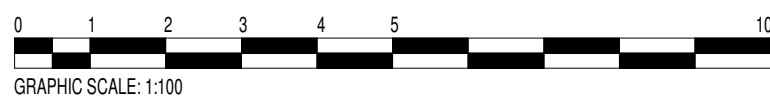
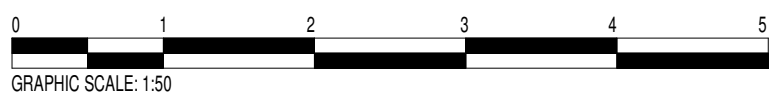
Proposed Side (West)
1 : 100



Section A.A.
1 : 50



Section B.B.
1 : 50



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Ms N Stachon

Job Title
**50 Sandy Point Road
Hayling Island**

Drawing Title
**New House
Proposed Plans**

Scale **As indicated** Sheet **A1**

Date **AUG 20** Drawn by **CM**

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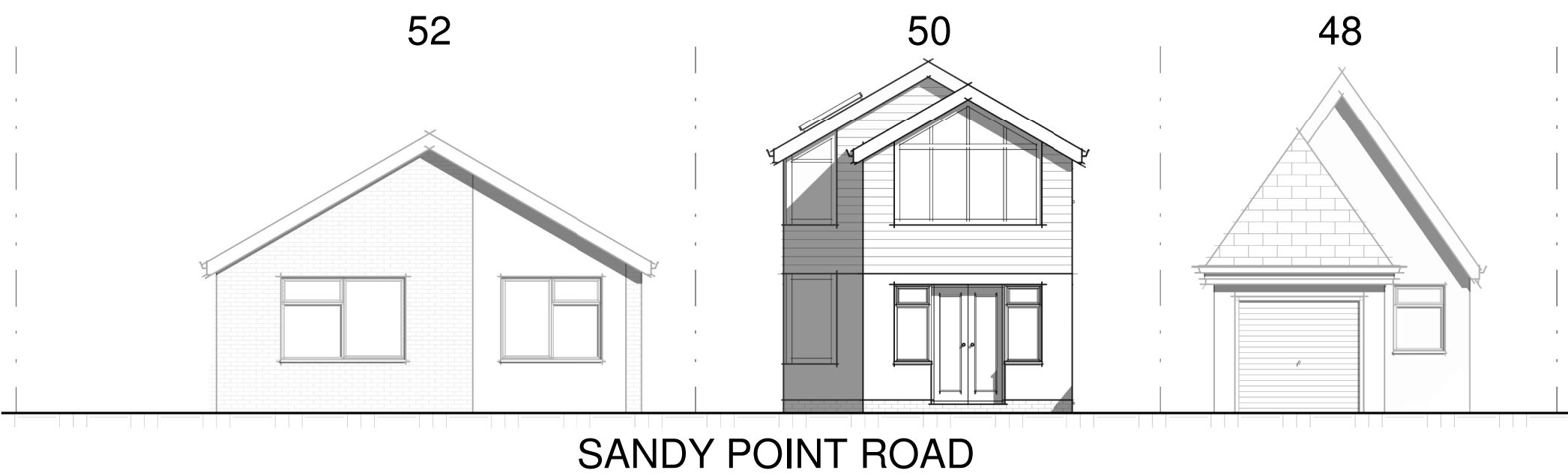
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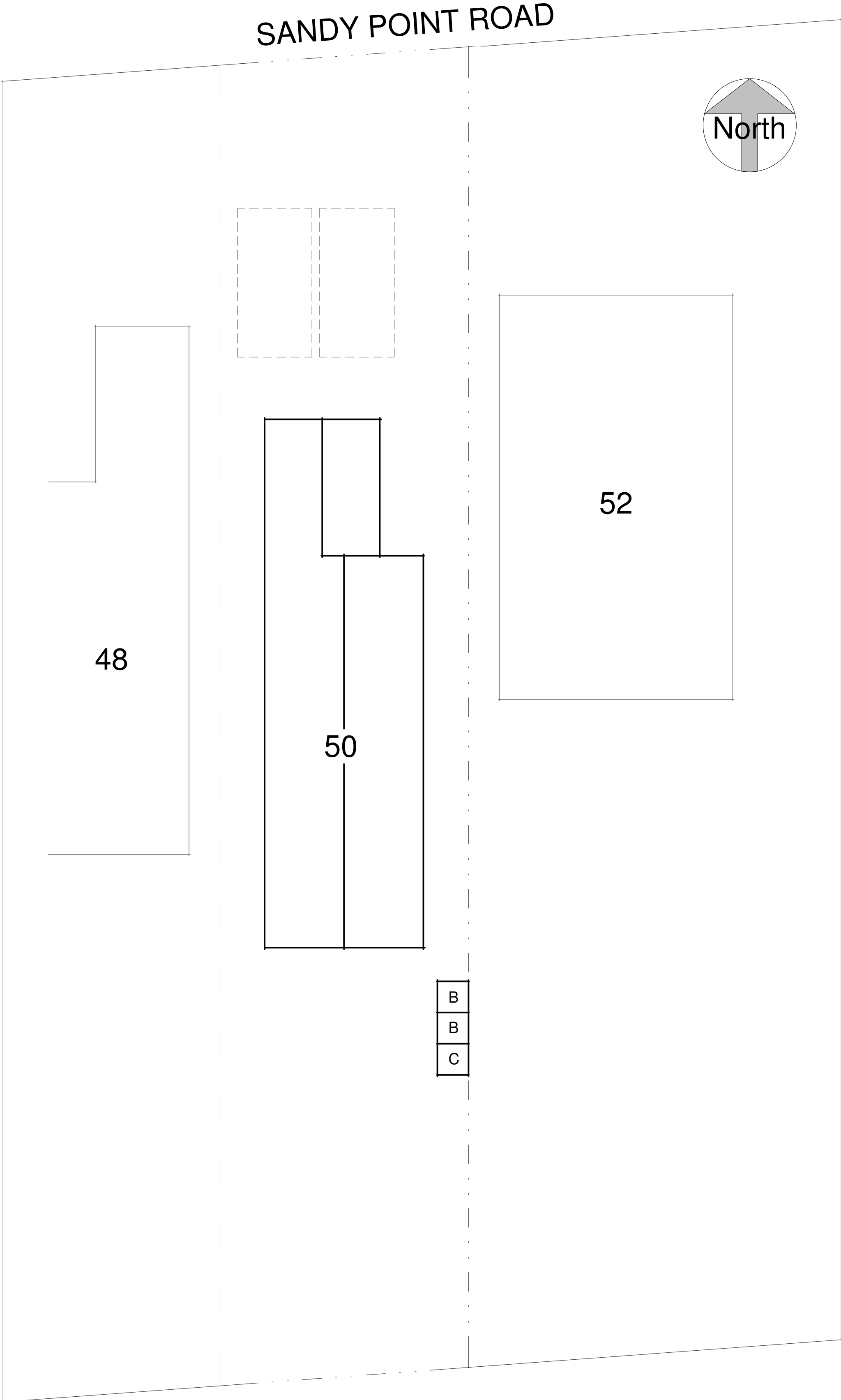
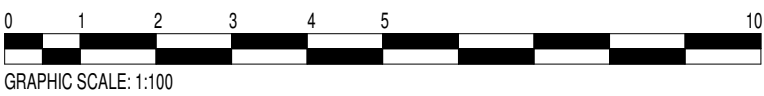
3D Front



3D Rear



Proposed Street Scene
1 : 100



Site Plan
1 : 100

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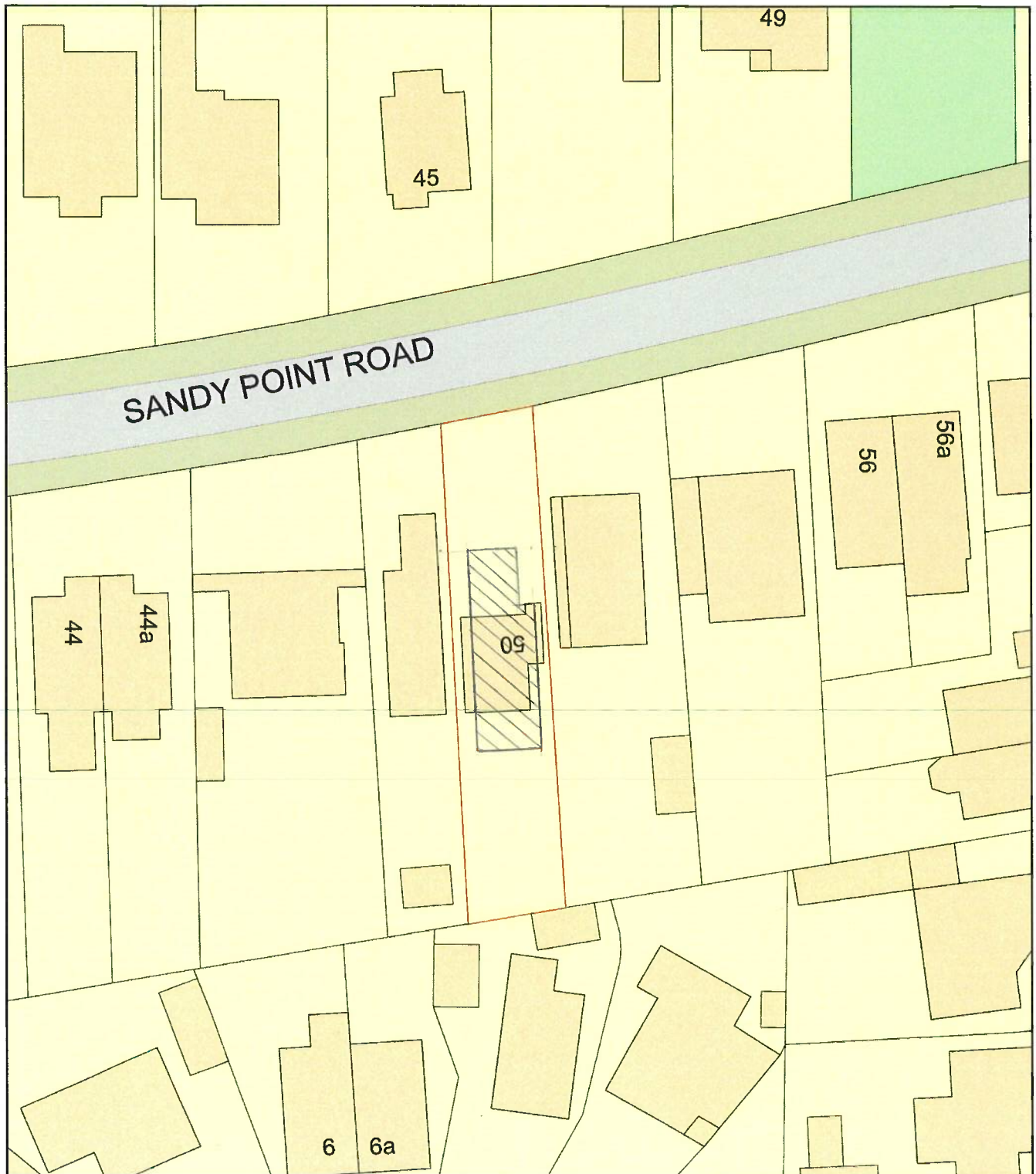
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Client		
Ms N Stachon		
Job Title		
50 Sandy Point Road Hayling Island		
Drawing Title		
New House Site Plan & Street Scene		
Scale 1 : 100		Sheet A1
Date AUG 20	Drawn by CM	
Drg. No. 3164 · 19 · 1.21		Rev.

50 Sandy Point Road, Hayling Island



0 20
Metres



Plan Produced for: Mrs N Stachon

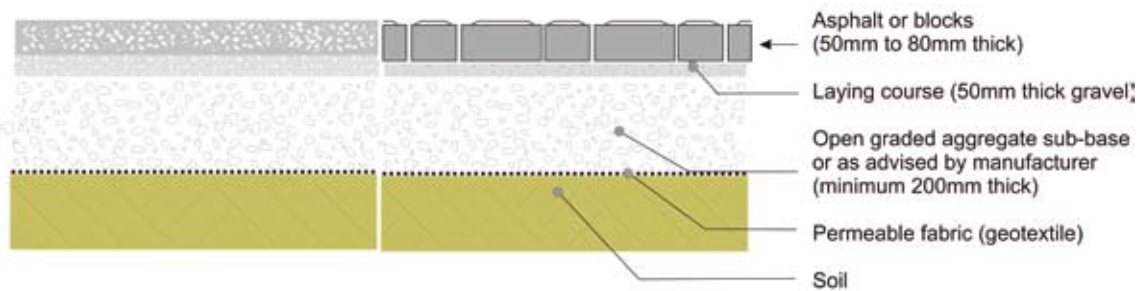
Date Produced: 12 Aug 2019

Plan Number/Project ID: TQRQM19224160239881

Scale: 1:500 @ A4

Hard permeable and porous surfaces

Hard surfacing which allows water to soak into it can be built with porous asphalt, porous concrete blocks, concrete or clay block permeable paving. The material has open voids across the surface of the material or around the edges of blocks that allow water to soak in. The surface is constructed over a permeable sub-base. Systems are available from a variety of manufacturers. Sources of further information are provided in Section 6.



Pros	Cons
Hard and durable with a very long service life if correctly constructed	Can be more expensive than other options
Require the least amount of maintenance	Require knowledgeable contractor to construct correctly (especially porous asphalt which should be provided and laid by a specialist company)
Wide variety of shapes and colours available for concrete blocks	

Section 3

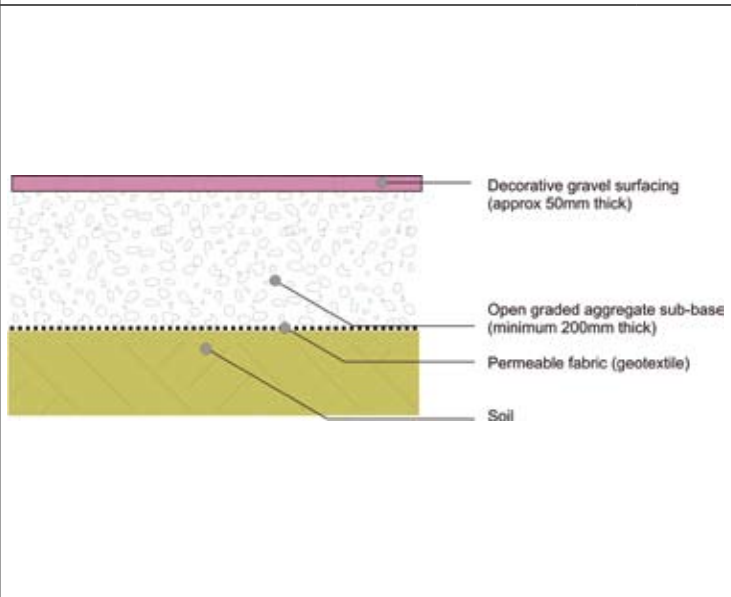
Types of surface

Planted and gravel driveways

The Royal Horticultural Society has identified many simple ways that a green or gravel driveway can be created. These green solutions provide an attractive space that can be used to park cars.

Loose gravel

This is the most simple type of construction. The driveway sub-base is covered by a surface layer of gravel or shingle. Gravel with different shapes and colours is available to make the surface more decorative. A strip of block paving or asphalt at the entrance can limit the loss and spread of gravel from the drive.





Pros	Cons
Simple to construct and maintain	Gravel will scatter or form waves
Cheap	Not suitable on steeply sloping drives
Materials readily available	Not suitable for wheel-chairs
Easily integrated with planting to provide visual enhancement to driveway layout	

Appendix C



Surface water storage requirements for sites

www.uksuds.com | Storage estimation tool

Calculated by:

Site name:

Site location:

Site Details

Latitude:

Longitude:

Reference:

Date:

This is an estimation of the storage volume requirements that are needed to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013), the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). It is not to be used for detailed design of drainage systems. It is recommended that hydraulic modelling software is used to calculate volume requirements and design details before finalising the design of the drainage scheme.

Site characteristics

Total site area (ha):	0.03
Significant public open space (ha):	0
Area positively drained (ha):	0.03
Impermeable area (ha):	0.03
Percentage of drained area that is impermeable (%):	100
Impervious area drained via infiltration (ha):	0
Return period for infiltration system design (year):	10
Impervious area drained to rainwater harvesting (ha):	0
Return period for rainwater harvesting system (year):	10
Compliance factor for rainwater harvesting system (%):	66
Net site area for storage volume design (ha):	0.03
Net impermeable area for storage volume design (ha):	0.03
Pervious area contribution to runoff (%):	30

* where rainwater harvesting or infiltration has been used for managing surface water runoff such that the effective impermeable area is less than 50% of the 'area positively drained', the 'net site area' and the estimates of Q_{BAR} and other flow rates will have been reduced accordingly.

Design criteria

Climate change allowance factor:

Urban creep allowance factor:

Volume control approach:

Interception rainfall depth (mm):

Minimum flow rate (l/s):

Methodology

esti:

Q_{BAR} estimation method:

SPR estimation method:

Soil characteristics

	Default	Edited
SOIL type:	3	3
SPR:	0.37	0.37

Hydrological characteristics

	Default	Edited
Rainfall 100 yrs 6 hrs:	--	55
Rainfall 100 yrs 12 hrs:	--	80.01
FEH / FSR conversion factor:	1.27	1.27
SAAR (mm):	679	679
M5-60 Rainfall Depth (mm):	17	17
'r' Ratio M5-60/M5-2 day:	0.4	0.4
Hydrological region:	7	7
Growth curve factor 1 year:	0.85	0.85
Growth curve factor 10 year:	1.62	1.62
Growth curve factor 30 year:	2.3	2.3
Growth curve factor 100 years:	3.19	3.19
Q_{BAR} for total site area (l/s):	0.08	0.08
Q_{BAR} for net site area (l/s):	0.08	0.08

Site discharge rates

	Default	Edited
1 in 1 year (l/s):	3	3
1 in 30 years (l/s):	3	3
1 in 100 year (l/s):	3	3

Estimated storage volumes

	Default	Edited
Attenuation storage 1/100 years (m^3):	3	3
Long term storage 1/100 years (m^3):	0	0
Total storage 1/100 years (m^3):	3	3

This report was produced using the storage estimation tool developed by HRWallingford and available at www.uksuds.com. The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at <http://uksuds.com/terms-and-conditions.htm>. The outputs from this tool have been used to estimate storage volume requirements. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, CEH, Hydrosolutions or any other organisation for the use of these data in the design or operational characteristics of any drainage scheme.