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Proposed Student Accommodation

Prussia Street

Dublin 7

- Storm Water Management Report

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Document Control Sheet

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Client:	Lyonshall Ltd.		
Document Title:	Strom Drainage Management Report		
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Issue History

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Review

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Date:	15th February 2024
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Checked by:	Pat Brady

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Table of Contents

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1.0 Introduction

Lyonshall Development Ltd. intend to apply for planning permission for the development of a Student Accommodation Facility at Prussia Street, Dublin 7.

This facility is to be located on the site of the former IDA Centre at the west side of Prussia Street - see figure 1 below.

Figure 1 *Development Site at Prussia Street, Dublin 7*

The scope of the development is to comprise of the following:

The demolition of the existing structures on the site, and the construction of a large-scale residential development consisting of a Student Accommodation scheme with 373 no. student bedspaces, a café and all other ancillary site development works. The proposed development consists of 2 no. apartment blocks ranging in height from 3 to 5 storeys and a terrace of 6 no. studio units and all ancillary development works.

See Figure 2 – Proposed Development.

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2.0

Figure 2 – Proposed Development

In response to a submission made by the Design Team acting on behalf of Lyonshall Ltd. Dublin City Council have issued a Notice of LRD Opinion in which they have requested that specific information be submitted with the LRD application – See Appendix A: Notice of LRD Opinion from Dublin City Council

Including in this information request is the Storm Water Drainage Strategy for the site and demonstration of the compliance of same with Dublin City Development Plan 2022-2028.

The following report addresses the information request related to the above, these itemised in Section 4c – 4h of the Notice of LRD Opinion.

Items 4a (Basement Impact Assessment) & 4b (Site Specific Flood Risk Assessment) are addressed in separate reports.

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2.0 Report

As stated in the introduction, Dublin City Council have requested information on the Storm Water Drainage Strategy for the site.

The following report responds to the request for information under the following headings:

i. Rate of Storm Water run-off –

Storm water generated within the proposed development is to be collected and managed in manner such that the rate of discharge from the site is to be limited to a discharge rate of greenfield run-off equivalent or 2l/sec/ha, whichever is greater.

Based on the output generated from the Autodesk Infodrainage Software, the greenfield run-off from the site is 2.0 litres/sec – see extract below.

KC12 - Prussia Street Development:	Date: 30/01/2024		
	Designed by: KL	Checked by: KC	Approved By: KC
Report Title: UK and Ireland Rural Runoff Calculator	Company Address:		

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ICP SUDS / IH 124

Details

Method	ICP SUDS
Area (ha)	0.50
SAAR (mm)	800.0
Soil	0.3
Region	Ireland East
Urban	0
Return Period (years)	100

Results

Region	QBAR Rural (L/s)	QBAR Urban (L/s)	Q 100 (years) (L/s)	Q 1 (years) (L/s)	Q 30 (years) (L/s)	Q 100 (years) (L/s)
Ireland East	1.1	1.1	2.0	0.9	1.7	2.0

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ii. Infiltration rate –

The site of the proposed development is located in an area historically known for the presence of Dublin Boulder Clay.

In the absence of infiltration tests, a conservative approach has been taken on the infiltration rate at the site and a figure of 3mm/hour infiltration has been assumed for the design of the various suds features referred to later in this report.

iii. Storm Water Management Strategy –

The storm water management strategy for the site is to adopt a number of suds features throughout the site, these to work in sequence with each other, resulting in very limited infiltration of storm water within the site and the attenuation of storm water, restricting the rate of discharge to the Uisce Eireann combined network to 2 L/sec.

This strategy for the site is illustrated in Figure 3.

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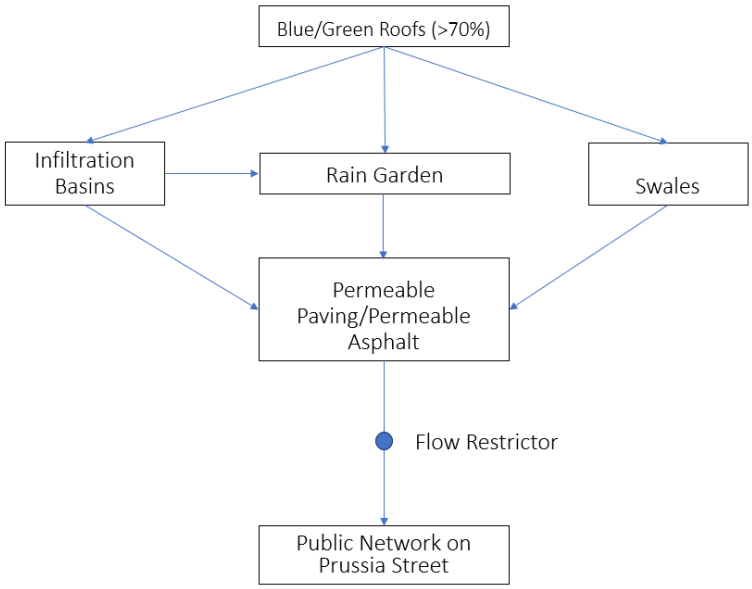

Figure 3 – Storm Water Drainage Strategy

Suds Features –

The following is a brief summary of each of the suds features to be adopted

a. Blue/Green Roof Technology

Blue/Green Blue roof technology is to be adopted on over 70% of the roof.

Such technology will significantly reduce the flow of storm water from these roofs and will delay the flow rate for a number of hours. In addition to reducing the flow rate, these roofs will assist in purifying the air, reducing ambient temperatures, help regulate indoor temperatures, save energy and encourage biodiversity in the area.

These blue/green roofs will eventually discharge storm water to the infiltration basins in the courtyard, winter garden and to the permeable paving/permeable asphalt area to the east of the site.

See Figure 4, which identifies the extent of Blue/Green Roof to be adopted.

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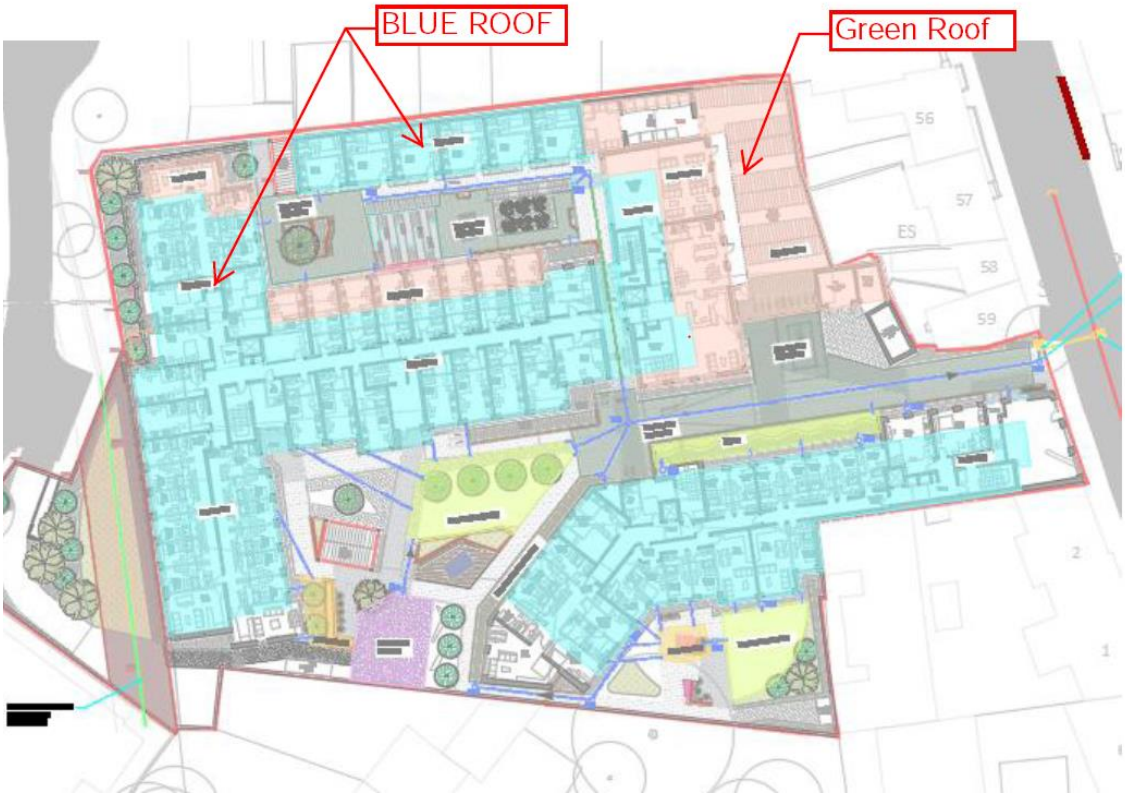

Figure 4 – Extent of Blue/Green Roof Technology

Infiltration Basins –

2 no. Infiltration basins are to be provided to the south of the site, these receiving storm water from the blue/green roofs identified in figure 4 above.

These infiltration basins are sized such that they will attenuate storm water for the 1:100 year storm event. The size of each infiltration basins are 48m3 and 40m3 respectively. There will be an outfall constructed for each basin, this to allow for an overflow to the next suds feature, be it the adjoining infiltration basin or the permeable asphalt subbase. The outfall for each basin will comprise of a concrete weir complete with a grated cover. The final outfall will be to the permeable asphalt subbase within the access road.

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See Figure 5: Extract from Storm Water Management Plan & Figure 6: Typical section through Infiltration Basin.

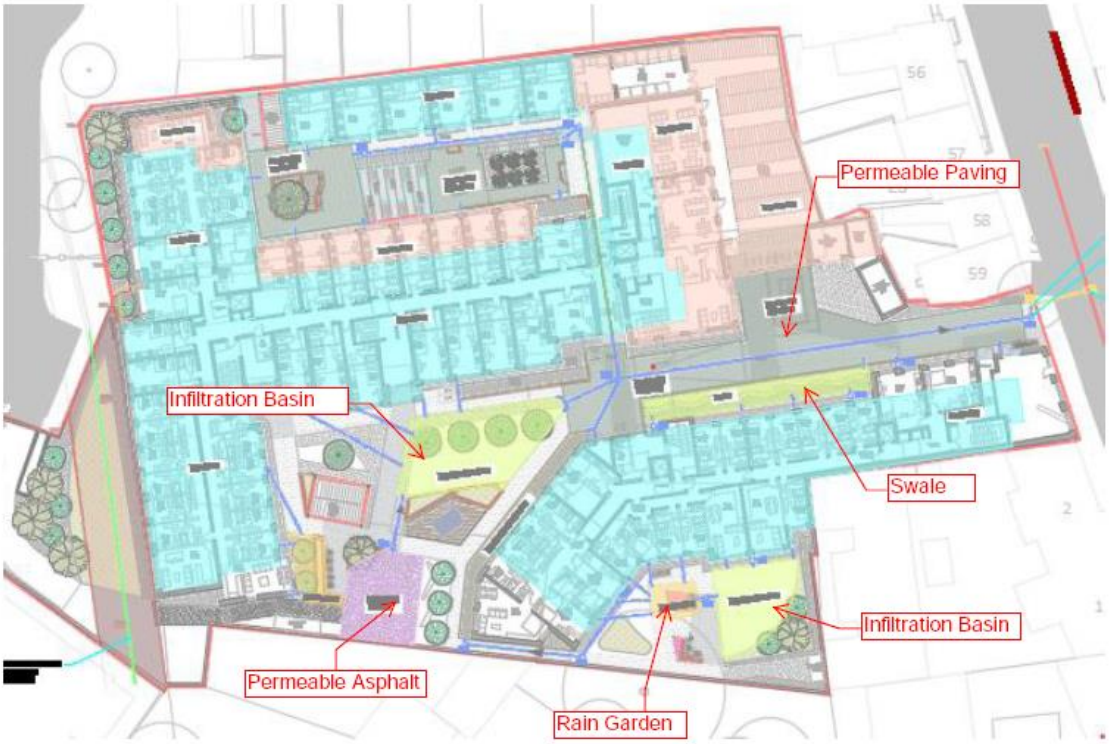

Figure 5 – Extract from Storm Water Management Plan

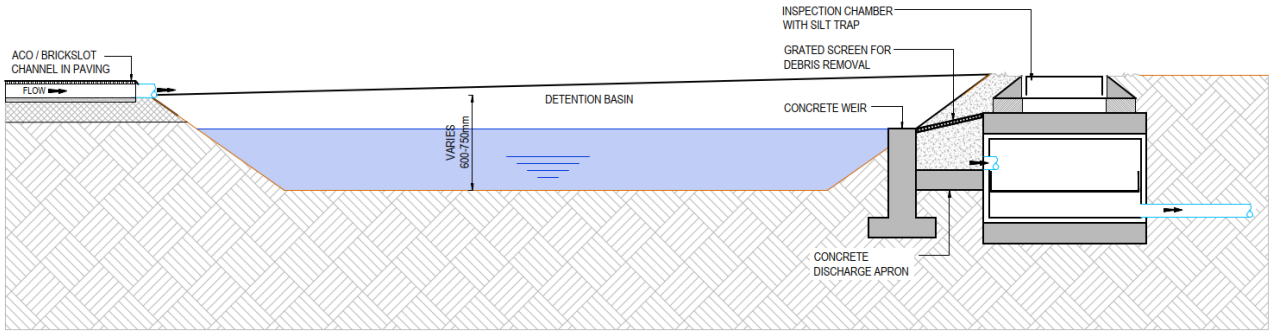

Figure 6 – Typical Section through Infiltration Basin

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Supporting calculations for the sizing of these basins is appended to B of this report.

b. Rain/Winter Gardens –

Two Rain Gardens are to be provided to the south of the site, these will receive storm water from the blue/green roofs and Infiltration basin identified in figure 4 above.

This rain gardens are sized such that these will attenuate storm water for the 1:100 year storm event. The size of the rain winter gardens measure 14m3 and 7m3. There will be an outfall pipe installed for the Rain garden, this to allow for an overflow to the next suds feature, which will be the permeable asphalt subbase and a swale.

See Figure 6: Extract from Storm Water Management Plan & Figure 7: Typical section through Rain Garden

Figure 7: Rain Garden

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c. Swales –

Swales are to be provided to the south of the site, this receiving storm water from the blue/green roofs identified in figure 4 above.

This swale is sized such that it will attenuate storm water for the 1:100 year storm event. The size of the swale measures 13m3 and 18 m3. There will be an outfall pipe installed in the swale, this to allow for an overflow to the next suds feature, which will be the permeable asphalt subbase.

See Figure 6: Extract from Storm Water Management Plan & Figures 8 & 9: Typical Swale illustration.

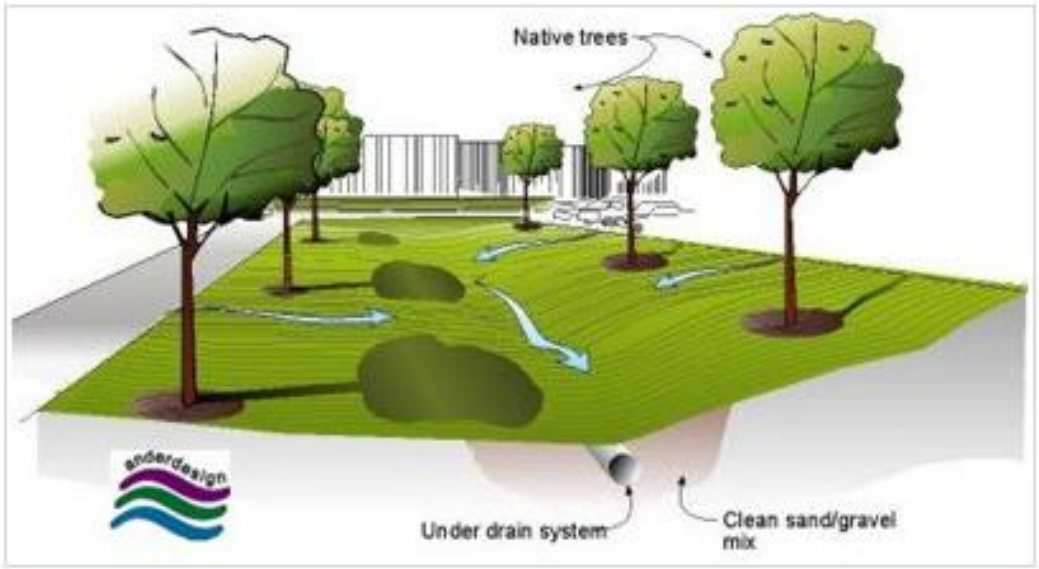

Figure 8: Swale

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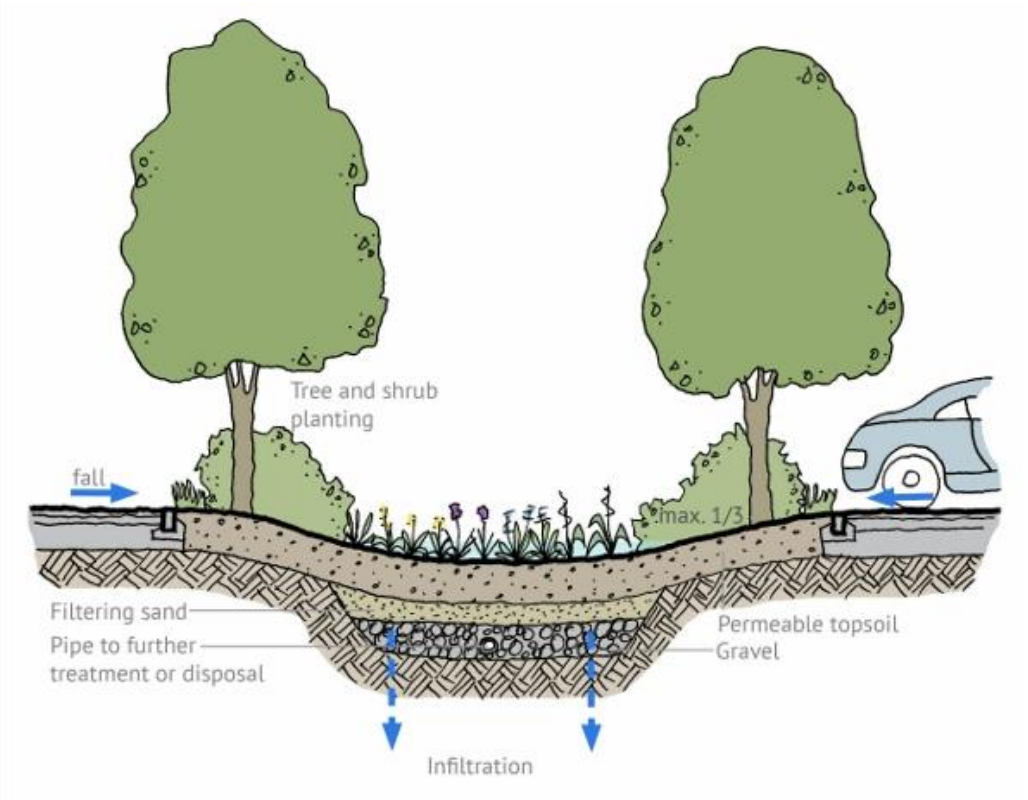

Figure 9: Swale

d. Permeable Paving/Permeable Asphalt –

Permeable Paving/Permeable asphalt technology is proposed for the access road and car parking to the site. This paving will receive overflow from the infiltration basins, rain garden and swale, this in addition to the storm water generated by the road/parking.

The permeable paving has been sized based on the infiltration rate for the site (which is assumed to be negligible) and is to be construction as identified in Figure 10: Typical Permeable Asphalt Section.

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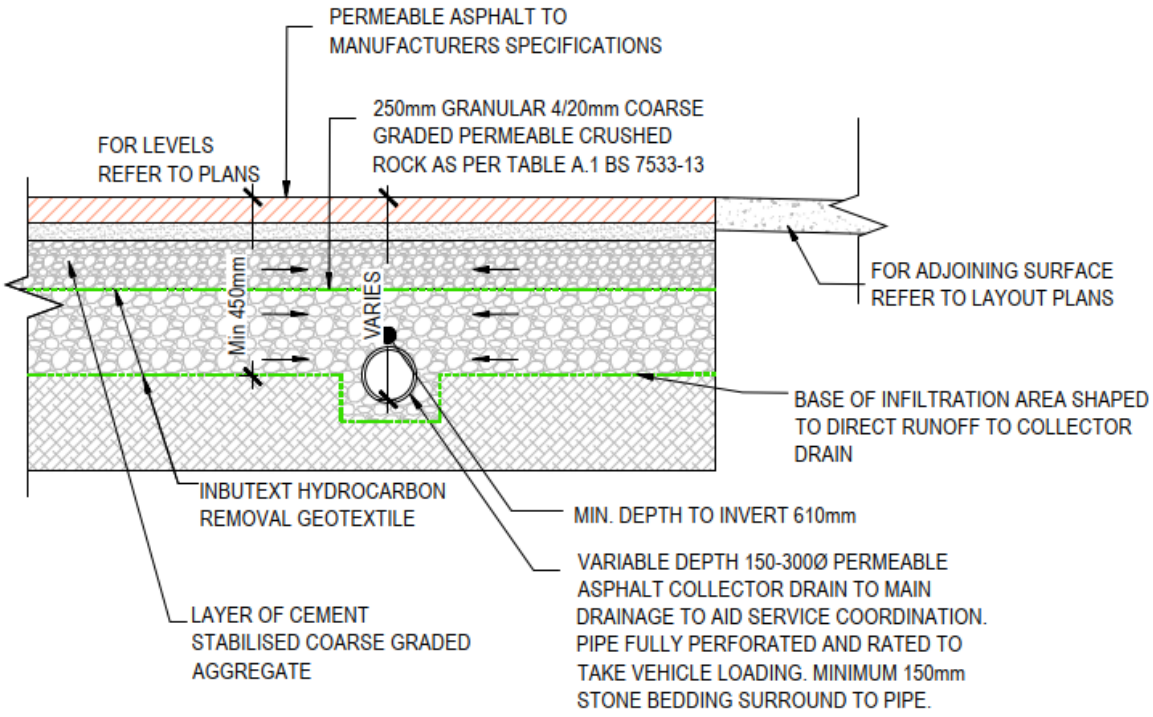

Figure 10 – Typical Permeable Asphalt section

Storm water from this feature will discharge at a controlled rate of 2 litres/sec to the Uisce Eireann network on Prussia Street.

See supporting calculations appended to Appendix B of this report.

For Plan of all SUDs Features identified above, refer to the following:

Appendix C: Drg. No. KC11-V1-XXX-DR-HLCE-CE-0006 Proposed Storm Water Management Plan

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iv. O&M Procedures –

In providing the above-mentioned suds features within the development, there is an obligation to ensure the systems adopted can be maintained, this to ensure continued functionality and longevity of the different systems.

The design and locations of such systems have been developed such that such maintenance can be easily achieved.

a. Infiltration basins/Rain Gardens

Infiltration basins/Rain Gardens generally require a low level of maintenance. It is generally recommended that the infiltration basins/Rain Gardens should be kept litter free, whilst also managing the vegetation & landscaping in a normal manner. The features should be periodically inspected on an annual basis. However, the basins themselves should also be inspected following substantial storm events, for sediment monitoring and removal of same when required.

Infiltration basins will have a concrete weir and galvanised steel screen to help remove large items such as branches and litter from entering the Storm System. The screen will require periodic inspection to remove any debris from storm flows to ensure the weir outlet is not blocked.

Silt trap manholes will be placed as an inspection chamber alongside the weir to remove sediment and smaller debris from the system. All silt trap chambers are easily accessible via a manhole and will be required to be periodically inspected, and inspected after all considerable storm events.

Infiltration basins/Winter Gardens will be surcharged with water during rainfall events, in particular storm events, however it is expected that these features will have infiltrated all retained water up to 48 hours after a storm event.

b. Permeable Paving/asphalt

It is recommended that the permeable pavement/asphalt receive a vacuum sweep of its surface twice a year to remove debris such as sediment, grass clippings trash and leaves using a maintenance vehicle. The surface should be inspected 3 to 4 times a year to ensure it is kept free of all debris and sediment.

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Notice should be provided to the residents of the cleaning in advance of maintenance taking place to ensure all permeable surfaces are available to be inspected and cleaned. It is recommended to minimise the use of road salts and grit for De-icing in the winter and keeping the surrounding landscape well maintained to prevent soil being washed into the pavement, thus increasing the life span.

c. Hydrobrake Flow Control system

The outlet manhole at the boundary to the site will have a hydrobrake flow control system which also requires periodic inspections to ensure that the intake is not blocked and free from sediment or debris build up. Normally little maintenance is required with a hydrobrake as it has no moving parts. The hydrobrake has a pivoting bypass door should it get blocked and cause surcharging or flooding of the system upstream and allow the system to be drained and access to the blockage for maintenance.

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Appendix A: Notice of LRD Opinion from Dublin City Council

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Comhairle Cathrach
Bhaile Átha Cliath
Dublin City Council

Planning and Development Act 2000, as amended

Planning and development (Large Scale Residential Developments) Act 2021

Notice of LRD Opinion

Planning Authority Reference No: LRD6050/23-S2

Location; 57-61 Prussia Street

Description: The demolition of the structures on the site, and the construction of a large-scale residential development consisting of a Student Accommodation scheme with 373 no. student bedspaces, a café and all other ancillary site development works. The proposed development consists of 2 no. apartment blocks ranging in height from 4 to 5 storeys and a terrace of 6 no. studio units and all ancillary development works.

Applicant: Lyonshall Limited

The Planning Authority refers to your request pursuant to section 32 of the Planning and development (Large Scale Residential Developments) Act 2021. Section 32D of the Act provides that the planning authority shall provide an opinion as to whether or not the documents submitted for the purposes of the meeting constitute a reasonable basis on which to make an application for permission for the proposed LRD.

Following consideration of the issues raised during the LDR meeting the Planning Authority is of the opinion that the documentation submitted **requires further consideration and amendment** for an application for permission for the proposed LRD.

In the event that the applicant proceeds to submit a planning application, the applicant is advised that the LRD application should be accompanied in the first instance by:

- Statement of response to the issues set out in the LRD opinion.
- Statement that in the applicant's opinion the proposal is consistent with the relevant objectives of the development plan for the area.

Furthermore pursuant to article 16A of the Planning and Development (Large-scale Residential Development) Regulations 2021 the applicant is hereby notified that, in addition to the requirements of section 32D, notify the prospective LRD applicant that specified information in addition to the requirements of article 23, the following specific information should be submitted with any LRD application for permission for the proposed development:

1. Planning Issues
    a. A detailed schedule of accommodation which shall indicate compliance with all relevant standards in the Dublin City Development Plan 2022-2028.
    b. The applicant should demonstrate that the proposed development would not have an undue impact on the amenities of surrounding properties having regard to Section 14.6 Transitional Zone Areas of the Dublin City Development Plan 2022-2028.
    c. The application should include a robust, demand-led rationale for the number of studio units proposed within the development
    d. The application should include a robust, detailed justification and rationale for Student Accommodation in this area having particular regard to the number of student accommodation developments within the area.
    e. The applicant should justify why the provisions of Policy CUO25 of the Dublin City Development Plan 2022-2028 would not apply to the proposed development.
    f. The Planning Authority is of the opinion that the proposed development in its current form is overly bulky. The Planning Authority noted that the scale could be reduced be reduced by design e.g. different brick colour or fenestration. Revised drawings, updated Architectural Design Report, with text referring to the revised design, and revised photomontages, are required.
    g. Drawings should demonstrate that the scheme maximises more durable materials (such as brick) and that rendering is minimised.
    h. An updated and detailed daylight and sunlight assessment of the proposed development as per discussions in the LRD meeting, in accordance with the relevant Guidelines, which will demonstrate an acceptable level of day light and sunlight for the proposed occupants of the development, the communal open space for residents and existing neighbouring properties is required.
    i. The applicant shall ensure that all communal facilities comply with Section 15.13.1.3 of the Dublin City Development Plan 2022-2028.
    j. The applicant should include updated cross sections and elevations which show line of sight from the upper floors of the north and south facing buildings to demonstrate that the proposal would not lead to undue overlooking of surrounding properties.
    k. Demonstration (by way of revised Visual Impact Assessment, photomontages, shadow analysis, etc) that neighbouring residential amenity and the visual amenity of the area is not unduly affected.
    l. A full, detailed and robust screening documents for Appropriate Assessment is required.
    m. A full nesting bird survey is required.
    n. A full, detailed and robust screening documents for Environmental Impact Assessment is required.

o. The applicants should satisfy themselves that they have submitted all required material as set out in Table 15-1 of the Development Plan (not reiterated here) for a development of this size and nature.

2. Conservation Issues
   a) All drawings should be appropriately labelled. All demolition to be shown in red – not green or blue.
   b) The front façade of the new building along Prussia Street should be re-designed to be more in keeping with the character of the area and should be closer to that proposed in the first pre-planning meeting.
   c) The setback of the new proposal from Prussia Street still remains visible the skyline. A set-back may not be the most appropriate solution as it does not have the effect of receding the proposal into the background. The applicant shall consider this.
   d) The applicant shall give further consideration to the impact of the proximity and height of the proposed development on the setting of the NIAH structures in proximity to the proposed development.
   e) The height of the new development should relate more sympathetically with the parapet heights of the immediately adjoining NIAH structures so that it sits more comfortably within its context.
   f) The Architectural Heritage Impact Assessment should be augmented to provide a more detailed analysis of the surrounding context. Photographs and documentation of the NIAH structures, Protected Structures / Church and the receiving historic environment should be provided.
   g) The Architectural Heritage Impact Assessment should include an appraisal of the surrounding context and an impartial assessment of the impact of the proposal on that receiving environment.

3. Transportation Issues
   (1) Site access, internal permeability and outdoor seating area requires review:

      a) The applicant should revisit the proposed outdoor seating area in terms of safety, which currently is located near a shared area where only vehicular site access is also proposed, creating an unsafe zone for all users due to the encroachment of manoeuvres by vehicles. Consideration should be given regarding security measures at this location, i.e. bollards. The applicant should clarify how the potential for overspilling street furniture at this location can be avoided.
      b) Internal footpaths should be designed for all users, specifically users with limited mobility. In that regard, the applicant should revisit internal footpath widths in order to avoid pitch points (i.e. footpaths less than 1.8m wide as per DMURS).

   (2) Car & Bicycle Parking provision requires review:

      a) The applicant should ensure consistency through the documentation, including the MMP and TP, regarding the lack of provision for a drop-off area. If access to the site for drop-off is intended, this should be clearly described in the submitted documentation, including details of management of the same.
      b) Where large bicycle stores are proposed, consideration should be given regarding the provision of additional security measures within these stores, e.g., the provision of bicycle cages that hold a smaller number of bicycles,

specifically where shared access is to be proposed for more than one purpose (i.e. shared access for bicycle and bin storage).

c) The provision of bicycle parking spaces for staff of the retail unit should be incorporated as per Table 1 of Appendix 5 of the 2022-2028 Dublin City Development Plan.

d) Provision for adapted bikes and e-charging facilities are required to be incorporated.

e) Detailed drawings of all bicycle parking areas should be included in the final LRD application, ensuring adequate separation distances between racks & internal access corridors for ease of access and functionality without conflict with landscaping proposals or walls (refer to the Cycle Design Manual, 2023).

f) The applicant should include clarification regarding the allocation of the bicycle spaces for staff, students, retail unit and visitors, including management strategy for these.

(3) Site Servicing & Operations requires review:

a) The applicant should demonstrate how each of the four issues raised in the RSA can be appropriately addressed. Where no amendments are proposed, a justification for same should be submitted for such.

b) The applicant should provide scaled auto-tracking drawings for delivery vehicles within the turning head of the proposed development to demonstrate that access and egress of same can be safely achieved.

c) The applicant should clarify if bin storage for the commercial aspect of the site is proposed to be incorporated within the red-line boundary and how this will be managed.

d) Details regarding the student accommodation's bin management and staging area should be submitted. If necessary, a new refuse auto tracking should be submitted, demonstrating sufficient space for staging bin area and reverse manoeuvres, as the site has limited space for manoeuvres as proposed.

(4) Other Issues:

a) The applicant should submit revised drawings overlaying the CBC route with the proposed
development to ensure it does not preclude future road improvement works on Prussia Street.

4. <u>Drainage Issues</u>

a) An updated Basement Impact Assessment should be submitted. Prior to submission of a planning application for this development, the applicant should consult with the Drainage Planning, Policy and Development Control (DPPDC) section to ensure all inadequacies of the BIA report, and all concerns about the basement development, are addressed.

b) The applicants should submit a Site Specific Flood Risk Assessment for the proposed development. The assessment should identify and propose design solutions to mitigate the potential risks from all sources of flooding including coastal, fluvial, pluvial and groundwater. Reference should be made to the DEHLG/OPW Guidelines on the Planning Process and Flood Risk Management published in November 2009 and the Dublin City Development Plan 2022-2028 Strategic Flood Risk Assessment.

c) The Drainage Planning, Policy and Development Control (DPPDC) section is not in favour of underground attenuation tanks. In accordance with the Dublin City Development Plan 2022-2028, blue roofs are proposed to be utilised throughout the development. However, the residual storage requirements should be provided

via alternatives to the underground tank, such as storage in permeable paving subbase.

d) The Horgan Lynch green/blue roof layout does not align with the architect's roof plan. Updated plans should be submitted.

e) The storm water management criteria set out in Section 16 of the Greater Dublin Regional Code of Practice for Drainage Works Version 6.0 must be addressed. In particular, the applicant should address the interception storage requirements. Full calculations for the storage requirements and provisions at each storage location on site shall be provided.

f) The existing public surface water sewer through the site should be indicated on the drainage layout, along with separation distances between the sewer and proposed buildings.

g) If infiltration rates on site have not yet been established, an alternative to the infiltration devices should be established, in case of poor infiltration rates.

h) Finally the applicant was informed that full design details for the SuDS devices including the green & blue roofs (and associated flow controls), infiltration devices, rain garden, swale, and permeable paving shall be provided.

5. Parks, Biodiversity and Landscape Issues

a) In accordance with the Development plan Vol 2 Appendix 6, 7.0, a rationale for compensatory measures applied to mitigate any shortfall in the minimum standards, shall be submitted.

b) The lane access from Prussia Street shall be surfaced in predominantly natural stone materials.

c) The scheme shall allow 50% of all external seating to have arm & back rests which shall be referenced in the landscape submission.

d) The scheme shall allow 50% of external cycle stands to be covered.

e) A schedule of materials /external furniture/recreational units shall be submitted.

f) A section from the proposed building façade through the boundary and T 7 with measured canopy shall be submitted.

g) A tree protection plan shall be submitted.

h) A tree bond will apply to the development (subject to permission) and the value will be determined by CAVAT or Halliwell methods. Professional arboricultural supervision of the works in proximity to trees will also be required during construction.

i) A heat map of cumulative external spaces daylight/sunlight results shall be submitted.

j) The following are to be submitted:
- An Appropriate Assessment Screening Report
- An Ecological Impact Report (including bat survey and invasive alien species survey)
- A biodiversity enhancement plan-This shall include relevant mitigation measures (e.g. control of external lighting for bats) as well as other biodiversity enhancement measures that can be incorporated into the architecture and landscape architecture proposals (e.g., bird & bat boxes).

k) A finalised Landscape Masterplan shall be submitted, including detailed CGIs of each communal open space area, boundary treatments, details of control barrier between lane to Prussia Street and internal open spaces, outline planting material specification and hardscape materials.

l) A green roof plan shall be submitted inclusive of biodiverse habitat planting/measures. The applicant shall refer to the new DCC green/blue roof guidelines.

6. Any Other Business

a) An updated, detailed, project-specific desktop Archaeological Assessment is required. This should be carried out in consultation with the City Archaeologist. In the event of a grant of permission, the removal of the ground slab should be monitored under licence and post-demolition archaeological testing should be carried out at a pre-construction stage.

b) The application material should include a demolition justification report to set out the rational for the demolition having regard to the 'embodied carbon' of existing structures and demonstrate that all options other than demolition, such as refurbishment, extension or retrofitting are not possible; as well as the additional use of resources and energy arising from new construction relative to the reuse of existing structures, in line with Section 15.7.1 of the Dublin City Development Plan 2022-2028 should be included with the application.

c) A Climate Action Energy Statement in line with Section 15.7.3 of the Dublin City Development Plan 2022-2028 should be included with the application.

Please Note:

Under section 32E of the Act of 2021 neither the taking place of an LRD meeting nor the provision of an LRD opinion shall prejudice the performance by the planning authority of its functions under this Act or any regulations under this Act or any other enactment and cannot be relied upon in the formal planning process or in legal proceedings.

Éeer Uí Fhátharta

Emer Uí Fhátharta

Deputy City Planner

Horganlynch
Consulting Engineers

Appendix B: Storm Drainage Calculations

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BLUE ROOF

Type : Catchment Area

Area (ha)	0.021

Dynamic Sizing

Runoff Method	Green Roof
Summer Volumetric Runoff Coefficient	0.750
Winter Volumetric Runoff Coefficient	0.840
Depression Storage (mm)	40
Evapotranspiration (mm/day)	2.0
Decay Coefficiency	0.050
Time Delay (mins)	120

BLUE ROOF 1

Type : Catchment Area

Area (ha)	0.019

Dynamic Sizing

Runoff Method	Green Roof
Summer Volumetric Runoff Coefficient	0.750
Winter Volumetric Runoff Coefficient	0.840
Depression Storage (mm)	40
Evapotranspiration (mm/day)	2.0
Decay Coefficiency	0.050
Time Delay (mins)	120

BLUE ROOF 11

Type : Catchment Area

Area (ha)	0.014

Dynamic Sizing

Runoff Method	Green Roof
Summer Volumetric Runoff Coefficient	0.750
Winter Volumetric Runoff Coefficient	0.840
Depression Storage (mm)	40
Evapotranspiration (mm/day)	2.0
Decay Coefficiency	0.050
Time Delay (mins)	120

BLUE ROOF 2

Type : Catchment Area

Area (ha)	0.017

Dynamic Sizing

Runoff Method	Green Roof
Summer Volumetric Runoff Coefficient	0.750
Winter Volumetric Runoff Coefficient	0.840
Depression Storage (mm)	40
Evapotranspiration (mm/day)	2.0
Decay Coefficiency	0.050
Time Delay (mins)	120

BLUE ROOF 4

Type : Catchment Area

Area (ha)	0.032

Dynamic Sizing

Runoff Method	Green Roof
Summer Volumetric Runoff Coefficient	0.750
Winter Volumetric Runoff Coefficient	0.840
Depression Storage (mm)	45
Evapotranspiration (mm/day)	3.0
Decay Coefficiency	0.050
Time Delay (mins)	120

BLUE ROOF 5

Type : Catchment Area

Area (ha)	0.018

Dynamic Sizing

Runoff Method	Green Roof
Summer Volumetric Runoff Coefficient	0.750
Winter Volumetric Runoff Coefficient	0.840
Depression Storage (mm)	45
Evapotranspiration (mm/day)	2.0
Decay Coefficiency	0.050
Time Delay (mins)	120

BLUE ROOF 3

Type : Catchment Area

Area (ha)	0.029

Dynamic Sizing

Runoff Method	Green Roof
Summer Volumetric Runoff Coefficient	0.750
Winter Volumetric Runoff Coefficient	0.840
Depression Storage (mm)	45
Evapotranspiration (mm/day)	3.0
Decay Coefficiency	0.050
Time Delay (mins)	120

CA

Type : Catchment Area

Area (ha)	0.001

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.750
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	5
Percentage Impervious (%)	100

CA1

Type : Catchment Area

Area (ha)	0.015

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.750
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	5
Percentage Impervious (%)	100

CA3

Type : Catchment Area

Area (ha)	0.009

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.750
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	5
Percentage Impervious (%)	100

CA4

Type : Catchment Area

Area (ha)	0.007

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.750
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	5
Percentage Impervious (%)	100

CA6

Type : Catchment Area

Area (ha)	0.012

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.750
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	5
Percentage Impervious (%)	100

CA5

Type : Catchment Area

Area (ha)	0.006

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.750
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	5
Percentage Impervious (%)	100

CA7

Type : Catchment Area

Area (ha)	0.007

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.750
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	5
Percentage Impervious (%)	100

CA8

Type : Catchment Area

Area (ha)	0.014

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.750
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	5
Percentage Impervious (%)	100

CA9

Type : Catchment Area

Area (ha)	0.027

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.750
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	5
Percentage Impervious (%)	100

CA10

Type : Catchment Area

Area (ha)	0.027

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.750
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	5
Percentage Impervious (%)	100

BLUE ROOF 9

Type : Catchment Area

Area (ha)	0.026

Dynamic Sizing

Runoff Method	Green Roof
Summer Volumetric Runoff Coefficient	0.750
Winter Volumetric Runoff Coefficient	0.840
Depression Storage (mm)	40
Evapotranspiration (mm/day)	3.0
Decay Coefficiency	0.050
Time Delay (mins)	120

CA11

Type : Catchment Area

Area (ha)	0.006

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.750
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	5
Percentage Impervious (%)	100

BLUE ROOF 7

Type : Catchment Area

Area (ha)	0.017

Dynamic Sizing

Runoff Method	Green Roof
Summer Volumetric Runoff Coefficient	0.750
Winter Volumetric Runoff Coefficient	0.840
Depression Storage (mm)	45
Evapotranspiration (mm/day)	3.0
Decay Coefficiency	0.050
Time Delay (mins)	120

BLUE ROOF 8

Type : Catchment Area

Area (ha)	0.007

Dynamic Sizing

Runoff Method	Green Roof
Summer Volumetric Runoff Coefficient	0.750
Winter Volumetric Runoff Coefficient	0.840
Depression Storage (mm)	45
Evapotranspiration (mm/day)	3.0
Decay Coefficiency	0.050
Time Delay (mins)	120

CA2

Type : Catchment Area

Area (ha)	0.01

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.750
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	5
Percentage Impervious (%)	100

CA12

Type : Catchment Area

Area (ha)	0.003

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.750
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	5
Percentage Impervious (%)	100

Green Roof

Type : Catchment Area

Area (ha)	0.009

Dynamic Sizing

Runoff Method	Green Roof
Summer Volumetric Runoff Coefficient	0.750
Winter Volumetric Runoff Coefficient	0.840
Depression Storage (mm)	0
Evapotranspiration (mm/day)	3.0
Decay Coefficiency	0.050
Time Delay (mins)	120

GR1

Type : Catchment Area

Area (ha)	0.016

Dynamic Sizing

Runoff Method	Green Roof
Summer Volumetric Runoff Coefficient	0.750
Winter Volumetric Runoff Coefficient	0.840
Depression Storage (mm)	5
Evapotranspiration (mm/day)	3.0
Decay Coefficiency	0.050
Time Delay (mins)	120

BLUE ROOF 10

Type : Catchment Area

Area (ha)	0.013

Dynamic Sizing

Runoff Method	Green Roof
Summer Volumetric Runoff Coefficient	0.750
Winter Volumetric Runoff Coefficient	0.840
Depression Storage (mm)	45
Evapotranspiration (mm/day)	3.0
Decay Coefficiency	0.050
Time Delay (mins)	120

GR4

Type : Catchment Area

Area (ha)	0.004

Dynamic Sizing

Runoff Method	Green Roof
Summer Volumetric Runoff Coefficient	0.750
Winter Volumetric Runoff Coefficient	0.840
Depression Storage (mm)	5
Evapotranspiration (mm/day)	3.0
Decay Coefficiency	0.050
Time Delay (mins)	120

GR3

Type : Catchment Area

Area (ha)	0.021

Dynamic Sizing

Runoff Method	Green Roof
Summer Volumetric Runoff Coefficient	0.750
Winter Volumetric Runoff Coefficient	0.840
Depression Storage (mm)	5
Evapotranspiration (mm/day)	3.0
Decay Coefficiency	0.050
Time Delay (mins)	120

GR2

Type : Catchment Area

Area (ha)	0.003

Dynamic Sizing

Runoff Method	Green Roof
Summer Volumetric Runoff Coefficient	0.750
Winter Volumetric Runoff Coefficient	0.840
Depression Storage (mm)	5
Evapotranspiration (mm/day)	3.0
Decay Coefficiency	0.050
Time Delay (mins)	120

GR5

Type : Catchment Area

Area (ha)	0.003

Dynamic Sizing

Runoff Method	Green Roof
Summer Volumetric Runoff Coefficient	0.750
Winter Volumetric Runoff Coefficient	0.840
Depression Storage (mm)	5
Evapotranspiration (mm/day)	3.0
Decay Coefficiency	0.050
Time Delay (mins)	120

CA13

Type : Catchment Area

Area (ha)	0.003

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.750
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	5
Percentage Impervious (%)	100

CA20

Type : Catchment Area

Area (ha)	0.003

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.750
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	5
Percentage Impervious (%)	100

CA21

Type : Catchment Area

Area (ha)	0.008

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.750
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	5
Percentage Impervious (%)	100

Catchment Area (2)

Type : Catchment Area

Area (ha)	0.002

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.750
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	5
Percentage Impervious (%)	100

BASIN1 Type : Pond

Dimensions

Exceedance Elevation (m)	25.850
Depth (m)	0.500
Base Elevation (m)	25.350
Freeboard (mm)	50
Initial Depth (m)	0.000
Porosity (%)	100
Average Slope (1:x)	3.175
Total Volume (m³)	42.144

Depth (m)	Area (m²)	Volume (m³)
0.000	70.00	0.000
0.500	125.00	48.090

Inlets

Inlet (2)

Inlet Type	Lateral Inflow
Incoming Item(s)	BLUE ROOF 3
Bypass Destination	(None)
Capacity Type	No Restriction

Inlet (3)

Inlet Type	Lateral Inflow
Incoming Item(s)	CA9
Bypass Destination	(None)
Capacity Type	No Restriction

Inlet (4)

Inlet Type	Lateral Inflow
Incoming Item(s)	BLUE ROOF 4
Bypass Destination	(None)
Capacity Type	No Restriction

Inlet (5)

Inlet Type	Lateral Inflow
Incoming Item(s)	CA8
Bypass Destination	(None)
Capacity Type	No Restriction

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	P12
Bypass Destination	(None)
Capacity Type	No Restriction

Inlet (1)

Inlet Type	Lateral Inflow
Incoming Item(s)	CA13
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	P6
Outlet Type	Weir

Width (m)	2.500
Coefficient of Discharge	0.544
Crest Elevation (m)	25.790

Advanced

Base Infiltration Rate (m/hr)	0.003
Side Infiltration Rate (m/hr)	0.003
Safety Factor	2.0
Perimeter	Rectangular
Length (m)	20.438
Friction Scheme	Manning's n
n	0.03

BASIN2 Type : Pond

Dimensions

Exceedance Elevation (m)	26.000
Depth (m)	0.500
Base Elevation (m)	25.500
Freeboard (mm)	0
Initial Depth (m)	0.000
Porosity (%)	100
Average Slope (1:x)	2.483
Total Volume (m³)	39.325

Depth (m)	Area (m²)	Volume (m³)
0.000	60.000	0.000
0.500	98.932	39.329

Inlets

Inlet

Inlet Type	Lateral Inflow
Incoming Item(s)	CA1
Bypass Destination	(None)
Capacity Type	No Restriction

Inlet (1)

Inlet Type	Lateral Inflow
Incoming Item(s)	BLUE ROOF 7
Bypass Destination	(None)
Capacity Type	No Restriction

Inlet (2)

Inlet Type	Lateral Inflow
Incoming Item(s)	CA6
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	P8
Outlet Type	Weir

Width (m)	1.500
Coefficient of Discharge	0.544
Crest Elevation (m)	25.900

Advanced

Base Infiltration Rate (m/hr)	0.003
Side Infiltration Rate (m/hr)	0.003
Safety Factor	2.0
Perimeter	Circular
Length (m)	14.251
Friction Scheme	Manning's n
n	0.03

PP4

Type : Porous Paving

Dimensions

Exceedance Elevation (m)	26.050
Depth (m)	0.650
Base Elevation (m)	25.400
Paving Layer Depth (mm)	100
Membrane Percolation (m/hr)	396.0
Porosity (%)	30
Length (m)	12.299
Long. Slope (1:x)	500.00
Width (m)	5.904
Total Volume (m³)	11.982

Inlets

Inlet (1)

Inlet Type	Lateral Inflow
Incoming Item(s)	CA21
Bypass Destination	(None)
Capacity Type	No Restriction

Inlet (2)

Inlet Type	Lateral Inflow
Incoming Item(s)	CA20
Bypass Destination	(None)
Capacity Type	No Restriction

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	P20
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	P12
Outlet Type	Orifice

Diameter (m)	0.050
Coefficient of Discharge	0.600
Invert Elevation (m)	25.500

Advanced

Base Infiltration Rate (m/hr)	0.003
Side Infiltration Rate (m/hr)	0.003
Safety Factor	2.0
Conductivity (m/hr)	500.0

PP2

Type : Porous Paving

Dimensions

Exceedance Elevation (m)	26.050
Depth (m)	0.525
Base Elevation (m)	25.525
Paving Layer Depth (mm)	100
Membrane Percolation (m/hr)	396.0
Porosity (%)	30
Length (m)	16.002
Long. Slope (1:x)	500.00
Width (m)	4.014
Total Volume (m³)	8.189

Inlets

Inlet (2)

Inlet Type	Lateral Inflow
Incoming Item(s)	BLUE ROOF 1
Bypass Destination	(None)
Capacity Type	No Restriction

Inlet (1)

Inlet Type	Lateral Inflow
Incoming Item(s)	CA2
Bypass Destination	(None)
Capacity Type	No Restriction

Inlet (3)

Inlet Type	Lateral Inflow
Incoming Item(s)	BLUE ROOF 2
Bypass Destination	(None)
Capacity Type	No Restriction

Inlet (4)

Inlet Type	Lateral Inflow
Incoming Item(s)	Green Roof
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	P4
Outlet Type	Orifice

Diameter (m)	0.225
Coefficient of Discharge	0.600
Invert Elevation (m)	25.525

Advanced

Base Infiltration Rate (m/hr)	0.003
Side Infiltration Rate (m/hr)	0.003
Safety Factor	2.0
Conductivity (m/hr)	500.0

PP1 Type : Porous Paving

Dimensions

Exceedance Elevation (m)	26.050
Depth (m)	0.550
Base Elevation (m)	25.500
Paving Layer Depth (mm)	100
Membrane Percolation (m/hr)	360.0
Porosity (%)	30
Length (m)	7.276
Long. Slope (1:x)	500.00
Width (m)	8.668
Total Volume (m³)	8.515

Inlets

Inlet

Inlet Type	Lateral Inflow
Incoming Item(s)	BLUE ROOF
Bypass Destination	(None)
Capacity Type	No Restriction

Inlet (1)

Inlet Type	Lateral Inflow
Incoming Item(s)	CA5
Bypass Destination	(None)
Capacity Type	No Restriction

Inlet (2)

Inlet Type	Lateral Inflow
Incoming Item(s)	CA7
Bypass Destination	(None)
Capacity Type	No Restriction

Inlet (3)

Inlet Type	Lateral Inflow
Incoming Item(s)	GR4
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet (1)

Outgoing Connection	P1
Outlet Type	Free Discharge

Advanced

Base Infiltration Rate (m/hr)	0.003
Side Infiltration Rate (m/hr)	0.003
Safety Factor	2.0
Conductivity (m/hr)	500.0

PP3 Type : Porous Paving

Dimensions

Exceedance Elevation (m)	26.050
Depth (m)	0.700
Base Elevation (m)	25.350
Paving Layer Depth (mm)	100
Membrane Percolation (m/hr)	2.5
Porosity (%)	30
Length (m)	44.529
Long. Slope (1:x)	500.00
Width (m)	6.092
Total Volume (m³)	48.830

Inlets

Inlet

Inlet Type	Lateral Inflow
Incoming Item(s)	CA10
Bypass Destination	(None)
Capacity Type	No Restriction

Inlet (3)

Inlet Type	Lateral Inflow
Incoming Item(s)	BLUE ROOF 9
Bypass Destination	(None)
Capacity Type	No Restriction

Inlet (4)

Inlet Type	Lateral Inflow
Incoming Item(s)	CA11
Bypass Destination	(None)
Capacity Type	No Restriction

Inlet (5)

Inlet Type	Lateral Inflow
Incoming Item(s)	GR3
Bypass Destination	(None)
Capacity Type	No Restriction

Inlet (6)

Inlet Type	Lateral Inflow
Incoming Item(s)	GR1
Bypass Destination	(None)
Capacity Type	No Restriction

Inlet (7)

Inlet Type	Lateral Inflow
Incoming Item(s)	P14
Bypass Destination	(None)
Capacity Type	No Restriction

Inlet (1)

Inlet Type	Point Inflow
Incoming Item(s)	P13
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet (1)

Outgoing Connection	P15
Outlet Type	Free Discharge

Advanced

Conductivity (m/hr)	500.0

RAIN GARDEN 2

Type : Swale

Swale

Exceedance Elevation (m)	26.050
Depth (m)	0.600
Base Elevation (m)	25.450
Top Width (m)	2.465
Side Slope (1:x)	0.80
Base Width (m)	1.505
Freeboard (mm)	0
Length (m)	9.786
Long. Slope (1:x)	250.00
Filtration Rate (m/hr)	0.3
Friction Scheme	Manning's n
n	0.03
Total Volume (m³)	13.861

Trench

Trench Depth (m)	0.500
Trench Porosity (%)	30

Inlets

Inlet

Inlet Type	Lateral Inflow
Incoming Item(s)	BLUE ROOF 5
Bypass Destination	(None)
Inlet Destination	Ponding Area
Capacity Type	No Restriction

Inlet (1)

Inlet Type	Lateral Inflow
Incoming Item(s)	Catchment Area (2)
Bypass Destination	(None)
Inlet Destination	Ponding Area
Capacity Type	No Restriction

Inlet (3)

Inlet Type	Lateral Inflow
Incoming Item(s)	GR5
Bypass Destination	(None)
Inlet Destination	Ponding Area
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	P20
Outlet Type	Free Discharge

Advanced

Safety Factor	2.0

Swale

Side Infiltration Rate (m/hr)	0.003
Porosity (%)	100

Trench

Base Infiltration Rate (m/hr)	0.003
Side Infiltration Rate (m/hr)	0.003
Trench Conductivity (m/hr)	750.0

RAIN GARDEN 1

Type : Swale

Swale

Exceedance Elevation (m)	26.050
Depth (m)	0.450
Base Elevation (m)	25.600
Top Width (m)	2.513
Side Slope (1:x)	1.00
Base Width (m)	1.613
Freeboard (mm)	0
Length (m)	5.876
Long. Slope (1:x)	500.00
Filtration Rate (m/hr)	0.3
Friction Scheme	Manning's n
n	0.03
Total Volume (m^3)	7.026

Trench

Trench Depth (m)	0.400
Trench Porosity (%)	40

Under Drain

Height Above Base (m)	0.150
Diameter (mm)	100
No. of Barrels	2
Release Height (m)	0.000
Friction Scheme	Manning's n
n	0.015

Inlets

Inlet

Inlet Type	Lateral Inflow
Incoming Item(s)	BLUE ROOF 8
Bypass Destination	(None)
Inlet Destination	Ponding Area
Capacity Type	No Restriction

Inlet (1)

Inlet Type	Lateral Inflow
Incoming Item(s)	P8
Bypass Destination	(None)
Inlet Destination	Ponding Area
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	P9
Outlet Type	Free Discharge

Advanced

Safety Factor	2.0

Swale

Porosity (%)	100

Trench

Base Infiltration Rate (m/hr)	0.03
Side Infiltration Rate (m/hr)	0.003
Trench Conductivity (m/hr)	250.0

Swale Type : Swale

Swale

Exceedance Elevation (m)	26.000
Depth (m)	0.575
Base Elevation (m)	25.425
Top Width (m)	1.419
Side Slope (1:x)	1.00
Base Width (m)	0.269
Freeboard (mm)	0
Length (m)	26.944
Long. Slope (1:x)	500.00
Filtration Rate (m/hr)	0.0
Friction Scheme	Manning's n
n	0.03
Total Volume (m³)	13.072

Inlets

Inlet

Inlet Type	Lateral Inflow
Incoming Item(s)	CA4 BLUE ROOF 10
Bypass Destination	(None)
Inlet Destination	Ponding Area
Capacity Type	No Restriction

Inlet (1)

Inlet Type	Point Inflow
Incoming Item(s)	P11
Bypass Destination	(None)
Inlet Destination	Ponding Area
Capacity Type	No Restriction

Outlets

Outlet (1)

Outgoing Connection	P7
Outlet Type	Free Discharge

Advanced

Safety Factor	2.0

Swale

Base Infiltration Rate (m/hr)	0.003
Side Infiltration Rate (m/hr)	0.003
Porosity (%)	100

Swale (1)

Type : Swale

Swale

Exceedance Elevation (m)	26.050
Depth (m)	0.350
Base Elevation (m)	25.700
Top Width (m)	2.390
Side Slope (1:x)	1.00
Base Width (m)	1.690
Freeboard (mm)	0
Length (m)	24.969
Long. Slope (1:x)	500.00
Filtration Rate (m/hr)	0.0
Friction Scheme	Manning's n
n	0.03
Total Volume (m³)	17.829

Inlets

Inlet

Inlet Type	Lateral Inflow
Incoming Item(s)	CA3
Bypass Destination	(None)
Inlet Destination	Ponding Area
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	P14
Outlet Type	Orifice

Diameter (m)	0.050
Coefficient of Discharge	0.600
Invert Elevation (m)	25.700

Advanced

Safety Factor	2.0

Swale

Base Infiltration Rate (m/hr)	0.003
Side Infiltration Rate (m/hr)	0.003
Porosity (%)	100

KC12 - Prussia Street Development:	Date: 30/01/2024		
	Designed by: KL	Checked by: KC	Approved By: KC
Report Details: Type: Inflow Summary Storm Phase: Phase 4 Redesign 130224	Company Address:		

Horganlynch Consulting Engineers

Inflow Label	Connected To	Flow (L/s)	Runoff Method	Area (ha)	Percentage Impervious (%)	Urban Creep (%)	Adjusted Percentage Impervious (%)	Area Analyzed (ha)
BLUE ROOF	PP1		Green Roof	0.021		0		0.021
BLUE ROOF 1	PP2		Green Roof	0.019		0		0.019
BLUE ROOF 2	PP2		Green Roof	0.017		0		0.017
BLUE ROOF 3	BASIN1		Green Roof	0.029		0		0.029
BLUE ROOF 4	BASIN1		Green Roof	0.032		0		0.032
BLUE ROOF 5	RAIN GARDEN 2		Green Roof	0.018		0		0.018
BLUE ROOF 7	BASIN2		Green Roof	0.017		0		0.017
BLUE ROOF 8	RAIN GARDEN 1		Green Roof	0.007		0		0.007
BLUE ROOF 9	PP3		Green Roof	0.026		0		0.026
BLUE ROOF 10	Swale		Green Roof	0.013		0		0.013
BLUE ROOF 11	SMH4		Green Roof	0.014		0		0.014
Catchment Area (2)	RAIN GARDEN 2		Time of Concentration	0.002	100	0	100	0.002
CA	SMH3		Time of Concentration	0.001	100	0	100	0.001
CA1	BASIN2		Time of Concentration	0.015	100	0	100	0.015
CA2	PP2		Time of Concentration	0.010	100	0	100	0.010
CA3	Swale (1)		Time of Concentration	0.009	100	0	100	0.009
CA4	Swale		Time of Concentration	0.007	100	0	100	0.007
CA5	PP1		Time of Concentration	0.006	100	0	100	0.006
CA6	BASIN2		Time of Concentration	0.012	100	0	100	0.012
CA7	PP1		Time of Concentration	0.007	100	0	100	0.007
CA8	BASIN1		Time of Concentration	0.014	100	0	100	0.014
CA9	BASIN1		Time of Concentration	0.027	100	0	100	0.027
CA10	PP3		Time of Concentration	0.027	100	0	100	0.027
CA11	PP3		Time of Concentration	0.006	100	0	100	0.006
CA12	SMH2		Time of Concentration	0.003	100	0	100	0.003
CA13	BASIN1		Time of Concentration	0.003	100	0	100	0.003
CA20	PP4		Time of Concentration	0.003	100	0	100	0.003
CA21	PP4		Time of Concentration	0.008	100	0	100	0.008
Green Roof	PP2		Green Roof	0.009		0		0.009
GR1	PP3		Green Roof	0.016		0		0.016
GR2	SMH2		Green Roof	0.003		0		0.003
GR3	PP3		Green Roof	0.021		0		0.021
GR4	PP1		Green Roof	0.004		0		0.004
GR5	RAIN GARDEN 2		Green Roof	0.003		0		0.003
TOTAL		**0.0**		**0.430**				**0.430**

KC12 - Prussia Street Development:	Date: 30/01/2024		
	Designed by: KL	Checked by: KC	Approved By: KC
Report Details: Type: Network Design Criteria Storm Phase: Phase 4 Redesign 130224	Company Address:		

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Flow Options

Peak Flow Calculation	(UK) Modified Rational Method
Min. Time of Entry (mins)	5
Max. Travel Time (mins)	30

Pipe Options

Lock Slope Options	None
Design Options	Minimize Excavation
Design Level	Level Crowns
Min. Cover Depth (m)	1.200
Min. Slope (1:x)	500.00
Max. Slope (1:x)	40.00
Min. Velocity (m/s)	1.0
Max. Velocity (m/s)	3.0
Use Flow Restriction	☐
Reduce Channel Depths	☐

Manhole Options

Apply Offset	☐

KC12 - Prussia Street Development:	Date: 30/01/2024		
	Designed by: KL	Checked by: KC	Approved By: KC
Report Details: Type: Outfall Details Storm Phase: Phase 4 Redesign 130224	Company Address:		

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Outfalls

Outfall	Outfall Type	Fixed Surcharged Elevation (m)	Elevation Curve
SMH6	Free Discharge		
SMH8	Free Discharge		

Runoff Type	Dynamic
Output Interval (mins)	1
Time Step	Shortest
Urban Creep	Apply Global Value
Urban Creep Global Value (%)	0
Junction Flood Risk Margin (mm)	50
Perform No Discharge Analysis	☐

Rainfall

FSR

Type: FSR

Region	Scotland and Ireland
M5-60 (mm)	16.8
Ratio R	0.300
Summer	☑
Winter	☑

Return Period

Return Period (years)	Increase Rainfall (%)
100.0	20.000

Storm Durations

Duration (mins)	Run Time (mins)
15	30
30	60
60	120
120	240
240	480
480	960
960	1920
1440	2880

ICP SUDS / IH 124

Details

Method	ICP SUDS
Area (ha)	0.50
SAAR (mm)	800.0
Soil	0.3
Region	Ireland East
Urban	0
Return Period (years)	100

Results

Region	QBAR Rural (L/s)	QBAR Urban (L/s)	Q 100 (years) (L/s)	Q 1 (years) (L/s)	Q 30 (years) (L/s)	Q 100 (years) (L/s)
Ireland East	1.1	1.1	2.0	0.9	1.7	2.0

Critical Storm Per Item: Rank By: Max. Inflow

Inflow	Storm Event	Inflow Area (ha)	Max. Inflow (L/s)	Total Inflow Volume (m³)
BLUE ROOF	FSR: 100 years: +20 %: 240 mins: Winter	0.02	1.3	3.543
BLUE ROOF 1	FSR: 100 years: +20 %: 240 mins: Winter	0.02	1.2	3.335
BLUE ROOF 11	FSR: 100 years: +20 %: 240 mins: Winter	0.01	0.9	2.323
BLUE ROOF 2	FSR: 100 years: +20 %: 240 mins: Winter	0.02	1.1	2.945
BLUE ROOF 4	FSR: 100 years: +20 %: 480 mins: Summer	0.03	1.6	6.645
BLUE ROOF 5	FSR: 100 years: +20 %: 480 mins: Summer	0.02	1.0	3.926
BLUE ROOF 3	FSR: 100 years: +20 %: 480 mins: Summer	0.03	1.5	6.046
CA	FSR: 100 years: +20 %: 15 mins: Winter	0.00	0.5	0.232
CA1	FSR: 100 years: +20 %: 15 mins: Winter	0.02	6.2	2.867
CA3	FSR: 100 years: +20 %: 15 mins: Winter	0.01	3.9	1.781
CA4	FSR: 100 years: +20 %: 15 mins: Winter	0.01	3.0	1.403
CA6	FSR: 100 years: +20 %: 15 mins: Winter	0.01	4.9	2.280
CA5	FSR: 100 years: +20 %: 15 mins: Winter	0.01	2.3	1.069
CA7	FSR: 100 years: +20 %: 15 mins: Winter	0.01	3.0	1.368
CA8	FSR: 100 years: +20 %: 15 mins: Winter	0.01	6.0	2.756

CA9	FSR: 100 years: +20 %: 15 mins: Winter	0.03	11.1	5.152
CA10	FSR: 100 years: +20 %: 15 mins: Winter	0.03	11.2	5.153
BLUE ROOF 9	FSR: 100 years: +20 %: 240 mins: Winter	0.03	1.6	4.454
CA11	FSR: 100 years: +20 %: 15 mins: Winter	0.01	2.3	1.058
BLUE ROOF 7	FSR: 100 years: +20 %: 480 mins: Summer	0.02	0.8	3.478
BLUE ROOF 8	FSR: 100 years: +20 %: 480 mins: Summer	0.01	0.4	1.536
CA2	FSR: 100 years: +20 %: 15 mins: Winter	0.01	4.3	1.979
CA12	FSR: 100 years: +20 %: 15 mins: Winter	0.00	1.4	0.633
Green Roof	FSR: 100 years: +20 %: 30 mins: Winter	0.01	1.2	2.174
GR1	FSR: 100 years: +20 %: 30 mins: Winter	0.02	2.0	2.979
BLUE ROOF 10	FSR: 100 years: +20 %: 480 mins: Summer	0.01	0.6	2.630
GR4	FSR: 100 years: +20 %: 30 mins: Winter	0.00	0.6	0.821
GR3	FSR: 100 years: +20 %: 30 mins: Winter	0.02	2.7	3.959
GR2	FSR: 100 years: +20 %: 30 mins: Winter	0.00	0.4	0.576
GR5	FSR: 100 years: +20 %: 30 mins: Winter	0.00	0.3	0.505
CA13	FSR: 100 years: +20 %: 15 mins: Winter	0.00	1.4	0.632
CA20	FSR: 100 years: +20 %: 15 mins: Winter	0.00	1.1	0.531

CA21	FSR: 100 years: +20 %: 15 mins: Winter	0.01	3.4	1.563
Catchment Area (2)	FSR: 100 years: +20 %: 15 mins: Winter	0.00	1.0	0.445

KC12 - Prussia Street Development:	Date: 30/01/2024		
	Designed by: KL	Checked by: KC	Approved By: KC
Report Details: Type: Junctions Summary Storm Phase: Phase 4 Redesign 130224	Company Address:		

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Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Elevation (m)	Invert Elevation (m)	Max. Elevation (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
SMH1	FSR: 100 years: +20 %: 240 mins: Winter	26.050	25.650	25.685	0.035	1.6	0.040	0.000	1.6	8.212	OK
SMH2	FSR: 100 years: +20 %: 480 mins: Winter	26.050	25.500	25.653	0.153	1.8	0.174	0.000	1.7	15.682	Surcharged
SMH3	FSR: 100 years: +20 %: 480 mins: Winter	26.000	25.475	25.653	0.178	3.3	0.201	0.000	3.3	37.087	Surcharged
SMH4	FSR: 100 years: +20 %: 480 mins: Winter	26.000	25.350	25.645	0.295	5.5	0.334	0.000	2.7	80.206	Surcharged
SMH6	FSR: 100 years: +20 %: 480 mins: Winter	26.000	25.450	25.504	0.054	5.6	0.062	0.000	2.8	66.443	OK
SMH5	FSR: 100 years: +20 %: 1440 mins: Winter	26.000	25.536	25.541	0.005	0.0	0.006	0.000	0.0	0.168	OK
SMH7	FSR: 100 years: +20 %: 240 mins: Winter	26.100	25.100	25.502	0.402	1.8	0.454	0.000	1.7	20.717	Surcharged
SMH8	FSR: 100 years: +20 %: 240 mins: Summer	26.100	25.000	25.025	0.025	1.7	0.000	0.000	1.7	18.339	OK

Critical Storm Per Item: Rank By: Max. Resident Volume

Stormwater Control	Storm Event	Max. US Elevation (m)	Max. DS Elevation (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
BASIN1	FSR: 100 years: +20 %: 1440 mins: Winter	25.804	25.804	0.454	0.454	2.6	42.475	0.000	8.025	1.1	24.414	-0.786	Flood Risk
RAIN GARDEN 2	FSR: 100 years: +20 %: 1440 mins: Winter	25.827	25.827	0.838	0.877	2.7	8.472	0.000	1.995	6.9	10.320	38.879	OK
PP4	FSR: 100 years: +20 %: 1440 mins: Winter	25.826	25.805	0.402	0.405	6.9	8.788	0.000	5.905	0.2	10.124	26.652	OK
PP2	FSR: 100 years: +20 %: 480 mins: Winter	25.959	25.653	0.402	0.128	2.8	5.615	0.000	1.612	1.8	20.665	31.431	OK
PP1	FSR: 100 years: +20 %: 240 mins: Winter	25.778	25.715	0.263	0.215	2.2	4.519	0.000	0.811	1.6	8.215	46.930	OK
RAIN GARDEN 1	FSR: 100 years: +20 %: 1440 mins: Winter	25.600	25.605	0.388	0.405	0.2	1.519	0.000	2.977	0.0	0.169	78.380	OK
BASIN2	FSR: 100 years: +20 %: 1440 mins: Winter	25.868	25.868	0.368	0.368	1.1	27.021	0.000	5.820	0.0	0.000	31.287	OK
Swale	FSR: 100 years: +20 %: 480 mins: Winter	25.553	25.570	0.074	0.145	5.6	1.167	0.000	0.264	0.1	66.746	91.074	OK
PP3	FSR: 100 years: +20 %: 480 mins: Winter	25.645	25.500	0.206	0.150	5.1	21.499	0.000	0.000	1.8	49.229	55.973	OK
Swale (1)	FSR: 100 years: +20 %: 30 mins: Winter	25.761	25.761	0.011	0.061	3.1	1.567	0.000	0.065	1.0	1.968	91.209	OK

Critical Storm Per Item: Rank By: Max. Flow

Connection	Storm Event	Connection Type	From	To	Upstream Cover Elevation (m)	Max. US Water Elevation (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
P5	FSR: 100 years: +20 %: 480 mins: Winter	Pipe	SMH3	SMH4	26.000	25.653	0.150	37.073	0.2	0.23	3.3	Surcharged
P2	FSR: 100 years: +20 %: 240 mins: Winter	Pipe	SMH1	SMH2	26.050	25.685	0.091	8.212	0.2	0.13	1.6	OK
P3	FSR: 100 years: +20 %: 240 mins: Winter	Pipe	SMH2	SMH3	26.050	25.650	0.150	11.285	0.2	0.16	1.7	Surcharged
P1	FSR: 100 years: +20 %: 240 mins: Winter	Pipe	PP1	SMH1	26.050	25.739	0.037	8.215	0.6	0.3	1.6	OK
P10	FSR: 100 years: +20 %: 1440 mins: Winter	Pipe	SMH5	SMH6	26.000	25.541	0.021	0.168	0.0	0	0.0	OK
P8	FSR: 100 years: +20 %: 15 mins: Summer	Pipe	BASIN2	RAIN GARDEN 1	26.000	25.573	0.000	0.000	0.0	0	0.0	OK
P14	FSR: 100 years: +20 %: 30 mins: Winter	Pipe	Swale (1)	PP3	26.100	25.736	0.100	1.957	0.1	0.05	1.0	OK
P9	FSR: 100 years: +20 %: 1440 mins: Winter	Pipe	RAIN GARDEN 1	SMH5	26.062	25.603	0.005	0.169	0.2	0	0.0	OK
P6	FSR: 100 years: +20 %: 1440 mins: Winter	Pipe	BASIN1	SMH4	25.850	25.804	0.118	19.967	0.0	0	1.1	Flood Risk
P12	FSR: 100 years: +20 %: 60 mins: Winter	Pipe	PP4	BASIN1	26.075	25.545	0.100	0.470	0.0	0.05	0.3	OK
P11	FSR: 100 years: +20 %: 15 mins: Summer	Pipe	SMH6	Swale	26.000	25.470	0.026	1.272	0.0	0	0.0	OK
P4	FSR: 100 years: +20 %: 480 mins: Winter	Pipe	PP2	SMH3	26.082	25.816	0.153	20.664	0.2	0.04	1.8	Surcharged
P7	FSR: 100 years: +20 %: 15 mins: Winter	Pipe	Swale	SMH4	26.054	25.494	0.100	0.591	0.5	0.43	2.3	OK
P16	FSR: 100 years: +20 %: 240 mins: Summer	Pipe	SMH7	SMH8	26.100	25.469	0.026	18.339	0.8	0.06	1.7	Surcharged

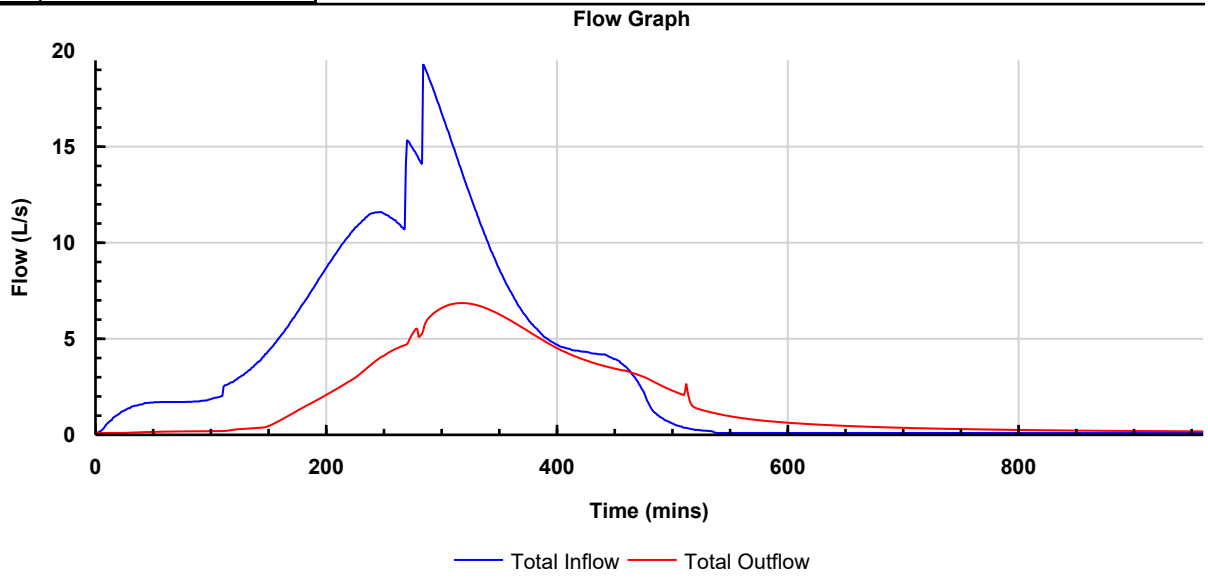
P13	FSR: 100 years: +20 %: 15 mins: Winter	Pipe	SMH4	PP3	26.000	25.533	0.138	0.588	0.2	0.08	2.3	OK
P15	FSR: 100 years: +20 %: 30 mins: Summer	Pipe	PP3	SMH7	26.139	25.479	0.100	3.339	0.6	0.14	2.9	Surcharged
P20	FSR: 100 years: +20 %: 1440 mins: Winter	Pipe	RAIN GARDEN 2	PP4	26.089	25.807	0.127	4.931	0.6	0.05	6.9	OK

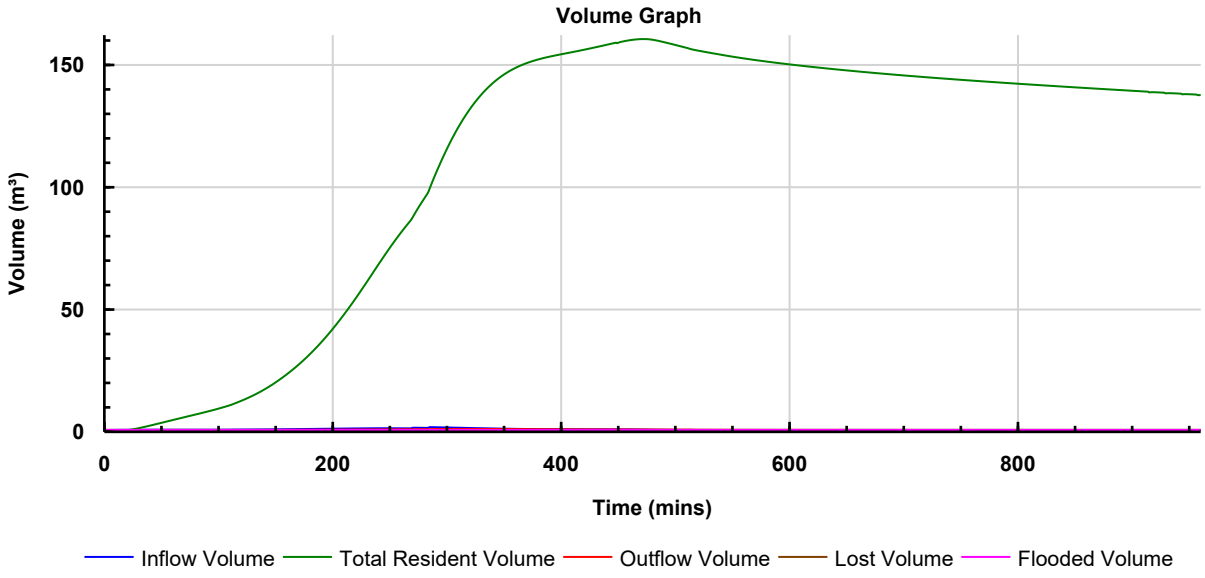
Phase 4 Redesign 130224
FSR: 100 years: Increase Rainfall (%): +20: 480 mins: Winter

Tables

Name	Max. Inflow (L/s)	Total Inflow Volume (m³)	Max. Outflow (L/s)	Total Outflow Volume (m³)
SMH6			2.8	33.222
SMH6			2.8	33.222
SMH8			1.7	29.169
TOTAL	19.3	186.303	6.8	95.612

Graphs

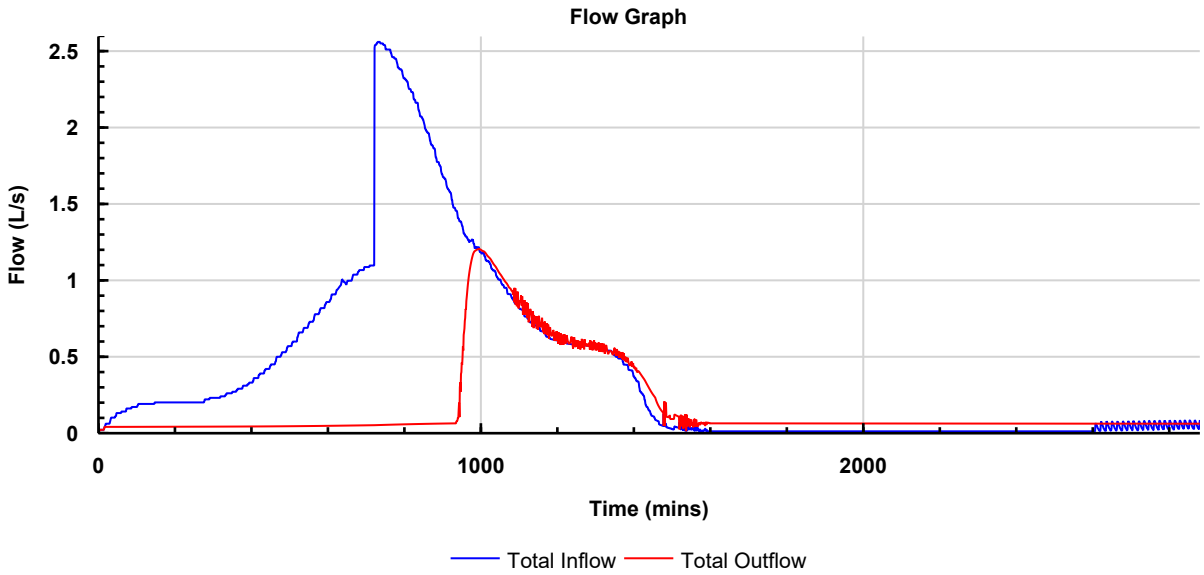


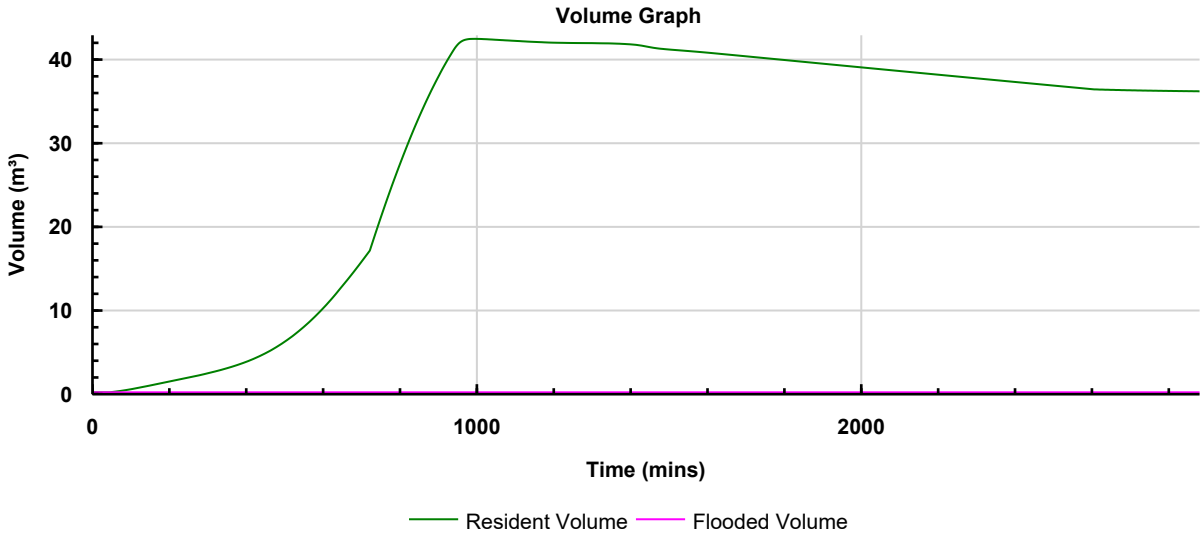


BASIN1 Type : Pond

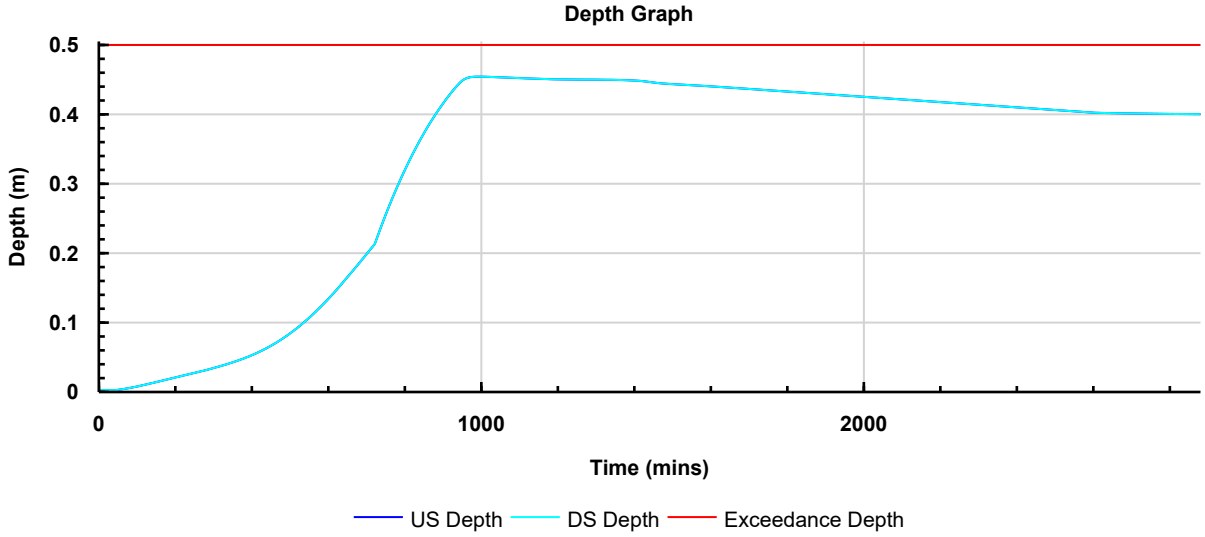
Critical Storm: FSR: 100 years: Increase Rainfall (%): +20: 1440 mins: Winter

Graphs





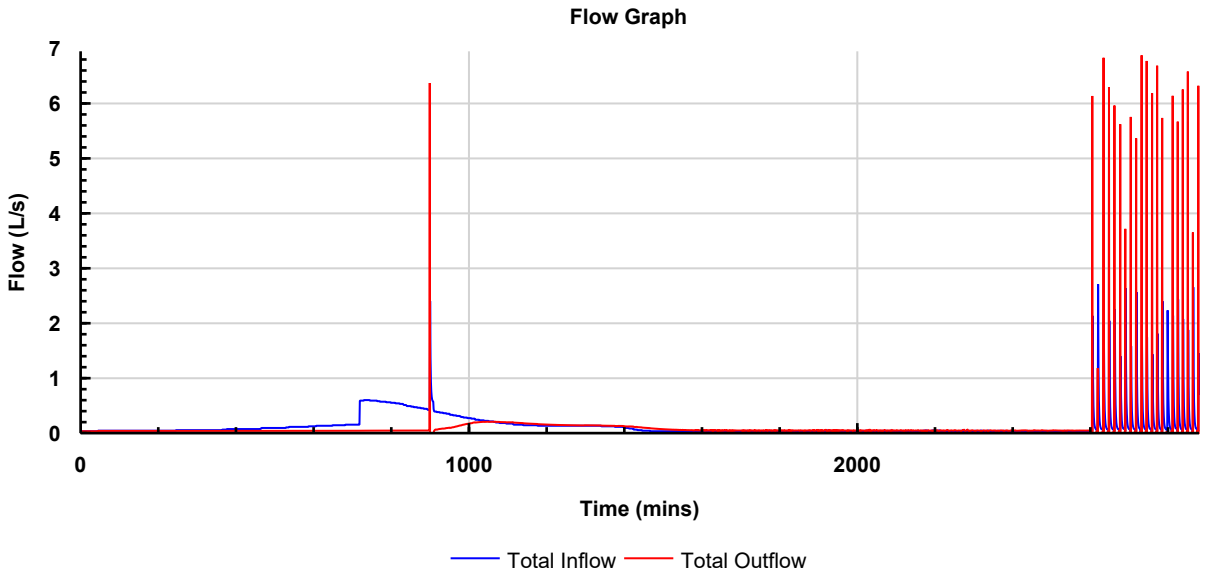
KC12 - Prussia Street Development:	Date: 30/01/2024		
	Designed by: KL	Checked by: KC	Approved By: KC
Report Details: Type: Stormwater Control Results Storm Phase: Phase 4 Redesign 130224	Company Address:		

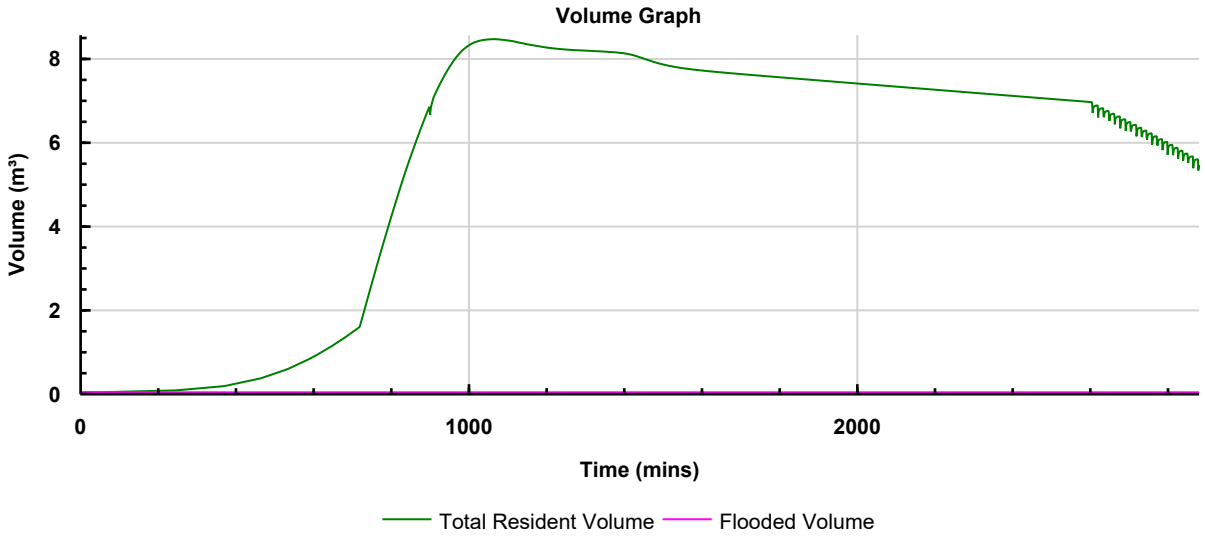


RAIN GARDEN 2 Type : Swale

Critical Storm: FSR: 100 years: Increase Rainfall (%): +20: 1440 mins: Winter

Graphs





KC12 - Prussia Street Development:	Date: 30/01/2024		
	Designed by: KL	Checked by: KC	Approved By: KC
Report Details: Type: Stormwater Control Results Storm Phase: Phase 4 Redesign 130224	Company Address:		

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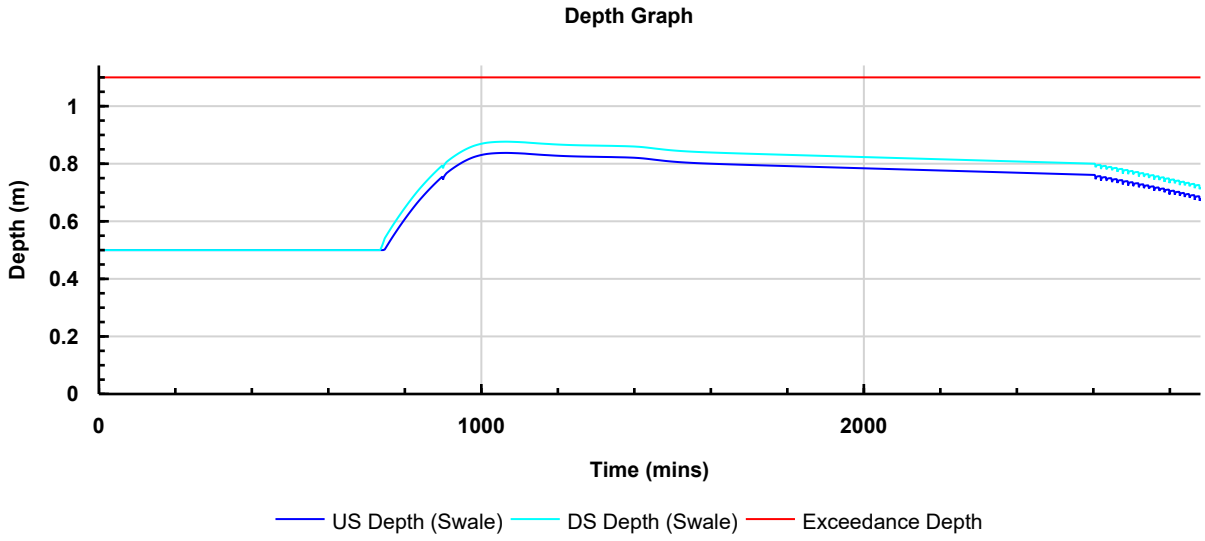
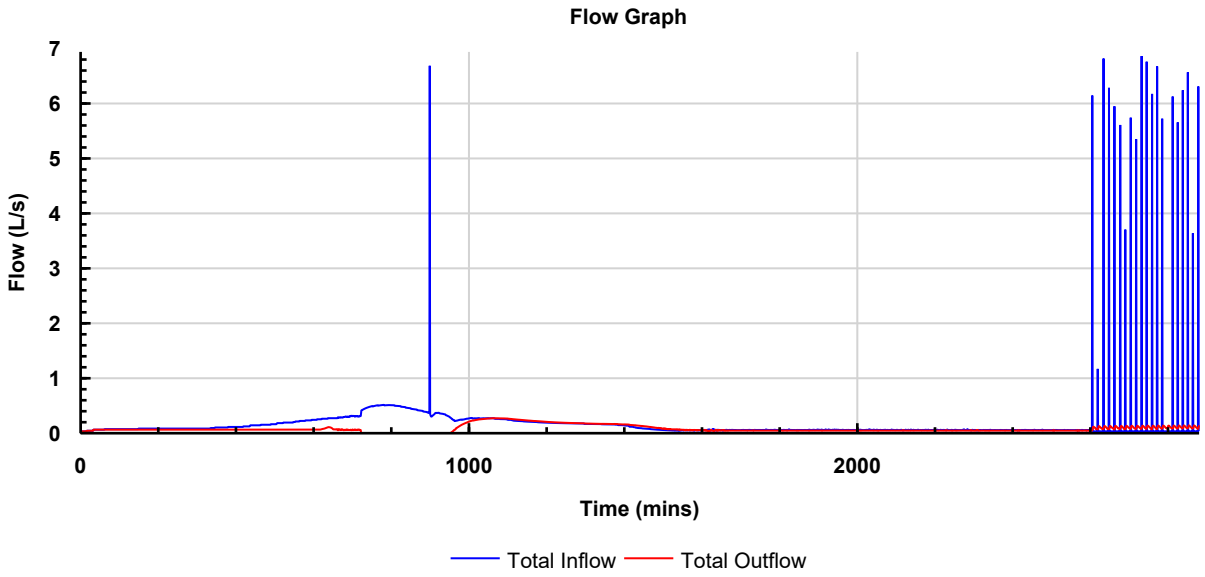
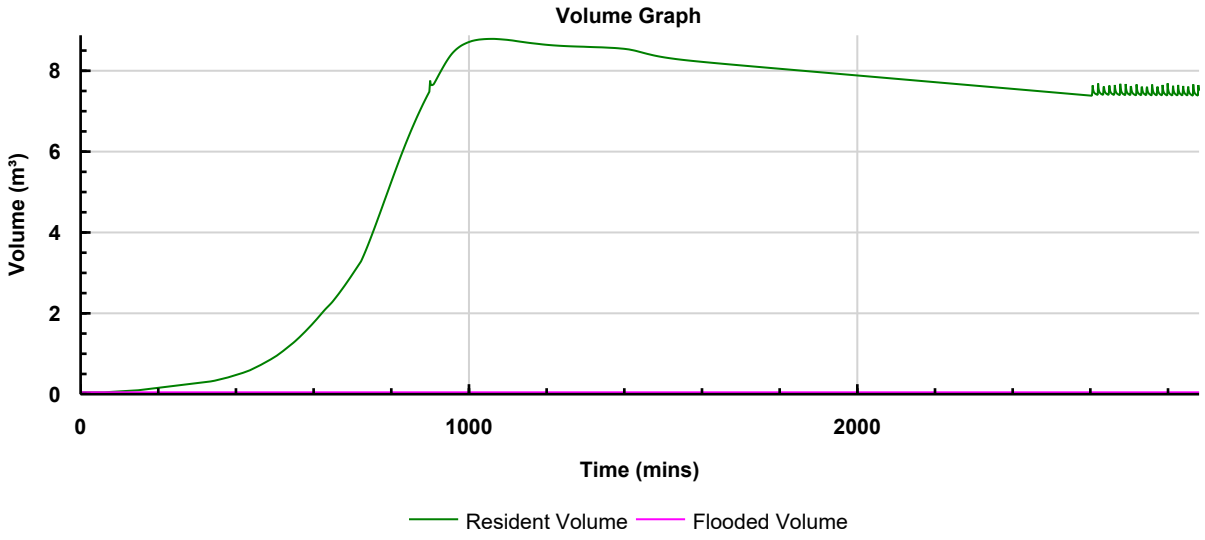


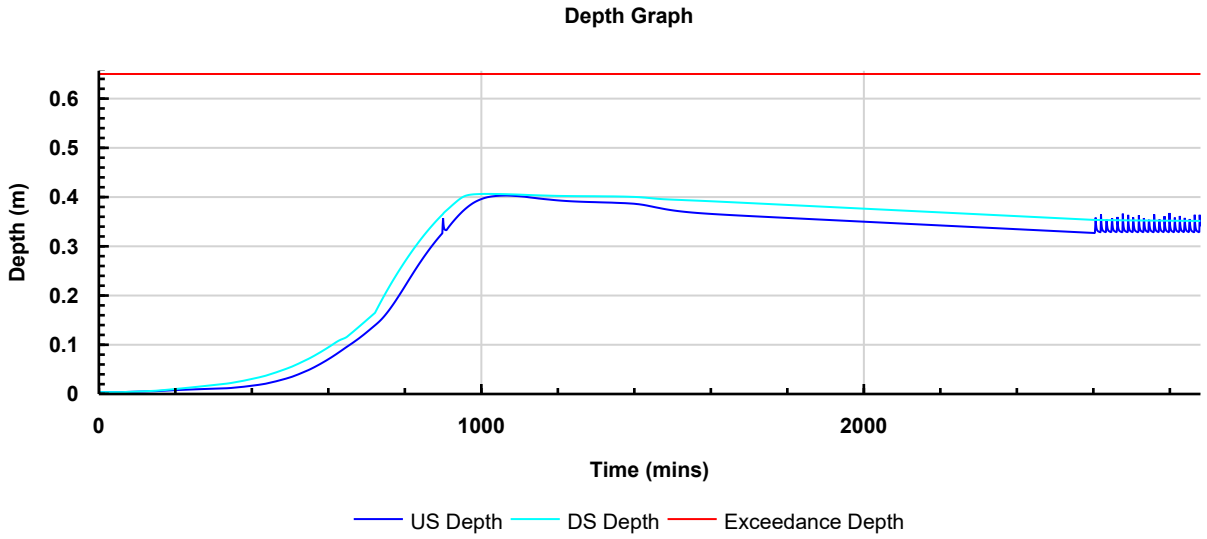
PP4
Critical Storm: FSR: 100 years: Increase Rainfall (%): +20: 1440 mins: Winter

Type : Porous Paving

Graphs



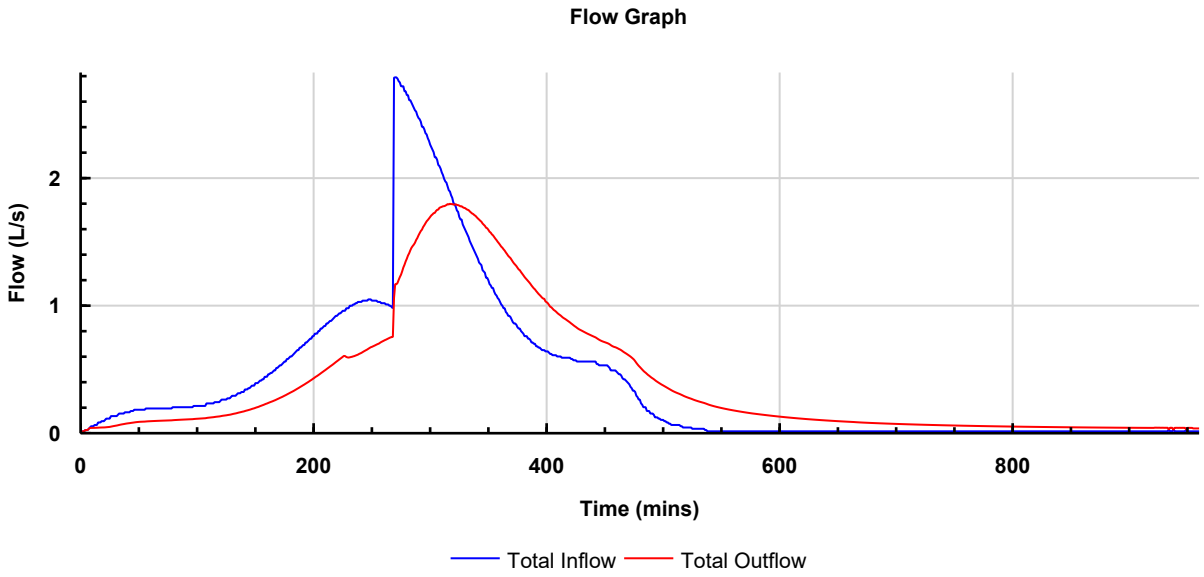


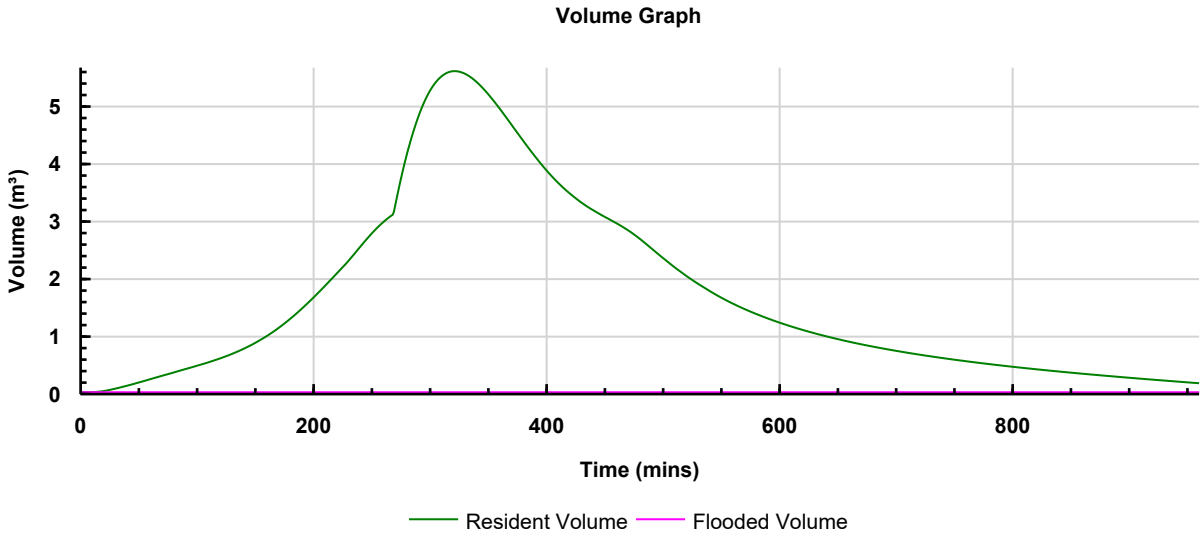

Depth Graph
Depth (m)
0.6
0.5
0.4
0.3
0.2
0.1
0
0
1000
2000
Time (mins)
US Depth
DS Depth
Exceedance Depth

PP2
Critical Storm: FSR: 100 years: Increase Rainfall (%): +20: 480 mins: Winter

Type : Porous Paving

Graphs





KC12 - Prussia Street Development:	Date: 30/01/2024		
	Designed by: KL	Checked by: KC	Approved By: KC
Report Details: Type: Stormwater Control Results Storm Phase: Phase 4 Redesign 130224	Company Address:		

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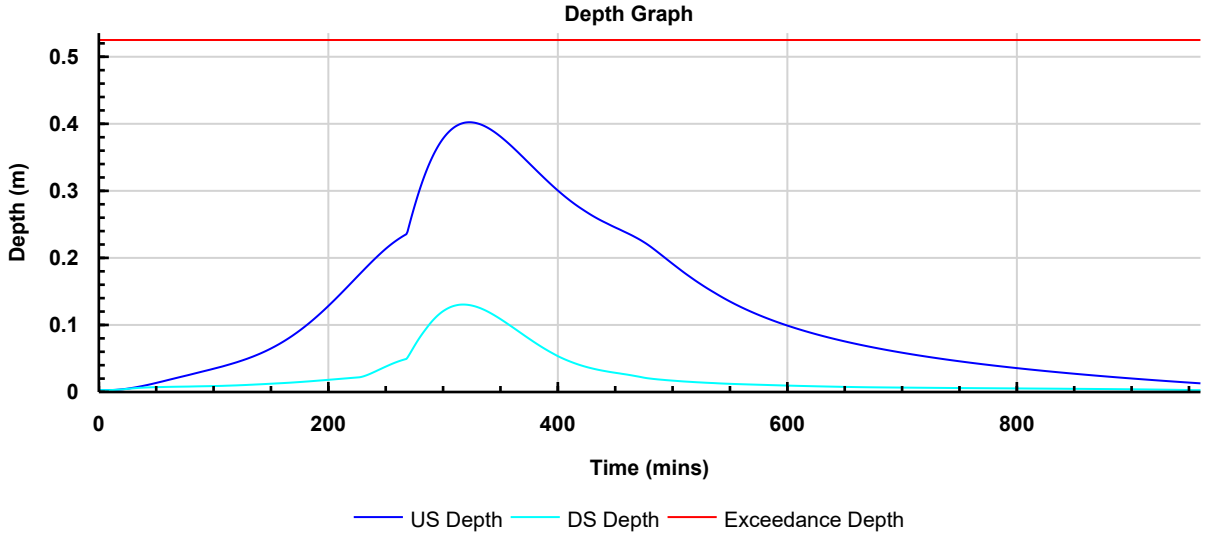
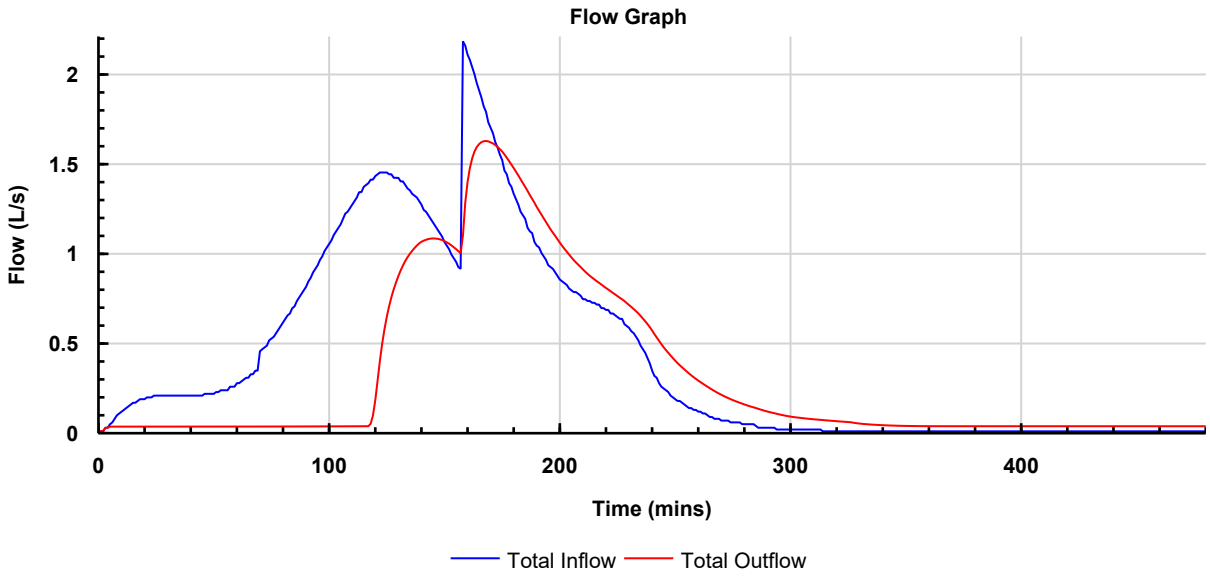
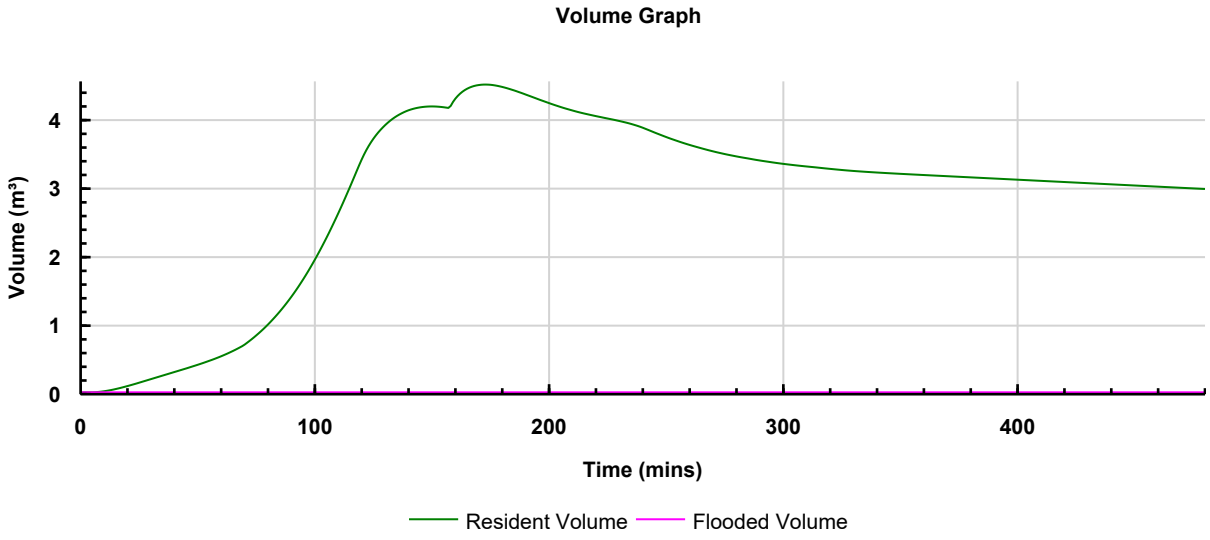


PP1
Critical Storm: FSR: 100 years: Increase Rainfall (%): +20: 240 mins: Winter

Type : Porous Paving

Graphs





KC12 - Prussia Street Development:	Date: 30/01/2024		
	Designed by: KL	Checked by: KC	Approved By: KC
Report Details: Type: Stormwater Control Results Storm Phase: Phase 4 Redesign 130224	Company Address:		

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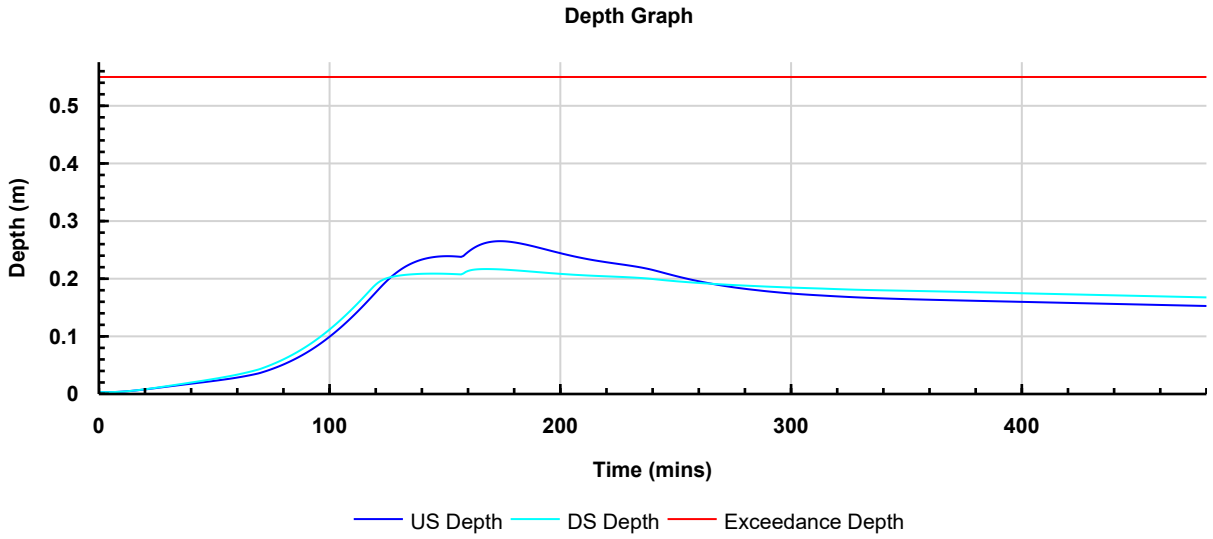
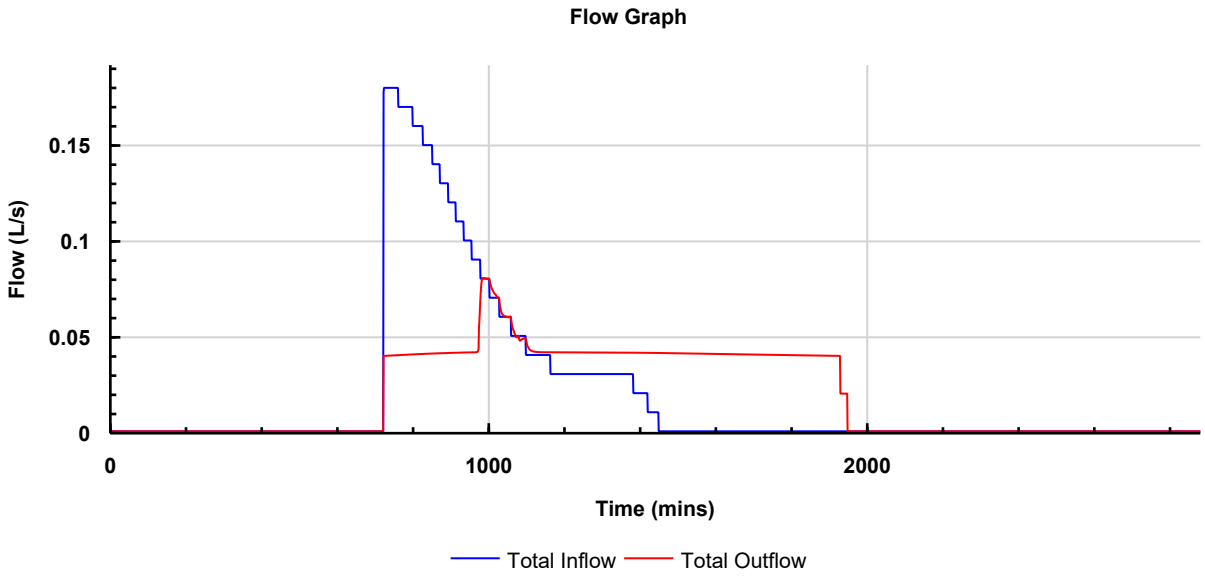
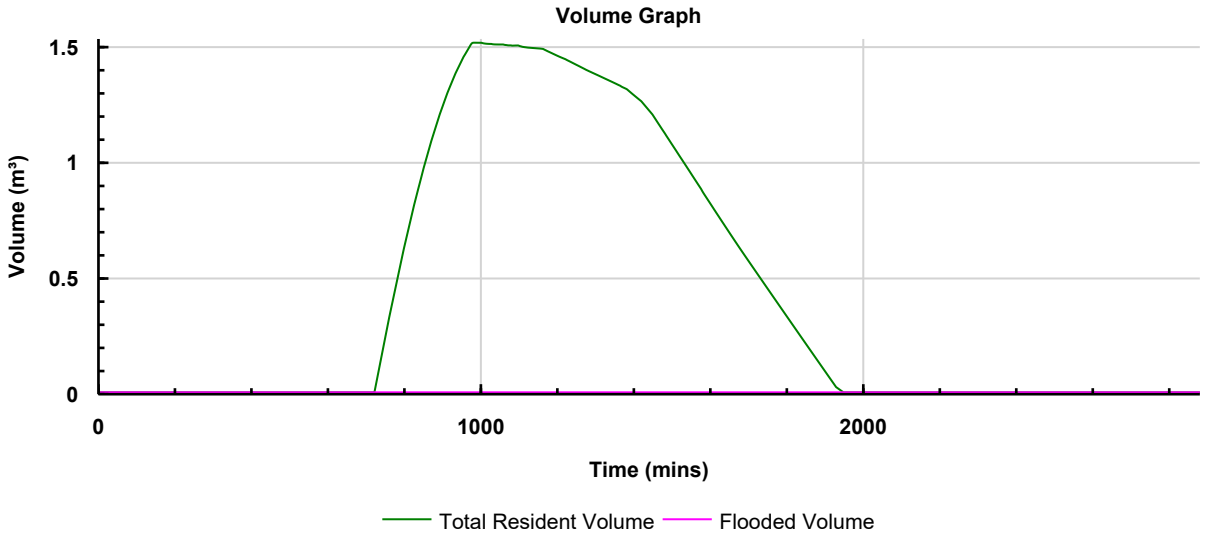


RAIN GARDEN 1 Type : Swale

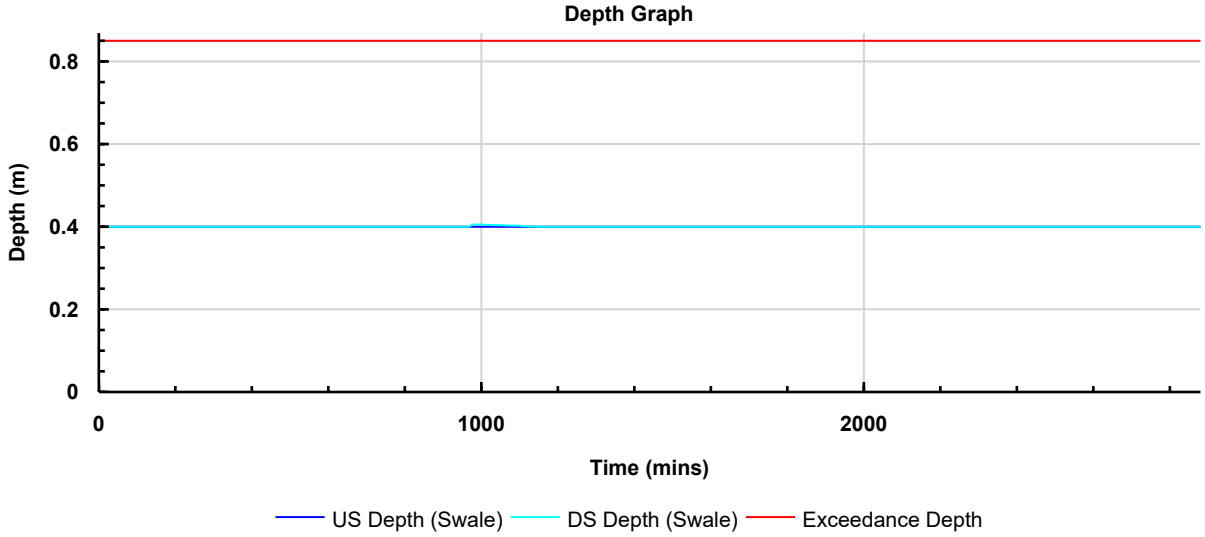
Critical Storm: FSR: 100 years: Increase Rainfall (%): +20: 1440 mins: Winter

Graphs





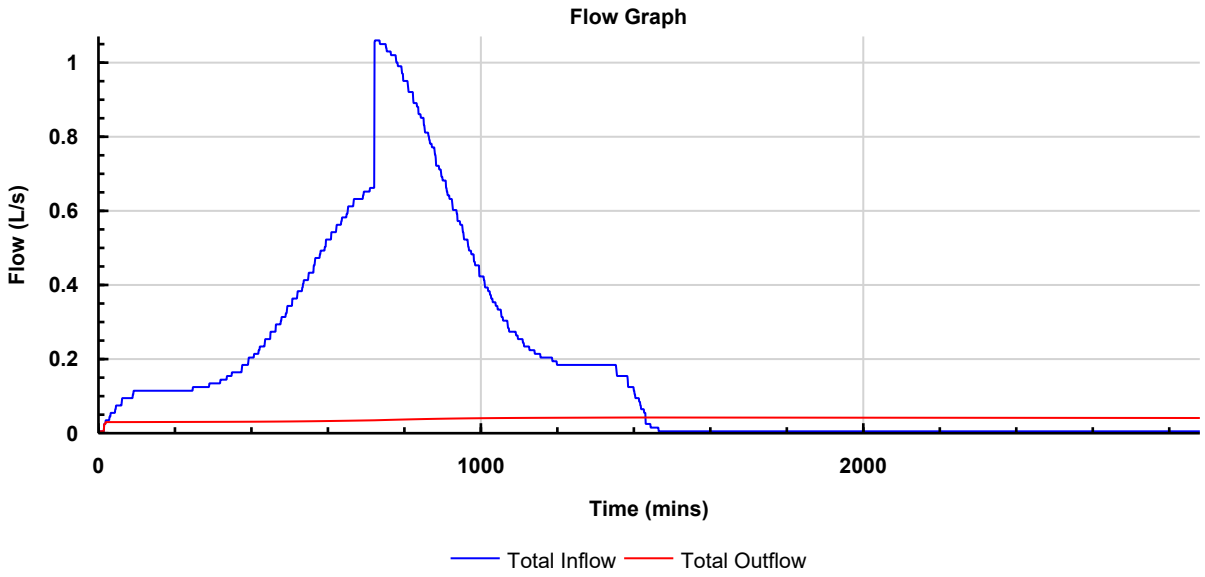
KC12 - Prussia Street Development:	Date: 30/01/2024		
	Designed by: KL	Checked by: KC	Approved By: KC
Report Details: Type: Stormwater Control Results Storm Phase: Phase 4 Redesign 130224	Company Address:		

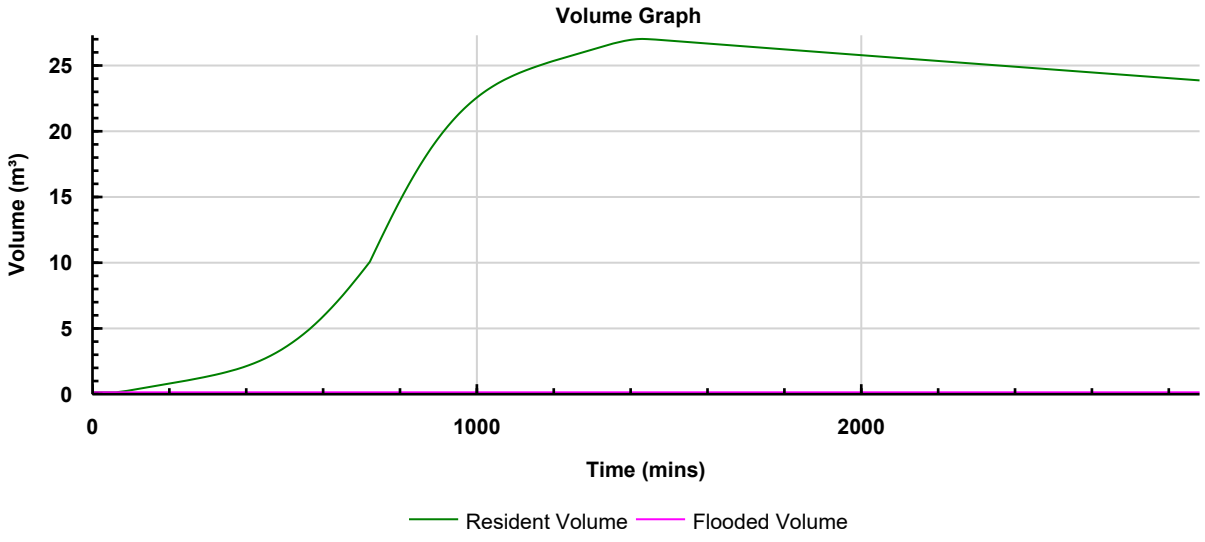


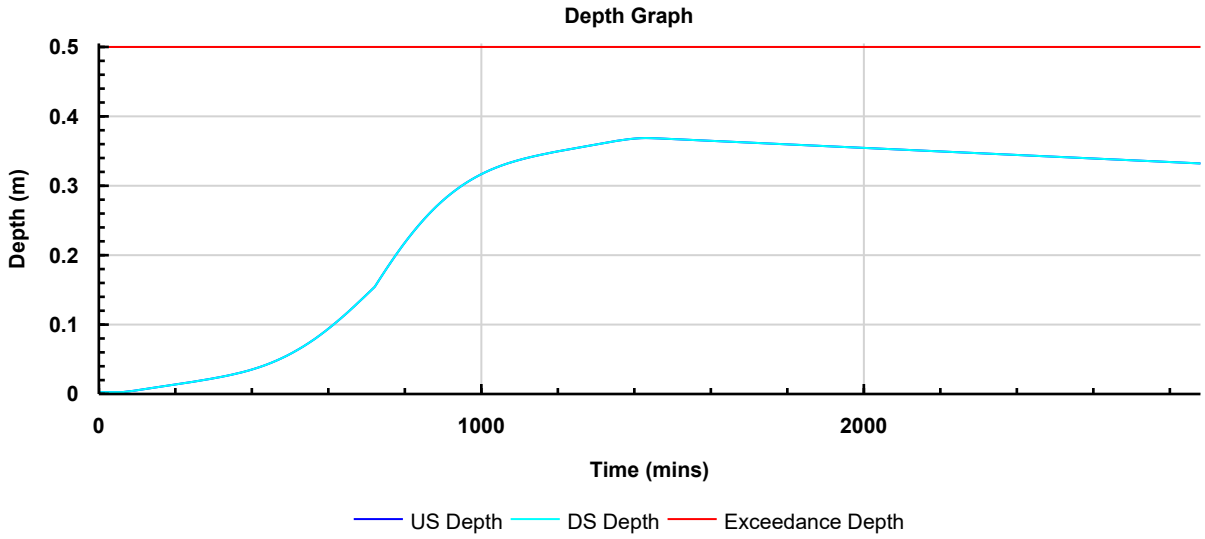
BASIN2
Critical Storm: FSR: 100 years: Increase Rainfall (%): +20: 1440 mins: Winter

Type : Pond

Graphs



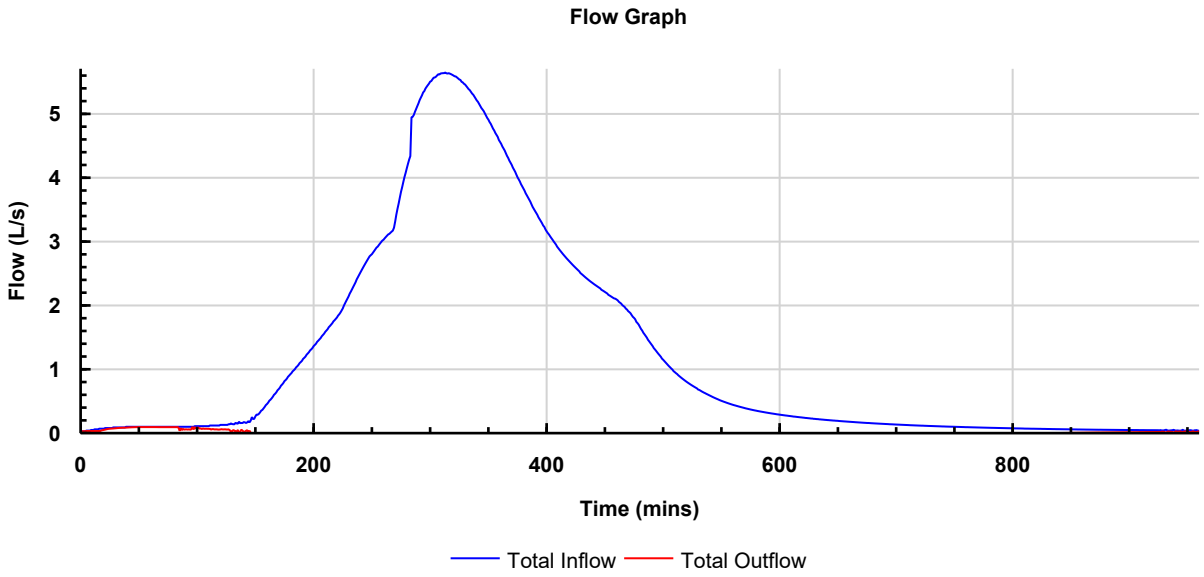


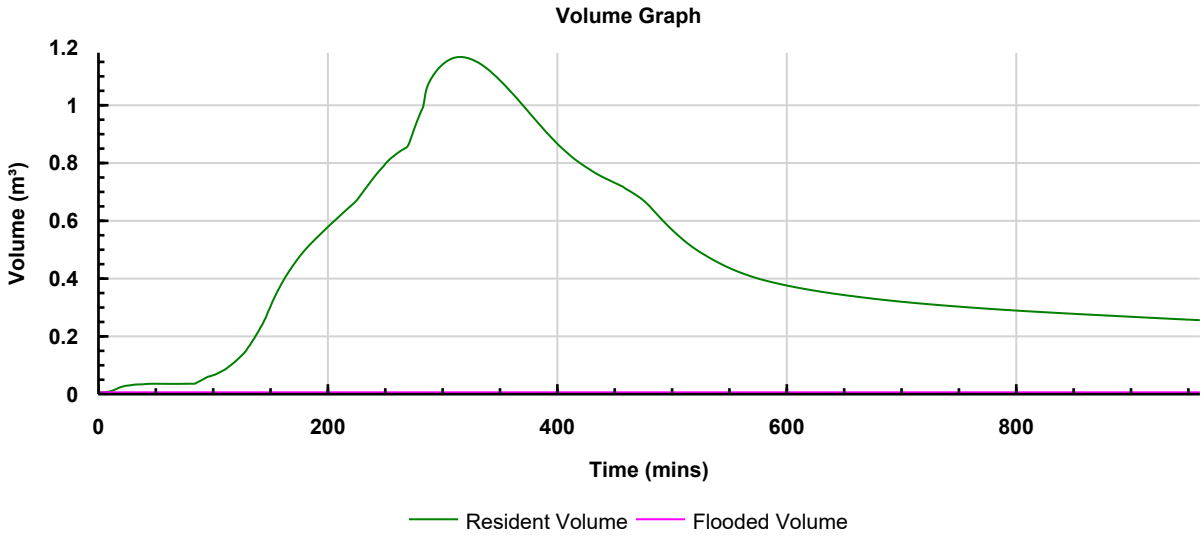

Depth Graph
0.5
0.4
0.3
0.2
0.1
0
Depth (m)
0
1000
2000
Time (mins)
US Depth
DS Depth
Exceedance Depth

Swale
Critical Storm: FSR: 100 years: Increase Rainfall (%): +20: 480 mins: Winter

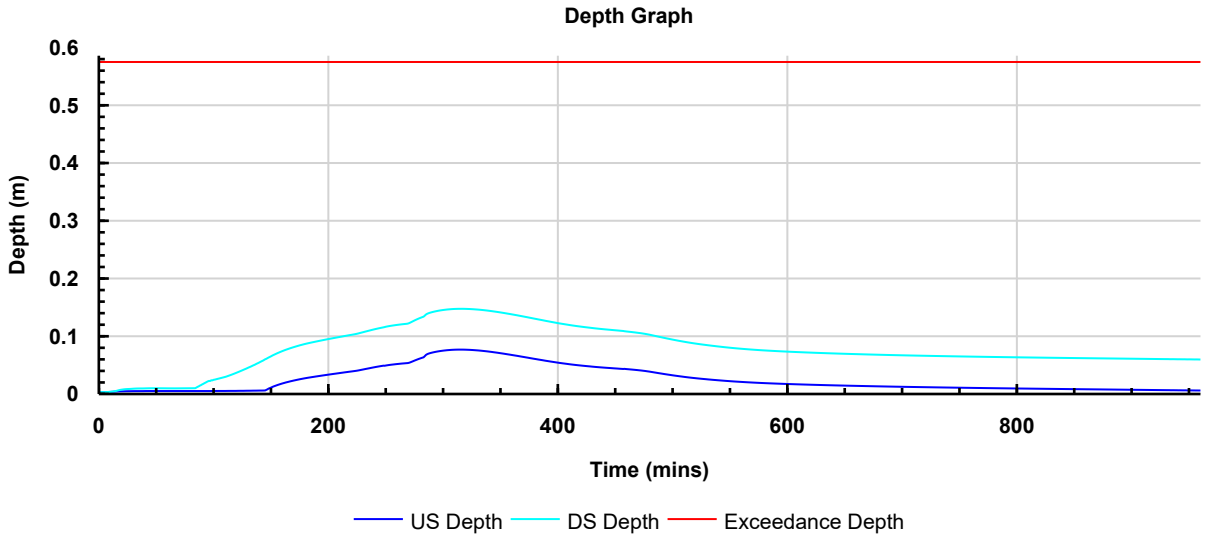
Type : Swale

Graphs





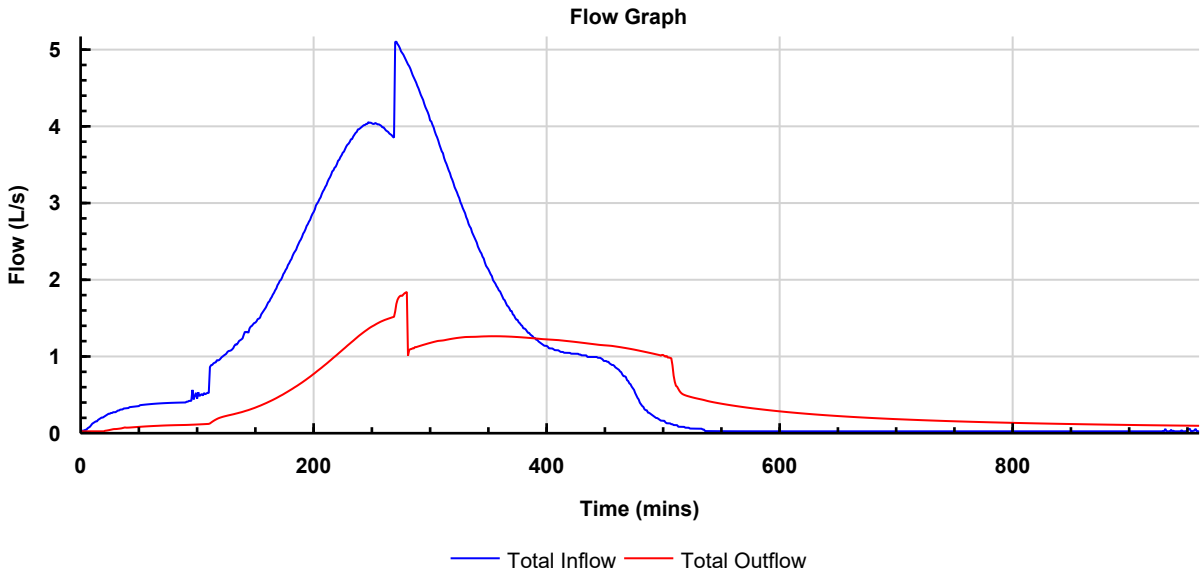
KC12 - Prussia Street Development:	Date: 30/01/2024		
	Designed by: KL	Checked by: KC	Approved By: KC
Report Details: Type: Stormwater Control Results Storm Phase: Phase 4 Redesign 130224	Company Address:		

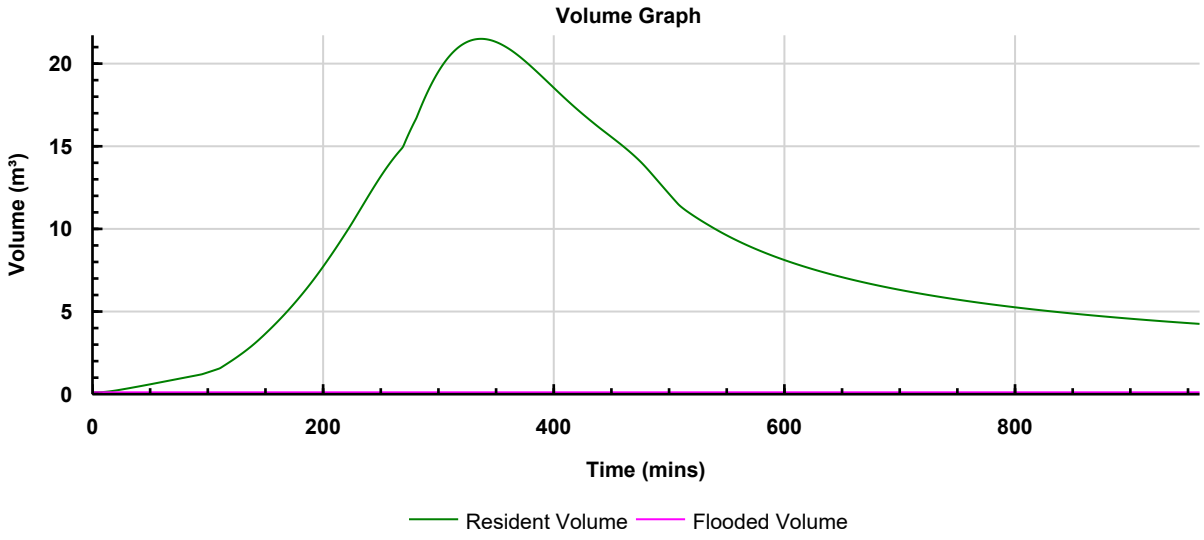


PP3 Type : Porous Paving

Critical Storm: FSR: 100 years: Increase Rainfall (%): +20: 480 mins: Winter

Graphs





KC12 - Prussia Street Development:	Date: 30/01/2024		
	Designed by: KL	Checked by: KC	Approved By: KC
Report Details: Type: Stormwater Control Results Storm Phase: Phase 4 Redesign 130224	Company Address:		

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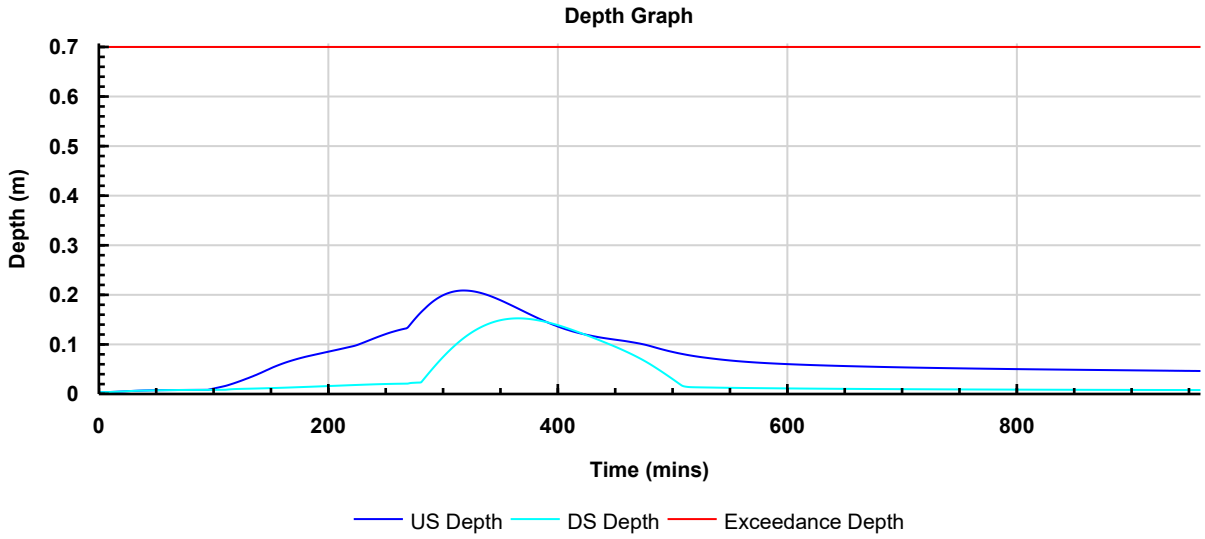
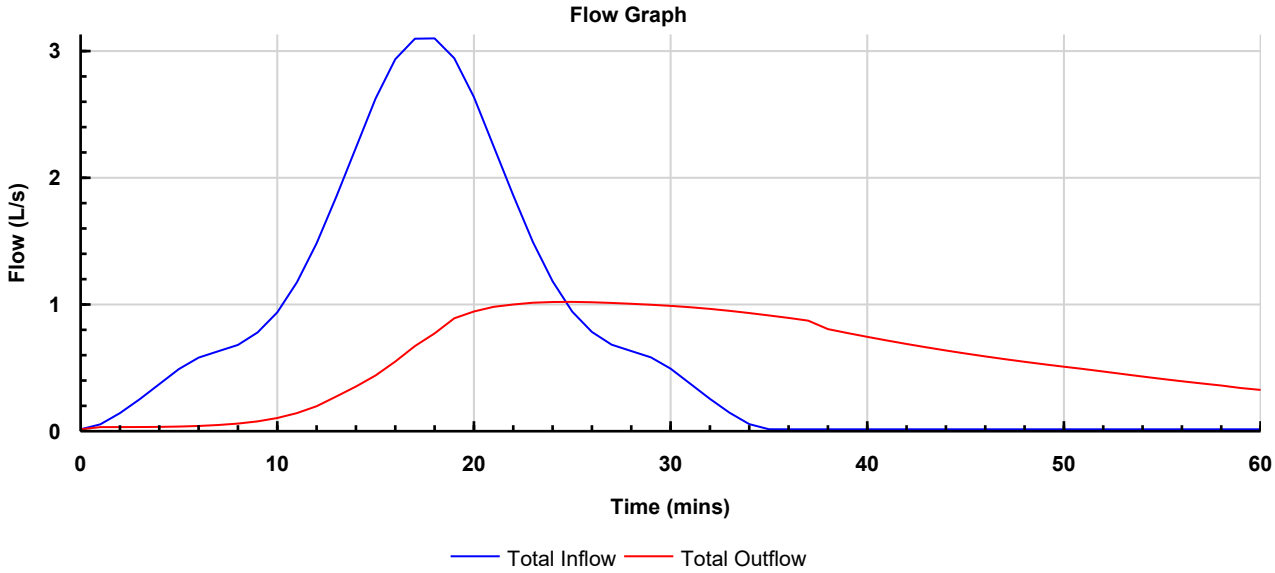
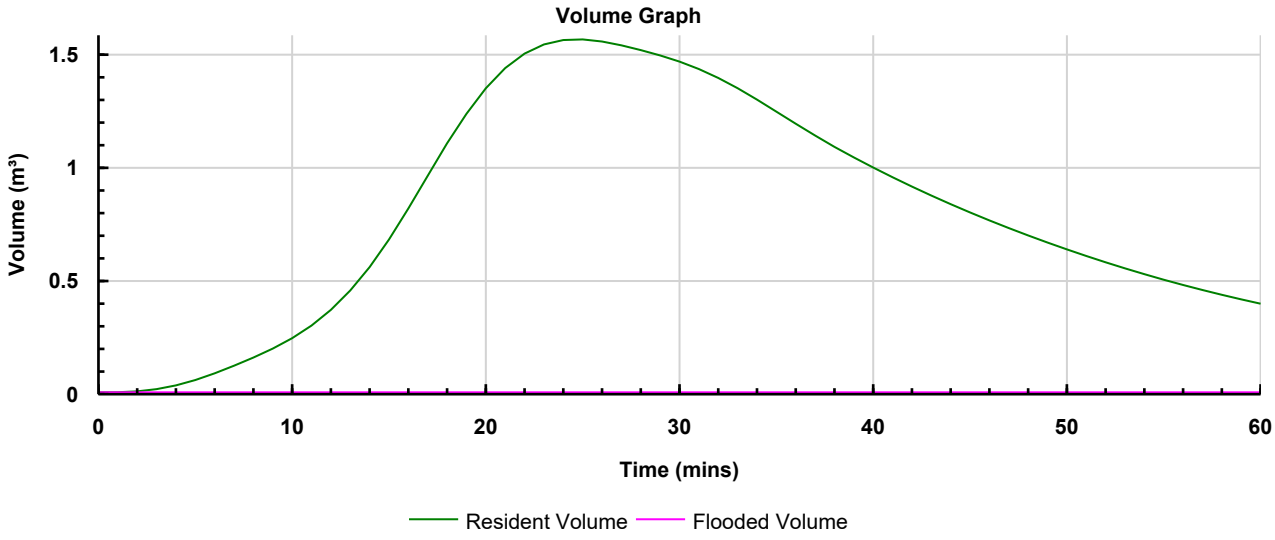


Swale (1)
Critical Storm: FSR: 100 years: Increase Rainfall (%): +20: 30 mins: Winter

Type : Swale

Graphs





KC12 - Prussia Street Development:	Date: 30/01/2024		
	Designed by: KL	Checked by: KC	Approved By: KC
Report Details: Type: Stormwater Control Results Storm Phase: Phase 4 Redesign 130224	Company Address:		

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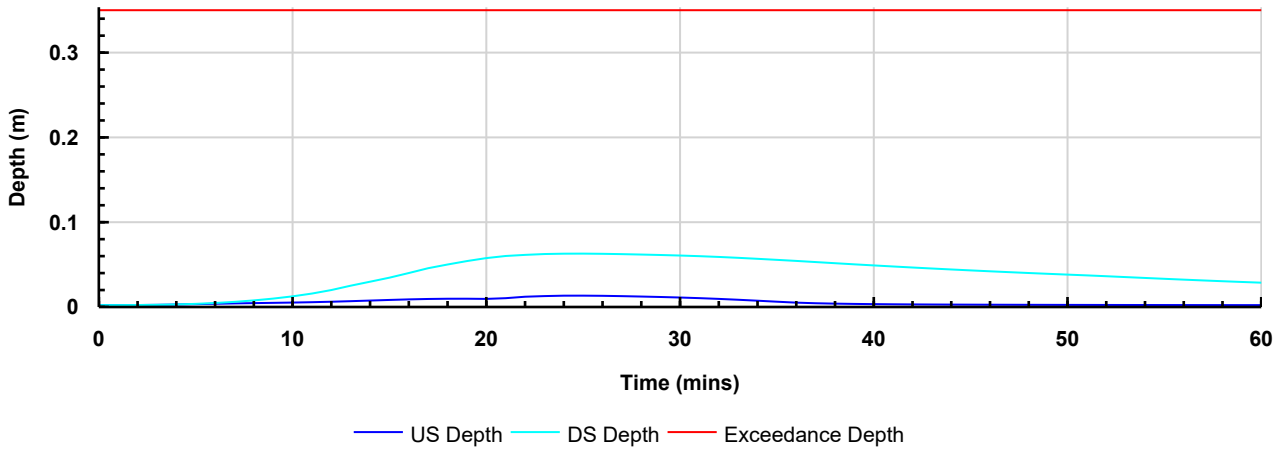
Depth Graph



- Extract from Infodrainage Software: Infiltration Basins, Permeable Asphalt, Attenuation Tank

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Appendix C: Drg. No. KC11-V1-XXX-DR-HLCE-CE-0006 Storm Water Management Plan

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STORM WATER MANAGEMENT PLAN
SCALE 1:200

REV	BY	CKD.	DATE	DESCRIPTION
0	KL	NF	12.03.24	ISSUED FOR INFORMATION

L:\KC\KC1201-WIP\CAD\KC12-V1-XXX-DR-HLCE-CE-0006.dwg 12/3/2024 11:54 - A1

PROJECT
PROPOSED STUDENT ACCOMODATION AT PRUSSIA STREET, STONEYBATTER

DRG. TITLE
PROPOSED STORM WATER MANAGEMENT PLAN

SCALE	DRAWN BY	CHECKED BY	APPROVED BY
AS SHOWN (@ A1)	SP	NF	NF

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DWG	KC12-V1-XXX-DR-HLCE-CE-0006		
HL PROJECT REF.	STATUS	REVISION
KC12	P1	0