



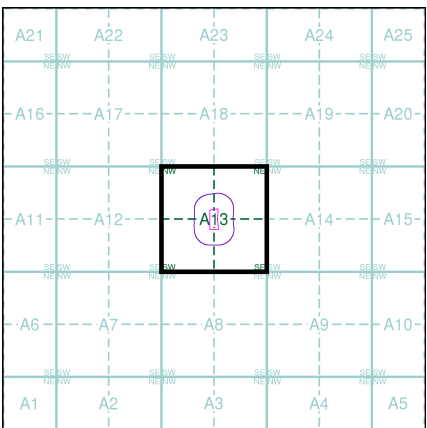
G R O U P

Historical Aerial Photography

Published 2000

This aerial photography was produced by Getmapping, these vertical aerial photographs provide a seamless, full colour survey of the whole of Great Britain

Historical Aerial Photography - Segment A13



Order Details

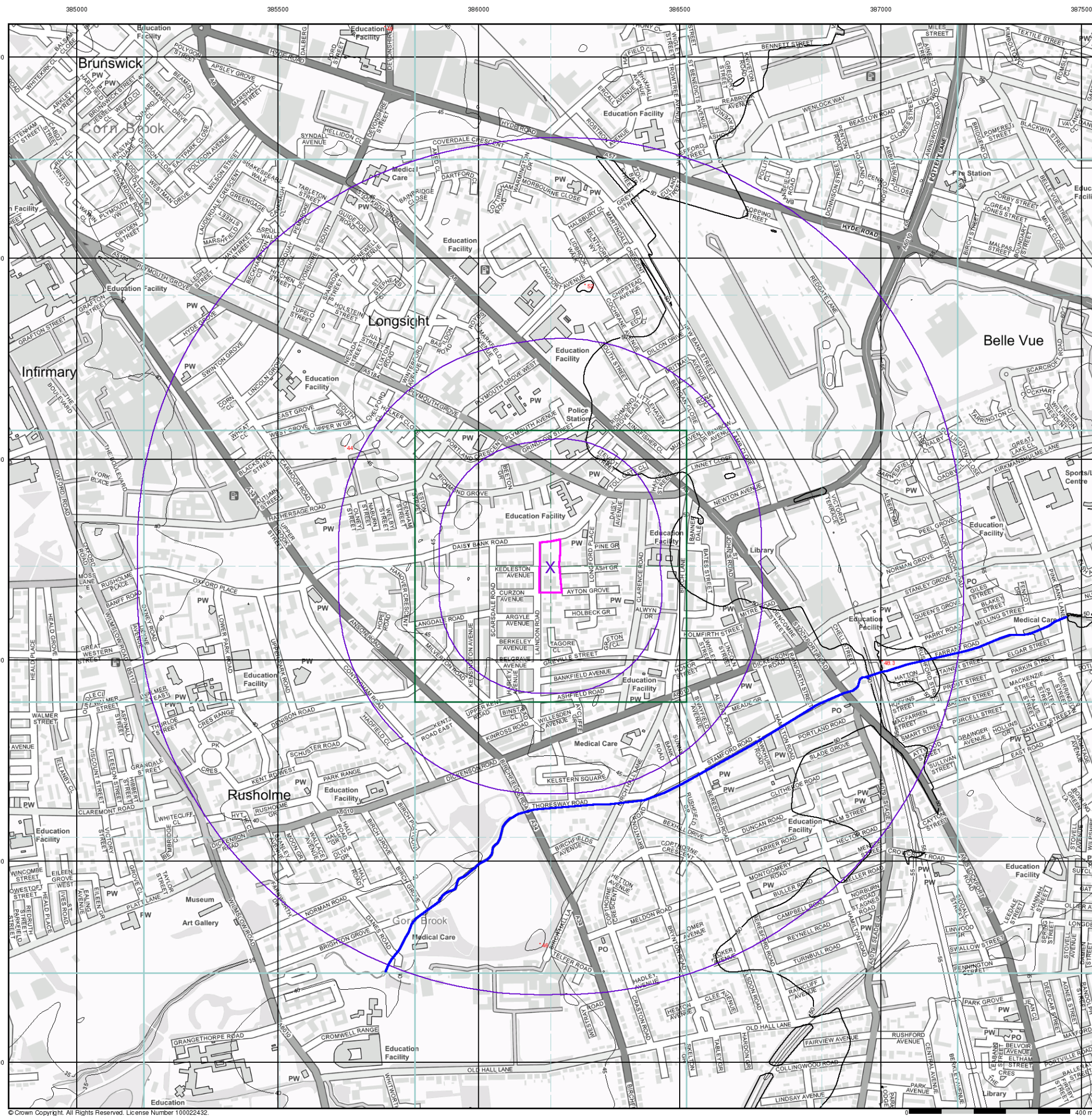
Order Number: 298702326_1_1
Customer Ref: LKC 21 1679
National Grid Reference: 386180, 395730
Slice: A
Site Area (Ha): 0.66
Search Buffer (m): 100

Site Details

Site at 386170, 395690

Landmark
INFORMATION GROUP

Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk



General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point

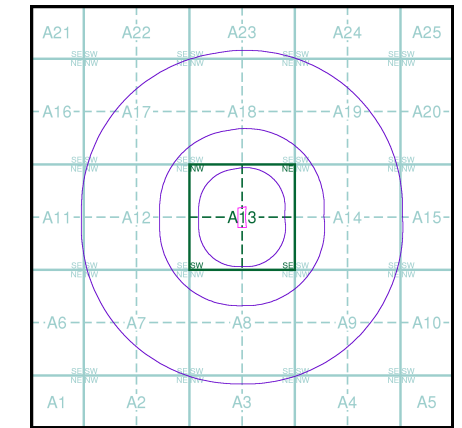
OS Water Network Data

- | | |
|--------------|-------------------------|
| Canal | Drain |
| Reservoir | Other |
| Foreshore | Lake |
| Marsh | Transfer |
| Tidal River | Lock Or Flight Of Locks |
| Inland River | Sea |

Contours (height in meters)

- Standard Contour 105 100 95
- Master Contour
- Spot Height 167.3
- MLW Mean Low Water
- MHW Mean High Water

OS Water Network Map - Slice A



Order Details

Order Number: 298702326_1_1
Customer Ref: LKC 21 1679
National Grid Reference: 386180, 395730
Slice: A
Site Area (Ha): 0.66
Search Buffer (m): 1000

Site Details

Site at 386170, 395690



Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk

Appendix C

Environment Agency Data

Flood map for planning

Your reference
Victoria Park

Location (easting/northing)
386180/395730

Created
27 Sep 2022 15:23

Your selected location is in flood zone 1, an area with a low probability of flooding.

You will need to do a flood risk assessment if your site is **any of the following:**

- bigger than 1 hectare (ha)
- In an area with critical drainage problems as notified by the Environment Agency
- identified as being at increased flood risk in future by the local authority's strategic flood risk assessment
- at risk from other sources of flooding (such as surface water or reservoirs) and its development would increase the vulnerability of its use (such as constructing an office on an undeveloped site or converting a shop to a dwelling)

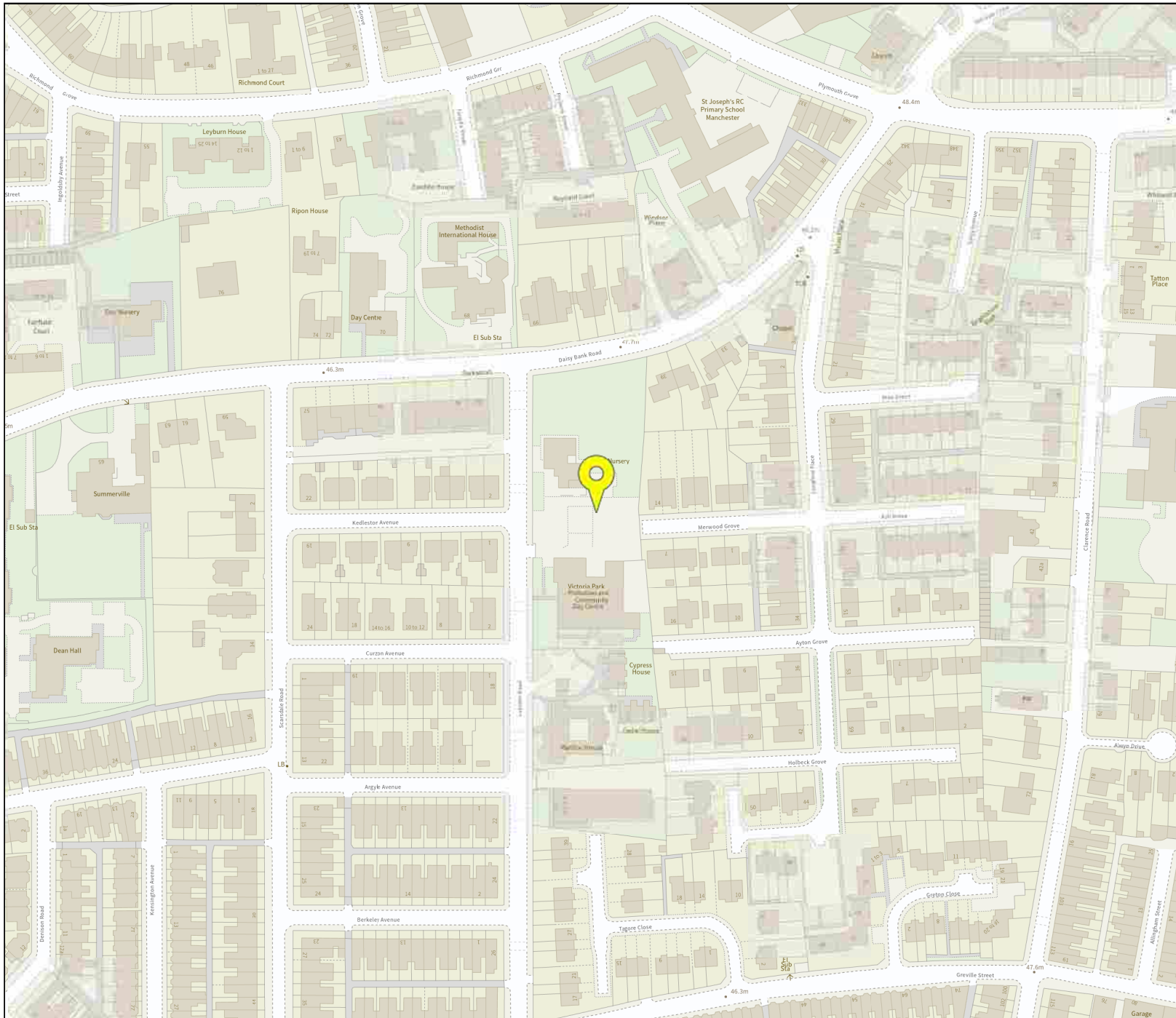
Notes

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.

Flood risk data is covered by the Open Government Licence **which** sets out the terms and conditions for using government data. <https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/>

Use of the address and mapping data is subject to Ordnance Survey public viewing terms under Crown copyright and database rights 2021 OS 100024198. <https://flood-map-for-planning.service.gov.uk/os-terms>



Flood map for planning

Your reference
Victoria Park

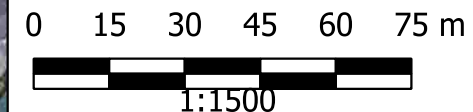
Location (easting/northing)
386180/395730

Scale
1:2500

Created
27 Sep 2022 15:23

-  Selected point
-  Flood zone 3
-  Flood zone 3: areas benefitting from flood defences
-  Flood zone 2
-  Flood zone 1
-  Flood defence
-  Main river
-  Water storage area


0 20 40 60m



KEY



Site Location

Sampling locations and features annotated by LK Consult Ltd are approximate and are based upon observed measurements unless otherwise stated. Do not scale from this drawing and work from marked dimensions only. All dimensions and features should be confirmed on site by the Contractor. Where this drawing includes information provided to LK Consult Ltd by others, LK Consult Ltd gives no warranty, representation or assurance as to the accuracy of such information.



Client: **Britannia Victoria Ltd**

Site: **Victoria Park Probation Centre,
Manchester**

Title: **Low Surface Water Risk**

Job No:	Scale (see scale bar):	Figure:	Rev:
FRA 22 1121	1:1500 @ A4		
Drawn By:	Checked By:	Drawn:	
JL	MJ	Sept 2022	

Flood risk

Location

Extent of flooding

M14 5YJ



Maximum extent of flooding from reservoirs:

● when river levels are normal ■ when there is also flooding from rivers ⊕ Location you selected

Appendix D

Consultee Correspondence

Mark Jones

From: wastewaterdeveloperservices@uuplc.co.uk
Sent: 20 December 2022 18:47
To: Mark Jones
Cc: Jenna Lowe
Subject: RE: PDE for: Victoria Park, Manchester UU Ref : 02800739

Hi Mark,

To accurately measure all brownfield impermeable area that drains to the public sewer we would need a detailed topo survey showing levels/contours and drains/gullies/rainwater down pipes etc and an existing impermeable area catchment plan. The submitted CCTV drainage plan is not clear on the MH numbers/references therefore I cannot match up which sewers are which on the report.

It is understood that a portion of the car park has been surveyed to show it drains to the sewer on site as well as the northern building, therefore based on a rough area calculation we can assume this area existing discharge rate using the calculations made by my colleague previously comes to 27.8l/s, and with a betterment of 50% the rate is 13.9l/s which we would accept subject to points of connections and a drainage plan being reviewed.

Kind regards,

Shoaib.

----- Original Message -----

From: wastewaterdeveloperservices@uuplc.co.uk [wastewaterdeveloperservices@uuplc.co.uk]
Sent: 14/12/2022 11:50
To: m.jones@thelkgroup.com
Cc: j.lowe@thelkgroup.com
Subject: PDE for: Victoria Park, Manchester UU Ref : 02800739

Good Morning,

Thank you for contacting United Utilities.

I have passed your details to our engineer who will respond in due course.

Kind Regards,



Louise Dack
Customer Advisor Advanced
Developer Services & Metering
Customer Services
T: 01925 233063 (33063 internal)
unitedutilities.com

Did you know we now have a live chat facility available to you Mon to Friday 8 -5pm. You just click on the orange live chat box on our webpage and one of our advisors will be ready to chat to you and help you with your enquiry <https://www.unitedutilities.com/builders-developers/> or you can email us at WastewaterDeveloperServices@uuplc.co.uk

----- Original Message -----

From: Mark Jones [m.jones@thelkgroup.com]

Sent: 14/12/2022 10:09

To: wastewaterdeveloperservices@uuplc.co.uk

Cc: j.lowe@thelkgroup.com

Subject: RE: PDE for: Victoria Park, Manchester UU Ref : 02800739

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.

Mohamed

Please find the attached report from Metrorod for the above site for your information. Hopefully you have enough information to determine the allowable peak flow from the site.

Regards

Mark

From: Mark Jones

Sent: 06 December 2022 12:16

To: wastewaterdeveloperservices@uuplc.co.uk

Cc: Jenna Lowe <j.lowe@thelkgroup.com>

Subject: RE: PDE for: Victoria Park, Manchester UU Ref : 02800739

Mohamed

We have been sent the attached information by our client he has asked if the other hard surfaces and the other building could be considered within your calculations in addition to the roof area of one building. The information includes a CCTV that was undertaken to show that the car parking drainage connects directly to the sewer system and other drainage details on site.

He has asked if this can be re-assesses including an allowance for the green areas that are underlain by clay based soils.

Regards

Mark

From: wastewaterdeveloperservices@uuplc.co.uk <wastewaterdeveloperservices@uuplc.co.uk>
Sent: 09 November 2022 10:45
To: Mark Jones <M.Jones@thelkgroup.com>
Cc: Jenna Lowe <j.lowe@thelkgroup.com>
Subject: RE: PDE for: Victoria Park, Manchester UU Ref : 02800739

Good morning Mark,
Thanks for your email.

According to the provided document, we are satisfied that infiltration is not feasible, we accept the provided sufficient evidence to discount infiltration.

We have noted that you have provided brownfield calculations. The applicant has not provided sufficient details on how was calculated. Also, the applicant must provide evidence that the area used in the calculation such as the existing parking area and hard-standing area was drained into the public network (positively drained to the public sewer) to be considered.

We have calculated the building footprint is draining to our network which is the positive drainage area = 0.126ha. Using the Wallingford Procedure Methodology Calculation = $2.78 * CiA = 2.78 * 1 * 50 * 0.126 = 17.5$ l/s, after 50% betterment it became 9l/s.
And as such United Utilities request that any agreed rate does not exceed 9l/s (anticipated QBar rate from the site impermeable areas only).

Kind regards,



Mohammed Aljafarawi (He/Him)
Developer Engineer
Developer Services & Metering
Customer Services
M: 07950474499
unitedutilities.com

If you have received a great service today why not tell us?
Visit: unitedutilities.com/wow

----- Original Message -----

From: Mark Jones [m.jones@thelkgroup.com]
Sent: 27/10/2022 11:17
To: wastewaterdeveloperservices@uuplc.co.uk
Cc: j.lowe@thelkgroup.com
Subject: RE: PDE for: Victoria Park, Manchester UU Ref : 02800739

To developer services.

Thank you for the reply below. I can confirm that infiltration is unlikely to be feasible on the site as it is underlain by made ground and clay based soils (see above). In fact the water level rose within the boreholes to within 0.4m and 1.5m of the surface, probably through artesian flows.

As the existing combined drainage around the plot is generally the head of systems and relatively shallow (assumed 1.2m cover), there is likely to be difficulties with incorporating adoptable SuDS within the housing development I am enquiring to see if there is any capacity within the system for an increased allowance in flows from the development.

The calculated existing flows are below.

Q_{bar} : 47.80 l/s

1 in 1-year peak runoff rate: 33.50 l/s

1 in 30-year peak runoff rate: 84.70 l/s

1 in 100-year peak runoff rate: 107.30 l/s

If this reduced by 50% would give the following rates:

Q_{bar} : 23.90 l/s

1 in 1-year peak runoff rate: 16.75 l/s

1 in 30-year peak runoff rate: 42.35 l/s

1 in 100-year peak runoff rate: 53.65 l/s

There are existing drainage connections from the site to the existing drains serving the former probation centre.

Regards

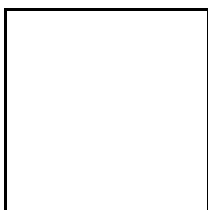
Mark

From: wastewaterdeveloperservices@uuplc.co.uk <wastewaterdeveloperservices@uuplc.co.uk>

Sent: 26 September 2022 17:10

To: Jenna Lowe <j.lowe@thelkgroup.com>

Subject: PDE for: Victoria Park, Manchester UU Ref : 02800739



Good afternoon Jenna,

Pre Development Enquiry for: Victoria Park, Manchester UU Reference Number : 02800739

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 6723 723 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 combined sewer system at any convenient point and at an unrestricted rate. United Utilities would have no preference to the specific connection point in this instance.

Please ensure all proposed manhole chambers cover levels and finished floor levels are higher than the receiving public sewer.

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.

Waterbody

United Utilities acknowledge that the nearest watercourse is a significant distance off-site.

Highway Drainage

If an evidence based assessment has been carried out and confirms that infiltration is not feasible, we recommend that you investigate the possibility of draining surface water to the highway drain where this ultimately discharges to a watercourse, by contacting the relevant Highway Authority.

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 225mm diameter public combined sewer within Laindon Road located 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 5l/s.

Please note the given discharge rate is based on the full site area as the specifics of the area being developed are not yet clear. If there are significant areas of the site that will not be developed, the discharge rate should be reduced accordingly.

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.

Land drainage / Overland flows / track drainage

United Utilities have no obligation, and furthermore we do not accept land drainage, overland flows or track drainage into the public sewerage network under any circumstances

Existing Wastewater Assets Crossing the Site

We have reviewed our records and can confirm that there does not appear to be any charted public sewers located within the boundary of proposed development. However, due to the accuracy of the records and the public sewer transfer legislation in 2011, not all public sewers are shown on our records so we would ask that you proceed with caution and carry out your own site investigation works. If any uncharted sewers are identified while carrying out your works we would ask that you contact United Utilities at the earliest opportunity so that we can offer guidance and update our records.

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/wastewater-services/sewer-connections/sewer-connection/>

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.

Sewer Adoptions

You have indicated on your application form that you intend to put the sewers forward for adoption (including any SuDS components that can come within the meaning of a sewer).

United Utilities assess adoption applications based on the current Design & Construction Guidance and local practices which have now replaced 'Sewers For Adoption 6th Edition'.

We recommend that you submit a pre design assessment to the sewer adoption mailbox (SewerAdoptions@uuplc.co.uk) stating pre design assessment in the title

Please refer to links below to obtain further guidance:

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

Site drainage must be designed in accordance with Building Regulations, National Planning Policy, and local flood authority guidelines, we would recommend that you speak and make suitable agreements with the relevant statutory bodies.

If you intend to put forward your wastewater assets for adoption by United Utilities, the proposed detail design will be subject to a technical appraisal by an Adoption Engineer as we need to be sure that the proposals meets the requirements set out in the Design & Construction Guidance. The proposed design should give consideration to long term operability and give United Utilities a safe and cost effective proposal for the lifetime of the assets. In these cases, we strongly recommend that no construction commences until the detailed drainage design, submitted as part of the Section 104 application, has been assessed and accepted in writing by United Utilities. Any work carried out prior to the technical assessment being approved is done entirely at the developer's own risk and could be subject to change.

SuDS

If your development proposal incorporates any SuDS component(s) which interact with a sewer network you plan on offering for adoption to United Utilities; contact should be made with our technical team at your earliest convenience, please complete the 'Section 104 pre-application form : ' and include as much relevant detail as you can. These discussions can help prevent delays later in the development process.

Section 104 Pre application form (1b)

As per the sewerage sector guidance, all SuDS should be designed in accordance with the standards within the Design & construction guidance & the CIRIA SuDS manual (C753)

Codes For Adoption

The new Codes for Adoption are outlined on the Water UK Website. The link below takes you to their webpage:

<https://www.water.org.uk/technical-guidance/developers-services/codes-for-adoption/>

A free copy of the new Design & Construction Guidance can be downloaded via the link below:

<https://www.water.org.uk/sewerage-sector-guidance-approved-documents/>

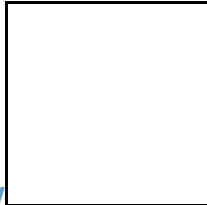
Many thanks and kind regards,



Mohammed Aljafarawi (He/Him)

Developer Engineer
Developer Services & Metering
Customer Services
M: 07950474499
unitedutilities.com

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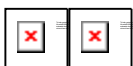


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<http://www.unitedutilities.com/subsidiaries>



Jenna Lowe

From: wastewaterdeveloperservices@uuplc.co.uk
Sent: 26 September 2022 17:10
To: Jenna Lowe
Subject: PDE for: Victoria Park, Manchester UU Ref : 02800739



Good afternoon Jenna,

Pre Development Enquiry for: Victoria Park, Manchester UU Reference Number : 02800739

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 6723 723 or refer to the link below:

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Foul Water

Foul flow from this site will be allowed to drain into the public combined sewer system at any convenient point and at an unrestricted rate. United Utilities would have no preference to the specific connection point in this instance.

Please ensure all proposed manhole chambers cover levels and finished floor levels are higher than the receiving public sewer.

Surface Water

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4. **to a combined sewer.**

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Waterbody

United Utilities acknowledge that the nearest watercourse is a significant distance off-site.

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Once evidence is provided as outlined above, United Utilities will consider a connection to the 225mm diameter public

combined sewer within Laindon Road located 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 5l/s.

Please note the given discharge rate is based on the full site area as the specifics of the area being developed are not yet clear. If there are significant areas of the site that will not be developed, the discharge rate should be reduced accordingly.

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.

Land drainage / Overland flows / track drainage

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Existing Wastewater Assets Crossing the Site

We have reviewed our records and can confirm that there does not appear to be any charted public sewers located within the boundary of proposed development. However, due to the accuracy of the records and the public sewer transfer legislation in 2011, not all public sewers are shown on our records so we would ask that you proceed with caution and carry out your own site investigation works. If any uncharted sewers are identified while carrying out your works we would ask that you contact United Utilities at the earliest opportunity so that we can offer guidance and update our records.

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/wastewater-services/sewer-connections/sewer-connection/>

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.

Sewer Adoptions

You have indicated on your application form that you intend to put the sewers forward for adoption (including any SuDS components that can come within the meaning of a sewer).

United Utilities assess adoption applications based on the current Design & Construction Guidance and local practices which have now replaced 'Sewers For Adoption 6th Edition'.

We recommend that you submit a pre design assessment to the sewer adoption mailbox (SewerAdoptions@uuplc.co.uk) stating pre design assessment in the title

Please refer to links below to obtain further guidance:

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

Site drainage must be designed in accordance with Building Regulations, National Planning Policy, and local flood authority guidelines, we would recommend that you speak and make suitable agreements with the relevant statutory bodies.

If you intend to put forward your wastewater assets for adoption by United Utilities, the proposed detail design will be subject to a technical appraisal by an Adoption Engineer as we need to be sure that the proposals meets the requirements set out in the Design & Construction Guidance. The proposed design should give consideration to long term operability and give United Utilities a safe and cost effective proposal for the lifetime of the assets. In these cases, we strongly recommend that no construction commences until the detailed drainage design, submitted as part of the Section 104 application, has been assessed and accepted in writing by United Utilities. Any work carried out prior to the technical assessment being approved is done entirely at the developer's own risk and could be subject to change.

SuDS

If your development proposal incorporates any SuDS component(s) which interact with a sewer network you plan on offering for adoption to United Utilities; contact should be made with our technical team at your earliest convenience, please complete the 'Section 104 pre-application form : ' and include as much relevant detail as you can. These discussions can help prevent delays later in the development process.

Section 104 Pre application form (1b)

As per the sewerage sector guidance, all SuDS should be designed in accordance with the standards within the Design & construction guidance & the CIRIA SuDS manual (C753)

Codes For Adoption

The new Codes for Adoption are outlined on the Water UK Website. The link below takes you to their webpage:

<https://www.water.org.uk/technical-guidance/developers-services/codes-for-adoption/>

A free copy of the new Design & Construction Guidance can be downloaded via the link below:

<https://www.water.org.uk/sewerage-sector-guidance-approved-documents/>

Many thanks and kind regards,



Mohammed Aljafarawi (He/Him)

Developer Engineer
Developer Services & Metering
Customer Services
M: 07950474499
unitedutilities.com

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LKGroup

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Radcliffe, Greater Manchester
M26 2ZS

FAO:

How to contact us:

United Utilities Water Limited
Property Searches
Haweswater House
Lingley Mere Business Park
Great Sankey
Warrington
WA5 3LP

Telephone: 0370 7510101

E-mail: propertysearches@uuplc.co.uk

Your Ref: FRA 22 1121
Our Ref: UUPS-ORD-431533
Date: 14/09/2022

Dear Sirs

Location: Victoria Park Probation Centre

I acknowledge with thanks your request dated 13/09/2022 for information on the location of our services.

Please find enclosed plans showing the approximate position of United Utilities' apparatus known to be in the vicinity of this site.

The enclosed plans are being provided to you subject to the United Utilities terms and conditions for both the wastewater and water distribution plans which are shown attached.

If you are planning works anywhere in the North West, please read United Utilities' access statement before you start work to check how it will affect our network. <http://www.unitedutilities.com/work-near-asset.aspx>.

I trust the above meets with your requirements and look forward to hearing from you should you need anything further.

If you have any queries regarding this matter please [contact us](#).

Yours Faithfully,



Karen McCormack
Property Searches Manager

TERMS AND CONDITIONS - WASTEWATER AND WATER DISTRIBUTION PLANS

These provisions apply to the public sewerage, water distribution and telemetry systems (including sewers which are the subject of an agreement under Section 104 of the Water Industry Act 1991 and mains installed in accordance with the agreement for the self construction of water mains) (UUWL apparatus) of United Utilities Water Limited "(UUWL)".

TERMS AND CONDITIONS:

- This Map and any information supplied with it is issued subject to the provisions contained below, to the exclusion of all others and no party relies upon any representation, warranty, collateral contract or other assurance of any person (whether party to this agreement or not) that is not set out in this agreement or the documents referred to in it.
- This Map and any information supplied with it is provided for general guidance only and no representation, undertaking or warranty as to its accuracy, completeness or being up to date is given or implied.
- In particular, the position and depth of any UUWL apparatus shown on the Map are approximate only. UUWL strongly recommends that a comprehensive survey is undertaken in addition to reviewing this Map to determine and ensure the precise location of any UUWL apparatus. The exact location, positions and depths should be obtained by excavation trial holes.
- The location and position of private drains, private sewers and service pipes to properties are not normally shown on this Map but their presence must be anticipated and accounted for and you are strongly advised to carry out your own further enquiries and investigations in order to locate the same.
- The position and depth of UUWL apparatus is subject to change and therefore this Map is issued subject to any removal or change in location of the same. The onus is entirely upon you to confirm whether any changes to the Map have been made subsequent to issue and prior to any works being carried out.
- This Map and any information shown on it or provided with it must not be relied upon in the event of any development, construction or other works (including but not limited to any excavations) in the vicinity of UUWL apparatus or for the purpose of determining the suitability of a point of connection to the sewerage or other distribution systems.
- No person or legal entity, including any company shall be relieved from any liability howsoever and whensoever arising for any damage caused to UUWL apparatus by reason of the actual position and/or depths of UUWL apparatus being different from those shown on the Map and any information supplied with it.
- If any provision contained herein is or becomes legally invalid or unenforceable, it will be taken to be severed from the remaining provisions which shall be unaffected and continue in full force and affect.
- This agreement shall be governed by English law and all parties submit to the exclusive jurisdiction of the English courts, save that nothing will prevent UUWL from bringing proceedings in any other competent jurisdiction, whether concurrently or otherwise.



Refno	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad	Refno	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad
2809	48.7	CO	0	750			VC	26.9232	1 in 59	3901	48.27	CO	48.8	225			VC	48.0141	1 in 86
3603	48.89	CO	46.6	375			VC	27.0789	1 in 40	3704	48.16	CO	47.48	225			VC	19.0263	1 in 44
1409	45.02	CO	23.410	225			VC	23.2173	1 in 12	3607	45.40	CO	42.74	300			VC	60.0653	1 in 78
1507		CO	0	225			VC	47.97381		0602	45.42	CO	42.37	375			VC	60	1 in 1000
3505	48.66	CO	47.09	225			VC	17.47335		1503	46.37	CO	43.35	225			VC	47.01064	1 in 53
1401	45.79	CO	41.55	375			VC	40.04997	1 in 74										
3906	49.68	CO	46.88	450			VC	19.54297											
3505	48.66	CO	47.09	225			VC	28.16026	1 in 65										
0901	47.22	CO	0	150			VC	31.7531											
3707	48.58	CO	46.94	375			VC	25.07887	1 in 38										
3911	48.64	CO	47.81	225			VC	15.52417											
2507		CO	0	225			VC	10.10867											
0400	44.69	CO	41.50	375			VC	87.02113	1 in 164										
3903	48.66	CO	0	750			VC	29.42788											
3706	49.19	CO	46.28	375			VC	28.01785	1 in 37										
3906		CO	0	750			VC	32.02448											
4502	48.78	CO	46.28	225			VC	61.18623											
0501	45.14	CO	42.31	375			VC	61.0347	1 in 87										
2402	45.05	CO	43.17	225			VC	84.0115	1 in 247										
0501	44.91	CO	43.02	300			VC	86.14523	1 in 123										
1406	45.54	CO	0	300			VC	23.95555											
2408	45.55	CO	42.04	300			VC	46.52566											
1803	46.07	CO	43.65	750			VC	20.51828	1 in 121										
2400	46.09	CO	42.84	225			VC	79.36373	1 in 138										
3916		CO	0	400			VC	15.31541											
8503		CO	0	225			VC	8.650387											
3918		CO	0	400			VC	7.886487											
0401	45.09	CO	42.34	300			VC	0	1 in 71										
3919		CO	0	150			VC	12.36278											
3909		CO	0	150			VC	9.852108											
3401	46.76	CO	44.6	225			VC	7.071008											
3813		CO	0	0			VC	10.50595	1 in										
4910		CO	0	0			VC	32.24587	1 in										
1506		CO	0	150			VC	7.587753											
4909	50.47	CO	0	225			VC	22.05295	1 in										
3907		CO	0	375			VC	22.67157											
3607		CO	0	750			VC	16											
1403	45.03	CO	40.35	525			VC	9.618214											
1701	46.74	CO	44.08	300			VC	63	1 in 158										
3701	48.38	CO	44.93	690			BR	28.01785	1 in 85										
2802	46.80	CO	46.08	300			VC	26.87006											
0402	45.07	CO	42.42	300			VC	63	1 in 41										
1805	45.88	CO	43.48	750			VC	30.85584	1 in 31										
0805		CO	0	150			VC	31.19473											
4400		CO	0	100			PVC	10.87558											
1501	46.09	CO	43.74	300			VC	63.06338	1 in 65										
0505		CO	0	225			VC	30.38159											
2904		CO	0	750			VC	15.78622											
3708	49.84	CO	47.44	375			VC	19.0263	1 in 38										
1402	45.07	CO	40.98	375			VC	33.01515	1 in 82										
3904	40.87	CO	46.34	375			VC	31.82786	1 in 69										
2811		CO	0	150			VC	38.74868											
0702	45.98	CO	43.6	375			VC	7.652153											
2909	46.46	CO	46.73	375			VC	32	1 in 145										
1001	48.44	CO	44.37	300			VC	30.01666	1 in 125										
2911		CO	0	100			VC	46.97335	1 in 73										
3902		CO	0	375			VC	16.96232											
1511		CO	0	100			VC	40.17249											
2905		CO	0	150			VC	9.593393											
4616		CO	0	150			VC	4.656647	1 in										
2505		CO	0	225			VC	7.401886											
3802	49.35	CO	46.48	300			VC	13.22902											
3608	48.42	CO	46.48	375			VC	54.38327	1 in 69										
3970	48.75	CO	45.96	375			VC	2.230008											
2701	48.84	CO	45.96	375			VC	23	1 in 88										
0703	45.91	CO	0	225			VC	13.0384	1 in 119										
3605	48.7	CO	46.66	300			VC	61.20457											
3602	49.15	CO	46.45	375			VC	27.38372	1 in 138										
2904		CO	0	150			VC	52.03845	1 in 108										
2903	48.31	CO	0	750			VC	7.838918											
8808	44.88	CO	43.84	225			VC	8.761206											
3917		CO	0	400			VC	51.41984	1 in 101										
2901	46.15	CO	45.91	375			VC	6.550626											
9902	45.79	CO	42.04	300			VC	30.00068	1 in 300										
1702	47.15	CO	45.63	225			VC	10											
4910	46.16	CO	45.63	1050			VC	20.08975	1 in 40										
9902	48.4	CO	42.25	300			VC	59.03889											
0701	48.84	CO	45.38	375			VC	5.658854	1 in 35										
1605	46.8	CO	44.24	300			VC	59.09417	1 in 131										
9804	45.13	CO	43.52	225			VC	90.01136	1 in 85										
1804	46.68	CO	44.45	225			VC	112.4229	1 in 74										
1801	46.38	CO	44.72	300			VC	17.48425	1 in 51										
1400	45.54	CO	43.68	300			VC	19	1 in 86										
0607		CO	0	150			VC	26.1725											
2806	47.54	CO	44.51	750			VC	96.96841	1 in 57										
3420		CO	0	150			VC	4.833											
9636		CO	0	750			VC	12.64911	1 in 63										
4019	46.8	CO	45.63	7004			VC	6.637004											
4616		CO	0	150			VC	7.763383											
4406		CO	0	100			PVC	9.703915											
4701	49.46	CO	44.24	670			BR	7.36887											
9018		CO	0	150			VC	53.03772	1 in 183										
2905		CO	0	225			VC	20.59995											
9702	45.07	CO	43.37	450			VC	44.72136	1 in 11										
2905		CO	0	450			VC	27.07897	1 in 83										
9400	44.66	CO	43.59	300			VC	9.027674	1 in 93										
9503	45.07	CO	44.05	375			VC	50.39999	1 in 100										
9504	44.9	CO	42.96	300			VC	53.97491	1 in 123										
9503	45.14	CO	43.28	300			VC	42.01445	1 in 131										
9502		CO	0	150			VC	3.388732											
3802	49.11	CO	46.85	300			VC	18.24829	1 in 63										
2807	46.34	CO	44.99	300															



Lead Local Flood Authority

Highways Service
Growth and Neighbourhoods Directorate
Manchester City Council
PO Box 532
Town Hall
Manchester
M60 2LA

Email: floodriskmanagement@manchester.gov.uk

DATE 03/10/2022

Dear Sir or Madam,

RE: Our Ref: MCC003/10/2022

We acknowledge with thanks your payment received on 23/09/2022 for our LLFA data screen service.

Please find enclosed plan showing the results of the data screen. The position of features shown on this plan is approximate only and is given in accordance with the best information currently available.

The enclosed plan cannot be used to substitute a competent site investigation.

The enclosed plan is being provided to you subject to Manchester City Council's terms and conditions which are shown attached.

I trust the above meets your requirements and look forward to hearing from you should you need anything further.

If you have any queries regarding this matter, please do not hesitate to contact us.

Yours Faithfully,

A handwritten signature in black ink, appearing to read "Neil Bayliss-Rowe", with a horizontal line drawn through it.

Neil Bayliss-Rowe, Highways Development Control & Flood Risk Manager, Lead Local Flood Authority

TERMS AND CONDITIONS – LLFA DATA SCREEN

These provisions apply to LLFA data supplied by Manchester City Council (“MCC”).

TERMS AND CONDITIONS:

- This data Map and any information supplied with it is issued subject to the provisions contained below, to the exclusion of all others and no party relies upon any representation, warranty, collateral contract or other assurance of any person (whether party to this agreement or not) that is not set out in this agreement or the documents referred to in it.
- MCC has taken all reasonable care to compile this data Map. This data Map and any information supplied with it is provided for general guidance only and MCC makes no representation, undertaking or warranty of any kind as to its accuracy, completeness or being up to date is given or implied.
- In particular, the position of any culverted assets shown on the data Map are approximate only. MCC strongly recommends that a comprehensive site investigation is undertaken in addition to reviewing this data Map to determine and ensure the precise location of any assets. The exact location, positions and depths should be obtained by an appropriate survey which may include but shall not be limited to GPR and CCTV.
- The data screened may be modified over time without notice and therefore this data Map is issued subject to any removal or change in location of the same. The onus is entirely upon you to confirm whether any changes to the data Map have been made subsequent to issue and prior to any works being carried out.
- This data Map and any information shown on it or provided with it must not be relied upon in the event of any development, construction or other works (including but not limited to any excavations) or for the purpose of determining the suitability of a point of connection to discharge.
- No person or legal entity, including any company shall be relieved from any liability howsoever and whensoever arising from damages of any kind caused to assets by reason of the actual position and/or existence of assets being different from those shown on the data Map and any information supplied with it.
- If any provision contained herein is or becomes legally invalid or unenforceable, it will be taken to be severed from the remaining provisions which shall be unaffected and continue in full force and affect.
- This agreement shall be governed by English law and all parties submit to the exclusive jurisdiction of the English courts, save that nothing will prevent MCC from bringing proceedings in any other competent jurisdiction, whether concurrently or otherwise.

DATA SCREEN SYMBOLOGY

Bridge

-  Good
-  Fair
-  Poor
-  Very Poor
-  Unknown

Trash Screen

-  Good
-  Fair
-  Poor
-  Very Poor
-  Unknown

Culvert Orifice

-  Very Good
-  Good
-  Fair
-  Poor
-  Very Poor
-  Unknown

Culvert Conduit

-  CCTV surveyed
-  Not CCTV surveyed
-  Ordinary Watercourse Conduit
-  MCC SuDS
-  MCC Flood Incident Points
-  MCC Section 19 Report
-  MCC Flood Incident Polygons
-  MCC Local Authority Boundary

Supplementary Information where available:

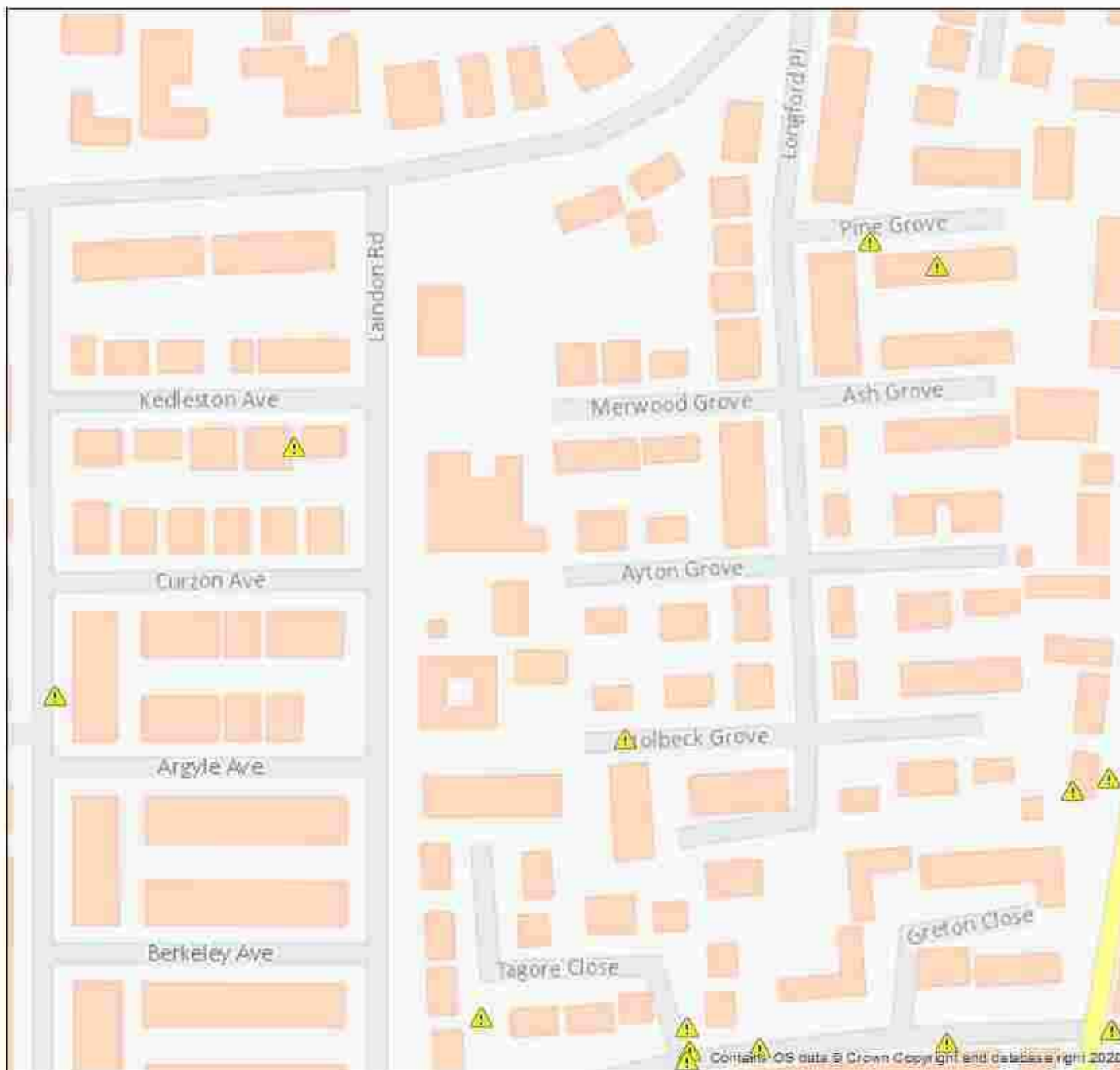
Critical Drainage Area – the Site is within the Conurbation Core Critical Drainage Area (CDA).

Flood Incidents - The nearest incident was recorded 10/02/2020 approximately 55m to the south-east of the Site on Holbeck Grove, described as blocked highway gully or drain.

Culvert Conduits – There are no culverted ordinary watercourse conduits on-record in the LLFA asset register within the vicinity of the Site.

Survey and Design Archive – A copy of the 1984 major drainage survey is included, which does not record any culverted ordinary watercourses within vicinity of the Site.

Any other information – The Site is >0.5 Ha and located within a Critical Drainage Area, therefore the planning application would benefit from a Flood Risk Assessment and SuDS Strategy. We recommend the attached SuDS Guidance for Developers is reviewed to support any planning application for this Site.



**MANCHESTER
CITY COUNCIL**

LLFA DATA SCREEN

Address/Site Ref:
Victoria Park Probation Centre

Our Ref: **MCC003/10/2022**

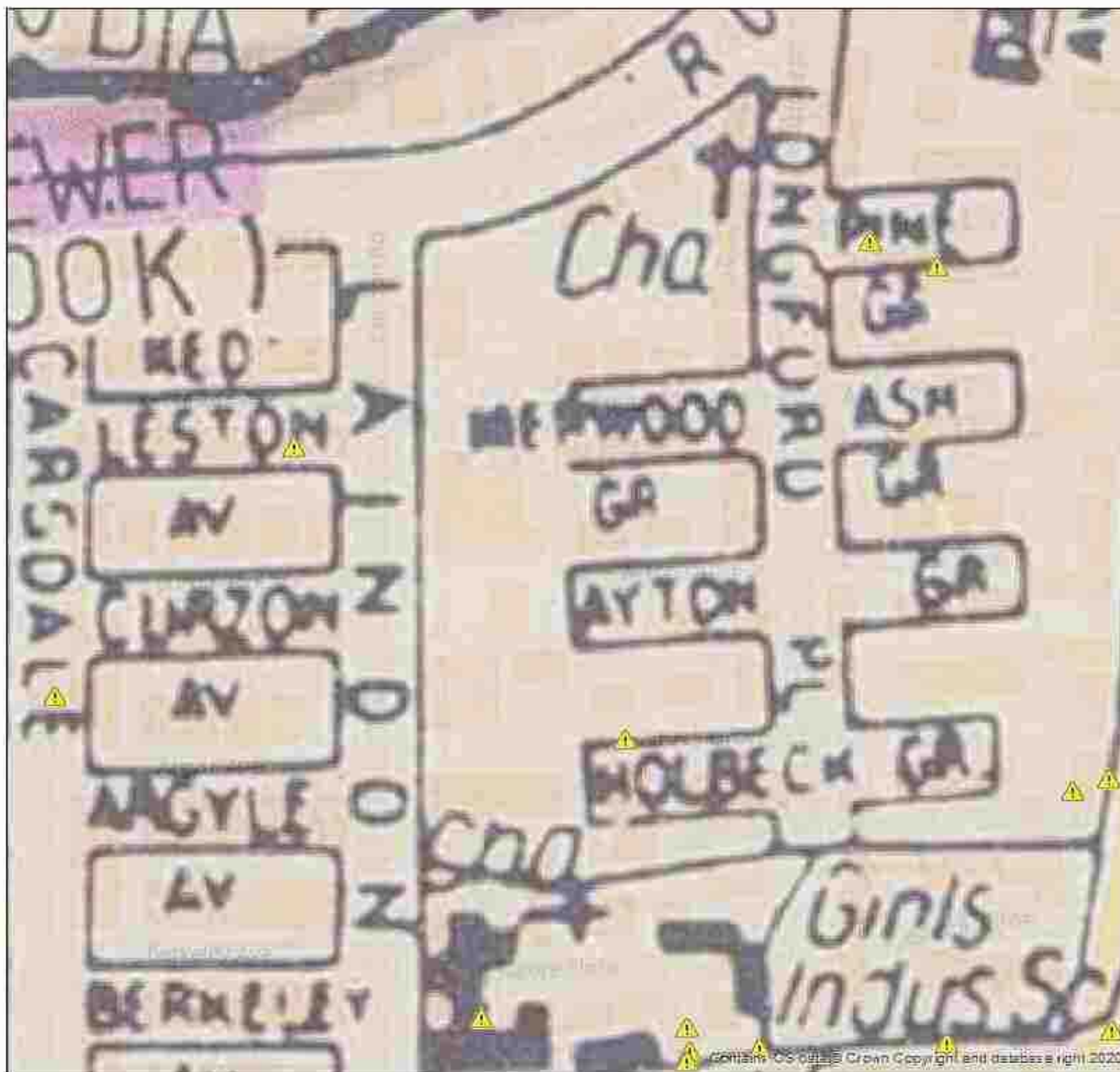
Author: Manchester City Council LLFA
Date: 03/10/2022
Scale: 1:1,722

The position of features shown on this plan is approximate only and is given in accordance with the best information currently available. Manchester City Council will not accept liability for any loss or damage caused by the actual position being different from those shown.

0 12.5 25 50
Meters



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and database right 2022



**MANCHESTER
CITY COUNCIL**

LLFA DATA SCREEN

Address/Site Ref:
Victoria Park Probation Centre

Our Ref: **MCC003/10/2022**

Author: Manchester City Council LLFA
Date: 03/10/2022
Scale: 1:1,722

The position of features shown on this plan is approximate only and is given in accordance with the best information currently available. Manchester City Council will not accept liability for any loss or damage caused by the actual position being different from those shown.

0 12.5 25 50
Meters



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Lead Local Flood Authority - Manchester City Council

SuDS Requirements for New Developments Update 2019

The Government has strengthened planning policy on the provision of sustainable drainage systems (SuDS) for 'major' planning applications which is being introduced from 6 April 2015 (Paragraph 103 of National Planning Policy Framework and Ministerial Statement on SuDS).

Changes were made to the Town and Country Planning Policy and Guidance to give Local Authority Planning Departments the responsibility for ensuring that new developments are drained in a sustainable way, through the planning process, in consultation with the Lead Local Flood Authorities. As per the guidance issued by the Department of Communities and Local Government (DCLG), all 'major' planning applications being determined from 6 April 2015, must consider sustainable drainage systems.

Decisions about the suitability of sustainable drainage provision are made by the Local Planning Authority. However, under the new consultation arrangements Manchester City Council, in its role as Lead Local Flood Authority, is a statutory consultee for all major applications with regards to sustainable drainage. All 'major' planning applications submitted from 15 April 2015 are required to include a Surface Water Drainage Statement.

Developers submitting the planning application to Manchester City Council are advised to:

- Assess the suitability of sustainable drainage systems in accordance with: paragraphs 051, 079 and 080 of the revised NPPF Planning Practice Guidance (PPG) for Flood Risk and Coastal Change.
- Design sustainable drainage systems in line with national Non-Statutory Technical Standards for SuDS: <https://www.gov.uk/government/publications/sustainable-drainage-systems-non-statutory-technical-standards> and local policies DM1, EN08, EN14 and EN17 of the Core Strategy.
- Implement strategy that supports surface water runoff control as near to its source as possible through a sustainable drainage approach to surface water management, preferably through green types of SuDS wherever practicable.
- Maximise use of Green Infrastructure to manage surface water runoff (sustainable drainage systems – SuDS) as feasibility of use of green types of SuDS will be evaluated by LLFA during planning application stage. Even on sites where infiltration is not possible due to the unfavourable soil conditions, utilisation of attenuating types of SuDS should be maximised as part of green infrastructure in order to bring surface water runoff peak and volume reduction but also provide additional environmental and social benefits in line with Policies DM1, EN08, EN14 and EN17 of the Core Strategy. Developers are encouraged to look into CIRIA SuDS Manual 2015 for details of these systems to manage surface water runoff.
- Assess surface water attenuation requirements that offer a reduction in surface water runoff rate in line with the 'Manchester City, Salford City and Trafford Councils Level 2 Hybrid SFRA, User Guide, Final, dated May 2010'. (Section 3.4.1 Critical Drainage Areas, page 31). Please note that all new connections to the watercourses shall comply with reduction of flows to Greenfield runoff rates.

http://www.manchester.gov.uk/downloads/download/3871/strategic_flood_risk_assessment-manchester_salford_trafford

- Submit hydraulic calculations and drawings to support the design along with proposed standards of operation and maintenance in accordance with paragraph 081 of NPF (PPG).
- It will be essential that the type of sustainable drainage system for a site, along with details of its extent/position, is identified at the design stage of the whole scheme. This information will be required for both outline and full applications so it is clearly demonstrated that the SuDS can be accommodated within the development that is proposed. It will no longer be acceptable to leave the design of SuDS to a later stage to be dealt with by planning conditions.

Applicants are strongly advised to discuss their proposals with relevant planning officers at the pre-application stage to ensure that an acceptable SuDS scheme is submitted.

Minimum requirements for approval

In order to avoid objection, the following three elements of evidence are required:

- Surface Water Management Statement for the site is submitted that is in line with requirement of NPPF PPG Paragraph 079:
 - “New development should only be considered appropriate in areas at risk of flooding if priority has been given to the use of green types of sustainable drainage systems as a primary mean of surface water management that could be accompanied by traditional attenuation systems if volumes required. Additionally, and more widely, when considering major development, as defined in the Town and Country Planning (Development Management Procedure) (England) Order 2015, sustainable drainage systems should be provided unless demonstrated to be inappropriate”.
 - The strategy should be accompanied by at least an outline layout of the proposed drainage systems with space allocation for the proposed attenuation in line with relevant flow reduction requirements.
- Evidence that drainage hierarchy has been applied in line with NPPF PPG Paragraph 080. The aim should be to discharge surface run off as high up the following hierarchy of drainage options as reasonably practicable:
 - into the ground (infiltration);
 - to a surface water body;
 - to a surface water sewer, highway drain, or another drainage system;
 - to a combined sewer.
- Evidence that one viable solution for draining the site is secured and agreed in principle with relevant authority:
 - Results of ground investigation carried out under Building Research Establishment Digest 365. Site investigations should be undertaken in locations and at proposed depths of the proposed infiltration devices. Proposal of the attenuation that is achieving half emptying time within 24 hours. If no ground

investigations are possible or infiltration is not feasible on site, evidence of alternative surface water disposal routes (as follows) is required.

- Where surface water is connected to Main River, any works within or adjacent to the river that would affect it would require consent from Environment Agency. An email of acceptance of proposed flows and/or new connection will suffice.
- Where surface water is connected to the public sewer, agreement in principle from United Utilities is required that there is adequate spare capacity in the existing system taking future development requirements into account. An email of acceptance of proposed flows and/or new connection will suffice.

Where surface water is connected to the ordinary watercourse, agreement in principle from Manchester City Council as Lead Local Flood Authority is required. Please note that all new connections to the watercourses shall comply with reduction of flows to Greenfield runoff rates. An email of acceptance of proposed flows and/or new connection will suffice.

- Where surface water is connected to ordinary watercourse, any works within or adjacent to the watercourse that would affect it would require consent from Manchester City Council as Lead Local Flood Authority. Consent forms can be obtained on the website at:

http://www.manchester.gov.uk/downloads/download/5567/land_drainage_consent_and_guidance.com

Avoiding or discharging drainage condition

- Evidence of consideration of green SuDS solution wherever practicable and viable in line with NPPF PPG Paragraph 051. SuDS should be designed to:
 - reduce the causes and impacts of flooding;
 - remove pollutants from urban run-off at source;
 - combine water management with green space with benefits for amenity, recreation and wildlife wherever practicable.
- For Greenfield site developments, details of surface water attenuation that offers a reduction in surface water runoff rate in line with the Manchester Trafford and Salford Strategic Flood Risk Assessment, i.e. to the Greenfield runoff rates;
- For Brownfield site developments, for all sites located within Conurbation Core Critical Drainage Areas, details of surface water attenuation that offers a reduction in surface water runoff rate in line with the Manchester Trafford and Salford Strategic Flood Risk Assessment, i.e. at least a 50% reduction in runoff rate compared to the existing rates with an aim to reduce to Greenfield runoff rates wherever practicable;
- Where surface water runoff is to be disposed through infiltration, details of surface water attenuation that is adequate for infiltration capacity of the underlying soil is required. This capacity has to be assessed through site investigation carried out in line with Building Research Establishment Digest 365. Site investigations should be undertaken in locations and at proposed depths of the proposed infiltration devices. Half emptying time of proposed attenuation within 24 hours should be achieved.

- Evidence that the drainage system has been designed (unless an area is designated to hold and/or convey water as part of the design) so that flooding does not occur during a 1 in 100 year rainfall event in any part of a building; The NPPF suggests that ‘for events with a return-period in excess of 30 years, surface flooding of open spaces such as landscaped areas or car parks is acceptable for short periods, but the layout and landscaping of the site should aim to route water away from any vulnerable property, and avoid creating hazards to access and egress routes. No flooding of property should occur as a result of a one in 100 year storm event (including an appropriate allowance for climate change)’.
- Assessment of overland flow routes for extreme events that is diverted away from buildings providing long and cross sections for the proposed drainage system and finished floor levels;
- Evidence that runoff volume in the 1 in 100 year, 6 hours rainfall shall be constrained to a value as close as is reasonably practical to the Greenfield runoff volume for the same event, but never to exceed the runoff volume from the development site prior to redevelopment;
- Hydraulic calculation of the proposed drainage system;
- Design construction drawings of proposed SuDS elements and flow controls;
- For sites where proposed development would cause unusual pollution risk to surface water (large car park areas (>50 parking spaces) or industrial estates), evidence of pollution control measures (preferably through SuDS) is required.
- Where an application is part of a larger site which already has planning permission it is essential that the new proposal does not compromise the drainage scheme already approved.

SuDS Maintenance

Maintenance of SuDS is essential for its proper operation and a clear management and maintenance plan for the lifetime of the development is required as part of the planning application.

In considering a development that includes a sustainable drainage system, Manchester City Council as local planning authority will want to be satisfied that the proposed minimum standards of operation are appropriate and that there are clear arrangements in place for ongoing maintenance. Information sought by Manchester City Council would be no more than necessary, having regard to the nature and scale of the development concerned in line with NPPF Paragraph 081.

In some instances where no clear adoption of the drainage system is proposed, a drainage maintenance condition could be attached to the planning applications. In order to discharge this condition, the following evidence should be provided following *construction*:

- Verification report providing photographic evidence of construction as per design drawings;
- As built construction drawings if different from design construction drawings;

- Management and maintenance plan for the lifetime of the development which shall include the arrangements for adoption by any public body or statutory undertaker, or any other arrangements to secure the operation of the sustainable drainage scheme throughout its lifetime.

Applicants are strongly advised to discuss their proposals with relevant planning officers at the pre-application stage to ensure that an acceptable SuDS scheme is submitted.

Appendix E

Calculations



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Job No.		
Sheet no. 1		
Date 29/09/22		
By	Checked	Reviewed

Project	Qbar Existing Runoff Victoria Park, Manchester
Title	Qbar Existing Runoff Victoria Park, Manchester

Area data:-

FSR data

M5-60 = 18.5

Soil index = 0.45

WRAP value = 4

r = 0.36

SAAR = 860

Nat grid = SJ8695

Site data:-

Ret. period (yrs) = 2.33

Time of entry = 7.00

Impervious area drained = 3700 m²

Site slope = Mild <2% (1:50)

Length of overland flow = 0.00

ToC = 7.0 mins

Overland flow time = 0.0 mins

Pervious area drained = 2500 m²

Soil type = Clay

Climate change factor = 0.0 %

Calculated data:-

Calculated runoff factor = 47.0%

Rainfall rate = 59.1 mm/Hr

UCWI = 90.1

Runoff rate (gross) = 47.8 l/s

Methods

Runoff factor (RF) = 47.0, calculated from:-

Runoff factor = $(0.829 \times \text{PIMP}) + (25 \times \text{SOIL}) + (0.078 \times \text{UCWI}) - 20.7$

where

PIMP = $\text{Impervious Area} \times 100 / (\text{Impervious Area} + \text{Pervious Area})$

UCWI = Calculated value for Wetness Index

Calculations produced by MasterDrain Surface Water design program



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Job No.		
Sheet no. 1		
Date 29/09/22		
By	Checked	Reviewed

Project **1 Year Existing Runoff Victoria Park, Manchester**

Title **1 Year Existing Runoff Victoria Park, Manchester**

Area data:-

FSR data

M5-60 = 18.5

Soil index = 0.45

WRAP value = 4

r = 0.36

SAAR = 860

Nat grid = SJ8695

Site data:-

Ret. period (yrs) = 1

Time of entry = 10.00

Impervious area drained = 3700 m²

Site slope = Mild <2% (1:50)

Length of overland flow = 0.00

ToC = 10.0 mins

Overland flow time = 0.0 mins

Pervious area drained = 2500 m²

Soil type = Clay

Climate change factor = 0.0 %

Calculated data:-

Calculated runoff factor = 47.0%

Rainfall rate = 41.4 mm/Hr

UCWI = 90.1

Runoff rate (gross) = 33.5 l/s

Methods

Runoff factor (RF) = 47.0, calculated from:-

Runoff factor = $(0.829 \times \text{PIMP}) + (25 \times \text{SOIL}) + (0.078 \times \text{UCWI}) - 20.7$

where

PIMP = $\text{Impervious Area} \times 100 / (\text{Impervious Area} + \text{Pervious Area})$

UCWI = Calculated value for Wetness Index

Calculations produced by MasterDrain Surface Water design program



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Job No.		
Sheet no. 1		
Date 29/09/22		
By	Checked	Reviewed

Project	30 Years Existing Runoff Victoria Park, Manchester
Title	30 Years Existing Runoff Victoria Park, Manchester

Area data:-

FSR data

M5-60 = 18.5

Soil index = 0.45

WRAP value = 4

r = 0.36

SAAR = 860

Nat grid = SJ8695

Site data:-

Ret. period (yrs) = 30

Time of entry = 6.00

Impervious area drained = 3700 m²

Site slope = Mild <2% (1:50)

Length of overland flow = 0.00

ToC = 6.0 mins

Overland flow time = 0.0 mins

Pervious area drained = 2500 m²

Soil type = Clay

Climate change factor = 0.0 %

Calculated data:-

Calculated runoff factor = 47.0%

Rainfall rate = 104.7 mm/Hr

UCWI = 90.1

Runoff rate (gross) = 84.7 l/s

Methods

Runoff factor (RF) = 47.0, calculated from:-

Runoff factor = $(0.829 \times \text{PIMP}) + (25 \times \text{SOIL}) + (0.078 \times \text{UCWI}) - 20.7$

where

PIMP = $\text{Impervious Area} \times 100 / (\text{Impervious Area} + \text{Pervious Area})$

UCWI = Calculated value for Wetness Index

Calculations produced by MasterDrain Surface Water design program



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Job No.		
Sheet no. 1		
Date 29/09/22		
By	Checked	Reviewed

Project **100 Years Existing Runoff Victoria Park, Manchester**

Title **100 Years Existing Runoff Victoria Park, Manchester**

Area data:-

FSR data

M5-60 = 18.5

Soil index = 0.45

WRAP value = 4

r = 0.36

SAAR = 860

Nat grid = SJ8695

Site data:-

Ret. period (yrs) = 100

Time of entry = 6.00

Impervious area drained = 3700 m²

Site slope = Mild <2% (1:50)

Length of overland flow = 0.00

ToC = 6.0 mins

Overland flow time = 0.0 mins

Pervious area drained = 2500 m²

Soil type = Clay

Climate change factor = 0.0 %

Calculated data:-

Calculated runoff factor = 47.0%

Rainfall rate = 132.6 mm/Hr

UCWI = 90.1

Runoff rate (gross) = 107.3 l/s

Methods

Runoff factor (RF) = 47.0, calculated from:-

Runoff factor = $(0.829 \times \text{PIMP}) + (25 \times \text{SOIL}) + (0.078 \times \text{UCWI}) - 20.7$

where

PIMP = $\text{Impervious Area} \times 100 / (\text{Impervious Area} + \text{Pervious Area})$

UCWI = Calculated value for Wetness Index

Calculations produced by MasterDrain Surface Water design program



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Job No.		
Sheet no. 1		
Date 03/01/23		
By	Checked	Reviewed

Project **30 Years Storage Event Victoria Park, Manchester**
Title **30 Years Storage Event Victoria Park, Manchester**

Data:-

FSR Hydrology:-

Location = VIC PARK, MANCH
M5-60 (mm) = 18.5
Soil index = 0.45
Return period = 30
UCWI = 92.2

Grid reference = SJ8695
r = 0.36
SAAR (mm/yr) = 860
WRAP = 4
Climate change = 0

Clayey, or loamy over clayey soils with an impermeable layer at shallow depth.

Runoff factor (RF) = 65.0, calculated from:-

$$\text{Runoff factor} = (0.829 \times \text{PIMP}) + (25 \times \text{SOIL}) + (0.078 \times \text{UCWI}) - 20.7$$

where

PIMP = Impervious Area*100/(Impervious Area+Pervious Area)

UCWI = Calculated value for Wetness Index

Design data:-

Imperv. area = 5000 m²
Total area (TA) = 6200 m²
Mean disch. rate = 13.900 l/s
Additional flow = 0.00 l/s

Pervious area = 1200 m²
Equiv area = 4030 m² (TA x RF).
Areal reduction factor = 1.000
Climate change factor = 0

Calculated data:-

Time to max = 41.0 mins
Rainfall at max = 36.65 mm/hr
Pipeline storage = 0.0 m³
Offline storage = 0.0 m³

Calculated storage volume = 65.2 m³
Allowed discharge rate = 13.900 l/s
Available MH storage = 0.0 m³

Fixed 6 hour data:-

Rainfall event = 6 hours
Rainfall rate = 8.00 mm/hr

Calculated storage volume = 0.0 m³
Allowed discharge rate = 13.900 l/s

Rainfall intensities calculated using the Wallingford Procedure

Storage lengths for initial calculation (x 1.1, 1.2, 1.3 or 1.5 as above if required) :-

Diam	Len	Diam	Len	Ovoid	Len	Box culvert	Len
100	8302.4	1125	65.6	400 x 600	362.2	500 x 500	260.8
150	3689.9	1200	57.7	600 x 900	157.7	500 x 750	173.9
225	1640.0	1275	51.1	800 x 1200	88.7	500 x 1000	130.4
300	922.5	1350	45.6			750 x 1000	86.9
375	590.4	1425	40.9			750 x 1200	72.4
450	410.0	1500	36.9			750 x 1500	58.0
525	301.2	1575	33.5			1000 x 1000	65.2
600	230.6	1650	30.5			1000 x 1200	54.3
675	182.2	1725	27.9			1000 x 1500	43.5
750	147.6	1800	25.6			1000 x 1800	36.2
825	122.0	1875	23.6			1000 x 2000	32.6
900	102.5	1950	21.8			1500 x 1500	29.0
975	87.3	2025	20.2			1500 x 1800	24.1
1050	75.3	2100	18.8			1500 x 2000	21.7



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Data:-

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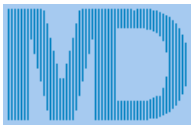
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Job No.		
Sheet no. 2		
Date 03/01/23		
By	Checked	Reviewed

Project	30 Years Storage Event Victoria Park, Manchester	
Title	30 Years Storage Event Victoria Park, Manchester	

Time (mins)	Rain mm/hr	Inflow (m3)	Outflow (m3)	Balance (m3)
10	83.0	55.171	8.340	46.831
20	57.0	75.817	16.680	59.137
30	45.0	88.845	25.020	63.825
40	37.0	98.538	33.360	65.178
50	32.0	106.328	41.700	64.628
60	28.0	112.876	50.040	62.836
70	26.0	118.546	58.380	60.166
80	23.0	123.557	66.720	56.837
90	22.0	128.055	75.060	52.995
100	20.0	132.141	83.400	48.741
110	19.0	135.887	91.740	44.147
120	18.0	139.347	100.080	39.267
130	17.0	142.565	108.420	34.145
140	16.0	145.572	116.760	28.812
150	15.0	148.395	125.100	23.295
160	14.0	151.056	133.440	17.616
170	14.0	153.573	141.780	11.793
180	13.0	155.960	150.120	5.840
190	13.0	158.231	158.460	0.000
200	12.0	160.396	166.800	0.000
210	12.0	162.464	175.140	0.000
220	11.0	164.444	183.480	0.000
230	11.0	166.342	191.820	0.000
240	11.0	168.166	200.160	0.000
250	10.0	169.920	208.500	0.000
260	10.0	171.609	216.840	0.000
270	10.0	173.238	225.180	0.000
280	9.0	174.811	233.520	0.000
290	9.0	176.331	241.860	0.000
300	9.0	177.801	250.200	0.000
310	9.0	179.225	258.540	0.000
320	9.0	180.668	266.880	0.000
330	8.0	182.082	275.220	0.000
340	8.0	183.462	283.560	0.000
350	8.0	184.809	291.900	0.000
360	8.0	186.126	300.240	0.000
370	8.0	187.415	308.580	0.000
380	8.0	188.675	316.920	0.000
390	7.0	189.910	325.260	0.000
400	7.0	191.119	333.600	0.000
410	7.0	192.305	341.940	0.000
420	7.0	193.468	350.280	0.000
430	7.0	194.609	358.620	0.000
440	7.0	195.729	366.960	0.000
450	7.0	196.829	375.300	0.000
460	7.0	197.909	383.640	0.000
470	6.0	198.971	391.980	0.000
480	6.0	200.015	400.320	0.000
490	6.0	201.042	408.660	0.000
500	6.0	202.053	417.000	0.000
510	6.0	203.047	425.340	0.000
520	6.0	204.026	433.680	0.000
530	6.0	204.990	442.020	0.000
540	6.0	205.940	450.360	0.000
550	6.0	206.876	458.700	0.000
560	6.0	207.798	467.040	0.000
570	6.0	208.708	475.380	0.000
580	5.0	209.605	483.720	0.000
590	5.0	210.489	492.060	0.000
600	5.0	211.362	500.400	0.000

Storage volume (m³) = 65.2 m³



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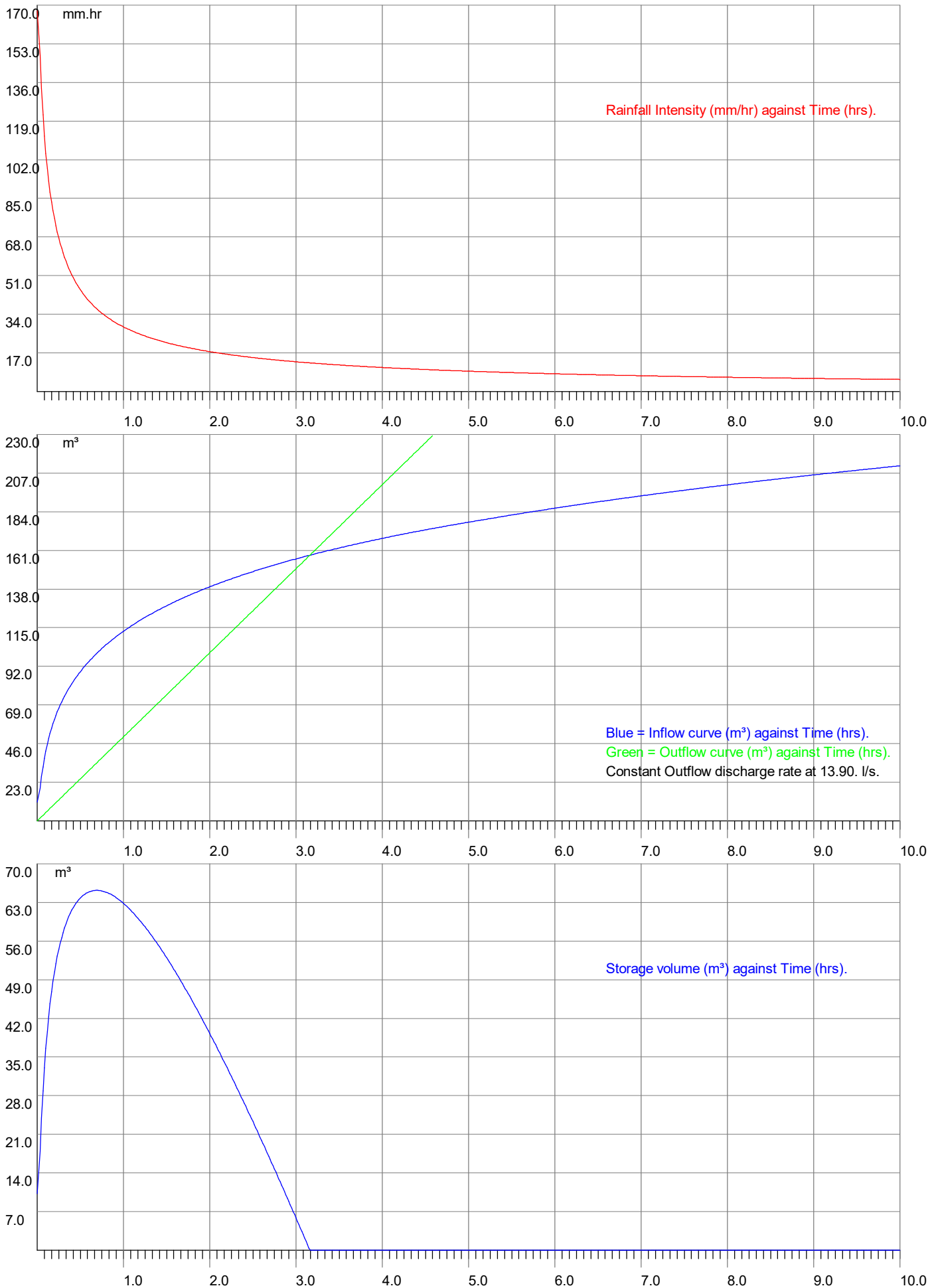
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Job No.		
Sheet no. 3		
Date 03/01/23		
By	Checked	Reviewed

Project **30 Years Storage Event Victoria Park, Manchester**

Title **30 Years Storage Event Victoria Park, Manchester**





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Job No.		
Sheet no. 4		
Date 03/01/23		
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Project **30 Years Storage Event Victoria Park, Manchester**

Title **30 Years Storage Event Victoria Park, Manchester**

Explanatory notes for Peak Flow Storage

- 1) This system uses the rainfall intensity/ duration curve calculated using either the Wallingford or FEH method as selected.
- 2) The balance is calculated from the inflow minus the outflow.
- 3) The storage volume is the maximum value of the balance curve.
- 4) This method was described by Davis (1963) - see Butler & Davies, 2nd edition, p294
- 5) References to 'storm duration' relate only to the hydrograph method (qv).
- 6) There are always 600 steps in the calculation process, thus a 'run' time of 10 hours will be sampled every minute,

Explanatory notes for Hydrograph Storage

- 1) The user has the choice of Summer or Winter curves
- 2) The mean intensity varies with the duration of the storm curve
- 3) There are always 120 steps in the calculation process, irrespective of storm duration.
- 4) The balance is calculated from the inflow minus the outflow.
- 5) The storage volume is the sum of the balance values for each step.
- 6) Varying durations should be tried to find the maximum storage value - this can be narrowed down very closely.

*Modelling using the flow characteristics of the restrictor is available using Vortex Control modelling function. Please be aware that this function needs the full design data file to function.

Why do the two methods give different results?

The rainfall characteristics for each method are very different.

The Peak flow (using the Intensity/Duration/Frequency curve) does not model the actual rainfall. This curve is joined points which represent the mean intensity of a storm at a given duration i.e. a value of 19.5 mm/hr for a 60 minute storm indicates that over the sixty minute period, the mean intensity was 19.5 mm/hr. The calculation method samples the IDF curve for a given location and frequency (Return Period) and calculates the storage for that rate and duration less the outflow volume. The maximum value is displayed as the 'worst case' storage. The outflow volume is constant throughout the process at the specified discharge rate.

The hydrograph method uses a standard curve for either Winter or Summer storms. Traditionally these are symmetrical about the central peak. UK rainfall does not fit into this convenient curve, so the calculations are dealing with a stylised set of data. The mean intensity for the storm is calculated from the IDF curve and applied to the curve data, calculating the storage for that step less the outflow volume. The final storage volume is the sum of the storage for all the steps. The outflow volume varies with the hydraulic head on the control device using flow equations provided by the control manufacturer. This is a far more accurate method than the peak flow method and often results in bigger storage volumes.

It can be seen that these two methods are very different, and the user may have the choice of which result to use. This is not an exact science, though is often treated as such by those that do not understand the principles of the calculations.



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Job No.		
Sheet no. 1		
Date 03/01/23		
By	Checked	Reviewed

Project	100 Years + 20% Storage Event Victoria Park, Manchester
Title	100 Years + 20% Storage Event Victoria Park, Manchester

Data:-

FSR Hydrology:-

Location = VIC PARK, MANCH
M5-60 (mm) = 18.5
Soil index = 0.45
Return period = 100
UCWI = 92.2

Grid reference = SJ8695
r = 0.36
SAAR (mm/yr) = 860
WRAP = 4
Climate change = 20

Clayey, or loamy over clayey soils with an impermeable layer at shallow depth.

Runoff factor (RF) = 65.0, calculated from:-

$$\text{Runoff factor} = (0.829 \times \text{PIMP}) + (25 \times \text{SOIL}) + (0.078 \times \text{UCWI}) - 20.7$$

where

PIMP = Impervious Area*100/(Impervious Area+Pervious Area)

UCWI = Calculated value for Wetness Index

Design data:-

Imperv. area = 5000 m²
Total area (TA) = 6200 m²
Mean disch. rate = 13.900 l/s
Additional flow = 0.00 l/s

Pervious area = 1200 m²
Equiv area = 4030 m² (TA x RF).
Areal reduction factor = 1.000
Climate change factor = 20

Calculated data:-

Time to max = 71.0 mins
Rainfall at max = 40.00 mm/hr
Pipeline storage = 0.0 m³
Offline storage = 0.0 m³

Calculated storage volume = 128.6 m³
Allowed discharge rate = 13.900 l/s
Available MH storage = 0.0 m³

Fixed 6 hour data:-

Rainfall event = 6 hours
Rainfall rate = 12.00 mm/hr

Calculated storage volume = 0.0 m³
Allowed discharge rate = 13.900 l/s

Rainfall intensities calculated using the Wallingford Procedure

Storage lengths for initial calculation (x 1.1, 1.2, 1.3 or 1.5 as above if required) :-

Diam	Len	Diam	Len	Ovoid	Len	Box culvert	Len
100	16375.7	1125	129.4	400 x 600	714.4	500 x 500	514.4
150	7278.1	1200	113.7	600 x 900	311.1	500 x 750	342.9
225	3234.7	1275	100.7	800 x 1200	174.9	500 x 1000	257.2
300	1819.5	1350	89.9			750 x 1000	171.5
375	1164.5	1425	80.6			750 x 1200	142.9
450	808.7	1500	72.8			750 x 1500	114.3
525	594.1	1575	66.0			1000 x 1000	128.6
600	454.9	1650	60.1			1000 x 1200	107.2
675	359.4	1725	55.0			1000 x 1500	85.7
750	291.1	1800	50.5			1000 x 1800	71.4
825	240.6	1875	46.6			1000 x 2000	64.3
900	202.2	1950	43.1			1500 x 1500	57.2
975	172.3	2025	39.9			1500 x 1800	47.6
1050	148.5	2100	37.1			1500 x 2000	42.9



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Data:-

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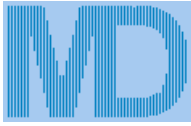
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Job No.		
Sheet no. 2		
Date 03/01/23		
By	Checked	Reviewed

Project	100 Years + 20% Storage Event Victoria Park, Manchester
Title	100 Years + 20% Storage Event Victoria Park, Manchester

Time (mins)	Rain mm/hr	Inflow (m3)	Outflow (m3)	Balance (m3)
10	128.0	84.868	8.340	76.528
20	89.0	118.100	16.680	101.420
30	70.0	139.131	25.020	114.111
40	59.0	154.787	33.360	121.427
50	51.0	167.347	41.700	125.647
60	45.0	177.875	50.040	127.835
70	40.0	186.960	58.380	128.580
80	37.0	194.960	66.720	128.240
90	34.0	202.112	75.060	127.052
100	32.0	208.580	83.400	125.180
110	29.0	214.485	91.740	122.745
120	28.0	219.915	100.080	119.835
130	26.0	224.940	108.420	116.520
140	25.0	229.615	116.760	112.855
150	24.0	233.983	125.100	108.883
160	23.0	238.081	133.440	104.641
170	22.0	241.938	141.780	100.158
180	21.0	245.579	150.120	95.459
190	20.0	249.025	158.460	90.565
200	19.0	252.294	166.800	85.494
210	18.0	255.402	175.140	80.262
220	18.0	258.362	183.480	74.882
230	17.0	261.186	191.820	69.366
240	17.0	263.885	200.160	63.725
250	16.0	266.468	208.500	57.968
260	16.0	268.942	216.840	52.102
270	15.0	271.316	225.180	46.136
280	15.0	273.596	233.520	40.077
290	14.0	275.788	241.860	33.928
300	14.0	277.898	250.200	27.698
310	14.0	279.930	258.540	21.390
320	13.0	282.052	266.880	15.172
330	13.0	284.133	275.220	8.913
340	13.0	286.162	283.560	2.602
350	12.0	288.143	291.900	0.000
360	12.0	290.077	300.240	0.000
370	12.0	291.967	308.580	0.000
380	12.0	293.816	316.920	0.000
390	11.0	295.624	325.260	0.000
400	11.0	297.394	333.600	0.000
410	11.0	299.128	341.940	0.000
420	11.0	300.828	350.280	0.000
430	11.0	302.494	358.620	0.000
440	10.0	304.128	366.960	0.000
450	10.0	305.732	375.300	0.000
460	10.0	307.306	383.640	0.000
470	10.0	308.852	391.980	0.000
480	10.0	310.372	400.320	0.000
490	10.0	311.865	408.660	0.000
500	9.0	313.333	417.000	0.000
510	9.0	314.777	425.340	0.000
520	9.0	316.198	433.680	0.000
530	9.0	317.596	442.020	0.000
540	9.0	318.973	450.360	0.000
550	9.0	320.328	458.700	0.000
560	9.0	321.664	467.040	0.000
570	9.0	322.979	475.380	0.000
580	8.0	324.276	483.720	0.000
590	8.0	325.554	492.060	0.000
600	8.0	326.814	500.400	0.000

Storage volume (m³) = 128.6 m³



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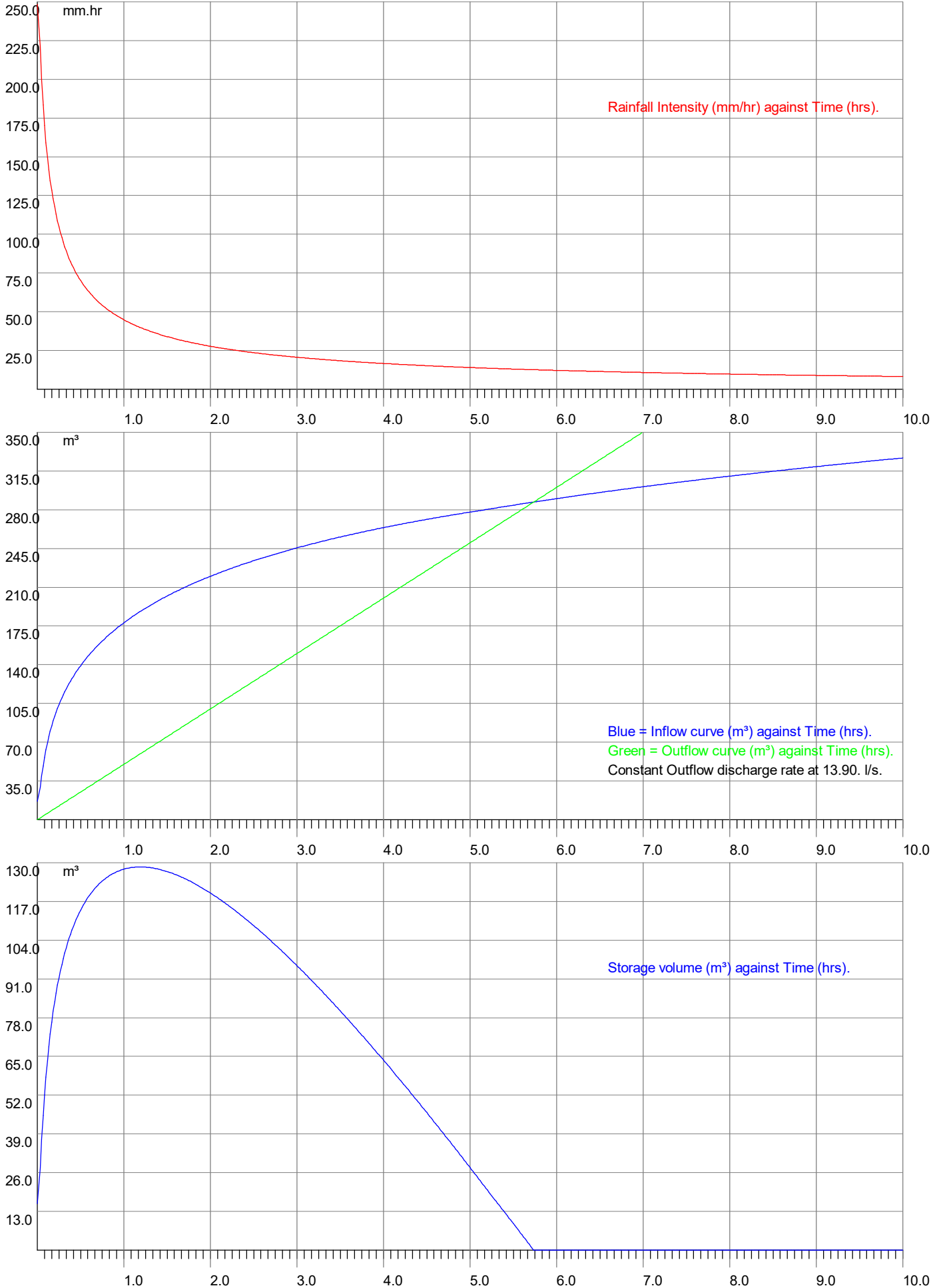
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Project **100 Years + 20% Storage Event Victoria Park, Manchester**

Title **100 Years + 20% Storage Event Victoria Park, Manchester**





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Project **100 Years + 20% Storage Event Victoria Park, Manchester**

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Explanatory notes for Peak Flow Storage

- 1) This system uses the rainfall intensity/ duration curve calculated using either the Wallingford or FEH method as selected.
- 2) The balance is calculated from the inflow minus the outflow.
- 3) The storage volume is the maximum value of the balance curve.
- 4) This method was described by Davis (1963) - see Butler & Davies, 2nd edition, p294
- 5) References to 'storm duration' relate only to the hydrograph method (qv).
- 6) There are always 600 steps in the calculation process, thus a 'run' time of 10 hours will be sampled every minute,

Explanatory notes for Hydrograph Storage

- 1) The user has the choice of Summer or Winter curves
- 2) The mean intensity varies with the duration of the storm curve
- 3) There are always 120 steps in the calculation process, irrespective of storm duration.
- 4) The balance is calculated from the inflow minus the outflow.
- 5) The storage volume is the sum of the balance values for each step.
- 6) Varying durations should be tried to find the maximum storage value - this can be narrowed down very closely.

*Modelling using the flow characteristics of the restrictor is available using Vortex Control modelling function. Please be aware that this function needs the full design data file to function.

Why do the two methods give different results?

The rainfall characteristics for each method are very different.

The Peak flow (using the Intensity/Duration/Frequency curve) does not model the actual rainfall. This curve is joined points which represent the mean intensity of a storm at a given duration i.e. a value of 19.5 mm/hr for a 60 minute storm indicates that over the sixty minute period, the mean intensity was 19.5 mm/hr. The calculation method samples the IDF curve for a given location and frequency (Return Period) and calculates the storage for that rate and duration less the outflow volume. The maximum value is displayed as the 'worst case' storage. The outflow volume is constant throughout the process at the specified discharge rate.

The hydrograph method uses a standard curve for either Winter or Summer storms. Traditionally these are symmetrical about the central peak. UK rainfall does not fit into this convenient curve, so the calculations are dealing with a stylised set of data. The mean intensity for the storm is calculated from the IDF curve and applied to the curve data, calculating the storage for that step less the outflow volume. The final storage volume is the sum of the storage for all the steps. The outflow volume varies with the hydraulic head on the control device using flow equations provided by the control manufacturer. This is a far more accurate method than the peak flow method and often results in bigger storage volumes.

It can be seen that these two methods are very different, and the user may have the choice of which result to use. This is not an exact science, though is often treated as such by those that do not understand the principles of the calculations.



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Project	100 Years + 40% Storage Event Victoria Park, Manchester
Title	100 Years + 40% Storage Event Victoria Park, Manchester

Data:-

FSR Hydrology:-

Location = VIC PARK, MANCH
M5-60 (mm) = 18.5
Soil index = 0.45
Return period = 100
UCWI = 92.2

Grid reference = SJ8695
r = 0.36
SAAR (mm/yr) = 860
WRAP = 4
Climate change = 40

Clayey, or loamy over clayey soils with an impermeable layer at shallow depth.

Runoff factor (RF) = 65.0, calculated from:-

$$\text{Runoff factor} = (0.829 \times \text{PIMP}) + (25 \times \text{SOIL}) + (0.078 \times \text{UCWI}) - 20.7$$

where

PIMP = Impervious Area*100/(Impervious Area+Pervious Area)

UCWI = Calculated value for Wetness Index

Design data:-

Imperv. area = 5000 m²
Total area (TA) = 6200 m²
Mean disch. rate = 13.900 l/s
Additional flow = 0.00 l/s

Pervious area = 1200 m²
Equiv area = 4030 m² (TA x RF).
Areal reduction factor = 1.000
Climate change factor = 40

Calculated data:-

Time to max = 85.0 mins
Rainfall at max = 41.22 mm/hr
Pipeline storage = 0.0 m³
Offline storage = 0.0 m³

Calculated storage volume = 160.8 m³
Allowed discharge rate = 13.900 l/s
Available MH storage = 0.0 m³

Fixed 6 hour data:-

Rainfall event = 6 hours
Rainfall rate = 14.00 mm/hr

Calculated storage volume = 32.0 m³
Allowed discharge rate = 13.900 l/s

Rainfall intensities calculated using the Wallingford Procedure

Storage lengths for initial calculation (x 1.1, 1.2, 1.3 or 1.5 as above if required) :-

Diam	Len	Diam	Len	Ovoid	Len	Box culvert	Len
100	20483.4	1125	161.8	400 x 600	893.6	500 x 500	643.4
150	9103.7	1200	142.2	600 x 900	389.1	500 x 750	428.9
225	4046.1	1275	126.0	800 x 1200	218.8	500 x 1000	321.7
300	2275.9	1350	112.4			750 x 1000	214.5
375	1456.6	1425	100.9			750 x 1200	178.7
450	1011.5	1500	91.0			750 x 1500	143.0
525	743.2	1575	82.6			1000 x 1000	160.8
600	569.0	1650	75.2			1000 x 1200	134.0
675	449.6	1725	68.8			1000 x 1500	107.2
750	364.1	1800	63.2			1000 x 1800	89.4
825	300.9	1875	58.3			1000 x 2000	80.4
900	252.9	1950	53.9			1500 x 1500	71.5
975	215.5	2025	50.0			1500 x 1800	59.6
1050	185.8	2100	46.4			1500 x 2000	53.6



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Data:-

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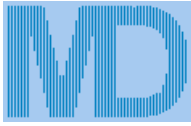
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Project **100 Years + 40% Storage Event Victoria Park, Manchester**

Title **100 Years + 40% Storage Event Victoria Park, Manchester**

Time (mins)	Rain mm/hr	Inflow (m3)	Outflow (m3)	Balance (m3)
10	150.0	99.013	8.340	90.673
20	104.0	137.783	16.680	121.103
30	82.0	162.319	25.020	137.299
40	68.0	180.585	33.360	147.225
50	59.0	195.238	41.700	153.538
60	52.0	207.521	50.040	157.481
70	47.0	218.120	58.380	159.740
80	43.0	227.454	66.720	160.734
90	40.0	235.797	75.060	160.737
100	37.0	243.344	83.400	159.944
110	34.0	250.232	91.740	158.492
120	32.0	256.567	100.080	156.487
130	31.0	262.430	108.420	154.010
140	29.0	267.884	116.760	151.124
150	28.0	272.980	125.100	147.880
160	26.0	277.761	133.440	144.321
170	25.0	282.261	141.780	140.481
180	24.0	286.509	150.120	136.389
190	23.0	290.529	158.460	132.069
200	22.0	294.343	166.800	127.543
210	21.0	297.969	175.140	122.829
220	21.0	301.422	183.480	117.942
230	20.0	304.717	191.820	112.897
240	19.0	307.866	200.160	107.706
250	19.0	310.879	208.500	102.379
260	18.0	313.766	216.840	96.926
270	18.0	316.536	225.180	91.356
280	17.0	319.196	233.520	85.676
290	17.0	321.753	241.860	79.893
300	16.0	324.214	250.200	74.014
310	16.0	326.584	258.540	68.044
320	16.0	329.060	266.880	62.180
330	15.0	331.488	275.220	56.268
340	15.0	333.856	283.560	50.296
350	15.0	336.167	291.900	44.267
360	14.0	338.423	300.240	38.184
370	14.0	340.629	308.580	32.049
380	14.0	342.785	316.920	25.865
390	13.0	344.895	325.260	19.635
400	13.0	346.960	333.600	13.360
410	13.0	348.983	341.940	7.043
420	13.0	350.965	350.280	0.685
430	12.0	352.909	358.620	0.000
440	12.0	354.816	366.960	0.000
450	12.0	356.687	375.300	0.000
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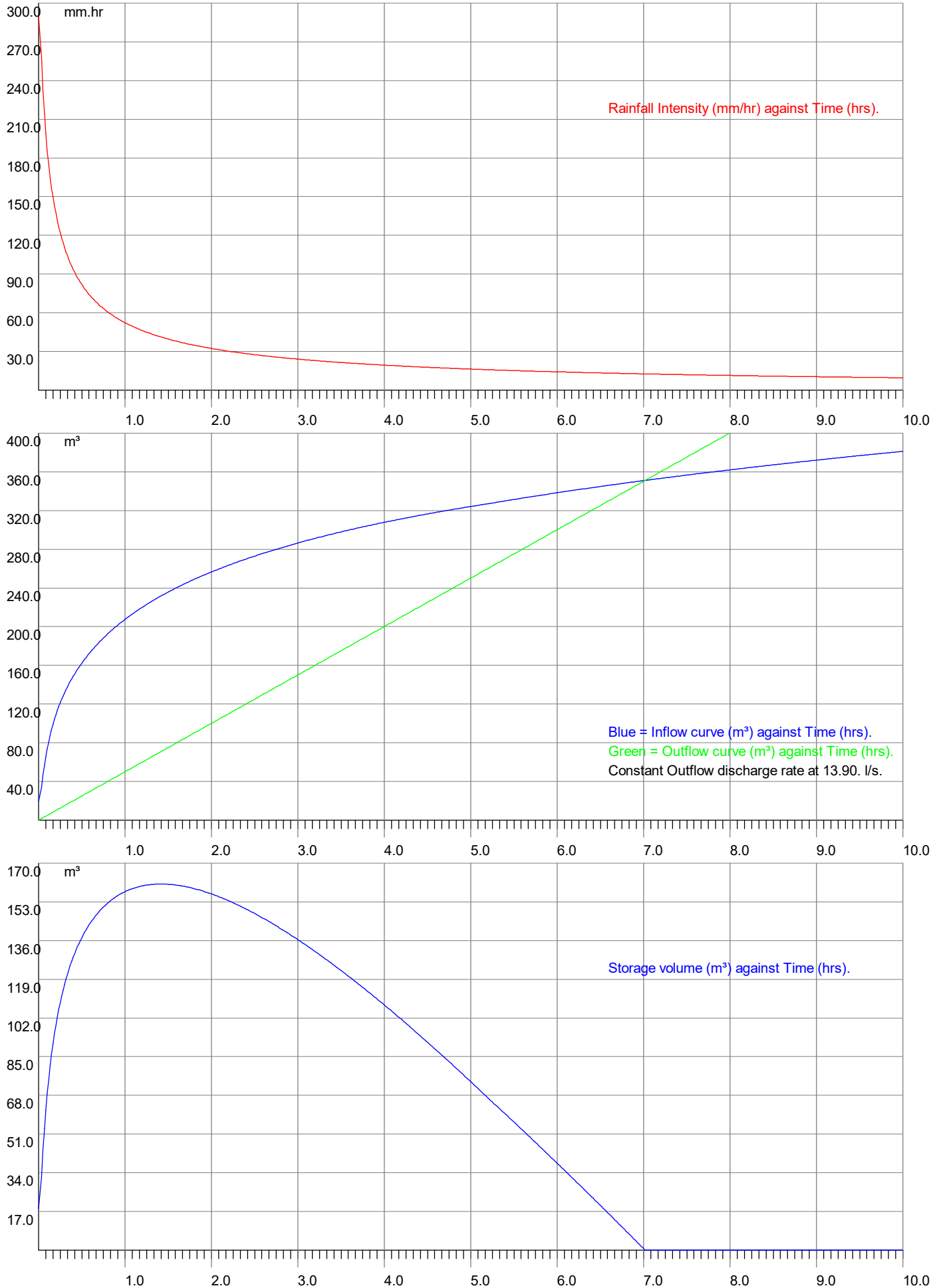
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