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PROJECT 2020
PLANNING CONDITION 13 DISCHARGE REPORT

PROJECT 2020
PLANNING CONDITION 13 DISCHARGE REPORT

Revision **01**
Date **02/02/2018**
Made by **Robert Rigge**
Checked by **GA**
Approved by **Lisa Sawyer**
Description **Information to Discharge Planning Condition 13**

Ref 1620003673-RAM-XX-XX-RE-D-00002

Revision	Date	Made by	Checked by	Approved by	Description
01	02/02/18	Robert Rigge	Gavin Smith	Lisa Sawyer	Issued to planning

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APPENDICES

1. INTRODUCTION

This report has been produced to support the discharge of Pre-Commencement Planning Condition 13 for Project 2020 and 17 Charterhouse Street London.

Condition 13 relates to Sustainable Urban Drainage Systems and states;

"Prior to commencement of development, other than site clearance and enabling works, details of a sustainable urban drainage system shall be submitted to and approved in writing by the local planning authority. Such system shall be based on a 1:100-year event with 30% provision for climate change (demonstrating in excess of 50% betterment on existing brownfield rates and seeking greenfield levels of runoff). The system shall be implemented as part of the development and thereafter retained and maintained."

2. DRAINAGE STRATEGY SUMMARY

The following discharge hierarchy has been reviewed in regards to discharge of surface water from the proposed development site; Infiltration, Watercourse and Sewer. It is not possible to discharge surface water via infiltration due to limited external space and proximity to existing and proposed buildings. There are also no surface watercourses within the vicinity of the site.

As such it is proposed that, the surface water drainage from site will discharge into the combined public sewer network in Farringdon Street at a restricted rate of 9.3l/s. This flow rate is a 81.5% betterment on the existing greenfield flows.

Surface water attenuation will be provided by two areas of blueroof and an oversized pipe below ground in the courtyard area between the existing services.

The details of the blue roof are provided in Section 3 and appendix 5. Below ground attenuation volumes are indicated in Appendix 1.

Surface water will discharge via an existing outfall into the public sewer within Farringdon Street.

A copy of the Thames Water acceptance letter and cover email are provided in Appendix 2.

A copy of the existing surface water calculations are provided in Appendix 3.

3. BLUE / GREEN ROOF DESIGN PARAMETERS

Due to loading limitations of the existing structure the maximum depth of water that can be stored on the roof has been calculated as 100mm, this is in addition to the blueroof build up i.e. insulation, crate, membrane). The areas of blueroof which will contribute to the attenuation zones are shown in appendix 4. As noted the blue roof is split over two levels.

- The level 7 Charterhouse roof is to be restricted to 3.09l/s
- The level 6 Saffron Hill roof is to be restricted to 1.18l/s

Alumasc have carried out calculations to demonstrate that both areas of roof do not exceed 100mm of water in a 1 in 100 year storm + 30% climate Change. The calculations are provided in Appendix 5.

4. CONCULSION

We consider that this report provides sufficient evidence in support of the discharge of the Pre Planning Condition 13

APPENDIX 1
SURFACE WATER ATTENUATION COURTYARD

Summary of Results for 100 year Return Period (+30%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	9.538	0.538	9.9	16.1	O K
30 min Summer	9.591	0.591	9.9	17.7	O K
60 min Summer	9.555	0.555	9.9	16.6	O K
120 min Summer	9.417	0.417	9.9	12.5	O K
180 min Summer	9.298	0.298	9.9	8.9	O K
240 min Summer	9.219	0.219	9.8	6.6	O K
360 min Summer	9.149	0.149	8.7	4.5	O K
480 min Summer	9.125	0.125	7.2	3.7	O K
600 min Summer	9.111	0.111	6.1	3.3	O K
720 min Summer	9.101	0.101	5.3	3.0	O K
960 min Summer	9.087	0.087	4.2	2.6	O K
1440 min Summer	9.072	0.072	3.1	2.2	O K
2160 min Summer	9.060	0.060	2.2	1.8	O K
2880 min Summer	9.053	0.053	1.7	1.6	O K
4320 min Summer	9.044	0.044	1.3	1.3	O K
5760 min Summer	9.039	0.039	1.0	1.2	O K
7200 min Summer	9.035	0.035	0.8	1.1	O K
8640 min Summer	9.033	0.033	0.7	1.0	O K
10080 min Summer	9.030	0.030	0.6	0.9	O K
15 min Winter	9.620	0.620	9.9	18.6	O K
30 min Winter	9.684	0.684	9.9	20.5	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	137.202	0.0	22.4	15
30 min Summer	88.493	0.0	28.9	24
60 min Summer	54.281	0.0	35.4	42
120 min Summer	32.170	0.0	42.0	74
180 min Summer	23.391	0.0	45.8	104
240 min Summer	18.559	0.0	48.4	132
360 min Summer	13.358	0.0	52.3	188
480 min Summer	10.579	0.0	55.2	246
600 min Summer	8.822	0.0	57.5	308
720 min Summer	7.602	0.0	59.5	368
960 min Summer	6.008	0.0	62.7	490
1440 min Summer	4.306	0.0	67.4	728
2160 min Summer	3.082	0.0	72.4	1100
2880 min Summer	2.429	0.0	76.1	1448
4320 min Summer	1.734	0.0	81.5	2188
5760 min Summer	1.365	0.0	85.5	2888
7200 min Summer	1.133	0.0	88.7	3592
8640 min Summer	0.972	0.0	91.4	4400
10080 min Summer	0.855	0.0	93.7	4976
15 min Winter	137.202	0.0	25.1	16
30 min Winter	88.493	0.0	32.3	27

Summary of Results for 100 year Return Period (+30%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	9.614	0.614	9.9	18.4	O K
120 min Winter	9.392	0.392	9.9	11.8	O K
180 min Winter	9.231	0.231	9.8	6.9	O K
240 min Winter	9.157	0.157	9.1	4.7	O K
360 min Winter	9.119	0.119	6.8	3.6	O K
480 min Winter	9.102	0.102	5.4	3.0	O K
600 min Winter	9.091	0.091	4.5	2.7	O K
720 min Winter	9.083	0.083	3.9	2.5	O K
960 min Winter	9.073	0.073	3.1	2.2	O K
1440 min Winter	9.060	0.060	2.2	1.8	O K
2160 min Winter	9.050	0.050	1.6	1.5	O K
2880 min Winter	9.044	0.044	1.3	1.3	O K
4320 min Winter	9.037	0.037	0.9	1.1	O K
5760 min Winter	9.033	0.033	0.7	1.0	O K
7200 min Winter	9.030	0.030	0.6	0.9	O K
8640 min Winter	9.028	0.028	0.5	0.8	O K
10080 min Winter	9.026	0.026	0.4	0.8	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	54.281	0.0	39.7	46
120 min Winter	32.170	0.0	47.0	78
180 min Winter	23.391	0.0	51.3	106
240 min Winter	18.559	0.0	54.2	128
360 min Winter	13.358	0.0	58.6	188
480 min Winter	10.579	0.0	61.8	246
600 min Winter	8.822	0.0	64.5	308
720 min Winter	7.602	0.0	66.7	366
960 min Winter	6.008	0.0	70.2	488
1440 min Winter	4.306	0.0	75.5	726
2160 min Winter	3.082	0.0	81.1	1092
2880 min Winter	2.429	0.0	85.2	1428
4320 min Winter	1.734	0.0	91.2	2148
5760 min Winter	1.365	0.0	95.7	2920
7200 min Winter	1.133	0.0	99.3	3576
8640 min Winter	0.972	0.0	102.3	4392
10080 min Winter	0.855	0.0	104.9	5024

Model Details

Storage is Online Cover Level (m) 10.000

Tank or Pond Structure

Invert Level (m) 9.000

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	30.0	1.000	30.0	1.001	0.0

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0146-1000-1000-1000
Design Head (m)	1.000
Design Flow (l/s)	10.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	146
Invert Level (m)	9.000
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	10.0
Flush-Flo™	0.306	9.9
Kick-Flo®	0.673	8.3
Mean Flow over Head Range	-	8.6

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	5.2	1.200	10.9	3.000	16.8	7.000	25.2
0.200	9.6	1.400	11.7	3.500	18.1	7.500	26.1
0.300	9.9	1.600	12.5	4.000	19.3	8.000	26.9
0.400	9.8	1.800	13.2	4.500	20.4	8.500	27.7
0.500	9.6	2.000	13.9	5.000	21.5	9.000	28.5
0.600	9.1	2.200	14.5	5.500	22.5	9.500	29.2
0.800	9.0	2.400	15.1	6.000	23.4		
1.000	10.0	2.600	15.7	6.500	24.4		

APPENDIX 2
THAMES WATER CORRESPONDENCE

Robert Rigge

From: DEVELOPER.SERVICES@THAMESWATER.CO.UK
Sent: 15 January 2018 09:51
To: ian.jackson@gdmp.co.uk
Cc: Lisa Sawyer; Robert Rigge
Subject: IRef:1015405837 DS6039946 PDEV EC1N 6RA 17 Charterhouse
Attachments: DS6039946 PDEV EC1N 6RA 17 Charterhouse.pdf

Robert

Thank you for providing your revised surface water drainage strategy. I can confirm Thames Water support your max surface water discharge of 9.3l/s into combined sewer. See formal response enclosed.

Kind Regards

Artur Jaroma
Developer Services – Adoptions Engineer
Thames Water Utilities Ltd,
Clear Water Court
Vastern Rd
Reading, RG1 8DB
☎: Internal 0203 5778 082
: developer.services@thameswater.co.uk

Mr Robert Rigge
Ramboll
2nd Floor, The Exchange
St John Street, Chester
CH1 1DA

Your account number
DS6039946

Developer.services@thameswater.co.uk

0800 009 3921

Mon – Fri 9am-5pm,

15/01/2018

Pre Development Enquiry

Site Address: Anglo American De Beers, 17 Charterhouse St, London, EC1N 6RA.

Development Details:

Existing site: Commercial: Offices 10500m^2. Foul water discharging by gravity into combined sewer in Farringdon Street, Existing SW run off for 1 in 1:50.2l/s 1 in 10: 64.1l/s, 1 in 30: 120.2l/s 1 in 100:153.1l/s discharging by gravity into combined sewer in Farringdon Street.

Proposed Development: Extension to the existing buildings to increase floor space: Offices 14000m^2. Foul water discharging by gravity into combined sewer in Farringdon Street, Proposed Surface Water run off discharging by gravity into combined sewer in Farringdon Street at max rate of 9.3l/s

Dear Mr Rigge,

I write in relation to the Pre-Development application submitted, we have completed the assessment of the foul water flows and surface water runoff based on the information submitted in your application with the purpose of assessing sewer capacity within the existing Thames Water sewer network.

Foul Water

From the information you have provided, we can confirm that the existing foul sewer network does have sufficient capacity to accommodate the proposed foul water discharge from the proposed development.

Surface Water

Please note that discharging surface water to the public sewer network should only be considered after all other methods of disposal have been investigated and proven to not be viable. In accordance with the Building Act 2000 Clause H3.3, positive connection 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. The disposal hierarchy being: 1st Soakaways; 2nd Watercourses; 3rd Sewers.

Only when it can be proven that soakage into the ground or a connection into the adjacent watercourse is not possible would we consider a restricted discharge into the public surface water sewer network.

Where there are no Surface Water sewers connection of surface water to a Foul Sewer will only be considered when all other methods of disposing of the surface water have been proven impracticable.

We would encourage techniques such as green roofs and/or permeable paving that restricts surface water discharge from your site.

We confirm that the public combined water sewer system will observe a net reduction in peak flow and therefore has capacity to accept the proposed discharge from this site.

Furthermore, the configuration of the onsite drainage and use of appropriate points of connection have not been considered in this point.

When redeveloping an existing 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.

If they are consulted as part of any planning application, Thames Water Planning team would ask to see why it is not practicable to attenuate the flows to Greenfield run-off rates i.e. 5l/s/hectare of the total site area or if the site is less than hectare in size then the flows should be reduced by 95% of existing flows. Should the policy above be followed, we would envisage no capacity concerns with regards to surface water for this site.

Please note that the Local Planning authority may comment on surface water discharge under the planning process.

Please Note

All connection requests are subject to a full Section 106 (Water Industry Act 1991) application before the Company can confirm approval to the connection itself. Please also note that capacity in the public sewerage system cannot be reserved.

Foul and surface water must not be combined. This will only be permitted when a combined public sewerage system exists. When it is proposed to connect to a combined public sewer, the site drainage should be separate and combined at the final manhole nearest the boundary. Connections are not permitted for the removal of Ground Water. The discharge of non-domestic effluent is not permitted until a valid trade effluent consent has been issued by Thames Water. If anything other than domestic sewage is discharged into the public sewers without the above agreement an offence is committed and the applicant will be liable to the penalties contained in

Section 109(1) (WIA 1991). Applicants should contact Trade Effluent prior to seeking a connection approval, to discuss trade effluent consent and conditions of discharge. A Trade Effluent reference number should be obtained and included in the relevant box of the attached application form. The address for Trade Effluent is - Thames Water Utilities Limited, Waste Water Quality, Crossness Sewage Treatment Works, Belvedere Road, Abbeywood, London. SE2 9AQ. Alternatively you can telephone them on 020 8507 4321.

As the development is located on a Brownfield site there may be existing sewers or rising mains crossing the site. Where these sewers or rising mains are to become redundant or have to be diverted the full cost of administering and undertaking the works shall be financed by the developer.

Where existing sewers or rising mains cross a site and there is no practical way of their being diverted the stand off distances tabulated in the SFA 6th will be applied to assess the width of easement required.

Note on trunk sewers: Connecting directly to Trunk sewers can be complex and dangerous, which means we often refuse permission. In this case, you will need to find an alternative sewer or method of discharge. Please contact the Sewer Connections team through our Helpdesk on 0800 009 39 21 for further information.

If Thames Water permits a connection to the trunk sewer, we will insist on carrying out the connection ourselves under Section 107 of the Water Industry Act. We would advise for you to apply as soon as possible.

The discharge of non-domestic effluent is not permitted until a valid trade effluent consent has been issued by Thames Water. If anything other than domestic sewage is discharged into the public sewers without the above agreement an offence is committed and the applicant will be liable to the penalties contained in Section 109(1) (WIA 1991).

Applicants should contact Trade Effluent prior to seeking a connection approval, to discuss trade effluent consent and conditions of discharge. A Trade Effluent reference number should be obtained and included in the relevant box of the attached application form. The address for Trade Effluent is - Thames Water Utilities Limited, Waste Water Quality, Crossness Sewage Treatment Works, Belvedere Road, Abbeywood, London. SE2 9AQ. Alternatively you can telephone them on 020 8507 4321.

The views expressed by Thames Water in this letter are in response to this pre development enquiry at this time and do not represent our final views on any future planning applications made in relation to this site.

Yours sincerely,

Artur Jaroma
Adoptions Engineer

APPENDIX 3
EXISTING SURFACE WATER CALCULATIONS

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Job number	1620003673
Sheet number	1of2
Date	31/07/17
Eng	RR
Checked	

Project Project 2026 - Existing Surface Water Flows

The Existing surface water flows have be calculated based on the Wallingford Procedure.

from figure A1 = M5-60 = 20mm.

figure A2 = r = 0.44

from figure A3b = Z_1 = 0.39

therefore = M5-5 = 20 × 0.39 = 7.8mm

from table A1 are bitionship between the M5-5 storm and other return periods can be found.

M1 = 0.61
M2 = 0.79
M30 = 1.46
M100 = 1.86

Therefore the following storms can be calculated as follows.

M1-5 = 7.8 × 0.61 = 4.76 mm
M2-5 = 7.8 × 0.78 = 6.08 mm
M30 - 5 = 7.8 × 1.46 = 11.39 mm
M100 - 5 = 7.8 × 1.86 = 14.51 mm

The point intensities for the above storms as follows.

M1 - 5 = 4.76 ÷ (5÷60) = 57.12 mm/hr
M2 - 5 = 6.08 ÷ (5÷60) = 72.96 mm/hr
M30 - 5 = 11.39 ÷ (5÷60) = 136.68 mm/hr
M100 - 5 = 14.51 ÷ (5÷60) = 174.12 mm/hr

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Job number	1620003673
Sheet number	2 of 2
Date	31/07/17
Eng	RR
Checked	

Project Project 2020 - Existing Surface Water Flows

- Surface water runoff can be calculated based on the following equation;

$$Q = 3.61 \times Cu \times i \times A$$

where; Cu = a coefficient of discharge

i = is the point intensity

A = is the site area.

$A = 2927 m^2 = 0.29 ha$

$M_1 = 3.61 \times 0.84 \times 57.12 \times 0.29$

$M_2 = 3.61 \times 0.84 \times 72.96 \times 0.29$

$M_{30} = 3.61 \times 0.84 \times 136.69 \times 0.29$

$M_{100} = 3.61 \times 0.84 \times 174.12 \times 0.29$

$M_1 = 50.2 l/s$

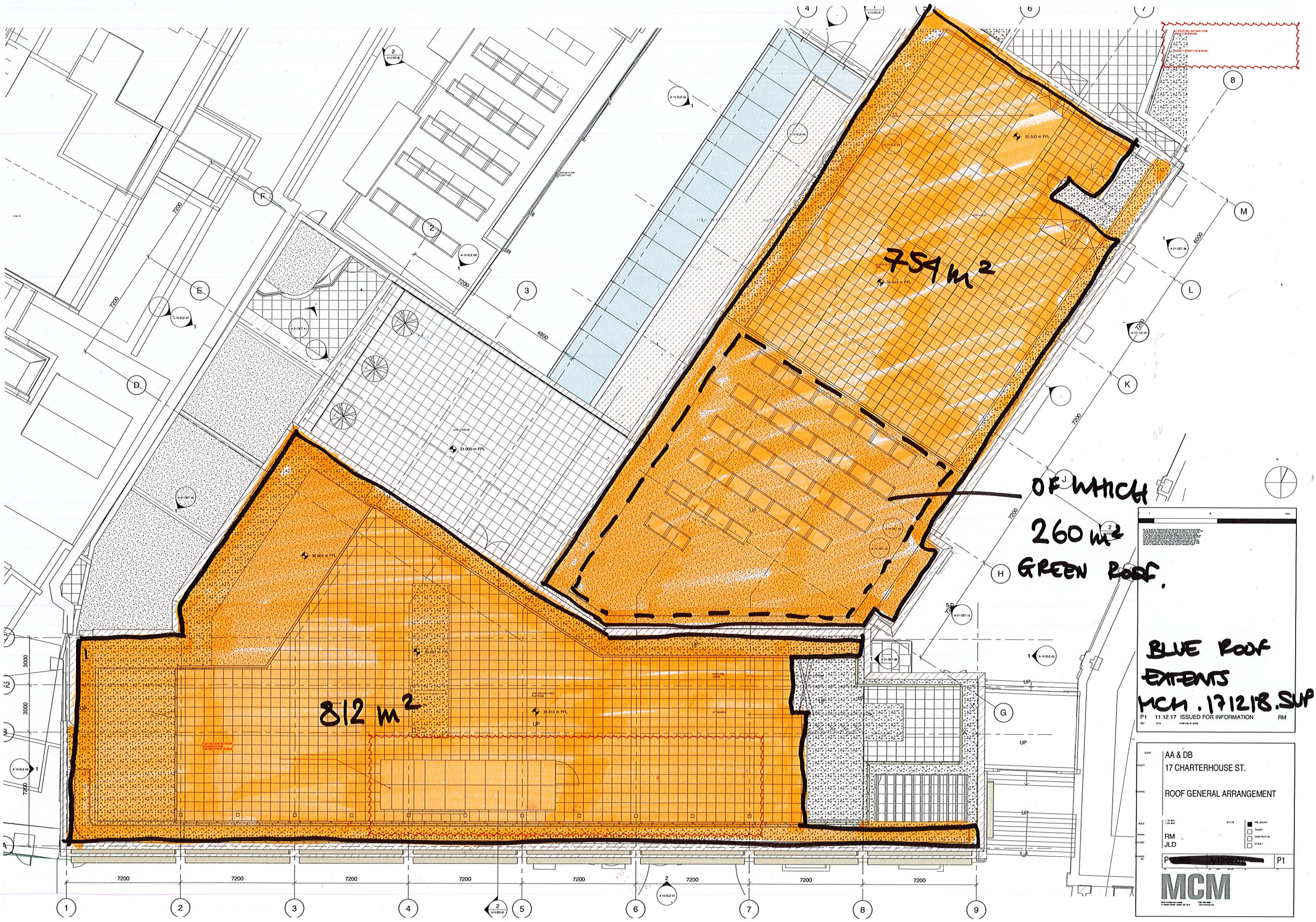
$M_2 = 64.1 l/s$

$M_{30} = 120.2 l/s$

$M_{100} = 153.1 l/s.$

} Existing flow Rates

APPENDIX 4
BLUEROOF AREAS



754 m²
OF WHICH
260 m²
GREEN ROOF.
812 m²
BLUE ROOF
EXTENTS
MCM . 171218.SUP
P1 11.12.17 ISSUED FOR INFORMATION RM
AA & DB
17 CHARTERHOUSE ST.
ROOF GENERAL ARRANGEMENT
RM
JLD
P[redacted] P1
MCM

APPENDIX 5
BLUEROOF DESIGN CALCULATIONS

Blue Roof Calculation

Project Reference: SP87643-BC3

Project Details

Location:	London	Outlet Type:	Harmer BR20
Drainage Area:	912 m^2	No. Of Outlets:	4 no.
Blue Roof Area:	812 m^2	Max. Upstand/VF Depth:	100 mm

Design Storm Inputs

Return Period:	100 years	Intensity Profile:	50% Summer
Duration:	6 hours	Climate Change Factor:	30%

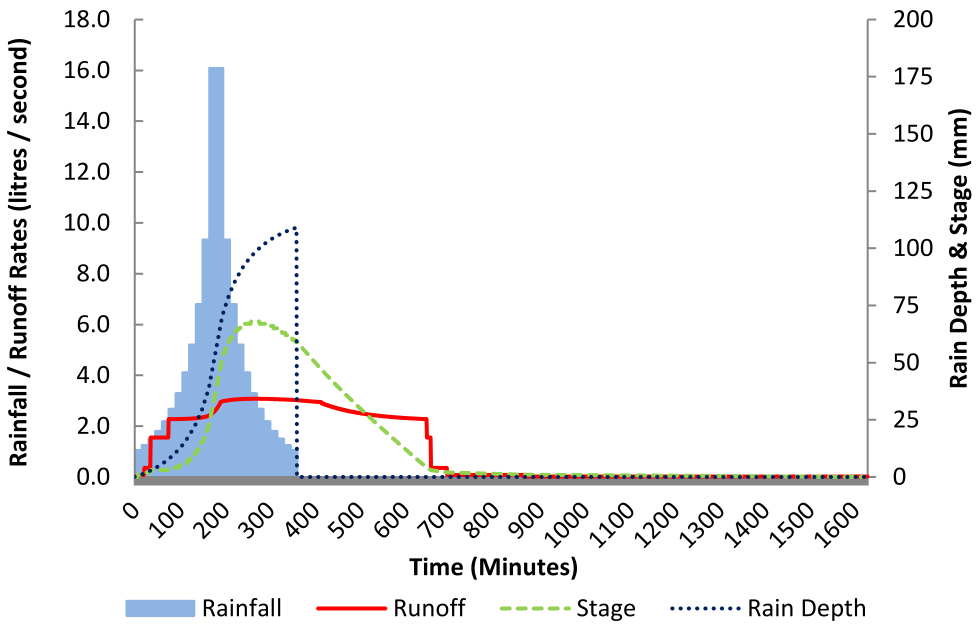
Design Storm Characteristics

Rainfall Depth:	109.04 mm	Peak Rainfall Intensity:	0.018 $l/s/m^2$
Peak Rainfall Rate:	16.09 l/s		

Blue Roof Response

Peak Runoff Rate:	3.08 l/s	Peak Runoff Reduction:	80.85%
Attenuation Time:	21 hours	Max. Stage:	68 mm
Detention Volume:	48 m3	Overflow Volume:	0 m3

Alumasc BluRoof Response



Blue Roof Calculations – Terms & Conditions of Use

BASIS OF MODEL

1. The model derives a design storm profile based on the principles of a Depth-Duration-Frequency (DDF) Model. This utilises coefficients published in the Institute of Hydrology's Flood Estimation Handbook (FEH, 1999) to estimate the design rainfall profile for a given return period and duration at any UK location.
2. Runoff characteristics are based on a totally flat roof surface. Once storage reaches its maximum volume, overflow is deemed to occur instantaneously. In order to ensure that the roof's integrity is preserved, sufficient overflow capacity is a requirement. The sizing of this facility should be designed cognisant of the probability of overflow and of all resulting risks of detriment to the building.
3. Coefficients used to calculate design storm conditions have been taken from the FEH CD-ROM. As a 1 kilometre square grid has been selected to represent a given location, there may be some variations as a result of micro-geographical factors (e.g. land topology etc)
4. No provision has been included for the Time of Concentration (i.e. the time for rain that falls on the most distant part of the roof from the outlet to reach the outlet). This will vary with roof specification. The model assumes runoff commences immediately following rainfall.
5. As with all hydrological software, the model is reliant upon natural elements that are outside human control. Rainfall events are categorised by their probability of occurrence. However, the return period (say, for example, 1 in 100 years) would not preclude an event of this magnitude occurring immediately, nor in successive years. Alumasc cannot therefore accept responsibility for the design storm events being exceeded and any additional measures appropriate for the mitigation of the risk of damage must be considered by the designers.
6. Product performance data in respect of the outlets has been collected through research conducted on behalf of Alumasc Exterior Building Products Ltd. This research has encompassed the use of prototype inserts, with various outlet sizes. A curve-fitting exercise has been conducted to allow equations to be formed to model the stage-discharge response of each of the tested outlet sizes. Extrapolating these equations to suit outlet sizes that were not originally tested is only advised when appropriate cautionary measures are implemented in the analysis and interpretation of the results data.

WARRANTY

The Licensor gives no warranty as to the accuracy or completeness of the information inputted into the model for the purpose of any specific project. It is the sole responsibility of the client to validate that this information is correct prior to its incorporation into the project design. The designer is responsible for ensuring that the roof design is suitable to accommodate the maximum storage depth stipulated in the calculation including, but not limited to, structural suitability and water overflow details.

LIABILITY

All guarantees, representations and warranties of any kind, whether express or implied, including, without limitation, the implied warranties of satisfactory quality and fitness for a particular purpose or ability to achieve a particular result are hereby excluded, so far as such exclusion or disclaimer is permitted under the applicable law. All calculations are provided in good faith. The free provision of this calculation tool should not imply that Alumasc has any design responsibility; whether specific to any project or in more general terms. The calculation tool used to produce the results herein is at an interim stage of development and the interpretation of these results should reflect this status until such time as field research data becomes available to substantiate, or alter, the methodology used.

SEVERABILITY

If any provision of this licence agreement is held invalid, illegal or unenforceable for any reason by any court of competent jurisdiction such provision shall be severed and the remainder of the provisions hereof shall continue in full force and effect as if this licence agreement had been agreed with the invalid illegal or unenforceable provision eliminated.

OWNERSHIP

Alumasc Exterior Building Products Ltd retains ownership of the documentation, together with any copyright. Where applicable, the following acknowledgement and copyright notice, shall be stated on all copies of publications and reports, including but not limited to, use in presentations to any audience:

The data contained in this blue roof report has been produced by Alumasc Exterior Building Products Ltd and relates to the use of Alumasc's Harmer Drainage Systems only. Should alternative drainage systems be used, Alumasc cannot validate the performance of the system. Please contact Alumasc on 01744 648400 for details.

GOVERNING LAW AND JURISDICTION

This agreement shall be governed by and construed in accordance with English law and the parties submit to the exclusive jurisdiction of the English courts.

Blue Roof Calculation

Project Reference: SP87643-BC1/Rev2

Project Details

Location:	London	Outlet Type:	Harmer BR15
Drainage Area:	765 m^2	No. Of Outlets:	3 no.
Blue Roof Area:	754 m^2	Max. Upstand/VF Depth:	100 mm

Design Storm Inputs

Return Period:	100 years	Intensity Profile:	50% Summer
Duration:	6 hours	Climate Change Factor:	30%

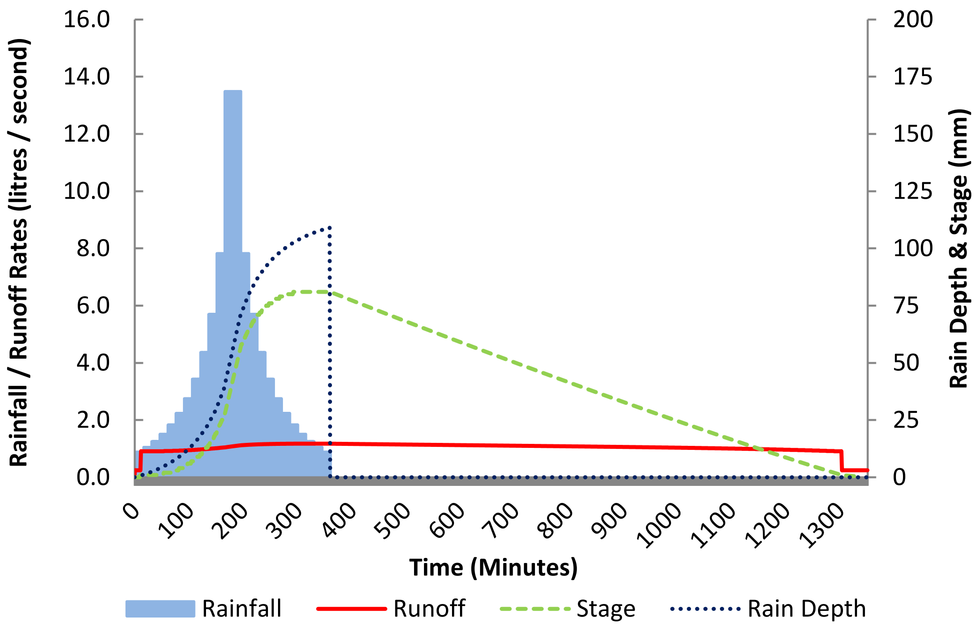
Design Storm Characteristics

Rainfall Depth:	109.04 mm	Peak Rainfall Intensity:	0.018 $l/s/m^2$
Peak Rainfall Rate:	13.49 l/s		

Blue Roof Response

Peak Runoff Rate:	1.18 l/s	Peak Runoff Reduction:	91.29%
Attenuation Time:	17 hours	Max. Stage:	81 mm
Detention Volume:	61 m3	Overflow Volume:	0 m3

Alumasc BluRoof Response



Blue Roof Calculations – Terms & Conditions of Use

BASIS OF MODEL

1. The model derives a design storm profile based on the principles of a Depth-Duration-Frequency (DDF) Model. This utilises coefficients published in the Institute of Hydrology's Flood Estimation Handbook (FEH, 1999) to estimate the design rainfall profile for a given return period and duration at any UK location.
2. Runoff characteristics are based on a totally flat roof surface. Once storage reaches its maximum volume, overflow is deemed to occur instantaneously. In order to ensure that the roof's integrity is preserved, sufficient overflow capacity is a requirement. The sizing of this facility should be designed cognisant of the probability of overflow and of all resulting risks of detriment to the building.
3. Coefficients used to calculate design storm conditions have been taken from the FEH CD-ROM. As a 1 kilometre square grid has been selected to represent a given location, there may be some variations as a result of micro-geographical factors (e.g. land topology etc)
4. No provision has been included for the Time of Concentration (i.e. the time for rain that falls on the most distant part of the roof from the outlet to reach the outlet). This will vary with roof specification. The model assumes runoff commences immediately following rainfall.
5. As with all hydrological software, the model is reliant upon natural elements that are outside human control. Rainfall events are categorised by their probability of occurrence. However, the return period (say, for example, 1 in 100 years) would not preclude an event of this magnitude occurring immediately, nor in successive years. Alumasc cannot therefore accept responsibility for the design storm events being exceeded and any additional measures appropriate for the mitigation of the risk of damage must be considered by the designers.
6. Product performance data in respect of the outlets has been collected through research conducted on behalf of Alumasc Exterior Building Products Ltd. This research has encompassed the use of prototype inserts, with various outlet sizes. A curve-fitting exercise has been conducted to allow equations to be formed to model the stage-discharge response of each of the tested outlet sizes. Extrapolating these equations to suit outlet sizes that were not originally tested is only advised when appropriate cautionary measures are implemented in the analysis and interpretation of the results data.

WARRANTY

The Licensor gives no warranty as to the accuracy or completeness of the information inputted into the model for the purpose of any specific project. It is the sole responsibility of the client to validate that this information is correct prior to its incorporation into the project design. The designer is responsible for ensuring that the roof design is suitable to accommodate the maximum storage depth stipulated in the calculation including, but not limited to, structural suitability and water overflow details.

LIABILITY

All guarantees, representations and warranties of any kind, whether express or implied, including, without limitation, the implied warranties of satisfactory quality and fitness for a particular purpose or ability to achieve a particular result are hereby excluded, so far as such exclusion or disclaimer is permitted under the applicable law. All calculations are provided in good faith. The free provision of this calculation tool should not imply that Alumasc has any design responsibility; whether specific to any project or in more general terms. The calculation tool used to produce the results herein is at an interim stage of development and the interpretation of these results should reflect this status until such time as field research data becomes available to substantiate, or alter, the methodology used.

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If any provision of this licence agreement is held invalid, illegal or unenforceable for any reason by any court of competent jurisdiction such provision shall be severed and the remainder of the provisions hereof shall continue in full force and effect as if this licence agreement had been agreed with the invalid illegal or unenforceable provision eliminated.

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