Technical Note for Surface Water Drainage Condition Discharge

March 2024

Our reference:
93763-Curteis-AcaciaAv v1.1

Prepared for:
Panoramic Developments Limited

Location:
34 Acacia Avenue
Ruislip
HA4 8RG

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Document Issue Record

Location:	34 Acacia Avenue, Ruislip, HA4 8RG				
Application:	Erection of 1 no. detached 4-bed dwelling and 2 no. semi-detached 4-bed dwellings, with associated parking and amenity space. (Revised drawing received on 12.10.2022)				
Prepared for:	Panoramic Developments Limited				
Title:	Surface Water Drainage Technical Note				
Project No.:	93763	**Date:**	6th March 2024	**Issue No.:**	1.1
Written By:	A. Rousou BSc (Hons)	**Checked By:**	E. Bouet, BSc (Hons)	**Authorised By:**	E. Bouet, BSc (Hons)

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1. Introduction

1.1. This Surface Water Drainage Technical Note has been prepared by Unda Consulting Limited on behalf of Panoramic Developments Limited, to address part of Condition 5 of a planning application.

1.2. The Planning application relates to the erection of 1 no. detached 4-bed dwelling and 2 no. semi-detached 4-bed dwellings, with associated parking and amenity space. (Revised drawing received on 12.10.2022). These works are proposed to be undertaken at 34 Acacia Avenue, Ruislip, HA4 8RG.

1.3. Post development the total built footprint of the three dwellings and bin stores amounts to approximately 235m².

1.4. This report assesses the surface water drainage arrangement for the proposed development, which forms part of Condition 5 of a planning application. Condition 5 states the following:

Condition 5:
No development approved by this permission shall be commenced until a scheme for the provision of sustainable water management and water efficiency has been submitted to and approved in writing by the Local Planning Authority. The scheme shall:

i. Provide information about the design storm period and intensity, the method employed to delay and control the surface water discharged from the site and the measures taken to prevent pollution of the receiving groundwater and/or surface waters;
ii. Include a timetable for its implementation; and
iii. Provide a management and maintenance plan for the lifetime of the development which shall include the arrangements for adoption by any public authority or statutory undertaker and any other arrangements to secure the operation of the scheme throughout its lifetime.

The scheme shall also demonstrate the use of methods to minimise the use of potable water through water collection, reuse and recycling and will:
iv. Provide details of water collection facilities to capture excess rainwater;
v. Provide details of how rain and grey water will be recycled and reused in the development;
vi. Provide details of how the dwellings will achieve a water efficiency standard of no more than 110 litres per person per day maximum water consumption (to include a fixed factor of water for outdoor use of 5 litres per person per day in accordance with the optional requirement defined within Approved Document G of the Building Regulations).

Thereafter the development shall be implemented and retained/maintained in accordance with these details for as long as the development remains in existence.
REASON

To ensure the development does not increase the risk of flooding in accordance with Policies DMEI 9 and DMEI 10 of the Hillingdon Local Plan Part 2 (2020) and Policies SI2 and SI 13 of the London Plan (2021).

1.5. This Technical Note provides the information required to address part of the surface water elements of planning application Condition 5.

2. Existing Site:

2.1. The existing site is occupied by a residential dwelling.

2.2. The surrounding area is characterised by residential dwellings.

Figure 1: Site location (Source: Google)

Site Topography:

2.3. Environment Agency LiDAR has been used to assess the topography across the site and wider area. Light Detection and Ranging (LiDAR) is an airborne mapping technique, which uses a laser to measure the distance between the aircraft and the ground surface. Up to 100,000 measurements per second are made of the ground, allowing highly detailed terrain models to be generated at high spatial resolutions. The EA's LiDAR data archive contains digital elevation data derived from surveys carried out by the EA's specialist remote sensing team. Accurate elevation data is available for over 70% of England. The LiDAR technique records an elevation accurate to +0.3m every 2m. This dataset is derived from a combination of the EA's full dataset which has been merged and re-sampled to give the best possible coverage. The dataset can be supplied as a Digital Surface Model (DSM) produced from the signal returned to the LiDAR (which includes heights of objects, such as vehicles, buildings and vegetation, as well as the terrain surface) or as a Digital Terrain Model (DTM) produced by removing objects from the Digital Surface Model. 1.0m horizontal resolution DTM LiDAR data has been used for the purposes of this study.

2.4. EA 1.0m LiDAR remotely sensed digital elevation data suggests that the ground topography on site ranges approximately between 54.78mAOD to 55.24mAOD.

Existing Ground Conditions:

2.5. The 1:50,000 BGS map shows the site to be located directly upon the bedrock of Lambeth Group – Sand, Silt and Clay.

2.6. According to BGS mapping the site is not underlaid by superficial deposits.

2.7. The soil type taken from the BGS UKSO Soil Map Viewer, shows a soil parent material of Prequaternary Marine/ Estuarine Sand and Silt with a soil texture of clayey loam to silty loam.

2.8. There are no nearby BGS borehole logs in the vicinity of the site.

2.9. The published Environment Agency Groundwater Source protection Zone map shows the site is not located within a Groundwater Source Protection Zone.

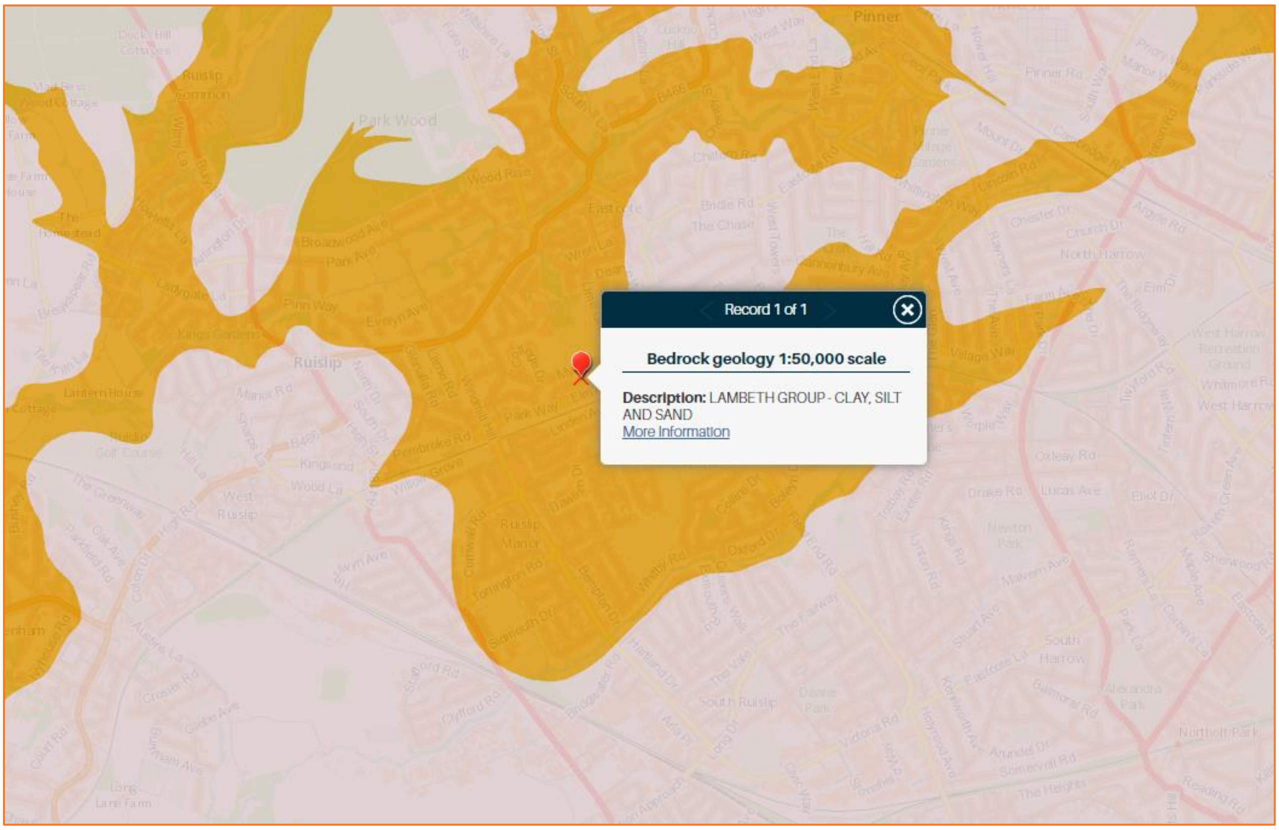

Figure 2: BGS Bedrock Geology (Source: BGS)

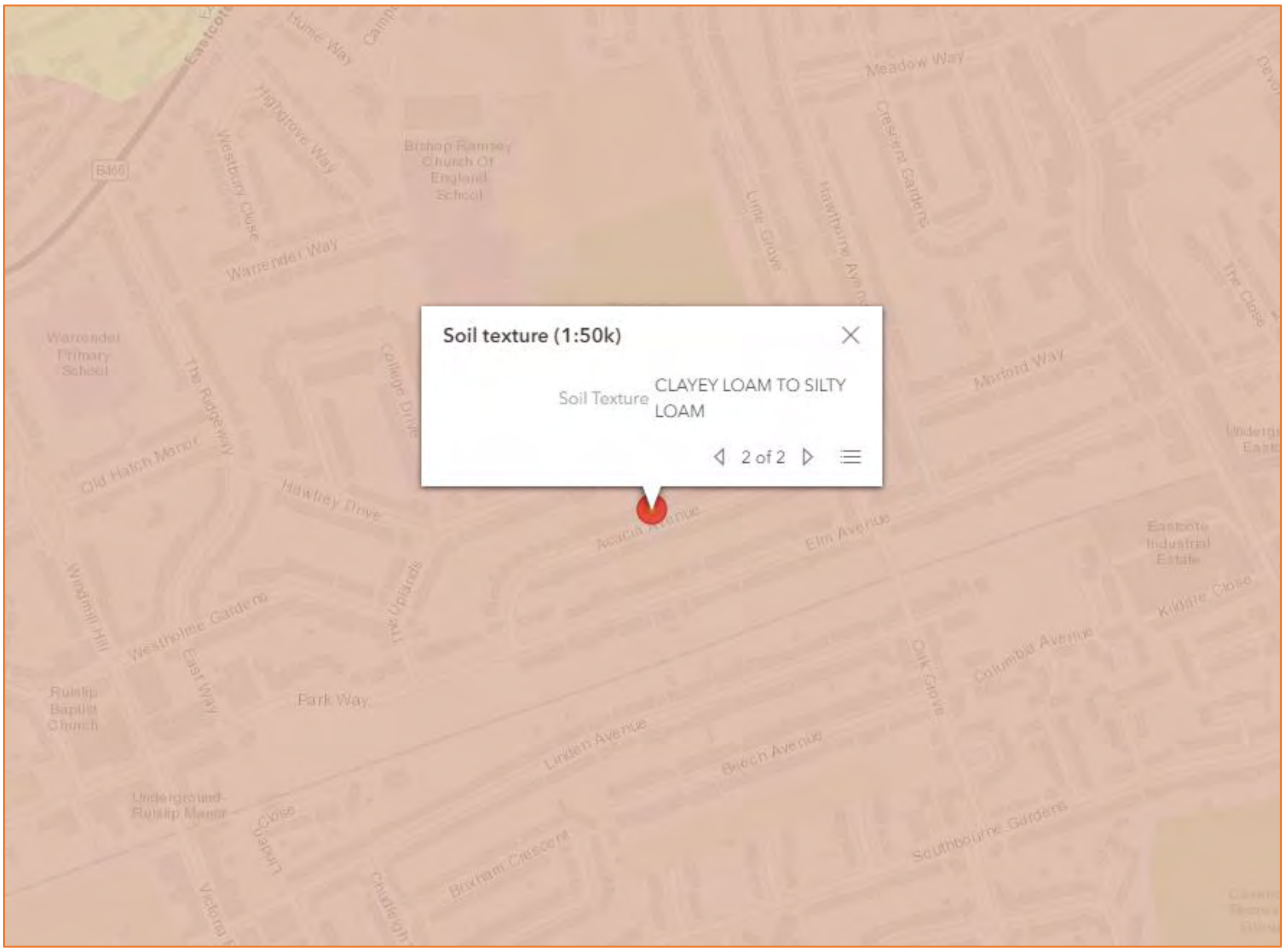

Figure 3: Soil Texture Map (Source: UK Soils, BGS)

Nearby Watercourses / Drainage Features:

2.10. The nearest existing watercourse to the site is a drain located 717m south west of the site.

Existing Drainage:

2.11. The site currently discharges its surface water to sewer at an unattenuated rate.

3. Development Proposals:

Proposed Development:

3.1. Discharge of Surface Water Planning Condition 5 is for the erection of 1 no. detached 4-bed dwelling and 2 no. semi-detached 4-bed dwellings, with associated parking and amenity space. (Revised drawing received on 12.10.2022) at 34 Acacia Avenue, Ruislip, HA4 8RG. Post development the total built footprint of the three dwellings and bin stores amounts to approximately 235m².

3.2. Therefore, attenuation sizing within the strategy has been based on the impermeable area from the dwellings and bin stores.

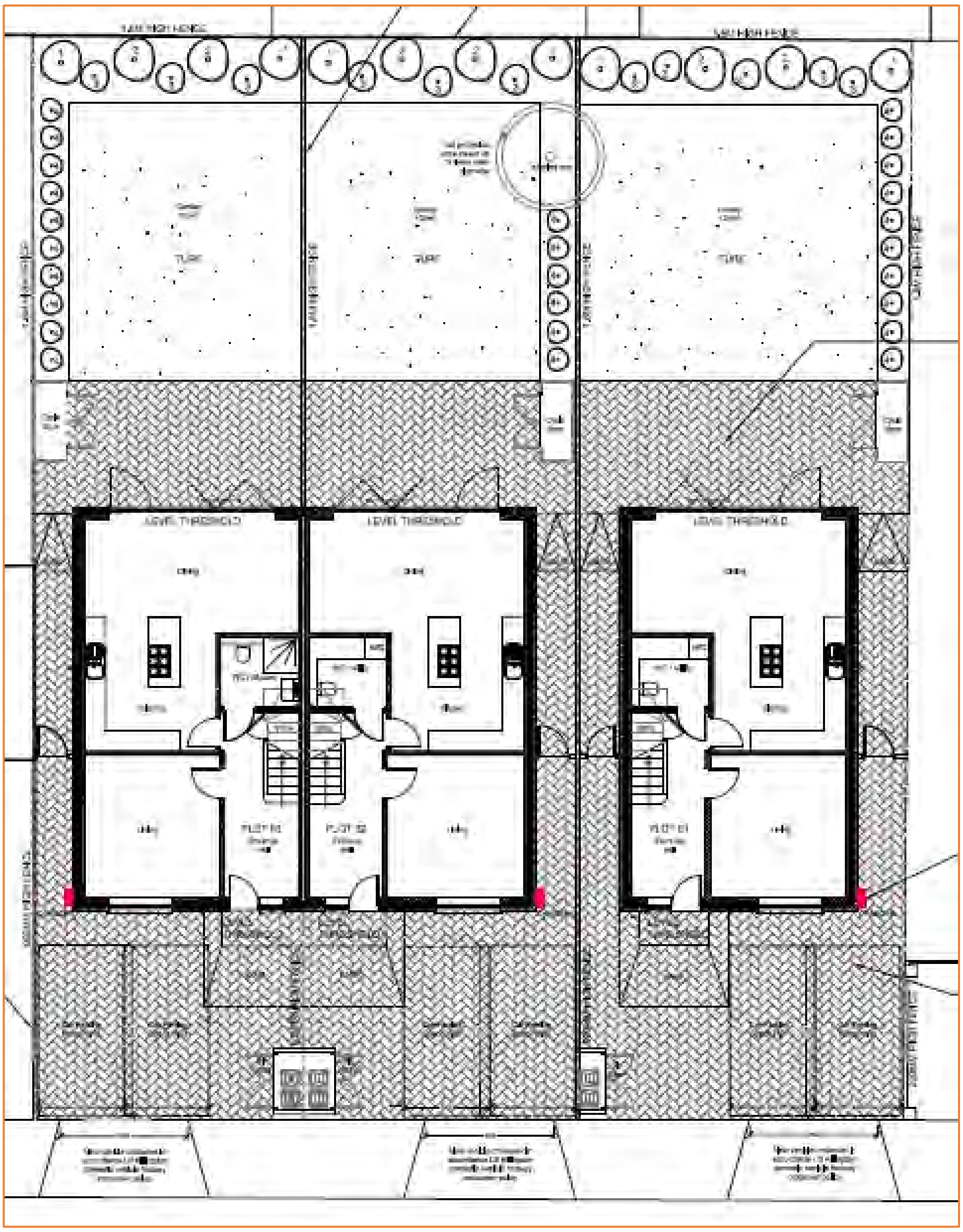

Figure 4: Proposed Site Layout Plan (Source: Bernard Murray Design)

4. Surface Water Drainage Strategy:

4.1. In order to mitigate flood risk posed by post development runoff, adequate control measures will need to be considered within the site. This will ensure that surface water runoff is dealt with at source and flood risk is not increased elsewhere.

Drainage Hierarchy:

4.2. The drainage strategy for the site has been prepared according to the drainage discharge hierarchy from CIRIA C753 The Suds Manual, as follows:

- Infiltration to the maximum extent that is practical;
- Discharge to surface waters;
- Discharge to surface water sewer.

Infiltration Potential:

4.3. Records from the BGS indicate that the site is located directly upon the bedrock of Lambeth Group – Sand, Silt and Clay.

4.4. Infiltration testing at the site did not drain sufficiently for infiltration SuDS to be viable at the site. Therefore, an attenuation based strategy will be utilised.

Proposed Discharge Rate:

4.5. Existing greenfield runoff rates for the area of plot 1 being attenuated has been calculated as 0.1 l/s for the 1:1 annual runoff event, 0.1 l/s for the 1:30 year event and 0.2 l/s for the 1:100 year event. Refer to calculations in the report Appendix.

4.6. Existing greenfield runoff rates for the area of plot 2 being attenuated has been calculated as 0.0 l/s for the 1:1 annual runoff event, 0.1 l/s for the 1:30 year event and 0.2 l/s for the 1:100 year event. Refer to calculations in the report Appendix.

4.7. Existing greenfield runoff rates for the area of plot 3 being attenuated has been calculated as 0.1 l/s for the 1:1 annual runoff event, 0.1 l/s for the 1:30 year event and 0.2 l/s for the 1:100 year event. Refer to calculations in the report Appendix.

4.8. Roof runoff from each dwelling and bin store roof will be directed into each plots individual area (Plot 1, Plot 2 and Plot 3 respectively) of tanked permeable paving. Each area of tanked permeable paving will then discharge into an existing manhole at an attenuated rate of 0.2l/s via orifice plates.

4.9. All remaining ground surfaces will be of permeable construction.

Tanked Permeable Paving for Plot 1:

4.10. Tanked permeable paving will cover approximately $63m^2$ of plot 1.

4.11. Runoff from the dwelling and bin store will be directed into and stored within a 0.55m gravel sub-base beneath the Permeable Paving surface.

4.12. The proposed development comprises some $142m^2$ of potentially impermeable surfacing. In order to comply with CIRIA C753 The SuDS Manual, a 10% allowance will be added to take into account future urban creep. Applying a 10% allowance to all new impermeable surfacing ($142m^2$) gives a value of $156.2m^2$. Therefore, all drainage calculations have been made on the basis of a total impermeable area of $156.2m^2$.

4.13. Preliminary calculations indicate that sufficient storage required to attenuate runoff from the proposed impermeable areas arising from the critical 1:100 year + 40% climate change event can be provided within the substrate base of tanked permeable paving of dimensions $63m^2$ x 0.55m deep x 0.3 (voids).

4.14. Preliminary calculations indicated that approximately $10.4m^3$ of storage is required to attenuate the runoff for all storms up to and including the 1:100 year + 40% climate change event.

4.15. *Please note that the levels and locations of the cellular storage within the Causeway calculations are arbitrary for modelling purposes.*

4.16. All preliminary surface water drainage calculations have been undertaken using Causeway software. Refer to the appendix.

Tanked Permeable Paving for Plot 2:

4.17. Tanked permeable paving will cover approximately 47m^2 of plot 2.

4.18. Runoff from the dwelling and bin store will be directed into and stored within a 0.6m gravel sub-base beneath the Permeable Paving surface.

4.19. The proposed development comprises some 125m^2 of potentially impermeable surfacing. In order to comply with CIRIA C753 The SuDS Manual, a 10% allowance will be added to take into account future urban creep. Applying a 10% allowance to all new impermeable surfacing (125m^2) gives a value of 137.5m^2. Therefore, all drainage calculations have been made on the basis of a total impermeable area of 137.5m^2.

4.20. Preliminary calculations indicate that sufficient storage required to attenuate runoff from the proposed impermeable areas arising from the critical 1:100 year + 40% climate change event can be provided within the substrate base of tanked permeable paving of dimensions 47m^2 x 0.6m deep x 0.3 (voids).

4.21. Preliminary calculations indicated that approximately 8.5m^3 of storage is required to attenuate the runoff for all storms up to and including the 1:100 year + 40% climate change event.

4.22. *Please note that the levels and locations of the cellular storage within the Causeway calculations are arbitrary for modelling purposes.*

4.23. All preliminary surface water drainage calculations have been undertaken using Causeway software. Refer to the appendix.

Tanked Permeable Paving for Plot 3:

4.24. Tanked permeable paving will cover approximately 47m^2 of plot 3.

4.25. Runoff from the dwelling and bin store will be directed into and stored within a 0.6m gravel sub-base beneath the Permeable Paving surface.

4.26. The proposed development comprises some 125m^2 of potentially impermeable surfacing. In order to comply with CIRIA C753 The SuDS Manual, a 10% allowance will be added to take into account future urban creep. Applying a 10% allowance to all new impermeable surfacing (125m^2) gives a value of 137.5m^2. Therefore, all drainage calculations have been made on the basis of a total impermeable area of 137.5m^2.

4.27. Preliminary calculations indicate that sufficient storage required to attenuate runoff from the proposed impermeable areas arising from the critical 1:100 year + 40% climate change event can be provided within the substrate base of tanked permeable paving of dimensions 47m^2 x 0.6m deep x 0.3 (voids).

4.28. Preliminary calculations indicated that approximately 8.5m^3 of storage is required to attenuate the runoff for all storms up to and including the 1:100 year + 40% climate change event.

4.29. *Please note that the levels and locations of the cellular storage within the Causeway calculations are arbitrary for modelling purposes.*

4.30. All preliminary surface water drainage calculations have been undertaken using Causeway software. Refer to the appendix.

Water Quality:

4.31. Water quality has been assessed in line with the Simple Index approach from Chapter 26 of CIRIA C753 The SuDS Manual:
Step 1 – Allocate suitable pollution hazard indices for the proposed land use.
Step 2 – Select SuDS with a total pollution mitigation index that equals or exceeds the pollution hazard index.

4.32. The highest pollution hazard level for the proposed land use is Low (residential car parks and low trafficked roads). The pollution hazard indices for this land use are shown in Table 1 below.

Total suspended solids (TSS)	Metals	Hydrocarbons
0.5	0.4	0.4

Table 1: Pollution Hazard Indices for the proposed site (from Table 26.2 of CIRIA C753 The SuDS Manual)

4.33. All SuDS components are assessed for their effectiveness in pollutant removal prior to discharge in Table 26.3 in CIRIA C753 The SuDS Manual. The pollution mitigation indices for permeable pavements are show in Table 2 below.

Total suspended solids (TSS)	Metals	Hydrocarbons
0.7	0.6	0.7

Table 2: Pollution Mitigation Indices for permeable pavements (from Table 26.3 of CIRIA C753 The SuDS Manual)

4.34. The Pollution Mitigation Indices for permeable pavement are greater than the Pollution Hazard Indices for car parks and low trafficked roads. Therefore, permeable pavements will provide sufficient water quality treatment prior to discharge.

4.35. Runoff from roof areas are considered to be uncontaminated and does not warrant any form of treatment process to improve water quality. Nevertheless, it is suggested to include debris / sediment traps on any new drainage.

Design Exceedance:

4.36. Should the onsite drainage system fail under extreme rainfall events or blockage, flooding may occur within the site. In the event of the drainage system failure, the runoff flow can be managed through detailing the new external levels to direct water away from structures.

Adoption and Maintenance:

4.37. It is proposed that all SuDS facilities will be maintained privately by the end users (the individual Plot users).

4.38. A draft Maintenance Schedule is outlined in the Table below.

Tanked Permeable Paving

4.47. Permeable surfaces need to be regularly cleaned of silt and other sediments to preserve their infiltration capability. A brush and suction cleaner, which can be a lorry-mounted device or a smaller precinct sweeper, should be used and the sweeping regime should be as follows:

1. End of winter (April) – to collect winter debris.
2. Mid-summer (July/August) – to collect dust, flower and grass-type deposits.
3. After autumn leaf fall (November).

4.48. If reconstruction is necessary, the following procedure should be followed:

1. Lift surface layer and laying course.
2. Remove any geotextile filter layer.
3. Inspect sub-base and remove, wash and replace if required.
4. Renew any geotextile layer.
5. Renew laying course, jointing material and concrete block paving.

4.49. Materials removed from the voids or the layers below the surface of the paving may contain hazardous substances such as heavy metals and hydrocarbons which may need to be disposed of as controlled waste.

Pipework and Catchpits:

4.50. It is not envisaged that silt build up within the pipework systems will require a rigorous maintenance regime so long as silt is removed from upstream catch pits on a regular basis. Notwithstanding this, a suitable maintenance regime for the systems will comprise of routine inspection (every three months) and silt removal (as necessary).

Drainage Element	Maintenance Requirement	Frequency
Gutters & Downpipes	Inspect and remove silt/ debris	To be inspected every three months and silt/ debris removed as necessary.
Catchpits and Inspection Chambers	Inspect and remove silt	To be inspected every three months and silt/ debris removed as necessary. Flow control to be checked for blockages.
Flow Controls	Inspected for blockage and blockage / debris build up removed	Every six months
Tanked Permeable Paving	Sweeping/vacuuming to remove build-up of silt or other sediments	Three times a year or as necessary
	▪ Removal of weeds ▪ Replacement of cracked paving blocks Remedial work to cracks and depressions	As required

Table 3: Suggested Maintenance Regime for Elements of the Drainage Infrastructure

Note: In addition to the above maintenance requirements, it is recommended that all drainage elements are inspected:

Following the first storm event;

Monthly for the first 3 months following commissioning .

5. Discussion and Conclusions:

5.1. This Surface Water Drainage Technical Note has been prepared by Unda Consulting Limited on behalf of Panoramic Developments Limited, to address part of Condition 5 of a planning application.

5.2. The Planning application relates to the erection of 1 no. detached 4-bed dwelling and 2 no. semi-detached 4-bed dwellings, with associated parking and amenity space. (Revised drawing received on 12.10.2022). These works are proposed to be undertaken at 34 Acacia Avenue, Ruislip, HA4 8RG.

5.3. Post development the total built footprint of the three dwellings and bin stores amounts to approximately 235m².

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To ensure the development does not increase the risk of flooding in accordance with Policies DMEI 9 and DMEI 10 of the Hillingdon Local Plan Part 2 (2020) and Policies SI2 and SI 13 of the London Plan (2021).

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5.7. Therefore, attenuation sizing within the strategy has been based on the impermeable area from the dwellings and bin stores.

5.8. The 1:50,000 BGS map shows the site to be located directly upon the bedrock of Lambeth Group – Sand, Silt and Clay.

5.9. According to BGS mapping the site is not underlaid by superficial deposits.

5.10. The soil type taken from the BGS UKSO Soil Map Viewer, shows a soil parent material of Prequaternary Marine/ Estuarine Sand and Silt with a soil texture of clayey loam to silty loam.

Surface Water Drainage Discussion

5.11. Infiltration testing at the site did not drain sufficiently for infiltration SuDS to be viable at the site. Therefore, an attenuation based strategy will be utilised.

5.12. Existing greenfield runoff rates for the area of plot 1 being attenuated has been calculated as 0.1 l/s for the 1:1 annual runoff event, 0.1 l/s for the 1:30 year event and 0.2 l/s for the 1:100 year event. Refer to calculations in appendix.

5.13. Existing greenfield runoff rates for the area of plot 2 being attenuated has been calculated as 0.0 l/s for the 1:1 annual runoff event, 0.1 l/s for the 1:30 year event and 0.2 l/s for the 1:100 year event. Refer to calculations in appendix.

5.14. Existing greenfield runoff rates for the area of plot 3 being attenuated has been calculated as 0.1 l/s for the 1:1 annual runoff event, 0.1 l/s for the 1:30 year event and 0.2 l/s for the 1:100 year event. Refer to calculations in appendix.

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5.19. The proposed development comprises some 142m^2 of potentially impermeable surfacing. In order to comply with CIRIA C753 The SuDS Manual, a 10% allowance will be added to take into account future urban creep. Applying a 10% allowance to all new impermeable surfacing (142m^2) gives a value of 156.2m^2. Therefore, all drainage calculations have been made on the basis of a total impermeable area of 156.2m^2.

5.20. Preliminary calculations indicate that sufficient storage required to attenuate runoff from the proposed impermeable areas arising from the critical 1:100 year + 40% climate change event can be provided within the substrate base of tanked permeable paving of dimensions 63m^2 x 0.55m deep x 0.3 (voids).

5.21. Preliminary calculations indicated that approximately 10.4m^3 of storage is required to attenuate the runoff for all storms up to and including the 1:100 year + 40% climate change event.

5.22. *Please note that the levels and locations of the cellular storage within the Causeway calculations are arbitrary for modelling purposes.*

5.23. All preliminary surface water drainage calculations have been undertaken using Causeway software. Refer to the appendix.

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Tanked Permeable Paving for Plot 3

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5.39. Runoff from roof areas are considered to be uncontaminated and does not warrant any form of treatment process to improve water quality. Nevertheless, it is suggested to include debris / sediment traps on any new drainage.

5.40. Should the onsite drainage system fail under extreme rainfall events or blockage, flooding may occur within the site. In the event of the drainage system failure, the runoff flow can be managed through detailing the new external levels to direct water away from structures.

5.41. This drainage strategy has been undertaken in accordance with the principles set out in NPPF. We can conclude that providing the development adheres to the conditions advised above, the said development proposals can be accommodated without increasing flood risk within the locality in accordance with objectives set by Central Government and the EA.

Unda Consulting Limited

March 2024

6. Appendix

A - Plans by others:

- Proposed Plans – Bernard Murray Design;

B – Causeway Calculations:

- IH124 Pre-Development Greenfield Runoff Calculations for the area of the site being attenuated;
- Tanked permeable Paving Calculations for each plot.

C - Plans:

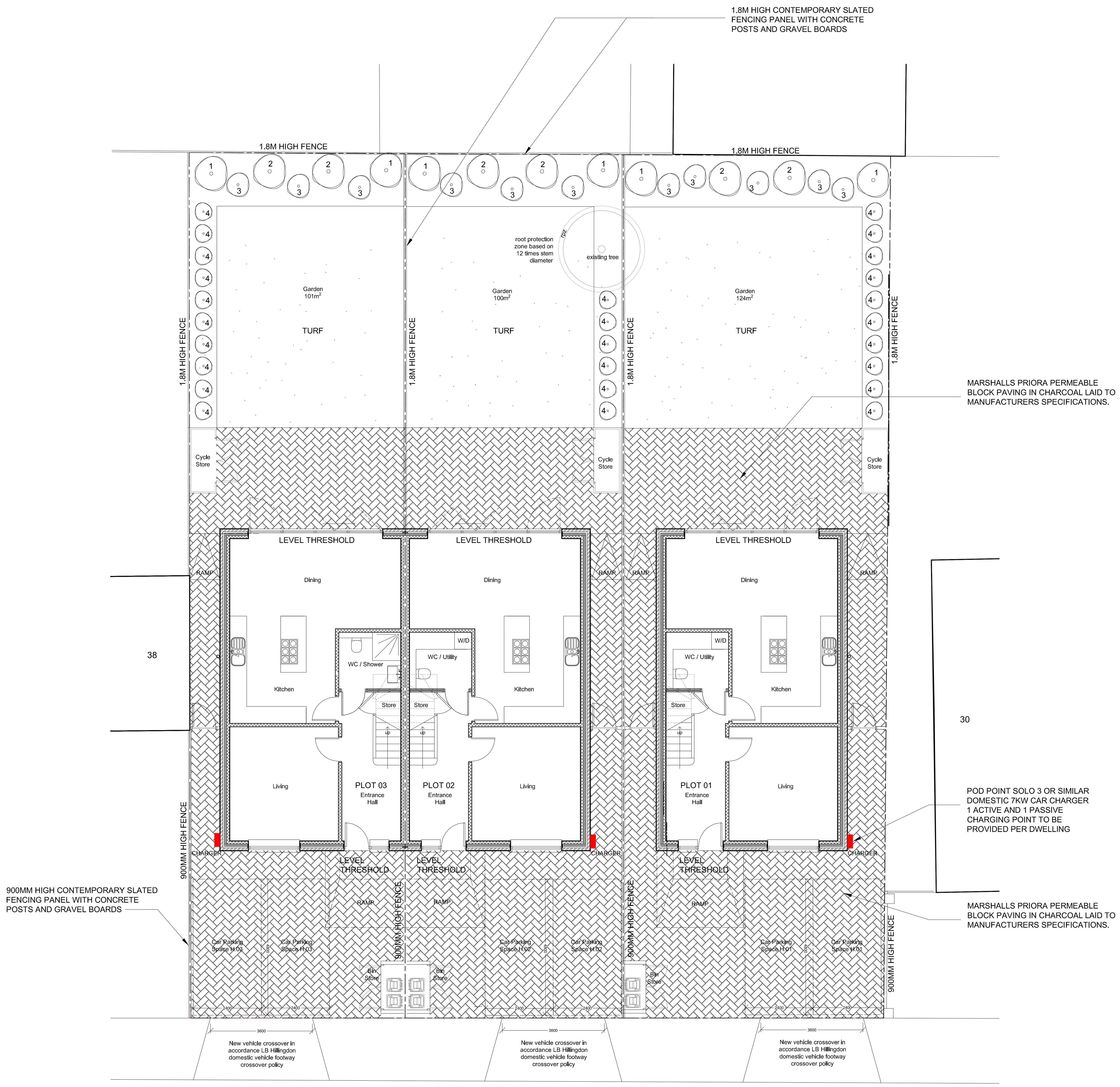
- Proposed Drainage Layout.

GREY HEAVY DUTY STEEL CYCLE STORE

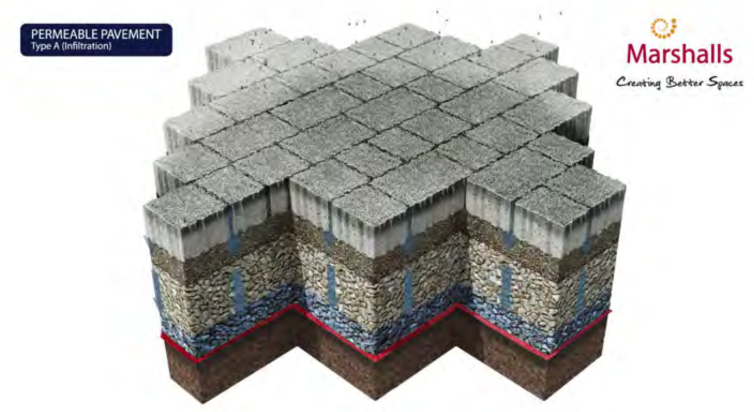
TIMBER DOUBLE BIN STORE
HEIGHT 1200MM
DEPTH 950MM
WIDTH 1500MM

900mm OR 1.8M HIGH CONTEMPORARY SLATED FENCING PANEL WITH CONCRETE POSTS AND GRAVEL BOARDS

POD POINT SOLO 3 DOMESTIC 7KW CAR CHARGER 1 ACTIVE AND 1 PASSIVE CHARGING POINT TO BE PROVIDED PER DWELLING



MARSHALLS PRIORA PERMEABLE BLOCK PAVING IN CHARCOAL



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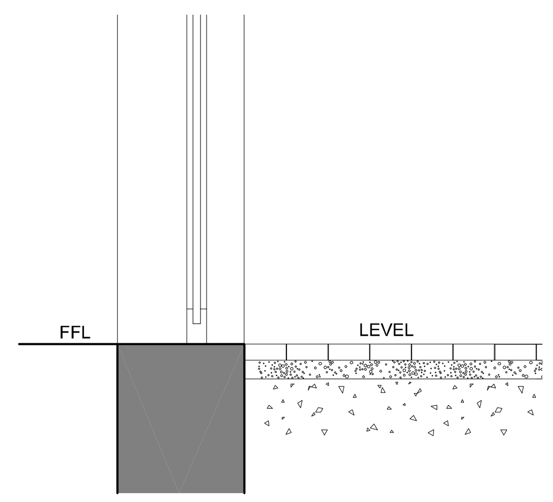


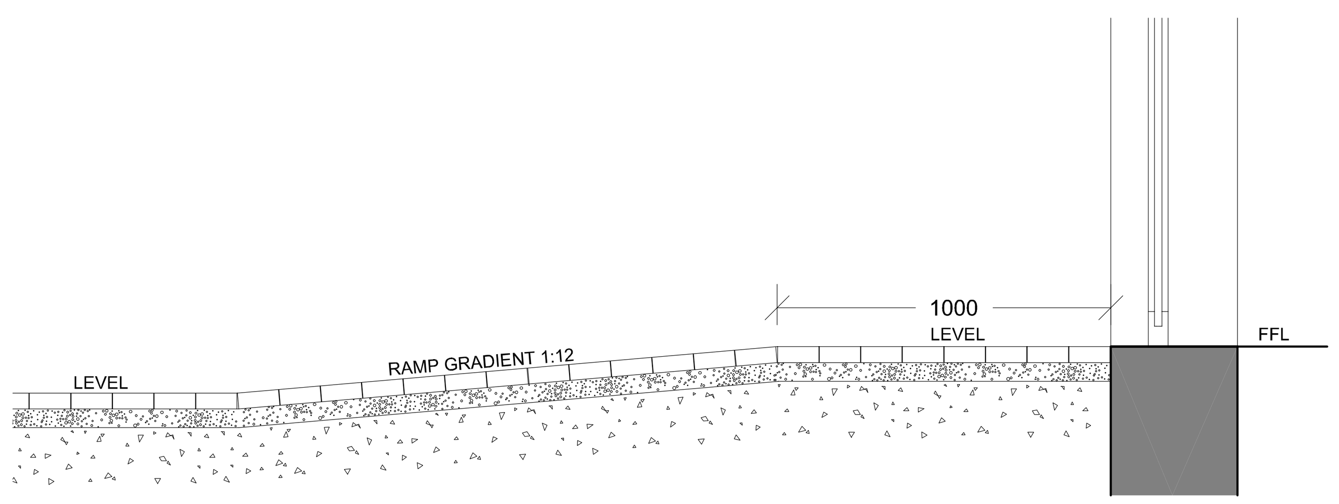
REAR PATIO DOORS LEVEL THRESHOLD 1:20

PHOTINIA FRASERI 'RED ROBIN'

VULGARIS 'KATHERINE HAVEMEYER

EUONYMUS JAPONICUS 'MARIEKE'

HYPERICUM HIDCOTEENSE 'HIDCOTE'



MAIN ENTRANCE DOORS LEVEL THRESHOLD 1:20

PLANTING & MAINTENANCE SCHEDULE

PLANTING SCHEDULE

1. PHOTINIA FRASERI 'RED ROBIN' 20L POT
2. VULGARIS 'KATHERINE HAVEMEYER 20L POT
3. EUONYMUS JAPONICUS 'MARIEKE' 15L POT
4. HYPERICUM HIDCOTEENSE 'HIDCOTE' 5L POT

PLANTING PITS

BOTTOM OF PITS TO BE BROKEN UP TO MIN DEPTH OF 150MM AND MIXED WITH COMPOST.

PITS TO BE AT LEAST 75MM DEEPER THAN ROOT SYSTEM AND WIDE ENOUGH TO ACCOMMODATE ROOTS WHEN FULLY SPREAD.

BACK FILLING MATERIAL TO BE IMPORTED TOPSOIL AS REQUIRED TO ACHIEVE 50% TOPSOIL - 50% TREE PLANTING AND MULCHING COMPOST AND FERTILIZER. NO AVAILABLE TOPSOIL AT SITE.

PLANTS TO BE CONTAINER GROWN.

PITS SHALL BE OF SUFFICIENT SIZE FOR NEW PLANTS WITH 50mm GRAVEL BED, GOOD QUALITY LOAM FILL WITH COMPOST AND 4 OUNCES OF BONEMEAL PER M².

ALL AREAS AROUND SHRUBS SHALL BE LAID WITH A WEED FREE MULCH MIN. 50mm DEEP.

GOOD QUALITY ORNAMENTAL BARK MULCH.

NEW PLANTING AND LANDSCAPE OPERATIONS SHOULD COMPLY WITH THE REQUIREMENTS SPECIFIED IN BS 3936 AND BS 4428.

AREAS OF HARD AND SOFT LANDSCAPING TO BE PERMANENTLY RETAINED.

STAKING

STAKES AND TIES SHOULD NOT BE HIGHER THAN NECESSARY TO ENSURE THAT THE ROOT SYSTEM IS SECURE AND DOES NOT ROCK.

STAKES TO BE FIRMLY DRIVEN INTO THE GROUND EITHER SIDE OF ROOTS.

SHRUBS TO BE PLANTED AND STAKED IN ACCORDANCE WITH BS 395 AND BS 4428.

SHRUBS IN ACCORDANCE WITH BS 395 & BS 4428.

MAINTENANCE

MAINTENANCE TO COMPLY WITH BS 395 AND BS4428.

DURING FIRST 5 YEARS KEEP PLANTING WEEDED AND WATERED.

ANY SHRUB WHICH DIES OR IS REMOVED OR DAMAGED WITHIN 5 YEARS TO BE REPLACED IN NEXT PLANTING SEASON.

SOIL AROUND PLANTS TO BE FIRMED AND THE MULCH MADE GOOD AFTER HIGH WINDS AND FROSTS AND GIVEN ANNUAL FEEDING OF A GOOD FERTILIZER .

PRUNING TO BE CARRIED OUT BY BY QUALIFIED PERSONS.

QUALIFIED LANDSCAPE CONTRACTOR TO CARRY OUT THE PLANTING SCHEME AND UNDERTAKE TO ARRANGE A CONTRACT TO CARRY OUT MAINTENANCE WORKS TO THE APPROVED SCHEME.

TURFING

TURF SHOULD BE TO BS 3969 FROM AN APPROVED SOURCE

SUFFICIENTLY FIBROUS TO WITHSTAND THE HANDLING CONDITIONS

FREE FROM UNDESIRABLE GRASSES (INCLUDING RYEGRASS) AND WEEDS

SAMPLE TURVES TO BE SUBMITTED FOR APPROVAL BEFORE LAYING COMMENCES

TURF TO BE KEPT WATERED UNTIL ESTABLISHED

N

0 0.5 1 Metres 3 4 5 6
Scale 1:100

PERMEABLE PAVING	FEB 2024	A
AMENDMENTS	DATE	REV.

Dimensions, areas and levels where given are only approximate and subject to site survey. All dimensions are to be checked on site. Figured dimensions only are to be taken from this drawing. This drawing is to be read in conjunction with all relevant consultants and/or specialists drawings/documents and any discrepancies or variations are to be notified to the architect before the affected work commences. This drawing is copyright and remains the property of the Architects.

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DRAWING
LANDSCAPING PLAN

SCALE	1:100 @ A1	DRAWING NUMBER	REV.
DATE	JAN 2024	1201-7	A
DRAWN	BM		

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	100	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.400	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	4.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Easting (m)	Northing (m)	Depth (m)
MH1	0.016	4.00	10.000	100.000	100.000	0.550

Simulation Settings

Rainfall Methodology	FSR	Drain Down Time (mins)	240
FSR Region	England and Wales	Additional Storage (m^3/ha)	0.0
M5-60 (mm)	20.000	Check Discharge Rate(s)	✓
Ratio-R	0.400	1 year (l/s)	0.1
Summer CV	0.750	30 year (l/s)	0.1
Winter CV	0.840	100 year (l/s)	0.2
Analysis Speed	Normal	Check Discharge Volume	x
Skip Steady State	x		

Storm Durations

15	60	180	360	600	960	2160	4320	7200	10080
30	120	240	480	720	1440	2880	5760	8640	

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
100	40	0	0

Pre-development Discharge Rate

Site Makeup	Greenfield	Growth Factor 30 year	2.40
Greenfield Method	IH124	Growth Factor 100 year	3.19
Positively Drained Area (ha)	0.014	Betterment (%)	0
SAAR (mm)	648	QBar	0.1
Soil Index	4	Q 1 year (l/s)	0.1
SPR	0.47	Q 30 year (l/s)	0.1
Region	6	Q 100 year (l/s)	0.2
Growth Factor 1 year	0.85		

Node MH1 Online Orifice Control

Flap Valve	x	Invert Level (m)	9.450	Discharge Coefficient	0.600
Replaces Downstream Link	✓	Diameter (m)	0.010		

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Node MH1 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	9.450	Slope (1:X)	1000.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)		Depth (m)	
Safety Factor	2.0	Width (m)	10.000	Inf Depth (m)	
Porosity	0.30	Length (m)	6.300		

Results for 100 year +40% CC 15 minute summer. 255 minute analysis at 1 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	MH1	19	9.677	0.227	10.6	4.0733	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
15 minute summer	MH1	Orifice	0.1	1.3

Results for 100 year +40% CC 15 minute winter. 255 minute analysis at 1 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	MH1	19	9.704	0.254	10.6	4.5758	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
15 minute winter	MH1	Orifice	0.1	1.4

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Results for 100 year +40% CC 30 minute summer. 270 minute analysis at 1 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute summer	MH1	33	9.744	0.294	9.3	5.3089	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
30 minute summer	MH1	Orifice	0.1	1.6

Results for 100 year +40% CC 30 minute winter. 270 minute analysis at 1 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute winter	MH1	33	9.778	0.328	8.1	5.9308	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
30 minute winter	MH1	Orifice	0.1	1.7

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Results for 100 year +40% CC 60 minute summer. 300 minute analysis at 1 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m^3)	Flood (m^3)	Status
60 minute summer	MH1	63	9.810	0.360	6.7	6.5327	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m^3)
60 minute summer	MH1	Orifice	0.1	1.9

Results for 100 year +40% CC 60 minute winter. 300 minute analysis at 1 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute winter	MH1	62	9.850	0.400	5.3	7.2773	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
60 minute winter	MH1	Orifice	0.1	2.1

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Results for 100 year +40% CC 120 minute summer. 360 minute analysis at 2 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m^3)	Flood (m^3)	Status
120 minute summer	MH1	122	9.864	0.414	4.3	7.5394	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m^3)
120 minute summer	MH1	Orifice	0.1	2.4

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Results for 100 year +40% CC 120 minute winter. 360 minute analysis at 2 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
120 minute winter	MH1	120	9.917	0.467	3.2	8.5251	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
120 minute winter	MH1	Orifice	0.1	2.6

Results for 100 year +40% CC 180 minute summer. 420 minute analysis at 4 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m^3)	Flood (m^3)	Status
180 minute summer	MH1	184	9.894	0.444	3.3	8.0948	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m^3)
180 minute summer	MH1	Orifice	0.1	2.8

Results for 100 year +40% CC 180 minute winter. 420 minute analysis at 4 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
180 minute winter	MH1	180	9.943	0.493	2.4	9.0238	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
180 minute winter	MH1	Orifice	0.1	3.0

Results for 100 year +40% CC 240 minute summer. 480 minute analysis at 4 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
240 minute summer	MH1	240	9.904	0.454	2.5	8.2836	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
240 minute summer	MH1	Orifice	0.1	3.2

Results for 100 year +40% CC 240 minute winter. 480 minute analysis at 4 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
240 minute winter	MH1	240	9.960	0.510	1.9	9.3300	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
240 minute winter	MH1	Orifice	0.1	3.4

Results for 100 year +40% CC 360 minute summer. 600 minute analysis at 8 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
360 minute summer	MH1	360	9.914	0.464	1.9	8.4702	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
360 minute summer	MH1	Orifice	0.1	3.9

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Results for 100 year +40% CC 360 minute winter. 600 minute analysis at 8 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m^3)	Flood (m^3)	Status
360 minute winter	MH1	344	9.975	0.525	1.4	9.6285	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m^3)
360 minute winter	MH1	Orifice	0.2	4.1

Results for 100 year +40% CC 480 minute summer. 720 minute analysis at 8 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
480 minute summer	MH1	424	9.917	0.467	1.5	8.5316	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
480 minute summer	MH1	Orifice	0.1	4.5

Results for 100 year +40% CC 480 minute winter. 720 minute analysis at 8 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m^3)	Flood (m^3)	Status
480 minute winter	MH1	456	9.986	0.536	1.1	9.8304	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m^3)
480 minute winter	MH1	Orifice	0.2	4.9

Results for 100 year +40% CC 600 minute summer. 840 minute analysis at 15 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
600 minute summer	MH1	495	9.930	0.480	1.2	8.7824	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
600 minute summer	MH1	Orifice	0.1	5.2

Results for 100 year +40% CC 600 minute winter. 840 minute analysis at 15 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
600 minute winter	MH1	555	9.991	0.541	0.9	9.9205	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
600 minute winter	MH1	Orifice	0.2	5.6

Results for 100 year +40% CC 720 minute summer. 960 minute analysis at 15 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
720 minute summer	MH1	555	9.913	0.463	1.0	8.4532	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
720 minute summer	MH1	Orifice	0.1	5.8

Results for 100 year +40% CC 720 minute winter. 960 minute analysis at 15 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m^3)	Flood (m^3)	Status
720 minute winter	MH1	585	9.966	0.516	0.8	9.4556	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m^3)
720 minute winter	MH1	Orifice	0.1	6.1

Results for 100 year +40% CC 960 minute summer. 1200 minute analysis at 15 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
960 minute summer	MH1	690	9.908	0.458	0.8	8.3673	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
960 minute summer	MH1	Orifice	0.1	7.1

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Results for 100 year +40% CC 960 minute winter. 1200 minute analysis at 15 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
960 minute winter	MH1	735	9.957	0.507	0.6	9.2834	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
960 minute winter	MH1	Orifice	0.1	7.4

Results for 100 year +40% CC 1440 minute summer. 1680 minute analysis at 30 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
1440 minute summer	MH1	960	9.886	0.436	0.6	7.9510	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
1440 minute summer	MH1	Orifice	0.1	9.7

Results for 100 year +40% CC 1440 minute winter. 1680 minute analysis at 30 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m^3)	Flood (m^3)	Status
1440 minute winter	MH1	1050	9.935	0.485	0.5	8.8629	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m^3)
1440 minute winter	MH1	Orifice	0.1	10.0

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Results for 100 year +40% CC 2160 minute summer. 2400 minute analysis at 60 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m^3)	Flood (m^3)	Status
2160 minute summer	MH1	1380	9.848	0.398	0.4	7.2442	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m^3)
2160 minute summer	MH1	Orifice	0.1	11.5

Results for 100 year +40% CC 2160 minute winter. 2400 minute analysis at 60 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
2160 minute winter	MH1	1500	9.884	0.434	0.3	7.9077	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
2160 minute winter	MH1	Orifice	0.1	13.5

Results for 100 year +40% CC 2880 minute summer. 3120 minute analysis at 60 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
2880 minute summer	MH1	1800	9.810	0.360	0.3	6.5334	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
2880 minute summer	MH1	Orifice	0.1	12.5

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Results for 100 year +40% CC 2880 minute winter. 3120 minute analysis at 60 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
2880 minute winter	MH1	1920	9.839	0.389	0.3	7.0627	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
2880 minute winter	MH1	Orifice	0.1	14.0

Results for 100 year +40% CC 4320 minute summer. 4560 minute analysis at 60 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
4320 minute summer	MH1	2520	9.783	0.333	0.3	6.0364	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
4320 minute summer	MH1	Orifice	0.1	13.7

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Results for 100 year +40% CC 4320 minute winter. 4560 minute analysis at 60 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
4320 minute winter	MH1	2580	9.795	0.345	0.2	6.2577	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
4320 minute winter	MH1	Orifice	0.1	16.4

Results for 100 year +40% CC 5760 minute summer. 6000 minute analysis at 60 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
5760 minute summer	MH1	3180	9.727	0.277	0.2	4.9962	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
5760 minute summer	MH1	Orifice	0.1	13.0

Results for 100 year +40% CC 5760 minute winter. 6000 minute analysis at 60 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
5760 minute winter	MH1	4080	9.652	0.202	0.1	3.6205	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
5760 minute winter	MH1	Orifice	0.1	14.4

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Results for 100 year +40% CC 7200 minute summer. 7440 minute analysis at 60 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
7200 minute summer	MH1	4560	9.676	0.226	0.2	4.0574	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
7200 minute summer	MH1	Orifice	0.1	13.0

Results for 100 year +40% CC 7200 minute winter. 7440 minute analysis at 60 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
7200 minute winter	MH1	4920	9.659	0.209	0.1	3.7373	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
7200 minute winter	MH1	Orifice	0.1	16.2

Results for 100 year +40% CC 8640 minute summer. 8880 minute analysis at 60 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
8640 minute summer	MH1	5340	9.642	0.192	0.1	3.4395	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
8640 minute summer	MH1	Orifice	0.1	12.2

Results for 100 year +40% CC 8640 minute winter. 8880 minute analysis at 60 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
8640 minute winter	MH1	5760	9.662	0.212	0.1	3.7956	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
8640 minute winter	MH1	Orifice	0.1	17.3

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Results for 100 year +40% CC 10080 minute summer. 10320 minute analysis at 60 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
10080 minute summer	MH1	6120	9.646	0.196	0.1	3.5056	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
10080 minute summer	MH1	Orifice	0.1	13.0

Results for 100 year +40% CC 10080 minute winter. 10320 minute analysis at 60 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
10080 minute winter	MH1	6540	9.664	0.214	0.1	3.8303	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
10080 minute winter	MH1	Orifice	0.1	18.0

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Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	100	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.400	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	4.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Easting (m)	Northing (m)	Depth (m)
MH1	0.014	4.00	10.000	100.000	100.000	0.600

Simulation Settings

Rainfall Methodology	FSR	Drain Down Time (mins)	240
FSR Region	England and Wales	Additional Storage (m³/ha)	0.0
M5-60 (mm)	20.000	Check Discharge Rate(s)	✓
Ratio-R	0.400	1 year (l/s)	0.0
Summer CV	0.750	30 year (l/s)	0.1
Winter CV	0.840	100 year (l/s)	0.2
Analysis Speed	Normal	Check Discharge Volume	x
Skip Steady State	x		

Storm Durations

15	60	180	360	600	960	2160	4320	7200	10080
30	120	240	480	720	1440	2880	5760	8640	

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
100	40	0	0

Pre-development Discharge Rate

Site Makeup	Greenfield	Growth Factor 30 year	2.40
Greenfield Method	IH124	Growth Factor 100 year	3.19
Positively Drained Area (ha)	0.012	Betterment (%)	0
SAAR (mm)	648	QBar	0.1
Soil Index	4	Q 1 year (l/s)	0.0
SPR	0.47	Q 30 year (l/s)	0.1
Region	6	Q 100 year (l/s)	0.2
Growth Factor 1 year	0.85		

Node MH1 Online Orifice Control

Flap Valve	x	Invert Level (m)	9.400	Discharge Coefficient	0.600
Replaces Downstream Link	✓	Diameter (m)	0.010		

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Node MH1 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	9.400	Slope (1:X)	1000.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)		Depth (m)	
Safety Factor	2.0	Width (m)	10.000	Inf Depth (m)	
Porosity	0.30	Length (m)	4.700		

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Results for 100 year +40% CC 15 minute summer. 255 minute analysis at 1 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	MH1	19	9.653	0.253	9.3	3.5326	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
15 minute summer	MH1	Orifice	0.1	1.4

Results for 100 year +40% CC 15 minute winter. 255 minute analysis at 1 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	MH1	19	9.685	0.285	9.3	3.9837	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
15 minute winter	MH1	Orifice	0.1	1.5

Results for 100 year +40% CC 30 minute summer. 270 minute analysis at 1 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m^3)	Flood (m^3)	Status
30 minute summer	MH1	33	9.729	0.329	8.2	4.5996	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m^3)
30 minute summer	MH1	Orifice	0.1	1.7

Results for 100 year +40% CC 30 minute winter. 270 minute analysis at 1 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute winter	MH1	33	9.769	0.369	7.0	5.1722	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
30 minute winter	MH1	Orifice	0.1	1.8

Results for 100 year +40% CC 60 minute summer. 300 minute analysis at 1 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m^3)	Flood (m^3)	Status
60 minute summer	MH1	63	9.803	0.403	5.8	5.6403	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m^3)
60 minute summer	MH1	Orifice	0.1	2.0

Results for 100 year +40% CC 60 minute winter. 300 minute analysis at 1 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute winter	MH1	62	9.852	0.452	4.6	6.3409	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
60 minute winter	MH1	Orifice	0.1	2.2

Results for 100 year +40% CC 120 minute summer. 360 minute analysis at 2 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
120 minute summer	MH1	122	9.864	0.464	3.8	6.5077	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
120 minute summer	MH1	Orifice	0.1	2.5

Results for 100 year +40% CC 120 minute winter. 360 minute analysis at 2 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
120 minute winter	MH1	120	9.924	0.524	2.8	7.3592	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
120 minute winter	MH1	Orifice	0.2	2.7

Results for 100 year +40% CC 180 minute summer. 420 minute analysis at 4 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
180 minute summer	MH1	180	9.893	0.493	2.9	6.9136	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
180 minute summer	MH1	Orifice	0.1	2.9

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Results for 100 year +40% CC 180 minute winter. 420 minute analysis at 4 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m^3)	Flood (m^3)	Status
180 minute winter	MH1	176	9.961	0.561	2.1	7.8764	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m^3)
180 minute winter	MH1	Orifice	0.2	3.1

Results for 100 year +40% CC 240 minute summer. 480 minute analysis at 4 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
240 minute summer	MH1	240	9.900	0.500	2.2	7.0159	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
240 minute summer	MH1	Orifice	0.1	3.3

Results for 100 year +40% CC 240 minute winter. 480 minute analysis at 4 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
240 minute winter	MH1	232	9.964	0.564	1.6	7.9184	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
240 minute winter	MH1	Orifice	0.2	3.5

Results for 100 year +40% CC 360 minute summer. 600 minute analysis at 8 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m^3)	Flood (m^3)	Status
360 minute summer	MH1	344	9.921	0.521	1.7	7.3061	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m^3)
360 minute summer	MH1	Orifice	0.1	4.0

Results for 100 year +40% CC 360 minute winter. 600 minute analysis at 8 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
360 minute winter	MH1	344	9.969	0.569	1.2	7.9833	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
360 minute winter	MH1	Orifice	0.2	4.2

Results for 100 year +40% CC 480 minute summer. 720 minute analysis at 8 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
480 minute summer	MH1	400	9.910	0.510	1.3	7.1547	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
480 minute summer	MH1	Orifice	0.1	4.7

Results for 100 year +40% CC 480 minute winter. 720 minute analysis at 8 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m^3)	Flood (m^3)	Status
480 minute winter	MH1	448	9.989	0.589	1.0	8.2746	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m^3)
480 minute winter	MH1	Orifice	0.2	5.1

Results for 100 year +40% CC 600 minute summer. 840 minute analysis at 15 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m^3)	Flood (m^3)	Status
600 minute summer	MH1	465	9.887	0.487	1.0	6.8362	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m^3)
600 minute summer	MH1	Orifice	0.1	5.2

Results for 100 year +40% CC 600 minute winter. 840 minute analysis at 15 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
600 minute winter	MH1	480	9.969	0.569	0.8	7.9822	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
600 minute winter	MH1	Orifice	0.2	5.6

Results for 100 year +40% CC 720 minute summer. 960 minute analysis at 15 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
720 minute summer	MH1	525	9.886	0.486	0.9	6.8147	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
720 minute summer	MH1	Orifice	0.1	5.9

Results for 100 year +40% CC 720 minute winter. 960 minute analysis at 15 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
720 minute winter	MH1	555	9.974	0.574	0.7	8.0652	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
720 minute winter	MH1	Orifice	0.2	6.4

Results for 100 year +40% CC 960 minute summer. 1200 minute analysis at 15 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
960 minute summer	MH1	660	9.900	0.500	0.7	7.0102	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
960 minute summer	MH1	Orifice	0.1	7.4

Results for 100 year +40% CC 960 minute winter. 1200 minute analysis at 15 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
960 minute winter	MH1	705	9.949	0.549	0.6	7.6995	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
960 minute winter	MH1	Orifice	0.2	7.7

Results for 100 year +40% CC 1440 minute summer. 1680 minute analysis at 30 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
1440 minute summer	MH1	960	9.863	0.463	0.5	6.4901	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
1440 minute summer	MH1	Orifice	0.1	9.6

Results for 100 year +40% CC 1440 minute winter. 1680 minute analysis at 30 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
1440 minute winter	MH1	1020	9.917	0.517	0.4	7.2549	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
1440 minute winter	MH1	Orifice	0.1	10.3

Results for 100 year +40% CC 2160 minute summer. 2400 minute analysis at 60 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
2160 minute summer	MH1	1380	9.830	0.430	0.4	6.0312	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
2160 minute summer	MH1	Orifice	0.1	10.9

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Results for 100 year +40% CC 2160 minute winter. 2400 minute analysis at 60 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
2160 minute winter	MH1	1440	9.841	0.441	0.3	6.1874	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
2160 minute winter	MH1	Orifice	0.1	12.8

Results for 100 year +40% CC 2880 minute summer. 3120 minute analysis at 60 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
2880 minute summer	MH1	1740	9.788	0.388	0.3	5.4424	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
2880 minute summer	MH1	Orifice	0.1	11.3

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Results for 100 year +40% CC 2880 minute winter. 3120 minute analysis at 60 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
2880 minute winter	MH1	1860	9.789	0.389	0.2	5.4476	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
2880 minute winter	MH1	Orifice	0.1	13.1

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Results for 100 year +40% CC 4320 minute summer. 4560 minute analysis at 60 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
4320 minute summer	MH1	2460	9.718	0.318	0.2	4.4442	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
4320 minute summer	MH1	Orifice	0.1	11.5

Results for 100 year +40% CC 4320 minute winter. 4560 minute analysis at 60 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
4320 minute winter	MH1	2400	9.698	0.298	0.2	4.1673	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
4320 minute winter	MH1	Orifice	0.1	13.7

Results for 100 year +40% CC 5760 minute summer. 6000 minute analysis at 60 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
5760 minute summer	MH1	3060	9.643	0.243	0.2	3.3948	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
5760 minute summer	MH1	Orifice	0.1	10.8

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Results for 100 year +40% CC 5760 minute winter. 6000 minute analysis at 60 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
5760 minute winter	MH1	3960	9.610	0.210	0.1	2.9289	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
5760 minute winter	MH1	Orifice	0.1	13.0

Results for 100 year +40% CC 7200 minute summer. 7440 minute analysis at 60 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
7200 minute summer	MH1	4440	9.596	0.196	0.1	2.7288	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
7200 minute summer	MH1	Orifice	0.1	10.1

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Results for 100 year +40% CC 7200 minute winter. 7440 minute analysis at 60 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
7200 minute winter	MH1	4800	9.615	0.215	0.1	2.9985	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
7200 minute winter	MH1	Orifice	0.1	14.4

Results for 100 year +40% CC 8640 minute summer. 8880 minute analysis at 60 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
8640 minute summer	MH1	5220	9.600	0.200	0.1	2.7882	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
8640 minute summer	MH1	Orifice	0.1	10.8

Results for 100 year +40% CC 8640 minute winter. 8880 minute analysis at 60 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
8640 minute winter	MH1	5580	9.617	0.217	0.1	3.0276	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
8640 minute winter	MH1	Orifice	0.1	15.1

Results for 100 year +40% CC 10080 minute summer. 10320 minute analysis at 60 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
10080 minute summer	MH1	5940	9.600	0.200	0.1	2.7882	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
10080 minute summer	MH1	Orifice	0.1	10.8

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Results for 100 year +40% CC 10080 minute winter. 10320 minute analysis at 60 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
10080 minute winter	MH1	6360	9.619	0.219	0.1	3.0536	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
10080 minute winter	MH1	Orifice	0.1	15.8

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	100	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.400	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	4.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Easting (m)	Northing (m)	Depth (m)
MH1	0.014	4.00	10.000	100.000	100.000	0.600

Simulation Settings

Rainfall Methodology	FSR	Drain Down Time (mins)	240
FSR Region	England and Wales	Additional Storage (m³/ha)	0.0
M5-60 (mm)	20.000	Check Discharge Rate(s)	✓
Ratio-R	0.400	1 year (l/s)	0.0
Summer CV	0.750	30 year (l/s)	0.1
Winter CV	0.840	100 year (l/s)	0.2
Analysis Speed	Normal	Check Discharge Volume	x
Skip Steady State	x		

Storm Durations

15	60	180	360	600	960	2160	4320	7200	10080
30	120	240	480	720	1440	2880	5760	8640	

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
100	40	0	0

Pre-development Discharge Rate

Site Makeup	Greenfield	Growth Factor 30 year	2.40
Greenfield Method	IH124	Growth Factor 100 year	3.19
Positively Drained Area (ha)	0.012	Betterment (%)	0
SAAR (mm)	648	QBar	0.1
Soil Index	4	Q 1 year (l/s)	0.0
SPR	0.47	Q 30 year (l/s)	0.1
Region	6	Q 100 year (l/s)	0.2
Growth Factor 1 year	0.85		

Node MH1 Online Orifice Control

Flap Valve	x	Invert Level (m)	9.400	Discharge Coefficient	0.600
Replaces Downstream Link	✓	Diameter (m)	0.010		

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Node MH1 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	9.400	Slope (1:X)	1000.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)		Depth (m)	
Safety Factor	2.0	Width (m)	10.000	Inf Depth (m)	
Porosity	0.30	Length (m)	4.700		

Results for 100 year +40% CC 15 minute summer. 255 minute analysis at 1 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	MH1	19	9.653	0.253	9.3	3.5326	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
15 minute summer	MH1	Orifice	0.1	1.4

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Results for 100 year +40% CC 15 minute winter. 255 minute analysis at 1 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	MH1	19	9.685	0.285	9.3	3.9837	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
15 minute winter	MH1	Orifice	0.1	1.5

Results for 100 year +40% CC 30 minute summer. 270 minute analysis at 1 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute summer	MH1	33	9.729	0.329	8.2	4.5996	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
30 minute summer	MH1	Orifice	0.1	1.7

Results for 100 year +40% CC 30 minute winter. 270 minute analysis at 1 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m^3)	Flood (m^3)	Status
30 minute winter	MH1	33	9.769	0.369	7.0	5.1722	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m^3)
30 minute winter	MH1	Orifice	0.1	1.8

Results for 100 year +40% CC 60 minute summer. 300 minute analysis at 1 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	MH1	63	9.803	0.403	5.8	5.6403	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
60 minute summer	MH1	Orifice	0.1	2.0

Results for 100 year +40% CC 60 minute winter. 300 minute analysis at 1 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute winter	MH1	62	9.852	0.452	4.6	6.3409	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
60 minute winter	MH1	Orifice	0.1	2.2

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Results for 100 year +40% CC 120 minute summer. 360 minute analysis at 2 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
120 minute summer	MH1	122	9.864	0.464	3.8	6.5077	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
120 minute summer	MH1	Orifice	0.1	2.5

Results for 100 year +40% CC 120 minute winter. 360 minute analysis at 2 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
120 minute winter	MH1	120	9.924	0.524	2.8	7.3592	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
120 minute winter	MH1	Orifice	0.2	2.7

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Results for 100 year +40% CC 180 minute summer. 420 minute analysis at 4 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
180 minute summer	MH1	180	9.893	0.493	2.9	6.9136	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
180 minute summer	MH1	Orifice	0.1	2.9

Results for 100 year +40% CC 180 minute winter. 420 minute analysis at 4 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m^3)	Flood (m^3)	Status
180 minute winter	MH1	176	9.961	0.561	2.1	7.8764	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m^3)
180 minute winter	MH1	Orifice	0.2	3.1

Results for 100 year +40% CC 240 minute summer. 480 minute analysis at 4 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
240 minute summer	MH1	240	9.900	0.500	2.2	7.0159	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
240 minute summer	MH1	Orifice	0.1	3.3

Results for 100 year +40% CC 240 minute winter. 480 minute analysis at 4 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
240 minute winter	MH1	232	9.964	0.564	1.6	7.9184	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
240 minute winter	MH1	Orifice	0.2	3.5

Results for 100 year +40% CC 360 minute summer. 600 minute analysis at 8 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
360 minute summer	MH1	344	9.921	0.521	1.7	7.3061	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
360 minute summer	MH1	Orifice	0.1	4.0

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Results for 100 year +40% CC 360 minute winter. 600 minute analysis at 8 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
360 minute winter	MH1	344	9.969	0.569	1.2	7.9833	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
360 minute winter	MH1	Orifice	0.2	4.2

Results for 100 year +40% CC 480 minute summer. 720 minute analysis at 8 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
480 minute summer	MH1	400	9.910	0.510	1.3	7.1547	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
480 minute summer	MH1	Orifice	0.1	4.7

Results for 100 year +40% CC 480 minute winter. 720 minute analysis at 8 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
480 minute winter	MH1	448	9.989	0.589	1.0	8.2746	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
480 minute winter	MH1	Orifice	0.2	5.1

Results for 100 year +40% CC 600 minute summer. 840 minute analysis at 15 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
600 minute summer	MH1	465	9.887	0.487	1.0	6.8362	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
600 minute summer	MH1	Orifice	0.1	5.2

Results for 100 year +40% CC 600 minute winter. 840 minute analysis at 15 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
600 minute winter	MH1	480	9.969	0.569	0.8	7.9822	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
600 minute winter	MH1	Orifice	0.2	5.6

Results for 100 year +40% CC 720 minute summer. 960 minute analysis at 15 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m^3)	Flood (m^3)	Status
720 minute summer	MH1	525	9.886	0.486	0.9	6.8147	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m^3)
720 minute summer	MH1	Orifice	0.1	5.9

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Results for 100 year +40% CC 720 minute winter. 960 minute analysis at 15 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
720 minute winter	MH1	555	9.974	0.574	0.7	8.0652	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
720 minute winter	MH1	Orifice	0.2	6.4

Results for 100 year +40% CC 960 minute summer. 1200 minute analysis at 15 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
960 minute summer	MH1	660	9.900	0.500	0.7	7.0102	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
960 minute summer	MH1	Orifice	0.1	7.4

Results for 100 year +40% CC 960 minute winter. 1200 minute analysis at 15 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
960 minute winter	MH1	705	9.949	0.549	0.6	7.6995	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
960 minute winter	MH1	Orifice	0.2	7.7

Results for 100 year +40% CC 1440 minute summer. 1680 minute analysis at 30 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
1440 minute summer	MH1	960	9.863	0.463	0.5	6.4901	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
1440 minute summer	MH1	Orifice	0.1	9.6

Results for 100 year +40% CC 1440 minute winter. 1680 minute analysis at 30 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
1440 minute winter	MH1	1020	9.917	0.517	0.4	7.2549	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
1440 minute winter	MH1	Orifice	0.1	10.3

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Results for 100 year +40% CC 2160 minute summer. 2400 minute analysis at 60 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
2160 minute summer	MH1	1380	9.830	0.430	0.4	6.0312	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
2160 minute summer	MH1	Orifice	0.1	10.9

Results for 100 year +40% CC 2160 minute winter. 2400 minute analysis at 60 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m^3)	Flood (m^3)	Status
2160 minute winter	MH1	1440	9.841	0.441	0.3	6.1874	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m^3)
2160 minute winter	MH1	Orifice	0.1	12.8

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Results for 100 year +40% CC 2880 minute summer. 3120 minute analysis at 60 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
2880 minute summer	MH1	1740	9.788	0.388	0.3	5.4424	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
2880 minute summer	MH1	Orifice	0.1	11.3

Results for 100 year +40% CC 2880 minute winter. 3120 minute analysis at 60 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
2880 minute winter	MH1	1860	9.789	0.389	0.2	5.4476	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
2880 minute winter	MH1	Orifice	0.1	13.1

Results for 100 year +40% CC 4320 minute summer. 4560 minute analysis at 60 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
4320 minute summer	MH1	2460	9.718	0.318	0.2	4.4442	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
4320 minute summer	MH1	Orifice	0.1	11.5

Results for 100 year +40% CC 4320 minute winter. 4560 minute analysis at 60 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
4320 minute winter	MH1	2400	9.698	0.298	0.2	4.1673	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
4320 minute winter	MH1	Orifice	0.1	13.7

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Results for 100 year +40% CC 5760 minute summer. 6000 minute analysis at 60 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
5760 minute summer	MH1	3060	9.643	0.243	0.2	3.3948	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
5760 minute summer	MH1	Orifice	0.1	10.8

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Results for 100 year +40% CC 5760 minute winter. 6000 minute analysis at 60 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
5760 minute winter	MH1	3960	9.610	0.210	0.1	2.9289	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
5760 minute winter	MH1	Orifice	0.1	13.0

Results for 100 year +40% CC 7200 minute summer. 7440 minute analysis at 60 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m^3)	Flood (m^3)	Status
7200 minute summer	MH1	4440	9.596	0.196	0.1	2.7288	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m^3)
7200 minute summer	MH1	Orifice	0.1	10.1

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Results for 100 year +40% CC 7200 minute winter. 7440 minute analysis at 60 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
7200 minute winter	MH1	4800	9.615	0.215	0.1	2.9985	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
7200 minute winter	MH1	Orifice	0.1	14.4

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Results for 100 year +40% CC 8640 minute summer. 8880 minute analysis at 60 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m^3)	Flood (m^3)	Status
8640 minute summer	MH1	5220	9.600	0.200	0.1	2.7882	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m^3)
8640 minute summer	MH1	Orifice	0.1	10.8

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Results for 100 year +40% CC 8640 minute winter. 8880 minute analysis at 60 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
8640 minute winter	MH1	5580	9.617	0.217	0.1	3.0276	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
8640 minute winter	MH1	Orifice	0.1	15.1

Results for 100 year +40% CC 10080 minute summer. 10320 minute analysis at 60 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
10080 minute summer	MH1	5940	9.600	0.200	0.1	2.7882	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
10080 minute summer	MH1	Orifice	0.1	10.8

Results for 100 year +40% CC 10080 minute winter. 10320 minute analysis at 60 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m^3)	Flood (m^3)	Status
10080 minute winter	MH1	6360	9.619	0.219	0.1	3.0536	0.0000	OK

Link Event	US Node	Link	Outflow (l/s)	Discharge Vol (m^3)
10080 minute winter	MH1	Orifice	0.1	15.8

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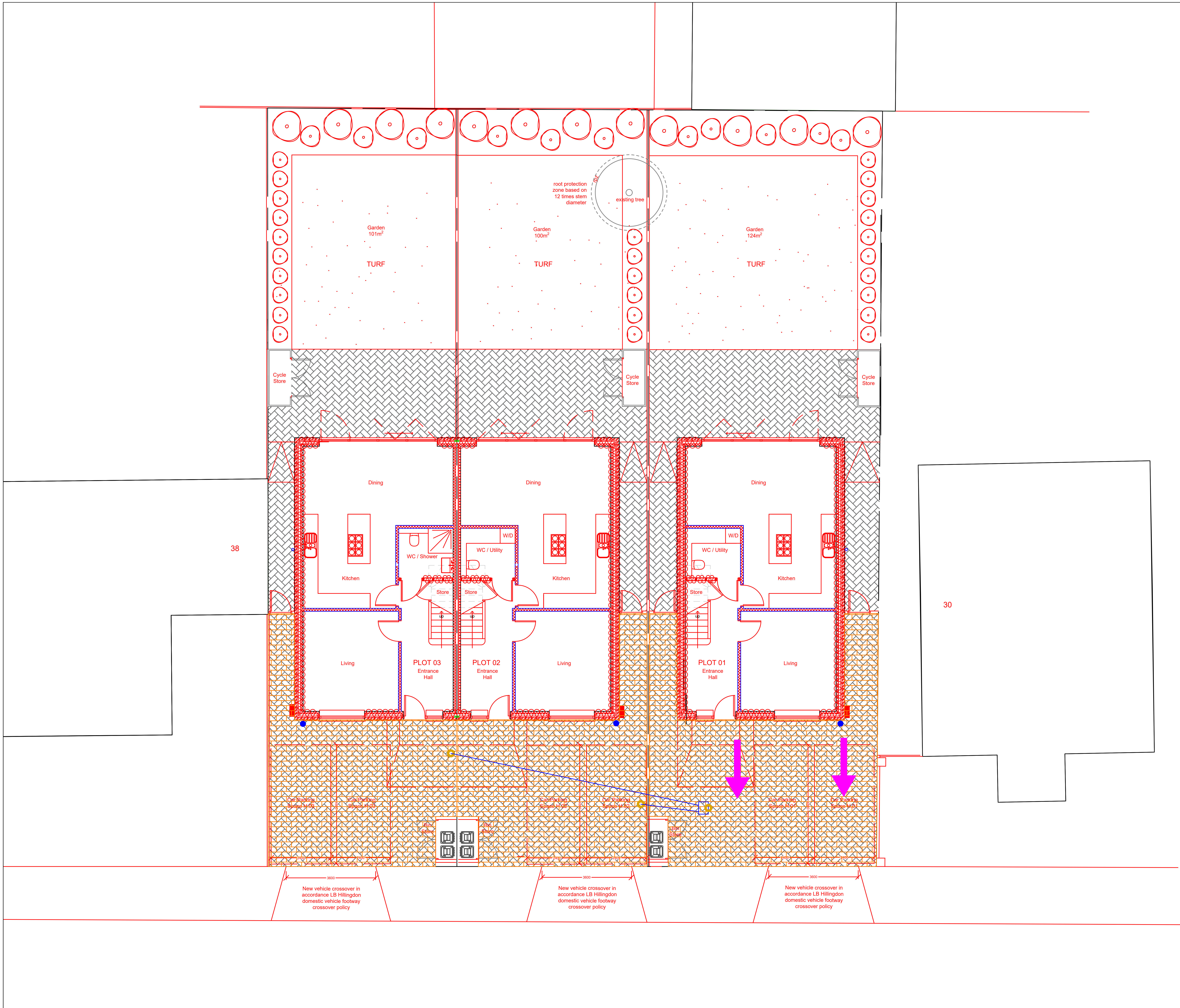

Notes:

1. Discharge of surface water via Tanked Permeable Paving. Preliminary calculations indicate that sufficient storage required to attenuate runoff arising from the area of the site being attenuated, during the critical 1 in 100 year + 40% Climate Change event, can be provided within tanked permeable paving of dimensions 63m^2 x 0.55m deep x 0.3 (voids), 47m^2 x 0.6m deep x 0.3 (voids) and 47m^2 x 0.6m deep x 0.3 (voids).

Legend

- Proposed Tanked Permeable Paving
- Proposed Surface Water Downpipe
- Proposed Orifice Plate
- Proposed Surface Water Pipework
- Design Exceedance Route

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Job Reference:	Date:
93763-Curteis-AcaciaAv	5-Mar-24
Drawing Number:	**Revision:**
93763-02	v1.1

Designed by:	Drawn by:	Checked by:
AR	EB	EB

Scale: 1:100@A2

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