

Land at Dalefield Way (West) Gravesend

Drainage Calculation (Planning Condition 7 Submission)

O'Halloran & O'Brien Ltd

Status: Information
Revision: Rev 00

Project No.: 24054_WP01
Date: February 2026

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1.0 Introduction

Manhire Associates have been appointed by O'Halloran & O'Brien Ltd to prepare a Surface Water Drainage Design in support of discharge of condition 7 of planning permission 2025/0596.

The site is located on Dalefield Way, Gravesend, Kent DA12 2JH in an area known as Dalefield Way Industrial Estate. Permission was granted on 23 January 2026 by Gravesham Borough Council for the construction of 1615m² of asphalt surfacing and associated drainage that will connect into the overall SuDS system already constructed and 10923m² of permeable hardstanding for storage.

Figure 1 below shows the site boundary in red.



Figure 1 - Aerial Image of site.

2.0 Review of Condition

Condition 7 of the approved permission states

“Prior to the addition of the final surfacing, a detailed sustainable surface water drainage scheme for the site shall be submitted to and approved in writing by the Local Planning Authority. The detailed drainage scheme shall be based upon the design principles detailed within the Flood Risk Assessment (24054_WP01-Revision 3). The submitted scheme shall demonstrate compliance with the required technical standards at the time of submission and shall demonstrate that the surface water generated by this development (for all rainfall durations and intensities up to and including the climate change adjusted critical 100 year storm) can be accommodated and disposed of without increase to flood risk on or off-site.

The drainage scheme shall also demonstrate (with reference to published guidance):

- that silt and pollutants resulting from the site use can be adequately managed to ensure there is no pollution risk to receiving waters.*
- appropriate operational, maintenance and access requirements for each drainage feature or SuDS component are adequately considered, including any proposed arrangements for future adoption by any public body or statutory undertaker.*

The drainage scheme shall be implemented in accordance with the approved details”

3.0 Proposed Drainage Design

The approved development consists of 1615m² impermeable hardstanding and 10923m² of permeable hardstanding. The approved drainage strategy considered the SuDS hierarchy and permeable construction of the tarmac hard standing was considered the most suitable method of discharging runoff.

The paving will be lined to prevent infiltration as per the requirement of condition 6 and have a restricted discharge to the adjacent ditch. The 1615m² of tarmac area will be positively drained through the permeable surface, the gravel subbase will provide attenuation of the runoff from a storm event with a probability of 1 in 100 years plus allowance of 20% for climate changes. The proposed permeable paved areas are shown on drawing PSK802 included in Appendix A.

The greenfield discharge rate from the site was estimated at 0.5 l/sec. it is not possible to restrict the discharge to such a low rate so a rate 3.75 l/sec was approved as part of the planning consent.

The drainage strategy considered impacts of climate change on the development, the site is a less vulnerable use with a life expectancy of 50 years, the PPG guidance recommends the use of the central allowance for the 2070s epoch for development with a lifetime up to 2100. The site is located in the Medway Management Catchment so a climate change allowance of 20% should be factored into the drainage design for a 3.3% and 1% annual exceedance rainfall event.

The permeable paving subbase thickness has been set at 400mm thick, this will accommodate a 1 in 100 year storm event plus 20% allowance for climate change, to accommodate a 1 in 100 year storm event plus 20% allowance for climate change.

The remainder of the site will be open storage but will have similar hardstanding to that existing on site so there will be no change to the current drainage regime for this area of 10923m².

Drawing 24054-MAN-00-DR-PK-00-00353 shows the proposed drainage and is included in Appendix B. The full supporting calculations are also included in Appendix C.

The water quality of the runoff from the development will receive treatment through the use of permeable paving and petrol interceptor. Section 26 of SuDS Manual C753, focuses on the assessment of pollution hazard indices and verification that the proposed SuDS treatment train delivers the necessary level of treatment in accordance with the Manual.

The SuDS Manual introduces the concept of pollution hazard indices to assess the potential risk to water quality from different land uses and site activities. Each land use is assigned hazard indices for three pollutant categories:

- Suspended solids
- Metals
- Hydrocarbons

For the proposed development of open storage area is considered under the SuDS manual to present a medium pollution hazard. The hazard indices should be determined by referencing Table 26.2 in the SuDS Manual, which provides guidance for various land uses. A medium risk hazard is considered to have indices of 0.7 for suspended solids, 0.6 for metals, and 0.7 for hydrocarbons.

According to the SuDS Manual, permeable pavements are effective at removing pollutants through filtration, sedimentation, and microbial breakdown within the sub-base and geotextile layers. The treatment performance of permeable pavements is typically summarised by their "SuDS mitigation indices," which should be compared against the pollution hazard indices for the site.

As per Table 26.3 in the SuDS Manual C753, the mitigation indices for a well-designed and maintained permeable pavement are generally:

- Suspended solids: 0.7
- Metals: 0.6
- Hydrocarbons: 0.7

These values indicate that the permeable pavement provides a level of treatment that meets or exceeds the pollution hazard indices for medium-risk. The proposals will provide an adequate level of treatment from medium risk areas, however a petrol interceptor will also be incorporated in the treatment train as well in case of spillage to provide additional protection.

Regular inspection of the surface water drainage network for blockages and clearing unwanted debris/silt from the system should improve the performance of the surface water network and decrease the need for future repairs. In the event of blockages, high pressure water jets can be used to clear the gullies and pipes to ensure they are functioning correctly, this should be undertaken by certified trained professionals.

The level and frequency of maintenance required on site is dependent on the type of facility. The type of maintenance will fall into one of three categories "regular maintenance", "occasional maintenance", and "remedial maintenance".

Regular Maintenance of the drainage and SuDS features will include, inspections, removal of litter/debris and sweeping of the surfaces. Occasional maintenance will include removal of sediment etc. and remedial maintenance may include structural repairs and infiltration reconditioning if required.

The drainage and SuDS elements after an initial inspection following construction should be inspected on a monthly basis for the first 12 months and after large storms, thereafter the following maintenance regime should be applied and adjusted if the 12-month monitoring process has identified any issues.

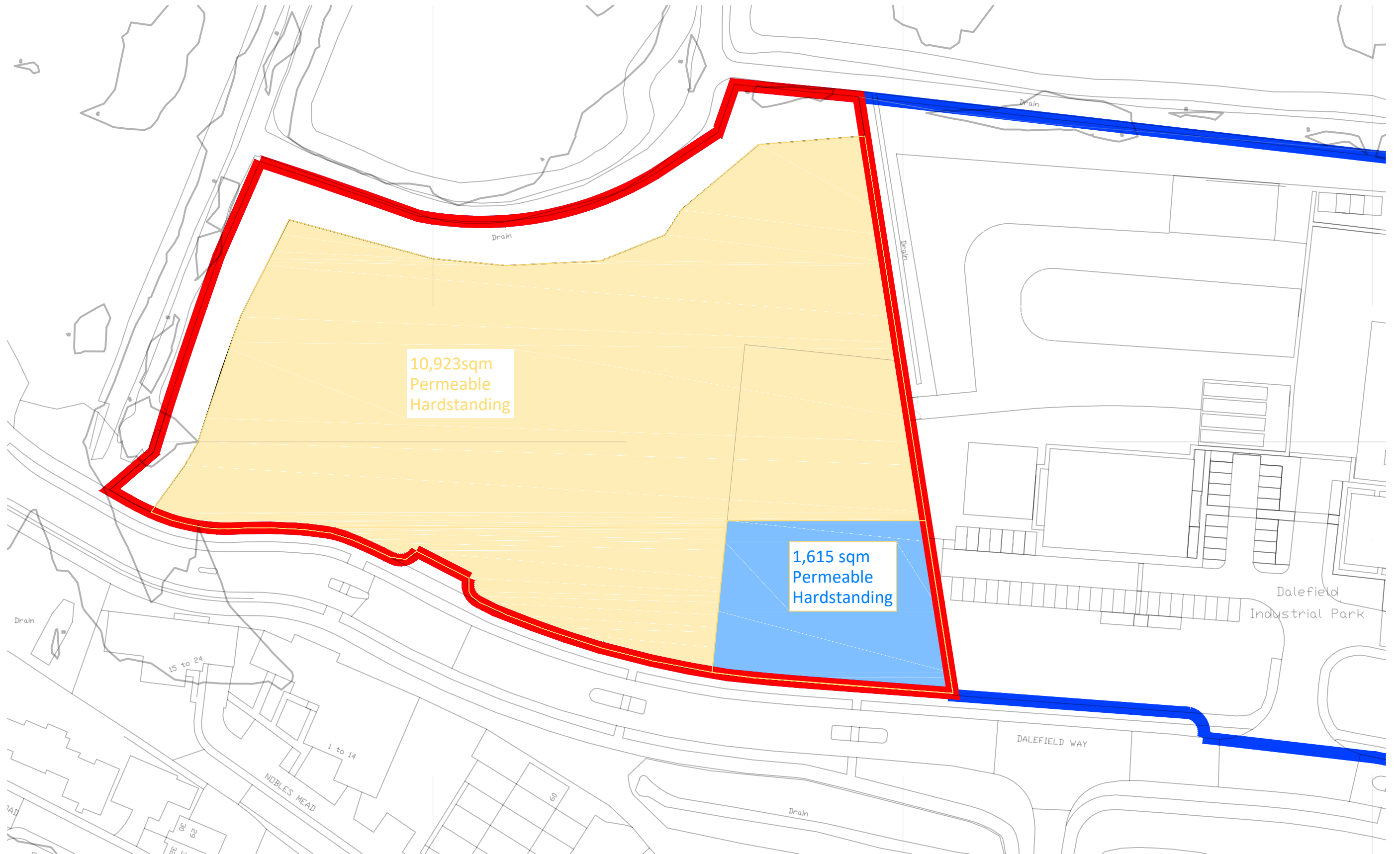
Permeable Paving

For permeable paving areas, the following maintenance is recommended.

Permeable Paving Maintenance Schedule		
	Required Action	Typical Frequency
Regular maintenance	Remove debris and leaves etc.	Once a year, after autumn leaf fall, or reduced frequency as required, based on site-specific observations of clogging or manufacturer's recommendations – pay particular attention to areas where water runs onto pervious surfaces from adjacent impermeable areas as this area is most likely to collect the most sediment.
Occasional maintenance	Stabilise and mow contributing and adjacent areas	As required
	Removal of weeds	As required- once per year on less frequently used pavements
Remedial Actions	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50 mm of the level of the paving	As required
	Remedial work to any depressions, rutting etc	As required
	Rehabilitation of surface and upper substructure	Every 10 to 15 years or as required (if infiltration performance is reduced due to significant clogging)
Monitoring	Inspect for evidence of poor operation and/or weed growth - if required, take remedial action.	Three-monthly, 48 hours after large storms in the first six months
	Inspect silt accumulation rates and establish appropriate frequencies for rehabilitation	Annually
	Monitor inspection chambers	Annually

Table 1 Permeable Paving Maintenance Schedule

Appendix A – Proposed Site Area Plan



Manhire Associates
CONSULTING ENGINEERS

Manhire Associates Limited
Consulting Engineers
50 Kingston Road, New Malden
Surrey, KT3 3LZ

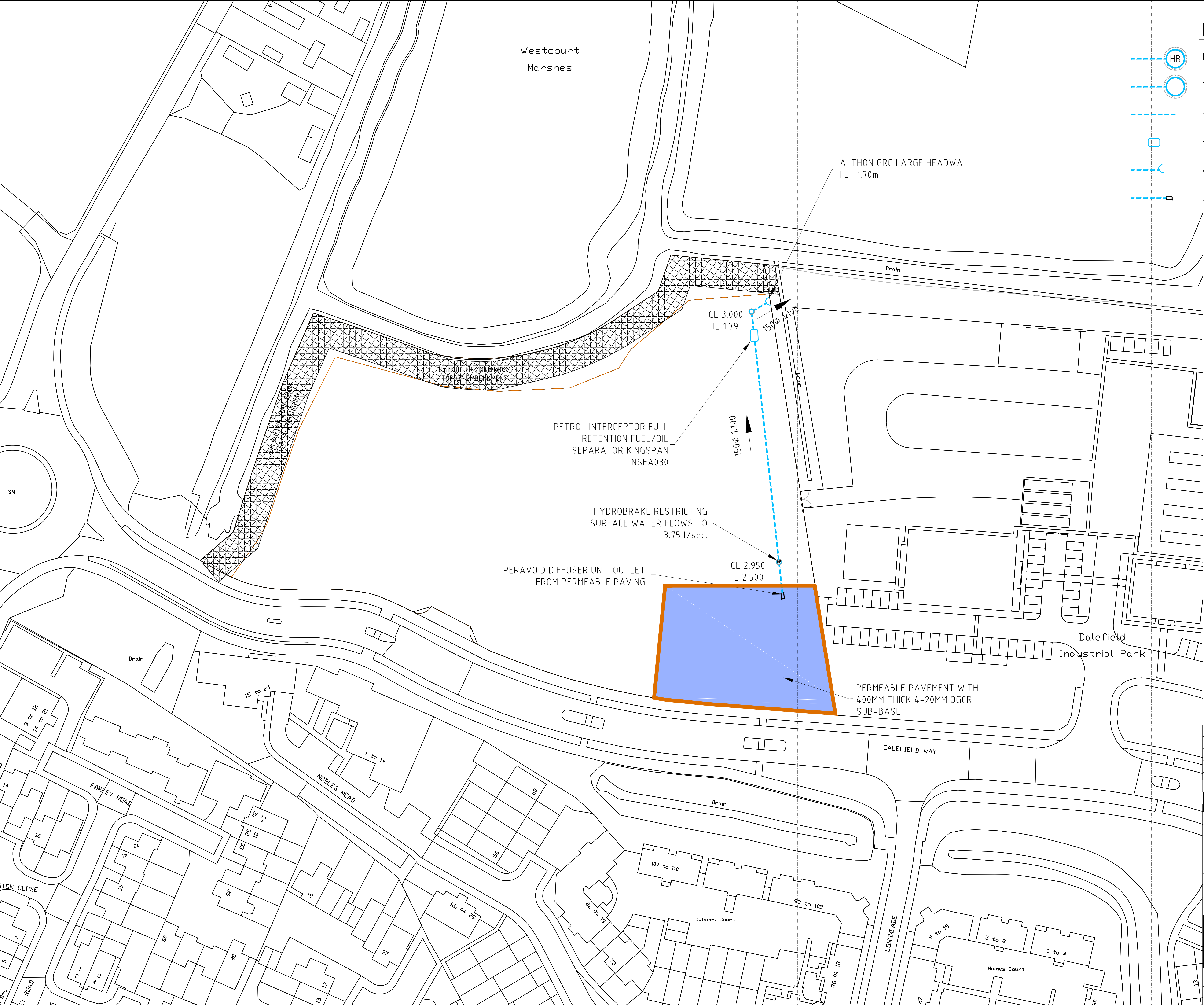
T: +44 20 8390 9097
E: enquiries@manhireassociates.co.uk

NOTES

REV	DATE	DESCRIPTION	BY

PROJECT	LAND AT DALEFIELD WAY (WEST) GRAVESEND				PROJECT NO 24054	
	TITLE PROPOSED HARDSTANDING AREAS				DRG NO PSK802	DATE DEC 25 REV 01
BY GMC		CHK -				

Appendix B – Proposed Drainage Layout



LEGEND

- HB PROPOSED HYDROBRAKE
- PRIVATE P.C.C. RING MANHOLE FOUL (TYPE A)
- PRIVATE 150mm PVC PIPE
- KINGSPAN NSFA03 PETROL INTERCEPTOR
- ALTHON GRC HEADWALL
- DIFFUSER UNIT

C1	29/1/26	FOR CONSTRUCTION	KL
REV	DATE	DESCRIPTION	BY
DRG STATUS FOR CONSTRUCTION			
CLIENT Keady Construction			
PROJECT LAND AT DALEFIELD WAY (WEST) GRAVESEND			
DRG TITLE TECHNICAL LAYOUT			
Manhire Associates CONSULTING ENGINEERS Manhire Associates Limited Consulting Engineers 50 Kingston Road, New Malden Surrey, KT3 3LZ T: +44 20 8390 9097 E: enquiries@manhireassociates.co.uk			
PROJECT NO	24054	SCALE	1:500
DRN	KL	DATE	JAN-26
REV			
DRG NO 24054-MAN-00-DR-PL-00-0353			
C1			

Appendix C – Drainage Calculations

Network Details

Manhole Schedule

Manhole	Catchment Area (ha)	Diameter (m)	Type	CL (m)	IL (m)	Depth To Soffit (m)	Easting (m)	Northing (m)
S1	0.162	1.350	Type C	3.600	3.070	0.380	566895.708	173581.189
S2	0.000	1.350	Type C	3.600	2.907	0.543	566896.673	173597.448
S3	0.000	1.350	Type C	2.600	1.700	0.750	566902.398	173611.385

Pipe Schedule

Pipe Number	US Manhole	US IL (m)	DS Manhole	DS IL (m)	Shape	Dimension (m)	Length (m)	Gradient (1:x)	Roughness (mm)	US Depth To Soffit (m)	DS Depth To Soffit (m)
1.000	S1	3.070	S2	2.907	Circ	0.15mØ	16.288	99.9	0.600	0.380	0.543
1.001	S2	2.907	S3	1.700	Circ	0.15mØ	15.067	12.5	0.600	0.543	0.750

Permeable Paving Schedule

Permeable Paving	Assigned Manhole	Effective Storage Volume (m3)	CL (m)	IL (m)	Storage Infil Rate (m/hr)	Safety Factor	Easting (m)	Northing (m)
Permeable Paving1	S1	258.607	3.600	3.070	0.00000000	2.00	566889.548	173565.726

Outfall Details

Outfall Manhole S3 : Free Discharge

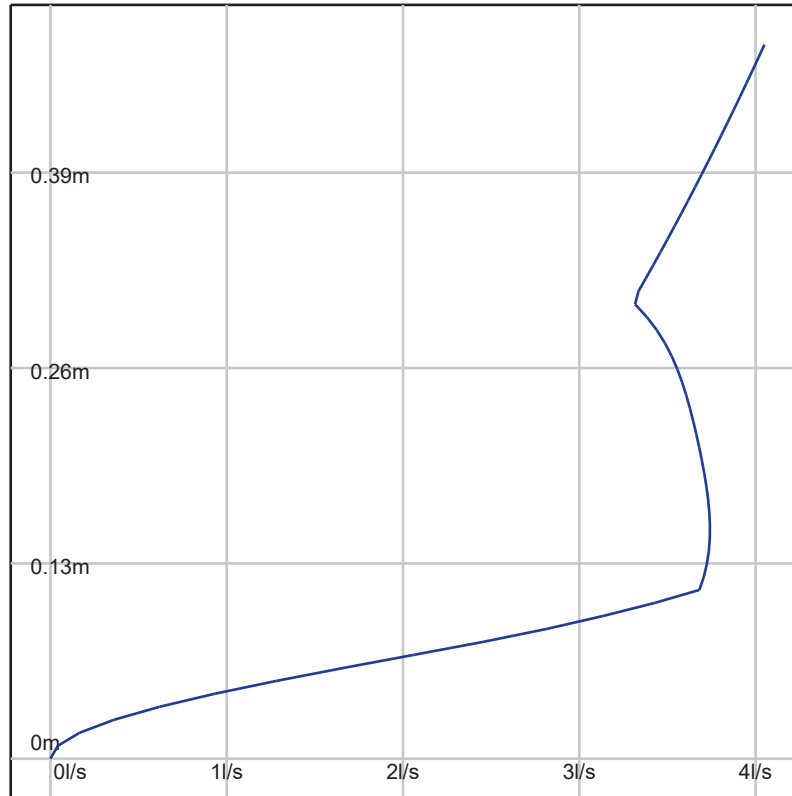
Flow Control Details

Controls within Manhole S2

Hydro-Brake® Optimum Control at Manhole S2

Model Ref	Design Depth (m)	Design Flow (l/s)	Depth Above Invert (m)	FF Head (m)	FF Flow (l/s)	KF Head (m)	KF Flow (l/s)
SHE-0100-3750-0400-3750	0.400	3.750	0.000	0.152	3.741	0.304	3.300

Hydro-Brake® Optimum Control at S2



Simulation Settings

FEH2022 (point): Filename=FEH_Point_Descriptors_566811_173616_v5_1_0.xml

Summer (Cv: 1.00), Winter (Cv: 1.00)

Global Time of Entry: 5.0 mins

Durations (mins): 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080

Return Periods (yrs) + Climate Change: (1, +0%), (10, +0%), (30, +0%), (30, +20%), (100, +0%), (100, +20%)

Simulated Rainfall Events

Storm	Average Intensity (mm/hr)	Runoff Continuity %	Flow Continuity %	Storm	Average Intensity (mm/hr)	Runoff Continuity %	Flow Continuity %
1Yr 15Min Winter	13.907	0.00	0.00	30Yr+20% 15Min Summer	91.817	0.00	0.00
1Yr 15Min Summer	13.907	0.00	0.00	30Yr+20% 15Min Winter	91.817	0.00	0.00
1Yr 30Min Winter	9.003	0.00	0.00	30Yr+20% 30Min Summer	59.608	0.00	0.00
1Yr 30Min Summer	9.003	0.00	0.00	30Yr+20% 30Min Winter	59.608	0.00	0.00
1Yr 60Min Winter	5.561	0.00	0.00	30Yr+20% 60Min Summer	36.866	0.00	0.00
1Yr 60Min Summer	5.561	0.00	0.00	30Yr+20% 60Min Winter	36.866	0.00	0.00
1Yr 120Min Summer	4.426	0.00	0.00	30Yr+20% 120Min Summer	22.376	0.00	0.00
1Yr 120Min Winter	4.426	0.00	0.00	30Yr+20% 120Min Winter	22.376	0.00	0.00
1Yr 180Min Winter	3.771	0.00	0.00	30Yr+20% 180Min Summer	16.610	0.00	0.00
1Yr 180Min Summer	3.771	0.00	0.00	30Yr+20% 180Min Winter	16.610	0.00	0.00
1Yr 240Min Summer	3.144	0.00	0.00	30Yr+20% 240Min Summer	13.384	0.00	0.00
1Yr 240Min Winter	3.144	0.00	0.00	30Yr+20% 240Min Winter	13.384	0.00	0.00
1Yr 360Min Summer	2.447	0.00	0.00	30Yr+20% 360Min Summer	9.856	0.00	0.00
1Yr 360Min Winter	2.447	0.00	0.00	30Yr+20% 360Min Winter	9.856	0.00	0.00
1Yr 480Min Summer	2.029	0.00	0.00	30Yr+20% 480Min Summer	7.935	0.00	0.00
1Yr 480Min Winter	2.029	0.00	0.00	30Yr+20% 480Min Winter	7.935	0.00	0.00
1Yr 600Min Summer	1.727	0.00	0.00	30Yr+20% 600Min Summer	6.702	0.00	0.00
1Yr 600Min Winter	1.727	0.00	0.00	30Yr+20% 600Min Winter	6.702	0.00	0.00
1Yr 720Min Summer	1.502	0.00	0.00	30Yr+20% 720Min Summer	5.835	0.00	0.00
1Yr 720Min Winter	1.502	0.00	0.00	30Yr+20% 720Min Winter	5.835	0.00	0.00
1Yr 960Min Summer	1.210	0.00	0.00	30Yr+20% 960Min Summer	4.698	0.00	0.00
1Yr 960Min Winter	1.210	0.00	0.00	30Yr+20% 960Min Winter	4.698	0.00	0.00
1Yr 1440Min Winter	0.892	0.00	0.00	30Yr+20% 1440Min Summer	3.461	0.00	0.00
1Yr 1440Min Summer	0.892	0.00	0.00	30Yr+20% 1440Min Winter	3.461	0.00	0.00
1Yr 2160Min Summer	0.657	0.00	0.00	30Yr+20% 2160Min Summer	2.543	0.00	0.00
1Yr 2160Min Winter	0.657	0.00	0.00	30Yr+20% 2160Min Winter	2.543	0.00	0.00
1Yr 2880Min Summer	0.531	0.00	0.00	30Yr+20% 2880Min Summer	2.034	0.00	0.00
1Yr 2880Min Winter	0.531	0.00	0.00	30Yr+20% 2880Min Winter	2.034	0.00	0.00
1Yr 4320Min Summer	0.401	0.00	0.00	30Yr+20% 4320Min Summer	1.484	0.00	0.00
1Yr 4320Min Winter	0.401	0.00	0.00	30Yr+20% 4320Min Winter	1.484	0.00	0.00
1Yr 5760Min Summer	0.334	0.00	0.00	30Yr+20% 5760Min Summer	1.191	0.00	0.00
1Yr 5760Min Winter	0.334	0.00	0.00	30Yr+20% 5760Min Winter	1.191	0.00	0.00
1Yr 7200Min Summer	0.293	0.00	0.00	30Yr+20% 7200Min Summer	1.014	0.00	0.00
1Yr 7200Min Winter	0.293	0.00	0.00	30Yr+20% 7200Min Winter	1.014	0.00	0.00
1Yr 8640Min Summer	0.265	0.00	0.00	30Yr+20% 8640Min Summer	0.897	0.00	0.00
1Yr 8640Min Winter	0.265	0.00	0.00	30Yr+20% 8640Min Winter	0.897	0.00	0.00
1Yr 10080Min Summer	0.245	0.00	0.00	30Yr+20% 10080Min Summer	0.814	0.00	0.00
1Yr 10080Min Winter	0.245	0.00	0.00	30Yr+20% 10080Min Winter	0.814	0.00	0.00
10Yr 15Min Summer	58.140	0.00	0.00	100Yr 15Min Summer	98.007	0.00	0.00
10Yr 15Min Winter	58.140	0.00	0.00	100Yr 15Min Winter	98.007	0.00	0.00
10Yr 30Min Summer	37.385	0.00	0.00	100Yr 30Min Summer	64.152	0.00	0.00
10Yr 30Min Winter	37.385	0.00	0.00	100Yr 30Min Winter	64.152	0.00	0.00
10Yr 60Min Summer	23.009	0.00	0.00	100Yr 60Min Summer	39.969	0.00	0.00
10Yr 60Min Winter	23.009	0.00	0.00	100Yr 60Min Winter	39.969	0.00	0.00
10Yr 120Min Summer	14.366	0.00	0.00	100Yr 120Min Summer	24.020	0.00	0.00
10Yr 120Min Winter	14.366	0.00	0.00	100Yr 120Min Winter	24.020	0.00	0.00
10Yr 180Min Summer	10.807	0.00	0.00	100Yr 180Min Summer	17.819	0.00	0.00
10Yr 180Min Winter	10.807	0.00	0.00	100Yr 180Min Winter	17.819	0.00	0.00
10Yr 240Min Summer	8.689	0.00	0.00	100Yr 240Min Summer	14.457	0.00	0.00
10Yr 240Min Winter	8.689	0.00	0.00	100Yr 240Min Winter	14.457	0.00	0.00
10Yr 360Min Summer	6.397	0.00	0.00	100Yr 360Min Summer	10.809	0.00	0.00
10Yr 360Min Winter	6.397	0.00	0.00	100Yr 360Min Winter	10.809	0.00	0.00
10Yr 480Min Summer	5.138	0.00	0.00	100Yr 480Min Summer	8.829	0.00	0.00
10Yr 480Min Winter	5.138	0.00	0.00	100Yr 480Min Winter	8.829	0.00	0.00
10Yr 600Min Summer	4.315	0.00	0.00	100Yr 600Min Summer	7.555	0.00	0.00

Simulated Rainfall Events

Storm	Average Intensity (mm/hr)	Runoff Continuity %	Flow Continuity %	Storm	Average Intensity (mm/hr)	Runoff Continuity %	Flow Continuity %
10Yr 600Min Winter	4.315	0.00	0.00	100Yr 600Min Winter	7.555	0.00	0.00
10Yr 720Min Summer	3.733	0.00	0.00	100Yr 720Min Summer	6.651	0.00	0.00
10Yr 720Min Winter	3.733	0.00	0.00	100Yr 720Min Winter	6.651	0.00	0.00
10Yr 960Min Summer	2.978	0.00	0.00	100Yr 960Min Summer	5.430	0.00	0.00
10Yr 960Min Winter	2.978	0.00	0.00	100Yr 960Min Winter	5.430	0.00	0.00
10Yr 1440Min Summer	2.171	0.00	0.00	100Yr 1440Min Summer	4.033	0.00	0.00
10Yr 1440Min Winter	2.171	0.00	0.00	100Yr 1440Min Winter	4.033	0.00	0.00
10Yr 2160Min Summer	1.588	0.00	0.00	100Yr 2160Min Summer	2.951	0.00	0.00
10Yr 2160Min Winter	1.588	0.00	0.00	100Yr 2160Min Winter	2.951	0.00	0.00
10Yr 2880Min Summer	1.274	0.00	0.00	100Yr 2880Min Summer	2.336	0.00	0.00
10Yr 2880Min Winter	1.274	0.00	0.00	100Yr 2880Min Winter	2.336	0.00	0.00
10Yr 4320Min Summer	0.947	0.00	0.00	100Yr 4320Min Summer	1.661	0.00	0.00
10Yr 4320Min Winter	0.947	0.00	0.00	100Yr 4320Min Winter	1.661	0.00	0.00
10Yr 5760Min Summer	0.776	0.00	0.00	100Yr 5760Min Summer	1.298	0.00	0.00
10Yr 5760Min Winter	0.776	0.00	0.00	100Yr 5760Min Winter	1.298	0.00	0.00
10Yr 7200Min Summer	0.671	0.00	0.00	100Yr 7200Min Summer	1.080	0.00	0.00
10Yr 7200Min Winter	0.671	0.00	0.00	100Yr 7200Min Winter	1.080	0.00	0.00
10Yr 8640Min Summer	0.601	0.00	0.00	100Yr 8640Min Summer	0.936	0.00	0.00
10Yr 8640Min Winter	0.601	0.00	0.00	100Yr 8640Min Winter	0.936	0.00	0.00
10Yr 10080Min Winter	0.550	0.00	0.00	100Yr 10080Min Summer	0.835	0.00	0.00
10Yr 10080Min Summer	0.550	0.00	0.00	100Yr 10080Min Winter	0.835	0.00	0.00
30Yr 15Min Summer	76.514	0.00	0.00	100Yr+20% 15Min Summer	117.609	0.00	0.00
30Yr 15Min Winter	76.514	0.00	0.00	100Yr+20% 15Min Winter	117.609	0.00	0.00
30Yr 30Min Summer	49.673	0.00	0.00	100Yr+20% 30Min Summer	76.982	0.00	0.00
30Yr 30Min Winter	49.673	0.00	0.00	100Yr+20% 30Min Winter	76.982	0.00	0.00
30Yr 60Min Summer	30.722	0.00	0.00	100Yr+20% 60Min Summer	47.962	0.00	0.00
30Yr 60Min Winter	30.722	0.00	0.00	100Yr+20% 60Min Winter	47.962	0.00	0.00
30Yr 120Min Summer	18.646	0.00	0.00	100Yr+20% 120Min Summer	28.824	0.00	0.00
30Yr 120Min Winter	18.646	0.00	0.00	100Yr+20% 120Min Winter	28.824	0.00	0.00
30Yr 180Min Summer	13.842	0.00	0.00	100Yr+20% 180Min Summer	21.383	0.00	0.00
30Yr 180Min Winter	13.842	0.00	0.00	100Yr+20% 180Min Winter	21.383	0.00	0.00
30Yr 240Min Summer	11.154	0.00	0.00	100Yr+20% 240Min Summer	17.348	0.00	0.00
30Yr 240Min Winter	11.154	0.00	0.00	100Yr+20% 240Min Winter	17.348	0.00	0.00
30Yr 360Min Summer	8.213	0.00	0.00	100Yr+20% 360Min Summer	12.971	0.00	0.00
30Yr 360Min Winter	8.213	0.00	0.00	100Yr+20% 360Min Winter	12.971	0.00	0.00
30Yr 480Min Summer	6.612	0.00	0.00	100Yr+20% 480Min Summer	10.595	0.00	0.00
30Yr 480Min Winter	6.612	0.00	0.00	100Yr+20% 480Min Winter	10.595	0.00	0.00
30Yr 600Min Summer	5.585	0.00	0.00	100Yr+20% 600Min Summer	9.067	0.00	0.00
30Yr 600Min Winter	5.585	0.00	0.00	100Yr+20% 600Min Winter	9.067	0.00	0.00
30Yr 720Min Summer	4.862	0.00	0.00	100Yr+20% 720Min Summer	7.981	0.00	0.00
30Yr 720Min Winter	4.862	0.00	0.00	100Yr+20% 720Min Winter	7.981	0.00	0.00
30Yr 960Min Winter	3.915	0.00	0.00	100Yr+20% 960Min Summer	6.516	0.00	0.00
30Yr 960Min Summer	3.915	0.00	0.00	100Yr+20% 960Min Winter	6.516	0.00	0.00
30Yr 1440Min Summer	2.884	0.00	0.00	100Yr+20% 1440Min Summer	4.840	0.00	0.00
30Yr 1440Min Winter	2.884	0.00	0.00	100Yr+20% 1440Min Winter	4.840	0.00	0.00
30Yr 2160Min Summer	2.119	0.00	0.00	100Yr+20% 2160Min Summer	3.541	0.00	0.00
30Yr 2160Min Winter	2.119	0.00	0.00	100Yr+20% 2160Min Winter	3.541	0.00	0.00
30Yr 2880Min Summer	1.695	0.00	0.00	100Yr+20% 2880Min Summer	2.803	0.00	0.00
30Yr 2880Min Winter	1.695	0.00	0.00	100Yr+20% 2880Min Winter	2.803	0.00	0.00
30Yr 4320Min Summer	1.237	0.00	0.00	100Yr+20% 4320Min Summer	1.993	0.00	0.00
30Yr 4320Min Winter	1.237	0.00	0.00	100Yr+20% 4320Min Winter	1.993	0.00	0.00
30Yr 5760Min Summer	0.992	0.00	0.00	100Yr+20% 5760Min Summer	1.558	0.00	0.00
30Yr 5760Min Winter	0.992	0.00	0.00	100Yr+20% 5760Min Winter	1.558	0.00	0.00
30Yr 7200Min Summer	0.845	0.00	0.00	100Yr+20% 7200Min Summer	1.296	0.00	0.00
30Yr 7200Min Winter	0.845	0.00	0.00	100Yr+20% 7200Min Winter	1.296	0.00	0.00
30Yr 8640Min Summer	0.748	0.00	0.00	100Yr+20% 8640Min Summer	1.124	0.00	0.00
30Yr 8640Min Winter	0.748	0.00	0.00	100Yr+20% 8640Min Winter	1.124	0.00	0.00
30Yr 10080Min Summer	0.678	0.00	0.00	100Yr+20% 10080Min Winter	1.002	0.00	0.00
30Yr 10080Min Winter	0.678	0.00	0.00	100Yr+20% 10080Min Summer	1.002	0.00	0.00

Simulation Results

Return Period Yrs: 1.0

Climate Change %: 0

Manholes

Manhole	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Status
S1	2160 min Summer	1312	3.086	0.016	0.444		OK
S2	2160 min Summer	1313	2.946	0.039	0.444		OK
S3	2160 min Summer	1314	1.710	0.010	0.444		Outfall

Conduits

Pipe No.	Critical Storm	Peak (mins)	US Manhole	DS Manhole	Flow Depth (m)	Max Velocity (m/s)	Max Flow (l/s)	Flow / Capacity	Status
1.000	2160 min Summer	1313	S1	S2	0.027	0.201	0.444	0.025	OK
1.001	2160 min Summer	1314	S2	S3	0.010	0.884	0.444	0.009	OK

Permeable Paving Storage

Permeable Paving	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Status
Permeable Paving1	2160 min Summer	1311	3.095	0.025	0.444		OK

Return Period Yrs: 10.0

Climate Change %: 0

Manholes

Manhole	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Status
S1	600 min Summer	390	3.103	0.033	1.894		OK
S2	600 min Summer	392	2.992	0.085	1.894		OK
S3	600 min Summer	392	1.720	0.020	1.894		Outfall

Conduits

Pipe No.	Critical Storm	Peak (mins)	US Manhole	DS Manhole	Flow Depth (m)	Max Velocity (m/s)	Max Flow (l/s)	Flow / Capacity	Status
1.000	600 min Summer	391	S1	S2	0.059	0.293	1.894	0.107	OK
1.001	600 min Summer	392	S2	S3	0.020	1.373	1.894	0.037	OK

Permeable Paving Storage

Permeable Paving	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Status
Permeable Paving1	600 min Summer	390	3.132	0.062	1.896		OK

Return Period Yrs: 30.0

Climate Change %: 0

Manholes

Manhole	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Status
S1	600 min Summer	383	3.110	0.040	2.792		OK
S2	600 min Summer	384	3.017	0.110	2.792		OK
S3	600 min Summer	384	1.724	0.024	2.792		Outfall

Conduits

Pipe No.	Critical Storm	Peak (mins)	US Manhole	DS Manhole	Flow Depth (m)	Max Velocity (m/s)	Max Flow (l/s)	Flow / Capacity	Status
1.000	600 min Summer	384	S1	S2	0.075	0.317	2.792	0.157	OK
1.001	600 min Summer	384	S2	S3	0.024	1.543	2.792	0.055	OK

Permeable Paving Storage

Permeable Paving	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Status
Permeable Paving1	600 min Summer	383	3.149	0.079	2.767		OK

Return Period Yrs: 30.0

Climate Change %: 20

Manholes

Manhole	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Status
S1	480 min Summer	311	3.116	0.046	3.638		OK
S2	480 min Summer	312	3.045	0.138	3.638		OK
S3	480 min Summer	312	1.727	0.027	3.638		Outfall

Conduits

Pipe No.	Critical Storm	Peak (mins)	US Manhole	DS Manhole	Flow Depth (m)	Max Velocity (m/s)	Max Flow (l/s)	Flow / Capacity	Status
1.000	480 min Summer	312	S1	S2	0.092	0.324	3.638	0.205	OK
1.001	480 min Summer	312	S2	S3	0.027	1.669	3.638	0.072	OK

Permeable Paving Storage

Permeable Paving	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Status
Permeable Paving1	480 min Summer	310	3.164	0.094	3.668		OK

Return Period Yrs: 100.0

Climate Change %: 0

Manholes

Manhole	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Status
S1	720 min Summer	453	3.146	0.076	3.680		OK
S2	720 min Summer	453	3.142	0.235	3.680		Surcharged
S3	480 min Winter	414	1.727	0.027	3.741		Outfall

Conduits

Pipe No.	Critical Storm	Peak (mins)	US Manhole	DS Manhole	Flow Depth (m)	Max Velocity (m/s)	Max Flow (l/s)	Flow / Capacity	Status
1.000	720 min Summer	453	S1	S2	0.113	0.363	4.588	0.259	OK
1.001	480 min Winter	414	S2	S3	0.028	1.683	3.741	0.074	OK

Permeable Paving Storage

Permeable Paving	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Status
Permeable Paving1	720 min Summer	452	3.177	0.107	3.681		OK

Return Period Yrs: 100.0

Climate Change %: 20

Manholes

Manhole	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Status
S1	720 min Summer	466	3.173	0.103	3.625		OK
S2	720 min Summer	467	3.168	0.261	3.625		Surcharged
S3	360 min Summer	431	1.727	0.027	3.741		Outfall

Conduits

Pipe No.	Critical Storm	Peak (mins)	US Manhole	DS Manhole	Flow Depth (m)	Max Velocity (m/s)	Max Flow (l/s)	Flow / Capacity	Status
1.000	720 min Summer	466	S1	S2	0.127	0.367	4.640	0.262	OK
1.001	360 min Summer	431	S2	S3	0.028	1.683	3.741	0.074	OK

Permeable Paving Storage

Permeable Paving	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Status
Permeable Paving1	720 min Summer	465	3.203	0.133	3.631		OK