

Surface Water Drainage Pro-forma for new developments

This pro-forma accompanies our advice note on surface water drainage. Developers should complete this form and submit it to the Local Planning Authority, referencing from where in their submission documents this information is taken. The pro-forma is supported by the [Defra/EA guidance on Rainfall Runoff Management](#) and uses the storage calculator on www.UKsuds.com. This pro-forma is based on current industry best practice and focuses on ensuring surface water drainage proposals meet national and local policy requirements. The pro-forma should be considered alongside other supporting SuDS Guidance.

1. Site Details

Site	Mountview Lodge
Address & post code or LPA reference	9 Swiss Terrace, London NW6 4RR
Grid reference	TQ 26599 84329
Is the existing site developed or Greenfield?	Brownfield
Is the development in a LFRZ or in an area known to be at risk of surface or ground water flooding? If yes, please demonstrate how this is managed, in line with DP23?	Not in CDA or LFRZ. EA surface water flood risk mapping does not show site to be at risk. No groundwater flood events recorded at site and site is located on low permeability London Clay Formation. Note that proposal relates to rooftop extension only and is therefore elevated significantly above street level.
Total Site Area served by drainage system (excluding open space) (Ha)*	0.02ha.

* The Greenfield runoff off rate from the development which is to be used for assessing the requirements for limiting discharge flow rates and attenuation storage from a site should be calculated for the area that forms the drainage network for the site whatever size of site and type of drainage technique. Please refer to the Rainfall Runoff Management document or CIRIA manual for detail on this.

2. Impermeable Area

	Existing	Proposed	Difference (Proposed-Existing)	Notes for developers
Impermeable area (ha)	0.02	0.02	0	If the proposed amount of impermeable surface is greater, then runoff rates and volumes will increase. Section 6 must be filled in. If proposed impermeability is equal or less than existing, then section 6 can be skipped and section 7 filled in.
Drainage Method (infiltration/sewer/watercourse)	sewer	sewer	N/A	If different from the existing, please fill in section 3. If existing drainage is by infiltration and the proposed is not, discharge volumes may increase. Fill in section 6.

3. Proposing to Discharge Surface Water via

	Yes	No	Evidence that this is possible	Notes for developers
Existing and proposed MicroDrainage calculations		x	N/A. Rooftop extension and no increase in hard-standing.	Please provide MicroDrainage calculations of existing and proposed run-off rates and volumes in accordance with a recognised methodology or the results of a full infiltration test (see line below) if infiltration is proposed.
Infiltration		x	N/A, will tie in with existing drainage system.	e.g. soakage tests. Section 6 (infiltration) must be filled in if infiltration is proposed.
To watercourse		x	N/A, will tie in with existing drainage system.	e.g. Is there a watercourse nearby?
To surface water sewer	x		Yes, drainage will tie in with existing.	Confirmation from sewer provider that sufficient capacity exists for this connection.
Combination of above		x	N/A	e.g. part infiltration part discharge to sewer or watercourse. Provide evidence above.
Has the drainage proposal had regard to the SuDS hierarchy?	x		Existing drainage system to be used. Green roof proposed	Evidence must be provided to demonstrate that the proposed Sustainable Drainage strategy has had regard to the SuDS hierarchy as outlined in Section 2.5 above.
Layout plan showing where the sustainable drainage infrastructure will be located on site.		x	N/A, formal attenuation not proposed as there will be no increase in hard-standing. A green roof is proposed for biodiversity benefits and will also provide reduction in surface water run off rates.	Please provide plan reference numbers showing the details of the site layout showing where the sustainable drainage infrastructure will be located on the site. If the development is to be constructed in phases this should be shown on a separate plan and confirmation should be provided that the sustainable drainage proposal for each phase can be constructed and can operate independently and is not reliant on any later phase of development.

4. Peak Discharge Rates – This is the maximum flow rate at which storm water runoff leaves the site during a particular storm event.

	Existing Rates (l/s)	Proposed Rates (l/s)	Difference (l/s) (Proposed-Existing)	% Difference (difference /existing x 100)	Notes for developers
Greenfield QBAR		N/A	N/A	N/A	QBAR is approx. 1 in 2 storm event. Provide this if Section 6 (QBAR) is proposed.
1 in 1					Proposed discharge rates (with mitigation) should aim to be equivalent to greenfield rates for all corresponding storm events. As a minimum, peak discharge rates must be reduced by 50% from the existing sites for all corresponding rainfall events.
1 in 30					
1 in 100					
1 in 100 plus climate change	N/A	Rates not provided as scheme is	rooftop extension		The proposed 1 in 100 +CC peak discharge rate (with mitigation) should aim to be equivalent to greenfield rates. As a minimum, proposed 1 in 100 +CC peak discharge rate must be reduced by 50% from the existing 1 in 100 runoff rate sites.

5. Calculate additional volumes for storage –The total volume of water leaving the development site. New hard surfaces potentially restrict the amount of stormwater that can go to the ground, so this needs to be controlled so not to make flood risk worse to properties downstream.

	Greenfield runoff volume (m ³)	Existing Volume (m ³)	Proposed Volume (m ³)	Difference (m ³) (Proposed-Existing)	Notes for developers
1 in 1					Proposed discharge volumes (with mitigation) should be constrained to a value as close as is reasonably practicable to the greenfield runoff volume wherever practicable and as a minimum should be no greater than existing volumes for all corresponding storm events. Any increase in volume increases flood risk elsewhere. Where volumes are increased section 6 must be filled in.
1 in 30					
1 in 100 6 hour					
1 in 100 6 hour plus climate change	N/A -	Proposal	will use	existing system.	The proposed 1 in 100 +CC discharge volume should be constrained to a value as close as is reasonably practicable to the greenfield runoff volume wherever practicable. As a minimum, to mitigate for climate change the proposed 1 in 100 +CC volume discharge from site must be no greater than the existing 1 in 100 storm event. If not, flood risk increases under climate change.

6. Calculate attenuation storage – Attenuation storage is provided to enable the rate of runoff from the site into the receiving watercourse to be limited to an acceptable rate to protect against erosion and flooding downstream. The attenuation storage volume is a function of the degree of development relative to the greenfield discharge rate.

		Notes for developers
Storage Attenuation volume (Flow rate control) required to meet greenfield run off rates (m ³)	N/A	Volume of water to attenuate on site if discharging at a greenfield run off rate. Can't be used where discharge volumes are increasing
Storage Attenuation volume (Flow rate control) required to reduce rates by 50% (m ³)	N/A	Volume of water to attenuate on site if discharging at a 50% reduction from existing rates. Can't be used where discharge volumes are increasing
Storage Attenuation volume (Flow rate control) required to meet [OTHER RUN OFF RATE (as close to greenfield rate as possible)] (m ³)	N/A	Volume of water to attenuate on site if discharging at a rate different from the above – please state in 1 st column what rate this volume corresponds to. On previously developed sites, runoff rates should not be more than three times the calculated greenfield rate. Can't be used where discharge volumes are increasing
Storage Attenuation volume (Flow rate control) required to retain rates as existing (m ³)	N/A	Volume of water to attenuate on site if discharging at existing rates. Can't be used where discharge volumes are increasing
Percentage of attenuation volume stored above ground,	N/A	Percentage of attenuation volume which will be held above ground in swales/ponds/basins/green roofs etc. If 0, please demonstrate why.

7. How is Storm Water stored on site?

Storage is required for the additional volume from site but also for holding back water to slow down the rate from the site. This is known as attenuation storage and long term storage. The idea is that the additional volume does not get into the watercourses, or if it does it is at an exceptionally low rate. You can either infiltrate the stored water back to ground, or if this isn't possible hold it back with on site storage. Firstly, can infiltration work on site?

			Notes for developers
Infiltration	State the Site's Geology and known Source Protection Zones (SPZ)	London Clay Formation and likely also Made Ground. Partially in SPZ 2.	Avoid infiltrating in made ground. Infiltration rates are highly variable and refer to Environment Agency website to identify and source protection zones (SPZ)
	Are infiltration rates suitable?	N/A	Infiltration rates should be no lower than 1×10^{-9} m/s.
	State the distance between a proposed infiltration device base and the ground water (GW) level	N/A - no infiltration devices proposed	Need 1m (min) between the base of the infiltration device & the water table to protect Groundwater quality & ensure GW doesn't enter infiltration devices. Avoid infiltration where this isn't possible.

	Were infiltration rates obtained by desk study or infiltration test?	N/A - proposed to connect into existing drainage system of building.	Infiltration rates can be estimated from desk studies at most stages of the planning system if a back up attenuation scheme is provided..
	Is the site contaminated? If yes, consider advice from others on whether infiltration can happen.	N/A	Advice on contaminated Land in Camden can be found on our supporting documents webpage Water should not be infiltrated through land that is contaminated. The Environment Agency may provide bespoke advice in planning consultations for contaminated sites that should be considered.
In light of the above, is infiltration feasible?	Yes/No? If the answer is No, please identify how the storm water will be stored prior to release	It is proposed to connect into the existing drainage system.	If infiltration is not feasible how will the additional volume be stored?. The applicant should then consider the following options in the next section.

Storage requirements

The developer must confirm that either of the two methods for dealing with the amount of water that needs to be stored on site.

Option 1 Simple – Store both the additional volume and attenuation volume in order to make a final discharge from site at the greenfield run off rate. This is preferred if no infiltration can be made on site. This very simply satisfies the runoff rates and volume criteria.

Option 2 Complex – If some of the additional volume of water can be infiltrated back into the ground, the remainder can be discharged at a very low rate of 2 l/sec/hectare. A combined storage calculation using the partial permissible rate of 2 l/sec/hectare and the attenuation rate used to slow the runoff from site.

Please confirm what option has been chosen and how much storage is required on site.	N/A	Notes for developers The developer at this stage should have an idea of the site characteristics and be able to explain what the storage requirements are on site and how it will be achieved.
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8. Please confirm

		Notes for developers
Which Drainage Systems measures have been used, including green roofs?	Green roof will provide biodiversity benefits and some reduction in run-off rates.	SUDS can be adapted for most situations even where infiltration isn't feasible e.g. impermeable liners beneath some SUDS devices allows treatment but not infiltration. See CIRIA SUDS Manual C697.
Drainage system can contain in the 1 in 30 storm event without flooding	Extension will use existing system.	This a requirement for sewers for adoption & is good practice even where drainage system is not adopted.
Will the drainage system contain the 1 in 100 +CC storm event? If no please demonstrate how buildings and utility plants will be protected.	N/A	National standards require that the drainage system is designed so that flooding does not occur during a 1 in 100 year rainfall event in any part of: a building (including a basement); or in any utility plant susceptible to water (e.g. pumping station or electricity substation) within the development.
Any flooding between the 1 in 30 & 1 in 100 plus climate change storm events will be safely contained on site.	N/A	Safely: not causing property flooding or posing a hazard to site users i.e. no deeper than 300mm on roads/footpaths. Flood waters must drain away at section 6 rates. Existing rates can be used where runoff volumes are not increased.
How will exceedance events be catered on site without increasing flood risks (both on site and outside the development)?	N/A - factored into existing drainage system.	Safely: not causing property flooding or posing a hazard to site users i.e. no deeper than 300mm on roads/footpaths. Flood waters must drain away at section 6 rates. Existing rates can be used where runoff volumes are not increased. Exceedance events are defined as those larger than the 1 in 100 +CC event.
How are rates being restricted (vortex control, orifice etc)	N/A - scheme to tie into existing system	Detail of how the flow control systems have been designed to avoid pipe blockages and ease of maintenance should be provided.
Please confirm the owners/adopters of the entire drainage systems throughout the development. Please list all the owners.	TBC through S106 agreement	If these are multiple owners then a drawing illustrating exactly what features will be within each owner's remit must be submitted with this Proforma.
How is the entire drainage system to be maintained?	Please see attached SuDS Maintenance Plan. A detailed plan can be provided at detailed design stage.	If the features are to be maintained directly by the owners as stated in answer to the above question please answer yes to this question and submit the relevant maintenance schedule for each feature. If it is to be maintained by others than above please give details of each feature and the maintenance schedule. Clear details of the maintenance proposals of all elements of the proposed drainage system must be provided. Details must demonstrate that maintenance and operation requirements are economically proportionate. Poorly maintained drainage can lead to increased flooding problems in the future.

9. Evidence Please identify where the details quoted in the sections above were taken from. i.e. Plans, reports etc. Please also provide relevant drawings that need to accompany your proforma, in particular exceedance routes and ownership and location of SuDS (maintenance access strips etc

Pro-forma Section	Document reference where details quoted above are taken from	Page Number
Section 2		
Section 3		
Section 4		
Section 5		
Section 6		
Section 7		
Section 8		

The above form should be completed using evidence from the Flood Risk Assessment and site plans. It should serve as a summary sheet of the drainage proposals and should clearly show that the proposed rate and volume as a result of development will not be increasing. If there is an increase in rate or volume, the rate or volume section should be completed to set out how the additional rate/volume is being dealt with.

This form is completed using factual information from the Flood Risk Assessment and Site Plans and can be used as a summary of the surface water drainage strategy on this site.

Form Completed By Rachel Shepherd

Qualification of person responsible for signing off this pro-forma BSc (Hons) MCIWEM

Company RPS Consulting Services Ltd

On behalf of (Client's details) Graham Shapiro

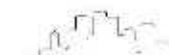
Date: 17th September 2018

SuDS Maintenance Plan

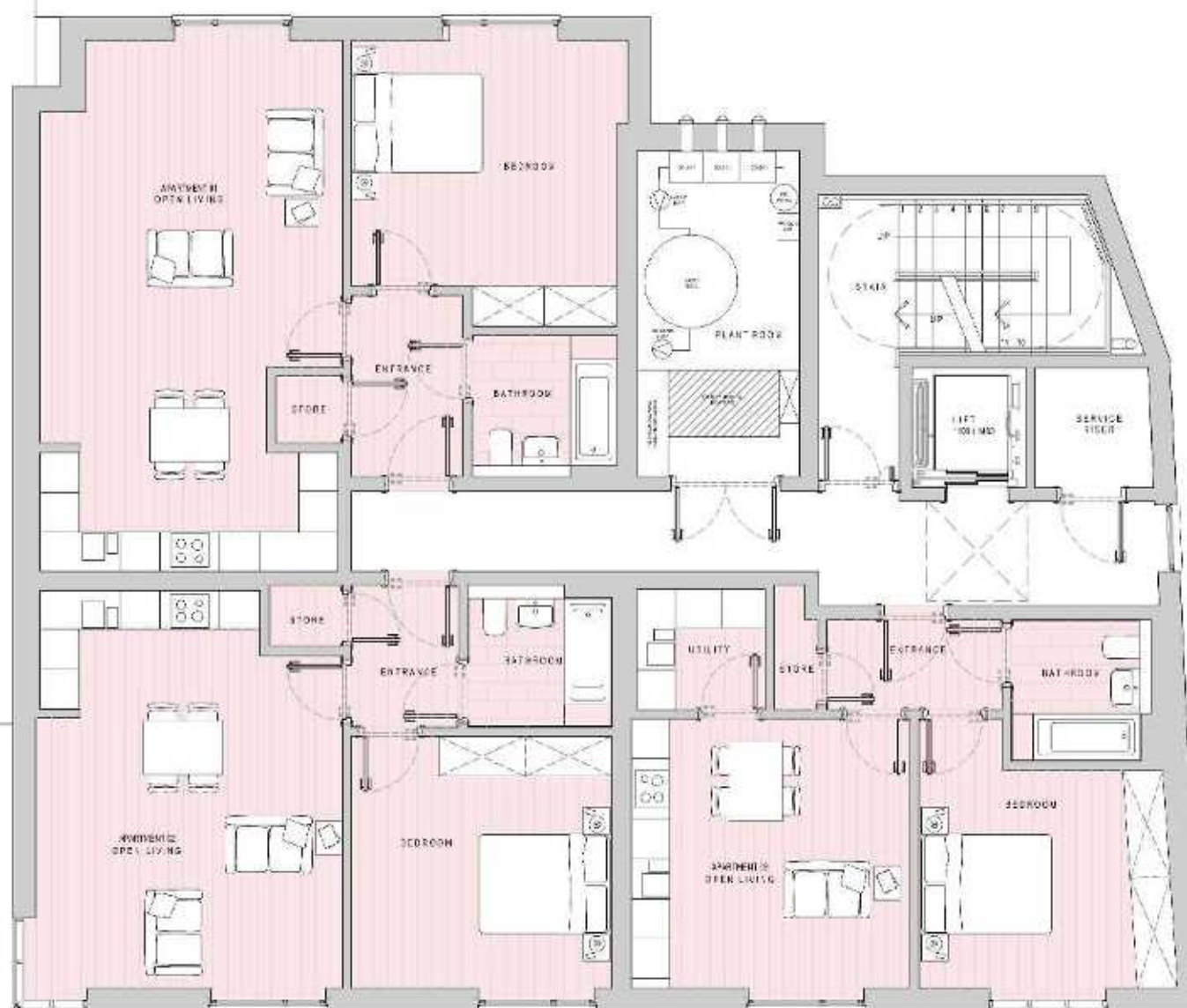
This Maintenance Plan has been produced in order to ensure that the SuDS incorporated at the site remain functional for the lifetime of the development. This will ensure a continued reduction in local flood risk through the attenuation of surface water run-off on-site. It is proposed to provide a green roof at the site. This plan demonstrates that the maintenance and operation requirements of the SuDS are economically proportionate to the development. Maintenance would be undertaken by a suitably qualified contractor or third party.

Type of SuDS	Illustration	Maintenance required	Regularity	Indicative cost
Green roofs	 <p>Green roofs comprise a multi-layered system that covers the roof of a building or podium structure with vegetation cover / landscaping. The roof is likely to consist of an impermeable layer, or substrate or growing medium and a drainage layer.</p>	Litter and debris removal	Monthly	£30 / month
		Weed removal	6 monthly	£60 / roof
		Inspection of bare patches and replacement of plants	6 monthly	£150 / roof
		Indicative annual maintenance cost <ul style="list-style-type: none"> - £2,500 per year for first 2 years for covered roof with sedum mat, £600 per year after. - £1,250 per year for first 2 years for covered roof with biodiverse roof, £150 per year after 		

This document was compiled with reference to the Ciria Susdrain website, the CIRIA SuDS Manual (2015) and to 'Cost estimation for SUDS - summary of evidence' (Environment Agency, March 2015) and references therein.



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PROPOSED NEW SIXTH FLOOR 1:100



PROPOSED NEW SEVENTH FLOOR 1:100

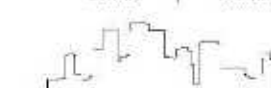


Do not scale off this drawing.
This drawing is for information and is intended for planning purposes only.

**PLANNING ISSUE**

C	Scheme design updated to reflect Pre-Planning feedback.	DC		09-08-18
B	Apartment windows amended.	JA	DC	04-05-18
A	Apartment numbers amended.	JA	DC	02-05-18
Revision	Decision	Drawn	Checked	Date

Interim ☐ Information ☒ Tender ☐ Construction ☐ As Built ☐



Title MOUNTVIEW LODGE, SWISS TERRACE
STEWARTBY

Detail EXTENSION OPTIONS
SIXTH AND SEVENTH FLOORS

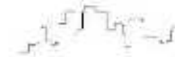
Scale 1:100 @ A3 Date MARCH 2018 Drawn JA Check DC

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Woods Hardwick
Architects, Engineers and Development Consultants

15-17 Gresham Road
Dorchester
Dorset DT1 1JL
T: 01306 300000
F: 01306 300001
www.woods-hardwick.com

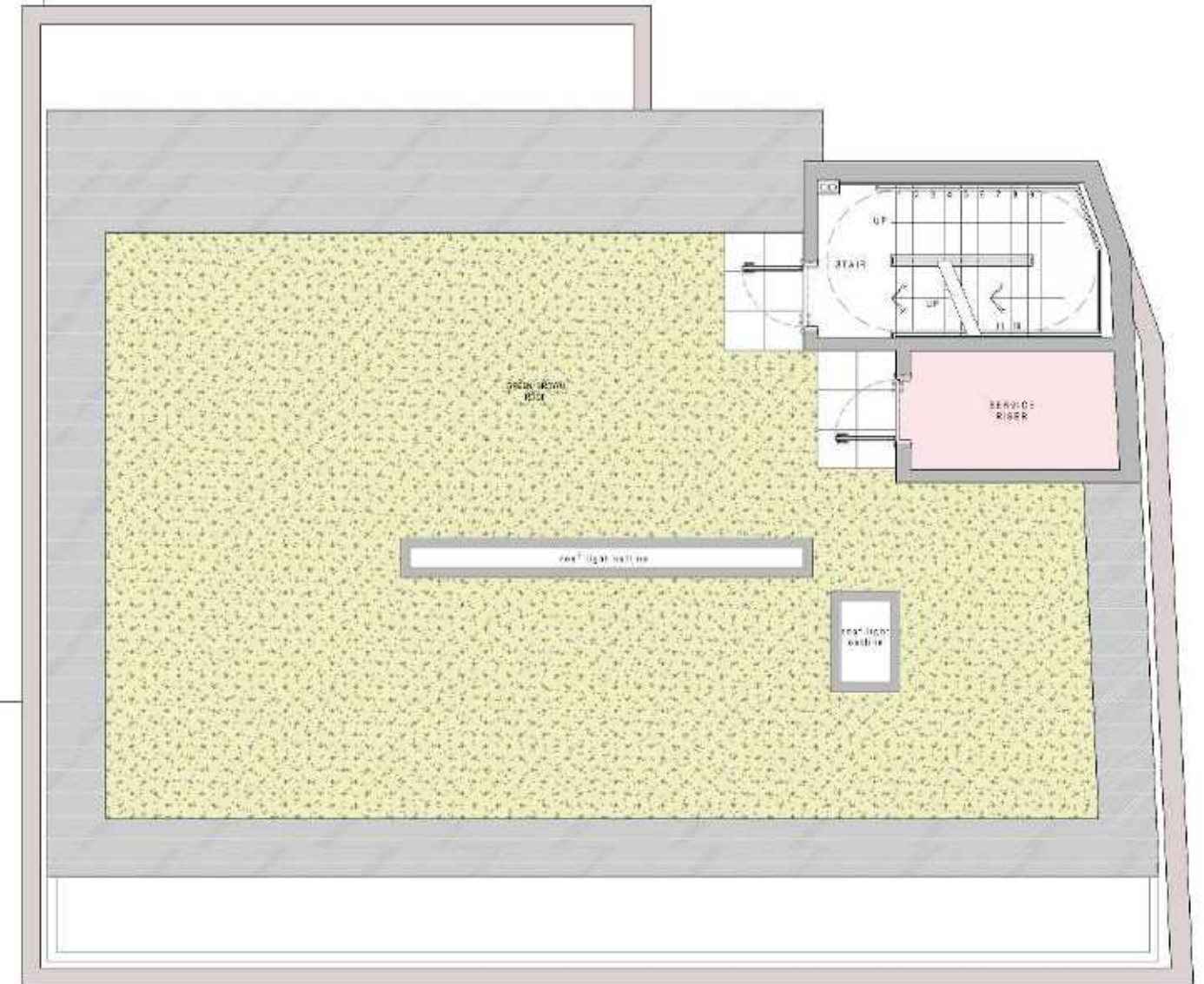
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PROPOSED NEW EIGHTH FLOOR 1:100



PROPOSED NEW ROOF TOP 1:100



Direct scale will be used.
This drawing is for identification and is intended for planning purposes only.



PLANNING ISSUE

D	Bedroom arrangement amended to apartment B.	DC		15-08-18
C	Scheme design updated to reflect Pre-Planning feedback.	DC		09-08-18
B	Apartment windows amended.	JA	DC	04-05-18
A	Apartment numbers amended.	JA	DC	02-05-18
Revision	Description	Drawn	Checked	Date

Particulars ☐ Information ☒ Detail ☐ Construction ☐ As Built ☐



188 MOUNTVIEW LODGE, SWISS TERRACE
STEWARTBY

WORK: EXTENSION OPTIONS
EIGHTH FLOOR AND ROOF TOP

Scale: 1:100 @ A3 Date: MARCH 2018 Drawn: JA Check: DC

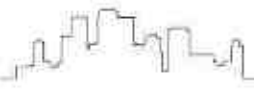
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Woods Hardwick
Architects, Engineers and Development Consultants



188 Mountview Lodge
Stewartby
Bedfordshire
MK43 0JH
T: 01455 561111
F: 01455 561112
E: info@woods-hardwick.co.uk
www.woods-hardwick.co.uk

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ALL DIMENSIONS AND LEVELS ARE SUBJECT TO A THOROUGH AND ACCURATE ON SITE CHECK BY THE CONTRACTOR PRIOR TO THE COMMENCEMENT OF ANY WORKS.

ALL SIZES OF STRUCTURAL COMPONENTS ARE TO BE VERIFIED BY A STRUCTURAL ENGINEER.

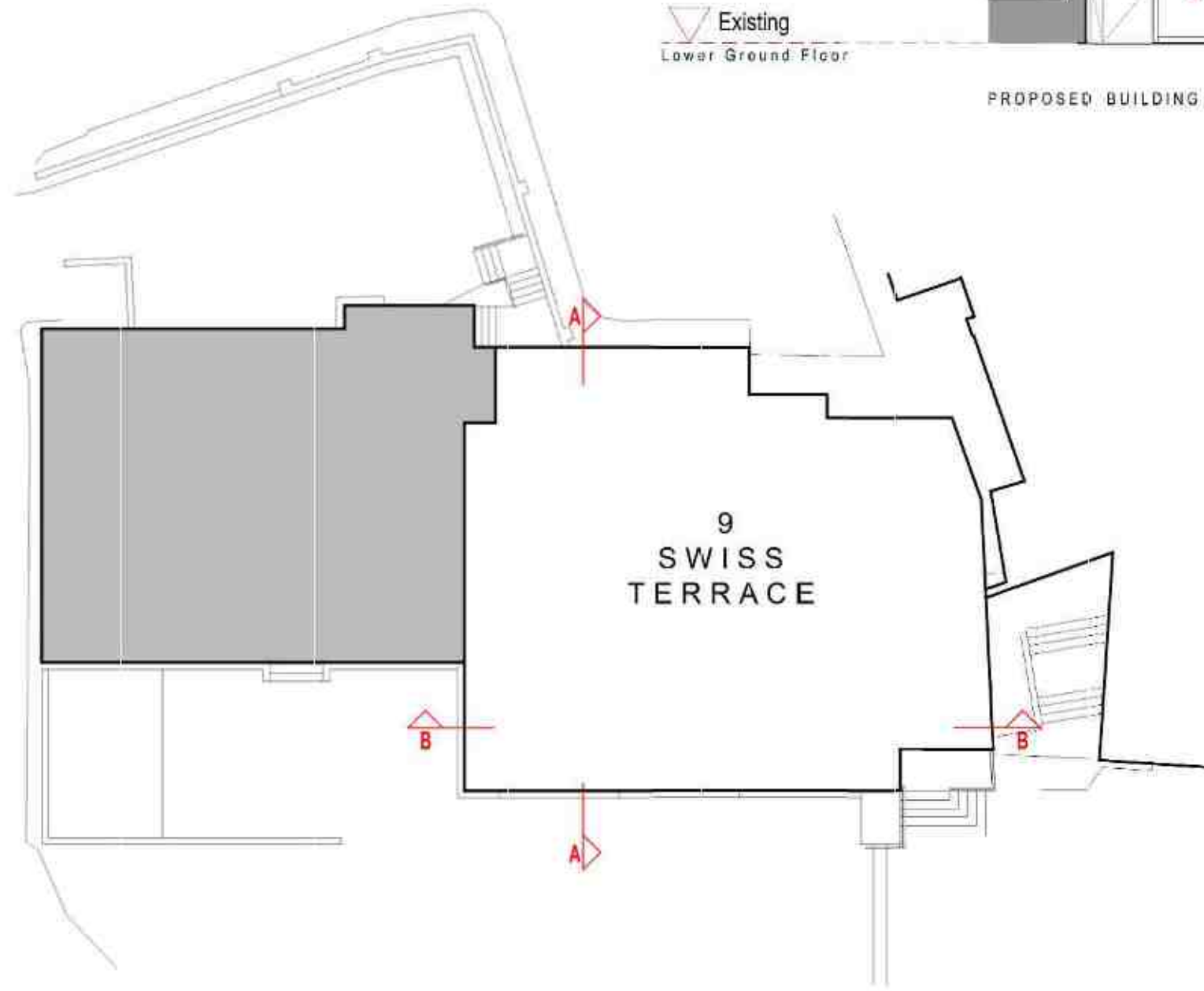
PLEASE NOTE ELECTRICAL CONTRACTORS MUST BE MEMBERS OF THE NATIONAL INSPECTION COUNCIL FOR ELECTRICAL INSTALLATION & CONTRACTING (NICIEC) & THE ELECTRICAL CONTRACTORS ASSOCIATION.

ALL WORKS ARE TO COMPLY WITH THE LATEST REVISION OF THE BRITISH STANDARDS.

THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER DRAWINGS AND DETAILS ISSUED FOR THE PROJECT.


OWING TO THE NATURE OF THE WORKS ALL SITE DIMENSIONS AND LEVELS ETC. ARE TO BE THOROUGHLY CHECKED BY THE CONTRACTOR ENSURING THAT THE SPECIFIC SCOPE OF WORK IS FULLY UNDERSTOOD AND DEFINED.

REFER TO SERVICES ENGINEERS' DRAWINGS AND DETAILS FOR ALL SERVICES INFORMATION.



PLANNING ISSUE

B	Scheme design updated to reflect Pre-Planning feedback				DC		09-08-18			
A	Sections amended.				JA	DC	04-05-18			
Revision	Description				Drawn	Checked	Date			
	Preliminary	<input type="checkbox"/>	Information	<input checked="" type="checkbox"/>	Tender	<input type="checkbox"/>	Construction	<input type="checkbox"/>	As Built	<input type="checkbox"/>



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Title: MOUNTVIEW LODGE, SWISS TERRACE
SWISS COTTAGE

Details: PROPOSED SECTIONS

Scale: 1:100 @ A1 Date: MARCH 2018 Drawn: JA Chk: DC

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15-17 Goldington Road
Bedford
MK40 3NH
United Kingdom
T: +44 (0)1234 368852
F: +44 (0)1234 35304
mail@woodshardwick.com
www.woodshardwick.com

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