

Design Note

Project Angel Square Gardens Marketing Suite
Subject Drainage Note
Project no 0043434
Date 27 January 2022

Revision	Description	Issued by	Date	Approved (signature)
00	For Information	CB	12/02/21	
01	For Information	CB	17/02/21	
02	For information	FR	21/05/21	
03	Update following UU PDE response	FR	25/06/21	
04	Maintenance and management section added	FR	27/10/21	
05	Section 4.2 updated	FR	10/11/21	
06	Update following comments from MCC Flood Risk Management team	FR	27/01/22	

1 Introduction

The purpose of this design note is to set out the drainage strategy for the Angel Square Gardens Marketing Suite, shown in Figure 1 below. The total area within the redline is 0.12Ha and the site sits within flood zone 1.



Figure 1 - Proposed Scheme

2 Planning Policy

Manchester Local Flood Risk Management Strategy (MCC, 2014)

In accordance with National Planning Policy Framework (NPPF) (February, 2019), Manchester Local Flood Risk Management (LFRM) Policies and SuDS, consideration of sustainable drainage systems and surface water attenuation methodologies are required. The below policies are considered:

Policy 5.15

One of the ways that surface water runoff can be managed is by attenuating precipitation that falls, either through hard engineering – underground storage tanks for example – or through SuDS – which replicate natural features such as sumps, swales and ponds, or through the use of permeable paving or planting schemes, including rooftop planting. SuDS can also have wider benefits in terms of improving water quality and biodiversity. New developments are required by local Planning policy to minimise surface runoff and developing appropriate attenuation systems as part of schemes is one of the most effective ways of doing this. Given the presence of contaminated land in many parts of Manchester as a legacy of its industrial past, careful consideration of appropriate ways of managing surface water risk without spreading pollution will be needed.

Policy 5.46

Within Critical Drainage Areas, and consistent with Core Strategy policy EN14 Flood Risk, developers should aim to minimise surface water runoff from developments, and achieve at least the following runoff rates:

Greenfield runoff on Greenfield sites up to a 1 in 100 year storm event, including consideration of climate change

A 50% runoff rate reduction for Brownfield sites, with an aim of reducing runoff to Greenfield rates up to a 1 in 100 year storm event, including consideration of climate change

These are not local Sustainable Drainage System (SuDS) standards but adopted planning policy, provided because of the overlapping nature of Planning and SuDS Approving Body processes.

Policy 5.47

Surface water runoff rates can be reduced by a range of measures, both conventional engineering and Sustainable Drainage Systems (SuDS); and the relationship between the SAB [Sustainable Drainage Systems (SuDS) Approval Body] and the LLFA [Lead Local Flood Authority] will be important in this regard once this aspect of the FWMA commences. The presence of contaminated land within Manchester, as a result of its industrial past means that careful consideration of attenuation mechanisms will be needed.

3 Existing Site

The existing site is located in Miller Street, NOMA, Manchester. The post code and grid reference of the site are M4 4DU and SJ 84331 98953 respectively. The site is bounded to the south to Miller Street, to the north to a temporary car park, to the east to Angel Square and to the west to Angel Gardens.

The site generally slopes from west to east and from north to south. Topographical survey shows a high point at a level of 44.50m AOD on the car park to the north and the lowest point at a level of 41.08m AOD located to the south eastern side of the site. Refer to Appendix A.

The site consists of a surface car park and some landscaped areas as shown in Figure 2, which indicates an approximate impermeable area of 90%, equating to 0.110Ha. The site is drained via a series of gullies located on the southern area to an existing 300mm dia sewer located within the site that discharges to the UU sewer in Miller Street, as indicated in the utilities survey in Appendix B.



Figure 2 - Existing Site

4 Proposed Strategy

4.1 Consultations

A pre-development enquiry was submitted to United Utilities on 14/05/2021. The response states that foul water would be allowed at an unrestricted rate whereas surface water will be restricted to 5l/s. The proposed drainage strategy will be based on this assumption. Refer to Appendix C for correspondence.

4.2 Surface Water

In the proposed scheme the impermeable area is reduced to approximately 0.045Ha which is a 37.5% of the site area as shown on Figure 3 below. Also refer to the proposed hard landscaping drawing in Appendix D.

The surface water drainage system will be provided to collect surface water runoff from the site. This will include runoff from roof and surrounding hardstanding areas. Primary runoff from ground will be from hard impermeable surfaces such as roof and any exposed area of hard standing. The proposed strategy for the surface water drainage design has been developed so that the system discharges via the existing sewer connection into Miller Street. Prior to the connection, surface water and foul water merge in chamber EX MH01. Refer to Appendix E for proposed drainage layout.

As surface water will be combined with foul, proposed drainage channels will be trapped to avoid any odour from the sewer.

United Utilities assessed that the existing impermeable area is less than 0.11ha, they stated that the impermeable area that is captured by the existing gullies is 0.073ha, therefore the flow generated is 10l/s and a 50% betterment would result in 5l/s.

The performance of the surface water drainage systems will be checked against the 1 in 100year storm return period plus 10% climate change, to ensure the building is protected against flooding. Refer to Appendix F for results. Table 1 shows a summary of the results:

STORM EVENT	RETURN PERIOD (year)	FLOW (l/s)
15 min Winter	1	2.2
15 min Winter	5	3.3
15 min Winter	30	4.8
30 min Summer	100+10%CC	5.5

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The results show that the surface water system only discharges more than 5l/s for the 1 in 100-year storm event +10%CC. It should be noted that the drainage channels and connections to RWP outlets have not been included in the model which would add some additional storage to the system and could reduce the final discharge rate to less than 5l/s and/or the volume of flooding for the 1 in 100year event+10% CC. Also, as the building will be operative for three or four years, the 5year storm event has been included to demonstrate that for that event flow will be less than the restriction given by UU.

The results also show that there will be 0.784m³ of flood in manhole SW01 for the 1 in 100year storm event + 10%CC. As the proposed levels fall away from the building, it is envisaged this water is captured in the drainage channel to the south of the manhole and re-introduce to the system.

4.3 Drainage system Operation and Maintenance Plan

Regular maintenance of the drainage system is essential to maintain its performance and avoid failure of the mechanical/electrical components. It is anticipated that the maintenance of the drainage elements will be undertaken by an experienced contractor. An agreed maintenance programme will be prepared in accordance with the manufacturers recommendations and supervised by either the proposed development's facilities manager or an appointed property management company. This will be included within the Building Manual for the proposed development on completion.

4.3.1 Details of the party responsible for maintenance of each feature.

Adoptable drainage features shall be adopted by the Lead Local Flood Authority (Manchester City Council) or the Water Authority (United Utilities).

It is currently understood that all drainage features will remain within the ownership of the developer, including the abandoned highway drain that will be used to convey the water to the public sewer, in accordance with the comments from MCC Flood Risk Management team.

4.3.2 Inspection and Maintenance requirements

Whilst the drainage system has been designed to operate with as little maintenance as possible, there are key operations that must regularly be undertaken to ensure that it remains in optimal condition, most of which are general housekeeping tasks that should be undertaken for any drainage system, but with additional attention to the flow control devices (orifice plate). These operations are summarised below together with recommended frequencies:

- Periodic desilting of catchpits and channel drains. These should be emptied at least as follows (but with an annual inspection and additional cleansing if required): On completion of drainage works, Year 1, Year 3, then every 5 years. The desilting of these items are required to ensure the flow control device operate as per the design, and do not become blocked.
- Periodic jetting or rodding of pipework as required to clear blockages.
- Gratings on any channel drains to be kept clear of debris.

Orifice

Periodic checks to ensure the orifice is not blocked, annual inspection and additional cleansing if required.

4.4 Maintenance Options, Risks and Safeguards

There are many options that will allow the successful operation and maintenance of a drainage feature for the lifetime of the proposed development. With each maintenance option there may be associated risks for the onsite and surrounding land and property owners; LPA, LHA and LLFA should the chosen maintenance option become compromised.

The most appropriate maintenance option will be specific to the drainage features employed.

4.5 Safety and Access

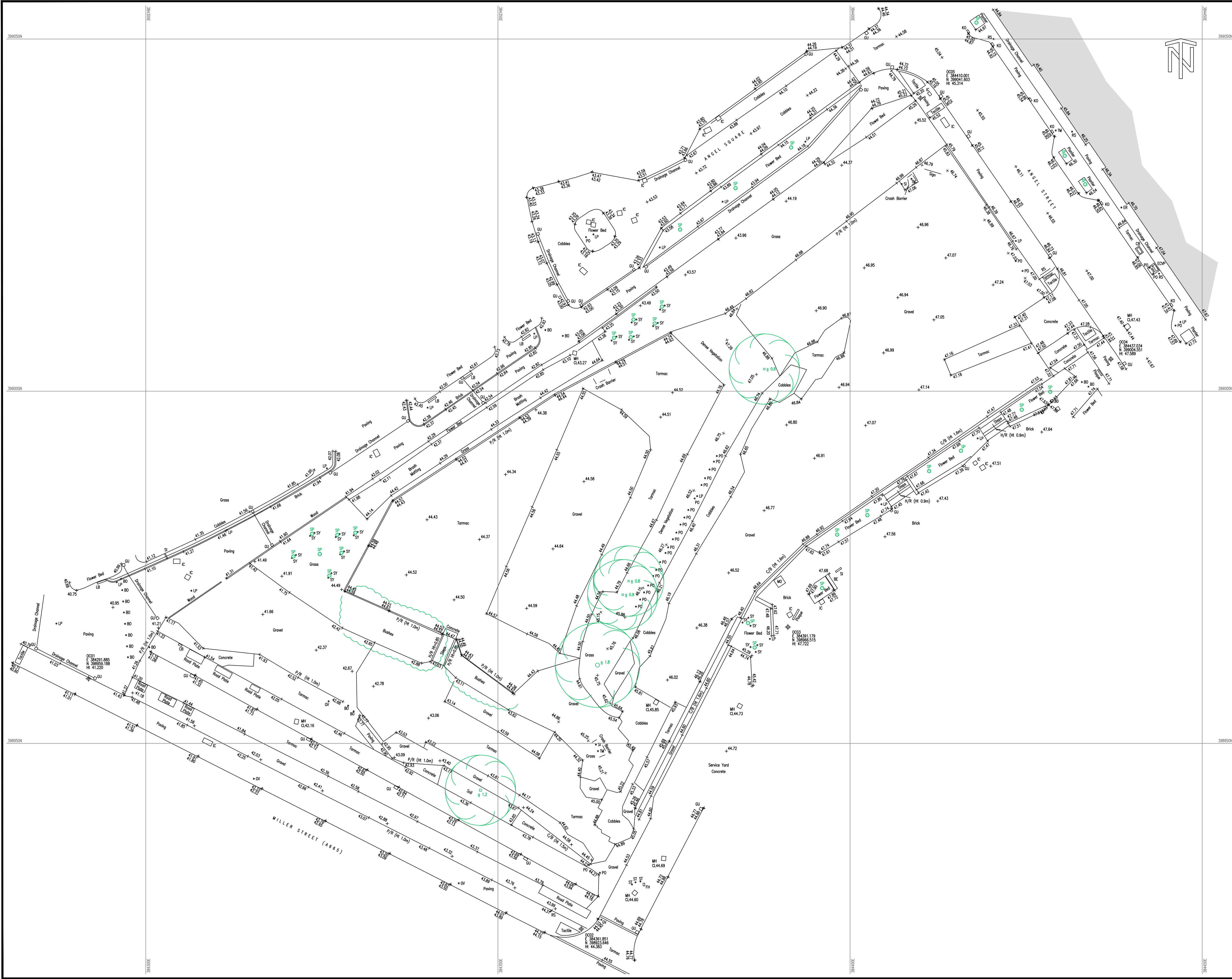
Consideration will be given to safety in design and appropriate consideration of access during the design of the drainage features used.

CDM Regulations 2015 will be considered and applied to the planning, design and construction and long-term maintenance of the drainage systems used.

4.6 Foul Water

Foul water is proposed to discharge to the existing sewer in Miller Street, via the existing connection, with unrestricted rate as shown in Appendix E.

5 APPENDIX A



KEY
Grid & Datum - Local Plane Grid related to OS National Grid & Datum
By GNSS RTK Observations

STANDARD ABBREVIATIONS

STREET FURNITURE	LA - LADDER	TS - TRAFFIC SIGNAL
AC - AIR CONDITIONING	LB - LITTER BIN	TP - TELEGRAPH POLE
AL - ALARM	LC - LIGHTING COLUMN	UL - UNABLE TO LEFT
AV - AERIAL	LP - LAMP POST	VB - VEHICLE BELOW
AW - AIR VALVE	MB - MOORING BOLLARD	VP - VENT PIPE
BA - BATTERY AID	MA - MAST	WB - WHEELS BELOW
BB - BELLS REACTION	MM - MANHOLE	WM - WATER METER
BD - BUILDING DIVIDE	MD - MONUMENT	WO - WASH OUT
BE - BENCH	ME - MILE POST	WP - WASTE PIPE
BF - BENCH FURNITURE	MF - MONUMENT	
BL - BOLLARD	MM - MONITORING WELL	
BO - BOUNDARY POST	MP - MOUND	
BS - BUS STOP	OH - OVERHEAD	
BU - BUSH	OSM - ORDNANCE SURVEY	
CA - CABLE	PA - PLAY APPARATUS	
CB - CONTROL BOX	PS - PILLAR BOX	
CC - CLOSE CIRCUIT TV	PH - PUBLIC HOUSE	
CD - CIGARETTE BIN	PI - PIPE	
CE - COLUMN	PL - PLANT	
CF - CLOSE CIRCUIT TV POLE	PM - PARKING METER	
CG - DOWN PIPE	PN - PUNTER	
CH - CHIMNEY	PP - PETROL PUMP	
CI - CLOTHES LINE	PR - ROAD SIGN	
CL - CLOTHES LINE	RS - RETAINING WALL	
CM - CLOTHES LINE	RWP - RAINWATER PIPE	
CO - CLOTHES LINE	SA - STATION	
CP - CLOTHES LINE	SC - SPEED CAMERA	
CQ - CLOTHES LINE	SD - SAFETY FENCE	
CR - CLOTHES LINE	SE - SIGNAL	
CS - CLOTHES LINE	SI - SIGN	
CT - CLOTHES LINE	SM - SERVICE MARKER POST	
CU - CLOTHES LINE	SS - SECURITY SENSOR	
CV - CLOTHES LINE	ST - STOP TAP	
CW - CLOTHES LINE	SU - STUMP	
CX - CLOTHES LINE	SV - STOP VALVE	
CY - CLOTHES LINE	SW - SWITCHGEAR	
CZ - CLOTHES LINE	SY - STAY	
DA - DRAIN	TA - TAP	
DB - DRAIN	TB - TEMPORARY BENCH MARK	
DC - DRAIN	TCB - TELEPHONE CALL BOX	
DD - DRAIN	TE - TELEPHONE	
DE - DRAIN	TF - TICKET MACHINE	

SYMBOLS

STATION TABLE

STATION	EASTING	NORTHING	LEVEL
OCO1	E 384291.885	N 398959.188	Ht 41.220
OCO2	E 384301.851	N 398923.646	Ht 44.383
OCO3	E 384301.179	N 398966.515	Ht 47.722
OCO4	E 384337.034	N 399004.551	Ht 47.589
OCO5	E 384410.001	N 399041.603	Ht 45.314

Rev	Date	Drawn	Description	Ch'd	App'd

CHARTERED GEOMATIC SURVEYORS

Jupiter House, 21 Roebuck Lane, Sale, Manchester, M33 7SY
T: 0161 973 3495 F: 0161 962 6819
E: mail@ndoliver.com www.ndoliver.com

Client
GARDINER & THEOBALD LLP
MERCHANT EXCHANGE
17-19 WHITWORTH STREET WEST
MANCHESTER
M1 5WG

Title
ANGEL SQUARE
MILLER STREET
MANCHESTER
TOPOGRAPHICAL SURVEY
SHEET 1 OF 1

Surveyed	PG	Drawn	BW	Drawn Date
Checked	AM	Approved	NDO	26/04/2021
Scale	1:250 @ A1	Project	11164	Status
Drawing No	CAD File	11164 / 001	ORIG	Rev

6 APPENDIX B

7 APPENDIX C

Francisco Rodriguez

From: Wastewater Developer Services <WastewaterDeveloperServices@uuplc.co.uk>
Sent: 01 November 2021 19:04
To: Francisco Rodriguez; Wastewater Developer Services
Cc: Andrew Tabern
Subject: 4200039900 MILLER STREET. NOMA.STRAGEWAYS. MANCHESTER M4 4DU

****External Email. This email originated from outside Buro Happold.****

Hi Francis,

Thanks for the CCTV you have submitted, the drainage strategy is acceptable.

Kind regards,

Shoaib.



Shoaib Tauqeer
Developer Engineer
Developer Services & Metering
M: 07876745601
unitedutilities.com

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Coronavirus

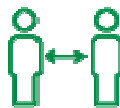
Prevent the spread



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hands**



**Disinfect
common surfaces**



**Practise social
distancing**



**FEVER +
COUGH**

**Stay home if you
have symptoms**

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From: Francisco Rodriguez [mailto:Francisco.Rodriguez@BuroHappold.com]
Sent: 20 October 2021 10:02
To: Wastewater Developer Services <WastewaterDeveloperServices@uuplc.co.uk>
Cc: Andrew Tabern <Andrew.Tabern@BuroHappold.com>
Subject: RE: 4200039900 MILLER STREET. NOMA.STRAGEWAYS. MANCHESTER M4 4DU

EXTERNAL EMAIL This email originated outside of the organisation. Do not click links or open attachments unless you recognise the sender and know the content is safe.

Good Morning Shoaib.

Hope you are keeping well.

Please find attached CCTV survey report and an email to access the videos if require.

CCTV survey shows there is an existing connection from the pipework that is intended to be used on site and the UU sewer. It is also shown that the branches that connects to EX MH01 have lateral connections to the existing gullies within the car park.

With regards to surface water, we have introduced some attenuation on site and a flow control device to restrict the flow to 5l/s as requested

We trust the above information is acceptable and enough to granted the approval. A prompt response will be appreciated.

Please let me know if you have any comment.

Kind Regards
Francis

Francisco Rodriguez (Francis)
Infrastructure Engineer
Buro Happold | Cities Infrastructure Leeds
T:+44 (0)1132 042200

www.burohappold.com | [Twitter](#) | [Instagram](#)

BURO HAPPOLD

From: Wastewater Developer Services <WastewaterDeveloperServices@uuplc.co.uk>

Sent: 23 June 2021 22:07

To: Francisco Rodriguez <Francisco.Rodriguez@BuroHappold.com>; Wastewater Developer Services <WastewaterDeveloperServices@uuplc.co.uk>

Subject: 4200039900 MILLER STREET. NOMA.STRAGEWAYS. MANCHESTER M4 4DU

****External Email. This email originated from outside Buro Happold.****

Good evening Francisco,

Apologies for the delay in responding to your query.

Please could you provide evidence i.e. CCTV footage and dye testing to prove the on site former highway drainage pipe which has been abandoned connects to the combined sewer currently please also dye test/survey the onsite gully's. This is required to prove a positive connection to our public sewer. It may actually connect to an unidentified highway drain within Miller street – the submitted Utility survey does not show the ultimate connection point from the existing manhole onsite, therefore further evidence required. Once this has been satisfied and if the condition of

this existing sewer is suitable we would accept both foul and surface water to drain from the proposed site to the combined sewer via this existing pipe in principle. Foul water would be allowed at an unrestricted rate. Please see below for surface water discharge rate restriction.

With regard to surface water, if the existing on site sewer and gully's do have a positive connection as requested above to the combined public sewer then we would allow 50% betterment on the existing situation. It appears there are two gully's on site and the impermeable area excluding the permeable grassed area amounts to approximately 0.073ha therefore based on a 50mm/hr rainfall rate this is calculated to give 10 l/s, and a 50% betterment would result in 5l/s. We would not allow betterment rate to be calculated based on the 100 year 15minute event, this should be based on a 1 year 15minute event.

Kind regards,

Shoaib.



Shoaib Tauqeer
Developer Engineer
Developer Services & Metering
M: 07876745601
unitedutilities.com

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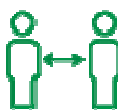
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hands



Disinfect
common surfaces



Practise social
distancing



FEVER +
COUGH

Stay home if you
have symptoms

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From: Francisco Rodriguez [<mailto:Francisco.Rodriguez@BuroHappold.com>]

Sent: 11 June 2021 08:37

To: Wastewater Developer Services <WastewaterDeveloperServices@uuplc.co.uk>

Cc: Mura, Marie <Marie.Mura@uuplc.co.uk>

Subject: FW: NOMA Marketing Suite, Pre development enquiry - 4200039900 EMAIL 1/2

EXTERNAL EMAIL This email originated outside of the organisation. Do not click links or open attachments unless you recognise the sender and know the content is safe.

Hi Marie,

As discussed please see below the email I sent you 2nd June regarding the above pre development enquiry that for some reason hasn't been delivered. I will send a second email with the drainage strategy to support the information below.

A prompt response will be really appreciated as the Client is chasing this up.

Many thanks
Francis

Francisco Rodriguez (Francis)
Infrastructure Engineer
Buro Happold | Cities Infrastructure Leeds
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BURO HAPPOLD

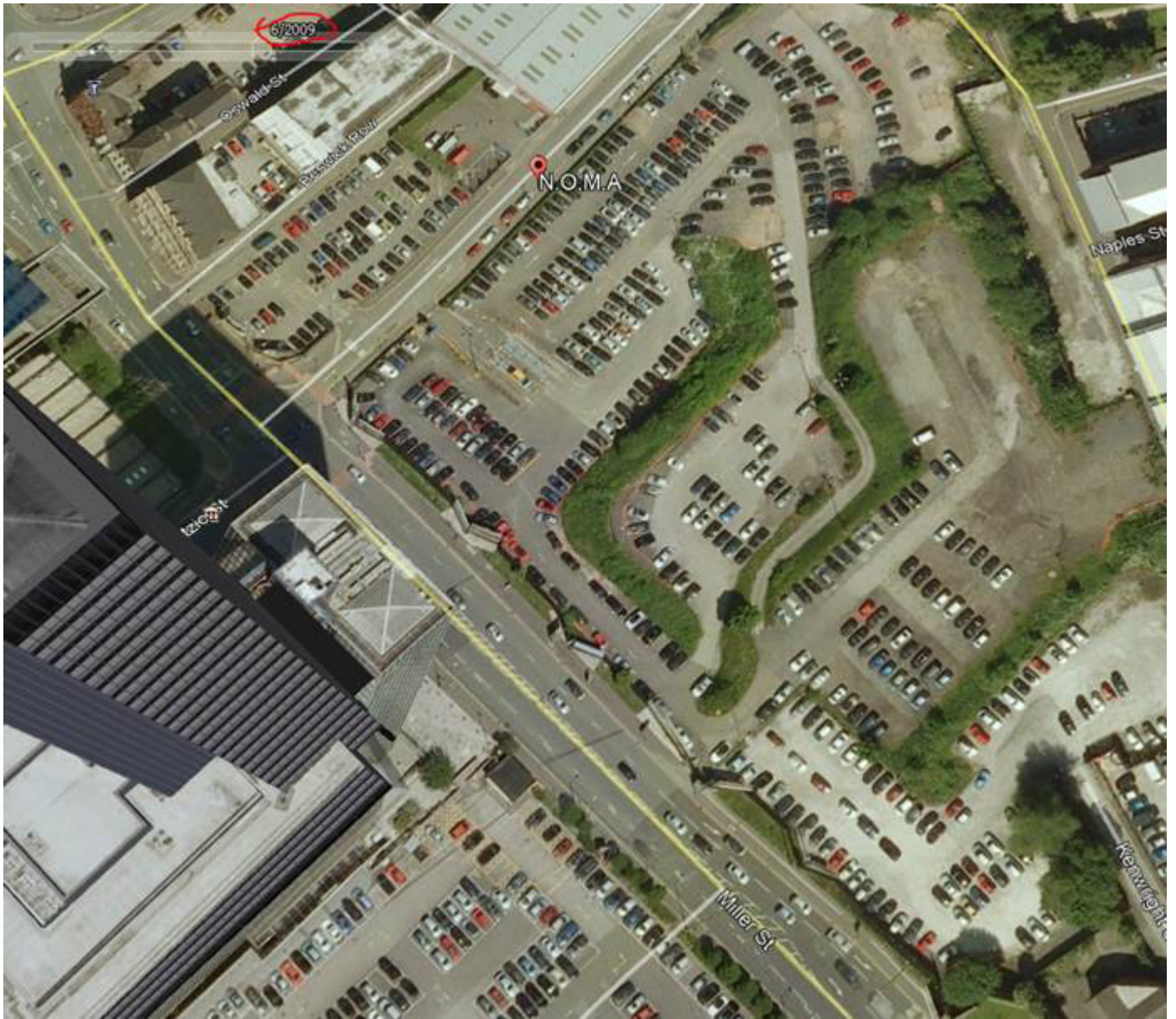
From: Francisco Rodriguez
Sent: 02 June 2021 10:52
To: Wastewater Developer Services
Cc: Andrew Tabern ; Colin Byrne
Subject: RE: NOMA Marketing Suite, Pre development enquiry - 4200039900

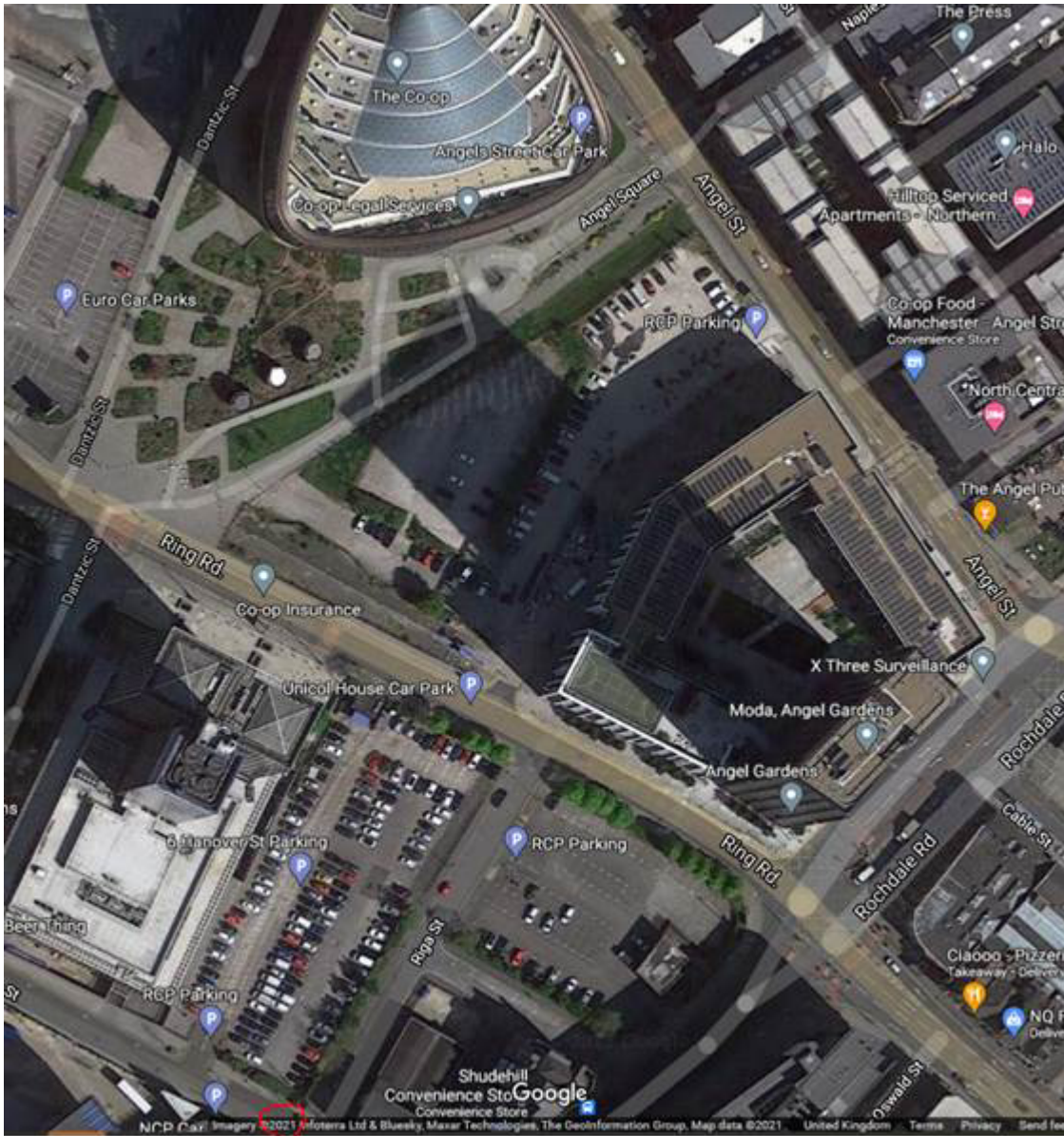
Hi Marie,

Thanks for your time earlier.

As discussed, we would like some clarification for the proposed response:

The proposed marketing suite is a temporary building that will be operative for 2 to 3 years until the construction of 2 & 3 Angel Square buildings is undertaken. There is an abandoned highway drainage network within the site that connects to the UU sewer within Miller Street as shown on the attached S104 plan for the adjacent building (Angel Gardens). With the construction of Angel Gardens the highway drainage was abandoned and we would like to use this existing connection to discharge flows from the temporary marketing suite as per the attached drawing 3100 in order to use an existing connection, avoid disruption on public highway and/or someone else's land and avoid a deep excavation in Miller street (combined sewer is circa 10m deep). Please see below that the highway drain was redundant when in 2013 the carriageway was reduced to 2 lanes instead of 4.





Therefore, we hope it is acceptable to discharge foul water from the marketing suite at an unrestricted flow via this existing connection(as per the attached drawing).

With regards to the surface water, we cannot infiltrate as the site is made ground and clay below as per the ground engineering desk study previously provided, we cannot go to a watercourse and again we would like to use the existing infrastructure to discharge the surface water to the combined sewer in Miller street as per the attached drawing.

The proposed site is 0.12ha which it is envisaged that only 0.033ha impermeable area will discharge to the UU sewer. Please see attached a drainage strategy with a MicroDrainage calculation to show the proposed flows for the site for the 1,30 and 100 year return periods. As shown on the document, the proposed flow for 1 in 100year event is 13l/s whereas the 50% of the existing brownfield runoff for the same storm event is 14.7l/s therefore, we don't envisage any attenuation is required for this site.

Hope the above is clear but please give me a call to discuss if require.

Kind Regards
Francis

Francisco Rodriguez (Francis)

BURO HAPPOLD

From: Wastewater Developer Services <WastewaterDeveloperServices@uuplc.co.uk>

Sent: 26 May 2021 14:42

To: Francisco Rodriguez <Francisco.Rodriguez@BuroHappold.com>

Cc: Wastewater Developer Services <WastewaterDeveloperServices@uuplc.co.uk>

Subject: FW: NOMA Marketing Suite, Pre development enquiry - 4200039900

****External Email. This email originated from outside Buro Happold.****

Good Afternoon Francis,

We have carried out an assessment of your application which is based on the information provided. This pre-development advice on your drainage strategy will be valid for 12 months. Your drainage strategy will need to be reviewed by other competent authorities as part of the planning process, and we advise that you carry out the necessary site investigations to confirm the viability of your proposals.

If your investigations require access to our public sewer network, we ask that you contact our network engineers with a request for an access certificate via our main contact telephone number 0345 3723223 or refer to the link below:

<https://www.unitedutilities.com/builders-developers/working-near-our-assets/>

Foul Water

Foul flow from this site will be allowed to drain into the public foul water/combined sewer system.

Our preferred point of discharge would be to the 675 x 1500mm diameter public combined sewer within located to the South of your proposed development at an unrestricted rate.

If you are able to identify an alternative, more suitable point of discharge, we request that you contact us at your earliest convenience so that we can assess suitability.

Surface Water

All surface water flow from the proposed development should drain in-line with the drainage hierarchy, as outlined in Paragraph 80, (Reference ID: 7-080-20150323), of the National Planning Practice Guidance. We also recommend you prioritise the use of multi-functional sustainable drainage systems for the management of surface water in accordance with national planning policy.

Generally, the aim should be to discharge surface run off as high up the following hierarchy of drainage options as reasonably practicable.

This is outlined as follows, in order of priority:

1. **into the ground (infiltration);**
2. **to a surface waterbody;**
3. **to a surface water sewer or highway drain;**

4. to a combined sewer.

For guidance, The North West SuDS Pro-Forma provides information on the appropriate evidence required at each stage of the hierarchy, to demonstrate how each level has been discounted.

The Lead Local Flood Authority has responsibility for all surface water drainage concerns and their input to your proposal is critical. You should also consider whether it is necessary to discuss your proposal with the Environment Agency, or Internal Drainage Board (if operating in your area).

The Local Planning Authority are the determining authority for any application for planning permission and the appropriate authority for determining cost viability of a proposed drainage scheme, such assessments are outside of the jurisdiction of United Utilities.

Infiltration

Surface water runoff generated from this development should discharge to the ground via infiltration system where feasible.

A detailed evidence based feasibility assessment must be carried out in line with Chapter 25 of the CIRIA SuDS Manual 2015 to determine whether infiltration is a suitable method of surface water disposal.

Particular attention must be paid to Ground Water Source Protection Zones to ensure that the risk of pollution to these valuable resources is not compromised. Details can be obtained from the government website:

<https://www.gov.uk/guidance/groundwater-source-protection-zones-spzs#find-groundwater-spzs>

If your site is in a Groundwater Source Protection Zone, you should have regard to the Environment Agency's approach to Groundwater Protection. Information on this is available via the link below:

<https://www.gov.uk/government/publications/groundwater-protection-position-statements>

Please note that such a location could have implications for the principle of your development and the need for additional mitigating measures to protect the groundwater environment and public water supply in the detailed design of your site.

Public Sewer

In accordance with the hierarchy of drainage options within the National Planning Practice Guidance, both discharge to ground via infiltration and discharge to a waterbody should be discounted prior to consideration of discharging surface water to the public sewer system. Evidence should be provided to demonstrate how these have been discounted, as outlined in the North West SuDS pro-forma.

Once evidence is provided as outlined above, United Utilities will consider a connection to the 300mm diameter public surface water sewer located 37m West of the proposed site at a pass forward flow to be agreed by the Lead Local Flood Authority. United Utilities request that any agreed rate does not exceed 5 l/s.

As a Water Company, we have no obligation to accept highway drainage into our public sewer network. However, should your proposals include runoff from highways, we would request that consideration is given to SuDS components that deliver source control are incorporated within the design of the scheme to reduce the volume and frequency of discharges of these flows to the public sewer.

Levels

For low-lying sites, (where the ground level of the site or the level of a basement is below the ground level at the point where the drainage connects to the public sewer), care should be taken to ensure that the property is not at increased risk of flooding. If these circumstances exist, we recommend that you contact us to discuss further. It could affect the detailed design of your site and result in the need to incorporate appropriate mitigating measures in your drainage scheme.

Existing Water Assets Crossing the Site

It is the developer responsibility to identify utilities on-site. Where clean water assets are shown on our records, we recommend that you contact our Water Pre-Development Team, via the following email address:

DeveloperServicesWater@uuplc.co.uk. Further information for this service can be found on our website via the link below:

<https://www.unitedutilities.com/builders-developers/larger-developments/pre-development/water-pre-dev/>

Connection Application

Although we may discuss and agree discharge points and rates in principle, please be aware that you will have to apply for a formal sewer connection. This is so that we can assess the method of construction, Health & Safety requirements and to ultimately inspect the connection when it is made. Details of the application process and the form itself can be obtained from our website by following the link below:

<https://www.unitedutilities.com/builders-developers/larger-developments/wastewater/sewer-connections/>

We recommend that the detailed design should confirm the locations of all utilities in the area and ensure that any proposed drainage solution considers routing and clash checks where required.

If we can be of any further assistance please don't hesitate to contact us further.

Kind regards,

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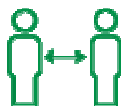
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distancing



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From: Francisco Rodriguez [<mailto:Francisco.Rodriguez@BuroHappold.com>]

Sent: 14 May 2021 13:26

To: Wastewater Developer Services <WastewaterDeveloperServices@uuplc.co.uk>

Cc: Colin Byrne <Colin.Byrne@BuroHappold.com>; 042512 NOMA Plot P
<042512NomaPlotP9337@burohappold.onmicrosoft.com>

Subject: NOMA Marketing Suite, Pre development enquiry

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Good Afternoon,

Please find attached the wastewater pre-development enquiry for the above site.

The proposed Noma marketing suite will be a temporary one storey building with associated landscaping located on Miller Street, M4 4DU . It is envisaged the this marketing suite will be operative for 2 to 3 years until the construction of 2 & 3 Angel Square buildings is undertaken. Please find attached the proposed site layout and how it is integrated in the bigger picture in the following image:



Figure 1: Extract of Simpson Haugh drawing 10341-Z1-A-B5D8-G100-XP-XX-001 with NMS boundary (red) & 28x3 Angel Square boundary (blue).

The existing site consists of a surface car park and some landscaped area as shown in the following images:





The existing site falls from north to south and it currently drains through existing gullies located in the southern part of the boundary, please refer to the topo survey attached. The existing site has a 85% of impermeable area and only a 15% of permeable whereas the proposed development increase the permeable area up to a 50% of the total site area.

Please see attached the estimated brownfield calculation for the site using the Modified Rational Method. Existing peak flow rate for the 15min 1 in 100 year event is 29.3l/s and the proposed rate will be a 50% reduction of that, giving a discharge rate of 14.7l/s.

Due to the short term nature of the building (2 to 3 years) and the increased in permeable area, we would like to discharge surface water to the calculated discharge rate (14.7l/s) and foul water unrestricted to an existing pipe within the site that connects to the public sewer on Miller street.

Please let me know if you require further information.

Kind Regards

Francis

Francisco Rodriguez (Francis)

BURO HAPPOLD

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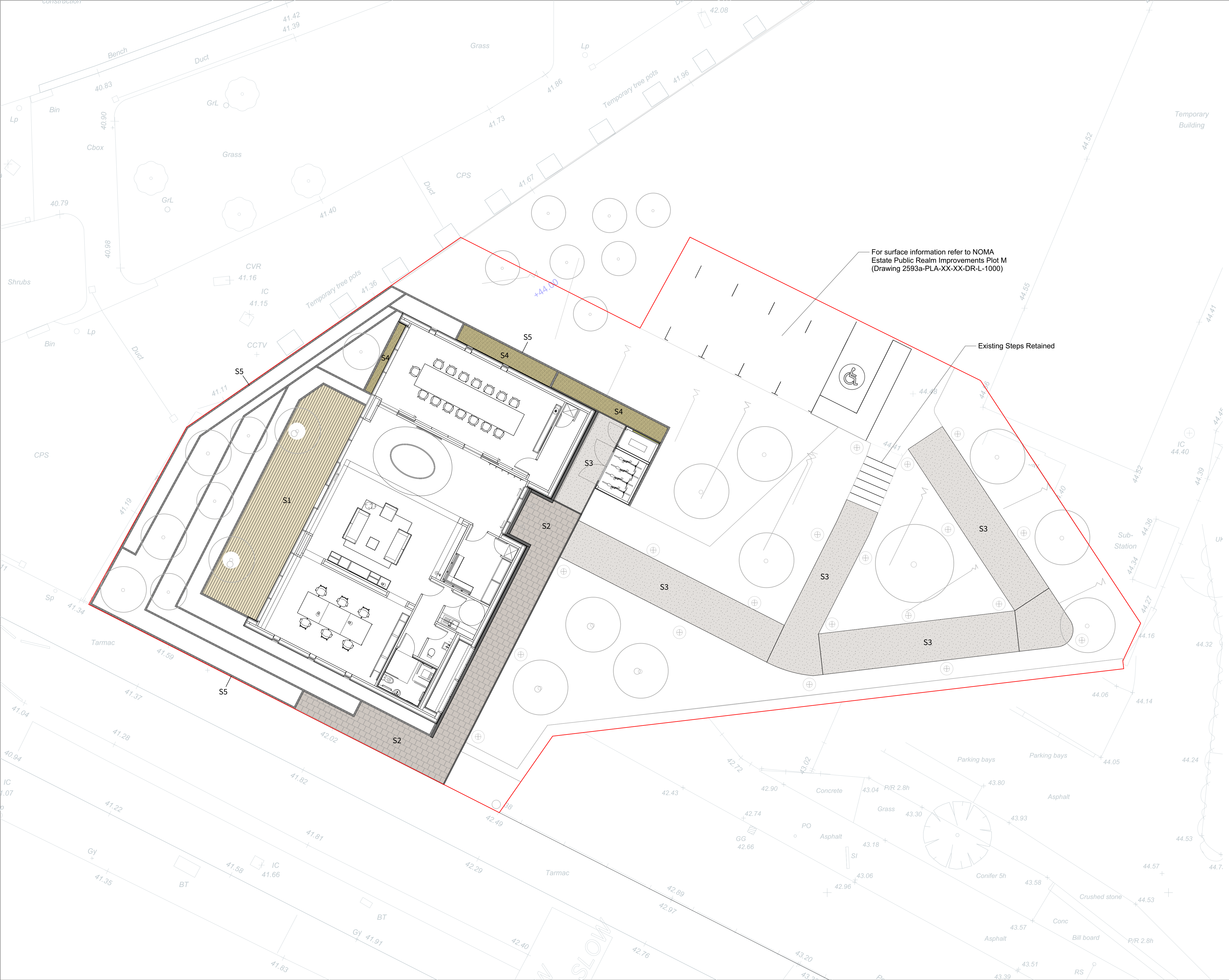
EMGateway3.uuplc.co.uk made the following annotations

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8 APPENDIX D



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NOTES:

1. Do not scale from this drawing.
2. Always work to noted dimensions.
3. All dimensions are in millimetres unless otherwise stated.
4. All setting out, levels and dimensions to be agreed on site.
5. The dimensions of all materials must be checked on site before being laid out.
6. This drawing must be read with the relevant specification clauses and detail drawings.
7. Order of construction and setting out to be agreed on site.

- Key:**
- HARDWORKS**
- S1** Decking
Material: Millboard composite decking
Location: West side of Marketing Suite
Product: Millboard Enhanced Grain
Colour: Limed Oak (tbc)
Sizes: 176mm x 32mm x 3600mm
 - S2** Yorkstone Paving
Location: Entrance off Miller street to Marketing Suite
Product: Whitworth by Hardscape
Colour: Buff / Grey
Sizes: 300mm x 60mm x 300-700mm RL
To Specialist clause Q25/
 - S3** Self Bound Gravel Surfacing
Location: Path and ramp from Car park
Product: CEDEC footpath Gravel
Colour: Silver
To Specialist clause Q23/
 - S4** Loose Gravel
Material: Sandstone
Location: North Edge of Marketing Suite
Product: 75mm Crusher Run
Colour: Varied
Supplier: Marshalls or similar approved
To Specialist clause Q23/
 - S5** Charred Sleeper retaining edge / terraces
Material: Charred Oak Sleepers
Location: To Terraced Planters
Sizes: 100mm x 200mm x various lengths as shown on detail drawings.
Sleepers to be stacked vertically mechanically fixed from rear face.
To Specialist clause Q10/

S3-P02	07.05.21	Stage 3- Final Draft	CS	MS
S3-P01	14.04.21	Stage 3 - Preliminary Issue	CS	MS
Revision	Date	Description	Drawn	Apprvd.



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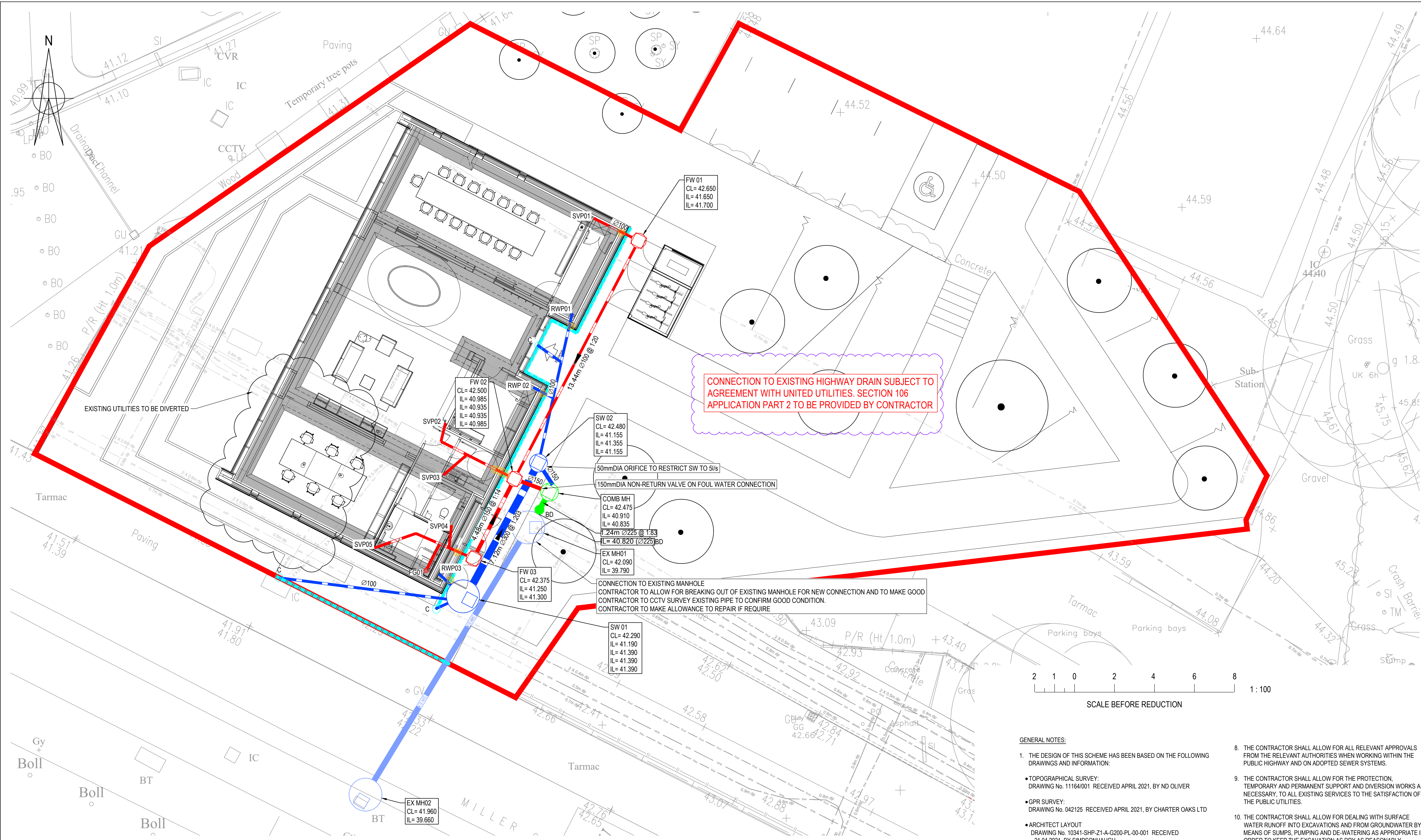
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T: 0207 253 5678

LIVERPOOL

Tempest 5.3, 12 Tithebarn Street, Liverpool, L2 2DT
T: 0151 363 1230

Client	MEPC		
Project	NOMA Marketing Suite		
Drg Title	GA Hardworks		
Created on	Created by	Approved by	
09/04/2021	CS	MS	
Scale	Size	Workstage	
1:100	A1	Stage 3	
Drg No.	Suitability		Revision
2629-PLA-XX-XX-DR-L-1000	S3		P02

9 APPENDIX E



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IN ADDITION TO THE HAZARD RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING:
CONSTRUCTION
- WORKS WITHIN POTENTIAL CONFINED SPACE CONDITIONS - WORKS IN PROXIMITY TO LIVE SERVICES - WORKS INTERFACE WITH THE PUBLIC ON MILLER STREET
MAINTENANCE/CLEANING/OPERATION
- WORKS WITHIN POTENTIAL CONFINED SPACE CONDITIONS - WORKS IN PROXIMITY TO LIVE SERVICES - WORKS INTERFACE WITH THE PUBLIC ON MILLER STREET
DECOMMISSIONING/DEMOLITION
- WORKS WITHIN POTENTIAL CONFINED SPACE CONDITIONS - WORKS IN PROXIMITY TO LIVE SERVICES - WORKS INTERFACE WITH THE PUBLIC ON MILLER STREET

LEGEND:

FW

SW

COMB

EXISTING DRAINAGE

C = CHANNEL OUTLET

FG

SVP

RWP

PROPOSED FOUNDATIONS

DRAINAGE CAST THROUGH FOUNDATION

PROPOSED SITE BOUNDARY

REVISION CLOUD

PROPOSED FOUL WATER DRAINAGE AND MANHOLE WITH REFERENCE

PROPOSED SURFACE WATER DRAINAGE AND MANHOLE WITH REFERENCE

PROPOSED COMBINED WATER DRAINAGE AND MANHOLE WITH REFERENCE

EXISTING DRAINAGE

PROPOSED ACO MULTIDRAIN M1000 WITH SUMP UNITS WITH RODABLE FOUL AIR TRAP OR SIMILAR AND IN ACCORDANCE TO LANDSCAPE ARCHITECT SPECIFICATIONS

PROPOSED SHOWER GULLY

PROPOSED SOIL VENT PIPE

PROPOSED RAINWATER PIPE

PROPOSED FOUNDATIONS

DRAINAGE CAST THROUGH FOUNDATION

PROPOSED SITE BOUNDARY

REVISION CLOUD

ALL PIPES TO BE 100mmØ UNLESS OTHERWISE STATED

C01	ISSUE FOR CONSTRUCTION	27.10.2021	FR	CB	CB
P02	UPDATED SW DRAINAGE	25.06.2021	FR	CB	CB
P01	ISSUED FOR STAGE 3	19.05.2021	FR	CB	CB
Rev	Description	Date	Iss'd	Rev'd	App'd

RIBA STAGE 4

Project Stage

CONSTRUCTION

Status of Drawing

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ClientScarborough Developments

ArchitectWhitlam Cox Architects

ProjectNOMA MARKETING SUITE

Drg TitleDRAINAGE GENERAL ARRANGEMENT AND MANHOLE SCHEDULES

Job No.0042512

Scale: A1

1:100

Drawn/Designed By:FR

Checked By:CB

Approved By:CB

Drawing No.0042512-BHE-XX-XX-DR-C-3100

RevisionC01

MANHOLE SCHEDULE - PR FW drainage													
NAME	EASTING [m]	NORTHING [m]	COVER LEVEL [m]	INVERT LEVEL [m]	DEPTH [m]	TYPE & INNER DIA	COVER LOADING	COVER TYPE	INCOMING PIPE DIAMETER [mm]	INCOMING PIPE IL [m]	OUTGOING PIPE DIAMETER [mm]	OUTGOING PIPE IL [m]	COMMENTS
COMB MH	384322.454	398954.918	42.475	40.835	1.640	PPIC 600mm	B125	ST	150 150	40.910 40.910	225	40.835	COMBINED WATER MANHOLE NON-RETURN VALVE ON FOUL WATER CONNECTION
FW 01	384326.915	398967.495	42.650	41.650	1.000	PPIC 450mm	B125	ST	100	41.700	100	41.650	
FW 02	384320.704	398955.575	42.500	40.935	1.565	PPIC 450mm	B125	RE	100 150 100	40.985 40.935 40.985	150	40.935	
FW 03	384318.658	398951.591	42.375	41.250	1.125	PPIC 450mm	B125	RE	100	41.300	150	41.250	

MANHOLE SCHEDULE - PR SW Drainage													
NAME	EASTING [m]	NORTHING [m]	COVER LEVEL [m]	INVERT LEVEL [m]	DEPTH [m]	TYPE & INNER DIA	COVER LOADING	COVER TYPE	INCOMING PIPE DIAMETER [mm]	INCOMING PIPE IL [m]	OUTGOING PIPE DIAMETER [mm]	OUTGOING PIPE IL [m]	COMMENTS
SW 01	384318.125	398949.698	42.290	41.190	1.100	TYPE B 1200mm	B125	RE	100 100 100	41.390 41.390 41.390	300	41.190	
SW 02	384321.903	398956.368	42.480	41.155	1.325	PPIC 600mm	B125	RE	100 300	41.355 41.155	150	41.155	50mm ORIFICE PLATE TO RESTRICT FLOW TO 5l/s

ABBREVIATIONS

ST - SOLID TOP
RE - RECESSED COVER

GENERAL NOTES:

- THE DESIGN OF THIS SCHEME HAS BEEN BASED ON THE FOLLOWING DRAWINGS AND INFORMATION:
 - TOPOGRAPHICAL SURVEY: DRAWING No. 11164/001 RECEIVED APRIL 2021, BY ND OLIVER
 - GPR SURVEY: DRAWING No. 042125 RECEIVED APRIL 2021, BY CHARTER OAKS LTD
 - ARCHITECT LAYOUT: DRAWING No. 10341-SHP-Z1-A-G200-PL-00-001 RECEIVED 21.04.2021, BY SIMPSONHAUGH
DRAWING No. NMS-SHP-28-00-DR-A-1901 REV P01 RECEIVED 06.10.2021, BY SIMPSONHAUGH
 - LANDSCAPE ARCHITECT LAYOUT: DRAWING No. 2629-PLA-XX-XX-DR-1-2000 REV P02 RECEIVED 07.05.2021, BY PLANIT.
- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS, DETAILS AND SPECIFICATIONS.
- ALL DIMENSIONS ARE IN METRES UNLESS STATED OTHERWISE.
- THE CONTRACTOR SHALL TAKE ALL NECESSARY SAFETY PRECAUTIONS IN LINE WITH CURRENT LEGISLATION WHEN WORKING IN NEAR CONFINED SPACES, DEEP EXCAVATIONS AND UTILITIES.
- PRIOR TO THE COMMENCEMENT OF WORK THE LOCATION, SIZE AND DEPTH OF ALL EXISTING DRAINS/SEWERS AND SERVICES SHALL BE ESTABLISHED BY THE CONTRACTOR. ANY DISCREPANCIES FROM THE INFORMATION INDICATED ON THESE DRAWINGS SHALL IMMEDIATELY BE BROUGHT TO THE ATTENTION OF THE ARCHITECT OR ENGINEER.
- ALL DRAINAGE SHALL BE CONSTRUCTED IN ACCORDANCE WITH BS EN 752 DRAINS AND SEWERS OUTSIDE BUILDINGS, THE CURRENT BUILDING REGULATIONS AND TO THE SATISFACTION OF THE WATER AUTHORITY / BUILDING CONTROL OR SPECIFIC REQUIREMENTS OF THE CLIENT IF APPLICABLE.
- ANY DRAINAGE TO BE PUT FORWARD FOR ADOPTION SHALL BE CONSTRUCTED TO "SEWERS FOR ADOPTION" AND ANY SPECIFIC REQUIREMENTS OF THE ADOPTING AUTHORITY.

- THE CONTRACTOR SHALL ALLOW FOR ALL RELEVANT APPROVALS FROM THE RELEVANT AUTHORITIES WHEN WORKING WITHIN THE PUBLIC HIGHWAY AND ON ADOPTED SEWER SYSTEMS.
- THE CONTRACTOR SHALL ALLOW FOR THE PROTECTION, TEMPORARY AND PERMANENT SUPPORT AND DIVERSION WORKS AS NECESSARY, TO ALL EXISTING SERVICES TO THE SATISFACTION OF THE PUBLIC UTILITIES.
- THE CONTRACTOR SHALL ALLOW FOR DEALING WITH SURFACE WATER RUNOFF INTO EXCAVATIONS AND FROM GROUNDWATER BY MEANS OF SUMPS, PUMPING AND DE-WATERING AS APPROPRIATE IN ORDER TO KEEP THE EXCAVATION AS DRY AS REASONABLY PRACTICABLE DURING THE CONSTRUCTION OF THE WORKS. DEWATERING SHALL BE UNDERTAKEN IN STRICT ACCORDANCE WITH THE SPECIFICATION.
- THE CONTRACTOR SHALL TAKE ALL NECESSARY SAFETY PRECAUTIONS IN LINE WITH CURRENT LEGISLATION WHEN WORKING IN NEAR CONFINED SPACES, DEEP EXCAVATIONS AND UTILITIES.
- UPON COMPLETION OF THE WORKS THE CONTRACTOR SHALL CLEAN ALL DRAINAGE BY JETTING, REMOVING ALL DEBRIS FROM SITE. NO DEBRIS SHALL BE PERMITTED TO ENTER THE PUBLIC DRAINAGE SYSTEM, WATERCOURSE OR OFFSITE DISCHARGE NETWORK. ALL DRAINS SHALL BE CCTV SURVEYED WITH THE RECORD INFORMATION (INCLUDING VIDEO FOOTAGE) BEING PASSED TO THE ENGINEER FOR REVIEW.
- ALL PROPRIETARY PRODUCTS SHALL BE INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURERS' SPECIFIC REQUIREMENTS AND SPECIFICATIONS.
- ALL EXISTING DRAINAGE INFRASTRUCTURE NOT REQUIRED AS PART OF THE FINAL DRAINAGE SYSTEM IS TO BE GRUBBED UP AND REMOVED FROM SITE OR GROUTED UP AS DIRECTED BY THE ENGINEER.
- ABOVE GROUND RODDING POINTS MUST BE PROVIDED TO FOUL STACKS AND RAINWATER DOWNPIPES WHICH DO NOT CONNECT DIRECTLY TO A MANHOLE. ALL RODDING POINTS MUST BE PROVIDED WITH ACCESS PANELS.
- WHERE INFILL MANHOLE COVERS ARE SPECIFIED THE LOCATION OF MANHOLES AND ORIENTATION OF THE COVERS SHALL BE COORDINATED ON SITE TO SUIT THE SURFACING MATERIAL AND PAVING ARRANGEMENT WHEREVER POSSIBLE.
- DUCTILE IRON SHALL BE USED FOR PIPE WORK WHICH IS TO BE CAST THROUGH PILE CAPS / PAD FOUNDATIONS.

Filename: C:\Users\jgibson\Documents\0042512-NOMA-Mkt-P-02.dwg Date: 27/10/2021 14:43:00 User: jgibson

10 APPENDIX F

BuroHappold Ltd		Page 1
Camden Mill Lower Bristol Road Bath		
Date 27/01/2022 10:56 File NOMA MARKETING SUITE SW...	Designed by frodrigu Checked by	
Innovyze	Network 2020.1.3	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	30	PIMP (%)	100
M5-60 (mm)	18.000	Add Flow / Climate Change (%)	0
Ratio R	0.361	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	7.665	0.035	219.0	0.012	5.00	0.0	0.600	o	300	Pipe/Conduit	
1.001	1.552	0.245	6.3	0.021	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.002	2.068	0.015	137.8	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	E I.Area (ha)	E Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	5.12	41.190	0.012	0.0	0.0	0.0	1.06	74.8	1.6
1.001	50.00	5.13	41.155	0.033	0.0	0.0	0.0	4.03	71.2	4.5
1.002	50.00	5.16	40.835	0.033	0.0	0.0	0.0	1.11	44.2	4.5

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	0
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

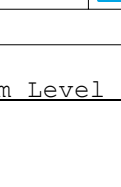
Synthetic Rainfall Details

Rainfall Model	FSR	Region	England and Wales
Return Period (years)	30	M5-60 (mm)	18.000

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BuroHappold Ltd		Page 2
Camden Mill Lower Bristol Road Bath		
Date 27/01/2022 10:56 File NOMA MARKETING SUITE SW...	Designed by frodrigu Checked by	
Innovyze	Network 2020.1.3	
<u>Synthetic Rainfall Details</u> Ratio R 0.361 Cv (Winter) 0.840 Profile Type Summer Storm Duration (mins) 30 Cv (Summer) 0.750		
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Camden Mill Lower Bristol Road Bath		
Date 27/01/2022 10:56 File NOMA MARKETING SUITE SW...	Designed by frodrigu Checked by	
Innovyze	Network 2020.1.3	
<u>Online Controls for Storm</u> <u>Orifice Manhole: SW 02, DS/PN: 1.001, Volume (m³): 0.9</u> Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 41.155		
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Camden Mill Lower Bristol Road Bath		
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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	0
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.360
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	18.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)

Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	1, 5, 30, 100
Climate Change (%)	0, 0, 0, 10

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	SW 01	15 Winter	1	+0%	5/15 Summer	100/15 Summer		
1.001	SW 02	15 Winter	1	+0%	1/15 Summer			
1.002	COMB MH	15 Winter	1	+0%				

PN	US/MH Name	Water	Surcharged	Flooded	Flow / Cap.	Overflow (l/s)	Half Drain	Pipe	Status
		Level (m)	Depth (m)	Volume (m³)			Time (mins)	Flow (l/s)	
1.000	SW 01	41.360	-0.130	0.000	0.02			0.9	OK
1.001	SW 02	41.360	0.055	0.000	0.07			2.2	SURCHARGED
1.002	COMB MH	40.876	-0.184	0.000	0.08			2.2	OK

PN	US/MH Name	Level Exceeded
1.000	SW 01	5

BuroHappold Ltd		Page 5
Camden Mill Lower Bristol Road Bath		
Date 27/01/2022 10:56 File NOMA MARKETING SUITE SW...	Designed by frodrigu Checked by	
Innovyze	Network 2020.1.3	
<u>1 year Return Period Summary of Critical Results by Maximum Level (Rank 1)</u> <u>for Storm</u>		
	US/MH	Level
PN	Name	Exceeded
1.001	SW 02	
1.002	COMB MH	
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BuroHappold Ltd

Camden Mill
Lower Bristol Road
Bath

Date 27/01/2022 10:56
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Page 6



Designed by frodrigu
Checked by

Network 2020.1.3

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

Simulation Criteria

Areal Reduction Factor 1.000

Hot Start (mins) 0

Hot Start Level (mm) 0

Manhole Headloss Coeff (Global) 0.500

Foul Sewage per hectare (l/s) 0.000

Additional Flow - % of Total Flow 0.000

MADD Factor * 10m³/ha Storage 2.000

Inlet Coeffiecient 0.800

Flow per Person per Day (l/per/day) 0.000

Number of Input Hydrographs 0

Number of Online Controls 1

Number of Offline Controls 0

Number of Storage Structures 0

Number of Time/Area Diagrams 0

Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model

Region England and Wales Cv (Summer)

M5-60 (mm)

FSR

Ratio R 0.360

0.750

18.000 Cv (Winter)

0.840

Margin for Flood Risk Warning (mm)

Analysis Timestep 2.5 Second Increment (Extended)

DTS Status

DVD Status

Inertia Status

300.0

OFF

ON

ON

Profile(s)

Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440

Return Period(s) (years)

Climate Change (%)

Summer and Winter

1, 5, 30, 100

0, 0, 0, 10

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	SW 01	15 Winter	5	+0%	5/15 Summer	100/15 Summer		
1.001	SW 02	15 Winter	5	+0%	1/15 Summer			
1.002	COMB MH	15 Winter	5	+0%				

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap. (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
1.000	SW 01	41.581	0.091	0.000	0.02		1.3	SURCHARGED
1.001	SW 02	41.580	0.275	0.000	0.11		3.3	SURCHARGED
1.002	COMB MH	40.885	-0.175	0.000	0.11		3.3	OK

PN	US/MH Name	Level Exceeded
1.000	SW 01	5

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Camden Mill Lower Bristol Road Bath		
Date 27/01/2022 10:56 File NOMA MARKETING SUITE SW...	Designed by frodrigu Checked by	
Innovyze	Network 2020.1.3	
<u>5 year Return Period Summary of Critical Results by Maximum Level (Rank 1)</u> <u>for Storm</u>		
	US/MH	Level
PN	Name	Exceeded
1.001	SW 02	
1.002	COMB MH	
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BuroHappold Ltd		Page 9
Camden Mill Lower Bristol Road Bath		
Date 27/01/2022 10:56 File NOMA MARKETING SUITE SW...	Designed by frodrigu Checked by	
Innovyze	Network 2020.1.3	
<u>30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)</u> <u>for Storm</u>		
	US/MH	Level
PN	Name	Exceeded
1.001	SW 02	
1.002	COMB MH	
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BuroHappold Ltd		Page 11												
Camden Mill Lower Bristol Road Bath														
Date 27/01/2022 10:56 File NOMA MARKETING SUITE SW...	Designed by frodrigu Checked by													
Innovyze	Network 2020.1.3													
<u>100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm</u>														
	<table><tr><td></td><td>US/MH</td><td>Level</td></tr><tr><td>PN</td><td>Name</td><td>Exceeded</td></tr><tr><td>1.001</td><td>SW 02</td><td></td></tr><tr><td>1.002</td><td>COMB MH</td><td></td></tr></table>		US/MH	Level	PN	Name	Exceeded	1.001	SW 02		1.002	COMB MH		
	US/MH	Level												
PN	Name	Exceeded												
1.001	SW 02													
1.002	COMB MH													
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