PDFelement

The Landings, Ford Airfield

Infrastructure RM (IRM)

Drainage Technical Note
IRM_04.B
December 2024

Vistry Group

ARDENT
CONSULTING ENGINEERS
AN EMPLOYEE OWNED COMPANY

VISTRY HOMES LIMITED

THE LANDINGS, LAND AT FORD AIRFIELD, FORD

Infrastructure Reserved Matters Drainage Technical Note

REPORT REF.
2205771-R16-C

December 2024

[redacted]

Email: enquiries@ardent-ce.co.uk

ARUN DISTRICT COUNCIL F/14/24/RES

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Document Control Sheet

REV	ISSUE PURPOSE	AUTHOR	CHECKED	APPROVED	DATE
-	Final	VL	AD	MR	09/08/2024
A	Final	VL	AD	MR	15/08/2024
B	Final	VL	AD	MR	22/08/2024
C	Final	VL	AD	MR	13/12/2024

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1. Introduction

1.1. Ardent Consulting Engineers (ACE) has been appointed by Vistry Homes Limited to advise on the Drainage and flood risk aspects of the proposals for a residential-led mixed-use development on Land at Ford Airfield, Ford.

1.2. The site location is shown in Ardent Drawing 2205771-D60, and the proposed development layout is included in **Appendix A.**

1.3. The Local Planning Authority (LPA) is Arun District Council (ADC) and the Lead Local Flood Authority is West Sussex County Council (WSCC).

Planning History

Outline Application

1.4. Outline (all matters reserved except access) permission (ref F/4/20/OUT) was granted in July 2023 for:

"…the development of up to 1,500 dwellings (Use Class C3), 60-bed care home (Use Class C2), up to 9,000 sqm of employment floorspace (Use Classes B1), local centre of up to 2,350 sqm including up to 900 sqm retail / commercial (Use Classes A1-A5) and 1,450 sqm community / leisure floorspace (Use Classes D1-D2), land for a two-form entry primary school (Use Class D1), public open space, allotments, new sports pitches and associated facilities, drainage, parking and associated access, infrastructure, landscape, ancillary and site preparation works, including demolition of existing buildings and part removal of existing runway hardstanding…"

Current Application

1.5. The development will be brought forward via a number of reserved matters applications. This Drainage Technical Note (DTN) covers foul and surface drainage strategy for the Infrastructure Reserved Matters (IRM) application, which consists of:

Approval of Reserved Matters pursuant to condition 1 (Reserved Matters Details) following outline consent F/4/20/OUT for Infrastructure RM, for the provision of a primary spine road and associated secondary road junctions, pavement, footpaths, cycle infrastructure and bus stops; site wide drainage infrastructure, including foul pumping stations, foul sewer infrastructure, SUDS basins, SUDS swales, surface

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water infrastructure; public open space, including landscape details, play areas, footpaths & associated works.

1.6. This DTN covers the proposed foul and surface water strategic drainage networks and Sustainable Drainage systems (SuDS) for the IRM. Two further DTNs have been produced to cover drainage arrangements for the two residential development phases referred to as Phase RM1 (North) and Phase RM4 (South).

1.7. A site-wide drainage strategy was produced by JNP Group as part of the outline planning application and has been used as the basis for the IRM detailed drainage design. The IRM drainage design has been updated to incorporate further findings of ground investigations as well as pre-application discussions with West Sussex County Council as the LLFA. A response to comments made by the LLFA as part of pre-application discussions is included in Ardent's letter response in **Appendix B** (Ref. MCE/2205771).

Post-submission comments

1.8. This Technical Note was submitted as part of planning applications F/14/24/RES & F/15/24/RES in September 2024. In their response to the planning application, West Sussex County Council (WSCC) as the Lead Local Flood Authority (LLFA) raised an objection and provided a number of comments in their response letter of 30th October 2024.

1.9. Following receipt of these comments, Ardent held a meeting with the LLFA on 25 November 2024, during which additional information was discussed, and clarifications were provided on several points. Ardent's letter dated 2nd December 2024, included in **Appendix G** of this technical note, summarises the discussions and sets out our detailed responses to each of the LLFA's comments.

1.10. In their letter dated 9th December, the LLFA confirmed they were satisfied with the information provided on several points but maintained their objection on a small number of outstanding matters (refer to letter in **Appendix G**), which have been addressed herein. A summary of the comments and responses is provided in Table Table 1-1 below.

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Table 1-1 Post-submission correspondence

Comment number	Summary	Resolved/ Outstanding (as per LLFA letter 09/12/24)	Ardent's response
1	Request for additional information regarding infiltration testing.	**Resolved** (refer to Appendix G)	-
2	Request for additional information regarding groundwater levels.	**Resolved** (refer to Appendix G)	-
3	Discharge rates: *discharge rate for the northern part of the site will be reduced due to the existing outfall pipe size to below greenfield rates. We recommend that the updated proposed discharge rates are provided for each of the catchments as well as new drawings showing the extents of the basins*	Outstanding	The discharge rate from the northern part of the site has been reduced to account for the existing outfall pipe size. This results in a maximum allowable discharge rates below the previously calculated mean greenfield runoff rate (Qbar). As a result, the attenuation basin has increased in size (refer to **Ardent Drawing 2205771 – D131 (Sheet 2 of 7)** in **Appendix D**). The drainage calculations have been updated accordingly (refer to **Appendix E**).
4	As per comment 3; rates from the northern pond should be restricted to no more than Qbar.	Outstanding	As above, refer to comment 3.
5	Details of further attenuation feature.	**Resolved** (refer to Appendix G)	-

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6	CV values for the 1 in 2 and 1 in 100year rainfall event should be set to 1.	Outstanding	The updated drainage calculations use a Cv value 1 for the 2 year and 30 year events, while Cv values of 0.84 and 0.75 for winter and summer respectively have been applied to the 100 yr + CC design event. Refer to refer to **Appendix E**.
7	Clearly indicate on relevant drawings the 3m maintenance easements from either side of watercourses, as well as availability of off road parking for maintenance vehicles.	Outstanding	This has been shown on drawings 2205771 – D130 to D136 in **Appendix D**.
8	Consideration should be give to the requirement of a SuDS implementation plan to reflect how areas may drain independently in advance of further phases coming forward.	**Resolved** (refer to Appendix G)	

2. Surface Water Drainage

Technical Standards

2.1. The proposed surface water drainage strategy for the development is in accordance with the following technical standards and best practice guidance:

- West Sussex County Council (WCCC) Sustainable Drainage Systems Design Guidance;
- CIRIA SuDS Manual (C753);
- Non-statutory technical standards for sustainable drainage systems. A Best Practice Guidance was published by the Local Authority SuDS Officer Organisation (LASOO) in July 2015 to accompany this document;
- The National Planning Policy Framework.

Drainage Discharge Hierarchy

2.2. In line with CIRIA C753's discharge hierarchy, drainage strategies must aim to use a method of discharge as high up the following hierarchy as possible:

1. Store water for later use
2. Discharge to the ground via infiltration
3. Discharge to a surface water body
4. Discharge to a surface water sewer
5. Discharge to a combined sewer

2.3. It is proposed to include water butts across the site for water re-use. However, the benefits of rainwater harvesting on a specific design storm event cannot be quantified, due to the variable availability of storage within the structure. As such, these have not been included in the drainage strategy calculations.

2.4. The surface water drainage strategy approved at outline stage was divided into a northern parcel, which was drained via infiltration using a series of infiltration basins, and a southern parcel, which utilised swales, detention basins and flow control devices before discharging into drainage ditches in the private land to the west.

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2.5. Subsequent ground investigations including winter groundwater monitoring were undertaken by Omnia Ltd between December and April 2024 (refer to **Appendix C**). The investigations recorded groundwater levels as shallow as 0.24 m bgl. As a result, infiltration systems have been discarded as a method of disposal of surface water. This matter was agreed during post-submission discussions with the LLFA (Refer to correspondence LLFA in **Appendix G**).

2.6. In line with the drainage discharge hierarchy outlined above, it is proposed to attenuate flows within attenuation basins prior to discharging surface water into adjoining ordinary watercourses via 3no. outfalls.

Proposed discharge rates

2.7. Surface Water Drainage strategy drawings are included in **Appendix D**.

2.8. The surface water drainage strategy separates the site into 8 sub-catchments (6 no. Drainage Areas and 2no. roundabouts) based on the natural topography of the site. Surface water runoff from each plot is conveyed either via a piped drainage network (serving the northern half of the site) or grassed swales (serving the southern half) into 5no. strategic detention basins, prior to discharging at the equivalent mean greenfield runoff rate (Qbar). Flows will be controlled by a number of vortex flow controls.

2.9. A Qbar rate of 2.42 l/s/ha has been calculated for the site using the FEH method. The proposed maximum allowable discharge rates per catchment are based on the respective gross development areas for each catchment and including a 10% allowance for urban creep.

SuDS Design

2.10. Priority has been given to above-ground SuDS features which provide amenity, biodiversity and water quality benefits. Due to spatial constraints, an attenuation tank is proposed to serve the proposed school site (Drainage Area 4).

2.11. SuDS features have been designed to accommodate flows up to the 1 in 100 year plus 40% climate change (CC).

2.12. Detention basins have been designed to include the following design characteristics:

- Maximum 1 in 3 side slopes;

- Minimum 300mm freeboard (over the 1 in 100 year + 40%CC water level);
- Water level (during a 1 in 100 year + 40% CC event) not exceeding 2.0m;
- Impermeable geo-membrane to prevent groundwater ingress;
- Forebays and bioretention features; and
- Permanent water feature to enhance amenity and ecological benefits .

2.13. In addition, a pressure relief system (Pozidrain or similar) will be designed to underlay the proposed basins, to mitigate the risk of floatation from high groudnwater levels onsite. Detailed specifications and floatation calculations will be included at the detailed design stage.

Surface Water Drainage Calculations

2.14. Causeway Flow results are included in **Appendix E**. FEH 2022 data has been used in the calculations. The results demonstrate there is not flooding onsite for all rainfall events up to the 1 in 100 year +40%CC, and there is no surcharging in the network during the 1 in 2 year event.

2.15. Following discussions with the LLFA, a Volumetric Run-off Coefficient (CV) value of 1 has been adopted for the 1 in 2 and 1 in 100 year calculations.

2.16. All outfalls have been modelled as fully surcharged up to the flood levels (assumed as top of bank levels) in a 1 in 100 years + 40% CC event.

Surface Water Quality

2.17. Based on the CIRIA753 Simple Index Treatment Method, the development would have an associated pollution hazard level between 'Low' and 'Medium' (considering the level of traffic at the main access road). Conservatively, a 'Medium pollution hazard level has been used for the site.

2.18. The recommended stage of treatment, in line with Tables 26.2 and 26.3 of the SuDS Manual, will be met through the aforementioned swales and bioretention basins. Refer to Tables 2-1 and 2-2 below.

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Table 2-1 Pollution Indices (North)

Pollution Hazard Indices for other Inputs (roofs, driveways, roads, roadside/high traffic roads)			
	Required mitigation indices		
Source	TSS	Metals	Hydrocarbons
Medium	**0.7**	**0.6**	**0.7**
Type of SuDS component provided			
Bioretention system	0.80	0.80	0.80
Total	**0.80**	**0.80**	**0.80**
Check	**+0.10**	**+0.20**	**+0.10**

Table 2-2 Pollution Indices (South)

Pollution Hazard Indices for other Inputs (roofs, driveways, roads, roadside/high traffic roads)			
	Required mitigation indices		
Source	TSS	Metals	Hydrocarbons
Medium	**0.7**	**0.6**	**0.7**
Type of SuDS component provided			
Swale	0.50	0.60	0.60
Bioretention system (x0.5)	0.40	0.40	0.40
Total	**0.90**	**1.00**	**1.00**
Check	**+0.20**	**+0.40**	**+0.30**

Designing for Exceedance

2.19. Drainage exceedance may occur if the rate of surface water runoff exceeds the capacity of the drainage system, the receiving water or piped system becomes overloaded or blocked, or when the outfall becomes restricted due to flood levels in the receiving watercourse.

2.20. Exceedance routes were initially identified at the outline stage in Drawing No. 2205771-D020, which has since been superseded by the RM drawings submitted in this application. However, the exceedance routes remain unchanged. As mentioned above, all outfalls have been modelled as fully surcharged up to the flood levels (top of bank levels) in a 1 in 100 years + 40% CC event.

Future Maintenance

2.21. The drainage elements covered within this application (the sewer network, swales and basins) will be offered for adoption by a New Appointments and Variations (NAVs) company under a S104 agreement.

2.22. A Maintenance and Management Plan for all SuDS features is provided within **Appendix F**, detailing the operational requirements for each SuDS feature for the lifetime of the development.

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3. Foul Water Drainage

3.1. Foul Water Drainage strategy drawings are included in **Appendix D**.

3.2. The foul drainage strategy has been designed to convey foul flows to 3no. proposed adoptable pumping stations (Pump Stations 1, 2 and 3), which will in turn discharge into a fourth pump station (Terminal Pump Station 4). Foul Pump Station 4 will pump flows to Ford wastewater treatment works to the east of the site.

3.3. All pumping stations will be fitted with a telemetry system and emergency storage to adoptable standards.

3.4. Refer to Table 3-1 below for pumping station catchment details.

Table 3-1 Foul drainage catchments

Station Reference	Type	Catchment
Pump Station 1	Satellite	132 Dwellings plus 12l/s design flow from an adjacent development
Pump Station 2	Satellite	717 Dwellings
Pump Station 3	Satellite	437 Dwellings
Pump Station 4	Terminal	98 Dwellings, 60 bed care home, 2 form entry primary school, 2320m2 local centre plus pumped flows from Pump Stations 1,2 and 3

3.5. Total foul flows from Terminal Pump Station 4 have been calculated as 87.51 l/s. Desing flows for each pumping station are set out in Table 3-2 below.

Table 3-2 Foul drainage design flows

Pump Station	Design Flow (l/s)
1	18.22
2	33.19
3	20.23
4* (*Total site flows, including flows from PS 1, 2 and 3)	87.51

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4. Summary and Conclusion

4.1. Ardent Consulting Engineers (ACE) has been appointed by Vistry Homes Limited to advise on the Drainage and flood risk aspects of the proposals for a residential-led mixed-use development on Land at Ford Airfield, Ford.

4.2. The development will be brought forward via a number of reserved matters applications. This Drainage Technical Note (TTN) covers the Infrastructure Reserved Matters (IRM) application.

4.3. The Local Planning Authority (LPA) is Arun District Council (ADC) and the Lead Local Flood Authority (LLFA) is West Sussex County Council (WSCC). Pre-application discussions with the LLFA have taken place and have informed the drainage design for the IRM application. Post-submission discussions have also taken place and any outstanding comments have been addressed in this DTN.

4.4. The surface water drainage strategy proposes to attenuate flows within attenuation basins prior to discharging surface water into adjoining ordinary watercourses via 3no. outfalls, at restricted rates equivalent to mean greenfield runoff rates (Qbar) or lower.

4.5. Causeway Flow results demonstrate there is not flooding onsite for all rainfall events up to the 1 in 100 year +40%CC, and there is no surcharging in the network during the 1 in 2 year event.

4.6. All outfalls have been modelled as fully surcharged up to the flood levels (assumed as top of bank levels) in a 1 in 100 years + 40% CC event.

4.7. The foul drainage strategy has been designed to convey foul flows to 3no. proposed adoptable pumping stations (Pump Stations 1, 2 and 3), which will in turn discharge into a fourth pump station (Terminal Pump Station 4). Foul Pump Station 4 will pump flows to Ford wastewater treatment works to the east of the site.

4.8. It is anticipated that the drainage systems described in this RMI application will be adopted by a private adoption company. A Maintenance and Management Plan is included in Appendix F of this DTN.

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Appendix A

GENERAL NOTES:

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELATED DRAWINGS ISSUED BY THE ENGINEER.
2. DO NOT SCALE FROM THIS DRAWING. WORK FROM FIGURED DIMENSIONS ONLY.

N

RAISED TABLE AT CROSS-ROADS TRAFFIC CALMING FEATURE
ACOUSTIC SCREENING 4m EFFECTIVE HEIGHT
PROPOSED SURFACE WATER OUTFALL INTO THE EXISTING ORDINARY WATERCOURSE
PROPOSED S278 DRAINAGE TO SERVE NORTHERN ROUNDABOUT
BUS STOP
RAISED TABLE AT CROSS-ROADS TRAFFIC CALMING FEATURE
PROPOSED STRATEGIC SURFACE WATER SEWER SERVING INFRASTRUCTURE AND DEVELOPMENT
DETENTION BASIN 2 - NORTH WITH FOREBAYS AND BIORETENTION FEATURES
BUS STOP
CHICANE, ROAD NARROWING, TRAFFIC CALMING FEATURE
LTN 1/20 PEDESTRIAN PRIORITY JUNCTION
PUBLIC RIGHT OF WAY
[FWPS2] FOUL WATER PUMP STATION No.2 (INCL. EMERGENCY STORAGE) PUMPING TO FOUL WATER PUMPING STATION No.4
PUBLIC RIGHT OF WAY
[FWPS1] FOUL WATER PUMP STATION No.1 (INCL. EMERGENCY STORAGE) PUMPING TO FOUL WATER PUMPING STATION No.4
LTN 1/20 PEDESTRIAN PRIORITY JUNCTION SET BACK MIN. 5.0m, AS RECOMMENDED
CHICANE, ROAD NARROWING, TRAFFIC CALMING FEATURE
DETENTION BASIN 1 - NORTH WITH FOREBAYS AND BIORETENTION FEATURES
BRIDLEWAY
LTN 1/20 PEDESTRIAN AND CYCLIST PRIORITY JUNCTION
RAISED TABLE AT ARUN WAY AND BRIDLEWAY CROSSING
BUS STOP
BUS STOP
RAISED TABLE AT CROSS-ROADS TRAFFIC CALMING FEATURE
ACOUSTIC SCREENING 4m EFFECTIVE HEIGHT
PUBLIC RIGHT OF WAY
LTN 1/20 PEDESTRIAN AND CYCLIST PRIORITY JUNCTION
[FWPS4] FOUL WATER PUMP STATION No.4 (INCL. EMERGENCY STORAGE) PUMPING TO EXISTING WASTE WATER TREATMENT WORKS
RAISED TABLE AT BELLMOUTH JUNCTION TRAFFIC CALMING FEATURE
LTN 1/20 PEDESTRIAN AND CYCLIST PRIORITY JUNCTION
FOUL WATER RISING MAIN FROM FWPS4
ACOUSTIC SCREENING 4m EFFECTIVE HEIGHT
RAISED TABLE AT CROSS-ROADS, TRAFFIC CALMING FEATURE
BUS STOP
EXISTING WASTEWATER TREATMENT WORKS
LTN 1/20 PEDESTRIAN PRIORITY JUNCTION (GIVE WAY MARKINGS ON THE MAIN ROAD)
BUS STOP
PROPOSED SuDS/SWALE WITH PERFORATED PIPE BELOW
LTN 1/20 PEDESTRIAN AND CYCLIST PRIORITY JUNCTION
LTN 1/20 PEDESTRIAN PRIORITY JUNCTION SET BACK MIN. 5.0m, AS RECOMMENDED
CHICANE, ROAD NARROWING, TRAFFIC CALMING FEATURE
PROPOSED SuDS/SWALE WITH PERFORATED PIPE BELOW
LTN 1/20 PEDESTRIAN AND CYCLIST PRIORITY JUNCTION SET BACK MIN. 5.0m, AS RECOMMENDED
LTN 1/20 PEDESTRIAN PRIORITY JUNCTION SET BACK MIN. 5.0m, AS RECOMMENDED
PROPOSED SuDS/SWALE
PROPOSED SuDS/SWALE WITH PERFORATED PIPE BELOW
RAISED TABLE , TRAFFIC CALMING FEATURE
PROPOSED SuDS/SWALE WITH PERFORATED PIPE BELOW
PROPOSED SuDS/SWALE WITH PERFORATED PIPE BELOW
LTN 1/20 PEDESTRIAN AND CYCLIST PRIORITY JUNCTION SET BACK MIN. 5.0m, AS RECOMMENDED
CHICANE, ROAD NARROWING, TRAFFIC CALMING FEATURE
PROPOSED SuDS/SWALE
BUS STOP
DETENTION BASIN 1 - SOUTH WITH FOREBAYS AND BIORETENTION FEATURES
CHICANE, ROAD NARROWING, TRAFFIC CALMING FEATURE
3.5m SHARED CYCLEWAY
PUBLIC RIGHT OF WAY AND 3.5m SHARED CYCLE CROSSING
RAISED TABLE AT CROSS-ROADS, TRAFFIC CALMING FEATURE
BUS STOP
DETENTION BASIN 2 - SOUTH WITH FOREBAYS AND BIORETENTION FEATURES
2.0m FOOTPATH
PUBLIC RIGHT OF WAY
DETENTION BASIN 3 - SOUTH
PROPOSED SURFACE WATER OUTFALL INTO THE EXISTING ORDINARY WATERCOURSE
DETENTION BASIN 4 - SOUTH WITH FOREBAYS AND BIORETENTION FEATURES
[FWPS3] FOUL WATER PUMP STATION No.3 (INCL. EMERGENCY STORAGE) PUMPING TO FOUL WATER PUMPING STATION No.4
DETENTION BASIN 5 - SOUTH WITH FOREBAYS AND BIORETENTION FEATURES
PROPOSED SURFACE WATER OUTFALL INTO THE EXISTING ORDINARY WATERCOURSE

0m 15m 75m
Scale: 1:1500 @ A0

SURFACE FINISH LEGEND

- ENABLING INFRASTRUCTURE BOUNDARY
- CARRIAGEWAY IN ASPHALT CONSTRUCTION
- FOOTWAY / 3.5m SHARED CYCLEWAY IN ASPHALT CONSTRUCTION. SHARED CYCLEWAY TO BE IN COLOURED ASPHALT CONSTRUCTION
- RAISED TABLE AND RAMPS TO BE IN BLOCK PAVING CONSTRUCTION (EXCEPT 3.5m SHARED CYCLEWAY, WHICH IS TO BE IN COLOURED ASPHALT)

PRELIMINARY

Rev	Description	Drn	Chk	App	Date
P13	PRELIMINARY ISSUE	AJB	AJB	AD	17.12.24
P12	PRELIMINARY ISSUE	HP	IK	AD	15.08.24
P11	ACOUSTIC SCREENING ADJUSTED TO SUIT UPDATED LANDSCAPE PLAN RECIEVED ON 14-08-2024	IK	IK	MR	14.08.24
P10	INFRASTRUCTURE RESERVED MATTERS BOUNDARY EXTENDED TO INCLUDE ACOUSTIC SCREENING AND EXTENT OF ASSOCIATED LANDSCAPE SCREEN	IK	IK	MR	13.08.24
P9	PRELIMINARY ISSUE	IK	IK	MR	08.08.24
P8	PRELIMINARY ISSUE	IK	IK	MR	06.08.24
P7	PRELIMINARY ISSUE	IK	IK	MR	23.07.24
P6	PRELIMINARY ISSUE	IK	IK	MR	03.07.24
P5	PRELIMINARY ISSUE	IK	IK	MR	27.06.24
P4	PRELIMINARY ISSUE	IK	IK	MR	24.05.24
P3	PRELIMINARY ISSUE	IK	IK	MR	03.05.24
P2	PRELIMINARY ISSUE	IK	IK	MR	02.05.24
P1	PRELIMINARY ISSUE	IK	IK	MR	30.04.24
-	DRAFT ISSUE	IK	IK	MR	29.04.24

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Client
VISTRY SOUTH EAST

Project Title:
FORD AIRFIELD, ARUN

Drawing Title:
ENABLING INFRASTRUCTURE GENERAL ARRANGEMENT

A0 Scale	Date	Designed by
1:1500	14-02-24	IK
Drawn by	Checked by	Approved by
IK	IK	MR

Drawing Number: 2205771-D100 Rev P13

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Appendix B

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Our Ref: MCE/2205771-DRAFT

Eleanor Read
West Sussex County Council
Ground Floor
Northleigh
County Hall
Chichester
PO19 1RH

22/08/2024

Dear Elanor,

Thank you for your pre-application comments following the second meeting and a review of the documents for the proposed development at Ford Airfield. We are continuing to work on the proposals and taking on board your comments.

Following your comments, please find our response in blue:

1. In the outline planning application, the Qbar rate was calculated to be 1.14 l/s/ha. The proposed discharge rates do not match Qbar. It is noted this is a very low rate, however, if discharging at over greenfield runoff rate, flood risk could increase elsewhere, which is against policy.

Ardent CE Response
As part of the planning application, JNP Group initially specified the QMed value manually as 1.0, which resulted in a Qbar rate calculation of 1.14 l/s/ha. However, we have recalculated the greenfield runoff rate using the FEH method, utilising point data from the FEH Web Service. This approach provides more accurate results, and the Qbar rate has been recalculated as 2.42 l/s/ha. Specifically, we used a BFIHOST value of 0.63, obtained from the FEH Web Service.

We believe that the point data from the FEH Web Service provides a more precise estimate, and therefore, we have used the Qbar rate of 2.42 l/s/ha for the proposed drainage calculations to support our planning application. A summary of the greenfield runoff estimation results is enclosed along with our response.

2. As stated on previous pre-app comments, a Cv value of 1 must be used for summer and winter events. The rainfall being used isn't consistent currently. FEH 2022 rainfall is required (we are aware some software has issues with FEH 2022).

Ardent CE Response
The design has been updated and FEH 2022 rainfall data has been used for all hydraulic calculations and networks have been modelled with a surcharged outfall based on surface water flood levels obtained from EA Flood Zone map. Outfall 1 and 3 have been designed to have surcharged levels up to the top of bank levels as the EA map shows the flood risk between 'Medium' & 'High risk'. However, as the surface water flood levels deemed as 'low risk' – surface water flood depth below 300mm, Outfall 2 has been designed with 300mm surcharged depth. The proposed basins have been designed with 300mm freeboard based on default CV values (0.75 for summer & 0.84 wintar events).

A sensitivity check has been carried out with CV values of 1 and the additional volume of surface water runoff is attenuated within the available freeboard. Therefore, there will not be an increase in off-site flooding within the development.

3. The amount of groundwater monitoring and infiltration testing is satisfactory for this site and demonstrates high groundwater levels and limited infiltration potential. The high groundwater levels will need to be considered in detailed design of the basins.

Ardent CE Response

[redacted]

Noted, suitable mitigation measures will be provided. Additional information will be submitted as part of the planning application including lining details and flotation calculations, as necessary.

4. Calculations to show 50% AEP rainfall event does not surcharge in the drainage network and 3.33% AEP rainfall event plus climate change does not flood outside the drainage network which is designed to hold water.

Ardent CE Response
Noted. Detailed drainage network calculations will be provided as part of planning submission.

5. Calculations for surcharged outfall to watercourses are required. This surcharge level must be the 1% AEP flood event of the receiving watercourse if known or bank full if not already hydraulically modelled.

Ardent CE Response
All outfalls have been modelled as fully surcharged up to the flood levels (top of bank levels) in 1 in 100 years + 40% CC event.

6. Basins should be designed using Ciria SuDS Manual. 1.8m is too deep for safety reasons. Fencing should be avoided as much as possible to enhance multifunctional benefits of SuDS.

Ardent CE Response
Basins have been designed varying side slopes with no steeper than 1:3 in line with SuDS manual guidance to provide safe access for maintenance works. Within the SuDS manual guidance Section 22.2 of Part D, it's stated that the maximum depth of water in the basin should be no more than 2m in the most extreme design events and this principle has been adhered to through the design of the proposals.

7. While I have reviewed the phasing plan, a phasing plan for the delivery of the drainage basins is required. We need to ensure the site is only discharging for the impermeable area that has been built. This will involve changing flow controls through the construction of the development but is essential to not increase flood risk elsewhere. –

Ardent CE Response
The attenuation basins and associated flow control chambers will be constructed prior to the construction of any impermeable area.

The southern section of the site (outfall 2 and 3) restricts flows to a combined rate of 15l/s, the equivalent greenfield Qbar rate is 68.4l/s. It is not necessary to change flow controls as the discharge rate is circa 20% of the Qbar rate.

Through the construction process, all runoff from the development site will be directed through the attenuation basins ensuring that all flows are continued to be restricted to greenfield. Where this is not possible then alternative measures will be put in place by the contractor to manage flood risk during construction. This will be managed through the Construction Management Plan (CMP) for the development.

8. Evidence of third party agreement for discharge into their land/system is required for the outfalls outside the red line boundary (these don't need to be submitted when the application is submitted, we just need to see them so that there is not issues later on).

Ardent CE Response
Noted. Third party agreement plans will be provided.

9. Easements 3m from top of bank of both sides of watercourses and the basins is required for maintenance access. Off road parking for maintenance vehicles is required.

Ardent CE Response
3m flat maintenance strips have been provided for all the basins. Visitor parking bays or on-street parking bay will

be located closer to the attenuation basins.

10. Water quality-is assessment of water quality being submitted as part of later applications?

Ardent CE Response
Yes, water quality will be assessed as part of each planning application.

11. As mentioned previously, open source, above ground SuDS should be prioritised in the design of the development, instead of reliance on underground pipes and end of pipe design, as source control means water is dealt with where it falls. Although swales are included in the indicative drainage layout, it is unclear how these will connect to the wider drainage system. Once the layout is set it is very difficult to make any changes to the drainage layout, therefore we require more detail on where source control SuDS will be used.

Ardent CE Response
Attenuation requirements are met by providing above ground SuDS (except the S278 roundabout to the North which utilises an attenuation tank). Providing attenuation adjacent to the outfall is the most effective strategy. Where feasible, additional at source SuDS components will be provided within the development parcel such as water butts.

A carrier drain will be laid beneath the swale which will connect into the adjacent piped network.

12. Urban creep-it is unclear whether 10% urban creep has been included in the volume of SuDS storage required.

Ardent CE Response
10% Urban creep has been included to the impermeable areas, please refer to the table on the Sitewide SuDs sketch.

13. Cross sections and long sections of the network and structures such as basins and swales will need to be submitted.

Ardent CE Response
Noted. Cross sections & long sections of the basins and swales will be provided as part of the planning submission.

We trust the above is satisfactory and we look forward to hearing back from you.

Yours sincerely,

[redacted]

Mehmet Cakir Ertay
Senior Engineer

[redacted]

Appendix C

Omnia
Suite 1 Pure Offices,
One Port Way,
Port Solent
PO6 4TY
[redacted]

28th March 2024

ref: A11918-3/240326/L1.1

Dan Chapman
Vistry Southeast
Linden House
Guards Avenue
Caterham
Surrey
CR3 5XL

[redacted]

Dear Dan,

RE: Ford Airfield, Arun, West Sussex BN17 5QZ – (Interim Report) Winter Groundwater Monitoring – Geo environmental Consultancy Support

Omnia were commissioned by Vistry South East to undertake winter groundwater monitoring within nineteen (19no.) previously installed wells and thirteen (13no.) further locations installed by Omnia across the site in order to provide detailed information on groundwater levels over the winter period between December and April 2024.

If you have any questions, please do not hesitate to contact us.

Yours Sincerely,
Omnia Consulting

[redacted]

Abbie Dodds
Geo Environmental Consultant

Olivia Maxwell
Principal Geo Environmental Consultant

Attachments:

Attachment I: Limitations

Attachment II: Drawings

Attachment III: Exploratory Hole Logs

Attachment IV: Photographs

Attachment V: Groundwater Monitoring Graphs

Attachment VI: A11918-3 Winter Monitoring Technical Note

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Quality Assurance

Remarks	Draft
Date	March 2024
Prepared by	A. Dodds
Signature	[redacted]
Checked and authorised by	O. Maxwell
Signature	[redacted]
Project number	A11918-3
Comments	

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Site Details	
Site Name	Ford Airfield, Arun, West Sussex, BN17 5QZ
National Grid Reference	499156, 103169

1 Background

It is understood that Vistry South East are proposing to develop the former Ford Airfield, in Arun, West Sussex to comprise residential housing, local centre and open space, including attenuation basins.

A period of groundwater monitoring is required to provide detailed information on groundwater levels over the winter period, to assist with drainage design.

To date a series of reports have been prepared for the site including a Geo-Environmental and Geotechnical Site Assessment, a series of infiltration tests and limited winter spot monitoring, amongst other supporting reports. Post review, a technical summary has been produced, as detailed within the Omnia Winter Groundwater Monitoring Technical Note A11918-3/231220/L1 included within Attachment VI.

During the first phase of works completed by Omnia, eleven (11no.) continuous data loggers were deployed within existing wells on the 21st of December 2023, as specified by the client and detailed with the technical note. An additional twelve (12no.) monitoring wells were advanced using Window Samplers by Omnia on 18th-19th January 2024 as well as a further seven (7no.) loggers deployed within existing wells on the 17th of January 2024.

Following this installation, Ardent confirmed that deeper wells were required, as due to ground conditions during the installation, and UXO readings, some wells were not installed to the full 5m depth required. Following confirmation from Vistry South East, ten (10no.) monitoring wells were re-drilled, with the logger re-deployed to supplement the existing data set between the 19th to 22nd of February 2024. The positions were re-drilled with a larger cable percussive rig. The locations redrilled were WS401, WS402, WS403, WS404, WS405, WS408, WS410, WS411 and WS412.

One (1no.) additional logger was deployed within the new well (WS413) on the 22nd of February 2024. Due to wet conditions on site hindering drilling equipment, one (1no.) monitoring well was installed as within the position (CP502) on the 22nd of February 2024, as WS402 could not be reached to re-drill the location.

The winter monitoring period will continue until the 17th of April 2024 however Vistry South East require an interim report with all the data acquired so far as well as information on the previous monitoring periods prior to 2023/2024 included from the Technical note.

The change of logger positioning is detailed within the same graphs to reduce confusion, as shown within Attachment V.

Site Description

The area of investigation is located between the villages of Ford and Yapton in West Sussex, with the wider site boundary approximately 90 hectares in size. The southern parcel of land is 32.43 ha, and the northern parcel 30.63 ha.

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The land is predominantly used for agricultural purposes, however commercial premises are also located on the site, including the haulage yard within the northern parcel of land and fuel storage/former runway within the southern parcel.

The site is bordered by a mixture of residential to the south and west and commercial/open fields to the south, east and north.

Scope of works

From the previous phases of works and more recent advancements of monitoring wells completed by Omnia on site, thirty-two (32no.) window sampler and cable percussive boreholes were utilised (P16, BH1, P21, P24, BH5, WS6, P12, BH3, BH2, DS22Z, WS2, WS8, BH6, P1, DS6Z, P4, DS7Z, BH4, WS401, WS402, WS403, WS404, WS405, WS406, WS407, WS408, WS409, WS410, WS411, WS412, WS413 and CP205) for winter groundwater monitoring. The maximum depth of the monitoring borehole installations across the site was 10.49m bgl within BH2.

Dataloggers were placed within all thirty-two (32no.) monitoring wells across the site, allowing the collection of a continuous dataset with groundwater measurements taken at one-hour intervals depending on the location. Continuous monitoring data was downloaded at monthly intervals at which point each well was manually dipped with an electronic dip-tape to confirm that the dataloggers were operating within the expected parameters.

Winter groundwater monitoring was commenced for eleven (11no.) positions on the 21st of December 2023, seven (7no.) positions on the 17th of January 2024, twelve (12no.) positions on 18-19th January 2024 and two (2no.) positions on 22nd of February 2024. The monitoring period at the time of writing this report is ongoing and will end on the 17th of April 2024, however this report will provide all the groundwater monitoring data up to the 20th to 21st of March 2024.

Site Topography

A review of topographic maps, EA LiDAR and on-site observations indicated that the site was generally flat. There were slight inclines or declines around field and road edges as well as a stockpile in the northwest of the site.

2 Geology & Hydrogeology

The British Geological Survey (BGS) map for the site (Chichester and Bognor, Solid and Drift, Sheet 317/332 at a scale of 1: 50,000, 1996) indicates that the site is underlain by the geological sequence summarised in Table 2.1:

Table 2.1 - Geological Succession

Geological Unit	Classification	Description	Aquifer Classification
Superficial	Brickearth	Silts and Gravels	Secondary A
Superficial	River Terrace Deposits	Sands and gravels	

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Bedrock	Lewes Nodular Chalk, Seaford chalk, Newhaven Chalk, Culver chalk and Portsdown Chalk	Chalk	Principal

The intrusive site investigation undertaken by Omnia in January 2024 found the geology present on site to generally correspond with that highlighted within BGS mapping as well as deposits found within previous investigations. The findings are outlined below.

Made Ground was encountered within one (1no.) location (WS404) to a depth of 1.00m bgl. The base of the Made Ground was proven. It typically comprised grass over soft brown or orangeish brown sandy CLAY with rare gravel. Sand is fine and medium. Gravel is subangular medium clinker.

Topsoil was encountered within the remaining twelve (12no.) intrusive locations (WS401-WS403, WS405-WS412) to a maximum depth of 1.20m bgl within WS401. The base of the Topsoil was proven in all locations. It typically comprised grass over soft or very soft orangeish brown sandy CLAY. Sand is fine to coarse. Rare cobbles of subangular flint within WS405. Rare gravel of flint within WS407.

River Terrace Deposits were encountered within all locations (WS401-WS412) beneath the Topsoil and Made Ground. The base of the River Terrace Deposits was confirmed within WS402, WS404, WS405, WS406, WS407, WS409 and WS411. It was found to a maximum depth of 5.00m bgl (WS401) within this phase of investigation. These were typically recovered as:

- Soft grey mottled orange or yellowish or orangeish brown slightly gravelly sandy CLAY or sandy CLAY. Gravel is subangular to subrounded fine flint. Sand is fine to coarse.
- Yellowish orange mottled grey or orangeish brown clayey gravelly fine to coarse SAND. Gravel is subangular to subrounded fine to coarse flint.
- Orangeish brown slightly clayey very sandy angular to subrounded fine to coarse GRAVEL of flint and chalk.

The Lewes Nodular Chalk, Seaford chalk, Newhaven Chalk, Culver chalk and Portsdown Chalk identified as Undifferentiated Chalk were found directly beneath the River Deposits within WS402, WS404, WS405, WS406, WS407, WS409 and WS411 to a maximum drilled depth of 5.00m bgl. The base of the Undifferentiated chalk was not proven. These were typically recovered as:

- Orangeish brown slightly sandy slightly gravelly CLAY mottled with structureless CHALK composed of slightly sandy gravelly SILT. Sand is fine. Gravel is subangular to subrounded fine and medium flint and medium density CHALK. (Weathered Differentiated chalk)
- Recovered as structureless CHALK composed of cream sandy gravelly SILT. Sand is fine to coarse. Gravel is subangular to subrounded fine and medium low or medium density weak chalk with black specks. Presumed Grade Dm.

Groundwater Conditions

During the drilling of the holes for the monitoring installations groundwater strikes were encountered these are summarised below in Table 2. During return groundwater monitoring visits, groundwater was encountered at 0.00 – 4.58m bgl.

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Table 2-Summary of Groundwater Conditions

Location	Depth (m bgl)	Strata	Type of Water Strike
Omnia site works (Jan and Feb 2024)			
WS401	1.00	River Terrace Deposits	Water Strike
CP501*	2.50	River Terrace Deposits	Water Strike
WS402	0.80	River Terrace Deposits	Water Strike
WS403	3.63	River Terrace Deposits	Water Strike
WS404	1.20	River Terrace Deposits	Water Strike
WS405	1.80	River Terrace Deposits	Water Strike
WS406	1.33	River Terrace Deposits	Water Strike
WS407	2.65	River Terrace Deposits	Water Strike
WS411	1.10	River Terrace Deposits	Water Strike
RSK Investigation (Aug and Sept 2018)			
WS1	3.20	River Terrace Deposits	Water Strike
BH1	7.00	Undifferentiated Chalk	Water Strike
BH3	6.10	Undifferentiated Chalk	Water Strike
BH4	5.50	Undifferentiated Chalk	Water Strike
BH5	4.00	Undifferentiated Chalk	Water Strike
BH6	6.10	Undifferentiated Chalk	Water Strike

*Please note CP501 was a cable percussive hole drilled within 5m of WS401.

3 Groundwater Monitoring Results- Previous investigations

A summary of winter groundwater monitoring at the above-mentioned site has been provided within the Omnia Winter Groundwater Monitoring Technical Note (Ref: A11918-3/231220/L1), this has been provided within Attachment VI if further details are required. The summary of data collated by previous groundwater monitoring is as follows (References remain the same as within the Technical Note):

Intrusive works undertaken by RSK, where groundwater monitoring was undertaken over August and September 2018 within seven (7no.) locations. Their monitoring results are summarised below in Table 2-1

Table 2-1 Summary of RSK groundwater monitoring

Location	Groundwater Strike depth during SI	Groundwater level (29/8/18) in m bgl	Groundwater level (5/9/18) in m bgl	Groundwater level (13/9/18) in m bgl
WS1	3.2	1.73	1.88	1.93
BH1	7.0	2.15	2.29	2.37
BH2	N/A	3.13	3.26	3.31
BH3	6.1	4.218	4.42	4.57
BH4	5.5	4.592	4.74	4.95
BH5	4.0	4.78	4.85	4.81
BH6	6.1	5.368	5.41	5.52

A summary of the shallowest and deepest groundwater levels recorded from the previous RSK investigation is provided within Table 2-2 below.

Table 2-2 Summary of Shallowest and Deepest Recorded Groundwater Level

Location	Shallowest recorded GW (m bgl)	Date	Deepest recorded GW (m bgl)	Date
North of site				

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Location	Shallowest recorded GW (m bgl)	Date	Deepest recorded GW (m bgl)	Date
BH3	1.30	Feb 2020	4.62	12/10/2018
BH5	4.11	Feb 2020	4.86	13/09/2018
BH6	2.96	Feb 2020	5.52	13/09/2018
DS5Z	4.00	Feb 2020	4.75	Jan 2020
DS6Z	3.23	Feb 2020	4.14	Jan 2020
DS3Z	1.54	Feb 2020	1.99	Jan 2020
DS7Z	3.015	Feb 2020	3.69	Jan 2020
DS11Z	3.17	Feb 2020	4.01	Jan 2020
DS13Z	2.28	Feb 2020	3.48	Jan 2020
DS8Z	2.41	Feb 2020	3.24	Jan 2020
DS9Z	2.23	Feb 2020	3.21	Jan 2020
DS12Z	1.89	Feb 2020	2.96	Jan 2020
South of site				
WS1	0.15	13/12/2019	1.93	13/09/2018
BH1	0.335	Feb 2020	2.41	12/10/2018
BH2	0.893	Dec 2019	3.36	12/10/2018
BH4	2.195	Feb 2020	4.95	13/09/2018 & 12/10/2018
DS14Z	1.26	Feb 2020	2.24	Jan 2020
DS16Z	1.02	Dec 2019	1.39	Jan 2020
DS22Z	0.58	Dec 2019	1.26	Jan 2020
P21	1.83	Dec 2019	1.93	Jan 2020
DS23Z	0.923	Dec 2019	1.525	Jan 2020

The shallowest groundwater recorded within the north of the site ranged from 1.30 – 4.11m bgl. The shallowest groundwater recorded within the south of the site ranged from 0.15 – 2.195m bgl.

Omnia attended site on 7th December to investigate whether the existing wells were still present on-site and serviceable. Omnia identified eighteen (18no.) wells, the co-ordinates for each identified well are displayed below and a summary of the recorded groundwater is provided within Table 3-3 below.

Table 3-3 Summary of Groundwater Levels - 07/12/2023

Location	Coordinates	Depth to base of well (m bgl)	Depth to GW (m bgl)
North of site			
BH3	499048,103009	10.19	2.05
BH5	499727,103379	9.3	3.47
BH6	498830,103554	9.52	3.52
WS6	499313,103302	2.35	DRY
WS8	498938,103256	2.79	DRY
DS6Z	498929,103604	4.76	3.62
DS7Z	499217,102488	4.97	3.27
P1	498915,103855	1.96	DRY
P4	499245,103550	1.97	DRY
P12	499096,103172	1.97	0.88
South of site			
DS22Z	499217,102488	3.23	0.75
BH1	499503,102349	7.73	0.53
BH2	499087,102527	10.69	1.17
BH4	499358,103009	10.47	2.35
P16	499037,102646	1.94	1.15
P21	499447,102588	1.99	1.71
P24	499498,102433	1.98	1.08
WS2	499156,102574	3.49	1.52

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4 Groundwater Monitoring Results- Omnia investigation

Spot Monitoring

Results of the groundwater spot monitoring undertaken between 21/12/2024 to 20-21/03/2024 for all available monitoring wells has been summarised and included in Table 3.1 below. Please note that this is an interim report, and that the final data collection will be completed on the 17/04/2024 and subsequent full data will be reported after this.

Table 3.1 – Groundwater monitoring results

Location	Date	Depth to Groundwater (m bgl)	Depth to base (m bgl)
BH1	21/12/2024	0.42	7.71

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Location	Date	Depth to Groundwater (m bgl)	Depth to base (m bgl)
P12	17/01/2024	1.54	2.00

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Location	Date	Depth to Groundwater (m bgl)	Depth to base (m bgl)
	21/03/2024	1.83	3.48**

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BH2	3.80	-
BH3	4.05	-
BH4	10.15	-
BH5	8.95	-
BH6	7.79	-
CP502	4.85	-
DS6Z	4.71	-
DS7Z	4.62	-
DS22Z	2.15	-
P1	1.81	-
P4	2.55	-
P12	2.29	-
P16	1.76	-
P21**	1.92	-
P24	1.81	-
WS2	2.79	-
WS6**	2.12	-
WS8	2.69	-
WS401	3.90	4.38
WS402	1.60	-
WS403	3.64	4.53
WS404	1.25	4.50
WS405	3.55	4.69
WS406	3.83	3.41*
WS407	3.90	3.01*
WS408	2.26	3.90
WS409**	3.89	-
WS410	2.26	2.28
WS411**	2.44	4.51
WS412	1.80	4.75
WS413	4.70	-

*Logger depth was changed as it was silty at the bottom which can affect the compensation results, not because it was redeployed.

**Please note that these loggers are missing some information, which is further explained below.

Variations of scope

On return to site on the 21st of February 2024 it was found that the logger was removed from within BH4. Therefore, no data of groundwater was recovered between the period of 04/02/2024 at 12.45am to 21/02/2024 at 09.45am. The logger was placed properly within the hole at the latter date and had no further issues.

On return to site on the 20th of February 2024 it was found that the headworks for P21 had been knocked over and the logger moved within the hole during the incident. It was not apparent from the groundwater data when this occurred, so no adjustments were made to the data. On the return to site on the 20th of March 2024 the logger string was found to be cut, luckily the logger was able to be retrieved from the hole, but once again the incident was not apparent from data. The data within this time period has been denoted with a dotted line on the graph, as complete surety to the data set cannot be given, given the movement of the logger.

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On return on the 20th of March 2024 the logger and logger string within WS6 was not present in the monitoring location or it's vicinity. It is suspected that the logger was stolen as the string was burnt off. Therefore, there is no continuous monitoring data between 21/02/2024 to 20/03/2024. A replacement logger was deployed within the hole on the 23rd of March 2024 to gather data for the remaining monitoring period.

Data from WS409 is missing due to a system error in data recovery. After the error was discovered, the logger was changed and re-deployed on the 1st of March 2024. Data is missing between the 16/02/2024 and the 01/03/2024.

The data from WS411 is incomplete as the logger had a technical fault, such that limited data has been recorded between 19/01/24 – 01/03/24. A replacement logger was redeployed on the 01/03/24 and data was recovered between the 01/03/2024 until the 21/03/2024.

Locations of the groundwater monitoring installations have been denoted on Figure 3.0 appended to this report.

The minimum and maximum groundwater levels recorded have been summarised in Table 4-2 below:

Table 4.2 – Summary of Minimum and Maximum Winter Groundwater Levels – 2023/2024 period

Location	Shallowest Groundwater Level (m bgl)	Deepest Groundwater Level (m bgl)	Date of Shallowest Groundwater Level
BH1	0.02	0.91	8/02/2024, 18/02/2024
BH2	0.45	1.82	18/02/2024
BH3	0.86	3.25	02/03/2024
BH4	1.34	3.20	02/03/2024
BH5	2.72	4.13	02/03/2024 and 03/03/2024
BH6	2.06	4.41	02/03/2024 and 03/03/2024
CP502	0.32	0.61	02/03/2024 and 03/03/2024
DS6Z	1.86	4.62	02/03/2024
DS7Z	2.27	4.02	02/03/2024 and 03/03/2024
DS22Z	0.09	1.53	18/02/2024
P1	0.99	Dry	02/03/2024
P4	1.42	Dry	02/03/2024
P12	0.12	1.91	25/02/2024, 26/02/2024 and 02/03/2024
P16	0.26	1.78	02/03/2024
P21	1.62	Dry	04/01/2024, 05/01/2024, 22/02/2024, 25/02/2024, 26/02/2024 and 02/03/2024
P24	0.95	1.62	18/02/2024
WS2	0.48	1.81	02/03/2024
WS6	2.03	Dry	05/01/2024
WS8	1.27	Dry	02/03/2024 and 03/03/2024
WS401	GL	0.99	25/02/2024, 26/02/2024 and 02/03/2024
WS402	GL	0.71	18/02/2024, 19/02/2024 and 21/02/2024-08/03/2024 and 10/03/2024-21/03/2024
WS403	1.44	3.93	02/03/2024 and 03/03/2024
WS404	0.69	Dry	02/03/2024

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WS405	0.11	1.70	26/02/2024
WS406	1.01	1.50	18/02/2024
WS407	1.10	3.47	02/03/2024
WS408	0.95	2.47	02/03/2024 and 03/03/2024
WS409	3.05	Dry	02/03/2024 and 03/03/2024
WS410	0.56	2.45	18/02/2024
WS411	0.24	1.16	02/03/2024
WS412	0.51	2.28	02/03/2024 and 03/03/2024
WS413	2.36	3.38	02/03/2024 and 03/03/2024

A review of groundwater levels across the thirty-two (32no.) locations shows groundwater has been recorded between 4.62m bgl (DS6Z) at its deepest (where dry boreholes have been discounted) and ground level (WS401 and WS402) is at the shallowest.

Fluctuations within the groundwater recorded within all thirty-two (32no.) boreholes are observed, which correlates with rainfall data (ref: https://meteostat.net/en/place/gb/littlehampton?s=03876&t=2023-12-21/2024-02-05 [Accessed on the 25.03.2024 – Shoreham Airport] for the site's location.

Further review of the data indicates that the groundwater across the site fluctuates similarly responding to the groundwater and has been shown to be at the shallowest points at similar dates within some anomalies, the most common dates are 18/02/2024, 02/03/2024, 03/03/2024, 25/02/2024 and 26/02/2024.

WS402 showed extended periods of high groundwater between 21/02/2024-08/03/2024 and 10/03/2024-21/03/2024, from topography on site and anecdotal evidence this has been known to be an area where high levels of groundwater and surface water have been found, as it is at the sites lowest point.

5 Discussion

As this is an interim report, it is important to note that the data represented is only partial, there is still one month of data collection before the winter period is completed in April 2024.

From a review of the data presented above, it can be seen that the shallowest groundwater levels at all locations followed a similar pattern in the 2023/2024 winter groundwater monitoring period. The data for all thirty-two (32no.) boreholes positively correlates with rainfall records within the location of the site. Therefore, consideration should be given to the presence of groundwater across the site during the design of foundations and drainage solutions for the site.

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Attachment I

Limitations

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1. This report and its findings should be considered in relation to the terms of reference and objectives agreed between OEC and the Client as indicated in Section 1.0.

2. For the work, reliance has been placed on publicly available data obtained from the sources identified. The information is not necessarily exhaustive and further information relevant to the site may be available from other sources. When using the information, it has been assumed it is correct. No attempt has been made to verify the information.

3. This report has been produced in accordance with current UK policy and legislative requirements for land and groundwater contamination, which are enforced, by the local authority and the Environment Agency. Liabilities associated with land contamination are complex and requires advice from legal professionals.

4. During the site walkover reasonable effort has been made to obtain an overview of the site conditions. However, during the site walkover no attempt has been made to enter areas of the site that are unsafe or present a risk to health and safety, are locked, barricaded, overgrown, or the location of the area has not been made known or accessible.

5. Access considerations, the presence of services and the activities being carried out on the site limited the locations where sampling locations could be installed and the techniques that could be used.

6. Site sensitivity assessments have been made based on available information at the time of writing and are ultimately for the decision of the regulatory authorities.

7. Where mention has been made to the identification of Japanese Knotweed and other invasive plant species and asbestos or asbestos-containing materials this is for indicative purposes only and do not constitute or replace full and proper surveys.

8. The executive summary, conclusions and recommendations sections of the report provide an overview and guidance only and should not be specifically relied upon without considering the context of the report in full.

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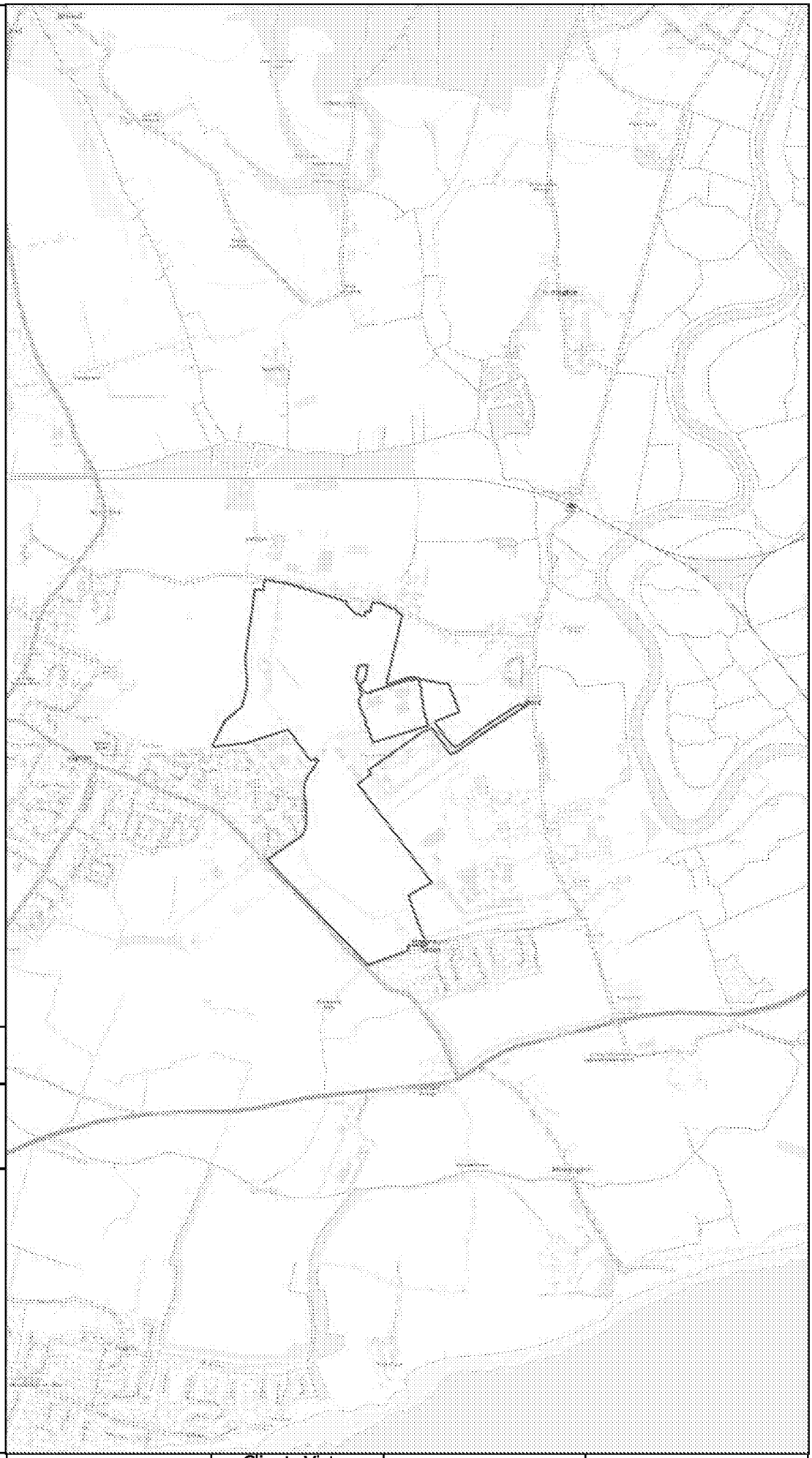
10. New information, revised practices or changes in legislation may necessitate the re-interpretation of the report, in whole or in part.

ARUN DISTRICT COUNCIL F/14/24/RES

Attachment II

Drawings

ARUN DISTRICT COUNCIL F/14/24/RES



Key

Whole Site Boundary

0 200 400 600 800 m

Scale	Paper Size
1:25,000	A4

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OMNIA

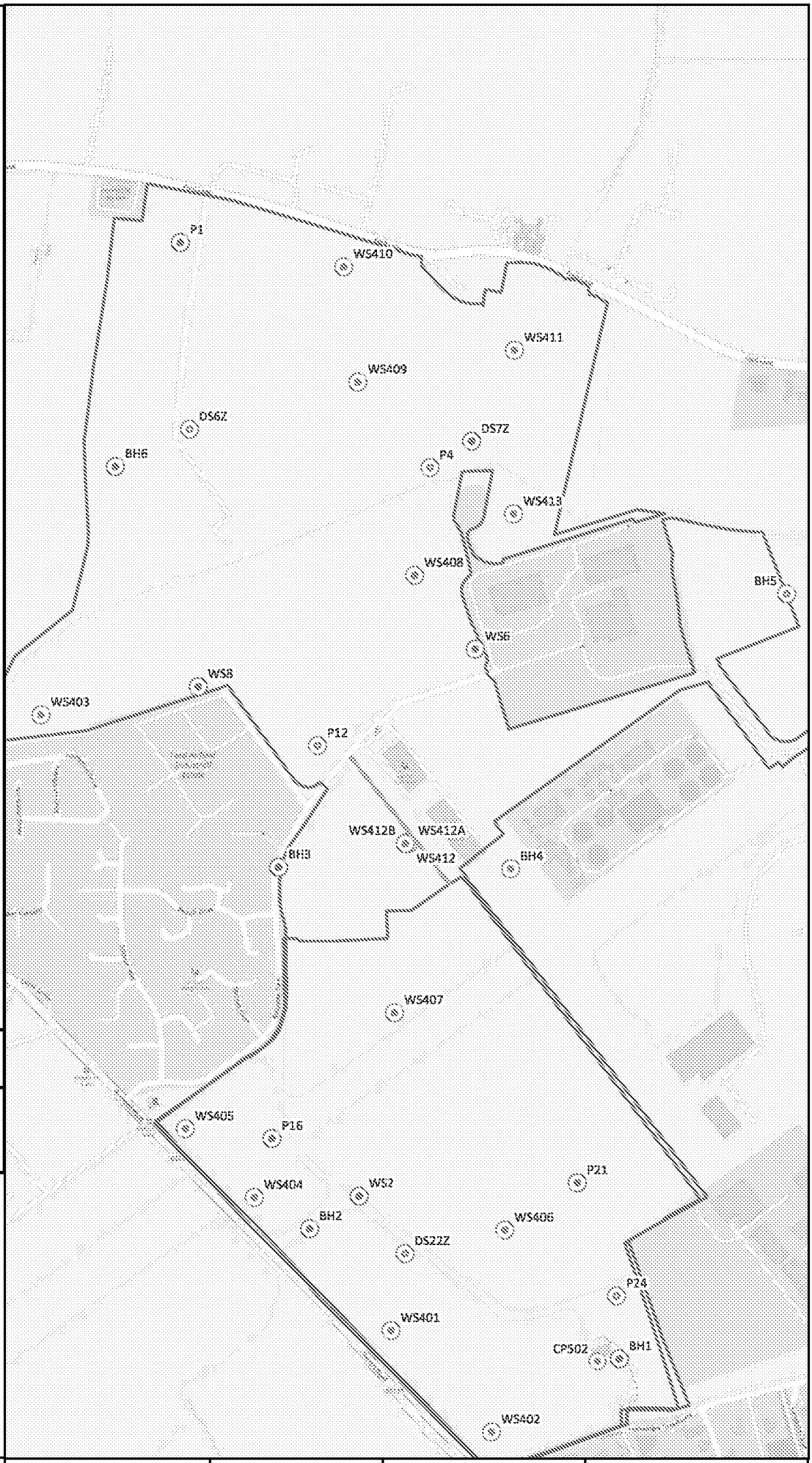
Project Number: A11918-3	Client: Vistry Housebuilding South East	Drawn By: L. Burnett	Drawing Title:
Job Title: Ford Airfield	Date: 07/11/2023	Authorised By: O. Maxwell	Figure 1.0 Site Location Map

ARUN DISTRICT COUNCIL F/14/24/RES

Key

Monitoring Locations

Whole Site Boundary



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Scale	Paper Size
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OMNIA

Project Number: A11918-3	Client: Vistry Housebuilding South East	Drawn By: A. Dodds	Drawing Title: Figure 3.0 Groundwater Monitoring Locations
Job Title: Ford Airfield	Date: 26/03/2024	Authorised By: O. Maxwell	

Appendix D

N

Fir Tree Cottages

Wicks Cottages

Path (um)

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KEY

- LAND OWNERSHIP BOUNDARY
- PLANNING APPLICATION BOUNDARY
- PROPOSED ATTENUATION BASIN

SECTION 104 DRAINAGE KEY

- SECTION 104 ADOPTABLE SURFACE WATER SEWER & MANHOLE
- 1500 PERFORATED PIPE WITH 600x600 GRAVEL TRENCH SURROUND
- AQUASPIRA OR SIMILAR APPROVED LARGE DIAMETER PIPE
- B — AQUASPIRA OR SIMILAR APPROVED LARGE DIAMETER PIPE - BEND
- RCC — AQUASPIRA OR SIMILAR APPROVED LARGE DIAMETER PIPE - 12000 ACCESS CHAMBER
- HB — AQUASPIRA OR SIMILAR APPROVED LARGE DIAMETER PIPE - HYDROBRAKE CHAMBER
- SECTION 104 ADOPTABLE FOUL WATER SEWER & MANHOLE
- SECTION 104 ADOPTABLE FOUL WATER RISING MAIN
- ARV — SECTION 104 ADOPTABLE FOUL WATER RISING MAIN AIR RELEASE VALVE CHAMBER
- WC — SECTION 104 ADOPTABLE FOUL WATER RISING MAIN WASHOUT CHAMBER
- SECTION 104 DRAINAGE EASEMENT
- SWALE WITH LINER

SECTION 38 DRAINAGE KEY

- SG — SECTION 38 GULLEY AND CONNECTION
- SECTION 38 MANHOLE

EXISTING DRAINAGE KEY

- EXISTING SURFACE WATER SEWER & MANHOLE
- EXISTING FOUL WATER SEWER & MANHOLE
- EXISTING FOUL WATER RISING MAIN

KEYPLAN

SHEET 1 | SHEET 2 | SHEET 3 | SHEET 4 | SHEET 5 | SHEET 6 | SHEET 7

0m 5m 25m

Scale: 1:500 @ A0

PRELIMINARY

FOR PLANNING

Rev	Description	Drn	Chk	App	Date
B	DRAINAGE STRATEGIES REVISED	AJB	AJB	MR	17.12.24
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Client

VISTRY SOUTH EAST

Project Title:

THE LANDING, LAND AT FORD AIRFIELD, FORD

Drawing Title:

IRM - DRAINAGE STRATEGY (SHEET 1)

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IK	EF	MR
A0 Scale	**Date**	**Revision**
1:500	09.08.24	B

Drawing Number

2205771 - 130

File Location: y:\ardent projects\2205771 - fox and hare, ewhurst\3 ce\3 engineering\3 drawings\2205771-130-DB1 irm drainage strategy.dwg

N
Boundary Cottages
PROPOSED OUTFALL 1
TOP OF EX BANK: 2.33m
EX HEADWALL IL: 1.20m
SURCHARGED OUTFALL DEPTH: 1.13m
15m OFFSET FOR FOUL WATER PUMP STATION WETWELL
EXISTING WATER MAIN
EXISTING FOUL WATER SEWER
EXISTING SURFACE WATER SEWER
EXISTING FOUL WATER RISING MAIN
PROPOSED FOUL WATER RISING MAIN
PROPOSED FOUL WATER SEWER
PROPOSED SURFACE WATER SEWER
PROPOSED SURFACE WATER PIPE
PROPOSED SWALE
PROPOSED ATTENUATION BASIN
PROPOSED FOUL WATER PUMP STATION
PROPOSED FOUL WATER RISING MAIN AIR RELEASE VALVE CHAMBER
PROPOSED FOUL WATER RISING MAIN WASHOUT CHAMBER
PROPOSED HYDROBRAKE CHAMBER
PROPOSED ACCESS CHAMBER
PROPOSED BEND
PROPOSED GULLEY
PROPOSED MANHOLE
PROPOSED CATCHPIT MANHOLE
PROPOSED ACCESS MANHOLE
PROPOSED FOUL WATER MANHOLE
PROPOSED SURFACE WATER MANHOLE
PROPOSED FOUL WATER PUMP STATION
PROPOSED FOUL WATER RISING MAIN AIR RELEASE VALVE CHAMBER
PROPOSED FOUL WATER RISING MAIN WASHOUT CHAMBER
PROPOSED HYDROBRAKE CHAMBER
PROPOSED ACCESS CHAMBER
PROPOSED BEND
PROPOSED GULLEY
PROPOSED MANHOLE
PROPOSED CATCHPIT MANHOLE
PROPOSED ACCESS MANHOLE
PROPOSED FOUL WATER MANHOLE
PROPOSED SURFACE WATER MANHOLE
PROPOSED FOUL WATER PUMP STATION
EXISTING WATER MAIN
EXISTING FOUL WATER SEWER
EXISTING SURFACE WATER SEWER
EXISTING FOUL WATER RISING MAIN
EXISTING FOUL WATER RISING MAIN
EXISTING FOUL WATER SEWER
EXISTING SURFACE WATER SEWER
EXISTING SURFACE WATER PIPE
EXISTING FOUL WATER PUMP STATION

N

PUMP STATION: EXISTING PACK 4
COVER LEVEL: 7.300m AOD
PUMP STATION TO ACCOMMODATE FLOWS ATTENUATION FROM:
(N) DWELLINGS @ 4000 CAR/CAR/UNIT = 12.45 l/s
OFFSITE CONNECTION = 22 l/s
TOTAL FLOW RATE = 34.45 l/s
NO WITHIN STORAGE ASSUMED
STORAGE: (W ASTE @ 180 L/HEP) = 48.96m³
OFFSITE WORKS = TBC
TOTAL STORAGE REQUIRED = TBC
ASSUMED UNRESTRICTED DISCHARGE RATE = 34.45 l/s
UNRESTRICTED CONNECTION: 2.298m AOD
EXISTING MH24 OUTLET PIPE CL: 5.900m AOD

15m OFFSET FOR FOUL WATER PUMP STATION WET WELL

Mast

Sewage

A1 A2 A3 A4 A5

PUMP STATION: EXISTING PACK 4
PUMP STATION TO ACCOMMODATE FLOWS ATTENUATION FROM:
108 DWELLINGS @ 4000 CAR/CAR/UNIT = 9.31 l/s
CRAZ HOMES = 1.242 l/s
LOCAL CENTRE = 12.5 l/s

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KEY

- LAND OWNERSHIP BOUNDARY
- PLANNING APPLICATION BOUNDARY
- PROPOSED ATTENUATION BASIN

SECTION 104 DRAINAGE KEY

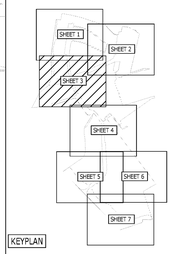
- SECTION 104 ADOPTABLE SURFACE WATER SEWER & MANHOLE
- 1500 PERFORATED PIPE WITH 600x600 GRAVEL TRENCH SURROUND
- AQUASPIRA OR SIMILAR APPROVED LARGE DIAMETER PIPE
- B — AQUASPIRA OR SIMILAR APPROVED LARGE DIAMETER PIPE - BEND
- RCA — AQUASPIRA OR SIMILAR APPROVED LARGE DIAMETER PIPE - 12000 ACCESS CHAMBER
- HBC — AQUASPIRA OR SIMILAR APPROVED LARGE DIAMETER PIPE - HYDROBRAKE CHAMBER
- SECTION 104 ADOPTABLE FOUL WATER SEWER & MANHOLE
- SECTION 104 ADOPTABLE FOUL WATER RISING MAIN
- ARV — SECTION 104 ADOPTABLE FOUL WATER RISING MAIN AIR RELEASE VALVE CHAMBER
- WC — SECTION 104 ADOPTABLE FOUL WATER RISING MAIN WASHOUT CHAMBER
- SECTION 104 DRAINAGE EASEMENT
- SWALE WITH LINER

SECTION 38 DRAINAGE KEY

- SECTION 38 GULLEY AND CONNECTION
- SECTION 38 MANHOLE

EXISTING DRAINAGE KEY

- EXISTING SURFACE WATER SEWER & MANHOLE
- EXISTING FOUL WATER SEWER & MANHOLE
- EXISTING FOUL WATER RISING MAIN



KEYPLAN

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Scale: 1:500 @ A0

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FOR PLANNING

Rev	Description	Drn	Chk	App	Date
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B	DRAINAGE STRATEGIES REVISED	AJB	AJB	MR	17.12.24
A	REVISED TO SUIT NEW SITE LAYOUT	MCE	EF	MR	15.08.24
-	PRELIM ISSUE	IK	EF	MR	09.08.24

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Client
VISTRY SOUTH EAST

Project Title:
THE LANDING, LAND AT FORD AIRFIELD, FORD

Drawing Title:
IRM - DRAINAGE STRATEGY (SHEET 3)

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KEY

- LAND OWNERSHIP BOUNDARY
- PLANNING APPLICATION BOUNDARY
- PROPOSED ATTENUATION BASIN

SECTION 104 DRAINAGE KEY

- SECTION 104 ADOPTABLE SURFACE WATER SEWER & MANHOLE
- 1500 PERFORATED PIPE WITH 600x600 GRAVEL TRENCH SURROUND
- AQUASPIRA OR SIMILAR APPROVED LARGE DIAMETER PIPE
- AQUASPIRA OR SIMILAR APPROVED LARGE DIAMETER PIPE - BEND (B)
- AQUASPIRA OR SIMILAR APPROVED LARGE DIAMETER PIPE - 12000 ACCESS CHAMBER (AC)
- AQUASPIRA OR SIMILAR APPROVED LARGE DIAMETER PIPE - HYDROBRAKE CHAMBER (HB)
- SECTION 104 ADOPTABLE FOUL WATER SEWER & MANHOLE
- SECTION 104 ADOPTABLE FOUL WATER RISING MAIN
- SECTION 104 ADOPTABLE FOUL WATER RISING MAIN AIR RELEASE VALVE CHAMBER (APV)
- SECTION 104 ADOPTABLE FOUL WATER RISING MAIN WASHOUT CHAMBER (WC)
- SECTION 104 DRAINAGE EASEMENT
- SWALE WITH LINER

SECTION 38 DRAINAGE KEY

- SECTION 38 GULLEY AND CONNECTION (SG)
- SECTION 38 MANHOLE

EXISTING DRAINAGE KEY

- EXISTING SURFACE WATER SEWER & MANHOLE
- EXISTING FOUL WATER SEWER & MANHOLE
- EXISTING FOUL WATER RISING MAIN

KEYPLAN

SHEET 1 · SHEET 2 · SHEET 3 · SHEET 4 · SHEET 5 · SHEET 6 · SHEET 7

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Scale: 1:500 @ A0

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Client

VISTRY SOUTH EAST

Project Title:

THE LANDING, LAND AT FORD AIRFIELD, FORD

Drawing Title:

IRM - DRAINAGE STRATEGY (SHEET 4)

Drawn by	Checked by	Approved by
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A0 Scale: 1:500	Date: 09.08.24	Revision: C

Drawing Number: 2205771 - 133

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KEY

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- PLANNING APPLICATION BOUNDARY
- PROPOSED ATTENUATION BASIN

SECTION 104 DRAINAGE KEY

- SECTION 104 ADOPTABLE SURFACE WATER SEWER & MANHOLE
- 150Ø PERFORATED PIPE WITH 600x600 GRAVEL TRENCH SURROUND
- AQUASPIRA OR SIMILAR APPROVED LARGE DIAMETER PIPE
- B — AQUASPIRA OR SIMILAR APPROVED LARGE DIAMETER PIPE - BEND
- CA — AQUASPIRA OR SIMILAR APPROVED LARGE DIAMETER PIPE - 12000 ACCESS CHAMBER
- HB — AQUASPIRA OR SIMILAR APPROVED LARGE DIAMETER PIPE - HYDROBRAKE CHAMBER
- SECTION 104 ADOPTABLE FOUL WATER SEWER & MANHOLE
- SECTION 104 ADOPTABLE FOUL WATER RISING MAIN
- ARV — SECTION 104 ADOPTABLE FOUL WATER RISING MAIN AIR RELEASE VALVE CHAMBER
- WC — SECTION 104 ADOPTABLE FOUL WATER RISING MAIN WASHOUT CHAMBER
- SECTION 104 DRAINAGE EASEMENT
- SWALE WITH LINER

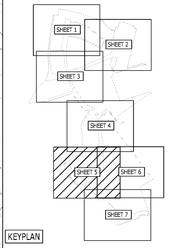
SECTION 38 DRAINAGE KEY

- SECTION 38 GULLEY AND CONNECTION
- SECTION 38 MANHOLE

EXISTING DRAINAGE KEY

- EXISTING SURFACE WATER SEWER & MANHOLE
- EXISTING FOUL WATER SEWER & MANHOLE
- EXISTING FOUL WATER RISING MAIN

KEYPLAN



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PRELIMINARY

FOR PLANNING

Rev	Description	Drn	Chk	App	Date
B	DRAINAGE STRATEGIES REVISED	AJB	AJB	MR	17.12.24
A	REVISED TO SUIT NEW SITE LAYOUT	MCE	EF	MR	15.08.24
-	PRELIM ISSUE	IK	EF	MR	09.08.24

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Client

VISTRY SOUTH EAST

Project Title:

THE LANDING, LAND AT FORD AIRFIELD, FORD

Drawing Title:

IRM - DRAINAGE STRATEGY (SHEET 5)

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A0 Scale	**Date**	**Revision**
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Drawing Number

2205771 - 134

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KEY

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- PLANNING APPLICATION BOUNDARY
- PROPOSED ATTENUATION BASIN

SECTION 104 DRAINAGE KEY

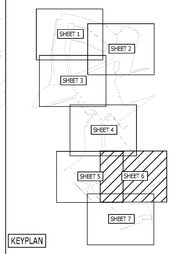
- SECTION 104 ADOPTABLE SURFACE WATER SEWER & MANHOLE
- 150Ø PERFORATED PIPE WITH 600x600 GRAVEL TRENCH SURROUND
- AQUASPIRA OR SIMILAR APPROVED LARGE DIAMETER PIPE
- B — AQUASPIRA OR SIMILAR APPROVED LARGE DIAMETER PIPE - BEND
- AQUASPIRA OR SIMILAR APPROVED LARGE DIAMETER PIPE - 1200Ø ACCESS CHAMBER
- HDB — AQUASPIRA OR SIMILAR APPROVED LARGE DIAMETER PIPE - HYDROBRAKE CHAMBER
- SECTION 104 ADOPTABLE FOUL WATER SEWER & MANHOLE
- SECTION 104 ADOPTABLE FOUL WATER RISING MAIN
- ARV — SECTION 104 ADOPTABLE FOUL WATER RISING MAIN AIR RELEASE VALVE CHAMBER
- WC — SECTION 104 ADOPTABLE FOUL WATER RISING MAIN WASHOUT CHAMBER
- SECTION 104 DRAINAGE EASEMENT
- SWALE WITH LINER

SECTION 38 DRAINAGE KEY

- SECTION 38 GULLEY AND CONNECTION
- SECTION 38 MANHOLE

EXISTING DRAINAGE KEY

- EXISTING SURFACE WATER SEWER & MANHOLE
- EXISTING FOUL WATER SEWER & MANHOLE
- EXISTING FOUL WATER RISING MAIN



KEYPLAN

0m 5m 25m
Scale: 1:500 @ A0

PRELIMINARY

FOR PLANNING

Rev	Description	Drn	Chk	App	Date
B	DRAINAGE STRATEGIES REVISED	AJB	AJB	MR	17.12.24
A	REVISED TO SUIT NEW SITE LAYOUT	MCE	EF	MR	15.08.24
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E-mail: enquiries@ardent-ce.co.uk

Client

VISTRY SOUTH EAST

Project Title:

THE LANDING, LAND AT FORD AIRFIELD, FORD

Drawing Title:

IRM - DRAINAGE STRATEGY (SHEET 6)

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AO Scale	Date	Revision
1:500	09.08.24	B

Drawing Number

2205771 - 135

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KEY

- LAND OWNERSHIP BOUNDARY
- PLANNING APPLICATION BOUNDARY
- PROPOSED ATTENUATION BASIN

SECTION 104 DRAINAGE KEY

- SECTION 104 ADOPTABLE SURFACE WATER SEWER & MANHOLE
- 1500 PERFORATED PIPE WITH 600x600 GRAVEL TRENCH SURROUND
- AQUASPIRA OR SIMILAR APPROVED LARGE DIAMETER PIPE
- B — AQUASPIRA OR SIMILAR APPROVED LARGE DIAMETER PIPE - BEND
- CA — AQUASPIRA OR SIMILAR APPROVED LARGE DIAMETER PIPE - 12000 ACCESS CHAMBER
- HB — AQUASPIRA OR SIMILAR APPROVED LARGE DIAMETER PIPE - HYDROBRAKE CHAMBER
- SECTION 104 ADOPTABLE FOUL WATER SEWER & MANHOLE
- SECTION 104 ADOPTABLE FOUL WATER RISING MAIN
- ARV — SECTION 104 ADOPTABLE FOUL WATER RISING MAIN AIR RELEASE VALVE CHAMBER
- WC — SECTION 104 ADOPTABLE FOUL WATER RISING MAIN WASHOUT CHAMBER
- SECTION 104 DRAINAGE EASEMENT
- SWALE WITH LINER

SECTION 38 DRAINAGE KEY

- SECTION 38 GULLEY AND CONNECTION
- SECTION 38 MANHOLE

EXISTING DRAINAGE KEY

- EXISTING SURFACE WATER SEWER & MANHOLE
- EXISTING FOUL WATER SEWER & MANHOLE
- EXISTING FOUL WATER RISING MAIN

SHEET 1 | SHEET 2 | SHEET 3 | SHEET 4 | SHEET 5 | SHEET 6 | SHEET 7

KEYPLAN

0m 5m 25m

Scale: 1:500 @ A0

PRELIMINARY

FOR PLANNING

Rev	Description	Drn	Chk	App	Date
B	DRAINAGE STRATEGIES REVISED	AJB	AJB	MR	17.12.24
A	REVISED TO SUIT NEW SITE LAYOUT	MCE	EF	MR	15.08.24
-	PRELIM ISSUE	IK	EF	MR	09.08.24

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Client: VISTRY SOUTH EAST

Project Title: THE LANDING, LAND AT FORD AIRFIELD, FORD

Drawing Title: IRM - DRAINAGE STRATEGY (SHEET 7)

Drawn by	Checked by	Approved by
IK	EF	MR
AO Scale: 1:500	Date: 09.08.24	Revision: B

Drawing Number: 2205771 - 136

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Appendix E

Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	100	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.600
CV	0.750	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	x
Maximum Rainfall (mm/hr)	50.0		

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Detailed	Starting Level (m)	
Rainfall Events	Singular	Skip Steady State	x	Check Discharge Rate(s)	x
Summer CV	1.000	Drain Down Time (mins)	2000	Check Discharge Volume	x
Winter CV	1.000	Additional Storage (m³/ha)	35.0		

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 %)
1	0	0	0

Node 293 Online Hydro-Brake® Control

Flap Valve	✓	Objective	(HE) Minimise upstream storage
Downstream Link	51.001	Sump Available	✓
Replaces Downstream Link	✓	Product Number	CTL-SHE-0154-1330-1820-1330
Invert Level (m)	1.680	Min Outlet Diameter (m)	0.225
Design Depth (m)	1.820	Min Node Diameter (mm)	1500
Design Flow (l/s)	13.3		

Node 289 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Downstream Link	49.001	Sump Available	✓
Replaces Downstream Link	✓	Product Number	CTL-SHE-0129-1330-3830-1330
Invert Level (m)	2.170	Min Outlet Diameter (m)	0.150
Design Depth (m)	3.830	Min Node Diameter (mm)	1500
Design Flow (l/s)	13.3		

Node S278 S7 Online Hydro-Brake® Control

Flap Valve	✓	Objective	(HE) Minimise upstream storage
Downstream Link	35.002	Sump Available	✓
Replaces Downstream Link	✓	Product Number	CTL-SHE-0094-4000-1037-4000
Invert Level (m)	3.848	Min Outlet Diameter (m)	0.150
Design Depth (m)	1.037	Min Node Diameter (mm)	1200
Design Flow (l/s)	4.0		

Node 292 Flow through Pond Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Main Channel Length (m)	104.045
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	1.700	Main Channel Slope (1:X)	500.0
Safety Factor	2.0	Time to half empty (mins)	0	Main Channel n	0.030

Inlets

291	287

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Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	615.7	0.0	0.300	6490.6	0.0	1.300	8081.0	0.0	2.100	9337.0	0.0
0.299	620.0	0.0	0.800	7312.0	0.0	1.800	8865.3	0.0			

Node 288 Flow through Pond Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Main Channel Length (m)	63.936
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	4.100	Main Channel Slope (1:X)	500.0
Safety Factor	2.0	Time to half empty (mins)	0	Main Channel n	0.035

Inlets

248

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	346.7	0.0	0.099	346.7	0.0	0.100	5421.2	0.0	1.900	8141.3	0.0

Node S278 Storage Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	4.034
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	0

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	182.0	0.0	0.800	182.0	0.0	0.801	0.0	0.0

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Results for 1 year Critical Storm Duration. Lowest mass balance: 94.56%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	Spur 15	10	5.824	0.124	49.7	0.9115	0.0000	OK
15 minute summer	201	10	4.555	0.135	52.9	0.3931	0.0000	OK
10080 minute summer	202	6780	4.540	0.202	4.7	0.5905	0.0000	OK
15 minute summer	Spur 14	10	5.110	0.130	24.9	0.3620	0.0000	OK
10080 minute summer	Spur 13	6780	4.542	0.648	5.8	8.3030	0.0000	SURCHARGED
10080 minute summer	203	6780	4.540	0.673	13.6	1.1805	0.0000	OK
15 minute summer	Spur 12	10	5.319	0.129	84.5	1.1947	0.0000	OK
10080 minute summer	204	6900	4.542	0.778	26.4	1.3319	0.0000	OK
10080 minute summer	205	6900	4.541	0.802	16.3	0.0000	0.0000	OK
10080 minute summer	206	6900	4.540	0.810	19.0	1.1596	0.0000	OK
10080 minute summer	207	6900	4.540	0.839	19.4	0.2097	0.0000	OK
15 minute summer	Spur 10	10	5.362	0.072	8.7	0.0803	0.0000	OK
15 minute summer	208	11	5.090	0.104	20.0	0.2929	0.0000	OK
15 minute summer	209	11	4.757	0.104	21.8	0.2223	0.0000	OK
10080 minute summer	210	6780	4.539	0.823	1.3	1.6707	0.0000	OK
10080 minute summer	211	6900	4.539	0.871	17.3	1.5397	0.0000	OK
10080 minute summer	212	6780	4.543	0.967	17.0	1.1551	0.0000	OK
10080 minute summer	213	6780	4.542	0.990	11.1	0.0000	0.0000	OK
15 minute summer	Dummy 3	11	5.971	0.162	44.5	0.9536	0.0000	OK
10080 minute summer	214	6780	4.542	0.998	13.9	2.1342	0.0000	OK
10080 minute summer	215	6840	4.540	1.126	35.4	1.3629	0.0000	OK
10080 minute summer	216	6660	4.541	1.160	13.7	1.4721	0.0000	OK
10080 minute summer	217	6660	4.542	1.186	16.2	2.5365	0.0000	OK
10080 minute summer	218	6660	4.543	1.220	18.5	0.0000	0.0000	OK
10080 minute summer	Spur 9	6900	4.541	0.311	3.8	2.8019	0.0000	OK
10080 minute summer	219	6840	4.541	1.313	26.4	2.8074	0.0000	OK
10080 minute summer	220	6780	4.542	1.460	22.3	0.0000	0.0000	OK
10080 minute summer	221	6780	4.543	1.525	20.3	3.2597	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	Spur 15	1.000	201	48.9	2.242	0.556	0.5217	
15 minute summer	201	1.001	202	52.6	0.787	0.044	1.5553	
10080 minute summer	202	1.002	203	2.3	0.438	0.003	1.3922	
15 minute summer	Spur 14	2.000	203	24.4	1.049	0.612	0.5142	
10080 minute summer	Spur 13	3.000	203	5.8	0.408	0.026	2.8331	
10080 minute summer	203	1.003	204	16.0	0.307	0.007	47.0247	
15 minute summer	Spur 12	4.000	204	83.2	1.920	0.099	1.5390	
10080 minute summer	204	1.004	205	10.7	0.346	0.006	21.9970	
10080 minute summer	205	1.005	206	-16.3	0.390	-0.009	7.8175	
10080 minute summer	206	1.006	207	-19.0	0.565	-0.010	10.4530	
10080 minute summer	207	1.007	211	-19.4	0.441	-0.005	11.7589	
15 minute summer	Spur 10	6.000	208	8.6	0.794	0.216	0.1448	
15 minute summer	208	5.001	209	18.2	0.728	0.112	1.8061	
15 minute summer	209	5.002	209a	21.6	0.639	0.056	0.4011	
10080 minute summer	210	5.004	211	2.8	0.069	0.001	21.2169	
10080 minute summer	211	1.008	212	16.8	0.428	0.005	52.2697	
10080 minute summer	212	1.009	213	11.1	0.424	0.003	14.6093	
10080 minute summer	213	1.010	214	13.5	0.416	0.004	5.1441	
15 minute summer	Dummy 3	6.000_1	214	42.1	0.905	0.264	3.0382	
10080 minute summer	214	1.011	215	35.2	0.426	0.008	94.0106	
10080 minute summer	215	1.012	216	13.5	0.422	0.003	26.0514	
10080 minute summer	216	1.013	217	16.2	0.428	0.004	20.5178	
10080 minute summer	217	1.014	218	16.2	0.436	0.004	27.4489	
10080 minute summer	218	1.015	219	20.5	0.421	0.005	82.7953	
10080 minute summer	Spur 9	7.000	219	4.1	0.470	0.025	1.2279	
10080 minute summer	219	1.016	220	-24.2	0.498	-0.005	94.0161	
10080 minute summer	220	1.017	221	20.3	0.490	0.004	44.0054	
10080 minute summer	221	1.018	222	20.3	0.478	0.004	39.7388	

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Results for 1 year Critical Storm Duration. Lowest mass balance: 94.56%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
10080 minute summer	222	6780	4.543	1.582	20.3	0.0000	0.0000	OK
10080 minute summer	223	6600	4.541	1.805	17.5	3.8595	0.0000	SURCHARGED
10080 minute summer	224	6600	4.543	1.864	17.7	0.0000	0.0000	SURCHARGED
10080 minute summer	Spur 11 Optional	6600	4.544	0.134	2.6	0.0000	0.0000	OK
15 minute summer	Spur 8	10	5.877	0.107	17.4	0.2883	0.0000	OK
10080 minute summer	225	7020	4.539	0.407	4.7	0.8510	0.0000	OK
10080 minute summer	226	6780	4.539	0.450	7.2	0.9417	0.0000	OK
10080 minute summer	227	6780	4.541	0.521	7.6	1.0829	0.0000	OK
10080 minute summer	Spur 6	6960	4.539	0.505	18.1	14.3662	0.0000	OK
10080 minute summer	228	6540	4.543	1.158	15.6	1.6568	0.0000	OK
10080 minute summer	229	6540	4.543	1.183	14.8	1.9856	0.0000	OK
10080 minute summer	230	6540	4.542	1.201	17.1	0.0000	0.0000	OK
10080 minute summer	231	6900	4.539	1.243	33.5	1.7789	0.0000	OK
15 minute summer	Spur 7	11	6.860	0.265	145.4	6.8958	0.0000	OK
10080 minute summer	232	6600	4.542	1.307	29.2	1.8698	0.0000	OK
10080 minute summer	233	6960	4.540	1.343	20.9	1.9218	0.0000	OK
15 minute summer	Spur 44	10	5.697	0.127	23.0	0.3374	0.0000	OK
15 minute summer	Spur 16	10	4.622	0.157	97.6	1.3581	0.0000	OK
10080 minute summer	234	6840	4.541	1.387	20.7	1.9841	0.0000	SURCHARGED
10080 minute summer	235	6840	4.540	1.402	20.5	0.0000	0.0000	SURCHARGED
10080 minute summer	236	6600	4.541	1.726	20.4	3.6893	0.0000	SURCHARGED
15 minute summer	Spur 45	1	5.350	0.000	0.0	0.0000	0.0000	OK
10080 minute summer	237	6600	4.541	1.794	20.2	3.8359	0.0000	SURCHARGED
15 minute summer	Spur 17	10	6.122	0.245	173.9	7.6127	0.0000	OK
10080 minute summer	238	6780	4.540	1.879	39.6	4.0163	0.0000	SURCHARGED
15 minute summer	Spur 18	10	5.008	0.133	24.9	0.4119	0.0000	OK
10080 minute summer	239	6600	4.540	2.013	40.3	4.3045	0.0000	SURCHARGED
15 minute summer	Spur 19	10	4.613	0.063	16.2	0.1267	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
10080 minute summer	222	1.019	223	17.5	0.433	0.003	160.8156	
10080 minute summer	223	1.020	224	17.7	0.340	0.003	41.7047	
10080 minute summer	224	1.021	238	17.0	0.225	0.003	13.0133	
10080 minute summer	Spur 11 Optional	9.000	225	3.6	0.088	0.032	0.7442	
15 minute summer	Spur 8	10.000	225	17.2	0.951	0.431	0.1988	
10080 minute summer	225	8.001	226	7.2	0.210	0.025	5.2861	
10080 minute summer	226	8.002	227	5.0	0.244	0.018	9.6868	
10080 minute summer	227	8.003	229	-4.4	0.102	-0.006	17.2438	
10080 minute summer	Spur 6	10.000_1	228	15.6	0.639	0.020	4.1803	
10080 minute summer	228	10.001	229	14.8	0.382	0.005	14.0419	
10080 minute summer	229	8.004	230	17.1	0.395	0.007	14.8926	
10080 minute summer	230	9.005	231	33.5	0.389	0.014	36.8514	
10080 minute summer	231	8.006	232	27.8	0.339	0.012	50.5806	
15 minute summer	Spur 7	11.000	232	141.2	1.796	0.753	0.5714	
10080 minute summer	232	8.007	233	20.9	0.415	0.009	32.0681	
10080 minute summer	233	8.008	234	16.5	0.380	0.007	37.3524	
15 minute summer	Spur 44	12.000	234	22.7	1.016	0.570	0.2236	
15 minute summer	Spur 16	13.000	234	96.7	2.772	0.455	0.3051	
10080 minute summer	234	8.009	235	20.5	0.440	0.009	13.8107	
10080 minute summer	235	8.010	236	20.4	0.573	0.009	19.5247	
10080 minute summer	236	8.011	237	20.2	0.379	0.005	78.9638	
15 minute summer	Spur 45	14.000	237	0.0	0.000	0.000	0.0000	
10080 minute summer	237	8.012	238	19.8	0.269	0.005	110.4863	
15 minute summer	Spur 17	15.000	238	169.1	2.444	0.601	0.3829	
10080 minute summer	238	1.022	239	39.5	0.416	0.010	171.3435	
15 minute summer	Spur 18	16.000	239	24.5	1.037	0.614	0.2308	
10080 minute summer	239	1.023_1	240	40.3	0.381	0.010	127.8281	
15 minute summer	Spur 19	17.000	240	16.1	2.369	0.339	0.0595	

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Results for 1 year Critical Storm Duration. Lowest mass balance: 94.56%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
10080 minute summer	240	6780	4.540	2.113	40.8	4.5174	0.0000	SURCHARGED
10080 minute summer	241	6780	4.540	2.144	40.8	4.5834	0.0000	SURCHARGED
10080 minute summer	242	6780	4.540	2.172	40.8	4.6428	0.0000	SURCHARGED
10080 minute summer	243	6960	4.539	2.236	40.7	4.7813	0.0000	SURCHARGED
10080 minute summer	244	6840	4.539	2.317	40.7	4.9541	0.0000	SURCHARGED
10080 minute summer	245	6840	4.539	2.352	40.7	5.0292	0.0000	OK
10080 minute summer	246	6900	4.539	0.250	3.4	0.2829	0.0000	OK
10080 minute summer	247	6840	4.539	0.317	2.9	0.3588	0.0000	OK
10080 minute summer	248	6900	4.539	0.339	13.5	0.0000	0.0000	OK
15 minute summer	Spur 5	10	4.621	0.131	27.3	0.2749	0.0000	OK
15 minute summer	249	11	4.301	0.106	31.0	0.2168	0.0000	OK
15 minute summer	Spur 4	10	4.387	0.217	62.2	0.9476	0.0000	OK
15 minute summer	250	11	4.150	0.248	95.1	0.5045	0.0000	OK
15 minute summer	251	12	4.043	0.245	97.0	0.4963	0.0000	OK
15 minute summer	Spur 3	10	4.320	0.150	62.2	0.8147	0.0000	OK
15 minute summer	252	12	3.583	0.268	147.7	0.7559	0.0000	OK
15 minute summer	253	13	3.480	0.268	152.6	0.7550	0.0000	OK
15 minute summer	Spur 1	10	4.175	0.245	87.0	1.7214	0.0000	OK
15 minute summer	254	11	3.846	0.236	88.9	0.4772	0.0000	OK
15 minute summer	255	12	3.757	0.231	92.9	0.4702	0.0000	OK
15 minute summer	Spur 2	10	4.171	0.221	93.2	1.6687	0.0000	OK
15 minute summer	256	13	3.381	0.422	310.8	0.5795	0.0000	OK
15 minute summer	Spur 43	10	4.987	0.137	27.3	0.3820	0.0000	OK
15 minute summer	257	13	3.343	0.414	325.7	0.5554	0.0000	OK
15 minute summer	Spur 24	10	4.012	0.084	11.2	0.0703	0.0000	OK
15 minute summer	258	13	3.305	0.404	328.6	0.4566	0.0000	OK
15 minute summer	Spur 42	10	4.371	0.141	27.3	0.3062	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
10080 minute summer	240	1.024_1	241	40.8	0.385	0.010	40.6716	
10080 minute summer	241	1.025_1	242	40.8	0.374	0.011	40.0815	
10080 minute summer	242	1.026_2	243	40.7	0.365	0.010	75.8260	
10080 minute summer	243	1.023	244	40.7	0.312	0.010	103.9317	
10080 minute summer	244	1.024	245	40.7	0.194	0.010	44.1097	
10080 minute summer	245	1.025	246	3.4	0.066	0.003	4.3096	
10080 minute summer	245	1.026_1	289	40.7	0.108	0.010	21.6853	
10080 minute summer	246	1.026	247	2.9	0.029	0.002	7.5323	
10080 minute summer	247	1.027	248	3.1	0.019	0.003	2.9971	
10080 minute summer	248	Flow through pond	288	-13.4	-0.005	0.000	1550.3680	
15 minute summer	Spur 5	18.000	249	27.0	0.937	0.380	0.4896	
15 minute summer	249	18.001	250	30.6	0.487	0.093	4.1518	
15 minute summer	Spur 4	19.000	250	61.4	1.197	0.861	0.6414	
15 minute summer	250	18.002	251	93.2	0.987	0.429	5.0060	
15 minute summer	251	18.003	252	93.0	1.071	0.428	4.6397	
15 minute summer	Spur 3	20.000	252	61.5	1.814	0.461	0.6021	
15 minute summer	252	18.004	253	149.5	0.960	0.185	9.7069	
15 minute summer	253	18.005	256	147.0	0.992	0.181	9.7511	
15 minute summer	Spur 1	21.000	254	85.1	1.210	0.770	2.1725	
15 minute summer	254	21.001	255	89.1	0.969	0.314	4.8308	
15 minute summer	255	21.002	256	85.6	0.994	0.303	6.4200	
15 minute summer	Spur 2	22.000	256	91.0	1.680	0.861	1.8991	
15 minute summer	256	18.006	257	300.5	0.951	0.249	5.8142	
15 minute summer	Spur 43	23.000	257	26.7	1.077	0.670	0.8145	
15 minute summer	257	18.007	258	322.4	0.970	0.188	5.7206	
15 minute summer	Spur 24	24.000	258	11.1	0.849	0.277	0.1141	
15 minute summer	258	18.008	259	330.2	0.970	0.192	13.4979	
15 minute summer	Spur 42	25.000	259	27.0	1.062	0.677	0.3436	

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Results for 1 year Critical Storm Duration. Lowest mass balance: 94.56%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	Spur 20	10	4.991	0.151	29.8	0.4416	0.0000	OK
15 minute summer	259	13	3.253	0.418	365.3	0.5498	0.0000	OK
15 minute summer	Spur 41	10	4.449	0.099	16.2	0.1386	0.0000	OK
15 minute summer	260	14	3.194	0.441	373.5	0.5796	0.0000	OK
15 minute summer	Spur 25	10	3.771	0.103	16.2	0.1154	0.0000	OK
15 minute summer	261	14	3.155	0.425	373.7	0.4807	0.0000	OK
15 minute summer	Spur 21	10	4.692	0.172	36.0	0.5566	0.0000	OK
15 minute summer	262	14	3.101	0.447	386.3	0.5849	0.0000	OK
15 minute summer	Spur 40	10	3.795	0.069	10.4	0.0528	0.0000	OK
15 minute summer	263	14	3.054	0.452	384.8	0.5115	0.0000	OK
15 minute summer	Spur 26	10	5.048	0.078	9.9	0.0917	0.0000	OK
30 minute summer	264	22	3.015	0.429	379.0	0.5669	0.0000	OK
15 minute summer	Spur 22	10	4.589	0.149	29.8	0.5421	0.0000	OK
30 minute summer	265	22	2.952	0.459	392.5	0.6165	0.0000	OK
15 minute summer	Spur 23	10	4.085	0.115	33.6	0.4569	0.0000	OK
30 minute summer	266	22	2.909	0.442	405.4	0.5950	0.0000	OK
30 minute summer	267	22	2.865	0.471	403.7	0.0000	0.0000	OK
180 minute summer	S278 Storage	116	4.096	0.062	8.3	10.6394	0.0000	OK
15 minute summer	S278 S6	10	4.166	0.251	28.6	0.9743	0.0000	SURCHARGED
15 minute summer	S278 S7	10	4.165	0.317	7.8	0.3588	0.0000	SURCHARGED
15 minute summer	S278 S8	10	3.745	0.062	8.0	0.0885	0.0000	OK
15 minute summer	268	10	3.477	0.076	11.9	0.1042	0.0000	OK
15 minute summer	Spur 35	10	5.528	0.078	9.1	0.0908	0.0000	OK
15 minute summer	Spur 27	10	3.622	0.133	24.9	0.2319	0.0000	OK
15 minute summer	269	11	3.291	0.165	47.9	0.3197	0.0000	OK
15 minute summer	270	11	3.221	0.163	49.9	0.3162	0.0000	OK
15 minute summer	Spur 36	10	5.014	0.134	24.9	0.3678	0.0000	OK
15 minute summer	Spur 28	10	5.116	0.156	31.1	0.5709	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	Spur 20	26.000	259	29.4	1.076	0.737	0.2487	
15 minute summer	259	18.009	260	362.5	1.007	0.211	17.8043	
15 minute summer	Spur 41	27.000	260	16.0	0.806	0.226	0.2625	
15 minute summer	260	18.010	261	364.9	1.005	0.212	5.0916	
15 minute summer	Spur 25	28.000	261	16.1	0.932	0.404	0.1362	
15 minute summer	261	18.011	262	368.0	1.012	0.214	16.8131	
15 minute summer	Spur 21	29.000	262	35.4	1.137	0.890	0.3899	
15 minute summer	262	18.012	263	381.1	1.002	0.221	11.9547	
15 minute summer	Spur 40	30.000	263	10.3	1.012	0.198	0.1539	
15 minute summer	263	18.013	264	382.0	1.028	0.216	3.3895	
15 minute summer	Spur 26	31.000	264	9.8	0.823	0.245	0.1157	
30 minute summer	264	18.014	265	379.5	1.001	0.221	21.2597	
15 minute summer	Spur 22	32.000	265	29.3	1.082	0.733	0.3096	
30 minute summer	265	18.015	266	390.5	1.011	0.227	6.0349	
15 minute summer	Spur 23	33.000	266	32.9	1.651	0.500	0.6599	
30 minute summer	266	18.016	267	403.7	1.034	0.234	17.1235	
30 minute summer	267	18.017	280	408.4	0.986	0.238	10.0500	
180 minute summer	S278 Storage	35.000	S278 S6	-8.3	-0.839	-0.199	0.0820	
15 minute summer	S278 S6	35.001	S278 S7	7.8	0.513	0.198	0.4545	
15 minute summer	S278 S7	Hydro-Brake®	S278 S8	4.0				
15 minute summer	S278 S8	35.003	268	7.9	0.908	0.159	0.1970	
15 minute summer	268	35.004	269	11.8	0.874	0.131	0.2551	
15 minute summer	Spur 35	35.000_1	269	9.0	0.991	0.508	0.0985	
15 minute summer	Spur 27	36.000	269	24.6	1.036	0.619	0.2541	
15 minute summer	269	35.005	270	47.5	0.869	0.198	1.5757	
15 minute summer	270	35.006	271	48.6	0.931	0.201	2.7175	
15 minute summer	Spur 36	37.000	271	24.6	1.035	0.615	0.1959	
15 minute summer	Spur 28	38.000	271	30.6	1.080	0.768	0.2305	

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Results for 1 year Critical Storm Duration. Lowest mass balance: 94.56%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	271	12	3.014	0.236	104.6	0.6397	0.0000	OK
15 minute summer	Spur 29	10	5.333	0.083	9.9	0.1055	0.0000	OK
15 minute summer	Spur 37	10	5.315	0.065	6.6	0.0564	0.0000	OK
15 minute summer	272	12	2.996	0.306	120.4	0.8282	0.0000	OK
15 minute summer	Spur 38	10	5.031	0.111	18.6	0.2217	0.0000	OK
15 minute summer	273	12	2.979	0.332	133.0	0.8979	0.0000	OK
15 minute summer	Spur 30	10	5.038	0.168	41.0	0.7254	0.0000	OK
15 minute summer	274	12	2.962	0.340	169.5	0.9172	0.0000	OK
15 minute summer	Spur 31	10	5.327	0.077	8.7	0.0811	0.0000	OK
15 minute summer	275	12	2.924	0.365	175.4	0.9843	0.0000	OK
15 minute summer	Spur 32	10	4.606	0.186	48.5	0.8335	0.0000	OK
15 minute summer	276	13	2.893	0.396	212.6	1.0694	0.0000	OK
15 minute summer	Spur 39	10	5.186	0.156	31.1	0.5665	0.0000	OK
30 minute summer	277	21	2.871	0.392	216.5	1.0575	0.0000	OK
30 minute summer	278	22	2.856	0.442	210.0	1.1981	0.0000	OK
15 minute summer	Spur 33	10	4.288	0.178	44.7	0.8334	0.0000	OK
30 minute summer	279	22	2.848	0.465	231.7	1.1838	0.0000	OK
30 minute summer	280	22	2.839	0.485	590.8	0.6947	0.0000	OK
30 minute summer	281	22	2.789	0.469	590.0	0.0000	0.0000	OK
30 minute summer	282	23	2.757	0.489	587.8	0.0000	0.0000	OK
15 minute summer	Spur 34	10	3.265	0.149	33.6	0.7109	0.0000	OK
10080 minute summer	283	7740	2.710	0.482	35.4	0.8515	0.0000	OK
10080 minute summer	284	7740	2.710	0.591	35.1	1.0441	0.0000	OK
10080 minute summer	285	7740	2.710	0.650	35.3	1.1484	0.0000	OK
10080 minute summer	286	7740	2.710	0.788	35.1	1.3922	0.0000	OK
10080 minute summer	287	7740	2.712	0.812	53.8	0.0000	0.0000	OK
10080 minute summer	288	6900	4.539	0.439	31.4	0.0000	0.0000	OK
10080 minute summer	289	6780	4.539	2.369	40.7	5.0656	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	271	35.007	272	102.0	0.776	0.166	5.0440	
15 minute summer	Spur 29	39.000	272	9.8	1.010	0.554	0.1065	
15 minute summer	Spur 37	40.000	272	6.5	0.912	0.368	0.0558	
15 minute summer	272	35.008	273	114.6	0.668	0.206	3.7548	
15 minute summer	Spur 38	41.000	273	18.4	0.970	0.460	0.1879	
15 minute summer	273	35.009	274	131.6	0.703	0.235	2.3096	
15 minute summer	Spur 30	42.000	274	40.5	1.045	0.568	0.2707	
15 minute summer	274	35.010	275	166.4	0.861	0.326	7.4286	
15 minute summer	Spur 31	43.000	275	8.6	0.972	0.487	0.0624	
15 minute summer	275	35.011	276	170.4	0.762	0.335	8.0615	
15 minute summer	Spur 32	44.000	276	47.9	1.103	0.672	0.3769	
15 minute summer	276	35.012	277	208.2	0.922	0.414	2.4869	
15 minute summer	Spur 39	45.000	277	30.6	1.081	0.766	0.2000	
30 minute summer	277	35.013	278	208.4	0.822	0.258	11.2445	
30 minute summer	278	35.014	279	200.7	0.695	0.248	5.9577	
15 minute summer	Spur 33	46.000	279	44.2	1.073	0.623	0.2503	
30 minute summer	279	35.015	280	224.3	0.783	0.275	5.8151	
30 minute summer	280	19.018	281	590.0	1.311	0.252	9.1723	
30 minute summer	281	19.019	282	587.8	1.302	0.252	14.2026	
30 minute summer	282	19.020	283	584.4	1.282	0.249	10.9502	
15 minute summer	Spur 34	47.000	283	33.1	0.987	0.464	0.3305	
10080 minute summer	283	19.021	284	35.1	0.296	0.011	37.0352	
10080 minute summer	284	19.022	285	35.3	0.292	0.011	24.2972	
10080 minute summer	285	19.023	286	35.1	0.281	0.011	68.9561	
10080 minute summer	286	19.024	287	41.3	0.368	0.013	12.6956	
10080 minute summer	287	Flow through pond	292	29.0	0.057	0.000	4386.0693	
10080 minute summer	288	48.000	289	-31.4	-0.280	-0.019	7.7779	
10080 minute summer	289	Hydro-Brake®	290	9.6				

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Results for 1 year Critical Storm Duration. Lowest mass balance: 94.56%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
10080 minute summer	290	7740	2.711	0.771	9.6	1.1033	0.0000	SURCHARGED
10080 minute summer	291	7740	2.711	0.811	10.2	0.0000	0.0000	OK
10080 minute summer	292	7740	2.709	1.009	29.0	0.0000	0.0000	SURCHARGED
10080 minute summer	293	7740	2.709	1.029	13.3	2.6191	0.0000	SURCHARGED
8640 minute winter	294	6720	2.149	0.739	13.3	0.8358	0.0000	SURCHARGED
8640 minute winter	Ex Outfall	6720	2.140	0.840	13.3	0.9499	0.0000	FLOOD RISK
15 minute summer	Ex Ditch	1	2.133	0.880	4.2	0.0000	0.0000	OK
15 minute summer	209a	12	4.727	0.111	21.6	0.1953	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
10080 minute summer	290	49.002	291	9.6	0.531	0.086	1.4199	
10080 minute summer	291	Flow through pond	292	29.0	0.057	0.000	4386.0693	
10080 minute summer	292	51.000	293	13.3	0.037	0.035	4.3173	
10080 minute summer	293	Hydro-Brake®	294	13.3				
8640 minute winter	294	51.002	Ex Outfall	13.3	0.334	0.234	0.3660	
8640 minute winter	Ex Outfall	50.003	Ex Ditch	13.3	0.334	0.334	0.3179	6456.9
15 minute summer	209a	5.003	210	21.8	0.696	0.076	0.3720	

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Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	100	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.600
CV	0.750	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	x
Maximum Rainfall (mm/hr)	50.0		

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Detailed	Starting Level (m)	
Rainfall Events	Singular	Skip Steady State	x	Check Discharge Rate(s)	x
Summer CV	1.000	Drain Down Time (mins)	2000	Check Discharge Volume	x
Winter CV	1.000	Additional Storage (m³/ha)	35.0		

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 %)
30	0	0	0

Node 293 Online Hydro-Brake® Control

Flap Valve	✓	Objective	(HE) Minimise upstream storage
Downstream Link	51.001	Sump Available	✓
Replaces Downstream Link	✓	Product Number	CTL-SHE-0154-1330-1820-1330
Invert Level (m)	1.680	Min Outlet Diameter (m)	0.225
Design Depth (m)	1.820	Min Node Diameter (mm)	1500
Design Flow (l/s)	13.3		

Node 289 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Downstream Link	49.001	Sump Available	✓
Replaces Downstream Link	✓	Product Number	CTL-SHE-0129-1330-3830-1330
Invert Level (m)	2.170	Min Outlet Diameter (m)	0.150
Design Depth (m)	3.830	Min Node Diameter (mm)	1500
Design Flow (l/s)	13.3		

Node S278 S7 Online Hydro-Brake® Control

Flap Valve	✓	Objective	(HE) Minimise upstream storage
Downstream Link	35.002	Sump Available	✓
Replaces Downstream Link	✓	Product Number	CTL-SHE-0094-4000-1037-4000
Invert Level (m)	3.848	Min Outlet Diameter (m)	0.150
Design Depth (m)	1.037	Min Node Diameter (mm)	1200
Design Flow (l/s)	4.0		

Node 292 Flow through Pond Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Main Channel Length (m)	104.045
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	1.700	Main Channel Slope (1:X)	500.0
Safety Factor	2.0	Time to half empty (mins)		Main Channel n	0.030

Inlets

291	287

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Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	615.7	0.0	0.300	6490.6	0.0	1.300	8081.0	0.0	2.100	9337.0	0.0
0.299	620.0	0.0	0.800	7312.0	0.0	1.800	8865.3	0.0			

Node 288 Flow through Pond Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Main Channel Length (m)	63.936
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	4.100	Main Channel Slope (1:X)	500.0
Safety Factor	2.0	Time to half empty (mins)	0	Main Channel n	0.035

Inlets

248

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	346.7	0.0	0.099	346.7	0.0	0.100	5421.2	0.0	1.900	8141.3	0.0

Node S278 Storage Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	4.034
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	0

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	182.0	0.0	0.800	182.0	0.0	0.801	0.0	0.0

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Results for 30 year Critical Storm Duration. Lowest mass balance: 95.13%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	Spur 15	12	7.529	1.829	190.9	13.4919	0.0000	FLOOD RISK
30 minute summer	201	22	5.740	1.320	257.3	3.8323	0.0000	SURCHARGED
30 minute summer	202	22	6.036	1.698	171.0	4.9581	0.0000	SURCHARGED
60 minute summer	Spur 14	37	5.894	0.914	65.9	2.5368	0.0000	SURCHARGED
60 minute summer	Spur 13	36	5.825	1.931	439.0	24.7598	0.0000	SURCHARGED
30 minute summer	203	22	6.042	2.175	830.7	3.8136	0.0000	SURCHARGED
60 minute summer	Spur 12	36	5.626	0.436	268.8	4.0484	0.0000	OK
60 minute summer	204	36	5.758	1.994	891.9	3.4152	0.0000	SURCHARGED
60 minute summer	205	36	5.690	1.951	850.4	0.0000	0.0000	SURCHARGED
60 minute summer	206	36	5.667	1.937	838.8	2.7722	0.0000	SURCHARGED
60 minute summer	207	36	5.646	1.945	838.0	0.4862	0.0000	SURCHARGED
60 minute summer	Spur 10	37	6.029	0.739	23.1	0.8200	0.0000	SURCHARGED
60 minute summer	208	37	5.903	0.917	173.4	2.5880	0.0000	SURCHARGED
60 minute summer	209	36	5.792	1.139	178.9	2.4249	0.0000	SURCHARGED
60 minute summer	210	36	5.643	1.927	173.6	3.9093	0.0000	SURCHARGED
60 minute summer	211	36	5.632	1.964	953.1	3.4710	0.0000	SURCHARGED
60 minute summer	212	36	5.566	1.990	982.3	2.3783	0.0000	SURCHARGED
60 minute summer	213	36	5.550	1.998	1011.4	0.0000	0.0000	SURCHARGED
15 minute summer	Dummy 3	11	6.187	0.378	170.9	2.2318	0.0000	OK
60 minute summer	214	36	5.543	1.999	1130.2	4.2743	0.0000	SURCHARGED
60 minute summer	215	36	5.449	2.035	1226.2	2.4618	0.0000	SURCHARGED
30 minute summer	216	23	5.421	2.040	1408.7	2.5889	0.0000	SURCHARGED
30 minute summer	217	20	5.530	2.174	1376.2	4.6480	0.0000	SURCHARGED
60 minute summer	218	37	5.416	2.093	1286.6	0.0000	0.0000	SURCHARGED
60 minute summer	Spur 9	36	5.643	1.413	286.5	12.7177	0.0000	SURCHARGED
60 minute summer	219	37	5.463	2.235	1431.9	4.7783	0.0000	SURCHARGED
60 minute summer	220	37	5.477	2.395	1398.3	0.0000	0.0000	SURCHARGED
60 minute summer	221	37	5.477	2.459	1380.9	5.2578	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	Spur 15	1.000	201	154.2	3.877	1.752	0.9480	
30 minute summer	201	1.001	202	158.4	1.003	0.134	14.6567	
30 minute summer	202	1.002	203	193.8	1.159	0.242	7.7396	
60 minute summer	Spur 14	2.000	203	65.4	1.644	1.642	0.8766	
60 minute summer	Spur 13	3.000	203	435.5	2.016	1.993	2.8331	
30 minute summer	203	1.003	204	809.2	1.045	0.340	86.0956	
60 minute summer	Spur 12	4.000	204	234.3	2.520	0.279	8.8933	
60 minute summer	204	1.004	205	850.4	1.260	0.474	36.1959	
60 minute summer	205	1.005	206	838.8	1.318	0.459	12.5487	
60 minute summer	206	1.006	207	827.5	1.414	0.450	16.5329	
60 minute summer	207	1.007	211	820.6	1.337	0.201	19.9639	
60 minute summer	Spur 10	6.000	208	38.2	1.027	0.960	0.5325	
60 minute summer	208	5.001	209	134.3	0.972	0.829	11.3964	
60 minute summer	209	5.002	209a	170.1	0.831	0.442	3.3108	
60 minute summer	210	5.004	211	155.4	0.261	0.043	36.4226	
60 minute summer	211	1.008	212	950.7	1.327	0.282	81.4047	
60 minute summer	212	1.009	213	1011.4	1.308	0.299	21.1381	
60 minute summer	213	1.010	214	1044.2	1.312	0.309	7.3078	
15 minute summer	Dummy 3	6.000_1	214	165.1	1.317	1.037	8.0885	
60 minute summer	214	1.011	215	1194.6	1.305	0.276	138.3789	
60 minute summer	215	1.012	216	1242.5	1.190	0.287	35.2311	
30 minute summer	216	1.013	217	1376.2	1.465	0.318	26.9660	
30 minute summer	217	1.014	218	1315.9	1.492	0.304	35.1203	
60 minute summer	218	1.015	219	1282.6	1.091	0.296	100.7194	
60 minute summer	Spur 9	7.000	219	286.3	1.817	1.792	1.6012	
60 minute summer	219	1.016	220	1398.3	1.281	0.265	105.0926	
60 minute summer	220	1.017	221	1380.9	1.250	0.262	46.2697	
60 minute summer	221	1.018	222	1347.9	1.313	0.256	40.7142	

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Results for 30 year Critical Storm Duration. Lowest mass balance: 95.13%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	222	37	5.471	2.510	1347.9	0.0000	0.0000	SURCHARGED
60 minute summer	223	37	5.449	2.713	1338.3	5.7995	0.0000	SURCHARGED
60 minute summer	224	37	5.433	2.754	1372.6	0.0000	0.0000	SURCHARGED
60 minute summer	Spur 11 Optional	34	5.699	1.289	26.3	0.0000	0.0000	SURCHARGED
15 minute summer	Spur 8	10	6.127	0.357	66.8	0.9633	0.0000	SURCHARGED
60 minute summer	225	37	5.770	1.638	106.1	3.4229	0.0000	SURCHARGED
60 minute summer	226	37	5.723	1.634	273.0	3.4173	0.0000	SURCHARGED
60 minute summer	227	37	5.561	1.541	291.1	3.2013	0.0000	SURCHARGED
60 minute summer	Spur 6	38	5.625	1.591	948.5	45.2479	0.0000	SURCHARGED
60 minute summer	228	38	5.574	2.189	1003.9	3.1323	0.0000	SURCHARGED
60 minute summer	229	38	5.567	2.207	1019.7	3.7031	0.0000	SURCHARGED
60 minute summer	230	38	5.561	2.220	1022.5	0.0000	0.0000	SURCHARGED
60 minute summer	231	38	5.546	2.250	1023.3	3.2198	0.0000	SURCHARGED
15 minute summer	Spur 7	11	7.704	1.109	558.3	28.8308	0.0000	SURCHARGED
60 minute summer	232	38	5.513	2.278	1377.3	3.2602	0.0000	SURCHARGED
60 minute summer	233	38	5.482	2.285	1374.6	3.2702	0.0000	SURCHARGED
15 minute summer	Spur 44	10	6.073	0.503	88.3	1.3368	0.0000	SURCHARGED
15 minute summer	Spur 16	11	5.712	1.247	374.6	10.7795	0.0000	SURCHARGED
60 minute summer	234	38	5.450	2.296	1660.2	3.2852	0.0000	SURCHARGED
60 minute summer	235	38	5.433	2.295	1657.5	0.0000	0.0000	SURCHARGED
60 minute summer	236	37	5.425	2.610	1653.8	5.5793	0.0000	SURCHARGED
60 minute summer	Spur 45	38	5.402	0.052	3.6	0.0000	0.0000	OK
60 minute summer	237	37	5.427	2.680	1640.0	5.7303	0.0000	SURCHARGED
15 minute summer	Spur 17	11	7.086	1.209	668.1	37.5984	0.0000	SURCHARGED
60 minute summer	238	37	5.423	2.762	2669.7	5.9045	0.0000	SURCHARGED
15 minute summer	Spur 18	10	5.425	0.550	95.5	1.7031	0.0000	SURCHARGED
60 minute summer	239	38	5.304	2.777	2723.7	5.9383	0.0000	SURCHARGED
60 minute summer	Spur 19	38	5.417	0.867	42.8	1.7501	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute summer	222	1.019	223	1338.3	0.873	0.254	161.9302	
60 minute summer	223	1.020	224	1372.6	0.644	0.262	41.7047	
60 minute summer	224	1.021	238	1395.2	0.655	0.265	13.0133	
60 minute summer	Spur 11 Optional	9.000	225	51.3	0.465	0.461	1.8707	
15 minute summer	Spur 8	10.000	225	65.6	1.650	1.648	0.4288	
60 minute summer	225	8.001	226	135.2	0.722	0.473	6.9219	
60 minute summer	226	8.002	227	-262.5	1.031	-0.922	11.2093	
60 minute summer	227	8.003	229	-280.6	-0.996	-0.400	17.9369	
60 minute summer	Spur 6	10.000_1	228	1003.9	2.300	1.305	5.5407	
60 minute summer	228	10.001	229	1007.2	1.011	0.363	15.2396	
60 minute summer	229	8.004	230	1022.5	1.053	0.433	15.9297	
60 minute summer	230	9.005	231	1023.3	0.971	0.439	38.7499	
60 minute summer	231	8.006	232	1022.4	0.827	0.435	51.7849	
15 minute summer	Spur 7	11.000	232	523.2	4.744	2.789	0.7941	
60 minute summer	232	8.007	233	1374.6	1.071	0.585	32.2331	
60 minute summer	233	8.008	234	1373.6	1.024	0.592	37.3724	
15 minute summer	Spur 44	12.000	234	86.8	2.183	2.181	0.3940	
15 minute summer	Spur 16	13.000	234	358.2	5.088	1.687	0.6157	
60 minute summer	234	8.009	235	1657.5	1.388	0.712	13.8107	
60 minute summer	235	8.010	236	1653.8	1.523	0.704	19.5247	
60 minute summer	236	8.011	237	1640.0	0.917	0.395	78.9638	
60 minute summer	Spur 45	14.000	237	-3.6	-0.503	-0.200	0.0244	
60 minute summer	237	8.012	238	1628.4	0.850	0.412	110.4863	
15 minute summer	Spur 17	15.000	238	611.8	5.547	2.175	0.6049	
60 minute summer	238	1.022	239	2682.0	1.259	0.679	171.3435	
15 minute summer	Spur 18	16.000	239	93.4	2.348	2.337	0.3840	
60 minute summer	239	1.023_1	240	2732.8	1.283	0.691	127.8281	
60 minute summer	Spur 19	17.000	240	38.7	2.824	0.815	0.1540	

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Results for 30 year Critical Storm Duration. Lowest mass balance: 95.13%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
10080 minute winter	240	9240	5.251	2.824	59.5	6.0379	0.0000	SURCHARGED
10080 minute winter	241	9240	5.251	2.855	59.5	6.1039	0.0000	SURCHARGED
10080 minute winter	242	9240	5.251	2.883	59.4	6.1628	0.0000	SURCHARGED
10080 minute winter	243	9300	5.250	2.947	59.4	6.3013	0.0000	SURCHARGED
10080 minute winter	244	9300	5.249	3.027	59.4	6.4723	0.0000	SURCHARGED
10080 minute winter	245	8760	5.249	3.062	59.4	6.5465	0.0000	OK
10080 minute winter	246	9240	5.249	0.960	15.1	1.0857	0.0000	OK
10080 minute winter	247	9240	5.249	1.027	14.5	1.1613	0.0000	OK
10080 minute winter	248	9120	5.248	1.048	27.8	0.0000	0.0000	OK
15 minute summer	Spur 5	11	4.970	0.480	105.0	1.0056	0.0000	SURCHARGED
15 minute summer	249	11	4.806	0.611	119.4	1.2483	0.0000	SURCHARGED
15 minute summer	Spur 4	11	5.386	1.216	238.6	5.3175	0.0000	SURCHARGED
15 minute summer	250	11	4.750	0.848	342.7	1.7262	0.0000	SURCHARGED
15 minute summer	251	13	4.523	0.725	353.4	1.4712	0.0000	SURCHARGED
15 minute summer	Spur 3	11	5.115	0.945	238.6	5.1458	0.0000	SURCHARGED
15 minute summer	252	13	4.377	1.062	583.7	2.9933	0.0000	SURCHARGED
15 minute summer	253	13	4.320	1.108	534.5	3.1244	0.0000	SURCHARGED
15 minute summer	Spur 1	11	5.099	1.169	334.0	8.1994	0.0000	SURCHARGED
15 minute summer	254	13	4.435	0.825	338.0	1.6696	0.0000	SURCHARGED
15 minute summer	255	13	4.370	0.844	350.0	1.7166	0.0000	SURCHARGED
15 minute summer	Spur 2	12	6.910	2.960	357.9	22.3184	0.0000	SURCHARGED
15 minute summer	256	13	4.286	1.327	1081.6	1.8238	0.0000	SURCHARGED
15 minute summer	Spur 43	11	6.146	1.296	105.0	3.6219	0.0000	SURCHARGED
30 minute summer	257	20	4.266	1.337	1088.2	1.7941	0.0000	SURCHARGED
15 minute summer	Spur 24	13	4.244	0.316	43.0	0.2648	0.0000	SURCHARGED
30 minute summer	258	20	4.262	1.361	1099.2	1.5390	0.0000	SURCHARGED
15 minute summer	Spur 42	10	4.987	0.757	105.0	1.6470	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
10080 minute winter	240	1.024_1	241	59.5	0.401	0.014	40.6716	
10080 minute winter	241	1.025_1	242	59.4	0.395	0.016	40.0815	
10080 minute winter	242	1.026_2	243	59.4	0.395	0.014	75.8260	
10080 minute winter	243	1.023	244	59.4	0.299	0.015	103.9317	
10080 minute winter	244	1.024	245	59.4	0.191	0.015	44.1097	
10080 minute winter	245	1.025	246	15.1	0.106	0.012	26.0400	
10080 minute winter	245	1.026_1	289	49.8	0.108	0.013	21.6853	
10080 minute winter	246	1.026	247	14.5	0.050	0.012	33.6979	
10080 minute winter	247	1.027	248	14.3	0.045	0.012	11.2022	
10080 minute winter	248	Flow through pond	288	25.2	-0.006	0.000	6072.3711	
15 minute summer	Spur 5	18.000	249	104.1	1.493	1.467	1.1980	
15 minute summer	249	18.001	250	108.9	0.628	0.331	13.6554	
15 minute summer	Spur 4	19.000	250	223.3	3.171	3.133	0.8824	
15 minute summer	250	18.002	251	338.8	1.568	1.559	11.0371	
15 minute summer	251	18.003	252	352.0	1.647	1.620	11.4564	
15 minute summer	Spur 3	20.000	252	231.4	3.286	1.736	1.2513	
15 minute summer	252	18.004	253	519.9	1.222	0.643	39.2521	
15 minute summer	253	18.005	256	479.3	0.846	0.589	38.7261	
15 minute summer	Spur 1	21.000	254	323.4	2.932	2.926	3.3970	
15 minute summer	254	21.001	255	335.4	1.291	1.183	13.7388	
15 minute summer	255	21.002	256	329.8	1.341	1.166	20.7278	
15 minute summer	Spur 2	22.000	256	308.0	4.374	2.914	2.4657	
15 minute summer	256	18.006	257	1080.5	1.253	0.896	15.6776	
15 minute summer	Spur 43	23.000	257	99.3	2.498	2.495	1.2940	
30 minute summer	257	18.007	258	1062.9	1.103	0.620	19.0380	
15 minute summer	Spur 24	24.000	258	44.3	1.210	1.107	0.3470	
30 minute summer	258	18.008	259	1041.6	1.075	0.606	44.6301	
15 minute summer	Spur 42	25.000	259	102.6	2.581	2.577	0.5331	

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Results for 30 year Critical Storm Duration. Lowest mass balance: 95.13%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	Spur 20	10	5.534	0.694	114.5	2.0309	0.0000	SURCHARGED
15 minute summer	259	13	4.130	1.295	1333.9	1.7044	0.0000	SURCHARGED
15 minute summer	Spur 41	10	4.568	0.218	62.0	0.3033	0.0000	OK
30 minute summer	260	20	4.130	1.377	1212.7	1.8110	0.0000	SURCHARGED
30 minute summer	Spur 25	20	4.126	0.458	56.6	0.5104	0.0000	SURCHARGED
30 minute summer	261	20	4.097	1.367	1233.4	1.5466	0.0000	SURCHARGED
15 minute summer	Spur 21	11	5.645	1.125	138.4	3.6428	0.0000	SURCHARGED
15 minute summer	262	13	3.988	1.334	1343.1	1.7461	0.0000	SURCHARGED
15 minute summer	Spur 40	13	4.046	0.320	40.1	0.2437	0.0000	SURCHARGED
30 minute summer	263	20	3.940	1.338	1344.6	1.5130	0.0000	SURCHARGED
15 minute summer	Spur 26	10	5.151	0.181	38.2	0.2127	0.0000	OK
30 minute summer	264	20	3.901	1.315	1376.4	1.7370	0.0000	SURCHARGED
15 minute summer	Spur 22	11	5.215	0.775	114.5	2.8105	0.0000	SURCHARGED
30 minute summer	265	20	3.802	1.309	1453.5	1.7565	0.0000	SURCHARGED
15 minute summer	Spur 23	11	5.379	1.409	128.9	5.6162	0.0000	SURCHARGED
30 minute summer	266	20	3.714	1.247	1548.2	1.6800	0.0000	SURCHARGED
15 minute summer	267	13	3.647	1.253	1621.7	0.0000	0.0000	SURCHARGED
120 minute winter	S278 Storage	118	4.428	0.394	29.1	68.0482	0.0000	SURCHARGED
15 minute summer	S278 S6	10	4.509	0.594	109.8	2.3094	0.0000	SURCHARGED
15 minute summer	S278 S7	10	4.508	0.660	9.3	0.7463	0.0000	SURCHARGED
15 minute summer	S278 S8	12	4.491	0.808	18.6	1.1502	0.0000	SURCHARGED
15 minute summer	268	12	4.481	1.080	47.9	1.4878	0.0000	SURCHARGED
15 minute summer	Spur 35	10	5.938	0.488	34.8	0.5653	0.0000	SURCHARGED
15 minute summer	Spur 27	12	4.750	1.261	95.5	2.1912	0.0000	SURCHARGED
15 minute summer	269	12	4.425	1.299	171.6	2.5164	0.0000	SURCHARGED
15 minute summer	270	12	4.418	1.360	186.4	2.6361	0.0000	SURCHARGED
15 minute summer	Spur 36	10	5.395	0.515	95.5	1.4162	0.0000	SURCHARGED
15 minute summer	Spur 28	10	5.650	0.690	119.3	2.5244	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	Spur 20	26.000	259	111.7	2.809	2.798	0.3582	
15 minute summer	259	18.009	260	1222.5	1.221	0.712	55.4893	
15 minute summer	Spur 41	27.000	260	61.4	1.196	0.869	0.6788	
30 minute summer	260	18.010	261	1200.0	1.139	0.698	15.6691	
30 minute summer	Spur 25	28.000	261	56.6	1.428	1.424	0.3145	
30 minute summer	261	18.011	262	1233.6	1.118	0.717	51.2540	
15 minute summer	Spur 21	29.000	262	133.8	3.364	3.358	0.4928	
15 minute summer	262	18.012	263	1348.4	1.198	0.782	34.9584	
15 minute summer	Spur 40	30.000	263	39.7	1.412	0.764	0.6011	
30 minute summer	263	18.013	264	1350.4	1.199	0.763	10.2057	
15 minute summer	Spur 26	31.000	264	37.9	1.162	0.945	0.3159	
30 minute summer	264	18.014	265	1381.9	1.227	0.804	63.1599	
15 minute summer	Spur 22	32.000	265	111.1	2.794	2.778	0.4494	
30 minute summer	265	18.015	266	1452.8	1.290	0.845	17.5924	
15 minute summer	Spur 23	33.000	266	115.0	2.893	1.747	1.3133	
30 minute summer	266	18.016	267	1547.2	1.373	0.897	49.0344	
15 minute summer	267	18.017	280	1618.3	1.436	0.941	27.0297	
120 minute winter	S278 Storage	35.000	S278 S6	-29.1	-0.931	-0.696	0.2440	
15 minute summer	S278 S6	35.001	S278 S7	9.3	0.713	0.233	0.4545	
15 minute summer	S278 S7	Hydro-Brake®	S278 S8	4.0				
15 minute summer	S278 S8	35.003	268	22.5	1.134	0.452	0.8979	
15 minute summer	268	35.004	269	37.0	0.939	0.410	1.3307	
15 minute summer	Spur 35	35.000_1	269	33.8	1.920	1.908	0.1889	
15 minute summer	Spur 27	36.000	269	94.3	2.372	2.372	0.4254	
15 minute summer	269	35.005	270	149.7	1.095	0.623	5.9141	
15 minute summer	270	35.006	271	158.0	0.973	0.654	11.1957	
15 minute summer	Spur 36	37.000	271	93.9	2.362	2.352	0.3247	
15 minute summer	Spur 28	38.000	271	115.9	2.914	2.911	0.3203	

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Results for 30 year Critical Storm Duration. Lowest mass balance: 95.13%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	271	12	4.347	1.569	340.0	4.2547	0.0000	SURCHARGED
15 minute summer	Spur 29	11	5.831	0.581	38.2	0.7416	0.0000	SURCHARGED
15 minute summer	Spur 37	10	5.499	0.249	25.3	0.2150	0.0000	SURCHARGED
15 minute summer	272	12	4.313	1.623	411.8	4.3961	0.0000	SURCHARGED
15 minute summer	Spur 38	10	5.304	0.384	71.6	0.7640	0.0000	SURCHARGED
15 minute summer	273	12	4.268	1.621	482.7	4.3802	0.0000	SURCHARGED
15 minute summer	Spur 30	10	5.335	0.465	157.5	2.0041	0.0000	SURCHARGED
15 minute summer	274	12	4.218	1.596	618.6	4.3083	0.0000	SURCHARGED
15 minute summer	Spur 31	10	5.620	0.370	33.4	0.3877	0.0000	SURCHARGED
15 minute summer	275	12	4.081	1.522	653.2	4.1051	0.0000	SURCHARGED
15 minute summer	Spur 32	10	5.005	0.585	186.1	2.6292	0.0000	SURCHARGED
15 minute summer	276	12	3.930	1.433	813.1	3.8676	0.0000	SURCHARGED
15 minute summer	Spur 39	10	5.678	0.648	119.3	2.3488	0.0000	SURCHARGED
30 minute summer	277	20	3.809	1.330	914.3	3.5902	0.0000	SURCHARGED
30 minute summer	278	20	3.715	1.301	920.8	3.5235	0.0000	SURCHARGED
15 minute summer	Spur 33	10	4.598	0.488	171.8	2.2884	0.0000	SURCHARGED
30 minute summer	279	20	3.651	1.268	1057.0	3.2279	0.0000	SURCHARGED
30 minute summer	280	21	3.584	1.230	2455.3	1.7600	0.0000	OK
30 minute summer	281	21	3.519	1.199	2437.6	0.0000	0.0000	OK
30 minute summer	282	21	3.491	1.223	2368.4	0.0000	0.0000	OK
15 minute summer	Spur 34	10	3.526	0.410	128.9	1.9588	0.0000	SURCHARGED
30 minute summer	283	21	3.426	1.198	2442.5	2.1163	0.0000	OK
30 minute summer	284	21	3.307	1.188	2444.6	2.0996	0.0000	OK
10080 minute summer	285	9900	3.235	1.175	60.3	2.0764	0.0000	OK
10080 minute winter	286	9720	3.238	1.316	48.8	2.3248	0.0000	OK
10080 minute winter	287	10080	3.239	1.339	75.9	0.0000	0.0000	OK
10080 minute winter	288	9180	5.248	1.148	49.1	0.0000	0.0000	SURCHARGED
10080 minute winter	289	8760	5.249	3.079	49.8	6.5826	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	271	35.007	272	350.0	0.810	0.568	15.4650	
15 minute summer	Spur 29	39.000	272	37.1	2.105	2.094	0.1913	
15 minute summer	Spur 37	40.000	272	24.9	1.417	1.403	0.1347	
15 minute summer	272	35.008	273	416.1	0.946	0.749	9.2610	
15 minute summer	Spur 38	41.000	273	70.9	1.782	1.771	0.3877	
15 minute summer	273	35.009	274	482.2	1.096	0.863	5.3211	
15 minute summer	Spur 30	42.000	274	156.1	2.217	2.190	0.4864	
15 minute summer	274	35.010	275	617.9	1.404	1.212	16.0935	
15 minute summer	Spur 31	43.000	275	32.9	1.870	1.859	0.1226	
15 minute summer	275	35.011	276	652.2	1.482	1.281	15.8716	
15 minute summer	Spur 32	44.000	276	183.8	2.610	2.581	0.6055	
15 minute summer	276	35.012	277	816.7	1.856	1.623	4.7163	
15 minute summer	Spur 39	45.000	277	116.1	2.919	2.904	0.2781	
30 minute summer	277	35.013	278	912.9	1.441	1.132	24.8585	
30 minute summer	278	35.014	279	911.7	1.439	1.127	11.7901	
15 minute summer	Spur 33	46.000	279	170.2	2.417	2.398	0.4235	
30 minute summer	279	35.015	280	1049.5	1.656	1.287	10.8515	
30 minute summer	280	19.018	281	2437.6	1.836	1.041	27.5084	
30 minute summer	281	19.019	282	2368.4	1.811	1.016	42.3638	
30 minute summer	282	19.020	283	2378.7	1.796	1.014	32.1573	
15 minute summer	Spur 34	47.000	283	127.3	1.809	1.784	0.6759	
30 minute summer	283	19.021	284	2444.6	1.669	0.794	98.2810	
30 minute summer	284	19.022	285	2384.8	1.648	0.773	52.1990	
10080 minute summer	285	19.023	286	59.7	0.344	0.019	128.5804	
10080 minute winter	286	19.024	287	65.7	0.403	0.021	21.8859	
10080 minute winter	287	Flow through pond	292	74.6	0.045	0.000	8497.6201	
10080 minute winter	288	48.000	289	-49.1	-0.217	-0.030	17.8712	
10080 minute winter	289	Hydro-Brake®	290	10.0				

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Results for 30 year Critical Storm Duration. Lowest mass balance: 95.13%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
10080 minute summer	290	10140	3.234	1.294	10.0	1.8518	0.0000	SURCHARGED
10080 minute summer	291	10140	3.234	1.334	10.0	0.0000	0.0000	OK
10080 minute winter	292	10020	3.231	1.531	85.7	0.0000	0.0000	SURCHARGED
10080 minute winter	293	10080	3.276	1.596	54.6	4.0626	0.0000	SURCHARGED
480 minute winter	294	384	2.149	0.739	13.3	0.8358	0.0000	SURCHARGED
10080 minute summer	Ex Outfall	10980	2.140	0.840	13.3	0.9500	8.2123	FLOOD
15 minute summer	Ex Ditch	1	2.133	0.880	11.1	0.0000	0.0000	OK
60 minute summer	209a	36	5.812	1.196	170.1	2.1125	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
10080 minute summer	290	49.002	291	10.0	0.589	0.090	1.4199	
10080 minute summer	291	Flow through pond	292	106.1	0.099	0.001	8500.4336	
10080 minute winter	292	51.000	293	54.6	0.153	0.144	4.3173	
10080 minute winter	293	Hydro-Brake®	294	13.3				
480 minute winter	294	51.002	Ex Outfall	13.3	0.577	0.234	0.3660	
10080 minute summer	Ex Outfall	50.003	Ex Ditch	13.3	0.334	0.334	0.3179	7369.9
60 minute summer	209a	5.003	210	167.0	0.922	0.581	3.3407	

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ARUN DISTRICT COUNCIL F/14/24/RES

Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	100	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.600
CV	0.750	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	x
Maximum Rainfall (mm/hr)	50.0		

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Detailed	Starting Level (m)	
Rainfall Events	Singular	Skip Steady State	x	Check Discharge Rate(s)	x
Summer CV	0.750	Drain Down Time (mins)	2000	Check Discharge Volume	x
Winter CV	0.840	Additional Storage (m³/ha)	35.0		

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

Node 293 Online Hydro-Brake® Control

Flap Valve	✓	Objective	(HE) Minimise upstream storage
Downstream Link	51.001	Sump Available	✓
Replaces Downstream Link	✓	Product Number	CTL-SHE-0154-1330-1820-1330
Invert Level (m)	1.680	Min Outlet Diameter (m)	0.225
Design Depth (m)	1.820	Min Node Diameter (mm)	1500
Design Flow (l/s)	13.3		

Node 289 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Downstream Link	49.001	Sump Available	✓
Replaces Downstream Link	✓	Product Number	CTL-SHE-0129-1330-3830-1330
Invert Level (m)	2.170	Min Outlet Diameter (m)	0.150
Design Depth (m)	3.830	Min Node Diameter (mm)	1500
Design Flow (l/s)	13.3		

Node S278 S7 Online Hydro-Brake® Control

Flap Valve	✓	Objective	(HE) Minimise upstream storage
Downstream Link	35.002	Sump Available	✓
Replaces Downstream Link	✓	Product Number	CTL-SHE-0094-4000-1037-4000
Invert Level (m)	3.848	Min Outlet Diameter (m)	0.150
Design Depth (m)	1.037	Min Node Diameter (mm)	1200
Design Flow (l/s)	4.0		

Node 292 Flow through Pond Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Main Channel Length (m)	104.045
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	1.700	Main Channel Slope (1:X)	500.0
Safety Factor	2.0	Time to half empty (mins)		Main Channel n	0.030

Inlets

291	287

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ARUN DISTRICT COUNCIL F/14/24/RES

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	615.7	0.0	0.300	6490.6	0.0	1.300	8081.0	0.0	2.100	9337.0	0.0
0.299	620.0	0.0	0.800	7312.0	0.0	1.800	8865.3	0.0			

Node 288 Flow through Pond Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Main Channel Length (m)	63.936
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	4.100	Main Channel Slope (1:X)	500.0
Safety Factor	2.0	Time to half empty (mins)		Main Channel n	0.035

Inlets

248

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	346.7	0.0	0.099	346.7	0.0	0.100	5421.2	0.0	1.900	8141.3	0.0

Node S278 Storage Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	4.034
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	236

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	182.0	0.0	0.800	182.0	0.0	0.801	0.0	0.0

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Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 91.01%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute winter	Spur 15	21	7.598	1.998	215.0	16.2593	0.0000	FLOOD RISK
30 minute winter	201	20	7.159	2.739	216.5	7.9522	0.0000	SURCHARGED
30 minute winter	202	20	7.169	2.831	514.1	8.2671	0.0000	FLOOD RISK
30 minute winter	Spur 14	20	7.501	2.521	104.4	7.5000	0.0000	FLOOD RISK
30 minute winter	Spur 13	20	7.499	3.605	889.5	52.5879	0.0000	FLOOD RISK
30 minute winter	203	20	7.141	3.274	1027.5	5.7391	0.0000	FLOOD RISK
30 minute winter	Spur 12	20	7.307	2.117	365.9	23.3877	0.0000	SURCHARGED
30 minute winter	204	20	7.075	3.311	1376.6	5.6714	0.0000	SURCHARGED
30 minute winter	205	20	7.066	3.327	1348.2	0.0000	0.0000	SURCHARGED
30 minute winter	206	20	7.064	3.334	1335.4	4.7704	0.0000	SURCHARGED
30 minute winter	207	20	7.071	3.370	1357.2	0.8426	0.0000	SURCHARGED
30 minute winter	Spur 10	20	7.470	2.180	48.0	4.8835	0.0000	FLOOD RISK
30 minute winter	208	20	7.302	2.316	175.5	6.5358	2.9449	FLOOD
30 minute winter	209	20	7.091	2.438	218.8	5.1910	0.0000	SURCHARGED
30 minute winter	210	20	7.095	3.379	142.0	6.8551	0.0000	SURCHARGED
30 minute winter	211	20	7.081	3.413	2868.5	6.0304	0.0000	SURCHARGED
30 minute winter	212	20	7.092	3.516	1472.1	4.2019	0.0000	SURCHARGED
30 minute winter	213	20	7.085	3.533	1489.7	0.0000	0.0000	SURCHARGED
30 minute summer	Dummy 3	21	7.194	1.385	206.6	8.1715	0.0000	SURCHARGED
30 minute winter	214	20	7.074	3.530	1695.5	7.5465	0.0000	SURCHARGED
30 minute winter	215	20	6.889	3.475	2255.7	4.2045	0.0000	SURCHARGED
30 minute winter	216	20	6.847	3.466	1924.8	4.3979	0.0000	SURCHARGED
30 minute winter	217	21	6.820	3.464	1851.4	7.4070	0.0000	SURCHARGED
30 minute winter	218	21	6.808	3.485	1845.4	0.0000	0.0000	SURCHARGED
30 minute winter	Spur 9	21	6.963	2.733	454.1	24.5934	0.0000	SURCHARGED
30 minute winter	219	21	6.786	3.558	2207.8	7.6063	0.0000	SURCHARGED
30 minute winter	220	21	6.751	3.669	2207.0	0.0000	0.0000	SURCHARGED
30 minute winter	221	21	6.728	3.710	2208.6	7.9321	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute winter	Spur 15	1.000	201	199.8	2.838	1.077	1.6842	
30 minute winter	201	1.001	202	325.3	1.046	0.275	14.6567	
30 minute winter	202	1.002	203	221.2	1.157	0.276	7.7396	
30 minute winter	Spur 14	2.000	203	102.9	2.588	2.586	0.8766	
30 minute winter	Spur 13	3.000	203	686.8	3.179	3.143	2.8331	
30 minute winter	203	1.003	204	1004.8	1.072	0.423	86.0956	
30 minute winter	Spur 12	4.000	204	431.4	2.732	0.514	9.9987	
30 minute winter	204	1.004	205	1348.2	1.407	0.752	36.1959	
30 minute winter	205	1.005	206	1335.4	1.460	0.730	12.5487	
30 minute winter	206	1.006	207	1340.5	1.578	0.729	16.5329	
30 minute winter	207	1.007	211	1352.7	1.452	0.332	19.9639	
30 minute winter	Spur 10	6.000	208	49.7	1.249	1.248	0.5325	
30 minute winter	208	5.001	209	-130.2	1.096	-0.803	11.3964	
30 minute winter	209	5.002	209a	-203.0	0.936	-0.528	3.3108	
30 minute winter	210	5.004	211	165.4	0.321	0.045	36.4226	
30 minute winter	211	1.008	212	-1453.1	1.488	-0.430	81.4047	
30 minute winter	212	1.009	213	1489.7	1.487	0.441	21.1381	
30 minute winter	213	1.010	214	1503.3	1.498	0.445	7.3078	
30 minute summer	Dummy 3	6.000_1	214	200.8	1.365	1.261	10.3185	
30 minute winter	214	1.011	215	1733.3	1.522	0.400	138.3789	
30 minute winter	215	1.012	216	-2175.3	1.417	-0.502	35.2311	
30 minute winter	216	1.013	217	1851.4	1.460	0.427	26.9660	
30 minute winter	217	1.014	218	1845.4	1.480	0.426	35.1203	
30 minute winter	218	1.015	219	1842.3	1.356	0.425	100.7194	
30 minute winter	Spur 9	7.000	219	606.4	3.827	3.795	1.6012	
30 minute winter	219	1.016	220	2207.0	1.612	0.418	105.0926	
30 minute winter	220	1.017	221	2208.6	1.486	0.419	46.2697	
30 minute winter	221	1.018	222	2211.7	1.507	0.419	40.7142	

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Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 91.01%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute winter	222	21	6.708	3.747	2211.7	0.0000	0.0000	SURCHARGED
30 minute winter	223	21	6.671	3.935	2211.1	8.4136	0.0000	SURCHARGED
30 minute winter	224	21	6.654	3.975	2187.9	0.0000	0.0000	SURCHARGED
30 minute winter	Spur 11 Optional	21	7.131	2.721	47.1	0.0000	0.0000	FLOOD RISK
30 minute winter	Spur 8	21	7.192	1.422	73.1	3.8365	0.0000	SURCHARGED
30 minute winter	225	21	7.143	3.011	127.1	6.2924	0.0000	SURCHARGED
30 minute winter	226	21	7.156	3.067	113.4	6.4139	0.0000	SURCHARGED
30 minute winter	227	21	7.030	3.010	374.5	6.2549	0.0000	SURCHARGED
30 minute winter	Spur 6	21	7.158	3.124	1502.9	88.8414	0.0000	SURCHARGED
30 minute winter	228	21	7.018	3.633	1387.5	5.1993	0.0000	SURCHARGED
30 minute winter	229	21	7.001	3.641	1452.1	6.1102	0.0000	SURCHARGED
30 minute winter	230	21	6.988	3.647	1514.0	0.0000	0.0000	SURCHARGED
30 minute winter	231	21	6.964	3.668	1554.0	5.2486	0.0000	SURCHARGED
15 minute summer	Spur 7	11	8.170	1.575	734.6	42.3205	0.0000	FLOOD RISK
30 minute winter	232	21	6.932	3.697	2197.6	5.2900	0.0000	SURCHARGED
30 minute winter	233	21	6.881	3.684	2228.2	5.2722	0.0000	SURCHARGED
30 minute winter	Spur 44	21	7.003	1.433	96.6	3.8110	0.0000	SURCHARGED
30 minute winter	Spur 16	21	7.578	3.113	409.7	26.9025	0.0000	FLOOD RISK
30 minute winter	234	21	6.829	3.675	2678.1	5.2595	0.0000	SURCHARGED
30 minute winter	235	21	6.795	3.657	2643.9	0.0000	0.0000	SURCHARGED
30 minute winter	236	21	6.754	3.939	2609.9	8.4219	0.0000	SURCHARGED
30 minute winter	Spur 45	21	6.717	1.367	19.9	0.0000	0.0000	SURCHARGED
30 minute winter	237	21	6.704	3.957	2511.7	8.4609	0.0000	SURCHARGED
15 minute summer	Spur 17	10	7.452	1.575	878.9	55.9141	0.0000	FLOOD RISK
30 minute winter	238	21	6.639	3.978	4526.1	8.5040	0.0000	SURCHARGED
30 minute winter	Spur 18	21	6.600	1.725	104.4	5.3376	0.0000	SURCHARGED
15 minute winter	239	11	6.780	4.253	3352.5	9.0929	0.0000	SURCHARGED
30 minute winter	Spur 19	21	6.805	2.255	67.8	4.6255	0.0000	FLOOD RISK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute winter	222	1.019	223	2211.1	1.038	0.419	161.9302	
30 minute winter	223	1.020	224	2187.9	1.027	0.418	41.7047	
30 minute winter	224	1.021	238	2179.0	1.023	0.413	13.0133	
30 minute winter	Spur 11 Optional	9.000	225	-47.1	-0.427	-0.423	1.8707	
30 minute winter	Spur 8	10.000	225	82.7	2.081	2.079	0.4382	
30 minute winter	225	8.001	226	103.5	0.774	0.362	6.9219	
30 minute winter	226	8.002	227	122.7	1.096	0.431	11.2093	
30 minute winter	227	8.003	229	-333.2	-1.183	-0.475	17.9369	
30 minute winter	Spur 6	10.000_1	228	1387.5	3.153	1.804	5.5407	
30 minute winter	228	10.001	229	1372.9	1.173	0.495	15.2396	
30 minute winter	229	8.004	230	1514.0	1.187	0.641	15.9297	
30 minute winter	230	9.005	231	1554.0	1.143	0.667	38.7499	
30 minute winter	231	8.006	232	1610.2	1.129	0.686	51.7849	
15 minute summer	Spur 7	11.000	232	668.8	6.064	3.565	0.7941	
30 minute winter	232	8.007	233	2228.2	1.563	0.948	32.2331	
30 minute winter	233	8.008	234	2230.5	1.564	0.961	37.3724	
30 minute winter	Spur 44	12.000	234	94.6	2.378	2.377	0.3980	
30 minute winter	Spur 16	13.000	234	354.1	5.029	1.667	0.6157	
30 minute winter	234	8.009	235	2643.9	1.946	1.135	13.8107	
30 minute winter	235	8.010	236	2609.9	2.156	1.111	19.5247	
30 minute winter	236	8.011	237	2511.7	1.214	0.606	78.9638	
30 minute winter	Spur 45	14.000	237	-19.9	-1.469	-1.110	0.0572	
30 minute winter	237	8.012	238	2387.0	1.121	0.604	110.4863	
15 minute summer	Spur 17	15.000	238	776.5	7.041	2.761	0.6055	
30 minute winter	238	1.022	239	4501.7	2.113	1.139	171.3435	
30 minute winter	Spur 18	16.000	239	101.7	2.557	2.544	0.3880	
15 minute winter	239	1.023_1	240	3349.6	1.675	0.848	127.8281	
30 minute winter	Spur 19	17.000	240	56.1	3.186	1.180	0.1540	

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Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 91.01%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute winter	240	21	6.118	3.691	4627.4	7.8903	0.0000	SURCHARGED
30 minute winter	241	21	5.958	3.562	4632.0	7.6150	0.0000	SURCHARGED
10080 minute winter	242	9600	5.907	3.539	77.4	7.5661	0.0000	SURCHARGED
10080 minute winter	243	9420	5.907	3.604	77.8	7.7050	0.0000	SURCHARGED
10080 minute winter	244	9540	5.907	3.685	77.6	7.8782	0.0000	FLOOD RISK
10080 minute winter	245	9540	5.907	3.720	77.4	7.9530	0.0000	FLOOD RISK
10080 minute winter	246	9540	5.907	1.618	23.7	1.8298	0.0000	SURCHARGED
10080 minute winter	247	9600	5.907	1.685	23.7	1.9055	0.0000	SURCHARGED
10080 minute winter	248	9600	5.907	1.707	33.5	0.0000	0.0000	OK
15 minute winter	Spur 5	12	7.131	2.641	145.2	5.5286	0.0000	SURCHARGED
15 minute winter	249	13	6.992	2.797	152.6	5.7171	0.0000	SURCHARGED
15 minute winter	Spur 4	12	7.638	3.468	330.1	15.1645	0.0000	SURCHARGED
15 minute winter	250	13	6.956	3.054	451.8	6.2154	0.0000	SURCHARGED
15 minute winter	251	13	6.647	2.849	459.8	5.7830	0.0000	SURCHARGED
15 minute winter	Spur 3	12	7.172	3.002	330.1	16.3526	0.0000	FLOOD RISK
15 minute winter	252	13	6.287	2.972	742.9	8.3784	0.0000	SURCHARGED
15 minute winter	253	13	6.209	2.997	625.0	8.4474	0.0000	SURCHARGED
15 minute winter	Spur 1	12	7.417	3.487	462.1	24.4477	0.0000	FLOOD RISK
15 minute winter	254	13	6.482	2.872	414.7	5.8096	0.0000	SURCHARGED
15 minute winter	255	13	6.343	2.817	419.2	5.7306	0.0000	SURCHARGED
15 minute summer	Spur 2	10	7.431	3.481	470.9	40.1830	0.0000	FLOOD RISK
15 minute winter	256	13	6.125	3.166	1329.6	4.3494	0.0000	SURCHARGED
15 minute winter	Spur 43	12	7.563	2.713	145.2	7.5841	0.0000	FLOOD RISK
15 minute winter	257	13	6.031	3.102	1472.1	4.1634	0.0000	SURCHARGED
15 minute winter	Spur 24	13	6.028	2.100	59.4	1.7623	0.0000	SURCHARGED
15 minute winter	258	13	5.972	3.071	1481.1	3.4733	0.0000	SURCHARGED
15 minute winter	Spur 42	12	6.468	2.238	145.2	4.8713	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute winter	240	1.024_1	241	4632.0	2.175	1.086	40.6716	
30 minute winter	241	1.025_1	242	4635.4	2.176	1.242	40.0815	
10080 minute winter	242	1.026_2	243	77.8	0.390	0.019	75.8260	
10080 minute winter	243	1.023	244	77.6	0.294	0.020	103.9317	
10080 minute winter	244	1.024	245	77.4	0.193	0.019	44.1097	
10080 minute winter	245	1.025	246	23.7	0.093	0.019	27.7588	
10080 minute winter	245	1.026_1	289	54.5	0.142	0.014	21.6853	
10080 minute winter	246	1.026	247	23.7	0.054	0.020	34.5046	
10080 minute winter	247	1.027	248	23.6	0.045	0.019	11.2384	
10080 minute winter	248	Flow through pond	288	-16.2	-0.006	0.000	10947.9102	
15 minute winter	Spur 5	18.000	249	131.5	1.868	1.854	1.1980	
15 minute winter	249	18.001	250	141.5	0.780	0.430	13.6554	
15 minute winter	Spur 4	19.000	250	289.1	4.107	4.057	0.8824	
15 minute winter	250	18.002	251	438.7	2.031	2.019	11.0371	
15 minute winter	251	18.003	252	427.8	1.980	1.969	11.4564	
15 minute winter	Spur 3	20.000	252	294.1	4.176	2.206	1.2513	
15 minute winter	252	18.004	253	608.6	1.229	0.753	39.2521	
15 minute winter	253	18.005	256	617.6	0.975	0.759	38.7261	
15 minute winter	Spur 1	21.000	254	393.6	3.569	3.562	3.3970	
15 minute winter	254	21.001	255	398.1	1.413	1.403	13.7388	
15 minute winter	255	21.002	256	398.9	1.416	1.410	20.7278	
15 minute summer	Spur 2	22.000	256	343.6	4.880	3.252	2.4657	
15 minute winter	256	18.006	257	1329.0	1.541	1.102	15.6776	
15 minute winter	Spur 43	23.000	257	125.8	3.164	3.161	1.3072	
15 minute winter	257	18.007	258	1439.2	1.278	0.840	19.0380	
15 minute winter	Spur 24	24.000	258	59.0	1.485	1.474	0.3470	
15 minute winter	258	18.008	259	1474.9	1.309	0.858	44.6301	
15 minute winter	Spur 42	25.000	259	139.3	3.503	3.497	0.5385	

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Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 91.01%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	Spur 20	12	6.349	1.509	158.4	4.4139	0.0000	SURCHARGED
15 minute winter	259	13	5.883	3.048	1716.2	4.0112	0.0000	SURCHARGED
15 minute winter	Spur 41	13	5.788	1.438	85.8	2.0050	0.0000	SURCHARGED
15 minute winter	260	13	5.753	3.000	1779.2	3.9456	0.0000	SURCHARGED
15 minute winter	Spur 25	13	5.774	2.106	85.8	2.3477	0.0000	SURCHARGED
15 minute winter	261	13	5.670	2.940	1831.1	3.3255	0.0000	SURCHARGED
15 minute winter	Spur 21	12	6.675	2.155	191.4	6.9809	0.0000	SURCHARGED
15 minute winter	262	13	5.529	2.875	1989.8	3.7634	0.0000	SURCHARGED
15 minute winter	Spur 40	13	5.465	1.739	55.4	1.3248	0.0000	SURCHARGED
15 minute winter	263	13	5.392	2.790	2026.1	3.1556	0.0000	SURCHARGED
15 minute winter	Spur 26	13	5.342	0.372	52.8	0.4366	0.0000	SURCHARGED
15 minute winter	264	13	5.295	2.709	2072.2	3.5782	0.0000	SURCHARGED
15 minute winter	Spur 22	11	5.755	1.315	158.4	4.7710	0.0000	SURCHARGED
15 minute winter	265	13	5.092	2.599	2199.8	3.4878	0.0000	SURCHARGED
15 minute summer	Spur 23	11	6.341	2.371	169.5	10.9291	0.0000	FLOOD RISK
15 minute winter	266	13	4.962	2.495	2319.2	3.3613	0.0000	SURCHARGED
15 minute winter	267	13	4.793	2.399	2289.3	0.0000	0.0000	SURCHARGED
180 minute winter	S278 Storage	176	4.699	0.665	32.0	114.8947	0.0000	SURCHARGED
15 minute winter	S278 S6	11	4.828	0.913	151.8	3.5504	0.0000	SURCHARGED
15 minute winter	S278 S7	11	4.813	0.965	9.4	1.0912	0.0000	SURCHARGED
15 minute winter	S278 S8	12	5.916	2.233	23.5	3.1769	0.0000	SURCHARGED
15 minute winter	268	12	5.899	2.498	161.0	3.4394	0.0000	SURCHARGED
15 minute winter	Spur 35	12	6.437	0.987	48.2	1.1444	0.0000	SURCHARGED
15 minute winter	Spur 27	12	6.390	2.901	132.0	5.0417	0.0000	SURCHARGED
15 minute winter	269	13	5.873	2.747	194.7	5.3208	0.0000	SURCHARGED
15 minute winter	270	13	5.835	2.777	196.1	5.3842	0.0000	SURCHARGED
15 minute winter	Spur 36	12	6.125	1.245	132.0	3.4221	0.0000	SURCHARGED
15 minute winter	Spur 28	12	6.369	1.409	165.0	5.1516	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	Spur 20	26.000	259	151.4	3.808	3.793	0.3618	
15 minute winter	259	18.009	260	1707.8	1.516	0.994	55.4893	
15 minute winter	Spur 41	27.000	260	84.7	1.332	1.199	0.9312	
15 minute winter	260	18.010	261	1771.0	1.572	1.030	15.6691	
15 minute winter	Spur 25	28.000	261	85.2	2.142	2.144	0.3145	
15 minute winter	261	18.011	262	1825.0	1.620	1.061	51.2540	
15 minute winter	Spur 21	29.000	262	175.3	4.407	4.398	0.4979	
15 minute winter	262	18.012	263	1988.8	1.765	1.154	34.9584	
15 minute winter	Spur 40	30.000	263	54.6	1.450	1.051	0.6011	
15 minute winter	263	18.013	264	2018.4	1.792	1.140	10.2057	
15 minute winter	Spur 26	31.000	264	52.3	1.327	1.307	0.3861	
15 minute winter	264	18.014	265	2063.0	1.831	1.200	63.1599	
15 minute winter	Spur 22	32.000	265	150.2	3.776	3.754	0.4540	
15 minute winter	265	18.015	266	2175.3	1.931	1.266	17.5924	
15 minute summer	Spur 23	33.000	266	133.5	3.357	2.027	1.3133	
15 minute winter	266	18.016	267	2289.3	2.032	1.328	49.0344	
15 minute winter	267	18.017	280	2283.7	2.027	1.328	27.0297	
180 minute winter	S278 Storage	35.000	S278 S6	-32.0	-0.804	-0.764	0.2440	
15 minute winter	S278 S6	35.001	S278 S7	9.4	0.741	0.236	0.4545	
15 minute winter	S278 S7	Hydro-Brake®	S278 S8	4.0				
15 minute winter	S278 S8	35.003	268	29.5	1.129	0.593	0.8979	
15 minute winter	268	35.004	269	-116.6	-1.657	-1.293	1.3307	
15 minute winter	Spur 35	35.000_1	269	45.8	2.601	2.583	0.1908	
15 minute winter	Spur 27	36.000	269	114.1	2.870	2.870	0.4254	
15 minute winter	269	35.005	270	183.8	1.118	0.765	5.9141	
15 minute winter	270	35.006	271	182.2	0.992	0.755	11.1957	
15 minute winter	Spur 36	37.000	271	128.1	3.222	3.207	0.3280	
15 minute winter	Spur 28	38.000	271	156.0	3.922	3.919	0.3236	

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Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 91.01%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	271	13	5.764	2.986	445.9	8.0980	0.0000	SURCHARGED
15 minute winter	Spur 29	12	6.379	1.129	52.8	1.4422	0.0000	SURCHARGED
15 minute winter	Spur 37	13	5.869	0.619	35.0	0.5346	0.0000	SURCHARGED
15 minute winter	272	13	5.717	3.027	503.1	8.1961	0.0000	SURCHARGED
15 minute winter	Spur 38	12	5.854	0.934	99.0	1.8615	0.0000	SURCHARGED
15 minute winter	273	13	5.664	3.017	577.9	8.1519	0.0000	SURCHARGED
15 minute winter	Spur 30	13	5.764	0.894	217.8	3.8503	0.0000	SURCHARGED
15 minute winter	274	13	5.607	2.985	765.9	8.0575	0.0000	SURCHARGED
15 minute winter	Spur 31	10	5.877	0.627	46.2	0.6580	0.0000	SURCHARGED
15 minute winter	275	13	5.444	2.885	788.0	7.7842	0.0000	SURCHARGED
15 minute winter	Spur 32	13	5.518	1.098	257.4	4.9320	0.0000	SURCHARGED
15 minute winter	276	13	5.258	2.761	1033.1	7.4506	0.0000	SURCHARGED
15 minute winter	Spur 39	11	6.089	1.059	165.0	3.8350	0.0000	SURCHARGED
15 minute winter	277	13	5.098	2.619	1188.3	7.0694	0.0000	SURCHARGED
15 minute winter	278	13	4.937	2.523	1180.8	6.8340	0.0000	SURCHARGED
15 minute winter	Spur 33	13	4.992	0.882	237.6	4.1388	0.0000	SURCHARGED
15 minute winter	279	13	4.822	2.439	1388.8	6.2061	0.0000	SURCHARGED
15 minute winter	280	13	4.676	2.322	3585.5	3.3234	0.0000	SURCHARGED
15 minute winter	281	13	4.534	2.214	3570.8	0.0000	0.0000	SURCHARGED
15 minute winter	282	13	4.431	2.163	3562.7	0.0000	0.0000	SURCHARGED
15 minute winter	Spur 34	13	4.407	1.291	178.2	6.1605	0.0000	SURCHARGED
15 minute winter	283	13	4.276	2.048	3650.7	3.6189	0.0000	SURCHARGED
15 minute winter	284	13	4.037	1.918	3589.8	3.3886	0.0000	SURCHARGED
15 minute winter	285	13	3.860	1.800	3590.9	3.1802	0.0000	SURCHARGED
15 minute winter	286	13	3.588	1.666	3591.2	2.9435	0.0000	FLOOD RISK
15 minute winter	287	13	3.509	1.609	3592.0	0.0000	0.0000	OK
10080 minute winter	288	9600	5.907	1.807	44.2	0.0000	0.0000	SURCHARGED
10080 minute winter	289	9540	5.907	3.737	54.5	7.9894	0.0000	FLOOD RISK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	271	35.007	272	414.1	0.941	0.672	15.4650	
15 minute winter	Spur 29	39.000	272	49.4	2.807	2.793	0.1932	
15 minute winter	Spur 37	40.000	272	34.3	1.947	1.928	0.1369	
15 minute winter	272	35.008	273	485.6	1.103	0.874	9.2610	
15 minute winter	Spur 38	41.000	273	97.3	2.447	2.432	0.3937	
15 minute winter	273	35.009	274	564.1	1.282	1.009	5.3211	
15 minute winter	Spur 30	42.000	274	214.4	3.046	3.009	0.4919	
15 minute winter	274	35.010	275	730.4	1.660	1.432	16.0935	
15 minute winter	Spur 31	43.000	275	45.0	2.554	2.539	0.1238	
15 minute winter	275	35.011	276	784.5	1.783	1.540	15.8716	
15 minute winter	Spur 32	44.000	276	251.6	3.573	3.532	0.6117	
15 minute winter	276	35.012	277	1017.1	2.311	2.021	4.7163	
15 minute winter	Spur 39	45.000	277	158.8	3.993	3.973	0.2781	
15 minute winter	277	35.013	278	1167.6	1.842	1.448	24.8585	
15 minute winter	278	35.014	279	1161.3	1.833	1.436	11.7901	
15 minute winter	Spur 33	46.000	279	233.6	3.318	3.292	0.4278	
15 minute winter	279	35.015	280	1365.6	2.155	1.675	10.8515	
15 minute winter	280	19.018	281	3570.8	2.504	1.525	29.0218	
15 minute winter	281	19.019	282	3562.7	2.499	1.528	44.7790	
15 minute winter	282	19.020	283	3542.8	2.485	1.510	34.0070	
15 minute winter	Spur 34	47.000	283	175.1	2.487	2.455	0.6945	
15 minute winter	283	19.021	284	3589.8	2.138	1.165	115.1814	
15 minute winter	284	19.022	285	3590.9	2.040	1.164	62.2049	
15 minute winter	285	19.023	286	3591.2	2.040	1.165	145.5374	
15 minute winter	286	19.024	287	3592.0	2.041	1.170	23.4056	
15 minute winter	287	Flow through pond	292	3728.3	0.646	0.021	2385.5513	
10080 minute winter	288	48.000	289	-44.2	-0.201	-0.027	17.8712	
10080 minute winter	289	Hydro-Brake®	290	10.9				

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Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 91.01%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
7200 minute winter	290	6780	3.404	1.464	10.8	2.0948	0.0000	SURCHARGED
7200 minute winter	291	6780	3.404	1.504	10.8	0.0000	0.0000	OK
7200 minute winter	292	6780	3.402	1.702	107.5	0.0000	0.0000	SURCHARGED
7200 minute winter	293	6780	3.402	1.722	19.4	4.3815	0.0000	SURCHARGED
240 minute winter	294	148	2.096	0.686	13.3	0.7759	0.0000	SURCHARGED
2880 minute summer	Ex Outfall	4260	2.087	0.787	13.3	0.8906	0.0000	FLOOD RISK
15 minute summer	Ex Ditch	1	2.080	0.827	12.6	0.0000	0.0000	OK
30 minute winter	209a	20	7.098	2.482	220.3	4.3857	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
7200 minute winter	290	49.002	291	10.8	0.589	0.098	1.4199	
7200 minute winter	291	Flow through pond	292	-227.5	0.045	-0.001	9929.4619	
7200 minute winter	292	51.000	293	19.4	0.054	0.051	4.3173	
7200 minute winter	293	Hydro-Brake®	294	13.3				
240 minute winter	294	51.002	Ex Outfall	13.3	0.741	0.234	0.3660	
2880 minute summer	Ex Outfall	50.003	Ex Ditch	13.3	0.334	0.334	0.3179	3044.8
30 minute winter	209a	5.003	210	-220.3	1.056	-0.766	3.3407	

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Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	100	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.600
CV	0.750	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	x
Maximum Rainfall (mm/hr)	50.0		

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Detailed	Starting Level (m)	
Rainfall Events	Singular	Skip Steady State	x	Check Discharge Rate(s)	x
Summer CV	1.000	Drain Down Time (mins)	2000	Check Discharge Volume	x
Winter CV	1.000	Additional Storage (m³/ha)	35.0		

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 %)
1	0	0	0

Node S278 S9 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Downstream Link	17.001	Sump Available	✓
Replaces Downstream Link	✓	Product Number	CTL-SHE-0115-6800-1500-6800
Invert Level (m)	3.831	Min Outlet Diameter (m)	0.150
Design Depth (m)	1.500	Min Node Diameter (mm)	1200
Design Flow (l/s)	6.8		

Node 445 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Downstream Link	52.001	Sump Available	✓
Replaces Downstream Link	✓	Product Number	CTL-SHE-0098-5400-1758-5400
Invert Level (m)	4.292	Min Outlet Diameter (m)	0.150
Design Depth (m)	1.758	Min Node Diameter (mm)	1200
Design Flow (l/s)	5.4		

Node 443 Online Orifice Control

Flap Valve	x	Invert Level (m)	4.350	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.675		

Node 444 Online Orifice Control

Flap Valve	x	Replaces Downstream Link	x	Diameter (m)	0.225
Downstream Link	52.000	Invert Level (m)	4.350	Discharge Coefficient	0.600

Node 451 Online Orifice Control

Flap Valve	x	Invert Level (m)	4.341	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.450		

Node 454 Online Orifice Control

Flap Valve	x	Invert Level (m)	4.370	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.450		

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Node 446 Online Orifice Control

Flap Valve	x	Invert Level (m)	4.633	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.450		

Node 452 Online Orifice Control

Flap Valve	x	Replaces Downstream Link	x	Diameter (m)	0.450
Downstream Link	58.000	Invert Level (m)	4.575	Discharge Coefficient	0.600

Node 448 Online Orifice Control

Flap Valve	x	Invert Level (m)	4.633	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.450		

Node S278 Headwall 1 Online Orifice Control

Flap Valve	x	Invert Level (m)	3.929	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.300		

Node S278 Headwall 3 Flow through Pond Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Main Channel Length (m)	19.524
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	3.890	Main Channel Slope (1:X)	500.0
Safety Factor	2.0	Time to half empty (mins)	0	Main Channel n	0.030

Inlets

S278 Headwall 1 | S278 Headwall 2

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	245.2	0.0	2.360	786.0	0.0

Node 452 Flow through Pond Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Main Channel Length (m)	29.115
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	4.575	Main Channel Slope (1:X)	500.0
Safety Factor	2.0	Time to half empty (mins)	0	Main Channel n	0.030

Inlets

448 | 446

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	104.5	0.0	0.055	1324.3	0.0	0.925	1747.5	0.0	1.700	2171.8	0.0
0.054	134.6	0.0	0.425	1497.3	0.0	1.425	2016.0	0.0			

Node 444 Flow through Pond Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Main Channel Length (m)	10.000
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	4.350	Main Channel Slope (1:X)	500.0
Safety Factor	2.0	Time to half empty (mins)	0	Main Channel n	0.030

Inlets

454 | 451 | 443

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	746.0	0.0	0.140	2757.0	0.0	1.150	3907.9	0.0
0.139	787.0	0.0	0.650	3325.4	0.0	1.650	4515.4	0.0

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ARUN DISTRICT COUNCIL F/14/24/RES

Results for 1 year Critical Storm Duration. Lowest mass balance: 96.99%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	400	10	6.046	0.105	17.4	0.4237	0.0000	OK
15 minute summer	401	10	6.094	0.048	4.1	0.0927	0.0000	OK
15 minute summer	402	11	5.916	0.114	21.0	0.1628	0.0000	OK
15 minute summer	Spur 55	10	5.930	0.078	17.4	0.2578	0.0000	OK
15 minute summer	403	12	5.790	0.153	38.0	0.2189	0.0000	OK
15 minute summer	404	10	5.891	0.011	1.9	0.0162	0.0000	OK
15 minute summer	405	12	5.782	0.193	39.2	0.2767	0.0000	SURCHARGED
15 minute summer	406	12	5.769	0.202	37.6	0.3561	0.0000	OK
15 minute summer	Spur 54b	12	5.755	0.105	26.6	0.4744	0.0000	OK
15 minute summer	407	12	5.761	0.226	60.1	0.3985	0.0000	OK
15 minute summer	408	12	5.744	0.209	58.9	0.4312	0.0000	SURCHARGED
15 minute summer	409	13	5.664	0.199	56.4	0.3521	0.0000	OK
15 minute summer	Spur 54	1	5.818	0.000	0.0	0.0000	0.0000	OK
15 minute summer	410	14	5.644	0.195	53.6	0.3446	0.0000	OK
15 minute summer	411	14	5.627	0.196	53.7	0.4040	0.0000	SURCHARGED
30 minute summer	412	25	5.497	0.176	49.4	0.0000	0.0000	SURCHARGED
30 minute summer	413	25	5.489	0.178	47.0	0.2666	0.0000	SURCHARGED
30 minute summer	414	25	5.481	0.184	45.8	0.0000	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	400	1.000	402	17.0	0.808	0.240	0.3294	
15 minute summer	401	2.000	402	4.0	0.669	0.093	0.0825	
15 minute summer	402	1.001	403	21.1	0.799	0.191	0.7679	
15 minute summer	Spur 55	3.000	403	17.2	1.062	0.091	0.2553	
15 minute summer	403	1.002	405	37.4	0.855	0.150	0.4540	
15 minute summer	404	4.000	405	0.3	0.069	0.011	0.1251	
15 minute summer	404	5.000	405	0.0	0.000	0.000	0.0002	
15 minute summer	404	6.000	405	1.6	0.051	0.014	0.8403	
15 minute summer	405	1.003	406	5.9	0.353	0.749	0.1911	
15 minute summer	405	7.000	406	0.0	0.000	0.000	0.0002	
15 minute summer	405	8.000	406	32.0	0.271	0.913	1.2864	
15 minute summer	406	1.004	407	38.2	0.448	0.129	0.7307	
15 minute summer	Spur 54b	7.000_1	407	26.3	0.688	0.096	0.8611	
15 minute summer	407	1.005	408	57.0	0.786	0.194	0.7562	
15 minute summer	408	1.006	409	9.4	0.551	1.195	0.6080	
15 minute summer	408	10.000	409	0.0	0.000	0.000	0.0005	
15 minute summer	408	11.000	409	48.0	0.401	1.366	4.2246	
15 minute summer	409	1.007	410	53.6	0.763	0.179	0.6679	
15 minute summer	Spur 54	9.000	410	0.0	0.000	0.000	0.0000	
15 minute summer	410	1.008	411	52.7	1.017	0.170	0.7004	
15 minute summer	411	1.009	412	10.5	0.673	1.321	0.9431	
15 minute summer	411	13.000	412	0.0	0.000	0.000	0.0008	
15 minute summer	411	14.000_1	412	41.9	0.410	1.185	5.4668	
30 minute summer	412	1.013	413	10.4	0.623	1.306	0.0852	
30 minute summer	412	19.000_1	413	36.6	0.411	1.033	0.5142	
30 minute summer	413	1.011	414	10.9	1.028	1.161	0.0858	
30 minute summer	413	16.000	414	36.1	0.459	0.862	0.5277	
30 minute summer	414	1.012	429	5.3	0.324	0.672	2.1090	

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Results for 1 year Critical Storm Duration. Lowest mass balance: 96.99%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	415	12	5.976	0.031	2.3	0.0435	0.0000	OK
15 minute summer	416	12	5.974	0.084	5.1	0.1204	0.0000	OK
15 minute summer	Spur 56	11	6.691	0.127	26.1	1.1829	0.0000	OK
15 minute summer	417	12	5.972	0.121	27.2	0.2125	0.0000	OK
15 minute summer	418	13	5.937	0.107	25.9	0.1533	0.0000	OK
15 minute summer	419	13	5.874	0.155	24.4	0.0000	0.0000	SURCHARGED
15 minute summer	420	13	5.870	0.161	26.5	0.2324	0.0000	SURCHARGED
15 minute summer	421	13	5.865	0.166	27.2	0.0000	0.0000	SURCHARGED
15 minute summer	Spur 57	11	5.863	0.141	44.7	1.0585	0.0000	OK
15 minute summer	422	13	5.856	0.207	52.0	0.3929	0.0000	SURCHARGED
15 minute summer	423	13	5.804	0.282	49.0	0.4982	0.0000	OK
15 minute summer	Spur 58	11	5.814	0.181	69.6	1.9556	0.0000	OK
30 minute summer	424	20	5.798	0.292	96.5	0.5838	0.0000	OK
15 minute summer	425	13	5.780	0.294	97.0	0.5195	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute summer	414	33.000	429	0.0	0.000	0.000	0.0018	
30 minute summer	414	34.000	429	33.8	0.206	0.969	19.8102	
15 minute summer	415	12.000	416	0.4	0.120	0.053	0.1554	
15 minute summer	415	18.000_2	416	0.0	0.000	0.000	0.0004	
15 minute summer	415	14.000	416	1.5	0.060	0.039	0.8396	
15 minute summer	416	12.001	417	4.6	-0.271	0.018	0.1687	
15 minute summer	Spur 56	20.000	417	25.4	0.830	0.227	0.3693	
15 minute summer	417	12.002	418	25.9	0.891	0.146	0.2170	
15 minute summer	418	12.003	419	6.8	0.608	0.872	0.8588	
15 minute summer	418	21.000	419	0.0	0.000	0.000	0.0008	
15 minute summer	418	17.000_2	419	17.7	0.264	0.506	4.3476	
15 minute summer	419	12.004	420	5.4	0.370	0.676	0.0857	
15 minute summer	419	23.000	420	20.7	0.228	0.586	0.4609	
15 minute summer	420	17.005	421	5.5	0.401	0.696	0.0850	
15 minute summer	420	24.000	421	22.0	0.234	0.619	0.4739	
15 minute summer	421	21.006	422	5.7	0.423	0.548	0.2564	
15 minute summer	421	26.000	422	0.0	0.000	0.000	0.0002	
15 minute summer	421	19.000	422	23.5	0.227	0.514	1.6318	
15 minute summer	Spur 57	25.000_1	422	43.4	1.201	0.190	0.7770	
15 minute summer	422	12.009	423	6.9	0.414	0.738	0.7997	
15 minute summer	422	28.000	423	0.0	0.000	0.000	0.0007	
15 minute summer	422	22.000	423	43.4	0.311	1.053	6.6644	
15 minute summer	423	12.010	424	53.0	0.499	0.173	1.0581	
15 minute summer	Spur 58	30.000	424	67.8	1.092	0.223	0.9649	
30 minute summer	424	12.011	425	95.0	0.828	0.311	1.3656	
15 minute summer	425	12.012	426	10.3	0.595	1.234	0.6610	
15 minute summer	425	31.000	426	0.0	0.000	0.000	0.0006	
15 minute summer	425	25.000	426	84.8	0.533	2.271	5.9670	

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Results for 1 year Critical Storm Duration. Lowest mass balance: 96.99%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	426	13	5.636	0.236	95.1	0.4164	0.0000	OK
15 minute summer	427	13	5.587	0.203	96.5	0.4212	0.0000	OK
30 minute summer	428	20	5.491	0.133	96.0	0.2356	0.0000	OK
30 minute summer	429	25	5.424	0.367	126.2	0.6480	0.0000	SURCHARGED
15 minute summer	35.000:50%	11	6.520	0.023	3.1	0.0000	0.0000	OK
30 minute summer	430	26	5.343	0.351	109.7	0.0000	0.0000	SURCHARGED
30 minute summer	431	26	5.329	0.347	108.1	0.4912	0.0000	SURCHARGED
30 minute summer	432	26	5.317	0.345	107.7	0.0000	0.0000	SURCHARGED
30 minute summer	433	26	5.288	0.341	107.2	0.0000	0.0000	SURCHARGED
30 minute summer	434	26	5.275	0.338	106.8	0.5018	0.0000	SURCHARGED
30 minute summer	435	27	5.263	0.336	106.7	0.0000	0.0000	SURCHARGED
120 minute summer	436	72	5.198	0.320	101.4	0.7126	0.0000	OK
15 minute summer	437	1	5.844	0.000	0.0	0.0000	0.0000	OK
15 minute summer	Spur 53	10	5.422	0.154	33.6	0.9920	0.0000	OK
120 minute summer	438	72	5.180	0.331	112.1	0.5849	0.0000	OK
120 minute summer	439	72	5.165	0.341	113.1	0.7409	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	426	12.013	427	95.4	1.023	0.311	0.7449	
15 minute summer	427	12.014	428	96.5	1.541	0.313	0.8324	
30 minute summer	428	12.015	429	98.8	1.789	0.092	1.3255	
30 minute summer	429	1.013_1	430	9.8	0.566	1.337	0.6507	
30 minute summer	429	36.000	430	100.4	0.488	3.050	7.8345	
30 minute summer	429	35.000	35.000:50%	0.0	0.000	0.000	0.1157	
30 minute summer	429	35.000	430	2.6	0.261	0.001	0.1808	
30 minute summer	430	1.017	431	9.5	0.546	1.182	0.0840	
30 minute summer	430	39.000	431	99.4	0.490	2.782	0.9981	
30 minute summer	431	1.018	432	9.6	0.559	1.075	0.0677	
30 minute summer	431	40.000	432	99.3	0.493	2.496	0.7987	
30 minute summer	432	1.019	433	10.1	0.577	1.287	0.2183	
30 minute summer	432	39.000_1	433	0.0	0.000	0.000	0.0002	
30 minute summer	432	42.000	433	98.6	0.490	2.815	2.5513	
30 minute summer	433	1.020	434	8.9	0.507	0.993	0.0673	
30 minute summer	433	43.000	434	98.0	0.490	2.456	0.7791	
30 minute summer	434	1.021	435	8.9	0.507	0.987	0.0665	
30 minute summer	434	44.000	435	98.1	0.492	2.444	0.7644	
30 minute summer	435	1.022	436	9.2	0.521	1.168	0.4280	
30 minute summer	435	43.000_1	436	0.0	0.000	0.000	0.0004	
30 minute summer	435	46.000	436	97.3	0.501	2.780	4.7764	
120 minute summer	436	1.023	438	101.2	0.651	0.331	2.2695	
15 minute summer	437	45.000	438	0.0	0.000	0.000	0.0000	
15 minute summer	Spur 53	46.000_1	438	32.8	0.966	0.447	0.3412	
120 minute summer	438	1.024	439	112.0	0.654	0.267	2.1886	
120 minute summer	439	1.025	440	11.7	0.665	1.495	0.7392	
120 minute summer	439	50.000	440	101.1	0.603	2.898	7.0390	
120 minute summer	439	47.000	47.000:50%	0.0	0.000	0.000	0.1976	

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Results for 1 year Critical Storm Duration. Lowest mass balance: 96.99%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute summer	47.000:50%	20	6.720	0.036	2.7	0.0527	0.0000	OK
120 minute summer	440	72	4.958	0.218	114.0	0.3848	0.0000	OK
120 minute summer	441	72	4.897	0.170	115.0	0.3724	0.0000	OK
15 minute summer	Spur 52	10	5.015	0.105	60.9	1.0638	0.0000	OK
10080 minute summer	442	6420	4.771	0.405	12.1	0.7156	0.0000	OK
10080 minute summer	443	6480	4.772	0.422	15.7	0.0000	0.0000	OK
15 minute summer	S278 S1	11	4.650	0.066	6.2	0.1660	0.0000	OK
15 minute summer	S278 S2	11	4.481	0.083	12.3	0.2033	0.0000	OK
15 minute summer	S278 S3	11	4.406	0.065	6.0	0.1533	0.0000	OK
15 minute summer	S278 S4	11	4.262	0.114	20.7	0.1719	0.0000	OK
10080 minute summer	444	6420	4.770	0.420	20.5	0.0000	0.0000	SURCHARGED
10080 minute summer	445	6420	4.767	0.475	4.9	0.8390	0.0000	SURCHARGED
60 minute summer	S278 S5	34	4.270	0.081	7.1	0.2459	0.0000	OK
15 minute summer	S278 S6	12	4.198	0.133	25.7	0.3392	0.0000	OK
600 minute summer	S278 Headwall 1	420	4.101	0.172	9.9	0.0000	0.0000	OK
600 minute summer	S278 Headwall 3	420	4.100	0.210	13.6	0.2425	0.0000	OK
600 minute summer	S278 S9	420	4.098	0.267	13.2	0.3017	0.0000	SURCHARGED
600 minute summer	Ex Mh	420	3.725	0.075	6.5	0.1326	0.0000	OK
600 minute summer	Ex Headwall	420	3.645	0.065	6.5	0.0000	0.0000	OK
15 minute summer	S278 S7	10	4.434	0.049	3.5	0.0793	0.0000	OK
15 minute summer	S278 S8	11	4.361	0.055	6.8	0.0917	0.0000	OK
600 minute summer	S278 Headwall 2	420	4.100	0.171	1.3	0.0000	0.0000	OK
15 minute summer	Spur 51	10	4.922	0.196	64.0	1.7957	0.0000	OK
15 minute summer	446	11	4.850	0.217	62.4	0.3101	0.0000	OK
15 minute summer	Spur 50	11	4.919	0.212	59.7	1.9265	0.0000	OK
15 minute summer	447	11	4.884	0.205	57.8	0.2928	0.0000	OK
15 minute summer	448	11	4.840	0.207	57.7	0.2962	0.0000	OK
15 minute summer	449	10	5.248	0.153	64.0	1.5325	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
120 minute summer	439	47.000	440	1.4	0.124	0.002	0.2485	
120 minute summer	440	1.026	441	113.8	1.347	0.276	0.5620	
120 minute summer	441	1.027	442	114.8	1.009	0.146	5.8721	
15 minute summer	Spur 52	49.000	442	60.3	2.238	0.109	0.2946	
10080 minute summer	442	1.028	443	12.0	0.265	0.029	1.8982	
10080 minute summer	443	Flow through pond	444	20.5	0.003	0.000	879.3669	
15 minute summer	S278 S1	17.000_1	S278 S2	6.0	0.642	0.181	0.2537	
15 minute summer	S278 S2	17.001_1	S278 S4	12.1	0.606	0.171	1.2334	
15 minute summer	S278 S3	18.000_1	S278 S4	5.8	0.636	0.175	0.2626	
15 minute summer	S278 S4	17.002	S278 S6	20.1	0.740	0.284	0.5572	
10080 minute summer	444	52.000	445	4.9	0.302	0.123	0.3876	
10080 minute summer	445	Hydro-Brake®	S278 S5	4.9				
60 minute summer	S278 S5	1.031	S278 S6	7.1	0.615	0.262	0.2064	
15 minute summer	S278 S6	1.032	S278 Headwall 1	25.6	0.897	0.405	0.2175	
600 minute summer	S278 Headwall 1	Flow through pond	S278 Headwall 3	13.4	0.016	0.000	50.9147	
600 minute summer	S278 Headwall 3	17.000	S278 S9	13.2	0.483	0.335	0.4007	
600 minute summer	S278 S9	Hydro-Brake®	Ex Mh	6.5				
600 minute summer	Ex Mh	1.036	Ex Headwall	6.5	0.617	0.227	0.2399	794.6
15 minute summer	S278 S7	18.000	S278 S8	3.4	0.501	0.104	0.1327	
15 minute summer	S278 S8	54.001	S278 Headwall 2	6.7	0.896	0.130	0.2033	
600 minute summer	S278 Headwall 2	Flow through pond	S278 Headwall 3	13.4	0.016	0.000	50.9147	
15 minute summer	Spur 51	55.000	446	62.4	0.996	0.392	1.5495	
15 minute summer	446	Flow through pond	452	88.2	0.379	0.000	19.3220	
15 minute summer	Spur 50	56.000	447	57.8	0.821	0.363	0.8156	
15 minute summer	447	56.001	448	57.7	0.879	0.359	0.7769	
15 minute summer	448	Flow through pond	452	88.2	0.379	0.000	19.3220	
15 minute summer	449	57.000	450	63.2	1.946	0.205	0.3891	

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Results for 1 year Critical Storm Duration. Lowest mass balance: 96.99%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	450	10	5.068	0.080	63.2	0.1148	0.0000	OK
10080 minute summer	451	6420	4.772	0.431	4.8	0.0000	0.0000	OK
10080 minute summer	452	6420	4.770	0.195	4.3	0.2791	0.0000	OK
10080 minute summer	453	6480	4.770	0.217	4.1	0.3107	0.0000	OK
10080 minute summer	454	6480	4.771	0.401	6.7	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	450	57.001	451	63.1	1.407	0.071	0.4026	
10080 minute summer	451	Flow through pond	444	20.5	0.003	0.000	879.3669	
10080 minute summer	452	58.000	453	3.5	0.389	0.022	0.6270	
10080 minute summer	453	58.001	454	3.4	0.442	0.021	0.7539	
10080 minute summer	454	Flow through pond	444	20.5	0.003	0.000	879.3669	

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ARUN DISTRICT COUNCIL F/14/24/RES

Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	100	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.600
CV	0.750	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	x
Maximum Rainfall (mm/hr)	50.0		

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Detailed	Starting Level (m)	
Rainfall Events	Singular	Skip Steady State	x	Check Discharge Rate(s)	x
Summer CV	1.000	Drain Down Time (mins)	2000	Check Discharge Volume	x
Winter CV	1.000	Additional Storage (m³/ha)	35.0		

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 %)
30	0	0	0

Node S278 S9 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Downstream Link	17.001	Sump Available	✓
Replaces Downstream Link	✓	Product Number	CTL-SHE-0115-6800-1500-6800
Invert Level (m)	3.831	Min Outlet Diameter (m)	0.150
Design Depth (m)	1.500	Min Node Diameter (mm)	1200
Design Flow (l/s)	6.8		

Node 445 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Downstream Link	52.001	Sump Available	✓
Replaces Downstream Link	✓	Product Number	CTL-SHE-0098-5400-1758-5400
Invert Level (m)	4.292	Min Outlet Diameter (m)	0.150
Design Depth (m)	1.758	Min Node Diameter (mm)	1200
Design Flow (l/s)	5.4		

Node 443 Online Orifice Control

Flap Valve	x	Invert Level (m)	4.350	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.675		

Node 444 Online Orifice Control

Flap Valve	x	Replaces Downstream Link	x	Diameter (m)	0.225
Downstream Link	52.000	Invert Level (m)	4.350	Discharge Coefficient	0.600

Node 451 Online Orifice Control

Flap Valve	x	Invert Level (m)	4.341	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.450		

Node 454 Online Orifice Control

Flap Valve	x	Invert Level (m)	4.370	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.450		

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ARUN DISTRICT COUNCIL F/14/24/RES

Node 446 Online Orifice Control

Flap Valve	x	Invert Level (m)	4.633	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.450		

Node 452 Online Orifice Control

Flap Valve	x	Replaces Downstream Link	x	Diameter (m)	0.450
Downstream Link	58.000	Invert Level (m)	4.575	Discharge Coefficient	0.600

Node 448 Online Orifice Control

Flap Valve	x	Invert Level (m)	4.633	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.450		

Node S278 Headwall 1 Online Orifice Control

Flap Valve	x	Invert Level (m)	3.929	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.300		

Node S278 Headwall 3 Flow through Pond Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Main Channel Length (m)	19.524
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	3.890	Main Channel Slope (1:X)	500.0
Safety Factor	2.0	Time to half empty (mins)	0	Main Channel n	0.030

Inlets

S278 Headwall 1 | S278 Headwall 2

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	245.2	0.0	2.360	786.0	0.0

Node 452 Flow through Pond Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Main Channel Length (m)	29.115
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	4.575	Main Channel Slope (1:X)	500.0
Safety Factor	2.0	Time to half empty (mins)	0	Main Channel n	0.030

Inlets

448 | 446

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	104.5	0.0	0.055	1324.3	0.0	0.925	1747.5	0.0	1.700	2171.8	0.0
0.054	134.6	0.0	0.425	1497.3	0.0	1.425	2016.0	0.0			

Node 444 Flow through Pond Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Main Channel Length (m)	10.000
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	4.350	Main Channel Slope (1:X)	500.0
Safety Factor	2.0	Time to half empty (mins)	0	Main Channel n	0.030

Inlets

454 | 451 | 443

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	746.0	0.0	0.140	2757.0	0.0	1.150	3907.9	0.0
0.139	787.0	0.0	0.650	3325.4	0.0	1.650	4515.4	0.0

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Results for 30 year Critical Storm Duration. Lowest mass balance: 96.05%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	400	12	6.246	0.305	66.8	1.2294	0.0000	SURCHARGED
15 minute summer	401	12	6.201	0.155	15.8	0.3006	0.0000	OK
15 minute summer	402	12	6.194	0.392	80.4	0.5606	0.0000	SURCHARGED
15 minute summer	Spur 55	12	6.162	0.310	66.8	1.0253	0.0000	OK
15 minute summer	403	12	6.154	0.517	130.6	0.7395	0.0000	SURCHARGED
15 minute summer	404	12	6.128	0.248	8.1	0.3615	0.0000	SURCHARGED
15 minute summer	405	12	6.129	0.540	128.1	0.7723	0.0000	SURCHARGED
15 minute summer	406	12	6.115	0.548	123.6	0.9683	0.0000	OK
15 minute summer	Spur 54b	12	6.117	0.467	102.1	2.1205	0.0000	SURCHARGED
30 minute summer	407	21	6.110	0.575	194.4	1.0157	0.0000	OK
30 minute summer	408	21	6.103	0.568	198.4	1.1708	0.0000	SURCHARGED
30 minute summer	409	23	6.082	0.617	191.8	1.0908	0.0000	SURCHARGED
30 minute summer	Spur 54	22	6.080	0.262	4.1	0.0000	0.0000	SURCHARGED
30 minute summer	410	23	6.080	0.631	177.4	1.1142	0.0000	SURCHARGED
30 minute summer	411	23	6.077	0.646	173.7	1.3287	0.0000	SURCHARGED
30 minute summer	412	23	6.063	0.742	151.6	0.0000	0.0000	SURCHARGED
30 minute summer	413	23	6.062	0.751	131.3	1.1236	0.0000	SURCHARGED
30 minute summer	414	23	6.060	0.763	124.8	0.0000	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	400	1.000	402	64.3	1.139	0.908	1.0995	
15 minute summer	401	2.000	402	16.1	0.919	0.376	0.4752	
15 minute summer	402	1.001	403	71.1	0.901	0.642	3.2014	
15 minute summer	Spur 55	3.000	403	62.3	1.179	0.331	1.6406	
15 minute summer	403	1.002	405	124.7	1.037	0.501	1.2782	
15 minute summer	404	4.000	405	1.0	0.090	0.038	0.2422	
15 minute summer	404	5.000	405	0.0	0.000	0.000	0.0002	
15 minute summer	404	6.000	405	5.7	0.068	0.050	3.2492	
15 minute summer	405	1.003	406	6.8	0.385	0.859	0.1911	
15 minute summer	405	7.000	406	0.0	0.000	0.000	0.0002	
15 minute summer	405	8.000	406	117.9	0.393	3.359	3.5430	
15 minute summer	406	1.004	407	122.5	0.452	0.415	2.3245	
15 minute summer	Spur 54b	7.000_1	407	93.3	0.779	0.341	2.5422	
30 minute summer	407	1.005	408	192.1	0.777	0.653	2.3756	
30 minute summer	408	1.006	409	10.5	0.607	1.329	0.6080	
30 minute summer	408	10.000	409	0.0	0.000	0.000	0.0005	
30 minute summer	408	11.000	409	182.5	0.616	5.199	12.2465	
30 minute summer	409	1.007	410	177.4	0.786	0.591	2.3405	
30 minute summer	Spur 54	9.000	410	-4.1	-0.164	-0.079	0.5495	
30 minute summer	410	1.008	411	167.0	1.000	0.539	2.4745	
30 minute summer	411	1.009	412	10.0	0.703	1.263	0.9431	
30 minute summer	411	13.000	412	0.0	0.000	0.000	0.0008	
30 minute summer	411	14.000_1	412	144.3	0.535	4.076	22.2415	
30 minute summer	412	1.013	413	10.1	0.610	1.275	0.0852	
30 minute summer	412	19.000_1	413	118.5	0.451	3.344	2.1677	
30 minute summer	413	1.011	414	11.7	1.145	1.245	0.0858	
30 minute summer	413	16.000	414	120.0	0.497	2.864	2.2034	
30 minute summer	414	1.012	429	6.2	0.375	0.789	2.1090	

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Results for 30 year Critical Storm Duration. Lowest mass balance: 96.05%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	415	13	6.421	0.476	21.7	0.6716	0.0000	SURCHARGED
30 minute summer	416	21	6.420	0.530	28.7	0.7586	0.0000	SURCHARGED
15 minute summer	Spur 56	10	6.844	0.280	100.2	2.5953	0.0000	OK
30 minute summer	417	21	6.420	0.569	97.9	0.9950	0.0000	SURCHARGED
30 minute summer	418	21	6.413	0.583	78.5	0.8337	0.0000	SURCHARGED
30 minute summer	419	21	6.399	0.680	71.8	0.0000	0.0000	SURCHARGED
30 minute summer	420	21	6.397	0.688	82.2	0.9951	0.0000	SURCHARGED
30 minute summer	421	21	6.395	0.696	84.7	0.0000	0.0000	SURCHARGED
30 minute summer	Spur 57	20	6.410	0.688	156.8	5.1691	0.0000	SURCHARGED
30 minute summer	422	21	6.391	0.742	187.9	1.4081	0.0000	SURCHARGED
30 minute summer	423	21	6.346	0.824	181.6	1.4558	0.0000	SURCHARGED
30 minute summer	Spur 58	20	6.347	0.714	243.9	7.7058	0.0000	SURCHARGED
30 minute summer	424	21	6.329	0.823	365.5	1.6449	0.0000	SURCHARGED
30 minute summer	425	21	6.277	0.791	363.6	1.3976	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute summer	414	33.000	429	0.0	0.000	0.000	0.0018	
30 minute summer	414	34.000	429	102.7	0.251	2.946	62.6238	
15 minute summer	415	12.000	416	-1.9	0.163	-0.230	0.4285	
15 minute summer	415	18.000_2	416	0.0	0.000	0.000	0.0004	
15 minute summer	415	14.000	416	-14.7	-0.086	-0.395	7.3427	
30 minute summer	416	12.001	417	-28.7	0.372	-0.112	0.9740	
15 minute summer	Spur 56	20.000	417	98.1	1.232	0.878	0.9592	
30 minute summer	417	12.002	418	78.5	0.967	0.441	1.0888	
30 minute summer	418	12.003	419	6.7	0.598	0.852	0.9733	
30 minute summer	418	21.000	419	0.0	0.000	0.000	0.0008	
30 minute summer	418	17.000_2	419	69.1	0.249	1.978	20.9423	
30 minute summer	419	12.004	420	5.0	0.341	0.628	0.0857	
30 minute summer	419	23.000	420	76.4	0.229	2.161	1.9973	
30 minute summer	420	17.005	421	5.3	0.372	0.668	0.0850	
30 minute summer	420	24.000	421	81.6	0.240	2.298	2.0057	
30 minute summer	421	21.006	422	5.4	0.406	0.526	0.2564	
30 minute summer	421	26.000	422	0.0	0.000	0.000	0.0002	
30 minute summer	421	19.000	422	85.6	0.244	1.872	6.2843	
30 minute summer	Spur 57	25.000_1	422	145.5	1.125	0.639	2.3206	
30 minute summer	422	12.009	423	6.5	0.469	0.697	0.7997	
30 minute summer	422	28.000	423	0.0	0.000	0.000	0.0007	
30 minute summer	422	22.000	423	176.2	0.377	4.273	21.3402	
30 minute summer	423	12.010	424	182.9	0.650	0.596	2.2416	
30 minute summer	Spur 58	30.000	424	231.3	1.071	0.761	2.8408	
30 minute summer	424	12.011	425	363.6	1.291	1.190	2.8218	
30 minute summer	425	12.012	426	14.4	0.820	1.721	0.6610	
30 minute summer	425	31.000	426	0.0	0.000	0.000	0.0006	
30 minute summer	425	25.000	426	339.6	0.893	9.098	17.3712	

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Results for 30 year Critical Storm Duration. Lowest mass balance: 96.05%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute summer	426	22	6.163	0.763	353.0	1.3474	0.0000	SURCHARGED
30 minute summer	427	22	6.123	0.739	338.7	1.5303	0.0000	SURCHARGED
30 minute summer	428	23	6.076	0.718	329.8	1.2695	0.0000	SURCHARGED
30 minute summer	429	23	6.036	0.979	393.7	1.7305	0.0000	SURCHARGED
15 minute summer	35.000:50%	11	6.546	0.049	11.9	0.0000	0.0000	OK
30 minute summer	430	23	5.945	0.953	367.4	0.0000	0.0000	SURCHARGED
30 minute summer	431	23	5.928	0.946	366.2	1.3393	0.0000	SURCHARGED
30 minute summer	432	23	5.913	0.941	365.9	0.0000	0.0000	SURCHARGED
30 minute summer	433	23	5.880	0.933	365.6	0.0000	0.0000	SURCHARGED
30 minute summer	434	23	5.864	0.927	367.6	1.3755	0.0000	SURCHARGED
30 minute summer	435	23	5.849	0.922	367.3	0.0000	0.0000	SURCHARGED
30 minute summer	436	23	5.773	0.895	370.3	1.9950	0.0000	SURCHARGED
15 minute summer	437	1	5.844	0.000	0.0	0.0000	0.0000	OK
15 minute summer	Spur 53	10	5.714	0.446	128.9	2.8779	0.0000	SURCHARGED
30 minute summer	438	23	5.687	0.838	405.5	1.4801	0.0000	SURCHARGED
30 minute summer	439	23	5.631	0.807	410.4	1.7540	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute summer	426	12.013	427	331.6	1.366	1.083	2.2481	
30 minute summer	427	12.014	428	329.8	1.871	1.069	3.6032	
30 minute summer	428	12.015	429	327.0	2.305	0.305	3.5125	
30 minute summer	429	1.013_1	430	9.5	0.575	1.291	0.6507	
30 minute summer	429	36.000	430	353.0	0.621	10.726	21.1613	
30 minute summer	429	35.000	35.000:50%	0.0	0.000	0.000	0.2731	
30 minute summer	429	35.000	430	10.6	0.426	0.004	0.4558	
30 minute summer	430	1.017	431	9.6	0.563	1.194	0.0840	
30 minute summer	430	39.000	431	355.0	0.628	9.938	2.7169	
30 minute summer	431	1.018	432	9.5	0.579	1.066	0.0677	
30 minute summer	431	40.000	432	356.6	0.633	8.966	2.1775	
30 minute summer	432	1.019	433	9.5	0.615	1.213	0.2183	
30 minute summer	432	39.000_1	433	0.0	0.000	0.000	0.0002	
30 minute summer	432	42.000	433	356.8	0.635	10.187	6.9711	
30 minute summer	433	1.020	434	9.5	0.541	1.061	0.0673	
30 minute summer	433	43.000	434	355.7	0.637	8.917	2.1346	
30 minute summer	434	1.021	435	9.6	0.548	1.067	0.0665	
30 minute summer	434	44.000	435	357.7	0.645	8.911	2.0950	
30 minute summer	435	1.022	436	9.7	0.548	1.229	0.4280	
30 minute summer	435	43.000_1	436	0.0	0.000	0.000	0.0004	
30 minute summer	435	46.000	436	357.8	0.661	10.217	13.2530	
30 minute summer	436	1.023	438	372.1	1.321	1.218	4.0976	
15 minute summer	437	45.000	438	0.0	0.000	0.000	0.1316	
15 minute summer	Spur 53	46.000_1	438	125.9	1.789	1.716	0.7055	
30 minute summer	438	1.024	439	405.6	1.136	0.967	4.4058	
30 minute summer	439	1.025	440	16.1	0.917	2.063	0.7392	
30 minute summer	439	50.000	440	394.3	1.008	11.302	16.5191	
30 minute summer	439	47.000	47.000:50%	-2.2	-0.089	-0.002	0.5692	

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Results for 30 year Critical Storm Duration. Lowest mass balance: 96.05%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	47.000:50%	12	6.753	0.069	11.5	0.1959	0.0000	OK
30 minute summer	440	23	5.244	0.504	414.8	0.8906	0.0000	OK
30 minute summer	441	21	5.146	0.419	419.6	0.9184	0.0000	OK
30 minute summer	Spur 52	18	5.146	0.236	213.4	2.3852	0.0000	OK
10080 minute winter	442	8340	5.119	0.753	34.2	1.3302	0.0000	SURCHARGED
10080 minute summer	443	7140	5.130	0.780	26.2	0.0000	0.0000	OK
15 minute summer	S278 S1	10	4.729	0.145	23.9	0.3642	0.0000	OK
15 minute summer	S278 S2	11	4.576	0.178	47.8	0.4356	0.0000	OK
15 minute summer	S278 S3	12	4.541	0.200	22.9	0.4745	0.0000	OK
15 minute summer	S278 S4	12	4.500	0.352	79.8	0.5298	0.0000	SURCHARGED
10080 minute summer	444	7560	5.112	0.762	39.3	0.0000	0.0000	SURCHARGED
10080 minute summer	445	7560	5.109	0.817	4.9	1.4445	0.0000	SURCHARGED
15 minute summer	S278 S5	12	4.413	0.224	21.8	0.6796	0.0000	OK
480 minute summer	S278 S6	480	4.403	0.338	20.6	0.8609	0.0000	SURCHARGED
480 minute summer	S278 Headwall 1	480	4.403	0.474	20.3	0.0000	0.0000	OK
480 minute summer	S278 Headwall 3	480	4.402	0.512	20.0	0.5923	0.0000	SURCHARGED
480 minute summer	S278 S9	480	4.400	0.569	11.7	0.6432	0.0000	SURCHARGED
2160 minute winter	Ex Mh	1680	3.727	0.077	6.8	0.1356	0.0000	OK
2160 minute winter	Ex Headwall	1680	3.647	0.067	6.8	0.0000	0.0000	OK
15 minute summer	S278 S7	10	4.488	0.103	13.4	0.1670	0.0000	OK
15 minute summer	S278 S8	10	4.420	0.114	26.1	0.1901	0.0000	OK
480 minute summer	S278 Headwall 2	480	4.402	0.473	4.2	0.0000	0.0000	OK
15 minute summer	Spur 51	11	5.339	0.613	245.7	5.6071	0.0000	SURCHARGED
15 minute summer	446	11	5.177	0.544	238.5	0.7785	0.0000	OK
15 minute summer	Spur 50	11	5.343	0.636	229.0	5.7761	0.0000	SURCHARGED
15 minute summer	447	11	5.239	0.560	221.7	0.8016	0.0000	SURCHARGED
15 minute summer	448	11	5.135	0.501	222.1	0.7176	0.0000	OK
15 minute summer	449	10	5.427	0.332	245.7	3.3259	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute summer	439	47.000	440	6.7	0.225	0.007	0.6524	
30 minute summer	440	1.026	441	415.8	1.760	1.007	1.7159	
30 minute summer	441	1.027	442	421.4	1.373	0.534	15.0025	
30 minute summer	Spur 52	49.000	442	210.5	2.757	0.380	1.2856	
10080 minute winter	442	1.028	443	27.8	0.284	0.068	2.9633	
10080 minute summer	443	Flow through pond	444	39.3	0.003	0.000	1989.5034	
15 minute summer	S278 S1	17.000_1	S278 S2	23.3	0.931	0.705	0.6787	
15 minute summer	S278 S2	17.001_1	S278 S4	46.3	0.815	0.654	3.4710	
15 minute summer	S278 S3	18.000_1	S278 S4	22.3	0.773	0.673	1.1109	
15 minute summer	S278 S4	17.002	S278 S6	72.1	1.024	1.020	1.4329	
10080 minute summer	444	52.000	445	4.9	0.302	0.123	0.3876	
10080 minute summer	445	Hydro-Brake®	S278 S5	4.9				
15 minute summer	S278 S5	1.031	S278 S6	18.9	0.656	0.702	0.7139	
480 minute summer	S278 S6	1.032	S278 Headwall 1	20.3	0.791	0.320	0.5356	
480 minute summer	S278 Headwall 1	Flow through pond	S278 Headwall 3	18.1	0.022	0.000	148.6964	
480 minute summer	S278 Headwall 3	17.000	S278 S9	11.7	0.518	0.297	0.4069	
480 minute summer	S278 S9	Hydro-Brake®	Ex Mh	6.8				
2160 minute winter	Ex Mh	1.036	Ex Headwall	6.8	0.624	0.237	0.2474	1344.2
15 minute summer	S278 S7	18.000	S278 S8	13.2	0.695	0.399	0.3671	
15 minute summer	S278 S8	54.001	S278 Headwall 2	25.7	1.290	0.501	0.5430	
480 minute summer	S278 Headwall 2	Flow through pond	S278 Headwall 3	18.1	0.022	0.000	148.6964	
15 minute summer	Spur 51	55.000	446	238.5	1.505	1.497	3.8652	
15 minute summer	446	Flow through pond	452	607.4	0.755	0.003	148.5167	
15 minute summer	Spur 50	56.000	447	221.7	1.400	1.391	1.8009	
15 minute summer	447	56.001	448	222.1	1.402	1.384	1.8417	
15 minute summer	448	Flow through pond	452	607.4	0.755	0.003	148.5167	
15 minute summer	449	57.000	450	243.5	2.525	0.788	1.1320	

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Results for 30 year Critical Storm Duration. Lowest mass balance: 96.05%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	450	10	5.188	0.200	243.5	0.2865	0.0000	OK
10080 minute summer	451	7380	5.114	0.773	6.4	0.0000	0.0000	OK
10080 minute summer	452	7500	5.117	0.542	12.0	0.7756	0.0000	SURCHARGED
10080 minute summer	453	7500	5.114	0.561	11.8	0.8026	0.0000	SURCHARGED
10080 minute summer	454	7500	5.118	0.748	12.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	450	57.001	451	242.2	1.843	0.273	0.9780	
10080 minute summer	451	Flow through pond	444	39.3	0.003	0.000	1989.5034	
10080 minute summer	452	58.000	453	11.8	0.389	0.074	1.4029	
10080 minute summer	453	58.001	454	12.0	0.443	0.075	1.4770	
10080 minute summer	454	Flow through pond	444	39.3	0.003	0.000	1989.5034	

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Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	100	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.600
CV	0.750	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	x
Maximum Rainfall (mm/hr)	50.0		

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Detailed	Starting Level (m)	
Rainfall Events	Singular	Skip Steady State	x	Check Discharge Rate(s)	x
Summer CV	0.750	Drain Down Time (mins)	2000	Check Discharge Volume	x
Winter CV	0.840	Additional Storage (m³/ha)	35.0		

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

Node S278 S9 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Downstream Link	17.001	Sump Available	✓
Replaces Downstream Link	✓	Product Number	CTL-SHE-0115-6800-1500-6800
Invert Level (m)	3.831	Min Outlet Diameter (m)	0.150
Design Depth (m)	1.500	Min Node Diameter (mm)	1200
Design Flow (l/s)	6.8		

Node 445 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Downstream Link	52.001	Sump Available	✓
Replaces Downstream Link	✓	Product Number	CTL-SHE-0098-5400-1758-5400
Invert Level (m)	4.292	Min Outlet Diameter (m)	0.150
Design Depth (m)	1.758	Min Node Diameter (mm)	1200
Design Flow (l/s)	5.4		

Node 443 Online Orifice Control

Flap Valve	x	Invert Level (m)	4.350	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.675		

Node 444 Online Orifice Control

Flap Valve	x	Replaces Downstream Link	x	Diameter (m)	0.225
Downstream Link	52.000	Invert Level (m)	4.350	Discharge Coefficient	0.600

Node 451 Online Orifice Control

Flap Valve	x	Invert Level (m)	4.341	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.450		

Node 454 Online Orifice Control

Flap Valve	x	Invert Level (m)	4.370	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.450		

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Node 446 Online Orifice Control

Flap Valve	x	Invert Level (m)	4.633	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.450		

Node 452 Online Orifice Control

Flap Valve	x	Replaces Downstream Link	x	Diameter (m)	0.450
Downstream Link	58.000	Invert Level (m)	4.575	Discharge Coefficient	0.600

Node 448 Online Orifice Control

Flap Valve	x	Invert Level (m)	4.633	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.450		

Node S278 Headwall 1 Online Orifice Control

Flap Valve	x	Invert Level (m)	3.929	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.300		

Node S278 Headwall 3 Flow through Pond Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Main Channel Length (m)	19.524
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	3.890	Main Channel Slope (1:X)	500.0
Safety Factor	2.0	Time to half empty (mins)	0	Main Channel n	0.030

Inlets

S278 Headwall 1 | S278 Headwall 2

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	245.2	0.0	2.360	786.0	0.0

Node 452 Flow through Pond Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Main Channel Length (m)	29.115
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	4.575	Main Channel Slope (1:X)	500.0
Safety Factor	2.0	Time to half empty (mins)	0	Main Channel n	0.030

Inlets

448 | 446

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	104.5	0.0	0.055	1324.3	0.0	0.925	1747.5	0.0	1.700	2171.8	0.0
0.054	134.6	0.0	0.425	1497.3	0.0	1.425	2016.0	0.0			

Node 444 Flow through Pond Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Main Channel Length (m)	10.000
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	4.350	Main Channel Slope (1:X)	500.0
Safety Factor	2.0	Time to half empty (mins)		Main Channel n	0.030

Inlets

454 | 451 | 443

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	746.0	0.0	0.140	2757.0	0.0	1.150	3907.9	0.0
0.139	787.0	0.0	0.650	3325.4	0.0	1.650	4515.4	0.0

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Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 96.25%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	400	11	6.599	0.658	92.4	2.6501	0.0000	SURCHARGED
15 minute winter	401	12	6.510	0.464	21.8	0.9013	0.0000	SURCHARGED
15 minute winter	402	12	6.490	0.688	101.7	0.9842	0.0000	SURCHARGED
30 minute winter	Spur 55	22	6.444	0.592	73.1	1.9613	0.0000	SURCHARGED
30 minute winter	403	22	6.437	0.800	150.2	1.1447	0.0000	SURCHARGED
30 minute winter	404	23	6.426	0.546	8.0	0.7973	0.0000	SURCHARGED
30 minute winter	405	23	6.426	0.837	149.2	1.1979	0.0000	SURCHARGED
30 minute winter	406	23	6.424	0.857	137.7	1.5145	0.0000	SURCHARGED
30 minute winter	Spur 54b	23	6.425	0.775	111.7	3.5175	0.0000	SURCHARGED
30 minute winter	407	23	6.421	0.886	236.2	1.5659	0.0000	SURCHARGED
30 minute winter	408	23	6.413	0.878	242.2	1.8113	0.0000	SURCHARGED
30 minute winter	409	24	6.402	0.937	225.9	1.6556	0.0000	SURCHARGED
30 minute winter	Spur 54	24	6.397	0.579	3.4	0.0000	0.0000	SURCHARGED
30 minute winter	410	24	6.396	0.947	205.1	1.6726	0.0000	SURCHARGED
30 minute winter	411	24	6.389	0.958	209.2	1.9705	0.0000	SURCHARGED
30 minute winter	412	24	6.377	1.056	181.3	0.0000	0.0000	SURCHARGED
30 minute winter	413	24	6.375	1.064	165.6	1.5933	0.0000	SURCHARGED
30 minute winter	414	24	6.374	1.077	159.4	0.0000	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	400	1.000	402	83.0	1.179	1.173	1.0995	
15 minute winter	401	2.000	402	18.6	0.876	0.435	0.5484	
15 minute winter	402	1.001	403	100.2	0.909	0.904	3.2014	
30 minute winter	Spur 55	3.000	403	69.1	1.062	0.367	1.7429	
30 minute winter	403	1.002	405	148.3	0.968	0.596	1.2782	
30 minute winter	404	4.000	405	0.6	0.151	0.024	0.2422	
30 minute winter	404	5.000	405	0.0	0.000	0.000	0.0002	
30 minute winter	404	6.000	405	4.5	0.091	0.039	5.7083	
30 minute winter	405	1.003	406	6.1	0.362	0.768	0.1911	
30 minute winter	405	7.000	406	0.0	0.000	0.000	0.0002	
30 minute winter	405	8.000	406	132.6	0.356	3.777	5.5187	
30 minute winter	406	1.004	407	130.7	0.464	0.442	2.4134	
30 minute winter	Spur 54b	7.000_1	407	106.0	0.716	0.388	2.5422	
30 minute winter	407	1.005	408	233.8	0.830	0.795	2.4365	
30 minute winter	408	1.006	409	10.2	0.614	1.292	0.6080	
30 minute winter	408	10.000	409	0.0	0.000	0.000	0.0005	
30 minute winter	408	11.000	409	217.6	0.618	6.195	18.7906	
30 minute winter	409	1.007	410	205.1	0.777	0.683	2.3405	
30 minute winter	Spur 54	9.000	410	-3.4	-0.113	-0.065	0.5495	
30 minute winter	410	1.008	411	200.7	1.092	0.648	2.4745	
30 minute winter	411	1.009	412	10.5	0.700	1.328	0.9431	
30 minute winter	411	13.000	412	0.0	0.000	0.000	0.0008	
30 minute winter	411	14.000_1	412	175.9	0.518	4.968	32.2663	
30 minute winter	412	1.013	413	11.2	0.666	1.406	0.0852	
30 minute winter	412	19.000_1	413	150.4	0.474	4.242	3.0788	
30 minute winter	413	1.011	414	14.6	1.207	1.553	0.0858	
30 minute winter	413	16.000	414	155.3	0.554	3.706	3.1170	
30 minute winter	414	1.012	429	6.1	0.372	0.783	2.1090	

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Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 96.25%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute winter	415	22	6.720	0.775	19.6	1.0939	0.0000	SURCHARGED
30 minute winter	416	22	6.720	0.830	33.5	1.1879	0.0000	SURCHARGED
15 minute winter	Spur 56	10	6.917	0.353	138.5	3.2731	0.0000	OK
30 minute winter	417	22	6.720	0.869	117.3	1.5203	0.0000	SURCHARGED
30 minute winter	418	22	6.710	0.880	98.6	1.2596	0.0000	SURCHARGED
30 minute winter	419	22	6.705	0.986	79.5	0.0000	0.0000	SURCHARGED
30 minute winter	420	22	6.704	0.995	105.3	1.4386	0.0000	SURCHARGED
30 minute winter	421	22	6.703	1.004	108.5	0.0000	0.0000	SURCHARGED
30 minute winter	Spur 57	22	6.722	1.000	187.9	7.5114	0.0000	SURCHARGED
30 minute winter	422	22	6.701	1.052	197.6	1.9968	0.0000	SURCHARGED
30 minute winter	423	22	6.678	1.156	190.8	2.0424	0.0000	SURCHARGED
30 minute winter	Spur 58	22	6.682	1.049	292.2	11.3208	0.0000	SURCHARGED
30 minute winter	424	22	6.661	1.155	422.3	2.3069	0.0000	SURCHARGED
30 minute winter	425	23	6.596	1.110	419.2	1.9621	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute winter	414	33.000	429	0.0	0.000	0.000	0.0018	
30 minute winter	414	34.000	429	132.1	0.262	3.788	85.1875	
30 minute winter	415	12.000	416	1.4	0.167	0.166	0.4285	
30 minute winter	415	18.000_2	416	0.0	0.000	0.000	0.0004	
30 minute winter	415	14.000	416	-12.7	0.083	-0.342	11.7232	
30 minute winter	416	12.001	417	-33.5	0.394	-0.130	0.9740	
15 minute winter	Spur 56	20.000	417	134.8	1.377	1.206	1.1626	
30 minute winter	417	12.002	418	98.6	1.039	0.555	1.0888	
30 minute winter	418	12.003	419	7.0	0.609	0.896	0.9733	
30 minute winter	418	21.000	419	0.0	0.000	0.000	10.3518	
30 minute winter	418	17.000_2	419	77.4	0.260	2.216	30.9514	
30 minute winter	419	12.004	420	4.7	0.329	0.592	0.0857	
30 minute winter	419	23.000	420	100.3	0.225	2.838	2.8914	
30 minute winter	420	17.005	421	4.9	0.361	0.618	0.0850	
30 minute winter	420	24.000	421	105.6	0.237	2.976	2.8956	
30 minute winter	421	21.006	422	5.0	0.383	0.489	0.2564	
30 minute winter	421	26.000	422	0.0	0.000	0.000	0.0002	
30 minute winter	421	19.000	422	110.8	0.247	2.425	8.9840	
30 minute winter	Spur 57	25.000_1	422	175.2	1.223	0.770	2.3206	
30 minute winter	422	12.009	423	6.9	0.504	0.745	0.7997	
30 minute winter	422	28.000	423	0.0	0.000	0.000	0.0007	
30 minute winter	422	22.000	423	186.9	0.321	4.532	30.0923	
30 minute winter	423	12.010	424	200.1	0.710	0.652	2.2416	
30 minute winter	Spur 58	30.000	424	276.7	1.281	0.911	2.8408	
30 minute winter	424	12.011	425	419.2	1.488	1.372	2.8218	
30 minute winter	425	12.012	426	14.3	0.813	1.707	0.6610	
30 minute winter	425	31.000	426	0.0	0.000	0.000	0.0006	
30 minute winter	425	25.000	426	392.6	0.896	10.518	25.3011	

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Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 96.25%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute winter	426	23	6.536	1.136	402.4	2.0064	0.0000	SURCHARGED
30 minute winter	427	23	6.479	1.095	388.6	2.2695	0.0000	SURCHARGED
30 minute winter	428	24	6.413	1.055	385.0	1.8638	0.0000	SURCHARGED
30 minute winter	429	24	6.350	1.293	485.7	2.2852	0.0000	SURCHARGED
15 minute winter	35.000:50%	11	6.554	0.057	16.5	0.0000	0.0000	OK
30 minute winter	430	24	6.271	1.279	465.9	0.0000	0.0000	SURCHARGED
30 minute winter	431	24	6.256	1.274	469.8	1.8046	0.0000	SURCHARGED
30 minute winter	432	24	6.243	1.271	470.9	0.0000	0.0000	SURCHARGED
30 minute winter	433	24	6.216	1.269	472.5	0.0000	0.0000	SURCHARGED
30 minute winter	434	24	6.203	1.266	477.1	1.8774	0.0000	SURCHARGED
30 minute winter	435	24	6.190	1.263	478.2	0.0000	0.0000	SURCHARGED
30 minute winter	436	24	6.128	1.250	485.4	2.7870	0.0000	SURCHARGED
30 minute winter	437	23	5.984	0.140	3.2	0.1587	0.0000	OK
30 minute winter	Spur 53	21	6.073	0.805	140.9	5.2010	0.0000	SURCHARGED
30 minute winter	438	23	5.989	1.140	538.1	2.0138	0.0000	SURCHARGED
30 minute winter	439	23	5.892	1.068	545.9	2.3205	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute winter	426	12.013	427	379.7	1.372	1.240	2.2481	
30 minute winter	427	12.014	428	385.0	1.861	1.248	3.6032	
30 minute winter	428	12.015	429	381.9	2.366	0.356	3.5125	
30 minute winter	429	1.013_1	430	10.5	0.600	1.427	0.6507	
30 minute winter	429	36.000	430	451.9	0.610	13.729	28.1724	
30 minute winter	429	35.000	35.000:50%	0.0	0.000	0.000	0.3087	
30 minute winter	429	35.000	430	12.8	0.453	0.005	0.5195	
30 minute winter	430	1.017	431	9.6	0.572	1.196	0.0840	
30 minute winter	430	39.000	431	458.7	0.613	12.843	3.6540	
30 minute winter	431	1.018	432	9.7	0.586	1.085	0.0677	
30 minute winter	431	40.000	432	462.1	0.622	11.619	2.9385	
30 minute winter	432	1.019	433	9.7	0.572	1.231	0.2183	
30 minute winter	432	39.000_1	433	0.0	0.000	0.000	0.0002	
30 minute winter	432	42.000	433	464.3	0.632	13.258	9.4518	
30 minute winter	433	1.020	434	9.6	0.545	1.068	0.0673	
30 minute winter	433	43.000	434	465.2	0.641	11.663	2.9086	
30 minute winter	434	1.021	435	9.7	0.553	1.078	0.0665	
30 minute winter	434	44.000	435	469.2	0.651	11.689	2.8646	
30 minute winter	435	1.022	436	9.8	0.556	1.246	0.4280	
30 minute winter	435	43.000_1	436	0.0	0.000	0.000	0.0004	
30 minute winter	435	46.000	436	472.4	0.679	13.492	18.3315	
30 minute winter	436	1.023	438	489.0	1.736	1.601	4.0976	
30 minute winter	437	45.000	438	-3.2	-0.199	-0.102	0.2597	
30 minute winter	Spur 53	46.000_1	438	130.2	1.848	1.775	0.7055	
30 minute winter	438	1.024	439	538.5	1.509	1.283	4.4058	
30 minute winter	439	1.025	440	15.8	0.897	2.019	0.7392	
30 minute winter	439	50.000	440	535.8	0.991	15.359	24.7615	
30 minute winter	439	47.000	47.000:50%	-3.1	-0.108	-0.003	0.6622	

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Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 96.25%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	47.000:50%	12	6.764	0.080	15.8	0.2657	0.0000	OK
30 minute winter	440	22	5.639	0.899	554.8	1.5892	0.0000	SURCHARGED
30 minute winter	441	22	5.560	0.833	567.9	1.8268	0.0000	SURCHARGED
10080 minute winter	Spur 52	9600	5.442	0.532	12.4	5.3796	0.0000	SURCHARGED
10080 minute winter	442	9600	5.444	1.078	32.3	1.9045	0.0000	SURCHARGED
10080 minute winter	443	9360	5.451	1.101	47.7	0.0000	0.0000	OK
15 minute winter	S278 S1	12	5.024	0.440	33.0	1.1057	0.0000	SURCHARGED
15 minute winter	S278 S2	12	4.935	0.537	63.3	1.3174	0.0000	SURCHARGED
15 minute winter	S278 S3	12	4.847	0.506	31.7	1.1969	0.0000	SURCHARGED
15 minute winter	S278 S4	12	4.765	0.617	95.0	0.9285	0.0000	SURCHARGED
10080 minute winter	444	9420	5.431	1.081	47.1	0.0000	0.0000	SURCHARGED
10080 minute winter	445	9420	5.428	1.136	4.9	2.0074	0.0000	SURCHARGED
720 minute winter	S278 S5	705	4.636	0.447	6.8	1.3586	0.0000	SURCHARGED
720 minute winter	S278 S6	705	4.634	0.569	15.3	1.4477	0.0000	SURCHARGED
720 minute winter	S278 Headwall 1	705	4.634	0.705	15.0	0.0000	0.0000	OK
720 minute winter	S278 Headwall 3	705	4.633	0.743	20.4	0.8591	0.0000	SURCHARGED
720 minute winter	S278 S9	705	4.631	0.800	12.3	0.9045	0.0000	SURCHARGED
30 minute winter	Ex Mh	259	3.727	0.077	6.8	0.1356	0.0000	OK
30 minute winter	Ex Headwall	259	3.647	0.067	6.8	0.0000	0.0000	OK
720 minute winter	S278 S7	705	4.634	0.249	1.5	0.4022	0.0000	SURCHARGED
720 minute winter	S278 S8	705	4.633	0.327	2.9	0.5449	0.0000	SURCHARGED
720 minute winter	S278 Headwall 2	705	4.636	0.706	3.5	0.0000	0.0000	OK
15 minute winter	Spur 51	11	5.754	1.028	339.9	9.4009	0.0000	SURCHARGED
15 minute winter	446	11	5.451	0.818	325.2	1.1707	0.0000	OK
15 minute winter	Spur 50	11	5.753	1.046	316.8	9.5029	0.0000	SURCHARGED
15 minute winter	447	11	5.561	0.882	301.2	1.2626	0.0000	SURCHARGED
10080 minute winter	448	9180	5.436	0.803	9.3	1.1491	0.0000	OK
15 minute winter	449	11	5.564	0.469	339.9	4.7020	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute winter	439	47.000	440	8.3	0.245	0.009	0.7509	
30 minute winter	440	1.026	441	562.0	1.695	1.361	2.3650	
30 minute winter	441	1.027	442	569.0	1.594	0.721	18.1684	
10080 minute winter	Spur 52	49.000	442	17.7	0.785	0.032	1.7324	
10080 minute winter	442	1.028	443	44.2	0.298	0.108	2.9633	
10080 minute winter	443	Flow through pond	444	47.1	0.003	0.000	3146.5830	
15 minute winter	S278 S1	17.000_1	S278 S2	29.0	0.963	0.878	1.0782	
15 minute winter	S278 S2	17.001_1	S278 S4	55.2	0.827	0.779	4.2945	
15 minute winter	S278 S3	18.000_1	S278 S4	27.1	0.776	0.819	1.1454	
15 minute winter	S278 S4	17.002	S278 S6	93.3	1.325	1.320	1.4329	
10080 minute winter	444	52.000	445	4.9	0.302	0.123	0.3876	
10080 minute winter	445	Hydro-Brake®	S278 S5	4.9				
720 minute winter	S278 S5	1.031	S278 S6	6.6	0.599	0.247	0.7144	
720 minute winter	S278 S6	1.032	S278 Headwall 1	15.0	0.712	0.237	0.5356	
720 minute winter	S278 Headwall 1	Flow through pond	S278 Headwall 3	18.6	0.017	0.000	237.3976	
720 minute winter	S278 Headwall 3	17.000	S278 S9	12.3	0.454	0.313	0.4069	
720 minute winter	S278 S9	Hydro-Brake®	Ex Mh	6.8				
30 minute winter	Ex Mh	1.036	Ex Headwall	6.8	0.624	0.237	0.2474	714.9
720 minute winter	S278 S7	18.000	S278 S8	1.5	0.394	0.045	0.7687	
720 minute winter	S278 S8	54.001	S278 Headwall 2	2.9	0.550	0.056	1.0839	
720 minute winter	S278 Headwall 2	Flow through pond	S278 Headwall 3	18.6	0.017	0.000	237.3976	
15 minute winter	Spur 51	55.000	446	325.2	2.053	2.041	3.8652	
15 minute winter	446	Flow through pond	452	715.8	1.097	0.004	234.3100	
15 minute winter	Spur 50	56.000	447	301.2	1.901	1.889	1.8009	
15 minute winter	447	56.001	448	301.4	1.903	1.878	1.8417	
10080 minute winter	448	Flow through pond	452	11.0	0.024	0.000	1169.3475	
15 minute winter	449	57.000	450	327.7	2.533	1.061	1.6446	

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Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 96.25%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
10080 minute winter	450	9420	5.434	0.446	8.9	0.6378	0.0000	OK
10080 minute winter	451	9420	5.437	1.096	15.3	0.0000	0.0000	OK
10080 minute winter	452	9480	5.434	0.859	11.0	1.2288	0.0000	SURCHARGED
10080 minute winter	453	9240	5.432	0.879	11.1	1.2578	0.0000	SURCHARGED
10080 minute winter	454	9420	5.434	1.064	11.1	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
10080 minute winter	450	57.001	451	9.0	0.139	0.010	1.3669	
10080 minute winter	451	Flow through pond	444	47.1	0.003	0.000	3146.5830	
10080 minute winter	452	58.000	453	11.1	0.374	0.070	1.4029	
10080 minute winter	453	58.001	454	11.1	0.423	0.070	1.4770	
10080 minute winter	454	Flow through pond	444	47.1	0.003	0.000	3146.5830	

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Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	100	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.600
CV	0.750	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	50.0		

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Detailed	Starting Level (m)	
Rainfall Events	Singular	Skip Steady State	x	Check Discharge Rate(s)	x
Summer CV	1.000	Drain Down Time (mins)	2000	Check Discharge Volume	x
Winter CV	1.000	Additional Storage (m³/ha)	35.0		

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 %)
1	0	0	0

Node 520 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Downstream Link	1.001	Sump Available	✓
Replaces Downstream Link	✓	Product Number	CTL-SHE-0126-8400-1558-8400
Invert Level (m)	3.575	Min Outlet Diameter (m)	0.150
Design Depth (m)	1.558	Min Node Diameter (mm)	1200
Design Flow (l/s)	8.4		

Node 504 Online Orifice Control

Flap Valve	x	Invert Level (m)	3.760	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.825		

Node 518 Online Orifice Control

Flap Valve	x	Invert Level (m)	3.760	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.450		

Node 508 Online Orifice Control

Flap Valve	x	Invert Level (m)	3.760	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.600		

Node 515 Online Orifice Control

Flap Valve	x	Invert Level (m)	3.760	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.300		

Node 512 Online Orifice Control

Flap Valve	x	Invert Level (m)	4.255	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	1.050		

Node 519 Flow through Pond Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Main Channel Length (m)	5.000
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	3.750	Main Channel Slope (1:X)	500.0
Safety Factor	2.0	Time to half empty (mins)	0	Main Channel n	0.030

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Inlets

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Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	781.5	0.0	0.349	1195.1	0.0	0.350	5535.9	0.0	1.600	9559.0	0.0

Node 513 Flow through Pond Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Main Channel Length (m)	61.000
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	4.175	Main Channel Slope (1:X)	500.0
Safety Factor	2.0	Time to half empty (mins)	0	Main Channel n	0.030

Inlets

512

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	360.7	0.0	0.124	360.7	0.0	0.125	1519.2	0.0	1.500	2718.3	0.0

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Results for 1 year Critical Storm Duration. Lowest mass balance: 99.67%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	501	10	4.811	0.088	22.4	0.4898	0.0000	OK
15 minute summer	502	10	4.645	0.207	238.6	10.0263	0.0000	OK
10080 minute summer	503	6420	4.307	0.288	9.1	0.7318	0.0000	OK
10080 minute summer	504	6420	4.307	0.547	9.0	0.0000	0.0000	OK
15 minute summer	505	11	4.977	0.099	17.4	0.3182	0.0000	OK
15 minute summer	506	10	4.856	0.269	145.3	5.8690	0.0000	OK
15 minute summer	507	11	4.573	0.148	159.3	0.2618	0.0000	OK
10080 minute summer	508	6420	4.309	0.549	6.2	0.0000	0.0000	OK
15 minute summer	509	10	4.853	0.292	310.7	11.5302	0.0000	OK
15 minute summer	510	10	5.238	0.066	17.4	0.2041	0.0000	OK
15 minute summer	551	10	4.680	0.342	321.6	0.8697	0.0000	OK
15 minute summer	512	11	4.639	0.384	320.1	0.0000	0.0000	OK
120 minute summer	513	78	4.435	0.260	140.4	0.0000	0.0000	OK
180 minute summer	514	112	4.379	0.240	70.3	0.2719	0.0000	OK
10080 minute summer	515	6420	4.307	0.547	11.5	0.0000	0.0000	OK
10080 minute summer	516	6420	4.308	0.386	4.1	3.7644	0.0000	OK
10080 minute summer	517	6420	4.308	0.476	3.8	0.6807	0.0000	SURCHARGED
10080 minute summer	518	6420	4.311	0.551	4.4	0.0000	0.0000	OK
10080 minute summer	519	6420	4.307	0.557	21.3	0.6298	0.0000	SURCHARGED
10080 minute summer	520	6420	4.303	0.728	9.3	0.8228	0.0000	SURCHARGED
60 minute winter	521	39	3.469	0.073	8.4	0.0821	0.0000	OK
60 minute summer	Ex_Mh	39	3.180	0.090	8.4	0.1292	0.0000	OK
60 minute summer	Ex_Outfall	39	3.135	0.065	8.4	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	501	4.000	503	22.0	1.316	0.177	0.2391	
15 minute summer	502	5.000	503	232.6	2.705	0.175	1.1608	
10080 minute summer	503	4.001	504	9.0	0.588	0.006	6.6709	
10080 minute summer	504	Flow through pond	519	21.3	0.002	0.000	1511.4640	
15 minute summer	505	2.000	507	17.0	0.850	0.233	0.7030	
15 minute summer	506	3.000	507	142.3	1.331	0.511	2.7938	
15 minute summer	507	2.001	508	159.6	3.111	0.120	0.6372	
10080 minute summer	508	Flow through pond	519	21.3	0.002	0.000	1511.4640	
15 minute summer	509	8.000	551	304.4	2.082	0.269	1.2786	
15 minute summer	510	7.000	551	17.3	1.549	0.099	0.1073	
15 minute summer	551	7.001	512	320.1	1.345	0.194	2.8848	
15 minute summer	512	Flow through pond	513	306.7	0.366	0.006	126.9496	
120 minute summer	513	9.000	514	72.0	1.146	1.006	0.5399	
180 minute summer	514	9.001	515	70.2	1.254	0.992	0.7467	
10080 minute summer	515	Flow through pond	519	21.3	0.002	0.000	1511.4640	
10080 minute summer	516	6.000	517	-3.9	0.316	-0.015	2.1246	
10080 minute summer	517	6.001	518	4.4	0.308	0.027	2.0228	
10080 minute summer	518	Flow through pond	519	21.3	0.002	0.000	1511.4640	
10080 minute summer	519	1.000	520	9.3	0.425	0.155	0.5249	
10080 minute summer	520	Hydro-Brake®	521	8.4				
60 minute winter	521	1.002	Ex_Mh	8.4	0.781	0.210	0.1607	
60 minute summer	Ex_Mh	3.003	Ex_Outfall	8.4	0.511	0.135	0.3325	575.9

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Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	100	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.600
CV	0.750	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	50.0		

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Detailed	Starting Level (m)	
Rainfall Events	Singular	Skip Steady State	x	Check Discharge Rate(s)	x
Summer CV	1.000	Drain Down Time (mins)	2000	Check Discharge Volume	x
Winter CV	1.000	Additional Storage (m³/ha)	35.0		

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 %)
30	0	0	0

Node 520 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Downstream Link	1.001	Sump Available	✓
Replaces Downstream Link	✓	Product Number	CTL-SHE-0126-8400-1558-8400
Invert Level (m)	3.575	Min Outlet Diameter (m)	0.150
Design Depth (m)	1.558	Min Node Diameter (mm)	1200
Design Flow (l/s)	8.4		

Node 504 Online Orifice Control

Flap Valve	x	Invert Level (m)	3.760	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.825		

Node 518 Online Orifice Control

Flap Valve	x	Invert Level (m)	3.760	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.450		

Node 508 Online Orifice Control

Flap Valve	x	Invert Level (m)	3.760	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.600		

Node 515 Online Orifice Control

Flap Valve	x	Invert Level (m)	3.760	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.300		

Node 512 Online Orifice Control

Flap Valve	x	Invert Level (m)	4.255	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	1.050		

Node 519 Flow through Pond Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Main Channel Length (m)	5.000
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	3.750	Main Channel Slope (1:X)	500.0
Safety Factor	2.0	Time to half empty (mins)	0	Main Channel n	0.030

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Inlets

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Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	781.5	0.0	0.349	1195.1	0.0	0.350	5535.9	0.0	1.600	9559.0	0.0

Node 513 Flow through Pond Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Main Channel Length (m)	61.000
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	4.175	Main Channel Slope (1:X)	500.0
Safety Factor	2.0	Time to half empty (mins)	0	Main Channel n	0.030

Inlets

512

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	360.7	0.0	0.124	360.7	0.0	0.125	1519.2	0.0	1.500	2718.3	0.0

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Results for 30 year Critical Storm Duration. Lowest mass balance: 95.97%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	501	10	4.917	0.194	85.9	1.0811	0.0000	OK
15 minute summer	502	11	4.958	0.520	916.1	25.1872	0.0000	OK
15 minute summer	503	11	4.735	0.716	970.8	1.8231	0.0000	OK
15 minute summer	504	11	4.641	0.881	971.9	0.0000	0.0000	OK
15 minute summer	505	10	5.102	0.224	66.8	0.7234	0.0000	OK
15 minute summer	506	11	5.386	0.799	558.2	17.4295	0.0000	SURCHARGED
15 minute summer	507	11	4.893	0.468	608.9	0.8263	0.0000	OK
15 minute summer	508	11	4.787	1.027	608.5	0.0000	0.0000	OK
15 minute summer	509	11	5.394	0.833	1192.8	32.8538	0.0000	SURCHARGED
15 minute summer	510	10	5.311	0.139	66.8	0.4289	0.0000	OK
15 minute summer	551	11	5.234	0.896	1222.5	2.2809	0.0000	OK
15 minute summer	512	11	5.150	0.895	1224.0	0.0000	0.0000	OK
120 minute summer	513	92	4.745	0.570	323.3	0.0000	0.0000	SURCHARGED
120 minute summer	514	98	4.671	0.532	89.5	0.6018	0.0000	SURCHARGED
10080 minute summer	515	7560	4.622	0.862	16.1	0.0000	0.0000	OK
10080 minute summer	516	7560	4.622	0.700	3.6	6.8286	0.0000	SURCHARGED
10080 minute summer	517	7860	4.623	0.791	6.2	1.1313	0.0000	SURCHARGED
10080 minute summer	518	7560	4.625	0.865	14.3	0.0000	0.0000	OK
10080 minute summer	519	7560	4.621	0.871	64.4	0.9851	0.0000	SURCHARGED
10080 minute summer	520	7560	4.618	1.043	8.4	1.1793	0.0000	SURCHARGED
120 minute summer	521	42	3.469	0.073	8.4	0.0821	0.0000	OK
240 minute winter	Ex_Mh	68	3.180	0.090	8.4	0.1292	0.0000	OK
180 minute winter	Ex_Outfall	56	3.135	0.065	8.4	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	501	4.000	503	84.9	1.841	0.682	0.6764	
15 minute summer	502	5.000	503	886.5	3.209	0.667	4.1288	
15 minute summer	503	4.001	504	971.9	1.867	0.671	13.4618	
15 minute summer	504	Flow through pond	519	919.9	0.086	0.000	1309.2250	
15 minute summer	505	2.000	507	65.3	1.233	0.895	1.8666	
15 minute summer	506	3.000	507	543.6	2.518	1.952	5.5254	
15 minute summer	507	2.001	508	608.5	3.034	0.458	3.2111	
15 minute summer	508	Flow through pond	519	919.9	0.086	0.000	1309.2250	
15 minute summer	509	8.000	551	1158.6	2.633	1.025	3.8385	
15 minute summer	510	7.000	551	68.3	2.026	0.393	0.4884	
15 minute summer	551	7.001	512	1224.0	1.933	0.742	7.6504	
15 minute summer	512	Flow through pond	513	1010.9	0.383	0.021	487.9439	
120 minute summer	513	9.000	514	89.5	1.271	1.251	0.6067	
120 minute summer	514	9.001	515	89.4	1.273	1.264	0.9122	
10080 minute summer	515	Flow through pond	519	64.4	0.001	0.000	3614.2720	
10080 minute summer	516	6.000	517	6.2	0.315	0.024	2.2212	
10080 minute summer	517	6.001	518	6.5	0.308	0.040	2.0228	
10080 minute summer	518	Flow through pond	519	64.4	0.001	0.000	3614.2720	
10080 minute summer	519	1.000	520	8.4	0.425	0.140	0.5249	
10080 minute summer	520	Hydro-Brake®	521	8.4				
120 minute summer	521	1.002	Ex_Mh	8.4	0.781	0.210	0.1607	
240 minute winter	Ex_Mh	3.003	Ex_Outfall	8.4	0.511	0.135	0.3325	968.9

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Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	100	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.600
CV	0.750	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	50.0		

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Detailed	Starting Level (m)	
Rainfall Events	Singular	Skip Steady State	x	Check Discharge Rate(s)	x
Summer CV	0.750	Drain Down Time (mins)	2000	Check Discharge Volume	x
Winter CV	0.840	Additional Storage (m³/ha)	35.0		

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

Node 520 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Downstream Link	1.001	Sump Available	✓
Replaces Downstream Link	✓	Product Number	CTL-SHE-0126-8400-1558-8400
Invert Level (m)	3.575	Min Outlet Diameter (m)	0.150
Design Depth (m)	1.558	Min Node Diameter (mm)	1200
Design Flow (l/s)	8.4		

Node 504 Online Orifice Control

Flap Valve	x	Invert Level (m)	3.760	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.825		

Node 518 Online Orifice Control

Flap Valve	x	Invert Level (m)	3.760	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.450		

Node 508 Online Orifice Control

Flap Valve	x	Invert Level (m)	3.760	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.600		

Node 515 Online Orifice Control

Flap Valve	x	Invert Level (m)	3.760	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.300		

Node 512 Online Orifice Control

Flap Valve	x	Invert Level (m)	4.255	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	1.050		

Node 519 Flow through Pond Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Main Channel Length (m)	5.000
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	3.750	Main Channel Slope (1:X)	500.0
Safety Factor	2.0	Time to half empty (mins)		Main Channel n	0.030

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Inlets

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Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	781.5	0.0	0.349	1195.1	0.0	0.350	5535.9	0.0	1.600	9559.0	0.0

Node 513 Flow through Pond Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Main Channel Length (m)	61.000
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	4.175	Main Channel Slope (1:X)	500.0
Safety Factor	2.0	Time to half empty (mins)	0	Main Channel n	0.030

Inlets

512

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	360.7	0.0	0.124	360.7	0.0	0.125	1519.2	0.0	1.500	2718.3	0.0

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Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 95.94%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	501	11	5.345	0.622	118.8	3.4618	0.0000	SURCHARGED
15 minute winter	502	11	5.506	1.068	1267.2	51.7669	0.0000	SURCHARGED
15 minute winter	503	11	5.177	1.158	1252.7	2.9467	0.0000	FLOOD RISK
15 minute winter	504	11	4.947	1.187	1250.7	0.0000	0.0000	OK
15 minute winter	505	11	5.678	0.800	92.4	2.5789	0.0000	SURCHARGED
15 minute winter	506	11	6.119	1.532	772.2	33.3953	0.0000	SURCHARGED
15 minute winter	507	11	5.459	1.034	770.8	1.8269	0.0000	SURCHARGED
15 minute winter	508	11	5.209	1.449	768.3	0.0000	0.0000	OK
15 minute winter	509	10	5.798	1.237	1650.1	48.7927	0.0000	SURCHARGED
15 minute winter	510	10	5.574	0.402	92.4	1.2430	0.0000	SURCHARGED
15 minute winter	551	10	5.490	1.152	1684.5	2.9313	0.0000	SURCHARGED
15 minute winter	512	11	5.317	1.062	1686.3	0.0000	0.0000	OK
120 minute winter	513	114	4.962	0.787	332.1	0.0000	0.0000	SURCHARGED
120 minute winter	514	116	4.877	0.738	98.0	0.8345	0.0000	SURCHARGED
10080 minute winter	515	9300	4.876	1.116	13.1	0.0000	0.0000	OK
15 minute winter	516	11	4.907	0.985	303.7	9.6157	0.0000	SURCHARGED
10080 minute winter	517	9300	4.877	1.045	5.9	1.4957	0.0000	FLOOD RISK
10080 minute winter	518	9300	4.882	1.122	10.2	0.0000	0.0000	OK
10080 minute winter	519	9300	4.874	1.124	135.9	1.2709	0.0000	SURCHARGED
10080 minute winter	520	9300	4.870	1.295	12.1	1.4643	0.0000	FLOOD RISK
120 minute summer	521	36	3.469	0.073	8.4	0.0821	0.0000	OK
120 minute winter	Ex_Mh	34	3.180	0.090	8.4	0.1292	0.0000	OK
120 minute winter	Ex_Outfall	34	3.135	0.065	8.4	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	501	4.000	503	106.6	1.829	0.857	1.0059	
15 minute winter	502	5.000	503	1146.1	3.211	0.862	4.7949	
15 minute winter	503	4.001	504	1250.7	2.346	0.864	14.0075	
15 minute winter	504	Flow through pond	519	1254.2	0.073	0.001	1868.8650	
15 minute winter	505	2.000	507	82.1	1.184	1.125	2.4790	
15 minute winter	506	3.000	507	688.7	3.188	2.472	5.6464	
15 minute winter	507	2.001	508	768.3	3.136	0.578	3.4967	
15 minute winter	508	Flow through pond	519	1254.2	0.073	0.001	1868.8650	
15 minute winter	509	8.000	551	1595.0	3.624	1.411	3.8405	
15 minute winter	510	7.000	551	89.5	2.044	0.515	0.6779	
15 minute winter	551	7.001	512	1686.3	2.661	1.022	7.6585	
15 minute winter	512	Flow through pond	513	1180.1	0.385	0.025	733.8399	
120 minute winter	513	9.000	514	98.0	1.391	1.370	0.6067	
120 minute winter	514	9.001	515	97.9	1.390	1.384	0.9122	
10080 minute winter	515	Flow through pond	519	135.9	0.002	0.000	5537.4927	
15 minute winter	516	6.000	517	284.1	1.793	1.099	2.2212	
10080 minute winter	517	6.001	518	6.2	0.308	0.039	2.0228	
10080 minute winter	518	Flow through pond	519	135.9	0.002	0.000	5537.4927	
10080 minute winter	519	1.000	520	12.1	0.425	0.202	0.5249	
10080 minute winter	520	Hydro-Brake®	521	8.4				
120 minute summer	521	1.002	Ex_Mh	8.4	0.781	0.210	0.1607	
120 minute winter	Ex_Mh	3.003	Ex_Outfall	8.4	0.511	0.135	0.3325	866.3

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Appendix F

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THE LANDINGS, LAND AT FORD AIRFIELD, FORD

SuDS Management & Maintenance Plan

REPORT REF.
2205771

August 2024

[redacted]

Email: enquiries@ardent-ce.co.uk

ARUN DISTRICT COUNCIL F/14/24/RES

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Document Control Sheet

REV	ISSUE PURPOSE	AUTHOR	CHECKED	APPROVED	DATE
-	First Issue	TA	VL		09/08/24

Distribution

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ARUN DISTRICT COUNCIL F/14/24/RES

1. Introduction

This report details the management and maintenance requirements of the surface water sustainable drainage system (SuDS) for the Reserved Matters applications for a residential-led mixed-use development on Land at Ford Airfield, Ford.

1.1. Outline (all matters reserved except access) permission (ref F/4/20/OUT) was granted in July 2023 for:

1.2. *"…the development of up to 1,500 dwellings (Use Class C3), 60-bed care home (Use Class C2), up to 9,000 sqm of employment floorspace (Use Classes B1), local centre of up to 2,350 sqm including up to 900 sqm retail / commercial (Use Classes A1-A5) and 1,450 sqm community / leisure floorspace (Use Classes D1-D2), land for a two-form entry primary school (Use Class D1), public open space, allotments, new sports pitches and associated facilities, drainage, parking and associated access, infrastructure, landscape, ancillary and site preparation works, including demolition of existing buildings and part removal of existing runway hardstanding…"*

1.3. The development will be brought forward via a number of reserved matters applications. This report is to be submitted to the Local Planning Authority in support of all Reserved Matters applications relating to drainage infrastructure. This report is to be read in conjunction with the Drainage Technical Note (Ref: 2205771-R16).

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2. Management & Maintenance Plan

The Sitewide Indicative Surface Water Drainage Strategy is shown on Ardent drawing **2205771-D020 F**.

2.1. This plan defines the management and maintenance responsibilities for all proposed SuDS components to ensure their effective operation for the lifetime of the development.

2.2. Following construction of the proposed SuDS components and connection of drained surfaces to these components, the drainage system will enter the operational phase of its design life. Periodic monitoring and maintenance will be required during the

2.3. operational phase as described within this document.

2.4. Maintenance requirements for the drainage system will be summarised in handover documentation provided to the operator(s) on completion of the development in the form of Health & Safety files and Operation and Maintenance (O&M) manuals.

2.5. As indicated on the Sitewide Indicative Surface Water Drainage Strategy drawing, the drainage system comprises of various SuDS components for the effective interception, treatment, attenuation and conveyance of surface water runoff.

2.6. Management responsibilities for SuDS components will belong to the landowner or to the asset owner in instances where components are dedicated to a Highway

2.7. Authority or Independent Adoption Company by statutory or private agreement.

For the purposes of this document the maintenance responsibilities for each SuDS component are defined by the following criteria:

- Regular Maintenance
- Occasional Maintenance
- Remedial Maintenance

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Ownership and Management

For the lifetime of the development the responsibility for ongoing management and maintenance of SuDS components will belong to the landowner or asset owner where ownership is transferred.

2.8. The following table summarises the SuDS components incorporated within the development and identifies their general location, ownership, and the maintenance duty holder.

2.9.

SuDS Component	Location	Owner	Maintenance Duty Holder
Below ground drainage (Private) • Pipes • Access & inspection chambers • Manholes • Silt traps/catchpits • Headwalls	Private land	Landowner	Landowner
Below ground drainage (Adoptable) • Pipes • Manholes • Headwalls • Foul Pumping Station	Public highway, public open space, private land	Independent Adoption Company	Independent Adoption Company
Below ground drainage (Highway) • Pipes • Manholes • Silt traps/Catchpits • Headwalls	Public highway, public open space, private land	Highway Authority	Highway Authority
Road Gully (Highway)	Public highway	Highway Authority	Highway Authority
Flow control device • Orifice plate • Vortex flow control	Public highway, public open space, private land	Highway Authority, Independent Adoption Company, Landowner	Highway Authority, Independent Adoption Company, Landowner
Swales	Public highway, public open space, private land	Highway Authority, Independent Adoption Company, Landowner	Highway Authority, Independent Adoption Company, Landowner
Detention Basin	Public open space, private land	Highway Authority, Independent Adoption Company, Landowner	Highway Authority, Independent Adoption Company, Landowner

2.10.

Table1: Ownership and maintenance matrix

2.11. Where SuDS components are not to be adopted by the dedicated to the Highway Authority, it is anticipated that an appropriate organisation (an independent adoption company) will be appointed the responsibility for the monitoring and maintenance of the surface water drainage system during the operational phase.

The maintenance regimes developed by this organisation will incorporate the requirements of this document together with the specific/further requirements detailed within handover documentation.

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Health & Safety Requirements

The design of the surface water drainage system shall comply with the Construction (Design and management) (CDM) Regulations 2015 in order that designers assess foreseeable risks during construction and maintenance and design to minimise them by the following (in order of preference):

2.12.

- Avoid
- Reduce
- Identify and mitigate residual risks

Designer's risk assessments and maintenance statements will be contained with the handover information to make the contractors and others aware of risks
2.13. associated with the management and maintenance of the system.

The Health and Safety at Work Act and Regulations under it apply to the
2.14. maintenance and monitoring works required for the surface water drainage. These operations will be always subject to risk assessment.

2.15. The organisation responsible for maintenance and monitoring requirements outlined in this document shall take appropriate health and safety precautions in accordance with 2.3.2 and 2.3.3.

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Suds Component Overview

The following tables provides an overview of maintenance requirements for different SuDS components.

2.16.

Operation and maintenance activity	SuDS Component				
	Below ground drainage	Road gullies	Flow control devices	Swales	Detention basins
Monitoring					
Inspection	▒	▒	▒	▒	▒
Regular maintenance					
Litter & debris removal	▒	▒	▒	▒	▒
Grass cutting				▒	▒
Weed & invasive vegetation control				▒	▒
Tree & shrub management				▒	▒
Shoreline vegetation management					▒
Aquatic vegetation management					▒

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	Below ground drainage	Road gullies	Flow control devices	Swales	Detention basins
Occasional maintenance					
Sediment management[1]					
Vegetation replacement					
Vacuum sweeping & brushing					
Remedial maintenance					
Structure rehabilit-ation/repair					
Infiltration surface reconditioning					

Table 2: SuDS Component Overview

Key

will be required
may be required
not required

1 Sediment should be collected and managed in pre-treatment systems, upstream of the main SuDS component.

3.0. Operation and Maintenance Requirements

3.1. Below Ground Drainage Network

Maintenance Schedule	Required Action	Required Frequency
Monitoring	Visually inspect manholes, silt traps, vortex separator inlet/outlet headwalls and attenuation basin for evidence of siltation, damage or blockage	Every 2 months first 12 months, then every 6 months
Occasional Maintenance	CCTV survey pipes to periodically record structural pipe condition. Undertake survey recommendations as required	Every 5 years; or as required by monitoring
Remedial Maintenance	Trimming of any roots that may be causing blockages	As required
	Removal of blockage by rodding, jetting, hydraulic rams, suction tanker etc.	As required
	Replacement of structurally damaged pipe sections	As required

Table 3: maintenance schedule for a below ground pipe network

3.2. Road Gullies

Maintenance Schedule	Required Action	Required Frequency
Monitoring	Inspection of silt accumulation rates and establish appropriate removal frequencies	Monthly during first year of operation, then every 6 months thereafter
	Structural inspection of gully covers, frames and bedding for defects or damage	Every 6 months
Regular Maintenance	Remove litter and debris	Every 6 months; or as required by monitoring
Occasional Maintenance	Emptying of gullies and accumulated deposits by suction tanker	Yearly, or as required by monitoring
Remedial Maintenance	Replacement of damaged gully tops	As required

Table 4: maintenance schedule for road gullies

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3.3. Manholes, Silt Traps, Catchpits and Foul Pumping Station

Maintenance Schedule	Required Action	Required Frequency
Monitoring	General inspection of chamber covers for signs of damage, wear and rocking covers	Every 6 months
	Structural inspection of chamber cover surrounds	Every 6 months
	Inspection of manhole chamber internals for evidence of pipe surcharging	Every 6 months
	Inspection of silt accumulation rates and establish appropriate removal frequencies	Monthly during first year of operation, then every 6 months thereafter
Regular Maintenance	Removal of accumulated deposits by suction tanker	Every 6 months; or as required by monitoring
Occasional Maintenance	Sides, benching and channels washed down with clean water jetting	Every 6 months; or as required by monitoring
	Removal of accumulated deposits by suction tanker following high return period storm or period of poor performance	As required
Remedial Maintenance	Replacement of damaged chamber covers and chamber cover bedding	As required
	Sealing repair of cracked/spalled concrete and benching	As required

Table 5: maintenance schedule for manholes, silt traps

3.4. Headwalls

Maintenance Schedule	Required Action	Required Frequency
Monitoring	Inspect apron for debris or signs of blockage	Every 6 months
	Inspect condition of security grille	Every 6 months
	Inspect condition of inlet/outfall structure	Every 6 months
Regular Maintenance	Remove accumulated litter, debris or vegetation from headwall and grille	Every 6 months
Occasional Maintenance	Remove accumulated litter, debris or vegetation following high return period storm	As required

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Maintenance Schedule	Required Action	Required Frequency
Remedial Maintenance	Sealing repair of cracked/spalled concrete	As required
	Repair or replacement of security grille components	As required

Table 6: maintenance schedule for inlets/outfalls

3.5. Swales

Maintenance Schedule	Required Action	Required Frequency
Monitoring	Inspect filter strip surface to identify evidence of erosion, poor vegetation growth, compaction, ponding, sedimentation and contamination (e.g. oils)	Monthly (at start, then half yearly)
	Check flow spreader and filter strip surface for even gradients	Monthly (at start, then half yearly)
	Inspect gravel flow spreader upstream of filter strip for clogging	Monthly (at start, then half yearly)
	Inspect silt accumulation rates and establish appropriate removal frequencies	Monthly (at start, then half yearly)
Regular Maintenance	Remove litter and debris	Monthly (or as required)
	Cut grass – to retain grass height within specified design range (e.g. 75-150mm)	Monthly (during growing season), or as required
	Manage other vegetation and remove nuisance plants	Monthly (at start, then as required)
Occasional Maintenance	Reseed areas of poor vegetation growth; alter plant types to better suit conditions, if required	As required or if bare soil is exposed over >10% of the filter strip area
Remedial Maintenance	Repair erosion or other damage by re-turfing or reseeding	As required
	Relevel uneven surfaces and reinstate design levels	As required
	Scarify and spike topsoil layer to improve infiltration performance break up silt deposits and prevent compaction of the soil surface	As required
	Remove build-up of sediment on upstream gravel trench,	As required

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	flow spreader, or at top of filter strip	
	Remove and dispose of oils or petrol residues using safe standard practises, undertake waste classification testing prior to disposa	As required

Table 7: maintenance schedule for swales

3.6. Detention Basins

Maintenance Schedule	Required Action	Required Frequency
Monitoring	Inspect/check all inlets, outlets and overflows to ensure that they are in good condition and free from blockages	Monthly
	Inspect banksides, structures, pipework etc. for evidence of physical damage	Monthly
	Inspect inlets and facility surface for silt accumulation. Establish appropriate silt removal frequencies	Monthly (for first year), then annually or as required
	Check any mechanical devices, e.g. penstocks	Every 6 months
Regular Maintenance	Remove litter and debris	Monthly (or as required)
	Cut grass – for spillways and access routes	Monthly (during growing season), or as required
	Cut grass – meadow grass in and around basin	Half yearly (spring – before nesting season, and autumn)
	Manage other vegetation and remove nuisance plants	Monthly (at start, then as required)
	Tidy all dead growth before start of growing season	Annually
	Manage wetland plants in outlet pool – where provided	Annually (see Wetlands)
Occasional Maintenance	Reseed areas of poor vegetation growth	As required
	Prune and trim any trees and remove cuttings	Every 2 years, or as required
	Remove sediment from inlets, outlets, forebay and main basin when required by monitoring	Every 2 to 5 years, or as required (likely to be minimal requirement where treatment is provided upstream)
Remedial Maintenance	Repair erosion or other damage by reseeding or returfing	As required

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Maintenance Schedule	Required Action	Required Frequency
	Realignment of rip-rap	As required
	Repair/rehabilitation of inlets, outlets and overflows	As required
	Relevel uneven surfaces and reinstate design levels	As required

Table 8: maintenance schedule for detention basins

Appendix G

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Our Ref: CC/2205771

Mat Jackson
West Sussex County Council
Ground Floor
Northleigh
County Hall
Chichester
PO19 1RH

2nd December 2024

Dear Mat,

F/15/24/RES & F/14/24/RES – Land at Ford Airfield, Ford, West Sussex

Thank you for your comments on the above applications. We held extensive pre-application discussions with the LLFA and the proposals put forward followed the principles of what was agreed through this process as well as according with the approved outline strategy. We would welcome a meeting to discuss the proposals further to assist with overcoming your concerns.

This letter has been updated following our meeting of 25 November 2024 with additional information discussed and clarification on some of the points. For information, Vistry are in the process of preparing a pack of updated information for the reserved matters applications over the next couple of weeks and will incorporate additional information on the drainage in to this pack as referenced in this letter.

Below we have provided our responses to each of the LLFA's comments, with the comments replicated above for ease.

1. Infiltration testing (in accordance with BRE 365) is required in those locations where groundwater has been found to be sufficiently deep, such that a 1m buffer below the base of infiltration structures is achievable. Where infiltration is found to be viable, it should be used in accordance with the drainage hierarchy. This should then be reflected in updated drainage calculations. Further refined and site-specific groundwater monitoring is required to inform the design in these areas.

Ardent CE Response
Out of the 32 groundwater test locations, 23 (72%) of the locations show groundwater being within 1.5m of ground levels (including min. 500mm typical buildup for permeable paving and 1m buffer). Therefore, this indicates the groundwater across the site is too shallow for effective surface water infiltration. It is considered the minor number of locations which have a deeper groundwater level are outliers. Best practice is to take the worst-case value in terms of groundwater, to reduce the risks of groundwater flooding and buoyancy.

Extensive discussions were undertaken with the LLFA in relation to the groundwater monitoring and infiltration test and the LLFA sent a pre-app response dated 19th July 2024 which stated "*The amount of groundwater monitoring and infiltration testing is satisfactory for this site and demonstrates high groundwater levels and limited infiltration potential.*" This letter is enclosed. The request for further testing is therefore considered to be unwarranted given the LLFA's original pre-application response.

We have set out below the findings of the various geotechnical site investigations undertaken at the site and the reason for excluding infiltration as a means of draining the proposed development.

[redacted]

Geological Site Conditions

The site investigations show that the site is underlain primarily by Sandy Clay overlain in places with pockets of River Terrace Deposits (sand and gravel). This indicates that the infiltration potential across the site is likely to be generally poor but it may be that some areas within the site, associated with the superficial deposits, that indicated infiltration would be possible.

Site Investigation

Various site investigations, including groundwater monitoring and soakage testing, at the proposed development has been undertaken, from 2018 to 2024, to inform the design of the development and the surface water drainage design. The testing locations were chosen to give a good spread of across the site but with a specific focus on obtaining groundwater levels and infiltration rates in the vicinity of the proposed SuDS features. The findings of the site investigations undertaken are shown on enclosed Drg No. 2205773-SK003.

The site investigation showed variable groundwater levels and infiltration rates across the site but notably high groundwater or poor infiltration rates at the locations of the proposed strategic SuDS basins (based on the approved outline drainage strategy). The variable levels and rates are characteristic of the underlying geology with good infiltration rates being associated with the pockets of sand and gravel within the site.

It is our professional opinion that the site investigation undertaken at the site does not support the use of infiltration for any parts of the site. Infiltration into small pockets of sand and gravel would be at high risk of causing localised groundwater issues when the soakage capacity of these pockets is exceeded. Given that the geological characteristics of the site are broadly consistent then it is prudent to consider the worst-case infiltration rates and groundwater levels to inform the drainage principles at the site, in order to ensure that risk of groundwater flooding does not increase within the site or elsewhere.

Notwithstanding the above, the worst-case groundwater readings taken at the locations of the SuDS features will be used to inform the design of these features (i.e. lining and flotation design).

Proposed Drainage Strategy

On the basis of the above, the proposed drainage strategy for the site has been designed to discharge all flows to the surrounding watercourse network (i.e. the second option of the drainage hierarchy within the Planning Practice Guidance). The proposed discharge rates have been limited to less than the Qbar rates (i.e. greenfield runoff rates) based on the proposed impermeable areas as a conservative measure. This demonstrates that the proposed drainage strategy will result in a reduction in discharge rates, relative to the existing site conditions.

2. The high groundwater levels will also need to be considered in detailed design of attenuation structures. 1m buffer (finished level and water level)

Ardent CE Response
Please refer to response to Point 1. The detailed design will give consideration to the groundwater level and SuDS features will be appropriately lined where required and flotation calculation will be provided as required.

3. Qbar rate is 2.42 l/s/ha. Currently discharging over greenfield runoff rate, flood risk could increase elsewhere. Rates must only account for impermeable areas which will drain off-site.

Ardent CE Response
The discharge rates were calculated based on the developable areas of the site which is appropriate for this type of development. However, the discharge rate from the northern part of the site will be reduced due to the existing

outfall pipe size meaning the discharge rate will be below existing greenfield rates (circa 13l/s).

We will update our drawings to the new extents of the basin.

4. Northern pond section is shown to be discharging c20l/s above Qbar at 70l/s? This infers potential flood risk. This must be reduced to actual Qbar.

Ardent CE Response
Please refer to response to Point 3.

5. Details of any additional attenuation features required within parcels should seek to act as source control where feasible.

Ardent CE Response
The design submitted in accordance with the outline site-wide strategy. There is minimal space within developable areas to provide attenuation features, however rainwater butts are proposed to be included within every residential property. As a conservative measure, the rainwater butts have not been accounted for within the attenuation provision for the drainage strategy or the hydraulic calculations. These will therefore provide additional storage over and above the requirements of the site. Rainwater butts would be owned and maintained by individual property owners. The drainage drawings will be updated to show the proposed rainwater butts.

6. Calculations showing 50% AEP rainfall event have shown no surcharge in the drainage network, also the 3.33% AEP rainfall event plus climate change does not flood outside the drainage network. These will require updating as necessary. Any areas which are shown to hold water should be clearly shown on plans.

Ardent CE Response
Please find enclosed Causeway Flow calculations for the 50% and 3.33% AEP events showing no surcharge and no flooding respectively for the northern part of the site. Similar calculations will be provided for the southern part of the site. As discussed at the meeting, and as part of the pre-app, these calculations use Cv values of 0.84 and 0.75 for winter and summer respectively. Calculations for the 100 yr + CC design event with a Cv value of 1 have been run as a sensitivity test and provided as part of the submission.

7. Easements 3m from the top of the bank on both sides of any watercourses and the basins are required for maintenance access. Off road parking for maintenance vehicles is also required. Updated plans should reflect these requirements and be sufficiently and clearly annotated.

Ardent CE Response
This is provided as annotated on applicable plans as hashed lines around each drainage feature - we will ensure this is made clearer by adding a note(s) to the plan. Parking for maintenance vehicles is available within the maintenance strip which is more practical for access and vegetation removal.

8. There is potential for the development to be phased, therefore we suggest consideration is given to the requirement of a SuDS implementation plan to reflect how areas may drain independently in advance of further phases coming forward.

Ardent CE Response
The SuDS basins will be constructed at the outset of the construction phase to manage runoff from the development. Due to the relatively low discharge rates, staged phasing of the discharge rate is not considered to be necessary. However, initially an orifice plate with a rate of 50% of the proposed discharge rate will be installed in prior to final outfall and this will be upgraded to a hydrobrake with the final discharge rate on completion of 50% of the development.

[redacted]

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We trust the above is satisfactory and we look forward to hearing back from you.

Yours sincerely,

[redacted]

Charlie Cooper
Associate Director

Encl Letter - Ford Airfield Pre-app Meeting 2 comments – 19th July 2024
Causeway Flow calculations for Northern part of the development
Ardent Drg No. 2205773-SK03 Site Investigation Findings

[redacted]

Ground Floor
Northleigh
County Hall
Chichester
West Sussex
PO19 1RH

Lead Local Flood Authority

Gardiner Hanson
Tor and Co

Date 19th July 2024

Dear Gardiner,

RE: **Ford Airfield Pre-app Meeting 2 comments**

Thank you for using the Flood Risk Management pre-application advise service. Following the second meeting and a review of the documents we have the following comments to make:

1. In the outline planning application, the Qbar rate was calculated to be 1.14 l/s/ha. The proposed discharge rates do not match Qbar. It is noted this is a very low rate, however if discharging at over greenfield runoff rate, flood risk could increase elsewhere, which is against policy.

2. As stated on previous pre-app comments, a Cv value of 1 must be used for summer and winter events. The rainfall being used isn't consistent currently. FEH 2022 rainfall is required (we are aware some software has issues with FEH 2022).

3. The amount of groundwater monitoring and infiltration testing is satisfactory for this site and demonstrates high groundwater levels and limited infiltration potential. The high groundwater levels will need to be considered in detailed design of the basins.

4. Calculations to show 50% AEP rainfall event does not surcharge in the drainage network and 3.33% AEP rainfall event plus climate change does not flood outside the drainage network which is designed to hold water.

5. Calculations for surcharged outfall to watercourses are required. This surcharge level must be the 1% AEP flood event of the receiving watercourse if known or bank full if not already hydraulically modelled.

6. Basins should be designed using Ciria SuDS Manual. 1.8m is too deep for safety reasons. Fencing should be avoided as much as possible to enhance multifunctional benefits of SuDS.

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7. While I have reviewed the phasing plan, a phasing plan for the delivery of the drainage basins is required. We need to ensure the site is only discharging for the impermeable area that has been built. This will involve changing flow controls through the construction of the development but is essential to not increase flood risk elsewhere.

8. Evidence of third party agreement for discharge into their land/system is required for the outfalls outside the red line boundary (these don't need to be submitted when the application is submitted, we just need to see them so that there is not issues later on).

9. Easements 3m from top of bank of both sides of watercourses and the basins is required for maintenance access. Off road parking for maintenance vehicles is required.

10. Water quality-is assessment of water quality being submitted as part of later applications?

11. As mentioned previously, open source, above ground SuDS should be prioritised in the design of the development, instead of reliance on underground pipes and end of pipe design, as source control means water is dealt with where it falls. Although swales are included in the indicative drainage layout, it is unclear how these will connect to the wider drainage system. Once the layout is set it is very difficult to make any changes to the drainage layout, therefore we require more detail on where source control SuDS will be used.

12. Urban creep-it is unclear whether 10% urban creep has been included in the volume of SuDS storage required.

13. Cross sections and long sections of the network and structures such as basins and swales will need to be submitted.

For the adoption queries, if it's draining the highway it will need to be in accordance with highways adoption standards Adoptable Highway Drainage and Sustainable Drainage Systems: Guidance for Developers (westsussex.gov.uk) (Lee Moses can cover this in more detail as it's not within our remit of work). We are still awaiting confirmation of Schedule 3 of Flood and Water Management Act, therefore currently do not adopt SuDS which drain anything other than the highway.

Yours sincerely,

Eleanor Read
Flood Risk Management Team
[redacted]

Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	100	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.600
CV	0.750	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	x
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
Spur 15	0.400	5.00	7.173		499164.586	103023.093	2.508
118	0.032	5.00	7.541	1800	499188.752	103024.235	2.975
117	0.032	5.00	7.315	1800	499187.599	103047.409	2.977
Spur 14	0.200	5.00	7.087		499165.533	103045.387	2.107
Spur 13	1.333	5.00	7.117		499193.793	103066.286	3.223
116	0.032	5.00	7.342	1350	499183.155	103058.841	3.475
Spur 12	0.680	5.00	7.284	1500	499174.824	103128.322	2.094
115	0.032	5.00	7.755	1500	499146.892	103107.110	3.991
114	0.032	5.00	8.139		499121.420	103136.922	4.438
Spur 10	0.070	5.00	7.500	1200	499036.026	103232.241	2.210
112	0.092	5.00	7.435	1350	499025.262	103224.277	2.449
111	0.032	5.00	7.769	1500	499066.916	103165.138	3.041
110	0.032	5.00	7.946	1500	499078.887	103155.603	4.230
109	0.032	5.00	8.278	2400	499105.673	103145.808	4.610
108	0.154	5.00	7.716		499120.090	103184.372	4.117
Dummy 3	0.358	5.00	7.634	1350	499093.327	103251.235	1.825
107			7.599	1650	499132.076	103198.867	4.031
106	0.154	5.00	7.432		499187.378	103239.787	3.979
105	0.153	5.00	7.079	1650	499200.526	103258.248	3.914
104			7.104		499204.642	103275.264	3.968
103			7.115		499201.237	103294.206	4.011
Spur 9	0.870	5.00	7.206		499179.282	103319.213	2.976
125			7.152	1650	499190.712	103324.270	4.101
102			7.101		499174.819	103369.669	4.130
101			7.134	1650	499153.806	103402.537	4.301
100			7.112		499127.380	103481.093	4.417
71			7.000	1650	499126.658	103497.388	4.332
Spur Optional		5.00	7.251		498968.816	103274.239	2.841
Spur 8	0.140	5.00	7.586		498993.572	103285.027	1.816
97	0.032	5.00	7.597	1500	498982.590	103284.136	3.465
96	0.032	5.00	7.552	1500	498969.293	103304.802	3.463
95	0.032	5.00	7.624	1500	498953.136	103341.169	3.604
Spur 6	2.880	5.00	7.245		498894.169	103388.913	3.268
28			7.622	1350	498921.794	103398.593	4.294
27	0.032	5.00	7.906	1350	498935.528	103402.365	4.603
26			7.844		498946.292	103405.352	4.559
25			7.691		498972.385	103412.939	4.451
Spur 7	1.170	5.00	7.658		499009.327	103417.714	3.138
24			7.719	1350	499006.799	103424.533	4.540
23			7.524	1350	499027.499	103433.612	4.383
Spur 44	0.185	5.00	7.546		499010.106	103455.721	1.976
Spur 16	0.785	5.00	7.312		499017.003	103466.949	2.847
22			7.353	1350	499019.683	103458.627	4.255
21			7.112	1650	499041.587	103466.614	4.297
Spur 45		5.00	7.086		499074.236	103484.375	1.736
20			7.041	1650	499075.573	103481.414	4.294
Spur 17	1.400	5.00	7.040		499122.909	103508.072	3.725
19			6.916	2550	499125.128	103502.995	4.259
Spur 18	0.200	5.00	6.733		499193.225	103543.287	1.858

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Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
18			6.758	1650	499196.872	103534.239	4.231
Spur 19	0.130	5.00	6.376		499243.526	103560.773	1.826
17			6.477	1650	499251.889	103558.198	4.040
16			6.169	1650	499267.304	103569.464	3.773
15			6.000	1650	499285.719	103565.600	3.632
14			6.500	1650	499294.729	103600.037	4.197
13			6.500	1650	499343.505	103598.872	4.278
12			6.500	2550	499352.070	103579.988	4.913
11			6.500	1200	499338.247	103550.897	2.211
10			6.587	1200	499336.790	103510.925	2.365
9			6.000		499349.716	103509.298	1.800
Spur 5	0.220	5.00	7.826		498910.933	103428.634	3.336
64	0.032	5.00	8.234	1500	498927.366	103433.036	4.039
Spur 4	0.500	5.00	8.104		498900.916	103492.081	3.934
63	0.032	5.00	8.089	1500	498913.184	103494.634	4.196
62	0.032	5.00	8.057	1500	498908.282	103545.488	4.268
Spur 3	0.500	5.00	7.036		498889.808	103598.946	2.866
61	0.032	5.00	7.397	1800	498907.572	103598.514	4.091
60	0.032	5.00	7.299	1800	498913.758	103660.138	4.096
Spur 1	0.700	5.00	7.133		498908.537	103846.451	3.203
66	0.032	5.00	7.987	1500	498938.961	103841.660	4.377
65	0.032	5.00	7.725	1500	498933.257	103793.220	4.199
Spur 2	0.750	5.00	7.139		498891.533	103725.473	3.189
59	0.032	5.00	7.560	1200	498926.114	103719.980	4.610
Spur 43	0.220	5.00	7.116		498948.935	103749.182	2.266
58	0.026	5.00	7.120	1200	498943.987	103716.688	4.200
Spur 24	0.090	5.00	7.221		498959.039	103705.067	3.377
J58			7.248	1200	498960.608	103713.649	4.356
Spur 42	0.220	5.00	7.296		499001.728	103719.893	2.366
Spur 20	0.240	5.00	7.286		498996.776	103697.869	2.446
57	0.026	5.00	7.306	1200	498999.573	103706.526	4.480
Spur 41	0.130	5.00	7.164		499051.249	103703.706	2.314
56	0.026	5.00	7.267	1200	499046.438	103691.389	4.523
Spur 25	0.130	5.00	7.297		499055.732	103678.368	3.629
J56			7.281	1200	499059.056	103685.542	4.560
Spur 21	0.290	5.00	7.233		499094.722	103655.229	2.713
55	0.026	5.00	7.297	1200	499100.331	103666.418	4.652
Spur 40	0.084	5.00	7.124		499134.834	103667.231	3.398
J55			7.047	1200	499128.537	103653.491	4.447
Spur 26	0.080	5.00	6.926		499132.608	103640.948	1.956
54	0.026	5.00	6.980	1200	499136.771	103649.717	4.394
Spur 22	0.240	5.00	6.282		499183.432	103614.977	1.842
53	0.026	5.00	6.234	1200	499187.411	103625.677	3.741
Spur 23	0.270	5.00	5.827		499234.287	103612.717	1.857
52	0.026	5.00	6.082	1200	499202.428	103621.401	3.615
51			6.121	1200	499214.996	103663.067	3.727
S278 Storage		5.00	6.275		498944.914	103902.661	2.241
S278 S6	0.230	5.00	6.835	1200	498943.518	103896.688	2.920
S278 S7			6.632	1200	498943.736	103885.262	2.784
S278 S8	0.032	5.00	7.512	1200	498942.580	103857.365	3.829
50	0.032	5.00	7.958	1200	498941.003	103834.844	4.557
Spur 35	0.073	5.00	7.276		498958.160	103821.285	1.826
Spur 27	0.200	5.00	7.089		498958.467	103842.641	2.649
49	0.020	5.00	7.249	1500	498959.687	103832.016	4.123
48	0.020	5.00	7.125	1500	498986.755	103827.919	4.067
Spur 36	0.200	5.00	6.961		499032.631	103805.011	2.081
Spur 28	0.250	5.00	6.997		499038.491	103820.252	2.037
47	0.020	5.00	6.968	1800	499036.213	103812.440	4.190
Spur 29	0.080	5.00	6.964		499072.717	103807.019	1.714

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Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
Spur 37	0.053	5.00	6.965		499064.291	103790.266	1.715
46	0.020	5.00	6.971	1800	499067.863	103797.176	4.281
Spur 38	0.150	5.00	7.072		499081.533	103778.710	2.152
45	0.020	5.00	7.094	1800	499086.445	103787.304	4.447
Spur 30	0.330	5.00	7.156		499100.526	103788.106	2.286
44	0.020	5.00	7.147	1800	499097.272	103781.925	4.525
Spur 31	0.070	5.00	7.097		499131.319	103765.768	1.847
43	0.020	5.00	7.124	1800	499126.809	103760.369	4.565
Spur 32	0.390	5.00	7.028		499160.591	103744.016	2.608
42	0.020	5.00	7.040	1800	499154.758	103737.580	4.543
Spur 39	0.250	5.00	7.033		499157.847	103725.251	2.003
41	0.020	5.00	7.013	1800	499162.698	103730.384	4.534
40	0.020	5.00	6.676	1800	499192.740	103705.167	4.262
Spur 33	0.360	5.00	6.502		499211.270	103699.873	2.392
39			6.493	1800	499208.109	103694.685	4.110
38			6.252	2250	499222.731	103685.776	3.898
37			5.828		499242.291	103680.152	3.508
36			4.915		499273.246	103674.875	2.647
Spur 34	0.270	5.00	4.740		499297.248	103683.454	1.624
35			4.609	1500	499297.060	103673.594	2.381
34			5.686	1500	499295.033	103608.199	3.567
33			5.362	1500	499330.361	103607.573	3.302
32			3.800	1500	499358.186	103685.419	1.878
31			3.800		499367.266	103695.131	1.900
8		5.00	6.000		499358.712	103556.598	1.900
7			6.000	2550	499361.760	103577.090	4.430
6			3.800	1350	499382.829	103647.539	1.860
5			3.800		499386.956	103659.733	1.900
4		5.00	3.800		499438.229	103757.672	2.100
3			3.800	1800	499432.495	103768.320	2.120
2			3.446	1200	499409.929	103808.231	2.036
Ex Outfall			2.140	1200	499411.839	103817.234	0.840
Ex Ditch			2.300		499412.938	103825.150	1.047
126			7.269		499029.034	103461.147	4.181
127			7.991		499131.310	103127.150	4.252

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Detailed	Additional Storage (m³/ha)	35.0
Summer CV	0.750	Skip Steady State	x	Check Discharge Rate(s)	x
Winter CV	0.840	Drain Down Time (mins)	240	Check Discharge Volume	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 %)	Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
2	0	0	0	100	45	0	0
30	0	0	0				

Node 3 Online Hydro-Brake® Control

Flap Valve	✓	Objective	(HE) Minimise upstream storage
Downstream Link	51.001	Sump Available	✓
Replaces Downstream Link	✓	Product Number	CTL-SHE-0154-1330-1820-1330
Invert Level (m)	1.680	Min Outlet Diameter (m)	0.225
Design Depth (m)	1.820	Min Node Diameter (mm)	1500
Design Flow (l/s)	13.3		

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Node 7 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Downstream Link	49.001	Sump Available	✓
Replaces Downstream Link	✓	Product Number	CTL-SHE-0129-1330-3830-1330
Invert Level (m)	2.170	Min Outlet Diameter (m)	0.150
Design Depth (m)	3.830	Min Node Diameter (mm)	1500
Design Flow (l/s)	13.3		

Node S278 S7 Online Hydro-Brake® Control

Flap Valve	✓	Objective	(HE) Minimise upstream storage
Downstream Link	35.002	Sump Available	✓
Replaces Downstream Link	✓	Product Number	CTL-SHE-0094-4000-1037-4000
Invert Level (m)	3.848	Min Outlet Diameter (m)	0.150
Design Depth (m)	1.037	Min Node Diameter (mm)	1200
Design Flow (l/s)	4.0		

Node 4 Flow through Pond Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Main Channel Length (m)	104.045
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	1.700	Main Channel Slope (1:X)	500.0
Safety Factor	2.0	Time to half empty (mins)		Main Channel n	0.030

Inlets

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Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	615.7	0.0	0.300	6490.6	0.0	1.300	8081.0	0.0	2.100	9337.0	0.0
0.299	620.0	0.0	0.800	7312.0	0.0	1.800	8865.3	0.0			

Node 8 Flow through Pond Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Main Channel Length (m)	63.936
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	4.100	Main Channel Slope (1:X)	500.0
Safety Factor	2.0	Time to half empty (mins)		Main Channel n	0.035

Inlets

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Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	346.7	0.0	0.099	346.7	0.0	0.100	5421.2	0.0	1.900	8141.3	0.0

Node S278 Storage Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	4.034
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	182.0	0.0	0.800	182.0	0.0	0.801	0.0	0.0

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Results for 2 year Critical Storm Duration. Lowest mass balance: 89.74%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	Spur 15	10	4.866	0.201	59.3	1.1215	0.0000	OK
15 minute winter	118	11	4.724	0.158	62.9	0.4602	0.0000	OK
15 minute winter	117	11	4.512	0.174	67.4	0.5070	0.0000	OK
15 minute winter	Spur 14	10	5.126	0.146	29.7	0.4848	0.0000	OK
10080 minute winter	Spur 13	7320	4.483	0.589	3.6	8.5266	0.0000	SURCHARGED
10080 minute winter	116	7320	4.483	0.616	5.5	1.0805	0.0000	OK
15 minute winter	Spur 12	10	5.334	0.144	100.8	1.8910	0.0000	OK
10080 minute winter	115	7320	4.483	0.719	7.1	1.4723	0.0000	OK
10080 minute winter	114	7320	4.483	0.782	7.0	0.1971	0.0000	OK
15 minute winter	Spur 10	10	5.371	0.081	10.4	0.1824	0.0000	OK
15 minute winter	112	11	5.100	0.114	23.8	0.3136	0.0000	OK
15 minute winter	111	11	4.848	0.120	26.3	0.2564	0.0000	OK
10080 minute winter	110	7320	4.483	0.767	1.8	1.5585	0.0000	OK
10080 minute winter	109	7320	4.483	0.815	7.8	3.8850	0.0000	OK
10080 minute winter	108	7320	4.483	0.884	8.1	1.1572	0.0000	OK
15 minute winter	Dummy 3	11	5.986	0.177	53.1	1.4711	0.0000	OK
10080 minute winter	107	7320	4.483	0.915	10.4	1.9563	0.0000	OK
10080 minute winter	106	7320	4.483	1.030	8.9	1.3956	0.0000	OK
10080 minute winter	105	7320	4.483	1.318	23.2	4.6207	0.0000	OK
10080 minute winter	104	7320	4.483	1.347	22.0	0.0000	0.0000	OK
10080 minute winter	103	7320	4.483	1.379	17.0	0.0000	0.0000	OK
15 minute winter	Spur 9	10	4.515	0.285	128.9	2.9152	0.0000	OK
10080 minute winter	125	7320	4.483	1.432	16.3	3.0615	0.0000	OK
10080 minute winter	102	7320	4.483	1.512	12.2	0.0000	0.0000	OK
10080 minute winter	101	7320	4.483	1.650	9.8	3.5278	0.0000	SURCHARGED
10080 minute winter	100	7320	4.483	1.788	29.0	0.0000	0.0000	SURCHARGED
10080 minute winter	71	7320	4.483	1.815	23.2	3.8806	0.0000	SURCHARGED
10080 minute winter	Spur Optional	7320	4.484	0.074	0.2	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	Spur 15	1.000	118	58.2	1.327	0.822	1.0580	
15 minute winter	118	1.001	117	62.9	1.015	0.086	1.4389	
15 minute winter	117	1.002	116	67.8	0.890	0.085	0.9362	
15 minute winter	Spur 14	2.000	116	28.8	1.089	0.723	0.5899	
10080 minute winter	Spur 13	3.000	116	3.6	0.368	0.016	2.8050	
10080 minute winter	116	1.003	115	5.2	0.282	0.002	42.4001	
15 minute winter	Spur 12	4.000	115	98.4	1.984	0.117	1.7445	
10080 minute winter	115	1.004	127	6.9	0.348	0.004	20.0277	
10080 minute winter	114	1.006_1	109	7.0	0.374	0.002	17.2276	
15 minute winter	Spur 10	6.000	112	10.2	0.817	0.255	0.1668	
15 minute winter	112	5.001	111	21.8	0.763	0.135	2.0887	
15 minute winter	111	5.002	110	26.0	0.773	0.110	0.5162	
10080 minute winter	110	6.003	109	1.4	0.063	0.000	26.8555	
10080 minute winter	109	1.006	108	7.7	0.376	0.002	42.3479	
10080 minute winter	108	1.007	107	9.5	0.381	0.003	20.7362	
15 minute winter	Dummy 3	6.000_1	107	50.0	0.950	0.314	3.4388	
10080 minute winter	107	1.008	106	8.5	0.447	0.002	89.8428	
10080 minute winter	106	1.009	105	22.8	0.783	0.003	34.1306	
10080 minute winter	105	1.010	104	22.0	0.376	0.006	32.2805	
10080 minute winter	104	1.011	103	17.0	0.380	0.004	36.2350	
10080 minute winter	103	1.012	125	10.0	0.353	0.003	61.5881	
15 minute winter	Spur 9	7.000	125	126.5	1.292	0.791	1.2227	
10080 minute winter	125	1.013	102	12.2	0.416	0.003	96.4406	
10080 minute winter	102	1.014	101	9.8	0.412	0.002	81.4225	
10080 minute winter	101	1.015	100	10.4	0.344	0.003	176.4882	
10080 minute winter	100	1.016	71	23.2	0.275	0.006	34.7454	
10080 minute winter	71	1.018	19	19.0	0.204	0.005	12.3806	
10080 minute winter	Spur Optional	9.000	97	-0.2	-0.010	-0.002	0.4045	

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Results for 2 year Critical Storm Duration. Lowest mass balance: 89.74%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	Spur 8	10	5.889	0.119	20.8	0.3201	0.0000	OK
10080 minute winter	97	7320	4.483	0.351	0.5	0.7331	0.0000	OK
10080 minute winter	96	7320	4.483	0.394	0.6	0.8232	0.0000	OK
10080 minute winter	95	7320	4.483	0.463	0.7	0.9624	0.0000	OK
10080 minute winter	Spur 6	7320	4.483	0.506	7.9	15.5966	0.0000	OK
10080 minute winter	28	7260	4.483	1.155	7.7	1.6531	0.0000	OK
10080 minute winter	27	7320	4.483	1.180	8.6	1.9769	0.0000	OK
10080 minute winter	26	7320	4.483	1.198	9.0	0.0000	0.0000	OK
10080 minute winter	25	7380	4.483	1.243	9.1	0.0000	0.0000	OK
15 minute winter	Spur 7	10	4.722	0.202	173.4	2.6321	0.0000	OK
10080 minute winter	24	7320	4.483	1.304	10.5	1.8663	0.0000	OK
10080 minute winter	23	7260	4.483	1.342	10.5	1.9206	0.0000	OK
15 minute winter	Spur 44	10	5.712	0.142	27.4	0.4645	0.0000	OK
15 minute winter	Spur 16	10	4.641	0.176	116.4	1.7002	0.0000	OK
10080 minute winter	22	7260	4.483	1.385	13.5	1.9820	0.0000	SURCHARGED
10080 minute winter	21	7260	4.483	1.668	13.5	3.5662	0.0000	SURCHARGED
15 minute summer	Spur 45	1	5.350	0.000	0.0	0.0000	0.0000	OK
10080 minute winter	20	7320	4.483	1.736	13.4	3.7116	0.0000	SURCHARGED
10080 minute winter	Spur 17	7320	4.483	1.168	37.5	15.3651	0.0000	SURCHARGED
10080 minute winter	19	7320	4.483	1.826	53.7	9.3257	0.0000	SURCHARGED
15 minute winter	Spur 18	10	5.024	0.149	29.7	0.5627	0.0000	OK
10080 minute winter	18	7380	4.483	1.956	25.8	4.1826	0.0000	SURCHARGED
15 minute winter	Spur 19	10	4.620	0.070	19.3	0.1735	0.0000	OK
10080 minute winter	17	7380	4.483	2.046	26.1	4.3753	0.0000	SURCHARGED
10080 minute winter	16	7380	4.483	2.087	26.1	4.4629	0.0000	SURCHARGED
10080 minute winter	15	7380	4.483	2.115	26.1	4.5227	0.0000	SURCHARGED
10080 minute winter	14	7380	4.483	2.180	26.1	4.6613	0.0000	SURCHARGED
10080 minute winter	13	7320	4.483	2.261	26.1	4.8342	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	Spur 8	10.000	97	20.4	0.992	0.513	0.2268	
10080 minute winter	97	8.001	96	0.5	0.186	0.002	4.5100	
10080 minute winter	96	8.002	95	0.6	0.232	0.002	8.5445	
10080 minute winter	95	8.003	27	0.7	0.102	0.001	16.4013	
10080 minute winter	Spur 6	10.000_1	28	7.7	0.497	0.015	9.7375	
10080 minute winter	28	10.001	27	7.8	0.341	0.003	18.6771	
10080 minute winter	27	8.004	26	9.0	0.371	0.004	14.8644	
10080 minute winter	26	9.005	25	9.1	0.374	0.004	36.8566	
10080 minute winter	25	8.006	24	7.4	0.328	0.003	50.5832	
15 minute winter	Spur 7	11.000	24	171.2	3.739	0.623	0.3326	
10080 minute winter	24	8.007	23	10.5	0.394	0.004	32.0530	
10080 minute winter	23	8.008	22	10.9	0.338	0.005	37.3517	
15 minute winter	Spur 44	12.000	22	26.9	1.055	0.675	0.2550	
15 minute winter	Spur 16	13.000	22	114.9	2.876	0.541	0.3494	
10080 minute winter	22	8.009	126	13.1	0.377	0.007	13.8107	
10080 minute winter	21	8.011	20	13.4	0.371	0.003	78.9611	
15 minute summer	Spur 45	14.000	20	0.0	0.000	0.000	0.0000	
10080 minute winter	20	8.012	19	12.8	0.269	0.003	115.1365	
10080 minute winter	Spur 17	15.000	19	-34.5	-0.312	-0.031	0.8779	
10080 minute winter	19	1.019	18	25.3	0.423	0.006	166.6912	
15 minute winter	Spur 18	16.000	18	29.1	1.076	0.727	0.2637	
10080 minute winter	18	1.020	17	25.8	0.400	0.007	127.8281	
15 minute winter	Spur 19	17.000	17	19.1	2.467	0.404	0.0679	
10080 minute winter	17	1.021	16	26.1	0.399	0.006	40.6716	
10080 minute winter	16	1.022	15	26.1	0.380	0.007	40.0815	
10080 minute winter	15	1.023_1	14	26.1	0.369	0.006	75.8260	
10080 minute winter	14	1.023	13	26.1	0.307	0.007	103.9317	
10080 minute winter	13	1.024	12	26.1	0.191	0.007	44.1715	

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Results for 2 year Critical Storm Duration. Lowest mass balance: 89.74%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
10080 minute winter	12	7320	4.483	2.296	26.1	11.7260	0.0000	SURCHARGED
10080 minute winter	11	7320	4.483	0.194	1.3	0.2194	0.0000	OK
10080 minute winter	10	7320	4.483	0.261	1.3	0.2951	0.0000	OK
10080 minute winter	9	7320	4.483	0.283	7.9	0.0000	0.0000	OK
15 minute winter	Spur 5	10	4.635	0.145	32.6	0.3351	0.0000	OK
15 minute winter	64	11	4.310	0.115	36.7	0.2343	0.0000	OK
15 minute winter	Spur 4	10	4.415	0.245	74.1	1.0892	0.0000	OK
15 minute winter	63	11	4.169	0.276	112.8	0.5609	0.0000	OK
15 minute winter	62	12	4.060	0.271	115.4	0.5495	0.0000	OK
15 minute winter	Spur 3	10	4.335	0.165	74.1	1.0060	0.0000	OK
15 minute winter	61	12	3.602	0.296	178.3	0.8347	0.0000	OK
15 minute winter	60	13	3.505	0.302	182.9	0.8514	0.0000	OK
15 minute winter	Spur 1	10	4.205	0.275	103.8	2.1051	0.0000	OK
15 minute winter	66	11	3.871	0.261	105.4	0.5274	0.0000	OK
15 minute winter	65	12	3.781	0.255	110.4	0.5190	0.0000	OK
15 minute winter	Spur 2	11	4.211	0.261	111.2	2.1483	0.0000	OK
15 minute winter	59	13	3.436	0.486	376.5	0.6671	0.0000	OK
15 minute winter	Spur 43	10	5.004	0.154	32.6	0.5221	0.0000	OK
15 minute winter	58	13	3.401	0.481	397.0	0.6484	0.0000	OK
15 minute winter	Spur 24	10	3.936	0.092	13.3	0.0860	0.0000	OK
15 minute winter	J58	13	3.363	0.471	400.3	0.5327	0.0000	OK
15 minute winter	Spur 42	10	5.089	0.159	32.6	0.5173	0.0000	OK
15 minute winter	Spur 20	10	5.011	0.171	35.6	0.5873	0.0000	OK
15 minute winter	57	13	3.316	0.490	446.3	0.6534	0.0000	OK
15 minute winter	Spur 41	10	4.963	0.113	19.3	0.2221	0.0000	OK
15 minute winter	56	14	3.264	0.520	453.5	0.6932	0.0000	OK
15 minute winter	Spur 25	10	3.783	0.115	19.3	0.1437	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
10080 minute winter	12	1.026_1	7	26.1	0.109	0.007	21.5447	
10080 minute winter	12	1.025	11	1.3	0.036	0.001	2.8575	
10080 minute winter	11	1.026	10	1.3	0.014	0.001	5.5262	
10080 minute winter	10	1.027	9	1.2	0.010	0.001	2.3070	
10080 minute winter	9	Flow through pond	8	-7.9	-0.006	0.000	1234.8524	
15 minute winter	Spur 5	19.000	64	32.0	0.983	0.451	0.5546	
15 minute winter	64	19.001	63	36.3	0.506	0.109	4.7278	
15 minute winter	Spur 4	20.000	63	72.8	1.268	1.021	0.7168	
15 minute winter	63	19.002	62	110.9	1.007	0.511	5.7058	
15 minute winter	62	19.003	61	111.8	1.126	0.515	5.2802	
15 minute winter	Spur 3	21.000	61	73.0	1.912	0.538	0.6780	
15 minute winter	61	19.004	60	179.2	1.002	0.222	11.3049	
15 minute winter	60	19.005	59	175.1	0.947	0.215	12.2799	
15 minute winter	Spur 1	22.000	66	100.9	1.274	0.913	2.4403	
15 minute winter	66	22.001	65	105.9	0.966	0.373	5.5373	
15 minute winter	65	22.002	59	103.6	1.048	0.366	7.3355	
15 minute winter	Spur 2	23.000	59	107.5	1.713	1.017	2.2491	
15 minute winter	59	19.006	58	365.5	0.957	0.302	7.0462	
15 minute winter	Spur 43	24.000	58	31.6	1.116	0.794	0.9313	
15 minute winter	58	19.007	J58	389.5	1.004	0.268	6.7366	
15 minute winter	Spur 24	25.000	J58	13.2	0.888	0.329	0.1294	
15 minute winter	J58	19.008	57	397.5	1.000	0.274	15.9857	
15 minute winter	Spur 42	26.000	57	31.9	1.100	0.801	0.3928	
15 minute winter	Spur 20	27.000	57	35.0	1.128	0.876	0.2816	
15 minute winter	57	19.009	56	439.0	1.043	0.302	21.1423	
15 minute winter	Spur 41	28.000	56	19.0	0.977	0.476	0.2567	
15 minute winter	56	19.010	J56	444.0	1.033	0.306	6.1244	
15 minute winter	Spur 25	29.000	J56	19.1	0.973	0.480	0.1551	

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Results for 2 year Critical Storm Duration. Lowest mass balance: 89.74%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	J56	14	3.228	0.507	455.8	0.5729	0.0000	OK
15 minute winter	Spur 21	10	4.719	0.199	43.0	0.7437	0.0000	OK
15 minute winter	55	14	3.182	0.537	474.7	0.7120	0.0000	OK
15 minute winter	Spur 40	10	3.821	0.095	12.5	0.0821	0.0000	OK
15 minute winter	J55	14	3.137	0.537	469.4	0.6073	0.0000	OK
15 minute winter	Spur 26	10	5.056	0.086	11.9	0.1233	0.0000	OK
15 minute winter	54	14	3.097	0.511	473.1	0.6832	0.0000	OK
15 minute winter	Spur 22	10	4.609	0.169	35.6	0.7721	0.0000	OK
15 minute winter	53	15	3.042	0.549	484.8	0.7547	0.0000	OK
15 minute winter	Spur 23	10	4.092	0.122	40.0	0.6220	0.0000	OK
15 minute winter	52	15	3.001	0.534	494.7	0.7392	0.0000	OK
15 minute winter	51	15	2.944	0.550	497.2	0.6225	0.0000	OK
120 minute winter	S278 Storage	90	4.112	0.078	8.4	13.4551	0.0000	OK
15 minute winter	S278 S6	10	4.179	0.264	34.1	1.0255	0.0000	SURCHARGED
15 minute winter	S278 S7	10	4.177	0.329	5.9	0.3721	0.0000	SURCHARGED
15 minute winter	S278 S8	10	3.748	0.065	8.7	0.0925	0.0000	OK
15 minute winter	50	10	3.481	0.080	13.3	0.1105	0.0000	OK
15 minute winter	Spur 35	10	5.537	0.087	10.8	0.1218	0.0000	OK
15 minute winter	Spur 27	10	4.590	0.150	29.7	0.3963	0.0000	OK
15 minute winter	49	11	3.306	0.180	56.0	0.3485	0.0000	OK
15 minute winter	48	11	3.236	0.178	58.3	0.3448	0.0000	OK
15 minute winter	Spur 36	10	5.030	0.150	29.7	0.5058	0.0000	OK
15 minute winter	Spur 28	10	5.137	0.177	37.1	0.7583	0.0000	OK
15 minute winter	47	12	3.054	0.276	123.7	0.7492	0.0000	OK
15 minute winter	Spur 29	10	5.343	0.093	11.9	0.1516	0.0000	OK
15 minute winter	Spur 37	10	5.322	0.072	7.9	0.0784	0.0000	OK
15 minute winter	46	12	3.039	0.349	141.4	0.9449	0.0000	OK
15 minute winter	Spur 38	10	5.044	0.124	22.2	0.3017	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	J56	19.011	55	444.5	1.018	0.306	20.4456	
15 minute winter	Spur 21	30.000	55	41.9	1.201	1.051	0.4357	
15 minute winter	55	19.012	J55	463.7	1.018	0.343	14.4727	
15 minute winter	Spur 40	31.000	J55	12.3	1.069	0.692	0.1737	
15 minute winter	J55	19.013	54	466.3	1.051	0.334	4.0936	
15 minute winter	Spur 26	32.000	54	11.7	0.863	0.293	0.1319	
15 minute winter	54	19.014	53	466.4	1.022	0.321	25.7120	
15 minute winter	Spur 22	33.000	53	34.7	1.131	0.868	0.3508	
15 minute winter	53	19.015	52	479.5	1.016	0.330	7.3725	
15 minute winter	Spur 23	34.000	52	39.0	1.808	0.554	0.7143	
15 minute winter	52	19.016	51	497.2	1.052	0.341	20.5763	
15 minute winter	51	19.017	38	499.8	1.059	0.344	11.4305	
120 minute winter	S278 Storage	35.000	S278 S6	-8.4	-0.806	-0.200	0.1017	
15 minute winter	S278 S6	35.001	S278 S7	5.9	0.521	0.149	0.4545	
15 minute winter	S278 S7	Hydro-Brake®	S278 S8	4.0				
15 minute winter	S278 S8	35.003	50	8.6	0.929	0.173	0.2094	
15 minute winter	50	35.004	49	13.2	0.901	0.146	0.2768	
15 minute winter	Spur 35	36.000	49	10.6	1.030	0.601	0.1120	
15 minute winter	Spur 27	37.000	49	29.2	1.073	0.733	0.2907	
15 minute winter	49	35.005	48	55.5	0.877	0.231	1.7754	
15 minute winter	48	35.006	47	56.9	0.972	0.236	3.0637	
15 minute winter	Spur 36	38.000	47	29.1	1.072	0.729	0.2240	
15 minute winter	Spur 28	39.000	47	36.3	1.141	0.913	0.2587	
15 minute winter	47	35.007	46	119.7	0.779	0.194	6.1085	
15 minute winter	Spur 29	40.000	46	11.7	1.050	0.661	0.1223	
15 minute winter	Spur 37	41.000	46	7.8	0.953	0.439	0.0637	
15 minute winter	46	35.008	45	133.5	0.671	0.240	4.4397	
15 minute winter	Spur 38	42.000	45	21.9	1.010	0.546	0.2141	

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Results for 2 year Critical Storm Duration. Lowest mass balance: 89.74%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	45	12	3.024	0.377	157.0	1.0179	0.0000	OK
15 minute winter	Spur 30	10	5.056	0.186	48.9	0.9421	0.0000	OK
15 minute winter	44	12	3.007	0.385	200.5	1.0401	0.0000	OK
15 minute winter	Spur 31	10	5.336	0.086	10.4	0.1144	0.0000	OK
15 minute winter	43	13	2.974	0.415	205.5	1.1193	0.0000	OK
15 minute winter	Spur 32	10	4.626	0.206	57.8	1.0796	0.0000	OK
15 minute winter	42	13	2.949	0.452	250.7	1.2204	0.0000	OK
15 minute winter	Spur 39	10	5.207	0.177	37.1	0.7716	0.0000	OK
15 minute winter	41	14	2.925	0.446	278.9	1.2042	0.0000	OK
15 minute winter	40	14	2.913	0.499	272.2	1.3517	0.0000	OK
15 minute winter	Spur 33	10	4.307	0.197	53.4	1.0374	0.0000	OK
15 minute winter	39	14	2.903	0.520	299.6	1.3237	0.0000	OK
15 minute winter	38	15	2.895	0.541	719.9	2.1511	0.0000	OK
15 minute winter	37	15	2.844	0.524	712.6	0.0000	0.0000	OK
15 minute winter	36	15	2.814	0.546	713.4	0.0000	0.0000	OK
15 minute winter	Spur 34	10	3.280	0.164	40.0	0.9568	0.0000	OK
15 minute winter	35	15	2.759	0.531	725.3	0.9391	0.0000	OK
10080 minute winter	34	7800	2.693	0.574	23.0	1.0137	0.0000	OK
10080 minute winter	33	7800	2.693	0.633	22.9	1.1179	0.0000	OK
10080 minute winter	32	7800	2.693	0.771	22.6	1.3618	0.0000	OK
10080 minute winter	31	7800	2.695	0.795	57.3	0.0000	0.0000	OK
10080 minute winter	8	7320	4.483	0.383	16.9	0.0000	0.0000	OK
10080 minute winter	7	7320	4.483	2.313	26.1	11.8128	0.0000	SURCHARGED
10080 minute winter	6	7800	2.694	0.754	9.6	1.0786	0.0000	SURCHARGED
10080 minute winter	5	7800	2.694	0.794	9.6	0.0000	0.0000	OK
10080 minute winter	4	7800	2.692	0.992	25.6	0.0000	0.0000	SURCHARGED
10080 minute winter	3	7800	2.692	1.012	13.3	2.5752	0.0000	SURCHARGED
10080 minute winter	2	7020	2.149	0.739	13.3	0.8358	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	45	35.009	44	153.5	0.709	0.275	2.7155	
15 minute winter	Spur 30	43.000	44	48.1	1.104	0.675	0.3046	
15 minute winter	44	35.010	43	194.7	0.869	0.382	8.7180	
15 minute winter	Spur 31	44.000	43	10.3	1.013	0.580	0.0714	
15 minute winter	43	35.011	42	200.4	0.770	0.393	9.5068	
15 minute winter	Spur 32	45.000	42	56.8	1.167	0.798	0.4228	
15 minute winter	42	35.012	41	245.7	0.949	0.488	2.9423	
15 minute winter	Spur 39	46.000	41	36.4	1.142	0.910	0.2247	
15 minute winter	41	35.013	40	269.9	0.924	0.335	13.2232	
15 minute winter	40	35.014	39	255.6	0.808	0.316	6.8867	
15 minute winter	Spur 33	47.000	39	52.6	1.136	0.741	0.2811	
15 minute winter	39	35.015	38	286.8	0.962	0.352	6.6525	
15 minute winter	38	19.018	37	712.6	1.379	0.304	10.6378	
15 minute winter	37	19.019	36	713.4	1.369	0.306	16.5083	
15 minute winter	36	19.020	35	711.9	1.347	0.303	12.6538	
15 minute winter	Spur 34	48.000	35	39.2	1.038	0.549	0.3724	
15 minute winter	35	19.021	34	718.3	1.299	0.233	36.8701	
10080 minute winter	34	19.022	33	22.9	0.301	0.007	23.4028	
10080 minute winter	33	19.023	32	22.6	0.282	0.007	66.8339	
10080 minute winter	32	19.024	31	25.9	0.359	0.008	12.3524	
10080 minute winter	31	Flow through pond	4	25.6	0.035	0.000	4261.1074	
10080 minute winter	8	18.000	7	-16.9	-0.162	-0.010	6.5843	
10080 minute winter	7	Hydro-Brake®	6	9.6				
10080 minute winter	6	49.002	5	9.6	0.515	0.086	1.4199	
10080 minute winter	5	Flow through pond	4	25.6	0.035	0.000	4261.1074	
10080 minute winter	4	51.000	3	13.3	0.131	0.035	4.3173	
10080 minute winter	3	Hydro-Brake®	2	13.3				
10080 minute winter	2	51.002	Ex Outfall	13.3	0.334	0.234	0.3660	

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Results for 2 year Critical Storm Duration. Lowest mass balance: 89.74%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
10080 minute winter	Ex Outfall	7020	2.140	0.840	13.3	0.9499	0.0000	FLOOD RISK
15 minute summer	Ex Ditch	1	2.133	0.880	0.5	0.0000	0.0000	OK
10080 minute winter	126	7260	4.483	1.395	13.1	0.0000	0.0000	SURCHARGED
10080 minute winter	127	7320	4.483	0.744	6.9	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
10080 minute winter	Ex Outfall	49.003	Ex Ditch	13.3	0.334	0.334	0.3179	5894.5
10080 minute winter	126	8.010	21	13.5	0.547	0.007	19.5247	
10080 minute winter	127	1.005	114	6.9	0.559	0.004	11.3321	

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Results for 30 year Critical Storm Duration. Lowest mass balance: 89.74%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	Spur 15	11	5.290	0.625	150.5	3.4886	0.0000	SURCHARGED
10080 minute winter	118	7920	4.960	0.394	1.8	1.1515	0.0000	OK
10080 minute winter	117	7920	4.960	0.622	4.5	1.8175	0.0000	OK
15 minute winter	Spur 14	11	5.530	0.550	75.3	1.8276	0.0000	SURCHARGED
10080 minute winter	Spur 13	7920	4.960	1.066	5.6	15.4346	0.0000	SURCHARGED
10080 minute winter	116	7920	4.960	1.093	12.9	1.9175	0.0000	OK
15 minute winter	Spur 12	10	5.432	0.242	255.9	3.1817	0.0000	OK
10080 minute winter	115	7920	4.960	1.196	21.8	2.4498	0.0000	OK
10080 minute winter	114	7920	4.960	1.259	24.3	0.3173	0.0000	OK
15 minute winter	Spur 10	10	5.433	0.143	26.3	0.3195	0.0000	OK
15 minute winter	112	11	5.177	0.191	60.4	0.5238	0.0000	OK
10080 minute winter	111	7980	4.960	0.232	0.8	0.4958	0.0000	OK
10080 minute winter	110	7920	4.960	1.244	4.1	2.5282	0.0000	OK
10080 minute winter	109	7920	4.960	1.292	31.4	6.1599	0.0000	OK
10080 minute winter	108	7920	4.960	1.361	44.9	1.7818	0.0000	OK
15 minute winter	Dummy 3	11	6.122	0.313	134.7	2.5979	0.0000	OK
10080 minute winter	107	7920	4.960	1.392	40.4	2.9766	0.0000	OK
10080 minute winter	106	7920	4.960	1.507	21.5	2.0423	0.0000	OK
10080 minute winter	105	7920	4.960	1.795	74.4	6.2940	0.0000	SURCHARGED
10080 minute winter	104	7920	4.960	1.824	30.5	0.0000	0.0000	SURCHARGED
10080 minute winter	103	7920	4.960	1.856	30.5	0.0000	0.0000	SURCHARGED
10080 minute winter	Spur 9	7920	4.960	0.730	9.4	7.4716	0.0000	SURCHARGED
10080 minute winter	125	7920	4.960	1.909	61.4	4.0819	0.0000	SURCHARGED
10080 minute winter	102	7920	4.960	1.989	39.3	0.0000	0.0000	SURCHARGED
10080 minute winter	101	7920	4.960	2.127	30.8	4.5480	0.0000	SURCHARGED
10080 minute winter	100	7920	4.960	2.265	29.9	0.0000	0.0000	SURCHARGED
10080 minute winter	71	7920	4.960	2.292	51.3	4.9007	0.0000	SURCHARGED
30 minute winter	Spur Optional	23	5.116	0.706	18.6	0.0000	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	Spur 15	1.000	118	145.3	2.078	2.053	1.6229	
10080 minute winter	118	1.001	117	3.2	0.441	0.004	6.0727	
10080 minute winter	117	1.002	116	4.1	0.435	0.005	5.8366	
15 minute winter	Spur 14	2.000	116	72.3	1.818	1.814	0.8693	
10080 minute winter	Spur 13	3.000	116	8.4	0.390	0.038	2.8050	
10080 minute winter	116	1.003	115	19.0	0.296	0.008	77.6784	
15 minute winter	Spur 12	4.000	115	251.4	2.523	0.298	3.5023	
10080 minute winter	115	1.004	127	19.9	0.361	0.011	34.1955	
10080 minute winter	114	1.006_1	109	25.2	0.386	0.008	28.8597	
15 minute winter	Spur 10	6.000	112	25.8	1.026	0.648	0.3373	
15 minute winter	112	5.001	111	58.0	0.997	0.359	4.2228	
10080 minute winter	111	5.002	110	1.0	0.333	0.004	1.5572	
10080 minute winter	110	6.003	109	8.6	0.063	0.003	45.2848	
10080 minute winter	109	1.006	108	44.3	0.393	0.014	67.7916	
10080 minute winter	108	1.007	107	38.2	0.391	0.012	31.8286	
15 minute winter	Dummy 3	6.000_1	107	129.2	1.235	0.812	6.8034	
10080 minute winter	107	1.008	106	20.9	0.459	0.005	136.2069	
10080 minute winter	106	1.009	105	41.9	0.786	0.006	47.2492	
10080 minute winter	105	1.010	104	-51.4	0.380	-0.013	37.2931	
10080 minute winter	104	1.011	103	30.5	0.385	0.008	40.9975	
10080 minute winter	103	1.012	125	51.6	0.356	0.013	67.8528	
10080 minute winter	Spur 9	7.000	125	22.7	0.443	0.142	1.9804	
10080 minute winter	125	1.013	102	39.3	0.415	0.010	102.4619	
10080 minute winter	102	1.014	101	30.8	0.411	0.005	83.1006	
10080 minute winter	101	1.015	100	29.9	0.339	0.008	176.5539	
10080 minute winter	100	1.016	71	51.3	0.272	0.013	34.7454	
10080 minute winter	71	1.018	19	35.8	0.202	0.008	12.3806	
30 minute winter	Spur Optional	9.000	97	-18.6	0.313	-0.167	1.8707	

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Results for 30 year Critical Storm Duration. Lowest mass balance: 89.74%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	Spur 8	10	6.031	0.261	52.7	0.7031	0.0000	SURCHARGED
60 minute summer	97	42	4.995	0.863	73.1	1.8038	0.0000	SURCHARGED
30 minute winter	96	23	5.025	0.936	165.9	1.9580	0.0000	SURCHARGED
10080 minute winter	95	7980	4.960	0.940	12.4	1.9539	0.0000	SURCHARGED
10080 minute winter	Spur 6	7920	4.960	0.983	12.2	30.3269	0.0000	SURCHARGED
10080 minute winter	28	7920	4.960	1.632	75.9	2.3357	0.0000	SURCHARGED
10080 minute winter	27	7920	4.960	1.657	63.0	2.7758	0.0000	SURCHARGED
10080 minute winter	26	7920	4.960	1.675	47.9	0.0000	0.0000	SURCHARGED
10080 minute winter	25	7920	4.960	1.720	34.4	0.0000	0.0000	SURCHARGED
15 minute winter	Spur 7	11	5.807	1.287	440.1	16.7901	0.0000	SURCHARGED
10080 minute winter	24	7920	4.960	1.781	32.9	2.5489	0.0000	SURCHARGED
10080 minute winter	23	7920	4.960	1.819	33.2	2.6033	0.0000	SURCHARGED
15 minute winter	Spur 44	10	5.935	0.365	69.6	1.1949	0.0000	SURCHARGED
15 minute winter	Spur 16	11	5.226	0.761	295.4	7.3422	0.0000	SURCHARGED
10080 minute winter	22	7920	4.960	1.862	35.3	2.6648	0.0000	SURCHARGED
10080 minute winter	21	7920	4.960	2.145	32.3	4.5865	0.0000	SURCHARGED
15 minute summer	Spur 45	1	5.350	0.000	0.0	0.0000	0.0000	OK
10080 minute winter	20	7920	4.960	2.213	32.1	4.7318	0.0000	SURCHARGED
10080 minute winter	Spur 17	7920	4.960	1.645	36.7	21.6410	0.0000	SURCHARGED
10080 minute winter	19	7920	4.960	2.303	101.4	11.7625	0.0000	SURCHARGED
15 minute winter	Spur 18	10	5.273	0.398	75.3	1.4998	0.0000	SURCHARGED
10080 minute winter	18	7920	4.960	2.433	46.6	5.2022	0.0000	SURCHARGED
10080 minute winter	Spur 19	7920	4.960	0.410	3.1	1.0221	0.0000	SURCHARGED
10080 minute winter	17	7920	4.960	2.523	48.7	5.3946	0.0000	SURCHARGED
10080 minute winter	16	7920	4.960	2.564	52.1	5.4823	0.0000	SURCHARGED
10080 minute winter	15	7920	4.960	2.592	55.2	5.5421	0.0000	SURCHARGED
10080 minute winter	14	7920	4.960	2.657	58.1	5.6811	0.0000	SURCHARGED
10080 minute winter	13	7920	4.960	2.738	60.1	5.8543	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	Spur 8	10.000	97	51.7	1.311	1.299	0.4152	
60 minute summer	97	8.001	96	96.5	0.685	0.338	6.9219	
30 minute winter	96	8.002	95	-160.3	1.098	-0.563	11.2093	
10080 minute winter	95	8.003	27	3.1	0.101	0.004	17.9369	
10080 minute winter	Spur 6	10.000_1	28	75.9	0.523	0.151	12.8832	
10080 minute winter	28	10.001	27	59.9	0.348	0.025	20.3104	
10080 minute winter	27	8.004	26	47.9	0.377	0.021	15.9297	
10080 minute winter	26	9.005	25	34.4	0.379	0.015	38.7499	
10080 minute winter	25	8.006	24	31.2	0.334	0.013	51.7849	
15 minute winter	Spur 7	11.000	24	404.6	5.746	1.472	0.5121	
10080 minute winter	24	8.007	23	33.2	0.397	0.014	32.2331	
10080 minute winter	23	8.008	22	33.2	0.340	0.014	37.3724	
15 minute winter	Spur 44	12.000	22	67.8	1.704	1.703	0.3909	
15 minute winter	Spur 16	13.000	22	282.2	4.009	1.329	0.6157	
10080 minute winter	22	8.009	126	32.3	0.378	0.018	13.8107	
10080 minute winter	21	8.011	20	32.1	0.368	0.008	78.9638	
15 minute summer	Spur 45	14.000	20	0.0	0.000	0.000	0.0000	
10080 minute winter	20	8.012	19	31.6	0.266	0.008	115.1365	
10080 minute winter	Spur 17	15.000	19	44.4	0.414	0.040	0.8779	
10080 minute winter	19	1.019	18	45.8	0.409	0.012	166.6912	
15 minute winter	Spur 18	16.000	18	73.2	1.840	1.831	0.3827	
10080 minute winter	18	1.020	17	45.5	0.397	0.012	127.8281	
10080 minute winter	Spur 19	17.000	17	3.5	0.812	0.074	0.1540	
10080 minute winter	17	1.021	16	52.1	0.400	0.012	40.6716	
10080 minute winter	16	1.022	15	55.2	0.389	0.015	40.0815	
10080 minute winter	15	1.023_1	14	58.1	0.395	0.014	75.8260	
10080 minute winter	14	1.023	13	60.1	0.307	0.015	103.9317	
10080 minute winter	13	1.024	12	60.7	0.194	0.015	44.1715	

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Results for 30 year Critical Storm Duration. Lowest mass balance: 89.74%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
10080 minute winter	12	7920	4.960	2.773	60.7	14.1627	0.0000	SURCHARGED
10080 minute winter	11	7920	4.960	0.671	18.5	0.7592	0.0000	OK
10080 minute winter	10	7980	4.960	0.738	12.9	0.8349	0.0000	OK
10080 minute winter	9	7920	4.960	0.760	180.8	0.0000	0.0000	OK
15 minute winter	Spur 5	10	4.763	0.273	82.8	0.6309	0.0000	OK
15 minute winter	64	12	4.465	0.270	93.3	0.5528	0.0000	OK
15 minute winter	Spur 4	11	4.847	0.677	188.1	3.0115	0.0000	SURCHARGED
15 minute winter	63	12	4.444	0.551	271.3	1.1214	0.0000	SURCHARGED
15 minute winter	62	12	4.281	0.492	271.7	0.9979	0.0000	OK
15 minute winter	Spur 3	11	4.752	0.582	188.1	3.5525	0.0000	SURCHARGED
15 minute winter	61	13	3.960	0.654	458.7	1.8428	0.0000	OK
15 minute winter	60	14	3.940	0.737	436.0	2.0781	0.0000	OK
15 minute winter	Spur 1	10	4.742	0.812	263.4	6.2082	0.0000	SURCHARGED
15 minute winter	66	11	4.083	0.473	265.8	0.9559	0.0000	OK
15 minute winter	65	12	3.982	0.456	275.5	0.9270	0.0000	OK
15 minute winter	Spur 2	11	5.832	1.882	282.2	15.4900	0.0000	SURCHARGED
15 minute winter	59	14	3.919	0.969	884.6	1.3318	0.0000	OK
15 minute winter	Spur 43	11	5.649	0.799	82.8	2.7136	0.0000	SURCHARGED
15 minute winter	58	14	3.892	0.972	911.3	1.3104	0.0000	OK
15 minute winter	Spur 24	10	4.010	0.166	33.9	0.1550	0.0000	OK
15 minute winter	J58	14	3.867	0.975	921.8	1.1029	0.0000	OK
15 minute winter	Spur 42	10	5.443	0.513	82.8	1.6690	0.0000	SURCHARGED
15 minute winter	Spur 20	10	5.331	0.491	90.3	1.6869	0.0000	SURCHARGED
15 minute winter	57	14	3.835	1.009	1046.5	1.3461	0.0000	OK
15 minute winter	Spur 41	10	5.092	0.242	48.9	0.4762	0.0000	SURCHARGED
15 minute winter	56	14	3.791	1.047	1046.9	1.3951	0.0000	OK
15 minute winter	Spur 25	10	3.902	0.234	48.9	0.2936	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
10080 minute winter	12	1.026_1	7	42.0	0.118	0.011	21.5447	
10080 minute winter	12	1.025	11	18.5	0.084	0.015	17.8734	
10080 minute winter	11	1.026	10	12.9	0.048	0.011	24.6178	
10080 minute winter	10	1.027	9	16.2	0.052	0.013	8.5834	
10080 minute winter	9	Flow through pond	8	-173.1	-0.007	-0.001	4153.2866	
15 minute winter	Spur 5	19.000	64	81.3	1.305	1.145	1.0499	
15 minute winter	64	19.001	63	85.1	0.609	0.254	10.3696	
15 minute winter	Spur 4	20.000	63	184.1	2.614	2.583	0.8824	
15 minute winter	63	19.002	62	260.4	1.246	1.198	10.8887	
15 minute winter	62	19.003	61	271.4	1.458	1.249	9.6718	
15 minute winter	Spur 3	21.000	61	181.5	2.578	1.338	1.2386	
15 minute winter	61	19.004	60	424.7	1.154	0.525	32.4149	
15 minute winter	60	19.005	59	372.2	0.837	0.457	35.5004	
15 minute winter	Spur 1	22.000	66	254.5	2.308	2.303	3.3461	
15 minute winter	66	22.001	65	264.2	1.184	0.931	11.3050	
15 minute winter	65	22.002	59	262.6	1.266	0.929	17.7097	
15 minute winter	Spur 2	23.000	59	248.7	3.532	2.354	2.4459	
15 minute winter	59	19.006	58	830.0	1.090	0.685	15.1459	
15 minute winter	Spur 43	24.000	58	77.6	1.952	1.949	1.2939	
15 minute winter	58	19.007	J58	894.4	1.120	0.616	15.4021	
15 minute winter	Spur 24	25.000	J58	33.6	1.113	0.839	0.2630	
15 minute winter	J58	19.008	57	892.2	1.080	0.615	36.6409	
15 minute winter	Spur 42	26.000	57	80.0	2.011	2.007	0.5331	
15 minute winter	Spur 20	27.000	57	87.9	2.210	2.202	0.3582	
15 minute winter	57	19.009	56	998.0	1.176	0.688	46.7538	
15 minute winter	Spur 41	28.000	56	47.9	1.234	1.204	0.4910	
15 minute winter	56	19.010	J56	995.9	1.159	0.686	13.3295	
15 minute winter	Spur 25	29.000	J56	48.5	1.260	1.220	0.2943	

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Results for 30 year Critical Storm Duration. Lowest mass balance: 89.74%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	J56	14	3.758	1.037	1035.4	1.1733	0.0000	OK
15 minute winter	Spur 21	11	5.266	0.746	109.1	2.7891	0.0000	SURCHARGED
15 minute winter	55	14	3.707	1.062	1084.9	1.4093	0.0000	OK
15 minute winter	Spur 40	10	4.213	0.487	31.6	0.4212	0.0000	SURCHARGED
15 minute winter	J55	14	3.657	1.057	1073.9	1.1952	0.0000	OK
15 minute winter	Spur 26	10	5.122	0.152	30.1	0.2169	0.0000	OK
15 minute winter	54	14	3.617	1.031	1088.8	1.3797	0.0000	OK
15 minute winter	Spur 22	11	4.971	0.531	90.3	2.4209	0.0000	SURCHARGED
15 minute winter	53	14	3.546	1.053	1144.7	1.4472	0.0000	OK
15 minute winter	Spur 23	11	4.654	0.684	101.6	3.4788	0.0000	SURCHARGED
15 minute winter	52	14	3.496	1.029	1226.0	1.4226	0.0000	OK
15 minute winter	51	14	3.410	1.016	1231.9	1.1493	0.0000	OK
120 minute winter	S278 Storage	116	4.339	0.305	24.0	52.7202	0.0000	SURCHARGED
15 minute winter	S278 S6	10	4.364	0.449	86.5	1.7443	0.0000	SURCHARGED
15 minute winter	S278 S7	10	4.362	0.514	11.0	0.5818	0.0000	SURCHARGED
15 minute winter	S278 S8	12	3.874	0.191	24.6	0.2720	0.0000	OK
15 minute winter	50	13	3.801	0.400	27.6	0.5509	0.0000	SURCHARGED
15 minute winter	Spur 35	10	5.763	0.313	27.5	0.4384	0.0000	SURCHARGED
15 minute winter	Spur 27	10	4.856	0.416	75.3	1.0997	0.0000	SURCHARGED
15 minute winter	49	12	3.911	0.785	135.3	1.5209	0.0000	SURCHARGED
15 minute winter	48	12	3.830	0.772	139.7	1.4971	0.0000	SURCHARGED
15 minute winter	Spur 36	10	5.261	0.381	75.3	1.2809	0.0000	SURCHARGED
15 minute winter	Spur 28	10	5.452	0.492	94.1	2.1118	0.0000	SURCHARGED
15 minute winter	47	12	3.740	0.962	294.2	2.6080	0.0000	SURCHARGED
15 minute winter	Spur 29	11	5.618	0.368	30.1	0.6006	0.0000	SURCHARGED
15 minute winter	Spur 37	10	5.412	0.162	19.9	0.1750	0.0000	SURCHARGED
15 minute winter	46	13	3.692	1.002	292.0	2.7134	0.0000	SURCHARGED
15 minute winter	Spur 38	10	5.199	0.279	56.4	0.6807	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	J56	19.011	55	991.1	1.129	0.683	43.7854	
15 minute winter	Spur 21	30.000	55	105.0	2.641	2.636	0.4928	
15 minute winter	55	19.012	J55	1052.4	1.149	0.778	30.0337	
15 minute winter	Spur 40	31.000	J55	30.4	1.729	1.715	0.2634	
15 minute winter	J55	19.013	54	1068.9	1.157	0.765	8.6875	
15 minute winter	Spur 26	32.000	54	29.7	1.082	0.742	0.2667	
15 minute winter	54	19.014	53	1095.4	1.160	0.755	53.7103	
15 minute winter	Spur 22	33.000	53	87.0	2.188	2.176	0.4494	
15 minute winter	53	19.015	52	1151.1	1.218	0.793	14.9480	
15 minute winter	Spur 23	34.000	52	90.8	2.283	1.289	1.3000	
15 minute winter	52	19.016	51	1231.9	1.302	0.846	41.1766	
15 minute winter	51	19.017	38	1240.5	1.335	0.854	22.2923	
120 minute winter	S278 Storage	35.000	S278 S6	-24.0	-0.943	-0.574	0.2440	
15 minute winter	S278 S6	35.001	S278 S7	11.0	0.701	0.277	0.4545	
15 minute winter	S278 S7	Hydro-Brake®	S278 S8	4.0				
15 minute winter	S278 S8	35.003	50	15.6	1.087	0.313	0.8543	
15 minute winter	50	35.004	49	39.0	0.999	0.432	1.3307	
15 minute winter	Spur 35	36.000	49	26.5	1.507	1.497	0.1883	
15 minute winter	Spur 27	37.000	49	73.8	1.856	1.856	0.4198	
15 minute winter	49	35.005	48	132.2	1.033	0.550	5.9141	
15 minute winter	48	35.006	47	125.6	0.994	0.520	11.1957	
15 minute winter	Spur 36	38.000	47	73.7	1.855	1.846	0.3237	
15 minute winter	Spur 28	39.000	47	91.0	2.287	2.285	0.3203	
15 minute winter	47	35.007	46	236.4	0.815	0.384	15.4650	
15 minute winter	Spur 29	40.000	46	29.0	1.646	1.638	0.1913	
15 minute winter	Spur 37	41.000	46	19.5	1.124	1.094	0.1306	
15 minute winter	46	35.008	45	279.1	0.686	0.502	9.2610	
15 minute winter	Spur 38	42.000	45	55.5	1.402	1.387	0.3773	

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Results for 30 year Critical Storm Duration. Lowest mass balance: 89.74%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	45	12	3.677	1.030	319.0	2.7839	0.0000	SURCHARGED
15 minute winter	Spur 30	10	5.245	0.375	124.2	1.8955	0.0000	SURCHARGED
15 minute winter	44	12	3.660	1.038	437.4	2.8026	0.0000	SURCHARGED
15 minute winter	Spur 31	10	5.504	0.254	26.3	0.3371	0.0000	SURCHARGED
15 minute winter	43	12	3.608	1.049	456.8	2.8303	0.0000	SURCHARGED
15 minute winter	Spur 32	10	4.876	0.456	146.7	2.3870	0.0000	SURCHARGED
15 minute winter	42	13	3.529	1.032	591.9	2.7848	0.0000	SURCHARGED
15 minute winter	Spur 39	10	5.497	0.467	94.1	2.0395	0.0000	SURCHARGED
15 minute winter	41	13	3.467	0.988	666.7	2.6671	0.0000	SURCHARGED
15 minute winter	40	13	3.410	0.996	656.3	2.6978	0.0000	SURCHARGED
15 minute winter	Spur 33	10	4.507	0.397	135.5	2.0896	0.0000	SURCHARGED
15 minute winter	39	13	3.375	0.992	755.1	2.5236	0.0000	SURCHARGED
15 minute winter	38	14	3.334	0.980	1877.8	3.8958	0.0000	OK
15 minute winter	37	14	3.276	0.956	1864.5	0.0000	0.0000	OK
15 minute winter	36	14	3.254	0.986	1856.6	0.0000	0.0000	OK
15 minute winter	Spur 34	10	3.440	0.324	101.6	1.8833	0.0000	SURCHARGED
15 minute winter	35	14	3.192	0.964	1877.7	1.7035	0.0000	OK
15 minute winter	34	15	3.095	0.976	1851.2	1.7246	0.0000	OK
10080 minute winter	33	9780	3.040	0.980	36.7	1.7317	0.0000	OK
10080 minute winter	32	9720	3.040	1.118	35.7	1.9754	0.0000	OK
10080 minute winter	31	9780	3.045	1.145	104.6	0.0000	0.0000	OK
10080 minute winter	8	7920	4.960	0.860	105.8	0.0000	0.0000	OK
10080 minute winter	7	7920	4.960	2.790	42.0	14.2495	0.0000	SURCHARGED
10080 minute winter	6	9780	3.040	1.100	9.7	1.5742	0.0000	SURCHARGED
10080 minute winter	5	9780	3.040	1.140	9.7	0.0000	0.0000	OK
10080 minute winter	4	9780	3.038	1.338	29.9	0.0000	0.0000	SURCHARGED
10080 minute winter	3	9780	3.038	1.358	13.3	3.4563	0.0000	SURCHARGED
2880 minute winter	2	1800	2.149	0.739	13.3	0.8358	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	45	35.009	44	333.0	0.757	0.596	5.3211	
15 minute winter	Spur 30	43.000	44	122.6	1.743	1.719	0.4767	
15 minute winter	44	35.010	43	430.5	0.978	0.844	16.0935	
15 minute winter	Spur 31	44.000	43	25.8	1.465	1.456	0.1220	
15 minute winter	43	35.011	42	465.1	1.057	0.913	15.8716	
15 minute winter	Spur 32	45.000	42	144.4	2.051	2.028	0.6023	
15 minute winter	42	35.012	41	581.1	1.320	1.154	4.7163	
15 minute winter	Spur 39	46.000	41	91.3	2.295	2.284	0.2781	
15 minute winter	41	35.013	40	650.4	1.055	0.806	24.8585	
15 minute winter	40	35.014	39	644.4	1.017	0.797	11.7901	
15 minute winter	Spur 33	47.000	39	133.7	1.899	1.884	0.4186	
15 minute winter	39	35.015	38	749.5	1.207	0.919	10.8515	
15 minute winter	38	19.018	37	1864.5	1.717	0.796	22.2836	
15 minute winter	37	19.019	36	1856.6	1.718	0.796	34.4984	
15 minute winter	36	19.020	35	1812.4	1.695	0.772	26.3126	
15 minute winter	Spur 34	48.000	35	99.5	1.442	1.395	0.6505	
15 minute winter	35	19.021	34	1851.2	1.611	0.601	78.3825	
15 minute winter	34	19.022	33	1803.7	1.602	0.585	42.2515	
10080 minute winter	33	19.023	32	35.7	0.294	0.012	108.5820	
10080 minute winter	32	19.024	31	55.5	0.380	0.018	18.9443	
10080 minute winter	31	Flow through pond	4	29.9	0.035	0.000	6930.8994	
10080 minute winter	8	18.000	7	-33.2	-0.249	-0.020	16.1796	
10080 minute winter	7	Hydro-Brake®	6	9.7				
10080 minute winter	6	49.002	5	9.7	0.538	0.087	1.4199	
10080 minute winter	5	Flow through pond	4	29.9	0.035	0.000	6930.8994	
10080 minute winter	4	51.000	3	13.3	0.177	0.035	4.3173	
10080 minute winter	3	Hydro-Brake®	2	13.3				
2880 minute winter	2	51.002	Ex Outfall	13.3	0.334	0.234	0.3660	

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Results for 30 year Critical Storm Duration. Lowest mass balance: 89.74%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
2880 minute winter	Ex Outfall	1800	2.140	0.840	13.3	0.9499	0.0000	FLOOD RISK
15 minute summer	Ex Ditch	1	2.133	0.880	8.3	0.0000	0.0000	OK
10080 minute winter	126	7920	4.960	1.872	32.3	0.0000	0.0000	SURCHARGED
10080 minute winter	127	7920	4.960	1.221	19.9	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
2880 minute winter	Ex Outfall	49.003	Ex Ditch	13.3	0.334	0.334	0.3179	1731.5
10080 minute winter	126	8.010	21	32.3	0.547	0.018	19.5247	
10080 minute winter	127	1.005	114	24.2	0.559	0.013	18.9461	

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Results for 100 year +65% CC Critical Storm Duration. Lowest mass balance: 89.74%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute summer	Spur 15	20	7.173	2.508	238.9	15.8571	0.0000	FLOOD RISK
30 minute winter	118	20	7.189	2.623	228.8	7.6613	0.0000	SURCHARGED
30 minute winter	117	20	7.192	2.854	244.8	8.3352	0.0000	FLOOD RISK
30 minute summer	Spur 14	21	7.087	2.107	119.5	8.1622	0.0000	FLOOD RISK
30 minute summer	Spur 13	20	7.117	3.223	796.4	48.8616	0.0000	FLOOD RISK
30 minute winter	116	20	7.172	3.305	1079.0	5.7967	0.0000	FLOOD RISK
30 minute winter	Spur 12	20	7.262	2.072	602.4	27.2099	0.0000	FLOOD RISK
30 minute winter	115	20	7.102	3.338	1445.7	6.8361	0.0000	SURCHARGED
30 minute winter	114	20	7.053	3.352	2201.1	0.8447	0.0000	SURCHARGED
30 minute winter	Spur 10	20	7.499	2.209	93.4	4.9486	0.0000	FLOOD RISK
30 minute winter	112	20	7.329	2.343	90.4	6.4343	0.0000	FLOOD RISK
30 minute winter	111	20	7.096	2.368	123.1	5.0548	0.0000	SURCHARGED
30 minute winter	110	20	7.038	3.322	2166.4	6.7503	0.0000	SURCHARGED
30 minute winter	109	20	7.036	3.368	2562.3	16.0554	0.0000	SURCHARGED
30 minute winter	108	20	7.011	3.412	2055.5	4.4667	0.0000	SURCHARGED
30 minute winter	Dummy 3	20	7.224	1.415	193.5	11.7367	0.0000	SURCHARGED
30 minute winter	107	20	6.986	3.418	1713.5	7.3087	0.0000	SURCHARGED
30 minute winter	106	20	6.890	3.437	1755.1	4.6568	0.0000	SURCHARGED
30 minute winter	105	21	6.865	3.700	3657.5	12.9735	0.0000	FLOOD RISK
30 minute winter	104	21	6.852	3.716	1830.4	0.0000	0.0000	FLOOD RISK
30 minute winter	103	21	6.846	3.742	1836.8	0.0000	0.0000	FLOOD RISK
30 minute winter	Spur 9	21	7.058	2.828	470.3	28.9341	0.0000	FLOOD RISK
30 minute winter	125	21	6.826	3.775	2204.5	8.0717	0.0000	SURCHARGED
30 minute winter	102	21	6.794	3.823	2224.9	0.0000	0.0000	SURCHARGED
30 minute winter	101	21	6.770	3.937	2232.3	8.4178	0.0000	SURCHARGED
30 minute winter	100	21	6.755	4.060	2241.8	0.0000	0.0000	SURCHARGED
30 minute winter	71	21	6.740	4.072	2239.3	8.7067	0.0000	FLOOD RISK
30 minute winter	Spur Optional	21	7.210	2.800	17.0	0.0000	0.0000	FLOOD RISK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute summer	Spur 15	1.000	118	229.2	3.255	3.239	1.7037	
30 minute winter	118	1.001	117	227.5	1.427	0.311	10.2121	
30 minute winter	117	1.002	116	242.4	1.183	0.303	7.7732	
30 minute summer	Spur 14	2.000	116	114.4	2.878	2.873	0.8818	
30 minute summer	Spur 13	3.000	116	784.8	3.633	3.574	2.8050	
30 minute winter	116	1.003	115	1060.6	1.166	0.446	86.0914	
30 minute winter	Spur 12	4.000	115	368.8	2.764	0.437	9.8793	
30 minute winter	115	1.004	127	1423.4	1.559	0.793	36.1988	
30 minute winter	114	1.006_1	109	1334.5	1.449	0.414	31.8313	
30 minute winter	Spur 10	6.000	112	-57.6	-1.448	-1.446	0.5325	
30 minute winter	112	5.001	111	94.1	1.105	0.582	11.4612	
30 minute winter	111	5.002	110	117.3	1.098	0.495	3.3062	
30 minute winter	110	6.003	109	-2041.7	-1.219	-0.659	50.2107	
30 minute winter	109	1.006	108	-2545.0	1.532	-0.824	72.4808	
30 minute winter	108	1.007	107	-1972.3	1.648	-0.644	33.1129	
30 minute winter	Dummy 3	6.000_1	107	219.9	1.394	1.381	10.3218	
30 minute winter	107	1.008	106	1694.9	1.815	0.428	146.5460	
30 minute winter	106	1.009	105	1755.9	1.959	0.232	48.2785	
30 minute winter	105	1.010	104	-2264.0	1.332	-0.575	37.2931	
30 minute winter	104	1.011	103	1836.8	1.255	0.465	40.9975	
30 minute winter	103	1.012	125	1844.9	1.114	0.467	67.8528	
30 minute winter	Spur 9	7.000	125	433.2	2.734	2.707	1.9804	
30 minute winter	125	1.013	102	2224.9	1.477	0.564	102.4619	
30 minute winter	102	1.014	101	2232.3	1.219	0.387	83.1006	
30 minute winter	101	1.015	100	2241.8	1.053	0.568	176.5539	
30 minute winter	100	1.016	71	2239.3	1.051	0.569	34.7454	
30 minute winter	71	1.018	19	2231.3	1.048	0.530	12.3806	
30 minute winter	Spur Optional	9.000	97	-17.0	-0.154	-0.153	1.8707	

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Results for 100 year +65% CC Critical Storm Duration. Lowest mass balance: 89.74%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute winter	Spur 8	21	7.250	1.480	75.7	3.9931	0.0000	SURCHARGED
30 minute winter	97	21	7.147	3.015	107.3	6.3015	0.0000	SURCHARGED
30 minute winter	96	21	7.146	3.057	128.0	6.3917	0.0000	SURCHARGED
30 minute winter	95	21	7.087	3.067	433.4	6.3741	0.0000	SURCHARGED
30 minute winter	Spur 6	21	7.245	3.268	1556.7	103.2363	0.0000	FLOOD RISK
30 minute winter	28	21	7.060	3.732	1483.5	5.3408	0.0000	SURCHARGED
30 minute winter	27	21	7.041	3.738	1560.9	6.2607	0.0000	SURCHARGED
30 minute winter	26	21	7.025	3.740	1492.4	0.0000	0.0000	SURCHARGED
30 minute winter	25	21	7.004	3.764	1453.2	0.0000	0.0000	SURCHARGED
15 minute summer	Spur 7	11	7.658	3.138	760.9	50.0856	0.0000	FLOOD RISK
30 minute winter	24	21	6.968	3.789	1925.6	5.4219	0.0000	SURCHARGED
30 minute winter	23	21	6.916	3.775	1912.1	5.4027	0.0000	SURCHARGED
30 minute winter	Spur 44	21	7.067	1.497	100.0	4.9051	0.0000	SURCHARGED
30 minute winter	Spur 16	20	7.312	2.847	424.3	31.2015	0.0000	FLOOD RISK
30 minute winter	22	21	6.864	3.766	2313.1	5.3885	0.0000	SURCHARGED
30 minute winter	21	21	6.792	3.977	2343.2	8.5027	0.0000	SURCHARGED
30 minute winter	Spur 45	21	6.751	1.401	20.9	0.0000	0.0000	SURCHARGED
30 minute winter	20	21	6.756	4.009	2385.6	8.5715	0.0000	FLOOD RISK
30 minute winter	Spur 17	21	7.009	3.694	756.8	48.5973	0.0000	FLOOD RISK
30 minute winter	19	21	6.711	4.054	4615.2	20.7044	0.0000	FLOOD RISK
30 minute winter	Spur 18	21	6.658	1.783	108.1	6.7176	0.0000	FLOOD RISK
30 minute winter	18	21	6.423	3.896	4667.9	8.3298	0.0000	SURCHARGED
15 minute winter	Spur 19	12	6.376	1.826	88.9	5.0532	0.0000	FLOOD RISK
30 minute winter	17	21	6.159	3.722	4709.2	7.9581	0.0000	SURCHARGED
30 minute winter	16	21	5.989	3.593	4708.0	7.6812	0.0000	FLOOD RISK
10080 minute winter	15	9600	5.974	3.606	79.9	7.7088	0.0000	FLOOD RISK
10080 minute winter	14	9600	5.974	3.671	79.9	7.8478	0.0000	SURCHARGED
10080 minute winter	13	9600	5.974	3.752	79.9	8.0209	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute winter	Spur 8	10.000	97	90.9	2.286	2.284	0.4382	
30 minute winter	97	8.001	96	88.2	0.802	0.308	6.9219	
30 minute winter	96	8.002	95	108.6	1.132	0.382	11.2093	
30 minute winter	95	8.003	27	-416.2	-1.478	-0.569	17.9369	
30 minute winter	Spur 6	10.000_1	28	1483.5	3.371	2.952	12.8832	
30 minute winter	28	10.001	27	1427.8	1.200	0.595	20.3104	
30 minute winter	27	8.004	26	1492.4	1.235	0.649	15.9297	
30 minute winter	26	9.005	25	1453.2	1.171	0.623	38.7499	
30 minute winter	25	8.006	24	1425.5	1.055	0.607	51.7849	
15 minute summer	Spur 7	11.000	24	632.1	8.978	2.299	0.5122	
30 minute winter	24	8.007	23	1912.1	1.397	0.814	32.2331	
30 minute winter	23	8.008	22	1913.7	1.402	0.825	37.3724	
30 minute winter	Spur 44	12.000	22	99.7	2.507	2.506	0.3980	
30 minute winter	Spur 16	13.000	22	355.6	5.050	1.674	0.6157	
30 minute winter	22	8.009	126	2328.2	1.854	1.267	13.8107	
30 minute winter	21	8.011	20	2385.6	1.197	0.575	78.9638	
30 minute winter	Spur 45	14.000	20	-20.9	-1.187	-1.168	0.0572	
30 minute winter	20	8.012	19	2409.2	1.131	0.610	115.1365	
30 minute winter	Spur 17	15.000	19	689.9	4.355	0.616	0.8779	
30 minute winter	19	1.019	18	4595.4	2.157	1.165	166.6912	
30 minute winter	Spur 18	16.000	18	109.6	2.756	2.742	0.3880	
30 minute winter	18	1.020	17	4662.5	2.189	1.244	127.8281	
15 minute winter	Spur 19	17.000	17	73.3	4.166	1.549	0.1540	
30 minute winter	17	1.021	16	4708.0	2.210	1.049	40.6716	
30 minute winter	16	1.022	15	4708.3	2.210	1.261	40.0815	
10080 minute winter	15	1.023_1	14	79.9	0.395	0.019	75.8260	
10080 minute winter	14	1.023	13	79.9	0.290	0.020	103.9317	
10080 minute winter	13	1.024	12	79.8	0.198	0.020	44.1715	

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Results for 100 year +65% CC Critical Storm Duration. Lowest mass balance: 89.74%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
10080 minute winter	12	9600	5.974	3.787	79.8	19.3382	0.0000	SURCHARGED
10080 minute winter	11	9600	5.974	1.685	27.5	1.9053	0.0000	SURCHARGED
10080 minute winter	10	9600	5.974	1.752	24.7	1.9811	0.0000	SURCHARGED
10080 minute winter	9	9600	5.974	1.774	182.8	0.0000	0.0000	OK
15 minute winter	Spur 5	13	7.811	3.321	150.3	7.6648	0.0000	FLOOD RISK
15 minute winter	64	13	7.672	3.477	155.0	7.1074	0.0000	SURCHARGED
15 minute winter	Spur 4	12	8.104	3.934	341.7	18.3668	0.0000	FLOOD RISK
15 minute winter	63	13	7.631	3.738	438.0	7.6037	0.0000	SURCHARGED
15 minute winter	62	13	7.314	3.525	399.3	7.1553	0.0000	SURCHARGED
15 minute summer	Spur 3	12	7.036	2.866	325.2	18.6588	0.0000	FLOOD RISK
15 minute winter	61	13	6.944	3.638	625.5	10.2518	0.0000	SURCHARGED
15 minute winter	60	13	6.872	3.669	619.5	10.3399	0.0000	SURCHARGED
15 minute summer	Spur 1	12	7.133	3.203	455.3	26.9748	0.0000	FLOOD RISK
15 minute winter	66	13	7.149	3.539	402.8	7.1602	0.0000	SURCHARGED
15 minute winter	65	13	7.007	3.481	400.0	7.0796	0.0000	SURCHARGED
15 minute summer	Spur 2	10	7.139	3.189	487.7	47.1598	0.0000	FLOOD RISK
15 minute winter	59	13	6.788	3.838	1312.3	5.2728	0.0000	SURCHARGED
15 minute summer	Spur 43	11	7.116	2.266	143.1	9.0962	0.0000	FLOOD RISK
15 minute winter	58	13	6.694	3.774	1423.0	5.0875	0.0000	SURCHARGED
15 minute winter	Spur 24	13	6.671	2.827	67.1	2.6380	0.0000	SURCHARGED
15 minute winter	J58	13	6.615	3.723	1462.4	4.2111	0.0000	SURCHARGED
15 minute winter	Spur 42	13	7.043	2.113	150.3	6.8755	0.0000	FLOOD RISK
15 minute winter	Spur 20	13	6.955	2.115	164.0	7.2620	0.0000	SURCHARGED
15 minute winter	57	13	6.495	3.669	1684.8	4.8946	0.0000	SURCHARGED
15 minute winter	Spur 41	13	6.498	1.648	88.9	3.2398	0.0000	SURCHARGED
15 minute winter	56	13	6.319	3.575	1746.6	4.7625	0.0000	SURCHARGED
15 minute winter	Spur 25	13	6.320	2.652	116.7	3.3252	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
10080 minute winter	12	1.026_1	7	55.9	0.111	0.014	21.5447	
10080 minute winter	12	1.025	11	27.5	0.116	0.023	27.7838	
10080 minute winter	11	1.026	10	24.7	0.060	0.020	34.5046	
10080 minute winter	10	1.027	9	24.7	0.063	0.020	11.2384	
10080 minute winter	9	Flow through pond	8	-173.3	-0.008	-0.001	11491.9893	
15 minute winter	Spur 5	19.000	64	133.1	1.890	1.876	1.1980	
15 minute winter	64	19.001	63	129.3	0.653	0.387	13.6554	
15 minute winter	Spur 4	20.000	63	286.9	4.074	4.025	0.8824	
15 minute winter	63	19.002	62	377.4	1.747	1.737	11.0371	
15 minute winter	62	19.003	61	364.0	1.685	1.675	11.4564	
15 minute summer	Spur 3	21.000	61	299.0	4.246	2.204	1.2513	
15 minute winter	61	19.004	60	602.4	1.225	0.745	39.2521	
15 minute winter	60	19.005	59	620.1	0.978	0.762	38.7261	
15 minute summer	Spur 1	22.000	66	388.3	3.521	3.514	3.3970	
15 minute winter	66	22.001	65	379.4	1.347	1.338	13.7388	
15 minute winter	65	22.002	59	349.3	1.355	1.235	20.7278	
15 minute summer	Spur 2	23.000	59	340.6	4.837	3.223	2.4657	
15 minute winter	59	19.006	58	1314.3	1.524	1.085	15.6776	
15 minute summer	Spur 43	24.000	58	119.8	3.013	3.009	1.3072	
15 minute winter	58	19.007	J58	1424.9	1.438	0.982	16.7461	
15 minute winter	Spur 24	25.000	J58	56.8	1.432	1.419	0.3470	
15 minute winter	J58	19.008	57	1464.1	1.477	1.009	39.2574	
15 minute winter	Spur 42	26.000	57	140.0	3.521	3.515	0.5385	
15 minute winter	Spur 20	27.000	57	155.0	3.897	3.881	0.3618	
15 minute winter	57	19.009	56	1675.1	1.690	1.154	48.8093	
15 minute winter	Spur 41	28.000	56	86.2	2.167	2.165	0.5259	
15 minute winter	56	19.010	J56	1742.5	1.758	1.200	13.7828	
15 minute winter	Spur 25	29.000	J56	81.9	2.059	2.060	0.3145	

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Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 89.74%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	J56	13	6.210	3.489	1796.2	3.9456	0.0000	SURCHARGED
15 minute winter	Spur 21	12	7.097	2.577	198.2	9.6404	0.0000	FLOOD RISK
15 minute winter	55	13	6.018	3.373	1943.1	4.4766	0.0000	SURCHARGED
15 minute winter	Spur 40	12	6.642	2.916	57.4	2.5224	0.0000	SURCHARGED
15 minute winter	J55	13	5.835	3.235	1981.1	3.6590	0.0000	SURCHARGED
15 minute winter	Spur 26	13	5.756	0.786	54.7	1.1246	0.0000	SURCHARGED
15 minute winter	54	13	5.707	3.121	2026.7	4.1760	0.0000	SURCHARGED
15 minute winter	Spur 22	13	6.017	1.577	164.0	7.1894	0.0000	FLOOD RISK
15 minute winter	53	13	5.429	2.936	2145.4	4.0345	0.0000	SURCHARGED
15 minute summer	Spur 23	11	5.827	1.857	175.6	14.1670	0.0000	FLOOD RISK
15 minute winter	52	13	5.257	2.790	2276.7	3.8581	0.0000	SURCHARGED
15 minute winter	51	13	4.956	2.562	2278.1	2.8971	0.0000	SURCHARGED
180 minute winter	S278 Storage	176	4.728	0.694	33.3	120.0357	0.0000	SURCHARGED
15 minute winter	S278 S6	11	4.883	0.968	157.1	3.7634	0.0000	SURCHARGED
15 minute winter	S278 S7	11	4.889	1.041	8.6	1.1772	0.0000	SURCHARGED
15 minute winter	S278 S8	13	6.064	2.381	24.2	3.3888	0.0000	SURCHARGED
15 minute winter	50	13	6.038	2.637	160.6	3.6306	0.0000	SURCHARGED
15 minute winter	Spur 35	12	6.592	1.142	49.9	1.5981	0.0000	SURCHARGED
15 minute winter	Spur 27	12	6.544	2.104	136.7	5.5599	0.0000	SURCHARGED
15 minute winter	49	13	6.021	2.895	185.2	5.6079	0.0000	SURCHARGED
15 minute winter	48	13	5.978	2.920	191.5	5.6617	0.0000	SURCHARGED
15 minute winter	Spur 36	12	6.264	1.384	136.7	4.6565	0.0000	SURCHARGED
15 minute winter	Spur 28	12	6.522	1.562	170.8	6.7124	0.0000	SURCHARGED
15 minute winter	47	13	5.895	3.117	455.7	8.4520	0.0000	SURCHARGED
15 minute winter	Spur 29	12	6.521	1.271	54.7	2.0765	0.0000	SURCHARGED
15 minute winter	Spur 37	13	6.006	0.756	36.2	0.8182	0.0000	SURCHARGED
15 minute winter	46	13	5.843	3.153	515.7	8.5396	0.0000	SURCHARGED
15 minute winter	Spur 38	13	5.981	1.061	102.6	2.5880	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	J56	19.011	55	1798.2	1.815	1.239	45.0839	
15 minute winter	Spur 21	30.000	55	165.5	4.161	4.152	0.4979	
15 minute winter	55	19.012	J55	1943.6	1.961	1.436	30.7500	
15 minute winter	Spur 40	31.000	J55	47.1	2.675	2.652	0.2661	
15 minute winter	J55	19.013	54	1983.0	2.001	1.419	8.9771	
15 minute winter	Spur 26	32.000	54	54.2	1.370	1.352	0.3861	
15 minute winter	54	19.014	53	2028.8	2.047	1.398	55.5565	
15 minute winter	Spur 22	33.000	53	148.4	3.733	3.711	0.4540	
15 minute winter	53	19.015	52	2146.7	2.166	1.479	15.4746	
15 minute summer	Spur 23	34.000	52	130.1	3.272	1.848	1.3133	
15 minute winter	52	19.016	51	2278.1	2.299	1.564	43.1315	
15 minute winter	51	19.017	38	2279.5	2.300	1.570	23.7758	
180 minute winter	S278 Storage	35.000	S278 S6	-33.3	-0.838	-0.795	0.2440	
15 minute winter	S278 S6	35.001	S278 S7	8.6	0.742	0.217	0.4545	
15 minute winter	S278 S7	Hydro-Brake®	S278 S8	4.0				
15 minute winter	S278 S8	35.003	50	28.2	1.135	0.566	0.8979	
15 minute winter	50	35.004	49	-123.4	-1.753	-1.368	1.3307	
15 minute winter	Spur 35	36.000	49	46.6	2.648	2.631	0.1908	
15 minute winter	Spur 27	37.000	49	118.4	2.976	2.976	0.4254	
15 minute winter	49	35.005	48	180.8	1.119	0.752	5.9141	
15 minute winter	48	35.006	47	202.4	0.990	0.838	11.1957	
15 minute winter	Spur 36	38.000	47	129.3	3.252	3.237	0.3280	
15 minute winter	Spur 28	39.000	47	159.1	4.001	3.997	0.3236	
15 minute winter	47	35.007	46	426.5	0.969	0.693	15.4650	
15 minute winter	Spur 29	40.000	46	49.8	2.831	2.817	0.1932	
15 minute winter	Spur 37	41.000	46	35.4	2.009	1.990	0.1369	
15 minute winter	46	35.008	45	497.8	1.131	0.896	9.2610	
15 minute winter	Spur 38	42.000	45	100.3	2.522	2.506	0.3937	

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Results for 100 year +65% CC Critical Storm Duration. Lowest mass balance: 89.74%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	45	13	5.787	3.140	602.3	8.4855	0.0000	SURCHARGED
15 minute winter	Spur 30	13	5.895	1.025	225.5	5.1763	0.0000	SURCHARGED
15 minute winter	44	13	5.726	3.104	801.6	8.3782	0.0000	SURCHARGED
15 minute winter	Spur 31	10	5.905	0.655	47.9	0.8689	0.0000	SURCHARGED
15 minute winter	43	13	5.549	2.990	824.8	8.0658	0.0000	SURCHARGED
15 minute winter	Spur 32	13	5.633	1.213	266.5	6.3474	0.0000	SURCHARGED
15 minute winter	42	13	5.350	2.853	1071.5	7.6998	0.0000	SURCHARGED
15 minute winter	Spur 39	11	6.146	1.116	170.8	4.8729	0.0000	SURCHARGED
15 minute winter	41	13	5.180	2.701	1226.8	7.2897	0.0000	SURCHARGED
15 minute winter	40	13	5.008	2.594	1216.4	7.0272	0.0000	SURCHARGED
15 minute winter	Spur 33	13	5.064	0.954	246.0	5.0256	0.0000	SURCHARGED
15 minute winter	39	13	4.885	2.502	1430.5	6.3676	0.0000	SURCHARGED
15 minute winter	38	13	4.729	2.375	3633.0	9.4427	0.0000	SURCHARGED
15 minute winter	37	13	4.583	2.263	3613.0	0.0000	0.0000	SURCHARGED
15 minute winter	36	13	4.476	2.208	3606.3	0.0000	0.0000	SURCHARGED
15 minute winter	Spur 34	13	4.457	1.341	184.5	7.8045	0.0000	FLOOD RISK
15 minute winter	35	13	4.317	2.089	3747.7	3.6915	0.0000	FLOOD RISK
15 minute winter	34	13	4.073	1.954	3648.1	3.4534	0.0000	SURCHARGED
15 minute winter	33	13	3.891	1.831	3630.7	3.2362	0.0000	SURCHARGED
15 minute winter	32	13	3.611	1.689	3631.4	2.9850	0.0000	FLOOD RISK
15 minute winter	31	13	3.529	1.629	3631.5	0.0000	0.0000	OK
10080 minute winter	8	9600	5.974	1.874	181.6	0.0000	0.0000	FLOOD RISK
10080 minute winter	7	9600	5.974	3.804	55.9	19.4250	0.0000	FLOOD RISK
8640 minute winter	6	6300	3.410	1.470	11.0	2.1039	0.0000	SURCHARGED
8640 minute winter	5	6300	3.410	1.510	11.1	0.0000	0.0000	OK
10080 minute winter	4	7500	3.407	1.707	294.8	0.0000	0.0000	SURCHARGED
10080 minute winter	3	7500	3.407	1.727	18.8	4.3954	0.0000	SURCHARGED
120 minute summer	2	108	2.149	0.739	13.3	0.8358	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	45	35.009	44	577.2	1.312	1.032	5.3211	
15 minute winter	Spur 30	43.000	44	221.4	3.144	3.105	0.4919	
15 minute winter	44	35.010	43	765.0	1.738	1.500	16.0935	
15 minute winter	Spur 31	44.000	43	46.1	2.619	2.603	0.1238	
15 minute winter	43	35.011	42	798.7	1.815	1.568	15.8716	
15 minute winter	Spur 32	45.000	42	259.1	3.680	3.638	0.6117	
15 minute winter	42	35.012	41	1052.8	2.392	2.092	4.7163	
15 minute winter	Spur 39	46.000	41	163.8	4.118	4.098	0.2781	
15 minute winter	41	35.013	40	1202.7	1.898	1.491	24.8585	
15 minute winter	40	35.014	39	1194.0	1.884	1.476	11.7901	
15 minute winter	Spur 33	47.000	39	241.2	3.426	3.399	0.4278	
15 minute winter	39	35.015	38	1431.0	2.258	1.755	10.8515	
15 minute winter	38	19.018	37	3613.0	2.534	1.543	29.0218	
15 minute winter	37	19.019	36	3606.3	2.529	1.547	44.7790	
15 minute winter	36	19.020	35	3595.7	2.522	1.532	34.0070	
15 minute winter	Spur 34	48.000	35	180.4	2.562	2.529	0.6945	
15 minute winter	35	19.021	34	3648.1	2.121	1.184	115.1814	
15 minute winter	34	19.022	33	3630.7	2.188	1.177	62.2049	
15 minute winter	33	19.023	32	3631.4	2.063	1.178	145.5374	
15 minute winter	32	19.024	31	3631.5	2.063	1.183	23.4056	
15 minute winter	31	Flow through pond	4	3868.9	0.639	0.022	2468.2571	
10080 minute winter	8	18.000	7	-45.8	-0.225	-0.028	17.8712	
10080 minute winter	7	Hydro-Brake®	6	11.1				
8640 minute winter	6	49.002	5	11.1	0.576	0.100	1.4199	
8640 minute winter	5	Flow through pond	4	225.3	0.049	0.001	9979.9131	
10080 minute winter	4	51.000	3	18.8	0.104	0.050	4.3173	
10080 minute winter	3	Hydro-Brake®	2	13.3				
120 minute summer	2	51.002	Ex Outfall	13.3	0.810	0.234	0.3660	

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Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 89.74%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
120 minute summer	Ex Outfall	108	2.140	0.840	13.3	0.9499	0.0000	FLOOD RISK
15 minute summer	Ex Ditch	1	2.133	0.880	12.2	0.0000	0.0000	OK
30 minute winter	126	21	6.830	3.742	2328.2	0.0000	0.0000	SURCHARGED
30 minute winter	127	20	7.066	3.327	1423.4	0.0000	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
120 minute summer	Ex Outfall	49.003	Ex Ditch	13.3	0.334	0.334	0.3179	238.3
30 minute winter	126	8.010	21	2343.2	2.030	1.282	19.5247	
30 minute winter	127	1.005	114	1321.4	1.599	0.728	19.8256	

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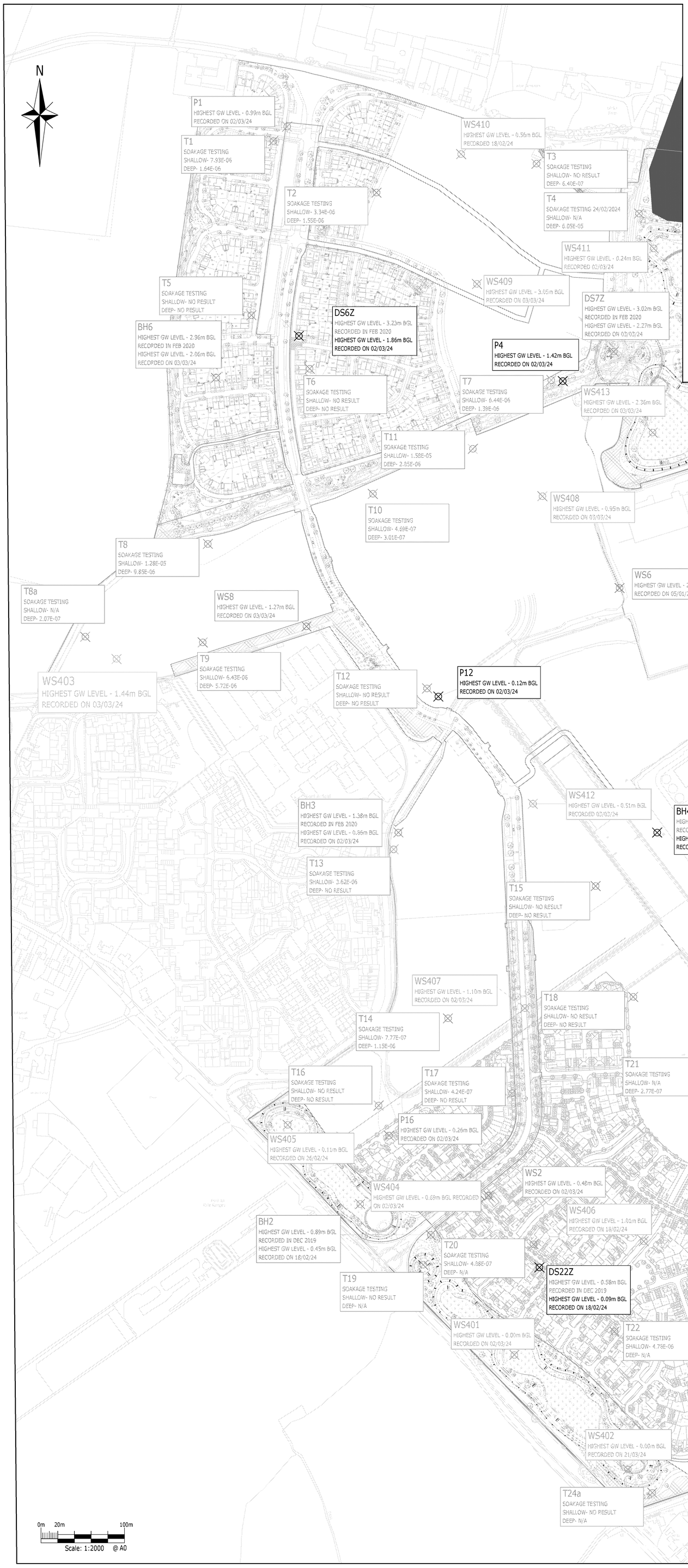

KEY

- INFRASTRUCTURE BOUNDARY
- INFILTRATION TESTING LOCATION
- GROUND WATER LOCATION - COLOUR MATCHES LATEST TEST CONDUCTED

GENERAL NOTES:

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE RELEVANT SPECIFICATION AND ALL OTHER RELATED DRAWINGS ISSUED BY THE ENGINEER.
2. DO NOT SCALE FROM THIS DRAWING, WORK FROM FIGURED DIMENSIONS ONLY.
3. ALL DIMENSIONS SHOWN ON THIS DRAWING ARE IN MILLIMETRES UNLESS OTHERWISE STATED.
4. ALL DIMENSIONS, LEVELS AND SURVEY GRID CO-ORDINATES ARE TO BE CHECKED ON SITE AND THE ENGINEER NOTIFIED IMMEDIATELY OF ANY DISCREPANCIES PRIOR TO THE COMMENCEMENT OF THE WORKS.
5. NO DEVIATION FROM THE DETAILS SHOWN ON THIS DRAWING IS PERMITTED WITHOUT PRIOR PERMISSION FROM THE ENGINEER.
6. ALL MATERIALS AND WORKMANSHIP SHALL COMPLY FULLY WITH THE MANUAL OF CONTRACT DOCUMENTS FOR HIGHWAY WORKS, VOLUME ONE, SPECIFICATION FOR HIGHWAY WORKS AND THE LOCAL AUTHORITY, WEST SUSSEX COUNTY COUNCIL SPECIFICATION FOR ROAD CONSTRUCTION AND STANDARD DETAILS.

INFILTRATION TESTING NOTES:

1. INFILTRATION RATES BASED ON RSK LETTER REPORT 29228 INF/01. INFILTRATION TESTING WAS CARRIED OUT IN FEBRUARY 2020.
2. INFILTRATION TESTING WAS CARRIED OUT IN ACCORDANCE WITH BRE365.
3. ALL INFILTRATION RATES ARE EXPRESSED IN M/S.
4. SHALLOW TRIAL PITS DUG TO DEPTHS BETWEEN 0.50m-0.8m; DEEP TRIAL PITS DUG TO DEPTHS BETWEEN 1.0-3.0m.

Rev	Description	Drn	Chk	App	Date

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Client
VISTRY SOUTH EAST

Project Title:
FORD AIRFIELD, ARUN

Drawing Title:
GROUNDWATER MONITORING AND INFILTRATION TESTING RESULTS

A0 Scale	Date	Designed by
AS SHOWN	25.11.2024	-
Drawn by	**Checked by**	**Approved by**
VL	AD	CC

Drawing Number 2205773-SK003 Rev -

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Ground Floor
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PO19 1RH

Lead Local Flood Authority

Jessica Riches
Planning and Building Control
Arun District Council
Arun Civic Centre
Maltravers Road
Littlehampton
West Sussex
BN17 5LF

Date 09 December 2024

Dear Jessica,

RE: **F/14/24/RES – Land at Ford Airfield, Ford, West Sussex**

Thank you for your re-consultation on the above site, received on 26 November 2024. We have reviewed the application as submitted and wish to make the following comments.

This is an application for the approval of Reserved Matters (layout, scale, appearance and landscaping) following outline consent F/4/20/OUT for the infrastructure RM including the provision of a primary spine road and associated secondary road junctions, pavement, footpaths, cycle infrastructure and bus stops; site wide drainage infrastructure including foul pumping stations, foul sewer infrastructure, SUDS basins, SUDS swales, surface water infrastructure; acoustic fencing; public open space including landscape details, play areas, footpaths & associated works. This application affects a Public Right of Way, may affect the setting of a Listed Building and falls within CIL Zone 1 (Ford strategic site - zero rated).

We previously objected to this application in our response dated 30 October 2024, because there were elements of the Drainage Strategy which we were concerned with such as the proposed discharge rate and drainage calculations. As such, we considered that there was not sufficient space in the proposed layout for appropriate and sufficient drainage infrastructure.

The outline planning permission (F/4/20/OUT) includes a condition (condition 29) related to the submission of full details of the proposed surface water drainage scheme for each phase of the development. However, according to the LPA planning portal, condition 29 has not yet been discharged. This response therefore assumes that the condition is still to be discharged.

We have reviewed the Drainage Response (by Ardent, 13 November 2024, Ref. CC/2205771) and are pleased to see that several issues have been addressed. However we still have some concerns regarding the drainage calculations and layout.

We **maintain our objection** to this planning application in the absence of an acceptable Drainage Strategy relating to:

- The application is not in accordance with NPPF, PPG Flood risk and coastal change or policy in Arun Local Plan.

Reason
To prevent flooding in accordance with National Planning Policy Framework paragraph 173, 175 and 180 by ensuring the satisfactory management of local flood risk, surface water flow paths, storage and disposal of surface water from the site in a range of rainfall events and ensuring the SuDS proposed operates as designed for the lifetime of the development.

We will consider reviewing this objection if the issues highlighted below are adequately addressed:

1. *Infiltration testing (in accordance with BRE 365) is required in those locations where groundwater has been found to be sufficiently deep, such that a 1m buffer below the base of infiltration structures is achievable. Where infiltration is found to be viable, it should be used in accordance with the drainage hierarchy. This should then be reflected in updated drainage calculations. Further refined and site-specific groundwater monitoring is required to inform the design in these areas.*

   The applicant has provided evidence that infiltration is not feasible, therefore no further infiltration testing or groundwater monitoring is required. **No further information required.**

2. *The high groundwater levels will also need to be considered in detailed design of attenuation structures.1m buffer (finished level and water level)*

   The applicant has confirmed that the attenuation structures will be lined where required to take into account high groundwater levels. This information should be provided as part of the discharge of Condition 29 of the outline planning permission F/4/20/OUT, for full details of the proposed surface water drainage scheme. **No further information required.**

3. *Qbar rate is 2.42 l/s/ha. If discharging at over greenfield runoff rate, flood risk could increase elsewhere, therefore rates must only account for impermeable areas which will drain off-site.*

   The applicant has confirmed that the discharge rate for the northern part of the site will be reduced due to the existing outfall pipe size to below greenfield rates. We recommend that the updated proposed discharge rates are provided for each of the catchments as well as new drawings showing the extents of the basins. **We request that further information is provided.**

4. *Northern pond section is shown to be discharging c20l/s above Qbar at 70l/s? This infers potential flood risk. This must be reduced to actual Qbar.*

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5. *Details of any additional attenuation features required within parcels should seek to act as source control where feasible.*

   The Drainage Strategy is in accordance with the Outline Drainage Strategy. **No further information required.**

6. *Calculations showing 50% AEP rainfall event have shown no surcharge in the drainage network, also the 3.33% AEP rainfall event plus climate change does not flood outside the drainage network. These will require updating as necessary. Any areas which are shown to hold water should be clearly shown on plans.*

   The calculations provided show surcharging in the 50% AEP rainfall event and use a CV value of 0.75 in summer and 0.84 in winter. We recommend that updated calculations are provided for the 50% AEP rainfall event with no surcharge and the 3.33% AEP rainfall event plus climate change, using a CV value of 1 for both the northern and southern areas. **We request that further information is provided.**

7. *Easements 3m from the top of the bank on both sides of any watercourses and the basins are required for maintenance access. Off road parking for maintenance vehicles is also required. Updated plans should reflect these requirements and be sufficiently and clearly annotated.*

   The applicant has confirmed that this has been considered and will be made clear on updated plans. We recommend that the updated plans are provided at this stage. **We request that further information is provided.**

8. *There is potential for the development to be phased, therefore we suggest consideration is given to the requirement of a SuDS implementation plan to reflect how areas may drain independently in advance of further phases coming forward.*

   The applicant has confirmed how this will be considered. **No further information required.**

Informative:
We suggest that condition 29 is discharged prior to re-submission of reserved matters in order that an approved drainage strategy can be considered in relation to the proposed layout.
Structures within or any culverting of an ordinary watercourse requires consent from the appropriate authority, which in this instance is West Sussex County Council. It is advised

to discuss proposals for any work, permanent or temporary at an early stage of proposals.

Please note if the LPA decide to grant planning permission, we wish to be notified for our records should there be any subsequent surface water flooding that we may be required to investigate as a result of the new development.

Yours sincerely,

Flood Risk Management Team

[redacted]

Annex

The following documents have been reviewed, which have been submitted to support the application;

- Drainage Response, by Ardent, November 2024, Ref. CC/2205771.
- Drainage Technical Note 2205771 – R16-B by Ardent, August 2024.
- IRM Site Sections 2205771-D170, 171, 172 by Ardent, August 2024.

Ground Floor
Northleigh
County Hall
Chichester
West Sussex
PO19 1RH

Lead Local Flood Authority

Jessica Riches
Planning and Building Control
Arun District Council
Arun Civic Centre
Maltravers Road
Littlehampton
West Sussex
BN17 5LF

Date 09 December 2024

Dear Jessica,

RE: F/15/24/RES – Land at Ford Airfield, Ford, West Sussex

Thank you for your re-consultation on the above site, received on 26 November 2024. We have reviewed the application as submitted and wish to make the following comments.

This is an application for the approval of reserved matters (layout, scale, appearance and landscaping) following outline permission F/4/20/OUT for phase Reserved Matters 1 (North), for the erection of 340 No. residential dwellings plus associated roads, infrastructure, parking, landscaping, open space & play areas and associated works. This application affects a Public Right of Way, may affect the setting of a Listed Building and falls within CIL Zone 1 (Ford strategic site - zero rated).

We previously objected to this application in our response dated 30 October 2024, because there were elements of the Drainage Strategy which we were concerned with such as the proposed discharge rate and drainage calculations. As such, we considered that there was not sufficient space in the proposed layout for appropriate and sufficient drainage infrastructure.

The outline planning permission (F/4/20/OUT) includes a condition (condition 29) related to the submission of full details of the proposed surface water drainage scheme for each phase of the development. However, according to the LPA planning portal, condition 29 has not yet been discharged. This response therefore assumes that the condition is still to be discharged.

We have reviewed the Drainage Response (by Ardent, 13 November 2024, Ref. CC/2205771) and are pleased to see that several issues have been addressed. However we still have some concerns regarding the drainage calculations and layout.

We **maintain our objection** to this planning application in the absence of an acceptable Drainage Strategy relating to:

- The application is not in accordance with NPPF, PPG Flood risk and coastal change or policy in Arun Local Plan.

Reason
To prevent flooding in accordance with National Planning Policy Framework paragraph 173, 175 and 180 by ensuring the satisfactory management of local flood risk, surface water flow paths, storage and disposal of surface water from the site in a range of rainfall events and ensuring the SuDS proposed operates as designed for the lifetime of the development.

We will consider reviewing this objection if the issues highlighted below are adequately addressed:

1. *Infiltration testing (in accordance with BRE 365) is required in those locations where groundwater has been found to be sufficiently deep, such that a 1m buffer below the base of infiltration structures is achievable. Where infiltration is found to be viable, it should be used in accordance with the drainage hierarchy. This should then be reflected in updated drainage calculations. Further refined and site-specific groundwater monitoring is required to inform the design in these areas.*

   The applicant has provided evidence that infiltration is not feasible, therefore no further infiltration testing or groundwater monitoring is required. **No further information required.**

2. *The high groundwater levels will also need to be considered in detailed design of attenuation structures.1m buffer (finished level and water level)*

   The applicant has confirmed that the attenuation structures will be lined where required to take into account high groundwater levels. This information should be provided as part of the discharge of Condition 29 of the outline planning permission F/4/20/OUT, for full details of the proposed surface water drainage scheme. **No further information required.**

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