MOMENTUM
structural engineers

Meadows Hall, Richmond

Management and Maintenance Plan for Sustainable Urban Drainage Systems (SuDS)

July 2022 . 4821
4821_MOM_MED_RPT_MMplan

Third Floor . 30-32 Westgate Buildings . Bath BA1 1EF . 01225 444194
Unit 4.8, The Loom . 14 Gower's Walk . London E1 8PY . 020 77396939
www.momentumengineering.com

Purpose

This document has been prepared for the sole benefit, use and information for the development at Meadows Hall, Richmond and for the purposes set out in the following pages.

The liability of Momentum Consulting Engineers Ltd in respect of the information contained in the document will not extend to any third party.

Document Control

Author
David Perkins

Checker
Richard Heath

Issue History

Rev.	Date	Comments
P01	8 July 2022	Planning issue

Contents

Preface

Introduction to SuDS
Sustainable urban drainage systems (SuDS) are an environmentally friendly approach to managing rainfall that uses landscape features to deal with surface water runoff.

SuDS aim to provide the following :

- Water quantity - Control the flow, volume and frequency of water leaving a development area.
- Water quality - Prevent pollution by intercepting silt and cleaning runoff from hard surfaces.
- Amenity - Provide attractive surroundings for the community.
- Biodiversity - Create opportunities for wildlife.

Reason for maintenance
Regular maintenance is required to ensure that the surface water drainage system operates efficiently and does not cause flooding to the property or surrounding buildings and land. Such work is part of the day-to-day responsibility of all clients, owners and occupiers. Maintenance is most effective when carried out regularly and on a planned cycle. Good maintenance needs the regular investment of small amounts of time and money, but the cost of preparing and carrying out a planned maintenance programme should be far less than the costs resulting from a series of unplanned major repairs, and will help plan future financial commitments. When carried out on a planned basis, maintenance helps to prevent the types of failure which occur predictably within the life drainage system.

Maintenance falls into four main categories :

- Inspection to assess condition, report any problems and decide whether repair or other work is necessary.
- Specific tasks such as clearing debris from chambers and pipes.
- Minor repairs such as fixing loose covers.
- Maintenance repair which is work carried out to put right defects or damage and work to return the drainage system to a good condition on a long- term basis.

SuDS techniques checklist
SuDS techniques include landscape features and control structures to manage surface water runoff as it flows towards site outfalls. The following techniques may be found on this site :

- Flow control structures are usually vortex devices or small orifices within a control chamber, slots or V-notches in weirs. They are usually near the surface so are accessible and easier to maintain. They may be located in baskets, within chambers with covers or in the open.
- Pumping chambers with a controlled discharge rate can perform flow control with a brake chamber as the demarcation chamber and gravity connection to the receiving water course.
- Underground storage tanks (attenuation) to store surface water runoff volume prior to regulated release.
- Manholes and inspection chambers or rodding access located on bends or where pipes come together. They allow cleaning of the system if necessary.
- Permeable surfaces to allow for percolation of rainfall through and into the ground below to mimic natural processes.

SuDS for hardworks
The SuDS are designed to prevent flooding of the site and control the flow of surface water runoff using infiltration where possible and flow controls with associated volume control (attenuation). The following is relevant to the development at Meadows Hall, Richmond :

- Surface water runoff from building roofs will be directed into underground storage tanks located centrally within the site below the pathway via a network of downpipes, gullies, pipes and chambers.
- External hard surfaces will be constructed from permeable paving allowing infiltration into the strata below.
- Runoff held in the underground storage tanks will be released via a controlled pumped discharge into the public surface water sewer in Church Road via a proposed direct connection.

Refer to Appendix A for associated drawings.

Landscape softworks
For maintenance and management plan for the landscape softworks refer to documentation by the Landscape Architect.

Management and Maintenance

Managing SuDS generally
SuDS have been designed for easy maintenance to comprise of the following :

- Regular maintenance - litter collection, grass cutting and checking the inlets and outlets where surface water enters or leaves a SuDS feature.
- Occasional tasks - removing any silt that builds up within the SuDS features.
- Remedial work - repairing damage where necessary.

Responsibility for maintenance
The proposed residential development includes common external areas, all of which will require maintenance.

Maintenance of the SuDS measures will be included in the general maintenance of the common shared areas of the development and managed by the development company.

Permeable surfaces
Permeable surfaces includes permeable block paving, porous jointed construction, porous asphalt, gravel or free draining soils. All of these allow rain to percolate through the surface into underlying drainage layers.

The following is to be considered for the management of permeable surfaces :

- Avoid the use of weedkillers and pesticides to prevent chemical pollution.
- Avoid de-icing agents wherever possible to allow bio-remediation of pollutants in permeable surfaces.
- Protect all permeable, porous and infiltration surfaces from silt, sand, compost, mulch and other fine particles.
- Paving and porous asphalt can be cleaned by suction brushing.

Above ground rainwater goods
Rainwater goods are to be inspected twice a year preferably in May and November. Clear debris from gutters and ensure outlets are free running. Inspect for cracks and leaks and repair or replace as necessary.

Hardworks SuDS management
Surface water runoff from roof surfaces as indicated on drawing number 4821-610 attached within Appendix A of this document will be collected by means of a network of downpipes, gullies, drainage channels, pipes, chambers and catchpits and stored within proprietary attenuation crates constructed using Wavin Aquacell or similar.

ACTIONS

- Check the inlet and the outlet of the catchpits are clear of debris.
- Check gullies and drainage channels are clear of debris and deposited silts.
- Check the attenuation for deposited silts via CCTV survey.

The external hard surfaces consist of permeable construction allowing infiltration into the strata below.

ACTION

- Regularly brush all porous jointed construction paving. Remove sweepings. Vacuum. Suction clean when necessary.

The stored surface water will be discharged into the public sewer network via a controlled pumped connection. The flow will be controlled to a rate of 2 l/s.

The pumped discharge will be taken via a brake chamber with a gravity connection to the receiving water course.

ACTIONS

- Check the inlet of the pumping chamber is clear of debris.
- Check the pump is in full working order.

Hardworks SuDS maintenance
The following is a summary of maintenance required for each SuDS feature.

Permeable surfaces

Regular maintenance	**Frequency**
Brush and remove sweepings from all hard surfaces.	Monthly
Occasional tasks	
Brush, vacuum and wash surface to prevent silt blockage and enhance design life.	Twice yearly - minimum
Remedial work	
Monitor effectiveness of permeable surfaces and when water does not infiltrate immediately advise client of possible need for reinstatement of top layers or specialist cleaning. Recent experience suggests jet washing and suction cleaning will substantially reinstate pavement to 90% efficiency.	As required

Additional advice :

Surfaces should be washed to ensure that the surface texture functions properly. This should be undertaken every 3 to 6 months.

Flow control structures (Pumping chamber)

Regular maintenance	**Frequency**
Remove chamber covers and check the inlet is clear of debris.	Monthly
Occasional tasks	
Remove chamber covers and check the pump is in full working order. Remove any debris and silt deposits from sumps.	Monthly - minimum
Remedial work	
Monitor effectiveness of flow control device. Immediately advise client of possible need for reinstatement if device is broken or faulty.	As required

Additional advice :

Pumps, together with their power supply should be part of a maintenance agreement with the manufacturer / installer or qualified personnel.

Underground storage tanks

Regular maintenance	**Frequency**
None	
Occasional tasks	
CCTV survey and jet wash through to remove any deposited silts.	Annually - minimum
Remedial work	
Advise client of possible need for reinstatement if CCTV survey highlights physical damage.	As required

Additional advice :

CCTV survey after every major storm and at regular intervals according to the specific maintenance plan for the site.

Catchpits should be routinely inspected and cleaned out to minimise debris reaching the underground storage tanks and to ensure there is no silting up of the system.

Below ground drainage network

Regular maintenance	**Frequency**
Remove chamber covers, drainage channel access, gully gratings and inspect to ensure that water is free flowing and that inlets and outlets are unobstructed. Remove any debris and silt deposits.	Twice yearly - minimum
Occasional tasks	
Where drainage covers are located in softworks ensure that levels of softworks are 20mm above covers to avoid mower damage.	As required
Remedial work	
Repair physical damage	As required

Additional advice :

Below ground drainage pipes, drainage channels, gullies, manholes and inspection chambers should be inspected twice a year preferably in May and November or after an intense storm for blockages. On completion of cleaning operations to the network the drainage pipes should be flushed through with water to ensure that they are free from silt and debris and free flowing.

Contacts

In the event of concern over any matter to do with the SuDS please contact the following :

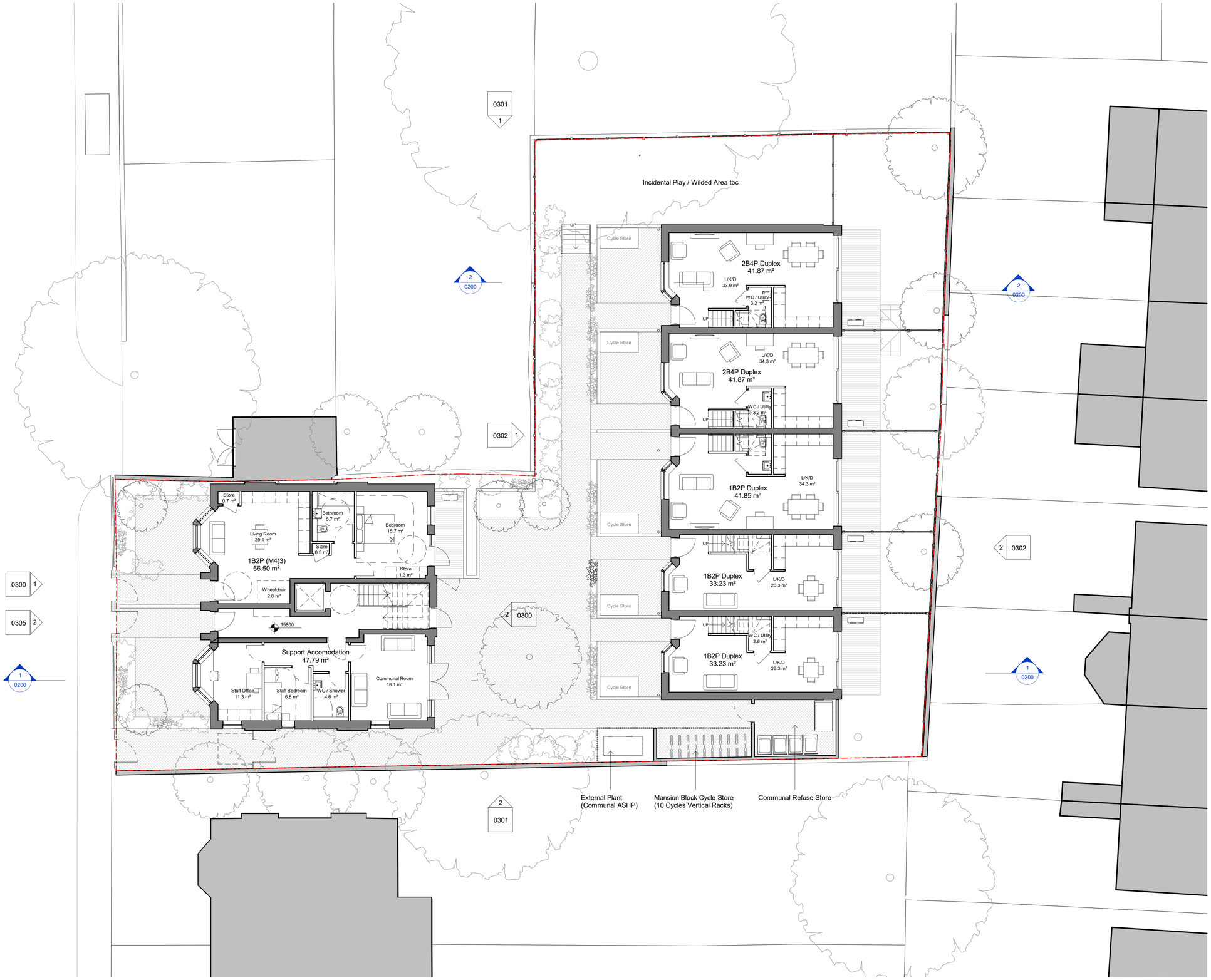
Hardworks :

Momentum Consulting Engineers Limited
Email : mail@momentumengineering.com
Website : www.momentumengineering.com

Softworks :

Outerspace
Email : info@outerspaceuk.com
Website : www.outerspaceuk.com

Appendix A - Drawings



0 1m 2m 5m

Tree Canopy Zone
(translated from Tree Survey)

Root Protection Zone
(translated from Tree Survey)

DRAFT

Date

Revision	Date	Description

project
Meadows Hall

drawing title
Proposed Ground Floor Plan

drawing number
WP-0733-A-0110

revision

scale @ A1
1 : 100

First Issue
10/12/2021

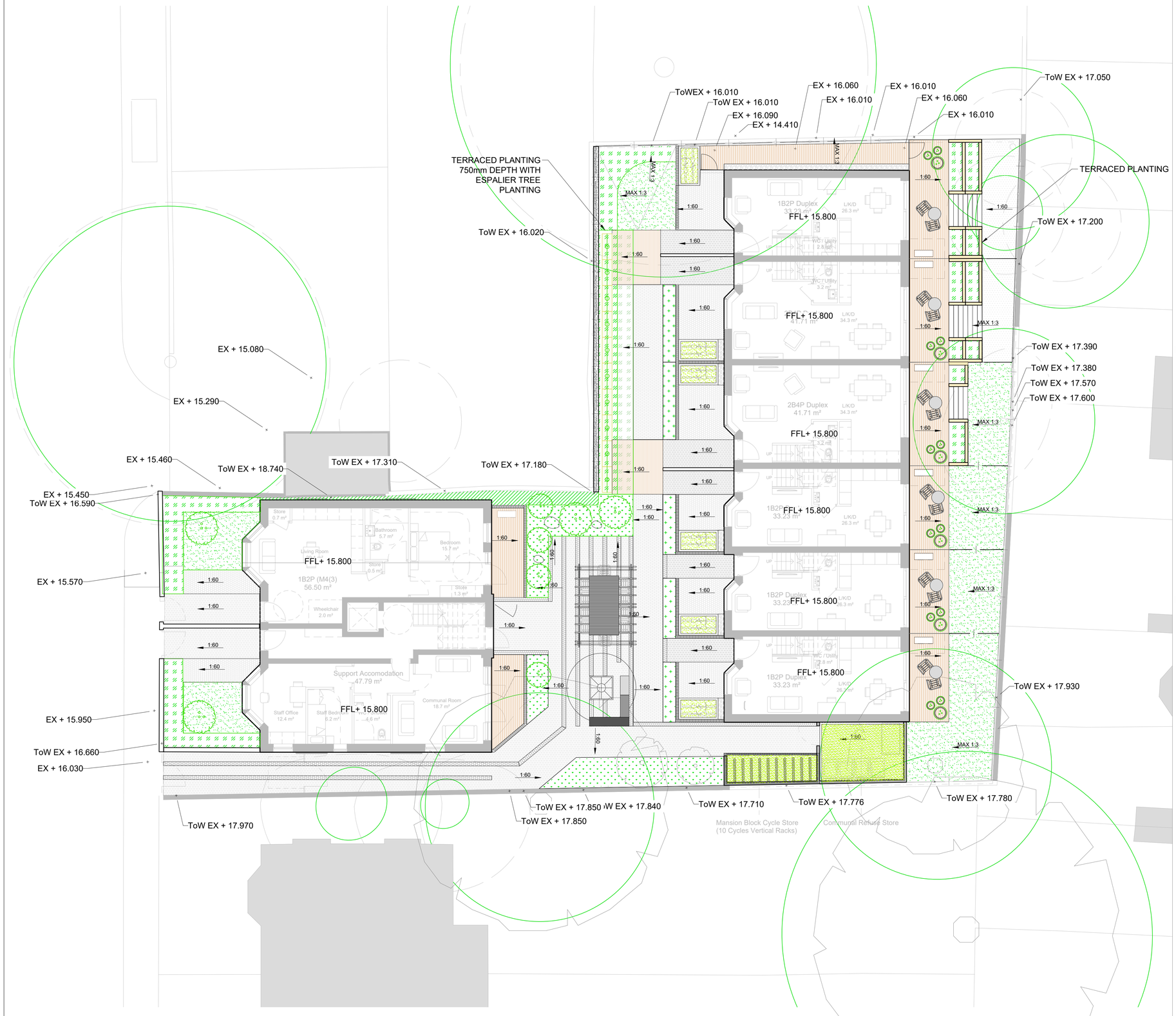
drawing purpose
DRAFT

WIMSHURST PELLERITI

The Mews,
6 Putney Common, SW15 1HL

0208 780 2206

info@wp.uk.com
wimshurst-pelleriti.com



NOTE:
The proposals are based on:

- Topo survey MSL38026-T dated June 2021.
- Limited Existing levels information indicated therefore assumed ground level in some locations.
- Proposed levels and surfaces finishes to be coordinated with Engineers.
- All proposals within RPA to be coordinated with Arb Consultant.

KEY

- EXISTING TREE TO BE RETAINED WITH ASSOCIATED RPA
- BOUNDARY LINE
- PROPOSED MULTISTEM TREE
- TERRACED PLANTING APPROX. 750mm DEPTH W ESPALIER TREE PLANTIN
- PROPOSED SINGLE STEM FOCAL TREE
- EXISTING PERIMETER FENCE TO BE RETAINED
- EXISTING WALL TO BE RETAINED
- ToW EX + 16.010 — TOP OF THE WALL EXISTING LEVELS
- EX + 16.060 — EXISTING LEVELS
- 1:60 — PROPOSED LEVEL GRADIENT

PAVING

- HIGH QUALITY PAVING CONCRETE SETT
- HIGH QUALITY PAVING CONCRETE BLOCKS
- COMPOSITE DECKING
- HIGH QUALITY LOOSE GRAVEL
- MAINTENANCE GRAVEL STRIP

EDGES & WALLS

- EDGING
- RETAINING WALL FOR LEVEL CHANGE TO BE CONFIRMED BY STRUCTURAL ENG'S
- RETAINING CONCRETE WALL WITH TRELLIS ON TOP TO BE CONFIRMED BY STRUCTURAL ENG'S
- WALL BETWEEN APARTMENTS & MEWS

PLAY EQUIPMENT & FURNITURE

- BOULDERS (INFORMAL PLAY)
- SCULPTURAL BENCH (INFORMAL PLAY)
- TREE GRILL
- RAISED PLANTERS
- INDICATIVE TABLES & CHAIRS ON TERRACES
- INDICATIVE POTS
- PERGOLA WITH TABLE & CHAIRS FOR 10 PEOPLE
- CYCLE STORE WITH GREEN ROOF (MEWS BLOCK)
- CYCLE STORE WITH GREEN ROOF (MANSION BLOCK)
- REFUSE STORE WITH GREEN ROOF
- PRIVATE SCREENS
- TIMBER FENCE
- METAL FENCE
- PROPOSED GATE & RAILING
- STARS RESPONDING TO LEVELS CHANGE WITH ASSOCIATED HANDRAILS

PLANTING

- LAWN
- ORNAMENTAL PLANTING
- TERRACED PLANTING APPROX. 750mm DEPTH
- EXTENSIVE GREEN ROOF
- BOUNDARY HEDGE
- DEFENSIBLE PLANTING

Revisions:
(see rev clouds and notes for additional explanation of change)

Rev.	Description	Dwn.	Chk.	Date
WIP01		SS	BT	01.12.2021
WIP02		SS	BT	08.12.2021

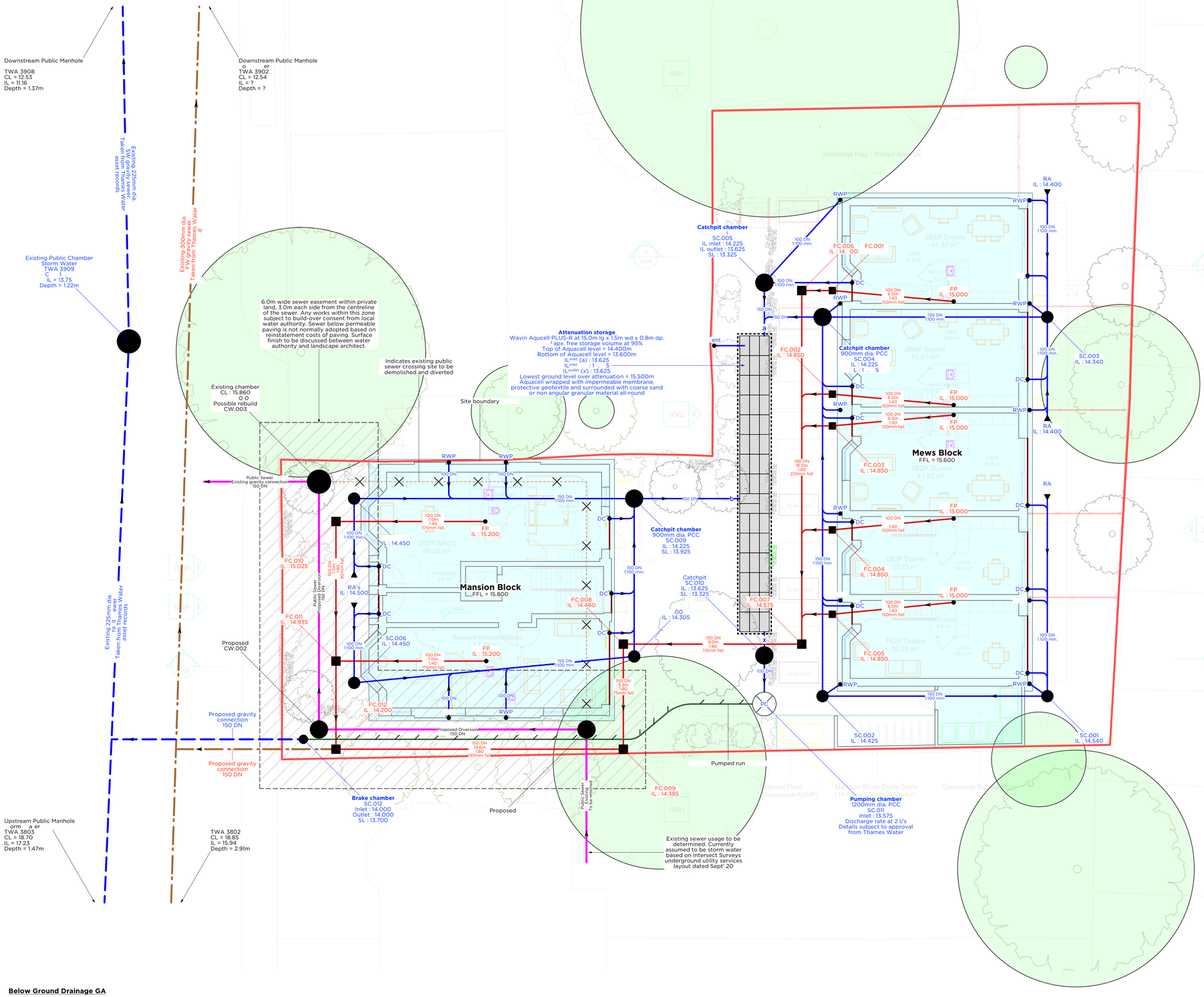
outerspace
urban + landscape design
the boathouse 27 ferry road
teddington middlesex tw11 9nn
t. 00 44 (0)20 8973 0070 e. info@outerspaceuk.com

Client: RHP	Project No: LN00651
Project: MEADOWS HALL	Dwg No: **L-100**
Drawing Title: **GENERAL ARRANGEMENT PLAN**	Status: **WIP**

Date	Scale	Rev	Dwn by:	Chk by:
01.12.2021	**1:100@ A1**	**WIP02**	SS	BT

Important note

ALL information subject to detailed design. This is a strategy **ONLY.**



Discharge strategy, general principles

General
For full details of discharge strategy refer to the following documents :

4821-MOM-MED-RPT-BGDstrategy-P01
4821-MOM-MED-RPT-MMplan-P01

Surface Water

Infiltration
Falling head permeability tests have been undertaken. All tests were completed within the natural granular strata. The soakage rates had been calculated as 7.3×10^{-5} and 5.7×10^{-5} m/s. Results from these tests provide suitable rates for dealing with surface water run-off from hard landscape surfaces. All soft landscaping will naturally infiltrate.

Hard permeable surfaces
Water landing on hard permeable surfaces will percolate through the joints in the paving and get captured in a gravel bed below the surface build-up. The gravel bed will filtrate and treat the run-off prior to infiltration into the natural soils. The gravel bed will act as long term attenuation.

Run-off from buildings
Surface water run-off from roofs will be taken to the attenuation storage located centrally on the site. The outflow from the storage will be restricted by a pumped flow control to an acceptable discharge rate. At present the site discharge rate has been set to 2 l/s. This rate is to be agreed with the LLFA and TWA. Storage requirement based on a 100 year plus 40% climate change rainfall event is acheivable on site. A brake chamber and new gravity connection to the public storm water sewer in Church Road will be required. This connection will be subject to a Section 106 application.

Foul Water

Foul water from buildings
Foul water will connect into the public foul water sewer in Church Road. This connection will be subject to a Section 106 application.

Public Sewer Diversion

A diversion of a public sewer is required due to its current location within the development proposals. The proposed route will run parallel to the south and to the west of the proposed mansion block with a connection onto the existing run that connects to the one of the public sewers within Church Road. The diversion, building close-to and abandonment of the existing sewer will all be subject to an agreement with TWA. All sewer works to be built to adoptable standards and under a section 185 agreement.

Specification

Surface Water General
All surface water drainage to be 100mm DN unless where indicated
Pumping chamber to be 1200mm dia.
Catchpit chambers to be 900mm dia. PCC
Brake chamber to be 900mm dia. PCC
All chambers other than the above to be 450/600 dia PPIC

Foul Water General
All foul water drainage to be 100mm DN unless where indicated
All chambers other than the above to be 450/600 dia PPIC
Soffits level where chambers accept and receive different pipe DN's

Sewer Diversion General
Diversion set to constant gradient to suit existing level information
Sewer chambers to be 1200mm dia. PCC

Key

Private drainage - Existing
Combined waste gravity drain — CW
Foul waste gravity drain — FW
Surface water gravity drain — SW
Drain to be made redundant
Drain to be demolished

Private drainage - Proposed
Combined waste gravity drain — CW
Foul waste gravity drain — FW
Surface water gravity drain — SW
Surface water land drain — LD
Surface water linear channel — LC

Private drainage - Miscellenous
Pumped pipeline - Foul or Surface
Perforated drain - Foul or Surface

Public drainage
Combined waste sewer — CW
Foul waste sewer — FW
Surface water sewer — SW

Foul waste

FC.001	Chamber
FR.001	Drain run
SS	Stub stack
SVP	Soil vent pipe
AAV	Air admittence valve
FP	Generic foul point
TG	Trapped gully

Surface water

SC.001	Chamber
1.000	Drain run
RWP	Rain water pipe
BIG	Back inlet gully
YG	Yard gully

Miscellenous

IL	Invert level
CL	Cover level
PPIC	Polypropylene inspection chamber
PCC	Precast concrete chamber
BWK	Brick chamber
MAC	Mini Access Chamber
SD	Slot drain
DC	Drainage channel
LC	Linear channel
VC	Vitrified clay
PP	Plastic pipe
RP	Rocker pipe
SL	Sump level
BD	Backdrop connection
IT	Interseptor trap
DN	Diameter

Tree root protection zone

Impermeable roof area

Rev	Date	By	Description
00	10.12.21	dp	Issued for information only
P01	17.06.22	dp	Issued for information only
P02	08.07.22	dp	Planning issue

NOT FOR CONSTRUCTION

Date	Scale	Format
Dec '21	1:100	A1
Drawn	Reviewed	Approved
dp		

Work Stage & Reason For Issue
Outline Design
Planning

Architect
Wimshurst Pelleriti

Client
-

Project Number & Title
4821
Meadows Hall
Richmond

Sheet Number & Title
00610
GA Plan
Drainage Strategy

MOMENTUM
structural engineers

Bath 01225 444194 | London 020 7739 6939

www.momentumengineering.com

Document Reference
4821-MOM-XX-XX-DR-C-00610
P02