

### Design Note 03

PROJECT:	Selkirk House, 166 High Holborn, 1 Museum Street, 10-12 Museum Street, 35-41 New Oxford Street and 16A-18 West Central Street		
TITLE:	MEINHARDT'S RESPONSE TO LLFA F	LANNING (	COMMENTS
REVISION:	01		
PREPARED BY:	Mr. C. Marchant	Date:	27 February 2023
REVIEWED BY:	Mr. C. Marchant	Date:	27 February 2023
APPROVED BY:	Mr. G. Bansal	Date:	27 February 2023

This design note has been prepared in response to the comments received from the London Borough of Camden (LBC), the Lead Local Flood Authority (LLFA) for the London Borough. The comments were received on 2<sup>nd</sup> February 2023, in relation to the proposed planning application submitted for the site; Selkirk House, 166 High Holborn, 1 Museum Street, 10-12 Museum Street, 35-41 New Oxford Street and 16A-18 West Central Street reference 2021/2954/P.

For the full LLFA comments via email please refer to Appendix A.

### 1 LLFA Review Summary of Application

#### Review Summary:

- Type of development: Major
- Types of conveyance / attenuation features: Attenuation tanks, green and blue roofs
- Runoff rate restriction (I/s): Original application 46I/s (36I/s unrestricted from Museum St site and 5I/s for the West Central development and 5I/s for the Museum Street Development).
- Runoff rate restriction per hectare (I/s/ha): N/A
- Runoff attenuation volume (m3): Originally stated to be at least 169m3. The blue roof attenuation volume has been amended. Calculations have been provided although these do not take the whole site into account.
- Maintenance plan: Incomplete
- Any other previously identified outstanding matters: The applicant has provided evidence that the London Borough of Camden have previously approved the unattenuated portion of Museum street.

### 2 LLFA Planning Comments – Below Ground Drainage Strategy

#### 2.1.1 LLFA Comment 1 – Pumped Surface Water Drainage Solution

The LLFA have stated the following comment on the Proposed Drainage Strategy Report.

"Both the developments in Museum Street and West Central Street propose the use of a pump to transfer water from the basement attenuation tanks to the sites internal drainage network. The applicant has not provided justification for the use of pumped drainage".

## MEIN-ARDT

The proposed Museum Street site consists of an existing basement structure which covers nearly the whole of the Museum Street private site ownership boundary. The existing basement structure makes it very difficult to design any below ground SuDS into the scheme, due to the footprint of the existing basement structure.

Therefore, to minimise the requirement for below ground SuDS, where possible we have designed above ground SuDS into the development such as blue and green roofs. However, due to project constraints such as the size of the development, the restricted discharge rate, not all roof areas being suitable for blue roofs and the fact that some of the external areas on the ground floor are built directly off the ground floor slab, making it is impossible to drain certain areas of the site via the restricted discharge rate without taking drainage into the existing basement. It is for the reasons above it is not possible to provide a SuDS solution for the development that can achieve the restricted discharge rate without providing a below basement attenuation tank and a pumped drainage solution.

To ensure the proposed building is feasible from a MEP engineering standpoint, the existing basement structure has been occupied for plant being used run the proposed development, leaving no room for attenuation tanks above the existing basement slab within the existing basement structure. However, even if there was additional space within the existing basement structure to provide an attenuation tank, the tank would still need to be pumped to connect into the Thames Water public sewer due to the depth of the existing public sewer network in the surrounding roads. Therefore, after exploring all of the options to provide a gravity-fed drainage system for the Museum Street development, the decision was made to provide a surface water attenuation tank beneath the basement slab and a pumped solution. However, it should be added that not all of the proposed museum street site is draining via the basement attenuation tank. All of the proposed areas of blue roofs will drain via gravity and make new connections to the Thames Water public sewer network. The proposed surface water discharge rate of 5.0l/s has been split between the proposed blue roofs and the remaining discharge rate is being used as the pumped discharge rate for the basement attenuation tank.

For the West Central Street site, we are also proposing to provide green roofs, blue roofs and a below ground attenuation tank system for the development. Just like the Museum Street Site, the West Central Street Site is constrained by the same elements such as a site wide existing basement, existing buildings being retained on site and limited space for below ground SuDS. Therefore, Meinhardt have worked with the design team to utilise as many of the available roof space areas for blue roofs as possible. However, some of the existing roof areas have been deemed by the structural engineers as not being able to take the loading from a blue roof, also there are areas of the site which will drain directly onto the ground floor with little to no space to provide attenuation without taking this drainage into the existing basement.

It is for the same reasoning as the Museum Street site, that a basement attenuation tank is required within the West Central Street development. Due to the depth of the existing Thames Water sewers, once the surface water drainage has been taken into the basement attenuation tank a pumped drainage solution is required to drain the tank.

#### 2.1.2 LLFA Comment 2 – Discharge Location Points

The LLFA have stated the following comment on the Proposed Drainage Strategy Report.

"It is not clear how many off-site discharge points are proposed and where these are located. The applicant has not confirmed the number and locations of off-site discharge points into the Thames Water combined sewer (this differs between drawings)".

For the proposed Museum Street site we are proposing to create three new connection points into the Thames Water public sewer, there are shown on Drawing 2413-MT-CV-DR-1MS-00100-P02 in Appendix B of the Drainage Strategy Report submitted for Planning.



The three new connections points from the Museum Street Development have been summarised below:

- 1 x new combined water connection from the Vine Lane Building into the existing Thames Water Combined Sewer in West Central Street.
- 1 x new combined water connection from the Museum Street Building into the existing Thames Water combined Sewer in West Central Street.
- 1 x new combined water connection from the proposed Holborn Building and the Museum Street Building into the existing Thames Water combined water sewer within High Holborn.

For the proposed West Central Street Building, we are proposing to create 3 x sewer connections to the Thames Water combined sewers. These connection points are shown on Drawings 2413-MHT-CV-DR-WCS-00099-P01 and 2413-MHT-CV-DR-WCS-00100-P01, these drawings can be found in Appendix B of the Drainage Strategy Report submitted for Planning.

The three drainage connection points from the West Central Street development have been summarised below:

- Reuse 1 x existing below basement foul water connection into existing Thames Water combined sewer with Museum Street.
- Reuse 1 x existing below basement foul water connection into the existing Thames Water combined sewer with New Oxford Street.
- 1 x new combined water connection from the Internal MEP below ground floor drainage into the Thames Water combined water sewer within West Central Street.

Please also refer to Appendix B of this Design Note for the Proposed Below Ground Drainage Drawings with the proposed connection points to the Thames Water combined sewer's locations.

#### 2.1.3 LLFA Comment 3 – West Central Street Blue Roofs

The LLFA have stated the following comment on the Proposed Drainage Strategy Report.

"Incomplete information has been submitted for the blue roof for West Central Street. The blue roof information in drainage drawing 2413-MHT-CV-DR-WCS-00101 P01 (Below Ground Drainage Strategy (September 2022), p.41) does not match the information provided in the surface water drainage strategy (Below Ground Drainage Strategy (September 2022), p.21".

In section 2.3.5 of the below ground drainage strategy report, Table 7 outlines the proposed summary of the blue roofs for the West Central Street development. An image of Table 7 is shown below.

Proposed West Central Street Blue Roofs					
Location	Area	Depth	Volume	Discharge Rate	
Courtyard	95m²	100mm	9.0m³	0.35I/s	
Roof 18	62m²	150mm	8.8m³	0.30I/s	

Table 7: West Central Street Blue Roof Summary

#### Figure 1: West Central Street Blue Roof Summary Table 7

The proposed drawing 2413-MHT-CV-DR-WCS-00101-P01 on page 41 of the below ground drainage strategy report, highlights the proposed blue roof areas proposed for the West Central Street site. On the West Central Street drawing stated above, Meinhardt have shown the area and volume of the West Central Street blue roofs as:

• Courtyard - 95m<sup>2</sup>, 100mm deep and a total volume of 9.5m<sup>3</sup>.



• Roof 18 (Yard Building) – 62m<sup>2</sup>, 150mm deep and a total volume of 9.3m<sup>3</sup>

The reason the values on the drawings differ slightly between what is shown in the table within the report and what is shown on the drawing is the values in the table take into consideration the fact that the blue roof attenuation tanks have 95% porosity.

- Courtyard = 9.5m<sup>3</sup> x 0.95 = 9.02m<sup>3</sup>. Value in the report table shown as 9.0m<sup>3</sup>
- Roof 18 = 9.3m<sup>3</sup> x 0.95 = 8.84m<sup>3</sup>. Value in the report table shown as 8.8m<sup>3</sup>

This is the reason for the discrepancy within the blue roof volumes on the drawing compared to the West Central Street Blue roof summary table within the report.

#### 2.1.4 LLFA Comment 4 – Blue and Green Roofs

The LLFA have stated the following comment on the Proposed Drainage Strategy Report.

"Not all the blue roofs are a minimum 150mm thickness. The depth of the proposed green roofs are not clear".

All of the proposed blue roof depths on the proposed Museum Street and the Vine Lane Building have been designed to be 150mm.

For West Central Street, there are two areas of blue roofs proposed the Courtyard and Roof 18 (Yard Building). The blue roof depth for proposed Roof 18 is 150mm as shown in the West Central Street blue roof summary and the drawing 2413-MHT-CV-DR-WCS-00101-P01.

The proposed blue roof for the courtyard area of the development has been designed as 100mm in depth. This is because when designing the blue roofs for the development, Meinhardt have been liaising with the blue roof designer Radmat who have completed their own blue roof design calculation for each of the proposed blue roofs on West Central Street site. Please refer to Appendix C for the Radmat proposed blue roof calculations.

The blue roof calculation demonstrates that for the proposed catchment area draining onto the courtyard blue roof, the optimum blue roof design depth to ensure maximum efficiency within the blue roof crate system is 100mm in depth. Therefore, we have decided to proceed with a 100mm deep blue roof crate design for this area of the development. The 100mm deep blue roof fits within the proposed architectural build-up for the courtyard and allows for a flush entrance into each of the proposed buildings from this level.

The green roof build-up is to be specified by the Architect, which will be confirmed at the next stage of the design. For the planning submission, we have assumed an 80mm deep green roof build-up.

Please can the green roof design and specification be included within the planning conditions.

#### 2.1.5 LLFA Comment 5 – Greenfield Runoff Rates and Flow Controls

The LLFA have stated the following comment on the Proposed Drainage Strategy Report.

"Points relating to run-off rates and flow control have not been sufficiently addressed, greenfield rates have not been provided and a portion of the site will drain unrestricted. Greenfield runoff rates have not been provided for the 1 in 1 year, 1 in 30 year and 1 in 100 year return periods. Completion of GLA SuDS proforma required."

Both the Museum Street and the West Central Street development are brownfield sites. Meinhardt have calculated the existing brownfield surface water discharge rates for each site recording the 1 in 1, 1 in 30 and 1 in 100 year brownfield surface water discharge rates. This information has been stated in the below ground drainage strategy report issue for Planning.



The proposed greenfield runoff rates for the West Central Street and the Museum Street sites have been calculated and can be found in Appendix D of this design note.

1 Museum Street Greenfield Runoff Rates		
Storm Event	Discharge Rate (I/s)	
1 in 1 year	0.43	
QBAR	0.51	
1 in 30 Year	1.62	
1 in 100 Year	1.90	

#### Table 1: Museum Street Greenfield Runoff Rates

#### Table 2: West Central Street Greenfield Runoff Rates

West Central Street Greenfield Runoff Rates		
Storm Event	Discharge Rate (I/s)	
1 in 1 year	0.13	
QBAR	0.16	
1 in 30 Year	0.36	
1 in 100 Year	0.50	

The London Borough of Camden SuDS proforma has been filled out for both the West Central Street and Museum Street sites and can be found in Appendix D.

#### 2.1.6 LLFA Comment 6 – Attenaution Volumes

The LLFA have stated the following comment on the Proposed Drainage Strategy Report.

"The applicant has not provided the required attenuation volume for the site or the attenuation volume of all of the drainage features. The calculations do not take the whole site area into account."

The proposed attenuation volumes for Museum Street can be found in section 2.3.4 of the drainage strategy report. These volumes have been summaries in the table below:

Proposed Museum Street Attenuation Features				
Location	Attenuation Feature	Volume (m <sup>3</sup> )		
Vine Lane 2 <sup>nd</sup> Floor North Terrace	Blue Roof	9.3		
Vine Lane 2 <sup>nd</sup> Floor South Terrace	Blue Roof	5.3		
Vine Lane 4 <sup>th</sup> Floor Terrace	Blue Roof	16.5		
Vine Lane Roof	Blue Roof	15.4		
8 <sup>th</sup> Floor Terrace	Blue Roof	17.8		
11 <sup>th</sup> Floor Terrace	Blue Roof	31.5		
Museum Street Basement	Attenuation Tank	134		
Total Volume		229.8		

#### **Table 3: Museum Street Attenuation Features**

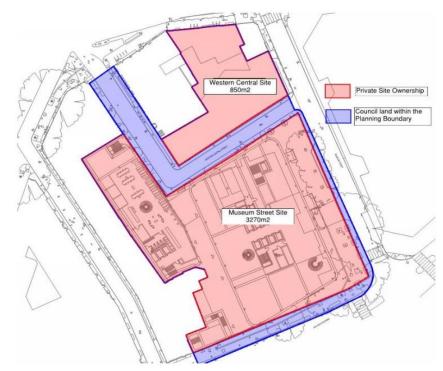
The whole of the private site catchment area has been included within the proposed drainage calculation, except for the area of the private site boundary that has been agreed by Thames Water and the LBC to be allowed to continue to drain unrestricted into the highway gullies connecting to the Thames Water combined sewer in Museum Street.

## MEINHARDT

Proposed West Central Street Attenuation Features				
Location	Attenuation Feature	Volume (m <sup>3</sup> )		
Vine Lane 2 <sup>nd</sup> Floor North Terrace	Blue Roof	9.5		
Vine Lane 2 <sup>nd</sup> Floor South Terrace	Blue Roof	9.3		
West Central Street Basement	Attenuation Tank	20		
	38.8			

#### Table 4: West Central Street Attenuation Features

The whole of the private site catchment area has been included in the design calculation for the West Central Street site. This can be seen by referring to the drainage calculations area summary sheet in Appendix E.



#### Figure 2: Private and Council owned area within the Planning Application Boundary

#### 2.1.7 LLFA Comment 7 – DEFRA Technical Standards

The LLFA have stated the following comment on the Proposed Drainage Strategy Report.

"The application does not comply with Defra Non-Statutory Technical Standards S7, 8, 9. Information has not been provided to indicate how exceedance flows will be managed."

The Defra Non-Statutory Technical Standard state the following:

"S7 - The drainage system must be designed so that, unless an area is designated to hold and/or convey water as part of the design, flooding does not occur on any part of the site for a 1 in 30 year rainfall event".

"S8 - The drainage system must be designed so that, unless an area is designated to hold and/or convey water as part of the design, flooding does not occur during a 1 in 100 year rainfall event in any part of: a building (including a basement); or in any utility plant susceptible to water (e.g. pumping station or electricity substation) within the development".

"S9 - The design of the site must ensure that, so far as is reasonably practicable, flows resulting from rainfall in excess of a 1 in 100 year rainfall event are managed in exceedance routes that minimise the risks to people and property".

## MEIN-ARDT

The proposed Museum Street and West Central Street sites have been designed to be able to accommodate a 1 in 30 year storm event and 1 in 100 year Storm Event + 40% CC without flooding.

For the design calculations providing this, please refer to Appendix I and J of the proposed drainage strategy report or refer to Appendix E of this Design Note.

The proposed Museum Street attenuation tank has been designed with a 300mm freeboard at the top of the attenuation tank and will be fitted with an alarm system in the pump chamber and the attenuation tank to ensure that should a pump failure or an exceedance storm event occur, the building management team is alerted of this issue and can provide the required response. The 300mm freeboard at the top of the basement attenuation tank accounts for circa 25m<sup>3</sup> of additional attenuation for excess flows that could occur if a storm event greater than a 1 in 100 year +40% CC was to occur. If for a certain reason, the attenuation tank and the tank freeboard were full of surface water, any excess surface water would be able to drain away into the basement plant room foul water gullies which are connected to a pump draining into the Thames Water combined sewer.

The proposed West Central Street attenuation tank has been designed with a 60mm freeboard at the top of the attenuation tank. This freeboard will be fitted with a high-level alarm system to alert the building management team of an exceedance event. A high-level alarm will also be installed within the proposed pump chamber to alter building users of a failure of the basement pump. The 60mm freeboard within the attenuation tank will provide 1.2m<sup>3</sup> of additional surface water attenuation to account for excess flows that could occur. Should the exceedance flows be far larger than the attenuation tank has capacity for then surface water that floods out of the attenuation tank would be able to drain away via the plant room gillies installed within the basement of the structure into the Thames Water combined sewer surrounding the site.

#### 2.1.8 LLFA Comment 8 – Maintenance Strategy

The LLFA have stated the following comment on the Proposed Drainage Strategy Report.

"The maintenance strategy does not include each drainage component or state the maintenance owner. The pumps have not been added to the maintenance strategy and the building management company has not been named."

The maintenance owner or company responsible for managing the maintenance of the building has not yet been confirmed.

The proposed SuDS for the Museum Street and the West Central Street development included green roofs, blue roofs and below ground attenuation tanks. A maintenance strategy has been provided for each of these design elements within the proposed drainage strategy report in section 4.0.

As requested by the LLFA, a maintenance strategy has been provided for a pump chamber.

#### Pump Chamber Maintenance Strategy

For the Museum Street site, both foul and surface water will be pumped out of the lower basement level. As part of the pump maintenance strategy, both pump chambers will require regular inspections and occasional maintenance.

A guideline maintenance regime for a pump chamber is outlined in the Table below.



Maintenance Schedule	Required Action	Recommended Frequency
Regular maintenance	Removal of any debris or sediment with the potential to obstruct the pump.	Monthly for 3 months, then six monthly or as required
	Access the pump motor and review the pump bearing condition.	
	Check motor cables for wear and water ingress.	
	Check the condition of the wet well/ pump chambers (where appropriate) for any damage	
Remedial actions	Repair/replacement of pump control device	As required
	Where a blockage has resulted in a flooded manhole, drain down and unblock as required	As required
Monitoring	Inspect/check flow control is in good condition and operating as designed, hose down as required.	Monthly for 3 months, then six monthly
	Check and test all safety/ alarm systems.	
	Visually inspect the pumps in operation to ensure correct operation and that no damage has occurred.	

#### Table 5: Operation and maintenance requirements for pump chambers

#### 2.1.9 LLFA Comment 9 – Thames Water Consent

The LLFA have stated the following comment on the Proposed Drainage Strategy Report.

"It is not clear if the Thames Water consent applies to each site or the entire development. Correspondence from Thames Water in response to the 2022 developer enquiry has not been submitted".

Within Appendix G of the drainage strategy report, the Thames Water correspondence from 6<sup>th</sup> July 2022 confirming they have the capacity for the proposed foul and surface water discharge rates is for the West Central Street site.

On the 23<sup>rd</sup> of February 2023, Thames Water responded to the proposed Museum Street predevelopment enquiry confirming the capacity for the proposed foul water flow rates. Within the predevelopment enquiry, Thames Water have also confirmed capacity for the proposed surface water drainage strategy to discharge the proposed development at a rate of 5l/s, whilst maintaining the existing site condition where 36l/s from the existing site area will continue to drainage into the highway gullies connected to the Thames Water sewer in Museum Street.

Please refer to Appendix F for the Thames Water correspondence confirming the capacity within their sewer network for the West Central Street and Museum Street new developments.



# Appendix A – LLFA Planning Comments

#### **Craig Marchant**

From: Sent: To: Subject: Daniel Staddon 03 February 2023 10:06 Craig Marchant; Gurdeep Bansal FW: 2021/2954/P - Selkirk House, 166 High Holborn, 1 Museum Street, 10-12 Museum Street, 35-41 New Oxford Street and 16A-18 West Central Street - LLFA

FYI below

**Kind Regards** 

Daniel Staddon MEng (Hons) CEng MIStructE Associate Director



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From: Andy Rudlin <arudlin@iceniprojects.com> Sent: 03 February 2023 10:01

To: Daniel Staddon <Daniel.Staddon@meinhardt.co.uk>; Rob Menendez <Rob.Menendez@meinhardt.co.uk>
Cc: Anna Snow <ASnow@iceniprojects.com>; Helen Allan <hallan@iceniprojects.com>; Charles Thomas-Davies
<C.Thomas-Davies@Gardiner.com>; Eleanor Wright <ewright@simten.co.uk>; Edward Beaver
<ebeaver@simten.co.uk>; Isabel Moreira <imoreira@dsdha.co.uk>; David Hills <dhills@dsdha.co.uk>
Subject: FW: 2021/2954/P - Selkirk House, 166 High Holborn, 1 Museum Street, 10-12 Museum Street, 35-41 New Oxford Street and 16A-18 West Central Street - LLFA

Hi Daniel

Please see comments below regarding Flood Risk for 1 Museum Street.

Camden have recommended further that information is submitted / improvements to the scheme are made in order to recommend approval.

Please can you review and let us know your thoughts?

Cc'ing in DSDHA as well for any input on this.

Kind regards

Andy

Andy Rudlin Planner, Planning

telephone: 020 8049 6972 mobile: 07823457276 email: arudlin@iceniprojects.com



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From: Katherine Frost <<u>Katherine.Frost@camden.gov.uk</u>>

Sent: 02 February 2023 15:32

To: David Fowler < David.Fowler@camden.gov.uk >

**Subject:** 2021/2954/P - Selkirk House, 166 High Holborn, 1 Museum Street, 10-12 Museum Street, 35-41 New Oxford Street and 16A-18 West Central Street - LLFA

David

Thank you for reconsulting us on 2021/2954/P - Selkirk House, 166 High Holborn, 1 Museum Street, 10-12 Museum Street, 35-41 New Oxford Street and 16A-18 West Central Street. We have considered the revised 'Below Ground Drainage Strategy by Meinhart Sept 2022.

Please see comments below. **Further information is required**. It is important that details of the proposed attenuation capacity, greenfield run off rate information, exceedance flow management information and correspondence from Thames Water are all satisfactorily provided prior to approval.

Selkirk House, 166 High Holborn and 1 Museum Street, 10-12 Museum Street, 35-41 New Oxford Street and 16A-18 West Central Street, London, WC1A 1JR Below Ground Drainage Strategy





#### Figure 5: West Central Street Roof Study

- 1. 6th Floor Roof Proposed Green Roof
- 2. 5th Floor External Plant Area Proposed Green Roof
- 3. 6th Floor Roof (Yard Building) Proposed 150mm blue roof
- 4. 5th Floor Roof Proposed Green Roof
- 5. 1st Floor External Courtyard Proposed 100mm blue roof
- 6. Private residential terrace
- Existing Buildings were deemed unsuitable for additional loading from SuDS by Meinhar Structural Engineers.
- 8. Light well not suitable for SuDS

#### a) Review Summary

- <u>Type of development:</u> Major
- <u>Types of conveyance / attenuation features</u>: Attenuation tanks, green and blue roofs
- <u>Runoff rate restriction (I/s)</u>: Original application 46I/s (36I/s unrestricted from Museum St site and 5I/s for the West Central development and 5I/s for the Museum Street Development).
- Runoff rate restriction per hectare (I/s/ha): N/A
- <u>Runoff attenuation volume (m3)</u>: Originally stated to be at least 169m<sup>3</sup>. The blue roof attenuation volume has been amended. Calculations have been provided although these do not take the whole site into account.

- <u>Maintenance plan:</u> Incomplete
- <u>Any other previously identified outstanding matters:</u> The applicant has provided evidence that the London Borough of Camden have previously approved the unattenuated portion of Museum street.

Previous comments:

- Both the developments in Museum Street and West Central Street propose the use of a pump to transfer water from the basement attenuation tanks to the sites internal drainage network. – FAIL
- 2. It is not clear how many off-site discharge points are proposed and where these are located. MORE INFORMATION REQUIRED
- 3. Incomplete information has been submitted for the blue roof for West Central Street. MORE INFORMATION REQUIRED
- 4. Not all the blue roofs are a minimum 150mm thickness. ---NOT APPLICABLE
- 5. Points relating to run-off rates and flow control have not been sufficiently addressed, greenfield rates have not been provided and a portion of the site will drain unrestricted. MORE INFORMATION REQUIRED
- 6. The applicant has not provided the required attenuation volume for the site or the attenuation volume of all of the drainage features. FAIL
- 7. The application does not comply with Defra Non-Statutory Technical Standards S7, 8, 9. FAIL
- 8. The maintenance strategy does not include each drainage component or state the maintenance owner. FAIL
- 9. It is not clear if the Thames Water consent applies to each site or the entire development. FAIL

#### Recommendation and Requests

We require more information and improved proposals before recommending approval of the application for the following reasons:

- 1. The applicant has not provided justification for the use of pumped drainage.
- 2. The applicant has not confirmed the number and locations of off-site discharge points into the Thames Water combined sewer (this differs between drawings).
- 3. The blue roof information in drainage drawing 2413-MHT-CV-DR-WCS-00101 P01 (Below Ground Drainage Strategy (September 2022), p.41) does not match the information provided in the surface water drainage strategy (Below Ground Drainage Strategy (September 2022), p.21).
- 4. The depth of the proposed green roofs are not clear.
- 5. Greenfield runoff rates have not been provided for the 1 in 1 year, 1 in 30 year and 1 in 100 year return periods. Completion of <u>GLA SuDS proforma</u> required.
- 6. The calculations do not take the whole site area into account.
- 7. Information has not been provided to indicate how exceedance flows will be managed.
- 8. The pumps have not been added to the maintenance strategy and the building management company has not been named.
- 9. Correspondence from Thames Water in response to the 2022 developer enquiry has not been submitted.

To address the above, please can the applicant submit information which:

- 1. Justifies the use of pumps.
- 2. Confirms the number and locations of off-site discharge points into the Thames Water combined sewer.
- 3. Clarifies the correct dimensions, volume and discharge rates of the blue roofs and align the drainage strategy with the drainage drawing.

- 4. Demonstrates that all of the green roofs are a minimum substrate thickness of 150 mm.
- 5. Greenfield runoff rates should be provided for the 1 in 1 year, 1 in 30 year and 1 in 100 year return periods. These should be based upon the whole site area which includes areas of soft landscaping. Calculations to support the rates should be provided.
- 6. Provides calculations demonstrating that there is no flooding on site in a 1 in 30 year event and no flooding to buildings during a 1 in 100 year + climate change event, taking the whole site area into account with the exception of the portion of the site that will flow unrestricted to the Thames Water sewer.
- 7. Indicates how exceedance flows will be managed in the case of exceedance events, or blockage/ failure of the system.
- 8. If adequate justification is provided for their inclusion, the pumps must be added to the maintenance strategy. The building management company should be specified.
- 9. The response from Thames Water to the 2022 developer enquiry should be submitted confirming if they accept the proposed discharge rate.

Kind regards

Katherine

Katherine Frost Senior Sustainability Officer (Planning) Supporting Communities London Borough of Camden

Telephone:020 7974 5922Web:camden.gov.uk

5 Pancras Square London N1C 4AG

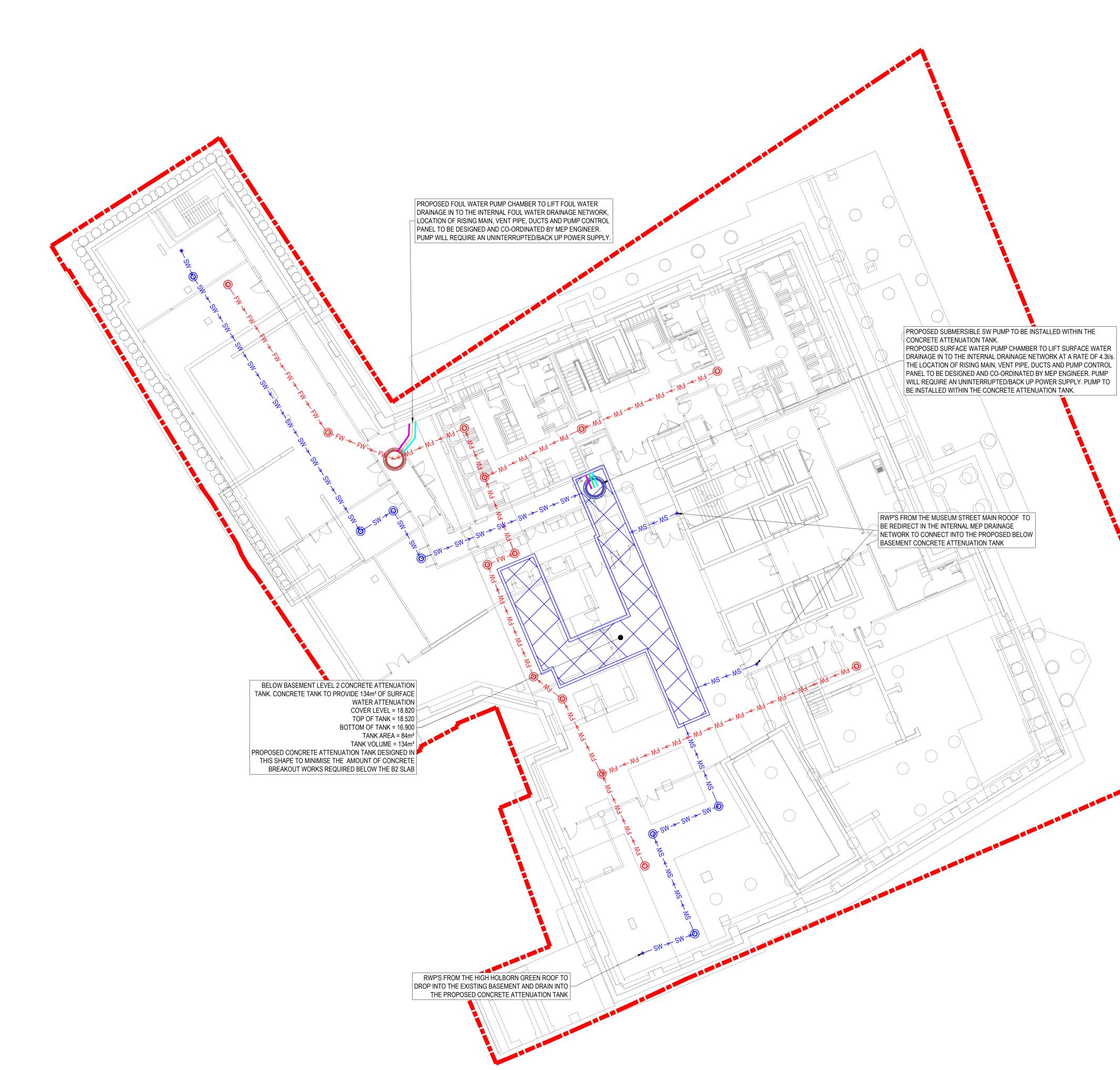
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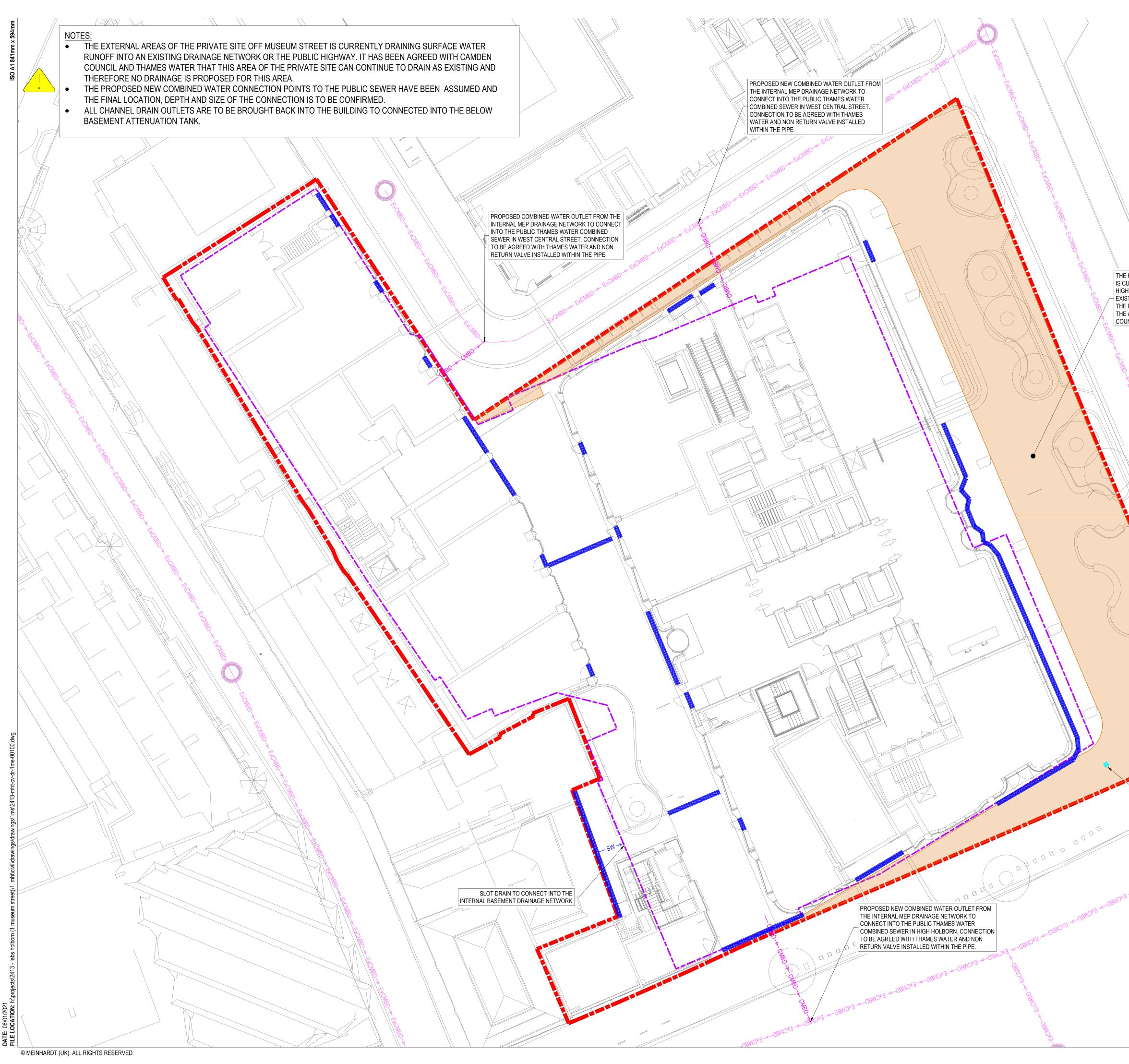


# Appendix B – Proposed Below Ground Drainage Drawings

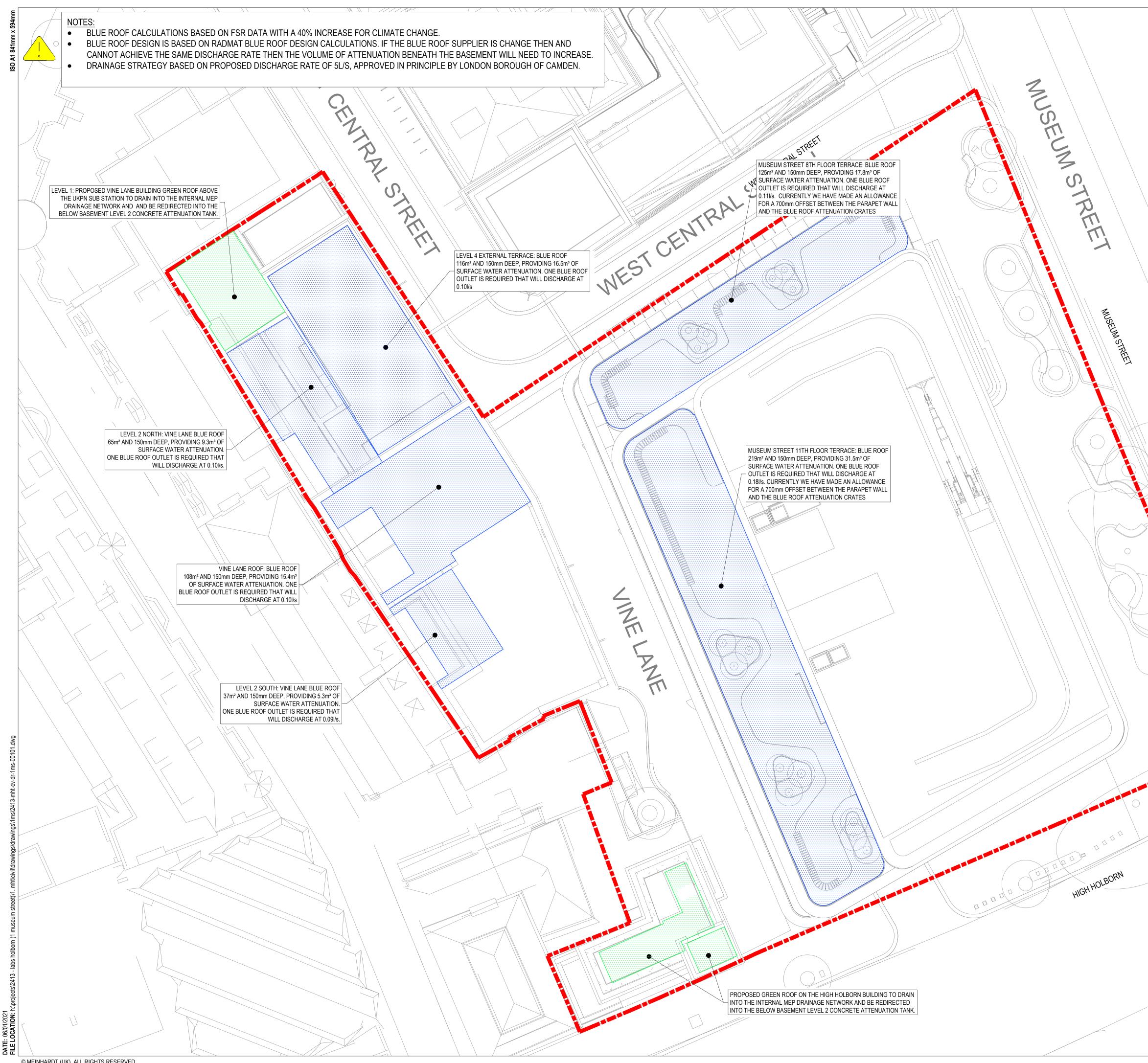


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		<ul> <li>PROPOSED FOUL WATE</li> <li>PROPOSED SURFACE W</li> </ul>		
_		PROPOSED FOUL WATE	R RISIN	
_	FWRM → FWRM →	PROPOSED SURFACE W RISING MAIN	/ATER	
	$\bigcirc$	PROPOSED FOUL WATE	R PUMF	)
	$\overline{\mathbf{O}}$	PROPOSED FOUL WATE	R PPIC	
	$\bigcirc$	PROPOSED SURFACE W	/ATER P	UM
	$\bigcirc$	PROPOSED SURFACE W	/ATER P	PIC
	•	PROPOSED RAIN WATE	R DRAIN	IAG
		POINT PROPOSED BELOW GRO	רואווכ	
		DRAINAGE ATTENUATIO		
	CDM RESIDUAL C	IVIL / STRUCTURAL DESIG	IN RIGRO	;
	CDM RESIDUAL C	IVIL / STRUCTURAL DESIG		;
	CDM RESIDUAL C	IVIL / STRUCTURAL DESIG	IN KIOKO	5
	CDM RESIDUAL C	IVIL / STRUCTURAL DESIG	N RISKS	5
	CDM RESIDUAL C	IVIL / STRUCTURAL DESIG	N RISKS	5
				; 
				<b>;</b>
	10 Alder	Sigate Street, London EC1A 4JU sphone: +44 (0)20 7831 7969		
PROJ	10 Alder Tele	Sgate Street, London EC1A 4JU		
LA	10 Alder Tele ABS HOLBO	sgate Street, London EC1A 4JU sphone: +44 (0)20 7831 7969 www.meinhardt.co.uk		
LA (1	10 Alder Tele ABS HOLBO MUSEUM	sgate Street, London EC1A 4JU sphone: +44 (0)20 7831 7969 www.meinhardt.co.uk		
LA (1	10 Alder Tele ABS HOLBO	sgate Street, London EC1A 4JU sphone: +44 (0)20 7831 7969 www.meinhardt.co.uk		
LA (1 W	ID Alder Tele ABS HOLBO MUSEUM C1A 1JP	sgate Street, London EC1A 4JU sphone: +44 (0)20 7831 7969 www.meinhardt.co.uk		
LA (1 W	II Alder Tele ABS HOLBO MUSEUM C1A 1JP	sgate Street, London EC1A 4JU sphone: +44 (0)20 7831 7969 www.meinhardt.co.uk		
LA (1 W CLIEN LAI	ID Alder Tele ABS HOLBO MUSEUM C1A 1JP	sgate Street, London EC1A 4JU phone: +44 (0)20 7831 7969 www.meinhardt.co.uk		
LA (1 W CLIEM LAI TITLE MU PR	ID Alder Tele ABS HOLBO MUSEUM C1A 1JP	sgate Street, London EC1A 4JU phone: +44 (0)20 7831 7969 www.meinhardt.co.uk DRN STREET)		
LA (1 W CLIEM LAI TITLE MU PR	LICE TO Alder Tele ABS HOLBO MUSEUM C1A 1JP	sgate Street, London EC1A 4JU phone: +44 (0)20 7831 7969 www.meinhardt.co.uk DRN STREET)		
LA (1 W LAI TITLE MU PR DR	LICE TO Alder Tele ABS HOLBO MUSEUM C1A 1JP	sgate Street, London EC1A 4JU phone: +44 (0)20 7831 7969 www.meinhardt.co.uk DRN STREET)		E @ 2
LA (1 W LAI TITLE MU PR DR	INAGE LAYOU PLINE IN ALLEY IN	sgate Street, London EC1A 4JU sphone: +44 (0)20 7831 7969 www.meinhardt.co.uk DRN STREET) - W BASEMENT -2 JT	SCAL	E @ 50
LA (1 W LAI TITLE MU PR DR DISCI CIV DRAV CN	T T T T T T T T T T T T T T	sgate Street, London EC1A 4JU sphone: +44 (0)20 7831 7969 www.meinhardt.co.uk DRN STREET) W BASEMENT -2 JT	SCALL 1:1	E @ 50

 $\bigcirc$ 



		NOT FOR CONSTRU	BY	DATE
	P01 P02	ISSUED FOR STAGE 2 REPORT UPDATED TO ARCHITECTS COMMENTS	CM CM	20.05.2 25.05.2
		<u>ES:</u> DO NOT SCALE FROM THIS DRAWING. ALL DIMENSIONS ARE IN METRES UNLES:		
	3.	OTHERWISE. THIS DRAWING IS FOR STAGE 3 PURPOSE SHOULD NOT BE USED FOR CONSTRUCTI	ES ONLY AND	)
ED AREA OF THE EXISTING PRIVATE SITE		DRAWINGS ARE TO BE READ IN CONJUNC RELEVANT ARCHITECTS, ENGINEERS AND DRAWINGS AND SPECIFICATIONS		
TLY DRAINING INTO THE PUBLIC THIS AREA IS TO CONTINUE TO DRAIN AS ITO THE PUBLIC HIGHWAY SEWER OR	5.	<ul> <li>DRAWING BASED ON:</li> <li>DSDHA PROPOSED 1MS GROUND FI ARCHITECTURAL LAYOUT REFEREN 205 DSD 1MC 00 DB A 20 100 DECE</li> </ul>	ICE	2
DSED SOFT LANDSCAPING AREA AS PER IMENT WITH CAMDEN BOROUGH		<ul> <li>295-DSD-1MS-00-DR-A-20.100, RECE</li> <li>DSDHA PROPOSED VLB GROUND FL ARCHITECTURAL LAYOUT REFEREN 295-DSD-VLB-00-DR-A-20.100, RECE</li> </ul>	.oor plan Ice	
		<ul> <li>CSL SURVEYS TOPOGRAPHICAL SU REFERENCE PROJECT NO. 20117S, I DATED 14.09.17</li> </ul>	RVEY,	
		<ul> <li>THAMES WATER ASSET RECORDS,</li> <li>SURVATECS CCTV SURVEYS, DATEI</li> </ul>		.17
2				
B	KEY	SITE BOUNDARY		
		BASEMENT EXTENT EXISTING THAMES		1BINED
Froman	_	CMBD CMBD PROPOSED COMBI	NED WATER	SEWEF
E E C M		EXISTING AREA OF DRAINING INTO THE		
T EC		PROPOSED CHANN	EL/SLOT DR	AIN
		EXISTING SURFACE	E WATER GU	LLY
Eran Ber				
		CDM RESIDUAL CIVIL / STRUCTURAL DI	ESIGN RISKS	3
EXISTING GULLY DRAINING PART	3		-	
OF THE PRIVATE SITE TO BE RETAINED AND REUSED PENDING THE RESULTS OF A CCTV SURVEY		10 Aldersgate Street, London EC1A 4JI		
.081053.4~	PROJE	Telephone: +44 (0)20 7831 7969 www.meinhardt.co.uk		
WHE - CANCE	LA	BS HOLBORN MUSEUM STREET)		
DX3 COBINY		C1A 1JP		
/~				
	TITLE	SEUM STREET		
	PR	OPOSED GROUND FLOOR AINAGE LAYOUT		
	DISCIF			E @ A1
		ILS DRAWING N DESIGNED CHECKED	1:1	50 ROVED

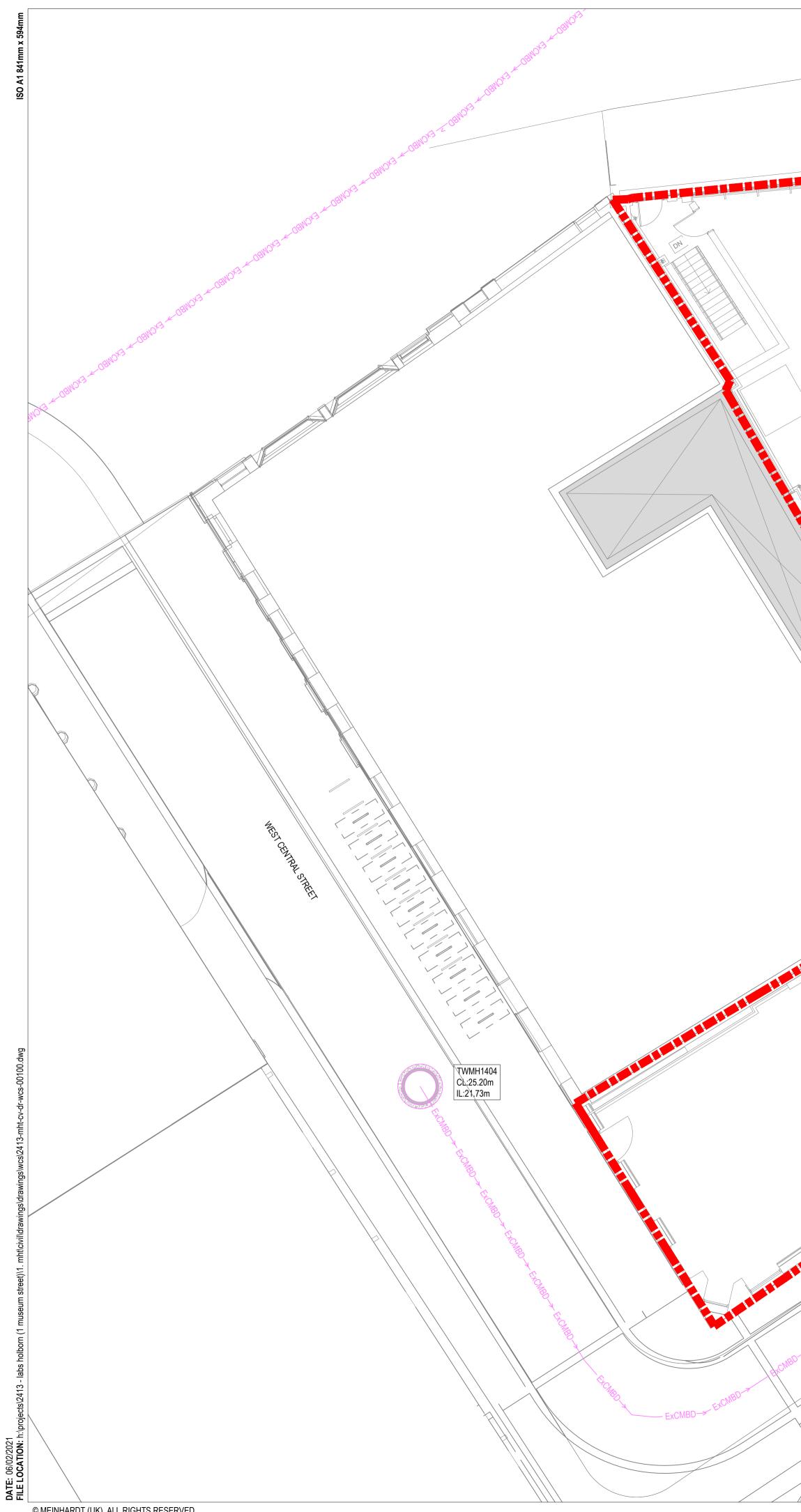


STAGE 2 NOT FOR CONSTRUCTION
REV         DESCRIPTION         BT         DATE           P01         ISSUED FOR THE STAGE 2 REPORT         CM         20.05.2           P02         UPDATED TO ARCHITECTS COMMENTS         CM         25.05.2
<ul> <li>NOTES:</li> <li>1. DO NOT SCALE FROM THIS DRAWING.</li> <li>2. ALL DIMENSIONS ARE IN METRES UNLESS NOTED</li> </ul>
OTHERWISE. 3. THIS DRAWING IS FOR STAGE 2 PURPOSES ONLY AND
<ul> <li>SHOULD NOT BE USED FOR CONSTRUCTION.</li> <li>4. DRAWINGS ARE TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, ENGINEERS AND CONSULTANTS</li> </ul>
<ul> <li>DRAWINGS AND SPECIFICATIONS</li> <li>5. DRAWING BASED ON:</li> <li>DSDHA SITE WIDE PROPOSED ROOF PLAN</li> </ul>
<ul> <li>ARCHITECTURAL LAYOUT REFERENCE</li> <li>295A-DSD-SITE-ZZ-DR-A-20.003, RECEIVED 03.05.2022</li> <li>RADMAT BUILDING PRODUCTS BLUE ROOF</li> </ul>
CALCULATIONS - BR-6843-00 - 1 MUSEUM STREET/ 166 HIGH HOLBORN - ROOF TERRACE
KEY:
SITE BOUNDARY
PROPOSED BLUE ROOF ATTENUATIO
PROPOSED GREEN ROOF
CDM RESIDUAL CIVIL / STRUCTURAL DESIGN RISKS
10 Aldersgate Street, London EC1A 4JU
10 Aldersgate Street, London EC1A 4JU Telephone: +44 (0)20 7831 7969 www.meinhardt.co.uk
PROJECT LABS HOLBORN
(1 MUSEUM STREET) WC1A 1JP
PROPOSED GREEN/ BLUE ROOF LAYOUT
DISCIPLINE SCALE @ A1 CIVILS DRAWING 1:150
DRAWN         DESIGNED         CHECKED         APPROVED           CM         CM         GB         PH
DRAWING №         ISSUE           2413-MHT-CV-DR-1MS-00101         P02



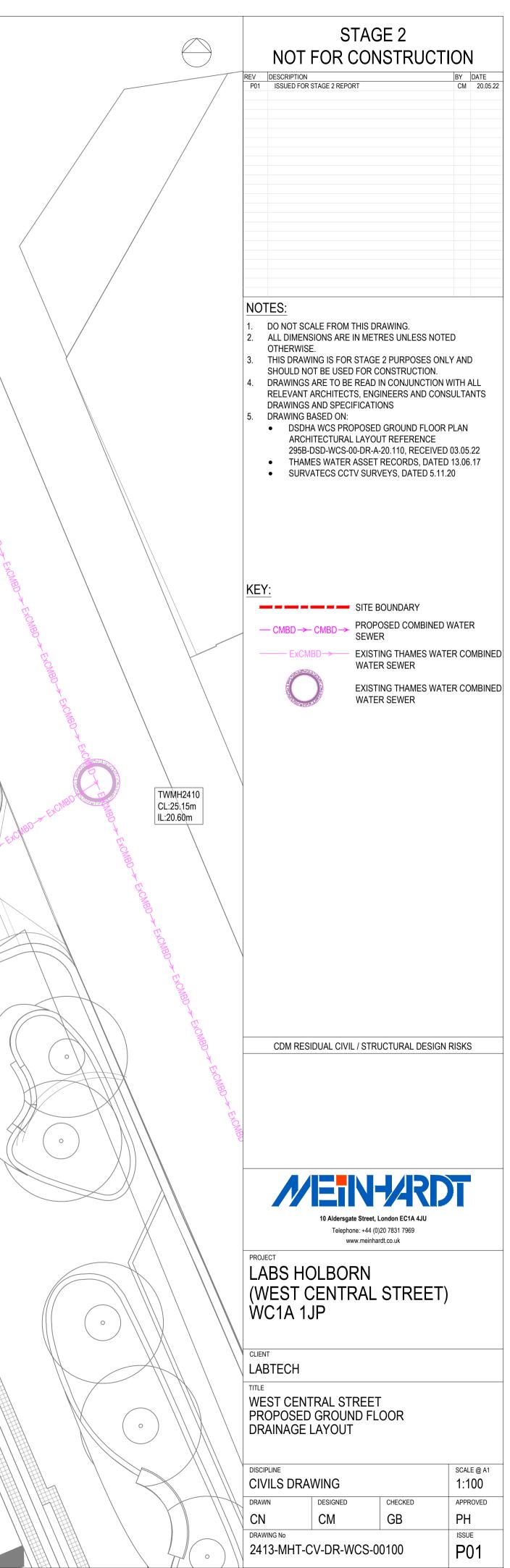
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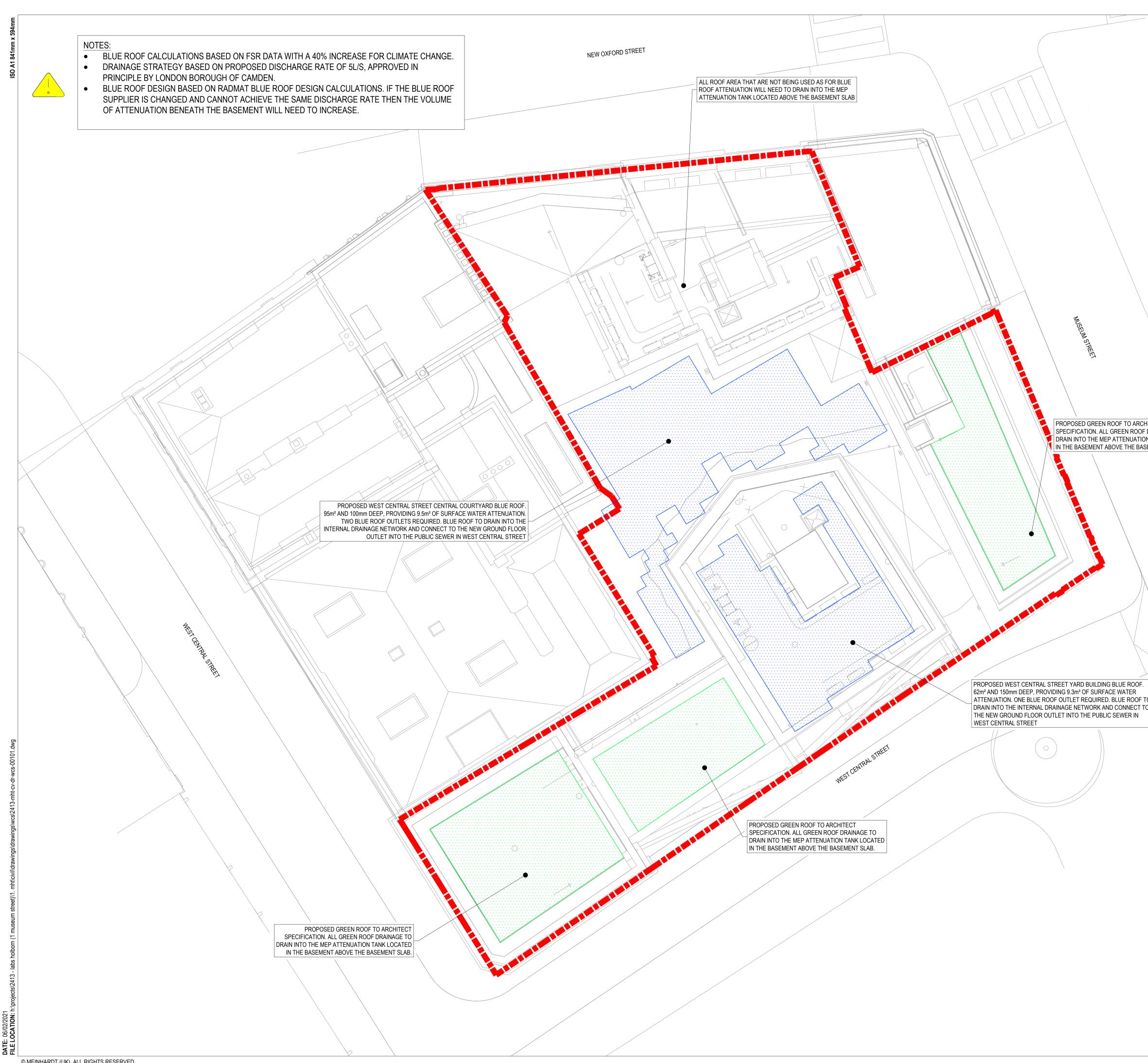
	STAGE 2 NOT FOR CONSTRUCTIO	<b>V</b>
	P01 ISSUED FOR STAGE 2 REPORT CM	
	<ul> <li>NOTES:         <ol> <li>DO NOT SCALE FROM THIS DRAWING.</li> <li>ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.</li> <li>THIS DRAWING IS FOR STAGE 2 PURPOSES ONLY A SHOULD NOT BE USED FOR CONSTRUCTION.</li> <li>DRAWINGS ARE TO BE READ IN CONJUNCTION WIT RELEVANT ARCHITECTS, ENGINEERS AND CONSULTANTS DRAWINGS AND SPECIFICATIONS</li> <li>DRAWING BASED ON:                 <ul> <li>DSDHA WEST CENTRAL STREET PROPOSED BASEMENT FLOOR PLAN ARCHITECTURAL LA REFERENCE 295B-DSD-WCS-B1-DR-A-20.109, RECEIVED 03.05.22</li> <li>SURVATECS CCTV SURVEYS, DATED 5.11.20</li></ul></li></ol></li></ul>	H ALL YOUT
	KEY: $\blacksquare$ ExCMBD $\blacksquare$ EXCMBD $\blacksquare$ EXCMBD $\blacksquare$ EXISTING THAMES WATER COWATER SEWER $\blacksquare$ EXFW $\blacksquare$ EXFW $\blacksquare$ EXFW $\blacksquare$ EXISTING FOUL WATER SEWER $\blacksquare$ FW $\blacksquare$ FW $\blacksquare$ PROPOSED FOUL WATER SEVEN $\blacksquare$ FWRM $\blacksquare$ PROPOSED FOUL WATER RISH $\blacksquare$ X $\blacksquare$ X $\blacksquare$ DUCT FOR PUMP CHAMBERVENT PIPE FOR PUMP CHAME	R /ER NG MAIN WER
-EXFW - F	EXISTING FOUL WATER MANH	
E Contraction	WATER MANHOLE PROPOSED FOUL WATER MA	
TWMH2410 CL:25.15m IL:20.60m	PROPOSED FOUL WATER PPI	
	<ul> <li>PROPOSED FOUL WATER GU</li> <li>PROPOSED FOUL WATER DF</li> <li>POINT</li> </ul>	AINAGE
ERCAMED	PROPOSED ABOVE BASEME ATTENUATION TANK	NT MEP
Exoma	CDM RESIDUAL CIVIL / STRUCTURAL DESIGN RISK	(S
Excomen - Exco		
BO	10 Aldersgate Street, London EC1A 4JU Telephone: +44 (0)20 7831 7969 www.meinhardt.co.uk	•
	LABS HOLBORN (WEST CENTRAL STREET) WC1A 1JP	
	CLIENT LABTECH	
	WEST CENTRAL STREET PROPOSED BELOW BASEMENT DRAINAGE LAYOUT	
	CIVILS DRAWING 1:	ALE @ A1 <b>100</b> PROVED
	DRAWN DESIGNED CHECKED API	



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• PROPOSED COMBINED WATER OUTLET FROM THE INTERNAL MEP DRAINAGE NETWORK TO CONNECT INTO THAMES WATER COMBINED WATER SEWER. CONNECTION TO BE AGREED WITH THAMES WATER. OUTFALL PIPE TO CONNECT INTO THE INTERNAL MEP DRAINAGE AND PASS THROUGH THE EXISTING BASEMENT WALL AT HIGH LEVEL IN B1. OUTFALL PIPE TO BE FITTED WITH A INTERNAL NON RETURN VALVE





	STAGE 2		
	NOT FOR CONSTRUCTION		
	P01 ISSUED FOR STAGE 2 REPORT CM 20.05		
	NOTES: 1. DO NOT SCALE FROM THIS DRAWING.		
	2. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.		
	<ol> <li>THIS DRAWING IS FOR STAGE 2 PURPOSES ONLY AND SHOULD NOT BE USED FOR CONSTRUCTION.</li> <li>DRAWINGS ARE TO BE READ IN CONJUNCTION WITH ALL</li> </ol>		
	RELEVANT ARCHITECTS, ENGINEERS AND CONSULTANTS DRAWINGS AND SPECIFICATIONS		
	<ul> <li>5. DRAWING BASED ON:</li> <li>DSDHA WCS PROPOSED ROOF PLAN ARCHITECTURA</li> </ul>		
	<ul> <li>LAYOUT REFERENCE 295B-DSD-WCS-06-DR-A-20.116, RECEIVED 03.05.22</li> <li>DSDHA WCS PROPOSED FIRST FLOOR PLAN</li> </ul>		
	ARCHITECTURAL LAYOUT REFERENCE     295B-DSD-WCS-01-DR-A-20.111, RECEIVED 03.05.22		
	RADMAT BUILDING PRODUCTS BLUE ROOF     CALCULATIONS		
	KEY:		
	SITE BOUNDARY		
TECT DRAINAGE TO	PROPOSED BLUE ROOF ATTENUATIO		
TANK LOCATED EMENT SLAB.	PROPOSED GREEN ROOF		
	CDM RESIDUAL CIVIL / STRUCTURAL DESIGN RISKS		
//			
	<b>10 Aldersgate Street, London EC1A 4JU</b> Telephone: +44 (0)20 7831 7969		
	www.meinhardt.co.uk PROJECT		
	(WEST CENTRAL STREET) WC1A 1JP		
	LABTECH TITLE		
	WEST CENTRAL STREET PROPOSED GREEN/ BLUE ROOF LAYOUT		
	DISCIPLINE SCALE @ A1 CIVILS DRAWING 1:100		
	DRAWN DESIGNED CHECKED APPROVED		
	CM     CM     GB     PH       DRAWING No     ISSUE		



# Appendix C – Radmat Blue Roof Calculations



Client:					
Project:	1 Mu	useum Street/Vi	ne Lane		
Reference	e: BR-	6843-01	Designe	er: N.Todd	Date: 16/03/2022
Location:	Lond	on			
Roof Loca	ation: Vine	Lane - 2nd Floo	or - Roof 1		
Roof Deta	ails:			Storage Details:	
BlueRoof Additional A Effective Ar		37 m² 13 m² 50 m²	x 100 % x 100 %	Length Width Depth Porosity	37 m 1 m 150 mm 95 %
Rainfall D	etails - FSF	R Method:		Outflow Details:	
Return Peri Climate Cha r value M5-60 Summer Stu	ange Factor	100 years 40 % 0.44 20.7 mm		Attenuation Control Control Diameter Discharge rate Outlet	Orifice Plate 12mm 0.09 l/s 1 No
Duration	Inter mm	mm/h	Required storage(m <sup>3</sup> )		
5 min 10 min 15 min	21.0 30.9 37.1	251.8 185.5 148.3	1.0 1.5 1.8	Result:	
30 min 45 min 60 min	47.9 54.2 58.7	95.7 72.3 58.7	2.3 2.6 2.7	Outcome Critical Storm Duration Hmax	Pass 3.42 hrs 90 mm
2 hours 6 hours 24 hours	69.7 86.8 112.1	34.8 14.5 4.7	3.1 3.1 2.5	Required Volume Time to half empty Roof Loading	3.2 m <sup>3</sup> 4.7 hrs 86.49 Kg/m <sup>2</sup>

Final determination of the suitability of any system is the sole responsibility of the user.



Client:					
Project:	1 M	useum Street/Vi	ne Lane		
Reference	e: BR-	6843-01	Designe	er: N.Todd	Date: 16/03/2022
Location:	Lond	lon			
Roof Loca	ition: Vine	Lane - 2nd Floo	or - Roof 2		
Roof Deta	ils:			Storage Details:	
BlueRoof Additional A Effective Are		65 m² 20 m² 85 m²	x 100 % x 100 %	Length Width Depth Porosity	65 m 1 m 150 mm 95 %
Rainfall De	etails - FSF	R Method:		Outflow Details:	
Return Peric		100 years 40 %		Attenuation Control Control Diameter	Orifice Plate 12 mm
r value M5-60	9	0.44 20.7 mm		Discharge rate Outlet	0.1 l/s 1 No
Summer Sto	orm Profile	2011 1111			
Duration	Inte mm	nsity mm/h	Required storage(m <sup>3</sup> )		
5 min 10 min 15 min	21.0 30.9 37.1	251.8 185.5 148.3	1.8 2.6 3.1	Result:	
30 min 45 min	47.9 54.2	95.7 72.3	4.0 4.5	Outcome Critical Storm Duration	Pass 6.08 hrs
60 min 2 hours 6 hours 24 hours	58.7 69.7 86.8 112.1	58.7 34.8 14.5 4.7	4.8 5.5 6.0 5.5	Hmax Required Volume Time to half empty Roof Loading	98 mm 6 m³ 8.6 hrs 92.31 Kg/m²

Final determination of the suitability of any system is the sole responsibility of the user.



Client:					
Project:	1 Mu	useum Street/Vir	ne Lane		
Reference	e: BR-6	6843-01	Designe	er: N.Todd	Date: 16/03/2022
Location:	Lond	on			
Roof Loca	ation: Vine	Lane - 4th Floor			
Roof Deta	nils:			Storage Details:	
BlueRoof Additional A Effective Are		116 m² 30 m² 146 m²	x 100 % x 100 %	Length Width Depth Porosity	116 m 1 m 150 mm 95 %
Rainfall D	etails - FSF	R Method:		Outflow Details:	
Return Perio Climate Cha r value M5-60 Summer Sto	ange Factor	100 years 40 % 0.44 20.7 mm		Attenuation Control Control Diameter Discharge rate Outlet	Orifice Plate 12 mm 0.1 l/s 1 No
Duration	Inter mm	nsity mm/h	Required storage(m <sup>3</sup> )		
5 min 10 min 15 min	21.0 30.9 37.1	251.8 185.5 148.3	3.1 4.5 5.4	Result:	
30 min 45 min 60 min	47.9 54.2 58.7	95.7 72.3 58.7	6.9 7.8 8.4	Outcome Critical Storm Duration Hmax	<b>Pass</b> 10.82 hrs 106 mm
2 hours 6 hours 24 hours	69.7 86.8 112.1	34.8 14.5 4.7	9.8 11.3 11.2	Required Volume Time to half empty Roof Loading	11.6 m³ 16 hrs 100 Kg/m²

Final determination of the suitability of any system is the sole responsibility of the user.



Client:					
Project:	1 Mu	useum Street/Vii	ne Lane		
Reference	e: BR-6	6843-01	Designe	er: N.Todd	Date: 16/03/2022
Location:	Lond	on			
Roof Loca	ation: Vine	Lane - Roof			
Roof Deta	ails:			Storage Details:	
BlueRoof Additional A Effective Ar		108 m² 29 m² 137 m²	x 100 % x 100 %	Length Width Depth Porosity	108 m 1 m 150 mm 95 %
Rainfall D	etails - FSR	R Method:		Outflow Details:	
r value M5-60	ange Factor	100 years 40 % 0.44 20.7 mm		Attenuation Control Control Diameter Discharge rate Outlet	Orifice Plate 12 mm 0.1 l/s 1 No
Summer Sto	Inter mm	mm/h	Required storage(m <sup>3</sup> )		
5 min 10 min 15 min	21.0 30.9 37.1	251.8 185.5 148.3	2.9 4.2 5.0	Result:	
30 min 45 min 60 min	47.9 54.2 58.7	95.7 72.3 58.7	6.5 7.3 7.9	Outcome Critical Storm Duration Hmax	<b>Pass</b> 10.1 hrs 105 mm
2 hours 6 hours 24 hours	69.7 86.8 112.1	34.8 14.5 4.7	9.1 10.5 10.4	Required Volume Time to half empty Roof Loading	10.8 m³ 14.9 hrs 100 Kg/m²

References should be made to any relevant codes of practice.

Final determination of the suitability of any system is the sole responsibility of the user.



Client:					
Project:	1 Mu	useum Street/Vii	ne Lane		
Reference	: BR-6	6843-01	Designe	er: N.Todd	Date: 16/03/2022
Location:	Lond	on			
Roof Locat	tion: Muse	eum Street - 8th	Floor		
Roof Detai	ils:			Storage Details:	
BlueRoof		125 m²	x 100 %	Length	125 m
Additional Ar	.00	71 m <sup>2</sup>	x 100 %	Width	125 m 1 m
Effective Are		196 m <sup>2</sup>	X 100 %	Depth	150 mm
	a	190 11-		Porosity	95 %
					55 /6
Rainfall De	etails - FSF	R Method:		Outflow Details:	
Return Perio	d	100 years		Attenuation Control	Orifice Plate
Climate Cha	nge Factor	40 %		Control Diameter	12 mm
r value		0.44		Discharge rate	0.11 l/s
M5-60		20.7 mm		Outlet	1 No
Summer Sto	rm Profile				
Duration	Inter	•	Required		
	mm	mm/h	storage(m <sup>3</sup> )		
5 min	21.0	251.8	4.1		
10 min	30.9	185.5	6.0	Result:	
15 min	37.1	148.3	7.2		
30 min	47.9	95.7	9.3	Outcome	Pass
45 min	54.2	72.3	10.5	Critical Storm Duration	13.08 hrs
60 min	58.7	58.7	11.3	Hmax	137 mm
2 hours	69.7	34.8	13.2	Required Volume	16.2 m³
6 hours	86.8	14.5	15.5	Time to half empty	19.6 hrs
24 hours	112.1	4.7	15.8	Roof Loading	129.6 Kg/m²

Final determination of the suitability of any system is the sole responsibility of the user.



Client:					
Project:	1 M	useum Street/Vi	ne Lane		
Reference	e: BR-	6843-01	Designe	er: N.Todd	Date: 16/03/2022
Location:	Lond	lon			
Roof Loca	ation: Mus	eum Street - 11t	h Floor		
Roof Deta	ails:			Storage Details:	
BlueRoof		210 m <sup>2</sup>	x 100 %	Length	210 m
Additional A	Area	133 m²	x 100 %	Width	1 m
Effective Ar	ea	343 m²		Depth	150 mm
				Porosity	95 %
Rainfall D	etails - FSF	R Method:		Outflow Details:	
Return Peri	od	100 years		Attenuation Control	Orifice Plate
Climate Cha	ange Factor	40 %		Control Diameter	15 mm
r value		0.44		Discharge rate	0.18 l/s
M5-60		20.7 mm		Outlet	1 No
Summer Sto	orm Profile				
Duration		nsity	Required		
	mm	mm/h	storage(m <sup>3</sup> )		
5 min	21.0	251.8	7.2		
10 min	30.9	185.5	10.6	Result:	
15 min	37.1	148.3	12.7		_
30 min	47.9	95.7	16.3	Outcome	Pass
45 min	54.2	72.3	18.4	Critical Storm Duration	14.45 hrs
60 min	58.7	58.7	19.8	Hmax	145 mm
2 hours	69.7	34.8	23.2	Required Volume	28.9 m <sup>3</sup>
6 hours	86.8	14.5	27.3	Time to half empty	21.7 hrs
24 hours	112.1	4.7	28.4	Roof Loading	137.62 Kg/m²

Final determination of the suitability of any system is the sole responsibility of the user.



Client:					
Project:	West	Central Street			
Reference	e: BR-6	6779-01	Designe	er: N.Todd	Date: 10/12/2020
Location:	Lond	on			
Roof Loca	ition: Blue	Roof 18			
Roof Deta	ils:			Storage Details:	
BlueRoof Additional A Effective Are		62 m² 80 m² 142 m²	x 100 % x 100 %	Length Width Depth Porosity	62 m 1 m 150 mm 95 %
Rainfall D	etails - FSF	R Method:		Outflow Details:	
Return Perio Climate Cha r value M5-60	ange Factor	100 years 40 % 0.44 20.7 mm		Attenuation Control Control Diameter Discharge rate Outlet	Orifice Plate 19mm 0.3 l/s 1 No
Summer Sto Duration	Inter	•	Required		
5 min 10 min 15 min	mm 21.0 30.9 37.1	mm/h 251.8 185.5 148.3	storage(m³) 2.9 4.3 5.1	Result:	
30 min 45 min 60 min	47.9 54.2 58.7	95.7 72.3 58.7	6.5 7.2 7.7	Outcome Critical Storm Duration Hmax	Pass 3.03 hrs 148 mm
2 hours 6 hours 24 hours	69.7 86.8 112.1	34.8 14.5 4.7	8.5 8.5 6.6	Required Volume Time to half empty Roof Loading	8.7 m <sup>3</sup> 4 hrs 140.32 Kg/m <sup>2</sup>

Final determination of the suitability of any system is the sole responsibility of the user.



Client:					
Project:	West	Central Street			
Reference:	BR-6	6779-01	Designe	r: N.Todd	Date: 10/12/2020
Location:	Lond	on			
Roof Locati	on: Blue	Roof Courtyard			
Roof Details	S:			Storage Details:	
BlueRoof Additional Are Effective Area		95 m² 55 m² 150 m²	x 100 % x 100 %	Length Width Depth Porosity	95 m 1 m 100 mm 95 %
Rainfall Det	tails - FSR	Method:		Outflow Details:	
Return Period Climate Chan r value M5-60 Summer Store	ge Factor	100 years 40 % 0.44 20.7 mm		Attenuation Control Control Diameter Discharge rate Outlet Flow Per Outlet	Orifice Plate 16 mm 0.35 l/s 2 No 0.17 l/s
Duration	Inter mm	mm/h	Required storage(m <sup>3</sup> )		0.17 #3
5 min 10 min 15 min	21.0 30.9 37.1	251.8 185.5 148.3	3.1 4.6 5.4	Result:	
30 min 45 min 60 min	47.9 54.2 58.7	95.7 72.3 58.7	6.8 7.6 8.1	Outcome Critical Storm Duration Hmax	Pass 2.78 hrs 100 mm
2 hours 6 hours 24 hours	69.7 86.8 112.1	34.8 14.5 4.7	8.9 8.7 6.5	Required Volume Time to half empty Roof Loading	9 m³ 3.6 hrs 94.74 Kg/m²

Final determination of the suitability of any system is the sole responsibility of the user.



# Appendix D – London Borough of Camden SuDS Proforma





	Project / Site Name (including sub- catchment / stage / phase where appropriate)	1 Museum Street
	Address & post code	166 High Holborn and 1 Museum Steet, 10-12 Museum Street and 35-41 New Oxford Street, WC1A 1JR.
	OS Grid ref. (Easting, Northing)	E 530169
	OS GHUTEL (Easting, Northing)	N 181391
tails	LPA reference (if applicable)	
1. Project & Site Details	Brief description of proposed work	The proposed development is to retain the existing basement of the Museum Street development and contructed a new mixed use offcie and residential development.
	Total site Area	3270 m <sup>2</sup>
	Total existing impervious area	3270 m <sup>2</sup>
	Total proposed impervious area	2700 m <sup>2</sup>
	Is the site in a surface water flood risk catchment (ref. local Surface Water Management Plan)?	No
	Existing drainage connection type and location	Pumped Surface. Gravity fed Foul Water Drainage into High Holborn
	Designer Name	Craig Marchant
	Designer Position	Civil Associate

	2a. Infiltration Feasibility				
	Superficial geology classification	London Clay			
	Bedrock geology classification				
	Site infiltration rate		m/s		
	Depth to groundwater level	3.3	m belo	w ground level	
	Is infiltration feasible?		No		
	2b. Drainage Hierarchy				
ments			Feasible (Y/N)	Proposed (Y/N)	
ange	1 store rainwater for later use		Y	Ν	
ırge Arra	2 use infiltration techniques, such a surfaces in non-clay areas	Ν	Ν		
Proposed Discharge Arrangements	3 attenuate rainwater in ponds or o features for gradual release	open water	Ν	Ν	
Propose	4 attenuate rainwater by storing in sealed water features for gradual re		Ν	Ν	
2.	5 discharge rainwater direct to a w	atercourse	Ν	Ν	
	6 discharge rainwater to a surface v sewer/drain	water	Ν	Ν	
	7 discharge rainwater to the combi	ined sewer.	Y	Y	
	2c. Proposed Discharge Details				
	Proposed discharge location Thames Water Combined Sewers				
	Has the owner/regulator of the discharge location been		Yes		





Designer Company	Meinhardt UK Ltd
Designer company	Wiennar at OK Eta

consulted?





	3a. Discharge Rat	es & Required Sto	orage			
		Greenfield (GF) runoff rate (l/s)	Existing discharge rate (I/s)	Required storage for GF rate (m <sup>3</sup> )	Proposed discharge rate (l/s)	
	Qbar	0.51	$\geq$	$\geq$	$\ge$	
	1 in 1	0.43	40.7	230	5	
	1 in 30	1.62	109	230	5	
	1 in 100	1.9	127.1	230	5	
	1 in 100 + CC		$\geq$	230	5	
	Climate change a	llowance used	40%			
ategy	3b. Principal Metl Control	nod of Flow	Blue Roofs to drain via orifice plate. Attenaution tanks to be pumped			
e Str	3c. Proposed SuD	S Measures				
3. Drainage Strategy			Catchment area (m²)	Plan area (m²)	Storage vol. (m <sup>3</sup> )	
_	Rainwater harves					
З.	Nainwater naives	ting	0		0	
3.	Infiltration system	-	0		0	
3.		-		82	0 0 0	
3.	Infiltration system	-	0	82 670	0 0 0 96	
3.	Infiltration systen Green roofs	-	0			
3.	Infiltration systen Green roofs Blue roofs	-	0 82 670	670	96	
3.	Infiltration systen Green roofs Blue roofs Filter strips	ns	0 82 670 0	670 0	96 0	
3.	Infiltration systen Green roofs Blue roofs Filter strips Filter drains	e pits	0 82 670 0	670 0	96 0 0	
3.	Infiltration system Green roofs Blue roofs Filter strips Filter drains Bioretention / tre Pervious paveme Swales	e pits	0 82 670 0 0	670 0 0	96 0 0	
3.	Infiltration system Green roofs Blue roofs Filter strips Filter drains Bioretention / tre Pervious paveme Swales Basins/ponds	e pits nts	0 82 670 0 0 0 0 0 0	670 0 0 0	96 0 0 0 0 0	
3.	Infiltration system Green roofs Blue roofs Filter strips Filter drains Bioretention / tre Pervious paveme Swales	e pits nts	0 82 670 0 0 0 0	670 0 0 0 0	96 96 0 0 0	

	4a. Discharge & Drainage Strategy	Page/section of drainage report	
4. Supporting Information	Infiltration feasibility (2a) – geotechnical factual and interpretive reports, including infiltration results	Section 2.3.2	
	Drainage hierarchy (2b)	Section 2.0	
	Proposed discharge details (2c) – utility plans, correspondence / approval from owner/regulator of discharge location	Section 2.3.2	
	Discharge rates & storage (3a) – detailed hydrologic and hydraulic calculations	Section 2.3.4 & 2.3.5	
	Proposed SuDS measures & specifications (3b)	Section 2.3.4 & 2.3.5	
	4b. Other Supporting Details	Page/section of drainage report	
Inc .	Detailed Development Layout	Appendix B	
4.	Detailed drainage design drawings, including exceedance flow routes	Appendix B	
	Detailed landscaping plans	Appendix B	
	Maintenance strategy	Section 3.0	
	Demonstration of how the proposed SuDS measures improve:	Section 2.3.4 & 2.3.5	
	a) water quality of the runoff?	Section 2.3.4 & 2.3.5	
	b) biodiversity?	Section 2.3.4 & 2.3.5	
	c) amenity?	Section 2.3.4 & 2.3.5	





	Project / Site Name (including sub- catchment / stage / phase where appropriate)	West Central Street	
	Address & post code	16A-18 West Central Street, WC1A 1JR.	
	OS Grid ref. (Easting, Northing)	E 530176	
		N 181424	
tails	LPA reference (if applicable)		
1. Project & Site Details	Brief description of proposed work	The proposed development is to retain the existing basement of the West Central Street development and construct a new residential development.	
	Total site Area	850 m <sup>2</sup>	
	Total existing impervious area	850 m <sup>2</sup>	
	Total proposed impervious area	850 m <sup>2</sup>	
	Is the site in a surface water flood risk catchment (ref. local Surface Water Management Plan)?	No	
	Existing drainage connection type and location	Gravity fed to the Thames Water combined Sewer	
	Designer Name	Craig Marchant	
	Designer Position	Civil Associate	

	2a. Infiltration Feasibility				
	Superficial geology classification	London Clay			
	Bedrock geology classification				
	Site infiltration rate	m/s			
	Depth to groundwater level	3.3 m below ground leve		w ground level	
	Is infiltration feasible?	No			
	2b. Drainage Hierarchy				
Proposed Discharge Arrangements			Feasible (Y/N)	Proposed (Y/N)	
	1 store rainwater for later use		Y	Ν	
	2 use infiltration techniques, such as porous surfaces in non-clay areas		Ν	Ν	
	3 attenuate rainwater in ponds or open water features for gradual release		Ν	Ν	
Propose	4 attenuate rainwater by storing in tanks or sealed water features for gradual release		Ν	Ν	
2.	5 discharge rainwater direct to a w	atercourse	Ν	Ν	
	6 discharge rainwater to a surface water sewer/drain		N	Ν	
	7 discharge rainwater to the combined sewer.		Y	Y	
	2c. Proposed Discharge Details				
	Proposed discharge location	Thames Water Combined Sewers			
	Has the owner/regulator of the discharge location been	Yes			





Designer Company	Meinhardt UK Ltd
Designer company	Wiennar at OK Eta

consulted?



# **GREATERLONDONAUTHORITY**



	3a. Discharge Rat	es & Required Sto	orage					
		Greenfield (GF) runoff rate (l/s)	Existing discharge rate (I/s)	Required storage for GF rate (m <sup>3</sup> )	Proposed discharge rate (l/s)			
	Qbar	0.13	$\ge$	$\geq$	$\ge$			
	1 in 1	0.16	10.4	39	5			
	1 in 30	0.36	29.8	39	5			
	1 in 100	0.5	38.6	39	5			
	1 in 100 + CC		$\geq$	39	5			
	Climate change a	llowance used	40%					
rategy	3b. Principal Metl Control	nod of Flow	Blue Roofs to drain via orifice plate. Attenaution tanks to be pumped					
e Sti	3c. Proposed SuD	S Measures						
3. Drainage Strategy			Catchment area (m²)	Plan area (m²)	Storage vol. (m <sup>3</sup> )			
-	Rainwater harves							
Э.	nummater numbes	ting	0		0			
3.	Infiltration system	-	0 0		0 0			
3.		-		140	0 0 0			
3.	Infiltration system	-	0	140 157	0 0 0 19			
3.	Infiltration systen Green roofs	-	0					
3.	Infiltration systen Green roofs Blue roofs	-	0 140 292	157	19			
3.	Infiltration systen Green roofs Blue roofs Filter strips	ns	0 140 292 0	157 0	19 0			
3.	Infiltration systen Green roofs Blue roofs Filter strips Filter drains	e pits	0 140 292 0 0	157 0 0	19 0 0			
3.	Infiltration system Green roofs Blue roofs Filter strips Filter drains Bioretention / tre Pervious paveme Swales	e pits	0 140 292 0 0 0	157 0 0	19 0 0 0			
3.	Infiltration system Green roofs Blue roofs Filter strips Filter drains Bioretention / tre Pervious paveme Swales Basins/ponds	e pits nts	0 140 292 0 0 0 0 0 0 0 0	157 0 0 0	19 0 0 0 0 0 0			
3.	Infiltration system Green roofs Blue roofs Filter strips Filter drains Bioretention / tre Pervious paveme Swales	e pits nts	0 140 292 0 0 0 0 0	157 0 0 0 0	19 0 0 0 0 0			

	4a. Discharge & Drainage Strategy	Page/section of drainage report
	Infiltration feasibility (2a) – geotechnical factual and interpretive reports, including infiltration results	Section 2.3.2
	Drainage hierarchy (2b)	Section 2.0
c	Proposed discharge details (2c) – utility plans, correspondence / approval from owner/regulator of discharge location	Section 2.3.2
ormatio	Discharge rates & storage (3a) – detailed hydrologic and hydraulic calculations	Section 2.3.4 & 2.3.5
4. Supporting Information	Proposed SuDS measures & specifications (3b)	Section 2.3.4 & 2.3.5
lodo	4b. Other Supporting Details	Page/section of drainage report
inc .	Detailed Development Layout	Appendix B
4	Detailed drainage design drawings, including exceedance flow routes	Appendix B
	Detailed landscaping plans	Appendix B
	Maintenance strategy	Section 3.0
	Demonstration of how the proposed SuDS measures improve:	Section 2.3.4 & 2.3.5
	a) water quality of the runoff?	Section 2.3.4 & 2.3.5
	b) biodiversity?	Section 2.3.4 & 2.3.5
	c) amenity?	Section 2.3.4 & 2.3.5



# Appendix E – Proposed Drainage Calculations

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2.0		0.00		18.138		028	0.0	0.0		0.0	1.31	52.0	3.	
2.0		0.00		18.084		040	0.0	0.0		0.0	1.31	52.0	5.	
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3.0	02 50	0.00	5.33	24.000	) 0.	.019	0.0	0.0		0.0	1.00	17.8	2.	6
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4.0	500 50		5.00	23.000			0.0	0.0						

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		0.00		26.900	0.014	0.0	0.0		0.0	1.00	17.8	2.0
		0.00		29.550	0.014	0.0	0.0		0.0	1.00	17.8	2.0
5.0	JUZ 5	0.00	5.33	24.000	0.014	0.0	0.0		0.0	1.00	17.8	2.0
6.0	000 5	0.00	5.08	29.600	0.004	0.0	0.0		0.0	1.00	17.8	0.6
		0.00		29.550	0.004	0.0	0.0		0.0	1.00	17.8	0.6
6.0	002 5	0.00	5.33	24.000	0.004	0.0	0.0		0.0	1.00	17.8	0.6
7.0	000 5	0.00	5.08	29.600	0.028	0.0	0.0		0.0	1.00	17.8	3.8
7.0	001 5	0.00		29.550	0.028	0.0	0.0		0.0	1.00	17.8	3.8
7.0	002 5	0.00	5.33	24.000	0.028	0.0	0.0		0.0	1.00	17.8	3.8
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Meinhardt (UH	() Ltd						Page 4
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		Inv	ert Level	(m) 29.550			
D	epth (m) Flo	ow (l/s) De	epth (m) Fl	low (l/s) D	epth (m) Fl	.ow (l/s)	
	0.050	0.1000	0.100	0.1000	0.150	0.1000	
	Pump Man	hole: 18,	DS/PN: !	5.001, Vol	Lume (m³):	0.1	
		Inv	ert Level	(m) 29.550			
D	epth (m) Flo	ow (l/s) De	epth (m) Fl	low (l/s) D	epth (m) Fl	.ow (1/s)	
	0.050	0.1000	0.100	0.1000	0.150	0.1000	
	Pump Man	hole: 21,	DS/PN:	6.001, Vol	lume (m³):	0.1	
		Inv	ert Level	(m) 29.550			
D	epth (m) Flo	ow (l/s) De	epth (m) Fl	low (l/s) D	epth (m) Fl	.ow (l/s)	
	0.055	0.1000	0.100	0.1000	0.150	0.1000	
	Pump Man	hole: 24,	DS/PN: '	7.001, Vol	lume (m³):	0.1	
		Inv	ert Level	(m) 29.550			
D	epth (m) Flo	ow (l/s) De	epth (m) Fl	low (l/s)	epth (m) Fl	.ow (1/s)	
	0.050		0.100		0.150	0.1800	
		©19	982-2020	Innovyze			

		Davis F
Meinhardt (UK) Ltd		Page 5
10 Aldersgate Street		
London		
EC1A 4HJ		Micro
Date 14/07/2022 17:42	Designed by Craig.Marchant	Micro Drainage
File Reduced Tank Size Incre		brainage
Innovyze	Network 2020.1	
Pump Manhole: 27,	DS/PN: 8.001, Volume (m <sup>3</sup> ): 0.1	
Inve	rt Level (m) 29.550	
Depth (m) Flow (1/s) Dep	oth (m) Flow (l/s) Depth (m) Flow (l/s)	
0.050 0.1000	0.100 0.1000 0.150 0.1000	
	I	
<u></u>	32-2020 Innovyze	
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Meinhardt (UK) Ltd				Page 6
10 Aldersgate Street				
London				
EC1A 4HJ				Micro
Date 14/07/2022 17:42	Designed b		archant	Drainage
	Checked by			Brainage
Innovyze	Network 20	20.1		
Storage	Structures	for Storm		
Cellular Storage	Manhole: T	ank, DS/P	N: 1.005	
Inver Infiltration Coefficient Infiltration Coefficient	Base (m/hr)	0.00000	ety Factor 2.0 Porosity 1.00	
Depth (m) Area (m <sup>2</sup> ) Inf. Are	ea (m²) Depth	(m) Area (:	m²) Inf. Area (	m²)
0.000 84.0 1.600 84.0	0.0 0.0	.601	0.0	0.0
Cellular Storage Manho	ole: 1MS 8	Floor BR,	DS/PN: 3.000	<u>)</u>
Inver Infiltration Coefficient Infiltration Coefficient	Base (m/hr)	0.00000	ety Factor 2.0 Porosity 0.95	
Depth (m) Area (m <sup>2</sup> ) Inf. Are	ea (m²) Depth	(m) Area (:	m²) Inf. Area (	m²)
0.000 125.0 0.150 125.0	0.0 0.0	.151	0.0	0.0
Cellular Storage Mar	hole: VLB	Roof BR, I	DS/PN: 4.000	
Inver Infiltration Coefficient Infiltration Coefficient	Base (m/hr)	0.0000	ety Factor 2.0 Porosity 0.95	
Depth (m) Area (m <sup>2</sup> ) Inf. Are	ea (m²) Depth	(m) Area (:	m²) Inf. Area (	m²)
0.000 108.0 0.150 108.0	0.0 0	.151	0.0	0.0
Cellular Storage Manho	le: VLB 4th	I Floor BR	, DS/PN: 5.00	00
Inver Infiltration Coefficient Infiltration Coefficient	Base (m/hr)	0.00000	ety Factor 2.0 Porosity 0.95	
Depth (m) Area (m²) Inf. Are		(m) Area (:	m²) Inf. Area (	m²)
0.000 116.0 0.150 116.0	0.0 0 0.0	.151	0.0	0.0
Cellular Storage Man	hole: VLB 2	nd BR N,	DS/PN: 6.000	
Inver Infiltration Coefficient Infiltration Coefficient	Base (m/hr)	0.00000	ety Factor 2.0 Porosity 0.95	

Meinhardt (UK) Ltd	Page 7
10 Aldersgate Street	
London	
EC1A 4HJ	
Date 14/07/2022 17:42 Designed by Craig.Marchant	Micro
File Reduced Tank Size Incre Checked by	Drainage
Innovyze Network 2020.1	
Innovyze Network 2020.1	
Cellular Storage Manhole: VLB 2nd BR N, DS/PN: 6.000	
Depth (m) Area (m <sup>2</sup> ) Inf. Area (m <sup>2</sup> ) Depth (m) Area (m <sup>2</sup> ) Inf. Area (m)	m²)
0.000 65.0 0.0 0.151 0.0 0.150 65.0 0.0	0.0
Cellular Storage Manhole: 1MS 11th Floor BR, DS/PN: 7.00	00
Invert Level (m) 29.600 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95 Infiltration Coefficient Side (m/hr) 0.00000 Depth (m) Area (m <sup>2</sup> ) Inf. Area (m <sup>2</sup> ) Depth (m) Area (m <sup>2</sup> ) Inf. Area (m <sup>2</sup> )	
0.000 210.0 0.0 0.151 0.0 0.150 210.0 0.0	0.0
Cellular Storage Manhole: VLB 2nd BR S, DS/PN: 8.000	
Invert Level (m) 29.600 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95 Infiltration Coefficient Side (m/hr) 0.00000 Depth (m) Area (m <sup>2</sup> ) Inf. Area (m <sup>2</sup> ) Depth (m) Area (m <sup>2</sup> ) Inf. Area (m	m²)
	0.0
0.150 37.0 0.0	

		Page 8
		Micco
Designed by	Craig Marcha	
	erarg.narenar	<sup>rt</sup> Drainag
	<b>N</b> 1	
Network 2020	).1	
Critical Rea	sults by Maxi	mum Level (Rank 1
000 Additic 0 MAD 0.500 Flow per 0.000 aphs 0 Number of rols 7 Number of	mal Flow - % of D Factor * 10m³ Inlet C Person per Day of Storage Struc of Time/Area Dia	/ha Storage 2.000 peffiecient 0.800 (l/per/day) 0.000 stures 7 grams 1
		trols 0
FSR land and Wales	Ratio R 0.4 Cv (Summer) 0.9	50
ing (mm) Timestep 2.5 Se S Status D Status a Status	econd Increment	300.0 (Extended) OFF ON ON
5, 30, 60, 120		and Winter 960, 1440 2, 30, 100 0, 0, 40
Return Climate Period Change	First (X) Surcharge	First (Y) First (Z) Flood Overflow
2 +0% 2 +0%		
2 +0%		
2 +0%		
2 +0%		
2 +0%		
	2/15 Cume-	
2 +0%	2, 15 Dunnet	
	100/240 Summer	
2 +0%		
2 +0%		
2 +0%		
2 +0%		
2 +0% 2 +0%		
	Checked by Network 2020 Critical Re for Storm ulation Criter .000 Additic 0 MAD 0.500 Flow per .000 uphs 0 Number of cols 7 Number of cols 7 Number of cols 0 Status a Status 5, 30, 60, 120 Return Climate Period Change 2 +0% 2 +0%2 +0%	Network 2020.1 Critical Results by Maxim for Storm ulation Criteria .000 Additional Flow - % of 0 MADD Factor * 10m <sup>3</sup> , 0 Inlet Co .500 Flow per Person per Day .000 aphs 0 Number of Storage Struct cols 7 Number of Time/Area Dia cols 0 Number of Real Time Con tic Rainfall Details FSR Ratio R 0.4 land and Wales Cv (Summer) 0.9 20.600 Cv (Winter) 0.9 20.600 Cv (Winter) 0.9 Status a Status Summer 5, 30, 60, 120, 240, 360, 480, Summer 5, 30, 60, 120, 240, 360, 480, Return Climate First (X) Period Change Surcharge 2 +0% 2

	lt (UK) Ltd							Page 9
10 Alder	sgate Street							
London								
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Date 14/	07/2022 17:42		Desi	.gned k	by Craig	Marcha	nt	
File Red	luced Tank Size	Incre	Chec	ked by	7			Drainago
Innovyze				vork 20				
	-		11007	.0111 2.				
2 vear	Return Period	Summary of	Crit	ical 1	Results	by Maxi	mum Leve	el (Rank 1)
<u>1 year</u>	needani rerrou	ballinary or		Storm		oy mane		21 (Raint 1)
			101	Deora	-			
		T-T	0			3		Half Drain
	US/MH	wate Overflow Lev		urcnarg Depth	ed Floode		Overflow	
PN	Name	Act. (m		(m)	(m <sup>3</sup> )	Cap.	(1/s)	(mins)
EW	Ivallie	Acc. (m	,	(111)	(111)	cap.	(1/5)	(11113)
1.000	1	19.5	01	-0.1	49 0.00	0.00		
1.001	1	18.4	03	-0.1	17 0.00			
1.002	2	18.1		-0.1				
1.003	3	18.1		-0.1				
1.004	4	18.0		-0.1				
2.000	5	18.2		-0.0				
2.001	6	18.2		-0.1				
2.002	7	18.1		-0.1				11.0
1.005	Tank	17.2		0.2				416
1.006	Pump Chamber	17.4		0.4				050
3.000	1MS 8 Floor BR	29.6		-0.1				250
3.001	12 13	29.6		-0.0				
3.002	VLB Roof BR	24.0		-0.1 -0.1				215
4.000 4.001	VLB ROOL BR	29.6 29.6		-0.1				215
4.001	15	29.0		-0.1				
	VLB 4th Floor BR	26.9		-0.1				
5.001	18 18	26.9		-2.7				
5.002	19	24.0		-0.1				
				Pipe				
		US/MH		Flow		Level	_	
	PN	Name		(1/s)	Status	Exceede	ed	
	1.000		1	0.0	O	c		
	1.001		1	1.8	OI			
	1.002		2	1.9	OI			
	1.003		3	1.9	01			
	1.004		4	5.8	01			
	2.000		5	4.4	01			
	2.001		6	6.0	01			
	2.002 1.005		7 Tank	8.4	OI SURCHARGEI			
	1.005				SURCHARGE			
	3.000	-			OICHARGE			
	3.000		1 BR	0.1	01			
	3.002		13	0.1	01			
	4.000			0.1	01			
	4.001		15	0.1	01			
	4.002		16	0.1	OI			
		VLB 4th Floc	r BR		OI			
	5.001		18	0.0	OI	ζ		
	5.002		19	0.0	OI	c		
		©198	2-20	20 Inr	lovyze			
		0190	0					

Meinhardt (UK) L	td							Page 10
10 Aldersgate St	reet							
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Date 14/07/2022	17.42		Desic	ned by	Craia	Marchar		Micro
File Reduced Tan		Tranc			crary.	Marchar	IL	Drainage
	k Size .	Incre		ed by	N 1			
Innovyze			Netwo	ork 2020	).1			
<u>2 year Return Pe</u>	eriod Su	ummary of		ical Res Storm	sults b	y Maxin	mum Leve	<u>l (Rank 1)</u>
US/MI PN Name		Storm		Climate Change	First Surch		First (Y) Flood	First (Z) Overflow
C 000		00 G	~					
		20 Summer	2	+0%				
6.001 6.002		20 Summer 20 Summer	2 2	+0% +0%				
6.002 7.000 1MS 11th Fl			2	+0% +0%				
7.000 IMS IIII FI 7.001		40 Summer	2		100/360	Winter		
7.002		15 Summer	2	+0%	_00,000			
		60 Summer	2	+0%				
8.001	27	60 Summer	2	+0%				
8.002		60 Summer	2	+0%				
3.003	14	60 Summer	2	+0%				
	-			rcharged			061	Half Drain
US/MH	70		evel	Depth			Overflow	Time
PN Name		Act.	(m)	(m)	(m³)	Cap.	(l/s)	(mins)
6.000 VLB 2nd	d BR N	29	.608	-0.142	0.000	0.01		72
6.001	21	29	.601	-0.099	0.000	0.01		
6.002	22		.004	-0.146				
7.000 1MS 11th Fl			.623	-0.127				251
7.001	24 25		.622	-0.078				
7.002 8.000 VLB 2nd			.008 .604	-0.142 -0.146				33
8.000 VLB 200 8.001	авк S 27		.587	-0.146				
8.002	28		.003	-0.147				
3.003	14		.518	-0.132				
		US/	мп	Pipe Flow		Level		
	PN	087 Nar			Status E			
	T.11	INGI		(1/8)	scutus I			
	6.000	VLB	2nd BR	N 0.1	OK			
	6.001			1 0.1	OK			
	6.002	1.00 1.1.1		2 0.1	OK			
		1MS 11th			OK			
	7.001 7.002			4 0.2 5 0.2	OK OK			
	8.000	WI.P	∠ 2nd BR		OK OK			
	8.000	מת א		7 0.1	OK			
	8.002			8 0.1	OK			
	3.003			4 0.6	OK			
				0 Innov				

	dt (UK) Ltd						Page 11
	ersgate Street						
London	2						
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			Dania	un a d'hara	Que in Manaha		Micro
	1/07/2022 17:42		-	-	Craig.Marcha	nt	Drainage
File Re	educed Tank Siz	e Incre		ed by			
Innovyz	e		Netwo	ork 2020	.1		
<u>30 year</u>	r Return Period	l Summary c		ical Re Storm	sults by Max:	imum Leve	l (Rank 1)
	Hot Star Hot Star Foul Sewage per he Number of Number of Number of Rainf	stion Factor Start (mins) Level (mm) eff (Global) ectare (l/s) Input Hydrog f Online Con Offline Con Offline Con Synth all Model Region En 5-60 (mm) .ood Risk War Analysis	1.000 0 0.500 F 0.000 raphs 0 trols 7 trols 0 etic Ra: gland ar ning (mm	MAD low per 1 Number c Number c Number c infall De FSR nd Wales 20.600 a) ep 2.5 Se	nal Flow - % of D Factor * 10m <sup>3</sup> Inlet C Person per Day of Storage Struc f Time/Area Dia f Real Time Cor tails	/ha Storag oeffiecien (l/per/day ctures 7 agrams 1 htrols 0 437 950 950 300.0	e 2.000 t 0.800 ) 0.000
		D	VD Statı ia Statı	ıs		ON ON	I
	Return Period		15, 30,	60, 120,	Summer 240, 360, 480,	and Winter , 960, 1440 2, 30, 100 0, 0, 40	)
PN	Return Period	on(s) (mins) l(s) (years)	Return	60, 120, Climate Change		, 960, 1440 2, 30, 100 0, 0, 40	)
	Return Period Climate US/MH Name	on(s) (mins) l(s) (years) e Change (%) Storm	Return Period	Climate Change	240, 360, 480, First (X)	, 960, 1440 2, 30, 100 0, 0, 40 First (Y)	First (Z)
1.000	Return Period Climate US/MH Name 1	n(s) (mins) l(s) (years) e Change (%) <b>Storm</b> 120 Winter	Return Period 30	Climate Change +0%	240, 360, 480, First (X)	, 960, 1440 2, 30, 100 0, 0, 40 First (Y)	First (Z)
	Return Period Climate US/MH Name	n(s) (mins) l(s) (years) e Change (%) <b>Storm</b> 120 Winter 15 Summer	Return Period 30 30	Climate Change	240, 360, 480, First (X)	, 960, 1440 2, 30, 100 0, 0, 40 First (Y)	First (Z)
1.000 1.001	Return Period Climate US/MH Name 1 1	n(s) (mins) l(s) (years) e Change (%) <b>Storm</b> 120 Winter 15 Summer 15 Summer	Return Period 30 30 30	Climate Change +0% +0%	240, 360, 480, First (X)	, 960, 1440 2, 30, 100 0, 0, 40 First (Y)	First (Z)
1.000 1.001 1.002	Return Period Climate US/MH Name 1 1 2	n(s) (mins) l(s) (years) e Change (%) storm 120 Winter 15 Summer 15 Summer 15 Summer	<b>Return</b> <b>Period</b> 30 30 30 30	Climate Change +0% +0% +0%	240, 360, 480, First (X)	, 960, 1440 2, 30, 100 0, 0, 40 First (Y)	First (Z)
1.000 1.001 1.002 1.003	Return Period Climate US/MH Name 1 1 2 3	n(s) (mins) (s) (years) c Change (%) storm 120 Winter 15 Summer 15 Summer 15 Summer 15 Summer	<b>Return</b> <b>Period</b> 30 30 30 30 30 30	Climate Change +0% +0% +0% +0%	240, 360, 480, First (X)	, 960, 1440 2, 30, 100 0, 0, 40 First (Y)	First (Z)
1.000 1.001 1.002 1.003 1.004	Return Period Climate US/MH Name 1 1 2 3 4	n(s) (mins) l(s) (years) Change (%) 120 Winter 15 Summer 15 Summer 15 Summer 15 Summer 15 Summer 15 Summer	<b>Return</b> <b>Period</b> 30 30 30 30 30 30 30	Climate Change +0% +0% +0% +0% +0%	240, 360, 480, First (X)	, 960, 1440 2, 30, 100 0, 0, 40 First (Y)	First (Z)
1.000 1.001 1.002 1.003 1.004 2.000	Return Period Climate US/MH Name 1 1 2 3 4 5	n(s) (mins) (s) (years) Change (%) 120 Winter 15 Summer 15 Summer 15 Summer 15 Summer 15 Summer 15 Summer 15 Summer	Return Period 30 30 30 30 30 30 30 30	Climate Change +0% +0% +0% +0% +0%	240, 360, 480, First (X)	, 960, 1440 2, 30, 100 0, 0, 40 First (Y)	First (Z)
1.000 1.001 1.002 1.003 1.004 2.000 2.001	Return Period Climate US/MH Name 1 1 2 3 4 5 6	n(s) (mins) (s) (years) Change (%) 120 Winter 15 Summer 15 Summer 15 Summer 15 Summer 15 Summer 15 Summer 15 Summer 15 Summer	Return Period 30 30 30 30 30 30 30 30 30 30	Climate Change +0% +0% +0% +0% +0% +0%	240, 360, 480, First (X)	, 960, 1440 2, 30, 100 0, 0, 40 First (Y)	First (Z)
1.000 1.001 1.002 1.003 1.004 2.000 2.001 2.002	Return Period Climate US/MH Name 1 1 2 3 4 5 6 7	n(s) (mins) (s) (years) Change (%) 120 Winter 15 Summer 15 Summer 15 Summer 15 Summer 15 Summer 15 Summer 15 Summer 240 Winter	Return Period 30 30 30 30 30 30 30 30 30 30 30	Climate Change +0% +0% +0% +0% +0% +0% +0%	240, 360, 480, First (X) Surcharge	, 960, 1440 2, 30, 100 0, 0, 40 First (Y)	First (Z)
1.000 1.001 1.002 1.003 1.004 2.000 2.001 2.002 1.005	Return Period Climate US/MH Name 1 1 2 3 4 5 6 7 7 Tank	n(s) (mins) (s) (years) Change (%) 120 Winter 15 Summer 15 Summer 15 Summer 15 Summer 15 Summer 15 Summer 15 Summer 240 Winter 240 Winter	Return Period 30 30 30 30 30 30 30 30 30 30 30 30 30	Climate Change +0% +0% +0% +0% +0% +0% +0% +0%	240, 360, 480, First (X) Surcharge 2/15 Summer	, 960, 1440 2, 30, 100 0, 0, 40 First (Y)	First (Z)
1.000 1.001 1.002 1.003 1.004 2.000 2.001 2.002 1.005 1.006	Return Period Climate US/MH Name 1 1 2 3 4 5 6 7 7 7 7 7 1 7 1 7 1 1 2 3 3 4 5 6 7 7 7 1 7 1 8 1 1 1 2 1 1 1 2 3 1 1 1 2 3 1 1 1 1 1 1	n(s) (mins) (s) (years) Change (%) 2 Change (%) 120 Winter 15 Summer 15 Summer 15 Summer 15 Summer 15 Summer 15 Summer 240 Winter 240 Winter 360 Winter	Return Period 30 30 30 30 30 30 30 30 30 30 30 30 30	Climate Change +0% +0% +0% +0% +0% +0% +0% +0% +0% +0%	240, 360, 480, First (X) Surcharge 2/15 Summer	, 960, 1440 2, 30, 100 0, 0, 40 First (Y)	First (Z)
1.000 1.001 1.002 1.003 1.004 2.000 2.001 2.002 1.005 1.006 3.000	Return Period Climate US/MH Name 1 1 2 3 4 5 6 7 7 7 7 7 8 8 9 2 8 9 1 8 9 1 8 9 1 1 1 2 3 3 4 5 6 7 7 7 7 7 8 8 1 1 8 8 1 1 8 1 8 1 1 8 1 8	n(s) (mins) (s) (years) Change (%) 2 Change (%) 120 Winter 15 Summer 15 Summer 15 Summer 15 Summer 15 Summer 15 Summer 240 Winter 240 Winter 360 Winter	Return Period 30 30 30 30 30 30 30 30 30 30 30 30 30	Climate Change +0% +0% +0% +0% +0% +0% +0% +0% +0% +0%	240, 360, 480, First (X) Surcharge 2/15 Summer 2/15 Summer	, 960, 1440 2, 30, 100 0, 0, 40 First (Y)	First (Z)
1.000 1.001 1.002 1.003 1.004 2.000 2.001 2.002 1.005 1.006 3.000 3.001 3.002 4.000	Return Period Climate US/MH Name 1 1 2 3 4 5 6 7 Tank Pump Chamber 1MS 8 Floor BR 12 13 VLB Roof BR	storm 120 Winter 15 Summer 15 Summer 15 Summer 15 Summer 15 Summer 15 Summer 15 Summer 15 Summer 16 Summer 16 Summer 17 Summer 18 Summer 19 Summer 19 Summer 10 Winter 240 Winter 360 Winter 15 Winter 240 Winter	Return Period 30 30 30 30 30 30 30 30 30 30 30 30 30	Climate Change +0% +0% +0% +0% +0% +0% +0% +0% +0% +0%	240, 360, 480, First (X) Surcharge 2/15 Summer 2/15 Summer	, 960, 1440 2, 30, 100 0, 0, 40 First (Y)	First (Z)
1.000 1.001 1.002 1.003 1.004 2.000 2.001 2.002 1.005 1.006 3.000 3.001 3.002	Return Period Climate US/MH Name 1 1 2 3 4 5 6 7 Tank Pump Chamber 1MS 8 Floor BR 12 13 VLB Roof BR 15	n(s) (mins) (s) (years) Change (%) 2 Change (%) 120 Winter 15 Summer 15 Summer 240 Winter 240 Winter 240 Winter 240 Winter	Return Period 30 30 30 30 30 30 30 30 30 30 30 30 30	Climate Change +0% +0% +0% +0% +0% +0% +0% +0% +0% +0%	240, 360, 480, First (X) Surcharge 2/15 Summer 2/15 Summer	, 960, 1440 2, 30, 100 0, 0, 40 First (Y)	First (Z)
1.000 1.001 1.002 1.003 1.004 2.000 2.001 2.002 1.005 1.006 3.000 3.001 3.002 4.000 4.001 4.002	Return Period Climate US/MH Name 1 1 2 3 4 5 6 7 Tank Pump Chamber 1MS 8 Floor BR 12 13 VLB Roof BR 15 16	n(s) (mins) (s) (years) Change (%) 2 Change (%) 120 Winter 15 Summer 15 Summer 15 Summer 15 Summer 15 Summer 15 Summer 15 Summer 240 Winter 360 Winter 360 Winter 240 Winter 240 Winter 30 Summer	Return Period 30 30 30 30 30 30 30 30 30 30 30 30 30	Climate Change +0% +0% +0% +0% +0% +0% +0% +0% +0% +0%	240, 360, 480, First (X) Surcharge 2/15 Summer 2/15 Summer	, 960, 1440 2, 30, 100 0, 0, 40 First (Y)	First (Z)
1.000 1.001 1.002 1.003 1.004 2.000 2.001 2.002 1.005 1.006 3.000 3.001 3.002 4.000 4.001 4.002 5.000	Return Period Climate US/MH Name 1 1 2 3 4 5 6 7 Tank Pump Chamber 1MS 8 Floor BR 12 13 VLB Roof BR 15 16 VLB 4th Floor BR	n(s) (mins) (s) (years) Change (%) 2 Change (%) 120 Winter 15 Summer 15 Summer 15 Summer 15 Summer 15 Summer 15 Summer 15 Summer 240 Winter 360 Winter 360 Winter 240 Winter 240 Winter 30 Summer 1440 Summer	Return Period 30 30 30 30 30 30 30 30 30 30 30 30 30	Climate Change +0% +0% +0% +0% +0% +0% +0% +0% +0% +0%	240, 360, 480, First (X) Surcharge 2/15 Summer 2/15 Summer	, 960, 1440 2, 30, 100 0, 0, 40 First (Y)	First (Z)
1.000 1.001 1.002 1.003 1.004 2.000 2.001 2.002 1.005 1.006 3.000 3.001 3.002 4.000 4.001 4.002 5.000 5.001	Return Period Climate US/MH Name 1 1 2 3 4 5 6 7 Tank Pump Chamber 1MS 8 Floor BR 12 13 VLB Roof BR 15 16 VLB 4th Floor BR 18	storm 120 Winter 120 Winter 15 Summer 15 Summer 15 Summer 15 Summer 15 Summer 15 Summer 15 Summer 16 Summer 16 Winter 240 Winter 360 Summer 360 Winter 360 Summer 360 Summ	Return Period 30 30 30 30 30 30 30 30 30 30 30 30 30	Climate Change +0% +0% +0% +0% +0% +0% +0% +0% +0% +0%	240, 360, 480, First (X) Surcharge 2/15 Summer 2/15 Summer	, 960, 1440 2, 30, 100 0, 0, 40 First (Y)	First (Z)
1.000 1.001 1.002 1.003 1.004 2.000 2.001 2.002 1.005 1.006 3.000 3.001 3.002 4.000 4.001 4.002 5.000	Return Period Climate US/MH Name 1 1 2 3 4 5 6 7 Tank Pump Chamber 1MS 8 Floor BR 12 13 VLB Roof BR 15 16 VLB 4th Floor BR	storm 120 Winter 120 Winter 15 Summer 15 Summer 15 Summer 15 Summer 15 Summer 15 Summer 15 Summer 16 Summer 17 Summer 18 Winter 240 Winter 360 Winter 240 Winter 240 Winter 360 Winter 15 Summer 15 Summer 15 Summer 15 Summer 16 Summer 17 Summer 17 Summer 18 Summer 19 Summer 19 Summer 19 Summer 10 Summe	Return Period 30 30 30 30 30 30 30 30 30 30 30 30 30	Climate Change +0% +0% +0% +0% +0% +0% +0% +0% +0% +0%	240, 360, 480, First (X) Surcharge 2/15 Summer 2/15 Summer 100/240 Summer	, 960, 1440 2, 30, 100 0, 0, 40 First (Y)	First (Z)

	lt (UK) Ltd								Page 12
	sgate Street								
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EC1A 4HJ	Г								Micro
Date 14/	07/2022 17:42		Desi	gned i	by	Craig.	Marchar	nt	
	luced Tank Size	Incre		ked b		2			Drainag
				ork 2		1			
Innovyze	2		Netw	OIK Z	020	• 1			
30 year	Return Period	Summary o	E Cri	tical	Res	sults k	oy Maxi	.mum Lev	el (Rank 1
1		1		Storr			1		
					_				
				urcharg	jed	Flooded			Half Drain
	US/MH		vel	Depth				Overflow	Time
PN	Name	Act. (1	n)	(m)		(m³)	Cap.	(1/s)	(mins)
1.000	1	19.	505	-0.1	145	0.000	0.01		
1.000	1		424	-0.0		0.000	0.28		
1.002	2		174	-0.0		0.000	0.38		
1.003	3		131	-0.0		0.000	0.35		
1.004	4		108	-0.1		0.000	0.32		
2.000	5		299	-0.0		0.000	0.54		
2.001	6	18.	235	-0.1	L28	0.000	0.38		
2.002	7	18.	183	-0.1	L26	0.000	0.39		
1.005	Tank	17.	584	0.5	534	0.000	0.26		317
1.006	Pump Chamber	17.	633	0.6	533	0.000	0.24		
3.000	1MS 8 Floor BR	29.	656	-0.0	)94	0.000	0.01		518
3.001	12	29.	656	-0.0	)44	0.000	0.01		
3.002	13	24.	005	-0.1	L45	0.000	0.01		
4.000	VLB Roof BR	29.	643	-0.1	L07	0.000	0.01		380
4.001	15	29.	644	-0.0	)56	0.000	0.01		
4.002	16	24.	004	-0.1	L46	0.000	0.01		
	VLB 4th Floor BR		978	-0.0		0.000	0.00		
5.001	18		978	-2.7		0.000	0.00		
5.002	19	24.	000	-0.1	150	0.000	0.00		
				Pipe					
		US/MH		Flow			Level		
	PN	Name		(l/s)	S	tatus	Exceede	ed	
	1.000		1	0.3		OK			
	1.001		1	4.7		OK			
	1.002		2	4.8		OK			
	1.003		3	4.8		OK			
	1.004		4	14.7		OK			
	2.000		5	8.4		OK			
	2.001		6 7	12.5		OK			
	2.002		/ Tank	18.4	CIID	OK CHARGED			
	1.005					CHARGED			
	3.000	-		0.1	JUR	OK			
	3.001		12 IN	0.1		OK			
	3.002		13	0.1		OK			
	4.000			0.1		OK			
	4.001		15	0.1		OK			
	4.002		16	0.1		OK			
		VLB 4th Flo		0.0		OK			
	5.001		18	0.0		OK			
	5.002		19	0.0		OK			
				20 Inr					

Meinhardt (UK) Lt	d							Page 13
10 Aldersgate Str	reet							
London								
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Date 14/07/2022 1	L7:42		Desid	ned by	Craig.M	larchar	nt	Micro
File Reduced Tank		TP		xed by	0101911	1012 01101		Drainage
	C DIZC III			ork 2020	1			3
Innovyze			Netwo	JIK ZUZU	/•⊥			
30 year Return P	eriod Sum	mary o	f Crit	ical Re	sults b	y Maxi	.mum Leve	el (Rank 1)
				Storm				
US/MH	I		Return	Climate	First	(X)	First (Y)	First (Z)
PN Name	S	torm	Period	Change	Surcha	arge	Flood	Overflow
6.000 VLB 2n	d BR N 120	Summer	30	+0%				
6.001	21 120	Summer	30	+0%				
6.002	22 15	Winter	30	+0%				
7.000 1MS 11th Fl	oor BR 360	Winter	30	+0%				
7.001	24 360	Winter	30	+0%	100/360	Winter		
7.002	25 15	Winter	30	+0%				
8.000 VLB 2n	d BR S 60	Summer	30	+0%				
8.001	27 60	Summer	30	+0%				
8.002		Winter	30	+0%				
3.003	14 30	Winter	30	+0%				
	0			ircharged			061	Half Drain
US/MH			evel	Depth			Overflow	Time
PN Name	Ac	t. (	(m)	(m)	(m³)	Cap.	(l/s)	(mins)
6.000 VLB 2nd	d br n	29	.616	-0.134	0.000	0.01		107
6.001	21	29	.615	-0.085	0.000	0.01		
6.002	22	24	.004	-0.146	0.000	0.01		
7.000 1MS 11th Flo	oor BR	29	.649	-0.101	0.000	0.01		468
7.001	24	29	.650	-0.050	0.000	0.01		
7.002	25	24	.008	-0.142	0.000	0.01		
8.000 VLB 2nd	l BR S	29	.608	-0.142	0.000	0.01		40
8.001	27	29	.601	-0.099	0.000	0.01		
8.002	28		.004	-0.146		0.01		
3.003	14	23	.519	-0.131	0.000	0.04		
		US/I	ми	Pipe Flow		Level		
	PN	Nan			Status E			
	6.000	VLB	2nd BR		OK			
	6.001			1 0.1	OK			
	6.002	0 11.1		2 0.1	OK			
	7.000 1M	is 11th			OK			
	7.001			4 0.2	OK			
	7.002	T7T		5 0.2	OK			
	8.000	VLB	2nd BR		OK			
	8.001 8.002			7 0.1 8 0.1	OK OK			
	3.002			4 0.6	OK			
	5.005		Ţ	. 0.0	OIC			
			0.0.5-	0.5				
		(c) 1 9	メンニン(12	0 Innov	VZE			

Meinhard	dt (UK) Ltd					I	Page 14
10 Alder	rsgate Street					[	
London							
EC1A 4HJ	Ţ						Micco
Date 14/	/07/2022 17:42		Desig	ned by	Craig.Marcha	nt	Micro
	duced Tank Siz		-	_			Drainage
Innovyze		c incic		rk 2020	1		
тшоуде	-		Netwo	IK ZUZU	• -		
<u>100 yea</u>	ar Return Peri	od Summary			Results by Ma	aximum Le	vel (Rank
			<u>1) 101</u>	Storm			
		Si	mulatio	n Criteri	La		
					nal Flow - % of		
				MADI	D Factor * 10m <sup>3</sup>		
Manh	HOT Start hole Headloss Coe	20102 ()	v	low per I		oeffiecient	
	oul Sewage per he			10% For 1		(1) por / dd/ /	01000
	Number of	Input Hydroar	aphs 0	Number o	f Storage Struc	ctures 7	
			-		f Time/Area Dia		
	Number of	Offline Cont	rols 0	Number o	f Real Time Cor	ntrols O	
		Synthe	etic Rai	infall De	tails		
	Rainf	all Model		FSR		437	
			gland ar		Cv (Summer) 0.9		
	М	5-60 (mm)		20.600	Cv (Winter) 0.9	950	
	Margin for Fl	ood Risk Warr	ning (mn	n )		300.0	
	_	Analysis	Timeste	ep 2.5 Se	cond Increment	(Extended)	
			IS Stati			OFF	
			/D Statı la Statı			ON ON	
		INCLU	La Statt	15		011	
		Profile(s)			Summer	and Winter	
	Duratio	. ,	L5, 30,	60, 120,	240, 360, 480,		
	Return Period	-				2, 30, 100	
	Climate	Change (%)				0, 0, 40	
PN	US/MH Name	Storm		Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow
1.000	1	60 Summer	100	+40%			
1.001	1	15 Summer	100	+40%			
1.002	2	15 Summer	100	+40%			
1.003	3	240 Summer	100 100	+40% +40%			
2.000	4	240 Summer 15 Summer	100	+408 +408			
2.001	6	15 Summer	100	+40%			
2.002	7	15 Summer	100	+40%			
1.005	Tank	240 Summer	100	+40%	2/15 Summer		
1.006	Pump Chamber 1MS 8 Floor BR	240 Summer 480 Winter	100 100	+40% +40%	2/15 Summer		
3.000	1M3 8 F1001 BK 12	480 Winter	100		100/240 Summer		
1	13	30 Winter	100	+40%			
3.002		480 Winter	100	+40%			
4.000	VLB Roof BR		100				
4.000 4.001	15	480 Winter	100 100	+40% +40%			
4.000 4.001 4.002		480 Winter 15 Winter	100 100 100	+40% +40% +40%			
4.000 4.001 4.002	15 16 VLB 4th Floor BR	480 Winter 15 Winter	100	+40%			
4.000 4.001 4.002 5.000	15 16 VLB 4th Floor BR	480 Winter 15 Winter 1440 Summer	100 100	+40% +40%			

London EC1A 4HJ Date 14/0	gate Street								
EC1A 4HJ Date 14/0 File Redu									
Date 14/0 File Redu									
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	7/2022 17:42		Desi	gned l	by C	Craig.N	larchar	nt	Drainac
Innovyze	ced Tank Size	Incre	Chec	ked b	У				יטומוומנ
			Netw	ork 2	020.	.1			
<u>100 year</u>	Return Perio	od Summary				esults	by Ma	ximum L	evel (Ran
			1) fc	or Sto	rm				
						looded			Half Drain
514			vel	Depth				Overflow	Time
PN	Name	Act. (1	n)	(m)		(m³)	Cap.	(l/s)	(mins)
1.000	1	19.	515	-0.1	.35	0.000	0.02		
1.001	1		446	-0.0		0.000	0.51		
1.002	2		203	-0.0		0.000	0.70		
1.003	3		179	-0.0		0.000	0.19		
1.004	4		178	-0.0		0.000	0.15		
2.000	5		359	-0.0		0.000	0.98		
2.001	6		278	-0.0		0.000	0.69		
2.002	7 		227	-0.0		0.000	0.71		264
1.005	Tank Pump Chamber		178	1.1		0.000	0.35 0.31		264
1.006 3.000	1MS 8 Floor BR		424 715	1.4 -0.0		0.000 0.000	0.31		
3.000	1MS 8 F100F BR		715	0.0		0.000	0.01		
3.002	13		005	-0.1		0.000	0.01		
4.000	VLB Roof BR		689	-0.0		0.000	0.01		
4.001	15		690	-0.0		0.000	0.01		
4.002	16		004	-0.1		0.000	0.01		
5.000 VL	B 4th Floor BR	27.	039	-0.0	11	0.000	0.00		
5.001	18	27.	039	-2.6	61	0.000	0.00		
5.002	19	24.	000	-0.1	.50	0.000	0.00		
				Pipe					
		US/MH		Flow			Level		
	PN	Name		(l/s)	St	atus	Exceede	ed	
	1.000		1	0.9		OK			
	1.001		1	8.5		OK			
	1.002		2	8.7		OK			
	1.003		3	2.6		OK			
	1.004		4	6.8		OK			
	2.000 2.001		5 6	15.2 22.6		OK OK			
	2.001		6 7	33.4		OK OK			
	1.005		, Tank		SURC	CHARGED			
	1.005	Pump Ch				CHARGED			
	3.000	1MS 8 Flo				DD RISK			
	3.001		12			DD RISK			
	3.002		13	0.1		OK			
	4.000	VLB RC	of BR	0.1		OK			
	4.001		15	0.1		OK			
	4.002		16	0.1		OK			
		VLB 4th Flo		0.0		OK			
	5.001		18	0.0		OK			
	5.002		19	0.0		OK			
				20 Inr					

leinnardt	(UK) Ltd							Page 16
-	ate Street							
London								
EC1A 4HJ								Micro
	/2022 17:42				Craig.M	larchar	nt	Drainago
File Reduc	ed Tank Size	e Incre	. Checł	ked by				
Innovyze			Netwo	ork 2020	0.1			
1.0.0		1 9	6 9					
100 year	Return Peri	od Summar				by Ma	ximum Le	evel (Rank
			1) 10	r Storm				
			<b>D</b>	<b>a</b> 1.4	<b>1</b>	(77)	Distant (W)	Rivet (R)
PN	US/MH Name	Storm		Climate Change			First (Y) Flood	First (Z) Overflow
6.000	VLB 2nd BR N	120 Winter	r 100	+40%				
6.001		120 Winter 120 Winter						
6.002	22							
	11th Floor BR							
7.001	24	480 Winter	r 100	+40%	100/360	Winter		
7.002	25	60 Winter	r 100	+40%				
8.000	VLB 2nd BR S			+40%				
8.001	27							
8.002	28			+40%				
3.003	14	30 Summer	r 100	+40%				
		,	Wator SI	rabarged	Flooded			Half Drain
	US/MH		Level	Depth		Flow /	Overflow	Time
PN	Name	Act.	(m)	(m)	(m <sup>3</sup> )	Cap.	(1/s)	(mins)
6.000	VLB 2nd BR N	2	9.635	-0.115	0.000	0.01		185
6.001	21	2	9.635	-0.065	0.000	0.01		
6.002	22	2	4.004	-0.146	0.000	0.01		
	11th Floor BR		9.701	-0.049		0.01		
7.001	24		9.701	0.001		0.01		
7.002 8.000	25 VLB 2nd BR S		4.008 9.617	-0.142		0.01 0.01		61
8.000	VLB 2110 BK S 27		9.616	-0.133		0.01		01
8.002	28		4.004	-0.146		0.01		
3.003	14				0.000	0.04		
				Pipe		_		
		US/M		Flow	<b>a</b>	Level		
	PN	Name	9	(l/s)	Status	Exceed	ea	
	6.000	VLB 2	nd BR N	0.1	OK			
	6.001		21	0.1	OK			
	6.002	1.10 11.1 -	22	0.1	OK			
		1MS 11th F			JOOD RISK			
	7.001 7.002		24 25	0.2 FL 0.2	JOOD RISK OK			
	8.000		nd BR S	0.2	OK OK			
	8.001		27	0.1	OK			
	8.002		28	0.1	OK			
	3.003		14	0.6	OK			
			000 000	0 Innov				

		() Lto									Pa	.ge 1
	gate	e Stre	eet									
											N	licro
L4/0	7/20	)22 17	7:48		D	esigned by	Craig	g.Marc	chan	t		rainad
Revi	sed	Planr	ning	WCS M	lo C	necked by						
ze					N	etwork 202	0.1					
		STODM	/ CFW	ידר סידי	STON by	the Modif	iod P	ation		lotho	2	
		010101			STON DY	CIIC MOUII	ICU IC				<u>u</u>	
				Netw	ork Des	ign Table	for S	torm				
		#	- Ind	licates	nine le	nath does no	t matcl	h coorc	linat	- 69		
		π	1110	ireaces	pipe ie.							
	-					Base	k	HYD		Sect	ion Ty	-
(1	n)	(m)	(1:X	) (ha	) (mins	) Flow (1/s)	(mm)	SECT	(mm)			Desi
8	.260	0.200	41.	3 0.0	00 5.0	0.0	0.600	0	100	Pipe	/Condu	it 🦰
25	.598	0.300	85.	3 0.0	00 5.0	0.0	0.600	0	150	Pipe	/Condu	it 🦰
										_		-
										-		
5.0	J00#	0.050	100.	0 0.0	00 0.0	J 0.0	0.600	0	150	Pipe	/Condu	it 🦰
5.0	#000	0.050	100.	0.0	14 5.0	0.0	0.600	0	150	Pipe	/Condu	
										_		
10.0	J00#	0.100	100.	0 0.0	00 0.0	5 0.0	0.600	0	150	ріре	/Condu	it 🦀
5.0	#00C	0.050	100.	0.0	14 5.0	0.0	0.600	0	150	Pipe	/Condu	
										-		
10.0	000#	0.100	100.	0 0.0	00 0.0	0.0	0.600	0	150	Pipe	/Condu	it 🦀
10.0	000#	0.100	100.	0 0.0	0.0	0.0	0.600	0	150	Pipe	/Condu	it 🔒
					Networ}	Results 7	[able					
DN	Dai	in 1		110 / TT	S T Area	7 Pago	Foul	মনন হা	014	Vol	Can	Flow
				(m)	(ha)						-	
.000	50	.00	5.11	4.200	0.000	0.0	0.0	C	0.0	1.20	9.5	0.0
.000	50	.00	5.39	4.300	0.000	0.0	0.0	C	0.0	1.09	19.2	0.0
												6.0 6.0
	50		5.55	0.00	0.045	0.0	0.0	Ĺ		1.00	±1.0	0.0
.000							0.0			1.00	17.8	1.9
												1.9 1.9
	50	.00	5.55	J.100	0.014	0.0	0.0	Ĺ		1.00	11.0	1.7
.000							0.0			1.00	17.8	1.9
											17.8	1.9
.002	50	.00	5.33	3.100	0.014	0.0	0.0	Ĺ	.0	1.00	17.8	1.9
									-	1 00		2 0
.003	50	.00	5.50	3.000	0.028	0.0	0.0	(	0.0	1.00	17.8	3.8
.003	50	.00	5.50	3.000	0.028	0.0	0.0	(	0.0	1.00	17.8	3.8
.003	50	.00	5.50	3.000	0.028	0.0	0.0	ί	0.0	1.00	17.8	3.8
	lers lers lHJ L4/0 Revi Zevi Zze Len (r 8 25 6 5.0 10.0 5.0 10.0 5.0 10.0 000 .000 .000 .000 .000 .000 .000 .000 .000 .000	dersgate h HJ L4/07/20 Revised ////////////////////////////////////	dersgate Stre h HJ L4/07/2022 1' Revised Plann //2e Length Fall (m) 8.260 0.200 25.598 0.300 6.201 0.050 5.000# 0.050 5.000# 0.050 5.000# 0.050 10.000# 0.100 5.000# 0.050 10.000# 0.100 10.000# 0.100 PN Rain T (mm/hr) (m .000 50.00 .001 50.00 .000 50.00 .000 50.00 .000 50.00 .000 50.00 .000 50.00	Aersgate Street A AHJ AHJ A/07/2022 17:48 Revised Planning //2e STORM SEW # - Ind Length Fall Slop (m) (m) (1:X 8.260 0.200 41. 25.598 0.300 85. 6.201 0.050 124. 5.000# 0.050 100. 5.000# 0.050 100. 5.000# 0.050 100. 5.000# 0.050 100. 5.000# 0.050 100. 5.000# 0.050 100. 5.000# 0.050 100. 10.000# 0.100 100. 10.000# 0.100 100. 10.000# 0.100 100. 10.000# 0.100 100. 10.000 50.00 5.11 000 50.00 5.11 000 50.00 5.11 000 50.00 5.11 000 50.00 5.11 000 50.00 5.11 000 50.00 5.11	dersgate Street h HJ L4/07/2022 17:48 Revised Planning WCS M //ze STORM SEWER DE Netw # - Indicates Length Fall Slope I.Ar (m) (m) (1:X) (ha 8.260 0.200 41.3 0.0 25.598 0.300 85.3 0.0 6.201 0.050 124.0 0.0 5.000# 0.050 100.0 0.0 10.000# 0.100 100.0 0.0 10.000 50.00 5.11 4.200 000 50.00 5.39 4.300 001 50.00 5.08 9.800 001 50.00 5.17 9.750 002 50.00 5.08 9.800 001 50.00 5.17 9.750 002 50.0	dersgate Street         n           4HJ	Bersgate Street         Image: head of the street         Image: head of the street           14HJ         Id/07/2022 17:48         Designed by Checked by           Revised Planning WCS Mo         Network 202           STORM SEWER DESIGN by the Modif         Network 202           store of the store of	Bersgate Street         Designed by Craig           14HJ         Designed by Craig           14U         Checked by           72e         Network 2020.1           STORM SEWER DESIGN by the Modified R           Network Design Table for S           # - Indicates pipe length does not mate           Length Fall Slope I.Area T.E. Base k           (m)         (m) (1:X)           8.260 0.200         41.3           0.000         5.00           0.000         0.00           0.001         0.50           0.001         0.000           0.001         0.000           0.000         0.00           0.000         0.00           0.000         0.00           0.000         0.00           0.000         0.00           0.000         0.00           0.000         0.00           0.000#         0.00           0.000#         0.00           0.000#         0.00           0.000#         0.00           0.000#         0.00           0.000#         0.00           0.000#         0.00           0.000#         0.00           0.000# </td <td>Bersgate Street         Designed by Craig.Marc           1HJ         Designed by Craig.Marc           2evised Planning WCS Mo         Checked by           72e         Network 2020.1           STORM SEWER DESIGN by the Modified Rations           Metwork Design Table for Storm           # - Indicates pipe length does not match coord           Length Fall Slope I.Area T.E.         Base         k           (m)         (1:X)         (ha)         (mins) Flow (1/s)         (mm) SECT           8.260         0.200         41.3         0.000         5.00         0.0         0.600         o           25.598         0.300         85.3         0.000         5.00         0.0         0.600         o           5.000#         0.501         100.0         0.000         0.00         0.00         o         o           5.000#         0.501         100.0         0.000         0.00         0.00         o         o           5.000#         0.501         0.00.0         0.00         0.00         o         o           6.0010         0.000         0.00         0.00         0.00         o         o         o           5.000#         0.501         0.00<!--</td--><td>Bersgate Street         Designed by Craig.Marchan           HHJ         Designed by Craig.Marchan           Revised Planning WCS Mo         Checked by           STORM SEWER DESIGN by the Modified Rational M         Network 2020.1           STORM SEWER DESIGN by the Modified Rational M         Network Design Table for Storm           # - Indicates pipe length does not match coordinat         Metwork Design Table for Storm           B.260 0.200 41.3 0.000 5.00 0.0 0.600 0 100         25.598 0.300 85.3 0.000 5.00 0.0 0.600 0 150           5.000# 0.050 100.0 0.014 5.00 0.0 0.600 0 150         5.000 0.00 0.600 0 150           5.000# 0.050 100.0 0.014 5.00 0.0 0.600 0 150         150           5.000# 0.050 100.0 0.014 5.00 0.0 0.600 0 150         150           5.000# 0.050 100.0 0.014 5.00 0.0 0.600 0 150         150           10.000# 0.100 100.0 0.000 0.00 0.00 0.00</td><td>Bersgate Street         Designed by Craig.Marchant           14J         Designed by Craig.Marchant           24/07/2022 17:48         Designed by Craig.Marchant           Revised Planning WCS Mo         Checked by           72e         Network 2020.1           STORM SEWER DESIGN by the Modified Rational Metho           Network 2020.1           # - Indicates pipe length does not match coordinates           Length Fall Slope I.Area T.E. Base k HYD DIA Sect           (m) (n) (1:X) (ha) (mins) Flow (1/s) (mm) SECT (mm)           8.260 0.200 41.3 0.000 5.00 0.0 0.600 o 150 Pipe           5.508 0.300 85.3 0.000 5.00 0.0 0.600 o 150 Pipe           5.000# 0.050 100.0 0.014 5.00 0.0 0.600 o 150 Pipe           5.000# 0.050 100.0 0.014 5.00 0.0 0.600 o 150 Pipe           Network Results Table           Network Results Table           Network Results Table           Network Results Table           Network Sound 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.</td><td>Bersgate Street         Designed by Craig.Marchant           HHJ         Checked by           Yze         Network 2020.1           STORM SEWER DESIGN by the Modified Rational Method         Network 2020.1           # - Indicates pipe length does not match coordinates           # - Indicates pipe length does not match coordinates           Bength Fall Slope I.Area T.E. Base k HYD DIA Section Typ (m) (m) (1:X) (ha) (mins) Flow (1/s) (mm) SECT (mm)           8.260 0.200 41.3 0.000 5.00 0.0 0.600 o 150 Pipe/Condu           5.2010 0.50 124.0 0.045 0.00 0.0 0.600 o 150 Pipe/Condu           5.000# 0.050 100.0 0.014 5.00 0.0 0.600 o 150 Pipe/Condu           5.000# 0.050 100.0 0.014 5.00 0.0 0.600 o 150 Pipe/Condu           5.000# 0.050 100.0 0.000 0.00 0.00 0.00 0.00 0</td></td>	Bersgate Street         Designed by Craig.Marc           1HJ         Designed by Craig.Marc           2evised Planning WCS Mo         Checked by           72e         Network 2020.1           STORM SEWER DESIGN by the Modified Rations           Metwork Design Table for Storm           # - Indicates pipe length does not match coord           Length Fall Slope I.Area T.E.         Base         k           (m)         (1:X)         (ha)         (mins) Flow (1/s)         (mm) SECT           8.260         0.200         41.3         0.000         5.00         0.0         0.600         o           25.598         0.300         85.3         0.000         5.00         0.0         0.600         o           5.000#         0.501         100.0         0.000         0.00         0.00         o         o           5.000#         0.501         100.0         0.000         0.00         0.00         o         o           5.000#         0.501         0.00.0         0.00         0.00         o         o           6.0010         0.000         0.00         0.00         0.00         o         o         o           5.000#         0.501         0.00 </td <td>Bersgate Street         Designed by Craig.Marchan           HHJ         Designed by Craig.Marchan           Revised Planning WCS Mo         Checked by           STORM SEWER DESIGN by the Modified Rational M         Network 2020.1           STORM SEWER DESIGN by the Modified Rational M         Network Design Table for Storm           # - Indicates pipe length does not match coordinat         Metwork Design Table for Storm           B.260 0.200 41.3 0.000 5.00 0.0 0.600 0 100         25.598 0.300 85.3 0.000 5.00 0.0 0.600 0 150           5.000# 0.050 100.0 0.014 5.00 0.0 0.600 0 150         5.000 0.00 0.600 0 150           5.000# 0.050 100.0 0.014 5.00 0.0 0.600 0 150         150           5.000# 0.050 100.0 0.014 5.00 0.0 0.600 0 150         150           5.000# 0.050 100.0 0.014 5.00 0.0 0.600 0 150         150           10.000# 0.100 100.0 0.000 0.00 0.00 0.00</td> <td>Bersgate Street         Designed by Craig.Marchant           14J         Designed by Craig.Marchant           24/07/2022 17:48         Designed by Craig.Marchant           Revised Planning WCS Mo         Checked by           72e         Network 2020.1           STORM SEWER DESIGN by the Modified Rational Metho           Network 2020.1           # - Indicates pipe length does not match coordinates           Length Fall Slope I.Area T.E. Base k HYD DIA Sect           (m) (n) (1:X) (ha) (mins) Flow (1/s) (mm) SECT (mm)           8.260 0.200 41.3 0.000 5.00 0.0 0.600 o 150 Pipe           5.508 0.300 85.3 0.000 5.00 0.0 0.600 o 150 Pipe           5.000# 0.050 100.0 0.014 5.00 0.0 0.600 o 150 Pipe           5.000# 0.050 100.0 0.014 5.00 0.0 0.600 o 150 Pipe           Network Results Table           Network Results Table           Network Results Table           Network Results Table           Network Sound 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.</td> <td>Bersgate Street         Designed by Craig.Marchant           HHJ         Checked by           Yze         Network 2020.1           STORM SEWER DESIGN by the Modified Rational Method         Network 2020.1           # - Indicates pipe length does not match coordinates           # - Indicates pipe length does not match coordinates           Bength Fall Slope I.Area T.E. Base k HYD DIA Section Typ (m) (m) (1:X) (ha) (mins) Flow (1/s) (mm) SECT (mm)           8.260 0.200 41.3 0.000 5.00 0.0 0.600 o 150 Pipe/Condu           5.2010 0.50 124.0 0.045 0.00 0.0 0.600 o 150 Pipe/Condu           5.000# 0.050 100.0 0.014 5.00 0.0 0.600 o 150 Pipe/Condu           5.000# 0.050 100.0 0.014 5.00 0.0 0.600 o 150 Pipe/Condu           5.000# 0.050 100.0 0.000 0.00 0.00 0.00 0.00 0</td>	Bersgate Street         Designed by Craig.Marchan           HHJ         Designed by Craig.Marchan           Revised Planning WCS Mo         Checked by           STORM SEWER DESIGN by the Modified Rational M         Network 2020.1           STORM SEWER DESIGN by the Modified Rational M         Network Design Table for Storm           # - Indicates pipe length does not match coordinat         Metwork Design Table for Storm           B.260 0.200 41.3 0.000 5.00 0.0 0.600 0 100         25.598 0.300 85.3 0.000 5.00 0.0 0.600 0 150           5.000# 0.050 100.0 0.014 5.00 0.0 0.600 0 150         5.000 0.00 0.600 0 150           5.000# 0.050 100.0 0.014 5.00 0.0 0.600 0 150         150           5.000# 0.050 100.0 0.014 5.00 0.0 0.600 0 150         150           5.000# 0.050 100.0 0.014 5.00 0.0 0.600 0 150         150           10.000# 0.100 100.0 0.000 0.00 0.00 0.00	Bersgate Street         Designed by Craig.Marchant           14J         Designed by Craig.Marchant           24/07/2022 17:48         Designed by Craig.Marchant           Revised Planning WCS Mo         Checked by           72e         Network 2020.1           STORM SEWER DESIGN by the Modified Rational Metho           Network 2020.1           # - Indicates pipe length does not match coordinates           Length Fall Slope I.Area T.E. 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Base k HYD DIA Section Typ (m) (m) (1:X) (ha) (mins) Flow (1/s) (mm) SECT (mm)           8.260 0.200 41.3 0.000 5.00 0.0 0.600 o 150 Pipe/Condu           5.2010 0.50 124.0 0.045 0.00 0.0 0.600 o 150 Pipe/Condu           5.000# 0.050 100.0 0.014 5.00 0.0 0.600 o 150 Pipe/Condu           5.000# 0.050 100.0 0.014 5.00 0.0 0.600 o 150 Pipe/Condu           5.000# 0.050 100.0 0.000 0.00 0.00 0.00 0.00 0

Meinhardt (UK) Ltd		Page 2
10 Aldersgate Street		
London		
EC1A 4HJ		Micro
Date 14/07/2022 17:48	Designed by Craig.Marchant	Drainage
File Revised Planning WCS Mo	Checked by	Diamage
Innovyze	Network 2020.1	

#### Area Summary for Storm

Pipe Number	РІМР Туре	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000 2.000 1.001	- User User User User User User		100 100 100 100 100 100 100	0.000 0.022 0.008 0.003 0.004 0.003 0.004	0.000 0.022 0.008 0.003 0.004 0.003 0.004	$\begin{array}{c} 0.000\\ 0.000\\ 0.022\\ 0.030\\ 0.032\\ 0.036\\ 0.039\\ 0.045\\ \end{array}$
1.002 3.000 3.001 3.002 4.000 4.001 4.002 3.003	- User - User - -		100 100 100 100 100 100 100	0.000 0.014 0.000 0.014 0.000 0.000 0.000 0.000 Total 0.073	0.000 0.014 0.000 0.014 0.000 0.000 0.000 0.000 Total 0.073	0.000 0.014 0.000 0.014 0.000 0.000 0.000 Total 0.073

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Meinhardt (UK) Ltd 10 Aldersgate Street						Page 3
London						
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Date 14/07/2022 17:4	8	Degiar	ed by Cr:	aig.Marcha	ant	Micro
File Revised Plannin		Checke		arg.Marcin	anc	Drainage
Innovyze	g web mo		ck 2020.1			
IIIIOVYZC		Neewor				
	Online	Contro	ls for St	corm		
Pump Manhole	e: Pump Chamb	oers, D	S/PN: 1.0	02, Volum	ne (m³):	0.5
	Inve	ert Level	L (m) 2.950	)		
Depth (m)	Flow (l/s) Dep	oth (m) 1	Flow (l/s)	Depth (m)	Flow (l/s)	
0.100 0.200	1.0000 1.5000	0.300 0.400	2.0000 3.5000		4.3000 4.3000	
Pump N	Manhole: 4, I	DS/PN:	3.001, Vo	olume (m³)	): 0.1	
	Inve	ert Level	L (m) 9.750	)		
Depth (m) Flow (l/s)	Depth (m) Flow	w (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.025 0.1000	0.050	0.2000	0.075	0.3000	0.100	0.3000
Pump N	Manhole: 7, I	DS/PN:	4.001, Vo	olume (m³)	): 0.1	
	Inve	ert Level	L (m) 9.750	)		
Depth (m) Flow (l/s)	Depth (m) Flow	w (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.038 0.1000	0.075	0.2000	0.110	0.3000	0.150	0.3000
	©198	82-2020	Innovyze	2		

Meinhardt (UK) Ltd		Page 4
10 Aldersgate Street		
London		
EC1A 4HJ		Micro
Date 14/07/2022 17:48	Designed by Craig.Marcha	nt Drainage
File Revised Planning WCS Mo	Checked by	Drainage
Innovyze	Network 2020.1	
	Channel free Channel	
Storage	Structures for Storm	
Cellular Storage Manho	ole: Attenuation Tank, DS/	'PN: 1.001
	rt Level (m) 3.000 Safety Fa Base (m/hr) 0.00000 Porc Side (m/hr) 0.00000	
Depth (m) Area (m <sup>2</sup> ) Inf. Ar	ea (m²) Depth (m) Area (m²) In	nf. Area (m²)
0.000 20.0	0.0 1.001 0.0	0.0
1.000 20.0	0.0	0.0
Cellular Storage Mar	hole: Courtyard BR, DS/PN	1: 3.000
Inve	rt Level (m) 9.800 Safety Fa	actor 20
	Base (m/hr) 0.00000 Porc	
Depth (m) Area (m²) Inf. Ar	ea (m²) Depth (m) Area (m²) In	nf. Area (m²)
0.000 95.0	0.0 0.101 0.0	0.0
0.100 95.0	0.0	
Cellular Storage Mar	hole: Blue Roof 18, DS/PN	1: 4.000
Inve Infiltration Coefficient Infiltration Coefficient		actor 2.0 Desity 0.95
Depth (m) Area (m <sup>2</sup> ) Inf. Ar	ea (m²) Depth (m) Area (m²) In	nf. Area (m²)
0.000 62.0	0.0 0.151 0.0	0.0
0.150 62.0	0.0	
©19	82-2020 Innovyze	

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	sgate Street								
ondon									
CIA 4HJ									Micro
ate 14/0	07/2022 17:48	3		Desig	gned by	Craig.	Marcha	nt	
'ile Revi	ised Planning	y WCS	Мо	Chec	ked by				Drainag
nnovyze				Netwo	ork 2020	).1			
2 year F	eturn Perioc	l Summ	ary o		<u>ical Re</u> s Storm	sults b	y Maxi	mum Leve	el (Rank 1
	Hot Star ble Headloss Co al Sewage per h Number of	Start t Leve eff (G ectare Input	Factor (mins) l (mm) lobal) (l/s) Hydrog	1.000 0 0.500 0.000 raphs 0	MAD Flow per Number o	nal Flow D Factor Person p of Stora	* 10m <sup>3</sup> Inlet C per Day ge Struc	/ha Stora oeffiecie (l/per/da ctures 3	ge 2.000 nt 0.800
					Number o Number o			5	
		fall Mc Reg M5-60 (	odel gion En		FSR Ind Wales 20.500	Rat		950	
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		Ar	- D	Timest TS Stat VD Stat ia Stat	us	econd In	crement		
	-	Profion(s) d(s) (	D D Inert ile(s) (mins) years)	TS Stat VD Stat ia Stat	us us us		Summer	OF	FF DN DN Pr 40 00
PN	Durati Return Perio	Prof: on(s) ( d(s) (χ e Chang	D D Inert ile(s) (mins) years)	TS Stat VD Stat ia Stat 15, 30, Return	us us us	, 240, 3	Summer 60, 480	OF () () () () () () () () () () () () ()	FF DN DN Pr 40 00
	Durati Return Perio Climat US/MH Name	Profi on(s) ( d(s) ( g Chang S	D D Inert ile(s) (mins) years) ge (%) torm	TS Stat VD Stat ia Stat 15, 30, Return Period	on climate Change	, 240, 3 <b>First</b>	Summer 60, 480	OF () () () () () () () () () () () () ()	FF DN DN er 40 00 40 <b>First (Z)</b>
1.000	Durati Return Perio Climat <b>US/MH</b> Name Green Roof	Profi on(s) ( d(s) ( g Chang <b>s</b> 1 60	D D Inert ile(s) (mins) years) ge (%) torm Summer	TS Stat VD Stat ia Stat 15, 30, Return Period	60, 120 Climate Change	, 240, 3 <b>First</b>	Summer 60, 480	OF () () () () () () () () () () () () ()	FF DN DN er 40 00 40 <b>First (Z)</b>
1.000 2.000	Durati Return Perio Climat US/MH Name	Prof: on(s) ( d(s) ( e Chang <b>s</b> 1 60 2 60	D D Inert ile(s) (mins) years) ge (%) torm	TS Stat VD Stat ia Stat 15, 30, Return Period 2 2	60, 120 Climate Change +0% +0%	, 240, 3 First Surch	Summer 60, 480	OF () () () () () () () () () () () () ()	FF DN DN er 40 00 40 <b>First (Z)</b>
1.000 2.000	Durati Return Perio Climat <b>US/MH</b> Name Green Roof Green Roof	Prof: on(s) ( d(s) ( e Chang <b>s</b> 1 60 2 60 nk 60	D D Inert ile(s) (mins) years) ge (%) torm Summer	TS Stat VD Stat ia Stat 15, 30, Return Period 2 2 2 2	60, 120 Climate Change +0% +0% +0%	, 240, 3 First Surch 2/15	Summer 60, 480 (X) : arge	OF () () () () () () () () () () () () ()	FF DN DN er 40 00 40 <b>First (Z)</b>
1.000 2.000 1.001 1.002 3.000	Durati Return Perio Climat <b>US/MH</b> Name Green Roof Green Roof Attenuation Tar	Prof: on(s) ( d(s) ( e Chang s 1 60 2 60 1k 60 cs 60 3R 120	D D D Inert (mins) years) ge (%) torm Summer Summer Summer Summer Summer Summer	TS Stat VD Stat ia Stat 15, 30, <b>Return</b> <b>Period</b> 2 2 2 2 2 2 2 2 2 2 2 2	60, 120 60, 120 Climate Change +0% +0% +0% +0% +0%	, 240, 3 First Surch 2/15	Summer 60, 480 (X) arge Summer	OF () () () () () () () () () () () () ()	FF DN DN er 40 00 40 <b>First (Z)</b>
1.000 2.000 1.001 1.002 3.000 3.001	Durati Return Perio Climat <b>US/MH</b> Name Green Roof Green Roof Attenuation Tar Pump Chamber	Prof: on(s) ( d(s) ( e Chang s 1 60 2 60 k 60 cs 60 BR 120 4 120	D D D Inert ile(s) (mins) years) ge (%) torm Summer Summer Summer Summer Summer Summer	TS Stat VD Stat ia Stat 15, 30, <b>Return</b> <b>Period</b> 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	60, 120 60, 120 <b>Climate</b> <b>Change</b> +0% +0% +0% +0% +0% +0% +0% +0%	, 240, 3 First Surch 2/15	Summer 60, 480 (X) arge Summer	OF () () () () () () () () () () () () ()	FF DN DN er 40 00 40 <b>First (Z)</b>
1.000 2.000 1.001 1.002 3.000 3.001 3.002	Durati Return Perio Climat <b>US/MH</b> Name Green Roof Green Roof Attenuation Tar Pump Chamber Courtyard H	Prof: on(s) ( d(s) ( e Chang c Chang s 1 60 2 60 0 k 60 cs 60 3R 120 4 120 5 120	D D D Inert ile(s) (mins) years) ge (%) torm Summer Summer Summer Summer Summer Summer Summer	TS Stat VD Stat ia Stat 15, 30, Period 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	60, 120 60, 120 Climate Change +0% +0% +0% +0% +0% +0% +0% +0% +0%	, 240, 3 First Surch 2/15	Summer 60, 480 (X) arge Summer	OF () () () () () () () () () () () () ()	FF DN DN er 40 00 40 <b>First (Z)</b>
1.000 2.000 1.001 1.002 3.000 3.001	Durati Return Perio Climat <b>US/MH</b> Name Green Roof Green Roof Attenuation Tar Pump Chamber	Prof: on(s) ( d(s) ( e Chang c Chang s 1 60 2 60 k 60 c 60 c 60 c 60 c 72 c 60 c 72 c 120 c 12	D D D Inert ile(s) (mins) years) ge (%) torm Summer Summer Summer Summer Summer Summer Summer	TS Stat VD Stat ia Stat 15, 30, Period 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	60, 120 60, 120 Climate Change +0% +0% +0% +0% +0% +0% +0% +0% +0% +0%	, 240, 3 First Surch 2/15	Summer 60, 480 (X) arge Summer Summer	OF () () () () () () () () () () () () ()	FF DN DN er 40 00 40 <b>First (Z)</b>
1.000 2.000 1.001 3.000 3.001 3.002 4.000	Durati Return Perio Climat <b>US/MH</b> Name Green Roof Green Roof Attenuation Tar Pump Chamber Courtyard H	Prof: on(s) ( d(s) ( e Chang c Chang s 1 60 2 60 0k 60 cs 60 3R 120 4 120 5 120 18 120 7 120	D D D Inert	TS Stat VD Stat ia Stat 15, 30, Period 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	60, 120 60, 120 60, 120 60, 120	, 240, 3 First Surch 2/15 2/15	Summer 60, 480 (X) arge Summer Summer	OF () () () () () () () () () () () () ()	FF DN DN er 40 00 40 <b>First (Z)</b>
1.000 2.000 1.001 3.000 3.001 3.002 4.000 4.001	Durati Return Perio Climat <b>US/MH</b> Name Green Roof Green Roof Attenuation Tar Pump Chamber Courtyard H	Prof: on(s) ( d(s) ( e Chang s 1 60 2 60 k 60 cs 60 3R 120 4 120 5 120 18 120 7 120 8 120	D D D Inert	TS Stat VD Stat ia Stat 15, 30, Period 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	60, 120 60, 120 <b>Climate</b> <b>Change</b> +0% +0% +0% +0% +0% +0% +0% +0%	, 240, 3 First Surch 2/15 2/15	Summer 60, 480 (X) arge Summer Summer	OF () () () () () () () () () () () () ()	FF DN DN er 40 00 40 <b>First (Z)</b>
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$1.000 \\ 2.000 \\ 1.001 \\ 1.002 \\ 3.000 \\ 3.001 \\ 3.002 \\ 4.000 \\ 4.001 \\ 4.002$	Durati Return Perio Climat <b>US/MH</b> Name Green Roof Green Roof Attenuation Tar Pump Chamber Courtyard H	Prof: on(s) ( d(s) ( e Chang s 1 60 2 60 k 60 cs 60 3R 120 4 120 5 120 18 120 7 120 8 120	D D D Inert	TS Stat VD Stat ia Stat 15, 30, <b>Return Period</b> 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	60, 120 60, 120 <b>Climate</b> <b>Change</b> +0% +0% +0% +0% +0% +0% +0% +0%	, 240, 3 First Surch 2/15 2/15 100/60	Summer 60, 480 (X) arge Summer Summer Summer	OF () () () () () () () () () () () () ()	FF DN Pr 40 00 40 First (Z) Overflow Half Drain
$1.000 \\ 2.000 \\ 1.001 \\ 1.002 \\ 3.000 \\ 3.001 \\ 3.002 \\ 4.000 \\ 4.001 \\ 4.002$	Durati Return Perio Climat <b>US/MH</b> Name Green Roof Green Roof Attenuation Tar Pump Chamber Courtyard H Blue Roof :	Prof: on(s) ( d(s) ( e Chang c Chang s 1 60 2 60 nk 60 cs 60 3R 120 4 120 5 120 18 120 7 120 8 120 6 120	D D D Inert	TS Stat VD Stat ia Stat 15, 30, Period 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	60, 120 60, 120 Climate Change +0% +0% +0% +0% +0% +0% +0% +0% +0% +0%	<pre>, 240, 3      First      Surch      2/15      2/15      100/60      Flooded</pre>	Summer 60, 480 (X) arge Summer Summer Summer	OF ( ) ( ) ( ) ( ) ) ( ) ) ( ) ( ) ) ( ) ( ) ) () (	FF DN Pr 40 00 40 First (Z) Overflow Half Drain
1.000 2.000 1.001 1.002 3.000 3.001 3.002 4.000 4.001 4.002 3.003	Durati Return Perio Climat US/MH Name Green Roof Green Roof Attenuation Tar Pump Chamber Courtyard H Blue Roof :	Prof: on(s) ( d(s) ( e Change s c Change c Change s c Change s c Change s c Change s c Change s c Change s c Change s c Chang c Change s c Change s c Change c Ch	D D D Inert	TS Stat VD Stat ia Stat 15, 30, Period 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	60, 120 60, 120 Climate Change +0% +0% +0% +0% +0% +0% +0% +0% +0% +0%	<pre>, 240, 3</pre>	Summer 60, 480 (X) arge Summer Summer Summer	OF ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) (	FF DN Pr 40 00 40 First (Z) Overflow Half Drain Time

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#### 2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (1/s)	Half Drain Time (mins)
1.001	Attenuation Tank		3.208	0.058	0.000	0.14		42
1.002	Pump Chambers		3.219	0.119	0.000	0.13		
3.000	Courtyard BR		9.819	-0.131	0.000	0.02		93
3.001	4		9.815	-0.085	0.000	0.02		
3.002	5		3.112	-0.138	0.000	0.02		
4.000	Blue Roof 18		9.829	-0.121	0.000	0.02		105
4.001	7		9.829	-0.071	0.000	0.02		
4.002	8		3.109	-0.141	0.000	0.01		
3.003	6		3.017	-0.133	0.000	0.03		

PN	US/MH Name	Pipe Flow (l/s)	Status	Level Exceeded
1.000	Green Roof 1	0.3	OK	
2.000	Green Roof 2	0.6	OK	
1.001	Attenuation Tank	1.8	SURCHARGED	
1.002	Pump Chambers	1.8	SURCHARGED	
3.000	Courtyard BR	0.3	FLOOD RISK	
3.001	4	0.3	FLOOD RISK	
3.002	5	0.3	OK	
4.000	Blue Roof 18	0.2	FLOOD RISK	
4.001	7	0.2	FLOOD RISK	
4.002	8	0.2	OK	
3.003	6	0.5	OK	

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	Hot Star ble Headloss Co al Sewage per b	Start rt Leve peff (G nectare	Factor (mins) el (mm) Global) e (l/s)	1.000 0 0.500 H 0.000	MAD Flow per	nal Flow D Factor Person p	* * 10m³ Inlet C per Day	/ha Stora oeffiecie (l/per/da	ge 2.000 nt 0.800
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	Manager factor	lood R	isk War	ning (m	m )			300.	. 0
	Margin for F			Timest TS Stat VD Stat ia Stat	us us	econd In	crement		
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PN	Durati Return Perio	Prof on(s) d(s) (: e Chan	Inert Inert ile(s) (mins) years)	TS Stat VD Stat ia Stat 15, 30, Return	us us us		Summer 60, 480 (X)	OF () () () () () () () () () () () () ()	FF DN DN Pr 40 00
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1.000	Durati Return Perio Climat <b>US/MH</b> <b>Name</b> Green Roof	Prof on(s) d(s) (; e Chan s 1 30	ile(s) (mins) years) ge (%) Storm	TS Stat VD Stat 15, 30, Return Period 30	Climate Change +0%	, 240, 3 <b>First</b>	Summer 60, 480 (X)	OF () () () () () () () () () () () () ()	FF DN DN er 40 00 40 <b>First (Z)</b>
1.000 2.000	Durati Return Perio Climat US/MH Name	Prof on(s) d(s) (; e Chan <b>s</b> 1 30 2 30	Inert ile(s) (mins) years) ge (%)	TS Stat VD Stat 15, 30, Return Period 30 30	us us 60, 120 Climate Change +0% +0%	, 240, 3 First Surch	Summer 60, 480 (X)	OF () () () () () () () () () () () () ()	FF DN DN er 40 00 40 <b>First (Z)</b>
1.000 2.000	Durati Return Perio Climat <b>US/MH</b> Name Green Roof Green Roof	Prof on(s) d(s) (; e Chan 1 30 2 30 nk 60	ile(s) (mins) years) ge (%) Storm Summer	TS Stat VD Stat ia Stat 15, 30, <b>Return</b> <b>Period</b> 30 30 30	us us 60, 120 Climate Change +0% +0%	, 240, 3 First Surch 2/15	Summer 60, 480 (X) : arge	OF () () () () () () () () () () () () ()	FF DN DN er 40 00 40 <b>First (Z)</b>
1.000 2.000 1.001 1.002 3.000	Durati Return Perio Climat <b>US/MH</b> Name Green Roof Green Roof Attenuation Ta	Prof on(s) d(s) (; e Chan 1 30 2 30 nk 60 rs 60 BR 120	ile(s) (mins) years) ge (%) Storm Summer Summer Summer Summer Summer	TS Stat VD Stat ia Stat 15, 30, <b>Return</b> <b>Period</b> 30 30 30 30 30 30	Climate Change +0% +0% +0% +0% +0% +0% +0%	, 240, 3 First Surch 2/15	Summer 60, 480 (X) arge Summer	OF () () () () () () () () () () () () ()	FF DN DN er 40 00 40 <b>First (Z)</b>
1.000 2.000 1.001 1.002 3.000 3.001	Durati Return Perio Climat <b>US/MH</b> Name Green Roof Green Roof Attenuation Ta Pump Chambe	Prof on(s) d(s) (; e Chan 1 30 2 30 nk 60 rs 60 BR 120 4 120	L L L L L L L L L L L L L L L L L L L	TS Stat VD Stat ia Stat 15, 30, <b>Return</b> <b>Period</b> 30 30 30 30 30 30 30	Climate (120) Climate Change +0% +0% +0% +0% +0% +0% +0% +0% +0%	, 240, 3 First Surch 2/15	Summer 60, 480 (X) arge Summer	OF () () () () () () () () () () () () ()	FF DN DN er 40 00 40 <b>First (Z)</b>
1.000 2.000 1.001 1.002 3.000 3.001 3.002	Durati Return Perio Climat <b>US/MH</b> Name Green Roof Green Roof Attenuation Ta Pump Chambe Courtyard	Prof on(s) d(s) (; e Chan s 1 30 2 30 nk 60 rs 60 BR 120 4 120 5 15	ile(s) (mins) years) ge (%) Storm Summer Summer Summer Summer Summer Summer Summer Summer	TS Stat VD Stat ia Stat 15, 30, <b>Return</b> <b>Period</b> 30 30 30 30 30 30 30 30	Climate Change +0% +0% +0% +0% +0% +0% +0% +0% +0% +0%	, 240, 3 First Surch 2/15	Summer 60, 480 (X) arge Summer	OF () () () () () () () () () () () () ()	FF DN DN er 40 00 40 <b>First (Z)</b>
1.000 2.000 1.001 3.000 3.001 3.002 4.000	Durati Return Perio Climat <b>US/MH</b> Name Green Roof Green Roof Attenuation Ta Pump Chambe	Prof on(s) d(s) (; e Chan s 1 30 2 30 nk 60 rs 60 BR 120 4 120 5 15 18 120	Lile(s) (mins) years) ge (%) Storm Summer Summer Summer Summer Summer Summer Summer Winter Winter	TS Stat VD Stat ia Stat 15, 30, <b>Return</b> <b>Period</b> 30 30 30 30 30 30 30 30 30 30 30 30 30	Climate (120) Climate Change +0% +0% +0% +0% +0% +0% +0% +0% +0% +0%	, 240, 3 First Surch 2/15 2/15	Summer 60, 480 (X) arge Summer Summer	OF () () () () () () () () () () () () ()	FF DN DN er 40 00 40 <b>First (Z)</b>
1.000 2.000 1.001 1.002 3.000 3.001 3.002	Durati Return Perio Climat <b>US/MH</b> Name Green Roof Green Roof Attenuation Ta Pump Chambe Courtyard	Prof on(s) d(s) (; e Chan s 1 30 2 30 nk 60 rs 60 BR 120 4 120 5 15 18 120 7 120	ile(s) (mins) years) ge (%) Storm Summer Summer Summer Summer Summer Summer Summer Summer	TS Stat VD Stat ia Stat 15, 30, <b>Return</b> <b>Period</b> 30 30 30 30 30 30 30 30 30 30 30 30 30	Climate (120) 60, 120 60, 120 60, 120 (120) (120	, 240, 3 First Surch 2/15	Summer 60, 480 (X) arge Summer Summer	OF () () () () () () () () () () () () ()	FF DN DN er 40 00 40 <b>First (Z)</b>
1.000 2.000 1.001 3.000 3.001 3.002 4.000 4.001	Durati Return Perio Climat <b>US/MH</b> Name Green Roof Green Roof Attenuation Ta Pump Chambe Courtyard	Prof on(s) d(s) (; e Chan s 1 30 2 30 nk 60 rs 60 BR 120 4 120 5 15 18 120 7 120 8 120	L L L L L L L L L L L L L L L L L L L	TS Stat VD Stat ia Stat 15, 30, <b>Return</b> <b>Period</b> 30 30 30 30 30 30 30 30 30 30 30 30 30	Climate (120) 60, 120 60, 120 Change +0% +0% +0% +0% +0% +0% +0% +0% +0% +0%	, 240, 3 First Surch 2/15 2/15	Summer 60, 480 (X) arge Summer Summer	OF () () () () () () () () () () () () ()	FF DN DN er 40 00 40 <b>First (Z)</b>
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$1.000 \\ 2.000 \\ 1.001 \\ 1.002 \\ 3.000 \\ 3.001 \\ 3.002 \\ 4.000 \\ 4.001 \\ 4.002$	Durati Return Perio Climat <b>US/MH</b> Name Green Roof Green Roof Attenuation Ta Pump Chambe Courtyard T Blue Roof	Prof on(s) d(s) (; e Chan s 1 30 2 30 nk 60 rs 60 BR 120 4 120 5 15 18 120 7 120 8 120 6 120	Linert ile(s) (mins) years) ge (%) Corm Summer Summer Summer Summer Winter Winter Winter Winter Winter Winter Winter	TS Stat VD Stat ia Stat 15, 30, <b>Return</b> <b>Period</b> 30 30 30 30 30 30 30 30 30 30 30 30 30	Climate Change +0% +0% +0% +0% +0% +0% +0% +0% +0% +0%	, 240, 3 First Surch 2/15 2/15 100/60 Flooded	Summer 60, 480 (X) arge Summer Summer Summer	OF ( ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( )	FF DN Pr 40 00 40 First (Z) Overflow Half Drain
1.000 2.000 1.001 3.000 3.001 3.002 4.000 4.001 4.002 3.003	Durati Return Perio Climat US/MH Name Green Roof Green Roof Attenuation Tat Pump Chamber Courtyard S Blue Roof US/MH	Prof on(s) d(s) (; e Chan s 1 30 2 30 nk 60 rs 60 BR 120 4 120 5 15 18 120 7 120 8 120 6 120	Lile(s) (mins) years) ge (%) Commer Summer Summer Summer Summer Winter Winter Winter Winter Winter Winter Winter Winter	TS Stat VD Stat ia Stat 15, 30, <b>Return</b> <b>Period</b> 30 30 30 30 30 30 30 30 30 30 30 30 30	Climate Change +0% +0% +0% +0% +0% +0% +0% +0% +0% +0%	, 240, 3 First Surch 2/15 2/15 100/60 Flooded Volume	Summer 60, 480 (X) arge Summer Summer Summer	OF ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) (	FF DN Pr 40 00 40 First (Z) Overflow Half Drain Time
$1.000 \\ 2.000 \\ 1.001 \\ 1.002 \\ 3.000 \\ 3.001 \\ 3.002 \\ 4.000 \\ 4.001 \\ 4.002$	Durati Return Perio Climat <b>US/MH</b> Name Green Roof Green Roof Attenuation Ta Pump Chambe Courtyard T Blue Roof	Prof on(s) d(s) (; e Chan s 1 30 2 30 nk 60 rs 60 BR 120 4 120 5 15 18 120 7 120 8 120 6 120	Lile(s) (mins) years) ge (%) Commer Summer Summer Summer Summer Winter Winter Winter Winter Winter Winter Winter Winter	TS Stat VD Stat ia Stat 15, 30, <b>Return</b> <b>Period</b> 30 30 30 30 30 30 30 30 30 30 30 30 30	Climate Change +0% +0% +0% +0% +0% +0% +0% +0% +0% +0%	, 240, 3 First Surch 2/15 2/15 100/60 Flooded	Summer 60, 480 (X) arge Summer Summer Summer	OF ( ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( )	FF DN Pr 40 00 40 First (Z) Overflow Half Drain
1.000 2.000 1.001 3.000 3.001 3.002 4.000 4.001 4.002 3.003	Durati Return Perio Climat US/MH Name Green Roof Green Roof Attenuation Tat Pump Chamber Courtyard S Blue Roof US/MH	Prof on(s) d(s) (; e Chan s 1 30 2 30 nk 60 rs 60 BR 120 4 120 5 15 18 120 7 120 8 120 6 120 6 120 <b>Over</b> Act	ile(s) (mins) years) ge (%) torm Summer Summer Summer Winter Winter Winter Winter Winter Winter Winter Winter Winter Winter Winter	TS Stat VD Stat ia Stat 15, 30, <b>Return</b> <b>Period</b> 30 30 30 30 30 30 30 30 30 30 30 30 30	Climate Change +0% +0% +0% +0% +0% +0% +0% +0% +0% +0%	, 240, 3 First Surch 2/15 2/15 100/60 Flooded Volume	Summer 60, 480 (X) arge Summer Summer Summer	OF ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) (	FF DN Pr 40 00 40 First (Z) Overflow Half Drain Time

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#### 30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (1/s)	Half Drain Time (mins)
1.001	Attenuation Tank		3.421	0.271	0.000	0.30		48
1.002	Pump Chambers		3.433	0.333	0.000	0.28		
3.000	Courtyard BR		9.839	-0.111	0.000	0.02		123
3.001	4		9.841	-0.059	0.000	0.02		
3.002	5		3.113	-0.137	0.000	0.02		
4.000	Blue Roof 18		9.860	-0.090	0.000	0.02		130
4.001	7		9.862	-0.038	0.000	0.02		
4.002	8		3.113	-0.137	0.000	0.02		
3.003	6		3.019	-0.131	0.000	0.04		

	US/MH	Pipe Flow		Level
PN	Name	(l/s)	Status	Exceeded
1.000	Green Roof 1	0.6	OK	
2.000	Green Roof 2	1.2	OK	
1.001	Attenuation Tank	4.1	SURCHARGED	
1.002	Pump Chambers	4.0	SURCHARGED	
3.000	Courtyard BR	0.3	FLOOD RISK	
3.001	4	0.3	FLOOD RISK	
3.002	5	0.3	OK	
4.000	Blue Roof 18	0.3	FLOOD RISK	
4.001	7	0.3	FLOOD RISK	
4.002	8	0.3	OK	
3.003	б	0.6	OK	

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	Hot Star e Headloss Co Sewage per P Number of	Start rt Leve beff (G hectare Input	Factor (mins) l (mm) lobal) (l/s) Hydrogr	1.000 0 0.500 F 0.000	MAD low per Number o	nal Flow D Factor Person <u>p</u> of Stora	r * 10m <sup>3</sup> Inlet C per Day ge Struc	/ha Storag coeffiecies (l/per/day ctures 3	ge 2.000 nt 0.800
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		Ar	- D' D'	rs Statı	15 15	econd In	crement	OF	'F
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	Return Perio	Profi on(s) (	D' D' Inert: ile(s) (mins) I years)	IS Statı /D Statı ia Statı	- 15 15		Summer	OF C and Winte	97 90 90 90 90 90 90
	Return Perio	Profi on(s) ( d(s) (y	D' D' Inert: ile(s) (mins) I years)	IS Statı /D Statı ia Statı	- 15 15		Summer	OF C and Winte , 960, 144 2, 30, 10	97 90 90 90 90 90 90
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Meinhardt (UK) Ltd		Page 10
10 Aldersgate Street		
London		
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Innovyze	Network 2020.1	*

# 100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (1/s)	Half Drain Time (mins)
1.001	Attenuation Tank		3.938	0.788	0.000	0.35		52
1.002	Pump Chambers		3.968	0.868	0.000	0.31		
3.000	Courtyard BR		9.883	-0.067	0.000	0.02		217
3.001	4		9.884	-0.016	0.000	0.02		
3.002	5		3.113	-0.137	0.000	0.02		
4.000	Blue Roof 18		9.926	-0.024	0.000	0.02		218
4.001	7		9.927	0.027	0.000	0.02		
4.002	8		3.113	-0.137	0.000	0.02		
3.003	б		3.019	-0.131	0.000	0.04		

PN	US/MH Name	Pipe Flow (l/s)	Status	Level Exceeded
1.000	Green Roof 1	1.1	OK	
2.000	Green Roof 2	2.2	OK	
1.001	Attenuation Tank	4.7	SURCHARGED	
1.002	Pump Chambers	4.3	SURCHARGED	
3.000	Courtyard BR	0.3	FLOOD RISK	
3.001	4	0.3	FLOOD RISK	
3.002	5	0.3	OK	
4.000	Blue Roof 18	0.3	FLOOD RISK	
4.001	7	0.3	FLOOD RISK	
4.002	8	0.3	OK	
3.003	б	0.6	OK	



# Appendix F – Thames Water Correspondence



Craig Marchant

MEINHARDT (UK) LTD 10 ALDERSGATE STREET London

EC1A 4HJ

Wastewater pre-planning Our ref DS6096359

23 February 2023

## **Pre-planning enquiry: Confirmation of sufficient capacity**

## Site Address: 1 Museum Street, Holborn, London, WC1A 1JR

Dear Craig,

Thank you for providing information on your development.

Proposed site: proposed 24 flats and offices (23625sqm). Proposed foul water connection by gravity into a combined sewer MH1404. Proposed surface water connection int a combined sewer MH1404 at a total of 41l/s.

We have completed the assessment of the foul water flows and surface water run-off based on the information submitted in your application with the purpose of assessing sewerage capacity within the existing Thames Water sewer network.

### **Foul Water**

If your proposals progress in line with the details you've provided, we're pleased to confirm that there will be sufficient sewerage capacity in the adjacent combined sewer network to serve your development.

This confirmation is valid for 12 months or for the life of any planning approval that this information is used to support, to a maximum of three years.

You'll need to keep us informed of any changes to your design – for example, an increase in the number or density of homes. Such changes could mean there is no longer sufficient capacity.

#### **Surface Water**

When developing a site, policy 5.13 of the London Plan and Policy 3.4 of the Supplementary Planning Guidance (Sustainable Design And Construction) states that every attempt should be made to use flow attenuation and SuDS/Storage to reduce the surface water discharge from the site as much as possible.

In accordance with the Building Act 2000 Clause H3.3, positive connection of surface water to a public sewer will only be consented when it can be demonstrated that the hierarchy of disposal methods have been examined and proven to be impracticable. Before we can consider your surface water needs, you'll need written approval from the lead local flood authority that you

have followed the sequential approach to the disposal of surface water and considered all practical means.

The disposal hierarchy being:

- 1) rainwater use as a resource (for example rainwater harvesting, blue roofs for irrigation)
- 2) rainwater infiltration to ground at or close to source

3) rainwater attenuation in green infrastructure features for gradual release (for example green roofs, rain gardens)

- 4) rainwater discharge direct to a watercourse (unless not appropriate)
- 5) controlled rainwater discharge to a surface water sewer or drain
- 6) controlled rainwater discharge to a combined sewer.

Where connection to the public sewerage network is required to manage surface water flows we will accept these flows at a discharge rate in line with CIRIA's best practice guide on SuDS or that stated within the sites planning approval.

If the above surface water hierarchy has been followed and if the flows are restricted to a total of 41 l/s then Thames Water would not have any objections to the proposal.

Please see the attached 'Planning your wastewater' leaflet for additional information.

#### What happens next?

Please make sure you submit your connection application, giving us at least 21 days' notice of the date you wish to make your new connection/s.

If you've any further questions, please contact me on 07747 641 932

Yours sincerely

Natalya Bacon Developer Services – Adoptions Engineer Mobile: 07747 641 932 Clearwater Court, Vastern Road, Reading, RG1 8DB Find us online at <u>developers.thameswater.co.uk</u> Get advice on making your sewer connection correctly at <u>connectright.org.uk</u>



**Mr Craig Marchant** 

Meinhardt (UK) Ltd 10 Aldersgate Street, London, E1A 4HJ Wastewater pre-planning Our ref DS6096361, DTS-65084

06 July 2022

# Pre-planning enquiry: Confirmation of sufficient capacity

## Site: 1 West Central Street, London - WC1V6PJ

Dear Craig,

Thank you for providing information on your proposed development.

Existing site: Flats (2 units), Public House (889 people), Offices (733m2) and Shopping Centre (587m2). Proposed site: Flats (26 units). Proposed foul water discharge by gravity into manholes TQ30812410, TQ3081141B and TQ30811404 Proposed surface water discharge at 5.0 l/s for all storm events up to and including 1:100yr+40\$CC into manhole TQ30811404.

We're pleased to confirm that there will be sufficient foul water and surface water capacity in our sewerage network to serve your development.

This confirmation is valid for 12 months or for the life of any planning approval that this information is used to support, to a maximum of three years.

You'll need to keep us informed of any changes to your design – for example, an increase in the number or density of homes. Such changes could mean there is no longer sufficient capacity.

### What happens next?

Please make sure you submit your connection application, giving us at least 21 days' notice of the date you wish to make your new connection/s.

If you've any further questions, please contact me on 07747 647 155.

## **Kind Regards**

Zaid Kazi Developer Services – Major Projects, Project Engineer zaid.kazi@thameswater.co.uk Get advice on making your sewer connection correctly at <u>connectright.org.uk</u> Clearwater Court, Vastern Road, Reading, RG1 8DB Find us online at <u>developers.thameswater.co.uk</u>



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