

29/03/2018

Safety, Health and Environmental Information
In addition to the hazards/risks normally associated with the types of work detailed on this drawing and noted in the designer risk assessments and health and safety plan, note the following:

Where applicable, significant residual risks are highlighted in the body of the drawing.

T02	18/12/2017	Updated Tender Issue - revised as clouded
T01	27/10/2017	Tender Issue
P03	29/06/17	Stage 3 AFL Issue
P02	09/06/17	Draft Stage 3
P01	26/05/17	Draft Stage 3

Issue	Date
Key Plan (NTS)	

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email: info@arupassociates.com

British Land Property

Management Limited

Triton Square

Drawing Title
Public Health Services

Piped Services

Basement
_layout

scale at A0 1 : 100

Public Health Services

Job No	Drawing Status
46868	Tender

Drawing No	Issue
246868-A A-XX-B1-DB-PX-53010	T02

102

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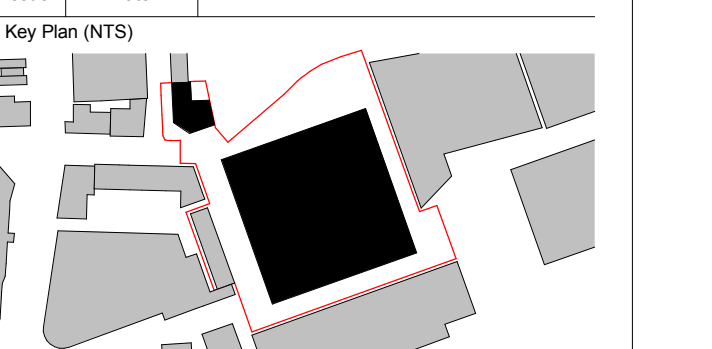
29/03/2018



FIGURED DIMENSIONS ONLY TO BE USED	
<p>Safety, Health and Environmental Information</p> <p>addition to the hazards/risks normally associated with the type of work detailed on this drawing and noted in the engineer risk assessments and health and safety plan, note the following:</p> <p>It is assumed that all works on this drawing will be carried out by a competent contractor working, where appropriate, to an approved method statement.</p> <p>Where applicable, significant residual risks are highlighted in the body of the drawing.</p>	14/02/2018 11:53:54

This drawing was issued under the reference
and title 246868-A_A-XX-B1-DR-PX-52010
Public Health Services - Drainage - Basement -
Layout

T02	18/12/2017	Updated Tender Issue - revised as clouded
T01	27/10/2017	Tender Issue
P03	29/06/17	Stage 3 AFL Issue
P02	09/06/17	Draft Stage 3
P01	26/05/17	Draft Stage 3



ARUP ASSOCIATES
3 Fitzroy Street
London
W1T 4BJ
tel: 020 7755 2525
fax: 020 7755 2561
email: info@arupassociates.com

British Land Property
Management Limited

Triton Square

Drawing Title

Public Health Services
Drainage
Basement
Layout

Scale at AO		1 : 100
Discipline		
Public Health Services		
Job No	Drawing Status	
46868	Tender	
Drawing No	Issue	
46868-A_XX-B1-DR-PX-52011	T02	

Equipment Data Sheet P13-Combined Attenuation & Water Recycling Package

Job Title:	1 Triton Square			Job Number:	246868
Job Stage:	Stage 4	Status:	Tender	Made by:	PM
Revision:	T02	Date:	27/10/2017	Checked by:	NR
Revision Description:					

General Information

Number Required	1 Package
Location	Basement 01 - PH Plantroom
System	Water Services
Type	Combined Attenuation & Water Recycling Package
Equipment Reference	CAWRP-B01-1

Suggested Supplier

Model Reference	N/A
Manufacturer	Aquality
Contact Name	Lutz Johnen
Telephone Number	0044 2089 91 37 25
E-mail Address	johnen@aquality.co.uk

Or Equal

1. Grey Water System

1 A grey water recycling plant, suitable for indoor installation and fully compliant with the requirements of BS 8525, shall be provided by a specialist supplier to recycle waste water collected from showers for re-use for non-potable cold water applications.

2 The collected waste water shall go through stages of membrane filtration, storage and direct/indirect loop aeration to produce grey water (process water) that meets the hygienic, micro-biological requirements of the EU Bathing Water Guideline 76/160/EEC, 2006/7/EC and BS 8525:2010. Further effluent qualities: COD: <20 mg/l; BOD 5: <5 mg/l; suspended solids: 0 mg/l; turbidity: 0 NTU.

3 The plant shall be provided with an automatic mains water top-up facility in full compliance with BS 8525 and BS EN 1717.

4 The plant shall be fully automatic in operation, through a programmable micro-processor based control system, located in a set mounted control panel. A clear addressable display mounted on the panel fascia shall provide indication and levels of plant status, system settings and parameters, failure indication and levels within storage tanks as a minimum. A facility shall be provided for common fault indication to the BMS.

5 Recycled water storage tanks shall supply to compact control unit with multi-stage centrifugal pumps arranged for duty and assist operation. Pumps shall be complete with inverter drives.

Performance

	Required	Offered
Effective Capacity	12000	

1.1. Grey Water Collection

1.1.1. Grey Water Pre-Filter

	Required	Offered
Number	1	
Type of Filtration	Physical	
Level of Filtration	Coarse	
Direction	Horizontal	
Material	Stainless Steel 304S	
Grid Type	S Grid	
Mesh Size	0.7	mm
Automatic Backwash	Yes	
Backwash Control Valve	25	mm
Overflow	100	mm
Filter Outlet Connection	100	mm
Filter Inlet Connection	100	mm

Comments

- To ensure maximum filter efficiency a calming distance of a minimum of 1m straight grey water pipe shall be provided at the inlet connection of the grey water filter.
- The filter shall be installed on support frame or shall be suspended from ceiling.

1.1.2. Grey Water Buffer Tanks

	Required	Offered	
Total Effective Capacity	12000		litres
Number of Tanks	3		
Effective Capacity of Each Buffer Tank	4000		litres
Type of Tank	Single Piece		
Material	Black HDPE		

Comments

- Each buffer tank shall have bracket connections and low-level tank interconnection sets.
- Indirect aeration via loop circulation system shall be provided to support aerobic biological treatment in all greywater storage tanks and to achieve longer storage periods.
- Level control/float switch shall be provided for each buffer tank.
- Tanks shall be individually vented to atmosphere via vent pipes.

Job Title:	1 Triton Square			Job Number:	246868
Job Stage:	Stage 4	Status:	Tender	Made by:	PM
Revision:	T02	Date:	27/10/2017	Checked by:	NR
Revision Description:					

Dimensions (per Tank)

	Required	Offered	
Length	2430		mm
Width	995		mm
Height	1950		mm
Inspection Lid	400		mm
Vent Pipe	50		mm

1.1.2.1. Submersible Self-Priming Circulation Pump to Transfer Grey Water from Buffer Tanks to Membrane Tanks

	Required	Offered	
Number	1		
Number per Buffer Tank	Only 1 pump and for last buffer tank		
Type	Submersible		
Configuration	Duty		
Duty Flow	1-3		l/s
Duty Head	5 (max)		bar
Closed Valve Pressure	MS		bar

Comments

1 Submersible self-priming circulation pump for greywater transfer between tanks.

Dimensions:

Overall Diameter / Ø	148	mm
Overall Height	253	mm
Impeller / Ø	MS	mm
Suction Header Ø		mm
Delivery Header Ø	25	mm
Operating weight	4.6	kg

Construction:

Pump Casing Material	Technopolymer
Shaft Material	Technopolymer
Impeller Material	Technopolymer
Seal Type	MS
Seal Facing Type	MS

Electrics:

	Required	Offered	
Electrical Supply	230		V/Ø
Electrical Supply	50		Hz
Duty Load	0.37		kW
Starting Current	N/A		A
Running Current	1		A
Power Source	Electricity		
Starter Type	DOL		
Normal Feed	Yes		
Essential Feed	N/A		

Controls

Speed Control	Fixed Speed
Drive Type	Close Coupled

BMS Outputs

	Required	Offered
Common Alarm Volt Free Contact	Yes	
Individual Pump Run Status	Yes	

1.2. Grey Water Treatment & Transfer**1.2.1. Greywater Membrane Filtration Tank**

	Required	Offered	
Total Treatment Capacity	12000		litres
Number of Tanks	4		
Nominal Capacity of Each Membrane Filtration Tank	690		litres
Type of Tank	Single Piece		
Material	Black HDPE		

Comments

1 Direct aeration system via aerator and externally mounted compressor shall be provided for bio-degrading organic load using steel plate consoles with vibration stop.

2 Level control/float switch shall be provided for each tank.

3 Submerged PES flat sheet membrane filtration modules with molecular weight cut off at 150 kDa (nominal pore size 35 nm), including EPDM tube aerator, stainless-steel chassis 304 S/S, pre-installed in tanks shall be provided for ultrafiltration and physical disinfection.

Dimensions (per Tank)

	Required	Offered	
Length	720		mm
Width	720		mm
Height	1690		mm
Inspection Lid	400		mm
Vent Pipe	N/A		mm

Job Title:	1 Triton Square			Job Number:	246868
Job Stage:	Stage 4	Status:	Tender	Made by:	PM
Revision:	T02	Date:	27/10/2017	Checked by:	NR
Revision Description:					

1.2.2. Integrated Submerged Filtrate Pumps to Transfer Treated Greywater from Membrane Filtration Tanks to Transfer Tank

	Required	Offered	
Number	4		
Number per Membrane Filtration Tank	1		
Type	Submersible		
Configuration	Duty		
Duty Head	0.025		l/s
Duty Flow	2 (max)		bar
Closed Valve Pressure	MS		bar

Comments

1 Integrated submerged filtrate pumps shall be provided for filtrate transfer to process water storage tanks.

Dimensions:

Overall Length	125	mm
Overall Width	75	mm
Overall Height	200	mm
Impeller / Ø	MS	mm
Suction Header Ø	MS	mm
Delivery Header Ø	8	mm
Operating weight	MS	kg

Construction:

Pump Casing Material	ABS
Shaft Material	ABS
Impeller Material	ABS
Seal Type	MS
Seal Facing Type	MS

Electrics:

	Required	Offered	
Electrical Supply	230		V/Ø
Electrical Supply	50		Hz
Duty Load	0.045		kW
Starting Current	MS		A
Running Current	0.21		A
Power Source	Electricity		
Starter Type	MS		
Normal Feed	Yes		
Essential Feed	N/A		

Controls

Speed Control	Fixed Speed
Drive Type	MS

BMS Outputs

	Required	Offered
Common Alarm Volt Free Contact	Yes	
Individual Pump Run Status	Yes	

1.2.3 Treated Grey Water Transfer Tank

	Required	Offered	
Total Effective Capacity	4000		litres
Number of Tanks	1		
Nominal Capacity of Each Tank	4000		litres
Type of Tank	Single Piece		
Material	Black HDPE		

Comments

1 The transfer tank shall have bracket connections and low level tank interconnection sets.

2 Level control via compact control unit with integrated pumps shall be provided.

3 The non-potable water shall meet the hygienic-microbiological requirements of the EU bathing water guideline 2006/7/EG and the British Standard BS 8525.

4 Ventilation shall be provided via air admittance / balancing valves.

Dimensions (per Tank)

	Required	Offered	
Length	2430		mm
Width	995		mm
Height	1950		mm
Inspection Lid	400		mm
Vent Pipe	N/A		mm

Job Title:	1 Triton Square			Job Number:	246868
Job Stage:	Stage 4	Status:	Tender	Made by:	PM
Revision:	T02	Date:	27/10/2017	Checked by:	NR
Revision Description:					

1.2.4 Transfer Pump to Transfer Treated Grey Water from Transfer Tank to Combined Storage Tank

	Required	Offered	Comments
Number	1		1 Submersible self-priming circulation pump for greywater transfer shall be provided.
Number per Tank	1		2 Dry run protection shall be provided.
Type	Submersible		
Configuration	Duty		
Duty Flow	2		l/s
Duty Head	1		bar
Closed Valve Pressure	MS		bar

Dimensions:

Overall Diameter / Ø	160	mm
Overall Height	334	mm
Impeller / Ø	MS	mm
Suction Header Ø		mm
Delivery Header Ø	25	mm
Operating weight	7	kg

Construction:

Pump Casing Material	Technopolymer
Shaft Material	Technopolymer
Impeller Material	Technopolymer
Seal Type	MS
Seal Facing Type	MS

Electrics:

	Required	Offered	
Electrical Supply	230		V/Ø
Electrical Supply	50		Hz
Duty Load	0.55		kW
Starting Current	MS		A
Running Current	3.5		A
Power Source	Electricity		
Starter Type	DOL		
Normal Feed	Yes		
Essential Feed	N/A		

Controls

Speed Control	Fixed Speed
Drive Type	MS

BMS Outputs

	Required	Offered
Common Alarm Volt Free Contact	Yes	
Individual Pump Run Status	Yes	

1.2.5 Grey Water Treatment Plant Control Panel

	Required	Offered	
Type of Control Panel	Electronic		
IP	65		
Electric Supply	Single Phase		
	230		V
	50		Hz
	8		A
	1000		W

Comments

- Electronic control panel with micro-processor and LED display for operation status, settings and fault indication installed in polycarbonate chassis IP 65, shall be provided.
- Volt-free contact to BMS system for general fault alarm shall be provided.
- Visual and acoustical alarms shall be provided.
- Power and signalling manifold for all level sensors / float switches, tank-internal transfer pumps, aerators, membrane filtration modules and valves shall be provided.
- Colour-coded or labelled connections shall be provided.

BMS Outputs

	Required	Offered
Common Alarm Volt Free Contact	Yes	

1.3 Combined Attenuation, Rainwater Harvesting & Treated Grey Water System

1.3.1 Combined Attenuation, Rainwater Harvesting & Treated Grey Water Tank

Performance

	Required	Offered	
Effective Capacity	285		litres
Nominal Capacity	355.25		litres

Construction

Arrangement	Externally Flanged Sides
	Internally Flanged Base
Type of Construction	Hot Press Moulded Tank
Tank Material	GRP- Sectional

Comments

- The combined tank shall be connected to CMAC Storm water management system.
- Forecast based control system which proportionally drain down tank before storm event shall be provided.
- Storm control system to include web gateway water management platform shall be provided.
- BV rainwater filters shall be provided.

Job Title:	1 Triton Square			Job Number:	246868
Job Stage:	Stage 4	Status:	Tender	Made by:	PM
Revision:	T02	Date:	27/10/2017	Checked by:	NR
Revision Description:					

Dimensions

Overall Internal Length	14500	mm
Overall Internal Width	7000	mm
Overall Internal Height	3500	mm
Overall External Length	14650	mm
Overall External Width	7150	mm
Overall External Height	3560	mm
Inlet Connection Size	Various	mm
Outlet Connection Size	Various	mm
Overflow Size	N/A	mm
Warning Pipe Size	N/A	mm
Vent Pipe Size	50	mm
Drain Outlet Size	50	mm
Ball Valve Housing Length	N/A	mm
Ball Valve Housing Width	N/A	mm
Ball Valve Housing Height	N/A	mm
Height of Plinth/Leveling Steels	150	mm

Options

Ball Valve Housing
Internal Ladder
External Ladder
Immersion Heaters
Sealed Heavy Duty Lid
Sealed Light Duty Lid
Access Hatch
Structural Internal Division
Contents Gauge
Overflow Screening
Warning Pipe Screening
Factory Insulation
Site Insulation
Base leveling steels
Airgap
Safety guardrail

Required Offered

No	
Yes	
Yes	
No	
No	
Yes	
Yes	
No	
No	
Yes	
No	
Yes	
Yes	
Yes	
No	
Yes	

Controls

	Required	Offered
High Level Alarm Switch	MS	
Low Level Alarm Switch	MS	
Temperature Sensor	MS	
BMS Links	MS	

1.3.2 Attenuation Pump

	Required	Offered	
Number	2		
Type	Centrifugal		
Configuration	Duty/Standby		
Duty Flow	30		l/s
Duty Head	2		bar
Closed Valve Pressure	MS		bar
Pressure Vessel Capacity	18		litres

Comments

1 Aqua-Storm Control shall be provided.

Dimensions:

Overall Length	1000	mm
Overall Width / Ø	650	mm
Overall Height	900	mm
Impeller / Ø	MS	mm
Suction Header Ø	80	mm
Delivery Header Ø	65	mm
Operating weight	MS	kg

Construction:

Pump Casing Material
Shaft Material
Impeller Material
Seal Type
Seal Facing Type
Pressure Vessel Shell Material
Pressure Vessel Diaphragm

Stainless Steel 1.4301
Stainless Steel 1.4301
Stainless Steel 1.4301
Stainless Steel 1.4301
Stainless Steel 1.4301
Steel
Rubber

Electrics:

	Required	Offered	
Electrical Supply	415		V/Ø
Electrical Supply	50		Hz
Duty Load	2*7.5		kW
Starting Current	MS		A
Running Current	32		A
Power Source	Electricity		
Starter Type	DOL		
Normal Feed	Y		
Essential Feed	N/A		

Options

Anti Condensation Heaters
Voltmeter
Ammeter
Pump Isolating Valves
Pump non-return valve
Pump Strainers
Test Points
Pressure Gauge
Pressure Transmitter

Required Offered

No	
No	
No	
Yes	
Yes	
No	
Yes	
Yes	
Yes	

Job Title:	1 Triton Square			Job Number:	246868
Job Stage:	Stage 4	Status:	Tender	Made by:	PM
Revision:	T02	Date:	27/10/2017	Checked by:	NR
Revision Description:					

Control Panel

Weather Proof Housing (IP54)
Normal Housing (IP52)
Start / Stop Buttons
Individual Pump Run Lights
Individual Pump Trip Lights
Supply On Lights
Minimum Run Timers
Hand Auto / On / Off Switch
Tank Interface Lights
Lockable with Padlock
Lockable with Cylinder Lock
Lamp Test Switch
Self Testing Lights
Location

Required	Offered
No	
Yes	
Yes	
Yes	
Yes	
Yes	
Yes	
Yes	
No	
No	
No	
No	
No	
Basement 01	

Controls

Speed Control
Drive Type

Variable Speed
Inverter

BMS Outputs

Common Alarm Volt Free Contact

Required	Offered
Yes	

**1.3.3 Non-Potable Package including
Booster Pump Set & Break Tank****Comments**

1	Compact control unit with booster pump set with fully-automatic and water efficient (demand-oriented) water top-up or manual changeover shall be provided. This shall enable the system to run fully on mains water e.g. during maintenance without any loss of service.
2	Integrated touch-screen display shall be provided for indication of operational status, system pressure, level in non-potable water tank and break tank, and any alarms.
3	WRAS approved solenoid valve with water hammer prevention and pre-filter shall be provided.
4	Emergency overflow shall be provided and shall be connected via tundish or bunded gully to drain point.
5	Break tank with AA-type air gap as per BS 8525 / BS EN 1717, shall be provided.

3	WRAS approved solenoid valve with water hammer prevention and pre-filter shall be provided.
4	Emergency overflow shall be provided and shall be connected via tundish or bunded gully to drain point.
5	300 Litres Break tank with AA-type air gap as per BS 8525 / BS EN 1717, shall be provided.
6	Dry run protection shall be provided.

1.3.3.1 Non-Potable Booster Set

	Required	Offered	
Number	3		
Type	Multistage		
	Centrifugal		
	variable speed		
Configuration	Duty/ Assist/Standby		
Duty Flow	6		l/s
Duty Head	8		bar
Closed Valve Pressure	MS		bar
Pressure Vessel Capacity	300		litres

Dimensions:

Overall Length	1700	mm
Overall Width / Ø	1200	mm
Overall Height	1950	mm
Impeller / Ø	MS	mm
Suction Header Ø	65	mm
Delivery Header Ø	65	mm
Operating weight	MS	kg
Pressure Vessel Height	1267	mm
Pressure Vessel Diameter Ø	650	mm

Construction:

Pump Casing Material
Shaft Material
Impeller Material
Seal Type
Seal Facing Type
Pressure Vessel Shell Material
Pressure Vessel Diaphragm

Steel
Stainless Steel 1.4301
Stainless Steel 1.4301
Stainless Steel 1.4301
SIC / EPDM
Stainless Steel 1.4301
Stainless Steel
EPDM

Job Title:	1 Triton Square			Job Number:	246868
Job Stage:	Stage 4	Status:	Tender	Made by:	PM
Revision:	T02	Date:	27/10/2017	Checked by:	NR
Revision Description:					

Electrics:

	Required	Offered	
Electrical Supply	415		V/Ø
Electrical Supply	50		Hz
Duty Load	3 * 4		kW
Starting Current	MS		A
Running Current	30		A
Power Source	Electricity		
Starter Type	Soft Start		
Normal Feed	Yes		
Essential Feed	N/A		

Options

Anti Condensation Heaters
 Voltmeter
 Ammeter
 Pump Isolating Valves
 Pump non-return valve
 Pump Strainers
 Test Points
 Pressure Gauge
 Pressure Transmitter
 Connection Set
 Floating Extraction
 UV Synchronizer

Required Offered

Required	Offered
No	
No	
No	
Yes	
Yes	
Yes	
Yes	
Yes	
Yes	
Yes	
Yes	
Yes	

Control Panel

	Required	Offered
Weather Proof Housing (IP54)	-	
Normal Housing (IP52)	Yes	
Start / Stop Buttons	Yes	
Individual Pump Run Lights	Yes	
Individual Pump Trip Lights	Yes	
Supply On Lights	Yes	
Minimum Run Timers	Yes	
Hand Auto / On / Off Switch	Yes	
Tank Interface Lights	Yes	
Lockable with Padlock	Yes	
Lockable with Cylinder Lock	No	
Lamp Test Switch	Yes	
Self Testing Lights	No	
Leakage Alarm	Yes	
Pipe Burst Alarm	Yes	
Intergrated Touch Scrren Display	Yes	
Dry Run and Cavitation Protection	Yes	
Stagnation Prevention	Yes	
Mains Water Back-up Fault Alarm	Yes	
Location	Basement 01	

Controls

Speed Control
 Drive Type

Variable Speed
Close coupled

BMS Outputs

Common Alarm Volt Free Contact
 Individual Pump Run Status

Required Offered

Required	Offered
Yes	
Yes	

1.4. Remote Monitoring System

1 Volt-free contact alarms and monitoring information shall be made available on an internet dashboard interface.
2 Supplies BMS fault information
3 Real time water meter data and totalizer
4 GSM reception shall be provided in the plant room.
5 Alarm signals shall be transmitted to the local BMS.
6 Cloud-baed platform for monitoring grey/rain and attenuation systems displayed through on line task board shall be provided.
7 Platform providing real-time site specific data through secure mutiple user login shall be provided.

General Comment

The system shall be provided by specialist and the the specialist will be responsible for the whole package.
--

Project Name	Triton
Job Number	246868-00
Type of Information	Combined Attenuation+ RWH + Treated Greywater
Revision	Stage 4
Date Modified	15/02/2018
Done By	PM Arup
Checked By	NR-KF Arup

Greywater Demand (WC & Urinal use):

Office: $3621 \times 15\text{l/p/d} = 54,315\text{l/d} \times 260\text{d} = \sim 14,122\text{m}^3 \text{ p.a.}$

Leisure: $235 \times 5\text{l/p/d} = 1,175\text{l/d} \times 360\text{d} = 423\text{m}^3 \text{ p.a.}$

Retail: $340 \times 0 = 0$

Affordable working (office): $112 \times 15\text{l/p/d} = 1680\text{l/d} \times 260\text{d} = \sim 436\text{m}^3 \text{ p.a.}$

Total: 14,981m³ p.a.

Greywater Yield (from showers):

Office: (we only collect the water from cycle shower areas)

Showers: $3621 \times 8.5\% = 307 \times 40\text{l/use} (8\text{l/min} \times 5\text{min}) = 12,311\text{l/d}$ (We have designed the combined system based on 12m³ of collected greywater)

Total: 12,311l/d x 260 = 3,200m³ p.a.

21.36% of total demand for WC & Urinals

RW Yield:

$5750\text{m}^2 \times 600\text{mm} \times 0.8 \times 0.9 = 2,484\text{m}^3 \text{ p.a.}$

5% of the annual rainwater Yield = $0.05 \times 2,484\text{m}^3 = \sim 124\text{m}^3$ (We have designed the combined system based on 124m³ of effective water for RWH)

16.5% of total demand for WC & Urinals

Note: 5% of Yield was less than 5% of Yield and hence the design is based on the RW Yield.

The Rain Water Harvesting System is Calculated based on the below:

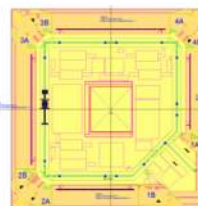
a) the amount and intensity of rainfall

b) the size and type of collection surface

c) the number and type of intended applications, both present and future

The design has been carried out based on BS8515- Intermediate Approach

Available Roof Area Draining to the Storage Tank			
Total Available Area			5750
Based on Figure 2-page 9: BS 8515 and considering London as the location of the project			
Annual Average Rainfall	600	mm	
RW Storage Capacity			
RW Storage Capacity should be: (minimum 5% of the annual rainwater yield, 5% of the annual non-potable demand)			
Annual rainwater yield			
$YR = A \times e \times h \times \eta$			
Ys	The annual Rainwater Yield	L	2484000
A	The Collecting Area	m ²	5750
e	The yield coefficient	%	0.8
h	The depth of rainfall	mm	600
η	Hydraulic Filter Efficiency	-	0.9
5% of the annual rainwater yield			124200
5% of the annual non-potable water demand			
$D_{\text{np}} = P_{\text{np}} \times n \times 365$			
D _{np}	The annual non-potable water demand	L	41302031.25
P _{np}	Daily requirement per person	L	25
n	the number of persons	-	4526.25
5% of the annual rainwater yield			2065101.563
Minimum of			124200



We have assumed the foot print of the building will be the area that the rain water will be collected and drain to RWH tank. We are well aware of further terraces in 2-5th floor. However we have discounted them in this calc considering the effect of direction of rain and wind.

Table A.1 Yield coefficients

Type	Run-off	Depression storage
Pitched roof with profiled metal sheeting	0.9	0.1
Pitched roof with tiles	0.8	0.3
Flat roof without gravel	0.8	1.0
Flat roof with gravel	0.8	2.0
Green roof, intensive ⁽¹⁾	0.5	5.0
Green roof, extensive ⁽¹⁾	0.7	4.0
Permeable pavement ⁽²⁾ - Granular media	0.7	4.0
Permeable pavement ⁽²⁾ - Plastic crates	0.8	2.0

⁽¹⁾ The run-off yield is uncertain for these surfaces and design needs to take account of the possibility of yields that are up to 20% higher or lower. In particular, the hydraulic run-off behaviour of green roofs depends on their design.

The guide is suggesting 50 litres to be used for WM and WC. However we are only considering the NPCW to be used for WCs

Attenuation Volume:

150m³. This is based on advice from Infrastructure team (100 Years+40% Climate Change).

Total Effective Capacity of the combined tank (RWH+ Treated Grey Water+ Attenuation):

124+12+150=286m³

Nominal Size of the tank: 355.25m³

Size of the combined tank: 3.5(H)*14.5(L)*7(W)

Internally Flanged Base and Externally Flanged Side

BREEAM 2014 Wat 01 Water consumption: Water efficiency calculator for new non domestic office buildings

BREEAM[®] UK

Building details

Building name

1 Triton Square (Project Mint)

BRE assessment reference no.

BREEAM-0068-5958

Key

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Building type	Description of building type	Default occupancy	Default annual days/operation	Default daily hours of operation
Office	TCP Classification B1: Offices and workshop business (including those with a basic (category 1) laboratory area)	3331.443	253	10

Main building activity areas	Description of activity area	Activity area present in building?	Net Floor Area (m ²)
Office - Office areas	Cellular or open plan office space, including staff kitchen where present/adjacent and reception areas. Exlcude meeting rooms, visitor waiting or circulation areas.	Yes	30013
Office - Small workshop / laboratory space	Small scale workshop or category 1 laboratory area	No	
Office - Staff canteen dining area	Seated dining areas that accompany a permanently staffed kitchen preparing food for consumption on the premises (excludes small un-staffed kitchen's used by office staff to re-heat food, make tea etc.)	No	
Office - Fitness suite/gym (with changing facility and showers)	A fitness suite or gym that is part of the office building/development and used by the building's employees only. The gym will have its own changing facility with showers.	No	

Note: the activity are large, to represent the present, as the areas i

Note: Only select this kitchen/servery areas

Water consumption - building microcomponent

WC component - all activity areas	units	Specification	Usage/person/day	Usage factor	Consumption (L/person/day)
WC - male (urinals installed)	Effective flush volume (Litres)	4.50	1.00	1.00	2.25
WC - female	Effective flush volume (Litres)	4.50	4.00	1.00	9.00

Note: Where the WC + 6 litres against both m ratio of male to femal

Urinal component - all activity areas	units	Specification	No. of cisterns	Flushing frequency (flushes/hour)	Consumption (L/person/day)
Automatically operated flushing cistern	Cistern capacity (Litres)				0.00
	No. of urinal bowls				
	units	Specification	Usage/person/day	Usage factor	Consumption (L/person/day)
Manual/automatic operated pressure flushing valve (all activity areas)	Flush volume (litres)	0.50	3.00	1.00	0.75
	No. of urinal bowls	82.00			
	units	Specification	Usage/person/day	Usage factor	Consumption (L/person/day)
Waterless urinals (all activity areas)	Flush volume (litres)	Waterless urinals - not specified	3.00	1.00	0.00
	No. of urinal bowls				

Note: This consumptic specified in the buildi

	units	Specification	Usage/person/day	Usage factor	Consumption (L/person/day)
Taps components (personal hygiene) - all activity areas					
Wash hand basin taps	Flow rate (litres/min)	4.00	4.00	0.25	2.71
Shower use	Flow rate (litres/min)	8.00	0.030	5.60	1.34
Fixed use - vessel filling	Litres/person/day	-	-	-	1.58
Tap components (cleaning) - staff kitchenette					
Kitchen taps - kitchenette	Flow rate (litres/min)	5.00	1.00	0.67	2.27
Dishwasher	Litres/cycle	0.00	0.04	1.00	0.00
Tap components (cleaning and food preparation) - staff canteen food preparation area					

Total	Microcomponent consumption (L/person/day)
	19.90

Note: This total includes a more accurate reflection of improvement and the specification e.g. WC 1

Non potable water yield - greywater system

Has, or will, the greywater system be specified and installed in compliance with BS8525-1:2010 Greywater Systems - Part 1 Code of Practice	Yes
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Greywater source (building components)		Greywater collected	Proportion of components collected from (%)	Greywater yield (L/person/day)
Wash hand basin taps		No		
Showers		Yes	95%	1.28
Kitchen taps - kitchenette		No		
Dishwasher - staff kitchenette		No		
Greywater source (other components)	Typical greywater yield (litres)	Frequency of yield (days)	Greywater yield (litres/day)	Greywater yield (L/person/day)
Other source of greywater	12000	1	12000.00	3.60

Note: If greywater is collected, it should be accounted for. This calculation

Total	Greywater yield (L/person/day)
	4.88

Non potable water yield - rainwater system

Has, or will, the rainwater system be specified and installed in compliance with BS8515:2009 Rainwater Harvesting Systems - Code of practice	Yes
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How has the storage capacity for the proposed system been calculated?	BS8515 Intermediate approach
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Rainwater yield if intermediate:

Collection area (m2)	Rainfall (average mm/yr)	Hydraulic filter efficiency (%)	Yield co-efficient (%)	Annual rainwater yield (Litres)	Rainwater yield (L/person/day)
5750	600	90.00%	80.00%	2484000	2.04

Rainwater yield if detailed:

Daily rainfall collection (litres)	Rainwater yield (L/person/day)

Non Potable Water Demand - Building Components

				Greywater and/or rainwater yield (L/person/day)
Total				6.92
Component	Greywater and/or rainwater utilised for component	Proportion of components using greywater and/or rainwater yield (%)	Maximum permissible demand (L/person/day)	
WC flushing	Yes	100%	11.25	
Urinal flushing	Yes	100%	0.75	
				Demand met by yield (L/person/day)
Total				6.92
Other permissible components				
Are there other permissible components present which demand greywater and/or rainwater yield?				No
				Maximum permissible demand (L/day)
				0
Proportion of maximum permissible demand utilised by other permissible components (%)				
				Demand met by yield (L/person/day)
Total				0.00
				Greywater and/or rainwater demand met by yield (L/person/day)
Total				6.92

Water consumption calculation results

	Litres/person/day	m ³ /person/yr
Water consumption - modelled baseline performance benchmark (excludes fixed uses)	33.85	8.56
Microcomponent water consumption - modelled performance (excludes fixed uses)	18.32	4.63
Modelled water demand met via greywater and rainwater sources	6.92	1.75

If greywater/rainwater systems specified has the minimum % efficiency improvement for component specifications been met	Yes	
Net modelled water consumption (excludes fixed uses)	11.40	2.88
Percentage improvement	66.33%	
Total Wat 01 BREEAM credits achieved	5 credits	
Total Wat 01 BREEAM Innovation credits achieved	1 innovation credit achieved	
Key performance indicator - use of freshwater resource (includes fixed uses)	12.98	3.28