coopers

chartered consulting engineers

Our ref: 7424SMP

SuDS Management Plan

for

White House Club

at

Manchester

For : Branley Homes Ltd
1 Bridgenorth Avenue
Urmston
Manchester
M41 9PA

06 September 2021

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Document Verification

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Prepared by

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A Jones

Senior Infrastructure Engineer

Document Revision

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7424SMP	10/09/2021	SuDS Management Plan	L Worthington	A Jones

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1.0 Introduction

Coopers (Chester) Ltd have been appointed by Branley Homes Ltd to prepare a SuDS Management Plan for the proposed White House Club residential and leisure development and in Manchester.

The surface water drainage system provides storage for up to a 30-year storm event within oversized on-line pipes and a series of online flow controls. The flow is restricted at the last manhole before discharging into the public sewer using a flow control device. This network will be adopted by United Utilities via a S104 Agreement and therefore will be maintained by United Utilities.

Branley Homes Ltd will be responsible for all the components until the final certificates have been issued at the end of the maintenance period.

Additional storage for the 100-year + 40% climate change allowance will be accommodated within a buried off-line geo-cellular tank and at source storage provided in 2No tanked macro pervious paving systems restricted by flow control chambers. This will be maintained by a private management company set up by Branley Homes Ltd for which this report sets out the inspection and maintenance requirements.

The management company will also be responsible for the maintenance of the SUDS platers that are to be installed on the Club House RWP's.

2.0 Operation and Maintenance

As with any drainage system, SuDS require regular inspection and maintenance to ensure that they continue to operate as designed and are fully functional at all times. The White House Club SuDS components will consist of a buried geo-cellular tank, silt trap, tanked macro pervious paving, flow control chambers and associated pipework and SuDS planters.

The SuDS components require regular inspection/clearing to prevent blockages due to accumulation of silt and debris. In general, it is recommended that they are initially inspected and cleared by a suitably trained person every 6 month for at least the first 2 years of operation and then establish a long-term regular inspection/clearing regime appropriate for the site:

Table 21.3 from CIRIA C753 The SuDS Manual provides a more detailed maintenance schedule for attenuation storage tanks. Inspection/clearing should also be carried out after every major storm event and to the manufacturer's recommendations.

Table 20.15 from CIRIA C753 The SuDS Manual provides a more detailed maintenance schedule for pervious pavements. Inspections should be carried out monthly for the first 3 months after installation to inspect for evidence of poor operation and 48hr after any major storm event for the first six months. Annual cleaning of the effective are to be carried out after the autumn leaf fall and annual inspection of silt accumulation within catch pit and drainage channels.

If regular excessive accumulation of silts and debris is found in silt-traps/catchpits serving below ground attenuation/soakaway tanks, a CCTV inspection of the tank should be undertaken. The geocellular tanks are provided with a special unit type along the base to enable inspection via manholes/inspection chambers at each end. If required the inspection channel can also be used for water jetting to clear the tanks of silt/debris. Notwithstanding the above, a CCTV inspection of the tanks should be undertaken at least every five years.

Any debris obstructing or in danger of obstructing the surface water flow should be removed within a period not exceeding two weeks from inspection. Any blockage or partial blockages reported to the managing organisation should be removed within a period not exceeding two weeks.

This maintenance plan is to be incorporated within the Health and Safety file, which, in addition to the details mentioned here, should include all the installed manufacturer's details and maintenance recommendations. In addition, it should hold the records of any inspections, together with any remedial measures undertaken. The drainage maintenance plan should be made available for inspection by the council if requested.

Monitoring and maintenance of the SuDS components will be the responsibility of a management company set up by Branley Homes Ltd. Details are as follows:

Management Company
Contact details and address TBC

3.0 Maintenance schedule

CIRIA SuDS Manual 2015

TABLE 21.3 Operation and maintenance requirements for attenuation storage tanks

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action	Monthly for 3 months, then annually
	Remove debris from the catchment surface (where it may cause risks to performance)	Monthly
	For systems where rainfall infiltrates into the tank from above, check surface of filter for blockage by sediment, algae or other matter; remove and replace surface infiltration medium as necessary.	Annually
	Remove sediment from pre-treatment structures and/ or internal forebays	Annually, or as required
Remedial actions	Repair/rehabilitate inlets, outlet, overflows and vents	As required
Monitoring	Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed	Annually
	Survey inside of tank for sediment build-up and remove if necessary	Every 5 years or as required

Extract from CIRIA C753 'The SuDS Manual'

TABLE 20.15 Operation and maintenance requirements for pervious pavements

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Brushing and vacuuming (standard cosmetic sweep over whole surface)	Once a year, after autumn leaf fall, or reduced frequency as required, based on site-specific observations of clogging or manufacturer's recommendations – pay particular attention to areas where water runs onto pervious surface from adjacent impermeable areas as this area is most likely to collect the most sediment
Occasional maintenance	Stabilise and mow contributing and adjacent areas	As required
	Removal of weeds or management using glyphospate applied directly into the weeds by an applicator rather than spraying	As required – once per year on less frequently used pavements
Remedial Actions	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50 mm of the level of the paving	As required
	Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users, and replace lost jointing material	As required
	Rehabilitation of surface and upper substructure by remedial sweeping	Every 10 to 15 years or as required (if infiltration performance is reduced due to significant clogging)
Monitoring	Initial inspection	Monthly for three months after installation
	Inspect for evidence of poor operation and/or weed growth – if required, take remedial action	Three-monthly, 48 h after large storms in first six months
	Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually
	Monitor inspection chambers	Annually

Extract from CIRIA C753 'The SuDS Manual'

4.0 Reference Drawings

DO NOT SCALE

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Note:
All proposed FFL's subject to ±300mm at detailed design

S11 (2.7 Dia Flow control manhole)
Hydrobrake Optimum
(by Hydro International)
MD-SHE-0137-1000-1600-1000
CL: 80,983
IL: 78,573
Design: 10 l/s @ 1.60m design head
Weir Wall IL= 80,215

FC Car Park Out 1(0,5 Dia flow control manhole)
CL:77,760
IL:77,110
Restricted to:1,4 l/s @ Orifice size 31mm

Tanked macro pervious paving providing storage for a 100yr + 40% CC storm event (28,5cu.m.)
Base Level = 77,16
158,4m² x 0,6m deep

Apartment car parking to drain through Macro pervious paving system providing at source storage/filtering of oil and suspended solids before entering pipe network.

FC Car Park Out 2 (0,5 Dia flow control manhole)
CL:76,050
IL:75,400
Restricted to:2,1 l/s @ Orifice size 39mm

Connection to 300dia public combined sewer. Approved by UU under S104 agreement IL=71,85

S20 (2.4 Dia Flow control manhole)
Hydrobrake Optimum
(by Hydro International)
MD-SHE-0144-1500-3150-1500
CL: 76,389
IL: 72,268
Design: 10l/s @ 3.15m design head

Rear RWP's to discharge into water butt for garden re-use with overflow into piped network.

RWP's to discharge into SUDS planters with overflow into piped network

Geocellular attenuation tank providing storage for a 100yr + 40% CC storm event (114cu.m.)
Base Level = 74,300
100m² x 1.2m deep
Aqueau 'Prima' or similar approved

Tanked macro pervious paving providing storage for a 100yr + 40% CC storm event (49,2cu.m.)
Base Level = 75,450
273,6m² x 0,6m deep

Club house car parking to drain through Macro pervious paving system providing at source storage/filtering of oil and suspended solids before entering pipe network.

FFL 80.70
FFL 80.80
FFL 80.95
FFL 81.05
FFL 81.20
FFL 80.85
FFL 81.10
FFL 81.15
FFL 81.60
FFL 81.25
FFL 81.55
FFL 82.00
FFL 81.85
FFL 82.10
FFL 82.20
FFL 81.70
FFL 82.15
FFL 81.65
FFL 81.70
FFL 82.10
FFL 82.15
FFL 82.25
FFL 82.55
FFL 82.45
FFL 78.15
FFL 76.70

Middleton Road

SUDS Methods

Method	Comment	Suitability for Development
Green Roofs	Can be used on suitable low rise buildings to provide retention, attenuation and treatment of rainwater, and promotes evaporation and local biodiversity.	Not suitable: Architectural proposals for the development involve a pitched roof arrangement which are not suitable for green roofs.
Rainwater Harvesting	Rainwater harvesting reduces the total runoff volume from the developed site, and reduces treated water consumption.	Not suitable: Additional costs of installation would have severe effect on viability of the development. Running and maintenance costs would not be acceptable to our client. The ability to restrict peak flow rates and short-term peak volumes is non-existent where a critical storm event occurs. Water butts will be installed to rear RWP of residential houses for reuse in the garden.
Infiltration	Reduces total run off volume from the development	Not suitable due to cohesive soils on site
Permeable Surfacing (Infiltration)	Reduces total run off volume from the development, Can be used to enhance quality of run -off water.	Not suitable due to cohesive soils on site
Permeable Surfacing (Tanked)	Can be used to enhance quality of run -off water, Sub-base provides 'source' storage and reduces the volume of storage downstream, The storage can be created with selection of the stone fill or use of plastic box systems. Impermeable membrane at base of construction to prevent impact on pavement stability.	Not suitable: Long term maintenance required and risk of reduction in permeability. Specialist maintenance required to maintain porous surfaces. No services to run beneath areas of permeable surface due to presence of base impermeable barrier which is very difficult to excavate through and reinstate if required). Spatial constraints of site do not allow alternative routes for services along plot frontages. Difficult to install small areas of tanked systems that require very small flow controls which can lead to maintenance issues. Presence of shallow sewers on site will make it difficult to install. Construction sequence can make it difficult to construct without use of a sacrificial road base surface
Macro-Previous Paving	Provide at source surface water storage and removal of oil and suspended solids.	Suitable: To be installed in apartment car park bays to provide at source surface water storage and improve water quality prior to discharge into piped system.
Swales, basins and ponds	Provide areas for above ground surface run off storage. Swales also allow filtering of particulate matter, improving water quality.	Not suitable: Space constraints on site do not permit large above ground areas for flood storage. No scope to reduce plot numbers due to site viability
Site Retention Areas	Collect and retain run -off to help improve water quality, prior to discharge in piped system or infiltration	Suitable: Space constraints on site do not permit large above ground areas for flood storage. No scope to reduce plot numbers due to site viability however SUDS planters can be provided on RWP's of the club house with overflow to piped network.
Highway Tree Planters	Suitable as traffic calming features. Can be used as surface water run off storage and improve water quality prior to discharge in piped system or infiltration.	Not Suitable: Due to the site topography, driveway locations, junctions and steep highway gradients there are no suitable locations to introduce tree planters, Site geology not suitable for infiltration.
Geocellular storage	Suitable for sites with insufficient space for basins etc. Suitable for sites where topography prevents the use of open basins etc. Can be very effective infiltration devices subject to ground conditions.	Suitable: Subject to detailed design and drainage layout suitable for attenuation, Infiltration not suitable due to soil conditions, clay strata.
Large Pipes, conduits and tanks	Suitable for sites with insufficient space for basins etc., Provide a volume of below ground storage with a high void ratio and good man entry provision to allow for future maintenance and cleaning. Generally, be suitable for adoption by the statutory water company (e.g., United Utilities).	Suitable: Large diameter on-line pipes can be located within the highway corridor and will be adopted by United Utilities via S104 agreement

Drainage Strategy

Existing Drainage

Existing drainage, foul and surface water (roof and hardstanding) areas, drain via a private combined network before discharging into the public combined sewer on White House Avenue.

Proposed Surface Water

1. Infiltration
The Site Investigation Report has determined soakaways are unlikely to be feasible due to unsuitable soil conditions, clay strata.

2. Watercourse
There is no watercourse close to the development.

3.Surface Water Sewer
Levels don't allow for the site to be drained to SW sewers in Coumhill Drive.

4.Combined Sewer
SW sewer discharges into combined sewer in Middleton Rd via gravity drainage network.

The proposed drainage networks will be designed for 100-year storm event plus an additional 40% allowance for climate change, Attenuation will be provided within oversized on-line pipes and off-line buried cellular crates. All on line pipes and manholes will be offered to United Utilities for adoption under a S104 Agreement and all off-line components will be maintained by a management company.

All flows will be contained within the drainage network and will result in no overland flows for a 100-year storm event plus and additional 40% climate change

Proposed Foul

Discharge to the existing combined sewer in Middleton Road via a gravity drainage network.

SUDS Strategy

The prime function of SuDS, as with conventional drainage, is to provide effective surface water drainage, ensuring the greatest degree of flood risk protection over the long term both within and downstream of the development and prevent pollution. However, SuDS approaches can bring wider benefits too. Appropriately designed, constructed and maintained, SuDS are more sustainable than conventional drainage systems and can help to:

- Reduce run-off surface water flow rates and/or volumes and hence reduce the risk of flooding
- Encourage natural groundwater re-charge
- Reduce pollutant concentrations in storm water
- Provide habitat for wildlife.

There are many site-specific factors which will influence the choice of any single or combination of SuDS devices used within a development, The primary factors are:

- Whether the development is domestic, commercial or industrial
- Whether the underlying ground is contaminated, if so, infiltration systems will most probably not be permitted,
- Whether the underlying ground is permeable enough for infiltration systems to be considered,
- Whether the ground water levels are deep enough for infiltration systems to be considered
- Whether the site is steeply sloping and its general topography
- The availability of space inside the development for each potential SUDS facility,
- Health & Safety aspects should the development be likely to be inhabited or used by children.

To ensure no increased flood risk to offsite land and development, disposal of surface water to the ground is encouraged and runoff volumes will be reduced through the SuDS management train where ground conditions permit. Where ground conditions are unsuitable, a discharge to an open water body / sewer will be necessary with rates restricted to the existing site conditions.

Surface Water Flow Rates

Site Area = 19725sq.m.
Impermeable Area = 2195sq.m

Existing Brownfield Run-off Rate
(Based on 50mm/hr rainfall intensity)

= A x i
= 2195sq/m x 50mm/hr
= 30 l/s

Greenfield Run-off Rate
(Based on 19625sq.m.)

1yr = 10,09 l/s
30yr = 19,72 l/s
100yr = 24,10 l/s
Qbar = 11,6 l/s

Proposed Run-off Rate

= Brownfield less 50% + Qbar

= 15l/s + 11,6l/s = 26,6l/s

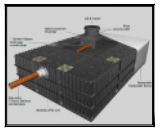
Following discussions with UU, a flow rate of 15l/s has been agreed. A betterment of 46% of proposed run-off rates

Legend

- Site Boundary
- Existing Foul Sewer
- Existing Surface Water Sewer
- Existing Private Combined Sewer (to be abandoned)
- Proposed Adoptable Foul Sewer (F01)
- Proposed Adoptable Combined Sewer (C01)
- Proposed Adoptable Surface Water Sewer (S01)
- Flow Control Manhole
- Proposed Slab Levels (FFL 0.00)
- Depth of cut (Between existing & proposed finished level) (-0.00)
- Depth of fill (Between existing & proposed finished level) (+0.00)
- Water Butt (Garden Reuse)
- Highway Gully
- SUDS Planter (at RWP Outlet)
- 100yr Attenuation
- Macro Pervious Paving
- Tree Canopy Area
- Private Surface Water Drain
- Private Foul Drain
- SVP
- BIG
- RWP
- Rodding Eye
- Linear Drainage Channel
- Private Road Gully


Water Butt


SUDS Planter


Cellular Storage


Macro Pervious Paving System

Rev.	Date	Revision	By	Appd.
B	03.09.21	Updates to suit LLFA submission	LW	AJ
A	23.06.21	Updates to suit LLFA submission	LW	AJ

APPROVAL

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Project
White House Club, Middleton Road, Manchester

Title
Drainage Stratergy

DRAWING NUMBER	SCALE at A0	1:500	REVISION
7424 / SK08	DATE	JUNE 20	B
	DRAWN	LW	
	CHECKED	AJ	