SUDS / DRAINAGE ASSESSMENT FOR PLANNING

AT

1 STANBURY WALK, LAND ADJACENT, MANCHESTER, M40 7LY

March 2020

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1.0 Scope

This report contains the details of a SUDS Drainage Strategy for planning carried out by Ark Environmental Consulting Limited ("ARK Ltd") for 1 Stanbury Walk, land adjacent, Manchester, M40 7LY, henceforth referred to as "the site" in this report.

This report has been prepared for Pshko Salmami 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 or provide exact specifications / warranties for the products used.

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2.0 Introduction

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

- British Geological Survey Website and iGeology Website
- EA Website
- Manchester City Council (MCC): policies, mapping and guidance
- MCC Preliminary Flood Risk Assessment (2011 and as updated);
- MCC as the Lead Local Flood Authority SUDS guidance
- Internet mapping and searches

3.0 Existing Site Status and Setting

3.1 Site Location and Status

The site is Brownfield and has a gross area of approx. 0.019 ha located at the junction of Stanbury Walk and Berkshire Road / Lower Vickers Street. The site location is indicated in red on the site location plan included within Appendix A.

The overall site comprises the existing vacant plot adjacent to 1 Stanbury Walk: hardstanding and porous scrubland. The site is in a predominantly residential area. The existing layout is also provided in Appendix A.

3.2 Geology

Geology

Based on BGS mapping and boreholes (and know conditions of the majority of Hounslow area):

- Bedrock: Pennine Upper Coal Measures Formation - Mudstone, Siltstone And Sandstone
- Superficial deposits: Till, Devensian - Diamicton

The Upper Coal measure stratum is not a water bearing stratum. There are no lost / underground rivers documented at the site or near the site nor identifiable by the local geology mapping.

The Till is also not a suitable stratum for use as a soakaway.

Given the geology and proximity to other properties, the SUDS strategy necessarily needs to be storage on site with restricted discharge to sewer.

No infiltration testing is required at this stage and it is an appropriate risk management strategy to design the SUDS as if infiltration were not feasible in order to oversize the SUDS storage.

It is considered that given the geology and site setting / constraints, there is no need to undertake BRE365 testing because a soakaway is not an option.

3.3 Existing Drainage

Public sewer records have not been sourced however there are public sewers located within Stanbury Walk and Lower Vickers given the existing connection at the site for 1 Stanbury Wlak and neighbouring properties.

A specific drainage survey of the site has not been carried out, however, there is at least one connection from the existing dwelling to the public sewer network.

Furthermore, the invert levels for the adjacent sewers are understood to be c. 1.0m to 1.4m below ground level; the existing dwelling discharges using gravity; there are no lower ground structures proposed that would suggest gravity drainage is not feasible even if the full site length was required to be covered by a fall to meet the existing sewer given the site is so small.

There is no evidence of any existing SUDS.

The site currently discharges unattenuated and has no sewer connection as it is a vacant plot.

An assessment of the Greenfield equivalent discharge for the site has been carried out. This has confirmed an average discharge rate (QBAR) of a nominal less than 0.12 l/s. This low rate is due to the relatively small nature of the site. A copy of the calculation output is included in Appendix C.

4.0 Assessment of Proposed Development

4.1 Proposed Development

The proposed development is (Appendix B) comprises:

- Erect new 2 storey dwelling
    - Maximisation of porous and permeable areas as amenity / parking
    - Maximisation of highest forms of SUDS
- **Reduces flood risk overall and meets LLFA SUDS requirements**
    - Restricting discharge on a previously unattenuated site
    - New SUDS to meet 2020 requirements

4.2 Foul Drainage

Based on proposed residential development the maximum peak foul discharge generated represents a minimal increase which unlikely to give rise to any capacity concerns within the public sewer network.

Subject to the approval of United Utilities, it is proposed to connect the foul discharge to the public foul sewer via the existing connection, subject to condition and level.

Subject to exact confirmation of the public sewer invert level and the proposed finished development levels, it is expected that a gravity connection will be feasible.

4.3 Surface Water Drainage

In accordance with the NPPF, PPG and LLFA policy requirements, sustainable drainage systems (SUDS) should be incorporated wherever possible to reduce positive surface water run-off and flood risk to other areas.

Intrusive ground investigation works have not been carried out on site at this stage, however, the likely strata as per the British Geological Survey (BGS) mapping suggests the strata would not be suitable for the use of infiltration SUDS techniques.

As a precaution for the discharge connection, so as not to rely on an unknown and to demonstrate a worse case of SUDS storage on site with restricted discharge, it is recommended that SUDS techniques are restricted to the use of the highest forms of SUDS feasible i.e. surface storage, with also permeable paving and underground storage.

It is proposed to provide an attenuation based surface water strategy to serve run-off from the proposed roof area, with a residual positive discharge rate being restricted to a minimal 2 l/s.

4.4 SUDS Storage Calculations

Calculations have been prepared based on the Micro Drainage software package to assess the size of structure require, based on the following design criteria.

- Use 100% of the site in the calculations even though the site will only be c. 28% impermeable
    - This is oversizing by 72% (significant)
- Design event for storage - 100 year (with climate change; see below)
- Climate change allowance - 40%
- Max. residual Discharge rate - 2 l/s (via modern vortex control / hydrobrake)
    - Lowest suitable discharge rate that is suitable given the size of aperture required
    - This is appropriate simply as a function of the fact that the site is very small
    - **It is a fact that the site cannot discharge even close to 1 l/s: this is just a function of the size of the site**
    - **It is unequivocal that there is no possibility that the site could discharge greater than even c. 0.3 l/s even in the 1in200year (i.e. greater than the 1in100year) design event.**
- The storage calculation output is included within Appendix C.
    - Storage required: 1.0m3

4.5 SUDS Specifications: SUDS Hierarchy Compliant

Formal SUDS Type	Source Control	Dimensions	Storage Volume
Porous amenity areas	Yes	n/a	n/a
Permeable Paving	YES	n/a	n/a
Permeable Car Park areas with granular underground storage	YES Permeable paving takes roof runoff	1 car park space 4.9m by 2.5m = 12.25m2 Use 0.10m depth of lined granular storage in addition to any make-up for the permeable paving = 1.225m3 of storage Refer to Appendix D for location of these areas within the site	1.225m3
		Total	1.225m3 Greater than the already significantly oversized 1.0m3 required

The indicative layout plan included within Appendix D shows locations for the SUDS structures.

It is proposed to connect the now restricted discharge from the permeable paving + geocellular storage directly to the public sewer system. The scheme restricts the discharge to the sewer hence the approval of United Utilities is considered obtainable during detailed designs as this is betterment with future-proofing for the 100 year lifetime of the scheme and reduces flood risk to and from the infrastructure.

4.6 Green Roofs

The rooftop areas have not been included as part of the SUDS strategy at this stage because the exact make-up for a green roof would not be confirmed. It is not possible or necessary at this stage to design to exact specifications of green roof as the stratum depth is not known and will have structural implications that are not necessary to quantify for the planning stage.

The SUDS strategy has been done in this way at this stage so there is no reliance on an unknown to demonstrate compliance.

Regardless: this scheme has pitched roofs and hence a green roof is not suitable or commensurate with the scale of the scheme.

4.7 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 planning and at a later date.

This is not required at this stage to demonstrate scheme can accommodate the surface water flows or meet LLFA requirements.

Further Enhancements

The SUDS strategy does not rely on any green roof areas to meet the required storage volumes.

Whilst internal rainwater harvesting is not proposed, it is recommended that rainwater pipes are fitted with water butts wherever feasible. Whilst the use of water butts won't reduce the design criteria of the receiving below ground drainage system, their use will reduce the time of entry and provide a supply of water for irrigation.

It will be necessary for the surface water drainage system to comply with the Environment Agency's pollution prevention guidance. Roof run-off is classified as uncontaminated and, in accordance with EA pollution prevention guidance, will not require any treatment. Any surface water run-off draining through permeable paving and the granular storage will receive an adequate level of filtration through the associate substrate.

4.8 Maintenance

With respect to maintenance, the proposed SUDS techniques should be maintained in accordance with the appropriate regimes set out within the SUDS manual and will be the responsibility of the owner / management company. A SUDS maintenance schedule is included within Appendix E.

5.0 Summary

It is proposed to connect the foul drainage from the new development to the public sewer in Stanbury Walk / Berkshire Road / Lower Vickers Street, via existing shared connections if feasible. The condition of the existing connection should be verified by a CCTV survey prior to re-use. Should it not be feasible to re-use the existing connection then it will be necessary to provide a new one. Any amendments to the existing discharge arrangements or new connection will be subject to the approval of the United Utilities, via a Section 106 Connection Application under the Water Industry Act 1991 at the design stage.

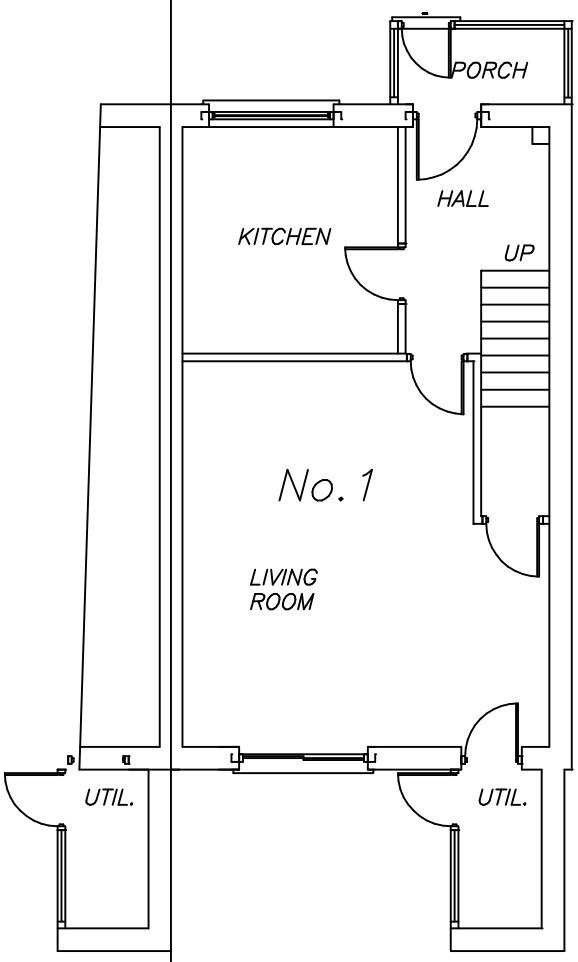
It is proposed to provide an attenuation based surface water drainage system to serve run-off from the new development roof area. It is proposed to use the highest forms of SUDS feasible. It is proposed to construct the new external hard standing areas from permeable paving. It should be noted that the proposed surface water strategy will reduce positive run-off from the site in the post development scenario and therefore reduce flood risk to other areas.

The proposed drainage strategy is subject to the approval of the Local Planning Authority, Lead Local Flood Authority and United Utilities.

APPENDICES

APPENDIX A

STANBURY WALK



LOWER VICKERS STREET

EXISTING GROUND FLOOR PLAN

PROPOSED NEW HOUSE
ON LAND ADJACENT TO
1,STANBURY WALK,
MANCHESTER,M40 7LY
FOR
MR.PSHKO SALMAMI.

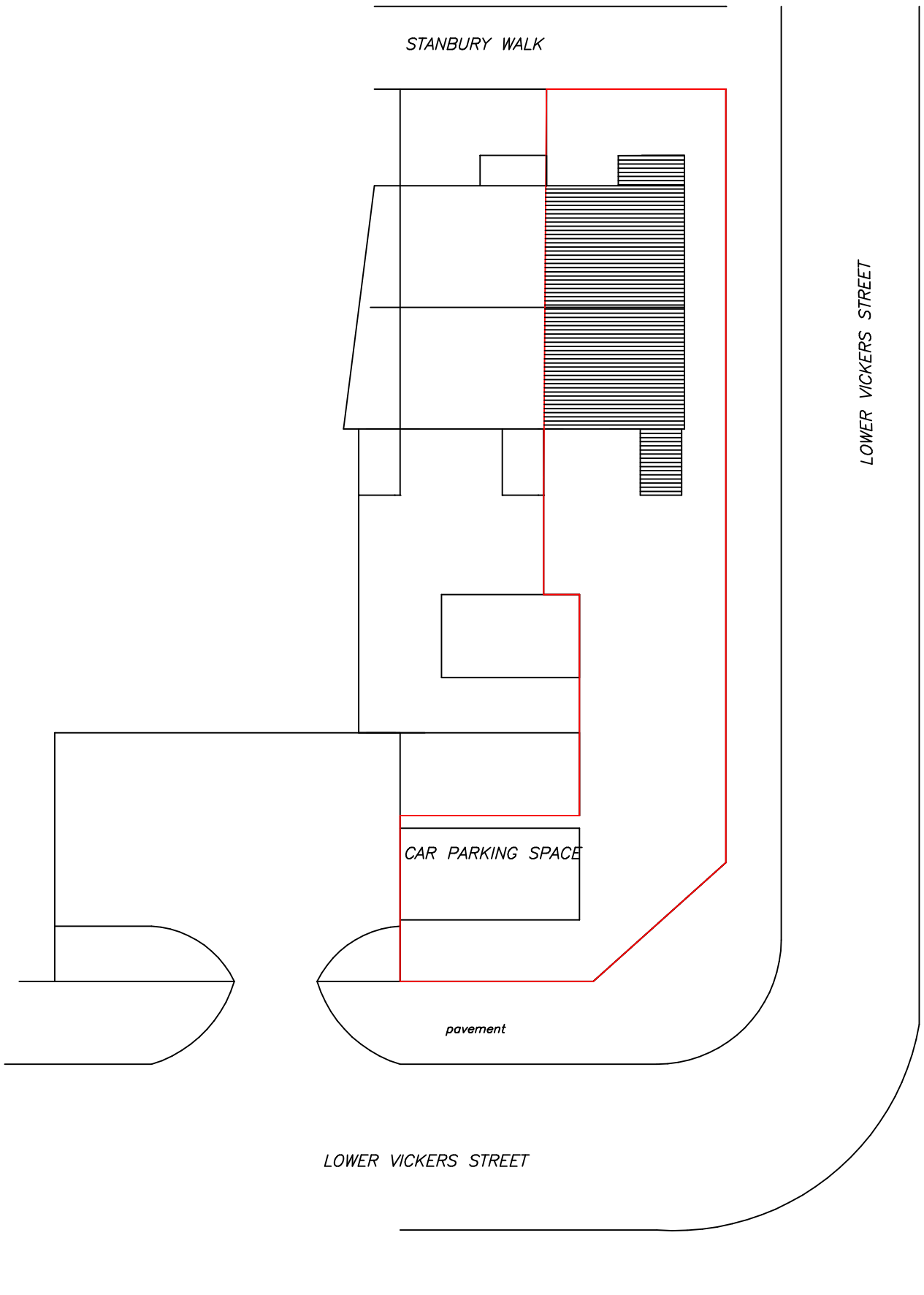
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DATE:-FEB'2020

les foey
BUILDING
DESIGN CONSULTANTS

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CHADDERTON,
OLDHAM,OL9 9DR
TEL&FAX: 0161-633-5057

APPENDIX B



SITE AND ROOF PLAN
1.200

PROPOSED NEW HOUSE
ON LAND ADJACENT TO
1,STANBURY WALK,
MANCHESTER,M40 7LY
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MR.PSHKO SALMAMI.

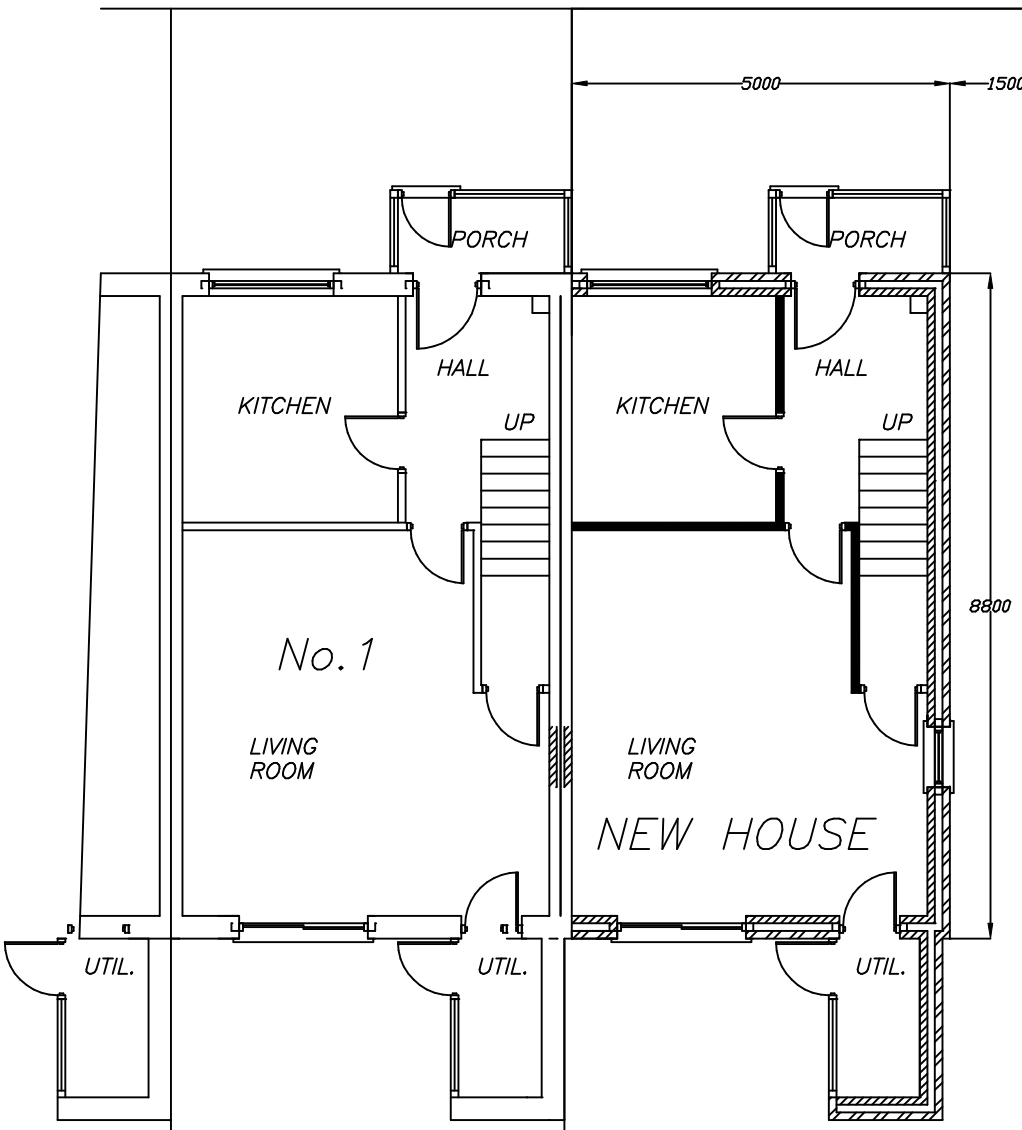
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NO WORK TO COMMENCE BEFORE PLANNING PERMISSION(IF REQUIRED)HAS BEEN GRANTED.
NO WORK TO COMMENCE UNTIL BUILDING REGULATIONS APPROVAL HAS BEEN GRANTED.
LES FOEY ACCEPTS NO RESPONSIBILITY FOR WORK UNDERTAKEN BEFORE BUILDING REGULATION APPROVAL OBTAINED.
ALL SIZES AND DIMENSIONS TO BE CHECKED AND VERIFIED BY THE CONTRACTOR BEFORE WORK COMMENCED
AND ANY DIFFERENCE TO THIS PLAN TO BE REPORTED TO LES FOEY BEFORE WORK COMMENCES.
IF THE WORK FALLS WITHIN THE PROVISIONS OF THE PARTY WALL ACT 1996 IT IS IMPORTANT THAT THE CLIENT
SERVES NOTICE TO THE OWNERS OF THE ADJOINING PROPERTY OF THE INTENTION TO BUILD TWO MONTHS BEFORE
THE COMMENCEMENT DATE AND THAT WRITTEN PERMISSION IS OBTAINED.ALL PROVISIONS OF THE PARTY WALL ACT 1966
(WHERE NECESSARRY TO BE ADHERED TO.

STANBURY WALK



LOWER VICKERS STREET

PROPOSED GROUND FLOOR PLAN

CAR PARKING SPACE

1200mm HIGH BRICK BIN ENCLOSURE

pavement

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SCALE:-1.100

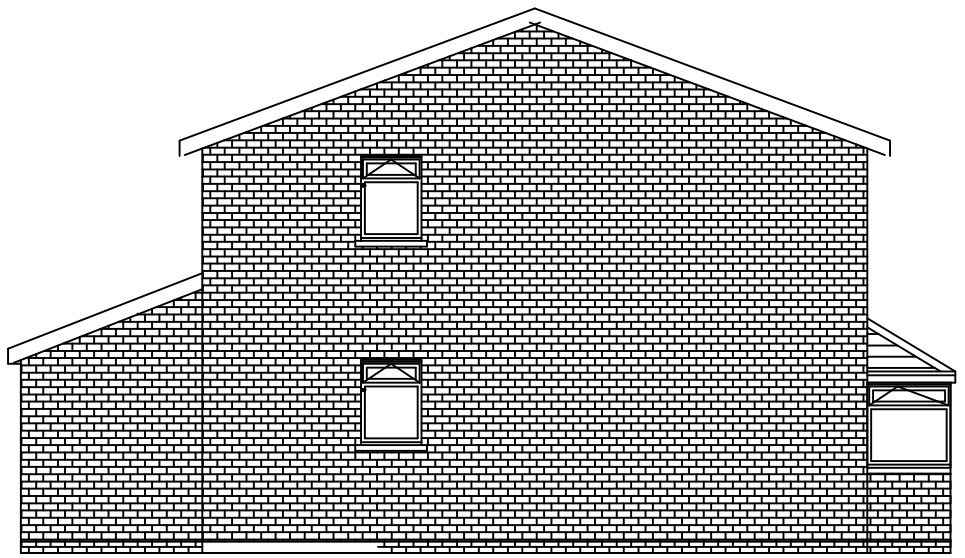
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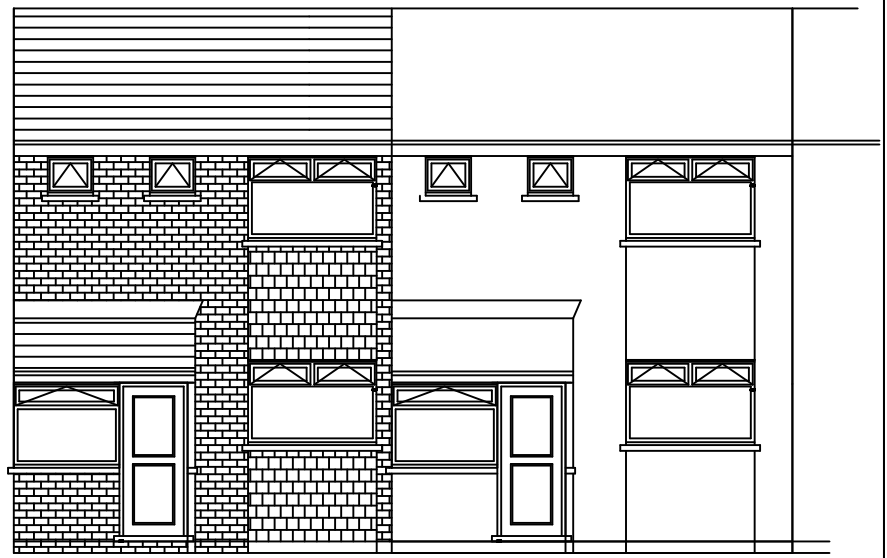
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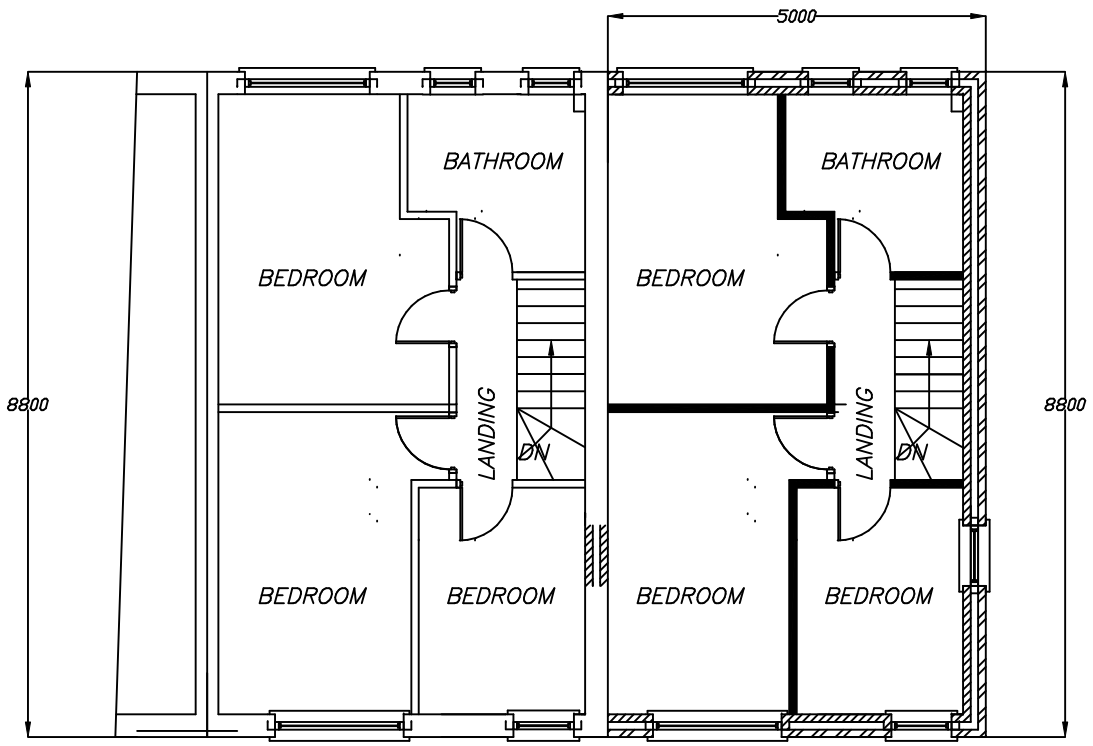
PROPOSED REAR ELEVATION



PROPOSED SIDE ELEVATION



PROPOSED FRONT ELEVATION



PROPOSED FIRST FLOOR PLAN

facing brick and roof tiles
to match existing houses

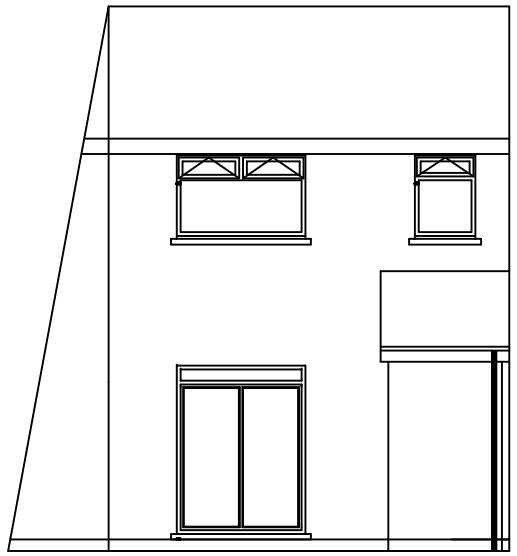
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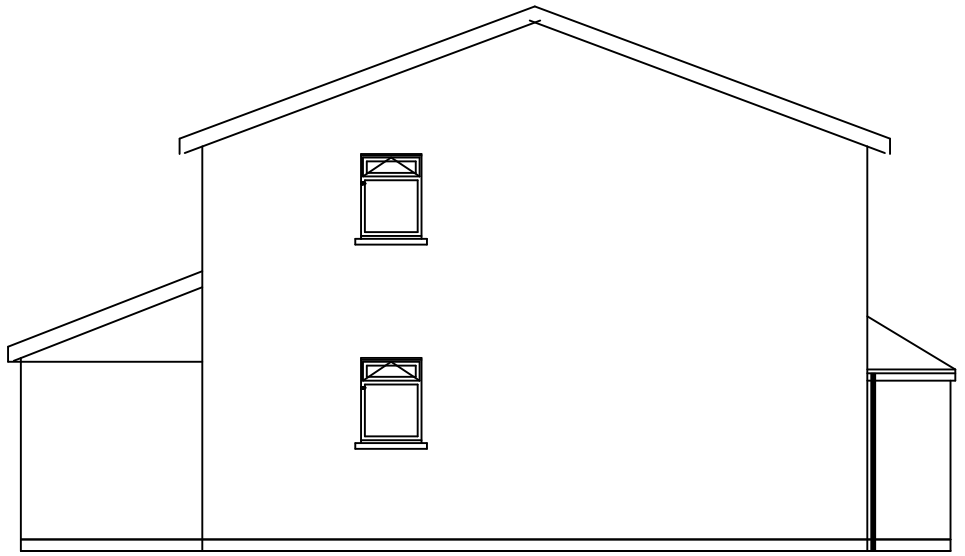
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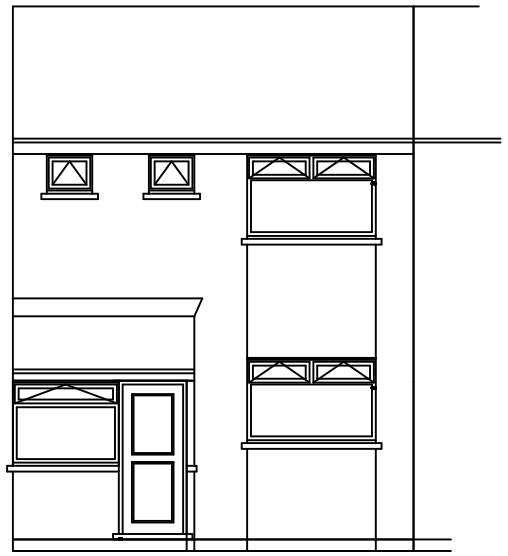
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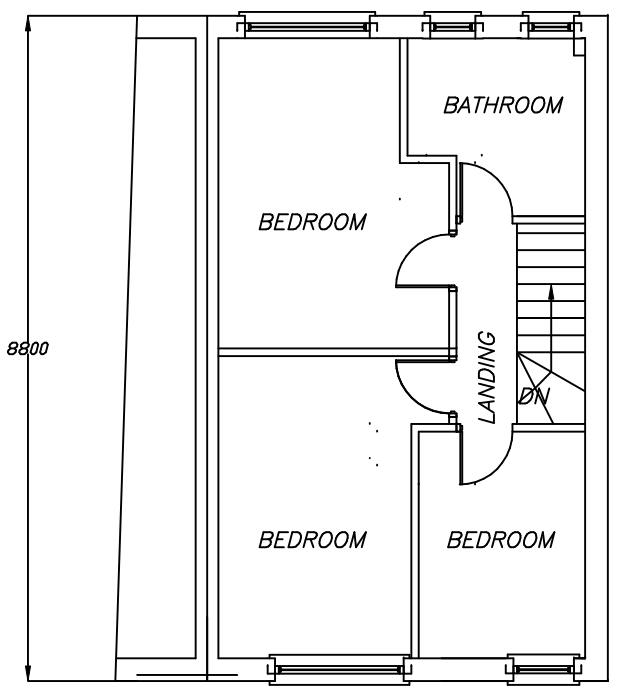
EXISTING REAR ELEVATION



EXISTING SIDE ELEVATION



EXISTING FRONT ELEVATION



EXISTING FIRST FLOOR PLAN

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APPENDIX C

Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by:	George Locke
Site name:	1 Stanbury Walk Manchester M40 7LY
Site location:	1 Stanbury Walk Manchester M40 7LY

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

Site Details

Latitude:	53.49029° N
Longitude:	2.21484° W
Reference:	3354532659
Date:	Mar 03 2020 20:23

Runoff estimation approach IH124

Site characteristics

Total site area (ha): 0.019

Methodology

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

Soil characteristics

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

Hydrological characteristics

	Default	Edited
SAAR (mm):	909	909
Hydrological region:	10	10
Growth curve factor 1 year:	0.87	0.87
Growth curve factor 30 years:	1.7	1.7
Growth curve factor 100 years:	2.08	2.08
Growth curve factor 200 years:	2.37	2.37

Notes

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

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

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

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

(3) Is SPR/SPRHOST ≤ 0.3?

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

Greenfield runoff rates

	Default	Edited
Q_{BAR} (l/s):	0.12	0.12
1 in 1 year (l/s):	0.11	0.11
1 in 30 years (l/s):	0.21	0.21
1 in 100 year (l/s):	0.26	0.26
1 in 200 years (l/s):	0.3	0.3

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

Surface water storage requirements for sites

www.uksuds.com | Storage estimation tool

Calculated by:	George Locke
Site name:	1 Stanbury Walk Manchester M40 7LY
Site location:	1 Stanbury Walk Manchester M40 7LY

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 Details

Latitude:	53.49027° N
Longitude:	2.21501° W
Reference:	44559536
Date:	Mar 03 2020 20:31

Site characteristics

Total site area (ha):	0.019
Significant public open space (ha):	0
Area positively drained (ha):	0.019
Impermeable area (ha):	0.019
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):	0.02
Net impermable area for storage volume design (ha):	0.02
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.

Methodology

esti	IH124
Q_{BAR} estimation method:	Calculate from SPR and SAAR
SPR estimation method:	Calculate from SOIL type

Soil characteristics

	Default	Edited
SOIL type:	4	4
SPR:	0.47	0.47

Hydrological characteristics

	Default	Edited
Rainfall 100 yrs 6 hrs:	--	55
Rainfall 100 yrs 12 hrs:	--	73.08
FEH / FSR conversion factor:	1.16	1.16
SAAR (mm):	909	909
M5-60 Rainfall Depth (mm):	17	17
'r' Ratio M5-60/M5-2 day:	0.4	0.4
Hydological region:	10	10
Growth curve factor 1 year:	0.87	0.87
Growth curve factor 10 year:	1.38	1.38
Growth curve factor 30 year:	1.7	1.7
Growth curve factor 100 years:	2.08	2.08
Q_{BAR} for total site area (l/s):	0.12	0.12
Q_{BAR} for net site area (l/s):	0.13	0.13

Design criteria

Climate change allowance factor:	1.4
Urban creep allowance factor:	1.1
Volume control approach	Use long term storage
Interception rainfall depth (mm):	5
Minimum flow rate (l/s):	2

Site discharge rates

	Default	Edited
1 in 1 year (l/s):	2	2
1 in 30 years (l/s):	2	2
1 in 100 year (l/s):	2	2

Estimated storage volumes

	Default	Edited
Attenuation storage 1/100 years (m³):	1	1
Long term storage 1/100 years (m³):	0	0
Total storage 1/100 years (m³):	1	1

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.

APPENDIX D

1 Stanbury SUDS Layout

Red Dashed Box

Lined Granular storage under permeable car park area; store then discharge restricted rated to inspection chamber and then to sewer

See report for dimensions

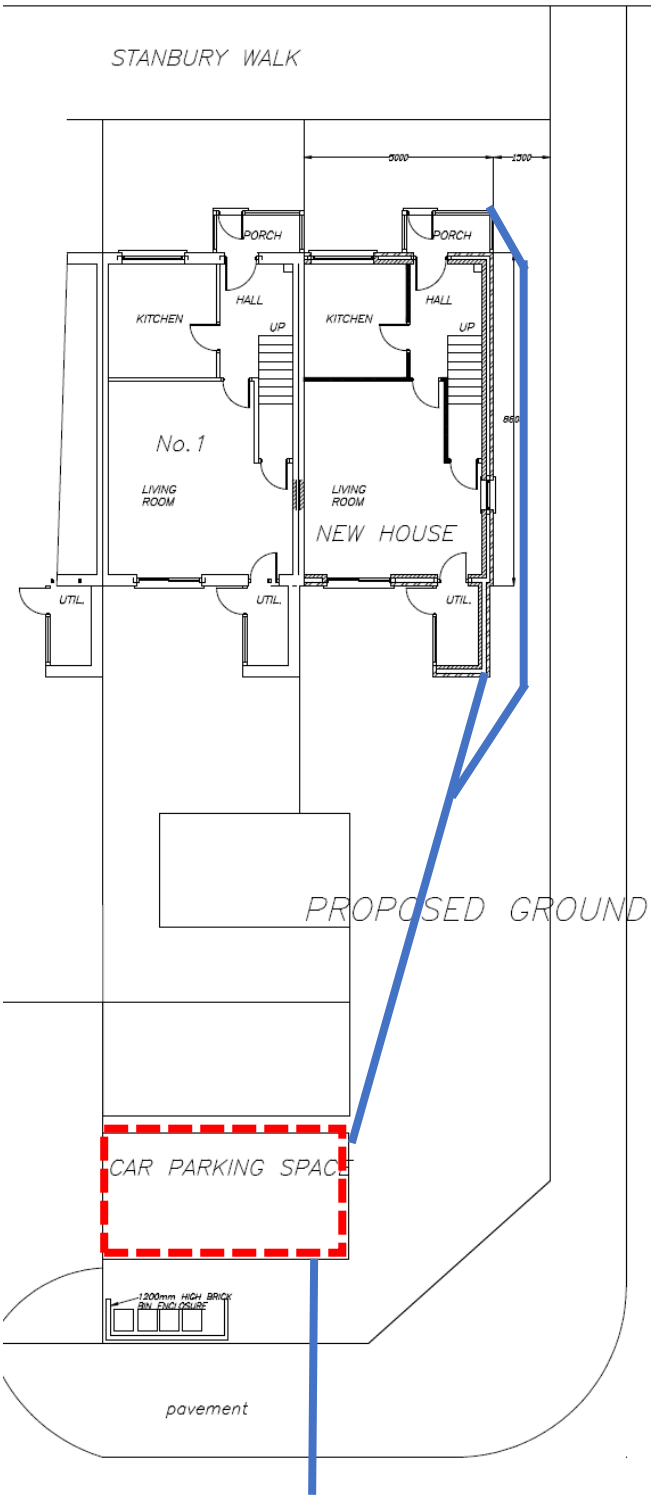
Exact connections to be confirmed as part of construction site set out.

There are existing connections adjacent given the existing fully functioning site adjacent with foul and surface water connections to the sewers adjacent to the site.

Connection subject to water company preference:

Potential to redirect surface water to Stanbury Walk, but the main sewer is within Lower Vickers hence the storage under the car parking space is optimal.

If connection to Stanbury Walk sewer is preferred, storage can be located in front amenity area using slightly greater depth to achieve the 1.0m3 storage



APPENDIX E

SUDS Maintenance Schedule

Installation	Maintenance Required	Frequency	Responsibility
Granular Attenuation	Inspection, sediment removal and jetting	Annually or as per supplier's recommendations	Supplier (via a maintenance/service package) or Estate Management Company
Permeable Paving (incl. associated distribution pipework and sump chambers)	Inspection, debris removal and jetting	Typically, inspection is recommended annually or after a severe or significant storm event, with any jetting/cleaning being carried out as necessary.	Estate/Building Management Company